MARKET INSIGHTS

Guide to the Markets®

U.S. | 4Q 2016 | As of September 30, 2016

J.P.Morgan Asset Management

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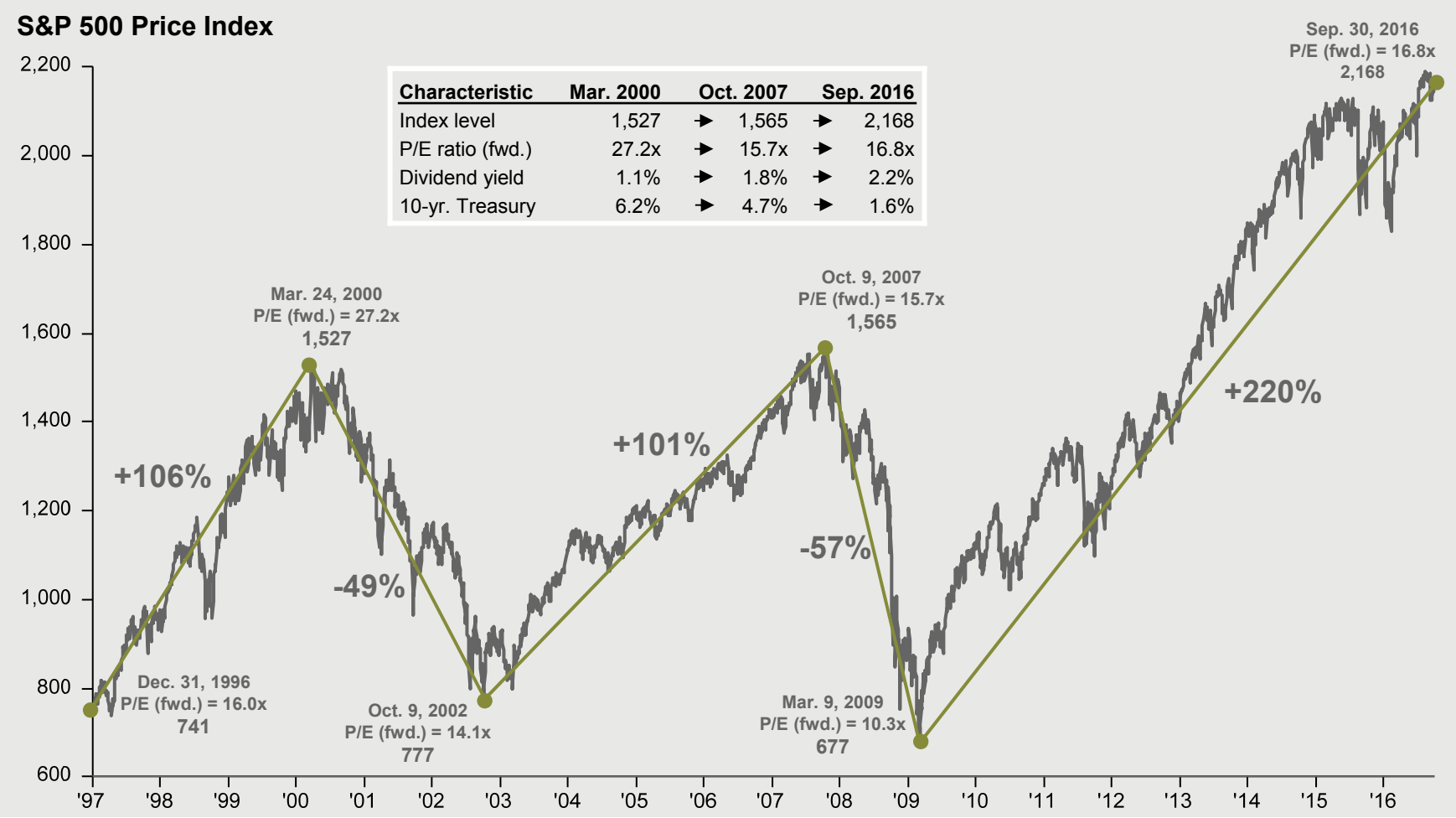
S&P 500 Index at inflection points

Equities



Characteristic	Mar. 2000		Oct. 2007		Sep. 2016
Index level	1,527	→	1,565	→	2,168
P/E ratio (fwd.)	27.2x	→	15.7x	→	16.8x
Dividend yield	1.1%	→	1.8%	→	2.2%
10-yr. Treasury	6.2%	→	4.7%	→	1.6%

Source: Compustat, FactSet, 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.
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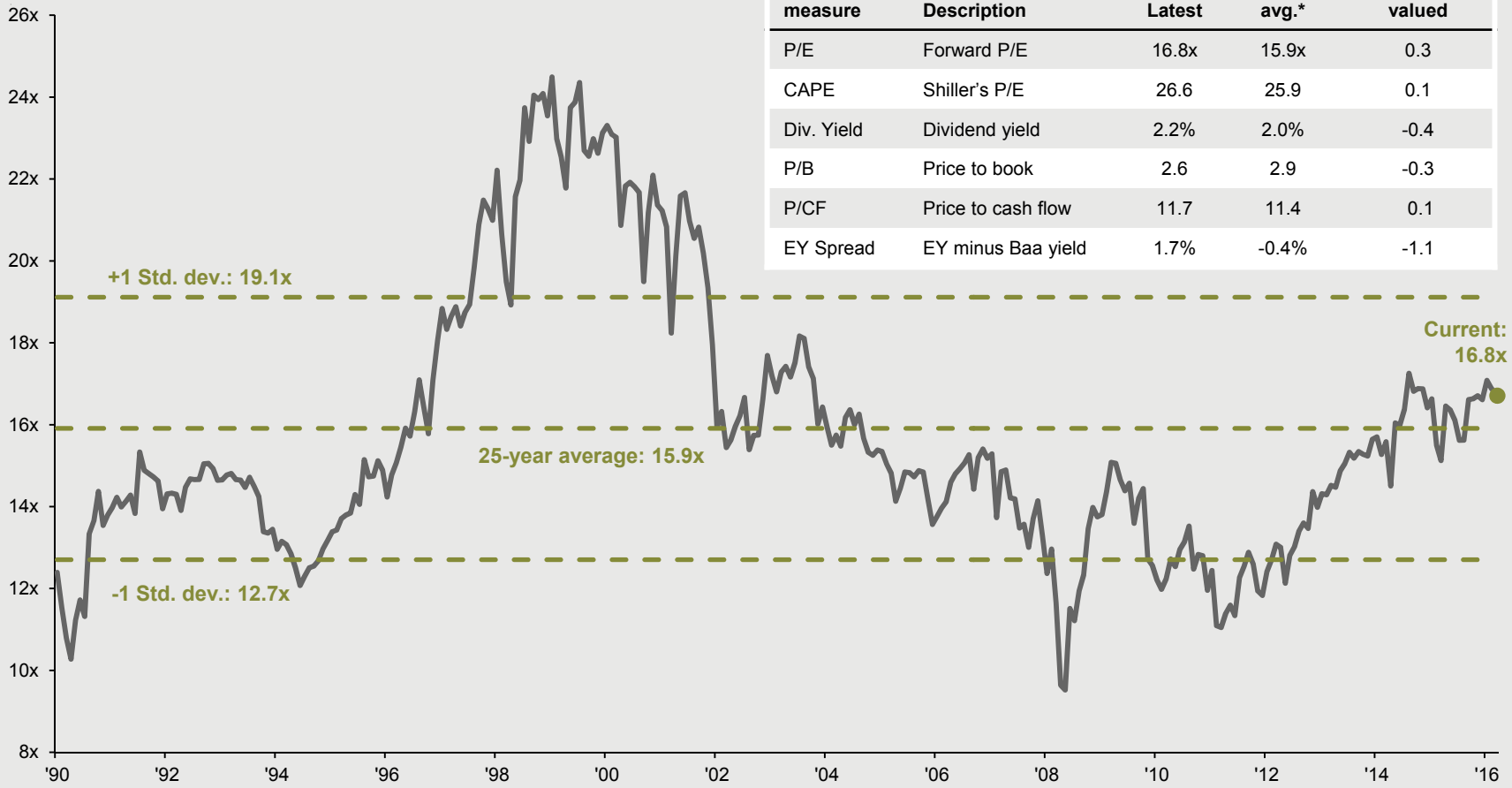
S&P 500 valuation measures

Equities

S&P 500 Index: Forward P/E ratio



Valuation measure	Description	Latest	25-year avg.*	Std. dev. Over-/under-valued
P/E	Forward P/E	16.8x	15.9x	0.3
CAPE	Shiller's P/E	26.6	25.9	0.1
Div. Yield	Dividend yield	2.2%	2.0%	-0.4
P/B	Price to book	2.6	2.9	-0.3
P/CF	Price to cash flow	11.7	11.4	0.1
EY Spread	EY minus Baa yield	1.7%	-0.4%	-1.1

Source: FactSet, FRB, Robert Shiller, Standard & Poor's, J.P. Morgan Asset Management.
Price to earnings is price divided by consensus analyst estimates of earnings per share for the next 12 months. 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.
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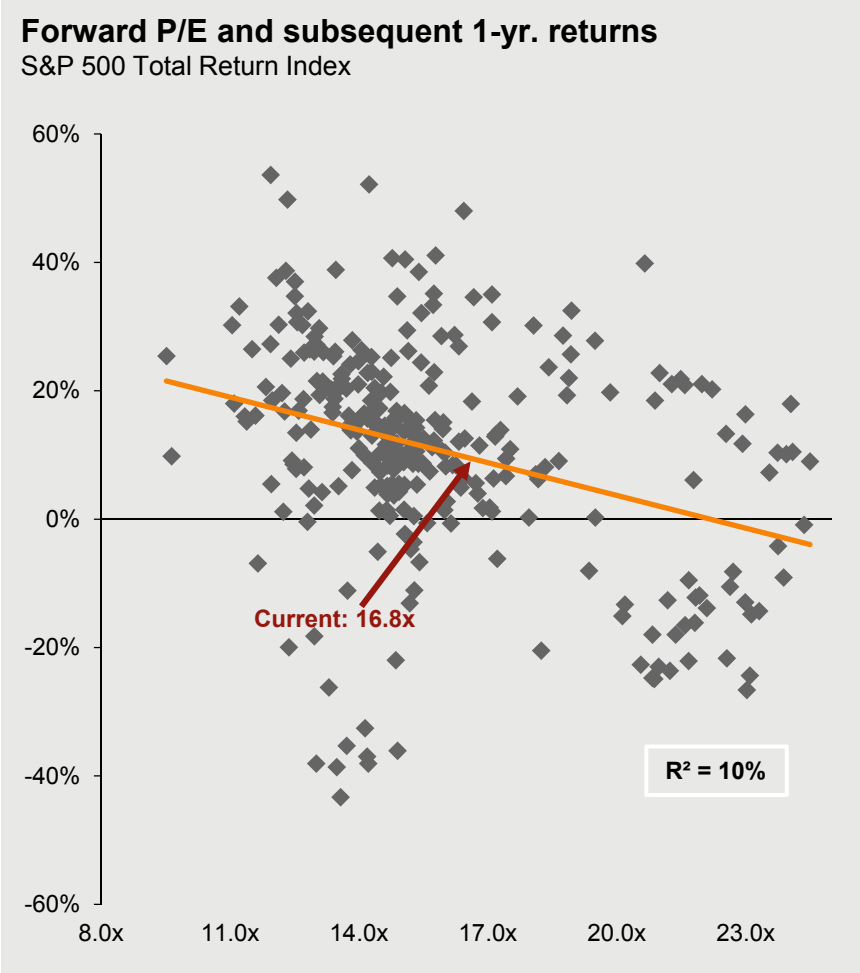
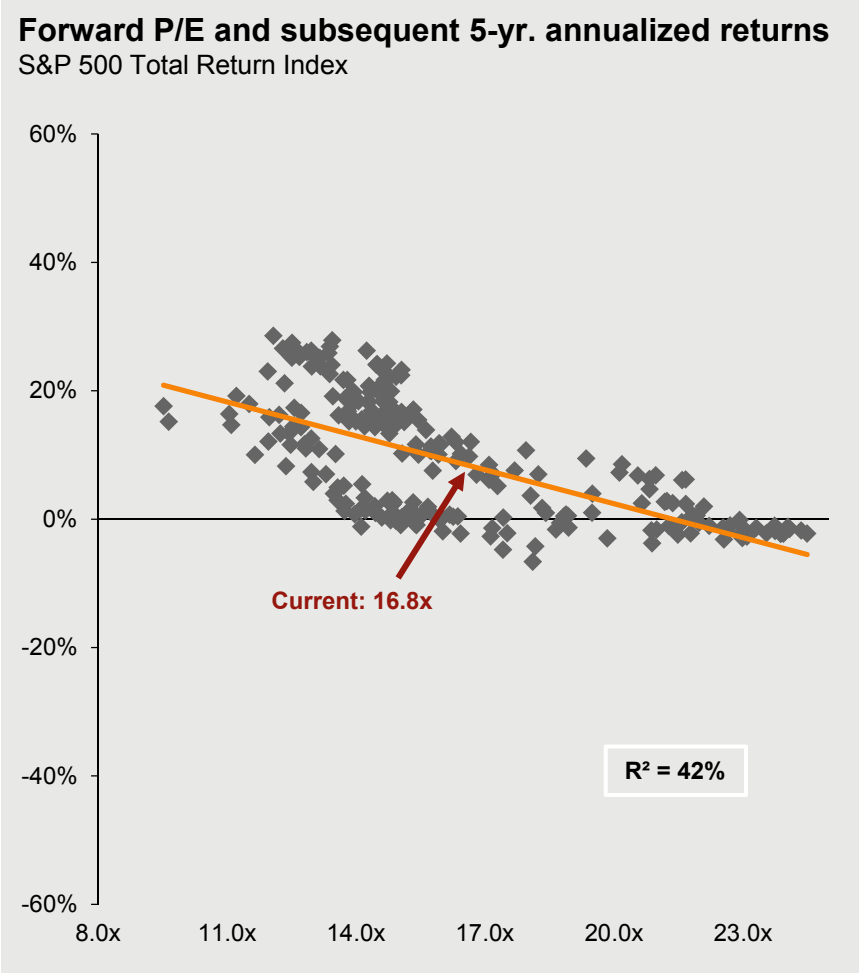
P/E ratios and equity returns





Source: FactSet, Reuters, Standard & Poor's, J.P. Morgan Asset Management.
Returns are 12-month and 60-month annualized total returns, measured monthly, beginning September 30, 1991. R^2 represents the percent of total variation in total returns that can be explained by forward P/E ratios.
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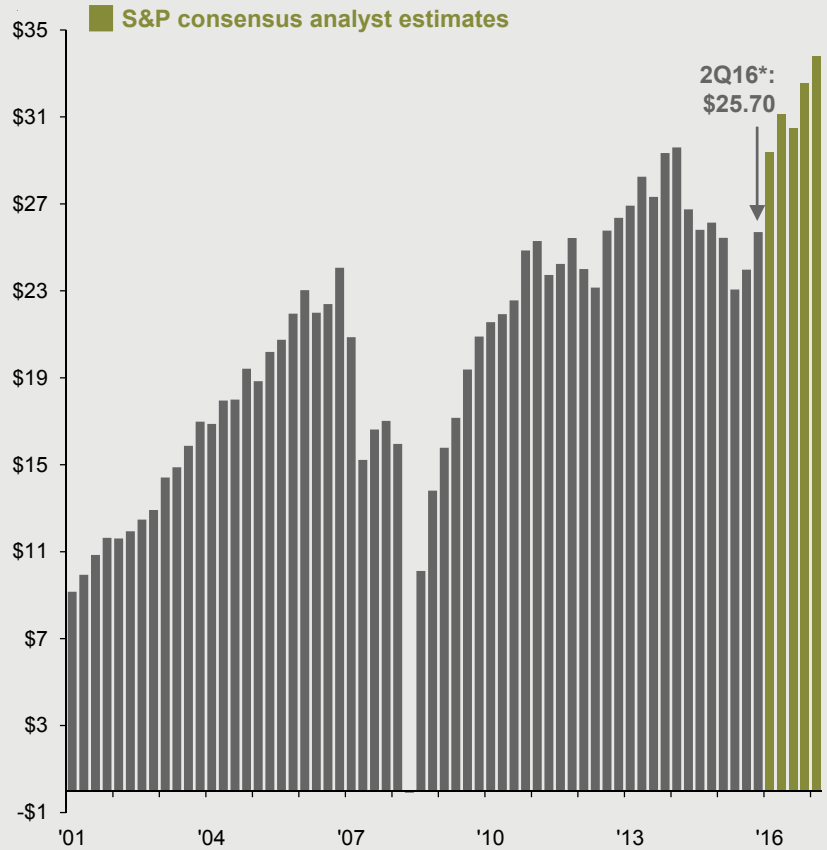
Asset Management

Equities

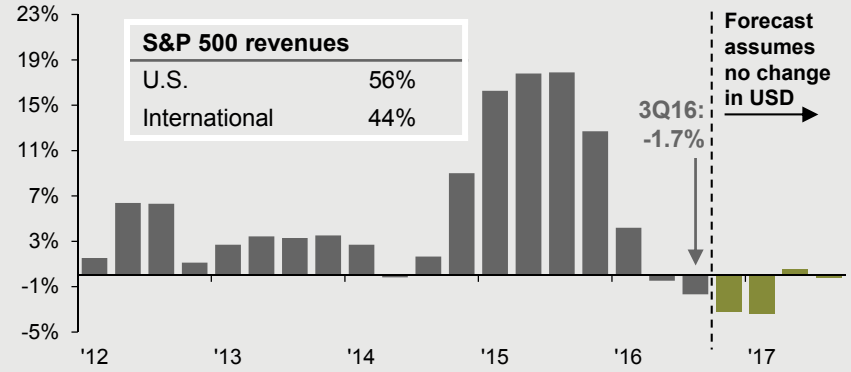
S&P 500 earnings per share

Index quarterly operating earnings



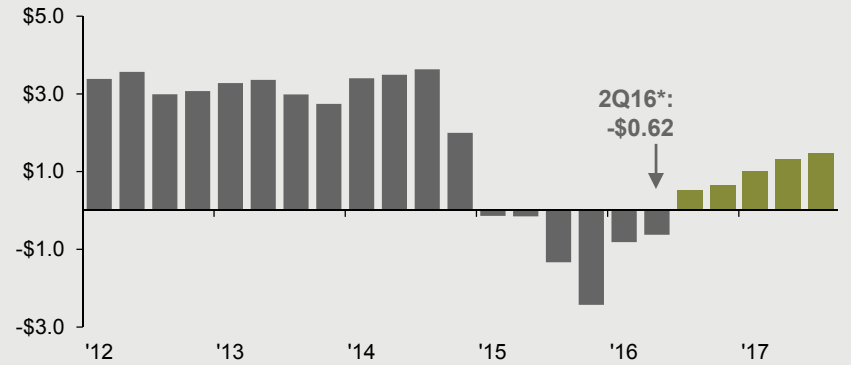
U.S. dollar

Year-over-year % change**, quarterly, USD major currencies index



Energy sector earnings

Energy sector contribution to S&P 500 EPS, quarterly



Source: Compustat, FactSet, Standard & Poor's, J.P. Morgan Asset Management; (Top right) Federal Reserve, S&P 500 individual company 10k filings, S&P Index Alert.

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. Currencies in the Trade Weighted U.S. Dollar Major Currencies Index are: British pound, euro, Swedish krona, Australian dollar, Canadian dollar, Japanese yen and Swiss franc. *2Q16 earnings are calculated using actual earnings for 98.6% of S&P 500 market cap and earnings estimates for the remaining 1.4% of companies. **Year-over-year change is calculated using the quarterly average for each period. USD forecast assumes no change in the U.S. dollar from its September 30, 2016 level.

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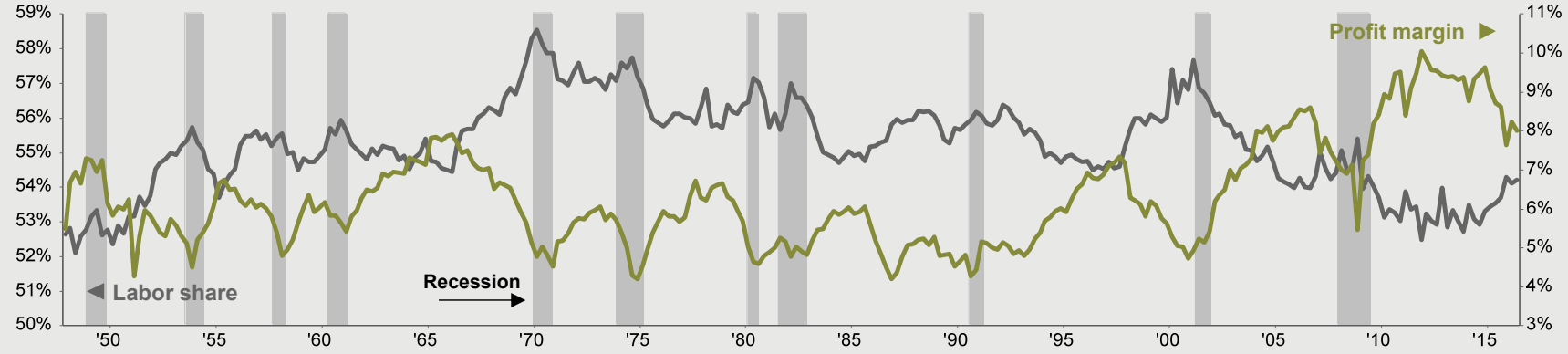
J.P.Morgan Asset Management

Equities

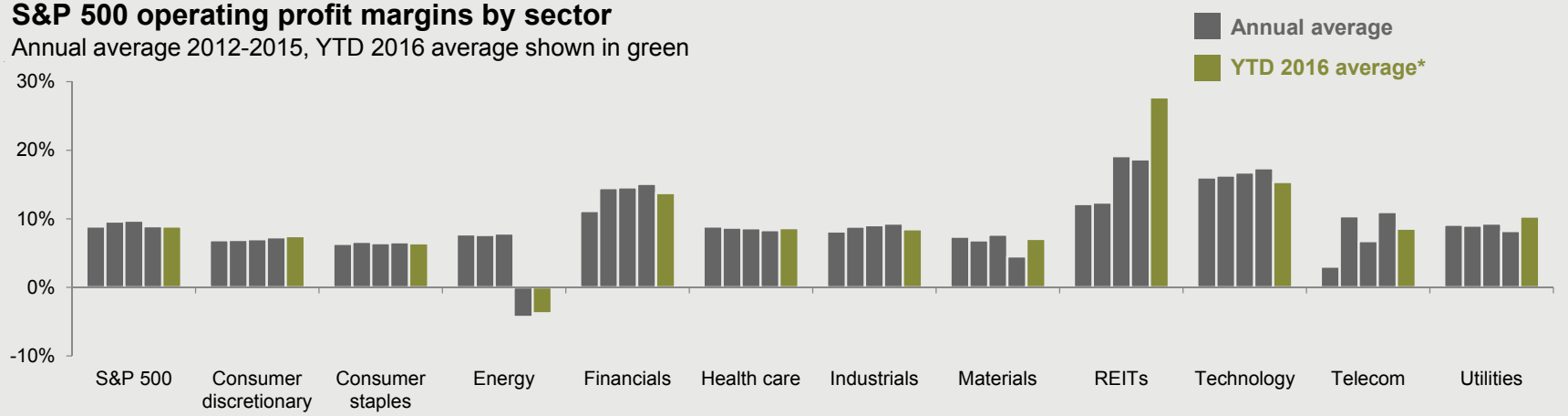
Labor share of income and profit margins

Employee compensation % nominal GDP, after-tax corporate profits with inventory & valuation adjustment % nominal GDP, SAAR



S&P 500 operating profit margins by sector

Annual average 2012-2015, YTD 2016 average shown in green



Source: FactSet, J.P. Morgan Asset Management; (Top) BEA; (Bottom) Standard & Poor's.
*YTD 2016 profit margin estimates are the average of reported data for 1Q16 and estimates for 2Q16. Estimates are based on actual earnings for 98.6% of the S&P 500 market cap and estimates for the remaining 1.4%.
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Returns and valuations by style

Equities

QTD

	Value	Blend	Growth
Large	3.5%	3.9%	4.6%
Mid	4.4%	4.5%	4.6%
Small	8.9%	9.0%	9.2%

YTD

	Value	Blend	Growth
Large	10.0%	7.8%	6.0%
Mid	13.7%	10.3%	6.8%
Small	15.5%	11.5%	7.5%

Since market peak (October 2007)

	Value	Blend	Growth
Large	50.4%	68.4%	90.5%
Mid	82.4%	82.9%	80.8%
Small	58.3%	67.9%	76.7%

Since market low (March 2009)

	Value	Blend	Growth
Large	274.9%	276.3%	288.5%
Mid	365.7%	341.4%	318.0%
Small	291.4%	304.8%	316.9%

Current P/E vs. 15-year avg. P/E*

	Value	Blend	Growth
Large	15.8 / 13.8	16.8 / 15.4	18.4 / 17.8
Mid	16.7 / 14.7	18.1 / 16.4	20.1 / 19.4
Small	17.5 / 16.5	22.3 / 20.1	30.5 / 27.1

Current P/E as % of 15-year avg. P/E*

	Value	Blend	Growth
Large	114.2%	109.0%	103.3%
Mid	113.8%	110.4%	103.4%
Small	105.9%	110.7%	112.5%

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 – 9/30/16, illustrating market returns since the S&P 500 Index high on 10/9/07. Since Market Low represents period 3/9/09 – 9/30/16, 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 indexes 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.
*Timeframe of average valuation decreased from 20 to 15 years because of a discontinued data series. The new data series shown is the next 12-months FactSet Market Aggregate Price to Earnings ratio.
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J.P.Morgan Asset Management

Returns and valuations by sector

Equities

	Financials	Technology	Health Care	Industrials	Energy	Cons. Discr.	Cons. Staples	Telecom	Utilities	Real Estate	Materials	S&P 500 Index	
S&P weight	**12.8%**	**21.2%**	**14.7%**	**9.7%**	**7.3%**	**12.5%**	**9.9%**	**2.6%**	**3.3%**	**3.1%**	**2.9%**	**100.0%**	Weight
Russell Growth weight	2.7%	31.5%	16.8%	10.4%	0.6%	20.6%	9.6%	1.2%	0.1%	2.8%	3.6%	100.0%	
Russell Value weight	23.4%	10.0%	11.5%	9.5%	13.5%	4.9%	8.9%	3.9%	6.5%	5.1%	2.9%	100.0%	
QTD	4.6	12.9	0.9	4.1	2.3	2.9	-2.6	-5.6	-5.9	-2.1	3.7	3.9	Return (%)
YTD	1.4	12.5	1.4	10.9	18.7	3.6	7.6	17.9	16.1	8.2	11.4	7.8	
Since market peak (October 2007)	-19.8	112.8	137.0	64.7	9.5	146.2	143.4	49.2	70.1	58.0	36.3	68.4	
Since market low (March 2009)	338.1	346.0	282.0	352.6	100.5	469.9	241.3	185.1	197.7	485.7	224.6	276.3	
Beta to S&P 500	1.42	1.10	0.73	1.19	0.98	1.11	0.58	0.61	0.47	1.32	1.28	1.00	β
Correl. to Treas. yields	0.59	0.36	0.19	0.30	0.34	0.36	-0.11	-0.08	-0.66	-0.41	0.40	0.37	ρ
Forward P/E ratio	12.2x	17.0x	15.1x	16.6x	55.5x	17.8x	19.9x	13.6x	17.2x	18.4x	16.7x	16.8x	P/E
20-yr avg.	**13.1x**	**22.4x**	**18.9x**	**17.5x**	**17.3x**	**19.4x**	**20.0x**	**17.9x**	**14.4x**	**18.5x**	**16.5x**	**17.2x**	
Trailing P/E ratio	13.2x	21.4x	21.9x	19.0x	26.1x	20.2x	22.4x	15.0x	21.8x	31.2x	18.9x	19.5x	
20-yr avg.	**15.9x**	**25.8x**	**24.1x**	**20.3x**	**16.6x**	**19.1x**	**21.2x**	**20.2x**	**15.6x**	**34.2x**	**19.2x**	**19.6x**	
Dividend yield	2.2%	1.6%	1.8%	2.4%	2.7%	1.7%	2.8%	4.7%	3.7%	3.6%	2.3%	2.2%	Div
20-yr avg.	**2.3%**	**1.0%**	**1.7%**	**2.1%**	**2.2%**	**1.3%**	**2.3%**	**3.8%**	**3.9%**	**3.6%**	**2.2%**	**1.9%**	

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 – 9/30/16. Since market low represents period 3/9/09 – 9/30/16. Correlation to Treasury yields are trailing 2-year monthly correlations between S&P 500 sector price returns and 10-year Treasury yield movements. 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. Historical data can change as new information becomes available. Note that P/E ratios for the S&P 500 may differ from estimates elsewhere in this book due to the use of a bottom-up calculation of constituent earnings (as described) rather than a top-down calculation. This methodology is used to allow proper comparison of sector level data to broad index level data. 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. Betas are calculated on a monthly frequency over the past 10 years. Past performance is not indicative of future returns.
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Sector weights and factor performance

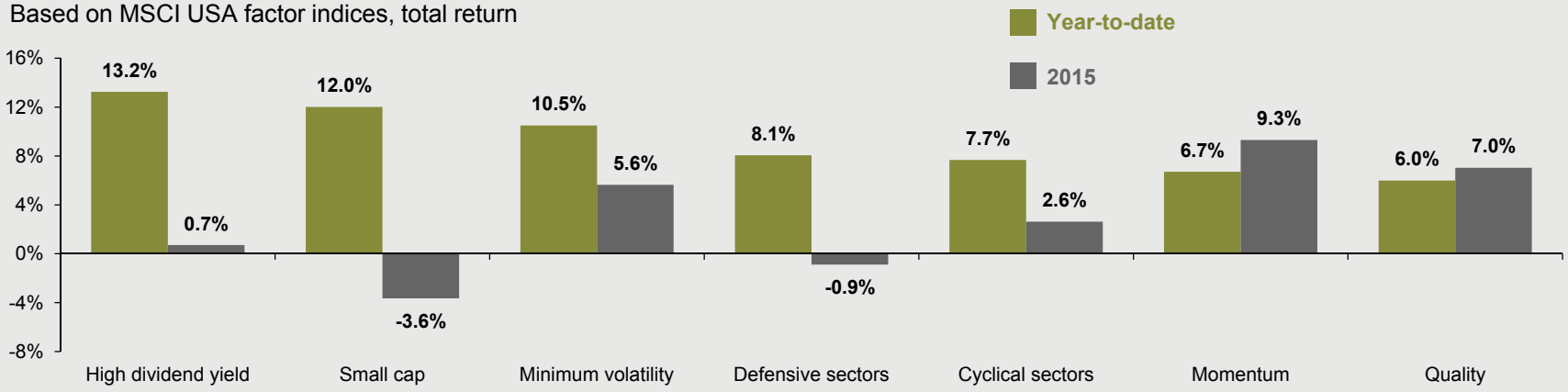
Sector weights over time

S&P 500 sector weights

	'90	'91	'92	'93	'94	'95	'96	'97	'98	'99	'00	'01	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13	'14	'15	'16
Financials	7.5	8.7	10.6	11.2	10.7	13.1	15.0	17.2	15.4	13.0	17.3	17.6	20.1	20.2	20.1	20.5	21.1	16.6	12.3	13.2	14.6	11.6	13.4	14.3	14.3	13.8	9.8
Tech.	6.3	5.3	5.1	5.9	8.6	9.4	12.4	12.3	17.7	29.2	21.2	17.6	14.3	17.7	16.1	15.1	15.1	16.7	15.3	19.9	18.6	19.0	19.0	18.6	19.7	20.7	21.2
Health Care	10.4	12.4	9.9	8.2	9.2	10.8	10.4	11.3	12.3	9.3	14.4	14.4	14.9	13.3	12.7	13.3	12.0	12.0	14.8	12.6	10.9	11.9	12.0	13.0	14.2	15.2	14.7
Industrials	13.6	13.2	13.3	13.9	13.0	12.6	12.7	11.7	10.1	9.9	10.6	11.3	11.5	10.9	11.8	11.3	10.8	11.5	11.1	10.2	10.9	10.7	10.1	10.9	10.4	10.0	9.7
Energy	13.4	10.6	9.7	10.0	10.0	9.1	9.2	8.4	6.3	5.6	6.6	6.3	6.0	5.8	7.2	9.3	9.8	12.9	13.3	11.5	12.0	12.3	11.0	10.3	8.4	6.5	7.3
Cons. Disc.	12.8	14.0	15.8	16.4	14.9	13.0	11.7	12.1	12.5	12.7	10.3	13.1	13.4	11.3	11.9	10.8	10.6	8.5	8.4	9.6	10.6	10.7	11.5	12.5	12.1	12.9	12.5
Cons. Staples	14.0	15.2	14.5	12.5	13.2	12.8	12.7	12.3	11.1	7.2	8.1	8.2	9.5	11.0	10.5	9.5	9.3	10.2	12.9	11.4	10.6	11.5	10.6	9.8	9.8	10.1	9.9
Telecom	8.7	8.0	8.5	9.1	8.6	8.5	6.5	6.9	8.4	7.9	5.5	5.5	4.2	3.5	3.3	3.0	3.5	3.6	3.8	3.2	3.1	3.2	3.1	2.3	2.3	2.4	2.6
Utilities	6.2	5.8	5.6	5.6	4.8	4.5	3.7	3.3	3.0	2.2	3.8	3.1	2.9	2.8	2.9	3.4	3.6	3.6	4.2	3.7	3.3	3.9	3.4	2.9	3.2	3.0	3.3
Materials	7.2	6.8	6.9	7.1	7.1	6.1	5.7	4.5	3.1	3.0	2.3	2.6	2.8	3.0	3.1	3.0	3.0	3.3	2.9	3.6	3.7	3.5	3.6	3.5	3.2	2.8	2.9
Real Estate												0.2	0.3	0.4	0.6	0.7	1.1	1.0	1.0	1.2	1.5	1.8	2.2	1.8	2.4	2.7	3.0

Factor returns

Based on MSCI USA factor indices, total return



Source: FactSet, J.P. Morgan Asset Management; (Top) Standard & Poor's; (Bottom) MSCI. REITs data unavailable prior to 2001. The **MSCI High Dividend Yield Index** only includes securities that offer a higher than average dividend yield relative to the parent index and that pass dividend sustainability and persistence screens. The **MSCI Minimum Volatility Index** is calculated by optimizing the MSCI USA Index using an estimated security co-variance matrix to produce an index that has the lowest 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 based on 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.
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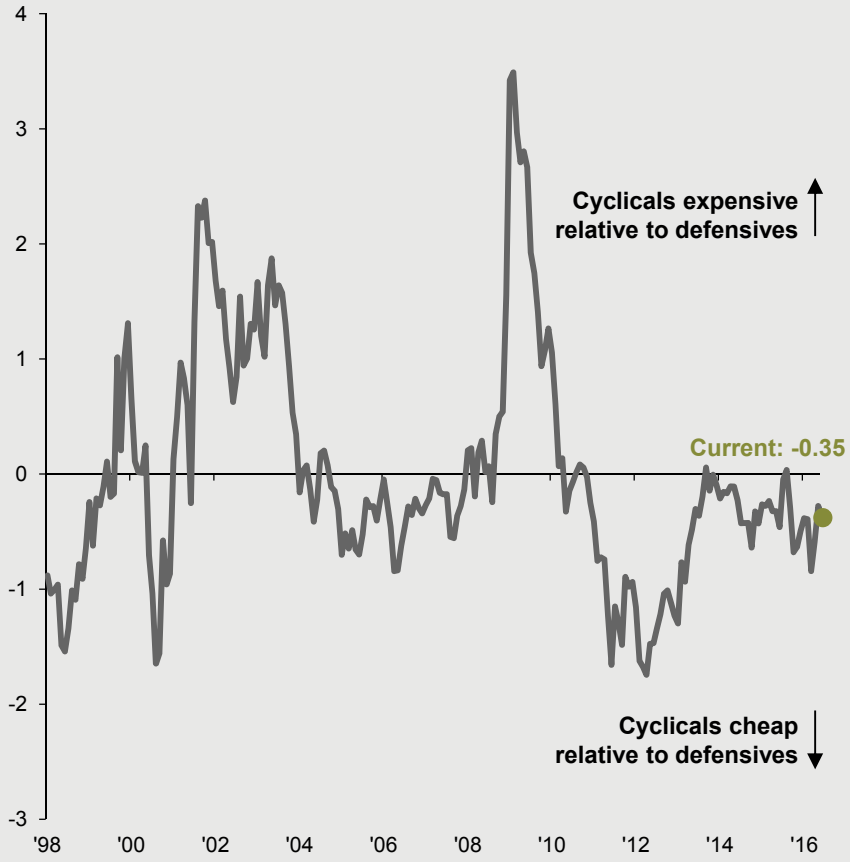
Cyclical and defensive sectors

Cyclicals ex-Energy vs. defensive valuations*

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



Cyclicals/defensives relative performance and rates

Cyclical/defensive performance**, 10-year U.S. Treasury yield

Source: FactSet, J.P. Morgan Asset Management; (Left) Standard & Poor's, (Right) MSCI.
*Cyclical sectors include Consumer Discretionary, Information Technology, Industrials, Financials 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. REITs are excluded from this analysis. Sector valuations are equal weighted. **Cyclicals represent the MSCI USA Cyclical Sector index and defensives represent the MSCI USA Defensive Sector index.
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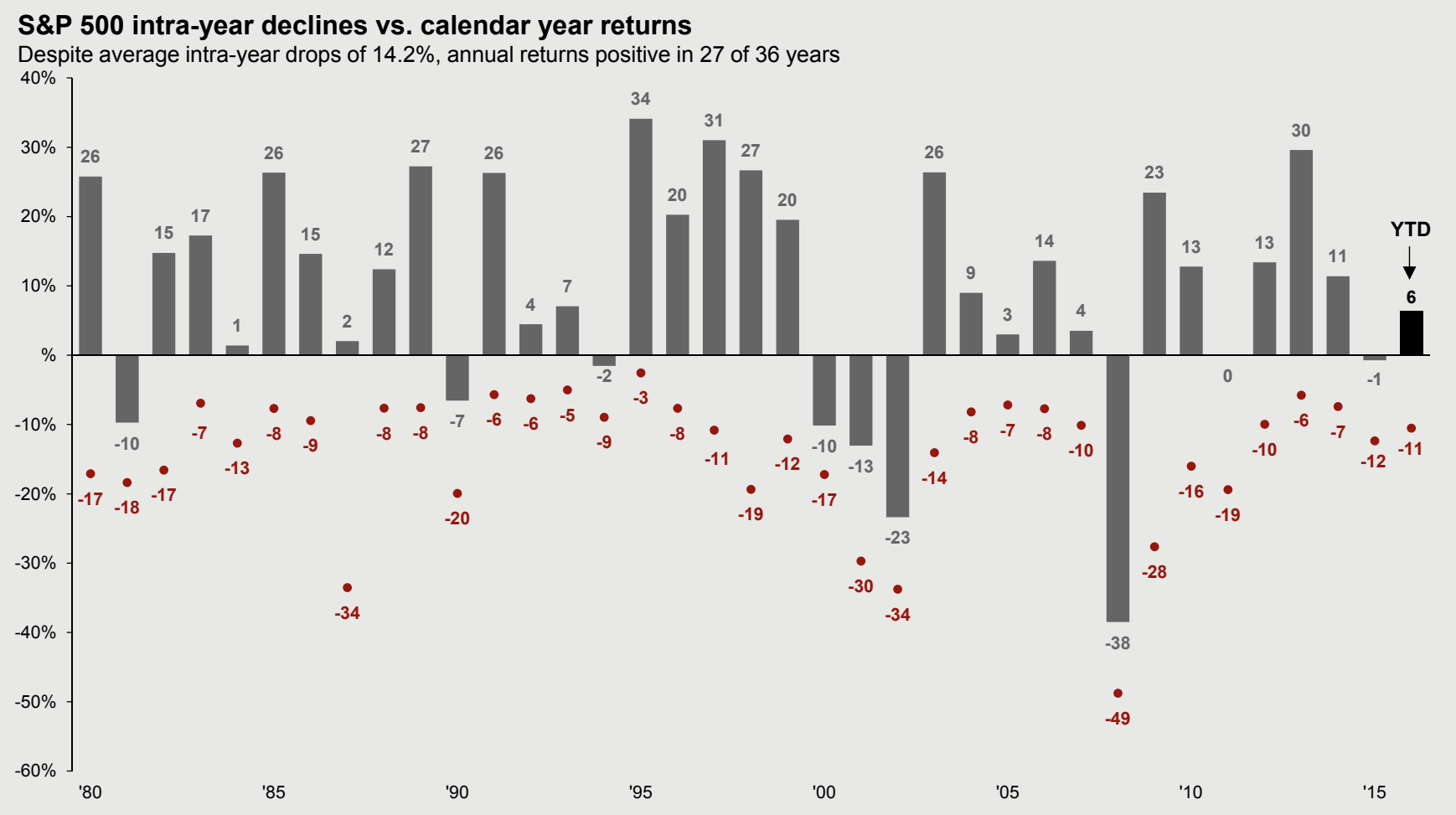
Annual returns and intra-year declines



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 2015, except for 2016, which is year to date.
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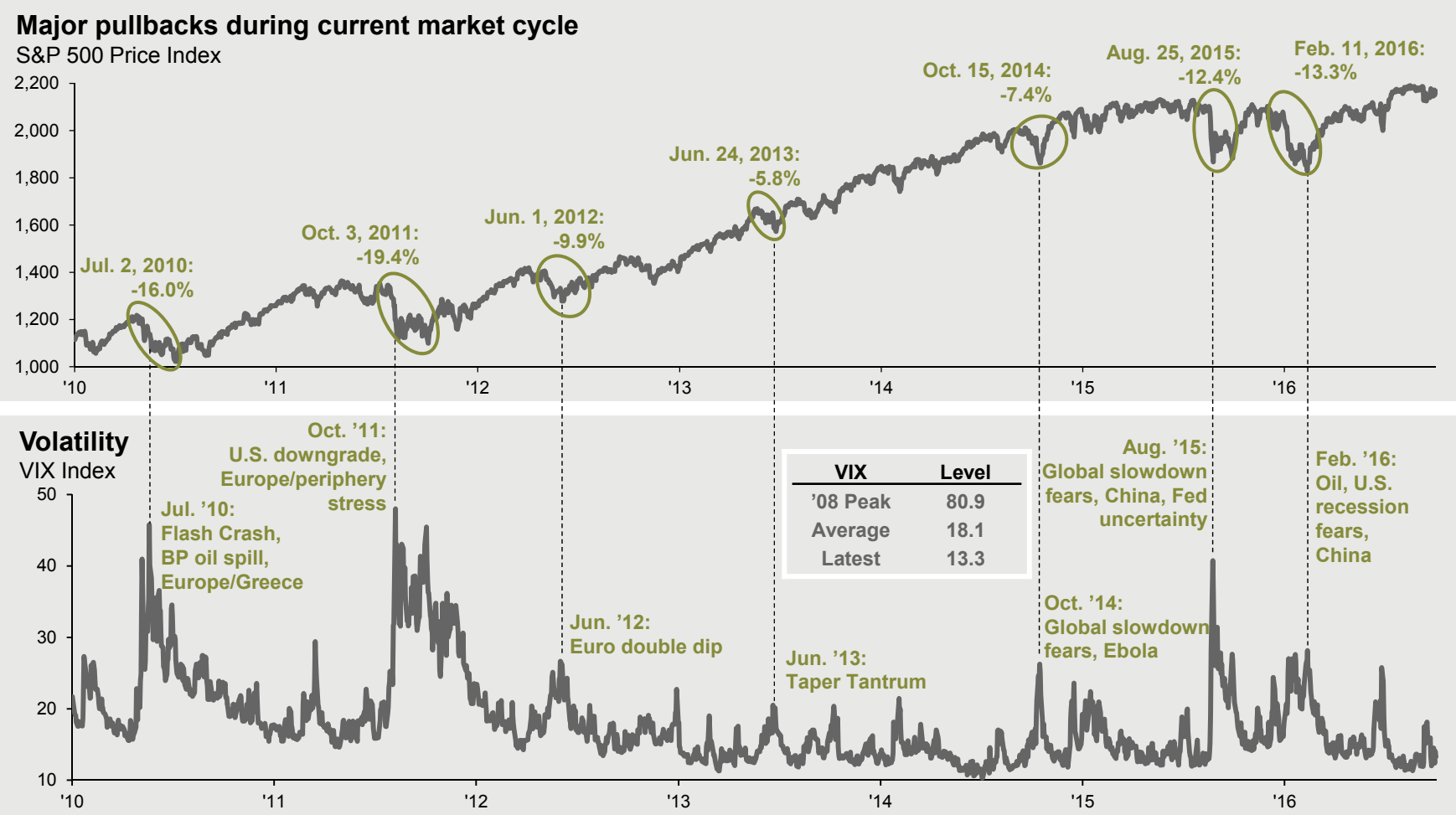
J.P.Morgan Asset Management

Equities



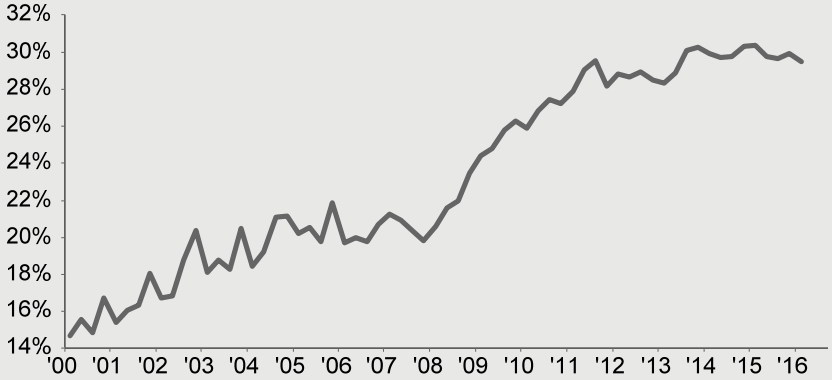
Source: FactSet, Standard & Poor's, J.P. Morgan Asset Management; (Bottom) CBOE.
Drawdowns are calculated as the prior peak to the lowest point.
Guide to the Markets – U.S. Data are as of September 30, 2016.

