ASSOCIATIONS EXHIBIT NO. A-8

Exhibit No. A-8

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Inquiry Regarding the Commission's Policy for Determining Return on Equity	))	Docket No. PL19-4-000

Reply Affidavit of Michael P. Gorman

On behalf of the Associations:
Aluminum Association,
American Chemistry Council,
American Forest and Paper Association,
American Public Power Association,
Electricity Consumers Resource Council,
Industrial Energy Consumers of America,
National Rural Electric Cooperative Association, and
Transmission Access Policy Study Group

July 26, 2019

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Reply Affidavit of Michael P. Gorman

Q PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A Michael P. Gorman. My business address is 16690 Swingley Ridge Road, Suite 140, Chesterfield, MO 63017.

Q ARE YOU THE SAME MICHAEL P. GORMAN WHO PREVIOUSLY FILED AN AFFIDAVIT IN THIS PROCEEDING?

A Yes. On June 26, 2019 I filed an Affidavit on behalf of the Aluminum Association, American Chemistry Council, American Forest and Paper Association, American Public Power Association, Electricity Consumers Resource Council, Industrial Energy Consumers of America, National Rural Electric Cooperative Association, and Transmission Access Policy Study Group (collectively, "Associations").

Q WHAT IS THE PURPOSE OF YOUR REPLY AFFIDAVIT?

A I will respond to four specific issues raised by Transmission Owners ("TOs") in their comments to the Federal Energy Regulatory Commission ("FERC" or "Commission"). Those are: (1) the use of projected interest rates within a risk premium study; (2) the use of Earnings/Book ratios, also known as "Expected Earnings"; (3) the application of an Empirical Capital Asset Pricing Model ("ECAPM") as proposed by the some TOs; and (4) the appropriate development of a market risk premium for a CAPM model, specifically, the validity estimating the long-

term return on a broad equity portfolio by applying a two-step Discounted Cash Flow ("DCF") model that assumes perpetual growth rates forecast for the near term.

As outlined later in this Affidavit, the TOs' proposed methodologies do not reflect economic logic in measuring a return on equity ("ROE") that meets the *Hope* and *Bluefield* standards. These specific issues will be addressed in detail below.

I. Risk Premium and Projected Interest Rates

Q DID THE MIDCONTINENT INDEPENDENT SYSTEM OPERATOR, INC. ("MISO") TOs MAKE COMMENTS CONCERNING PROJECTED INTEREST RATES WITHIN A RISK PREMIUM ANALYSIS?

A Yes. At page 44 of their Comments, the MISO TOs state the following:

> In the *Coakley* Briefing Order, the Commission presented the approach of averaging the results of risk premium analyses using historical and projected bond yields.[footnote omitted] Such a blended approach makes sense, as Mr. McKenzie has explained in the MISO Transmission Owners' ROE proceedings.[footnote omitted] The historical bond yield analysis reflects yields at the time the proxy group ROEs were established, and the projected bond yields provide a risk premium estimate more reflective of investors' forward-looking expectations.

Q IS IT APPROPRIATE TO USE FORECASTED INTEREST RATES IN A RISK PREMIUM STUDY?

A The use of projected yields in the risk premium methodology, as proposed by TOs, is not reasonable and produces a flawed risk premium estimate for several reasons including the following:

1. FERC rejected the use of projected bond yields because they are unreliable estimates of market cost of capital. This finding is valid.

2. The MISO TOs' risk premium methodology is internally inconsistent and develops a risk premium that is not accurately calibrated to apply to projected bond yields. Rather, the risk premium is calibrated to current observable equity costs and bond yields, and therefore the proposed application produces a mismatch in the measurement of a risk premium estimate.

3. Projected bond yields are rarely reasonable estimates of actual investor-required returns on capital investments. Therefore, the resulting risk premium estimate simply does not provide an accurate estimate of the market participant required ROE.

Q PLEASE DESCRIBE THE FERC'S FINDING ON USE OF PROJECTED BOND YIELDS IN A RISK PREMIUM STUDY.

A This issue was explored by the Administrative Law Judge ("ALJ") in Docket No. EL14-12, where the MISO TOs proposed historical risk premium analyses in combination with projected bond yields. However, the resulting study was rejected as speculative based on the following:

> Dr. Avera also produces a risk premium analysis using bond yields projected for 2016-20. This Initial Decision rejects those studies. Projected yields are speculative, and, therefore, a less reliable basis for a study than historical yields.[1]

The Commission went on to confirm the ALJ's findings in that same docket by stating as follows:

> The Presiding Judge held that projected yields used in risk premium analyses are speculative and less reliable than historical yields, and

[1] *Ass'n of Bus. Advocating Tariff Equity v. Midcontinent Indep. Sys. Operator, Inc.*, 153 FERC ¶ 63,027, P 257 (2015) ("*MISO I ID*") (footnote omitted), *aff'd*, Op. No. 551, 156 FERC ¶ 61,234 (2016).

> rejected Dr. Avera's use of projected Baa-rated bond yields. . . . [W]e agree with the Presiding Judge. . . .[2]

Q IS THERE EVIDENCE THAT PROJECTED BOND YIELDS ARE UNRELIABLE AS FOUND PREVIOUSLY BY THE FERC?

A Yes. This is illustrated on my Exhibit No. A-9. On that exhibit, I compare projected changes in Treasury bond yields out over a two-year period to the actual prevailing bond yield that was realized at the time the projection represented. As shown on this exhibit, over the last 18 years, economists have consistently been projecting increases in interest rates relative to current prevailing interest rates but those projections have been wrong. Indeed, interest rates have not increased as economists have consistently projected, and in many cases remained flat or even declined.

This exhibit clearly illustrates that projected interest rates are highly unreliable, and seldom accurately match the market's actual cost of capital demands. Hence, projected interest rates simply are not reliable by themselves in forming a risk premium study.

[2] Op. No. 551, P 194. *See also Potomac-Appalachian Transmission Highline, L.L.C.*, 122 FERC ¶ 61,188, P 102 (rejecting "speculative forecasting of th[e] indexed cost of debt" as a basis to raise the low-end test used to filter proxies' DCF results).

Q PLEASE EXPLAIN WHY THE TOs' PROPOSED MODEL WOULD BE INTERNALLY INCONSISTENT IF PROJECTED BOND YIELDS WERE INCLUDED.

A Risk premiums are derived by a comparison of Commission authorized ROEs relative to prevailing utility bond yields. Hence, the resulting equity risk premium represents a relationship between ROEs measured from current market data relative to observable bond yield market data. This produces a risk premium related to observable market data for a specific period of time. This equity risk premium then can be applied to observable market bond yields to measure the current market cost of equity.

However, the MISO TOs are proposing to use a historically derived equity risk premium, in combination with projected bond yields. This methodology mismatches the time period where the equity risk premium is derived relative to the time period the bond yield is "expected" to prevail. The combination of an inconsistent time period for measuring the (1) equity risk premiums, and applying that to a (2) projected bond yield produces an internally inconsistent, and unreliable, estimate of the market cost of equity.

Using internally consistent data is necessary to produce a valid estimate of the market cost of equity. Dr. Morin explains in the textbook cited throughout the Briefing Orders, "[o]ne must be careful that the debt instrument used to calculate the risk premium matches the debt instrument used to calculate the interest rate component of the risk premium approach."[3]

[3] Roger A. Morin, *New Regulatory Finance* at 113 (2006), provided as Exhibit No. A-10, page 2.

While it would be internally consistent to use projected bond yields to derive the projected risk premium, and then apply that to a current projected bond yield, such a methodology would not calculate the current cost of equity. Additionally, using projected bond yields to calculate both the historical risk premium and the current bond yield would amplify the problem of projected bond yields systematically exceeding actual bond yields over time, as evidenced by the actual versus projected yield comparisons in the six docket-specific *Coakley* and MISO ROE proceedings.

Q WHY DO YOU BELIEVE THAT ECONOMISTS' PROJECTED BOND YIELDS RARELY ACCURATELY REFLECT THE MARKET REQUIRED RETURN ON INVESTMENTS?

A This is illustrated by failure of economists to accurately project changes in future interest rates. I refer you once again to my Exhibit No. A-9, that shows that consensus economists' projections of changes in Treasury bond yields rarely turn out be accurate, and predominantly overstate the market required return on Treasury bonds that prevail at the point in time where the forecasts have been made. That is, economists consistently overestimate what the market cost of capital will be for Treasury bonds in their forecasts. As such, economists' projections simply are not reliable estimates of current or future capital costs required by market participants.

II. Earnings/Book Ratios

Q MR. MCKENZIE RECOMMENDS RELIANCE ON "EXPECTED EARNINGS," BY WHICH HE MEANS PROJECTED EARNINGS DIVIDED BY EQUITY BOOK VALUE. PLEASE EXPLAIN HIS RATIONALE.

A Mr. McKenzie states that "the Expected Earnings approach provides a direct guide to ensure that the allowed ROE is similar to the returns that investors expect other utilities of comparable risk will earn on invested capital."[4]

Q DO YOU HAVE A RESPONSE?

A Yes. Dr. Cornell provides Associations' main testimonial response to transmission owners' support for the use of "Expected Earnings," and I agree with him that this method does not indicate the cost of equity and should not be used. However, I am supplementing his evidence by responding to the statement by Mr. McKenzie quoted above. Mr. McKenzie refers to the returns that *utilities* are expected to earn, as distinguished from the returns that *investors* expect to earn. This is a crucial distinction, and it goes to the heart of why the Expected Earnings method should not be used. The cost to the utility of attracting investment capital is the return that *investors* can earn on alternative investments of comparable risk, *not* the return that the utility itself can earn. As investment capital is just one of many inputs that utilities need to assemble the assets and used to provide service, a useful analogy in this regard is the cost of electrical conduit used in providing transmission service. An open-

[4] eLibrary No. 20190626-5323, Attachment A to Initial Comments of the New England Transmission Owners, at 25.

market conduit vendor will charge a price that reflects what alternative purchasers would pay, i.e., a market price. The rate of return that the utility will earn after the conduit becomes a rate base asset is a *result* of regulators' regulatory determinations, not an *input* to that market price. Similarly, the cost to the utility of investors' equity is tied to alternative, comparable-risk investments that are actually available to current investors. As investors have no opportunity to purchase utility stocks at book values that diverge from market prices, the ratio of utilities' earnings to their equity book values is *not* a direct guide, or even a meaningful guide, to the returns that investors expect to receive from their market-priced investments in utility stocks.

III. Empirical CAPM

Q MR. MCKENZIE RECOMMENDS THE USE OF AN ECAPM ANALYSIS AS A COMPONENT OF A CAPM. PLEASE EXPLAIN HIS RATIONALE.

A Mr. McKenzie outlines that an ECAPM analysis can help correct for the deficiencies in the CAPM analysis by adjusting the intercept line of the security market line, and reducing the slope. He asserts that this modification in the intercept and slope of the security market line has the effect of producing a more reliable estimate of the expected return relative to risk for securities, because a standard CAPM analysis will understate the required return for companies with betas less than 1, and overstate the required return for companies with betas greater than 1.

Q IS IT APPROPRIATE TO APPLY THE ECAPM ANALYSIS THE WAY THAT MR. MCKENZIE HAS PROPOSED?

A No. As Dr. Cornell explains, the ECAPM is theoretically unsound, and is based on an empirical regression for which estimation methodologies and the estimation period are unspecified. Even if the Commission were to adopt this ad-hoc modification to the established CAPM, Mr. McKenzie's proposed application of the ECAPM is flawed. Specifically, he applies the ECAPM adjustments in combination with *The Value Line Investment Survey* ("*Value Line*") adjusted betas. The use of a standard CAPM analysis with *Value Line* adjusted betas and the ECAPM analysis double counts the change to the security market line that is theorized as needed to produce a more accurate return versus risk estimate. That is, both the ECAPM with "regression" or "raw" betas, and a CAPM using *Value Line* adjusted betas will raise the intercept point relative to the standard CAPM estimate, and reduce the slope of the security market line. Both of these methods have the effect of increasing return estimates for companies with betas less than 1, and reducing return estimates for companies with betas greater than 1.

Indeed, the mathematical modification to the security market line, the intercept and the slope, are nearly identical when a standard CAPM with a *Value Line* adjusted beta is employed, compared to an ECAPM analysis using a non-adjusted beta. The mathematical derivation of this is shown below in Table 1.

TABLE 1

Security Market Line

Line	Description		Intercept	+	Risk Premium
1	Standard CAPM	=	R_f	+	100% Raw β x MRP
2	CAPM with VL Beta	=	R_f + 35% MRP	+	67% x Raw β x MRP
3	ECAPM	=	R_f + 25% MRP	+	75% x Raw β x MRP
4	ECAPM with VL Beta	=	R_f + 51% MRP	+	50% x Raw β x MRP

As shown above under lines 1 and 2, the security market line is adjusted by use of *Value Line* adjusted betas to increase the intercept point and flatten the slope of the security market line. Similarly, the ECAPM applied with non-adjusted betas (regression or raw betas) similarly increases the intercept point and flattens the slope of the security market line. Both of these methodologies adjust the intercept point via combination of the risk-free rate plus a factor of the market risk premium, and reduce the slope line from 100% of the raw beta estimate relative to the market risk premium, to a fraction, approximately 3/4 to 2/3 of the beta adjusted risk premium estimate.

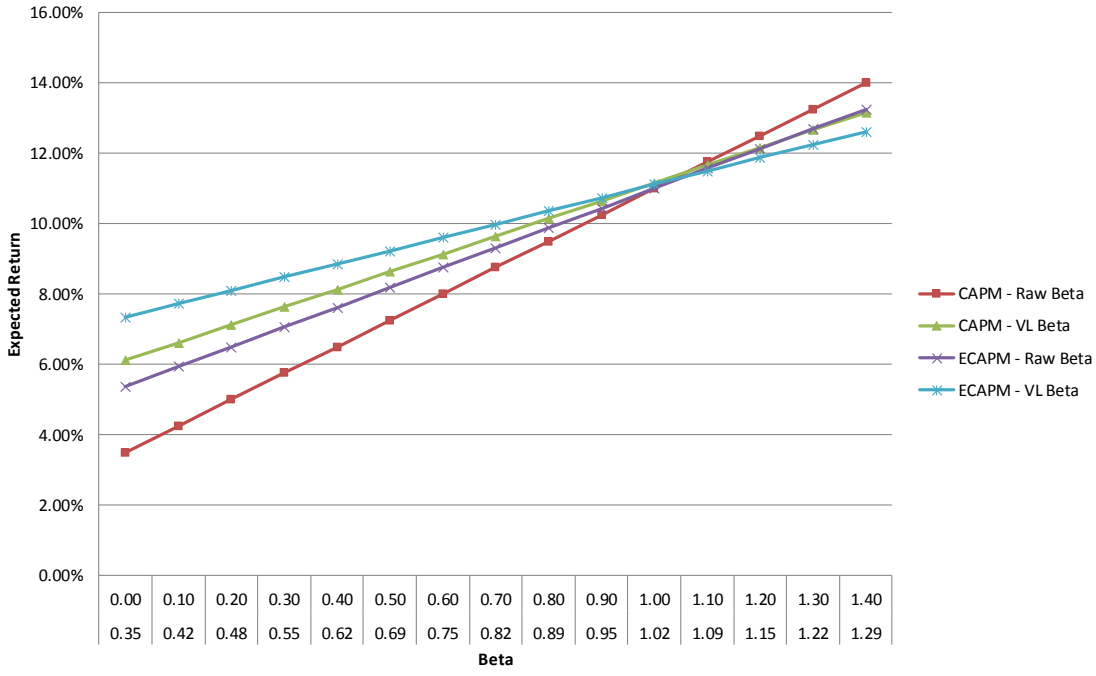
For example, using *Value Line* betas within a standard CAPM analysis (Line 2) increases the intercept from the risk-free rate up to the risk-free rate plus 35% of the market risk premium. From there, the slope of the line decreases from a raw beta estimate multiplied by the market-risk free premium to only 67% of the raw beta estimate by the market risk premium. Thus, using the *Value Line* beta adjustment in the standard CAPM model increases the intercept point and reduces the slope of the security market line.

Using an ECAPM with a raw beta estimate accomplishes nearly the same thing. Specifically, the ECAPM with a raw beta will increase the intercept point to the risk-free rate plus 25% of the market risk premium, and change the slope of the line from the raw beta multiplied by the market risk premium to 75% of the raw beta multiplied by the market risk premium. The impact on the intercept point and the slope of the security market line are very comparable using a standard CAPM with a *Value Line* adjusted beta, or an ECAPM using a raw beta estimate.

These relationships, along with the mathematical equations outlined in Table 1 above, are shown graphically in Figure 1 below.

FIGURE 1

Variations of the CAPM



As shown above, the ECAPM using *Value Line* betas intersects the zero beta X axis at a very high level, and then increases more slowly as the beta increases from zero up to above 1. Please note that at a beta of 1, all versions of the CAPM study produce the same market return estimate. Therefore, the adjustments to the standard CAPM produced by either a *Value Line* adjusted beta or ECAPM analysis had the effect of increasing CAPM return estimates for companies with betas less than 1, and decreasing CAPM return estimates for companies with betas greater than 1. The significant deficiency in the ECAPM employed with use of *Value Line* betas is it has a substantially greater impact on the CAPM return estimate for companies with betas less than 1, and a substantially reduced CAPM return estimate for companies with betas greater than 1.

Q WHY DO YOU STATE THAT USE OF A *VALUE LINE* ADJUSTED BETA WITHIN AN ECAPM ANALYSIS DOUBLE COUNTS THE ADJUSTMENT TO THE SECURITY MARKET LINE AS SUPPORTED BY ACADEMIC LITERATURE?

A Use of *Value Line* adjusted betas within an ECAPM analysis significantly distorts the security market line by further increasing the intercept point and nearly flattening the slope line. This is illustrated in Table 1 above on line 4. As shown in the table above, *Value Line* adjusted betas within an ECAPM analysis suggests that the required rate of return for a riskless security would be equal to the risk-free rate plus one-half of the market risk premium. Additional return for assuming securities of greater amounts of

risk would only be adjusted by less than one-half of the expected market premium adjustment by the beta estimate. More specifically, the adjustment to the intercept point produces a doubling of the addition to the risk-free rate by the market risk premium, and reduces the slope by about a third of the market risk premium based on a reduction of the weight of 75% down to 50%.

For these reasons, an ECAPM analysis should not be employed in combination with *Value Line* adjusted betas. The application of an ECAPM with *Value Line* adjusted betas does not produce an economically logical return estimate for a given level of investment risk. For these reasons, the ECAPM should not be employed in combination with *Value Line* adjusted betas, or any type of adjusted beta, because it simply produces an economically illogical estimate of the current market cost of equity.

IV. CAPM Market Risk Premium

Q IN DERIVING A CAPM RETURN ESTIMATE, HAS THE COMMISSION OFFERED DIRECTIONS ON HOW TO MEASURE THE MARKET RISK PREMIUM?

A Yes. The Commission states that the market risk premium should reflect a forward-looking estimate of the return on the market relative to the prevailing risk-free rate. The Commission opines that a forward-looking return on the market is best estimated from a DCF analysis.[5]

[5]Opinion No. 531 at 14.

Q IN ORDER TO PRODUCE AN ECONOMICALLY LOGICAL CAPM RETURN ESTIMATE, SHOULD THE COMMISSION TAKE CARE TO ENSURE THAT THE ESTIMATED FORWARD-LOOKING RETURN ON THE MARKET REFLECTS ECONOMICALLY LOGICAL RESULTS, AND LIKELY THEREFORE REFLECTS EXPECTATIONS OF INVESTORS?

A Yes. It is generally regarded that most investors act rationally, that rational investors will take advantage of any mis-pricing by any irrational investors, and that stock market prices therefore rationally and efficiently incorporate all relevant public information. To accord with the reality of efficient stock market pricing, any projection of long-term returns on a broad stock market portfolio should reflect an economically and rational outlook for expected returns on the market. Relevant pieces of information available to the investment community to make rational outlooks for expected returns on the market include the following:

1. Historically returns on the market have generally tracked growth of the economy in which the market sells its goods and services. More specifically, compound growth of the S&P 500 has reasonably tracked the compound growth of the U.S. Gross Domestic Product ("GDP").

2. Market participants' outlooks for expected return on the market generally support the historical relationship between the growth in the stock market, and the growth in the U.S. GDP, or economy in which the stock market companies operate.

Q PLEASE OUTLINE THE INFORMATION YOU HAVE THAT SUPPORTS YOUR BELIEF THAT MARKET PARTICIPANTS' PROJECTIONS FOR THE RETURN ON THE MARKET GENERALLY ALIGN WITH STOCK MARKET RETURNS THAT CORRELATE WITH U.S. GDP RETURNS.

A The current consensus outlook for both intermediate-term and long-term nominal GDP growth is around 4.2%, which includes the Federal Reserve's long-term inflation outlook of around 2%.

As shown in Table 2 below, the projections of independent advisory firms for long-term returns on the U.S. equity market bracket this outlook for future U.S. GDP growth. At the high end, BlackRock Investment Institute is projecting nominal 25-year returns for U.S. large cap equities to be around 7.1%. This is the highest of the surveyed independent market participants' projections for large-cap equity returns in the U.S. marketplace. At the low end, Research Affiliates is projecting nominal 10-year returns for U.S. large cap equities to be around 2.6%. The median surveyed projection of expected return on large-cap US equity is Vanguard's 3%-5%, comparable to the consensus projection of 4.2% nominal growth in GDP.

TABLE 2

Projected Return on the Market

Source	Term	Expected Return: Large Cap Equities	Expected Return: Nominal US GDP
BlackRock Capital Management[1]	25 Years	7.1%	N/A
JP Morgan Chase[2]	10 - 15 Years	5.25%	3.75%
Vanguard[3]	10 Years	3% - 5%	N/A
Research Affiliates[4]	10 Years	2.60%	3.51%
Morningstar[5]	10 Years	2.70%	N/A

Sources:

[1]BlackRock Investment Institute, April 2019 report, downloaded 7/23/2019.

[2]JP Morgan Chase, Long-Term Capital Market Assumptions, 2019 Report, provided as Exhibit No. A-10, pages 3-114.

[3]Vanguard Economic and Market Outlook for 2019: Down but not out, December 2018, provided as Exhibit No. A-10, pages 115-158.

[4]Research Affiliates, Asset Allocation Interactive, downloaded 7/24/2019.

[5]Morningstar Markets Observer Q2 2019 at 12, provided as Exhibit No. A-10, pages 159-210.

Q DID ANY COMMENTERS HAVE COMMENTS CONCERNING THE FERC'S USE OF A TWO-STAGE DCF IN MEASURING A MARKET RISK PREMIUM WITHIN A CAPM?

A Yes. Several transmission owners argued that the Commission should reject measuring the market risk premium using a two-stage DCF return on the market. The

New England TOs comments are generally reflective of the arguments made by all the transmission owners. The New England TOs assert that the Commission's rationale for including a long-term growth rate in a DCF analysis is because it is often unrealistic and unsustainable for high, short-term growth rates to continue into perpetuity. The New England TOs believe this rationale does not apply to a DCF return on the market index. The primary argument in support of this notion is that the market index as measured by the S&P 500 will always reflect higher performing companies. Therefore, since the S&P will rotate in high-performing companies in developing its index, the New England TOs assert that a short-term growth rate is higher than rational expectations for long-term sustainable growth is appropriate for measuring a DCF return on the market.

Q IS THE NEW ENGLAND TOs' REJECTION OF THE TWO-STAGE DCF MODEL TO MEASURE THE CURRENT MARKET RETURN ON THE S&P 500 ECONOMICALLY LOGICAL?

A No. There is simply no credible evidence that suggests that it is rational and an economically logical outlook for an investor to believe that the long-term sustainable growth rate on the S&P 500 can reflect growth outlooks that substantially exceed growth rates achieved in the past, or growth rates that reflect the economy in which the stock market as a whole will sell its goods and services into the future.

Specifically, historically, the S&P 500 has grown at a rate that reasonably tracks the actual nominal growth of the U.S. GDP. As such, there is verifiable

evidence that it is rational to believe that the market will track the growth rate of the economy in which the companies that make up the market, sell their goods and services. Further, it is rational to expect that the growth of the market for the companies that serve the market, will grow in line with the market demand for services. That is, the companies that sell goods and services to the market can experience growth in line with the market growth in demand for those goods and services. Indeed, this expectation is corroborated by a review of historical evidence. As shown in Table 3 below, the historical growth of the market has tracked the historical growth of the U.S. GDP.

TABLE 3

Historical Growth: S&P 500 vs GDP

Description	Percent
Nominal GDP (1929-2018)[1]	6.1%
S&P 500 Capital Growth (1926 - 2018)[2]	5.8%

Sources:
[1]Bureau of Economic Analysis, downloaded 7/15/19.
[2]Duff & Phelps 2019 SBBI Yearbook at 6-17, provided as Exhibit No. A-10, pages 211-212..

As outlined above, the historical nominal growth and geometric growth of the U.S. stock market has been approximately 6.1%, whereas the historical growth of the U.S. GDP has been 5.8%. (As discussed above, U.S. GDP growth is widely expected to be considerably lower going forward. This expectation reflects slower growth in population, slower growth in productivity, and lower inflation, in each case as between

the future and the historical period that began in the 1920s.) Clearly, there is an interrelationship between the growth rate of the consumer market for goods and services and the growth rate for publicly traded companies that operate to supply the goods and services demanded by the consumer market. As such, over long periods of time, it is reasonable to expect that the growth rate in the S&P 500 will continue to track the growth rate of the nominal GDP because these markets are interrelated, and can only grow over long periods of time at growth rates that are reasonably comparable to one another.

Q IS THERE MERIT TO THE NEW ENGLAND TOS' ARGUMENT THAT HIGH GROWTH COMPANIES WILL CONTINUE TO BE SWAPPED IN AND OUT OF THE S&P 500 INDEX, AND THEREFORE THE EXPECTED RETURN ON THE MARKET SHOULD TRACK NEAR-TERM PROJECTIONS OF THE EARNINGS GROWTH OF DIVIDEND-PAYING COMPANIES INCLUDED IN THE INDEX?

A No. While companies are periodically added to or removed from the S&P 500 index, this is always done such that the change of index composition leaves the index value unchanged, by in effect "selling" from the index portfolio a relatively large number of index shares in order to purchase relatively few shares in the added company. These transitions do not, in the aggregate, systematically increase the earnings associated with a portfolio that tracks the index. More important, CAPM theory calls for the equity market return to represent the entire stock market, not simply the high growth

companies included in any particular market index. The S&P 500 index is used only as a proxy for the entire stock market. Accordingly, expected return on the stock index should reflect the growth of the overall market. New England TOs' are not factually accurate in asserting that index composition changes can make the S&P 500 sustainably grow faster than the entire stock market and underlying economy, but if they were, that would be a reason to disregard the S&P 500 as a basis for estimating the CAPM equity risk premium, not a reason to substitute near-term S&P 500 growth for sustainable market returns in estimating the CAPM equity risk premium.

In any case, proponents of such substitution do not actually propose to conduct a DCF analysis of the S&P 500 index itself as its composition changes over time. Rather, they rely on a large and unchanging subset of the companies that are included in the index at a particular point in time. Any arguments about how the index will grow are irrelevant to the expected long-term growth of the individual companies in the index.

Q DOES THIS CONCLUDE YOUR REPLY AFFIDAVIT?

A Yes.

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Acronyms and Abbreviations

Associations	Aluminum Association, American Chemistry Council, American Forest and Paper Association, American Public Power Association, Electricity Consumers Resource Council, Industrial Energy Consumers of America, National Rural Electric Cooperative Association, and Transmission Access Policy Study Group
ALJ	Administrative Law Judge
CAPM	Capital Asset Pricing Model
Commission	Federal Energy Regulatory Commission
DCF	Discounted Cash Flow
ECAPM	Empirical Capital Asset Pricing Model
FERC	Federal Energy Regulatory Commission
GDP	Gross Domestic Product
Hope and *Bluefield*	*Bluefield Water Works & Improvement Co. v. Pub. Serv. Comm'n of W. Va.*, 262 U.S. 679 (1923) and *Fed. Power Comm'n v. Hope Natural Gas Co.*, 320 U.S. 591 (1944)
MISO	Midcontinent Independent System Operator, Inc.
NOI	Notice of Inquiry
ROE	Return on Equity
TO	Transmission Owner
Value Line	*The Value Line Investment Survey*

ASSOCIATIONS EXHIBIT NO. A-9

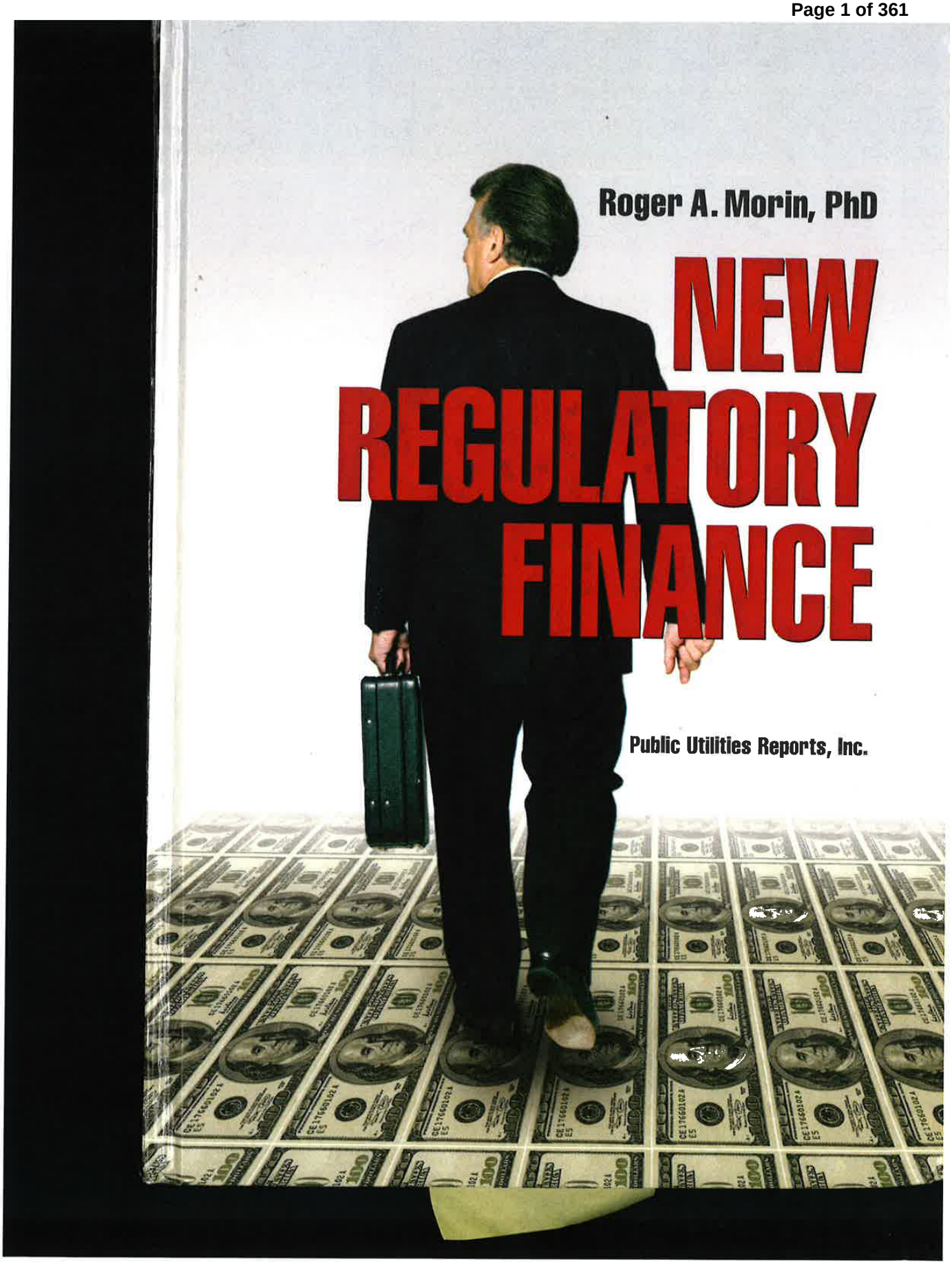
FERC NOI

Accuracy of Interest Rate Forecasts
(Long-Term Treasury Bond Yields - Projected Vs. Actual)

Line	Date	Publication Data: Prior Quarter Actual Yield (1)	Publication Data: Projected Yield (2)	Publication Data: Projected Quarter (3)	Actual Yield in Projected Quarter (4)	Projected Yield Higher (Lower) Than Actual Yield* (5)
1	Dec-00	5.8%	5.8%	1Q, 02	5.6%	0.2%
2	Mar-01	5.7%	5.6%	2Q, 02	5.8%	-0.2%
3	Jun-01	5.4%	5.8%	3Q, 02	5.2%	0.6%
4	Sep-01	5.7%	5.9%	4Q, 02	5.1%	0.8%
5	Dec-01	5.5%	5.7%	1Q, 03	5.0%	0.7%
6	Mar-02	5.3%	5.9%	2Q, 03	4.7%	1.2%
7	Jun-02	5.6%	6.2%	3Q, 03	5.2%	1.0%
8	Sep-02	5.8%	5.9%	4Q, 03	5.2%	0.7%
9	Dec-02	5.2%	5.7%	1Q, 04	4.9%	0.8%
10	Mar-03	5.1%	5.7%	2Q, 04	5.4%	0.3%
11	Jun-03	5.0%	5.4%	3Q, 04	5.1%	0.3%
12	Sep-03	4.7%	5.8%	4Q, 04	4.9%	0.9%
13	Dec-03	5.2%	5.9%	1Q, 05	4.8%	1.1%
14	Mar-04	5.2%	5.9%	2Q, 05	4.6%	1.4%
15	Jun-04	4.9%	6.2%	3Q, 05	4.5%	1.7%
16	Sep-04	5.4%	6.0%	4Q, 05	4.8%	1.2%
17	Dec-04	5.1%	5.8%	1Q, 06	4.6%	1.2%
18	Mar-05	4.9%	5.6%	2Q, 06	5.1%	0.5%
19	Jun-05	4.8%	5.5%	3Q, 06	5.0%	0.5%
20	Sep-05	4.6%	5.2%	4Q, 06	4.7%	0.5%
21	Dec-05	4.5%	5.3%	1Q, 07	4.8%	0.5%
22	Mar-06	4.8%	5.1%	2Q, 07	5.0%	0.1%
23	Jun-06	4.6%	5.3%	3Q, 07	4.9%	0.4%
24	Sep-06	5.1%	5.2%	4Q, 07	4.6%	0.6%
25	Dec-06	5.0%	5.0%	1Q, 08	4.4%	0.6%
26	Mar-07	4.7%	5.1%	2Q, 08	4.6%	0.5%
27	Jun-07	4.8%	5.1%	3Q, 08	4.5%	0.7%
28	Sep-07	5.0%	5.2%	4Q, 08	3.7%	1.5%
29	Dec-07	4.9%	4.8%	1Q, 09	3.5%	1.4%
30	Mar-08	4.6%	4.8%	2Q, 09	4.0%	0.8%
31	Jun-08	4.4%	4.9%	3Q, 09	4.3%	0.6%
32	Sep-08	4.6%	5.1%	4Q, 09	4.3%	0.8%
33	Dec-08	4.5%	4.6%	1Q, 10	4.6%	0.0%
34	Mar-09	3.7%	4.1%	2Q, 10	4.4%	-0.3%
35	Jun-09	3.5%	4.6%	3Q, 10	3.9%	0.8%
36	Sep-09	4.0%	5.0%	4Q, 10	4.2%	0.8%
37	Dec-09	4.3%	5.0%	1Q, 11	4.6%	0.4%
38	Mar-10	4.3%	5.2%	2Q, 11	4.3%	0.9%
39	Jun-10	4.6%	5.2%	3Q, 11	3.7%	1.5%
40	Sep-10	4.4%	4.7%	4Q, 11	3.0%	1.7%
41	Dec-10	3.9%	4.6%	1Q, 12	3.1%	1.5%
42	Mar-11	4.2%	5.1%	2Q, 12	2.9%	2.2%
43	Jun-11	4.6%	5.2%	3Q, 12	2.8%	2.5%
44	Sep-11	4.3%	4.2%	4Q, 12	2.9%	1.3%
45	Dec-11	3.7%	3.8%	1Q, 13	3.1%	0.7%
46	Mar-12	3.0%	3.8%	2Q, 13	3.2%	0.7%
47	Jun-12	3.1%	3.7%	3Q, 13	3.7%	0.0%
48	Sep-12	2.9%	3.4%	4Q, 13	3.8%	-0.4%
49	Dec-12	2.8%	3.4%	1Q, 14	3.7%	-0.3%
50	Mar-13	2.9%	3.6%	2Q, 14	3.4%	0.2%
51	Jun-13	3.1%	3.7%	3Q, 14	3.3%	0.4%
52	Sep-13	3.2%	4.2%	4Q, 14	3.0%	1.2%
53	Dec-13	3.7%	4.2%	1Q, 15	2.6%	1.7%
54	Mar-14	3.8%	4.4%	2Q 15	2.9%	1.5%
55	Jun-14	3.7%	4.3%	3Q 15	2.8%	1.5%
56	Sep-14	3.4%	4.3%	4Q 15	3.0%	1.3%
57	Dec-14	3.3%	4.0%	1Q 16	2.7%	1.3%
58	Mar-15	3.0%	3.7%	2Q 16	2.6%	1.1%
59	Jun-15	2.6%	3.7%	3Q 16	2.3%	1.4%
60	Sep-15	2.9%	3.8%	4Q 16	2.8%	1.0%
61	Dec-15	2.8%	3.7%	1Q 17	3.0%	0.7%
62	Mar-16	3.0%	3.5%	2Q 17	2.9%	0.6%
63	Jun-16	2.7%	3.4%	3Q 17	2.8%	0.6%
64	Sep-16	2.6%	3.1%	4Q 17	2.8%	0.3%
65	Dec-16	2.3%	3.4%	1Q 18	3.0%	0.4%
66	Mar-17	2.8%	3.7%	2Q 18	3.1%	0.6%
67	Jun-17	3.0%	3.7%	3Q 18	3.1%	0.6%
68	Sep-17	2.9%	3.6%	4Q 18	3.3%	0.3%
69	Dec-17	2.8%	3.6%	1Q 19	3.0%	0.6%
70	Mar-18	2.8%	3.7%	2Q 19		
71	Apr-18	3.0%	3.8%	3Q 19		
72	May-18	3.0%	3.8%	3Q 19		
73	Jun-18	3.0%	3.8%	3Q 19		
74	Jul-18	3.1%	3.8%	4Q 19		
75	Aug-18	3.1%	3.7%	4Q 19		
76	Sep-18	3.1%	3.7%	4Q 19		
77	Oct-18	3.1%	3.6%	1Q 20		
78	Nov-18	3.1%	3.7%	1Q 20		
79	Dec-18	3.1%	3.7%	1Q 20		
80	Jan-19	3.3%	3.6%	2Q 20		
81	Feb-19	3.3%	3.5%	2Q 20		
82	Mar-19	3.3%	3.4%	2Q 20		
83	Apr-19	3.0%	3.2%	3Q 20		
84	May-19	3.0%	3.2%	3Q 20		
85	Jun-19	3.0%	3.1%	3Q 20		
86	Jul-19	2.8%	2.8%	4Q 20		

Source:
Blue Chip Financial Forecasts, Various Dates.
* Col. 2 - Col. 4.

ASSOCIATIONS EXHIBIT NO. A-10


Roger A. Morin, PhD
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investments. Therefore, the yield on intermediate-term Treasury notes is an inappropriate proxy for the risk-free rate.

Some analysts prefer to use the yield on utility bonds rather than the yield on Treasury bonds when implementing the Risk Premium methodology. Because a utility's cost of capital is determined by its business and financial risks, it is reasonable to surmise that its cost of equity will track its cost of debt more closely than it will track the government bond yield. Trends in utility cost of capital are directly reflected in their cost of debt and are not directly captured by a risk premium estimate tied to government bond yields. To guard against this possibility, the risk premium analysis should be performed using both the government bond yield and the utility bond yield, and both sets of results weighted in arriving at a final estimate of the utility's cost of equity.

One must be careful that the debt instrument used to estimate the risk premium matches the debt instrument used to calculate the interest rate component of the risk premium approach. To illustrate, if the equity risk premium is calculated by comparing stock returns with A-rated utility bond yields, consistency requires that the yield on A-rated utility bonds be used to estimate the interest rate component of the risk premium approach.

Time Period

Realized risk premium results are highly dependent on the choice of time period over which the security return data are compiled. Both the length of the period and the choice of end points can make a substantial difference in the final results obtained. For example, Table 4-1 reports the realized returns on stocks and bonds obtained by Ibbotson Associates (2005) for the last 10,

TABLE 4-1
INSTABILITY OF RISK PREMIUMS COMPUTED FROM REALIZED RETURNS

Period	Stock Returns	Bond Returns	Risk Premium
1995 - 2004	12.1	9.8	2.3
1985 - 2004	13.2	10.8	2.4
1975 - 2004	13.7	9.5	4.2
1965 - 2004	10.5	7.7	2.8
1993 - 2002	9.3	9.7	−0.4
1983 - 2002	12.7	10.6	2.1
1973 - 2002	10.7	9.3	1.4
1963 - 2002	10.5	7.5	3.0

Source: Ibbotson Associates (2005)

PORTFOLIO INSIGHTS

2019 | 23rd ANNUAL EDITION

LONG-TERM CAPITAL MARKET ASSUMPTIONS

Time-tested projections to build stronger portfolios

J.P.Morgan
Asset Management

2019 LONG-TERM CAPITAL MARKET ASSUMPTIONS
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FOREWORD

CHRIS WILLCOX

MIKE O'BRIEN

ROB O'RAHILLY

"YOU CAN NEVER PLAN THE FUTURE BY THE PAST," wrote Edmund Burke, the 18th century British political theorist and politician. When investors study the past to assess the prospects for capital markets, they must think how its lessons will, and won't, apply in the years ahead.

Amid today's challenging investing environment, we present the 2019 edition of J.P. Morgan Asset Management's Long-Term Capital Market Assumptions (LTCMAs). In our 23rd year of producing capital market estimates, we incorporate more than 50 asset and strategy classes; our return assumptions are available in 14 base currencies. Over the years, many investors and advisors have come to depend on our assumptions to inform their strategic asset allocation, build stronger portfolios and establish reasonable expectations for risks and returns over a 10- to 15-year time frame.

We formulate our LTCMAs as part of a deeply researched proprietary process that draws on quantitative and qualitative inputs as well as insights from experts across J.P. Morgan Asset Management — a collaborative effort that has evolved over the past two decades. Our own multi-asset investment approach relies heavily on our LTCMAs. The assumptions form a critical foundation of our framework for designing, building and analyzing solutions aligned with our clients' specific investment needs.

This edition of our assumptions explores the challenges of late-cycle investing in a long-term context. Over our investment horizon we see still-modest returns in many asset markets. Navigating late cycle demands that investors think and manage outside the mean. It may also require new portfolio construction tools that account for the wider spectrum of risks that investors will need to assume to drive future returns.

Whatever approach investors take, a considered, long-term strategic perspective is essential. So too is careful manager selection and attentiveness to the power of active asset allocation.

We look forward to working with you to make the best use of our assumptions in setting your own strategic perspective and pursuing your investment goals.

On behalf of J.P. Morgan Asset Management, thank you for your continued trust and confidence. As always, we welcome your feedback.

Chris Willcox
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Asset Management

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EXECUTIVE SUMMARY

2019 Long-Term Capital Market Assumptions

John Bilton, CFA, *Head of Global Multi-Asset Strategy, Multi-Asset Solutions*

IN BRIEF

This executive summary gives readers a broad overview of our 2019 Long-Term Capital Market Assumptions (LTCMAs) and provides a context for how some of the structural factors affecting economies today are likely to drive asset returns over a 10- to 15-year investment horizon. The key takeaways from this year's LTCMAs:

- Our 2019 estimate for real global GDP growth of 2.5% is unchanged from last year, and despite a few country-level adjustments, the secular growth outlook is stable and risks are balanced. Asset returns at equilibrium look reasonable by historical standards, but cyclical headwinds constrain our return forecasts today and still present a challenge.
- Cyclical risks are building, many economies are operating above trend with little slack, and asset valuations are elevated. While long-term investors should consider returns over the whole cycle, the starting point matters greatly to the long-term outlook. Traditional investment frameworks reflect market risk quite well but may not capture factors like illiquidity risk, which can profoundly affect asset returns late in the cycle.
- Bond return forecasts improve this year, notably in the U.S., where policy normalization has created a favorable entry point. Global equity returns are unchanged, but there is some regional divergence, which may offer opportunities for investors. Alternatives are a relative bright spot, as fee reduction and improved alpha trends lend support.
- Expected returns for a U.S. 60/40 portfolio are slightly better, and the stock-bond frontier rotated further in a clockwise direction due to higher expected bond returns. In other regions, the frontier is little changed. This reflects both the late-cycle environment in the U.S. and the regional divergence in economic cycles. Ex-ante Sharpe ratios for U.S. Treasuries now meaningfully exceed those of U.S. stocks for the first time in a decade.
- Our message this year is to manage outside the mean. This implies looking for insight beyond our traditional mean-variance tools to help us navigate the end of this cycle. In the longer term, it suggests that while mean-reversion is a powerful force, it isn't infallible and we must be mindful which of today's dislocations may be tomorrow's new equilibria.

INTRODUCTION

For investors, 2019 could prove to be a symbolic, possibly even seminal year. Should the U.S. expansion persist to the middle of 2019, it will set a new record for the length of a U.S. cycle. Still well short of Australia's 27-year (and counting) expansion, but a notable record nonetheless. That is true especially when we consider some of the paradoxes that characterize this cycle. Developed market (DM) policy rates are rising yet remain below prior cycle troughs, just as G7 unemployment rates are at 40-year lows. This S&P 500 bull market is the longest on record, with trough-to-peak gains almost twice the bull market average of the last 50 years; but at the same time, global equities have delivered gains about 6% shy of prior bull market averages. And just as technology is eroding geographic boundaries and functional barriers, trade protectionism may be forcing globalization into retreat, at least in the short term.

Of course, the simple chronological age of this expansion has triggered intense speculation about when the current cycle may end. Most of us will not succeed in perfectly timing the end of the cycle, and arguably the effort to do so may be something of a fool's errand. Nevertheless, understanding the complexion of late cycle and preparing for a bear market phase, whenever that may arise, is a vital exercise. Longer-term investors might be forgiven for thinking that the vagaries of the cycle are less relevant to them – but for all our focus on structural themes and equilibrium returns, we must all enter and exit the market at prevailing prices, and those will profoundly affect performance even over the longest horizons (**Exhibit 1**).

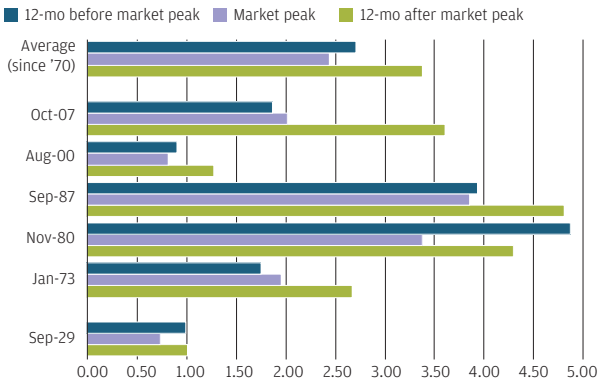
In making economic decisions, we instinctively weigh the possibilities to form a central case that is essentially an average, or mean, of possible future outcomes. But considering the end of the cycle implicitly means anticipating a discontinuity and an environment that will, for a time at least, be far away from any mean outcome. Much of our financial tool kit is anchored in average outcomes and mean-reversion, and therefore might not tell us the whole story at key turning points in cycles.

This isn't to say we should discard these trusted tools or abandon any instance of mean-reversion, and indeed our Long-Term Capital Market Assumptions work is grounded in such techniques. Instead, to gain better insight throughout the cycle we should complement those frameworks and better scrutinize assumptions of mean-reversion. After all, as this cycle has shown, economies and markets can stay far away from equilibrium for a long time, and those equilibria themselves are far from static.

Navigating late cycle demands that investors think and manage outside the mean, and evaluate how turning points in the cycle might lead to non-linear outcomes in even diversified portfolios. Scrutiny of when mean-reversion holds, and when it does not, also resonates with the broader thematic work we've undertaken. Exploring some of the apparent disequilibria we face – and recognizing where they might signal structural shifts in the fabric of our economies – is a thread that runs through all four of our thematic papers this year.

Entry point affects performance even over long time horizons

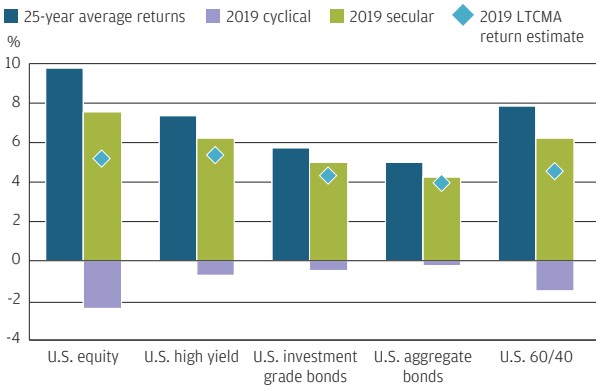
EXHIBIT 1: VALUE OF $1 INVESTED IN S&P 500 AFTER 10 YEARS GIVEN ENTRY POINT



Source: Bloomberg, J.P. Morgan Asset Management; data as of September 30, 2018.

We remain secular optimists despite increased cyclical headwinds; returns for a U.S. 60/40 stock-bond portfolio rise slightly due to better bond returns

EXHIBIT 2: HISTORICAL 25-YEAR AVERAGE RETURNS FOR KEY ASSETS AND THIS YEAR'S ESTIMATES, SPLIT INTO THEIR SECULAR (EQUILIBRIUM) AND CYCLICAL COMPONENTS



Source: Bloomberg, Datastream, J.P. Morgan Asset Management Multi-Asset Solutions; data as of September 30, 2018.

Last year, we described ourselves as secular optimists but cyclical realists. Our secular optimism is undiminished even as cyclical headwinds have increased this year — leading us to contemplate how to manage our portfolios as the storm clouds gather (**Exhibit 2**). We also note that some of the factors that might hasten the end of this cycle could also have gradual but profound effects on the economic and investment landscape over the long term. Indeed, the very nature of the cycle itself may well be changing, and with it the causes of — and remedies for — recessions. Debt levels and the size of central bank balance sheets create new challenges for policy and could ultimately compromise central bank independence; at the same time, the structure of the capital markets is evolving, generating new sources of return, and risk, for investors.

Overall, our long-term forecasts of economic growth and equilibrium interest rates change only modestly from last year. We see little upside pressure on price inflation and expect that over future cycles inflation will frequently fall short of central bank targets. This leads to a modest cut in our U.S. inflation expectations. Returns for a simple U.S. 60/40 stock-bond portfolio have risen slightly from 5.25% to 5.50% but, as a further sign that we are late in the cycle, this is entirely driven by higher returns from bonds. Most notably, our estimated Sharpe ratio for U.S. Treasuries is now meaningfully higher than that for U.S. stocks for the first time in a decade. As we will explore, Sharpe ratios don't tell the whole story, especially for assets with a left-tail risk[1] and especially when the cycle is mature, but they are a telling feature of today's investing environment.

MACROECONOMIC THEMES – MANAGING OUTSIDE THE MEAN

Our 10- to 15-year forecast for developed market real GDP growth is unchanged from last year at 1.50%, and we trim our emerging market (EM) estimate from 4.50% to 4.25% — although forecasts for the major EM economies[2] are unchanged. Overall, our global real GDP forecast of 2.50% is unchanged year-over-year and the relative levels of growth across countries and regions are similarly little changed (**Exhibit 3**). As was the case last year, our secular outlook is quite stable, with risks broadly balanced between the well-understood drag from demographics and the potential upside from a technology-led pickup in productivity. However, the cyclical risks have increased over the last 12 months — and not only from the simple aging of this cycle.

[1] We define left-tail risk as being the risk of more severe downside price action than upside price action; such assets can suffer more severe repricing during periods of stress than may be implied by a simple normal distribution.

[2] China, India and Brazil real GDP forecasts are unchanged this year; Russia real GDP growth forecasts are cut by 25 basis points.

Our 2019 global growth assumptions are subdued but mostly stable

EXHIBIT 3: MACROECONOMIC ASSUMPTIONS (%)

	2019 assumptions		2018 assumptions		Change (percentage points)	
	Real GDP	Core inflation	Real GDP	Core inflation	Real GDP	Core inflation
DEVELOPED MARKETS	**1.50**	**1.75**	**1.50**	**1.75**	**0.00**	**0.00**
U.S.	1.75	2.00	1.75	2.25	0.00	-0.25
Eurozone	1.50	1.50	1.50	1.50	0.00	0.00
UK	1.25	2.00	1.25	2.00	0.00	0.00
Japan	0.50	1.00	0.50	1.00	0.00	0.00
Australia	2.00	2.50	2.00	2.25	0.00	0.25
Canada	1.50	1.75	1.50	1.75	0.00	0.00
Sweden	1.75	1.75	1.75	1.75	0.00	0.00
Switzerland	1.25	0.50	1.25	0.75	0.00	-0.25
EMERGING MARKETS*	**4.25**	**3.50**	**4.50**	**3.50**	**-0.25**	**0.00**
China	5.00	2.75	5.00	2.75	0.00	0.00
India	7.00	5.00	7.00	5.00	0.00	0.00
Brazil	3.00	4.75	3.00	5.00	0.00	-0.25
Russia	1.25	5.50	1.50	5.50	-0.25	0.00
GLOBAL	**2.50**	**2.25**	**2.50**	**2.50**	**0.00**	**-0.25**

Source: J.P. Morgan Asset Management; estimates as of September 30, 2017 and September 30, 2018.

* Emerging markets aggregate derived from nine country sample.

The U.S.-China[3] trade dispute increasingly appears to be as much about ideology as tariff disparity and could well define the path of globalization far beyond the current cycle. U.S. policy normalization is inexorably tightening global financial conditions and may yet hasten the turn of the cycle, perhaps before other central banks even get going (**Exhibit 4**), risking a semi-permanent divergence in policy across the world economy. Corporate leverage itself might not trigger a downturn but could be an accelerant, and in the longer run high indebtedness across an economy complicates the transmission of monetary policy. But rather like trying to time a downturn, attempting to identify precise catalysts can be a futile exercise. Instead, recognizing where risks reside and considering how they might evolve and affect our secular framework is a key area of focus for our LTCMA thematic papers this year.

Our first paper explores this trend directly. It looks at the anatomy of past recessions and considers what the nature of future recessions — and recoveries — might be. Our LTCMA framework is designed to be "cycle neutral" by virtue of its long horizon, but it is not "cycle agnostic" in any sense. Put another way, we don't seek to time cycles within our framework, but our return forecasts are sensitive to the starting point. Arguably, the global economy today is more stable, which likely means longer and shallower cycles in the future as imbalances take longer to build up.

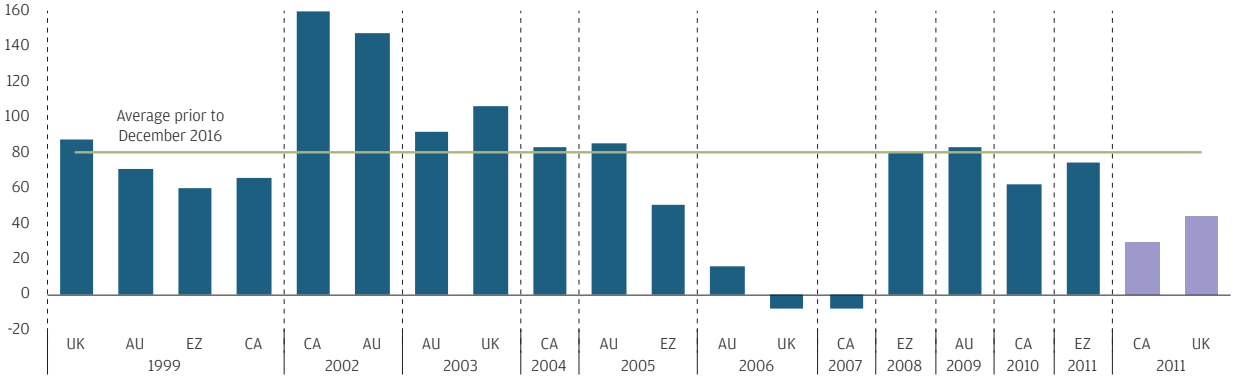
But just as downside risks are muted by a shorter inventory cycle, improved bank capitalization and steadier government spending patterns, the tools to stimulate an ailing economy are also blunted and forces that drove V-shaped recoveries in the past are fading. This likely means shallower recoveries and ever more inventive monetary policy. In short, it is likely that over the next decade policy rates are more often loose, with respect to the neutral rate of interest, than tight. Rates may remain below equilibrium for longer periods than in the past, as protracted periods of loose policy will probably be needed to stabilize future expansions.

Shallower and longer cycles that rely on prolonged stimulus will likely subdue interest rates, and this has major implications for debt dynamics. In our second paper, we explore government indebtedness — what might reduce it and whether governments either need to or want to reduce their debt levels. With rates likely to remain low and frequently below their neutral rate, there may be little incentive for governments to address debt levels over our 10- to 15-year forecast horizon. While this simply postpones the issue, it also means that anchoring our forward expectations to past averages for either sustainable debt levels or policy rates may prove incorrect. Perhaps, more profoundly, it also raises the question of whether the dual forces of rising government debt levels, and the growing exposure of central bank balance sheets to that debt, means we've passed the high water mark of central bank independence.

[3] Other trade disputes — e.g., NAFTA and with the European Union — we expect to be resolved through tariff negotiation, but the dispute with China at the time of writing appears less likely to be readily resolved.

Hiking cycles are often more globally synchronized; the U.S. yield curve is flatter today than the typical levels at which other regions would start their hiking cycles

EXHIBIT 4: U.S. 3-MONTH TO 2-YEAR BOND CURVE AT THE START OF MAJOR CENTRAL BANKS' HIKING CYCLE (BPS)



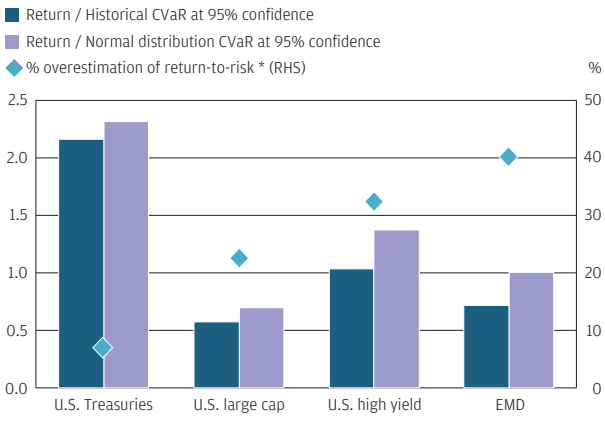
Source: Bloomberg, J.P. Morgan Asset Management; data as of October 2018.

Our third paper starts by looking at how the secular decline in interest rates has helped to catalyze an evolution of public equity markets from a venue primarily for raising investment capital to a venue used increasingly for cash distribution and balance sheet management. At the same time, private markets have grown in scale and scope to offer development capital to firms of all sizes. Today's large and accessible private asset markets offer potentially superior returns, subject to illiquidity risk and appropriate manager due diligence. Even as private assets have moved into the mainstream for investors, illiquidity risk – in both private and some public assets – can be a secondary consideration for many investors.

Common investment tools like Sharpe ratios take little direct account of liquidity, especially in periods of market stress, but other tools, such as CVaR (conditional value at risk) or Sortino[4] ratios, can be illuminating (**Exhibit 5**). And as late cycle plays out, ensuring proper compensation for illiquidity risk as well as market risk is crucial. Over the long term, public equity returns are likely to be dominated by income – leaving private asset markets to fill a return gap for investors and a funding gap for corporates. Ultimately, this demands new portfolio construction tools that account for the wider spectrum of risks that investors will need to assume to drive returns in the future.

Metrics that account for the distribution of risks as well as the average level of risks are valuable in late cycle

EXHIBIT 5: RETURN-TO-RISK RATIOS FOCUSED ON LEFT-TAIL RISK



Source: J.P. Morgan Asset Management Multi-Asset Solutions; data as of September 2018.

* Percentage difference between return-to-CVaR based on normal assumption and return-to-CVaR based on historical experience. Both CVaR measures are computed at 95% confidence level. See Volatility assumptions section for details.

The practicalities of managing a portfolio over the cycle is the focus of our final paper. Based on historical precedent, and a little humility, it is fair to say that most of us can neither predict the cause nor the timing of a downturn. However, we can make a reasonable assessment of the events that would wreak the greatest havoc in our particular portfolios. A shock caused by an excessive rise in interest rates may well have less impact on a liability-driven portfolio than on a long-only bond mutual fund, while a slump in corporate confidence and earnings might hit U.S. retail investors harder than their European peers, who generally own fewer stocks. If managing outside the mean is central to navigating the end of this cycle and locking in the more compelling secular returns that we anticipate, then identifying the non-linear exposures in specific portfolios is perhaps the best place to begin.

A common theme in our work this year is anticipation of discontinuity in the short term and accommodation of disequilibria in the long term. And yet we remain, at heart, quite optimistic. Our return numbers at equilibrium[5] are a little below the averages of the last 50 years, but after accounting for prevailing cyclical headwinds they are healthy enough. To be sure, investors may need to look for ways to complement existing investment frameworks. Managing outside the mean doesn't imply ignoring average return expectations and normalized risk-return profiles, but builds upon the traditional investing tool kit to better reflect tail risks and factors such as illiquidity. Nor does managing outside the mean suggest that we ignore equilibrium anchors, but it does imply that we should anticipate that some factors can stray from fair value for prolonged periods – especially given the unprecedented patterns of demographics, policy and market structure that look set to define the long-term investing environment.

[4] Conditional Value-at-Risk (CVaR): A risk assessment measure that qualifies the amount of tail risk in a portfolio, with a focus on less profitable outcomes, useful in unlikely scenarios. Sortino ratio improves the Sharpe ratio by isolating downside volatility from total volatility by dividing excess return by downside deviation.

[5] "At equilibrium" return numbers represent our forecasts assuming valuations, margins, credit spreads and interest rates to be at our fair value estimates rather than at prevailing market levels.

Selected LTCMA returns – Cyclical risks are building, weighing on returns and risk premia for equity and riskier credit

EXHIBIT 6: SELECTED LTCMA RETURNS (%)

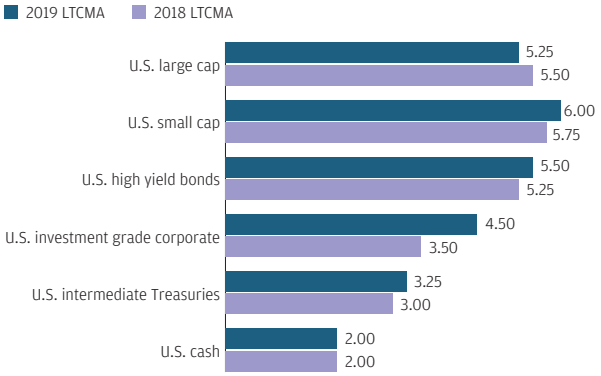
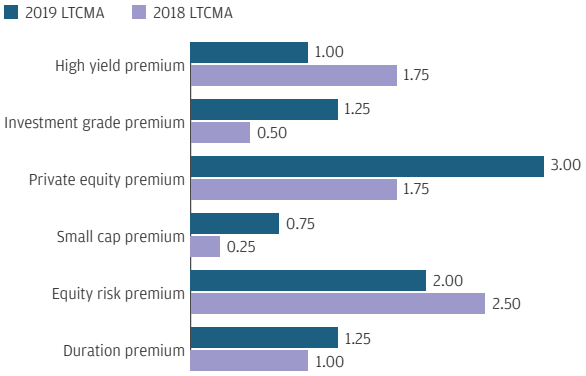


EXHIBIT 7: SELECTED LTCMA RISK PREMIA



Source: J.P. Morgan Asset Management; estimates as of September 30, 2017 and September 30, 2018.

MAJOR ASSET CLASS ASSUMPTIONS

Our stable long-term economic outlook this year translates into a fairly stable outlook for returns at equilibrium, with much of the variation in our asset return forecasts explained by market moves over the course of 2018 (**Exhibits 6** and **7**). At a global aggregate level, equity return expectations are little changed from last year, while our forecast for global government bond returns is slightly higher. There are meaningful regional differentials, mainly reflecting U.S. leadership in equity markets over 2018 and the more advanced state of policy normalization in U.S. rates.

Ex-ante Sharpe ratios for U.S. Treasuries now stand above those for U.S. equities, which is consistent with an economy late in its cycle. What is perhaps an important nuance is that the U.S. Treasury Sharpe ratio is boosted more by low interest rate volatility than by elevated returns. This may be an overhang of the loose monetary policy we have experienced over this cycle. In most other regions, however, equity Sharpe ratios are still higher than those for bonds, largely because policy normalization has yet to begin in many economies. The puzzle that investors face in judging the long-term global outlook in 2019 may be in deciding the extent to which patterns in the U.S. market will dominate risk appetite around the world – and in turn how much the U.S. will set the tempo for the entire global economic cycle.

FIXED INCOME – Flatter curves, lower yields

U.S. policy normalization has continued at a slow and steady pace. At the time of writing, U.S. cash rates and 10-year yields are close to our estimates of long-term equilibrium. We expect cash rates to rise further in this cycle but see less upside risk to long-end yields, likely leading to a flat or inverted yield curve at the end of this cycle, albeit at low absolute levels of rates. We see lower rates and flatter curves as a secular condition over the next 10 to 15-years, a view that reflects our dovish inflation outlook and anticipation of extended periods of stimulus as future business cycles elongate.

With U.S. rate normalization well advanced while other regions have yet to begin, there is a risk that this economic cycle might end before the hiking cycle outside the U.S. gets underway – raising the prospect of structural divergence in policy around the globe that transcends the current cycle. Cuts to equilibrium rate assumptions plus normalization[6] in some regions mean that our return expectations for global government bonds are slightly higher than last year. Credit and EM debt still offer the best return possibilities across fixed income over our forecast horizon. However, we would caution that their optically strong Sharpe ratios and contained volatility estimates probably do not capture the illiquidity risk that can manifest itself in stressed markets.

[6] Policy normalization in the U.S. has resulted in a more favorable starting point for U.S. bonds; for regions yet to begin normalizing rates (e.g., Europe), there is still a meaningful normalization penalty weighing on bond returns.

EQUITY – Turning a corner, returns hold steady

Our equity return forecasts for 2019 are largely a reflection of the variation in regional fortunes over the last year. Our forecast for U.S. equities, which led the pack in 2018, is down 25 basis points (bps) to 5.25%, and the U.S. equity risk premium (ERP) is now below long-term averages. By contrast, our forecast for EM equities, 2018's laggard, is up 50bps to 8.50%. This modestly widens the wedge between DM and EM equity return forecasts to 2.75% in USD terms and 3.00% in local FX. The underlying return drivers for DM and EM equities diverge further still in our 2019 forecasts, with as much as four-fifths of forecast returns in DM equity coming from dividends and buybacks, compared with less than one-third in EM equity.

One factor that unites both DM and EM equity is that stock markets in general are a lightning rod for de-risking when the economic cycle turns. So while investors must judge both how much risk to carry in late cycle and how far the cycle could run, we would reiterate that the equilibrium return assumptions for global equities are stable and reasonably attractive. Crucially, the cyclical elements that constrain returns today in some markets result in very different optimized portfolio allocations at prevailing return forecasts and at our expected equilibrium returns (**Exhibit 8**). What count for cyclical headwinds today – high valuations and wide margins – will become cyclical tailwinds after this cycle has troughed. A crucial consideration for any long-term investor in 2019 will be the trade-off between how much to continue to attempt to extract returns from risk assets in this cycle and how much "dry powder" to try and keep for the next one.

ALTERNATIVE ASSETS – Alpha gets you halfway

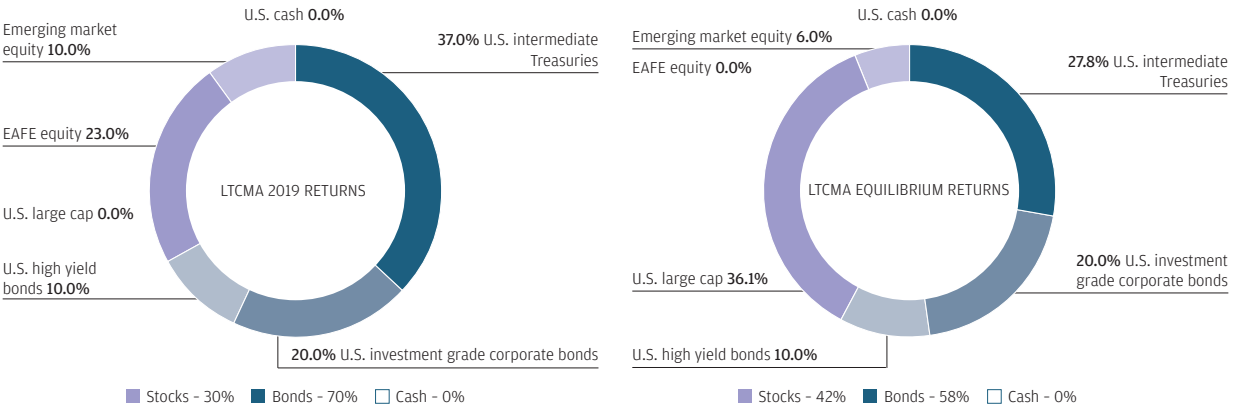
Alternative assets are a relative, and in some cases an absolute, bright spot in our 2019 assumptions. Improving alpha expectations in private equity result in an upgrade to our outlook this year. Elsewhere, return expectations across most other alternatives classes are little changed from last year, as the tailwind from lower fees roughly balances the headwind from lower public market returns. Given the paucity of returns in traditional asset classes, we expect that capital will continue to flood into alternative assets in search of enhanced returns – but probably pushing up valuations and eventually weighing on future returns. This prompts us to repeat our refrain that manager selection is the primary determinant of return across alternatives. Compensation for illiquidity and a modest boost to our alpha assumptions may get investors part of the way to their return aspirations in alternatives, but there really is no substitute for manager due diligence – especially given where we are in the economic cycle.

FOREIGN EXCHANGE – All roads lead to the dollar

Our forecasts for the major currencies this year are little changed, with our fair value estimate of EURUSD at 1.32 and USDJPY at 92, which illustrates the relative stability in our long-term economic outlook this year. The U.S. dollar remains well above fair value, but as price action over the last 12 months demonstrates, long-term valuation anchors have only limited influence on currencies' short-term trading patterns. Nevertheless, we expect that the dollar will weaken against most major crosses over our forecast horizon, boosting returns from international diversification for USD-based

An optimized liquid asset portfolio using our prevailing 10- to 15-year return assumptions looks very different from an optimized portfolio using equilibrium return estimates

EXHIBIT 8: LIQUID PORTFOLIO (EX-ALTS) WITH 2019 LTCMA RETURNS VS. EQUILIBRIUM RESULTS



Note: Stylized liquid asset portfolio mean-variance optimized for moderate risk tolerance using 1. LTCMA 2019 returns and 2. Equilibrium returns; max allocation constraints of 20% IG, 10% HY, 55% U.S. equity, 35% EAFE equity, 10% emerging market equity.

Source: J.P. Morgan Asset Management Multi-Asset Solutions; estimates as of September 30, 2018.

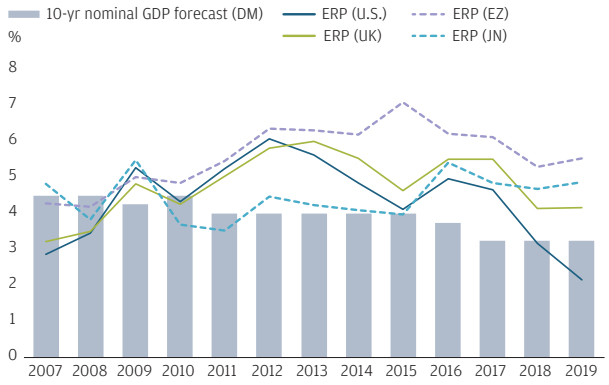
investors but having a rather more nuanced effect for non-dollar based investors. The Chinese renminbi will likely gain greater stature as an international reserve currency over the next decade. But despite concerns over U.S. deficits and debt dynamics that will only increase as time passes, we see little challenge to the dollar as the world's reserve currency over our forecast horizon. As a result, the trajectory of the greenback will continue to set the tone in currency markets.

IMPLICATIONS FOR INVESTORS

A couple of years ago, our secular growth forecasts were still falling but equity risk premia were elevated. Today our growth estimates are stable, but equity risk premia, notably in the U.S., are lower (**Exhibit 9**). The result is a progressive flattening of the U.S. stock-bond frontier, last year driven mostly by lower equity return expectations but this year largely driven by better bond returns. In other regions, where policy normalization has yet to begin, stock-bond frontiers are steeper even though returns for a 60/40 stock-bond portfolio are lower in absolute terms.

Estimates for equity risk premia are falling, especially in the U.S., even though GDP growth forecasts are stable

EXHIBIT 9: LTCMA IMPLIED EQUITY RISK PREMIA (ERP), % PER ANNUM

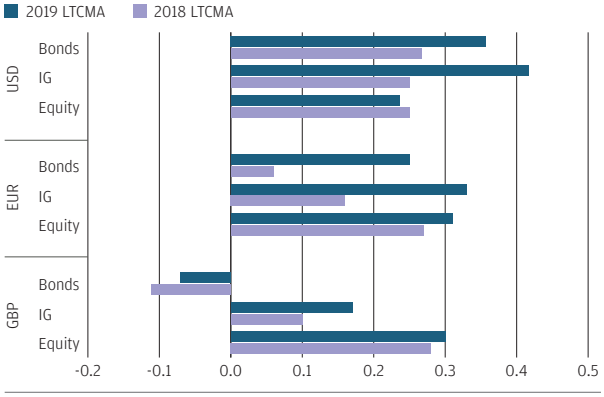


Source: J.P. Morgan Asset Management Multi-Asset Solutions; estimates as of September 2018.

The pattern also holds in regional Sharpe ratios: U.S. bond Sharpe ratios are ahead of those for U.S. stocks, but in Europe the reverse is true (**Exhibit 10**). The relative shape of stock-bond frontiers and rank order of Sharpe ratios in various currencies reflect the regional differences in stages of the business cycle and policy normalization rather well. But they won't tell us when a downturn may hit, where it will start and how it could spread, or what the distribution of returns might be in stressed markets.

For the first time since the crisis, U.S. bond Sharpe ratios are well ahead of those for U.S. stocks, but in Europe the reverse is true

EXHIBIT 10: SELECTED SHARPE RATIOS FOR G3 CURRENCIES



Source: J.P. Morgan Asset Management; estimates as of September 30, 2017 and September 30, 2018.

Looking ahead, a recession is virtually inevitable over the next decade and likely to occur sooner rather than later in our 10- to 15-year horizon. Many investors fixate on the precise catalysts and shape of the next downturn — and specifically on avoiding it. Yet market timing is notoriously tricky. We believe that focusing on staying in the game through a contraction and evaluating the possible contour of the next cycle is the more effective approach over the long run.

For any investor — even those with a longer-term horizon — navigating late cycle means recognizing what a traditional mean-variance-based framework can tell us and what it cannot. A relatively flat U.S. stock-bond frontier (**Exhibits 11A** and **11B**) tells us that de-risking is becoming more attractive, but it doesn't tell us whether policy rates outside the U.S. will normalize before the cycle rolls over. Relatively high Sharpe ratios in U.S. high yield and EM debt tell us that credit is attractive over a whole cycle, but don't tell us whether there will be the liquidity to cut positions in a weak market. And average long-term return forecasts for eurozone stocks that are three-quarters of a point above those for U.S. stocks don't tell us whether the skew of actual returns might be to the left in Europe but to the right in the U.S.

Managing outside the mean late in the cycle entails not only optimizing to market risks evident in our traditional frameworks, but also recognizing the risks they don't capture and, most importantly, ensuring those are compensated.

Turning to the long-term investing environment, we believe that identifying which elements of the current cycle might evolve into structural hallmarks of the next one is an important exercise; in particular, where they may lead apparently cyclical dislocations to become permanent or

cause accepted equilibria to reset. After all, mean-reversion is a powerful force, but it is not infallible. Differentiating among those dislocations that may be persistent, rather than merely stubborn, is critical in understanding the secular economic and investment environment.

We imagine that it is in policy rates where persistent dislocations are most likely to arise, as flatter cycles less sensitive to stimulus hold policy rates below equilibrium for long periods. This could in turn stoke asset prices, driving future rounds of asset inflation without associated price inflation. The new technology trends we wrote about last year[7] only serve to contain price and wage inflation further, even as they boost real growth and productivity. To the extent that such an environment reinforces economic inequality, the temptation for governments to borrow to fund fiscal stimulus is a good reason to think that national debt levels are unlikely to mean-revert anytime soon. In our view, policy rates, government balance sheets, market structure patterns and inflation trends all represent structural shifts in the investing environment that a simple mean-reversion framework is unlikely to capture.

To help meet these challenges, investors will be well served by focusing on more active investment around secular themes such as technology, and the growth in alternative assets, as well as ensuring all elements of risk – not merely market risk – are appropriately rewarded. For larger, more constrained or more risk-averse investors, the ability to de-risk efficiently as expected bond returns rise in some markets helps with staying in the game in late cycle, and in positioning for the next one. And for investors with deeper pockets or limited mark-to-market pressure, attractive Sharpe ratios on some less liquid assets create the potential to enhance returns over the long run, albeit with some nearer-term volatility. In any case, navigating late cycle doesn't mean avoiding risk, but it does mean knowing the risks you're taking.

[7] "The impact of technology on long-term potential economic growth," 2018 *Long-Term Capital Market Assumptions*, J.P. Morgan Asset Management, 2017.

Compared with last year, expected returns on a U.S. 60/40 portfolio are slightly better and improved bond returns have rotated the stock-bond frontier clockwise; by contrast, in Europe returns and frontiers are unchanged, reflecting that Europe has lagged the U.S. in policy normalization

EXHIBIT 11A: USD STOCK-BOND FRONTIERS AND 60/40 PORTFOLIOS BASED ON 2019 VS. 2018 LTCMAS FOR RISK AND RETURN (%)

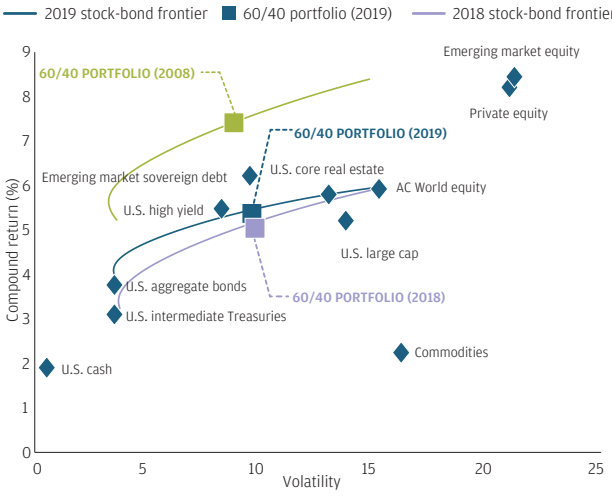
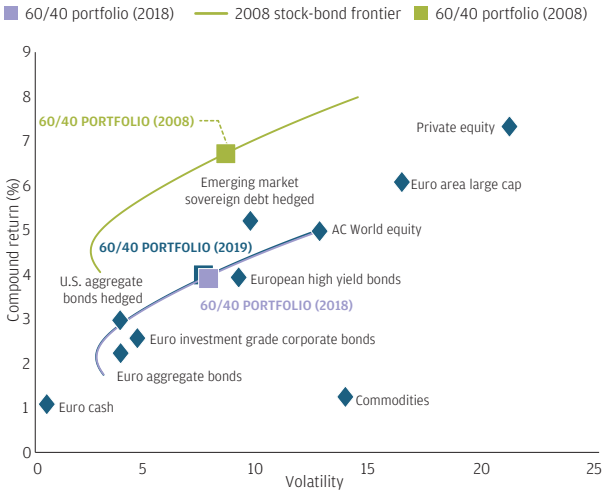


EXHIBIT 11B: EUR STOCK-BOND FRONTIERS AND 60/40 PORTFOLIOS BASED ON 2019 VS. 2018 LTCMAS FOR RISK AND RETURN (%)



Source: J.P. Morgan Asset Management Multi-Asset Solutions; estimates as of September 30, 2017 and September 30, 2018.

MACROECONOMIC ASSUMPTIONS

Stable forecasts of moderate growth and inflation

Michael Hood, *Global Strategist, Multi-Asset Solutions*
Dr. David Kelly, CFA, *Chief Global Strategist, Head of Global Market Insights Strategy*
Benjamin Mandel, Ph.D., *Global Strategist, Multi-Asset Solutions*

IN BRIEF

- This year's edition of our Long-Term Capital Market Assumptions (LTCMAs) makes few significant changes to the forecasts for GDP growth and inflation that underlie each asset class outlook.
- Our unchanged developed market (DM) growth projections lie below long-term historical averages, largely because of demographic forces. Among the four major DM economies, we think the U.S. will deliver the fastest pace of economic growth.
- Emerging market (EM) economies will continue to outgrow their DM counterparts, with India and China leading the way. We expect the gradual deceleration in Chinese growth underway during the past five years will persist over our forecast horizon.
- Fairly stable inflation will prevail at the global level. U.S. inflation will likely spend more time below target than above it; we slightly downgrade our U.S. CPI forecast.

In this 2019 edition of our Long-Term Capital Market Assumptions, we are not significantly changing the macroeconomic forecasts that underlie each asset class outlook. Indeed, our developed market economy growth projections have not moved compared with last year (**Exhibit 1**). For these countries, we continue to expect modest growth by historical standards, mostly because of weaker demographics. In some cases, however, our DM forecasts imply acceleration relative to average performance over the past decade. Continuing a trend that began in 2018, we see more upside risk to our DM projections than was generally the case in earlier years. By contrast, a handful of our emerging market economy growth numbers have fallen. These adjustments bring down the EM growth aggregate by 0.25 percentage points, but we continue to expect EM economies to expand considerably faster than their DM counterparts during the next 15 years, given still-ample space for gradual convergence toward DM income levels. Our 1.50% forecast for DM growth and our 4.25% EM figure combine to imply 2.50% global real GDP growth during our forecast horizon, the same as in 2018.

Our long-term inflation forecasts have shifted a bit more this year, although the aggregate levels are unchanged, with DM inflation averaging about 1.75% and EM inflation at 3.50%. In most cases, over the long run inflation seems likely to run fairly close to central bank targets. We recognize, however, that the distribution of inflation outcomes in many countries has changed during the past decade or so, with more low-side readings and fewer high outcomes. Put another way, inflation has shown a greater tendency to linger at low levels in post-recession environments, without overshooting strongly when the economic cycle is more advanced. While outright deflation remains a rare outcome, the risk to our base case inflation forecasts likely tilts to the downside.

GDP GROWTH: LONG-TERM DRIVERS

In setting our growth projections, we attempt to define a long-term trend or potential rate of expansion for each economy. In doing so, we focus on slow-moving drivers of capacity growth, which fall into three categories:

- **Labor input**, the growth rate of the labor force and the rate of improvement in human capital, along with any expected change in average hours worked.
- **Capital stock growth rate**, a reflection of investment spending.
- **Total factor productivity (TFP)**, which owes primarily to technological change, at least in DM economies.

We take a similar approach for emerging markets, with one nuance: Here, we think about TFP growth as reflecting varying speeds of convergence toward the global technological frontier rather than the movement of that line itself.

Our 2019 assumptions anticipate slow real GDP growth globally; global growth assumptions are little changed from last year at the aggregate level, with most developed-market projections stable

EXHIBIT 1: MACROECONOMIC ASSUMPTIONS (%)

	2019 assumptions		2018 assumptions		Change (percentage points)	
	Real GDP	Inflation	Real GDP	Inflation	Real GDP	Inflation
DEVELOPED MARKETS	**1.50**	**1.75**	**1.50**	**1.75**	**0.00**	**0.00**
U.S.	1.75	2.00	1.75	2.25	0.00	-0.25
Eurozone	1.50	1.50	1.50	1.50	0.00	0.00
UK	1.25	2.00	1.25	2.00	0.00	0.00
Japan	0.50	1.00	0.50	1.00	0.00	0.00
Australia	2.00	2.50	2.00	2.25	0.00	0.25
Canada	1.50	1.75	1.50	1.75	0.00	0.00
Sweden	1.75	1.75	1.75	1.75	0.00	0.00
Switzerland	1.25	0.50	1.25	0.75	0.00	-0.25
EMERGING MARKETS	**4.25**	**3.50**	**4.50**	**3.50**	**-0.25**	**0.00**
China	5.00	2.75	5.00	2.75	0.00	0.00
India	7.00	5.00	7.00	5.00	0.00	0.00
Brazil	3.00	4.75	3.00	5.00	0.00	-0.25
Russia	1.25	5.50	1.50	5.50	-0.25	0.00
GLOBAL	**2.50**	**2.25**	**2.50**	**2.50**	**0.00**	**-0.25**

Source: J.P. Morgan Asset Management; estimates as of September 30, 2018.

* Emerging markets aggregate derived from nine-country sample.

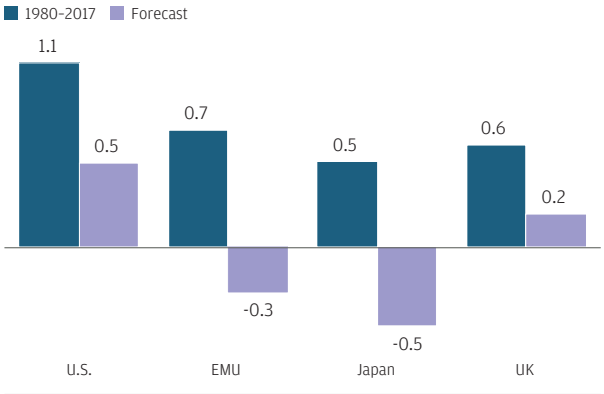
DM GROWTH: LABOR FORCES ACCOUNT FOR DIFFERENCES

Our unchanged DM growth projections lie below long-term historical averages, largely because of demographic forces. With population growth slower than it has been in the past and age structures (the distribution of a population's ages) now tilted toward older people, labor forces are increasing more sluggishly than before (**Exhibit 2**). On the high side, we expect 0.7% annual average labor supply growth in Australia; at the other end of the spectrum, Japan's labor force will likely shrink by 0.5% annually. At a 0.5% rate, the U.S. should benefit from relatively favorable labor supply trends, although even that figure falls well short of the 1.3% annual average labor force growth sustained as recently as the 1990s.

To estimate labor supply growth, we begin with the U.S. Census Bureau population projections for each country and then make assumptions about how participation in the labor force will evolve. Possible swings in immigration flows notwithstanding, there is little uncertainty about the population figures themselves over this time frame. After all, every person who will be of working age during our forecast horizon (the next 15 years) has already been born. More doubt attaches to labor force participation. We run a variety of scenarios for each economy, separating the age 15–64 population from those 65 and older (who are less likely to be involved in the labor force but whose participation has been rising in many countries).

Labor forces are increasing more sluggishly

EXHIBIT 2: DM LABOR FORCE GROWTH HISTORY AND FORECAST (% P.A.)



Source: Haver Analytics, J.P. Morgan Asset Management; data as of September 30, 2018.

Recent trends justify some optimism about participation in both cohorts, and we see modest upside risk to our forecasts. Even the most optimistic scenarios, though, would translate into only about a 0.25 percentage point (ppt) boost to expected GDP growth, relative to our baseline figures.

One question concerns possible effects of the more flexible working arrangements of the "gig economy," which conceivably could boost labor supply by allowing contributions from people who were previously sidelined. For now, we do not adjust our projections for two reasons. First, recent studies have shown that such jobs still represent a small minority of total employment. Second, the part-time nature of much of this work means that a decline in average hours worked could serve as a partial offset to any boost in the number of persons employed. In coming years, though, our forecasts will likely need to grapple further with the effects of these flexible arrangements and what they may mean for labor supply and other aspects of potential growth.

Our forecasts for TFP growth have edged higher this year vs. 2018. To be sure, evidence from the past year or so, especially outside of the U.S., does not yet suggest any acceleration from the generally weak TFP growth experienced since the financial crisis. That said, with seemingly rapid technological advances occurring in many fields, an eventual pickup in measured TFP growth, at least back toward historical norms, seems increasingly plausible. Our forecasts expect TFP to add 0.7ppt to GDP growth in the U.S., which we think of as a vanguard country in this respect; the boost is slightly less in other DM economies.

Combined with our assumptions about capital stock evolution, these labor supply and TFP expectations generate a 1.75% rate of average U.S. real GDP growth, in line with our estimates of the past two years. We continue to see the U.S. leading the way among the four major DM economies, with the euro area in second place at 1.50%. Although it suffers from significantly weaker demographics, the euro area is expected to benefit from three key factors: the ongoing take-up of the spare capacity created, especially in the labor market, by two recessions since 2009; rising workforce participation as labor market reforms pursued in several countries during the past decade take hold; and greater improvement in human capital as educational standards rise in economies such as Italy and Spain. We think UK growth will average 1.25%, with a penalty associated with the country's departure from the European Union and the associated deterioration in its foreign trade arrangements. Admittedly, uncertainty around this forecast remains high, as the exact nature of the UK's exit has not yet become clear. Japan, with its rapidly declining workforce, brings up the rear at 0.50%. The Japanese labor force has surged in the past few years, boosting growth, but with the country's labor force participation already quite high, we do not expect this trend to persist through our forecast horizon.

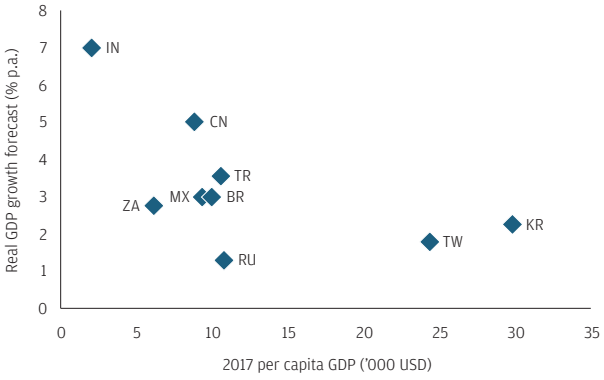
EM GROWTH: CONVERGENCE TO CONTINUE

As in prior years, we expect EM economies to outgrow their DM counterparts during our forecast period, with India and China – where per capita GDP remains fairly low compared with DM levels – leading the way (**Exhibit 3**). In parts of the EM universe, this outperformance reflects more favorable demographics, but population growth has already slowed sharply in other EM countries. Indeed, labor forces are expected to shrink during our forecast horizon in Korea, Taiwan and Russia, and to grow at a pace similar to the U.S. in China, Brazil and Turkey.

Larger EM-DM differences appear in other aspects of growth: in TFP, where EM economies can potentially converge toward the global frontier by adopting existing technology and best practice industrial organization techniques; in human capital, where educational standards are rising more rapidly than in already highly educated DM societies; and in investment, as many EM economies possess capital stock-to-GDP ratios below DM levels.

EM economies will continue to outperform their DM counterparts, although labor force growth is slowing in some countries

EXHIBIT 3: EM PER CAPITA GDP AND GROWTH FORECAST



Source: Haver Analytics, J.P. Morgan Asset Management; data as of September 30, 2018.

Our growth projections have not changed for three of the largest EM economies: China, India and Brazil. We expect the gradual deceleration in Chinese growth underway during the past five years to continue bringing growth to a 5.00% average for our forecast horizon. To be sure, the prime-age Chinese population will shrink over this period, but continued urbanization should provide an offset. Moreover, China has established a favorable track record of convergence via technology adoption and international trade specialization. Current tensions on the trade and technology-transfer fronts thus represent downside risk to our forecast. As has been the case in recent years, India leads the way in our growth forecasts, at 7.00%, helped by favorable demographics, improving human capital and its low starting point in per capita GDP, leaving corresponding room for catch-up. Our Brazil projection remains at 3.00%, supported by a weak cyclical starting point that has generated significant spare capacity but held back by uncertainty about the policy framework likely to prevail in coming years. We have cut our Russia forecast to 1.25%, extending a trend underway in recent years. Not only does Russia face an unfavorable demographic outlook with a declining workforce, but its commodity-centric economic structure, closed political system and vulnerability to international sanctions are likely to restrict TFP growth persistently.

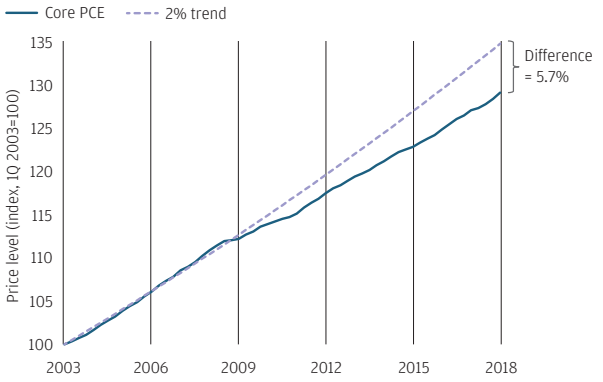
INFLATION: INCREASINGLY ASYMMETRIC AROUND TARGET

While we maintain a fairly stable outlook for inflation at the global level, we have made some country-level modifications to account for trends in the distribution of inflation outcomes. When making long-term inflation forecasts, we combine a view of the equilibrium rate of inflation – often governed by central bank targets – with specific features of the inflation process at the country level. As such, our projections represent a joint assessment of both the end point and the expected future path of price growth.

Among developed market forecasts, we scrutinize most closely our outlook for U.S. inflation. On the one hand, we believe that the Federal Reserve has maintained credibility in its 2% target for the personal consumption deflator (about 2.25% for CPI growth) and, indeed, the gravitational pull of its target has contributed to core CPI rising through 2% this year. On the other hand, we have just come to the end of a very long period in which inflation undershot its target, accompanied by a fattening of the inflation distribution's left tail. As policymakers' priorities for the coming years become clear, we arrive at the sobering conclusion that U.S. inflation is likely to spend more time below target than above it in the next 10 to 15 years (**Exhibit 4**). Binding constraints for inflation's path include what we perceive to be limited tolerance by policymakers for an inflation overshoot, and the high probability that policy interest rates return to the zero lower bound in the next recession, constraining the ability of monetary policy to boost demand and prices. Both of these constraints imply more undershooting of the target than overshooting over the next cycle. Balancing these considerations, we downgrade the U.S. CPI forecast by 25 basis points (bps), to 2%.

U.S. inflation will likely undershoot the Fed's target for much of the next cycle

EXHIBIT 4: U.S. CORE INFLATION VS. TREND



Source: Haver Analytics, J.P. Morgan Asset Management; data as of May 31, 2018.

In the other G4 economies, our projections are unchanged relative to last year. In the euro area, low inflation is a headwind insofar as expectations may have drifted downward, but we are comfortable with 1.5% as a reasonable discount to the European Central Bank's 2% inflation ceiling. In the UK, trailing inflation is near the Bank of England's target and the historical distribution is diffuse and roughly symmetric, keeping us at 2%. Finally, recent decades of history are not especially relevant in forecasting inflation in Japan, as they reflect a period when inflation expectations were anchored in negative territory. A gradual upward drift toward the Bank of Japan's 2% target — with a dynamic similar to the improvement observed over the past five years — is consistent with a 1% average realization over our forecast horizon.

Emerging markets present several general differences in the nature of their inflation dynamics relative to developed markets. First, inflation volatility is higher across the board, reflecting a somewhat weaker monetary policy anchoring, as well as the stronger influence of food prices and exchange rate volatility on domestic prices. These observations are related to the fact that EM inflation distributions tend to have fatter right tails, as blowouts in food and FX occasionally push inflation dramatically higher.

We make two kinds of revisions to our EM inflation forecasts. The first addresses the set of economies displaying more classical EM inflation characteristics. Mexico and Turkey, for example, have both been running inflation persistently above target, and currency volatility is adding significant skewness to inflation outcomes. Taking these developments into account, in Mexico's case we increased our forecast by 25bps to 3.5%, while noting that higher inflation drivers will be mitigated to some extent by expected peso appreciation over time. In Turkey, our forecast climbed 50bps to 7.5%, reflecting underlying erosion in central bank credibility. Brazil's estimate fell 25bps in light of an unusually low starting point as well as a likely headwind from currency appreciation and the imminent reduction in the central bank's target.

The second group of revisions relates to economies where inflation dynamics have begun to trend in the direction of their DM counterparts. In China and Korea (where, to be sure, the underlying drivers of inflation are distinct from developed markets'), inflation outcomes have moved lower, as have measures of inflation volatility and skewness. We believe that in addition to their lower starting points, these distributional changes are indicative of inflation dynamics that are becoming more inertial, supporting a downgrade of our Korean inflation projection by 25bps.

I Thematic articles

Fewer recessions but weaker recoveries

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IN BRIEF

- The U.S. economy has become more stable over time. Analysis of the components of aggregate demand suggests that this is primarily due to smaller inventory cycles and less disruption from big swings in government spending and housing.
- The U.S. economy has gradually seen slower growth, along with increased stability. However, simulation models suggest that, in predicting the frequency of recession, diminished macro volatility is more important than diminished average growth. This in turn suggests that recessions should occur less frequently than in the past and be milder than the average historical experience. It also, however, implies that future recoveries will be less robust.
- Extending the analysis outside the U.S. generally yields the same prediction – fewer and smaller recessions but weaker recoveries over our forecast horizon.
- It should be noted that this growing stability in the macro economy provides no guarantee that the next financial market downturn will be similarly mild. How investors fare in such a downturn will depend on both its causes and how portfolios are positioned when the downturn begins. We examine this issue in "Building investor resilience in a downturn."

INTRODUCTION

Our Long-Term Capital Market Assumptions are deliberately neutral with respect to the timing of business cycles. We recognize that within a 10- to 15-year forecast horizon, most economies will experience one or more recessions and that these recessions will impact the overall average pace of economic growth, inflation, interest rates and asset class returns. However, timing these recessions, particularly over such a long horizon, would be an overly ambitious goal, and in most cases subsequent recoveries will undo many of the impacts of the recessions themselves.

Still, we should not be blind to the changing nature of business cycles. Excluding the very deep global recession that was triggered by the global financial crisis, recessions have generally become milder and less frequent in recent decades, with correspondingly shallower recoveries. In this paper, we examine why this has been the case and what it implies for the cyclical behavior of economies in our forecast. We start with a brief review of the 11 post-World War II recessions in the U.S. This is followed by an examination of the causes of greater GDP stability and a simple model of recession dynamics, from which we derive probable U.S. recession frequency and depth over the next 15 years. We focus chiefly on the U.S., in part because of better historical data but also because U.S. recessions have often precipitated downturns overseas. We conclude with a brief look at some other economies' business cycles to determine common trends. In what has become a slower-growing but more stable global economy, we expect downturns to be less severe and recoveries less robust.

It is also important to recognize that while a milder business cycle could help reduce the size of financial market downturns, it provides no guarantee of this. This makes investor outcomes at least as dependent on portfolio positioning as macro stability. More broadly, outcomes will be driven by the impact of macro events on investors' wider circumstances and the impact of market events on their portfolios.

A BRIEF HISTORY OF U.S. POST-WORLD WAR II RECESSIONS

Massachusetts Institute of Technology economist Rudi Dornbusch famously remarked that postwar expansions "were all murdered by the Fed." That assessment is a bit of an exaggeration. Federal Reserve policy tightening has played a supporting role in triggering a few recessions, but tightening through prior expansions has largely been the appropriate response to accelerating demand, arguably leading to softer landings than would otherwise have occurred in overheating economies.[1]

Instead, the causes of U.S. recessions have been multifaceted and are not perfectly understood, even in hindsight. That said, each of the 11 postwar recessions since 1947 has some evident contributors. The first two, beginning in 1948 and 1953, seem to have been affected by demobilization and peacetime adjustment following, respectively, World War II and the Korean War. For the following nine recessions, a series of other factors all played contributing roles (**Exhibit 1**). The cause of one recession, the downturn that began in 1990, remains less clear.

Postwar recessions have varied causes

EXHIBIT 1: U.S. RECESSION STATISTICS

Recession start date	Duration (months)		Most evident cause
	Expansion	Recession	
August 1957	39	8	Fiscal tightening
April 1960	24	10	Monetary tightening
December 1969	106	11	Fiscal tightening
November 1973	36	16	Oil price shock
January 1980	58	6	Oil price shock
July 1981	12	16	Monetary tightening
July 1990	92	8	Unclear
March 2001	120	8	Equity bubble popped
December 2007	73	18	Financial crisis

Source: U.S. Bureau of Economic Analysis, J.P. Morgan Asset Management; data as of September 30, 2018.

The most recent recessions, beginning in 2001 and 2007, were sparked by financial shocks. While the bursting of the dot-com bubble in 2000–01 led to one of the shallowest postwar downturns, the subprime mortgage crisis of 2007–10 resulted in the deepest since the Great Depression. Factors explaining the different outcomes include differences in the sizes of markets involved; the distribution of ownership of impaired assets, especially by systemically important financial institutions; and the size of directly affected sectors in relation to the real economy.

[1] There are two notable exceptions, when Fed policy focused solely on inflation: the recessions starting in 1960 and 1981. In the more famous instance of 1981, growth collapsed after Paul Volcker's Fed raised the federal funds rate to 17.6% in April 1980 to combat high inflation, throwing the economy into a second recession. This policy move and subsequent recession helped to pave the way for today's lower and more anchored inflationary expectations.

SOURCES OF GREATER STABILITY

U.S. economic growth has become more stable over the past seven decades. Analyzing the variance and covariance of real growth and its subcomponents, we can identify several factors that have contributed to this stability.[2] Moreover, a number of factors that have added to variance — that is, made real GDP growth less stable — also have become apparent.

Our analysis examines the variance of quarterly changes in U.S. real GDP over rolling 10-year periods, with the first ending in the fourth quarter of 1957.[3] We find the subcomponent contributions to the change in volatility by calculating the contribution to quarterly real GDP growth of the 11 major sectors defined by the U.S. Bureau of Economic Analysis.[4]

Smarter and smoother inventory management

Lower inventory volatility has been a significant factor in increased economic stability (**Exhibit 2**). Improved inventory management has enabled corporations to adjust production capabilities more rapidly through just in time management. As a result, we see diminished evidence of inventory booms and busts, which in turn means fewer shocks to the economy.

Predictability in the housing sector

The decline in housing sector cyclicality has also contributed to increased economic stability. This decline reflects both a decreased overall demand for housing and diminished volatility in housing starts. In the past 10 years, housing starts have averaged 904,000 per month; in the five decades prior, average starts were nearly twice as high. This downward trend is likely a side effect of shifting demographics.

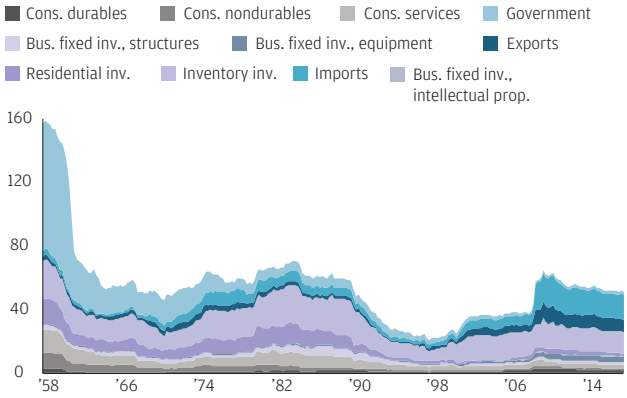
Perhaps more significantly, the standard deviation of housing starts over the last decade has fallen by nearly 25%. A persistently low interest rate environment, coupled with earlier deregulation of interest paid on deposits, has allowed for smoothed demand over time.

Smaller government, bigger economy

In recent decades, a reduced reliance on government spending helped make the economy more stable — in some ways, a counterintuitive finding. In 1957, government spending contributed nearly as much as consumption to GDP; this contribution has since decreased by roughly half, while consumption's contribution has increased by roughly a quarter. At the same time, government spending variance has fallen.

GDP variance has come down over time

EXHIBIT 2: AGGREGATE VARIANCE BY SUBCOMPONENT, 10-YEAR ROLLING PERIOD



Source: U.S. Bureau of Economic Analysis, J.P. Morgan Asset Management; data as of September 30, 2018.

A large component of this decline likely reflects historical trends. Public infrastructure investment, for example, was significantly higher in earlier decades, with the construction of the U.S. interstate highway system in 1956 providing a considerable tailwind to growth. Government expenditures on war were also substantial relative to the size of the U.S. economy. That said, it appears that high historical variance was perhaps more in measured GDP than in a broader assessment of real economic activity: In the early postwar years, government employment saw little volatility.

The implications of diminished covariance

It is worth noting that the covariance of GDP subcomponents has also declined over time (**Exhibit 3**). For example, whereas historically a fall in housing demand could slow consumption, possibly resulting in inventory mismanagement and weakened investment spending, today's economy is more resilient. Individual subcomponents are more insulated; in fact, GDP covariance has largely been negative since the turn of the century.

[2] Variance is broadly defined as how far a set of numbers are spread from their average value. Covariance is broadly defined as the measure of joint variability of two numbers.

[3] As a result, the scope of the analysis covers data beginning in 1947. This encompasses nearly the entirety of the postwar period.

[4] These are consumer durables, consumer nondurables, consumer services, business fixed investment in structures, business fixed investment in equipment, business fixed investment in intellectual property, residential investment, inventory investment, exports, imports and government.

The trade drag

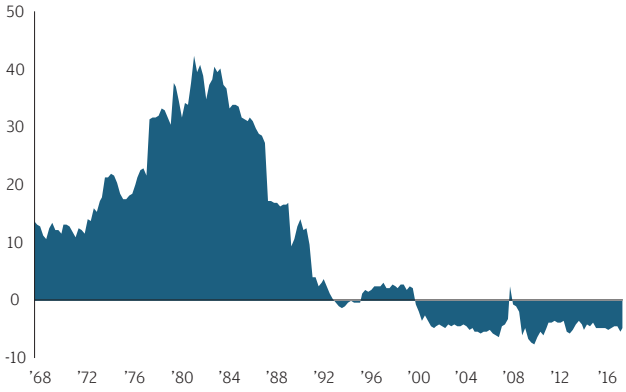
Trade has become an increasingly important part of the U.S. economy. Exports now account for roughly 14% of GDP, while imports are close to 19%.[5]

At the same time, the variance of these subcomponents has increased meaningfully, particularly for imports, which contribute roughly a quarter to overall GDP variance. Most of this increase happened recently, with variance doubling over the last decade. This may be attributable to the shifting nature of demand for overseas goods — consumer electronics are disproportionately produced overseas, for example — and large fluctuations in the U.S. dollar over the past decade, the unsurprising fallout from global economic and political turmoil.

We note, however, that higher import variance may not necessarily be a drag on economic growth, since large contractions in imports, particularly in response to recessions, can help bolster the economy.

GDP covariance has declined in recent decades

EXHIBIT 3: AGGREGATE COVARIANCE OF GDP BY SUBCOMPONENT, 10-YEAR ROLLING PERIOD



Source: U.S. Bureau of Economic Analysis, J.P. Morgan Asset Management; data as of September 30, 2018.

ULTIMATE CAUSES OF STABILITY

Although the average pace and volatility of quarter-to-quarter real GDP growth can be seen as the direct cause of successive negative quarters, thus meeting the unofficial definition of recession, history has often also revealed more ultimate causes, deeper imbalances that build up over many quarters or years. These might be unsustainable levels of demand, often manifesting as runaway price inflation, or rapid expansions of credit. Rapid monetary policy tightening, one evident cause of recessions historically, is often an attempt to correct these imbalances.

[5] Exports at 13.9% as of 2Q 2018; Imports at 18.5% as of 2Q 2018.

Expansions do not die of old age, but neither is recession risk constant, as underlying imbalances become more threatening as the economy progresses through the cycle. And because expansions now last longer than they have historically, there is more time for these threats to take hold. Wages and inflation tend to accelerate only once labor slack has tightened; spending tends to become stretched only once sentiment becomes exuberant. These factors are correlated and interconnected. A tighter job market, for instance, will tend to produce more optimistic households.

Other developments can make the expansion more fragile. As households grow increasingly confident, their saving rates tend to decline. All else equal, a lower saving rate means less buffer against a real income shock — from, say, a jump in the oil price. This could lead to a decline in real consumption. And once the economy has recovered fully and closing the output gap no longer provides a tailwind, the trend rate of growth slows.

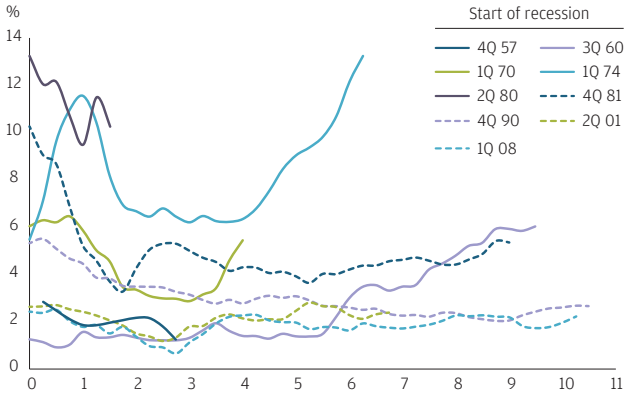
Some of these ultimate contributors to past recessions have faded in their relevance, and it is this change that is most relevant to the potential frequency of future recessions. Specifically:

- Inflation: Today runaway inflation seems unlikely to force a rapid tightening of monetary policy; over the last several decades, U.S. CPI has not only declined in magnitude but also grown less cyclical (**Exhibit 4**). Secular explanations range from the increased credibility of central bank inflation targets to the declining significance of labor unions and the offshoring of jobs. The increased sophistication of monetary policy also means that the Fed is less likely to tighten too aggressively in response to any threat of future inflation acceleration.
- Credit: The role of credit has also changed, but in more nuanced ways. On the one hand, easier access to revolving consumer loans has smoothed household consumption, making it less dependent on current income and savings. On the other hand, the expanding level of credit (**Exhibit 5**) poses its own risks: A credit bubble in the residential housing sector was a key contributor to the last recession. Aggregate private sector credit as a share of GDP is still increasing, and it is becoming notably extended in the nonfinancial corporate sector. Although regulation has made bank balance sheets more resilient, the threat of rapid credit expansions has not disappeared.

Other ultimate contributors to past recessions remain as relevant as ever. The economy will continue to be susceptible to unsustainable booms in investment and consumption, and rising income inequality will likely mean that a greater share of the population is living paycheck to paycheck, with little buffer against an adverse price shock or lost income.

Inflation has grown more quiescent and less cyclical

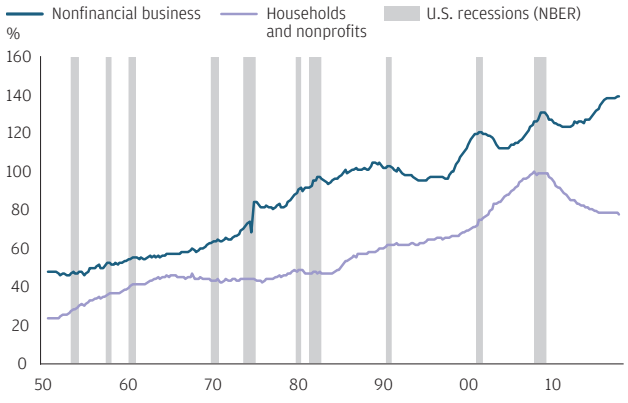
EXHIBIT 4: U.S. CORE CPI BY EXPANSION, % OF GDP Y/Y



Source: U.S. Bureau of Labor Statistics, NBER, J.P. Morgan Asset Management; data as of September 30, 2018.

Recession-inducing bubbles may still lurk

EXHIBIT 5: U.S. PRIVATE NONFINANCIAL SECTOR LIABILITIES AS % OF GDP



Source: U.S. Bureau of Economic Analysis, Federal Reserve, NBER, J.P. Morgan Asset Management; data as of September 30, 2018.

FUTURE U.S. RECESSIONS: LESS FREQUENT AND LESS DEEP, BUT WITH SLOWER RECOVERIES

What might be the frequency and depth of recessions over the next 15 years, given that the economy has become more stable over time? To answer that question, we have constructed a simple model of recession dynamics.

While the National Bureau of Economic Research, the unofficial scorekeeper of the U.S. business cycle, has a more complicated definition,[6] many economists describe a recession as the occurrence of two or more consecutive quarters of negative real GDP growth. Using this formulation, and looking purely at the pattern of real GDP growth over time, the probability of recession becomes a function of three parameters: (1) the average pace of real GDP growth; (2) the volatility of real GDP growth; and (3) any positive or negative correlation between real GDP growth rates over time. Specifically, the probability of recession falls when average growth rates are higher and rises when growth is more volatile. The probability of two consecutive negative quarters also rises when one quarter's growth is positively correlated with next quarter's growth, since this increases the chances of relatively rare negative quarters clustering together.

[6] A "recession is a significant decline in economic activity, spread across the economy, lasting more than a few months, normally visible in real GDP, real income, employment, industrial production, and wholesale-retail sales." "U.S. Business Cycle Expansions and Contractions." National Bureau of Economic Research, April 23, 2012, http://www.nber.org/cycles/cyclesmain.html.

MONTE CARLO SIMULATION

A simple econometric equation explaining quarterly percentage changes in real U.S. GDP, with a constant and a lag of its own value, allows us to calculate the historical value of all three parameters (the average level, variance and serial correlation of real GDP growth). We estimated the model over the post-WWII era (defined as 3Q 1948 to 2Q 2018). Doing so explains a portion of the change in real GDP over that period; the rest is explained by the random shocks that move growth.

If we assume that:

(1) shocks to the pace of real GDP growth are normally distributed,

(2) the average pace of real GDP growth going forward is the same as historically,

(3) shocks to that growth rate going forward have the same variance as historically, and

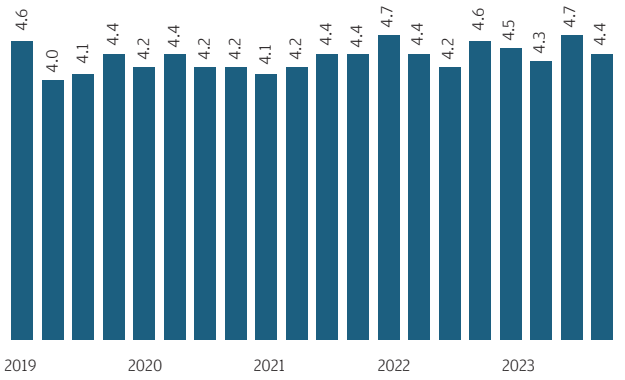
(4) real GDP growth going forward has the same autocorrelation as historically,

then we can use our estimated parameters and a random number generator to generate shocks in building a Monte Carlo simulation model. Specifically, we ran 10,000 iterations to estimate the probability of a recession starting in any given quarter, defining the start of a recession as two consecutive quarters of negative GDP growth following a positive one.* Over the next 15 years, adding up the number of times a recession starts in a given quarter over 10,000 iterations results in frequency and cumulative distributions of recession starts.

* This model assumes real GDP growth for this quarter is calculated as a function of a constant, real GDP growth in the prior quarter and a randomly generated real GDP shock. This shock is generated randomly and is normally distributed using the same variance as seen historically.

Historical data suggest recession probability of around 4% per quarter

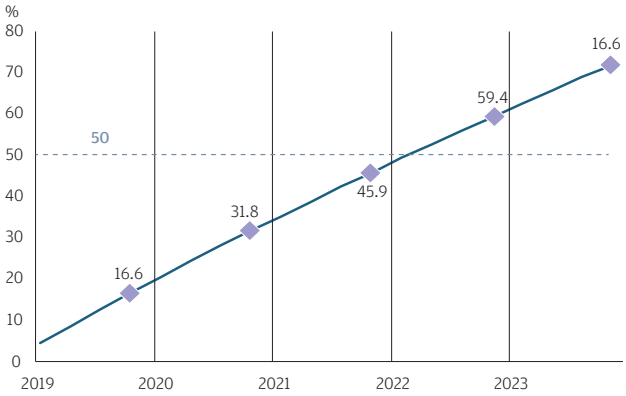
EXHIBIT 6: PROBABILITY PER QUARTER BASED ON 3Q48–2Q98 PARAMETERS



Source: U.S. Bureau of Economic Analysis, J.P. Morgan Asset Management; data as of September 30, 2018.

Historical data suggest 50% recession probability by 1Q 2022

EXHIBIT 7: CUMULATIVE PROBABILITY PER QUARTER BASED ON 3Q48–2Q18 PARAMETERS



Source: U.S. Bureau of Economic Analysis, J.P. Morgan Asset Management; data as of September 30, 2018.

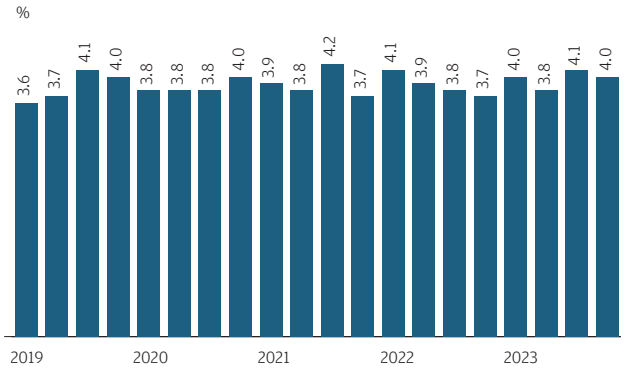
If, going forward, real GDP follows roughly its average behavior between 3Q 1948 and 2Q 1998 (a 50-year period), the chances of a recession starting in any given quarter are about 4.3% (**Exhibit 6**). Assuming that a recession will not begin in the second half of 2018, the simulations show that, on average, the probability of recession starting exceeds 50% 15 quarters from now. (**Exhibit 7**).

However, as we have discussed, the economy has become more stable over time. Estimating these parameters over the past 20 years vs. the 50 years before that should yield a lower probability of recession. This is, in fact, the case. Running the same equation over the past 20 years and using those parameter estimates to run simulations over the next 15 years result in a lower probability of a recession starting in any given quarter, with a 50% chance of the expansion surviving for another 17 quarters (**Exhibit 8** and **Exhibit 9**).[7]

[7] Remaining expansion length is based on an assumption that there is a zero percent probability of a recession occurring in the remaining quarters of 2018.

Recent data suggest recession probability of less than 4% per quarter

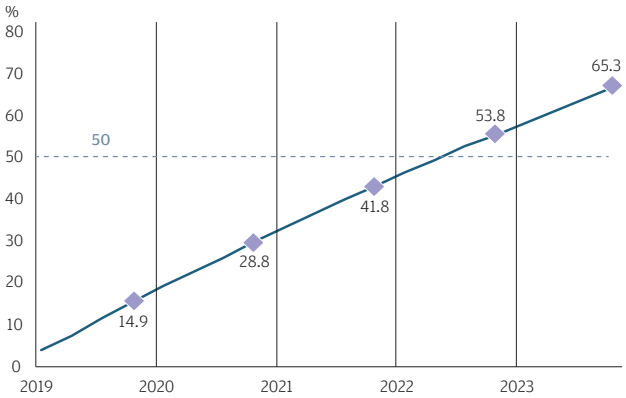
EXHIBIT 8: PROBABILITY PER QUARTER BASED ON 3Q98–2Q18 PARAMETERS



Source: U.S. Bureau of Economic Analysis, J.P. Morgan Asset Management; data as of September 30, 2018.

Recent data suggest 50% recession probability by 3Q 2022

EXHIBIT 9: CUMULATIVE PROBABILITY PER QUARTER BASED ON 3Q98–2Q18 PARAMETERS



Source: U.S. Bureau of Economic Analysis, J.P. Morgan Asset Management; data as of September 30, 2018.

It should be noted that a period of 17 quarters is not the expected length of future expansions. Rather, it represents the number of quarters any current expansion could be expected to survive, assuming that the future longevity of the expansion is unrelated to its present age (see "**Recession risks, expansion strength and the post-recession bounce**"). If a time traveler had arrived in a random expansion quarter in the postwar era, he or she could have expected to enjoy under four years of expansion before facing an impending recession. Based on the increased stability of the U.S. economy, if the time traveler arrived today, he or she would have a few extra quarters of growth.

RECESSION RISKS, EXPANSION STRENGTH AND THE POST-RECESSION BOUNCE

The probability assumption does not take into consideration the current position within the cycle. It therefore does not account for stronger early-expansion growth, which would diminish the probability of re-entering a recession within a year of the expansion start. Moreover, it underweights the probability of falling into a recession after the initial growth spurt, since growth tends to be lower – and therefore more susceptible to shocks – in any expansion quarter after the first year.

The same simulation model can tell us two other interesting things about future recessions. First, they should be less deep. The average recession from 1948 to 2018 involved a 1.9% decline in real GDP. However, based on GDP behavior over the last 20 years, a hypothetical future recession could involve just a 1.4% decline from peak to trough.

Second, recoveries are getting weaker. On average, in the three years following the 11 postwar recessions, the economy grew by 13.9%. However, based on the last 20 years of GDP volatility, a hypothetical future recovery could involve just 7.0% growth in the first three years.[8]

THE IMPLICATIONS OF GROWING GDP STABILITY OUTSIDE THE U.S.

Economies outside the U.S. have also become more stable over time. Looking at the variance of quarterly GDP growth throughout history, a similar trend to that of the U.S. is evident in major developed economies around the world.[9] Some economies have become more stable than others: Canada, the UK and Australia, for example, have become noticeably more stable throughout history, following a similar trajectory as the U.S. Japan, on the other hand, has seen GDP variance swing wildly. Europe is a more complicated story. Variance declined considerably before the financial crisis only to return, more or less, to prior peak levels; this is unique and likely reflects the second European recession, between 2011 and 2013.

An economy's underlying growth trend and volatility appear to be the key determinants of recession frequency. Australia, aided by the tailwind of a multi-decade commodity super-cycle, is in its 27th year of expansion; Japan, by contrast, where the underlying growth trend is the slowest among developed economies, has technically suffered four recessions within the last decade.

As declining economic variability has largely reduced the probability of recessions in the U.S., it has also done so in other countries. The UK, in particular, has seen probability decrease significantly – by nearly half – alongside similarly large moves in Australia and Japan. Canadian recession probability has declined as well, though by a smaller amount. Interestingly, the probability of a European recession has increased over the last two decades relative to history, again likely reflecting recent economic turbulence. If we ignore recent recessions, the resulting probability diminishes. This global downward trend has occurred alongside a fall in both economic variance and average growth rates (**Exhibit 10**).

[8] For any given economic recovery, it is clear that the first several quarters of an expansion are generally stronger than any subsequent quarters (historically by a multiple of 1.9). Therefore, while our crude model implies a roughly 0.5% quarterly growth rate throughout the first three years of recovery, we have adjusted this forecast to include an additional 0.4% of growth per quarter in the first four quarters of expansion to account for this phenomenon.

[9] Variance analysis is conducted using the same parameters as the analysis of U.S. growth. Time periods vary based on data availability: Japan begins 2Q 1955; Australia begins 3Q 1959; the UK begins 1Q 1960; Canada begins 1Q 1961; and Europe begins 2Q 1961. European data are based on the EU15, a 15-country subset of the European Union as provided by the OECD.

Global growth has become slower but more stable

EXHIBIT 10: GLOBAL ECONOMIC GROWTH STATISTICS

	Australia		Canada		Europe		Japan		UK		U.S.	
	20-yr	Long-term	20-yr	Long-term	20-yr	Long-term	20-yr	Long-term	20-yr	Long-term	20-yr	Long-term
Avg. GDP growth rate (%)	0.8	0.9	0.4	0.6	0.6	0.8	0.2	1.0	0.5	0.7	0.6	0.8
Avg. GDP variance	34.4	106.9	40.0	67.4	30.5	36.9	117.6	150.2	38.1	92.6	36.9	84.3
Quarterly probability of recession (%)	4.7	6.6	4.8	5.3	4.3	3.8	5.3	7.6	4.7	8.6	3.9	4.3

Source: Australia Bureau of Statistics, Bureau of Economic Analysis, ESRI, OECD, ONS, Statistics Canada, J.P. Morgan Asset Management; data as of September 30, 2018.

Note: "Long-term" varies by country due to data availability: for Canada, since 1Q 1961; for Japan, since 2Q 1955; for the UK, since 1Q 1960; for Australia, since 3Q 1959; for the U.S., since 3Q 1948.

CONCLUSION

Our analysis has focused chiefly on the U.S., in part because U.S. recessions have often sparked downturns overseas. Since 1965, each U.S. recession, with the exceptions of shallower ones in 1970 and 2001, has corresponded with recessions in the euro area, the UK and (with the additional exception of 1980–81) Japan. Expanding international financial and trade linkages imply that a large enough shock to one economy is likely to have a domino effect on others; at the same time, shocks to domestic demand in one economy can often be offset by the cushion of international trade.

The trends highlighted in the U.S. appear to be relevant around the world: decreased economic variance and slower overall growth trends have yielded a more stable global economy. All in all, these effects mean that recessions are less likely to occur than in the past, both in the U.S. and abroad, and will likely be milder. When they do occur, recoveries will unfortunately be slower and market cycles could still be as violent as in the past, particularly if a more stable macro environment fosters the growth of asset bubbles. Overall, however, while investors will find trend economic growth slower than in the past, they should be able to take some comfort in a global economy that will likely also be steadier.

Dealing with the upward drift in government debt

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Benjamin Mandel, Ph.D., *Global Strategist, Multi-Asset Solutions*

IN BRIEF

- Developed economy governments appear generally reluctant, or simply unwilling, to tackle the large stock of public debt that accumulated during the global financial crisis.
- We examine successful public debt consolidations since the 1950s, separating out the contributions made by financial conditions (interest rates vs. growth) from active fiscal policy (i.e., raising the budget balance).
- Recent case studies underscore that favorable monetary policy and a positive growth backdrop are important for debt consolidation. Government belt-tightening is also a common feature.
- Debt consolidation is not a foregone conclusion. But if it does occur in the coming decades, given fiscal spending constraints, it will be likelier for economies with a more favorable mix of interest rates relative to growth, or a tailwind from currency depreciation.
- We view any debt consolidation over the next 10 to 15 years as a mild downside risk to our interest rate projections. Extreme political pressure on central banks to keep rates low so as to keep debt growth in check could pose a challenge to central bank independence.

WHAT DO SUCCESSFUL DEBT ADJUSTMENTS LOOK LIKE?

The U.S. is currently deploying a significant and unfunded tax cut. Voters in Europe are demonstrating austerity fatigue. And Japan is still kicking the can down the road. Clearly, developed market (DM) governments are generally reluctant, or simply unwilling, to tackle the large stock of public debt accumulated during the global financial crisis (GFC). We document this drift in government priorities and then ask: What would a successful debt consolidation look like?

What are the key characteristics of adjustment paths, in which government debt stabilizes and then falls from high levels in an environment of relatively strong growth? History suggests the following ingredients, which fit into the common framework for thinking about debt sustainability:

1. Loose monetary conditions — a falling and sometimes artificially constrained real interest rate (e.g., the U.S. post-World War II)

2. Targeted fiscal policy, including cuts to entitlements that in some cases promoted labor force participation (e.g., Belgium and Canada in the 1990s)

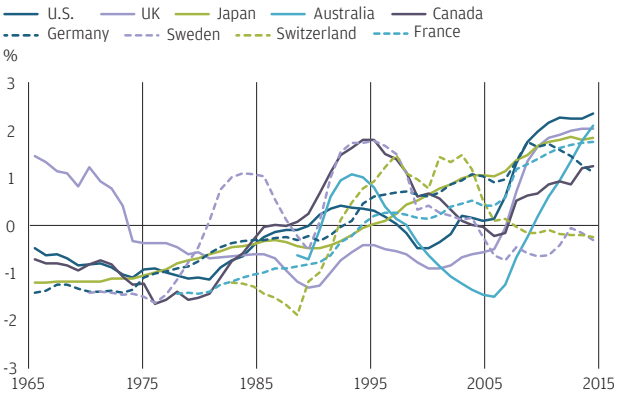
We discuss the likelihood of either of these in the context of our long-term macroeconomic and market expectations. We build a case that much of the burden of debt consolidation in the coming decades will fall on the central banks, in the form of pressure to maintain loose monetary conditions. Economies with a more favorable balance between interest rates and growth, or those experiencing a tailwind from currency depreciation, have the highest odds of successfully consolidating debt. We view this potential future pressure on central banks as a mild downside risk to our rates projections and, in its extreme form, as a possible challenge to central bank independence.

Documenting debt drift

Our empirical starting point is the observation that general government debt, as a share of GDP in developed market economies, has continued a long-term upward trajectory — what we're calling debt drift. The buildup in debt that took place during the global financial crisis has not been unwound (**Exhibit 1**). Below the surface of this trend, debt levels in the U.S., UK, France, Australia and Canada have continued rising in recent years; levels in Japan have remained relatively stable; and in Germany debt has fallen steadily. Sweden and Switzerland did not undertake significant buildups in debt during the financial crisis period, and their debt remains near levels of the mid 2000s.

Debt continues to drift upward in most DM economies

EXHIBIT 1: TRAJECTORY OF DEBT AS % OF GDP, STANDARDIZED



Source: IMF Fiscal Monitor, J.P. Morgan Asset Management; data as of August 2018.

Exhibit 1 also highlights the extent to which higher levels of government debt today are part of a longer-term, secular trend of rising debt. DM country debt levels in the 1960s and 1970s (with the exception of the UK) were roughly one standard deviation below their long-run averages for the 50 years between 1965 and 2015. This is an important qualifier for our results. Sustainable levels of debt may have increased in recent decades, and periods of relatively high debt may persist for some time.

Having documented the rise in debt, it is helpful to disentangle its underlying drivers. To do so, we follow an accounting framework that parses changes in the debt-to-GDP ratio, separating out contributions from the real interest rate, real GDP growth and the government's primary balance (the fiscal balance excluding interest payments) (**Exhibit 2**). The primary balance contains a cyclical component, reflecting how government finances deteriorate during periods of economic contraction and improve during expansions, and a structural component that more reflects the role of policy.

Debt is reduced when the real interest rate is below GDP growth or when policy tightens

EXHIBIT 2: GOVERNMENT DEBT ACCOUNTING FORMULA

Source: J.P. Morgan Asset Management; as of October 2018.

During the recent years of debt drift, looser fiscal policy played an overwhelming role. We know this because other factors leaned against it. For one, the balance of real interest rates and growth has generally been exerting downward pressure on debt levels. We estimate that from 2010–17 the fact that growth rates were higher than prevailing interest rates subtracted an average of 1.2 percentage points (ppt) annually from debt-to-GDP levels in each country (**Exhibit 3**). The cyclical aspect of the primary surplus added slightly to debt over this period as a whole (0.4ppt), but it has swung to become a force for debt reduction in recent years, particularly in the U.S., Germany, Canada and Sweden. In stark contrast, since 2010 the policy component of the primary balance has added 1.3ppt to debt levels annually, on average, for each country. All in all, monetary, growth and cyclical conditions have been generally favorable for debt consolidation, but both have been overwhelmed by sustained shifts in fiscal policy.

During recent years of debt drift, looser fiscal policy played an overwhelming role

EXHIBIT 3: DRIVERS OF CHANGE IN DEBT-TO-GDP RATIO

Debt/GDP drivers (2000-17)	Impact on debt-to-GDP (avg, annual, per country)
Growth rates higher than interest rates	-1.2ppt
Cyclical component of primary balance	+0.4ppt
Policy component of primary balance	+1.3ppt

Source: IMF Fiscal Monitor, J.P. Morgan Asset Management; data as of August 31, 2018.

Will large amounts of debt today restrain growth in the future?

It seems natural to conclude that government debt will necessarily restrain future growth — that lower taxes today will mean higher taxes in the future to ensure that debt is repaid — so that growth today comes at the expense of growth tomorrow. But history tells us this is not necessarily the case. In a number of instances in the past, high debt levels were tackled without significantly impeding growth.[1]

We use the deconstruction of debt-to-GDP ratios discussed above to characterize these successful consolidations going back to the 1950s. By doing so, we are able to separate the contributions of financial conditions (i.e., rates vs. growth) from those of policy (i.e., primary surplus) in pushing down debt levels (**Exhibit 4**). Notably, of the 14 successful debt consolidations that we identify, 13 occurred during periods of relatively tight fiscal policy (high primary surpluses), suggesting that at least some belt-tightening is necessary. The number of consolidation experiences that took place amid relatively low vs. relatively high rates is evenly split, implying a significant — but not necessary — role for low rates relative to growth. To shed light on the mechanics of consolidation, we describe selected cases from the lower two quadrants in Exhibit 3 (see Addendum, **Exhibit 8** for information on all 14 cases).

[1] The evidence for debt's feedback into future growth is mixed and fraught with difficulties in identifying whether or not the relationship is a causal one. This paper considers the narrower but more cleanly defined episodes of successful consolidation. Given the focus on DM economies, debt crises and their effects on growth and markets are outside the scope of the paper.

Policy tightening or favorable financial conditions are necessary — sometimes both

EXHIBIT 4: SUCCESSFUL CASES OF DEBT CONSOLIDATION AND THEIR ECONOMIC AND POLICY ENVIRONMENTS

	Neutral/high interest rates vs. growth	Low rates vs. growth
Less ↑ Neutral policy		Switzerland (1999-2007)
More ↓ Tight policy	Sweden (1985-90) Belgium (1994-2007) U.S. (1994-2001) Australia (1995-2007) UK (1996-2001) Canada (1997-2007) Japan (2006-07)	U.S. (1955-69) Canada (1962-69) Japan (1988-91) UK (1987-90) Sweden (1997-2008) Germany (2012-17)

Source: IMF Fiscal Monitor, Haver Analytics, J.P. Morgan Asset Management; data as of August 2018.

Tight policy/low interest rates vs. growth: The U.S.

The U.S. experience post-World War II is one of the most dramatic examples of debt consolidation. In 1946, government debt was 120% of GDP and the primary balance was a deficit equal to about 5% of GDP. Then, in the following few years, the primary balance swung dramatically into a surplus of more than 6%. The primary balance remained in surplus throughout much of the 1950s and 1960s; by 1969, government debt was down to 46% of GDP. Over this postwar period, monetary conditions were kept artificially loose, with Washington propping up government bond prices, continuing a policy put in place during the war. This prevented the Federal Reserve (Fed) from raising interest rates. Instead, the Fed attempted to curb excess credit growth through lending constraints. This had only limited success, and inflation spiked as economic recovery took hold. While it lasted, though, robust nominal activity combined with low interest payments contributed to the substantial fall in government debt.

Tight policy/neutral or high interest rates vs. growth: Belgium

Belgium experienced an expansion in government debt, to more than 100% of GDP, in the 1980s. In the years that followed, the Belgian government embarked on a tough deficit reduction plan that focused on reducing government spending. Public employment was scaled back, as was the generosity of the welfare state. Unemployment benefits were reduced, the retirement age was increased and, eventually, the cuts stretched to pension and health care costs. These efforts saw the primary balance swing by more than 11ppt into a primary surplus, where it remained for much of the next two decades. Despite the significant fiscal tightening, the debt-to-GDP ratio remained elevated as the economy struggled to cope with the combination of fiscal contraction and very tight monetary policy. It was only when monetary conditions eased in the mid 1990s that the fiscal efforts paid off and debt began falling.

By the mid-1990s, many other developed market nations were also focused on reducing the government debt accumulated during the early 1990s global recession. But for many, the debt problem was relatively short-lived. By the turn of the millennium, many countries – including Canada, the UK, Australia and Sweden – had managed to successfully change course and debt-to-GDP was falling.

This often involved a concerted fiscal effort, as in Belgium. The Canadian government directed its efforts to reducing public spending in difficult areas such as unemployment insurance, pensions and provincial government payments. This helped a primary deficit swing back into surplus. Other G7 countries, including the UK and Italy, saw similar improvements in their fiscal position, again after some tough political choices that reduced entitlements.

What all these fiscal consolidations had in common was a marked reduction in government spending on interest payments, reflecting the secular trend of falling bond yields. The shift toward independent central banks – mandated to deliver low inflation – coincided with a steady fall in bond yields through the 1990s, and both go a long way toward explaining the global growth performance and subsequent fiscal consolidation over that decade. We also note the possibility that falling bond yields likely increased the level of debt that economies could sustainably carry during the period that we examined.

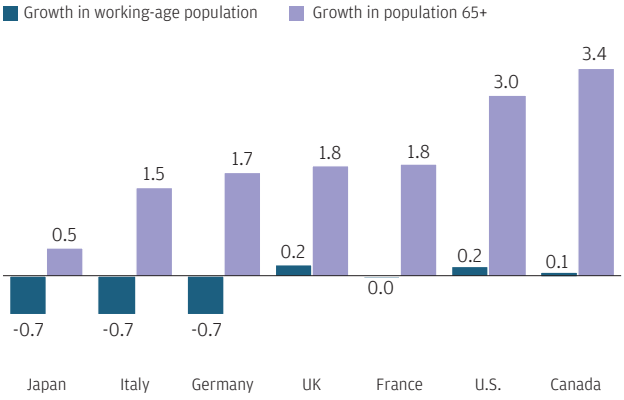
Considering these case studies, it appears possible for a government's debt burden to come down in a manner not detrimental to growth. The U.S. success relied on a good dose of unexpected inflation, but the other examples of debt consolidation have two things in common. First, governments made difficult political choices to reduce entitlements and bring down their spending. In many instances, because these changes increased workforce participation, they improved the supply side of the economy. Second, and perhaps more importantly, tight fiscal policy was accompanied by relatively low rates, which promoted demand to compensate for the reduction in public spending.

What are the chances of successful DM debt consolidation in the coming decades?

We conclude with a rough assessment of DM economies' ability to replicate the successful consolidation experiences of the past and, where it is likely that they can, what conditions would be necessary. To begin, the ability of the governments in the developed world to improve their primary balance position looks challenging on a number of fronts. The most acute challenge is the demographic shift set to take place in the coming decades. While the severity of the problem differs by country, all countries in the developed world are seeing a slowing rate of growth of their working-age populations and a rapid expansion of those of pensionable age (**Exhibit 5**).

A ubiquitous, though uneven, rotation in entitlement spending

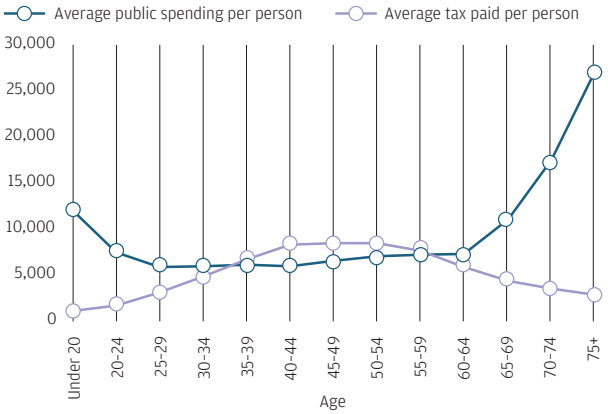
EXHIBIT 5: DEMOGRAPHIC TRANSITION IN DEVELOPED MARKETS (%, AVERAGE ANNUALIZED GROWTH, 2018-28)



Source: United Nations Department of Economic and Social Affairs, J.P. Morgan Asset Management; data as of July 31, 2018.

Government spending ramps up dramatically over the life cycle

EXHIBIT 6: DEMOGRAPHIC DRIVERS OF GOVERNMENT SPENDING AND TAXES IN THE UK (GBP)



Source: Office for Budget Responsibility, Her Majesty's Revenue and Customs (HMRC), J.P. Morgan Asset Management; data as of July 31, 2018.

This demographic shift will have a material impact on public finances. Exhibit 6 shows how tax payment and public spending vary by age in the UK. Tax contributions peak at around 50 years of age and then slow dramatically from the mid 60s, at which point many people no longer pay income tax (note that governments also receive taxes to fund spending from other sources, including corporations). By contrast, government spending per person increases substantially from age 70 as the provision of health and social care ramps up. Given that around half of those eligible to vote in the developed world are older than 50, governments are likely to find reducing pension and health care benefits politically challenging.

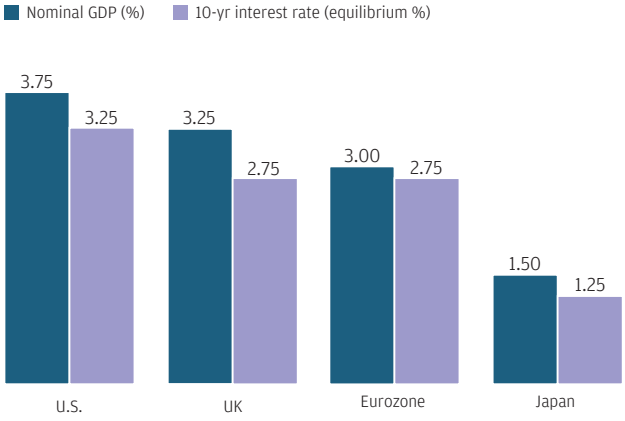
Further reducing benefits currently granted to the working population seems similarly challenging. Income growth for middle and lower income households has been very meager in this recovery in much of the developed world. This has contributed to the recent spate of populist pressures and the backlash against migration and globalization. If anything, the trend may be for some governments to increase support for low income households through guarantees of a minimum income, as was recently proposed in Italy.

While there are multiple structural downside risks to DM public finances, it is harder to identify upside risks. Perhaps in the near term a recovery in productivity is possible, which would raise GDP and, in turn, government revenues – though productivity has been lacking through much of this recovery and it is difficult to rely on a phenomenon whose drivers are little understood.

Finally, we note that in our 2019 baseline Long-Term Capital Market Assumptions (LTCMAs) macroeconomic assumptions – which link nominal GDP and interest rates as a matter of methodology – we do not anticipate a significant tailwind from financial conditions. In other words, we do not pencil in large imbalances between growth and interest rates (Exhibit 7). Should the next recession cause liquidity-trap dynamics like the post-GFC period's, leading to a sustained period when rates are lower than growth, we see little potential upside from the perspective of public debt consolidation. Such a dynamic would likely be accompanied by either a deep recession (requiring a big fiscal response) or by pressure on fiscal authorities to make up for less-effective monetary policy.

Big imbalances are not in our baseline projections

EXHIBIT 7: LTCMA ASSUMPTIONS FOR NOMINAL 10-YEAR RATES MINUS NOMINAL GDP GROWTH



Source: J.P. Morgan Asset Management; data as of October 2018.

CONCLUSION

The picture we've painted presents something of a quandary for DM economies, where debt is drifting higher but neither belt-tightening nor outsize contributions from financial conditions would be sufficient to cap it. Achieving the required primary fiscal surplus looks incredibly challenging in the developed world, given an aging electorate that will defend its entitlements at the ballot box. Globalization and automation, and the resulting social challenges, may also make it hard to reduce the generosity of the welfare state. Boosting trend growth using fiscal policy is difficult and has yielded a mixed bag of results in the past.

This leads us to our conclusion that if debt consolidation is going to happen in the coming decades, the bulk of the burden will need to be shouldered by monetary conditions, and we expect this would encompass both implicit and explicit pressure on central banks to provide the solution. In theory, monetary policy should remain independent, focused on the objective of containing inflation (and sustaining employment, in some cases). The reality, however, might prove trickier. Any efforts to rein in primary balances will reduce short-term growth and lead central banks to adopt more accommodative monetary policy stances — and political pressure to keep rates low cannot be ruled out. Currency trends will redistribute demand in a way that creates winners and losers vis-à-vis public debt consolidation.

In our baseline LTCMA macroeconomic assumptions for DM economies, public debt burdens do not feed back unduly into growth or inflation projections, or our expectations for monetary policy outcomes. Indeed, the trend toward higher debt burdens may well be borne for some time. But in time, efforts to consolidate debt are likely to present downside risk to interest rate projections, growth or both.

Addendum

EXHIBIT 8: SUCCESSFUL CONSOLIDATIONS

Debt/GDP drivers (2000-17)	(Debt/GDP) $_{t-1}$	Δ(Debt/GDP)	g	r	r-g	r-g (vs. all t)	PS (cyclical)	PS (structural)	PS (vs. all t)	ΔBroad FX
U.S. (1955-69)	73	-1.8	4.2%	2.2%	-2.0%	-1.3%				
Canada (1962-69)	68	-1.6	5.7%	5.0%	-0.7%	-2.4%				
UK (1987-90)	40	-3.2	3.6%	3.3%	-0.2%	-0.1%	1.7	-1.4	0.6	2.2%
Japan (1988-91)	77	-3.4	5.0%	3.2%	-1.8%	-1.5%				4.7%
Sweden (1985-90)	61	-3.5	2.4%	5.4%	3.1%	2.1%				1.4%
Switzerland (1984-89)	34	-1.1	3.0%	1.9%	-1.1%	0.3%				3.7%
U.S. (1994-2001)	70	-2.1	3.7%	3.5%	-0.2%	0.5%	0.8	0.9	5.0	5.5%
UK (1996-2001)	43	-1.5	3.3%	4.3%	1.1%	1.2%	-0.5	1.8	4.1	4.7%
Australia (1995-2007)	32	-1.7	3.6%	3.6%	-0.1%	0.3%	-0.2	1.3	2.1	1.5%
Canada (1997-2007)	101	-3.1	3.3%	4.6%	1.3%	-0.4%	0.2	3.2	3.1	2.5%
Sweden (1997-2008)	69	-2.7	3.1%	3.0%	-0.1%	-1.1%	1.5	1.0	1.6	-0.2%
Switzerland (1999-2007)	60	-1.4	2.4%	0.4%	-2.0%	-0.6%	0.0	0.5	-0.1	0.7%
Belgium (1994-2007)	134	-3.4	2.5%	3.2%	0.8%	0.7%	-0.1	4.5	2.9	2.8%
Japan (2006-07)	177	-0.7	1.5%	1.0%	-0.5%	-0.3%	0.4	-3.2	2.6	-6.3%
Germany (2012-17)	81	-2.1	1.7%	-0.5%	-2.2%	-3.1%	0.1	1.7	1.3	-0.2%

Source: IMF Fiscal Monitor, Haver Analytics, J.P. Morgan Asset Management; data as of August 2018.
PS: primary surplus; g: real GDP growth; r: real interest rate.

Managing illiquidity risk across public and private markets

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IN BRIEF

- The structure and role of the capital markets have evolved steadily but profoundly over the last 50 years. Public equity markets, which traditionally funded corporate expansion and investment, are increasingly becoming a mechanism for cash distribution and balance sheet management.
- At the same time, private markets, which traditionally provided vital funding for new ventures, have significantly expanded in their scale and scope; they now offer capital for many areas that had historically been financed by public equity markets.
- Investors in private assets take on illiquidity risk and tacitly assume it is compensated through superior returns. This is in essence correct, although full compensation is only captured by above-median managers. Some public assets may also have embedded illiquidity risk, but it is more cyclical and not always compensated. Identifying compensated and uncompensated illiquidity risk across public and private markets is critical in portfolio construction.
- Optimizing returns from the private part of the portfolio means staying the course and harvesting the illiquidity premium over the cycle. This suggests that any cash calls or redemptions may be disproportionately financed by the sale of public assets. While larger and more sophisticated investors have a greater propensity to take on private market illiquidity risk, there is no economy of scale in dealing with public market illiquidity.
- We introduce a framework to demonstrate how actively planning for illiquidity in public asset markets can help with portfolio construction decisions over the cycle.

THE EVOLVING ROLE OF PUBLIC AND PRIVATE MARKETS

Over the last half century, we have witnessed a gradual but profound shift in the role and structure of the capital markets. Public equity markets were traditionally where firms sought financing for expansion and investors sought to share in the fruits of that growth, including a dividend when operating cash flows allowed. Today, public equity markets are increasingly a vehicle for cash redistribution where greater regulatory scrutiny, plus regular reporting requirements, can incentivize firms to focus on current operations – possibly to the detriment of investing in future growth (**Exhibit 1**). More and more, public equity markets are playing the role in firms' financial calculus that corporate credit markets typically fulfilled, and in turn are giving investors an ever more bond-like return stream.

As public equity markets morphed from providing growth capital to providing operational capital, private asset markets grew to fill the void. Private markets were once a financial backwater where a small number of investors with deep pockets and even deeper risk tolerance offered capital for innovators and entrepreneurs. Today, the market value of private assets has grown to around one-fifth of the market capitalization of U.S. public equity markets (**Exhibit 2**). Increasingly, private asset markets attract investors of all types and offer the exposure to corporate growth, emerging technology, restructuring, and operational transformation that public equity markets may not – and with that, the prospect of superior returns. The trade-off is assumed to be illiquidity, but this may be a naive conclusion; private assets are indeed illiquid, but generally investors are compensated for it, subject to appropriate manager due diligence (see page 37 for a more detailed discussion). Public market assets can also be illiquid, but investors may not, at times, be fully compensated for it.

Identifying compensated and uncompensated illiquidity across different markets is critical in optimally designing a portfolio with both public and private assets.

In this paper, we explore the shifting structure of the private and public markets, and consider how this may affect portfolio construction. Specifically, we look at the nature of illiquidity[1] in both private and public assets to understand how best to harvest illiquidity premia across the cycle, and how to avoid being trapped with uncompensated illiquidity in public asset markets.

Looking back to the early phase of the modern financial era,[2] between the late 1960s and early 1980s, public equity markets functioned largely in the way described by the classic financial textbooks. Firms raised funds via the stock market, with returns generated from reinvestment of investors' capital (retained earnings) and any excess paid out as dividends. The permanent nature of public equity capital meant that it was traditionally viewed as the main source of funding for the expansion and development of businesses.

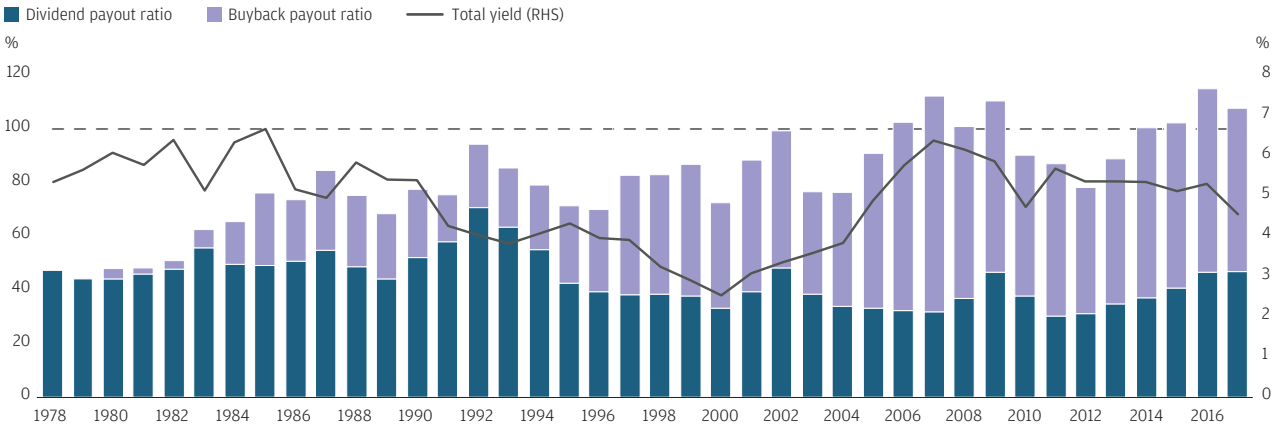
Over the subsequent decades, the role of equity markets changed. The secular decline in interest rates led investors to rely more heavily on equity income and to reward firms with

[1] Illiquidity premium is the additional return demanded by investors for assuming the risk of illiquidity, which typically arises due to the delay in conversion of an asset to cash at prevailing market prices. Illiquidity risk can arise from the size of the position, the nature of the underlying asset, friction in the capital market or a combination of all three. Literature has supported the existence of this phenomenon across asset classes for instance, Keynes (1936), Townsend (1937), Amihud and Mendelson (1986), Constantinides (1986), Luttmer (1996), Liu and Loewenstein (2002), among others.

[2] We assume the modern financial era to run from the late 1960s to the present day, the starting point being loosely defined as around the time when modern portfolio construction techniques (CAPM, efficient frontiers, etc.) gained prominence.

The U.S. equity payout ratio has been rising and has frequently been above 100% of earnings in recent years

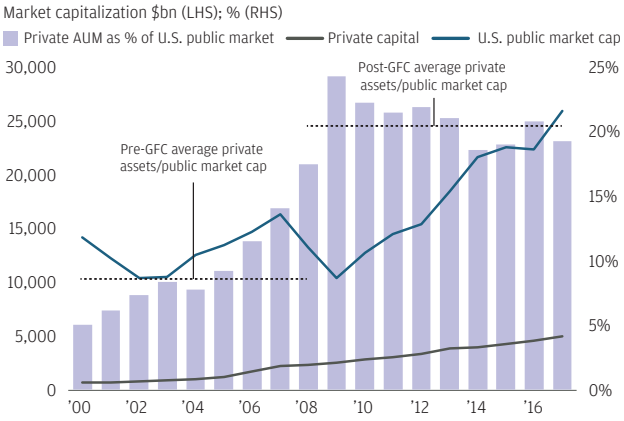
EXHIBIT 1: U.S. PAYOUT RATIO, BROKEN DOWN INTO BUYBACKS AND DIVIDENDS



Source: Thomson Reuters Datastream, J.P. Morgan Asset Management; data as of July 31, 2018.

Expanding private asset markets offer the exposure to corporate growth, emerging technology and operational transformation that public equity markets may not

EXHIBIT 2: PRIVATE EQUITY ASSETS AS A PERCENTAGE OF THE MSCI U.S. MARKET CAPITALIZATION



Source: Thomson Reuters Datastream, Preqin; data as of December 31, 2017.

more stable dividend streams. The global financial crisis (GFC) only reinforced this trend, as interest rates fell to near zero. The growing dual burden of regular reporting and regulation – notably Sarbanes-Oxley in the U.S. – further favored maximization of returns from current operations rather than investing in expansion (**Exhibit 3A**). Today, the combination of deeper and more liquid public markets, lower interest rates and diminished shareholder willingness to forgo dividend growth means that it often makes more sense to buy growth than to build it organically. Public equity has been transformed from being primarily a source of growth financing to being an income-bearing asset for investors and an acquisition currency for corporations.

This was not a transformation that could happen in isolation, of course. The expansion of private asset markets, as well as the scale and sophistication of M&A and primary markets, accompanied the gradual structural shifts in the role of public equity markets. From vehicles for financing the rebuilding of the industrial base, private asset markets gradually shifted toward the financing of innovation and new ventures. Venture capital and smaller cap private equity (PE) still focus on this today, while larger cap private equity is dedicated mainly to financing operating efficiency and building scale. The preference for private over public markets as financing venues for new enterprises is reflected in the long-term decline in IPOs (**Exhibit 3B**).

The evolution of market structure across public and private asset markets is symbiotic: Public markets have shifted to optimize the distribution of cash to shareholders that in turn provide the equity base to allow firms to raise other forms of capital. At the same time, private markets have expanded to provide funding for growth and operational effectiveness at an industrial scale, bringing to bear not only capital but professional and managerial resources.

The modern structure has developed as a compromise to address the sometimes competing requirements and incentives from the regulatory environment, cost of capital and investor demands. Public markets allow firms to concentrate on existing operations, and make it cheaper and less risky to simply "buy in" growth when needed. Private markets can effectively "hothouse" and optimize growth and expansion more effectively than might be possible within public enterprises and provide the bolt-on opportunities to public firms when they decide it's time to "buy in" growth.[3]

[3] M&A volumes and values tend to be cyclical and have grown in line with underlying market values over the long run. The nature of deals, though, appears to be shifting somewhat from large-scale consolidation to more targeted deals to acquire new capabilities, technology or access to new markets and to integrate these into the acquirers' existing business. See, for example, PitchBook 2Q18 M&A report and BCG 2017 M&A report.

As regulatory burdens increased, companies found public listings less compelling

EXHIBIT 3A: NUMBER OF PAGES OF THE CODE OF FEDERAL REGULATIONS, 1970-2017

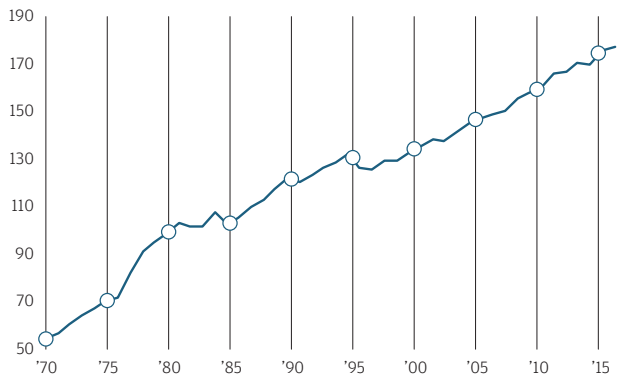
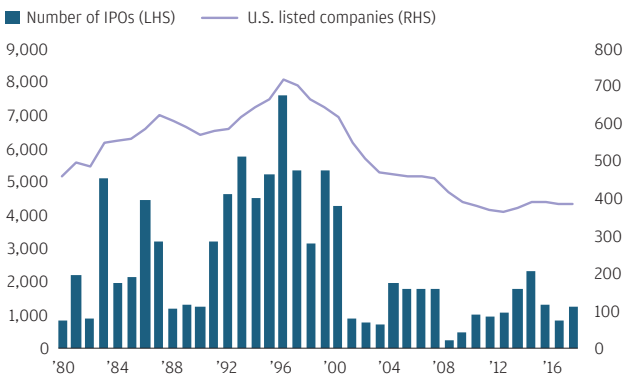


EXHIBIT 3B: NUMBER OF IPOS AND U.S. LISTED COMPANIES



Source: Jay R. Ritter, University of Florida, Warrington College of Business, "Initial Public Offerings: Updated Statistics," May 14, 2018; World Bank, data from 1980 - 2017; Federal Register, data as of December 31, 2017.

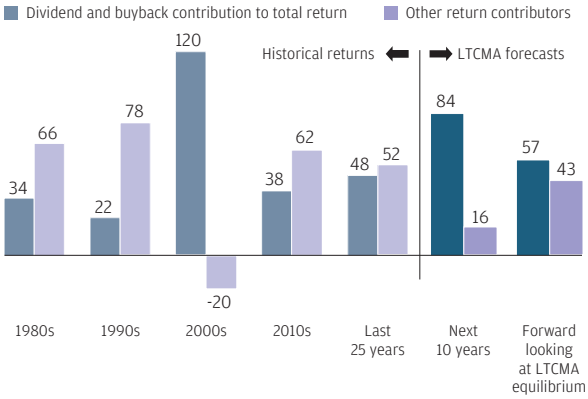
Portfolio construction: The role of private assets and the impact of illiquidity

At this juncture, we shift our perspective to the investor and consider how the evolution of public and private asset markets is affecting portfolio design and strategic allocation decisions across the cycle. We note the increasingly income-dominated return stream in public equity markets and the growth in access to private markets, and begin to consider how investors should factor in the illiquidity risks inherent in private assets.

Looking ahead, we expect over 80% of returns in developed public equity markets over the next 10 years to come from dividends and buybacks, compared with less than half over the last 25 years (**Exhibit 4**). The current return profile reflects the growing importance of income to investors but also implies that public equity markets have a reduced exposure to growth and new ventures. To capture those exposures, investors must increasingly turn to private asset markets, where they can expect a higher return but must also accept the illiquidity risk that comes with it.

Over 80% of the returns in developed public equity markets over the next 10 years could come from dividends and buybacks, vs. less than half over the last 25 years

EXHIBIT 4: PAST AND FUTURE PROPORTION OF EQUITY TOTAL RETURNS FROM CASH FLOWS (DIVIDENDS + BUYBACKS) VS. CAPITAL GROWTH (%)



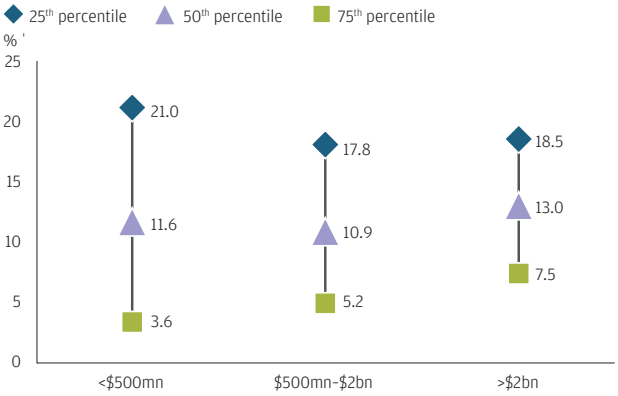
Source: Bloomberg, Citigroup, FactSet; data as of December 31, 2017. LTCMA equilibrium assumes returns at equilibrium margin buyback and valuation levels, as opposed to starting point values.

The benefits of the illiquidity risk premium in private assets are broadly accepted by sophisticated institutional investors. Indeed, illiquidity risk in private asset markets can be thought of as a function of the business model for which investors will be compensated over the cycle. Lack of a daily mark-to-market in private equity certainly helps to dampen traditional measures of market risk and can make private equity an optically outstanding portfolio contributor. But simply taking on illiquidity risk does not guarantee that private equity will deliver superior returns; these have to be generated by skilled managers, which need to be carefully identified and accessed. In an important sense, illiquidity is what enables skilled private equity managers to generate excess returns, through tools such as reorganization, leverage, product repositioning or strategic acquisition. In contrast, public market illiquidity risk is simply a frictional cost that is cyclical and for which investors are not always fully compensated.

In recent years, however, the average private equity manager has not delivered a meaningful premium over the public markets. A very wide dispersion of returns (**Exhibit 5**) suggests it's not illiquidity alone that is compensated but, rather, the strategy and skill of the operator employed. For investors with a sub-optimal selection of available managers and/or an uncertain commitment to the unique long-term aspects of private equity investing, the illiquidity risk they are taking on in private markets may be underestimated.

Wide dispersion of PE returns reflects relative manager skill more than illiquidity compensation

EXHIBIT 5: HISTORICAL PRIVATE EQUITY DISPERSION BY SIZE OF FUND, * IRR OF VINTAGE YEARS 2002-16 (%)



Source: Burgiss, J.P. Morgan Asset Management; data as of March 31, 2018.
*Includes buyout and expansion capital funds.

The optimal level of illiquidity risk needed to at least match required returns varies greatly across institutions. For those with ample access to top-tier managers and proven manager selection skills, illiquidity risk becomes a lower-order consideration. In such cases, liquidity is required only to meet planned distributions, to address dislocations in the normal cash flow modeling of illiquid exposures or to set aside a small contingency allocation. For investors with very long investment horizons, good access to top-tier managers and well-formulated contingency plans for any liquidity event, it is the value of liquidity that can be overestimated.

In the majority of institutional portfolios, a sustainable balance can be found between liquidity requirements and illiquidity risk, and between the potential for excess return

and the certainty of lower but more liquid/tactical and low cost returns. Nevertheless, this balance will vary cyclically with market and economic conditions.

There is also a connection between institutional asset size and the balance between liquid and illiquid allocations, with larger institutions generally more willing to take on illiquidity risk (**Exhibit 6**). However, as we will discuss at greater length, when we account for additional illiquidity risks in public asset markets and factor in the economic cycle, we find that larger institutions will need to be more proactive in managing public market illiquidity risks. Indeed, a higher propensity to hold illiquid private assets in a diversified portfolio only serves to exacerbate that need. An institution's size, though, is just one factor in determining an appropriate balance between liquidity and illiquidity. Other considerations include an institution's access to private investment, tolerance for illiquidity risk and J-curves,[4] and ability to accept 10- to 12-year lockups and identify high performing managers.

Assessing the costs and benefits of illiquidity under different market scenarios

We have thus far explored the evolution of public and private asset markets, and the opportunities and considerations they present to investors over a cycle in stable, equilibrium conditions. We now focus more on cyclicality – in particular for illiquidity risk – and propose a framework for evaluating allocations to both public and private assets in a multi-asset portfolio. The process is critical to successful portfolio construction and hinges on the idea that the illiquidity risk premium is a natural and even desirable feature of private assets, for which investors are generally compensated over the cycle. Meanwhile, in public asset markets illiquidity risk is a manifestation of friction in the secondary market, for which investors may not always be compensated. Thus, an investor with allocations to both public and private assets should look to capture compensated illiquidity risk in private assets but seek to avoid being forced to crystallize losses in less liquid public assets at times when illiquidity risk may be uncompensated.

