Morningstar's 2015 Ibbotson Update

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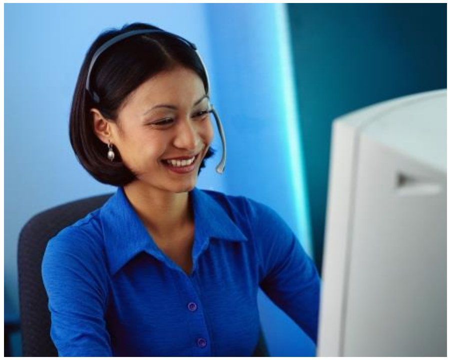

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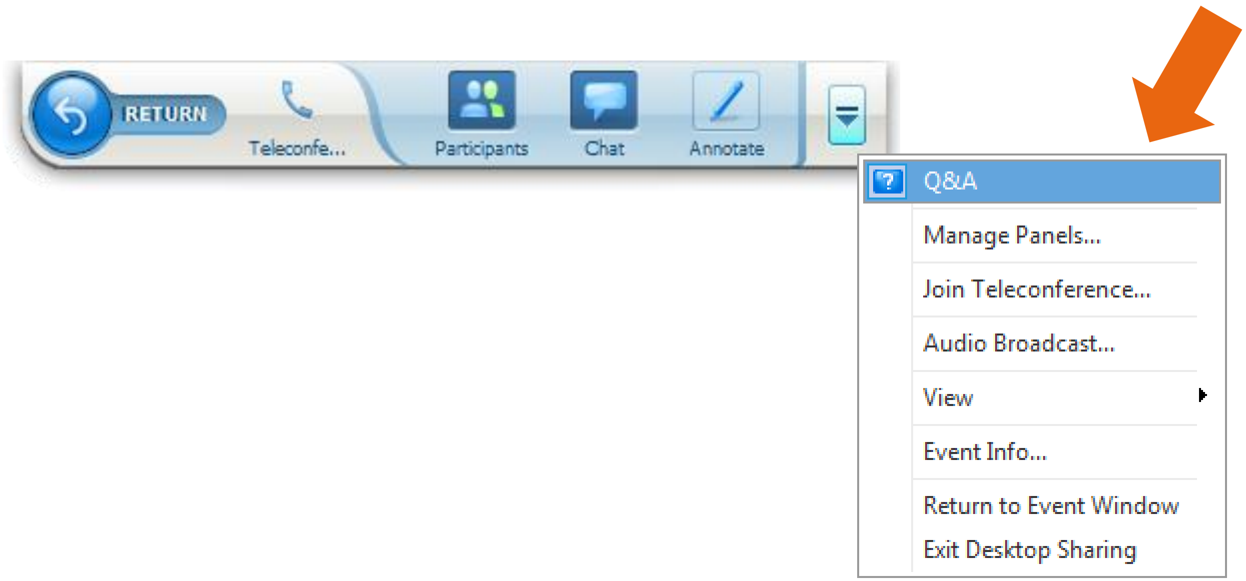

2015 Ibbotson Update – Advicent Solutions

August 2015

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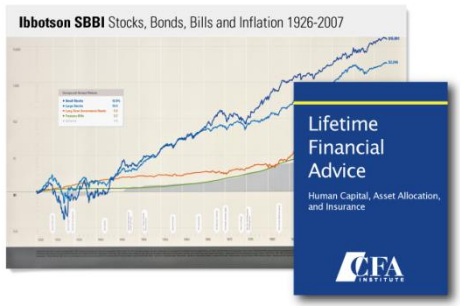
Agenda

- Overview of Ibbotson Associates, Inc.
- Economic and Market Outlook
- Ibbotson Capital Market Assumptions

Ibbotson Associates, Inc. Overview



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Ibbotson Economic/Market Outlook

Market Dashboard

Most of the major equity and fixed-income indexes posted reasonable returns so far in 2015. On the equity side, developed international stocks led the way, followed by U.S. small caps. High-yield and emerging-markets debt landed in the top fixed-income spots, as credit spreads were relatively unchanged. Commodities rallied in the second quarter of 2015, starting to reverse the long-term trend.

		Return (%)				
Equities	**12 Mo. Yield**	**YTD**	**3 Mo**	**1 Yr**	**3 Yrs**	**5 Yrs**
S&P 500	2.0	1.2	0.3	7.4	17.3	17.3
Russell 2000	1.3	4.8	0.4	6.5	17.8	17.1
MSCI EAFE	2.9	5.5	0.6	–4.2	12.0	9.5
MSCI Emerging Markets	2.6	2.9	0.7	–5.1	3.7	3.7
Fixed Income	**Curr. Yield**					
U.S. Aggregate	2.4	–0.1	–1.7	1.9	1.8	3.3
U.S. Corporates	3.5	0.5	–2.2	1.8	3.8	5.8
High Yield	6.9	2.5	0.0	–0.5	6.8	8.4
Municipals	2.3	0.1	–0.9	3.0	3.1	4.5
Emerging Markets	5.8	1.7	–0.3	0.5	4.3	6.8
Broad Commodities						
Bloomberg Commodity		–1.6	4.7	–23.7	–8.8	–3.9
Morningstar Commodity		0.7	7.2	–28.9	–8.2	–0.9

Fundamental Measures			
P/E	**P/B**	**P/S**	**P/C**
19.0	2.8	1.8	11.7
20.2	2.2	1.3	11.3
18.1	1.8	1.2	9.8
13.6	1.7	1.3	7.9

Interest Rates	**Current**	**1 Yr Ago**
2 Yr Treasury	0.6	0.5
5 Yr Treasury	1.6	1.6
10 Yr Treasury	2.4	2.5
20 Yr Treasury	3.1	3.3
Prime Rate	3.3	3.3
Commodities		
Brent Crude Oil	64	112
Gold	1,171	1,315

3-Month Return

	Value	Blend	Growth
Large	0.9	0.0	0.7
Mid	–1.3	–1.3	–1.0
Small	–3.6	0.2	1.2

Return (%)
> 8
4 to 8
0 to 4
–4 to 0
–8 to –4
< –8

1-Year Return

	Value	Blend	Growth
Large	1.9	8.1	12.6
Mid	1.8	8.8	10.5
Small	1.1	5.5	8.8

Return (%)
> 20
10 to 20
0 to 10
–10 to 0
–20 to –10
< –20

5-Year Return

	Value	Blend	Growth
Large	14.7	17.9	19.4
Mid	17.5	19.9	18.0
Small	16.7	17.2	18.9

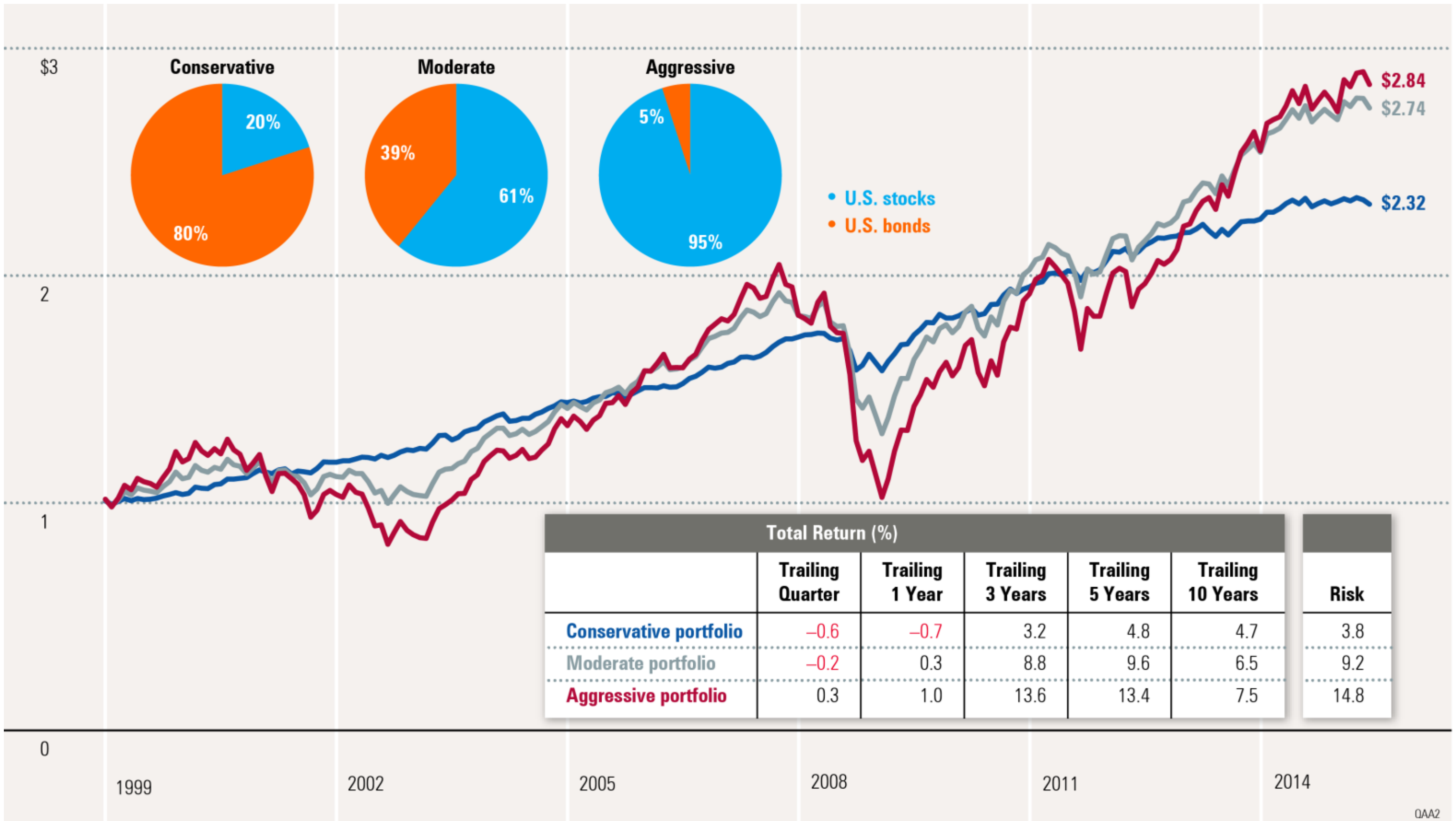
Return (%)
> 20
10 to 20
0 to 10
–10 to 0
–20 to –10
< –20

QM05

Source: Morningstar Direct. U.S. Aggregate—Barclays U.S. Aggregate Bond Total Return, U.S. Corporates—Barclays U.S. Corporate 5-10 Year Total Return, High Yield—Bank of America Merrill Lynch U.S. High Yield Master II Total Return, Municipals—Barclays Municipal Total Return, Fixed Income Emerging Markets—JPMorgan EMBI Global Diversified Total Return, Gold—London Fix Gold PM Price Return.

Performance of Risk-Based Portfolios

As expected, an aggressive portfolio with a larger allocation to stocks was able to deliver superior returns than its moderate and conservative counterparts over all time periods analyzed. However, it did so while assuming a greater risk level. Nevertheless, a multi-asset portfolio may be a better idea than a single-asset portfolio that has no exposure to a diversifying asset class.



Total Return (%)						
	Trailing Quarter	Trailing 1 Year	Trailing 3 Years	Trailing 5 Years	Trailing 10 Years	Risk
Conservative portfolio	–0.6	–0.7	3.2	4.8	4.7	3.8
Moderate portfolio	–0.2	0.3	8.8	9.6	6.5	9.2
Aggressive portfolio	0.3	1.0	13.6	13.4	7.5	14.8

Source: Conservative portfolio—Morningstar Conservative Target Risk Index. Moderate portfolio—Morningstar Moderate Target Risk Index. Aggressive portfolio—Morningstar Aggressive Target Risk Index. Returns for periods longer than 1 year are annualized.

Asset-Class Winners and Losers

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015 YTD	Entire Period
Highest return	42.2%	10.8	34.0	52.4	24.8	33.9	35.6	38.3	14.1	79.6	28.4	9.4	19.0	37.9	13.6	5.1	9.1
	12.3	8.5	13.5	47.7	21.7	25.5	25.1	31.8	–3.2	58.2	23.6	5.2	17.4	31.8	6.9	3.7	7.4
	9.7	5.3	11.1	41.2	20.4	15.3	17.0	12.1	–22.2	37.7	21.1	5.0	16.5	22.0	4.9	3.6	7.4
	7.7	5.3	–1.4	29.0	17.6	7.0	15.9	10.3	–26.2	35.2	15.1	2.6	16.0	14.3	4.5	2.5	6.5
	1.7	3.8	–3.8	27.0	11.5	5.8	13.0	8.6	–33.8	24.8	13.4	0.6	15.8	7.4	3.9	1.3	6.2
	–5.9	–2.5	–6.7	24.7	11.1	4.9	11.8	6.7	–36.1	21.8	12.3	–2.6	12.0	0.6	2.5	1.2	5.9
	–10.7	–15.1	–13.8	22.5	9.5	2.7	4.9	6.0	–36.2	20.9	11.2	–5.3	11.2	–1.8	–0.8	1.2	5.6
	–11.4	–20.5	–20.4	7.9	4.9	1.1	3.6	1.9	–43.4	19.5	8.5	–12.0	3.7	–2.7	–3.9	0.9	4.0
Lowest return	–36.0	–23.1	–23.5	2.7	3.0	0.7	–0.2	–0.7	–53.2	–1.4	7.1	–18.8	2.5	–3.7	–24.4	0.7	3.5

- Small stocks
- Large stocks
- International-developed stocks
- Emerging-market stocks
- Intermediate-term government bonds
- Intermediate-term corporate bonds
- High-yield bonds
- Commodities
- Moderate portfolio

QAA1

Source: Small stocks—Morningstar Small Cap Index. Large stocks—Morningstar Large Cap Index. Int'l stocks—Morningstar Developed Mkts ex-U.S. Index. Emerging stocks—Morningstar Emerging Mkts Index. Interm. govt bonds—Morningstar Interm. U.S. Govt Bond Index. Interm. corp. bonds—Morningstar Interm. Corp. Bond Index. High-yield bonds—Barclays U.S. High Yield Corp. Bond Index. Commodities—Morningstar Long-Only Commodity Index. Moderate portfolio—Morningstar Moderate Target Risk Index.

Fixed-Income Winners and Losers

Interest rates rose in 2013, so short duration categories like high-yield, bank loans, and short-term bonds posted the only positive returns. In 2014, interest rates declined, so the longer duration categories were the top performers. This year, the picture looks much like 2013 again, with bank loans and high yield leading the way because of stable credit spreads.

	2000	2001	2002	2003	2004	2005	2006	2007
Highest return	19.2% Long-term gov't	11.7 Long-term corp	24.8 International	29.0 High-yield	14.6 International	10.7 Emerging-market	11.8 High-yield	10.8 International
	14.4 Emerging-market	9.1 Short-term	16.7 Long-term gov't	25.7 Emerging-market	11.7 Emerging-market	5.1 Bank loans	9.9 Emerging-market	10.3 Intermediate-term gov't
	12.3 Intermediate-term gov't	8.5 Aggregate	13.5 Intermediate-term gov't	18.7 International	11.1 High-yield	5.0 Long-term gov't	6.8 International	9.9 Long-term gov't
	11.8 Aggregate	8.5 Intermediate-term gov't	13.1 Emerging-market	10.2 Long-term corp	8.0 Long-term corp	3.5 Municipal	6.7 Bank loans	7.4 Aggregate
	11.7 Municipal	5.3 High-yield	10.8 Long-term corp	10.0 Bank loans	6.9 Long-term gov't	2.7 High-yield	4.8 Municipal	7.3 Short-term
	9.7 Long-term corp	5.2 Long-term gov't	10.4 Aggregate	5.3 Municipal	5.2 Bank loans	2.7 Long-term corp	4.3 Aggregate	6.3 Emerging-market
	8.6 Short-term	5.1 Municipal	9.6 Municipal	4.0 Aggregate	4.5 Aggregate	2.5 Aggregate	4.1 Short-term	4.3 Long-term corp
	4.9 Bank loans	4.2 Bank loans	7.3 Short-term	3.2 Short-term	4.5 Municipal	1.6 Short-term	4.1 Long-term corp	3.4 Municipal
	–1.3 International	1.4 Emerging-market	1.9 Bank loans	2.7 Intermediate-term gov't	3.0 Intermediate-term gov't	1.1 Intermediate-term gov't	3.6 Intermediate-term gov't	2.1 Bank loans
Lowest return	–5.9 High-yield	–3.0 International	–1.4 High-yield	2.4 Long-term gov't	1.5 Short-term	–7.3 International	2.2 Long-term gov't	1.9 High-yield

	2008	2009	2010	2011	2012	2013	2014	2015 YTD	Entire Period
Highest return	20.7 Long-term gov't	58.2 High-yield	15.1 High-yield	22.7 Long-term gov't	18.5 Emerging-market	7.4 High-yield	18.2 Long-term gov't	2.8 Bank loans	9.2 Emerging-market
	14.1 Intermediate-term gov't	51.6 Bank loans	12.0 Emerging-market	11.8 Long-term corp	15.8 High-yield	5.3 Bank loans	12.8 Long-term corp	2.5 High-yield	7.5 Long-term corp
	10.3 International	28.2 Emerging-market	11.1 Long-term corp	10.7 Municipal	13.4 Long-term corp	0.6 Short-term	9.1 Municipal	1.8 Emerging-market	7.4 High-yield
	7.6 Aggregate	20.2 Long-term corp	10.1 Bank loans	9.4 Intermediate-term gov't	9.7 Bank loans	–1.9 Aggregate	6.1 Aggregate	0.9 Intermediate-term gov't	7.4 Long-term gov't
	5.0 Short-term	12.9 Municipal	9.4 Long-term gov't	8.5 Emerging-market	6.8 Municipal	–2.6 Municipal	5.5 Emerging-market	0.8 Short-term	5.7 Aggregate
	–2.5 Municipal	4.6 Aggregate	7.1 Intermediate-term gov't	8.0 Aggregate	4.4 Aggregate	–2.7 Intermediate-term gov't	3.9 Intermediate-term gov't	0.1 Municipal	5.6 Intermediate-term gov't
	–3.5 Long-term corp	4.2 Short-term	6.3 Aggregate	6.9 International	3.9 Long-term gov't	–4.5 Long-term corp	2.5 High-yield	0.1 Aggregate	5.4 Municipal
	–10.9 Emerging-market	4.2 International	5.8 International	5.0 High-yield	3.5 International	–4.5 International	2.0 International	–2.3 Long-term gov't	5.2 International
	–26.2 High-yield	–1.4 Intermediate-term gov't	3.5 Short-term	2.3 Short-term	2.5 Intermediate-term gov't	–6.6 Emerging-market	1.6 Bank loans	–3.0 Long-term corp	5.0 Bank loans
Lowest return	–29.1 Bank loans	–9.2 Long-term gov't	2.4 Municipal	1.5 Bank loans	1.7 Short-term	–9.9 Long-term gov't	1.0 Short-term	–6.3 International	3.9 Short-term