J.P.Morgan Asset Management

Equities

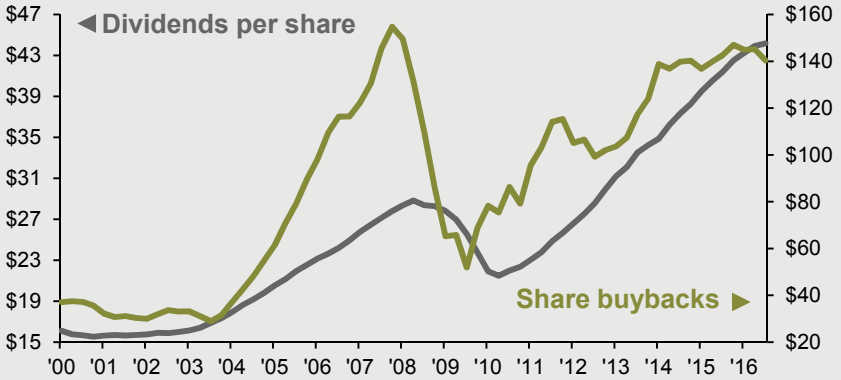
Corporate cash as a % of current assets

S&P 500 companies – cash and cash equivalents, quarterly



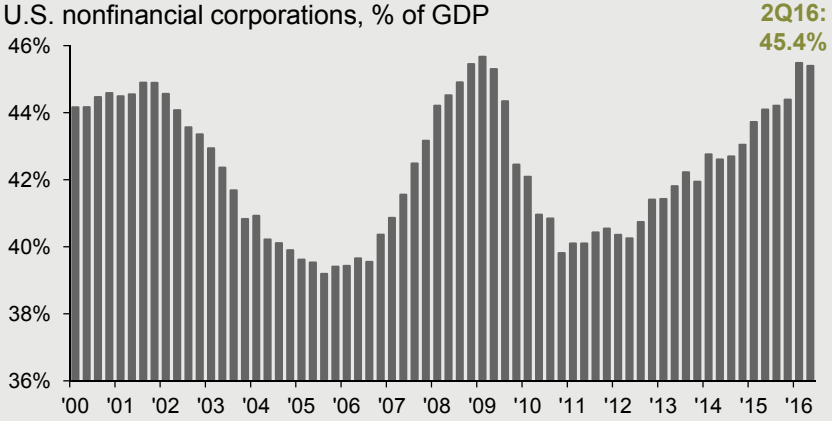
Cash returned to shareholders

S&P 500 companies, rolling 4-quarter averages, $bn



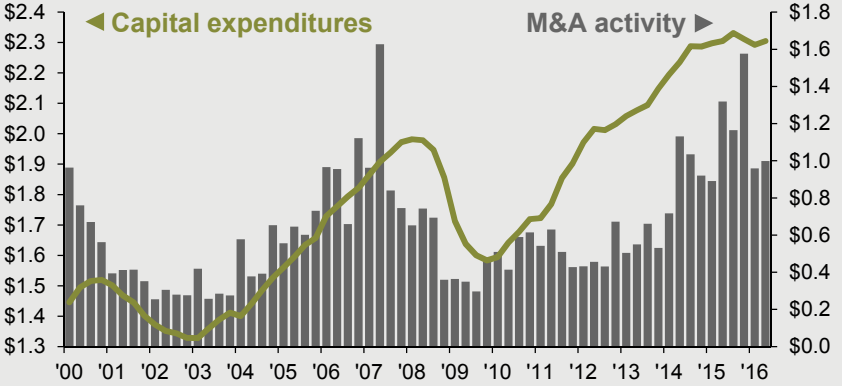
Nonfinancial corporate debt

U.S. nonfinancial corporations, % of GDP



Corporate growth

Private nonresidential fixed investment, value of deals announced, $tn

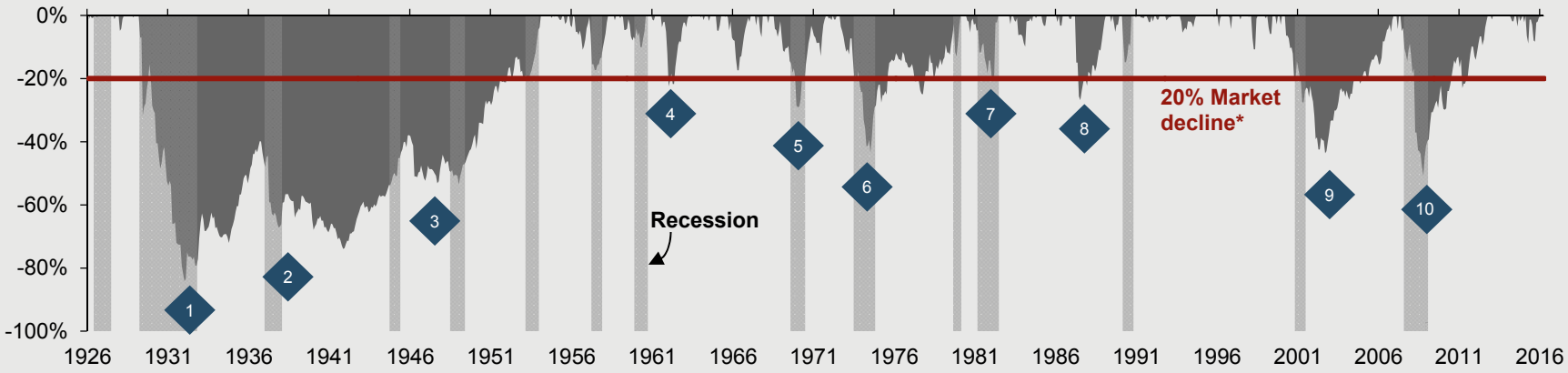


Source: FactSet, Standard & Poor's, J.P. Morgan Asset Management; (Bottom left) BEA, Federal Reserve; (Bottom right) Bloomberg, BEA.
M&A activity is the quarterly value of officially announced transactions, and capital expenditures are private nonresidential fixed domestic investment.
Guide to the Markets – U.S. Data are as of September 30, 2016.

J.P.Morgan Asset Management

Bear markets and subsequent bull runs

S&P 500 composite declines from all-time highs



Characteristics of bull and bear markets

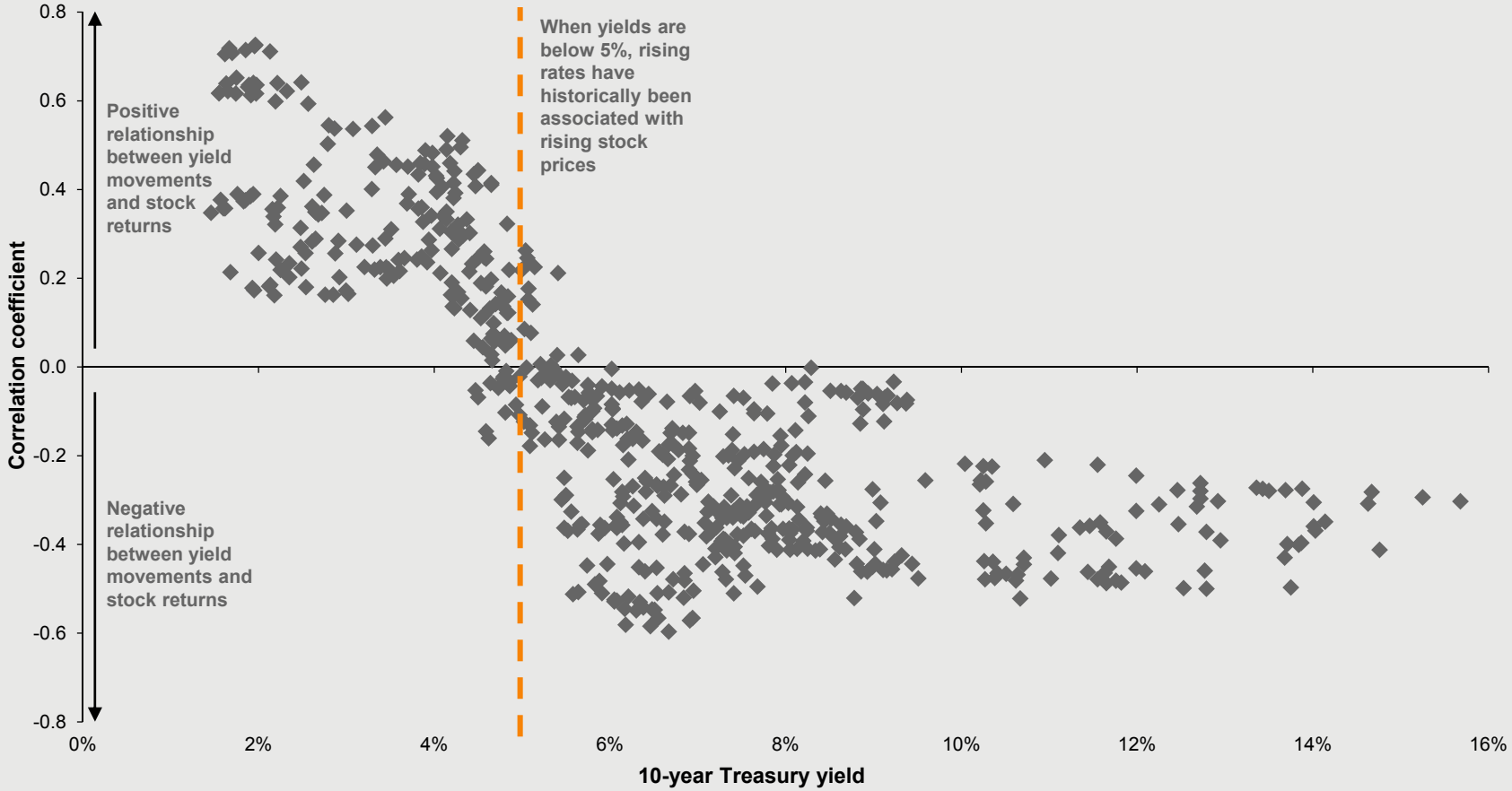
	Bear markets			Macro environment				Bull markets		
Market Corrections	Market peak	Bear return*	Duration (months)*	Recession	Commodity spike	Aggressive Fed	Extreme valuations	Bull begin date	Bull return	Duration (months)
1 Crash of 1929 - Excessive leverage, irrational exuberance	Sep 1929	-86%	33	◆			◆	Jul 1926	152%	38
2 1937 Fed Tightening - Premature policy tightening	Mar 1937	-60%	63	◆		◆		Mar 1935	129%	24
3 Post WWII Crash - Post-war demobilization, recession fears	May 1946	-30%	37	◆			◆	Apr 1942	158%	50
4 Flash Crash of 1962 - Flash crash, Cuban Missile Crisis	Dec 1961	-28%	7				◆	Oct 1960	39%	14
5 Tech Crash of 1970 - Economic overheating, civil unrest	Nov 1968	-36%	18	◆	◆	◆		Oct 1962	103%	74
6 Stagflation - OPEC oil embargo	Jan 1973	-48%	21	◆	◆			May 1970	74%	32
7 Volcker Tightening - Whip Inflation Now	Nov 1980	-27%	21	◆	◆	◆		Mar1978	62%	33
8 1987 Crash - Program trading, overheating markets	Aug 1987	-34%	3				◆	Aug 1982	229%	61
9 Tech Bubble - Extreme valuations, .com boom/bust	Mar 2000	-49%	31	◆			◆	Oct 1990	417%	115
10 Global Financial Crisis - Leverage/housing, Lehman collapse	Oct 2007	-57%	17	◆	◆	◆		Oct 2002	101%	61
Current Cycle								Mar 2009	220%	92
Averages	-	**-45%**	**25**					-	**153%**	**54**

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 bear 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 significant rapid upward moves in oil prices.
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. "Aggressive Fed Tightening" is defined as Federal Reserve monetary tightening that was unexpected and/or significant in magnitude.
Guide to the Markets – U.S. Data are as of September 30, 2016.

J.P.Morgan Asset Management

Equities

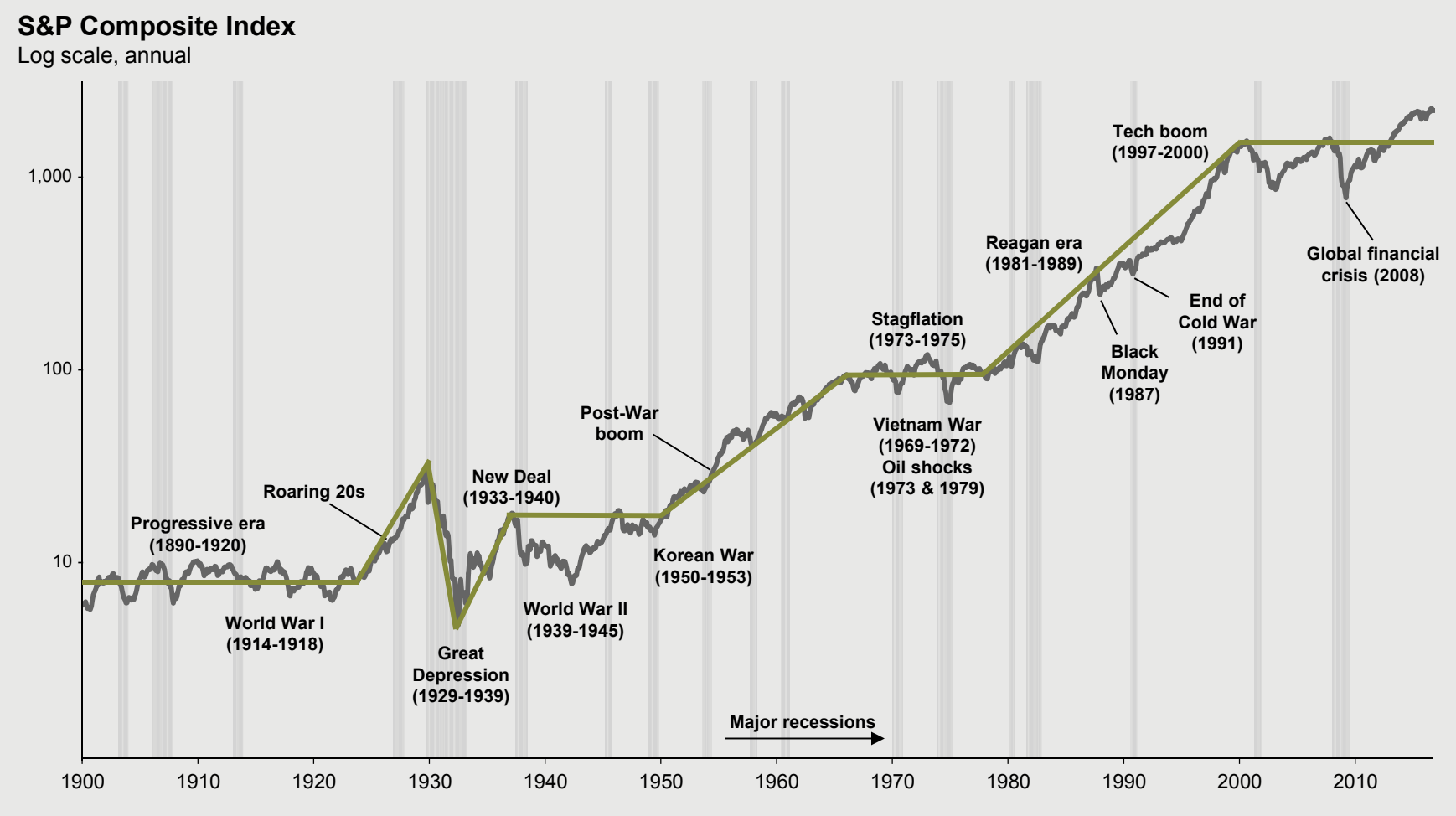
Correlations between weekly stock returns and interest rate movements
Weekly S&P 500 returns, 10-year Treasury yield, rolling 2-year correlation, May 1963 – September 2016



Source: FactSet, Standard & Poor's, FRB, 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 September 30, 2016.

J.P.Morgan Asset Management

Stock market since 1900

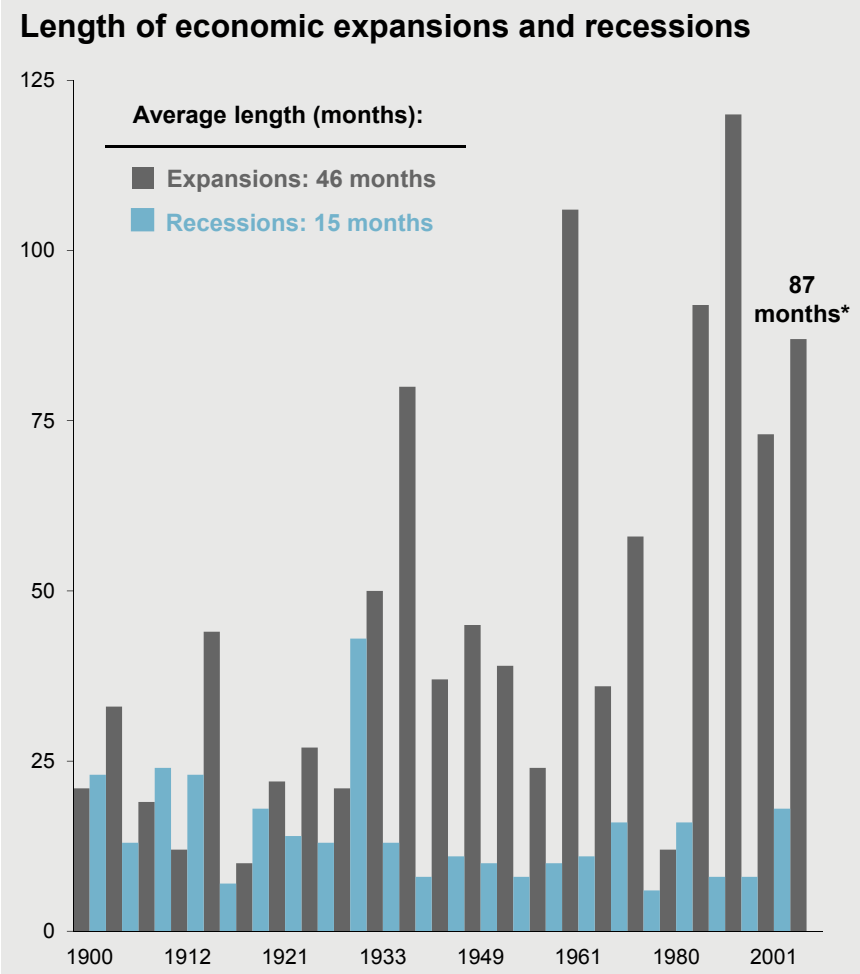


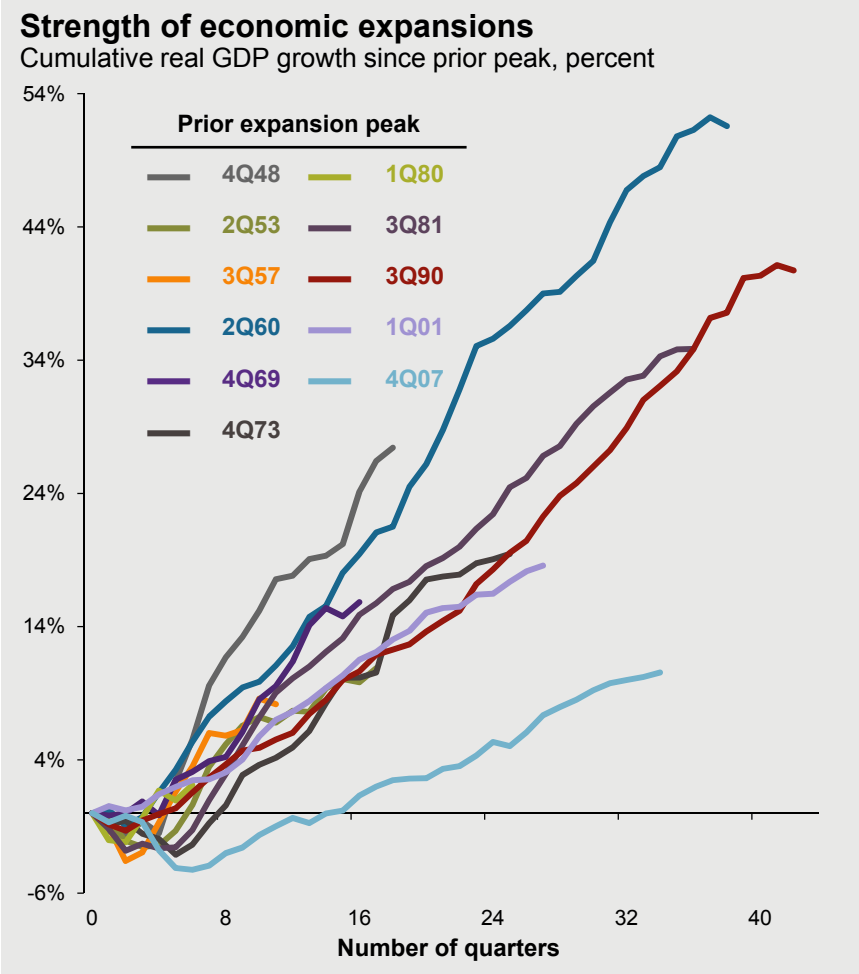
Source: FactSet, NBER, Robert Shiller, J.P. Morgan Asset Management.
Data shown in log scale to best illustrate long-term index patterns.
Past performance is not indicative of future returns. Chart is for illustrative purposes only.
Guide to the Markets – U.S. Data are as of September 30, 2016.

J.P.Morgan Asset Management

The length and strength of expansions

Economy



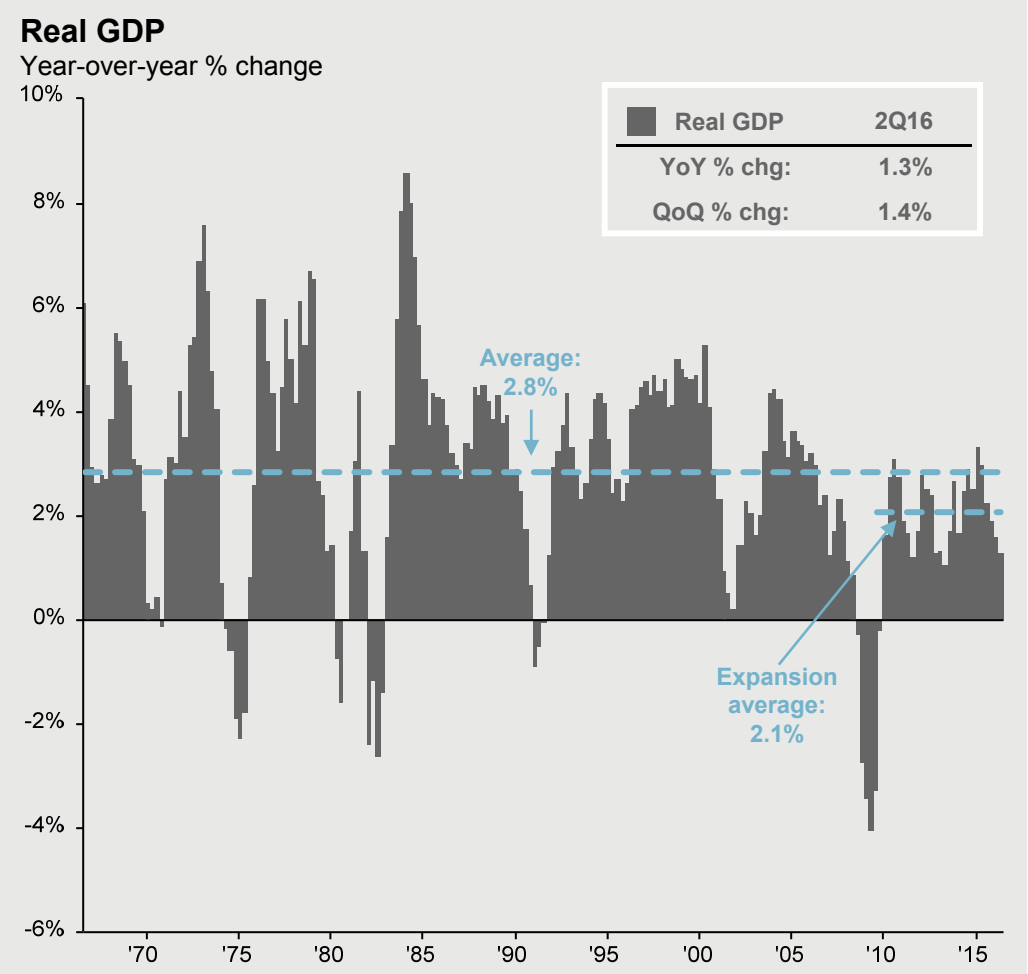


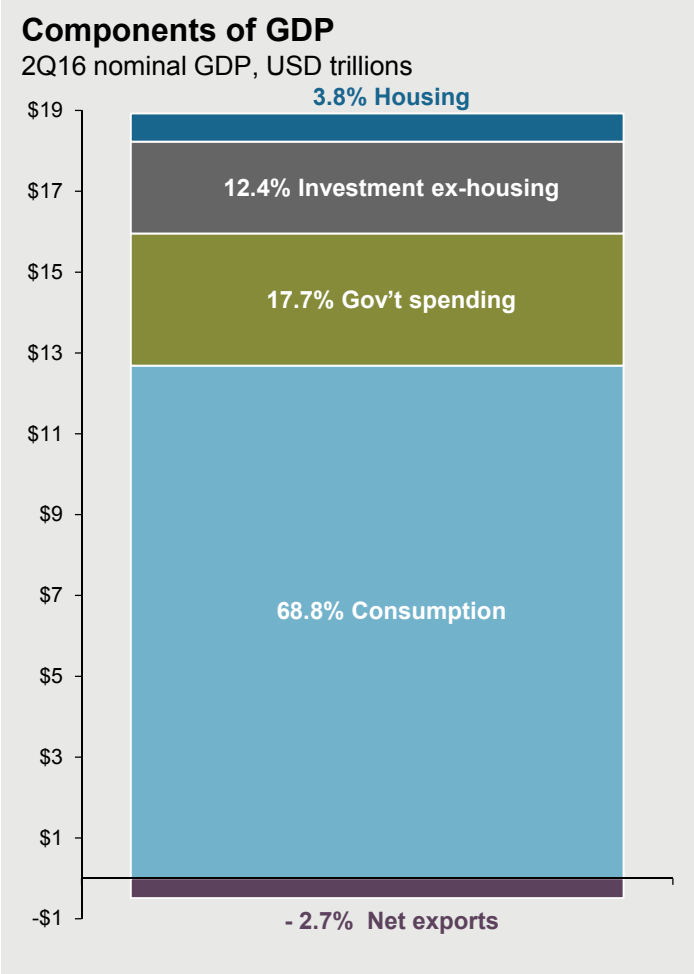
Source: BEA, NBER, J.P. Morgan Asset Management. *Chart assumes current expansion started in July 2009 and continued through September 2016, lasting 87 months so far. Data for length of economic expansions and recessions obtained from the National Bureau of Economic Research (NBER). These data can be found at www.nber.org/cycles/ and reflect information through September 2016.
Guide to the Markets – U.S. Data are as of September 30, 2016.

J.P.Morgan Asset Management

Economic growth and the composition of GDP

Economy





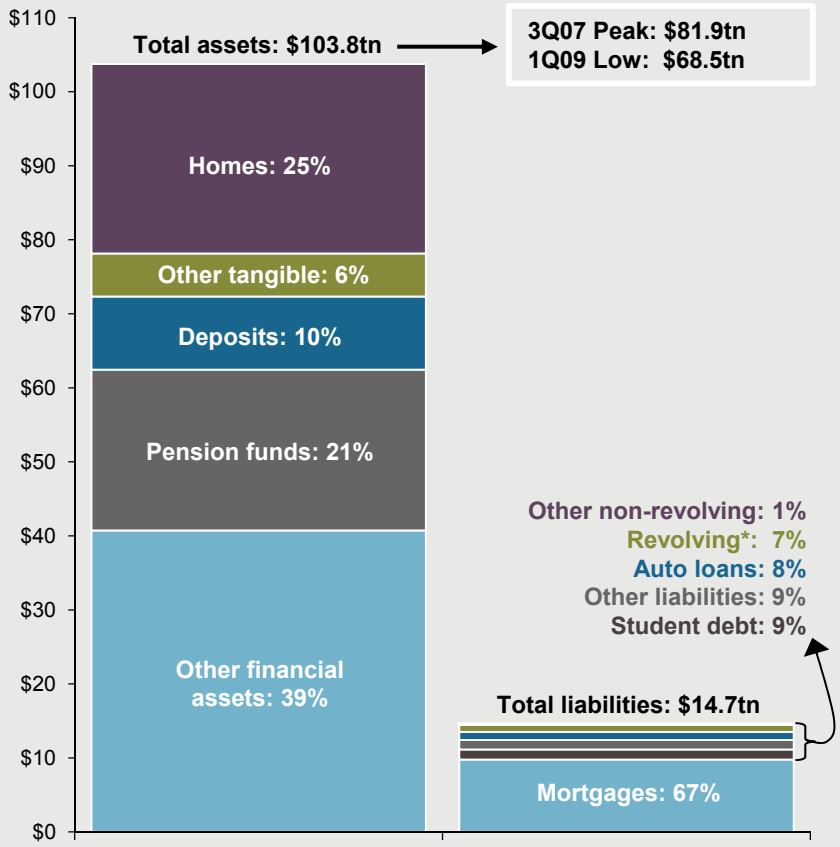
Source: BEA, FactSet, J.P. Morgan Asset Management.
Values may not sum to 100% due to rounding. Quarter-over-quarter percent changes are at an annualized rate. Average represents the annualized growth rate for the full period. Expansion average refers to the period starting in the second quarter of 2009.
Guide to the Markets – U.S. Data are as of September 30, 2016.

J.P.Morgan Asset Management

Economy

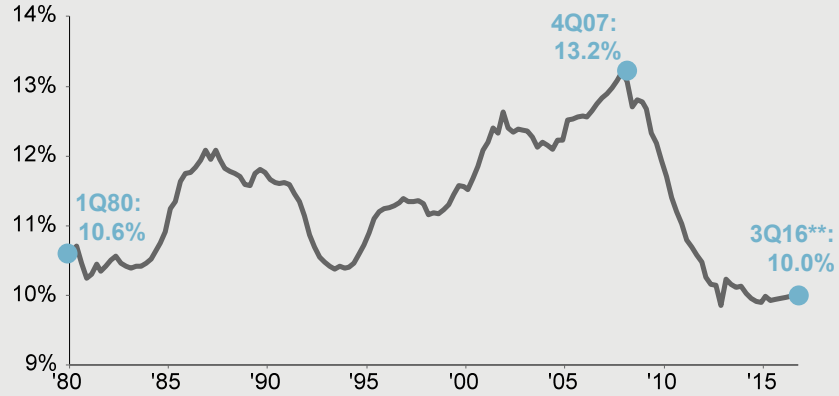
Consumer balance sheet

2Q16, trillions of dollars outstanding, not seasonally adjusted



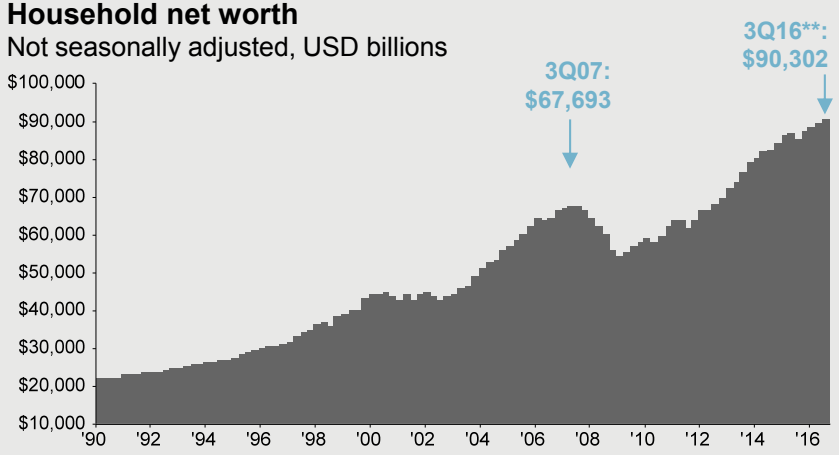
Household debt service ratio

Debt payments as % of disposable personal income, SA



Household net worth

Not seasonally adjusted, USD billions



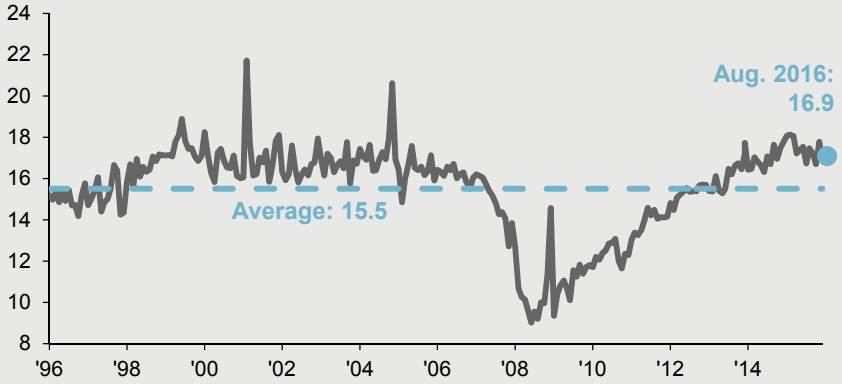
Source: FactSet, FRB, J.P. Morgan Asset Management; (Top and bottom right) BEA.
Data include households and nonprofit organizations. SA – seasonally adjusted.
*Revolving includes credit cards. **3Q16 household debt service ratio and household net worth are J.P. Morgan Asset Management estimates.
Values may not sum to 100% due to rounding.
Guide to the Markets – U.S. Data are as of September 30, 2016.

