Wilshire

Numbers In Context 2Q16

Asset Class Performance

Wilshire

Annual Asset Class Returns - Best to Worst

2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	YTD 2016	Annualized 5-Year as of June 16'
REITs 36.0%	Emrg Mrkts 39.8%	Core Bond 5.2%	Emrg Mrkts 79.0%	MLPs 35.9%	MLPs 13.9%	Emrg Mrkts 18.06	U.S. Equity 33.1%	REITs 31.8%	REITs 4.2%	MLPs 14.7%	REITs 12.5%
Emrg Mrkts 32.6%	Commodities 16.2%	T-Bills 2.1%	MLPs 76.4%	REITs 28.6%	U.S. TIPS 13.6%	Developed 17.9%	MLPs 27.6%	U.S. Equity 12.7%	U.S. Equity 0.7%	Commodities 13.3%	U.S. Equity 11.6%
Developed 26.9%	MLPs 12.7%	U.S. TIPS -2.4%	High Yield 58.2%	Emrg Mrkts 19.2%	REITs 9.2%	REITs 17.6%	Developed 23.3%	Core Bond 6.0%	Core Bond 0.6%	REITs 11.1%	High Yield 5.8%
MLPs 26.1%	U.S. TIPS 11.6%	High Yield -26.2%	Developed 32.5%	U.S. Equity 17.2%	Core Bond 7.8%	U.S. Equity 16.1%	High Yield 7.4%	MLPs 4.8%	T-Bills 0.1%	High Yield 9.1%	Core Bond 3.8%
U.S. Equity 15.8%	Developed 11.6%	Commodities -35.7%	REITs 28.6%	Commodities 16.8%	High Yield 5.0%	High Yield 15.8%	REITs 1.9%	U.S. TIPS 3.6%	Developed -0.4%	Emrg Mrkts 6.6%	MLPs 3.2%
High Yield 11.9%	Core Bond 7.0%	MLPs -36.9%	U.S. Equity 28.3%	High Yield 15.1%	U.S. Equity 1.0%	U.S. TIPS 7.0%	T-Bills 0.1%	High Yield 2.5%	U.S. TIPS -1.4%	U.S. TIPS 6.2%	U.S. TIPS 2.6%
T-Bills 4.8%	U.S. Equity 5.6%	U.S. Equity -37.2%	Commodities 18.9%	Developed 8.2%	T-Bills 0.1%	MLPs 4.8%	Core Bond -2.0%	T-Bills 0.0%	High Yield -4.5%	Core Bond 5.3%	Developed 2.1%
Core Bond 4.3%	T-Bills 5.0%	REITs -39.2%	U.S. TIPS 11.4%	Core Bond 6.5%	Developed -11.7%	Core Bond 4.2%	Emrg Mrkts -2.3%	Emrg Mrkts -1.8%	Emrg Mrkts -14.6%	U.S. Equity 4.0%	T-Bills 0.1%
Commodities 2.1%	High Yield 1.9%	Developed -43.1%	Core Bond 5.9%	U.S. TIPS 6.3%	Commodities -13.3%	T-Bills 0.1%	U.S. TIPS -8.6%	Developed -4.5%	Commodities -24.7%	T-Bills 0.1%	Emrg Mrkts -3.4%
U.S. TIPS 0.4%	REITs -17.6%	Emrg Mrkts -53.2%	T-Bills 0.2%	T-Bills 0.1%	Emrg Mrkts -18.2%	Commodities -1.0%	Commodities -9.5%	Commodities -17.0%	MLPs -32.6%	Developed -4.0%	Commodities -10.8%

Data sources: Wilshire Compass

Note: Developed asset class is developed markets ex-U.S., ex-Canada.

June 2016 Asset Class Assumptions

Wilshire

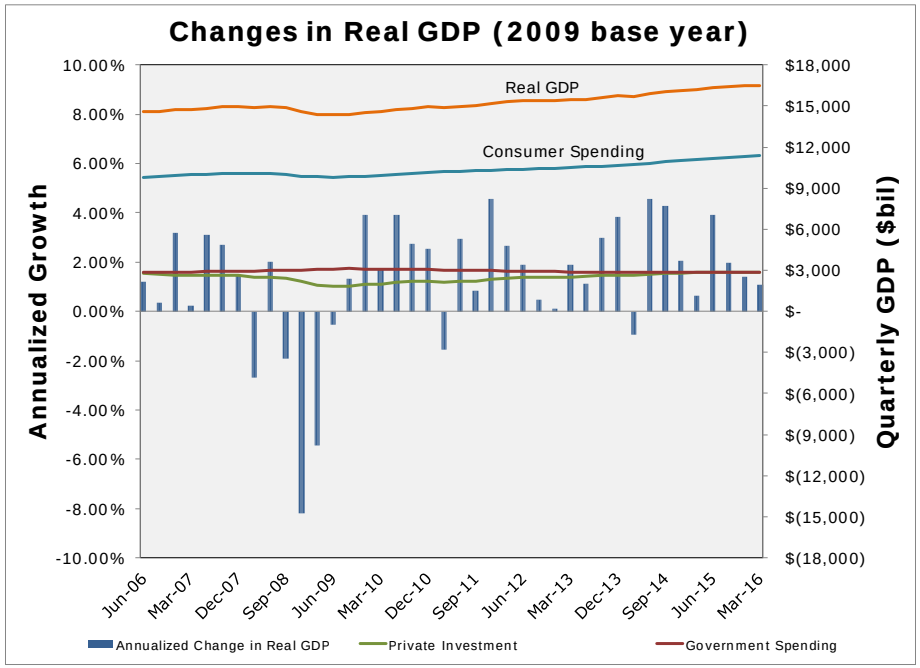
	Total Return (%)			Risk (%)
	Dec. 2015	Q2 2016	Change vs YE	Dec. 2015
Investment Categories:				
U.S. Stocks	6.50	6.25	(0.25)	17.00
Dev ex-U.S. Stocks	6.50	6.25	(0.25)	18.00
Emerging Mkt Stocks	6.50	6.25	(0.25)	26.00
Global Stocks	6.70	6.45	(0.25)	17.10
Private Markets	9.50	8.95	(0.55)	27.50
Cash Equivalents	1.25	1.15	(0.10)	1.25
Core Bonds	3.50	2.75	(0.75)	5.00
LT Core Bonds	4.30	3.15	(1.15)	10.00
TIPS	3.25	2.35	(0.90)	6.00
High Yield Bonds	6.35	5.65	(0.70)	10.00
EMD Local Currency (h)	5.60	4.70	(0.90)	5.00
U.S. RE Securities	5.00	4.70	(0.30)	17.00
Private Real Estate	5.80	5.85	0.05	14.00
Commodities	3.55	3.45	(0.10)	15.00
MLPs	9.65	8.35	(1.30)	17.00
Real Asset Basket	6.40	5.85	(0.55)	8.40
Inflation:	1.55	1.45	(0.10)	1.75
Returns minus Inflation:				
U.S. Stocks	4.95	4.80	(0.15)	
U.S. Bonds	1.95	1.30	(0.65)	
Cash Equivalents	(0.30)	(0.30)	-	
Stocks minus Bonds:	3.00	3.50	0.50	
Bonds minus Cash:	2.25	1.60	(0.65)	

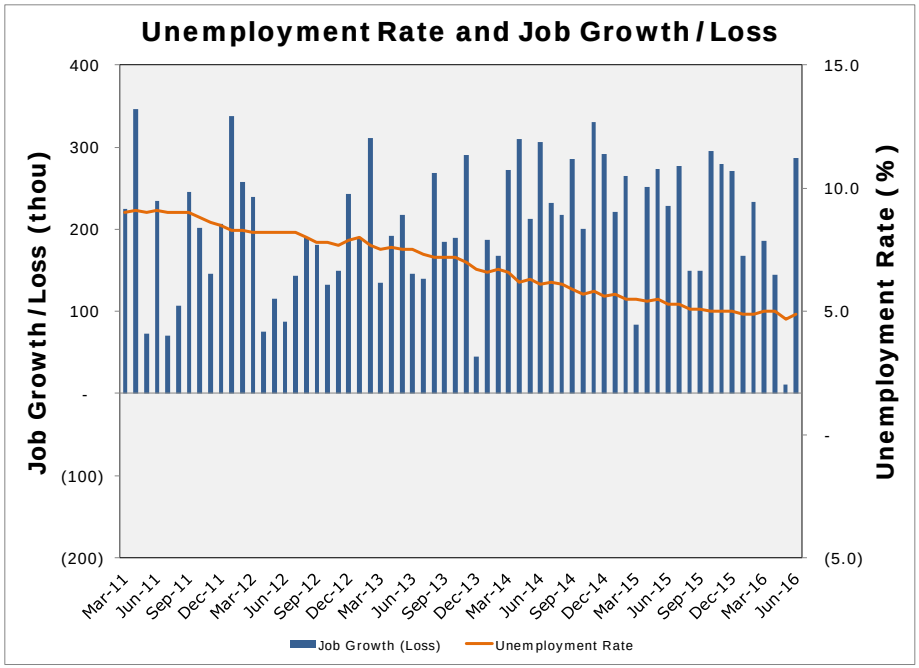
Economic Review

Wilshire

June 30, 2016	Key Economic Indicators			
CPI (all items)	Monthly Change		Cumulative Change	
Seasonally adjusted	Jun-16	0.2	3-Month	0.8
	May-16	0.2	12-Month	1.1
	Apr-16	0.4	10-Yr Annual	1.7
Breakeven Inflation	10-Year	1.5		
Consumer Sentiment	Jun-16	93.5		
Unv. of Michigan Survey	May-16	94.7		
	1-Yr Ago	96.1	10-Yr Avg	77.8
Manufacturing	Jun-16	53.2	Change in Manufacturing Sector	
Inst. for Supply Mgmt	May-16	51.3	>50	Expansion
Purchasing Mngrs' Idx	1-Yr Avg	50.3	<50	Contraction

Note: Seasonally adjusted CPI data is utilized to better reflect short-term pricing activity.