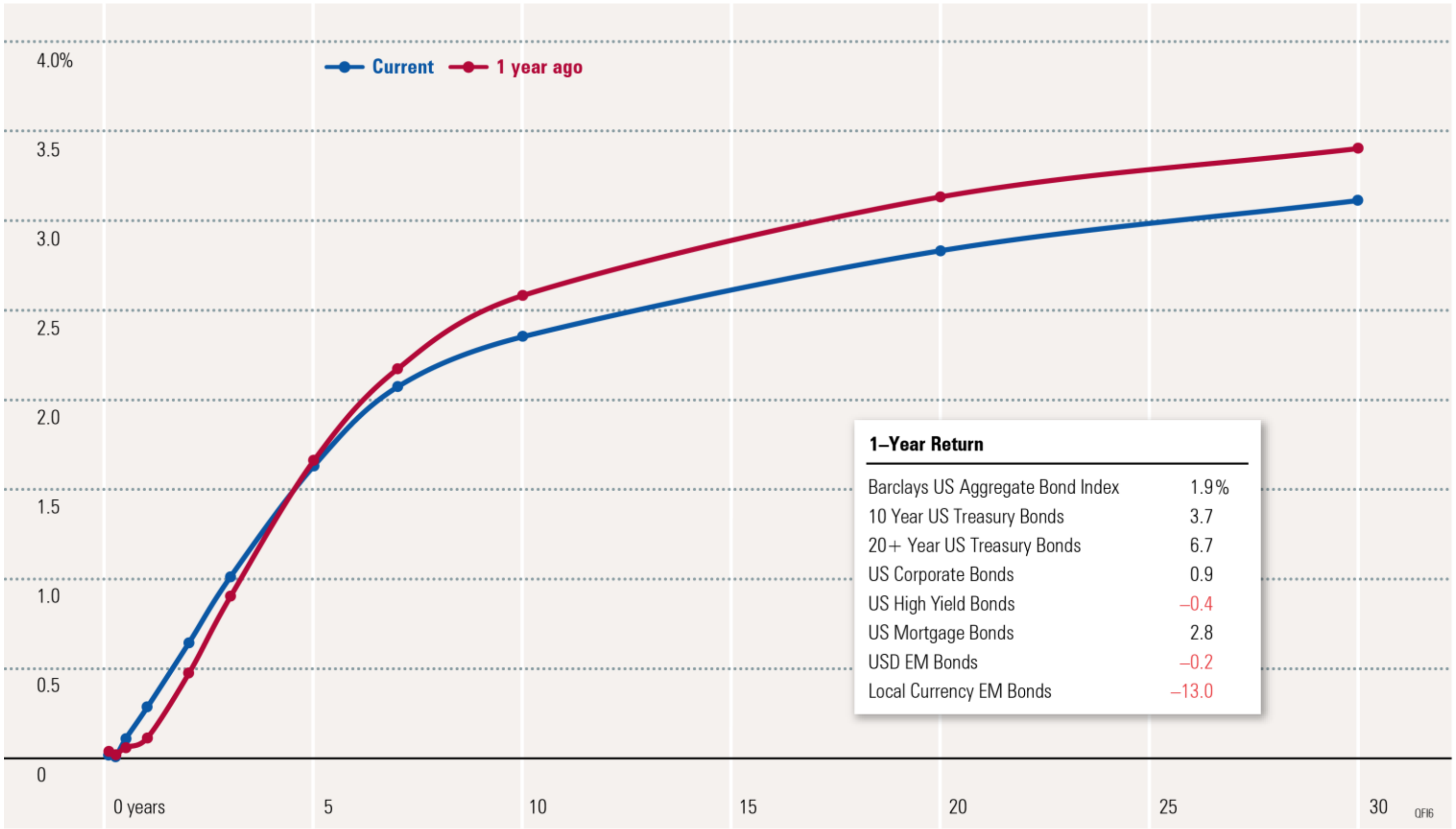
Bonds: Long-term gov't; Intermediate-term gov't; Long-term corp; Short-term; Municipal; International; Emerging-market; High-yield; Bank loans; Aggregate

OFI8

Source: Long-term gov't—Morningstar LT U.S. Gov't Bond Index. Intermediate-term gov't—Morningstar IT U.S. Gov't Bond Index. Long-term corp—Morningstar LT Corp Bond Index. Short-term—Morningstar Short-Term Core Bond Index. Municipal—Barclays Municipal Bond Index. International—Citigroup WGBI Non-USD 5+ Year Bond Index. Emerging-market—JPM EMBI Global Bond Index. High-yield—Barclays U.S. Corp High Yield Bond Index. Bank loans—S&P/LSTA Leveraged Loan Index. Aggregate—Morningstar Core Bond Index.

Long-Term Interest Rates Declined Over the Past Year

During the past year, the U.S. Treasury yield curve steepened at the short end and flattened at the long end, reflecting investors' expectations that short-term rates will rise and that inflation will stay below average in the long term. However, in the second quarter, short-term rates fell slightly, and only long-term rates rose. The 10-year Treasury yield went from 1.96% to 2.35%.

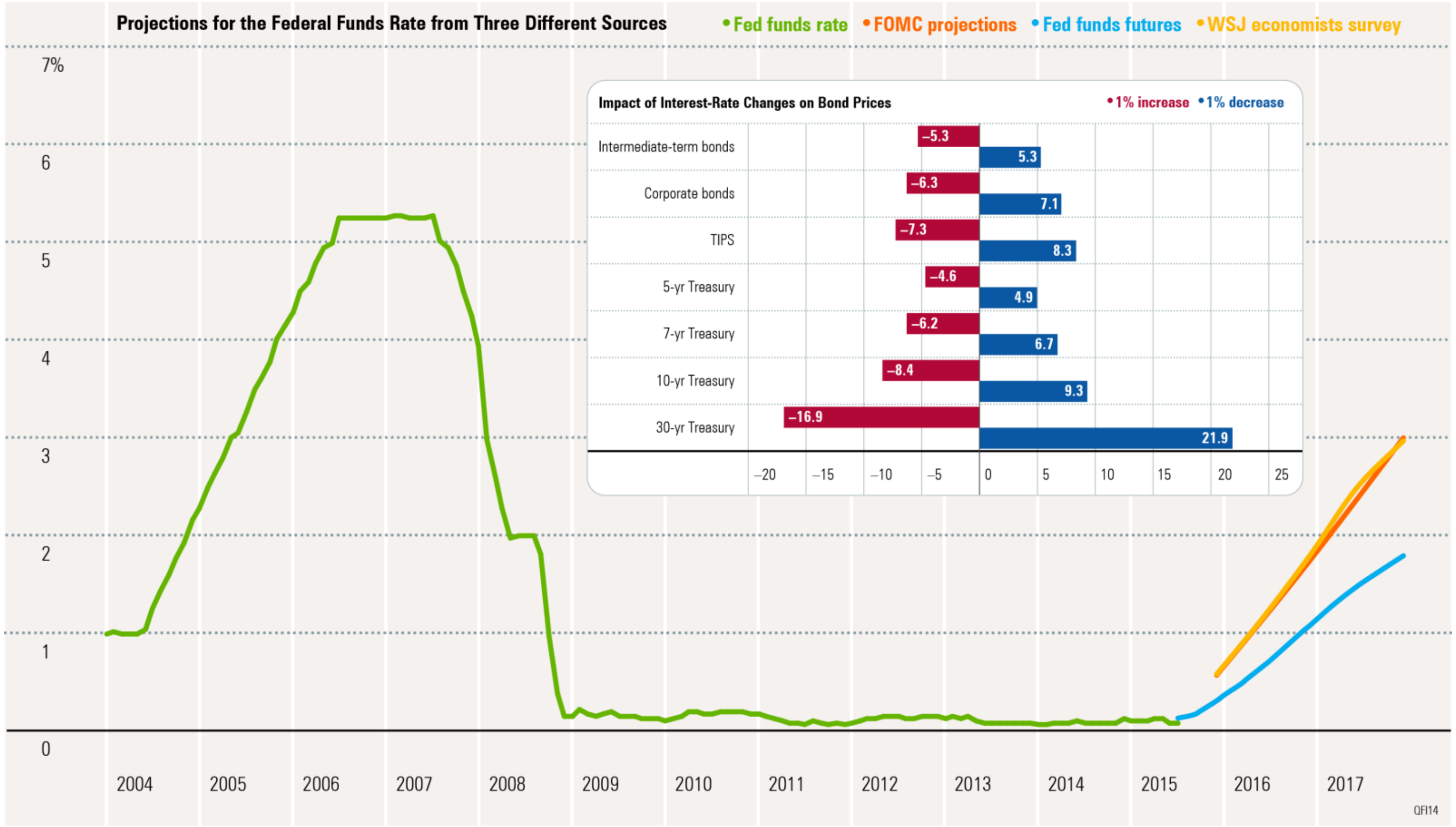


1-Year Return	
Barclays US Aggregate Bond Index	1.9%
10 Year US Treasury Bonds	3.7
20+ Year US Treasury Bonds	6.7
US Corporate Bonds	0.9
US High Yield Bonds	–0.4
US Mortgage Bonds	2.8
USD EM Bonds	–0.2
Local Currency EM Bonds	–13.0

Source: 10-Year US Treasury Bonds—Barclays US Treasury 7-10 Year Bond Index. 20+ Year US Treasury Bonds—Barclays US Treasury 20+ Year Bond Index. US Corporate Bonds—Morningstar Corporate Bond Index. US High Yield Bonds—Barclays US Corporate High Yield Bond Index. US Mortgage Bonds—Morningstar Mortgage Bond Index. USD EM Bonds—Morningstar EM Composite Bond Index. Local Currency EM Bonds—Barclays EM Local Currency Broad Bond Index.

What Will Happen to Bonds if Interest Rates Rise?

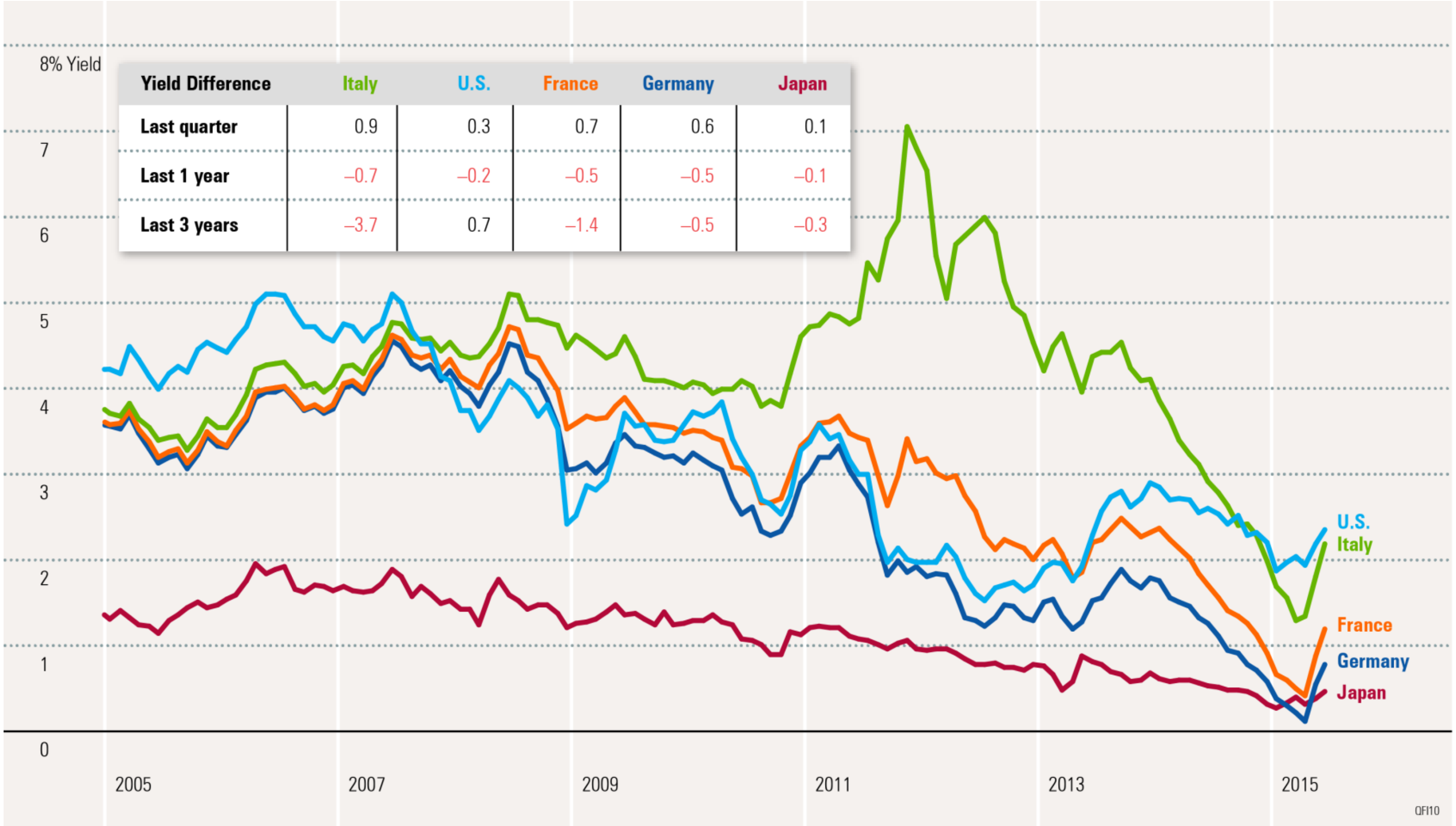
Projections from three different sources agree that U.S. interest rates may very well begin to rise this year. A rise in the fed funds rate may influence, but does not necessarily imply, an accompanying rise in long-term rates. For example, were 30-year rates to rise by 1%, an investor holding a 30-year Treasury would see a drop in value of 16.9%.



Source: Federal Reserve, Wall Street Journal, Chicago Mercantile Exchange, Morningstar Calculations.

World 10-Year Government Bond Yields

As a result of a deflationary environment and weak economic growth, interest rates have been collapsing across European countries since 2014. In the second quarter of 2015, however, European rates shot up from historically low and unsustainable levels. Despite the recent uptick, rates still remain very low.

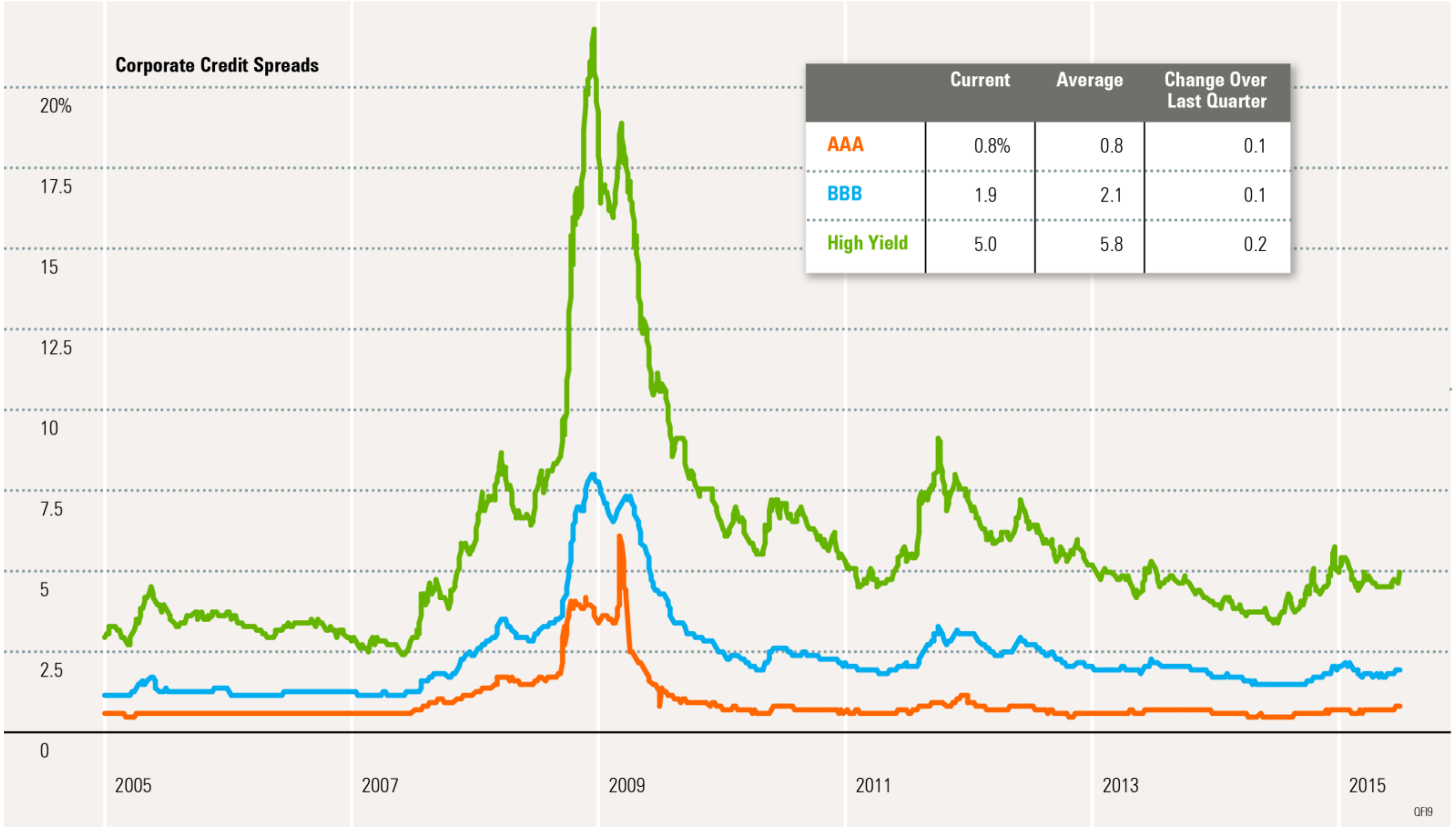


Yield Difference	Italy	U.S.	France	Germany	Japan
Last quarter	0.9	0.3	0.7	0.6	0.1
Last 1 year	–0.7	–0.2	–0.5	–0.5	–0.1
Last 3 years	–3.7	0.7	–1.4	–0.5	–0.3

Source: OECD, investing.com, Morningstar Calculations.

Corporate Credit Spreads

All corporate credit spreads spiked in 2007–2009 during the financial crisis, but have generally been on the decline since then. Spreads
are currently at or just below their long-term averages. Calm credit markets, for the moment, signify that investors don't foresee any credit shocks on the horizon.

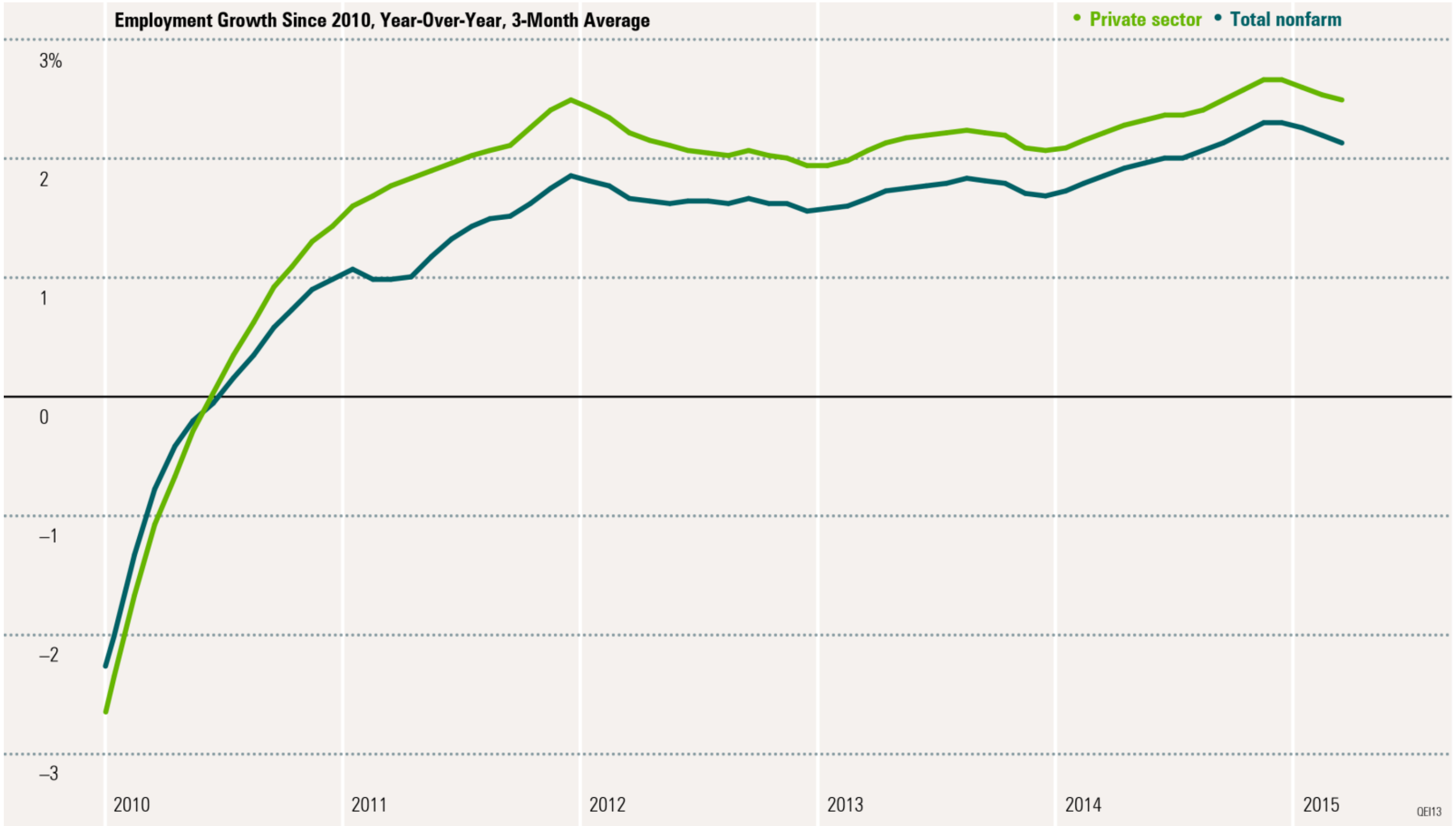


	Current	Average	Change Over Last Quarter
AAA	0.8%	0.8	0.1
BBB	1.9	2.1	0.1
High Yield	5.0	5.8	0.2

Source: Bank of America Merrill Lynch Corporate Spread Indexes from the Federal Reserve, Morningstar Calculations.