J.P.Morgan Asset Management

Economy

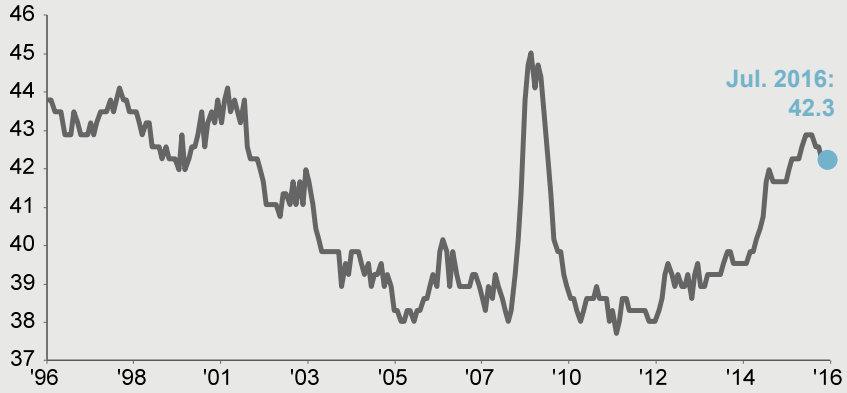
Light vehicle sales

Millions, seasonally adjusted annual rate



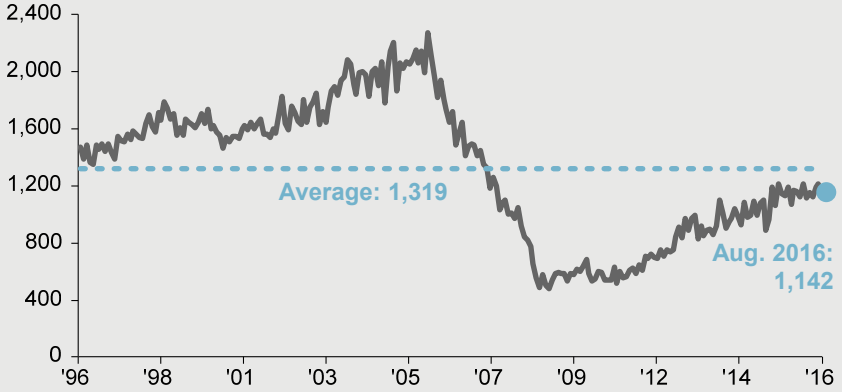
Manufacturing and trade inventories

Days of sales, seasonally adjusted



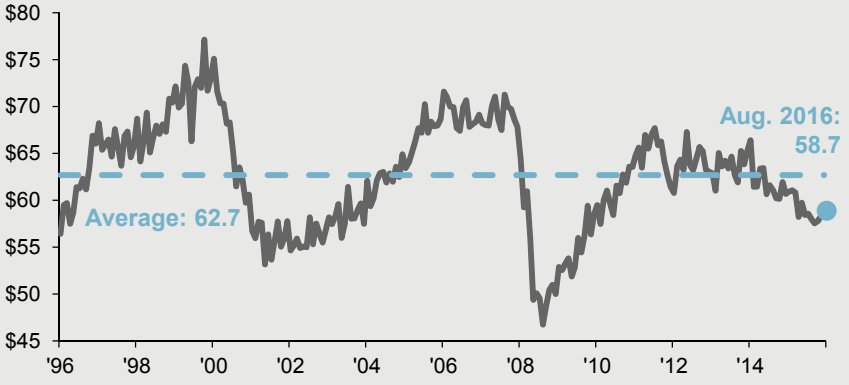
Housing starts

Thousands, seasonally adjusted annual rate



Real capital goods orders

Non-defense capital goods orders ex-aircraft, USD billions, SA

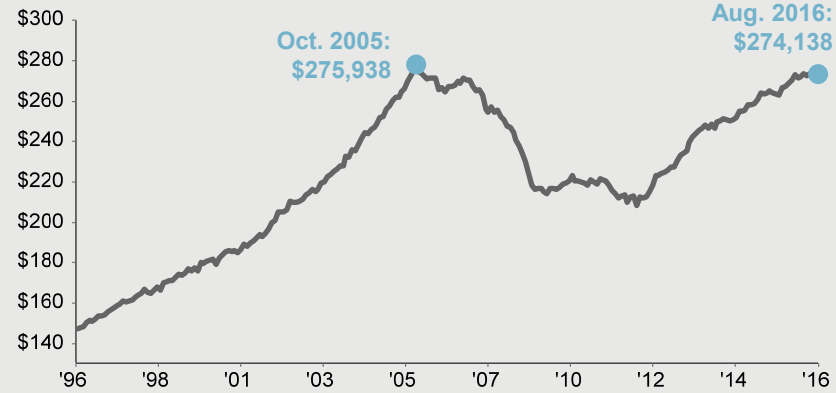


Source: J.P. Morgan Asset Management; (Top left) BEA; (Top and bottom right, bottom left) Census Bureau, FactSet.
Capital goods orders deflated using the producer price index for capital goods with a base year of 2009. August non-defense capital goods orders ex-aircraft is an advance estimate.
SA – seasonally adjusted.
Guide to the Markets – U.S. Data are as of September 30, 2016.

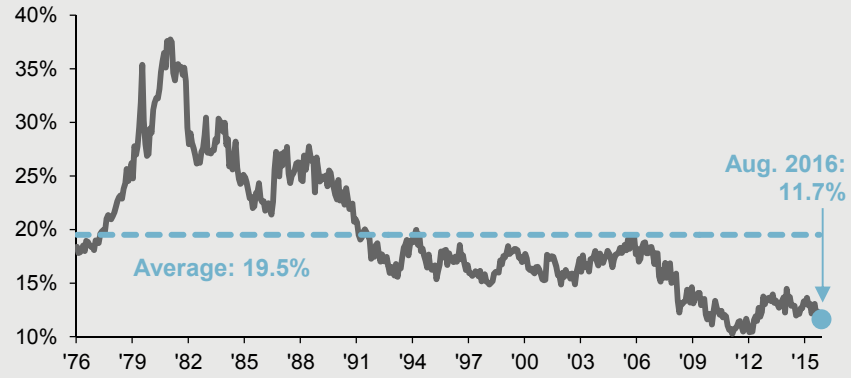
J.P.Morgan Asset Management

Economy

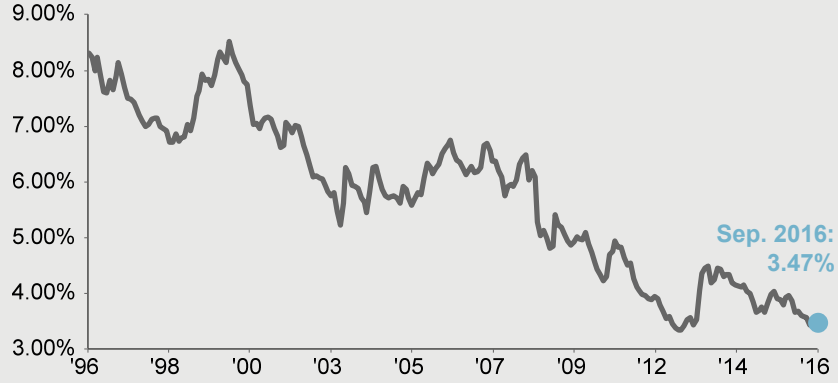
Average price for an existing single family home
Thousands USD, seasonally adjusted



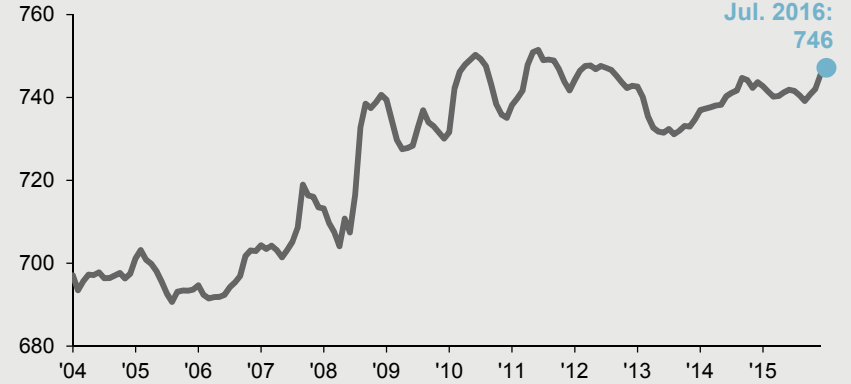
Housing Affordability Index
Avg. mortgage payment as a % of household income



Average interest rate on a U.S. mortgage
30-year fixed-rate mortgage



Lending standards for approved mortgage loans
Average FICO score based on origination date



Source: J.P. Morgan Asset Management; (Top left, bottom left and top right) FactSet; (Top left and top right) National Association of Realtors; (Bottom left) Freddie Mac; (Top right) BEA, Census Bureau; (Bottom right) McDash, J.P. Morgan Securitized Product Research.
Monthly mortgage payment assumes the prevailing 30-year fixed-rate mortgage rates and average new home prices excluding a 20% down payment.
Guide to the Markets – U.S. Data are as of September 30, 2016.

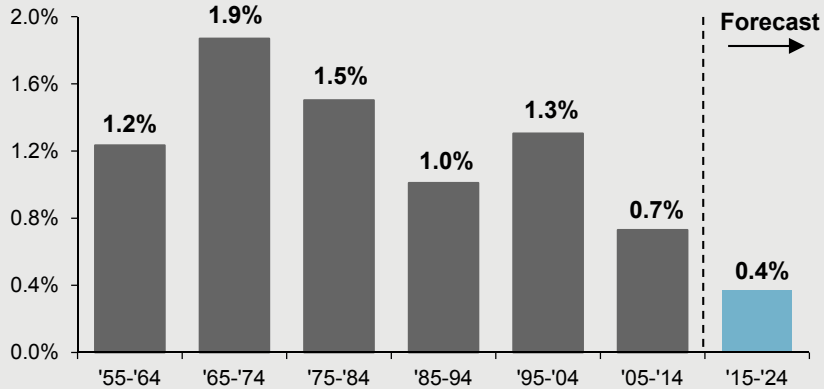
J.P.Morgan Asset Management

Long-term drivers of economic growth

Economy

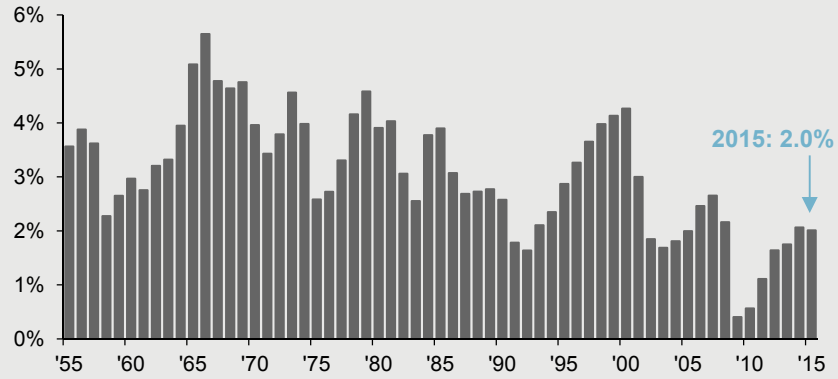
Growth in working age population

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



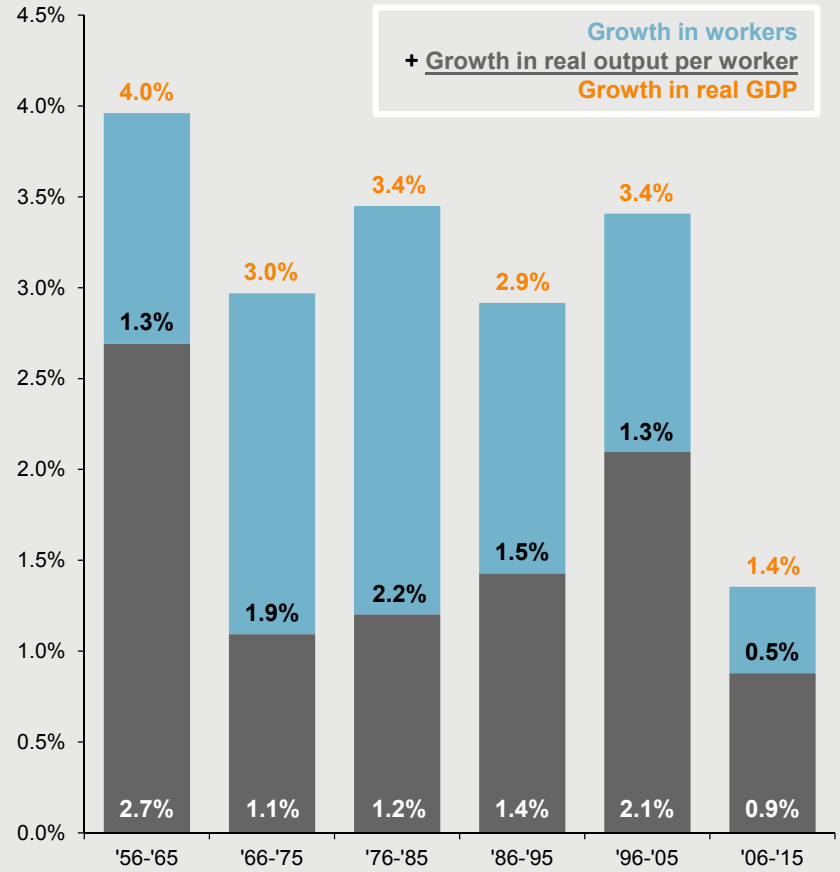
Growth in investment in structures and equipment

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



Drivers of GDP growth

Average year-over-year percent change



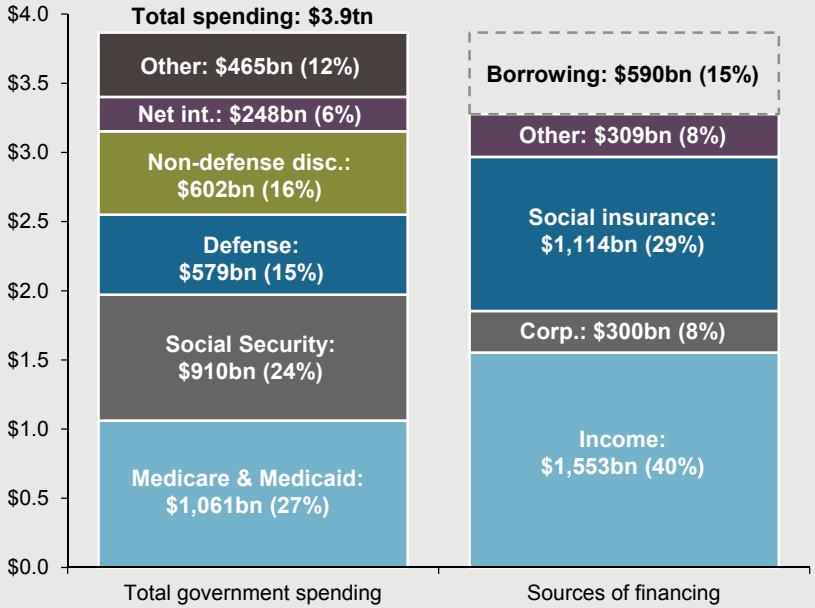
Source: J.P. Morgan Asset Management; (Top left) Census Bureau, DOD, DOJ; (Top left and right) BLS; (Right and bottom left) BEA.
GDP drivers are calculated as the average annualized growth between 4Q of the first and last year. Future working age population is calculated as the total estimated number of Americans from the Census Bureau, controlled for military enrollment, growth in institutionalized population and demographic trends.
Guide to the Markets – U.S. Data are as of September 30, 2016.

J.P.Morgan Asset Management

Federal finances

The 2016 federal budget

CBO Baseline forecast, USD trillions

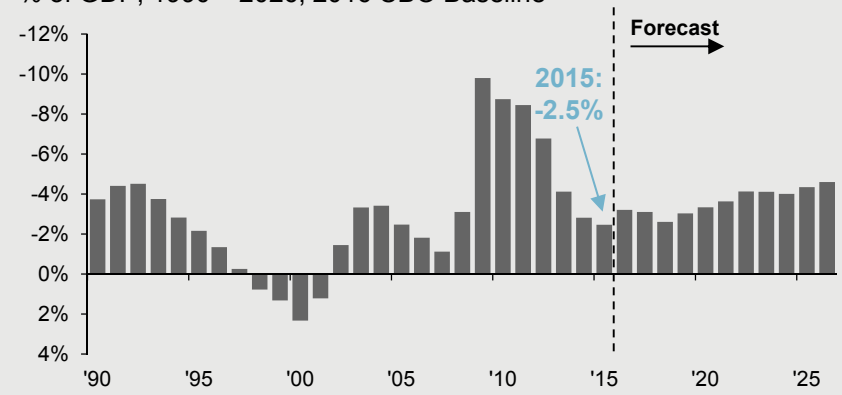


CBO's Baseline assumptions

	2016	'17-'18	'19-'20	'21-'26
Real GDP growth	1.9%	2.3%	1.7%	1.9%
10-year Treasury	1.9%	2.4%	3.2%	3.6%
Headline inflation (CPI)	1.0%	2.3%	2.3%	2.4%
Unemployment	4.9%	4.5%	4.9%	4.9%

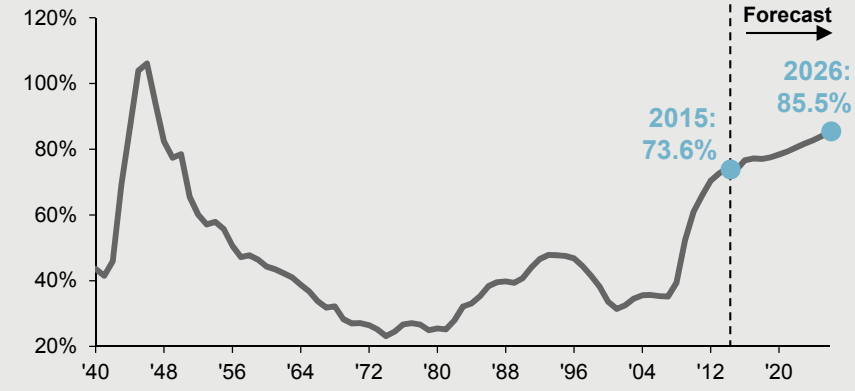
Federal budget surplus/deficit

% of GDP, 1990 – 2026, 2016 CBO Baseline



Federal net debt (accumulated deficits)

% of GDP, 1940 – 2026, 2016 CBO Baseline, end of fiscal year



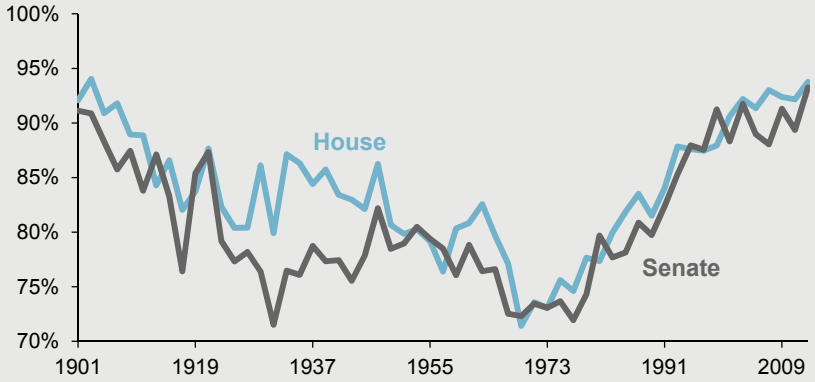
Source: CBO, J.P. Morgan Asset Management; (Top and bottom right) BEA, Treasury Department.
2016 Federal Budget is based on the Congressional Budget Office (CBO) August 2016 Baseline Budget Forecast. Other spending includes, but is not limited to, health insurance subsidies, income security and federal 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 September 30, 2016.

J.P.Morgan Asset Management

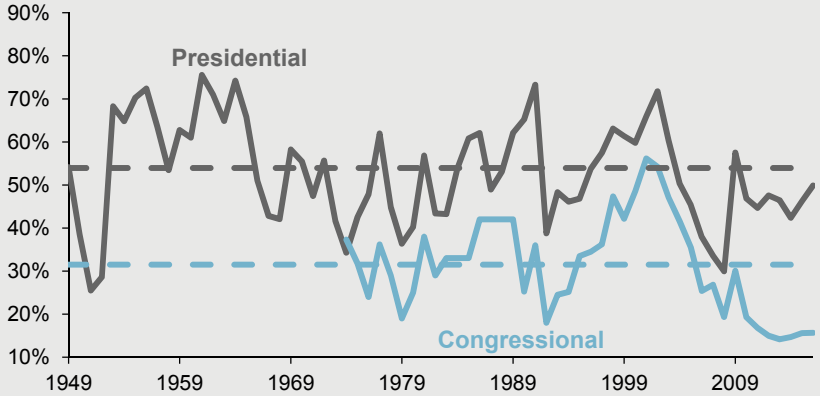
Economy

Political polarization

% of representatives voting with the majority of their party*

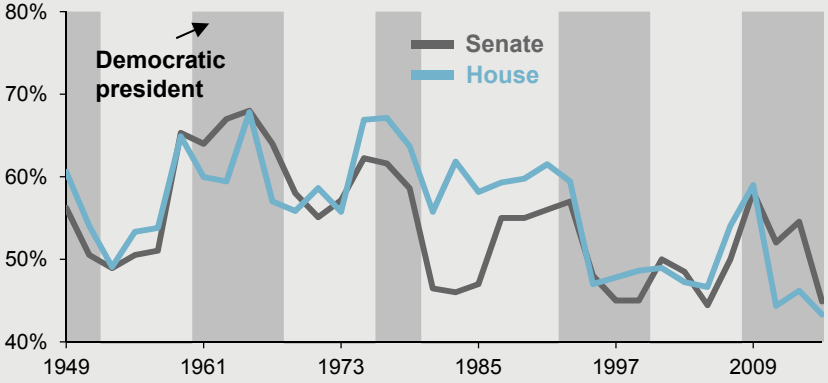


Congressional & presidential approval ratings



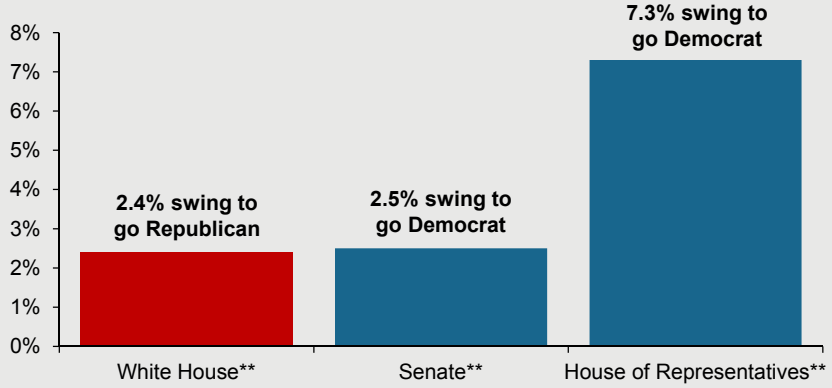
Political party dominance

Democratic % of major party seats



Vote swings and election outcomes

% change in votes required so that a new party takes control

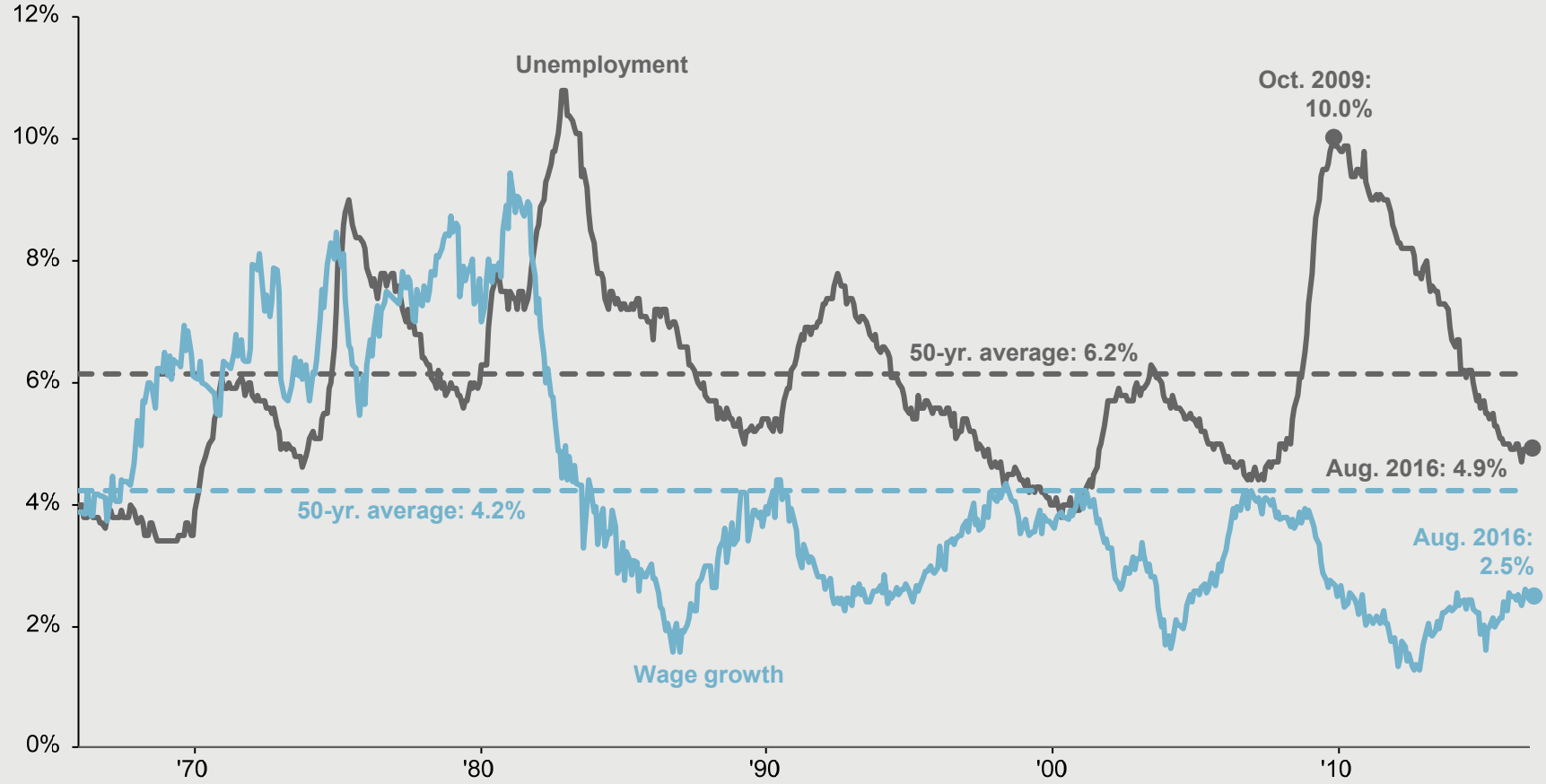


Source: J.P. Morgan Asset Management; (Top left) VoteView; (Bottom left and right) U.S. House of Representatives, U.S. Senate; (Top right) Gallup Inc.; (Bottom right) New York Times, Politico, RealClearPolitics. *In roll call votes where the majority in one party voted the opposite way to the majority in the other. Data compiled by Professors Keith T. Poole and Howard Rosenthal, available at www.voteview.com. Data on voting records are not yet available for the 114th Congress. **Swing required is defined as the percentage of total voters, on a uniform national basis, that would have to switch from voting Republican to Democrat or vice-versa, in order to achieve 270 Electoral College votes, 50 Senate seats or 218 House seats respectively. Calculations are relative to the 2010 Senate election, 2012 Presidential election and 2014 House election respectively. Estimates also count two independent senators currently caucusing with the Democrats as Democrats.
Guide to the Markets – U.S. Data are as of September 30, 2016.

J.P.Morgan Asset Management

Unemployment and wages

Civilian unemployment rate and year-over-year growth in wages of production and non-supervisory workers
Seasonally adjusted, percent



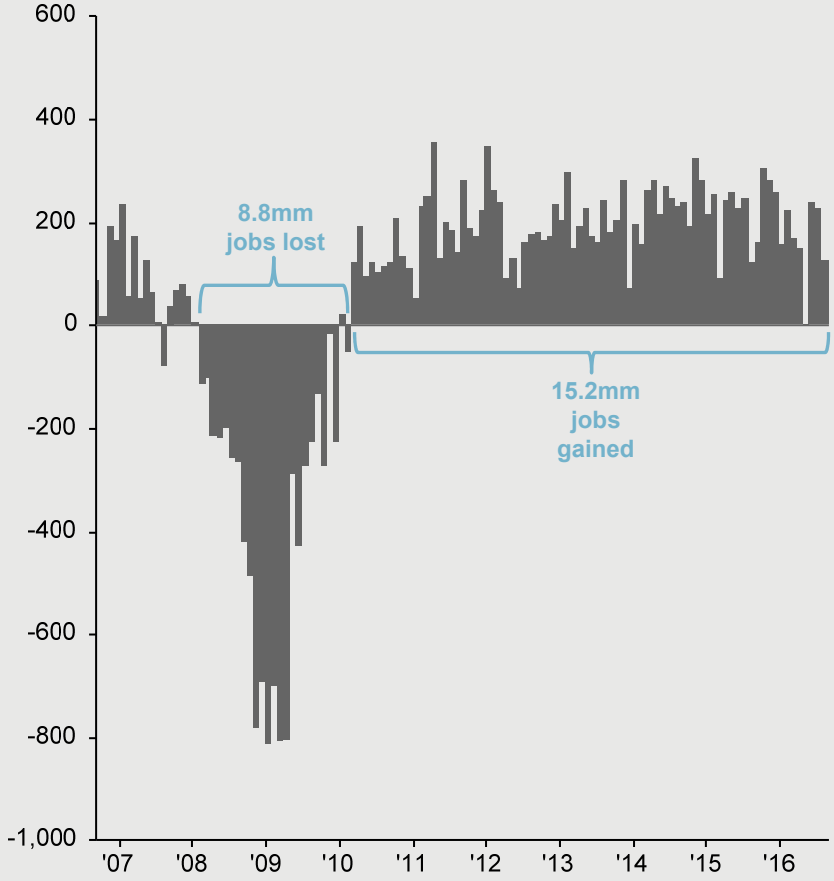
Source: BLS, FactSet, J.P. Morgan Asset Management.
Guide to the Markets – U.S. Data are as of September 30, 2016.

J.P.Morgan
Asset Management

Economy

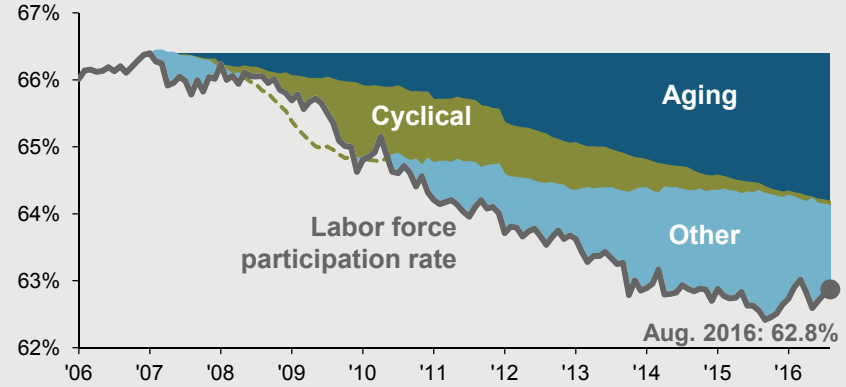
Employment – Total private payroll

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 Feb. 2010

Millions of jobs

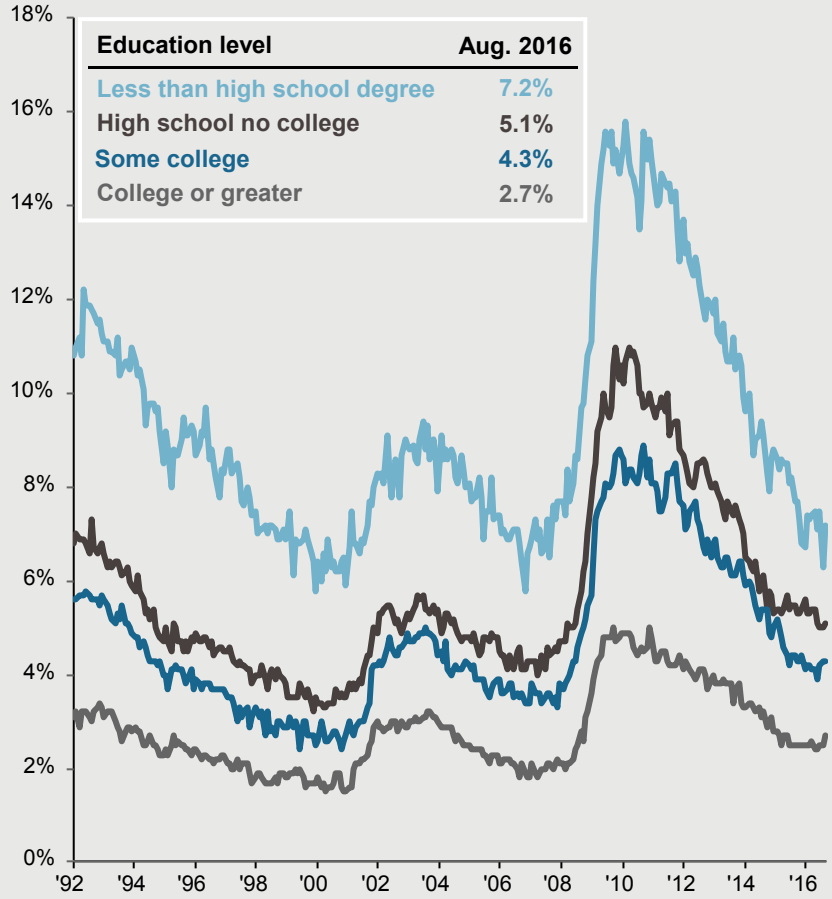
Source: BLS, FactSet, J.P. Morgan Asset Management.
(Bottom right) Info. fin. & bus. svcs. = Information, financial activities and professional and business services; Mfg. trade & trans.= Manufacturing, trade, transportation and utilities; Leisure, hospt. & other svcs.: Leisure, hospitality and other services; Educ. & health svcs.: Education & health services; Mining and construct: Natural resources mining & 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 September 30, 2016.

J.P.Morgan Asset Management

Employment and income by educational attainment

Economy

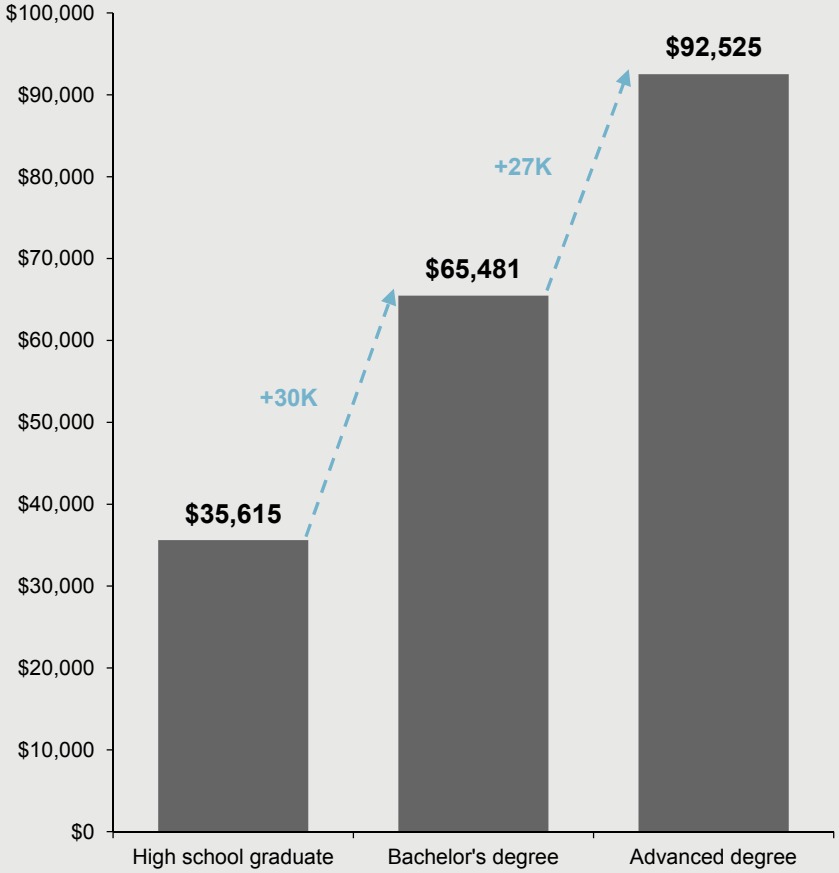
Unemployment rate by education level



Education level	Aug. 2016
Less than high school degree	7.2%
High school no college	5.1%
Some college	4.3%
College or greater	2.7%

Average annual earnings by highest degree earned

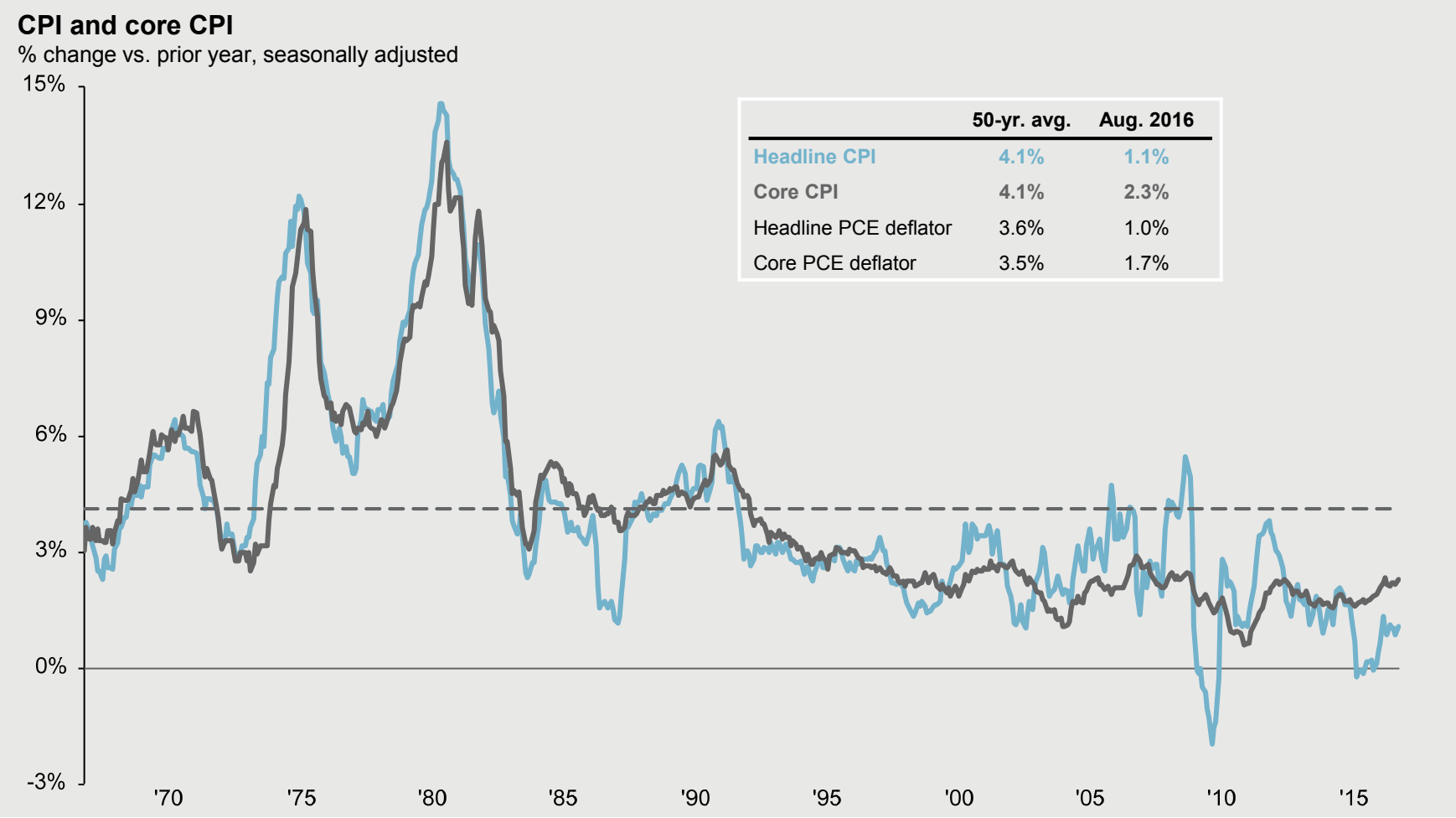
Workers aged 18 and older, 2015



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 September 30, 2016.

J.P.Morgan Asset Management

Economy



	50-yr. avg.	Aug. 2016
Headline CPI	4.1%	1.1%
Core CPI	4.1%	2.3%
Headline PCE deflator	3.6%	1.0%
Core PCE deflator	3.5%	1.7%

Source: BLS, FactSet, J.P. Morgan Asset Management.
CPI used is CPI-U and values shown are % change vs. one year ago and reflect August 2016 CPI data. 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.
Guide to the Markets – U.S. Data are as of September 30, 2016.

J.P.Morgan Asset Management

Economy

Trade balance
Current account balance, % of GDP

U.S. Dollar Index
Monthly average of major currencies nominal trade-weighted index

Source: J.P. Morgan Asset Management; (Left) BEA; (Right) Federal Reserve, FactSet.
Currencies in the Trade Weighted U.S. Dollar Major Currencies Index are: British pound, euro, Swedish kroner, Australian dollar, Canadian dollar, Japanese yen and Swiss franc.
Guide to the Markets – U.S. Data are as of September 30, 2016.