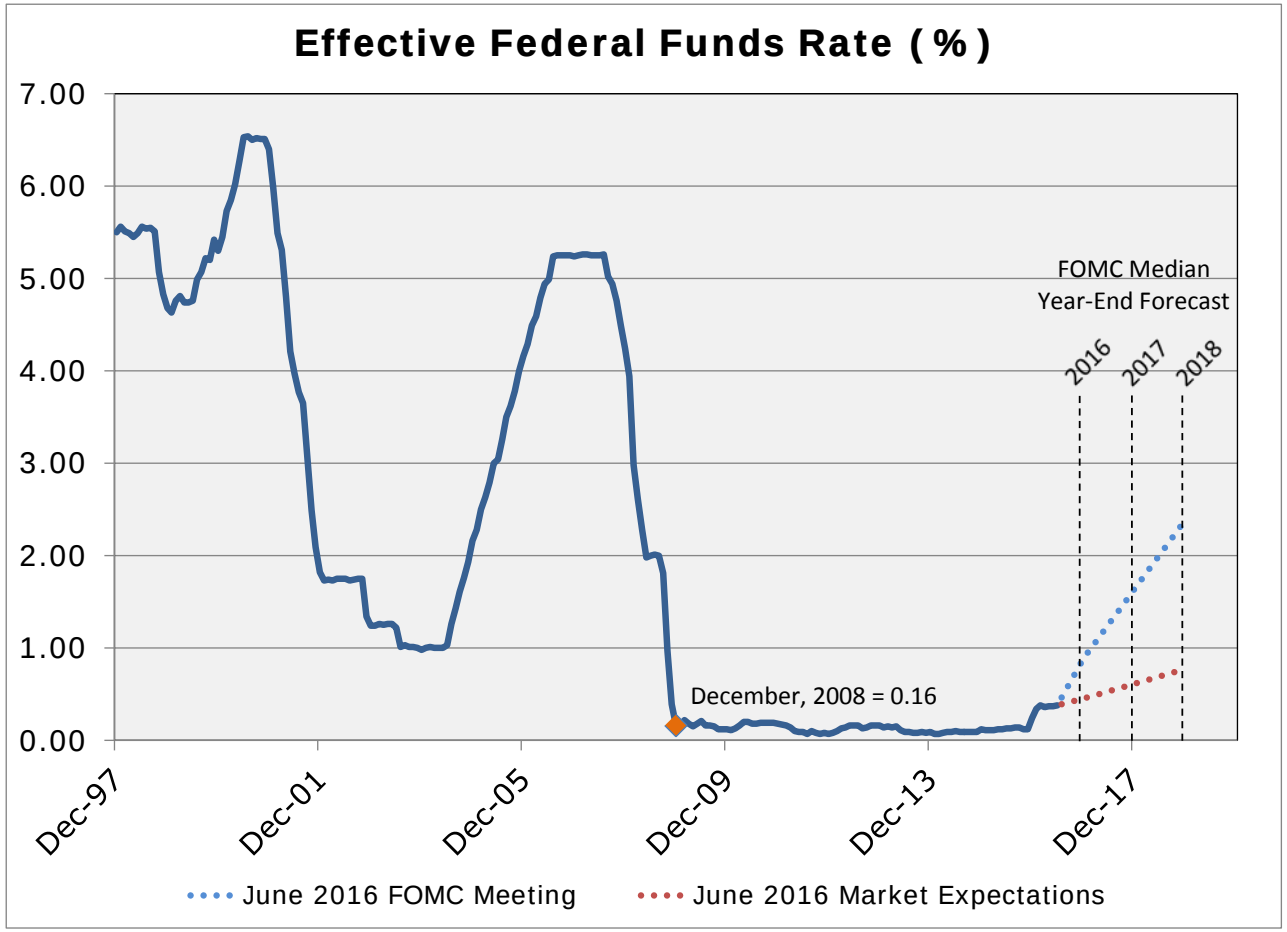




Data sources: Bureau of Economic Analysis, Bureau of Labor Statistics, Federal Reserve Bank of St. Louis, Barclays Capital

Federal Reserve

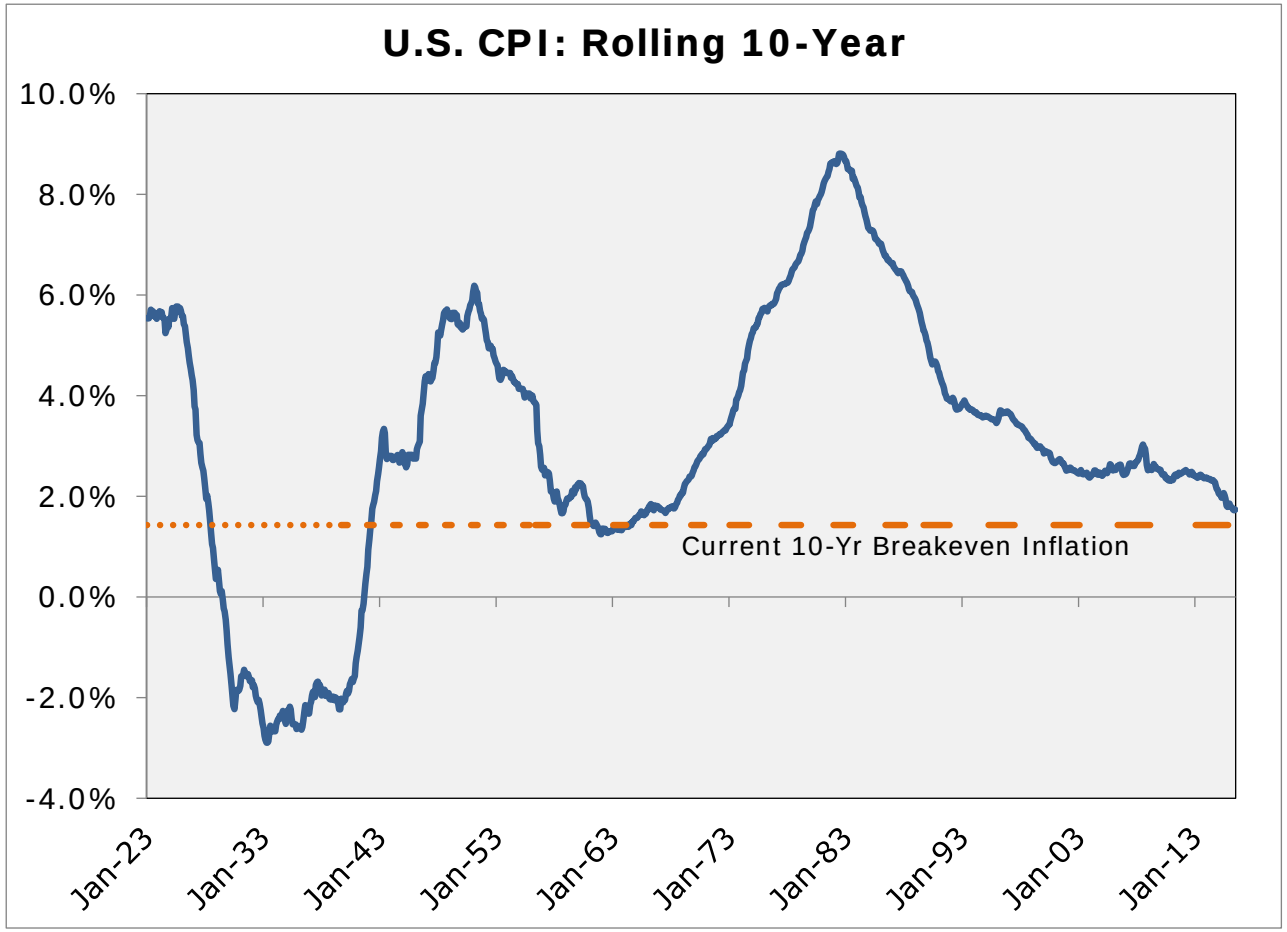
- Median forecast by Open Market Committee equals 0.88% for year-end 2016, which implies two 0.25% increases during second half of 2016
- Market forecast based on futures pricing is only 10 basis points higher than current