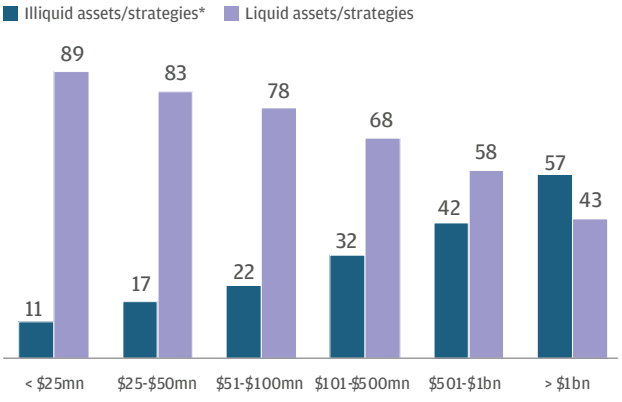
To help understand the interplay between illiquidity risk and market risk through the cycle, we refer to two concepts. The first is based on the way cash flows evolve over the life cycle of a private investment, and the second is based on the probability of experiencing an adverse liquidity event in public markets over a defined time horizon.

Private investments follow a life cycle with three defined phases: an investment phase in which capital is committed up front from investors, further cash calls are possible and cash flow to investors is negative; a breakeven point when cash flow to investors begins to turn positive; and a harvesting phase in which cash is returned to investors (**Exhibit 7**). Should economic conditions deteriorate during the investment phase, it may be that cash calls are brought forward and/or that planned future positive payouts to investors are delayed.

[4] The J-curve represents the pattern of returns an investor can expect to realize from a private equity fund over time, from inception to termination. The J-curve effect refers to the fact that a private equity fund will often show a negative return in its early years, when fees and start-up costs are incurred; investment gains will usually come in the later years as portfolio companies mature, increase in value and are ultimately exited with returns realized.

Larger institutions are generally more willing to take on illiquidity risk

EXHIBIT 6: ASSET ALLOCATION OF ENDOWMENTS BY SIZE FOR FISCAL YEAR 2017, %

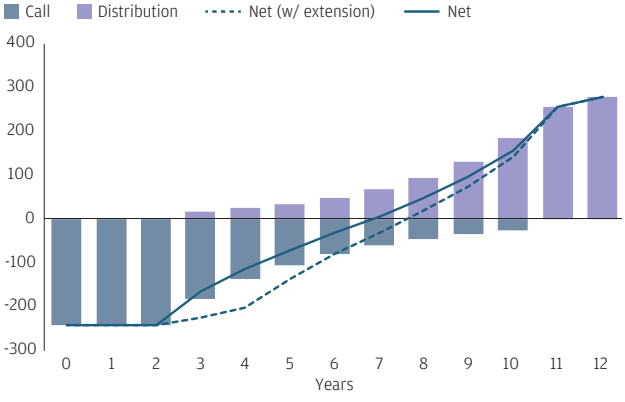


Source: 2017 NACUBO-Commonfund Study of Endowments.

* Includes private equity, hedge funds, venture capital, private real estate, energy, natural resources, commodities, managed futures, distressed debt and others.

To earn the illiquidity risk premium in private markets, investors need to be able to weather any variation in the cash flow profile over the full investment life cycle

EXHIBIT 7: AGGREGATE PRIVATE EQUITY INVESTMENT CASH FLOWS OVER LIFE CYCLE



Source: J.P. Morgan Asset Management. The chart shows a hypothetical stream of capital calls and distributions, and assumes an additional capital call in year three due to an unexpected period of financial market stress. The chart is based on average capital call and distribution data from Preqin back to 2000. By looking at average non-crisis cash flows, and using median net IRR data by vintage back to 2005, we have come up with a maximum drawdown by vintage, which was used to compute the average drawdown in non-crisis periods. We assume that the extension leads to an extra 1.75 years of average calls, which is consistent with the historical data.

In theory, investors are compensated for this through the higher returns available in private assets over the full life cycle of the private investment. In other words, to harvest the illiquidity risk premium in private markets, investors need to be able to stay the course, weathering any variation in the cash flow profile over the full cycle. This means that cash calls would need to be funded from elsewhere in the portfolio.

The ability to accept this type of risk ranges widely across investor types. Those that may be subject to redemptions or fund withdrawals (e.g., mutual fund managers) are less able to bear uncompensated illiquidity risk than those with a long-term pool of capital to deploy (e.g., sovereign wealth investors). Further, during times of market crisis, when investors are already seeking to cut exposure to public markets, threats to liquidity are generally correlated and can compound to become a serious issue for investors. Investors could face liquidity demands arising from redemptions and a prudent desire to hold higher portfolio cash buffers. At the same time, on the private asset side there may be cash calls to finance, calls that are best covered from public assets — and thus, avoiding uncompensated illiquidity traps in public markets becomes a priority. To fully assess the illiquidity risk in a portfolio, all of these factors need to be considered holistically.

Taking high yield (HY) bonds as an example of a potentially illiquid public asset with both market and illiquidity risk, we can ask whether, over a defined time horizon, the probability of being forced to crystallize a loss under adverse liquidity conditions is appropriately compensated (see Addendum, "Modeling the cost of high yield trading under illiquid conditions"). Early in the economic cycle, when credit spreads are wide, the illiquidity premium in an asset such as high yield credit may well offer an additional return compared with a replicating stock-bond portfolio.[5] However, as the cycle matures and credit spreads tighten, there will come a tipping point — some breakeven level of spread — where the return in credit is not sufficient to offset the probability-weighted risk of a loss over a defined time horizon. Effectively, the illiquidity risk has at that point become uncompensated and investors may be better served expressing their desired level of market risk via a replicating stock-bond portfolio.

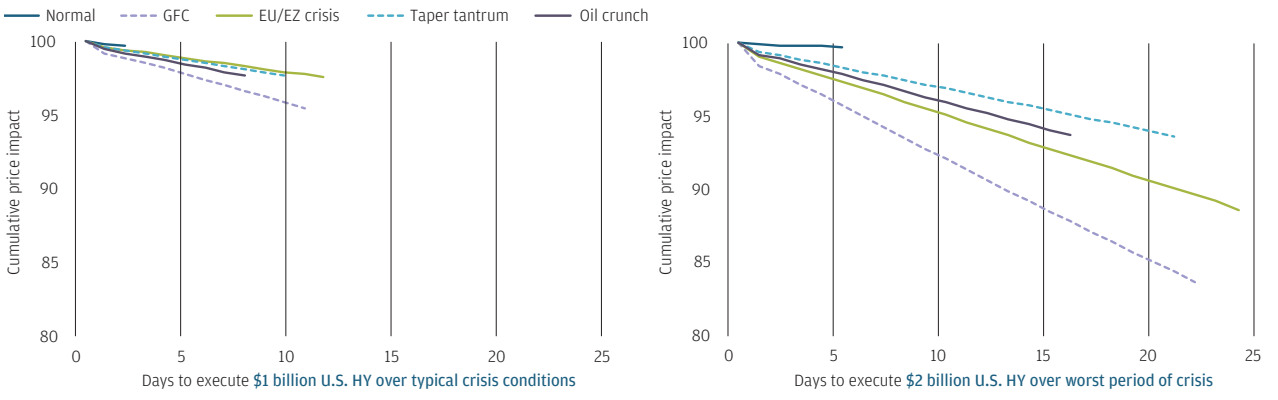
The scale of the potential illiquidity during times of market stress is demonstrated in **Exhibit 8**, again using HY credit as an example. The illiquid credit asset will suffer from wider bid-ask spreads and much reduced transaction volumes; large transactions can take considerable time to execute in markets where prices are dropping sequentially over multiple trading sessions.

Turning to private market assets, as investors have increasingly added private assets to portfolios there is commensurately more focus on the risk that they could be forced to liquidate private investments at an inopportune time to meet an additional capital call. Alternately, redemptions and other portfolio-level cash requirements may force them to exit private investments at an undesirable point. Since such events tend to occur during adverse conditions in public markets and the economy at large, the most relevant question is how bad things might really get.

[5] For the purpose of our analysis, we assume that the market risk of a credit investment can be approximately replicated with a combination of equity and bonds/cash; over the long run, the beta of high yield credit to the S&P 500 is approximately 0.4, so we make a simplifying assumption that a 40/60 stock-bond mix will approximate to high yield over short periods and for the purpose of our modeling exercise.

Large transactions take longer to execute in markets where prices are steadily falling

EXHIBIT 8: PRICE IMPACT AND DAYS TO TRANSACT A SIGNIFICANT SIZE IN U.S. HIGH YIELD CREDIT IN STRESSED CONDITIONS



Source: Financial Industry Regulatory Authority Trade Reporting and Compliance Engine, J.P. Morgan Asset Management; data as of May 31, 2018.

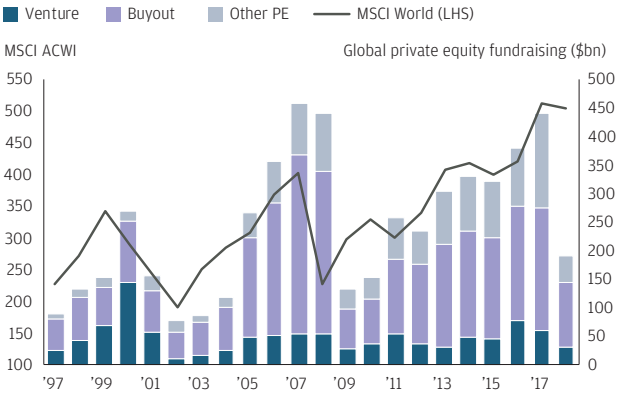
Notes: Based on historical liquidity patterns adjusted for typical third-quarter volumes; assumes ability to trade 10% of market volume in normal markets, with a drop-off of 50% after two days for ongoing sell orders; assumes trade size drops by one-third in stressed markets, with similar drop-off for ongoing sell orders. Bid-ask spreads assumed at 50bps in normal conditions and 300bps in stressed markets. Typical crisis conditions take the average daily price move during the depth of the crisis; worst period extrapolates the worst weekly price action across the full period.

The evolution of the secondary market for private assets allows us to estimate the drawdown investors might be forced to take if they were to instead sell their private assets. Using data on capital calls,[6] capital distributions and secondary market pricing over the past 18 years, it is possible to determine periods of private market stress. Using a composite of secondary market pricing data, we find that private equity assets have sold at an average of 88% of NAV on the secondary market since 2000. As such, we view periods where secondary market pricing was below 88% of NAV and net cash flow was negative (capital calls exceeded capital distributions) as stress periods – as seen in 2000-02 and 2008-09.[7]

As **Exhibit 9** illustrates, there is a tight relationship between private equity fundraising and public equity market performance. This suggests that increased cash demands on an investor correlate with periods of broad market weakness; this is borne out by data showing negative net cash flow from private equity during the 2000-02 and 2008-09 stress periods.

Increased cash demands on investors correlate with periods of broad market weakness

EXHIBIT 9: RELATIONSHIP BETWEEN PRIVATE EQUITY FUNDRAISING AND PUBLIC EQUITY MARKETS



Source: Bloomberg, Thomson One fundraising global private equity and venture capital; data as of June 30, 2018.

[6] Defined here as additional calls on investors' cash to support a stressed private equity investment.

[7] The year 2003 is excluded as a stress period despite the below-average secondary market NAV and a negative net cash flow, as both private and public equity markets generated a positive return that year and there were no broader signs of stress in the global economy.

The aggregate net cash flow during the two stress periods is negative at around $47 billion per year, and excluding 2008 it is closer to $29 billion per year (**Exhibit 10**). Translating this into terms of the percentage of assets under management (AUM), on average the private equity cash demands during a time of crisis amount to 6.2% of AUM; during the global financial crisis, that percentage was 11.3%.

Private equity cash demands rise in periods of market stress

EXHIBIT 10: AVERAGE NET PRIVATE ASSET CASH FLOWS IN STRESS PERIODS

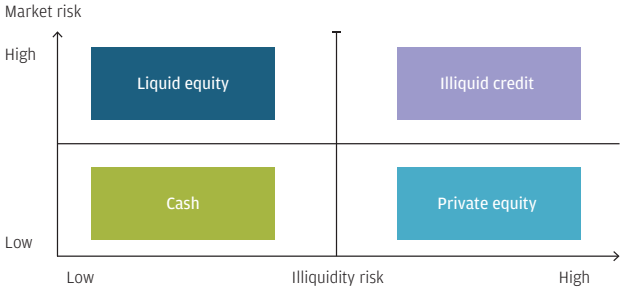
Stress period	Net cash flow ($bn)	Secondary pricing	Amt needed to sell ($bn)
2000	-22	84%	-$27
2001	-23	81%	-$29
2002	-27	85%	-$32
2008	-117	73%	-$161
2009	-43	59%	-$72
Average	-47	76%	-$61
Average ex-2008	-29	77%	-$38

Source: J.P. Morgan Asset Management; data through the end of 2017 and released in an August 2018 report.

Tying these concepts together, we can establish a framework that allows us to simulate the behavior of a portfolio of both private and public assets through the cycle. To this end, we create a stylized portfolio comprising a private asset, a liquid public asset (equity), an illiquid public asset (credit) and cash (**Exhibit 11**).

A stylized portfolio can simulate the behavior of private and public assets through the cycle

EXHIBIT 11: STYLIZED PORTFOLIO MARKET AND ILLIQUIDITY RISK ASSUMPTIONS



Source: J.P. Morgan Asset Management. Notes: The liquid equity, illiquid credit and cash are all public assets. (1) We assume that equity risk can be exited in a single trading session, so there is no ongoing negative price drift; we account for the price impact by taking the average and worst-case equity drawdown days from previous crises. (2) The private asset has market risk only in the event of a forced sale. If we insert the condition that any cash demands hitting the portfolio – from any source – must be funded purely from the portfolio's public assets, we can treat the private asset as having only illiquidity risk.

We assume that the market risk of credit can be approximately replicated with some combination of equity and cash so that we compare expected returns and choose whether to accept the additional illiquidity risk associated with credit. We also assume the liquid equity part of the public asset portfolio can be instantaneously exited even in stressed markets with limited additional friction.

Exhibit 12 shows our stylized four-asset portfolio. An unconstrained optimized portfolio tends to heavily allocate to private equity and high yield, given optically good information ratios. However, if we set maximum exposure to each asset at 20%, then in equity beta equivalent terms a 70/30 stock-bond portfolio and a 60/40 stock-bond portfolio can be replicated. The 50/20/20/10 portfolio (P1 in Exhibit 12) is representative of multi-asset portfolios with private asset exposure, so this is the stylized portfolio we test.

Optically, spreads today may appear to offer adequate compensation for illiquidity in both cases, but this assumes both perfect foresight and flawless execution, and makes no allowance for any rise in default rates. We would therefore reasonably expect that most investors would want a bigger cushion built into their breakeven spread assessment.

Our four-asset stylized portfolio can replicate in equity beta equivalent terms a 70/30 and a 60/40 stock-bond portfolio

EXHIBIT 12: SIMULATION PORTFOLIOS (FOUR-ASSET MIX)

	Expected		Equity	Portfolios (inc. HY & PE)		Equivalent (ex. HY & PE)	
Asset	Return	Vol	beta	Weights (P1)	Weights (P2)	Weights (Px1)	Weights (Px2)
U.S. large cap	5.25%	13.75%	1.0	50%	40%	70%	60%
Private equity	8.25%	21.00%	0.7	20%	20%	-	-
U.S. high yield bonds	5.50%	8.25%	0.4	20%	20%	-	-
U.S. cash	2.00%	0.50%	0.0	10%	20%	30%	40%
Excess return				3.58%	3.25%	2.28%	1.95%
Sharpe ratio				0.31	0.31	0.24	0.24

Source: J.P. Morgan Asset Management Multi-Asset Solutions; data as of September 30, 2018.

Our model can estimate how the sale of illiquid public assets will impact portfolio returns

EXHIBIT 13: BREAKEVEN SPREADS FOR ILLIQUID PUBLIC ASSETS (HY) IN PORTFOLIOS OF VARIOUS SIZES AT 15% WITH RECESSION PROBABILITY AVERAGE-CASE STRESS SIMULATION

Total fund	Cash call*	Public assets to sell (base)			Days to	Crisis price	Baseline*	Drawdown	Breakeven
($mn)	Base case	Equity	Cash	HY	transact	impact	spread	impact	HY spread
1,000	87	54	11	22	2	-0.8%	225	11	236
3,000	261	163	33	65	2	-0.8%	225	11	236
5,000	435	272	54	109	2	-0.8%	225	11	236
10,000	869	543	109	217	3	-1.0%	225	15	240
25,000	2,173	1358	272	543	6	-1.8%	225	27	252
50,000	4,345	2,716	543	1,086	12	-3.3%	225	50	275

Source: Financial Industry Regulatory Authority Trade Reporting and Compliance Engine, J.P. Morgan Asset Management; data as of May 31, 2018.
* Baseline spread is the required credit spread to compensate for losses given defaults (3.75% default assumption, 40% recovery rate). Note: Simulation assumes 15% probability of recession, base-case cash call, average crisis price drift.

The extent of the assumed drawdown will determine what spreads are required to hold high yield

EXHIBIT 14: BREAKEVEN SPREADS FOR ILLIQUID PUBLIC ASSETS (HY) IN PORTFOLIOS OF VARIOUS SIZES AT 33% RECESSION PROBABILITY WITH WORST-CASE STRESS SIMULATION

Total fund	Cash call*	Public assets to sell (bear)			Days to	Crisis price	Baseline*	Drawdown	Breakeven
($mn)	90th %ile	Equity	Cash	HY	transact	impact	spread	impact	HY spread
1,000	173	108	22	43	2	-1.4%	225	45	270
3,000	520	325	65	130	2	-1.4%	225	45	270
5,000	867	542	108	217	3	-1.8%	225	59	284
10,000	1,734	1,084	217	433	5	-2.7%	225	89	314
25,000	4,335	2,709	542	1,084	12	-5.9%	225	196	421
50,000	8,669	5,418	1,084	2,167	22	-10.5%	225	345	570

Source: Financial Industry Regulatory Authority Trade Reporting and Compliance Engine, J.P. Morgan Asset Management; data as of May 2018.
* Baseline spread is required credit spread to compensate for losses given defaults (3.75% default assumption, 40% recovery rate). Note: Simulation assumes 33% probability of recession, worst-case cash call, bear-case crisis price drift.

This would further push up breakeven spread requirements – possibly even to levels some way above prevailing spreads for managers of larger portfolios with meaningful exposure to illiquid public and private assets.

We can now consider how the portfolio copes with the varying cash demands that must be funded from public assets alone. These demands come from three sources that we assume are correlated with periods of market stress: cash calls from private assets, portfolio redemptions and increased portfolio cash buffers (with estimates taken from Girardi, Stahel and Wu, 2017[8]). As the cash calls are funded from public assets alone, we can estimate, for varying portfolio sizes and probabilities of market stress, what amount of illiquid public assets (HY) will need to be sold to meet portfolio cash needs and, in turn, what impact that will have on portfolio returns.[9]

Assuming a 15% probability of market stress over a one-year horizon and setting default and recovery rates at through-cycle averages, we see that it is only in extremely large portfolios, or those with outsize illiquid asset concentrations, in which the ex-ante breakeven spread might come anywhere close to recent trading ranges (**Exhibit 13**).

If we were to raise the probability of stress over the next 12 months to 33% – equivalent to assuming that the cycle may end in the next three years – then the breakeven spread the manager of a $10 billion portfolio should demand to hold high yield increases by 18 basis points (bps) to 258bps for a mild drawdown and by 49bps to 314bps for a severe drawdown (**Exhibit 14**).

Moreover, later on in the economic cycle, as recession risks rise objectively for all investors, even managers of smaller portfolios may begin to find that the ex-ante breakeven spread in illiquid public assets is uncomfortably close to prevailing trading levels.

CONCLUSIONS AND KEY FINDINGS

In this paper, we have explored the shifting nature of public and private asset markets – first from the perspective of firms that are raising capital and then from the perspective of investors that must evaluate the trade-off between returns and illiquidity in their portfolios.

The evolution in market structure that drove the growth in private asset markets and the transition of public equity markets toward more of an income asset is unlikely to reverse, in our view. A larger, and more easily accessible private asset market opens up new potential return streams for investors, particularly those seeking exposure to growth, innovation and corporate restructuring as drivers of returns. Investors are generally quite familiar with the subtleties of return differences between public and private markets. However, the growth in private assets likely demands that greater attention be paid to how illiquidity risk can manifest itself in portfolios – in particular, how it can arise, and interplay, within diversified portfolios.

One significant conclusion from our analysis is that while larger and more sophisticated investors have a greater propensity to take on private market illiquidity risk, the ability to absorb unexpected public market illiquidity episodes decreases as fund size grows. Unlike so many issues in investing and finance, there is no economy of scale for managing public market illiquidity. Indeed, there are *dis*economies of scale that can only be mitigated by proactively managing illiquidity risk in the public asset side of the portfolio so that the more stable and desirable private market illiquidity risk premium can be harvested.

Investment horizon may be a significant mitigating factor. The philosophy behind our modeling of breakeven spreads in high yield credit – to compensate for illiquidity risk as well as default assumptions – is that if we can avoid being forced sellers of an asset and crystallizing losses from any sale transaction greater than accrued returns, then we can manage a portfolio more efficiently. Investors with a long investment horizon, operating funds that are less subject to redemptions at times of market stress, are commensurately more able to assume illiquidity risk in private assets and ride out episodes of uncompensated illiquidity risk in public markets. Nevertheless, recognizing portfolio cash demands across the cycle is essential to prudently planning and managing a portfolio. And understanding that there is a cyclical element to the illiquidity risk premium in public assets is an important subtlety in optimally navigating a sophisticated multi-asset portfolio through the cycle.

[8] Giulio Girardi, Christof Stahel, and Youchang Wu, "Cash management and extreme liquidity demand of mutual funds," U.S. Securities and Exchange Commission, June 2017. The paper uses a data set that estimates the average monthly cash demand on a multi-asset portfolio in periods of stress to be 1.491% of AUM, with a standard deviation of 0.693%. We use this input to calculate our average and 90th percentile monthly stress period cash demands in our model portfolio simulations.

[9] We can also estimate the ex-ante breakeven spread required to include illiquid public assets in the portfolio, given the probability of market stress over the forecast horizon, using the methodology in the Addendum.

One way to frame this issue is to consider the difference between asset owner and asset manager. An asset owner is not forced, under any circumstances beyond its own preferences or the liquidity demands of its underlying (private) investments, to transact in public markets at a sub-optimal point. By contrast, an asset manager is a fiduciary that must transact not only to meet cash calls from private assets but also to manage redemptions, allocation constraints and associated rebalancing, and planned distributions. Sovereign wealth funds with no immediate distribution demands are probably closer to the asset owner end of the continuum, while mutual funds with daily liquidity commitments and predetermined distributions are likely closest to the asset manager end.

Simply put, the larger the fund and the closer it sits to the asset manager end of the owner/manager continuum, the more sensitive it will be to public market illiquidity risks, and as the cycle matures, there is a rising risk of a liquidity event hitting both public and private markets simultaneously. This may bring forward the point at which larger investors choose to exit more illiquid public asset markets, such as high yield credit, even if the prevailing spreads relative to realized defaults appear attractive. By contrast, smaller funds that are nearer the asset owner end of the spectrum are most insulated and — assuming necessary manager selection skill in, and access to, private asset investments — should be less constrained in harvesting both private and public market illiquidity risk premia over the cycle.

In running simulations of a simple multi-asset portfolio with exposure to both public and private assets, we can draw a few conclusions regarding illiquidity risk and how it might affect different investors:

- Illiquidity is not the same to all actors. If priced appropriately (in PE), it is a significant contributor to returns over the cycle, but in public markets it is more cyclical. The pricing of illiquidity risk should be considered in an overall portfolio context.
- An investor will always want to avoid becoming a forced seller in illiquid markets, public or private. But it will be more desirable to hold illiquid positions (in market weakness) in private markets than in public markets because in private markets illiquidity is a positive driver of returns, whereas in public markets it is a frictional cost that rises in times of market stress.
- Large, sophisticated investors with commitments to liquidity or regular outflows may be more exposed to public market illiquidity risk than their propensity to invest in private market illiquidity risk implies. Mitigating that risk requires a proactive assessment of the compensation for public market illiquidity risk that is being assumed and a disciplined process to reallocate to more liquid public market equivalents at times when public market illiquidity becomes undercompensated.
- Pension investors that have positive cash flow and are fully funded are less likely to face public market illiquidity traps — even given relatively large private asset allocations. But pension funds in negative cash flow or with funding gaps should operate more as asset managers than asset owners in planning for episodes of adverse public market illiquidity. Most importantly, scale is a disadvantage in dealing with public market illiquidity.
- Smaller investors are more nimble but should be mindful of the constraints that public and private market illiquidity place on larger investors and how this might distort market pricing at times of stress. Smaller investors with deep pockets and longer time horizons can even consider that they might, in times of severe market stress, in fact be the ultimate liquidity backstop — in turn profiting from the dislocations that might arise during episodes of illiquidity in public asset markets.

ADDENDUM: MODELING THE COST OF HIGH YIELD TRADING UNDER ILLIQUID CONDITIONS

In our modeling, we have used high yield credit as the archetypal public market asset subject to large illiquidity risk. Here we describe in more detail how we calibrate the frictional costs of exiting a bloc of high yield credit in times of market stress. The additional frictional cost in small transactions arises mostly from the wider bid-ask spread that can be expected in stressed markets. However, for larger transactions the frictional costs are dominated by the constraint on trading volumes, forcing investors to liquidate over multiple sessions, at sequentially lower prices from one session to the next (**Exhibit A1**).

This allows us to estimate what the ex-ante breakeven spread should be able to compensate us for a given probability of being forced to exit the position over a defined horizon. The table takes a one-year horizon and assumes a 15% probability of being a forced seller of varying trade sizes of high yield credit; this approximates the unconditional probability of recession in any given 12-month period. The volume and price impacts are taken from the average experience of periods of market stress from 2008 to the present,[10] and default and recovery rates are set at through-cycle average levels of 3.75% and 40%, respectively.

For an investor that may need to liquidate $1 billion of high yield and anticipates any crisis to be average in its severity, credit spreads above around 270bps compensate for illiquidity risk. But if the investor's subjective view of the probability of recession over the next year were to increase to 33%, then the breakeven credit spread required to compensate fully for illiquidity risk would jump to 320bps and as high as 398bps in a worst-case drawdown scenario. As portfolio size increases – and the potential illiquid asset trade size grows – the ex-ante breakeven spread required to compensate for illiquidity risk increases. Crucially, there is no economy of scale for illiquidity risks and, indeed, there are very apparent diseconomies of scale.

[10] We have tested four explicit periods of stress: the 2008-09 financial crisis, the 2011-12 U.S. debt ceiling and EU financial crisis period, the 2013 taper tantrum and the 2015-16 oil price and credit sell-off. The price action and trading conditions of these periods for high yield are then taken as potential scenarios, and an average price and trading path under stress is derived from these historical episodes for the purpose of estimating the effect of a future period of market stress on credit market trading conditions.

For larger transactions, investors may be forced to liquidate over multiple sessions, at sequentially lower prices

EXHIBIT A1: IMPACT OF SELLING A POSITION IN HIGH YIELD UNDER AVERAGE AND WORST-CASE SIMULATED MARKET STRESS CONDITIONS; IMPLIED EX-ANTE BREAKEVEN SPREAD TO COMPENSATE FOR ILLIQUIDITY RISK

Sale of HY $mn	Days to transact	Crisis price impact		Baseline* spread	Drawdown impact		Breakeven HY spread	
		Average	Worst case		Average	Worst case	Average	Worst case
500	4	1.2%	2.2%	225	19	34	244	259
1,000	10	2.9%	5.2%	225	43	79	268	304
2,000	20	5.6%	10.1%	225	84	151	309	376
3,000	29	8.0%	13.9%	225	120	209	345	434
4,000	36	10.5%	17.7%	225	157	266	382	491
5,000	43	12.6%	20.7%	225	189	311	414	536

Source: Financial Industry Regulatory Authority Trade Reporting and Compliance Engine, J.P. Morgan Asset Management; data as of May 31, 2018.

* Credit spread required to compensate for default losses; estimates based on 15% recession probability, 3.75% default rate and 40% recovery rate.

Building investor resilience in a downturn

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IN BRIEF

- Recession experiences have varied in terms of trigger events and associated market responses. In this paper, we consider a plausible range of downturn scenarios and the degrees to which different investor types may be resilient to them.
- The maturity of corporate defined benefit pension funds and their size relative to sponsors' balance sheets have raised concern that pension funds could hamper corporate recoveries. Corporate plans have de-risked investment strategies, but other risks have become more important – notably, cash flow, liquidity and operational risks. Sponsor covenant risk remains critical.
- A "corporate caution" scenario, characterized by severe equity downturns, falling interest rates and high default rates, is the most challenging scenario for defined benefit pension funds, particularly those whose resilience has been weakened by being in a negative cash flow position.
- Other institutional investors, such as sovereign wealth funds, endowments and foundations, and public pension funds, have a greater ability to take a long-term investing view and have thus extended more aggressively into alternatives. While this may help compensate for falling expected public market returns, the spending commitments of endowments and foundations and the negative cash flow position of many public pension funds can undermine this resilience.
- The resilience of individual investors will depend on the interaction of their income growth and their strategic portfolio allocation. Evidence suggests that higher income growth is associated with greater risk-taking.
- Particularly in the U.S., where households have a relatively high allocation to risk assets, there is evidence of an increasing use of balanced funds, including target date funds, within defined contribution holdings. Skillful management of asset allocations in these vehicles can help improve outcomes, resulting in greater individual investor resilience in a downturn.

FACING INTO THE LATE CYCLE

Our Long-Term Capital Market Assumptions (LTCMAs) are structurally optimistic, but we cannot fail to acknowledge the potential short-term pain that may come with the end of the current cycle. In this paper, we consider which risks different types of investors are bearing today, their capacity for bearing them and how these risks might impact investors through the end of the expansion.

LESSONS FROM RECESSION EXPERIENCE

Our review of recessions confirms a diverse experience across different recessionary periods. A variety of triggers have catalyzed recessions, and the quality and duration of the market response have been different in each case. Recessions are generally expected to spur equity sell-offs, credit defaults and a flight to quality driving Treasury prices up. These responses have not always occurred, however (**Exhibit 1**). Markets can respond violently and then bounce back straightaway, or they can shrug recessions off altogether. Further, the ordering of market responses is not fixed.

We can consider a range of potential downturn scenarios and the resilience of different investors when exposed to each. In "The taming of the business cycle: Fewer recessions but weaker recoveries,"[1] we examine clues about what future recessions might look like and conclude that, notwithstanding the recession associated with the global financial crisis, recessions have generally become milder, less frequent and more synchronized globally. In this context, and with the U.S. economy firmly in its late-cycle phase, we have created a heuristic and non-exhaustive set of four recession scenarios that we deem most likely and contemplate the potential effects of each on markets (**Exhibit 2**).

Against these scenarios, we look at different types of investors, the risks they bear and their ability to weather a recessionary environment. The way in which investors respond to different types of recessions depends not just on the recession itself but also on investors' wider circumstances, capacity to bear risk and investment goals.

[1] "The taming of the business cycle: Fewer recessions but weaker recoveries," 2019 *Long-Term Capital Market Assumptions*, J.P. Morgan Asset Management, 2018.

History confirms that all recessions are not made equal

EXHIBIT 1: REVIEW OF DEVELOPED MARKET RECESSION EXPERIENCES

● Equity market ■ Bond market ◆ Credit

Start date*	Trigger	Duration in quarters		Market reaction*			
				Led	Coincided	Lagged	Uninterrupted
Nov '73	Oil shock	U.S.	5				
		EU	2		●	■	
		JP	5				
Jan '80	Oil shock	U.S.	2				
		EU	10		■	●	
		JP	12				
Jul '81	Monetary tightening	U.S.	5		●	■	
Jul '85	Plaza Accord	JP	6	■			●
Jul '90	Unknown	U.S.	2				
		EU	6		●		■ ◆
		JP	11				
Jul '97	Asian financial crisis	JP	7		■	●	
Mar '01	Equity bubble	U.S.	3				
		JP	5	●		■	◆
Dec '07	Credit crisis	U.S.	6				
		EU	5	◆	● ■		
		JP	4				
Sep '11	Sovereign debt crisis	EU	6	● ■ ◆			

Source: Bank of America Merrill Lynch, Bloomberg, Moody's, NBER, Thomson Reuters Datastream, Trading Economics, J.P. Morgan Asset Management; as of October 2018.
* Market reactions are qualitative assessments. For global recessions, market reactions and start dates refer to U.S. sources. U.S. credit data is available from 4Q 1988. For region-specific recessions, the market reaction refers to the domestic market.

We cannot predict the shape of the next recession, but we can create plausible scenarios

EXHIBIT 2: POSSIBLE DOWNTURN SCENARIOS

● Negative ○ Moderately negative ○ Moderately positive ● Positive

Cause of recession	Possible triggers	Inflation	Curve shape into downturn	U.S. large cap	U.S. 10-year Treasuries	Credit	Emerging market assets	U.S. dollar
Monetary tightening	Inflation	Higher; distribution shifts to right	Flatter; led by a higher short end	○	○	○	●	●
Corporate caution	Change in tax regime	Lower; distribution shifts to left	Flatter	●	●	●	○	○
Trade war	Further tariff measures	Unclear; wider distribution	Flatter; led by long end	○	○	○	●	○
Consumer retreat	Labor market downturn	Lower; distribution shifts to left	Flatter	○	○	○	○	○

Source: J.P. Morgan Asset Management. For illustrative purposes only.

CORPORATE PENSION FUNDS

Defined benefit (DB) pension provision expanded rapidly during the economic boom following World War II, but the insolvencies that followed recessions in the 1960s and 1970s exposed the weak positions of the pension funds left behind by failing companies. The response was regulatory tightening, starting with the introduction in the U.S. in 1974 of the Employee Retirement Income Security Act (Erisa), which slowed the creation of new DB plans. Eventually, the regulatory burden triggered a global trend – closing defined benefit plans and shifting to defined contribution (DC) plans, albeit at different paces in different parts of the world.

Regulatory relief

Nonetheless, by the time the global financial crisis began in 2007, DB plans had become large, both on an absolute basis and relative to the size of their sponsors, through the natural process of maturation and consolidation into larger entities. Coming on the heels of a further round of regulatory tightening, the financial crisis was disastrous for DB plans and their sponsors, with funding levels plummeting. In contrast to previous recessions, the regulatory response was more accommodative, as concerns began to emerge that pension obligations could hamper corporate recoveries or, indeed, trigger sponsor insolvencies.

Squeezing the balloon: Changing risks

While pension funds have taken substantive steps to de-risk their investment strategies by shifting from risk assets to bonds, diversifying their exposure to equities and tapping the pension risk transfer markets, new risks and a different balance of risks are present today. Many plans, particularly those that are closed or frozen, are now in negative cash flow, routinely paying out more in benefits than they are receiving in contributions.[2] Defined benefit liabilities and deficits are concentrated in "old economy" sectors, where sponsors are arguably more vulnerable to a downturn. Pension funds are not only large relative to their sponsors; they are, in general, thinly capitalized despite sizable cash injections. For example, the U.S. industrial sector continues to have an outsize share of U.S. corporate defined benefit deficits (**Exhibit 3**), despite having contributed 9.8% of its operating cash flows over the last 10 years to its pension funds, compared with the market average of just 3.7%.[3]

It is also evident that pension portfolios today are much more complex. While they may carry less investment risk, particularly in the form of equity risk, many are carrying greater:

- cash flow risk arising from their negative cash flow position
- operational risk arising from derivatives-based liability and currency hedging programs
- liquidity risk arising from increased investment in private markets, skill-based strategies and extended credit
- covenant risk, given the concentration of defined benefit liability in "old economy" sectors, and the size of DB plans relative to the size of their sponsors

Surviving the short term to thrive in the long term

Nonetheless, we believe that the long-term outlook for pension funds is relatively benign, with the expectation that the gradual normalization of interest rates and steady returns from risk assets will help to repair funding levels over the time horizon of our assumptions.[4] However, to make it to the

[2] See "Matching cash flows and managing liquidity in maturing pension funds," *2018 Long-Term Capital Market Assumptions*, J.P. Morgan Asset Management, 2017.

[3] HOLT®; data as of July 8, 2018.

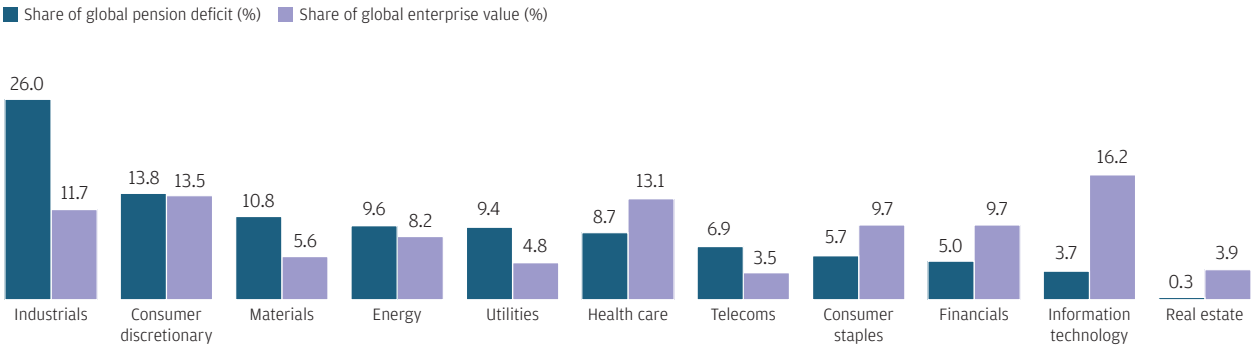
[4] "Matching cash flows and managing liquidity in maturing pension funds," *2018 Long-Term Capital Market Assumptions*, J.P. Morgan Asset Management, 2017.

long term, pension funds must survive the short term. The principal driver of the demise of pension funds following previous recessions was the demise of the sponsor, and this risk remains most pertinent today. But a key difference today is the concern that pension funds themselves may have the propensity to drag their sponsors under or, at least, materially impact their ability to recover from hard times.

A variety of risk factors can impact the resilience of pension institutions under our different scenarios. **Exhibit 4** shows the potential magnitude of the impact for an illustrative U.S. corporate DB plan, but clearly results will depend on how much an individual plan is exposed to the pension risk factors listed. For example, UK corporate plans tend to make much greater use of derivatives through leveraged liability-driven investment (LDI) and currency hedging programs, and are therefore more likely to experience large operational cash flows that can create or compound liquidity challenges. Many European pension funds have lower allocations to growth assets, so they may be less exposed to equity pullbacks than the sample U.S. plan shown.

"Old economy" sectors retain an outsize share of DB pension deficits

EXHIBIT 3: SHARE OF PENSION DEFICIT COMPARED WITH SHARE OF ENTERPRISE VALUE



Source: HOLT®, J.P. Morgan Asset Management; data as of July 8, 2018. Data refers to pension plans for the Russell 2000, MSCI Europe and FTSE 350.

Different types of downturns will have different implications for pension funds

EXHIBIT 4: IMPACT OF KEY RISK FACTORS ON RESILIENCE IN DIFFERENT RECESSION SCENARIOS — FRAMEWORK FOR ANALYTICAL THINKING

● Negative ○ Moderately negative ■ Neutral

Pension risk factor	Description of risk factor	Illustrative U.S. pension plan	Potential impact on pension plan			
			Monetary tightening	Corporate caution	Trade war	Consumer retreat
Negative cash flow drag	Negative cash flow creates a further drag on funding in low return scenarios.	-2.6% net cash flow	○	●	○	○
Public market illiquidity*	Forced selling in volatile markets amplifies funding level/balance sheet volatility.		○	●	○	○
Low hedging ratio	Flight to quality in volatile markets drives liability valuations upward.	Six years unhedged duration	○	●	○	○
Large growth allocation	Sharp sell-offs can drive funding levels below critical regulatory thresholds, requiring immediate intervention.	60% allocation to growth assets: public and private equity, REITs, hedge funds	○	●	○	○
Large credit exposure	Defaults and downgrades impair credit returns.	40% allocation to U.S. aggregate	○	●	○	○
Large illiquid allocation	Poorly planned liquidity management may result in liquidity squeezes during downturns.	5% allocation to private equity and hedge funds	■	○	■	■
Large foreign currency exposure	Strengthening of domestic currency impairs returns on non-domestic assets .	15% allocation to EAFE equities	○	■	■	■
Heavy derivatives usage	Derivatives can drive large operational cash flows during periods of volatility in rates and currencies.	Modest to little currency hedging; modest levels of interest rate leverage	■	■	■	■
Weak sponsor covenant	Extended pressure on sponsor may elevate insolvency risk.	Moderate to weak	○	●	○	○

Source: J.P. Morgan Asset Management; as of October 2018.
* "The evolution of market structure," *2019 Long-Term Capital Market Assumptions*, J.P. Morgan Asset Management, 2018.

In general, however, we expect that the corporate caution scenario, with its combination of severe equity downturns, falling interest rates and high default rates, is the most challenging scenario for DB pension funds — particularly those whose resilience has been weakened by being in a negative cash flow position — pointing to a need to be alert to the triggers of such a scenario.

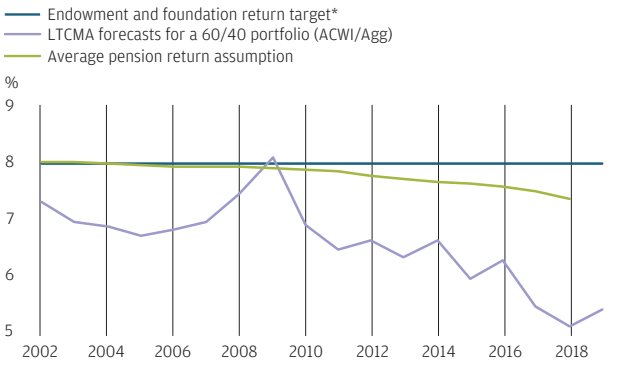
OTHER INSTITUTIONAL INVESTORS

Generally, the corporate caution scenario is also the most troublesome for insurers. Insurers rely heavily on credit in investment portfolios, and low interest rates feed through to mark-to-market liability valuations in Europe and new business book yields in the U.S.

Institutional investors that either have less concrete liabilities (such as sovereign wealth funds [SWFs] and endowments and foundations [E&Fs]), or are free of mark-to-market balance sheet accounting (public pension funds) are arguably more resilient in a downturn and able to take a long-term view. However, there is growing tension between the investment return requirements or expectations of these investors and what is likely to be attainable if our Long-Term Capital Market Assumptions are borne out. Endowments and foundations have the two-fold objective of preserving the purchasing power of their assets and meeting spending requirements, which we estimate implies a return of roughly 8% per annum, gross of fees. U.S. public pension funds have required returns of just under 8%, on average, having only marginally reduced their expectations over the last 10 years. This target looks increasingly difficult to achieve with public assets (**Exhibit 5**).

Investment returns from stocks and bonds are not expected to deliver the required returns of many institutional investors

EXHIBIT 5: EXPECTED RETURN ON A 60/40 PORTFOLIO (%)



Source: Public Plans Data — the Center for Retirement Research at Boston College and the Center for State and Local Government Excellence, J.P. Morgan Asset Management; data as of September 2018.

* The E&F return target is estimated at 8.00%, calculated as follows: 8.00% = spending rule (5%) + inflation (2.00%, per LTCMAs) + management fees (1%).

It is thus not surprising that E&Fs, public pension funds and SWFs have shifted substantially into alternatives, exploiting these institutions' perpetual horizons, less burdensome regulation and, for E&Fs and SWFs, non-contractual liabilities to harvest risk and illiquidity premia.

Nonetheless, the spending commitments of E&Fs and the negative cash flow positions of many public pension funds can undermine this resilience. Sovereign wealth funds, particularly those that are funded by revenues from natural resources and/or whose purpose is to smooth a nation's fiscal experience, may be faced with large and sudden divestment needs in a recessionary scenario. As outlined in our article "The evolution of market structure,"[5] it is essential for all investors to avoid becoming forced sellers in illiquid markets. Again, we find that the degree to which investors have control over the cash flows from their funds is a critical resilience factor.

INDIVIDUAL INVESTORS

We think about resilience for an individual investor in terms of the extent to which he or she will need to tap into household financial assets in a recessionary environment and in turn the declines in investment values that the individual and/or household will be able to tolerate.

Growth in income vs. growth in financial assets

Historically, the U.S. has enjoyed the greatest household net disposable income growth among OECD member nations, but we find that stronger income growth does not necessarily imply greater resilience in all types of recessions.

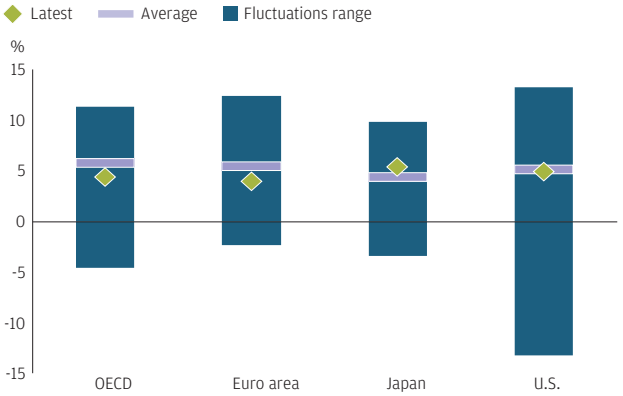
From 1995 to 2016, household wealth in the U.S. experienced greater variability than in other parts of the world (**Exhibit 6**) despite the fact that the U.S. faced fewer downturns than most OECD members (two in the U.S. vs. three in the euro area and four in Japan). U.S. households may have experienced the greatest growth in income during this period, but not in the value of their financial assets. In fact, we found very low correlations between household net disposable income growth and household financial asset (HFA) growth across OECD countries. This suggests to us that the strategic allocation of household financial assets may be the critical factor influencing HFA growth.

As we will see in the case of the U.S., for example, high income growth tends to be associated with more risk-taking and, over the period analyzed, with an average annual growth rate of HFAs slightly below the OECD average (5.08% for the U.S. vs. 5.71% for the OECD).

[5] "The evolution of market structure," *2019 Long-Term Capital Market Assumptions*, J.P. Morgan Asset Management, 2018.

Household wealth in the U.S. has experienced much wider variation historically vs. other regions … and an average annual growth in HFAs slightly below that of the OECD as a whole

EXHIBIT 6: CHANGE IN PER CAPITA HOUSEHOLD FINANCIAL ASSETS VALUE BY COUNTRY/REGION (%Y/Y, 1995-2016)



Source: OECD household financial assets (indicator). doi: 10.1787/7519b9dc-en; data as of July 2018.

Allocation of household wealth

An examination of the allocation of household wealth across regions (**Exhibit 7**) helps shed additional light on the relationship between strategic asset allocation and HFA growth. U.S. households have a relatively risky allocation, holding the greater part of their financial assets in pension funds (DB and DC) and equity shares. In contrast, for European households the balance shifts toward deposits and insurance-based savings, and in Japan toward cash and insurance-based savings.

This gives us a way to think about the relative resilience of households under different types of downturns. U.S. investors will be sensitive to a corporate caution scenario, for example, given that (a) they still have relatively higher direct exposure to equity shares and (b) a large proportion of their wealth is held in pension funds—either in DB plans or DC plans, which we can observe to have high equity allocations. European and Japanese investors may have a greater degree of resilience under a corporate caution scenario, given higher allocations to deposits and greater reliance on insurance-based savings.

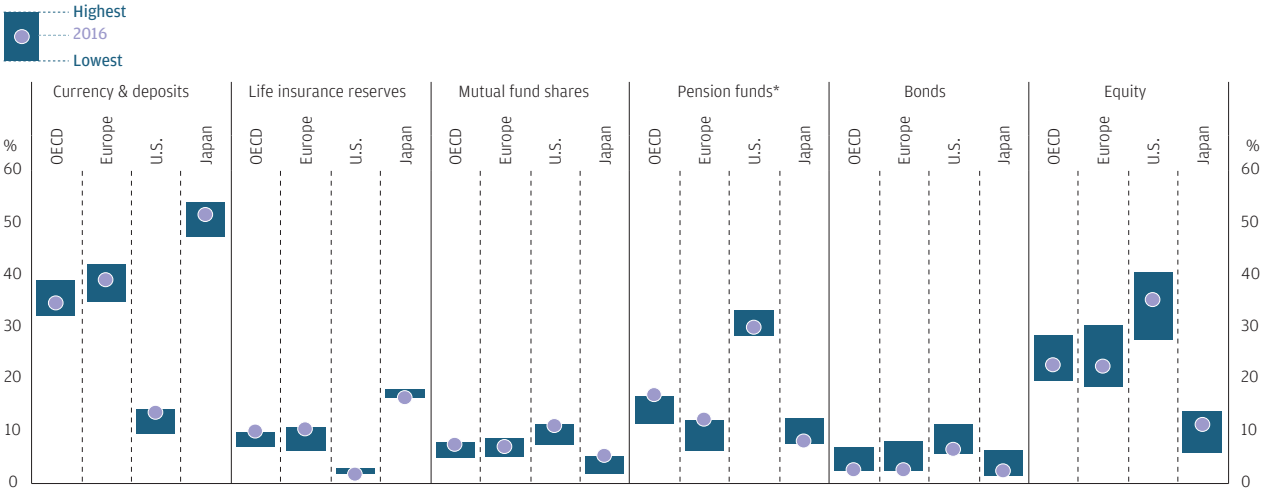
Evolving investor trends

The response of individual investors to recessionary environments is complicated by a gradual shift in market risk and investment decision-making toward the individual. This trend is being driven by insurers offering more market-based savings products with fewer guarantees and by the increasing role of DC plans in employee retirement saving. We see investors responding, in part, by increasing allocations to mutual funds and multi-asset structures, including target date funds (TDFs). This is observable across OECD countries in a move away from direct equity and bond exposure — now at the lower end of their historical ranges — in favor of mutual funds, now at the higher end, as shown in Exhibit 7. The delegation of asset allocation via balanced funds such as TDFs is another manifestation, particularly among U.S. DC plan participants.[6] These strategies can improve resilience through downturns by better aligning

[6] Employee Benefit Research Institute, Issue Brief No. 458, September 2018.

Household wealth allocations vary considerably across regions, with more conservative approaches in Europe and Japan vs. the U.S.

EXHIBIT 7: HOUSEHOLD FINANCIAL ASSET ALLOCATION BY COUNTRY/REGION (HIGH, LOW AND 2016 AVERAGE HFA ALLOCATIONS [%], 1995-2016)



Source: OECD household financial assets (indicator). doi: 10.1787/7519b9dc-en; data as of July 2018.
*Includes DB and DC plan assets.

asset allocations with investors' changing needs as they approach retirement. Further, dynamic management of these multi-asset structures can help to steer portfolios through a downturn and, where successful, reduce the degree of stress that investors experience. We see these trends as having the potential to help mitigate the strong cyclicality in household investing.

Reasons for concern

In general, though, there are still reasons for concern. Investor age and risk-taking are becoming more aligned, but there's room for improvement. Nearly one in five 401(k) participants in their 60s have equity allocations exceeding 80%, while 7% of those in their 20s have no allocation to equity.[7] J.P. Morgan's recent survey of U.S. corporate DC plan participants finds that less than 40% were highly confident in their ability to make investment decisions.[8] This knowledge gap and the large allocation of account balances to equities in the U.S., on average, (even among some participants near retirement) raise concern regarding the resilience of plan participants given a downturn. What's more, there are divergences among income groups in terms of savings participation: 87% of households with an income above $100,000 have a 401(k) or similar defined contribution plan account vs. only 37% of households with an income of less than $40,000.[9] Those households with both low income and low savings will likely be hardest hit by a recession, no matter what their portfolio allocation.

Meanwhile, outside the U.S., European and Japanese investors have fewer equities and may therefore be more immunized to equity drawdowns. However, they still have exposure to markets via insurance savings products, and hold large allocations of their household wealth in cash and deposits. A downturn that results in prolonged periods of low rates may confirm the validity of the term "reckless conservatism" as applied to these "lower risk" allocations.

In any case, there is apparently much less historic tolerance at the European and Japanese household level for variability in return than there is in the U.S., and the notion of age-appropriate investing is less well developed in these geographies. Consequently, even with lower equity exposure, the willingness to look through adverse equity market scenarios could be limited. In the context of insurers steadily switching business models to more market-based savings products with fewer guarantees, an early setback via a market downturn could inflict lasting damage to a nascent market-based savings culture.

CONCLUSION

While recessions will always be painful, the intensity and nature of that pain can vary greatly. In recessions caused by monetary tightening, emerging market assets will suffer alongside a strong U.S. dollar. Recessions characterized by corporate caution pose particular risks to stocks and credit markets. A recession following a trade war is likely to come with non-linear effects on near-term growth and inflation, with emerging market assets the likely underperformer. In the U.S., with its consumer-driven economy, a weaker demand impulse following a "consumer retreat" is likely to keep inflation contained.

For pension funds, the key risk today is that of dragging sponsors under, especially in a corporate caution scenario with severe equity downturns. Managing pension portfolios through recessionary environments will require monitoring a number of risk factors beyond just asset price performance, such as negative cash flow risks, derivatives usage and illiquid allocations.

Sovereign wealth funds and endowments and foundations are primed to weather recessionary environments well, but only if they can manage their spending commitments and avoid becoming a forced seller in illiquid markets. This is particularly important because these investors have allocated heavily to private assets, given that expected returns from stocks and bonds have moved lower over the cycle.

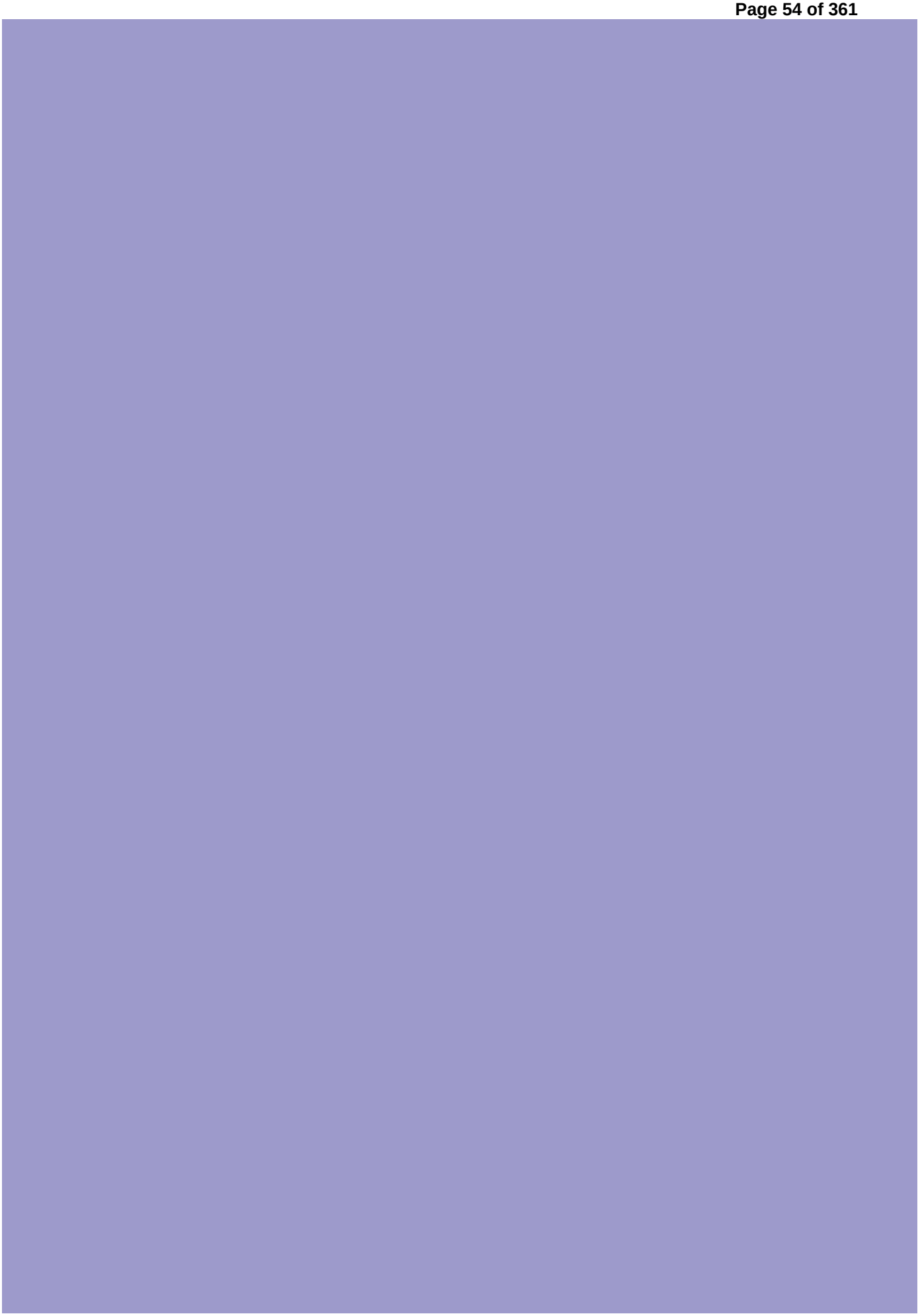
Individual investors with higher equity allocations, such as those in the U.S., will be hit hardest by a recession but may also have the greatest resilience, depending on their income level and age. Investment vehicles such as target date funds build on age-related resilience and may further improve resilience in the long run by actively managing investors' needs through to retirement. Additionally, multi-asset structures may be able to effectively manage portfolios through a period of market weakness.

Building resilience in a downturn requires all investors to assess the quality of the recessionary environment and to understand the risks they bear and their capacity to bear them. Such an appraisal is critical in order to survive the short term and thrive in the long term.

[7] Ibid.

[8] *2018 Defined Contribution Plan Participant Survey, Part 1,* J.P. Morgan Asset Management, 2018.

[9] Report on the Economic Well-Being of U.S. Households in 2015, Board of Governors of the Federal Reserve System.



II Assumptions

G4 government bonds: Flatter curves, lower yields

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IN BRIEF

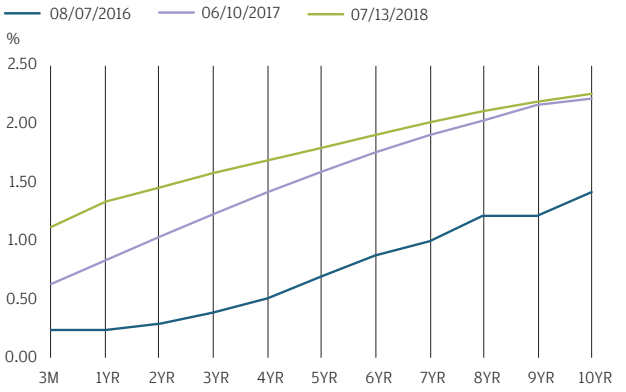
- Anticipating flatter curves and lower yields, we gradually shift our equilibrium interest rates lower across major G4 markets.
- For the first time since the financial crisis, the current U.S. cash rate is modestly above our forecast of equilibrium. Cash rates for the rest of the G4 are still far below our equilibrium assumptions and only expected to converge to the long-term equilibrium very gradually.
- In a much larger corporate bond market, duration has risen significantly and average credit quality has notably declined. But we do not expect these trends to continue over our forecast horizon; expected returns are somewhat improved from last year.
- For emerging market debt, our spread assumptions are unchanged, but more attractive starting valuations mean our return expectations are up significantly. However, the non-normal distribution of returns means the risk of outsize losses is substantially larger than these improved Sharpe ratios suggest.

OVERVIEW

The defining theme in fixed income markets over the last 12 months was the yield curve flattening associated with policy tightening in the U.S. The average of G4 cash rates rose by 60 basis points (bps) on a GDP-weighted basis – the largest one-year rise since the global financial crisis – a move that reflected 100bps of hikes by the Federal Reserve (Fed) and two rate hikes from the Bank of England (BoE). In contrast, the yield on the G4 10-year government bond yield rose just 20bps over the same time frame, flattening the G4 2s10s yield curve over the year (**Exhibits 1** and **2**).

As U.S. monetary policy has tightened in recent years, G4 yield curves have flattened

EXHIBIT 1: G4 GDP-WEIGHTED FORWARD CURVES FOR 3-MONTH RATES



Source: J.P. Morgan Asset Management; data as of September 30, 2018.

In the past year, the average of G4 cash rates rose by 60bps on a GDP-weighted basis – the largest one-year rise since the global financial crisis

EXHIBIT 2: G4 10-YEAR REAL YIELD (%)

Source: J.P. Morgan Asset Management; data as of September 30, 2018.

In keeping with the last few editions of our Long-Term Capital Market Assumptions (LTCMAs), we gradually shift our equilibrium interest rates lower across major G4 markets. On the one hand, low potential growth and ongoing disappointments on the inflation front argue for gradualism in normalization of monetary policy. On the other hand, zero and negative nominal interest rate policies are not expected to prevail over our forecast horizon. Evaluating these two factors in tandem, we expect that global central banks will gradually shift to a more hawkish position in coming years

OUR FIXED INCOME ASSUMPTIONS METHODOLOGY CONSTRUCTS EQUILIBRIUM YIELDS FROM SIMPLE BUILDING BLOCKS

BUILDING BLOCKS: ANATOMY OF FIXED INCOME YIELDS AND SPREADS

1. **Equilibrium cash rate**
   - The level of cash rates consistent with our long-run growth and inflation forecasts by country
2. **+ Curve (equilibrium long-dated yield)**
   - Additional yield to compensate investor for holding long-term bonds (term premium)
3. **+ Credit spread**
   - Additional credit spread, incorporating rating migration assumptions for *investment grade* (IG) and credit/liquidity risk premia and expected default loss for *high yield* (HY)
4. **Return calculation**
   - Reflects normalization path to equilibrium interest rate, annual roll-down and rebalancing to a constant maturity index, plus coupon accrual and any defaults/losses

In this year's edition of the LTCMAs, we introduced explicit equilibrium assumptions for the two-year and five-year parts of the yield curve.

Non-dollar developed market (DM) cash rates outside the U.S. are expected to converge to long-term equilibrium at a very gradual pace

EXHIBIT 3A: DEVELOPED MARKET CASH YIELD

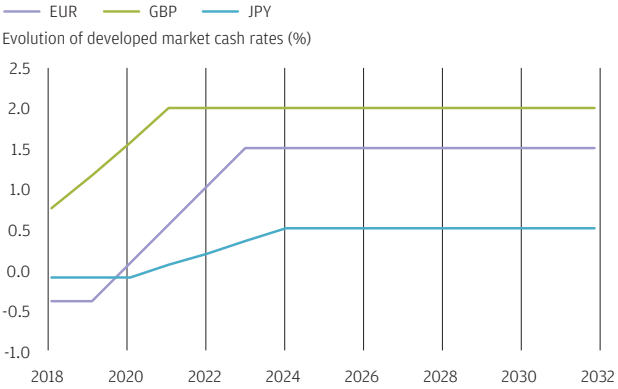
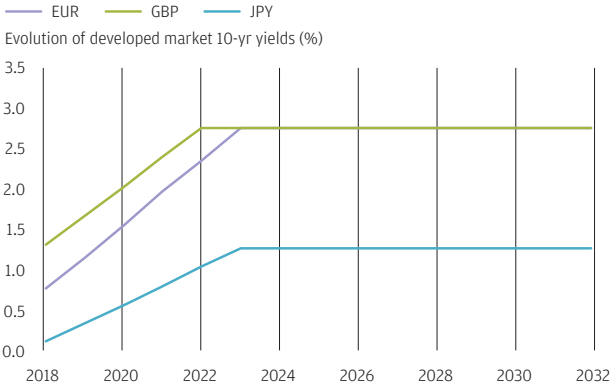


EXHIBIT 3B: 10-YEAR NORMALIZATION WINDOWS



Source: J.P. Morgan Asset Management; data as of September 30, 2018.

while keeping yields depressed below nominal GDP to provide ongoing stimulus. In addition, we acknowledge that the global economic cycle is mature and the likelihood of an economic downturn over our forecast horizon is rising. Experience has shown that central bank responses to a downturn are asymmetric. That is, with rates already close to zero, there is little room to cut rates in a downturn, but central banks can more easily raise rates in response to inflation. We think this asymmetry will persist, especially as we expect the zero lower bound (limited use of negative rates) will be broadly binding in the next recession. This view informs our expectation that real equilibrium yields will remain low, and certainly lower than experienced historically.

In terms of fiscal policy, the fact that we are seeing a large fiscal expansion at the peak of the U.S. cycle suggests we are likely to see structurally higher deficits over our forecast horizon. This limits the ammunition from fiscal policy in the next downturn.

For the G4 economies, we assume real cash rates are close to zero in equilibrium, with a relative ranking across countries dictated by their ranking of real GDP. The U.S. real cash rate is assumed to be the highest, and modestly positive, while Japan has the lowest ranking. For the first time since the financial crisis, the current U.S. cash rate is modestly above our forecast of equilibrium. Cash rates for the rest of the G4 are still far below our equilibrium assumptions and only expected to converge to the long-term equilibrium very gradually, meaning expected returns are forecasted to remain below equilibrium this year (**Exhibits 3A** and **3B**).

The most significant change we make this year is a downgrade to U.S. cash rates, which is a direct consequence of the lowering of our U.S. inflation assumption. The real cash rate for the U.S. is kept at 0.25% and remains the highest across G4 countries.

A key component of our framework for long-end yield assumptions is that quantitative easing (QE) is likely to be a part of the conventional central bank tool kit. Central banks have added QE and forward guidance to their monetary policy tools, and we believe these are here to stay in future downturns. Indeed, we think that QE will probably be used again over our forecast horizon. This is expected to keep term premia depressed, implying that curves remain flatter in equilibrium than experienced during the last 15 years. Along with the global impact of QE, unfavorable demographics, high indebtedness, lower potential growth rates and regulatory demand for fixed income are all weighing on long-end yields. The combination of these factors – primarily the large G4 central bank balance sheets – contributes to the globalization of long-end yields and affects our assumption of long-end yield normalization, particularly for the U.S. (**Exhibit 4**).

Higher starting yields improve bond returns, especially in the U.S. This also implies that the duration premium relative to cash improves modestly this year. We note, however, that the premium is still low relative to its history. On the broader spectrum of fixed income, long-term returns across emerging market (EM) and U.S. high yield are attractive compared with core sovereign bonds (**Exhibits 5A** and **5B**).

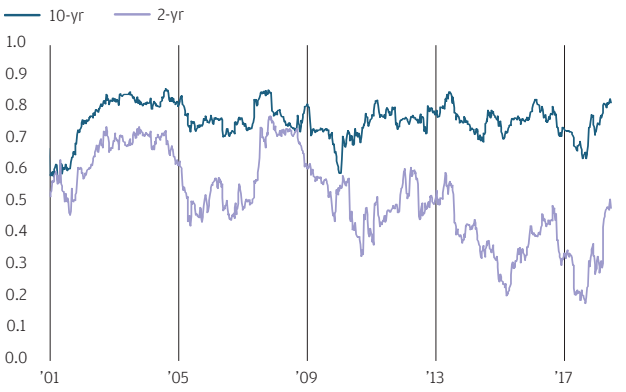
U.S. RATES

This year, we reduce the U.S. cash rate equilibrium assumption, based on our lower inflation estimate. We lower the equilibrium cash rate by 25bps to 2%, the same level as CPI inflation and roughly 25bps above PCE inflation. Our equilibrium assumption for the U.S. is now below the current prevailing cash rate in the U.S. – for the first time since the financial crisis. To be clear, our equilibrium, cycle-neutral assumption should not be confused with a terminal cash rate. Indeed, it is very likely that policy rates will rise above and fall below our equilibrium assumption at various points over the next 15 years.

We maintain our estimates for the cash 10-year yield curve at 125bps, which is around 50bps flatter than the average over the last 30 years. Mechanically, this pushes our 10-year yield assumption down by 25bps to 3.25%, which represents a 50bps discount vs. long-term nominal U.S. GDP growth. We maintain a 25bps yield curve assumption for the slope between 10-year and 30-year yields.

Developed market long-end yields are highly correlated despite differing economic cycles

EXHIBIT 4: 2-YEAR AND 10-YEAR YIELD CORRELATIONS



Source: Bloomberg; data as of September 30, 2018.

EUROZONE RATES

We modestly downgrade our cash real yield assumption in Europe from 0.25% to 0%,[1] as real yields are likely to be lower in Europe than in the U.S. We continue to expect that inflation will undershoot the European Central Bank (ECB) target over the forecast horizon despite the central bank's aggressive efforts to stimulate the economy. This therefore pushes our nominal cash yield assumption to 1.5%, 25bps lower than last year. Quantitative easing is likely to end this year, but the ECB's balance sheet is expected to remain large by historical standards. This keeps the EUR yield curve flatter in equilibrium than recent data would suggest. Our yield curve assumption is unchanged at 125bps (approximately 50bps flatter than the average since the financial crisis), which necessarily reduces our 10-year and 30-year yield assumptions by 25bps each, to 2.75% and 3%, respectively.

We hold the trajectory of normalization for both cash and 10-year yields unchanged, implying that we are one year closer to normalization. Cash rates will start normalizing in 2019 and reach equilibrium four years later, suggesting a significantly negative real return, all else equal, over our assumption horizon. The 10-year only ends normalizing in 2023.

UK RATES

Brexit presents the greatest element of uncertainty in our assumption framework for the UK. Our real growth estimates reflect a penalty relative to other G4 economies, especially the eurozone. In keeping with our ranking of real cash yields cross-sectionally based on real GDP estimates, we reduce our equilibrium cash yield from 2.25% to 2%. The supply side of the economy has weakened, and the UK's growth has lagged its G4 peers over the last year – phenomena undoubtedly linked to the uncertainty surrounding Brexit. On the monetary policy front, the Bank of England has already embarked on a rate hiking path that we assume will proceed at a very gradual pace over the next three years.

We keep our assumption for the cash 10-year yield curve unchanged at approximately 75bps, which is approximately 90bps flatter than the average since the financial crisis. We expect the ultra-long end will be supported by liability-driven investment; hence, our UK assumptions build in the flattest 10s30s curve across the G4. We expect the UK 10s30s curve to be flat in equilibrium, with both 10-year and 30-year bonds yielding 2.75%.

JAPANESE RATES

Over the last year, the Bank of Japan (BoJ) has successfully defended its yield curve control framework and kept 10-year yields within a target range. The introduction of flexibility in the target range injects some volatility into Japanese bond yields but does not change the fact that policy is keeping yields artificially depressed in order to provide stimulus. Low levels of growth and a widespread belief that inflation will persistently undershoot the BoJ's target keep return expectations low for Japanese fixed income. Our estimates are unchanged following our significant cut last year to our

[1] We use eurozone yields based on the French government curve as a benchmark.

Higher starting yields improve bond returns, especially in the U.S., but the duration premium is still low relative to its history

EXHIBIT 5A: G4 10-YEAR RATES, BUILDING BLOCKS

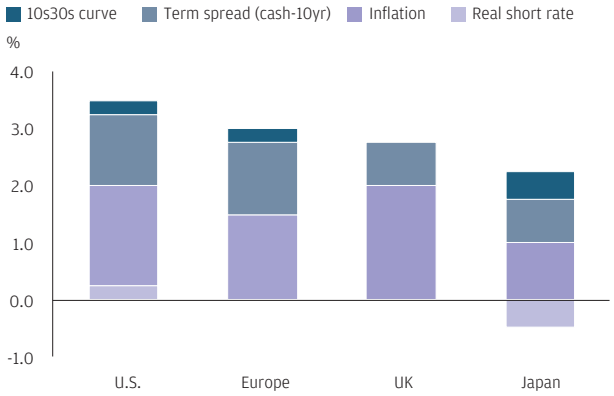
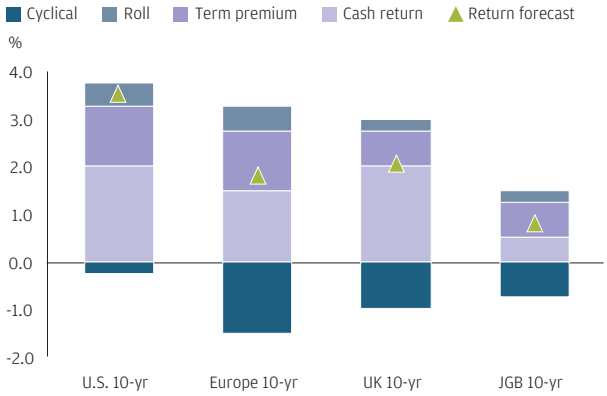


EXHIBIT 5B: 10-YEAR RETURN COMPONENTS



Source: J.P. Morgan Asset Management; data as of September 30, 2018.
Note: U.S. inflation refers to PCE inflation.

equilibrium cash rate expectation (from 1% to 0.5%). We also keep our normalization window unchanged for cash vs. last year, implying that cash rates will only start normalizing in 2021. This is premised on disappointing inflation outcomes over the last 12 months. We expect 10-year yields to reach their equilibrium level of 1.25% after five years of normalization, with the implied yield curve steeper than it has been in recent years. This assumption largely reflects our expectation that the BoJ will need to balance two competing factors: A steeper curve would aid the domestic financial sector, but suppressing long-end yields below GDP would aid debt sustainability.

OTHER DEVELOPED MARKETS

In Australia, our cash rate assumption is kept unchanged at 3.00%. But this masks some changes beneath the surface – our macro assumptions upgrade inflation by 25bps to 2.5%. At the same time, in keeping with our downgrade across major markets, we downgrade our Australia real cash rate from 0.75% to 0.5%. On a cross-sectional basis, Australian real cash rates remain the highest among the developed markets. We reduce the curve slope between cash and the 10-year, acknowledging a higher front-end yield as well as bringing the Australian curve slope closer to other developed markets. This 25bps decrease in curve slope between the three-month and the 10-year pushes our 10-year yield assumption to 4.00%.

In Canada, we keep our cash yield and 10-year yield assumption unchanged at 2.00% and 3.25%, respectively. However, we downgrade our 30-year yield assumption by 25bps to reflect the ongoing lack of long-end issuance and the persistence of the flatter 10s30s curve relative to G10 peers. This brings the Canadian curve more in line with peers and leaves the 10s30s curve slope at 25bps and the 30-year yield at 3.5%.

Finally, in Switzerland our lower inflation assumption leads to a lower short rate assumption. We reduce our equilibrium cash yield assumption to 0.25% vs. 0.5% last year. This filters through to the 10-year, as we keep the yield curve assumption unchanged at 100bps.

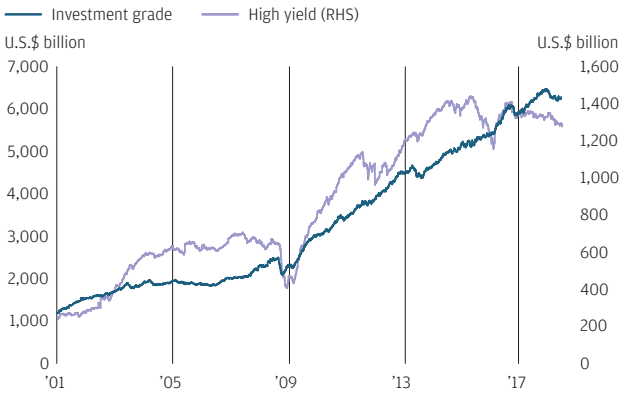
GLOBAL CREDIT MARKETS: BIGGER SIZE, HIGHER DURATION, LOWER QUALITY

In hindsight, it is clear that the corporate sector benefited most from quantitative easing and the long period of easy monetary policy. Evidence can be found not only in equity index levels above or close to pre-financial crisis highs, but also in the evolution of the size and shape of the corporate bond market.

In the U.S., the market value of outstanding investment grade corporate bonds more than tripled, from about $2 trillion on the eve of the financial crisis to $6.4 trillion by the middle of 2018 – a growth rate almost twice as fast as the pre-crisis average. A similar dynamic has played out in the U.S. high yield market, as well as in the market for EUR-denominated corporate bonds (**Exhibit 6**).

The market value of U.S. investment grade and high yield bonds has grown dramatically since the global financial crisis

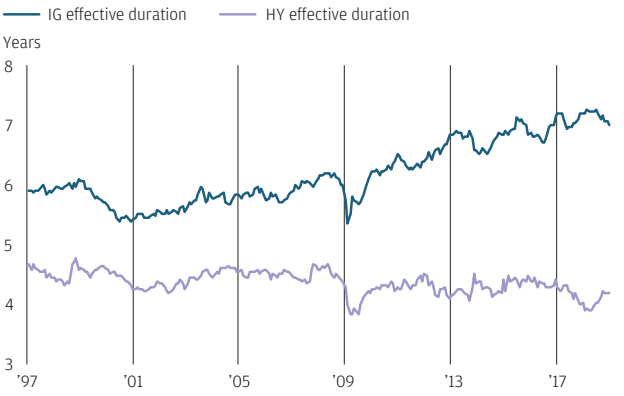
EXHIBIT 6: U.S. INVESTMENT GRADE, HIGH YIELD BONDS, MARKET VALUE, 2001-18



Source: BofA Merrill Lynch Credit Indices; data as of September 30, 2018.

As companies moved to lock in low funding costs, the duration of corporate credit rose steadily post-crisis

EXHIBIT 7: U.S. INVESTMENT GRADE CREDIT EFFECTIVE DURATION, 1997-2017



Source: ICE BofAML Credit Indices; data as of September 30, 2018.

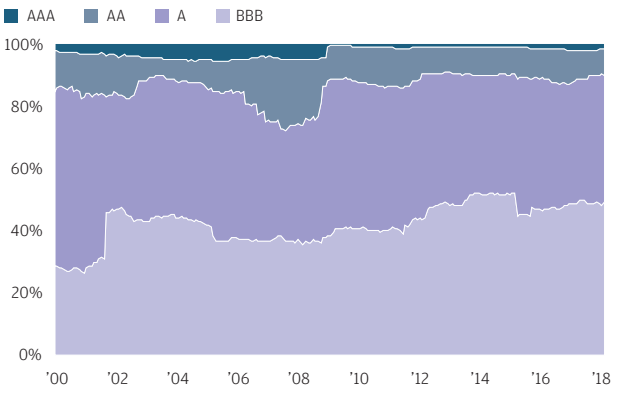
Perhaps even more remarkable than the change in the size of the U.S. corporate bond market has been the change in its composition. As they moved to lock in the extraordinarily low levels of funding costs for as long as possible, issuers across the credit quality spectrum issued bonds with longer maturities than they had in the past. This is particularly evident in the investment grade market, which has extended by 20%-30%, or between one to two years when compared with typical pre-2007 levels (**Exhibit 7**).

In the investment grade corporate bond market, in addition, the average credit quality declined significantly at the same time. While pre-crisis about 40% of investment grade debt had a credit rating of A and about 33% of BBB, today more than 50% has a debt rating of BBB and only about 25% has an A rating. The pace of the credit rating decline over the last five years has been the fastest, outside of a recession, since the mid 1990s. The average credit rating did not decline in the high yield bond market, where the credit spread represents a much larger proportion of the overall bond yield and quantitative easing therefore had a relatively smaller impact on the overall funding cost (**Exhibits 8A** and **8B**).

With policy normalization well underway in the U.S., we do not expect these trends to continue and have thus left our assumptions for the equilibrium spread for the broad U.S. investment grade and high yield market unchanged. Equally, we have not changed our broad UK investment grade assumption. In the euro area, however, we expect the credit market to generally follow themes established in the U.S.

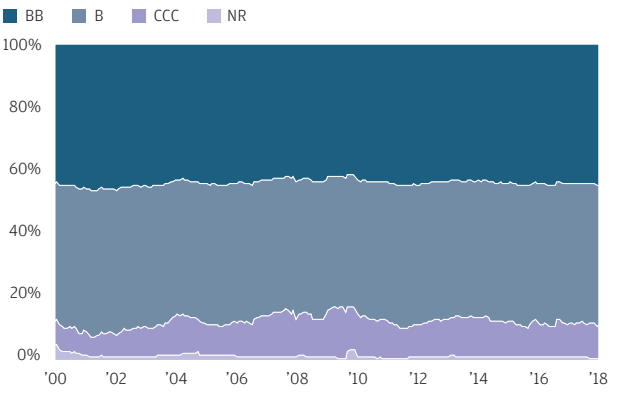
The pace of investment grade credit rating declines over the last five years has been the fastest, outside of a recession, since the mid 1990s; average credit ratings have been fairly stable in the high yield market since 2000

EXHIBIT 8A: RATINGS DISTRIBUTION FOR U.S. INVESTMENT GRADE CREDIT, 2000-18



Source: ICE BofAML Credit Indices; data as of June 30, 2018.

EXHIBIT 8B: RATINGS DISTRIBUTION FOR U.S. HIGH YIELD CREDIT, 2000-18



Source: ICE BofAML Credit Indices; data as of June 30, 2018.

Lower equilibrium yield and return assumptions reflect expectations of very gradual rate normalization, leading to a lower terminal rate

EXHIBIT 9: DEVELOPED MARKET EQUILIBRIUM YIELD AND RETURN ESTIMATES (10- TO 15-YEAR RETURN ASSUMPTIONS, LOCAL CURRENCY, %)

	USD		GBP		EUR		JPY	
	Equilibrium yield (%)	Return	Equilibrium yield (%)	Return	Equilibrium yield (%)	Return	Equilibrium yield (%)	Return
Inflation	2.00		2.00		1.50		1.00	
Cash	2.00	2.00	2.00	1.75	1.50	1.00	0.50	0.25
10-year bond	3.25	3.50	2.75	2.00	2.75	1.75	1.25	0.75
30-year bond	3.50	3.25	2.75	1.25	3.00	0.75	1.75	0.50
Investment grade credit*	4.75	4.50	4.25	3.00	4.00	2.50	1.75	1.00
High yield	7.75	5.50			6.25	4.00		
Emerging market debt**	6.25	6.25						

Source: J.P. Morgan Asset Management; estimates as of September 30, 2018.
* Investment grade corporate bonds. ** Emerging market sovereign debt.

during the QE era — credit quality deterioration and duration extension among them. For this reason, we increase our equilibrium spread assumption by 25bps to 150bps.

Looking across global credit markets broadly, we do not expect that the recent tweaks of rating standards will materially alter either an issuer's loss probability or expected recovery rate for a given credit quality. We do, however, believe that there is considerable uncertainty about the cost associated with a downgrade from an investment grade rating (BBB) to a high yield rating (BB). Given the high proportion of issuers with a BBB rating, it is likely that an unprecedented amount will drop out of the investment grade index during the next recession. This will test investor resilience and market liquidity, as regulatory requirements make owning non-investment grade debt onerous for those investors bound by particularly tight regulatory requirements, as well as for many index investors. And retail investors, in their search for yield, have for the first time this cycle become a more significant presence in credit markets. These concerns notwithstanding, valuations are less stretched than last year due to somewhat wider spreads and higher Treasury yields. We therefore arrive at expected returns that are slightly improved from last year, if unremarkable by historical standards (**Exhibit 9**).

GLOBAL EMERGING MARKET DEBT: MORE ATTRACTIVE STARTING VALUATIONS, CHANGING INDEX COMPOSITION

Our assumptions reflect unchanged expectations for the equilibrium spread for emerging market sovereign and corporate debt of 325bps and 375bps, respectively, as well as an unchanged loss rate of 50bps and 75bps. We believe that the index duration extension trend has ended and that the rating downward migration of the recent past reflects shorter-term cyclical pressures more than structural changes in the issuer composition and preferences.

Despite these unchanged fair value assumptions, our return expectations have improved substantially, from 5.25% for emerging market sovereign debt to 6.25%. This upgrade follows from more attractive starting valuations due to a more normalized rate environment in the U.S., as well as the lagging of the emerging market economic cycle relative to the U.S. and euro area. However, we do note that liquidity risks in emerging market debt dampen these return expectations.

Local emerging market debt return assumptions are up a little from last year, benefiting from slightly higher starting yields and an expectation for some translation gains as the U.S. dollar declines over the assumptions horizon. As a result, emerging market debt (EMD) Sharpe ratios appear very attractive relative to those of other fixed income assets; we therefore like to remind readers that, given the non-normal distribution of EMD returns, the risk of outsize losses is substantially larger than these Sharpe ratios suggest. (Please refer to "**Volatility and correlation assumptions**" for further detail.)

The composition of local EMD indices is likely to change materially in the not too distant future through the inclusion of Chinese debt. While the exact magnitude of the impact varies by index construction and inclusion rules, we expect that this will have an adverse impact on the index return assumptions, given the lower real yields on Chinese debt compared with the current index average.

Turning a corner: Returns hold steady

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IN BRIEF

- After several years of steadily lower expected returns, this year our equity return assumptions generally hold firm, with developed markets unchanged, emerging markets up and the U.S. slightly down. The expected dispersion in returns between emerging and developed equities widens to 3.00% in local FX terms and 2.75% in USD terms.
- In the U.S., our expected return falls modestly, mostly due to this year's cut to our U.S. inflation forecast and the knock-on impact on domestic nominal GDP; in the euro area, UK and Japan, our equity return estimates rise slightly.
- Central to our view on Japanese equities is the expectation that governance-led reforms are likely to drive a sustainable increase in return on equity (ROE), along with greater capital returns to shareholders.
- We project moderately higher emerging market equity returns, supported by lower starting valuations and higher GDP (and thus earnings) growth.
- We still expect the USD to weaken over our forecast horizon, providing a significant tailwind to the attractiveness of international equity markets to U.S. dollar-based investors.
- Return of capital to shareholders in the form of dividends and buybacks is expected to be a crucial component of future returns.

HOLDING FIRM

In recent years, our expected equity returns have steadily fallen. This year, we break from that trend. Our equity return assumptions generally hold firm, with developed markets unchanged, emerging markets up and the U.S. slightly down.[1]

In 2018, with the exception of the U.S., developed and emerging equity market indices trended sideways to slightly negative, drifting below our estimates of long-term returns. That provides valuation support to our projected returns, but it is tempered by a larger drag from margin normalization.

In local currency terms, our expectation for long-term developed market (DM) equity returns is unchanged at 5.50% while our expectation for emerging market (EM) equity returns has increased to 8.50% from 8.00%. The expected dispersion in returns between emerging and developed equities widens to 300 basis points (bps) in local FX terms and 275bps in USD terms. Within an unchanged DM aggregate return profile, we upgrade the eurozone, Japan and the UK, and modestly lower expected U.S. returns. The adjustments largely reflect the confluence of cyclical, valuation-driven upgrades for DM ex-U.S. markets and reduced U.S. revenue growth that follows a cut to our U.S. inflation forecast and the knock-on impact on domestic nominal GDP.

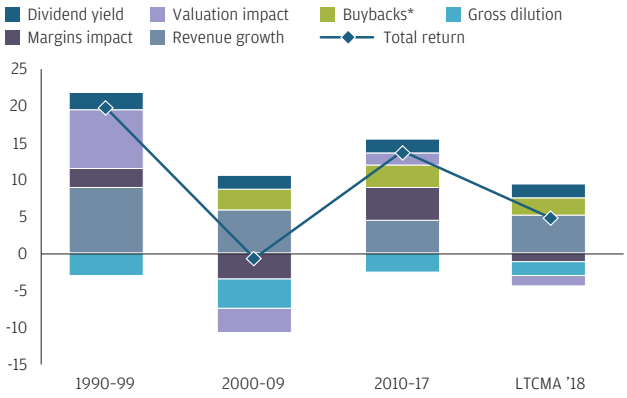
Our forecasts for currency movements are expected to continue to impact unhedged equity market returns. We still expect the USD to weaken relative to non-U.S. developed markets, providing a significant tailwind to the attractiveness to U.S. dollar-based investors. In contrast, our assumptions for the path of the dollar against the gamut of EM currencies in aggregate leaves our EM return assumption unchanged.

Return of capital to shareholders in the form of dividends and buybacks is expected to be a crucial component of future returns (**Exhibit 1**). We remain agnostic on whether return of capital will reflect a dearth of capital investment opportunities, ultra-low interest rates, demographic factors or some combination of the three.

[1] Our rounded estimate for global equity returns is unchanged this year, but unrounded return estimates for MSCI ACWI reveal a slight uplift.

Dividends and buybacks are expected to be key components of future returns

EXHIBIT 1: CONTRIBUTION TO TOTAL RETURNS, % ANNUAL, FOR U.S. LARGE CAP EQUITIES



Source: Citigroup, Thomson Reuters Datastream, U.S. Bureau of Economic Analysis, J.P. Morgan Asset Management; data as of September 2018.

* Buybacks are included in "gross dilution" before 2000 (i.e., as net dilution), due to limited data availability.

BUILDING OUR FORECASTS

We continue to rely on the equity return assumptions methodology we introduced in our 2015 assumptions (see box).

Our equity assumptions methodology breaks equity returns into easy-to-forecast return drivers

BUILDING BLOCKS – ANATOMY OF EQUITY TOTAL RETURNS

1. **Aggregate revenue growth**
2. **× Aggregate earnings growth / revenue growth (margins) = Aggregate earnings growth**
3. **× Earnings per share (EPS) growth / aggregate earnings growth (net dilution) = EPS growth**
4. **× Price return / EPS growth (valuations) = Price return**
5. **+ Dividends (carry) = Total return**

Similar to DuPont analysis, this methodology allows us to decompose total returns structurally into easy-to-forecast ratios as drivers of returns. It enables us to account explicitly for the global composition of corporate revenues – and how fast different regions are growing – as well as the normalization of profit margins and valuations, and the impact of share buybacks and dilution. Perhaps most importantly, it ties together complex interrelationships among these factors to ensure that retained earnings and gross dilution imply a future book value that is consistent with projected return on equity and future earnings. This framework – analogous to Robert

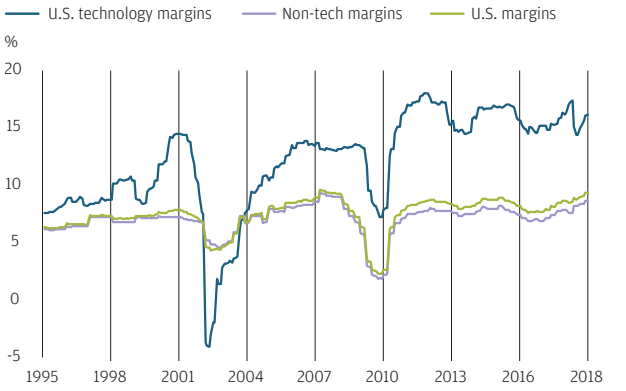
Higgins' sustainable growth rate (SGR) concept – ensures that higher shareholder payouts, for instance, would come at the expense of slower earnings growth, all else the same. Our methodology uses trailing, not forward, earnings, which tend to be more stable.

DEVELOPED MARKETS EQUITY RETURN ASSUMPTIONS

In the U.S., our expected return falls to 5.25% from 5.50%, mostly due to this year's cut to our U.S. inflation forecast and an increased drag from margin normalization. Earnings-based valuations for the U.S. equity market now sit comfortably in line with long-term averages. We have modestly upgraded longer-run equilibrium assumptions for large cap margins; we expect that tax reform-driven profitability increases in the high margin tech sector will persist (**Exhibit 2**).

A high margin technology sector has become increasingly dominant

EXHIBIT 2: U.S. MARGINS – TECHNOLOGY VS. NON-TECHNOLOGY



Source: Thomson Reuters Datastream; data as of August 2018.

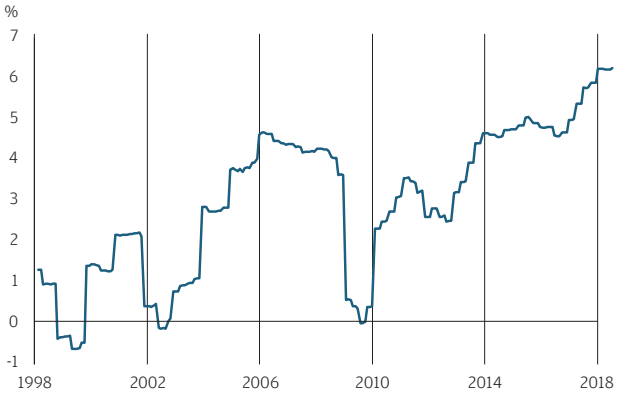
In the euro area, we raise our expectations of future returns by 25bps. The upgrade largely reflects a lower starting valuation level, but we also take into account reduced expectations of return on equity. In the eurozone, financial sector leverage levels fell precipitously over the last year and we think the regulatory environment is likely to lead to lower leverage over our forecast horizon. We see this as a structural change unlikely to be offset by asset turnover or improved margins.

Central to our view on Japanese equities is the expectation that governance-led reforms are likely to drive a sustainable increase in ROE in addition to capital returns to shareholders. Recent evidence suggests the trend is on track, supported by historically high margins and returns on shareholder equity, which have materially exceeded our longer-term view (**Exhibit 3**). Additionally, amendments to the corporate governance codes announced in June reinforce our view of the continuation of structural reforms within the market. Updates to the code include additional guidance on cross-shareholdings, management diversity and corporate strategy transparency, all of which aim to further align the incentives of investors with those of company managements.

The continued momentum in corporate profitability and ROE has led us to stress test whether our reform-driven expectations are too conservative even as they are much higher than historical averages would suggest. In our analysis, we assume that material yen appreciation over our forecast horizon will present a headwind to the export-heavy market; this will further pressure margins, although not enough to erode the benefit of a stronger yen that an unhedged investor would realize over our investment horizon. As a result, we leave unchanged the inputs to our building block model. Finally, we note that starting valuations, which had been a detractor in recent years, now provide a critical boost to forward-looking returns for Japanese equities.

Governance-led reforms are driving an increase in margins for Japanese corporations

EXHIBIT 3: JAPANESE STOCKS, NET MARGINS, 1998-2018



Source: Topix Net Margins, Factset as of September 2018.

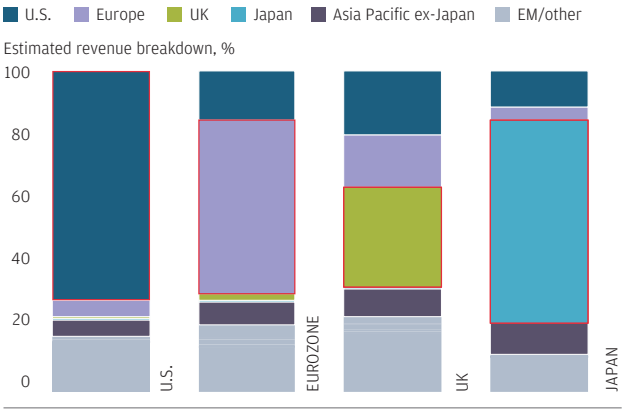
The UK market has moved modestly higher since last year, as earnings have recovered in the resource sectors. As a result, the expected drag from valuations has declined, leading to a modest upgrade in our UK equity return assumptions — a 25bps increase, from 5.50% to 5.75%. Commodity price performance has been somewhat mixed for the resources-dependent UK market, but the oil price has been quite firm amid an improved global supply and demand balance. Stronger performance from the extraction industries has contributed to a recent boost in ROE, but our long-term expectations for ROE are tempered by the decline in leverage across the UK market.

We can't predict how Brexit will affect the UK's future trading relationship with the European Union, but given that a large proportion of the UK stock market is linked to international rather than domestic growth, the impact on overall stock market profitability and direction should be fairly muted.

In terms of revenue, the breakdown of international vs. domestic revenue shares varies widely across major developed markets (**Exhibit 4**).

Foreign revenue shares vary widely across major developed markets

EXHIBIT 4: INTERNATIONAL REVENUE BREAKDOWN FOR G4 MARKETS



Source: Thomson Reuters Datastream, J.P. Morgan Asset Management; data as of August 2018.

EMERGING MARKETS EQUITY RETURN ASSUMPTIONS

After EM equities delivered robust returns in 2017, over the past year a combination of a stronger U.S. dollar and a rising U.S. 10-year Treasury yield has put at least a temporary dampener on investor sentiment, resulting in lower starting valuations for the EM equity universe. Nonetheless, we expect that emerging markets will offer a 300bps (in local terms) return premium relative to developed markets, an increase of 50bps over last year's assumption. Lower starting valuations support the higher expectation, but the wider spread mainly reflects higher revenue (and thus earnings) growth.

From a structural perspective, our views are unchanged. Relative to developed economies, we see higher growth potential for emerging economies from a range of forces: still-high productivity, the potential for the EM technology sector to catch up to its DM counterpart and more favorable demographics (with the exception of China). In the medium term, our expectation that the U.S. dollar will weaken over our forecast period also means that funding pressures for emerging market sovereign borrowers will likely dissipate.

Translating this strong economic growth into returns is a nuanced process in emerging markets, which investors need to consider as they determine their allocations. As we did last year, we note the dispersion among returns in individual emerging markets within the broader complex. Variations in market structure, sectoral composition, corporate governance and external exposure all contribute to the spread between individual EM market returns.

While high growth economies do tend to deliver strong equity returns over a long time horizon, this is not always the case. China reported the highest average annual real GDP growth in our sample, 9.2% over the past 23 years, as well as a dramatic increase in market capitalization. But it also delivered the lowest average annual returns among the individual EM equity markets we cover: 1.0% (**Exhibit 5**).[2] Although the size of the gap between economic growth and returns varies, both as a function of the starting point and of the high volatility inherent in emerging equities, over most periods and most countries returns lag real GDP growth on an average annualized basis.

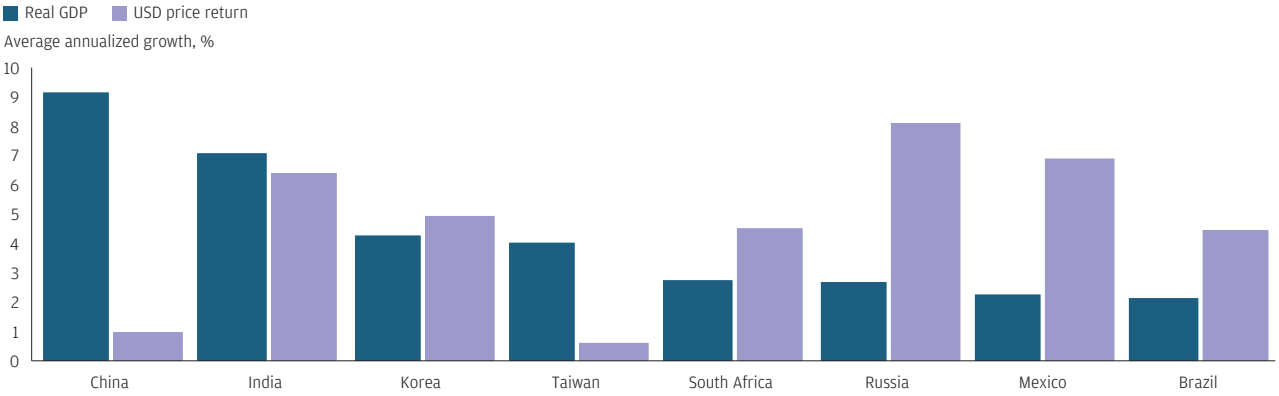
As highlighted in prior Long-Term Capital Market Assumptions (LTCMAs), earnings per share are more complicated to forecast for emerging markets.[3] As the market capitalization of a relatively nascent stock market grows through new issuance, the number of listed shares grows, diluting the portion of the pie owned by existing shareholders. As a result, faster economic growth does not necessarily result in faster earnings per share growth. Within our assumptions framework, this tends to lead to a higher dilution for emerging markets than for developed ones. A lower USD in aggregate over our forecast horizon will likely ease funding pressures on emerging market sovereign borrowers broadly, even though the individual exchange rates for emerging market currencies vs. the USD are unlikely to move in a uniform manner.

[2] Source: FactSet, MSCI, national statistics agencies, J.P. Morgan Securities LLC, J.P. Morgan Asset Management; data as of July 30, 2018. Data covers the period from December 31, 1994 through December 31, 2017, the longest period for which we could obtain both real GDP growth and equity returns data for all markets. The MSCI index returns shown are U.S. dollar price returns.

[3] Patrik Schöwitz and Michael Albrecht, "Emerging market equities: Then, now and tomorrow," *2016 Long-Term Capital Market Assumptions*, J.P. Morgan Asset Management, 2015.

High growth typically corresponds with high equity returns, with exceptions

EXHIBIT 5: REAL GDP GROWTH AND EQUITY MARKET RETURNS, AVERAGE ANNUALIZED % GROWTH



Source: FactSet, MSCI, J.P. Morgan Securities LLC, J.P. Morgan Asset Management; data as of July 30, 2018. Data covers the period from December 31, 1994 through December 31, 2017. Data covers the period from December 31, 1994 through December 31, 2017, the longest period for which we could obtain both real GDP growth and equity returns data for all markets. The MSCI index returns shown are U.S. dollar price returns.

This year our equity return assumptions generally hold firm

EXHIBIT 6A: SELECTED DEVELOPED MARKET EQUITY LONG-TERM RETURN ASSUMPTIONS AND BUILDING BLOCKS

Equity assumptions	U.S. large cap	Euro area	UK	Japan
Revenue growth	5.0	4.6	4.5	3.3
+ Margins impact	-0.9	-1.0	-1.2	-1.7
Earnings growth	4.1	3.5	3.3	1.5
+ Gross dilution	-2.0	-2.0	-2.0	-2.0
+ Buybacks	2.4	1.5	1.0	2.2
EPS growth	4.5	3.0	2.3	1.7
+ Valuation impact	-1.4	-0.1	-0.1	0.7
Price return	3.1	2.9	2.1	2.4
+ Dividend yield (DY)	2.0	3.0	3.5	2.5
Total return, local currency	5.25%	6.00%	5.75%	5.00%
Change vs. 2018	-25bps	+25bps	+25bps	+25bps

Source: J.P. Morgan Asset Management; estimates as of September 30, 2017 and September 30, 2018.

EXHIBIT 6B: SELECTED EMERGING MARKET EQUITY LONG-TERM RETURN ASSUMPTIONS AND BUILDING BLOCKS

Equity assumptions	China	Korea	Taiwan	India	South Africa	Brazil
Revenue growth	8.8	5.8	4.8	13.1	9.6	9.4
+ Margins impact	-0.2	-2.3	-1.1	-0.1	-0.4	-3.5
Earnings growth	8.5	3.4	3.7	13.0	9.2	5.5
+ Gross dilution	-3.2	0.1	-0.6	-2.9	-1.8	-2.0
+ Buybacks	0.3	1.3	0.5	0.3	0.5	0.8
EPS growth	5.3	4.8	3.5	10.0	7.8	4.1
+ Valuation impact	0.3	1.9	0.8	-2.7	-2.0	1.0
Price return	5.6	6.9	4.4	7.1	5.6	5.1
+ Dividend yield (DY)	2.8	1.5	3.5	1.5	3.0	3.5
Total return, local currency	8.75%	8.50%	8.00%	8.75%	8.75%	8.75%
Change vs. 2018	+100bps	+75bps	-25bps	–	+25bps	+200bps

Source: J.P. Morgan Asset Management; estimates as of September 30, 2017 and September 30, 2018.

We derive our aggregate EM equity assumption by applying the same methodology to nine large emerging markets and aggregating by market capitalization weight. The countries we include account for more than 85% of the market capitalization in the MSCI Emerging Markets Index. We once again caution that data history in emerging economies is generally shorter and data quality less robust, so our confidence in the resulting assumptions is by nature somewhat lower than for developed markets. Despite this reservation, and the variety of cyclical and structural cross-currents moving through the emerging market universe, we identify a few common themes.

Export-oriented countries (Brazil, South Africa and Korea) are expected to generate some of the highest returns within emerging markets. Brazil and South Africa, along with China, are each expected to return 8.75%. Korea is expected to return 8.5%. As referenced earlier, higher return expectations reflect lower starting valuations.

In only a few EM countries do we lower return expectations. Taiwan is the most noteworthy example: Modestly reduced expectations of revenue growth lead us to reduce return expectations from 8.25% to 8.0%. For an overview of our equity assumptions, see **Exhibits 6A** and **6B**.

CONVERTIBLE BONDS

Convertible bonds — corporate debt securities that provide the holder with an option to convert into the issuer's stock at a predetermined price — have historically offered investors equity-like returns with lower volatility and downside protection through a fixed income floor. Since Thomson Reuters' Global Hedged Convertible Bond Index started in 1994 through the third quarter of 2018, it has outperformed the MSCI World Index. Convertibles generally provide a more attractive income component than stocks alone while still allowing participation in the stock's price movement; they can improve the risk-adjusted returns of balanced stock-bond portfolios due to their asymmetric return profile and diversification benefits. Adding asymmetry to a portfolio may be especially attractive in times of economic uncertainty, whether investors expect a continued recovery or a recession.

As an equity alternative, convertibles allow investors to remain invested while lowering the risk of large drawdowns. Moreover, convertible valuations benefit from increased volatility, as they are implicitly long volatility via the optionality embedded within them.

As a credit alternative, convertibles offer a route to positive returns even as the environment for duration and credit spreads deteriorates. Convertibles will generally be more positively affected by rising stock values than negatively affected by rising interest rates due to their structurally low duration. However, like high yield bonds, convertibles have been susceptible to liquidity constraints during periods of market stress.

Our methodology for calculating convertible bond returns accounts for convertibles' similarities to and differences from traditional equity and fixed income, as well as the composition of convertible indices. While the geographic composition of the global convertibles universe is similar to that of the MSCI World, it has historically been biased toward smaller companies and cyclical sectors. We incorporate into our convertible bond assumptions our existing LTCMA numbers for equity and fixed income, along with convertibles' equity sensitivity, credit quality, option premium and the underlying stocks' unique characteristics.

This year, our global convertible bond and global credit-sensitive convertible bond assumptions (hedged into USD) are 5.50% and 4.75%, respectively. Credit-sensitive convertibles are securities whose underlying stock trades significantly below the conversion price, causing them to behave more like debt than equity. For context, we forecast 6.00% for MSCI AC (All Country) World and 4.25% for global credit returns (both also hedged into USD).

Compared with last year, our assumptions for convertible bonds (applying our methodology to last year's data) have increased approximately 50bps for both global and credit-sensitive convertibles. This change is consistent with the changes in our equity and fixed income assumptions that also resulted in modestly higher return expectations over the next 10 to 15 years.

EQUITY FACTOR ASSUMPTIONS

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For the first time in our LTCMAs' 23-year history, we are including long-term assumptions across a range of equity factor exposures, aiming to provide insight into a rapidly growing segment of the investment landscape (Exhibit). We define a factor as any characteristic that describes the risk and return of a group of securities or financial instruments. In our portfolios, we focus on factors that are backed by economic rationale and either drive returns in a manner that is unrelated to the market risk premium or deliver a desired outcome. Our assumptions cover five individual factors (value, quality, momentum, minimum volatility and dividend yield) and multi-factor approaches across five geographies (U.S., global developed, international developed, Europe and emerging markets).

At J.P. Morgan, we have been managing dedicated factor-based strategies for nearly a decade and consider factors from a bottom-up perspective. For example, equity value is represented by a grouping of individual stocks that are priced cheaply relative to peers. This notion of equity value may be familiar to investors when they think of the Russell 1000 Value Index (launched in 1987) or a Morningstar Style Box (introduced in 1992). However, factors represent a more diverse set of explicit, targeted exposures.

In this edition of our LTCMAs, we introduce assumptions across a range of equity factor exposures

RETURN ESTIMATES (ASSUMING ROUNDING TO THE NEAREST 25BPS)	
U.S. Multi-factor	5.50%
U.S. Value	6.00%
U.S. Momentum	5.50%
U.S. Quality	5.25%
U.S. Dividend	6.00%
U.S. Min vol	5.50%

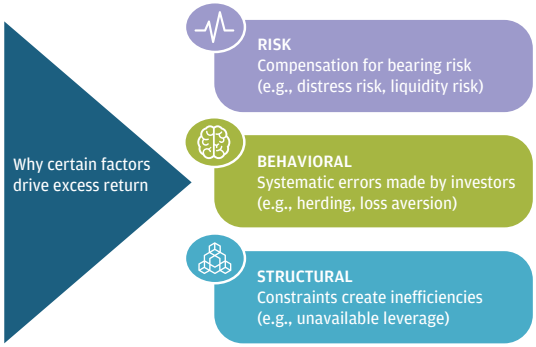
Methodology

We determine our long-term assumptions by examining the properties of two index suites, designed by J.P. Morgan Asset Management and calculated by FTSE Russell. The J.P. Morgan Diversified Factor Suite describes the performance of stocks chosen for their diversified factor characteristics; the J.P. Morgan US Single Factor Suite describes the performance of large U.S. companies chosen to target a single characteristic. Unlike many of the asset classes covered by our Long-Term Capital Market Assumptions, factor indices require a number of design decisions. While there is no unambiguous, natural choice of representative index, we hope that these long-term assumptions will help inform how investors think about asset allocation with respect to factors.

To reach a return assumption, we first make assumptions about the relative performance of the best and worst stocks according to a factor. We calculate the historical return difference between the best and worst quartile of stocks for each factor; significantly, we measure stocks relative to their sector and geographical region peers. Relative returns are adjusted to remove the impact of market beta, allowing for an isolated view of factor performance. The quartile portfolios are rebalanced quarterly and incorporate conservative estimates for the cost of trading. We then apply a haircut to these returns in order to be prudent in our estimation of factor performance and account for potential selection bias effects and market adaptation. These steps form a baseline for our long-term factor return assumptions.

Next, we adjust for the richness/cheapness of factors under the assumption that factor returns are persistent but cyclical. Mechanically, we assume that the forward earnings yield differential between top quartile stocks and bottom quartile stocks will revert to its long-term average, and adjust the return assumption accordingly.

Armed with these assumptions on the performance of each factor, we estimate the exposure of each index in the aforementioned diversified and single factor suites to the market risk premium, as well as the factors, using regression analysis. Multiplying each exposure by the appropriate return assumption gives us our final return assumptions. We base expectations for volatility and correlation on their historical values for the J.P. Morgan Asset Management Index series.



A generally stable, relatively attractive outlook for alternatives

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Nicolas Aguirre, CFA, *Vice President, Endowments & Foundations Group*
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IN BRIEF

- Long-term return assumptions for alternatives are generally consistent with last year's outlook, except for an alpha upgrade within private equity (PE). Expected returns for alternatives remain attractive relative to those for public markets. Our 2019 assumptions, however, reflect methodological changes. Most notably, all assumptions are now available net of fees and, except for commodities, on a levered basis.
- **Private equity:** PE provides the sole meaningful return increment vs. last year's estimates. Increasing alpha opportunities driven by disruptive innovation, geographic expansion and ample exit options are expected to offset a mixed public equity return outlook, high purchase price multiples and sizable asset flows.
- **Direct lending:** Our methodology is enhanced to more accurately reflect how investors access the strategy. After netting out fees, the increase from manager leverage more than offsets the anticipated decline from structural trends in direct lending.
- **Hedge funds:** Return assumptions are unchanged from 2018. A more fundamental, less macro-driven environment, fee reductions and interest rate normalization are expected to counter the headwinds of industry size, competition and absolute fee levels.
- **Real estate:** Core return assumptions (unlevered) are up marginally in the U.S. and down in Europe ex-UK, the UK and Asia, reflecting the stage of the investment cycle and trailing year price performance in each region. For value-added, we introduce an assumption further out on the risk curve and incorporate leverage. **REIT** returns are based on the underlying real asset outlook adjusted by sector, leverage and price-to-NAV differentials.
- **Infrastructure:** The outlook for **infrastructure equity** remains strong, despite a marginal reduction in this year's assumptions due to higher recent valuations and hence a less robust valuation impact. The **infrastructure debt** return estimate is moderately increased while its credit quality is slightly reduced.
- **Commodities:** Return assumptions are reduced to reflect an exuberant energy market over the past year and the introduction of standard industry fees across multiple vehicle types. For gold, we project a 25 basis point premium to broad commodities.

OVERVIEW

This year, return estimates are available on a net of fees, leveraged basis (**Exhibit 1**). To allow for this enhanced uniformity, we incorporate standard industry leverage assumptions for real estate, standard fee assumptions for commodities and both leverage and fee assumptions for direct lending. These additional leverage and fee assumptions are transparent components of the building block approaches used in generating our long-term return assumptions, as described in the commentary for each alternative strategy class.

Alternative return assumptions are generally stable relative to last year's estimates and remain attractive in comparison with public market return assumptions

EXHIBIT 1: SELECTED ALTERNATIVE STRATEGIES RETURN ASSUMPTIONS (LEVERED,[A] NET OF FEES, %)

	2019	2018
PRIVATE EQUITY (USD)[B]	**8.25**	**7.25**
U.S. private equity—small cap	7.75	6.50
U.S. private equity—mid cap	8.00	6.75
U.S. private equity—large/mega cap	8.50	7.50
PRIVATE DEBT (USD)		
Direct lending[C]	7.25	
HEDGE FUNDS (USD)		
Equity long bias	4.75	4.75
Event-driven	4.75	4.75
Relative value	4.50	4.50
Macro	3.75	3.75
Diversified[D]	4.25	4.25
Conservative[E]	3.75	3.75
REAL ESTATE—DIRECT (LOCAL CURRENCY)[F]		
U.S. core	5.75	
U.S. value-added	7.75	
European ex-UK core	5.50	
European ex-UK value-added	8.00	
UK core	5.00	
UK value-added	7.25	
Asia Pacific core	6.00	
REITS (LOCAL CURRENCY)		
U.S.	6.25	6.25
European	5.75	
European ex-UK	6.00	7.00
UK	5.50	
Asia Pacific	5.75	7.00
Global	6.00	6.50
GLOBAL INFRASTRUCTURE (USD)		
Equity—direct	6.00	6.25
Debt	4.75	4.25
COMMODITIES (USD)[A, G]	**2.25**	
Gold	2.50	

Source: J.P. Morgan Asset Management; estimates as of September 30, 2017 and September 30, 2018.
[A] All 2019 return assumptions incorporate leverage, except for commodities, where it does not apply.
[B] The private equity composite is AUM-weighted: 60% large cap and mega cap, 30% mid cap and 10% small cap. Capitalization size categories refer to the size of the asset pool, which has a direct correlation to the size of companies acquired, except in the case of mega cap.
[C] 2018 results for direct lending (not shown) were gross of fees and did not include leverage. See strategy class discussion for details.
[D] The diversified assumption represents the projected return for multi-strategy hedge funds.
[E] The conservative assumption represents the projected return for multi-strategy hedge funds that seek to achieve consistent returns and low overall portfolio volatility by primarily investing in lower volatility strategies such as equity market neutral and fixed income arbitrage.
[F] The 2018 results for real estate (not shown) did not include leverage. See strategy class discussion for details.
[G] The 2018 results for commodities (not shown) were gross of fees. See strategy class discussion for details.

PRIVATE EQUITY

Our private equity assumptions for 2019 (for small, mid and large/mega cap funds and the cap-weighted composite) are each raised relative to our 2018 assumptions (**Exhibit 2**). The improvement reflects a better operating environment for financial sponsors as the disruption factor in the economy becomes more pervasive, an increasing geographic alpha opportunity set – especially in the key emerging markets of India and China – and ample opportunities for portfolio position exits. The base building blocks of our private equity return assumptions – public equity returns – are mixed in terms of year-over-year performance expectations. However, the relative expected outperformance of non-U.S. equities vs. U.S. equities does provide a small lift to our assumptions. Our alpha projection, while improved, remains below what many investors believe to be fair compensation for the additional risk of illiquidity and below the 15-year historical average of industry alpha (**Exhibit 3**).

PE return assumptions are up as improved alpha opportunities outweigh a mixed public equity return outlook

EXHIBIT 2: PRIVATE EQUITY ASSUMPTIONS AND RETURN FRAMEWORK

	Small PE (<-$500mn)	Mid PE ($500mn-$2bn)	Large/mega PE (>-$2bn)	Cap-weighted*, **
PUBLIC MARKET EXPOSURES				
U.S. mid cap	✓	✓	✓	
Europe			✓	
Asia ex-Japan			✓	
ASSUMPTIONS (%)				
Public market exposure	5.75	5.75	6.25	6.00
Alpha trend	2.00	2.25	2.25	2.25
2019 LTCMA	**7.75**	**8.00**	**8.50**	**8.25**
2018 LTCMA	6.50	6.75	7.50	7.25

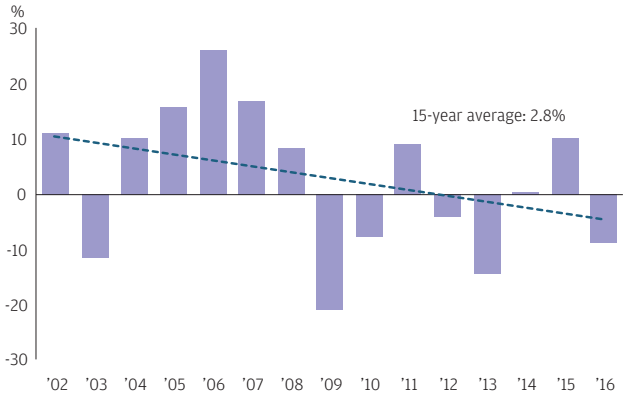
Source: J.P. Morgan Asset Management; estimates as of September 30, 2017 and September 30, 2018.

* The private equity composite is AUM-weighted: 60% large cap and mega cap, 30% mid cap and 10% small cap. Capitalization size categories refer to the size of the asset pool, which has a direct correlation to the size of companies acquired, except in the case of mega cap.

** The regional weights for the capitalization-weighted PE composite are: U.S.: 55%; Europe: 25%; Asia and other: 20%.

Our alpha projection is improved but still below historical averages

EXHIBIT 3: HISTORICAL PREMIUM OF PRIVATE EQUITY TO U.S. MID CAP (2002-16)*, **



Source: Bloomberg, Burgiss Private iQ, J.P. Morgan Asset Management; data as of March 31, 2018.

* Includes buyout and expansion capital funds.

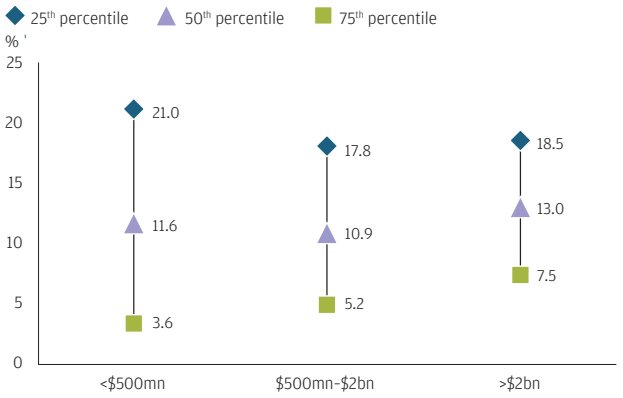
** The historical premium to U.S. mid cap returns (shown here) is not directly comparable to the forward-looking PE cap-weighted composite alpha trend assumption (in Exhibit 2). Our alpha trend assumption reflects a range of public market exposures (across regions and size categories) in addition to U.S. mid cap, the dominant market exposure.

Most of the factors that have been weighing on the outperformance of private vs. public equity markets are still in place. All-time highs in fundraising, post-global financial crisis highs in purchase price multiples and an increasing number of non-traditional competitors continue to suppress excess returns to levels below what many investors anticipate. However, we believe that the balance between new opportunities for creating value and the highly competitive environment for deploying capital tilts slightly in favor of a modest upgrade of the PE illiquidity premium over public markets for the next several years. The illiquidity premium for PE vs. public markets provides one of the few absolute returns across the capital markets that meet the elevated hurdle rates required by many organizations – returns that can't be met by a public-market-only portfolio.

We continue to emphasize the importance of manager selection in the PE space as a key determinant of the value of a private equity allocation. We would expect the dispersion of returns to remain very wide, especially in the small and mid segments of the market (**Exhibit 4**).

Manager choice is still a critical factor for success in PE investing — especially when investing in smaller funds

EXHIBIT 4: HISTORICAL PRIVATE EQUITY DISPERSION BY SIZE OF FUND,* IRR OF VINTAGE YEARS 2002-16 (%)



Source: Burgiss, J.P. Morgan Asset Management; data as of March 31, 2018.
*Includes buyout and expansion capital funds.

Economic change and the potential for incrementally better returns

As articulated in "The evolution of market structure,"[1] the public markets, which have traditionally funded corporate expansion and investment, are increasingly shifting their orientation toward returning capital and optimizing capital structure — leaving private markets to provide more of the vital funding for growth, in addition to funding for new ventures. In the past, we have expressed concern as to whether the private equity industry can find ample opportunities in the U.S. and European mid cap equity space to absorb fast-growing assets under management (AUM).

More recently, the global economy has been undergoing a number of disruptions that represent enhanced opportunities for new economy-attuned corporate restructurers and investors to potentially add value. As disruption advances, certain themes, such as those associated with e-commerce/supply-chain management, millennial consumer preferences, access-not-ownership, social connectivity, mobile everything and new food preferences, may be a better fit for the operating temperament and skill set of the private equity industry vs. that of a profit-optimizing, traditional risk corporate setting.

Regardless of who handles the new economy and social preferences best, in an environment of restructuring and adaptation, the risk-seeking private equity model has a new pool of niche, higher return opportunities. At the margin, we believe the scale of new economy opportunities may be enough to better absorb and profitably deploy the soaring AUM raised by the industry over the past few years.

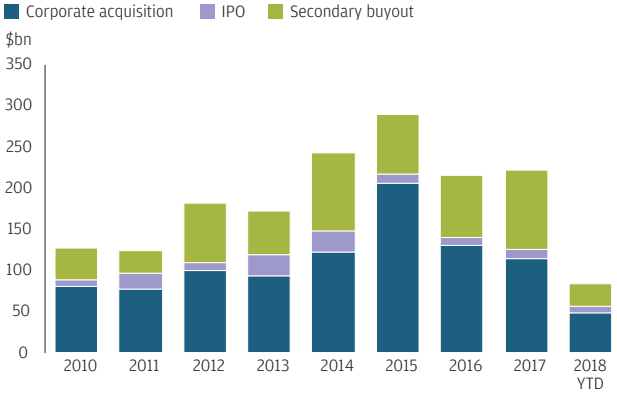
Multiple exits

An uptick in exit opportunities on multiple fronts, including corporate acquisitions, sponsor-to-sponsor transactions and IPOs, could help improve exit multiples.

Public companies' desire to bolster growth through strategic acquisitions appears robust, judging by the extent to which strategic (corporate) buyers have dominated PE-backed exits (**Exhibit 5**). The slowing trend of economic growth and, commensurate with it, the modest level of trend capital expenditures (capex), particularly in the U.S., provide ample rationalization for continued M&A activity. At the same time, sponsor-to-sponsor transactions (i.e., secondary buyouts) are rising, reflecting the need of those organizations without sufficient deal-sourcing capabilities or other corporate strategies to deploy capital raised. While not expected to create an important increment for returns, the recent opening of the IPO window should provide an additional premium to returns for certain product and service niches that are perceived to be most attractive at the time of public offering.

Increasing secondary buyouts, continued M&A activity and an improving IPO outlook could enhance exit opportunities

EXHIBIT 5: U.S. PRIVATE EQUITY-BACKED EXITS BY TYPE AND YEAR



Source: PitchBook 2Q 2018 U.S. Private Equity Breakdown; data as of June 30, 2018.

[1] "The evolution of market structure," *2019 Long-Term Capital Market Assumptions*, J.P. Morgan Asset Management, 2018.

The outlook for alpha stabilizes

We see the balance among high purchase price multiples (**Exhibit 6A**) and average debt multiples (**Exhibit 6B**), sizable assets to deploy and new non-sponsor competitors vs. new asset deployment opportunities – whether in Asia or in the new economy – as being roughly in equilibrium and poised to generate modest alpha over public markets. Our weighted fund-size composite excess return above the public markets assumption, while up from our 2018 long-term estimate, is slightly below the average performance of the industry over the past 15 years. Additional excess return potential lies in the ability to tap into premium exit avenues. Essentially, the sponsor community's willingness to take on disruption and geographic risk stabilizes returns at a modest increment over public markets, even with the burden of asset size and expensive purchase multiples.

Improved deployment and exit opportunities should offset the impact of high multiples, dry powder and increased competition on PE returns

EXHIBIT 6A: PRIVATE EQUITY PURCHASE PRICE MULTIPLES – ENTERPRISE VALUE/EBITDA (X)

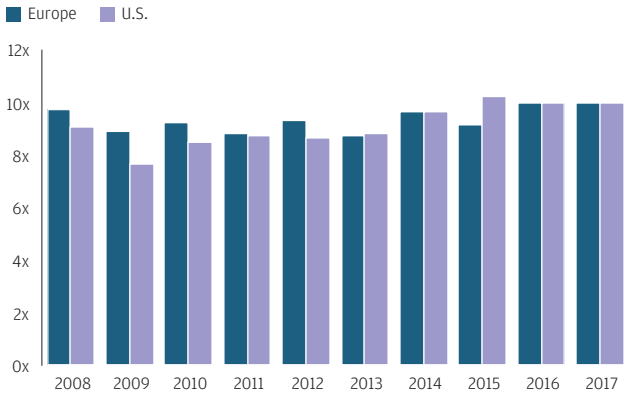
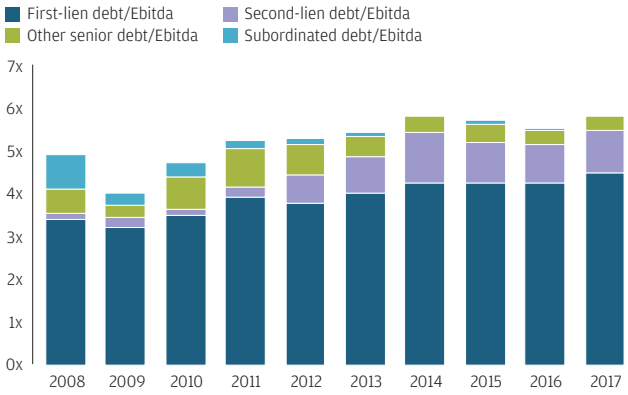


EXHIBIT 6B: AVERAGE DEBT MULTIPLES – DEBT/EBITDA (X)*



Source: S&P Global Inc., J.P. Morgan Asset Management; data as of December 2017.
* Debt multiples for issuers with Ebitda of more than $50 million.

DIRECT LENDING

Our 2019 long-term return estimate for direct lending is 7.25% (levered, net of fees), up from 2018's 7.00% unlevered, gross of fees estimate. After netting out fees, the increase from manager leverage more than offsets the anticipated decline from structural trends in middle market direct lending. Incorporating leverage is an enhancement in our methodology consistent with the way many investors access the direct lending market.

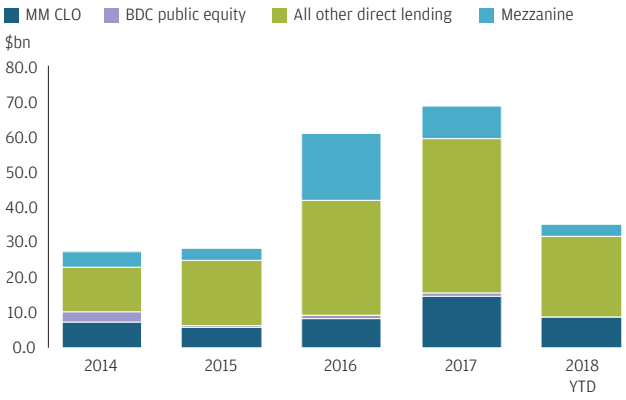
Fundraising growth trends persist, reflecting the historical yield premium delivered to investors, as well as the benefits to borrowers of working with a customized provider, namely speed and certainty of execution, a single counterparty and the flexibility of debt structures (**Exhibit 7**). Direct lending still offers a premium over public market credits of a similar quality. That said, early signs of a relaxed regulatory environment specific to collateralized loan obligation (CLO) risk retention, business development company (BDC) leverage limits and Dodd-Frank interpretation are reinforcing our view that competition for relatively higher yielding, mostly senior secured paper will likely drive both a deterioration in underwriting standards and a reduction in illiquidity premiums for direct lending.

Methodology

Adding to the methodology used in prior editions of our Long-Term Capital Market Assumptions (LTCMAs), which leveraged the Cliffwater Direct Lending Index (CDLI) as the basis for the starting yield assumptions, we have introduced a building block approach that incorporates publicly available loan data for the components of the Credit Suisse Leveraged Loan Index. In an asset class that lacks transparency, this information provides a more robust data set with characteristics close to those of the middle market lending opportunity set. Using our LTCMAs for terminal U.S. cash rates as the basis for Libor and to reflect the floating rate nature of the asset class, along with credit spreads and credit cost assumptions based on public loan information, we arrive at an unlevered yield of 6.75%. The reduction in the unlevered assumption (from 7.00% in 2018) incorporates relatively aggressive underwriting driven by the combination of later-cycle dynamics and our expectation of the continued asset growth in the market. Incorporating relatively conservative assumptions for leverage, financing costs and manager fees, we arrive at a net of fee, levered return assumption of 7.25% (**Exhibit 8**).

Growth in direct lending is likely to be a headwind to forward-looking returns

EXHIBIT 7: MIDDLE MARKET DIRECT LENDING CAPITAL RAISED (USD BILLIONS)



Source: Thomson Reuters LPC; data as of August 3, 2018.

Direct lending is expected to offer a premium vs. public market credits of similar quality, despite competitive pressures

EXHIBIT 8: DIRECT LENDING RETURN ASSUMPTIONS AND BUILDING BLOCKS (USD, %)

	2019 rate/spread (%)	
Libor	2.25	LTCMA for cash rate + 25bps interbank credit spread
Weighted average spread	4.50	Based on post-global financial crisis spreads from Credit Suisse; average of B rated loans (~400bps) and 65/35 mix of 1st/2nd-lien loans (~500bps)
Illiquidity	1.25	Credit Suisse spreads by loan size suggest a historical 150bps illiquidity premium; we adjust downward to reflect increasing market institutionalization
Starting yield	**8.00**	
Credit cost	-1.25	Incorporates LTCMAs for high yield default rates with 70% recovery value for 1st-lien loans and high yield recovery rates for junior debt
Unlevered yield	**6.75**	
Leverage	6.75	50% debt to assets
Cost of financing	-4.75	Assumes 200bps financing spread
Fees	-1.50	Per Cliffwater, asset- and performance-based fees historically have been ~20% of gross yield; we assume a modest reduction to reflect a maturing asset class
Levered return assumption	**7.25**	**2018 unlevered, gross of fees return assumption was 7.00%**

Source: J.P. Morgan Asset Management; estimates as of September 30, 2017 and September 30, 2018.

HEDGE FUNDS

Our hedge fund return assumptions hold firm relative to 2018 projections, reflecting our public market return assumptions, which, on balance, remain mostly unchanged from last year (**Exhibit 9**).

Hedge fund returns – both absolute and relative to public markets – have turned the corner over the past year. A fundamentally driven investment environment will continue to provide more fertile ground for a long-short investment format than the prior risk on/risk off backdrop shaped by central bank policy. We anticipate headwinds from asset size, increasing competition from liquid "smart beta" providers and the absolute level of fees in a low return world. At the same time, we expect limited partnership returns to be bolstered by a higher contribution from portfolio cash and rebates, and more conciliatory fee structures and levels.

A diversified hedge fund strategy, within the context of modest public market return expectations and rising volatility, should make a positive contribution to a multi-asset mandate by providing compelling and diversifying returns.

A more fundamentally driven market continues to support expected hedge fund returns at 2018 assumption levels

EXHIBIT 9: HEDGE FUND RETURN ASSUMPTIONS (USD, %)

	2019	2018
Equity long bias	4.75	4.75
Event-driven	4.75	4.75
Relative value	4.50	4.50
Macro	3.75	3.75
Diversified*	4.25	4.25
Conservative**	3.75	3.75

Source: J.P. Morgan Asset Management; estimates as of September 30, 2017 and September 30, 2018.

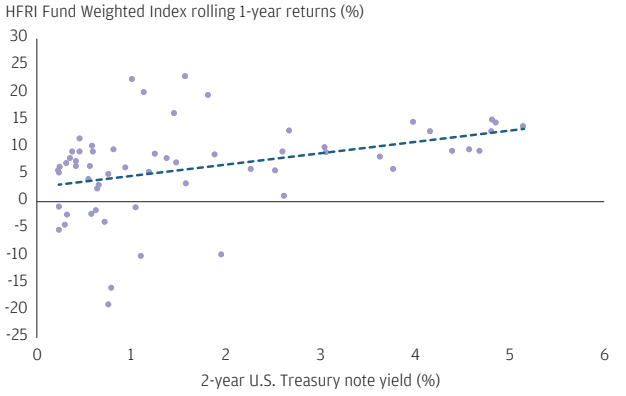
* The diversified assumption represents the projected return for multi-strategy hedge funds. ** The conservative assumption represents the projected return for multi-strategy hedge funds that seek to achieve consistent returns and low overall portfolio volatility by primarily investing in lower volatility strategies such as equity market neutral and fixed income arbitrage.

Post-global financial crisis (GFC) investment conditions

As central bank policies progress toward normalization, the environment for fundamental and, in particular, long-short fundamental investing should become more hospitable. Over the past year, falling intra-sector and stock level correlations, along with rising volatility, have provided conditions more conducive to absolute and relative return generation. Additionally, the normalization of U.S. policy rates, currently at 2.25%, provides a key building block for returns not present during most of the post-GFC environment (**Exhibit 10**). The environment for hedge fund investing has improved with policy normalization, but it is unlikely to reach the heyday of returns prior to the GFC.

Hedge fund returns are generally better in a higher rate environment

EXHIBIT 10: HEDGE FUND RETURNS VS. U.S. 2-YEAR TREASURY NOTE YIELD (3Q 2003–2Q 2018)



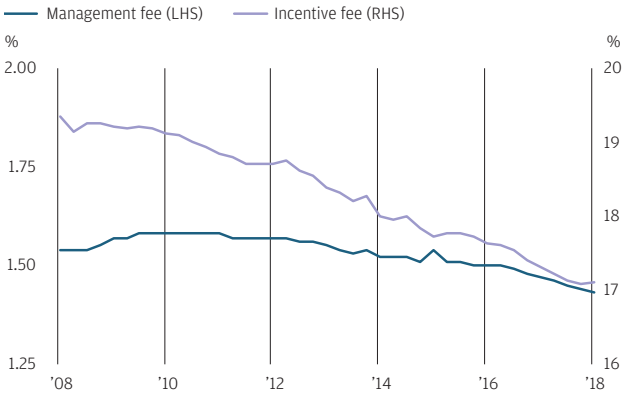
Source: Bloomberg, Hedge Fund Research, J.P. Morgan Asset Management; data as of 2Q 2018.

The fee environment

We continue to expect the trajectory for fees generally to be lower (**Exhibit 11**). While management fees have been the focus of reductions thus far, we fully expect performance fees to take the spotlight in the out years of our forecast period. Novel fee arrangements have been launched, such as offering significant principal protection in return for increased performance fees above a high hurdle rate, and increasing lockup periods in exchange for lower fees. Recently, as new fund launches have become more difficult, managers have become more conciliatory on fees.

Hedge fund fees continue to decline

EXHIBIT 11: AVERAGE MANAGEMENT AND INCENTIVE FEES – ALL SINGLE MANAGER STRATEGIES (1Q 2008–1Q 2018)



Source: Hedge Fund Research; data as of 1Q 2018.

The artificial intelligence disruption factor

The use of artificial intelligence (AI) to augment alpha capabilities is not new in the highly competitive hedge fund environment, but it has become the most commonly discussed factor for potentially disrupting hedge fund returns. While simple language processing techniques are already employed at a few of the larger, more quantitatively oriented organizations, we find the impact of advanced AI limited at this time. The limitation lies not so much in the availability of computing horsepower but rather in that of quality, unbiased data. Given its resource-intensive nature, AI may be yet another area in which larger, well-resourced organizations are best positioned – in this case, to tackle the data issues and afford the horsepower necessary to realize AI's true potential in the investment process.

The alpha outlook improves

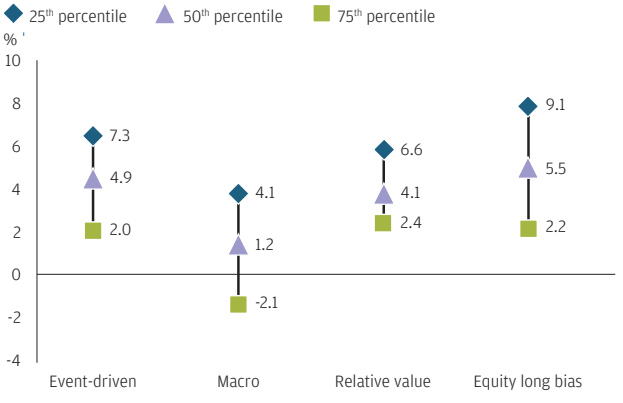
Markets driven more by sector- and security-level fundamentals have lifted the prospects for the industry, as indicated by performance in 2017 and 2018 so far. Our expectations are for alpha to rise closer but not back to the average levels of 15 to 20 years ago, especially for equity long bias and event-driven strategy classes. We see returns further boosted by fee rationalization and a contribution from portfolio cash and rebates.

Manager selection matters

The headwinds of significant industry asset pools and new liquid-format competitors chasing scarce opportunities are formidable. However, to reiterate the case we have made for a number of years, absolute return/hedge funds are investment strategies, not asset classes. The quality of due diligence in manager selection often makes or breaks the investment proposition that hedge funds generally are thought to represent (**Exhibit 12**).

Manager selection is critical in realizing the investment potential of hedge funds

EXHIBIT 12: DISPERSION OF MANAGER RETURNS (%), JULY 2013 TO JUNE 2018*



Source: Hedge Fund Research, J.P. Morgan Asset Management; data as of June 30, 2018.

*Returns adjusted for survivorship bias.

KEY COMPONENTS OF OUR HEDGE FUND RETURN ESTIMATION PROCESS

CORE BETA RETURNS: Approximated as the product of beta exposures (see table below) and our long-term assumptions for traditional asset classes in excess of the risk-free rate, plus the risk-free rate. Core beta returns are the primary component of our hedge fund return assumptions.

- *Our analysis finds beta exposures increasingly rotating toward higher return non-U.S. markets.*
- *We calculate beta by regressing excess returns so as to produce estimates that are independent of interest rate regimes and capture the positive impact of rising interest rates on hedge fund returns.*

ALPHA TRENDS: Based on historical alpha trends, adjusted for forward-looking expectations.

- *We expect the recent negative alpha trend to moderate as fundamentals increasingly drive performance.*

ALPHA POTENTIAL: Further adjustments, based on our interpretation of the impact of industry conditions on the forward-looking alpha potential of each strategy class.

- *We anticipate a fee reduction of 25bps at the average manager level, industry-wide.*

DERIVED EQUITY BETA EXPOSURES (COEFFICIENTS) AND GOODNESS OF FIT (R^2) STATISTICS

	Long bias	Event-driven	Relative value	Macro	Diversified*	Conservative**
Intercept	0.00	0.00	0.00	0.00	0.00	0.00
U.S. large cap	-0.16	-0.12	-0.03	-0.08	0.03	0.02
U.S. mid cap	0.29	0.19				
EAFE	0.14	0.11	0.05	0.07	0.11	0.10
Emerging markets	0.15	0.05	0.05	0.07	0.08	0.05
U.S. high yield		0.16	0.31			
U.S. long duration	-0.14	-0.13	-0.04	0.06	-0.06	-0.07
Adj. R^2	0.93	0.83	0.80	0.16	0.62	0.55

Source: Bloomberg, J.P. Morgan Asset Management. The time frame for regression analysis is November 2005 through April 2018.

* The diversified assumption represents the projected return for multi-strategy hedge funds.**The conservative assumption represents the projected return for multi-strategy hedge funds that seek to achieve consistent returns and low overall portfolio volatility by primarily investing in lower volatility strategies such as equity market neutral and fixed income arbitrage.

REAL ESTATE

Our 2019 Long-Term Capital Market Assumptions for real estate are expanded this year to include additional regional detail for value-added and REIT return projections. All assumptions are available on a levered, net of fee basis. Core return assumptions (unlevered) are up marginally in the U.S. and down in Europe ex-UK, the UK and Asia. Our value-added assumptions have moved further out on the real estate risk curve and are therefore generally not comparable to last year's assumptions.

Global real estate market trends

Over the past year, real estate markets globally have diverged somewhat, reflecting economic cycle differences across regions. Generally, the U.S. markets marked time while Europe and Asia remained strong and in the recovery stage. Consistent with the progression of the economic cycle around the world, core real estate supply has recently increased and credit is easier to obtain. Relative to past real estate cycles, however, there is no euphoria – particularly in the U.S. and European core markets. Leverage remains muted, loan-to-value is still at the low end of historical ranges, and discipline generally is being maintained relative to past cycles, especially the most recent one.

Globalization of real estate flows remains a theme driving a measure of return harmonization across regions. Global investor trends favor larger/tier one cities, larger assets and more innovative spaces. Lower expected return in the core space is pushing investors out on the risk curve and into the value-added segment. On average, core real estate markets appear attractively priced vs. comparable grade credit fixed income.

Core real estate

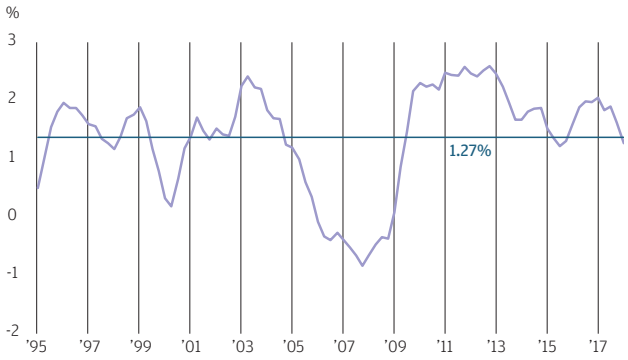
This year's real estate assumptions introduce leveraged returns and a more granular set of building blocks. Specifically, we start with an assumption for net operating income (NOI) before capex, adjust downward for maintenance capex and exit yields, deduct standard industry fees and adjust upward for net cash flow growth. Given this approach, our return assumptions, on a fundamental or apples-to-apples, unlevered basis, are marginally higher in the U.S. and lower in Europe ex-UK, the UK and Asia (**Exhibit 13**).

U.S. markets

Current U.S. core real estate cycle dynamics are in sharp contrast to the excess enthusiasm of the past cycle across a number of indicators. Transaction volumes have been drifting lower for the past few years, and loan-to-value ratios are currently in the low 20% range vs. 65% at the 2007 peak. Appreciation has been muted for the past three years, and ODCE[2] unlevered income yield spreads to BBB corporates, while at the lows for this cycle, are still well above past cycle lows (**Exhibit 14**).

Unlevered income yield spreads have tightened but still exceed historical cycle lows

EXHIBIT 14: CAP RATE (YIELD) SPREAD TO BBB CORPORATE BONDS (%)



Source: Moody's, NCREIF NPI Transaction Cap Rates, J.P. Morgan Asset Management; data as of June 2018.

[2] National Council of Real Estate Investment Fiduciaries (NCREIF) – Open End Diversified Core Equity (ODCE) funds.

Core real estate assumptions diverge regionally, based on the stage of the investment cycle and price performance over the trailing year

EXHIBIT 13: CORE REAL ESTATE ASSUMPTIONS (LOCAL CURRENCY, %)

Core real estate	U.S.	European ex-UK core	UK	Asia Pacific
Starting NOI (before capex) yield	5.00	4.35	4.65	3.50
Maintenance capex	-0.50	-0.20	-0.25	-0.35
Net cash flow growth	2.50	2.25	1.75	3.50
Exit yield adjustment	-0.85	-1.15	-1.05	-0.85
Standard industry fees	-0.70	-0.70	-0.70	-0.75
2019 unlevered return, net of fees	**5.45**	**4.55**	**4.40**	**5.05**
Leverage impact	0.30	0.95	0.60	0.95
2019 levered return, net of fees	**5.75**	**5.50**	**5.00**	**6.00**
2018 unlevered return, net of fees	5.25	4.75	4.75	5.50

Source: J.P. Morgan Asset Management; estimates as of September 30, 2017 and September 30, 2018.

Key thematic points on a U.S. sectoral basis

CENTRAL BUSINESS DISTRICT/OFFICE: Stock growth and tenant space growth are roughly in line. The trend of densification or falling space per worker serves to reduce absorption but raises the ability to pay rent even as wages paid per occupied square foot are rising. Rents and return on investment are rising over the short term.

WAREHOUSE/LOGISTICS: The drive to make the direct-to-consumer economy more efficient continues to push the industrial space-per-inventory ratio higher. The best infill locations see rent surges because the best locations save on other logistics costs. Pricing remains frothy for well-leased industrial assets in low density areas.

RETAIL: Headlines are bleaker than the reality as services are already replacing stores in retail centers. Top malls will continue to perform well, mid grade are well advanced in store-to-service center conversions, and the lowest tier are not likely to survive.

MULTI-FAMILY: A reaccelerating economy and a softer supply are helping rent growth. Luxury rents will continue to firm, but underperformance vs. mid tier will likely persist. Demographics are driving a modest shift back to the suburbs and, on the margin, from owning to renting.

European markets

Solid performance in European ex-UK real estate is being driven by above-trend economic growth in the region, along with global real estate investment flows targeting Europe and, in particular, Germany and France. Credit is readily available due to banks' renewed willingness to lend, as well as increased competition from new debt funds. Despite the strength, risk-taking remains disciplined, which should support values in the next downturn.

Continued demand from investors across the globe for high quality real estate in key European cities has underpinned yield-driven valuation uplifts for the past several years. Rent levels for offices, in most major cities are increasing as economies recover, but the supply of new office stock is failing to keep pace with tenant demand. Retail is undergoing a major structural shift, and yields are beginning to reflect this extra risk. Industrial and logistics have performed most strongly off the back of higher tenant demand, driving strong rental growth and attracting the highest level of investor interest.

Asian markets

Most markets in the region are in mid cycle dynamics. Within each country, however, there are pricing disparities among cities based upon the unique fundamentals of each. Tokyo is expensive for offices, while Osaka remains attractive given the limited supply. Chinese real estate flows are a greater force in New York and London than in Japan or Australia. U.S. and European flows continue into the region.

Value-added real estate

Over the past few years, the value-added sector has received an increasing percentage of real estate flows as investors have looked for yield in a moderate return environment. Consequently, the value-added market has tightened and spreads to core have come down. Given that the market is tight and likely in its late-cycle stage, the underwriting assumptions behind value-added pro formas seem increasingly stretched vs. core.

Our 2019 value-added projections move our assumptions further out on the real estate risk spectrum. Both our return and volatility assumptions are raised to reflect risk-taking between core and opportunistic in terms of leverage employed, targeted returns and degree of restructuring inherent in the investment process (**Exhibit 15**).

This year's assumptions for value-added real estate represent a point on the risk curve between core and opportunistic

EXHIBIT 15: VALUE-ADDED REAL ESTATE ASSUMPTIONS (LOCAL CURRENCY, %)

Value-added real estate	U.S.	European ex-UK	UK
Core real estate unlevered return, gross of fees	6.15	5.25	5.10
Risk premium	3.00	3.00	3.00
Cyclical adjustment	-1.40	-0.75	-0.95
Standard industry fees	-2.50	-2.50	-2.50
2019 unlevered return, net of fees	**5.25**	**5.00**	**4.65**
Leverage impact	2.50	3.00	2.60
2019 levered return, net of fees	**7.75**	**8.00**	**7.25**
2018 unlevered return, net of fees	6.50		

Source: J.P. Morgan Asset Management; estimates as of September 30, 2017, and September 30, 2018.

We define value-added as having the following characteristics:

- properties with significant leasing, repositioning and redevelopment risks
- properties with medium to low liquidity during the typical three- to five-year holding period
- leverage typically employed at the 50% or higher level
- a risk premium over core of approximately 3%, in an equilibrium valuation and at a similar stage of the cycle
- targeted income returns in the range of 30% to 50% of total return

REAL ESTATE INVESTMENT TRUSTS (REITS)

This year we introduce an assumption for UK REITs. Elsewhere, our REIT projections are flat for the U.S. and down for Europe ex-UK and Asia Pacific due to both market developments and methodological changes. Overall, the expected return for global REITs is reduced by 50 basis points (bps) in local currency terms.

Our regional REITs projections (**Exhibit 16**) utilize unlevered core real estate returns as a starting point, motivated by the belief that REITs are ultimately subject to the fundamentals of the underlying real estate held within the publicly traded vehicles. The regional core returns are then adjusted for:

- industry composition – U.S. REITs projections are adjusted slightly to account for the increased market share of higher growth alternative sectors (e.g., data centers) not captured in our core return figure.
- REIT leverage within each region
- valuation relative to underlying real estate – price to net asset value discount/premium is amortized to its historical average.

For U.S. REITs, the slight upgrade to core real estate was offset by a downgrade to the incremental return expected from higher growth sectors. Outside of the U.S., lower unlevered core real estate assumptions have driven part of the decline, while the benefits from previously assumed valuation discounts have also been adjusted downward. This year, we used a broader set of valuation metrics that showed a larger historical discount for European and Asian REITs, reducing the valuation impact for those markets. Lastly, the net leverage benefit declined for Asian REITs for two reasons. First, the starting assumption of a lower unlevered core return in the region depressed the leverage benefits. Second, a methodological move to incorporate a cycle-neutral, as opposed to contemporaneous, interest rate raised the cost of leverage for markets still early in their credit cycle, such as Japan.

REIT return estimates assume convergence to the value of the underlying real assets and incorporate leverage

EXHIBIT 16: REIT RETURN ASSUMPTIONS AND BUILDING BLOCKS (LEVERED, LOCAL CURRENCY, %)

REITS	U.S.	European	European ex-UK[A]	UK	Asia Pacific	Global
Unlevered return private real estate	5.45	4.50	4.55	4.40	5.05	5.20
Tilt toward higher growth sectors (e.g., data centers)	0.10					0.05
Net leverage benefit	0.45	1.00	1.20	0.85	0.55	0.55
Amortization to historical P/NAV discount	0.25	0.25	0.25	0.25	0.15	0.20
2019 expected return	**6.25**	**5.75**	**6.00**	**5.50**	**5.75**	**6.00**
2018 expected return	6.25		7.00		7.00	6.50

Source: J.P. Morgan Asset Management; estimates as of September 30, 2017, and September 30, 2018.
[A] The 2019 European ex-UK assumption is comparable to the 2018 European assumption (7.00), which did not include the UK.

INFRASTRUCTURE EQUITY

We reduce our 2019 long-term infrastructure equity return assumption marginally to 6.00% from 6.25% in 2018, primarily due to higher recent valuations in the space, leading to a somewhat less robust valuation impact (at 0.50%) going forward (**Exhibit 17**).

The outlook for infrastructure equity remains strong, given its relatively high, stable yields and anticipated demand from underallocated investors

EXHIBIT 17: OECD INFRASTRUCTURE LEVERED EQUITY—RETURN ASSUMPTIONS AND BUILDING BLOCKS (USD, %)

	2019
Starting yield	5.00
Cash flow growth	0.75
Valuation impact	0.50
Leverage impact	1.50
Fees and other expenses	-1.75
Expected return	**6.00**

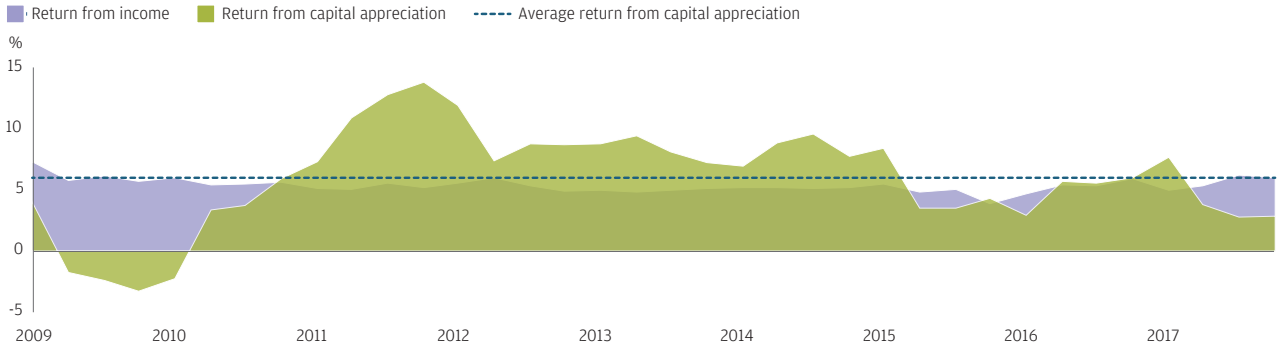
Source: J.P. Morgan Asset Management; estimates as of September 30, 2018.

The outlook remains generally strong as investors continue to value the asset class for its relatively steady, long-term contracted and regulated cash flows, especially in a lower return and more volatile investment environment. Historically stable average yields of approximately 5% (**Exhibit 18)**, with some growth based on operational efficiencies and/or contractual inflation mandates, represent an attractive option vs. many similarly risked equity alternatives. In addition to relatively high yields, the asset class benefits from a degree of inflation protection, which manifests in cash flows that grow with inflation over time.

Institutional investors across the board expect to increase their allocation to the asset class, as most have not met their current allocation targets (**Exhibit 19**).

Infrastructure is valued for its historically stable cash flows

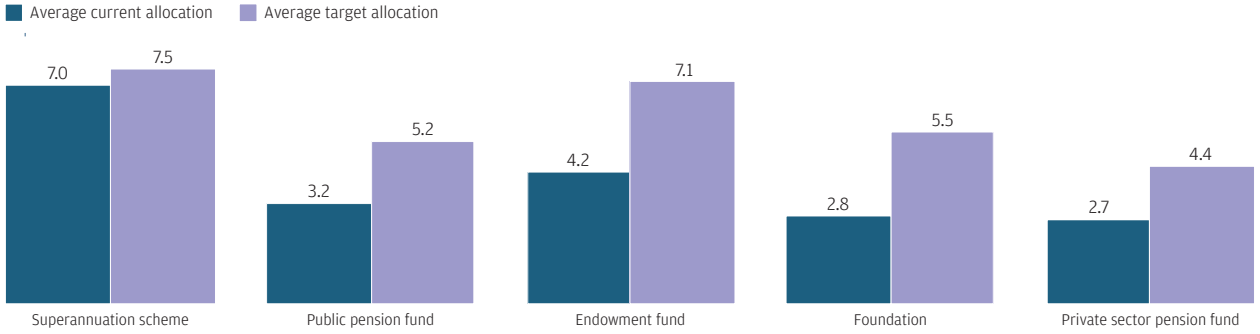
EXHIBIT 18: UNLISTED INFRASTRUCTURE RETURN COMPONENTS: INCOME AND CAPITAL APPRECIATION



Source: MSCI Global Quarterly Infrastructure Asset Index, J.P. Morgan Asset Management; data as of December 2017.
Data show rolling one-year returns from income and represent the index's full available timeline from 1Q 2009 onward.

Rising investor demand should continue to add a valuation premium

EXHIBIT 19: INSTITUTIONAL INVESTORS' CURRENT AND TARGET ALLOCATIONS TO INFRASTRUCTURE (%)



Source: Preqin; data as of December 2017. Based on survey data, subject to self-reporting bias. Percentage allocations shown exclude investors who have no allocation to infrastructure equity.

Utilities

Regulated utilities and distributed power should continue to perform well, as allowed returns have been resilient in the low interest rate environment. Aging systems require capex at the same time government balance sheets are under stress after years of slowing productivity and population growth. Electricity networks have felt the greatest impact from technology over the past few years: Distributed generation and intermittent resources have made grid management more important, while smart meters and demand management have made operators better able to address these changes. Technology is likely to continue to drive change in the industry, as will customers' focus on green energy, safe pipes and a clean water supply.

Transportation

The transportation sector has benefited from the secular trend toward greater trade and travel as the cost of transportation declines and wealth continues to grow. Technological advances and automation are also making transportation assets more efficient, and disruption to transportation business models is likely to continue over the medium term. Quasi-monopolistic market positions with inflation-indexed contracts have further strengthened cash flows. Valuations should move higher for trophy assets.

Contracted power

Power generation investments, particularly for renewable energy, can offer long-term power offtake agreements with sovereign entities, utilities or corporates. The structure of the agreements, including a measure of inflation protection, has tended to produce relatively high and stable yields with higher levels of leverage that consequently have pushed up valuations. Renewable energy costs continue to decline slowly, and there will be additional opportunities to invest in new projects. However, reduced incentives and greater competitiveness will likely reduce the tenor of new contracts in the space. This would make existing investments with longer contracts more valuable, especially in the event of a recession, when interest rates would be expected to fall.

MASTER LIMITED PARTNERSHIPS (MLPS)

In the past, MLPs issued by pipeline operators represented a potentially attractive approach for individual and institutional investors to gain energy infrastructure exposure in the public equity markets, with a steady income component and related tax advantages. Over time, as the industry has matured and reacted to various tax and regulatory changes, many operators have elected to restructure their businesses as traditional C-corporations rather than general partner/limited partnership arrangements. This revised structure has greater appeal for institutional investors like endowments and foundations but introduces greater uncertainty over the medium term around issues such as leverage, distribution growth trajectory and industry composition. Given the impact of this ongoing evolution, we do not feel that the long-term return for MLPs can be reliably estimated at this juncture.

INFRASTRUCTURE DEBT

Our infrastructure debt assumption is based largely on our return projection for global corporate credits of A to BBB quality and 15-year maturity, resulting in a long-term equilibrium return assumption of 4.75%.

COMMODITIES

Our 2019 long-term commodity return assumption is 2.25% net of fees or 3.00% gross of fees – a 75bps decline vs. our 3.75% gross of fees assumption in 2018.

With our U.S. inflation outlook down 25bps to 2.00%, 2019 return expectations imply positive real returns of 25bps net of fees (100bps gross of fees, down 50bps from 2018). Our real return assumption will continue to be tested by the impact of global trade policy, at least in the intermediate term.

Methodology and return assumption building blocks

Our assumptions methodology (basically unchanged, except for net of fee calculations) is detailed in "**Building blocks of commodity returns**."

BUILDING BLOCKS OF COMMODITY RETURNS*

We build our assumption based on the Bloomberg Commodity Total Return Index (a collateralized index of investible futures). We start with a projection of the collateral return for futures-based commodity investing. As this return is generally equivalent to inflation over the long term, we assign a value equivalent to our long-term assumption for U.S. inflation. We then adjust for:

(1) where we are in the current commodity cycle (Pricing theories based on the economics of non-renewable resources in finite supply are not embedded in our estimates.)

(2) a rising emerging market contribution to global per capita commodity consumption

(3) the inverse relationship between commodity returns and the U.S. trade-weighted dollar, with a modest adjustment for the diminishing role of the U.S. dollar in commodity trading

(4) the potential contribution from roll yields. We expect a zero contribution from this source during the 10- to 15-year time frame of our assumptions.

(5) fees – based on U.S commodity ETFs and mutual fund average fees*

* Prior to the 2019 assumptions, commodity return projections were gross of fees and are not comparable to 2019 net of fees return assumptions.

Our approach is a combination of quantitative and qualitative inputs. A comparison of the basic building blocks for 2019 vs. 2018 commodity return assumptions is laid out in **Exhibit 20**.

Relative to 2018, our U.S. inflation assumption (our long-term reference point for commodity returns) is reduced 25bps to 2.00%. Additionally, the "position in current cycle" component, as captured by the Commodity Event Index (see "**Capturing producers' supply constraint sentiment**"), is adjusted from 25bps down to zero, reflecting the impact from the significant surge seen in oil prices and the commensurate increase in U.S. energy capex. The adjustment for the rising role of emerging market (EM) growth and per capita commodity demand is unchanged at 0.25%. The impact of a trade-weighted U.S. dollar decline is reduced to 0.75%. We generally expect a zero contribution from roll yields over the time frame of our long-term projections. The result is a 3.00% commodity return assumption, gross of fees (down 75bps vs. 2018) or a 2.25% return, net of fees.

Our commodity assumption, net of fees, is 25bps in excess of inflation

EXHIBIT 20: COMMODITIES—RETURN ASSUMPTIONS AND BUILDING BLOCKS (USD, %)

	2019	2018
Collateral return*	2.00	2.25
Position in current cycle (premium/discount)	0.00	0.25
EM per capita consumption adjustment	0.25	0.25
Trade-weighted USD decline impact (projected incremental annual decline vs. historical base period)**	0.75	1.00
Impact of roll yield over average life of assumptions	0.00	0.00
Total return, gross of fees	**3.00**	**3.75**
Fees***	-0.75	N/A
Total return, net of fees	**2.25**	**N/A**
Gold return, net of fees	**2.50**	**N/A**

Source: J.P. Morgan Asset Management; estimates as of September 30, 2017 and September 30, 2018.

* The 2019 Long-Term Capital Market Assumption for U.S. inflation.
** The historical relationship of the U.S. dollar to commodities would call for a greater return contribution than the 0.75% shown, but in light of expectations for a reduced role of the U.S. dollar in international trade, we limit this long-term impact.
*** Market-based fees are based on U.S. commodity ETFs and mutual fund average fees. The 2018 assumption did not include fees and is therefore not comparable to the 2019 net of fees assumption.

Current cyclical conditions detract from our long-term commodity return assumption

Trade wars, OPEC/Russia supply constraints and global synchronous growth have produced thus far in 2018 a very volatile but generally negative return across the commodity complex, except for energy prices. The current imbalance in the energy markets is expected to give way to a long-term approximate balance between production and demand, as represented by the International Energy Agency's projection.[3] That outlook is likely to be tested in the intermediate term because underinvestment by the international oil majors, loss of output due to domestic upheavals in countries such as Venezuela and Libya, U.S. sanctions against Iran and, potentially, the new supply discipline of U.S. exploration and production companies have caused an intermediate imbalance that may ripple through the long-term trajectory of energy prices. These conditions, if extended beyond the next few years, should contribute to a commodity index return above the rate of inflation (a rate we view as a reasonable long-term return equilibrium). However, energy prices have likely overshot their long-term equilibrium price, dragging down the average price gain assumption and thus detracting from our 2019 long-term return assumption.

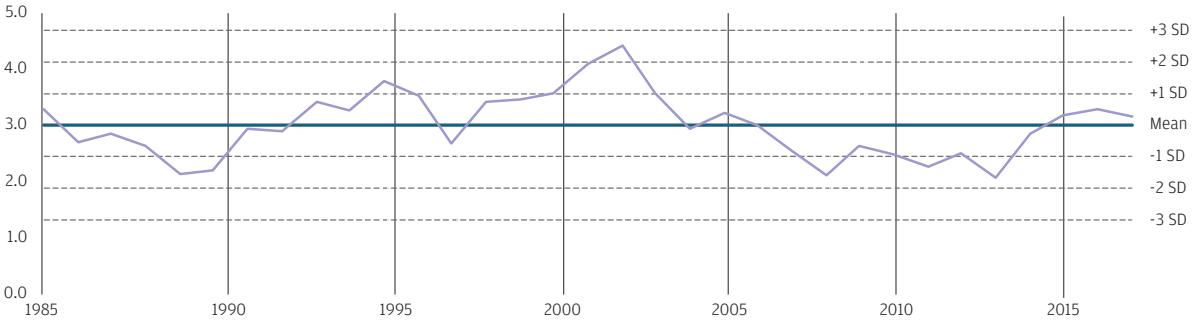
Long-term drivers of return: The U.S. dollar, inflation, emerging markets

More reliably, the projected decline of the U.S. dollar on a trade-weighted basis, in the context of a 2% projected U.S. inflation rate, provides the foundation of the return estimate.

[3] International Energy Agency World Energy Outlook 2017.

CAPTURING PRODUCERS' SUPPLY CONSTRAINT SENTIMENT

The Commodity Event Index



COMMODITY EVENT INDEX COMPONENTS

The Commodity Event Index is designed to capture producer sentiment around the loosening/tightening of production constraints within commodity markets. Higher index values indicate a more constrained environment, supportive of increasing commodity prices.

The event index utilizes a component weight scheme in which four components have 11.1% weightings, while three components that we deem more important receive an 18.5% weighting, as indicated below. Components were added as available (inclusion date in parentheses) for our universe of energy and materials companies, including:

Index component	Component weight %	Observed change to index component	Impact on index value
Credit rating (1985)	11.1	higher	lower
Age of capital stock (1985)	11.1	higher	higher
Financial leverage (1985)	11.1	lower	lower
Volume of bankruptcies, takeovers, debt-for-equity swaps (2004)	11.1	lower	lower
Capital expenditure to sales (1985)	18.5	lower	higher
Oil rig count (1991)	18.5	higher	lower
CEO turnover (2007)	18.5	higher	higher

Source: Baker Hughes, Bloomberg, FactSet, U.S. Bureau of Economic Analysis, J.P. Morgan Asset Management; data as of June 30, 2018.

The increasing role of emerging market consumers, particularly in India and China, two large countries expected to have the fastest-growing economies over the next 10-year-plus time frame, add an increment to the return outlook. When modeling even a modest increase in per capita consumption of commodities, especially in India, which is at the bottom of the middle income economic ladder, the potential for impact is clear (**Exhibit 21**).

