

# Guide to the Markets<sup>®</sup>

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U.S. | 1Q 2019 | As of December 31, 2018

*J.P. Morgan*

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


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
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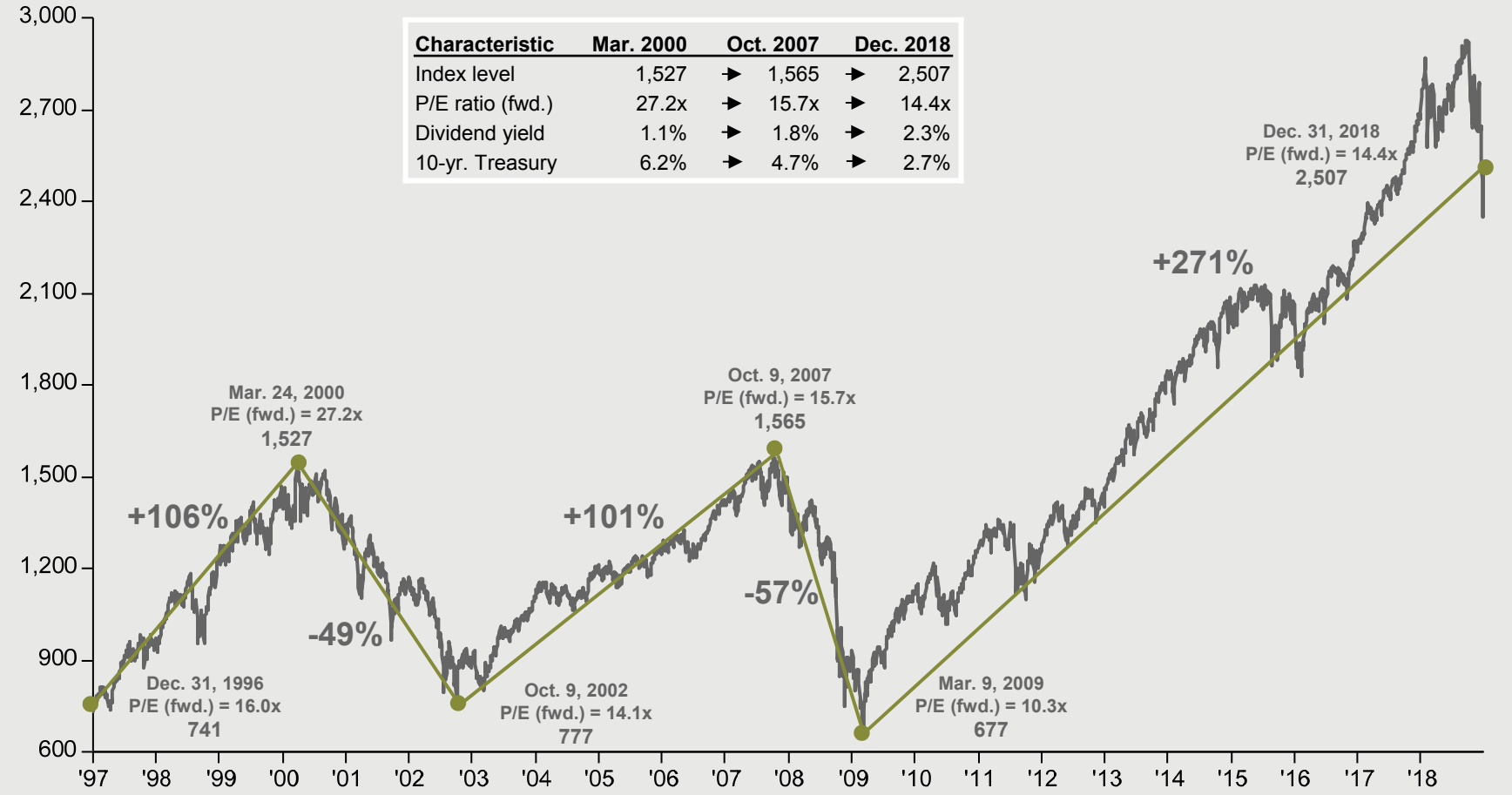
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## S&P 500 Price Index



Source: Compustat, FactSet, Federal Reserve, Standard & Poor's, J.P. Morgan Asset Management. Dividend yield is calculated as consensus estimates of dividends for the next 12 months, divided by most recent price, as provided by Compustat. Forward price to earnings ratio is a bottom-up calculation based on the most recent S&P 500 Index price, divided by consensus estimates for earnings in the next 12 months (NTM), and is provided by FactSet Market Aggregates. Returns are cumulative and based on S&P 500 Index price movement only, and do not include the reinvestment of dividends. Past performance is not indicative of future returns. *Guide to the Markets* – U.S. Data are as of December 31, 2018.

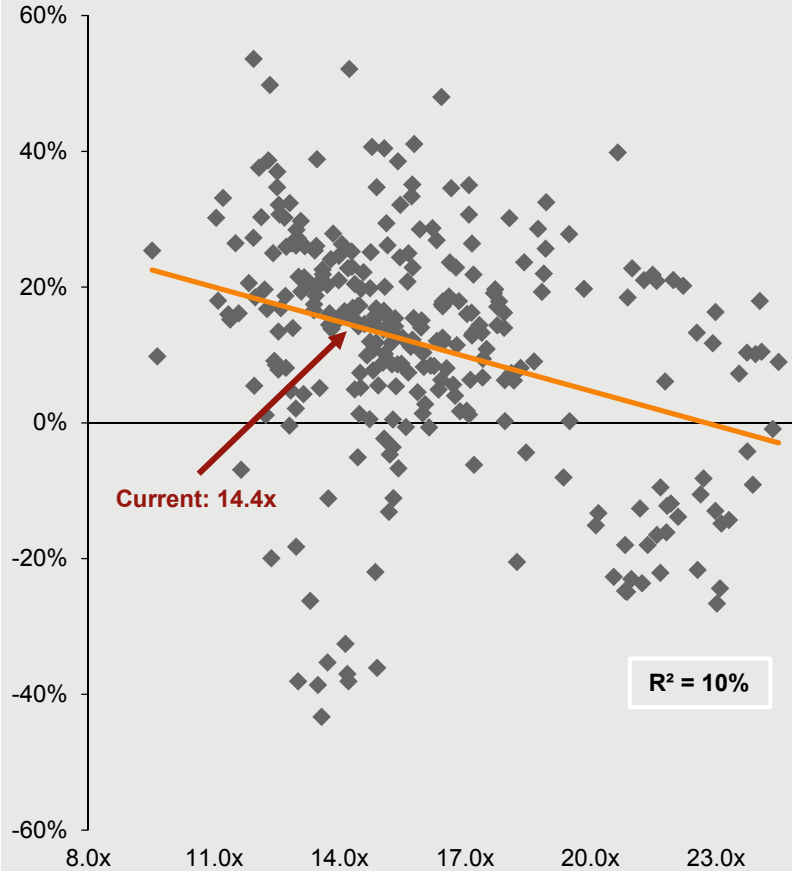
## S&P 500 Index: Forward P/E ratio



Source: FactSet, FRB, Robert Shiller, Standard & Poor's, Thomson Reuters, J.P. Morgan Asset Management. Price to earnings is price divided by consensus analyst estimates of earnings per share for the next 12 months as provided by IBES since December 1993, and FactSet for December 31, 2018. Average P/E and standard deviations are calculated using 25 years of IBES history. Shiller's P/E uses trailing 10-years of inflation-adjusted earnings as reported by companies. Dividend yield is calculated as the next 12-month consensus dividend divided by most recent price. Price to book ratio is the price divided by book value per share. Price to cash flow is price divided by NTM cash flow. EY minus Baa yield is the forward earnings yield (consensus analyst estimates of EPS over the next 12 months divided by price) minus the Moody's Baa seasoned corporate bond yield. Std. dev. over-/under-valued is calculated using the average and standard deviation over 25 years for each measure. \*P/CF is a 20-year average due to cash flow data availability. *Guide to the Markets* – U.S. Data are as of December 31, 2018.

**Forward P/E and subsequent 1-yr. returns**

S&P 500 Total Return Index



**Forward P/E and subsequent 5-yr. annualized returns**

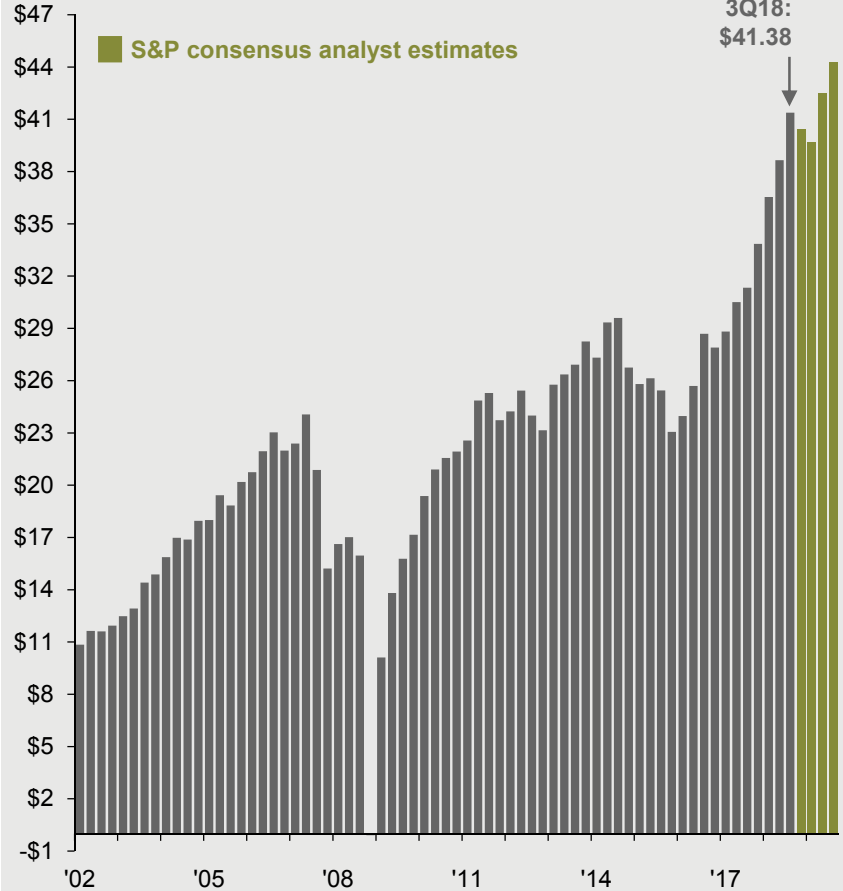
S&P 500 Total Return Index



Source: FactSet, Standard & Poor's, Thomson Reuters, J.P. Morgan Asset Management. Returns are 12-month and 60-month annualized total returns, measured monthly, beginning December 31, 1993. R<sup>2</sup> represents the percent of total variation in total returns that can be explained by forward P/E ratios. *Guide to the Markets - U.S.* Data are as of December 31, 2018.

**S&P 500 operating earnings per share**

Index quarterly operating earnings



**S&P 500 profit margins**

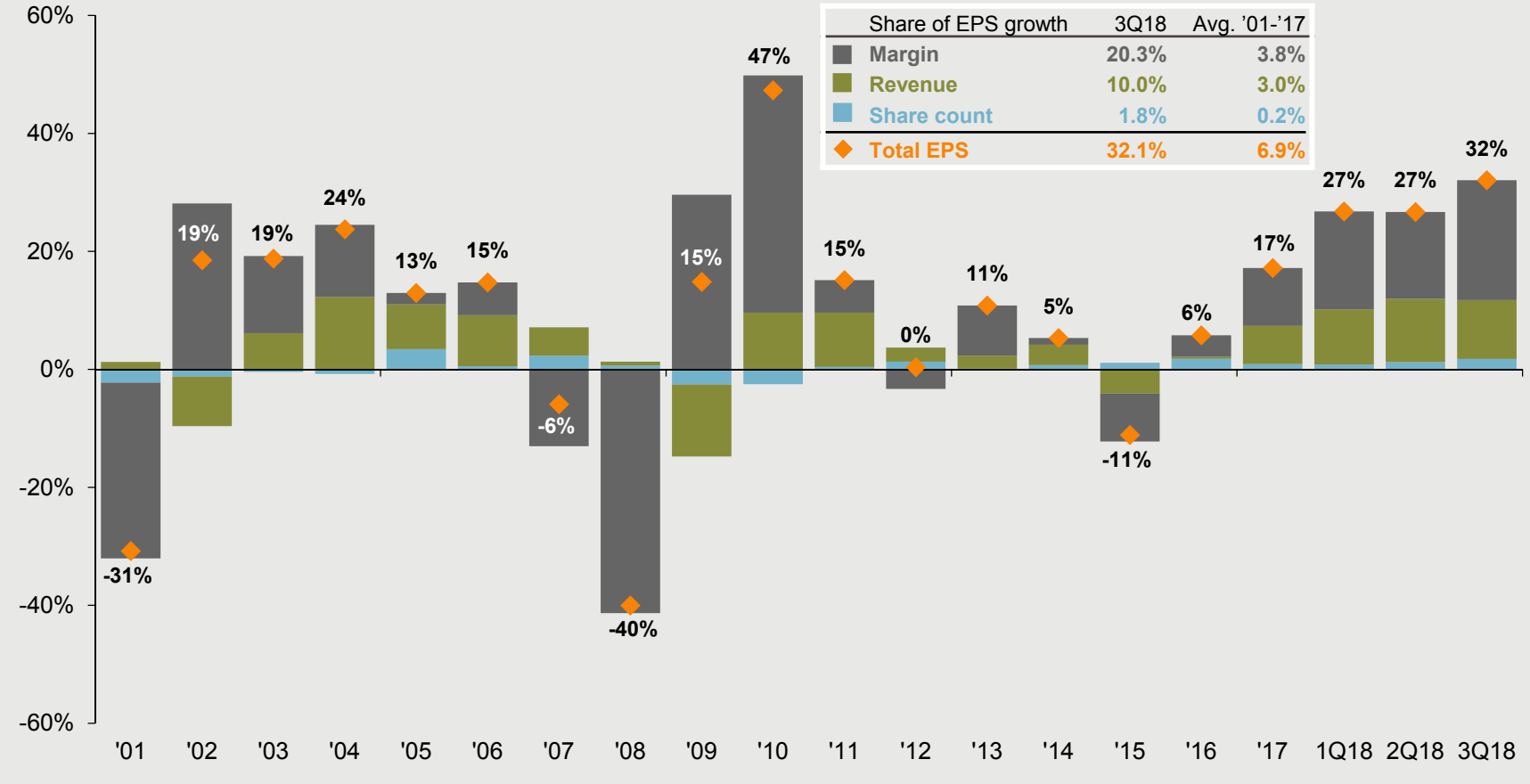
Quarterly operating earnings/sales



Source: Compustat, FactSet, Standard & Poor's, J.P. Morgan Asset Management; (Right) Federal Reserve. EPS levels are based on operating earnings per share. Earnings estimates are Standard & Poor's consensus analyst expectations. Past performance is not indicative of future returns. Guide to the Markets – U.S. Data are as of December 31, 2018.

## S&P 500 year-over-year operating EPS growth

Annual growth broken into revenue, changes in profit margin & changes in share count

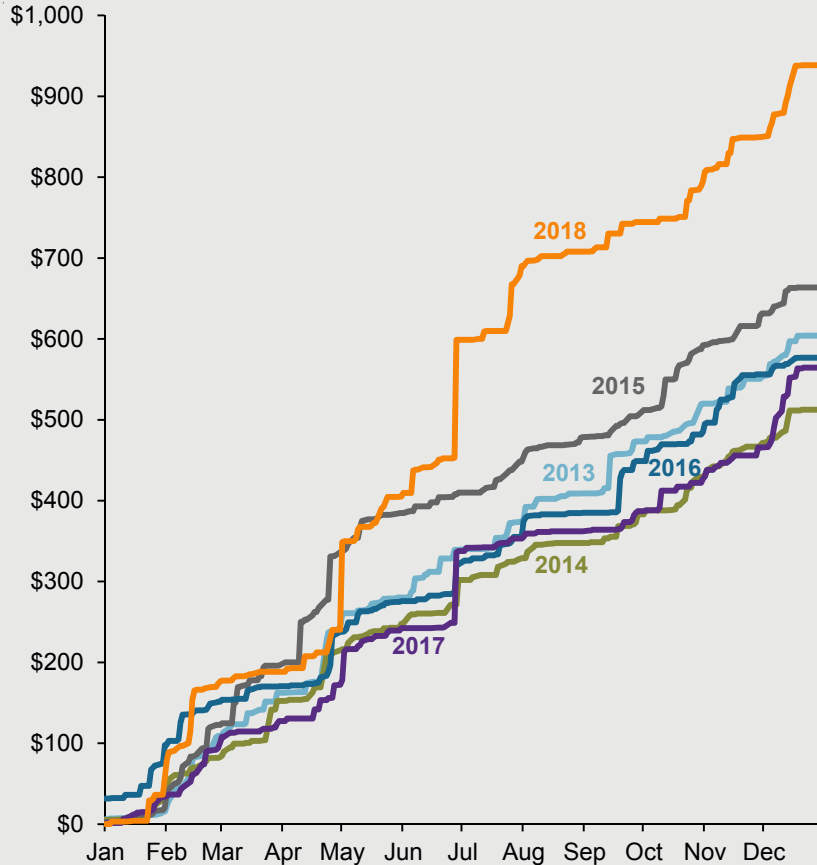


Source: Compustat, FactSet, Standard & Poor's, J.P. Morgan Asset Management. EPS levels are based on annual operating earnings per share except for 2018, which is quarterly. Percentages may not sum due to rounding. Past performance is not indicative of future returns. Guide to the Markets – U.S. Data are as of December 31, 2018.



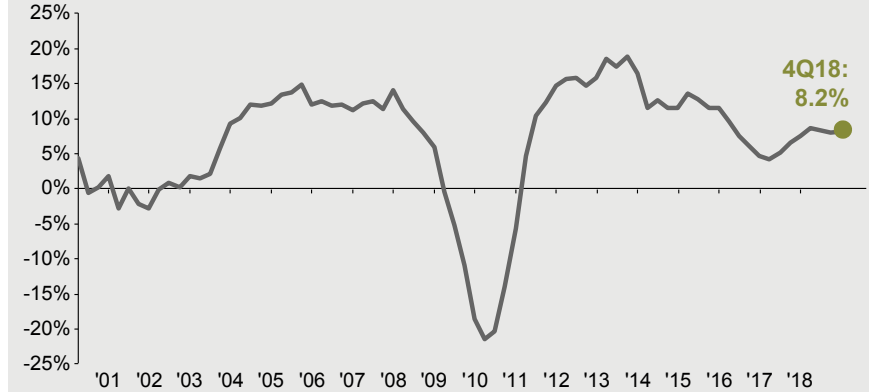
## S&P 500 announced buybacks

Value of announced buybacks, \$bn



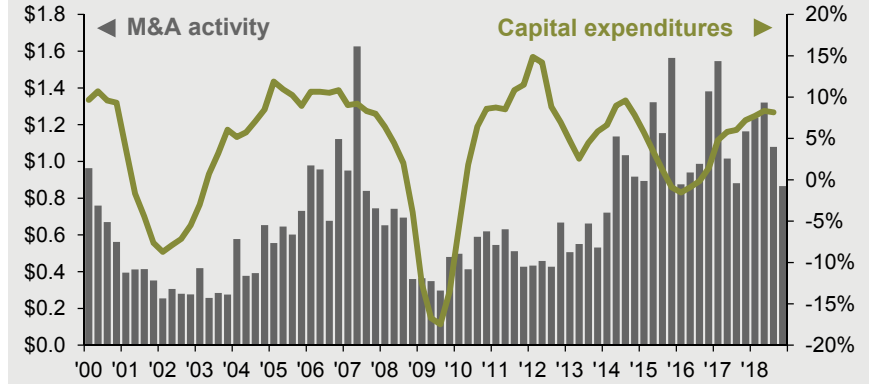
## S&P 500 dividends per share

Year-over-year % change, quarterly



## Corporate spending

Private non-residential fixed investment, y/y, value of deals announced, \$tn



Source: Bloomberg, Compustat, FactSet, Standard & Poor's, J.P. Morgan Asset Management.

M&A activity is the quarterly value of officially announced transactions, and capital expenditures are private non-residential fixed domestic investment. Buybacks are based on company announcements year to date.

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### 4Q 2018

	Value	Blend	Growth
Large	-11.7%	-13.5%	-15.9%
Mid	-15.0%	-15.4%	-16.0%
Small	-18.7%	-20.2%	-21.7%

### 2018

	Value	Blend	Growth
Large	-8.3%	-4.4%	-1.5%
Mid	-12.3%	-9.1%	-4.8%
Small	-12.9%	-11.0%	-9.3%

### Since market peak (October 2007)

	Value	Blend	Growth
Large	67.2%	103.7%	146.8%
Mid	91.4%	103.5%	116.7%
Small	69.6%	86.4%	102.7%

### Since market low (March 2009)

	Value	Blend	Growth
Large	317.0%	355.2%	403.3%
Mid	388.6%	391.0%	401.0%
Small	319.5%	349.4%	378.4%

### Current P/E vs. 20-year avg. P/E

	Value	Blend	Growth
Large	12.4 / 13.7	14.4 / 15.8	17.6 / 19.6
Mid	12.3 / 14.2	14.2 / 16.2	18.5 / 21.1
Small	12.6 / 16.0	17.8 / 20.1	29.2 / 29.2

### Current P/E as % of 20-year avg. P/E

	Value	Blend	Growth
Large	90.0%	90.9%	89.8%
Mid	86.8%	88.1%	87.5%
Small	78.8%	88.6%	99.9%

Source: FactSet, Russell Investment Group, Standard & Poor's, J.P. Morgan Asset Management.

All calculations are cumulative total return, including dividends reinvested for the stated period. Since Market Peak represents period 10/9/07 – 12/31/18, illustrating market returns since the S&P 500 Index high on 10/9/07. Since Market Low represents period 3/9/09 – 12/31/18, illustrating market returns since the S&P 500 Index low on 3/9/09. Returns are cumulative returns, not annualized. For all time periods, total return is based on Russell style indices with the exception of the large blend category, which is based on the S&P 500 Index. Past performance is not indicative of future returns. The price to earnings is a bottom-up calculation based on the most recent index price, divided by consensus estimates for earnings in the next 12 months (NTM), and is provided by FactSet Market Aggregates.

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# Returns and valuations by sector

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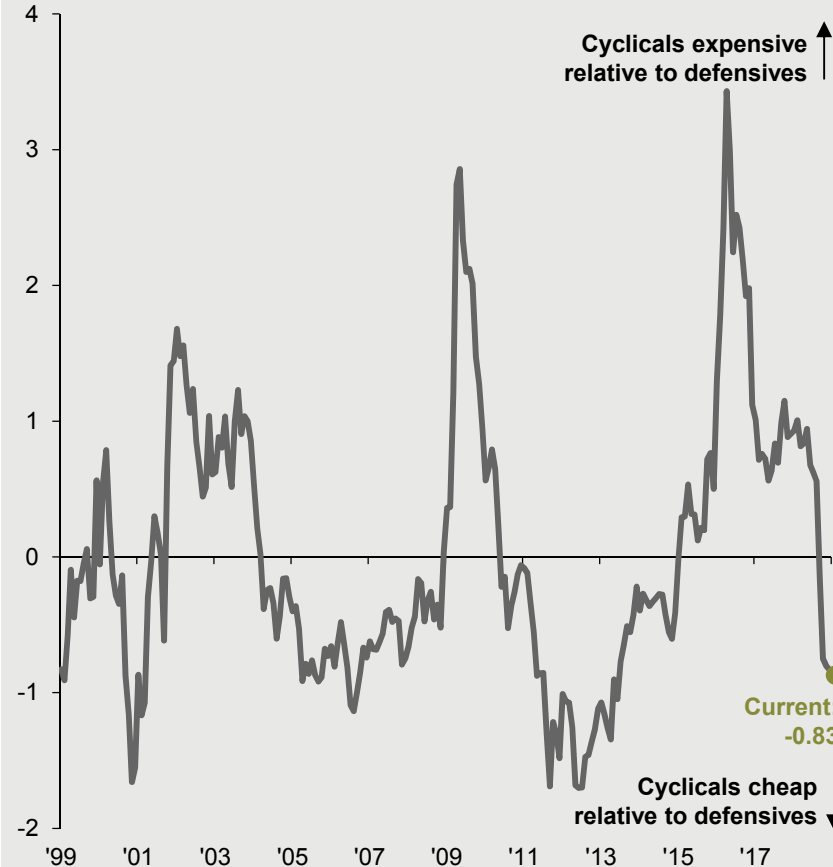
Equities

	Financials	Materials	Industrials	Real Estate	Cons. Discr.	Energy	Technology	Comm. Services*	Health Care	Cons. Staples	Utilities	S&P 500 Index	
<b>S&amp;P weight</b>	13.3%	2.7%	9.2%	3.0%	9.9%	5.3%	20.1%	10.1%	15.5%	7.4%	3.3%	100.0%	Weight
Russell Growth weight	4.4%	1.8%	11.8%	2.3%	15.1%	0.8%	31.5%	11.9%	14.3%	6.0%	0.0%	100.0%	
Russell Value weight	22.5%	4.1%	7.4%	4.9%	5.2%	9.3%	9.3%	7.3%	15.7%	7.8%	6.5%	100.0%	
<b>4Q 2018</b>	-13.1	-12.3	-17.3	-3.8	-16.4	-23.8	-17.3	-13.2	-8.7	-5.2	1.4	-13.5	Return (%)
<b>2018</b>	-13.0	-14.7	-13.3	-2.2	0.8	-18.1	-0.3	-12.5	6.5	-8.4	4.1	-4.4	
<b>Since market peak</b> (October 2007)	3.3	50.7	85.3	63.7	212.4	-4.8	198.2	35.1	195.7	147.9	98.8	103.7	
<b>Since market low</b> (March 2009)	463.7	259.0	409.3	506.9	623.1	74.4	524.7	158.0	376.7	247.7	248.0	355.2	
<b>Beta to S&amp;P 500</b>	1.41	1.27	1.25	1.12	1.12	1.07	1.02	0.91*	0.78	0.60	0.34	1.00	β
<b>Correl. to Treas. yields</b>	0.49	0.21	0.29	-0.20	0.29	0.49	0.17	0.22	0.25	0.15	-0.21	0.33	ρ
<b>Foreign % of sales</b>	31.2	52.7	44.6	-	34.1	54.1	56.9	-	38.2	32.5	41.3	43.6	%
<b>NTM Earnings Growth</b>	9.3%	5.9%	10.7%	3.6%	9.7%	7.2%	7.0%	6.0%*	7.3%	4.9%	5.2%	7.6%	EPS
<b>20-yr avg.</b>	22.6%	20.4%	11.0%	7.6%**	15.8%	13.4%	15.4%	10.7%*	9.9%	8.8%	5.0%	12.0%	
<b>Forward P/E ratio</b>	10.4x	13.5x	13.6x	16.5x	18.3x	13.7x	15.1x	15.7x	14.9x	16.8x	16.2x	14.4x	P/E
<b>20-yr avg.</b>	12.7x	14.0x	16.2x	15.3x	18.0x	17.5x	20.6x	18.2x*	16.9x	16.9x	14.2x	15.8x	
<b>Trailing P/E ratio</b>	11.4x	14.3x	15.0x	17.1x	20.1x	14.7x	16.1x	16.6x	16.0x	17.6x	17.1x	15.5x	
<b>20-yr avg.</b>	15.4x	16.7x	17.9x	16.3x	20.5x	21.6x	24.0x	20.2x*	18.5x	18.2x	14.8x	17.6x	
<b>Dividend yield</b>	2.6%	2.5%	2.3%	3.8%	1.5%	3.9%	1.9%	1.7%	1.9%	3.4%	3.7%	2.3%	Div
<b>20-yr avg.</b>	2.3%	2.6%	2.1%	4.4%	1.4%	2.3%	1.0%	1.7%*	1.8%	2.7%	4.0%	2.0%	

Source: FactSet, Russell Investment Group, Standard & Poor's, J.P. Morgan Asset Management. All calculations are cumulative total return, not annualized, including dividends for the stated period. Since market peak represents period 10/9/07 – 12/31/18. Since market low represents period 3/9/09 – 12/31/18. Correlation to Treasury yields are trailing 2-year monthly correlations between S&P 500 sector price returns and 10-year Treasury yield movements. Foreign percent of sales is from Standard & Poor's, S&P 500 2017: Global Sales report as of June 2018. Real Estate and Comm. Services foreign sales are not included due to lack of availability. NTM earnings growth is the percent change in next 12 months earnings estimates compared to last 12 months earnings provided by brokers. Forward P/E ratio is a bottom-up calculation based on the most recent S&P 500 Index price, divided by consensus estimates for earnings in the next 12 months (NTM), and is provided by FactSet Market Aggregates. Trailing P/E ratios are bottom-up values defined as month-end price divided by the last 12 months of available reported earnings from brokers. Dividend yield is calculated as the next 12-month consensus dividend divided by most recent price. Beta calculations are based on 10-years of monthly price returns for the S&P 500 and its sub-indices. \*Communication Services (formerly Telecom) averages and beta are based on 5-years of backtested data by JPMAM. \*\*Real estate NTM earnings growth is a 15-year average due to data availability. Past performance is not indicative of future returns.  
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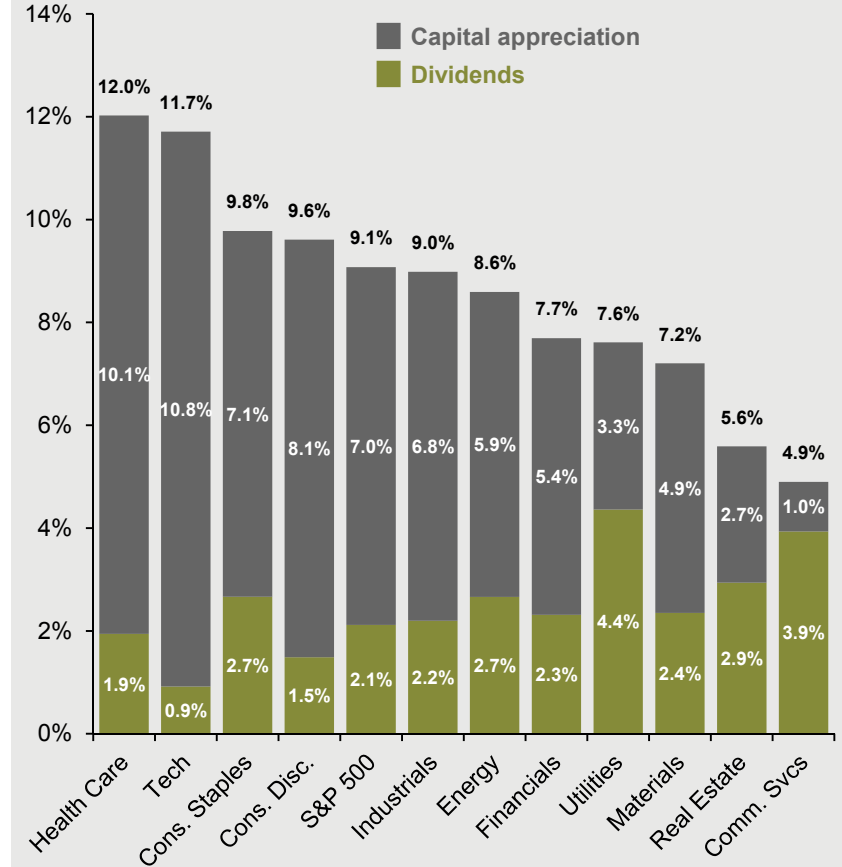
## Cyclicals vs. defensive valuations\*

Relative fwd. P/E ratio of cyclicals vs. defensives, z-score



## S&P 500 sector returns: Dividends vs. cap. apprec.

25-year annualized return, %



Source: FactSet, Standard & Poor's, J.P. Morgan Asset Management.

\*Cyclical sectors include Consumer Discretionary, Information Technology, Industrials, Financials, Energy and Materials. REITs are excluded from this analysis. It is more appropriate to value a REIT by looking at its price relative to its funds from operations (FFO), an income measure that excludes depreciation. P/E ratios look at price relative to net income, a measure that includes depreciation, making the comparison of valuations across sectors inappropriate. Defensive sectors include Telecommunications, Health Care, Utilities and Consumer Staples. From 9/30/2018 to present Communication Services (previously Telecommunications) is included in the cyclical sectors and removed from the defensive sectors due to changes in the composition of the sector. Sector valuations are equal weighted. 25-yr. annualized return calculated from 12/31/1993-12/31/2018. Past performance is not indicative of future returns.

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# Factor performance

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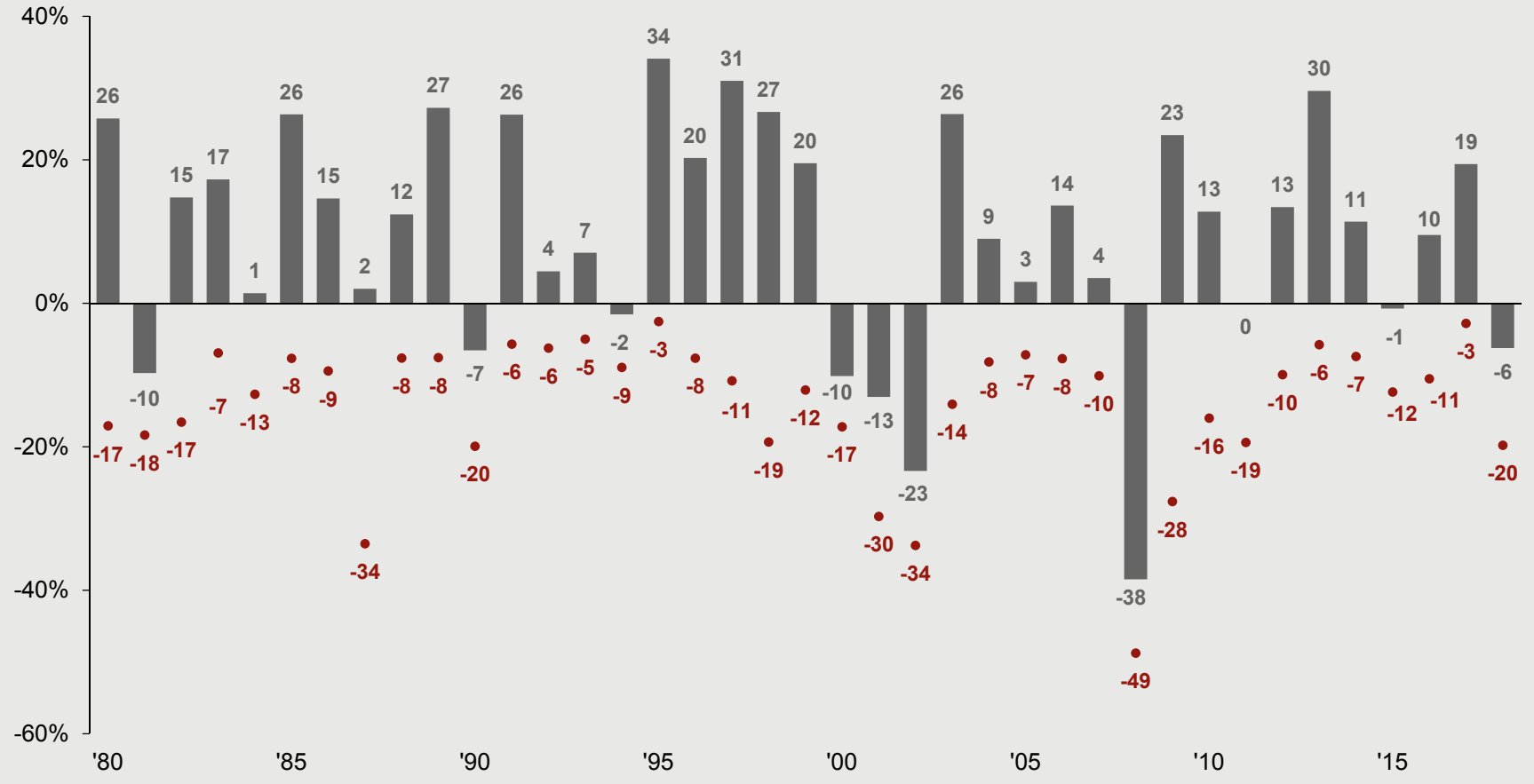
Equities

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2004 - 2018	
																Ann.	Vol.
Multi-Factor	21.1%	Momen.	High Div.	Momen.	Min. Vol.	Cyclical	Small Cap	High Div.	Cyclical	Small Cap	Min. Vol.	Momen.	Small Cap	Momen.	Min. Vol.	Momen.	Small Cap
	21.1%	19.3%	21.1%	17.8%	-25.7%	36.9%	26.9%	14.3%	20.1%	38.8%	16.5%	9.3%	21.3%	37.8%	1.5%	10.4%	18.6%
Small Cap	18.3%	Multi-Factor	Small Cap	Defens.	Defens.	Quality	Multi-Factor	Min. Vol.	Small Cap	Multi-Factor	High Div.	Quality	High Div.	Cyclical	Momen.	Multi-Factor	Cyclical
	18.3%	15.7%	18.4%	17.7%	-26.7%	32.0%	18.3%	12.9%	16.3%	37.4%	14.9%	7.0%	16.3%	27.3%	-1.6%	9.6%	17.4%
Momen.	16.9%	Defens.	Multi-Factor	Quality	High Div.	Multi-Factor	Momen.	Defens.	Multi-Factor	Cyclical	Multi-Factor	Min. Vol.	Cyclical	Quality	High Div.	Min. Vol.	Momen.
	16.9%	11.1%	16.6%	10.6%	-27.6%	29.8%	18.2%	10.1%	15.7%	35.0%	14.8%	5.6%	14.0%	26.0%	-2.3%	9.4%	16.2%
Min. Vol.	14.5%	Min. Vol.	Defens.	Multi-Factor	Quality	Small Cap	Cyclical	Quality	Momen.	Momen.	Momen.	Cyclical	Multi-Factor	Multi-Factor	Quality	Quality	Multi-Factor
	14.5%	6.6%	15.9%	5.5%	-30.2%	27.2%	17.9%	8.4%	15.1%	34.8%	14.7%	2.6%	13.7%	21.5%	-2.6%	9.3%	15.4%
Defens.	11.9%	Small Cap	Cyclical	Min. Vol.	Small Cap	High Div.	High Div.	Multi-Factor	Quality	Quality	Cyclical	High Div.	Min. Vol.	High Div.	Defens.	High Div.	High Div.
	11.9%	4.6%	15.0%	4.3%	-33.8%	18.4%	15.9%	7.3%	14.0%	33.5%	13.6%	0.7%	10.7%	19.5%	-2.9%	8.8%	13.2%
High Div.	11.8%	High Div.	Min. Vol.	High Div.	Multi-Factor	Min. Vol.	Min. Vol.	Momen.	Min. Vol.	High Div.	Defens.	Multi-Factor	Quality	Min. Vol.	Cyclical	Defens.	Quality
	11.8%	3.7%	15.0%	0.0%	-39.3%	18.4%	14.7%	6.1%	11.2%	28.9%	13.0%	0.4%	8.0%	19.2%	-5.3%	8.4%	13.0%
Quality	10.2%	Cyclical	Quality	Cyclical	Momen.	Momen.	Quality	Cyclical	Defens.	Defens.	Quality	Defens.	Defens.	Small Cap	Multi-Factor	Small Cap	Defens.
	10.2%	2.5%	12.0%	-0.8%	-40.9%	17.6%	12.6%	-3.4%	10.7%	28.9%	11.8%	-0.9%	7.7%	14.6%	-9.7%	7.5%	12.1%
Cyclical	10.0%	Quality	Momen.	Small Cap	Cyclical	Defens.	Defens.	Small Cap	High Div.	Min. Vol.	Small Cap	Small Cap	Momen.	Defens.	Small Cap	Cyclical	Min. Vol.
	10.0%	2.5%	10.7%	-1.6%	-44.8%	16.5%	12.0%	-4.2%	10.6%	25.3%	4.9%	-4.4%	5.1%	12.3%	-11.0%	7.3%	11.5%

Source: FactSet, MSCI, Russell, Standard & Poor's, J.P. Morgan Asset Management. The MSCI High Dividend Yield Index aims to offer a higher than average dividend yield relative to the parent index that passes dividend sustainability and persistence screens. The MSCI Minimum Volatility Index optimizes the MSCI USA Index using an estimated security co-variance matrix to produce low absolute volatility for a given set of constraints. The MSCI Defensive Sectors Index includes: Consumer Staples, Energy, Health Care, Telecommunication Services and Utilities. The MSCI Cyclical Sectors Index contains: Consumer Discretionary, Financials, Industrials, Information Technology and Materials. Securities in the MSCI Momentum Index are selected based on a momentum value of 12-month and 6-month price performance. Constituents of the MSCI Quality Index are selected based on three main variables: high return on equity, stable year-over-year earnings growth and low financial leverage. The Russell 2000 is used for small cap. The MSCI USA Diversified Multiple Factor Index aims to maximize exposure to four factors – Value, Momentum, Quality and Size. *Guide to the Markets – U.S.* Data are as of December 31, 2018.