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

Inflation

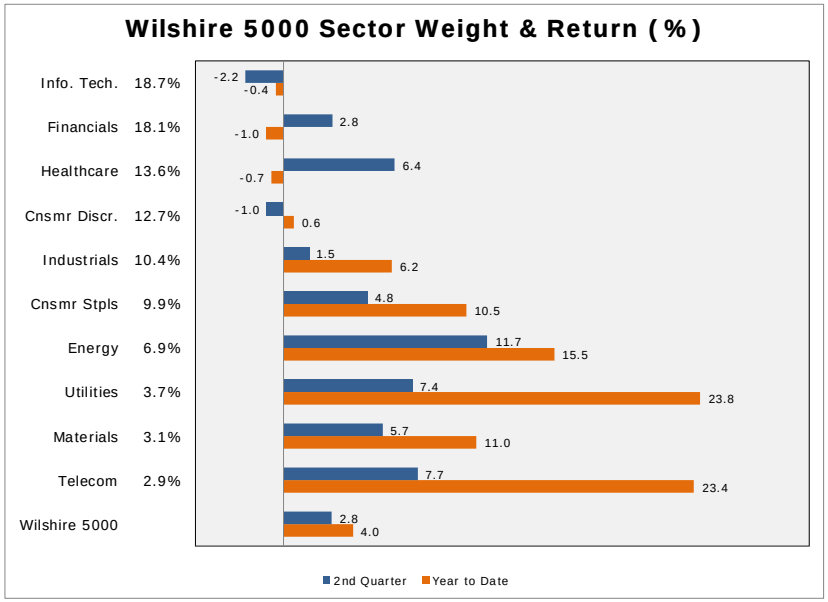
- CPI moved higher during Q2, although the 1-year gain is still modest
- Inflation expectation close to lowest actual reading since Great Depression
- Expectation also lower than most recent 10-year of 1.7%

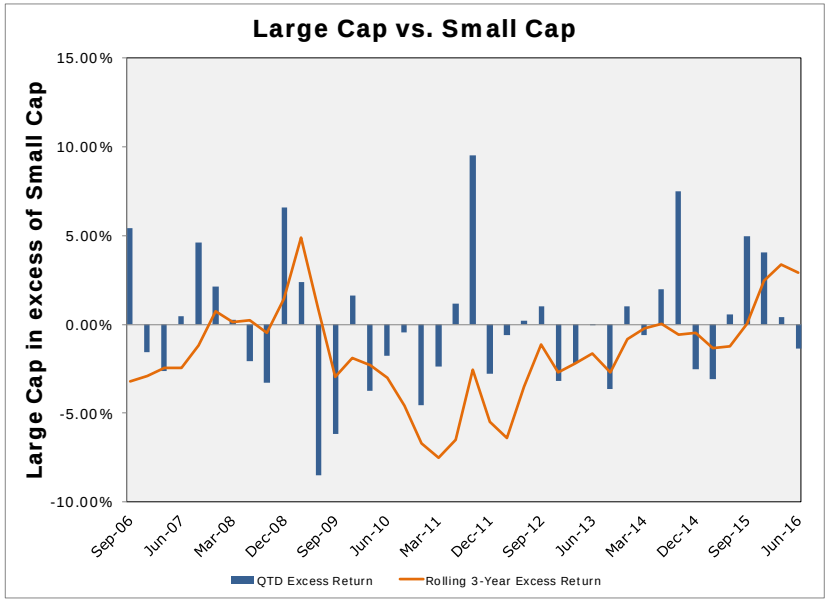


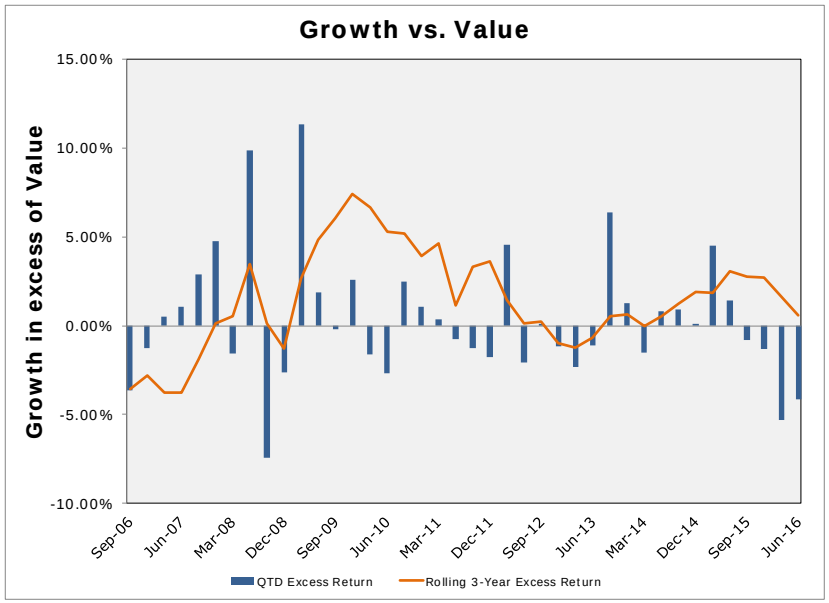
Source: Bureau of Labor Statsitics

U.S. Equity Market

June 30, 2016	Qtr	Ytd	1 Yr	3 Yr	5 Yr	10 Yr
Wilshire 5000	2.8	4.0	3.0	11.3	11.6	7.5
Wilshire U.S. Large Cap	2.7	3.9	3.8	11.6	11.9	7.5
Wilshire U.S. Small Cap	4.1	5.0	-4.0	8.4	9.7	7.9
Wilshire U.S. Large Growth	0.4	-1.3	-2.2	12.3	11.6	8.1
Wilshire U.S. Large Value	4.8	8.6	9.4	11.0	12.1	6.7
Wilshire U.S. Small Growth	2.2	-0.6	-11.9	6.3	8.1	7.7
Wilshire U.S. Small Value	6.0	10.4	4.0	10.5	11.1	8.0
Wilshire REIT Index	5.6	11.1	22.8	13.6	12.5	7.0
MSCI USA Minimum Volatility Index	5.6	11.4	16.5	14.2	13.9	8.7
FTSE RAFI U.S. 1000 Index	3.3	5.3	2.5	10.4	11.7	8.2





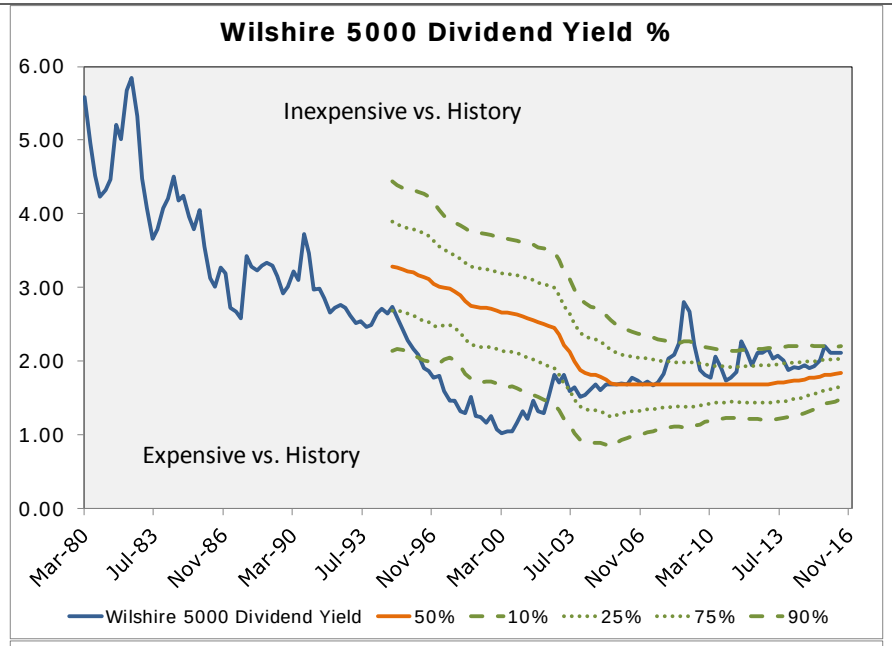


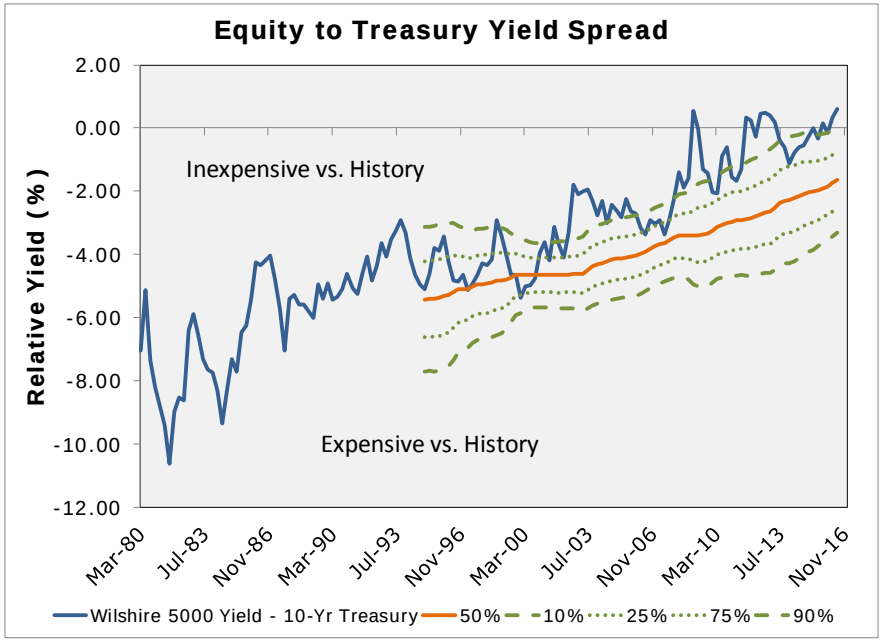
Data sources: Wilshire Compass, Wilshire Atlas