Disruption factor

Sustainable energy production, energy efficiency regulation, new modes of transportation-sharing and urbanization trends are growing strongly and may provide a partial offset to the 1% to 2% world energy demand growth experienced in the last few years **(Exhibit 22)**. Certainly, sustainable energy/efficiency growth rates vs. long-term energy demand would indicate a material loss of share by traditional/carbon energy sources. But off a low starting base, the real impact to the commodity demand and pricing picture is likely to be important beyond the 10-year-plus window of our estimation. As a partial offset to developed market energy per capita trends mentioned above, the Chinese One Belt, One Road initiative is likely to keep a positive tone on many commodities over the forecast period.

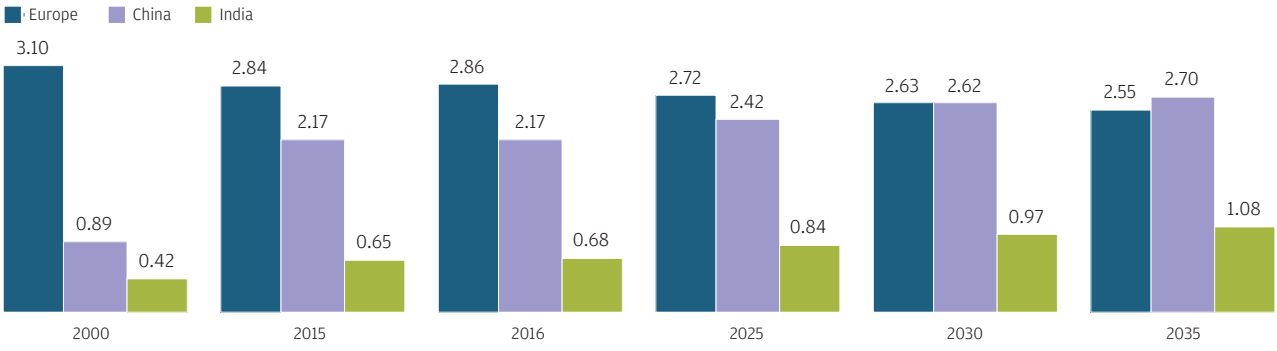
GOLD

The return for gold is driven by many of the same factors as general commodity returns but primarily by U.S. inflation, the direction of the trade-weighted U.S. dollar and a scaling factor that reflects the increasingly important developing economy impact on gold consumption. Consumption per capita can be expected to fall in China and India. However, since the two highest per capita gold consumers (with roughly twice the per capita consumption of developed economies) are also the two fastest-growing economies, we expect the net effect to be an increase in the absolute demand for gold. Another small increment to demand is assumed from an erratic but still long-term accumulation of gold for investment purposes.

Within the last few years, central banks have ceased liquidating their gold reserves and have started accumulating once again. We project a 25bps gold return premium to broad commodities (equivalent to last year's), implying a 2.50% return for gold, net of fees.

Energy demand per capita is decreasing in some developed markets but strengthening in emerging markets

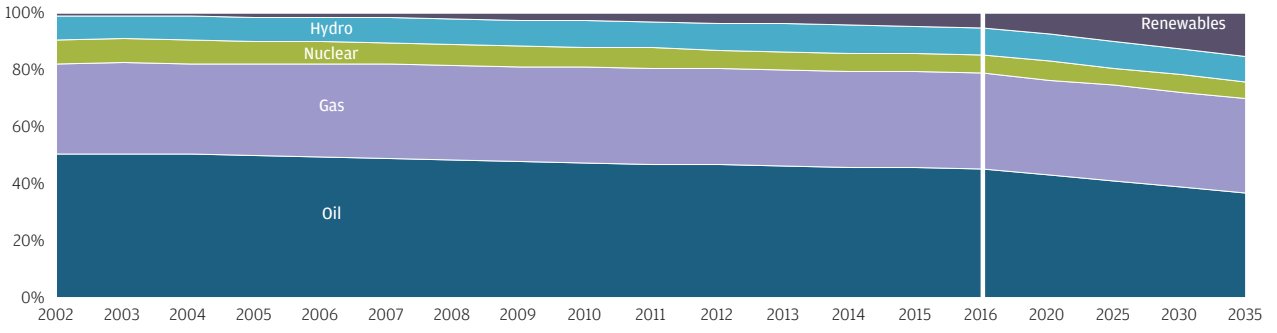
EXHIBIT 21: TOTAL PRIMARY ENERGY DEMAND PER CAPITA (TONS OF OIL EQUIVALENT)



Source: International Energy Agency World Energy Outlook 2017, J.P. Morgan Asset Management.

Renewable energy sources are expected to expand at the expense of fossil fuels

EXHIBIT 22: SHARE OF PRIMARY ENERGY EXCLUDING COAL SINCE THE ACCESSION OF CHINA TO THE WORLD TRADE ORGANIZATION



Source: 2018 BP Energy Outlook.

U.S. dollar strength: A cyclical pause, not a new long-term trend

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IN BRIEF

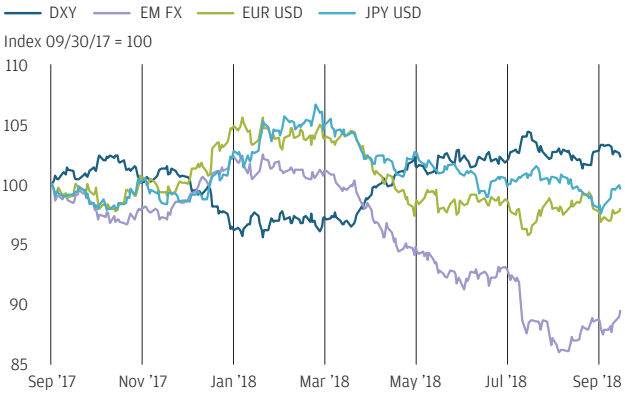
- U.S. fiscal stimulus has improved economic activity, corporate earnings and consumer sentiment, producing a divergence between the cyclical position of the U.S. and those of other countries — and abetted the Federal Reserve's policy rate normalization — a dynamic that has halted what had been an aggressive unwinding of the overvalued U.S. dollar.
- For most currency pairs, we expect this U.S. dollar reversal will produce only a transient impact, likely to subside as the effects of the fiscal impulse from the U.S. tax reform begin to wear off toward the end of 2019.
- We assume some recovery of pound sterling over our assumption horizon, although the currency has remained impaired given the political and economic costs of Brexit — though, at the time of writing, it is unclear what form Brexit may take, so the uncertainty around our sterling assumption is high.

CYCLICAL CHANGES AND SECULAR TRENDS

Year over year, the U.S. DXY index has hardly moved since we published the 2018 *Long-Term Capital Market Assumptions* (LTCMAs). But this headline FX market stability is an illusion masking a pretty volatile 12 months in currency markets. That volatility has been a tale in two parts: Between October 2017 and January 2018, a period of synchronized global growth across emerging and developed markets weakened the U.S. dollar. Then a strong fiscal package passed by the U.S. Congress in 4Q 2017 — in an economy already operating close to capacity — disrupted that incipient synchronized uplift in global growth.

Apparent USD stability masks a rather volatile year in currency markets

EXHIBIT 1: USD VS. EURO, YEN AND A BASKET OF EM CURRENCIES (JP MORGAN EM CURRENCY INDEX)



Source: Bloomberg; data as of September 30, 2018.

As the year progressed, trade concerns escalated and major developed market (DM) economies outside the U.S. saw a weak growth patch in Q1. Despite a weaker economic outlook outside the U.S., the Federal Open Market Committee (FOMC) continued resolutely raising interest rates. The confluence of growth and rate differentials boosted the U.S. dollar again, especially vs. emerging market (EM) currencies (Exhibit 1). In most cases, these disparities among economies' cyclical growth rates have not materially impacted our expectations for longer-term inflation and growth trends — nor our assessment of the future fair value of currency exchange rates.

What has changed, however, compared with last year's Long-Term Capital Market Assumptions, is that a number of starting valuations have shifted decidedly further away from fair value. Only in a few emerging markets, economic vulnerabilities have become apparent that may also adversely impact their currencies' longer-term fair-value trajectory.

As in prior years, we have determined today's fair value exchange rates for G10[1] currencies through a relative purchasing power parity (PPP) approach, based on the long- term average of each currency's real exchange rate. To calculate the fair value for emerging market currency exchange rates, we take an absolute PPP-based approach that builds on the PPP estimates for actual individual consumption,[2] as calculated by the World Bank and the Organization for Economic Co-operation and Development (OECD) for their international price comparison program.

To arrive at a given exchange rate projection over our assumption horizon, which we also refer to as future fair value, we adjust today's fair value exchange rate using the LTCMAs' underlying macroeconomic assumptions, as follows: For G10 currencies, we reflect the expected change in a country's terms of trade over the assumptions horizon by adjusting today's fair value for the projected inflation rate differential between the two countries. For emerging markets, we make an additional adjustment for the expected differential in GDP per capita growth.

Our assumptions continue to reflect the adverse impact on developed market economies' growth prospects of deteriorating demographics, smaller improvements in total factor productivity (TFP) and lower levels of human capital development.[3] We project that emerging markets, in aggregate, will grow faster than their DM counterparts, given larger increases in the size and quality of their labor forces, although with an increasingly wider dispersion in growth rates. Rather than an increase, some EM countries, such as Russia, Taiwan and Korea, are likely to begin experiencing a shrinking of their labor force in the coming years.

We now believe that the echo of the global financial crisis will continue to impact the effectiveness of developed market central banks' policies over the LTCMA horizon as they struggle to achieve their inflation targets. In particular, we expect that over the assumptions horizon, the G10 economies will experience longer periods of below-target inflation, followed by shorter periods above-target, fluctuating within a narrow band. For emerging market economies, in most cases we expect relatively stable inflation environments, at levels somewhat above their respective central bank targets.

[1] In this context we refer to the G10 as the following currencies: USD, EUR, JPY, GBP, CHF, AUD, CAD, NZD, SEK, NOK.

[2] PPP for actual individual consumption covers all households, consumption expenditure and that part of government final expenditure that covers services it supplies to individual households — for example, housing, health, education and social protection. It does not include government final expenditure on those services it supplies to households collectively, such as defense, police and environmental protection.

[3] Total factor productivity is a residual that in developed economies likely reflects technological change. It encompasses productivity growth not explained by capital stock accumulation or the labor force (increased hours worked), but rather captures the efficiency or intensity with which inputs are utilized.

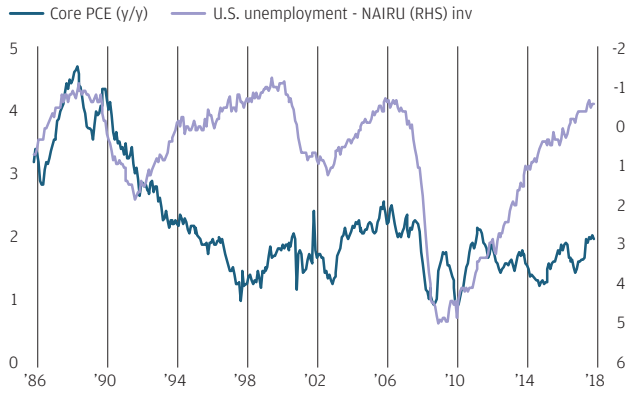
We do, however, acknowledge that populism continues to be on the rise, and in a growing number of countries, increasing the risk that economic trajectories may shift significantly – toward relatively less growth, more inflation and weaker currency exchange rates. Still, political risks to our assumptions for the eurozone remain low, even as Brexit continues to cloud the UK's prospects. Meanwhile, changes in U.S. trade policy are making China's transition from investment-led growth to a more balanced growth model an even more challenging endeavor.

LONG-TERM CURRENCY EXCHANGE RATE ASSUMPTIONS

While global growth has remained robust and continues at or above potential, divergences among the cyclical positions of the U.S. and other developed and emerging market economies have returned since last year's edition. Fiscal stimulus in the U.S., and the subsequent improvements in economic activity, corporate earnings and consumer sentiment, have made it easier for the Federal Reserve (Fed) to move forward with its policy rate normalization at a steady and somewhat faster pace than before.

Despite a tight labor market (unemployment below NAIRU), we are not seeing a meaningful pickup in inflation

EXHIBIT 2: U.S. UNEMPLOYMENT (Y/Y) AND INFLATION (CORE PCE), 1986–2018



Source: OECD, Bloomberg, J.P. Morgan Asset Management; data as of September 30, 2018.

The U.S. economy continues to operate in the flat part of the Phillips curve,[4] with core inflation rising only gradually, despite unemployment levels that for quite some time have been well below the Fed estimate of NAIRU (**Exhibit 2**).[5] In this context, the current Fed interest rate normalization process appears to be well advanced, and further rate hikes later in 2019 are likely to become much more data-dependent.

At the same time, in the euro area, economic activity data has softened, inflation remains well below target and, while the labor market is much improved from the days of the sovereign debt crisis, considerable slack still remains. It has therefore been unsurprising that the European Central Bank has adopted a more dovish tone and signaled that it will not start to raise interest rates for a while.

Abstracting from the volatility of activity data, growth in Japan has been respectably above trend for the last 12 months, mainly led by private consumption and investment spending. But inflation disappointed and remains stubbornly below 1%. In acknowledgment of a delay in the time it will take to reach the inflation target, the Bank of Japan (BoJ) was forced to modify its yield curve control framework. The 10-year yield range was shifted upward, the logic being that by allowing the 10-year yield to move between 0 and 20 basis points, the BoJ will be able to conduct easy monetary policy for longer, and at least until the consumption tax hike in 2019. The irony of the signal from this is not lost on us: The need to push long-term bond yields up, in order to maintain an easy monetary policy stance over a longer horizon, is an example of the quandary central banks are facing and are likely to face again in the coming years. Despite this, the BoJ is not expected to meet its inflation goal over our forecast horizon.

Over the past couple of years, Japan's current account surplus, which previously appeared to be vanishing, has stabilized at a high level, partly thanks to strong income receipts associated with international assets. This highly favorable external position contributes to the view that JPY will appreciate in nominal terms over the long run.

This dynamic has brought the aggressive pace at which the overvalued U.S. dollar had begun to unwind – historically, a seven-year process, on average – to a screeching halt. For DM currency pairs, this reversal of the U.S. dollar is not supported by a change in its long-term fair value, but rather produces a more transient impact likely to subside as the effects of the fiscal impulse from the U.S. tax reform begin to wear off toward the end of 2019.

Sterling has remained impaired as the political and economic costs of a soft Brexit have become more and more apparent, a shift that has also had the effect of elevating the risk that the process overall may unravel and end inadvertently in a hard Brexit.

[4] Low inflation and low unemployment, in this model of the relationship between unemployment and higher wages and consumer prices.

[5] NAIRU (non-accelerating inflation rate of unemployment) is defined as the lowest rate of unemployment at which inflation should begin to increase.

Emerging market economies

The path to our equilibrium assumptions for EM FX is not expected to be smooth, and the current market volatility is likely to persist while the Fed tightens policy and U.S. foreign policy focuses on tariffs. Because the U.S. dollar remains the preeminent funding currency for emerging markets, the ripple effects of Fed policy tightening have been clearly visible, even with other central banks still on hold and the absolute level of tightening still fairly benign. A number of emerging market economies, particularly in Latin America but also India and Indonesia, had to tighten their monetary policy in response, to limit exchange rate depreciation and to prevent the inflation rate from spiking. In some countries, this external tightening pressure has been compounded by internal vulnerabilities — either as a result of unfinished reform efforts such as in Argentina or due to profligate fiscal policies as in Turkey, Brazil and South Africa (**Exhibit 3**).

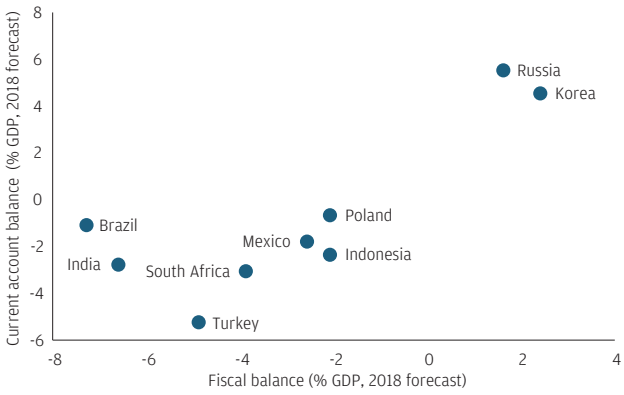
With polarized choices in elections in several emerging markets, political uncertainty and volatility are unusually elevated this year. This makes it hard to derive high conviction views on the economic fundamentals over the longer term. But we acknowledge that the revelation of specific vulnerabilities in parts of emerging markets, and a deterioration in the EM-U.S. inflation differential, adversely impact our longer-term fair value equilibrium assumptions for a number of EM currencies.

For the Chinese RMB, compared with last year's edition, our 2019 assumptions build in a modestly weaker exchange rate vs. the USD. Continued convergence between Chinese economic fundamentals and the global frontier, particularly in terms of growth in export volumes and unit labor costs, has lowered our estimate of fair value. This year, volatility in the RMB increased as headwinds from U.S.-China trade tariffs, and China's domestic deleveraging effort, weighed on growth. As China transitions toward a more balanced growth model, the currency is likely to gain more traction in nontrade international transactions — a welcome development. However, the currency may also have to act as a cushion in smoothly managing that transition.

Exhibit 4 provides an overview of some of our 2019 long-term currency exchange rate assumptions.

Large EM countries exposed to foreign capital flows also have large fiscal deficits

EXHIBIT 3: 2018 EXPECTED CURRENT ACCOUNT BALANCE VS. FISCAL BALANCE



Source: OECD, Institute of International Finance (IIF), Bloomberg, J.P. Morgan Asset Management; data as of September 30, 2018.

After a broad-based U.S. dollar reversal over the last year, our assumptions point toward significant future weakness

EXHIBIT 4: ASSUMPTIONS FOR SELECTED CURRENCY EXCHANGE RATES — NEXT 10–15 YEARS

(According to market convention, CURRENCY A/CURRENCY B means one unit of CURRENCY A is worth the stated number of units of CURRENCY B. EUR/USD = 1.30 means EUR 1.00 is worth USD 1.30.)

Currency		Current levels September 30, 2018	2019 Per annum % change from current*	2019 FX rate assumptions	2018 FX rate assumptions
Euro	EUR/USD	1.16	+1.00	1.32	1.34
Japanese yen	USD/JPY	114	+1.75	92	93
Swiss franc	USD/CHF	0.98	+1.50	0.85	0.88
British pound	GBP/USD	1.30	+0.75	1.43	1.47
Canadian dollar	USD/CAD	1.29	+0.75	1.18	1.14
Australian dollar	AUD/USD	0.72	-0.50	0.68	0.71
Chinese renminbi	USD/CNY	6.87	+1.00	6.07	5.87
Brazilian real	USD/BRL	4.02	0.00	4.02	3.59
Mexican peso	USD/MXN	18.72	-0.75	20.56	15.63

Source: Bloomberg, J.P. Morgan Asset Management; estimates as of September 30, 2017 and September 30, 2018.

*For consistency and ease of conversion, we have assumed that the forecast horizon for the per annum change in percentage terms is 12.5 years. Differing from market convention, we have also used a uniform signing convention, such that a positive figure represents a strengthening of the currency vs. the U.S. dollar, and vice versa.

BUILDING BLOCKS–CURRENCY EXCHANGE RATES

The annualized compound rate of change expresses the difference between two currencies' current exchange rate and our estimate of their fair value exchange rate at the end of our assumptions horizon – for consistency we use 12½ years.

A DEVELOPED MARKETS

- Starting fair value exchange rate based on the theory of purchasing power parity (PPP)
  - + Expected future inflation rate differential between domestic economies
  - + Review qualitatively and adjust currencies selectively to ensure internal consistency and incorporate secular factors and trends other than relative inflation that would otherwise not be captured
  - + The prevailing spot exchange rate level on September 29, 2018

B EMERGING MARKETS

- Starting fair value exchange rate based on the theory of purchasing power parity (PPP)
  - + Expected future inflation rate differentials and GDP per capita growth differentials* between domestic economies
  - + Review qualitatively and adjust currencies selectively to ensure internal consistency and incorporate secular factors and trends other than relative inflation that would otherwise not be captured
  - + The prevailing spot exchange rate level on September 29, 2018

* Academic studies suggest real equilibrium exchange rates in emerging economies are enhanced via the convergence process of higher productivity and trend growth rates. This can be proxied by GDP per capita. See Choudri and Khan (2004), "Real Exchange Rates in Developing Countries: Are Balassa-Samuelson Effects Present?" IMF Working Papers; Kravis and Lipsey (1983), "Toward an Explanation of National Price Levels," Princeton Studies in International Finance.

Stable volatility outlook, but tail risk management critical in late cycle

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Xiao Xiao, CFA, *Quantitative Analyst, Multi-Asset Solutions*
Ivan Chan, *Quantitative Analyst, Multi-Asset Solutions*

IN BRIEF

- Our broad volatility forecasts are little changed compared with last year, despite the spike in financial asset volatility at the beginning of 2018.
- With major markets becoming further entrenched in late-cycle dynamics, more frequent volatility spikes are likely – but we see little in the way of structural change to alter our long-term view.
- Late cycle highlights the need to pay attention to the left-tail risks of financial assets. We remind investors that return distributions for financial assets are non-normal, with a higher probability and magnitude of left-tail returns, notably in equities and especially in credit.

NO MAJOR CHANGE IN FORWARD-LOOKING RISK OUTLOOK, DESPITE CHOPPY, LATE-CYCLE MARKET DYNAMICS

Our broad volatility forecasts are little changed compared with last year. Despite the spike in financial asset volatility at the beginning of 2018, volatility has trended back to near historically low levels. Reviewing the underlying dynamics has generally revalidated our forward-looking risk view. Our Long-Term Capital Market Assumptions (LTCMA) risk forecast is cycle-neutral with full-cycle dynamics embedded. Even as markets have become further entrenched in late-cycle dynamics since last year's report, we see little in the way of structural change to alter our long-term view.

The volatility spike of early 2018 was technical in nature, in our view, likely driven by investors building excessive positions in short-volatility financial products as part of a reach for yield. Their unwinding led to a sudden and sharp rise in volatility. Without an underlying shift in fundamentals to sustain those sizable market moves, calmer markets returned promptly (**Exhibit 1**). As markets remain firmly in late cycle, especially in the U.S., more frequent volatility spikes and corrections are to be expected. However, we do not envision these likely short-lived events altering our long-term risk forecast.

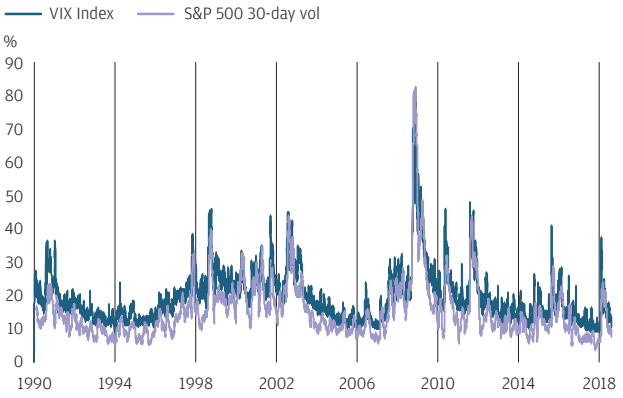
In terms of Sharpe ratio, we see very similar risk-return trade-offs for equities compared to prior years, which is broadly in line with long-run historical experience. What is changing this year is the improvement of risk-adjusted returns for fixed income assets. In prior years, the headwind of rate normalization dampened our rate return forecasts. With U.S. yields resetting to a higher level, returns are normalizing, along with their Sharpe ratios (SR). Fixed income assets in recent decades have delivered very high ex-post risk-adjusted returns (an ex-post SR over 1), given the backdrop of steadily declining yields.

Although we are not necessarily forecasting a return to historical highs, this year's LTCMA forecasts do suggest a reversion to more normal fixed income risk-adjusted return (with SR rising to 0.5 vs. 0.3 last year – the highest thus far in this expansion). Within fixed income, credit instruments are expected to deliver better risk-adjusted return over the cycle, compared with last year's forecast. However, we continue to caution against simply relying on SR, as credit tends to exhibit a higher likelihood of left-tail events.

The Long-Term Capital Market Assumptions' risk forecasts are focused on volatility – which is particularly useful for mean-variance analysis. However, investors should not lose sight of the broader concept of risk, including more extreme experiences – i.e., tail risks.[1] Financial assets tend to exhibit more extreme movements during market downturns and recessions, affecting not only short-term volatility but also the distribution of long-run returns, with a higher likelihood of severe losses (i.e., left tails) than of extreme gains (i.e., right tails). Financial asset returns have historically exhibited what we refer to technically as "fat left tails" – situations in which the probability of a negative return is more frequent and the probability of a decline more sizable than a simple normal distribution would suggest. Although we do not provide forecasts here for these alternative risk measures, we would like to highlight the importance of understanding these dynamics, which become particularly relevant in late cycle.

Despite a spike in early 2018, asset volatility returned to historical lows

EXHIBIT 1: EQUITY MARKET VOLATILITY



Source: Bloomberg, J.P. Morgan Asset Management; data as of July 31, 2018. For illustrative purposes only.

[1] We define tail risk as the risk of a generally unlikely but extreme outcome. See further discussion in the "**Special topic**" section.

Declining quality and lengthening maturity suggest higher risk vs. long-run history

EXHIBIT 2A: MARKET SHARE (%) BY CREDIT RATING FOR U.S. CORPORATE INVESTMENT GRADE BONDS

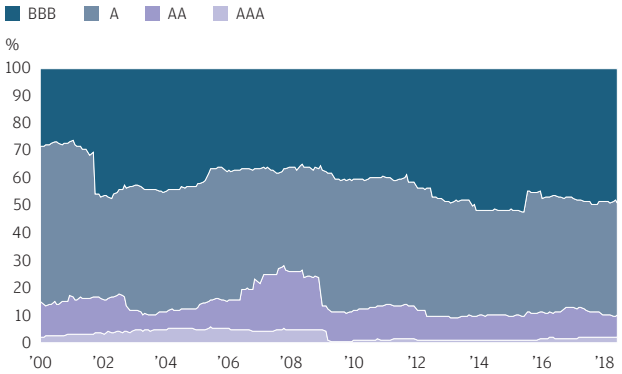
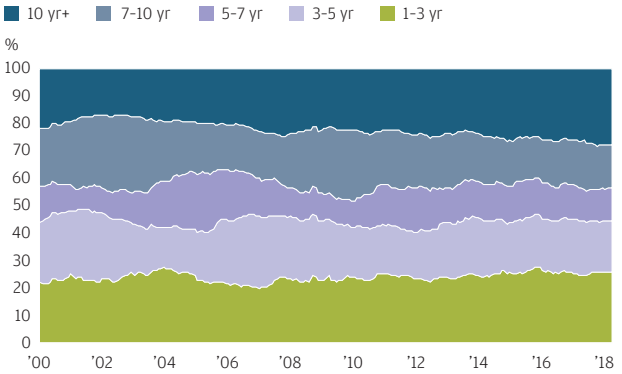


EXHIBIT 2B: MARKET SHARE (%) BY MATURITY FOR U.S. CORPORATE INVESTMENT GRADE BONDS



Source: J.P. Morgan Asset Management Multi-Asset Solutions; data as of June 30, 2018.

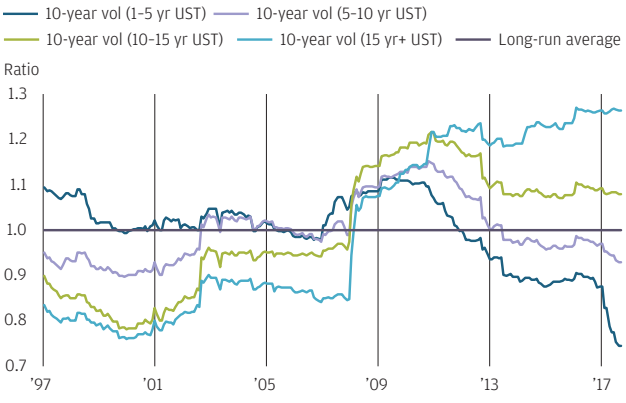
RISKS FOR SELECTED FIXED INCOME MARKETS HIGHER THAN WHAT HISTORY WOULD SUGGEST; EQUITY EXPECTATIONS LITTLE CHANGED

Select credit markets are likely to experience higher volatility over the forecast horizon. The composition of the investment grade corporate bond market has seen a gradual decline in quality over the past decade (**Exhibit 2A**). With cheap financing readily available for a wide spectrum of borrowers, including those with relatively lower quality balance sheets and a poorer ability to pay, companies have had little incentive to pursue elite rating status in recent years. A similar decline in credit quality can be observed in Europe. At the same time, corporates also lengthened the maturity of new debt issuance to lock in low rates (**Exhibit 2B**). Without a further decline in rates, both of these factors contribute to our view that forward-looking risks in investment grade corporate bonds are likely to be higher than long-run history would suggest in the U.S. and euro area.

Volatility will also likely be higher for short-duration instruments as quantitative easing (QE) unwinds over the next few years. The unconventional central bank policies of recent years created an artificial force that dampened fixed income volatility. The result was an unusually low-volatility environment in fixed income markets, especially at the short end of the Treasury yield curve. The results for one- to five-year maturity instruments (**Exhibit 3**) illustrate how this distortion helped volatility break out below its historical range. Our volatility assumptions incorporate the normalization of volatility levels for short-duration instruments to reflect the gradual removal of QE and other central bank stimulus over our forecast horizon.

Volatility is unusually low at the short end of the Treasury curve

EXHIBIT 3: ROLLING 10-YEAR HISTORICAL VOLATILITY, NORMALIZED BY LONG-RUN AVERAGE



Source: J.P. Morgan Asset Management; data as of September 30, 2018

The lines represent the rolling volatility divided by the full sample average of the rolling volatility, by maturity bucket.

Looking across credit markets, all roads don't lead to increased volatility. We expect European high yield (HY), for example, to be less volatile in the future, relative to historical standards, as the quality of the market has improved in recent years and fallen angels are likely to regain their investment grade status over time. We expect equity risks to stay in line with long-run historical levels.

In alternatives, our hedge fund and private equity volatility forecasts are little changed. Since we have revised our LTCMA return assumptions this year for select alternative assets – real estate, infrastructure and direct lending – to incorporate leverage, we are adjusting those volatility estimates accordingly. Our real estate volatility forecast rises from 10.75% to 12.25% for U.S. core to reflect leverage. However, even with this increase our forecast remains lower than the historical average of 14% – driven by an expectation that the peak level of leverage in this cycle will be lower than it was during the credit crisis. Similarly, we forecast lower U.S. REITs volatility over our forecast horizon, compared with recent history. We do not expect U.S. REITs to be as extended in this cycle; thus, in our opinion, recent history overstates likely future volatility.

SPECIAL TOPIC: DON'T FORGET ABOUT TAIL RISK, DESPITE LOW PROBABILITY

Investor interest in tail risk has seen a resurgence since the global financial crisis. We emphasize an important distinction in financial asset risks: Volatility (derived assuming a normal market condition) and tail risk (the behavior of risk at or beyond a typically high level quantile) are two different topics and should be studied separately. In the context of our Long-Term Capital Market Assumptions, volatility is the primary risk measure we forecast and our output has direct applicability in mean-variance frameworks. However, it is essential that investors be acutely aware of financial assets' total return distribution, which encompasses more than what a simple volatility measure can capture.

A tail event and its behavior can be observed from historical return distributions, and in this section we select a few representative asset classes for illustration: U.S. large cap equities, U.S. intermediate Treasuries, U.S. high yield debt and emerging market sovereign debt.[2] We use a sample of monthly data covering the period from February 1990 to June 2018.[3] We then standardize the monthly returns using sample mean and sample standard deviation for each individual asset (i.e., determine the z-score).[4]

First, for each asset we look at the histogram of standardized monthly return distribution vs. standard normal distribution to help visualize and compare the existence and magnitude of tail events (**Exhibit 4**). We calculate the ratio of left-tail events below negative three standard deviations (-3 STD) to the total number of observations in the sample period, and compare it to the cumulative distribution function (cdf) value at -3 STD of a standard normal distribution, which is 0.13%.

During the sample period, we can observe that equity and credit (i.e., high yield and emerging market debt [EMD]) have had both a greater number of and more severe left-tail events than the normal distribution would imply. For equities, the distribution of returns included 0.59% below -3 STD events, compared with the 0.13% that a normal distribution would suggest. It is more extreme for credit assets, where the historical probability was more than 10 times what normal distribution would imply (HY at 1.47%/EMD at 1.36% vs. 0.13%). Although a left-tail event remains unlikely, the historical frequencies clearly exceed the normal probability density curve. The return distribution of U.S. government bonds, on the other hand, is relatively close to normal, with a cdf value of 0.29% and no significant loss below -4 STD.

Interestingly, credit indices (high yield and EMD) experienced many more negative standard deviation events than the equity index, despite having lower volatilities at the total return level.[5] For example, in October 2008, monthly returns of U.S. large cap, high yield and EMD were -16.8%, -16.3% and -16.0%, respectively. Yet when we convert these returns into z-scores, they become -4.3, -7.4 and -5.0 standard deviation events, respectively. This could be driven by major default events in the credit market. EMD's worst drawdown event, a -26.0% monthly return, occurred in August 1998, when the Russian government defaulted on its debt. This is -7.9 standard deviations away from the mean. Statistically, the probability of a -7.9 standard deviation event, assuming normal distribution, would only occur in one in 700 trillion observations.

Given these observations about the probability of left-tail events, we then attempt to measure the magnitude of the risk. The most popular tail risk measures used in banking and insurance are value at risk (VaR) and conditional value at risk (CVaR), also known as expected shortfall. The VaR metric,

[2] Indices used: U.S. large cap: S&P 500 Total Return Index (SPTR Index); U.S. intermediate Treasuries: Bloomberg Barclays U.S. Intermediate Treasury Total Return Index (LT08TRUU Index); U.S. high yield: ICE BofAML U.S. Cash Pay High Yield Index (JOA0 Index); emerging market sovereign debt: J.P. Morgan EMBI Global Diversified Composite Index (JPGCCOMP Index). All these are total return indices.

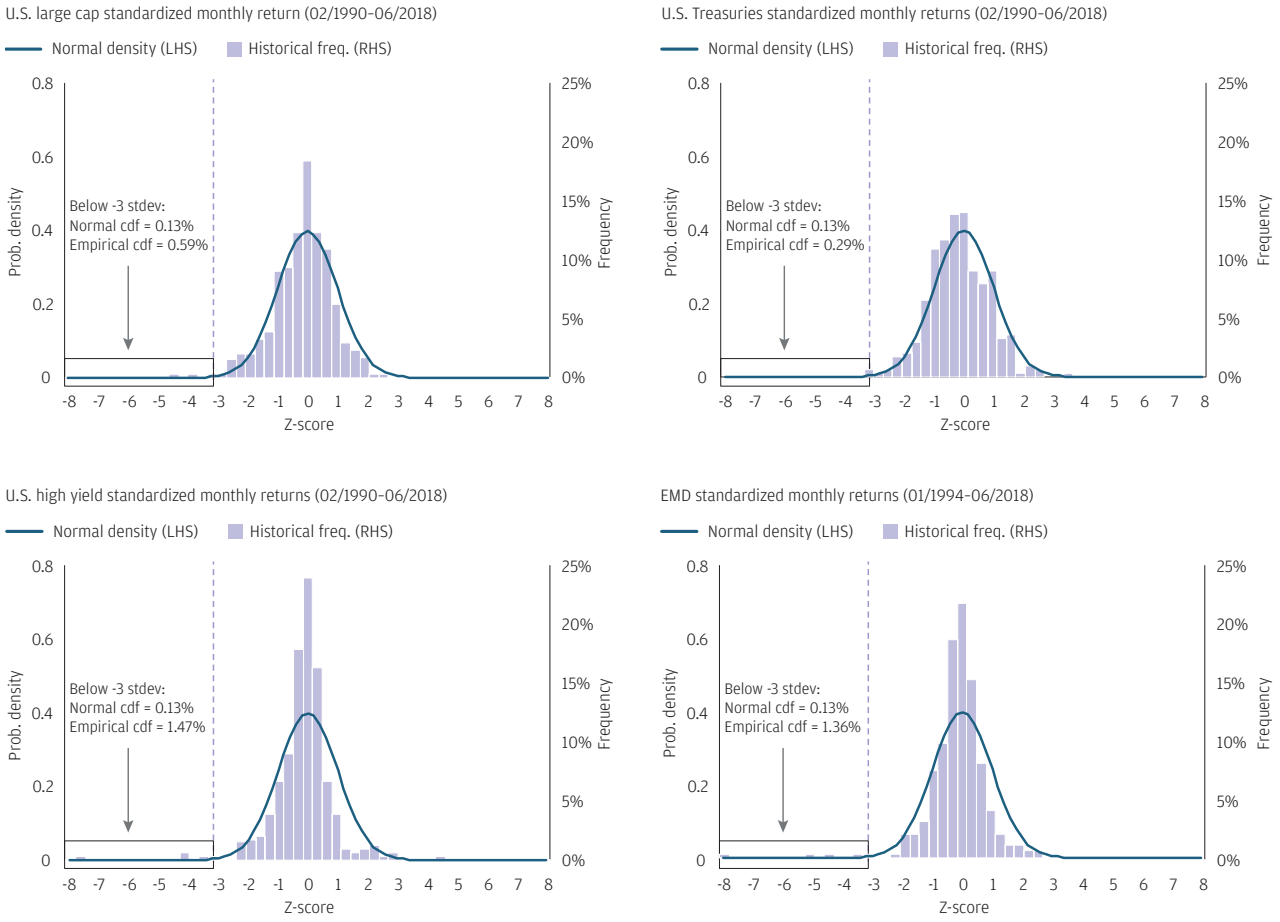
[3] In all, 341 observations. The exception is emerging market debt data, with a start date of January 1994 and 294 observations.

[4] Z-score is a measure of how many standard deviations a data point is above or below the mean.

[5] Sample period annual volatility: U.S. large cap 14.10%; U.S. high yield 7.96%; EMD 11.66%.

Probability of historical large left-tail events for risky financial assets is much higher than normal distribution would suggest

EXHIBIT 4: HISTOGRAM OF STANDARDIZED MONTHLY RETURN DISTRIBUTION VS. STANDARD NORMAL DISTRIBUTION



Source: Bloomberg, J.P. Morgan Asset Management. Monthly return data from February 1990 to June 2018; emerging market debt return data starts in January 1994.

introduced by J.P. Morgan in 1990, measures the maximum potential loss in value of an investment with a given probability, over a pre-set time horizon.[6] However, VaR was criticized as an inaccurate measure of downside exposure due to its inability to capture the true loss in the left tail during periods of significant financial market stress. Researchers therefore proposed CVaR as a more prudent and coherent measure of tail risk, which, by definition, is the average loss given that a loss below a certain probability has occurred.

For our analysis, we use a historical approach, simply based on the monthly return history for the same period, February 1990 to June 2018. In **Exhibit 5**, we look at VaR and CVaR in monthly returns at 95% and 99% confidence levels for each asset, along with their theoretical values, assuming normal distribution (shown in parentheses). Taking U.S. large cap as an example, there is a 5% chance of a loss greater than -6.3% in a month (VaR 95); a normal distribution would suggest a 5% probability of a loss greater than -5.8%. If a 5% left-tail event was to occur, the average loss (CVaR 95) would be -9.2% (vs. -7.5% assuming a normal distribution). VaR and CVaR for risky assets – U.S. large cap, high yield and EMD – are mostly lower than their corresponding normal values at both confidence levels. This indicates that the magnitude of left-tail risk for these assets is higher than their theoretical values. In contrast to risky assets, historical VaR and CVaR numbers for bonds (U.S. intermediate Treasuries) are close to the theoretical value, assuming normal distribution.

[6] "RiskMetrics – Technical Document, Fourth Edition," J.P. Morgan/Reuters, 1996.

The magnitude of left-tail risk for risk assets is historically higher than their theoretical values, assuming normal distribution

EXHIBIT 5: HISTORICAL VALUE AT RISK (VaR) AND CONDITIONAL VALUE AT RISK (CVaR) VALUES IN MONTHLY RETURNS, WITH THEIR THEORETICAL VALUES, ASSUMING NORMAL DISTRIBUTION (IN PARENTHESES)

	U.S. large cap	U.S. high yield	EMD	U.S. Treasuries
VaR 95	-6.3% (-5.8%)	-2.9% (-3.1%)	-4.2% (-4.8%)	-1.0% (-1.0%)
CVaR 95	-9.2% (-7.5%)	-5.3% (-4.0%)	-8.7% (-6.2%)	-1.5% (-1.4%)
VaR 99	-10.8% (-8.6%)	-7.8% (-4.6%)	-13.5% (-7.1%)	-1.9% (-1.6%)
CVaR 99	-14.0% (-10.0%)	-11.0% (-5.4%)	-21.0% (-8.2%)	-2.2% (-1.9%)

Source: J.P. Morgan Asset Management; historical estimates with monthly return data from February 1990 to June 2018.

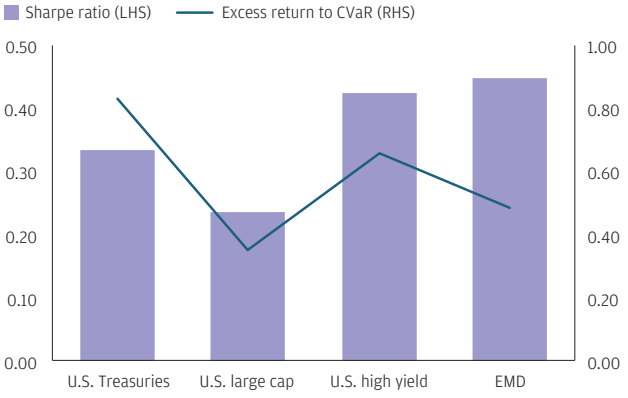
In short, historically both the probability and magnitude of left-tail risks for financial assets, especially risky assets such as equity and credit, are much higher than the normal distribution would suggest. Investors should be wary of the potential large losses associated with tail risks, something very difficult to capture in a single volatility metric in a traditional normal framework.

As **Exhibit 6** shows, the 2019 LTCMA Sharpe ratios of U.S. high yield and EMD are higher than the other two asset classes', suggesting an excellent return to risk. However, a more comprehensive picture using our CVaR analysis suggests otherwise: It finds U.S. Treasuries to be the best-compensated asset per unit of CVaR risk.

These are important considerations for portfolio construction. While a mean-variance framework is essential and useful, its assumptions inherently lead to an underestimation of the risks of holding fat-tail assets. The Sharpe ratio, one of the most referenced measures in the mean-variance framework, is therefore not a robust measure of risk-adjusted return for fat-tail assets or portfolios with large holdings of these assets. Investors can help protect their portfolios from the risk of left-tail events by using tail risk measures on a regular basis to monitor and forecast tail risks for their risky holdings. Investors may also consider expanding their portfolio construction objectives to include downside risk mitigation.

In determining which asset class offers the highest compensation per unit of risk, the winner changes depending on the risk measure used

EXHIBIT 6: 2019 LTCMA SHARPE RATIO VS. EXCESS RETURN TO CVaR RATIO



Source: J.P. Morgan Asset Management, September 30, 2018.

Sharpe ratio: (Total return-cash)/volatility. Excess return to CVaR ratio: (Total return -cash)/CVaR.

VOLATILITY AND CORRELATION ASSUMPTIONS METHODOLOGY

Long-term asset class volatilities and correlations tend to exhibit stability when measured over multiple cycles. As such, we use the following process in estimating long-term volatility and correlation assumptions for the main asset classes:

1. START WITH MONTHLY HISTORICAL RETURN DATA

- In prior estimates, we used 11 years of historical data as the anchor. This year, we increase the data window from 11 years to 12 years.

2. FILTER DATA OUTLIERS

- Extreme data outliers could bias volatility estimation and are filtered to improve robustness. This is done by winsorizing* historical raw data.
- For extreme data points above (or below) a 99.5% confidence level (or a 0.5% level of significance) for a normal distribution (or beyond 2.58 standard deviations from the mean), we adjust the return data by capping (or flooring) it at the 99.5% confidence level (or 0.5% level of significance).

3. CONSTRUCT ANCHOR MATRIX

- We leverage the historical experience to help anchor our forward-looking expectations, focusing on:
  - Simple historical return series (with each data point equally weighted)
  - Historical return series with each data point weighted by "relevance" (the expected frequency of stress vs. calm periods)**
- Variance-covariance matrix is calculated using the filtered data set.
  - Demean filtered data
    - After filtering the data, we demean each data point by the average of the full sample.
  - Calculate variance-covariance matrix
    - We multiply the weighted demeaned return time series matrix to calculate the covariance matrix.
    - Volatility and correlation are extracted from the covariance matrix. The monthly volatility is then annualized by the industry standard square root of 12 factor.

4. ADJUST FOR KEY THEMES AND STRUCTURAL CHANGES

- Key themes and structural changes that are expected over the forecast interval, such as those highlighted in this article, are reflected in the long-term risk forecast accordingly.

For alternative asset classes, serial correlations can be prevalent in illiquid and hard-to-price securities such as real estate. Because it is difficult to value the underlying assets at regular intervals, an investment manager must estimate fair prices, which are unobservable. This is typically done by updating lagged prices with changes in the economic environment. However, in our view, estimating using previous prices as an input artificially smooths returns, biasing risk estimates downward compared with the true economic risk. We correct for this bias by adjusting the returns from these hard-to-price assets for first-order serial correlation. We estimate the serial correlation coefficient using the same data window as we use for liquid assets, applying them to these illiquid assets' returns before calculating their anchoring volatility and correlations.

There are a few additional things to keep in mind. First, the standard deviation calculation is not subject to sequence risk. Thus, our assigned aggregate weighting of stress periods matters, but not the order of the data points or the continuity of the stress periods. Second, the weights are consistently applied to all the various currency matrices we publish. The forward-looking periods and the treatment of historical data are identical across regions and assets. Third, the volatility estimates capture the likely movement of the return around our central return forecasts. However, it does not incorporate distribution elements, such as the tail risk of the assets and other upper moments. It is particularly important for investors that hold assets known to have fat tails – such as high yield bonds, emerging market debt, convertible bonds, etc. – to account for risk aspects in addition to volatility.

* Winsorization applies a cap and a floor to extreme data values to remove the impact of potentially spurious outlier data on statistical results.

** We define stress periods based on NBER recession periods and assign them a long-run average probability of 15%. We apply these weights on a global basis.

TAIL-RISK ANALYSIS METHODOLOGY

1. RETURN STANDARDIZATION:

In Exhibit 4, we use standardized monthly returns instead of raw monthly returns. This provides us a comparable scale for tail risk behaviors in all four assets by removing the impact of the sample mean and volatility. For return X at month t for asset i, standardization is done by following

$$Z_{t,i} = \frac{X_{t,i} - \mu_i}{\sigma_i}$$

where μ_i is the sample mean and σ_i is the sample standard deviation of asset i *returns*. Therefore, if we assume X follows a normal distribution $X \sim N(\mu, \sigma^2)$, then Z follows a standard normal distribution $Z \sim N(0,1)$.

2. VALUE AT RISK (VaR) AND CONDITIONAL VALUE AT RISK (CVaR):

In mathematical terms, VaR is a quantile. VaR at confidence level α is defined as the risk level at α quantile (or return level at $1-\alpha$ quantile). The level α here is close to 1 in practice (typically 0.95 or 0.99). CVaR is the average loss of investment given that a loss is occurring at or below the α quantile risk level (or $1-\alpha$ quantile return level).

Historical VaR at α confidence level is the value of $1-\alpha$ percentile of monthly returns in the sample period, and historical CVaR at α confidence level is the average of all returns that are less than or equal to the α VaR—i.e., the average value of returns fall into the $(0, 1-\alpha]$ percentile range.

To calculate the theoretical VaR at α confidence level, one needs to first calculate the z-score (the number of standard deviations from the mean) of a standard normal distribution with a probability $1-\alpha$—i.e., to calculate the inverse cumulative standard normal distribution function value $\Phi^{-1}(1-\alpha)$. For example, a z-score of -1.64 corresponds to a cumulative probability of 5% in a standard normal distribution. One then translates the z-score back into the return form by multiplying the z-score by the standard deviation of the sample return series and adding the mean. Therefore, we have

$$\mathrm{VaR}_\alpha(X) = \mu + \sigma \cdot \Phi^{-1}(1-\alpha)$$

where $\Phi^{-1}(\cdot)$ is the inverse cumulative standard normal distribution function (so $\Phi^{-1}(1-\alpha)$ is the z-score evaluated at $1-\alpha$ probability), σ is the sample standard deviation, and μ is the sample mean.

Theoretical value for CVaR at α confidence level is calculated based on its corresponding VaR value. By definition, CVaR is expressed as

$$\mathrm{CVaR}_\alpha(X) = -E[X | X \le \mathrm{VaR}_\alpha(X)] = \frac{1}{1-\alpha} \int_\alpha^1 \mathrm{VaR}_\chi(X) d\chi.$$

Applying the VaR formula, we could derive a closed-form CVaR for normal distribution

$$\begin{aligned}
\mathrm{CVaR}_\alpha(X) &= \frac{1}{1-\alpha} \int_\alpha^1 (\sigma\phi^{-1}(1-\chi) + \mu) d\chi \\
&= \frac{\sigma}{1-\alpha} \int_\alpha^1 \phi^{-1}(1-\chi) d\chi + \mu \\
&= \frac{\sigma}{1-\alpha} (-\phi^1(\Phi^{-1}(\alpha))) + \mu \\
&= \mu - \frac{\sigma}{1-\alpha} \phi(\Phi^{-1}(\alpha))
\end{aligned}$$

where $\Phi(\cdot)$ is the standard normal density function. Given this, the theoretical value for CVaR at α confidence level could be easily calculated.*

* Jérémie Smaga, "Expected Shortfall Closed-Form for Normal Distribution," *Jérémie Smaga's Personal Blog*, November 6, 2016, http://blog.smaga.ch/expected-shortfall-closed-form-for-normal-distribution/.

III Assumptions matrices

HOW TO USE THE NUMBERS

Our assumptions can be used to:

- Develop or review a strategic asset allocation
- Understand the risk and return trade-offs across and within asset classes and regions
- Assess the risk characteristics of a strategic asset allocation
- Review relative value allocation decisions

The assumptions are not designed to inform short-term tactical allocation decisions. Our assumptions process is carefully calibrated and constructed to aid investors with strategic asset allocation or policy-level decisions over a 10- to 15-year investment horizon.

		Compound Return 2018 (%)	Annualized Volatility (%)	Arithmetic Return 2019 (%)	Compound Return 2019 (%)	U.S. Cash	U.S. Intermediate Treasuries	U.S. Long Treasuries	TIPS	U.S. Aggregate Bonds	U.S. Short Duration Government/ Credit	U.S. Long Duration Government/Credit	U.S. Inv Grade Corporate Bonds	U.S. Long Corporate Bonds	U.S. High Yield Bonds	U.S. Leveraged Loans	World Government Bonds hedged	World Government Bonds	World ex-U.S. Government Bonds hedged	World ex-U.S. Government Bonds	Emerging Markets Sovereign Debt	Emerging Markets Local Currency Debt	Emerging Markets Corporate Bonds	U.S. Muni 1-15 Yr Blend	U.S. Muni High Yield	U.S. Large Cap
FIXED INCOME	U.S. Cash	2.00	2.00	0.50	2.00	1.00																				
	U.S. Intermediate Treasuries	3.25	3.31	3.50	3.00	0.22	1.00																			
	U.S. Long Treasuries	3.25	3.83	11.00	2.50	0.04	0.80	1.00																		
	TIPS	3.25	3.38	5.25	2.75	0.07	0.65	0.56	1.00																	
	U.S. Aggregate Bonds	4.00	4.06	3.50	3.25	0.09	0.81	0.82	0.77	1.00																
	U.S. Short Duration Government/Credit	3.25	3.27	2.00	3.50	0.39	0.76	0.45	0.66	0.75	1.00															
	U.S. Long Duration Government/Credit	4.00	4.41	9.25	3.25	-0.01	0.68	0.90	0.65	0.91	0.51	1.00														
	U.S. Inv Grade Corporate Bonds	4.50	4.67	6.00	3.50	-0.05	0.42	0.50	0.64	0.82	0.61	0.79	1.00													
	U.S. Long Corporate Bonds	4.50	4.97	10.00	3.75	-0.07	0.40	0.61	0.57	0.81	0.47	0.88	0.96	1.00												
	U.S. High Yield Bonds	5.50	5.82	8.25	5.25	-0.11	-0.25	-0.23	0.31	0.20	0.15	0.12	0.57	0.46	1.00											
	U.S. Leveraged Loans	5.00	5.27	7.50	5.00	-0.15	-0.50	-0.42	0.05	-0.07	-0.10	-0.10	0.32	0.24	0.79	1.00										
	World Government Bonds hedged	2.75	2.84	3.00	2.50	0.10	0.84	0.86	0.52	0.80	0.58	0.79	0.51	0.55	-0.19	-0.43	1.00									
	World Government Bonds	2.75	3.04	6.25	2.50	0.12	0.64	0.50	0.64	0.68	0.65	0.58	0.56	0.53	0.17	-0.14	0.57	1.00								
	World ex-U.S. Government Bonds hedged	2.50	2.61	2.75	2.25	0.07	0.70	0.75	0.42	0.70	0.49	0.71	0.48	0.52	-0.15	-0.36	0.97	0.50	1.00							
	World ex-U.S. Government Bonds	2.75	2.96	8.00	2.25	0.10	0.53	0.38	0.59	0.59	0.59	0.49	0.53	0.49	0.23	-0.07	0.47	0.99	0.41	1.00						
	Emerging Markets Sovereign Debt	6.25	6.67	9.50	5.25	-0.03	0.23	0.21	0.57	0.60	0.47	0.51	0.77	0.68	0.71	0.39	0.29	0.54	0.28	0.56	1.00					
	Emerging Markets Local Currency Debt	6.75	7.44	12.25	6.25	0.10	0.15	0.06	0.45	0.40	0.39	0.32	0.55	0.48	0.60	0.29	0.14	0.60	0.13	0.65	0.81	1.00				
	Emerging Markets Corporate Bonds	6.00	6.32	8.25	5.25	-0.08	0.10	0.07	0.50	0.52	0.45	0.41	0.78	0.67	0.74	0.53	0.13	0.43	0.14	0.45	0.89	0.72	1.00			
	U.S. Muni 1-15 Yr Blend	3.25	3.29	3.00	2.50	0.03	0.47	0.49	0.53	0.66	0.47	0.57	0.58	0.53	0.26	0.10	0.52	0.40	0.47	0.35	0.51	0.25	0.39	1.00		
	U.S. Muni High Yield	4.50	4.72	6.75	4.50	-0.12	-0.01	0.10	0.32	0.30	0.08	0.26	0.40	0.33	0.43	0.54	0.10	0.08	0.12	0.08	0.42	0.21	0.38	0.58	1.00	
EQUITIES	U.S. Large Cap	5.25	6.03	13.75	5.50	-0.07	-0.31	-0.31	0.05	0.00	-0.05	-0.02	0.27	0.23	0.68	0.55	-0.25	0.14	-0.19	0.21	0.51	0.58	0.54	-0.01	0.19	1.00
	U.S. Mid Cap	5.75	6.79	15.75	5.75	-0.08	-0.33	-0.31	0.07	0.00	-0.05	-0.02	0.29	0.24	0.73	0.58	-0.26	0.11	-0.21	0.18	0.51	0.57	0.55	0.01	0.21	0.96
	U.S. Small Cap	6.00	7.47	18.25	5.75	-0.08	-0.36	-0.34	-0.02	-0.09	-0.11	-0.09	0.18	0.15	0.64	0.50	-0.29	0.03	-0.23	0.10	0.41	0.49	0.44	-0.07	0.09	0.90
	Euro Area Large Cap	7.00	9.03	21.50	6.75	0.02	-0.21	-0.26	0.14	0.08	0.11	0.03	0.36	0.29	0.69	0.49	-0.19	0.32	-0.15	0.39	0.61	0.69	0.60	0.04	0.16	0.85
	Japanese Equity	6.75	7.68	14.50	6.25	-0.09	-0.26	-0.19	0.11	0.07	0.03	0.09	0.38	0.34	0.60	0.46	-0.18	0.18	-0.14	0.24	0.48	0.56	0.54	-0.01	0.13	0.69
	Hong Kong Equity	6.75	8.50	20.00	6.50	0.03	-0.19	-0.20	0.20	0.16	0.16	0.10	0.47	0.39	0.68	0.54	-0.17	0.24	-0.14	0.30	0.64	0.68	0.67	0.14	0.29	0.68
	UK Large Cap	6.50	7.79	16.75	6.25	-0.02	-0.30	-0.32	0.12	0.05	0.04	0.01	0.38	0.31	0.72	0.62	-0.27	0.24	-0.22	0.32	0.59	0.64	0.62	0.04	0.28	0.85
	EAFE Equity hedged	6.50	7.41	13.50	6.25	-0.05	-0.39	-0.32	-0.03	-0.03	-0.08	-0.02	0.31	0.27	0.69	0.60	-0.27	-0.04	-0.19	0.02	0.51	0.52	0.56	-0.01	0.23	0.87
	EAFE Equity	6.75	7.94	16.75	6.25	-0.01	-0.25	-0.26	0.16	0.10	0.10	0.06	0.41	0.35	0.74	0.56	-0.21	0.31	-0.17	0.38	0.64	0.73	0.66	0.04	0.21	0.88
	Emerging Markets Equity	8.50	10.43	21.25	8.00	0.06	-0.19	-0.21	0.24	0.14	0.17	0.09	0.43	0.36	0.72	0.54	-0.17	0.33	-0.15	0.40	0.68	0.80	0.68	0.05	0.25	0.76
	AC Asia ex-Japan Equity	8.50	10.35	20.75	8.25	0.05	-0.18	-0.18	0.23	0.16	0.17	0.12	0.46	0.39	0.71	0.53	-0.14	0.30	-0.11	0.36	0.66	0.75	0.67	0.07	0.25	0.75
	AC World Equity	6.00	7.18	15.25	6.00	-0.02	-0.29	-0.29	0.13	0.06	0.05	0.03	0.37	0.32	0.75	0.58	-0.24	0.25	-0.19	0.33	0.62	0.71	0.64	0.02	0.22	0.95
	U.S. Equity Value Factor	6.00	7.04	15.00	-	-0.10	-0.32	-0.31	0.04	-0.02	-0.05	-0.04	0.26	0.22	0.69	0.54	-0.24	0.11	-0.19	0.18	0.49	0.56	0.52	-0.03	0.17	0.98
	U.S. Equity Momentum Factor	5.50	6.41	14.00	-	-0.06	-0.33	-0.31	0.08	-0.01	-0.06	-0.03	0.27	0.23	0.70	0.58	-0.28	0.11	-0.23	0.18	0.50	0.55	0.53	0.00	0.23	0.97
	U.S. Equity Quality Factor	5.25	5.98	12.50	-	-0.07	-0.28	-0.27	0.07	0.02	-0.03	0.00	0.28	0.24	0.67	0.52	-0.22	0.16	-0.16	0.22	0.52	0.59	0.54	0.01	0.18	0.99
	U.S. Equity Minimum Volatility Factor	5.50	6.07	11.00	-	-0.09	-0.21	-0.15	0.11	0.11	-0.01	0.10	0.34	0.31	0.67	0.51	-0.09	0.19	-0.03	0.25	0.56	0.60	0.53	0.10	0.24	0.93
	U.S. Equity Dividend Yield Factor	6.00	6.87	13.75	-	-0.08	-0.24	-0.19	0.13	0.11	0.01	0.09	0.36	0.32	0.72	0.56	-0.14	0.18	-0.09	0.24	0.57	0.61	0.58	0.11	0.26	0.95
	U.S. Equity Diversified Factor	5.50	6.23	12.50	-	-0.09	-0.29	-0.26	0.09	0.04	-0.03	0.02	0.31	0.27	0.71	0.56	-0.20	0.15	-0.14	0.21	0.54	0.59	0.56	0.05	0.22	0.98
	Global Convertible	5.50	5.92	9.50	5.00	-0.05	-0.32	-0.30	0.13	0.08	0.08	0.04	0.45	0.36	0.81	0.67	-0.23	0.12	-0.17	0.19	0.63	0.60	0.70	0.08	0.30	0.86
	Global Credit Sensitive Convertible	4.75	4.94	6.25	4.25	-0.07	-0.13	-0.20	-0.01	-0.02	-0.04	0.01	0.17	0.17	0.27	0.33	-0.10	0.08	-0.06	0.11	0.17	0.21	0.26	-0.03	0.21	0.36
ALTERNATIVES	Private Equity	8.25	10.20	21.00	7.25	0.06	-0.53	-0.56	0.07	-0.27	-0.18	-0.34	0.19	0.02	0.69	0.66	-0.52	-0.07	-0.46	0.03	0.54	0.56	0.64	-0.08	0.44	0.74
	U.S. Core Real Estate*	5.75	6.45	12.25	5.25	-0.07	-0.41	-0.32	0.06	-0.21	-0.30	-0.21	0.09	0.01	0.54	0.64	-0.38	-0.23	-0.35	-0.19	0.35	0.30	0.46	-0.23	0.57	0.56
	U.S. Value-Added Real Estate*	7.75	9.53	20.00	6.50	-0.07	-0.41	-0.32	0.06	-0.21	-0.30	-0.21	0.09	0.01	0.54	0.64	-0.38	-0.23	-0.35	-0.19	0.35	0.30	0.46	-0.23	0.57	0.56
	European ex-UK Core Real Estate*	6.50	7.74	16.50	5.75	0.03	-0.58	-0.55	0.08	-0.34	-0.26	-0.37	0.12	-0.03	0.64	0.66	-0.58	-0.08	-0.54	0.03	0.43	0.44	0.55	-0.18	0.46	0.61
	Asia Pacific Core Real Estate*	6.00	6.91	14.00	5.50	0.07	-0.38	-0.32	0.31	-0.06	-0.12	-0.12	0.30	0.18	0.72	0.76	-0.38	0.02	-0.35	0.10	0.59	0.47	0.66	0.07	0.71	0.64
	U.S. REITs	6.25	7.35	15.50	6.25	-0.07	0.00	0.06	0.22	0.29	0.10	0.27	0.44	0.42	0.61	0.35	0.11	0.29	0.13	0.31	0.55	0.57	0.46	0.22	0.24	0.72
	Global Infrastructure Equity	6.00	6.64	11.75	6.25	-0.03	-0.20	-0.22	0.32	0.05	0.09	-0.01	0.40	0.26	0.50	0.46	-0.23	0.25	-0.23	0.31	0.51	0.43	0.55	0.12	0.30	0.40
	Global Infrastructure Debt	4.75	4.95	6.50	4.25	-0.06	0.44	0.55	0.67	0.81	0.58	0.78	0.92	0.88	0.47	0.31	0.53	0.48	0.50	0.43	0.66	0.38	0.67	0.62	0.44	0.08
	Diversified Hedge Funds	4.25	4.52	7.50	4.25	0.07	-0.41	-0.36	0.06	-0.10	-0.08	-0.09	0.22	0.17	0.59	0.64	-0.36	-0.04	-0.30	0.03	0.35	0.38	0.42	-0.06	0.36	0.66
	Event Driven Hedge Funds	4.75	5.13	9.00	4.75	-0.02	-0.45	-0.46	0.05	-0.11	-0.06	-0.14	0.27	0.19	0.76	0.76	-0.42	0.02	-0.36	0.10	0.46	0.51	0.57	-0.06	0.37	0.79
	Long Bias Hedge Funds	4.75	5.32	11.00	4.75	-0.01	-0.41	-0.43	0.08	-0.07	-0.02	-0.11	0.30	0.22	0.74	0.66	-0.39	0.11	-0.33	0.19	0.52	0.60	0.60	-0.07	0.28	0.86
	Relative Value Hedge Funds	4.50	4.73	7.00	4.50	-0.03	-0.40	-0.38	0.16	0.02	0.03	-0.04	0.40	0.30	0.83	0.85	-0.35	0.01	-0.30	0.08	0.55	0.52	0.63	0.07	0.49	0.68
	Macro Hedge Funds	3.75	4.06	8.00	3.75	0.16	0.11	0.10	0.26	0.19	0.26	0.19	0.27	0.25	0.17	0.06	0.16	0.31	0.17	0.32	0.23	0.31	0.21	0.10	0.13	0.23
	Direct Lending*	7.25	8.14	14.00	7.00	-0.08	0.29	0.37	0.60	0.74	0.54	0.70	0.97	0.91	0.68	0.47	0.39	0.48	0.38	0.46	0.78	0.56	0.81	0.57	0.45	0.31
	Commodities*	2.25	3.50	16.25	3.75	0.08	-0.11	-0.23	0.27	0.05	0.17	-0.01	0.24	0.17	0.45	0.37	-0.24	0.34	-0.26	0.40	0.37	0.51	0.41	-0.09	0.12	0.44
	Gold*	2.50	4.02	18.00	4.00	0.07	0.37	0.27	0.49	0.41	0.41	0.32	0.37	0.30	0.11	-0.08	0.25	0.53	0.19	0.52	0.36	0.40	0.33	0.25	0.10	-0.02

U.S. DOLLAR ASSUMPTIONS

Note: All estimates on this page are in U.S. dollar terms. Given the complex risk-reward trade-offs involved, we advise clients to rely on judgment as well as quantitative optimization approaches in setting strategic allocations to all of these asset classes and strategies. Please note that all information shown is based on qualitative analysis. Exclusive reliance on this information is not advised. This information is not intended as a recommendation to invest in any particular asset class or strategy or as a promise of future performance. Note that these asset class and strategy assumptions are passive only-they do not consider the impact of active management. References to future returns are not promises or even estimates of actual returns a client portfolio may achieve. Assumptions, opinions and estimates are provided for illustrative purposes only. They should not be relied upon as recommendations to buy or sell securities. Forecasts of financial market trends that are based on current market conditions constitute our judgment and are subject to change without notice. We believe the information provided here is reliable, but do not warrant its accuracy or completeness. This material has been prepared for information purposes only and is not intended to provide, and should not be relied on for, accounting, legal or tax advice.

Source: J.P. Morgan Asset Management; as of September 30, 2018. Alternative asset classes (including hedge funds, private equity, real estate, direct lending and infrastructure) are unlike other asset categories shown above in that there is no underlying investible index. The return estimates for these alternative asset classes and strategies are estimates of the industry average, net of manager fees. The dispersion of return among managers of these asset classes and strategies is typically significantly wider than that of traditional asset classes. *Not directly comparable to 2018 assumptions. See strategy class discussion for details. U.S. Long Treasuries reflect the 10 years plus sector of the market instead of the 20 years plus sector in prior years. Return estimates for factor assets are based on the JPMorgan Factor Index Suite, taking into account long-term factor return assumptions, adjustments for factor richness/cheapness, and the underlying market exposure. Correlation figures shown are rounded to two significant figures, which may cause a loss of information. Correlations of value-added and core real estate in their local currencies are identical since value-added local returns are scaled versions of their corresponding core real estate local returns. All returns are nominal. *For reference index information, please visit our website.*

	U.S. Mid Cap	U.S. Small Cap	Euro Area Large Cap	Japanese Equity	Hong Kong Equity	UK Large Cap	EAFE Equity hedged	EAFE Equity	Emerging Markets Equity	AC Asia ex-Japan Equity	AC World Equity	U.S. Equity Value Factor	U.S. Equity Momentum Factor	U.S. Equity Quality Factor	U.S. Equity Minimum Volatility Factor	U.S. Equity Dividend Yield Factor	U.S. Equity Diversified Factor	Global Convertible	Global Credit Sensitive Convertible	Private Equity	U.S. Core Real Estate*	U.S. Value-Added Real Estate*	European ex-UK Core Real Estate*	Asia Pacific Core Real Estate*	U.S. REITs	Global Infrastructure Equity	Global Infrastructure Debt	Diversified Hedge Funds	Event Driven Hedge Funds	Long Bias Hedge Funds	Relative Value Hedge Funds	Macro Hedge Funds	Direct Lending*	Commodities*	Gold*
U.S. Mid Cap	1.00																																	
U.S. Small Cap	0.95	1.00																																
Euro Area Large Cap	0.82	0.74	1.00																															
Japanese Equity	0.68	0.60	0.71	1.00																														
Hong Kong Equity	0.67	0.56	0.72	0.63	1.00																													
UK Large Cap	0.82	0.72	0.90	0.70	0.76	1.00																												
EAFE Equity hedged	0.85	0.77	0.87	0.79	0.72	0.87	1.00																											
EAFE Equity	0.86	0.76	0.97	0.82	0.79	0.95	0.91	1.00																										
Emerging Markets Equity	0.76	0.66	0.82	0.67	0.87	0.82	0.75	0.87	1.00																									
AC Asia ex-Japan Equity	0.74	0.65	0.80	0.66	0.91	0.79	0.75	0.85	0.98	1.00																								
AC World Equity	0.93	0.84	0.93	0.77	0.80	0.93	0.91	0.97	0.89	0.87	1.00																							
U.S. Equity Value Factor	0.97	0.92	0.82	0.67	0.63	0.81	0.85	0.85	0.72	0.71	0.92	1.00																						
U.S. Equity Momentum Factor	0.97	0.90	0.82	0.67	0.70	0.83	0.86	0.86	0.78	0.77	0.94	0.93	1.00																					
U.S. Equity Quality Factor	0.96	0.91	0.83	0.66	0.67	0.83	0.85	0.86	0.75	0.73	0.94	0.97	0.97	1.00																				
U.S. Equity Minimum Volatility Factor	0.92	0.86	0.77	0.61	0.62	0.77	0.80	0.81	0.69	0.68	0.88	0.93	0.92	0.95	1.00																			
U.S. Equity Dividend Yield Factor	0.95	0.89	0.79	0.64	0.64	0.81	0.83	0.83	0.73	0.70	0.90	0.96	0.92	0.96	0.97	1.00																		
U.S. Equity Diversified Factor	0.98	0.91	0.82	0.67	0.67	0.82	0.85	0.86	0.75	0.73	0.93	0.97	0.97	0.98	0.97	0.97	1.00																	
Global Convertible	0.88	0.78	0.86	0.74	0.79	0.86	0.89	0.89	0.84	0.84	0.91	0.84	0.87	0.84	0.78	0.82	0.85	1.00																
Global Credit Sensitive Convertible	0.33	0.28	0.38	0.30	0.31	0.43	0.40	0.40	0.29	0.28	0.39	0.31	0.35	0.33	0.29	0.31	0.32	0.38	1.00															
Private Equity	0.76	0.69	0.75	0.53	0.74	0.82	0.71	0.78	0.83	0.79	0.80	0.70	0.76	0.72	0.64	0.67	0.73	0.80	0.28	1.00														
U.S. Core Real Estate*	0.57	0.54	0.39	0.41	0.37	0.52	0.48	0.46	0.44	0.42	0.52	0.57	0.54	0.54	0.59	0.57	0.57	0.42	0.32	0.49	1.00													
U.S. Value-Added Real Estate*	0.57	0.54	0.39	0.41	0.37	0.52	0.48	0.46	0.44	0.42	0.52	0.57	0.54	0.54	0.59	0.57	0.57	0.42	0.32	0.49	1.00	1.00												
European ex-UK Core Real Estate*	0.65	0.56	0.68	0.51	0.55	0.77	0.60	0.71	0.71	0.65	0.70	0.58	0.64	0.60	0.51	0.57	0.61	0.70	0.23	0.86	0.56	0.56	1.00											
Asia Pacific Core Real Estate*	0.67	0.56	0.61	0.45	0.58	0.71	0.57	0.65	0.68	0.64	0.68	0.61	0.67	0.62	0.64	0.68	0.66	0.63	0.36	0.60	0.73	0.73	0.69	1.00										
U.S. REITs	0.76	0.73	0.63	0.51	0.47	0.58	0.62	0.65	0.54	0.54	0.69	0.75	0.70	0.74	0.81	0.81	0.76	0.61	0.17	0.44	0.65	0.65	0.40	0.66	1.00									
Global Infrastructure Equity	0.40	0.27	0.49	0.41	0.57	0.57	0.35	0.53	0.59	0.55	0.51	0.32	0.43	0.36	0.26	0.32	0.36	0.51	0.10	0.59	0.32	0.32	0.61	0.41	0.21	1.00								
Global Infrastructure Debt	0.11	0.00	0.15	0.19	0.32	0.20	0.13	0.21	0.26	0.29	0.17	0.08	0.10	0.10	0.18	0.19	0.14	0.29	0.09	0.27	0.27	0.27	0.26	0.50	0.25	0.38	1.00							
Diversified Hedge Funds	0.68	0.57	0.65	0.60	0.63	0.73	0.73	0.71	0.69	0.66	0.73	0.61	0.73	0.64	0.57	0.59	0.65	0.78	0.41	0.81	0.50	0.50	0.74	0.65	0.32	0.49	0.15	1.00						
Event Driven Hedge Funds	0.82	0.75	0.75	0.65	0.68	0.83	0.80	0.81	0.77	0.74	0.84	0.78	0.81	0.77	0.69	0.75	0.78	0.86	0.50	0.81	0.59	0.59	0.75	0.70	0.50	0.43	0.15	0.87	1.00					
Long Bias Hedge Funds	0.88	0.80	0.83	0.73	0.81	0.87	0.85	0.89	0.88	0.86	0.93	0.83	0.90	0.84	0.75	0.80	0.85	0.92	0.40	0.83	0.48	0.48	0.72	0.65	0.53	0.52	0.13	0.87	0.93	1.00				
Relative Value Hedge Funds	0.71	0.61	0.67	0.62	0.71	0.77	0.74	0.75	0.75	0.72	0.76	0.67	0.71	0.65	0.62	0.67	0.68	0.84	0.42	0.79	0.59	0.59	0.72	0.74	0.43	0.49	0.33	0.84	0.92	0.86	1.00			
Macro Hedge Funds	0.22	0.12	0.29	0.25	0.29	0.32	0.24	0.33	0.38	0.35	0.32	0.17	0.28	0.24	0.22	0.21	0.23	0.32	0.13	0.28	-0.09	-0.09	0.20	0.06	0.14	0.25	0.22	0.56	0.30	0.38	0.30	1.00		
Direct Lending*	0.35	0.24	0.38	0.40	0.52	0.42	0.35	0.45	0.48	0.50	0.42	0.31	0.33	0.32	0.38	0.41	0.36	0.52	0.18	0.38	0.35	0.35	0.33	0.56	0.45	0.45	0.93	0.30	0.37	0.38	0.52	0.25	1.00	
Commodities*	0.46	0.37	0.47	0.35	0.48	0.59	0.34	0.53	0.60	0.52	0.54	0.40	0.48	0.42	0.36	0.42	0.42	0.47	0.27	0.61	0.41	0.41	0.62	0.62	0.24	0.55	0.13	0.53	0.57	0.61	0.54	0.42	0.26	1.00
Gold*	0.00	-0.05	0.07	-0.01	0.23	0.10	-0.13	0.09	0.24	0.19	0.08	-0.04	0.02	0.01	0.02	0.02	0.00	0.09	0.00	0.09	-0.03	-0.03	0.03	0.21	0.05	0.20	0.37	0.11	0.06	0.14	0.09	0.41	0.34	0.45	1.00

		Compound Return 2018 (%)	Annualized Volatility (%)	Arithmetic Return 2019 (%)	Compound Return 2019 (%)	Euro Cash	U.S. Aggregate Bonds hedged	Euro Aggregate Bonds	U.S. Inv Grade Corporate Bonds hedged	Euro Inv Grade Corp Bonds	U.S. High Yield Bonds hedged	European High Yield Bonds	U.S. Leveraged Loans hedged	Euro Government Bonds	Euro Govt Inflation-Linked	World Government Bonds hedged	World Government Bonds	World ex-Euro Government Bonds hedged	World ex-Euro Government Bonds	Emerging Markets Sovereign Debt hedged	Emerging Markets Local Currency Debt	Emerging Markets Corporate Bonds hedged	European Large Cap
FIXED INCOME	Euro Cash	1.00	1.00	0.50	1.25	1.00																	
	U.S. Aggregate Bonds hedged	3.00	3.07	3.75	2.50	0.18	1.00																
	Euro Aggregate Bonds	2.25	2.32	3.75	1.75	0.08	0.64	1.00															
	U.S. Inv Grade Corporate Bonds hedged	3.50	3.67	6.00	2.75	0.07	0.83	0.57	1.00														
	Euro Inv Grade Corp Bonds	2.50	2.60	4.50	2.00	-0.06	0.53	0.71	0.78	1.00													
	U.S. High Yield Bonds hedged	4.50	4.82	8.25	4.50	-0.08	0.19	0.04	0.56	0.57	1.00												
	European High Yield Bonds	4.00	4.39	9.00	3.50	-0.19	0.06	0.11	0.47	0.66	0.87	1.00											
	U.S. Leveraged Loans hedged	4.00	4.32	8.25	4.25	-0.20	-0.06	-0.12	0.32	0.43	0.81	0.88	1.00										
	Euro Government Bonds	2.00	2.08	4.00	1.50	0.09	0.59	0.97	0.45	0.56	-0.10	-0.05	-0.26	1.00									
	Euro Govt Inflation-Linked	2.00	2.11	4.75	1.50	0.08	0.55	0.76	0.58	0.66	0.32	0.29	0.08	0.72	1.00								
	World Government Bonds hedged	1.75	1.85	3.00	1.75	0.19	0.81	0.83	0.52	0.39	-0.19	-0.26	-0.41	0.86	0.58	1.00							
	World Government Bonds	1.75	2.11	7.25	1.50	0.13	0.33	0.46	0.13	0.11	-0.36	-0.29	-0.31	0.47	0.14	0.56	1.00						
	World ex-Euro Government Bonds hedged	1.75	1.73	3.00	1.75	0.24	0.83	0.60	0.49	0.22	-0.24	-0.37	-0.45	0.63	0.39	0.94	0.53	1.00					
	World ex-Euro Government Bonds	1.75	2.26	10.00	1.50	0.11	0.24	0.30	0.05	0.02	-0.36	-0.30	-0.27	0.31	0.01	0.44	0.98	0.44	1.00				
	Emerging Markets Sovereign Debt hedged	5.25	5.67	9.50	4.50	0.07	0.60	0.40	0.77	0.66	0.71	0.56	0.40	0.28	0.55	0.29	-0.19	0.24	-0.26	1.00			
	Emerging Markets Local Currency Debt	5.75	6.13	9.00	5.25	0.09	0.33	0.34	0.46	0.51	0.40	0.37	0.29	0.26	0.39	0.23	0.27	0.15	0.24	0.55	1.00		
	Emerging Markets Corporate Bonds hedged	5.00	5.32	8.25	4.50	0.05	0.51	0.33	0.78	0.72	0.73	0.67	0.53	0.18	0.46	0.14	-0.21	0.09	-0.27	0.89	0.51	1.00	
EQUITIES	European Large Cap	5.75	6.62	14.00	5.50	-0.26	-0.02	0.04	0.31	0.48	0.67	0.74	0.63	-0.06	0.27	-0.25	-0.31	-0.34	-0.32	0.47	0.42	0.52	1.00
	European Small Cap	6.00	7.25	15.75	5.75	-0.26	-0.04	-0.01	0.30	0.45	0.69	0.73	0.61	-0.11	0.24	-0.28	-0.44	-0.35	-0.44	0.48	0.27	0.54	0.89
	U.S. Large Cap	4.25	4.98	13.25	4.50	-0.29	-0.13	0.02	0.10	0.33	0.45	0.52	0.51	-0.06	0.12	-0.23	0.03	-0.32	0.05	0.18	0.45	0.27	0.77
	U.S. Large Cap hedged	4.25	5.04	13.75	4.75	-0.25	-0.01	-0.03	0.26	0.39	0.67	0.61	0.53	-0.11	0.22	-0.25	-0.52	-0.31	-0.54	0.50	0.27	0.53	0.82
	Euro Area Large Cap	6.00	7.19	16.25	5.75	-0.24	-0.02	0.04	0.29	0.44	0.66	0.70	0.56	-0.04	0.30	-0.23	-0.40	-0.32	-0.42	0.49	0.35	0.52	0.97
	Euro area Small Cap	6.25	7.57	17.00	6.00	-0.26	-0.03	0.01	0.30	0.45	0.67	0.73	0.61	-0.08	0.27	-0.27	-0.42	-0.35	-0.43	0.47	0.30	0.54	0.90
	UK Large Cap	5.50	6.42	14.00	5.25	-0.26	-0.05	0.02	0.29	0.47	0.62	0.72	0.66	-0.09	0.18	-0.28	-0.17	-0.37	-0.16	0.38	0.44	0.47	0.93
	UK Large Cap hedged	5.00	5.83	13.25	5.00	-0.19	0.11	0.07	0.38	0.44	0.64	0.58	0.50	-0.02	0.28	-0.12	-0.38	-0.17	-0.41	0.57	0.35	0.57	0.85
	Japanese Equity	5.75	6.62	14.00	5.25	-0.23	-0.06	0.06	0.21	0.35	0.37	0.44	0.41	-0.02	0.16	-0.18	0.12	-0.27	0.13	0.15	0.46	0.26	0.60
	Japanese Equity hedged	5.75	7.16	17.75	5.75	-0.06	-0.17	-0.10	0.12	0.26	0.47	0.49	0.45	-0.15	0.16	-0.35	-0.52	-0.43	-0.54	0.27	0.24	0.35	0.67
	Emerging Markets Equity	7.50	8.75	17.00	7.00	-0.12	0.06	0.04	0.38	0.48	0.67	0.68	0.61	-0.07	0.27	-0.20	-0.24	-0.27	-0.25	0.55	0.62	0.59	0.75
	AC Asia ex-Japan Equity	7.50	8.79	17.25	7.25	-0.13	0.08	0.10	0.40	0.49	0.63	0.65	0.56	-0.01	0.28	-0.14	-0.15	-0.22	-0.17	0.50	0.60	0.56	0.73
	AC World Equity	5.00	5.84	12.50	5.00	-0.27	-0.06	0.04	0.26	0.46	0.62	0.68	0.62	-0.07	0.22	-0.25	-0.11	-0.35	-0.11	0.37	0.53	0.46	0.91
	AC World ex-EMU Equity	5.00	5.76	12.50	5.00	-0.27	-0.07	0.04	0.24	0.44	0.59	0.66	0.62	-0.07	0.20	-0.25	-0.06	-0.35	-0.05	0.34	0.54	0.44	0.87
	Developed World Equity	4.75	5.54	12.50	5.00	-0.29	-0.08	0.03	0.22	0.43	0.59	0.66	0.61	-0.06	0.20	-0.26	-0.09	-0.35	-0.09	0.33	0.49	0.42	0.90
	Global Convertible hedged	4.50	4.93	9.50	4.25	-0.14	0.07	0.05	0.44	0.53	0.81	0.78	0.67	-0.07	0.31	-0.25	-0.50	-0.33	-0.52	0.62	0.34	0.70	0.84
	Global Credit Sensitive Convertible hedged	3.75	3.94	6.25	3.50	-0.30	-0.03	0.09	0.18	0.33	0.27	0.39	0.31	0.01	0.07	-0.11	-0.19	-0.16	-0.21	0.18	0.10	0.27	0.42
ALTERNATIVES	Private Equity	7.25	9.21	21.00	6.25	-0.37	-0.36	-0.32	0.04	0.17	0.59	0.57	0.63	-0.41	-0.07	-0.53	-0.28	-0.53	-0.24	0.38	0.38	0.51	0.68
	U.S. Core Real Estate*	4.75	5.54	13.00	4.25	-0.49	-0.16	-0.19	0.04	0.14	0.42	0.41	0.54	-0.25	-0.05	-0.29	0.04	-0.28	0.08	0.26	0.45	0.36	0.46
	European ex-UK Core Real Estate*	5.50	6.23	12.50	4.75	-0.47	-0.43	-0.38	-0.06	0.03	0.52	0.49	0.63	-0.43	-0.14	-0.58	-0.26	-0.60	-0.22	0.25	0.22	0.39	0.55
	European ex-UK Value-Added Real Estate*	8.00	9.78	20.00	6.50	-0.47	-0.43	-0.38	-0.06	0.03	0.52	0.49	0.63	-0.43	-0.14	-0.58	-0.26	-0.60	-0.22	0.25	0.22	0.39	0.55
	U.S. REITs	5.25	6.26	14.75	5.25	-0.19	0.22	0.22	0.33	0.40	0.45	0.40	0.33	0.17	0.33	0.14	0.15	0.07	0.13	0.33	0.52	0.28	0.56
	Global ex-U.S. REITs	5.50	6.83	17.00	7.00	-0.32	0.14	0.23	0.38	0.53	0.58	0.62	0.46	0.14	0.35	0.00	-0.15	-0.10	-0.19	0.47	0.37	0.44	0.76
	Global Infrastructure Equity	5.00	5.67	12.00	5.25	-0.34	0.02	-0.08	0.23	0.13	0.32	0.30	0.38	-0.13	0.05	-0.17	0.07	-0.18	0.08	0.27	0.18	0.33	0.25
	Diversified Hedge Funds hedged	3.25	3.52	7.50	3.50	-0.17	-0.11	-0.11	0.22	0.34	0.60	0.67	0.64	-0.21	0.13	-0.37	-0.45	-0.41	-0.44	0.36	0.22	0.44	0.72
	Event Driven Hedge Funds hedged	3.75	4.14	9.00	4.00	-0.21	-0.12	-0.13	0.26	0.42	0.77	0.79	0.75	-0.26	0.15	-0.43	-0.54	-0.47	-0.53	0.46	0.27	0.57	0.78
	Long Bias Hedge Funds hedged	3.75	4.33	11.00	4.00	-0.19	-0.09	-0.14	0.29	0.38	0.74	0.71	0.66	-0.25	0.17	-0.40	-0.60	-0.44	-0.60	0.51	0.27	0.59	0.79
	Relative Value Hedge Funds hedged	3.50	3.74	7.00	3.75	-0.11	0.02	-0.05	0.40	0.50	0.84	0.86	0.85	-0.19	0.21	-0.35	-0.43	-0.40	-0.42	0.55	0.38	0.64	0.73
	Macro Hedge Funds hedged	2.75	3.06	8.00	3.00	0.18	0.19	0.19	0.28	0.21	0.16	0.15	0.06	0.16	0.27	0.16	-0.04	0.15	-0.08	0.24	0.14	0.21	0.23
	Commodities*	1.25	2.16	13.75	2.75	-0.08	-0.05	-0.17	0.13	0.13	0.32	0.29	0.37	-0.23	0.05	-0.25	-0.05	-0.22	-0.01	0.14	0.28	0.24	0.29
	Gold*	1.50	2.92	17.25	3.00	0.16	0.32	0.18	0.24	0.12	-0.09	-0.11	-0.13	0.15	0.05	0.28	0.43	0.33	0.44	0.10	0.32	0.11	-0.20

EURO ASSUMPTIONS

Note: All estimates on this page are in euro terms. Given the complex risk-reward trade-offs involved, we advise clients to rely on judgment as well as quantitative optimization approaches in setting strategic allocations to all of these asset classes and strategies. Please note that all information shown is based on qualitative analysis. Exclusive reliance on this information is not advised. This information is not intended as a recommendation to invest in any particular asset class or strategy or as a promise of future performance. Note that these asset class and strategy assumptions are passive only-they do not consider the impact of active management. References to future returns are not promises or even estimates of actual returns a client portfolio may achieve. Assumptions, opinions and estimates are provided for illustrative purposes only. They should not be relied upon as recommendations to buy or sell securities. Forecasts of financial market trends that are based on current market conditions constitute our judgment and are subject to change without notice. We believe the information provided here is reliable, but do not warrant its accuracy or completeness. This material has been prepared for information purposes only and is not intended to provide, and should not be relied on for, accounting, legal or tax advice.

Source: J.P. Morgan Asset Management; as of September 30, 2018. Alternative asset classes (including hedge funds, private equity, real estate, direct lending and infrastructure) are unlike other asset categories shown above in that there is no underlying investible index. The return estimates for these alternative asset classes and strategies are estimates of the industry average, net of manager fees. The dispersion of return among managers of these asset classes and strategies is typically significantly wider than that of traditional asset classes. *Not directly comparable to 2018 assumptions. See strategy class discussion for details. Correlation figures shown are rounded to two significant figures, which may cause a loss of information. Correlations of value-added and core real estate in their local currencies are identical since value-added local returns are scaled versions of their corresponding core real estate local returns. All returns are nominal. *For reference index information, please visit our website.*

European Small Cap	U.S. Large Cap	U.S. Large Cap hedged	Euro Area Large Cap	Euro area Small Cap	UK Large Cap	UK Large Cap hedged	Japanese Equity	Japanese Equity hedged	Emerging Markets Equity	AC Asia ex-Japan Equity	AC World Equity	AC World ex-EMU Equity	Developed World Equity	Global Convertible hedged	Global Credit Sensitive Convertible hedged	Private Equity	U.S. Core Real Estate*	European ex-UK Core Real Estate*	European ex-UK Value-Added Real Estate*	U.S. REITs	Global ex-U.S. REITs	Global Infrastructure Equity	Diversified Hedge Funds hedged	Event Driven Hedge Funds hedged	Long Bias Hedge Funds hedged	Relative Value Hedge Funds hedged	Macro Hedge Funds hedged	Commodities*	Gold*
1.00																													
0.62	1.00																												
0.80	0.72	1.00																											
0.89	0.68	0.83	1.00																										
0.98	0.60	0.77	0.92	1.00																									
0.78	0.79	0.71	0.82	0.77	1.00																								
0.82	0.61	0.82	0.84	0.79	0.79	1.00																							
0.47	0.66	0.38	0.52	0.49	0.64	0.40	1.00																						
0.62	0.51	0.63	0.67	0.62	0.60	0.55	0.70	1.00																					
0.71	0.61	0.67	0.71	0.71	0.72	0.68	0.52	0.55	1.00																				
0.67	0.63	0.62	0.67	0.67	0.71	0.63	0.55	0.53	0.97	1.00																			
0.78	0.94	0.80	0.83	0.78	0.91	0.75	0.72	0.65	0.80	0.80	1.00																		
0.74	0.95	0.76	0.78	0.73	0.89	0.71	0.73	0.62	0.79	0.80	1.00	1.00																	
0.77	0.96	0.79	0.83	0.76	0.90	0.74	0.73	0.64	0.74	0.74	1.00	0.99	1.00																
0.87	0.59	0.85	0.85	0.86	0.75	0.81	0.46	0.68	0.79	0.75	0.77	0.74	0.74	1.00															
0.39	0.23	0.36	0.40	0.41	0.39	0.37	0.19	0.23	0.28	0.25	0.33	0.31	0.32	0.38	1.00														
0.62	0.69	0.60	0.60	0.58	0.74	0.49	0.47	0.51	0.75	0.73	0.75	0.75	0.73	0.65	0.11	1.00													
0.36	0.62	0.42	0.36	0.34	0.55	0.23	0.48	0.33	0.44	0.43	0.58	0.60	0.59	0.28	0.20	0.54	1.00												
0.50	0.56	0.43	0.47	0.50	0.65	0.31	0.47	0.48	0.58	0.54	0.61	0.62	0.60	0.52	0.03	0.82	0.65	1.00											
0.50	0.56	0.43	0.47	0.50	0.65	0.31	0.47	0.48	0.58	0.54	0.61	0.62	0.60	0.52	0.03	0.82	0.65	1.00	1.00										
0.46	0.70	0.54	0.51	0.45	0.53	0.51	0.45	0.29	0.43	0.44	0.66	0.66	0.67	0.43	0.10	0.40	0.68	0.36	0.36	1.00									
0.74	0.56	0.62	0.73	0.73	0.69	0.65	0.42	0.42	0.50	0.49	0.66	0.62	0.66	0.62	0.33	0.48	0.48	0.46	0.46	0.66	1.00								
0.14	0.33	0.15	0.16	0.13	0.36	0.05	0.38	0.21	0.39	0.38	0.36	0.38	0.34	0.25	-0.13	0.48	0.43	0.50	0.50	0.15	0.13	1.00							
0.76	0.51	0.66	0.68	0.76	0.69	0.62	0.43	0.62	0.70	0.64	0.68	0.66	0.65	0.78	0.40	0.72	0.38	0.62	0.62	0.21	0.47	0.32	1.00						
0.83	0.56	0.79	0.75	0.82	0.73	0.71	0.41	0.62	0.73	0.67	0.73	0.70	0.70	0.87	0.49	0.68	0.44	0.59	0.59	0.34	0.56	0.20	0.87	1.00					
0.84	0.55	0.86	0.78	0.83	0.71	0.75	0.41	0.67	0.80	0.74	0.74	0.71	0.70	0.92	0.40	0.65	0.32	0.50	0.50	0.32	0.53	0.22	0.87	0.93	1.00				
0.74	0.50	0.66	0.68	0.74	0.71	0.64	0.44	0.59	0.75	0.69	0.69	0.67	0.65	0.84	0.41	0.70	0.47	0.61	0.61	0.31	0.52	0.33	0.84	0.92	0.85	1.00			
0.24	0.04	0.21	0.22	0.26	0.21	0.30	0.07	0.14	0.31	0.26	0.18	0.16	0.15	0.30	0.12	0.12	-0.18	0.02	0.02	0.01	0.12	0.06	0.55	0.28	0.37	0.28	1.00		
0.21	0.29	0.22	0.18	0.20	0.43	0.27	0.20	0.14	0.43	0.37	0.38	0.40	0.35	0.29	0.17	0.51	0.44	0.51	0.51	0.13	0.15	0.40	0.44	0.42	0.40	0.45	0.31	1.00	
-0.23	-0.10	-0.29	-0.27	-0.23	-0.07	-0.15	-0.08	-0.36	0.03	0.03	-0.10	-0.06	-0.12	-0.14	-0.10	0.03	0.12	-0.02	-0.02	-0.01	-0.15	0.17	-0.03	-0.15	-0.13	-0.06	0.29	0.37	1.00

		Compound Return 2018 (%)	Annualized Volatility (%)	Arithmetic Return 2019 (%)	Compound Return 2019 (%)	UK Cash	U.S. Aggregate Bonds hedged	Euro Aggregate Bonds hedged	U.S. Inv Grade Corporate Bonds hedged	Euro Inv Grade Corp Bonds hedged	UK Inv Grade Corporate Bonds	U.S. High Yield Bonds hedged	European High Yield Bonds hedged	U.S. Leveraged Loans hedged	Euro Government Bonds hedged	UK Gilts	UK Inflation-Linked Bonds	World Government Bonds hedged	World Government Bonds	World ex-UK Government Bonds hedged	World ex-UK Government Bonds	Emerging Markets Sovereign Debt hedged	Emerging Markets Local Currency Debt	Emerging Markets Corporate Bonds hedged
FIXED INCOME	UK Cash	1.75	1.75	0.75	1.75	1.00																		
	U.S. Aggregate Bonds hedged	3.75	3.82	3.75	3.00	0.18	1.00																	
	Euro Aggregate Bonds hedged	3.00	3.07	3.75	2.25	0.07	0.64	1.00																
	U.S. Inv Grade Corporate Bonds hedged	4.25	4.41	5.75	3.25	0.05	0.83	0.57	1.00															
	Euro Inv Grade Corp Bonds hedged	3.25	3.35	4.50	2.50	-0.08	0.52	0.71	0.77	1.00														
	UK Inv Grade Corporate Bonds	3.00	3.27	7.50	2.50	-0.14	0.58	0.55	0.75	0.77	1.00													
	U.S. High Yield Bonds hedged	5.25	5.57	8.25	5.00	-0.10	0.19	0.04	0.55	0.55	0.43	1.00												
	European High Yield Bonds hedged	4.75	5.11	8.75	4.00	-0.19	0.07	0.10	0.48	0.64	0.48	0.89	1.00											
	U.S. Leveraged Loans hedged	4.75	5.02	7.50	4.75	-0.23	-0.08	-0.14	0.30	0.41	0.33	0.78	0.86	1.00										
	Euro Government Bonds hedged	2.75	2.83	4.00	2.00	0.09	0.59	0.97	0.45	0.56	0.44	-0.10	-0.05	-0.27	1.00									
	UK Gilts	1.25	1.46	6.50	1.00	0.09	0.68	0.57	0.43	0.26	0.57	-0.19	-0.25	-0.35	0.59	1.00								
	UK Inflation-Linked Bonds	1.25	1.62	8.75	0.50	-0.02	0.56	0.34	0.43	0.26	0.52	0.18	0.07	0.03	0.31	0.70	1.00							
	World Government Bonds hedged	2.50	2.62	3.00	2.25	0.20	0.81	0.83	0.52	0.39	0.44	-0.18	-0.25	-0.42	0.86	0.82	0.52	1.00						
	World Government Bonds	2.25	2.54	9.25	1.75	0.23	0.48	0.42	0.19	0.00	0.13	-0.34	-0.42	-0.53	0.48	0.63	0.40	0.68	1.00					
	World ex-UK Government Bonds hedged	2.75	2.77	2.75	2.25	0.21	0.81	0.84	0.52	0.40	0.41	-0.18	-0.24	-0.42	0.87	0.77	0.48	1.00	0.67	1.00				
	World ex-UK Government Bonds	2.25	2.67	9.50	1.75	0.23	0.46	0.41	0.18	-0.01	0.11	-0.34	-0.42	-0.53	0.47	0.60	0.38	0.67	1.00	0.66	1.00			
	Emerging Markets Sovereign Debt hedged	6.00	6.42	9.50	5.00	0.06	0.60	0.40	0.77	0.66	0.56	0.71	0.59	0.37	0.29	0.22	0.32	0.30	0.04	0.30	0.04	1.00		
	Emerging Markets Local Currency Debt	6.00	6.56	11.00	5.50	0.18	0.46	0.33	0.46	0.37	0.37	0.30	0.19	0.02	0.30	0.32	0.38	0.37	0.49	0.37	0.49	0.64	1.00	
	Emerging Markets Corporate Bonds hedged	5.75	6.05	8.00	5.00	0.04	0.52	0.33	0.78	0.71	0.57	0.73	0.68	0.51	0.18	0.09	0.23	0.15	-0.08	0.15	-0.08	0.89	0.53	1.00
EQUITIES	UK All Cap	5.75	6.53	13.00	5.50	-0.15	0.09	0.05	0.38	0.44	0.45	0.66	0.65	0.51	-0.04	-0.06	0.16	-0.14	-0.12	-0.15	-0.12	0.57	0.47	0.58
	UK Large Cap	5.75	6.57	13.25	5.50	-0.14	0.11	0.06	0.38	0.44	0.45	0.65	0.62	0.50	-0.02	-0.04	0.18	-0.12	-0.09	-0.13	-0.09	0.57	0.49	0.57
	UK Small Cap	6.00	7.10	15.50	5.75	-0.21	-0.01	-0.01	0.29	0.42	0.37	0.64	0.66	0.54	-0.11	-0.14	0.05	-0.23	-0.28	-0.24	-0.28	0.47	0.27	0.52
	U.S. Large Cap	4.50	5.23	13.25	4.75	-0.17	0.06	0.07	0.20	0.28	0.30	0.46	0.39	0.31	0.03	0.07	0.25	-0.03	0.15	-0.05	0.15	0.37	0.54	0.36
	U.S. Large Cap hedged	5.00	5.79	13.75	5.25	-0.21	-0.02	-0.04	0.25	0.38	0.31	0.68	0.64	0.54	-0.12	-0.21	0.04	-0.25	-0.34	-0.25	-0.34	0.50	0.32	0.52
	Euro Area Large Cap	6.25	7.78	18.50	6.00	-0.08	0.12	0.06	0.33	0.36	0.39	0.61	0.58	0.39	0.01	-0.04	0.18	-0.08	-0.02	-0.08	-0.02	0.58	0.54	0.55
	Euro Area Large Cap hedged	6.75	7.93	16.25	6.25	-0.19	-0.02	0.03	0.29	0.44	0.40	0.66	0.70	0.57	-0.05	-0.19	0.05	-0.24	-0.36	-0.24	-0.36	0.48	0.28	0.52
	Euro area Small Cap	6.50	8.22	19.50	6.25	-0.12	0.10	0.04	0.34	0.36	0.38	0.62	0.61	0.42	-0.02	-0.08	0.15	-0.11	-0.03	-0.11	-0.03	0.56	0.50	0.56
	Euro area Small Cap hedged	7.00	8.35	17.25	6.50	-0.23	-0.04	0.00	0.29	0.44	0.40	0.67	0.74	0.61	-0.09	-0.23	0.02	-0.27	-0.36	-0.27	-0.36	0.46	0.24	0.53
	Japanese Equity	6.00	6.78	13.25	5.50	-0.13	0.10	0.11	0.30	0.32	0.32	0.38	0.32	0.24	0.06	0.03	0.23	-0.01	0.12	-0.02	0.12	0.33	0.47	0.36
	Japanese Equity hedged	6.50	7.94	18.00	6.25	-0.21	-0.20	-0.10	0.11	0.28	0.21	0.49	0.51	0.47	-0.16	-0.33	-0.05	-0.38	-0.54	-0.37	-0.54	0.26	0.10	0.35
	AC Asia ex-Japan Equity	7.75	9.19	18.25	7.50	-0.02	0.21	0.12	0.44	0.43	0.37	0.61	0.54	0.39	0.05	0.04	0.21	0.00	0.03	0.00	0.03	0.62	0.65	0.60
	Emerging Markets Equity	7.75	9.22	18.50	7.25	-0.01	0.19	0.08	0.42	0.40	0.35	0.64	0.56	0.42	0.00	0.01	0.22	-0.04	0.01	-0.04	0.02	0.65	0.69	0.62
	AC World Equity	5.25	6.18	13.25	5.25	-0.12	0.12	0.08	0.34	0.38	0.39	0.60	0.53	0.39	0.02	0.03	0.25	-0.05	0.08	-0.06	0.08	0.55	0.63	0.53
	AC World ex-UK Equity	5.25	6.16	13.25	5.25	-0.12	0.12	0.08	0.33	0.37	0.38	0.59	0.52	0.38	0.02	0.03	0.26	-0.04	0.10	-0.05	0.10	0.54	0.64	0.52
	Developed World Equity	5.00	5.85	13.00	5.25	-0.14	0.11	0.08	0.31	0.36	0.38	0.58	0.51	0.38	0.02	0.03	0.25	-0.05	0.09	-0.06	0.09	0.51	0.60	0.50
	Global Convertible hedged	5.25	5.65	9.25	4.75	-0.11	0.07	0.04	0.43	0.52	0.39	0.81	0.79	0.65	-0.07	-0.22	0.03	-0.24	-0.38	-0.24	-0.38	0.62	0.32	0.69
	Global Credit Sensitive Convertible hedged	4.50	4.69	6.25	4.00	-0.27	-0.05	0.08	0.16	0.32	0.34	0.25	0.38	0.32	0.00	-0.16	-0.09	-0.13	-0.16	-0.12	-0.16	0.16	0.06	0.25
ALTERNATIVES	Private Equity	7.50	9.37	20.50	6.50	-0.25	-0.29	-0.22	0.04	0.20	0.22	0.47	0.44	0.43	-0.30	-0.30	0.10	-0.39	-0.30	-0.39	-0.29	0.34	0.13	0.42
	U.S. Core Real Estate*	5.00	5.73	12.50	4.50	-0.52	-0.21	-0.18	-0.03	0.16	0.27	0.42	0.37	0.53	-0.25	-0.24	0.16	-0.29	-0.47	-0.29	-0.48	0.25	-0.16	0.35
	European ex-UK Core Real Estate*	5.75	6.72	14.50	5.00	-0.38	-0.41	-0.30	-0.10	0.02	0.01	0.38	0.33	0.42	-0.33	-0.45	0.03	-0.47	-0.36	-0.47	-0.36	0.16	-0.12	0.27
	European ex-UK Value-Added Real Estate*	8.25	10.47	22.50	6.75	-0.45	-0.46	-0.36	-0.12	0.02	0.01	0.46	0.40	0.53	-0.40	-0.51	0.00	-0.55	-0.53	-0.55	-0.53	0.20	-0.27	0.33
	UK Core Real Estate*	5.00	6.11	15.50	4.75	-0.46	-0.39	-0.35	-0.12	-0.01	-0.04	0.44	0.37	0.56	-0.38	-0.46	-0.11	-0.50	-0.71	-0.49	-0.72	0.16	-0.51	0.30
	U.S. REITs	5.50	6.75	16.50	5.50	-0.13	0.30	0.22	0.36	0.34	0.43	0.46	0.34	0.22	0.19	0.27	0.39	0.22	0.23	0.21	0.23	0.43	0.55	0.32
	European REITs	6.00	7.56	18.50	7.25	-0.17	0.24	0.23	0.39	0.46	0.50	0.55	0.51	0.30	0.18	0.12	0.24	0.11	0.02	0.11	0.01	0.55	0.46	0.46
	Global Infrastructure Equity	5.25	5.70	9.75	5.50	-0.11	0.23	0.14	0.28	0.12	0.18	-0.02	-0.04	-0.07	0.13	0.23	0.35	0.15	0.23	0.14	0.23	0.12	0.13	0.08
	Diversified Hedge Funds hedged	4.00	4.27	7.50	4.00	-0.14	-0.12	-0.11	0.20	0.33	0.30	0.58	0.66	0.64	-0.21	-0.30	0.01	-0.37	-0.50	-0.37	-0.50	0.34	0.09	0.41
	Event Driven Hedge Funds hedged	4.50	4.88	9.00	4.50	-0.19	-0.13	-0.14	0.24	0.41	0.32	0.76	0.79	0.75	-0.26	-0.37	-0.03	-0.43	-0.52	-0.43	-0.51	0.45	0.18	0.55
	Long Bias Hedge Funds hedged	4.50	5.07	11.00	4.50	-0.15	-0.09	-0.15	0.27	0.38	0.29	0.73	0.73	0.65	-0.25	-0.34	-0.03	-0.40	-0.48	-0.40	-0.48	0.50	0.25	0.58
	Relative Value Hedge Funds hedged	4.25	4.48	7.00	4.25	-0.13	0.00	-0.06	0.38	0.49	0.39	0.83	0.85	0.84	-0.20	-0.33	0.04	-0.35	-0.51	-0.34	-0.51	0.54	0.20	0.62
	Macro Hedge Funds hedged	3.50	3.81	8.00	3.50	0.20	0.19	0.20	0.27	0.21	0.25	0.15	0.16	0.04	0.16	0.15	0.18	0.17	0.09	0.17	0.09	0.23	0.21	0.20
	Commodities*	1.50	2.48	14.25	3.00	0.02	0.11	-0.12	0.19	0.08	0.09	0.29	0.17	0.19	-0.15	-0.06	0.17	-0.08	0.11	-0.08	0.12	0.29	0.40	0.30
	Gold*	1.75	3.37	18.50	3.25	0.18	0.44	0.20	0.29	0.08	0.14	-0.06	-0.17	-0.26	0.20	0.39	0.29	0.40	0.51	0.39	0.51	0.23	0.44	0.16

STERLING ASSUMPTIONS

Note: All estimates on this page are in sterling terms. Given the complex risk-reward trade-offs involved, we advise clients to rely on judgment as well as quantitative optimization approaches in setting strategic allocations to all of these asset classes and strategies. Please note that all information shown is based on qualitative analysis. Exclusive reliance on this information is not advised. This information is not intended as a recommendation to invest in any particular asset class or strategy or as a promise of future performance. Note that these asset class and strategy assumptions are passive only-they do not consider the impact of active management. References to future returns are not promises or even estimates of actual returns a client portfolio may achieve. Assumptions, opinions and estimates are provided for illustrative purposes only. They should not be relied upon as recommendations to buy or sell securities. Forecasts of financial market trends that are based on current market conditions constitute our judgment and are subject to change without notice. We believe the information provided here is reliable, but do not warrant its accuracy or completeness. This material has been prepared for information purposes only and is not intended to provide, and should not be relied on for, accounting, legal or tax advice.

Source: J.P. Morgan Asset Management; as of September 30, 2018. Alternative asset classes (including hedge funds, private equity, real estate, direct lending and infrastructure) are unlike other asset categories shown above in that there is no underlying investible index. The return estimates for these alternative asset classes and strategies are estimates of the industry average, net of manager fees. The dispersion of return among managers of these asset classes and strategies is typically significantly wider than that of traditional asset classes. *Not directly comparable to 2018 assumptions. See strategy class discussion for details. Correlation figures shown are rounded to two significant figures, which may cause a loss of information. Correlations of value-added and core real estate in their local currencies are identical since value-added local returns are scaled versions of their corresponding core real estate local returns. All returns are nominal. *For reference index information, please visit our website.*

	UK All Cap	UK Large Cap	UK Small Cap	U.S. Large Cap	U.S. Large Cap hedged	Euro Area Large Cap	Euro Area Large Cap hedged	Euro area Small Cap	Euro area Small Cap hedged	Japanese Equity	Japanese Equity hedged	AC Asia ex-Japan Equity	Emerging Markets Equity	AC World Equity	AC World ex-UK Equity	Developed World Equity	Global Convertible hedged	Global Credit Sensitive Convertible hedged	Private Equity	U.S. Core Real Estate*	European ex-UK Core Real Estate*	European ex-UK Value-Added Real Estate*	UK Core Real Estate*	U.S. REITs	European REITs	Global Infrastructure Equity	Diversified Hedge Funds hedged	Event Driven Hedge Funds hedged	Long Bias Hedge Funds hedged	Relative Value Hedge Funds hedged	Macro Hedge Funds hedged	Commodities*	Gold*
UK All Cap	1.00																																
UK Large Cap	0.99	1.00																															
UK Small Cap	0.85	0.80	1.00																														
U.S. Large Cap	0.77	0.78	0.62	1.00																													
U.S. Large Cap hedged	0.83	0.81	0.74	0.78	1.00																												
Euro Area Large Cap	0.88	0.87	0.75	0.75	0.79	1.00																											
Euro Area Large Cap hedged	0.85	0.83	0.78	0.65	0.83	0.87	1.00																										
Euro area Small Cap	0.85	0.82	0.83	0.69	0.74	0.94	0.80	1.00																									
Euro area Small Cap hedged	0.83	0.79	0.88	0.58	0.77	0.81	0.92	0.88	1.00																								
Japanese Equity	0.58	0.59	0.46	0.63	0.47	0.58	0.51	0.55	0.50	1.00																							
Japanese Equity hedged	0.59	0.57	0.59	0.44	0.65	0.56	0.69	0.52	0.65	0.69	1.00																						
AC Asia ex-Japan Equity	0.73	0.73	0.61	0.66	0.65	0.73	0.62	0.73	0.63	0.55	0.45	1.00																					
Emerging Markets Equity	0.76	0.76	0.63	0.67	0.68	0.76	0.63	0.76	0.65	0.54	0.45	0.97	1.00																				
AC World Equity	0.89	0.89	0.73	0.94	0.83	0.89	0.77	0.84	0.73	0.70	0.55	0.83	0.84	1.00																			
AC World ex-UK Equity	0.88	0.88	0.72	0.94	0.82	0.88	0.76	0.84	0.71	0.71	0.54	0.83	0.84	1.00	1.00																		
Developed World Equity	0.89	0.89	0.72	0.96	0.83	0.88	0.77	0.83	0.72	0.71	0.55	0.77	0.79	1.00	0.99	1.00																	
Global Convertible hedged	0.84	0.81	0.82	0.62	0.85	0.80	0.85	0.80	0.86	0.51	0.69	0.74	0.76	0.78	0.76	0.75	1.00																
Global Credit Sensitive Convertible hedged	0.36	0.36	0.30	0.19	0.35	0.31	0.39	0.29	0.39	0.18	0.26	0.18	0.20	0.26	0.24	0.26	0.36	1.00															
Private Equity	0.66	0.64	0.63	0.58	0.60	0.56	0.56	0.56	0.54	0.29	0.43	0.64	0.69	0.66	0.65	0.64	0.64	0.34	1.00														
U.S. Core Real Estate*	0.31	0.29	0.34	0.36	0.47	0.13	0.36	0.17	0.35	0.12	0.36	0.16	0.21	0.30	0.29	0.30	0.28	0.34	0.26	1.00													
European ex-UK Core Real Estate*	0.48	0.47	0.48	0.34	0.42	0.39	0.40	0.46	0.46	0.21	0.40	0.32	0.42	0.42	0.41	0.41	0.49	0.29	0.71	0.36	1.00												
European ex-UK Value-Added Real Estate*	0.46	0.44	0.50	0.31	0.46	0.32	0.45	0.41	0.51	0.16	0.48	0.31	0.40	0.38	0.37	0.37	0.53	0.22	0.69	0.48	0.97	1.00											
UK Core Real Estate*	0.19	0.17	0.30	0.10	0.35	-0.04	0.35	0.05	0.36	-0.03	0.43	0.09	0.14	0.09	0.08	0.08	0.38	-0.03	0.33	0.60	0.53	0.71	1.00										
U.S. REITs	0.58	0.59	0.45	0.75	0.56	0.58	0.47	0.54	0.43	0.47	0.24	0.51	0.51	0.72	0.72	0.73	0.43	0.05	0.26	0.58	0.20	0.20	0.15	1.00									
European REITs	0.71	0.69	0.68	0.57	0.62	0.75	0.67	0.73	0.65	0.39	0.37	0.50	0.51	0.65	0.65	0.66	0.60	0.25	0.36	0.33	0.37	0.33	0.06	0.68	1.00								
Global Infrastructure Equity	0.06	0.07	-0.03	0.05	-0.05	0.04	-0.09	-0.01	-0.12	0.18	-0.02	0.12	0.16	0.10	0.11	0.09	0.05	0.07	0.20	-0.10	0.13	0.05	-0.21	-0.11	-0.05	1.00							
Diversified Hedge Funds hedged	0.64	0.62	0.68	0.40	0.66	0.54	0.68	0.60	0.76	0.36	0.62	0.53	0.57	0.54	0.53	0.52	0.77	0.41	0.66	0.39	0.56	0.63	0.48	0.15	0.34	0.05	1.00						
Event Driven Hedge Funds hedged	0.73	0.71	0.76	0.50	0.79	0.64	0.75	0.69	0.82	0.38	0.64	0.59	0.64	0.64	0.63	0.62	0.86	0.49	0.65	0.47	0.57	0.62	0.47	0.31	0.47	-0.06	0.87	1.00					
Long Bias Hedge Funds hedged	0.78	0.75	0.77	0.55	0.86	0.72	0.79	0.75	0.83	0.44	0.68	0.71	0.76	0.72	0.71	0.69	0.92	0.40	0.65	0.33	0.48	0.52	0.36	0.33	0.48	0.02	0.87	0.93	1.00				
Relative Value Hedge Funds hedged	0.66	0.64	0.68	0.39	0.67	0.55	0.69	0.60	0.74	0.36	0.60	0.58	0.62	0.55	0.54	0.53	0.83	0.42	0.60	0.47	0.50	0.58	0.50	0.26	0.41	0.00	0.84	0.92	0.85	1.00			
Macro Hedge Funds hedged	0.29	0.30	0.19	0.13	0.21	0.25	0.21	0.27	0.24	0.16	0.10	0.30	0.34	0.25	0.25	0.23	0.30	0.12	0.31	-0.17	0.22	0.14	-0.14	0.06	0.13	0.30	0.54	0.28	0.36	0.28	1.00		
Commodities*	0.39	0.41	0.23	0.32	0.27	0.30	0.14	0.32	0.17	0.18	0.05	0.40	0.48	0.41	0.40	0.38	0.30	0.15	0.36	0.20	0.35	0.31	0.09	0.21	0.17	0.22	0.34	0.36	0.40	0.35	0.36	1.00	
Gold*	-0.03	-0.01	-0.13	0.01	-0.22	-0.05	-0.27	-0.01	-0.22	-0.02	-0.41	0.14	0.16	0.04	0.05	0.02	-0.11	-0.13	-0.12	-0.27	-0.25	-0.34	-0.42	0.10	-0.03	0.18	-0.10	-0.18	-0.12	-0.13	0.33	0.44	1.00

IV Appendix

GLOSSARY

ACTUAL INDIVIDUAL CONSUMPTION (also called household actual final consumption) As defined by the OECD, the sum total of household final consumption expenditure, non-profit institutions serving households final consumption expenditure and government expenditure on individual consumption of goods and services.

CONDITIONAL VALUE-AT-RISK (CVaR): A risk metric that evaluates the average of the worst outcomes of investment returns at and below a specified risk level (typically at 0.95 or 0.99 quantile of possible losses) given that a loss at or below this risk level occurs. CVaR is also known as expected shortfall.

CUMULATIVE DISTRIBUTION FUNCTION (CDF) In statistics, a function whose value is the probability that a random variable will take a distribution function value less than or equal to a specified value. In financial risk management, CDF value typically measures the probability of a loss event below a specified percentile would occur.

FACTORS Characteristics that describe the risk of a group of securities or financial instruments. Exposure to a factor based on an economic rationale should reward (or compensate) an investor. Equity factors include, for example, momentum, quality, size and value.

FALLEN ANGEL A bond previously rated investment grade, currently at junk bond status.

FAT TAIL A distribution in which, compared with a simple normal distribution, the probability of a negative return is more frequent and more sizable.

G7 (THE GROUP OF SEVEN) A group of seven highly industrialized democracies — Canada, France, Germany, Italy, Japan, the UK and the U.S. — that have consulted to coordinate economic, security, and energy policy.

G10 (THE GROUP OF 10) Eleven industrial countries (Belgium, Canada, France, Germany, Italy, Japan, the Netherlands, Sweden, Switzerland, the UK and the U.S.) that consult and cooperate on economic, monetary and financial matters.

HUMAN CAPITAL DEVELOPMENT Adding to labor force skills, knowledge, creativity or leadership, through training or education, which improves workforce innovation and productivity.

ILLIQUIDITY The state of an asset that cannot readily be sold or exchanged for cash without a substantial loss in value. Investors demand an illiquidity premium, or extra return, for holding an asset, such as private equity or real estate, that is less liquid than another. (Liquidity is the state of an asset that is readily convertible to cash.)

LEFT-TAIL RISK A tail is the tapering at the far ends of a distribution curve representing least likely outcomes; left-tail risk is the low probability risk that the value of an asset (or portfolio of assets) moves more than three standard deviations from its current value. Managing downside, or left tail, risk has become a major focus for portfolio risk managers.

MEAN-REVERSION In financial theory, the concept that asset prices, or other indicators, eventually return to their long-run mean or average.

MEAN-VARIANCE OPTIMIZATION In portfolio theory, a mathematical tool for constructing portfolios with the maximum expected return (mean) for a given variance (or standard deviation of returns), or the minimum variance of return for a given mean (expected return). Simply put, considering the trade-off between risk and expected returns to achieve the optimal combination.

NON-ACCELERATING INFLATION RATE OF UNEMPLOYMENT (NAIRU) The unemployment rate at which the inflation rate stabilizes and will not increase. Graphed as the level of unemployment at the prevailing long-run Phillips curve.

PRIMARY BALANCE Government net borrowing or net lending, excluding interest payments on consolidated government liabilities.

PRIMARY SURPLUS The component of the fiscal surplus made up of government spending on programs, less income from tax revenues, excluding interest payments on debt.

TAIL RISK A concept that describes the risk of more severe downside price action than upside price action, such that assets can suffer more severe repricing during periods of stress than may be implied by a simple normal distribution. Market returns of financial assets tend to follow a heavy tailed distribution in relation to normal distribution, so that extreme outcomes occur more than expected.

TOTAL FACTOR PRODUCTIVITY (TFP) Productivity growth that is not explained by capital stock accumulation or the labor force (increased hours worked) but rather captures the efficiency or intensity with which inputs are utilized. A residual that likely reflects technological change.

VALUE-AT-RISK (VaR) A risk measure introduced by J.P. Morgan in 1990 that defines risk as potential investment loss with a given probability over a pre-set time horizon. In mathematical terms, the VaR metric is defined as the possible loss at a quantile, a point with a specified probability of greater losses, typically set at 0.95 or 0.99 by firms and regulators in financial industry.

WINSORIZATION Applies a cap and a floor to extreme data values to remove the impact of potentially spurious outlier data on statistical results.

Z-SCORE A measure of how many standard deviations a data point is above or below the mean.

LTCMA ACKNOWLEDGMENTS

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The *Long-Term Capital Market Assumptions Team and Committee* are grateful to many investment experts throughout the J.P. Morgan network whose input has been incorporated into the 2019 edition, including: Madhur Ambastha, Richard Biebel, Ivan Chan, Michael Cembalest, Marcella Chow, Charles Conrath, Maddi Dessner, James Elliot, Dave Esrig, Jeff Geller, Michael Gubenko, Roger Hallam, Josh Helfat, Jason Ko, Stephen Magyera, Mark Richards, Katherine Rosa, Gabriela Santos, Katy Thorneycroft, Courtney Mee, Meena Gandhi, Robert Michele, Shrenick Shah, Kenneth Tsang, Antony Vallee, Chester Barnes, Spenser Lerner, Karim Hassouna, Stephen Leh, Yazann Romahi, Garrett Norman, Livia Wu, Joe Staines.

We also want to express our utmost appreciation and gratitude to Global Insights and the Investment Writing team, Jill Hamburg-Coplan, Barbara Heubel, Nicola Owen, Barbara Rudolph and Melissa Wiegand; and Global Creative Services for design, Mark Virgo and Jamie Lonie.

PORTFOLIO INSIGHTS

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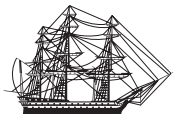

Vanguard®

Vanguard economic and market outlook for 2019: Down but not out

Vanguard Research

December 2018

- As the global economy enters its tenth year of expansion following the global financial crisis, concerns are growing that a recession may be imminent. Although several factors will raise the risk of recession in 2019, a slowdown in growth—led by the United States and China—with periodic "growth scares" is the most likely outcome. In short, economic growth should shift down but not out.

- Previous Vanguard outlooks anticipated that the secular forces of globalization and technological disruption would make achieving 2% inflation in the United States, Europe, Japan, and elsewhere more difficult. In 2018, we rightly anticipated a cyclical firming in core inflation across various economies. In 2019, we do not see a material risk of further strong rises in core inflation despite lower unemployment rates and higher wages. This is because higher wages are not likely to funnel through to higher consumer prices, as inflation expectations remain well-anchored.

- As inflation moves toward target, financial stability risks rise, and unemployment rates continue to approach or drop below estimates of full employment, global central banks will stay on their gradual normalization paths. In the United States, we still expect the Federal Reserve to reach terminal rate for this cycle in the summer of 2019, bringing the policy rate range to 2.75%–3% before halting further increases in the face of nonaccelerating inflation and decelerating top-line growth. Other developed-market central banks, though, will only begin to lift interest rates from postcrisis lows.

- With slowing growth, disparate rates of inflation, and continued policy normalization, volatility in financial markets is likely to accelerate. Long term, our ten-year outlook for investment returns remains guarded, given the backdrop of high valuations and depressed risk-free rates across major markets.

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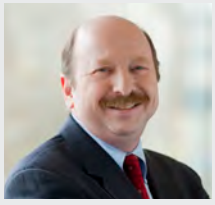

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Editorial note

This publication is an update of Vanguard's annual economic and market outlook for 2019 for key economies around the globe. Aided by Vanguard Capital Markets Model® simulations and other research, we also forecast future performance for a broad array of fixed income and equity asset classes.

Acknowledgments

We thank Kristen M. Storti, Donald B. Foote III, and Andrew S. Clarke, CFA, for their significant contributions to this piece and acknowledge the work of the Global Economics and Capital Markets Outlook Team. Further, we would like to acknowledge the work of Vanguard's broader Investment Strategy Group, without whose tireless research efforts this piece would not be possible.

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Notes on asset-return distributions

The asset-return distributions shown here represent Vanguard's view on the potential range of risk premiums that may occur over the next ten years; such long-term projections are not intended to be extrapolated into a short-term view. These potential outcomes for long-term investment returns are generated by the Vanguard Capital Markets Model® (VCMM) and reflect the collective perspective of our Investment Strategy Group. The expected risk premiums—and the uncertainty surrounding those expectations—are among a number of qualitative and quantitative inputs used in Vanguard's investment methodology and portfolio construction process.

IMPORTANT: The projections and other information generated by the VCMM regarding the likelihood of various investment outcomes are hypothetical in nature, do not reflect actual investment results, and are not guarantees of future results. Distribution of return outcomes from the VCMM are derived from 10,000 simulations for each modeled asset class. Simulations are as of September 30, 2018. Results from the model may vary with each use and over time. For more information, see the Appendix section "About the Vanguard Capital Markets Model."

Vanguard's distinct approach to forecasting

To treat the future with the deference it deserves, Vanguard has long believed that market forecasts are best viewed in a probabilistic framework. This annual publication's primary objectives are to describe the projected long-term return distributions that contribute to strategic asset allocation decisions and to present the rationale for the ranges and probabilities of potential outcomes. This analysis discusses our global outlook from the perspective of a U.S. investor with a dollar-denominated portfolio.

Global outlook summary

Global economy: *Down but not out*

As the global economic expansion enters its tenth year, concerns are growing that a recession may be imminent. Although several factors will raise the risk of recession in 2019, a slowdown in growth—led by the United States and China—is the most likely outcome. In short, economic growth should shift down but not out.

We expect the global economy to continue to grow, albeit at a slightly slower pace, over the next two years, leading at times to so-called growth scares. In 2019, U.S. economic growth should drop back toward a more sustainable 2% as the benefits of expansionary fiscal and monetary policy abate. Europe and Japan are at an earlier stage of the business cycle, though we expect growth there to remain modest.

In emerging markets, China's growth will remain near 6%, with increasing policy stimulus applied to help maintain that trajectory. Unresolved U.S.-China trade tensions remain one of the largest risk factors to our view, in addition to stronger-than-expected tightening by the Federal Reserve should the U.S. unemployment rate approach 3%.

Global inflation: *Unlikely to shoot past 2%*

Previous Vanguard outlooks anticipated that the secular forces of globalization and technological disruption would make achieving 2% inflation in the United States, Europe, Japan, and elsewhere more difficult. In 2018, we rightly anticipated a cyclical firming in core inflation across various economies. In 2019, we do not see a material risk of further strong rises in core inflation despite lower unemployment rates and higher wages, as inflation expectations remain well-anchored.

In the U.S., we expect core inflation to remain near or below 2% throughout 2019; an escalation in tariffs would only temporarily affect U.S. core inflation. In Europe and Japan, price pressures will increase gradually as labor market slack erodes, though core inflation is likely to stay well below 2%. Higher wages are likely, yes, but higher inflation is not.

Monetary policy: *Convergence commences, with the Fed stopping near 3%*

As inflation moves toward target, financial-stability risks rise, and unemployment rates approach full employment, global central banks will stay on their gradual normalization paths.

In the United States, we still expect the Fed to reach terminal rate for this cycle in the summer of 2019, bringing the policy rate range to 2.75%–3% before halting further increases in the face of nonaccelerating inflation and decelerating growth. Other developed-market central banks will only begin to lift interest rates from postcrisis lows. We expect the first rate increase from the European Central Bank in late 2019, followed by a very gradual hiking path thereafter. Japan is late to the party and we do not expect any rate increases in 2019, though some fine-tuning of its policy framework is likely to ease growing financial-stability risk. Emerging-market countries don't control their own destiny and will be proactively forced to tighten along with the Fed, while further modest currency depreciation, tempered by tightened capital controls, is the most likely outcome in China.

Investment outlook: *No pain, no gain*

With slowing growth, disparate rates of inflation, and continued policy normalization, volatility in financial markets is likely to accelerate. Long term, our ten-year outlook for investment returns remains guarded, given the backdrop of high valuations and depressed risk-free rates across major markets.

U.S. fixed income returns are most likely to be in the 2.5%–4.5% range, driven by rising policy rates and higher yields across the maturity curve as policy normalizes. This results in a modestly higher outlook compared with last year's outlook of 1.5%–3.5%—albeit still more muted than the historical precedent of 4.7%.

Returns in global equity markets are likely to be about 4.5%–6.5% for U.S.-dollar-based investors. This remains significantly lower than the experience of previous decades and of the postcrisis years, when global equities have risen 12.6% a year since the trough of the market downturn. We do, however, foresee improving return prospects in non-U.S. developed markets, building on slightly more attractive valuations (a key driver of the equity risk premiums) combined with higher expected risk-free rates.

As was the case last year, the risk of a correction for equities and other high-beta assets is projected to be considerably higher than for high-quality fixed income portfolios.

Indexes used in our historical calculations

The long-term returns for our hypothetical portfolios are based on data for the appropriate market indexes through September 2018. We chose these benchmarks to provide the best history possible, and we split the global allocations to align with Vanguard's guidance in constructing diversified portfolios.

U.S. bonds: Standard & Poor's High Grade Corporate Index from 1926 through 1968; Citigroup High Grade Index from 1969 through 1972; Lehman Brothers U.S. Long Credit AA Index from 1973 through 1975; and Bloomberg Barclays U.S. Aggregate Bond Index thereafter.

Ex-U.S. bonds: Citigroup World Government Bond Ex-U.S. Index from 1985 through January 1989 and Bloomberg Barclays Global Aggregate ex-USD Index thereafter.

Global bonds: Before January 1990, 100% U.S. bonds, as defined above. January 1990 onward, 70% U.S. bonds and 30% ex-U.S. bonds, rebalanced monthly.

U.S. equities: S&P 90 Index from January 1926 through March 1957; S&P 500 Index from March 1957 through 1974; Dow Jones Wilshire 5000 Index from the beginning of 1975 through April 2005; and MSCI US Broad Market Index thereafter.

Ex-U.S. equities: MSCI World ex USA Index from January 1970 through 1987 and MSCI All Country World ex USA Index thereafter.

Global equities: Before January 1970, 100% U.S. equities, as defined above. January 1970 onward, 60% U.S. equities and 40% ex-U.S. equities, rebalanced monthly.

I. Global economic perspectives

Global economic outlook: Down but not out

As the global economic expansion enters its tenth year, concerns are growing that a recession may be imminent. Although several factors raise the risk of recession in 2019, a slowdown in growth—led by the United States and China—is the most likely outcome.

Our global economic outlook is based on:

- an assessment of the stage of the business cycle for each of the world's largest economies (**Figure I-1**);
- estimates of how recent and expected future policy actions (fiscal, monetary, and trade) will affect economic growth and inflation, among other factors, in 2019 and beyond (see regional outlooks); and
- the probabilities of various risk factors and scenarios that could alter our base case (see Figure I-5 on page 10).

Our analysis of fundamentals and the historical drivers of recession leads us to conclude that continued expansion, albeit at a slower pace—rather than imminent collapse—is the most likely scenario for the global economy in 2019. This forecast is not sanguine, however. The expected easing of global growth in the next two years—driven by a fading boost from U.S. fiscal stimulus, more restrictive Federal Reserve policy, and the continued slowing of growth in China—is fraught with economic and market risks.

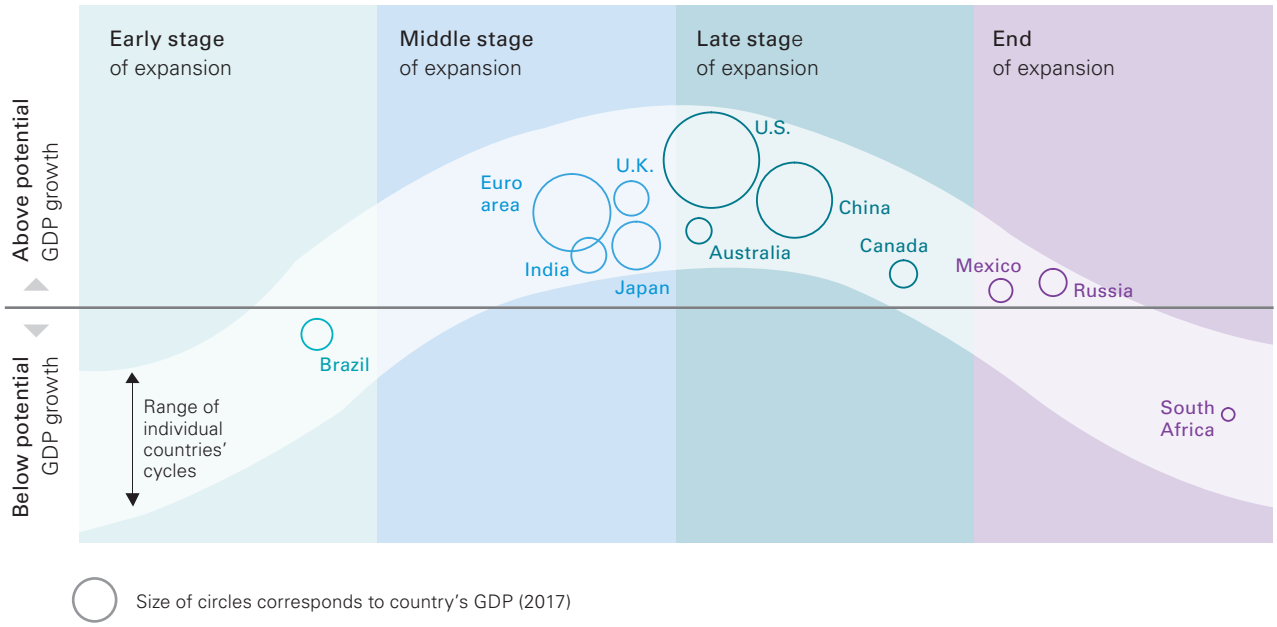
We provide explicit estimates from our Investment Strategy Group's economics team of the most prominent risks for 2019 (see Figure I-5 on page 10).

The global economic cycle

The concern about an imminent global recession often rests on the assumption that the U.S. expansion—which is among the longest on record—is clearly at the latest stage of the business cycle. The typical business cycle is characterized by an economy moving through a series of states: early cycle, when growth recovers strongly after a recession; mid-cycle, as an economy approaches and then exceeds full capacity and growth peaks; and late cycle, as the economy slows down and tips into recession

FIGURE I-1

Where are countries in their economic cycles?



Notes: The vertical axis represents GDP growth rate relative to each country's potential growth rate, represented by the horizontal line. There is no inherent time limit on the length of each stage; different economies progress through the stages at varying speeds. The end of an expansion represents below-trend growth, which may or may not match the common definition of recession of two consecutive quarters of negative real GDP growth.

Sources: Vanguard and the International Monetary Fund (IMF).

again. Yet Figure I-1 illustrates that the United States is only now approaching the later stages of expansion, in which imbalances grow larger, growth begins to decelerate, and recession risks increase. Other major economies, such as Europe and Japan, are even further behind given the slower progress made in their return to full capacity.

As the world's largest economy, the United States is naturally a critical driver of the global business cycle, and so most U.S. recessions are part of global recessions.

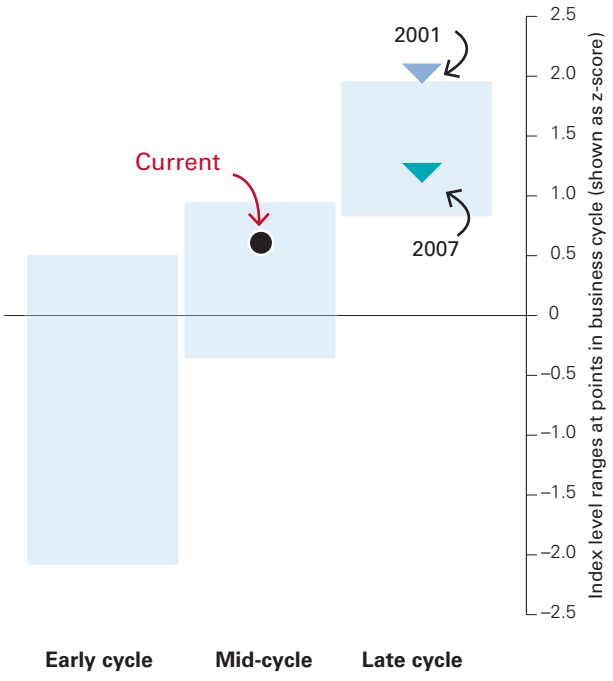
One way to assess the risk of a U.S. recession is to gauge the economy's proximity to the tipping point in the business cycle. **Figure I-2** displays a quantitative assessment of the present stage of the U.S. business cycle (that is, early, mid-, or late cycle). The colored circles indicate that the U.S. economy is only *now* transitioning toward the later stages of the expansion, despite the recovery's near-record length. In other words, current fundamentals such as consumer demand, household balance sheets, price inflation, and the present stance of monetary policy suggest that the U.S. recovery could persist at least through 2020. Other indicators,

FIGURE I-2

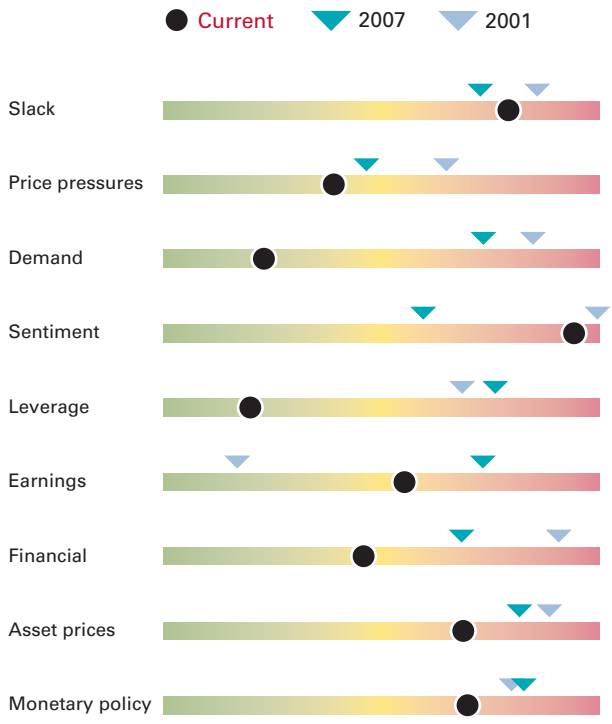
Still too early to call recession in the U.S.

A comparison of the current state of fundamentals with previous business cycles

a. Cyclical index just now moving toward later cycle levels



b. Lack of extremes broadly present across a range of indicators



Notes: Figure I-2a displays the historical ranges of a cyclical index at various points in the business cycle. Index is shown as a z-score and weighted by first principal components of 25 economic indicators (below). The business cycle is determined by historical observations of the output gap. Figure I-2b displays the underlying components of the cyclical index in Figure I-2a, presenting the current level relative to historical observations. The 2007 and 2001 data points indicate the index and component position 12 months prior to the onset of recession. Underlying indicators: slack = output gap, U3 and U6 unemployment rate gap relative to NAIRU. Price pressures = personal consumption expenditures (PCE), core PCE, average hourly earnings, unit labor costs. Demand = housing starts, residential investment, non-residential investment, durable goods consumption. Sentiment = business optimism, consumer sentiment, consumer confidence. Leverage = household financial obligations ratio, nonfinancial corporate debt, FRB Senior Loan Officer Opinion Survey for consumer and commercial and industrial credit terms. Earnings = corporate profits. Financial = Vanguard financial conditions index, yield curve (measured as the 10 year-3 month Treasury yield) Asset prices = Vanguard's fair-value CAPE, corporate OAS spread, high-yield OAS spread. Monetary policy = federal funds rate versus neutral rate estimated by the Laubach-Williams (2003) model. Data range is 1980 Q1-present.

Sources: Vanguard, Moody's Analytics Data Buffet, Federal Reserve Bank of St. Louis, Laubach-Williams (2003).

however, are clearly consistent with a slowdown in growth and a more elevated risk of recession, including tight labor markets and high asset valuations (such as equity price/earnings ratios and tight credit spreads).

Figure I-2 suggests that the chances of a U.S. recession occurring and thereby derailing growth in the global economy are roughly 30% as we enter 2019. U.S. growth in 2019 is likely headed lower, but not below zero—in other words, down but not out.

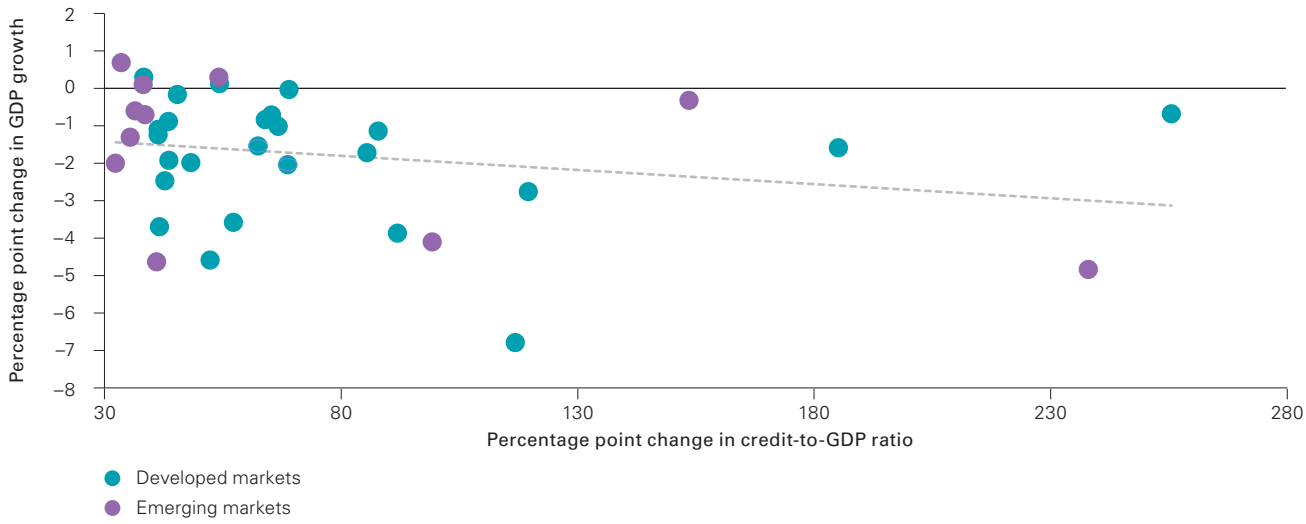
A modest yet persistent challenge that the global economy will face in 2019 (and beyond) is the growth in global debt. In part because of ultrastimulative global monetary policy, global debt levels have rarely if ever been higher, and may be sowing the seeds for the next crisis. The global debt-to-GDP ratio stood at 220% in 2018, up from 175% in 2008.

Specifically, two segments of the global debt markets are concerning: emerging-market debt denominated in hard currency and nonfinancial corporate debt in the U.S. and Europe. In the case of the latter, rapid growth in so-called leveraged loans is particularly alarming, having accounted for about 50% of the total corporate debt issuance in 2018, according to the International Monetary Fund (IMF). As the business cycle continues to mature and financial conditions gradually tighten in 2019, the global economy will be less able to sustain such credit growth (Chen and Kang, 2018). **Figure I-3** illustrates that credit booms eventually fade, helping to contribute to economic slowdowns.

Although many emerging-market economies are vulnerable, China is the key risk factor given the size of its economy, hefty corporate debt, and rapidly rising household debt. China's credit profile stabilized moderately in 2017 and 2018, thanks to a recovery in nominal growth and the government's financial deleveraging campaign. Furthermore, a typical emerging-market debt crisis that is triggered by withdrawal of foreign funding is unlikely, given that over 90% of Chinese debt is domestic. Meanwhile, as downside risk to growth emerges, the Chinese government has engaged in further monetary

FIGURE I-3

Most credit booms eventually lead to slower growth, a headwind for 2019



Notes: Credit booms are defined as periods where the credit-to-GDP ratio is growing at a rate of at least 30 percentage points over a rolling five-year window. The change in credit-to-GDP ratio is the difference between the credit-to-GDP ratio at the start of the credit boom and the credit-to-GDP ratio when credit is growing at its fastest rate, again over a rolling five-year window. The change in GDP growth is the average growth differential between the five-year post-boom and five-year pre-boom periods.

Sources: Vanguard calculations, based on data from Bloomberg, the IMF, and the Bank for International Settlements (BIS).

and fiscal easing. These stimulus measures, alongside strengthened capital controls, will most likely avert a near-term crisis in China and spillover to the global economy. Although China may be delaying important long-term reforms, its near-term growth is unlikely to collapse.

Where could the next recession come from?

To understand what factors might cause a global recession today, it is useful to examine what precipitated such downturns in the past (**Figure I-4**). A more systematic analysis, involving a historical sample of 108 recessions in 23 developed markets over the last 60 years, shows that the length of the expansion is a necessary but not sufficient condition for recession; thus, the duration of the recovery provides little insight into the causes, depth, or even timing of the next recession.

As inflation in most developed markets has fallen to more desired levels since the early 1990s, mainly because of a focus on explicit or implicit inflation-targeting by central banks, the sources of (or catalysts for) global or regional downturns have expanded beyond typical inflation pressures, as they did in the 1970s.

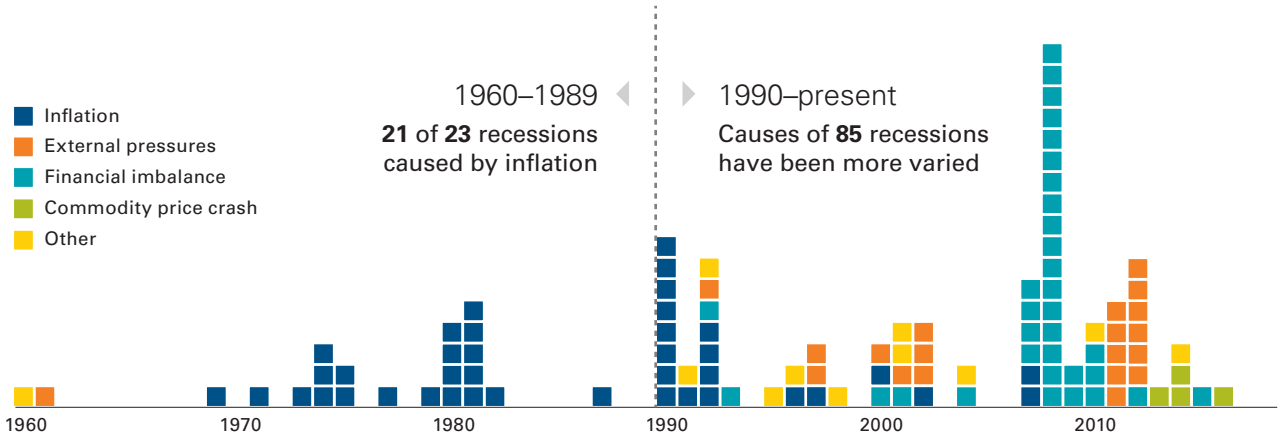
However, there has been no absence of significant inflation shocks to the global economy in the previous four decades. The reason behind the dramatic decline in inflation-induced recessions since the 1980s is that central banks learned to act preemptively in the face of inflation shocks, getting ahead of any price-wage inflationary spirals by better managing market expectations.

In 2019, we do not see a material risk of a strong rise in core inflation despite lower unemployment rates and higher wages, assuming inflation expectations remain well-anchored.

FIGURE I-4

Drivers of recessions vary

Drivers of 108 country-specific recessions since 1960



Notes: Recessions are defined as two consecutive quarters of negative real GDP growth. We examined 23 developed economies starting in 1960, or with the earliest available quarterly data. Recessions were categorized using a variety of macroeconomic indicators and historical analysis. Inflation recessions are those where regional inflation averaged greater than 4% in the 12 months preceding the recession's start. External pressures signify recessions caused by export-demand weakness. Financial imbalance broadly represents a misallocation of capital, either through unsustainable equity, housing, or credit valuations resulting in elevated financial sector stress. Commodity price crashes are most likely to affect commodity export-driven economies. Examples of idiosyncratic factors (other) include weather events, tax increases, and political developments.

Source: Vanguard calculations, based on data from Thomson Reuters, Moody's Analytics Data Buffet, and the Associated Press.

Vanguard's risk scorecard

Although we are not predicting a global recession in our central case, a wide range of triggers could spark a global downturn.

Figure I-5 describes some of the global concerns that are front and center for investors as we head into 2019. For each potential risk, it indicates the odds attached to upside, downside, and base-case scenarios based on our assessment of risks.

Overall, the largest single risk to our forecasts is if an overly aggressive Federal Reserve continues to raise rates beyond 3% in 2019, perhaps because of a temporary rise in core inflation or wages. This risk, if it materialized sometime in 2019, would significantly raise the odds of a U.S. recession in 2020. This would also adversely affect emerging-market countries that are dependent on dollar funding and vulnerable to a strengthening dollar. Other risks are rated at lower odds, yet some of them are interrelated.

FIGURE I-5

Global risks to the outlook

2019 global risks	Description	Vanguard assessment of risks: Negative scenario	Vanguard assessment of risks: Base case	Vanguard assessment of risks: Positive scenario
		27%	**52%**	**21%**
Global monetary policy normalization	Extreme nature of existing policy stimulus, uncharted territory of quantitative tightening, and uncertainty about the neutral setting for policy (r*).	Policy mistake in the U.S.: Fed continues tightening beyond r* and the yield curve inverts. ECB/BOE hold off on normalization plans, increasing the divergence of global policy rates.	Soft landing in the U.S. at 2.75%–3%. Gradual ECB/BOE normalization commences. Global growth slowing back to trend.	Soft landing in the U.S. at 3% or higher. Jump in productivity growth leads to higher growth with no inflation and shifts r* up. Global trend growth increases without global inflation.
		18%	**53%**	**29%**
Trade war and protectionism	Bilateral U.S.-China trade war continues to escalate. Tariffs can be increased further and non-tariff barriers can be put in place.	Trade war extends beyond tariffs to quantitative restrictions, boycotts, etc., with major retaliations from China. Geopolitical risks rise. Impact to GDP growth could be more than 100 basis points.	Trade war escalates in intensity, with level of existing tariffs and coverage of imports increased. Impact on the global economy of 30–50 basis points.	The U.S. and China reach a bilateral agreement. Tariffs are rolled back.
		23%	**57%**	**20%**
Instability of Chinese economy	Fears are rising about a potential hard landing in China, given the collateral damage of financial deleveraging and the expectation of continued deterioration in China-U.S. relations.	Capital flows intensify amid further escalation in the trade war and rising Fed policy rate. Policymakers fail to provide enough stimulus. Headline growth falls below 6%.	Further monetary and fiscal easing will support domestic demand, while financial stability risk remains under control. Headline growth likely moderates to 6.0%–6.3% for 2019.	U.S.-China striking a trade deal and/or policy over-easing represent upside risks to growth.

Two factors that we have built into our *base case* for 2019 are escalating U.S.-China trade tensions and some further moderation in China's economic growth. Those two (interrelated) factors are already acting as a small impediment to global growth in our base case, but the risk is that they could further undermine global demand and ultimately global growth.

We also think there is a nontrivial risk of disruption to economic activity from a flare-up of the standoff in Europe between Italy's government and European policymakers that, *in extremis*, could lead to Italy's exit from the euro area. Brexit-related risks continue to drag on the United Kingdom's economy and, to a lesser extent, Europe's, but we do not see this as one of the major risks likely to lead to a global downturn.

FIGURE I-5 (continued)

Global risks to the outlook

2019 global risks	Description	Vanguard assessment of risks: Negative scenario	Base case	Positive scenario
Euro breakup risk	An escalation in tensions relating to Italy. The risk is that the European Commission will assess penalties on Italy, which further stokes Italian resentment toward the European Union and provokes an Italian exit from the euro.	**16%** The Italian government maintains a loose fiscal policy that results in EU sanctions, prompting a political crisis and eventual departure from the euro. This results in a wider crisis in the euro area and the departure of more countries.	**68%** The Italian government revises fiscal policy to abide by EU rules and market tensions subside, but public and private sector deleveraging is still minimal. Euro breakup concerns are diminished but have not disappeared.	**16%** The Italian government backs down completely and submits a fiscal austerity plan that causes public debt to fall more quickly than currently expected and euro breakup concerns to subside.
Emerging-market debt crises	Key drivers of emerging-market cycles are global monetary divergence, the effect of the U.S. dollar on dollar-denominated debt, and global/China demand for commodities.	**24%** Trade wars, a slowdown of the Chinese economy, or a strong U.S. dollar due to continued divergence of monetary policy lead to spillovers and broader emerging-market crises.	**57%** Emerging-market debt crises remain contained to a few idiosyncratic cases. Global monetary convergence and the stabilization of the Chinese economy ease the risk of contagion to all emerging markets.	**19%** U.S. dollar level normalizes as developed-market central banks commence normalization. Risk-on environment helps emerging markets undergo V-shape bounce-back.

Note: Odds for each scenario are based on median responses to a poll of Vanguard's Global Economics and Capital Markets Outlook Team.
Source: Vanguard.

Global growth outlook: Moderating to trend

Vanguard dashboards of leading economic indicators and implied economic growth for 2019

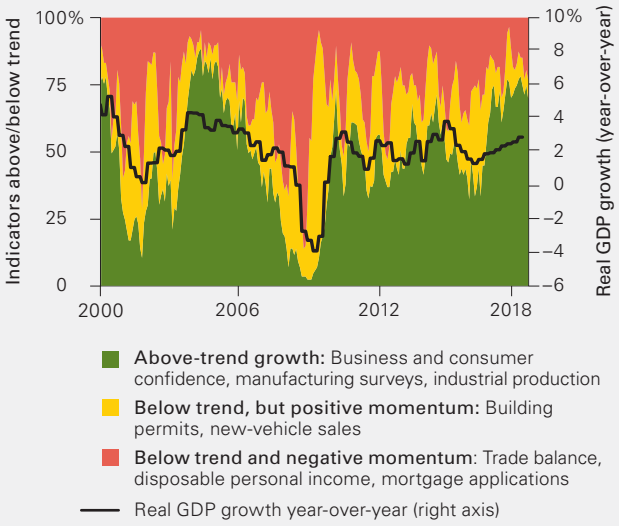
United States: Above trend but falling

Our proprietary U.S. leading indicators dashboard is a statistical model based on more than 80 leading economic indicators from major sectors of the U.S. economy. As **Figure I-6a** shows, in spite of a high proportion of green indicators (above-trend readings) in the dashboard at present, there is an incipient increasein red indicators, signaling the start of a gradual slowdown in the U.S. economy. The most positive (green) indicators are those associated with increased business and consumer confidence, a tightening labor market, and a stronger manufacturing sector. The negative (red) indicators are associated with trade balance, disposable personal income, and mortgage applications. Building permits and new-vehicle sales are below trend but show positive momentum (yellow indicators).

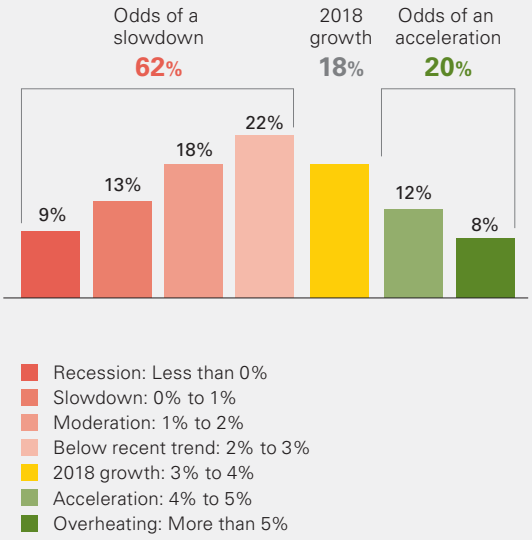
Using regression analysis, we mapped our proprietary indicators to a distribution of potential scenarios for U.S. economic growth in 2019, as shown in **Figure I-6b**. The odds of growth at or exceeding 3% in 2019 (38%) are lower than the odds of growth slowing down (62%). Our base case is for U.S. growth to moderate toward its long-term trend of 2%.

Figure I-6

a. Economic indicators



b. Estimated distribution of U.S. growth outcomes



Notes: Distribution of growth outcomes generated by bootstrapping the residuals from a regression based on a proprietary set of leading economic indicators and historical data, estimated from 1960 to 2018 and adjusting for the time-varying trend growth rate. Trend growth represents projected future estimated trend growth.

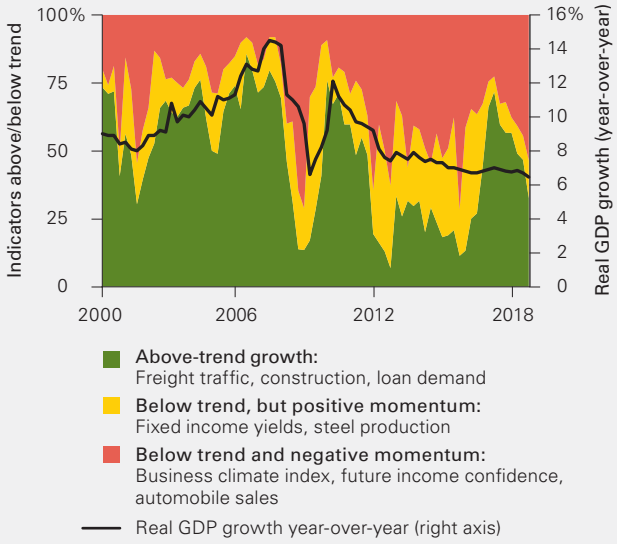
Source: Vanguard calculations, based on data from Moody's Analytics Data Buffet and Thomson Reuters Datastream.

China: Continued deceleration

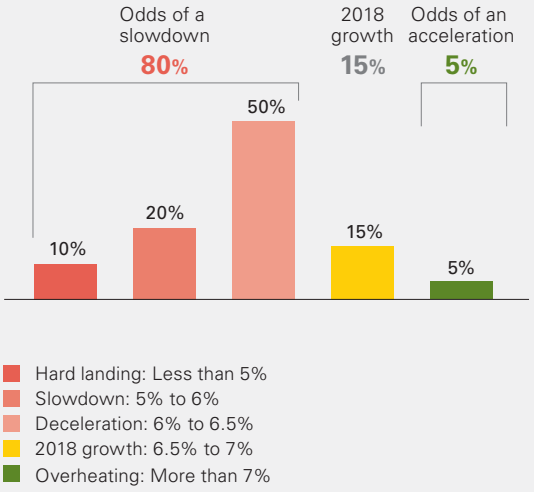
China is expected to continue its modest deceleration in 2019, with risks tilted to the downside, according to our proprietary China leading indicators dashboard (**Figure I-6c**). Specifically, despite ongoing policy efforts to stabilize near-term economic growth and combat international headwinds (as evident in improving fixed asset investment and commodity production), yellow and red indicators associated with softening sentiment and worsening asset returns suggest that more-aggressive stimulus measures may be needed to bolster private enterprise. Against this backdrop, China's economy is expected to grow by about 6%–6.3% in 2019 (**Figure I-6d**), with the risks of a downside slightly greater than those of a growth acceleration.

Figure I-6 (continued)

c. Economic indicators



d. Estimated distribution of China growth outcomes



Notes: Distribution of growth outcomes generated by bootstrapping the residuals from a regression based on a proprietary set of leading economic indicators and historical data, estimated from 1960 to 2018 and adjusting for the time-varying trend growth rate. Trend growth represents projected future estimated trend growth.

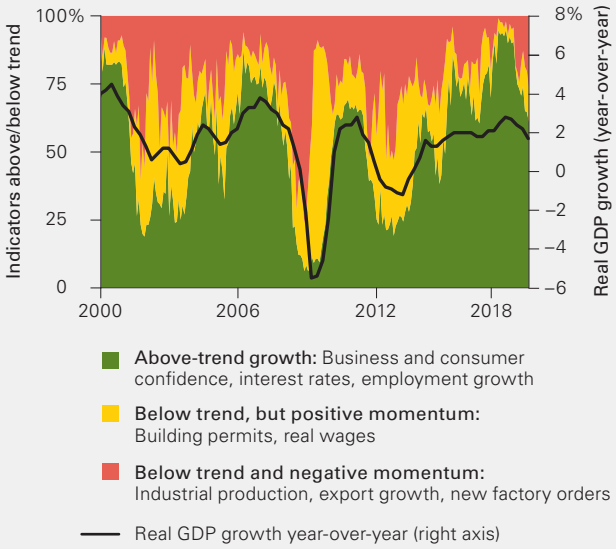
Source: Vanguard calculations, based on data from CEIC and Thomson Reuters Datastream.

Euro area: Above trend but falling

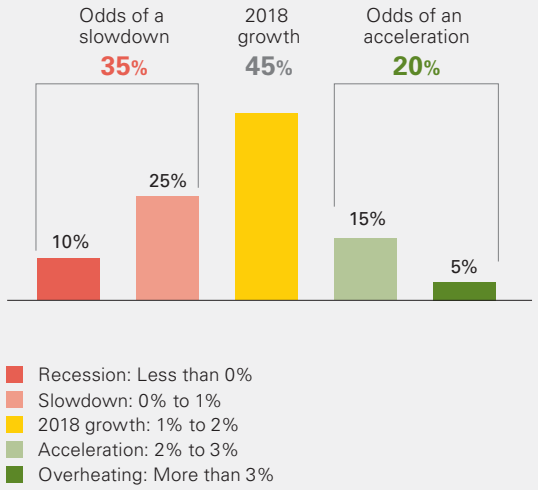
The euro area is expected to grow at a moderate rate of about 1.5% in 2019, which is slightly above trend. As illustrated by our leading indicators dashboard (**Figure I-6e**), the proportion of indicators that are tracking above trend fell throughout 2018, primarily driven by a weaker industrial sector and net trade. A slowdown in the global trade and industrial cycle, in addition to delays in German car production, explains most of this deterioration in economic momentum; German exports and German industrial production are both currently in the red category, indicating below-trend growth and negative momentum. We expect growth to stabilize in the first half of 2019 as car production recovers. Moreover, a large proportion of leading indicators are still in green territory, including business and consumer sentiment, labor market data, and monetary policy. This should provide support to growth next year. However, as shown in **Figure I-6f**, the risks to the growth outlook are skewed to the downside given China's continuing slowdown, U.S.-China trade tensions, and elevated political risks concerning Brexit and Italy.

Figure I-6 (continued)

e. Economic indicators



f. Estimated distribution of euro-area growth outcomes



Notes: Distribution of growth outcomes generated by bootstrapping the residuals from a regression based on a proprietary set of leading economic indicators and historical data, estimated from 1960 to 2018 and adjusting for the time-varying trend growth rate. Trend growth represents projected future estimated trend growth.
Source: Vanguard calculations, based on data from Bloomberg and Macrobond.

United States: Going for a soft landing

Much of our global outlook hinges on our expectations for conditions in the United States. In 2019, U.S. economic growth should decline from current levels toward trend growth of about 2%. While we believe a recession remains some time off (see Figure I-2 on page 7), we expect the U.S. labor market will cool, with employment growth falling closer in line with the trend growth of the labor force (80,000–100,000 per month), and structural factors such as technology and globalization should prevent inflation from rising significantly above the Federal Reserve's 2% target.

The strong performance of the U.S. economy over the last two years is in part explained by significant support from expansionary monetary and fiscal policies. We estimate that the latter contributed over 50 basis points to headline growth in 2018. (A basis point is one-hundredth of a percentage point.) In 2019, we expect monetary policy to dial back to "neutral," with the federal funds rate reaching 2.75%–3% in June of 2019. On the fiscal policy front, we may continue to see the expansionary effects of the Tax Cuts and Jobs Act through the first part of the year. However, we expect the boost to the year-over-year GDP growth rates from consumer spending to begin fading away toward the second half.

But the strong performance of the U.S. economy has been due to more than just policy. The U.S. consumer has been the key engine of growth during the recovery from the global financial crisis, with almost all drivers of spending firing on all cylinders, including recent support from lower income-tax payroll withholdings (see **Figure I-7**). Looking ahead to 2019, the dashboard gets a bit more muddled. Nothing is flashing red, but, with the exception of household debt measures and wage growth, all indicators get worse. Higher interest rates will start to bleed through to mortgage rates and rates for auto and personal loans. They will also affect asset valuations in credit-sensitive sectors such as housing. On the jobs front, it will be hard for the U.S. economy

FIGURE I-7

Dashboard of consumer drivers

	2017/ 2018	2019	Assessment
Wage growth	→	→	Further improvement in wages will be limited by low labor productivity growth
Jobs (growth, lower unemployment)	↑	→	Employment growth will level off
Household debt to disposable income	↑	↑	Outstanding debt and the cost of servicing it will remain low
Wealth effects	↑	→	High equity valuations and market volatility on the rise could be a drag on financial wealth. Rising rates will affect credit-sensitive sectors, including home prices. Year-over-year tax cuts will disappear.
Interest rates and cost of credit	↑	→	Mortgage rates and rates for auto and personal loans will rise
Consumer confidence	↑	→	Unknown; policy uncertainty and market volatility will rise
Consumer prices (inflation and import prices)	↑	→	Inflation will stay close to the Fed's target

Source: Vanguard's Global Economics and Capital Markets Outlook Team.

to replicate the impressive pace of job creation of the last two years. While the labor market will stay strong, it may not provide similar contributions to growth in 2019. And several unknowns such as trade policy uncertainty, increased market volatility, and high equity valuations will possibly affect consumer confidence and stock market wealth.