## S&P 500 intra-year declines vs. calendar year returns

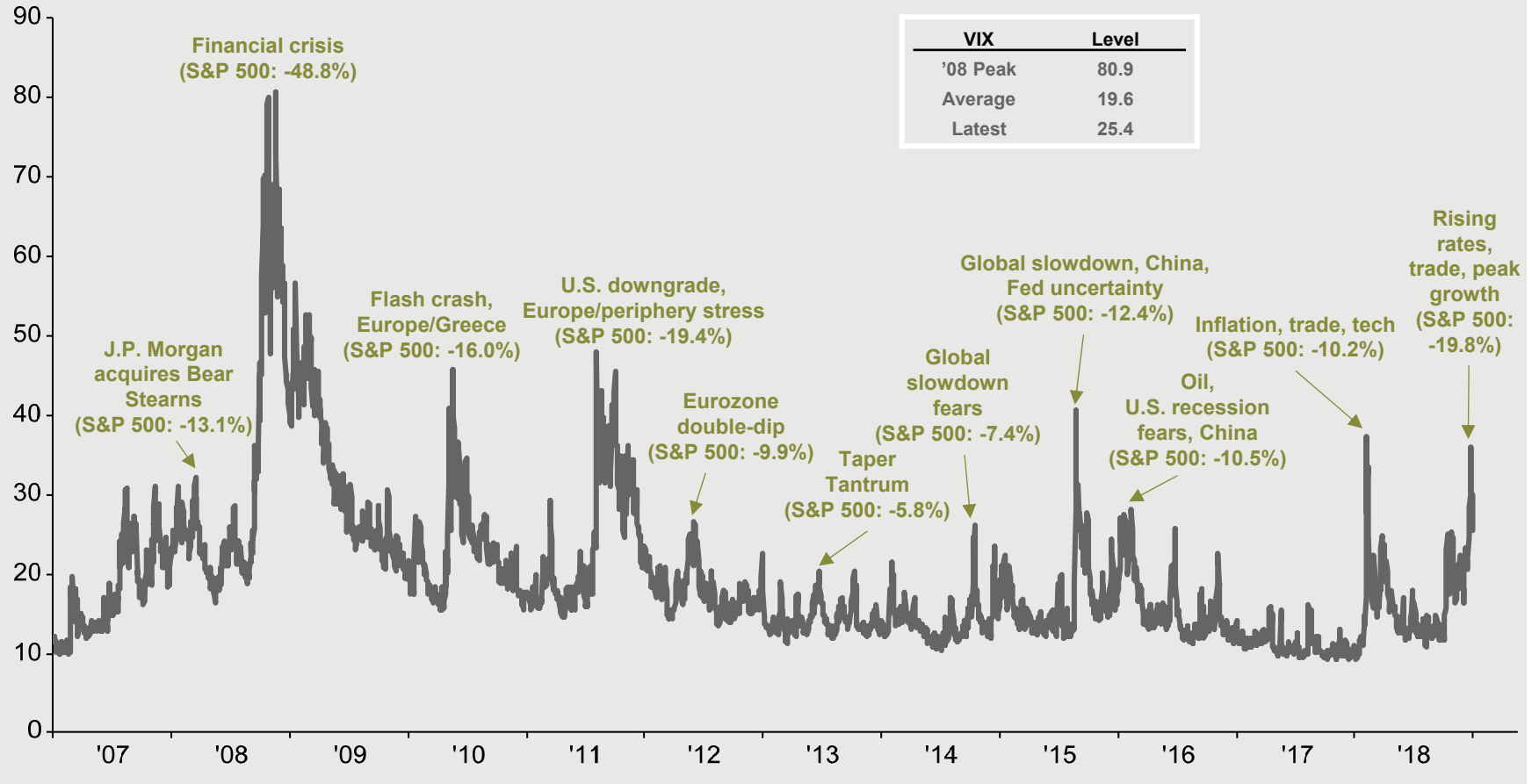
Despite average intra-year drops of 13.9%, annual returns positive in 29 of 39 years



Source: FactSet, Standard & Poor's, J.P. Morgan Asset Management. Returns are based on price index only and do not include dividends. Intra-year drops refers to the largest market drops from a peak to a trough during the year. For illustrative purposes only. Returns shown are calendar year returns from 1980 to 2018, over which time period the average annual return was 8.4%.  
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## CBOE Market Volatility Index (VIX)

Index level

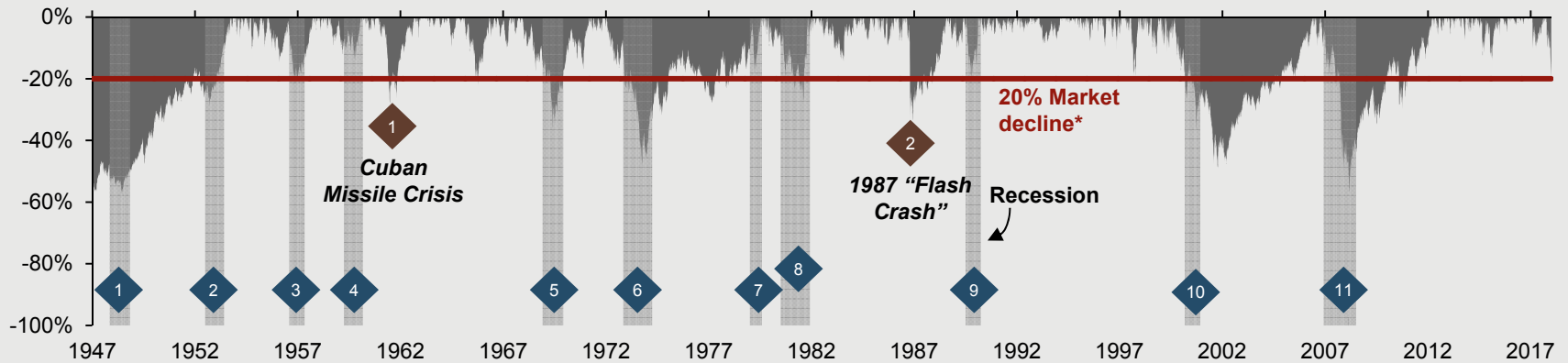


Sources: CBOE, FactSet, J.P. Morgan Asset Management.

Stock market returns are based on calendar year peak to trough declines experienced during VIX spike, except for J.P. Morgan acquires Bear Stearns, which is based on the calendar year peak to the acquisition date. Average is based on the period shown from 12/31/2006 to 12/31/2018.

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## U.S. recessions and S&P 500 composite declines from all-time highs



## Characteristics of recessions and related stock market declines

Recession	Recession			Related Market Sell-off			Macro Environment		
	Peak Quarter	Trough Quarter	% Decline	Peak Date	Trough Date	% Decline	Commodity Spike	Aggressive Fed	Extreme Valuations
1 Recession of 1949	4Q48	4Q49	-1.5%	6/15/1948	6/13/1949	-21%			◆
2 Recession of 1953	2Q53	2Q54	-2.4%	1/5/1953	9/14/1953	-15%			
3 Recession of 1958	3Q57	2Q58	-3.0%	8/2/1956	10/22/1957	-22%			◆
4 Recession of 1960-61	2Q60	1Q61	-0.1%	8/3/1959	10/25/1960	-14%			◆
5 Recession of 1969-70	4Q69	4Q70	-0.2%	11/29/1968	5/26/1970	-36%		◆	
6 Recession of 1973-75	4Q73	1Q75	-3.1%	1/11/1973	10/3/1974	-48%	◆		
7 Recession of 1980	1Q80	3Q80	-2.2%	2/13/1980	3/27/1980	-17%	◆	◆	
8 Recession of 1981-82	3Q81	4Q82	-2.5%	11/28/1980	8/12/1982	-27%	◆	◆	
9 Early 1990s recession	3Q90	1Q91	-1.4%	7/16/1990	10/11/1990	-20%	◆	◆	
10 Early 2000s recession	1Q01	4Q01	-0.4%	3/24/2000	10/9/2002	-49%	◆		◆
11 Great Recession	4Q07	2Q09	-4.0%	10/9/2007	3/9/2009	-57%	◆	◆	
<b>Non-recession Bear Markets</b>									
1 1962 flash crash, Cuban Missile Crisis	-	-	-	12/12/1961	6/26/1962	-28%			◆
2 1987 flash crash, program trading, overheating markets	-	-	-	8/25/1987	12/4/1987	-34%			◆
<b>Average</b>	-	-	<b>-1.9%</b>	-	-	<b>-30%</b>			

Source: FactSet, NBER, Robert Shiller, Standard & Poor's, J.P. Morgan Asset Management.

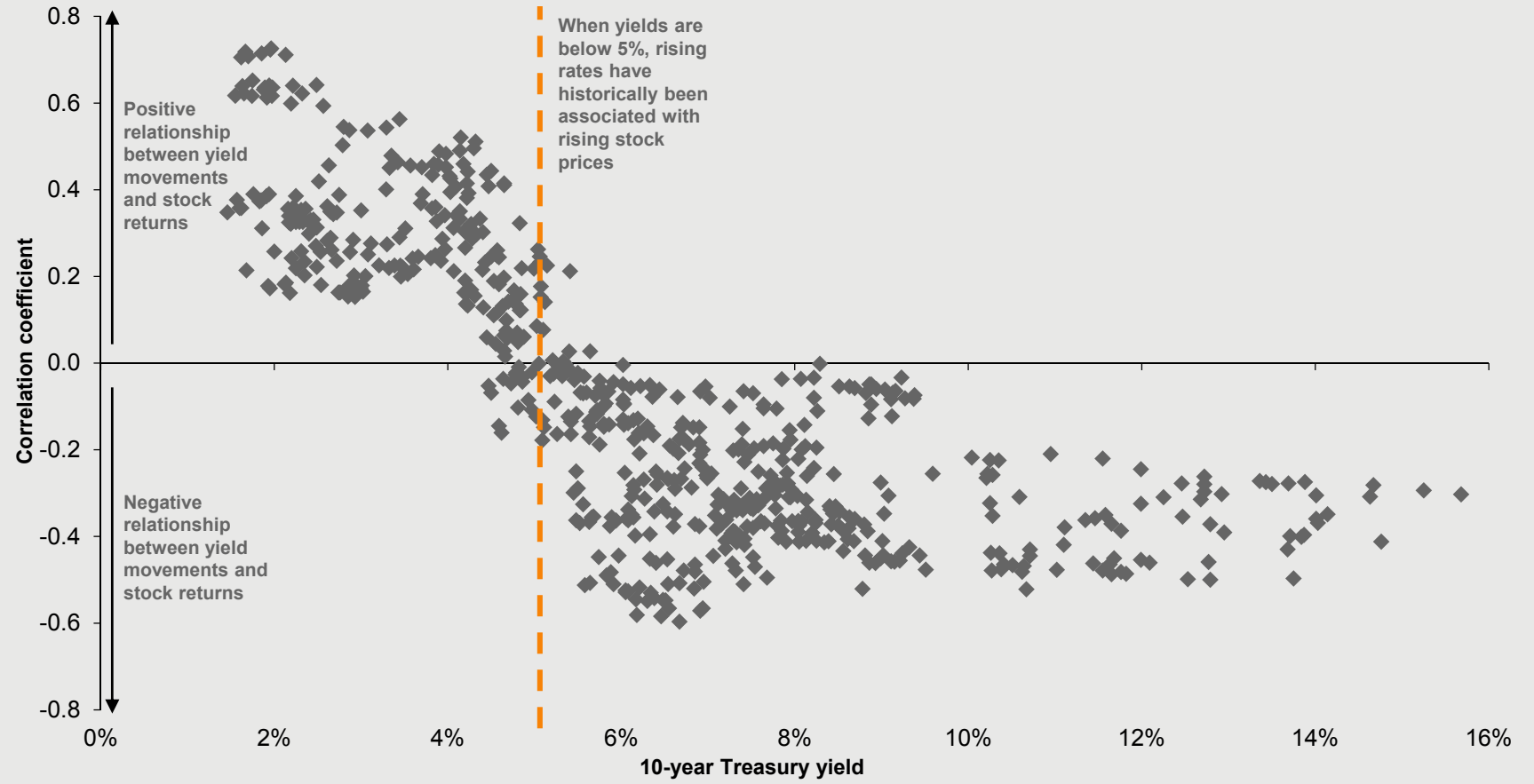
\*A bear market is defined as a 20% or more decline from the previous market high. The related market return is the peak to trough return over the cycle. Periods of "Recession" are defined using NBER business cycle dates. "Commodity spikes" are defined as movement in oil prices of over 100% over an 18-month period. Periods of "Extreme Valuations" are those where S&P 500 last 12 months' P/E levels were approximately two standard deviations above long-run averages, or time periods where equity market valuations appeared expensive given the broader macroeconomic environment. "Aggressive Fed Tightening" is defined as Federal Reserve monetary tightening that was unexpected and/or significant in magnitude. Bear and Bull returns are price returns.

Guide to the Markets – U.S. Data are as of December 31, 2018.



### Correlations between weekly stock returns and interest rate movements

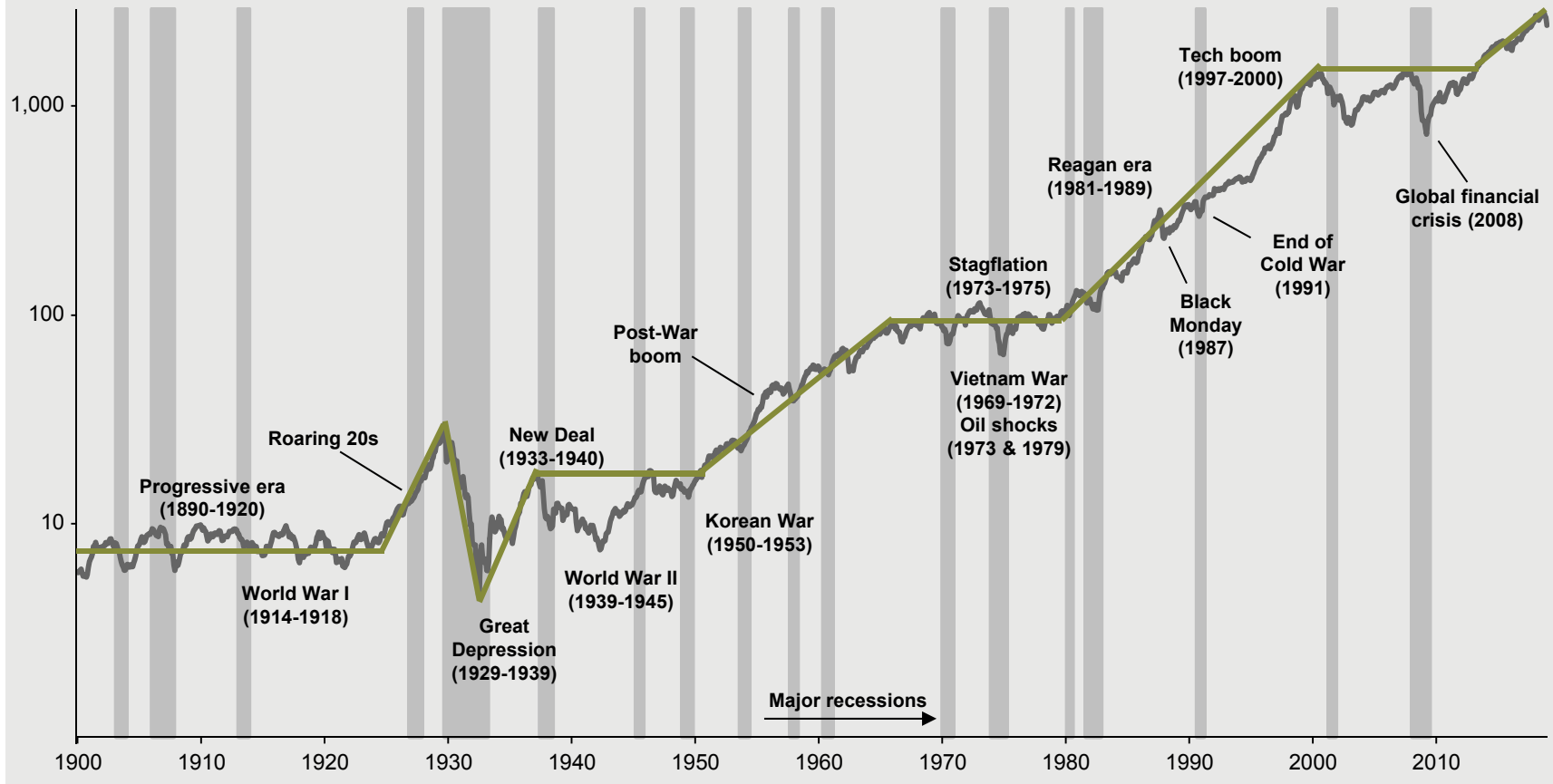
Weekly S&P 500 returns, 10-year Treasury yield, rolling 2-year correlation, May 1963 – December 2018



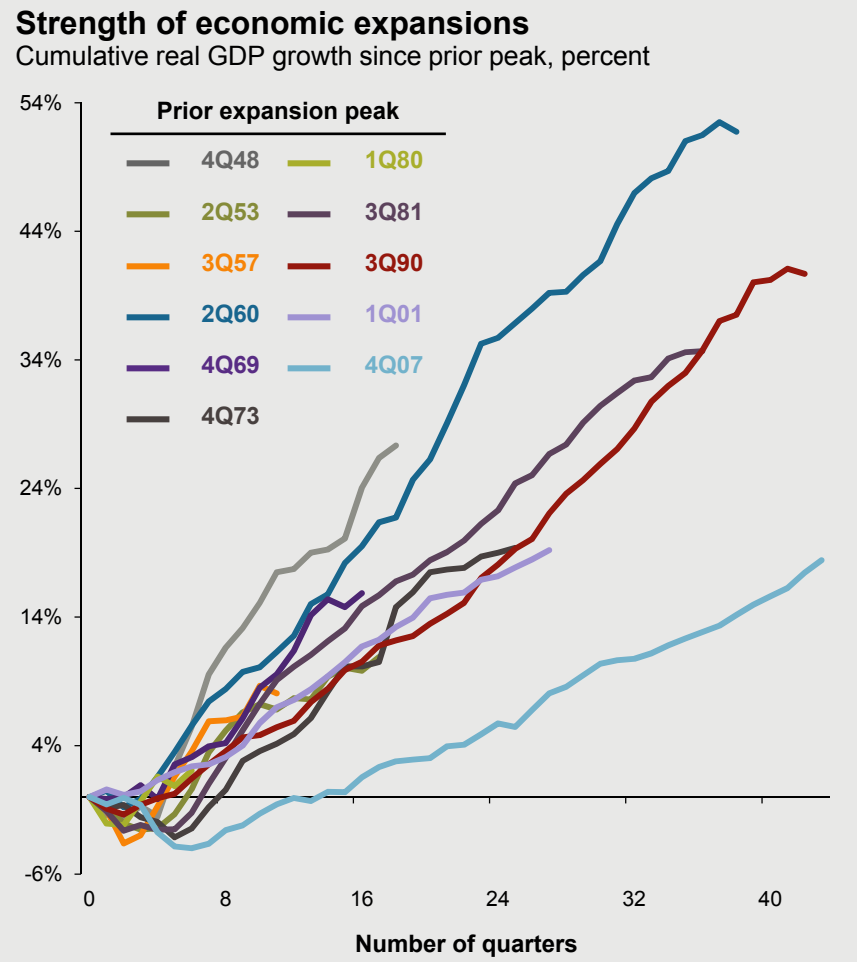
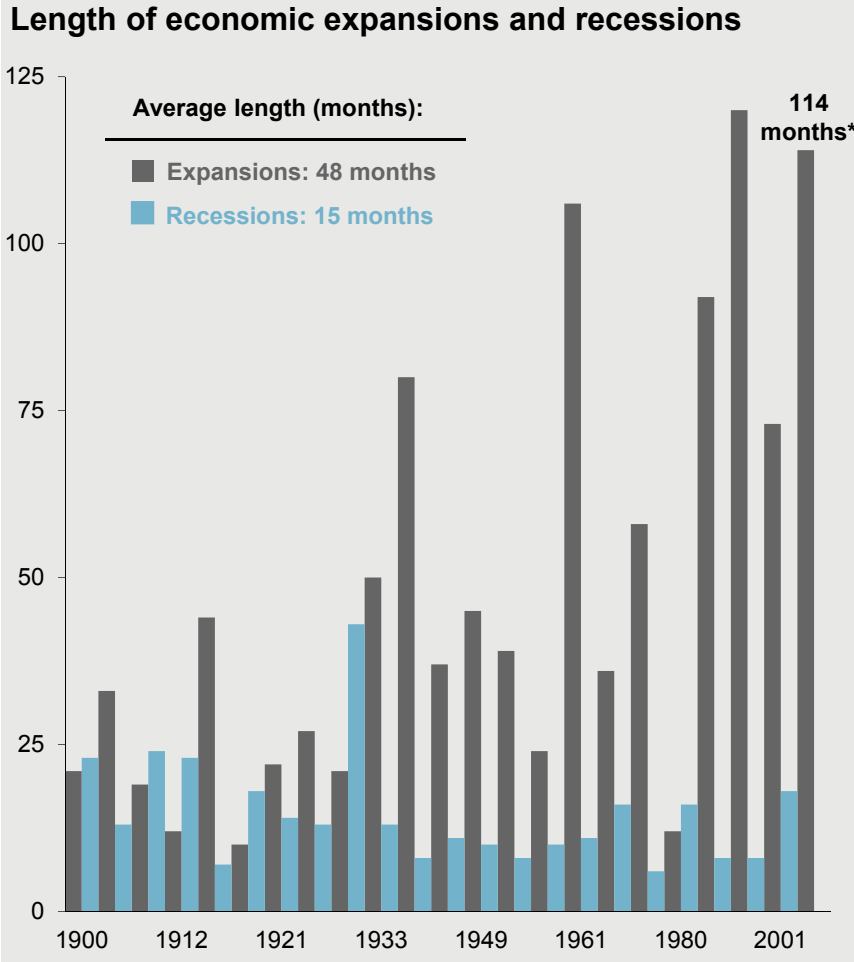
Source: FactSet, FRB, Standard & Poor's, J.P. Morgan Asset Management. Returns are based on price index only and do not include dividends. Markers represent monthly 2-year correlations only. *Guide to the Markets – U.S.* Data are as of December 31, 2018.

## S&P Composite Index

Log scale, annual



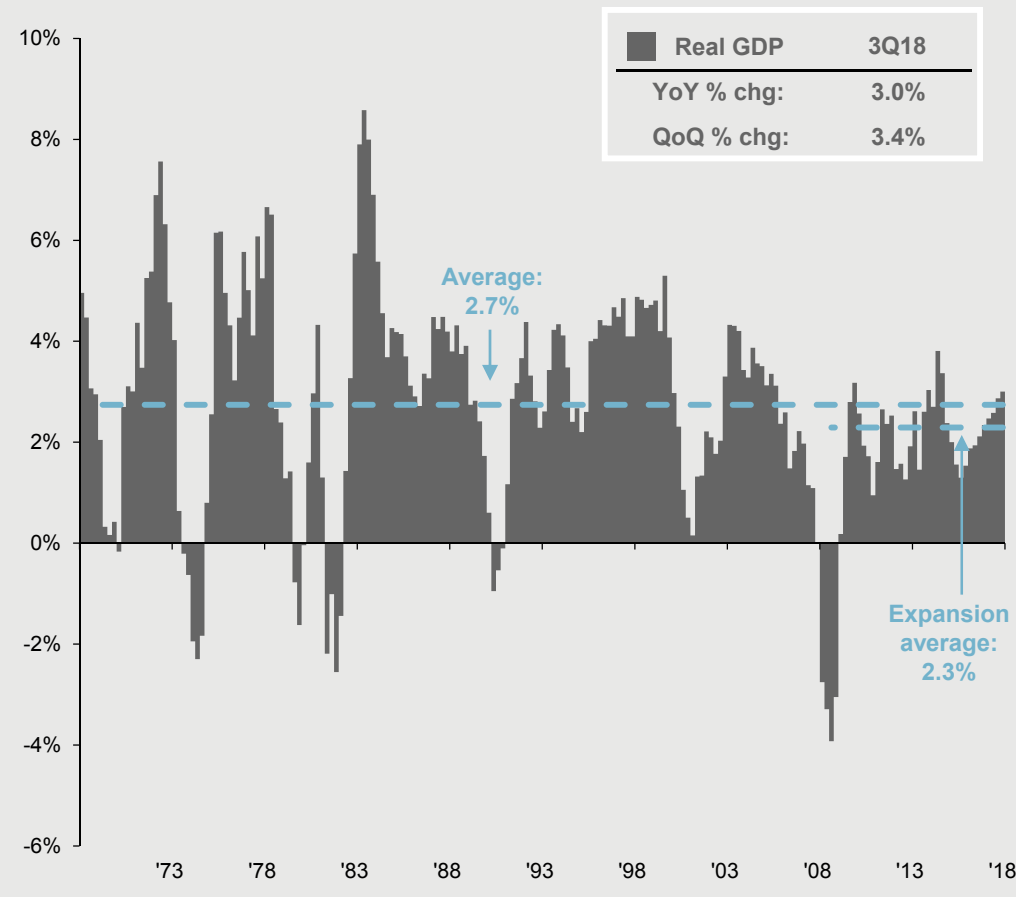
Source: FactSet, NBER, Robert Shiller, J.P. Morgan Asset Management.  
 Data shown in log scale to best illustrate long-term index patterns. Past performance is not indicative of future returns. Chart is for illustrative purposes only.  
 Guide to the Markets – U.S. Data are as of December 31, 2018.



Source: BEA, NBER, J.P. Morgan Asset Management. \*Chart assumes current expansion started in July 2009 and continued through December 2018, lasting 114 months so far. Data for length of economic expansions and recessions obtained from the National Bureau of Economic Research (NBER). These data can be found at [www.nber.org/cycles/](http://www.nber.org/cycles/) and reflect information through December 2018. Past performance is not a reliable indicator of current and future results.  
 Guide to the Markets – U.S. Data are as of December 31, 2018.

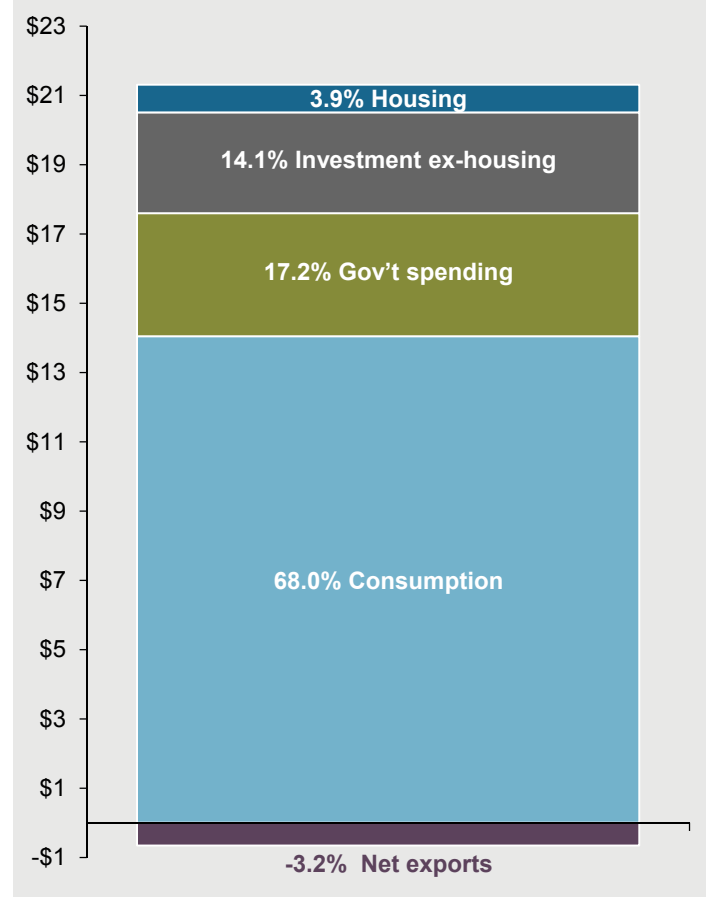
## Real GDP

Year-over-year % change



## Components of GDP

3Q18 nominal GDP, USD trillions



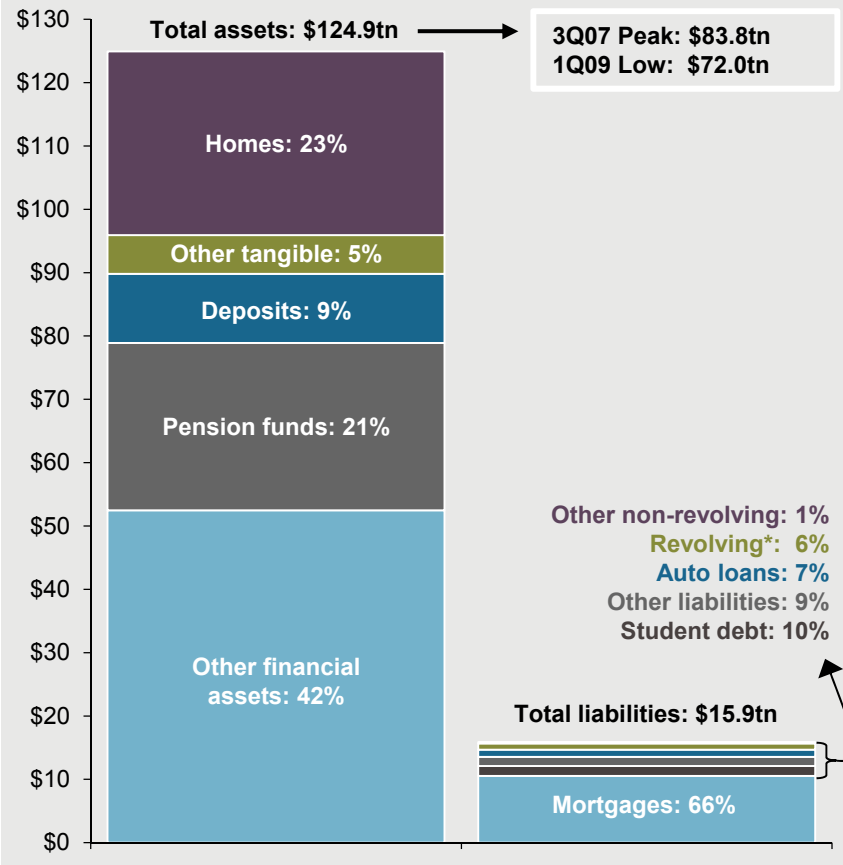
Source: BEA, FactSet, J.P. Morgan Asset Management.

Values may not sum to 100% due to rounding. Quarter-over-quarter percent changes are at an annualized rate. Average represents the annualized growth rate for the full period. Expansion average refers to the period starting in the third quarter of 2009.

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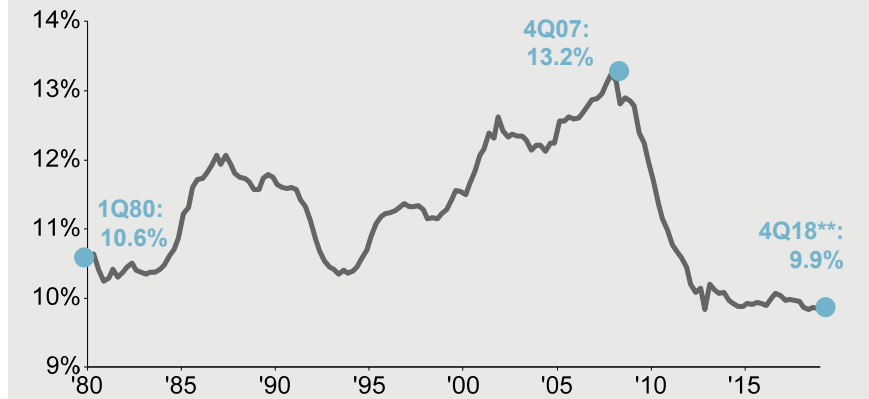
### Consumer balance sheet

3Q18, trillions of dollars outstanding, not seasonally adjusted



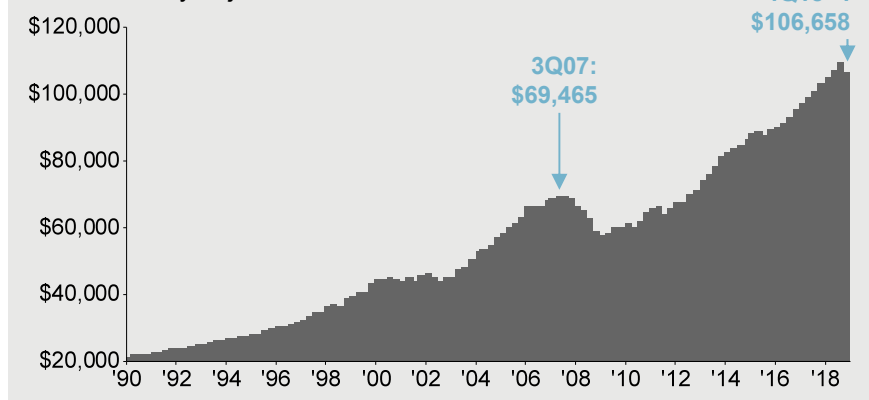
### Household debt service ratio

Debt payments as % of disposable personal income, SA



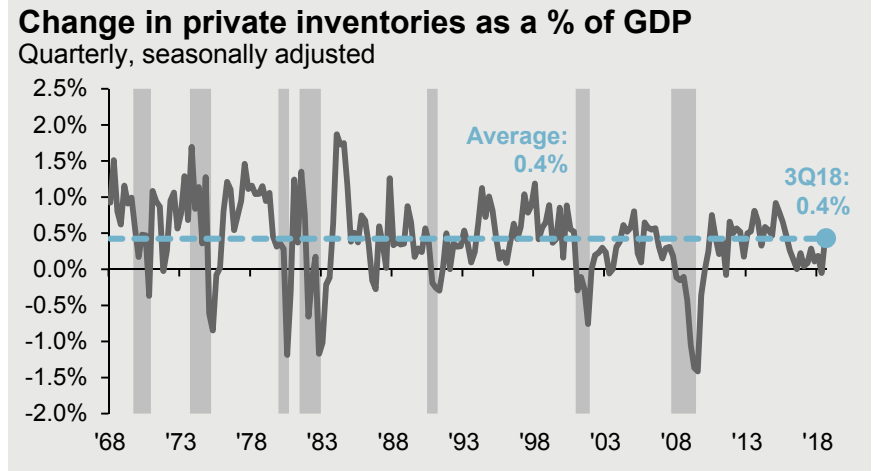
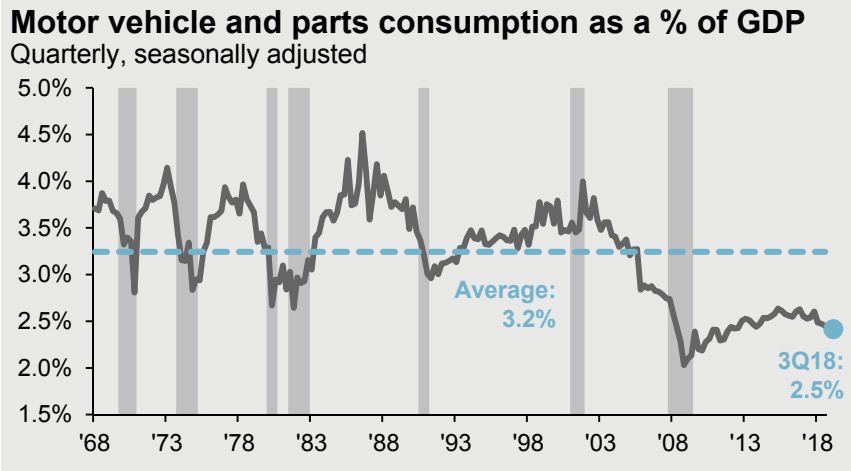
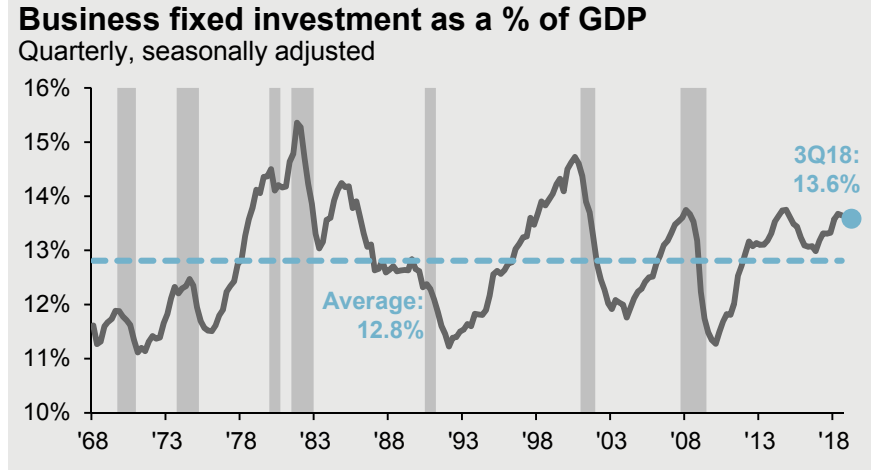
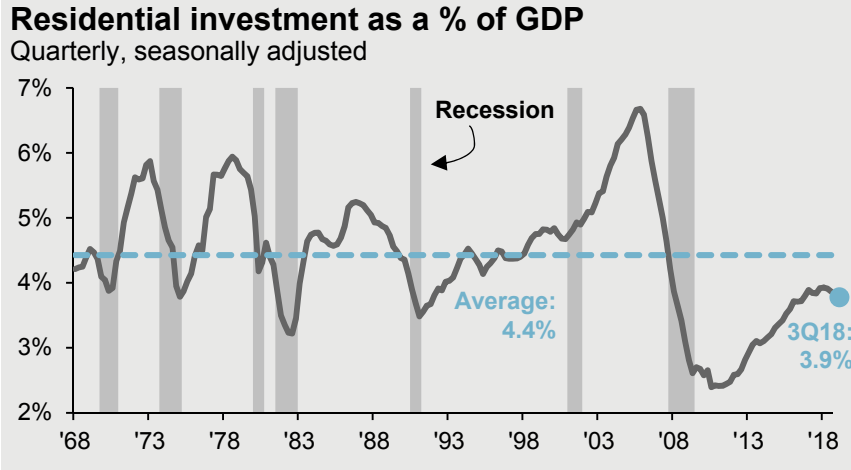
### Household net worth

Not seasonally adjusted, USD billions



Source: FactSet, FRB, J.P. Morgan Asset Management; (Top and bottom right) BEA. Data include households and nonprofit organizations. SA – seasonally adjusted. \*Revolving includes credit cards. Values may not sum to 100% due to rounding. \*\*3Q18 figure for debt service ratio and 4Q18 figures for debt service ratio and household net worth are J.P. Morgan Asset Management estimates.