J.P.Morgan
Asset Management

Economy

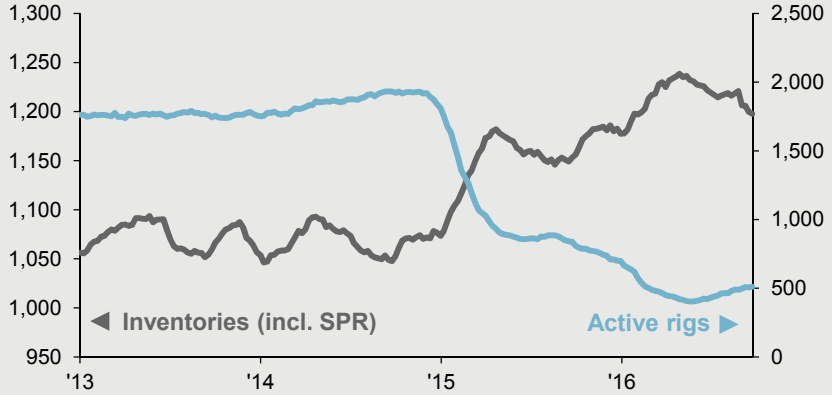
Change in production and consumption of oil

Production, consumption and inventories, millions of barrels per day

	2013	2014	2015	2016*	2017*	Growth since 2013
Production						
U.S.	12.3	14.1	15.0	14.7	14.7	19.4%
OPEC	37.6	37.5	38.3	39.2	40.0	6.5%
Global	**91.0**	**93.4**	**95.7**	**96.2**	**96.8**	**6.4%**
Consumption						
U.S.	19.0	19.1	19.4	19.6	19.7	4.1%
China	10.5	10.9	11.3	11.7	12.1	15.1%
Global	**91.4**	**92.5**	**93.9**	**95.4**	**96.8**	**5.9%**
Inventory Change	-0.4	0.9	1.8	0.8	0.0	

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

Million barrels, number of active rigs

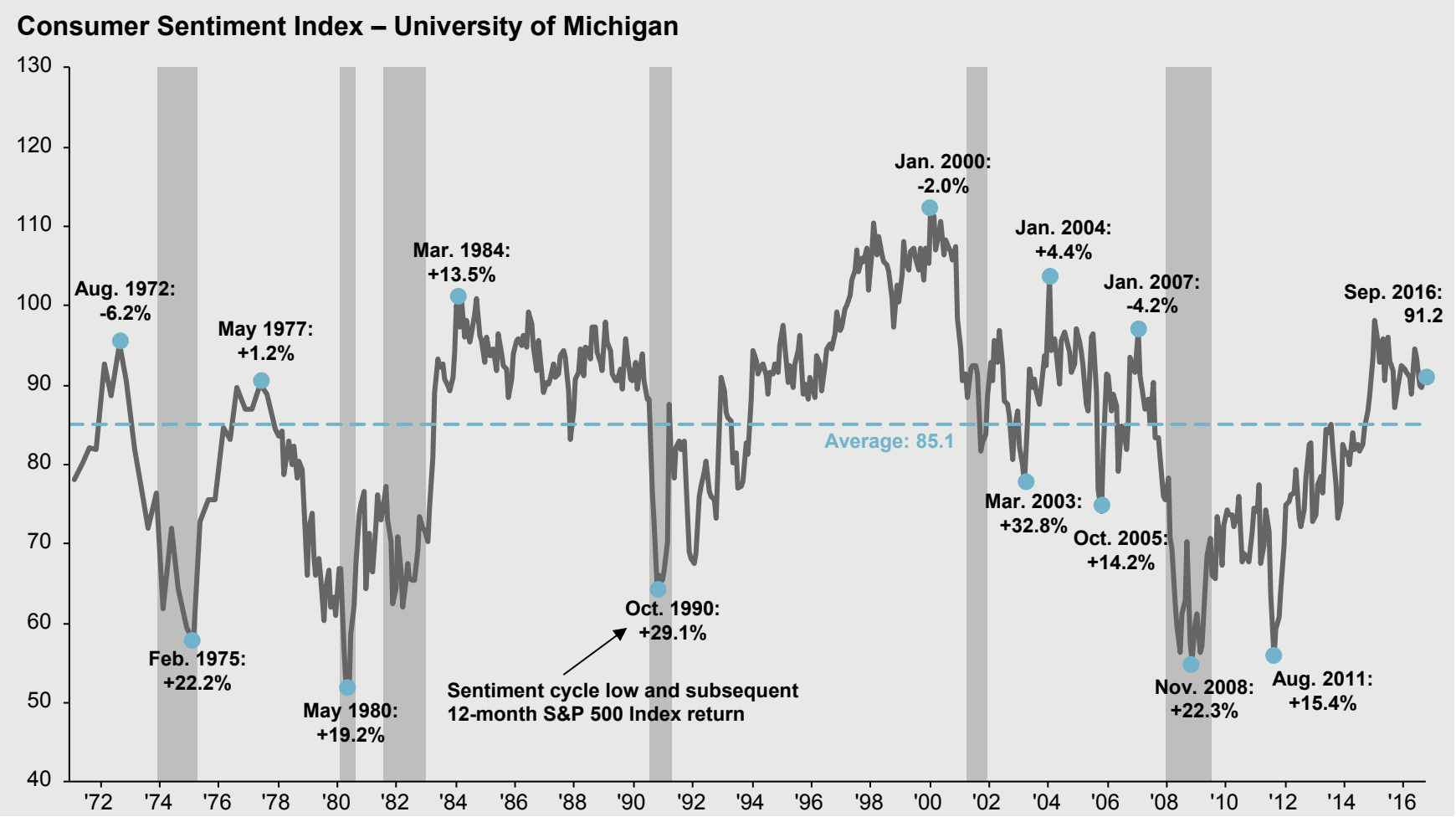


Price of oil

Brent crude, nominal prices, USD/barrel

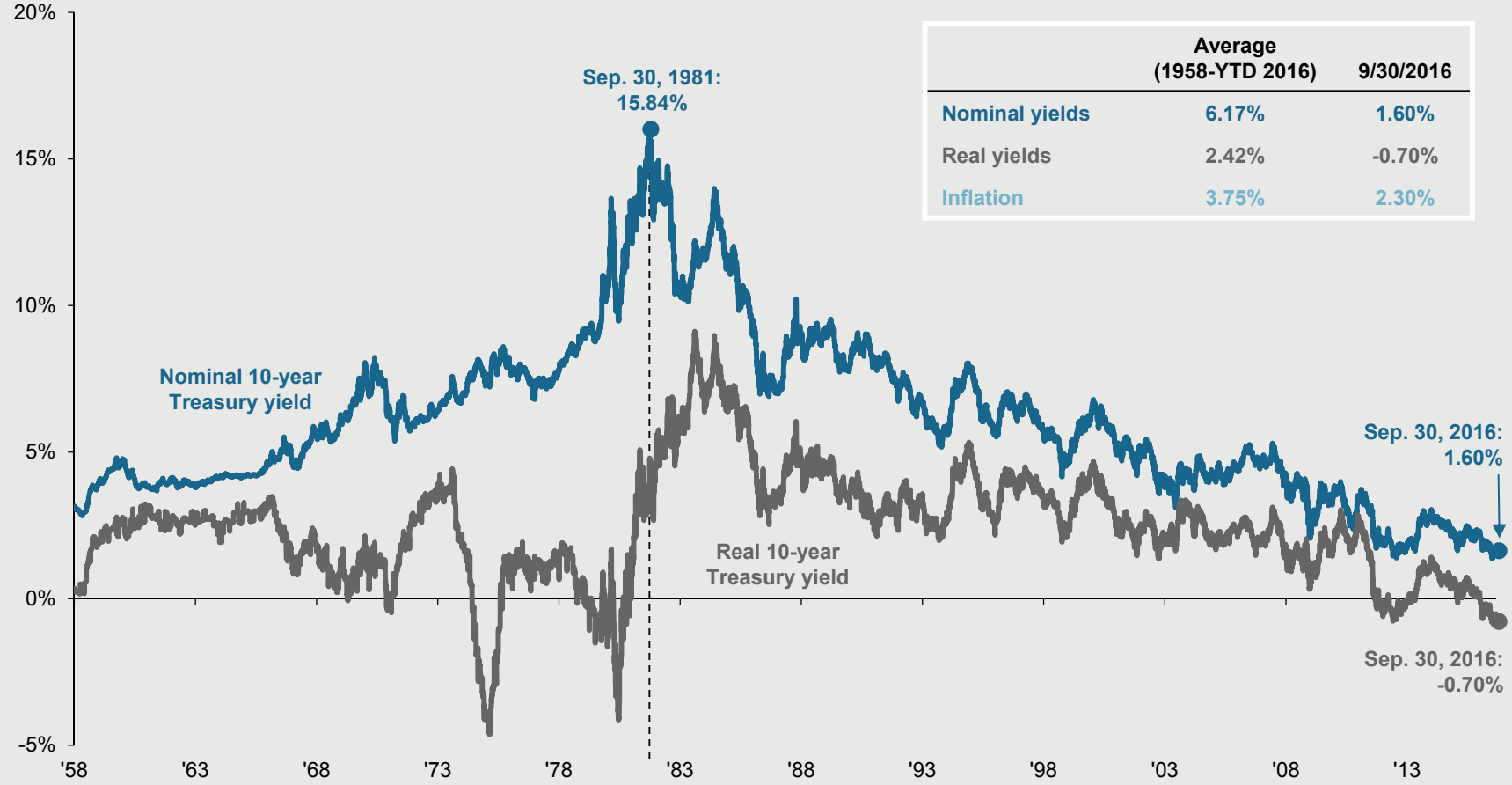
Source: J.P. Morgan Asset Management; (Top and bottom left) EIA; (Right) FactSet; (Bottom left) Baker Hughes.
*Forecasts are from the September 2016 EIA Short-Term Energy Outlook and start in 2016.
**U.S. crude oil inventories include the Strategic Petroleum Reserve (SPR). Active rig count includes both natural gas and oil rigs.
Brent crude prices are monthly averages in USD using global spot ICE prices.
Guide to the Markets – U.S. Data are as of September 30, 2016.

J.P.Morgan Asset Management



Source: Standard & Poor's, University of Michigan, FactSet, J.P. Morgan Asset Management.
Peak is defined as the highest index value before a series of lower lows, while a trough is defined as the lowest index value before a series of higher highs. Subsequent 12-month S&P 500 returns are price returns only, which excludes dividends.
Guide to the Markets – U.S. Data are as of September 30, 2016.

Nominal and real 10-year Treasury yields

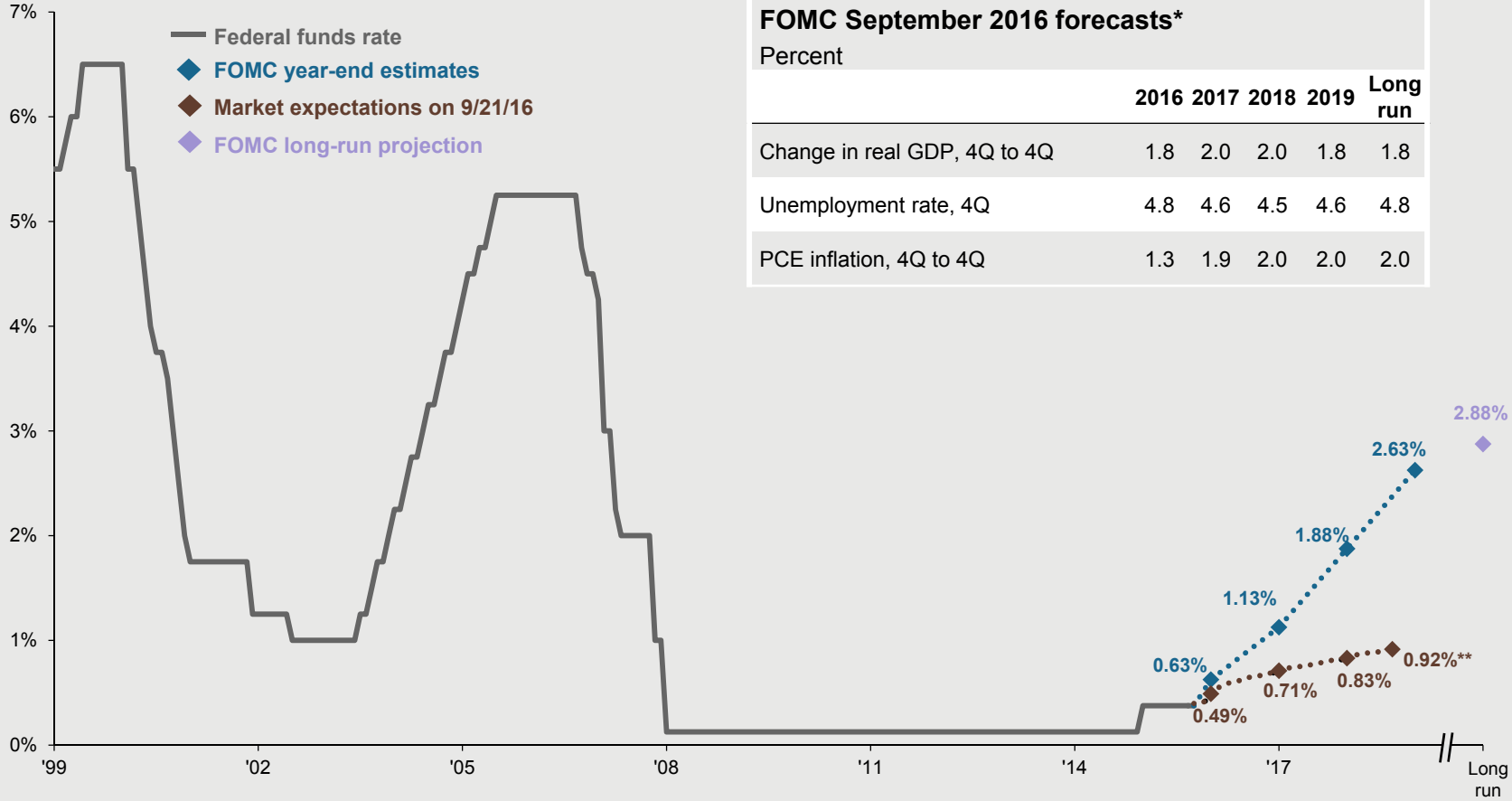


	Average (1958-YTD 2016)	9/30/2016
Nominal yields	6.17%	1.60%
Real yields	2.42%	-0.70%
Inflation	3.75%	2.30%

Source: BLS, 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 September 2016, where real yields are calculated by subtracting out August 2016 year-over-year core inflation.
Guide to the Markets – U.S. Data are as of September 30, 2016.

Federal funds rate expectations

FOMC and market expectations for the fed funds rate



FOMC September 2016 forecasts*

Percent

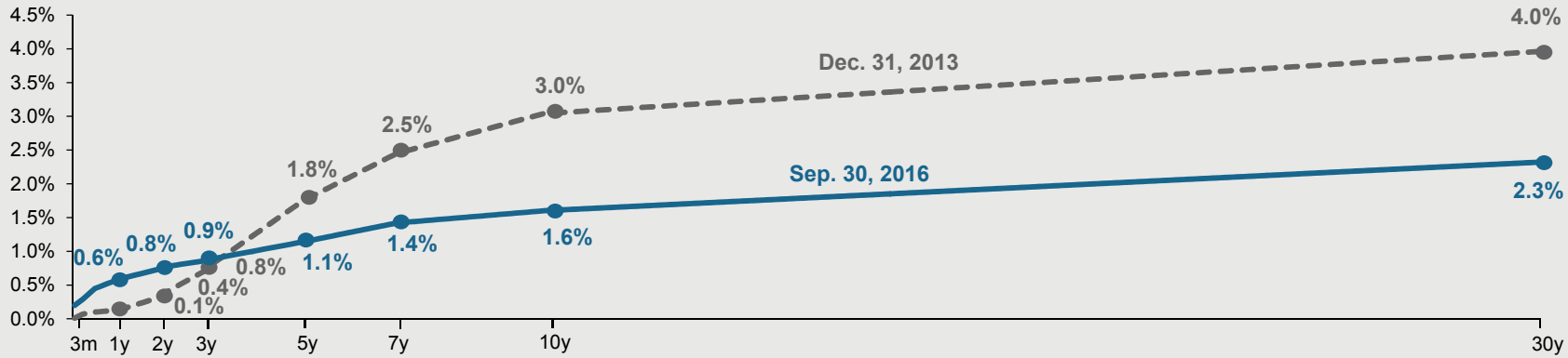
	2016	2017	2018	2019	Long run
Change in real GDP, 4Q to 4Q	1.8	2.0	2.0	1.8	1.8
Unemployment rate, 4Q	4.8	4.6	4.5	4.6	4.8
PCE inflation, 4Q to 4Q	1.3	1.9	2.0	2.0	2.0

Source: 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 September 2016 FOMC meeting. *Forecasts of 17 Federal Open Market Committee (FOMC) participants are median estimates. **Last futures market expectation is for August 2019 due to data availability.
Guide to the Markets – U.S. Data are as of September 30, 2016.

Shape of the yield curve

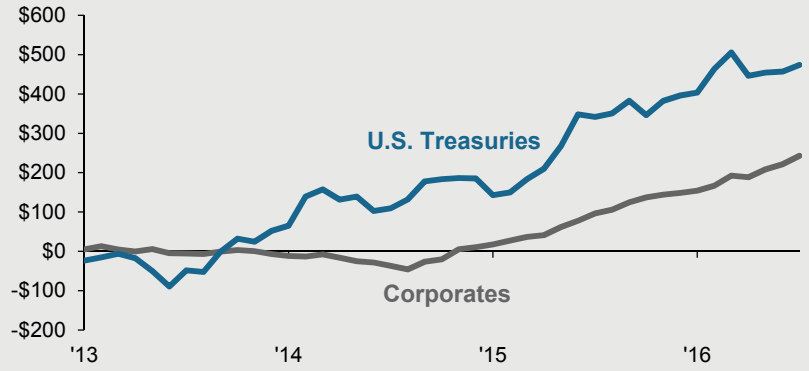
Yield curve

U.S. Treasury yield curve



Private foreign investor net flows to U.S. fixed income

Cumulative foreign private net flows into USTs and Corporates, $ billion



Correlation of government bonds

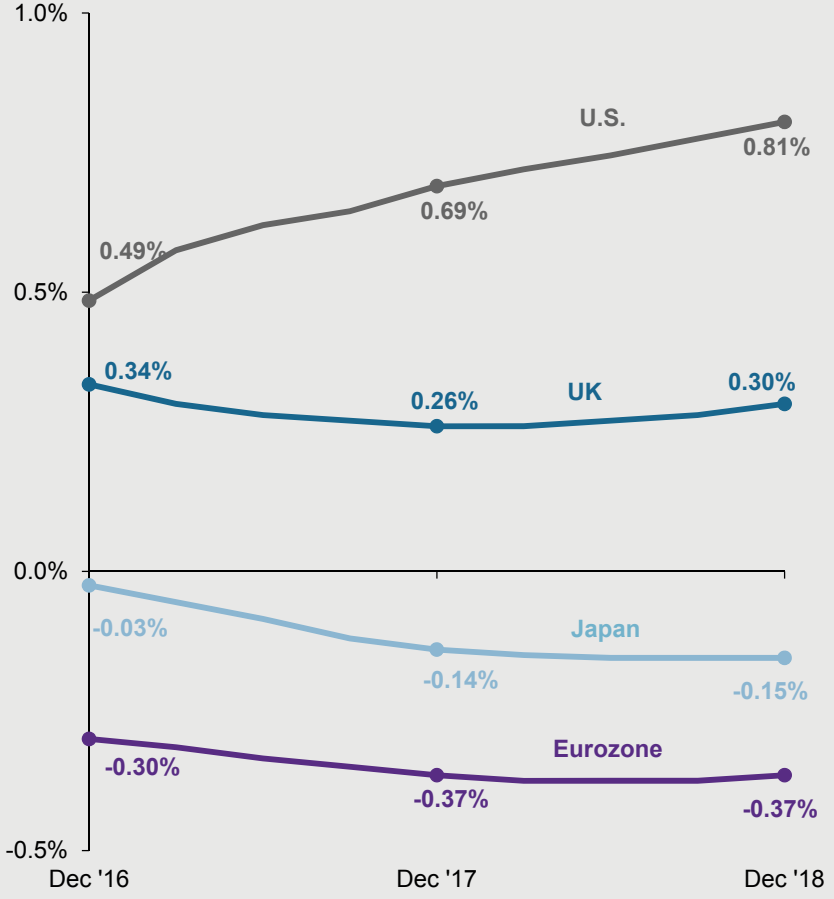
Correlation* between U.S. Treasury and German Bund yields

Source: FactSet, J.P. Morgan Asset Management; (Bottom left) U.S. Treasury.
*Rolling six-month correlation of weekly change in yield.
Guide to the Markets – U.S. Data are as of September 30, 2016.

J.P.Morgan
Asset Management

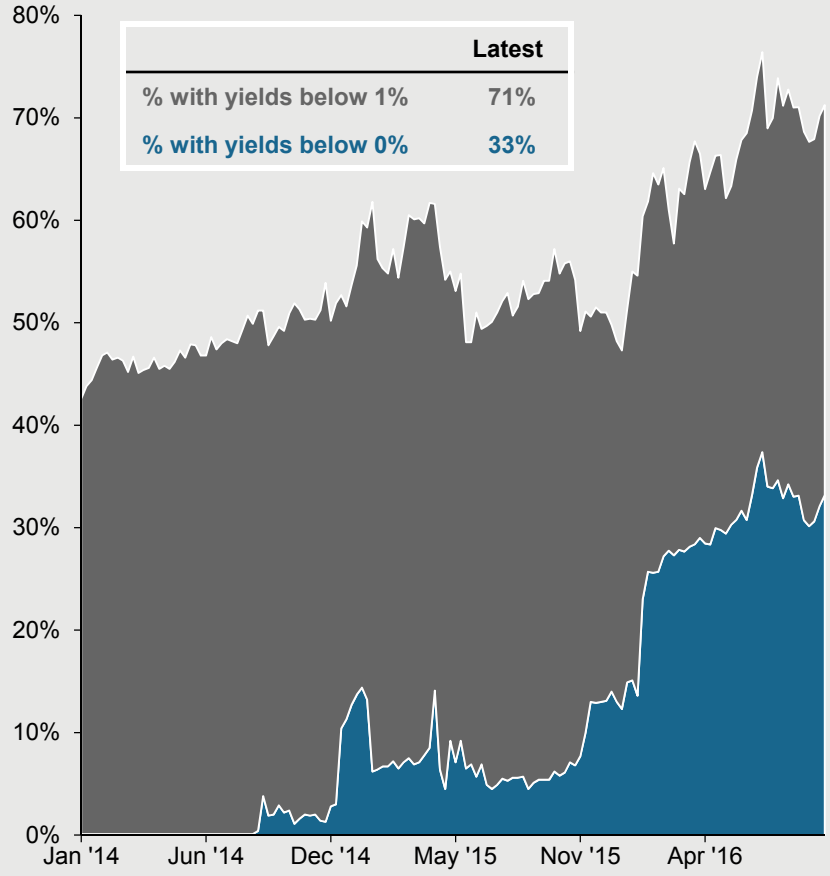
Developed market fixed income dynamics

Market expectations for target policy rate*



Government bonds with low or negative yields

% of government bond index with negative yields



	Latest
% with yields below 1%	71%
% with yields below 0%	33%

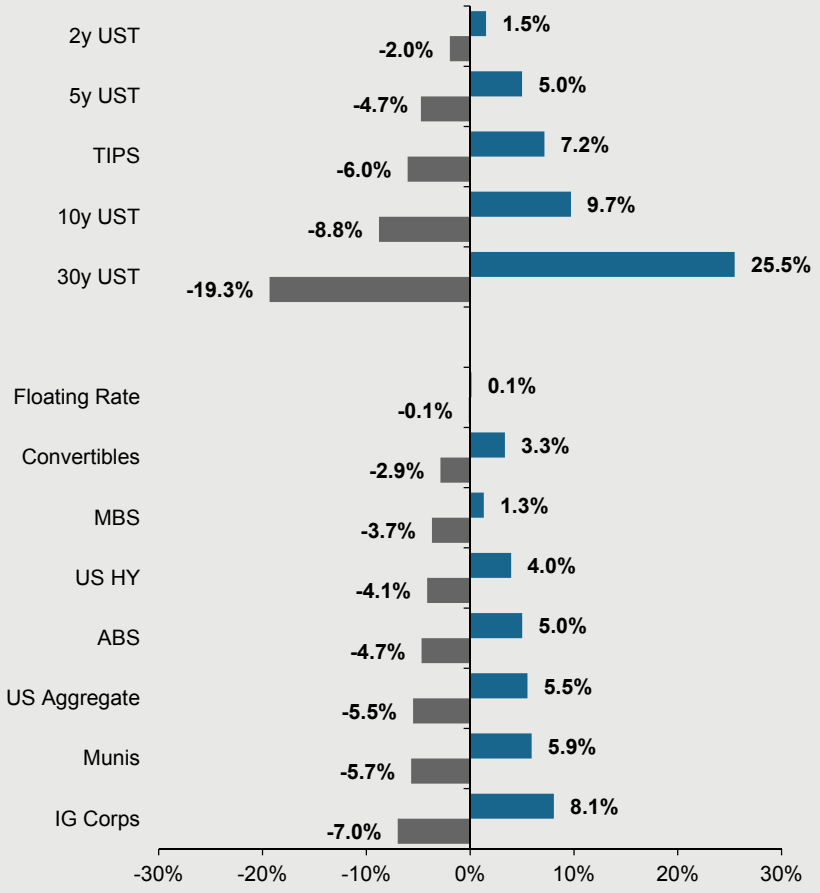
Source: Bloomberg, J.P. Morgan Asset Management; (Right) BofA/Merrill Lynch.
*Target policy rates for Japan are estimated using EuroYen 3m futures contracts less a risk premium of 6bps. Government bond index is the BofAML Global Government Bond Index, which includes investment-grade sovereign debt denominated in the issuer's own domestic currency. The index includes all euro members, the U.S., Japan, the UK, Canada, Australia, New Zealand, Switzerland, Norway and Sweden.
Guide to the Markets – U.S. Data are as of September 30, 2016.

J.P.Morgan Asset Management

Fixed income yields and returns

U.S. Treasuries	Correlation to 10-year	Avg. Maturity	Yield 9/30/2016	Yield 6/30/2016	Return 2016 YTD
2-Year	0.62	2 years	0.77%	0.58%	1.20%
5-Year	0.91	5	1.14%	1.01%	3.96%
10-Year	1.00	10	1.60%	1.49%	7.14%
30-Year	0.92	30	2.32%	2.30%	16.96%
TIPS	0.57	10	0.00%	0.09%	7.27%
Sector					
Broad Market	0.85	7.8 years	1.96%	1.91%	5.80%
MBS	0.79	5.1	2.06%	2.07%	3.72%
Municipals	0.44	10.0	1.72%	1.57%	4.35%
Corporates	0.43	10.9	2.84%	2.88%	9.20%
High Yield	-0.26	6.3	6.17%	7.27%	15.11%
Floating Rate	-0.21	2.3	1.75%	1.65%	1.93%
Convertibles	-0.31	--	0.99%	0.92%	8.94%
ABS	-0.02	5.4	1.97%	1.94%	5.68%

Price impact of a 1% rise/fall in interest rates*

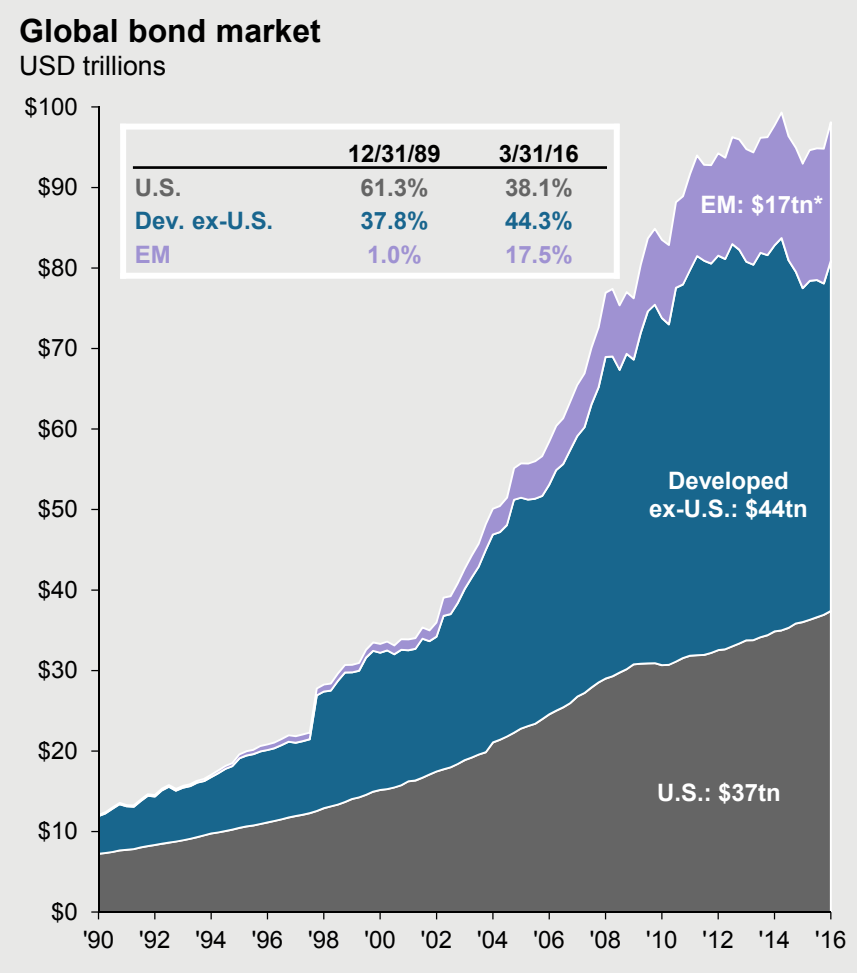


Source: Barclays, U.S. Treasury, FactSet, J.P. Morgan Asset Management. Sectors shown above are provided by Barclays and are represented by – Broad Market: U.S. Aggregate; MBS: U.S. Aggregate Securitized - MBS; Corporate: U.S. Corporates; Municipals: Muni Bond 10-year; High Yield: Corporate High Yield; TIPS: Treasury Inflation Protection Securities (TIPS). Floating Rate: FRN (BBB); Convertibles: U.S. Convertibles Composite; ABS: ABS + CMBS. Treasury securities data for number of issues based on U.S. Treasury benchmarks from Barclays. Yield and return information based on bellwethers for Treasury securities. Sector yields reflect yield to worst, while Treasury yields are yield to maturity. 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). *Calculation assumes 2-year Treasury interest rate falls 0.77% to 0.00%. Chart is for illustrative purposes only. Past performance is not indicative of future results.
Guide to the Markets – U.S. Data are as of September 30, 2016.

J.P.Morgan Asset Management

Global fixed income

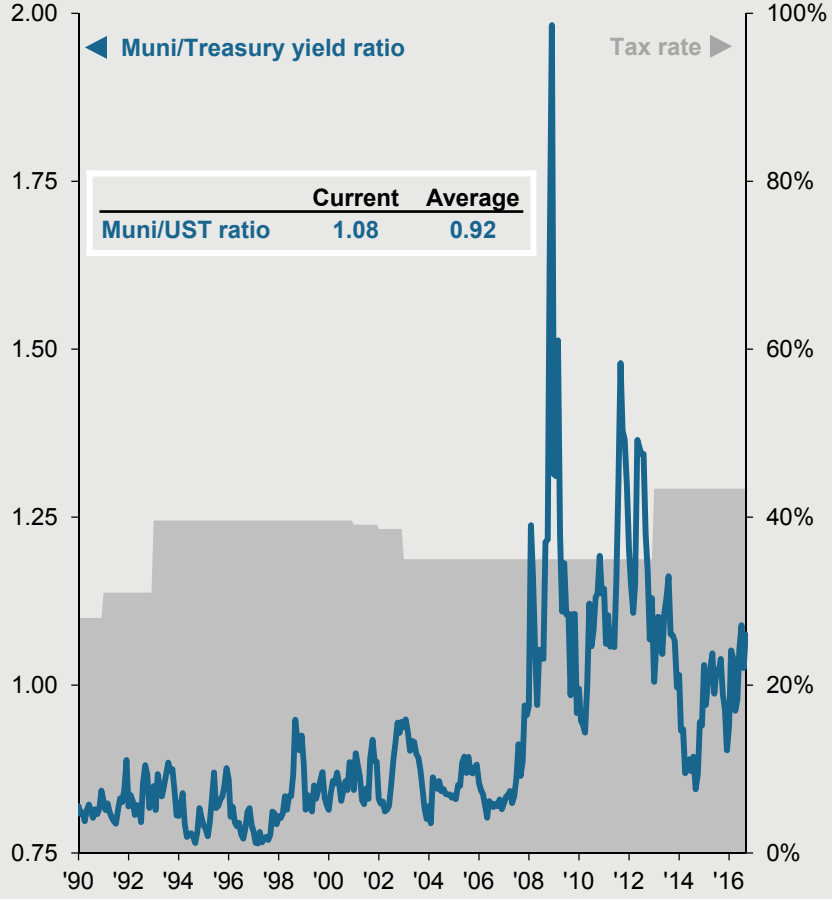
Aggregates	Correl to 10-year	Duration	Yield 9/30/2016	Yield 6/30/2016	2016 YTD Return Local	2016 YTD Return USD
U.S.	0.91	5.5 years	1.96%	1.91%	5.80%	5.80%
Gbl. ex-U.S.	0.22	7.7	0.67%	0.72%		12.46%
Japan	0.51	9.1	0.00%	-0.13%	4.30%	23.90%
Germany	-0.03	6.4	0.09%	0.12%	4.55%	8.16%
UK	0.21	10.4	1.21%	1.41%	16.11%	2.33%
Italy	-0.18	7.0	0.79%	0.88%	4.20%	7.80%
Spain	-0.17	6.7	0.53%	0.74%	6.69%	10.37%
Sector						
Euro Corp.	0.21	5.4 years	0.66%	0.92%	6.00%	9.65%
Euro HY	-0.28	4.1	4.29%	4.90%	4.18%	7.78%
EMD ($)	0.18	6.9	4.98%	5.37%		14.77%
EMD (LCL)	-0.01	5.0	6.18%	6.28%	10.91%	17.07%
EM Corp.	0.07	5.7	4.56%	5.01%		11.11%



Source: J.P. Morgan Asset Management; (Left) FactSet, Barclays; (Right) BIS.
Fixed income sectors shown above are provided by Barclays 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 Barclays Euro Aggregate Corporate Index and the Barclays Pan-European High Yield index. Sector yields reflect yield to worst. Duration is modified duration. Correlations are based on 7 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. *3Q15, 4Q15 and 1Q16 estimates for domestic Brazilian debt are J.P. Morgan Asset Management calculations based on Brazilian Central Bank data. 1Q16 estimate for total Argentinian debt assumes debt levels are unchanged from the previous quarter.
Guide to the Markets – U.S. Data are as of September 30, 2016.

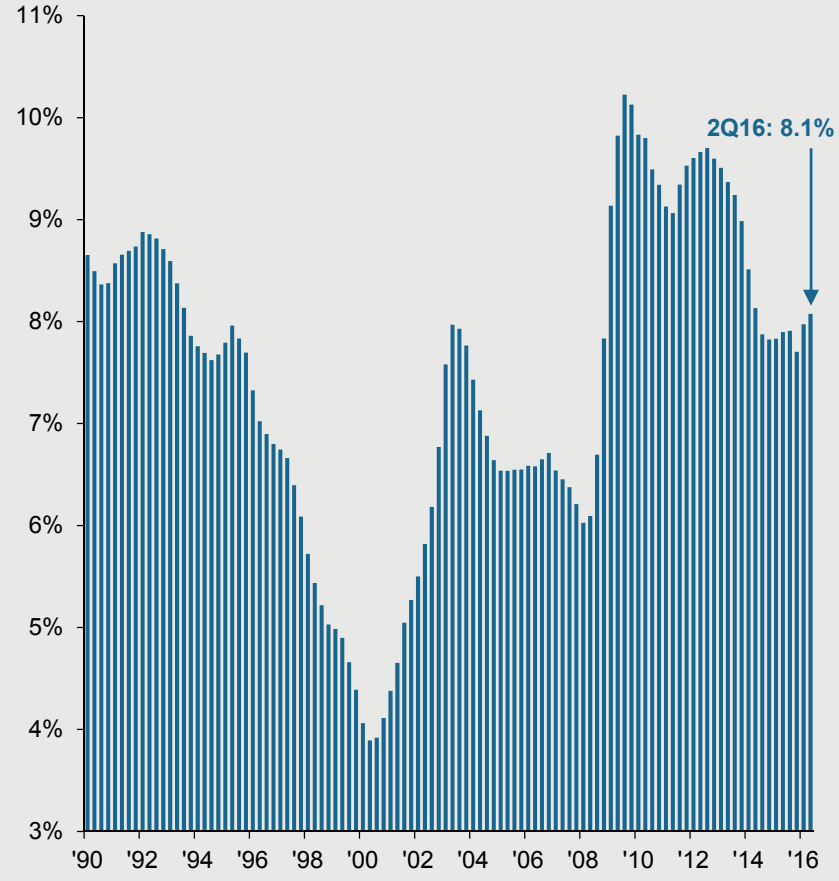
J.P.Morgan Asset Management

Municipal and Treasury bond yields and the tax rate



State and local government debt service

Debt service as % of state and local revenue



Source: J.P. Morgan Asset Management; (Left) FactSet, Barclays, FRB; (Right) BEA.
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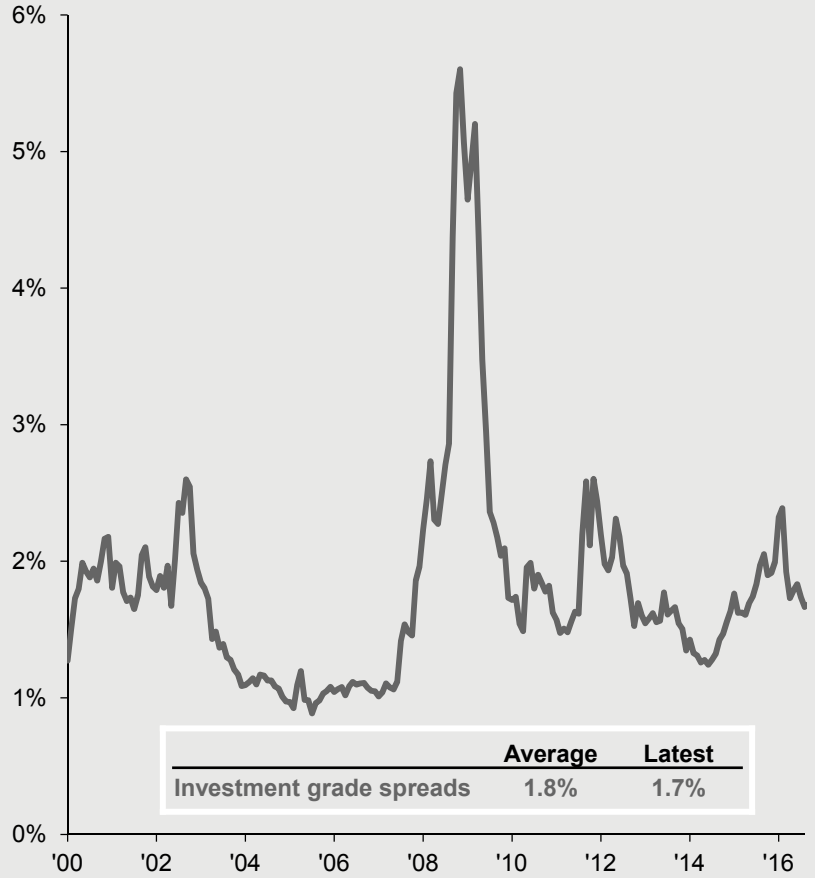
J.P.Morgan Asset Management

Investment grade spreads

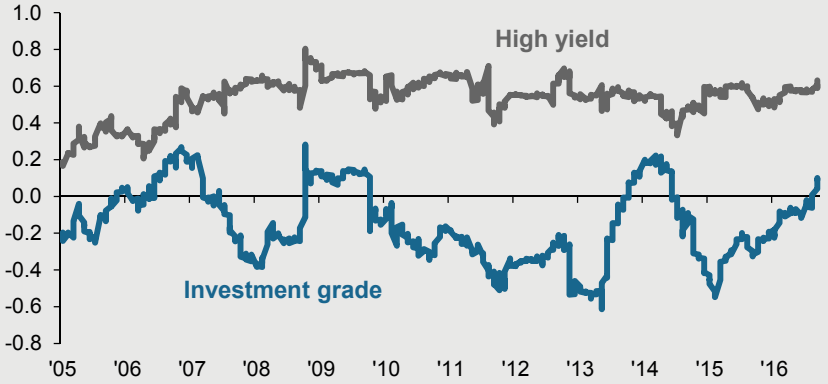
Spread to worst



	Average	Latest
Investment grade spreads	1.8%	1.7%

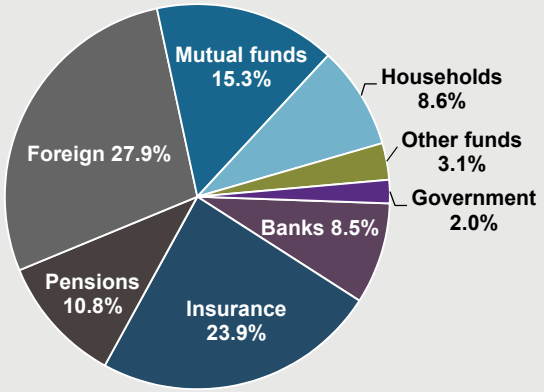
Rolling correlations of stocks and corporate bonds