One of the most puzzling aspects of an otherwise strong U.S. economy continues to be subpar wage growth. As the unemployment rate (3.7% as of November 2018) has fallen to the lowest level since the 1960s, why does wage growth, which is only now reaching 3%, remain so tepid by historical standards?

All else equal, stronger demand for workers should result in higher wages, but all else is not equal. Fundamentally, we should not expect inflation-adjusted (real) wages to exceed the levels of labor productivity growth and inflation. Productivity growth rates have been (1% since the recovery began in 2010, compared with 2% before the global financial crisis. This means we should not expect pre-crisis levels of wage growth, particularly after incorporating inflation, which has struggled to consistently achieve the Fed's 2% target (see **Figure I-8**).[1]

While low labor productivity can explain subdued real wage growth, one concern that investors have for 2019 is that ever tighter labor markets could eventually fuel a wage-inflation spiral involving nominal wages and final consumer prices. The concern is rooted in the strong historical relationship between nominal wages and inflation. However, as shown in **Figure I-9a**, the beta of nominal wage growth on consumer inflation has declined significantly since the 1990s. At the core of this shift in the wage-inflation relationship is the Fed's ability to manage inflation expectations effectively. If they

FIGURE I-8

Absent a significant increase in productivity, higher wage growth is unlikely

Notes: Real wage growth is calculated as the growth rate of hourly wages as reported in the Employment Cost Index (ECI) minus core PCE inflation rate for that year. Trend for real wage growth is estimated as a centered three-year moving average of real wage growth.

Sources: Congressional Budget Office, Bureau of Labor Statistics.

1 See the 2017 Vanguard Global Macro Matters paper *Why Is Inflation So Low? The Growing Deflationary Effects of Moore's Law.*

remain in check, workers would have little reason to fear high inflation and thus would not demand higher nominal wages above and beyond any labor productivity gains plus reasonable levels of inflation around the Fed's 2% target. If wage gains keep pace with productivity and inflation expectations remain near the Fed's target, unit labor costs for businesses would not rise faster than inflation and there would be no impact on final consumer prices.

Inflation expectations and the Fed's ability to manage them (that is, the Fed's credibility) are often overlooked in Phillips curve models that correlate rising inflation with low unemployment. **Figure I-9b** shows our inflation estimates from an augmented Phillips curve model that incorporates not only labor market slack but also inflation expectations and other secular forces affecting inflation, such as globalization and technology.[2] Core inflation is projected to hover closely near the Fed's inflation target in 2019.

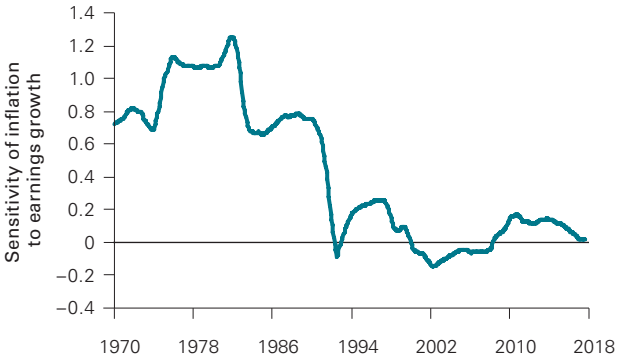
Yet it is this Phillips curve logic that has many who are attempting to anticipate the Fed's next move very focused on the labor market. However, in 2019, the Fed will be able to worry less about the unemployment-inflation link by leaning heavily on its credibility with the market. It will instead rely more on its assessment of a neutral policy stance as its guiding principle.

Calibrating policy rates to neutral is an extremely complex exercise full of risks. The so-called soft landing requires significant skill by policymakers. The neutral rate (usually referred to as r*) is a moving target and not directly observable, as it has to be estimated with statistical models. The Fed's extremely gradualist approach during this rate-hiking cycle does help increase the odds of a successful landing this time, however. Our best attempt to estimate the neutral rate places it somewhere in the 2.5%–3% range. If this is correct, the Fed is likely to

FIGURE I-9

Runaway inflation remains unlikely

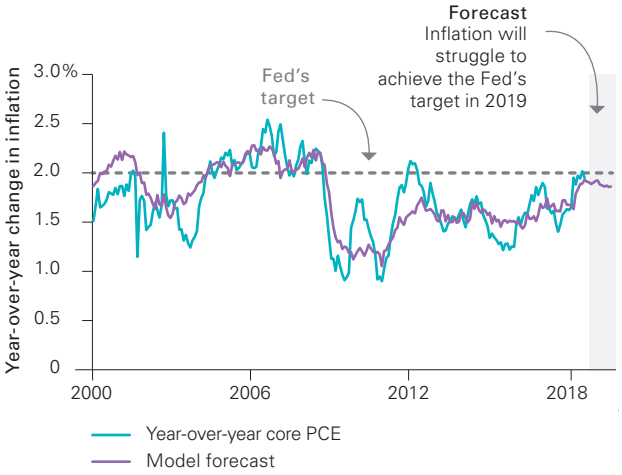
a. Pass-through of earnings to inflation has waned with anchored inflation expectations



Notes: Figure indicates the sensitivity of core PCE inflation to year-over-year growth in average hourly earnings using rolling ten-year regression coefficients. Data cover January 1960–September 2018.

Sources: Vanguard calculations, Moody's Analytics Data Buffet.

b. An "augmented" Phillips curve model



Notes: Core PCE model is a root mean square error (RMSE)-weighted average of two models: a bottom-up model where we model the deviation of augmented Phillips curve fitted values to each major component in the core PCE and a top-down macro model. The RMSE is 0.35 for the bottom-up model and 0.24 for the top-down model. This leads to a 40% weight for the bottom-up model and a 60% weight for the top-down model in the weighted model.

Source: Vanguard calculations, based on Thomson Reuters Datastream, Bureau of Economic Analysis, Bureau of Labor Statistics, Philadelphia Federal Reserve Bank Survey of Professional Forecasters, Congressional Budget Office, and Bloomberg Commodity Index.

2 See the 2018 Vanguard Global Macro Matters paper *From Reflation to Inflation: What's the Tipping Point for Portfolios?*

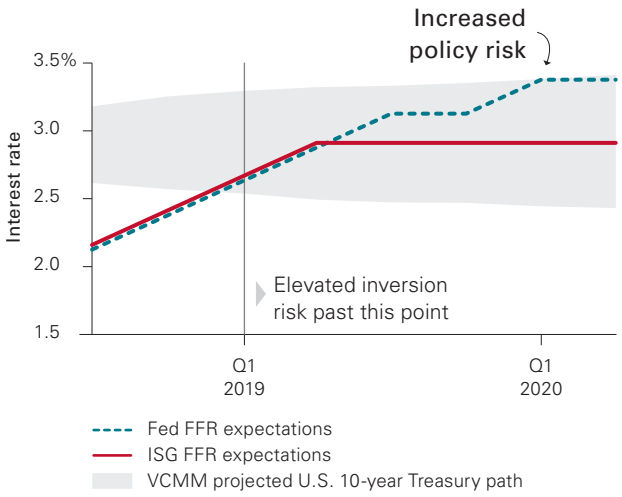
increase the policy rate to a range of 2.75%–3% by June of 2019 and then stop or at least pause to reassess conditions.

The risks to our view are not negligible. Historically, the U.S. Treasury yield curve has provided one of the clearest real-time indicators of overly tight policy. If policy becomes too restrictive, the slope of the yield curve falls, and at some point before a recession, it inverts.[3] Inversion typically occurs when the market believes the Fed has gone too far and drives the yield of the 10-year Treasury below the federal funds rate and that of the 3-month Treasury yield. Recession typically ensues 12 to 18 months later. Since the onset of policy rate increases in 2015, the slope of the Treasury curve has flattened from 300 basis points to around 80 basis points today. As the Fed continues to normalize policy in 2019, the risks of inversion will build (**Figure I-10a**). Some subscribe to the view that a new policy environment means that a flatter yield curve does not hold the same predictive power it once did. Our research leads us to believe that while this power has diminished over time, it still presents a fairly significant risk to our 2019 U.S. base case.[4]

FIGURE I-10

The yield curve remains a relevant leading indicator of economic growth

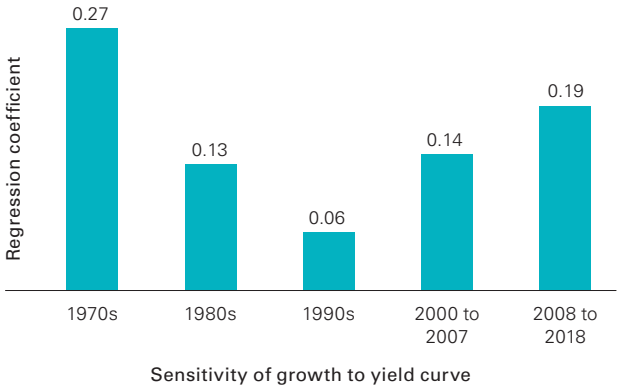
a. Further flattening expected; inversion risk increases in 2019



Notes: FFR refers to federal funds rate. The U.S.10-year Treasury path range uses the 35th to 65th percentile of projected VCMM path observations. Distribution of return outcomes is derived from 10,000 simulations for each modeled asset class. Simulations are as of June 30, 2018. Results from the model may vary with each use and over time.

Sources: Vanguard calculations, based on data from Thomson Reuters Datastream and Moody's Analytics Data Buffet; Federal Reserve Bank of New York.

b. Relationship of growth to yield curve has not deteriorated in the quantitative-easing era



Notes: Data are through June 30, 2018. Sensitivity is represented by coefficients from an ordinary least squares (OLS) regression model of yield curve slope (10-year U.S. Treasury yield minus 3-month T-bill yield) and the Vanguard Leading Economic Indicators series (used as a proxy for growth with monthly observations) 12 months forward. Coefficients are statistically significant at the 1 percent significance level.

Source: Vanguard calculations, based on data from Moody's Analytics Data Buffet and Thomson Reuters Datastream.

3 As measured by the difference between 3-month and 10-year constant-maturity Treasury yields.

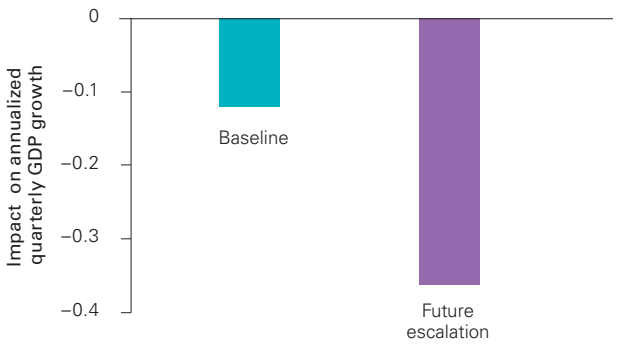
4 See the 2018 Vanguard Global Macro Matters paper *Rising Rates, Flatter Curve: This Time Isn't Different, It Just May Take Longer.*

Outside of monetary policy, the largest domestic risk to our U.S. outlook stems from trade policy. Trade represents a relatively small proportion of the U.S. economy (20% of GDP vs. a developed-market average of 35%). However, if trade tensions reverberate through financial markets (as shown in increases in the BBB spread in **Figure I-11**), the implications for economic conditions, including growth, become more significant. While we believe the U.S. will avoid recession in 2019, if the impacts of monetary and trade policies spread to financial markets, the likelihood of a downturn will become more substantial.

FIGURE I-11

Trade war impacts

GDP impact of higher costs of traded goods and financial market uncertainty



Baseline: A 25% tariff on $350 billion in imported goods (approximate amount of the U.S. trade deficit with China) and a retaliatory 25% tariff on $350 billion in exported goods along with a 25-basis-point widening of the credit spread.

Further escalation: A 25% tariff on a further $200 billion in imported goods (approximate amount of automobile, steel, and aluminum imports exposed to announced tariffs) and retaliatory 25% tariff on a further $200 billion in exported goods along with a 100-basis-point widening of the credit spread.

Notes: Tariff impacts are based on increasing prices of imports and exports by percentage indicated in the Federal Reserve's FRB/US model. The credit spread is the BBB spread. BBB spread impacts are based on shocking the yield spread of long-term BBB corporate bonds versus the 10-year Treasury bond yield by the indicated percentage.

Source: Vanguard calculations, based on the Federal Reserve's FRB/US Model.

Euro area: Stable growth as policy normalizes

After a sharp slowdown in 2018, euro-area growth is likely to stabilize around 1.5% in 2019, which is slightly above trend (see Figure I-6f on page 14). The slowdown was exacerbated by weak global demand for euro-area exports and delays to German car production as carmakers adjust to new European Union (EU) emissions standards.

In early 2019, we expect growth to modestly rebound as car production gets back on track. In addition, domestic demand in the euro area is likely to remain resilient, supported by healthy levels of business and consumer confidence and very low interest rates, which should continue to stimulate demand for credit. A stronger rebound remains unlikely in our view, given China's ongoing slowdown and U.S.-China trade tensions, which will weigh on demand for euro-area exports.

In 2019, risks to the euro area are tilted slightly to the downside, given a number of important global risks we outlined in the global growth outlook section. Domestically, the biggest risk is a further escalation in tensions between Italy's government and European policymakers. In 2019, Italy may break the 3% fiscal-deficit ceiling imposed on all EU members, and given the recent downgrade of Italian sovereign debt by key ratings agencies and the associated rise in Italian bond yields, Italy's debt levels are likely to remain elevated for the foreseeable future. Nervousness about Italy's fiscal position may spill over to other Italian assets and to periphery bond markets, which on its own could dampen growth. The larger risk, however, is that the European Commission imposes penalties on Italy, further stoking Italian resentment toward the EU and provoking Italy to exit from the euro. We think the chance of an Italian exit is only 5% over the next five years, but the situation warrants close attention.

In 2019, we expect the labor market to continue tightening, given that growth is likely to remain above trend for most of the year. The unemployment rate, now close to 8%, is likely to approach 7.5% by year-end, leading to a further lift in wage growth and core inflation (**Figure I-12a**).

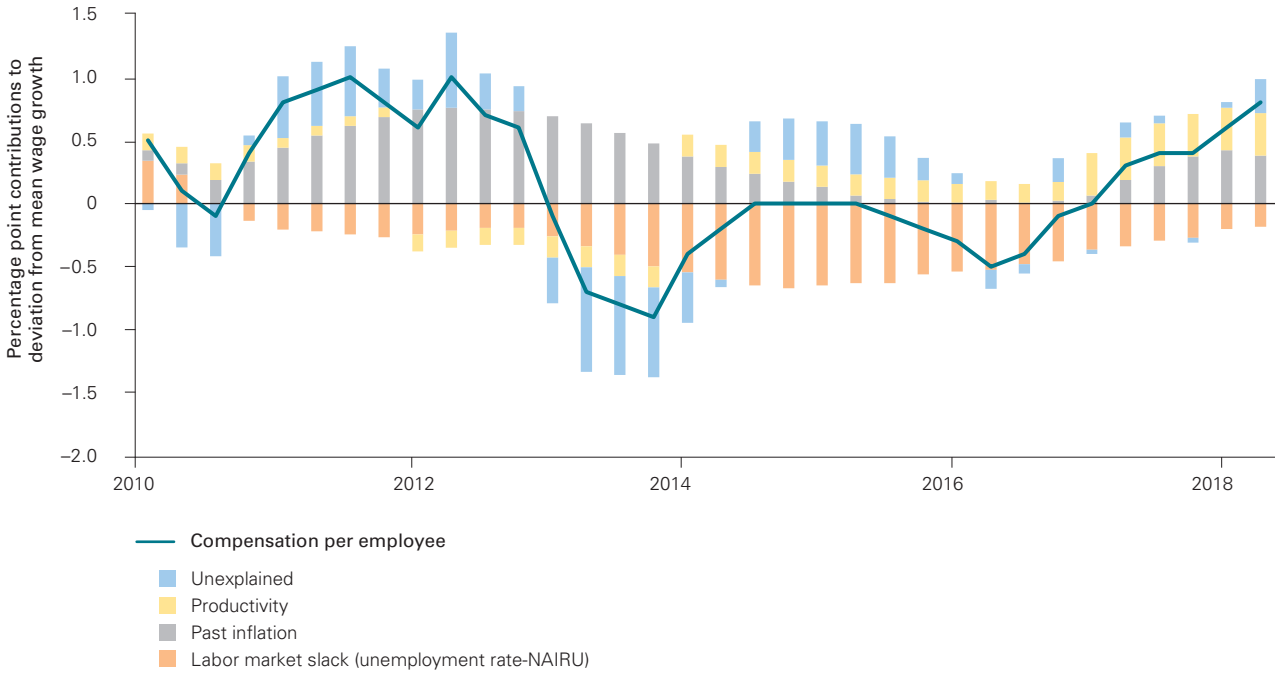
At this stage, we see a low probability of a surprise surge in core inflation, for two key reasons. First, Germany's economy is becoming deeply integrated with low-wage countries in Central and Eastern Europe, so German firms will be unwilling to offer higher wages at home. Second, periphery countries such as Italy, Spain, and Portugal need to contain their labor costs to restore competitiveness with the more efficient German economy.

Given this environment of tightening labor markets and rising inflation pressures, we expect the European Central Bank (ECB) to lift interest rates for the first time in late 2019 (**Figure I-12b**). By that stage, we estimate that the output gap will be slightly positive, with core inflation on track to reach target over the short to medium term. This will be followed by a very gradual hiking path thereafter (25 basis points every six months), given that we do not anticipate strong price pressures, as outlined above. Our analysis suggests that core inflation is unlikely to reach the ECB's target until wage growth increases.

FIGURE 1-12

European wage pressures are building, which will prompt the ECB to initiate a gradual hiking cycle

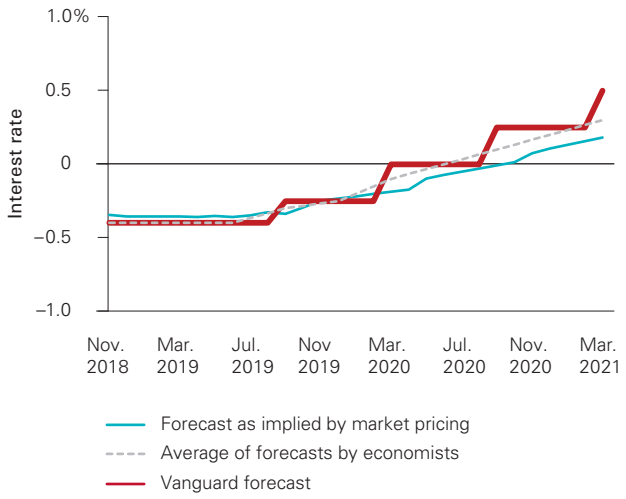
a. Drivers of euro-area wage growth



Notes: This decomposition has been derived from an OLS regression of compensation per employee on productivity growth, past inflation, and labor market slack. The nonaccelerating inflation rate of unemployment (NAIRU) is derived from the estimate by the Organisation for Economic Co-operation and Development (OECD).

Source: Vanguard calculations, based on data from Eurostat and the OECD.

FIGURE I-12 (continued)
b. ECB rate view (versus forward curve and economists' forecast)



Notes: Economists' forecast reflects the median expectation from a survey conducted by Bloomberg. The forecast implied by market pricing is derived from the forward overnight interest rate swap curve.
Sources: Vanguard, Bloomberg.

United Kingdom: Brexit is still the wild card

The United Kingdom is set to leave the EU on March 29, 2019. What happens beyond then depends on what, if any, deal it strikes with the EU. Under our base case, we assume that an agreement is reached that has the United Kingdom leave in March, with some kind of free-trade deal that starts after a transition period.

In the long run, according to government estimates, U.K. GDP would fall by as much as 5%. In 2019, however, the transition period would help limit disruption to the economy, so growth would be likely to remain around trend at 1.6%.

In contrast to previous years, our conviction in our base case is relatively low, given that several Brexit options are still on the table that could materially affect growth. One of the two most prominent risks is a "Crash Brexit," in which the United Kingdom fails to reach a deal and effectively falls out of the EU with no backstop. Such a scenario could be chaotic in the short run, depending on what sort of safety net the government puts in place, leading to sharply lower growth and possibly a recession.

The second risk is a "No Deal Brexit" scenario, in which the U.K. Parliament fails to ratify the deal, which could potentially lead to a second referendum and a vote to remain in the EU. Under this scenario, there would be several months of uncertainty as the referendum takes place, but a decision to remain in the EU could boost growth.

Headline and core inflation are likely to slow and ultimately settle close to 2% in 2019, after being pushed well above target by the sharp drop in the pound sterling after the EU referendum (**Figure I-13a** on page 22). There will still be further upward pressure on inflation, mostly from low unemployment and rising wages. However, we expect the Bank of England to preemptively respond to this potential inflation pickup to keep consumer price growth in line with its 2% target.

U.K. inflation is currently above the Bank of England's 2% target, and in normal times, this would already warrant policy tightening. We are not in normal times, however, given that the country is about to leave the EU.

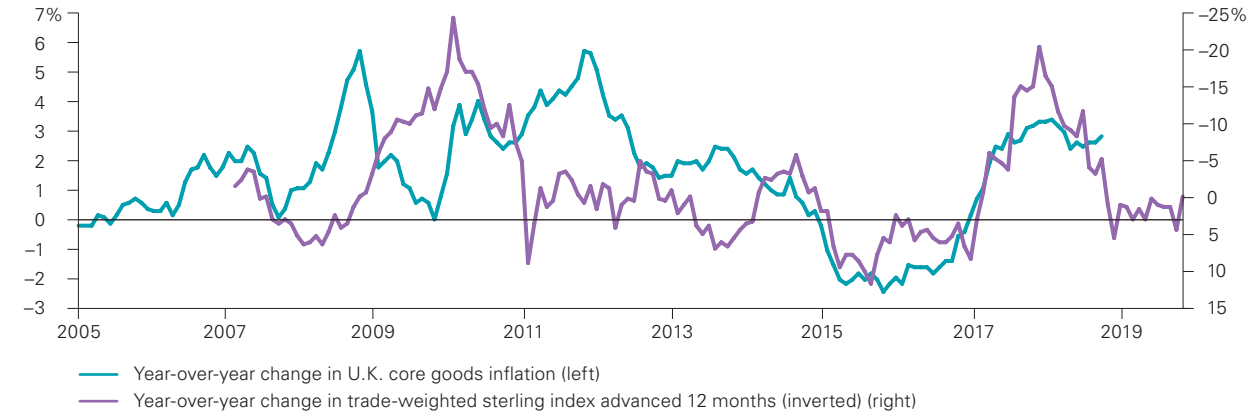
The Bank of England understands that sentiment is fragile and that the possibility of a "No Deal Brexit" is still on the table, so a rate hike could damage sentiment and push the United Kingdom into an unintended slowdown. We therefore believe that the central bank is likely to keep rates on hold until there is further clarity around Brexit.

If our base case plays out, and a "Compromise Brexit" deal is struck before March 2019, we would expect the Bank of England to increase rates twice in 2019, in May and in November, to bring inflation back in line with target (**Figure I-13b** on page 22). If no Brexit deal is reached, however, it will need to reassess its inflation outlook. If the hit to aggregate demand is judged to be greater and more persistent than the hit to aggregate supply, interest rates may be cut. But there is a chance that rates may need to rise even in a "No Deal Brexit" scenario, as the negative supply shock could lead to inflation accelerating above target for a sustained period.

FIGURE I-13

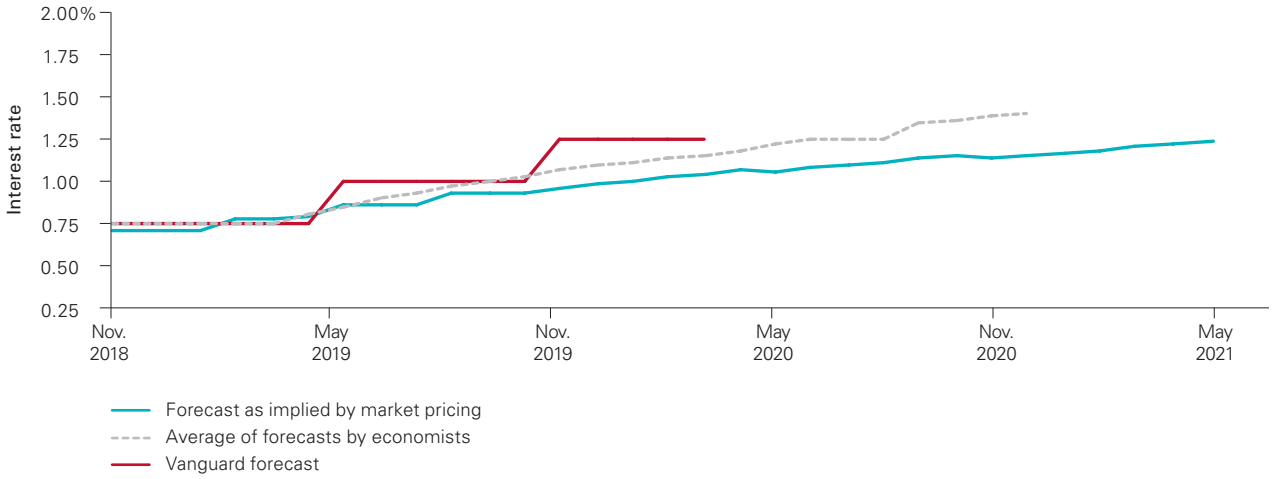
Bank of England to hike rates twice per year to stem inflation pressures

a. U.K. goods inflation is expected to fall because of a stronger pound



Sources: Bloomberg and the Office of National Statistics.

b. Bank of England rate view (versus forward curve and economists' forecast)



Notes: Economists' forecast reflects the median expectation from a survey conducted by Bloomberg. The forecast implied by market pricing is derived from the forward overnight interest rate swap curve.

Sources: Vanguard and Bloomberg.

China: Reprioritizing policy goals amid rising risks

The confluence of China's financial deleveraging campaign and rising geopolitical tensions with the United States has predictably shaken private sector confidence and slowed Chinese economic growth in 2018. These factors, along with the expectation of continued friction in China-U.S. relations, have compelled policymakers to reprioritize near-term growth stability over long-term economic restructuring and medium-term financial stability (see **Figure I-14**). As the government ramps up efforts to boost domestic demand in 2019 amid rising external and domestic challenges, we view the chance of a hard landing as low and expect China's economy to settle into a lower growth range of 6%–6.3% in 2019.

External headwinds have been rising as the United States and China approach a full-blown trade war. The stimulus from export front-loading is waning, and the true economic implications of U.S. tariffs will become apparent. We estimate the direct impact of current tariffs on China's GDP at a modest –0.15%, but this could accelerate to –0.60% with a 25% tariff on all imports from China.

FIGURE I-14

China's current easing is more moderate than in prior cycles

Priority		2014–2016	2017–2018	2018–2019 (projected)
Domestic objectives	Growth stability	**HIGH**	MEDIUM	**HIGH**
	Financial stability	LOW	HIGH	MEDIUM
	Structural reform	**HIGH**	MEDIUM	**HIGH**

Policy bias				
Monetary/ exchange rate policy	Interest rates			
	Quantity tools (reserve requirement ratio, liquidity tools)			
	Currency depreciation			
Fiscal policy	Infrastructure spending			
	Tax policy			
Regulatory	Bank credit			
	Shadow credit			
	Property regulations			

Source: Vanguard.

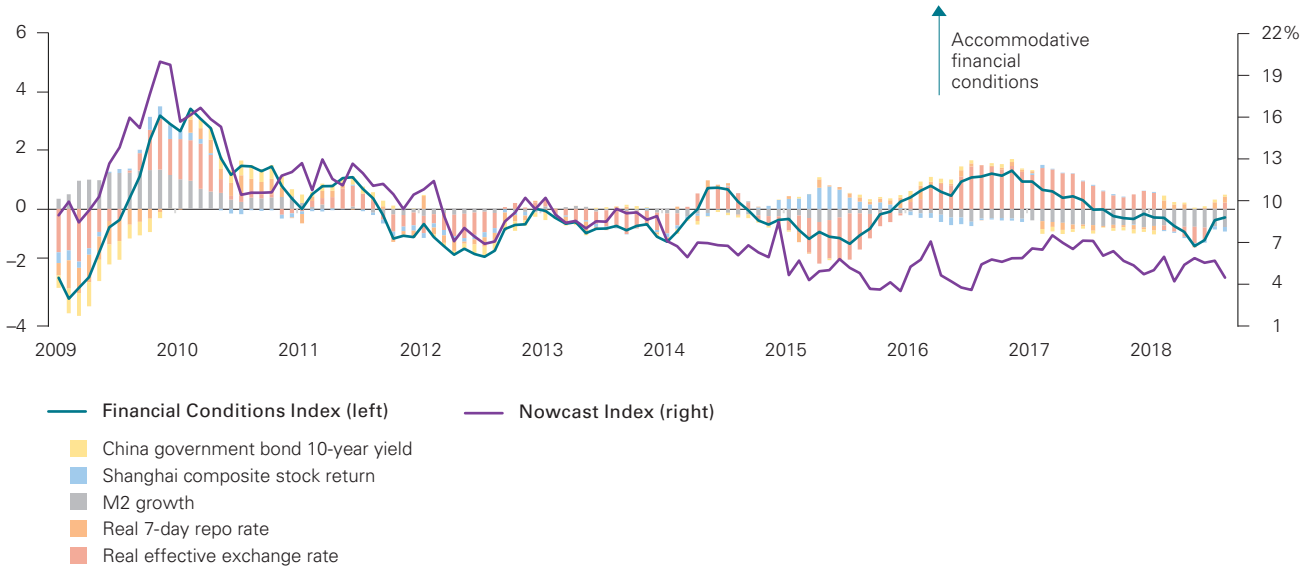
In addition, the potential downside is greater when considering the indirect impact on the labor market, consumption, business confidence, and financial markets. Although there are hopes that a trade deal is imminent, the U.S.-China conflict extends beyond trade to areas such as investment, technology, intellectual property rights, market access, and industry policy. Hence, the path to an eventual truce between the two economic superpowers is likely to be bumpy and prolonged.

China's 2016–2017 financial sector deleveraging campaign and regulatory crackdown on shadow banking had the adverse side effect of curbing credit to small and medium-sized private enterprises, a key component of China's new economy. As policymakers recognize the downside risk to growth, they are ready to pause or even modestly backtrack these deleveraging efforts to boost corporate sentiment; further monetary easing, such as required reserve ratio cuts, is in the pipeline (see **Figure I-15**). We expect regulatory reform aimed at encouraging entrepreneurship and private enterprise,

FIGURE I-15

Proactive policy stimulus should limit growth downside

Vanguard Financial Conditions Index versus Nowcast Index



Notes: Vanguard Financial Conditions Index is a VAR-weighted index of financial indicators. Positive values imply accommodative financial conditions; negative values imply tight conditions. Vanguard's Nowcast Index is designed to track China's economic growth in real time using a dynamic factor approach to weight economic and financial market indicators, accounting for co-movement between the factors.

Source: Vanguard calculations, based on data from Bloomberg, CEIC, and Thomson Reuters Datastream.

alongside fiscal expansionary measures including infrastructure investment and tax cuts, to combat the effects of a trade war.

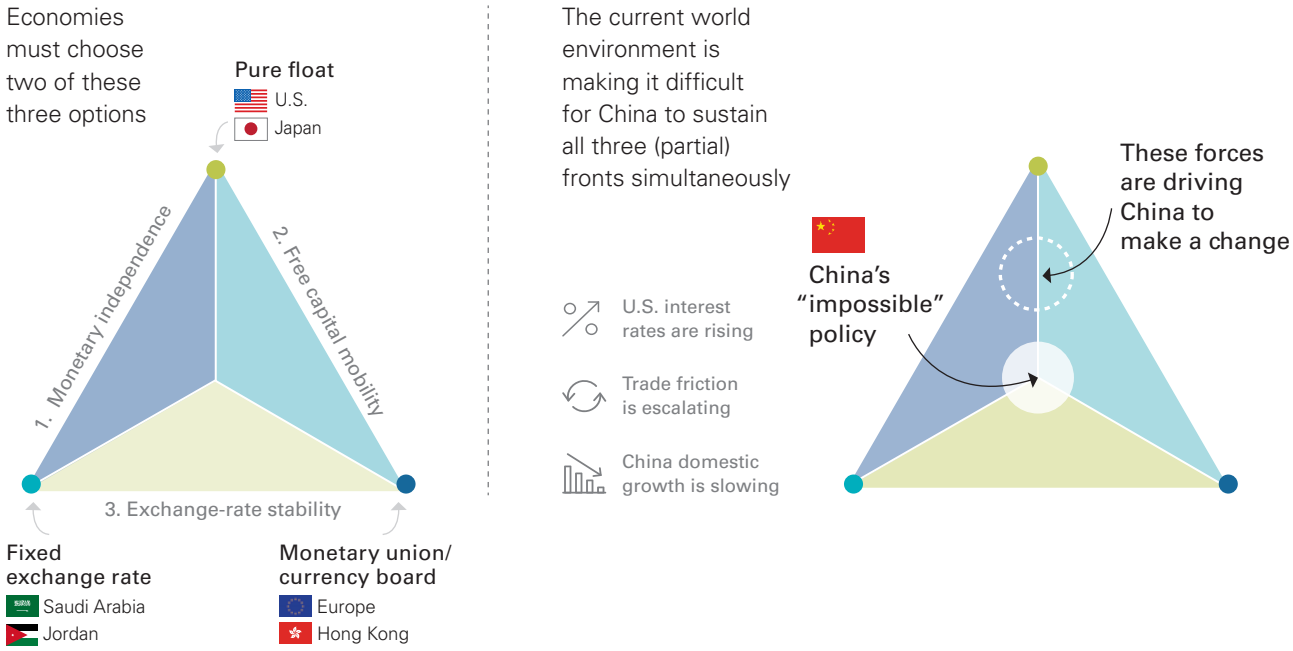
Responding to the slowdown through monetary policy easing revives the "impossible trinity" as the United States continues to raise interest rates.[5] However, we believe a repeat of 2015–2016, when China foreign exchange reserves declined by more than $1 trillion in 18 months amid a surge in capital outflows, is unlikely. With near-term growth stability becoming the top priority, monetary policy independence will prove critical in keeping domestic rates low in a global rising rate environment. As such, an "asymmetric capital control" is likely to be maintained, with tight control on outflows and inflows welcomed. A more flexible exchange rate regime should be allowed, especially when modest depreciation will be needed to offset the negative impact stemming from tariffs (see **Figure I-16**).

Although navigating the trilemma is a challenge in its own right, an ideal "Goldilocks" policy response would neutralize economic headwinds while pushing forward market reforms and safeguarding medium-term financial stability. The government will strive to avoid both under- and over-easing the economy in 2019, but achieving

FIGURE I-16

From an impossible tri-brid approach to a standard corner solution

China is moving toward less capital-account openness and more exchange-rate flexibility



Source: Vanguard.

5 The impossible trinity is a trilemma in international economics that states that it is impossible to have a fixed foreign exchange rate, free capital movement (absence of capital controls), and independent monetary policy at the same time.

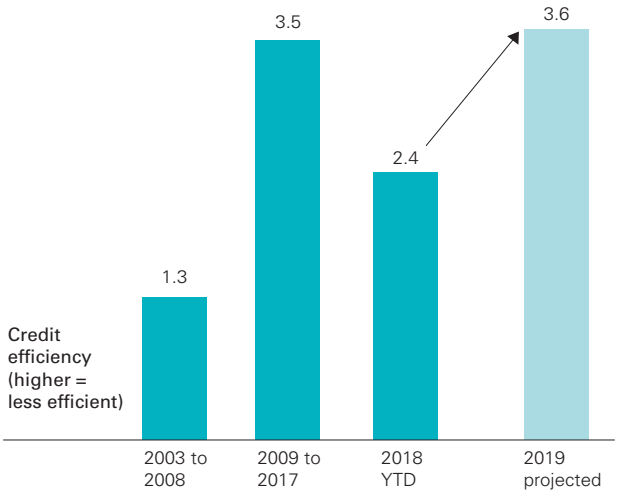
this balance amid multiple goals will be difficult. While we are not as concerned about the near-term growth outlook as many in the market and view the chance of a hard landing as rather low, there are rising concerns that the government is delaying the reforms necessary to alleviate medium-term financial risk and ultimately address distortions in resource allocation (see **Figure I-17**).[6]

Even though the path is likely to be bumpy, we remain cautiously optimistic that China will resume its economic liberalization and reform as a necessary response to enduring international and domestic pressures. The era of "growth at all costs" is coming to an end, and previous inefficiencies and excesses that were masked by China's size and population can no longer go unaddressed. Reform efforts in recent years have demonstrated China's commitment to emphasizing high-quality growth and progressing to a technology-intensive consumption- and service-oriented economy. We believe that continued reforms to improve corporate governance of state-owned enterprises; strengthening intellectual property protection; and providing a level playing field for all firms, including foreign, private, and state-owned enterprises, are critical for China's long-term development through more efficient capital allocation in domestic and international markets. In our view, this is China's ultimate path to higher productivity and future growth potential.

FIGURE I-17

The risk of "kicking the can down the road" remains

Credit efficiency to deteriorate modestly in 2019



Note: Credit efficiency is defined as debt in the economy divided by nominal GDP. 2018 YTD is through September.

Source: Vanguard calculations, based on data from CEIC.

Japan: No exit, but more flexibility

The Japanese economy has managed to weather multiple natural disasters and softening external demand in 2018, thanks to strong domestic demand. In 2019, impediments to growth will likely intensify, given the scheduled consumption tax hike and potential escalation of U.S. protectionism, notably auto tariffs. Nonetheless, we see the downside as being contained because the negative impact should be offset by continued labor market strength, strong corporate profitability, and various mitigating fiscal measures. Households' net burden from the 2019 tax hike is estimated to be only a quarter of the 2014 tax hike as a larger portion of the tax revenue (roughly half, versus one-fifth in 2014) will be rechanneled back to the real economy through social security enhancements, cash subsidies, and infrastructure projects. Overall, we expect growth to revert to its trend of approximately 0.8% in 2019, with the risk skewed modestly to the downside.

Although a positive output gap and tight labor market would warrant monetary policy normalization in most economies, the decades-long struggle with suppressed inflation expectations precludes the Bank of Japan from tightening.We expect core inflation to gradually rise toward 1% throughout 2019, but it is likely several years away from the BoJ target of 2% as a result of these muted expectations (**Figure I-18**).

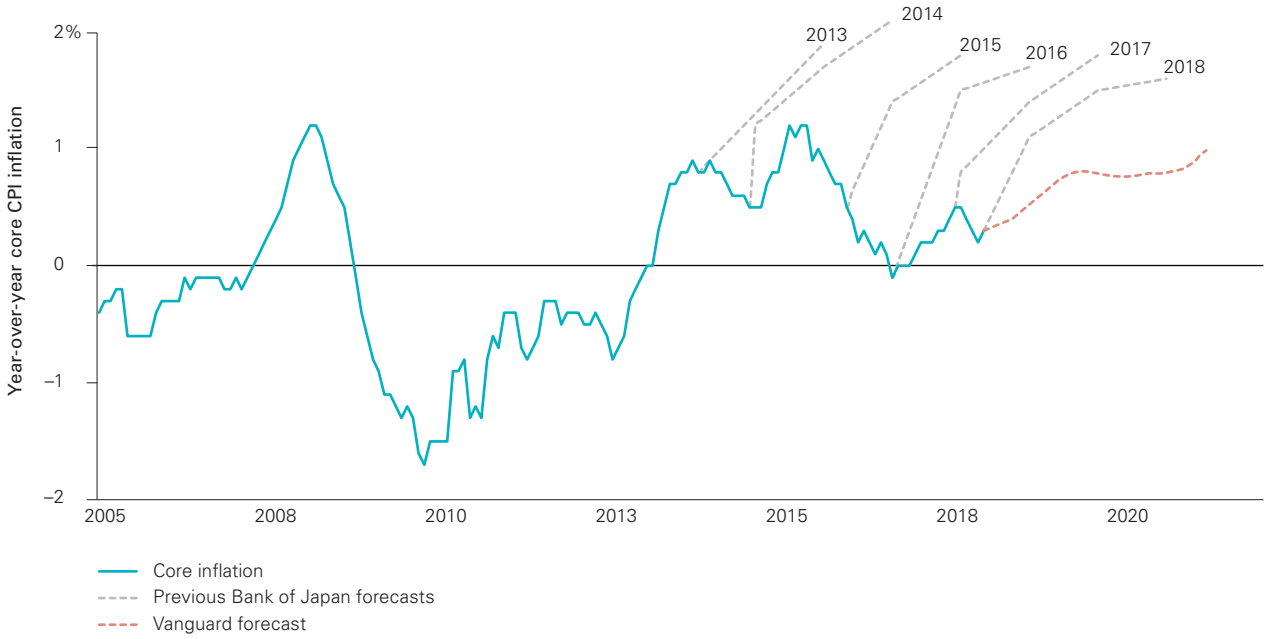
A standard Taylor rule would imply that the bank's current policy stance is accommodative enough, even under our more conservative forecast for inflation and the output gap (see **Figure I-19**). Nonetheless, the Taylor rule estimate based on market inflation expectations demonstrates that the current policy rate is still not low enough to achieve the BoJ's 2% inflation target. This dichotomy is a result of a number of structural factors—

6 See the 2017 Vanguard Global Macro Matters paper *SOE Reforms—China's Path to Higher Productivity.*

FIGURE I-18

The Bank of Japan's inflation woes

Core inflation forecasts (Bank of Japan and Vanguard)



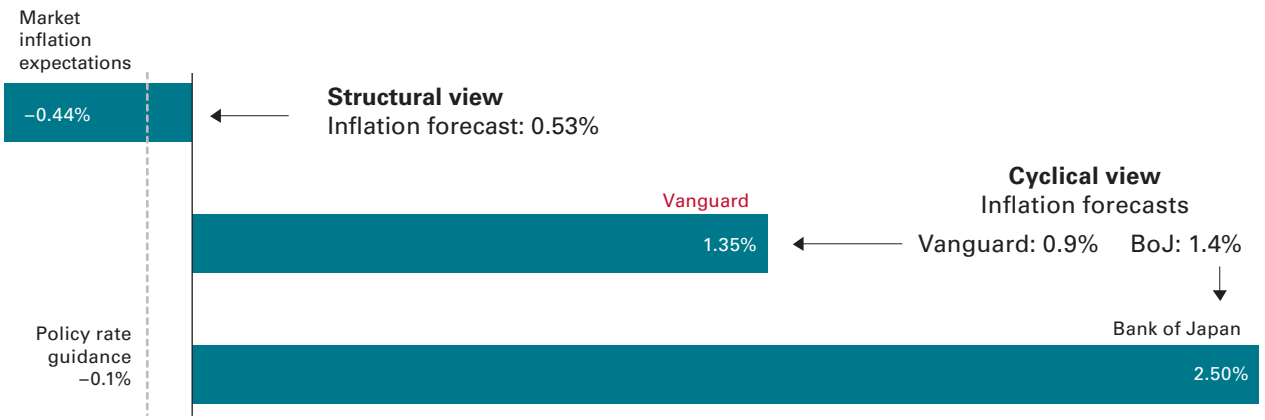
Notes: Core CPI includes all items except fresh food and energy. This measure is also referred to as BoJ Core.

Source: Vanguard calculations, based on data from Thomson Reuters and the Bank of Japan.

FIGURE I-19

A cyclical view of slack suggests current easing is sufficient, but a structural view suggests otherwise

Stylized Taylor rule estimates using inflation forecasts



Notes: The Taylor rule estimate using market inflation expectations takes a structural view of policy setting, taking into account only inflation expectations. It tends to be structurally low because of its highly adaptive nature, with no consideration given to what a cyclical upswing and tight labor market could do to boost prices. Vanguard's and the BoJ's forecasts take a cyclical view of slack by also factoring in the pass-through effects (which are limited in Vanguard's assessment) of a positive output gap and tight labor markets on prices.

Source: Vanguard calculations, based on data from the BoJ, IMF, Bloomberg, and Moody's Analytics Data Buffet.

including labor market duality, the more adaptive nature of Japan's inflation expectations, and global technology advancement—that are preventing labor market and economic pressure from being translated into wage and price increases. As a result, the BoJ is unlikely to raise rates in 2019 and should maintain its forward guidance that interest rates remain low for an extended period.

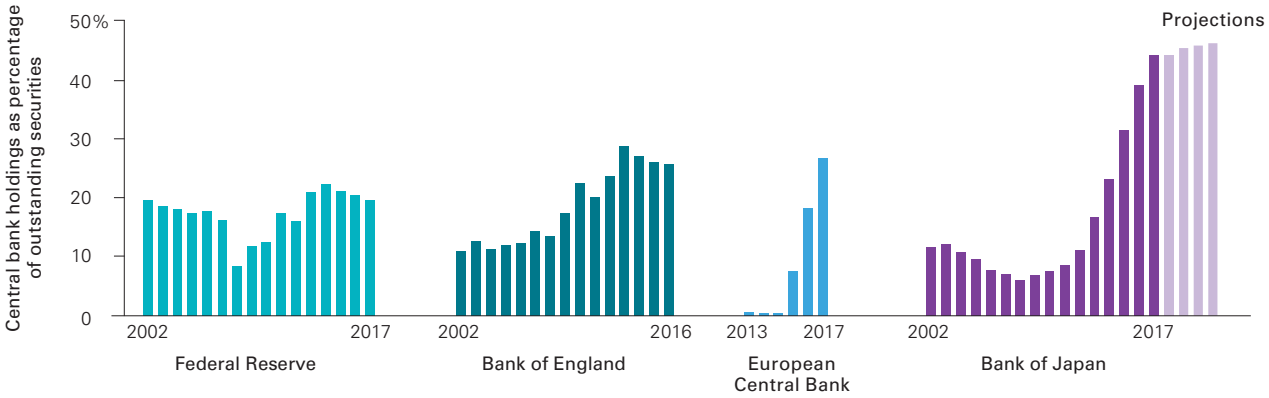
However, additional tweaks and policy fine-tuning measures will likely occur over the next few years. The BoJ is mindful that the side effects accompanying prolonged monetary easing, such as the decrease in Japanese government bond (JGB) market liquidity and deteriorating profitability of financial institutions, are becoming more prominent. The bank's quantitative and qualitative easing program continues to absorb most of the JGBs issued (see **Figure I-20**) and a prevailing low-yield environment continues to dampen profit margins for banks.

Hence, the BoJ will continue to seek more flexibility to enhance the sustainability and credibility of its policy framework without hampering the benefits of easy money. For safe-haven assets such as JGBs, this could mean giving a wider trading band than the current +/- 20 basis points for the 10-year yield. Although this could indirectly result in higher yields, it is by no means an exit from monetary stimulus. The yield curve control target will likely be anchored at approximately 0%, and a negative interest rate policy will still be in place. For risky assets such as the bank's annual 6 trillion yen ETF purchase program, fine-tuning could imply a "soft taper" as in the case of current JGB purchases, with the bank

FIGURE I-20

The side effects of monetary easing are growing

Elevated ownership of outstanding government bond securities poses liquidity risks



Source: Vanguard calculations, based on data from Moody's Analytics Data Buffet, Bloomberg, and the IMF.

intervening only when the equity market falls below a certain threshold instead of treating the 6 trillion yen as a fixed, hard target.

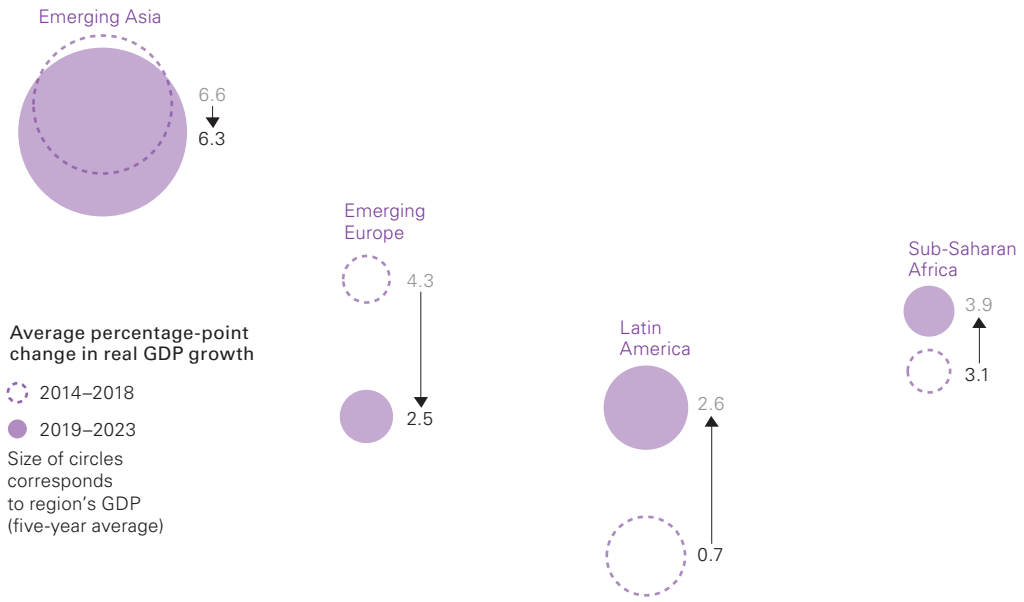
Japan's long-term economic growth prospects remain well below the average of G20 countries. Without the necessary structural reforms, accommodative monetary policy alone is unlikely to lift labor supply, investment, and productivity—and, hence, potential growth. In our view, confidence about economic prospects in the medium term, instead of low interest rates or easy access to credit, is the most important factor driving business investment decisions. The "third arrow" of Prime Minister Shinzo Abe's economic platform has notched notable wins in corporate tax and governance reforms, enhancing labor participation of women and older and foreign workers, reducing pay disparity between regular and nonregular employees, and embracing global trade liberalization. However, progress on immigration reform has been marginal, even as the nation bears a decades-long demographic headwind. Continued deregulation and broader adoption of automation technology, especially in the consumption and service sectors, will be critical to supporting productivity growth in the long term.

Emerging markets: A mixed bag

Growth for emerging markets in aggregate is expected to be 4.6% in 2019; however, there will be vast heterogeneity among and within regions (see **Figure I-21**). The Asia region is expected to register slower growth as China slows down, but it remains the fastest growing of the emerging-market regions. China is projected to register growth lower than 6.5% in 2019. Emerging-market Asian economies are deeply integrated with China-led supply chains and will feel the repercussions of declining export demand from

FIGURE I-21

GDP growth rate



Notes: GDP based on current prices was used to create weighted markers for the regions. Real GDP growth data from the IMF was averaged for the five-year periods 2014–2018 and 2019–2023.

Source: IMF DataMapper.

China. However, the newly ratified Comprehensive and Progressive Agreement for Trans-Pacific Partnership could lessen the blow.

In the Latin American region, the growth projection is 2.8%, an improvement from last year. Central bank policy rates across most emerging-market regions remain low compared with the pre-normalization era (see **Figure I-22**). Across most emerging markets, inflation and currency volatility will determine the pace of central bank hikes in 2019. Apart from some recent volatility, emerging-market currency volatility since normalization (2016–2018) has been lower than during the pre-normalization period (2010–2015).

Most risks for the emerging-market sector are external. The most notable are the U.S.-China trade tensions and a slowdown in China. Monetary policy normalization by the U.S. Federal Reserve has led to tighter financial conditions for emerging markets; this in turn has translated to volatility in emerging-market currencies and declining capital inflows. Populism and geopolitical risks, both at home and abroad, are downside risks for emerging markets. Corporate leverage has increased in emerging markets since the global financial crisis, with high levels of corporate debt issuance in nonlocal currency. A strengthening dollar could severely damage corporate balance sheets within emerging markets.

FIGURE I-22

Idiosyncratic emerging markets

Emerging markets represent a mixed basket; we expect tighter monetary policy to affect growth in countries with unsustainable borrowing

1. Current account (percentage of GDP as of December 2018)
2. Real effective exchange rate (REER) misalignment (as of November 2018)
3. International reserves (percentage of GDP as of Q4 2017)
4. Ease of doing business rank (as of Q4 2017)
5. Household debt (percentage of GDP as of Q1 2018)
6. Per capita GDP (in USD as of Q3 2018)
7. Inflation (percentage change in consumer prices as of September 2018)

	1	2	3	4	5	6	7
Emerging markets Asia	1.0%	3.2%	20%	68	42.6%	$6,104	3.4%
Emerging markets Europe	–0.2%	3.1%	20%	50	24.0%	$11,322	7.2%
Latin America	–2.2%	6.1%	20%	77	23.5%	$9,780	9.8%

Notes: Real exchange rate misalignment is defined as the deviation of the real effective exchange rate (REER) from its past five-year average. This vulnerability indicator is two-sided. Rapid appreciations or depreciations of a country's exchange rate may indicate that flows of foreign funds into or out of the economy may be unsustainable. Depreciations in the exchange rate also reduce purchasing power and increase the risk of economic slowdown. The World Bank Ease of Doing Business score serves as the basis for ranking economies on their business environment and is an indication of an economy's position relative to that of other economies.

Source: Vanguard calculations, based on data from the IMF *World Economic Outlook*, the Bureau of Industry and Security, the World Bank, and Moody's Analytics Data Buffet.

II. Global capital markets outlook

Vanguard's outlook for global stocks and bonds is subdued, yet modestly higher than this time last year. Downside risks are more elevated in the equity market than in the bond market. After factoring in higher short-term interest rates and non-U.S. equity market valuations, the net result is a modestly higher global market outlook for the next decade.

The market's efficient frontier of expected returns for a unit of portfolio risk is still in a lower return orbit. More important, common asset-return-centric portfolio tilts, seeking higher return or yield, are unlikely to escape the strong gravity of low return forces in play.

Global equity markets: High risk, low return

Global equity has rewarded patient investors with a 12.6% annualized return in the 9½ years since the lows of the global financial crisis. As part of this strong performance, valuations are currently much higher. For instance, valuations in the U.S. and emerging markets appear stretched relative to our proprietary fair-value benchmark, thereby making our global equity outlook guarded.

The ten-year outlook for global equities, similar to last year, is centered in the 4.5%–6.5% range based on our Vanguard Capital Markets Model (VCMM) projections.

Expected returns for the U.S. stock market are lower than those for international markets, underscoring the benefits of global equity strategies in this environment.

Equity valuations and Vanguard's "fair-value" CAPE

As discussed in a Vanguard Global Macro Matters piece titled *As U.S. Stock Prices Rise, the Risk-Return Trade-off Gets Tricky,* price/earnings ratios—including Robert Shiller's cyclically adjusted P/E ratio (CAPE)—are at alarming levels. The current CAPE level corresponds to the 95th percentile of its historical range of values, approaching highs seen during the dot-com era. However, a straight comparison of CAPE (or other valuation multiples) with its historical averages can be misleading, failing to account for today's low inflation and interest rates.

Because a secular decline in interest rates and inflation depresses the discount rates used in asset-pricing models, investors are willing to pay a higher price for future earnings, thus inflating P/E ratios. Therefore, a high CAPE may not be indicating overvalued stock prices but rather may be an outcome of low inflation and interest rates.

Vanguard's fair-value CAPE accounts for current interest rates and inflation levels and provides a more useful time-varying benchmark against which the traditional CAPE ratios can be compared, instead of the popular use of historical average benchmarks.

Figure II-1a plots Shiller's CAPE versus our fair-value model. For instance, in the late 1990s, the difference between the CAPE and our fair-value estimate would have suggested a bubble. Today, although the CAPE is approaching historical highs, it's not grossly overvalued, as it would be in a bubble, when compared with its fair value.

We have extended this fair-value concept to other regions. As illustrated in **Figure II-1b**, our equity valuation dashboard indicates that non-U.S. developed markets are fairly valued, even after adjusting valuations for rates and inflation. For emerging markets, it is important to note that their stocks typically trade at lower multiples than those in developed markets because of the higher risk and higher earnings yield required by investors. Even after adjusting for higher risk, emerging markets are overvalued.

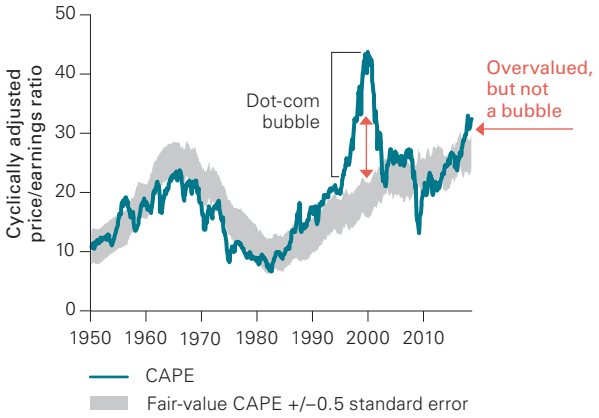
Global equities and the diversification of domestic risks

As shown in **Figure II-2**, our expected return outlook for U.S. equities over the next decade is centered in the 3%–5% range, in stark contrast with the 10.6% annualized return generated over the last 30 years. Although valuation expansion proved to be a tailwind to returns over those 30 years, we expect valuations to contract as interest rates gradually rise over the next decade. The expected equity risk premium (over cash) for the U.S. market appears compressed, primarily because of elevated valuations today.

FIGURE II-1

Divergence in global equity valuations

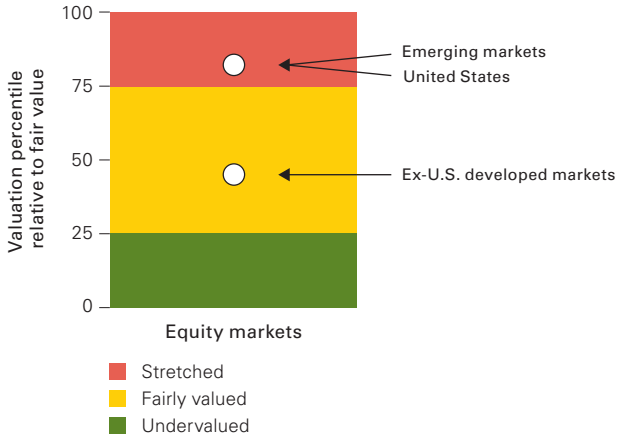
a. CAPE for the U.S. S&P 500 Index is approaching overvalued territory



Notes: Fair-value CAPE is based on a statistical model that corrects CAPE measures for the level of inflation expectations and for lower interest rates. The statistical model specification is a three-variable vector error correction (VEC), including equity earnings yields, ten-year trailing inflation, and ten-year U.S. Treasury yields estimated over the period January 1940–September 2018.

Source: Vanguard calculations, based on data from Robert Shiller's website (aida.wss.yale.edu/~shiller/data.htm), the U.S. Bureau of Labor Statistics, and the Federal Reserve Board.

b. Ex-U.S. developed markets appear to be fairly priced



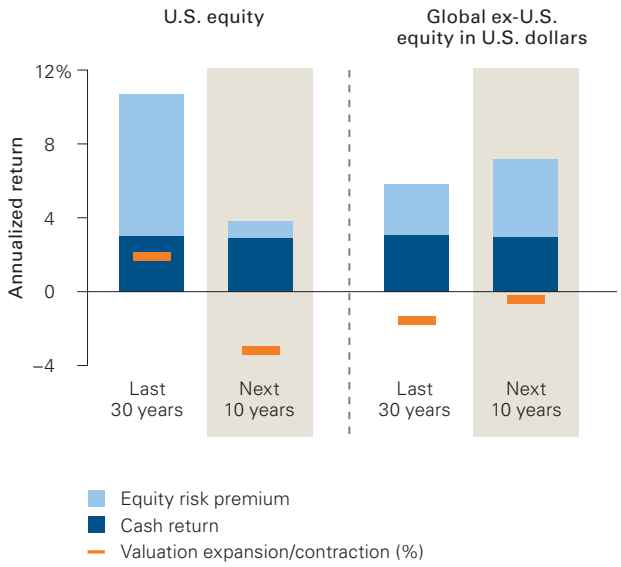
Notes: The U.S. valuation measure is the current CAPE percentile relative to fair-value CAPE for the S&P 500 Index from January 1940–September 2018. The developed markets valuation measure is the weighted average of each region's (Australia, United Kingdom, Germany, Japan, and Canada) current CAPE percentile relative to its own fair-value CAPE. The fair-value CAPE for the regions is a five-variable vector error correction (VEC) with equity earnings yield (MSCI index), ten-year trailing inflation, ten-year government bond yield, equity volatility, and bond volatility estimated over the period January 1970 to September 2018. The emerging markets valuation measure is a composite of emerging markets-to-U.S. relative valuations and current U.S. CAPE percentile relative to fair-value CAPE. The relative valuation is the current ratio of emerging markets-to-U.S. price-to-earnings metrics relative to its historical average, using three-year trailing average earnings from January 1990 to September 2018.

Source: Vanguard calculations, based on data from Robert Shiller's website (aida.wss.yale.edu/~shiller/data.htm), the U.S. Bureau of Labor Statistics, the Federal Reserve Board, and Thomson Reuters Datastream.

FIGURE II-2

The outlook for equity markets is subdued

a. Exposure to non-U.S. equities may be beneficial



Notes: Data for the last 30 years are from January 1988–December 2017, in USD. Next-10-year data are based on the median of 10,000 simulations from VCMM as of September 30, 2018, in USD. Historical returns are computed using indexes defined in "Indexes used in our historical calculations" on page 5. See Appendix for further details on asset classes shown here.

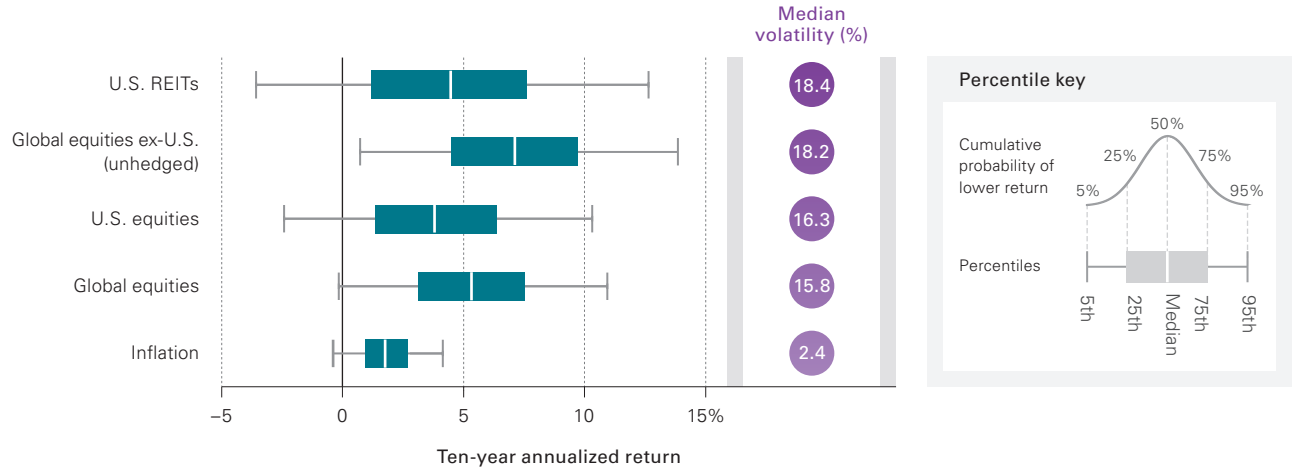
Source: Vanguard calculations, based on data from Dimson-Marsh-Staunton Global Returns Dataset, FactSet, Morningstar Direct, and Thomson Reuters Datastream.

From a U.S. investor's perspective, the expected return outlook for non-U.S. equity markets is in the 6%–8% range, modestly higher than that of U.S. equity (**Figures II-2a** and **II-2b**). The equity risk premium for non-U.S. equity markets, however, may be slightly higher going forward, as the valuation contraction may not be as drastic as that experienced over the last three decades.

This result is a function of the currently moderate level of valuations, as well as long-term expectations of the U.S. dollar decline priced in by the markets, especially with respect to other major currencies such as the euro and yen.

Our ten-year outlook for global equity (in USD) is in the 4.5%–6.5% range, as seen in Figure II-2b. Although the case for global diversification is particularly strong now, for the purposes of asset allocation we caution investors against implementing tactical tilts based on just the median expected return—that is, ignoring the entire distribution of asset returns and their correlations.

b. Equity market ten-year return outlook: Setting reasonable expectations



Notes: Forecast corresponds to distribution of 10,000 VCMM simulations for ten-year annualized nominal returns as of September 30, 2018, in USD, for asset classes shown. Median volatility is the 50th percentile of an asset class's distribution of annual standardized deviation of returns. See Appendix for further details on asset classes shown here.

Source: Vanguard.

Global fixed income markets: An improved outlook

Higher interest rates have improved our outlook for fixed income compared with this time last year. As shown in **Figure II-3**, it is in the 2.5%–4.5% range for the next decade. Expected returns for the riskier fixed income sub-asset classes appear more differentiated compared with previous years, in part because of a recent expansion in credit spreads, thereby giving them the cushion to capture the risk premium.

U.S. interest rates: A slightly higher yield curve

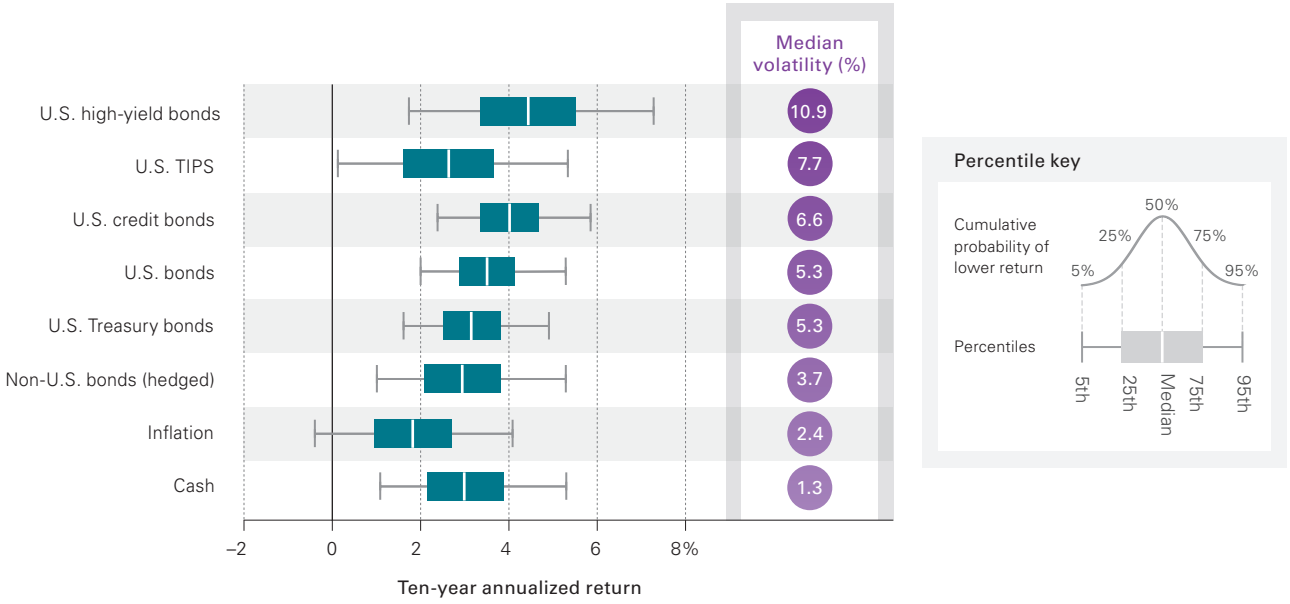
Despite the expected increase in short-term policy rates, the risk of a material rise in long-term interest rates remains modest. As illustrated in **Figure II-4**, duration strategies are fairly valued and less risky than investors may believe in a rising rate environment. This is because we expect the short end of the yield curve to rise more than the long end over the next decade, as the long rates are anchored by inflation expectations.

Corporate bonds: Higher risk, higher return

The central tendency for U.S. credit bonds (specifically, the Bloomberg Barclays U.S. Credit Bond Index) is in the 3.0%–5.0% range, modestly higher than last year because of the rise in the underlying Treasury rates. The central tendency for high-yield corporate bonds (specifically, the Bloomberg Barclays U.S. High Yield Corporate Bond Index) is in the 3.5%–5.5% range, again,

FIGURE II-3

Higher rates have pushed expected fixed income returns higher

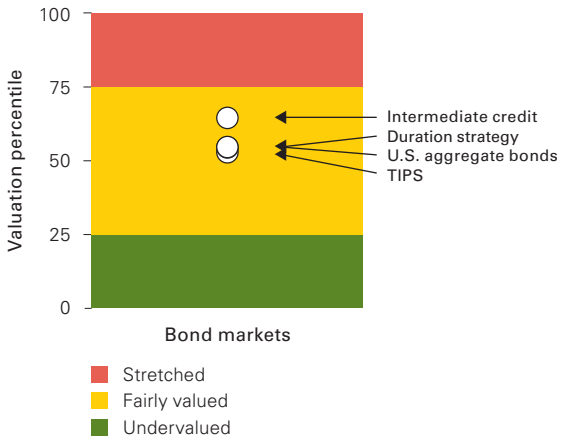


Notes: Forecast corresponds to distribution of 10,000 VCMM simulations for ten-year annualized nominal returns as of September 30, 2018, in USD for asset classes shown. Median volatility is the 50th percentile of an asset class's distribution of annual standardized deviation of returns. See Appendix for further details on asset classes shown here.

Source: Vanguard.

FIGURE II-4

Fixed income appears to be fairly valued



Notes: Valuation percentiles are relative to Year 30 projections from VCMM. Intermediate credit and U.S. aggregate bond valuations are current spreads relative to Year 30 from VCMM. Duration valuation is the expected return differential over the next decade between the long-term Treasury index and the short-term Treasury index relative to Years 21–30. The TIPS valuation is the ten-year-ahead annualized inflation expectation relative to Years 21–30.

Source: Vanguard.

higher because of higher underlying Treasury rates. We urge investors to be cautious in reaching for yield in segments such as high-yield corporates, not only because of the higher expected volatility that accompanies the higher yield but also because of the segment's correlation to the equity markets.

As shown in Figure II-5 (on page 37), a 20% overweight or tilt to high-yield corporates increases a portfolio's volatility excessively relative to a marginal increase in return. The sensitivity of spreads to the economic environment is much larger for high-yield corporate bonds than for other higher-quality segments of the U.S. fixed income market, which also contributes to an increased investment risk.

Treasury Inflation-Protected Securities (TIPS): Markets don't see inflation coming

Break-even inflation expectations inferred from the U.S. TIPS market remain close to the Fed's 2% inflation target and the VCMM long-term median levels. Markets are placing low odds for higher inflation outcomes. Although not attractive from a return perspective, TIPS could be a valuable inflation hedge for some institutions and investors sensitive to inflation risk.

Domestic versus international: Benefits of diversification remain

Although the central tendency of expected return for non-U.S. aggregate bonds appears to be marginally lower than that of U.S. aggregate bonds (see Figure II-3 on page 34), we expect the diversification benefits of global fixed income in a balanced portfolio to persist under most scenarios.

Yields in most developed markets are historically low, particularly in Europe and Japan, yet diversification through exposure to hedged non-U.S. bonds should help offset some risk specific to the U.S. fixed income market (Phillips et al., 2014).

Less-than-perfect correlation between two of the main drivers of bond returns—interest rates and inflation—is expected as global central bank policies are likely to diverge in the near term. Diversification with non-U.S. bonds also helps diversify the risk of policy mistakes by central banks.

Portfolio implications: A low return orbit

Investors have experienced spectacular returns over the last few decades because of two of the strongest equity bull markets in U.S. history, in addition to a secular decline in interest rates from 1980s highs. Figure II-5a contrasts our 4%–6% outlook for a global 60% equity/40% bond portfolio for the next decade against the extraordinary 9.4% return since 1970 and the 7.3% return since 1990. As highlighted in previous sections, elevated equity valuations and low rates have pulled the market's efficient frontier of expected returns into a lower orbit. The efficient frontier is also flatter (that is, with less return per unit of risk), as seen from the return and volatility expectations of balanced portfolios, as shown in Figure II-5c.

To try to increase portfolio returns, a popular strategy is to overweight higher-expected-return assets or higher-yield assets. A common "reach for yield" strategy is to overweight high-yield corporates. Similarly, "reach for return" strategies involve tilting the portfolio toward emerging-market equities to take advantage of higher growth prospects. Home bias causes some to shy away from non-U.S. equities.

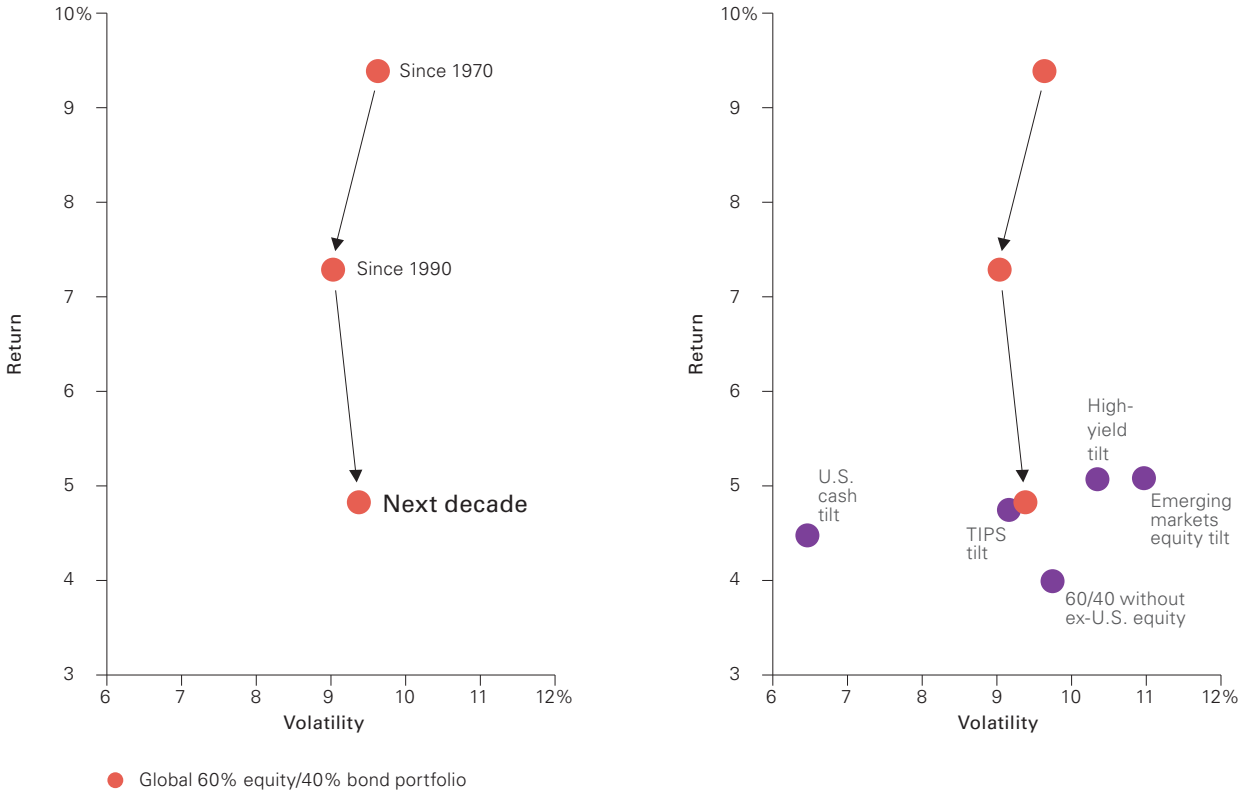
Figure II-5b illustrates that these common return-centric strategies are unlikely, by themselves, to restore portfolios to the higher orbit of historical returns.

FIGURE II-5

Asset allocation for a challenging decade

a. A lower return orbit ...

b. ... that popular "active tilts" will likely fail to escape



c. Projected ten-year annualized nominal returns as of September 2018

	Portfolios	5th percentile	25th percentile	Median	75th percentile	95th percentile	Median volatility
Global balanced portfolios	100% bonds	1.8%	2.7%	3.4%	4.1%	5.1%	4.5%
	20/80 stock/bond	2.3%	3.3%	4.0%	4.7%	5.9%	4.5%
	60/40 stock/bond	1.5%	3.5%	4.9%	6.3%	8.4%	9.4%
	80/20 stock/bond	0.8%	3.4%	5.2%	7.0%	9.7%	12.5%
	100% equity	–0.1%	3.1%	5.3%	7.6%	11.0%	15.8%
	60/40 stock/bond	**1.5%**	**3.5%**	**4.9%**	**6.3%**	**8.4%**	**9.4%**
Portfolios with common 20% tilts relative to 60/40 stock/bond	High-yield tilt	1.8%	3.7%	5.1%	6.5%	8.7%	**10.4%**
	Inflation protection tilt	1.4%	3.4%	4.8%	6.2%	8.4%	**9.2%**
	Emerging markets equity tilt	1.4%	3.6%	5.1%	6.6%	8.8%	**11.0%**
	U.S. cash tilt	1.9%	3.4%	4.4%	5.5%	7.1%	**6.4%**
	60/40 without ex-U.S. equity	0.1%	2.5%	4.0%	5.6%	8.1%	**9.8%**

Notes: The figure shows summary statistics of 10,000 VCMM simulations for projected ten-year annualized nominal returns as of September 2018 in USD before costs. Historical returns are computed using indexes defined in "Indexes used in our historical calculations" on page 5. The global equity portfolio is 60% U.S. equity and 40% global ex-U.S. equity. The global bond portfolio is 70% U.S. bonds and 30% global ex-U.S. bonds. Portfolios with tilts include a 20% tilt to the asset specified funded from the fixed income allocation for the fixed income tilts and the equity allocation for the equity tilts.

Source: Vanguard.

Portfolio construction strategies for three potential economic scenarios

Based on our global economic perspective, we examine in Figure II-6 three possible economic scenarios occurring over the next three years. The high-growth scenario illustrates an upside risk scenario of sustained economic growth with tighter labor markets and a moderate pickup in wages and inflation. The two others are a status quo scenario driven by continued low volatility with positive financial conditions and a recessionary scenario caused by a turn in the business cycle and a correction in the equity markets.

Figure II-6 shows optimal portfolios for each scenario that vary their exposures to the following four factors, or risk premiums: equity risk premium, term premium, credit premium, and inflation-risk premium. In a high-growth scenario, expected global equity returns would be high, causing the efficient frontier to be steep. Long and short rates would also rise faster than expected, resulting in an optimal portfolio loading on equity and short duration.

A recessionary-scenario portfolio would underweight equity and overweight long duration. Surprisingly, the allocation to U.S. equity remains rather large, as the portfolio that is also heavy on long-term Treasuries derives a larger diversification benefit from lower-returning U.S. equity (especially in a recession) than from including higher-returning non-U.S. equity assets. The portfolio strategy in a status quo scenario is well-diversified.

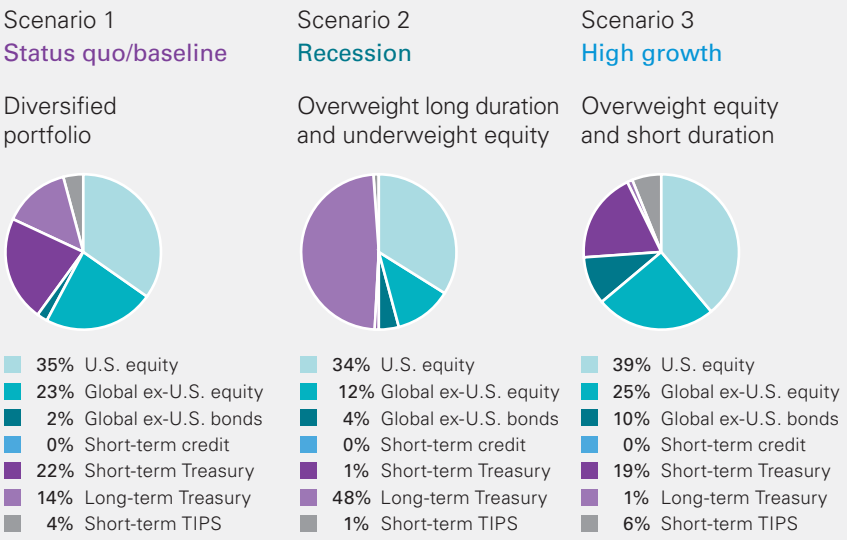
Using our VCMM simulations, we are able not only to illustrate the effectiveness of various portfolio strategies designed for each scenario but also to show the risks of such strategies. The following conclusions can be drawn from our analysis:

1. **Portfolios designed for specific macroeconomic scenarios entail important trade-offs:** If the scenario for which the portfolio was designed does not take place, then the portfolio performance is the worst of all the options.
2. **A balanced portfolio works well for investors who are agnostic about the future state of the economy:** The 60/40 balanced portfolio is an "all-weather" strategy, with either top or middle-of-the-road performance in each scenario.
3. **Portfolio tilts should be done within an optimization framework:** Ad hoc tilts ignore correlations among assets and lead to inefficient portfolios. For instance, in a recession-scenario strategy, U.S. equities can be relatively overweighted (as opposed to underweighted) because of the added diversification benefits of long-term bonds.

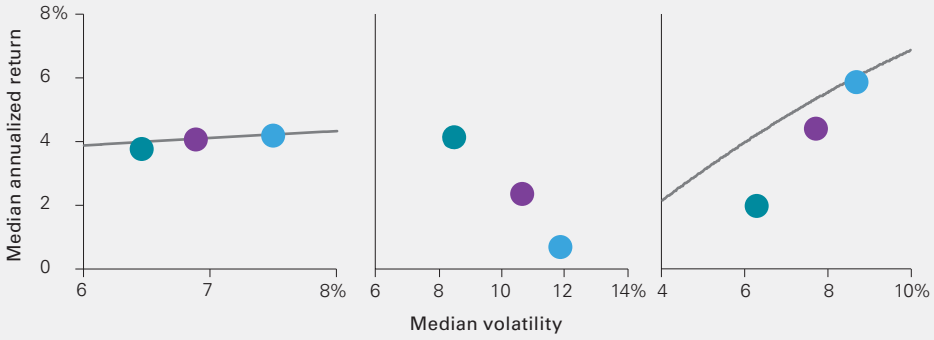
FIGURE II-6

Cyclical surprises and asset allocation trade-offs

a. Optimal portfolios vary for different economic environments



b. A diversified portfolio is not always the best, but it's never the worst



	Scenario 1	Scenario 2	Scenario 3
Best	Diversified portfolio	Overweight long duration and underweight equity	Overweight equity and short duration
Second-best	Overweight equity and short duration	Diversified portfolio	Diversified portfolio
Worst	Overweight long duration and underweight equity	Overweight equity and short duration	Overweight long duration and underweight equity

c. Portfolios designed for a single scenario are tempting but can be risky

Strategy **upside** relative to balanced portfolio	**1.4% higher annualized return** with 2.1% lower volatility in a recessionary scenario	**1.1% higher annualized return** with 1.1% higher volatility in a high-growth scenario
Strategy **downside** relative to balanced portfolio	**1.8% lower annualized return** with 1.4% lower volatility in a high-growth scenario	**1.2% lower annualized return** with 1.2% lower volatility in a a recessionary scenario

Notes: Performance is relative to the efficient frontier. Portfolios are selected from the frontier based on a fixed risk-aversion level using a utility function-based optimization model. The forecast displays a simulation of three-year annualized returns of asset classes shown as of September 2018. Scenarios are derived from sorting the VCMM simulations based on rates, growth, volatility, and equity return. The three scenarios are a subset of the 10,000 VCMM simulations. See Appendix for further details on asset classes shown here.

Source: Vanguard.

Portfolio construction strategies: Time-tested principles apply

Contrary to suggestions that an environment of low rates and compressed equity risk premiums warrants some radically new investment strategy, Figure II-5 (on page 37) reveals that the diversification benefits of global fixed income and global equity are particularly compelling, given the simulated ranges of portfolio returns and volatility.

The market's efficient frontier of expected returns for a unit of portfolio risk is in a lower orbit. More important, common asset-return-centric portfolio tilts, seeking higher return or yield, are unlikely to escape the strong gravity of low-return forces in play, as they ignore the benefits of diversification. Modestly outperforming asset-return-centric tilts requires a portfolio-centric approach that leverages the benefits of diversification by weighing risk, return, and correlation simultaneously.

Our prior research shows that investment success is within the control of long-term investors (Aliaga-Díaz, et al., 2016). Factors within a long-term investor's control—such as saving more, working longer, spending less, and controlling investment costs—far outweigh the less reliable benefits of ad hoc asset-return-seeking tilts. Thus, decisions around saving more, spending less, and controlling costs will be much more important than portfolio tilts.

Investment objectives based either on fixed spending requirements or on fixed portfolio return targets may require investors to consciously weigh their options in conjunction with their risk-tolerance levels. Ultimately, our global market outlook suggests a somewhat more challenging environment ahead, yet one in which investors with an appropriate level of discipline, diversification, and patience are likely to be rewarded over the long term. Adhering to investment principles such as long-term focus, disciplined asset allocation, and periodic portfolio rebalancing will be more crucial than ever before.

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III. Appendix

About the Vanguard Capital Markets Model

IMPORTANT: The projections or other information generated by the Vanguard Capital Markets Model regarding the likelihood of various investment outcomes are hypothetical in nature, do not reflect actual investment results, and are not guarantees of future results. VCMM results will vary with each use and over time.

The VCMM projections are based on a statistical analysis of historical data. Future returns may behave differently from the historical patterns captured in the VCMM. More important, the VCMM may be underestimating extreme negative scenarios unobserved in the historical period on which the model estimation is based.

The VCMM is a proprietary financial simulation tool developed and maintained by Vanguard's Investment Strategy Group. The model forecasts distributions of future returns for a wide array of broad asset classes. Those asset classes include U.S. and international equity markets, several maturities of the U.S. Treasury and corporate fixed income markets, international fixed income markets, U.S. money markets, commodities, and certain alternative investment strategies. The theoretical and empirical foundation for the Vanguard Capital Markets Model is that the returns of various asset classes reflect the compensation investors require for bearing different types of systematic risk (beta). At the core of the model are estimates of the dynamic statistical relationship between risk factors and asset returns, obtained from statistical analysis based on available monthly financial and economic data. Using a system of estimated equations, the model then applies a Monte Carlo simulation method to project the estimated interrelationships among risk factors and asset classes as well as uncertainty and randomness over time. The model generates a large set of simulated outcomes for each asset class over several time horizons. Forecasts are obtained by computing measures of central tendency in these simulations. Results produced by the tool will vary with each use and over time.

The primary value of the VCMM is in its application to analyzing potential client portfolios. VCMM asset-class forecasts—comprising distributions of expected returns, volatilities, and correlations—are key to the evaluation of potential downside risks, various risk–return trade-offs, and the diversification benefits of various asset classes. Although central tendencies are generated in any return distribution, Vanguard stresses that focusing on the full range of potential outcomes for the assets considered, such as the data presented in this paper, is the most effective way to use VCMM output. We encourage readers interested in more details of the VCMM to read Vanguard's white paper (Davis et al., 2014).

The VCMM seeks to represent the uncertainty in the forecast by generating a wide range of potential outcomes. It is important to recognize that the VCMM does not impose "normality" on the return distributions, but rather is influenced by the so-called fat tails and skewness in the empirical distribution of modeled asset-class returns. Within the range of outcomes, individual experiences can be quite different, underscoring the varied nature of potential future paths. Indeed, this is a key reason why we approach asset-return outlooks in a distributional framework.

Index simulations

The long-term returns of our hypothetical portfolios are based on data for the appropriate market indexes through September 2018. We chose these benchmarks to provide the most complete history possible, and we apportioned the global allocations to align with Vanguard's guidance in constructing diversified portfolios. Asset classes and their representative forecast indexes are as follows:

- U.S. equities: MSCI US Broad Market Index.
- Global ex-U.S. equities: MSCI All Country World ex USA Index.
- U.S. REITs: FTSE/NAREIT US Real Estate Index.
- U.S. cash: U.S. 3-Month Treasury–constant maturity.
- U.S. Treasury bonds: Bloomberg Barclays U.S. Treasury Index.
- U.S. short-term Treasury bonds: Bloomberg Barclays U.S. 1–5 Year Treasury Bond Index.
- U.S. long-term Treasury bonds: Bloomberg Barclays U.S. Long Treasury Bond Index.
- U.S. credit bonds: Bloomberg Barclays U.S. Credit Bond Index.
- U.S. short-term credit bonds: Bloomberg Barclays U.S. 1–3 Year Credit Bond Index.
- U.S. high-yield corporate bonds: Bloomberg Barclays U.S. High Yield Corporate Bond Index.
- U.S. bonds: Bloomberg Barclays U.S. Aggregate Bond Index.
- Global ex-U.S. bonds: Bloomberg Barclays Global Aggregate ex-USD Index.
- U.S. TIPS: Bloomberg Barclays U.S. Treasury Inflation Protected Securities Index.
- U.S. short-term TIPS: Bloomberg Barclays U.S. 1–5 Year Treasury Inflation Protected Securities Index.

Notes on risk

All investing is subject to risk, including the possible loss of the money you invest. Past performance is no guarantee of future returns. Investments in bond funds are subject to interest rate, credit, and inflation risk. Foreign investing involves additional risks, including currency fluctuations and political uncertainty. Diversification does not ensure a profit or protect against a loss in a declining market. There is no guarantee that any particular asset allocation or mix of funds will meet your investment objectives or provide you with a given level of income. The performance of an index is not an exact representation of any particular investment, as you cannot invest directly in an index.

Stocks of companies in emerging markets are generally more risky than stocks of companies in developed countries. U.S. government backing of Treasury or agency securities applies only to the underlying securities and does not prevent price fluctuations. Investments that concentrate on a relatively narrow market sector face the risk of higher price volatility. Investments in stocks issued by non-U.S. companies are subject to risks including country/regional risk and currency risk.

Bond funds are subject to the risk that an issuer will fail to make payments on time, and that bond prices will decline because of rising interest rates or negative perceptions of an issuer's ability to make payments. High-yield bonds generally have medium- and lower-range credit-quality ratings and are therefore subject to a higher level of credit risk than bonds with higher credit-quality ratings. Although the income from U.S. Treasury obligations held in the fund is subject to federal income tax, some or all of that income may be exempt from state and local taxes.

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Morningstar® Markets Observer

Q2 2019 Data as of March 31, 2019

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Market Overview

Market Dashboard

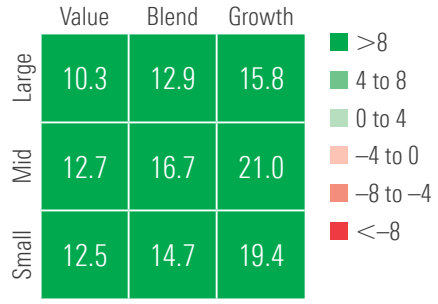
After a correction in the fourth quarter of 2018, global stock markets experienced a strong rebound in the first quarter. For U.S. stocks, the rebound was enough to bring one-year returns into positive territory; for international-developed and emerging-markets stocks, however, it was not. All fixed-income returns were positive as yields dropped. In the Morningstar Style Box, the rally was broad-based, and all nine style categories enjoyed double-digit returns.

		Return (%)					
Equities	**12 Month Yield**	**YTD**	**3 Mo**	**1 Yr**	**3 Yrs**	**5 Yrs**	**10 Yrs**
S&P 500	1.9	13.6	13.6	9.5	13.5	10.9	15.9
Russell 2000	1.3	14.6	14.6	2.0	12.9	7.1	15.4
MSCI EAFE	3.1	10.0	10.0	–3.7	7.3	2.3	9.0
MSCI Emerging Markets	2.6	9.9	9.9	–7.4	10.7	3.7	8.9
Fixed Income	**Current Yield**						
U.S. Aggregate	2.9	2.9	2.9	4.5	2.0	2.7	3.8
U.S. Corporates	3.6	5.4	5.4	6.1	3.6	4.0	7.3
High Yield	6.7	7.4	7.4	5.9	8.7	4.7	11.2
Municipals	2.3	2.9	2.9	5.4	2.7	3.7	4.7
Emerging Markets (USD)	6.0	7.0	7.0	4.2	5.8	5.4	8.5
Broad Commodities							
Bloomberg Commodity		6.3	6.3	–5.3	2.2	–8.9	–2.6
Morningstar Commodity		10.5	10.5	–3.0	4.5	–9.8	–0.7

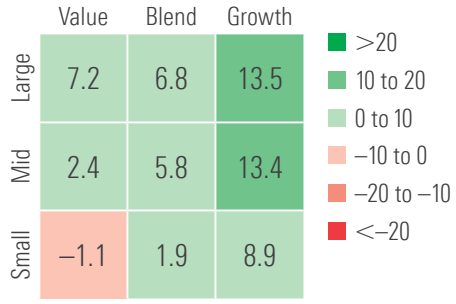
	Fundamental Measures			
	P/E	**P/B**	**P/S**	**P/C**
S&P 500	19.5	3.2	2.1	12.7
Russell 2000	17.8	2.1	1.2	10.1
MSCI EAFE	14.4	1.6	1.1	9.4
MSCI Emerging Markets	12.1	1.6	1.3	7.9

Interest Rates	**Current**	**1 Yr Ago**
2 Yr Treasury	2.3	2.3
5 Yr Treasury	2.2	2.6
10 Yr Treasury	2.4	2.7
20 Yr Treasury	2.8	3.0
Prime Rate	5.5	4.8
Commodities		
Brent Crude Oil	68	70
Gold	1,295	1,324

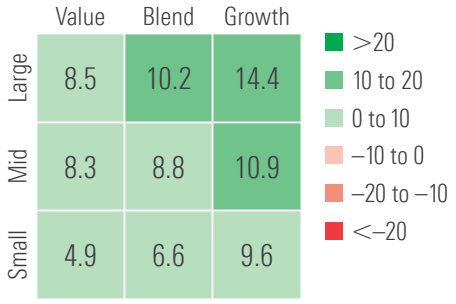
3-Month Return (%)



1-Year Return (%)



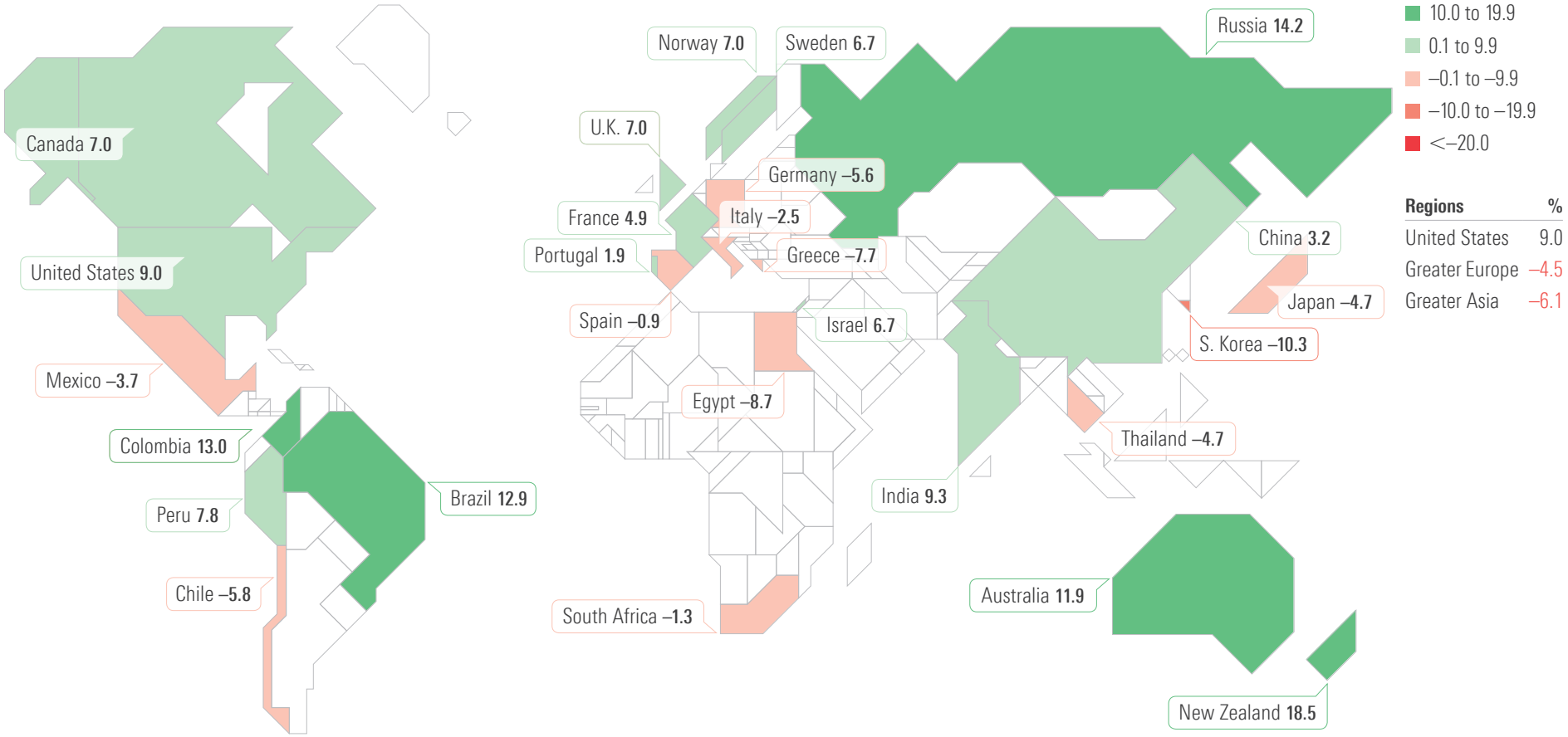
5-Year Return (%)



Global Market Barometer

Concerns about slowing global growth took a heavy toll on most international markets in the fourth quarter of 2018. Even though some countries were able to recover in the first quarter, many trailing one-year returns remained negative. Germany, as an export-heavy economy, continued to suffer from the global economic slowdown. Australia and New Zealand posted impressive returns, as well as Brazil, Russia, and India.

1-Year Trailing Returns of Morningstar Country Indexes in Base Currency by Percentage



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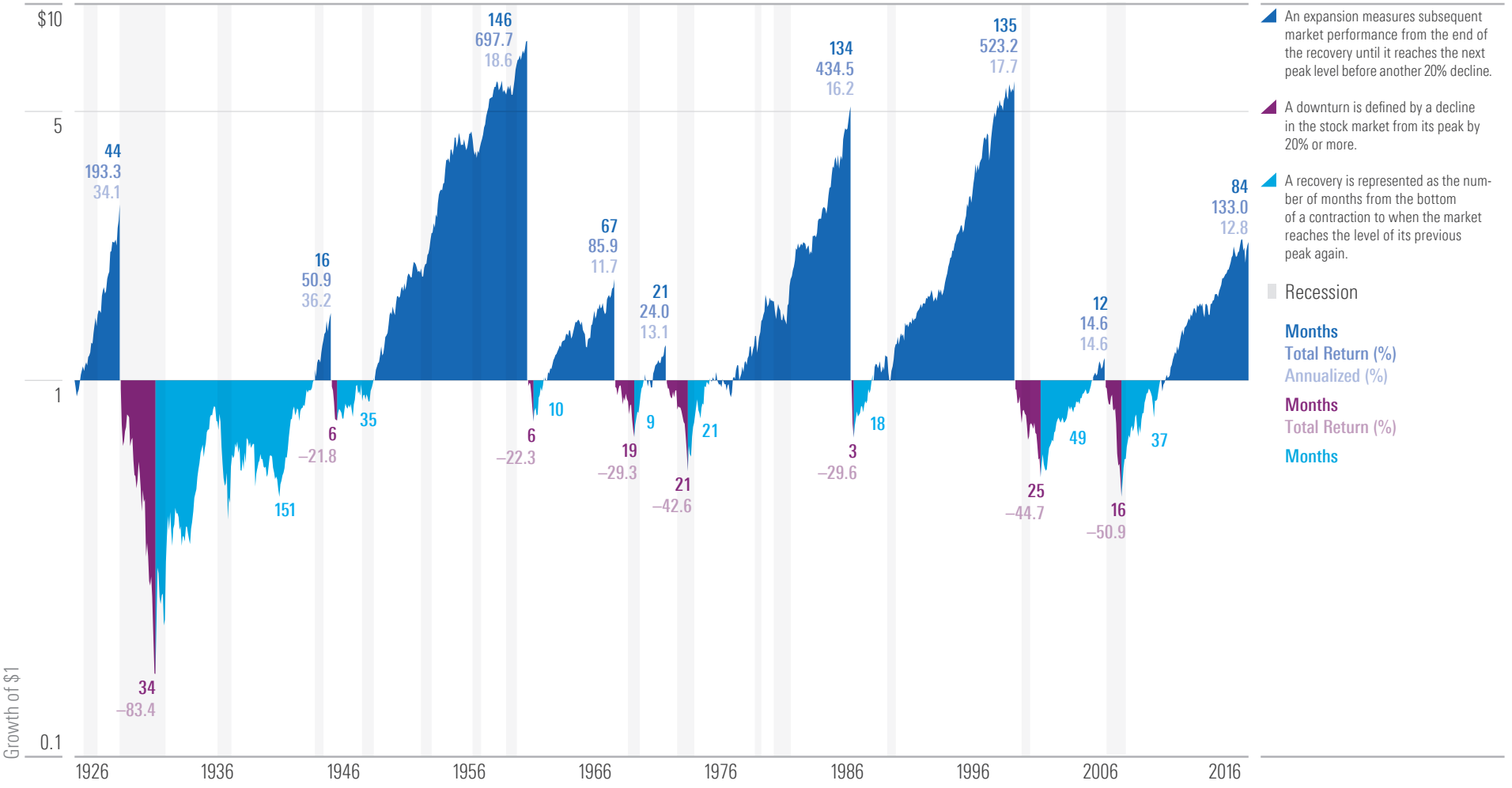
Bear Markets Are Painful, but Markets Rise Over the Long Term

There have been eight market downturns since 1926, the most severe one being the Great Depression. More recently, during the "lost decade," two consecutive downturns with little to no expansion discouraged U.S. investors. However, the market has returned 133.0% since the current expansion started in March 2012, and, based on previous expansionary episodes, there is still ample potential for future growth.

U.S. Market Downturns, Recoveries, and Expansions



QM06

Source: Stocks—Ibbotson Associates SBBI U.S. Large Stock Index.

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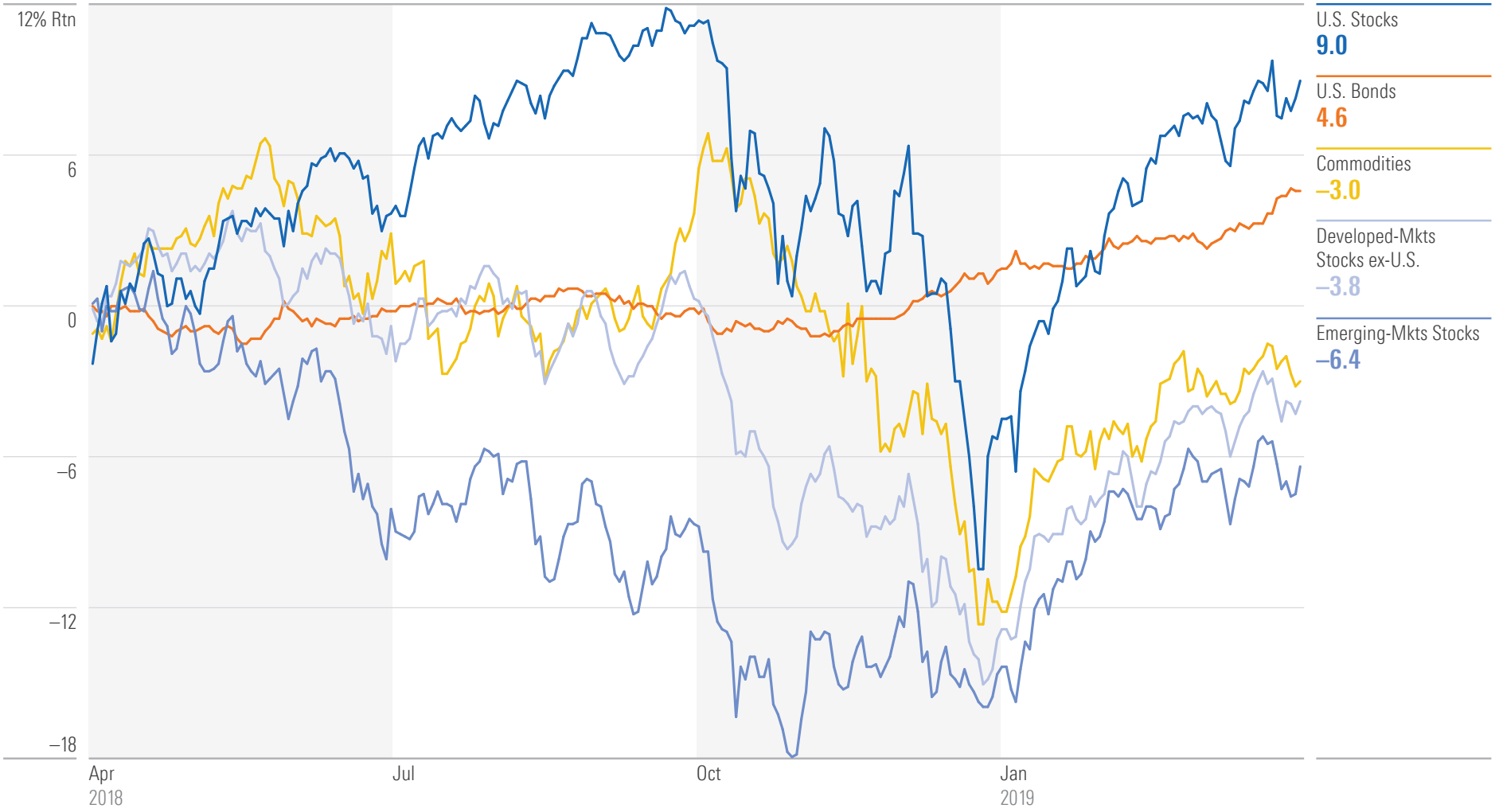
Trailing-12-Month Performance of Major Asset Classes

All major equity asset classes experienced elevated volatility during the past year. In the fourth quarter of 2018, weakening earnings growth and downward revisions in GDP growth forecasts contributed to a severe stock market correction. U.S. stocks were able to recover most of the losses in the first quarter of 2019, but the recovery was weaker for international stocks. On the other hand, because of falling Treasury rates, fixed income experienced a very strong quarter.



QM01

Source: U.S. stocks—Morningstar U.S. Market Index. Developed-markets stocks ex-U.S.—Morningstar Developed Markets ex-U.S. Index. Emerging-markets stocks—Morningstar Emerging Markets Index. U.S. bonds—Morningstar Core Bond Index. Commodities—Morningstar Long-Only Commodity Index.

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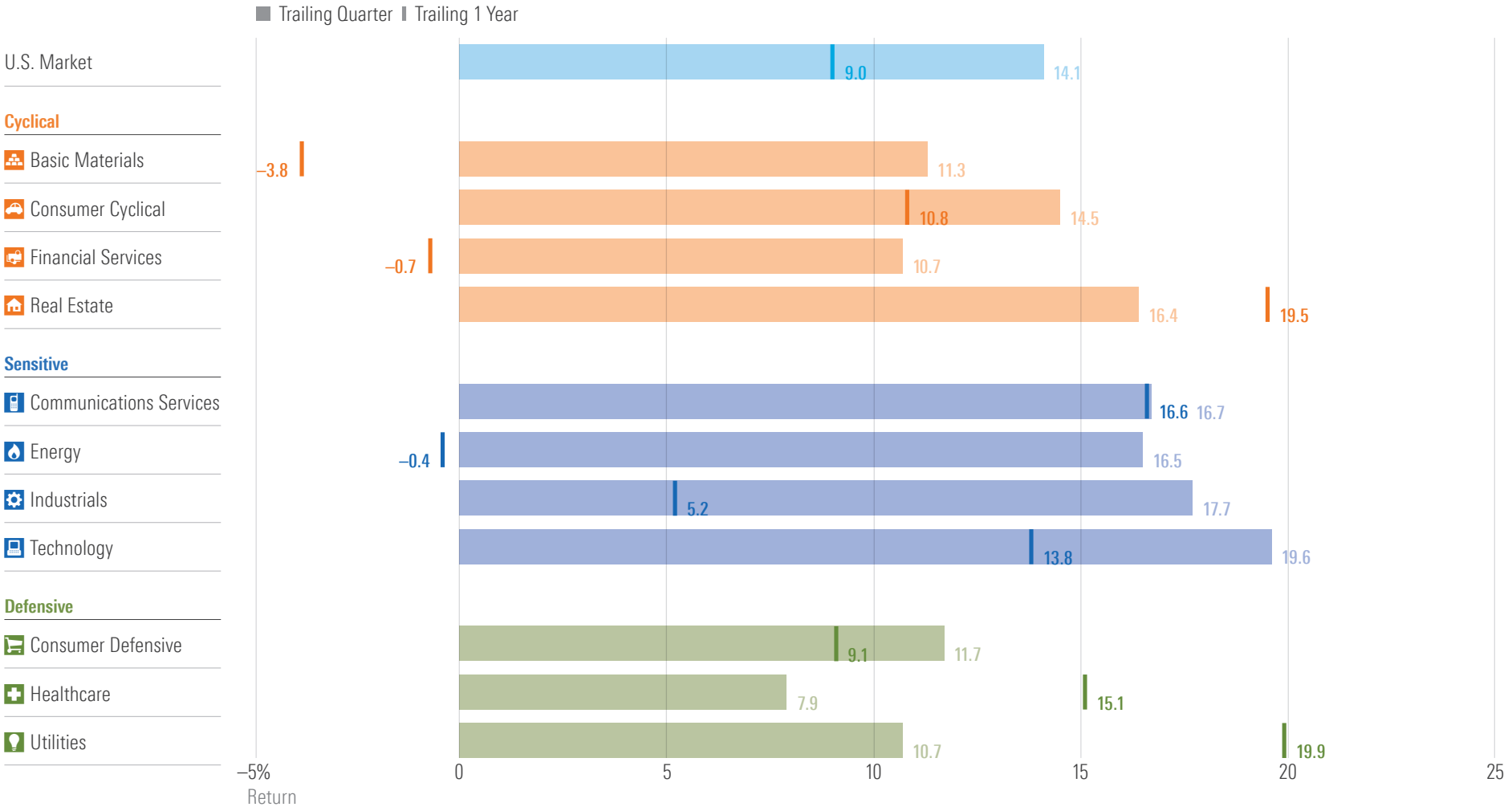
U.S. Sector Performance

After a disastrous 2018 for most sectors, technology and industrials were the quickest to recover in the first quarter of 2019. According to Morningstar equity analysts, there is a growing scarcity of strong buys in the technology sector. However, opportunities remain for long-term investors, particularly in semiconductors and online media. Healthcare was the weakest sector but maintained a healthy trailing-one-year return amid diminishing market concern around healthcare pricing pressures.



QM04

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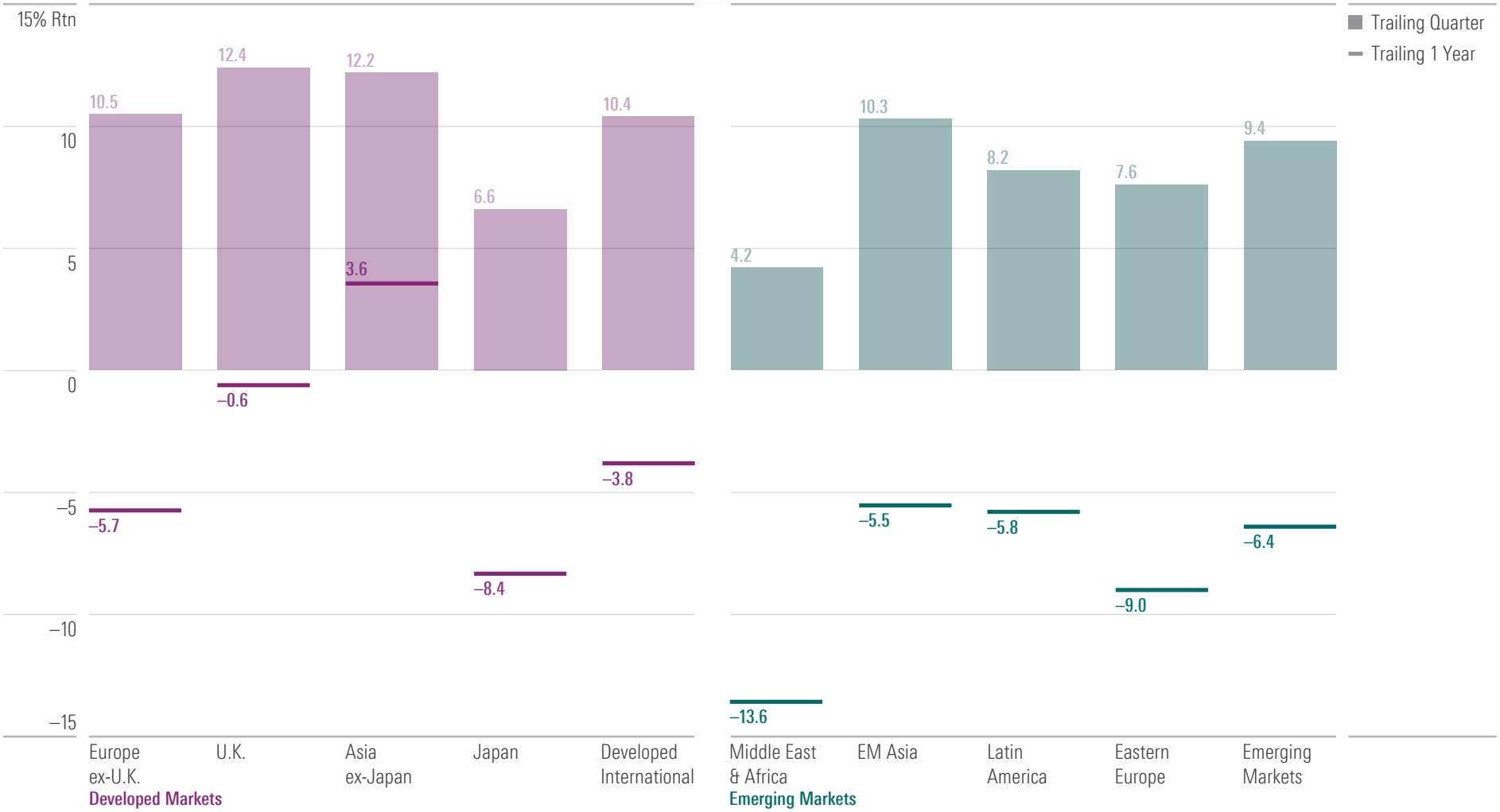
International Stock Market Performance

Surprisingly, despite continued Brexit turmoil, the United Kingdom was the best-performing region in the first quarter and the second-best over the trailing-one-year. Similarly, emerging Asia was the best region among emerging markets despite China's ongoing trade war with the U.S. Normally, uncertainty lowers equity returns, but both of the above examples are directly contradicting that pattern, which is why it is so difficult to predict how equity markets will react.



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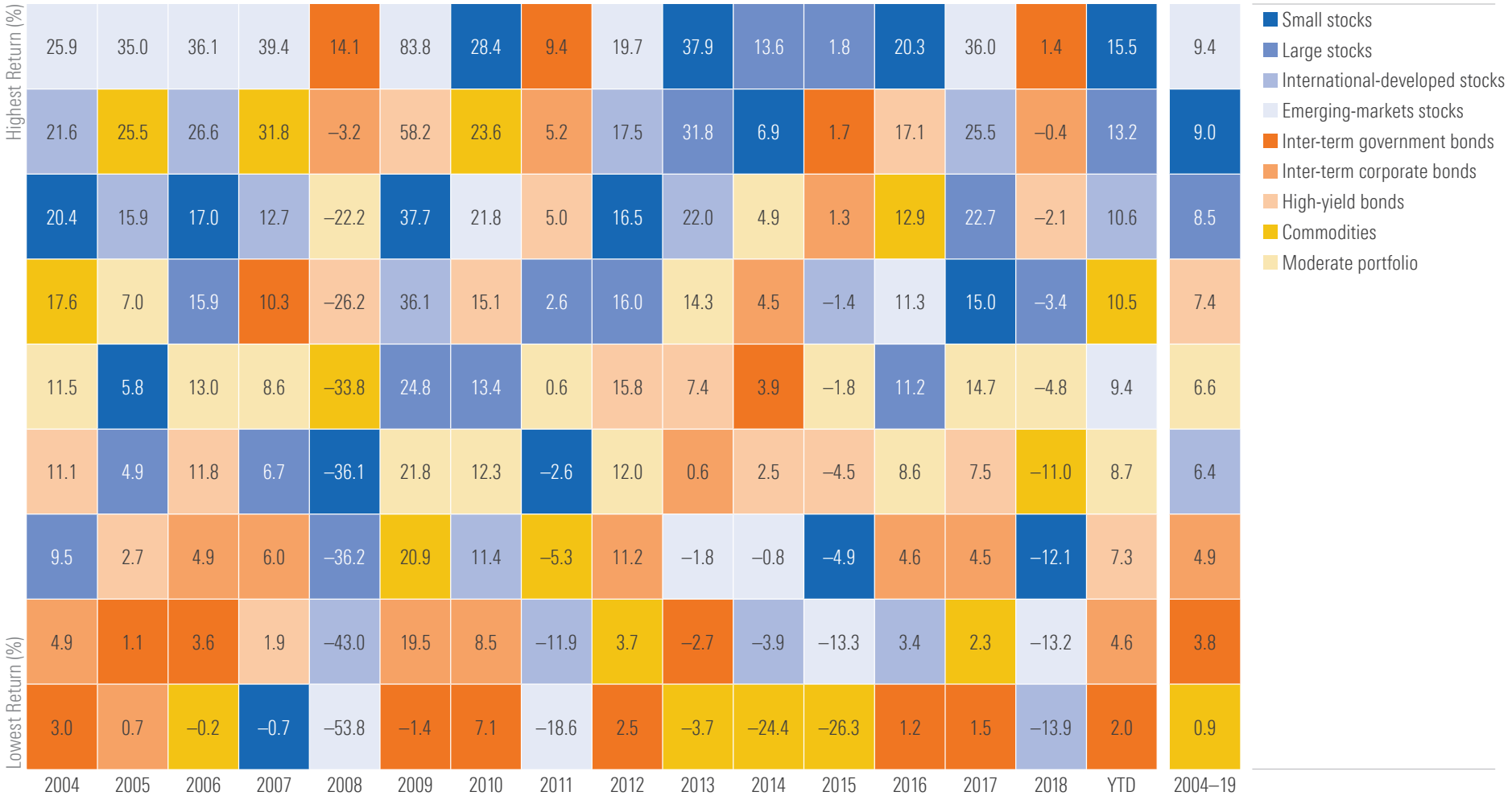
Asset-Class Winners and Losers

2018 was the first year since 2008 when seven out of eight asset classes and the moderate portfolio posted negative returns. All asset classes and the portfolio rebounded in the first quarter, with small stocks leading the way. Ironically, the worst-performing asset class in 2017 (intermediate-term government bonds) became the best-performing one in 2018, then once again the worst-performing for the year to date. Such wild swings illustrate the sometimes-overlooked benefits of diversification.



Source: Small stocks—Morningstar Small Cap Index. Large stocks—Morningstar Large Cap Index. Int'l stocks—Morningstar Developed Mkts ex-U.S. Index. Emerging stocks—Morningstar Emerging Mkts Index. Interm. govt bonds—Morningstar Interm. U.S. Govt Bond Index. Interm. corp. bonds—Morningstar Interm. Corp. Bond Index. High-yield bonds—Bloomberg Barclays U.S. High Yield Corp. Bond Index. Commodities—Morningstar Long-Only Commodity Index. Moderate portfolio—Morningstar Moderate Target Risk Index.

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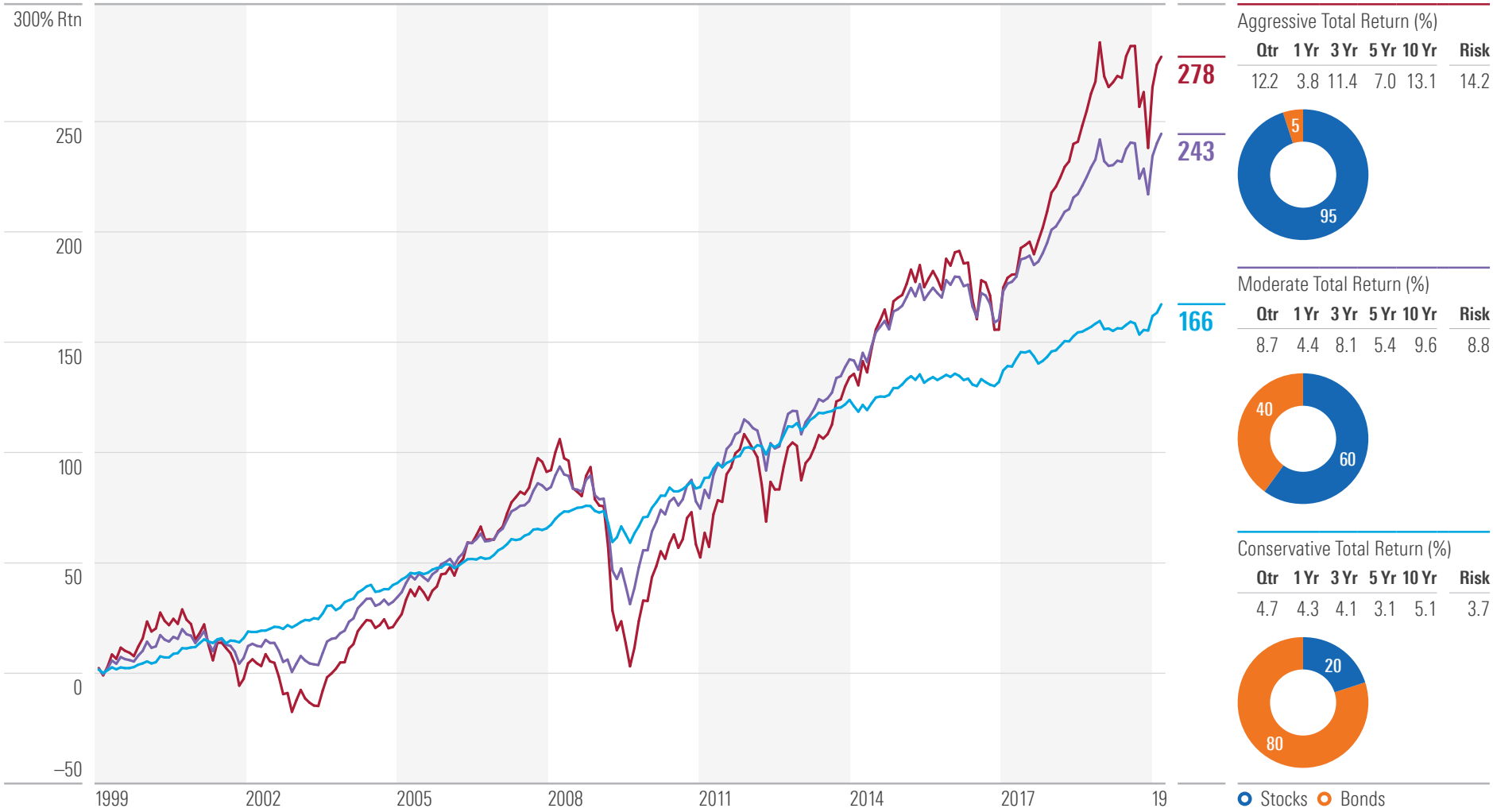
Performance of Risk-Based Portfolios

As expected, an aggressive portfolio with a larger allocation to stocks was able to deliver returns superior to its moderate and conservative counterparts over longer time periods. However, it also assumed a greater risk level, with negative consequences in the second half of 2018. The conservative portfolio posted lower returns but also had much lower volatility, losing much less than its aggressive counterpart, which made it a good option for risk-averse investors.



QAA2

Source: Conservative portfolio—Morningstar Conservative Target Risk Index. Moderate portfolio—Morningstar Moderate Target Risk Index. Aggressive portfolio—Morningstar Aggressive Target Risk Index. Returns for periods longer than one year are annualized.

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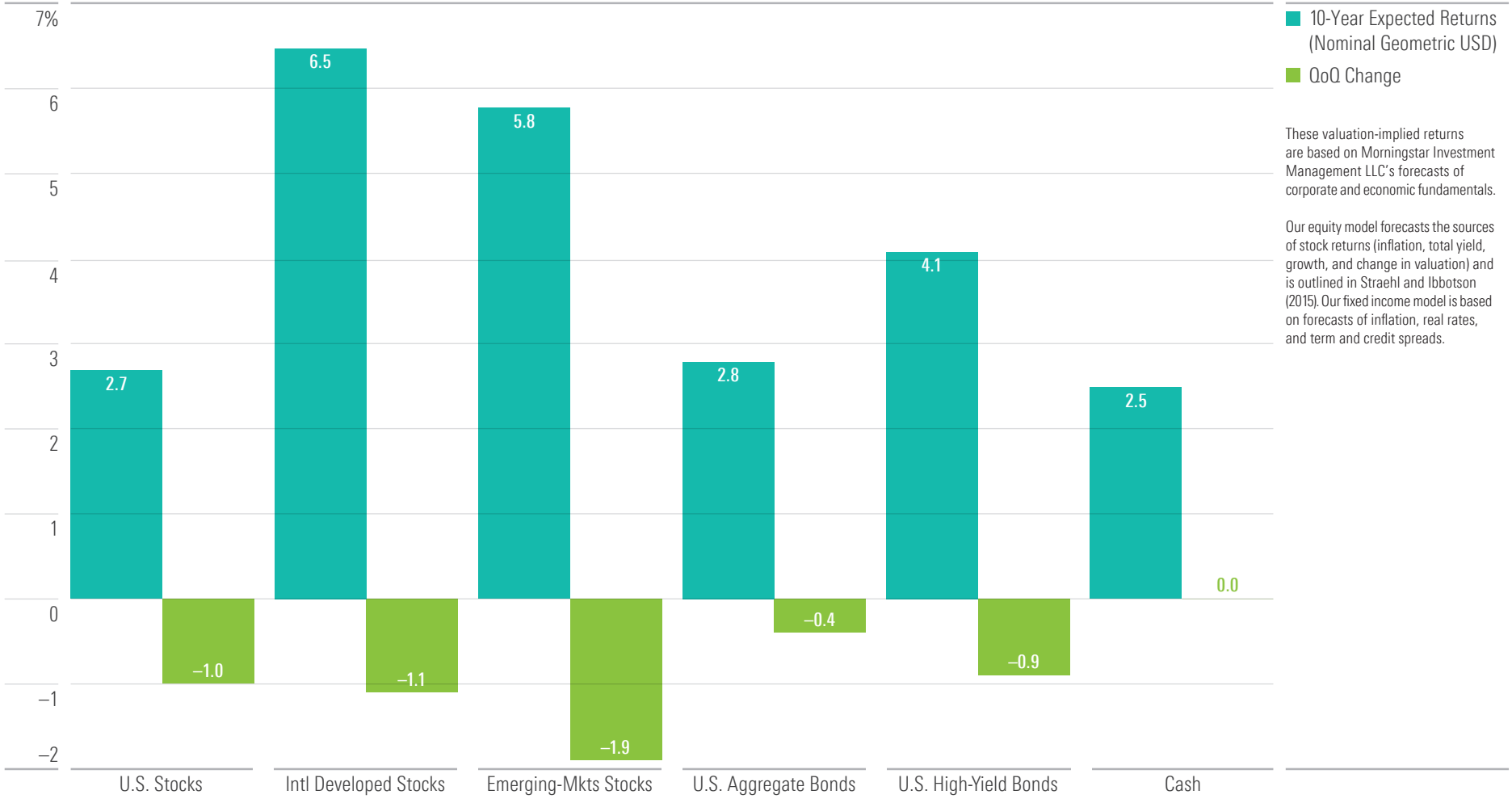
International Developed Stocks Expected to Outperform

Our valuation models indicate that international developed stocks will outperform both emerging markets and U.S. stocks over the next 10 years. Investment-grade bonds only offer a small return advantage over USD cash given low starting yields. The first quarter's strong returns significantly lowered the future expected returns for all asset classes except cash.

10-Year Valuation-Implied Returns



These valuation-implied returns are based on Morningstar Investment Management LLC's forecasts of corporate and economic fundamentals.

Our equity model forecasts the sources of stock returns (inflation, total yield, growth, and change in valuation) and is outlined in Straehl and Ibbotson (2015). Our fixed income model is based on forecasts of inflation, real rates, and term and credit spreads.

Ibbotson, R., & Straehl, P. 2015. "The Supply of Stock Returns: Adding Back Buybacks." http://corporate1.morningstar.com/ResearchArticle.aspx?documentId=737061.

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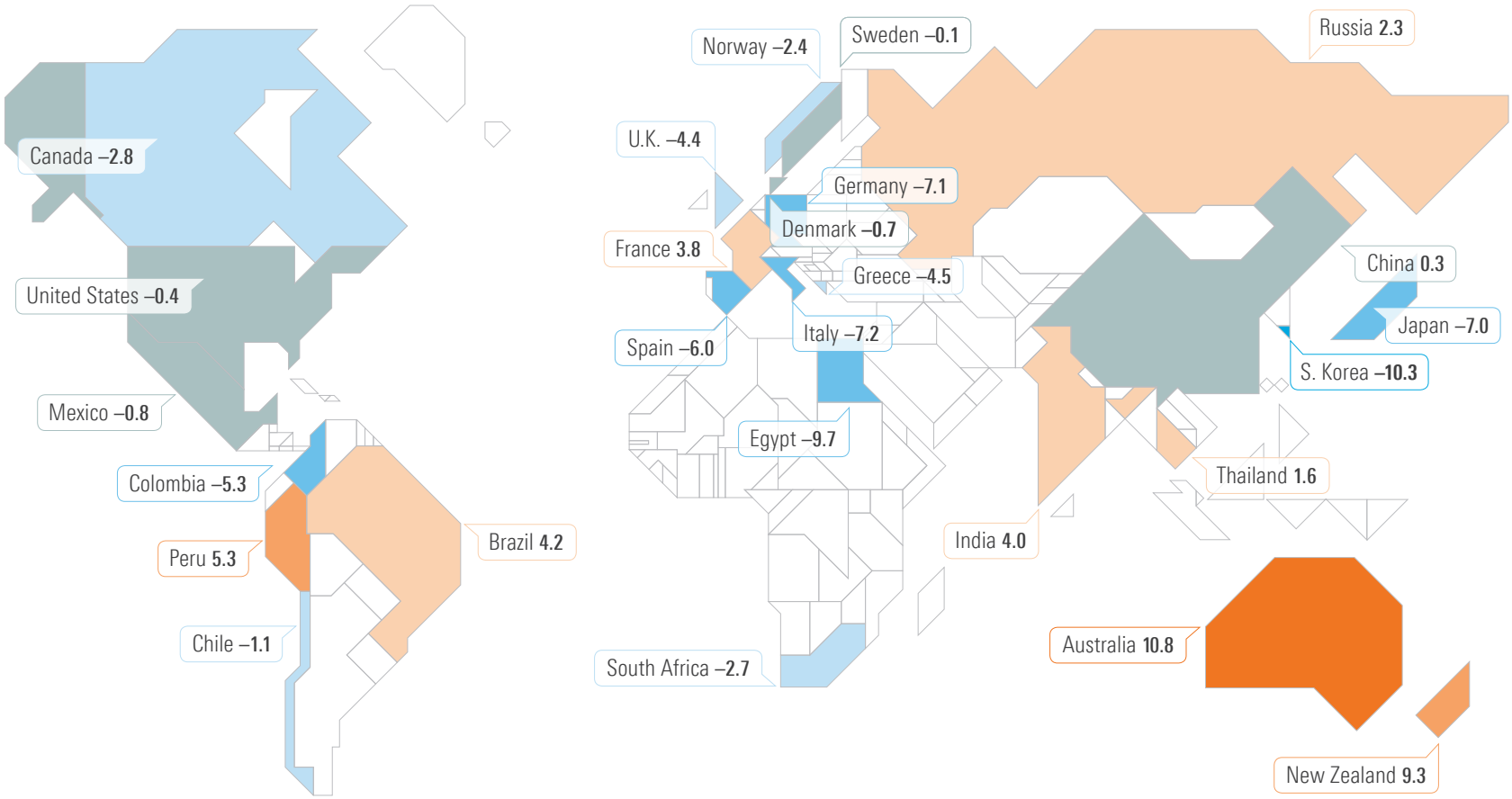
Equities

Morningstar Price to Fair Value by Country

Worldwide valuations hovered closer to fair value this quarter--a big swing from the drastic undervaluations seen last quarter. This includes the United States, which sits at a negative 0.4% valuation, up from negative 11.6%. Australia continues to be the most overvalued region, with developing regions like Brazil and Russia switching to overvalued as well.

Market-Cap-Weighted Valuation



Regions	%
Greater Asia	–3.9%
Greater Europe	–1.9%
United States	–0.4%

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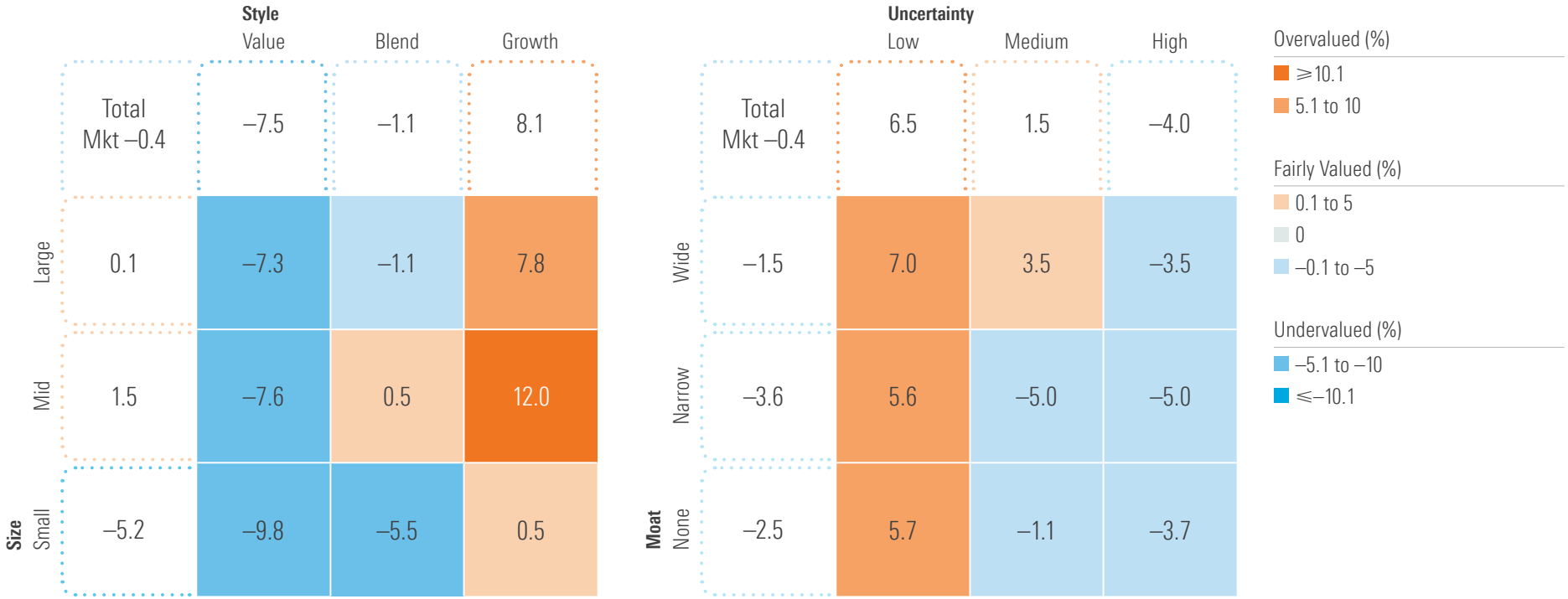
Morningstar Price to Fair Value, U.S. Equity Style Boxes

The U.S. market normalized this quarter, with valuations bouncing back across the board. Mid-cap growth had an especially strong shift to overvaluation after last quarter's dip. Spreads across the market remain wide between growth and value stocks, with the best buying opportunities still found in small-cap value.



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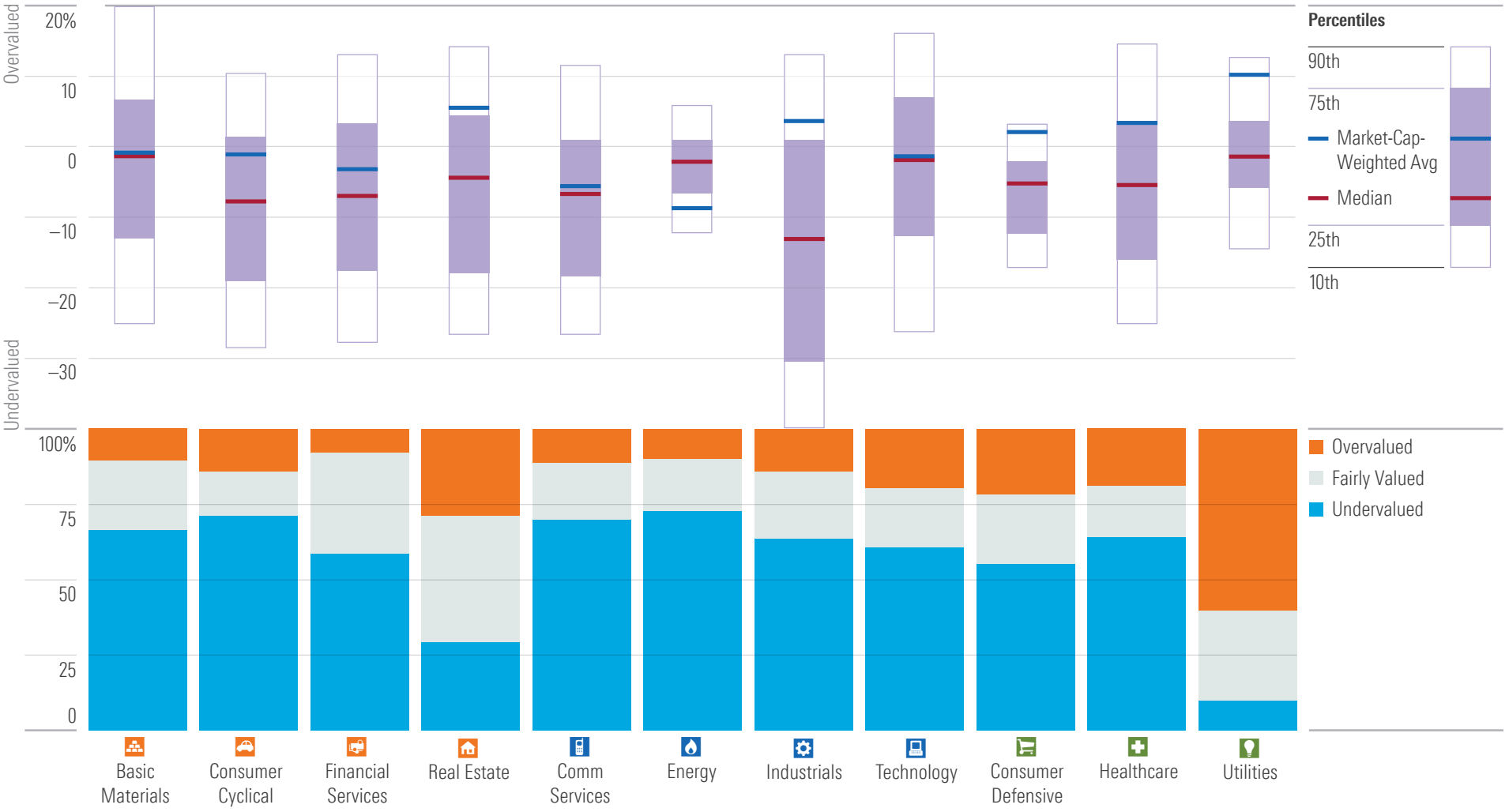
Morningstar Price to Fair Value Distribution by U.S. Sector

Undervaluations shifted down across sectors this quarter compared with last, with market-weighted average valuations drawing closer to zero. Real estate and utilities saw an influx of overvalued companies with market-cap-weighted averages deviating from their static median, indicating the largest companies in these sectors are driving these changes.



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Morningstar Price to Fair Value Distribution by Region

Morningstar calculates fair values for 53 countries. Most countries' market-cap-weighted valuations hovered near zero last quarter. Valuation changes were most influenced by the largest companies in each region, as proved by the median valuations, which did not change since last quarter. The top overvalued countries were not concentrated in any particular region but instead were dispersed around the world.

Top 10 Lowest-Valued Countries (Market-Cap-Weighted)

Country	Over/Undervalued by	Uncertainty Rating	Number of Companies
Sri Lanka	–11.5	Very High	165
Belgium	–11.5	High	85
South Korea	–10.3	High	1,637
Tunisia	–9.8	Very High	42
Egypt	–9.7	Very High	152
Iran, Islamic Republic of	–8.6	Very High	141
Hong Kong	–8.5	High	831
Bulgaria	–8.2	Very High	24
Iraq	–7.9	Very High	22
Italy	–7.2	High	183

Top 10 Highest-Valued Countries (Market-Cap-Weighted)

Country	Over/Undervalued by %	Uncertainty Rating	Number of Companies
Argentina	13.8	High	47
Australia	10.8	High	387
New Zealand	9.3	Medium	71
Morocco	7.0	High	34
Finland	5.9	High	98
Peru	5.3	High	26
Indonesia	5.1	High	335
Brazil	4.2	High	286
India	4.0	High	2,144
France	3.8	High	405

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Sector Statistics

Value and growth have very different sector allocations, which means investors should not focus only on one when creating a diversified portfolio. Currently, the U.S. market is trading at a premium to its long-term price/earnings and price/book ratios, as are all the defensive sectors. Considering the late-stage bull market, defensive sectors may not provide the protection that they have historically because they are all trading at premium valuations.

	Morningstar Index Weights (%)			Price to Earnings		Price to Book			
	U.S. Market	U.S. Value	U.S. Growth	Current	15 Yr Avg	Current	15 Yr Avg	Beta (3 Yr)	Dividend Yield (%)
Morningstar U.S. Market	—	—	—	19.5	17.5	3.0	2.5	1.0	1.9
Cyclical									
Basic Materials	2.8	3.4	1.7	19.0	18.2	2.6	2.7	1.0	1.8
Consumer Cyclical	12.3	5.8	17.7	22.2	18.6	4.8	3.0	1.1	1.4
Financial Services	15.0	24.8	9.6	15.7	14.0	1.6	1.4	1.1	1.5
Real Estate	3.8	3.2	2.6	27.6	28.7	2.3	2.2	0.8	4.3
Sensitive									
Communications Services	3.3	6.0	2.3	18.6	18.0	2.0	2.2	0.8	2.7
Energy	5.1	7.2	2.4	14.60	15.3	1.6	2.1	1.2	2.7
Industrials	10.7	5.1	9.0	19.8	18.4	4.3	3.1	1.2	1.8
Technology	22.7	11.6	35.0	19.7	20.6	5.6	3.8	1.1	1.2
Defensive									
Consumer Defensive	7.1	14.2	2.2	19.2	19.0	4.0	3.8	0.6	2.6
Healthcare	13.9	10.3	17.5	25.1	20.8	4.1	3.4	1.0	1.5
Utilities	3.2	8.4	0.0	20.2	16.6	2.1	1.8	0.2	3.2

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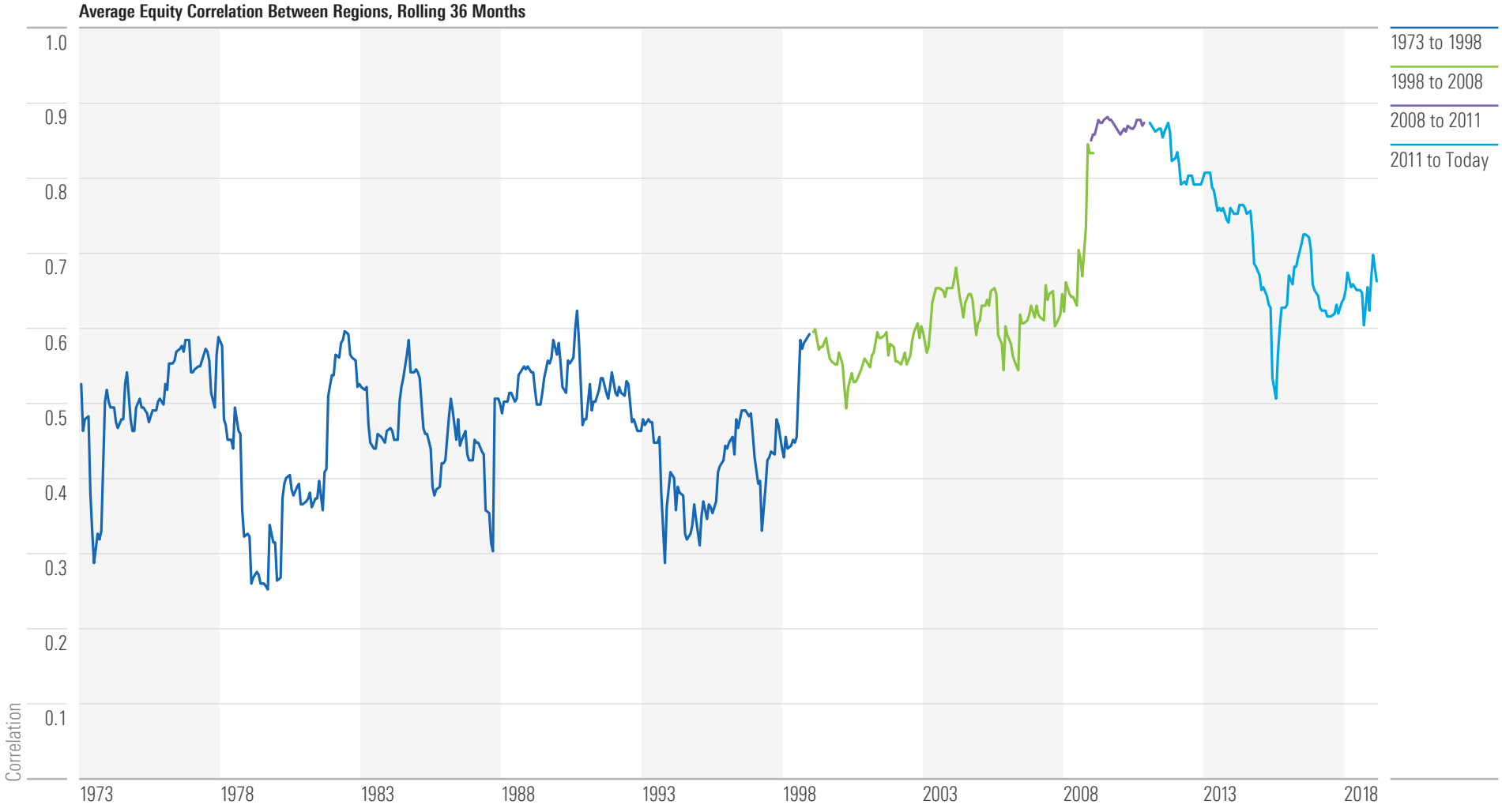
Equity Returns Are Becoming Increasingly Correlated

As passive investing keeps growing in popularity, one would expect correlations between global equity indexes to increase. Before the financial crisis in 2008, equity correlations remained fairly stable. When the crisis hit, however, correlations skyrocketed to 0.9, reducing the benefit of international diversification. As markets settled and passive showed no signs of slowing, correlation between regions remained higher than before, suggesting this is the "new normal" investors have to get used to.



Source: Morningstar Direct. The correlation figure shown is an average of the pairwise rolling 36-month return correlations between the following indexes: MSCI Europe GR, MSCI Far East NR, MSCI USA GR, and IA SBBI US Small Stock TR USD.

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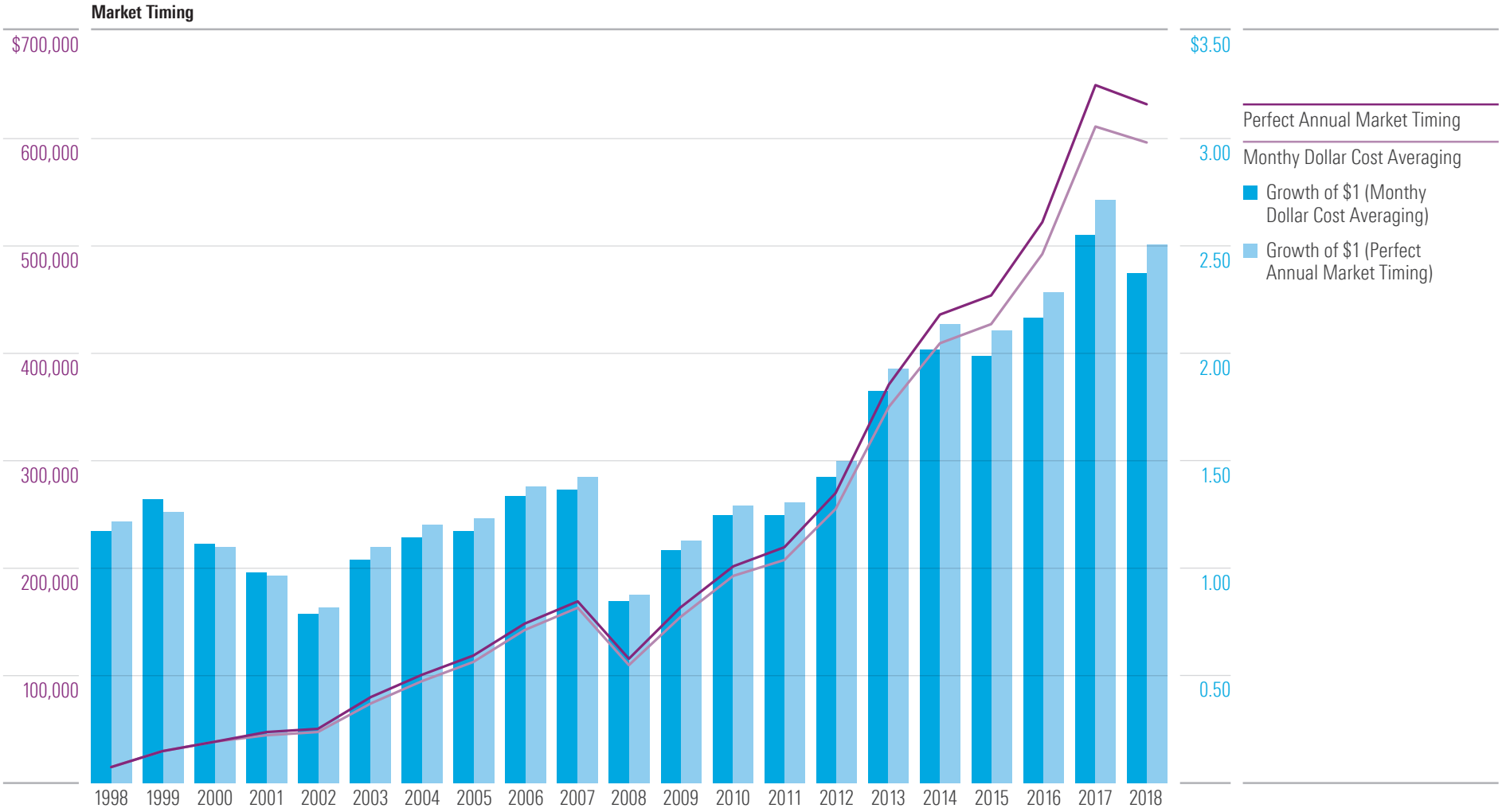
Dollar-Cost Averaging Is the Best Strategy for Most Investors

Dollar-cost averaging is a strategy that allows an investor to buy the same dollar amount of an investment in regular intervals. Below shows the difference between dollar-cost averaging $1,000 per month and investing $12,000 per year before the highest monthly return of the market each year. The difference in returns is minimal, demonstrating that, for the average investor, dollar-cost averaging is the best strategy because it avoids the risk of mistiming the market.



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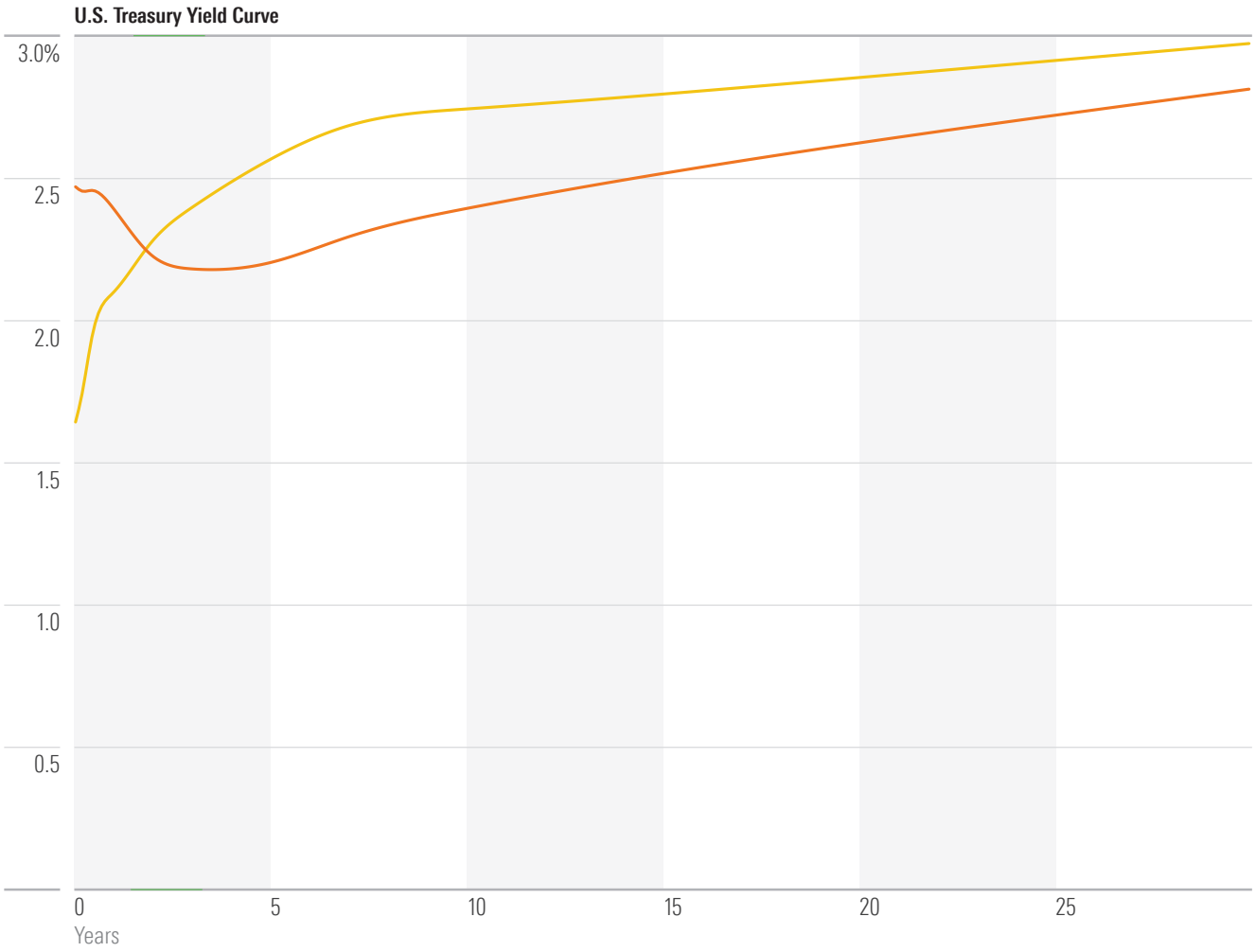
Fixed Income

The Short End of the U.S. Treasury Yield Curve Rises Significantly

The Federal Reserve has not raised rates since December 2018, and the positioning of the Fed has led to markets expecting more dovish monetary policy and the continued inversion of the yield curve. This unusual inversion comes from changing expectations for the long-term path of Fed policy as opposed to short-term expectations for the next meeting. The long end of the curve has lowered compared with a year ago but remains positively sloped.



Bonds	1-Year Return (%)
Core	3.0
10 Year U.S. Treasury	3.8
20 Year U.S. Treasury	2.6
Inflation Protected (TIPS)	2.0
U.S. Corporate	2.7
U.S. High Yield	5.0
USD Emerging Market	2.7
Local Currency Emerg Mkt	–2.7

Source: U.S. Federal Reserve. 10-Year US Treasury Bonds—Bloomberg Barclays US Treasury 7-10 Year Bond Index. 20+ Year US Treasury Bonds— Bloomberg Barclays US Treasury 20+ Year Bond Index. US Corporate Bonds—Morningstar Corporate Bond Index. US High Yield Bonds— Bloomberg Barclays US Corporate High Yield Bond Index. USD EM Bonds—Morningstar EM Composite Bond Index. Local Currency EM Bonds—Bloomberg Barclays EM Local Currency Broad Bond Index. Yield curve data as of 3/29/2019.

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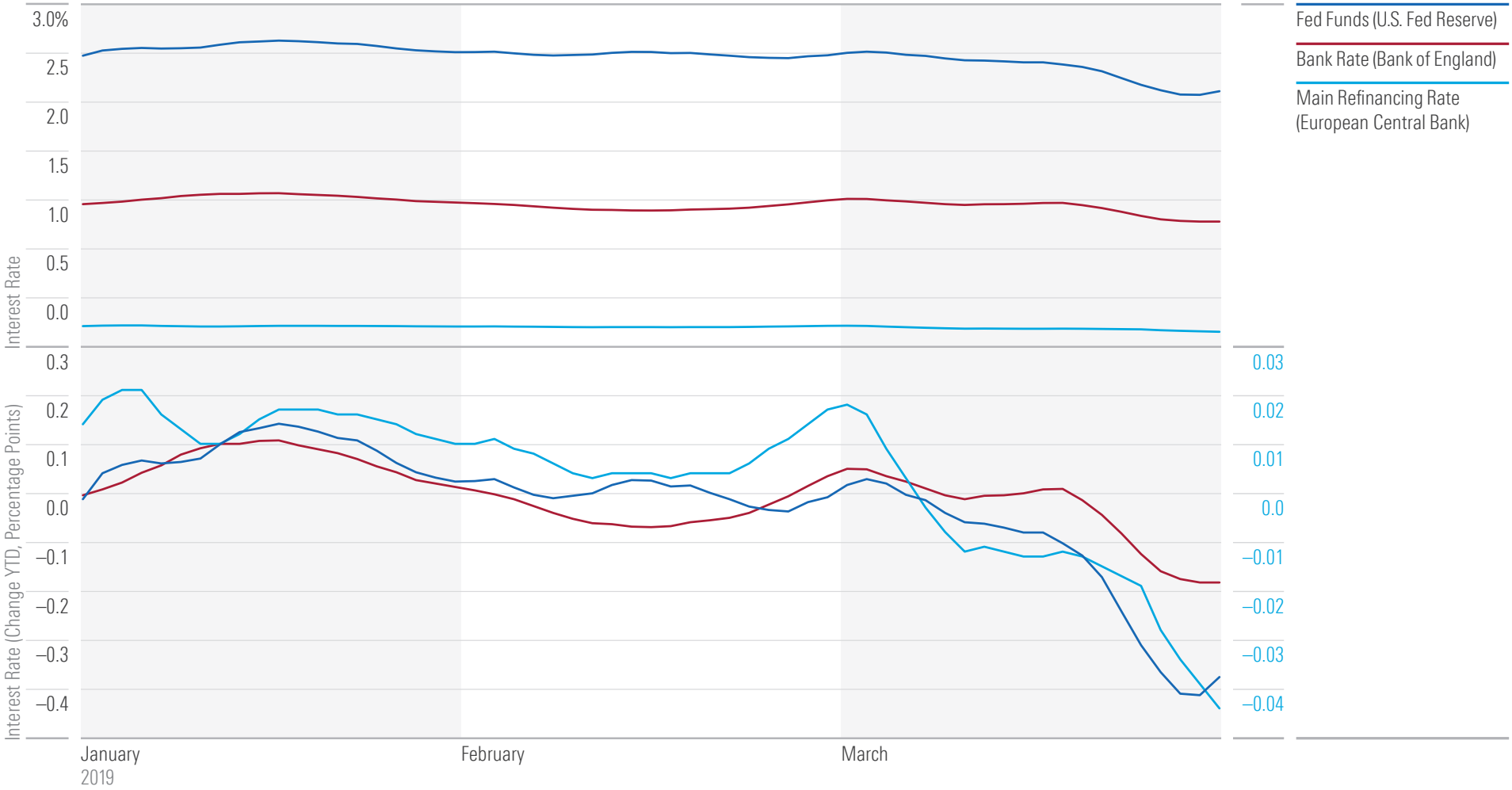
Expectations Decline for Major Policy Rates

Market expectations for the path of policy rates at the Federal Reserve, the European Central Bank, and the Bank of England declined in the first quarter of 2019. All three central banks revised down their growth forecasts while noting that inflation risks have softened. Fed and ECB policymakers also lowered their monetary policy guidance. Neither expects to increase rates in 2019, and implied rates on futures contracts show the market also discounting the likelihood of rate increases in 2020.

Market Expectations for Central Bank Policy Rates in December 2020



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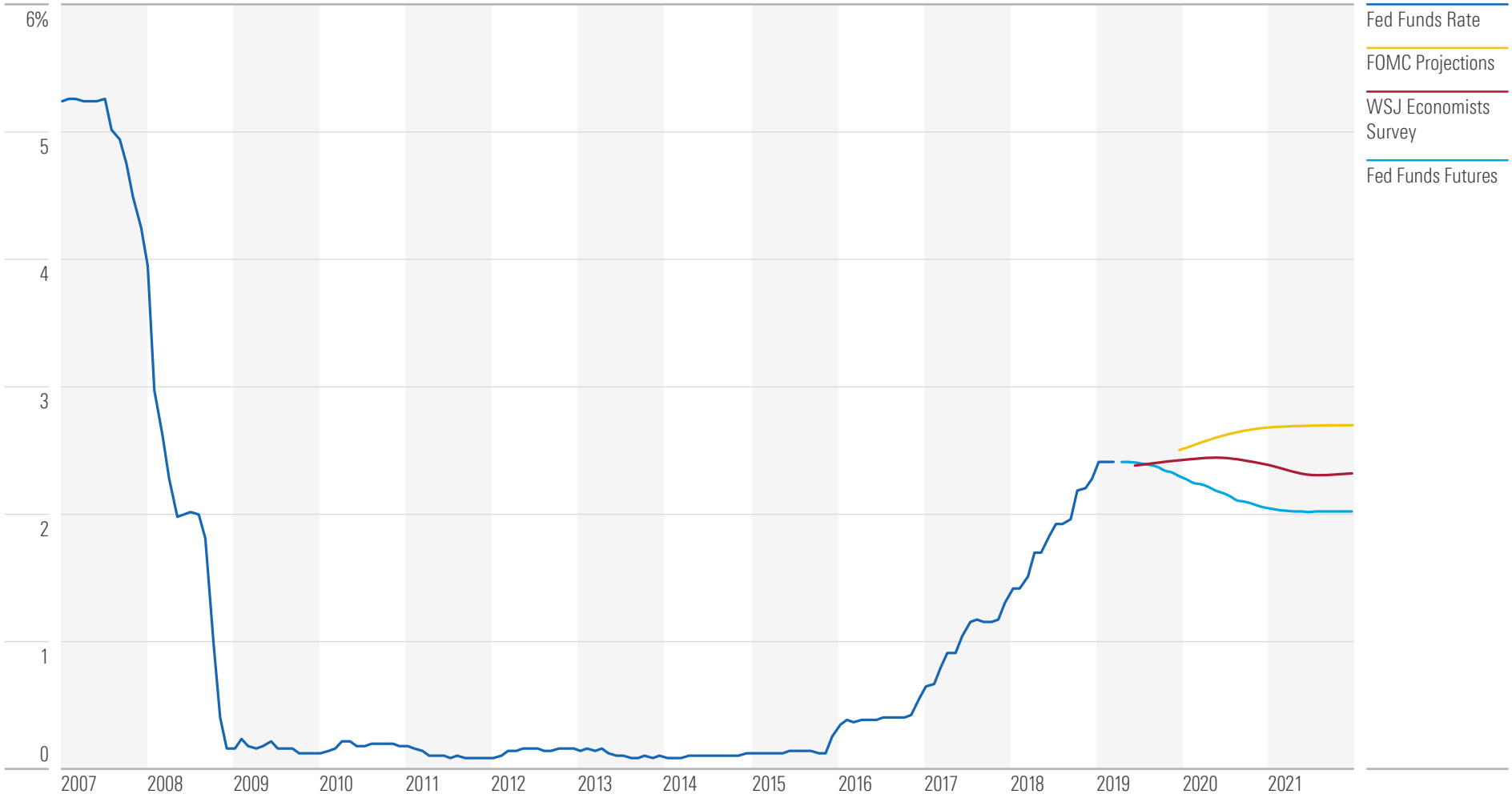
Three Different Projections for the Federal-Funds Rate

Projections from three different sources have disparate views on the path for U.S. interest rates. Notably, the market expects rates to decline from current levels through 2020, while economists surveyed by *The Wall Street Journal* predict rates staying mostly flat through the same time horizon. The Federal Reserve, however, projects rates continuing to rise starting in 2020. The difference between these three projections reflects heightened uncertainty about the path of future interest rates in the U.S.