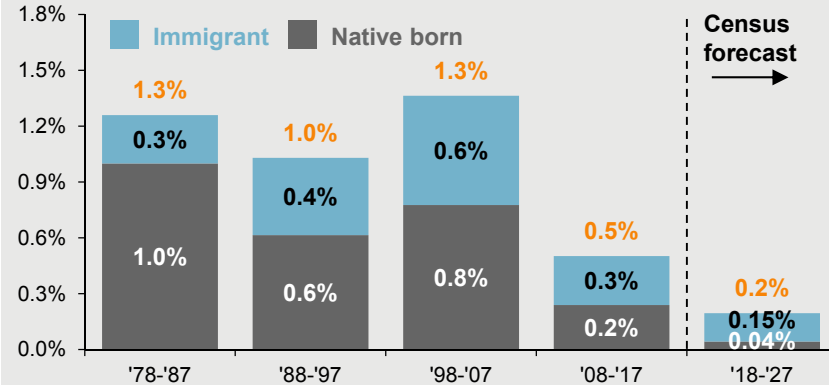
Guide to the Markets – U.S. Data are as of December 31, 2018.



Source: BEA, FactSet, J.P. Morgan Asset Management.  
 Guide to the Markets – U.S. Data are as of December 31, 2018.

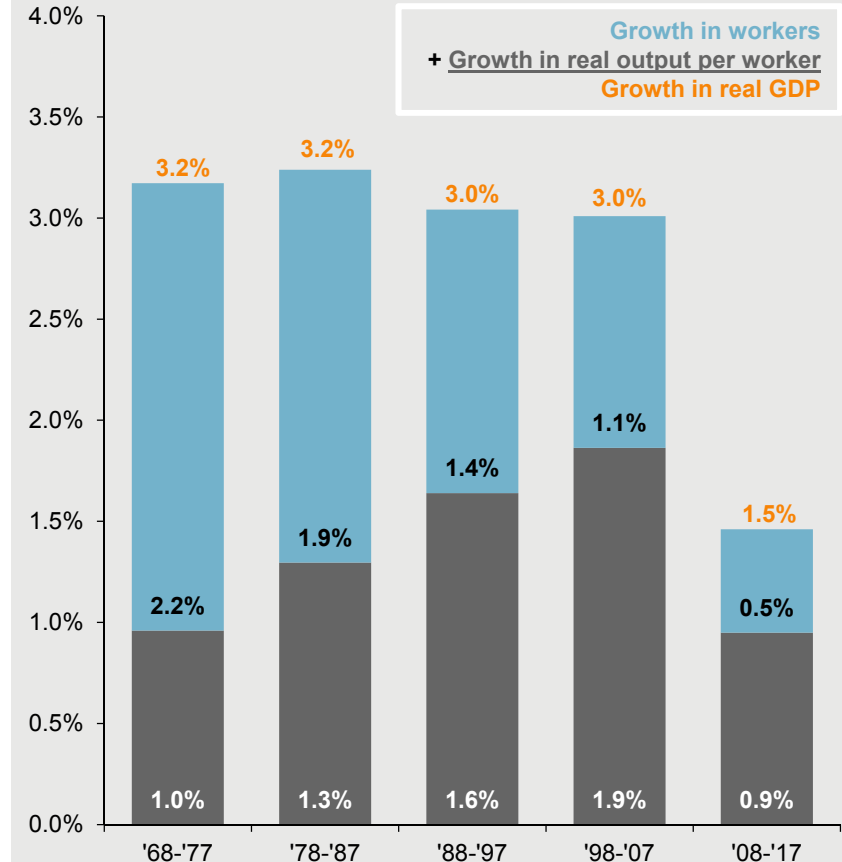
## Growth in working-age population

Percent increase in civilian non-institutional population ages 16-64



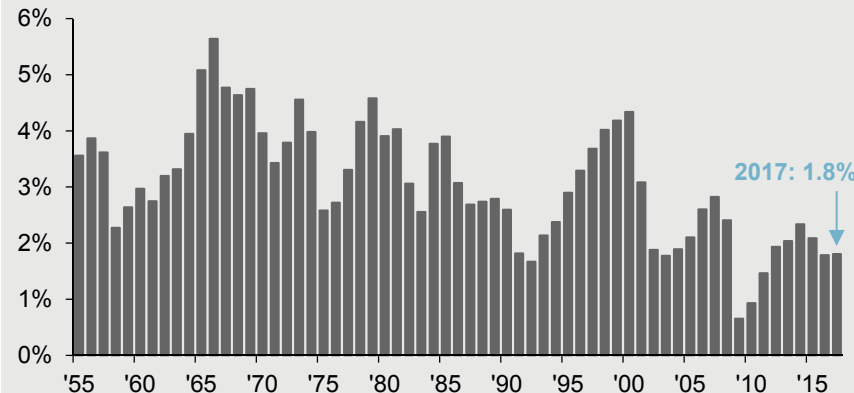
## Drivers of GDP growth

Average year-over-year % change



## Growth in private non-residential capital stock

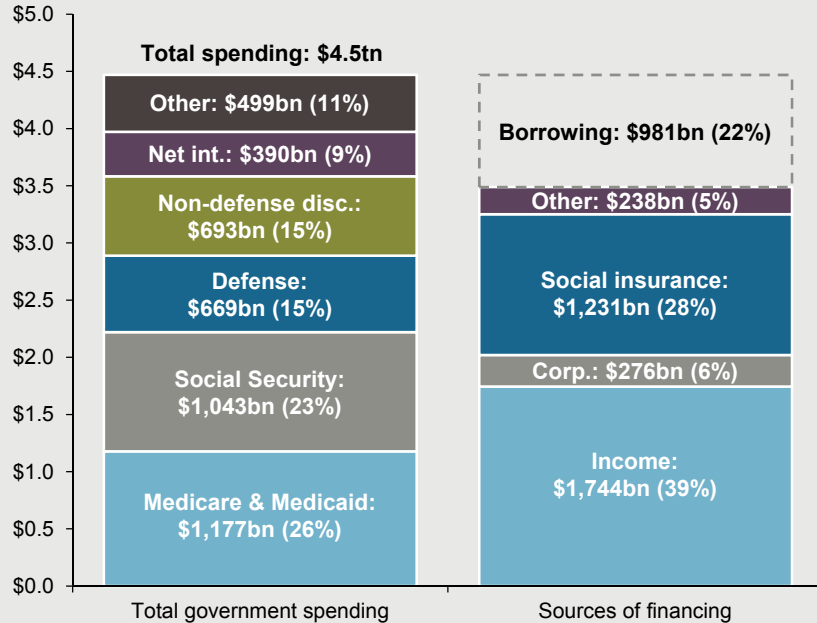
Non-residential fixed assets, year-over-year % change



Source: J.P. Morgan Asset Management; (Top left) Census Bureau, DOD, DOJ; (Top left and right) BLS; (Right and bottom left) BEA. GDP drivers are calculated as the average annualized growth in the 10 years ending in 4Q of the last year. Future working-age population is calculated as the total estimated number of Americans from the Census Bureau, per the September 2018 report, controlled for military enrollment, growth in institutionalized population and demographic trends. Growth in working-age population does not include illegal immigration; DOD Troop Readiness reports used to estimate percent of population enlisted. *Guide to the Markets - U.S.* Data are as of December 31, 2018.

## The 2019 federal budget

CBO Baseline forecast, USD trillions

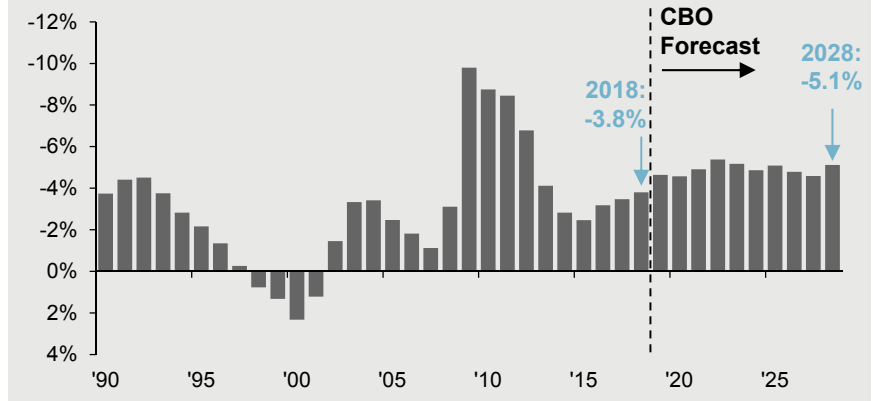


### CBO's Baseline assumptions

	2019	2020	'21-'22	'23-'28
<b>Real GDP growth</b>	3.0%	2.1%	1.6%	1.7%
<b>10-year Treasury</b>	3.5%	3.8%	4.0%	3.7%
<b>Headline inflation (CPI)</b>	2.3%	2.4%	2.5%	2.4%
<b>Unemployment</b>	3.4%	3.5%	4.3%	4.8%

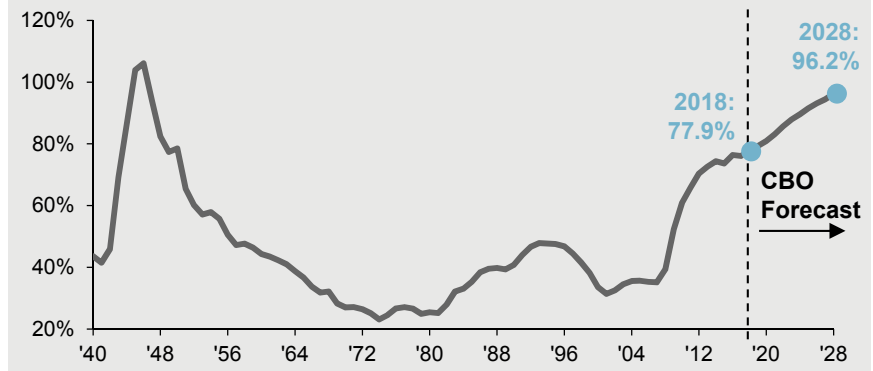
## Federal budget surplus/deficit

% of GDP, 1990 – 2028, 2018 CBO Baseline



## Federal net debt (accumulated deficits)

% of GDP, 1940 – 2028, 2018 CBO Baseline, end of fiscal year

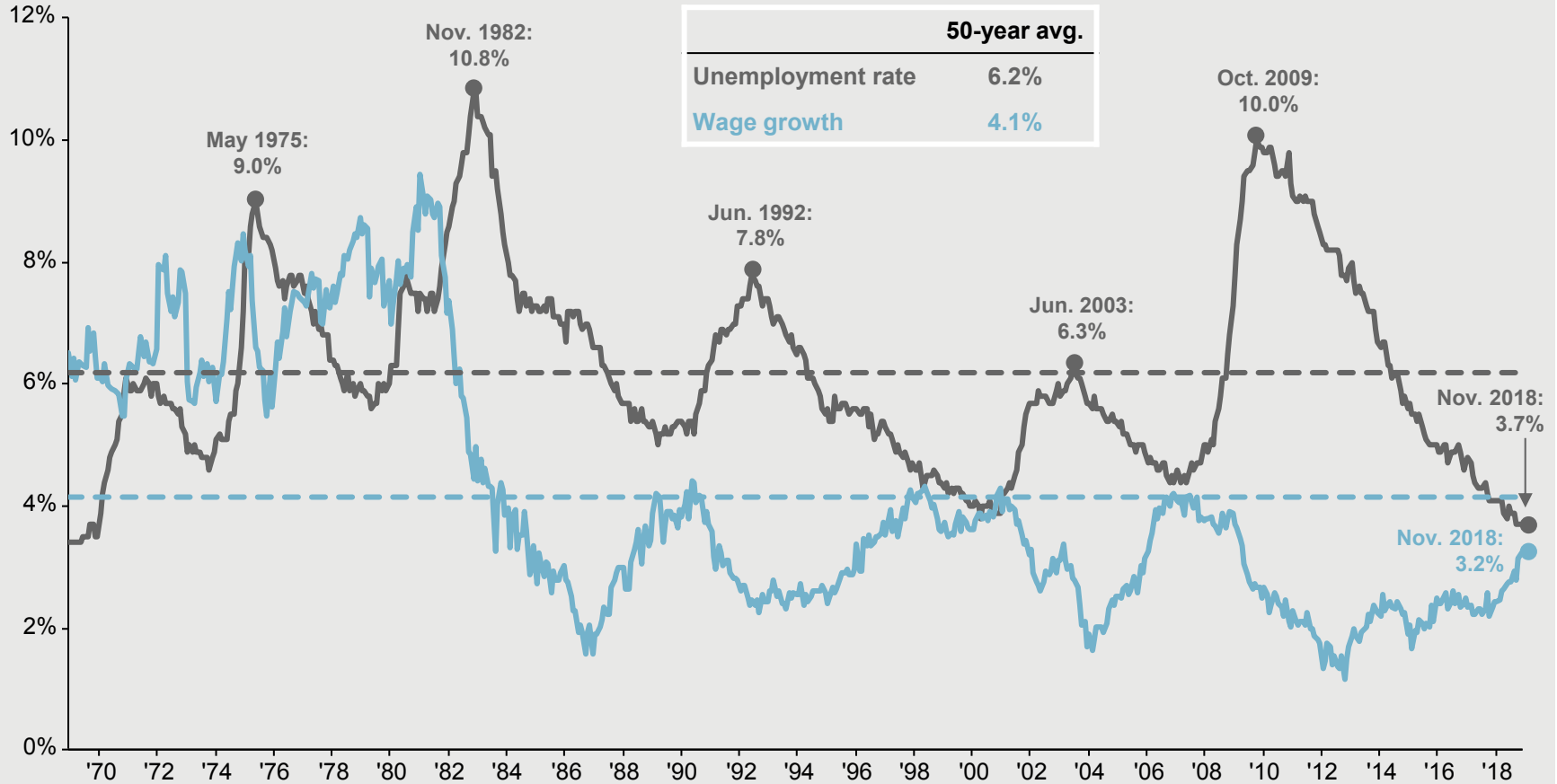


Source: CBO, J.P. Morgan Asset Management; (Top and bottom right) BEA, Treasury Department. 2019 Federal Budget is based on the Congressional Budget Office (CBO) April 2018 Baseline Budget Forecast. CBO Baseline is based on the Congressional Budget Office (CBO) August 2018 Update to Economic Outlook. Other spending includes, but is not limited to, health insurance subsidies, income security and federal civilian and military retirement. Note: Years shown are fiscal years (Oct. 1 through Sep. 30). *Guide to the Markets – U.S.* Data are as of December 31, 2018.



## Civilian unemployment rate and year-over-year wage growth for private production and non-supervisory workers

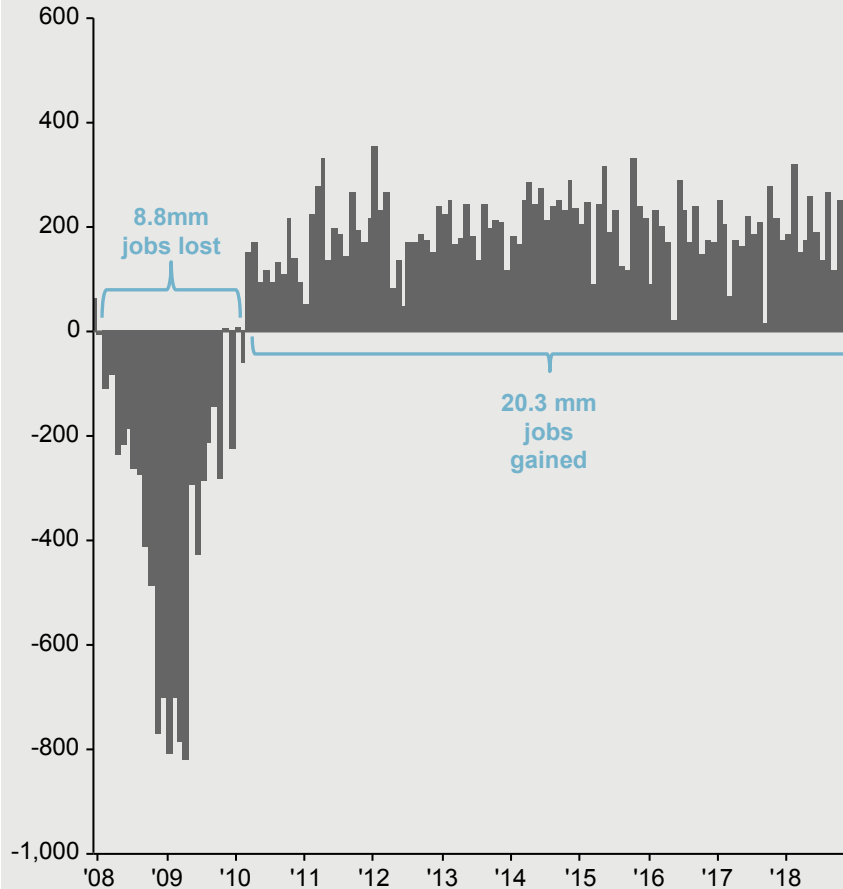
Seasonally adjusted, percent



Source: BLS, FactSet, J.P. Morgan Asset Management.  
 Guide to the Markets – U.S. Data are as of December 31, 2018.

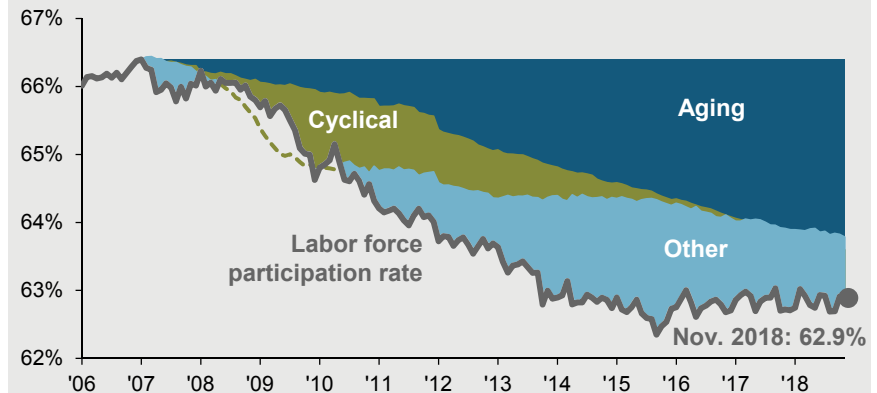
## Employment – Total private payroll

Total job gain/loss, thousands



## Labor force participation rate decline since 2007 peak\*

Population employed or looking for work as a % of total, ages 16+



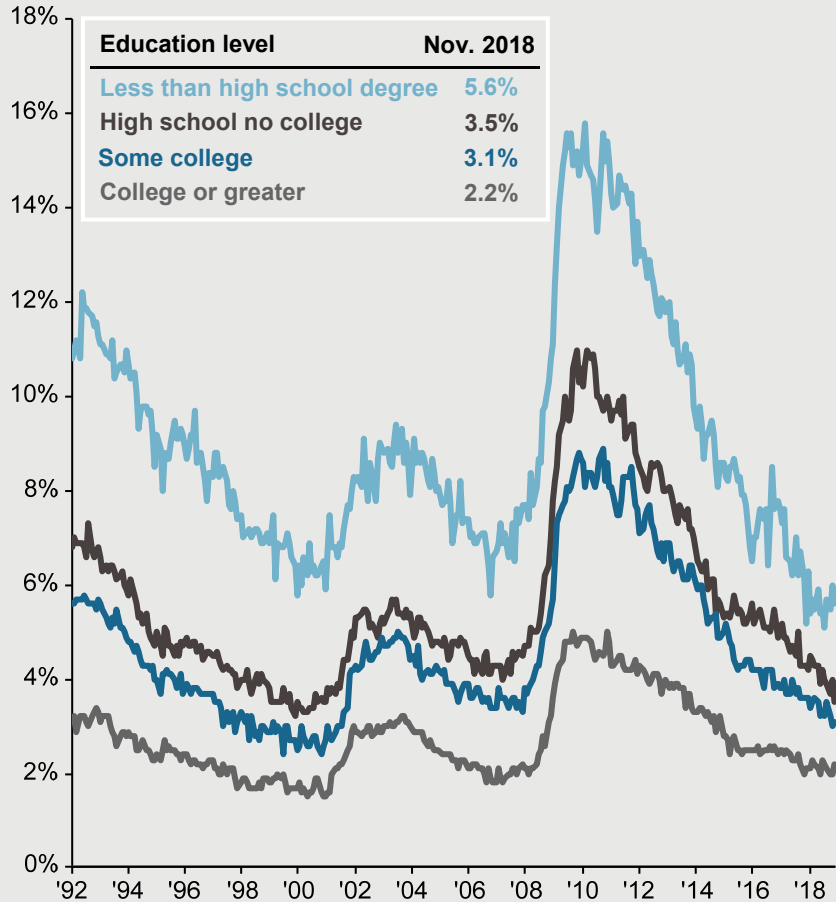
## Net job creation since February 2010

Millions of jobs



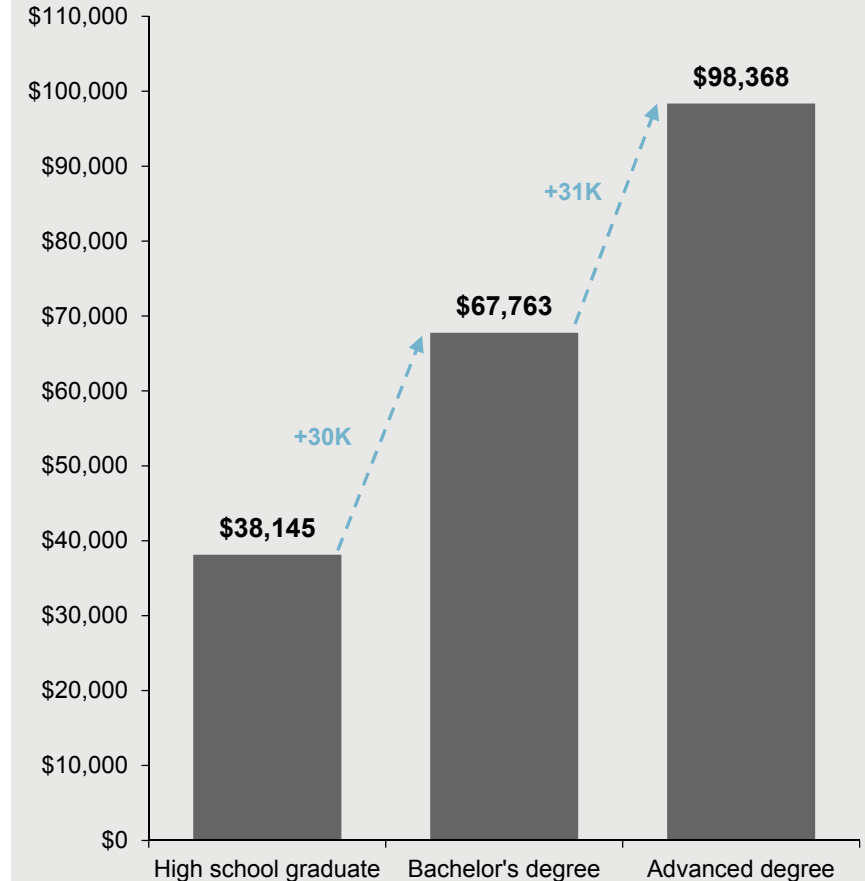
Source: BLS, FactSet, J.P. Morgan Asset Management. (Bottom right) Info. fin. & bus. svcs. = Information, financial activities and professional and business services; Mfg. trade & trans. = Manufacturing, trade, transportation and utilities; Leisure, hospt. & other svcs. = Leisure, hospitality and other services; Educ. & health svcs. = Education & health services; Mining & construct. = Natural resources mining and construction; Gov't = Government. \*Aging effect on the labor force participation rate is the estimated number of people who are no longer employed or looking for work because they are retired. Cyclical effect is the estimated number of people who lose their jobs and stop looking for work or do not look for work because of the economic conditions. Other represents the drop in labor force participation from the prior expansion peak that cannot be explained by age or cyclical effects. Estimates for reason of decline in labor force participation rate are made by J.P. Morgan Asset Management. *Guide to the Markets – U.S.* Data are as of December 31, 2018.

## Unemployment rate by education level



## Average annual earnings by highest degree earned

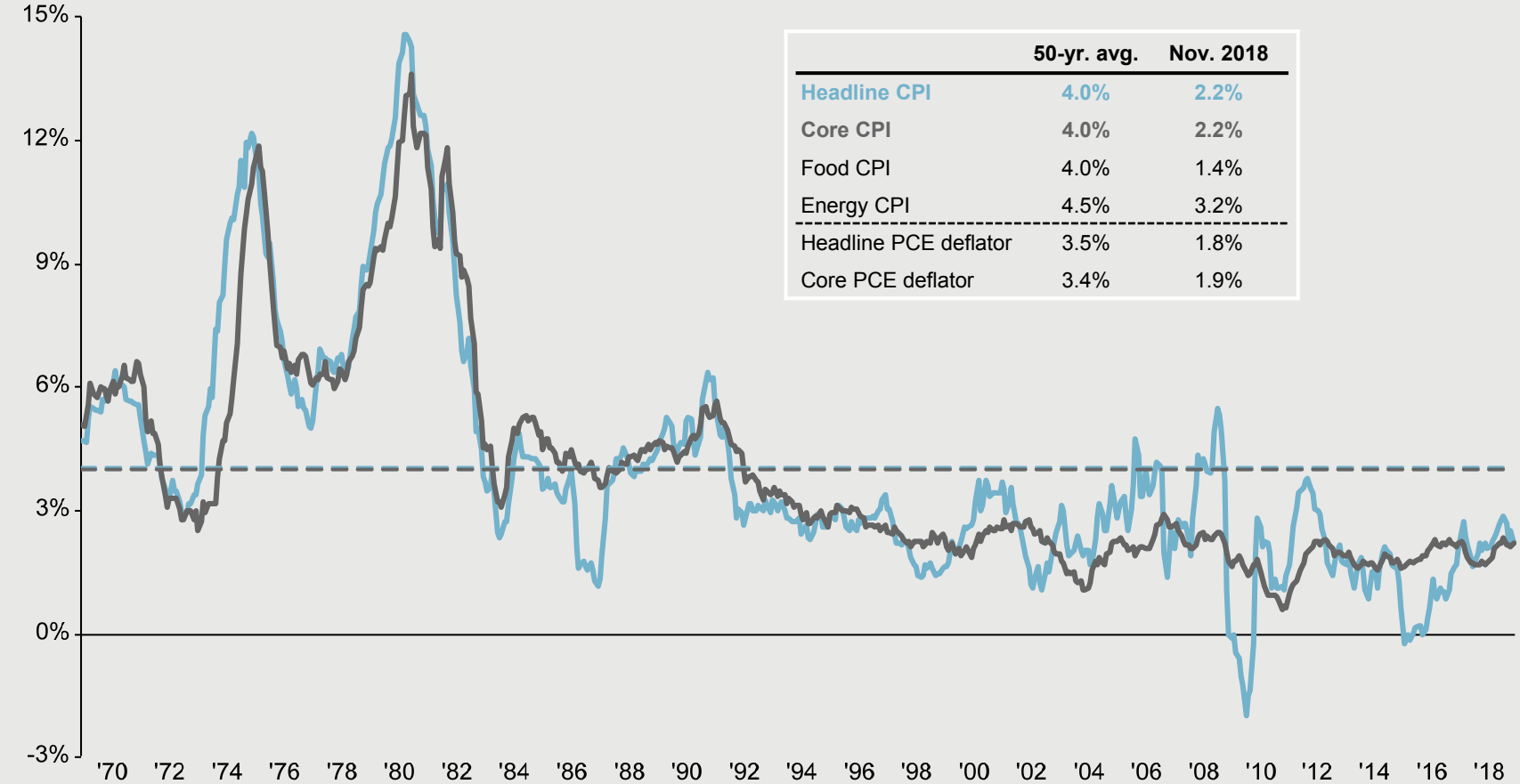
Workers aged 18 and older, 2017



Source: J.P. Morgan Asset Management; (Left) BLS, FactSet; (Right) Census Bureau. Unemployment rates shown are for civilians aged 25 and older. Earnings by educational attainment comes from the Current Population Survey and is published under historical income tables by person by the Census Bureau. *Guide to the Markets – U.S.* Data are as of December 31, 2018.

## CPI and core CPI

% change vs. prior year, seasonally adjusted



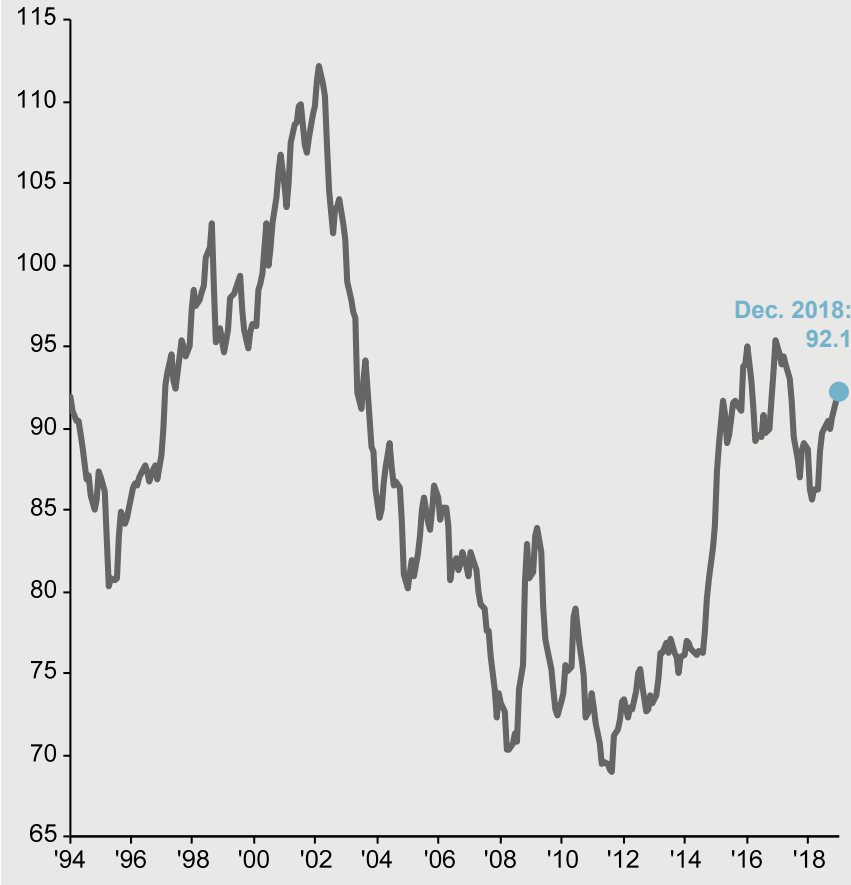
Source: BLS, FactSet, J.P. Morgan Asset Management.

CPI used is CPI-U and values shown are % change vs. one year ago. Core CPI is defined as CPI excluding food and energy prices. The Personal Consumption Expenditure (PCE) deflator employs an evolving chain-weighted basket of consumer expenditures instead of the fixed-weight basket used in CPI calculations.

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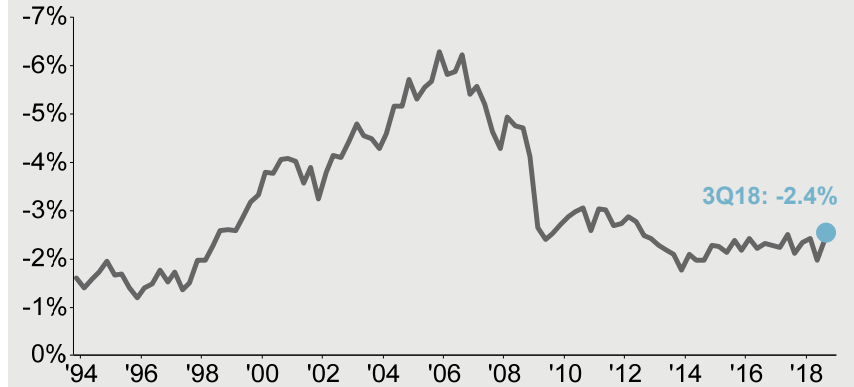
**The U.S. dollar**

Monthly average of major currencies nominal trade-weighted index



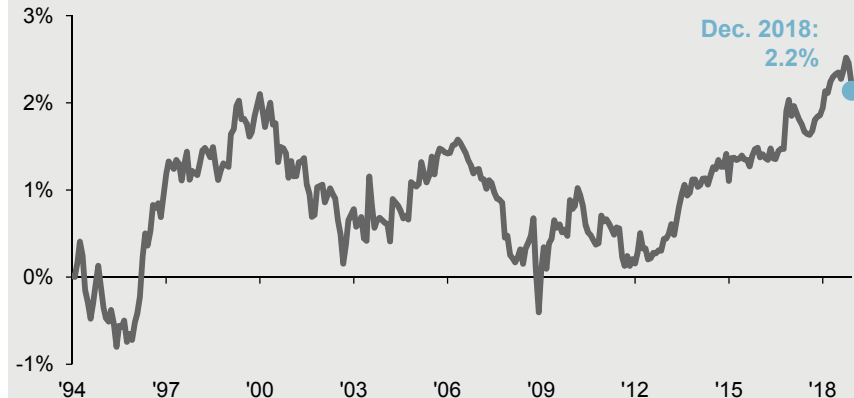
**The U.S. trade balance**

Current account balance, % of GDP



**Developed markets interest rate differentials**

Difference between U.S. and international 10-year yields\*



Source: J.P. Morgan Asset Management; (Left) FactSet, Federal Reserve; (Top right) Bureau of Economic Analysis, FactSet; (Bottom right) Tullett Prebon. Currencies in the Trade Weighted U.S. Dollar Major Currencies Index are: Australian dollar, British pound, Canadian dollar, euro, Japanese yen, Swedish krona and Swiss franc. \*Interest rate differential is the difference between the 10-year U.S. Treasury yield and a basket of the 10-year yields of each major trading partner (Australia, Canada, Europe, Japan, Sweden, Switzerland and UK). Weights on the basket are calculated using the 10-year average of total government bonds outstanding in each region. Europe is defined as the 19 countries in the euro area. *Guide to the Markets – U.S.* Data are as of December 31, 2018.