Correlation* of high yield and investment grade bonds with stocks



Corporate bond ownership

Ownership as percent of amount outstanding 2Q16



Source: J.P. Morgan Asset Management; (Left) J.P. Morgan Global Economic Research; (Top right) Barclays, FactSet; (Bottom right) FRB. Investment grade corporate bonds are represented by the J.P. Morgan U.S. Liquid Index (JULI). High yield corporate bonds are represented by the J.P. Morgan Domestic HY Index. Stocks are represented by the S&P 500. Correlation is based on the weekly change in price. Spreads indicated are benchmark yield to worst less comparable maturity Treasury yields. *Rolling 12-month correlation of weekly change in price.
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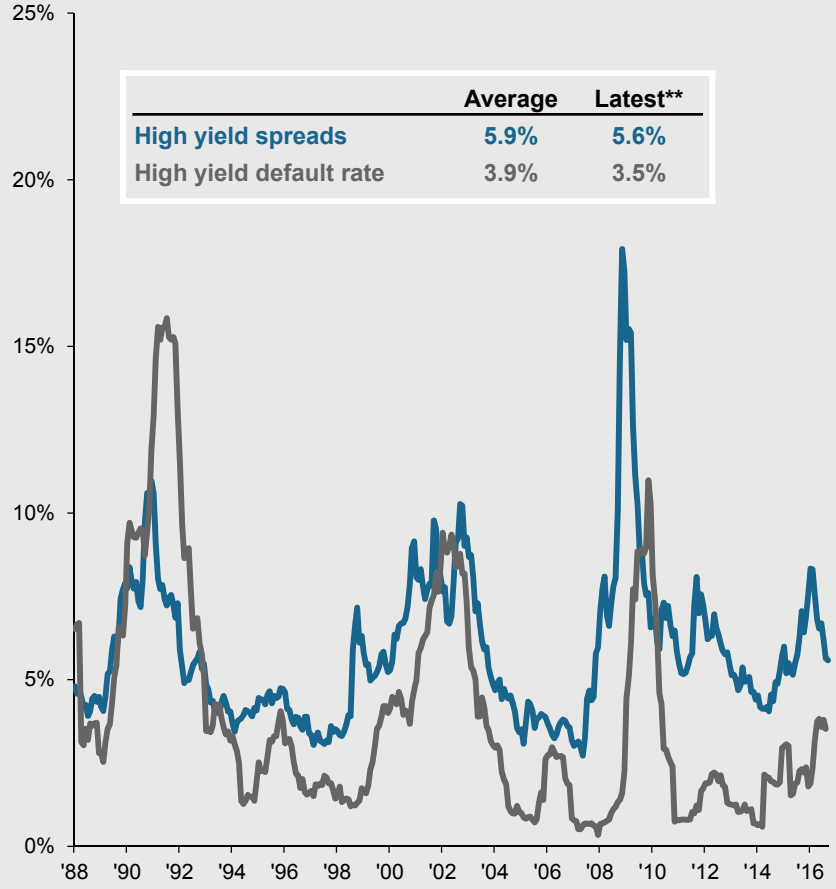
J.P.Morgan
Asset Management

High yield spreads and default rate

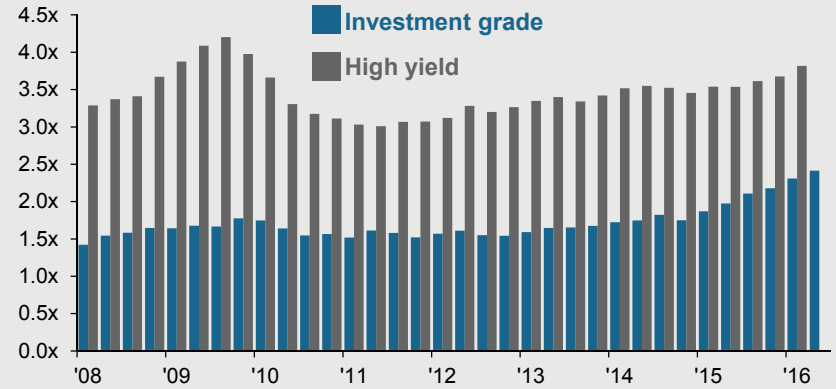
Spread to worst



	Average	Latest**
High yield spreads	5.9%	5.6%
High yield default rate	3.9%	3.5%

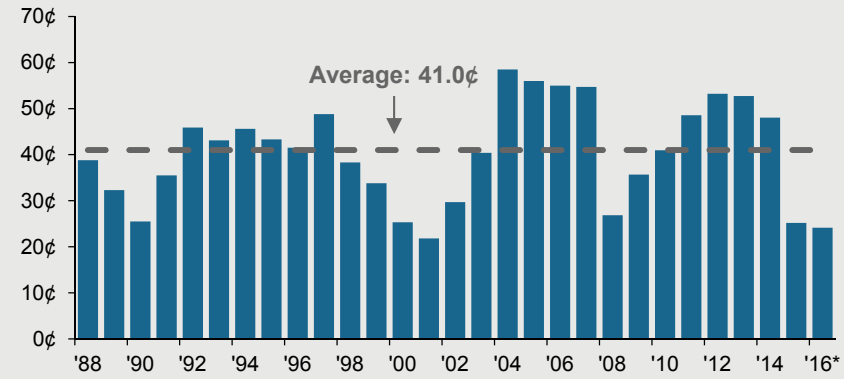
Historical high yield and high grade net leverage

Net debt/EBITDA



Historical high yield recovery rates

Issuer-weighted recovery rate, cents on the dollar



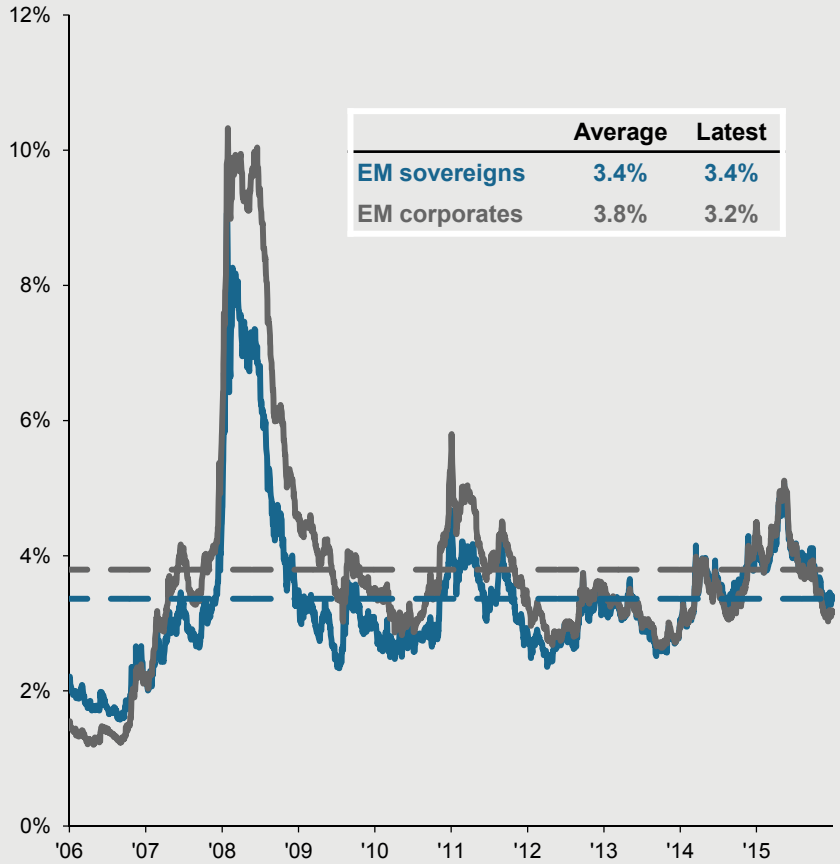
Source: J.P. Morgan Global Economic Research, J.P. Morgan Asset Management.
Default rates are defined as the par value percentage of the total market trading at or below 50% of par value and include any Chapter 11 filing, prepackaged filing or missed interest payments. Spreads indicated are benchmark 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 HY Index. Investment grade is represented by the J.P. Morgan U.S. Liquid Index. Recovery rates are issuer-weighted and based on bond price 30 days after default date. The 2009 adjusted recovery rate is based on year-end prices. *2016 recovery rate is for the last 12 months, as of 8/31/2016, and is not included in the average recovery rate calculated over the period. **Latest high yield default rate is as of 8/31/2016 due to data availability at time of publication.
Guide to the Markets – U.S. Data are as of August 31, 2016.

J.P.Morgan Asset Management

Emerging market debt

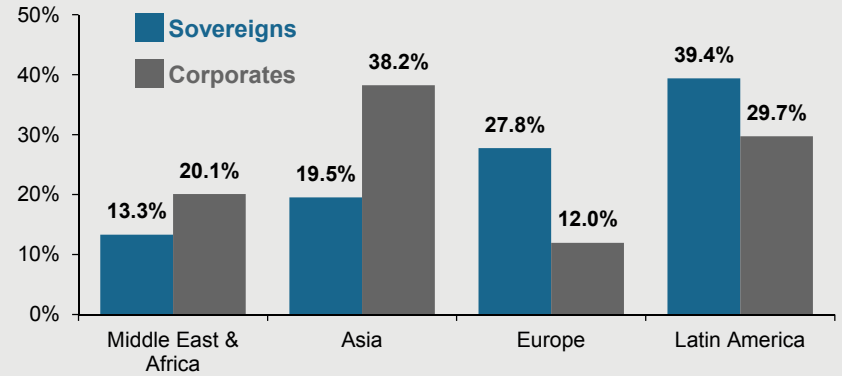
Corporate and sovereign EMD spreads

USD-denominated debt, percentage points over Treasury



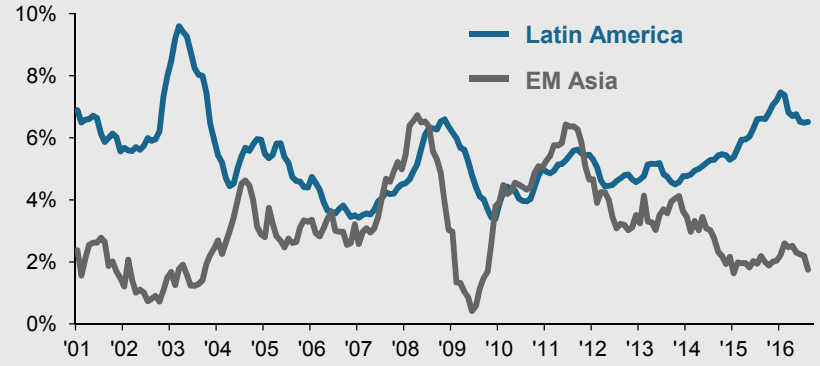
Regional weights in EMD indices

USD-denominated corporate and sovereign regional weightings



Headline inflation

YoY % change, Lat Am* and EM Asia aggregates



Source: J.P. Morgan Global Economic Research, J.P. Morgan Asset Management.
EM sovereigns: J.P. Morgan EMBIG Diversified Index; EM corporates: J.P. Morgan CEMBI Broad Diversified Index. *Lat Am index excludes Argentina, Ecuador and Venezuela.
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J.P.Morgan Asset Management

Fixed income sector returns

Fixed income

2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	YTD	2006 - 2015 Cum.	2006 - 2015 Ann.
EMD LCL. 15.2%	EMD LCL. 18.1%	Treas. 13.7%	High Yield 58.2%	EMD LCL. 15.7%	TIPS 13.6%	EMD USD 17.4%	High Yield 7.4%	Muni 8.7%	Muni 3.8%	EMD LCL. 17.1%	EMD USD 114.0%	EMD USD 7.9%
High Yield 11.8%	TIPS 11.6%	MBS 8.3%	EMD USD 29.8%	High Yield 15.1%	Muni 12.3%	EMD LCL. 16.8%	MBS -1.4%	Corp. 7.5%	MBS 1.5%	High Yield 15.1%	High Yield 95.9%	High Yield 7.0%
EMD USD 9.9%	Treas. 9.0%	Barclays Agg 5.2%	EMD LCL. 22.0%	EMD USD 12.2%	Treas. 9.8%	High Yield 15.8%	Corp. -1.5%	EMD USD 7.4%	EMD USD 1.2%	EMD USD 14.8%	Corp. 67.4%	Corp. 5.3%
Asset Alloc. 5.7%	Barclays Agg 7.0%	Muni 1.5%	Corp. 18.7%	Corp. 9.0%	Corp. 8.1%	Corp. 9.8%	Asset Alloc. -1.9%	MBS 6.1%	Treas. 0.8%	Corp. 9.2%	Muni 66.0%	Muni 5.2%
MBS 5.2%	MBS 6.9%	Asset Alloc. 0.1%	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. 7.7%	Asset Alloc. 65.7%	Asset Alloc. 5.2%
Muni 4.7%	Asset Alloc. 6.7%	TIPS -2.4%	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 7.3%	EMD LCL. 62.0%	EMD LCL. 4.9%
Barclays Agg 4.3%	EMD USD 6.2%	Corp. -4.9%	Muni 9.9%	TIPS 6.3%	EMD USD 7.3%	Muni 5.7%	Treas. -2.7%	Treas. 5.1%	Corp. -0.7%	Barclays Agg 5.8%	MBS 57.3%	MBS 4.6%
Corp. 4.3%	Corp. 4.6%	EMD LCL. -5.2%	Barclays Agg 5.9%	Treas. 5.9%	MBS 6.2%	Barclays Agg 4.2%	EMD USD -5.3%	TIPS 3.6%	TIPS -1.4%	Treas. 5.1%	Barclays Agg 55.5%	Barclays Agg 4.5%
Treas. 3.1%	Muni 4.3%	EMD USD -12.0%	MBS 5.9%	MBS 5.4%	High Yield 5.0%	MBS 2.6%	TIPS -8.6%	High Yield 2.5%	High Yield -4.5%	Muni 4.4%	Treas. 50.6%	Treas. 4.2%
TIPS 0.4%	High Yield 1.9%	High Yield -26.2%	Treas. -3.6%	Muni 4.0%	EMD LCL. -1.8%	Treas. 2.0%	EMD LCL. -9.0%	EMD LCL. -5.7%	EMD LCL. -14.9%	MBS 3.7%	TIPS 47.0%	TIPS 3.9%

Source: Barclays, 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 Barclays unless otherwise noted and are represented by Broad Market: Barclays U.S. Aggregate Index; MBS: Fixed Rate MBS Index; Corporate: U.S. Corporates; Municipals: Muni Bond 10-Year Index; High Yield: U.S. Corporate High Yield Index; Treasuries: Global U.S. Treasury; TIPS: 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 August 31, 2016.

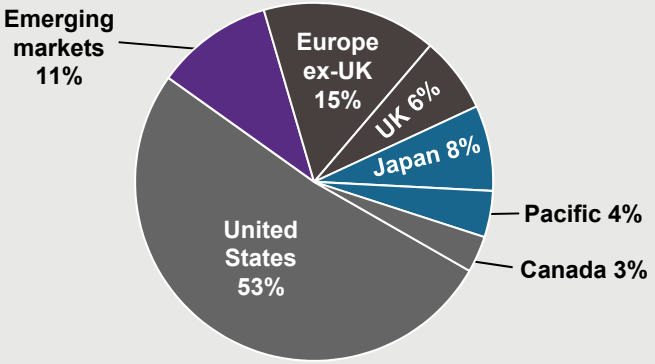
J.P.Morgan Asset Management

Global equity markets

	2016 YTD		2015	
Country / Region	**Local**	**USD**	**Local**	**USD**
Regions / Broad Indexes				
All Country World	5.2	7.1	1.8	-1.8
U.S. (S&P 500)	-	7.8	-	1.4
EAFE	-1.1	2.2	5.8	-0.4
Europe ex-UK	-2.6	0.5	9.1	0.1
Pacific ex-Japan	7.1	11.0	-0.8	-8.4
Emerging Markets	11.6	16.4	-5.4	-14.6
MSCI: Selected Countries				
United Kingdom	14.4	0.9	-2.2	-7.5
France	-0.5	2.9	12.3	0.8
Germany	-1.4	2.0	10.0	-1.3
Japan	-13.4	2.9	10.3	9.9
China	8.9	8.8	-7.7	-7.6
India	7.8	7.1	-1.6	-6.1
Brazil	34.0	63.2	-12.5	-41.2
Russia	16.7	31.3	22.9	5.0

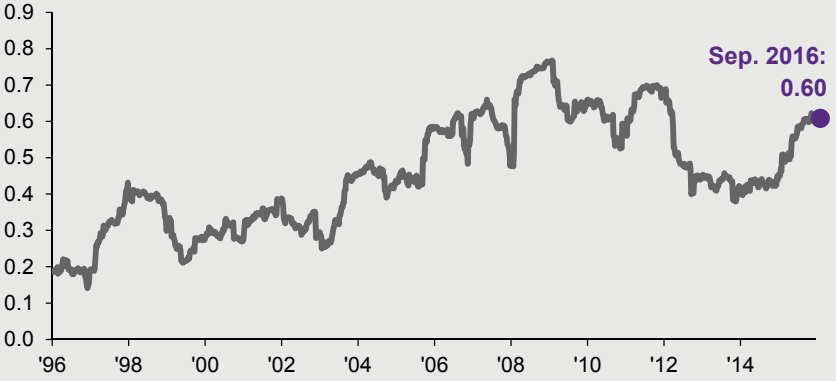
Weights in MSCI All Country World Index

% global market capitalization, float adjusted



Global equity market correlations

Rolling 1-year correlations, 30 countries

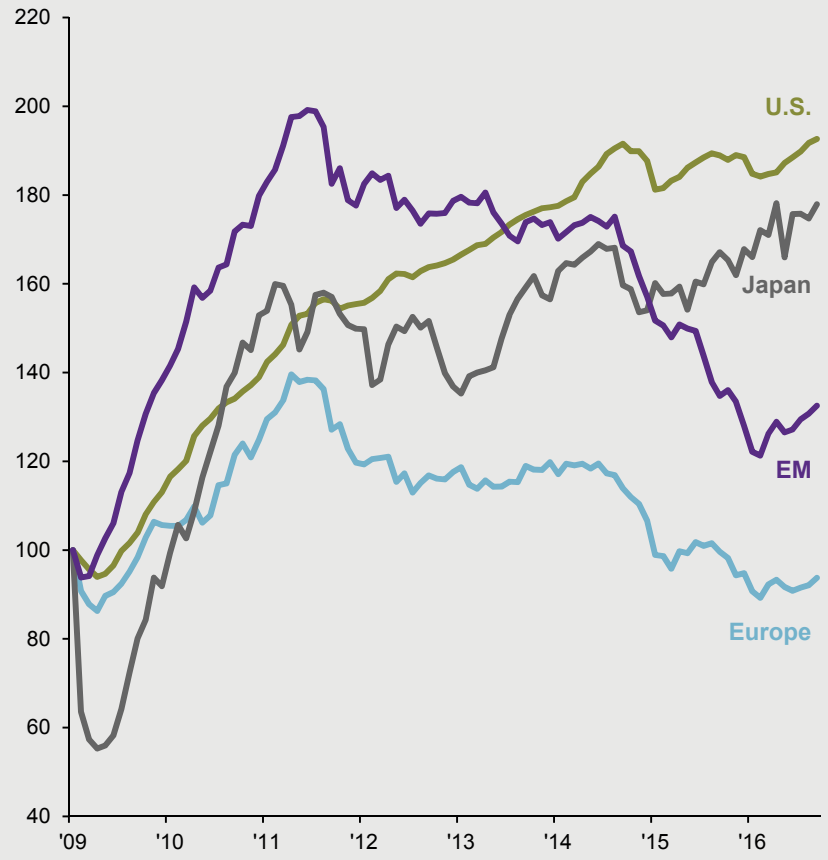


Source: FactSet, MSCI, Standard & Poor's, J.P. Morgan Asset Management.
All return values are MSCI Gross Index (official) data. Chart is for illustrative purposes only. Past performance is not indicative of future results. Please see disclosure page for index definitions. Countries included in global correlations include Argentina, South Africa, Japan, UK, Canada, France, Germany, Italy, Australia, Austria, Brazil, China, Colombia, Denmark, Finland, Hong Kong, India, Malaysia, Mexico, Netherlands, New Zealand, Peru, Philippines, Portugal, Korea, Spain, Taiwan, Thailand, Turkey, United States.
Guide to the Markets – U.S. Data are as of September 30, 2016.

J.P.Morgan Asset Management

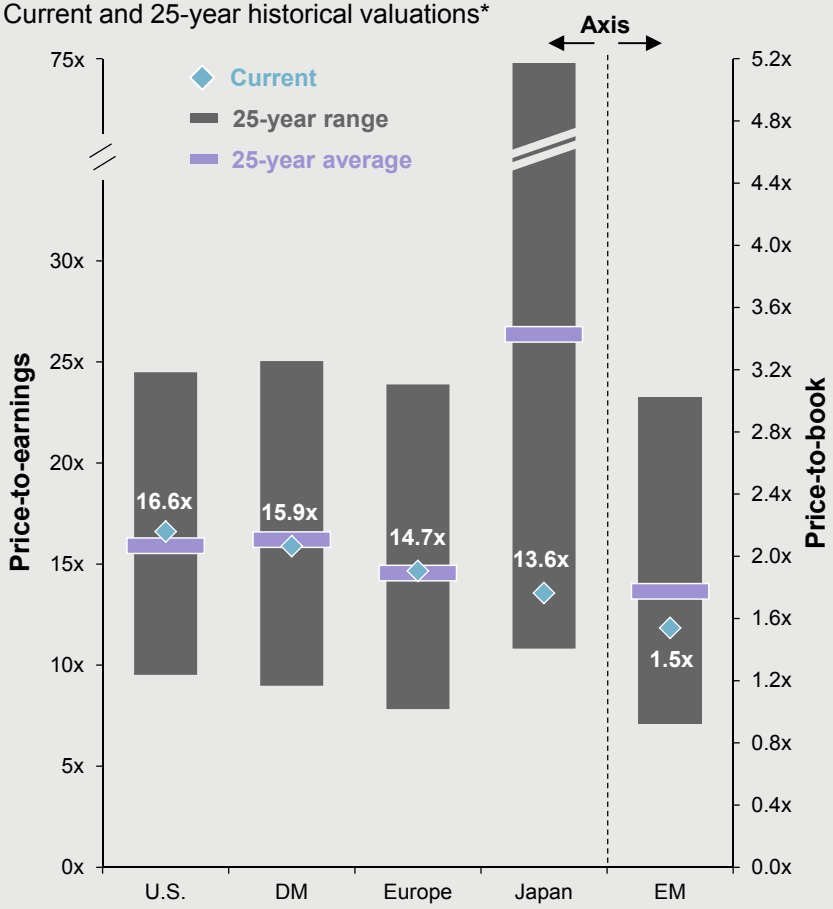
Global earnings

EPS, U.S. dollar, NTMA, Jan. 2009 = 100



Global valuations

Current and 25-year historical valuations*



Source: FactSet, MSCI, Standard & Poor's, J.P. Morgan Asset Management.
*Valuations refer to NTMA P/E for Europe, U.S. and Japan 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.
Guide to the Markets – U.S. Data are as of September 30, 2016.

Global Purchasing Managers' Index for manufacturing

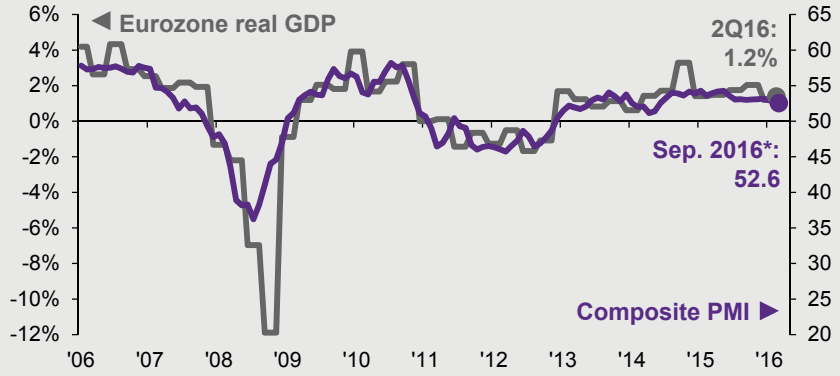
	Oct'14	Nov'14	Dec'14	Jan'15	Feb'15	Mar'15	Apr'15	May'15	Jun'15	Jul'15	Aug'15	Sep'15	Oct'15	Nov'15	Dec'15	Jan'16	Feb'16	Mar'16	Apr'16	May'16	Jun'16	Jul'16	Aug'16	Sep'16
Global	52.0	51.7	51.4	51.6	51.8	51.5	50.8	51.0	50.9	50.8	50.5	50.4	51.1	51.0	50.7	50.9	50.0	50.6	50.2	50.0	50.4	51.0	50.8	51.0
Developed Markets	53.4	52.8	52.4	52.5	52.8	53.0	52.1	52.4	52.1	52.5	52.3	52.1	53.0	52.6	52.0	52.3	50.9	50.9	50.4	50.2	50.9	51.5	51.3	51.6
Emerging Markets	50.5	50.6	50.4	50.8	50.9	49.8	49.3	49.4	49.2	48.8	48.3	48.3	48.9	49.0	49.2	49.2	48.8	50.0	49.5	49.5	49.3	50.1	49.8	-
U.S.	55.9	54.8	53.9	53.9	55.1	55.7	54.1	54.0	53.6	53.8	53.0	53.1	54.1	52.8	51.2	52.4	51.3	51.5	50.8	50.7	51.3	52.9	52.0	51.5
Canada	55.3	55.3	53.9	51.0	48.7	48.9	49.0	49.8	51.3	50.8	49.4	48.6	48.0	48.6	47.5	49.3	49.4	51.5	52.2	52.1	51.8	51.9	51.1	50.3
U.K.	52.9	53.1	52.6	52.9	54.1	53.7	52.2	52.0	51.2	52.3	51.7	51.5	55.1	52.3	51.7	53.0	50.8	51.0	49.5	50.4	52.1	48.2	53.4	55.4
Euro Area	50.6	50.1	50.6	51.0	51.0	52.2	52.0	52.2	52.5	52.4	52.3	52.0	52.3	52.8	53.2	52.3	51.2	51.6	51.7	51.5	52.8	52.0	51.7	52.6
Germany	51.4	49.5	51.2	50.9	51.1	52.8	52.1	51.1	51.9	51.8	53.3	52.3	52.1	52.9	53.2	52.3	50.5	50.7	51.8	52.1	54.5	53.8	53.6	54.3
France	48.5	48.4	47.5	49.2	47.6	48.8	48.0	49.4	50.7	49.6	48.3	50.6	50.6	50.6	51.4	50.0	50.2	49.6	48.0	48.4	48.3	48.6	48.3	49.7
Italy	49.0	49.0	48.4	49.9	51.9	53.3	53.8	54.8	54.1	55.3	53.8	52.7	54.1	54.9	55.6	53.2	52.2	53.5	53.9	52.4	53.5	51.2	49.8	51.0
Spain	52.6	54.7	53.8	54.7	54.2	54.3	54.2	55.8	54.5	53.6	53.2	51.7	51.3	53.1	53.0	55.4	54.1	53.4	53.5	51.8	52.2	51.0	51.0	52.3
Greece	48.8	49.1	49.4	48.3	48.4	48.9	46.5	48.0	46.9	30.2	39.1	43.3	47.3	48.1	50.2	50.0	48.4	49.0	49.7	48.4	50.4	48.7	50.4	49.2
Ireland	56.6	56.2	56.9	55.1	57.5	56.8	55.8	57.1	54.6	56.7	53.6	53.8	53.6	53.3	54.2	54.3	52.9	54.9	52.6	51.5	53.0	50.2	51.7	51.3
Australia	49.4	50.1	46.9	49.0	45.4	46.3	48.0	52.3	44.2	50.4	51.7	52.1	50.2	52.5	51.9	51.5	53.5	58.1	53.4	51.0	51.8	56.4	46.9	49.8
Japan	52.4	52.0	52.0	52.2	51.6	50.3	49.9	50.9	50.1	51.2	51.7	51.0	52.4	52.6	52.6	52.3	50.1	49.1	48.2	47.7	48.1	49.3	49.5	50.4
China	50.4	50.0	49.6	49.7	50.7	49.6	48.9	49.2	49.4	47.8	47.3	47.2	48.3	48.6	48.2	48.4	48.0	49.7	49.4	49.2	48.6	50.6	50.0	50.1
Indonesia	49.2	48.0	47.6	48.5	47.5	46.4	46.7	47.1	47.8	47.3	48.4	47.4	47.8	46.9	47.8	48.9	48.7	50.6	50.9	50.6	51.9	48.4	50.4	50.9
Korea	48.7	49.0	49.9	51.1	51.1	49.2	48.8	47.8	46.1	47.6	47.9	49.2	49.1	49.1	50.7	49.5	48.7	49.5	50.0	50.1	50.5	50.1	48.6	47.6
Taiwan	52.0	51.4	50.0	51.7	52.1	51.0	49.2	49.3	46.3	47.1	46.1	46.9	47.8	49.5	51.7	50.6	49.4	51.1	49.7	48.5	50.5	51.0	51.8	52.2
India	51.6	53.3	54.5	52.9	51.2	52.1	51.3	52.6	51.3	52.7	52.3	51.2	50.7	50.3	49.1	51.1	51.1	52.4	50.5	50.7	51.7	51.8	52.6	52.1
Brazil	49.1	48.7	50.2	50.7	49.6	46.2	46.0	45.9	46.5	47.2	45.8	47.0	44.1	43.8	45.6	47.4	44.5	46.0	42.6	41.6	43.2	46.0	45.7	46.0
Mexico	53.3	54.3	55.3	56.6	54.4	53.8	53.8	53.3	52.0	52.9	52.4	52.1	53.0	53.0	52.4	52.2	53.1	53.2	52.4	53.6	51.1	50.6	50.9	51.9
Russia	50.3	51.7	48.9	47.6	49.7	48.1	48.9	47.6	48.7	48.3	47.9	49.1	50.2	50.1	48.7	49.8	49.3	48.3	48.0	49.6	51.5	49.5	50.8	51.1

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.
Guide to the Markets – U.S. Data are as of September 30, 2016.

J.P.Morgan Asset Management

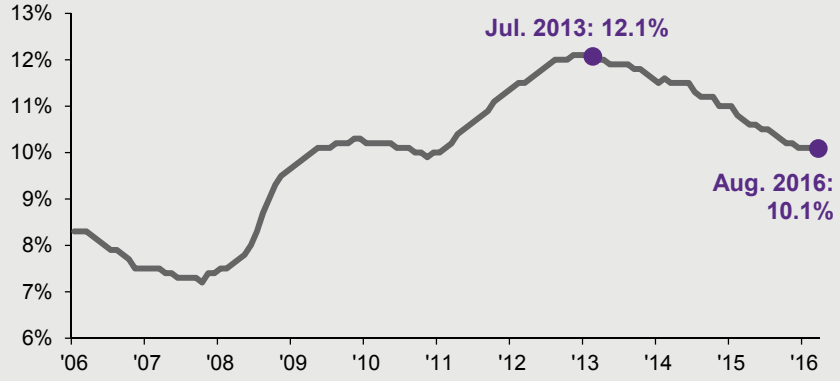
Markit PMI and GDP growth in the eurozone

Markit Composite PMI Index and eurozone real GDP q/q SAAR



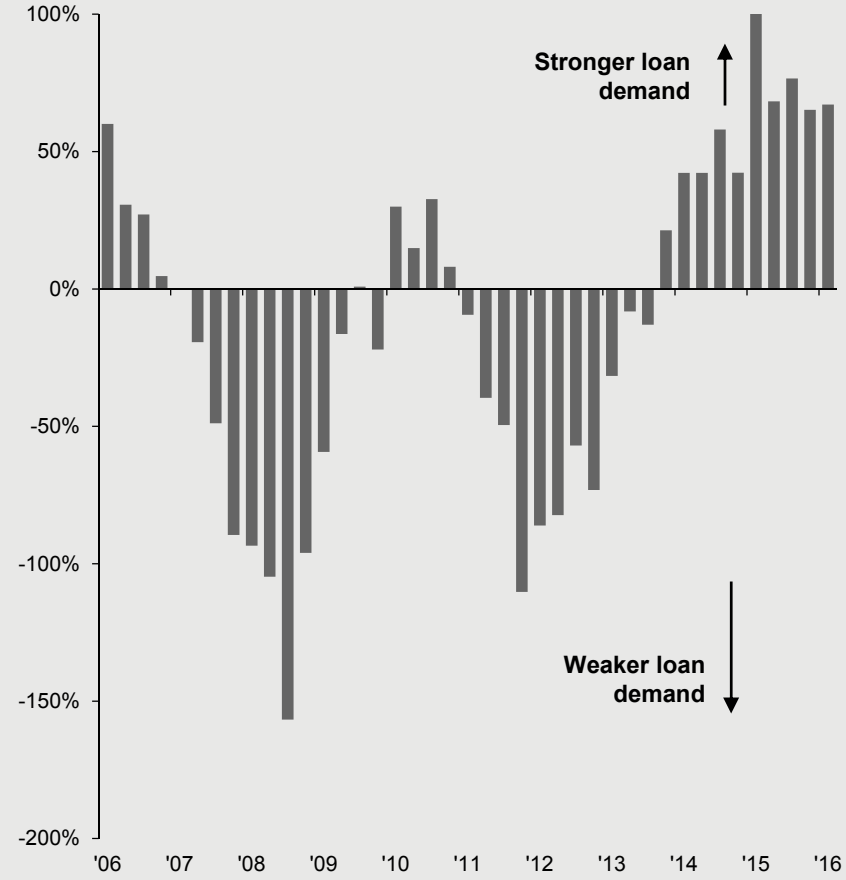
Eurozone unemployment

Persons unemployed as a percent of labor force, seasonally adjusted



Eurozone credit demand

Net % of banks reporting positive loan demand

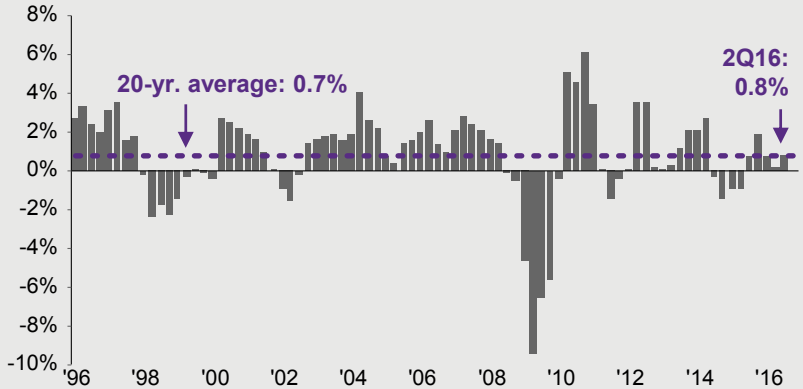


Source: FactSet, J.P. Morgan Asset Management; (Top left) Markit; (Top left and bottom left) Eurostat; (Right) ECB.
SAAR – Seasonally adjusted annual rate. *Eurozone September composite PMI is a flash estimate. Eurozone shown is the aggregate of the 19 countries that currently use the euro.
Guide to the Markets – U.S. Data are as of September 30, 2016.

Japan: Economy and markets

Japanese economic growth

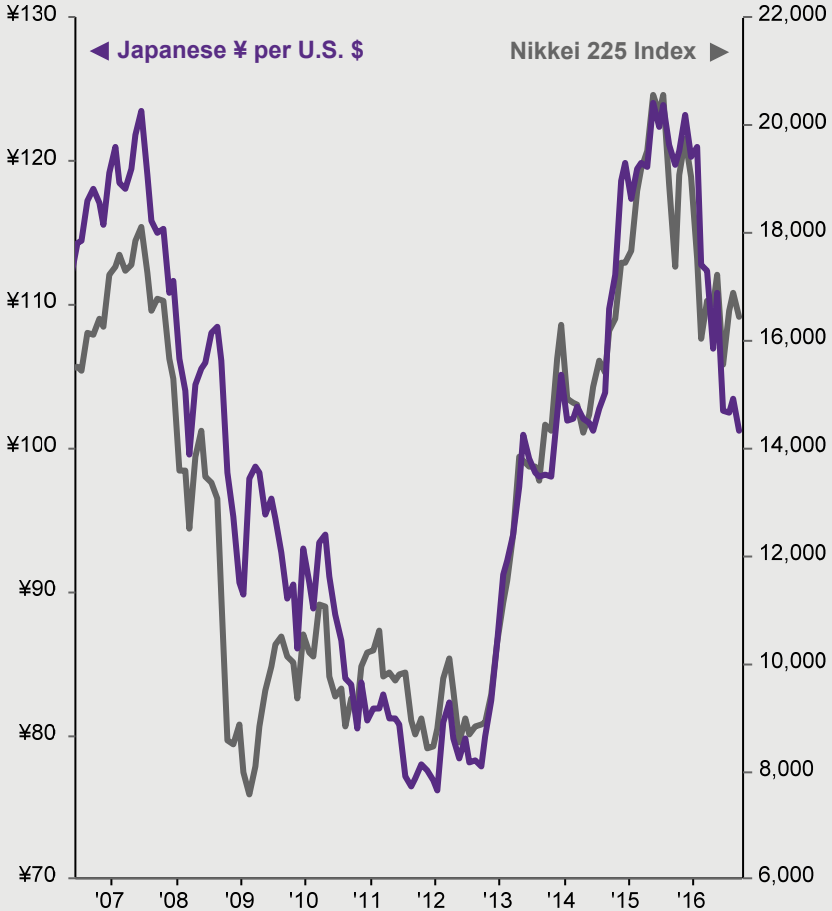
Real GDP, y/y % change



Japanese labor market

Unemployment, y/y % change in wages, 3-month moving average

Japanese yen and the stock market



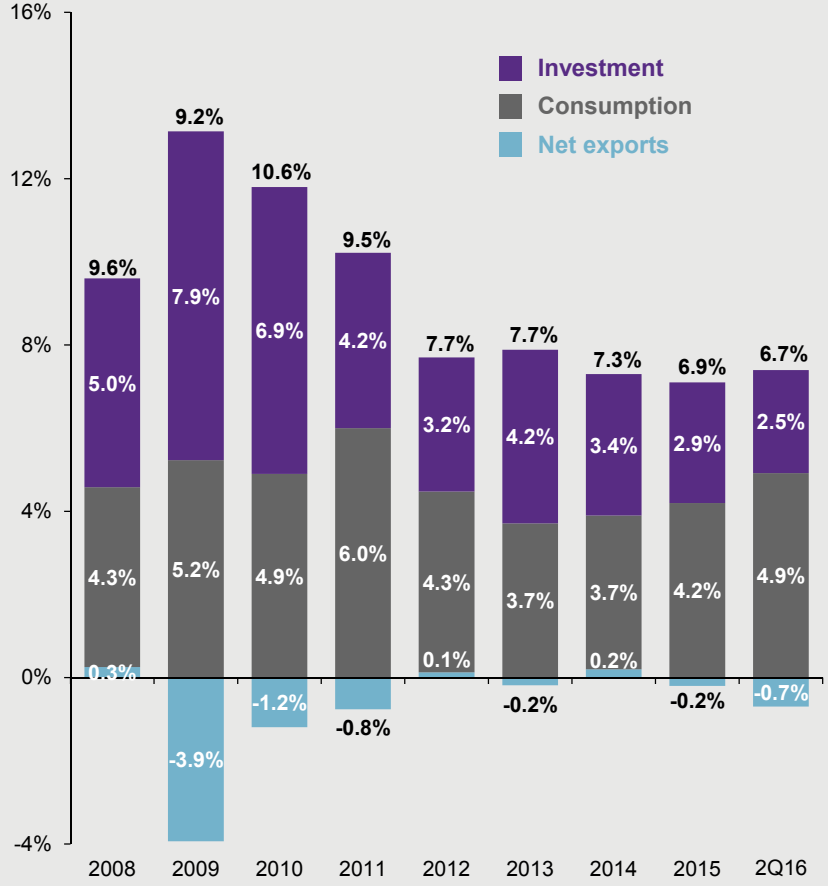
Source: FactSet, J.P. Morgan Asset Management; (Top and bottom left) Japanese Cabinet Office; (Right) Nikkei.
Guide to the Markets – U.S. Data are as of September 30, 2016.