Employment Growth Normalizes, Reflects the Overall Course of the Economy

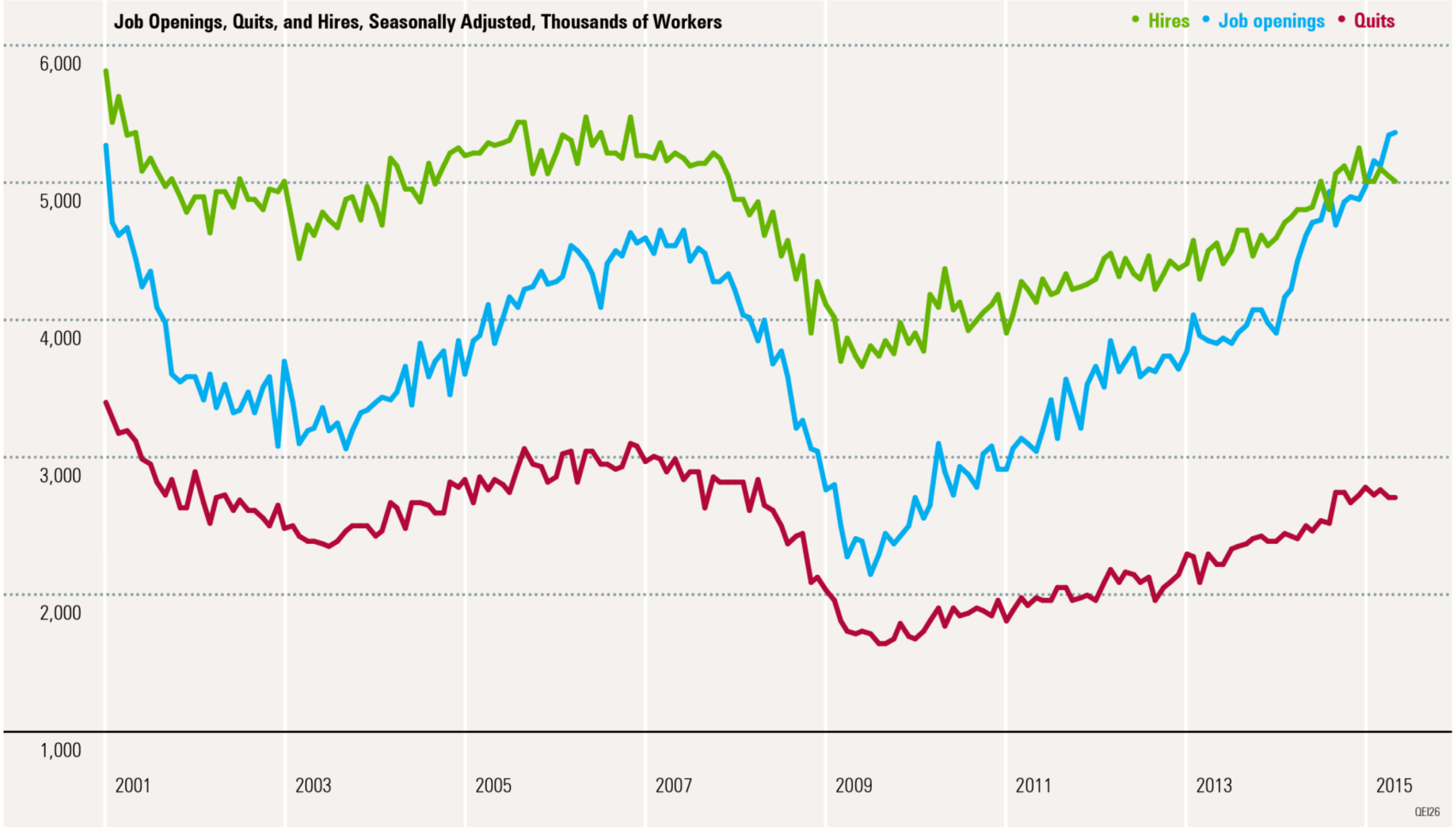
After a spectacular fourth quarter last year and a below-average growth in the first quarter of 2015, job growth has now stabilized at a rate that is more supportive of 2.0%–2.5% GDP growth, a pace at which the U.S. economy has grown since 2012.



Source: Bureau of Labor Statistics, Morningstar Calculations.

Job Openings Remain at an All-Time High

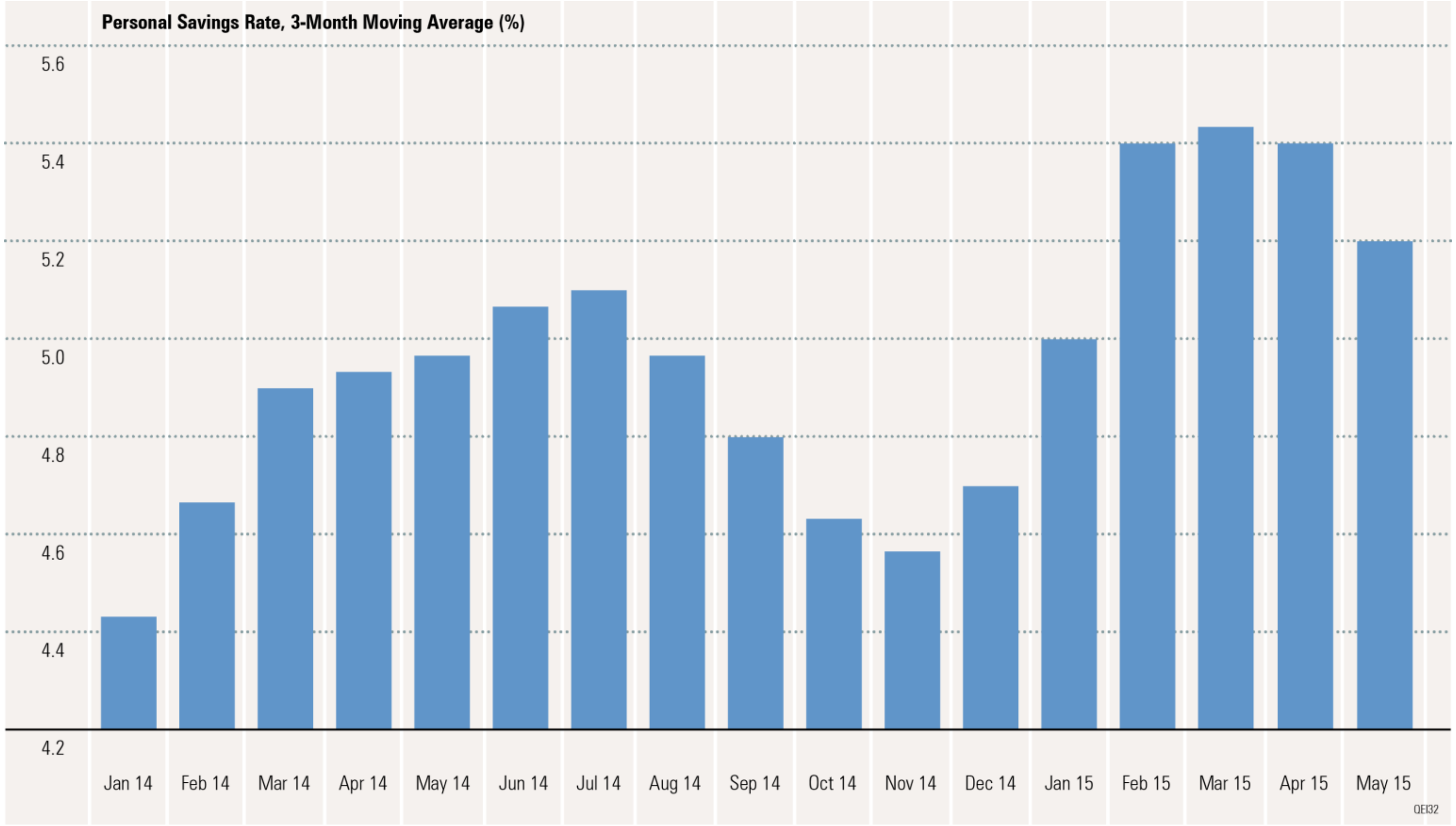
Job openings rose to 5.4 million in May, a new all-time high. Job openings continue to rise rapidly, while hiring struggles to keep up with a wide array of new job postings. This has been the trend since early 2014, reinforcing our thesis that labor scarcity issues could begin to intensify in the near future.



Source: Bureau of Labor Statistics.

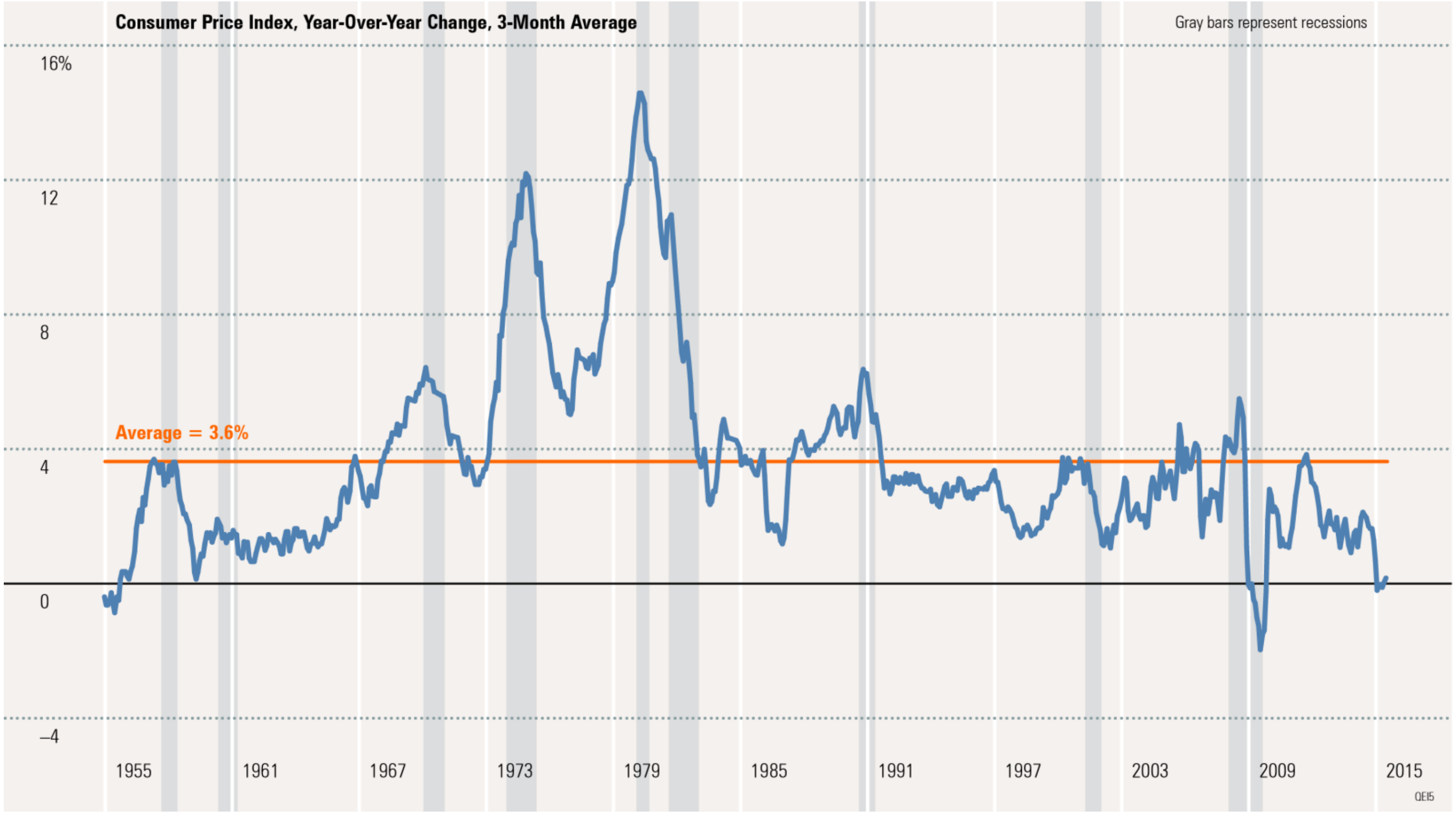
Unusually High Savings Rate Could Power Strong Second Half Consumption Growth

Consumers appeared to go on a buyers' strike early in 2015, with little spending growth despite healthy income growth. Seasonal factors,
port labor issues and weather all depressed consumption numbers. However, these saved dollars are now available for spending when consumers feel more confident.



Inflation Flat, but Will Bounce Back Closer to Fed's Target by Year End

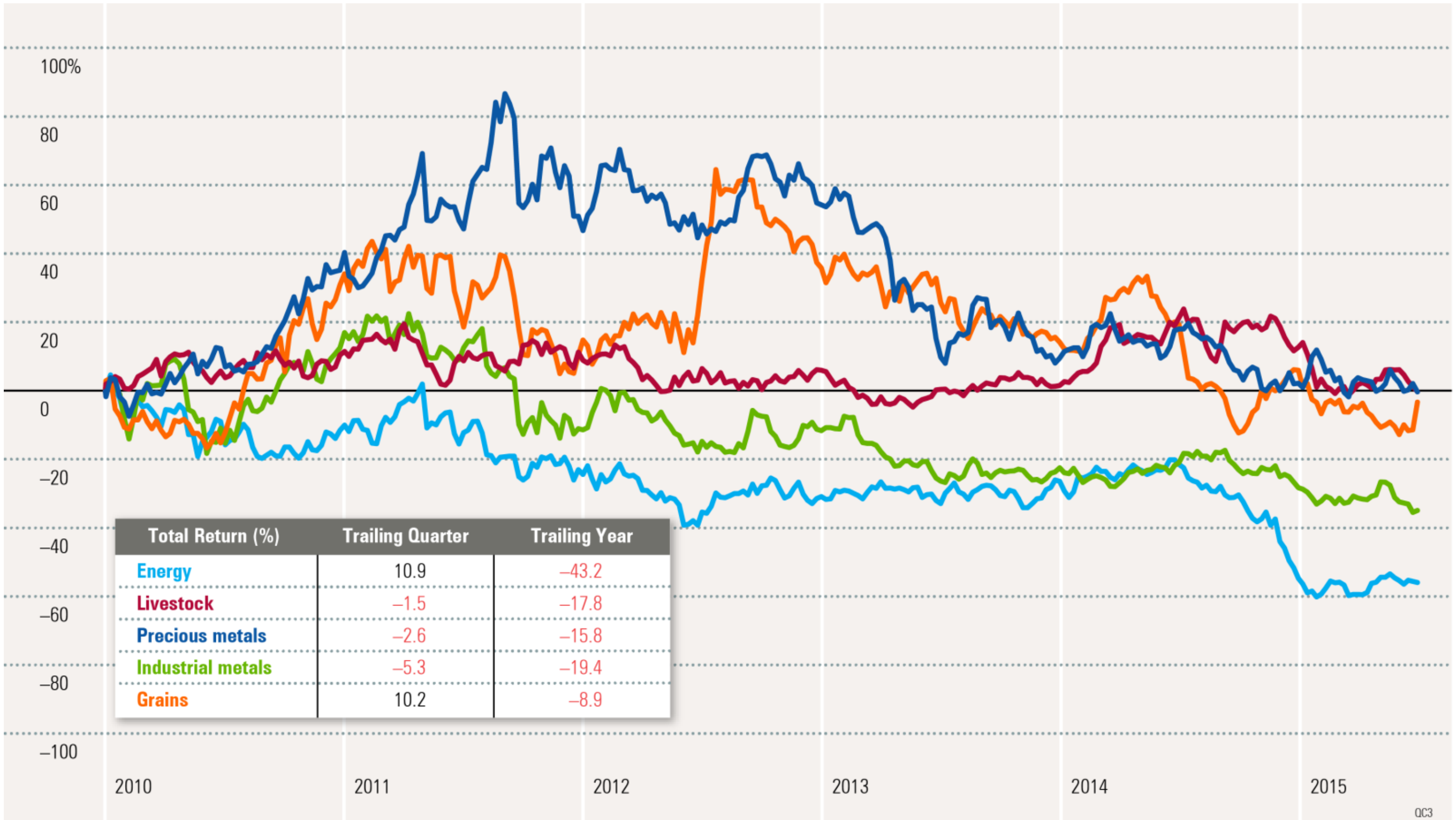
June consumer prices were up 0.1% year-over-year. The headline inflation has generally been flat or down since December, primarily because of lower gasoline. Prices excluding food and energy have been trending consistently around 1.8%. So as gasoline prices normalize, headline inflation will begin approaching 1.8%, which is just a little shy of the Fed's 2% target.



Source: Bureau of Labor Statistics, The National Bureau of Economic Research, Morningstar Calculations.

Commodities Remain a Mixed Bag

Since the 2010–2011 period commodities have been under persistent pressure, primarily because of slow world growth rates, especially in China. After a particularly rough end of 2014, most commodities haven't moved significantly from where they started at the beginning of the year. However, the notable exceptions, energy and grains, were up 10% or more in the second quarter.



Total Return (%)	Trailing Quarter	Trailing Year
Energy	10.9	–43.2
Livestock	–1.5	–17.8
Precious metals	–2.6	–15.8
Industrial metals	–5.3	–19.4
Grains	10.2	–8.9

Source: Morningstar Direct. Data represented by Bloomberg Commodity Indexes.