Projections for the Federal Funds Rate from Three Different Sources



QFI14

24

Source: Federal Reserve, The Wall Street Journal, Chicago Mercantile Exchange, Morningstar calculations.

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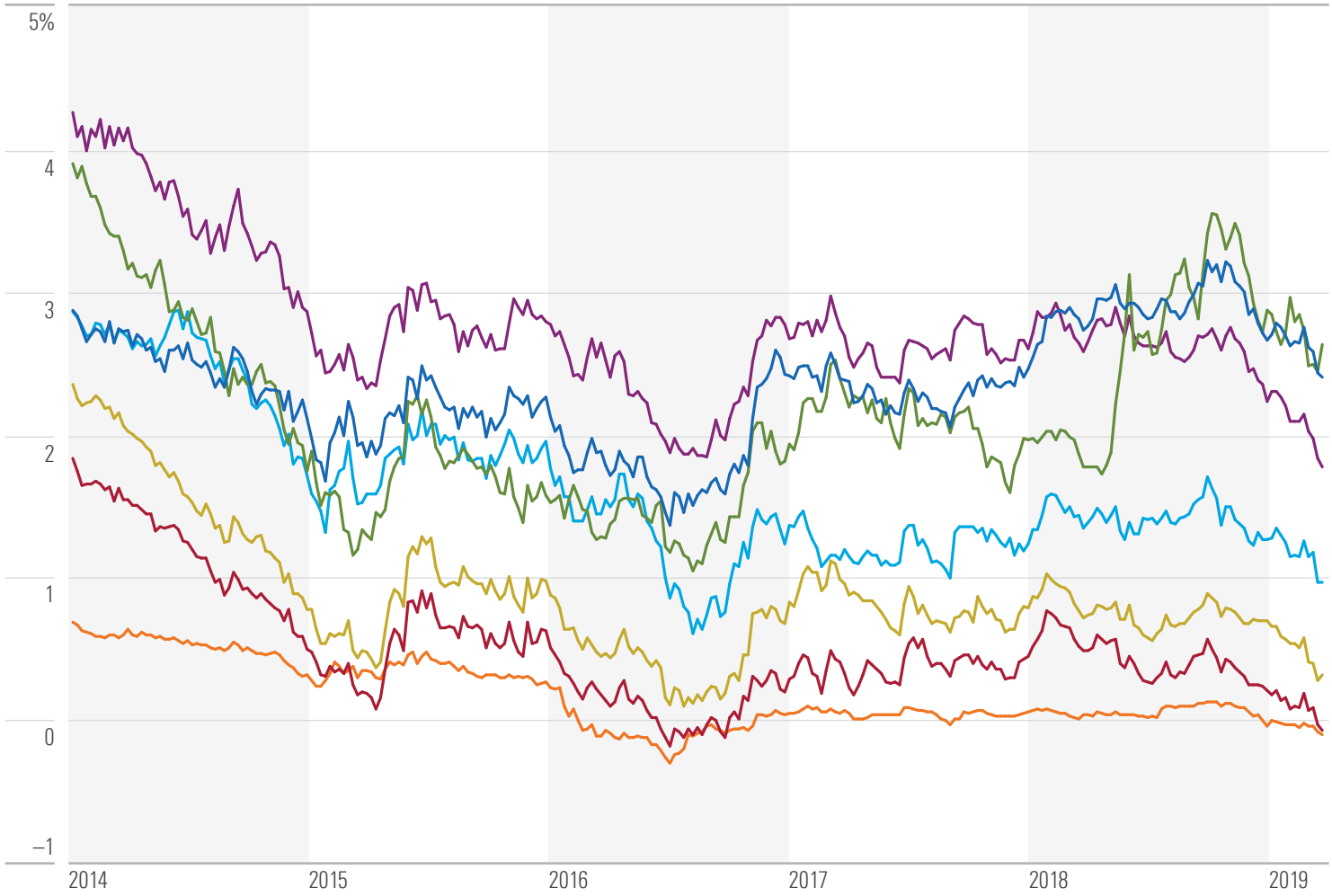
The United States Has One of the Highest Yields in the Developed World

The 10-year U.S. Treasury yield has fallen from its peak of 3.4% to 2.4%. However, it still remains significantly higher than that of the German bund, which has dropped all the way to negative 0.1%. In the first quarter of 2019, rates in most developed countries continued their decline, reflecting greater uncertainty for the global economic outlook. In the U.S. specifically, the Federal Reserve softened expectations about future rate increases.

10-Year Government Bond Yields



	Current Yield (%)	Change in Last Year (%)
Italy	2.6	0.9
United States	2.4	–0.3
Australia	1.8	–0.8
United Kingdom	1.0	–0.4
France	0.3	–0.4
Germany	–0.1	–0.6
Japan	–0.1	–0.1

QFI10

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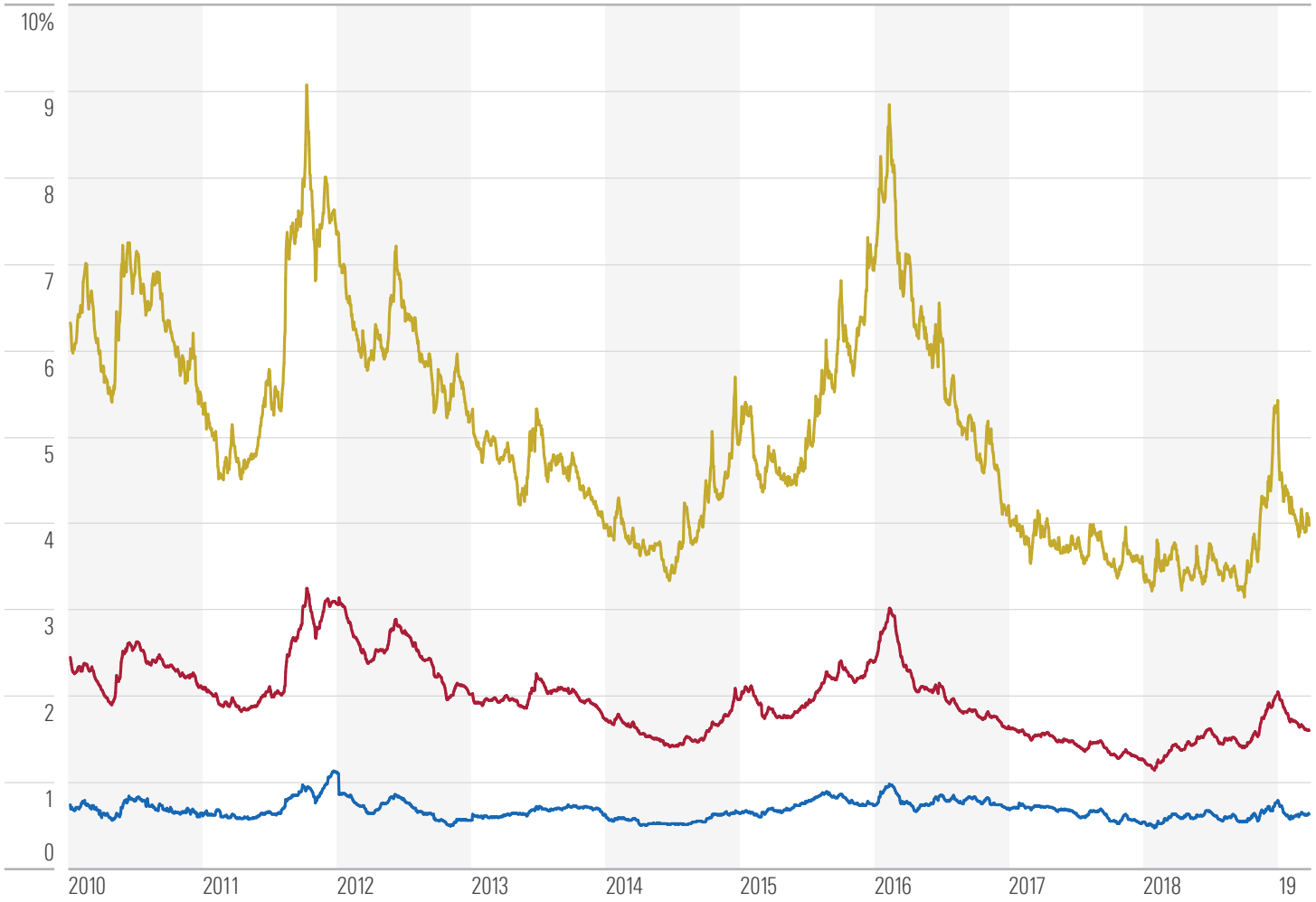
Corporate Credit Spreads Narrow in the First Quarter

Credit spreads narrowed in the first quarter of 2019 as equities recovered from the drawdown in late 2018. However, as the credit spreads have narrowed, they have come to rest at levels higher than before they sharply rose in the fourth quarter of 2018. This is particularly true of the high-yield and BBB spreads and implies that market expectations are accounting for more risk than last year.

Corporate Credit Spreads



	Current (%)	Avg (%)	Change Over Last Quarter
AAA	0.7	0.8	–0.1
BBB	1.6	2.0	–0.4
High Yield	4.1	5.6	–1.2

QFI9

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Source: Bank of America Merrill Lynch Corporate Spread Indexes from the Federal Reserve, Morningstar calculations.

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An Inverted Yield Curve Has Been a Good Recession Indicator

The image illustrates the yield differential between 10-year and two-year Treasuries. A normal yield curve occurs when long-term yields are higher than short-term ones, which would be a positive number on this chart. When the difference becomes negative, however, we have an inverted yield curve, and historically that has happened before every major recession in the past 40 years. Today, the 10-year/two-year spread remains below the long-term average and dangerously close to zero.

QFI20

27

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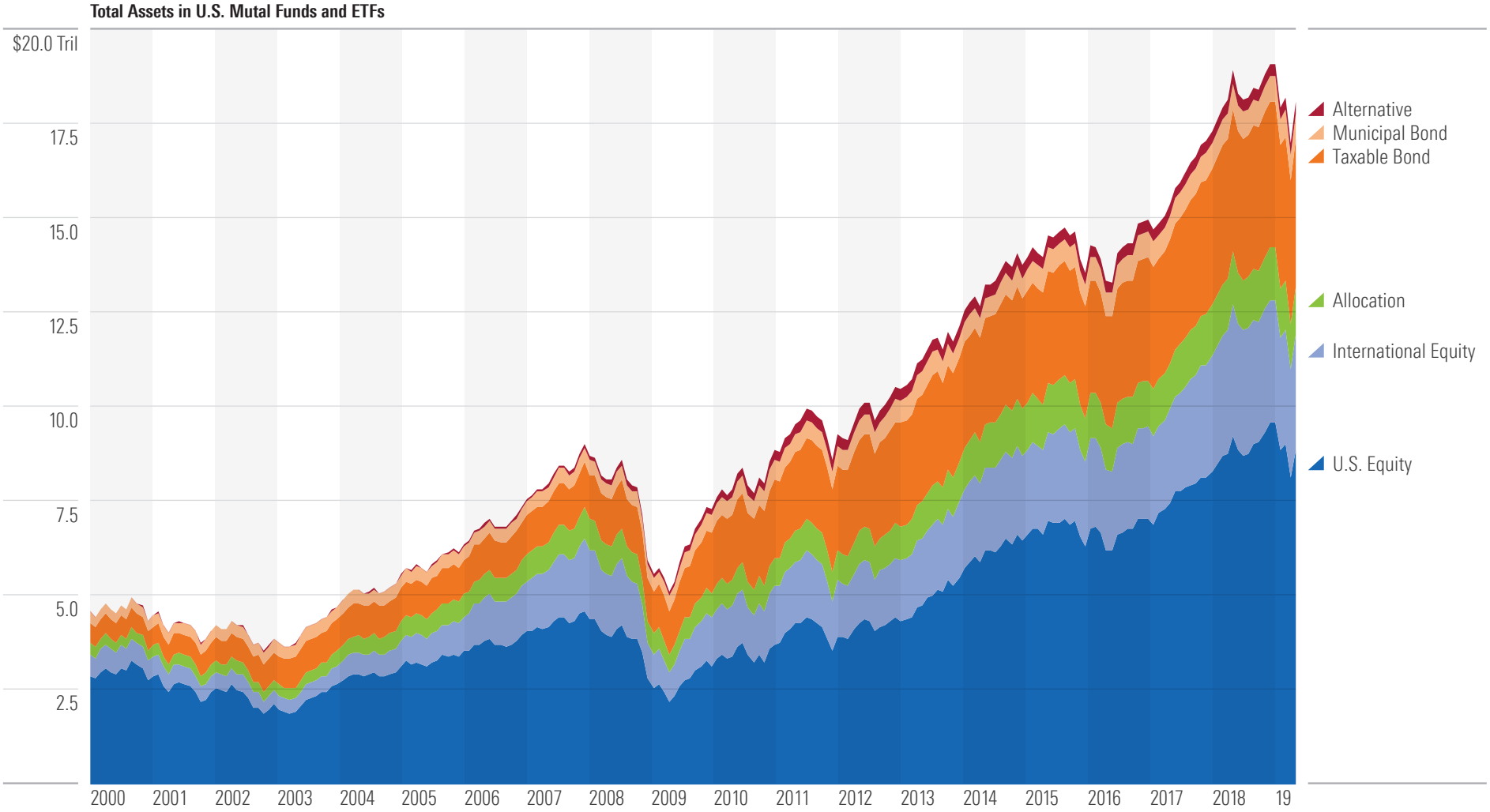
Funds

Assets Under Management in U.S. Category Groups

Total assets managed in U.S. open-end and exchanged-traded funds have grown from $4.6 trillion beginning in 2000 to $18.8 trillion this last quarter-end. As a percentage of assets managed, taxable bonds increased from 11% to 21% over this period. Concurrently, U.S. equity fell from 63% to 49% of assets managed. The largest percentage growth occurred in alternative, growing from $12 billion to $292 billion, a 2,300% change.



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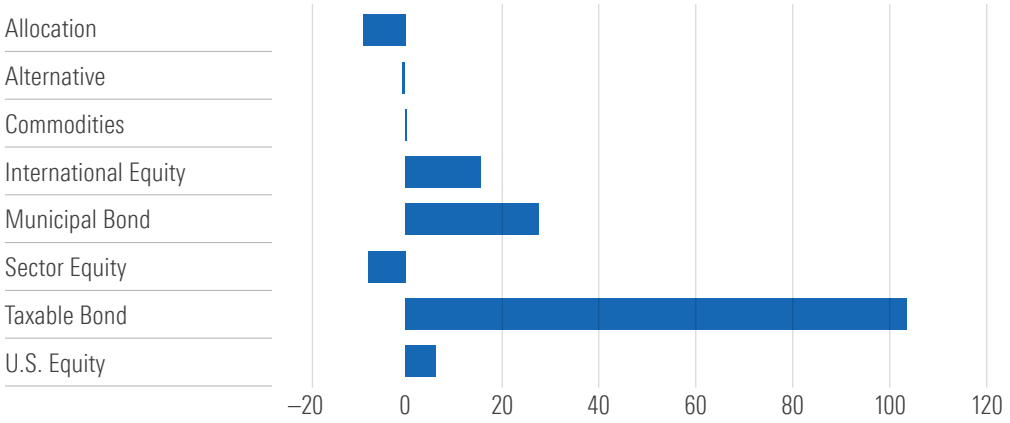
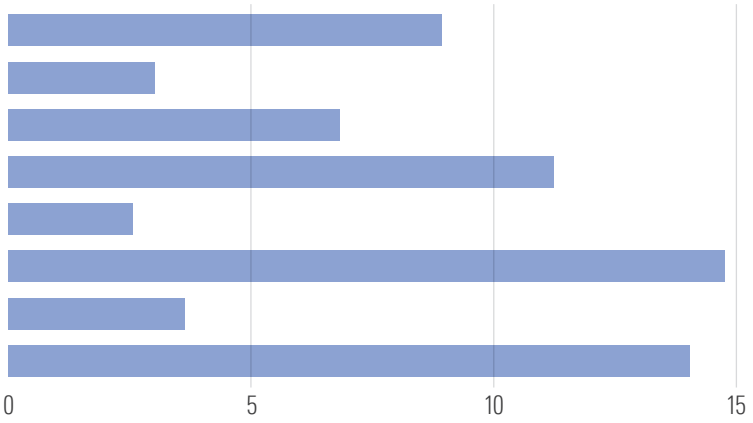
Top- and Bottom-Performing Morningstar Categories

Taxable-bond funds were in high demand last quarter, taking in more than $100 billion, as investors responded favorably to the Fed's pause on further interest-rate hikes. Most asset classes achieved impressive results, especially equity funds, whose returns were in the double digits. As stock markets recovered from their December lows, bear-market funds posted an unsurprising 17.4% loss, while China-region funds gained 20.9% thanks to encouraging developments surrounding the trade talks.

Trailing Quarter Flows ($ Bil)



Trailing Quarter Returns (%)



Top-Performing Morningstar Categories	U.S. Category Group	Return (%) Trailing Quarter	Trailing 1 Year	Quarterly Flow ($ Mil)
China Region	International Equity	20.9	–6.4	2,702
Commodities Energy	Commodities	20.8	–0.7	–357
Technology	Sector Equity	19.7	9.9	–1,041
Energy Limited Partnership	Sector Equity	19.1	13.0	231
Mid-Cap Growth	US Equity	18.2	8.0	–1,328
Small Growth	US Equity	17.0	7.7	–728
Equity Energy	Sector Equity	16.9	–9.5	–4,248
Real Estate	Sector Equity	16.1	17.1	3361
Large Growth	US Equity	15.7	10.7	–8,804
Industrials	Sector Equity	15.2	0.0	–1,457

Bottom-Performing Morningstar Categories	U.S. Category Group	Return (%) Trailing Quarter	Trailing 1 Year	Quarterly Flow ($ Mil)
Bear Market	Alternative	–17.4	–10.1	–58
Commodities Agriculture	Commodities	–3.7	–14.1	–29
Market Neutral	Alternative	0.1	–0.2	1,493
Ultrashort Bond	Taxable Bond	1.0	2.4	7,184
Short Government	Taxable Bond	1.0	2.4	3,218
Muni National Short	Municipal Bond	1.2	2.5	1,669
Managed Futures	Alternative	1.2	–2.4	–1,503
Multicurrency	Alternative	1.4	2.1	–505
Muni Single State Short	Municipal Bond	1.6	3.6	33
Short-Term Bond	Taxable Bond	1.7	3.0	7,406

>20
10 to 20
0 to 10
–10 to 0
–20 to –10
<–20

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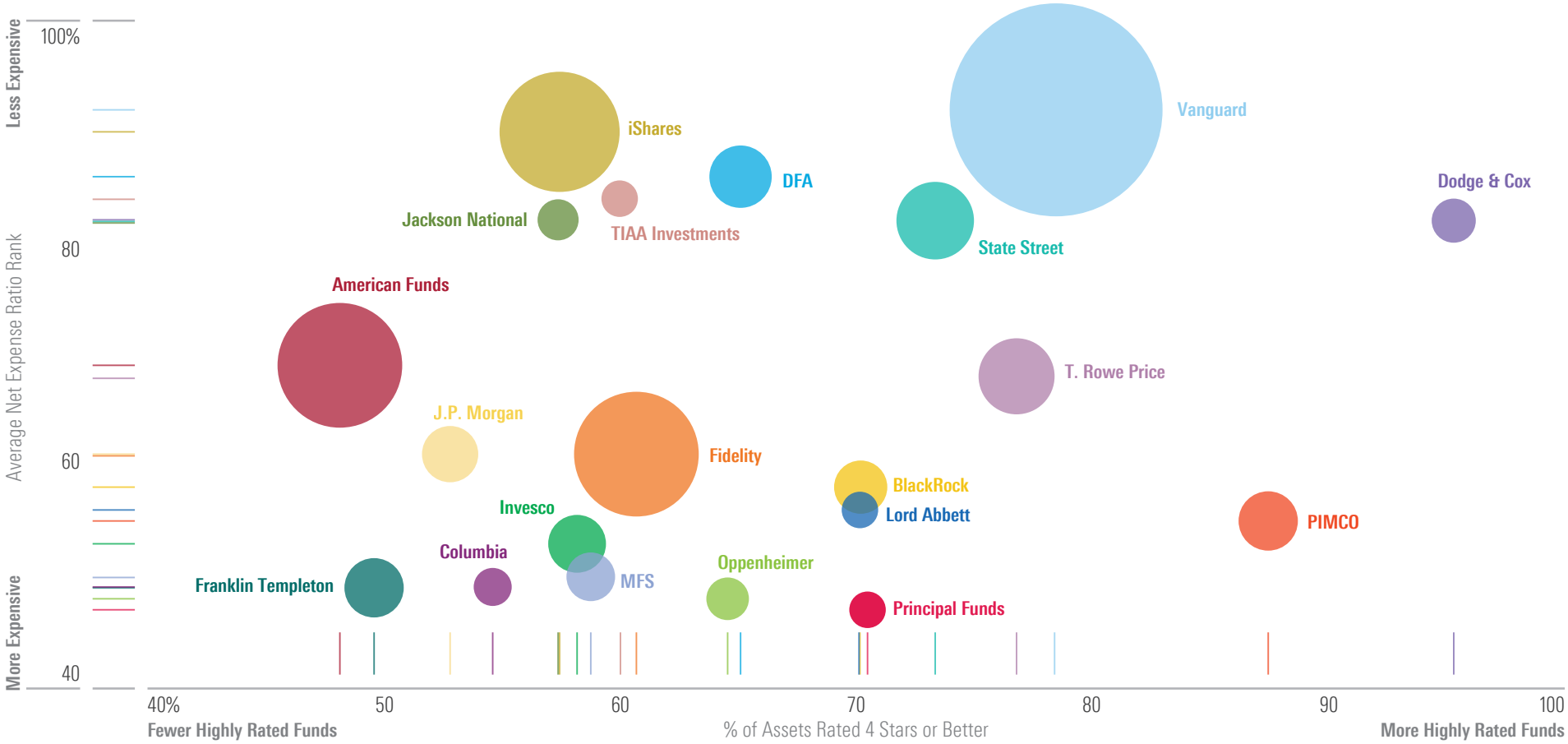
Top 20 Fund Companies: Relationship Between Ratings, Expenses, and Assets

Almost all fund companies in the graph below have over 50% of their assets in funds with a Morningstar Rating of 4 stars or higher, confirming investors' strong preference for low-cost funds with above-average long-term results. This chart used to illustrate a stronger linear relationship between low expenses and high returns. In recent quarters, however, that trend has weakened as companies have had a wider dispersion in performance without much change in fee levels.



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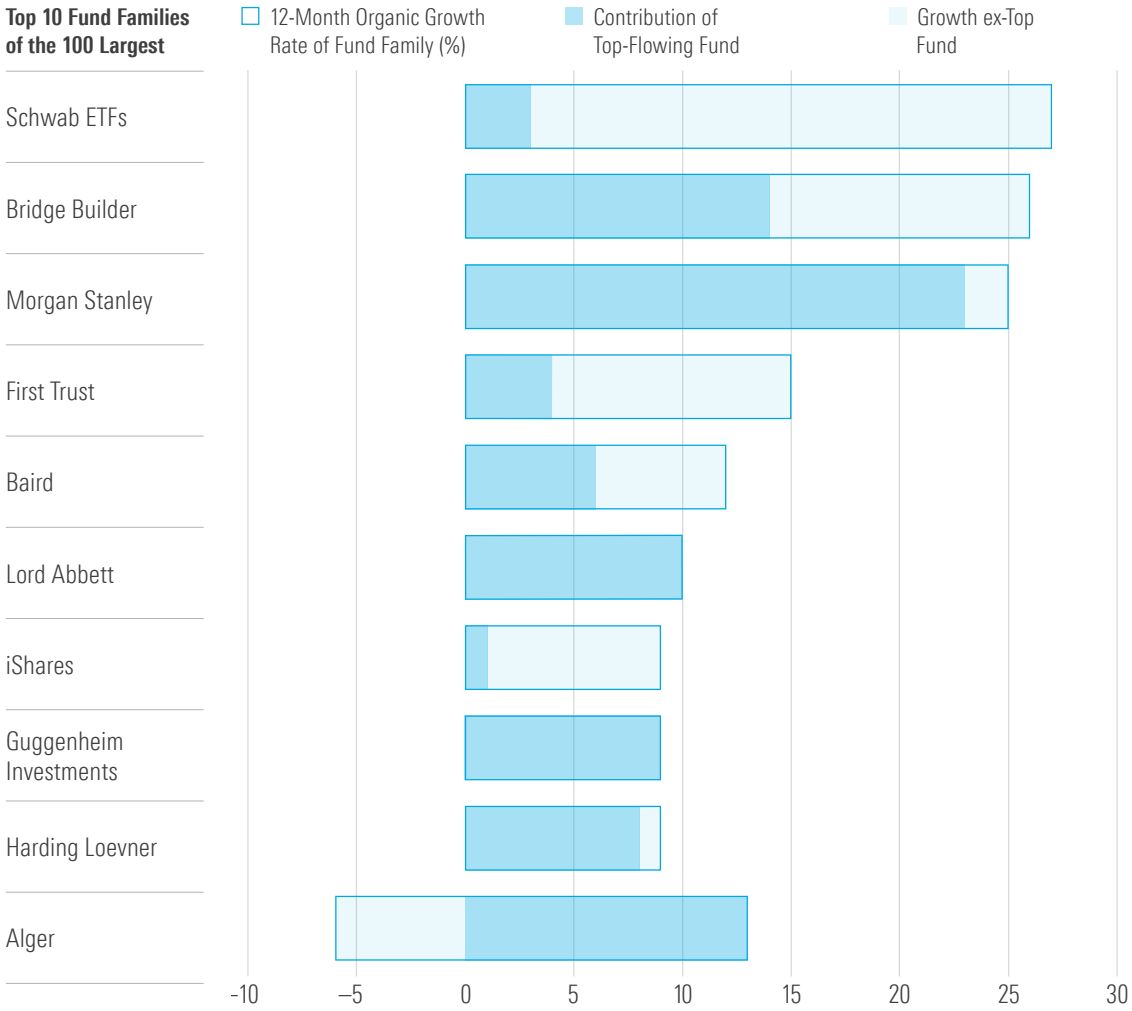
Fastest-Growing Fund Families

Schwab ETFs and Edward Jones' Bridge Builder funds achieved the two highest trailing-12-month organic growth rates for the eighth consecutive quarter. The market movements in the first quarter of 2019 led to three new fund families in this ranking: Baird, Alger, and Lord Abbett, displacing MassMutual, Primecap, and VanEck. Of particular interest: Six of the top 10 contributing funds are ultrashort- and intermediate-term bond funds, compared with only four in last quarter's ranking.



Top Fund for Each Family	Morningstar Category	Firm Active/ Passive
Schwab International Equity ETF	Foreign Large Blend	Passive
Bridge Builder Core Plus Bond	Intermediate-Term Bond	Active
Morgan Stanley Institutional Ultra-Short Income	Ultrashort Bond	Active
First Trust Enhanced Short Maturity ETF	Ultrashort Bond	Active
Baird Aggregate Bond	Intermediate-Term Bond	Active
Lord Abbett Ultra Short Bond	Ultrashort Bond	Active
iShares Core S&P 500 ETF	Large Blend	Passive
Guggenheim Total Return Bond	Intermediate-Term Bond	Active
Harding Loevner International Equity	Foreign Large Growth	Active
Alger Small Cap Focus	Small Growth	Active

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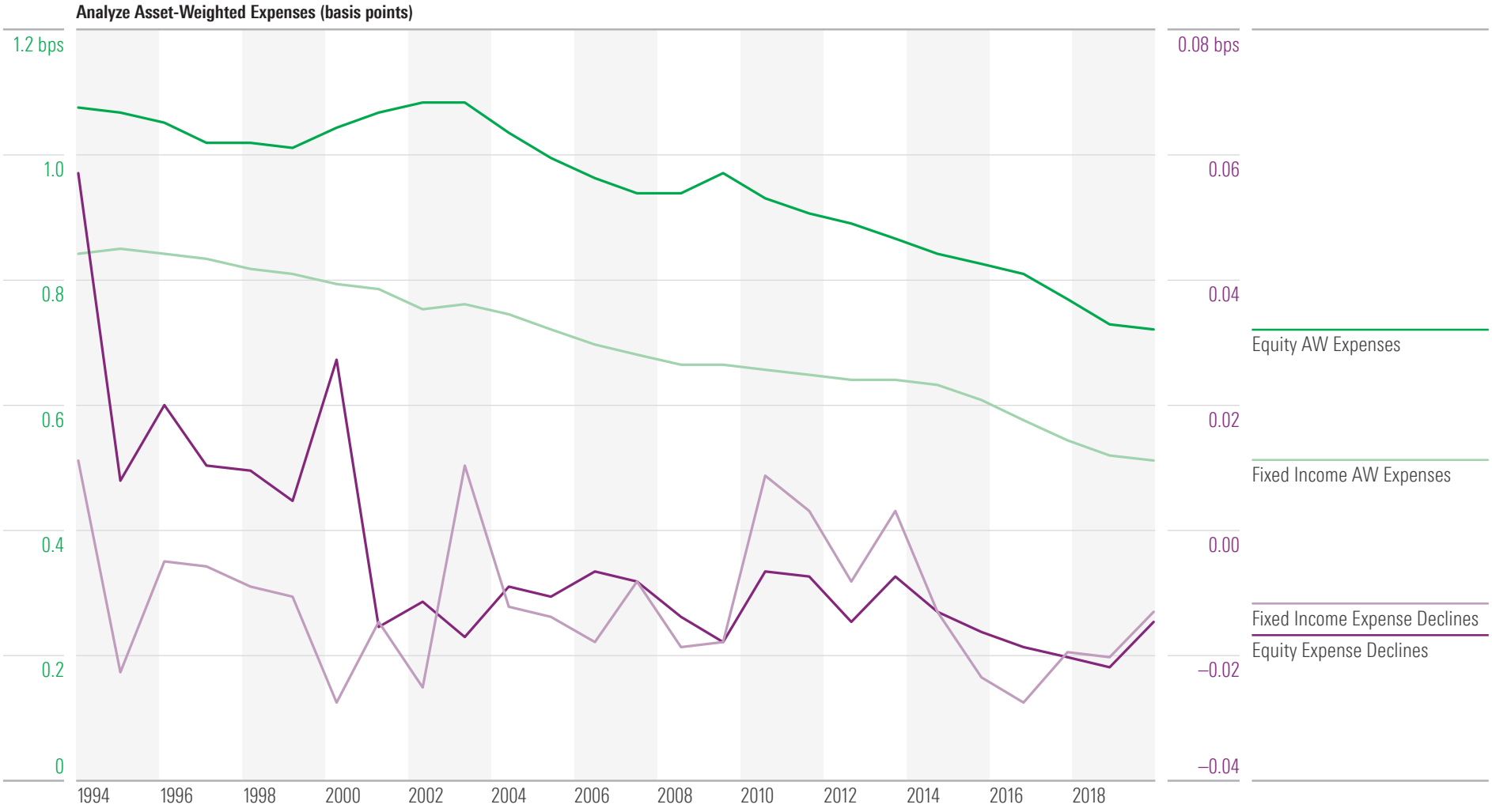
Despite Price Pressures, Fund Companies Are Hesitant to Lower Fees

Investing costs can fall for two main reasons: fund companies lowering expenses on existing funds, or assets shifting to lower-cost funds. The chart below shows how costs decline as a direct result of fund companies lowering fees. Although asset-weighted expenses have fallen nearly 30 basis points since 1994 for both equity and fixed-income funds, cost declines caused by expense ratio cuts hover near zero, which means that, in general, fund companies are not lowering fees.



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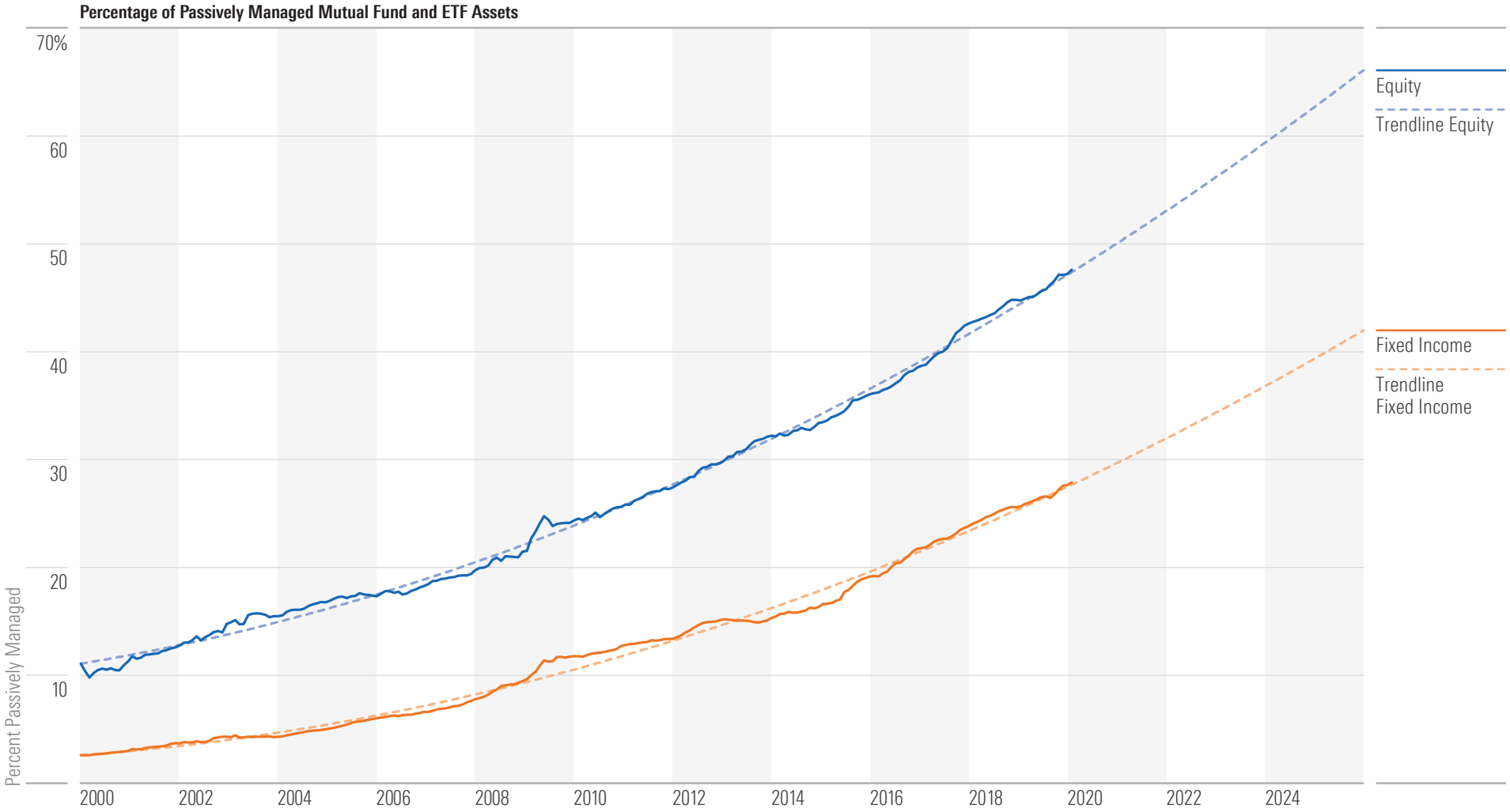
Growth of Assets in Passively Managed Vehicles Steadily Continues

The percentage of passively managed open-end and exchanged-traded fund assets continues to grow steadily. The passively managed percentage of equity assets is currently 48% and on track to reach 60% by 2024. Investors have also been moving into passively managed fixed-income funds, but at a slower rate than for equity, likely because of the superior performance of active funds, on average, in the fixed-income space.



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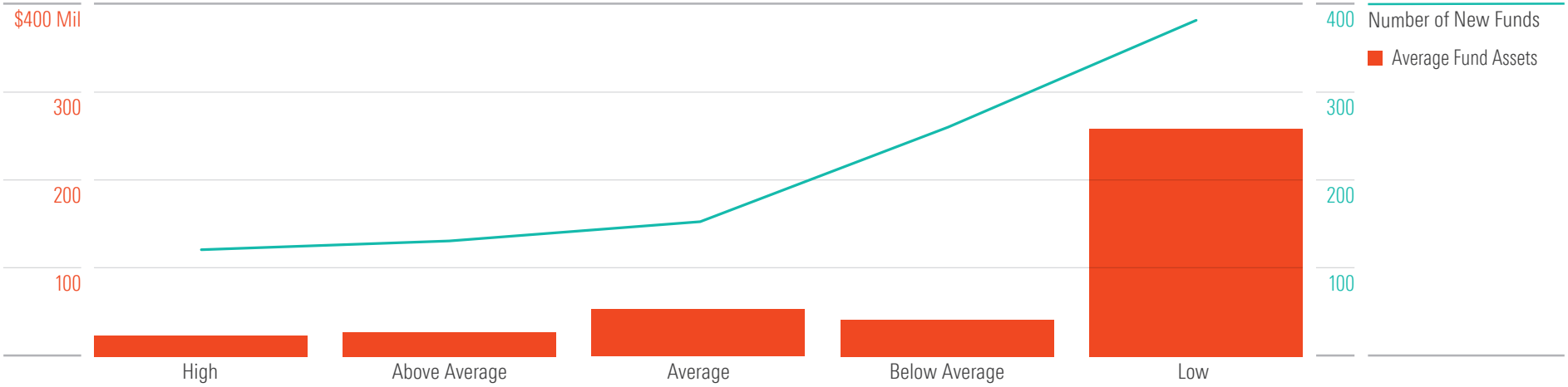
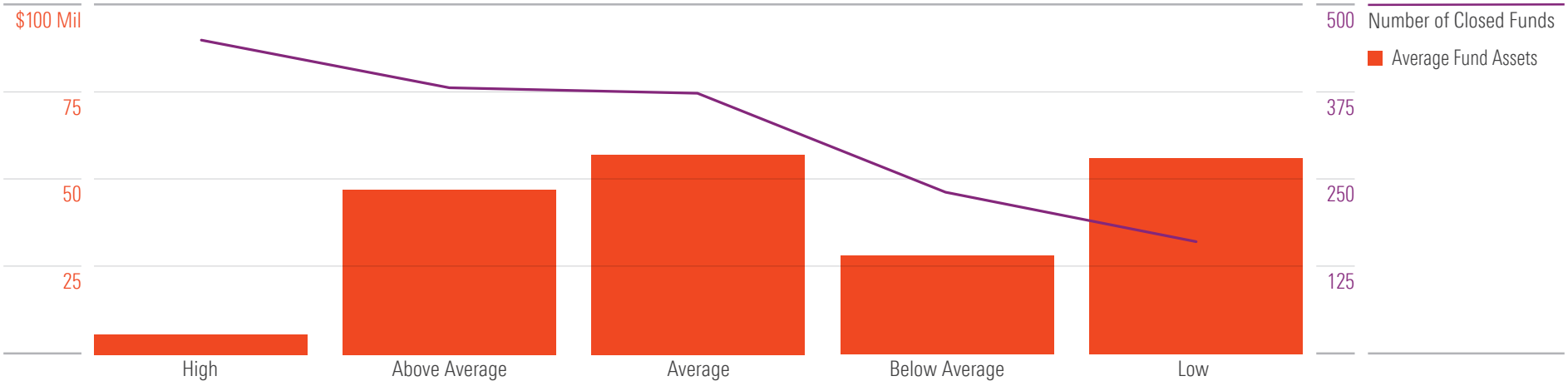
New Funds and Fund Closures

Among the funds that closed between December 2017 and November 2018, a majority had average to high expenses. In terms of net assets, funds with average to low expenses earned the most assets. For the funds that launched during the same period, the cheapest funds, on average, had more assets than all the funds in the higher-fee categories combined. An overwhelming number of new funds had low to below-average fees, while only 10% had high fees.

New Fund Launches From December 2017 to November 2018



Fund Closures From December 2017 to November 2018



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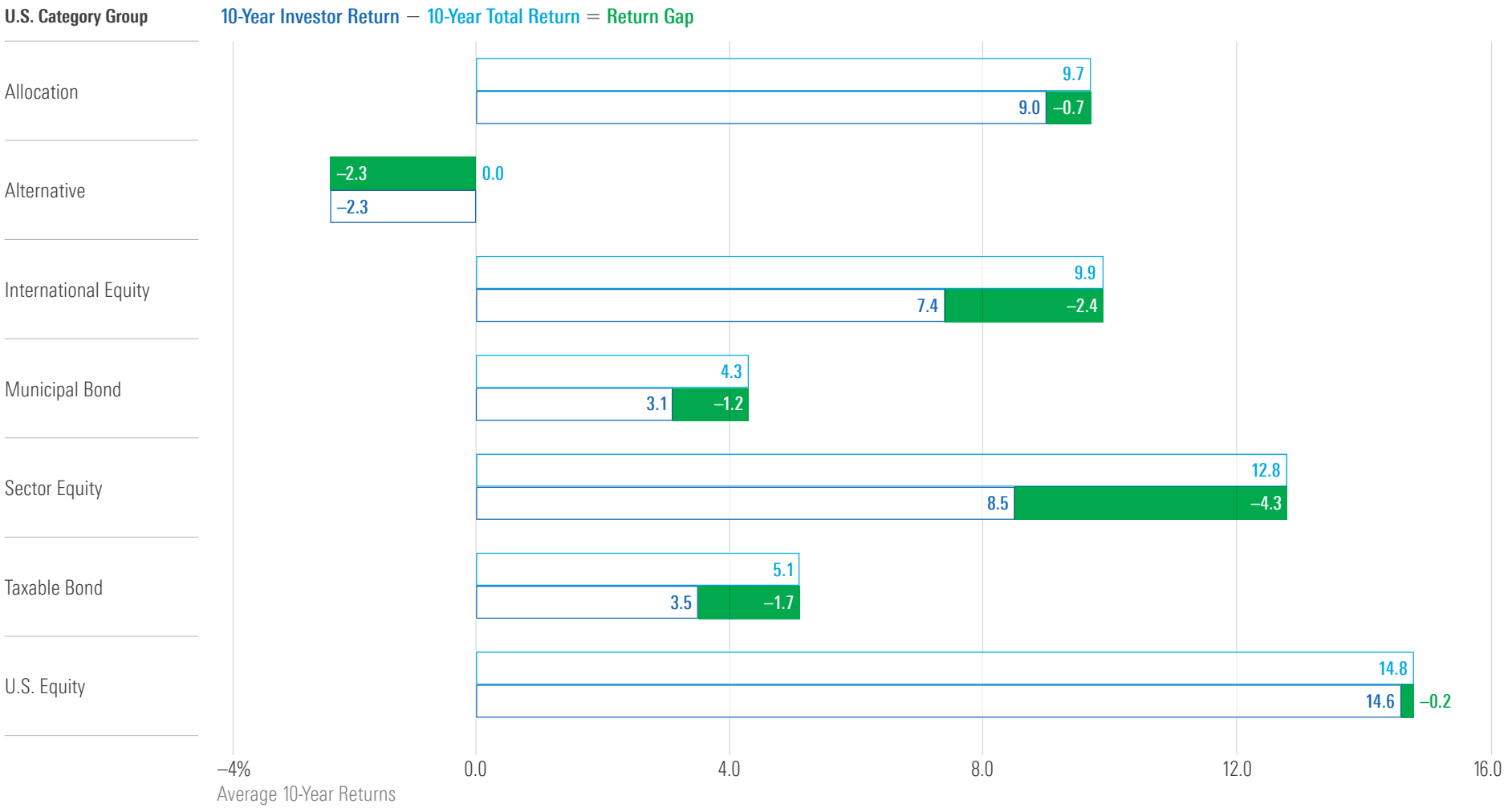
U.S. Equity Funds Have the Lowest Return Gap Among U.S. Category Groups

Morningstar Investor Returns take into account monthly fund flows and monthly returns to estimate a typical investor's experience in a fund. Over the past 10 years, investor returns in every category group lagged behind total returns, suggesting that investors are poor market-timers. For sector equity, international equity and alternative, the gap is large, ranging from 2.3% to 4.3%. Investors did better in U.S. equity and allocation, missing out by less than 1%.



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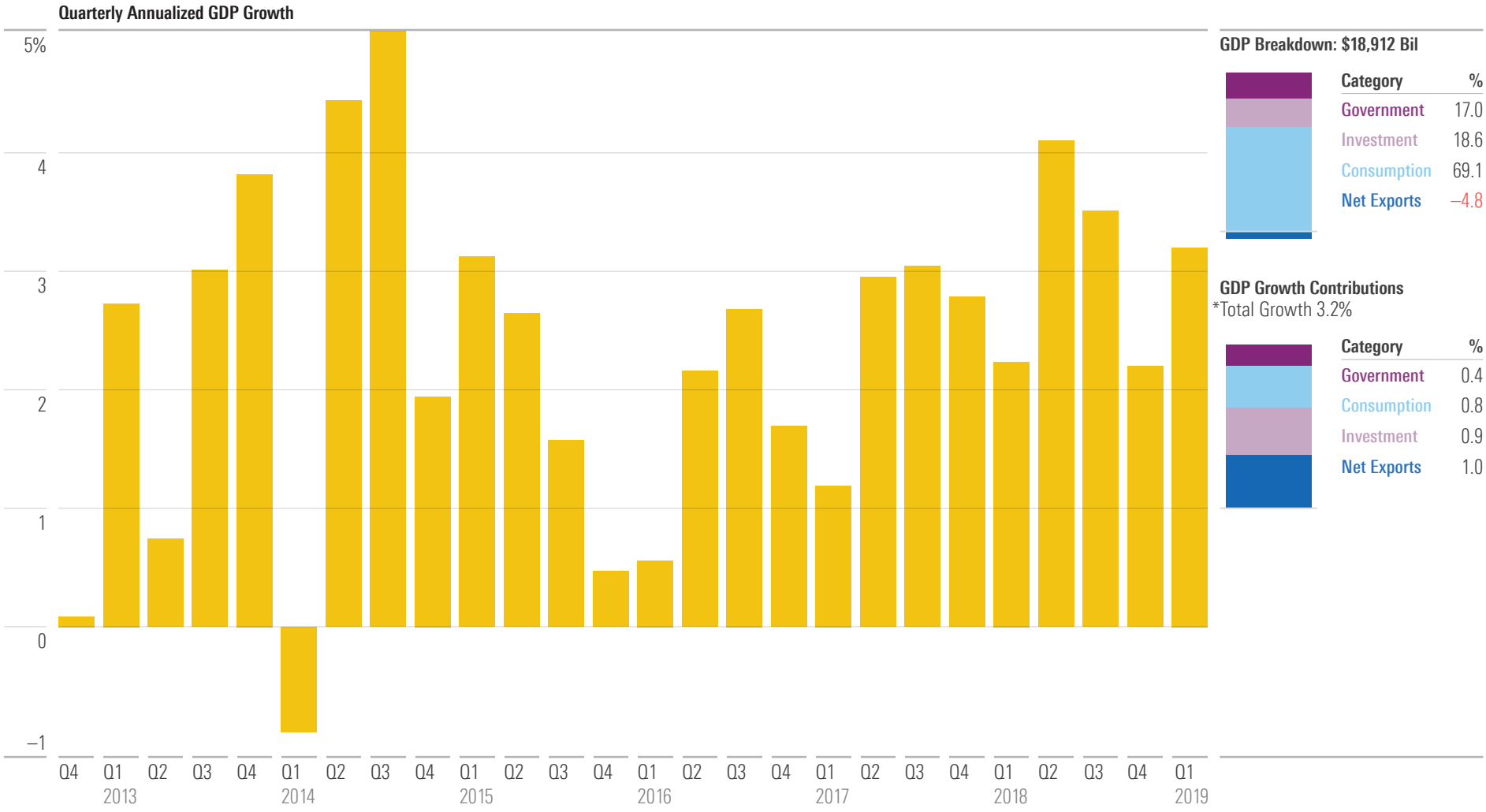
Economic Indicators

After a Winter Slowdown Prompted Recession Fears, the U.S. Economy Looks to Be on More Solid Footing

A growth deceleration in the fourth quarter and uninspiring economic data early in 2019 stoked recession fears in some corners of the market, even as equities staged an impressive rebound. In the end, stocks may have gotten it right: The initial estimate of first-quarter GDP growth printed at 3.2%. The impressive headline number belies some softness in consumer spending and fixed investment, but overall the data certainly suggest a low likelihood of recession in the near term.



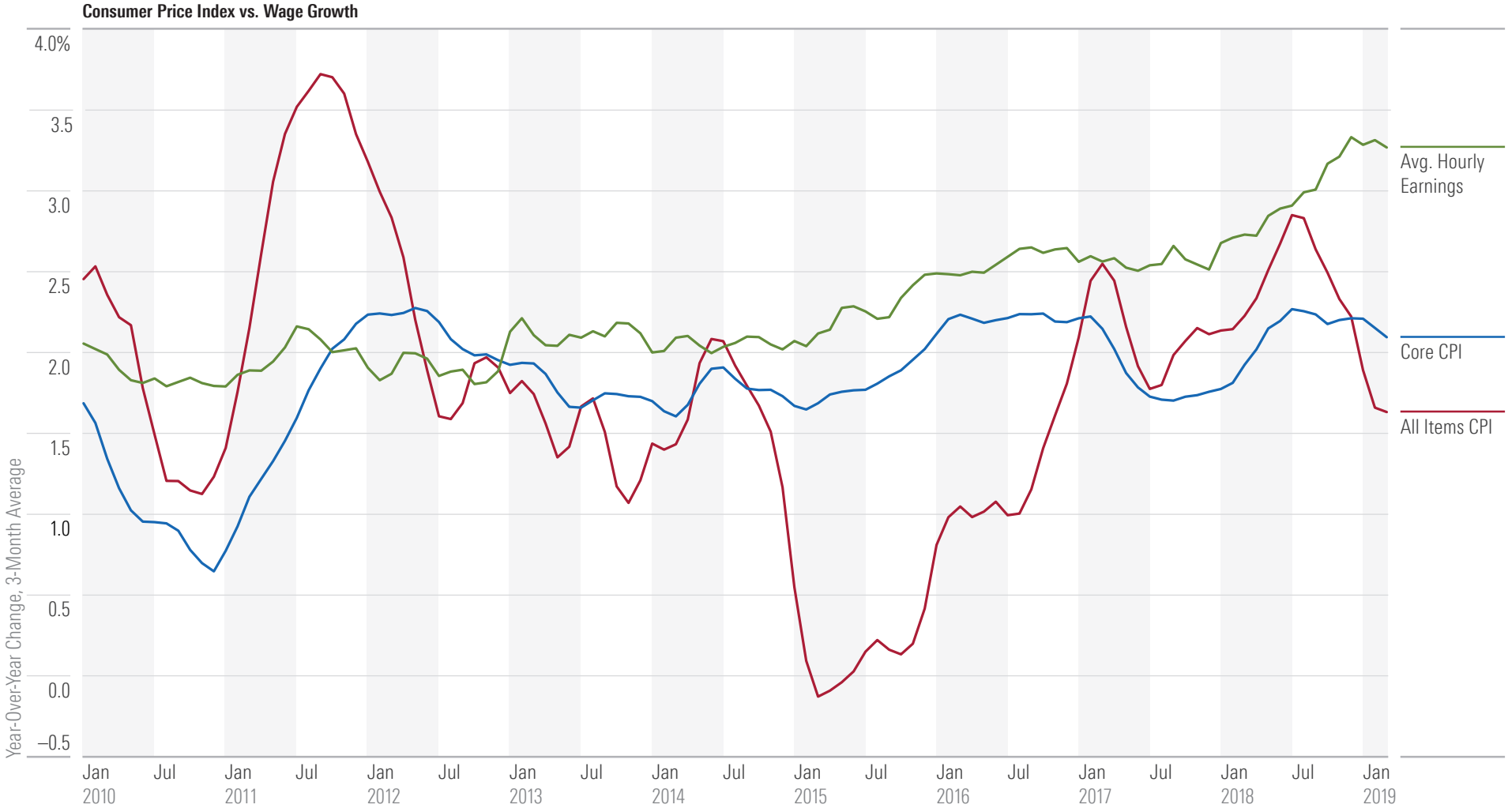
QEI7

Source: Bureau of Economic Analysis, Morningstar calculations. *Percentage breakdowns might not add up to their totals because of rounding differences.

MORNINGSTAR®

U.S. Inflation, Wage Growth Show Signs of Moderating

Average hourly earnings accelerated by nearly 1 percentage point over the course of 2018, though it appears that upward pressure is subsiding. While still holding steady at the fastest pace since the financial crisis, nominal wage growth is still some 50 basis points below peaks of roughly 4% ahead of the past three recessions. Consumer price inflation also appears to be softening. Together, these data suggest the Fed was right to make a "dovish pivot" in January.



QEI5

Source: Bureau of Labor Statistics, Morningstar calculations.

MORNINGSTAR®

Retail Sales Take a Hit in the First Quarter; Elevated Sentiment, Strong Labor Market Portend a Rebound

Retail sales growth plunged to its slowest pace in five years in late 2018 and early 2019, contributing to a general pessimism around the near-term growth outlook. Nonetheless, the macroeconomic environment still looks favorable for U.S. households, given a strong labor market, easing financial conditions, and elevated consumer sentiment. Indeed, March retail sales rose 1.7% year over year, beating most economist expectations and assuaging some concerns about a more prolonged slump.

Consumer Sentiment and Retail Sales

QEI118

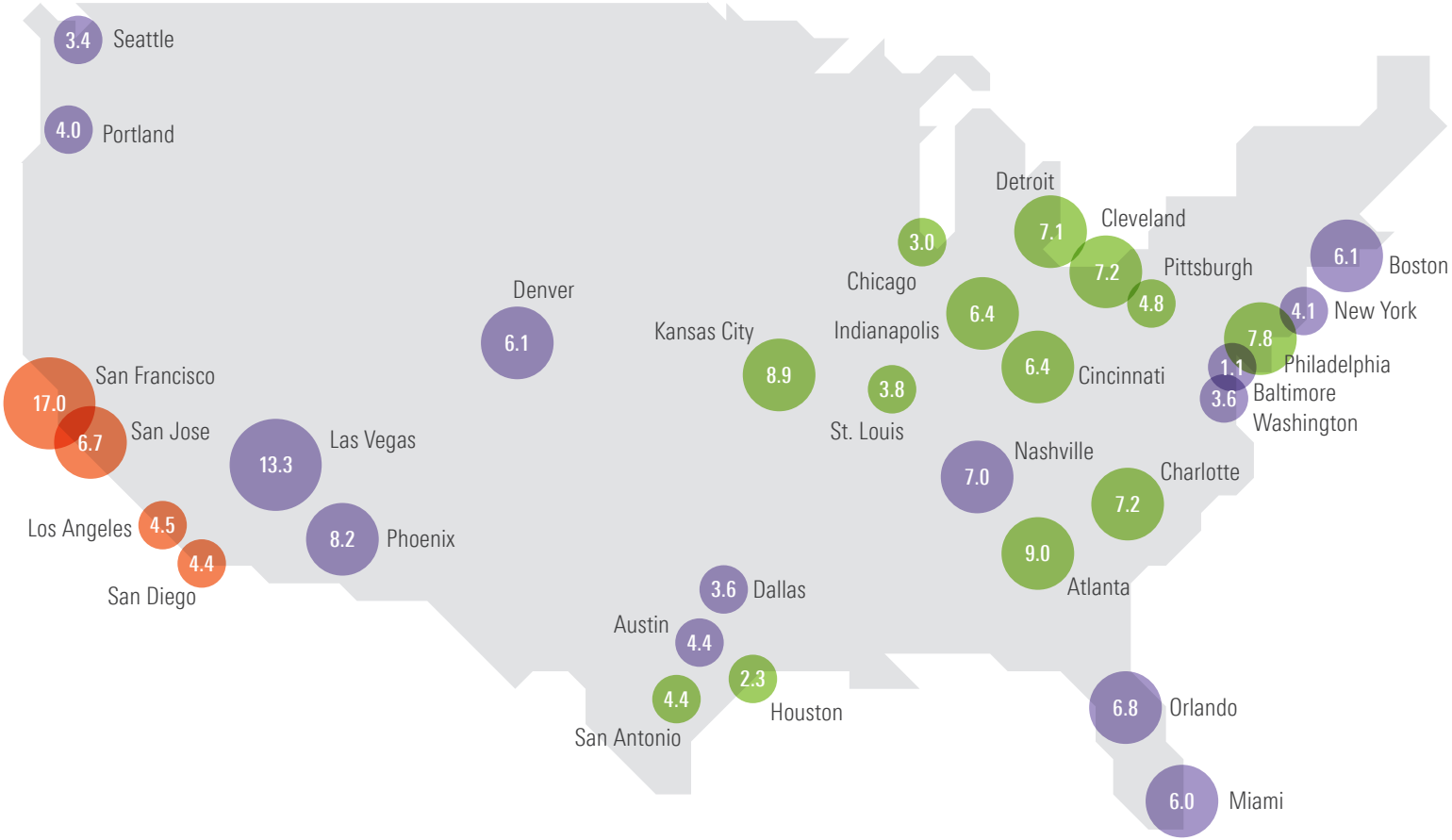
Source: U.S. Department of Commerce, University of Michigan.

MORNINGSTAR®

National Real Estate Price Growth Slows to 5.7% in the Fourth Quarter, Slowest Pace in More Than Two Years

U.S. home prices increased by less than 6% year over year for the first time since second-quarter 2016, with only a handful of the 100 largest metropolitan areas showing signs of positive price momentum going into 2019. Seattle saw one of the most significant slowdowns, while price growth in San Francisco and Las Vegas continued to trend higher. Outside of these two markets, the most notable price increases were concentrated in relatively inexpensive cities in the Midwest and South.

Year-Over-Year Price Growth



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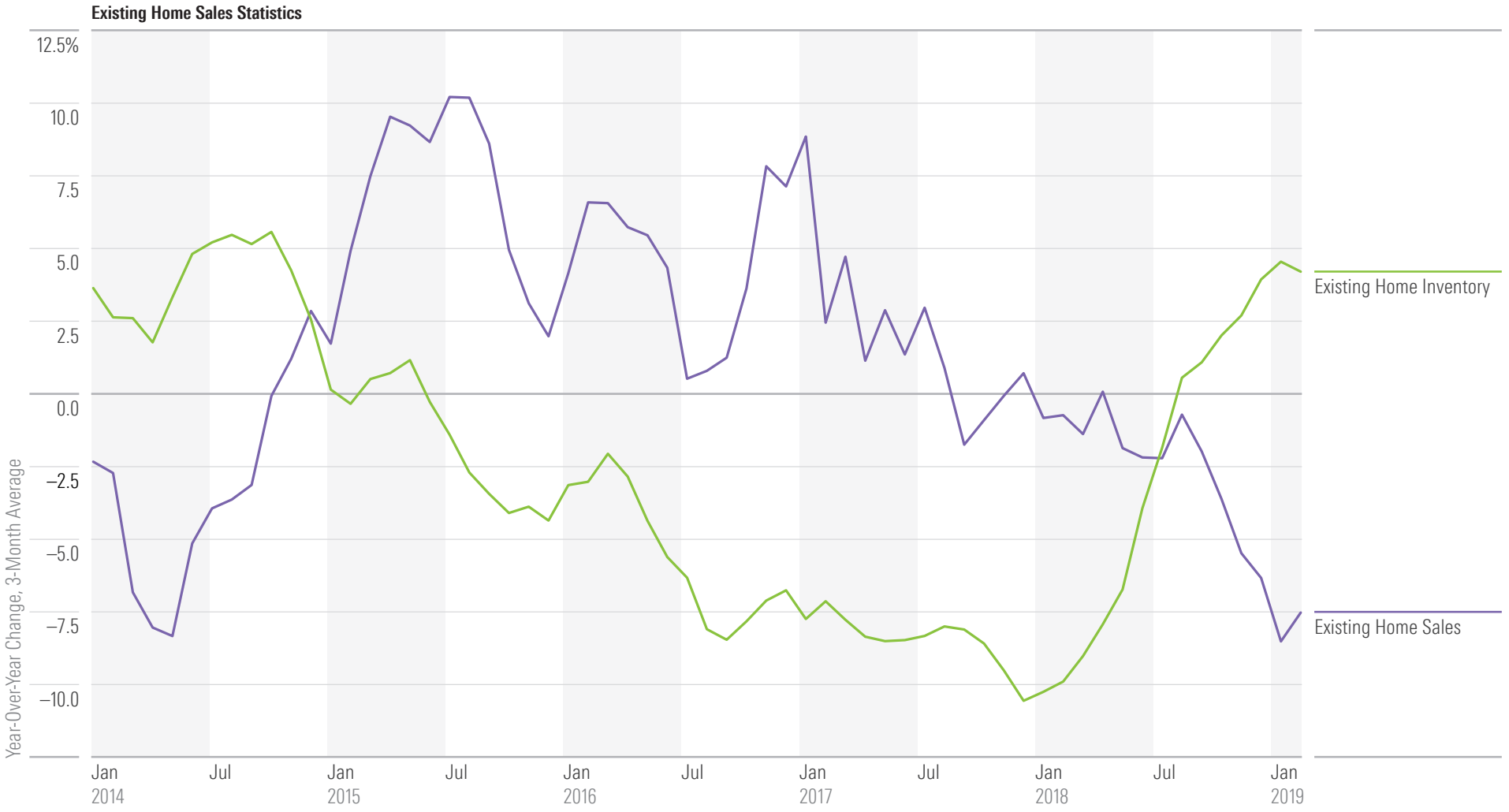
Slowing House Price Appreciation Consistent With Ongoing Weakness in the U.S. Housing Market

Existing home sales continued to drop in the first quarter, though there are nascent signs of a bottoming. Lower mortgage rates are expected to help support housing demand going forward, and workers are still enjoying the fruits of a tight labor market and the fastest nominal wage growth since the financial crisis. Still, affordability remains a challenge in many parts of the country. It remains to be seen whether the rise in inventories will put enough downward pressure on prices to pull in buyers.



QEI107

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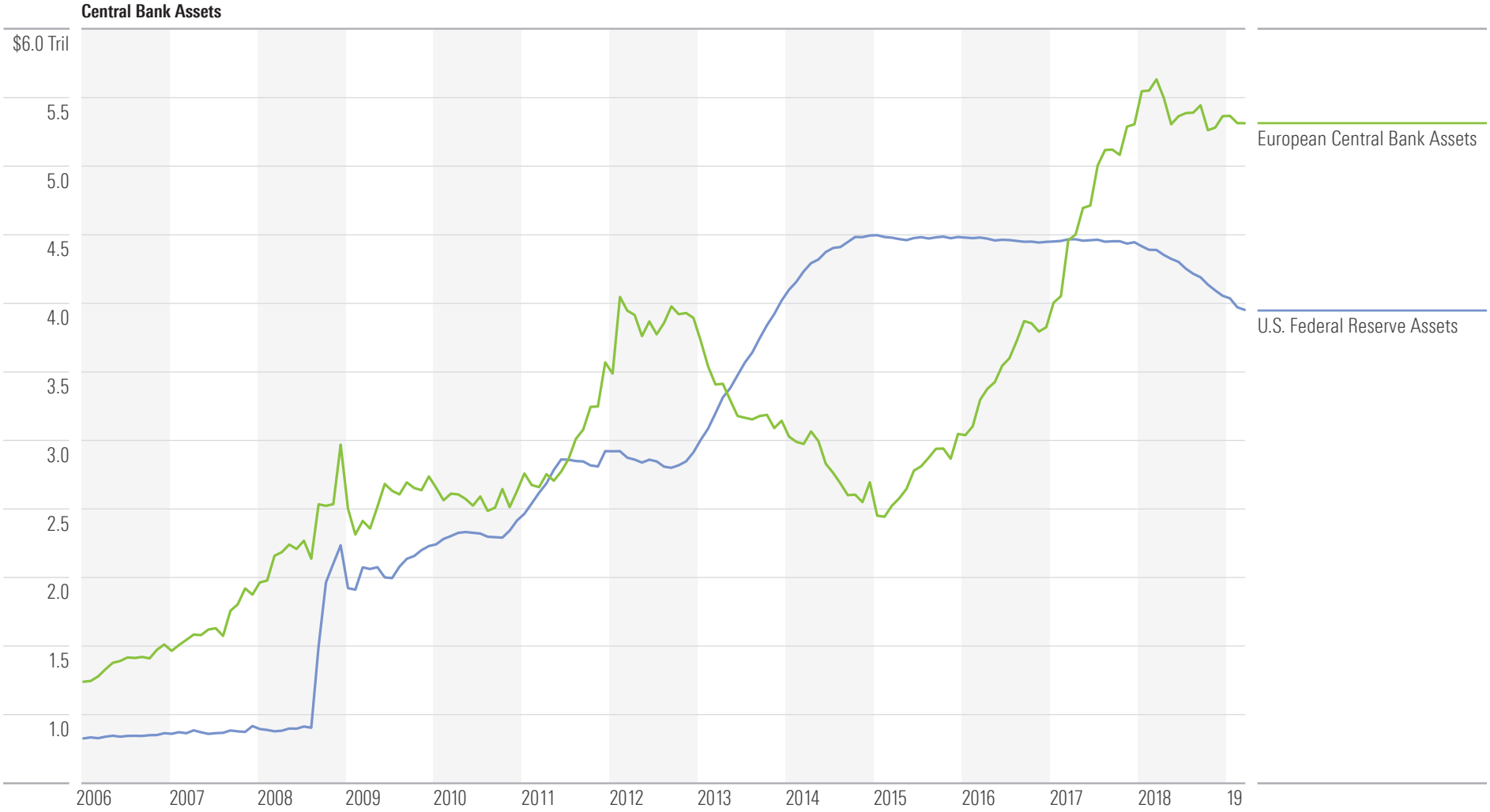
The European Central Bank Announces New Lending Operation

In the face of moderating inflation and slowing growth momentum, the European Central Bank (ECB) in March announced plans to offer a new targeted long-term refinancing operation (TLTRO) to banks in the currency union in an effort to bolster lending to the real economy. The size of the program will depend on bank demand and eligibility; the previous TLTRO in 2016–17 resulted in roughly $890 billion in loan support to banks, accounting for 15% of the ECB's $5.4 trillion in assets.



QEI119

43

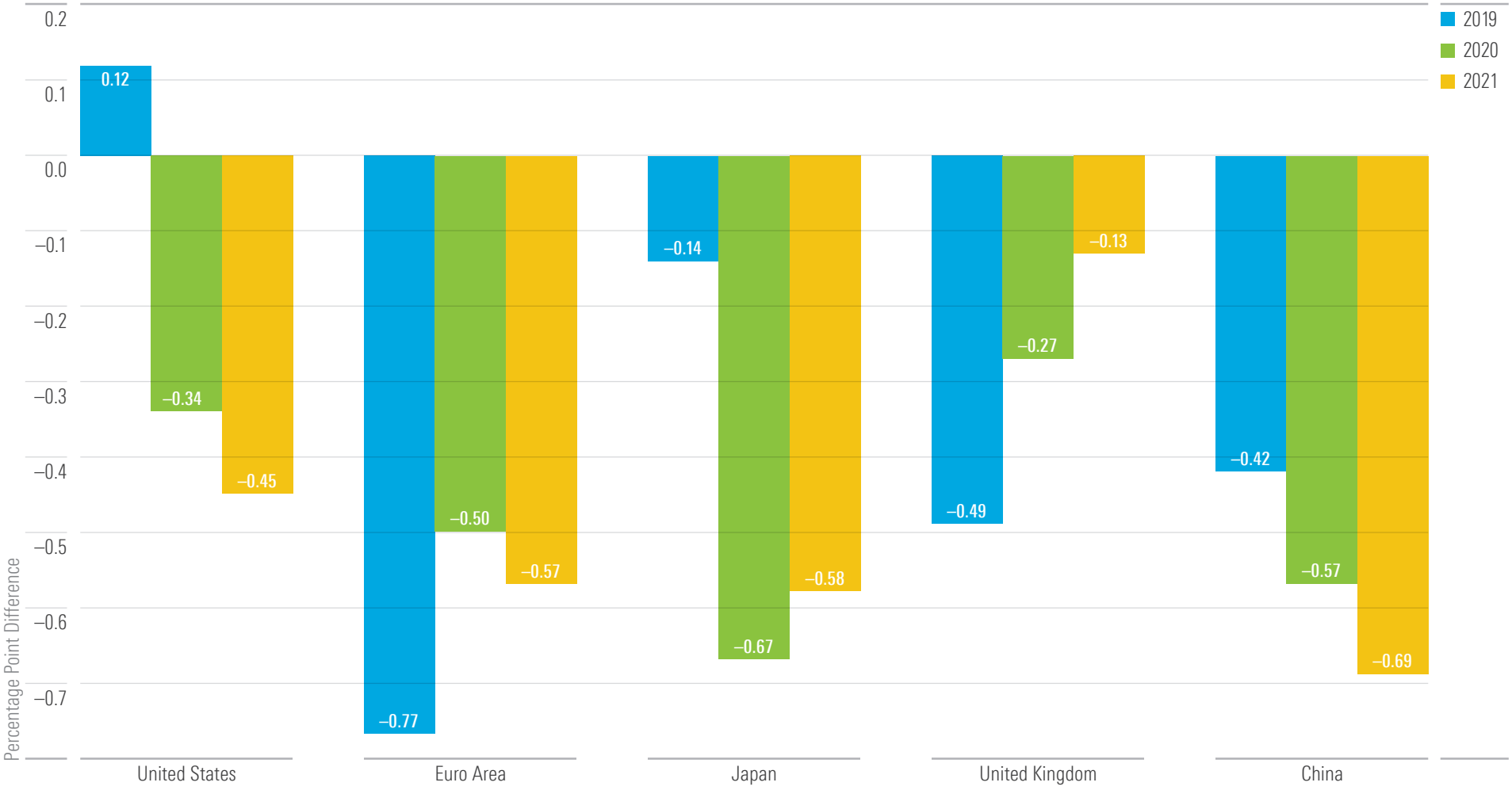
Source: Federal Reserve, European Central Bank.

MORNINGSTAR®

IMF Expects Global Growth to Slow Over the Next Three Years

The International Monetary Fund's latest forecasts, released in April, show global growth slowing over the coming three years relative to 2016–18 averages. Only the United States is expected to post above-trend growth in 2019 before slowing in 2020–21. An easier monetary-policy stance by the major central banks, fiscal stimulus in China, and a potential trade agreement between the U.S. and China present some upside risk to the medium-term outlook.

Last IMF Growth Forecasts Relative to Most Recent Three-Year Average Growth Rate (2016–2018)



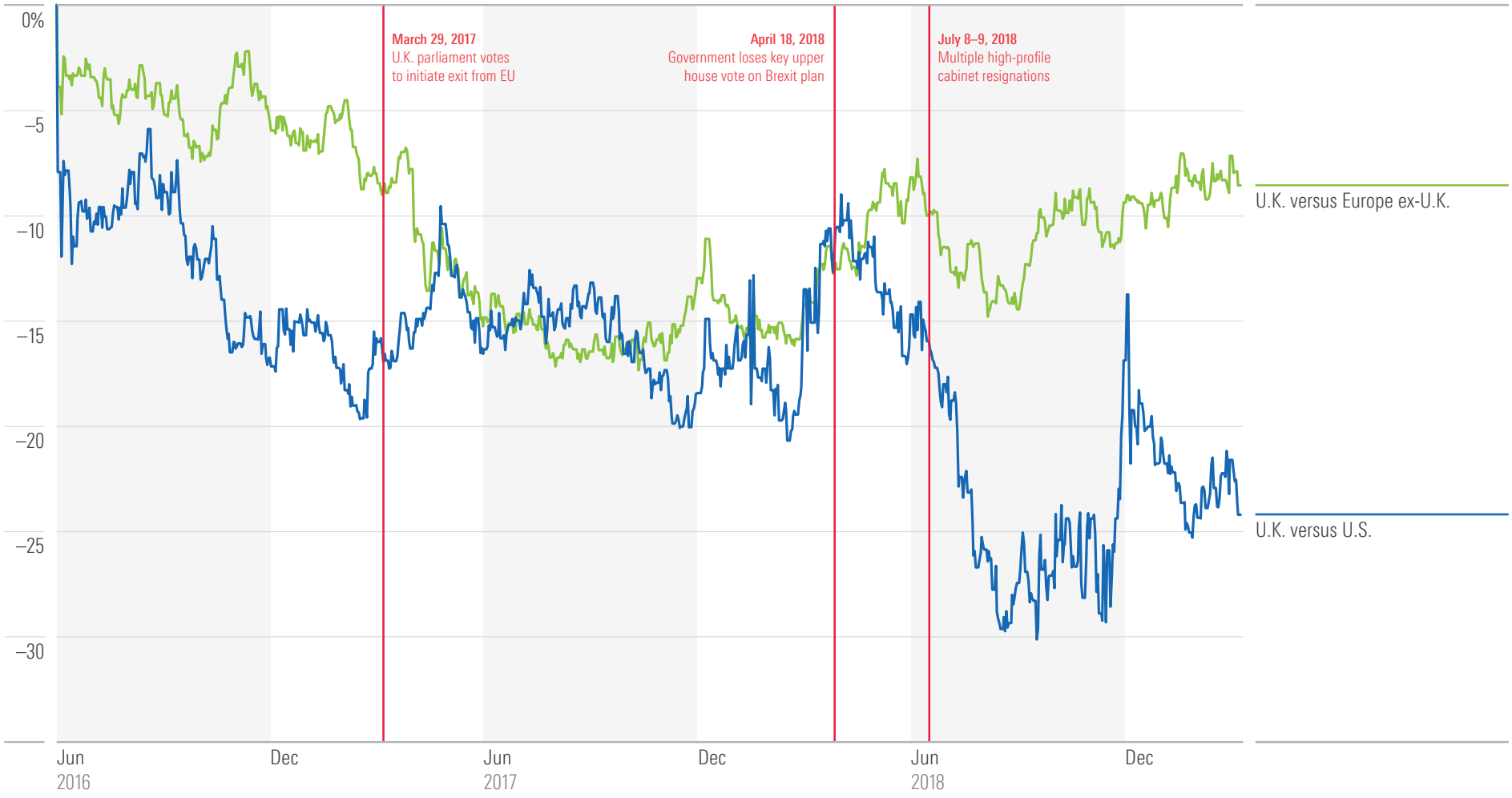
QEI16

MORNINGSTAR®

Brexit-Related Uncertainty Remained a Major Market Theme in the First Quarter

U.K. equities failed to keep pace with the U.S. rally in the first quarter and remain about 25% lower versus the U.S. market since the Brexit referendum in June 2016. This is just off the lows of late 2018, after several negative developments raised the probability of a "no-deal" Brexit. While continental European equities have also been laggards of late, they remain around 8% higher versus the U.K. since the referendum, suggesting a negative Brexit premium is still being priced into British stocks.

Morningstar U.K. Total Return Index: Relative Performance vs. European and U.S. Equities Since Brexit Referendum (June 23, 2016)



QEI116

Source: Morningstar. U.K. = Morningstar U.K. Index, Europe ex-U.K. = Morningstar Developed Market Europe ex-U.K. Index, U.S. = Morningstar U.S. Core Index

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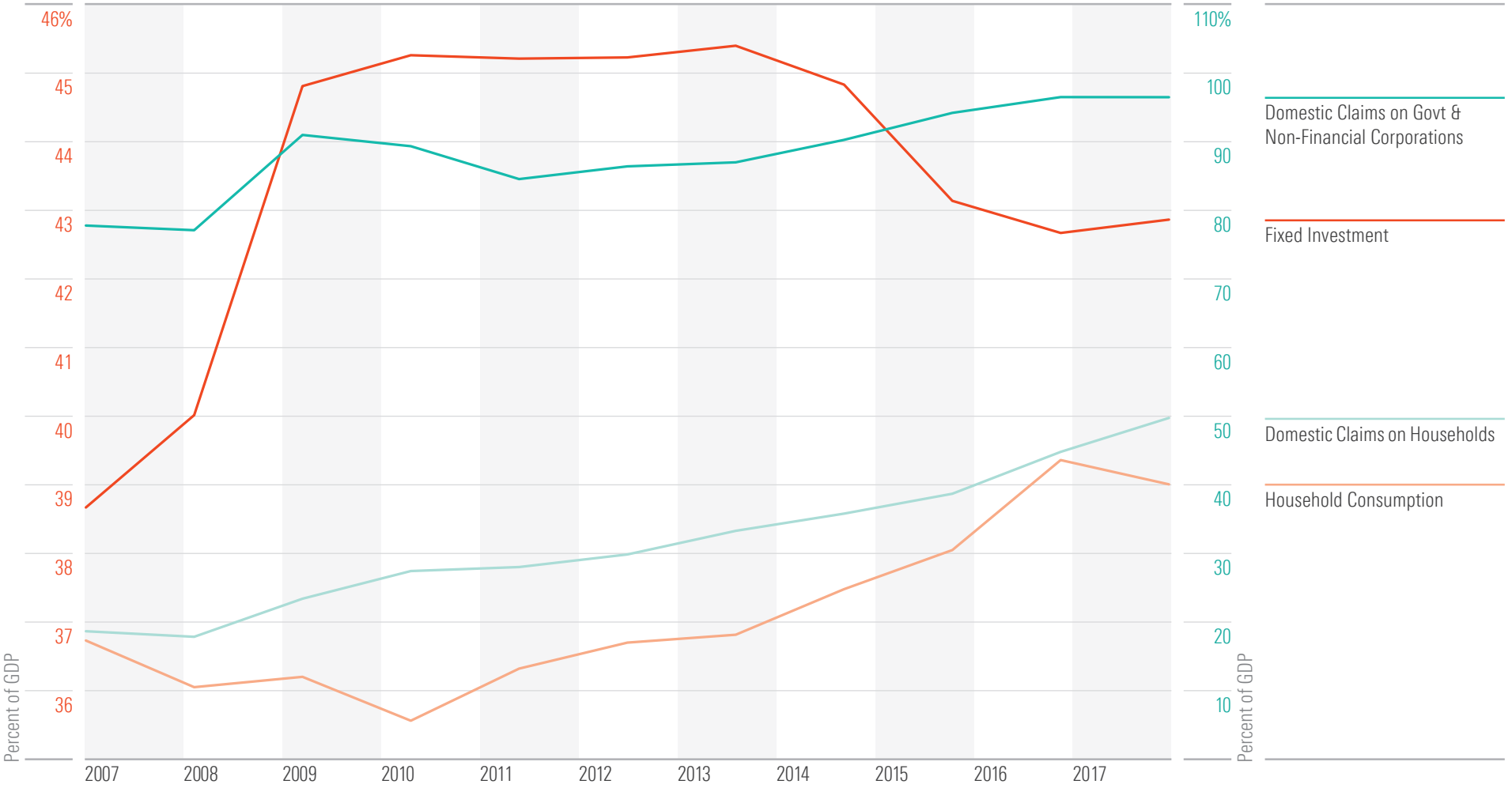
China Targets Consumption Over Investment in Most-Recent Stimulus Packages

Over the past 12 months, Chinese authorities have announced tax cuts, deductions, and other incentives worth around $500 billion aimed at bolstering consumer spending and economic activity. Previous stimulus packages tended to focus on investment-related spending, but as debt has piled up for local governments and state-owned enterprises, policymakers have increasingly relied on households as the preferred channel for managing the country's growth trajectory.

China: Consumption, Investment, and Debt as a Percent of GDP



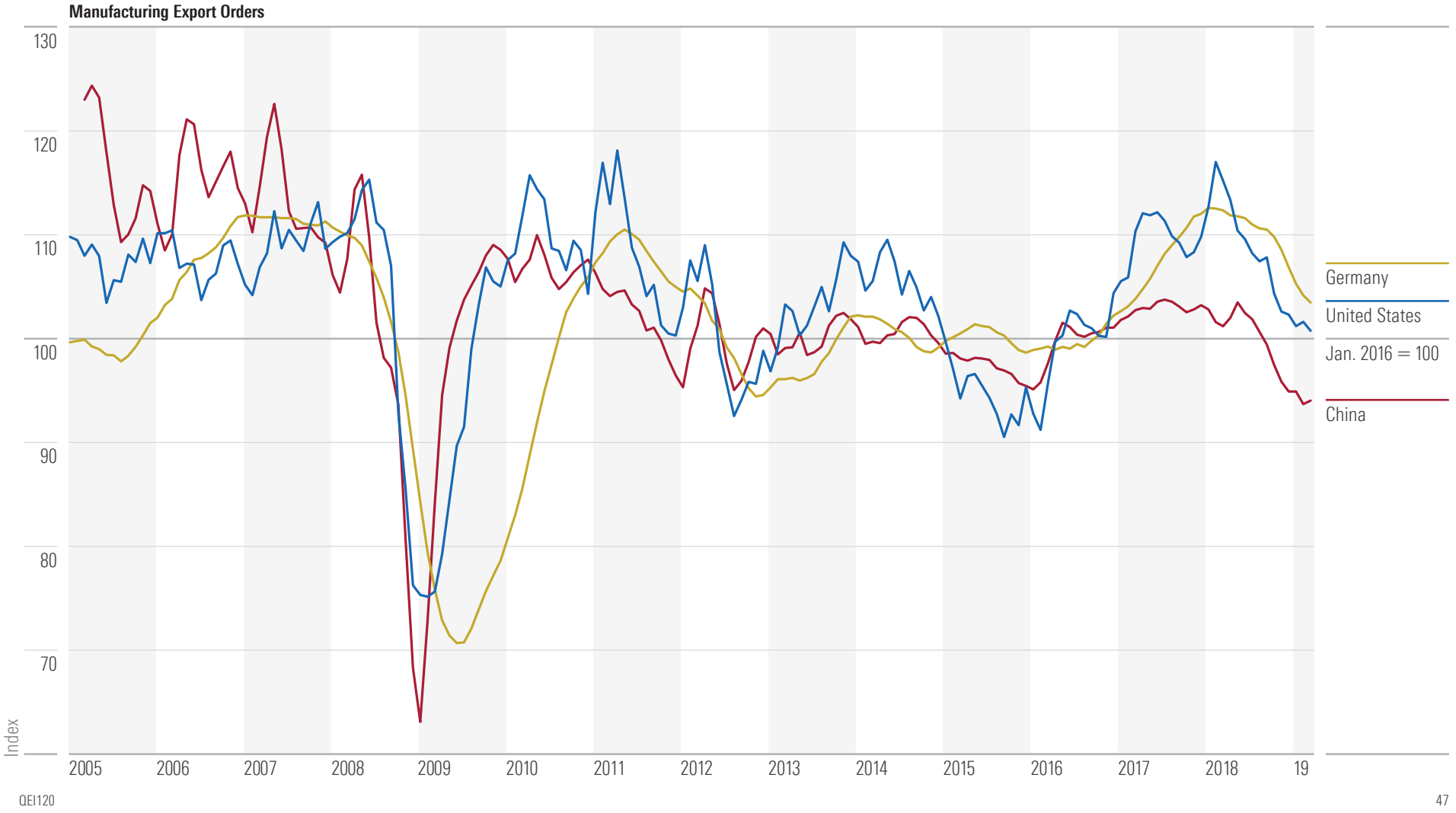
QEI117

Source: China National Bureau of Statistics, People's Bank of China.

MORNINGSTAR®

Global Trade Has Slowed: Are We Near the Trough?

The outlook for global trade remains gloomy, but the pace of the slowdown may be moderating. Chinese manufacturers' export orders showed signs of bottoming in the first quarter. U.S. and German exporters have continued to see a slowdown in new orders, but the overall pace remains near post crisis averages. Of course, much of the outlook for trade hinges on politics, namely, whether the U.S. and China can reach a detente.



QEI120

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Index and Disclosure

Index Definitions

The **Morningstar Style index** family consists of 16 indexes that track the U.S. equity market by capitalization and investment style to create an integrated system. The indexes were built using a comprehensive and non-overlapping approach based on the methodology of Morningstar Style Box.

The **Morningstar Sector index** family consists of 14 indexes—three Super Sector and 11 Sector indexes that track the U.S. equity market using a consumption based analysis of economic sectors in a comprehensive, non-overlapping structure. The sector indexes are consumer defensive, healthcare, utilities, basic materials, consumer cyclical, financial services, real estate, communications services, energy, industrials, and technology.

The **Morningstar Global Equity indexes** offer a consistent view of global investment opportunities by applying the same rules for every market around the world. Covering 97% of stocks by market capitalization, the indexes encompass 45 countries in both developed and emerging markets. The index family is designed to work as an integrated system, allowing for meaningful global views across market capitalization and regions.

The **Morningstar Target Risk index** family is designed to meet the needs of investors who would like to maintain a target level of equity exposure. The index family provides global equity market risk levels that are scaled to fit five equity market risk profiles: aggressive, moderately aggressive, moderate, moderately conservative, and conservative.

The **S&P 500® index** includes 500 leading companies and captures approximately 80% coverage of available market capitalization.

The **Russell 2000 index** measures the performance of the 2,000 smallest companies in the Russell 3000 index.

The **MSCI EAFE index** captures the returns of large and mid-cap equities across developed markets in Europe, Australasia, and the Far East, excluding the U.S. and Canada.

The **MSCI Emerging Markets index** captures the returns of large and mid-cap equities across 23 emerging markets countries. The index covers approximately 85% of the free float-adjusted market capitalization in each country.

The **Barclays U.S. Aggregate Bond index** is a broad-based benchmark that measures the investment grade, U.S. dollar-denominated, fixed-rate taxable bond market. The index includes Treasuries, government-related and corporate securities, MBS (agency fixed-rate and hybrid ARM pass-throughs), ABS and CMBS (agency and non-agency).

The **Barclays U.S. 5–10 Year Corporate Bond index** measures the investment return of U.S. dollar denominated, investment-grade, fixed rate, taxable securities issued by industrial, utility, and financial companies with maturities between 5 and 10 years.

The **BofA Merrill Lynch U.S. High Yield Master II Index** tracks the performance of U.S. dollar denominated below investment grade corporate debt publicly issued in the U.S. domestic market. Qualifying securities must have a below investment grade rating (based on an average of Moody's, S&P and Fitch).

The **Barclays Municipal Bond index** measures the broad market for investment grade, tax-exempt bonds with a maturity of at least one year.

The **JP Morgan EMBI Global Diversified index** tracks the performance of dollar-denominated sovereign bonds issued by a selection of emerging market countries. The index limits the weights of countries with larger debt stocks by only including a specified portion of these countries' eligible current face amounts of debt outstanding.

The **London Fix Gold PM index** is the price of gold per ounce at 15:00 GMT determined by the five members of the London Gold Pool.

The **Bloomberg Commodity index** represents 20 commodities, which are weighted for economic significance and market liquidity.

The **Bloomberg Livestock index** reflects the returns of an unlevered investment in futures contracts on livestock commodities. The index consists of two commodity futures (lean hogs and live cattle).

The **Bloomberg Grains index** reflects the returns of an unlevered investment in futures contracts on precious metals commodities. The index consists of three commodity futures (corn, soybeans, and wheat).

The **Bloomberg Precious Metals index** reflects the returns of an unlevered investment in futures contracts on livestock commodities. The index consists of two commodity futures (gold and silver).

The **Bloomberg Industrial Metals index** reflects the returns of an unlevered investment in futures contracts on industrial metals commodities. The index consists of four commodity futures (copper, aluminum, zinc, and nickel).

The **Bloomberg Energy index** reflects the returns of an unlevered investment in futures contracts on energy commodities. The index consists of five commodity futures (natural gas, WTI crude oil, Brent crude oil, unleaded gasoline, and heating oil).

The **Morningstar® Long-Only Commodity index** is a fully collateralized commodity futures index that is long all 20 eligible commodities and uses a dollar weighted open interest weighting scheme.

The **Brent Crude Oil index** tracks the spot price of Brent Crude oil.

The **Morningstar U.S. Market index** covers the top 97% market capitalization of the U.S. equity markets.

The **Morningstar Developed Ex U.S. index** captures the performance of the stocks located in the developed countries across the world. Stocks in the index are weighted by their float capital, which removes corporate cross ownership, government holdings and other locked-in shares.

The **Morningstar Emerging Markets index** captures the performance of the stocks located in the emerging countries across the world. Stocks in the index are weighted by their float capital, which removes corporate cross ownership, government holdings and other locked-in shares.

The **Morningstar Core Bond index** is a broad investment-grade index that includes the largest, most important sectors of the investment-grade U.S. bond market. The index is comprised of the Morningstar U.S. Government Bond, U.S. Corporate Bond and U.S. Mortgage Bond indexes.

The **Morningstar Intermediate U.S. Government Bond index** includes U.S. Treasury and U.S. government agency bonds with maturities between four and seven years. The Morningstar Intermediate Corporate Bond index includes U.S. corporate bonds with maturities of between four and seven years.

The **Morningstar U.S. Corporate Bond index** includes U.S. corporate bonds with maturities of more than one year and at least $500 million outstanding.

The **Morningstar Short-Term Core Bond index** includes all bonds in the Morningstar Core Bond Index that have maturities between one and four years.

The **Morningstar Emerging Markets Composite Bond index** includes the most liquid sovereign and corporate bonds issued in U.S. Dollars (USD) by the governments and corporations of the most prominent emerging markets.

The **Morningstar U.S. Mortgage Bond index** tracks approximately 98% of the fixed-rate mortgages issued by Ginnie Mae, Fannie Mae and Freddie Mac.

The **Morningstar Long-Term U.S. Government Bond index** includes U.S. Treasury and U.S. Government Agency bonds with maturities of seven years or longer.

The **Morningstar Long-Term Corporate Bond index** includes U.S. corporate bonds with maturities of seven years or longer.

The **Barclays U.S. Corporate High Yield index** represents the universe of fixed rate, non-investment grade debt.

The **Barclays U.S. Corporate High Yield ex-Energy index** represents the universe of fixed rate, non-investment grade debt not in the energy sector.

The **Barclays U.S. Treasury 7-10 Year Bond index** measures the performance of U.S. Treasury securities that have a remaining maturity of at least seven years and less than ten years.

The **Barclays U.S. Treasury 20+ Year Bond index** represents the performance of U.S. Treasury securities that have a remaining maturity of greater than 20 years.

The **Barclays Emerging Markets Local Currency Broad Bond index** represents the performance of the sovereign, local currency bond markets of emerging market countries. The Barclays Municipal Bond index is representative of the broad market for investment grade, tax-exempt bonds with a maturity of at least one year.

The **Citigroup WGBI Non-USD 5+ Year Bond index** measures the performance of fixed-rate, local currency, investment grade sovereign bonds. It comprises debt from over 20 countries.

The **S&P/LSTA Leveraged Loan index** tracks the universe of syndicated leveraged loans.

The **MSCI China A Local Currency index** captures large and mid-cap equities listed on the Shanghai and Shenzhen exchanges.

Disclosures

Past performance is no guarantee of future results. This is for illustrative purposes only and not indicative of any investment. The information, data, analyses, and opinions presented herein do not constitute investment advice, are provided solely for informational purposes, and therefore are not an offer to buy or sell a security or invest in a specific asset class or strategy. An investment cannot be made directly in an index. The data assumes reinvestment of all income and does not account for taxes or transaction costs. Diversification does not eliminate the risk of experiencing investment losses. Holding a portfolio of securities for the long-term does not ensure a profitable outcome, and investing in securities always involves risk of loss.

Risk and return are measured by standard deviation and compound annual return, respectively. Standard deviation measures the fluctuation of returns around the arithmetic average return of the investment. The higher the standard deviation, the greater the variability (and thus risk) of the investment returns.

Stocks are not guaranteed and have been more volatile than the other asset classes.

Small company stocks are more volatile than large company stocks and are subject to significant price fluctuations, business risks, and are thinly traded.

Government bonds and Treasury bills are guaranteed by the full faith and credit of the United States government as to the timely payment of principal and interest. Bonds in a portfolio are typically intended to provide income and/or diversification. U.S. government bonds may be exempt from state taxes and income is taxed as ordinary income in the year received. With government bonds, the investor is a creditor of the government.

With **corporate bonds** an investor is a creditor of the corporation and the bond is subject to default risk. Corporate bonds are not guaranteed.

High-yield corporate bonds exhibit significantly more risk of default than investment grade corporate bonds.

Only insured **municipal bonds** are guaranteed as to the timely payment of principal and interest by issuer. However, insurance does not eliminate market risk. A municipal bond investor is a creditor of the issuing municipality and the bond is subject to default risk. Municipal bonds may be subject to the alternative minimum tax (AMT) and state and local taxes, and federal taxes would apply to any capital gains distributions.

International bonds are not guaranteed. With international bonds the investor is a creditor of a foreign government or corporation. International investments involve special risks such as fluctuations in currency, foreign taxation, economic and political risks, liquidity risks, and differences in accounting and financial standards.

International stocks involve special risks such as fluctuations in currency, foreign taxation, economic and political risks, liquidity risks, and differences in accounting and financial standards. Liquidity is typically lower in emerging markets than in developed markets. The risk of principal and return may be significantly greater than that of other developed international markets.

Sector investments are narrowly focused investments that typically exhibit higher volatility than the market in general. Sector investments will fluctuate with current market conditions and may be worth more or less than the original cost upon liquidation.

Growth and value stocks: Although value stocks have outperformed growth stocks, please keep in mind that each type of stock carries unique risks which include, but are not limited to, economic risk, market risk, company risk, and strategy risk.

Gold/commodity investments will be subject to the risks of investing in physical commodities, including regulatory, economic and political developments, weather events, natural disasters, and market disruptions. Exposure to the commodities markets may subject the investment to greater volatility than investments in more traditional securities, such as stocks and bonds.

Holders of **preferred stock** are usually guaranteed a dividend payment and their dividends are always paid out before dividends on common stock. In event that the company fails, there's a priority list for a company's obligations, and obligations to preferred stockholders must be met before those to common stockholders. On the other hand, preferred stockholders are lower on the list of investors to be reimbursed than bondholders are.

Mutual funds are sold by prospectus, which can be obtained from your financial professional or the company and which contains complete information, including investment objectives, risks, charges and expenses. Investors should read the prospectus and consider this information carefully before investing or sending money.

Holding an exchange-traded fund does not ensure a profitable outcome and all investing involves risk, including the loss of the entire principal. Since each ETF is different, investors should read the prospectus and consider this information carefully before investing. The prospectus can be obtained from your financial professional or the ETF provider and contains complete information, including investment objectives, risks, charges and expenses. ETF risks include, but are not limited to, market risk, market trading risk, liquidity risk, imperfect benchmark correlation, leverage, and any other risk associated with the underlying securities. There is no guarantee that any fund will achieve its investment objective. In addition to ETF expenses, brokerage costs apply. Fees are charged regardless of profitability and may result in depletion of assets.

Credit/default risk: Debt securities are subject to credit/default risk, which is the risk associated with the issuer failing to meet its contractual obligations either through a default or credit downgrade.

Interest-rate risk: Debt securities have varying levels of sensitivity to changes in interest rates. In general, the price of a debt security tends to fall when interest rates rise and rise when interest rates fall. Securities with longer maturities and mortgage securities can be more sensitive to interest rate changes.

This publication contains certain forward-looking statements which involve known and unknown risks, uncertainties, and other factors that may cause the actual results to differ materially from any future results expressed or implied by those projected statements. Past performance does not guarantee future results.

U.S. Capital Markets Performance
by Asset Class 1926–2018

2019
SBBI® Yearbook

Stocks, Bonds, Bills, and Inflation®

Roger G. Ibbotson

DUFF & PHELPS

Basic Series Summary Statistics

Exhibit 6.9 presents summary statistics of annual total return, and where applicable, income and capital appreciation, for each asset class. The summary statistics presented here are arithmetic mean, geometric mean, standard deviation, and serial correlation. Exhibit 6.10 presents summary statistics for the six inflation-adjusted total return series.

Exhibit 6.9: Total Returns, Income Returns, and Capital Appreciation Returns of the SBBI® Asset Classes; Summary Statistics of Annual Returns (%)
1926–2018

	Geometric Mean (%)	Arithmetic Mean (%)	Standard Deviation (%)	Serial Correlation
Large-Cap Stocks				
Total Return	10.0	11.9	19.8	0.01
Income	3.9	4.0	1.6	0.91
Capital Appreciation	5.8	7.7	19.1	0.01
Small-Cap Stocks (TR)	11.8	16.2	31.6	0.06
Long-term Corp Bonds (TR)	5.9	6.3	8.4	0.03
Long-term Gov't Bonds				
Total Return	5.5	5.9	9.8	-0.15
Income	4.9	5.0	2.6	0.96
Capital Appreciation	0.3	0.7	8.8	-0.26
Inter-term Gov't Bonds				
Total Return	5.1	5.2	5.6	0.15
Income	4.4	4.4	2.9	0.96
Capital Appreciation	0.5	0.6	4.4	-0.17
U.S. Treasury Bills (TR)	3.3	3.4	3.1	0.92
Inflation	2.9	3.0	4.0	0.64

Exhibit 6.9 shows that over 1926–2018 small-cap stocks were the riskiest asset class with a standard deviation of 31.6%, but provided the greatest rewards to long-term investors, with an arithmetic mean annual return of 16.2%. The geometric mean of the small-cap series is 11.8%.

Large-cap stocks, long-term government bonds, long-term corporate bonds, and intermediate-term government bonds are progressively less risky, and have lower average returns. U.S. Treasury bills were nearly riskless and had the lowest return. In general, risk is rewarded by a higher return over the long term.

Blue Chip Financial Forecasts®

Top Analysts' Forecasts Of U.S. And Foreign Interest Rates, Currency Values And The Factors That Influence Them

Vol. 32, No. 12, December 1, 2013

Wolters Kluwer
Law & Business

Long-Range Estimates:

The table below contains results of our semi-annual long-range CONSENSUS survey. There are also Top 10 and Bottom 10 averages for each variable. Shown are estimates for the years 2015 through 2019 and averages for the five-year periods 2015-2019 and 2020-2024. Apply these projections cautiously. Few economic, demographic and political forces can be evaluated accurately over such long time spans.

		Average For The Year					Five-Year Averages	
Interest Rates		**2015**	**2016**	**2017**	**2018**	**2019**	**2015-2019**	**2020-2024**
1. Federal Funds Rate	**CONSENSUS**	**0.4**	**1.7**	**2.9**	**3.6**	**3.9**	**2.5**	**3.7**
	Top 10 Average	0.8	2.6	3.9	4.2	4.5	3.2	4.4
	Bottom 10 Average	0.2	0.8	1.6	2.6	3.1	1.6	2.9
2. Prime Rate	**CONSENSUS**	**3.5**	**4.8**	**6.0**	**6.6**	**6.9**	**5.6**	**6.7**
	Top 10 Average	3.9	5.6	6.9	7.2	7.6	6.2	7.4
	Bottom 10 Average	3.3	4.1	5.0	5.7	6.1	4.8	5.8
3. LIBOR, 3-Mo.	**CONSENSUS**	**0.9**	**2.2**	**3.3**	**4.0**	**4.2**	**2.9**	**4.0**
	Top 10 Average	1.6	3.3	4.6	5.0	5.2	3.9	5.0
	Bottom 10 Average	0.4	1.1	2.0	2.8	3.3	1.9	3.0
4. Commercial Paper, 1-Mo.	**CONSENSUS**	**0.6**	**2.0**	**3.1**	**3.7**	**3.9**	**2.6**	**3.7**
	Top 10 Average	1.0	2.7	3.9	4.3	4.5	3.3	4.3
	Bottom 10 Average	0.3	1.3	2.3	2.9	3.1	2.0	3.0
5. Treasury Bill Yield, 3-Mo.	**CONSENSUS**	**0.5**	**1.7**	**2.9**	**3.5**	**3.7**	**2.5**	**3.6**
	Top 10 Average	1.0	2.7	3.9	4.3	4.5	3.3	4.3
	Bottom 10 Average	0.2	0.8	1.7	2.4	3.0	1.6	2.7
6. Treasury Bill Yield, 6-Mo.	**CONSENSUS**	**0.7**	**2.0**	**3.1**	**3.7**	**3.9**	**2.7**	**3.8**
	Top 10 Average	1.2	2.9	4.1	4.5	4.6	3.5	4.5
	Bottom 10 Average	0.3	1.1	1.9	2.7	3.1	1.8	2.8
7. Treasury Bill Yield, 1-Yr.	**CONSENSUS**	**0.9**	**2.2**	**3.2**	**3.8**	**4.0**	**2.8**	**3.9**
	Top 10 Average	1.5	3.2	4.3	4.7	4.8	3.7	4.6
	Bottom 10 Average	0.4	1.2	2.0	2.8	3.1	1.9	2.9
8. Treasury Note Yield, 2-Yr.	**CONSENSUS**	**1.4**	**2.6**	**3.6**	**4.0**	**4.3**	**3.2**	**4.2**
	Top 10 Average	2.0	3.5	4.5	4.9	5.0	4.0	4.9
	Bottom 10 Average	0.8	1.7	2.4	3.1	3.5	2.3	3.3
10. Treasury Note Yield, 5-Yr.	**CONSENSUS**	**2.3**	**3.3**	**4.1**	**4.4**	**4.6**	**3.7**	**4.4**
	Top 10 Average	2.9	4.0	4.8	5.1	5.3	4.4	5.1
	Bottom 10 Average	1.7	2.6	3.2	3.5	3.7	2.9	3.6
11. Treasury Note Yield, 10-Yr.	**CONSENSUS**	**3.4**	**4.1**	**4.6**	**4.8**	**5.0**	**4.4**	**4.9**
	Top 10 Average	3.9	4.8	5.3	5.6	5.8	5.1	5.6
	Bottom 10 Average	2.8	3.5	3.8	4.0	4.1	3.7	4.0
12. Treasury Bond Yield, 30-Yr.	**CONSENSUS**	**4.3**	**4.7**	**5.2**	**5.5**	**5.6**	**5.0**	**5.5**
	Top 10 Average	4.8	5.5	6.0	6.3	6.5	5.8	6.2
	Bottom 10 Average	3.7	4.0	4.4	4.6	4.7	4.3	4.6
13. Corporate Aaa Bond Yield	**CONSENSUS**	**4.9**	**5.4**	**5.9**	**6.2**	**6.3**	**5.7**	**6.2**
	Top 10 Average	5.6	6.2	6.7	7.0	7.2	6.5	7.0
	Bottom 10 Average	4.2	4.5	4.9	5.2	5.3	4.8	5.3
13. Corporate Baa Bond Yield	**CONSENSUS**	**5.9**	**6.3**	**6.8**	**7.1**	**7.2**	**6.7**	**7.0**
	Top 10 Average	6.5	7.1	7.5	7.9	8.1	7.4	7.9
	Bottom 10 Average	5.1	5.4	5.7	6.1	6.1	5.7	6.0
14. State & Local Bonds Yield	**CONSENSUS**	**4.8**	**5.2**	**5.6**	**5.7**	**5.7**	**5.4**	**5.5**
	Top 10 Average	5.2	5.9	6.3	6.5	6.6	6.1	6.3
	Bottom 10 Average	4.3	4.5	4.8	4.9	4.9	4.7	4.7
15. Home Mortgage Rate	**CONSENSUS**	**5.1**	**5.6**	**6.1**	**6.4**	**6.5**	**5.9**	**6.4**
	Top 10 Average	5.6	6.3	6.9	7.1	7.3	6.6	7.1
	Bottom 10 Average	4.4	5.0	5.3	5.5	5.6	5.2	5.6
A. FRB - Major Currency Index	**CONSENSUS**	**77.8**	**78.4**	**78.8**	**79.1**	**79.2**	**78.7**	**79.7**
	Top 10 Average	81.0	82.3	83.4	84.2	84.4	83.1	84.8
	Bottom 10 Average	74.6	74.3	74.0	73.7	74.0	74.1	74.7
		Year-Over-Year, % Change					Five-Year Averages	
		2015	**2016**	**2017**	**2018**	**2019**	**2015-2019**	**2020-2024**
B. Real GDP	**CONSENSUS**	**3.0**	**2.9**	**2.7**	**2.6**	**2.5**	**2.7**	**2.4**
	Top 10 Average	3.5	3.3	3.1	2.9	2.9	3.1	2.7
	Bottom 10 Average	2.5	2.5	2.3	2.1	2.2	2.3	2.1
C. GDP Chained Price Index	**CONSENSUS**	**2.0**	**2.1**	**2.1**	**2.1**	**2.1**	**2.1**	**2.1**
	Top 10 Average	2.5	2.5	2.6	2.5	2.5	2.5	2.5
	Bottom 10 Average	1.5	1.7	1.7	1.7	1.7	1.7	1.7
D. Consumer Price Index	**CONSENSUS**	**2.2**	**2.3**	**2.3**	**2.3**	**2.3**	**2.3**	**2.3**
	Top 10 Average	2.6	2.8	2.8	2.8	2.8	2.8	2.8
	Bottom 10 Average	1.7	1.9	1.9	1.9	2.0	1.9	1.9

Blue Chip Financial Forecasts®

Top Analysts' Forecasts Of U.S. And Foreign Interest Rates, Currency Values And The Factors That Influence Them

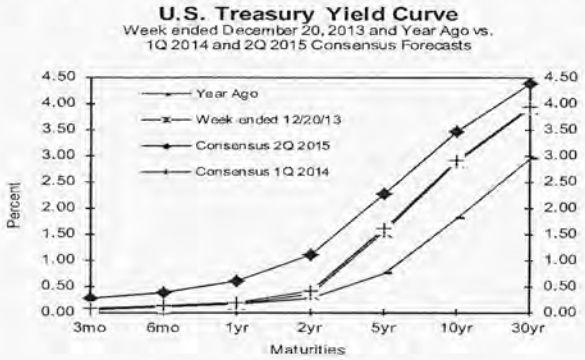
Vol. 33, No. 1, January 1, 2014

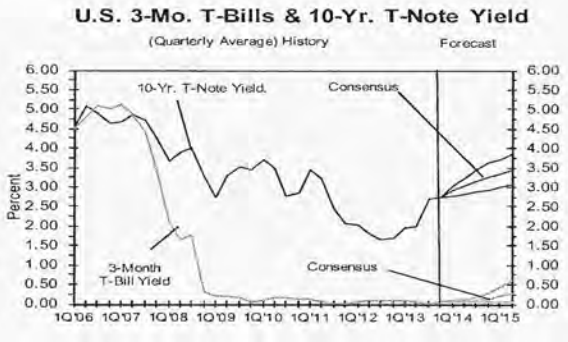
Wolters Kluwer
Law & Business

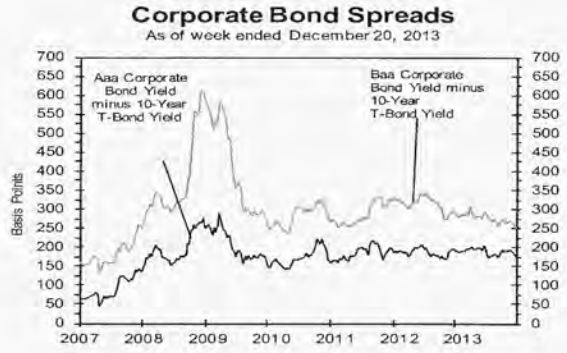
Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

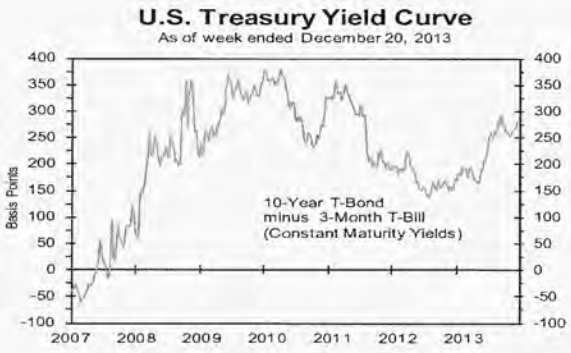
	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Q*	1Q	2Q	3Q	4Q	1Q	2Q
Interest Rates	Dec. 20	Dec. 13	Dec. 6	Nov. 29	Nov.	Oct.	Sep.	4Q 2013	2014	2014	2014	2014	2015	2015
Federal Funds Rate	0.09	0.09	0.08	0.09	0.08	0.09	0.08	*0.09*	**0.1**	**0.1**	**0.2**	**0.2**	**0.2**	**0.3**
Prime Rate	3.25	3.25	3.25	3.25	3.25	3.25	3.25	*3.25*	**3.3**	**3.3**	**3.3**	**3.3**	**3.3**	**3.4**
LIBOR, 3-mo.	0.24	0.24	0.24	0.24	0.24	0.24	0.25	*0.24*	**0.3**	**0.3**	**0.3**	**0.4**	**0.4**	**0.5**
Commercial Paper, 1-mo.	0.07	0.08	0.05	0.06	0.05	0.07	0.05	*0.06*	**0.1**	**0.1**	**0.1**	**0.2**	**0.2**	**0.3**
Treasury bill, 3-mo.	0.07	0.07	0.06	0.07	0.07	0.05	0.02	*0.06*	**0.1**	**0.1**	**0.1**	**0.1**	**0.2**	**0.3**
Treasury bill, 6-mo.	0.09	0.10	0.10	0.11	0.10	0.08	0.04	*0.09*	**0.1**	**0.1**	**0.2**	**0.2**	**0.3**	**0.4**
Treasury bill, 1 yr.	0.14	0.14	0.13	0.13	0.12	0.12	0.12	*0.13*	**0.2**	**0.2**	**0.3**	**0.3**	**0.5**	**0.6**
Treasury note, 2 yr.	0.34	0.32	0.30	0.29	0.30	0.34	0.40	*0.32*	**0.4**	**0.5**	**0.6**	**0.8**	**0.9**	**1.1**
Treasury note, 5 yr.	1.54	1.51	1.46	1.36	1.37	1.37	1.60	*1.41*	**1.6**	**1.7**	**1.8**	**2.0**	**2.1**	**2.3**
Treasury note, 10 yr.	2.88	2.86	2.84	2.74	2.72	2.62	2.81	*2.73*	**2.9**	**3.0**	**3.1**	**3.3**	**3.3**	**3.4**
Treasury note, 30 yr.	3.89	3.87	3.88	3.82	3.80	3.68	3.79	*3.79*	**3.9**	**4.0**	**4.1**	**4.2**	**4.3**	**4.4**
Corporate Aaa bond	4.64	4.66	4.69	4.62	4.63	4.53	4.64	*4.61*	**4.7**	**4.8**	**4.9**	**5.0**	**5.1**	**5.2**
Corporate Baa bond	5.39	5.40	5.44	5.37	5.38	5.31	5.47	*5.37*	**5.5**	**5.6**	**5.7**	**5.8**	**5.9**	**6.0**
State & Local bonds	4.73	4.74	4.70	4.61	4.60	4.56	4.79	*4.63*	**4.7**	**4.8**	**4.8**	**4.9**	**4.9**	**5.0**
Home mortgage rate	4.47	4.42	4.46	4.29	4.26	4.19	4.49	*4.30*	**4.6**	**4.7**	**4.8**	**4.9**	**5.0**	**5.1**
	History								Consensus Forecasts-Quarterly					
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q*	1Q	2Q	3Q	4Q	1Q	2Q
Key Assumptions	2012	2012	2012	2012	2013	2013	2013	2013	2014	2014	2014	2014	2015	2015
Major Currency Index	72.9	73.9	74.0	73.2	74.7	76.4	76.7	*76.4*	**76.4**	**76.8**	**77.1**	**77.4**	**77.5**	**77.5**
Real GDP	3.7	1.2	2.8	0.1	1.1	2.5	4.1	*1.9*	**2.5**	**2.7**	**2.8**	**2.9**	**3.0**	**3.0**
GDP Price Index	2.0	1.8	2.3	1.1	1.3	0.6	2.0	*1.4*	**1.7**	**1.8**	**1.9**	**1.9**	**2.0**	**2.0**
Consumer Price Index	2.3	1.0	2.1	2.2	1.4	0.0	2.6	*0.9*	**1.7**	**1.9**	**2.1**	**2.0**	**2.1**	**2.1**

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data for interest rates except LIBOR is from Federal Reserve Release (FRSR) H.15. LIBOR quotes available from *The Wall Street Journal*. Interest rate definitions are same as those in FRSR H.15. Treasury yields are reported on a constant maturity basis. Historical data for Fed's Major Currency Index is from FRSR H.10 and G.5. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS). **Interest rate data for 4Q 2014 based on historical data through the week ended December 20th. *Data for 4Q 2013 Major Currency Index is based on data through week ended December 20th. Figures for 4Q 2013 Real GDP, GDP Chained Price Index and Consumer Price Index are consensus forecasts based on a special question asked of the panelists' this month*









Blue Chip Financial Forecasts®

Top Analysts' Forecasts Of U.S. And Foreign Interest Rates, Currency Values And The Factors That Influence Them

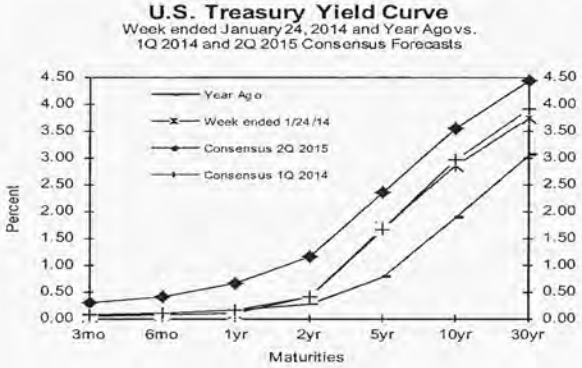
Vol. 33, No. 2, February 1, 2014

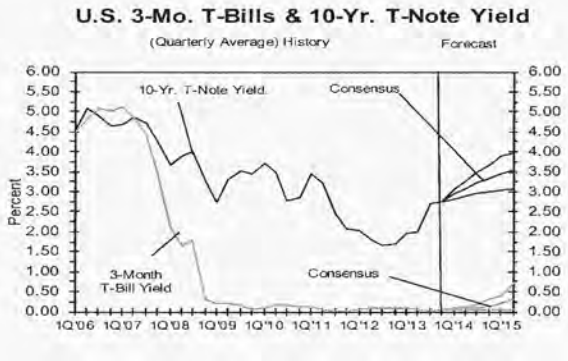
Wolters Kluwer
Law & Business

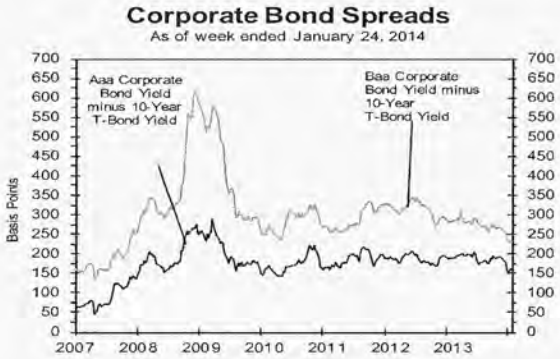
Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

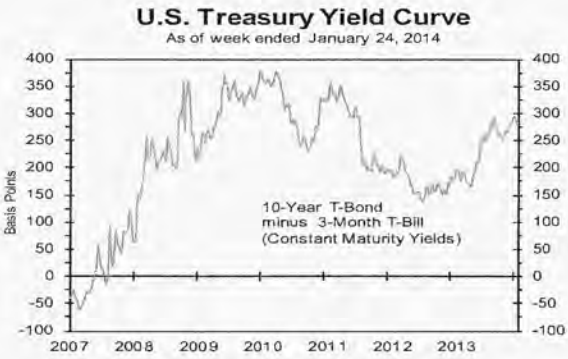
	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Q	1Q	2Q	3Q	4Q	1Q	2Q
Interest Rates	Jan. 24	Jan. 17	Jan. 10	Jan. 3	Dec.	Nov.	Oct.	4Q 2013	2014	2014	2014	2014	2015	2015
Federal Funds Rate	0.07	0.07	0.08	0.08	0.09	0.08	0.09	0.09	0.1	0.1	0.2	0.2	0.2	0.3
Prime Rate	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.3	3.3	3.3	3.3	3.3	3.4
LIBOR, 3-mo.	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.3	0.3	0.3	0.4	0.4	0.5
Commercial Paper, 1-mo.	0.05	0.05	0.05	0.05	0.06	0.05	0.07	0.06	0.1	0.1	0.1	0.2	0.2	0.4
Treasury bill, 3-mo.	0.04	0.04	0.05	0.07	0.07	0.07	0.05	0.06	0.1	0.1	0.1	0.1	0.2	0.3
Treasury bill, 6-mo.	0.07	0.06	0.07	0.10	0.10	0.10	0.08	0.09	0.1	0.1	0.2	0.2	0.3	0.4
Treasury bill, 1 yr.	0.11	0.11	0.13	0.13	0.13	0.12	0.12	0.12	0.2	0.2	0.3	0.4	0.5	0.7
Treasury note, 2 yr.	0.41	040	0.41	0.39	0.34	0.30	0.34	0.33	0.4	0.5	0.6	0.8	1.0	1.2
Treasury note, 5 yr.	1.67	1.65	1.71	1.73	1.58	1.37	1.37	1.44	1.7	1.8	1.9	2.1	2.2	2.4
Treasury note, 10 yr.	2.86	2.86	2.96	3.01	2.90	2.72	2.62	2.75	3.0	3.1	3.2	3.3	3.4	3.5
Treasury note, 30 yr.	3.75	3.78	3.87	3.93	3.89	3.80	3.68	3.79	3.9	4.0	4.1	4.3	4.3	4.4
Corporate Aaa bond	4.47	4.48	4.53	4.55	4.62	4.63	4.53	4.59	4.6	4.8	4.9	5.0	5.1	5.2
Corporate Baa bond	5.17	5.19	5.28	5.35	5.38	5.38	5.31	5.36	5.4	5.6	5.7	5.8	5.9	6.0
State & Local bonds	4.50	4.55	4.68	4.75	4.73	4.60	4.56	4.63	4.6	4.7	4.8	4.8	4.9	5.0
Home mortgage rate	4.39	4.41	4.51	4.53	4.46	4.26	4.19	4.30	4.6	4.7	4.8	5.0	5.1	5.2
	History								Consensus Forecasts-Quarterly					
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	*4Q**	1Q	2Q	3Q	4Q	1Q	2Q
Key Assumptions	2012	2012	2012	2012	2013	2013	2013	*2013*	2014	2014	2014	2014	2015	2015
Major Currency Index	72.9	73.9	74.0	73.2	74.7	76.4	76.7	76.0	76.8	77.2	77.6	77.6	77.7	77.7
Real GDP	3.7	1.2	2.8	0.1	1.1	2.5	4.1	*3.1*	2.5	2.8	2.9	3.0	3.0	3.0
GDP Price Index	2.0	1.8	2.3	1.1	1.3	0.6	2.0	*1.4*	1.7	1.7	1.9	1.9	2.0	2.0
Consumer Price Index	2.3	1.0	2.1	2.2	1.4	0.0	2.6	0.9	1.8	1.8	2.1	2.0	2.1	2.0

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data for interest rates except LIBOR is from Federal Reserve Release (FRSR) H.15. LIBOR quotes available from *The Wall Street Journal*. Interest rate definitions are same as those in FRSR H.15. Treasury yields are reported on a constant maturity basis. Historical data for Fed's Major Currency Index is from FRSR H.10 and G.5. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS). **Figures for 4Q 2013 Real GDP and GDP Chained Price Index are consensus forecasts based on a special question asked of the panelists' this month.*









Blue Chip Financial Forecasts®

Top Analysts' Forecasts Of U.S. And Foreign Interest Rates, Currency Values And The Factors That Influence Them

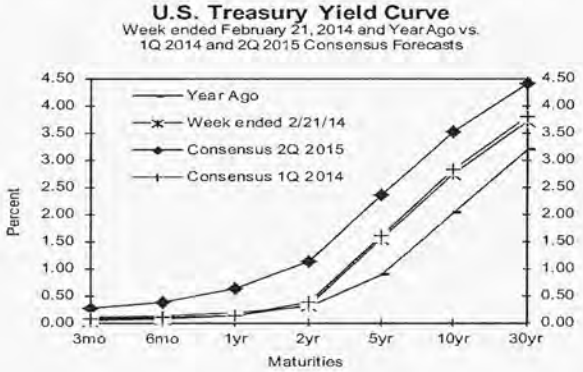
Vol. 33, No. 3, March 1, 2014

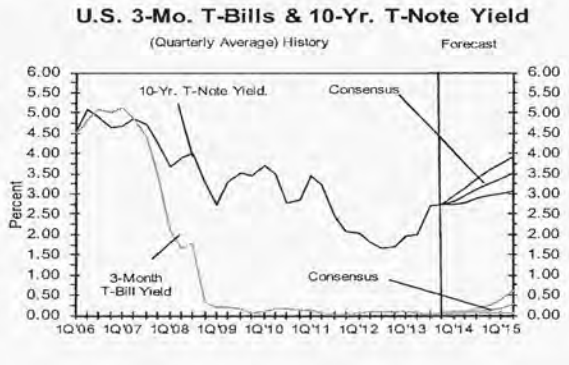
Wolters Kluwer
Law & Business

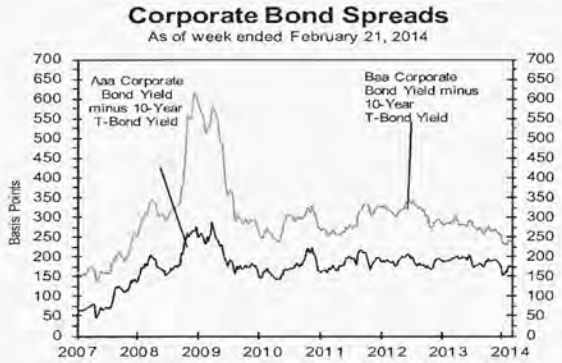
Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

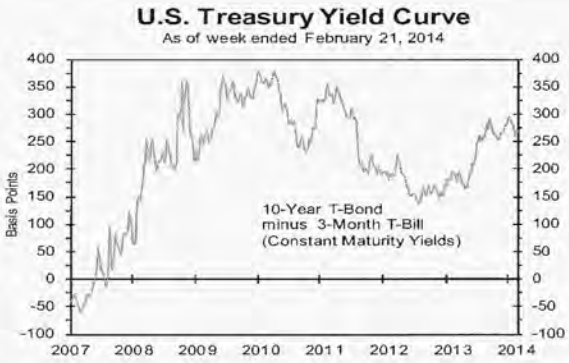
	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Q	1Q	2Q	3Q	4Q	1Q	2Q
Interest Rates	Feb. 21	Feb. 14	Feb. 7	Jan. 31	Jan.	Dec.	Nov.	4Q 2013	2014	2014	2014	2014	2015	2015
Federal Funds Rate	0.06	0.06	0.07	0.07	0.07	0.09	0.08	0.09	0.1	0.1	0.1	0.2	0.2	0.3
Prime Rate	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.3	3.3	3.3	3.3	3.3	3.3
LIBOR, 3-mo.	0.24	0.24	0.23	0.23	0.24	0.24	0.24	0.24	0.3	0.3	0.3	0.3	0.4	0.5
Commercial Paper, 1-mo.	0.06	0.06	0.06	0.05	0.05	0.06	0.05	0.06	0.1	0.1	0.1	0.2	0.2	0.3
Treasury bill, 3-mo.	0.05	0.04	0.07	0.04	0.04	0.07	0.07	0.06	0.1	0.1	0.1	0.1	0.2	0.3
Treasury bill, 6-mo.	0.08	0.09	0.08	0.07	0.07	0.10	0.10	0.09	0.1	0.1	0.2	0.2	0.3	0.4
Treasury bill, 1 yr.	0.12	0.12	0.12	0.11	0.12	0.13	0.12	0.12	0.1	0.2	0.3	0.3	0.5	0.6
Treasury note, 2 yr.	0.33	0.33	0.31	0.36	0.39	0.34	0.30	0.33	0.4	0.5	0.6	0.8	0.9	1.1
Treasury note, 5 yr.	1.54	1.53	1.48	1.55	1.65	1.58	1.37	1.44	1.6	1.7	1.9	2.0	2.2	2.3
Treasury note, 10 yr.	2.73	2.75	2.68	2.73	2.86	2.90	2.72	2.75	2.8	3.0	3.1	3.3	3.4	3.5
Treasury note, 30 yr.	3.70	3.69	3.63	3.65	3.77	3.89	3.80	3.79	3.8	3.9	4.1	4.2	4.3	4.4
Corporate Aaa bond	4.48	4.50	4.45	4.45	4.49	4.62	4.63	4.59	4.6	4.7	4.8	4.9	5.0	5.2
Corporate Baa bond	5.13	5.13	5.09	5.10	5.19	5.38	5.38	5.36	5.2	5.4	5.5	5.7	5.8	5.9
State & Local bonds	4.44	4.46	4.46	4.48	4.59	4.73	4.60	4.63	4.5	4.6	4.7	4.8	4.9	4.9
Home mortgage rate	4.33	4.28	4.23	4.32	4.43	4.46	4.26	4.30	4.4	4.6	4.7	4.8	5.0	5.1
	History								Consensus Forecasts-Quarterly					
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q
Key Assumptions	2012	2012	2012	2012	2013	2013	2013	2013	2014	2014	2014	2014	2015	2015
Major Currency Index	72.9	73.9	74.0	73.2	74.7	76.4	76.7	76.0	77.1	77.5	77.9	78.2	78.2	78.1
Real GDP	3.7	1.2	2.8	0.1	1.1	2.5	4.1	2.4	1.9	2.8	2.9	3.0	3.0	3.0
GDP Price Index	2.0	1.8	2.3	1.1	1.3	0.6	2.0	1.6	1.6	1.7	1.9	1.9	2.0	1.9
Consumer Price Index	2.1	1.4	1.7	2.4	1.2	0.4	2.2	1.1	1.8	1.8	2.1	2.0	2.0	2.1

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data for interest rates except LIBOR is from Federal Reserve Release (FRSR) H.15. LIBOR quotes available from *The Wall Street Journal*. Interest rate definitions are same as those in FRSR H.15. Treasury yields are reported on a constant maturity basis. Historical data for Fed's Major Currency Index is from FRSR H.10 and G.5. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS).









Blue Chip Financial Forecasts®

Top Analysts' Forecasts Of U.S. And Foreign Interest Rates, Currency Values And The Factors That Influence Them

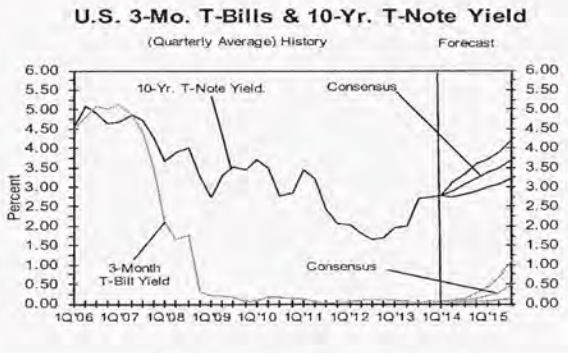
Vol. 33, No. 4, April 1, 2014

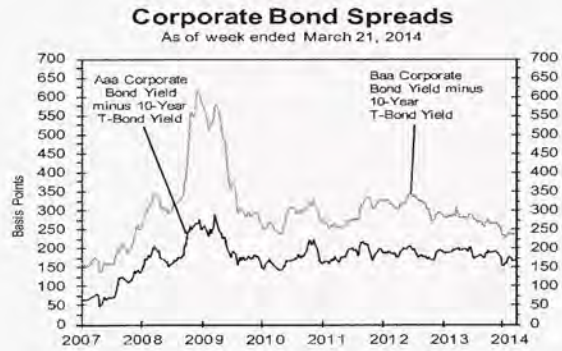
Wolters Kluwer
Law & Business

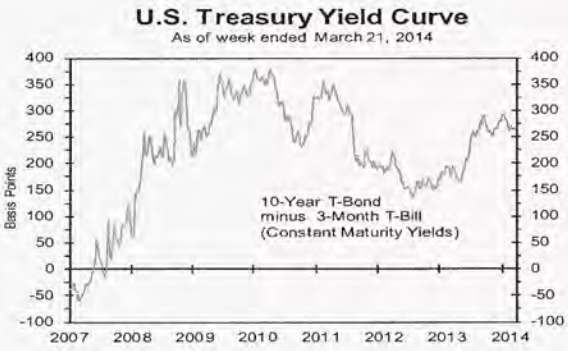
Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Q*	2Q	3Q	4Q	1Q	2Q	3Q
Interest Rates	Mar. 21	Mar. 14	Mar. 7	Feb. 28	Feb.	Jan.	Dec.	*1Q 2014*	**2014**	**2014**	**2014**	**2015**	**2015**	**2015**
Federal Funds Rate	0.08	0.08	0.07	0.07	0.07	0.07	0.09	*0.07*	**0.1**	**0.1**	**0.2**	**0.2**	**0.3**	**0.5**
Prime Rate	3.25	3.25	3.25	3.25	3.25	3.25	3.25	*3.25*	**3.3**	**3.3**	**3.3**	**3.3**	**3.4**	**3.6**
LIBOR, 3-mo.	0.23	0.23	0.23	0.23	0.24	0.24	0.24	*0.24*	**0.3**	**0.3**	**0.3**	**0.4**	**0.5**	**0.8**
Commercial Paper, 1-mo.	0.06	0.05	0.07	0.05	0.06	0.05	0.06	*0.06*	**0.1**	**0.1**	**0.2**	**0.2**	**0.4**	**0.6**
Treasury bill, 3-mo.	0.06	0.05	0.05	0.05	0.05	0.04	0.07	*0.05*	**0.1**	**0.1**	**0.1**	**0.2**	**0.3**	**0.5**
Treasury bill, 6-mo.	0.08	0.08	0.08	0.08	0.08	0.07	0.10	*0.08*	**0.1**	**0.1**	**0.2**	**0.3**	**0.4**	**0.7**
Treasury bill, 1 yr.	0.14	0.12	0.12	0.11	0.12	0.12	0.13	*0.12*	**0.2**	**0.2**	**0.3**	**0.4**	**0.6**	**0.9**
Treasury note, 2 yr.	0.42	0.36	0.35	0.34	0.33	0.39	0.34	*0.37*	**0.5**	**0.6**	**0.8**	**0.9**	**1.2**	**1.4**
Treasury note, 5 yr.	1.67	1.59	1.55	1.52	1.52	1.65	1.58	*1.59*	**1.7**	**1.9**	**2.0**	**2.2**	**2.4**	**2.6**
Treasury note, 10 yr.	2.74	2.72	2.71	2.69	2.71	2.86	2.90	*2.76*	**2.9**	**3.1**	**3.2**	**3.4**	**3.5**	**3.7**
Treasury note, 30 yr.	3.64	3.66	3.65	3.64	3.66	3.77	3.89	*3.69*	**3.8**	**4.0**	**4.1**	**4.2**	**4.3**	**4.5**
Corporate Aaa bond	4.42	4.41	4.38	4.37	4.45	4.49	4.62	*4.45*	**4.6**	**4.7**	**4.9**	**5.0**	**5.2**	**5.3**
Corporate Baa bond	5.11	5.10	5.07	5.06	5.10	5.19	5.38	*5.13*	**5.3**	**5.4**	**5.6**	**5.7**	**5.9**	**6.0**
State & Local bonds	4.51	4.47	4.41	4.38	4.44	4.59	4.73	*4.50*	**4.5**	**4.6**	**4.7**	**4.8**	**4.9**	**5.0**
Home mortgage rate	4.32	4.37	4.28	4.37	4.30	4.43	4.46	*4.35*	**4.5**	**4.7**	**4.8**	**4.9**	**5.1**	**5.3**
	History								Consensus Forecasts-Quarterly					
	2Q	3Q	4Q	1Q	2Q	3Q	4Q	*1Q**	2Q	3Q	4Q	1Q	2Q	3Q
Key Assumptions	2012	2012	2012	2013	2013	2013	2013	*2014*	**2014**	**2014**	**2014**	**2015**	**2015**	**2015**
Major Currency Index	73.9	74.0	73.2	74.7	76.4	76.7	76.0	*77.1*	**77.2**	**77.5**	**78.3**	**78.1**	**78.2**	**78.6**
Real GDP	1.2	2.8	0.1	1.1	2.5	4.1	2.6	*1.8*	**2.9**	**3.0**	**3.0**	**3.0**	**3.0**	**3.1**
GDP Price Index	1.8	2.3	1.1	1.3	0.6	2.0	1.6	*1.6*	**1.7**	**1.9**	**1.9**	**1.9**	**1.9**	**2.0**
Consumer Price Index	1.4	1.7	2.4	1.2	0.4	2.2	1.1	*1.7*	**1.8**	**2.1**	**2.0**	**2.0**	**2.0**	**2.2**

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data for interest rates except LIBOR is from Federal Reserve Release (FRSR) H.15. LIBOR quotes available from *The Wall Street Journal*. Interest rate definitions are same as those in FRSR H.15. Treasury yields are reported on a constant maturity basis. Historical data for Fed's Major Currency Index is from FRSR H.10 and G.5. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS). **Interest rate data for 1Q 2014 based on historical data through the week ended March 21st. *Data for 1Q 2014 Major Currency Index is based on data through week ended March 21th. Figure: for 1Q 2014 Real GDP, GDP Chained Price Index and Consumer Price Index are consensus forecasts based on a special question asked of the panelists' this month.*







Blue Chip Financial Forecasts®

Top Analysts' Forecasts Of U.S. And Foreign Interest Rates, Currency Values And The Factors That Influence Them

Vol. 33, No. 5, May 1, 2014

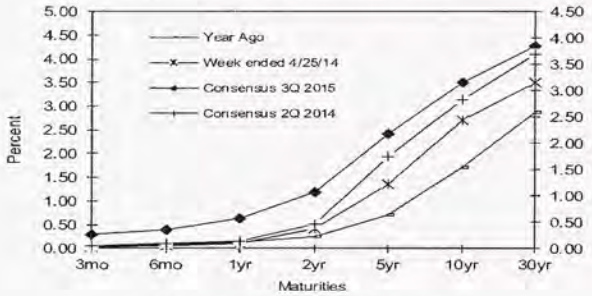
Wolters Kluwer
Law & Business

Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

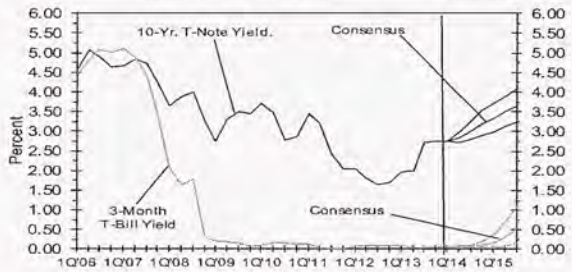
	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Q*	2Q	3Q	4Q	1Q	2Q	3Q
Interest Rates	Apr. 25	Apr. 18	Apr. 11	Apr. 4	Mar.	Feb.	Jan.	1Q 2014	2014	2014	2014	2015	2015	2015
Federal Funds Rate	0.10	0.09	0.08	0.08	0.08	0.07	0.07	0.07	0.1	0.1	0.1	0.2	0.3	0.5
Prime Rate	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.3	3.3	3.3	3.3	3.4	3.6
LIBOR, 3-mo.	0.23	0.23	0.23	0.23	0.23	0.24	0.24	0.24	0.3	0.3	0.3	0.4	0.5	0.7
Commercial Paper, 1-mo.	0.06	0.06	0.05	0.06	0.06	0.06	0.05	0.06	0.1	0.1	0.1	0.2	0.3	0.6
Treasury bill, 3-mo.	0.03	0.04	0.04	0.03	0.05	0.05	0.04	0.05	0.1	0.1	0.1	0.2	0.3	0.5
Treasury bill, 6-mo.	0.06	0.05	0.06	0.06	0.08	0.08	0.07	0.08	0.1	0.1	0.2	0.2	0.4	0.7
Treasury bill, 1 yr.	0.11	0.11	0.10	0.12	0.13	0.12	0.12	0.12	0.2	0.2	0.3	0.4	0.6	1.0
Treasury note, 2 yr.	0.43	0.40	0.38	0.45	0.40	0.33	0.39	0.37	0.5	0.6	0.8	1.0	1.2	1.5
Treasury note, 5 yr.	1.35	1.67	1.63	1.75	1.64	1.52	1.65	1.59	1.7	1.9	2.1	2.3	2.4	2.6
Treasury note, 10 yr.	2.72	2.67	2.68	2.77	2.72	2.71	2.86	2.76	2.8	3.0	3.2	3.3	3.5	3.7
Treasury note, 30 yr.	3.50	3.48	3.53	3.60	3.62	3.66	3.77	3.69	3.7	3.9	4.0	4.1	4.3	4.4
Corporate Aaa bond	4.24	4.22	4.24	4.31	4.38	4.45	4.49	4.45	4.4	4.6	4.7	4.9	5.0	5.2
Corporate Baa bond	4.88	4.86	4.92	5.02	5.06	5.10	5.19	5.13	5.1	5.3	5.5	5.6	5.8	5.9
State & Local bonds	4.32	4.32	4.32	4.44	4.46	4.44	4.59	4.50	4.4	4.5	4.6	4.7	4.8	5.0
Home mortgage rate	4.33	4.27	4.34	4.41	4.34	4.30	4.43	4.35	4.4	4.6	4.8	4.9	5.1	5.2
	History								Consensus Forecasts-Quarterly					
	2Q	3Q	4Q	1Q	2Q	3Q	4Q	*1Q**	2Q	3Q	4Q	1Q	2Q	3Q
Key Assumptions	2012	2012	2012	2013	2013	2013	2013	*2014*	2014	2014	2014	2015	2015	2015
Major Currency Index	73.9	74.0	73.2	74.7	76.4	76.7	76.0	77.1	76.9	77.3	77.7	77.9	78.2	78.4
Real GDP	1.2	2.8	0.1	1.1	2.5	4.1	2.6	*1.3*	3.1	3.0	3.1	3.0	3.1	3.1
GDP Price Index	1.8	2.3	1.1	1.3	0.6	2.0	1.6	*1.5*	1.7	1.9	1.9	1.9	2.0	2.1
Consumer Price Index	1.4	1.7	2.4	1.2	0.4	2.2	1.1	1.7	1.9	2.0	2.0	2.0	2.0	2.2

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data for interest rates except LIBOR is from Federal Reserve Release (FRSR) H.15. LIBOR quotes available from *The Wall Street Journal*. Interest rate definitions are same as those in FRSR H.15. Treasury yields are reported on a constant maturity basis. Historical data for Fed's Major Currency Index is from FRSR H.10 and G.5. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS). ***Figures for Q1 2014 Real GDP and GDP price index are consensus forecasts based on special question asked of panelists this month. BEA will release its first estimates of Q1 2014 Real GDP and GDP price index on Wednesday, April 30th.***

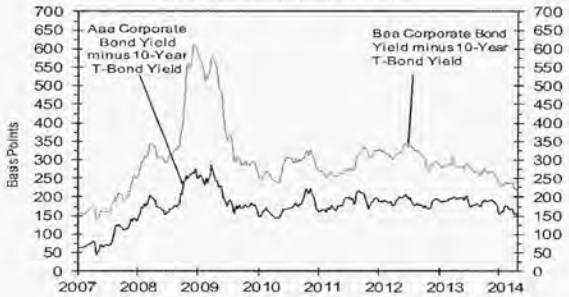
U.S. Treasury Yield Curve
Week ended April 25, 2014 and Year Ago vs. 2Q 2014 and 3Q 2015 Consensus Forecasts



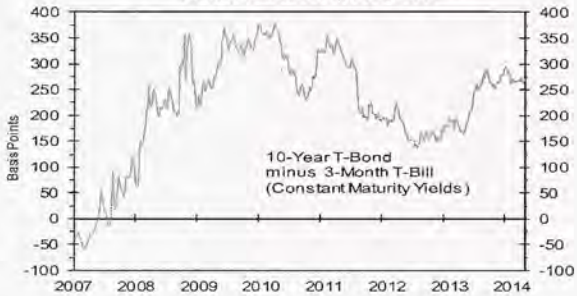
U.S. 3-Mo. T-Bills & 10-Yr. T-Note Yield
(Quarterly Average) History Forecast



Corporate Bond Spreads
As of week ended April 25, 2014



U.S. Treasury Yield Curve
As of week ended April 25, 2014



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Vol. 33, No. 6, June 1, 2014

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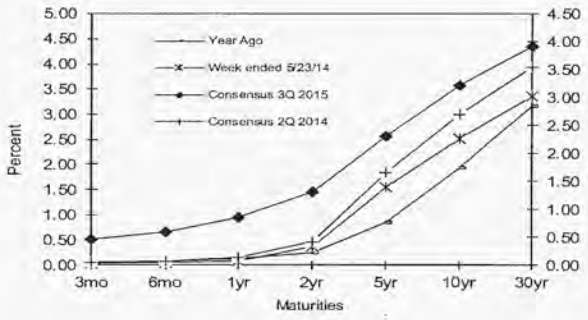
Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Q	2Q	3Q	4Q	1Q	2Q	3Q
Interest Rates	May 23	May 16	May 9	May 2	Apr.	Mar.	Feb.	1Q 2014	2014	2014	2014	2015	2015	2015
Federal Funds Rate	0.09	0.08	0.09	0.09	0.09	0.08	0.07	0.07	0.1	0.1	0.1	0.2	0.3	0.5
Prime Rate	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.3	3.3	3.3	3.3	3.3	3.6
LIBOR, 3-mo.	0.23	0.23	0.23	0.23	0.23	0.23	0.24	0.24	0.2	0.3	0.3	0.4	0.5	0.7
Commercial Paper, 1-mo.	0.14	0.06	0.05	0.05	0.05	0.06	0.06	0.06	0.1	0.1	0.1	0.2	0.3	0.6
Treasury bill, 3-mo.	0.03	0.03	0.03	0.03	0.03	0.05	0.05	0.05	0.0	0.1	0.1	0.2	0.3	0.5
Treasury bill, 6-mo.	0.05	0.05	0.05	0.05	0.05	0.08	0.08	0.08	0.1	0.1	0.2	0.2	0.4	0.7
Treasury bill, 1 yr.	0.09	0.09	0.10	0.10	0.11	0.13	0.12	0.12	0.1	0.2	0.3	0.4	0.6	0.9
Treasury note, 2 yr.	0.37	0.39	0.41	0.43	0.42	0.40	0.33	0.37	0.4	0.5	0.7	0.9	1.2	1.5
Treasury note, 5 yr.	1.55	1.59	1.65	1.70	1.70	1.64	1.52	1.59	1.7	1.8	2.0	2.2	2.4	2.6
Treasury note, 10 yr.	2.52	2.57	2.62	2.66	2.71	2.72	2.71	2.76	2.7	2.9	3.1	3.3	3.4	3.6
Treasury note, 30 yr.	3.37	3.40	3.42	3.44	3.52	3.62	3.66	3.69	3.5	3.7	3.9	4.1	4.2	4.3
Corporate Aaa bond	4.13	4.15	4.17	4.19	4.24	4.38	4.45	4.45	4.3	4.5	4.6	4.8	4.9	5.1
Corporate Baa bond	4.75	4.77	4.79	4.81	4.90	5.06	5.10	5.13	5.0	5.2	5.4	5.5	5.6	5.8
State & Local bonds	4.28	4.26	4.31	4.33	4.35	4.46	4.44	4.50	4.3	4.4	4.6	4.7	4.8	4.9
Home mortgage rate	4.14	4.20	4.21	4.29	4.34	4.34	4.30	4.35	4.3	4.5	4.7	4.8	5.0	5.2
	History								Consensus Forecasts-Quarterly					
	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q
Key Assumptions	2012	2012	2012	2013	2013	2013	2013	2014	2014	2014	2014	2015	2015	2015
Major Currency Index	73.9	74.0	73.2	74.7	76.4	76.7	76.0	77.1	76.7	77.0	77.4	77.6	77.8	78.1
Real GDP	1.2	2.8	0.1	1.1	2.5	4.1	2.6	0.1	3.4	3.0	3.1	3.0	3.0	3.0
GDP Price Index	1.8	2.3	1.1	1.3	0.6	2.0	1.6	1.3	1.8	1.9	1.9	1.9	1.9	2.0
Consumer Price Index	1.4	1.7	2.4	1.2	0.4	2.2	1.1	1.9	2.2	2.1	1.9	2.0	2.0	2.1

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data for interest rates except LIBOR is from Federal Reserve Release (FRSR) H.15. LIBOR quotes available from *The Wall Street Journal*. Interest rate definitions are same as those in FRSR H.15. Treasury yields are reported on a constant maturity basis. Historical data for Fed's Major Currency Index is from FRSR H.10 and G.5. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS).

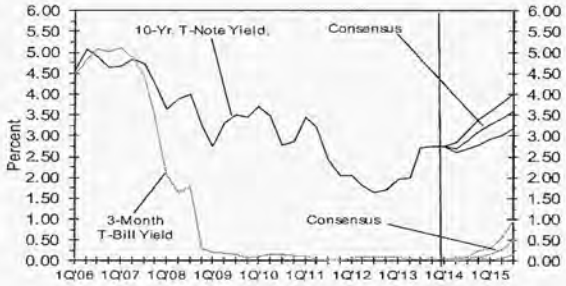
U.S. Treasury Yield Curve

Week ended May 23, 2014 and Year Ago vs. 2Q 2014 and 3Q 2015 Consensus Forecasts



U.S. 3-Mo. T-Bills & 10-Yr. T-Note Yield

(Quarterly Average) History Forecast

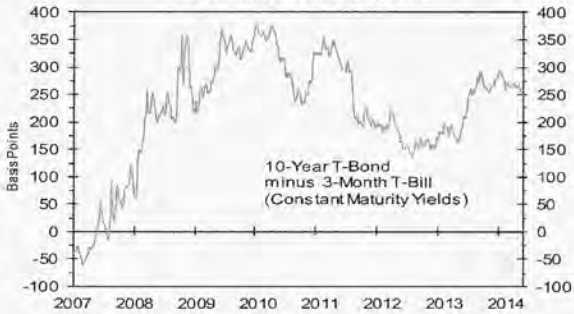


Corporate Bond Spreads

As of week ended May23, 2014

U.S. Treasury Yield Curve

As of week ended May23, 2014



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Vol. 33, No. 6, June 1, 2014

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Long-Range Estimates:

The table below contains the results of our twice-year long-range CONSENSUS survey. There are also Top 10 and Bottom 10 averages for each variable. Shown are estimates for the years 2016 through 2020 and averages for the five-year periods 2016-2020 and 2021-2025. Apply these projections cautiously. Few economic, demographic and political forces can be evaluated accurately over such long time spans.

		Average For The Year					Five-Year Averages	
Interest Rates		**2016**	**2017**	**2018**	**2019**	**2020**	**2016-2020**	**2021-2025**
1. Federal Funds Rate	**CONSENSUS**	**1.8**	**3.0**	**3.6**	**3.8**	**3.7**	**3.2**	**3.8**
	Top 10 Average	2.5	3.6	4.2	4.3	4.2	3.7	4.1
	Bottom 10 Average	1.1	2.1	2.8	3.0	3.1	2.4	3.2
2. Prime Rate	**CONSENSUS**	**4.9**	**6.0**	**6.5**	**6.7**	**6.7**	**6.2**	**6.7**
	Top 10 Average	5.5	6.6	7.1	7.2	7.1	6.7	7.1
	Bottom 10 Average	4.2	5.2	5.8	6.0	6.0	5.4	6.1
3. LIBOR, 3-Mo.	**CONSENSUS**	**2.1**	**3.2**	**3.8**	**4.0**	**4.0**	**3.4**	**4.0**
	Top 10 Average	2.7	3.8	4.4	4.6	4.5	4.0	4.5
	Bottom 10 Average	1.4	2.4	3.0	3.2	3.3	2.7	3.4
4. Commercial Paper, 1-Mo.	**CONSENSUS**	**2.0**	**3.0**	**3.5**	**3.7**	**3.7**	**3.2**	**3.7**
	Top 10 Average	2.4	3.5	4.2	4.3	4.2	3.7	4.1
	Bottom 10 Average	1.4	2.4	2.8	3.0	3.1	2.6	3.2
5. Treasury Bill Yield, 3-Mo.	**CONSENSUS**	**1.8**	**2.9**	**3.4**	**3.6**	**3.6**	**3.1**	**3.7**
	Top 10 Average	2.4	3.5	4.0	4.3	4.2	3.7	4.2
	Bottom 10 Average	1.2	2.1	2.7	2.9	3.0	2.3	3.1
6. Treasury Bill Yield, 6-Mo.	**CONSENSUS**	**2.0**	**3.0**	**3.6**	**3.8**	**3.8**	**3.2**	**3.8**
	Top 10 Average	2.6	3.7	4.2	4.4	4.3	3.9	4.3
	Bottom 10 Average	1.3	2.2	2.8	3.0	3.1	2.5	3.2
7. Treasury Bill Yield, 1-Yr.	**CONSENSUS**	**2.3**	**3.2**	**3.7**	**3.9**	**3.9**	**3.4**	**4.0**
	Top 10 Average	3.0	4.0	4.4	4.7	4.6	4.1	4.5
	Bottom 10 Average	1.6	2.3	2.9	3.1	3.2	2.6	3.4
8. Treasury Note Yield, 2-Yr.	**CONSENSUS**	**2.7**	**3.6**	**4.0**	**4.2**	**4.2**	**3.7**	**4.3**
	Top 10 Average	3.4	4.4	4.8	4.9	4.9	4.5	4.9
	Bottom 10 Average	2.0	2.7	3.1	3.3	3.5	2.9	3.7
10. Treasury Note Yield, 5-Yr.	**CONSENSUS**	**3.4**	**4.0**	**4.4**	**4.5**	**4.5**	**4.2**	**4.6**
	Top 10 Average	3.8	4.6	5.0	5.3	5.3	4.8	5.3
	Bottom 10 Average	2.9	3.4	3.6	3.7	3.8	3.5	4.0
11. Treasury Note Yield, 10-Yr.	**CONSENSUS**	**4.1**	**4.5**	**4.8**	**5.0**	**5.0**	**4.7**	**5.0**
	Top 10 Average	4.6	5.1	5.6	5.9	5.9	5.4	5.9
	Bottom 10 Average	3.6	3.9	4.0	4.2	4.2	4.0	4.3
12. Treasury Bond Yield, 30-Yr.	**CONSENSUS**	**4.7**	**5.1**	**5.4**	**5.5**	**5.6**	**5.3**	**5.6**
	Top 10 Average	5.3	5.9	6.3	6.6	6.6	6.1	6.6
	Bottom 10 Average	4.1	4.3	4.4	4.6	4.7	4.4	4.7
13. Corporate Aaa Bond Yield	**CONSENSUS**	**5.5**	**5.9**	**6.3**	**6.4**	**6.4**	**6.1**	**6.4**
	Top 10 Average	5.9	6.5	7.0	7.2	7.2	6.8	7.3
	Bottom 10 Average	4.9	5.3	5.5	5.6	5.6	5.4	5.6
13. Corporate Baa Bond Yield	**CONSENSUS**	**6.3**	**6.8**	**7.1**	**7.2**	**7.3**	**6.9**	**7.3**
	Top 10 Average	6.8	7.4	7.8	8.1	8.1	7.6	8.1
	Bottom 10 Average	5.7	6.0	6.2	6.4	6.5	6.2	6.5
14. State & Local Bonds Yield	**CONSENSUS**	**5.1**	**5.4**	**5.6**	**5.8**	**5.8**	**5.5**	**5.8**
	Top 10 Average	5.6	6.0	6.4	6.7	6.8	6.3	6.8
	Bottom 10 Average	4.7	4.8	4.8	4.9	4.9	4.8	4.9
15. Home Mortgage Rate	**CONSENSUS**	**5.6**	**6.1**	**6.4**	**6.6**	**6.6**	**6.3**	**6.7**
	Top 10 Average	6.1	6.7	7.2	7.4	7.5	7.0	7.5
	Bottom 10 Average	5.0	5.3	5.5	5.7	5.7	5.4	5.8
A. FRB - Major Currency Index	**CONSENSUS**	**77.7**	**78.1**	**78.6**	**79.2**	**79.3**	**78.6**	**79.5**
	Top 10 Average	80.5	81.3	82.1	83.1	83.5	82.1	84.2
	Bottom 10 Average	74.7	74.8	75.1	75.5	75.2	75.1	75.0
		Year-Over-Year, % Change					Five-Year Averages	
		2016	**2017**	**2018**	**2019**	**2020**	**2016-2020**	**2021-2025**
B. Real GDP	**CONSENSUS**	**2.9**	**2.8**	**2.5**	**2.5**	**2.4**	**2.6**	**2.4**
	Top 10 Average	3.3	3.1	3.0	2.9	2.7	3.0	2.7
	Bottom 10 Average	2.5	2.3	2.0	2.1	2.0	2.2	2.0
C. GDP Chained Price Index	**CONSENSUS**	**2.0**	**2.2**	**2.2**	**2.2**	**2.1**	**2.1**	**2.1**
	Top 10 Average	2.4	2.7	2.6	2.6	2.4	2.5	2.4
	Bottom 10 Average	1.7	1.8	1.9	1.9	1.9	1.8	1.9
D. Consumer Price Index	**CONSENSUS**	**2.2**	**2.5**	**2.5**	**2.4**	**2.3**	**2.4**	**2.3**
	Top 10 Average	2.7	3.1	3.0	2.9	2.7	2.9	2.7
	Bottom 10 Average	1.8	1.9	2.0	2.0	2.0	2.0	2.0

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Top Analysts' Forecasts Of U.S. And Foreign Interest Rates, Currency Values And The Factors That Influence Them

Vol. 33, No. 7, July 1, 2014

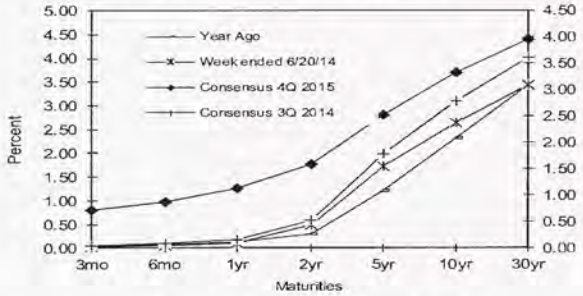
Wolters Kluwer
Law & Business

Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

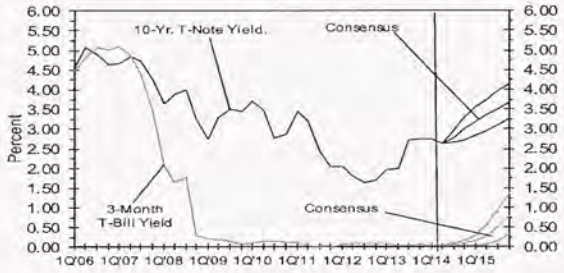
	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Q*	3Q	4Q	1Q	2Q	3Q	4Q
Interest Rates	June 20	June 13	June 6	May 30	May	Apr.	Mar.	2Q 2014	2014	2014	2014	2015	2015	2015
Federal Funds Rate	0.10	0.09	0.09	0.09	0.09	0.09	0.08	*0.09*	**0.1**	**0.1**	**0.2**	**0.3**	**0.5**	**0.8**
Prime Rate	3.25	3.25	3.25	3.25	3.25	3.25	3.25	*3.25*	**3.3**	**3.3**	**3.3**	**3.3**	**3.5**	**3.9**
LIBOR, 3-mo.	0.23	0.23	0.23	0.23	0.23	0.23	0.23	*0.23*	**0.3**	**0.3**	**0.4**	**0.5**	**0.7**	**1.0**
Commercial Paper, 1-mo.	0.07	0.06	0.06	0.06	0.05	0.05	0.06	*0.05*	**0.1**	**0.1**	**0.2**	**0.3**	**0.5**	**0.9**
Treasury bill, 3-mo.	0.03	0.04	0.04	0.04	0.03	0.03	0.05	*0.03*	**0.1**	**0.1**	**0.1**	**0.3**	**0.5**	**0.8**
Treasury bill, 6-mo.	0.06	0.06	0.06	0.06	0.05	0.05	0.08	*0.05*	**0.1**	**0.1**	**0.2**	**0.4**	**0.6**	**1.0**
Treasury bill, 1 yr.	0.10	0.11	0.10	0.10	0.10	0.11	0.13	*0.10*	**0.2**	**0.3**	**0.4**	**0.6**	**0.9**	**1.3**
Treasury note, 2 yr.	0.49	0.44	0.40	0.38	0.39	0.42	0.40	*0.42*	**0.5**	**0.7**	**0.9**	**1.1**	**1.4**	**1.8**
Treasury note, 5 yr.	1.72	1.69	1.64	1.53	1.59	1.70	1.64	*1.66*	**1.8**	**2.0**	**2.2**	**2.4**	**2.6**	**2.8**
Treasury note, 10 yr.	2.63	2.62	2.59	2.47	2.56	2.71	2.72	*2.63*	**2.8**	**3.0**	**3.2**	**3.3**	**3.5**	**3.7**
Treasury note, 30 yr.	3.44	3.44	3.43	3.33	3.39	3.52	3.62	*3.45*	**3.6**	**3.8**	**4.0**	**4.1**	**4.3**	**4.4**
Corporate Aaa bond	4.27	4.28	4.27	4.16	4.16	4.24	4.38	*4.22*	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.2**
Corporate Baa bond	4.81	4.82	4.82	4.70	4.76	4.90	5.06	*4.83*	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**5.9**
State & Local bonds	4.36	4.37	4.37	4.26	4.29	4.35	4.46	*4.34*	**4.4**	**4.6**	**4.7**	**4.8**	**4.9**	**5.0**
Home mortgage rate	4.17	4.20	4.14	4.12	4.19	4.34	4.34	*4.23*	**4.4**	**4.6**	**4.8**	**4.9**	**5.1**	**5.3**
	History								Consensus Forecasts-Quarterly					
	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q*	3Q	4Q	1Q	2Q	3Q	4Q
Key Assumptions	2012	2012	2013	2013	2013	2013	2014	*2014*	**2014**	**2014**	**2014**	**2015**	**2015**	**2015**
Major Currency Index	74.0	73.2	74.7	76.4	76.7	76.0	77.1	*76.8*	**77.2**	**77.4**	**77.5**	**77.7**	**78.2**	**78.4**
Real GDP	2.8	0.1	1.1	2.5	4.1	2.6	-2.9	*3.4*	**3.1**	**3.1**	**3.0**	**3.0**	**3.0**	**2.9**
GDP Price Index	2.3	1.1	1.3	0.6	2.0	1.6	1.3	*2.0*	**1.9**	**1.9**	**2.0**	**1.9**	**2.0**	**2.1**
Consumer Price Index	1.7	2.4	1.2	0.4	2.2	1.1	1.9	*2.7*	**2.4**	**2.0**	**2.0**	**2.1**	**2.2**	**2.3**

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data for interest rates except LIBOR is from Federal Reserve Release (FRSR) H.15. LIBOR quotes available from *The Wall Street Journal*. Interest rate definitions are same as those in FRSR H.15. Treasury yields are reported on a constant maturity basis. Historical data for Fed's Major Currency Index is from FRSR H.10 and G.5. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS). **Interest rate data for 2Q 2014 based on historical data through the week ended June 20th. *Data for 2Q 2014 Major Currency Index is based on data through week ended June 20th. Figures for 2Q 2014 Real GDP, GDP Chained Price Index and Consumer Price Index are consensus forecasts based on a special question asked of the panelists' this month.*

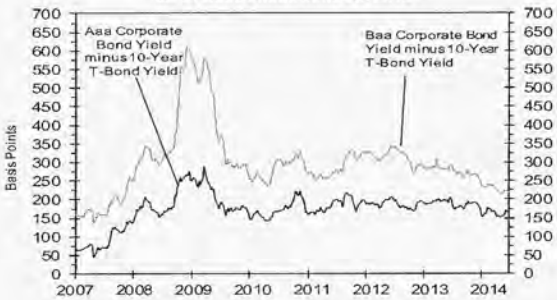
U.S. Treasury Yield Curve
Week ended June 20, 2014 and Year Ago vs. 3Q 2014 and 4Q 2015 Consensus Forecasts



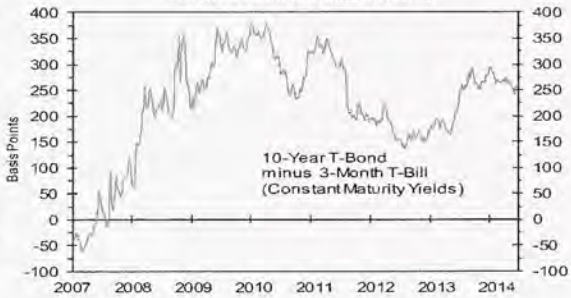
U.S. 3-Mo. T-Bills & 10-Yr. T-Note Yield
(Quarterly Average) History Forecast



Corporate Bond Spreads
As of week ended June 20, 2014



U.S. Treasury Yield Curve
As of week ended June 20, 2014



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Vol. 33, No. 8, August 1, 2014

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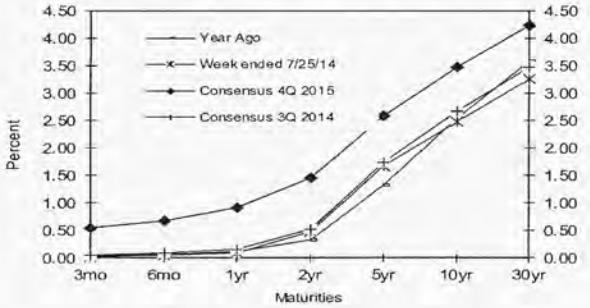
Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

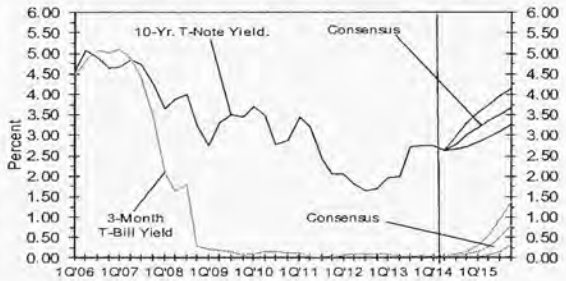
	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Q	3Q	4Q	1Q	2Q	3Q	4Q
Interest Rates	July 25	July 18	July 11	July 4	June	May	Apr.	2Q 2014	2014	2014	2014	2015	2015	2015
Federal Funds Rate	0.09	0.09	0.09	0.10	0.10	0.09	0.09	0.09	0.1	0.1	0.2	0.3	0.5	0.9
Prime Rate	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.3	3.3	3.3	3.4	3.6	3.9
LIBOR, 3-mo.	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.3	0.3	0.4	0.5	0.8	1.1
Commercial Paper, 1-mo.	0.08	0.08	0.06	0.06	0.06	0.05	0.05	0.05	0.1	0.1	0.2	0.4	0.6	1.0
Treasury bill, 3-mo.	0.03	0.02	0.03	0.02	0.04	0.03	0.03	0.03	0.1	0.1	0.1	0.3	0.6	0.9
Treasury bill, 6-mo.	0.06	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.1	0.1	0.2	0.4	0.7	1.0
Treasury bill, 1 yr.	0.11	0.11	0.11	0.11	0.10	0.10	0.11	0.10	0.2	0.2	0.4	0.6	0.9	1.3
Treasury note, 2 yr.	0.50	0.49	0.50	0.49	0.45	0.39	0.42	0.42	0.5	0.7	0.9	1.2	1.5	1.8
Treasury note, 5 yr.	1.68	1.69	1.69	1.68	1.68	1.59	1.70	1.66	1.8	1.9	2.1	2.4	2.6	2.8
Treasury note, 10 yr.	2.48	2.53	2.57	2.60	2.60	2.56	2.71	2.62	2.7	2.9	3.1	3.3	3.5	3.7
Treasury note, 30 yr.	3.27	3.33	3.38	3.42	3.42	3.39	3.52	3.44	3.5	3.7	3.9	4.0	4.2	4.4
Corporate Aaa bond	4.11	4.16	4.19	4.23	4.25	4.16	4.24	4.22	4.3	4.5	4.6	4.8	5.0	5.2
Corporate Baa bond	4.68	4.73	4.76	4.80	4.80	4.76	4.90	4.82	5.0	5.2	5.4	5.6	5.8	5.9
State & Local bonds	4.29	4.36	4.38	4.31	4.35	4.29	4.35	4.33	4.4	4.5	4.6	4.8	4.9	5.0
Home mortgage rate	4.13	4.13	4.15	4.12	4.16	4.19	4.34	4.23	4.3	4.5	4.7	4.9	5.1	5.2
	History								Consensus Forecasts-Quarterly					
	3Q	4Q	1Q	2Q	3Q	4Q	1Q	*2Q**	3Q	4Q	1Q	2Q	3Q	4Q
Key Assumptions	2012	2012	2013	2013	2013	2013	2014	*2014*	2014	2014	2014	2015	2015	2015
Major Currency Index	74.0	73.2	74.7	76.4	76.7	76.0	77.1	76.6	76.9	77.3	77.5	77.8	78.2	78.4
Real GDP	2.8	0.1	1.1	2.5	4.1	2.6	-2.9	*2.9*	3.1	3.1	3.0	3.0	3.0	3.0
GDP Price Index	2.3	1.1	1.3	0.6	2.0	1.6	1.3	*2.1*	1.9	1.9	1.9	2.0	2.1	2.1
Consumer Price Index	1.7	2.4	1.2	0.4	2.2	1.1	1.9	3.0	2.4	2.0	2.1	2.2	2.3	2.3

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data for interest rates except LIBOR is from Federal Reserve Release (FRSR) H.15. LIBOR quotes available from *The Wall Street Journal*. Interest rate definitions are same as those in FRSR H.15. Treasury yields are reported on a constant maturity basis. Historical data for Fed's Major Currency Index is from FRSR H.10 and G.5. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS). *Figures for 2Q 2014 Real GDP and GDP Chained Price Index forecasts based on a special question asked of the panelists' this month.*

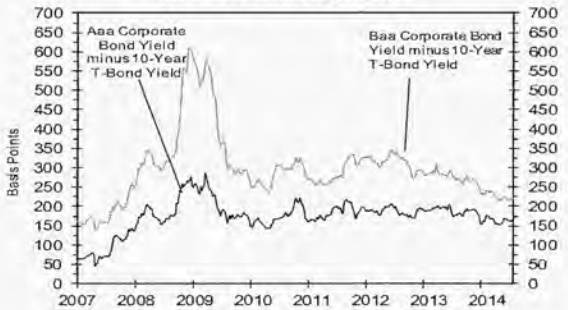
U.S. Treasury Yield Curve
Week ended July 25, 2014 and Year Ago vs. 3Q 2014 and 4Q 2015 Consensus Forecasts



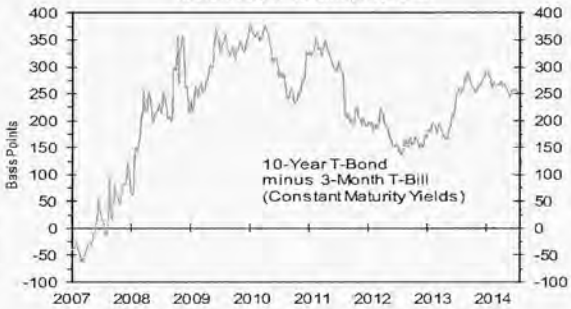
U.S. 3-Mo. T-Bills & 10-Yr. T-Note Yield
(Quarterly Average) History Forecast



Corporate Bond Spreads
As of week ended July 25, 2014



U.S. Treasury Yield Curve
As of week ended July 25, 2014



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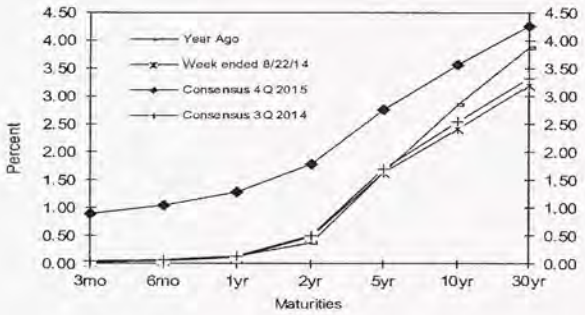
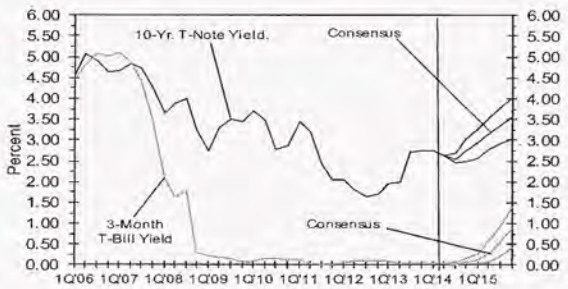
	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Q	3Q	4Q	1Q	2Q	3Q	4Q
Interest Rates	Aug. 22	Aug. 15	Aug. 8	Aug. 1	July	June	May	2Q 2014	2014	2014	2015	2015	2015	2015
Federal Funds Rate	0.09	0.09	0.09	0.09	0.09	0.10	0.09	0.09	0.1	0.1	0.2	0.3	0.5	0.9
Prime Rate	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.3	3.3	3.3	3.4	3.6	3.9
LIBOR, 3-mo.	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.2	0.3	0.4	0.5	0.8	1.1
Commercial Paper, 1-mo.	0.10	0.07	0.08	0.07	0.07	0.06	0.05	0.05	0.1	0.1	0.2	0.3	0.6	1.0
Treasury bill, 3-mo.	0.03	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.0	0.1	0.1	0.3	0.6	0.9
Treasury bill, 6-mo.	0.06	0.05	0.05	0.06	0.06	0.06	0.05	0.05	0.1	0.1	0.2	0.4	0.7	1.1
Treasury bill, 1 yr.	0.11	0.10	0.11	0.12	0.11	0.10	0.10	0.10	0.1	0.2	0.4	0.6	1.0	1.3
Treasury note, 2 yr.	0.48	0.44	0.46	0.53	0.51	0.45	0.39	0.42	0.5	0.7	0.9	1.2	1.5	1.8
Treasury note, 5 yr.	1.63	1.59	1.64	1.73	1.70	1.68	1.59	1.66	1.7	1.9	2.1	2.3	2.5	2.8
Treasury note, 10 yr.	2.41	2.41	2.47	2.53	2.54	2.60	2.56	2.62	2.5	2.8	2.9	3.2	3.4	3.6
Treasury note, 30 yr.	3.20	3.22	3.26	3.28	3.33	3.42	3.39	3.44	3.3	3.5	3.7	3.9	4.1	4.3
Corporate Aaa bond	4.08	4.08	4.14	4.13	4.16	4.25	4.16	4.22	4.2	4.3	4.5	4.7	4.9	5.1
Corporate Baa bond	4.70	4.71	4.73	4.72	4.68	4.80	4.76	4.82	4.9	5.1	5.3	5.5	5.7	5.9
State & Local bonds	4.21	4.24	4.31	4.33	4.33	4.35	4.29	4.33	4.3	4.4	4.5	4.7	4.8	5.0
Home mortgage rate	4.10	4.12	4.14	4.12	4.13	4.16	4.19	4.23	4.2	4.4	4.5	4.8	5.0	5.2
	History								Consensus Forecasts-Quarterly					
	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Key Assumptions	2012	2012	2013	2013	2013	2013	2014	2014	2014	2014	2015	2015	2015	2015
Major Currency Index	74.0	73.2	74.7	76.4	76.7	76.0	77.1	76.6	77.4	78.1	78.4	78.7	79.0	79.3
Real GDP	2.5	0.1	2.7	1.8	4.5	3.5	-2.1	4.2	2.9	3.0	3.0	3.0	3.0	2.9
GDP Price Index	2.1	1.3	1.3	1.2	1.7	1.5	1.3	2.1	1.9	1.8	1.9	2.0	2.1	2.1
Consumer Price Index	1.7	2.4	1.2	0.4	2.2	1.1	1.9	3.0	2.1	2.0	2.1	2.2	2.3	2.3

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data for interest rates except LIBOR is from Federal Reserve Release (FRSR) H.15. LIBOR quotes available from *The Wall Street Journal*. Interest rate definitions are same as those in FRSR H.15. Treasury yields are reported on a constant maturity basis. Historical data for Fed's Major Currency Index is from FRSR H.10 and G.5. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS).