J.P.Morgan
Asset Management

China: Economic and policy snapshot

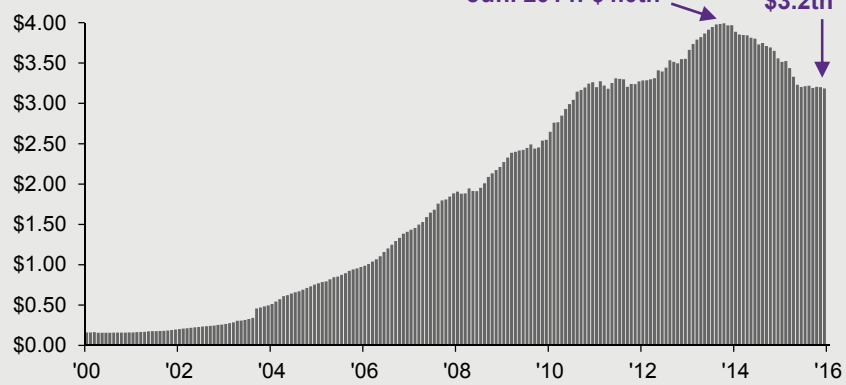
China real GDP contribution

Year-over-year % change



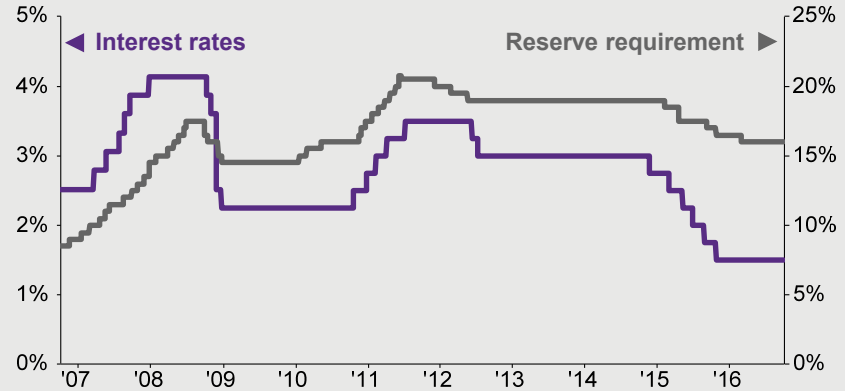
China foreign exchange reserves

Trillions USD



Monetary policy tools

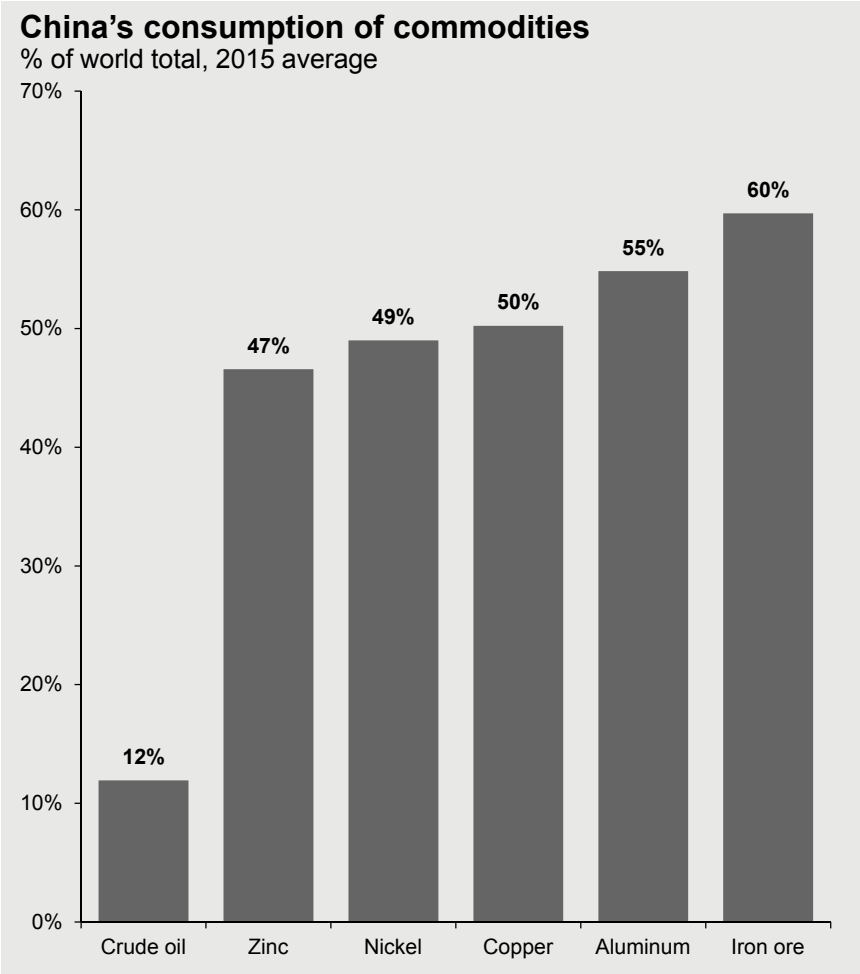
Policy rate on 1-year renminbi deposits



Source: FactSet, J.P. Morgan Asset Management; (Left) CEIC; (Top and bottom right) People's Bank of China.
Guide to the Markets – U.S. Data are as of September 30, 2016.

J.P.Morgan Asset Management

Emerging market headwinds

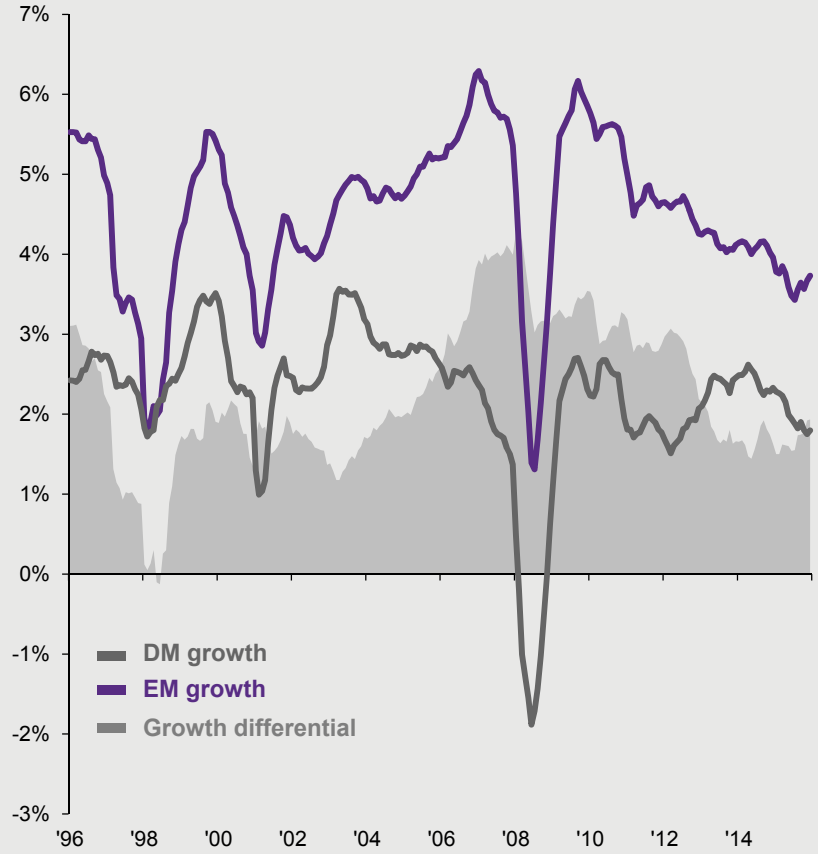


Source: J.P. Morgan Asset Management; (Left) Bloomberg, EIA, World Bureau of Metal Statistics; (Right) BIS, various National Statistics Offices.
*Private credit includes non-financial corporates and households, and bank lending, corporate bonds and shadow banking. Aggregated from BIS underlying data.
Guide to the Markets – U.S. Data are as of September 30, 2016.

Emerging market equities

EM vs. DM growth

Monthly, consensus expectations for GDP growth in 12 months



EM earnings by region

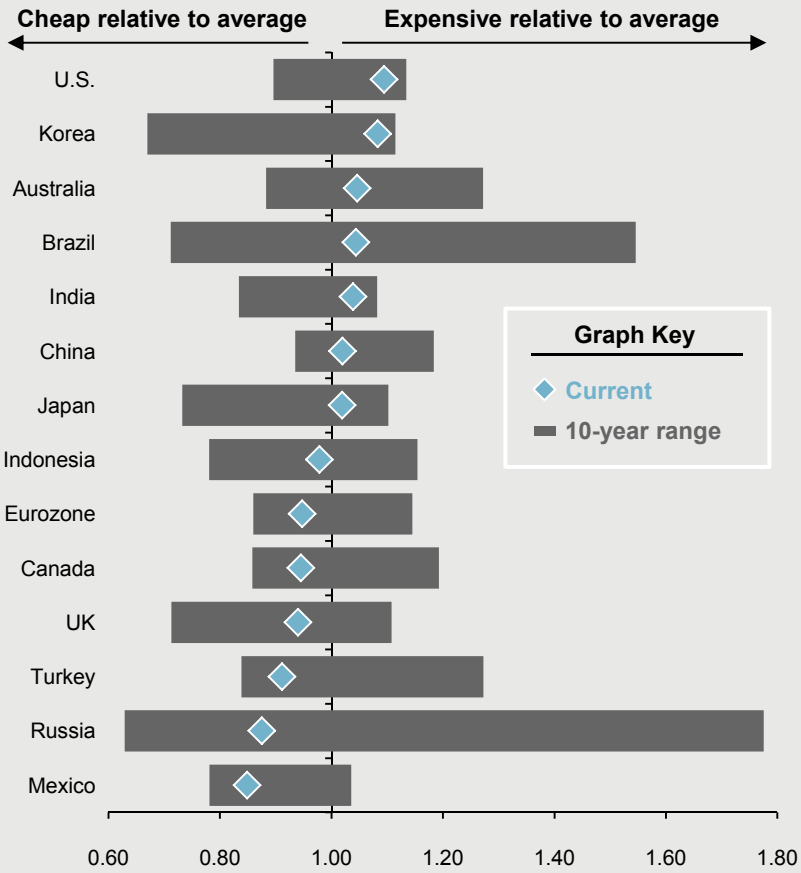
EPS for next 12-month consensus, U.S. dollar, rebased to 100

Source: FactSet, MSCI, Consensus Economics, J.P. Morgan Asset Management.
"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.
Guide to the Markets – U.S. Data are as of September 30, 2016.

J.P.Morgan Asset Management

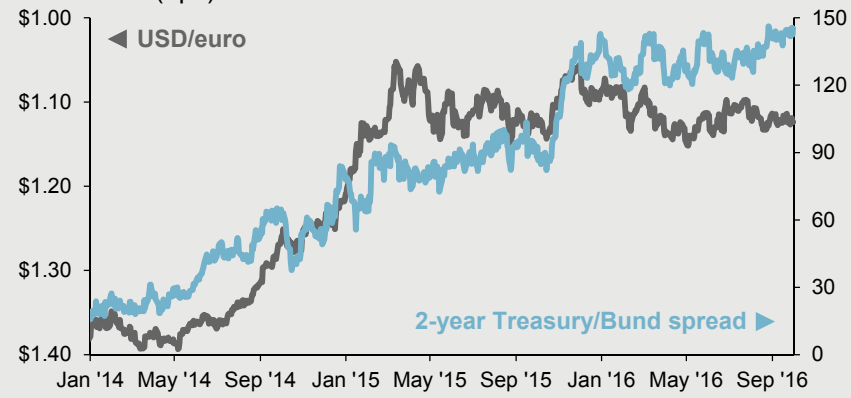
Real effective exchange rates*

FX adjusted for relative inflation changes vs. 10-year average



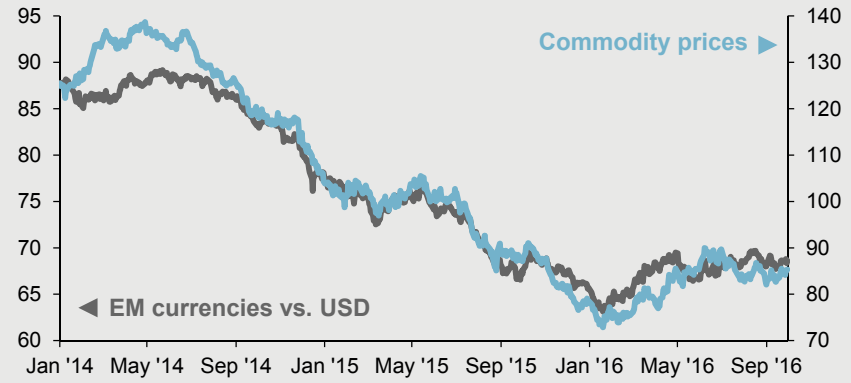
Developed markets

Short rates (bps) and FX



Emerging markets

Commodity prices and FX



Source: J.P. Morgan Asset Management; (Left and bottom right) J.P. Morgan Global Economic Research; (Top right) FactSet, Tullett Prebon; (Bottom right) Bloomberg.

*Real effective exchange rates (REERs) compare the value of a currency to a weighted basket of several foreign currencies. They are deflated using a producer price index, except for Indonesia, which uses a consumer price index. EM currencies is the J.P. Morgan Emerging Market Currencies Index. Commodity prices is the Bloomberg Commodity Price Index.

Guide to the Markets – U.S. Data are as of September 30, 2016.

Correlations and volatility

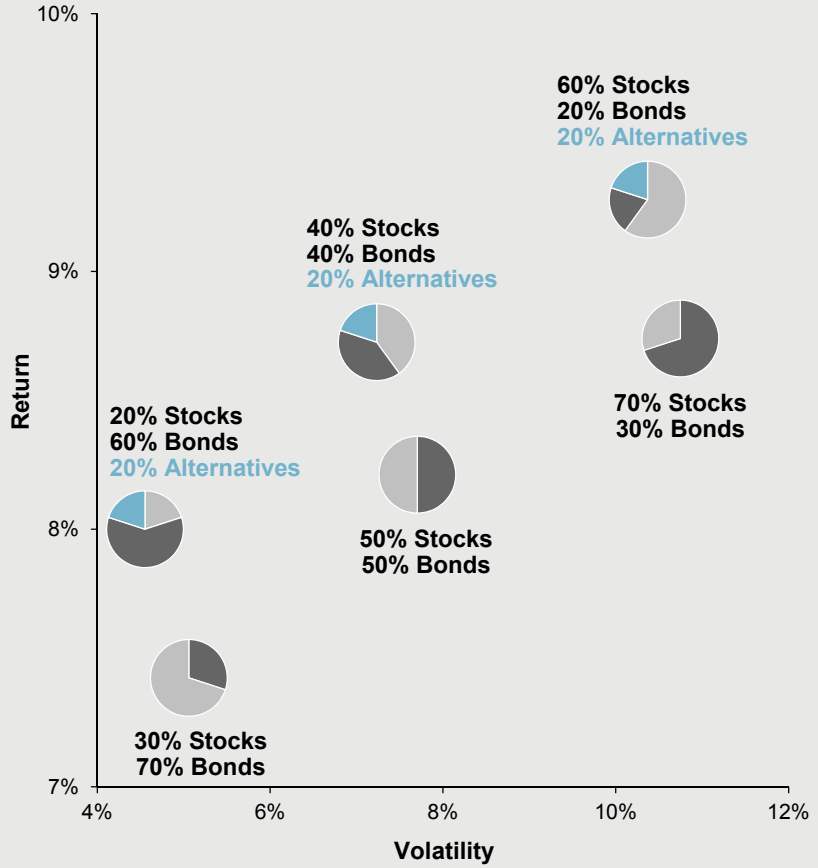
	U.S. Large Cap	EAFE	EME	Bonds	Corp. HY	Munis	Currcy.	EMD	Cmdty.	REITs	Hedge funds	Private equity	Ann. Volatility
U.S. Large Cap	1.00	0.89	0.79	-0.30	0.75	-0.12	-0.48	0.62	0.54	0.78	0.81	0.80	16%
EAFE		1.00	0.90	-0.16	0.79	-0.02	-0.64	0.72	0.61	0.67	0.86	0.81	20%
EME			1.00	-0.07	0.85	0.05	-0.67	0.82	0.69	0.56	0.87	0.80	25%
Bonds				1.00	-0.06	0.77	-0.14	0.23	-0.09	-0.01	-0.21	-0.26	3%
Corp. HY					1.00	0.12	-0.52	0.89	0.66	0.67	0.79	0.66	12%
Munis						1.00	-0.10	0.43	-0.07	0.06	-0.03	-0.16	4%
Currencies							1.00	-0.59	-0.67	-0.38	-0.49	-0.56	8%
EMD								1.00	0.60	0.60	0.68	0.58	8%
Commodities									1.00	0.41	0.72	0.70	21%
REITs										1.00	0.53	0.58	26%
Hedge funds											1.00	0.87	7%
Private equity												1.00	11%

Source: Barclays Inc., Bloomberg, Cambridge Associates, Credit Suisse/Tremont, FactSet, Federal Reserve, MSCI, NCREIF, Standard & Poor's, J.P. Morgan Asset Management.
Indexes used – Large Cap: S&P 500 Index; Currencies: Federal Reserve Trade Weighted Dollar; EAFE: MSCI EAFE; EME: MSCI Emerging Markets; Bonds: Barclays Aggregate; Corp HY: Barclays Corporate High Yield; EMD: 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 two quarter lag. All correlation coefficients and annualized volatility calculated based on quarterly total return data for period 9/30/06 to 9/30/16. This chart is for illustrative purposes only.
Guide to the Markets – U.S. Data are as of September 30, 2016.

J.P.Morgan Asset Management

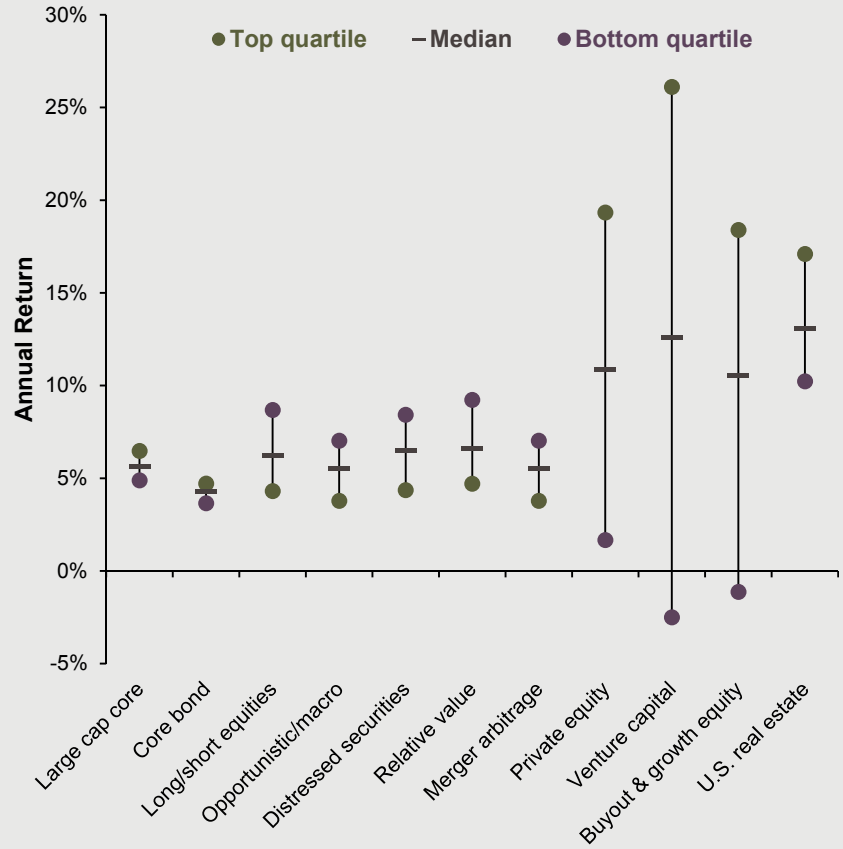
Alternatives and portfolio risk/return

Annualized volatility and returns, 2Q91 – 1Q16



Manager alpha and dispersion

Based on returns from 2006 – 2015*



Source: Cambridge Associates, HFRI, J.P. Morgan Asset Management; (Left) Barclays, FactSet, NCREIF, Standard & Poor's; (Right) Lipper.
The portfolios that do not contain alternatives are a mix of the S&P 500 and the Barclays U.S. Aggregate. The 20% allocation to alternatives shown on the left reflects the following: 10% in hedge funds (HFR FW Comp.), 5% in private equity and 5% in private real estate. The volatility and returns are based on data from 2Q91 to 1Q16, encompassing 25 years of data. *Manager dispersion is based on: 2006 – 2015 annual returns for large cap core, Core Bond; 2006 – 2015 monthly returns for hedge funds; 2006 – 2014 annual returns for private equity, venture capital, and buyout & growth; and 2009 – 2015 quarterly returns for U.S. real estate.

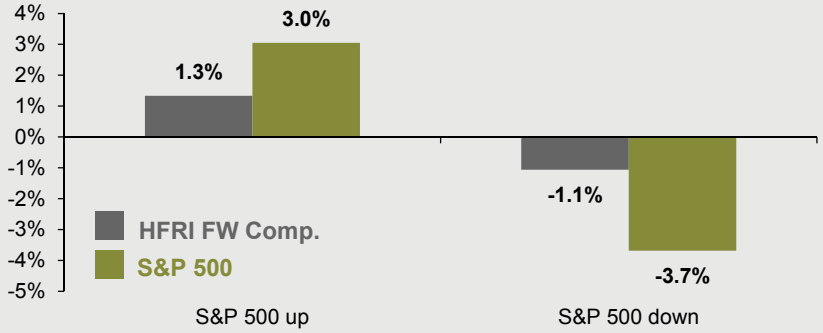
Guide to the Markets – U.S. Data are as of September 30, 2016.

Hedge funds

2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	YTD	14-yrs. '02-'15 Ann.	14-yrs. '02-'15 Vol.
Macro 5.5%	Large Cap 28.7%	Event Driven 14.2%	Equity L/S 10.0%	Large Cap 15.8%	Macro 11.4%	Macro 4.7%	Large Cap 26.5%	Large Cap 15.1%	Large Cap 2.1%	Large Cap 16.0%	Large Cap 32.4%	Large Cap 13.7%	Market Neutral 4.5%	Large Cap 7.8%	Large Cap 6.3%	Large Cap 16.4%
Relative Value 5.3%	Event Driven 23.0%	Large Cap 10.9%	Event Driven 8.6%	Event Driven 15.2%	Equity L/S 11.4%	Market Neutral -3.0%	Relative Value 23.0%	Relative Value 12.5%	Relative Value 0.8%	Relative Value 9.7%	Equity L/S 14.5%	Macro 5.8%	Large Cap 1.4%	Event Driven 6.1%	Event Driven 6.3%	Equity L/S 10.0%
Market Neutral 0.9%	Macro 21.5%	Equity L/S 7.9%	Market Neutral 6.1%	Equity L/S 12.8%	Relative Value 10.0%	Relative Value -17.3%	Equity L/S 22.3%	Event Driven 11.5%	Event Driven -0.5%	Event Driven 6.5%	Event Driven 13.4%	Relative Value 5.3%	Macro 0.4%	Relative Value 4.9%	Relative Value 6.0%	Event Driven 8.6%
Equity L/S -1.7%	Equity L/S 16.9%	Macro 7.5%	Macro 6.1%	Relative Value 12.2%	Event Driven 8.7%	Event Driven -20.8%	Event Driven 20.3%	Equity L/S 8.9%	Macro -0.7%	Equity L/S 4.7%	Relative Value 7.5%	Equity L/S 3.6%	Relative Value 0.2%	Equity L/S 3.1%	Macro 5.5%	Relative Value 6.2%
Event Driven -3.1%	Relative Value 9.1%	Relative Value 6.1%	Relative Value 5.3%	Macro 8.2%	Market Neutral 5.7%	Equity L/S -26.4%	Macro 6.9%	Macro 3.2%	Market Neutral -1.5%	Market Neutral 3.1%	Market Neutral 6.4%	Market Neutral 3.2%	Equity L/S -0.2%	Macro 2.1%	Equity L/S 5.0%	Macro 5.1%
Large Cap -22.1%	Market Neutral 3.3%	Market Neutral 3.4%	Large Cap 4.9%	Market Neutral 7.0%	Large Cap 5.5%	Large Cap -37.0%	Market Neutral -1.7%	Market Neutral 2.5%	Equity L/S -4.3%	Macro -1.3%	Macro 0.1%	Event Driven 2.6%	Event Driven -2.8%	Market Neutral 0.4%	Market Neutral 2.8%	Market Neutral 2.7%

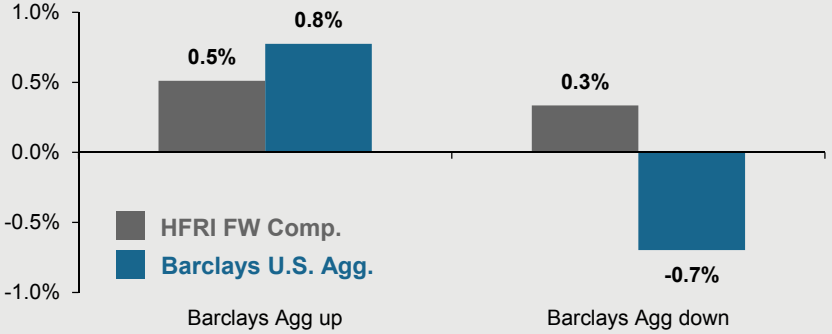
Hedge fund returns in different market environments

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 Barclays Agg.



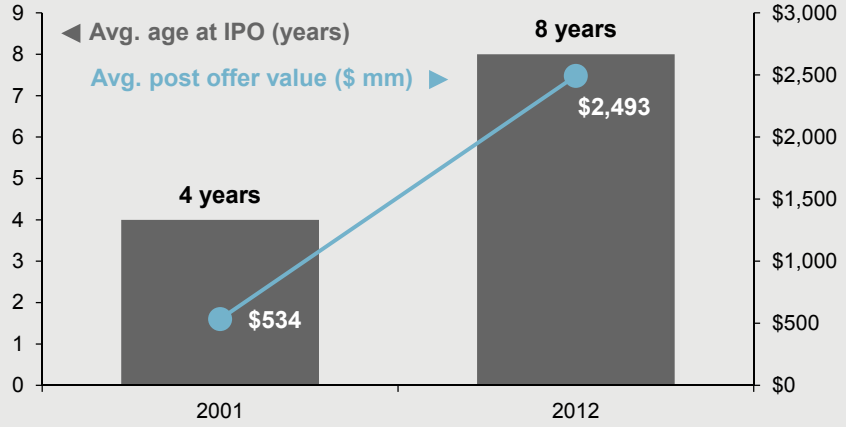
Source: Barclays, FactSet, HFRI, Standard & Poor's, J.P. Morgan Asset Management.
Hedge fund returns in different market environments are based on monthly returns over the past 15 years through August 31, 2016, due to data availability. Year-to-date returns are as of August 31, 2016.
Guide to the Markets – U.S. Data are as of September 30, 2016.

Other asset classes

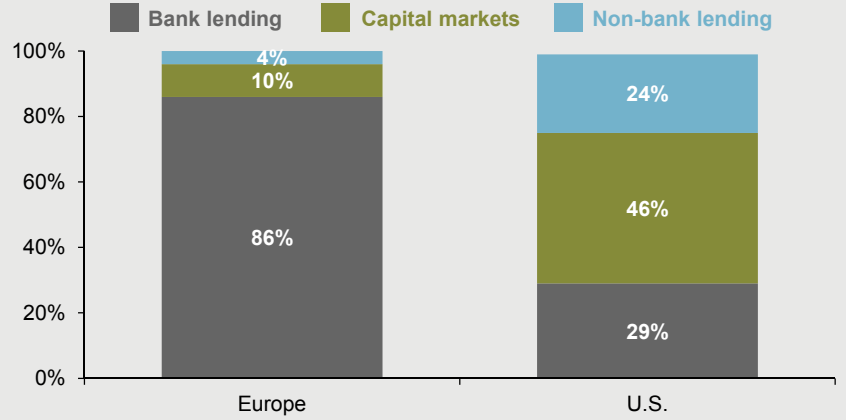
J.P.Morgan Asset Management

Private debt and equity

Private company age and market value

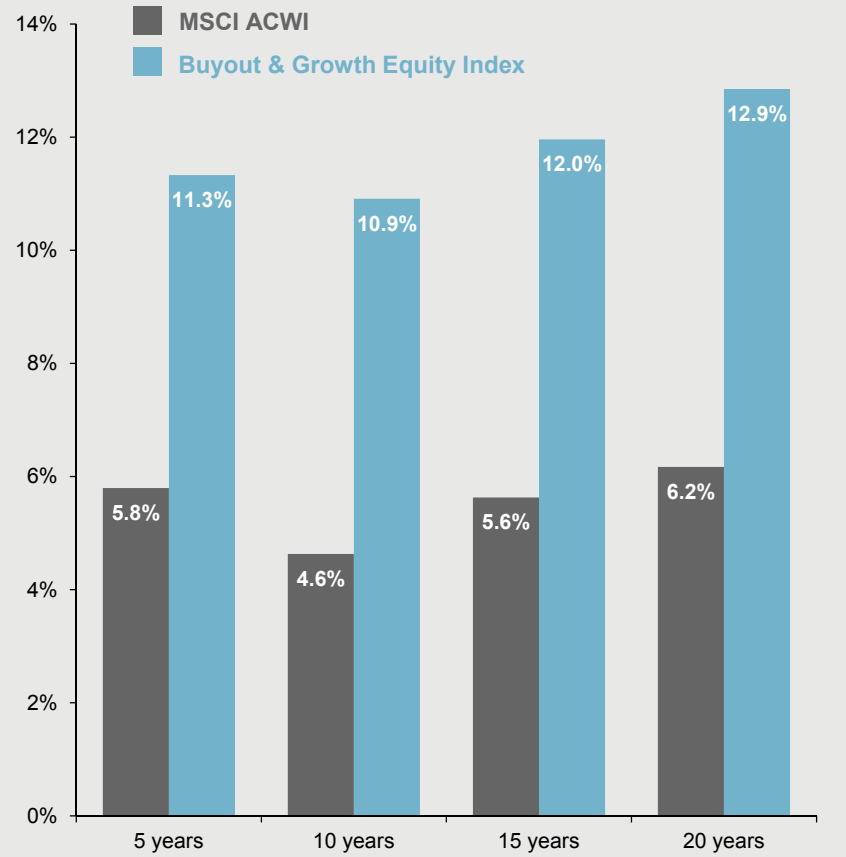


Composition of firms' external financing sources



Public vs. private equity returns

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

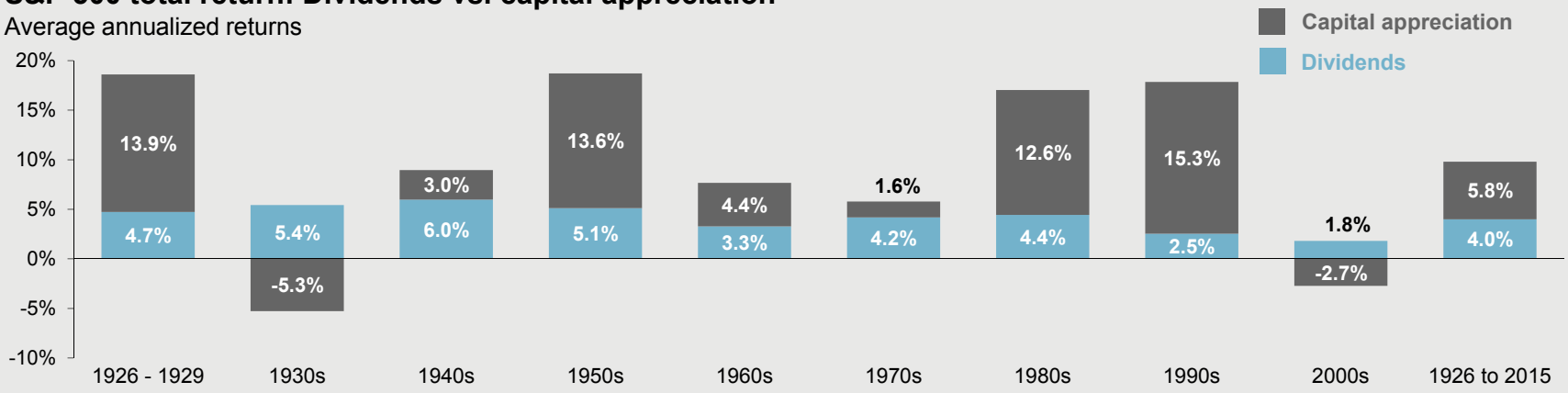


Source: Cambridge Associates, Deutsche Bank, FactSet, MSCI, National Venture Capital Association, J.P. Morgan Asset Management.
Age at IPO is defined as time elapsed from first funding round until IPO date. *Data as of 1Q16.
Guide to the Markets – U.S. Data are as of September 30, 2016.

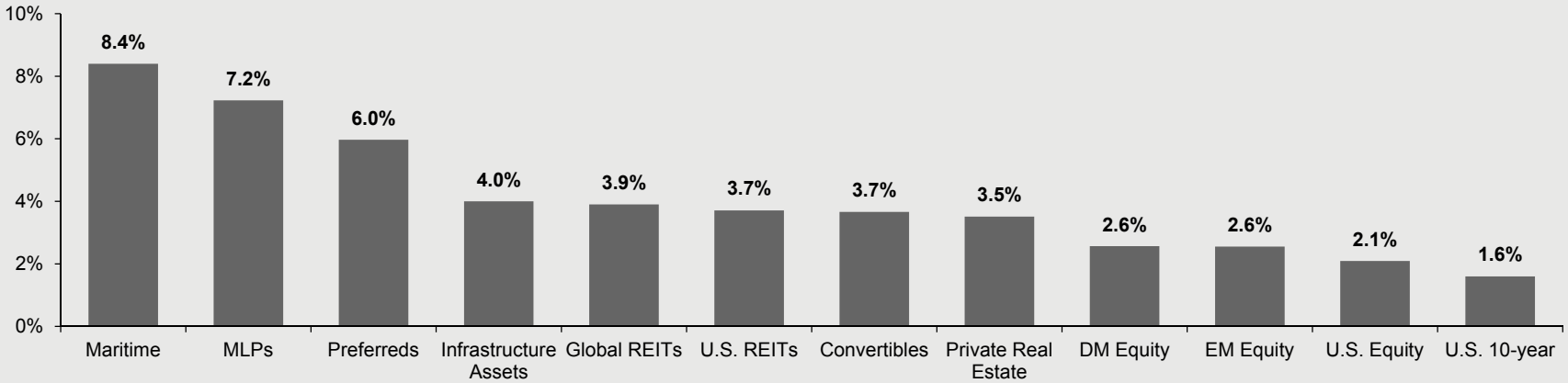
Yield alternatives: Domestic and global

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

Average annualized returns



Asset class yields



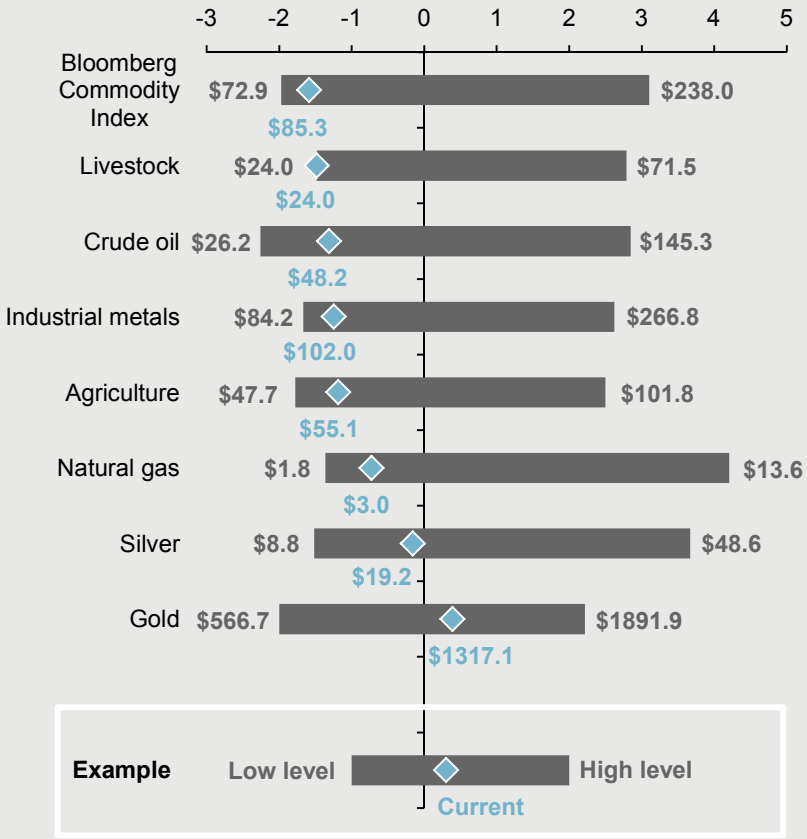
Source: FactSet, J.P. Morgan Asset Management; (Top) Ibbotson, Standard & Poor's; (Bottom) Alerian, BAML, Barclays, Clarkson, Drewry Maritime Consultants, Federal Reserve, FTSE, MSCI, NCREIF, Standard & Poor's. Dividend vs. capital appreciation returns are through 12/31/15. Yields are as of 9/30/16, except maritime (12/31/2015), infrastructure assets and private real estate (6/30/16). Maritime: Unlevered yields for maritime assets are calculated as the difference between charter rates (rental income) and operating expenses as a percentage of current asset value. Yields for each of the sub-vessel types above are calculated and the respective weightings are applied to calculate sub-sector specific yields, and then weighted to arrive at the current indicative yield for the World Maritime Fleet; MLPs: Alerian MLP; Preferreds: BAML Hybrid Preferred Securities; Private Real Estate: NCREIF ODCE; Global/U.S. REITs: FTSE NAREIT Global/USA REITs; Infrastructure Assets: MSCI Global Infrastructure Asset Index; Convertibles: Barclays U.S. Convertibles Composite; EM Equity: MSCI Emerging Markets; DM Equity: MSCI The World Index; U.S. Equity: MSCI USA.

Guide to the Markets – U.S. Data are as of September 30, 2016.

J.P.Morgan Asset Management

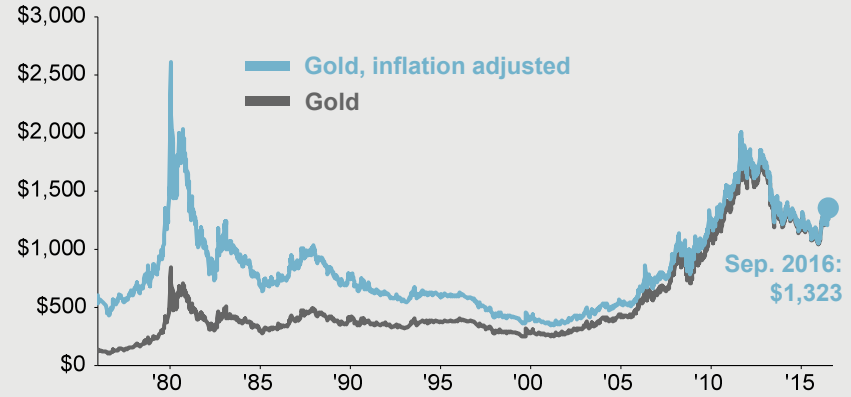
Commodity prices

Commodity price z-scores



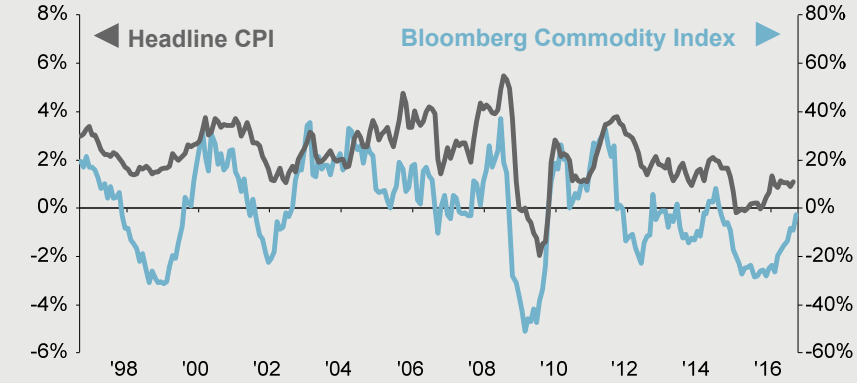
Gold prices

USD per ounce



Commodity prices and inflation

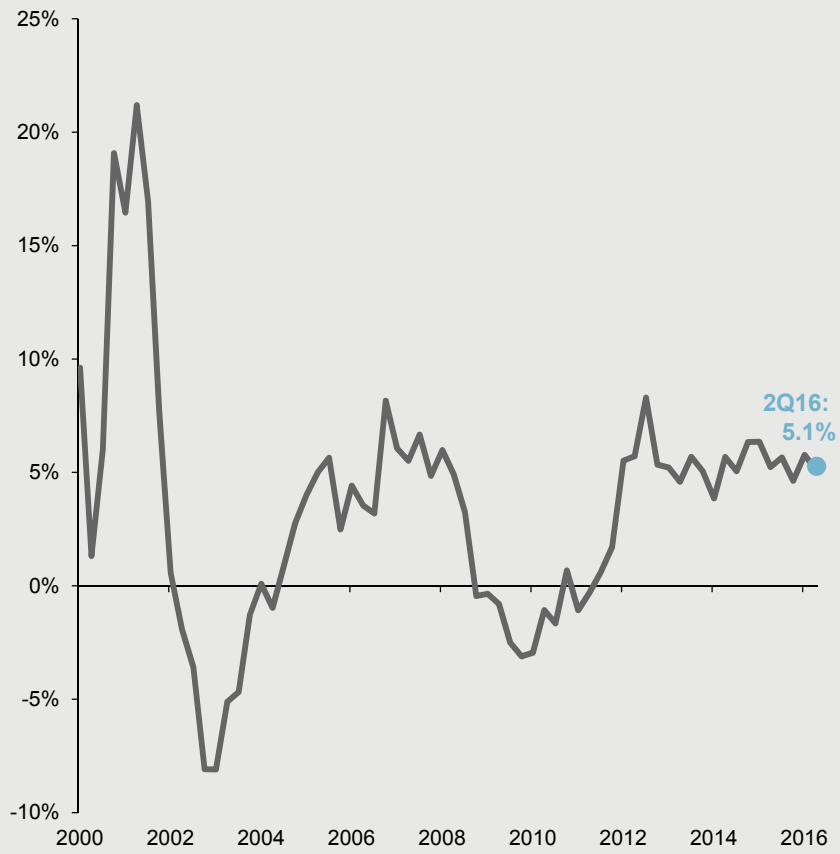
Year-over-year % change



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 Brent crude. 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 September 30, 2016.