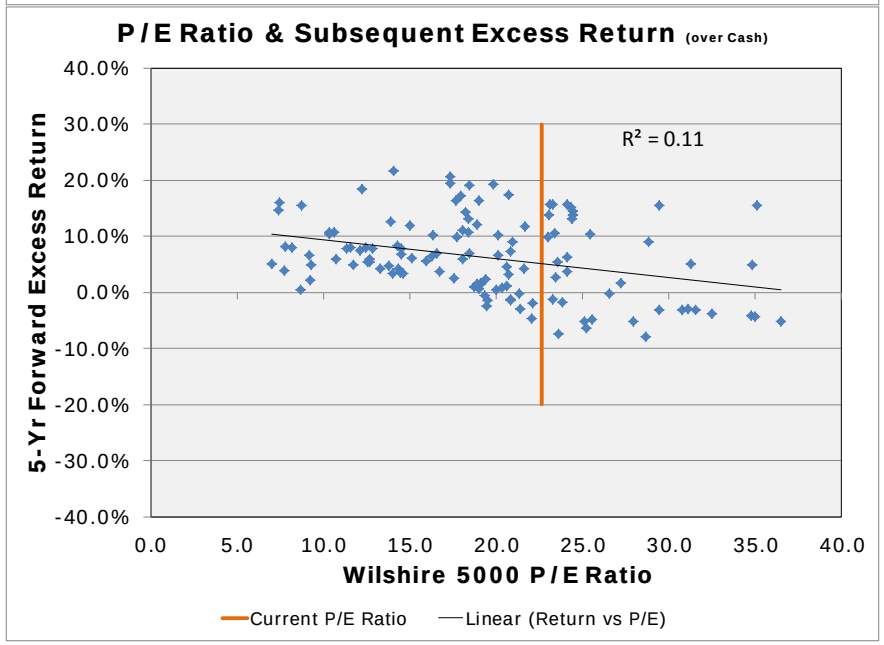
U.S. Equity Valuations

Wilshire

- Distribution of historical dividend yield is tight; current observation at the 83%-percentile outcome
- Spread (discount) between the dividend yield and Treasuries has decreased as yields have fallen through the years





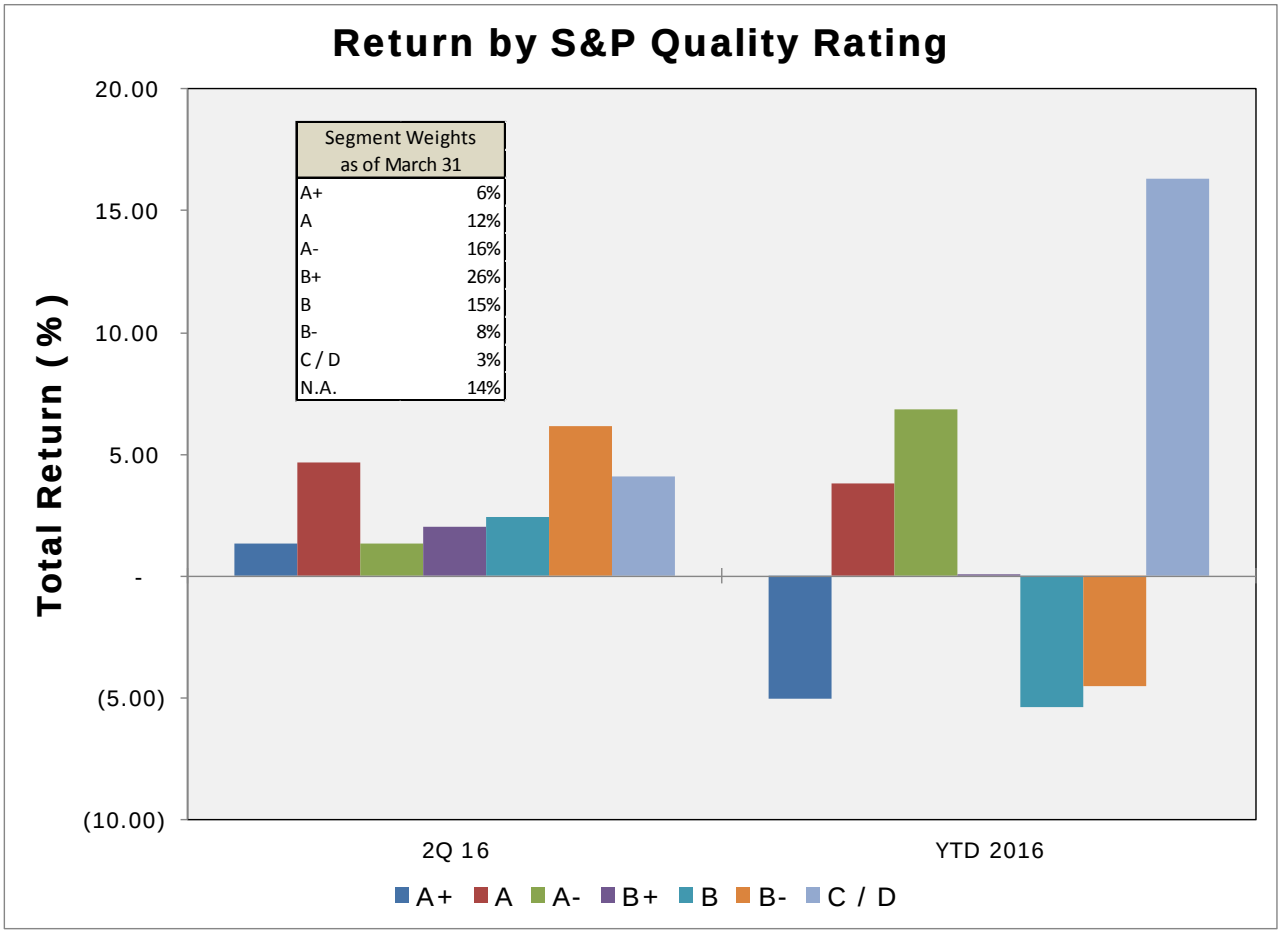


Source: Wilshire Compass, Wilshire Atlas, Barclays Capital

Returns by Quality Segment

Wilshire

Lower quality names outperformed during Q2 (the A segment excluded) while results are mixed for the year

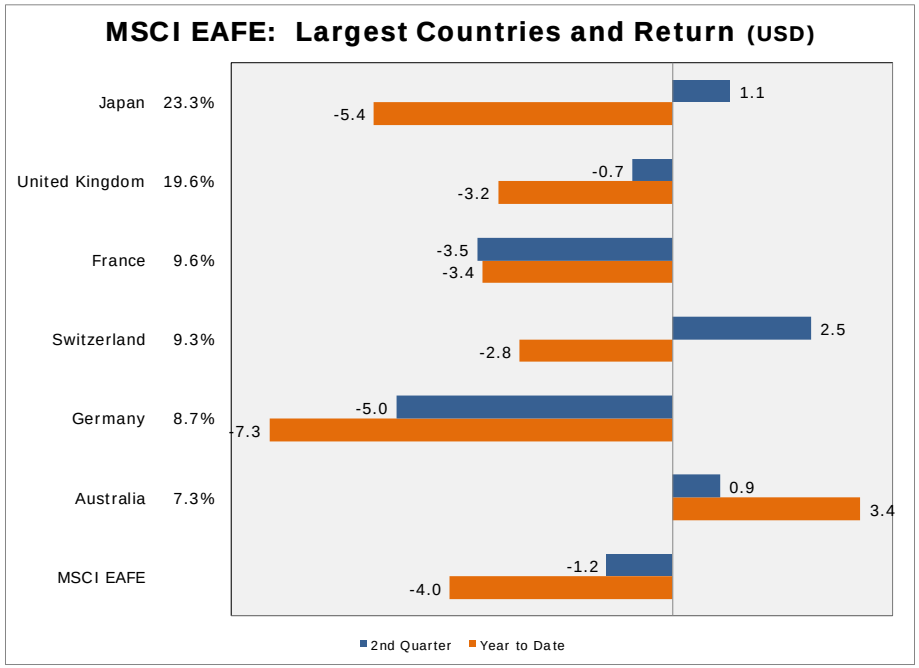


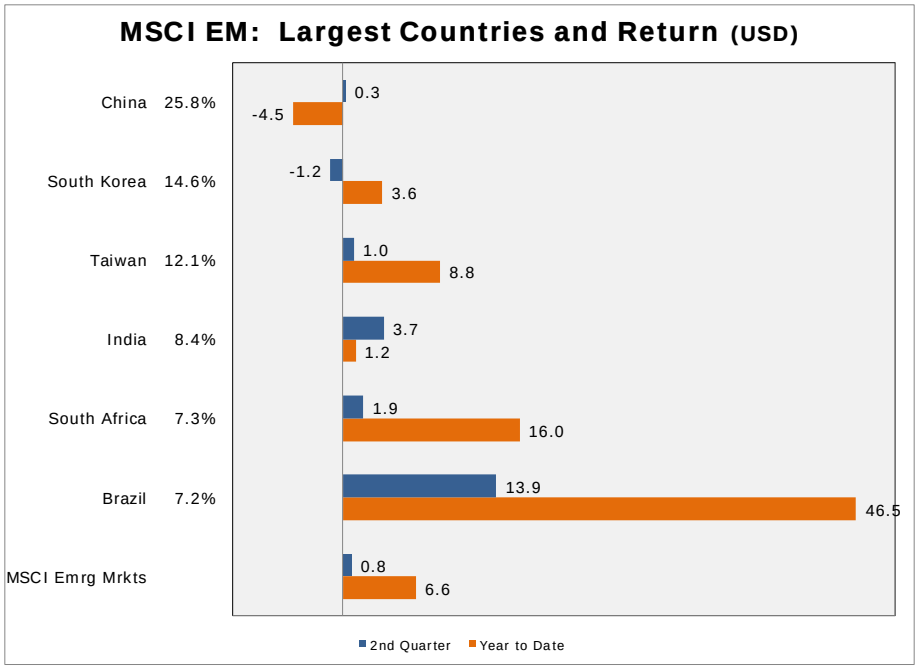
Segment Weights as of March 31	
A+	6%
A	12%
A-	16%
B+	26%
B	15%
B-	8%
C / D	3%
N.A.	14%