U.S. Treasury Yield Curve
Week ended August 22, 2014 and Year Ago vs.
3Q 2014 and 4Q 2015 Consensus Forecasts

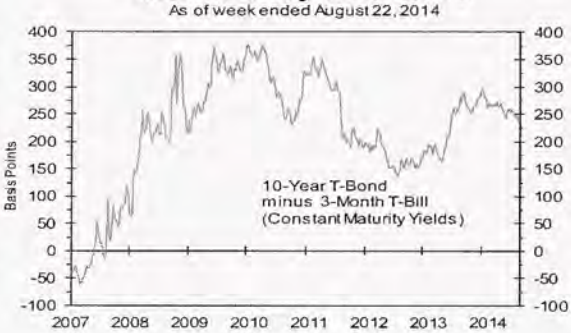


U.S. 3-Mo. T-Bills & 10-Yr. T-Note Yield
(Quarterly Average) History Forecast



Corporate Bond Spreads
As of week ended August 22, 2014

U.S. Treasury Yield Curve
As of week ended August 22, 2014



Blue Chip Financial Forecasts®

Top Analysts' Forecasts Of U.S. And Foreign Interest Rates, Currency Values And The Factors That Influence Them

Vol. 33, No. 10, October 1, 2014

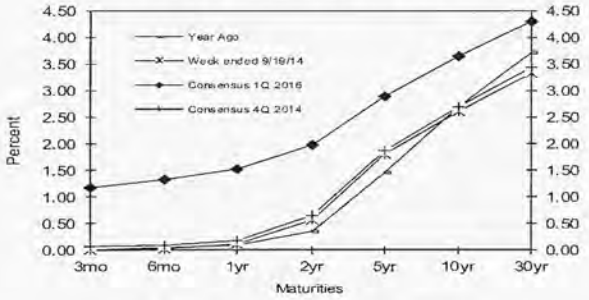
Wolters Kluwer
Law & Business

Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

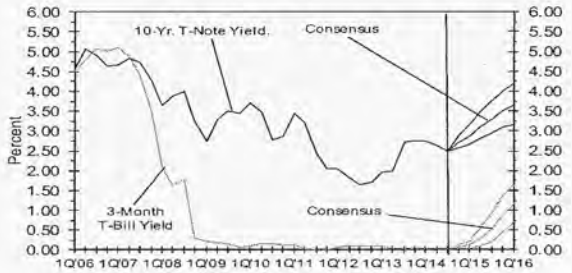
	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			*Latest Q**	4Q	1Q	2Q	3Q	4Q	1Q
Interest Rates	Sep. 19	Sep. 12	Sep. 5	Aug. 29	Aug.	July	June	*3Q 2014*	2014	2015	2015	2015	2015	2016
Federal Funds Rate	0.09	0.09	0.08	0.09	0.09	0.09	0.10	*0.09*	0.1	0.2	0.3	0.6	0.9	1.2
Prime Rate	3.25	3.25	3.25	3.25	3.25	3.25	3.25	*3.25*	3.3	3.3	3.4	3.6	3.9	4.3
LIBOR, 3-mo.	0.23	0.23	0.23	0.23	0.23	0.23	0.23	*0.23*	0.3	0.3	0.5	0.8	1.1	1.5
Commercial Paper, 1-mo.	0.06	0.07	0.08	0.07	0.08	0.07	0.06	*0.07*	0.1	0.2	0.3	0.6	1.0	1.3
Treasury bill, 3-mo.	0.02	0.02	0.03	0.03	0.03	0.03	0.03	*0.03*	0.1	0.1	0.3	0.6	0.9	1.2
Treasury bill, 6-mo.	0.04	0.05	0.05	0.05	0.05	0.06	0.06	*0.05*	0.1	0.2	0.4	0.7	1.0	1.3
Treasury bill, 1 yr.	0.12	0.11	0.10	0.11	0.11	0.11	0.10	*0.11*	0.2	0.3	0.6	0.9	1.3	1.5
Treasury note, 2 yr.	0.58	0.57	0.53	0.51	0.47	0.51	0.45	*0.51*	0.7	0.9	1.2	1.5	1.8	2.0
Treasury note, 5 yr.	1.82	1.78	1.70	1.66	1.63	1.70	1.68	*1.70*	1.9	2.0	2.3	2.5	2.7	2.9
Treasury note, 10 yr.	2.61	2.54	2.44	2.37	2.42	2.54	2.60	*2.50*	2.7	2.9	3.1	3.3	3.5	3.7
Treasury note, 30 yr.	3.34	3.27	3.19	3.11	3.20	3.33	3.42	*3.27*	3.4	3.6	3.8	4.0	4.2	4.3
Corporate Aaa bond	4.21	4.13	4.03	3.98	4.08	4.16	4.25	*4.12*	4.3	4.4	4.7	4.9	5.1	5.2
Corporate Baa bond	4.89	4.79	4.69	4.61	4.69	4.68	4.80	*4.72*	5.0	5.2	5.4	5.6	5.8	5.9
State & Local bonds	4.17	4.14	4.09	4.17	4.23	4.33	4.35	*4.23*	4.2	4.3	4.5	4.7	4.8	4.9
Home mortgage rate	4.23	4.12	4.10	4.10	4.12	4.13	4.16	*4.13*	4.3	4.5	4.7	4.9	5.1	5.3
	History								Consensus Forecasts-Quarterly					
	4Q	1Q	2Q	3Q	4Q	1Q	2Q	*3Q**	4Q	1Q	2Q	3Q	4Q	1Q
Key Assumptions	2012	2013	2013	2013	2013	2014	2014	*2014*	2014	2015	2015	2015	2015	2016
Major Currency Index	73.2	74.7	76.4	76.7	76.0	77.1	76.6	*77.9*	79.2	79.9	80.3	80.6	80.9	80.9
Real GDP	0.1	2.7	1.8	4.5	3.5	-2.1	4.6	*3.0*	3.0	3.0	3.0	3.0	2.9	2.9
GDP Price Index	1.3	1.3	1.2	1.7	1.5	1.3	2.1	*1.7*	1.9	2.0	2.0	2.1	2.1	2.1
Consumer Price Index	2.4	1.2	0.4	2.2	1.1	1.9	3.0	*1.5*	1.9	2.0	2.2	2.2	2.3	2.3

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data for interest rates except LIBOR is from Federal Reserve Release (FRSR) H.15. LIBOR quotes available from *The Wall Street Journal*. Interest rate definitions are same as those in FRSR H.15. Treasury yields are reported on a constant maturity basis. Historical data for Fed's Major Currency Index is from FRSR H.10 and G.5. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS). **Interest rate data for 3Q 2014 based on historical data through the week ended September 19th. *Data for 3Q 2014 Major Currency Index is based on data through week ended September 19th Figures for 3Q 2014 Real GDP, GDP Chained Price Index and Consumer Price Index are consensus forecasts based on a special question asked of the panelists' this month.*

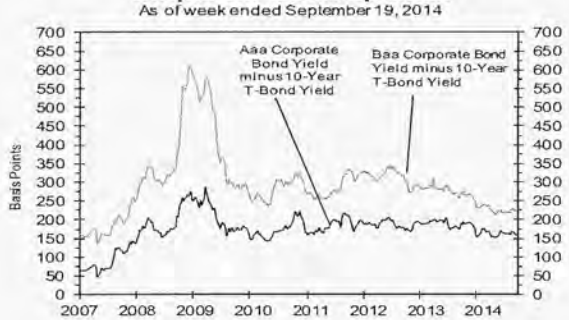
U.S. Treasury Yield Curve
Week ended September 19, 2014 and Year Ago vs.
4Q 2014 and 1Q 2016 Consensus Forecasts



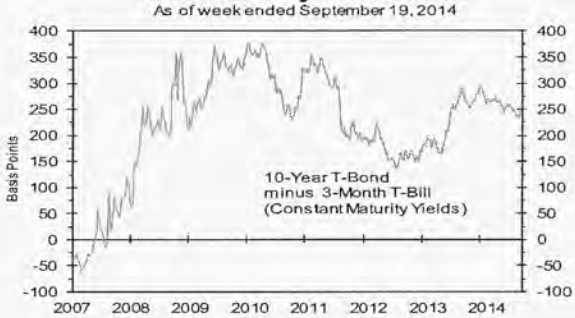
U.S. 3-Mo. T-Bills & 10-Yr. T-Note Yield
(Quarterly Average) Forecast



Corporate Bond Spreads
As of week ended September 19, 2014



U.S. Treasury Yield Curve
As of week ended September 19, 2014



Blue Chip Financial Forecasts®

Top Analysts' Forecasts Of U.S. And Foreign Interest Rates, Currency Values And The Factors That Influence Them

Vol. 33, No. 11, November 1, 2014

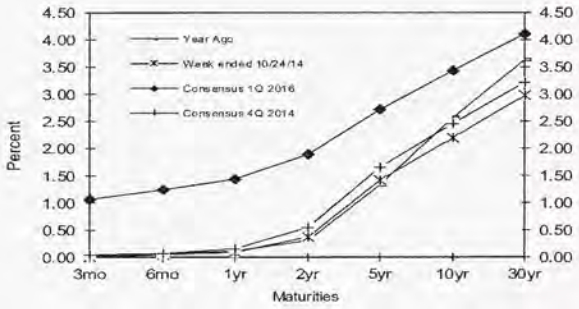
Wolters Kluwer
Law & Business

Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

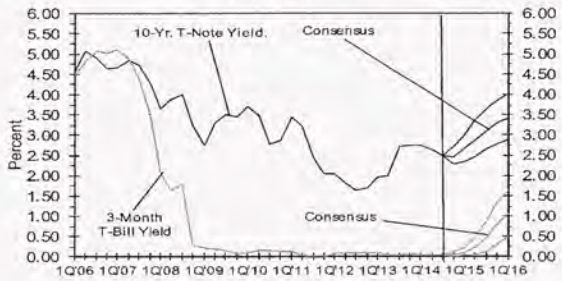
	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Q	4Q	1Q	2Q	3Q	4Q	1Q
Interest Rates	Oct. 24	Oct. 17	Oct. 10	Oct. 3	Sep.	Aug.	July	3Q 2014	2014	2015	2015	2015	2015	2016
Federal Funds Rate	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	**0.1**	**0.1**	**0.3**	**0.5**	**0.8**	**1.1**
Prime Rate	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	**3.3**	**3.3**	**3.3**	**3.5**	**3.9**	**4.2**
LIBOR, 3-mo.	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	**0.3**	**0.3**	**0.4**	**0.7**	**1.1**	**1.4**
Commercial Paper, 1-mo.	0.07	0.07	0.06	0.05	0.06	0.08	0.07	0.07	**0.1**	**0.2**	**0.3**	**0.6**	**0.9**	**1.2**
Treasury bill, 3-mo.	0.02	0.02	0.01	0.02	0.02	0.03	0.03	0.03	**0.1**	**0.1**	**0.2**	**0.5**	**0.8**	**1.1**
Treasury bill, 6-mo.	0.06	0.05	0.05	0.04	0.04	0.05	0.06	0.05	**0.1**	**0.1**	**0.3**	**0.6**	**0.9**	**1.2**
Treasury bill, 1 yr.	0.10	0.10	0.10	0.11	0.11	0.11	0.11	0.11	**0.2**	**0.3**	**0.5**	**0.8**	**1.1**	**1.4**
Treasury note, 2 yr.	0.38	0.37	0.49	0.56	0.57	0.47	0.51	0.52	**0.6**	**0.7**	**1.1**	**1.4**	**1.7**	**1.9**
Treasury note, 5 yr.	1.43	1.41	1.61	1.73	1.77	1.63	1.70	1.70	**1.7**	**1.8**	**2.1**	**2.3**	**2.6**	**2.7**
Treasury note, 10 yr.	2.21	2.19	2.36	2.47	2.53	2.42	2.54	2.50	**2.5**	**2.6**	**2.9**	**3.1**	**3.3**	**3.4**
Treasury note, 30 yr.	2.98	2.95	3.07	3.16	3.26	3.20	3.33	3.26	**3.2**	**3.4**	**3.6**	**3.8**	**4.0**	**4.1**
Corporate Aaa bond	3.89	3.83	3.92	4.00	4.11	4.08	4.16	4.12	**4.1**	**4.2**	**4.5**	**4.7**	**4.9**	**5.0**
Corporate Baa bond	4.66	4.62	4.68	4.76	4.80	4.69	4.68	4.72	**4.8**	**5.0**	**5.2**	**5.4**	**5.6**	**5.8**
State & Local bonds	3.90	3.87	4.01	4.11	4.13	4.23	4.33	4.23	**4.0**	**4.2**	**4.4**	**4.6**	**4.7**	**4.8**
Home mortgage rate	3.92	3.97	4.12	4.19	4.16	4.12	4.13	4.14	**4.1**	**4.3**	**4.5**	**4.7**	**4.9**	**5.1**
	History								Consensus Forecasts-Quarterly					
	4Q	1Q	2Q	3Q	4Q	1Q	2Q	*3Q**	4Q	1Q	2Q	3Q	4Q	1Q
Key Assumptions	2012	2013	2013	2013	2013	2014	2014	*2014*	**2014**	**2015**	**2015**	**2015**	**2015**	**2016**
Major Currency Index	73.2	74.7	76.4	76.7	76.0	77.1	76.6	77.9	**80.6**	**81.3**	**81.6**	**81.8**	**82.0**	**81.5**
Real GDP	0.1	2.7	1.8	4.5	3.5	-2.1	4.6	*3.1*	**3.0**	**2.9**	**2.9**	**3.0**	**3.0**	**2.9**
GDP Price Index	1.3	1.3	1.2	1.7	1.5	1.3	2.1	*1.6*	**1.7**	**1.9**	**2.0**	**2.1**	**2.1**	**2.1**
Consumer Price Index	2.4	1.2	0.4	2.2	1.1	1.9	3.0	1.1	**1.3**	**1.8**	**2.1**	**2.2**	**2.3**	**2.3**

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data for interest rates except LIBOR is from Federal Reserve Release (FRSR) H.15. LIBOR quotes available from *The Wall Street Journal*. Interest rate definitions are same as those in FRSR H.15. Treasury yields are reported on a constant maturity basis. Historical data for Fed's Major Currency Index is from FRSR H.10 and G.5. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS). *Figures for 3Q 2014 Real GDP and GDP Chained Price Index are consensus forecasts based on a special question asked of the panelists' this month.*

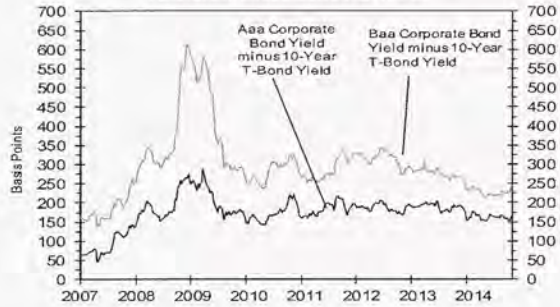
U.S. Treasury Yield Curve
Week ended October 24, 2014 and Year Ago vs.
4Q 2014 and 1Q 2016 Consensus Forecasts



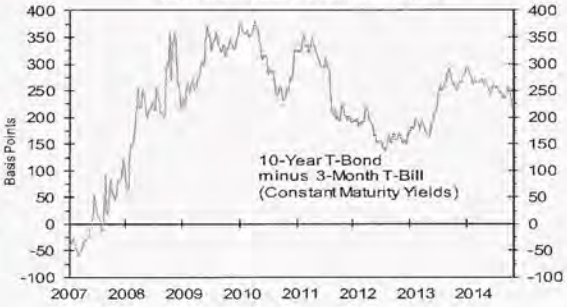
U.S. 3-Mo. T-Bills & 10-Yr. T-Note Yield
(Quarterly Average) Forecast



Corporate Bond Spreads
As of week ended October 24, 2014



U.S. Treasury Yield Curve
As of week ended October 24, 2014



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Top Analysts' Forecasts Of U.S. And Foreign Interest Rates, Currency Values And The Factors That Influence Them

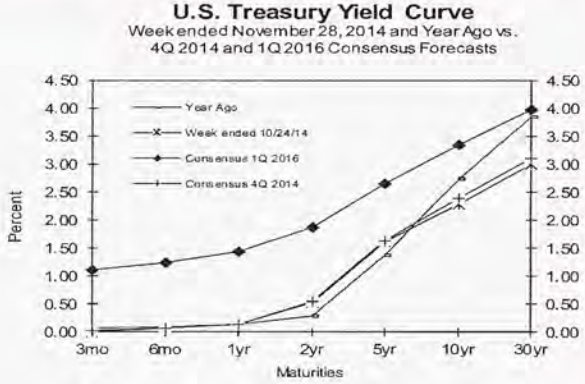
Vol. 33, No. 12, December 1, 2014

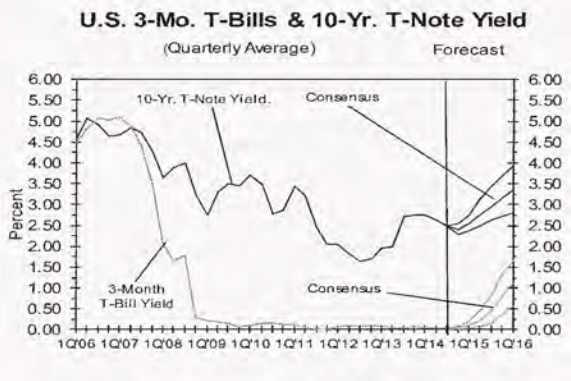
Wolters Kluwer
Law & Business

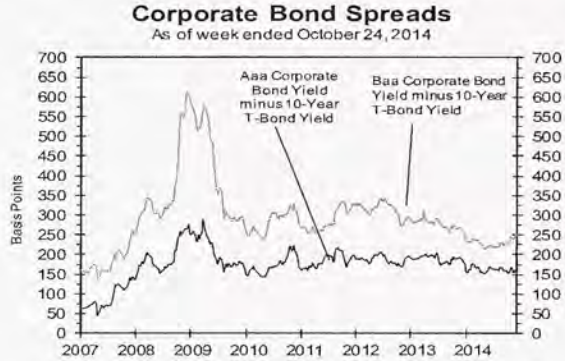
Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

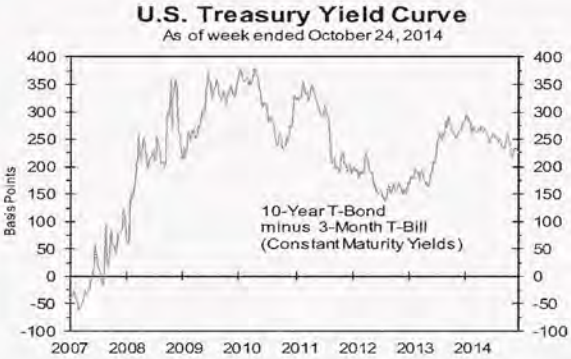
	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Q	4Q	1Q	2Q	3Q	4Q	1Q
Interest Rates	Nov. 28	Nov. 21	Nov. 14	Nov. 7	Oct.	Sep.	Aug.	3Q 2014	2014	2015	2015	2015	2015	2016
Federal Funds Rate	0.10	0.10	0.09	0.08	0.09	0.09	0.09	0.09	0.1	0.1	0.2	0.5	0.8	1.1
Prime Rate	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.3	3.3	3.3	3.5	3.8	4.1
LIBOR, 3-mo.	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.3	0.3	0.4	0.7	1.0	1.4
Commercial Paper, 1-mo.	0.07	0.07	0.07	0.07	0.06	0.06	0.08	0.07	0.1	0.1	0.3	0.5	0.9	1.2
Treasury bill, 3-mo.	0.02	0.02	0.02	0.03	0.02	0.02	0.03	0.03	0.0	0.1	0.2	0.5	0.8	1.1
Treasury bill, 6-mo.	0.07	0.07	0.07	0.06	0.05	0.04	0.05	0.05	0.1	0.1	0.3	0.6	0.9	1.2
Treasury bill, 1 yr.	0.14	0.14	0.14	0.12	0.10	0.11	0.11	0.11	0.1	0.3	0.5	0.8	1.1	1.4
Treasury note, 2 yr.	0.53	0.53	0.54	0.52	0.45	0.57	0.47	0.52	0.5	0.7	1.0	1.3	1.6	1.9
Treasury note, 5 yr.	1.61	1.64	1.64	1.63	1.55	1.77	1.63	1.70	1.6	1.8	2.0	2.2	2.4	2.7
Treasury note, 10 yr.	2.29	2.33	2.36	2.36	2.30	2.53	2.42	2.50	2.4	2.5	2.7	3.0	3.2	3.3
Treasury note, 30 yr.	3.00	3.05	3.08	3.06	3.04	3.26	3.20	3.26	3.1	3.3	3.4	3.6	3.8	4.0
Corporate Aaa bond	3.93	3.96	3.95	3.90	3.92	4.11	4.08	4.12	4.0	4.2	4.4	4.6	4.7	4.9
Corporate Baa bond	4.80	4.84	4.80	4.76	4.69	4.80	4.69	4.72	4.8	5.0	5.2	5.4	5.5	5.7
State & Local bonds	n.a.	3.93	3.98	3.98	3.96	4.13	4.23	4.23	4.0	4.1	4.3	4.5	4.6	4.8
Home mortgage rate	3.97	3.99	4.01	4.02	4.04	4.16	4.12	4.14	4.1	4.2	4.4	4.6	4.8	5.0
	History								Consensus Forecasts-Quarterly					
	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q
Key Assumptions	2012	2013	2013	2013	2013	2014	2014	2014	2014	2015	2015	2015	2015	2016
Major Currency Index	73.2	74.7	76.4	76.7	76.0	77.1	76.6	77.8	82.1	82.9	83.3	83.6	83.7	83.5
Real GDP	0.1	2.7	1.8	4.5	3.5	-2.1	4.6	3.9	2.7	2.9	2.9	3.0	3.0	2.8
GDP Price Index	1.3	1.3	1.2	1.7	1.5	1.3	2.1	1.4	1.4	1.7	1.9	1.9	2.0	2.0
Consumer Price Index	2.4	1.2	0.4	2.2	1.1	1.9	3.0	1.1	0.6	1.7	2.1	2.2	2.2	2.2

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data for interest rates except LIBOR is from Federal Reserve Release (FRSR) H.15. LIBOR quotes available from *The Wall Street Journal*. Interest rate definitions are same as those in FRSR H.15. Treasury yields are reported on a constant maturity basis. Historical data for Fed's Major Currency Index is from FRSR H.10 and G.5. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS).









Blue Chip Financial Forecasts®

Top Analysts' Forecasts Of U.S. And Foreign Interest Rates, Currency Values And The Factors That Influence Them

Vol. 33, No. 12, December 1, 2014

Wolters Kluwer
Law & Business

Long-Range Estimates:

The table below contains results of our semi-annual long-range CONSENSUS survey. There are also Top 10 and bottom 10 averages for each variable. Shown are estimates for the years 2016 through 2020 and averages for the five-year periods 2016-2020 and 2020-2025. Apply these projections cautiously. Few economic, demographic and political forces can be evaluated accurately over such long time spans.

		Average For The Year					Five-Year Averages	
Interest Rates		**2016**	**2017**	**2018**	**2019**	**2020**	**2016-2020**	**2021-2025**
1. Federal Funds Rate	**CONSENSUS**	**1.8**	**2.9**	**3.6**	**3.7**	**3.7**	**3.1**	**3.6**
	Top 10 Average	2.4	3.7	4.2	4.2	4.2	3.7	4.1
	Bottom 10 Average	1.2	2.3	2.9	3.0	3.0	2.5	2.9
2. Prime Rate	**CONSENSUS**	**4.7**	**5.8**	**6.5**	**6.6**	**6.6**	**6.0**	**6.5**
	Top 10 Average	5.4	6.6	7.1	7.2	7.2	6.7	7.1
	Bottom 10 Average	4.2	5.2	5.8	5.9	5.8	5.4	5.6
3. LIBOR, 3-Mo.	**CONSENSUS**	**2.1**	**3.2**	**3.7**	**3.9**	**3.9**	**3.3**	**3.8**
	Top 10 Average	2.7	3.9	4.3	4.4	4.4	3.9	4.3
	Bottom 10 Average	1.5	2.5	3.1	3.2	3.3	2.7	3.3
4. Commercial Paper, 1-Mo.	**CONSENSUS**	**1.9**	**3.0**	**3.5**	**3.7**	**3.7**	**3.1**	**3.7**
	Top 10 Average	2.4	3.5	4.0	4.2	4.2	3.6	4.2
	Bottom 10 Average	1.5	2.5	3.0	3.1	3.2	2.7	3.2
5. Treasury Bill Yield, 3-Mo.	**CONSENSUS**	**1.8**	**2.9**	**3.4**	**3.6**	**3.6**	**3.0**	**3.5**
	Top 10 Average	2.4	3.6	4.0	4.2	4.1	3.7	4.1
	Bottom 10 Average	1.3	2.2	2.9	2.9	2.9	2.4	2.7
6. Treasury Bill Yield, 6-Mo.	**CONSENSUS**	**2.0**	**3.0**	**3.6**	**3.7**	**3.7**	**3.2**	**3.6**
	Top 10 Average	2.5	3.8	4.2	4.4	4.3	3.8	4.2
	Bottom 10 Average	1.5	2.4	3.0	3.1	3.1	2.6	2.8
7. Treasury Bill Yield, 1-Yr.	**CONSENSUS**	**2.1**	**3.2**	**3.7**	**3.8**	**3.8**	**3.3**	**3.7**
	Top 10 Average	2.8	3.9	4.4	4.5	4.4	4.0	4.3
	Bottom 10 Average	1.6	2.5	3.1	3.1	3.2	2.7	2.9
8. Treasury Note Yield, 2-Yr.	**CONSENSUS**	**2.5**	**3.4**	**3.9**	**4.0**	**4.0**	**3.6**	**4.0**
	Top 10 Average	3.3	4.1	4.5	4.7	4.6	4.2	4.5
	Bottom 10 Average	1.9	2.8	3.3	3.3	3.3	2.9	3.2
10. Treasury Note Yield, 5-Yr.	**CONSENSUS**	**3.1**	**3.8**	**4.2**	**4.3**	**4.3**	**4.0**	**4.3**
	Top 10 Average	3.8	4.5	4.9	5.1	5.1	4.7	4.9
	Bottom 10 Average	2.6	3.2	3.6	3.5	3.6	3.3	3.6
11. Treasury Note Yield, 10-Yr.	**CONSENSUS**	**3.7**	**4.3**	**4.6**	**4.7**	**4.7**	**4.4**	**4.6**
	Top 10 Average	4.4	5.0	5.4	5.6	5.6	5.2	5.4
	Bottom 10 Average	3.2	3.5	3.8	3.8	3.9	3.7	3.9
12. Treasury Bond Yield, 30-Yr.	**CONSENSUS**	**4.3**	**4.8**	**5.0**	**5.1**	**5.2**	**4.9**	**5.1**
	Top 10 Average	5.0	5.6	5.9	6.2	6.2	5.8	6.0
	Bottom 10 Average	3.7	4.0	4.2	4.2	4.3	4.1	4.3
13. Corporate Aaa Bond Yield	**CONSENSUS**	**5.1**	**5.6**	**6.0**	**6.1**	**6.1**	**5.8**	**6.1**
	Top 10 Average	5.8	6.4	6.8	7.0	7.0	6.6	6.8
	Bottom 10 Average	4.5	4.8	5.1	5.1	5.2	5.0	5.4
13. Corporate Baa Bond Yield	**CONSENSUS**	**6.0**	**6.5**	**6.8**	**6.9**	**7.0**	**6.6**	**7.0**
	Top 10 Average	6.7	7.3	7.7	7.9	7.9	7.5	7.7
	Bottom 10 Average	5.4	5.6	5.9	5.9	6.0	5.8	6.2
14. State & Local Bonds Yield	**CONSENSUS**	**4.9**	**5.2**	**5.4**	**5.4**	**5.4**	**5.2**	**5.3**
	Top 10 Average	5.5	5.7	6.0	6.1	6.1	5.9	6.0
	Bottom 10 Average	4.3	4.6	4.7	4.7	4.7	4.6	4.7
15. Home Mortgage Rate	**CONSENSUS**	**5.2**	**5.8**	**6.2**	**6.3**	**6.3**	**6.0**	**6.2**
	Top 10 Average	5.9	6.5	7.1	7.2	7.2	6.8	7.0
	Bottom 10 Average	4.6	5.1	5.5	5.5	5.5	5.2	5.3
A. FRB - Major Currency Index	**CONSENSUS**	**83.6**	**83.3**	**82.7**	**82.4**	**82.1**	**82.8**	**82.0**
	Top 10 Average	86.7	86.7	86.6	86.5	86.6	86.6	86.3
	Bottom 10 Average	80.3	79.8	78.5	77.9	77.3	78.7	77.4
		Year-Over-Year, % Change					Five-Year Averages	
		2016	**2017**	**2018**	**2019**	**2020**	**2016-2020**	**2021-2025**
B. Real GDP	**CONSENSUS**	**2.8**	**2.8**	**2.6**	**2.4**	**2.4**	**2.6**	**2.3**
	Top 10 Average	3.2	3.1	2.9	2.8	2.7	2.9	2.6
	Bottom 10 Average	2.6	2.4	2.3	1.8	2.0	2.2	2.0
C. GDP Chained Price Index	**CONSENSUS**	**2.0**	**2.2**	**2.2**	**2.1**	**2.1**	**2.1**	**2.1**
	Top 10 Average	2.3	2.7	2.6	2.5	2.4	2.5	2.5
	Bottom 10 Average	1.7	1.8	1.8	1.8	1.8	1.8	1.8
D. Consumer Price Index	**CONSENSUS**	**2.3**	**2.5**	**2.4**	**2.3**	**2.3**	**2.4**	**2.3**
	Top 10 Average	2.7	3.1	3.0	2.8	2.7	2.8	2.7
	Bottom 10 Average	2.0	2.0	2.0	1.9	1.9	1.9	1.9

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Vol. 34, No. 1, January 1, 2015

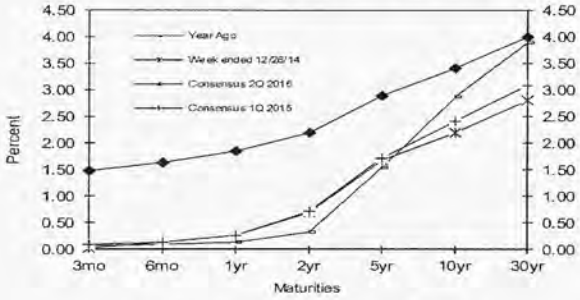
Wolters Kluwer
Law & Business

Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

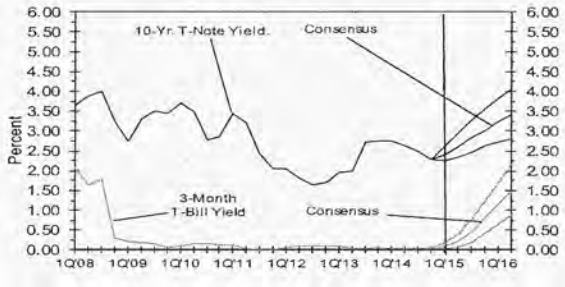
	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			*Latest Q**	1Q	2Q	3Q	4Q	1Q	2Q
Interest Rates	Dec. 26	Dec. 19	Dec. 12	Dec. 5	Nov.	Oct.	Sep.	*4Q 2014*	2015	2015	2015	2015	2016	2016
Federal Funds Rate	0.13	0.12	0.12	0.10	0.09	0.09	0.09	0.10	**0.1**	**0.2**	**0.5**	**0.8**	**1.2**	**1.5**
Prime Rate	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	**3.3**	**3.3**	**3.5**	**3.9**	**4.2**	**4.6**
LIBOR, 3-mo.	0.24	0.23	0.23	0.23	0.23	0.23	0.23	0.23	**0.3**	**0.4**	**0.7**	**1.0**	**1.4**	**1.8**
Commercial Paper, 1-mo.	0.12	0.11	0.11	0.10	0.07	0.06	0.06	0.08	**0.1**	**0.2**	**0.5**	**0.9**	**1.3**	**1.6**
Treasury bill, 3-mo.	0.04	0.04	0.03	0.02	0.02	0.02	0.02	0.03	**0.1**	**0.2**	**0.5**	**0.8**	**1.2**	**1.5**
Treasury bill, 6-mo.	0.13	0.11	0.10	0.08	0.07	0.05	0.04	0.08	**0.1**	**0.3**	**0.6**	**0.9**	**1.3**	**1.6**
Treasury bill, 1 yr.	0.26	0.23	0.20	0.15	0.13	0.10	0.11	0.15	**0.3**	**0.5**	**0.8**	**1.2**	**1.5**	**1.9**
Treasury note, 2 yr.	0.70	0.63	0.61	0.56	0.53	0.45	0.57	0.54	**0.7**	**1.0**	**1.3**	**1.6**	**1.9**	**2.2**
Treasury note, 5 yr.	1.69	1.61	1.61	1.60	1.62	1.55	1.77	1.60	**1.7**	**1.9**	**2.2**	**2.4**	**2.7**	**2.9**
Treasury note, 10 yr.	2.21	2.14	2.19	2.27	2.33	2.30	2.53	2.27	**2.4**	**2.6**	**2.8**	**3.0**	**3.2**	**3.4**
Treasury note, 30 yr.	2.80	2.75	2.84	2.97	3.04	3.04	3.26	2.96	**3.1**	**3.3**	**3.5**	**3.7**	**3.9**	**4.0**
Corporate Aaa bond	3.78	3.74	3.75	3.90	3.92	3.92	4.11	3.87	**4.0**	**4.2**	**4.3**	**4.6**	**4.8**	**5.0**
Corporate Baa bond	4.75	4.72	4.72	4.79	4.79	4.69	4.80	4.74	**4.9**	**5.1**	**5.3**	**5.5**	**5.7**	**5.8**
State & Local bonds	na	3.65	3.65	3.83	3.96	3.96	4.13	3.86	**3.9**	**4.1**	**4.3**	**4.5**	**4.6**	**4.8**
Home mortgage rate	na	3.80	3.93	3.89	4.00	4.04	4.16	3.97	**4.1**	**4.3**	**4.5**	**4.7**	**4.9**	**5.1**
	History								Consensus Forecasts-Quarterly					
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	*4Q**	1Q	2Q	3Q	4Q	1Q	2Q
Key Assumptions	2013	2013	2013	2013	2014	2014	2014	*2014*	2015	2015	2015	2015	2016	2016
Major Currency Index	74.7	76.4	76.7	76.0	77.1	76.6	77.8	*83.9*	**84.0**	**84.7**	**85.3**	**85.5**	**85.7**	**85.5**
Real GDP	2.7	1.8	4.5	3.5	-2.1	4.6	5.0	*2.7*	**2.9**	**2.9**	**3.0**	**3.0**	**2.9**	**2.9**
GDP Price Index	1.3	1.2	1.7	1.5	1.3	2.1	1.4	*1.0*	**1.3**	**1.7**	**1.9**	**2.0**	**2.1**	**2.0**
Consumer Price Index	1.2	0.4	2.2	1.1	1.9	3.0	1.1	*-0.9*	**0.4**	**1.9**	**2.1**	**2.3**	**2.2**	**2.2**

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data for interest rates except LIBOR is from Federal Reserve Release (FRSR) H.15. LIBOR quotes available from *The Wall Street Journal*. Interest rate definitions are same as those in FRSR H.15. Treasury yields are reported on a constant maturity basis. Historical data for Fed's Major Currency Index is from FRSR H.10 and G.5. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS). **Data for 4Q 2014 Major Currency Index is based on data through December 23. Figures for 4Q 2014 Real GDP, GDP Chained Price Index and Consumer Price Index are consensus forecasts based on a special question asked of the panelists' this month.*

U.S. Treasury Yield Curve
Week ended December 26, 2014 and Year Ago vs.
1Q 2014 and 2Q 2016 Consensus Forecasts

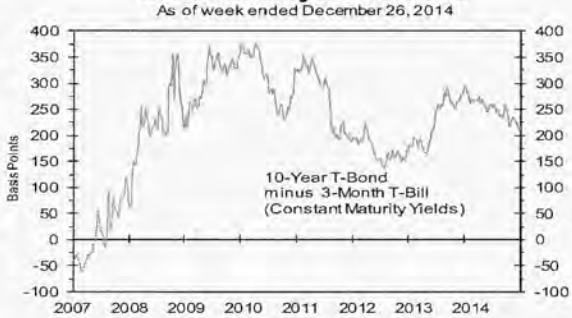


U.S. 3-Mo. T-Bills & 10-Yr. T-Note Yield
(Quarterly Average) Forecast



Corporate Bond Spreads
As of week ended December 26, 2014

U.S. Treasury Yield Curve
As of week ended December 26, 2014



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Vol. 34, No. 2, February 1, 2015

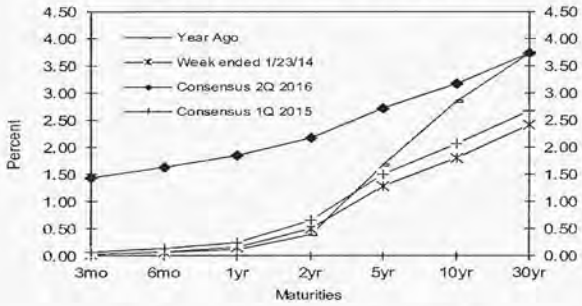
Wolters Kluwer
Law & Business

Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

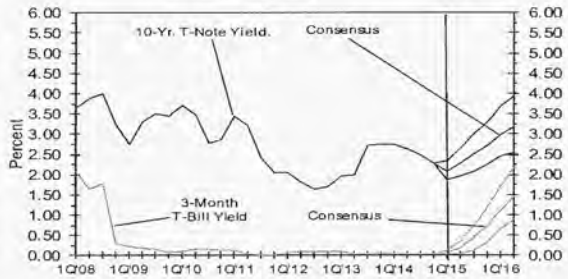
	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Q	1Q	2Q	3Q	4Q	1Q	2Q
Interest Rates	Jan. 23	Jan. 16	Jan. 9	Jan. 2	Dec.	Nov.	Oct.	4Q 2014	2015	2015	2015	2015	2016	2016
Federal Funds Rate	0.12	0.12	0.11	0.12	0.12	0.09	0.09	0.10	0.1	0.2	0.5	0.8	1.1	1.5
Prime Rate	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.3	3.3	3.5	3.8	4.1	4.5
LIBOR, 3-mo.	0.26	0.25	0.25	0.25	0.23	0.23	0.23	0.23	0.3	0.4	0.6	0.9	1.3	1.7
Commercial Paper, 1-mo.	0.08	0.11	0.09	0.13	0.11	0.07	0.06	0.08	0.1	0.2	0.5	0.8	1.2	1.5
Treasury bill, 3-mo.	0.03	0.03	0.03	0.03	0.03	0.02	0.02	0.02	0.1	0.2	0.4	0.7	1.1	1.5
Treasury bill, 6-mo.	0.08	0.08	0.09	0.12	0.11	0.07	0.05	0.08	0.1	0.3	0.5	0.9	1.2	1.6
Treasury bill, 1 yr.	0.17	0.18	0.24	0.25	0.21	0.13	0.10	0.15	0.2	0.4	0.7	1.1	1.4	1.8
Treasury note, 2 yr.	0.50	0.51	0.63	0.69	0.64	0.53	0.45	0.54	0.7	0.9	1.2	1.5	1.8	2.2
Treasury note, 5 yr.	1.29	1.32	1.50	1.67	1.64	1.62	1.55	1.60	1.5	1.7	2.0	2.2	2.5	2.7
Treasury note, 10 yr.	1.82	1.86	2.00	2.18	2.21	2.33	2.30	2.28	2.1	2.3	2.5	2.7	3.0	3.2
Treasury note, 30 yr.	2.42	2.46	2.56	2.75	2.83	3.04	3.04	2.97	2.7	2.9	3.1	3.3	3.5	3.7
Corporate Aaa bond	3.45	3.46	3.54	3.72	3.79	3.92	3.92	3.88	3.7	3.9	4.1	4.3	4.6	4.8
Corporate Baa bond	4.44	4.45	4.53	4.68	4.74	4.79	4.69	4.74	4.6	4.8	5.0	5.2	5.4	5.6
State & Local bonds	3.36	3.29	3.42	3.56	3.70	3.96	3.96	3.87	3.5	3.7	3.9	4.1	4.4	4.6
Home mortgage rate	3.63	3.66	3.73	3.87	3.86	4.00	4.04	3.97	3.8	4.0	4.2	4.5	4.7	4.9
	History								Consensus Forecasts-Quarterly					
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q*	1Q	2Q	3Q	4Q	1Q	2Q
Key Assumptions	2013	2013	2013	2013	2014	2014	2014	2014	2015	2015	2015	2015	2016	2016
Major Currency Index	74.7	76.4	76.7	76.0	77.1	76.6	77.8	82.6	86.7	87.7	88.4	88.8	88.3	87.8
Real GDP	2.7	1.8	4.5	3.5	-2.1	4.6	5.0	*3.0*	2.9	3.0	3.0	3.0	2.9	2.9
GDP Price Index	1.3	1.2	1.7	1.5	1.3	2.1	1.4	*0.9*	0.8	1.6	1.8	2.0	2.0	2.1
Consumer Price Index	1.2	0.4	2.2	1.1	1.9	3.0	1.1	-0.9	-1.5	1.8	2.2	2.2	2.3	2.3

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data for interest rates except LIBOR is from Federal Reserve Release (FRSR) H.15. LIBOR quotes available from *The Wall Street Journal*. Interest rate definitions are same as those in FRSR H.15. Treasury yields are reported on a constant maturity basis. Historical data for Fed's Major Currency Index is from FRSR H.10 and G.5. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS). * *Figures for 4Q 2014 Real GDP and GDP Chained Price Index.*

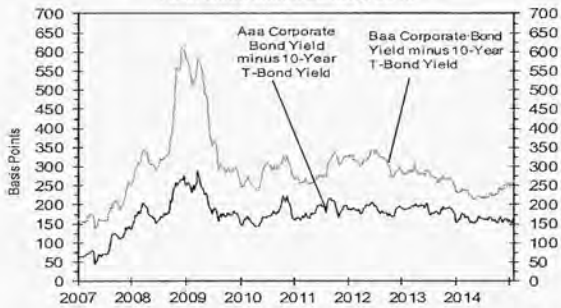
U.S. Treasury Yield Curve
Week ended January 23, 2015 and Year Ago vs.
1Q 2015 and 2Q 2016 Consensus Forecasts



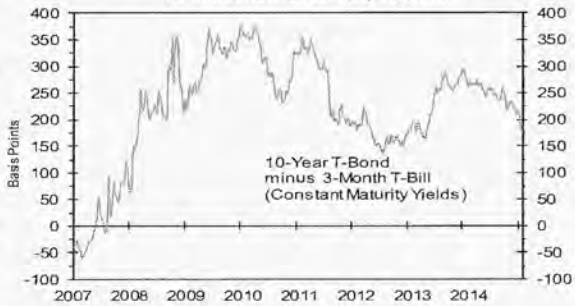
U.S. 3-Mo. T-Bills & 10-Yr. T-Note Yield
(Quarterly Average) Forecast



Corporate Bond Spreads
As of week ended January, 2015



U.S. Treasury Yield Curve
As of week ended January 23, 2015



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Vol. 34, No. 3, March 1, 2015

Wolters Kluwer
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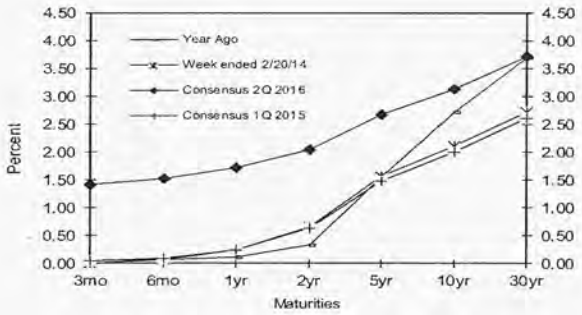
Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

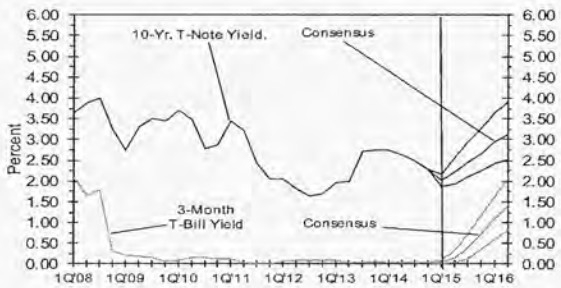
	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Q	1Q	2Q	3Q	4Q	1Q	2Q
Interest Rates	Feb. 20	Feb. 13	Feb. 6	Jan. 30	Jan.	Dec.	Nov.	4Q 2014	2015	2015	2015	2015	2016	2016
Federal Funds Rate	0.12	0.12	0.09	0.12	0.11	0.12	0.09	0.10	0.1	0.2	0.4	0.8	1.1	1.4
Prime Rate	3.25	3.25	325	3.25	3.25	3.25	3.25	3.25	3.3	3.3	3.5	3.8	4.1	4.5
LIBOR, 3-mo.	0.26	0.26	0.26	0.26	0.26	0.23	0.23	0.23	0.3	0.4	0.6	0.9	1.3	1.6
Commercial Paper, 1-mo.	0.06	0.08	0.08	0.08	0.09	0.11	0.07	0.08	0.1	0.2	0.4	0.8	1.1	1.5
Treasury bill, 3-mo.	0.02	0.01	0.02	0.02	0.03	0.03	0.02	0.02	0.0	0.2	0.4	0.7	1.1	1.4
Treasury bill, 6-mo.	0.07	0.07	0.07	0.08	0.08	0.11	0.07	0.08	0.1	0.2	0.5	0.8	1.2	1.5
Treasury bill, 1 yr.	0.24	0.24	0.21	0.17	0.20	0.21	0.13	0.15	0.2	0.4	0.7	1.1	1.4	1.7
Treasury note, 2 yr.	0.67	0.65	0.54	0.51	0.55	0.64	0.53	0.54	0.6	0.9	1.1	1.5	1.8	2.1
Treasury note, 5 yr.	1.58	1.51	1.31	1.28	1.37	1.64	1.62	1.60	1.5	1.7	1.9	2.1	2.4	2.7
Treasury note, 10 yr.	2.11	2.00	1.81	1.77	1.88	2.21	2.33	2.28	2.0	2.2	2.4	2.7	2.9	3.1
Treasury note, 30 yr.	2.72	2.58	2.39	2.33	2.46	2.83	3.04	2.97	2.6	2.8	3.0	3.3	3.5	3.7
Corporate Aaa bond	3.77	3.62	3.42	3.36	3.46	3.79	3.92	3.88	3.7	3.8	4.1	4.3	4.6	4.8
Corporate Baa bond	4.64	4.53	4.41	4.36	4.45	4.74	4.79	4.74	4.6	4.7	5.0	5.2	5.4	5.6
State & Local bonds	3.62	3.60	3.49	3.36	3.40	3.70	3.96	3.87	3.5	3.7	3.9	4.2	4.4	4.5
Home mortgage rate	3.76	3.69	3.59	3.66	3.71	3.86	4.00	3.97	3.8	3.9	4.2	4.4	4.7	4.9
	History								Consensus Forecasts-Quarterly					
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q
Key Assumptions	2013	2013	2013	2013	2014	2014	2014	2014	2015	2015	2015	2015	2016	2016
Major Currency Index	74.7	76.4	76.7	76.0	77.1	76.6	77.8	82.6	87.7	89.0	89.5	90.0	89.6	89.1
Real GDP	2.7	1.8	4.5	3.5	-2.1	4.6	5.0	2.2	2.6	3.0	3.1	3.0	2.9	2.9
GDP Price Index	1.3	1.2	1.7	1.5	1.3	2.1	1.4	0.1	0.4	1.6	1.8	1.9	2.0	2.0
Consumer Price Index	1.2	0.4	2.2	1.1	1.9	3.0	1.1	-1.2	-1.8	2.0	2.2	2.2	2.2	2.2

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data for interest rates except LIBOR is from Federal Reserve Release (FRSR) H.15. LIBOR quotes available from *The Wall Street Journal*. Interest rate definitions are same as those in FRSR H.15. Treasury yields are reported on a constant maturity basis. Historical data for Fed's Major Currency Index is from FRSR H.10 and G.5. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS).

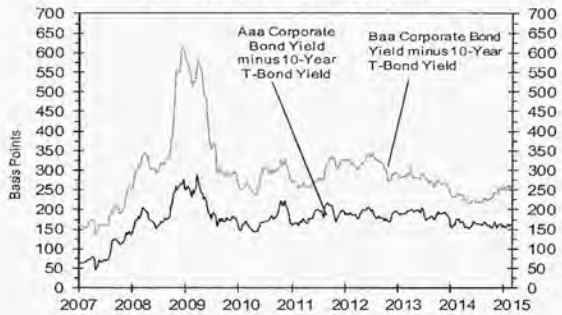
U.S. Treasury Yield Curve
Week ended February 20, 2015 and Year Ago vs.
1Q 2015 and 2Q 2016 Consensus Forecasts



U.S. 3-Mo. T-Bills & 10-Yr. T-Note Yield
(Quarterly Average) Forecast



Corporate Bond Spreads
As of week ended February 20, 2015



U.S. Treasury Yield Curve
As of week ended February 20, 2015

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Top Analysts' Forecasts Of U.S. And Foreign Interest Rates, Currency Values And The Factors That Influence Them

Vol. 34, No. 4, April 1, 2015

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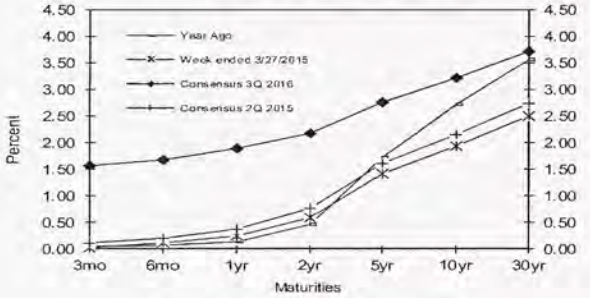
Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

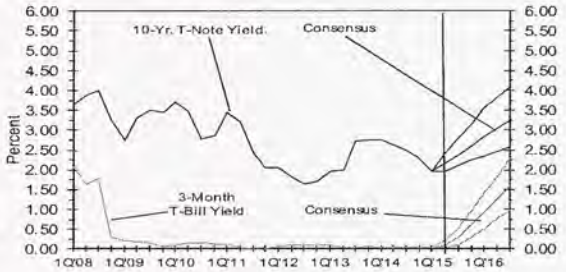
	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			*Latest Q**	2Q	3Q	4Q	1Q	2Q	3Q
Interest Rates	Mar. 27	Mar. 20	Mar. 13	Mar. 6	Feb.	Jan.	Dec.	*1Q 2015*	2015	2015	2015	2016	2016	2016
Federal Funds Rate	0.12	0.11	0.12	0.09	0.11	0.11	0.12	*0.11*	0.2	0.4	0.7	1.0	1.3	1.6
Prime Rate	3.25	3.25	3.25	3.25	3.25	3.25	3.25	*3.25*	3.3	3.4	3.7	4.0	4.3	4.6
LIBOR, 3-mo.	0.27	0.27	0.27	0.27	0.26	0.26	0.23	*0.26*	0.3	0.5	0.9	1.2	1.5	1.9
Commercial Paper, 1-mo.	0.08	0.09	0.08	0.07	0.08	0.09	0.11	*0.08*	0.2	0.3	0.7	1.0	1.4	1.7
Treasury bill, 3-mo.	0.03	0.03	0.03	0.02	0.02	0.03	0.03	*0.03*	0.1	0.3	0.6	0.9	1.3	1.6
Treasury bill, 6-mo.	0.11	0.13	0.10	0.08	0.07	0.08	0.11	*0.09*	0.2	0.4	0.7	1.1	1.4	1.7
Treasury bill, 1 yr.	0.25	0.25	0.25	0.25	0.22	0.20	0.21	*0.22*	0.4	0.6	0.9	1.3	1.6	1.9
Treasury note, 2 yr.	0.60	0.63	0.69	0.68	0.62	0.55	0.64	*0.61*	0.8	1.0	1.3	1.6	1.9	2.2
Treasury note, 5 yr.	1.42	1.49	1.61	1.61	1.57	1.37	1.64	*1.49*	1.6	1.8	2.1	2.3	2.5	2.8
Treasury note, 10 yr.	1.93	2.00	2.14	2.13	1.98	1.88	2.21	*1.97*	2.2	2.4	2.6	2.8	3.0	3.2
Treasury note, 30 yr.	2.50	2.57	2.72	2.73	2.57	2.46	2.83	*2.55*	2.7	2.9	3.1	3.4	3.6	3.7
Corporate Aaa bond	3.54	3.62	3.70	3.74	3.61	3.46	3.79	*3.57*	3.7	4.0	4.2	4.5	4.7	4.9
Corporate Baa bond	4.45	4.51	4.59	4.60	4.51	4.45	4.74	*4.50*	4.6	4.8	5.1	5.3	5.5	5.7
State & Local bonds	3.52	3.52	3.62	3.68	3.58	3.40	3.70	*3.52*	3.7	3.9	4.1	4.3	4.5	4.6
Home mortgage rate	3.69	3.78	3.86	3.75	3.71	3.71	3.86	*3.73*	3.9	4.1	4.4	4.6	4.8	5.0
	History								Consensus Forecasts-Quarterly					
	2Q	3Q	4Q	1Q	2Q	3Q	4Q	*1Q**	2Q	3Q	4Q	1Q	2Q	3Q
Key Assumptions	2013	2013	2013	2014	2014	2014	2014	*2015*	2015	2015	2015	2016	2016	2016
Major Currency Index	76.4	76.7	76.0	77.1	76.6	77.8	82.6	*89.5*	91.5	92.1	92.6	92.2	91.6	91.2
Real GDP	1.8	4.5	3.5	-2.1	4.6	5.0	2.2	*1.7*	3.2	3.0	3.0	2.8	2.8	2.8
GDP Price Index	1.2	1.7	1.5	1.3	2.1	1.4	0.1	*0.2*	1.6	1.8	1.9	1.9	2.0	2.1
Consumer Price Index	-0.1	2.3	1.4	2.1	2.4	1.2	-0.9	*-2.3*	1.9	1.9	2.1	2.2	2.2	2.3

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data for interest rates except LIBOR is from Federal Reserve Release (FRSR) H.15. LIBOR quotes available from *The Wall Street Journal*. Interest rate definitions are same as those in FRSR H.15. Treasury yields are reported on a constant maturity basis. Historical data for Fed's Major Currency Index is from FRSR H.10 and G.5. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS). **Interest rate data for 1Q 2015 based on historical data through the week ended March 27th. *Data for 1Q 2015 Major Currency Index is based on data through week ended March 20th. Figures for 1Q 2015 Real GDP, GDP Chained Price Index and Consumer Price Index are consensus forecasts based on a special question asked of the panelists' this month*

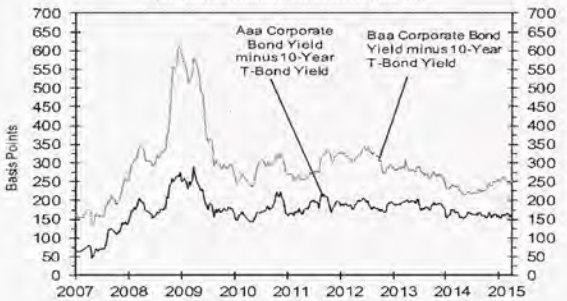
U.S. Treasury Yield Curve
Week ended March 27, 2015 and Year Ago vs.
2Q 2015 and 3Q 2016 Consensus Forecasts



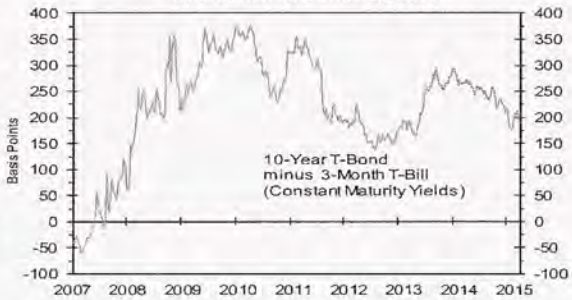
U.S. 3-Mo. T-Bills & 10-Yr. T-Note Yield
(Quarterly Average) Forecast



Corporate Bond Spreads
As of week ended March 27, 2015



U.S. Treasury Yield Curve
As of week ended March 27, 2015



Blue Chip Financial Forecasts®

Top Analysts' Forecasts Of U.S. And Foreign Interest Rates, Currency Values And The Factors That Influence Them

Vol. 34, No. 5, May 1, 2015

Wolters Kluwer

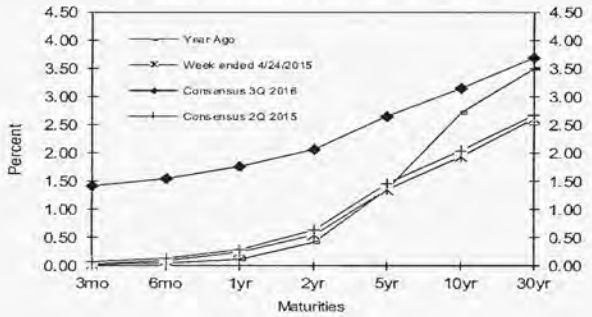
Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Q	2Q	3Q	4Q	1Q	2Q	3Q
Interest Rates	Apr. 24	Apr. 17	Apr. 10	Apr. 3	Mar.	Feb.	Jan.	1Q 2015	2015	2015	2015	2016	2016	2016
Federal Funds Rate	0.13	0.12	0.12	0.11	0.11	0.11	0.11	0.11	0.1	0.3	0.6	0.9	1.2	1.5
Prime Rate	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.3	3.4	3.6	3.9	4.2	4.5
LIBOR, 3-mo.	0.28	0.28	0.28	0.27	0.26	0.26	0.26	0.26	0.3	0.5	0.8	1.1	1.4	1.7
Commercial Paper, 1-mo.	0.07	0.08	0.07	0.08	0.08	0.08	0.09	0.08	0.1	0.3	0.6	1.0	1.3	1.6
Treasury bill, 3-mo.	0.03	0.02	0.02	0.02	0.03	0.02	0.03	0.03	0.1	0.2	0.5	0.8	1.1	1.4
Treasury bill, 6-mo.	0.10	0.09	0.10	0.12	0.11	0.07	0.08	0.09	0.1	0.4	0.6	1.0	1.3	1.6
Treasury bill, 1 yr.	0.24	0.23	0.22	0.25	0.25	0.22	0.20	0.22	0.3	0.5	0.8	1.2	1.5	1.8
Treasury note, 2 yr.	0.55	0.52	0.54	0.55	0.64	0.62	0.55	0.60	0.6	0.9	1.2	1.5	1.8	2.1
Treasury note, 5 yr.	1.36	1.33	1.36	1.34	1.52	1.57	1.37	1.49	1.5	1.7	1.9	2.2	2.4	2.7
Treasury note, 10 yr.	1.94	1.90	1.93	1.91	2.04	1.98	1.88	1.97	2.0	2.3	2.5	2.7	3.0	3.2
Treasury note, 30 yr.	2.61	2.55	2.56	2.52	2.63	2.57	2.46	2.55	2.7	2.9	3.1	3.3	3.5	3.7
Corporate Aaa bond	3.54	3.47	3.50	3.49	3.64	3.61	3.46	3.57	3.6	3.8	4.1	4.4	4.6	4.8
Corporate Baa bond	4.48	4.44	4.47	4.46	4.54	4.51	4.45	4.50	4.5	4.7	5.0	5.2	5.4	5.6
State & Local bonds	3.52	3.45	3.49	3.49	3.59	3.58	3.40	3.52	3.5	3.7	4.0	4.2	4.4	4.6
Home mortgage rate	3.65	3.67	3.66	3.70	3.77	3.71	3.71	3.73	3.8	4.0	4.2	4.5	4.7	4.9
	History								Consensus Forecasts-Quarterly					
	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q
Key Assumptions	2013	2013	2013	2014	2014	2014	2014	2015	2015	2015	2015	2016	2016	2016
Major Currency Index	76.4	76.7	76.0	77.1	76.6	77.8	82.6	89.4	91.1	91.7	92.2	92.2	92.1	92.0
Real GDP	1.8	4.5	3.5	-2.1	4.6	5.0	2.2	0.2	3.3	3.1	3.0	2.8	2.8	2.7
GDP Price Index	1.2	1.7	1.5	1.3	2.1	1.4	0.1	-0.1	1.8	1.8	1.8	1.9	2.0	2.1
Consumer Price Index	-0.1	2.3	1.4	2.1	2.4	1.2	-0.9	-3.1	1.9	2.2	2.2	2.1	2.3	2.4

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data for interest rates except LIBOR is from Federal Reserve Release (FRSR) H.15. LIBOR quotes available from *The Wall Street Journal*. Interest rate definitions are same as those in FRSR H.15. Treasury yields are reported on a constant maturity basis. Historical data for Fed's Major Currency Index is from FRSR H.10 and G.5. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS).

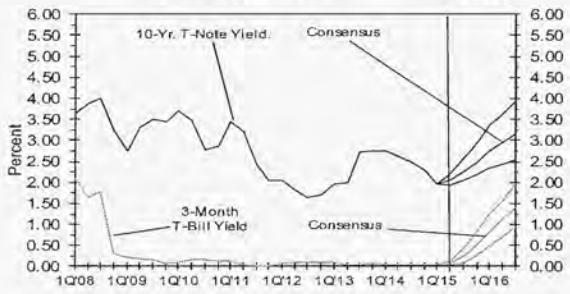
U.S. Treasury Yield Curve

Week ended April 24, 2015 and Year Ago vs. 2Q 2015 and 3Q 2016 Consensus Forecasts



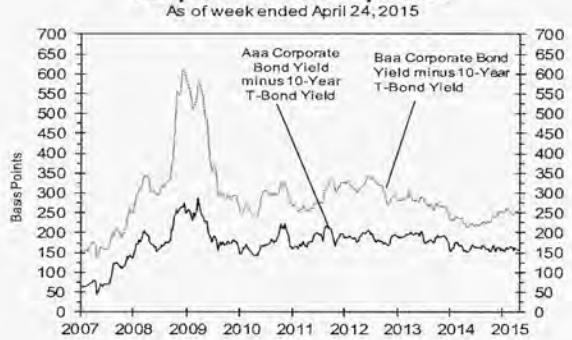
U.S. 3-Mo. T-Bills & 10-Yr. T-Note Yield

(Quarterly Average) Forecast



Corporate Bond Spreads

As of week ended April 24, 2015



U.S. Treasury Yield Curve

As of week ended April 24, 2015

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Top Analysts' Forecasts Of U.S. And Foreign Interest Rates, Currency Values And The Factors That Influence Them

Vol. 34, No. 6, June 1, 2015

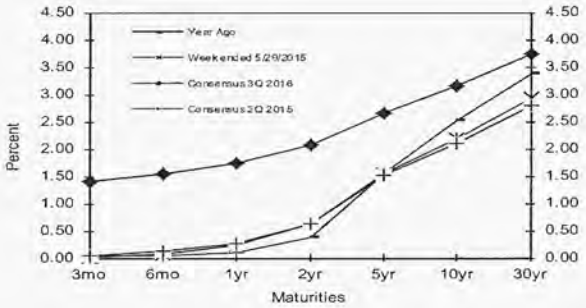
Wolters Kluwer

Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

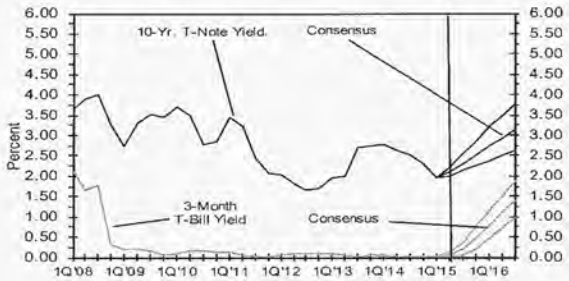
	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Q	2Q	3Q	4Q	1Q	2Q	3Q
Interest Rates	May 29	May 22	May 15	May 8	Apr.	Mar.	Feb.	1Q 2015	2015	2015	2015	2016	2016	2016
Federal Funds Rate	0.12	0.13	0.13	0.12	0.12	0.11	0.11	0.11	0.1	0.3	0.5	0.8	1.1	1.4
Prime Rate	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.3	3.3	3.5	3.8	4.1	4.5
LIBOR, 3-mo.	0.29	0.29	0.29	0.29	0.28	0.26	0.26	0.26	0.3	0.4	0.7	1.0	1.4	1.7
Commercial Paper, 1-mo.	0.08	0.08	0.08	0.08	0.07	0.08	0.08	0.08	0.1	0.3	0.5	0.9	1.2	1.5
Treasury bill, 3-mo.	0.02	0.02	0.02	0.01	0.02	0.03	0.02	0.03	0.0	0.2	0.5	0.8	1.1	1.4
Treasury bill, 6-mo.	0.08	0.08	0.09	0.08	0.09	0.11	0.07	0.09	0.1	0.3	0.6	0.9	1.2	1.5
Treasury bill, 1 yr.	0.24	0.23	0.24	0.24	0.23	0.25	0.22	0.22	0.3	0.5	0.8	1.1	1.4	1.7
Treasury note, 2 yr.	0.63	0.61	0.59	0.62	0.54	0.64	0.62	0.60	0.6	0.9	1.2	1.5	1.8	2.1
Treasury note, 5 yr.	1.54	1.54	1.54	1.54	1.35	1.52	1.57	1.49	1.5	1.7	2.0	2.2	2.4	2.7
Treasury note, 10 yr.	2.17	2.23	224	2.19	1.94	2.04	1.98	1.97	2.1	2.3	2.5	2.7	2.9	3.1
Treasury note, 30 yr.	2.94	3.02	3.02	2.91	2.59	2.63	2.57	2.55	2.8	3.0	3.2	3.4	3.6	3.7
Corporate Aaa bond	3.99	4.07	4.02	3.91	3.52	3.64	3.61	3.57	3.8	4.0	4.2	4.4	4.7	4.9
Corporate Baa bond	4.90	4.96	4.94	4.82	4.48	4.54	4.51	4.50	4.7	4.9	5.0	5.2	5.4	5.6
State & Local bonds	3.73	3.81	3.74	3.74	3.51	3.59	3.58	3.52	3.7	3.8	4.0	4.2	4.4	4.6
Home mortgage rate	3.87	3.84	3.85	3.80	3.67	3.77	3.71	3.73	3.8	4.0	4.2	4.5	4.7	4.9
	History								Consensus Forecasts-Quarterly					
	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q
Key Assumptions	2013	2013	2013	2014	2014	2014	2014	2015	2015	2015	2015	2016	2016	2016
Major Currency Index	76.4	76.7	76.0	77.1	76.6	77.8	82.6	89.4	90.4	90.9	91.6	91.7	91.6	91.3
Real GDP	1.8	4.5	3.5	-2.1	4.6	5.0	2.2	-0.7	2.6	3.2	3.0	2.7	2.8	2.8
GDP Price Index	1.2	1.7	1.5	1.3	2.1	1.4	0.1	-0.1	1.7	1.8	1.8	1.9	2.0	2.1
Consumer Price Index	-0.1	2.3	1.4	2.1	2.4	1.2	-0.9	-3.1	2.2	2.2	2.2	2.1	2.3	2.4

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data for interest rates except LIBOR is from Federal Reserve Release (FRSR) H.15. LIBOR quotes available from *The Wall Street Journal*. Interest rate definitions are same as those in FRSR H.15. Treasury yields are reported on a constant maturity basis. Historical data for Fed's Major Currency Index is from FRSR H.10 and G.5. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS).

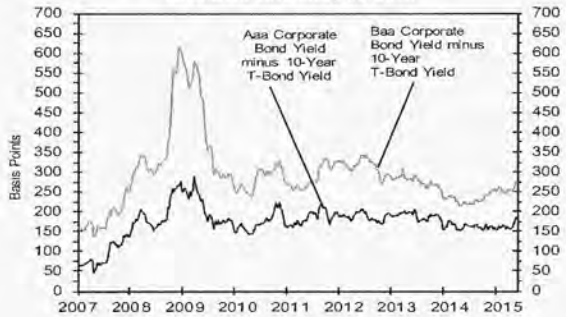
U.S. Treasury Yield Curve
Week ended May 29, 2015 and Year Ago vs.
2Q 2015 and 3Q 2016 Consensus Forecasts



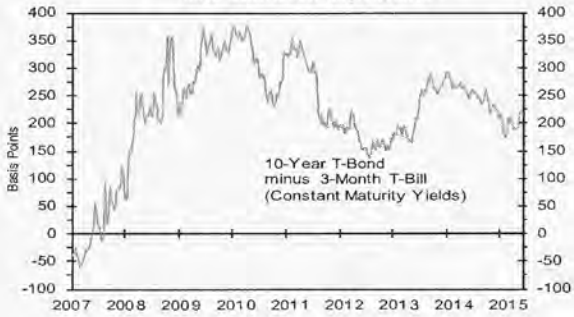
U.S. 3-Mo. T-Bills & 10-Yr. T-Note Yield
(Quarterly Average)



Corporate Bond Spreads
As of week ended May 29, 2015



U.S. Treasury Yield Curve
As of week ended May 29, 2015



Blue Chip Financial Forecasts®

Top Analysts' Forecasts Of U.S. And Foreign Interest Rates, Currency Values And The Factors That Influence Them

Vol. 34, No. 6, June 1, 2015

Wolters Kluwer

Long-Range Estimates:

The table below contains results of our semi-annual long-range CONSENSUS survey. There are also Top 10 and bottom 10 averages for each variable. Shown are estimates for the years 2017 through 2021 and averages for the five-year periods 2017-2021 and 2022-2026. Apply these projections cautiously. Few economic, demographic and political forces can be evaluated accurately over such long time spans.

		Average For The Year					Five-Year Averages	
Interest Rates		**2017**	**2018**	**2019**	**2020**	**2021**	**2017-2021**	**2022-2026**
1. Federal Funds Rate	**CONSENSUS**	**2.5**	**3.3**	**3.5**	**3.6**	**3.7**	**3.3**	**3.5**
	Top 10 Average	3.1	4.0	4.2	4.3	4.2	4.0	4.0
	Bottom 10 Average	1.8	2.5	2.7	2.8	3.0	2.6	2.9
2. Prime Rate	**CONSENSUS**	**5.5**	**6.2**	**6.5**	**6.6**	**6.6**	**6.3**	**6.5**
	Top 10 Average	6.1	7.0	7.3	7.3	7.3	7.0	7.0
	Bottom 10 Average	4.7	5.3	5.6	5.8	5.9	5.5	5.8
3. LIBOR, 3-Mo.	**CONSENSUS**	**2.7**	**3.5**	**3.8**	**3.9**	**3.9**	**3.6**	**3.8**
	Top 10 Average	3.4	4.3	4.6	4.6	4.6	4.3	4.4
	Bottom 10 Average	1.9	2.7	2.9	3.1	3.1	2.7	3.0
4. Commercial Paper, 1-Mo.	**CONSENSUS**	**2.6**	**3.4**	**3.7**	**3.8**	**3.8**	**3.5**	**3.7**
	Top 10 Average	3.2	4.0	4.3	4.3	4.3	4.0	4.0
	Bottom 10 Average	2.1	2.8	3.0	3.2	3.2	2.9	3.3
5. Treasury Bill Yield, 3-Mo.	**CONSENSUS**	**2.4**	**3.1**	**3.4**	**3.5**	**3.5**	**3.2**	**3.4**
	Top 10 Average	3.2	3.9	4.2	4.3	4.2	3.9	4.0
	Bottom 10 Average	1.7	2.3	2.6	2.8	2.9	2.4	2.7
6. Treasury Bill Yield, 6-Mo.	**CONSENSUS**	**2.5**	**3.2**	**3.5**	**3.7**	**3.7**	**3.3**	**3.5**
	Top 10 Average	3.4	4.1	4.4	4.5	4.4	4.1	4.2
	Bottom 10 Average	1.8	2.4	2.7	2.9	3.0	2.6	2.8
7. Treasury Bill Yield, 1-Yr.	**CONSENSUS**	**2.8**	**3.5**	**3.7**	**3.8**	**3.8**	**3.5**	**3.7**
	Top 10 Average	3.6	4.3	4.5	4.6	4.5	4.3	4.4
	Bottom 10 Average	1.9	2.6	2.9	3.0	3.0	2.7	2.9
8. Treasury Note Yield, 2-Yr.	**CONSENSUS**	**3.0**	**3.6**	**3.9**	**4.0**	**4.0**	**3.7**	**3.9**
	Top 10 Average	3.9	4.4	4.7	4.8	4.8	4.5	4.6
	Bottom 10 Average	2.1	2.8	3.0	3.1	3.1	2.8	3.0
10. Treasury Note Yield, 5-Yr.	**CONSENSUS**	**3.4**	**3.9**	**4.1**	**4.3**	**4.3**	**4.0**	**4.2**
	Top 10 Average	4.1	4.7	5.1	5.2	5.2	4.8	5.0
	Bottom 10 Average	2.6	3.0	3.1	3.3	3.3	3.1	3.3
11. Treasury Note Yield, 10-Yr.	**CONSENSUS**	**3.7**	**4.2**	**4.4**	**4.6**	**4.6**	**4.3**	**4.5**
	Top 10 Average	4.5	5.1	5.5	5.7	5.8	5.3	5.6
	Bottom 10 Average	3.0	3.2	3.4	3.5	3.6	3.3	3.5
12. Treasury Bond Yield, 30-Yr.	**CONSENSUS**	**4.3**	**4.7**	**4.9**	**5.1**	**5.1**	**4.8**	**5.0**
	Top 10 Average	5.1	5.7	6.0	6.2	6.2	5.8	6.1
	Bottom 10 Average	3.4	3.7	3.8	4.0	4.0	3.8	3.8
13. Corporate Aaa Bond Yield	**CONSENSUS**	**5.4**	**5.8**	**5.9**	**6.1**	**6.1**	**5.9**	**6.1**
	Top 10 Average	6.0	6.5	6.8	7.0	7.1	6.7	6.9
	Bottom 10 Average	4.8	5.0	5.1	5.2	5.2	5.0	5.3
13. Corporate Baa Bond Yield	**CONSENSUS**	**6.1**	**6.6**	**6.8**	**6.9**	**6.9**	**6.7**	**6.9**
	Top 10 Average	6.9	7.4	7.8	8.0	8.0	7.6	8.0
	Bottom 10 Average	5.4	5.7	5.7	5.8	5.8	5.7	5.9
14. State & Local Bonds Yield	**CONSENSUS**	**4.9**	**5.1**	**5.3**	**5.4**	**5.4**	**5.2**	**5.3**
	Top 10 Average	5.6	5.9	6.1	6.2	6.2	6.0	6.1
	Bottom 10 Average	4.2	4.4	4.4	4.5	4.5	4.4	4.6
15. Home Mortgage Rate	**CONSENSUS**	**5.4**	**5.8**	**6.0**	**6.1**	**6.1**	**5.9**	**6.0**
	Top 10 Average	6.0	6.6	7.0	7.1	7.1	6.8	6.9
	Bottom 10 Average	4.7	4.9	5.0	5.2	5.2	5.0	5.0
A. FRB - Major Currency Index	**CONSENSUS**	**90.0**	**89.8**	**89.1**	**88.5**	**88.1**	**89.1**	**87.9**
	Top 10 Average	93.7	93.8	93.4	92.9	92.7	93.3	92.4
	Bottom 10 Average	86.4	85.8	84.7	84.2	83.5	84.9	83.4
		Year-Over-Year, % Change					Five-Year Averages	
		2017	**2018**	**2019**	**2020**	**2021**	**2017-2021**	**2022-2026**
B. Real GDP	**CONSENSUS**	**2.6**	**2.5**	**2.4**	**2.4**	**2.4**	**2.5**	**2.3**
	Top 10 Average	3.0	2.9	2.8	2.8	2.8	2.9	2.7
	Bottom 10 Average	2.2	2.1	2.0	1.9	2.0	2.0	2.0
C. GDP Chained Price Index	**CONSENSUS**	**2.1**	**2.1**	**2.1**	**2.1**	**2.1**	**2.1**	**2.1**
	Top 10 Average	2.3	2.5	2.4	2.4	2.4	2.4	2.4
	Bottom 10 Average	1.8	1.8	1.9	1.9	1.8	1.8	1.9
D. Consumer Price Index	**CONSENSUS**	**2.4**	**2.4**	**2.3**	**2.3**	**2.3**	**2.3**	**2.3**
	Top 10 Average	2.7	2.7	2.7	2.6	2.5	2.6	2.5
	Bottom 10 Average	2.1	2.1	2.1	2.0	2.1	2.1	2.0

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Vol. 34, No. 7, July 1, 2015

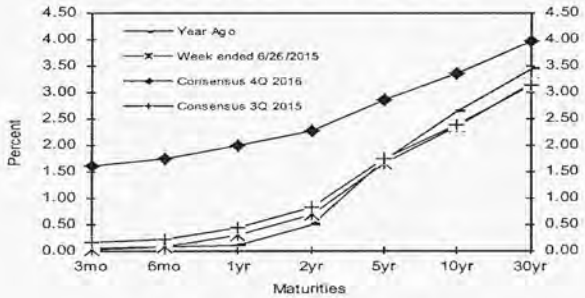
Wolters Kluwer

Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

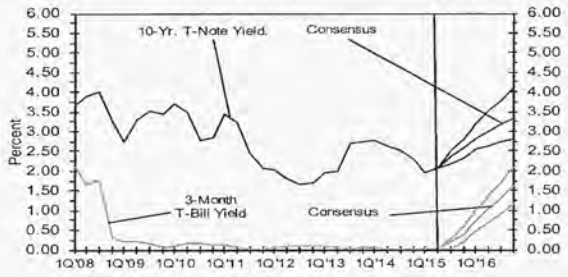
	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Q*	3Q	4Q	1Q	2Q	3Q	4Q
Interest Rates	June 26	June 19	June 12	June 5	May	Apr.	Mar.	2Q 2015	2015	2015	2016	2016	2016	2016
Federal Funds Rate	0.13	0.13	0.13	0.10	0.12	0.12	0.11	*0.11*	**0.2**	**0.5**	**0.8**	**1.1**	**1.4**	**1.7**
Prime Rate	3.25	3.25	3.25	3.25	3.25	3.25	3.25	*3.25*	**3.3**	**3.5**	**3.8**	**4.1**	**4.4**	**4.7**
LIBOR, 3-mo.	0.28	0.28	0.28	0.28	0.28	0.28	0.26	*0.27*	**0.4**	**0.7**	**1.0**	**1.3**	**1.7**	**2.0**
Commercial Paper, 1-mo.	0.11	0.01	0.02	0.02	0.02	0.07	0.08	*0.07*	**0.2**	**0.5**	**0.8**	**1.2**	**1.5**	**1.8**
Treasury bill, 3-mo.	0.01	0.01	0.02	0.02	0.02	0.02	0.03	*0.02*	**0.1**	**0.4**	**0.7**	**1.0**	**1.3**	**1.6**
Treasury bill, 6-mo.	0.08	0.09	0.09	0.07	0.08	0.09	0.11	*0.08*	**0.2**	**0.5**	**0.8**	**1.1**	**1.5**	**1.8**
Treasury bill, 1 yr.	0.28	0.27	0.28	0.27	0.24	0.23	0.25	*0.23*	**0.4**	**0.7**	**1.1**	**1.4**	**1.7**	**2.0**
Treasury note, 2 yr.	0.67	0.68	0.73	0.67	0.61	0.54	0.64	*0.62*	**0.8**	**1.1**	**1.4**	**1.7**	**2.0**	**2.3**
Treasury note, 5 yr.	1.66	1.65	1.75	1.65	1.54	1.35	1.52	*1.54*	**1.7**	**2.0**	**2.2**	**2.4**	**2.7**	**2.9**
Treasury note, 10 yr.	2.36	2.32	2.42	2.31	2.20	1.94	2.04	*2.07*	**2.4**	**2.6**	**2.8**	**3.0**	**3.2**	**3.4**
Treasury note, 30 yr.	3.14	3.09	3.14	3.04	2.96	2.59	2.63	*2.71*	**3.1**	**3.3**	**3.5**	**3.7**	**3.8**	**4.0**
Corporate Aaa bond	4.22	4.17	4.20	4.13	3.98	3.52	3.64	*3.75*	**4.1**	**4.3**	**4.5**	**4.7**	**4.9**	**5.1**
Corporate Baa bond	5.17	5.10	5.13	5.04	4.89	4.48	4.54	*4.69*	**5.0**	**5.1**	**5.3**	**5.5**	**5.7**	**5.9**
State & Local bonds	3.80	3.79	3.87	3.81	3.76	3.51	3.59	*3.60*	**3.9**	**4.1**	**4.3**	**4.4**	**4.6**	**4.7**
Home mortgage rate	4.02	4.00	4.04	3.87	3.84	3.67	3.77	*3.80*	**4.0**	**4.3**	**4.5**	**4.7**	**4.9**	**5.1**
	History								Consensus Forecasts-Quarterly					
	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q*	3Q	4Q	1Q	2Q	3Q	4Q
Key Assumptions	2013	2013	2014	2014	2014	2014	2015	*2015*	**2015**	**2015**	**2016**	**2016**	**2016**	**2016**
Major Currency Index	76.7	76.0	77.1	76.6	77.8	82.6	89.4	*89.9*	**90.5**	**91.0**	**91.2**	**91.3**	**91.1**	**90.7**
Real GDP	4.5	3.5	-2.1	4.6	5.0	2.2	-0.2	*2.9*	**3.2**	**3.1**	**2.6**	**2.8**	**2.8**	**2.7**
GDP Price Index	1.7	1.5	1.3	2.1	1.4	0.1	0.0	*1.8*	**1.8**	**1.8**	**1.9**	**2.0**	**2.0**	**2.1**
Consumer Price Index	2.3	1.4	2.1	2.4	1.2	-0.9	-3.1	*2.4*	**2.2**	**2.0**	**2.1**	**2.3**	**2.4**	**2.4**

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data for interest rates except LIBOR is from Federal Reserve Release (FRSR) H.15. LIBOR quotes available from *The Wall Street Journal*. Interest rate definitions are same as those in FRSR H.15. Treasury yields are reported on a constant maturity basis. Historical data for Fed's Major Currency Index is from FRSR H.10 and G.5. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS). **Interest rate data for 2Q 2015 based on historical data through the week ended June 26th. *Data for 2Q 2015 Major Currency Index is based on data through week ended June 26th. Figures for 2Q 2015 Real GDP, GDP Chained Price Index and Consumer Price Index are consensus forecasts based on a special question asked of the panelists' this month*

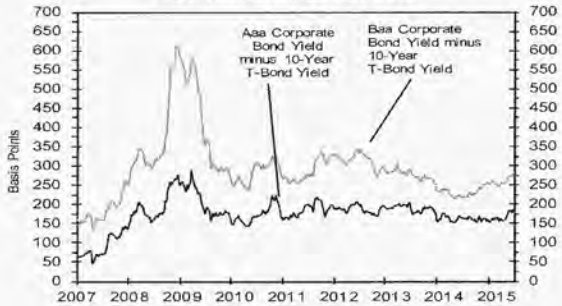
U.S. Treasury Yield Curve
Week ended June 26, 2015 and Year Ago vs.
3Q 2015 and 4Q 2016 Consensus Forecasts



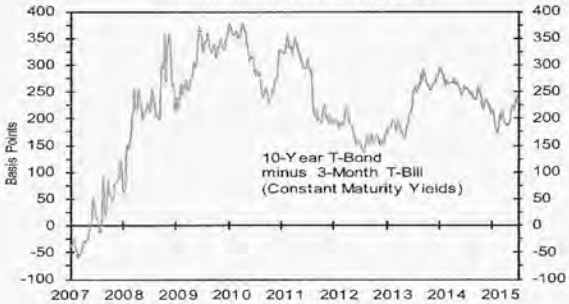
U.S. 3-Mo. T-Bills & 10-Yr. T-Note Yield
(Quarterly Average)



Corporate Bond Spreads
As of week ended June 26, 2015



U.S. Treasury Yield Curve
As of week ended June 26, 2015



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Vol. 34, No. 8, August 1, 2015

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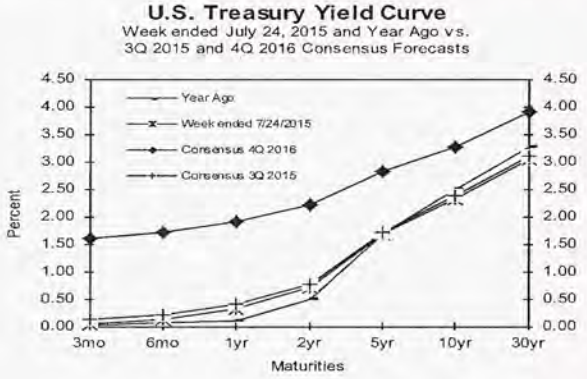
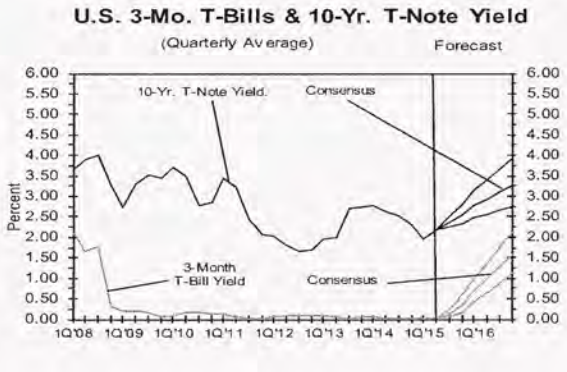
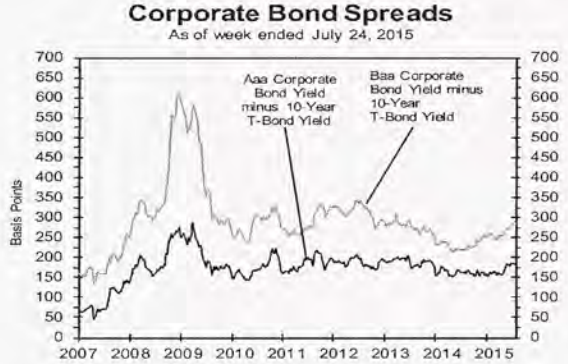
Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Q	3Q	4Q	1Q	2Q	3Q	4Q
Interest Rates	July 24	July 17	July 10	July 3	Jun.	May	Apr.	2Q 2015	2015	2015	2016	2016	2016	2016
Federal Funds Rate	0.13	0.13	0.13	0.12	0.13	0.12	0.12	0.12	0.2	0.5	0.7	1.0	1.3	1.6
Prime Rate	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.3	3.5	3.8	4.1	4.4	4.7
LIBOR, 3-mo.	0.30	0.30	0.29	0.28	0.28	0.28	0.28	0.28	0.4	0.6	1.0	1.3	1.6	1.9
Commercial Paper, 1-mo.	0.08	0.08	0.09	0.09	0.09	0.02	0.07	0.06	0.2	0.4	0.8	1.1	1.5	1.8
Treasury bill, 3-mo.	0.04	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.1	0.4	0.7	1.0	1.3	1.6
Treasury bill, 6-mo.	0.13	0.10	0.08	0.11	0.09	0.08	0.09	0.09	0.2	0.5	0.8	1.1	1.4	1.7
Treasury bill, 1 yr.	0.33	0.28	0.26	0.27	0.28	0.24	0.23	0.25	0.4	0.7	1.0	1.3	1.6	1.9
Treasury note, 2 yr.	0.72	0.67	0.60	0.65	0.69	0.61	0.54	0.61	0.8	1.1	1.4	1.7	1.9	2.2
Treasury note, 5 yr.	1.68	1.67	1.57	1.65	1.68	1.54	1.35	1.52	1.7	1.9	2.2	2.4	2.6	2.8
Treasury note, 10 yr.	2.32	2.38	2.31	2.38	2.36	2.20	1.94	2.17	2.4	2.6	2.8	2.9	3.1	3.3
Treasury note, 30 yr.	3.03	3.15	3.08	3.15	3.11	2.96	2.59	2.89	3.1	3.3	3.4	3.6	3.8	3.9
Corporate Aaa bond	4.13	4.22	4.15	4.23	4.19	3.98	3.52	3.90	4.1	4.3	4.5	4.7	4.8	5.0
Corporate Baa bond	5.18	5.27	5.17	5.22	5.13	4.89	4.48	4.83	5.1	5.2	5.4	5.5	5.7	5.8
State & Local bonds	3.75	3.82	3.76	3.85	3.82	3.76	3.51	3.70	3.8	4.0	4.2	4.4	4.5	4.6
Home mortgage rate	4.04	4.09	4.04	4.08	3.98	3.84	3.67	3.83	4.1	4.3	4.5	4.7	4.9	5.1
	History								Consensus Forecasts-Quarterly					
	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Key Assumptions	2013	2013	2014	2014	2014	2014	2015	2015	2015	2015	2016	2016	2016	2016
Major Currency Index	76.7	76.0	77.1	76.6	77.8	82.6	89.4	89.9	91.4	92.3	92.6	92.6	92.6	92.4
Real GDP	3.0	3.8	-0.9	4.6	4.3	2.1	0.6	2.3	3.1	3.0	2.6	2.7	2.7	2.7
GDP Price Index	2.0	1.8	1.5	2.2	1.6	0.1	0.1	2.0	1.8	1.7	1.9	2.0	2.0	2.1
Consumer Price Index	2.3	1.4	2.1	2.4	1.2	-0.9	-3.1	3.0	2.0	1.9	2.1	2.3	2.4	2.4

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data for interest rates except LIBOR is from Federal Reserve Release (FRSR) H.15. LIBOR quotes available from *The Wall Street Journal*. Interest rate definitions are same as those in FRSR H.15. Treasury yields are reported on a constant maturity basis. Historical data for Fed's Major Currency Index is from FRSR H.10 and G.5. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS).







Blue Chip Financial Forecasts®

Top Analysts' Forecasts Of U.S. And Foreign Interest Rates, Currency Values And The Factors That Influence Them

Vol. 34, No. 9, September 1, 2015

Wolters Kluwer

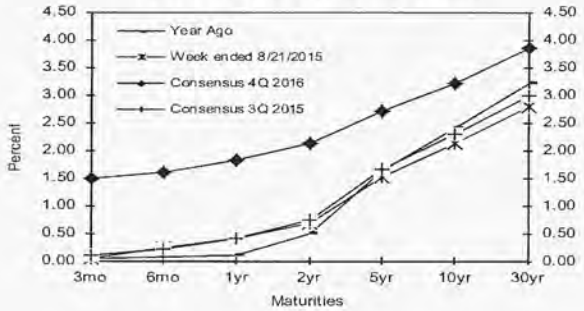
Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Q	3Q	4Q	1Q	2Q	3Q	4Q
Interest Rates	Aug. 21	Aug. 14	Aug. 7	July 31	Jun.	May	Apr.	2Q 2015	2015	2015	2016	2016	2016	2016
Federal Funds Rate	0.15	0.14	0.11	0.13	0.13	0.13	0.12	0.12	0.2	0.4	0.7	0.9	1.2	1.5
Prime Rate	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.3	3.4	3.7	4.0	4.2	4.5
LIBOR, 3-mo.	0.33	0.33	0.32	0.32	0.29	0.28	0.28	0.28	0.4	0.6	0.9	1.2	1.5	1.8
Commercial Paper, 1-mo.	0.11	0.10	0.08	0.08	0.08	0.09	0.02	0.06	0.2	0.4	0.7	1.0	1.3	1.7
Treasury bill, 3-mo.	0.05	0.10	0.07	0.06	0.03	0.02	0.02	0.02	0.1	0.4	0.6	0.9	1.2	1.5
Treasury bill, 6-mo.	0.23	0.24	0.19	0.14	0.12	0.09	0.08	0.09	0.2	0.4	0.7	1.0	1.3	1.6
Treasury bill, 1 yr.	0.39	0.39	0.36	0.33	0.30	0.28	0.24	0.25	0.4	0.6	0.9	1.2	1.5	1.8
Treasury note, 2 yr.	0.69	0.71	0.72	0.69	0.67	0.69	0.61	0.61	0.7	1.0	1.3	1.6	1.9	2.1
Treasury note, 5 yr.	1.52	1.57	1.60	1.59	1.63	1.68	1.54	1.52	1.6	1.8	2.1	2.3	2.5	2.7
Treasury note, 10 yr.	2.12	2.18	2.22	2.25	2.32	2.36	2.20	2.17	2.3	2.5	2.6	2.8	3.0	3.2
Treasury note, 30 yr.	2.80	2.85	2.89	2.95	3.07	3.11	2.96	2.89	3.0	3.1	3.3	3.5	3.7	3.8
Corporate Aaa bond	3.99	4.02	4.02	4.06	4.15	4.19	3.98	3.90	4.1	4.2	4.4	4.6	4.7	4.9
Corporate Baa bond	5.16	5.14	5.12	5.16	5.20	5.13	4.89	4.83	5.1	5.2	5.4	5.5	5.7	5.8
State & Local bonds	3.73	3.69	3.75	3.75	3.79	3.82	3.76	3.70	3.8	3.9	4.1	4.2	4.4	4.5
Home mortgage rate	3.93	3.94	3.91	3.98	4.05	3.98	3.84	3.83	4.0	4.2	4.4	4.6	4.8	5.0
	History								Consensus Forecasts-Quarterly					
	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Key Assumptions	2013	2013	2014	2014	2014	2014	2015	2015	2015	2015	2016	2016	2016	2016
Major Currency Index	76.7	76.0	77.1	76.6	77.8	82.6	89.4	89.9	91.5	92.5	92.8	93.0	93.1	93.2
Real GDP	3.0	3.8	-0.9	4.6	4.3	2.1	0.6	3.7	2.7	2.8	2.7	2.8	2.7	2.6
GDP Price Index	2.0	1.8	1.5	2.2	1.6	0.1	0.1	2.1	1.7	1.6	1.9	2.0	2.0	2.1
Consumer Price Index	2.3	1.4	2.1	2.4	1.2	-0.9	-3.1	3.0	1.8	1.4	2.0	2.3	2.3	2.3

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data for interest rates except LIBOR is from Federal Reserve Release (FRSR) H.15. LIBOR quotes available from *The Wall Street Journal*. Interest rate definitions are same as those in FRSR H.15. Treasury yields are reported on a constant maturity basis. Historical data for Fed's Major Currency Index is from FRSR H.10 and G.5. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS).

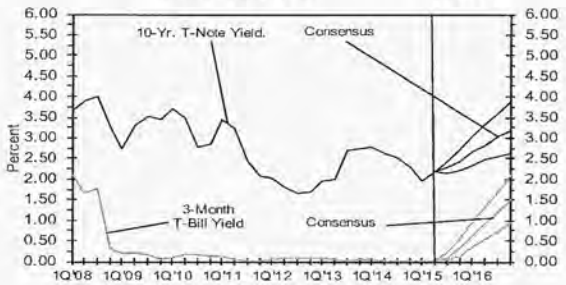
U.S. Treasury Yield Curve

Week ended August 21, 2015 and Year Ago vs. 3Q 2015 and 4Q 2016 Consensus Forecasts



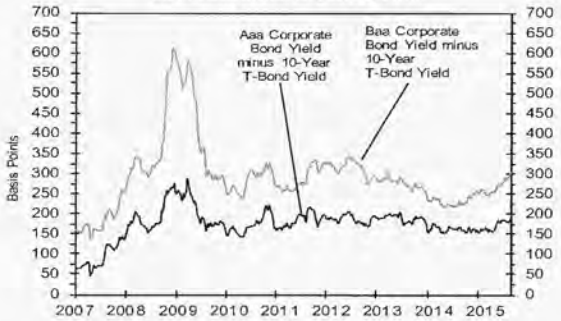
U.S. 3-Mo. T-Bills & 10-Yr. T-Note Yield

(Quarterly Average)



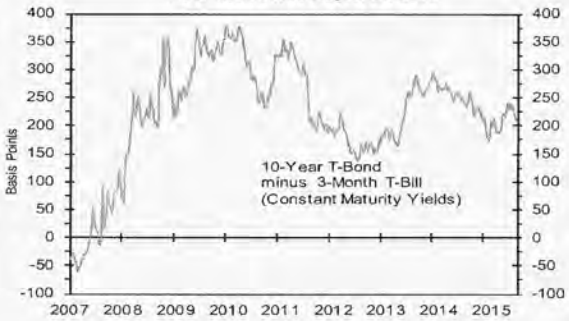
Corporate Bond Spreads

As of week ended August 21, 2015



U.S. Treasury Yield Curve

As of week ended August 21, 2015



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Vol. 34, No. 10, October 1, 2015

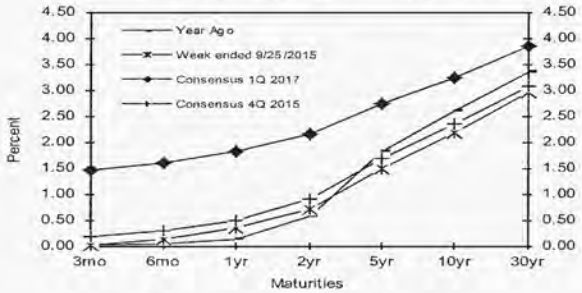
Wolters Kluwer

Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

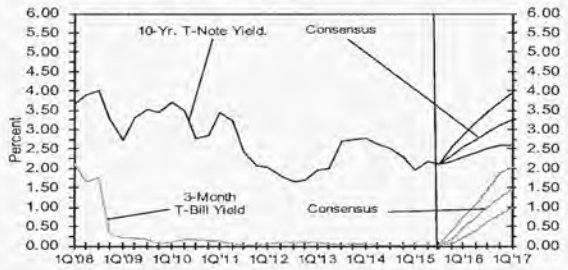
	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Q*	4Q	1Q	2Q	3Q	4Q	1Q
Interest Rates	Sep. 25	Sep. 18	Sep. 11	Sep. 4	Aug.	Jul.	Jun.	3Q 2015	2015	2015	2016	2016	2016	2017
Federal Funds Rate	0.14	0.14	0.14	0.13	0.14	0.13	0.13	*0.13*	0.2	0.5	0.8	1.1	1.3	1.6
Prime Rate	3.25	3.25	3.25	3.25	3.25	3.25	3.25	*3.25*	3.3	3.6	3.8	4.1	4.4	4.6
LIBOR, 3-mo.	0.33	0.34	0.33	0.33	0.32	0.29	0.28	*0.30*	0.5	0.7	1.0	1.3	1.6	1.9
Commercial Paper, 1-mo.	0.13	0.15	0.14	0.12	0.10	0.08	0.09	*0.08*	0.3	0.6	0.8	1.1	1.4	1.8
Treasury bill, 3-mo.	0.01	0.02	0.04	0.04	0.07	0.03	0.02	*0.02*	0.2	0.4	0.7	1.0	1.3	1.5
Treasury bill, 6-mo.	0.11	0.21	0.26	0.25	0.22	0.12	0.09	*0.12*	0.3	0.5	0.8	1.1	1.4	1.6
Treasury bill, 1 yr.	0.36	0.41	0.39	0.37	0.38	0.30	0.28	*0.29*	0.5	0.8	1.1	1.3	1.6	1.8
Treasury note, 2 yr.	0.70	0.75	0.74	0.72	0.70	0.67	0.69	*0.63*	0.9	1.2	1.4	1.7	1.9	2.2
Treasury note, 5 yr.	1.47	1.54	1.53	1.50	1.54	1.63	1.68	*1.47*	1.7	1.9	2.1	2.3	2.6	2.7
Treasury note, 10 yr.	2.17	2.22	2.21	2.18	2.17	2.32	2.36	*2.11*	2.3	2.5	2.7	2.9	3.1	3.2
Treasury note, 30 yr.	2.97	3.01	2.97	2.94	2.86	3.07	3.11	*2.84*	3.1	3.2	3.4	3.6	3.7	3.9
Corporate Aaa bond	4.04	4.10	4.09	4.12	4.04	4.15	4.19	*3.86*	4.2	4.4	4.5	4.7	4.9	5.0
Corporate Baa bond	5.33	5.37	5.33	5.34	5.19	5.20	5.13	*4.90*	5.2	5.4	5.5	5.7	5.8	6.0
State & Local bonds	3.71	3.78	3.82	3.82	3.74	3.79	3.82	*3.68*	3.8	4.0	4.2	4.3	4.5	4.6
Home mortgage rate	3.86	3.91	3.90	3.89	3.91	4.05	3.98	*3.80*	4.0	4.3	4.5	4.7	4.9	5.0
	History								Consensus Forecasts-Quarterly					
	4Q	1Q	2Q	3Q	4Q	1Q	2Q	*3Q**	4Q	1Q	2Q	3Q	4Q	1Q
Key Assumptions	2013	2014	2014	2014	2014	2015	2015	*2015*	2015	2015	2016	2016	2016	2017
Major Currency Index	76.0	77.1	76.6	77.8	82.6	89.4	89.9	*91.56*	92.4	92.9	93.1	93.1	92.9	92.1
Real GDP	3.8	-0.9	4.6	4.3	2.1	0.6	3.9	*2.4*	2.8	2.6	2.7	2.7	2.6	2.5
GDP Price Index	1.8	1.5	2.2	1.6	0.1	0.1	2.1	*1.6*	1.5	1.8	1.9	2.0	2.0	2.1
Consumer Price Index	1.4	2.1	2.4	1.2	-0.9	-3.1	3.0	*1.4*	1.3	2.0	2.1	2.3	2.4	2.3

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data for interest rates except LIBOR is from Federal Reserve Release (FRSR) H.15. LIBOR quotes available from *The Wall Street Journal*. Interest rate definitions are same as those in FRSR H.15. Treasury yields are reported on a constant maturity basis. Historical data for Fed's Major Currency Index is from FRSR H.10 and G.5. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS). **Interest rate data for 3Q 2015 based on historical data through the week ended September 25th. *Data for 3Q 2015 Major Currency Index is based on data through week ended September18th. Figures for 3Q 2015 Real GDP, GDP Chained Price Index and Consumer Price Index are consensus forecasts based on a special question asked of the panelists' this month*

U.S. Treasury Yield Curve
Week ended September 25, 2015 and Year Ago vs.
4Q 2015 and 1Q 2017 Consensus Forecasts

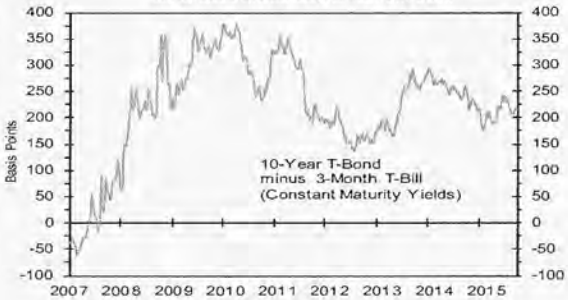


U.S. 3-Mo. T-Bills & 10-Yr. T-Note Yield
(Quarterly Average) Forecast



Corporate Bond Spreads
As of week ended September 25, 2015

U.S. Treasury Yield Curve
As of week ended September 25, 2015



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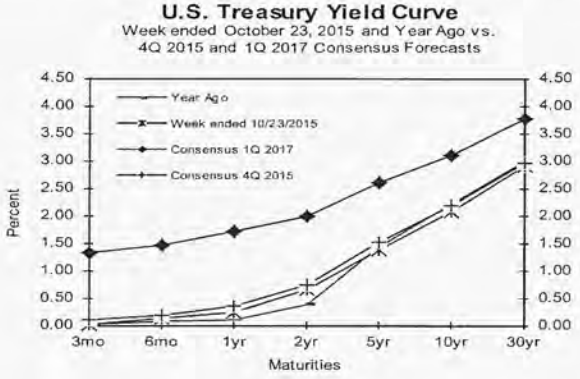
Vol. 34, No. 11, November 1, 2015

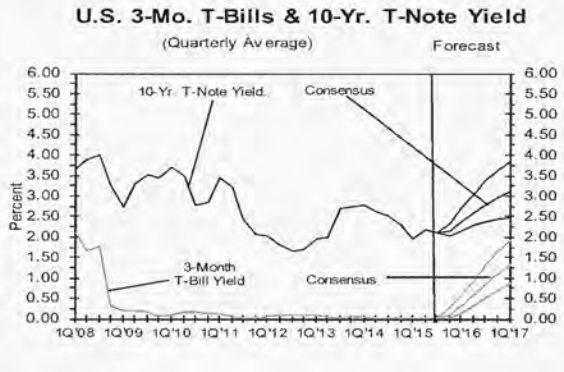
Wolters Kluwer

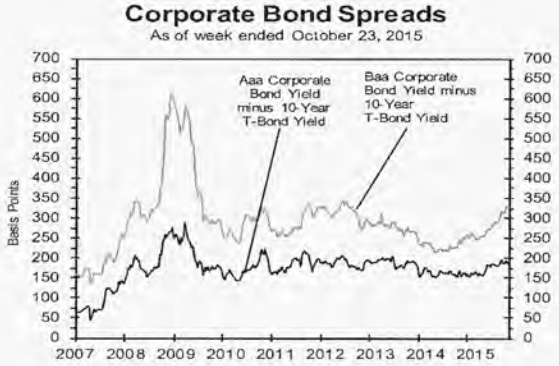
Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

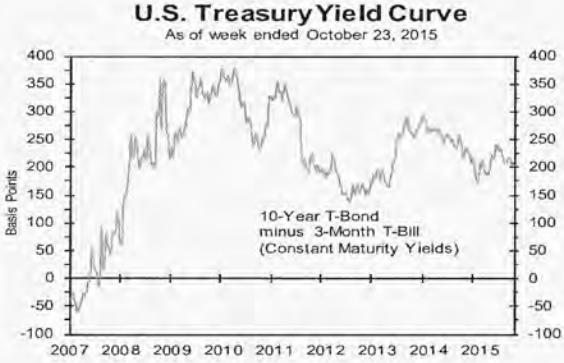
	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Q	4Q	1Q	2Q	3Q	4Q	1Q
Interest Rates	Oct. 23	Oct. 16	Oct. 9	Oct. 2	Sep.	Aug.	Jul.	3Q 2015	2015	2016	2016	2016	2016	2017
Federal Funds Rate	0.13	0.13	0.13	0.12	0.14	0.14	0.13	0.13	0.2	0.4	0.6	0.9	1.2	1.4
Prime Rate	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.3	3.5	3.7	3.9	4.2	4.4
LIBOR, 3-mo.	0.32	0.32	0.32	0.32	0.32	0.32	0.29	0.30	0.4	0.6	0.9	1.2	1.4	1.7
Commercial Paper, 1-mo.	0.12	0.11	0.11	0.11	0.13	0.10	0.08	0.08	0.2	0.4	0.7	0.9	1.2	1.5
Treasury bill, 3-mo.	0.01	0.01	0.00	0.00	0.02	0.07	0.03	0.02	0.1	0.3	0.6	0.8	1.1	1.3
Treasury bill, 6-mo.	0.12	0.08	0.07	0.08	0.18	0.22	0.12	0.12	0.2	0.4	0.7	1.0	1.2	1.5
Treasury bill, 1 yr.	0.23	0.23	0.27	0.31	0.37	0.38	0.30	0.29	0.4	0.6	0.9	1.2	1.5	1.7
Treasury note, 2 yr.	0.64	0.61	0.63	0.63	0.71	0.70	0.67	0.63	0.7	1.0	1.3	1.5	1.8	2.0
Treasury note, 5 yr.	1.38	1.34	1.37	1.36	1.49	1.54	1.63	1.47	1.5	1.8	2.0	2.2	2.4	2.6
Treasury note, 10 yr.	2.06	2.03	2.09	2.05	2.17	2.17	2.32	2.11	2.2	2.4	2.6	2.8	3.0	3.1
Treasury note, 30 yr.	2.89	2.87	2.91	2.85	2.95	2.86	3.07	2.84	2.9	3.1	3.3	3.5	3.6	3.8
Corporate Aaa bond	3.92	3.92	4.01	3.98	4.07	4.04	4.15	3.86	4.0	4.2	4.4	4.6	4.7	4.9
Corporate Baa bond	5.33	5.32	5.38	5.33	5.34	5.19	5.20	4.90	5.2	5.3	5.4	5.6	5.7	5.8
State & Local bonds	3.67	3.68	3.68	3.67	3.78	3.74	3.79	3.68	3.7	3.9	4.1	4.2	4.4	4.5
Home mortgage rate	3.79	3.82	3.76	3.85	3.89	3.91	4.05	3.80	3.9	4.1	4.3	4.5	4.7	4.9
	History								Consensus Forecasts-Quarterly					
	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q
Key Assumptions	2013	2014	2014	2014	2014	2015	2015	2015	2015	2016	2016	2016	2016	2017
Major Currency Index	76.0	77.1	76.6	77.8	82.6	89.4	89.9	91.8	91.7	91.9	92.3	92.2	91.8	90.7
Real GDP	3.8	-0.9	4.6	4.3	2.1	0.6	3.9	1.5	2.6	2.5	2.7	2.6	2.6	2.5
GDP Price Index	1.8	1.5	2.2	1.6	0.1	0.1	2.1	1.2	1.4	1.8	1.9	2.0	2.0	2.1
Consumer Price Index	1.4	2.1	2.4	1.2	-0.9	-3.1	3.0	1.6	1.0	1.9	2.3	2.2	2.3	2.3

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data for interest rates except LIBOR is from Federal Reserve Release (FRSR) H.15. LIBOR quotes available from *The Wall Street Journal*. Interest rate definitions are same as those in FRSR H.15. Treasury yields are reported on a constant maturity basis. Historical data for Fed's Major Currency Index is from FRSR H.10 and G.5. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS).









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Vol. 34, No. 12, December 1, 2015

Wolters Kluwer

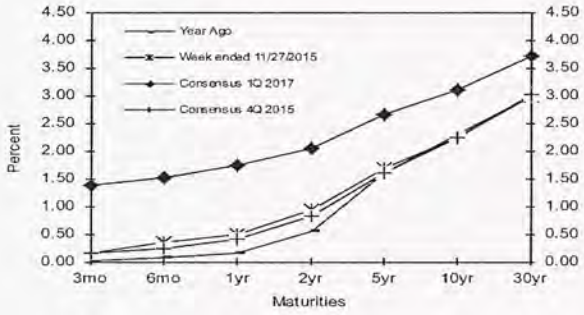
Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Q	4Q	1Q	2Q	3Q	4Q	1Q
Interest Rates	Nov. 27	Nov. 20	Nov. 13	Nov. 6	Oct.	Sep.	Aug.	3Q 2015	2015	2016	2016	2016	2016	2017
Federal Funds Rate	0.12	0.12	0.12	0.10	0.12	0.14	0.14	0.13	0.2	0.5	0.7	0.9	1.2	1.4
Prime Rate	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.3	3.5	3.7	4.0	4.2	4.5
LIBOR, 3-mo.	0.39	0.36	0.35	0.35	0.34	0.32	0.32	0.30	0.4	0.7	0.9	1.2	1.4	1.7
Commercial Paper, 1-mo.	0.12	0.10	0.10	0.10	0.11	0.13	0.10	0.08	0.2	0.4	0.7	1.0	1.2	1.5
Treasury bill, 3-mo.	0.14	0.13	0.14	0.06	0.02	0.02	0.07	0.02	0.1	0.4	0.6	0.9	1.1	1.4
Treasury bill, 6-mo.	0.34	0.32	0.34	0.28	0.11	0.18	0.22	0.12	0.2	0.5	0.7	1.0	1.3	1.5
Treasury bill, 1 yr.	0.50	0.49	0.50	0.41	0.26	0.37	0.38	0.29	0.4	0.7	1.0	1.3	1.5	1.7
Treasury note, 2 yr.	0.93	0.90	0.88	0.83	0.64	0.71	0.70	0.63	0.8	1.1	1.3	1.6	1.8	2.0
Treasury note, 5 yr.	1.68	1.68	1.72	1.64	1.39	1.49	1.54	1.47	1.6	1.9	2.0	2.3	2.4	2.6
Treasury note, 10 yr.	2.24	2.26	2.32	2.26	2.07	2.17	2.17	2.11	2.2	2.4	2.6	2.8	3.0	3.1
Treasury note, 30 yr.	3.00	3.03	3.09	3.01	2.89	2.95	2.86	2.84	3.0	3.2	3.3	3.5	3.6	3.7
Corporate Aaa bond	4.03	4.07	4.11	4.05	3.95	4.07	4.04	3.86	4.0	4.2	4.4	4.6	4.8	4.9
Corporate Baa bond	5.45	5.47	5.50	5.43	5.34	5.34	5.19	4.90	5.3	5.4	5.5	5.7	5.8	5.9
State & Local bonds	3.65	3.65	3.74	3.69	3.67	3.78	3.74	3.68	3.7	3.9	4.1	4.3	4.4	4.5
Home mortgage rate	3.95	3.97	3.98	3.87	3.80	3.89	3.91	3.80	4.0	4.2	4.4	4.6	4.7	4.9
	History								Consensus Forecasts-Quarterly					
	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q
Key Assumptions	2013	2014	2014	2014	2014	2015	2015	2015	2015	2016	2016	2016	2016	2017
Major Currency Index	76.0	77.1	76.6	77.8	82.6	89.4	89.9	91.8	92.8	93.4	93.9	94.0	93.9	93.2
Real GDP	3.8	-0.9	4.6	4.3	2.1	0.6	3.9	2.1	2.5	2.5	2.7	2.6	2.6	2.5
GDP Price Index	1.8	1.5	2.2	1.6	0.1	0.1	2.1	1.3	1.3	1.8	2.0	2.0	2.0	2.1
Consumer Price Index	1.4	2.1	2.4	1.2	-0.9	-3.1	3.0	1.6	0.8	1.7	2.3	2.2	2.4	2.2

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data for interest rates except LIBOR is from Federal Reserve Release (FRSR) H.15. LIBOR quotes available from *The Wall Street Journal*. Interest rate definitions are same as those in FRSR H.15. Treasury yields are reported on a constant maturity basis. Historical data for Fed's Major Currency Index is from FRSR H.10 and G.5. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS).

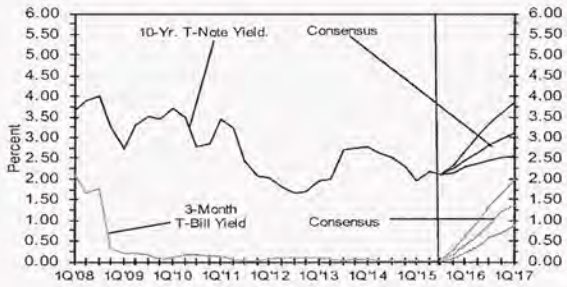
U.S. Treasury Yield Curve

Week ended November 27, 2015 and Year Ago vs. 4Q 2015 and 1Q 2017 Consensus Forecasts



U.S. 3-Mo. T-Bills & 10-Yr. T-Note Yield

(Quarterly Average) Forecast

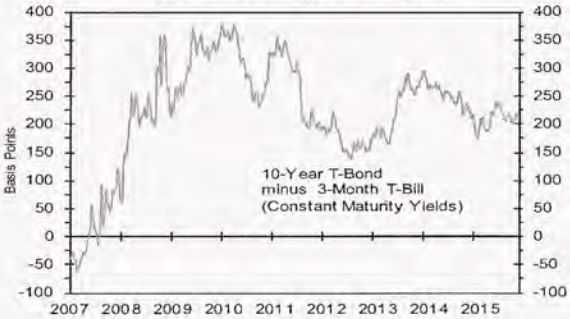


Corporate Bond Spreads

As of week ended November 27, 2015

U.S. Treasury Yield Curve

As of week ended November 27, 2015



Blue Chip Financial Forecasts®

Top Analysts' Forecasts Of U.S. And Foreign Interest Rates, Currency Values And The Factors That Influence Them

Vol. 34, No. 12, December 1, 2015

Wolters Kluwer

Long-Range Estimates:

The table below contains the results of our twice-annual long-range CONSENSUS survey. There are also Top 10 and Bottom 10 averages for each variable. Shown are consensus estimates for the years 2017 through 2021 and averages for the five-year periods 2017-2021 and 2022-2026. Apply these projections cautiously. Few if any economic, demographic and political forces can be evaluated accurately over such long time spans.

		Average For The Year					Five-Year Averages	
Interest Rates		**2017**	**2018**	**2019**	**2020**	**2021**	**2017-2021**	**2022-2026**
1. Federal Funds Rate	**CONSENSUS**	**2.0**	**2.8**	**3.2**	**3.3**	**3.4**	**2.9**	**3.3**
	Top 10 Average	2.7	3.6	4.0	4.0	4.0	3.7	3.8
	Bottom 10 Average	1.4	2.1	2.3	2.4	2.7	2.2	2.7
2. Prime Rate	**CONSENSUS**	**5.0**	**5.8**	**6.2**	**6.4**	**6.4**	**6.0**	**6.3**
	Top 10 Average	5.7	6.5	7.0	7.1	7.0	6.7	6.8
	Bottom 10 Average	4.4	5.2	5.5	5.7	5.8	5.3	5.7
3. LIBOR, 3-Mo.	**CONSENSUS**	**2.3**	**3.1**	**3.3**	**3.4**	**3.6**	**3.1**	**3.5**
	Top 10 Average	2.8	3.7	4.0	4.2	4.1	3.8	4.0
	Bottom 10 Average	1.8	2.4	2.6	2.7	3.0	2.5	3.0
4. Commercial Paper, 1-Mo.	**CONSENSUS**	**2.2**	**3.0**	**3.4**	**3.5**	**3.4**	**3.1**	**3.4**
	Top 10 Average	2.6	3.5	3.9	4.1	4.0	3.6	3.8
	Bottom 10 Average	1.7	2.4	2.9	2.9	2.9	2.6	2.9
5. Treasury Bill Yield, 3-Mo.	**CONSENSUS**	**2.0**	**2.8**	**3.2**	**3.3**	**3.3**	**2.9**	**3.2**
	Top 10 Average	2.8	3.5	3.9	4.0	3.9	3.6	3.7
	Bottom 10 Average	1.4	2.1	2.5	2.7	2.7	2.3	2.6
6. Treasury Bill Yield, 6-Mo.	**CONSENSUS**	**2.1**	**2.9**	**3.3**	**3.4**	**3.4**	**3.0**	**3.3**
	Top 10 Average	3.0	3.6	4.0	4.1	4.0	3.7	3.8
	Bottom 10 Average	1.5	2.2	2.6	2.8	2.8	2.4	2.7
7. Treasury Bill Yield, 1-Yr.	**CONSENSUS**	**2.3**	**3.1**	**3.4**	**3.5**	**3.5**	**3.2**	**3.4**
	Top 10 Average	3.2	3.8	4.1	4.2	4.2	3.9	4.0
	Bottom 10 Average	1.6	2.3	2.7	2.9	2.9	2.5	2.8
8. Treasury Note Yield, 2-Yr.	**CONSENSUS**	**2.5**	**3.2**	**3.5**	**3.6**	**3.7**	**3.3**	**3.7**
	Top 10 Average	3.4	4.0	4.4	4.4	4.4	4.1	4.3
	Bottom 10 Average	1.8	2.4	2.6	2.7	3.0	2.5	3.0
10. Treasury Note Yield, 5-Yr.	**CONSENSUS**	**3.0**	**3.6**	**3.8**	**3.9**	**4.0**	**3.6**	**4.0**
	Top 10 Average	3.8	4.4	4.7	4.8	4.8	4.5	4.7
	Bottom 10 Average	2.3	2.7	2.8	2.9	3.2	2.8	3.3
11. Treasury Note Yield, 10-Yr.	**CONSENSUS**	**3.4**	**3.8**	**4.1**	**4.2**	**4.3**	**4.0**	**4.3**
	Top 10 Average	4.2	4.7	5.0	5.2	5.2	4.9	5.1
	Bottom 10 Average	2.8	2.9	3.0	3.2	3.5	3.1	3.5
12. Treasury Bond Yield, 30-Yr.	**CONSENSUS**	**4.0**	**4.4**	**4.6**	**4.8**	**4.9**	**4.5**	**4.8**
	Top 10 Average	4.9	5.3	5.7	5.9	5.9	5.5	5.7
	Bottom 10 Average	3.3	3.6	3.5	3.7	3.9	3.6	3.9
13. Corporate Aaa Bond Yield	**CONSENSUS**	**5.1**	**5.5**	**5.7**	**5.8**	**5.8**	**5.6**	**5.8**
	Top 10 Average	5.7	6.2	6.5	6.6	6.6	6.3	6.5
	Bottom 10 Average	4.5	4.9	5.0	5.0	4.9	4.9	5.2
13. Corporate Baa Bond Yield	**CONSENSUS**	**6.0**	**6.5**	**6.7**	**6.8**	**6.7**	**6.5**	**6.8**
	Top 10 Average	6.8	7.2	7.6	7.7	7.6	7.4	7.5
	Bottom 10 Average	5.2	5.7	5.9	6.0	5.8	5.7	6.0
14. State & Local Bonds Yield	**CONSENSUS**	**4.5**	**4.9**	**5.0**	**5.1**	**5.1**	**4.9**	**5.1**
	Top 10 Average	5.0	5.5	5.7	5.8	5.8	5.6	5.8
	Bottom 10 Average	4.0	4.3	4.3	4.4	4.4	4.3	4.4
15. Home Mortgage Rate	**CONSENSUS**	**5.1**	**5.6**	**5.8**	**5.9**	**6.0**	**5.7**	**6.0**
	Top 10 Average	5.8	6.3	6.7	6.8	6.8	6.5	6.7
	Bottom 10 Average	4.4	4.8	4.9	5.0	5.1	4.9	5.2
A. FRB - Major Currency Index	**CONSENSUS**	**92.8**	**91.7**	**91.2**	**90.8**	**91.1**	**91.5**	**90.1**
	Top 10 Average	96.9	96.6	96.4	96.4	96.4	96.5	96.0
	Bottom 10 Average	88.4	86.6	85.7	85.1	85.7	86.3	84.2
		Year-Over-Year, % Change					Five-Year Averages	
		2017	**2018**	**2019**	**2020**	**2021**	**2017-2021**	**2022-2026**
B. Real GDP	**CONSENSUS**	**2.5**	**2.4**	**2.2**	**2.2**	**2.3**	**2.3**	**2.2**
	Top 10 Average	2.9	2.8	2.6	2.6	2.6	2.7	2.5
	Bottom 10 Average	2.2	1.8	1.8	1.9	1.9	1.9	2.0
C. GDP Chained Price Index	**CONSENSUS**	**2.1**	**2.1**	**2.1**	**2.1**	**2.1**	**2.1**	**2.0**
	Top 10 Average	2.3	2.5	2.4	2.3	2.2	2.3	2.2
	Bottom 10 Average	1.8	1.8	1.9	1.9	1.9	1.9	1.9
D. Consumer Price Index	**CONSENSUS**	**2.3**	**2.4**	**2.3**	**2.3**	**2.3**	**2.3**	**2.2**
	Top 10 Average	2.8	2.8	2.7	2.6	2.5	2.7	2.5
	Bottom 10 Average	2.0	2.0	2.0	2.0	2.1	2.0	2.0

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Top Analysts' Forecasts Of U.S. And Foreign Interest Rates, Currency Values And The Factors That Influence Them

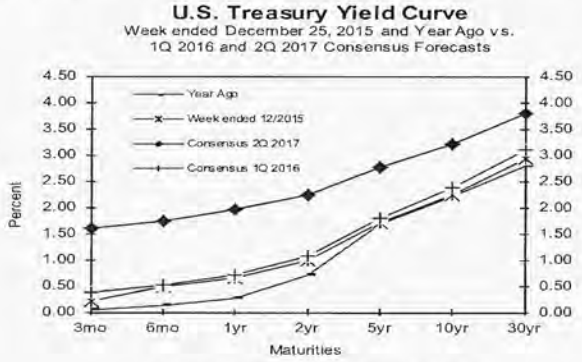
Vol. 35, No. 1, January 1, 2016

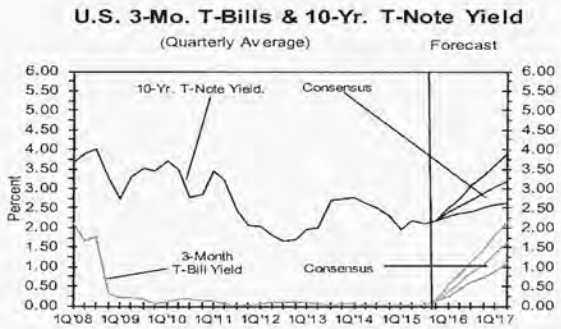
Wolters Kluwer

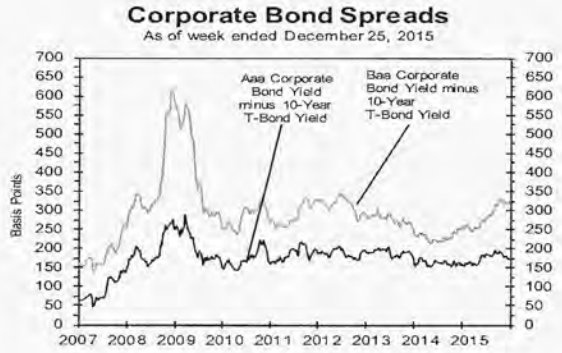
Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

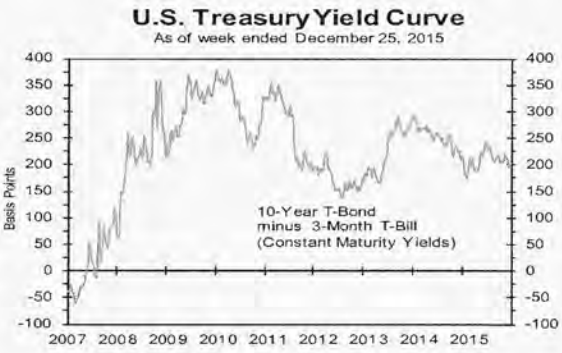
	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Q*	1Q	2Q	3Q	4Q	1Q	2Q
Interest Rates	Dec. 25	Dec. 18	Dec. 11	Dec. 4	Nov.	Oct.	Sep.	4Q 2015	2016	2016	2016	2016	2017	2017
Federal Funds Rate	0.36	0.14	0.13	0.12	0.12	0.12	0.14	*0.15*	0.4	0.7	0.9	1.1	1.4	1.7
Prime Rate	3.50	3.25	3.25	3.25	3.25	3.25	3.25	*3.28*	3.5	3.7	3.9	4.2	4.4	4.7
LIBOR, 3-mo.	0.58	0.52	0.46	0.42	0.39	0.34	0.32	*0.42*	0.7	0.9	1.1	1.4	1.6	1.9
Commercial Paper, 1-mo.	0.35	0.35	0.26	0.16	0.11	0.11	0.13	*0.18*	0.4	0.7	0.9	1.2	1.4	1.7
Treasury bill, 3-mo.	0.21	0.24	0.26	0.22	0.13	0.02	0.02	*0.13*	0.4	0.6	0.8	1.1	1.3	1.6
Treasury bill, 6-mo.	0.48	0.51	0.55	0.44	0.33	0.11	0.18	*0.32*	0.5	0.7	1.0	1.2	1.4	1.7
Treasury bill, 1 yr.	0.66	0.69	0.71	0.54	0.48	0.26	0.37	*0.48*	0.7	0.9	1.2	1.4	1.7	1.9
Treasury note, 2 yr.	0.99	0.99	0.93	0.94	0.88	0.64	0.71	*0.83*	1.1	1.3	1.5	1.7	2.0	2.2
Treasury note, 5 yr.	1.70	1.70	1.65	1.66	1.67	1.39	1.49	*1.58*	1.8	2.0	2.2	2.4	2.6	2.8
Treasury note, 10 yr.	2.23	2.25	2.21	2.23	2.26	2.07	2.17	*2.19*	2.4	2.6	2.7	2.9	3.0	3.2
Treasury note, 30 yr.	2.94	2.96	2.95	2.98	3.03	2.89	2.95	*2.96*	3.1	3.2	3.4	3.5	3.7	3.8
Corporate Aaa bond	3.95	3.97	3.95	3.97	4.06	3.95	4.07	*3.99*	4.1	4.3	4.4	4.7	4.8	4.9
Corporate Baa bond	5.48	5.47	5.40	5.41	5.46	5.34	5.34	*5.42*	5.4	5.6	5.7	5.9	6.0	6.1
State & Local bonds	na	3.57	3.57	3.57	3.68	3.67	3.78	*3.64*	3.8	3.9	4.1	4.2	4.4	4.5
Home mortgage rate	na	3.97	3.95	3.93	3.94	3.80	3.89	*3.90*	4.1	4.3	4.5	4.7	4.8	5.0
	History								Consensus Forecasts-Quarterly					
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q*	1Q	2Q	3Q	4Q	1Q	2Q
Key Assumptions	2014	2014	2014	2014	2015	2015	2015	2015	2016	2016	2016	2016	2017	2017
Major Currency Index	77.1	76.6	77.8	82.6	89.4	89.9	91.8	*94.1*	94.0	94.7	94.9	94.8	94.5	94.1
Real GDP	-0.9	4.6	4.3	2.1	0.6	3.9	2.1	*2.0*	2.5	2.6	2.6	2.5	2.4	2.5
GDP Price Index	1.5	2.2	1.6	0.1	0.1	2.1	1.3	*1.1*	1.7	1.9	1.9	2.0	2.0	2.1
Consumer Price Index	2.1	2.4	1.2	-0.9	-3.1	3.0	1.6	*0.6*	1.3	2.2	2.3	2.3	2.2	2.4

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data for interest rates except LIBOR is from Federal Reserve Release (FRSR) H.15. LIBOR quotes available from *The Wall Street Journal*. Interest rate definitions are same as those in FRSR H.15. Treasury yields are reported on a constant maturity basis. Historical data for Fed's Major Currency Index is from FRSR H.10 and G.5. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS). **Interest rate data for 4Q 2015 based on historical data through the week ended December 25th. *Data for 4Q 2015 Major Currency Index is based on data through week ended December 18th Figures for 4Q 2015 Real GDP, GDP Chained Price Index and Consumer Price Index are consensus forecasts based on a special question asked of the panelists' this month.*









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Top Analysts' Forecasts Of U.S. And Foreign Interest Rates, Currency Values And The Factors That Influence Them

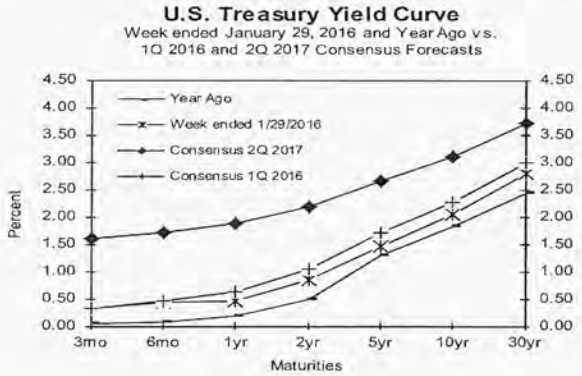
Vol. 35, No. 2, February 1, 2016

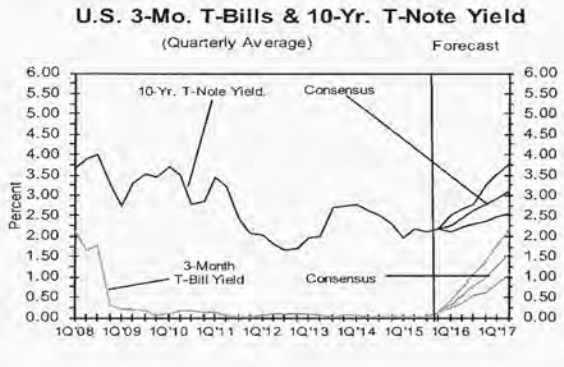
Wolters Kluwer

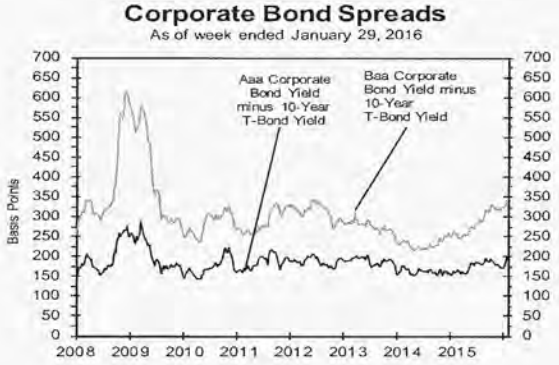
Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

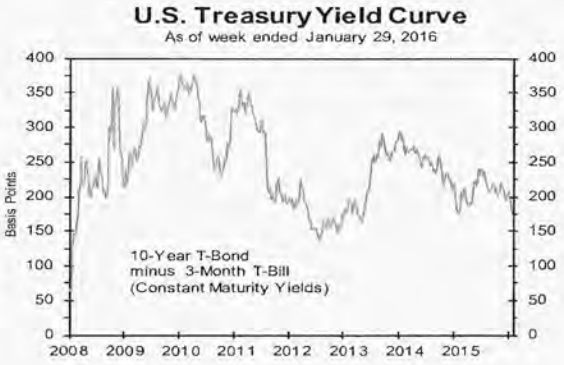
	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Qtr	1Q	2Q	3Q	4Q	1Q	2Q
Interest Rates	Jan. 29	Jan. 22	Jan. 15	Jan. 8	Dec.	Nov.	Oct.	4Q2015	2016	2016	2016	2016	2017	2017
Federal Funds Rate	0.38	0.36	0.36	0.27	0.16	0.12	0.12	0.16	0.4	0.6	0.9	1.1	1.3	1.6
Prime Rate	3.50	3.50	3.50	3.50	3.29	3.25	3.25	3.29	3.5	3.7	3.9	4.1	4.4	4.7
LIBOR, 3-mo.	0.62	0.62	0.62	0.61	0.41	0.37	0.32	0.41	0.7	0.9	1.1	1.3	1.6	1.9
Commercial Paper, 1-mo.	0.33	0.34	0.35	0.33	0.17	0.11	0.11	0.17	0.4	0.6	0.9	1.1	1.4	1.7
Treasury bill, 3-mo.	0.31	0.28	0.23	0.21	0.13	0.13	0.02	0.13	0.3	0.5	0.8	1.0	1.3	1.6
Treasury bill, 6-mo.	0.42	0.38	0.44	0.47	0.31	0.33	0.11	0.31	0.5	0.7	0.9	1.1	1.4	1.7
Treasury bill, 1 yr.	0.46	0.46	0.58	0.65	0.25	0.48	0.26	0.46	0.6	0.9	1.1	1.3	1.6	1.9
Treasury note, 2 yr.	0.86	0.86	0.91	0.99	0.83	0.88	0.64	0.83	1.0	1.2	1.5	1.7	1.9	2.2
Treasury note, 5 yr.	1.46	1.47	1.52	1.66	1.59	1.67	1.39	1.59	1.7	1.9	2.1	2.2	2.5	2.7
Treasury note, 10 yr.	2.03	2.04	2.10	2.19	2.19	2.26	2.07	2.19	2.3	2.4	2.6	2.8	2.9	3.1
Treasury note, 30 yr.	2.80	2.80	2.88	2.95	2.96	3.03	2.89	2.96	3.0	3.1	3.3	3.4	3.6	3.7
Corporate Aaa bond	4.04	4.03	3.95	3.98	3.99	4.06	3.95	3.99	4.0	4.2	4.4	4.6	4.7	4.9
Corporate Baa bond	5.48	5.45	5.42	5.46	5.42	5.46	5.34	5.42	5.4	5.5	5.6	5.8	5.9	6.1
State & Local bonds	n.a.	3.37	3.45	3.45	3.64	3.68	3.67	3.64	3.6	3.8	4.0	4.1	4.3	4.4
Home mortgage rate	n.a.	3.81	3.92	3.97	3.90	3.94	3.80	3.90	4.0	4.2	4.4	4.6	4.7	4.9
	History								Consensus Forecasts-Quarterly					
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q
Key Assumptions	2014	2014	2014	2014	2015	2015	2015	2015	2016	2016	2016	2016	2017	2017
Major Currency Index	77.1	76.6	77.8	82.6	89.4	89.9	91.8	93.1	94.8	95.6	95.8	95.6	95.3	94.8
Real GDP	-0.9	4.6	4.3	2.1	0.6	3.9	2.0	0.7	2.3	2.5	2.5	2.5	2.4	2.5
GDP Price Index	1.5	2.2	1.6	0.1	0.1	2.1	1.3	0.8	1.2	1.9	1.9	1.9	2.0	2.1
Consumer Price Index	2.1	2.4	1.2	-0.9	-3.1	3.0	1.6	0.2	0.5	2.2	2.2	2.2	2.3	2.5

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data for interest rates except LIBOR is from Federal Reserve Release (FRSR) H.15. LIBOR quotes available from *The Wall Street Journal*. Interest rate definitions are same as those in FRSR H.15. Treasury yields are reported on a constant maturity basis. Historical data for Fed's Major Currency Index is from FRSR H.10 and G.5. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS).









Blue Chip Financial Forecasts®

Top Analysts' Forecasts Of U.S. And Foreign Interest Rates, Currency Values And The Factors That Influence Them

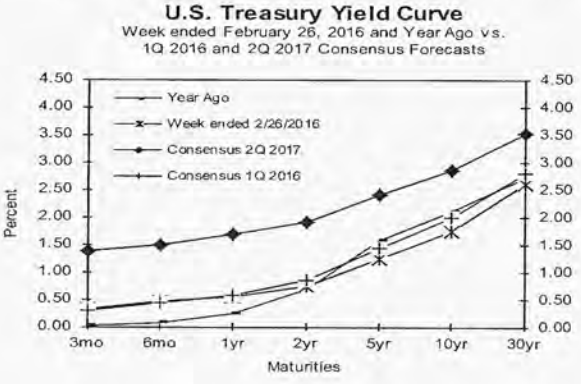
Vol. 35, No. 3, March 1, 2016

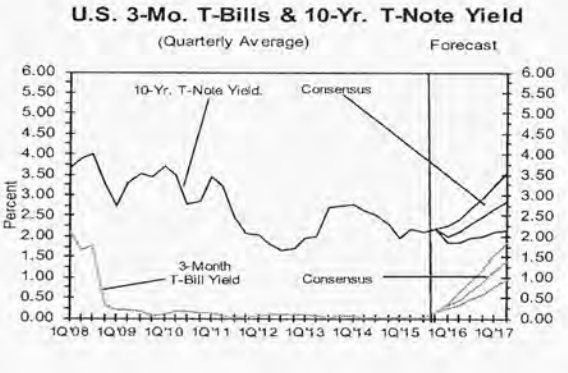
Wolters Kluwer

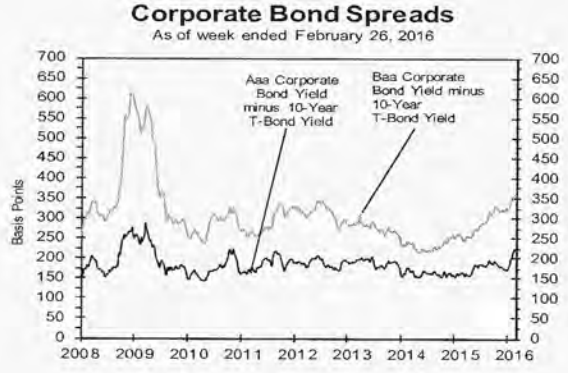
Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

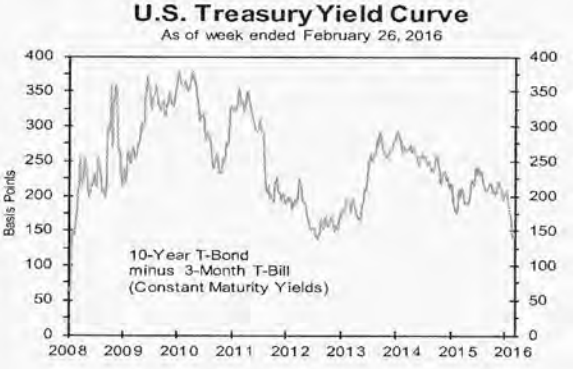
	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Qtr	1Q	2Q	3Q	4Q	1Q	2Q
Interest Rates	Feb. 26	Feb. 19	Feb. 12	Feb. 5	Jan.	Dec.	Nov.	4Q2015	2016	2016	2016	2016	2017	2017
Federal Funds Rate	0.38	0.38	0.38	0.34	0.34	0.16	0.12	0.16	0.4	0.5	0.7	0.9	1.2	1.4
Prime Rate	3.50	3.50	3.50	3.50	3.50	3.29	3.25	3.29	3.5	3.6	3.8	4.0	4.2	4.5
LIBOR, 3-mo.	0.62	0.62	0.62	0.62	0.62	0.41	0.37	0.41	0.6	0.7	1.0	1.1	1.4	1.7
Commercial Paper, 1-mo.	0.36	0.35	0.35	0.35	0.34	0.17	0.11	0.17	0.4	0.5	0.8	1.0	1.3	1.5
Treasury bill, 3-mo.	0.32	0.30	0.30	0.32	0.26	0.13	0.13	0.13	0.3	0.4	0.7	0.9	1.1	1.4
Treasury bill, 6-mo.	0.46	0.44	0.41	0.46	0.43	0.31	0.33	0.31	0.4	0.6	0.8	1.0	1.2	1.5
Treasury bill, 1 yr.	0.54	0.53	0.51	0.52	0.54	0.25	0.48	0.46	0.6	0.7	1.0	1.2	1.4	1.7
Treasury note, 2 yr.	0.75	0.74	0.68	0.74	0.90	0.83	0.88	0.83	0.8	1.0	1.2	1.4	1.7	1.9
Treasury note, 5 yr.	1.23	1.24	1.15	1.29	1.52	1.59	1.67	1.59	1.4	1.6	1.8	2.0	2.2	2.4
Treasury note, 10 yr.	1.75	1.78	1.71	1.89	2.09	2.19	2.26	2.19	2.0	2.1	2.3	2.5	2.7	2.8
Treasury note, 30 yr.	2.61	2.64	2.55	2.70	2.86	2.96	3.03	2.96	2.8	2.9	3.1	3.2	3.4	3.5
Corporate Aaa bond	3.96	4.01	3.92	4.03	4.00	3.99	4.06	3.99	4.0	4.1	4.3	4.4	4.6	4.8
Corporate Baa bond	5.33	5.37	5.29	5.40	5.45	5.42	5.46	5.42	5.3	5.4	5.5	5.6	5.7	5.9
State & Local bonds	3.27	3.27	3.27	3.30	3.41	3.64	3.68	3.64	3.4	3.5	3.8	3.9	4.0	4.2
Home mortgage rate	3.65	3.65	3.65	3.72	3.87	3.90	3.94	3.90	3.8	3.9	4.1	4.3	4.5	4.7
	History								Consensus Forecasts-Quarterly					
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q
Key Assumptions	2014	2014	2014	2014	2015	2015	2015	2015	2016	2016	2016	2016	2017	2017
Major Currency Index	77.1	76.6	77.8	82.6	89.4	89.9	91.8	93.1	93.9	94.4	94.8	94.8	94.5	94.2
Real GDP	-0.9	4.6	4.3	2.1	0.6	3.9	2.0	1.0	2.1	2.5	2.5	2.4	2.4	2.4
GDP Price Index	1.5	2.2	1.6	0.1	0.1	2.1	1.3	0.9	1.1	1.8	1.9	1.9	2.0	2.1
Consumer Price Index	2.1	2.4	1.2	-0.9	-3.1	3.0	1.6	0.2	0.2	1.9	2.2	2.3	2.3	2.4

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data for interest rates except LIBOR is from Federal Reserve Release (FRSR) H.15. LIBOR quotes available from *The Wall Street Journal*. Interest rate definitions are same as those in FRSR H.15. Treasury yields are reported on a constant maturity basis. Historical data for Fed's Major Currency Index is from FRSR H.10 and G.5. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS).









Blue Chip Financial Forecasts®

Top Analysts' Forecasts Of U.S. And Foreign Interest Rates, Currency Values And The Factors That Influence Them

Vol. 35, No. 4, April 1, 2016

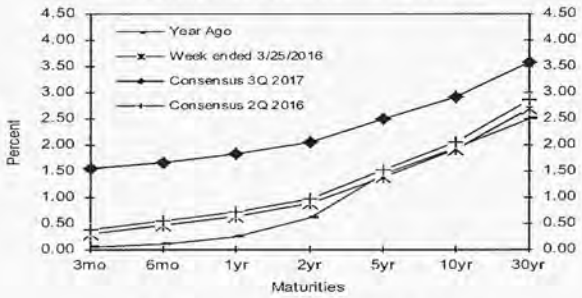
Wolters Kluwer

Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

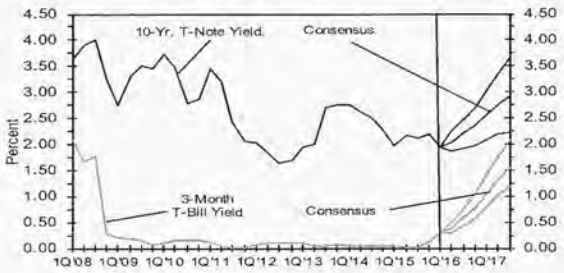
	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Qtr	2Q	3Q	4Q	1Q	2Q	3Q
Interest Rates	Mar. 25	Mar. 18	Mar. 11	Mar. 4	Feb.	Jan.	Dec.	1Q2016*	2016	2016	2016	2017	2017	2017
Federal Funds Rate	0.37	0.36	0.36	0.36	0.38	0.34	0.16	*0.36*	**0.5**	**0.6**	**0.8**	**1.0**	**1.3**	**1.5**
Prime Rate	3.25	3.50	3.50	3.50	3.50	3.50	3.29	*3.47*	**3.6**	**3.7**	**3.9**	**4.1**	**4.4**	**4.6**
LIBOR, 3-mo.	0.62	0.63	0.63	0.63	0.62	0.61	0.41	*0.62*	**0.7**	**0.9**	**1.0**	**1.3**	**1.6**	**1.8**
Commercial Paper, 1-mo.	0.34	0.33	0.34	0.35	0.35	0.34	0.17	*0.34*	**0.5**	**0.7**	**0.9**	**1.1**	**1.4**	**1.7**
Treasury bill, 3-mo.	0.30	0.32	0.31	0.32	0.31	0.26	0.13	*0.29*	**0.4**	**0.6**	**0.8**	**1.0**	**1.3**	**1.6**
Treasury bill, 6-mo.	0.46	0.48	0.49	0.48	0.45	0.43	0.31	*0.45*	**0.5**	**0.7**	**0.9**	**1.2**	**1.4**	**1.7**
Treasury bill, 1 yr.	0.63	0.67	0.68	0.66	0.53	0.54	0.25	*0.58*	**0.7**	**0.9**	**1.1**	**1.3**	**1.6**	**1.8**
Treasury note, 2 yr.	0.87	0.91	0.92	0.84	0.73	0.90	0.83	*0.84*	**1.0**	**1.2**	**1.4**	**1.6**	**1.8**	**2.0**
Treasury note, 5 yr.	1.38	1.43	1.42	1.32	1.22	1.52	1.59	*1.38*	**1.5**	**1.7**	**1.9**	**2.1**	**2.3**	**2.5**
Treasury note, 10 yr.	1.91	1.93	1.91	1.82	1.78	2.09	2.19	*1.93*	**2.0**	**2.2**	**2.4**	**2.6**	**2.8**	**2.9**
Treasury note, 30 yr.	2.69	2.71	2.69	2.67	2.62	2.86	2.96	*2.73*	**2.8**	**3.0**	**3.1**	**3.3**	**3.5**	**3.6**
Corporate Aaa bond	3.78	3.80	3.88	3.89	3.96	4.00	3.99	*3.93*	**3.9**	**4.1**	**4.3**	**4.5**	**4.6**	**4.8**
Corporate Baa bond	5.04	5.13	5.25	5.32	5.32	5.45	5.42	*5.30*	**5.3**	**5.4**	**5.5**	**5.7**	**5.8**	**5.9**
State & Local bonds	3.38	3.40	3.42	3.34	3.30	3.41	3.64	*3.37*	**3.5**	**3.7**	**3.8**	**3.9**	**4.1**	**4.2**
Home mortgage rate	3.71	3.73	3.68	3.64	3.66	3.87	3.90	*3.75*	**3.9**	**4.0**	**4.2**	**4.4**	**4.6**	**4.8**
	History								Consensus Forecasts-Quarterly					
	2Q	3Q	4Q	1Q	2Q	3Q	4Q	*1Q*	2Q	3Q	4Q	1Q	2Q	3Q
Key Assumptions	2014	2014	2014	2015	2015	2015	2015	*2016**	2016	2016	2016	2017	2017	2017
Major Currency Index	76.6	77.8	82.6	89.4	89.9	91.8	93.1	*92.0*	**92.9**	**93.3**	**93.7**	**93.7**	**92.9**	**93.2**
Real GDP	4.6	4.3	2.1	0.6	3.9	2.0	1.4	*1.9*	**2.3**	**2.5**	**2.4**	**2.4**	**2.4**	**2.3**
GDP Price Index	2.2	1.6	0.1	0.1	2.1	1.3	0.9	*1.1*	**1.7**	**1.8**	**1.9**	**2.0**	**2.1**	**2.1**
Consumer Price Index	1.9	0.9	-0.3	-2.9	2.4	1.4	0.8	*0.1*	**1.9**	**2.1**	**2.3**	**2.3**	**2.4**	**2.3**

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data for interest rates except LIBOR is from Federal Reserve Release (FRSR) H.15. LIBOR quotes available from *The Wall Street Journal*. Interest rate definitions are same as those in FRSR H.15. Treasury yields are reported on a constant maturity basis. Historical data for Fed's Major Currency Index is from FRSR H.10 and G.5. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS). **Interest rate data for 1Q 2016 based on historical data through the week ended March 25th. *Data for 1Q 2016 Major Currency Index is based on data through week ended March 18th. Figures for 1Q 2016 Real GDP, GDP Chained Price Index and Consumer Price Index are consensus forecasts based on a special question asked of the panelists' this month*

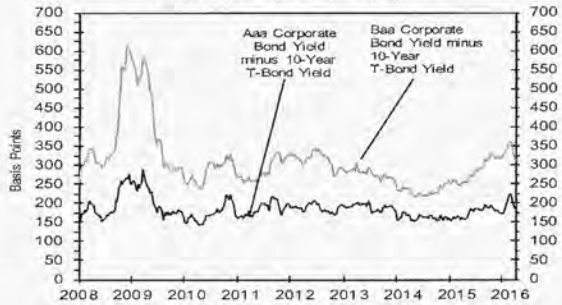
U.S. Treasury Yield Curve
Week ended March 25, 2016 and Year Ago vs.
2Q 2016 and 3Q 2017 Consensus Forecasts



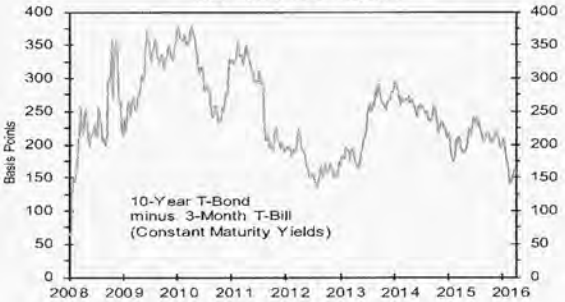
U.S. 3-Mo. T-Bills & 10-Yr. T-Note Yield
(Quarterly Average) Forecast



Corporate Bond Spreads
As of week ended March 25, 2016



U.S. Treasury Yield Curve
As of week March 25, 2016



Blue Chip Financial Forecasts®

Top Analysts' Forecasts Of U.S. And Foreign Interest Rates, Currency Values And The Factors That Influence Them

Vol. 35, No. 5, May 1, 2016

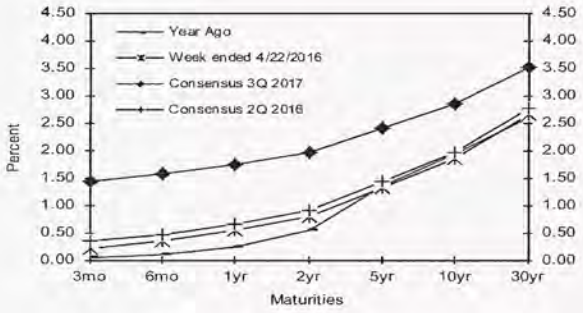
Wolters Kluwer

Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

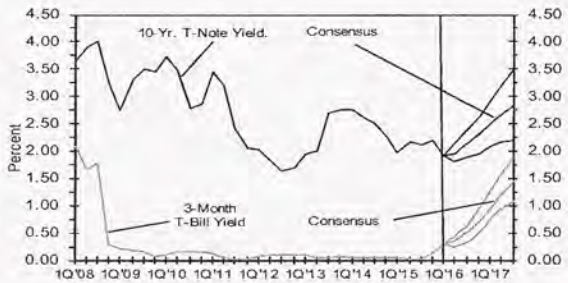
	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Qtr	2Q	3Q	4Q	1Q	2Q	3Q
Interest Rates	Apr. 22	Apr. 15	Apr. 8	Apr. 1	Mar.	Feb.	Jan.	1Q 2016	2016	2016	2016	2017	2017	2017
Federal Funds Rate	0.37	0.37	0.35	0.37	0.36	0.38	0.34	0.36	0.4	0.6	0.8	1.0	1.2	1.5
Prime Rate	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.6	3.7	3.8	4.1	4.3	4.5
LIBOR, 3-mo.	0.63	0.63	0.63	0.63	0.63	0.62	0.61	0.62	0.7	0.9	1.0	1.3	1.5	1.8
Commercial Paper, 1-mo.	0.34	0.35	0.33	0.32	0.34	0.35	0.34	0.34	0.5	0.6	0.8	1.1	1.3	1.6
Treasury bill, 3-mo.	0.22	0.22	0.23	0.23	0.30	0.31	0.26	0.29	0.3	0.5	0.7	1.0	1.2	1.4
Treasury bill, 6-mo.	0.36	0.36	0.36	0.42	0.47	0.45	0.43	0.45	0.5	0.7	0.8	1.1	1.3	1.6
Treasury bill, 1 yr.	0.54	0.54	0.55	0.62	0.66	0.53	0.54	0.58	0.6	0.8	1.0	1.3	1.5	1.7
Treasury note, 2 yr.	0.80	0.74	0.72	0.78	0.88	0.73	0.90	0.84	0.9	1.1	1.3	1.5	1.7	1.9
Treasury note, 5 yr.	1.31	1.22	1.18	1.27	1.38	1.22	1.52	1.37	1.4	1.6	1.8	2.0	2.2	2.4
Treasury note, 10 yr.	1.84	1.77	1.74	1.82	1.89	1.78	2.09	1.92	2.0	2.1	2.3	2.5	2.7	2.8
Treasury note, 30 yr.	2.65	2.58	2.56	2.63	2.68	2.62	2.86	2.72	2.8	2.9	3.1	3.2	3.4	3.5
Corporate Aaa bond	3.57	3.61	3.63	3.73	3.82	3.96	4.00	3.93	3.8	4.0	4.1	4.3	4.5	4.6
Corporate Baa bond	4.77	4.78	4.82	4.91	5.13	5.32	5.45	5.30	5.0	5.2	5.3	5.5	5.6	5.8
State & Local bonds	3.28	3.30	3.28	3.38	3.38	3.30	3.41	3.36	3.4	3.6	3.7	3.9	4.1	4.2
Home mortgage rate	3.59	3.58	3.59	3.71	3.69	3.66	3.87	3.74	3.8	4.0	4.1	4.3	4.5	4.7
	History								Consensus Forecasts-Quarterly					
	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q
Key Assumptions	2014	2014	2014	2015	2015	2015	2015	2016	2016	2016	2016	2017	2017	2017
Major Currency Index	76.6	77.8	82.6	89.4	89.9	91.8	93.1	93.3	90.8	91.2	91.9	92.1	92.0	91.9
Real GDP	4.6	4.3	2.1	0.6	3.9	2.0	1.4	0.5	2.3	2.4	2.4	2.3	2.4	2.3
GDP Price Index	2.2	1.6	0.1	0.1	2.1	1.3	0.9	0.7	1.8	1.9	1.9	2.0	2.1	2.0
Consumer Price Index	1.9	0.9	-0.3	-2.9	2.4	1.4	0.8	-0.3	1.9	2.2	2.3	2.3	2.4	2.3

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data for interest rates except LIBOR is from Federal Reserve Release (FRSR) H.15. LIBOR quotes available from *The Wall Street Journal*. Interest rate definitions are same as those in FRSR H.15. Treasury yields are reported on a constant maturity basis. Historical data for Fed's Major Currency Index is from FRSR H.10 and G.5. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS).