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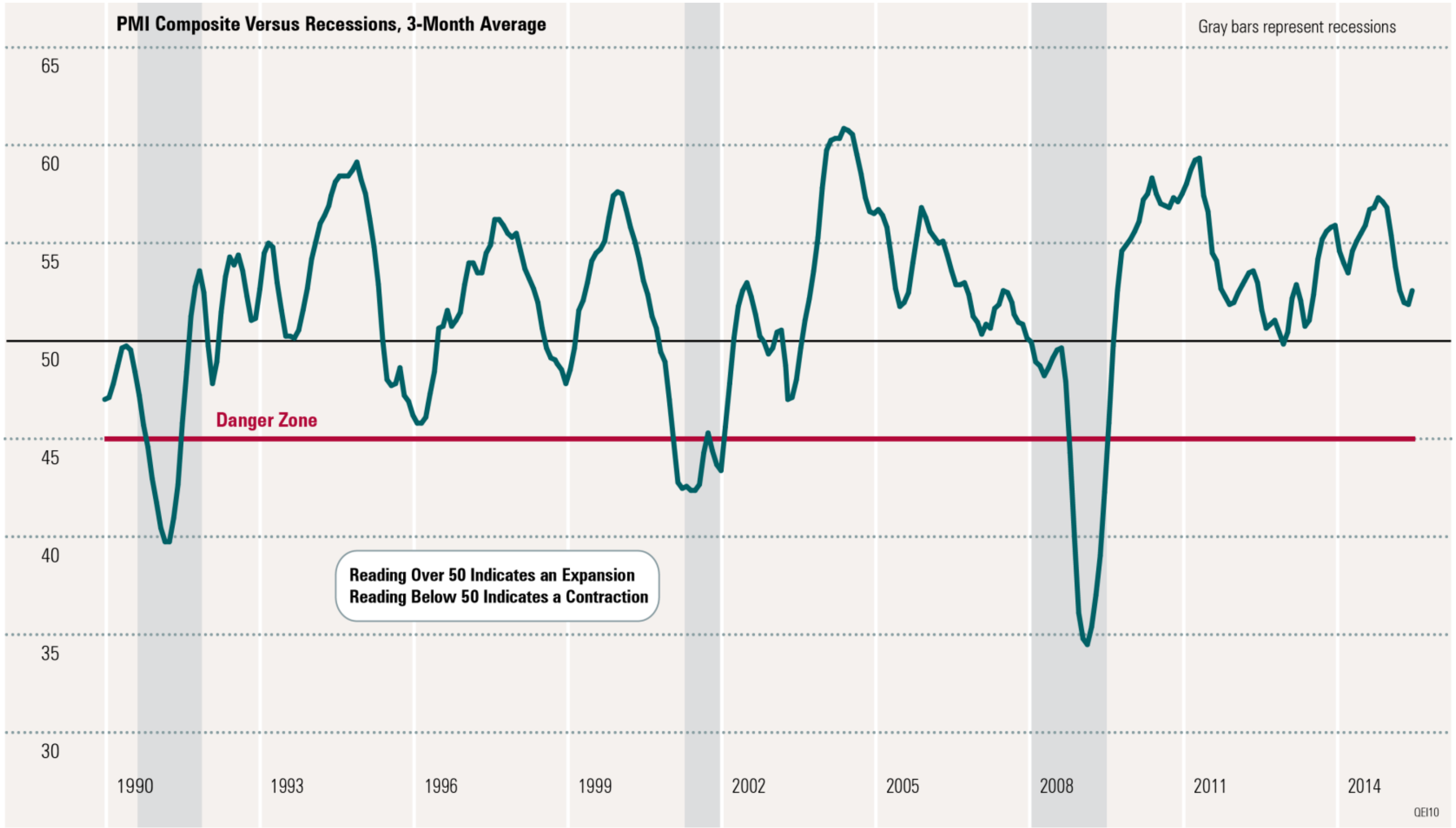
Manufacturing Industry Stabilizes After 5-Month Decline

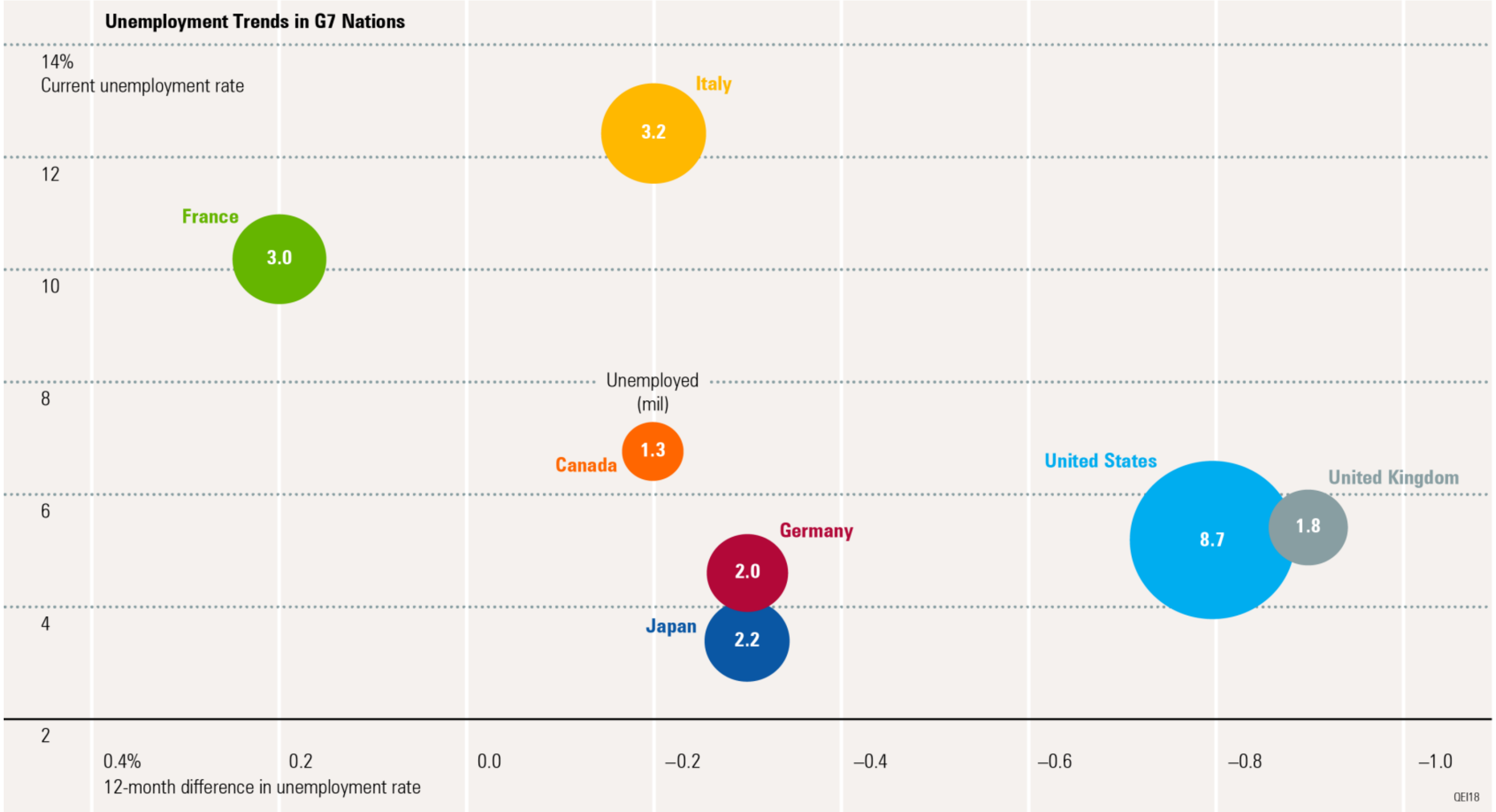
The manufacturing sector boomed in 2014 as a perfect storm of auto production, energy related equipment, and exports combined. That boom ended in late 2014 and growth continued to slow in the first half of 2015. Now, it appears that manufacturing has begun to stabilize.



Source: Institute for Supply Management, The National Bureau of Economic Research.

G7 Employment Situation Improves, France Still Stuck in a Rut

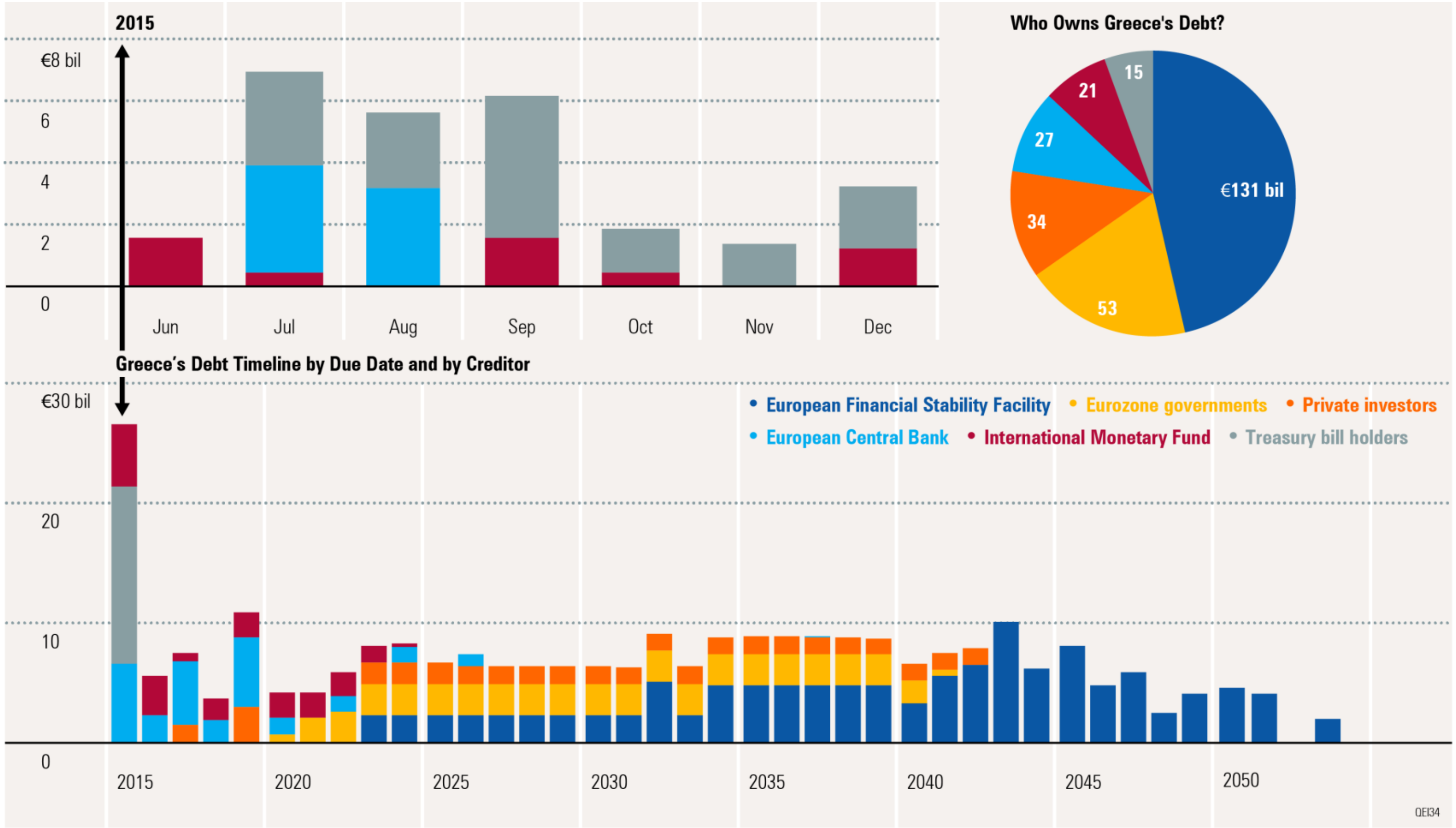
The employment situation in G7 nations continued to improve as Italy has now begun to see a falling unemployment rate. The first batch of QE countries, namely the U.S. and the U.K., have seen their unemployment rates improve the most over the past 12–24 months. France is the only exception among G7 countries, seeing its unemployment rate worsen over the past year.



Source: Eurostat, Japan Statistics Bureau, Statistics Canada, Bureau of Labor Statistics.

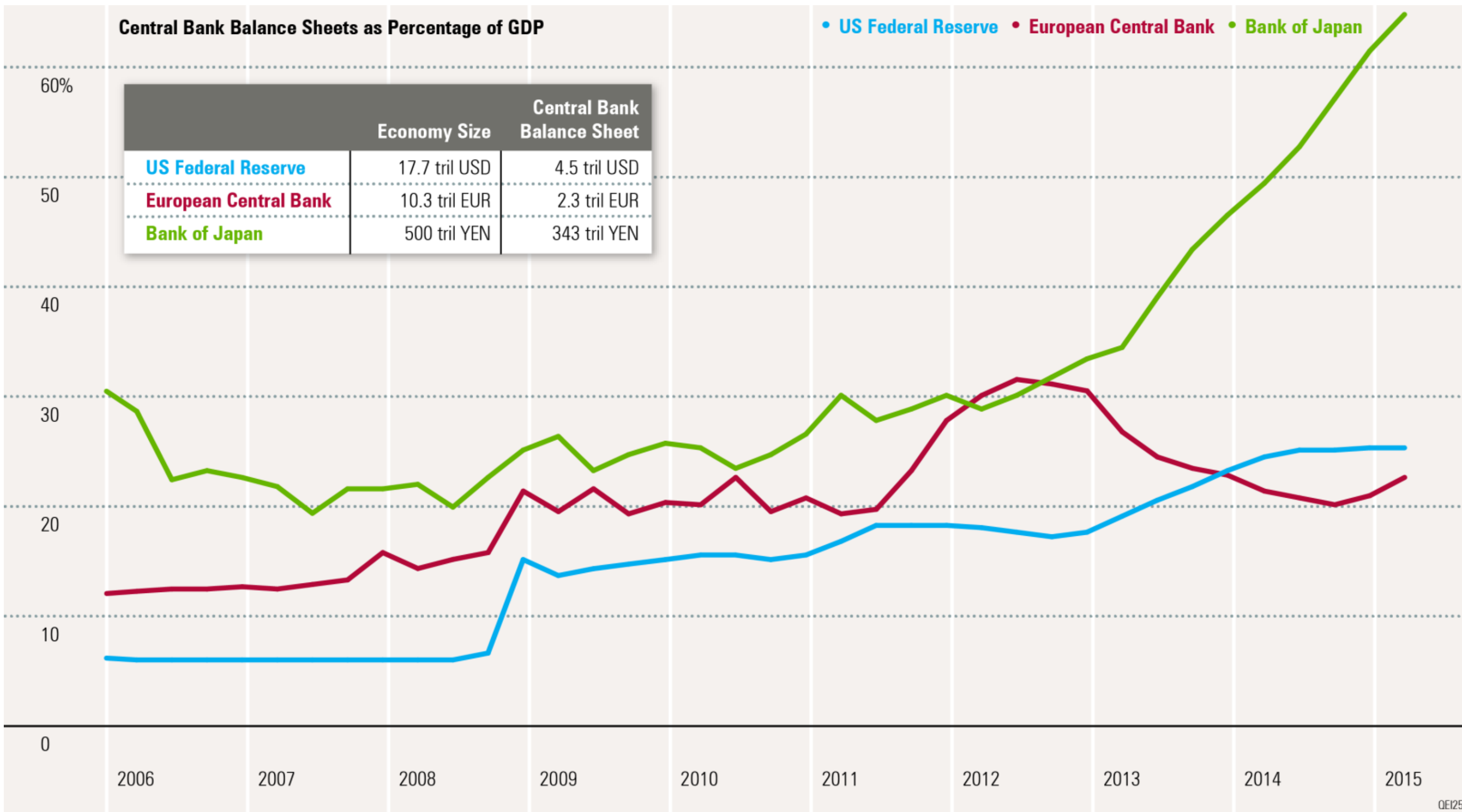
Current Holders of Greek Debt Limit Contagion Potential

Unlike in 2010, most Greek debt is now owned by large government-related entities as opposed to fragile banks, corporations, or individuals. The large government agencies have either deep pockets or the ability to print money. That means that a Greek default is unlikely to create cascading financial failures.



U.S. and European Monetary Policy Going in Opposite Directions

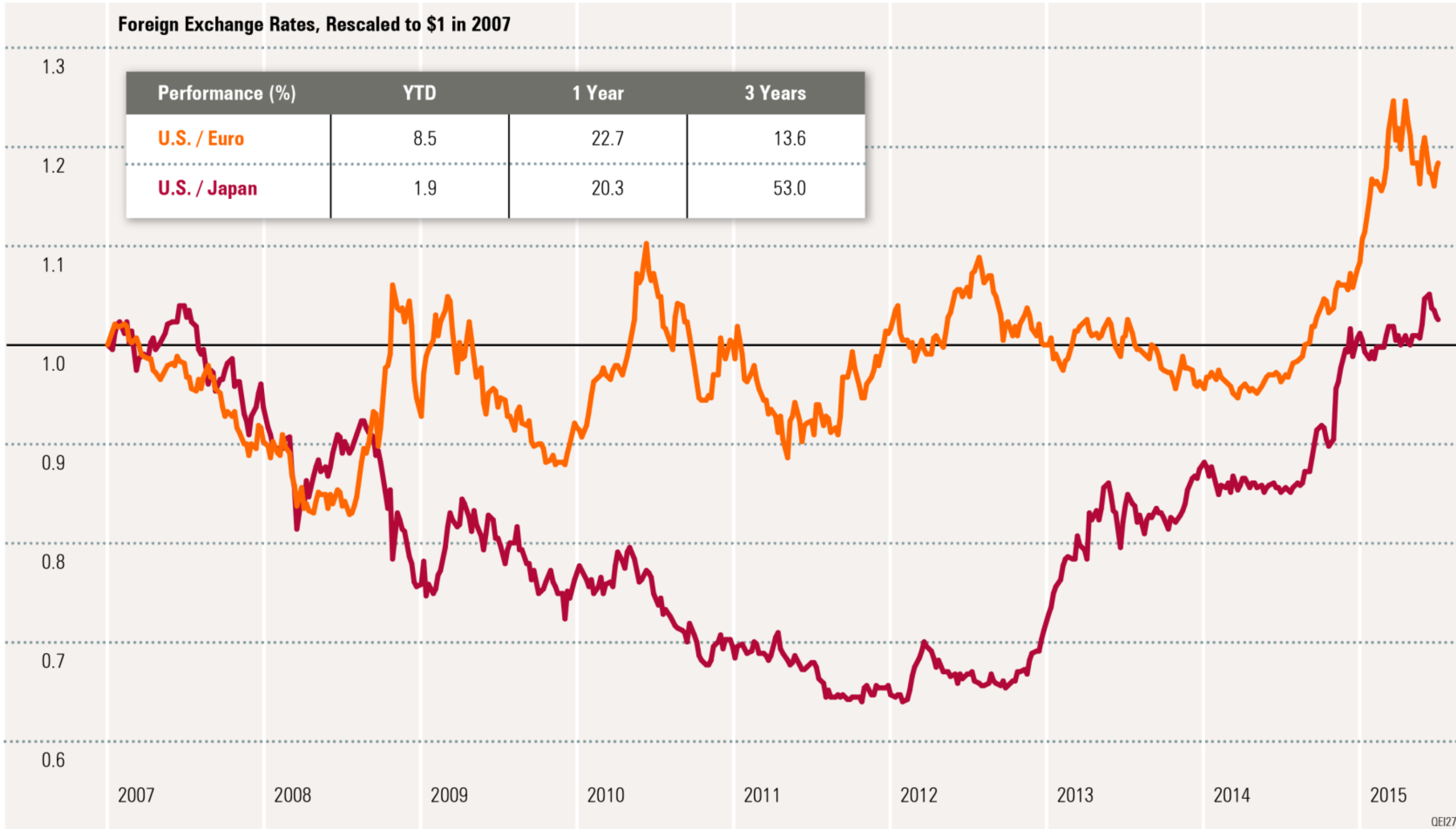
The U.S. has stopped expanding its balance sheet because employment data and economic growth have improved. Japan has boosted
equity markets but hasn't yet seen improvement in its economy so the country is continuing its massive bond purchases. Europe is only just starting its QE program after several years of contracting its balance sheet.



Source: Federal Reserve, European Central Bank, and Bank of Japan.

U.S. Dollar Maintains Its Strength

After a dramatic ascent started in 2013, the U.S. dollar fell slightly against the euro in the first quarter of 2015. However, with the potential for rising interest rates in the U.S. and QE in place in Europe and Japan, the dollar is very likely to remain strong against these two currencies going forward.