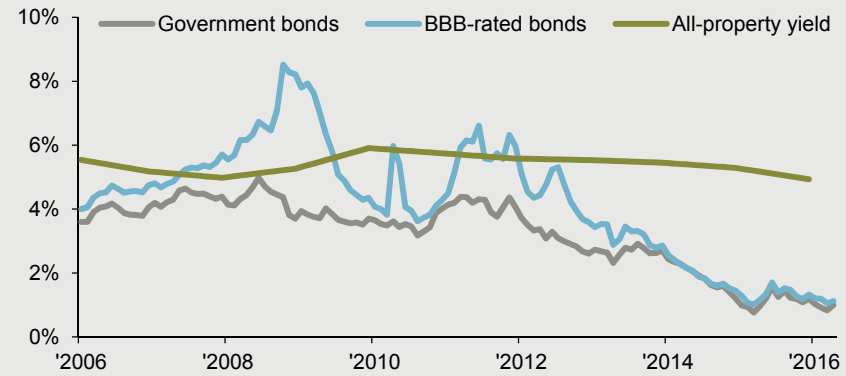
U.S. real estate net operating income growth

Year-over-year NCREIF ODCE Index NOI growth



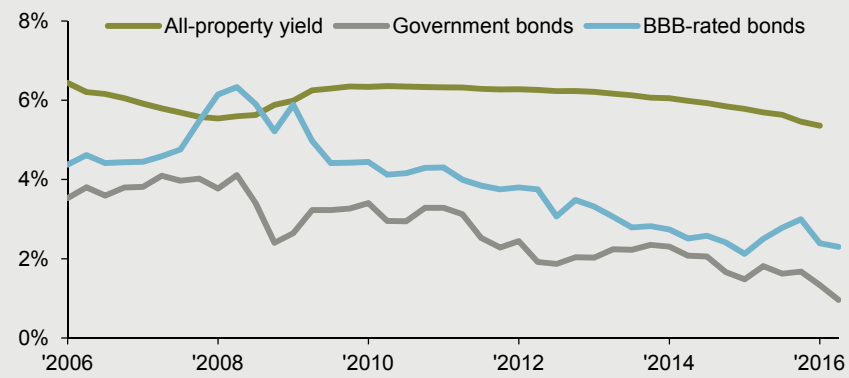
Europe real estate property yield spreads

Property yields vs. government bonds vs. BBB rated bonds



Asia Pacific real estate property yield spreads

Property yields vs. government bonds vs. BBB-rated bonds



Source: (Left) U.S. Real Estate: NCREIF, J.P. Morgan Asset Management; (Top right) Europe real estate: IPD, Barclays J.P. Morgan Asset Management; (Bottom right) Asia Pacific real estate: IPD, FTSE, S&P ASX, J.P. Morgan Asset Management. All property yields (equally-weighted, capitalization rates), government bonds and BBB-rated bonds for Asia Pacific are represented by Australia and Japan.
Guide to the Markets – U.S. Data are as of August 31, 2016.

Asset class returns

2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	YTD	2000 - 2015 Ann.	2000 - 2015 Vol.
Comdty. 31.8%	REITs 13.9%	Comdty. 25.9%	EM Equity 56.3%	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%	EM Equity 16.4%	REITs 12.0%	EM Equity 25.4%
REITs 26.4%	Fixed Income 8.4%	Fixed Income 10.3%	Small Cap 47.3%	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 14.5%	High Yield 7.9%	REITs 22.0%
Fixed Income 11.6%	Cash 4.1%	High Yield 4.1%	DM Equity 39.2%	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%	REITs 12.3%	Small Cap 6.6%	Small Cap 21.2%
Cash 6.1%	Small Cap 2.5%	REITs 3.8%	REITs 37.1%	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%	Small Cap 11.5%	EM Equity 5.9%	DM Equity 19.6%
High Yield 1.0%	High Yield 2.3%	Cash 1.7%	High Yield 32.4%	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%	Comdty. 8.9%	Asset Alloc. 5.6%	Comdty. 18.7%
Asset Alloc. 0.0%	EM Equity -2.4%	Asset Alloc. -5.9%	Large Cap 28.7%	Asset Alloc. 12.8%	Large Cap 4.9%	Asset Alloc. 15.3%	Large Cap 5.5%	Comdty. -35.6%	Large Cap 25.5%	High Yield 14.8%	Asset Alloc. -0.7%	Large Cap 16.0%	REITs 2.9%	Cash 0.0%	Asset Alloc. -2.0%	Large Cap 7.8%	Fixed Income 5.4%	Large Cap 16.7%
Small Cap -3.0%	Asset Alloc. -3.9%	EM Equity -6.0%	Asset Alloc. 26.3%	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. 7.5%	Large Cap 4.1%	High Yield 11.5%
Large Cap -9.1%	Large Cap -11.9%	DM Equity -15.7%	Comdty. 23.9%	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 5.8%	DM Equity 2.8%	Asset Alloc. 11.2%
DM Equity -14.0%	Comdty. -19.5%	Small Cap -20.5%	Fixed Income 4.1%	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 2.2%	Cash 1.8%	Fixed Income 3.4%
EM Equity -30.6%	DM Equity -21.2%	Large Cap -22.1%	Cash 1.0%	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 0.2%	Comdty. 0.8%	Cash 1.0%

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: Barclays Global HY Index, Fixed Income: Barclays Aggregate, REITs: NAREIT Equity REIT Index. 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 Barclays Aggregate, 5% in the Barclays 1-3m Treasury, 5% in the 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 12/31/99 – 12/31/15. 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 September 30, 2016.

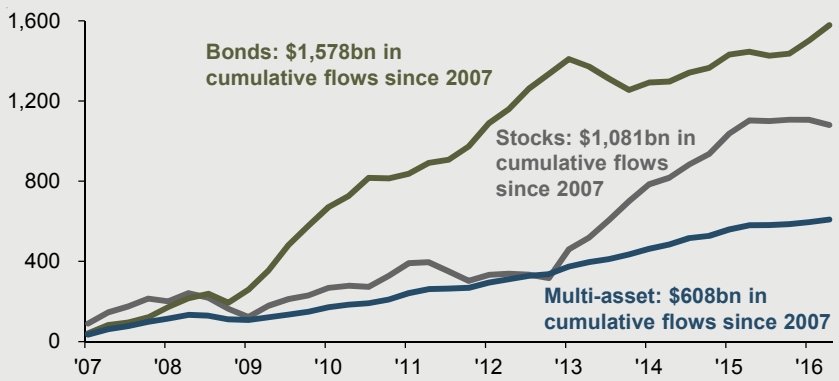
J.P.Morgan Asset Management

Fund flows

USD billions	AUM	YTD 2016	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999
		Registered product flows																	
U.S. equity	6,446	(53)	(36)	93	180	(45)	(43)	13	9	(12)	20	70	101	160	133	47	84	129	122
World equity	2,581	6	207	143	203	59	18	85	58	(39)	194	174	138	92	42	12	(9)	43	22
Taxable bond	3,056	169	50	78	(23)	308	170	221	312	60	108	49	43	25	48	111	62	(10)	10
Tax-free bond	688	51	21	32	(57)	53	(10)	14	73	13	13	17	7	(8)	(4)	13	10	(9)	(7)
Multi-asset	2,109	28	58	92	98	69	58	61	38	12	99	79	81	85	55	24	20	(19)	(12)
Liquidity	2,597	38	35	23	36	9	(69)	(363)	(265)	687	547	185	51	(56)	(102)	19	286	77	131

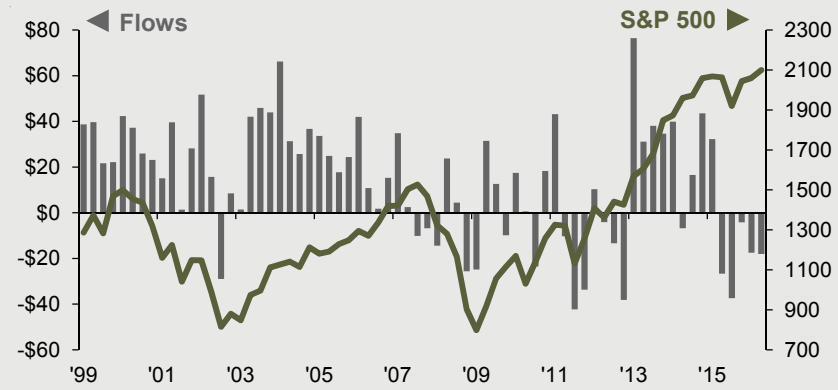
Cumulative flows into long-term asset products

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

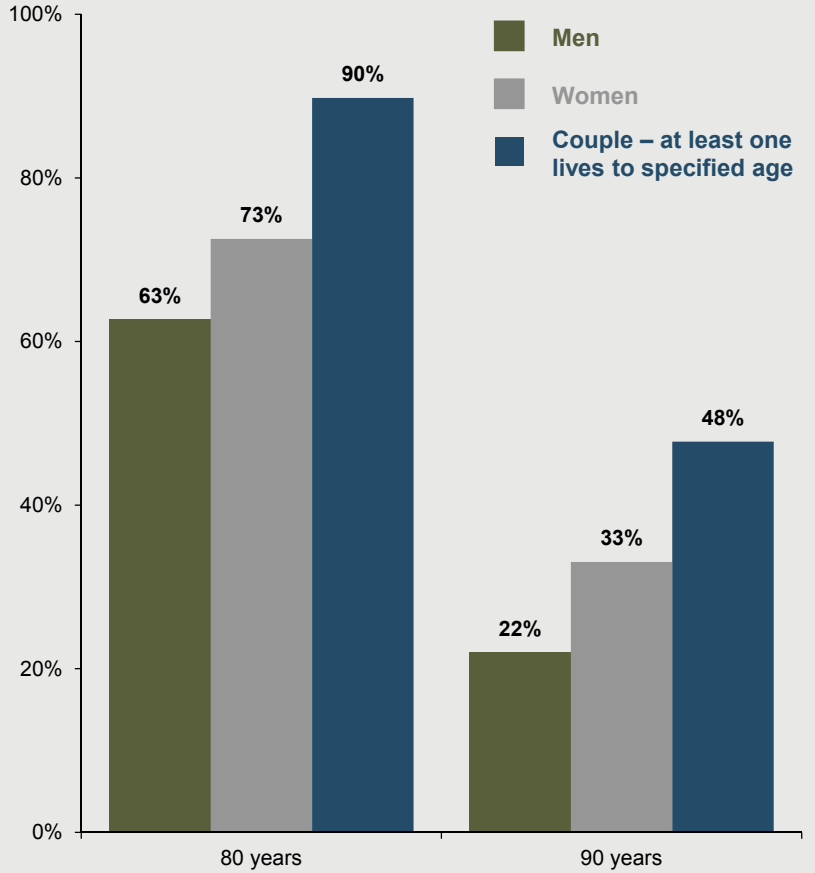


Source: Strategic Insight Simfund, J.P. Morgan Asset Management; (Top) All data includes flows through August 2016 and captures all registered product flows (open-end mutual funds and ETFs); (Bottom left and right) All data includes flows through June 2016 (2Q) and captures all registered product flows (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.
Guide to the Markets – U.S. Data are as of September 30, 2016.

Life expectancy and pension shortfall

Probability of reaching ages 80 and 90

Persons aged 65, by gender, and combined couple

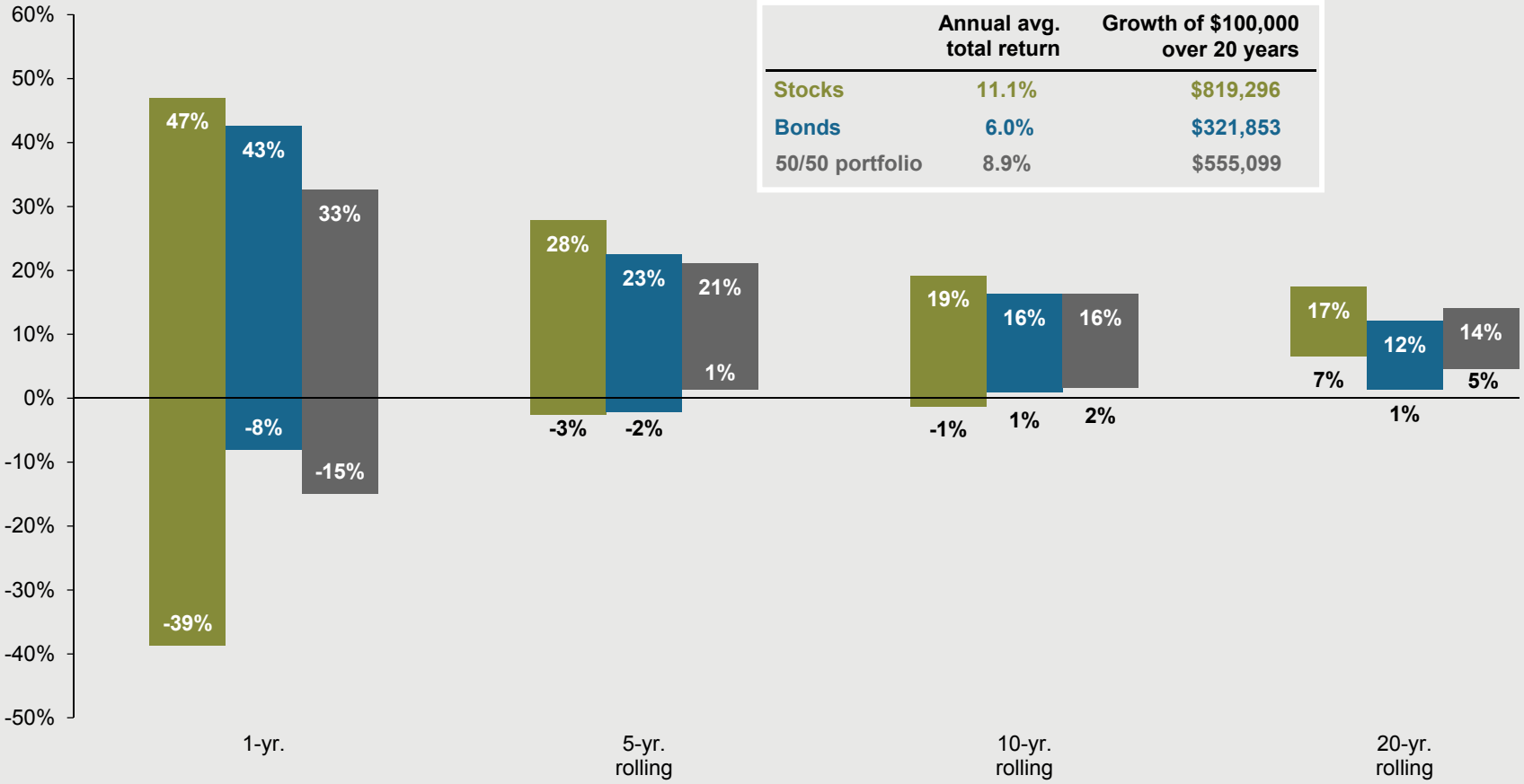


Perceived retirement shortfall by country

Source: J.P. Morgan Asset Management; (Left) SSA 2013 Life Tables; (Right) "The Future of Retirement: Life after work?" study by HSBC.
Figures represent the expected portion of retirement that will not be covered by retirement savings based on survey data.
Guide to the Markets – U.S. Data are as of September 30, 2016.

Range of stock, bond and blended total returns

Annual total returns, 1950-2015



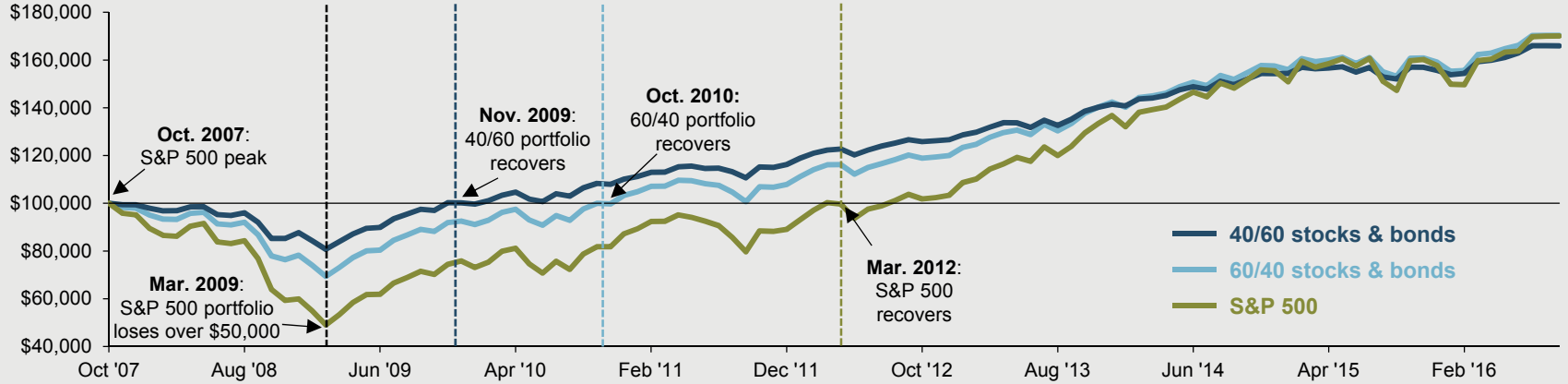
	Annual avg. total return	Growth of $100,000 over 20 years
Stocks	11.1%	$819,296
Bonds	6.0%	$321,853
50/50 portfolio	8.9%	$555,099

Source: Barclays, FactSet, Federal Reserve, Robert Shiller, Strategas/Ibbotson, J.P. Morgan Asset Management.
Returns shown are based on calendar year returns from 1950 to 2015. Stocks represent the S&P 500 Shiller Composite and Bonds represent Strategas/Ibbotson for periods from 1950 to 2010 and Barclays Aggregate thereafter. Growth of $100,000 is based on annual average total returns from 1950 to 2015.
Guide to the Markets – U.S. Data are as of September 30, 2016.

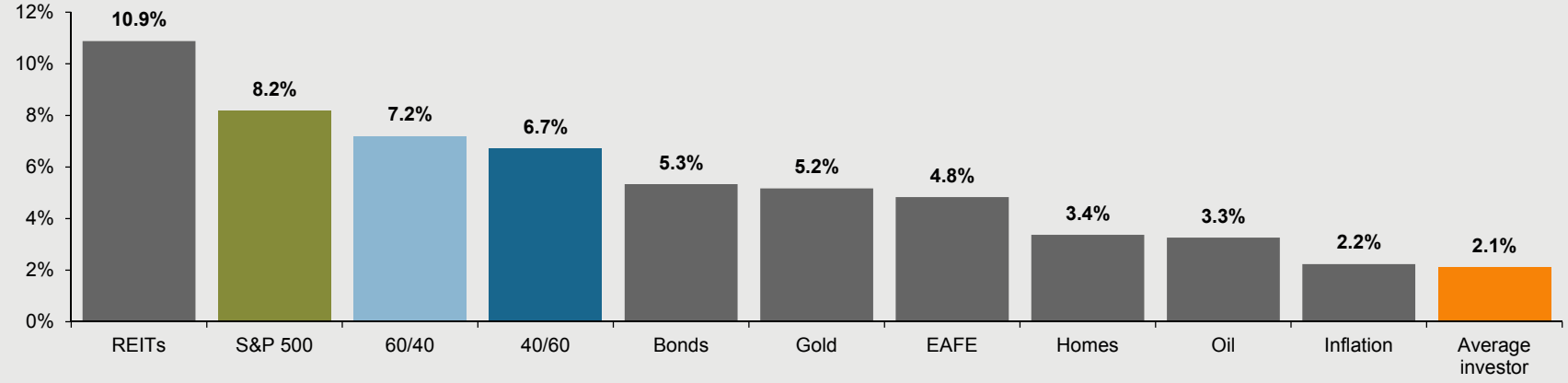
J.P.Morgan Asset Management

Diversification and the average investor

Portfolio returns: Equities vs. equity and fixed income blend



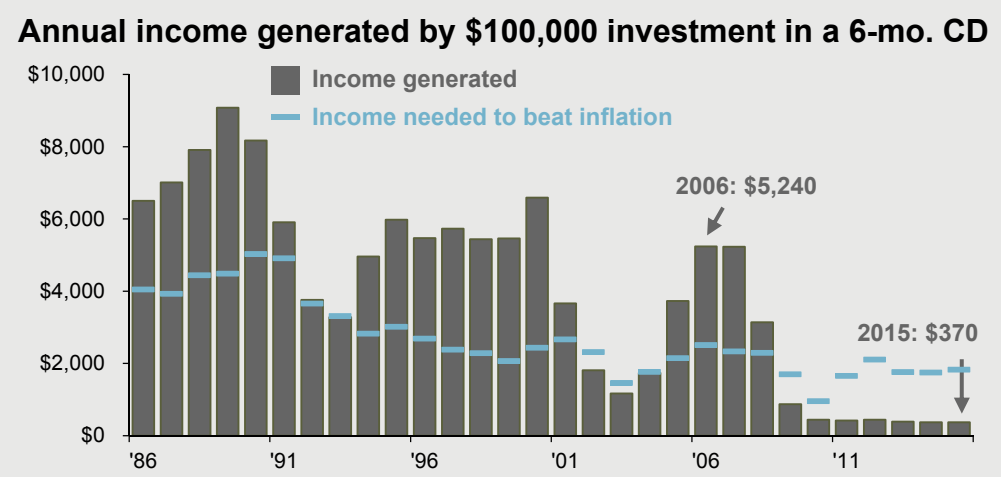
20-year annualized returns by asset class (1996 – 2015)

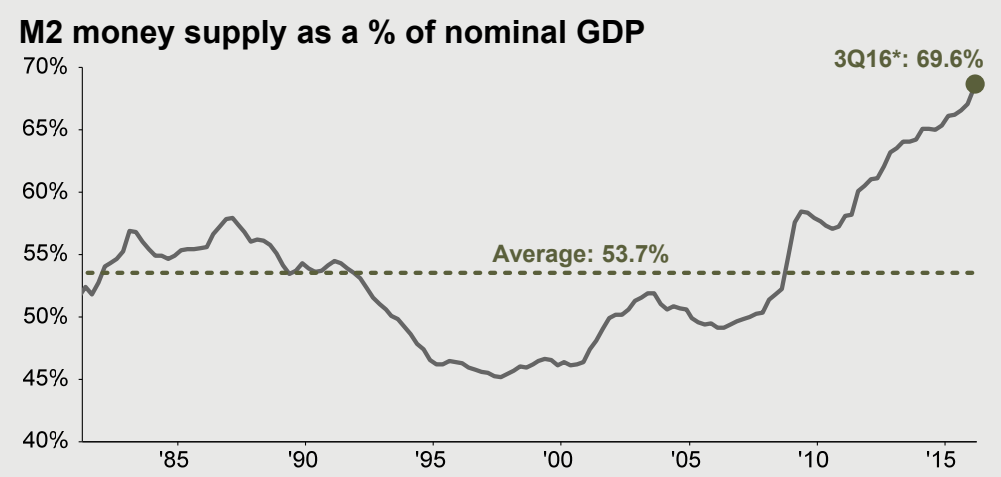


Source: J.P. Morgan Asset Management; (Top) Barclays, FactSet, Standard & Poor's; (Bottom) Dalbar Inc.
Indexes used are as follows: REITS: NAREIT Equity REIT Index, EAFE: MSCI EAFE, Oil: WTI Index, Bonds: Barclays U.S. Aggregate Index, Homes: median sale price of existing single-family homes, Gold: USD/troy 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 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 12/31/15 to match Dalbar's most recent analysis.
Guide to the Markets – U.S. Data are as of September 30, 2016.

J.P.Morgan Asset Management

Cash accounts

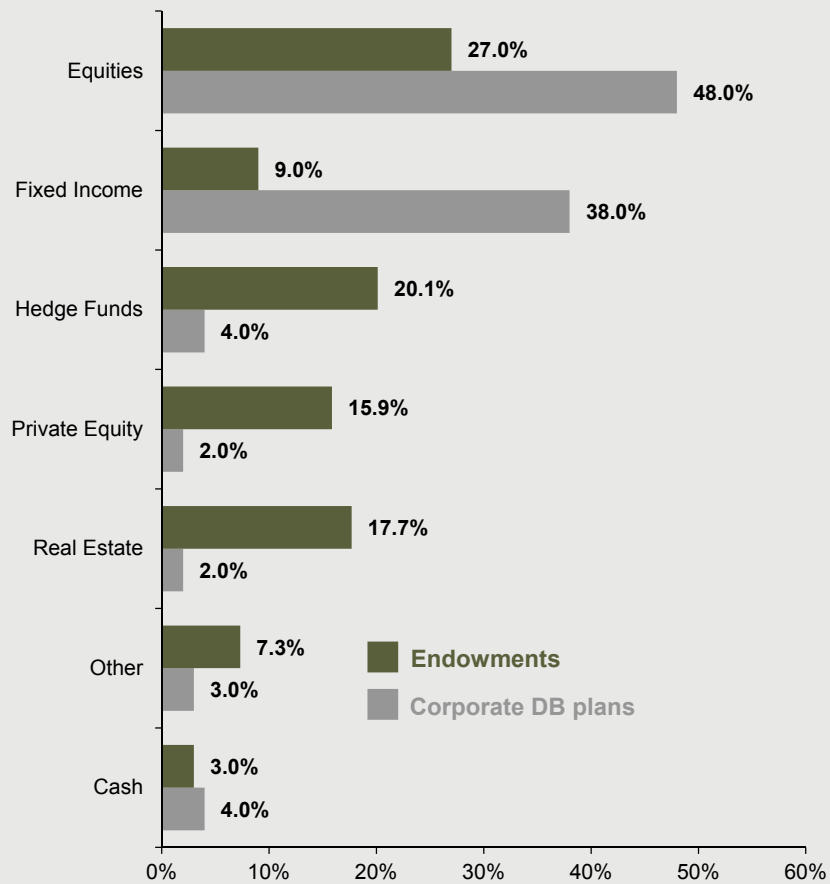




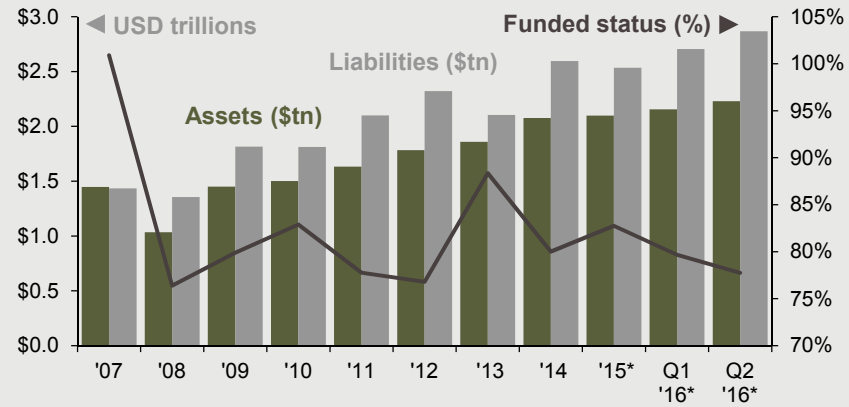
Money supply component	USD billions	Weight in money supply
M2-M1	**$9,691**	**79.3%**
Retail MMMFs	$689	5.6%
Savings deposits	$8,611	70.5%
Small time deposits	$391	3.2%
Institutional MMMFs	**$1,852**	**15.2%**
Cash in IRA & Keogh accounts	**$676**	**5.5%**
Total	**$12,219**	**100.0%**

Source: FactSet, J.P. Morgan Asset Management; (Top left) Bankrate.com; (Bottom left and right) BEA, Federal Reserve, St. Louis Fed.
All cash measures obtained from the Federal Reserve are latest available seasonally adjusted month averages. All numbers are in billions of U.S. dollars. Small-denomination time deposits are those issued in amounts of less than $100,000. All IRA and Keogh account balances at commercial banks and thrift institutions are subtracted from small time deposits. 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. IRA and Keogh account balances at money market mutual funds are subtracted from retail money funds. Past performance is not indicative of comparable future results. *3Q M2 money supply as a % of GDP is a J.P. Morgan Asset Management estimate.

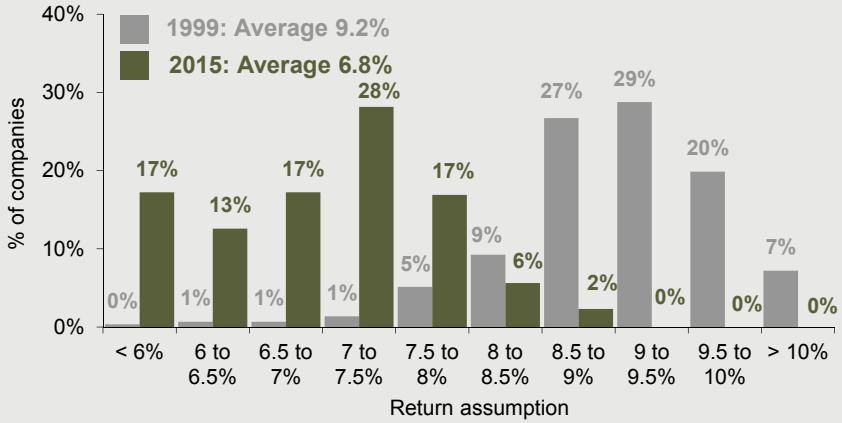
Asset allocation: Corporate DB plans vs. endowments



Defined benefit plans: Russell 3000 companies



Pension return assumptions: S&P 500 companies



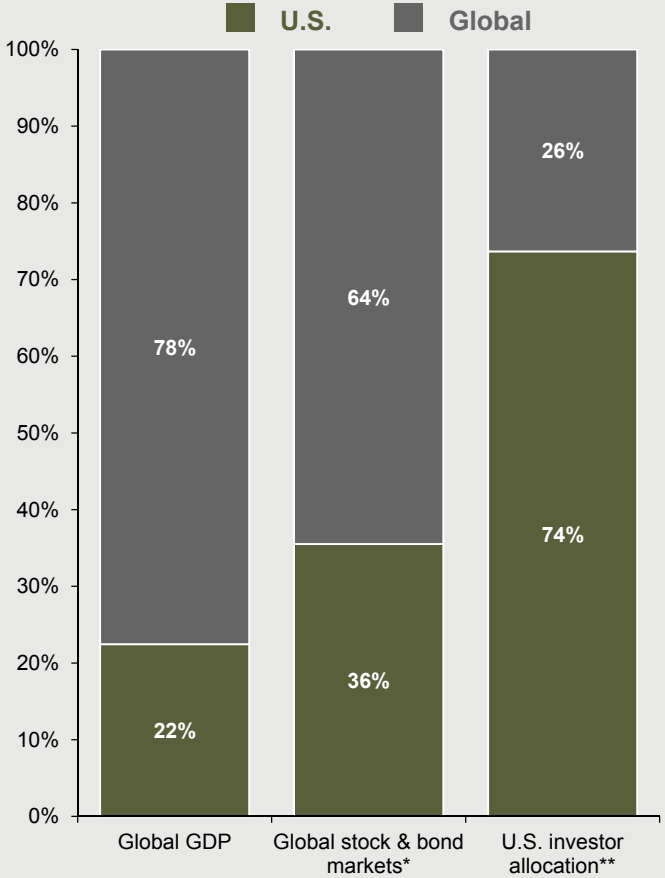
Source: J.P. Morgan Asset Management; (Left) NACUBO (National Association of College and University Business Officers), Towers Watson; (Top right) Bloomberg, Russell 3000 corporate 10-Ks; (Bottom right) Compustat/FactSet, S&P 500 corporate 10-Ks.
Asset allocation as of 2012. Endowments represents dollar-weighted average data of 842 colleges and universities. Pension return assumptions based on all available and reported data from S&P 500 Index companies. Pension assets, liabilities and funded status based on Russell 3000 companies reporting pension data. Return assumption bands are inclusive of upper range. *2015 and 2016 estimates are based on market moves only and do not include contributions, benefit payments and service costs.
All information is shown for illustrative purposes only.
Guide to the Markets – U.S. Data are as of September 30, 2016.

J.P.Morgan
Asset Management

Local investing and global opportunities

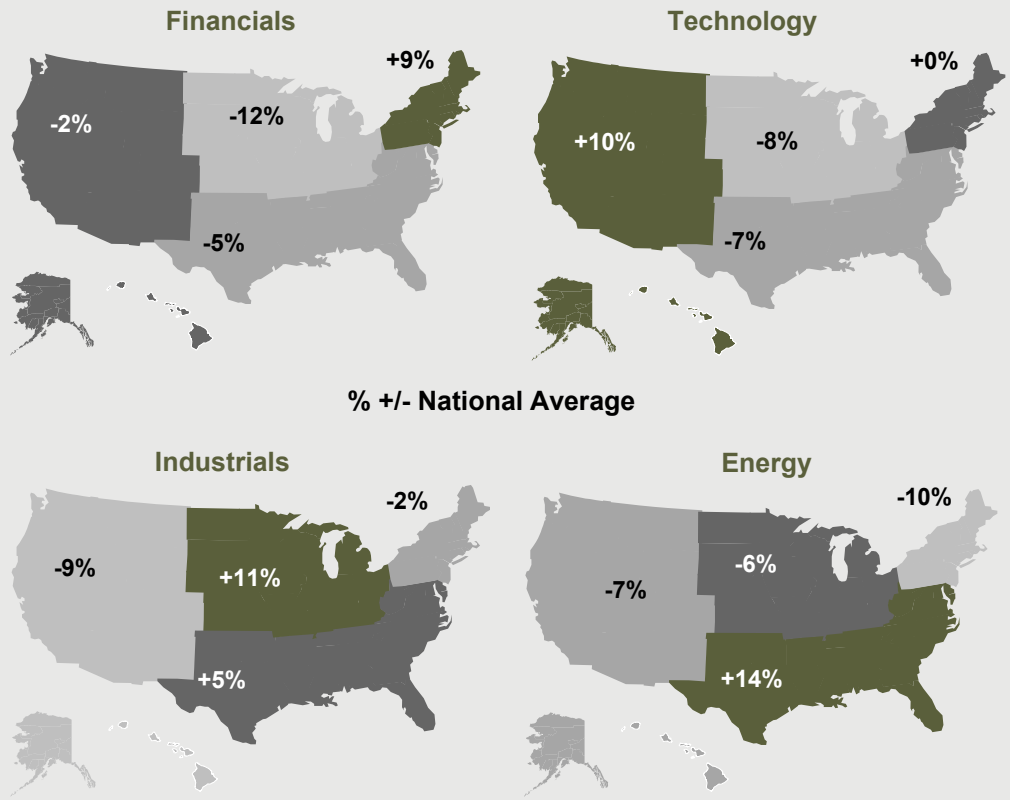
Investment universe & U.S. investors

Percentage of total net assets, 2014



Investor allocation by region

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



Source: Openfolio, IMF, ICI, 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. ***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 September 30, 2016.

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

The **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 **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 **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 **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) at maturity 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 or 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.

The Market Insights program provides comprehensive data and commentary on global markets without reference to products. Designed as a tool to help clients understand the markets and support investment decision-making, the program explores the implications of current economic data and changing market conditions.

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Unless otherwise stated, all data are as of September 30, 2016 or most recently available.

Guide to the Markets – U.S.

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J.P.Morgan Asset Management

Callan

October 28, 2016

Tucson Supplemental Retirement System

Fixed Income Workshop

Gordon Weightman, CFA
Vice President

John Pirone, CFA, CAIA
Senior Vice President

Agenda

- Overview of fixed income
  - The role of fixed income at the overall portfolio level
  - Commonly employed fixed income strategies
  - Challenges currently faced by fixed income investors
- Overview of TSRS's current fixed income structure
  - Characteristics
  - Evaluation of fixed income sector correlations with the broader plan
  - Active vs. passive considerations

1 Overview of Fixed Income

The ABC(&D)s of Bonds

Bonds are debt securities whereby the purchaser of the bond is lending money to the issuer in exchange for specified rate of interest during the life of the bond and for the face value (or, principal amount) to be repaid upon maturity.

- Maturity – the number of years before the bond comes due and the bond issuer must repay the principal to the bond holder.
- Coupon rate – the interest rate that the issuer pays the lender (calculated as a percentage of the face value of the bond).
- Bond prices – have an inverse relationship with interest rates. If interest rates rise, a bond's price must fall to keep the yield constant.
- Duration – expressed as a number of years, tells you how much a bond's price will change given a 1.00% change in interest rates.
  - For example, if interest rates rise (fall) 1.00%, the price of a bond with a duration of five years will fall (rise) by 5.00%.
- Bond Managers seek to add value with three basic levers:
  - Duration management
  - Sector rotation
  - Issue selection

Types of Fixed Income Investors

	Income Oriented Investor	Total Return Investor	Liability Driven Investor (LDI)
Type of Investor	• Retirees • Insurance Companies	• Public Pension Plans • Taft-Hartley Plans • Corporate Pension Plans • Endowments • Foundations	• Corporate Pension Plans
Objectives	• Income Generation • Capital Preservation • Liquidity • Meet Solvency Requirements	• Diversification • Flight to Quality/Deflation Hedge • Liquidity • Additional Return	• Hedge Liabilities • Additional Return

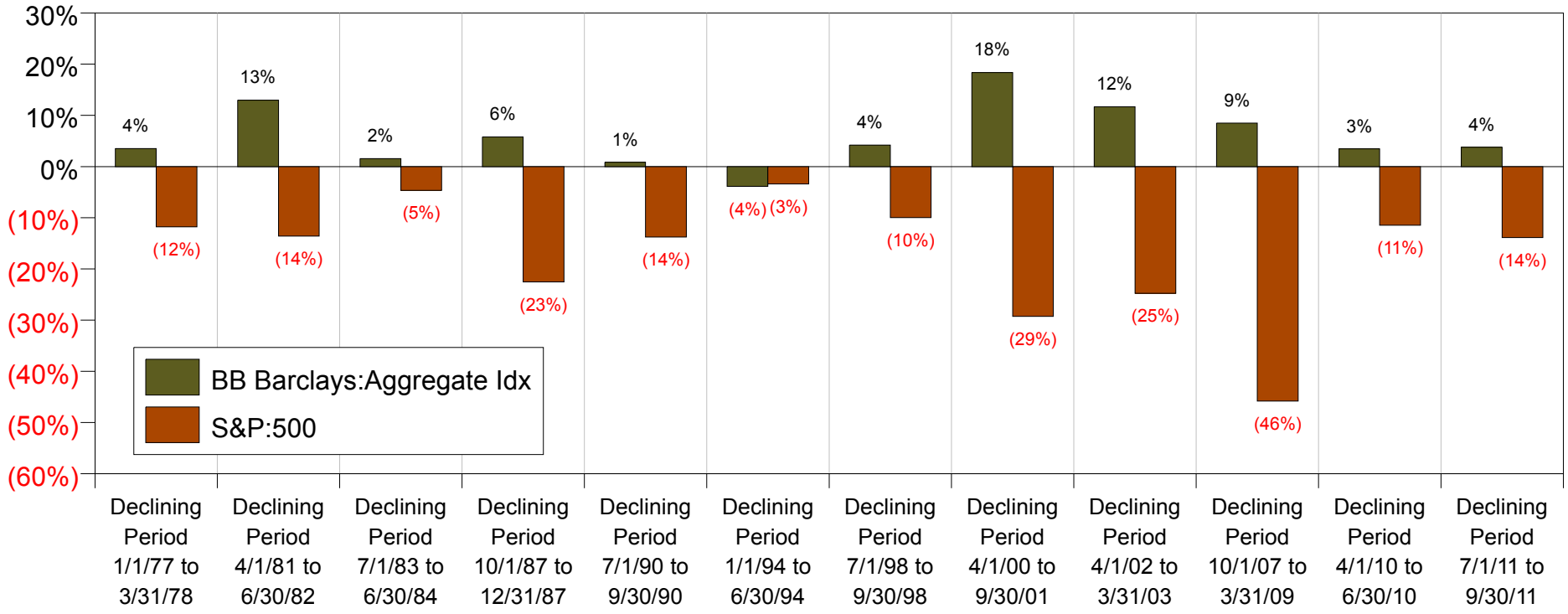
- Fixed income investors can be categorized into three types depending on investment objectives, time horizon, liquidity needs, risk tolerance, and regulatory framework among many other factors.
- TSRS is a total return investor.