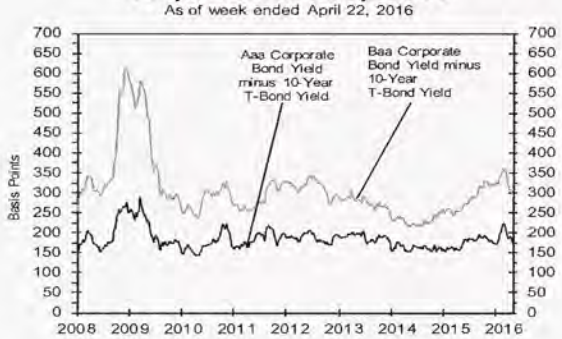
U.S. Treasury Yield Curve
Week ended April 22, 2016 and Year Ago vs.
2Q 2016 and 3Q 2017 Consensus Forecasts



U.S. 3-Mo. T-Bills & 10-Yr. T-Note Yield
(Quarterly Average)



Corporate Bond Spreads
As of week ended April 22, 2016



U.S. Treasury Yield Curve
As of week April 22, 2016

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Vol. 35, No. 6, June 1, 2016

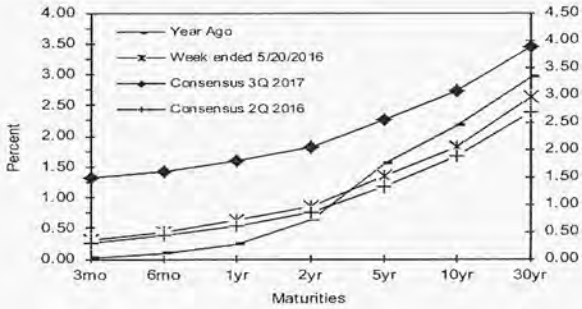
Wolters Kluwer

Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

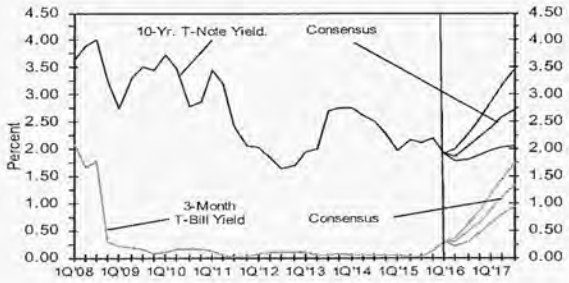
	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Qtr	2Q	3Q	4Q	1Q	2Q	3Q
Interest Rates	May 20	May 13	May 6	Apr. 29	Apr.	Mar.	Feb.	1Q 2016	2016	2016	2016	2017	2017	2017
Federal Funds Rate	0.37	0.37	0.34	0.37	0.37	0.36	0.38	0.36	0.4	0.6	0.7	0.9	1.1	1.3
Prime Rate	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.5	3.7	3.8	4.0	4.2	4.4
LIBOR, 3-mo.	0.63	0.63	0.63	0.63	0.63	0.63	0.62	0.62	0.6	0.8	1.0	1.2	1.4	1.7
Commercial Paper, 1-mo.	0.35	0.34	0.35	0.36	0.35	0.34	0.35	0.34	0.4	0.6	0.8	1.0	1.3	1.5
Treasury bill, 3-mo.	0.30	0.26	0.20	0.23	0.23	0.30	0.31	0.29	0.3	0.5	0.7	0.9	1.1	1.3
Treasury bill, 6-mo.	0.42	0.37	0.40	0.40	0.37	0.47	0.45	0.45	0.4	0.6	0.8	1.0	1.2	1.4
Treasury bill, 1 yr.	0.62	0.53	0.52	0.58	0.56	0.66	0.53	0.58	0.6	0.8	1.0	1.2	1.4	1.6
Treasury note, 2 yr.	0.86	0.74	0.75	0.82	0.77	0.88	0.73	0.84	0.8	1.0	1.2	1.4	1.6	1.8
Treasury note, 5 yr.	1.34	1.21	1.25	1.33	1.26	1.38	1.22	1.37	1.3	1.5	1.7	1.9	2.1	2.3
Treasury note, 10 yr.	1.82	1.75	1.81	1.88	1.81	1.89	1.78	1.92	1.9	2.1	2.2	2.4	2.6	2.7
Treasury note, 30 yr.	2.62	2.59	2.65	2.71	2.62	2.68	2.62	2.72	2.7	2.9	3.0	3.2	3.3	3.4
Corporate Aaa bond	3.65	3.63	3.66	3.62	3.62	3.82	3.96	3.93	3.7	3.9	4.1	4.3	4.4	4.6
Corporate Baa bond	4.69	4.64	4.66	4.75	4.79	5.13	5.32	5.30	4.9	5.1	5.2	5.4	5.5	5.7
State & Local bonds	3.26	3.32	3.32	3.32	3.30	3.38	3.30	3.36	3.4	3.5	3.6	3.8	4.0	4.1
Home mortgage rate	3.58	3.57	3.61	3.66	3.61	3.69	3.66	3.74	3.7	3.9	4.0	4.2	4.4	4.5
	History								Consensus Forecasts-Quarterly					
	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q
Key Assumptions	2014	2014	2014	2015	2015	2015	2015	2016	2016	2016	2016	2017	2017	2017
Major Currency Index	76.6	77.8	82.6	89.4	89.9	91.8	93.1	93.3	90.4	91.3	92.1	92.4	92.3	92.3
Real GDP	4.6	4.3	2.1	0.6	3.9	2.0	1.4	0.8	2.3	2.4	2.4	2.3	2.4	2.3
GDP Price Index	2.2	1.6	0.1	0.1	2.1	1.3	0.9	0.6	1.8	1.8	1.9	1.9	2.2	2.1
Consumer Price Index	1.9	0.9	-0.3	-2.9	2.4	1.4	0.8	-0.3	2.2	2.4	2.3	2.2	2.4	2.3

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data for interest rates except LIBOR is from Federal Reserve Release (FRSR) H.15. LIBOR quotes available from *The Wall Street Journal*. Interest rate definitions are same as those in FRSR H.15. Treasury yields are reported on a constant maturity basis. Historical data for Fed's Major Currency Index is from FRSR H.10 and G.5. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS).

U.S. Treasury Yield Curve
Week ended May 20, 2016 and Year Ago vs. 2Q 2016 and 3Q 2017 Consensus Forecasts

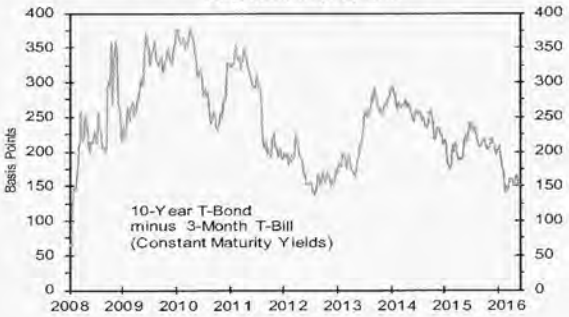


U.S. 3-Mo. T-Bills & 10-Yr. T-Note Yield
(Quarterly Average) Forecast



Corporate Bond Spreads
As of week ended May 20, 2016

U.S. Treasury Yield Curve
As of week May 20, 2016



Blue Chip Financial Forecasts®

Top Analysts' Forecasts Of U.S. And Foreign Interest Rates, Currency Values And The Factors That Influence Them

Vol. 35, No. 6, June 1, 2016

Wolters Kluwer

Long-Range Survey:

The table below contains results of our semi-annual long-range CONSENSUS survey. There are also Top 10 and bottom 10 averages for each variable. Shown are estimates for the years 2018 through 2022 and averages for the five-year periods 2018-2022 and 2023-2027. Apply these projections cautiously. Few economic, demographic and political forces can be evaluated accurately over such long time spans.

		Average For The Year					Five-Year Averages	
Interest Rates		**2018**	**2019**	**2020**	**2021**	**2022**	**2018-2022**	**2023-2027**
1. Federal Funds Rate	**CONSENSUS**	**2.2**	**2.7**	**3.0**	**3.2**	**3.2**	**2.9**	**3.2**
	Top 10 Average	3.1	3.6	3.8	3.9	3.9	3.7	3.8
	Bottom 10 Average	1.4	1.6	2.0	2.5	2.4	2.0	2.5
2. Prime Rate	**CONSENSUS**	**5.2**	**5.7**	**6.0**	**6.1**	**6.1**	**5.8**	**6.0**
	Top 10 Average	6.1	6.6	6.9	6.9	6.9	6.7	6.7
	Bottom 10 Average	4.4	4.7	5.1	5.4	5.3	5.0	5.4
3. LIBOR, 3-Mo.	**CONSENSUS**	**2.5**	**3.0**	**3.2**	**3.4**	**3.4**	**3.1**	**3.4**
	Top 10 Average	3.4	3.9	4.0	4.1	4.1	3.9	4.0
	Bottom 10 Average	1.7	1.9	2.3	2.8	2.7	2.3	2.7
4. Commercial Paper, 1-Mo.	**CONSENSUS**	**2.5**	**3.0**	**3.2**	**3.4**	**3.3**	**3.1**	**3.3**
	Top 10 Average	3.2	3.7	3.9	4.0	4.0	3.7	3.8
	Bottom 10 Average	1.8	2.2	2.6	2.8	2.6	2.4	2.7
5. Treasury Bill Yield, 3-Mo.	**CONSENSUS**	**2.2**	**2.7**	**2.9**	**3.1**	**3.1**	**2.8**	**3.1**
	Top 10 Average	3.0	3.6	3.8	3.8	3.8	3.6	3.7
	Bottom 10 Average	1.4	1.6	1.9	2.5	2.4	2.0	2.4
6. Treasury Bill Yield, 6-Mo.	**CONSENSUS**	**2.4**	**2.9**	**3.2**	**3.3**	**3.2**	**3.0**	**3.2**
	Top 10 Average	3.2	3.7	4.0	4.0	4.0	3.8	3.8
	Bottom 10 Average	1.6	1.9	2.4	2.6	2.5	2.2	2.6
7. Treasury Bill Yield, 1-Yr.	**CONSENSUS**	**2.5**	**3.0**	**3.2**	**3.4**	**3.3**	**3.1**	**3.3**
	Top 10 Average	3.4	4.0	4.0	4.1	4.1	3.9	4.0
	Bottom 10 Average	1.7	2.0	2.4	2.6	2.5	2.3	2.7
8. Treasury Note Yield, 2-Yr.	**CONSENSUS**	**2.7**	**3.1**	**3.4**	**3.6**	**3.5**	**3.3**	**3.5**
	Top 10 Average	3.6	4.1	4.3	4.3	4.3	4.1	4.2
	Bottom 10 Average	1.8	2.0	2.4	2.8	2.8	2.4	2.7
10. Treasury Note Yield, 5-Yr.	**CONSENSUS**	**3.0**	**3.4**	**3.6**	**3.8**	**3.8**	**3.5**	**3.8**
	Top 10 Average	3.9	4.3	4.5	4.6	4.6	4.4	4.5
	Bottom 10 Average	2.1	2.3	2.7	3.0	2.9	2.6	3.0
11. Treasury Note Yield, 10-Yr.	**CONSENSUS**	**3.3**	**3.7**	**3.9**	**4.1**	**4.0**	**3.8**	**4.1**
	Top 10 Average	4.2	4.6	4.8	4.8	4.8	4.6	4.8
	Bottom 10 Average	2.5	2.7	3.0	3.2	3.2	2.9	3.3
12. Treasury Bond Yield, 30-Yr.	**CONSENSUS**	**3.9**	**4.2**	**4.4**	**4.6**	**4.5**	**4.3**	**4.6**
	Top 10 Average	4.8	5.2	5.3	5.4	5.4	5.2	5.4
	Bottom 10 Average	3.1	3.3	3.5	3.7	3.6	3.4	3.8
13. Corporate Aaa Bond Yield	**CONSENSUS**	**5.1**	**5.4**	**5.5**	**5.5**	**5.5**	**5.4**	**5.6**
	Top 10 Average	5.7	6.2	6.3	6.3	6.3	6.2	6.3
	Bottom 10 Average	4.4	4.6	4.6	4.7	4.7	4.6	4.9
13. Corporate Baa Bond Yield	**CONSENSUS**	**6.1**	**6.4**	**6.5**	**6.5**	**6.5**	**6.4**	**6.6**
	Top 10 Average	6.7	7.2	7.3	7.3	7.3	7.1	7.3
	Bottom 10 Average	5.4	5.6	5.7	5.7	5.6	5.6	5.9
14. State & Local Bonds Yield	**CONSENSUS**	**4.4**	**4.6**	**4.7**	**4.7**	**4.7**	**4.7**	**4.8**
	Top 10 Average	5.2	5.5	5.6	5.6	5.6	5.5	5.6
	Bottom 10 Average	3.7	3.7	3.8	3.9	3.8	3.8	4.0
15. Home Mortgage Rate	**CONSENSUS**	**5.1**	**5.5**	**5.6**	**5.7**	**5.7**	**5.5**	**5.8**
	Top 10 Average	5.8	6.3	6.4	6.4	6.5	6.3	6.4
	Bottom 10 Average	4.3	4.6	4.8	4.9	4.8	4.7	5.0
A. FRB - Major Currency Index	**CONSENSUS**	**92.2**	**91.5**	**91.2**	**91.1**	**91.0**	**91.4**	**90.1**
	Top 10 Average	95.6	95.7	96.1	96.0	95.9	95.9	95.2
	Bottom 10 Average	88.8	87.2	86.1	86.0	85.9	86.8	85.0
		Year-Over-Year, % Change					Five-Year Averages	
		2018	**2019**	**2020**	**2021**	**2022**	**2018-2022**	**2023-2027**
B. Real GDP	**CONSENSUS**	**2.2**	**2.1**	**2.1**	**2.2**	**2.2**	**2.2**	**2.2**
	Top 10 Average	2.7	2.7	2.6	2.6	2.5	2.6	2.5
	Bottom 10 Average	1.7	1.6	1.6	1.8	1.8	1.7	1.9
C. GDP Chained Price Index	**CONSENSUS**	**2.1**	**2.1**	**2.1**	**2.1**	**2.1**	**2.1**	**2.1**
	Top 10 Average	2.4	2.4	2.4	2.3	2.2	2.4	2.3
	Bottom 10 Average	1.8	1.9	1.9	1.9	1.9	1.9	1.9
D. Consumer Price Index	**CONSENSUS**	**2.3**	**2.3**	**2.3**	**2.3**	**2.2**	**2.3**	**2.2**
	Top 10 Average	2.7	2.6	2.5	2.4	2.5	2.6	2.5
	Bottom 10 Average	1.9	2.0	2.0	2.1	2.0	2.0	2.0

Blue Chip Financial Forecasts®

Top Analysts' Forecasts Of U.S. And Foreign Interest Rates, Currency Values And The Factors That Influence Them

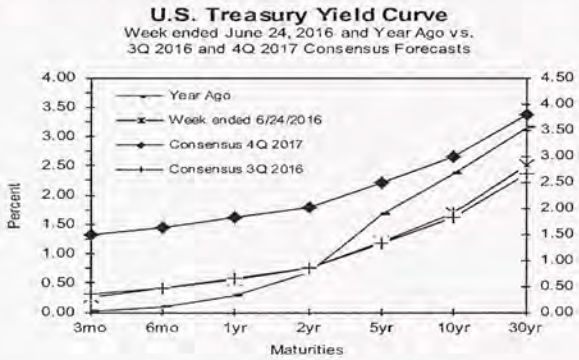
Vol. 35, No. 7, July 1, 2016

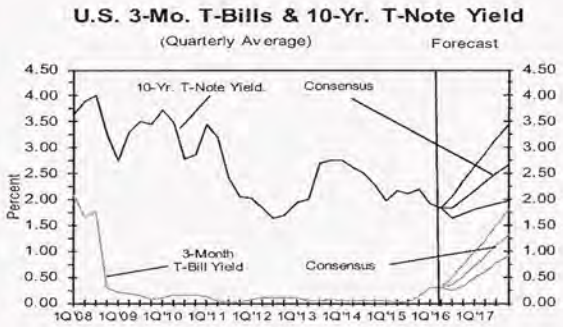
Wolters Kluwer

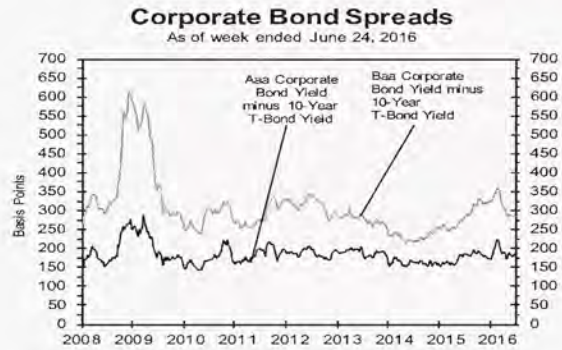
Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

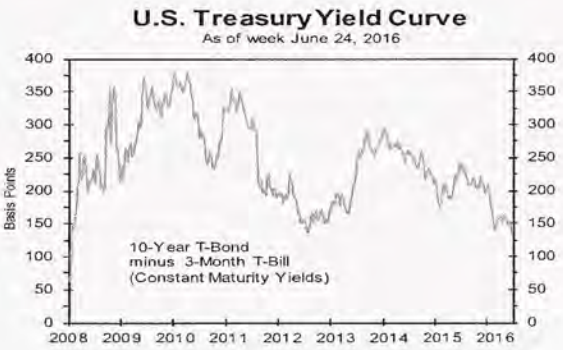
	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Qtr	3Q	4Q	1Q	2Q	3Q	4Q
Interest Rates	June 24	June 17	June 10	June 3	May	Apr.	Mar.	2Q 2016*	2016	2016	2017	2017	2017	2017
Federal Funds Rate	0.38	0.37	0.37	0.36	0.37	0.37	0.36	*0.36*	**0.4**	**0.6**	**0.8**	**0.9**	**1.1**	**1.3**
Prime Rate	3.50	3.50	3.50	3.50	3.50	3.50	3.50	*3.50*	**3.6**	**3.7**	**3.9**	**4.0**	**4.2**	**4.4**
LIBOR, 3-mo.	0.64	0.65	0.66	0.68	0.64	0.63	0.63	*0.63*	**0.7**	**0.8**	**1.1**	**1.2**	**1.5**	**1.7**
Commercial Paper, 1-mo.	0.36	0.37	0.40	0.38	0.35	0.35	0.34	*0.36*	**0.4**	**0.6**	**0.8**	**1.0**	**1.3**	**1.5**
Treasury bill, 3-mo.	0.27	0.27	0.26	0.31	0.28	0.23	0.30	*0.28*	**0.4**	**0.5**	**0.7**	**0.9**	**1.1**	**1.3**
Treasury bill, 6-mo.	0.40	0.38	0.43	0.47	0.42	0.37	0.47	*0.43*	**0.5**	**0.6**	**0.8**	**1.0**	**1.2**	**1.5**
Treasury bill, 1 yr.	0.56	0.53	0.59	0.67	0.59	0.56	0.66	*0.54*	**0.7**	**0.8**	**1.0**	**1.2**	**1.4**	**1.6**
Treasury note, 2 yr.	0.75	0.71	0.77	0.86	0.82	0.77	0.88	*0.79*	**0.9**	**1.0**	**1.2**	**1.4**	**1.6**	**1.8**
Treasury note, 5 yr.	1.20	1.12	1.22	1.34	1.30	1.26	1.38	*1.30*	**1.3**	**1.5**	**1.7**	**1.9**	**2.0**	**2.2**
Treasury note, 10 yr.	1.69	1.61	1.70	1.80	1.81	1.81	1.89	*1.84*	**1.8**	**2.0**	**2.2**	**2.3**	**2.5**	**2.7**
Treasury note, 30 yr.	2.50	2.42	2.50	2.59	2.63	2.62	2.68	*2.65*	**2.6**	**2.8**	**2.9**	**3.1**	**3.2**	**3.4**
Corporate Aaa bond	3.56	3.45	3.51	3.59	3.65	3.62	3.82	*3.82*	**3.7**	**3.8**	**4.0**	**4.1**	**4.3**	**4.4**
Corporate Baa bond	4.55	4.49	4.55	4.64	4.68	4.79	5.13	*5.10*	**4.8**	**4.9**	**5.1**	**5.2**	**5.3**	**5.5**
State & Local bonds	3.18	3.18	3.18	3.26	3.29	3.30	3.38	*3.30*	**3.3**	**3.4**	**3.6**	**3.8**	**3.9**	**4.0**
Home mortgage rate	3.56	3.54	3.60	3.66	3.60	3.61	3.69	*3.70*	**3.7**	**3.8**	**4.0**	**4.2**	**4.3**	**4.5**
	History								Consensus Forecasts-Quarterly					
	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Key Assumptions	2014	2014	2015	2015	2015	2015	2016	2016	2016	2016	2017	2017	2017	2017
Major Currency Index	77.8	82.6	89.4	89.9	91.8	93.1	93.3	*89.5*	**91.1**	**92.0**	**92.5**	**92.6**	**92.5**	**92.5**
Real GDP	4.3	2.1	0.6	3.9	2.0	1.4	0.8	*2.5*	**2.3**	**2.3**	**2.2**	**2.3**	**2.3**	**2.2**
GDP Price Index	1.6	0.1	0.1	2.1	1.3	0.9	0.6	*1.9*	**1.8**	**1.9**	**1.9**	**2.2**	**2.1**	**2.1**
Consumer Price Index	0.9	-0.3	-2.9	2.4	1.4	0.8	-0.3	*2.3*	**2.5**	**2.3**	**2.2**	**2.4**	**2.3**	**2.3**

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data for interest rates except LIBOR is from Federal Reserve Release (FRSR) H.15. LIBOR quotes available from *The Wall Street Journal*. Interest rate definitions are same as those in FRSR H.15. Treasury yields are reported on a constant maturity basis. Historical data for Fed's Major Currency Index is from FRSR H.10 and G.5. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS). **Interest rate data for 2Q 2016 based on historical data through the week ended June 24th. *Data for 2Q 2016 Major Currency Index is based on data through week ended June 17th. Figures fo 2Q 2016 Real GDP, GDP Chained Price Index and Consumer Price Index are consensus forecasts based on a special question asked of the panelists' this month.*









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Vol. 35, No. 8, August 1, 2016

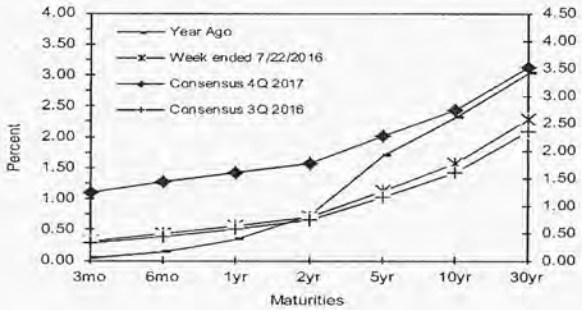
Wolters Kluwer

Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

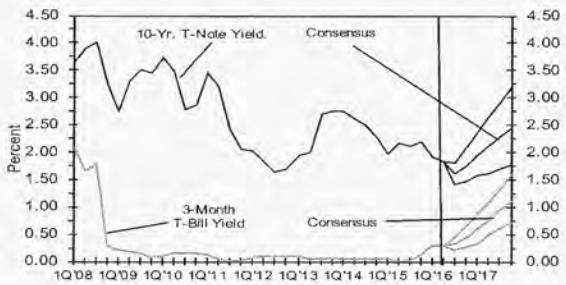
	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Qtr	3Q	4Q	1Q	2Q	3Q	4Q
Interest Rates	July 22	July 15	July 8	July 1	Jun	May	Apr	2Q 2016	2016	2016	2017	2017	2017	2017
Federal Funds Rate	0.40	0.40	0.39	0.40	0.38	0.37	0.37	0.37	0.4	0.5	0.6	0.8	1.0	1.1
Prime Rate	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.5	3.6	3.7	3.9	4.0	4.2
LIBOR, 3-mo.	0.70	0.67	0.67	0.66	0.69	0.64	0.63	0.63	0.7	0.8	0.9	1.1	1.3	1.5
Commercial Paper, 1-mo.	0.33	0.37	0.37	0.38	0.38	0.35	0.35	0.36	0.4	0.5	0.7	0.9	1.1	1.3
Treasury bill, 3-mo.	0.32	0.31	0.28	0.27	0.27	0.28	0.23	0.28	0.3	0.4	0.6	0.7	0.9	1.1
Treasury bill, 6-mo.	0.44	0.41	0.36	0.36	0.40	0.42	0.37	0.43	0.4	0.6	0.7	0.9	1.1	1.3
Treasury bill, 1 yr.	0.55	0.52	0.46	0.45	0.55	0.59	0.56	0.54	0.6	0.7	0.9	1.1	1.2	1.4
Treasury note, 2 yr.	0.70	0.68	0.58	0.60	0.73	0.82	0.77	0.79	0.7	0.9	1.1	1.2	1.4	1.6
Treasury note, 5 yr.	1.13	1.09	0.95	1.01	1.17	1.30	1.26	1.30	1.1	1.3	1.5	1.7	1.8	2.0
Treasury note, 10 yr.	1.58	1.51	1.38	1.47	1.64	1.81	1.81	1.84	1.6	1.8	1.9	2.1	2.3	2.4
Treasury note, 30 yr.	2.29	2.22	2.13	2.28	2.45	2.63	2.62	2.64	2.4	2.5	2.7	2.8	3.0	3.1
Corporate Aaa bond	3.34	3.27	3.21	3.39	3.50	3.65	3.62	3.82	3.4	3.6	3.8	3.9	4.1	4.2
Corporate Baa bond	4.24	4.21	4.19	4.39	4.53	4.68	4.79	5.10	4.5	4.6	4.8	5.0	5.1	5.3
State & Local bonds	2.87	2.80	3.18	3.18	3.20	3.29	3.30	3.30	3.1	3.2	3.3	3.5	3.6	3.8
Home mortgage rate	3.45	3.42	3.41	3.48	3.57	3.60	3.61	3.70	3.5	3.7	3.8	4.0	4.2	4.3
	History								Consensus Forecasts-Quarterly					
	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Key Assumptions	2014	2014	2015	2015	2015	2015	2016	2016	2016	2016	2017	2017	2017	2017
Major Currency Index	77.8	82.6	89.4	89.9	91.8	93.1	93.3	89.6	91.0	91.8	92.4	92.5	92.5	92.3
Real GDP	5.0	2.3	2.0	2.6	2.0	0.9	0.8	1.2	2.3	2.3	2.2	2.3	2.3	2.2
GDP Price Index	1.7	0.5	-0.1	2.3	1.3	0.8	0.5	2.2	1.8	1.8	1.9	2.1	2.1	2.1
Consumer Price Index	0.9	-0.3	-2.9	2.4	1.4	0.8	-0.3	2.5	2.2	2.2	2.2	2.3	2.3	2.3

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data for interest rates except LIBOR is from Federal Reserve Release (FRSR) H.15. LIBOR quotes available from *The Wall Street Journal*. Interest rate definitions are same as those in FRSR H.15. Treasury yields are reported on a constant maturity basis. Historical data for Fed's Major Currency Index is from FRSR H.10 and G.5. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS).

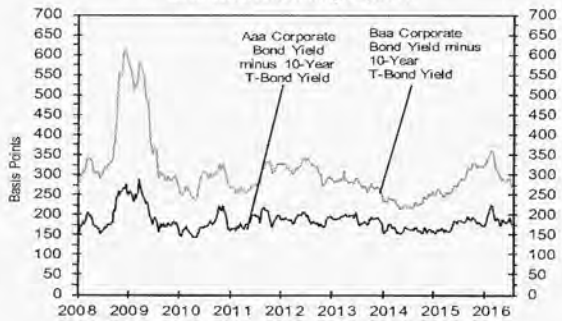
U.S. Treasury Yield Curve
Week ended July 22, 2016 and Year Ago vs.
3Q 2016 and 4Q 2017 Consensus Forecasts



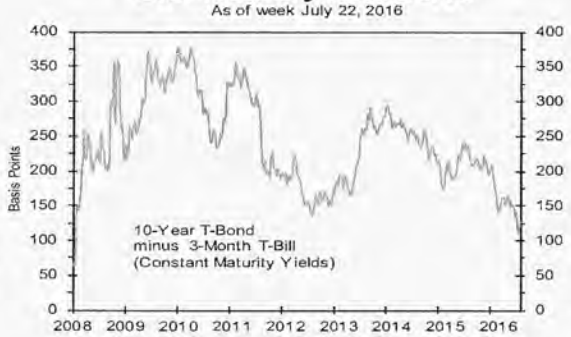
U.S. 3-Mo. T-Bills & 10-Yr. T-Note Yield
(Quarterly Average)



Corporate Bond Spreads
As of week ended July 22, 2016



U.S. Treasury Yield Curve
As of week July 22, 2016



Blue Chip Financial Forecasts®

Top Analysts' Forecasts Of U.S. And Foreign Interest Rates, Currency Values And The Factors That Influence Them

Vol. 35, No. 9, September 1, 2016

Wolters Kluwer

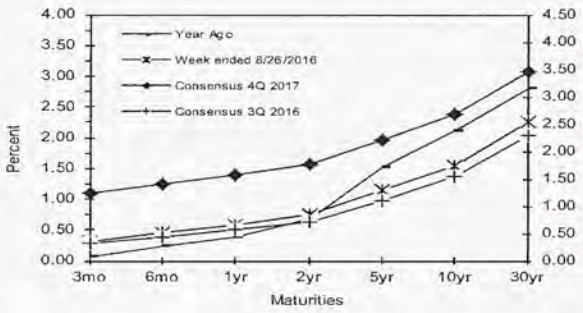
Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Qtr	3Q	4Q	1Q	2Q	3Q	4Q
Interest Rates	Aug. 26	Aug. 19	Aug. 12	Aug. 5	Jul	Jun	May	2Q 2016	2016	2016	2017	2017	2017	2017
Federal Funds Rate	0.40	0.40	0.40	0.36	0.39	0.38	0.37	0.37	0.4	0.5	0.6	0.8	0.9	1.1
Prime Rate	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.5	3.6	3.7	3.9	4.0	4.2
LIBOR, 3-mo.	0.82	0.82	0.82	0.78	0.70	0.69	0.64	0.63	0.8	0.9	1.0	1.1	1.3	1.5
Commercial Paper, 1-mo.	0.38	0.37	0.36	0.37	0.35	0.38	0.35	0.36	0.4	0.5	0.7	0.9	1.0	1.2
Treasury bill, 3-mo.	0.30	0.30	0.29	0.28	0.30	0.27	0.28	0.28	0.3	0.5	0.6	0.8	0.9	1.1
Treasury bill, 6-mo.	0.45	0.45	0.44	0.42	040	0.40	0.42	0.43	0.4	0.6	0.7	0.9	1.1	1.3
Treasury bill, 1 yr.	0.58	0.58	0.56	0.52	0.51	0.55	0.59	0.54	0.6	0.7	0.9	1.1	1.2	1.4
Treasury note, 2 yr.	0.75	0.74	0.72	0.67	0.67	0.73	0.82	0.79	0.7	0.9	1.1	1.2	1.4	1.6
Treasury note, 5 yr.	1.14	1.15	1.12	1.07	1.07	1.17	1.30	1.30	1.1	1.3	1.5	1.6	1.8	2.0
Treasury note, 10 yr.	1.55	1.56	1.54	1.54	1.50	1.64	1.81	1.84	1.5	1.7	1.9	2.1	2.2	2.4
Treasury note, 30 yr.	2.25	2.28	2.26	2.28	2.23	2.45	2.63	2.64	2.3	2.5	2.6	2.8	2.9	3.1
Corporate Aaa bond	3.27	3.31	3.34	3.40	3.28	3.50	3.65	3.82	3.3	3.6	3.8	3.9	4.1	4.2
Corporate Baa bond	4.21	4.25	4.25	4.29	4.22	4.53	4.68	5.10	4.4	4.6	4.8	4.9	5.0	5.2
State & Local bonds	2.84	2.84	2.85	2.85	2.83	3.20	3.29	3.30	3.0	3.1	3.3	3.4	3.6	3.7
Home mortgage rate	3.43	3.43	3.45	3.43	3.44	3.57	3.60	3.70	3.5	3.7	3.8	4.0	4.2	4.3
	History								Consensus Forecasts-Quarterly					
	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Key Assumptions	2014	2014	2015	2015	2015	2015	2016	2016	2016	2016	2017	2017	2017	2017
Major Currency Index	77.8	82.6	89.4	89.9	91.8	93.1	93.3	89.6	90.4	91.2	91.8	91.9	92.0	92.0
Real GDP	5.0	2.3	2.0	2.6	2.0	0.9	0.8	1.1	2.7	2.4	2.2	2.3	2.2	2.2
GDP Price Index	1.7	0.5	-0.1	2.3	1.3	0.8	0.5	2.3	1.6	1.8	1.9	2.1	2.1	2.1
Consumer Price Index	0.9	-0.3	-2.9	2.4	1.4	0.8	-0.3	2.5	1.8	2.2	2.2	2.3	2.3	2.3

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data for interest rates except LIBOR is from Federal Reserve Release (FRSR) H.15. LIBOR quotes available from *The Wall Street Journal*. Interest rate definitions are same as those in FRSR H.15. Treasury yields are reported on a constant maturity basis. Historical data for Fed's Major Currency Index is from FRSR H.10 and G.5. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS).

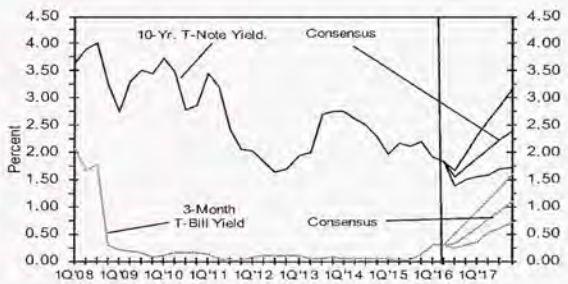
U.S. Treasury Yield Curve

Week ended August 26, 2016 and Year Ago vs. 3Q 2016 and 4Q 2017 Consensus Forecasts



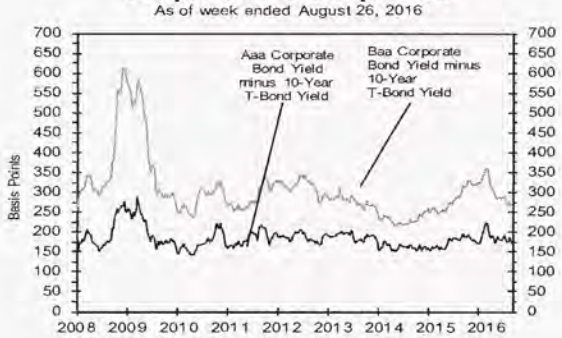
U.S. 3-Mo. T-Bills & 10-Yr. T-Note Yield

(Quarterly Average)



Corporate Bond Spreads

As of week ended August 26, 2016



U.S. Treasury Yield Curve

As of week August 26, 2016

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Vol. 35, No. 10, October 1, 2016

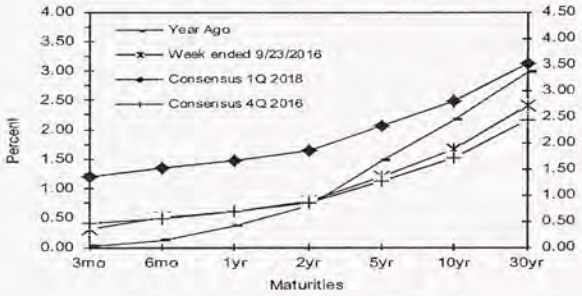
Wolters Kluwer

Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

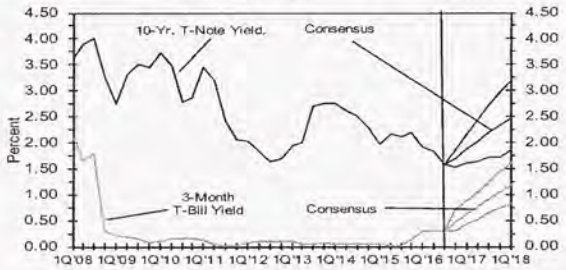
	History							Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			*Latest Qtr*	4Q	1Q	2Q	3Q	4Q	1Q
Interest Rates	Sep. 23	Sep. 16	Sep. 9	Sep. 2	Aug	Jul	Jun	*3Q 2016**	2016	2017	2017	2017	2017	2018
Federal Funds Rate	0.40	0.40	0.40	0.39	0.40	0.39	0.38	*0.39*	0.5	0.6	0.8	0.9	1.1	1.3
Prime Rate	3.50	3.50	3.50	3.50	3.50	3.50	3.50	*3.50*	3.6	3.7	3.9	4.0	4.2	4.3
LIBOR, 3-mo.	0.85	0.85	0.84	0.84	0.81	0.70	0.69	*0.72*	0.9	1.0	1.1	1.3	1.5	1.6
Commercial Paper, 1-mo.	0.40	0.41	0.37	0.39	0.37	0.35	0.38	*0.37*	0.5	0.7	0.8	1.0	1.2	1.3
Treasury bill, 3-mo.	0.32	0.33	0.34	0.33	0.30	0.30	0.27	*0.29*	0.5	0.6	0.8	0.9	1.1	1.2
Treasury bill, 6-mo.	0.50	0.52	0.49	0.47	0.45	0.40	0.40	*0.42*	0.6	0.7	0.9	1.0	1.2	1.3
Treasury bill, 1 yr.	0.60	0.61	0.57	0.61	0.57	0.51	0.55	*0.54*	0.7	0.9	1.0	1.2	1.3	1.5
Treasury note, 2 yr.	0.77	0.77	0.76	0.80	0.74	0.67	0.73	*0.71*	0.9	1.1	1.2	1.4	1.5	1.6
Treasury note, 5 yr.	1.20	1.22	1.17	1.19	1.13	1.07	1.17	*1.12*	1.3	1.5	1.6	1.8	1.9	2.0
Treasury note, 10 yr.	1.66	1.70	1.59	1.58	1.56	1.50	1.64	*1.57*	1.7	1.9	2.0	2.2	2.3	2.5
Treasury note, 30 yr.	2.40	2.45	2.30	2.24	2.26	2.23	2.45	*2.31*	2.4	2.6	2.8	2.9	3.0	3.1
Corporate Aaa bond	3.44	3.49	3.33	3.24	3.32	3.28	3.50	*3.37*	3.5	3.7	3.9	4.0	4.1	4.3
Corporate Baa bond	4.35	4.41	4.25	4.19	4.24	4.22	4.53	*4.33*	4.5	4.7	4.8	5.0	5.1	5.3
State & Local bonds	2.98	2.96	2.83	2.84	2.85	2.83	3.20	*2.96*	3.1	3.2	3.4	3.5	3.6	3.6
Home mortgage rate	3.48	3.50	3.44	3.46	3.44	3.44	3.57	*3.48*	3.6	3.8	3.9	4.1	4.2	4.3
	History								Consensus Forecasts-Quarterly					
	4Q	1Q	2Q	3Q	4Q	1Q	2Q	*3Q*	4Q	1Q	2Q	3Q	4Q	1Q
Key Assumptions	2014	2015	2015	2015	2015	2016	2016	*2016**	2016	2017	2017	2017	2017	2018
Major Currency Index	82.6	89.4	89.9	91.8	93.1	93.3	89.6	*90.0*	90.8	91.6	91.9	92.0	92.0	91.5
Real GDP	2.3	2.0	2.6	2.0	0.9	0.8	1.1	*2.8*	2.4	2.2	2.3	2.2	2.2	2.1
GDP Price Index	0.5	-0.1	2.3	1.3	0.8	0.5	2.3	*1.5*	1.8	1.9	2.0	2.0	2.1	2.0
Consumer Price Index	-0.3	-2.9	2.4	1.4	0.8	-0.3	2.5	*1.7*	2.3	2.1	2.3	2.3	2.4	2.3

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data for interest rates except LIBOR is from Federal Reserve Release (FRSR) H.15. LIBOR quotes available from *The Wall Street Journal*. Interest rate definitions are same as those in FRSR H.15. Treasury yields are reported on a constant maturity basis. Historical data for Fed's Major Currency Index is from FRSR H.10 and G.5. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS). **Interest rate data for 3Q 2016 based on historical data through the week ended September 23rd. *Data for 3Q 2016 Major Currency Index is based on data through week ended September 16th. Figures for 3Q 2016 Real GDP, GDP Chained Price Index and Consumer Price Index are consensus forecasts based on a special question asked of the panelists' this month.*

U.S. Treasury Yield Curve
Week ended September 23, 2016 and Year Ago vs. 4Q 2016 and 1Q 2018 Consensus Forecasts



U.S. 3-Mo. T-Bills & 10-Yr. T-Note Yield
(Quarterly Average)



Corporate Bond Spreads
As of week ended September 23, 2016

U.S. Treasury Yield Curve
As of week September 23, 2016

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Vol. 35, No. 11, November 1, 2016

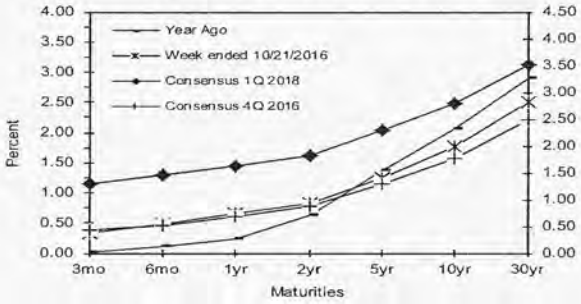
Wolters Kluwer

Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

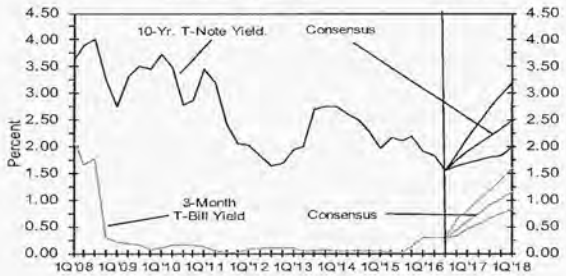
	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Qtr	4Q	1Q	2Q	3Q	4Q	1Q
Interest Rates	Oct. 21	Oct. 14	Oct. 7	Sep. 30	Sep	Aug	Jul	3Q 2016	2016	2017	2017	2017	2017	2018
Federal Funds Rate	0.41	0.40	0.35	0.40	0.40	0.40	0.39	0.40	0.5	0.7	0.8	0.9	1.1	1.2
Prime Rate	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.6	3.7	3.9	4.0	4.2	4.3
LIBOR, 3-mo.	0.88	0.88	0.87	0.85	0.85	0.81	0.70	0.79	0.9	1.0	1.2	1.3	1.5	1.6
Commercial Paper, 1-mo.	0.43	0.46	0.41	0.39	0.40	0.37	0.35	0.37	0.5	0.7	0.8	1.0	1.1	1.3
Treasury bill, 3-mo.	0.34	0.34	0.33	0.27	0.29	0.30	0.30	0.30	0.4	0.6	0.8	0.9	1.0	1.2
Treasury bill, 6-mo.	0.47	0.47	0.47	0.43	0.47	0.45	0.40	0.44	0.5	0.7	0.9	1.0	1.2	1.3
Treasury bill, 1 yr.	0.66	0.67	0.65	0.59	0.59	0.57	0.51	0.56	0.7	0.9	1.0	1.2	1.3	1.4
Treasury note, 2 yr.	0.82	0.86	0.83	0.75	0.77	0.74	0.67	0.73	0.9	1.1	1.2	1.3	1.5	1.6
Treasury note, 5 yr.	1.25	1.29	1.24	1.13	1.18	1.13	1.07	1.13	1.3	1.5	1.6	1.7	1.9	2.0
Treasury note, 10 yr.	1.76	1.78	1.70	1.58	1.63	1.56	1.50	1.56	1.8	1.9	2.1	2.2	2.3	2.5
Treasury note, 30 yr.	2.50	2.51	2.42	2.30	2.35	2.26	2.23	2.28	2.5	2.6	2.8	2.9	3.0	3.1
Corporate Aaa bond	3.67	3.70	3.65	3.56	3.41	3.32	3.28	3.34	3.5	3.7	3.9	4.0	4.2	4.3
Corporate Baa bond	4.32	4.35	4.31	4.22	4.31	4.24	4.22	4.26	4.5	4.7	4.8	5.0	5.1	5.3
State & Local bonds	3.37	3.36	3.32	3.28	2.93	2.85	2.83	2.87	3.2	3.3	3.4	3.5	3.7	3.7
Home mortgage rate	3.54	3.52	3.47	3.42	3.46	3.44	3.44	3.45	3.6	3.8	3.9	4.1	4.2	4.4
	History								Consensus Forecasts-Quarterly					
	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q
Key Assumptions	2014	2015	2015	2015	2015	2016	2016	2016	2016	2017	2017	2017	2017	2018
Major Currency Index	82.6	89.4	89.9	91.8	93.1	93.3	89.6	90.0	91.6	92.3	92.6	92.6	92.7	92.2
Real GDP	2.3	2.0	2.6	2.0	0.9	0.8	1.4	2.9	2.3	2.2	2.3	2.2	2.1	2.1
GDP Price Index	0.5	-0.1	2.3	1.3	0.8	0.5	2.3	1.5	2.0	2.0	2.1	2.1	2.2	2.2
Consumer Price Index	-0.3	-2.9	2.4	1.4	0.8	-0.3	2.5	1.6	2.7	2.2	2.3	2.2	2.4	2.3

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data: Treasury rates from the Federal Reserve Board's H.15; AA-AAA and BBB-A corporate bond yields from Bank of America-Merrill Lynch and are 15+ years, yield to maturity; State and local bond yields from Bank of America-Merrill Lynch, A-rated, yield to maturity; Mortgage rates from Freddie Mac, 30-year, fixed; LIBOR quotes from Intercontinental Exchange. Historical data for Fed's Major Currency Index is from FRSR H.10 and G.5. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS).

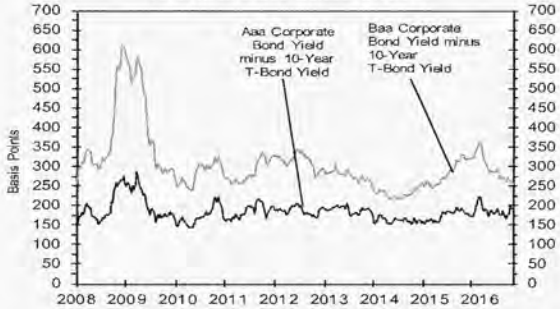
U.S. Treasury Yield Curve
Week ended October 21, 2016 and Year Ago vs. 4Q 2016 and 1Q 2018 Consensus Forecasts



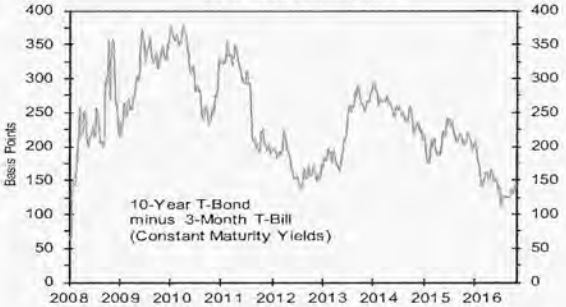
U.S. 3-Mo. T-Bills & 10-Yr. T-Note Yield
(Quarterly Average) Forecast



Corporate Bond Spreads
As of week ended October 21, 2016



U.S. Treasury Yield Curve
As of week October, 2016



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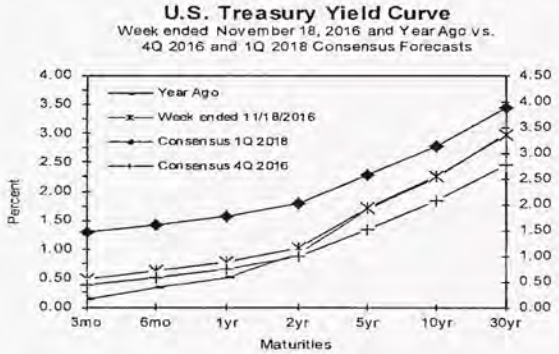
Vol. 35, No. 12, December 1, 2016

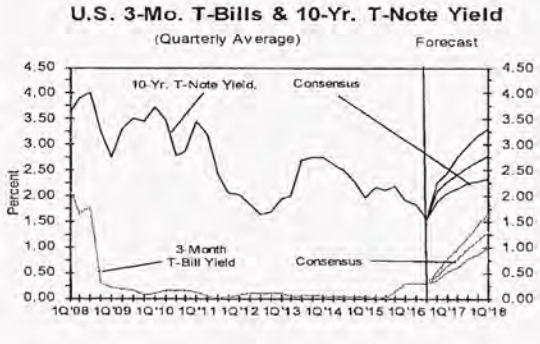
Wolters Kluwer

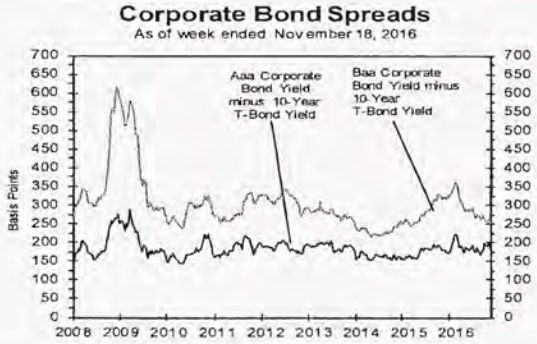
Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

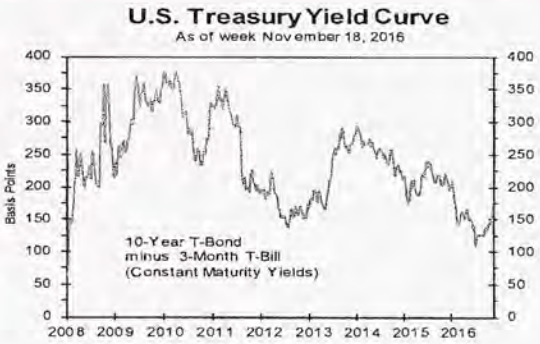
	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Qtr	4Q	1Q	2Q	3Q	4Q	1Q
Interest Rates	Nov. 18	Nov. 11	Nov. 4	Oct. 28	Oct	Sep	Aug	3Q 2016	2016	2017	2017	2017	2017	2018
Federal Funds Rate	0.41	0.41	0.40	0.41	0.39	0.40	0.40	0.40	0.5	0.7	0.8	1.0	1.1	1.3
Prime Rate	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.6	3.8	3.9	4.1	4.2	4.4
LIBOR, 3-mo.	0.91	0.89	0.88	0.89	0.88	0.85	0.81	0.79	0.9	1.1	1.2	1.4	1.5	1.7
Commercial Paper, 1-mo.	0.43	0.42	0.42	0.40	0.43	0.40	0.37	0.37	0.5	0.7	0.9	1.1	1.3	1.4
Treasury bill, 3-mo.	0.48	0.44	0.36	0.32	0.33	0.29	0.30	0.30	0.4	0.6	0.8	1.0	1.1	1.3
Treasury bill, 6-mo.	0.62	0.56	0.51	0.48	0.47	0.47	0.45	0.44	0.6	0.8	0.9	1.1	1.3	1.4
Treasury bill, 1 yr.	0.77	0.70	0.64	0.67	0.66	0.59	0.57	0.56	0.7	0.9	1.1	1.3	1.4	1.6
Treasury note, 2 yr.	1.03	0.88	0.82	0.86	0.84	0.77	0.74	0.73	1.0	1.1	1.3	1.5	1.6	1.8
Treasury note, 5 yr.	1.71	1.42	1.27	1.30	1.27	1.18	1.13	1.13	1.5	1.7	1.9	2.0	2.2	2.3
Treasury note, 10 yr.	2.26	1.98	1.82	1.81	1.76	1.63	1.56	1.56	2.1	2.3	2.4	2.6	2.7	2.8
Treasury note, 30 yr.	2.98	2.76	2.58	2.55	2.50	2.35	2.26	2.28	2.8	3.0	3.1	3.2	3.3	3.4
Corporate Aaa bond	4.10	3.95	3.79	3.73	3.69	3.41	3.32	3.34	3.8	4.0	4.1	4.2	4.4	4.5
Corporate Baa bond	4.77	4.61	4.44	4.37	4.34	4.31	4.24	4.26	4.7	4.9	5.1	5.2	5.3	5.5
State & Local bonds	3.59	3.40	3.36	3.37	3.35	2.93	2.85	2.87	3.4	3.6	3.7	3.8	3.9	4.0
Home mortgage rate	3.94	3.57	3.54	3.47	3.47	3.46	3.44	3.45	3.8	4.0	4.2	4.3	4.4	4.6
	History								Consensus Forecasts-Quarterly					
	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q
Key Assumptions	2014	2015	2015	2015	2015	2016	2016	2016	2016	2017	2017	2017	2017	2018
Major Currency Index	82.6	89.4	89.9	91.8	93.1	93.3	89.6	90.0	92.8	93.9	94.3	94.2	94.2	93.8
Real GDP	2.3	2.0	2.6	2.0	0.9	0.8	1.4	2.9	2.3	2.2	2.2	2.3	2.2	2.3
GDP Price Index	0.5	-0.1	2.3	1.3	0.8	0.5	2.3	1.5	2.1	1.9	2.1	2.1	2.1	2.2
Consumer Price Index	-0.3	-2.9	2.4	1.4	0.8	-0.3	2.5	1.6	2.8	2.1	2.4	2.3	2.5	2.3

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data: Treasury rates from the Federal Reserve Board's H.15; AAA-AA and A-BBB corporate bond yields from Bank of America-Merrill Lynch and are 15+ years, yield to maturity; State and local bond yields from Bank of America-Merrill Lynch, A-rated, yield to maturity; Mortgage rates from Freddie Mac, 30-year, fixed; LIBOR quotes from Intercontinental Exchange. All interest rate data is sourced from Haver Analytics. Historical data for Fed's Major Currency Index is from FRSR H.10. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS).









Long-Range Survey:

The table below contains the results of our twice-annual long-range CONSENSUS survey. There are also Top 10 and Bottom 10 averages for each variable. Shown are consensus estimates for the years 2018 through 2022 and averages for the five-year periods 2018-2022 and 2023-2027. Apply these projections cautiously. Few if any economic, demographic and political forces can be evaluated accurately over such long time spans.

		Average For The Year					Five-Year Averages	
Interest Rates		2018	2019	2020	2021	2022	2018-2022	2023-2027
1. Federal Funds Rate	CONSENSUS	1.8	2.4	2.8	3.0	3.0	2.6	3.0
	Top 10 Average	2.4	3.1	3.5	3.6	3.7	3.3	3.6
	Bottom 10 Average	1.3	1.5	2.0	2.2	2.2	1.9	2.2
2. Prime Rate	CONSENSUS	4.8	5.5	5.8	6.0	6.0	5.6	5.9
	Top 10 Average	5.4	6.2	6.6	6.7	6.7	6.3	6.6
	Bottom 10 Average	4.3	4.7	5.0	5.3	5.2	4.9	5.1
3. LIBOR, 3-Mo.	CONSENSUS	2.1	2.8	3.1	3.2	3.3	2.9	3.2
	Top 10 Average	2.7	3.4	3.8	3.9	3.9	3.5	3.8
	Bottom 10 Average	1.7	2.1	2.4	2.5	2.5	2.2	2.5
4. Commercial Paper, 1-Mo.	CONSENSUS	2.0	2.7	3.1	3.2	3.2	2.8	3.2
	Top 10 Average	2.5	3.2	3.6	3.7	3.8	3.4	3.7
	Bottom 10 Average	1.6	2.1	2.5	2.6	2.6	2.3	2.6
5. Treasury Bill Yield, 3-Mo.	CONSENSUS	1.7	2.4	2.8	2.9	2.9	2.6	2.9
	Top 10 Average	2.4	3.2	3.5	3.6	3.7	3.3	3.6
	Bottom 10 Average	1.3	1.7	2.0	2.1	2.1	1.8	2.1
6. Treasury Bill Yield, 6-Mo.	CONSENSUS	1.9	2.6	2.9	3.1	3.1	2.7	3.0
	Top 10 Average	2.6	3.3	3.7	3.8	3.8	3.4	3.7
	Bottom 10 Average	1.4	1.9	2.1	2.2	2.2	2.0	2.2
7. Treasury Bill Yield, 1-Yr.	CONSENSUS	2.1	2.7	3.0	3.1	3.2	2.8	3.2
	Top 10 Average	2.8	3.5	3.8	3.9	3.9	3.6	3.8
	Bottom 10 Average	1.5	1.9	2.2	2.3	2.3	2.1	2.3
8. Treasury Note Yield, 2-Yr.	CONSENSUS	2.2	2.9	3.2	3.3	3.3	3.0	3.3
	Top 10 Average	2.9	3.6	4.0	4.0	4.0	3.7	4.1
	Bottom 10 Average	1.7	2.1	2.4	2.5	2.5	2.2	2.4
10. Treasury Note Yield, 5-Yr.	CONSENSUS	2.7	3.2	3.5	3.6	3.6	3.3	3.6
	Top 10 Average	3.3	4.0	4.3	4.3	4.4	4.0	4.4
	Bottom 10 Average	2.2	2.4	2.6	2.8	2.8	2.6	2.8
11. Treasury Note Yield, 10-Yr.	CONSENSUS	3.1	3.5	3.8	3.9	3.9	3.6	3.9
	Top 10 Average	3.8	4.3	4.6	4.6	4.6	4.4	4.7
	Bottom 10 Average	2.5	2.7	2.9	3.1	3.1	2.8	3.1
12. Treasury Bond Yield, 30-Yr.	CONSENSUS	3.8	4.1	4.3	4.4	4.4	4.2	4.5
	Top 10 Average	4.5	5.0	5.2	5.2	5.3	5.0	5.3
	Bottom 10 Average	3.1	3.3	3.5	3.6	3.6	3.4	3.6
13. Corporate Aaa Bond Yield	CONSENSUS	4.8	5.2	5.4	5.5	5.5	5.3	5.5
	Top 10 Average	5.4	5.8	6.1	6.1	6.1	5.9	6.2
	Bottom 10 Average	4.3	4.6	4.8	4.8	4.8	4.7	4.9
13. Corporate Baa Bond Yield	CONSENSUS	5.9	6.2	6.4	6.4	6.4	6.3	6.4
	Top 10 Average	6.5	6.9	7.0	7.1	7.2	6.9	7.2
	Bottom 10 Average	5.3	5.5	5.8	5.8	5.7	5.6	5.7
14. State & Local Bonds Yield	CONSENSUS	4.3	4.6	4.5	4.8	4.8	4.6	4.8
	Top 10 Average	4.9	5.3	5.4	5.5	5.6	5.3	5.6
	Bottom 10 Average	3.8	3.8	3.5	4.0	4.0	3.8	4.0
15. Home Mortgage Rate	CONSENSUS	4.9	5.3	5.5	5.6	5.6	5.4	5.6
	Top 10 Average	5.5	6.0	6.2	6.3	6.3	6.0	6.3
	Bottom 10 Average	4.3	4.6	4.7	4.9	4.9	4.7	4.9
A. FRB - Major Currency Index	CONSENSUS	94.6	93.8	93.6	93.5	93.2	93.8	92.1
	Top 10 Average	97.6	97.9	98.3	98.4	98.4	98.1	97.4
	Bottom 10 Average	91.5	89.6	88.7	88.4	87.9	89.2	86.6
		Year-Over-Year, % Change					Five-Year Averages	
		2018	2019	2020	2021	2022	2018-2022	2023-2027
B. Real GDP	CONSENSUS	2.3	2.2	2.1	2.1	2.1	2.2	2.1
	Top 10 Average	2.7	2.5	2.4	2.4	2.4	2.5	2.5
	Bottom 10 Average	1.9	1.8	1.7	1.8	1.8	1.8	1.8
C. GDP Chained Price Index	CONSENSUS	2.1	2.1	2.1	2.1	2.0	2.1	2.0
	Top 10 Average	2.4	2.4	2.4	2.4	2.2	2.3	2.2
	Bottom 10 Average	1.8	1.8	1.9	1.9	1.9	1.9	1.9
D. Consumer Price Index	CONSENSUS	2.4	2.3	2.3	2.3	2.3	2.3	2.3
	Top 10 Average	2.7	2.6	2.6	2.6	2.5	2.6	2.5
	Bottom 10 Average	2.1	2.1	2.2	2.1	2.0	2.1	2.1

Blue Chip Financial Forecasts®

Top Analysts' Forecasts Of U.S. And Foreign Interest Rates, Currency Values And The Factors That Influence Them

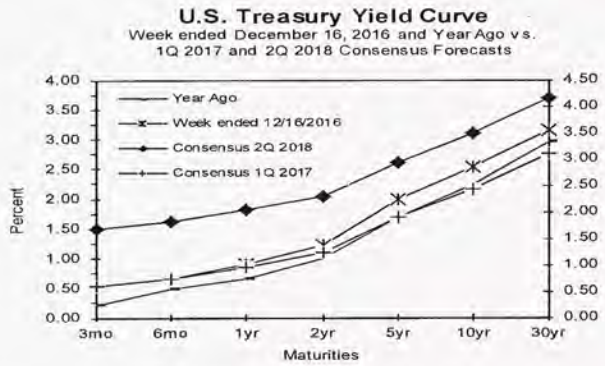
Vol. 36, No. 1, January 1, 2017

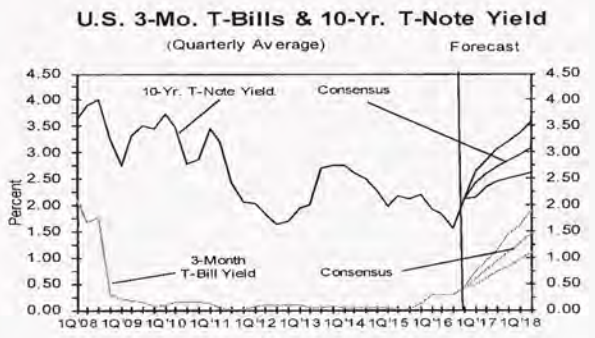
Wolters Kluwer

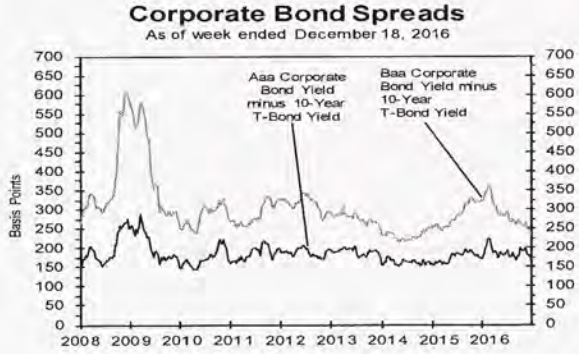
Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

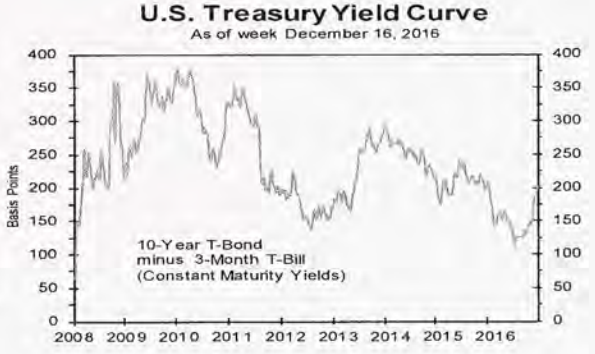
	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Qtr	1Q	2Q	3Q	4Q	1Q	2Q
Interest Rates	Dec. 16	Dec. 9	Dec. 2	Nov. 25	Nov	Oct	Sep	*4Q 2016**	2017	2017	2017	2017	2018	2018
Federal Funds Rate	0.41	0.41	0.41	0.41	0.41	0.39	0.40	*0.40*	0.7	0.8	1.0	1.2	1.3	1.5
Prime Rate	3.50	3.50	3.50	3.50	3.50	3.50	3.50	*3.50*	3.8	3.9	4.1	4.2	4.4	4.6
LIBOR, 3-mo.	0.98	0.95	0.94	0.93	0.90	0.88	0.85	*0.92*	1.1	1.2	1.4	1.5	1.7	1.9
Commercial Paper, 1-mo.	0.63	0.52	0.49	0.41	0.43	0.43	0.40	*0.48*	0.7	0.9	1.1	1.2	1.4	1.6
Treasury bill, 3-mo.	0.52	0.51	0.48	0.49	0.45	0.33	0.29	*0.43*	0.6	0.8	1.0	1.1	1.3	1.5
Treasury bill, 6-mo.	0.65	0.63	0.61	0.62	0.58	0.47	0.47	*0.56*	0.7	0.9	1.1	1.3	1.4	1.6
Treasury bill, 1 yr.	0.89	0.84	0.80	0.79	0.74	0.66	0.59	*0.76*	0.9	1.1	1.3	1.5	1.6	1.8
Treasury note, 2 yr.	1.23	1.12	1.11	1.10	0.98	0.84	0.77	*1.00*	1.2	1.4	1.6	1.7	1.9	2.0
Treasury note, 5 yr.	2.00	1.84	1.83	1.81	1.60	1.27	1.18	*1.60*	1.9	2.1	2.2	2.4	2.5	2.6
Treasury note, 10 yr.	2.54	2.40	2.37	2.34	2.14	1.76	1.63	*2.12*	2.4	2.6	2.7	2.8	3.0	3.1
Treasury note, 30 yr.	3.16	3.08	3.03	3.01	2.86	2.50	2.35	*2.83*	3.1	3.2	3.3	3.5	3.6	3.7
Corporate Aaa bond	4.24	4.19	4.15	4.15	4.00	3.69	3.41	*3.97*	4.1	4.3	4.4	4.5	4.6	4.7
Corporate Baa bond	4.86	4.82	4.81	4.82	4.66	4.34	4.31	*4.61*	5.0	5.1	5.2	5.4	5.5	5.6
State & Local bonds	3.78	3.78	3.80	3.67	3.51	3.35	2.93	*3.55*	3.7	3.8	3.9	4.1	4.1	4.3
Home mortgage rate	4.16	4.13	4.08	4.03	3.77	3.47	3.46	*3.80*	4.2	4.3	4.4	4.5	4.6	4.8
	History								Consensus Forecasts-Quarterly					
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	*4Q*	1Q	2Q	3Q	4Q	1Q	2Q
Key Assumptions	2015	2015	2015	2015	2016	2016	2016	*2016**	2017	2017	2017	2017	2018	2018
Major Currency Index	89.4	89.9	91.8	93.1	93.3	89.6	90.3	*93.2*	95.2	95.6	95.9	96.0	95.4	95.2
Real GDP	2.0	2.6	2.0	0.9	0.8	1.4	3.5	*2.1*	2.3	2.3	2.4	2.4	2.5	2.5
GDP Price Index	-0.1	2.3	1.3	0.8	0.5	2.3	1.4	*2.1*	2.0	2.1	2.1	2.1	2.2	2.2
Consumer Price Index	-2.9	2.4	1.4	0.8	-0.3	2.5	1.6	*2.9*	2.3	2.4	2.4	2.5	2.3	2.4

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data: Treasury rates from the Federal Reserve Board's H.15; AAA-AA and A-BBB corporate bond yields from Bank of America-Merrill Lynch and are 15+ years, yield to maturity; State and local bond yields from Bank of America-Merrill Lynch, A-rated, yield to maturity; Mortgage rates from Freddie Mac, 30-year, fixed; LIBOR quotes from Intercontinental Exchange. All interest rate data is sourced from Haver Analytics. Historical data for Fed's Major Currency Index is from FRSR H.10. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS). **Interest rate data for 4Q 2016 based on historical data through the week ended December 16th *Data for 4Q 2016 Major Currency Index is based on data through week ended December 16th. Figures for 4Q 2016 Real GDP, GDP Chained Price Index and Consumer Price Index are consensus forecasts based on a special question asked of the panelists' this month.*









Blue Chip Financial Forecasts®

Top Analysts' Forecasts Of U.S. And Foreign Interest Rates, Currency Values And The Factors That Influence Them

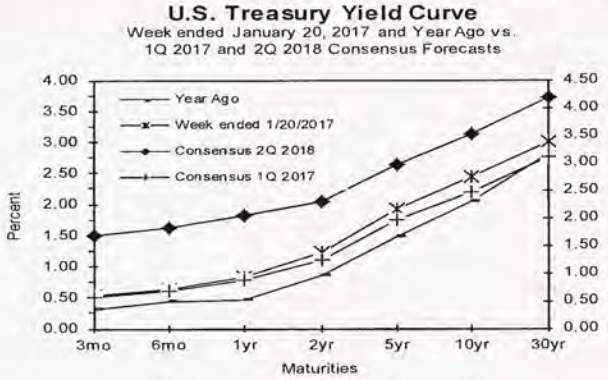
Vol. 36, No. 2, February 1, 2017

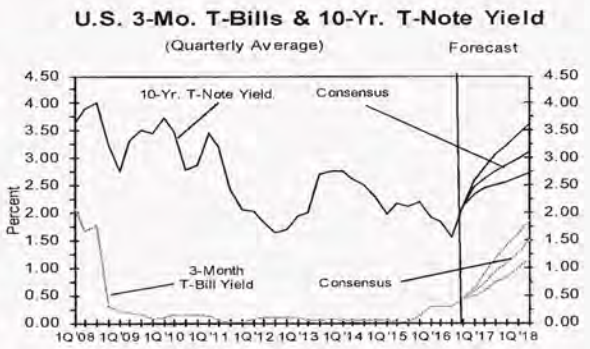
Wolters Kluwer

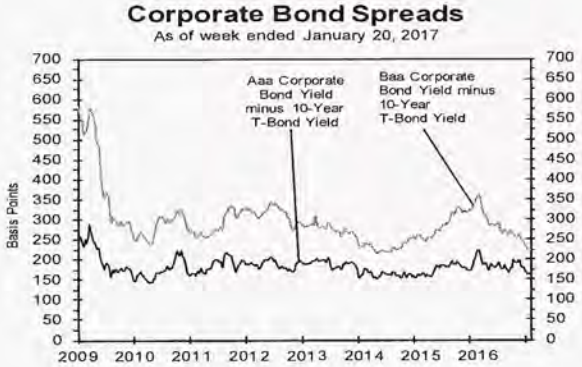
Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

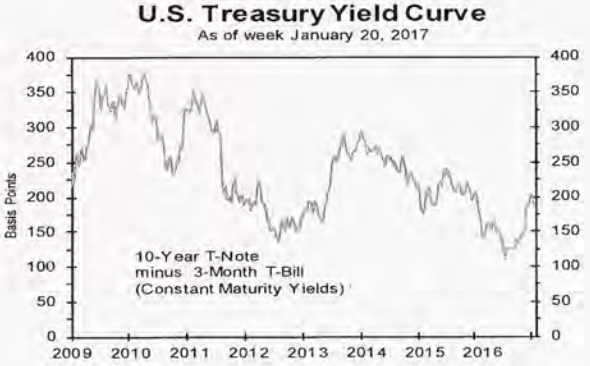
	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Qtr	1Q	2Q	3Q	4Q	1Q	2Q
Interest Rates	Jan. 20	Jan. 13	Jan. 6	Dec. 31	Dec	Nov	Oct	4Q 2016*	2017	2017	2017	2017	2018	2018
Federal Funds Rate	0.66	0.66	0.60	0.66	0.54	0.41	0.39	0.45	0.7	0.8	1.0	1.1	1.3	1.6
Prime Rate	3.75	3.75	3.75	3.73	3.63	3.50	3.50	3.54	3.8	3.9	4.1	4.3	4.4	4.6
LIBOR, 3-mo.	1.03	1.02	1.01	1.00	0.97	0.90	0.88	0.92	1.0	1.2	1.3	1.5	1.7	1.9
Commercial Paper, 1-mo.	0.66	0.63	0.62	0.65	0.56	0.43	0.43	0.47	0.7	0.8	1.0	1.2	1.4	1.6
Treasury bill, 3-mo.	0.53	0.52	0.53	0.51	0.51	0.45	0.33	0.43	0.6	0.7	0.9	1.1	1.3	1.5
Treasury bill, 6-mo.	0.62	0.60	0.63	0.63	0.63	0.58	0.47	0.56	0.7	0.8	1.1	1.2	1.4	1.6
Treasury bill, 1 yr.	0.82	0.82	0.86	0.87	0.86	0.74	0.66	0.75	0.9	1.0	1.3	1.4	1.6	1.8
Treasury note, 2 yr.	1.21	1.20	1.21	1.24	1.19	0.98	0.84	1.00	1.2	1.4	1.5	1.7	1.9	2.0
Treasury note, 5 yr.	1.92	1.89	1.92	2.00	1.94	1.60	1.27	1.60	1.9	2.1	2.2	2.4	2.5	2.6
Treasury note, 10 yr.	2.43	2.38	2.43	2.51	2.47	2.14	1.76	2.12	2.5	2.6	2.7	2.9	3.0	3.1
Treasury note, 30 yr.	3.01	2.98	3.01	3.09	3.10	2.86	2.50	2.82	3.1	3.2	3.4	3.5	3.6	3.7
Corporate Aaa bond	4.04	4.02	4.05	4.14	4.18	4.00	3.69	3.96	4.1	4.2	4.4	4.5	4.6	4.8
Corporate Baa bond	4.64	4.63	4.67	4.75	4.81	4.66	4.34	4.60	4.9	5.0	5.2	5.3	5.4	5.6
State & Local bonds	3.67	3.67	3.73	3.75	3.78	3.51	3.35	3.55	3.7	3.8	3.9	4.1	4.2	4.3
Home mortgage rate	4.09	4.12	4.20	4.32	4.20	3.77	3.47	3.81	4.2	4.3	4.4	4.6	4.7	4.8
	History								Consensus Forecasts-Quarterly					
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q
Key Assumptions	2015	2015	2015	2015	2016	2016	2016	2016*	2017	2017	2017	2017	2018	2018
Major Currency Index	89.4	89.9	91.8	93.1	93.3	89.6	90.3	93.7	94.8	95.3	95.6	95.7	95.5	95.1
Real GDP	2.0	2.6	2.0	0.9	0.8	1.4	3.5	1.9	2.2	2.3	2.4	2.4	2.4	2.5
GDP Price Index	-0.1	2.3	1.3	0.8	0.5	2.3	1.4	2.1	2.0	2.1	2.0	2.1	2.1	2.2
Consumer Price Index	-2.9	2.4	1.4	0.8	-0.3	2.5	1.6	3.4	2.5	2.3	2.4	2.4	2.3	2.3

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data: Treasury rates from the Federal Reserve Board's H.15; AAA-AA and A-BBB corporate bond yields from Bank of America-Merrill Lynch and are 15+ years, yield to maturity; State and local bond yields from Bank of America-Merrill Lynch, A-rated, yield to maturity; Mortgage rates from Freddie Mac, 30-year, fixed; LIBOR quotes from Intercontinental Exchange. All interest rate data is sourced from Haver Analytics. Historical data for Fed's Major Currency Index is from FRSR H.10. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS).









Blue Chip Financial Forecasts®

Top Analysts' Forecasts Of U.S. And Foreign Interest Rates, Currency Values And The Factors That Influence Them

Vol. 36, No. 3, March 1, 2017

Wolters Kluwer

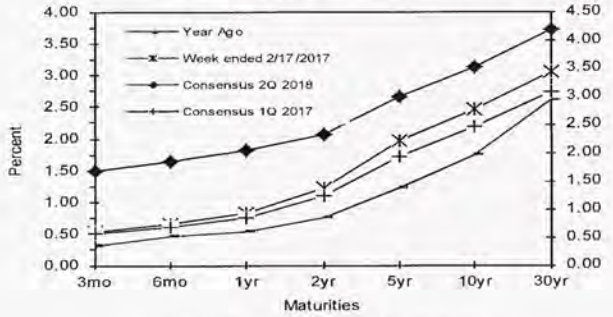
Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Qtr	1Q	2Q	3Q	4Q	1Q	2Q
Interest Rates	Feb. 17	Feb. 10	Feb. 3	Jan. 27	Jan	Dec	Nov	4Q 2016*	2017	2017	2017	2017	2018	2018
Federal Funds Rate	0.66	0.66	0.65	0.66	0.65	0.54	0.41	0.45	0.7	0.8	1.0	1.2	1.4	1.6
Prime Rate	3.75	3.75	3.75	3.75	3.75	3.63	3.50	3.54	3.8	3.9	4.1	4.3	4.5	4.6
LIBOR, 3-mo.	1.05	1.04	1.03	1.04	1.02	0.97	0.90	0.92	1.0	1.2	1.4	1.5	1.7	1.9
Commercial Paper, 1-mo.	0.60	0.62	0.62	0.65	0.64	0.56	0.43	0.47	0.7	0.8	1.0	1.2	1.4	1.6
Treasury bill, 3-mo.	0.53	0.54	0.51	0.51	0.52	0.51	0.45	0.43	0.6	0.7	0.9	1.1	1.3	1.5
Treasury bill, 6-mo.	0.66	0.63	0.64	0.61	0.62	0.63	0.58	0.56	0.7	0.8	1.1	1.2	1.4	1.6
Treasury bill, 1 yr.	0.83	0.80	0.83	0.81	0.83	0.86	0.74	0.75	0.8	1.0	1.2	1.4	1.6	1.8
Treasury note, 2 yr.	1.23	1.17	1.21	1.21	1.21	1.19	0.98	1.00	1.2	1.4	1.5	1.7	1.9	2.1
Treasury note, 5 yr.	1.96	1.86	1.92	1.94	1.92	1.94	1.60	1.60	1.9	2.1	2.2	2.4	2.5	2.7
Treasury note, 10 yr.	2.46	2.39	2.48	2.48	2.43	2.47	2.14	2.12	2.5	2.6	2.7	2.9	3.0	3.1
Treasury note, 30 yr.	3.05	3.01	3.08	3.06	3.02	3.10	2.86	2.82	3.1	3.2	3.3	3.5	3.6	3.7
Corporate Aaa bond	4.11	4.08	4.15	4.11	4.06	4.18	4.00	3.96	4.0	4.2	4.3	4.5	4.6	4.7
Corporate Baa bond	4.69	4.67	4.74	4.70	4.66	4.81	4.66	4.60	4.7	4.9	5.1	5.3	5.4	5.5
State & Local bonds	3.73	3.71	3.74	3.72	3.70	3.78	3.51	3.55	3.7	3.8	3.9	4.0	4.2	4.3
Home mortgage rate	4.15	4.17	4.19	4.19	4.15	4.20	3.77	3.81	4.2	4.3	4.4	4.6	4.7	4.8
	History								Consensus Forecasts-Quarterly					
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q
Key Assumptions	2015	2015	2015	2015	2016	2016	2016	2016*	2017	2017	2017	2017	2018	2018
Major Currency Index	89.4	89.9	91.8	93.1	93.3	89.6	90.3	93.7	94.3	94.6	95.0	95.3	95.4	95.1
Real GDP	2.0	2.6	2.0	0.9	0.8	1.4	3.5	1.9	2.2	2.3	2.4	2.4	2.5	2.5
GDP Price Index	-0.1	2.3	1.3	0.8	0.5	2.3	1.4	2.1	2.2	2.0	2.1	2.1	2.2	2.2
Consumer Price Index	-2.9	2.4	1.4	0.8	-0.3	2.5	1.6	3.4	2.9	2.2	2.4	2.3	2.4	2.3

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data: Treasury rates from the Federal Reserve Board's H.15; AAA-AA and A-BBB corporate bond yields from Bank of America-Merrill Lynch and are 15+ years, yield to maturity; State and local bond yields from Bank of America-Merrill Lynch, A-rated, yield to maturity; Mortgage rates from Freddie Mac, 30-year, fixed; LIBOR quotes from Intercontinental Exchange. All interest rate data is sourced from Haver Analytics. Historical data for Fed's Major Currency Index is from FRSR H.10. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS).

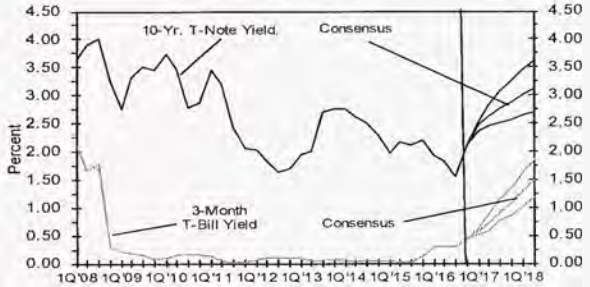
U.S. Treasury Yield Curve

Week ended February 17, 2017 and Year Ago vs. 1Q 2017 and 2Q 2018 Consensus Forecasts



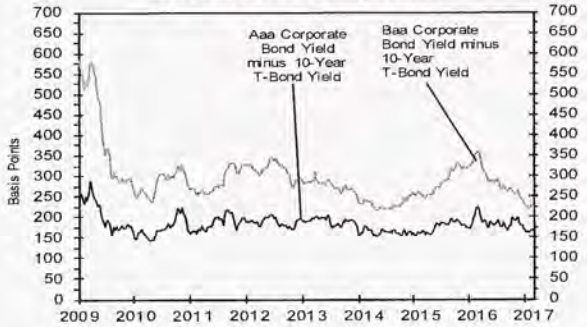
U.S. 3-Mo. T-Bills & 10-Yr. T-Note Yield

(Quarterly Average)



Corporate Bond Spreads

As of week ended February 17, 2017



U.S. Treasury Yield Curve

As of week February 17, 2017

Blue Chip Financial Forecasts®

Top Analysts' Forecasts Of U.S. And Foreign Interest Rates, Currency Values And The Factors That Influence Them

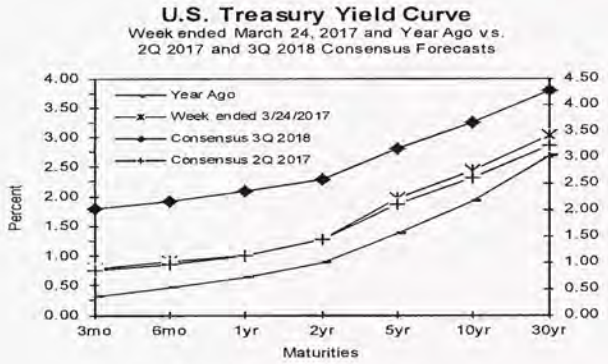
Vol. 36, No. 4, April 1, 2017

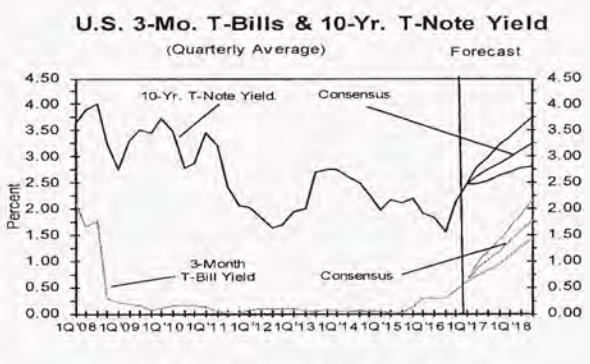
Wolters Kluwer

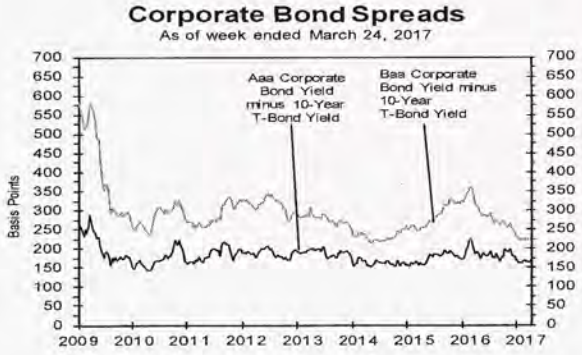
Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Qtr	2Q	3Q	4Q	1Q	2Q	3Q
Interest Rates	Mar. 24	Mar. 17	Mar. 10	Mar. 3	Feb.	Jan.	Dec.	1Q 2017*	2017	2017	2017	2018	2018	2018
Federal Funds Rate	0.91	0.66	0.65	0.66	0.66	0.65	0.54	*0.68*	**0.9**	**1.1**	**1.3**	**1.5**	**1.7**	**1.9**
Prime Rate	4.00	3.75	3.75	3.75	3.75	3.75	3.63	*3.78*	**4.0**	**4.2**	**4.4**	**4.6**	**4.7**	**4.9**
LIBOR, 3-mo.	1.15	1.14	1.11	1.08	1.04	1.02	0.97	*1.06*	**1.3**	**1.4**	**1.6**	**1.8**	**2.0**	**2.2**
Commercial Paper, 1-mo.	0.82	0.85	0.74	0.63	0.61	0.64	0.56	*0.68*	**1.0**	**1.1**	**1.3**	**1.5**	**1.7**	**1.9**
Treasury bill, 3-mo.	0.77	0.75	0.74	0.61	0.53	0.52	0.51	*0.60*	**0.8**	**1.0**	**1.2**	**1.4**	**1.6**	**1.8**
Treasury bill, 6-mo.	0.90	0.90	0.87	0.77	0.65	0.62	0.63	*0.72*	**1.0**	**1.1**	**1.3**	**1.5**	**1.7**	**1.9**
Treasury bill, 1 yr.	1.00	1.03	1.02	0.91	0.82	0.83	0.86	*0.89*	**1.1**	**1.3**	**1.5**	**1.7**	**1.9**	**2.1**
Treasury note, 2 yr.	1.27	1.36	1.34	1.27	1.20	1.21	1.19	*1.24*	**1.4**	**1.6**	**1.8**	**1.9**	**2.1**	**2.3**
Treasury note, 5 yr.	1.96	2.07	2.08	1.96	1.91	1.92	1.94	*1.96*	**2.1**	**2.2**	**2.4**	**2.5**	**2.7**	**2.8**
Treasury note, 10 yr.	2.42	2.55	2.55	2.43	2.43	2.43	2.47	*2.46*	**2.6**	**2.7**	**2.9**	**3.0**	**3.1**	**3.2**
Treasury note, 30 yr.	3.03	3.15	3.14	3.04	3.04	3.02	3.10	*3.06*	**3.2**	**3.3**	**3.5**	**3.6**	**3.7**	**3.8**
Corporate Aaa bond	4.10	4.20	4.19	4.07	4.10	4.06	4.18	*4.11*	**4.2**	**4.3**	**4.5**	**4.6**	**4.8**	**4.9**
Corporate Baa bond	4.68	4.79	4.77	4.65	4.68	4.66	4.81	*4.70*	**4.9**	**5.1**	**5.3**	**5.4**	**5.5**	**5.6**
State & Local bonds	3.71	3.77	3.76	3.71	3.72	3.70	3.78	*3.72*	**3.9**	**4.0**	**4.1**	**4.3**	**4.4**	**4.5**
Home mortgage rate	4.23	4.30	4.21	4.10	4.17	4.15	4.20	*4.19*	**4.3**	**4.4**	**4.6**	**4.7**	**4.8**	**4.9**
	History								Consensus Forecasts-Quarterly					
	2Q	3Q	4Q	1Q	2Q	3Q	4Q	*1Q*	2Q	3Q	4Q	1Q	2Q	3Q
Key Assumptions	2015	2015	2015	2016	2016	2016	2016*	*2017**	2017	2017	2017	2018	2018	2018
Major Currency Index	89.9	91.8	93.1	93.3	89.6	90.3	93.7	*94.5*	**94.5**	**95.0**	**95.4**	**95.5**	**95.1**	**94.9**
Real GDP	2.6	2.0	0.9	0.8	1.4	3.5	1.9	*1.7*	**2.5**	**2.4**	**2.4**	**2.4**	**2.5**	**2.4**
GDP Price Index	2.3	1.3	0.8	0.5	2.3	1.4	2.1	*2.2*	**1.9**	**2.1**	**2.2**	**2.3**	**2.2**	**2.2**
Consumer Price Index	2.4	1.5	0.4	0.1	2.3	1.8	3.0	*3.1*	**1.9**	**2.4**	**2.3**	**2.4**	**2.4**	**2.4**

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data: Treasury rates from the Federal Reserve Board's H.15; AAA-AA and A-BBB corporate bond yields from Bank of America-Merrill Lynch and are 15+ years, yield to maturity; State and local bond yields from Bank of America-Merrill Lynch, A-rated, yield to maturity; Mortgage rates from Freddie Mac, 30-year, fixed; LIBOR quotes from Intercontinental Exchange. All interest rate data is sourced from Haver Analytics. Historical data for Fed's Major Currency Index is from FRSR H.10. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS). **Interest rate data for 1Q 2017 based on historical data through the week ended March 24th. *Data for 1Q 2017 Major Currency Index is based on data through week ended March 24th. Figures for 1Q 2017 Real GDP, GDP Chained Price Index and Consumer Price Index are consensus forecasts based on a special question asked of the panelists' this month.*







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Top Analysts' Forecasts Of U.S. And Foreign Interest Rates, Currency Values And The Factors That Influence Them

Vol. 36, No. 5, May 1, 2017

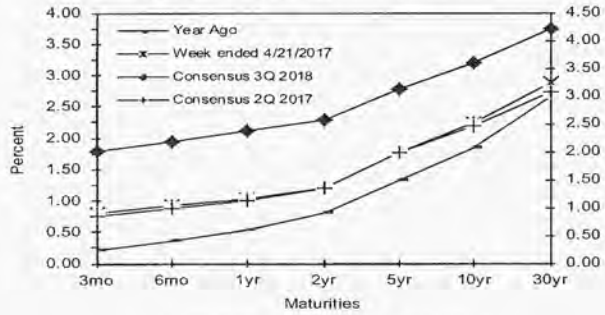
Wolters Kluwer

Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

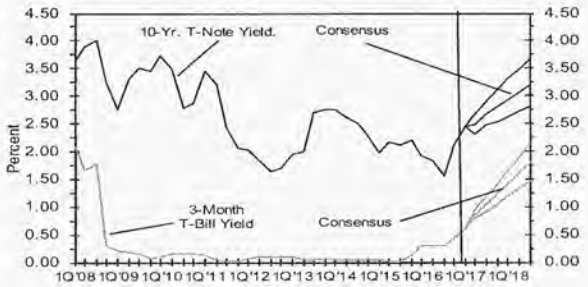
	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Qtr	2Q	3Q	4Q	1Q	2Q	3Q
Interest Rates	Apr. 21	Apr. 14	Apr. 7	Mar. 31	Mar.	Feb.	Jan.	1Q 2017	2017	2017	2017	2018	2018	2018
Federal Funds Rate	0.91	0.91	0.87	0.91	0.76	0.66	0.65	0.69	1.0	1.2	1.3	1.5	1.7	1.9
Prime Rate	4.00	4.00	4.00	4.00	3.85	3.75	3.75	3.78	4.0	4.2	4.4	4.6	4.8	5.0
LIBOR, 3-mo.	1.15	1.16	1.15	1.15	1.13	1.04	1.02	1.06	1.2	1.4	1.6	1.8	2.0	2.2
Commercial Paper, 1-mo.	0.83	0.82	0.83	0.82	0.77	0.61	0.64	0.67	1.0	1.1	1.4	1.6	1.7	1.9
Treasury bill, 3-mo.	0.81	0.82	0.80	0.78	0.73	0.53	0.52	0.59	0.9	1.1	1.2	1.4	1.6	1.8
Treasury bill, 6-mo.	0.93	0.95	0.93	0.91	0.87	0.65	0.62	0.71	1.0	1.2	1.4	1.5	1.7	1.9
Treasury bill, 1 yr.	1.02	1.05	1.04	1.03	1.00	0.82	0.83	0.88	1.1	1.3	1.5	1.7	1.9	2.1
Treasury note, 2 yr.	1.20	1.25	1.25	1.28	1.30	1.20	1.21	1.24	1.4	1.6	1.8	1.9	2.1	2.3
Treasury note, 5 yr.	1.76	1.83	1.88	1.94	2.00	1.91	1.92	1.94	2.0	2.2	2.4	2.5	2.6	2.8
Treasury note, 10 yr.	2.23	2.30	2.35	2.40	2.47	2.43	2.43	2.44	2.5	2.7	2.8	2.9	3.1	3.2
Treasury note, 30 yr.	2.88	2.93	2.99	3.01	3.07	3.04	3.02	3.04	3.1	3.3	3.4	3.5	3.6	3.7
Corporate Aaa bond	3.94	3.99	4.06	4.06	4.13	4.10	4.06	4.10	4.1	4.3	4.5	4.6	4.7	4.9
Corporate Baa bond	4.54	4.59	4.65	4.65	4.71	4.68	4.66	4.68	4.8	5.0	5.2	5.3	5.5	5.6
State & Local bonds	3.51	3.55	3.59	3.64	3.72	3.72	3.70	3.71	3.8	4.0	4.2	4.3	4.4	4.5
Home mortgage rate	3.97	4.08	4.10	4.23	4.20	4.17	4.15	4.17	4.2	4.4	4.5	4.7	4.8	4.9
	History								Consensus Forecasts-Quarterly					
	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q
Key Assumptions	2015	2015	2015	2016	2016	2016	2016	2017	2017	2017	2017	2018	2018	2018
Major Currency Index	89.9	91.8	93.1	93.3	89.6	90.3	93.7	94.4	94.3	94.7	95.0	95.1	94.8	94.5
Real GDP	2.6	2.0	0.9	0.8	1.4	3.5	2.1	0.7	2.7	2.4	2.4	2.4	2.5	2.4
GDP Price Index	2.3	1.3	0.8	0.5	2.3	1.4	2.1	2.3	1.7	2.1	2.1	2.2	2.2	2.2
Consumer Price Index	2.4	1.5	0.4	0.1	2.3	1.8	3.0	3.1	1.6	2.4	2.3	2.4	2.3	2.4

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data: Treasury rates from the Federal Reserve Board's H.15; AAA-AA and A-BBB corporate bond yields from Bank of America-Merrill Lynch and are 15+ years, yield to maturity; State and local bond yields from Bank of America-Merrill Lynch, A-rated, yield to maturity; Mortgage rates from Freddie Mac, 30-year, fixed; LIBOR quotes from Intercontinental Exchange. All interest rate data is sourced from Haver Analytics. Historical data for Fed's Major Currency Index is from FRSR H.10. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS).

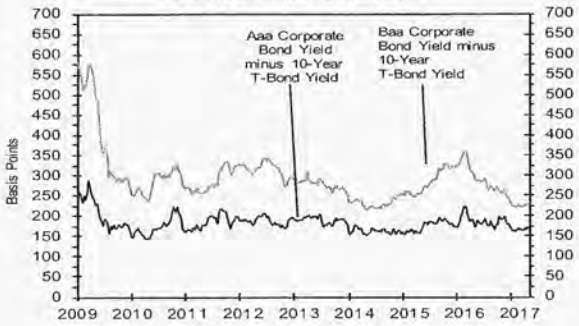
U.S. Treasury Yield Curve
Week ended April 21, 2017 and Year Ago vs.
2Q 2017 and 3Q 2018 Consensus Forecasts



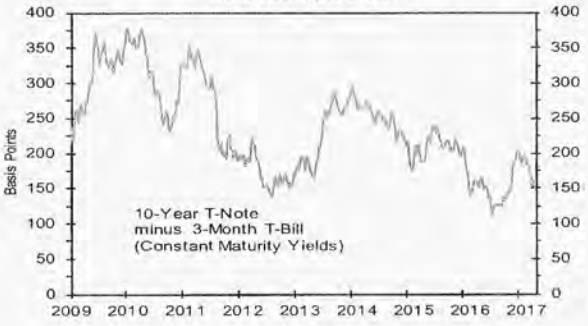
U.S. 3-Mo. T-Bills & 10-Yr. T-Note Yield
(Quarterly Average)



Corporate Bond Spreads
As of week ended April 21, 2017



U.S. Treasury Yield Curve
As of week April 21, 2017



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Top Analysts' Forecasts Of U.S. And Foreign Interest Rates, Currency Values And The Factors That Influence Them

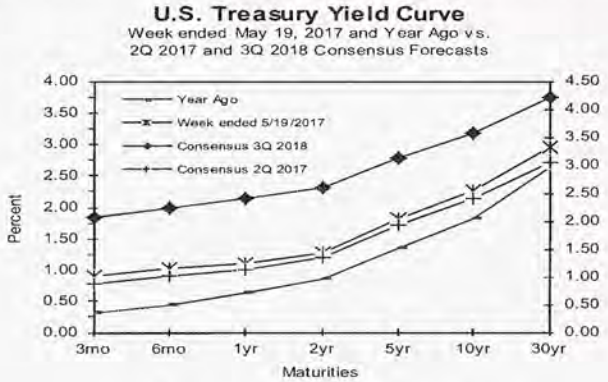
Vol. 36, No. 6, June 1, 2017

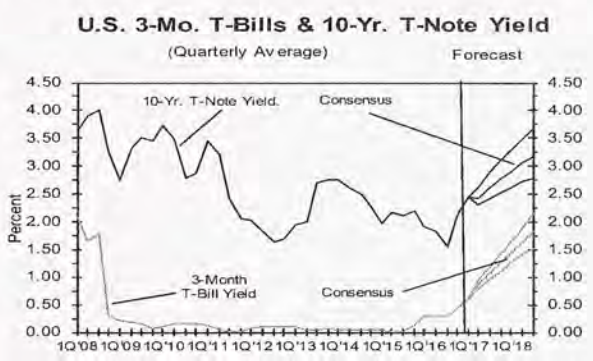
Wolters Kluwer

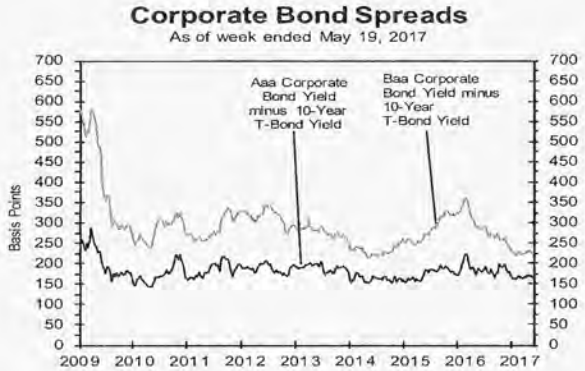
Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

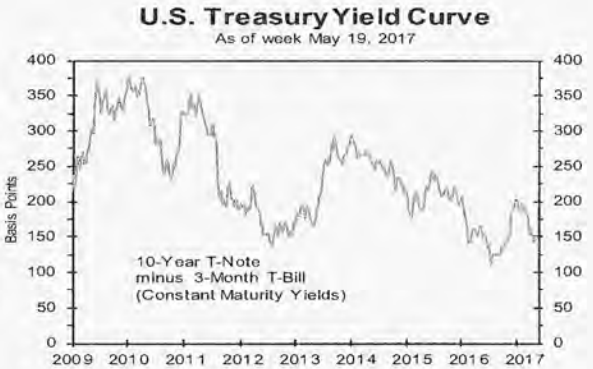
	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Qtr	2Q	3Q	4Q	1Q	2Q	3Q
Interest Rates	May 19	May 12	May 5	Apr. 28	Apr.	Mar.	Feb.	1Q 2017	2017	2017	2017	2018	2018	2018
Federal Funds Rate	0.91	0.91	0.88	0.91	0.90	0.76	0.66	0.69	1.0	1.2	1.4	1.5	1.7	1.9
Prime Rate	4.00	4.00	4.00	4.00	4.00	3.85	3.75	3.78	4.1	4.2	4.4	4.6	4.8	5.0
LIBOR, 3-mo.	1.18	1.18	1.18	1.17	1.16	1.13	1.04	1.06	1.2	1.4	1.6	1.8	2.0	2.2
Commercial Paper, 1-mo.	0.84	0.83	0.83	0.83	0.83	0.77	0.61	0.67	1.0	1.2	1.4	1.6	1.8	2.0
Treasury bill, 3-mo.	0.91	0.90	0.85	0.81	0.81	0.73	0.53	0.59	0.9	1.1	1.3	1.4	1.6	1.8
Treasury bill, 6-mo.	1.02	1.03	1.00	0.98	0.95	0.87	0.65	0.71	1.0	1.2	1.4	1.6	1.8	2.0
Treasury bill, 1 yr.	1.10	1.13	1.10	1.06	1.04	1.00	0.82	0.88	1.1	1.4	1.6	1.7	1.9	2.1
Treasury note, 2 yr.	1.28	1.34	1.30	1.27	1.24	1.30	1.20	1.24	1.3	1.6	1.8	1.9	2.1	2.3
Treasury note, 5 yr.	1.81	1.91	1.86	1.83	1.83	2.00	1.91	1.94	1.9	2.2	2.3	2.5	2.6	2.8
Treasury note, 10 yr.	2.27	2.39	2.33	2.31	2.30	2.47	2.43	2.44	2.4	2.6	2.8	2.9	3.1	3.2
Treasury note, 30 yr.	2.94	3.02	2.99	2.96	2.94	3.07	3.04	3.04	3.0	3.2	3.4	3.5	3.6	3.7
Corporate Aaa bond	3.94	4.05	4.03	4.00	4.00	4.13	4.10	4.10	4.0	4.3	4.5	4.6	4.7	4.9
Corporate Baa bond	4.52	4.64	4.62	4.60	4.60	4.71	4.68	4.68	4.7	5.0	5.2	5.3	5.5	5.6
State & Local bonds	3.49	3.55	3.56	3.54	3.55	3.72	3.72	3.71	3.7	3.9	4.1	4.2	4.3	4.4
Home mortgage rate	4.02	4.05	4.02	4.03	4.05	4.20	4.17	4.17	4.1	4.3	4.5	4.6	4.8	4.9
	History								Consensus Forecasts-Quarterly					
	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q
Key Assumptions	2015	2015	2015	2016	2016	2016	2016	2017	2017	2017	2017	2018	2018	2018
Major Currency Index	89.9	91.8	93.1	93.3	89.6	90.3	93.7	94.4	94.0	94.1	94.5	94.6	94.4	94.2
Real GDP	2.6	2.0	0.9	0.8	1.4	3.5	2.1	1.2	3.1	2.4	2.4	2.4	2.5	2.4
GDP Price Index	2.3	1.3	0.8	0.5	2.3	1.4	2.1	2.2	1.5	2.0	2.1	2.2	2.1	2.2
Consumer Price Index	2.4	1.5	0.4	0.1	2.3	1.8	3.0	3.1	1.1	2.2	2.3	2.4	2.2	2.4

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data: Treasury rates from the Federal Reserve Board's H.15; AAA-AA and A-BBB corporate bond yields from Bank of America-Merrill Lynch and are 15+ years, yield to maturity; State and local bond yields from Bank of America-Merrill Lynch, A-rated, yield to maturity; Mortgage rates from Freddie Mac, 30-year, fixed; LIBOR quotes from Intercontinental Exchange. All interest rate data is sourced from Haver Analytics. Historical data for Fed's Major Currency Index is from FRSR H.10. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS).









Long-Range Survey:

The table below contains the results of our twice-annual long-range CONSENSUS survey. There are also Top 10 and Bottom 10 averages for each variable. Shown are consensus estimates for the years 2019 through 2023 and averages for the five-year periods 2019-2023 and 2024-2028. Apply these projections cautiously. Few if any economic, demographic and political forces can be evaluated accurately over such long time spans.

		Average For The Year					Five-Year Averages	
Interest Rates		**2019**	**2020**	**2021**	**2022**	**2023**	**2019-2023**	**2024-2028**
1. Federal Funds Rate	**CONSENSUS**	**2.6**	**2.9**	**2.9**	**2.9**	**2.9**	**2.8**	**3.0**
	Top 10 Average	3.1	3.5	3.4	3.5	3.5	3.4	3.5
	Bottom 10 Average	2.0	2.3	2.3	2.3	2.4	2.3	2.4
2. Prime Rate	**CONSENSUS**	**5.6**	**5.9**	**5.9**	**5.9**	**5.9**	**5.8**	**6.0**
	Top 10 Average	6.1	6.5	6.5	6.5	6.5	6.4	6.5
	Bottom 10 Average	5.0	5.3	5.3	5.2	5.3	5.2	5.4
3. LIBOR, 3-Mo.	**CONSENSUS**	**2.9**	**3.1**	**3.2**	**3.1**	**3.2**	**3.1**	**3.2**
	Top 10 Average	3.4	3.7	3.7	3.7	3.8	3.7	3.8
	Bottom 10 Average	2.4	2.6	2.6	2.5	2.6	2.5	2.6
4. Commercial Paper, 1-Mo.	**CONSENSUS**	**2.7**	**3.0**	**3.0**	**3.0**	**3.1**	**3.0**	**3.1**
	Top 10 Average	3.2	3.5	3.5	3.6	3.6	3.5	3.6
	Bottom 10 Average	2.2	2.5	2.5	2.4	2.5	2.4	2.6
5. Treasury Bill Yield, 3-Mo.	**CONSENSUS**	**2.5**	**2.8**	**2.8**	**2.8**	**2.9**	**2.8**	**2.9**
	Top 10 Average	3.1	3.4	3.4	3.4	3.5	3.3	3.5
	Bottom 10 Average	1.9	2.2	2.3	2.2	2.3	2.2	2.3
6. Treasury Bill Yield, 6-Mo.	**CONSENSUS**	**2.6**	**2.9**	**3.0**	**3.0**	**3.0**	**2.9**	**3.0**
	Top 10 Average	3.2	3.6	3.5	3.6	3.6	3.5	3.6
	Bottom 10 Average	2.0	2.4	2.4	2.4	2.4	2.3	2.4
7. Treasury Bill Yield, 1-Yr.	**CONSENSUS**	**2.8**	**3.1**	**3.1**	**3.1**	**3.1**	**3.0**	**3.2**
	Top 10 Average	3.4	3.7	3.7	3.7	3.7	3.6	3.7
	Bottom 10 Average	2.1	2.5	2.5	2.5	2.5	2.4	2.5
8. Treasury Note Yield, 2-Yr.	**CONSENSUS**	**2.9**	**3.2**	**3.3**	**3.3**	**3.3**	**3.2**	**3.3**
	Top 10 Average	3.5	3.9	3.9	3.9	3.9	3.8	4.0
	Bottom 10 Average	2.3	2.6	2.7	2.6	2.6	2.6	2.7
10. Treasury Note Yield, 5-Yr.	**CONSENSUS**	**3.3**	**3.5**	**3.5**	**3.6**	**3.6**	**3.5**	**3.6**
	Top 10 Average	3.9	4.2	4.2	4.2	4.2	4.1	4.3
	Bottom 10 Average	2.7	2.9	2.9	3.0	3.0	2.9	3.0
11. Treasury Note Yield, 10-Yr.	**CONSENSUS**	**3.6**	**3.8**	**3.8**	**3.9**	**3.9**	**3.8**	**3.9**
	Top 10 Average	4.2	4.5	4.4	4.5	4.5	4.4	4.6
	Bottom 10 Average	2.9	3.1	3.1	3.2	3.3	3.1	3.3
12. Treasury Bond Yield, 30-Yr.	**CONSENSUS**	**4.2**	**4.3**	**4.4**	**4.4**	**4.4**	**4.3**	**4.5**
	Top 10 Average	4.9	5.0	5.0	5.0	5.0	5.0	5.1
	Bottom 10 Average	3.5	3.7	3.7	3.8	3.8	3.7	3.8
13. Corporate Aaa Bond Yield	**CONSENSUS**	**5.2**	**5.4**	**5.4**	**5.4**	**5.5**	**5.4**	**5.5**
	Top 10 Average	5.7	5.9	5.9	6.0	5.9	5.9	6.0
	Bottom 10 Average	4.7	4.9	4.9	4.9	5.0	4.9	5.1
13. Corporate Baa Bond Yield	**CONSENSUS**	**6.1**	**6.3**	**6.3**	**6.3**	**6.3**	**6.3**	**6.4**
	Top 10 Average	6.8	7.0	6.9	7.0	6.9	6.9	7.0
	Bottom 10 Average	5.5	5.6	5.7	5.6	5.8	5.6	5.7
14. State & Local Bonds Yield	**CONSENSUS**	**4.6**	**4.7**	**4.7**	**4.7**	**4.7**	**4.7**	**4.8**
	Top 10 Average	5.1	5.3	5.2	5.3	5.3	5.2	5.3
	Bottom 10 Average	4.2	4.2	4.2	4.1	4.1	4.2	4.2
15. Home Mortgage Rate	**CONSENSUS**	**5.3**	**5.5**	**5.5**	**5.5**	**5.5**	**5.4**	**5.6**
	Top 10 Average	5.9	6.2	6.1	6.2	6.1	6.1	6.2
	Bottom 10 Average	4.6	4.8	4.8	4.7	4.9	4.8	4.9
A. FRB - Major Currency Index	**CONSENSUS**	**93.8**	**93.2**	**93.1**	**93.0**	**92.7**	**93.2**	**92.5**
	Top 10 Average	96.5	96.6	96.9	97.1	97.2	96.9	97.1
	Bottom 10 Average	91.0	89.7	89.2	88.7	88.1	89.3	88.1
		Year-Over-Year, % Change					Five-Year Averages	
		2019	**2020**	**2021**	**2022**	**2023**	**2019-2023**	**2024-2028**
B. Real GDP	**CONSENSUS**	**2.2**	**2.0**	**2.0**	**2.0**	**2.0**	**2.0**	**2.1**
	Top 10 Average	2.6	2.4	2.4	2.4	2.3	2.4	2.3
	Bottom 10 Average	1.7	1.6	1.6	1.6	1.6	1.6	1.8
C. GDP Chained Price Index	**CONSENSUS**	**2.2**	**2.1**	**2.1**	**2.0**	**2.0**	**2.1**	**2.0**
	Top 10 Average	2.5	2.3	2.3	2.2	2.2	2.3	2.3
	Bottom 10 Average	1.9	1.9	1.9	1.9	1.7	1.8	1.9
D. Consumer Price Index	**CONSENSUS**	**2.3**	**2.3**	**2.3**	**2.3**	**2.2**	**2.2**	**2.2**
	Top 10 Average	2.6	2.6	2.5	2.5	2.4	2.5	2.4
	Bottom 10 Average	1.9	2.0	2.0	2.1	1.8	2.0	2.0

Blue Chip Financial Forecasts®

Top Analysts' Forecasts Of U.S. And Foreign Interest Rates, Currency Values And The Factors That Influence Them

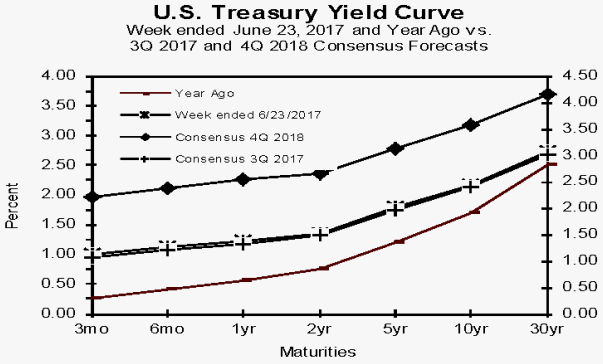
Vol. 36, No. 7, July 1, 2017

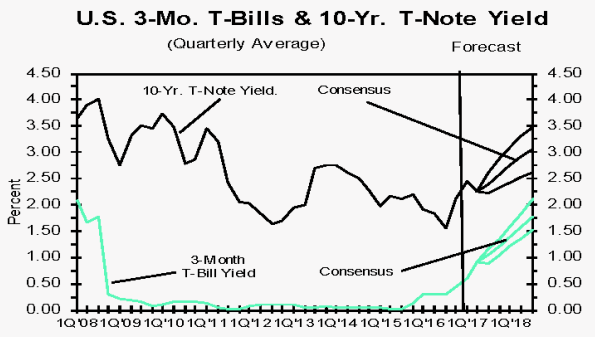
Wolters Kluwer

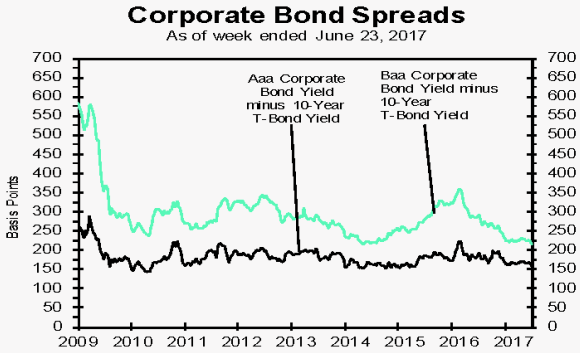
Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

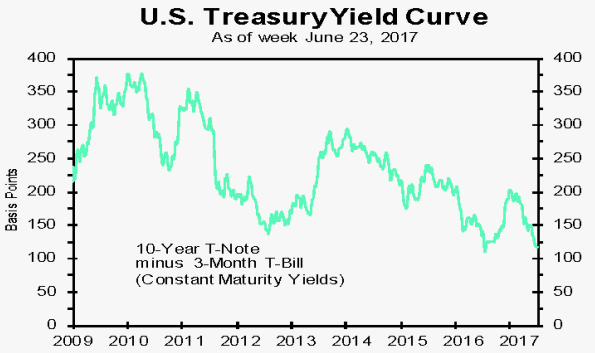
	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			*Latest Qtr*	3Q	4Q	1Q	2Q	3Q	4Q
Interest Rates	June 23	June 16	June 9	June 2	May	Apr.	Mar.	*2Q 2017**	2017	2017	2018	2018	2018	2018
Federal Funds Rate	1.16	0.91	0.91	0.90	0.90	0.90	0.76	0.93	**1.2**	**1.3**	**1.5**	**1.7**	**1.9**	**2.1**
Prime Rate	4.25	4.00	4.00	4.00	4.00	4.00	3.85	4.03	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.1**
LIBOR, 3-mo.	1.29	1.26	1.22	1.21	1.18	1.16	1.13	1.20	**1.4**	**1.5**	**1.7**	**1.9**	**2.1**	**2.3**
Commercial Paper, 1-mo.	1.10	1.05	0.93	0.87	0.84	0.83	0.77	0.90	**1.2**	**1.3**	**1.5**	**1.7**	**1.9**	**2.1**
Treasury bill, 3-mo.	0.99	1.01	0.99	0.97	0.90	0.81	0.73	0.90	**1.1**	**1.2**	**1.4**	**1.6**	**1.8**	**2.0**
Treasury bill, 6-mo.	1.12	1.12	1.09	1.07	1.03	0.95	0.87	1.03	**1.2**	**1.3**	**1.5**	**1.7**	**1.9**	**2.1**
Treasury bill, 1 yr.	1.22	1.21	1.18	1.16	1.12	1.04	1.00	1.12	**1.3**	**1.5**	**1.7**	**1.9**	**2.1**	**2.3**
Treasury note, 2 yr.	1.35	1.35	1.32	1.28	1.31	1.24	1.30	1.30	**1.5**	**1.7**	**1.8**	**2.0**	**2.2**	**2.4**
Treasury note, 5 yr.	1.78	1.76	1.74	1.75	1.85	1.83	2.00	1.81	**2.0**	**2.1**	**2.3**	**2.5**	**2.6**	**2.8**
Treasury note, 10 yr.	2.16	2.18	2.18	2.20	2.31	2.30	2.47	2.26	**2.4**	**2.6**	**2.7**	**2.9**	**3.1**	**3.2**
Treasury note, 30 yr.	2.74	2.82	2.84	2.86	2.97	2.94	3.07	2.90	**3.0**	**3.2**	**3.3**	**3.5**	**3.6**	**3.7**
Corporate Aaa bond	3.74	3.82	3.85	3.88	3.99	4.00	4.13	3.93	**4.0**	**4.2**	**4.4**	**4.6**	**4.7**	**4.8**
Corporate Baa bond	4.32	4.39	4.43	4.46	4.57	4.60	4.71	4.52	**4.7**	**4.9**	**5.1**	**5.3**	**5.4**	**5.6**
State & Local bonds	3.37	3.37	3.35	3.39	3.51	3.55	3.72	3.47	**3.7**	**3.9**	**4.1**	**4.2**	**4.3**	**4.4**
Home mortgage rate	3.90	3.91	3.89	3.94	4.01	4.05	4.20	3.99	**4.1**	**4.3**	**4.5**	**4.6**	**4.8**	**4.9**
	History								Consensus Forecasts-Quarterly					
	3Q	4Q	1Q	2Q	3Q	4Q	1Q	*2Q*	3Q	4Q	1Q	2Q	3Q	4Q
Key Assumptions	2015	2015	2016	2016	2016	2016	2017	*2017**	2017	2017	2018	2018	2018	2018
Major Currency Index	91.8	93.1	93.3	89.6	90.3	93.7	94.4	*92.0*	**92.8**	**93.3**	**93.6**	**93.5**	**93.2**	**92.9**
Real GDP	2.0	0.9	0.8	1.4	3.5	2.1	1.4	*2.8*	**2.4**	**2.3**	**2.3**	**2.5**	**2.3**	**2.3**
GDP Price Index	1.3	0.8	0.5	2.3	1.4	2.1	1.9	*1.3*	**1.9**	**2.0**	**2.1**	**2.1**	**2.1**	**2.2**
Consumer Price Index	1.5	0.4	0.1	2.3	1.8	3.0	3.1	*0.4*	**1.9**	**2.2**	**2.3**	**2.2**	**2.3**	**2.4**

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data: Treasury rates from the Federal Reserve Board's H.15; AAA-AA and A-BBB corporate bond yields from Bank of America-Merrill Lynch and are 15+ years, yield to maturity; State and local bond yields from Bank of America-Merrill Lynch, A-rated, yield to maturity; Mortgage rates from Freddie Mac, 30-year, fixed; LIBOR quotes from Intercontinental Exchange. All interest rate data is sourced from Haver Analytics. Historical data for Fed's Major Currency Index is from FRSR H.10. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS). **Interest rate data for 2Q 2017 based on historical data through the week ended June 23rd. *Data for 2Q 2017 Major Currency Index is based on data through week ended June 23rd.. Figures for 2Q 2017 Real GDP, GDP Chained Price Index and Consumer Price Index are consensus forecasts based on a special question asked of the panelists' this month.*









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Top Analysts' Forecasts Of U.S. And Foreign Interest Rates, Currency Values And The Factors That Influence Them

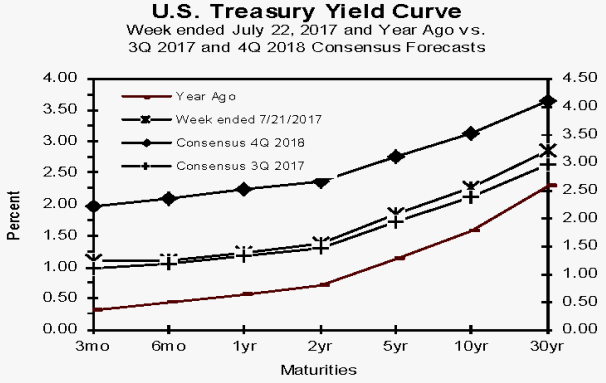
Vol. 36, No. 8, August 1, 2017

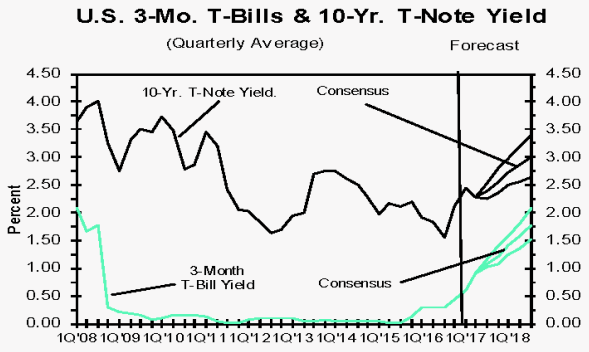
Wolters Kluwer

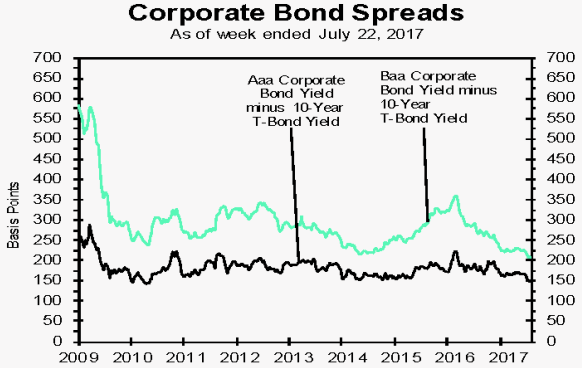
Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

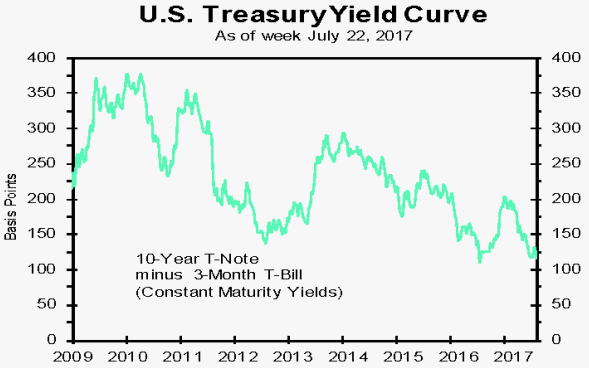
	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Qtr	3Q	4Q	1Q	2Q	3Q	4Q
Interest Rates	July 21	July 14	July 7	June 30	Jun	May	Apr	2Q 2017	2017	2017	2018	2018	2018	2018
Federal Funds Rate	1.16	1.16	1.12	1.16	1.03	0.90	0.90	0.94	**1.2**	**1.3**	**1.5**	**1.6**	**1.8**	**2.0**
Prime Rate	4.25	4.25	4.25	4.25	4.13	4.00	4.00	4.04	**4.3**	**4.4**	**4.5**	**4.7**	**4.9**	**5.1**
LIBOR, 3-mo.	1.31	1.30	1.30	1.30	1.26	1.18	1.16	1.20	**1.4**	**1.5**	**1.7**	**1.9**	**2.1**	**2.3**
Commercial Paper, 1-mo.	1.11	1.10	1.09	1.06	1.00	0.84	0.83	0.89	**1.2**	**1.3**	**1.5**	**1.7**	**1.9**	**2.1**
Treasury bill, 3-mo.	1.11	1.05	1.05	1.02	1.00	0.90	0.81	0.90	**1.1**	**1.2**	**1.4**	**1.6**	**1.8**	**2.0**
Treasury bill, 6-mo.	1.11	1.13	1.14	1.13	1.11	1.03	0.95	1.03	**1.2**	**1.3**	**1.5**	**1.7**	**1.9**	**2.1**
Treasury bill, 1 yr.	1.22	1.22	1.23	1.22	1.20	1.12	1.04	1.12	**1.3**	**1.5**	**1.7**	**1.9**	**2.1**	**2.2**
Treasury note, 2 yr.	1.36	1.37	1.41	1.37	1.33	1.31	1.24	1.29	**1.5**	**1.6**	**1.8**	**2.0**	**2.2**	**2.3**
Treasury note, 5 yr.	1.83	1.90	1.94	1.83	1.77	1.85	1.83	1.82	**1.9**	**2.1**	**2.3**	**2.4**	**2.6**	**2.7**
Treasury note, 10 yr.	2.27	2.35	2.36	2.23	2.19	2.31	2.30	2.27	**2.4**	**2.6**	**2.7**	**2.9**	**3.0**	**3.1**
Treasury note, 30 yr.	2.85	2.91	2.89	2.78	2.81	2.97	2.94	2.91	**3.0**	**3.1**	**3.3**	**3.4**	**3.6**	**3.7**
Corporate Aaa bond	3.75	3.84	3.85	3.76	3.81	3.99	4.00	3.93	**3.9**	**4.1**	**4.3**	**4.5**	**4.7**	**4.8**
Corporate Baa bond	4.34	4.44	4.44	4.34	4.39	4.57	4.60	4.52	**4.6**	**4.8**	**5.0**	**5.1**	**5.4**	**5.5**
State & Local bonds	3.41	3.46	3.47	3.40	3.37	3.51	3.55	3.48	**3.6**	**3.8**	**4.0**	**4.1**	**4.3**	**4.4**
Home mortgage rate	3.96	4.03	3.96	3.88	3.90	4.01	4.05	3.99	**4.1**	**4.2**	**4.4**	**4.6**	**4.7**	**4.8**
	History								Consensus Forecasts-Quarterly					
	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Key Assumptions	2015	2015	2016	2016	2016	2016	2017	2017	2017	2017	2018	2018	2018	2018
Major Currency Index	91.8	93.1	93.3	89.6	90.3	93.7	94.4	93.0	**90.9**	**90.9**	**91.1**	**91.6**	**91.4**	**91.4**
Real GDP	1.6	0.5	0.6	2.2	2.8	1.8	1.2	2.6	**2.4**	**2.3**	**2.3**	**2.4**	**2.3**	**2.2**
GDP Price Index	1.4	0.8	0.3	2.4	1.4	2.0	2.0	1.0	**1.7**	**2.0**	**2.1**	**2.1**	**2.1**	**2.2**
Consumer Price Index	1.5	0.4	0.1	2.3	1.8	3.0	3.1	-0.3	**1.6**	**2.2**	**2.3**	**2.2**	**2.2**	**2.4**

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data: Treasury rates from the Federal Reserve Board's H.15; AAA-AA and A-BBB corporate bond yields from Bank of America-Merrill Lynch and are 15+ years, yield to maturity; State and local bond yields from Bank of America-Merrill Lynch, A-rated, yield to maturity; Mortgage rates from Freddie Mac, 30-year, fixed; LIBOR quotes from Intercontinental Exchange. All interest rate data is sourced from Haver Analytics. Historical data for Fed's Major Currency Index is from FRSR H.10. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS).









Blue Chip Financial Forecasts®

Top Analysts' Forecasts Of U.S. And Foreign Interest Rates, Currency Values And The Factors That Influence Them

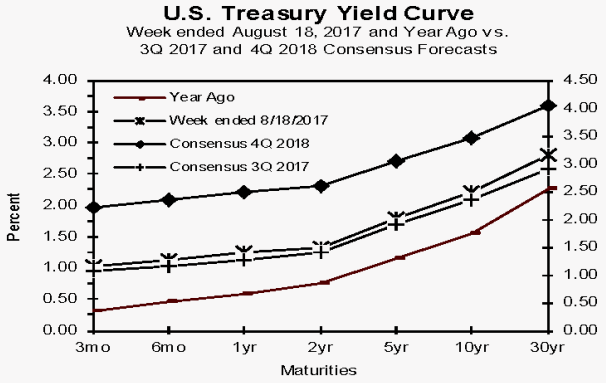
Vol. 36, No. 9, September 1, 2017

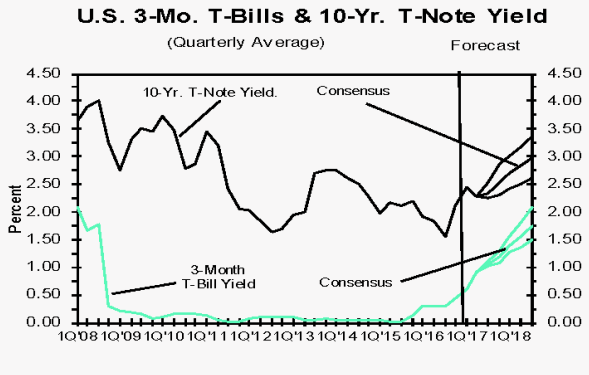
Wolters Kluwer

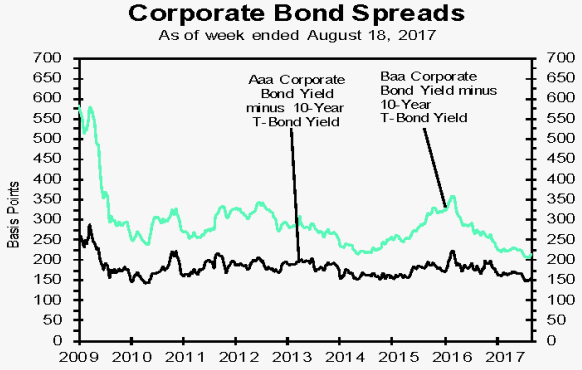
Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

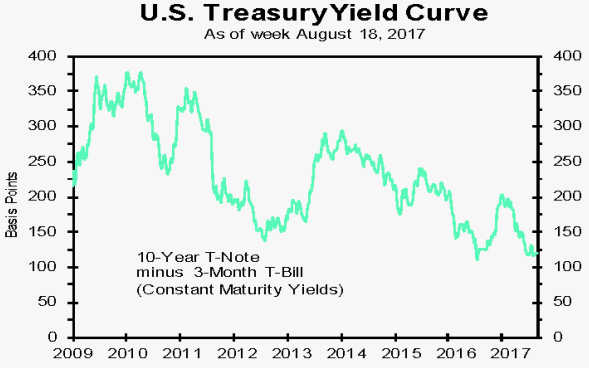
	History				History				Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Qtr	3Q	4Q	1Q	2Q	3Q	4Q
Interest Rates	Aug 18	Aug 11	Aug 4	Jul 28	Jul	Jun	May	2Q 2017	2017	2017	2018	2018	2018	2018
Federal Funds Rate	1.16	1.16	1.15	1.16	1.15	1.03	0.90	0.94	**1.15**	**1.25**	**1.46**	**1.63**	**1.84**	**2.03**
Prime Rate	4.25	4.25	4.25	4.25	4.25	4.13	4.00	4.04	**4.25**	**4.34**	**4.53**	**4.70**	**4.90**	**5.09**
LIBOR, 3-mo.	1.32	1.31	1.31	1.31	1.31	1.26	1.18	1.20	**1.33**	**1.47**	**1.68**	**1.86**	**2.06**	**2.27**
Commercial Paper, 1-mo.	1.09	1.11	1.10	1.11	1.10	1.00	0.84	0.89	**1.15**	**1.27**	**1.48**	**1.67**	**1.89**	**2.11**
Treasury bill, 3-mo.	1.02	1.04	1.08	1.13	1.09	1.00	0.90	0.90	**1.06**	**1.18**	**1.38**	**1.56**	**1.76**	**1.95**
Treasury bill, 6-mo.	1.13	1.15	1.14	1.13	1.13	1.11	1.03	1.03	**1.15**	**1.30**	**1.51**	**1.68**	**1.90**	**2.09**
Treasury bill, 1 yr.	1.24	1.22	1.23	1.23	1.23	1.20	1.12	1.12	**1.26**	**1.44**	**1.65**	**1.83**	**2.03**	**2.20**
Treasury note, 2 yr.	1.33	1.34	1.35	1.37	1.38	1.33	1.31	1.29	**1.41**	**1.60**	**1.79**	**1.96**	**2.16**	**2.31**
Treasury note, 5 yr.	1.78	1.80	1.81	1.85	1.88	1.77	1.85	1.82	**1.90**	**2.09**	**2.26**	**2.40**	**2.57**	**2.70**
Treasury note, 10 yr.	2.22	2.24	2.27	2.30	2.32	2.19	2.31	2.27	**2.34**	**2.52**	**2.69**	**2.83**	**2.98**	**3.08**
Treasury note, 30 yr.	2.80	2.82	2.85	2.89	2.89	2.81	2.97	2.91	**2.91**	**3.06**	**3.24**	**3.36**	**3.50**	**3.59**
Corporate Aaa bond	3.77	3.77	3.77	3.79	3.81	3.81	3.99	3.93	**3.81**	**4.00**	**4.22**	**4.41**	**4.57**	**4.66**
Corporate Baa bond	4.36	4.35	4.34	4.36	4.39	4.39	4.57	4.52	**4.49**	**4.70**	**4.93**	**5.12**	**5.29**	**5.44**
State & Local bonds	3.33	3.35	3.39	3.38	3.43	3.37	3.51	3.48	**3.51**	**3.69**	**3.92**	**4.08**	**4.22**	**4.34**
Home mortgage rate	3.89	3.90	3.93	3.92	3.97	3.90	4.01	3.99	**3.99**	**4.14**	**4.34**	**4.48**	**4.64**	**4.77**
	History								Consensus Forecasts-Quarterly					
	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Key Assumptions	2015	2015	2016	2016	2016	2016	2017	2017	2017	2017	2018	2018	2018	2018
Major Currency Index	91.8	93.1	93.3	89.6	90.3	93.7	94.4	93.0	**89.6**	**89.5**	**89.7**	**89.8**	**89.8**	**89.8**
Real GDP	1.6	0.5	0.6	2.2	2.8	1.8	1.2	2.6	**2.7**	**2.4**	**2.3**	**2.4**	**2.3**	**2.2**
GDP Price Index	1.4	0.8	0.3	2.4	1.4	2.0	2.0	1.0	**1.7**	**2.0**	**2.1**	**2.0**	**2.1**	**2.1**
Consumer Price Index	1.5	0.4	0.1	2.3	1.8	3.0	3.1	-0.3	**1.5**	**2.2**	**2.2**	**2.1**	**2.2**	**2.4**

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data: Treasury rates from the Federal Reserve Board's H.15; AAA-AA and A-BBB corporate bond yields from Bank of America-Merrill Lynch and are 15+ years, yield to maturity; State and local bond yields from Bank of America-Merrill Lynch, A-rated, yield to maturity; Mortgage rates from Freddie Mac, 30-year, fixed; LIBOR quotes from Intercontinental Exchange. All interest rate data is sourced from Haver Analytics. Historical data for Fed's Major Currency Index is from FRSR H.10. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS).









Blue Chip Financial Forecasts®

Top Analysts' Forecasts Of U.S. And Foreign Interest Rates, Currency Values And The Factors That Influence Them

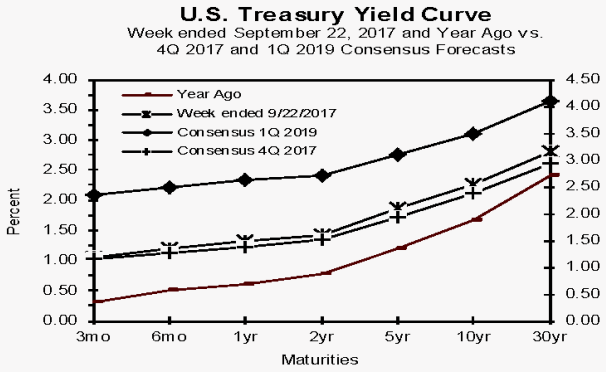
Vol. 36, No. 10, October 1, 2017

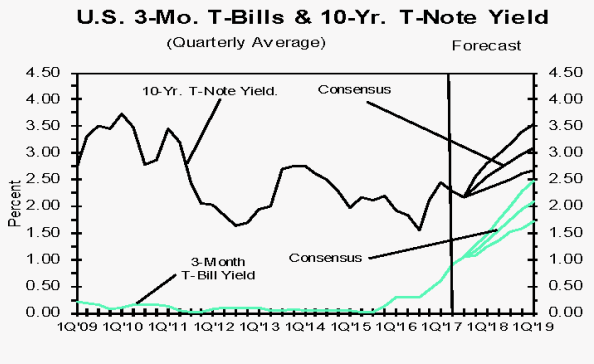
Wolters Kluwer

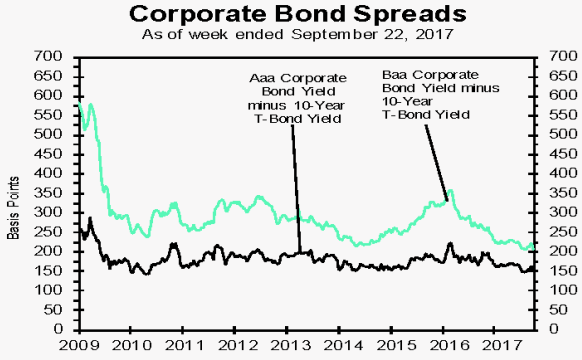
Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

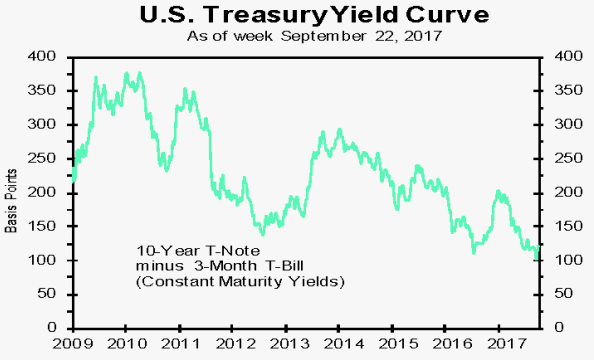
	History				History				Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Qtr	4Q	1Q	2Q	3Q	4Q	1Q
Interest Rates	Sep. 22	Sep. 15	Sep. 8	Sep. 1	Aug	Jul	Jun	3Q 2017*	2017	2018	2018	2018	2018	2019
Federal Funds Rate	1.16	1.16	1.15	1.16	1.16	1.15	1.03	1.16	**1.2**	**1.4**	**1.6**	**1.8**	**2.0**	**2.2**
Prime Rate	4.25	4.25	4.25	4.25	4.25	4.25	4.13	4.25	**4.3**	**4.5**	**4.7**	**4.9**	**5.1**	**5.2**
LIBOR, 3-mo.	1.33	1.32	1.32	1.32	1.31	1.31	1.26	1.32	**1.4**	**1.6**	**1.8**	**2.0**	**2.2**	**2.4**
Commercial Paper, 1-mo.	1.11	1.11	1.10	1.11	1.10	1.10	1.00	1.11	**1.2**	**1.4**	**1.6**	**1.8**	**2.0**	**2.2**
Treasury bill, 3-mo.	1.04	1.04	1.05	1.04	1.04	1.09	1.00	1.04	**1.2**	**1.4**	**1.5**	**1.7**	**1.9**	**2.1**
Treasury bill, 6-mo.	1.19	1.16	1.15	1.11	1.13	1.13	1.11	1.17	**1.3**	**1.5**	**1.7**	**1.9**	**2.1**	**2.2**
Treasury bill, 1 yr.	1.31	1.27	1.23	1.23	1.23	1.23	1.20	1.27	**1.4**	**1.6**	**1.8**	**2.0**	**2.2**	**2.3**
Treasury note, 2 yr.	1.43	1.35	1.29	1.33	1.34	1.38	1.33	1.36	**1.5**	**1.7**	**1.9**	**2.1**	**2.3**	**2.4**
Treasury note, 5 yr.	1.87	1.77	1.65	1.72	1.79	1.88	1.77	1.76	**1.9**	**2.1**	**2.3**	**2.5**	**2.6**	**2.8**
Treasury note, 10 yr.	2.26	2.18	2.07	2.14	2.23	2.32	2.19	2.17	**2.4**	**2.5**	**2.7**	**2.8**	**3.0**	**3.1**
Treasury note, 30 yr.	2.81	2.77	2.69	2.75	2.81	2.89	2.81	2.76	**2.9**	**3.1**	**3.3**	**3.4**	**3.5**	**3.6**
Corporate Aaa bond	3.77	3.76	3.70	3.72	3.76	3.81	3.81	3.74	**3.9**	**4.1**	**4.3**	**4.4**	**4.6**	**4.7**
Corporate Baa bond	4.33	4.34	4.3	4.31	4.34	4.39	4.39	4.32	**4.5**	**4.8**	**5.0**	**5.1**	**5.3**	**5.5**
State & Local bonds	3.32	3.31	3.29	3.30	3.35	3.43	3.37	3.31	**3.6**	**3.8**	**4.0**	**4.1**	**4.2**	**4.3**
Home mortgage rate	3.83	3.78	3.78	3.82	3.88	3.97	3.90	3.80	**4.0**	**4.2**	**4.4**	**4.5**	**4.7**	**4.8**
	History								Consensus Forecasts-Quarterly					
	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q
Key Assumptions	2015	2016	2016	2016	2016	2017	2017	2017*	2017	2018	2018	2018	2018	2019
Major Currency Index	93.1	93.3	89.6	90.3	93.7	94.4	93.0	88.3	**88.4**	**88.9**	**89.1**	**89.1**	**89.2**	**88.6**
Real GDP	0.5	0.6	2.2	2.8	1.8	1.2	3.1	2.2	**2.6**	**2.3**	**2.4**	**2.3**	**2.2**	**2.1**
GDP Price Index	0.8	0.3	2.4	1.4	2.0	2.0	1.0	1.7	**2.0**	**1.9**	**1.9**	**2.1**	**2.1**	**2.2**
Consumer Price Index	0.4	0.1	2.3	1.8	3.0	3.1	-0.3	1.9	**2.4**	**2.0**	**2.0**	**2.2**	**2.3**	**2.3**

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data: Treasury rates from the Federal Reserve Board's H.15; AAA-AA and A-BBB corporate bond yields from Bank of America-Merrill Lynch and are 15+ years, yield to maturity; State and local bond yields from Bank of America-Merrill Lynch, A-rated, yield to maturity; Mortgage rates from Freddie Mac, 30-year, fixed; LIBOR quotes from Intercontinental Exchange. All interest rate data is sourced from Haver Analytics. Historical data for Fed's Major Currency Index is from FRSR H.10. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS). **Interest rate data for 3Q 2017 based on historical data through the week ended September 22nd. *Data for 3Q 2017 Major Currency Index is based on data through week ended September 22nd. Figures for 3Q 2017 Real GDP, GDP Chained Price Index and Consumer Price Index are consensus forecasts based on a special question asked of the panelists' this month.*









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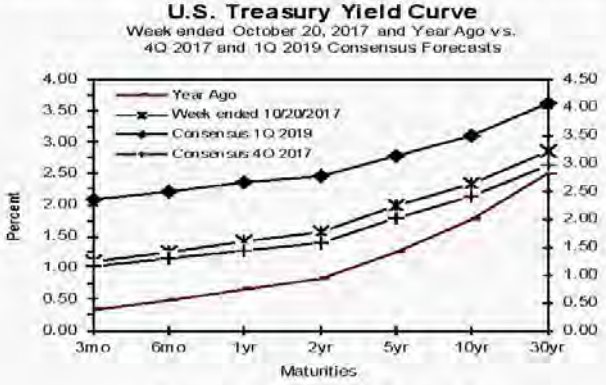
Vol. 36, No. 11, November 1, 2017

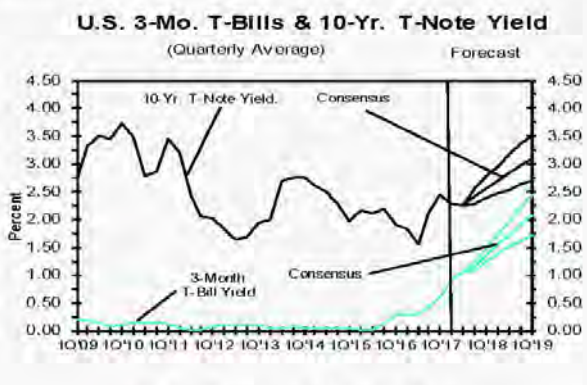
Wolters Kluwer

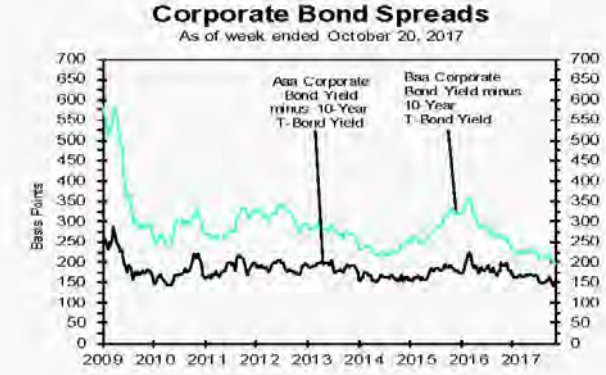
Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Qtr	4Q	1Q	2Q	3Q	4Q	1Q
Interest Rates	Oct. 20	Oct. 13	Oct. 6	Sep. 29	Sep	Aug	Jul	3Q 2017	2017	2018	2018	2018	2018	2019
Federal Funds Rate	1.16	1.16	1.12	1.16	1.16	1.16	1.15	1.16	1.2	1.4	1.6	1.8	2.0	2.1
Prime Rate	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.3	4.5	4.7	4.9	5.1	5.2
LIBOR, 3-mo.	1.36	1.36	1.35	1.33	1.33	1.31	1.31	1.32	1.4	1.6	1.8	2.0	2.2	2.4
Commercial Paper, 1-mo.	1.14	1.12	1.10	1.11	1.12	1.10	1.10	1.11	1.2	1.4	1.6	1.8	2.0	2.2
Treasury bill, 3-mo.	1.10	1.09	1.06	1.04	1.06	1.04	1.09	1.05	1.2	1.3	1.5	1.7	1.9	2.1
Treasury bill, 6-mo.	1.25	1.26	1.21	1.19	1.19	1.13	1.13	1.17	1.3	1.5	1.7	1.9	2.1	2.2
Treasury bill, 1 yr.	1.42	1.41	1.33	1.31	1.31	1.23	1.23	1.28	1.4	1.6	1.8	2.0	2.2	2.4
Treasury note, 2 yr.	1.57	1.51	1.49	1.43	1.46	1.34	1.38	1.41	1.6	1.8	1.9	2.1	2.3	2.5
Treasury note, 5 yr.	1.98	1.94	1.94	1.87	1.89	1.79	1.88	1.85	2.0	2.2	2.3	2.5	2.7	2.8
Treasury note, 10 yr.	2.33	2.33	2.34	2.26	2.28	2.23	2.32	2.26	2.4	2.6	2.7	2.8	3.0	3.1
Treasury note, 30 yr.	2.84	2.86	2.88	2.81	2.83	2.81	2.89	2.82	3.0	3.1	3.3	3.4	3.5	3.6
Corporate Aaa bond	3.71	3.74	3.76	3.77	3.75	3.76	3.81	3.76	3.8	4.0	4.2	4.4	4.5	4.6
Corporate Baa bond	4.29	4.32	4.34	4.33	4.32	4.34	4.39	4.33	4.5	4.7	4.9	5.1	5.3	5.4
State & Local bonds	3.35	3.37	3.38	3.32	3.34	3.35	3.43	3.34	3.5	3.7	3.9	4.1	4.2	4.3
Home mortgage rate	3.86	3.88	3.91	3.85	3.82	3.88	3.97	3.85	4.0	4.2	4.4	4.5	4.7	4.8
	History								Consensus Forecasts-Quarterly					
	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q
Key Assumptions	2015	2016	2016	2016	2016	2017	2017	2017	2017	2018	2018	2018	2018	2019
Major Currency Index	93.1	93.3	89.6	90.3	93.7	94.4	93.0	88.3	88.4	88.8	89.0	89.0	88.9	88.4
Real GDP	0.5	0.6	2.2	2.8	1.8	1.2	3.1	3.0	2.7	2.4	2.5	2.4	2.3	2.1
GDP Price Index	0.8	0.3	2.4	1.4	2.0	2.0	1.0	2.2	2.0	1.9	2.0	2.1	2.1	2.2
Consumer Price Index	0.4	0.1	2.3	1.8	3.0	3.1	-0.3	2.0	2.6	2.0	2.0	2.2	2.3	2.3

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data: Treasury rates from the Federal Reserve Board's H.15; AAA-AA and A-BBB corporate bond yields from Bank of America-Merrill Lynch and are 15+ years, yield to maturity; State and local bond yields from Bank of America-Merrill Lynch, A-rated, yield to maturity; Mortgage rates from Freddie Mac, 30-year, fixed; LIBOR quotes from Intercontinental Exchange. All interest rate data is sourced from Haver Analytics. Historical data for Fed's Major Currency Index is from FRSR H.10. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS).







Blue Chip Financial Forecasts®

Top Analysts' Forecasts Of U.S. And Foreign Interest Rates, Currency Values And The Factors That Influence Them

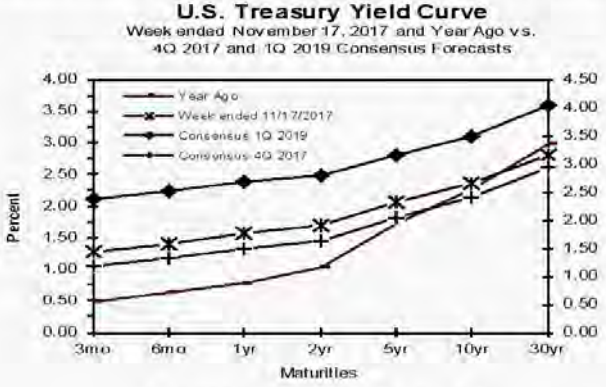
Vol. 36, No. 12, December 1, 2017

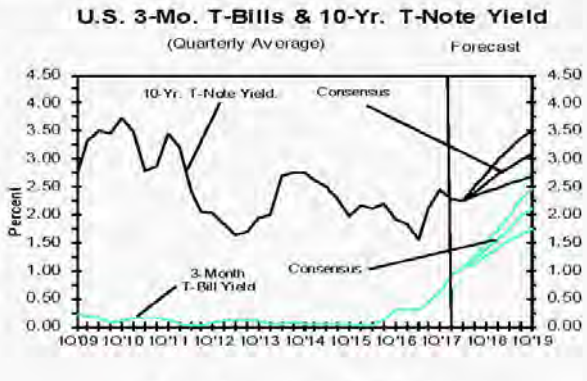
Wolters Kluwer

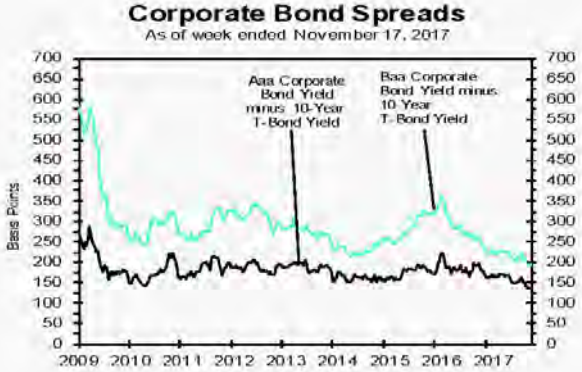
Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Qtr	4Q	1Q	2Q	3Q	4Q	1Q
Interest Rates	Nov. 17	Nov. 10	Nov. 3	Oct. 27	Oct	Sep	Aug	3Q 2017	2017	2018	2018	2018	2018	2019
Federal Funds Rate	1.16	1.16	1.15	1.16	1.15	1.16	1.16	1.16	1.2	1.4	1.6	1.8	2.0	2.2
Prime Rate	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.3	4.5	4.7	4.9	5.1	5.2
LIBOR, 3-mo.	1.43	1.41	1.39	1.37	1.36	1.33	1.31	1.32	1.4	1.6	1.8	2.0	2.2	2.4
Commercial Paper, 1-mo.	1.15	1.16	1.14	1.14	1.13	1.12	1.10	1.11	1.2	1.4	1.6	1.8	2.0	2.2
Treasury bill, 3-mo.	1.26	1.22	1.16	1.11	1.09	1.06	1.04	1.05	1.2	1.4	1.6	1.7	2.0	2.1
Treasury bill, 6-mo.	1.40	1.34	1.28	1.27	1.25	1.19	1.13	1.17	1.3	1.5	1.7	1.9	2.1	2.2
Treasury bill, 1 yr.	1.57	1.52	1.45	1.43	1.40	1.31	1.23	1.28	1.5	1.7	1.9	2.0	2.3	2.4
Treasury note, 2 yr.	1.70	1.64	1.61	1.60	1.54	1.46	1.34	1.41	1.6	1.8	2.0	2.2	2.3	2.5
Treasury note, 5 yr.	2.06	2.01	2.00	2.04	1.98	1.89	1.79	1.85	2.0	2.2	2.4	2.5	2.7	2.8
Treasury note, 10 yr.	2.37	2.34	2.36	2.42	2.36	2.28	2.23	2.26	2.4	2.6	2.7	2.8	3.0	3.1
Treasury note, 30 yr.	2.81	2.81	2.85	2.93	2.88	2.83	2.81	2.82	2.9	3.1	3.3	3.4	3.5	3.6
Corporate Aaa bond	3.74	3.71	3.71	3.77	3.75	3.75	3.76	3.76	3.8	4.0	4.2	4.3	4.5	4.6
Corporate Baa bond	4.32	4.29	4.29	4.35	4.32	4.32	4.34	4.33	4.4	4.6	4.9	5.1	5.2	5.3
State & Local bonds	3.41	3.37	3.40	3.38	3.37	3.34	3.35	3.34	3.5	3.7	3.9	4.0	4.2	4.3
Home mortgage rate	3.95	3.90	3.94	3.94	3.90	3.82	3.88	3.85	4.0	4.2	4.4	4.5	4.6	4.8
	History								Consensus Forecasts-Quarterly					
	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q
Key Assumptions	2015	2016	2016	2016	2016	2017	2017	2017	2017	2018	2018	2018	2018	2019
Major Currency Index	93.1	93.3	89.6	90.3	93.7	94.4	93.0	88.3	88.7	89.0	89.1	89.1	88.9	88.5
Real GDP	0.5	0.6	2.2	2.8	1.8	1.2	3.1	3.0	2.7	2.4	2.6	2.3	2.3	2.1
GDP Price Index	0.8	0.3	2.4	1.4	2.0	2.0	1.0	2.2	2.2	2.0	1.9	2.1	2.1	2.2
Consumer Price Index	0.4	0.1	2.3	1.8	3.0	3.1	-0.3	2.0	3.0	2.2	1.9	2.2	2.2	2.3

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data: Treasury rates from the Federal Reserve Board's H.15; AAA-AA and A-BBB corporate bond yields from Bank of America-Merrill Lynch and are 15+ years, yield to maturity; State and local bond yields from Bank of America-Merrill Lynch, A-rated, yield to maturity; Mortgage rates from Freddie Mac, 30-year, fixed; LIBOR quotes from Intercontinental Exchange. All interest rate data is sourced from Haver Analytics. Historical data for Fed's Major Currency Index is from FRSR H.10. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS).







Long-Range Survey:

The table below contains the results of our twice-annual long-range CONSENSUS survey. There are also Top 10 and Bottom 10 averages for each variable. Shown are consensus estimates for the years 2019 through 2023 and averages for the five-year periods 2019-2023 and 2024-2028. Apply these projections cautiously. Few if any economic, demographic and political forces can be evaluated accurately over such long time spans.

		Average For The Year					Five-Year Averages	
Interest Rates		2019	2020	2021	2022	2023	2019-2023	2024-2028
1. Federal Funds Rate	**CONSENSUS**	**2.5**	**2.7**	**2.9**	**2.9**	**2.9**	**2.8**	**3.0**
	Top 10 Average	2.9	3.2	3.4	3.4	3.5	3.3	3.5
	Bottom 10 Average	2.1	2.0	2.3	2.3	2.4	2.2	2.4
2. Prime Rate	**CONSENSUS**	**5.5**	**5.8**	**5.9**	**5.9**	**5.9**	**5.8**	**5.9**
	Top 10 Average	5.9	6.3	6.4	6.5	6.6	6.3	6.5
	Bottom 10 Average	5.0	5.1	5.2	5.2	5.2	5.1	5.3
3. LIBOR, 3-Mo.	**CONSENSUS**	**2.8**	**3.1**	**3.2**	**3.1**	**3.2**	**3.1**	**3.2**
	Top 10 Average	3.2	3.6	3.8	3.8	3.9	3.7	3.8
	Bottom 10 Average	2.4	2.6	2.6	2.5	2.6	2.5	2.6
4. Commercial Paper, 1-Mo.	**CONSENSUS**	**2.6**	**2.9**	**3.0**	**3.0**	**3.1**	**2.9**	**3.1**
	Top 10 Average	3.1	3.5	3.6	3.7	3.8	3.5	3.8
	Bottom 10 Average	2.2	2.5	2.6	2.5	2.5	2.5	2.6
5. Treasury Bill Yield, 3-Mo.	**CONSENSUS**	**2.5**	**2.8**	**2.9**	**2.9**	**2.9**	**2.8**	**2.9**
	Top 10 Average	2.9	3.3	3.4	3.4	3.5	3.3	3.5
	Bottom 10 Average	2.1	2.3	2.4	2.3	2.3	2.3	2.4
6. Treasury Bill Yield, 6-Mo.	**CONSENSUS**	**2.6**	**2.9**	**3.0**	**3.0**	**3.0**	**2.9**	**3.1**
	Top 10 Average	3.0	3.4	3.5	3.6	3.7	3.5	3.7
	Bottom 10 Average	2.2	2.4	2.5	2.4	2.4	2.4	2.5
7. Treasury Bill Yield, 1-Yr.	**CONSENSUS**	**2.7**	**3.0**	**3.1**	**3.1**	**3.2**	**3.0**	**3.2**
	Top 10 Average	3.2	3.6	3.7	3.7	3.8	3.6	3.9
	Bottom 10 Average	2.3	2.5	2.6	2.5	2.5	2.5	2.6
8. Treasury Note Yield, 2-Yr.	**CONSENSUS**	**2.8**	**3.1**	**3.3**	**3.2**	**3.3**	**3.1**	**3.3**
	Top 10 Average	3.3	3.8	3.8	3.8	3.9	3.7	4.0
	Bottom 10 Average	2.4	2.6	2.7	2.6	2.6	2.6	2.7
10. Treasury Note Yield, 5-Yr.	**CONSENSUS**	**3.1**	**3.4**	**3.5**	**3.5**	**3.5**	**3.4**	**3.6**
	Top 10 Average	3.6	3.9	4.1	4.1	4.1	3.9	4.3
	Bottom 10 Average	2.6	2.8	2.9	2.9	2.9	2.8	3.0
11. Treasury Note Yield, 10-Yr.	**CONSENSUS**	**3.3**	**3.6**	**3.7**	**3.7**	**3.8**	**3.6**	**3.8**
	Top 10 Average	3.9	4.2	4.3	4.3	4.3	4.2	4.5
	Bottom 10 Average	2.8	2.9	3.1	3.1	3.1	3.0	3.2
12. Treasury Bond Yield, 30-Yr.	**CONSENSUS**	**3.8**	**4.1**	**4.2**	**4.2**	**4.2**	**4.1**	**4.3**
	Top 10 Average	4.4	4.7	4.7	4.7	4.8	4.7	5.0
	Bottom 10 Average	3.3	3.5	3.6	3.5	3.6	3.5	3.7
13. Corporate Aaa Bond Yield	**CONSENSUS**	**4.9**	**5.1**	**5.2**	**5.2**	**5.3**	**5.1**	**5.4**
	Top 10 Average	5.5	5.9	5.9	6.0	6.0	5.9	6.2
	Bottom 10 Average	4.3	4.5	4.5	4.5	4.6	4.5	4.7
13. Corporate Baa Bond Yield	**CONSENSUS**	**5.7**	**6.0**	**6.0**	**6.0**	**6.1**	**6.0**	**6.2**
	Top 10 Average	6.4	6.8	6.8	6.9	6.9	6.8	7.0
	Bottom 10 Average	5.0	5.2	5.3	5.2	5.3	5.2	5.4
14. State & Local Bonds Yield	**CONSENSUS**	**4.4**	**4.5**	**4.6**	**4.5**	**4.6**	**4.5**	**4.8**
	Top 10 Average	5.0	5.2	5.2	5.3	5.3	5.2	5.5
	Bottom 10 Average	3.9	4.0	4.0	3.9	4.1	4.0	4.1
15. Home Mortgage Rate	**CONSENSUS**	**5.0**	**5.2**	**5.3**	**5.3**	**5.4**	**5.2**	**5.5**
	Top 10 Average	5.5	5.8	5.9	6.0	6.0	5.8	6.1
	Bottom 10 Average	4.5	4.7	4.7	4.6	4.7	4.6	4.9
A. FRB - Major Currency Index	**CONSENSUS**	**90.4**	**90.0**	**89.9**	**89.9**	**90.0**	**90.0**	**90.4**
	Top 10 Average	94.7	94.8	95.0	95.1	95.3	95.0	95.4
	Bottom 10 Average	86.9	85.8	85.4	85.5	85.6	85.8	86.1
		Year-Over-Year, % Change					Five-Year Averages	
		2019	2020	2021	2022	2023	2019-2023	2024-2028
B. Real GDP	**CONSENSUS**	**2.2**	**1.9**	**2.0**	**2.0**	**2.0**	**2.0**	**2.0**
	Top 10 Average	2.5	2.4	2.5	2.4	2.3	2.4	2.4
	Bottom 10 Average	1.8	1.4	1.7	1.6	1.7	1.6	1.7
C. GDP Chained Price Index	**CONSENSUS**	**2.2**	**2.1**	**2.1**	**2.1**	**2.1**	**2.1**	**2.1**
	Top 10 Average	2.5	2.3	2.3	2.3	2.3	2.3	2.3
	Bottom 10 Average	1.8	1.9	1.9	2.0	1.9	1.9	1.9
D. Consumer Price Index	**CONSENSUS**	**2.3**	**2.3**	**2.3**	**2.2**	**2.2**	**2.3**	**2.2**
	Top 10 Average	2.7	2.6	2.6	2.4	2.4	2.5	2.4
	Bottom 10 Average	1.9	1.9	2.0	2.0	2.0	2.0	2.0

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Top Analysts' Forecasts Of U.S. And Foreign Interest Rates, Currency Values And The Factors That Influence Them

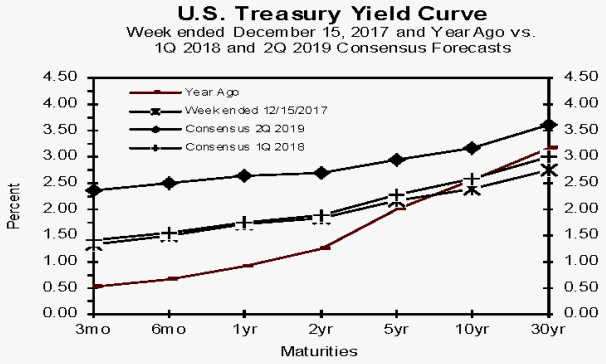
Vol. 37, No. 11, January 1, 2018

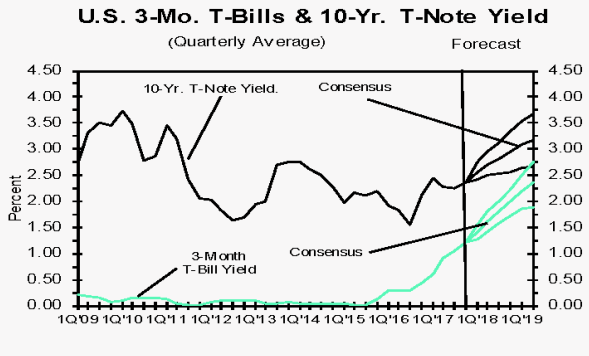
Wolters Kluwer

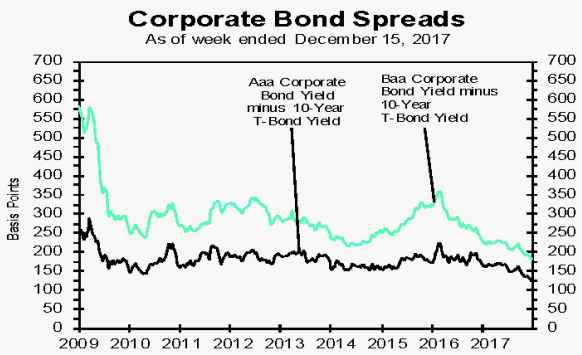
Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

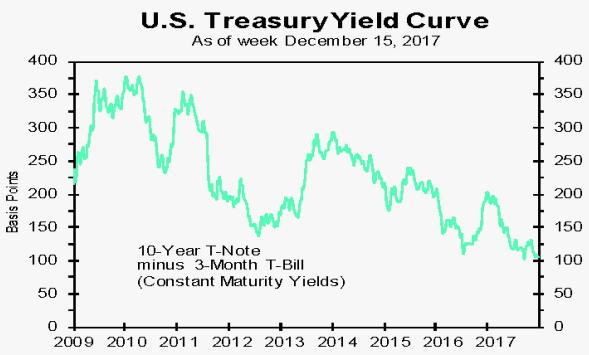
	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			*Latest Qtr*	1Q	2Q	3Q	4Q	1Q	2Q
Interest Rates	Dec. 15	Dec. 8	Dec. 1	Nov. 24	Nov	Oct	Sep	*4Q 2017**	2018	2018	2018	2018	2019	2019
Federal Funds Rate	1.16	1.16	1.16	1.16	1.16	1.15	1.16	*1.16*	**1.5**	**1.7**	**1.9**	**2.0**	**2.2**	**2.4**
Prime Rate	4.25	4.25	4.25	4.25	4.25	4.25	4.25	*4.25*	**4.5**	**4.7**	**4.9**	**5.1**	**5.3**	**5.5**
LIBOR, 3-mo.	1.59	1.53	1.48	1.46	1.42	1.36	1.33	*1.45*	**1.7**	**1.9**	**2.1**	**2.3**	**2.5**	**2.7**
Commercial Paper, 1-mo.	1.35	1.26	1.18	1.16	1.15	1.13	1.12	*1.20*	**1.5**	**1.7**	**1.9**	**2.1**	**2.3**	**2.5**
Treasury bill, 3-mo.	1.32	1.29	1.28	1.30	1.23	1.09	1.06	*1.21*	**1.4**	**1.6**	**1.8**	**2.0**	**2.2**	**2.3**
Treasury bill, 6-mo.	1.48	1.47	1.44	1.45	1.37	1.25	1.19	*1.37*	**1.6**	**1.7**	**2.0**	**2.1**	**2.3**	**2.5**
Treasury bill, 1 yr.	1.70	1.66	1.62	1.62	1.54	1.40	1.31	*1.54*	**1.7**	**1.9**	**2.1**	**2.3**	**2.5**	**2.6**
Treasury note, 2 yr.	1.82	1.80	1.77	1.76	1.68	1.54	1.46	*1.68*	**1.9**	**2.1**	**2.2**	**2.4**	**2.6**	**2.7**
Treasury note, 5 yr.	2.15	2.14	2.10	2.08	2.04	1.98	1.89	*2.06*	**2.3**	**2.4**	**2.5**	**2.7**	**2.8**	**2.9**
Treasury note, 10 yr.	2.37	2.36	2.36	2.35	2.36	2.36	2.28	*2.36*	**2.6**	**2.7**	**2.8**	**2.9**	**3.1**	**3.2**
Treasury note, 30 yr.	2.74	2.75	2.79	2.76	2.81	2.88	2.83	*2.81*	**3.0**	**3.1**	**3.3**	**3.4**	**3.5**	**3.6**
Corporate Aaa bond	3.60	3.63	3.68	3.67	3.70	3.75	3.75	*3.69*	**3.8**	**4.0**	**4.2**	**4.4**	**4.5**	**4.6**
Corporate Baa bond	4.18	4.21	4.26	4.25	4.29	4.32	4.32	*4.27*	**4.5**	**4.7**	**4.9**	**5.1**	**5.2**	**5.4**
State & Local bonds	3.44	3.43	3.51	3.45	3.41	3.37	3.34	*3.41*	**3.6**	**3.8**	**3.9**	**4.1**	**4.2**	**4.3**
Home mortgage rate	3.94	3.93	3.94	3.92	3.92	3.90	3.82	*3.92*	**4.1**	**4.3**	**4.4**	**4.6**	**4.7**	**4.8**
	History								Consensus Forecasts-Quarterly					
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	*4Q*	1Q	2Q	3Q	4Q	1Q	2Q
Key Assumptions	2016	2016	2016	2016	2017	2017	2017	*2017**	2018	2018	2018	2018	2019	2019
Major Currency Index	93.3	89.6	90.3	93.7	94.4	93.0	88.3	*89.1*	**89.1**	**89.5**	**89.5**	**89.2**	**89.0**	**88.6**
Real GDP	0.6	2.2	2.8	1.8	1.2	3.1	3.2	*2.8*	**2.5**	**2.6**	**2.5**	**2.4**	**2.2**	**2.2**
GDP Price Index	0.3	2.4	1.4	2.0	2.0	1.0	2.1	*2.2*	**2.0**	**1.9**	**2.0**	**2.1**	**2.2**	**2.0**
Consumer Price Index	0.1	2.3	1.8	3.0	3.1	-0.3	2.0	*3.1*	**2.1**	**1.9**	**2.2**	**2.2**	**2.3**	**2.2**

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data: Treasury rates from the Federal Reserve Board's H.15; AAA-AA and A-BBB corporate bond yields from Bank of America-Merrill Lynch and are 15+ years, yield to maturity; State and local bond yields from Bank of America-Merrill Lynch, A-rated, yield to maturity; Mortgage rates from Freddie Mac, 30-year, fixed; LIBOR quotes from Intercontinental Exchange. All interest rate data is sourced from Haver Analytics. Historical data for Fed's Major Currency Index is from FRSR H.10. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS). **Interest rate data for 4Q 2017 based on historical data through the week ended December 15th. *Data for 4Q 2017 Major Currency Index is based on data through week ended December 15th. Figures for 4Q 2017 Real GDP, GDP Chained Price Index and Consumer Price Index are consensus forecasts based on a special question asked of the panelists' this month.*









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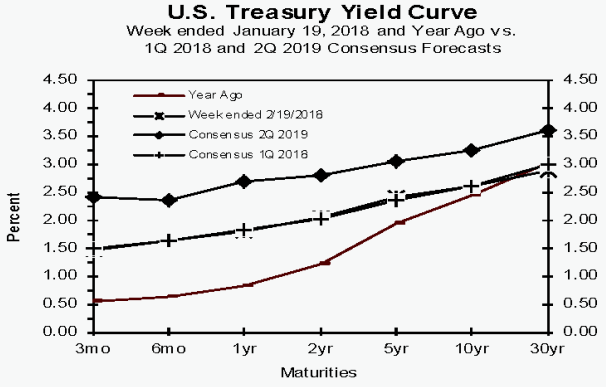
Vol. 37, No. 2, February 1, 2018

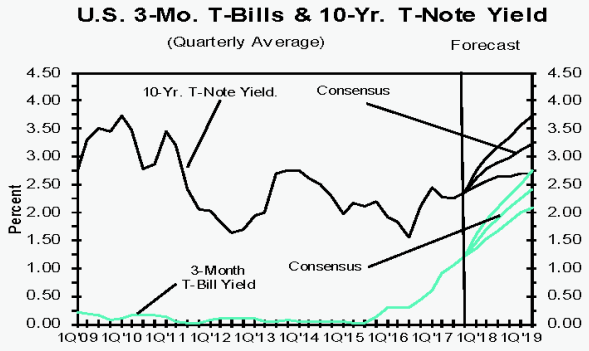
Wolters Kluwer

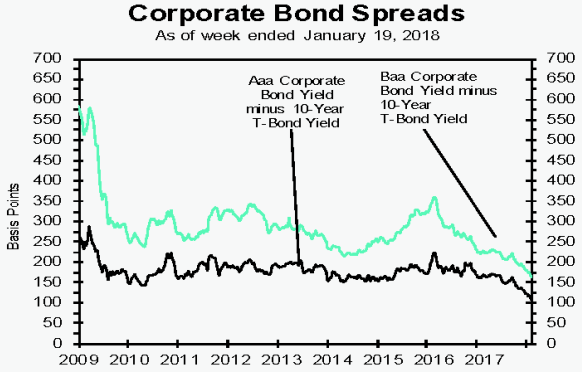
Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

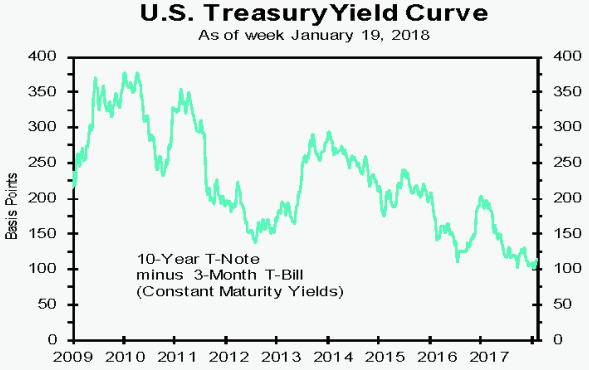
	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Qtr	1Q	2Q	3Q	4Q	1Q	2Q
Interest Rates	Jan. 19	Jan. 12	Jan. 5	Dec. 29	Dec	Nov	Oct	4Q 2017	2018	2018	2018	2018	2019	2019
Federal Funds Rate	1.42	1.42	1.37	1.42	1.29	1.16	1.15	1.20	**1.5**	**1.7**	**1.9**	**2.1**	**2.3**	**2.5**
Prime Rate	4.50	4.50	4.50	4.50	4.38	4.25	4.25	4.29	**4.5**	**4.8**	**5.0**	**5.2**	**5.3**	**5.5**
LIBOR, 3-mo.	1.74	1.71	1.70	1.69	1.59	1.42	1.36	1.46	**1.7**	**1.9**	**2.1**	**2.3**	**2.5**	**2.7**
Commercial Paper, 1-mo.	1.50	1.50	1.49	1.52	1.38	1.15	1.13	1.22	**1.5**	**1.7**	**1.9**	**2.1**	**2.3**	**2.5**
Treasury bill, 3-mo.	1.45	1.43	1.41	1.42	1.33	1.23	1.09	1.22	**1.5**	**1.7**	**1.9**	**2.1**	**2.2**	**2.4**
Treasury bill, 6-mo.	1.63	1.59	1.60	1.53	1.49	1.37	1.25	1.37	**1.6**	**1.8**	**2.0**	**2.2**	**2.4**	**2.6**
Treasury bill, 1 yr.	1.79	1.78	1.82	1.76	1.69	1.54	1.40	1.54	**1.8**	**2.0**	**2.2**	**2.4**	**2.5**	**2.7**
Treasury note, 2 yr.	2.05	1.98	1.95	1.90	1.83	1.68	1.54	1.68	**2.0**	**2.2**	**2.3**	**2.5**	**2.7**	**2.8**
Treasury note, 5 yr.	2.41	2.32	2.27	2.23	2.17	2.04	1.98	2.06	**2.3**	**2.5**	**2.6**	**2.8**	**2.9**	**3.0**
Treasury note, 10 yr.	2.59	2.54	2.46	2.43	2.40	2.36	2.36	2.37	**2.6**	**2.8**	**2.9**	**3.0**	**3.1**	**3.2**
Treasury note, 30 yr.	2.87	2.87	2.80	2.77	2.77	2.81	2.88	2.82	**3.0**	**3.1**	**3.3**	**3.4**	**3.5**	**3.6**
Corporate Aaa bond	3.67	3.68	3.64	3.59	3.63	3.70	3.75	3.69	**3.8**	**4.0**	**4.2**	**4.3**	**4.5**	**4.6**
Corporate Baa bond	4.23	4.24	4.21	4.17	4.21	4.29	4.32	4.27	**4.5**	**4.7**	**4.9**	**5.0**	**5.2**	**5.4**
State & Local bonds	3.43	3.42	3.40	3.43	3.46	3.41	3.37	3.41	**3.6**	**3.7**	**3.9**	**4.0**	**4.2**	**4.3**
Home mortgage rate	4.04	3.99	3.95	3.99	3.95	3.92	3.90	3.92	**4.1**	**4.3**	**4.4**	**4.6**	**4.7**	**4.8**
	History								Consensus Forecasts-Quarterly					
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q
Key Assumptions	2016	2016	2016	2016	2017	2017	2017	2017	2018	2018	2018	2018	2019	2019
Major Currency Index	93.3	89.6	90.3	93.7	94.4	93.0	88.3	88.9	**87.3**	**87.2**	**87.3**	**87.2**	**87.0**	**86.9**
Real GDP	0.6	2.2	2.8	1.8	1.2	3.1	3.2	2.6	**2.6**	**2.8**	**2.7**	**2.5**	**2.3**	**2.3**
GDP Price Index	0.3	2.4	1.4	2.0	2.0	1.0	2.1	2.4	**2.0**	**2.0**	**2.1**	**2.1**	**2.2**	**2.1**
Consumer Price Index	0.1	2.3	1.8	3.0	3.1	-0.3	2.0	3.7	**2.5**	**1.9**	**2.2**	**2.2**	**2.3**	**2.2**

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data: Treasury rates from the Federal Reserve Board's H.15; AAA-AA and A-BBB corporate bond yields from Bank of America-Merrill Lynch and are 15+ years, yield to maturity; State and local bond yields from Bank of America-Merrill Lynch, A-rated, yield to maturity; Mortgage rates from Freddie Mac, 30-year, fixed; LIBOR quotes from Intercontinental Exchange. All interest rate data is sourced from Haver Analytics. Historical data for Fed's Major Currency Index is from FRSR H.10. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS).