Data sources: Wilshire Atlas

Non-U.S. Equity Market

June 30, 2016	Qtr	Ytd	1 Yr	3 Yr	5 Yr	10 Yr
MSCI ACWI ex-US ($g)	-0.4	-0.7	-9.8	1.6	0.6	2.3
MSCI EAFE ($g)	-1.2	-4.0	-9.7	2.5	2.1	2.1
MSCI Emerging Markets ($g)	0.8	6.6	-11.7	-1.2	-3.4	3.9
MSCI Frontier Markets ($g)	0.6	-0.1	-11.7	1.4	1.8	0.8
MSCI ACWI ex-US Growth ($g)	0.6	0.4	-5.9	3.5	1.9	3.2
MSCI ACWI ex-US Value ($g)	-1.5	-1.7	-13.7	-0.3	-0.8	1.4
MSCI ACWI ex-US Small ($g)	-0.7	0.0	-5.1	5.3	2.7	4.5
MSCI EAFE Minimum Volatility Idx	1.0	3.1	4.3	8.7	7.6	6.4
FTSE RAFI Developed ex-US Index	-1.6	-4.0	-12.5	1.7	0.4	2.3
MSCI EAFE LC (g)	-0.5	-6.8	-9.7	6.3	6.7	2.6
MSCI Emerging Markets LC (g)	0.8	3.6	-7.3	4.1	2.4	6.1



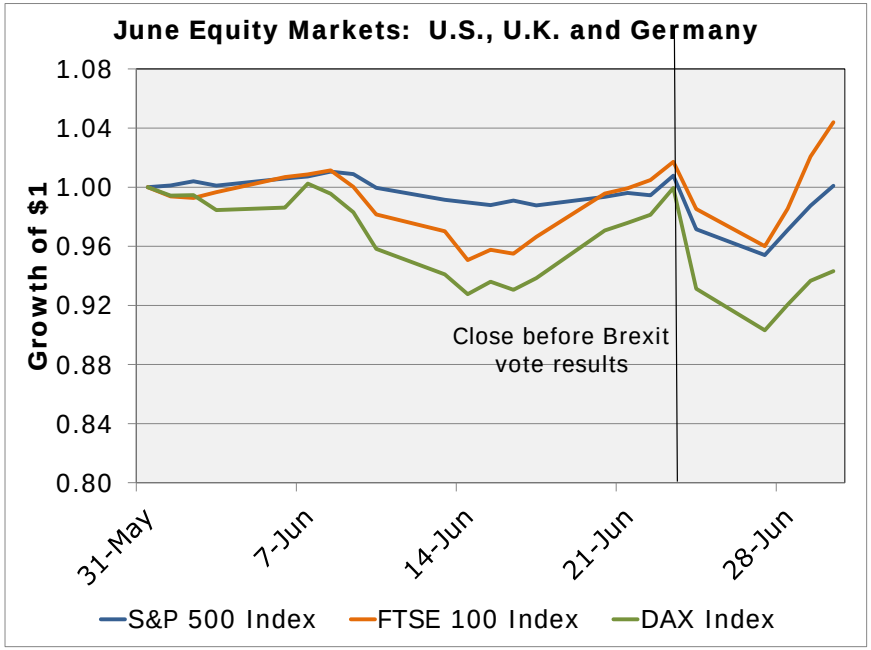


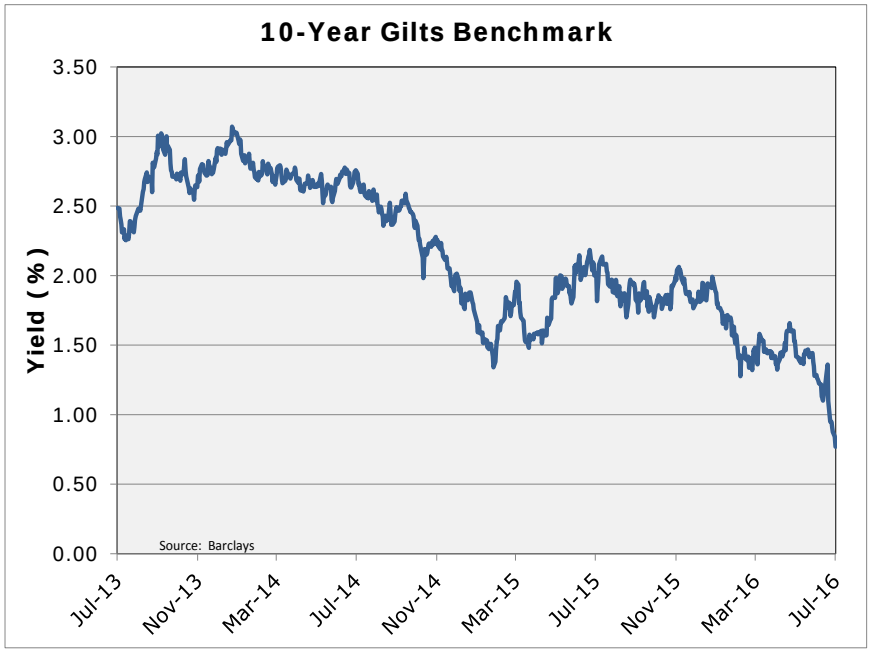
Data sources: Wilshire Compass

Market Reaction to Brexit

Wilshire

- Pound sterling is down -12% from the pre-vote high versus the U.S. dollar (as of July 4th)
- Equity prices dropped in reaction to the announcement but then recovered in the U.K. and U.S.
  - S&P 500 Index -0.7%
  - FTSE 100 Index +2.6%
  - DAX Index -5.6%
- Gilt yields remain depressed
- Flight to quality pushed Treasury yields lower, as well