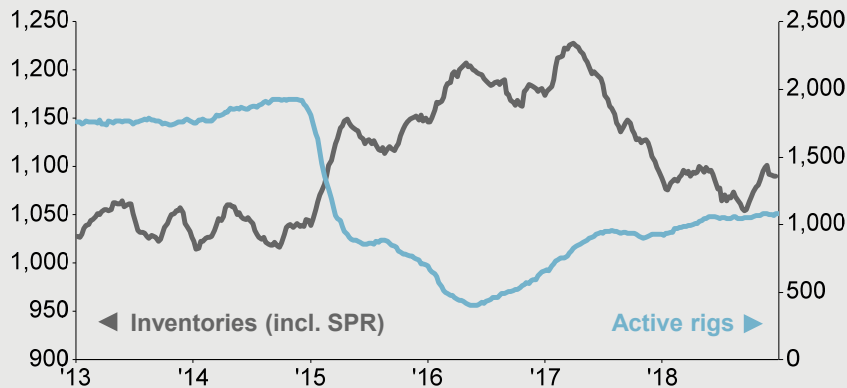
## Change in production and consumption of liquid fuels

Production, consumption and inventories, millions of barrels per day

Production	2015	2016	2017	2018*	2019*	Growth since '15
U.S.	15.1	14.8	15.7	17.8	19.6	29.5%
OPEC	38.4	39.4	39.3	39.2	38.3	-0.2%
Russia	11.0	11.3	11.2	11.4	11.5	4.4%
<b>Global</b>	<b>97.0</b>	<b>97.4</b>	<b>98.1</b>	<b>100.4</b>	<b>101.8</b>	<b>5.0%</b>
Consumption						
U.S.	19.5	19.7	20.0	20.5	20.8	6.6%
China	12.4	12.8	13.4	13.9	14.3	15.8%
<b>Global</b>	<b>95.9</b>	<b>96.9</b>	<b>98.6</b>	<b>100.1</b>	<b>101.6</b>	<b>6.0%</b>
Inventory Change	1.1	0.4	-0.5	0.3	0.2	

## U.S. crude oil inventories and rig count\*\*

Million barrels, number of active rigs



## Price of oil

WTI crude, nominal prices, USD/barrel



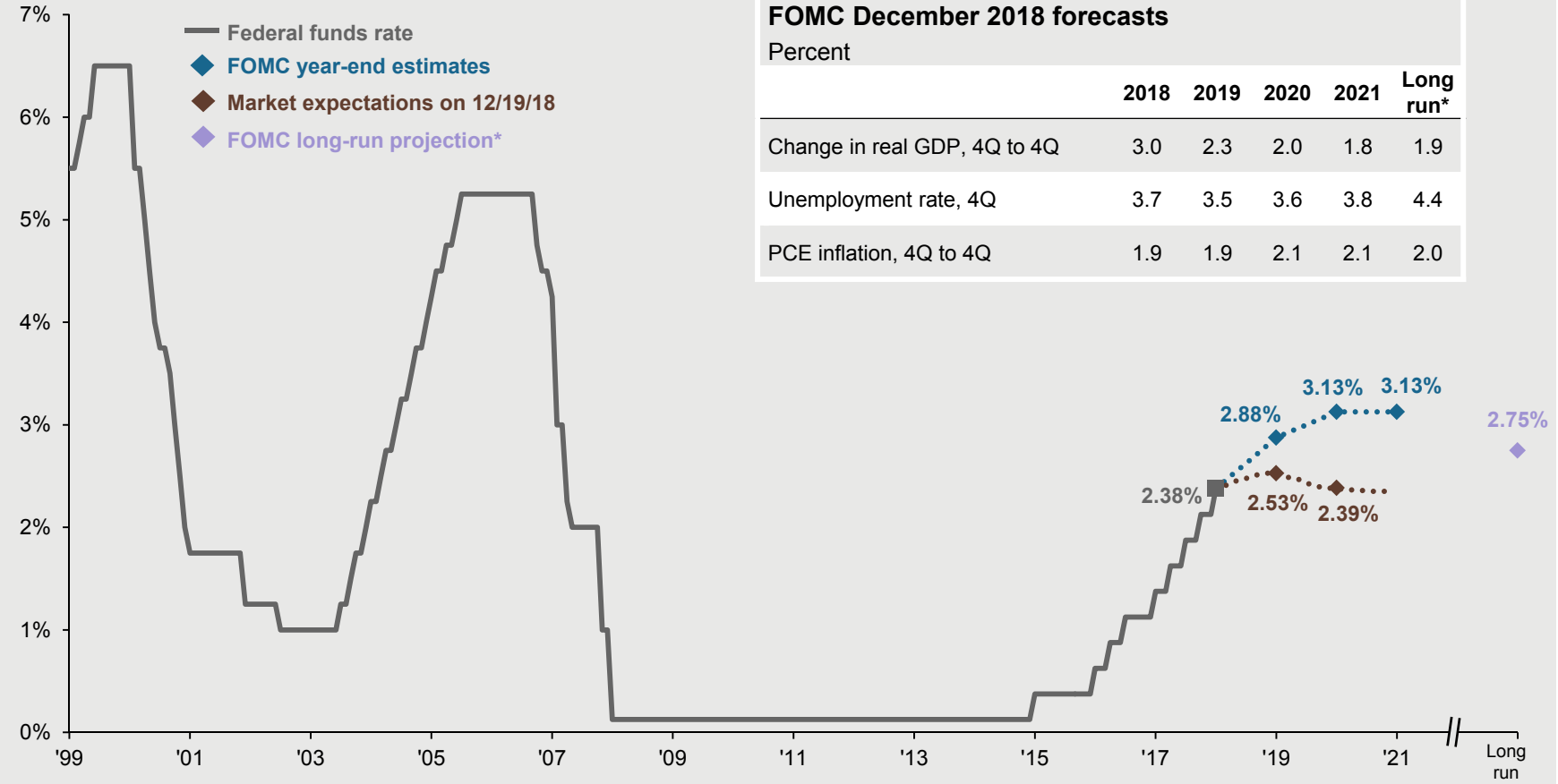
Source: J.P. Morgan Asset Management; (Top and bottom left) EIA; (Right) FactSet; (Bottom left) Baker Hughes.

\*Forecasts are from the December 2018 EIA Short-Term Energy Outlook and start in 2018. \*\*U.S. crude oil inventories include the Strategic Petroleum Reserve (SPR). Active rig count includes both natural gas and oil rigs. WTI crude prices are monthly averages in USD using continuous contract NYM prices.

Guide to the Markets – U.S. Data are as of December 31, 2018.

## Federal funds rate expectations

FOMC and market expectations for the federal funds rate

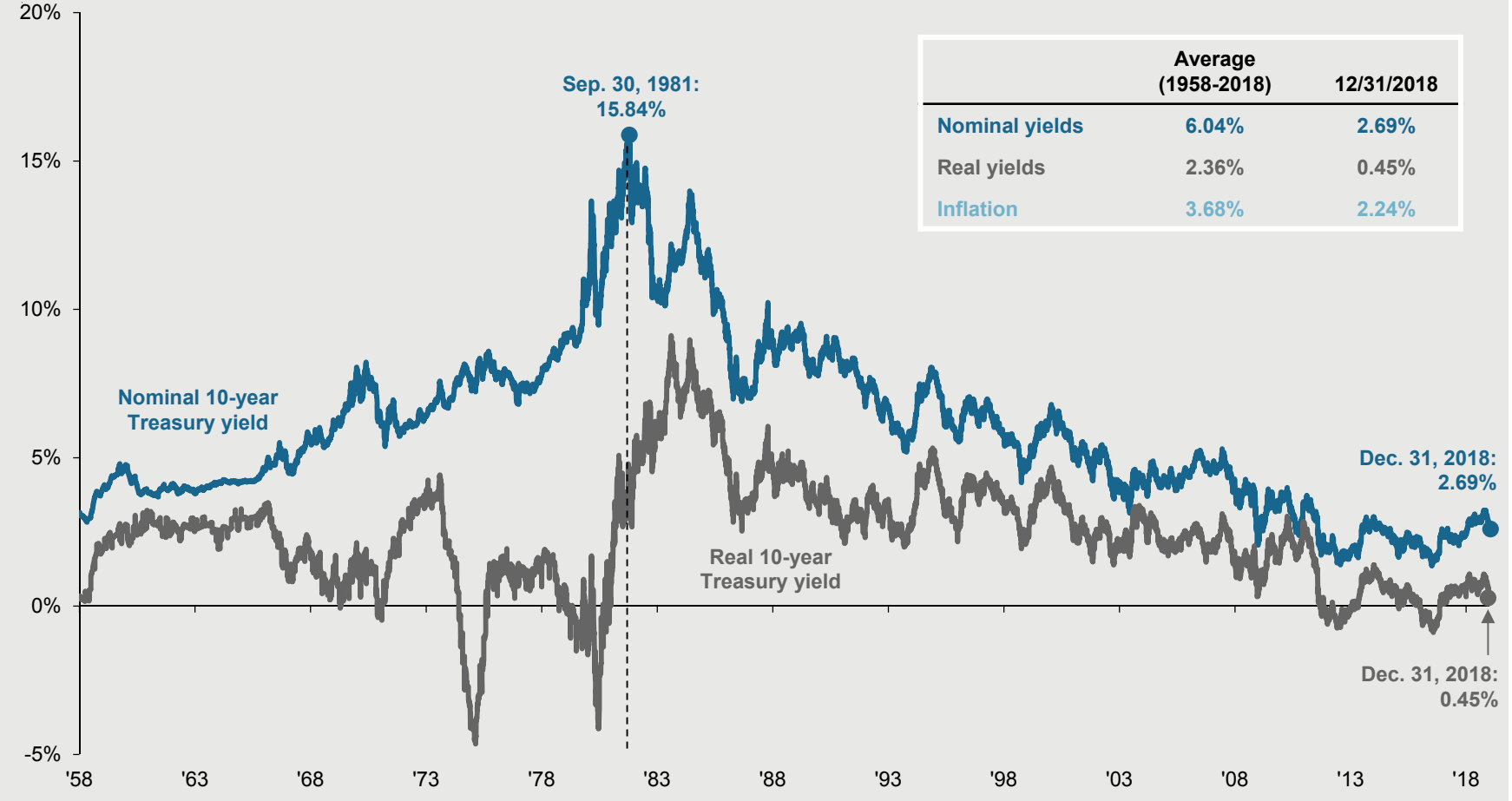


Source: Bloomberg, FactSet, Federal Reserve, J.P. Morgan Asset Management.

Market expectations are the federal funds rates priced into the fed futures market as of the date of the December 2018 FOMC meeting and are through November 2021. \*Long-run projections are the rates of growth, unemployment and inflation to which a policymaker expects the economy to converge over the next five to six years in absence of further shocks and under appropriate monetary policy.

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Nominal and real 10-year Treasury yields

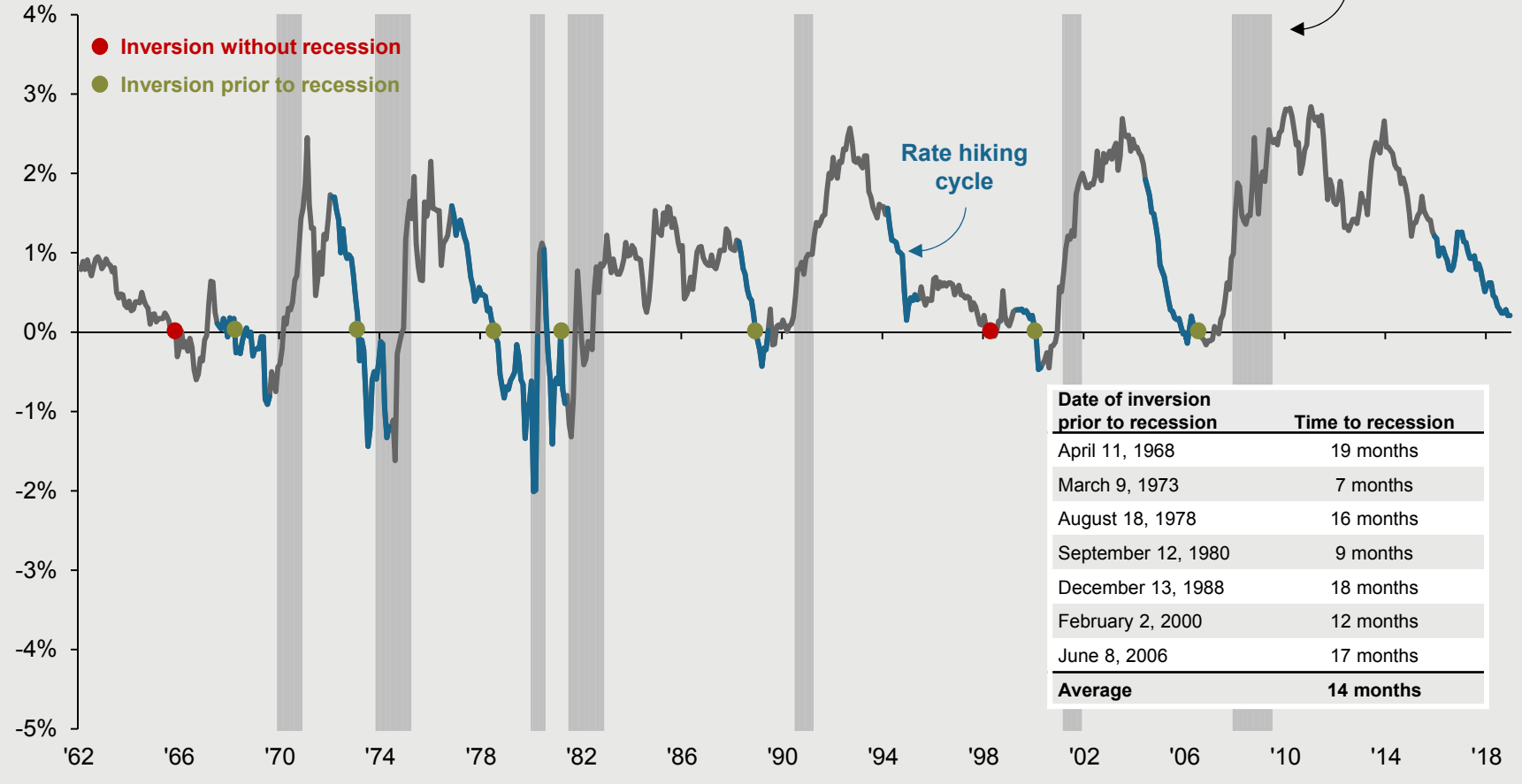


Source: BLS, FactSet, Federal Reserve, J.P. Morgan Asset Management.  
 Real 10-year Treasury yields are calculated as the daily Treasury yield less year-over-year core CPI inflation for that month except for December 2018, where real yields are calculated by subtracting out November 2018 year-over-year core inflation.  
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## U.S. yield curve steepness

Short-term yield versus long-term yield spread\*

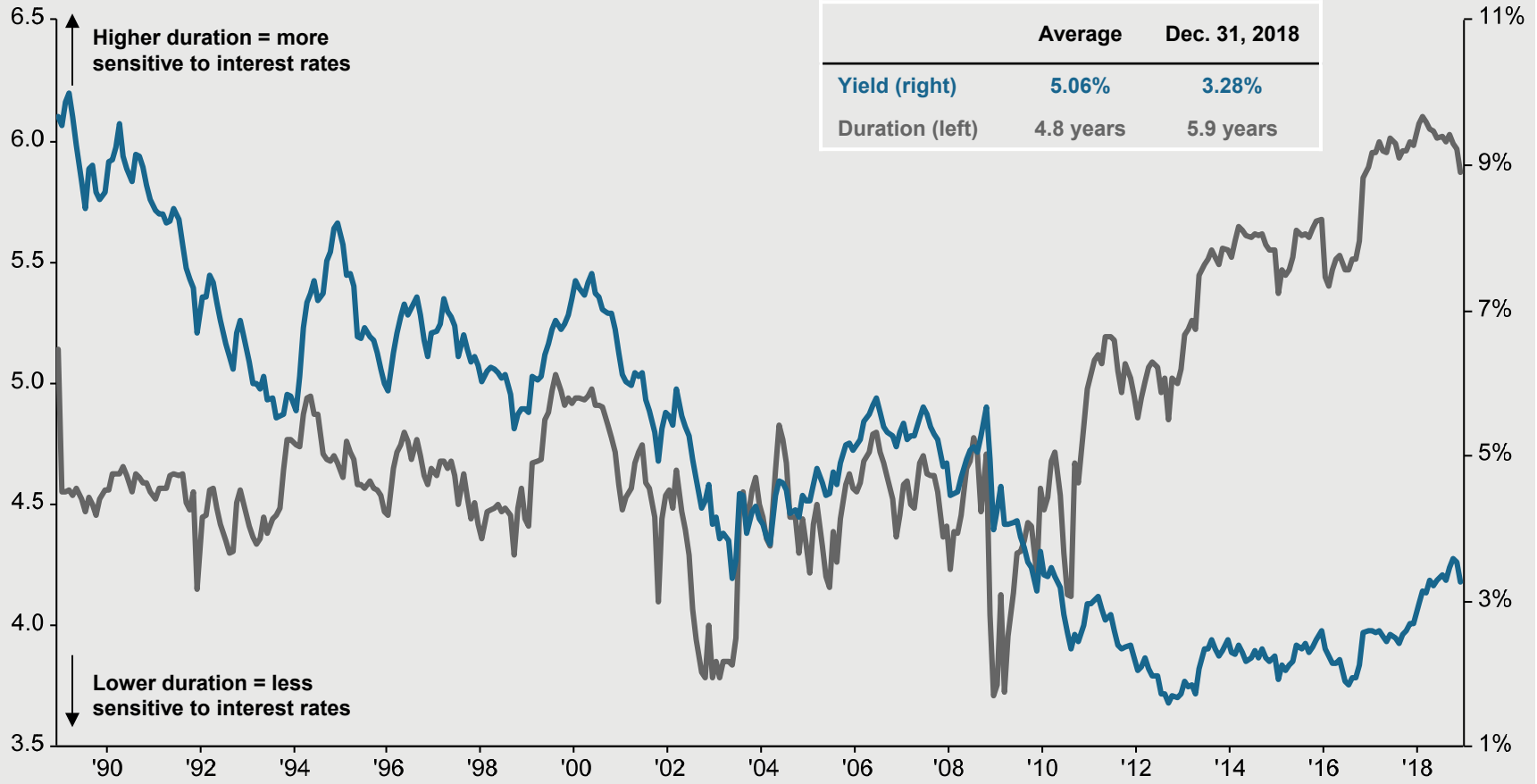


Source: FactSet, Federal Reserve, J.P. Morgan Asset Management. \*From January 1962 to May 1976 short-term bond is U.S. 1-year bond. Short-dated bond is 2-year from June 1976. Time to recession is calculated as the time between the final sustained inversion of the yield curve prior to recession, and the onset of recession.

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## Duration and yield of the Bloomberg Barclays U.S. Aggregate Index

Years (left) and yield to worst (right)



Source: Barclays, Bloomberg, FactSet, J.P. Morgan Asset Management.

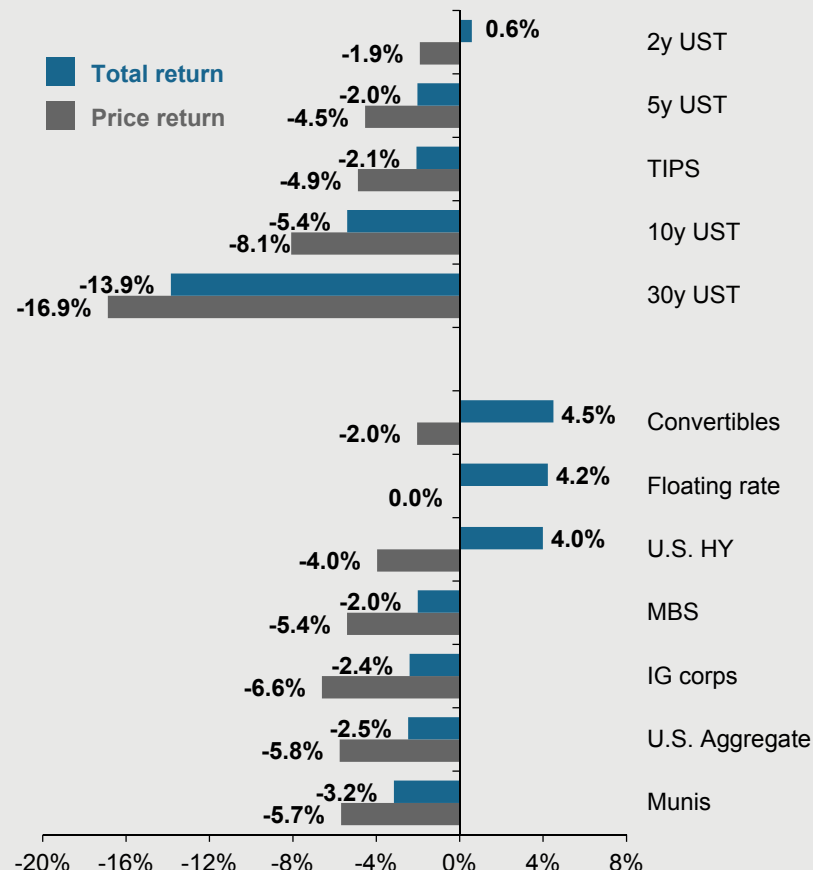
Duration measures the sensitivity of the price of a bond to a change in interest rates. The higher the duration the greater the sensitivity of the bond is to movements in the interest rate. Yield is yield to worst.

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U.S. Treasuries	Yield		Return			
	12/31/2018	12/31/2017	2018	Avg. Maturity	Correlation to 10-year	Correlation to S&P 500
<b>2-Year</b>	2.48%	1.89%	1.40%	2 years	0.72	-0.17
<b>5-Year</b>	2.51%	2.20%	1.42%	5	0.92	-0.23
<b>TIPS</b>	0.98%	0.44%	-1.26%	10	0.62	0.07
<b>10-Year</b>	2.69%	2.40%	0.00%	10	1.00	-0.31
<b>30-Year</b>	3.02%	2.74%	-2.72%	30	0.92	-0.32
<b>Sector</b>						
<b>Convertibles</b>	6.54%	6.35%	-2.03%	-	-0.35	0.88
<b>Floating Rate</b>	4.26%	2.05%	0.92%	3.0	-0.42	0.35
<b>High Yield</b>	7.95%	5.72%	-2.08%	5.8	-0.27	0.63
<b>MBS</b>	3.39%	2.91%	0.99%	7.2	0.77	-0.14
<b>Broad Market</b>	3.28%	2.71%	0.01%	8.2	0.87	-0.06
<b>Corporates</b>	4.20%	3.25%	-2.51%	10.7	0.46	0.23
<b>Municipals</b>	2.53%	2.26%	1.41%	10.0	0.56	-0.13

## Impact of a 1% rise in interest rates

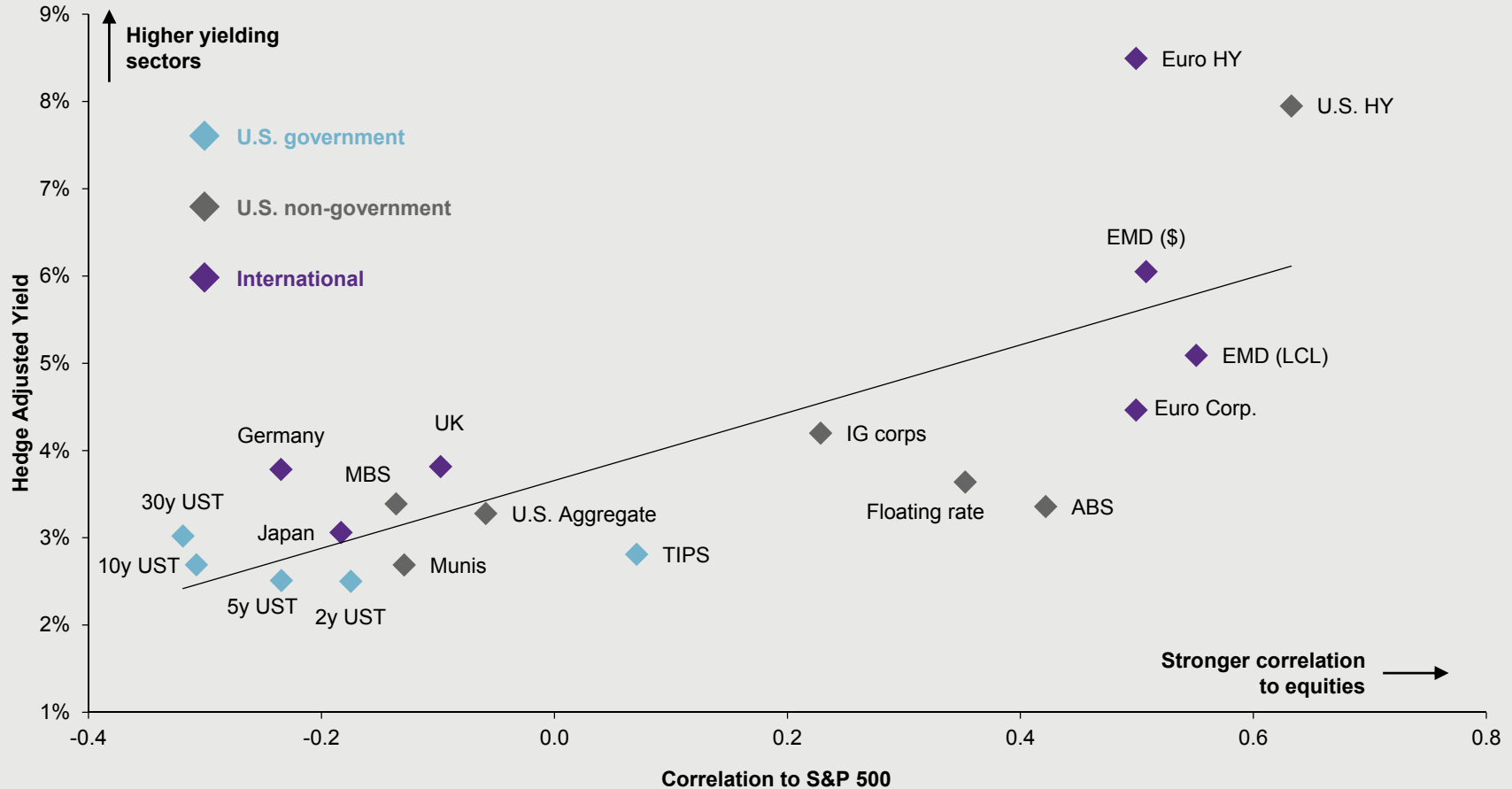
Assumes a parallel shift in the yield curve and steady spreads



Source: Barclays, Bloomberg, FactSet, Standard & Poor's, U.S. Treasury, J.P. Morgan Asset Management. Sectors shown above are provided by Bloomberg and are represented by – Broad Market: U.S. Aggregate; MBS: U.S. Aggregate Securitized - MBS; Corporate: U.S. Corporates; Municipals: Muni Bond 10-year; High Yield: Corporate High Yield; TIPS: Treasury Inflation-Protection Securities (TIPS); Floating Rate: FRN (BBB); Convertibles: U.S. Convertibles Composite. Yield and return information based on bellwethers for Treasury securities. Sector yields reflect yield to worst. Convertibles yield is based on US portion of Bloomberg Barclays Global Convertibles. Correlations are based on 10-years of monthly returns for all sectors. Change in bond price is calculated using both duration and convexity according to the following formula:  $New\ Price = (Price + (Price * -Duration * Change\ in\ Interest\ Rates)) + (0.5 * Price * Convexity * (Change\ in\ Interest\ Rates)^2)$ . Chart is for illustrative purposes only. Past performance is not indicative of future results.

Guide to the Markets – U.S. Data are as of December 31, 2018.

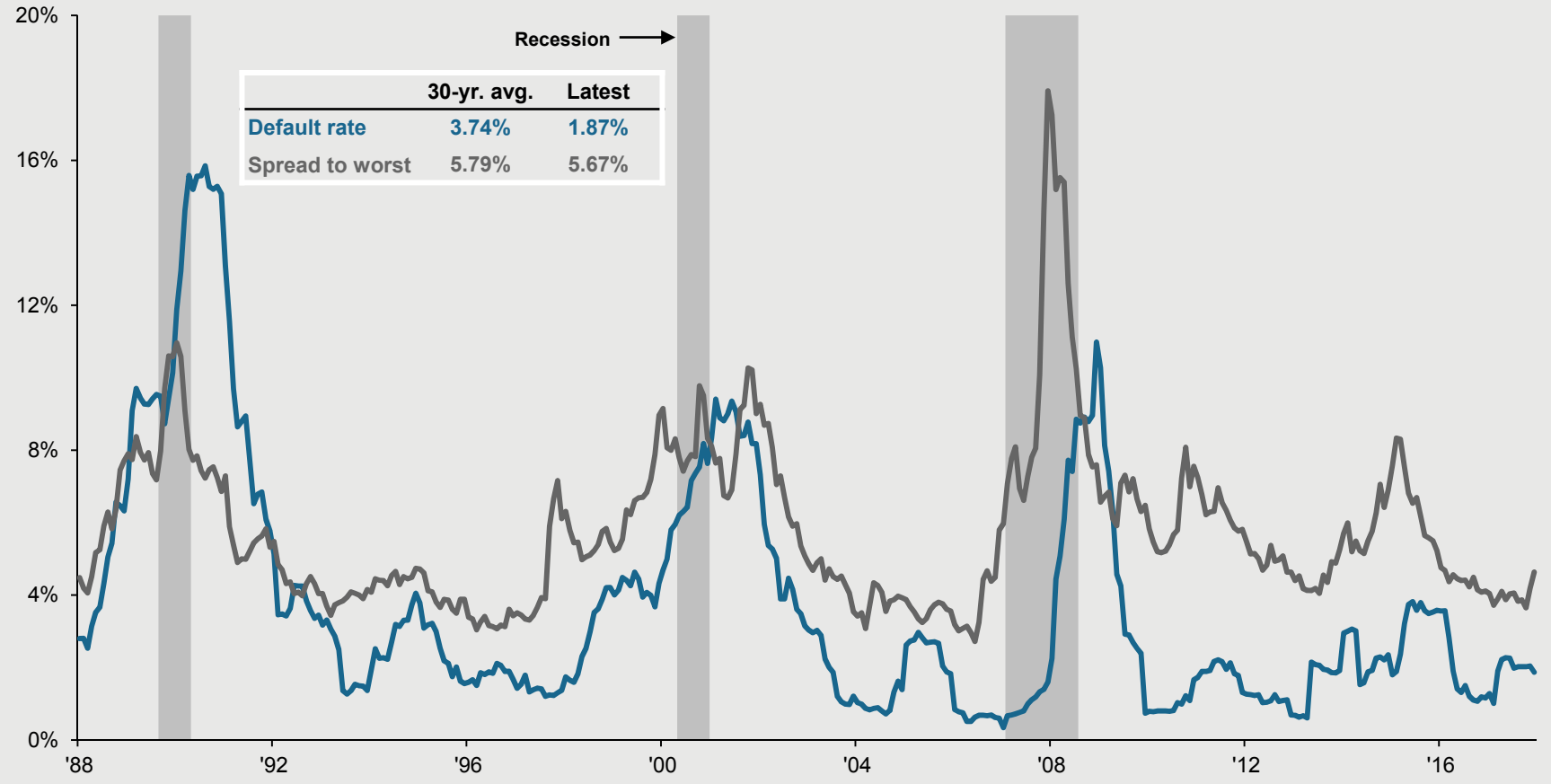
Correlation of fixed income sectors vs. S&P 500 and yields



Source: Bloomberg, FactSet, ICE, J.P. Morgan Asset Management. Sectors shown above are provided by Bloomberg and are represented by – Barclay’s U.S. Aggregate; MBS: U.S. Aggregate Securitized - MBS; IG corps: U.S. Corporates; Municipals: Muni Bond 10-year; U.S. High Yield: Corporate High Yield; TIPS: Treasury Inflation-Protection Securities (TIPS); Floating Rate: FRN (BBB); Convertibles: U.S. Convertibles Composite; EMD (\$): Barclay’s EM USD Aggregate; EMD (LCL): Barclay’s EM Local Currency Government Index; European Corporates: Bloomberg Barclays Euro Aggregate Corporate Index; Euro HY: Bloomberg Barclays Pan-European High Yield index. Country yields are represented by the global aggregate for each country except where noted. Yield and return information based on bellwethers for Treasury securities. Correlations are based on 10-years of monthly returns for all sectors. International fixed income sector correlations are in hedged U.S. dollar returns except EMD local index. Yields for all indices are in hedged returns using three-month LIBOR rates between the U.S. and international LIBOR. Guide to the Markets – U.S. Data are as of December 31, 2018.

## Default rate and spread to worst

Percent



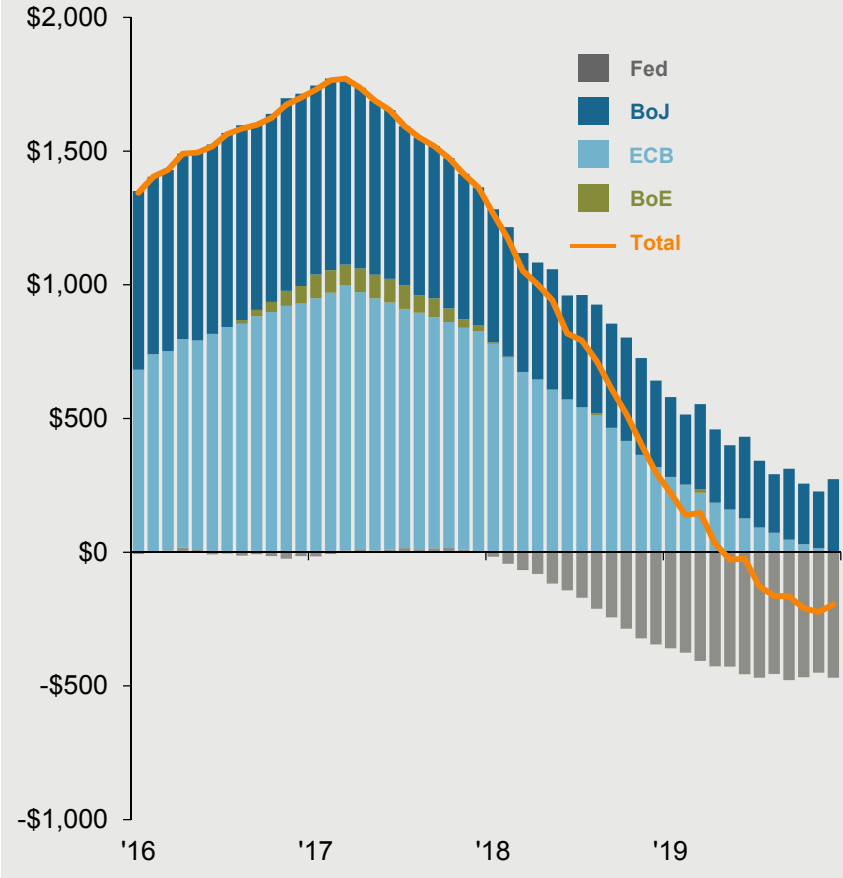
Source: J.P. Morgan Global Economic Research, J.P. Morgan Asset Management.

Default rates are defined as the par value percentage of the total market trading at or below 50% of par value and include any Chapter 11 filing, prepackaged filing or missed interest payments. Spreads indicated are benchmark yield to worst less comparable maturity Treasury yields. Yield to worst is defined as the lowest potential yield that can be received on a bond without the issuer actually defaulting and reflects the possibility of the bond being called at an unfavorable time for the holder. High yield is represented by the J.P. Morgan Domestic High Yield Index.

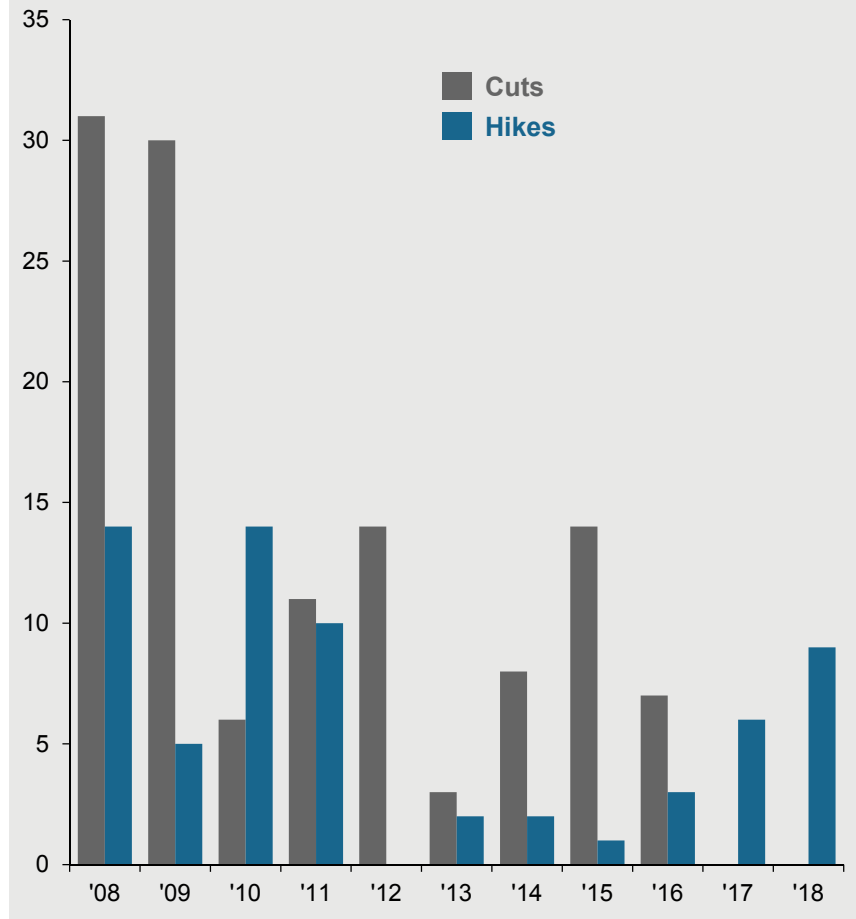
Guide to the Markets – U.S. Data are as of December 31, 2018.

## Global central bank balance sheet expansion\*

USD billions, 12-month rolling flow



## Number of rate changes by top-10 DM central banks\*\*



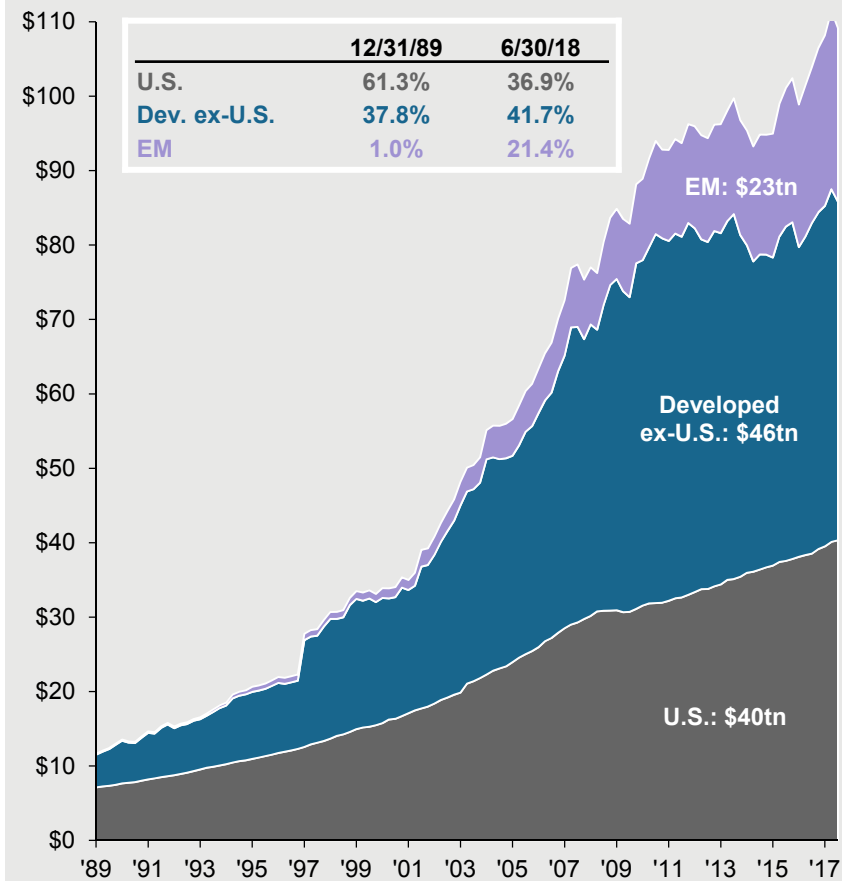
Source: J.P. Morgan Asset Management; (Left) Bank of England, Bank of Japan, European Central Bank, FactSet, Federal Reserve System, J.P. Morgan Global Economic Research; (Right) Bloomberg. \*Includes the Bank of Japan (BoJ), Bank of England (BoE), European Central Bank (ECB) and Federal Reserve. Balance sheet expansion assumes no more quantitative easing (QE) from BoE; tapering of ECB from 30bn to 15bn EUR in October 2018 and 0 in January 2019; tapering of BoJ QE to 20trn JPY ann. for the remainder of 2018 and 2019; and tapering of Fed QE per the September 2017 FOMC statement, incorporating a maturity schedule. \*\*Including: Australia, Canada, Denmark, Eurozone, Japan, Norway, Sweden, Switzerland, UK and U.S.