Performance (%)	YTD	1 Year	3 Years
U.S. / Euro	8.5	22.7	13.6
U.S. / Japan	1.9	20.3	53.0

Source: Federal Reserve,

Summary

Economy

- Pluses: Improving investor / consumer confidence, broadening expansion, stable housing, and accommodative monetary policy outside the U.S.
- Minuses: Soft wage growth, historically high profit margins, headwinds from a stronger U.S. dollar, uncertainty stemming from sovereign debt troubles in Europe and Chinese market volatility/economic slowdown
- Net-Net: Challenges exist, but expansion should continue at a modest pace

Markets

- Pluses: Businesses are flush, economy stirring, uptick in consumer spending
- Minuses: Rate hike on the horizon, bargains increasingly scarce in the U.S.
- Net-Net: Stocks beat bonds for the long haul, but valuations imply muted (i.e., mid-single-digit) returns going forward; harvest gains judiciously and let cash build if necessary

Ibbotson Capital Market Assumption Methodology Enhancements

Ibbotson's Core Investment Management Process

Step 1: Capital Market Assumptions
Identify opportunity set of asset classes'
Long & Intermediate-term:
- Expected returns
- Standard deviations
- Correlations

Skewness
Kurtosis

Step 2a: Strategic Asset Allocation
Mean-conditional value-at-risk optimization
Liability-relative & mean-variance optimization
Resampling
Yield(income) preference optimization
Sensitivity analysis and stress testing

Step 2b: Dynamic/Tactical Asset Allocation
Fundamental dynamic asset allocation
Quantitative tactical models:
- Target volatility
- Momentum
- Global tactical asset allocation

Step 3: Manager Research
5 qualitative pillars:
Parent, People, Process, Performance, Price
Forward-looking alpha:
- Liquidity
- Momentum

Holdings-based/returns-based style analysis

Step 4: Portfolio Construction
Fund of funds optimization
Alpha-tracking error optimization
Active risk budgeting
Non-normal return strategies
Higher momentum optimization

Step 5: Monitor
Internal portfolio review
Rebalancing
Detailed performance attribution
Custom benchmarking
Annual review

For illustrative purposes only

Advicent Expanded Asset Class Models

Advicent 2015 Final 18 Asset Class Model Allocation	Conservative	Moderate Conservative	Moderate	Moderate Aggressive	Aggressive
US Large Cap Growth Equities	4%	7%	9%	10%	12%
US Large Cap Value Equities	6%	9%	12%	14%	15%
US Mid Cap Equities	3%	6%	9%	13%	15%
US Small Cap Equities	0%	3%	5%	8%	10%
US REITs	0%	2%	2%	3%	4%
International REITs	0%	0%	2%	2%	2%
International Equities	4%	7%	9%	13%	16%
International Small Cap Equities	0%	0%	3%	3%	4%
Emerging Markets Equities	0%	2%	4%	6%	8%
Long Term Bonds	6%	4%	2%	0%	0%
Intermediate Term Bonds	16%	15%	10%	9%	3%
TIPS	6%	5%	3%	0%	0%
Short Term Bonds	25%	16%	9%	3%	0%
High Yield Bonds	8%	6%	5%	2%	0%
International Bonds	8%	7%	6%	4%	0%
Commodities	2%	2%	2%	3%	3%
Hedge Funds - Fund of Funds	5%	5%	6%	7%	8%
Cash	7%	4%	2%	0%	0%
Equity	20%	40%	60%	80%	95%
Fixed Income	80%	60%	40%	20%	5%
Portfolio	100%	100%	100%	100%	100%
Expected Return (Arithmetic)	4.31%	5.39%	6.54%	7.54%	8.34%
Expected Return (Geometric)	4.16%	5.08%	5.95%	6.62%	7.09%
Expected Standard Deviation	5.51%	8.11%	11.25%	14.14%	16.63%

Advicent 2015 Final 17 Asset Class Model Allocation	Conservative	Moderate Conservative	Moderate	Moderate Aggressive	Aggressive
US Large Cap Growth Equities	4%	7%	10%	12%	13%
US Large Cap Value Equities	7%	9%	12%	15%	16%
US Mid Cap Equities	3%	7%	10%	13%	16%
US Small Cap Equities	0%	3%	5%	8%	10%
US REITs	0%	2%	2%	3%	4%
International REITs	0%	0%	2%	2%	2%
International Equities	4%	8%	10%	14%	18%
International Small Cap Equities	0%	0%	3%	4%	5%
Emerging Markets Equities	0%	2%	4%	6%	8%
Long Term Bonds	6%	4%	2%	0%	0%
Intermediate Term Bonds	18%	17%	13%	11%	5%
TIPS	6%	5%	3%	0%	0%
Short Term Bonds	27%	17%	9%	3%	0%
High Yield Bonds	8%	6%	5%	2%	0%
International Bonds	8%	7%	6%	4%	0%
Commodities	2%	2%	2%	3%	3%
Cash	7%	4%	2%	0%	0%
Equity	20%	40%	60%	80%	95%
Fixed Income	80%	60%	40%	20%	5%
Portfolio	100%	100%	100%	100%	100%
Expected Return (Arithmetic)	4.25%	5.40%	6.58%	7.66%	8.52%
Expected Return (Geometric)	4.10%	5.07%	5.95%	6.65%	7.14%
Expected Standard Deviation	5.63%	8.35%	11.65%	14.83%	17.45%

Advicent Expanded Tax Aware Asset Class Models

Advicent 2015 Final 16 Asset Class Model Allocation					
	Conservative	Moderate Conservative	Moderate	Moderate Aggressive	Aggressive
US Large Cap Growth Equities	5%	9%	11%	13%	14%
US Large Cap Value Equities	7%	10%	13%	15%	16%
US Mid Cap Equities	3%	6%	9%	13%	16%
US Small Cap Equities	0%	2%	4%	6%	8%
US REITs	0%	0%	2%	2%	3%
International REITs	0%	0%	0%	2%	2%
International Equities	4%	7%	10%	13%	16%
International Small Cap Stocks	0%	0%	2%	3%	4%
Emerging Markets Equities	0%	2%	4%	6%	8%
Long-Term Municipal Bonds	8%	6%	4%	0%	0%
Intermediate-Term Municipal Bonds	28%	23%	15%	11%	3%
Short-Term Municipal Bonds	25%	18%	11%	5%	0%
High Yield Municipal	8%	6%	5%	2%	0%
Commodities	0%	2%	2%	2%	2%
Hedge Funds - Fund of Funds	5%	5%	6%	7%	8%
Cash	7%	4%	2%	0%	0%
Equity	20%	40%	60%	80%	95%
Fixed Income	80%	60%	40%	20%	5%
Portfolio	100%	100%	100%	100%	100%
Expected Return (Arithmetic)	3.97%	5.06%	6.30%	7.45%	8.35%
Expected Return (Geometric)	3.86%	4.80%	5.76%	6.54%	7.08%
Expected Standard Deviation	4.91%	7.51%	10.82%	14.09%	16.76%

Advicent 2015 Final 15 Asset Class Model Allocation					
	Conservative	Moderate Conservative	Moderate	Moderate Aggressive	Aggressive
US Large Cap Growth Equities	5%	9%	12%	14%	15%
US Large Cap Value Equities	7%	11%	13%	16%	17%
US Mid Cap Equities	3%	6%	9%	13%	16%
US Small Cap Equities	0%	2%	4%	7%	9%
US REITs	0%	0%	2%	2%	3%
International REITs	0%	0%	0%	2%	2%
International Equities	5%	8%	11%	14%	18%
International Small Cap Stocks	0%	0%	3%	4%	5%
Emerging Markets Equities	0%	2%	4%	6%	8%
Long-Term Municipal Bonds	8%	6%	4%	0%	0%
Intermediate-Term Municipal Bonds	30%	24%	17%	12%	5%
Short-Term Municipal Bonds	27%	20%	12%	6%	0%
High Yield Municipal	8%	6%	5%	2%	0%
Commodities	0%	2%	2%	2%	2%
Cash	7%	4%	2%	0%	0%
Equity	20%	40%	60%	80%	95%
Fixed Income	80%	60%	40%	20%	5%
Portfolio	100%	100%	100%	100%	100%
Expected Return (Arithmetic)	3.90%	5.05%	6.33%	7.56%	8.52%
Expected Return (Geometric)	3.78%	4.77%	5.75%	6.56%	7.12%
Expected Standard Deviation	4.98%	7.70%	11.18%	14.80%	17.61%

Step 1: Develop Asset Class Inputs

- Asset class inputs represent the forecast of asset class behavior

Expected Returns	Standard Deviation	Correlation

Stocks, Bonds, Bills and Inflation Study (1976 / 1977)

- Ibbotson/Sinquefield (1976/1977) approach is designed to measure the long-term risk/return trade-off of asset classes
- Rely on long-term data to identify structural drivers (building blocks) of asset class returns
- Key return building blocks: equity risk premium, horizon premium, credit premium, inflation and real interest rates
- Assumes that building blocks (risk premia) are constant and that market prices are “fair” and therefore accurately reflect currently available information
- Ibbotson/Sinquefield forecasts are designed to provide a benchmark against which to compare shorter term market views, and are intended to be used as an input to defining long-term investment policy (SAA)
- Key benefits of the Ibbotson/Sinquefield approach (according to Jack Treynor’s 1977 foreword to SBBI book):
  - Can be consistently applied across asset classes
  - Provides simple and intuitive framework for capital market forecasts

Academic underpinnings

- Diermeier, Ibbotson and Siegel (1984) were among the first to stress the importance for capital market forecasts to be macro-consistent.
- Shiller (1984) was among the first to study the predictability of stocks returns using the dividend-to-price ratio, finding that periods of high (low) dividends-to-price ratios are followed by high (low) returns.
- Ibbotson and Chen (2003) explain how the supply-side model is based on the idea that equity returns can be decomposed into underlying sources of returns such as income and earnings growth (building block approach)

Comparing Expected Returns
Classic versus Enhanced Building Blocks

	Classic Demand-Side Building Blocks	Enhanced Supply-Side Building Blocks
Definition	Demand-side: Investors demand "return premiums" for risk	Supply-side: Returns are supplied by the real economy and corporate fundamentals
Building Blocks	Building blocks based on long-term historical risk premiums above government bond yields (e.g. equity risk premium, default premium)	Building blocks based on identifiable economic and corporate drivers of returns (e.g. inflation, dividends, productivity growth, defaults)
Valuation Impact	Valuation adjustment to account for historical change in valuation	Forward-looking valuation models applied to each asset class individually assuming mean-reversion to fair value
Year-over-year Changes	Small year-over-year changes in Forecasts, leading to small year-over-year changes in asset class models	Moderate year-over-year changes in Forecasts, leading to moderate year-over-year changes in asset class models
Usage	Strategic Asset Allocation	Strategic Asset Allocation

CMA Methodology Enhancements
Equity Model

Equity Model

- “Building Blocks” continue to be relevant – they provide a useful way to think about the sources of returns and structure the thinking around forecasting returns
- Shift to supply-side building blocks
  - Supply-side building blocks can be related to identifiable, current *and* long-term economic variables and corporate fundamentals.
  - We have more confidence in forecasting the fundamental drivers of return (e.g., dividends and earnings) than changes in investors’ risk-aversion (which influences risk premia; e.g. demand-side building blocks), which is not directly observable and difficult to estimate.
  - We explicitly account for dividends and repurchases as building block components of our return predictions.
- We are incorporating additional valuation adjustments in our forecasts. Valuation and the profit cycle are important in predicting returns.

New Equity Model – Example of New Building Blocks Expected Returns

$$E_t(R) = \underbrace{E_t(\text{Total Yield}) + E_t(\text{Growth})}_{\text{Cash Flow Return}} + \underbrace{E_t(\textit{Change in Valuation})}_{\text{Change in Valuation}} + E_t(\text{Inflation})$$

Old Model	New Model
	Chg. Valuation
	Growth
Equity Risk Premium	Total Yield (Div. & Rep.)
Risk-free rate	Inflation

CMA Methodology Enhancements
Fixed Income Model

Fixed Income Model

- The new fixed-income model is based on forward-looking assumptions about the path of future interest rates and spreads (e.g. credit and term spreads). Our previous approach was based on a combination of a market-implied risk free rate and historical risk premia.
- This approach allows us to incorporate forward-looking assumptions about current and long-term fixed income fundamentals.
- Key enhancements:
  - Explicitly model forward-looking fair yield curves (which can be thought of as very long-term) and inflation expectations for major bond markets
  - Includes explicit assumptions about future default losses across credit sectors
  - Incorporation of roll yields and credit migration

New Fixed Income Model

Expected Return = Income Return + Shift Return + Roll Yield + Credit Migration Cost + Default Loss

- Rather than using existing yield curves, we are now using a robust cash flow methodology and IRR to calculate the returns, providing a more active approach to fixed income return forecasting

Current Model	New Framework
Default	Credit spread
Horizon	Term spread
Risk-free rate	Real Rate
	Inflation

Changes from 2014 CMAs

2014 v 2015 20-Year CMAs for Broadly Used Asset Classes

		2015 20 Year		2014 20 Year		Difference	
Asset Class	Benchmark	Return	Std. Dev.	Return	Std. Dev.	Return	Std. Dev.
Large Cap Growth Stocks	Russell 1000 Growth TR USD	7.4%	21.9%	8.3%	22.1%	-0.9%	-0.2%
Large Cap Value Stocks	Russell 1000 Value TR USD	8.5%	17.4%	9.9%	17.5%	-1.4%	-0.1%
Mid Cap Growth Stocks	Russell Mid Cap Growth TR USD	7.8%	23.0%	9.9%	23.2%	-2.1%	-0.2%
Mid Cap Value Stocks	Russell Mid Cap Value TR USD	10.0%	19.0%	11.9%	19.2%	-1.9%	-0.2%
Small Cap Growth Stocks	Russell 2000 Growth TR USD	7.2%	27.3%	9.4%	27.6%	-2.2%	-0.3%
Small Cap Value Stocks	Russell 2000 Value TR USD	10.3%	22.3%	12.8%	22.5%	-2.5%	-0.2%
International Stocks	MSCI EAFE GR USD	9.1%	20.7%	9.4%	20.6%	-0.3%	0.1%
International Small Cap Stocks	MSCI EAFE Small Cap GR USD	9.9%	21.5%	10.5%	21.4%	-0.6%	0.1%
Emerging Market Stocks	MSCI EM GR USD	12.3%	29.2%	13.5%	29.7%	-1.2%	-0.5%
US REITs	FTSE NAREIT All Equity REITs TR	8.1%	23.5%	8.4%	23.6%	-0.3%	-0.1%
Non-US REITs	S&P Developed Ex US Property TR USD	8.7%	23.3%	10.5%	23.4%	-1.8%	-0.1%
Emerging Market Bonds	JPM EMBI Plus TR USD	6.1%	14.3%	6.9%	14.4%	-0.8%	-0.1%
Non-US Bonds	Citi WGBI NonUSD USD	3.3%	11.2%	3.1%	11.2%	0.2%	0.0%
High Yield Bonds	Barclays US Corporate High Yield TR USD	5.2%	11.2%	7.4%	11.3%	-2.2%	-0.1%
Long Term US Bonds	Barclays US Govt/Credit Long TR USD	3.5%	10.8%	4.3%	10.9%	-0.8%	-0.1%
Intermediate Term US Bonds	Barclays US Agg Bond TR USD	3.4%	7.0%	3.4%	7.1%	0.0%	-0.1%
TIPS	Barclays Gbl Infl Linked US TIPS TR USD	3.7%	7.0%	2.7%	7.1%	1.0%	-0.1%
Short-Term Bonds	Barclays US Govt/Credit 1-3 Yr TR USD	2.9%	3.6%	2.1%	3.6%	0.8%	0.0%
Cash Equivalents	BofAML US Treasury Bill 3 Mon	2.0%	1.9%	1.0%	1.9%	1.0%	0.1%
Commodities	Bloomberg Commodity TR USD	4.6%	17.4%	4.5%	17.9%	0.2%	-0.5%

Source: Morningstar Direct. Indexes shown are unmanaged and not available for direct investment.

2014 vs 2015 20-Year CMAs For Broadly Used Asset Classes

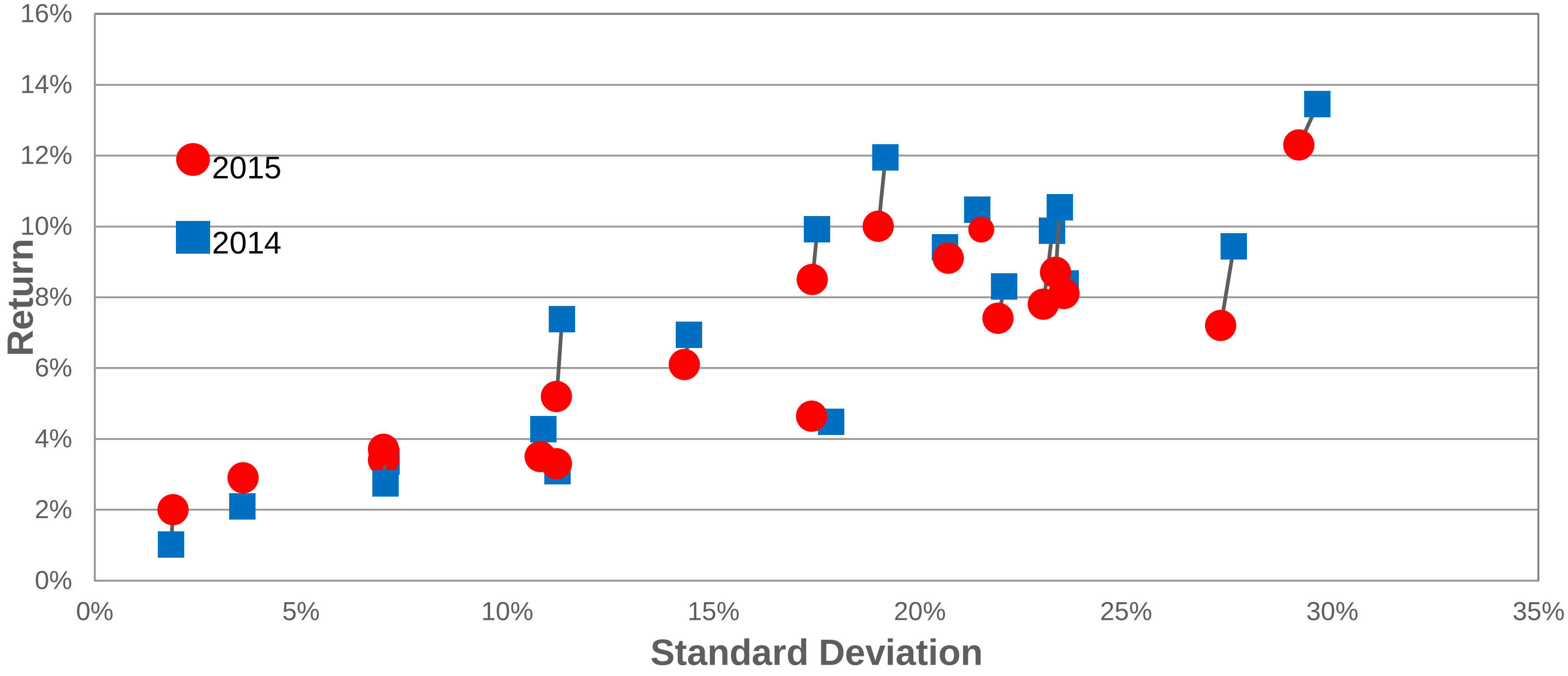
Relative Move		2015 Sharpe Ratio	2014 Sharpe Ratio	
0	MCV	0.395	0.492	MCV
0	SCV	0.350	0.456	SCV
+1	LCV	0.345	0.430	HY Bonds
+1	Intl SC	0.344	0.424	LCV
+1	EM Equity	0.336	0.372	Intl SC
+2	EAFE	0.319	0.369	EM Equity
0	Non-US REITs	0.266	0.344	Non-US REITs
+2	EMD	0.252	0.335	EAFE
-6	HY Bonds	0.241	0.317	MCG
+3	US REITs	0.238	0.308	EMD
-2	MCG	0.230	0.263	LCG
-1	LCG	0.224	0.251	SCG
-1	SCG	0.172	0.250	US REITs
+4	TIPS	0.171	0.163	LT Bonds
0	AGG	0.129	0.121	AGG
0	Commods	0.123	0.111	Commods
+2	ST Bonds	0.111	0.052	Non-US Bonds
-4	LT Bonds	0.093	0.034	TIPS
-2	Non-US Bonds	0.071	-0.114	ST Bonds
0	Cash	-0.263	-0.800	Cash

- The Sharpe Ratios listed for 2015 and 2014 are calculated with a risk free rate of 2.5%
- Each year is sorted by descending Sharpe Ratio to highlight changes in rankings
- Assets that we find more attractive should receive higher allocations this year and vice-versa
- International Equity asset classes look slightly more valuable, on a relative basis
- HY Bonds and LT Bonds took the largest hit while TIPS and ST Bonds look more attractive

Source: Morningstar Direct. Indexes shown are unmanaged and not available for direct investment.