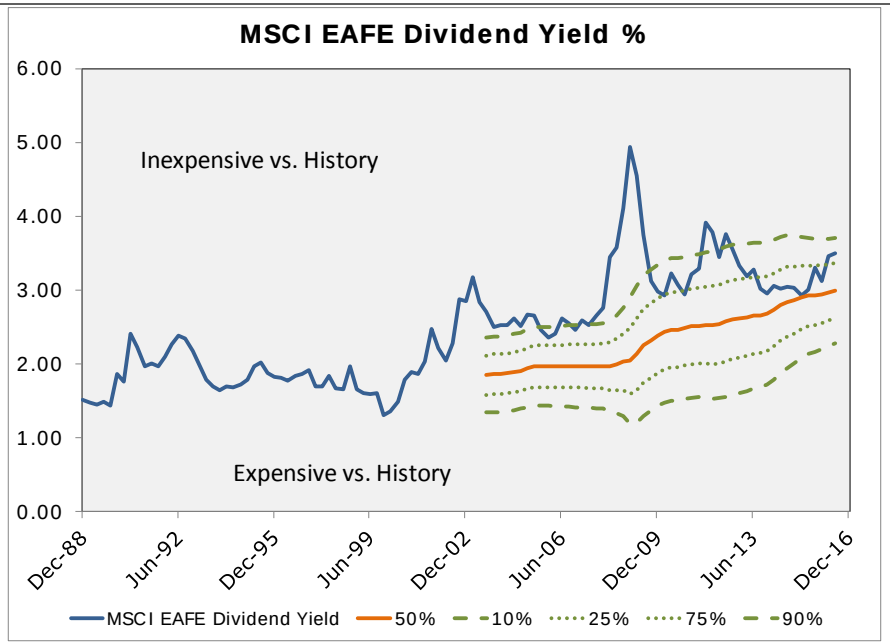


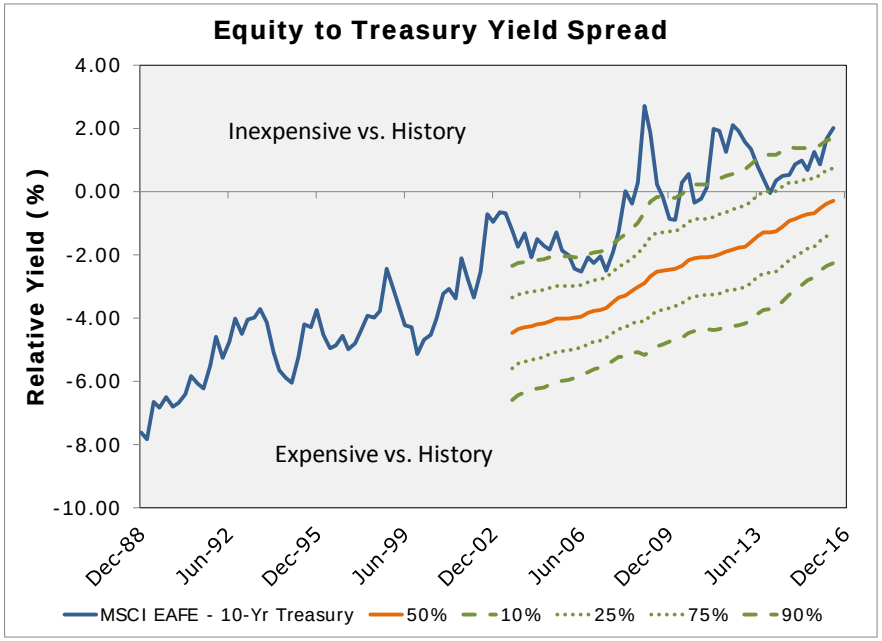


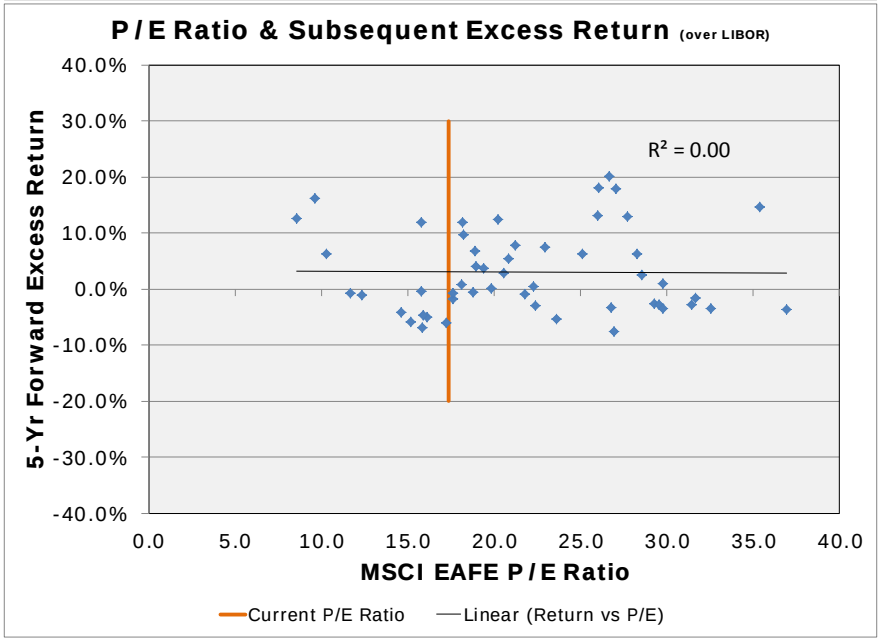
Developed Market Equity Valuations

Wilshire

- Dividend yield is above the 15-year median; at the 82%-percentile outcome
- Spread between Developed Equity and the 10-Year Treasury has been narrowing





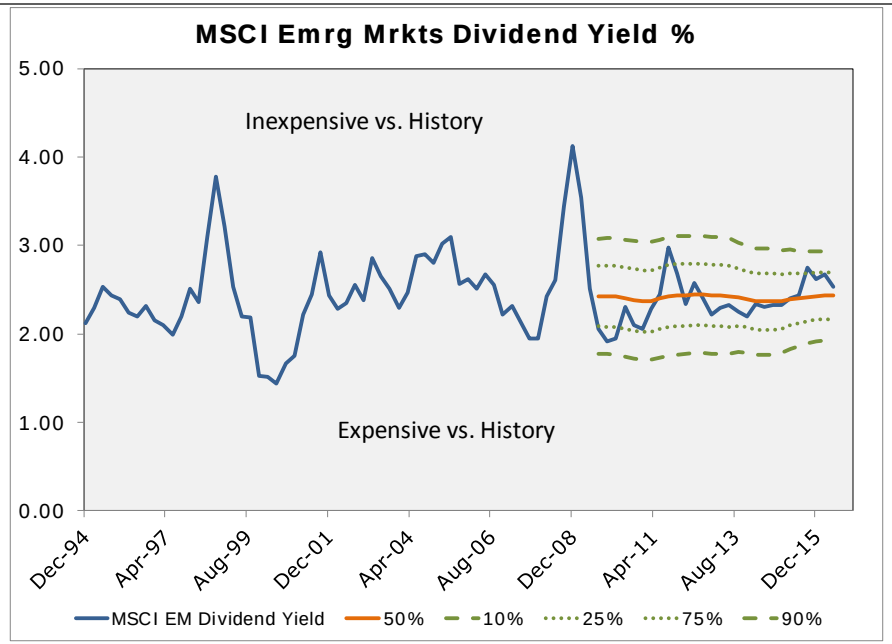


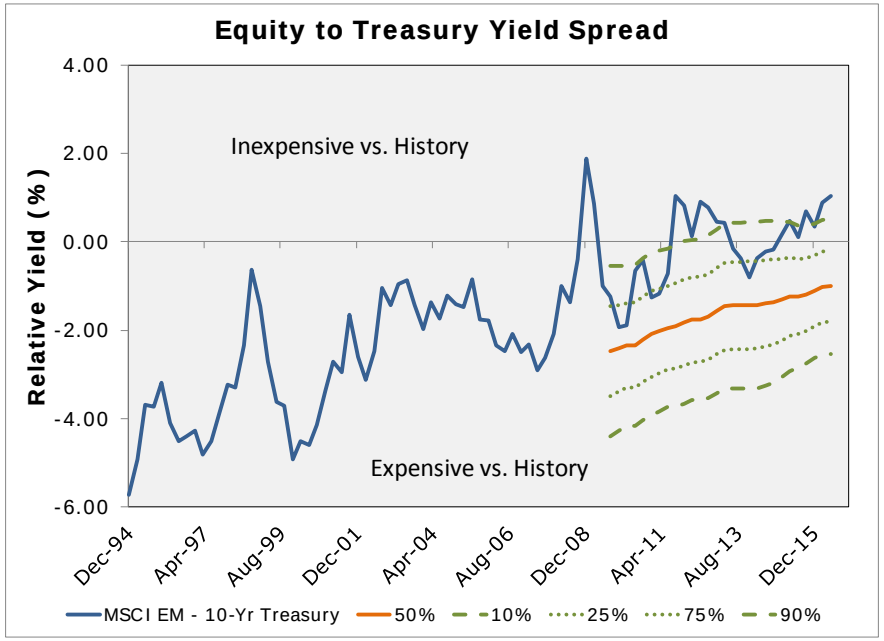
Source: Wilshire Compass, Wilshire Atlas, Barclays Capital

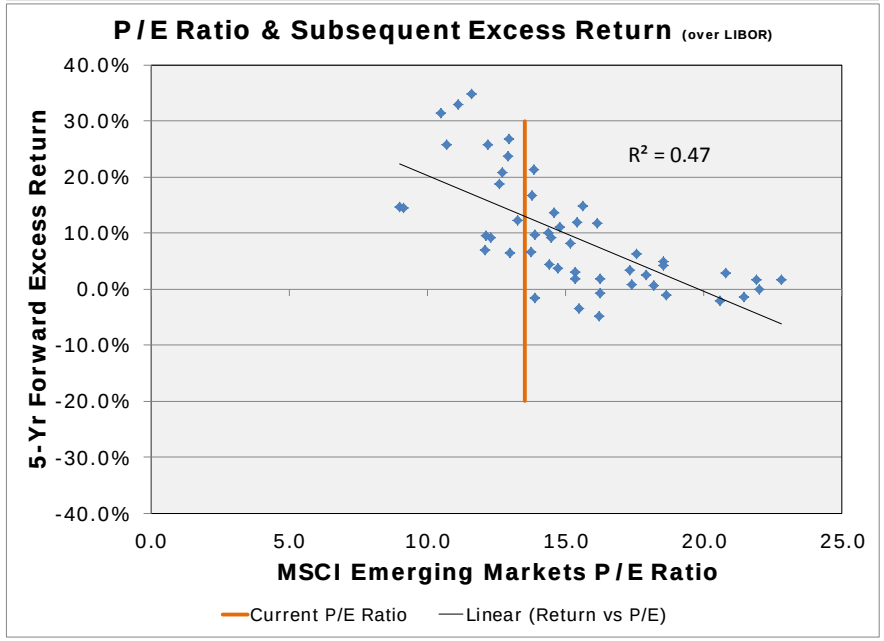
Emerging Market Equity Valuations

Wilshire

- Current dividend yield above its 15-year median; at the 60%-percentile outcome
- Spread between Emerging Market Equity and the 10-Year Treasury has been narrowing