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Aggregates	Yield		2018 Return			
	12/31/2018	12/31/2017	Local	USD	Duration	Correl to 10-year
<b>U.S.</b>	3.28%	2.71%	0.01%	0.01%	5.9 years	0.87
<b>Gbl. ex-U.S.</b>	1.26%	1.03%	-	-1.90%	7.6	0.30
<b>Japan</b>	0.18%	0.20%	0.82%	3.51%	9.3	0.48
<b>Germany</b>	0.62%	0.46%	1.56%	-3.32%	6.3	0.12
<b>UK</b>	1.92%	1.49%	0.40%	-5.48%	10.1	0.21
<b>Italy</b>	2.00%	1.25%	-1.51%	-6.23%	6.4	-0.03
<b>Spain</b>	0.98%	0.90%	1.97%	-2.93%	6.8	-0.01
<b>Sector</b>						
<b>Euro Corp.</b>	1.30%	0.75%	-1.25%	-5.99%	5.0 years	0.15
<b>Euro HY</b>	5.33%	3.32%	-3.59%	-8.22%	4.1	-0.33
<b>EMD (\$)</b>	6.86%	5.26%	-	-4.26%	6.3	0.17
<b>EMD (LCL)</b>	6.46%	6.14%	3.18%	-6.21%	5.1	0.04
<b>EM Corp.</b>	6.14%	4.53%	-	-1.65%	5.3	-0.04

## Global bond market

USD trillions



Source: J.P. Morgan Asset Management; (Left) Barclays, Bloomberg, FactSet; (Right) BIS.  
 Fixed income sectors shown above are provided by Bloomberg and are represented by the global aggregate for each country except where noted. EMD sectors are represented by the J.P. Morgan EMBIG Diversified Index (USD), the J.P. Morgan GBI EM Global Diversified Index (LCL) and the J.P. Morgan CEMBI Broad Diversified Index (Corp). European Corporates are represented by the Bloomberg Barclays Euro Aggregate Corporate Index and the Bloomberg Barclays Pan-European High Yield index. Sector yields reflect yield to worst. Correlations are based on 10 years of monthly returns for all sectors. Past performance is not indicative of future results. Global bond market regional breakdown may not sum to 100% due to rounding.

Guide to the Markets – U.S. Data are as of December 31, 2018.

# Fixed income sector returns

GTM - U.S. | 40

Fixed income

										2009 - 2018	
2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Ann.	Vol.
High Yield 58.2%	EMD USD 15.7%	TIPS 13.6%	EMD LCL. 17.4%	High Yield 7.4%	Muni 8.7%	Muni 3.8%	High Yield 17.1%	EMD USD 15.2%	Muni 1.4%	High Yield 11.1%	High Yield 17.8%
EMD LCL. 29.8%	High Yield 15.1%	Muni 12.3%	EMD USD 16.8%	MBS -1.4%	Corp. 7.5%	MBS 1.5%	EMD LCL. 10.2%	EMD LCL. 10.3%	MBS 1.0%	EMD LCL. 8.2%	EMD USD 13.1%
EMD USD 22.0%	EMD LCL. 12.2%	Treas. 9.8%	High Yield 15.8%	Corp. -1.5%	EMD LCL. 7.4%	EMD LCL. 1.2%	EMD USD 9.9%	High Yield 7.5%	Treas. 0.9%	Corp. 5.9%	EMD LCL. 10.3%
Corp. 18.7%	Corp. 9.0%	Corp. 8.1%	Corp. 9.8%	Asset Alloc. -1.9%	MBS 6.1%	Treas. 0.8%	Corp. 6.1%	Corp. 6.4%	Barclays Agg 0.0%	Asset Alloc. 5.0%	TIPS 6.5%
Asset Alloc. 14.7%	Asset Alloc. 7.9%	Asset Alloc. 8.1%	Asset Alloc. 7.4%	Barclays Agg -2.0%	Barclays Agg 6.0%	Barclays Agg 0.5%	Asset Alloc. 4.7%	Muni 5.8%	Asset Alloc. -0.7%	Muni 4.8%	Corp. 6.4%
TIPS 11.4%	Barclays Agg 6.5%	Barclays Agg 7.8%	TIPS 7.0%	Muni -2.2%	Asset Alloc. 5.5%	Asset Alloc. -0.3%	TIPS 4.7%	Asset Alloc. 5.3%	TIPS -1.3%	TIPS 3.6%	Asset Alloc. 5.0%
Muni 9.9%	TIPS 6.3%	EMD LCL. 7.3%	Muni 5.7%	Treas. -2.7%	Treas. 5.1%	Corp. -0.7%	Barclays Agg 2.6%	Barclays Agg 3.5%	High Yield -2.1%	Barclays Agg 3.5%	Muni 4.5%
Barclays Agg 5.9%	Treas. 5.9%	MBS 6.2%	Barclays Agg 4.2%	EMD LCL. -5.3%	TIPS 3.6%	TIPS -1.4%	MBS 1.7%	TIPS 3.0%	Corp. -2.5%	EMD USD 3.5%	Treas. 4.0%
MBS 5.9%	MBS 5.4%	High Yield 5.0%	MBS 2.6%	TIPS -8.6%	High Yield 2.5%	High Yield -4.5%	Treas. 1.0%	MBS 2.5%	EMD LCL. -4.3%	MBS 3.1%	Barclays Agg 3.2%
Treas. -3.6%	Muni 4.0%	EMD USD -1.8%	Treas. 2.0%	EMD USD -9.0%	EMD USD -5.7%	EMD USD -14.9%	Muni -0.1%	Treas. 2.3%	EMD USD -6.2%	Treas. 2.1%	MBS 2.6%

Source: Barclays, Bloomberg, FactSet, J.P. Morgan Global Economic Research, J.P. Morgan Asset Management.

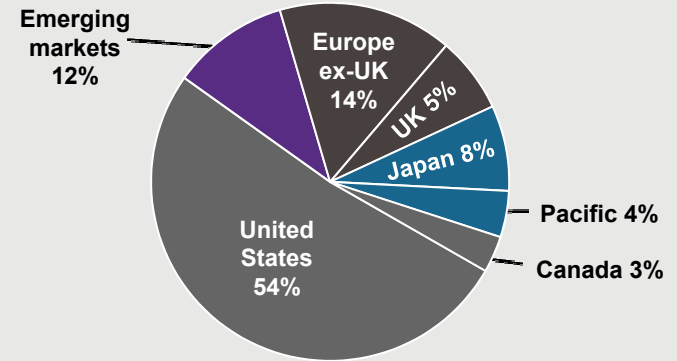
Past performance is not indicative of future returns. Fixed income sectors shown above are provided by Bloomberg unless otherwise noted and are represented by Broad Market: Bloomberg Barclays U.S. Aggregate Index; MBS: Bloomberg Barclays US Aggregate Securitized - MBS Index; Corporate: Bloomberg Barclays U.S. Aggregate Credit - Corporates - Investment Grade; Municipals: Bloomberg Barclays Municipal Bond 10-Year Index; High Yield: Bloomberg Barclays U.S. Aggregate Credit - Corporate - High Yield Index; Treasuries: Bloomberg Barclays Global U.S. Treasury; TIPS: Bloomberg Barclays Global Inflation-Linked - U.S. TIPS; Emerging Debt USD: J.P. Morgan EMBIG Diversified Index; Emerging Debt LCL: J.P. Morgan EM Global Index. The "Asset Allocation" portfolio assumes the following weights: 20% in MBS, 20% in Corporate, 15% in Municipals, 5% in Emerging Debt USD, 5% in Emerging Debt LCL, 10% in High Yield, 20% in Treasuries, 5% in TIPS. Asset allocation portfolio assumes annual rebalancing.  
Guide to the Markets - U.S. Data are as of December 31, 2018.



Returns	2018		2017		15-years	
	Local	USD	Local	USD	Ann.	Beta
<b>Regions</b>						
U.S. (S&P 500)	-	-4.4	-	21.8	7.8	0.86
AC World ex-U.S.	-10.2	-13.8	18.8	27.8	5.7	1.11
EAFE	-10.5	-13.4	15.8	25.6	5.2	1.07
Europe ex-UK	-10.6	-14.4	14.5	27.8	5.7	1.22
Emerging markets	-9.7	-14.2	31.0	37.8	8.3	1.28
<b>Selected Countries</b>						
United Kingdom	-8.8	-14.1	11.8	22.4	4.1	1.01
France	-7.5	-11.9	14.1	29.9	5.4	1.23
Germany	-17.7	-21.6	12.9	28.5	6.1	1.34
Japan	-14.9	-12.6	20.1	24.4	4.0	0.76
China	-18.6	-18.7	55.3	54.3	9.9	1.25
India	1.4	-7.3	30.5	38.8	10.0	1.37
Brazil	16.7	-0.1	26.9	24.5	10.0	1.51
Russia	17.8	0.2	1.2	6.1	4.8	1.54

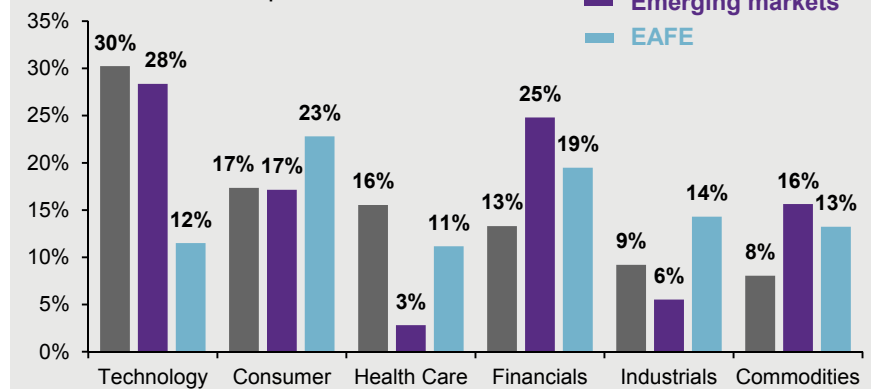
## Weights in MSCI All Country World Index

% global market capitalization, float adjusted



## Global equities by sector

% of index market capitalization



Source: FactSet, Federal Reserve, MSCI, Standard & Poor's, J.P. Morgan Asset Management.

All return values are MSCI Gross Index (official) data. 15-year history based on U.S. dollar returns. 15-year return and beta figures are calculated for the time period 12/31/03-12/31/18. Beta is for monthly returns relative to the MSCI AC World Index. Chart is for illustrative purposes only. Please see disclosure page for index definitions. Past performance is not a reliable indicator of current and future results.

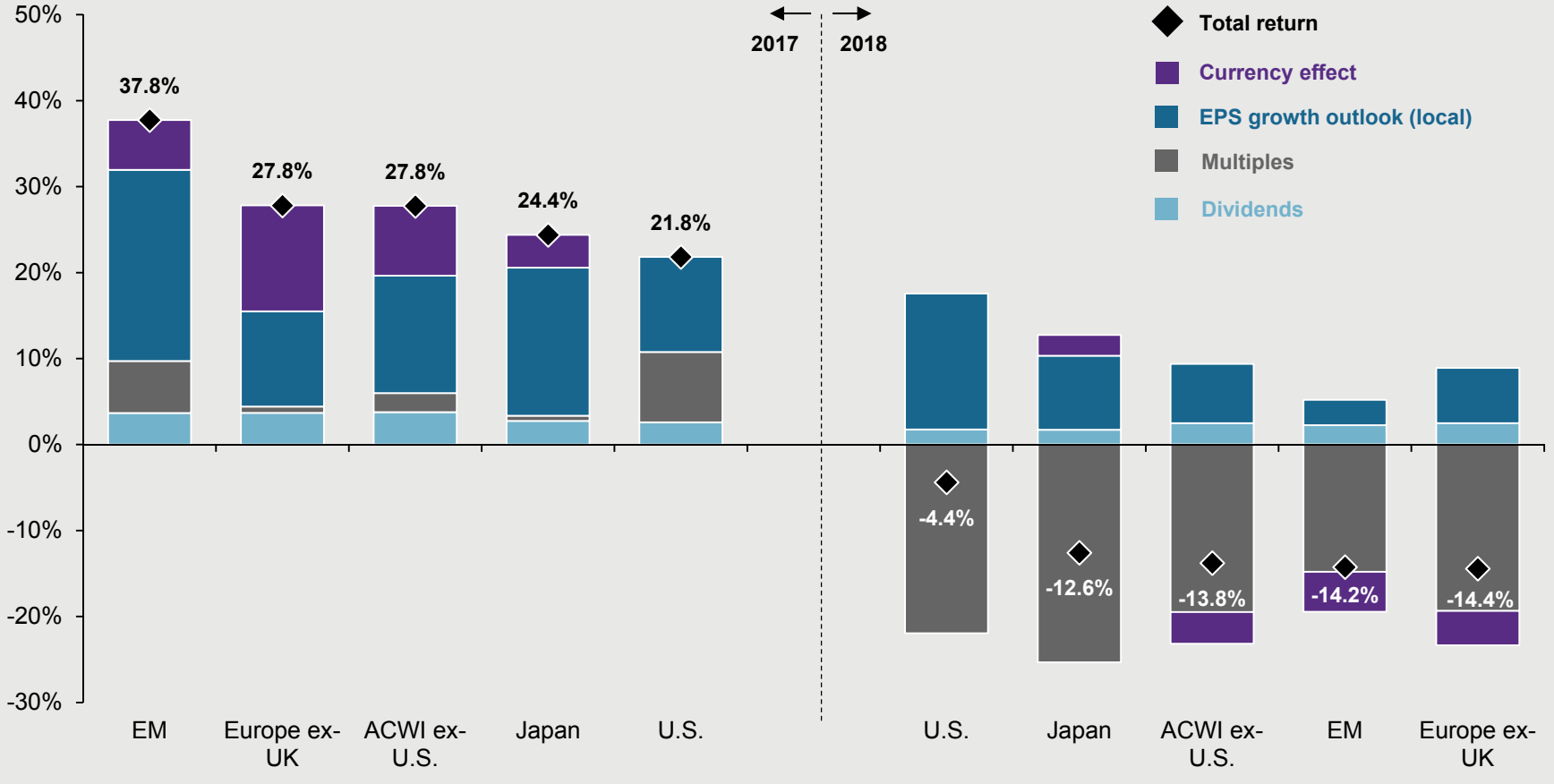
Sector breakdown includes the following aggregates: Technology (communication services and technology), consumer (consumer discretionary and staples), and commodities (energy and materials). The graph excludes the utilities and real estate sectors for illustrative purposes.

Guide to the Markets – U.S. Data are as of December 31, 2018.

International

## Sources of global equity returns\*

Total return, USD



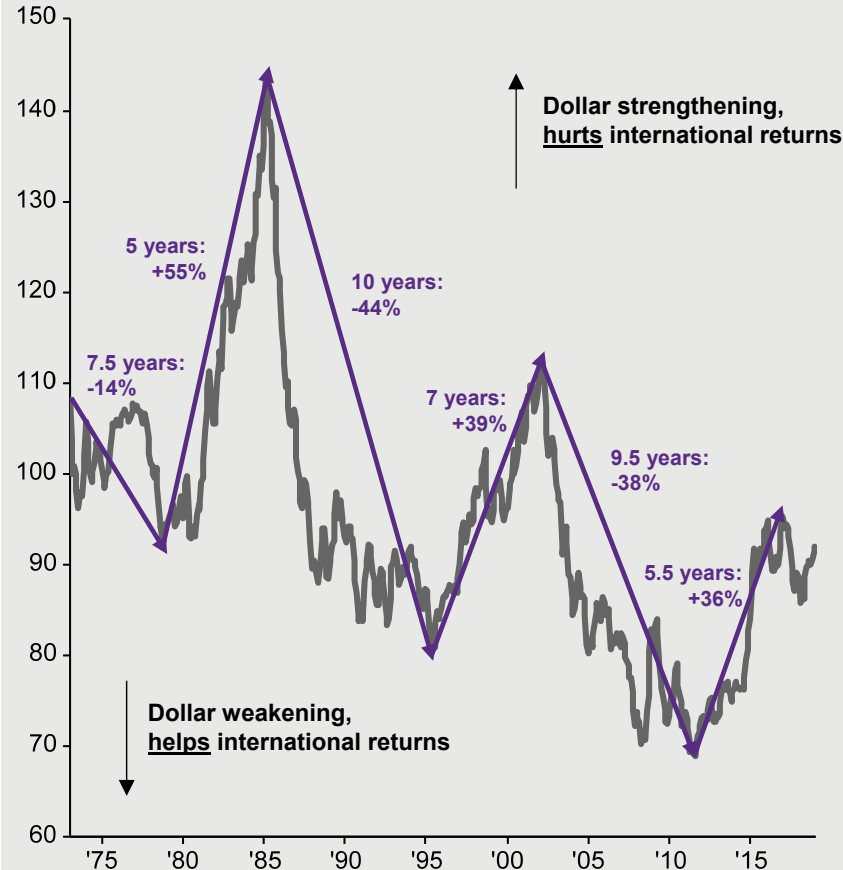
Source: FactSet, MSCI, Standard & Poor's, J.P. Morgan Asset Management.

All return values are MSCI Gross Index (official) data, except the U.S., which is the S&P 500. \*Multiple expansion is based on the forward P/E ratio and EPS growth outlook is based on NTMA earnings estimates. Chart is for illustrative purposes only. Past performance is not indicative of future results.

Guide to the Markets – U.S. Data are as of December 31, 2018.

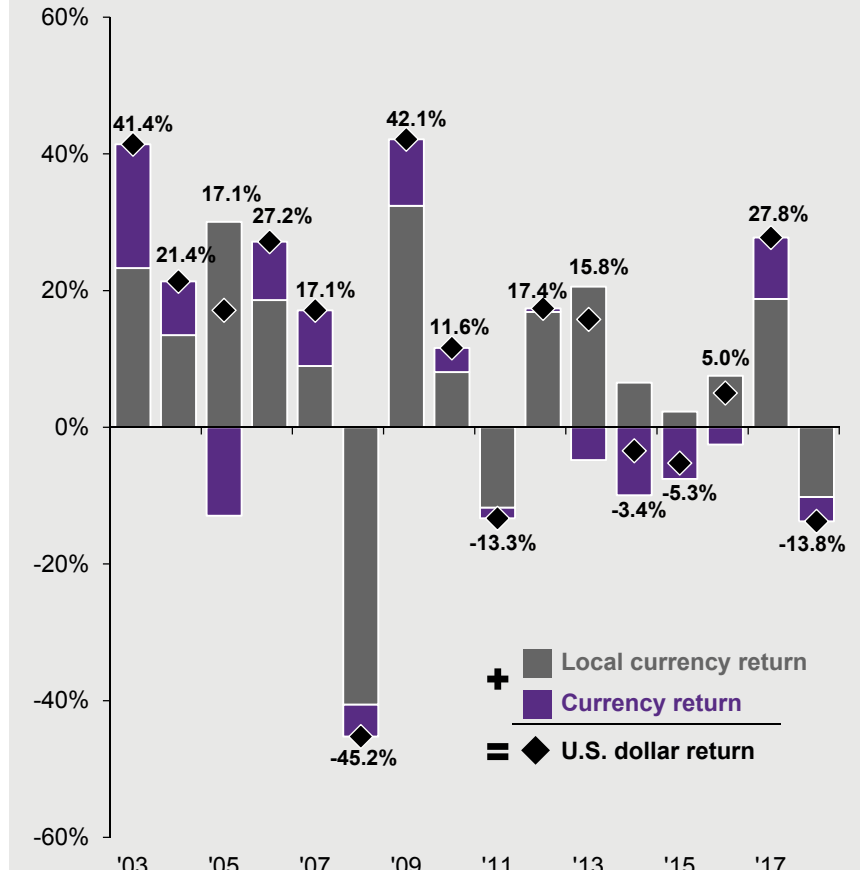
## U.S. dollar in historical perspective

Index level, nom. major trade-weighted exchange rate, Mar. 1973=100



## Currency impact on international returns

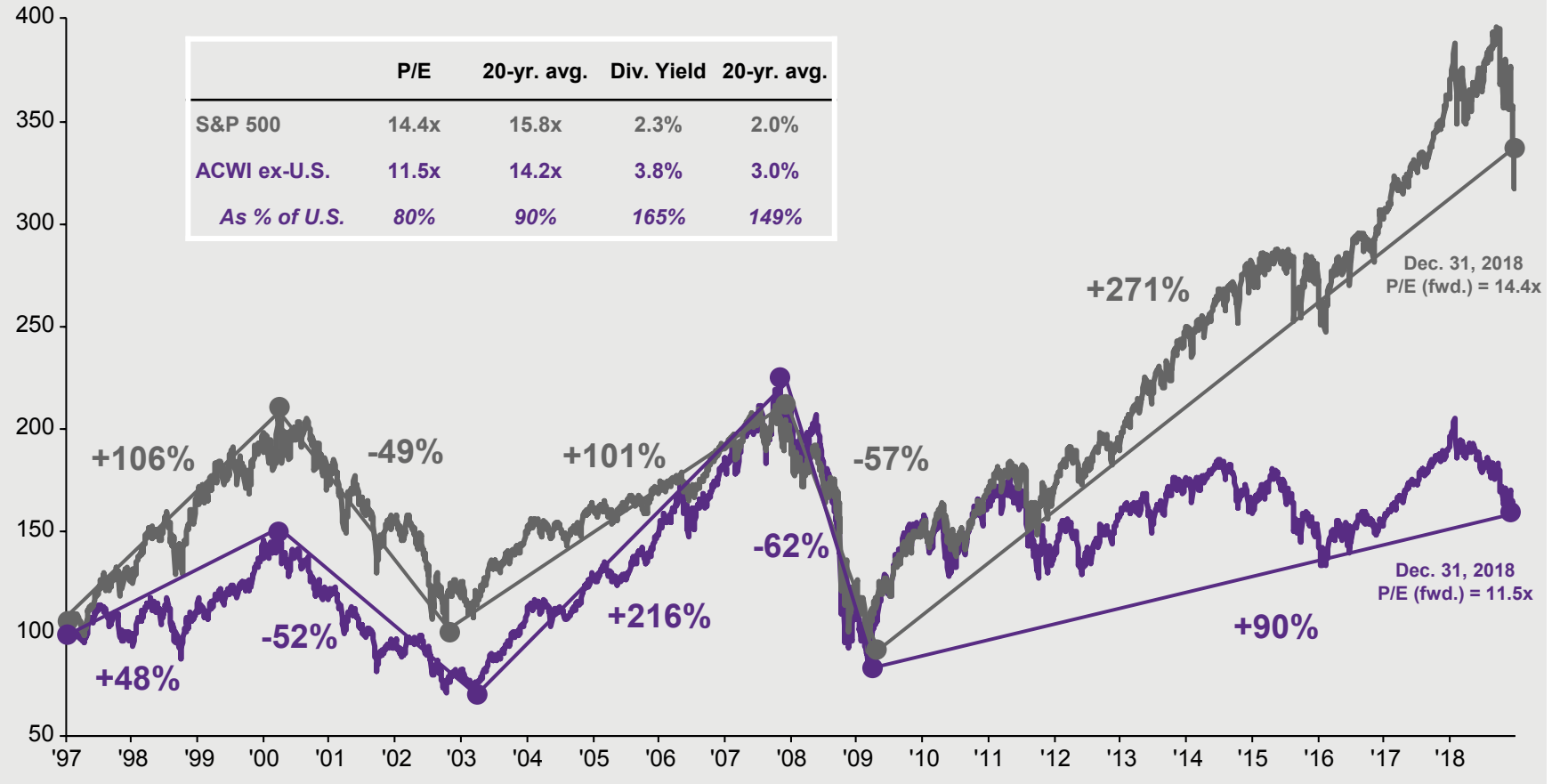
MSCI All Country World ex-U.S. Index, total return



Source: FactSet, J.P. Morgan Asset Management; (Left) Federal Reserve; (Right) MSCI. Currencies in the nominal major trade-weighted U.S. dollar index are: Australian dollar, British pound, Canadian dollar, euro, Japanese yen, Swedish krona and Swiss franc. Past performance is not a reliable indicator of current and future results. *Guide to the Markets – U.S.* Data are as of December 31, 2018.

## MSCI All Country World ex-U.S. and S&P 500 Indices

Dec. 1996 = 100, U.S. dollar, price return

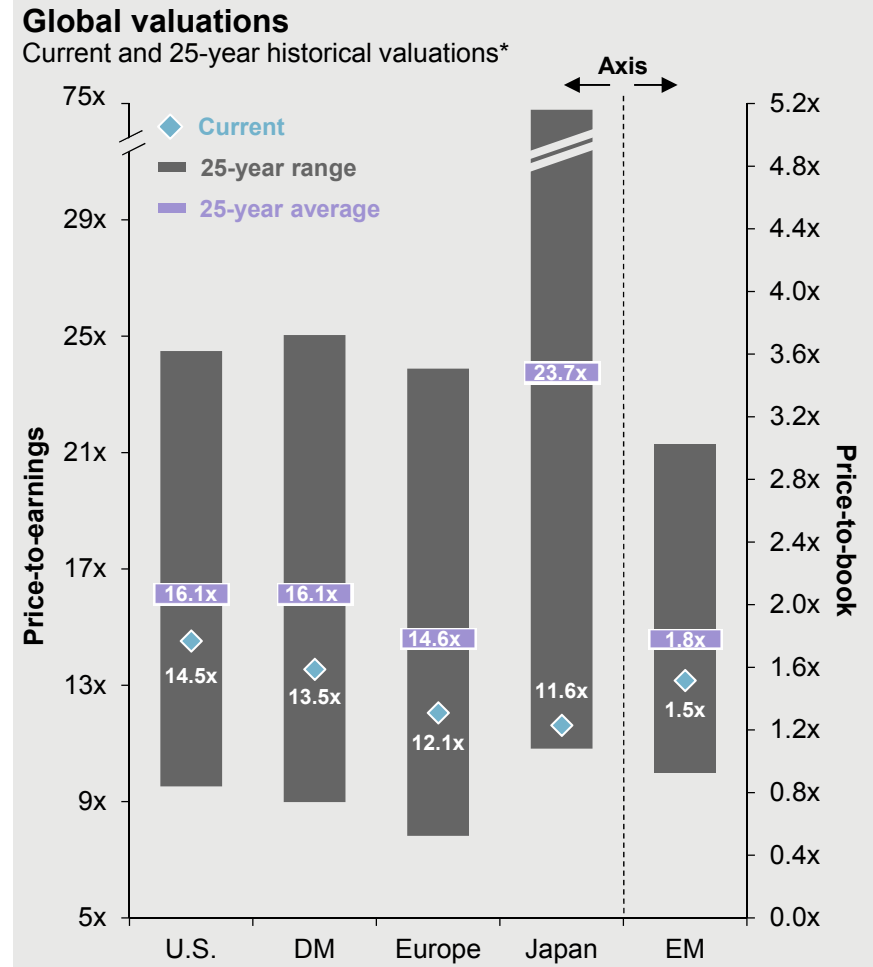
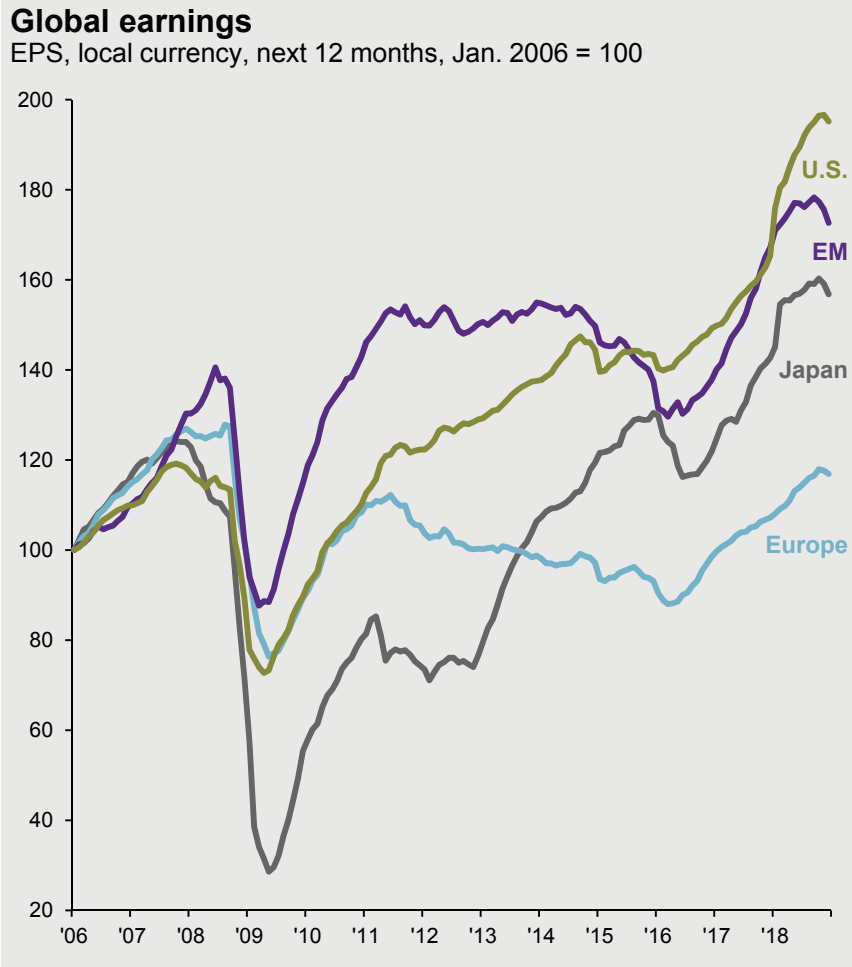


International

Source: FactSet, MSCI, Standard & Poor's, J.P. Morgan Asset Management.

Forward price to earnings ratio is a bottom-up calculation based on the most recent index price, divided by consensus estimates for earnings in the next 12 months (NTM), and is provided by FactSet Market Aggregates. Returns are cumulative and based on price movement only, and do not include the reinvestment of dividends. Dividend yield is calculated as consensus estimates of dividends for the next 12 months, divided by most recent price, as provided by FactSet Market Aggregates. Past performance is not a reliable indicator of current and future results.

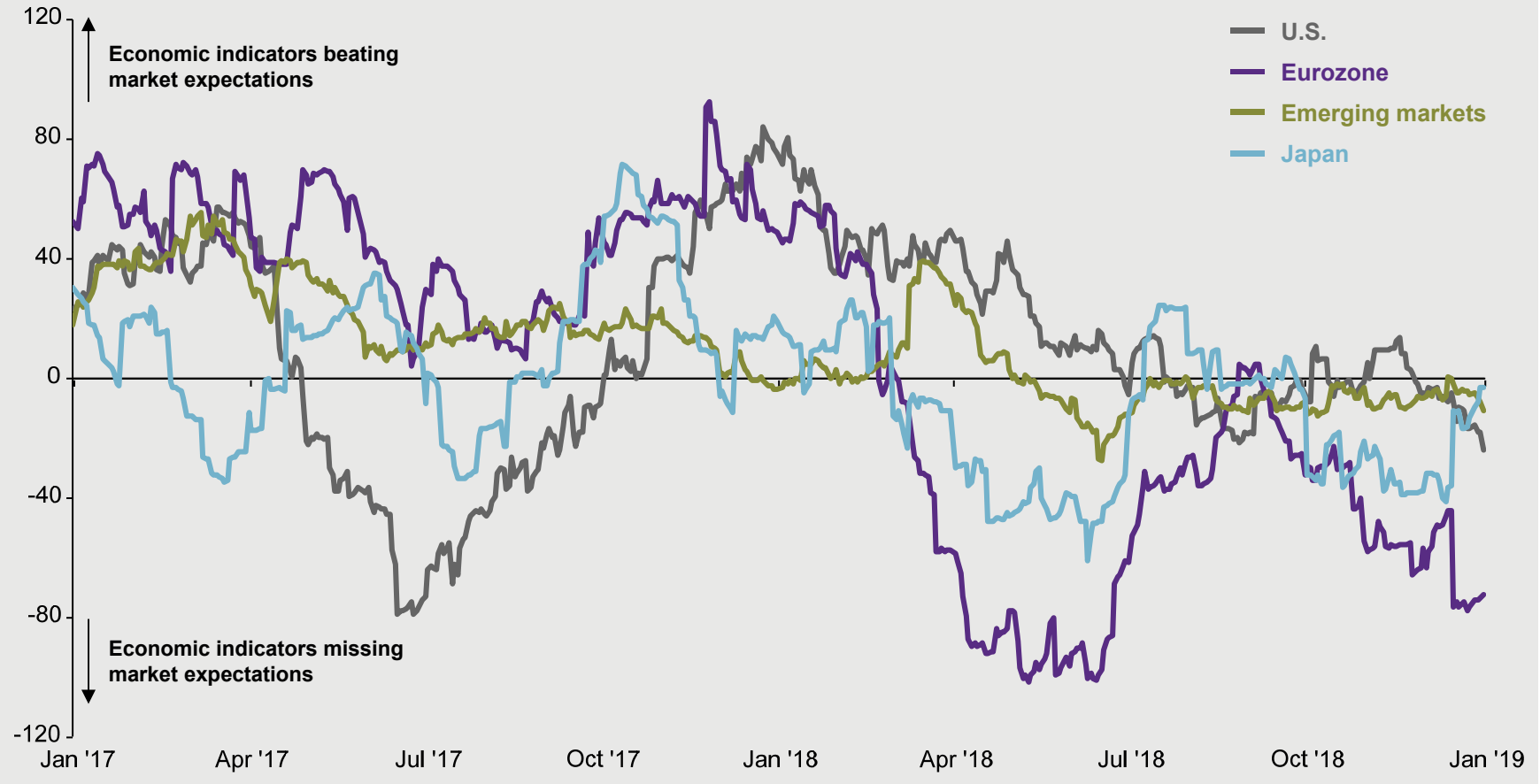
Guide to the Markets – U.S. Data are as of December 31, 2018.



Source: FactSet, MSCI, Standard & Poor's, Thomson Reuters, J.P. Morgan Asset Management.  
 \*Valuations refer to NTMA P/E for Europe, U.S., Japan and developed markets and P/B for emerging markets. Valuation and earnings charts use MSCI indices for all regions/countries, except for the U.S., which is the S&P 500. All indices use IBES aggregate earnings estimates, which may differ from earnings estimates used elsewhere in the book. MSCI Europe includes the eurozone as well as countries not in the currency bloc, such as Norway, Sweden, Switzerland and the UK (which collectively make up 47% of the overall index). Past performance is not a reliable indicator of current and future results.  
 Guide to the Markets – U.S. Data are as of December 31, 2018.

**Growth surprises**

Citi Economic Surprise Indices by region

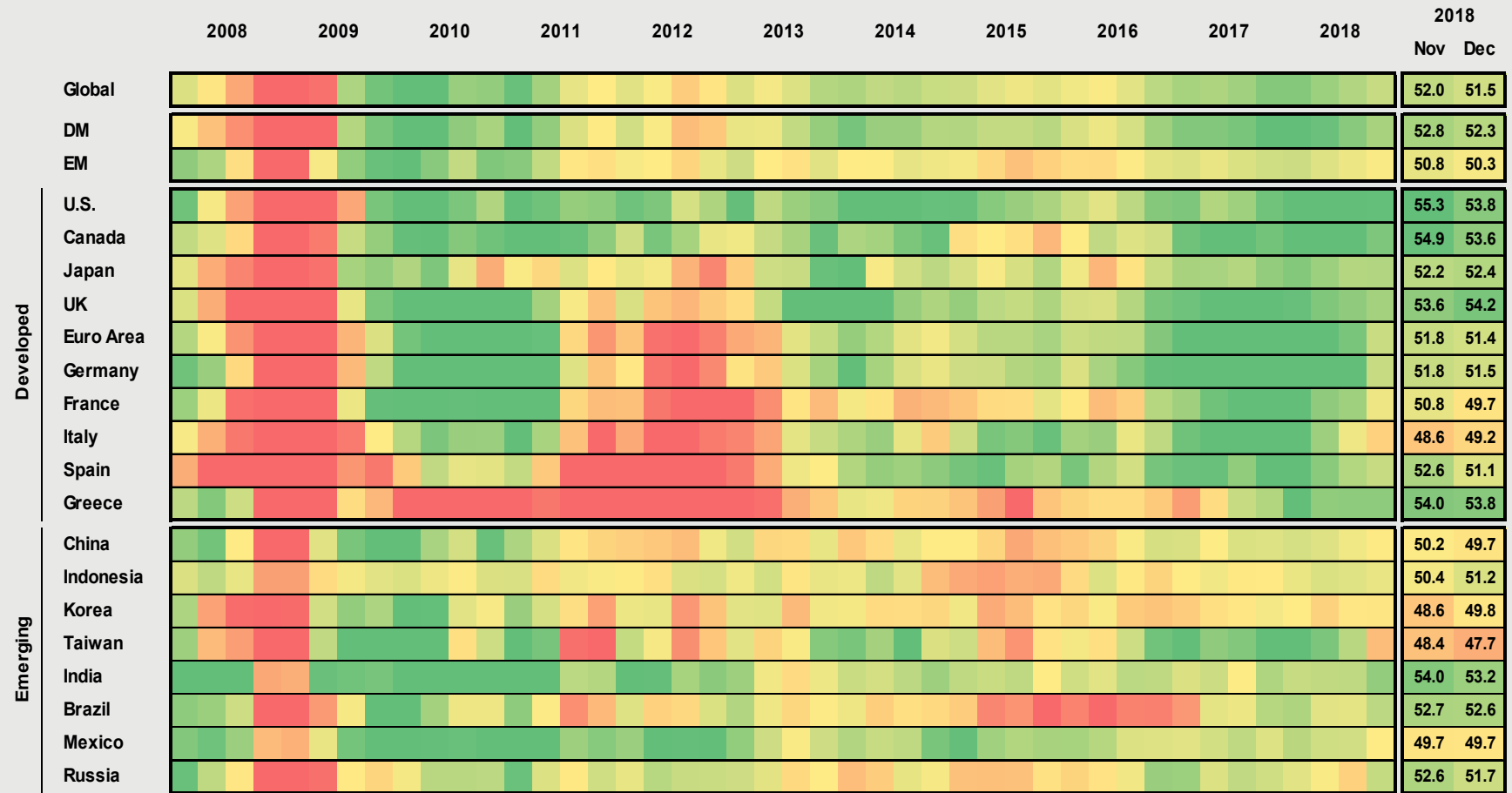


Source: Citi, FactSet, J.P. Morgan Asset Management.

The Citi Economic Surprise Index is a 90-day weighted moving average of surprises in economic indicators relative to consensus. A positive reading means that the data releases have been stronger than expected and a negative reading means that the data releases have been worse than expected.

Guide to the Markets – U.S. Data are as of December 31, 2018.