CMA's - 2014 vs. 2015 20-Year For Popular Asset Classes

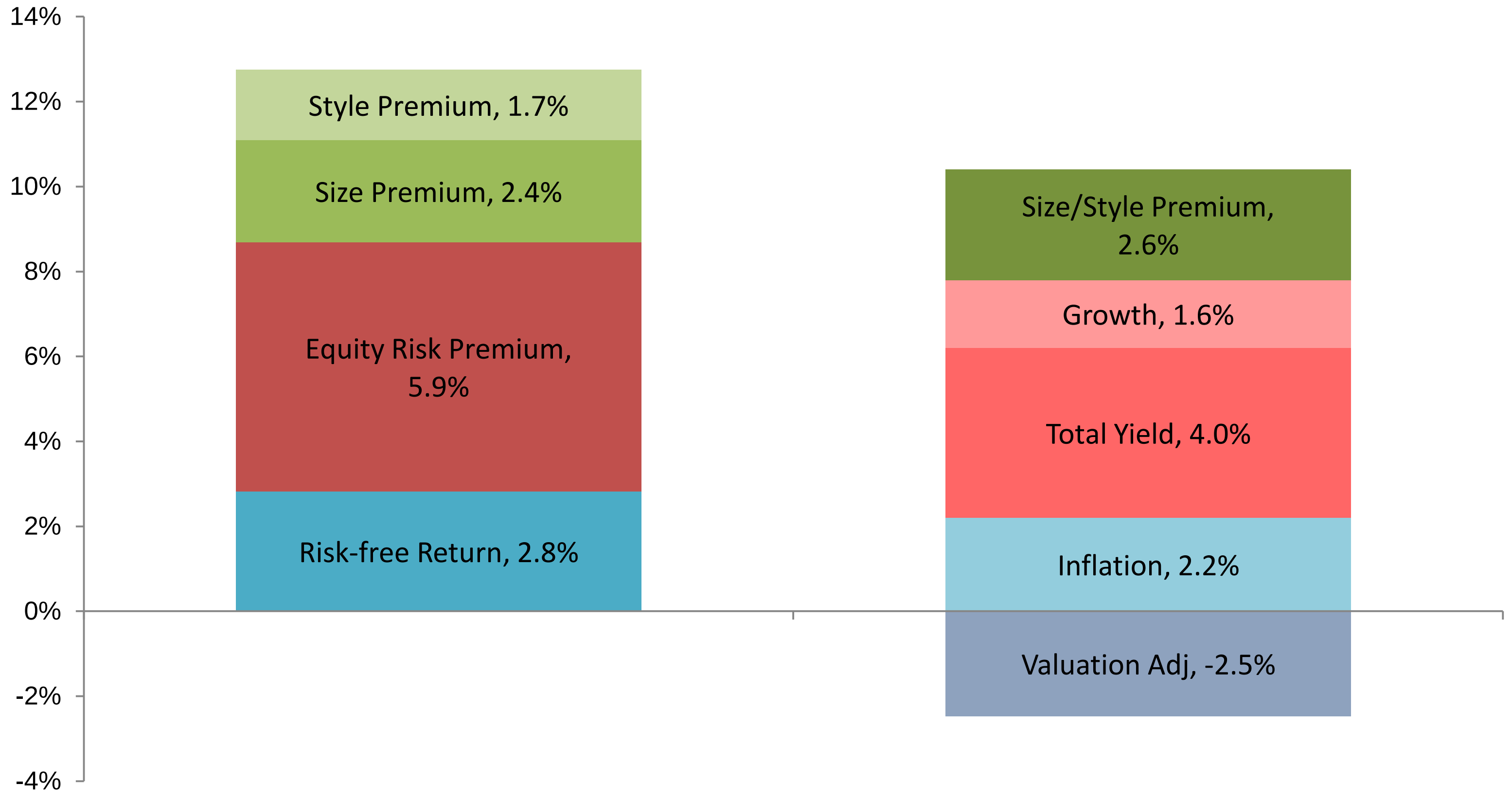
- Fixed-income expected returns generally increased while equities decreased.
- High-yield bonds is a notable exception, as its expected return decreased by 2.2%.



Source: Morningstar Direct. Indexes shown are unmanaged and not available for direct investment.

Example

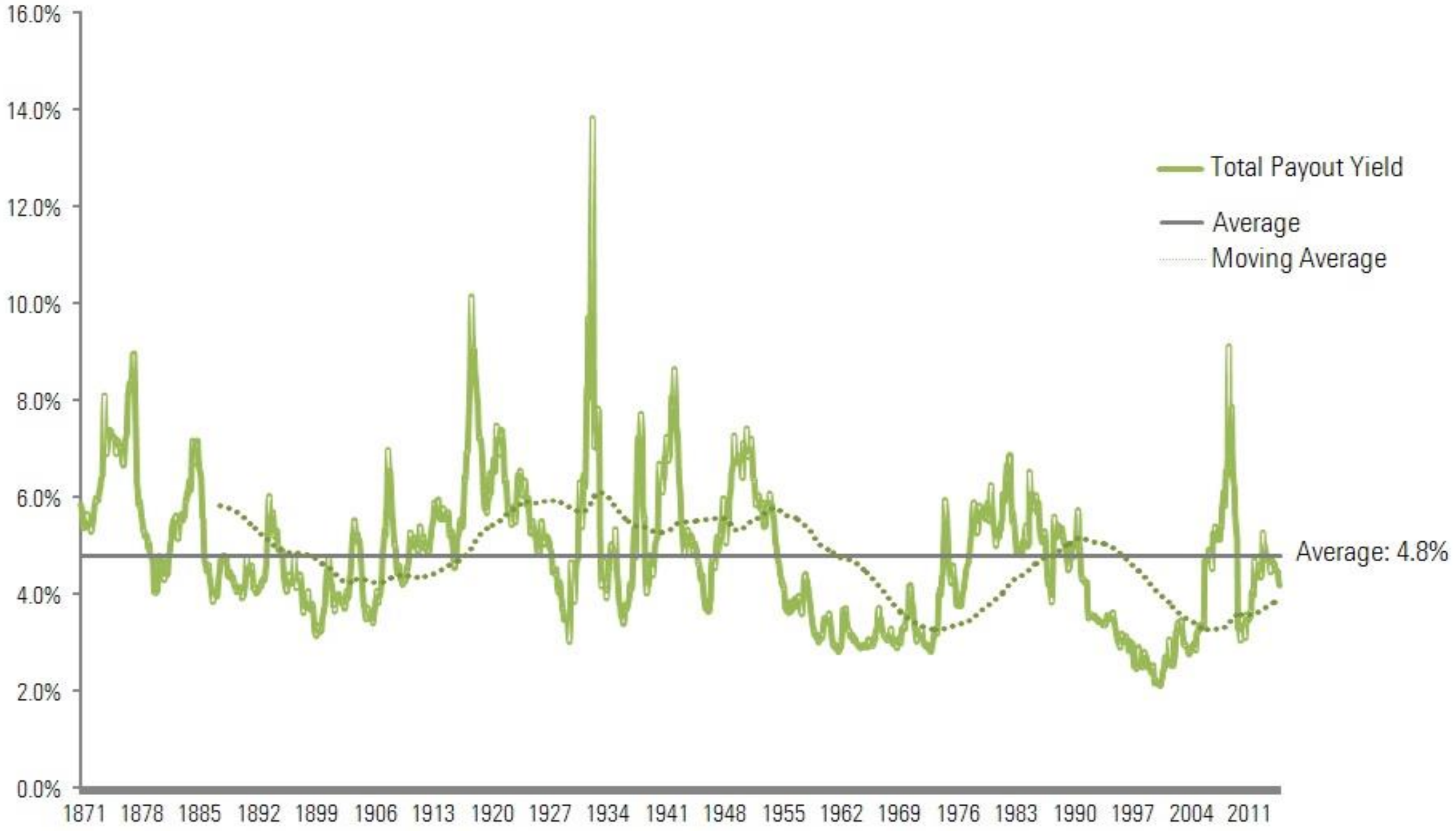
Capital Market Assumptions—Equity Model Framework Small-Cap Value



Note: Old building blocks are in arithmetic terms and the new framework is in geometric terms.

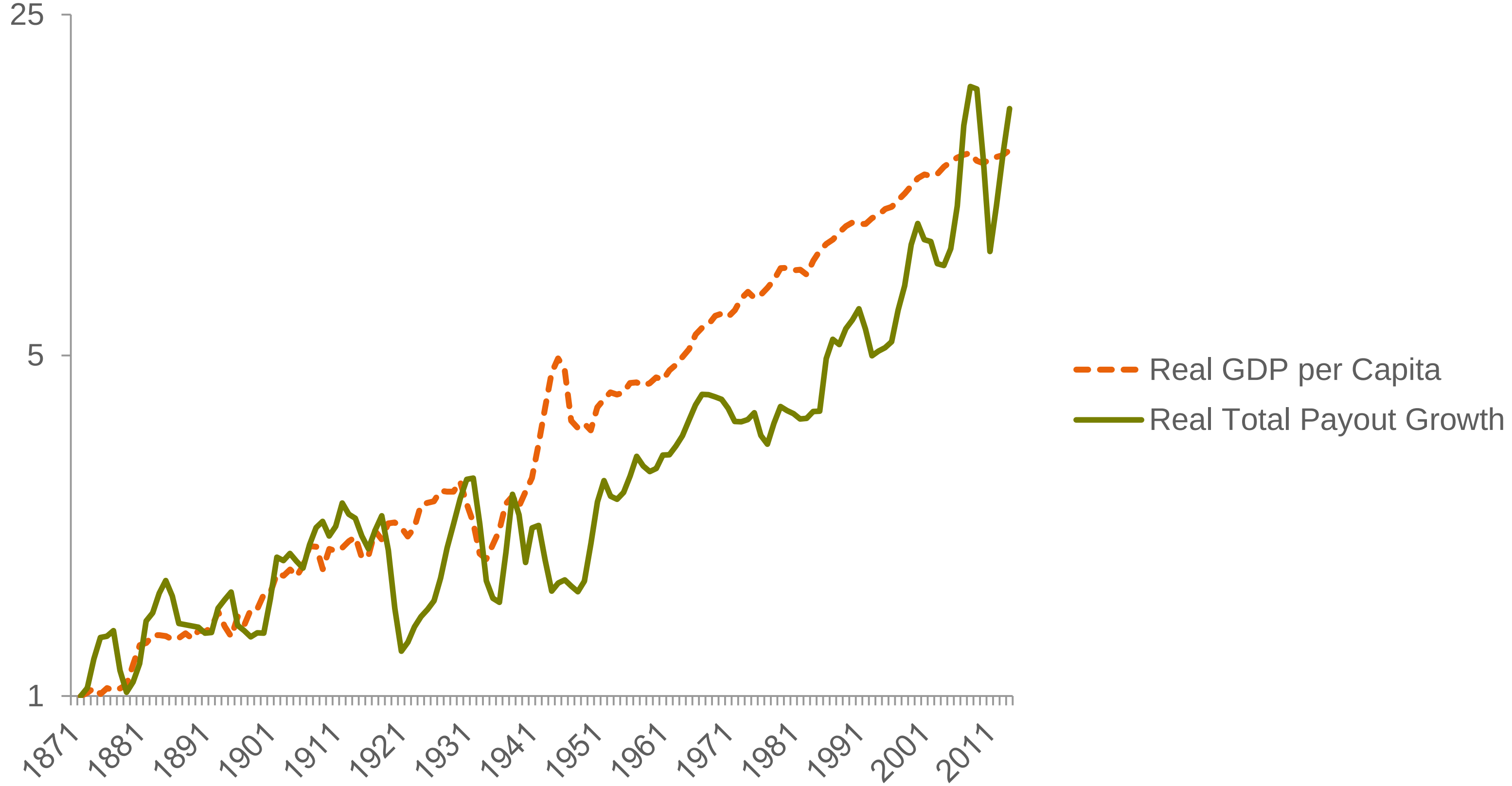
Supporting Slides

U.S. Equity Markets: Total Payout Yield (1871 – 2014)



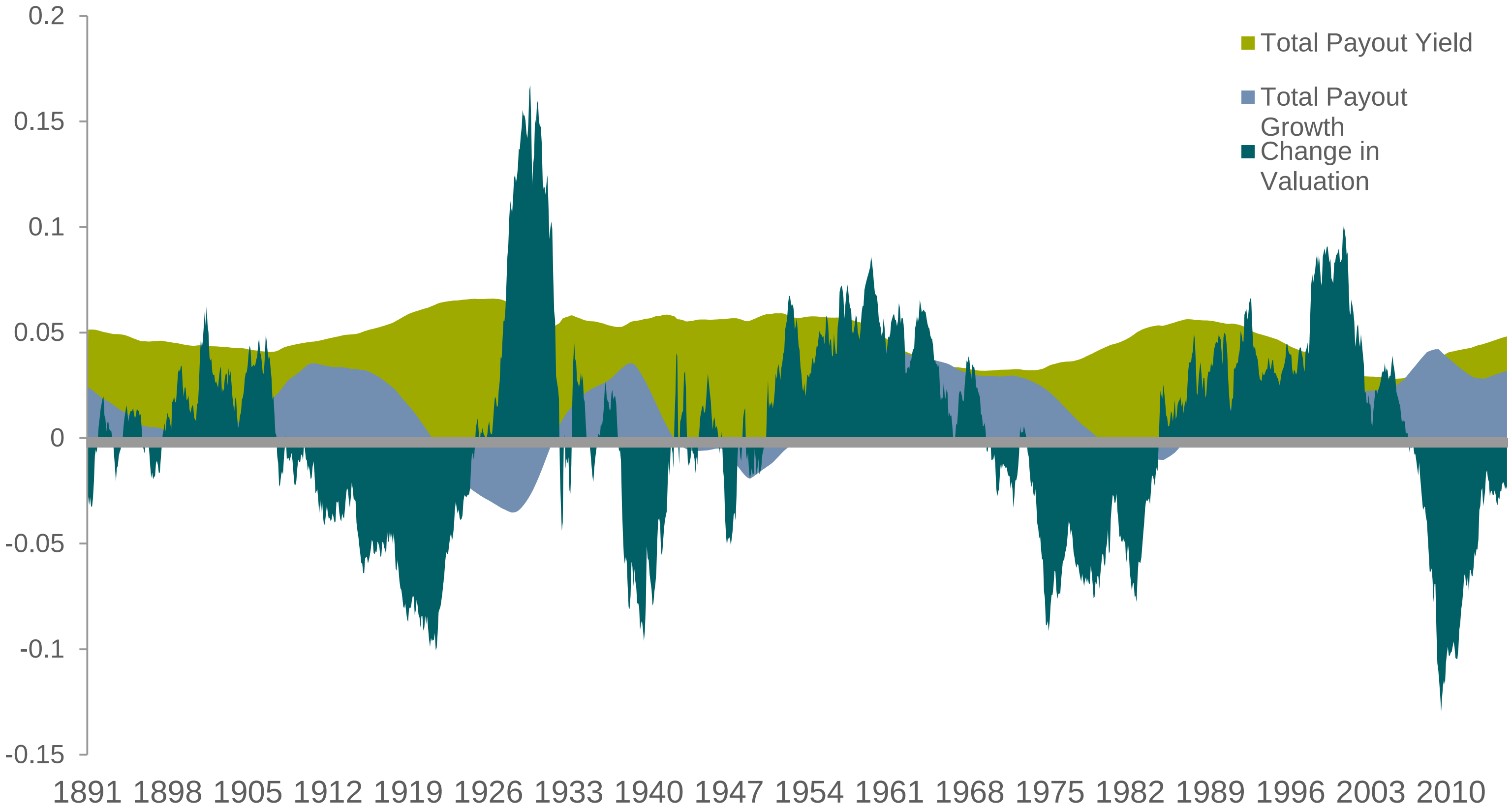
Source: Morningstar, Shiller, Boudoukh et al (2007), Skinner et al (2013)

U.S. Equity Markets: Cash Flow Growth and GDP per Capita (1871 – 2014)



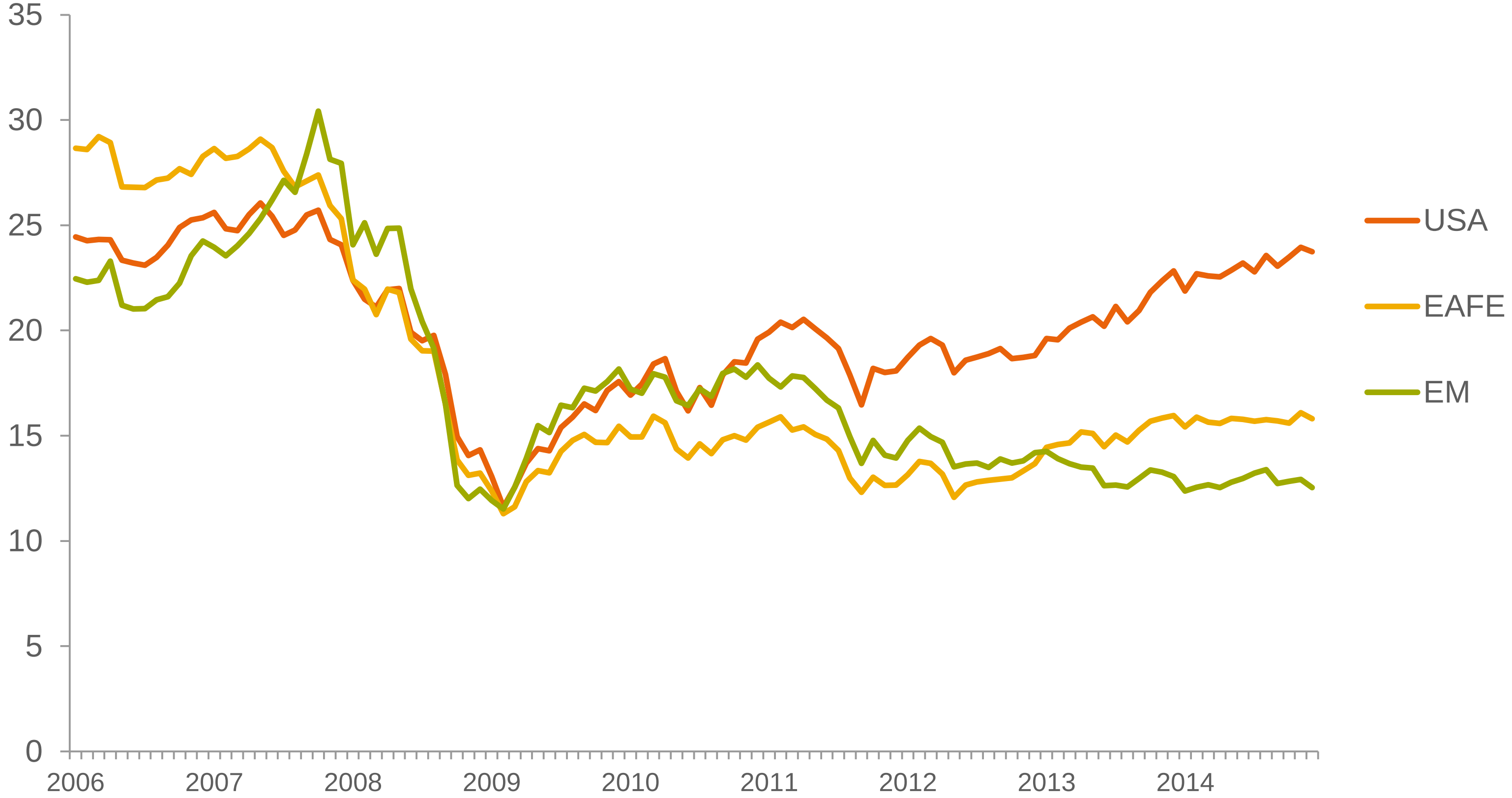
Source: Morningstar, Shiller, Boudoukh et al (2007), Skinner et al (2013)

Decomposition of 10-Year Equity Market Return (1871 – 2014)