Fixed Income

Role as the "Anchor to Windward"

- Within a total return strategy the role of fixed income is to serve as a low-risk, diversifying anchor against which an investor takes on riskier investments in assets such as equity.

Cumulative Returns in Periods when Domestic Equity Declines



Overview of Fixed Income Strategies

- Fixed income is typically a low risk, diversifying asset for the equity allocation rather than a primary source of additional return to a fund.
  - Bonds offer protection in the short run.
  - Dependable income provides comfort in economic downturns or sudden market corrections.
- The three main factors that define fixed income strategies are:
  - Active versus passive implementation.
  - Use of tactical “core plus” mandates versus dedicated allocations to securities outside of the benchmark, primarily high yield (in the case of the Barclays Aggregate) and non-U.S. bonds.
  - Broad market exposure versus one narrowed by sector or duration.
- The most commonly employed strategies include:
  - Passive (benchmarked to the Barclays Aggregate)
  - Active core
  - Active core plus
  - Global/Non-US
  - Specialty
  - Unconstrained

Fixed Income Strategies

Descriptions, Pros and Cons

- Passive Core: Replicates the return of the underlying index
  - Pros
    - *Virtually no tracking error*
    - *Low cost*
    - *Large Treasury allocation expected to perform well when equities perform poorly*
    - *Provides liquidity for cash flows, rebalancing, and transitions*
    - *Simple to monitor*
  - Cons
    - *Lacks the potential to add value over the index*
    - *Large Treasury allocation likely to be a drag on returns in normal markets due to low yields*

BlackRock US Debt Index is an example of this style in TSRS's portfolio

- Active Core: Attempts to add modest amounts of value over the return of the Aggregate index while experiencing a limited amount of tracking error
  - Pros
    - *Expectation of value added by modest interest rate, sector, and security management*
    - *Low tracking error*
  - Cons
    - *Outperformance over the index can be difficult to achieve net of fees*
    - *Active core managers can underperform during times of equity market stress due to low Treasury allocations*

Fixed Income Strategies

Descriptions, Pros and Cons

- Core Plus: Attempts to add significant value over the Aggregate with relatively high tracking error due in part to the use of non-index securities such as high yield and emerging market bond debt
  - Pros
    - *Managers have generally added value over the index net of fees*
    - *Tactical allocation to non-index securities when their valuations make them attractive*
  - Cons
    - *Higher tracking error may not be consistent with stabilizing role of fixed income*
    - *Non-index securities tend to have <u>higher correlations to equities</u> limiting the amount of overall portfolio diversification*

    PIMCO's custom strategy (¼ high yield, ¼ emerging market debt, ¼ mortgages, and ¼ investment grade credit) is an example of this style in TSRS's portfolio

- Global/Non-U.S: Broadly diversified allocations to bonds across the globe; can be active or passive, hedged or unhedged, with varying degrees of risk and use of non-benchmark securities
  - Pros
    - *Managers have the ability to move between under and over-valued markets*
    - *Can reduce the complexity of the structure*
  - Cons
    - *Similar to the U.S., yields overseas are at historical lows*
    - *Government securities dominate the non-U.S. debt market*
    - *Requires a well-resourced firm to adequately cover the markets*
    - *Currency volatility can overwhelm return expected from underlying bond holdings*

Fixed Income Strategies

Descriptions, Pros and Cons

- Specialty: Separate, dedicated allocations to fixed income sectors such as credit, high yield and emerging markets debt
  - Pros
    - *Managers focused on specific markets tend to add more value due to specialization*
  - Cons
    - *No ability to move tactically between under and over-valued markets*
    - *Committee must set target allocation and rebalancing ranges*
    - *Leads to complex structures which are difficult to maintain*
    - *Lower allocation sizes in specialized areas can lead to higher fees*

- Unconstrained Global: Attempts to add value by scanning the global fixed income market for the most attractive investment opportunities; generally not constrained to a benchmark
  - Pros
    - *Increased return expectations*
    - *Allows for more active duration management across global fixed income sectors*
    - *Potential diversification benefits depending on regional/currency exposure*
    - *Removes the allocation and rebalancing decisions from the plan sponsor*
  - Cons
    - *Correlation to equities may be higher due to greater use of credit and active duration management*
    - *Limited peer group*
    - *Many managers have short track records*

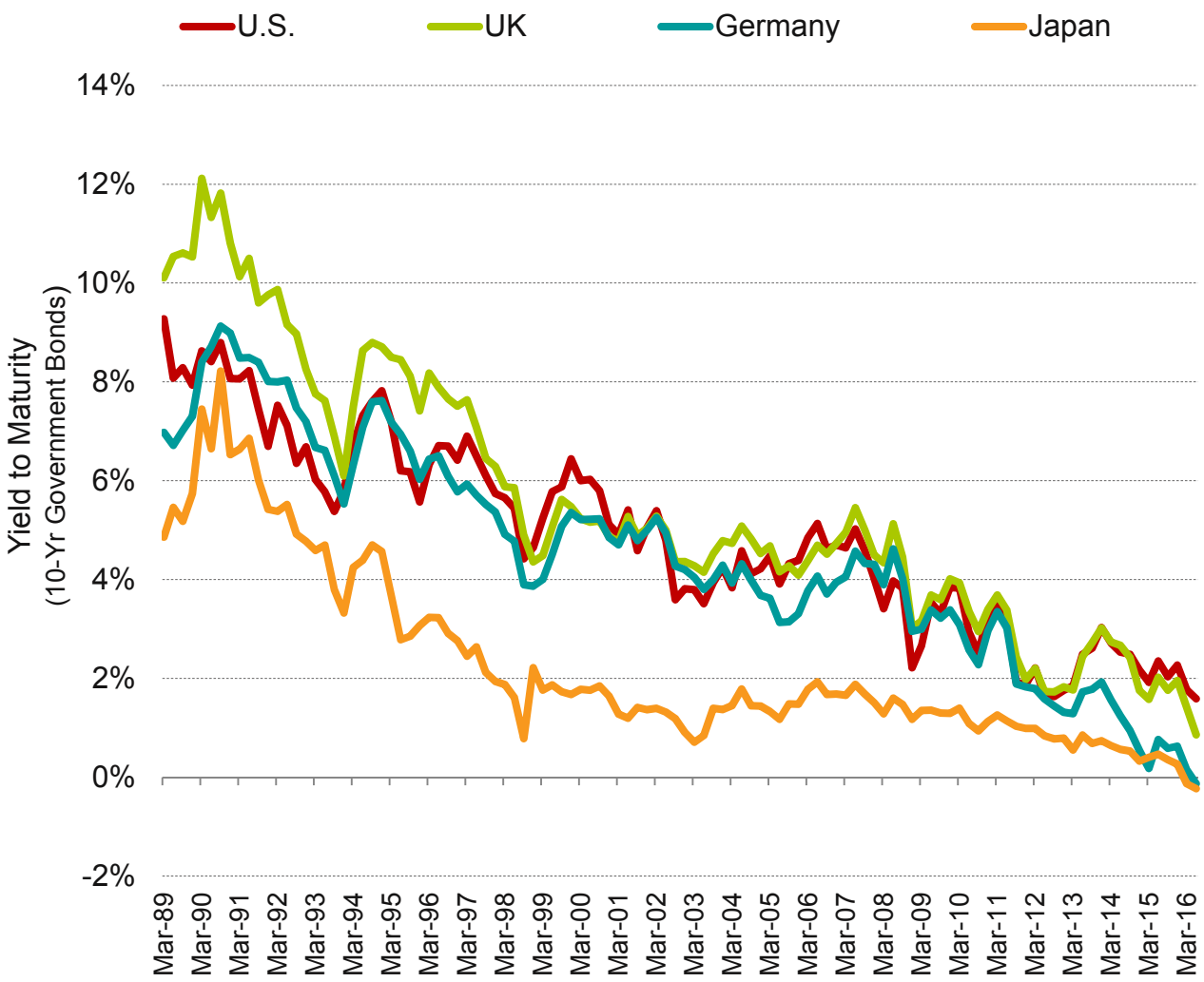
Major Issues Facing Fixed Income Investors Today

Issue	Consequence
Low Yield Environment	Difficult for investors to achieve return targets.
Potential for Rising Rates	Investors are grappling with the reality of potentially negative returns on their fixed income portfolios.
Dysfunctional Political System and Uncertain Macro Environment	Global government intervention and uncertain policy make it difficult for investors to position their portfolio.

Fixed Income

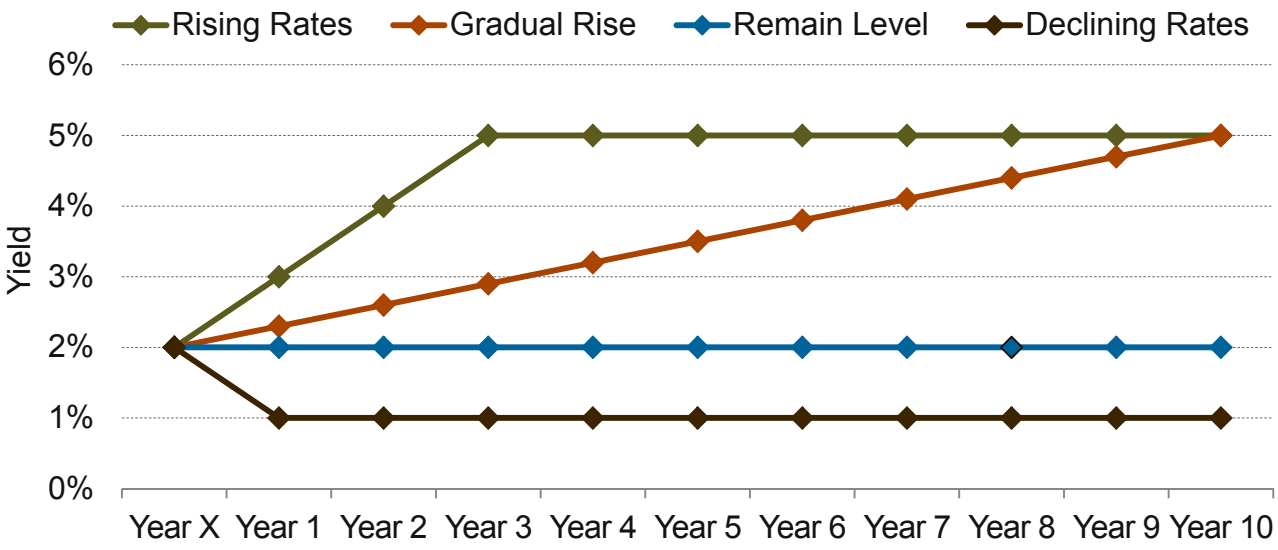
Government Interest Rates

- Interest rates have reached lows not seen in many decades, for a number of reasons including:
  - Central bank intervention including quantitative easing ("QE")
  - Low inflation
  - Flight to quality investments
  - Expanded or new roles for debt (bank capital, long-term liability hedging)
- US government bond rates are higher than other developed markets
  - Makes global benchmark centric strategies look relatively unattractive



Are Rising Rates Necessarily A Bad Thing?

- Fixed income returns derive from income, capital gains/losses and reinvestment of interim cash flows.
  - A rise in yields may lead to higher returns if the time horizon is long.
  - A prolonged period of low rates is not a good environment for long-term investors.

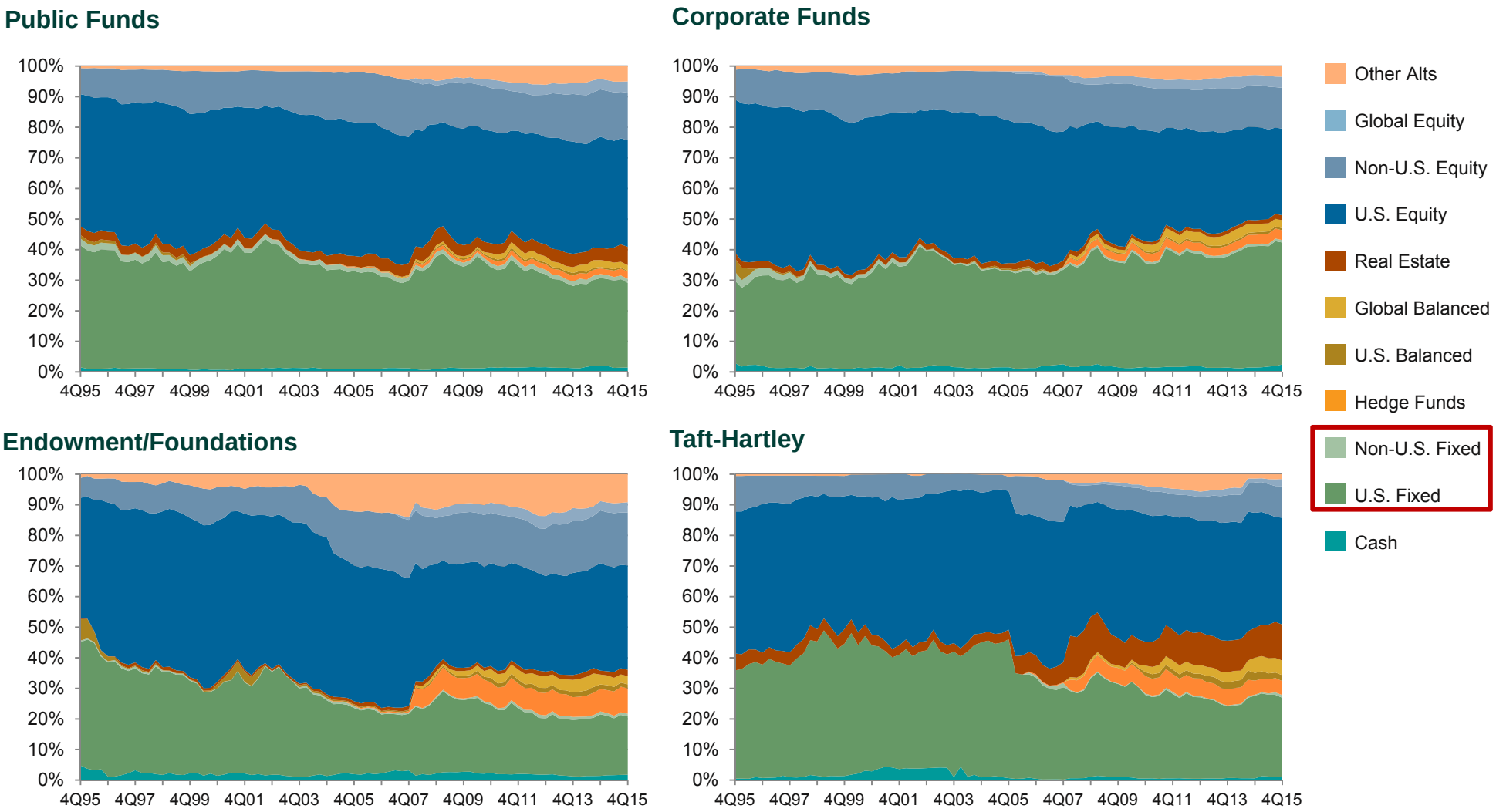


	1-Year*	3-Year*	10-Year*
Rising Rates	-2.60%	-1.70%	3.00%
Gradually Rise	0.60%	0.90%	1.90%
Remain Level	2.00%	2.00%	2.00%
Declining Rates	6.60%	2.80%	1.50%

* Assumes constant five-year duration, parallel shift in the yield curve and 100% reinvestment at new yield every year.

Plan Sponsors Have Been Reducing Fixed Income for 20 Years

Except corporate defined benefit plans, due to LDI considerations



Source: Callan. Callan's database includes the following groups: public defined benefit, corporate defined benefit, endowments/foundations, and Taft-Hartley plans. Approximately 10-15% of the database constituents are Callan's clients. All database group returns presented gross of fees. Past performance is no guarantee of future results.

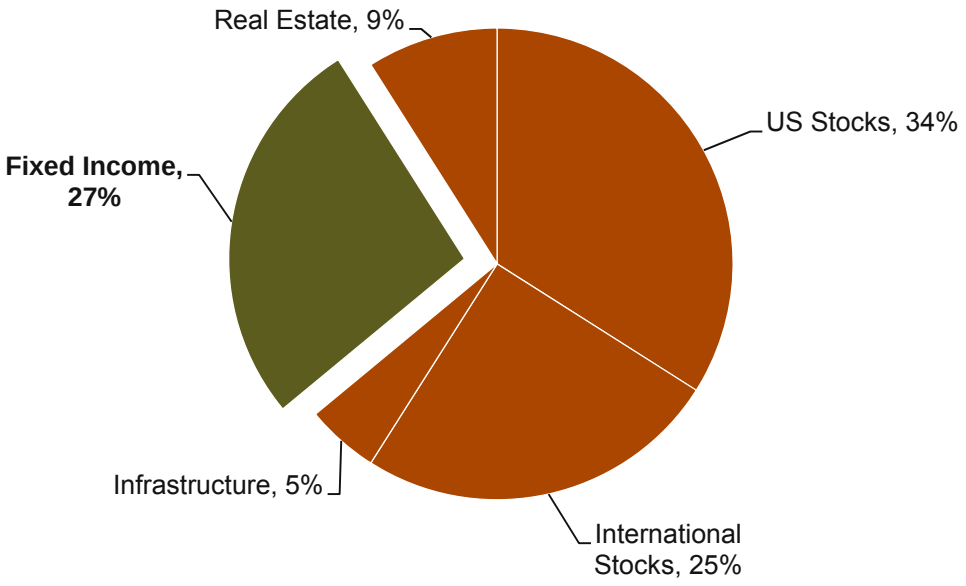
Current Fixed Income Structure

TSRS's Current Strategic Asset Allocation

As of September 30, 2016

- The target asset allocation is well diversified with exposure to both public and private asset classes
- Fixed income represents 27% of the portfolio
  - 27% fixed income equates to approximately $200 million as of September 30, 2016
  - The median allocation to fixed income for Public DB plans as of 6/30/16 was 27% with a range of 14% - 40%.
- In the 2014 asset allocation study, fixed income was benchmarked to the Barclays Aggregate
  - TSRS's actual fixed income composition has a greater allocation to higher risk bond sectors

Current Target Asset Allocation

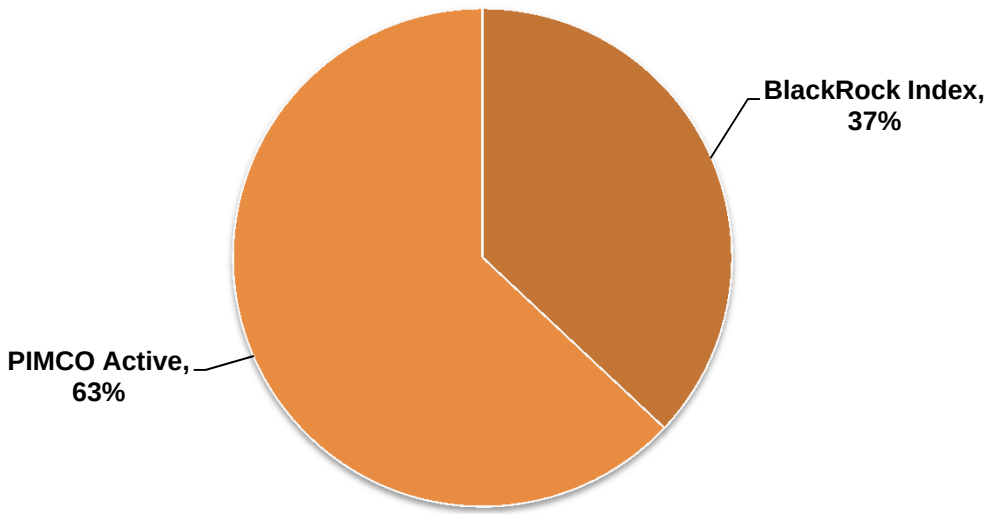


TSRS's Target Fixed Income Structure

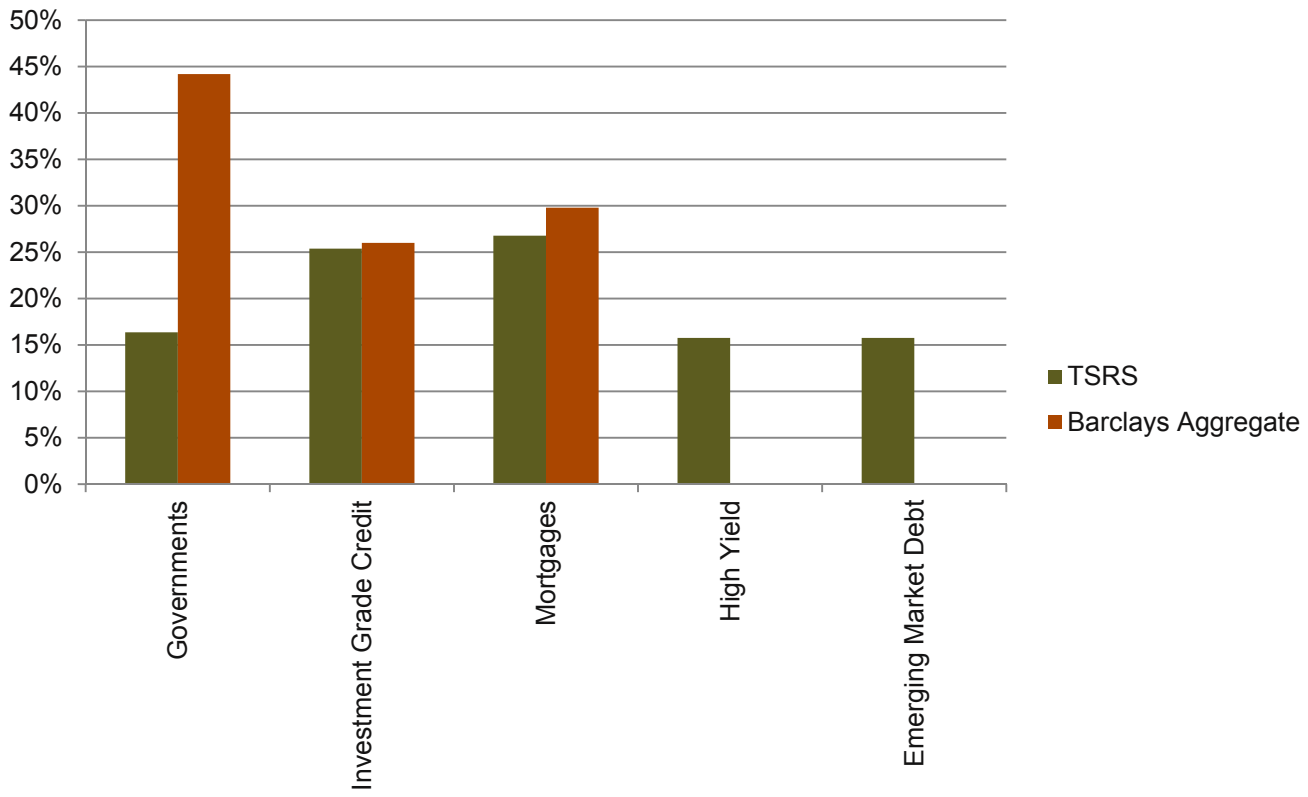
As of September 30, 2016

- The current target structure employs two managers, with PIMCO at a 63% target allocation
- The PIMCO active mandate has a custom benchmark (25% each to high yield, emerging market debt, mortgages and investment grade credit). It can at times be highly correlated with the equity markets, particularly in periods of market stress
- The BlackRock portfolio is passively managed and replicates the Barclays Aggregate index

Current Target Fixed Income Structure



Comparison of TSRS's Structure to the Barclays Aggregate



- TSRS has exposure to high yield, and emerging market debt outside of the Barclays Aggregate
- TSRS is underweight governments relative to the Barclays Aggregate
- Investment grade credit and mortgage exposure are comparable to the benchmark

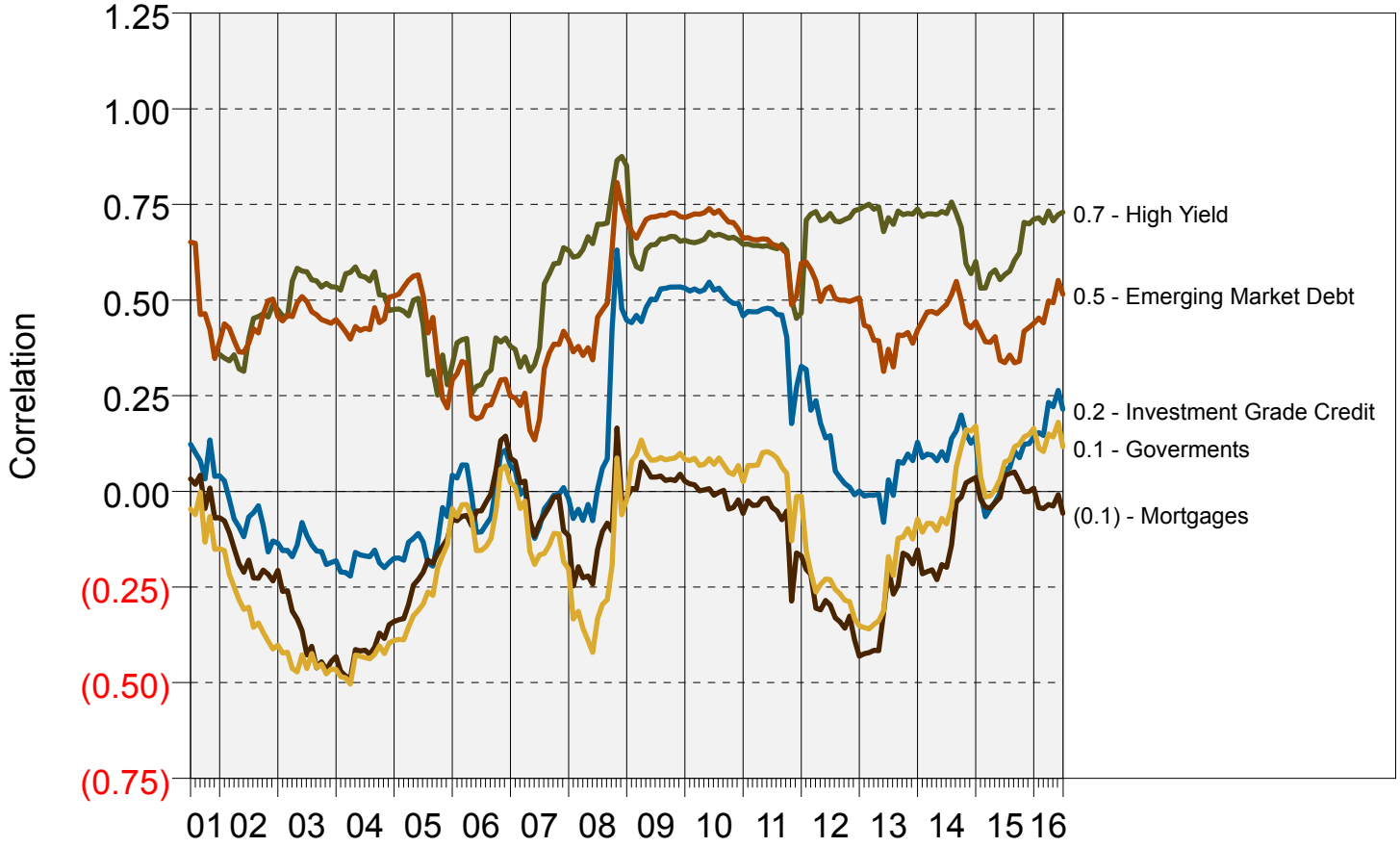
As of 9/30/2016. TSRS exposures are based on the underlying benchmarks for PIMCO and BlackRock combined at policy weights.

Introduction to Correlation

- Correlation measures the degree to which two variables, such as asset classes, move in relation to each other. Correlations range from -1 to +1.
- -1 correlation:
  - Returns of two investment move in precisely opposite directions.
  - Good returns of one investment cancel out bad returns of other investment.
  - Maximum reduction in volatility.
- 0 correlation:
  - The relationship between the returns of two investments is unrelated.
  - Substantial, but not complete, reduction in volatility.
- +1 correlation:
  - Returns are completely synchronized.
  - Said to be “perfectly correlated.”
  - No diversification/volatility reduction.

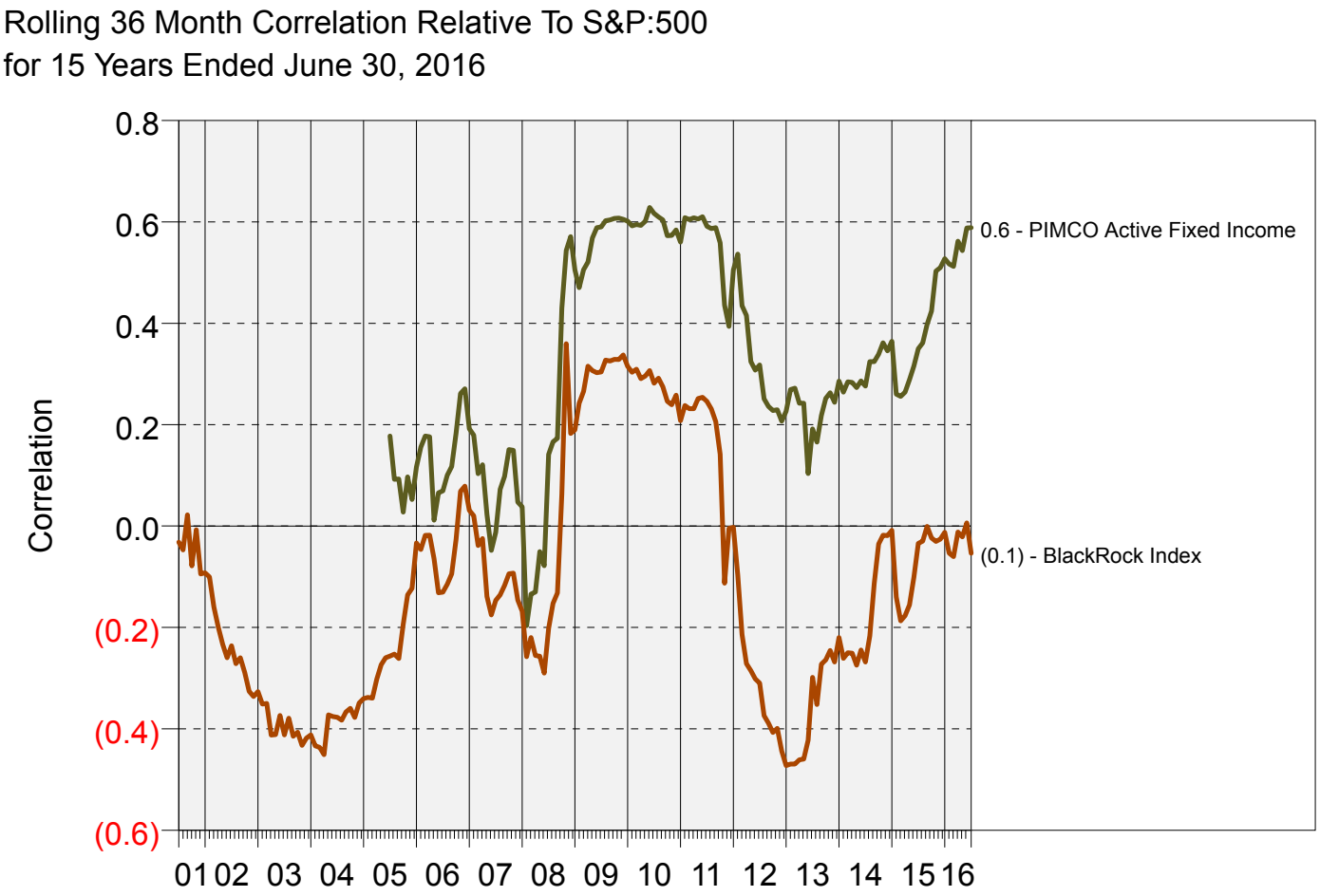
Correlation of Fixed Income Sectors with Equity

Rolling 36 Month Correlation Relative To S&P:500
for 15 Years Ended June 30, 2016



- High yield, emerging market debt and investment grade credit can be highly correlated with stocks
- Mortgages and governments have exhibited zero or negative correlations with equity

TSRS's Manager Correlations with Equity

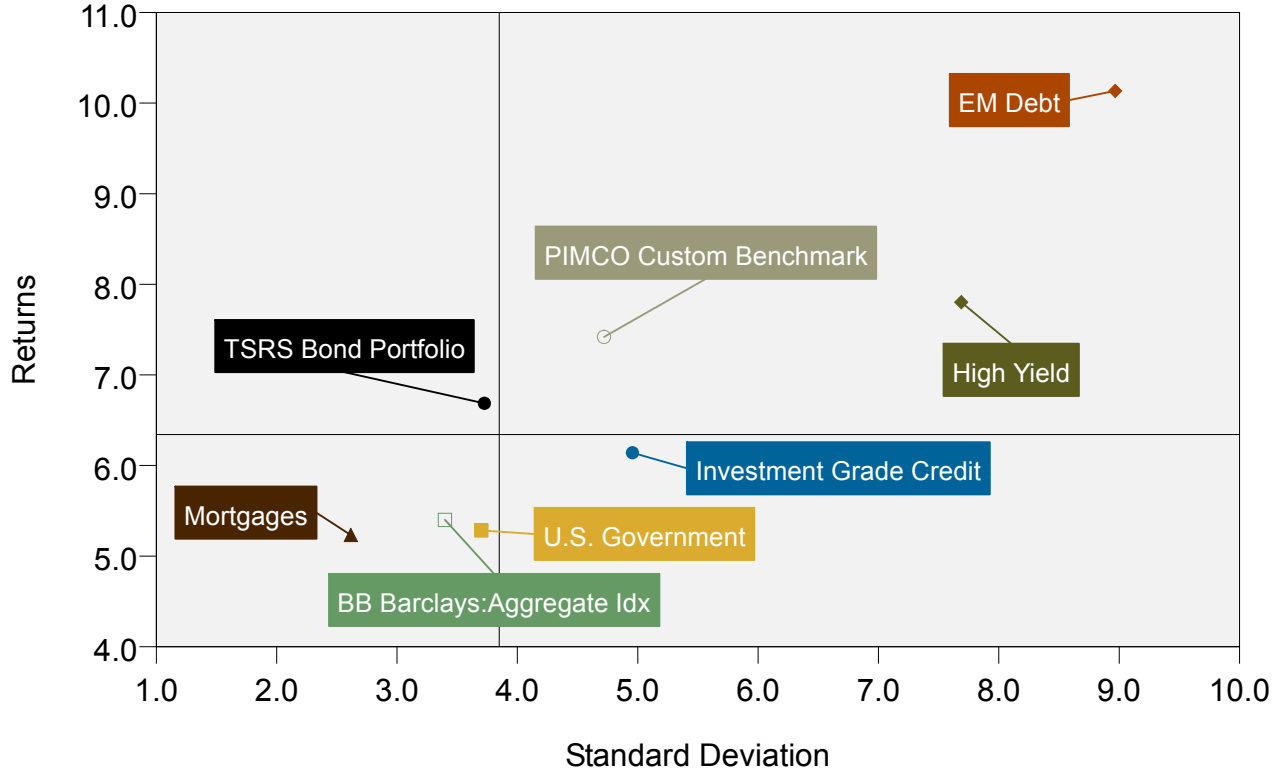


- PIMCO is significantly more correlated with equity than BlackRock

Return and Risk

Bond portfolios and sectors in which TSRS is invested

Scatter Chart
for 17 Years Ended June 30, 2016



- The TSRS Bond Portfolio shown is 63% PIMCO benchmark and 37% Barclays Aggregate.
  - Benchmarks were used to show longer history. The PIMCO benchmark is 25% each to mortgages, high yield, EMD and Investment Grade Credit.
  - The PIMCO custom benchmark has displayed greater risk and return historically then the median core plus fixed income manager (represented by the cross hair). This has been partially offset by diversified exposure to the Barclays Aggregate Index.

Calendar Year Returns

Returns
for Calendar Years
10 Years Ended June 30, 2016

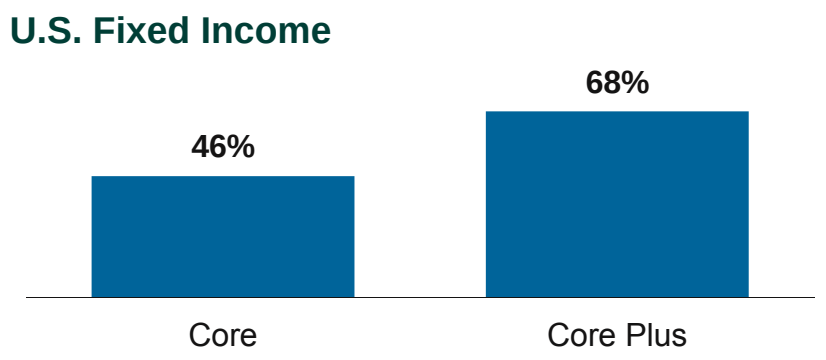
	2 Qtrs. 2016	2015	2014	2013	2012	2011	2010	2009	2008	2007
BB Barclays:Aggregate Idx	5.31	0.55	5.97	(2.02)	4.21	7.84	6.54	5.93	5.24	6.97
PIMCO Custom Benchmark	7.65	0.39	6.33	(1.76)	10.97	7.74	10.04	22.78	(5.58)	5.39
EM Debt	12.29	1.82	6.15	(8.32)	18.04	9.20	11.83	25.95	(9.70)	6.45
High Yield	7.72	(1.13)	5.40	4.95	14.31	6.90	13.94	45.93	(17.26)	3.05
Investment Grade Credit	7.54	(0.77)	7.53	(2.01)	9.37	8.35	8.47	16.04	(3.08)	5.11
Mortgages	3.10	1.51	6.08	(1.41)	2.59	6.23	5.37	5.89	8.34	6.90
U.S. Government	5.69	(0.39)	6.14	(2.71)	4.90	6.67	5.02	2.48	8.51	7.96
TSRS Bond Portfolio	6.78	0.46	6.20	(1.85)	8.44	7.79	8.75	16.30	(1.64)	5.98

- Riskier segments of the bond market have larger drawdowns and swings in performance year-to year.
- The TSRS Bond Portfolio is constructed using indices to show longer history.

Active vs. Passive Considerations

- Active and passive strategies can be complementary and can both play important roles in a portfolio
- Passive mandates provide low-cost exposure to the market
- Passive allocations are good liquidity vehicles for rebalancing, transition management, and making cash contributions/distributions
- Passive allocations are simple to monitor with less manager (and business) risk
- Passive mandates provide competitive performance in efficient markets and lower the tracking error for the total portfolio
- There are active managers who outperform the index – the challenge is to identify and hold them throughout their full performance cycle
- Like any style of investing, passive management will go in and out of favor over time

Percent of 3-Year periods where the median manager beat the benchmark after fees, for 20 years ended June 30, 2016



Fee Assumptions: Core = 0.25%, Core Plus = 0.30%

Questions for the Board

- What is the role of fixed income in the TSRS portfolio?
  - Should it act solely as an anchor to windward and a flight to quality asset?
  - Should it seek higher yield in this low return environment?
  - Is there a way to accomplish both objectives?
- How much risk is the Board willing to take in fixed income?
  - More risk results in higher correlation to growth assets.
- Is there a place for active and passive management? Does the Board favor one approach?
- At our next meeting, Callan will present alternative fixed income portfolio structures for the Board's consideration.

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