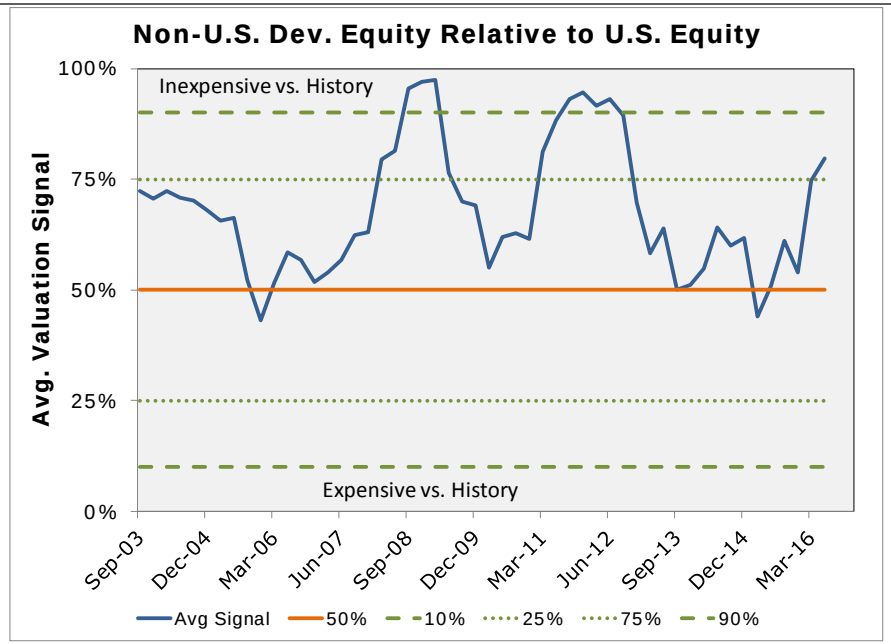


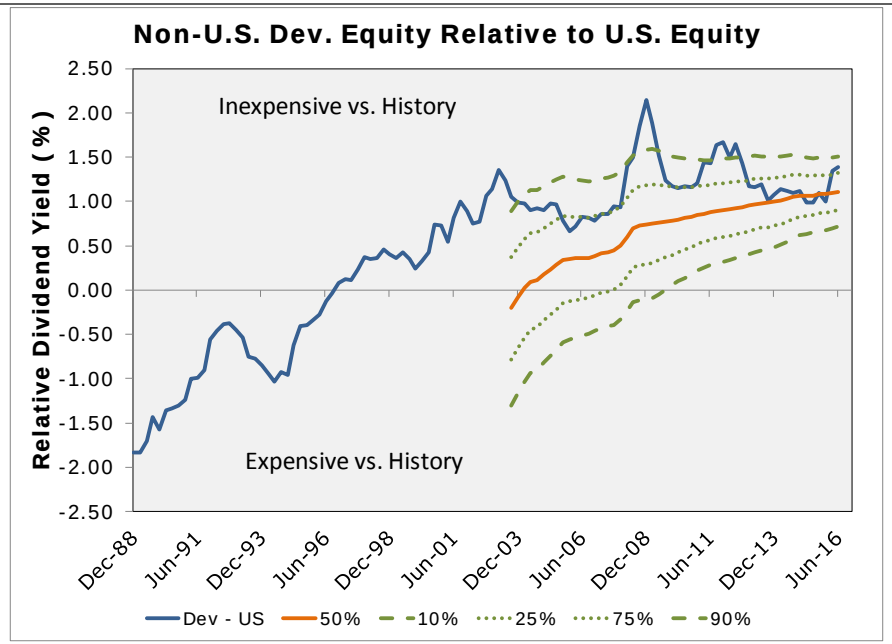


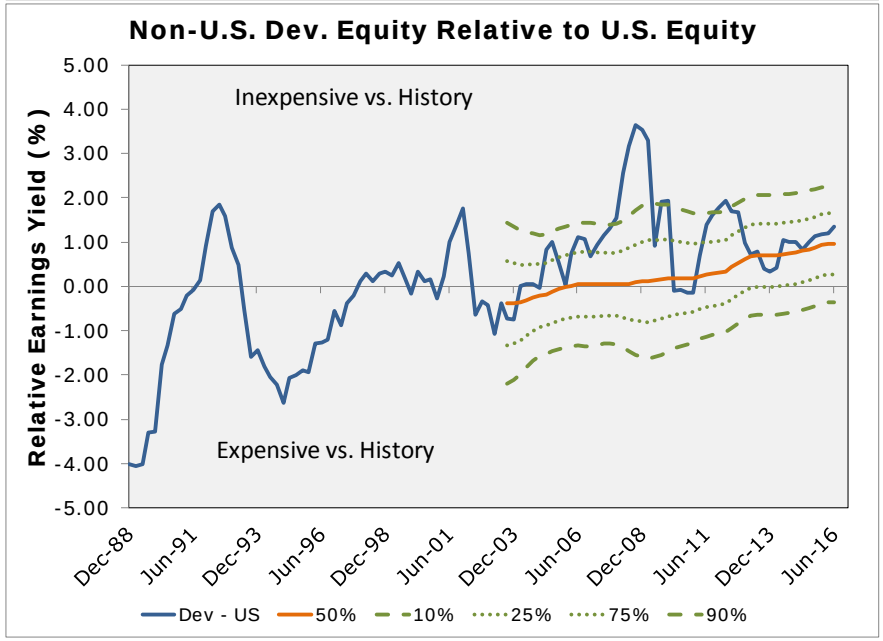
Source: Wilshire Compass, Wilshire Atlas, Barclays Capital

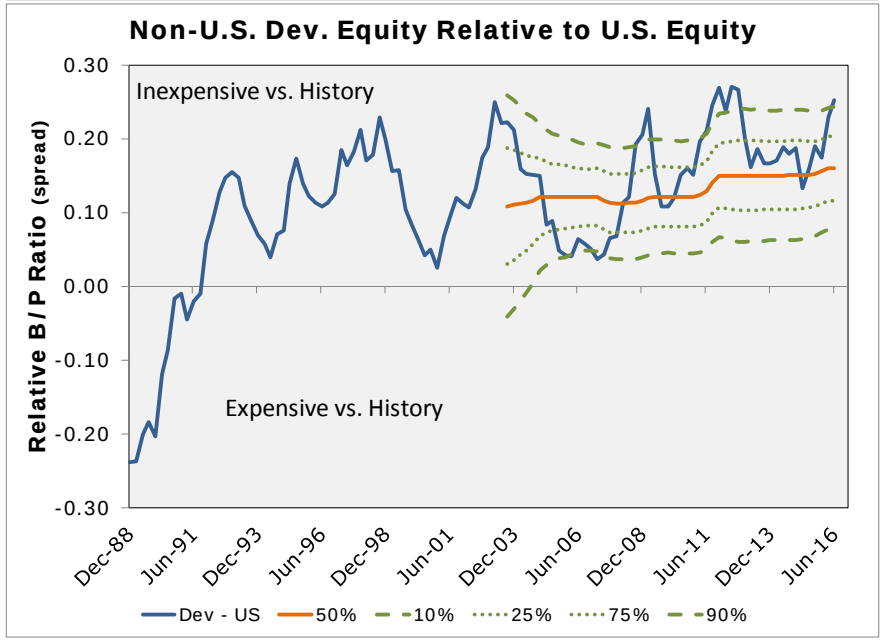
Developed (Non-U.S.) Equity vs. U.S. Equity