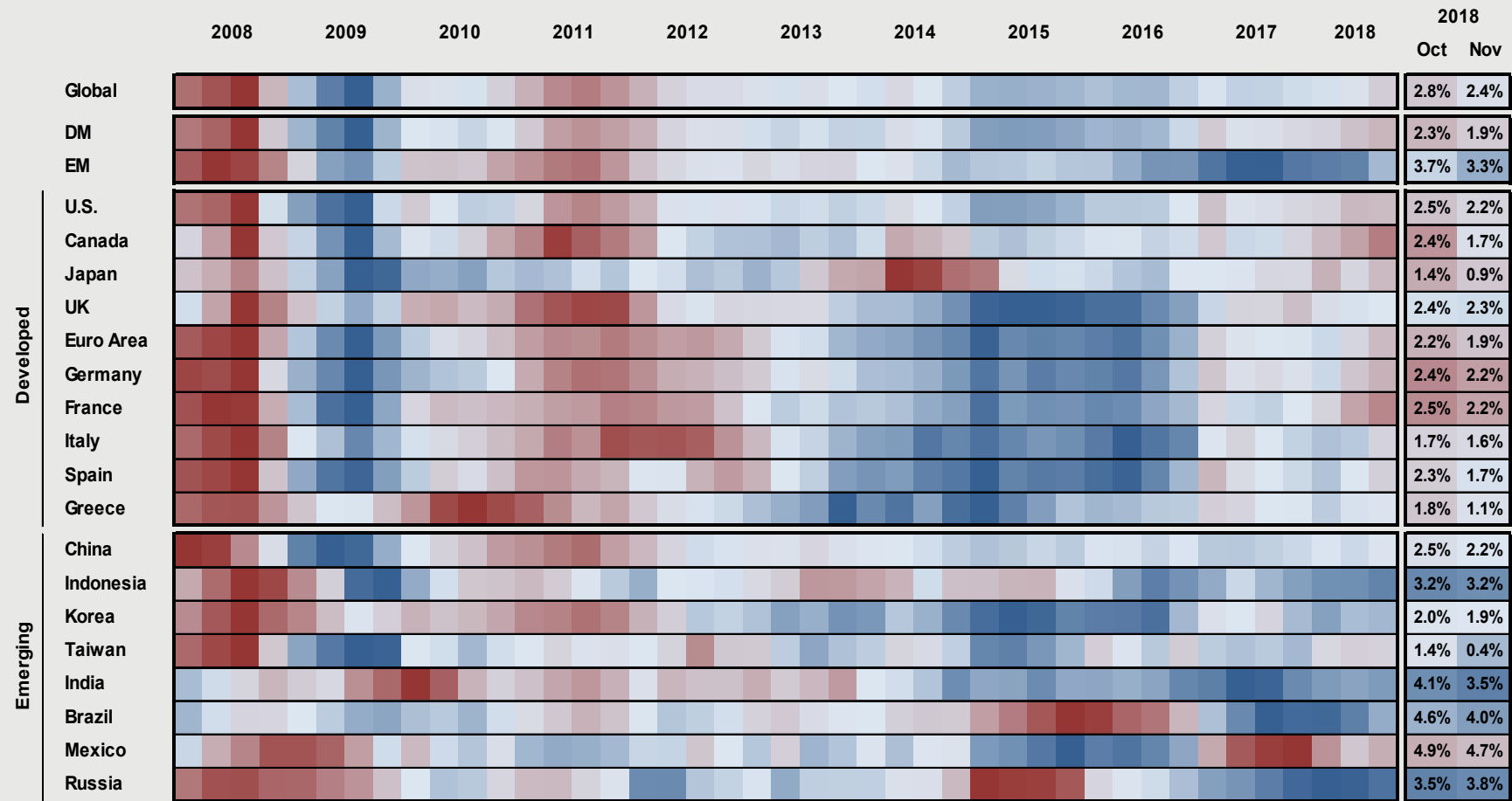
## Global Purchasing Managers' Index for manufacturing, quarterly



Source: Markit, J.P. Morgan Asset Management.

Heatmap colors are based on PMI relative to the 50 level, which indicates acceleration or deceleration of the sector, for the time period shown. Heat map is based on quarterly averages, with the exception of the two most recent figures, which are single month readings. Data for Canada, Indonesia and Mexico are back-tested and filled in from December 2007 to November 2010 for Canada and May 2011 for Indonesia and Mexico due to lack of existing PMI figures for these countries. DM and EM represent developed markets and emerging markets, respectively. *Guide to the Markets – U.S.* Data are as of December 31, 2018.

## Year-over-year headline inflation by country and region, quarterly

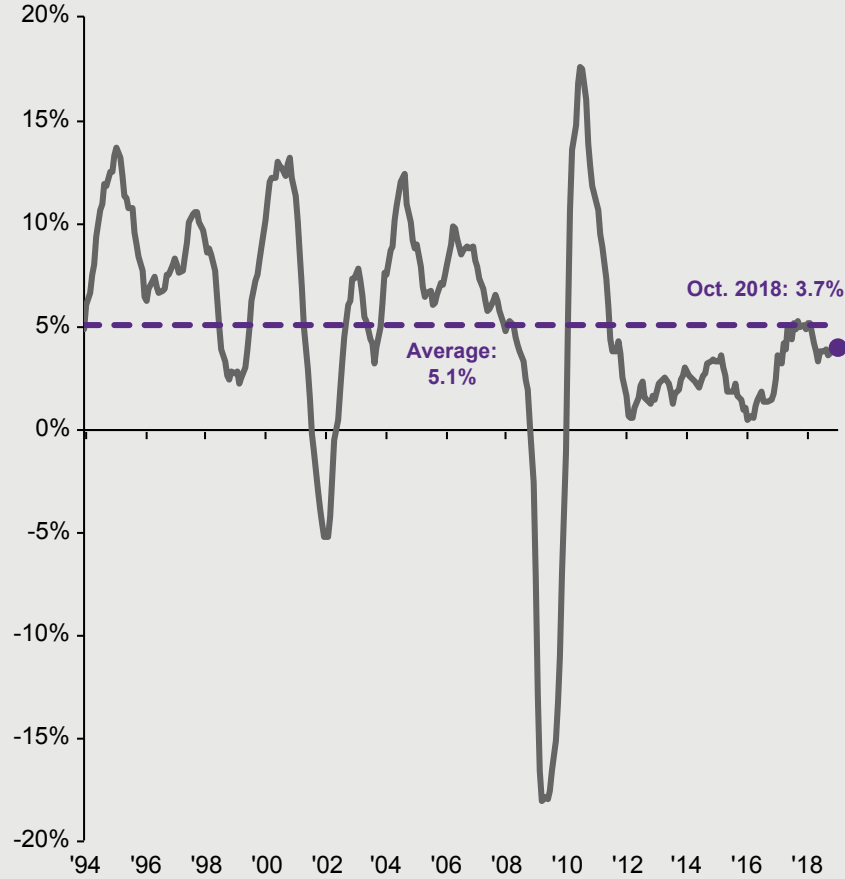


Source: Bank of Mexico, DGBAS, Eurostat, FactSet, Federal Reserve, Goskomstat of Russia, IBGE, India Ministry of Statistics & Programme Implementation, Japan Ministry of Internal Affairs & Communications, Korean National Statistical Office, Melbourne Institute, National Bureau of Statistics China, Statistics Canada, Statistics Indonesia, UK Office for National Statistics (ONS), J.P. Morgan Asset Management. Heatmap is based on quarterly averages, with the exception of the two most recent figures, which are single month readings. Colors are based on z-score of year-over-year inflation rate relative to 10-year history. DM and EM represent developed markets and emerging markets, respectively. *Guide to the Markets – U.S.* Data are as of December 31, 2018.



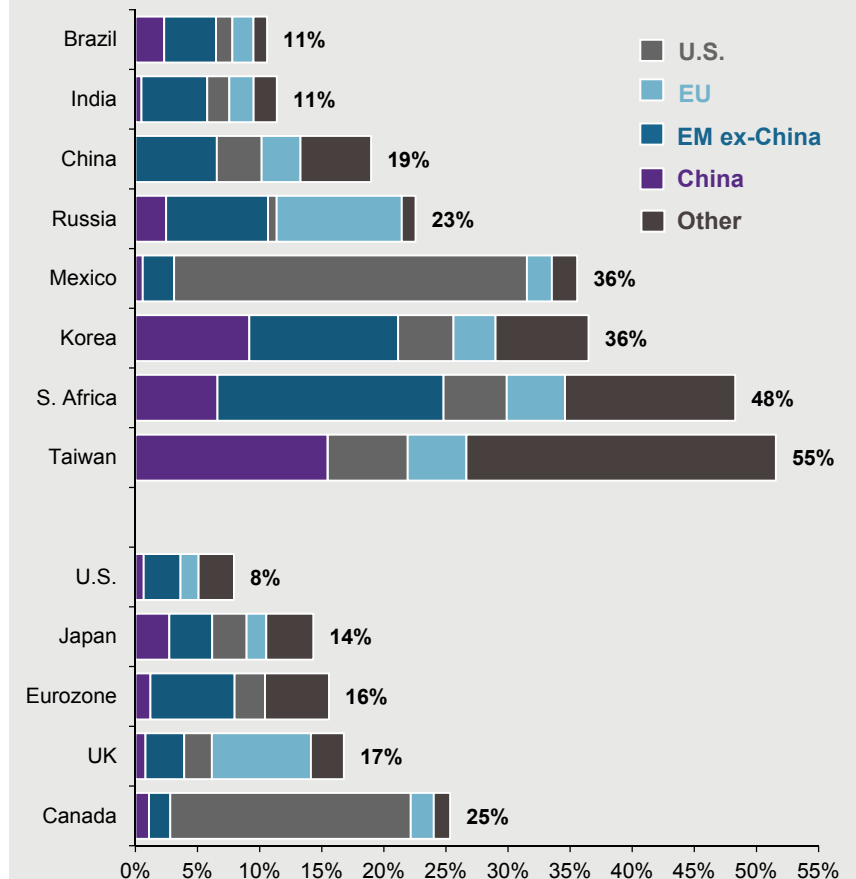
**World trade volume**

Year-over-year, % change, 3-month moving average, monthly



**Exports as a share of GDP**

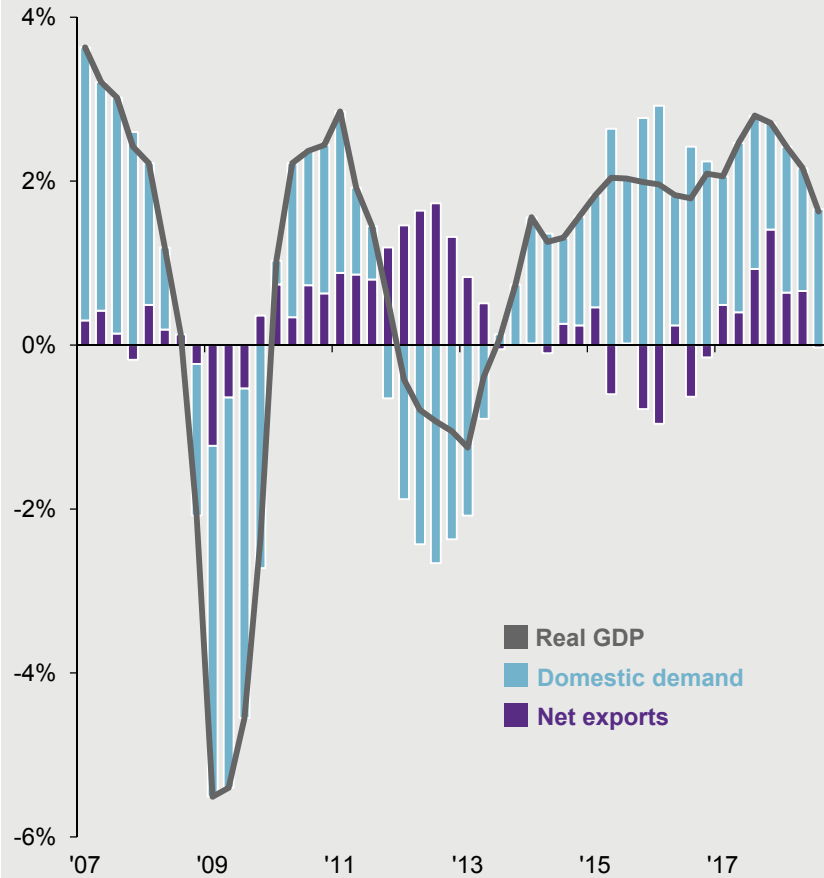
Goods exports, 2017



Source: FactSet, J.P. Morgan Asset Management; (Left) CPB Netherlands Bureau for Economic Policy Analysis; (Right) IMF. Guide to the Markets – U.S. Data are as of December 31, 2018.

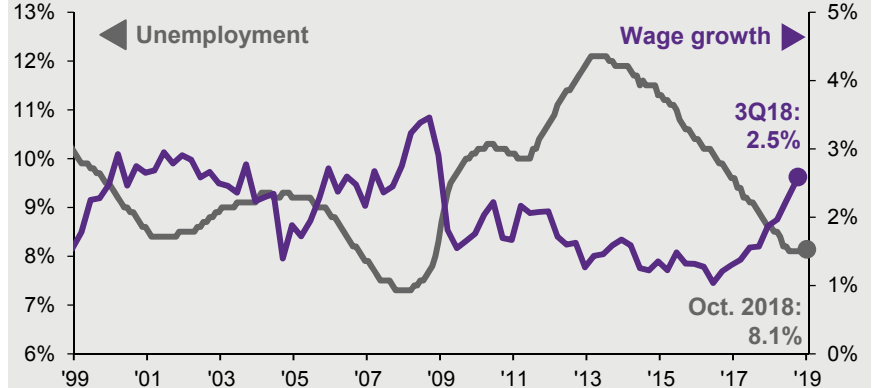
### Eurozone GDP growth

Contribution to eurozone real GDP growth, % change year-over-year



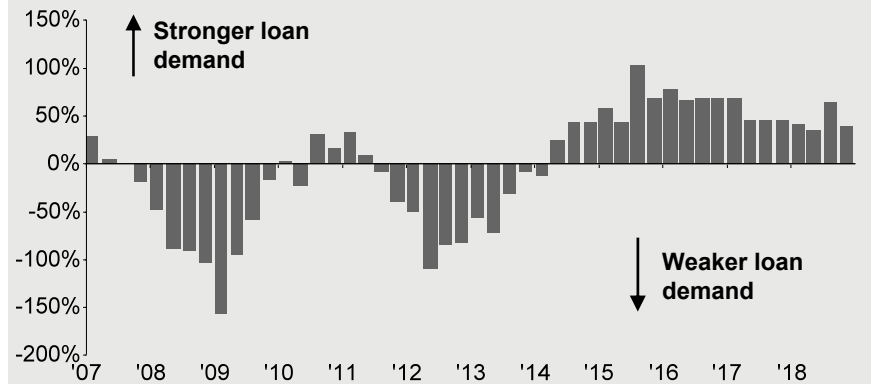
### Eurozone unemployment and wage growth

Seasonally adjusted, year-over-year compensation growth

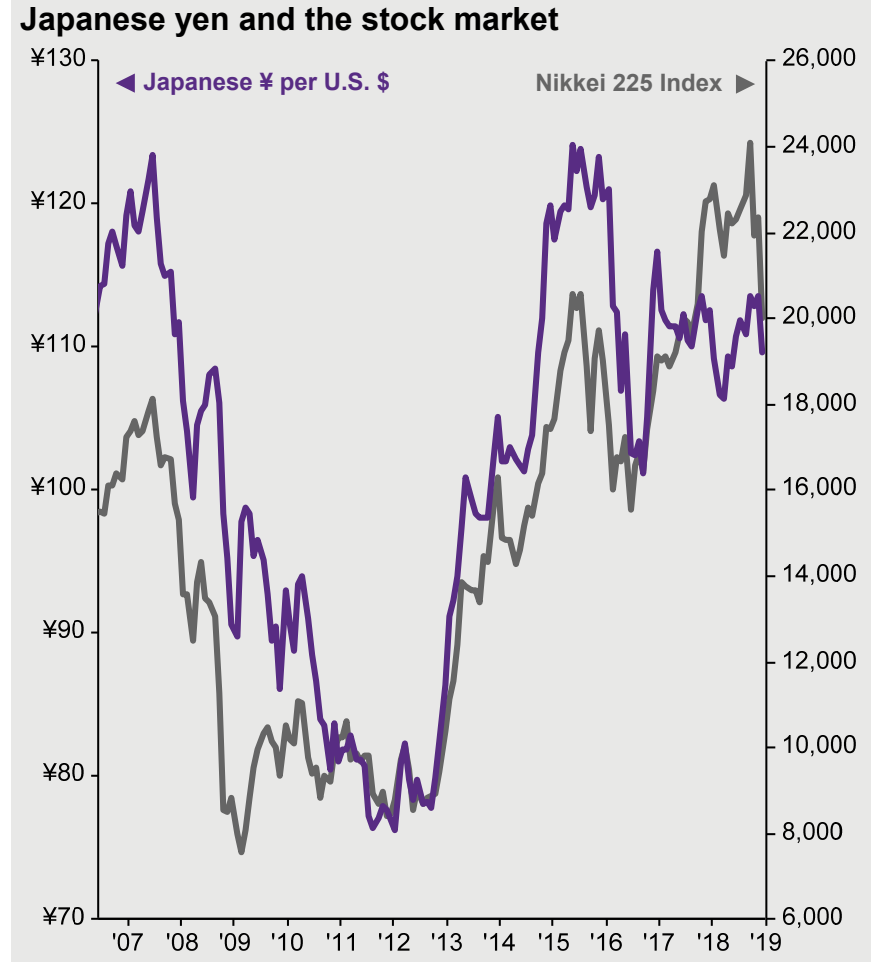
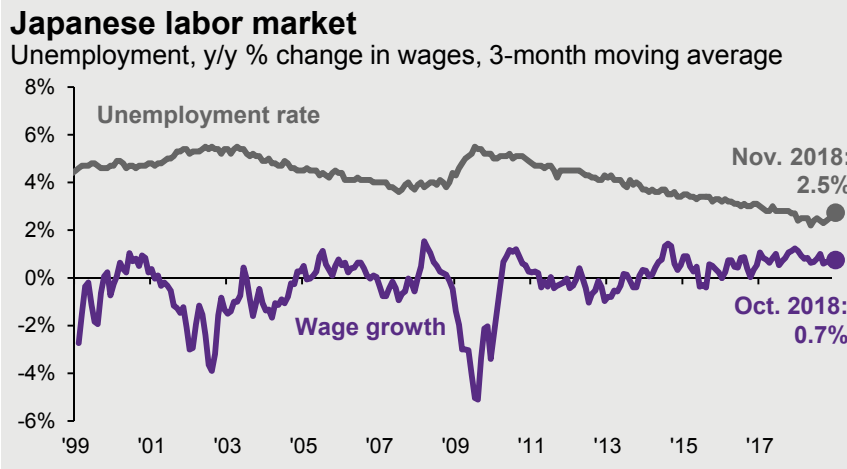
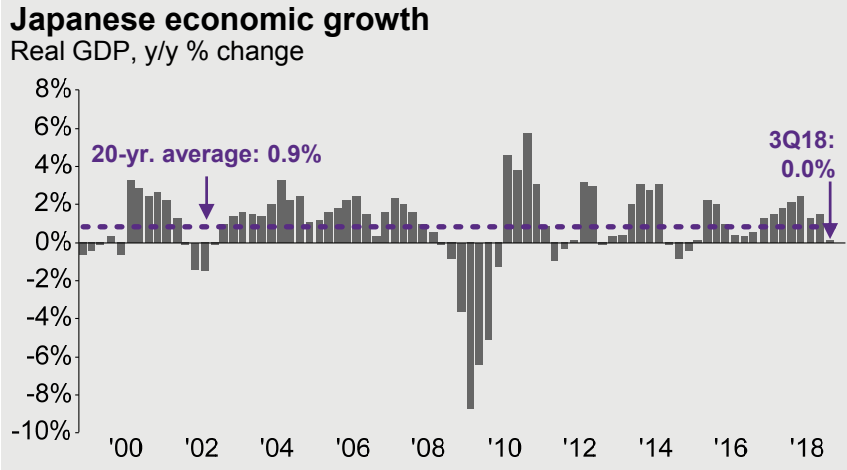


### Eurozone credit demand

Net % of banks reporting positive loan demand



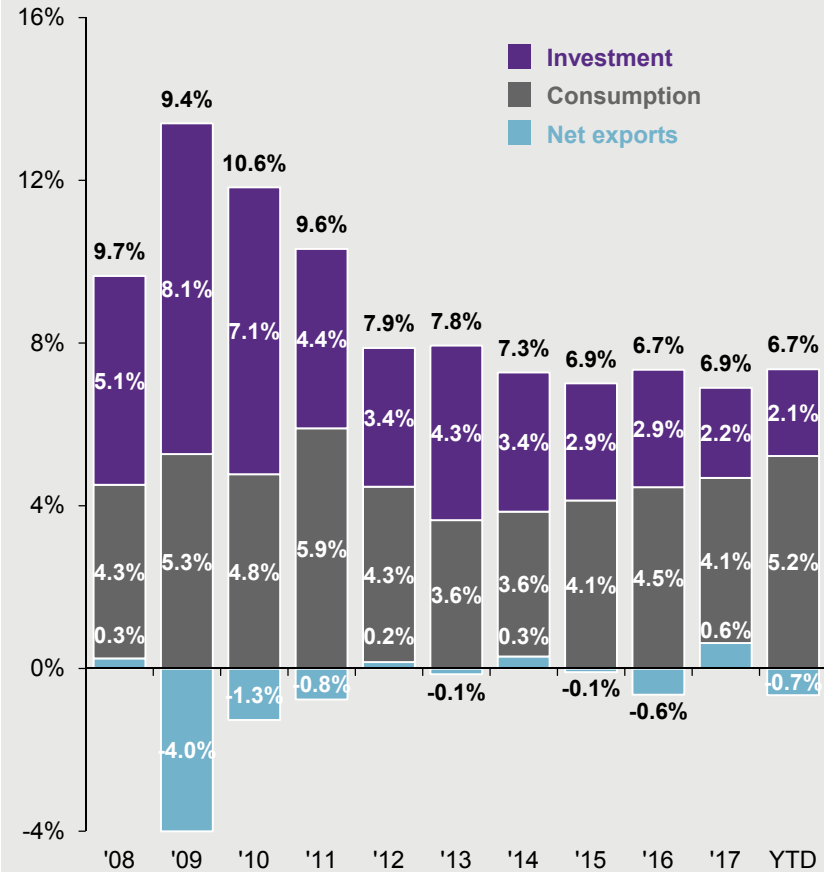
Source: FactSet, J.P. Morgan Asset Management; (Left and top right) ECB, Eurostat; (Bottom right) ECB.  
 Eurozone shown is the aggregate of the 19 countries that currently use the euro.  
 Guide to the Markets – U.S. Data are as of December 31, 2018.



Source: FactSet, J.P. Morgan Asset Management; (Top left) Japanese Cabinet Office; (Bottom left) Ministry of Health, Labor and Welfare Japan; (Right) Nikkei. Past performance is not a reliable indicator of current and future results.  
 Guide to the Markets – U.S. Data are as of December 31, 2018.

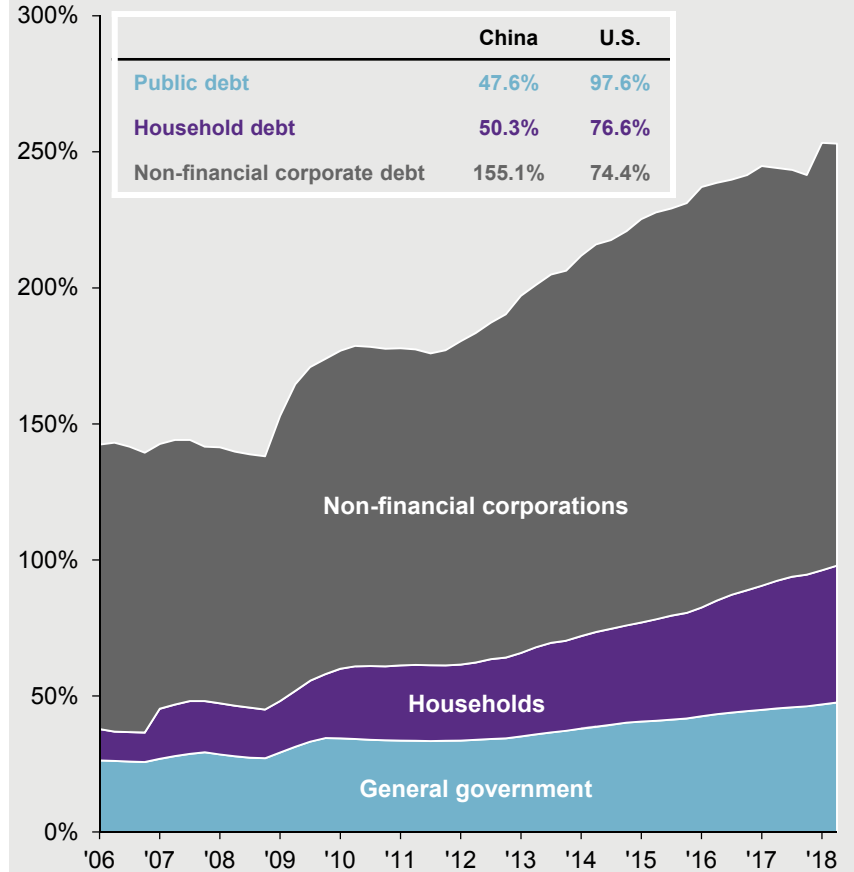
## China real GDP contribution

Year-over-year % change



## Chinese debt by sector

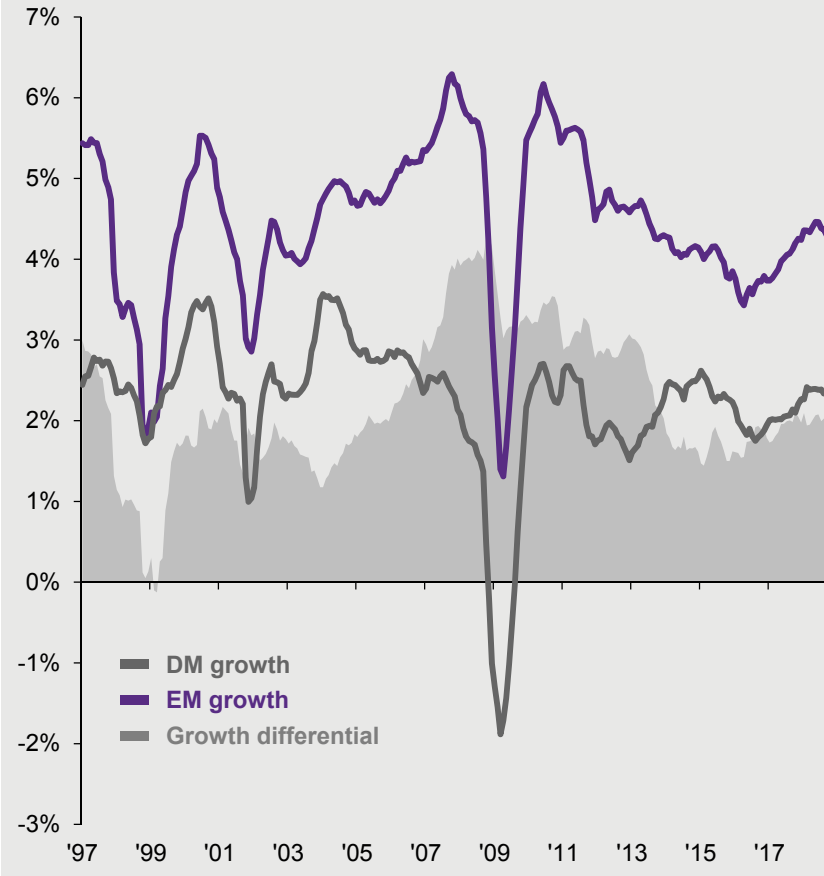
% of GDP, 2Q18



Source: FactSet, J.P. Morgan Asset Management; (Left) CEIC; (Right) BIS.  
 China real GDP contribution – YTD is year-to-date through 3Q18. Household and non-financial corporate debt is based on market value and government debt is based on nominal value. Public debt refers to general government debt.  
 Guide to the Markets – U.S. Data are as of December 31, 2018.

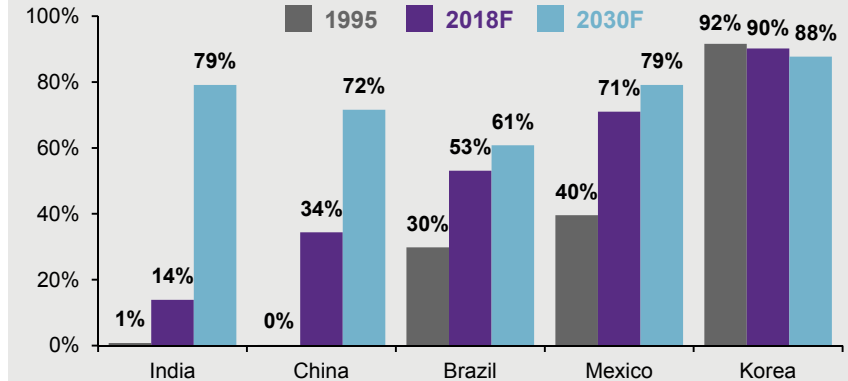
## EM vs. DM growth

Monthly, consensus expectations for GDP growth in 12 months



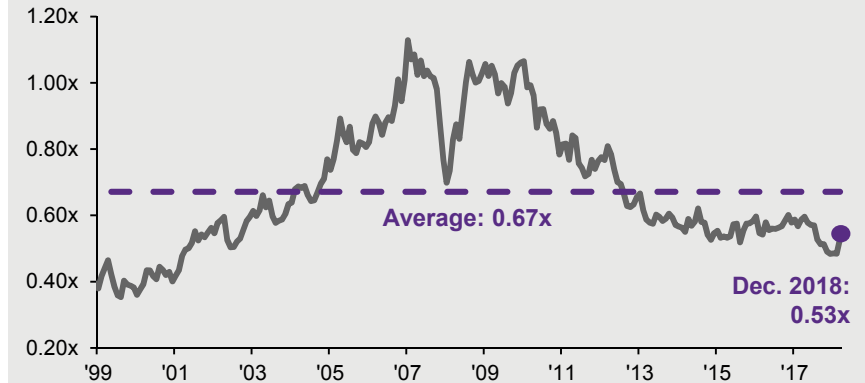
## Growth of the middle class

Percent of total population



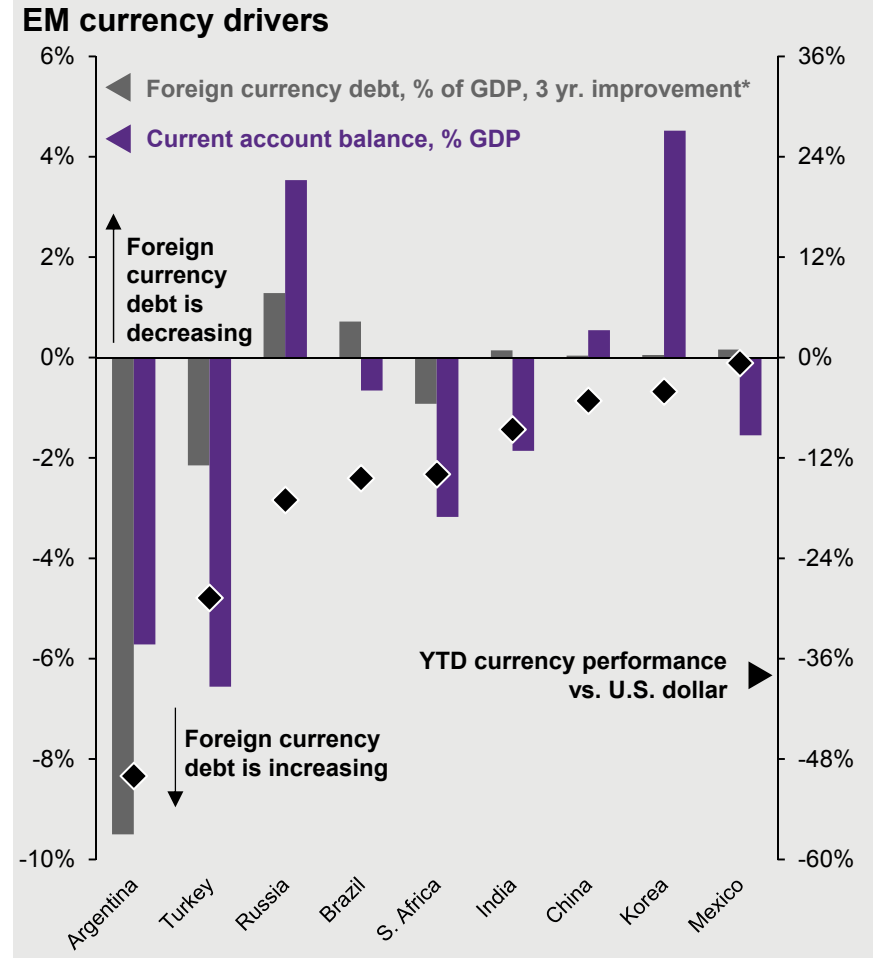
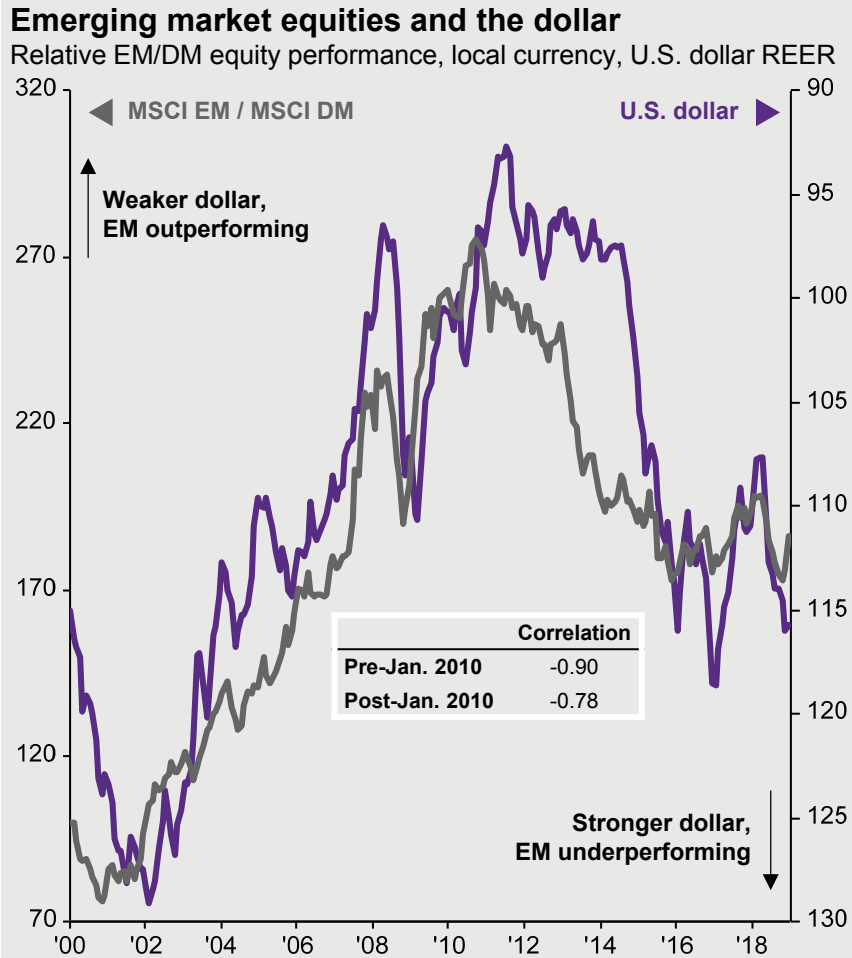
## Relative price-to-book ratio

MSCI Emerging Markets vs. S&P 500



Source: J.P. Morgan Asset Management; (Left) Consensus Economics; (Top right) Brookings Institute; (Bottom right) FactSet, MSCI, Standard & Poor's. "Growth differential" is consensus estimates for EM growth in the next 12 months minus consensus estimates for DM growth in the next 12 months, provided by Consensus Economics. Middle class is defined as \$3,600-\$36,000 annual per capita income in purchasing power parity terms. Historical and forecast figures come from the Brookings Development, Aid and Governance Indicators. EM vs. DM growth is as of November 30, 2018.

Guide to the Markets – U.S. Data are as of December 31, 2018.



Source: J.P. Morgan Asset Management; (Left) MSCI; (Right) FactSet, IIF (Institute of International Finance), INDEC (National Institute of Statistics and Census of Argentina), Central Bank of Turkey, Central Bank of Brazil, Central Bank of Russia, Reserve Bank of India, Bank of Korea, State Administration of Foreign Exchange China, Bank of Mexico, Reserve Bank of South Africa.  
 \*Four-quarter moving average of quarterly foreign currency denominated debt as a percentage of GDP levels, compared to levels that prevailed three years ago. A negative figure indicates foreign currency debt has been rising, while a positive figure indicates foreign currency debt has been falling. Current account figures are an average of the past four quarters.  
 Guide to the Markets – U.S. Data are as of December 31, 2018.