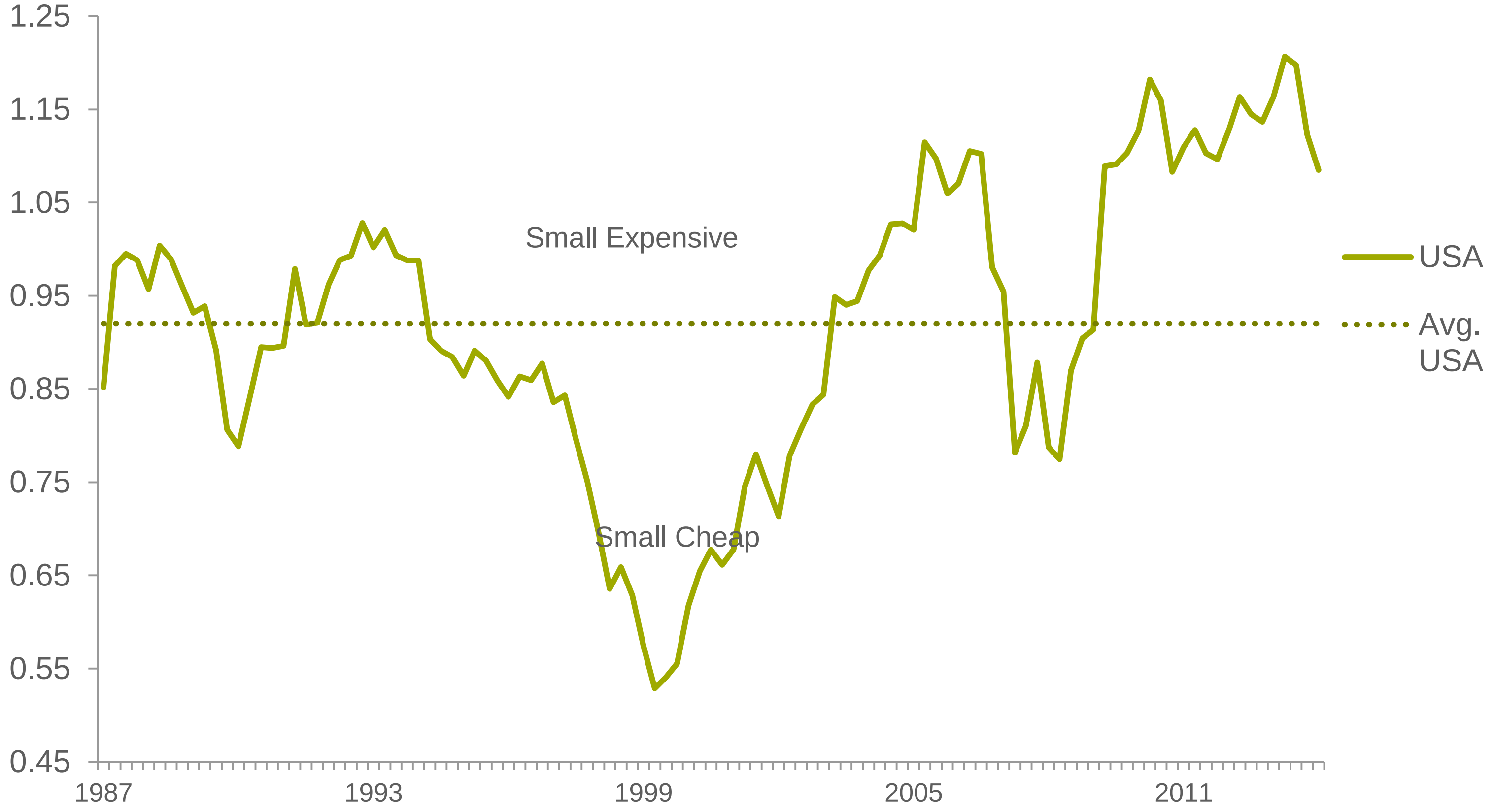
Source: Morningstar, Shiller, Boudoukh et al (2007), Skinner et al (2013)

Divergence between USA/Intl. Equity Valuations
10-Year Cyclically-Adjusted PE (2006-2014)



Source: Morningstar, Shiller, Boudoukh et al (2007), Skinner et al (2013)

Size is expensive relative to history…
Relative Valuation U.S. Small vs. U.S. Market (1987-2014)



Source: Morningstar, Wordscope

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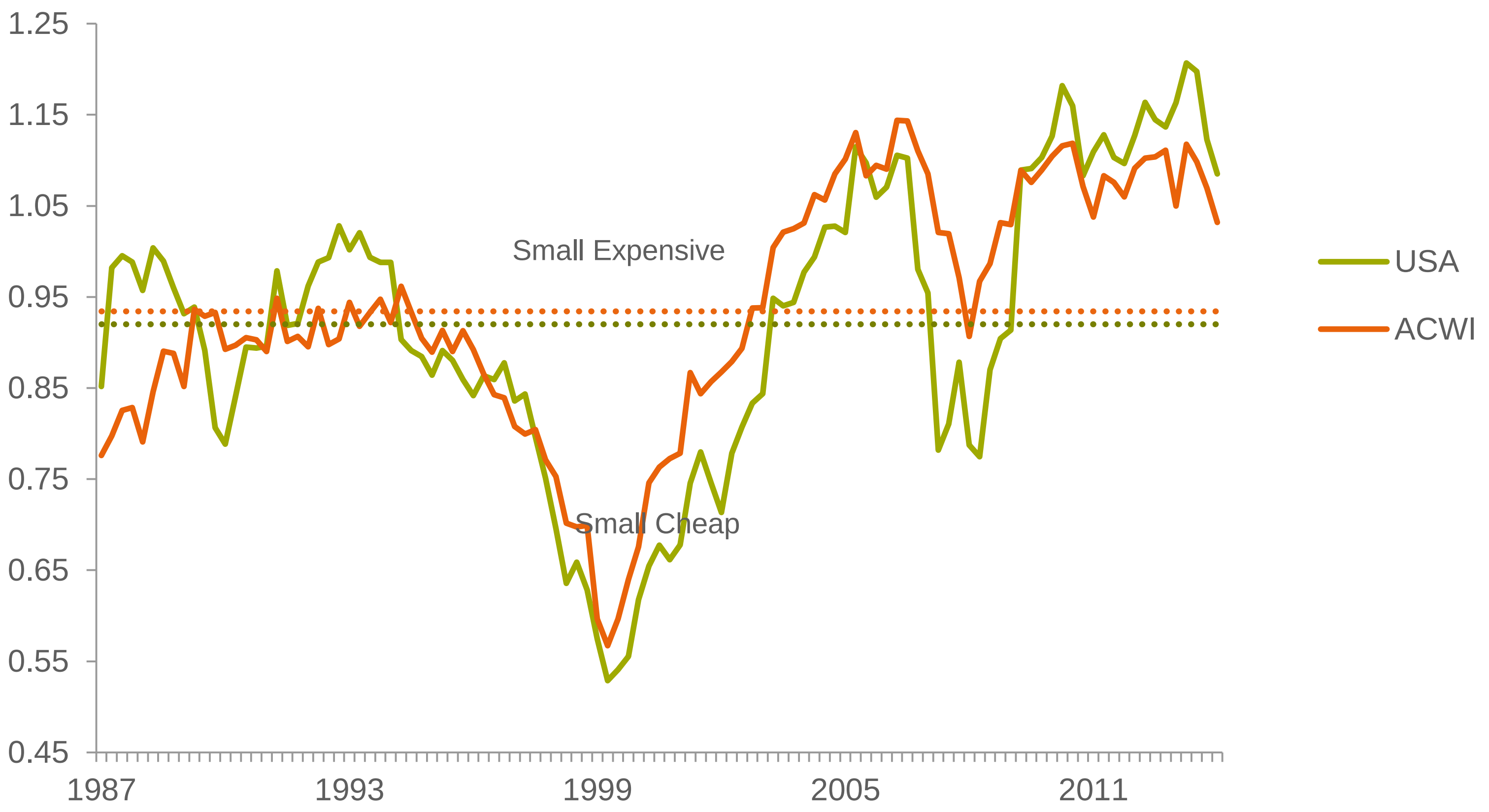
Size is expensive relative to history…
Relative Valuation Small vs. Market (1987-2014)



Source: Morningstar, Wordscope

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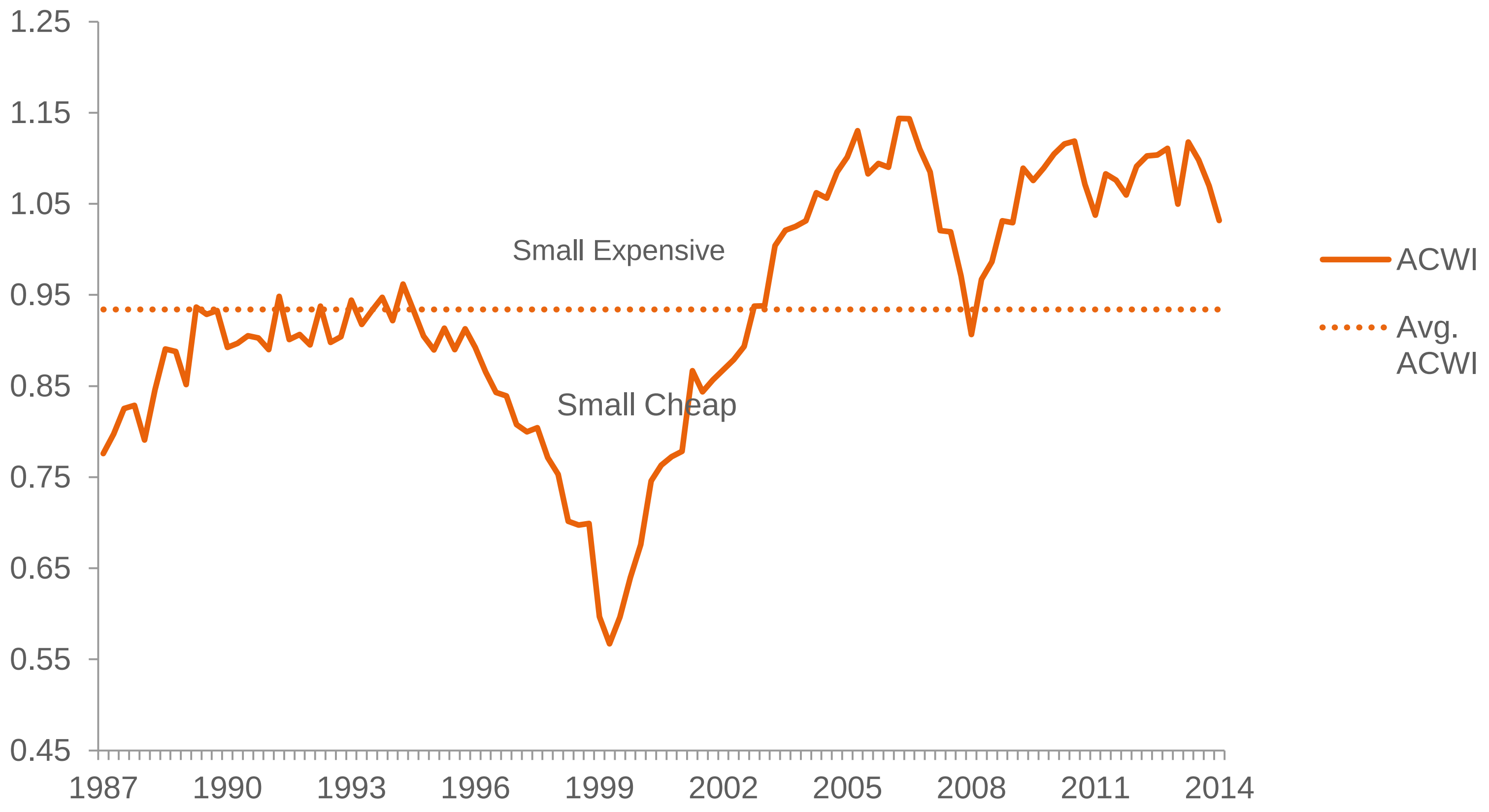
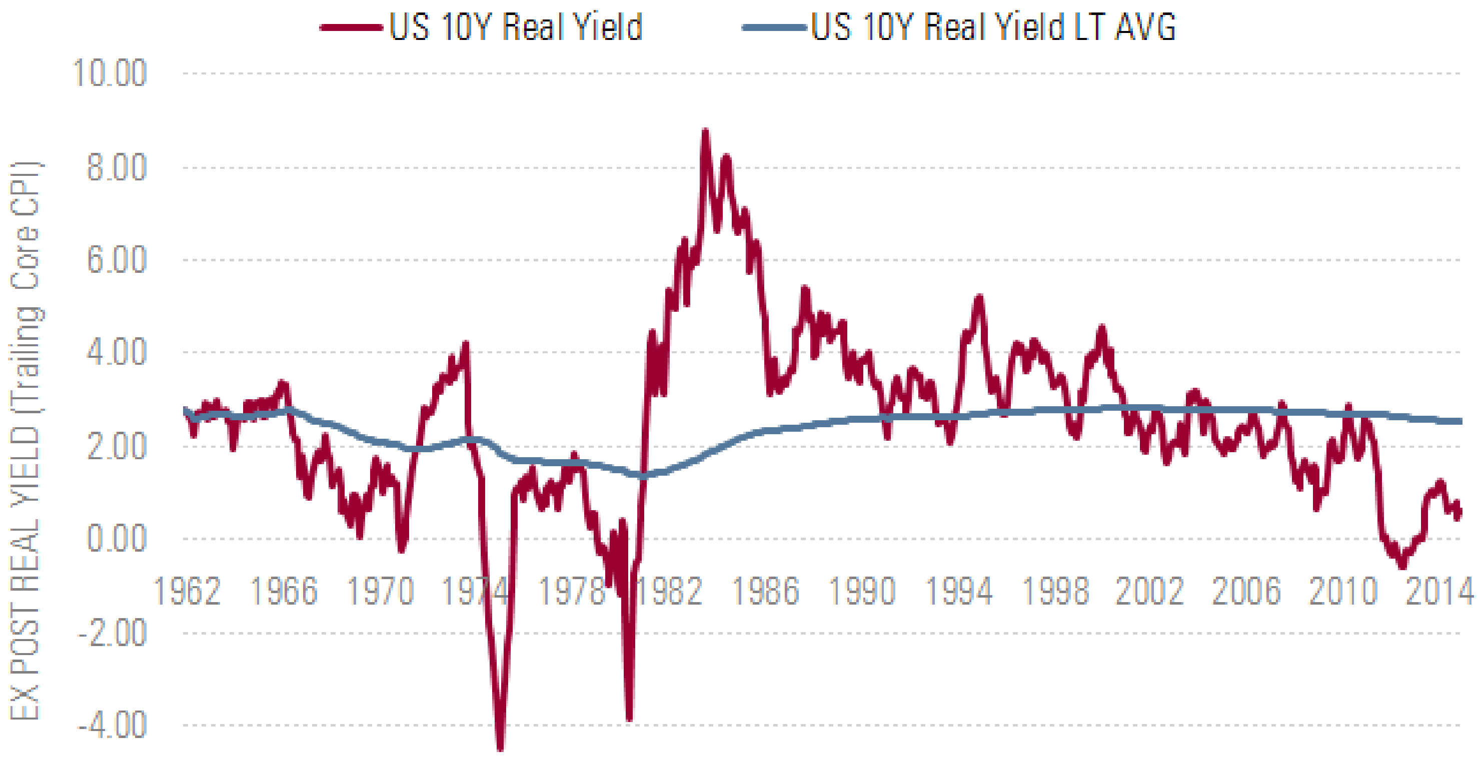
Size is expensive relative to history…
Relative Valuation Small vs. Market (1987-2014)



Source: Morningstar, Wordscope

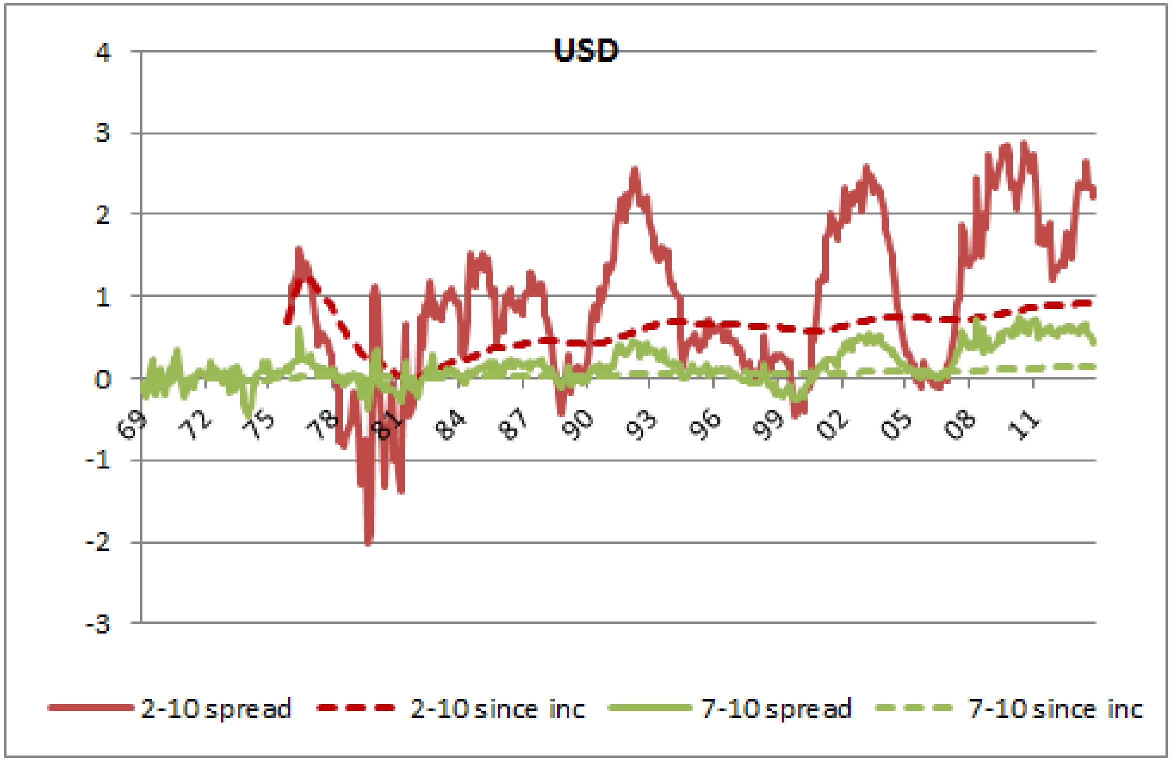
Real Yields
Long-Term Mean Reverting



Source: FRED, Morningstar

Term Spreads
Term Spreads are Mean Reverting

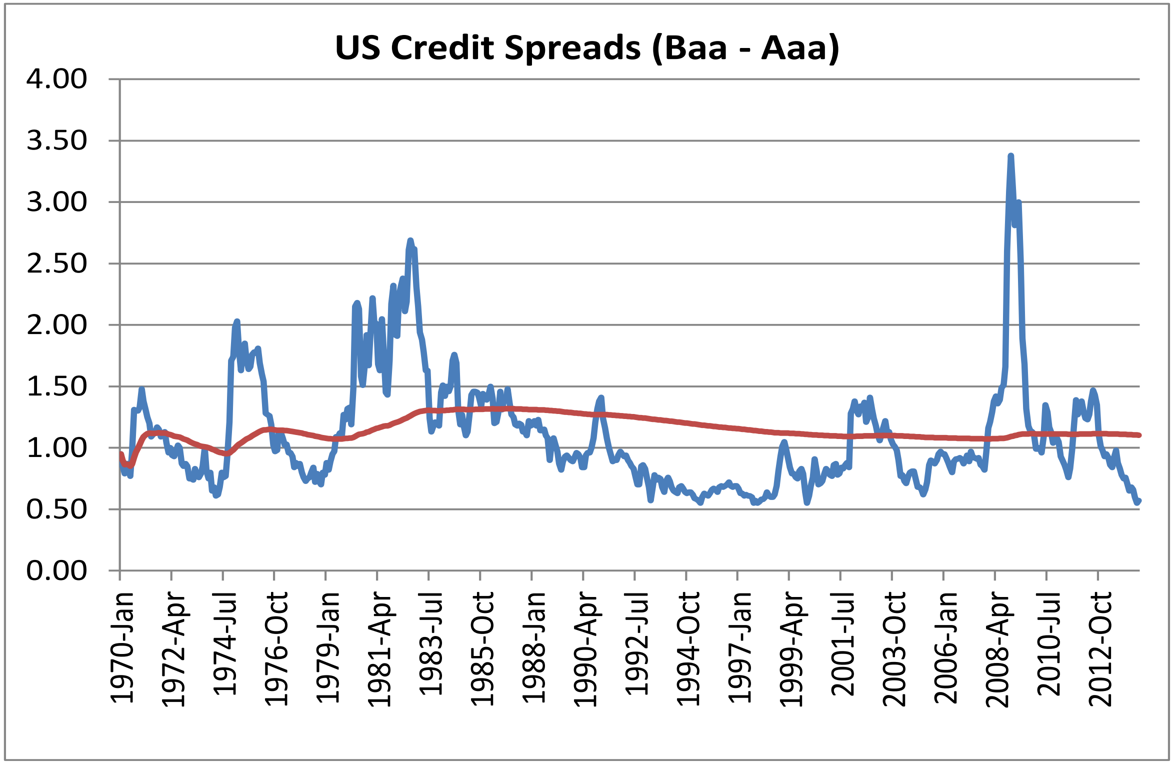
- Stationary tests significant for major countries and different points on the curve (2-10, 7-10)
- Given term spreads are stationary, long term averages should be a good proxy of equilibrium.