Blue Chip Financial Forecasts®

Top Analysts' Forecasts Of U.S. And Foreign Interest Rates, Currency Values And The Factors That Influence Them

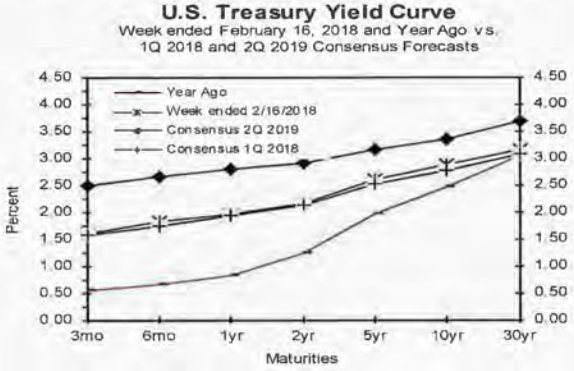
Vol. 37, No. 3, March 1, 2018

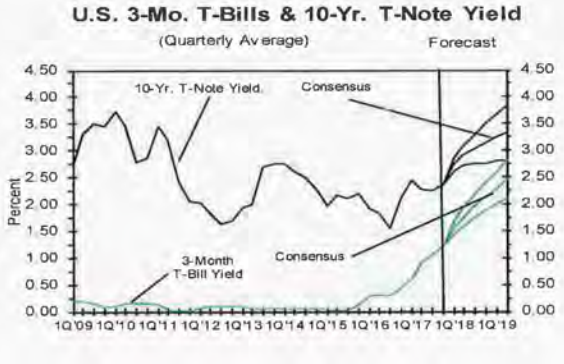
Wolters Kluwer

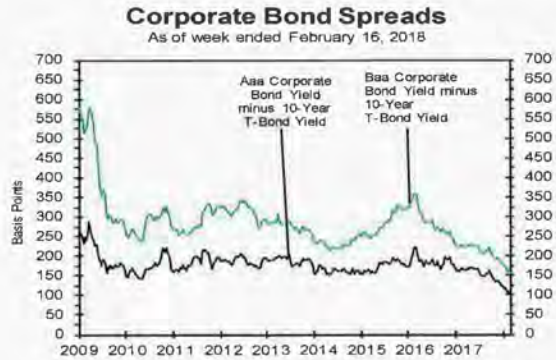
Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

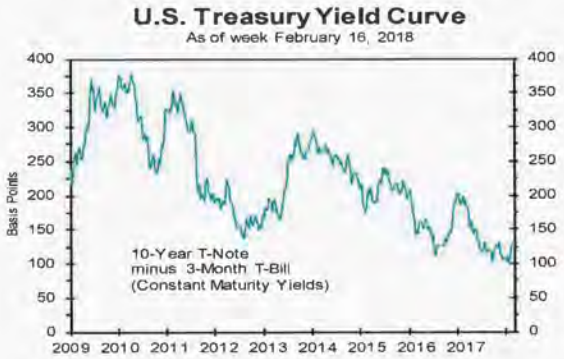
	History				History				Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Qtr	1Q	2Q	3Q	4Q	1Q	2Q
Interest Rates	Feb. 16	Feb. 9	Feb. 2	Jan. 26	Jan	Dec	Nov	4Q 2017	2018	2018	2018	2018	2019	2019
Federal Funds Rate	1.42	1.42	1.42	1.41	1.41	1.29	1.16	1.20	1.5	1.7	1.9	2.2	2.3	2.5
Prime Rate	4.50	4.50	4.50	4.50	4.50	4.38	4.25	4.29	4.6	4.8	5.0	5.2	5.4	5.6
LIBOR, 3-mo.	1.86	1.80	1.78	1.75	1.73	1.59	1.42	1.46	1.8	2.0	2.2	2.4	2.6	2.8
Commercial Paper, 1-mo.	1.53	1.50	1.50	1.52	1.50	1.38	1.15	1.22	1.5	1.7	2.0	2.2	2.4	2.5
Treasury bill, 3-mo.	1.60	1.54	1.46	1.43	1.43	1.33	1.23	1.22	1.6	1.8	2.0	2.1	2.3	2.5
Treasury bill, 6-mo.	1.82	1.71	1.65	1.64	1.62	1.49	1.37	1.37	1.7	1.9	2.1	2.3	2.5	2.6
Treasury bill, 1 yr.	1.97	1.89	1.87	1.79	1.80	1.69	1.54	1.54	1.9	2.1	2.3	2.5	2.6	2.8
Treasury note, 2 yr.	2.15	2.10	2.14	2.09	2.02	1.83	1.68	1.68	2.1	2.3	2.5	2.6	2.8	2.9
Treasury note, 5 yr.	2.61	2.54	2.53	2.44	2.36	2.17	2.04	2.06	2.5	2.7	2.8	2.9	3.1	3.2
Treasury note, 10 yr.	2.87	2.82	2.75	2.65	2.56	2.40	2.36	2.37	2.8	2.9	3.0	3.1	3.3	3.3
Treasury note, 30 yr.	3.14	3.10	2.99	2.91	2.86	2.77	2.81	2.82	3.1	3.2	3.4	3.5	3.6	3.7
Corporate Aaa bond	3.97	3.89	3.79	3.73	3.68	3.63	3.70	3.69	3.8	4.1	4.3	4.4	4.6	4.7
Corporate Baa bond	4.54	4.45	4.31	4.26	4.24	4.21	4.29	4.27	4.5	4.8	5.0	5.2	5.3	5.4
State & Local bonds	3.58	3.57	3.53	3.45	3.42	3.46	3.41	3.41	3.6	3.8	3.9	4.1	4.2	4.3
Home mortgage rate	4.38	4.32	4.22	4.15	4.03	3.95	3.92	3.92	4.3	4.5	4.6	4.7	4.9	5.0
	History								Consensus Forecasts-Quarterly					
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q
Key Assumptions	2016	2016	2016	2016	2017	2017	2017	2017	2018	2018	2018	2018	2019	2019
Major Currency Index	93.3	89.6	90.3	93.7	94.4	93.0	88.3	88.9	86.5	86.5	86.5	86.4	86.4	86.3
Real GDP	0.6	2.2	2.8	1.8	1.2	3.1	3.2	2.6	2.7	3.0	2.9	2.7	2.5	2.4
GDP Price Index	0.3	2.4	1.4	2.0	2.0	1.0	2.1	2.4	2.1	2.0	2.2	2.1	2.2	2.2
Consumer Price Index	0.1	2.3	1.8	3.0	3.1	-0.3	2.0	3.7	3.0	2.0	2.3	2.1	2.3	2.3

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data: Treasury rates from the Federal Reserve Board's H.15; AAA-AA and A-BBB corporate bond yields from Bank of America-Merrill Lynch and are 15+ years, yield to maturity; State and local bond yields from Bank of America-Merrill Lynch, A-rated, yield to maturity; Mortgage rates from Freddie Mac, 30-year, fixed; LIBOR quotes from Intercontinental Exchange. All interest rate data is sourced from Haver Analytics. Historical data for Fed's Major Currency Index is from FRSR H.10. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS).









Blue Chip Financial Forecasts®

Top Analysts' Forecasts Of U.S. And Foreign Interest Rates, Currency Values And The Factors That Influence Them

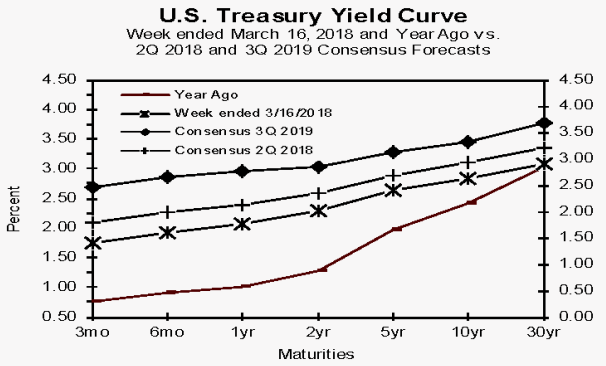
Vol. 37, No. 4, April 1, 2018

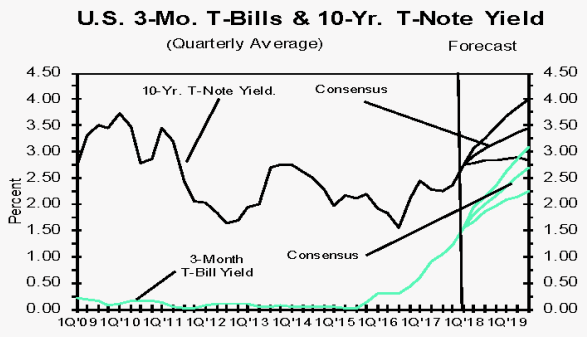
Wolters Kluwer

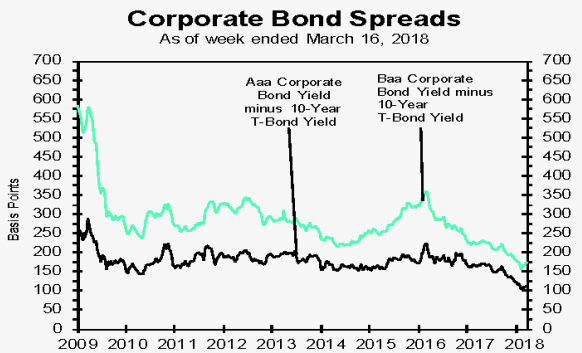
Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

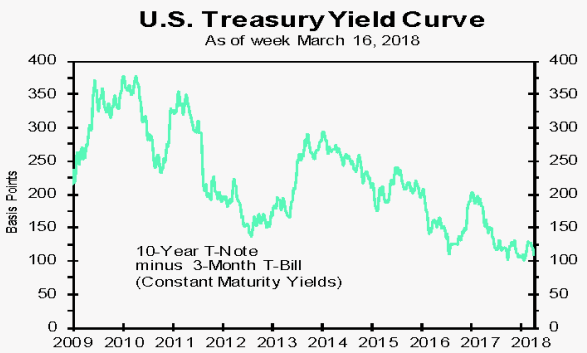
	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month									
Interest Rates	Mar. 16	Mar. 9	Mar. 2	Feb. 23	Feb	Jan	Dec	*Latest Qtr 1Q 2018**	2Q 2018	3Q 2018	4Q 2018	1Q 2019	2Q 2019	3Q 2019
Federal Funds Rate	1.42	1.42	1.41	1.42	1.42	1.41	1.29	*1.42*	**1.7**	**2.0**	**2.2**	**2.4**	**2.6**	**2.7**
Prime Rate	4.50	4.50	4.50	4.50	4.50	4.50	4.38	*4.50*	**4.8**	**5.0**	**5.2**	**5.4**	**5.6**	**5.8**
LIBOR, 3-mo.	2.15	2.06	2.01	1.92	1.84	1.73	1.59	*1.88*	**2.1**	**2.3**	**2.5**	**2.7**	**2.9**	**3.1**
Commercial Paper, 1-mo.	1.79	1.68	1.64	1.56	1.52	1.50	1.38	*1.57*	**1.8**	**2.0**	**2.3**	**2.5**	**2.7**	**2.9**
Treasury bill, 3-mo.	1.75	1.68	1.65	1.64	1.56	1.43	1.33	*1.56*	**1.8**	**2.0**	**2.2**	**2.3**	**2.5**	**2.7**
Treasury bill, 6-mo.	1.93	1.88	1.86	1.85	1.76	1.62	1.49	*1.76*	**2.0**	**2.2**	**2.3**	**2.5**	**2.7**	**2.9**
Treasury bill, 1 yr.	2.06	2.05	2.06	2.02	1.94	1.80	1.69	*1.93*	**2.1**	**2.3**	**2.5**	**2.7**	**2.8**	**3.0**
Treasury note, 2 yr.	2.28	2.25	2.24	2.25	2.16	2.02	1.83	*2.15*	**2.4**	**2.5**	**2.7**	**2.8**	**2.9**	**3.0**
Treasury note, 5 yr.	2.63	2.65	2.63	2.66	2.59	2.36	2.17	*2.53*	**2.7**	**2.8**	**2.9**	**3.1**	**3.2**	**3.3**
Treasury note, 10 yr.	2.84	2.88	2.86	2.91	2.84	2.56	2.40	*2.75*	**2.9**	**3.1**	**3.2**	**3.3**	**3.4**	**3.4**
Treasury note, 30 yr.	3.08	3.15	3.14	3.19	3.11	2.86	2.77	*3.03*	**3.2**	**3.3**	**3.5**	**3.6**	**3.7**	**3.8**
Corporate Aaa bond	3.97	4.00	3.97	3.99	3.91	3.68	3.63	*3.86*	**4.1**	**4.2**	**4.4**	**4.6**	**4.7**	**4.8**
Corporate Baa bond	4.58	4.61	4.56	4.56	4.47	4.24	4.21	*4.43*	**4.8**	**5.0**	**5.1**	**5.3**	**5.4**	**5.5**
State & Local bonds	3.61	3.60	3.60	3.59	3.57	3.42	3.46	*3.53*	**3.8**	**3.9**	**4.1**	**4.2**	**4.3**	**4.4**
Home mortgage rate	4.44	4.46	4.43	4.40	4.33	4.03	3.95	*4.27*	**4.5**	**4.6**	**4.8**	**4.9**	**5.0**	**5.2**
	History								Consensus Forecasts-Quarterly					
	2Q	3Q	4Q	1Q	2Q	3Q	4Q	*1Q**	2Q	3Q	4Q	1Q	2Q	3Q
Key Assumptions	2016	2016	2016	2017	2017	2017	2017	*2018*	**2018**	**2018**	**2018**	**2019**	**2019**	**2019**
Major Currency Index	89.6	90.3	93.7	94.4	93.0	88.3	88.9	*86.3*	**86.4**	**86.4**	**86.5**	**86.5**	**86.6**	**86.7**
Real GDP	2.2	2.8	1.8	1.2	3.1	3.2	2.6	*2.2*	**3.1**	**3.0**	**2.8**	**2.5**	**2.4**	**2.1**
GDP Price Index	2.4	1.4	2.0	2.0	1.0	2.1	2.4	*2.3*	**2.0**	**2.2**	**2.1**	**2.2**	**2.1**	**2.2**
Consumer Price Index	2.3	1.8	3.0	3.1	-0.3	2.0	3.7	*3.3*	**1.9**	**2.2**	**2.1**	**2.2**	**2.2**	**2.3**

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data: Treasury rates from the Federal Reserve Board's H.15; AAA-AA and A-BBB corporate bond yields from Bank of America-Merrill Lynch and are 15+ years, yield to maturity; State and local bond yields from Bank of America-Merrill Lynch, A-rated, yield to maturity; Mortgage rates from Freddie Mac, 30-year, fixed; LIBOR quotes from Intercontinental Exchange. All interest rate data is sourced from Haver Analytics. Historical data for Fed's Major Currency Index is from FRSR H.10. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS). **Interest rate data for 1Q 2018 based on historical data through the week ended March 16th. *Data for 1Q 2018 Major Currency Index is based on data through week ended March 16th. Figures for 1Q 2018 Real GDP, GDP Chained Price Index and Consumer Price Index are consensus forecasts based on a special question asked of the panelists' this month.*









Blue Chip Financial Forecasts®

Top Analysts' Forecasts Of U.S. And Foreign Interest Rates, Currency Values And The Factors That Influence Them

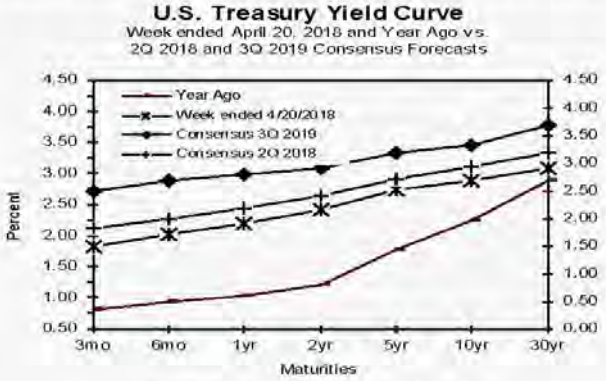
Vol. 37, No. 5, May 1, 2018

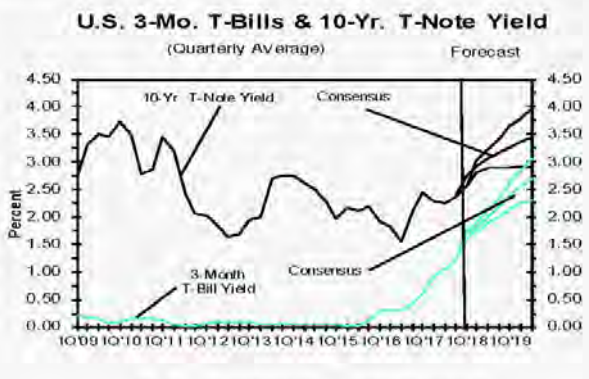
Wolters Kluwer

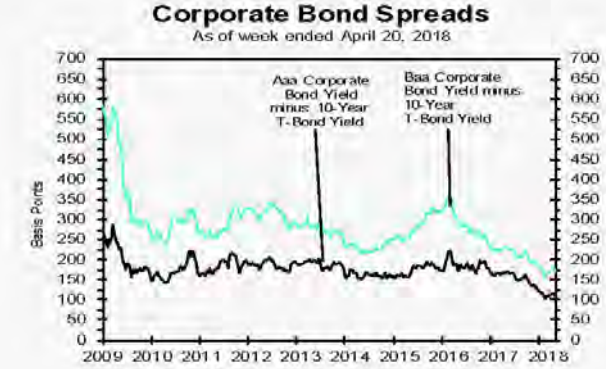
Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Qtr	2Q	3Q	4Q	1Q	2Q	3Q
Interest Rates	Apr. 20	Apr. 13	Apr. 6	Mar. 30	Mar	Feb	Jan	1Q 2018	2018	2018	2018	2019	2019	2019
Federal Funds Rate	1.69	1.69	1.68	1.68	1.49	1.42	1.41	1.44	1.7	2.0	2.2	2.4	2.6	2.8
Prime Rate	4.75	4.75	4.75	4.75	4.75	4.50	4.50	4.58	4.8	5.0	5.2	5.4	5.6	5.8
LIBOR, 3-mo.	2.36	2.34	2.32	2.30	2.16	1.84	1.73	1.91	2.3	2.4	2.6	2.8	2.9	3.1
Commercial Paper, 1-mo.	1.83	1.81	1.83	1.86	1.76	1.52	1.50	1.59	1.8	2.1	2.3	2.5	2.7	2.9
Treasury bill, 3-mo.	1.81	1.75	1.74	1.76	1.72	1.56	1.43	1.57	1.8	2.0	2.2	2.4	2.6	2.7
Treasury bill, 6-mo.	2.01	1.95	1.92	1.94	1.91	1.76	1.62	1.76	2.0	2.2	2.4	2.6	2.7	2.9
Treasury bill, 1 yr.	2.18	2.10	2.07	2.09	2.06	1.94	1.80	1.93	2.2	2.3	2.5	2.7	2.9	3.0
Treasury note, 2 yr.	2.42	2.33	2.28	2.29	2.27	2.16	2.02	2.15	2.4	2.6	2.7	2.9	3.0	3.1
Treasury note, 5 yr.	2.73	2.64	2.60	2.59	2.63	2.59	2.36	2.53	2.7	2.9	3.0	3.1	3.2	3.3
Treasury note, 10 yr.	2.88	2.80	2.78	2.79	2.85	2.84	2.56	2.75	2.9	3.1	3.2	3.3	3.4	3.5
Treasury note, 30 yr.	3.07	3.02	3.02	3.02	3.10	3.11	2.86	3.02	3.2	3.3	3.5	3.6	3.7	3.8
Corporate Aaa bond	3.98	3.93	3.95	3.95	3.98	3.91	3.68	3.86	4.0	4.2	4.4	4.6	4.7	4.8
Corporate Baa bond	4.60	4.55	4.58	4.58	4.59	4.47	4.24	4.43	4.8	5.0	5.2	5.3	5.4	5.5
State & Local bonds	3.63	3.62	3.62	3.62	3.61	3.57	3.42	3.53	3.8	3.9	4.0	4.1	4.3	4.4
Home mortgage rate	4.47	4.42	4.40	4.44	4.44	4.33	4.03	4.27	4.5	4.7	4.8	4.9	5.0	5.1
	History								Consensus Forecasts-Quarterly					
	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q
Key Assumptions	2016	2016	2016	2017	2017	2017	2017	2018	2018	2018	2018	2019	2019	2019
Major Currency Index	89.6	90.3	93.7	94.4	93.0	88.3	88.9	86.1	86.6	86.7	86.7	86.7	86.5	86.6
Real GDP	2.2	2.8	1.8	1.2	3.1	3.2	2.9	2.3	3.1	3.0	2.9	2.5	2.4	2.2
GDP Price Index	2.4	1.4	2.0	2.0	1.0	2.1	2.3	2.0	2.0	2.2	2.1	2.2	2.2	2.3
Consumer Price Index	2.7	1.8	2.7	3.0	0.1	2.1	3.3	3.5	1.9	2.3	2.1	2.2	2.2	2.3

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data: Treasury rates from the Federal Reserve Board's H.15; AAA-AA and A-BBB corporate bond yields from Bank of America-Merrill Lynch and are 15+ years, yield to maturity; State and local bond yields from Bank of America-Merrill Lynch, A-rated, yield to maturity; Mortgage rates from Freddie Mac, 30-year, fixed; LIBOR quotes from Intercontinental Exchange. All interest rate data is sourced from Haver Analytics. Historical data for Fed's Major Currency Index is from FRSR H.10. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS).







Blue Chip Financial Forecasts®

Top Analysts' Forecasts Of U.S. And Foreign Interest Rates, Currency Values And The Factors That Influence Them

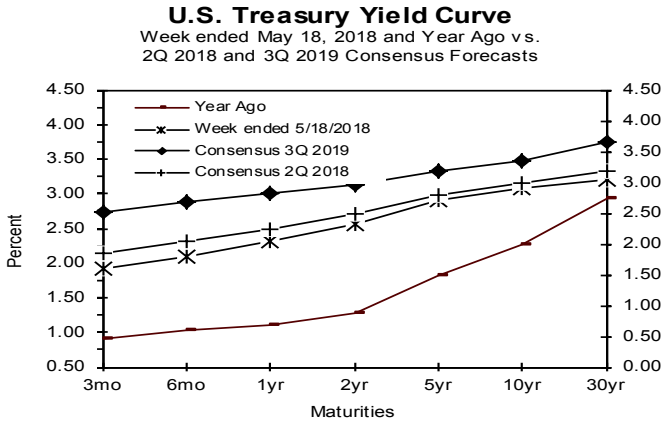
Vol. 37, No. 6, June 1, 2018

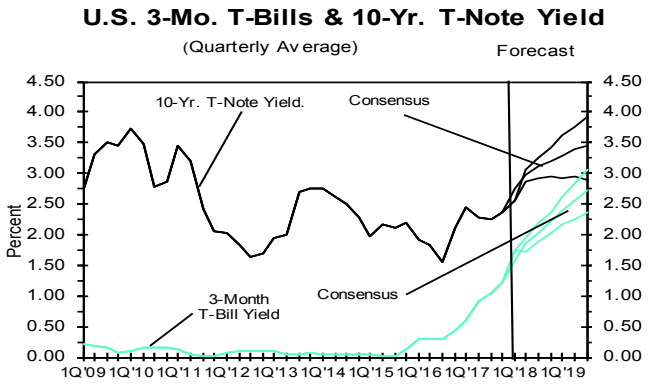
Wolters Kluwer

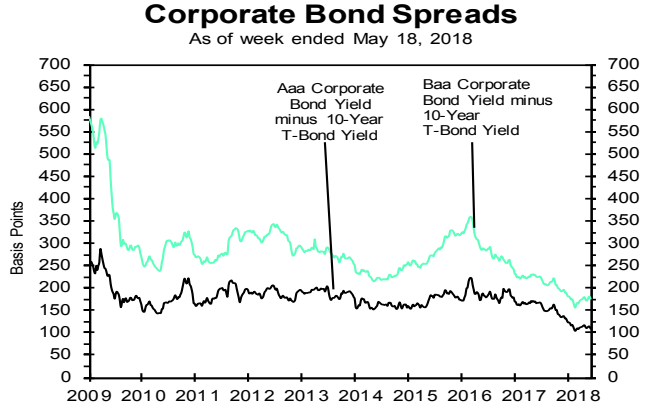
Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

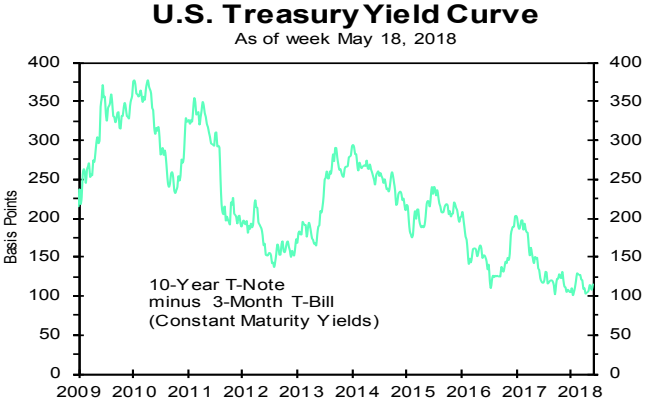
	History				History				Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Qtr	2Q	3Q	4Q	1Q	2Q	3Q
Interest Rates	May 18	May 11	May 4	Apr. 27	Apr.	Mar.	Feb.	1Q 2018	2018	2018	2018	2019	2019	2019
Federal Funds Rate	1.70	1.70	1.70	1.70	1.69	1.49	1.42	1.44	1.7	2.0	2.2	2.4	2.6	2.8
Prime Rate	4.75	4.75	4.75	4.75	4.75	4.75	4.50	4.58	4.8	5.0	5.2	5.4	5.6	5.8
LIBOR, 3-mo.	2.33	2.35	2.36	2.36	2.35	2.16	1.84	1.91	2.3	2.4	2.6	2.8	3.0	3.1
Commercial Paper, 1-mo.	1.81	1.79	1.85	1.82	1.82	1.76	1.52	1.59	1.8	2.1	2.3	2.5	2.7	2.9
Treasury bill, 3-mo.	1.92	1.89	1.85	1.85	1.79	1.72	1.56	1.57	1.9	2.0	2.2	2.4	2.6	2.7
Treasury bill, 6-mo.	2.09	2.05	2.03	2.03	1.98	1.91	1.76	1.76	2.0	2.2	2.4	2.6	2.7	2.9
Treasury bill, 1 yr.	2.31	2.27	2.24	2.25	2.15	2.06	1.94	1.93	2.2	2.4	2.6	2.7	2.9	3.0
Treasury note, 2 yr.	2.57	2.52	2.50	2.49	2.38	2.27	2.16	2.15	2.5	2.6	2.8	2.9	3.0	3.1
Treasury note, 5 yr.	2.91	2.82	2.79	2.82	2.70	2.63	2.59	2.53	2.8	2.9	3.0	3.1	3.2	3.3
Treasury note, 10 yr.	3.07	2.97	2.96	2.99	2.86	2.85	2.84	2.75	3.0	3.1	3.2	3.3	3.4	3.5
Treasury note, 30 yr.	3.20	3.13	3.12	3.17	3.07	3.10	3.11	3.02	3.2	3.3	3.4	3.5	3.7	3.8
Corporate Aaa bond	4.16	4.11	4.10	4.11	3.99	3.98	3.91	3.86	4.1	4.3	4.4	4.6	4.7	4.8
Corporate Baa bond	4.83	4.78	4.75	4.73	4.61	4.59	4.47	4.43	4.8	5.0	5.2	5.3	5.5	5.6
State & Local bonds	3.64	3.63	3.67	3.69	3.64	3.61	3.57	3.53	3.8	3.9	4.0	4.2	4.3	4.4
Home mortgage rate	4.66	4.61	4.55	4.55	4.47	4.44	4.33	4.27	4.6	4.7	4.8	4.9	5.1	5.1
	History								Consensus Forecasts-Quarterly					
	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q
Key Assumptions	2016	2016	2016	2017	2017	2017	2017	2018	2018	2018	2018	2019	2019	2019
Major Currency Index	89.6	90.3	93.7	94.4	93.0	88.3	88.9	86.1	87.3	87.6	87.3	87.0	87.0	87.1
Real GDP	2.2	2.8	1.8	1.2	3.1	3.2	2.9	2.3	3.2	3.0	2.8	2.4	2.4	2.2
GDP Price Index	2.4	1.4	2.0	2.0	1.0	2.1	2.3	2.0	2.1	2.2	2.1	2.2	2.2	2.2
Consumer Price Index	2.7	1.8	2.7	3.0	0.1	2.1	3.3	3.5	2.2	2.5	2.1	2.2	2.2	2.3

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data: Treasury rates from the Federal Reserve Board's H.15; AAA-AA and A-BBB corporate bond yields from Bank of America-Merrill Lynch and are 15+ years, yield to maturity; State and local bond yields from Bank of America-Merrill Lynch, A-rated, yield to maturity; Mortgage rates from Freddie Mac, 30-year, fixed; LIBOR quotes from Intercontinental Exchange. All interest rate data is sourced from Haver Analytics. Historical data for Fed's Major Currency Index is from FRSR H.10. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS).









Long-Range Survey:

The table below contains the results of our twice-annual long-range CONSENSUS survey. There are also Top 10 and Bottom 10 averages for each variable. Shown are consensus estimates for the years 2020 through 2024 and averages for the five-year periods 2020-2024 and 2025-2029. Apply these projections cautiously. Few if any economic, demographic and political forces can be evaluated accurately over such long time spans.

		----------Average For The Year----------					Five-Year Averages	
Interest Rates		**2020**	**2021**	**2022**	**2023**	**2024**	**2020-2024**	**2025-2029**
1. Federal Funds Rate	**CONSENSUS**	**3.0**	**3.0**	**3.0**	**3.0**	**3.0**	**3.0**	**3.0**
	Top 10 Average	3.5	3.6	3.6	3.5	3.5	3.5	3.5
	Bottom 10 Average	2.6	2.5	2.4	2.4	2.6	2.5	2.6
2. Prime Rate	**CONSENSUS**	**6.1**	**6.0**	**6.0**	**6.0**	**6.1**	**6.0**	**6.0**
	Top 10 Average	6.5	6.6	6.6	6.5	6.5	6.6	6.5
	Bottom 10 Average	5.6	5.5	5.4	5.5	5.6	5.5	5.6
3. LIBOR, 3-Mo.	**CONSENSUS**	**3.3**	**3.3**	**3.3**	**3.3**	**3.4**	**3.3**	**3.3**
	Top 10 Average	3.7	3.9	4.0	3.9	3.9	3.9	3.8
	Bottom 10 Average	2.9	2.8	2.7	2.7	2.9	2.8	2.9
4. Commercial Paper, 1-Mo.	**CONSENSUS**	**3.1**	**3.2**	**3.1**	**3.1**	**3.2**	**3.1**	**3.2**
	Top 10 Average	3.5	3.7	3.7	3.7	3.7	3.6	3.6
	Bottom 10 Average	2.7	2.6	2.6	2.6	2.7	2.6	2.7
5. Treasury Bill Yield, 3-Mo.	**CONSENSUS**	**3.0**	**3.0**	**2.9**	**2.9**	**3.0**	**3.0**	**3.0**
	Top 10 Average	3.5	3.6	3.6	3.5	3.6	3.5	3.5
	Bottom 10 Average	2.5	2.4	2.4	2.4	2.5	2.4	2.5
6. Treasury Bill Yield, 6-Mo.	**CONSENSUS**	**3.1**	**3.1**	**3.1**	**3.1**	**3.2**	**3.1**	**3.2**
	Top 10 Average	3.6	3.7	3.7	3.7	3.7	3.7	3.7
	Bottom 10 Average	2.7	2.6	2.5	2.5	2.7	2.6	2.7
7. Treasury Bill Yield, 1-Yr.	**CONSENSUS**	**3.2**	**3.3**	**3.2**	**3.2**	**3.3**	**3.2**	**3.3**
	Top 10 Average	3.7	3.8	3.8	3.8	3.8	3.8	3.9
	Bottom 10 Average	2.8	2.7	2.6	2.7	2.8	2.7	2.8
8. Treasury Note Yield, 2-Yr.	**CONSENSUS**	**3.4**	**3.4**	**3.4**	**3.4**	**3.4**	**3.4**	**3.5**
	Top 10 Average	3.9	4.0	4.0	3.8	4.0	3.9	4.1
	Bottom 10 Average	2.9	2.9	2.8	2.8	2.9	2.8	2.9
10. Treasury Note Yield, 5-Yr.	**CONSENSUS**	**3.6**	**3.6**	**3.6**	**3.6**	**3.7**	**3.6**	**3.8**
	Top 10 Average	4.0	4.1	4.1	4.1	4.2	4.1	4.4
	Bottom 10 Average	3.2	3.2	3.0	3.1	3.2	3.1	3.2
11. Treasury Note Yield, 10-Yr.	**CONSENSUS**	**3.8**	**3.8**	**3.8**	**3.8**	**3.8**	**3.8**	**3.9**
	Top 10 Average	4.3	4.3	4.4	4.3	4.4	4.3	4.5
	Bottom 10 Average	3.3	3.3	3.2	3.2	3.3	3.2	3.4
12. Treasury Bond Yield, 30-Yr.	**CONSENSUS**	**4.1**	**4.2**	**4.2**	**4.2**	**4.2**	**4.2**	**4.4**
	Top 10 Average	4.7	4.7	4.7	4.8	4.8	4.7	5.0
	Bottom 10 Average	3.6	3.6	3.6	3.6	3.7	3.6	3.7
13. Corporate Aaa Bond Yield	**CONSENSUS**	**5.2**	**5.2**	**5.2**	**5.3**	**5.4**	**5.3**	**5.4**
	Top 10 Average	5.7	5.8	5.9	6.0	6.0	5.9	6.0
	Bottom 10 Average	4.7	4.7	4.6	4.6	4.7	4.6	4.7
13. Corporate Baa Bond Yield	**CONSENSUS**	**6.0**	**6.0**	**6.0**	**6.1**	**6.2**	**6.1**	**6.3**
	Top 10 Average	6.6	6.8	6.9	7.0	7.0	6.9	7.0
	Bottom 10 Average	5.3	5.3	5.3	5.3	5.4	5.3	5.4
14. State & Local Bonds Yield	**CONSENSUS**	**4.6**	**4.5**	**4.5**	**4.5**	**4.6**	**4.5**	**4.6**
	Top 10 Average	5.1	5.1	5.1	5.1	5.1	5.1	5.2
	Bottom 10 Average	4.0	3.9	3.9	4.0	4.1	4.0	4.1
15. Home Mortgage Rate	**CONSENSUS**	**5.4**	**5.4**	**5.4**	**5.4**	**5.5**	**5.4**	**5.6**
	Top 10 Average	5.8	5.9	6.0	6.0	6.0	6.0	6.1
	Bottom 10 Average	4.9	4.9	4.8	4.8	4.9	4.9	5.0
A. FRB - Major Currency Index	**CONSENSUS**	**89.6**	**89.4**	**89.6**	**90.0**	**90.1**	**89.7**	**90.4**
	Top 10 Average	94.3	94.6	94.5	94.5	94.5	94.5	94.8
	Bottom 10 Average	84.6	84.0	84.3	85.4	85.6	84.8	85.9
		----------Year-Over-Year, % Change----------					Five-Year Averages	
		2020	**2021**	**2022**	**2023**	**2024**	**2020-2024**	**2025-2029**
B. Real GDP	**CONSENSUS**	**1.9**	**1.9**	**2.0**	**2.1**	**2.1**	**2.0**	**2.1**
	Top 10 Average	2.4	2.4	2.4	2.4	2.5	2.4	2.4
	Bottom 10 Average	1.5	1.3	1.5	1.8	1.8	1.6	1.8
C. GDP Chained Price Index	**CONSENSUS**	**2.2**	**2.2**	**2.1**	**2.1**	**2.1**	**2.1**	**2.1**
	Top 10 Average	2.4	2.4	2.3	2.2	2.3	2.3	2.2
	Bottom 10 Average	2.0	2.0	2.0	1.9	2.0	2.0	2.0
D. Consumer Price Index	**CONSENSUS**	**2.3**	**2.3**	**2.3**	**2.2**	**2.2**	**2.3**	**2.2**
	Top 10 Average	2.7	2.6	2.5	2.4	2.5	2.5	2.4
	Bottom 10 Average	1.9	2.0	2.1	2.0	2.0	2.0	2.1

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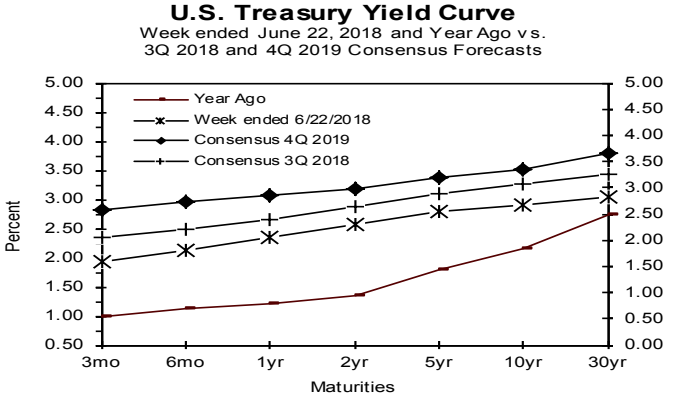
Vol. 37, No. 7, July 1, 2018

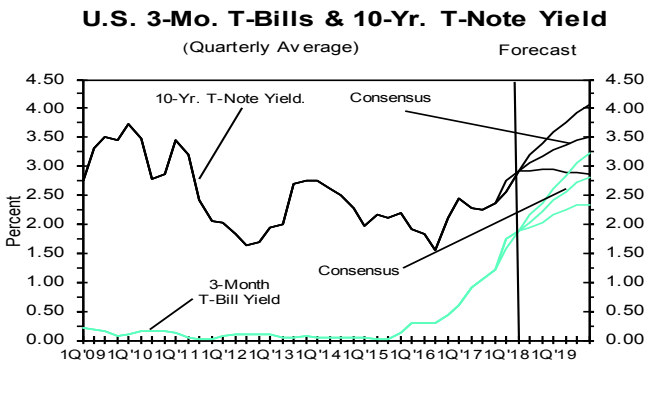
Wolters Kluwer

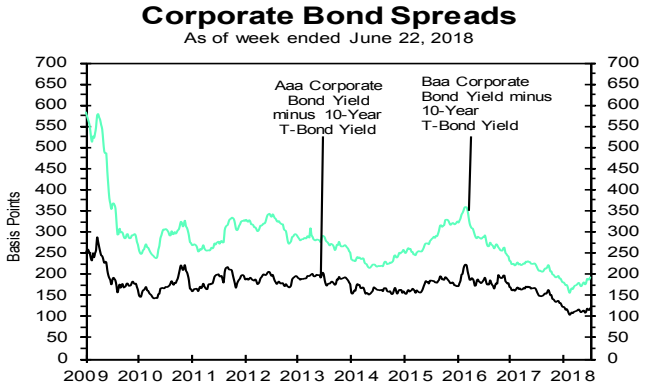
Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

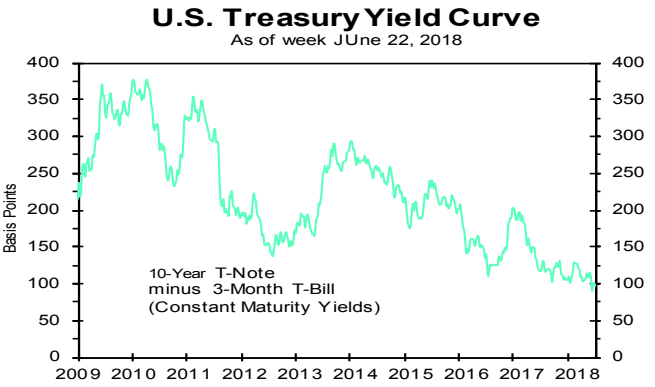
	History				History				Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Qtr	3Q	4Q	1Q	2Q	3Q	4Q
Interest Rates	Jun 22	Jun 15	Jun 8	Jun 1	May.	Apr.	Mar.	2Q 2018*	2018	2018	2019	2019	2019	2019
Federal Funds Rate	1.90	1.82	1.70	1.70	1.70	1.69	1.49	*1.73*	**2.0**	**2.2**	**2.4**	**2.6**	**2.8**	**2.9**
Prime Rate	5.00	5.00	4.75	4.75	4.75	4.75	4.75	*4.81*	**5.0**	**5.2**	**5.4**	**5.6**	**5.8**	**5.9**
LIBOR, 3-mo.	2.33	2.33	2.32	2.31	2.34	2.35	2.16	*2.34*	**2.4**	**2.6**	**2.8**	**2.9**	**3.1**	**3.2**
Commercial Paper, 1-mo.	1.96	1.96	1.88	1.85	1.82	1.82	1.76	*1.86*	**2.0**	**2.3**	**2.5**	**2.7**	**2.8**	**3.0**
Treasury bill, 3-mo.	1.94	1.94	1.94	1.93	1.90	1.79	1.72	*1.88*	**2.0**	**2.2**	**2.4**	**2.6**	**2.7**	**2.8**
Treasury bill, 6-mo.	2.13	2.09	2.13	2.08	2.07	1.98	1.91	*2.06*	**2.2**	**2.4**	**2.6**	**2.7**	**2.9**	**3.0**
Treasury bill, 1 yr.	2.34	2.34	2.31	2.23	2.28	2.15	2.06	*2.25*	**2.4**	**2.6**	**2.7**	**2.9**	**3.0**	**3.1**
Treasury note, 2 yr.	2.56	2.56	2.51	2.40	2.53	2.38	2.27	*2.48*	**2.6**	**2.8**	**2.9**	**3.0**	**3.1**	**3.2**
Treasury note, 5 yr.	2.78	2.82	2.78	2.67	2.84	2.70	2.63	*2.78*	**2.9**	**3.0**	**3.1**	**3.2**	**3.3**	**3.4**
Treasury note, 10 yr.	2.91	2.95	2.94	2.83	3.00	2.86	2.85	*2.93*	**3.1**	**3.2**	**3.3**	**3.4**	**3.4**	**3.5**
Treasury note, 30 yr.	3.04	3.08	3.09	3.00	3.15	3.07	3.10	*3.10*	**3.3**	**3.4**	**3.5**	**3.6**	**3.7**	**3.8**
Corporate Aaa bond	4.11	4.10	4.11	4.02	4.12	3.99	3.98	*4.07*	**4.2**	**4.4**	**4.6**	**4.7**	**4.8**	**4.9**
Corporate Baa bond	4.84	4.82	4.82	4.72	4.79	4.61	4.59	*4.74*	**5.0**	**5.2**	**5.3**	**5.5**	**5.6**	**5.6**
State & Local bonds	3.62	3.63	3.63	3.60	3.65	3.64	3.61	*3.64*	**3.9**	**4.0**	**4.1**	**4.3**	**4.3**	**4.4**
Home mortgage rate	4.57	4.62	4.54	4.56	4.59	4.47	4.44	*4.55*	**4.7**	**4.8**	**4.9**	**5.1**	**5.1**	**5.2**
	History								Consensus Forecasts-Quarterly					
	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Key Assumptions	2016	2016	2017	2017	2017	2017	2018	*2018**	**2018**	**2018**	**2019**	**2019**	**2019**	**2019**
Major Currency Index	90.3	93.7	94.4	93.0	88.3	88.9	86.1	*88.2*	**89.1**	**89.0**	**88.8**	**88.7**	**88.6**	**88.4**
Real GDP	2.8	1.8	1.2	3.1	3.2	2.9	2.0	*3.8*	**2.9**	**2.8**	**2.4**	**2.4**	**2.2**	**1.9**
GDP Price Index	1.4	2.0	2.0	1.0	2.1	2.3	2.2	*2.1*	**2.2**	**2.2**	**2.2**	**2.2**	**2.3**	**2.2**
Consumer Price Index	1.8	2.7	3.0	0.1	2.1	3.3	3.5	*2.1*	**2.4**	**2.2**	**2.3**	**2.1**	**2.4**	**2.3**

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data: Treasury rates from the Federal Reserve Board's H.15; AAA-AA and A-BBB corporate bond yields from Bank of America-Merrill Lynch and are 15+ years, yield to maturity; State and local bond yields from Bank of America-Merrill Lynch, A-rated, yield to maturity; Mortgage rates from Freddie Mac, 30-year, fixed; LIBOR quotes from Intercontinental Exchange. All interest rate data is sourced from Haver Analytics. Historical data for Fed's Major Currency Index is from FRSR H.10. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS). **Interest rate data for 2Q 2018 based on historical data through the week ended June 22nd. *Data for 2Q 2018 Major Currency Index is based on data through week ended June 22nd. Figures for 2Q 2018 Real GDP, GDP Chained Price Index and Consumer Price Index are consensus forecasts based on a special question asked of the panelists' this month.*









Blue Chip Financial Forecasts®

Top Analysts' Forecasts Of U.S. And Foreign Interest Rates, Currency Values And The Factors That Influence Them

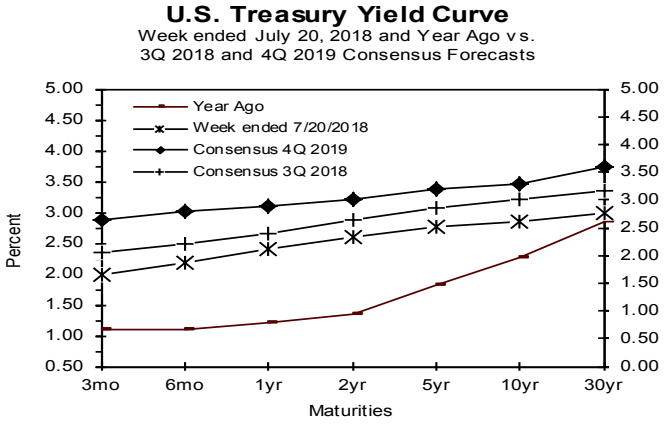
Vol. 37, No. 8, August 1, 2018

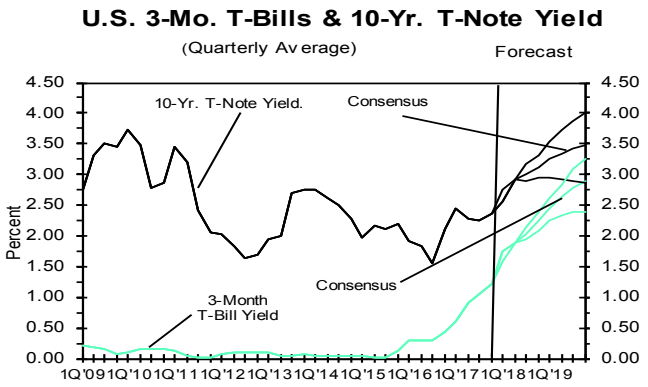
Wolters Kluwer

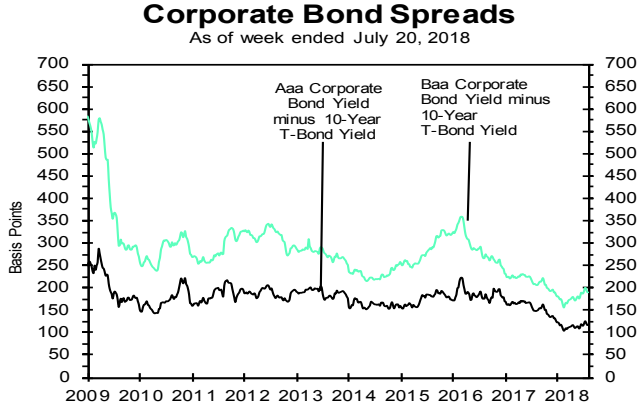
Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

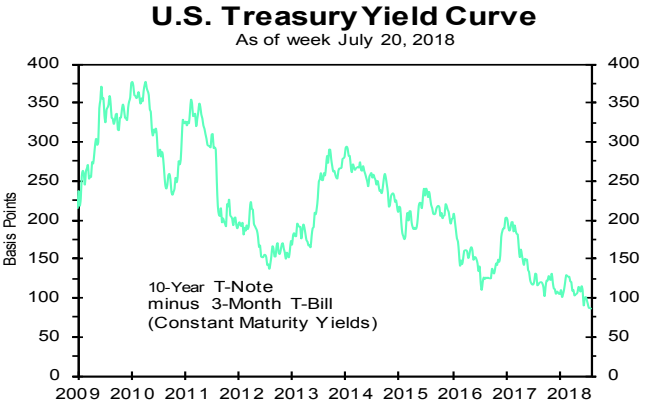
	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Qtr	3Q	4Q	1Q	2Q	3Q	4Q
Interest Rates	July 20	July 13	July 6	June 29	Jun.	May	Apr	2Q 2018	2018	2018	2019	2019	2019	2019
Federal Funds Rate	1.91	1.91	1.91	1.92	1.81	1.70	1.69	1.73	2.0	2.2	2.4	2.6	2.8	2.9
Prime Rate	5.00	5.00	5.00	5.00	4.88	4.75	4.75	4.79	5.0	5.3	5.5	5.7	5.8	5.9
LIBOR, 3-mo.	2.34	2.34	2.34	2.34	2.33	2.34	2.35	2.34	2.4	2.6	2.8	3.0	3.1	3.2
Commercial Paper, 1-mo.	1.97	1.96	1.96	1.97	1.92	1.82	1.82	1.85	2.0	2.3	2.5	2.7	2.9	3.0
Treasury bill, 3-mo.	2.00	1.98	1.97	1.93	1.94	1.90	1.79	1.88	2.0	2.2	2.4	2.6	2.8	2.9
Treasury bill, 6-mo.	2.17	2.15	2.13	2.12	2.11	2.07	1.98	2.05	2.2	2.4	2.6	2.8	2.9	3.0
Treasury bill, 1 yr.	2.40	2.36	2.33	2.33	2.31	2.28	2.15	2.25	2.4	2.6	2.8	2.9	3.0	3.1
Treasury note, 2 yr.	2.60	2.59	2.55	2.53	2.51	2.53	2.38	2.47	2.6	2.8	2.9	3.1	3.2	3.2
Treasury note, 5 yr.	2.76	2.75	2.73	2.73	2.76	2.84	2.70	2.77	2.9	3.0	3.1	3.2	3.3	3.4
Treasury note, 10 yr.	2.86	2.85	2.84	2.85	2.90	3.00	2.86	2.92	3.0	3.1	3.3	3.3	3.4	3.5
Treasury note, 30 yr.	2.98	2.95	2.96	2.99	3.04	3.15	3.07	3.09	3.2	3.3	3.5	3.6	3.7	3.7
Corporate Aaa bond	4.03	4.02	4.07	4.11	4.09	4.12	3.99	4.07	4.1	4.3	4.6	4.7	4.8	4.9
Corporate Baa bond	4.76	4.76	4.83	4.85	4.81	4.79	4.61	4.74	5.0	5.2	5.3	5.5	5.6	5.7
State & Local bonds	3.59	3.61	3.62	3.61	3.62	3.65	3.64	3.64	3.9	4.0	4.2	4.3	4.4	4.5
Home mortgage rate	4.52	4.53	4.52	4.55	4.57	4.59	4.47	4.54	4.6	4.8	4.9	5.0	5.1	5.2
	History								Consensus Forecasts-Quarterly					
	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Key Assumptions	2016	2016	2017	2017	2017	2017	2018	2018	2018	2018	2019	2019	2019	2019
Major Currency Index	90.3	93.7	94.4	93.0	88.3	88.9	86.1	88.3	89.5	89.5	89.2	88.9	88.7	88.4
Real GDP	1.9	1.8	1.8	3.0	2.8	2.3	2.2	4.1	2.9	2.7	2.4	2.4	2.2	2.0
GDP Price Index	1.4	2.3	2.0	1.2	2.2	2.5	2.0	3.0	2.3	2.2	2.3	2.2	2.3	2.2
Consumer Price Index	1.8	2.7	3.0	0.1	2.1	3.3	3.5	1.7	2.4	2.2	2.3	2.2	2.3	2.3

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data: Treasury rates from the Federal Reserve Board's H.15; AAA-AA and A-BBB corporate bond yields from Bank of America-Merrill Lynch and are 15+ years, yield to maturity; State and local bond yields from Bank of America-Merrill Lynch, A-rated, yield to maturity; Mortgage rates from Freddie Mac, 30-year, fixed; LIBOR quotes from Intercontinental Exchange. All interest rate data is sourced from Haver Analytics. Historical data for Fed's Major Currency Index is from FRSR H.10. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS.









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Top Analysts' Forecasts Of U.S. And Foreign Interest Rates, Currency Values And The Factors That Influence Them

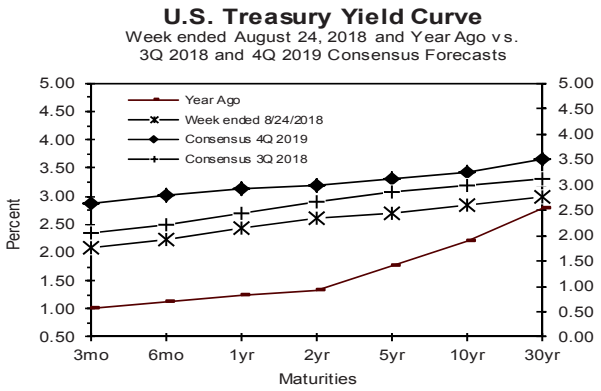
Vol. 37, No. 9, September 1, 2018

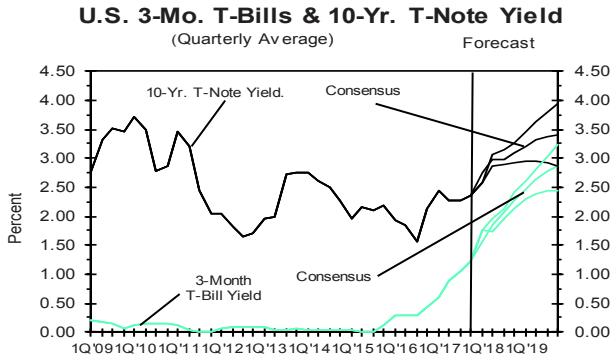
Wolters Kluwer

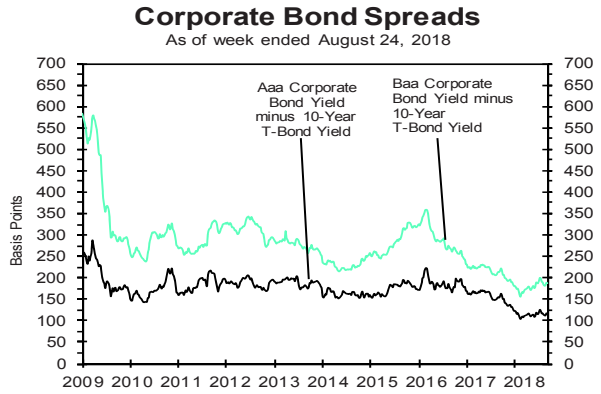
Consensus Forecasts of U.S. Interest Rates and Key Assumptions

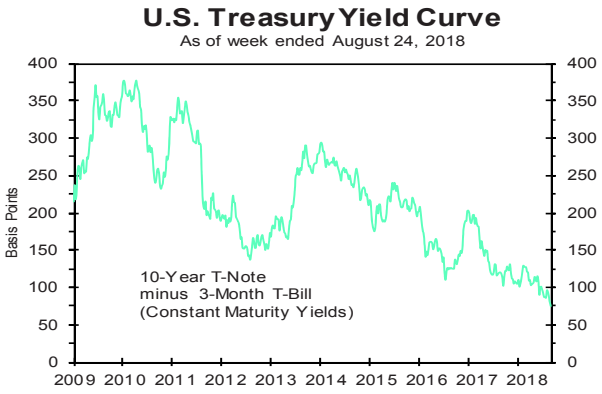
	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Qtr	3Q	4Q	1Q	2Q	3Q	4Q
Interest Rates	Aug 24	Aug 17	Aug 10	Aug 3	July	June	May	Q2 2018	2018	2018	2019	2019	2019	2019
Federal Funds Rate	1.92	1.91	1.91	1.91	1.91	1.81	1.70	1.73	2.0	2.2	2.4	2.6	2.8	2.9
Prime Rate	5.00	5.00	5.00	5.00	5.00	4.88	4.75	4.79	5.0	5.3	5.5	5.7	5.9	6.0
LIBOR, 3-mo.	2.31	2.32	2.34	2.34	2.34	2.33	2.34	2.34	2.4	2.6	2.8	3.0	3.1	3.2
Commercial Paper, 1-mo.	1.95	1.95	1.95	1.96	1.96	1.92	1.82	1.86	2.0	2.3	2.5	2.7	2.8	2.9
Treasury bill, 3-mo.	2.08	2.07	2.06	2.03	1.99	1.94	1.90	1.88	2.1	2.3	2.5	2.6	2.8	2.9
Treasury bill, 6-mo.	2.24	2.24	2.24	2.22	2.16	2.11	2.07	2.06	2.2	2.4	2.6	2.8	2.9	3.0
Treasury bill, 1 yr.	2.44	2.44	2.44	2.44	2.38	2.31	2.28	2.25	2.4	2.6	2.8	2.9	3.0	3.1
Treasury note, 2 yr.	2.61	2.62	2.65	2.66	2.60	2.51	2.53	2.48	2.7	2.8	2.9	3.1	3.1	3.2
Treasury note, 5 yr.	2.71	2.75	2.80	2.85	2.77	2.76	2.84	2.76	2.9	3.0	3.1	3.2	3.3	3.3
Treasury note, 10 yr.	2.83	2.87	2.94	2.97	2.88	2.90	3.00	2.92	3.0	3.1	3.2	3.3	3.4	3.4
Treasury note, 30 yr.	2.98	3.04	3.09	3.11	3.00	3.04	3.15	3.08	3.1	3.3	3.4	3.5	3.6	3.7
Corporate Aaa bond	3.99	4.04	4.06	4.10	4.06	4.09	4.12	4.07	4.1	4.3	4.5	4.6	4.7	4.8
Corporate Baa bond	4.71	4.76	4.77	4.79	4.79	4.81	4.79	4.74	4.9	5.1	5.3	5.4	5.5	5.6
State & Local bonds	3.62	3.63	3.65	3.63	3.60	3.62	3.65	3.63	3.8	4.0	4.1	4.2	4.3	4.4
Home mortgage rate	4.51	4.53	4.59	4.60	4.53	4.57	4.59	4.54	4.6	4.7	4.9	5.0	5.1	5.1
	History								Consensus Forecasts-Quarterly					
	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Key Assumptions	2016	2016	2017	2017	2017	2017	2018	2018	2018	2018	2019	2019	2019	2019
Major Currency Index	90.2	93.6	94.3	92.9	88.3	88.9	86.1	88.3	89.8	89.9	89.8	89.6	89.2	88.9
Real GDP	1.9	1.8	1.8	3.0	2.8	2.3	2.2	4.2	3.1	2.8	2.4	2.4	2.1	1.9
GDP Price Index	1.4	2.3	2.0	1.2	2.2	2.5	2.0	3.0	2.2	2.3	2.3	2.3	2.2	2.2
Consumer Price Index	1.8	2.7	3.0	0.1	2.1	3.3	3.5	1.7	2.3	2.3	2.4	2.2	2.3	2.3

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data: Treasury rates from the Federal Reserve Board's H.15; AAA-AA and A-BBB corporate bond yields from Bank of America-Merrill Lynch and are 15+ years, yield to maturity; State and local bond yields from Bank of America-Merrill Lynch, A-rated, yield to maturity; Mortgage rates from Freddie Mac, 30-year, fixed; LIBOR quotes from Intercontinental Exchange. All interest rate data are sourced from Haver Analytics. Historical data for Fed's Major Currency Index are from FRSR H.10. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS).









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Top Analysts' Forecasts Of U.S. And Foreign Interest Rates, Currency Values And The Factors That Influence Them

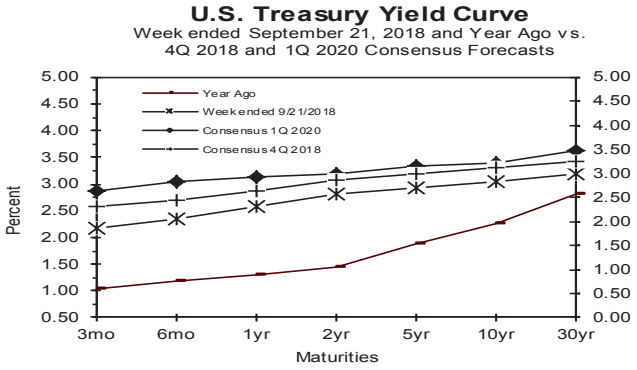
Vol. 37, No. 10, October 1, 2018

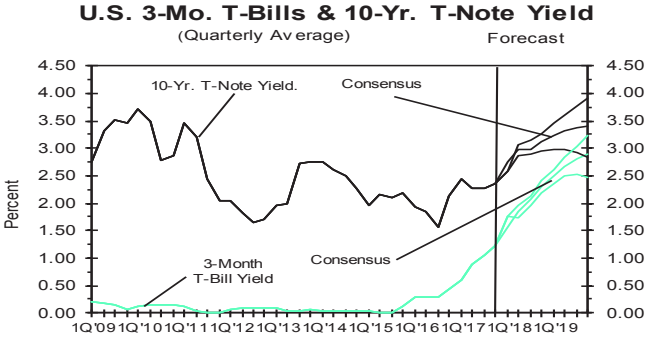
Wolters Kluwer

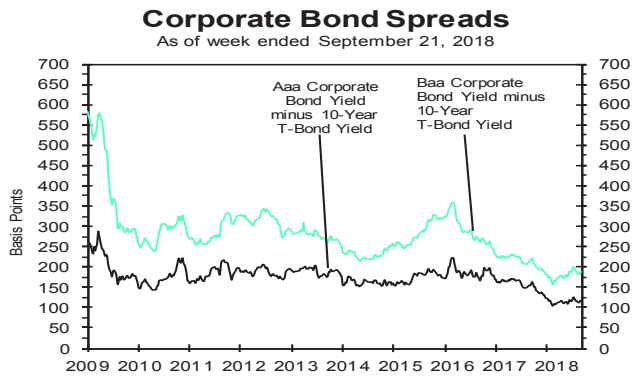
Consensus Forecasts of U.S. Interest Rates and Key Assumptions

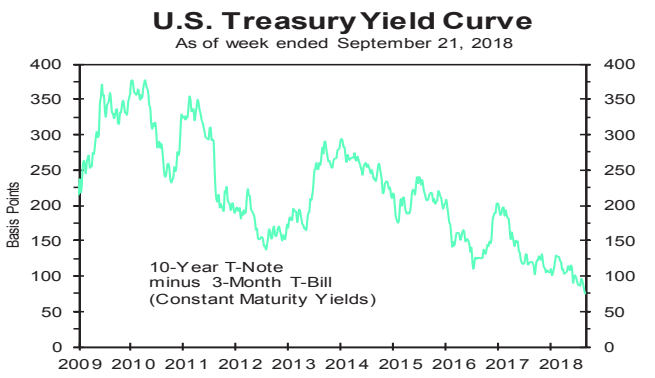
	History				History				Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Qtr	4Q	1Q	2Q	3Q	4Q	1Q
Interest Rates	Sep 21	Sep 14	Sep 7	Aug 31	Aug	Jul	Jun	*Q3 2018**	2018	2019	2019	2019	2019	2020
Federal Funds Rate	1.92	1.92	1.91	1.92	1.91	1.91	1.81	*1.91*	**2.2**	**2.4**	**2.7**	**2.8**	**2.9**	**2.9**
Prime Rate	5.00	5.00	5.00	5.00	5.00	5.00	4.88	*5.00*	**5.3**	**5.5**	**5.7**	**5.9**	**6.0**	**5.9**
LIBOR, 3-mo.	2.35	2.33	2.32	2.32	2.33	2.34	2.33	*2.33*	**2.6**	**2.8**	**3.0**	**3.1**	**3.2**	**3.2**
Commercial Paper, 1-mo.	2.10	2.03	2.00	1.99	1.96	1.96	1.92	*1.98*	**2.3**	**2.5**	**2.7**	**2.8**	**2.9**	**2.9**
Treasury bill, 3-mo.	2.17	2.15	2.14	2.12	2.07	1.99	1.94	*2.06*	**2.3**	**2.5**	**2.7**	**2.8**	**2.9**	**2.9**
Treasury bill, 6-mo.	2.36	2.32	2.30	2.27	2.24	2.16	2.11	*2.24*	**2.4**	**2.6**	**2.8**	**2.9**	**3.0**	**3.0**
Treasury bill, 1 yr.	2.58	2.55	2.50	2.47	2.45	2.38	2.31	*2.45*	**2.6**	**2.8**	**2.9**	**3.1**	**3.1**	**3.1**
Treasury note, 2 yr.	2.80	2.75	2.67	2.65	2.64	2.60	2.51	*2.65*	**2.8**	**3.0**	**3.1**	**3.2**	**3.2**	**3.2**
Treasury note, 5 yr.	2.94	2.87	2.78	2.76	2.77	2.77	2.76	*2.80*	**3.0**	**3.1**	**3.2**	**3.3**	**3.3**	**3.3**
Treasury note, 10 yr.	3.05	2.97	2.91	2.87	2.90	2.88	2.90	*2.91*	**3.1**	**3.2**	**3.3**	**3.4**	**3.4**	**3.4**
Treasury note, 30 yr.	3.19	3.11	3.08	3.01	3.05	3.00	3.04	*3.05*	**3.3**	**3.4**	**3.5**	**3.6**	**3.7**	**3.6**
Corporate Aaa bond	4.17	4.12	4.10	4.03	4.04	4.06	4.09	*4.07*	**4.3**	**4.5**	**4.6**	**4.7**	**4.7**	**4.7**
Corporate Baa bond	4.86	4.83	4.82	4.75	4.75	4.79	4.81	*4.78*	**5.1**	**5.3**	**5.4**	**5.5**	**5.6**	**5.6**
State & Local bonds	3.75	3.71	3.67	3.63	3.63	3.60	3.62	*3.64*	**4.0**	**4.1**	**4.2**	**4.3**	**4.4**	**4.4**
Home mortgage rate	4.65	4.60	4.54	4.52	4.55	4.53	4.57	*4.57*	**4.7**	**4.9**	**5.0**	**5.1**	**5.1**	**5.2**
	History								Consensus Forecasts-Quarterly					
	4Q	1Q	2Q	3Q	4Q	1Q	2Q	*3Q*	4Q	1Q	2Q	3Q	4Q	1Q
Key Assumptions	2016	2017	2017	2017	2017	2018	2018	*2018**	2018	2019	2019	2019	2019	2020
Major Currency Index	93.6	94.3	92.9	88.3	88.9	86.1	88.3	*90.2*	**90.0**	**89.8**	**89.4**	**88.6**	**88.5**	**88.5**
Real GDP	1.8	1.8	3.0	2.8	2.3	2.2	4.2	*3.2*	**2.8**	**2.4**	**2.4**	**2.2**	**1.9**	**1.8**
GDP Price Index	2.3	2.0	1.2	2.2	2.5	2.0	3.0	*2.2*	**2.3**	**2.3**	**2.3**	**2.2**	**2.2**	**2.2**
Consumer Price Index	2.7	3.0	0.1	2.1	3.3	3.5	1.7	*2.2*	**2.4**	**2.4**	**2.2**	**2.3**	**2.3**	**2.3**

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data: Treasury rates from the Federal Reserve Board's H.15; AAA-AA and A-BBB corporate bond yields from Bank of America-Merrill Lynch and are 15+ years, yield to maturity; State and local bond yields from Bank of America-Merrill Lynch, A-rated, yield to maturity; Mortgage rates from Freddie Mac, 30-year, fixed; LIBOR quotes from Intercontinental Exchange. All interest rate data are sourced from Haver Analytics. Historical data for Fed's Major Currency Index are from FRSR H.10. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS).). **Interest rate data for Q3 2018 based on historical data through the week ended September 21.* **Data for Q3 2018 Major Currency Index based on data through week ended September 21. Figures for Q3 2018 Real GDP, GDP Chained Price Index and Consumer Price Index are consensus forecasts based on a special question asked of the panelists this month.*





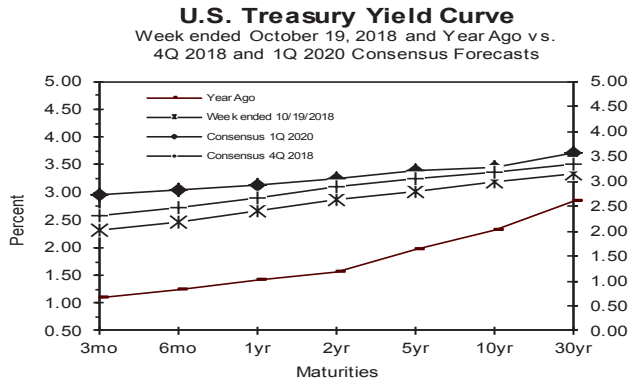


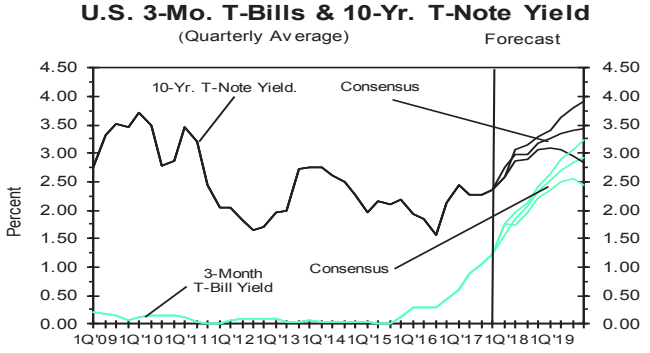


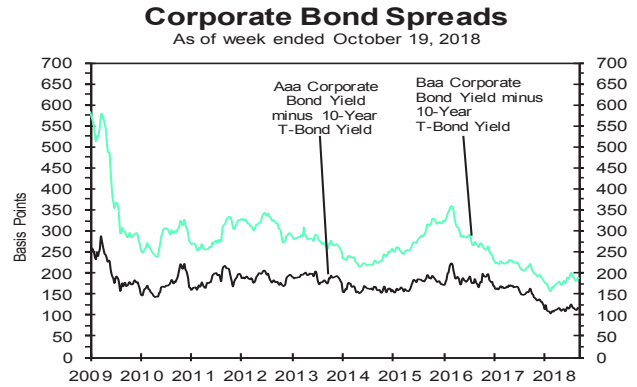
Consensus Forecasts of U.S. Interest Rates and Key Assumptions

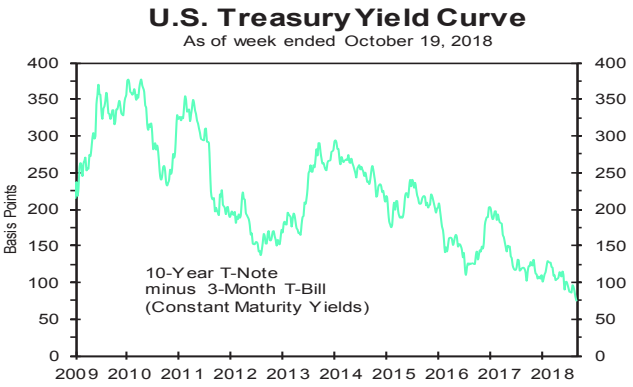
	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Qtr	4Q	1Q	2Q	3Q	4Q	1Q
Interest Rates	Oct 19	Oct 12	Oct 5	Sep 28	Sep	Aug	Jul	Q3 2018	2018	2019	2019	2019	2019	2020
Federal Funds Rate	2.18	2.18	2.18	1.92	1.95	1.91	1.91	1.92	2.3	2.5	2.7	2.8	3.0	3.0
Prime Rate	5.25	5.25	5.25	5.00	5.03	5.00	5.00	5.01	5.3	5.5	5.7	5.9	6.0	6.0
LIBOR, 3-mo.	2.46	2.43	2.41	2.39	2.35	2.32	2.34	2.34	2.6	2.8	3.0	3.1	3.2	3.2
Commercial Paper, 1-mo.	2.23	2.22	2.20	2.11	2.06	1.96	1.95	1.99	2.3	2.5	2.7	2.9	2.9	2.9
Treasury bill, 3-mo.	2.31	2.27	2.23	2.20	2.17	2.07	1.99	2.08	2.3	2.5	2.7	2.8	2.9	2.9
Treasury bill, 6-mo.	2.47	2.45	2.41	2.37	2.34	2.24	2.17	2.25	2.5	2.7	2.8	2.9	3.0	3.1
Treasury bill, 1 yr.	2.67	2.66	2.62	2.59	2.56	2.45	2.39	2.47	2.7	2.8	3.0	3.1	3.1	3.1
Treasury note, 2 yr.	2.88	2.87	2.85	2.83	2.77	2.64	2.61	2.67	2.9	3.0	3.1	3.2	3.2	3.3
Treasury note, 5 yr.	3.03	3.03	3.01	2.96	2.89	2.77	2.78	2.81	3.1	3.2	3.3	3.3	3.4	3.4
Treasury note, 10 yr.	3.18	3.18	3.14	3.07	3.00	2.89	2.89	2.93	3.2	3.3	3.4	3.4	3.4	3.5
Treasury note, 30 yr.	3.35	3.35	3.30	3.20	3.15	3.04	3.01	3.07	3.3	3.5	3.6	3.6	3.7	3.7
Corporate Aaa bond	4.30	4.29	4.23	4.16	4.14	4.04	4.06	4.08	4.2	4.5	4.6	4.7	4.7	4.7
Corporate Baa bond	5.02	5.00	4.93	4.84	4.84	4.75	4.78	4.79	5.1	5.3	5.4	5.5	5.6	5.6
State & Local bonds	3.86	3.85	3.80	3.77	3.72	3.63	3.61	3.65	4.0	4.1	4.2	4.3	4.3	4.3
Home mortgage rate	4.85	4.90	4.71	4.72	4.63	4.55	4.53	4.57	4.8	5.0	5.1	5.1	5.2	5.2
	History								Consensus Forecasts-Quarterly					
	4Q	1Q	2Q	3Q	4Q	1Q	2Q	*3Q*	4Q	1Q	2Q	3Q	4Q	1Q
Key Assumptions	2016	2017	2017	2017	2017	2018	2018	*2018*	2018	2019	2019	2019	2019	2020
Major Currency Index	93.6	94.3	92.9	88.3	88.9	86.1	88.3	90.2	90.6	90.5	90.0	89.2	89.0	89.1
Real GDP	1.8	1.8	3.0	2.8	2.3	2.2	4.2	3.5	2.8	2.4	2.4	2.2	1.9	1.8
GDP Price Index	2.3	2.0	1.2	2.2	2.5	2.0	3.0	1.7	2.4	2.3	2.3	2.2	2.3	2.2
Consumer Price Index	2.7	3.0	0.1	2.1	3.3	3.5	1.7	2.0	2.5	2.5	2.2	2.3	2.4	2.3

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data: Treasury rates from the Federal Reserve Board's H.15; AAA-AA and A-BBB corporate bond yields from Bank of America-Merrill Lynch and are 15+ years, yield to maturity; State and local bond yields from Bank of America-Merrill Lynch, A-rated, yield to maturity; Mortgage rates from Freddie Mac, 30-year, fixed; LIBOR quotes from Intercontinental Exchange. All interest rate data are sourced from Haver Analytics. Historical data for Fed's Major Currency Index are from FRSR H.10. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS).).





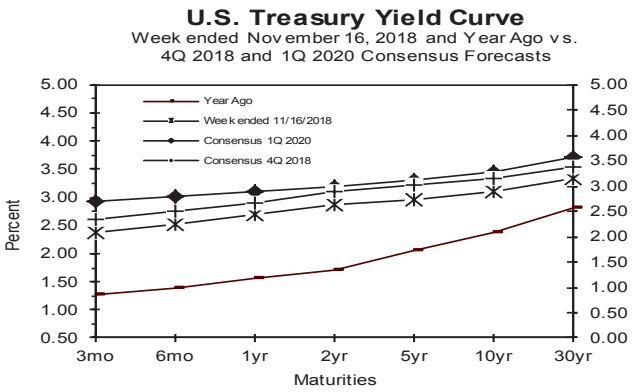


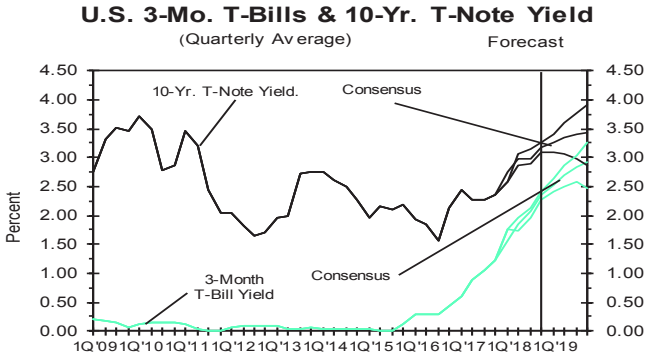


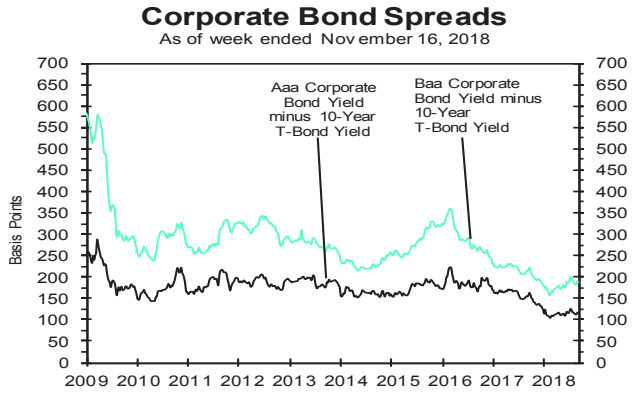
Consensus Forecasts of U.S. Interest Rates and Key Assumptions

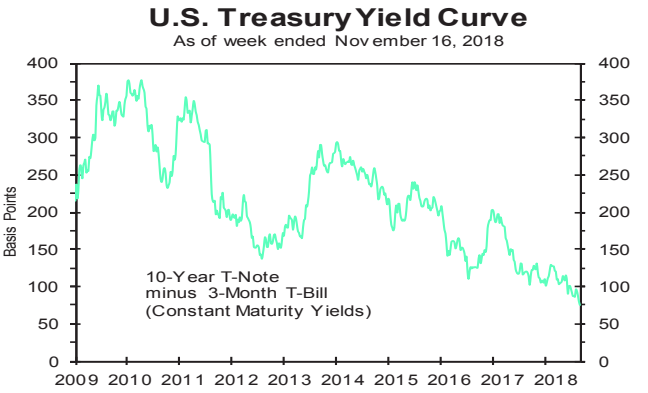
	History				History				Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Qtr	4Q	1Q	2Q	3Q	4Q	1Q
Interest Rates	Nov 16	Nov 9	Nov 2	Oct 26	Oct	Sep	Aug	Q3 2018	2018	2019	2019	2019	2019	2020
Federal Funds Rate	2.19	2.20	2.20	2.19	2.19	1.95	1.91	1.92	**2.3**	**2.5**	**2.7**	**2.9**	**3.0**	**3.0**
Prime Rate	5.25	5.25	5.25	5.25	5.25	5.03	5.00	5.01	**5.3**	**5.5**	**5.7**	**5.9**	**6.0**	**6.0**
LIBOR, 3-mo.	2.63	2.60	2.56	2.50	2.46	2.35	2.32	2.34	**2.6**	**2.8**	**3.0**	**3.2**	**3.3**	**3.3**
Commercial Paper, 1-mo.	2.29	2.27	2.25	2.26	2.23	2.06	1.96	1.99	**2.3**	**2.5**	**2.7**	**2.9**	**2.9**	**2.9**
Treasury bill, 3-mo.	2.37	2.36	2.33	2.34	2.29	2.17	2.07	2.08	**2.4**	**2.5**	**2.7**	**2.8**	**2.9**	**2.9**
Treasury bill, 6-mo.	2.52	2.52	2.49	2.48	2.46	2.34	2.24	2.25	**2.5**	**2.7**	**2.8**	**3.0**	**3.0**	**3.0**
Treasury bill, 1 yr.	2.70	2.73	2.67	2.66	2.65	2.56	2.45	2.47	**2.7**	**2.8**	**3.0**	**3.1**	**3.1**	**3.1**
Treasury note, 2 yr.	2.86	2.94	2.85	2.86	2.86	2.77	2.64	2.67	**2.9**	**3.0**	**3.1**	**3.2**	**3.2**	**3.2**
Treasury note, 5 yr.	2.95	3.06	2.97	2.98	3.00	2.89	2.77	2.81	**3.0**	**3.1**	**3.2**	**3.3**	**3.4**	**3.3**
Treasury note, 10 yr.	3.11	3.21	3.14	3.14	3.15	3.00	2.89	2.93	**3.2**	**3.3**	**3.4**	**3.4**	**3.4**	**3.4**
Treasury note, 30 yr.	3.35	3.42	3.38	3.35	3.34	3.15	3.04	3.07	**3.4**	**3.5**	**3.6**	**3.6**	**3.7**	**3.7**
Corporate Aaa bond	4.34	4.38	4.38	4.33	4.30	4.14	4.04	4.08	**4.2**	**4.5**	**4.6**	**4.7**	**4.8**	**4.8**
Corporate Baa bond	5.15	5.14	5.13	5.06	5.02	4.84	4.75	4.79	**5.1**	**5.3**	**5.5**	**5.5**	**5.6**	**5.6**
State & Local bonds	3.87	3.91	3.87	3.85	3.84	3.72	3.63	3.65	**4.1**	**4.2**	**4.3**	**4.4**	**4.4**	**4.4**
Home mortgage rate	4.94	4.94	4.83	4.86	4.83	4.63	4.55	4.57	**4.8**	**5.0**	**5.1**	**5.2**	**5.2**	**5.2**
	History								Consensus Forecasts-Quarterly					
	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q
Key Assumptions	2016	2017	2017	2017	2017	2018	2018	2018	2018	2019	2019	2019	2019	2020
Major Currency Index	93.6	94.3	92.9	88.3	88.9	86.1	88.3	90.2	**90.6**	**90.5**	**90.1**	**89.2**	**89.1**	**88.9**
Real GDP	1.8	1.8	3.0	2.8	2.3	2.2	4.2	3.5	**2.6**	**2.4**	**2.4**	**2.2**	**2.0**	**1.8**
GDP Price Index	2.3	2.0	1.2	2.2	2.5	2.0	3.0	1.7	**2.3**	**2.2**	**2.3**	**2.2**	**2.2**	**2.2**
Consumer Price Index	2.7	3.0	0.1	2.1	3.3	3.5	1.7	2.0	**2.2**	**2.2**	**2.2**	**2.3**	**2.3**	**2.3**

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data: Treasury rates from the Federal Reserve Board's H.15; AAA-AA and A-BBB corporate bond yields from Bank of America-Merrill Lynch and are 15+ years, yield to maturity; State and local bond yields from Bank of America-Merrill Lynch, A-rated, yield to maturity; Mortgage rates from Freddie Mac, 30-year, fixed; LIBOR quotes from Intercontinental Exchange. All interest rate data are sourced from Haver Analytics. Historical data for Fed's Major Currency Index are from FRSR H.10. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS).









Long-Range Survey:

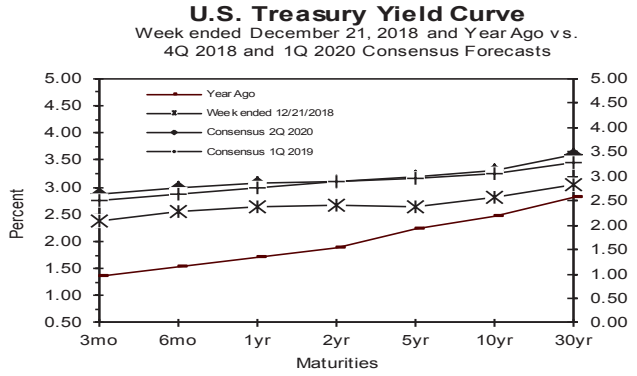
The table below contains the results of our twice-annual long-range CONSENSUS survey. There are also Top 10 and Bottom 10 averages for each variable. Shown are consensus estimates for the years 2020 through 2024 and averages for the five-year periods 2020-2024 and 2025-2029. Apply these projections cautiously. Few if any economic, demographic and political forces can be evaluated accurately over such long time spans.

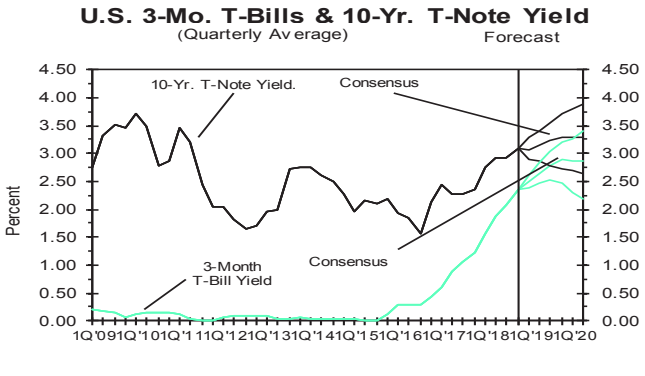
		Average For The Year					Five-Year Averages	
Interest Rates		**2020**	**2021**	**2022**	**2023**	**2024**	**2020-2024**	**2025-2029**
1. Federal Funds Rate	**CONSENSUS**	**2.9**	**2.8**	**2.8**	**3.0**	**3.0**	**2.9**	**3.1**
	Top 10 Average	3.5	3.6	3.6	3.6	3.6	3.6	3.6
	Bottom 10 Average	2.1	1.9	2.0	2.3	2.5	2.2	2.6
2. Prime Rate	**CONSENSUS**	**5.9**	**5.8**	**5.9**	**6.0**	**6.1**	**5.9**	**6.1**
	Top 10 Average	6.5	6.6	6.6	6.6	6.6	6.6	6.6
	Bottom 10 Average	5.2	4.9	5.1	5.4	5.6	5.2	5.7
3. LIBOR, 3-Mo.	**CONSENSUS**	**3.3**	**3.2**	**3.2**	**3.5**	**3.5**	**3.3**	**3.5**
	Top 10 Average	3.9	4.0	4.0	4.2	4.2	4.0	4.0
	Bottom 10 Average	2.7	2.5	2.5	2.8	2.9	2.7	3.1
4. Commercial Paper, 1-Mo.	**CONSENSUS**	**3.0**	**2.9**	**3.0**	**3.1**	**3.1**	**3.0**	**3.1**
	Top 10 Average	3.5	3.6	3.6	3.6	3.6	3.6	3.6
	Bottom 10 Average	2.5	2.3	2.3	2.6	2.6	2.4	2.6
5. Treasury Bill Yield, 3-Mo.	**CONSENSUS**	**2.9**	**2.8**	**2.8**	**3.0**	**3.0**	**2.9**	**3.1**
	Top 10 Average	3.5	3.6	3.6	3.6	3.6	3.6	**3.6**
	Bottom 10 Average	2.1	1.9	2.0	2.3	2.5	2.1	**2.6**
6. Treasury Bill Yield, 6-Mo.	**CONSENSUS**	**3.0**	**2.9**	**3.0**	**3.1**	**3.2**	**3.1**	**3.2**
	Top 10 Average	3.6	3.7	3.7	3.7	3.8	3.7	**3.7**
	Bottom 10 Average	2.4	2.1	2.2	2.5	2.7	2.4	**2.8**
7. Treasury Bill Yield, 1-Yr.	**CONSENSUS**	**3.1**	**3.1**	**3.1**	**3.2**	**3.3**	**3.2**	**3.4**
	Top 10 Average	3.7	3.8	3.8	3.8	3.8	3.8	**3.9**
	Bottom 10 Average	2.5	2.3	2.3	2.6	2.8	2.5	**2.9**
8. Treasury Note Yield, 2-Yr.	**CONSENSUS**	**3.2**	**3.2**	**3.2**	**3.3**	**3.4**	**3.3**	**3.5**
	Top 10 Average	3.8	3.9	3.9	3.9	4.0	3.9	**4.0**
	Bottom 10 Average	2.5	2.4	2.4	2.7	2.8	2.6	**2.9**
10. Treasury Note Yield, 5-Yr.	**CONSENSUS**	**3.4**	**3.3**	**3.4**	**3.5**	**3.5**	**3.4**	**3.6**
	Top 10 Average	4.0	4.0	4.1	4.1	4.1	4.1	**4.2**
	Bottom 10 Average	2.7	2.7	2.6	2.8	2.9	2.7	**3.0**
11. Treasury Note Yield, 10-Yr.	**CONSENSUS**	**3.5**	**3.5**	**3.5**	**3.6**	**3.7**	**3.6**	**3.8**
	Top 10 Average	4.2	4.2	4.3	4.3	4.3	4.3	**4.4**
	Bottom 10 Average	2.9	2.9	2.8	3.0	3.0	2.9	**3.2**
12. Treasury Bond Yield, 30-Yr.	**CONSENSUS**	**3.8**	**3.8**	**3.9**	**4.0**	**4.0**	**3.9**	**4.2**
	Top 10 Average	4.5	4.5	4.6	4.7	4.7	4.6	**4.9**
	Bottom 10 Average	3.2	3.2	3.2	3.3	3.4	3.2	**3.5**
13. Corporate Aaa Bond Yield	**CONSENSUS**	**4.9**	**4.9**	**4.9**	**5.0**	**5.1**	**5.0**	**5.1**
	Top 10 Average	5.6	5.7	5.8	5.8	5.8	5.7	**5.9**
	Bottom 10 Average	4.2	4.1	4.1	4.2	4.3	4.2	**4.4**
13. Corporate Baa Bond Yield	**CONSENSUS**	**5.8**	**5.8**	**5.9**	**5.9**	**6.0**	**5.9**	**6.0**
	Top 10 Average	6.5	6.6	6.8	6.8	6.8	6.7	**6.9**
	Bottom 10 Average	5.2	5.1	5.1	5.2	5.3	5.2	**5.3**
14. State & Local Bonds Yield	**CONSENSUS**	**4.6**	**4.5**	**4.5**	**4.5**	**4.6**	**4.5**	**4.7**
	Top 10 Average	5.1	5.0	5.0	5.0	5.1	5.1	**5.2**
	Bottom 10 Average	4.2	4.0	3.9	4.0	4.0	4.0	**4.1**
15. Home Mortgage Rate	**CONSENSUS**	**5.2**	**5.2**	**5.2**	**5.3**	**5.4**	**5.3**	**5.5**
	Top 10 Average	5.8	5.8	5.9	6.0	6.0	5.9	**6.1**
	Bottom 10 Average	4.6	4.5	4.5	4.7	4.8	4.6	**4.9**
A. FRB - Major Currency Index	**CONSENSUS**	**90.1**	**89.7**	**89.4**	**90.0**	**89.8**	**89.8**	**89.9**
	Top 10 Average	94.6	94.6	94.4	94.2	94.0	94.3	93.9
	Bottom 10 Average	85.5	84.8	84.2	85.8	85.6	85.2	85.8
		Year-Over-Year, % Change					Five-Year Averages	
		2020	**2021**	**2022**	**2023**	**2024**	**2020-2024**	**2025-2029**
B. Real GDP	**CONSENSUS**	**1.8**	**1.8**	**2.1**	**2.2**	**2.1**	**2.0**	**2.1**
	Top 10 Average	2.4	2.3	2.4	2.6	2.5	2.5	2.5
	Bottom 10 Average	1.3	1.3	1.7	1.8	1.7	1.6	1.8
C. GDP Chained Price Index	**CONSENSUS**	**2.1**	**2.1**	**2.1**	**2.1**	**2.1**	**2.1**	**2.1**
	Top 10 Average	2.4	2.4	2.3	2.4	2.3	2.3	2.3
	Bottom 10 Average	1.9	1.8	1.9	1.9	1.9	1.9	1.9
D. Consumer Price Index	**CONSENSUS**	**2.1**	**2.1**	**2.2**	**2.2**	**2.2**	**2.2**	**2.2**
	Top 10 Average	2.5	2.5	2.5	2.5	2.4	2.5	2.4
	Bottom 10 Average	1.7	1.8	1.9	2.0	1.9	1.9	2.0

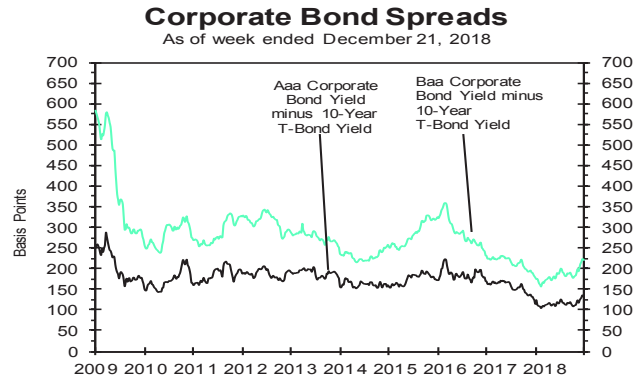
Consensus Forecasts of U.S. Interest Rates and Key Assumptions

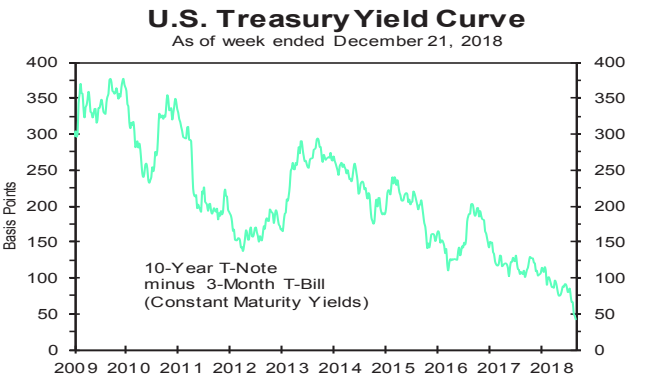
	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Qtr	1Q	2Q	3Q	4Q	1Q	2Q
Interest Rates	Dec 14	Dec 7	Nov 30	Nov 23	Nov	Oct	Sep	Q4 2018*	2019	2019	2019	2019	2020	2020
Federal Funds Rate	2.19	2.20	2.20	2.20	2.20	2.19	1.95	2.19	2.5	2.6	2.8	2.9	2.9	2.9
Prime Rate	5.25	5.25	5.25	5.25	5.25	5.25	5.03	5.25	5.5	5.7	5.8	5.9	5.9	5.9
LIBOR, 3-mo.	2.78	2.76	2.72	2.67	2.65	2.46	2.35	2.59	2.8	3.0	3.1	3.2	3.2	3.2
Commercial Paper, 1-mo.	2.43	2.36	2.30	2.29	2.29	2.23	2.06	2.28	2.5	2.7	2.8	2.9	2.9	2.9
Treasury bill, 3-mo.	2.42	2.40	2.39	2.40	2.37	2.29	2.17	2.35	2.5	2.7	2.8	2.9	2.9	2.9
Treasury bill, 6-mo.	2.55	2.56	2.53	2.52	2.52	2.46	2.34	2.50	2.6	2.8	2.9	3.0	3.0	3.0
Treasury bill, 1 yr.	2.69	2.70	2.70	2.67	2.70	2.65	2.56	2.68	2.8	2.9	3.0	3.1	3.1	3.1
Treasury note, 2 yr.	2.75	2.78	2.82	2.80	2.86	2.86	2.77	2.84	2.9	3.0	3.1	3.1	3.1	3.1
Treasury note, 5 yr.	2.74	2.77	2.87	2.88	2.95	3.00	2.89	2.94	2.9	3.1	3.2	3.2	3.2	3.2
Treasury note, 10 yr.	2.89	2.90	3.05	3.06	3.12	3.15	3.00	3.09	3.1	3.2	3.2	3.3	3.3	3.3
Treasury note, 30 yr.	3.14	3.18	3.32	3.31	3.36	3.34	3.15	3.31	3.3	3.4	3.5	3.5	3.6	3.6
Corporate Aaa bond	4.22	4.26	4.35	4.33	4.36	4.30	4.14	4.31	4.2	4.4	4.5	4.5	4.6	4.6
Corporate Baa bond	5.10	5.14	5.21	5.18	5.17	5.02	4.84	5.10	5.2	5.3	5.4	5.5	5.5	5.5
State & Local bonds	3.75	3.76	3.81	3.83	3.86	3.84	3.72	3.83	4.0	4.1	4.1	4.2	4.2	4.3
Home mortgage rate	4.63	4.75	4.81	4.81	4.87	4.83	4.63	4.80	4.8	4.9	4.9	5.0	5.0	5.0
	History								Consensus Forecasts-Quarterly					
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q
Key Assumptions	2017	2017	2017	2017	2018	2018	2018	2018*	2019	2019	2019	2019	2020	2020
Major Currency Index	94.3	92.9	88.3	88.8	86.1	88.3	90.2	91.4	91.5	91.1	90.7	90.3	90.0	89.7
Real GDP	1.8	3.0	2.8	2.3	2.2	4.2	3.4	2.6	2.4	2.4	2.2	2.0	1.6	1.5
GDP Price Index	2.0	1.2	2.2	2.5	2.0	3.0	1.8	2.0	2.1	2.3	2.2	2.2	2.2	2.2
Consumer Price Index	3.0	0.1	2.1	3.3	3.5	1.7	2.0	1.8	1.9	2.2	2.3	2.3	2.3	2.1

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data: Treasury rates from the Federal Reserve Board's H.15; AAA-AA and A-BBB corporate bond yields from Bank of America-Merrill Lynch and are 15+ years, yield to maturity; State and local bond yields from Bank of America-Merrill Lynch, A-rated, yield to maturity; Mortgage rates from Freddie Mac, 30-year, fixed; LIBOR quotes from Intercontinental Exchange. All interest rate data are sourced from Haver Analytics. Historical data for Fed's Major Currency Index are from FRSR H.10. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS). **Interest rate data for Q4 2018 based on historical data through the week ended December 14. *Data for Q4 2018 Major Currency Index based on data through week ended December 14. Figures for Q4 2018 Real GDP, GDP Chained Price Index and Consumer Price Index are consensus forecasts based on a special question asked of the panelists this month.*





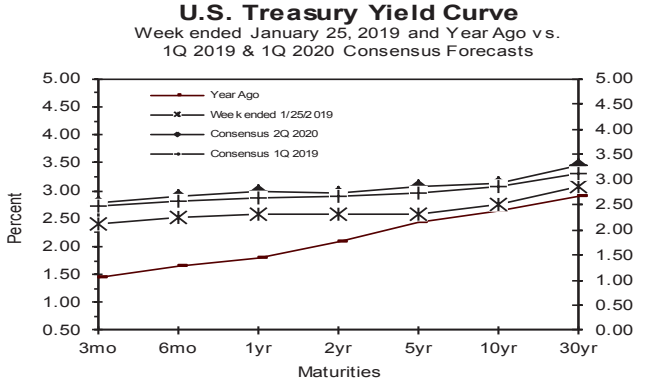


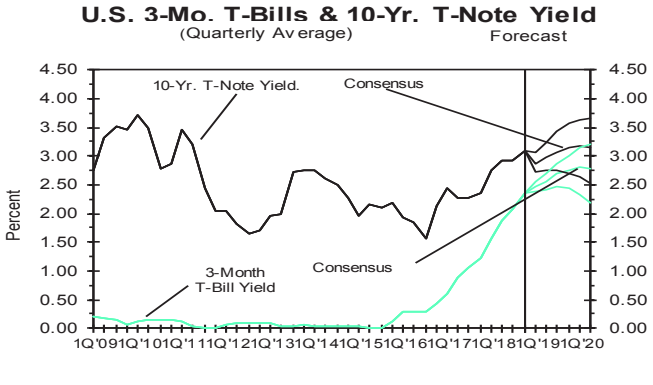


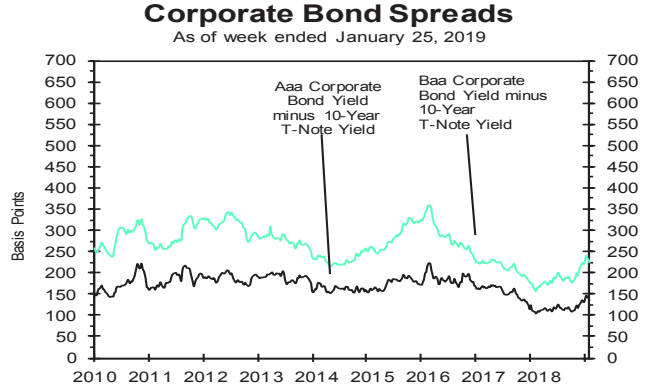
Consensus Forecasts of U.S. Interest Rates and Key Assumptions

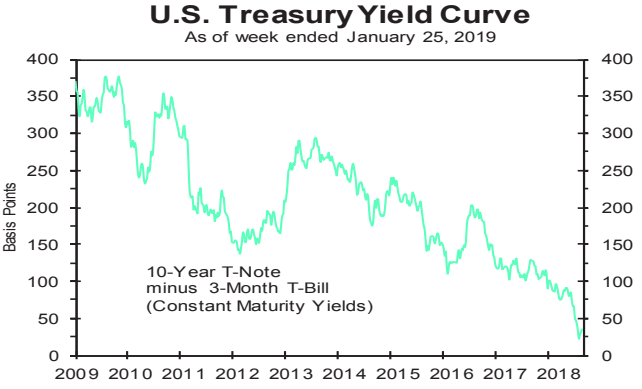
	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			*Latest Qtr*	1Q	2Q	3Q	4Q	1Q	2Q
Interest Rates	Jan 18	Jan 11	Jan 4	Dec 28	Dec	Nov	Oct	Q4 2018	2019	2019	2019	2019	2020	2020
Federal Funds Rate	2.40	2.40	2.40	2.40	2.27	2.20	2.19	2.22	**2.4**	**2.5**	**2.7**	**2.8**	**2.8**	**2.8**
Prime Rate	5.50	5.50	5.50	5.50	5.35	5.25	5.25	5.28	**5.5**	**5.6**	**5.7**	**5.8**	**5.9**	**5.8**
LIBOR, 3-mo.	2.77	2.79	2.80	2.80	2.79	2.65	2.46	2.63	**2.8**	**2.9**	**3.0**	**3.1**	**3.1**	**3.1**
Commercial Paper, 1-mo.	2.49	2.49	2.50	2.42	2.44	2.29	2.23	2.32	**2.5**	**2.5**	**2.7**	**2.8**	**2.9**	**2.8**
Treasury bill, 3-mo.	2.43	2.44	2.43	2.43	2.41	2.37	2.29	2.36	**2.5**	**2.5**	**2.7**	**2.8**	**2.8**	**2.8**
Treasury bill, 6-mo.	2.51	2.52	2.51	2.51	2.54	2.52	2.46	2.51	**2.6**	**2.7**	**2.8**	**2.9**	**2.9**	**2.9**
Treasury bill, 1 yr.	2.58	2.59	2.58	2.59	2.66	2.70	2.65	2.67	**2.6**	**2.7**	**2.9**	**3.0**	**3.0**	**3.0**
Treasury note, 2 yr.	2.56	2.56	2.47	2.56	2.68	2.86	2.86	2.80	**2.7**	**2.8**	**2.9**	**3.0**	**3.0**	**3.0**
Treasury note, 5 yr.	2.56	2.55	2.47	2.60	2.68	2.95	3.00	2.88	**2.7**	**2.9**	**3.0**	**3.0**	**3.1**	**3.1**
Treasury note, 10 yr.	2.74	2.72	2.65	2.76	2.83	3.12	3.15	3.03	**2.9**	**3.0**	**3.1**	**3.1**	**3.2**	**3.1**
Treasury note, 30 yr.	3.07	3.02	2.97	3.04	3.10	3.36	3.34	3.27	**3.1**	**3.2**	**3.3**	**3.4**	**3.5**	**3.5**
Corporate Aaa bond	4.17	4.14	4.12	4.15	4.19	4.36	4.30	4.28	**4.1**	**4.2**	**4.4**	**4.5**	**4.5**	**4.5**
Corporate Baa bond	5.07	5.05	5.06	5.07	5.08	5.17	5.02	5.09	**5.1**	**5.3**	**5.4**	**5.5**	**5.5**	**5.5**
State & Local bonds	3.67	3.67	3.68	3.70	3.73	3.86	3.84	3.81	**3.9**	**4.0**	**4.1**	**4.2**	**4.2**	**4.3**
Home mortgage rate	4.45	4.45	4.51	4.55	4.64	4.87	4.83	4.78	**4.6**	**4.8**	**4.9**	**5.0**	**5.0**	**5.0**
	History								Consensus Forecasts-Quarterly					
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	*4Q*	1Q	2Q	3Q	4Q	1Q	2Q
Key Assumptions	2017	2017	2017	2017	2018	2018	2018	*2018**	2019	2019	2019	2019	2020	2020
Major Currency Index	94.3	92.9	88.3	88.9	86.1	88.3	90.2	91.5	**91.3**	**91.2**	**91.0**	**90.8**	**90.5**	**90.1**
Real GDP	1.8	3.0	2.8	2.3	2.2	4.2	3.4	2.6	**2.1**	**2.5**	**2.2**	**1.9**	**1.6**	**1.6**
GDP Price Index	2.0	1.2	2.2	2.5	2.0	3.0	1.8	2.0	**1.9**	**2.3**	**2.1**	**2.2**	**2.2**	**2.2**
Consumer Price Index	3.0	0.1	2.1	3.3	3.5	1.7	2.0	1.8	**1.6**	**2.2**	**2.3**	**2.3**	**2.3**	**2.2**

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data: Treasury rates from the Federal Reserve Board's H.15; AAA-AA and A-BBB corporate bond yields from Bank of America-Merrill Lynch and are 15+ years, yield to maturity; State and local bond yields from Bank of America-Merrill Lynch, A-rated, yield to maturity; Mortgage rates from Freddie Mac, 30-year, fixed; LIBOR quotes from Intercontinental Exchange. All interest rate data are sourced from Haver Analytics. Historical data for Fed's Major Currency Index are from FRSR H.10. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS). **Figures for Q4 2018 for Real GDP and GDP Chained Price Index are consensus forecasts based on a special question asked of the panelists this month.*









Blue Chip Financial Forecasts®

Top Analysts' Forecasts Of U.S. And Foreign Interest Rates, Currency Values And The Factors That Influence Them

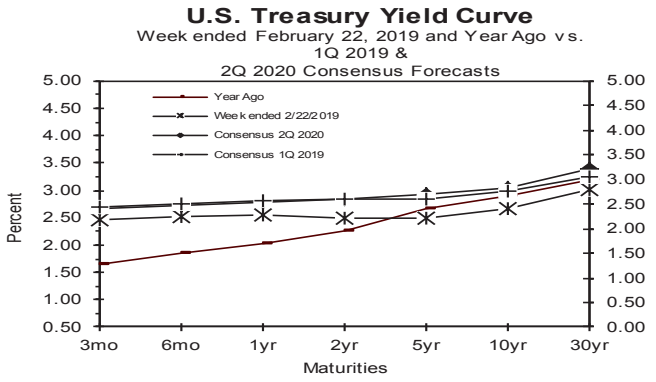
Vol. 38, No. 3, March 1, 2019

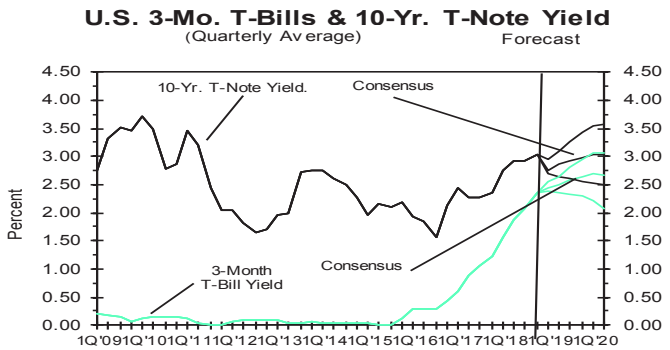
Wolters Kluwer

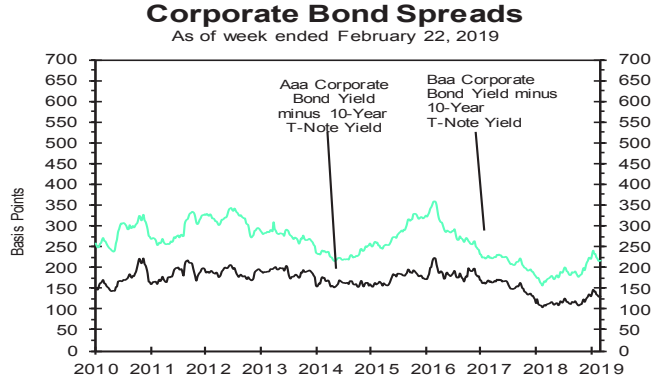
Consensus Forecasts of U.S. Interest Rates and Key Assumptions

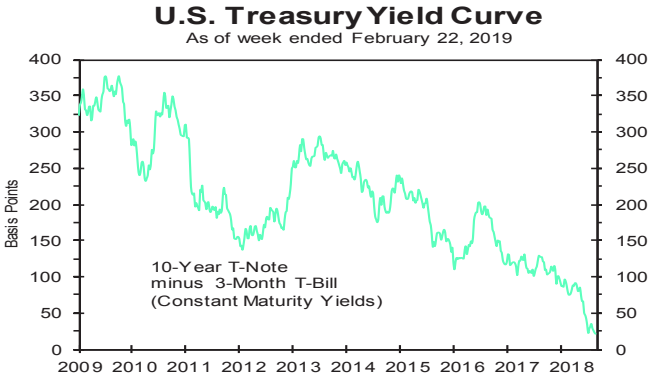
	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			*Latest Qtr*	1Q	2Q	3Q	4Q	1Q	2Q
Interest Rates	Feb 22	Feb 15	Feb 8	Feb 1	Jan	Dec	Nov	Q4 2018	2019	2019	2019	2019	2020	2020
Federal Funds Rate	2.40	2.40	2.40	2.40	2.40	2.27	2.20	2.22	**2.4**	**2.4**	**2.5**	**2.6**	**2.7**	**2.6**
Prime Rate	5.50	5.50	5.50	5.50	5.50	5.35	5.25	5.28	**5.5**	**5.5**	**5.6**	**5.7**	**5.7**	**5.7**
LIBOR, 3-mo.	2.65	2.69	2.72	2.74	2.77	2.79	2.65	2.63	**2.7**	**2.8**	**2.9**	**2.9**	**3.0**	**3.0**
Commercial Paper, 1-mo.	2.43	2.42	2.43	2.45	2.48	2.44	2.29	2.32	**2.5**	**2.5**	**2.6**	**2.7**	**2.7**	**2.7**
Treasury bill, 3-mo.	2.45	2.44	2.42	2.41	2.42	2.41	2.37	2.36	**2.4**	**2.5**	**2.6**	**2.7**	**2.7**	**2.7**
Treasury bill, 6-mo.	2.51	2.51	2.49	2.49	2.51	2.54	2.52	2.51	**2.5**	**2.6**	**2.7**	**2.7**	**2.8**	**2.7**
Treasury bill, 1 yr.	2.55	2.55	2.56	2.58	2.58	2.66	2.70	2.67	**2.6**	**2.6**	**2.7**	**2.8**	**2.8**	**2.8**
Treasury note, 2 yr.	2.50	2.51	2.50	2.53	2.54	2.68	2.86	2.80	**2.6**	**2.7**	**2.8**	**2.8**	**2.9**	**2.8**
Treasury note, 5 yr.	2.48	2.49	2.49	2.51	2.54	2.68	2.95	2.88	**2.6**	**2.7**	**2.8**	**2.9**	**2.9**	**2.9**
Treasury note, 10 yr.	2.66	2.67	2.68	2.70	2.71	2.83	3.12	3.03	**2.8**	**2.9**	**2.9**	**3.0**	**3.0**	**3.0**
Treasury note, 30 yr.	3.02	3.01	3.02	3.04	3.04	3.10	3.36	3.27	**3.1**	**3.1**	**3.2**	**3.3**	**3.4**	**3.4**
Corporate Aaa bond	3.97	3.96	3.98	4.04	4.12	4.19	4.36	4.28	**3.9**	**4.1**	**4.1**	**4.2**	**4.3**	**4.4**
Corporate Baa bond	4.83	4.83	4.84	4.92	5.02	5.08	5.17	5.09	**5.0**	**5.1**	**5.2**	**5.3**	**5.4**	**5.4**
State & Local bonds	3.61	3.62	3.64	3.65	3.67	3.73	3.86	3.81	**3.9**	**3.9**	**4.0**	**4.1**	**4.2**	**4.2**
Home mortgage rate	4.35	4.37	4.41	4.46	4.46	4.64	4.87	4.78	**4.5**	**4.6**	**4.7**	**4.8**	**4.8**	**4.8**
	History								Consensus Forecasts-Quarterly					
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	*4Q*	1Q	2Q	3Q	4Q	1Q	2Q
Key Assumptions	2017	2017	2017	2017	2018	2018	2018	*2018*	2019	2019	2019	2019	2020	2020
Major Currency Index	94.3	92.9	88.3	88.9	86.1	88.3	90.2	91.5	**91.3**	**91.2**	**90.8**	**90.5**	**90.1**	**89.7**
Real GDP	1.8	3.0	2.8	2.3	2.2	4.2	3.4	2.6	**1.9**	**2.5**	**2.2**	**1.9**	**1.6**	**1.6**
GDP Price Index	2.0	1.2	2.2	2.5	2.0	3.0	1.8	1.8	**1.8**	**2.2**	**2.1**	**2.2**	**2.1**	**2.2**
Consumer Price Index	2.8	0.4	2.2	3.1	3.2	2.1	2.0	1.5	**1.3**	**2.3**	**2.3**	**2.2**	**2.2**	**2.2**

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data: Treasury rates from the Federal Reserve Board's H.15; AAA-AA and A-BBB corporate bond yields from Bank of America-Merrill Lynch and are 15+ years, yield to maturity; State and local bond yields from Bank of America-Merrill Lynch, A-rated, yield to maturity; Mortgage rates from Freddie Mac, 30-year, fixed; LIBOR quotes from Intercontinental Exchange. All interest rate data are sourced from Haver Analytics. Historical data for Fed's Major Currency Index are from FRSR H.10. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS).









Blue Chip Financial Forecasts®

Top Analysts' Forecasts Of U.S. And Foreign Interest Rates, Currency Values And The Factors That Influence Them

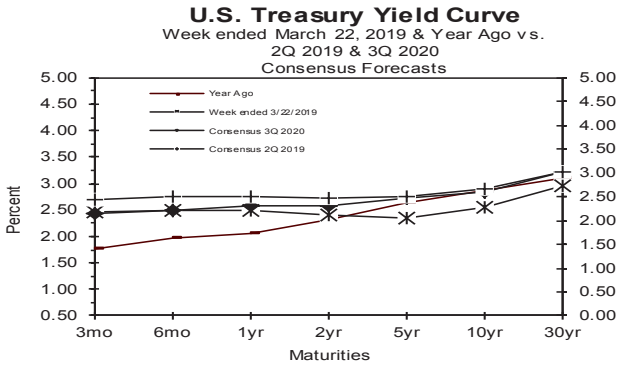
Vol. 38, No. 4, April 1, 2019

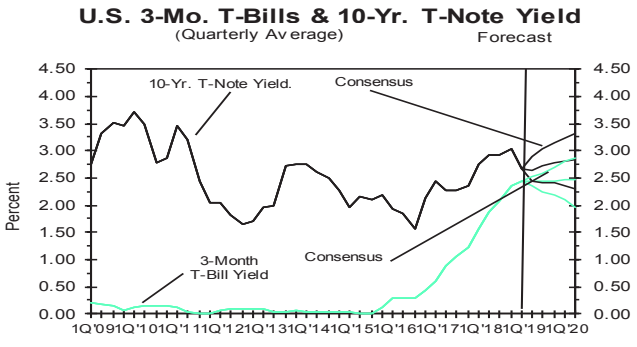
Wolters Kluwer

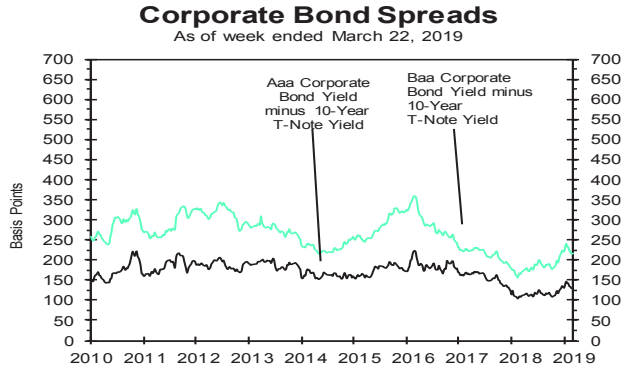
Consensus Forecasts of U.S. Interest Rates and Key Assumptions

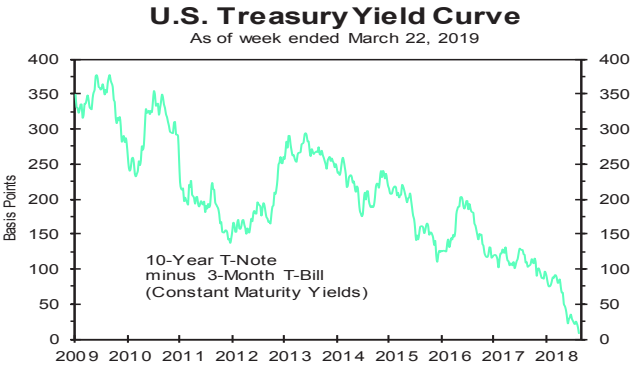
	History				History				Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			*Latest Qtr*	2Q	3Q	4Q	1Q	2Q	3Q
Interest Rates	Mar 22	Mar 15	Mar 8	Mar 1	Feb	Jan	Dec	Q1 2019*	**2019**	**2019**	**2019**	**2020**	**2020**	**2020**
Federal Funds Rate	2.40	2.40	2.40	2.40	2.40	2.40	2.27	2.40	**2.4**	**2.4**	**2.4**	**2.5**	**2.5**	**2.4**
Prime Rate	5.50	5.50	5.50	5.50	5.50	5.50	5.35	5.50	**5.5**	**5.5**	**5.5**	**5.5**	**5.5**	**5.5**
LIBOR, 3-mo.	2.61	2.61	2.60	2.62	2.68	2.77	2.79	2.70	**2.7**	**2.7**	**2.7**	**2.7**	**2.8**	**2.7**
Commercial Paper, 1-mo.	2.45	2.43	2.42	2.44	2.43	2.48	2.44	2.45	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**
Treasury bill, 3-mo.	2.47	2.45	2.46	2.45	2.44	2.42	2.41	2.44	**2.5**	**2.4**	**2.5**	**2.5**	**2.5**	**2.4**
Treasury bill, 6-mo.	2.50	2.53	2.53	2.52	2.50	2.51	2.54	2.51	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**
Treasury bill, 1 yr.	2.48	2.52	2.53	2.55	2.55	2.58	2.66	2.56	**2.5**	**2.5**	**2.5**	**2.6**	**2.6**	**2.6**
Treasury note, 2 yr.	2.41	2.45	2.51	2.51	2.50	2.54	2.68	2.51	**2.5**	**2.5**	**2.6**	**2.6**	**2.6**	**2.6**
Treasury note, 5 yr.	2.35	2.42	2.48	2.50	2.49	2.54	2.68	2.49	**2.5**	**2.6**	**2.6**	**2.7**	**2.7**	**2.7**
Treasury note, 10 yr.	2.55	2.62	2.68	2.70	2.68	2.71	2.83	2.68	**2.7**	**2.7**	**2.8**	**2.8**	**2.8**	**2.8**
Treasury note, 30 yr.	2.97	3.02	3.05	3.07	3.02	3.04	3.10	3.03	**3.0**	**3.1**	**3.1**	**3.2**	**3.2**	**3.2**
Corporate Aaa bond	3.94	4.00	4.04	4.03	3.98	4.12	4.19	4.04	**3.9**	**4.0**	**4.1**	**4.1**	**4.2**	**4.2**
Corporate Baa bond	4.74	4.82	4.86	4.86	4.84	5.02	5.08	4.90	**4.9**	**5.0**	**5.1**	**5.1**	**5.2**	**5.2**
State & Local bonds	3.54	3.57	3.60	3.60	3.62	3.67	3.73	3.63	**3.7**	**3.7**	**3.8**	**3.9**	**4.0**	**3.9**
Home mortgage rate	4.28	4.31	4.41	4.35	4.37	4.46	4.64	4.40	**4.4**	**4.5**	**4.5**	**4.6**	**4.6**	**4.6**
	History								Consensus Forecasts-Quarterly					
	2Q	3Q	4Q	1Q	2Q	3Q	*4Q*	*1Q*	**2Q**	**3Q**	**4Q**	**1Q**	**2Q**	**3Q**
Key Assumptions	2017	2017	2017	2018	2018	2018	*2018*	*2019***	**2019**	**2019**	**2019**	**2020**	**2020**	**2020**
Fed's AFE $ Index	109.1	103.7	104.3	101.1	103.7	105.9	107.5	107.4	**108.3**	**108.4**	**108.4**	**108.0**	**107.4**	**107.0**
Real GDP	3.0	2.8	2.3	2.2	4.2	3.4	2.2	1.3	**2.6**	**2.2**	**2.0**	**1.7**	**1.7**	**1.6**
GDP Price Index	1.2	2.2	2.5	2.0	3.0	1.8	1.7	1.7	**2.2**	**2.1**	**2.1**	**2.1**	**2.2**	**2.1**
Consumer Price Index	0.4	2.2	3.1	3.2	2.1	2.0	1.5	1.1	**2.5**	**2.3**	**2.2**	**2.2**	**2.1**	**2.2**

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data: Treasury rates from the Federal Reserve Board's H.15; AAA-AA and A-BBB corporate bond yields from Bank of America-Merrill Lynch and are 15+ years, yield to maturity; State and local bond yields from Bank of America-Merrill Lynch, A-rated, yield to maturity; Mortgage rates from Freddie Mac, 30-year, fixed; LIBOR quotes from Intercontinental Exchange. All interest rate data are sourced from Haver Analytics. Historical data for Fed's Major Currency Index are from FRSR H.10. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS). **Interest rate data for 1Q 2019 based on historical data through the week ended March 22.* **Data for 1Q 2019 for the Fed's AFE $ Index based on data through week ended March 22.* *** Figures for 1Q 2019 Real GDP, GDP Chained Price Index and Consumer Price Index are consensus forecasts based on a special question asked of the panelists' this month.*









Blue Chip Financial Forecasts®

Top Analysts' Forecasts Of U.S. And Foreign Interest Rates, Currency Values And The Factors That Influence Them

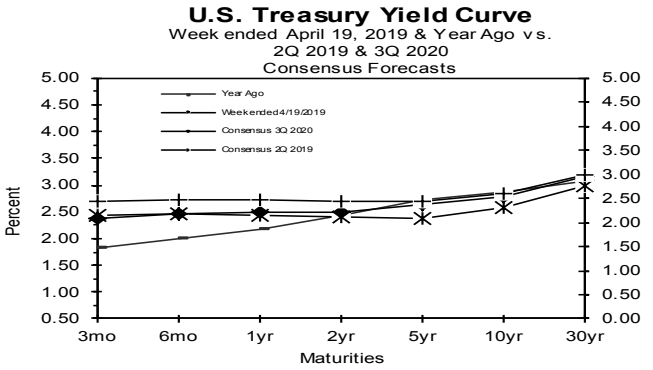
Vol. 38, No. 5, May 1, 2019

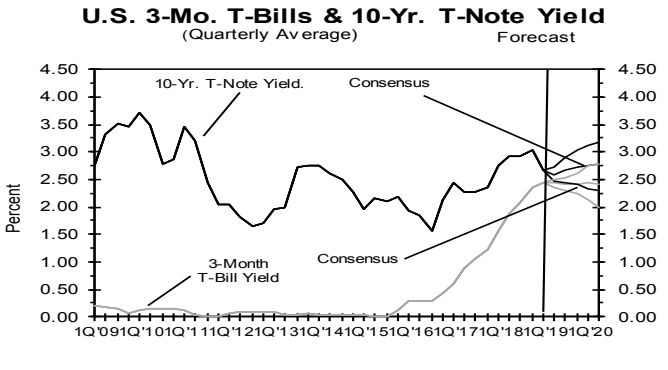
Wolters Kluwer

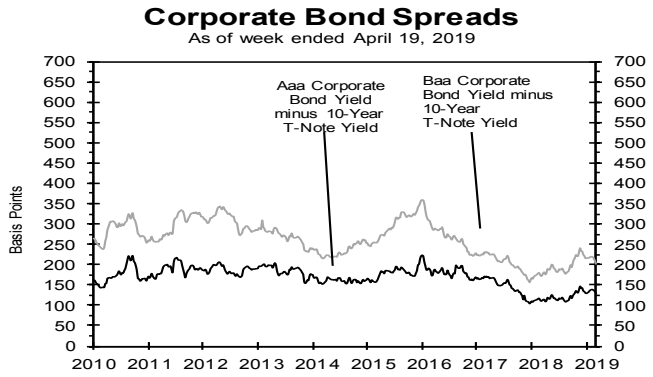
Consensus Forecasts of U.S. Interest Rates and Key Assumptions

	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			*Latest Qtr*	2Q	3Q	4Q	1Q	2Q	3Q
Interest Rates	Apr 19	Apr 12	Apr 5	Mar 29	Mar	Feb	Jan	Q1 2019	**2019**	**2019**	**2019**	**2020**	**2020**	**2020**
Federal Funds Rate	2.41	2.41	2.42	2.41	2.41	2.40	2.40	2.40	**2.4**	**2.4**	**2.4**	**2.4**	**2.4**	**2.4**
Prime Rate	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	**5.5**	**5.5**	**5.5**	**5.5**	**5.5**	**5.5**
LIBOR, 3-mo.	2.59	2.59	2.60	2.60	2.61	2.68	2.77	2.69	**2.6**	**2.7**	**2.7**	**2.7**	**2.7**	**2.7**
Commercial Paper, 1-mo.	2.45	2.43	2.46	2.46	2.44	2.43	2.48	2.45	**2.5**	**2.4**	**2.5**	**2.5**	**2.5**	**2.5**
Treasury bill, 3-mo.	2.43	2.43	2.43	2.44	2.45	2.44	2.42	2.44	**2.4**	**2.4**	**2.4**	**2.4**	**2.4**	**2.4**
Treasury bill, 6-mo.	2.47	2.47	2.46	2.46	2.51	2.50	2.51	2.51	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**
Treasury bill, 1 yr.	2.44	2.43	2.41	2.41	2.49	2.55	2.58	2.54	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**
Treasury note, 2 yr.	2.40	2.35	2.33	2.24	2.41	2.50	2.54	2.48	**2.4**	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**
Treasury note, 5 yr.	2.39	2.32	2.31	2.20	2.37	2.49	2.54	2.47	**2.4**	**2.5**	**2.6**	**2.6**	**2.6**	**2.6**
Treasury note, 10 yr.	2.58	2.52	2.50	2.41	2.57	2.68	2.71	2.65	**2.6**	**2.7**	**2.7**	**2.8**	**2.8**	**2.8**
Treasury note, 30 yr.	2.98	2.93	2.91	2.84	2.98	3.02	3.04	3.01	**3.0**	**3.0**	**3.1**	**3.1**	**3.1**	**3.2**
Corporate Aaa bond	3.88	3.86	3.86	3.79	3.95	3.98	4.12	4.01	**3.8**	**3.9**	**4.0**	**4.0**	**4.1**	**4.1**
Corporate Baa bond	4.60	4.61	4.65	4.60	4.76	4.84	5.02	4.87	**4.8**	**4.9**	**4.9**	**5.0**	**5.1**	**5.1**
State & Local bonds	3.50	3.50	3.50	3.48	3.55	3.62	3.67	3.61	**3.6**	**3.7**	**3.8**	**3.8**	**3.9**	**3.9**
Home mortgage rate	4.17	4.12	4.08	4.06	4.27	4.37	4.46	4.37	**4.3**	**4.4**	**4.4**	**4.5**	**4.5**	**4.6**
	History								Consensus Forecasts-Quarterly					
	2Q	3Q	4Q	1Q	2Q	3Q	*4Q*	*1Q*	2Q	3Q	4Q	1Q	2Q	3Q
Key Assumptions	2017	2017	2017	2018	2018	2018	*2018*	*2019*	**2019**	**2019**	**2019**	**2020**	**2020**	**2020**
Fed's AFE $ Index	111.1	105.6	106.2	102.9	105.5	107.8	109.4	109.4	**108.7**	**108.8**	**108.8**	**108.5**	**108.2**	**107.9**
Real GDP	3.0	2.8	2.3	2.2	4.2	3.4	2.2	3.2	**2.5**	**2.1**	**2.0**	**1.7**	**1.7**	**1.7**
GDP Price Index	1.2	2.2	2.5	2.0	3.0	1.8	1.7	0.9	**2.3**	**2.1**	**2.1**	**2.1**	**2.1**	**2.1**
Consumer Price Index	0.4	2.2	3.1	3.2	2.1	2.0	1.5	0.9	**2.9**	**2.3**	**2.1**	**2.1**	**2.1**	**2.1**

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data: Treasury rates from the Federal Reserve Board's H.15; AAA-AA and A-BBB corporate bond yields from Bank of America-Merrill Lynch and are 15+ years, yield to maturity; State and local bond yields from Bank of America-Merrill Lynch, A-rated, yield to maturity; Mortgage rates from Freddie Mac, 30-year, fixed; LIBOR quotes from Intercontinental Exchange. All interest rate data are sourced from Haver Analytics. Historical data for Fed's Major Currency Index are from FRSR H.10. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS).







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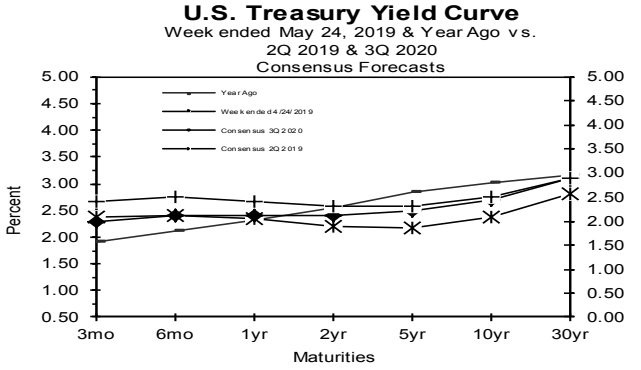
Vol. 38, No. 6, June 1, 2019

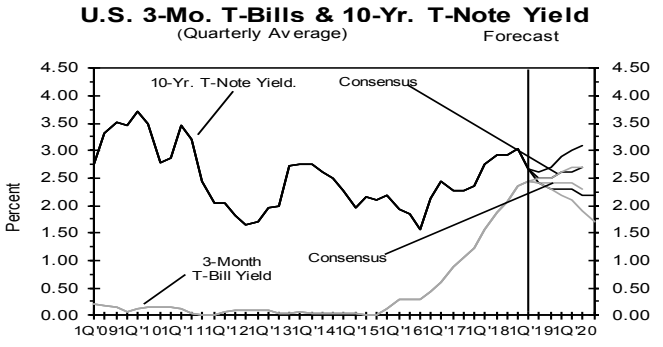
Wolters Kluwer

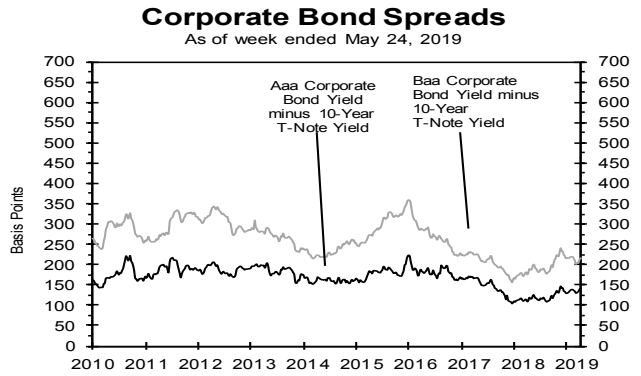
Consensus Forecasts of U.S. Interest Rates and Key Assumptions

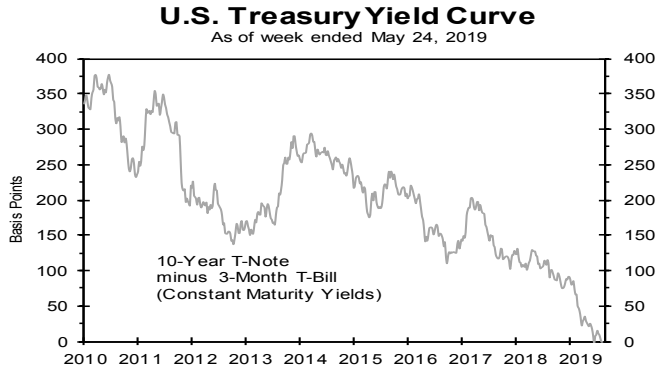
	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			*Latest Qtr*	2Q	3Q	4Q	1Q	2Q	3Q
Interest Rates	May 24	May 17	May 10	May 3	Apr	Mar	Feb	Q1 2019	**2019**	**2019**	**2019**	**2020**	**2020**	**2020**
Federal Funds Rate	2.39	2.38	2.40	2.44	2.42	2.41	2.40	2.40	**2.4**	**2.4**	**2.4**	**2.4**	**2.4**	**2.3**
Prime Rate	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	**5.5**	**5.5**	**5.4**	**5.5**	**5.4**	**5.4**
LIBOR, 3-mo.	2.52	2.52	2.54	2.57	2.59	2.61	2.68	2.69	**2.6**	**2.6**	**2.6**	**2.7**	**2.7**	**2.6**
Commercial Paper, 1-mo.	2.41	2.42	2.42	2.42	2.44	2.44	2.43	2.45	**2.4**	**2.4**	**2.4**	**2.5**	**2.4**	**2.4**
Treasury bill, 3-mo.	2.38	2.41	2.43	2.44	2.43	2.45	2.44	2.44	**2.4**	**2.4**	**2.4**	**2.4**	**2.3**	**2.3**
Treasury bill, 6-mo.	2.41	2.43	2.46	2.46	2.46	2.51	2.50	2.51	**2.5**	**2.5**	**2.5**	**2.5**	**2.4**	**2.4**
Treasury bill, 1 yr.	2.34	2.32	2.37	2.40	2.42	2.49	2.55	2.54	**2.4**	**2.4**	**2.4**	**2.5**	**2.4**	**2.4**
Treasury note, 2 yr.	2.20	2.19	2.28	2.31	2.34	2.41	2.50	2.48	**2.3**	**2.4**	**2.4**	**2.4**	**2.4**	**2.4**
Treasury note, 5 yr.	2.17	2.18	2.27	2.32	2.33	2.37	2.49	2.47	**2.3**	**2.4**	**2.5**	**2.5**	**2.5**	**2.5**
Treasury note, 10 yr.	2.37	2.40	2.47	2.53	2.53	2.57	2.68	2.65	**2.5**	**2.5**	**2.6**	**2.6**	**2.7**	**2.7**
Treasury note, 30 yr.	2.80	2.83	2.88	2.94	2.94	2.98	3.02	3.01	**2.9**	**3.0**	**3.0**	**3.1**	**3.1**	**3.1**
Corporate Aaa bond	3.78	3.81	3.83	3.86	3.87	3.95	3.98	4.01	**3.8**	**3.8**	**3.9**	**4.0**	**4.0**	**4.0**
Corporate Baa bond	4.53	4.55	4.56	4.57	4.61	4.76	4.84	4.87	**4.7**	**4.8**	**4.8**	**4.9**	**5.0**	**5.0**
State & Local bonds	3.36	3.37	3.42	3.46	3.49	3.55	3.62	3.61	**3.6**	**3.6**	**3.6**	**3.7**	**3.7**	**3.7**
Home mortgage rate	4.06	4.07	4.10	4.14	4.14	4.27	4.37	4.37	**4.2**	**4.3**	**4.3**	**4.4**	**4.4**	**4.4**
	History								Consensus Forecasts-Quarterly					
	2Q	3Q	4Q	1Q	2Q	3Q	*4Q*	*1Q*	2Q	3Q	4Q	1Q	2Q	3Q
Key Assumptions	2017	2017	2017	2018	2018	2018	*2018*	*2019*	**2019**	**2019**	**2019**	**2020**	**2020**	**2020**
Fed's AFE $ Index	111.1	105.6	106.2	102.9	105.5	107.8	109.4	109.4	**109.0**	**109.0**	**109.1**	**108.3**	**108.0**	**107.7**
Real GDP	3.0	2.8	2.3	2.2	4.2	3.4	2.2	3.2	**2.0**	**2.1**	**2.0**	**1.9**	**1.7**	**1.7**
GDP Price Index	1.2	2.2	2.5	2.0	3.0	1.8	1.7	0.9	**2.4**	**2.1**	**2.1**	**2.1**	**2.1**	**2.1**
Consumer Price Index	0.4	2.2	3.1	3.2	2.1	2.0	1.5	0.9	**3.1**	**2.3**	**2.1**	**2.1**	**2.1**	**2.1**

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data: Treasury rates from the Federal Reserve Board's H.15; AAA-AA and A-BBB corporate bond yields from Bank of America-Merrill Lynch and are 15+ years, yield to maturity; State and local bond yields from Bank of America-Merrill Lynch, A-rated, yield to maturity; Mortgage rates from Freddie Mac, 30-year, fixed; LIBOR quotes from Intercontinental Exchange. All interest rate data are sourced from Haver Analytics. Historical data for Fed's Major Currency Index are from FRSR H.10. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS).









Long-Range Survey:

The table below contains the results of our twice-annual long-range CONSENSUS survey. There are also Top 10 and Bottom 10 averages for each variable. Shown are consensus estimates for the years 2021 through 2025 and averages for the five-year periods 2021-2025 and 2026-2030. Apply these projections cautiously. Few if any economic, demographic and political forces can be evaluated accurately over such long time spans.

		Average For The Year					Five-Year Averages	
		2021	2022	2023	2024	2025	2021-2025	2026-2030
1. Federal Funds Rate	**CONSENSUS**	**2.4**	**2.4**	**2.6**	**2.7**	**2.8**	**2.6**	**2.8**
	Top 10 Average	3.1	3.2	3.4	3.4	3.4	3.3	3.4
	Bottom 10 Average	1.5	1.6	1.7	2.1	2.2	1.8	2.1
2. Prime Rate	**CONSENSUS**	**5.4**	**5.5**	**5.6**	**5.8**	**5.8**	**5.6**	**5.7**
	Top 10 Average	6.1	6.2	6.4	6.4	6.4	6.3	6.2
	Bottom 10 Average	4.6	4.7	4.8	5.1	5.3	4.9	5.1
3. LIBOR, 3-Mo.	**CONSENSUS**	**2.7**	**2.8**	**2.8**	**3.0**	**3.0**	**2.9**	**3.0**
	Top 10 Average	3.3	3.4	3.6	3.6	3.6	3.5	3.6
	Bottom 10 Average	2.1	2.1	2.0	2.4	2.5	2.2	2.5
4. Commercial Paper, 1-Mo.	**CONSENSUS**	**2.5**	**2.6**	**2.7**	**2.9**	**2.9**	**2.7**	**2.9**
	Top 10 Average	3.1	3.2	3.4	3.4	3.5	3.3	3.4
	Bottom 10 Average	2.0	2.0	2.0	2.4	2.4	2.2	2.4
5. Treasury Bill Yield, 3-Mo.	**CONSENSUS**	**2.4**	**2.4**	**2.5**	**2.7**	**2.8**	**2.6**	**2.8**
	Top 10 Average	3.1	3.2	3.4	3.4	3.4	3.3	3.4
	Bottom 10 Average	1.5	1.6	1.7	2.0	2.2	1.8	2.1
6. Treasury Bill Yield, 6-Mo.	**CONSENSUS**	**2.4**	**2.5**	**2.7**	**2.9**	**2.9**	**2.7**	**2.9**
	Top 10 Average	3.1	3.3	3.5	3.5	3.5	3.4	3.5
	Bottom 10 Average	1.7	1.7	1.8	2.2	2.4	2.0	2.3
7. Treasury Bill Yield, 1-Yr.	**CONSENSUS**	**2.5**	**2.6**	**2.8**	**3.0**	**3.0**	**2.8**	**3.0**
	Top 10 Average	3.3	3.4	3.6	3.6	3.7	3.5	3.7
	Bottom 10 Average	1.8	1.8	2.0	2.3	2.4	2.0	2.3
8. Treasury Note Yield, 2-Yr.	**CONSENSUS**	**2.6**	**2.7**	**2.9**	**3.0**	**3.1**	**2.9**	**3.1**
	Top 10 Average	3.3	3.5	3.7	3.8	3.8	3.6	3.8
	Bottom 10 Average	1.8	1.9	2.0	2.3	2.4	2.1	2.3
10. Treasury Note Yield, 5-Yr.	**CONSENSUS**	**2.8**	**2.9**	**3.1**	**3.2**	**3.3**	**3.0**	**3.3**
	Top 10 Average	3.5	3.7	4.0	4.0	4.0	3.8	4.1
	Bottom 10 Average	2.0	2.1	2.2	2.3	2.5	2.2	2.4
11. Treasury Note Yield, 10-Yr.	**CONSENSUS**	**3.0**	**3.1**	**3.3**	**3.3**	**3.4**	**3.2**	**3.4**
	Top 10 Average	3.6	3.9	4.2	4.2	4.2	4.0	4.4
	Bottom 10 Average	2.3	2.4	2.4	2.5	2.6	2.4	2.6
12. Treasury Bond Yield, 30-Yr.	**CONSENSUS**	**3.3**	**3.5**	**3.6**	**3.7**	**3.8**	**3.6**	**3.8**
	Top 10 Average	4.0	4.3	4.5	4.6	4.6	4.4	4.8
	Bottom 10 Average	2.7	2.7	2.8	2.9	2.9	2.8	2.9
13. Corporate Aaa Bond Yield	**CONSENSUS**	**4.4**	**4.6**	**4.7**	**4.7**	**4.8**	**4.6**	**4.8**
	Top 10 Average	5.0	5.2	5.5	5.5	5.5	5.3	5.6
	Bottom 10 Average	3.8	3.9	3.9	4.0	4.0	3.9	4.0
13. Corporate Baa Bond Yield	**CONSENSUS**	**5.3**	**5.6**	**5.7**	**5.7**	**5.7**	**5.6**	**5.8**
	Top 10 Average	6.0	6.3	6.6	6.6	6.7	6.5	6.8
	Bottom 10 Average	4.7	4.8	4.7	4.8	4.8	4.7	4.8
14. State & Local Bonds Yield	**CONSENSUS**	**4.1**	**4.2**	**4.3**	**4.3**	**4.3**	**4.2**	**4.4**
	Top 10 Average	4.6	4.9	5.0	5.0	5.0	4.9	5.1
	Bottom 10 Average	3.5	3.6	3.6	3.6	3.6	3.6	3.6
15. Home Mortgage Rate	**CONSENSUS**	**4.7**	**4.8**	**4.9**	**5.0**	**5.0**	**4.9**	**5.0**
	Top 10 Average	5.3	5.5	5.8	5.8	5.8	5.6	5.9
	Bottom 10 Average	4.0	4.0	4.0	4.2	4.2	4.1	4.2
A. Fed's AFE Nominal $ Index	**CONSENSUS**	**108.5**	**108.2**	**108.0**	**107.6**	**106.9**	**107.8**	**106.7**
	Top 10 Average	110.8	110.5	110.9	110.8	110.6	110.7	111.2
	Bottom 10 Average	106.6	105.8	104.9	104.6	103.6	105.1	102.9
		Year-Over-Year, % Change					Five-Year Averages	
		2021	2022	2023	2024	2025	2021-2025	2026-2030
B. Real GDP	**CONSENSUS**	**1.9**	**1.9**	**2.0**	**2.1**	**2.1**	**2.0**	**2.1**
	Top 10 Average	2.3	2.4	2.4	2.5	2.5	2.4	2.6
	Bottom 10 Average	1.5	1.4	1.6	1.8	1.8	1.6	1.8
C. GDP Chained Price Index	**CONSENSUS**	**2.1**	**2.1**	**2.0**	**2.0**	**2.0**	**2.1**	**2.0**
	Top 10 Average	2.4	2.4	2.2	2.2	2.2	2.3	2.2
	Bottom 10 Average	1.8	1.8	1.8	1.9	1.9	1.9	1.8
D. Consumer Price Index	**CONSENSUS**	**2.1**	**2.2**	**2.2**	**2.1**	**2.1**	**2.1**	**2.1**
	Top 10 Average	2.5	2.4	2.4	2.4	2.4	2.4	2.4
	Bottom 10 Average	1.7	1.8	1.9	1.9	1.9	1.8	1.8

Blue Chip Financial Forecasts®

Top Analysts' Forecasts Of U.S. And Foreign Interest Rates, Currency Values And The Factors That Influence Them

Vol. 38, No. 7, July 1, 2019

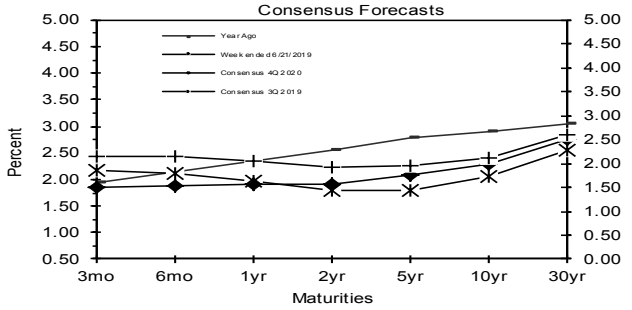
Wolters Kluwer

Consensus Forecasts of U.S. Interest Rates and Key Assumptions

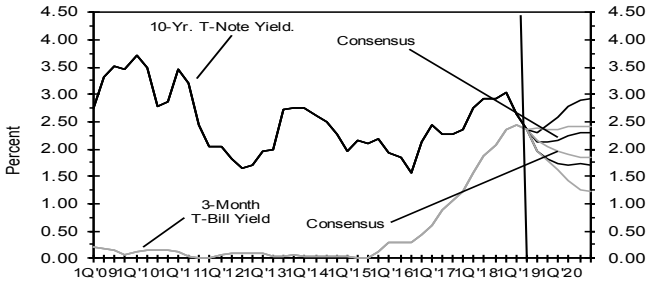
	History				History				Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			*Latest Qtr*	**3Q**	**4Q**	**1Q**	**2Q**	**3Q**	**4Q**
Interest Rates	Jun 21	Jun 14	Jun 7	May 31	May	Apr	Mar	2Q 2019*	**2019**	**2019**	**2020**	**2020**	**2020**	**2020**
Federal Funds Rate	2.37	2.37	2.39	2.38	2.39	2.42	2.41	2.40	**2.2**	**2.0**	**1.9**	**1.9**	**1.8**	**1.8**
Prime Rate	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	**5.3**	**5.2**	**5.1**	**5.0**	**5.0**	**4.9**
LIBOR, 3-mo.	2.38	2.43	2.47	2.52	2.53	2.59	2.61	2.52	**2.4**	**2.3**	**2.2**	**2.2**	**2.2**	**2.1**
Commercial Paper, 1-mo.	2.34	2.37	2.38	2.41	2.42	2.44	2.44	2.41	**2.3**	**2.1**	**2.0**	**2.0**	**2.0**	**1.9**
Treasury bill, 3-mo.	2.18	2.24	2.33	2.37	2.40	2.43	2.45	2.37	**2.2**	**2.0**	**2.0**	**1.9**	**1.9**	**1.8**
Treasury bill, 6-mo.	2.12	2.20	2.24	2.38	2.42	2.46	2.51	2.37	**2.2**	**2.1**	**2.0**	**2.0**	**1.9**	**1.9**
Treasury bill, 1 yr.	1.98	2.02	2.05	2.28	2.34	2.42	2.49	2.28	**2.1**	**2.0**	**2.0**	**2.0**	**1.9**	**1.9**
Treasury note, 2 yr.	1.79	1.88	1.85	2.06	2.21	2.34	2.41	2.15	**1.9**	**1.9**	**1.9**	**1.9**	**1.9**	**1.9**
Treasury note, 5 yr.	1.80	1.88	1.86	2.02	2.19	2.33	2.37	2.14	**1.9**	**1.9**	**2.0**	**2.0**	**2.1**	**2.1**
Treasury note, 10 yr.	2.05	2.12	2.10	2.22	2.40	2.53	2.57	2.35	**2.1**	**2.1**	**2.2**	**2.2**	**2.3**	**2.3**
Treasury note, 30 yr.	2.56	2.61	2.59	2.66	2.82	2.94	2.98	2.79	**2.6**	**2.6**	**2.7**	**2.7**	**2.8**	**2.8**
Corporate Aaa bond	3.53	3.62	3.64	3.69	3.79	3.87	3.95	3.76	**3.5**	**3.5**	**3.6**	**3.7**	**3.8**	**3.8**
Corporate Baa bond	4.30	4.40	4.43	4.47	4.53	4.61	4.76	4.51	**4.5**	**4.5**	**4.6**	**4.7**	**4.8**	**4.8**
State & Local bonds	3.29	3.30	3.30	3.33	3.38	3.49	3.55	3.40	**3.2**	**3.2**	**3.2**	**3.3**	**3.4**	**3.4**
Home mortgage rate	3.84	3.82	3.82	3.99	4.07	4.14	4.27	4.03	**3.9**	**3.9**	**3.9**	**4.0**	**4.0**	**4.0**
	History								**Consensus Forecasts-Quarterly**					
	3Q	4Q	1Q	2Q	3Q	4Q	*1Q*	*2Q*	**3Q**	**4Q**	**1Q**	**2Q**	**3Q**	**4Q**
Key Assumptions	2017	2017	2018	2018	2018	2018	*2019*	*2019***	**2019**	**2019**	**2020**	**2020**	**2020**	**2020**
Fed's AFE $ Index	105.6	106.2	102.9	105.5	107.8	109.4	109.4	110.4	**109.1**	**109.0**	**108.1**	**107.8**	**107.5**	**107.0**
Real GDP	2.8	2.3	2.2	4.2	3.4	2.2	3.1	1.8	**1.9**	**1.9**	**1.7**	**1.7**	**1.8**	**1.8**
GDP Price Index	2.2	2.5	2.0	3.0	1.8	1.7	0.8	2.3	**2.0**	**2.0**	**2.1**	**2.1**	**2.0**	**2.0**
Consumer Price Index	2.2	3.1	3.2	2.1	2.0	1.5	0.9	2.8	**2.0**	**2.1**	**2.1**	**2.1**	**2.0**	**2.0**

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data: Treasury rates from the Federal Reserve Board's H.15; AAA-AA and A-BBB corporate bond yields from Bank of America-Merrill Lynch and are 15+ years, yield to maturity; State and local bond yields from Bank of America-Merrill Lynch, A-rated, yield to maturity; Mortgage rates from Freddie Mac, 30-year, fixed; LIBOR quotes from Intercontinental Exchange. All interest rate data are sourced from Haver Analytics. Historical data for Fed's Major Currency Index are from FRSR H.10. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS). **Interest rate data for 2Q 2019 are based on historical data through the week ended June 21.* ***Data for 2Q 2019 for the Fed's AFE $ Index based on data through week ended June 21. Figures for 2Q 2019 Real GDP, GDP Chained Price Index and Consumer Price Index are consensus forecasts based on a special question asked of the panelists this month.*

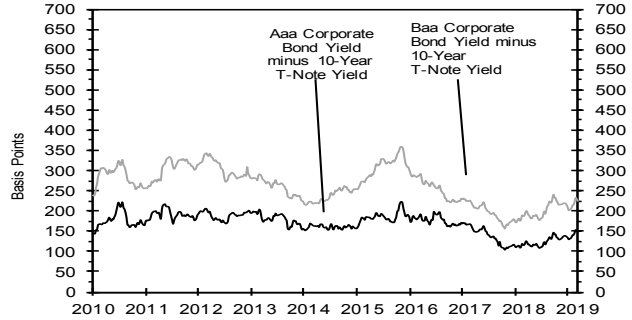
U.S. Treasury Yield Curve
Week ended June 21, 2019 & Year Ago vs. 3Q 2019 & 4Q 2020 Consensus Forecasts



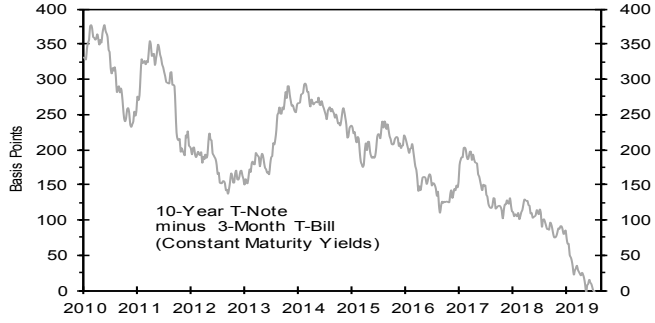
U.S. 3-Mo. T-Bills & 10-Yr. T-Note Yield
(Quarterly Average)



Corporate Bond Spreads
As of week ended June 21, 2019



U.S. Treasury Yield Curve
As of week ended June 21, 2019



UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Inquiry Regarding the Commission's Policy for Determining Return on Equity	))	Docket No. PL19-4-000

Affidavit of Michael P. Gorman

SAINT LOUIS, MISSOURI ss:

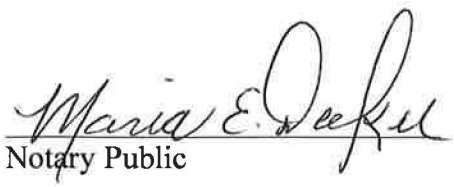
BEFORE ME, the undersigned authority, personally appeared Michael P. Gorman, who after being by me first duly sworn, deposes and says that the facts stated herein are true based on personal knowledge.

I hereby affirm that the foregoing is true and correct to the best of my knowledge and belief. If called to testify in this matter, I would testify as set forth herein.

Further affiant says not.

Michael P. Gorman
Affiant

Subscribed and sworn to before me by Mr. Michael P. Gorman, who is known to me this 25th day of July, 2019.



Notary Public

MARIA E. DECKER
Notary Public - Notary Seal
STATE OF MISSOURI
St. Louis City
My Commission Expires: May 5, 2021
Commission # 13706793

My Commission Expires: May 5, 2021