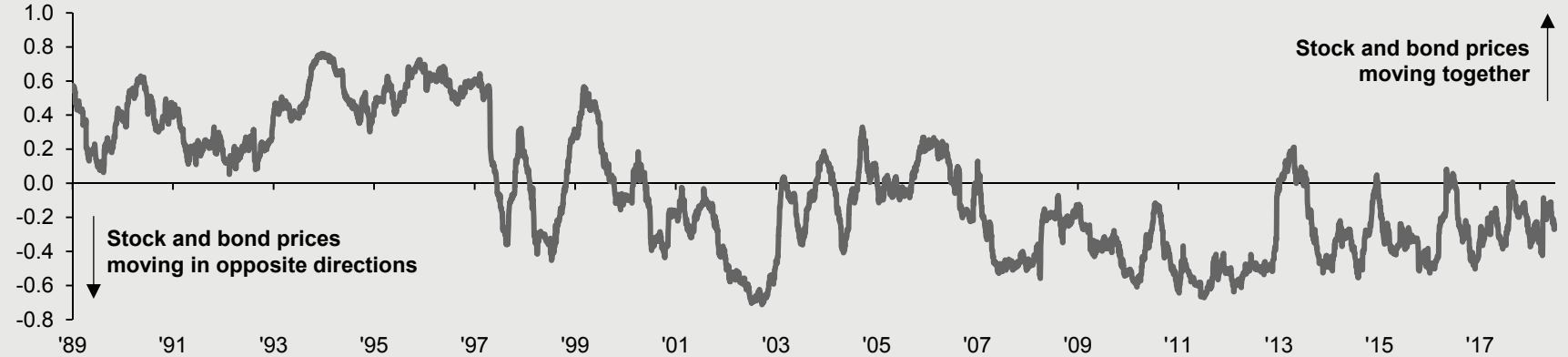
	U.S. Large Cap	EAFE	EME	Bonds	Corp. HY	Munis	Currency.	EMD	Cmdty.	REITs	Hedge funds	Private equity	Ann. Volatility
U.S. Large Cap	1.00	0.88	0.73	-0.18	0.64	-0.16	-0.49	0.45	0.55	0.75	0.83	0.81	14%
EAFE		1.00	0.88	-0.06	0.74	-0.04	-0.66	0.63	0.58	0.70	0.86	0.82	18%
EME			1.00	0.07	0.85	0.06	-0.70	0.81	0.63	0.57	0.82	0.67	20%
Bonds				1.00	0.18	0.85	-0.19	0.50	-0.05	0.29	-0.11	-0.21	3%
Corp. HY					1.00	0.15	-0.53	0.83	0.61	0.61	0.75	0.46	10%
Munis						1.00	-0.16	0.53	-0.16	0.18	-0.08	-0.26	4%
Currencies							1.00	-0.61	-0.57	-0.43	-0.43	-0.62	7%
EMD								1.00	0.47	0.52	0.59	0.33	7%
Commodities									1.00	0.39	0.60	0.64	15%
REITs										1.00	0.59	0.60	21%
Hedge funds											1.00	0.72	5%
Private equity												1.00	10%

Alternatives

Source: Barclays Inc., Bloomberg, Cambridge Associates, Credit Suisse/Tremont, FactSet, Federal Reserve, MSCI, NCREIF, Standard & Poor's, J.P. Morgan Asset Management.  
 Indices used – Large Cap: S&P 500 Index; Currencies: Federal Reserve Trade Weighted Dollar; EAFE: MSCI EAFE; EME: MSCI Emerging Markets; Bonds: Bloomberg Barclays Aggregate; Corp HY: Bloomberg Barclays Corporate High Yield; EMD: Bloomberg Barclays Emerging Market; Cmdty.: Bloomberg Commodity Index; Real Estate: NAREIT ODCE Index; Hedge Funds: CS/Tremont Hedge Fund Index; Private equity: Cambridge Associates Global Buyout & Growth Index. Private equity data are reported on a one-quarter lag. All correlation coefficients and annualized volatility are calculated based on quarterly total return data for period 12/31/08 to 12/31/18, except for Private equity, which is based on the period from 9/30/08 to 9/30/18. This chart is for illustrative purposes only.  
 Guide to the Markets – U.S. Data are as of December 31, 2018.

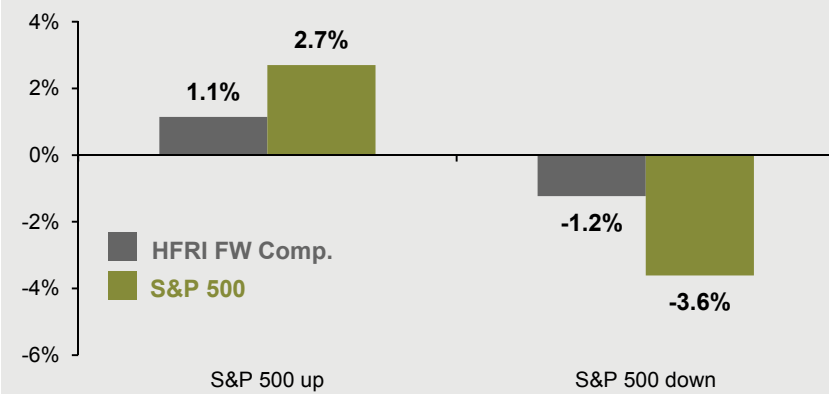
### U.S. stock/bond correlations

Rolling 90-day correlation between the S&P 500 and the Bloomberg Barclays U.S. Aggregate



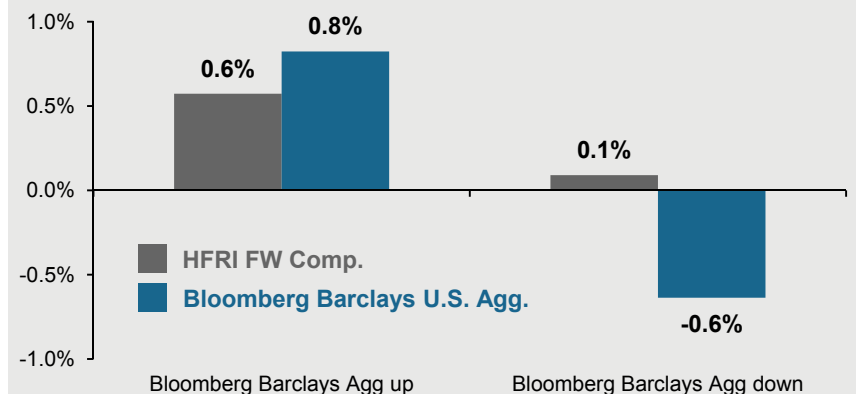
### Hedge fund returns in different market environments

Average return in up and down months for S&P 500



### Hedge fund returns in different market environments

Average return in up and down months for Bloomberg Barclays Agg.

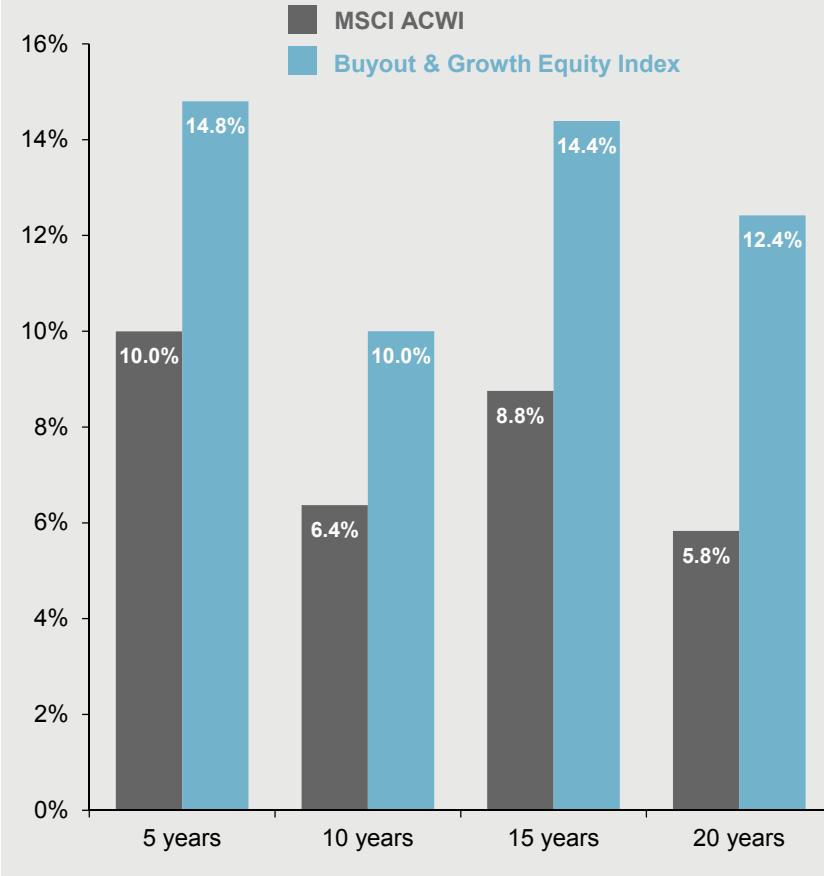


Source: Barclays, Bloomberg, FactSet, HFRI, Standard & Poor's, J.P. Morgan Asset Management. *Guide to the Markets - U.S.* Data are as of December 31, 2018.

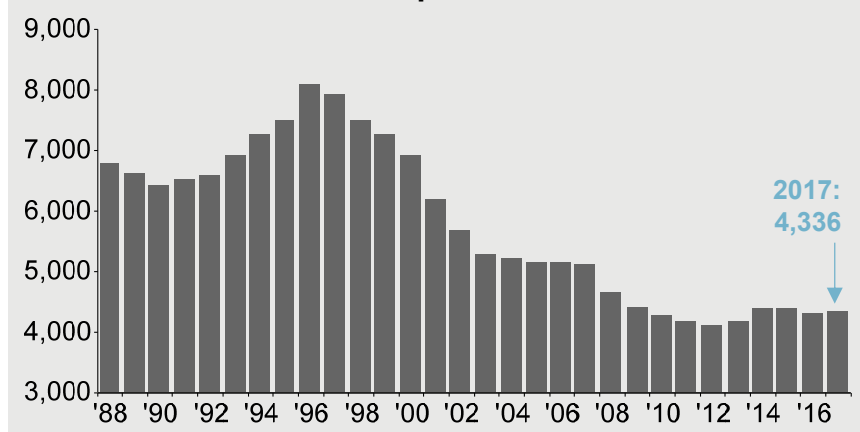


**Public vs. private equity returns**

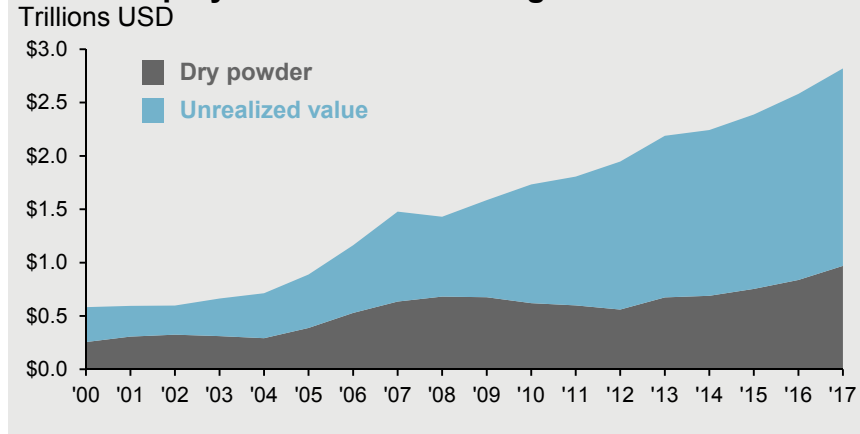
MSCI AC World total return and Global Buyout & Growth Equity Index\*



**Number of U.S. listed companies**



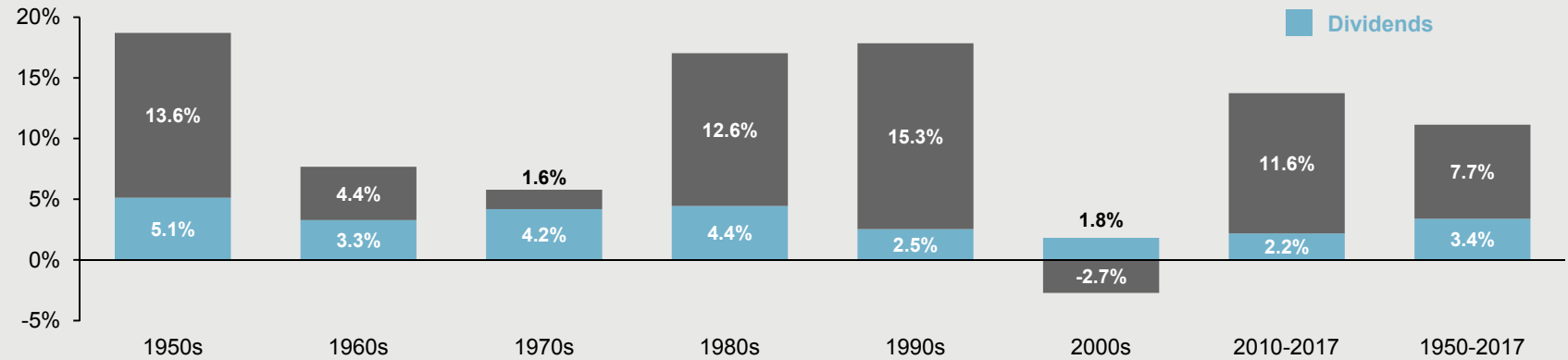
**Private equity assets under management**



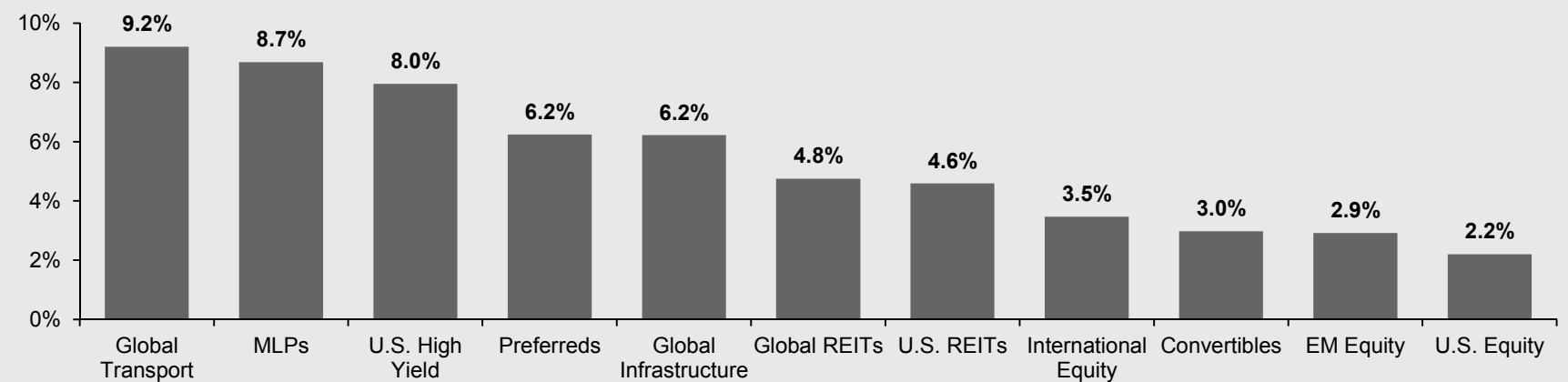
Sources: Cambridge Associates, Prequin, Standard & Poor's, University of Florida, J.P. Morgan Asset Management.  
 \*Global Buyout & Growth Equity and MSCI AC World total return data are as of June 30, 2018.  
 Guide to the Markets – U.S. Data are as of December 31, 2018.

**S&P 500 total return: Dividends vs. capital appreciation**

Average annualized returns



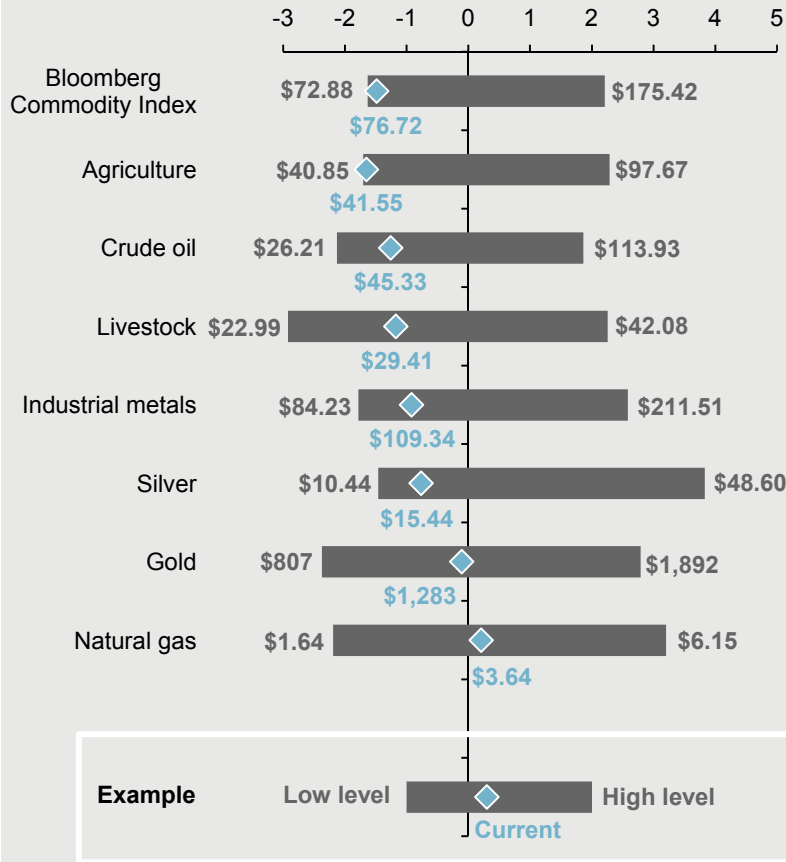
**Asset class yields**



Source: FactSet, Standard & Poor's, J.P. Morgan Asset Management; (Top) Ibbotson; (Bottom) Alerian, BAML, Barclays, Bloomberg, Clarkson, Drewry Maritime Consultants, Federal Reserve, FTSE, MSCI, NCREIF. Dividend vs. capital appreciation returns are through 12/31/17. Yields are as of 12/31/18, except Global Transport, Global Infrastructure and U.S. Real Estate (6/30/18). Global Transport: Levered yields for transport assets are calculated as the difference between charter rates (rental income), operating expenses, debt amortization and interest expenses, as a percentage of equity value. Yields for each of the sub-vessel types above are calculated and respective weightings are applied to each of the sub-sectors to arrive at the current levered yields for Global Transportation; MLPs: Alerian MLP; Preferreds: BAML Hybrid Preferred Securities; U.S. High Yield: Bloomberg US Aggregate Corporate High Yield; Global Infrastructure: MSCI Global Infrastructure Asset Index-Low risk; U.S. Real Estate: NCREIF-ODCE Index; Global REITs: FTSE NAREIT Global REITs; Convertibles: Bloomberg Barclays U.S. Convertibles Composite; International Equity: MSCI AC World ex-U.S.; U.S. 10-year: Tullett Prebon; U.S. Equity: MSCI USA. *Guide to the Markets - U.S.* Data are as of December 31, 2018.

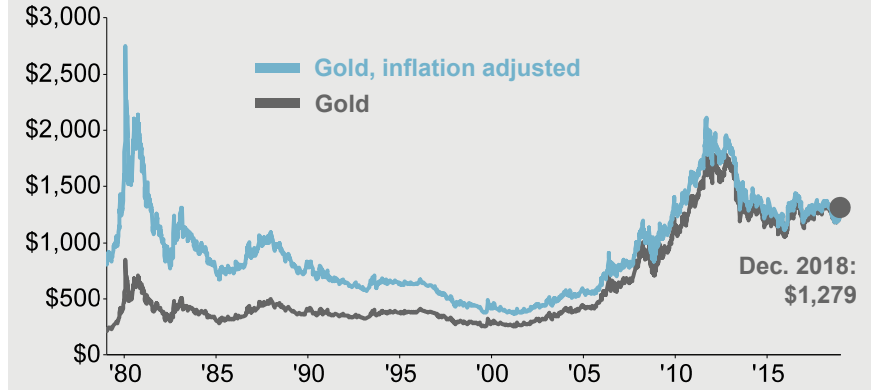
**Commodity prices**

Commodity price z-scores



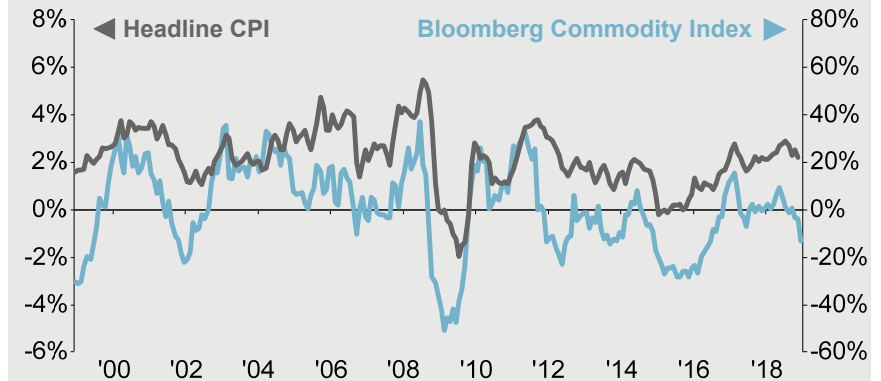
**Gold prices**

USD per ounce



**Commodity prices and inflation**

Year-over-year % change



Source: FactSet, J.P. Morgan Asset Management; (Left) Bloomberg, CME; (Top right) BLS, CME; (Bottom right) Bloomberg, BLS. Commodity prices are represented by the appropriate Bloomberg Commodity sub-index. Crude oil shown is WTI. Other commodity prices are represented by futures contracts. Z-scores are calculated using daily prices over the past 10 years. *Guide to the Markets – U.S.* Data are as of December 31, 2018.

# Asset class returns

																2004 - 2018	
2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Ann.	Vol.	
REITs 31.6%	EM Equity 34.5%	REITs 35.1%	EM Equity 39.8%	Fixed Income 5.2%	EM Equity 79.0%	REITs 27.9%	REITs 8.3%	REITs 19.7%	Small Cap 38.8%	REITs 28.0%	REITs 2.8%	Small Cap 21.3%	EM Equity 37.8%	Cash 1.8%	REITs 8.5%	REITs 22.4%	
EM Equity 26.0%	Comdty. 21.4%	EM Equity 32.6%	Comdty. 16.2%	Cash 1.8%	High Yield 59.4%	Small Cap 26.9%	Fixed Income 7.8%	High Yield 19.6%	Large Cap 32.4%	Large Cap 13.7%	Large Cap 1.4%	High Yield 14.3%	DM Equity 25.6%	Fixed Income 0.0%	EM Equity 8.3%	EM Equity 22.1%	
DM Equity 20.7%	DM Equity 14.0%	DM Equity 26.9%	DM Equity 11.6%	Asset Alloc. -25.4%	DM Equity 32.5%	EM Equity 19.2%	High Yield 3.1%	EM Equity 18.6%	DM Equity 23.3%	Fixed Income 6.0%	Fixed Income 0.5%	Large Cap 12.0%	Large Cap 21.8%	REITs -4.0%	Large Cap 7.8%	Small Cap 18.6%	
Small Cap 18.3%	REITs 12.2%	Small Cap 18.4%	Asset Alloc. 7.1%	High Yield -26.9%	REITs 28.0%	Comdty. 16.8%	Large Cap 2.1%	DM Equity 17.9%	Asset Alloc. 14.9%	Asset Alloc. 5.2%	Cash 0.0%	Comdty. 11.8%	Small Cap 14.6%	High Yield -4.1%	Small Cap 7.5%	Comdty. 18.6%	
High Yield 13.2%	Asset Alloc. 8.1%	Large Cap 15.8%	Fixed Income 7.0%	Small Cap -33.8%	Small Cap 27.2%	Large Cap 15.1%	Cash 0.1%	Small Cap 16.3%	High Yield 7.3%	Small Cap 4.9%	DM Equity -0.4%	EM Equity 11.6%	Asset Alloc. 14.6%	Large Cap -4.4%	High Yield 7.3%	DM Equity 17.6%	
Asset Alloc. 12.8%	Large Cap 4.9%	Asset Alloc. 15.3%	Large Cap 5.5%	Comdty. -35.6%	Large Cap 16.5%	High Yield 14.8%	Asset Alloc. -0.7%	Large Cap 16.0%	REITs 2.9%	Cash 0.0%	Asset Alloc. -2.0%	REITs 8.6%	High Yield 10.4%	Asset Alloc. -5.8%	Asset Alloc. 6.2%	Large Cap 14.5%	
Large Cap 10.9%	Small Cap 4.6%	High Yield 13.7%	Cash 4.8%	Large Cap -37.0%	Asset Alloc. 25.0%	Asset Alloc. 13.3%	Small Cap -4.2%	Asset Alloc. 12.2%	Cash 0.0%	High Yield 0.0%	High Yield -2.7%	Asset Alloc. 8.3%	REITs 8.7%	Small Cap -11.0%	DM Equity 5.2%	High Yield 11.0%	
Comdty. 9.1%	High Yield 3.6%	Cash 4.8%	High Yield 3.2%	REITs -37.7%	Comdty. 18.9%	DM Equity 8.2%	DM Equity -11.7%	Fixed Income 4.2%	Fixed Income -2.0%	EM Equity -1.8%	Small Cap -4.4%	Fixed Income 2.6%	Fixed Income 3.5%	Comdty. -11.2%	Fixed Income 3.9%	Asset Alloc. 10.3%	
Fixed Income 4.3%	Cash 3.0%	Fixed Income 4.3%	Small Cap -1.6%	DM Equity -43.1%	Fixed Income 5.9%	Fixed Income 6.5%	Comdty. -13.3%	Cash 0.1%	EM Equity -2.3%	DM Equity -4.5%	EM Equity -14.6%	DM Equity 1.5%	Comdty. 1.7%	DM Equity -13.4%	Cash 1.3%	Fixed Income 3.3%	
Cash 1.2%	Fixed Income 2.4%	Comdty. 2.1%	REITs -15.7%	EM Equity -53.2%	Cash 0.1%	Cash 0.1%	EM Equity -18.2%	Comdty. -1.1%	Comdty. -9.5%	Comdty. -17.0%	Comdty. -24.7%	Cash 0.3%	Cash 0.8%	EM Equity -14.2%	Comdty. -2.5%	Cash 0.8%	

Source: Barclays, Bloomberg, FactSet, MSCI, NAREIT, Russell, Standard & Poor's, J.P. Morgan Asset Management.

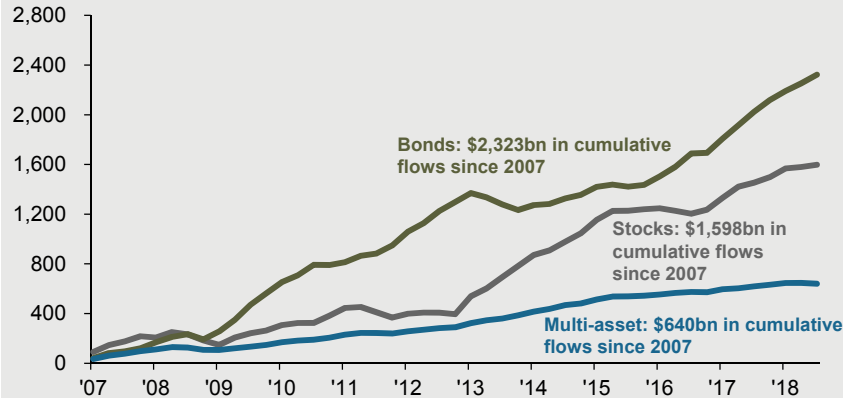
Large cap: S&P 500, Small cap: Russell 2000, EM Equity: MSCI EME, DM Equity: MSCI EAFE, Comdty: Bloomberg Commodity Index, High Yield: Bloomberg Barclays Global HY Index, Fixed Income: Bloomberg Barclays US Aggregate, REITs: NAREIT Equity REIT Index, Cash: Bloomberg Barclays 1-3m Treasury. The "Asset Allocation" portfolio assumes the following weights: 25% in the S&P 500, 10% in the Russell 2000, 15% in the MSCI EAFE, 5% in the MSCI EME, 25% in the Bloomberg Barclays US Aggregate, 5% in the Bloomberg Barclays 1-3m Treasury, 5% in the Bloomberg Barclays Global High Yield Index, 5% in the Bloomberg Commodity Index and 5% in the NAREIT Equity REIT Index. Balanced portfolio assumes annual rebalancing. Annualized (Ann.) return and volatility (Vol.) represents period of 12/31/03 – 12/31/18. Please see disclosure page at end for index definitions. All data represents total return for stated period. Past performance is not indicative of future returns.

Guide to the Markets – U.S. Data are as of December 31, 2018.

USD billions	AUM	YTD	Registered product flows																
			2017	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001
<b>U.S. equity</b>	8,269	10	16	(20)	(22)	106	176	(35)	(33)	33	22	0	24	77	114	173	142	57	88
<b>World equity</b>	3,235	106	241	11	208	149	201	61	20	85	56	(35)	186	168	133	88	39	11	(9)
<b>Taxable bond</b>	3,627	166	390	224	57	86	(8)	295	168	210	301	57	105	50	45	27	44	103	58
<b>Tax-free bond</b>	702	7	33	31	21	33	(55)	52	(8)	14	71	12	14	17	7	(7)	(3)	12	9
<b>Multi-asset</b>	2,442	7	61	29	60	95	96	51	33	58	39	11	96	78	80	81	51	22	19
<b>Liquidity</b>	2,814	107	92	200	40	29	30	(0)	(47)	(347)	(237)	675	527	171	49	(53)	(91)	1	255

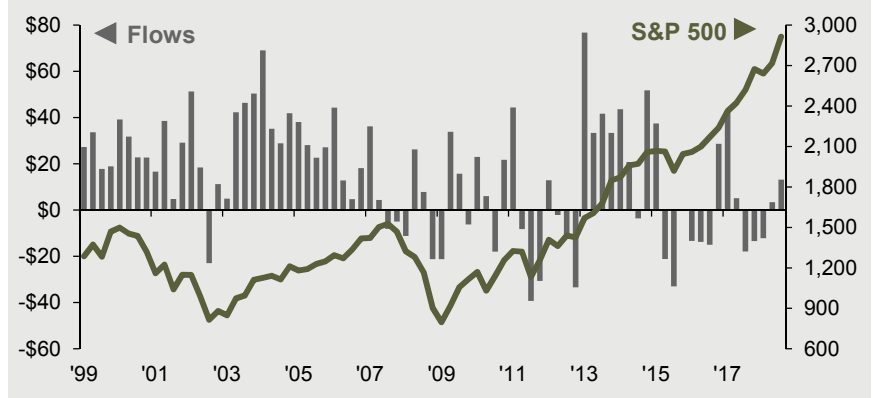
**Cumulative flows into long-term asset products**

Mutual fund and ETF flows, quarterly, USD billions



**Flows into U.S. equity funds & S&P 500 performance**

Mutual fund and ETF flows, price index, quarterly, USD billions

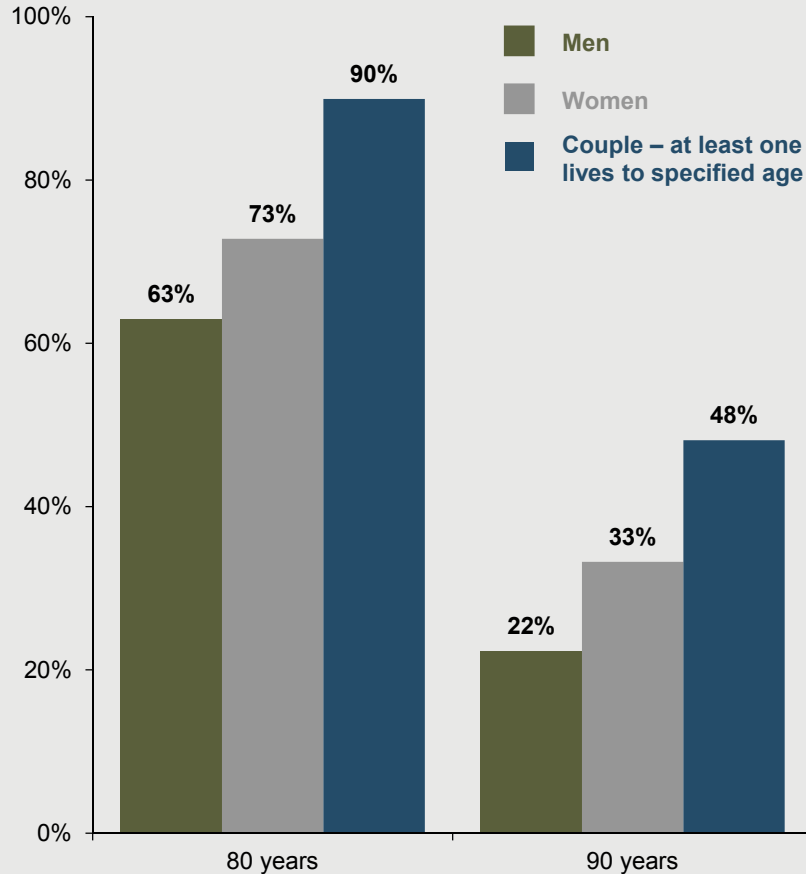


Source: Strategic Insight Simfund, J.P. Morgan Asset Management. All data include flows through November 2018 and capture all registered product flows (open-end mutual funds and ETFs). Simfund data are subject to periodic revisions. World equity flows are inclusive of emerging market, global equity and regional equity flows. Multi-asset flows include asset allocation, balanced fund, flexible portfolio and mixed income flows. Bottom right chart is as of 3Q18.

Guide to the Markets – U.S. Data are as of December 31, 2018.

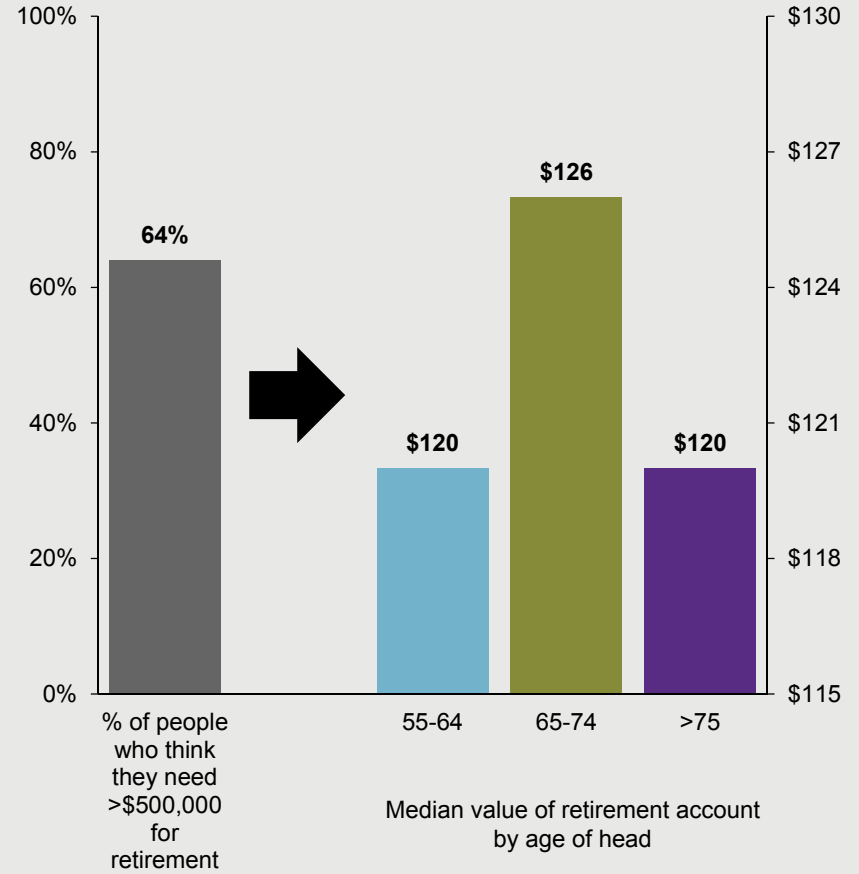
## Probability of reaching ages 80 and 90

Persons aged 65, by gender, and combined couple



## Retirement savings gap

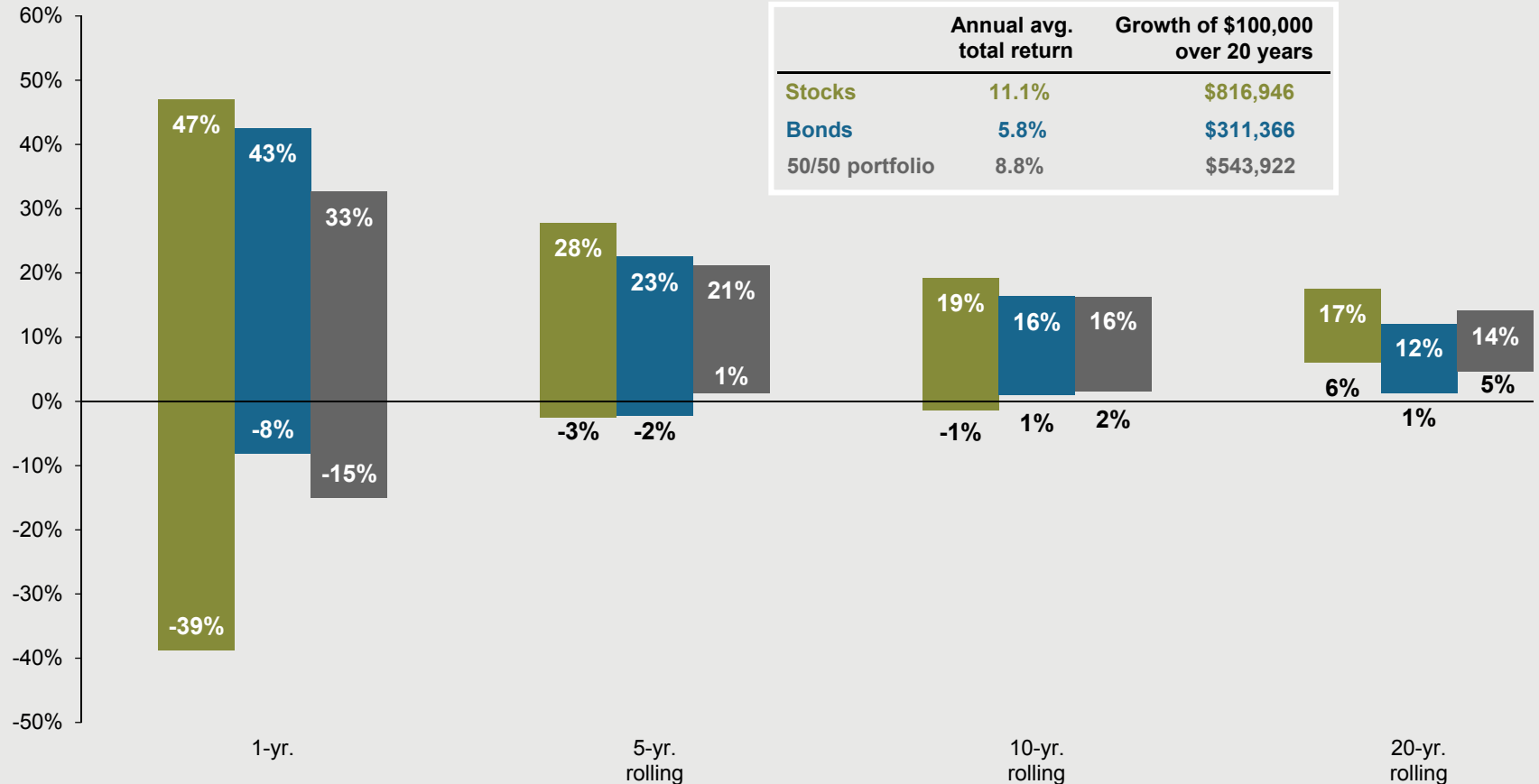
Anticipated amount needed vs. actual savings, thousands



Source: J.P. Morgan Asset Management; (Left) SSA 2015 Life Tables; (Right) 2017 Retirement Confidence Survey, Employee Benefit Research Institute and Greenwald & Associates; 2016 Survey of Consumer Finances, Federal Reserve. EBRI survey was conducted from January 6, 2017 to January 13, 2017 through online interviews with 1,671 individuals (1,082 workers and 589 retirees) ages 25 and older in the United States. *Guide to the Markets – U.S.* Data are as of December 31, 2018.