Source: FRED, Morningstar

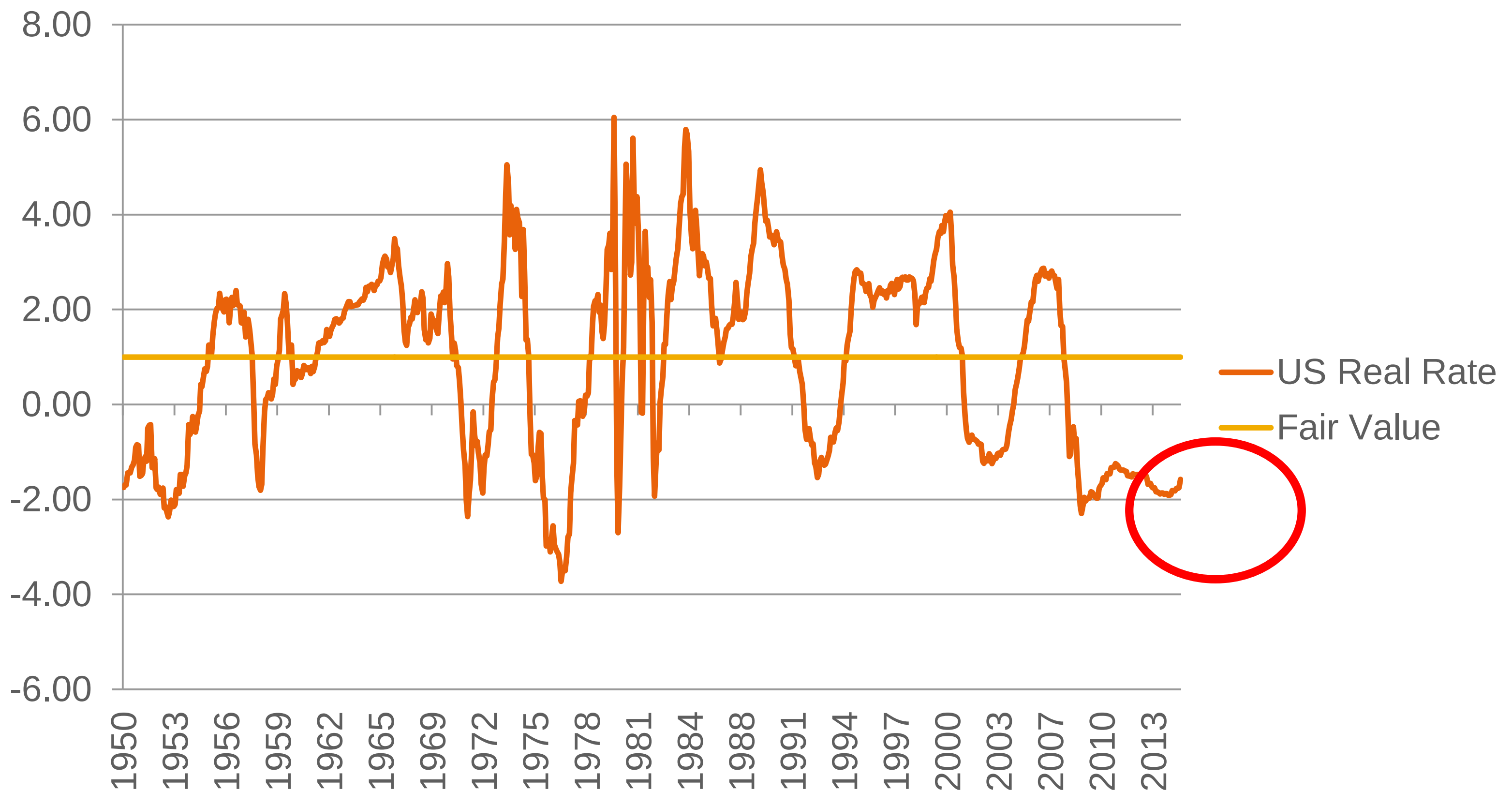
Credit Spreads
Credit Spreads are Mean Reverting

- Stationary tests significant for US Investment grade.
- Further tests to be done on High Yield and other regions.
- Given term spreads are stationary, long term averages should be a good proxy of equilibrium.



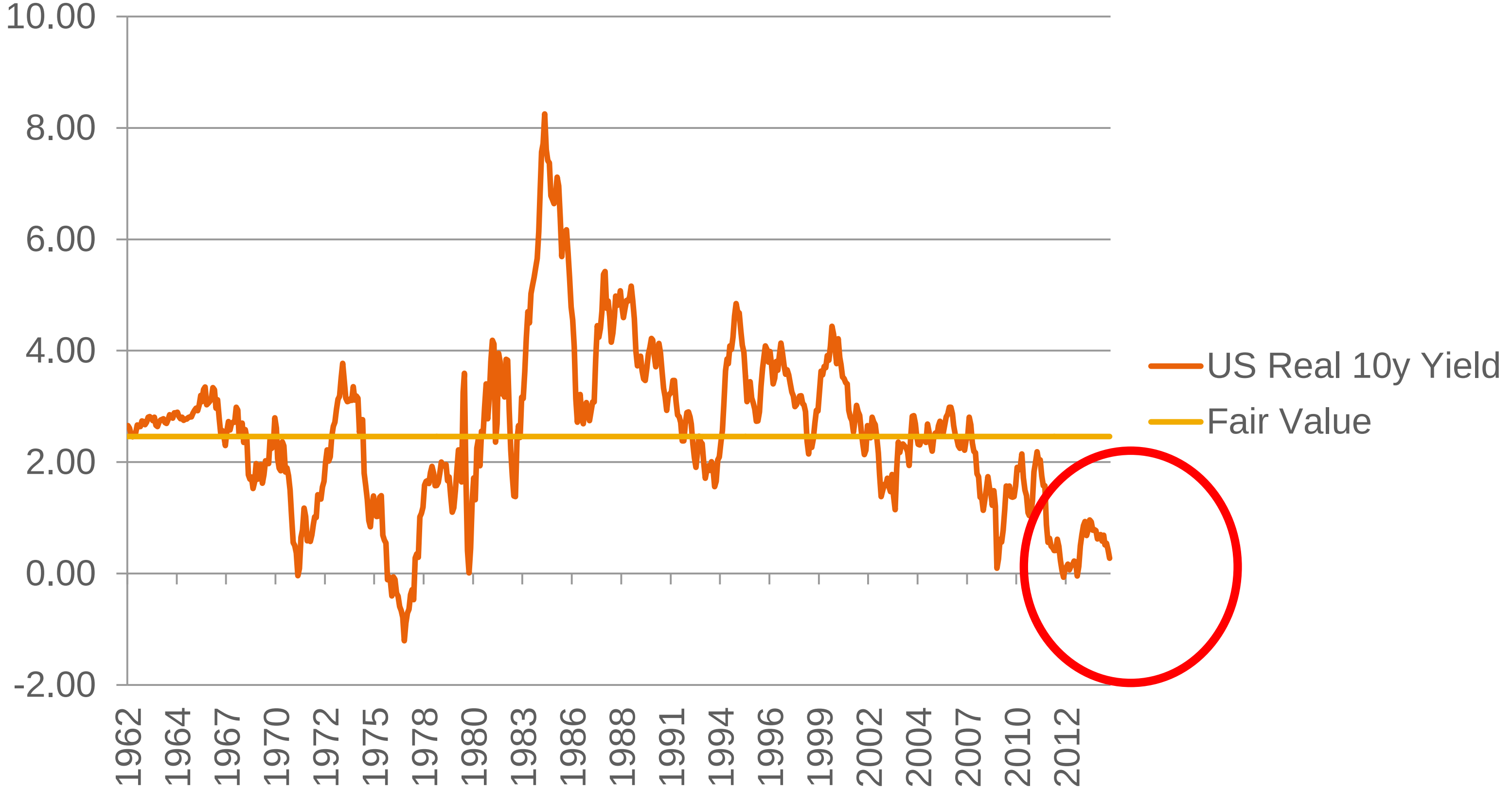
Source: FRED, Morningstar

Real Yields Are at Very Low Levels Compared to History
Ex Post Real 3-month Rate (1950-2014)



Source: Fred – using 3-year trailing core CPI

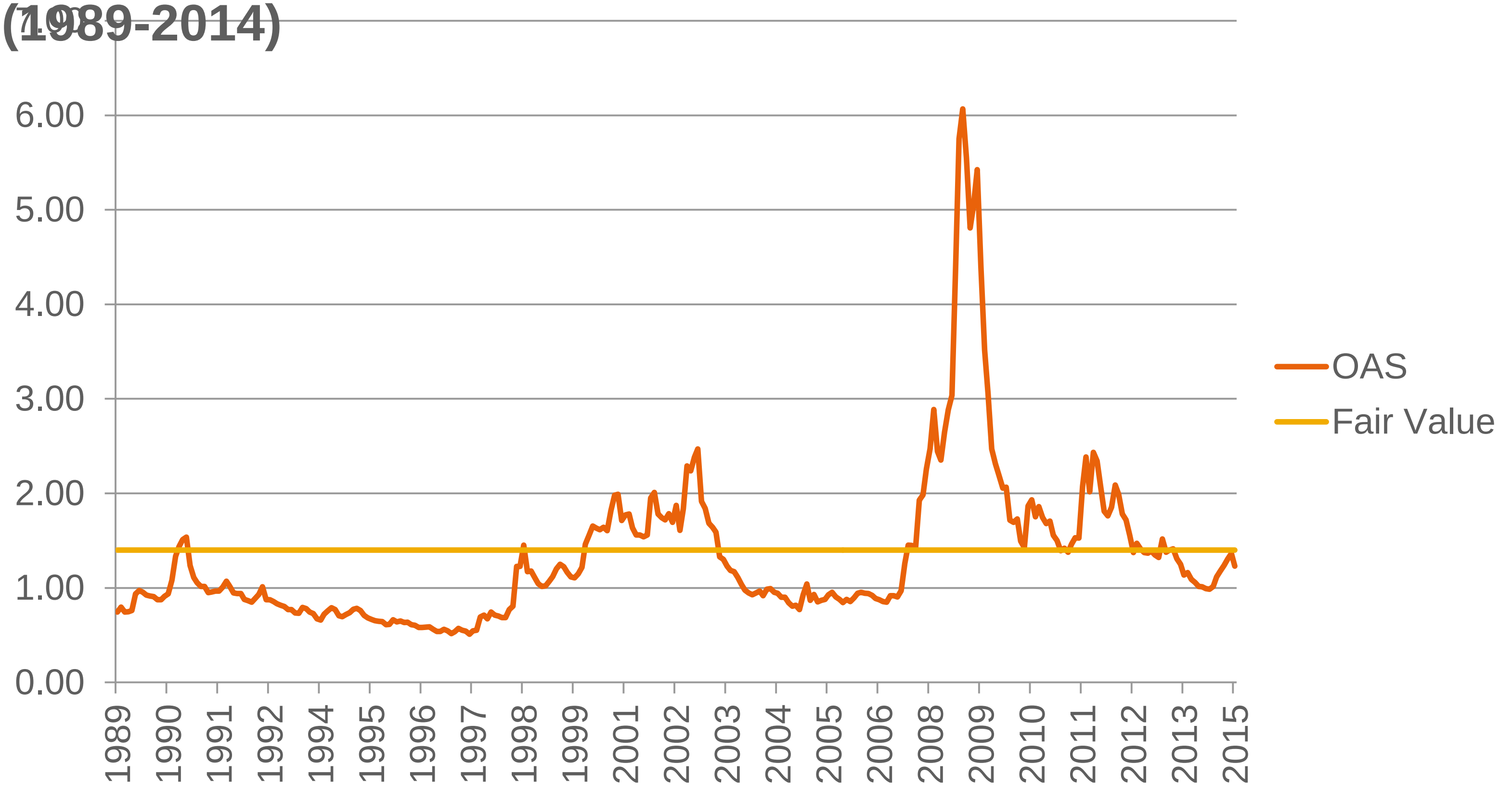
Real Yields Are at Very Low Levels Compared to History
Ex Post Real 10-year Yield (1962-2014)



Source: Fred – using 3-year trailing core CPI

Investment-Grade Spreads Went Close to Their Fair Value in the Recent Months

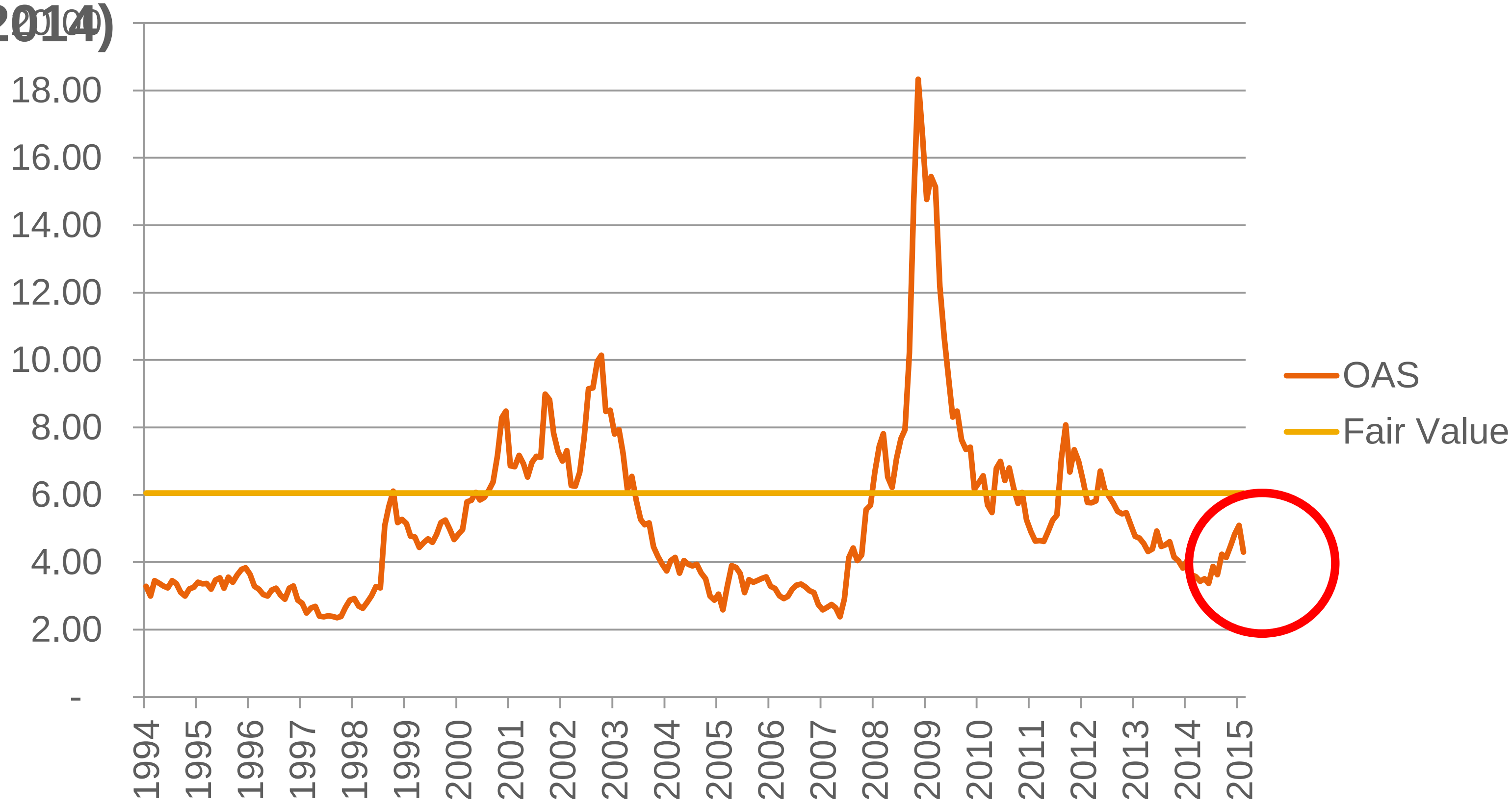
U.S. Corporate Investment Grade – Option-Adjusted Spread (1989-2014)



Source: Fred – using 3-year trailing core CPI

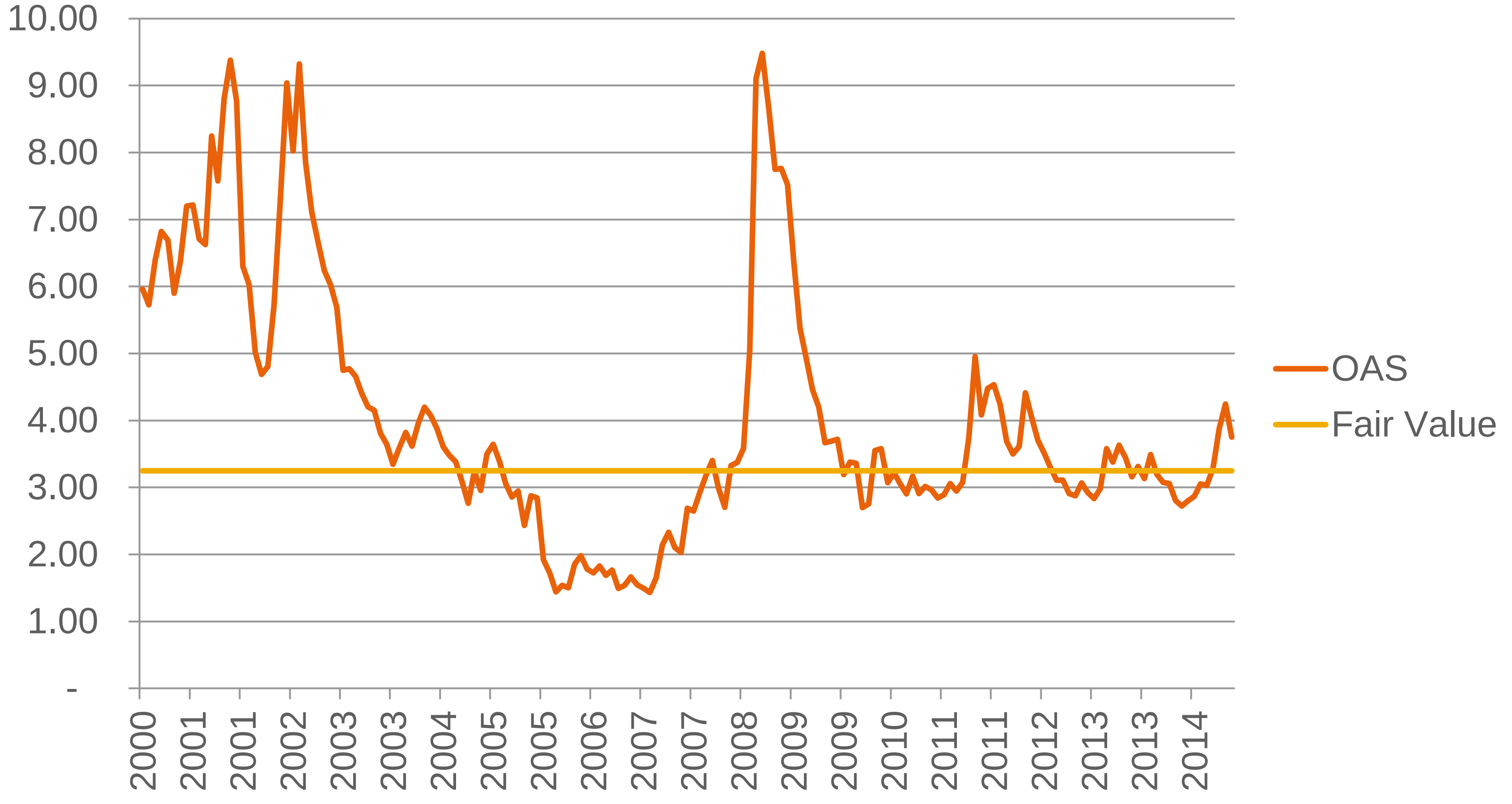
High Yield Spreads Remain Low Compared to Historical Levels

U.S. Corporate High Yield – Option-Adjusted Spread (1994-2014)



Source: Fred – using 3-year trailing core CPI

Emerging-Market Debt (Hard Currency) Spreads Look Attractive
EM USD Aggregate – Option-Adjusted Spread (2000-2014)



Source: Fred – using 3-year trailing core CPI

Disclosure

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