## Range of stock, bond and blended total returns

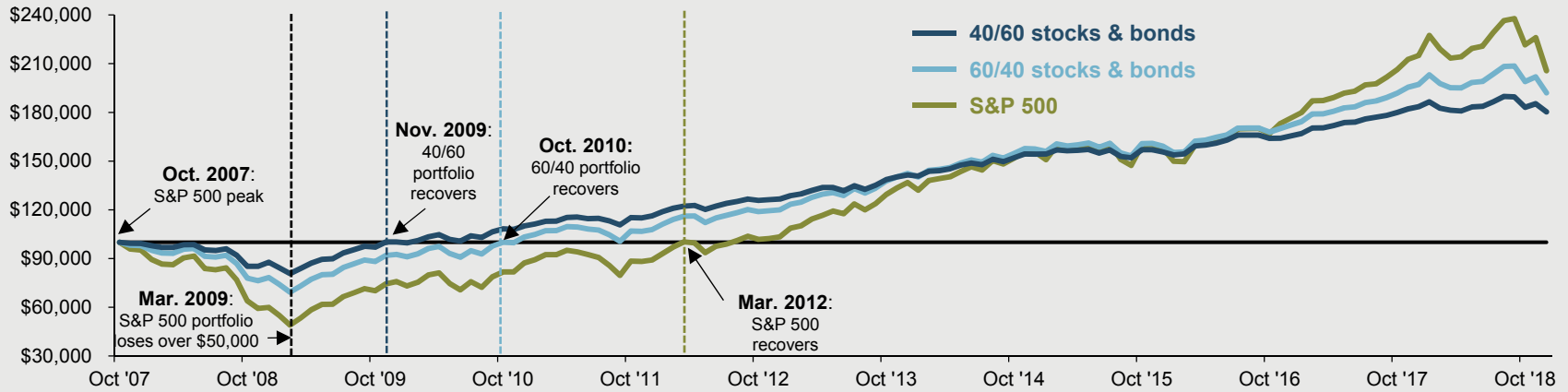
Annual total returns, 1950-2018



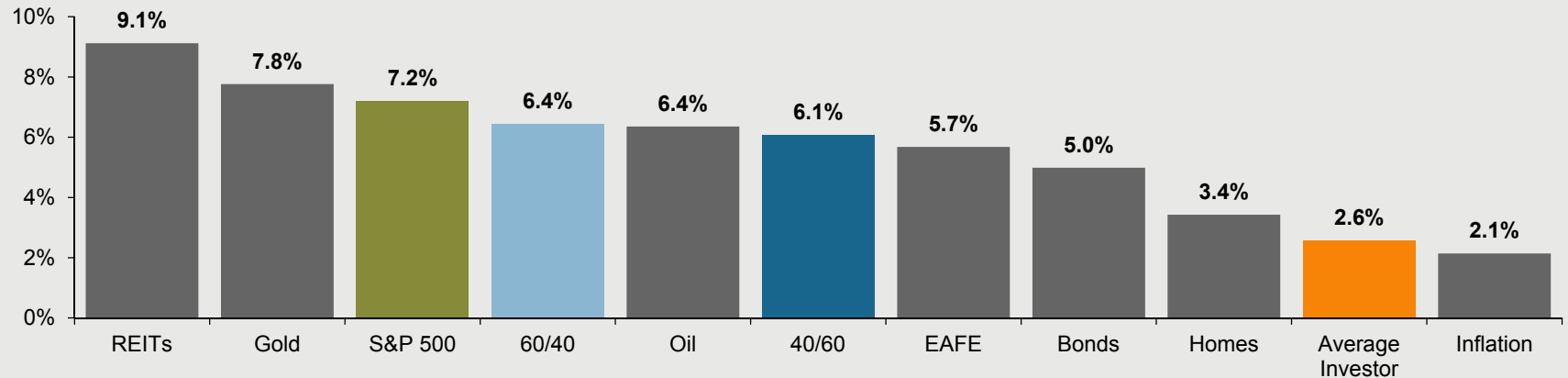
Source: Barclays, Bloomberg, FactSet, Federal Reserve, Robert Shiller, Strategas/lbbotson, J.P. Morgan Asset Management. Returns shown are based on calendar year returns from 1950 to 2018. Stocks represent the S&P 500 Shiller Composite and Bonds represent Strategas/lbbotson for periods from 1950 to 2010 and Bloomberg Barclays Aggregate thereafter. Growth of \$100,000 is based on annual average total returns from 1950 to 2018.

Guide to the Markets – U.S. Data are as of December 31, 2018.

## Portfolio returns: Equities vs. equity and fixed income blend



## 20-year annualized returns by asset class (1998 – 2017)

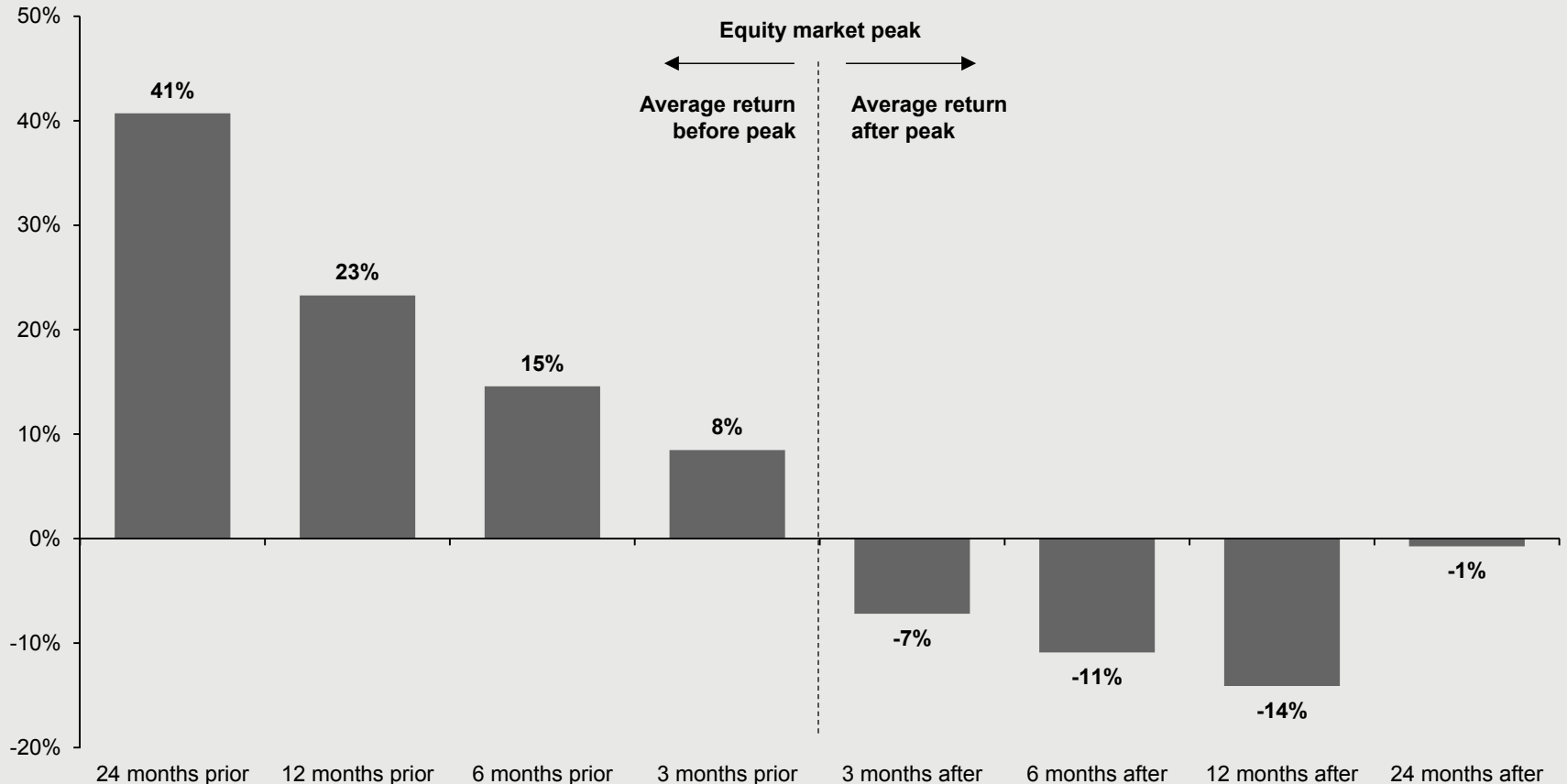


Source: J.P. Morgan Asset Management; (Top) Barclays, Bloomberg, FactSet, Standard & Poor's; (Bottom) Dalbar Inc. Indices used are as follows: REITs: NAREIT Equity REIT Index, EAFE: MSCI EAFE, Oil: WTI Index, Bonds: Bloomberg Barclays U.S. Aggregate Index, Homes: median sale price of existing single-family homes, Gold: USD/troy oz., Inflation: CPI. 60/40: A balanced portfolio with 60% invested in S&P 500 Index and 40% invested in high-quality U.S. fixed income, represented by the Bloomberg Barclays U.S. Aggregate Index. The portfolio is rebalanced annually. Average asset allocation investor return is based on an analysis by Dalbar Inc., which utilizes the net of aggregate mutual fund sales, redemptions and exchanges each month as a measure of investor behavior. Returns are annualized (and total return where applicable) and represent the 20-year period ending 12/31/17 to match Dalbar's most recent analysis. *Guide to the Markets - U.S.* Data are as of December 31, 2018.



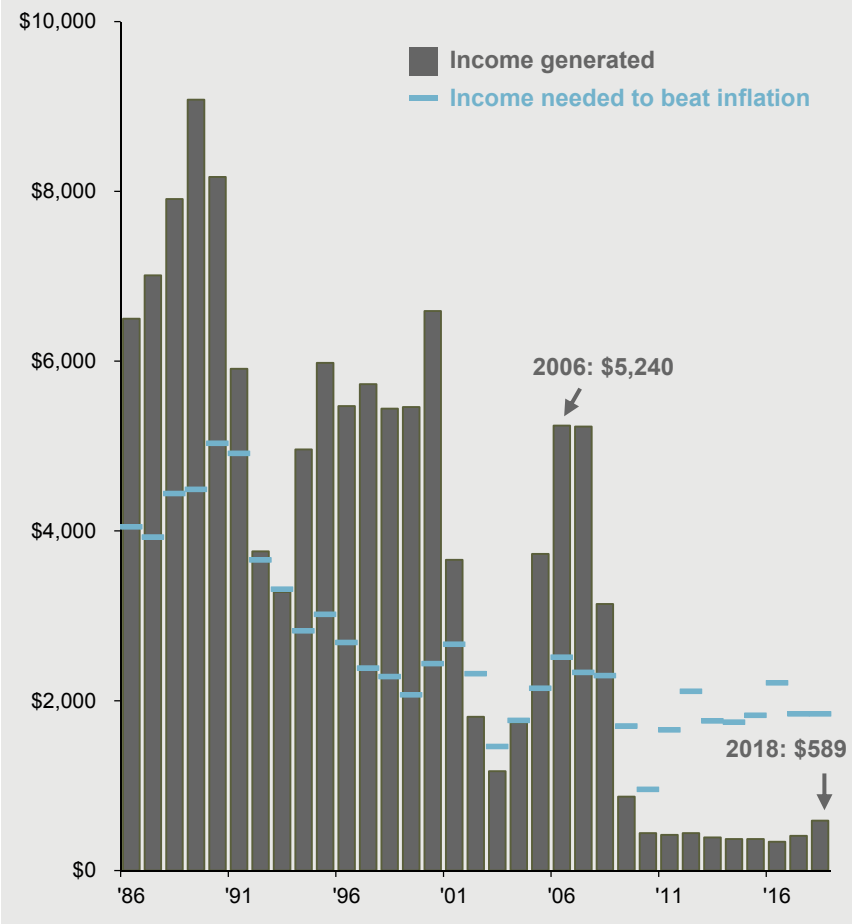
## Average return leading up to and following equity market peaks

S&P 500 total return index, 1945 - 2018

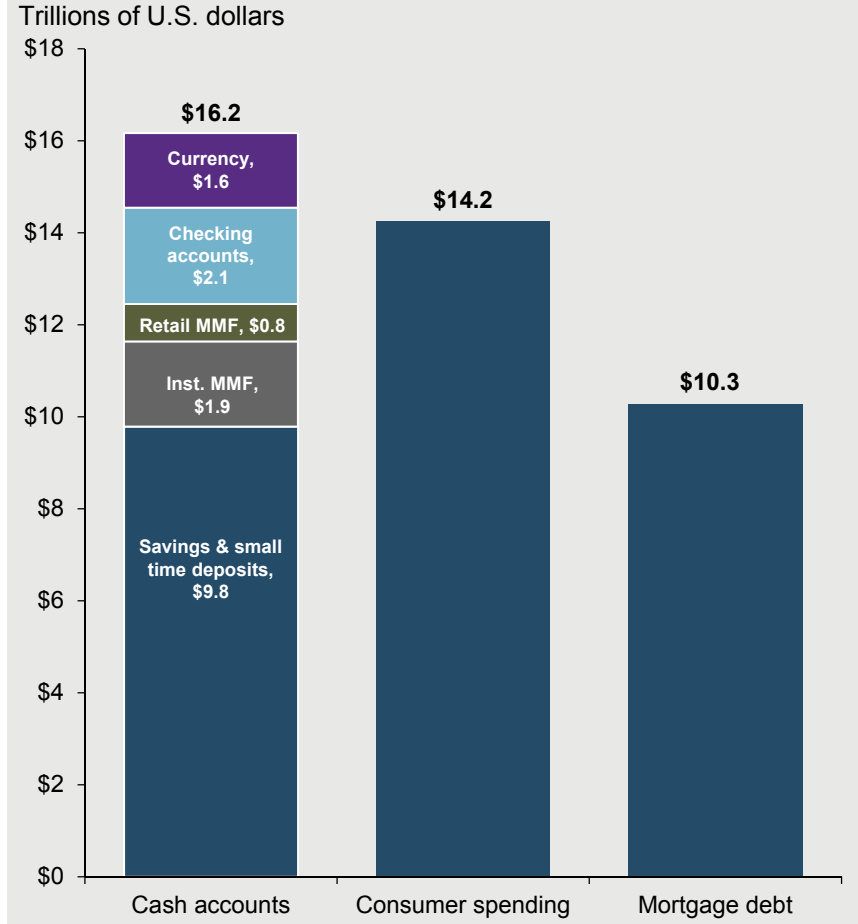


Source: FactSet, Robert Shiller, Standard & Poor's, J.P. Morgan Asset Management.  
 Chart is based on return data from 11 bear markets since 1945. A bear market is defined as a decline of 20% or more in the S&P 500 benchmark. Monthly total return data from 1945 to 1970 is from the S&P Shiller Composite index. From 1970 to present, return data is from Standard & Poor's. *Guide to the Markets - U.S.* Data are as of December 31, 2018.

### Income earned by \$100,000 investment in a 6-mo. CD

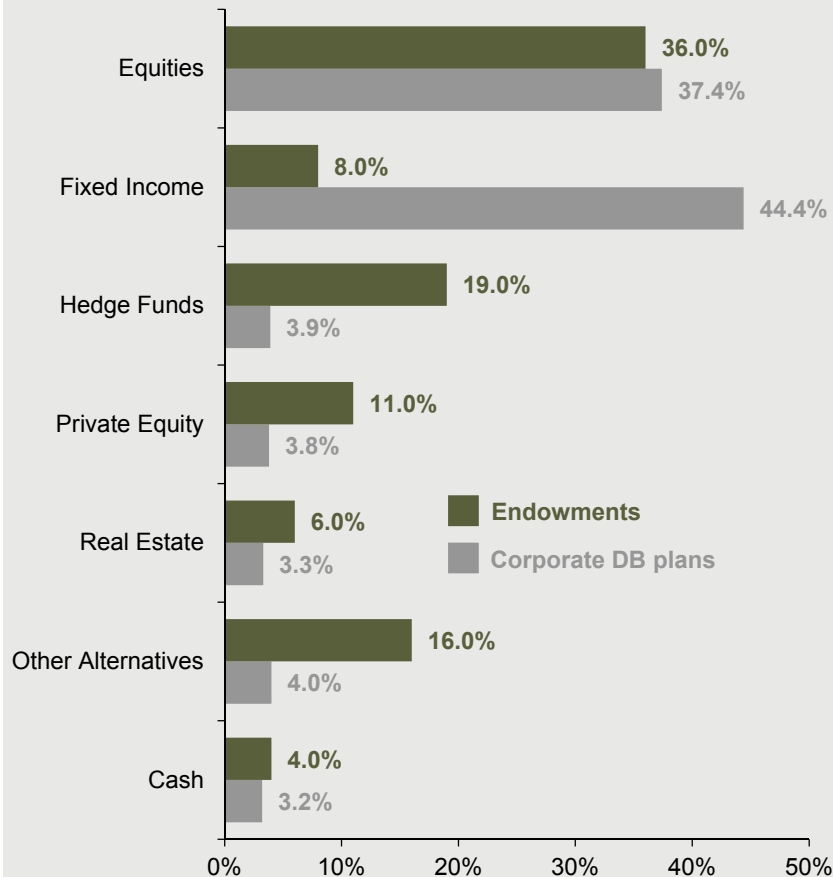


### Cash accounts in perspective

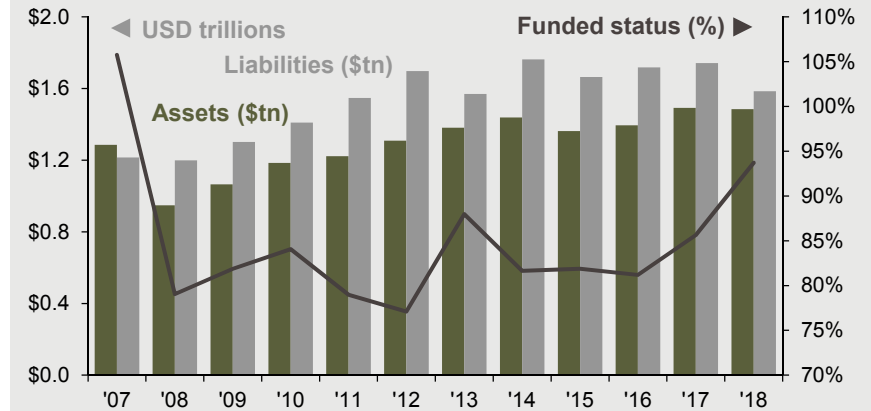


Source: FactSet, J.P. Morgan Asset Management; (Left) Bankrate.com; (Right) BEA, Federal Reserve System. Cash accounts and consumer spending are as of 11/30/18 and mortgage debt is as of 9/30/18. M2 includes M1 (currency in circulation and checking accounts) plus savings deposits, small-denomination time deposits and retail money market funds. Institutional money market funds are considered a memorandum item, not included in M2. Annual income is for illustrative purposes and is calculated based on the 6-month CD yield on average during each year and \$100,000 invested. Past performance is not indicative of comparable future results. *Guide to the Markets – U.S.* Data are as of December 31, 2018.

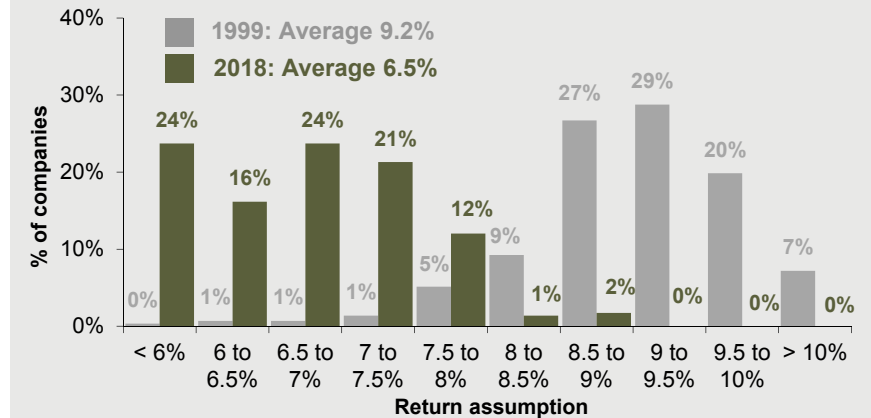
## Asset allocation: Corporate DB plans vs. endowments



## Defined benefit plans: Milliman 100 companies



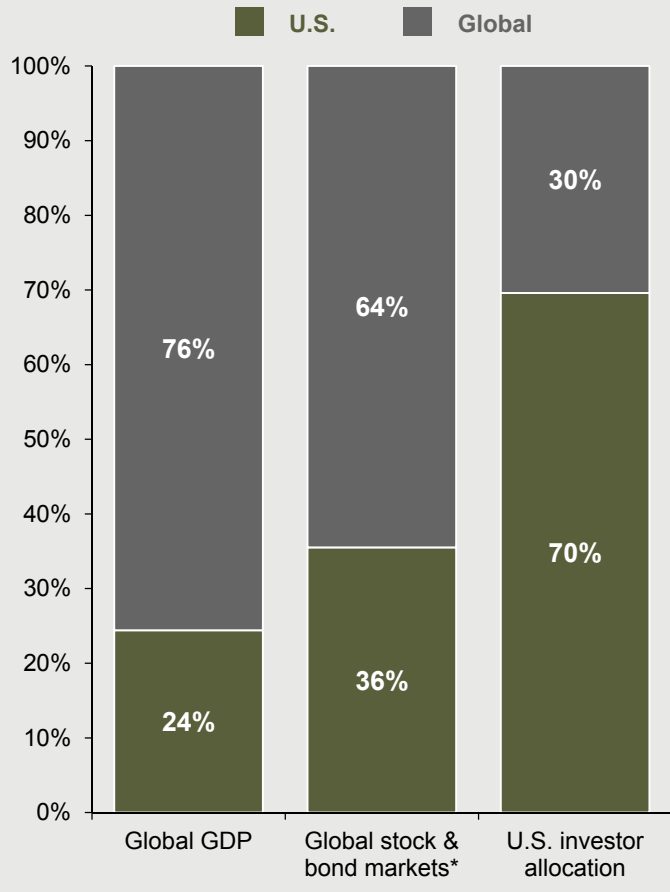
## Pension return assumptions: S&P 500 companies



Source: J.P. Morgan Asset Management; (Left) NACUBO (National Association of College and University Business Officers), Towers Watson; (Top right) Milliman Pension Funding Index; (Bottom right) Compustat/FactSet, S&P 500 corporate 10-Ks. Endowment asset allocation as of 2017. Corporate DB plans asset allocation as of 2016. Endowments represents dollar-weighted average data of 805 colleges and universities. Corporate DB plans represents aggregate asset allocation of Fortune 1000 pension plans. Pension return assumptions based on all available and reported data from S&P 500 Index companies. Pension assets, liabilities and funded status based on Milliman 100 companies reporting pension data as of November 30, 2018. Return assumption bands are inclusive of upper range. All information is shown for illustrative purposes only. *Guide to the Markets - U.S.* Data are as of December 31, 2018.

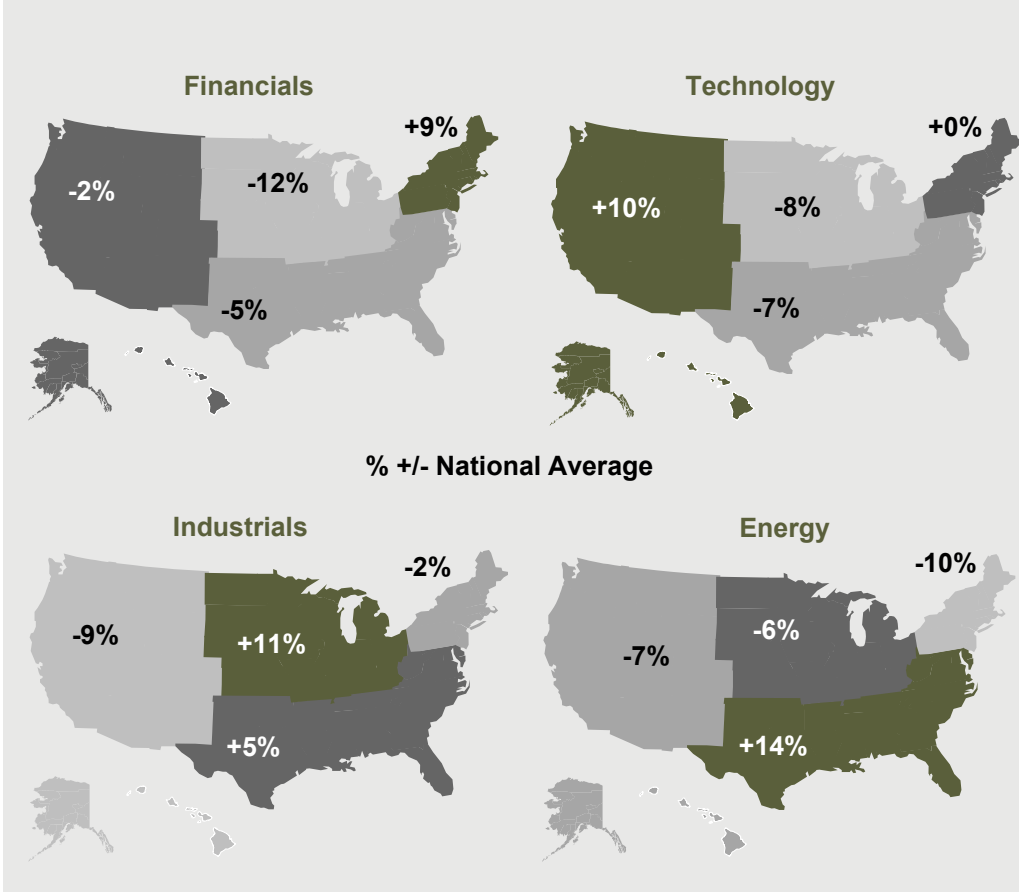
## Investment universe & U.S. investors

Percentage of total net assets, 2017



## Investor allocation by region

Likelihood of owning stocks in an industry vs. national average\*\*



Source: IMF, Openfolio, Strategic Insight Simfund, J.P. Morgan Asset Management.

\*Global stock and bond markets data are as of 2013. U.S. investor allocation is the total value of investments in global or domestic equity mutual funds and ETFs as of 2017. \*\*Investor allocation by region is based on data collected by Openfolio. Average sector allocations at the national level are determined by looking at the sector allocations of over 20,000 brokerage accounts, and taking a simple average. Portfolio allocations are then evaluated on a regional basis, and the regional averages are compared to the national average to highlight any investor biases. Further details can be found on openfolio.com.

Guide to the Markets – U.S. Data are as of December 31, 2018.

**All indexes are unmanaged and an individual cannot invest directly in an index. Index returns do not include fees or expenses.**

*Equities:*

The **Dow Jones Industrial Average** is a price-weighted average of 30 actively traded blue-chip U.S. stocks.

The **MSCI ACWI (All Country World Index)** is a free float-adjusted market capitalization weighted index that is designed to measure the equity market performance of developed and emerging markets.

The **MSCI EAFE Index (Europe, Australasia, Far East)** is a free float-adjusted market capitalization index that is designed to measure the equity market performance of developed markets, excluding the US & Canada.

The **MSCI Emerging Markets Index** is a free float-adjusted market capitalization index that is designed to measure equity market performance in the global emerging markets.

The **MSCI Europe Index** is a free float-adjusted market capitalization index that is designed to measure developed market equity performance in Europe.

The **MSCI Pacific Index** is a free float-adjusted market capitalization index that is designed to measure equity market performance in the Pacific region.

The **Russell 1000 Index**® measures the performance of the 1,000 largest companies in the Russell 3000.

The **Russell 1000 Growth Index**® measures the performance of those Russell 1000 companies with higher price-to-book ratios and higher forecasted growth values.

The **Russell 1000 Value Index**® measures the performance of those Russell 1000 companies with lower price-to-book ratios and lower forecasted growth values.

The **Russell 2000 Index**® measures the performance of the 2,000 smallest companies in the Russell 3000 Index.

The **Russell 2000 Growth Index**® measures the performance of those Russell 2000 companies with higher price-to-book ratios and higher forecasted growth values.

The **Russell 2000 Value Index**® measures the performance of those Russell 2000 companies with lower price-to-book ratios and lower forecasted growth values.

The **Russell 3000 Index**® measures the performance of the 3,000 largest U.S. companies based on total market capitalization.

The **Russell Midcap Index**® measures the performance of the 800 smallest companies in the Russell 1000 Index.

The **Russell Midcap Growth Index**® measures the performance of those Russell Midcap companies with higher price-to-book ratios and higher forecasted growth values. The stocks are also members of the Russell 1000 Growth index.

The **Russell Midcap Value Index**® measures the performance of those Russell Midcap companies with lower price-to-book ratios and lower forecasted growth values. The stocks are also members of the Russell 1000 Value index.

The **S&P 500 Index** is widely regarded as the best single gauge of the U.S. equities market. The index includes a representative sample of 500 leading companies in leading industries of the U.S. economy. The **S&P 500 Index** focuses on the large-cap segment of the market; however, since it includes a significant portion of the total value of the market, it also represents the market.

*Fixed income:*

The **Bloomberg Barclays 1-3 Month U.S. Treasury Bill Index** includes all publicly issued zero-coupon US Treasury Bills that have a remaining maturity of less than 3 months and more than 1 month, are rated investment grade, and have \$250 million or more of outstanding face value. In addition, the securities must be denominated in U.S. dollars and must be fixed rate and non convertible.

The **Bloomberg Barclays Global High Yield Index** is a multi-currency flagship measure of the global high yield debt market. The index represents the union of the US High Yield, the Pan-European High Yield, and Emerging Markets (EM) Hard Currency High Yield Indices. The high yield and emerging markets sub-components are mutually exclusive. Until January 1, 2011, the index also included CMBS high yield securities.

The **Bloomberg Barclays Municipal Index** consists of a broad selection of investment-grade general obligation and revenue bonds of maturities ranging from one year to 30 years. It is an unmanaged index representative of the tax-exempt bond market.

The **Bloomberg Barclays US Dollar Floating Rate Note (FRN) Index** provides a measure of the U.S. dollar denominated floating rate note market.

The **Bloomberg Barclays US Corporate Investment Grade Index** is an unmanaged index consisting of publicly issued US Corporate and specified foreign debentures and secured notes that are rated investment grade (Baa3/BBB or higher) by at least two ratings agencies, have at least one year to final maturity and have at least \$250 million par amount outstanding. To qualify, bonds must be SEC-registered.

The **Bloomberg Barclays US High Yield Index** covers the universe of fixed rate, non-investment grade debt. Eurobonds and debt issues from countries designated as emerging markets (sovereign rating of Baa1/BBB+/BBB+ and below using the middle of Moody's, S&P, and Fitch) are excluded, but Canadian and global bonds (SEC registered) of issuers in non-EMG countries are included.

The **Bloomberg Barclays US Mortgage Backed Securities Index** is an unmanaged index that measures the performance of investment grade fixed-rate mortgage backed pass-through securities of GNMA, FNMA and FHLMC.

The **Bloomberg Barclays US TIPS Index** consists of Inflation-Protection securities issued by the U.S. Treasury.

The **J.P. Morgan Emerging Market Bond Global Index (EMBI)** includes U.S. dollar denominated Brady bonds, Eurobonds, traded loans and local market debt instruments issued by sovereign and quasi-sovereign entities.

The **J.P. Morgan Domestic High Yield Index** is designed to mirror the investable universe of the U.S. dollar domestic high yield corporate debt market.

The **J.P. Morgan Corporate Emerging Markets Bond Index Broad Diversified (CEMBI Broad Diversified)** is an expansion of the **J.P. Morgan Corporate Emerging Markets Bond Index (CEMBI)**. The CEMBI is a market capitalization weighted index consisting of U.S. dollar denominated emerging market corporate bonds.

The **J.P. Morgan Emerging Markets Bond Index Global Diversified (EMBI Global Diversified)** tracks total returns for U.S. dollar-denominated debt instruments issued by emerging market sovereign and quasi-sovereign entities: Brady bonds, loans, Eurobonds. The index limits the exposure of some of the larger countries.

The **J.P. Morgan GBI EM Global Diversified** tracks the performance of local currency debt issued by emerging market governments, whose debt is accessible by most of the international investor base.

The **U.S. Treasury Index** is a component of the U.S. Government index.

*Other asset classes:*

The **Alerian MLP Index** is a composite of the 50 most prominent energy Master Limited Partnerships (MLPs) that provides investors with an unbiased, comprehensive benchmark for the asset class.

The **Bloomberg Commodity Index** and related sub-indices are composed of futures contracts on physical commodities and represents twenty two separate commodities traded on U.S. exchanges, with the exception of aluminum, nickel, and zinc

The **Cambridge Associates U.S. Global Buyout and Growth Index®** is based on data compiled from 1,768 global (U.S. & ex – U.S.) buyout and growth equity funds, including fully liquidated partnerships, formed between 1986 and 2013.

The **CS/Tremont Hedge Fund Index** is compiled by Credit Suisse Tremont Index, LLC. It is an asset-weighted hedge fund index and includes only funds, as opposed to separate accounts. The Index uses the Credit Suisse/Tremont database, which tracks over 4500 funds, and consists only of funds with a minimum of US\$50 million under management, a 12-month track record, and audited financial statements. It is calculated and rebalanced on a monthly basis, and shown net of all performance fees and expenses. It is the exclusive property of Credit Suisse Tremont Index, LLC.

The **HFRI Monthly Indices (HFRI)** are equally weighted performance indexes, utilized by numerous hedge fund managers as a benchmark for their own hedge funds. The HFRI are broken down into 4 main strategies, each with multiple sub strategies. All single-manager HFRI Index constituents are included in the HFRI Fund Weighted Composite, which accounts for over 2200 funds listed on the internal HFR Database.

The **NAREIT EQUITY REIT Index** is designed to provide the most comprehensive assessment of overall industry performance, and includes all tax-qualified real estate investment trusts (REITs) that are listed on the NYSE, the American Stock Exchange or the NASDAQ National Market List.

The **NFI-ODCE**, short for NCREIF Fund Index - Open End Diversified Core Equity, is an index of investment returns reporting on both a historical and current basis the results of 33 open-end commingled funds pursuing a core investment strategy, some of which have performance histories dating back to the 1970s. The NFI-ODCE Index is capitalization-weighted and is reported gross of fees. Measurement is time-weighted.

*Definitions:*

Investing in **alternative assets** involves higher risks than traditional investments and is suitable only for sophisticated investors. Alternative investments involve greater risks than traditional investments and should not be deemed a complete investment program. They are not tax efficient and an investor should consult with his/her tax advisor prior to investing. Alternative investments have higher fees than traditional investments and they may also be highly leveraged and engage in speculative investment techniques, which can magnify the potential for investment loss or gain. The value of the investment may fall as well as rise and investors may get back less than they invested.

**Bonds** are subject to interest rate risks. Bond prices generally fall when interest rates rise.

Investments in **commodities** may have greater volatility than investments in traditional securities, particularly if the instruments involve leverage. The value of commodity-linked derivative instruments may be affected by changes in overall market movements, commodity index volatility, changes in interest rates, or factors affecting a particular industry or commodity, such as drought, floods, weather, livestock disease, embargoes, tariffs and international economic, political and regulatory developments. Use of leveraged commodity-linked derivatives creates an opportunity for increased return but, at the same time, creates the possibility for greater loss.

**Derivatives** may be riskier than other types of investments because they may be more sensitive to changes in economic or market conditions than other types of investments and could result in losses that significantly exceed the original investment. The use of derivatives may not be successful, resulting in investment losses, and the cost of such strategies may reduce investment returns.

**Distressed Restructuring Strategies** employ an investment process focused on corporate fixed income instruments, primarily on corporate credit instruments of companies trading at significant discounts to their value at issuance or obliged (par value) as a result of either formal bankruptcy proceeding or financial market perception of near term proceedings.

Investments in **emerging markets** can be more volatile. The normal risks of investing in foreign countries are heightened when investing in emerging markets. In addition, the small size of securities markets and the low trading volume may lead to a lack of liquidity, which leads to increased volatility. Also, emerging markets may not provide adequate legal protection for private or foreign investment or private property.

The price of **equity** securities may rise, or fall because of changes in the broad market or changes in a company's financial condition, sometimes rapidly and unpredictably. These price movements may result from factors affecting individual companies, sectors or industries, or the securities market as a whole, such as changes in economic or political conditions. Equity securities are subject to "stock market risk" meaning that stock prices in general may decline over short or extended periods of time.

**Equity market neutral strategies** employ sophisticated quantitative techniques of analyzing price data to ascertain information about future price movement and relationships between securities, select securities for purchase and sale. Equity Market Neutral Strategies typically maintain characteristic net equity market exposure no greater than 10% long or short.

**Global macro strategies** trade a broad range of strategies in which the investment process is predicated on movements in underlying economic variables and the impact these have on equity, fixed income, hard currency and commodity markets.

**International** investing involves a greater degree of risk and increased volatility. Changes in currency exchange rates and differences in accounting and taxation policies outside the U.S. can raise or lower returns. Some overseas markets may not be as politically and economically stable as the United States and other nations.

There is no guarantee that the use of **long and short positions** will succeed in limiting an investor's exposure to domestic stock market movements, capitalization, sector swings or other risk factors. Using long and short selling strategies may have higher portfolio turnover rates. Short selling involves certain risks, including additional costs associated with covering short positions and a possibility of unlimited loss on certain short sale positions.

**Merger arbitrage strategies** which employ an investment process primarily focused on opportunities in equity and equity related instruments of companies which are currently engaged in a corporate transaction.

**Mid-capitalization** investing typically carries more risk than investing in well-established "blue-chip" companies. Historically, mid-cap companies' stock has experienced a greater degree of market volatility than the average stock.

**Price to forward earnings** is a measure of the price-to-earnings ratio (P/E) using forecasted earnings. **Price to book value** compares a stock's market value to its book value. **Price to cash flow** is a measure of the market's expectations of a firm's future financial health. **Price to dividends** is the ratio of the price of a share on a stock exchange to the dividends per share paid in the previous year, used as a measure of a company's potential as an investment.

**Real estate** investments may be subject to a higher degree of market risk because of concentration in a specific industry, sector or geographical sector. Real estate investments may be subject to risks including, but not limited to, declines in the value of real estate, risks related to general and economic conditions, changes in the value of the underlying property owned by the trust and defaults by borrower.

**Relative Value Strategies** maintain positions in which the investment thesis is predicated on realization of a valuation discrepancy in the relationship between multiple securities.

**Small-capitalization** investing typically carries more risk than investing in well-established "blue-chip" companies since smaller companies generally have a higher risk of failure. Historically, smaller companies' stock has experienced a greater degree of market volatility than the average stock.

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Unless otherwise stated, all data are as of December 31, 2018 or most recently available.

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