Wilshire





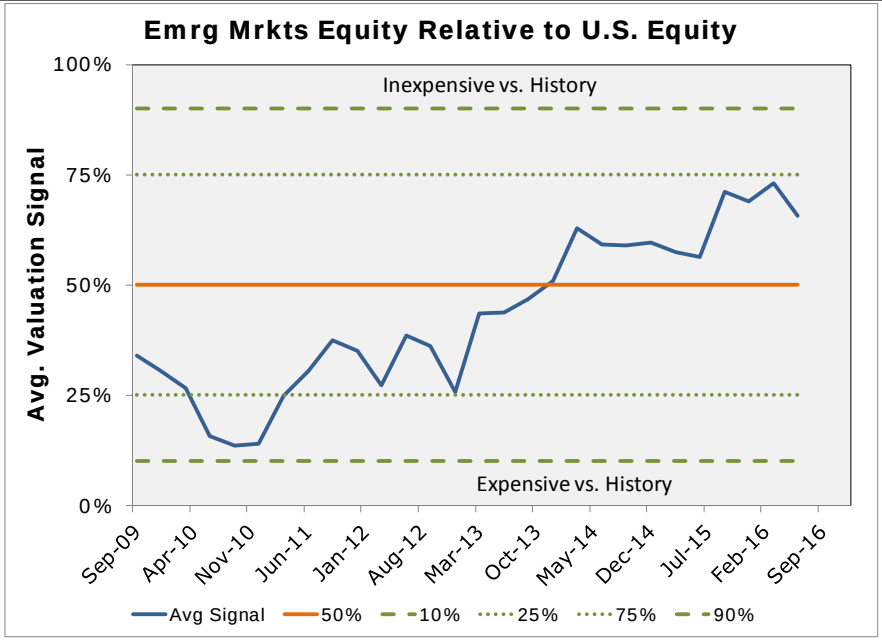


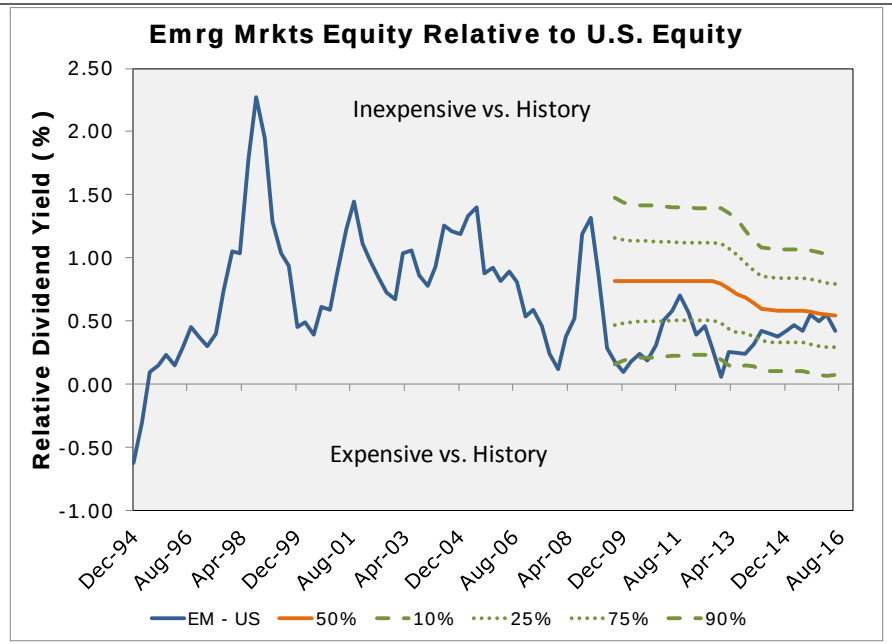


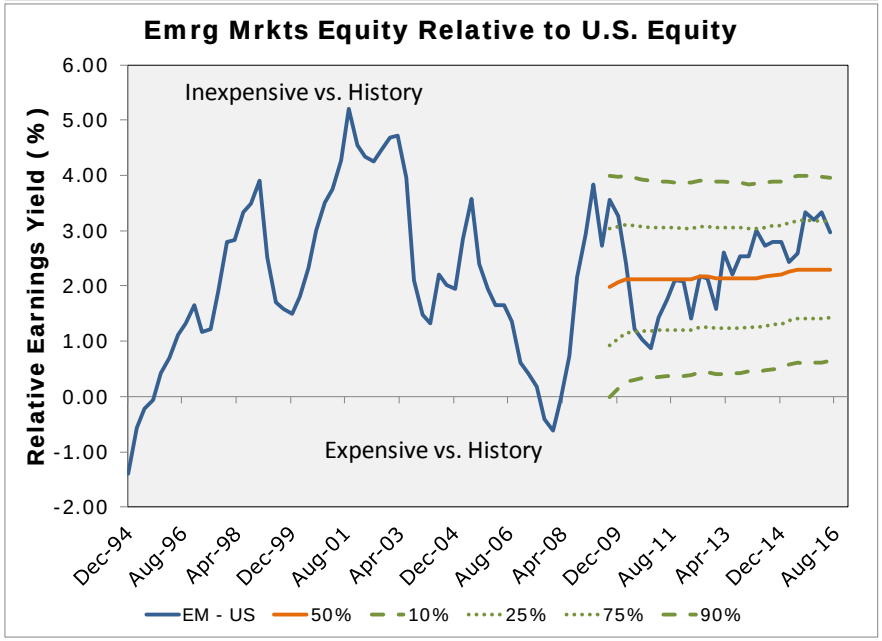
Source: Wilshire Compass, Wilshire Atlas

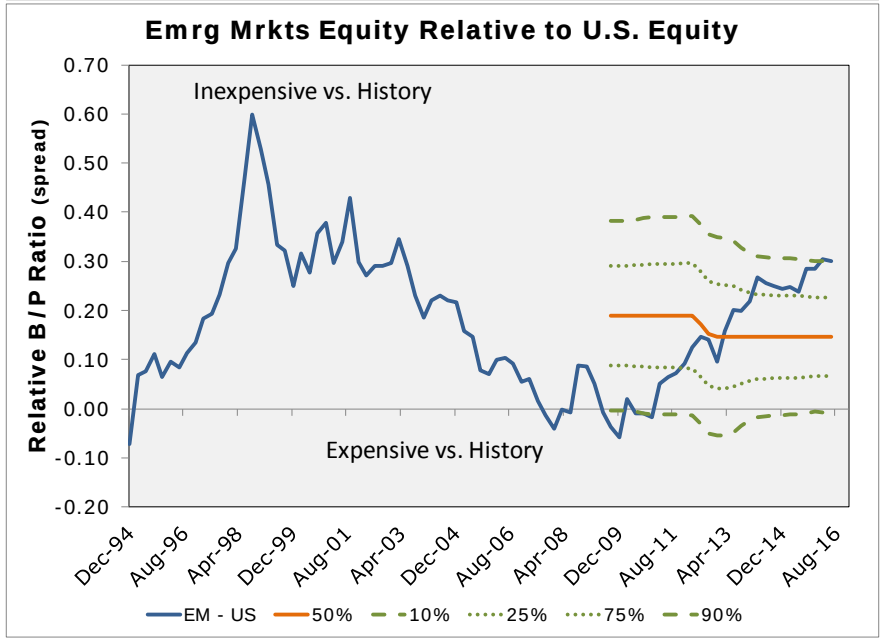
Emerging Markets Equity vs. U.S. Equity

Wilshire





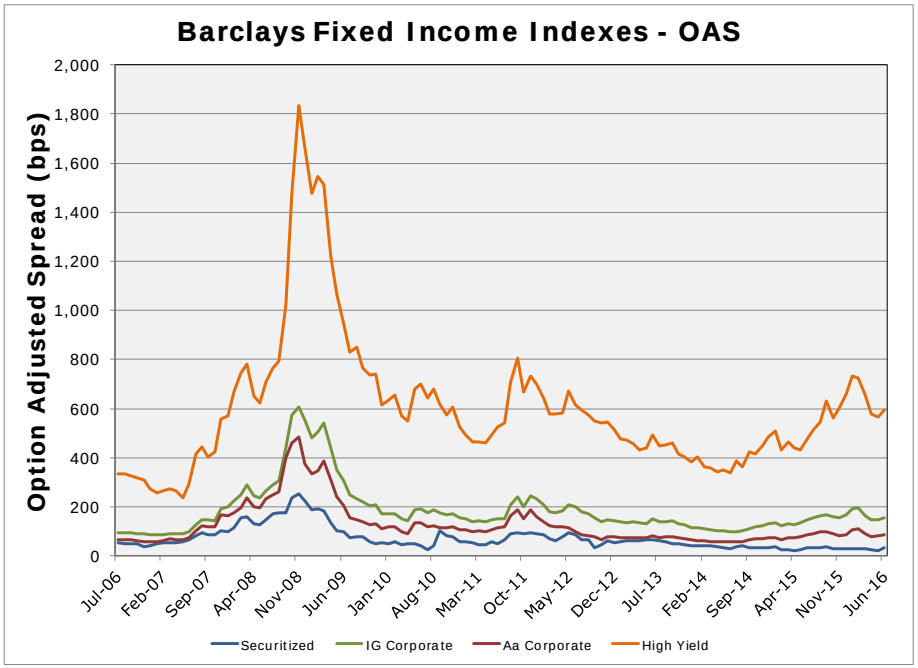


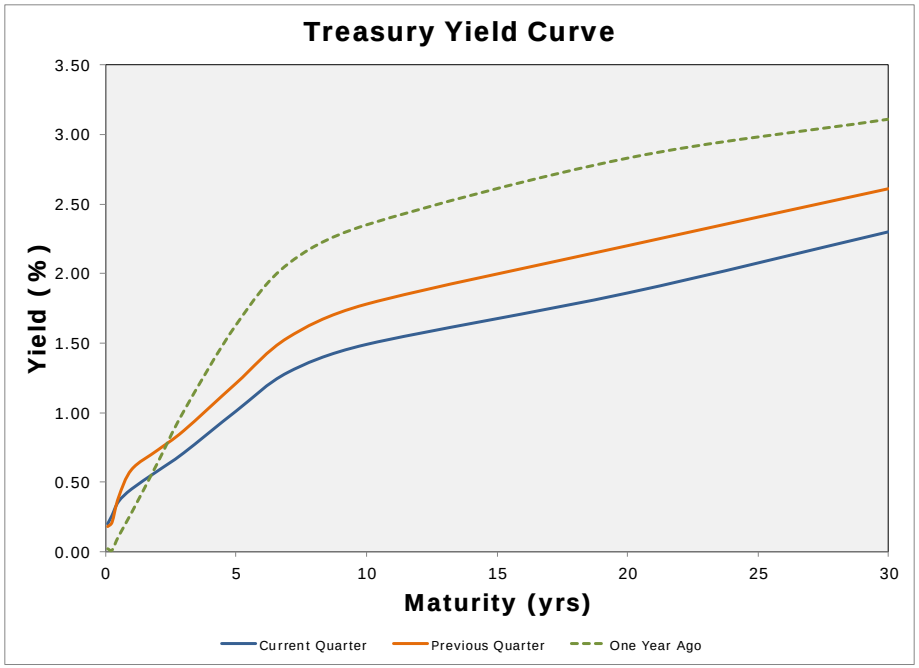


Source: Wilshire Compass, Wilshire Atlas

U.S. Fixed Income Market

June 30, 2016	Qtr	Ytd	1 Yr	3 Yr	5 Yr	10 Yr
Barclays Aggregate Bond Index	2.2	5.3	6.0	4.1	3.8	5.1
Barclays Treasury Index	2.1	5.4	6.2	3.5	3.5	4.9
Barclays Gov't-Related Index	2.5	5.7	5.2	3.9	3.4	4.8
Barclays Securitized Index	1.2	3.3	4.4	3.7	3.1	4.9
Barclays Corporate IG Index	3.6	7.7	7.9	5.4	5.4	6.2
Barclays LT Gov't/Credit Index	6.6	14.3	15.7	9.3	9.2	8.4
Barclays LT Treasury Index	6.4	15.1	19.3	10.5	10.3	8.8
Barclays LT Gov't-Related Index	6.4	13.5	12.7	9.0	8.4	8.3
Barclays LT Corporate IG Index	6.6	13.9	14.1	8.6	8.5	8.1
Barclays U.S. TIPS Index	1.7	6.2	4.4	2.3	2.6	4.7
Barclays High Yield Index	5.5	9.1	1.6	4.2	5.8	7.6
Treasury Bills	0.1	0.1	0.2	0.1	0.1	1.0



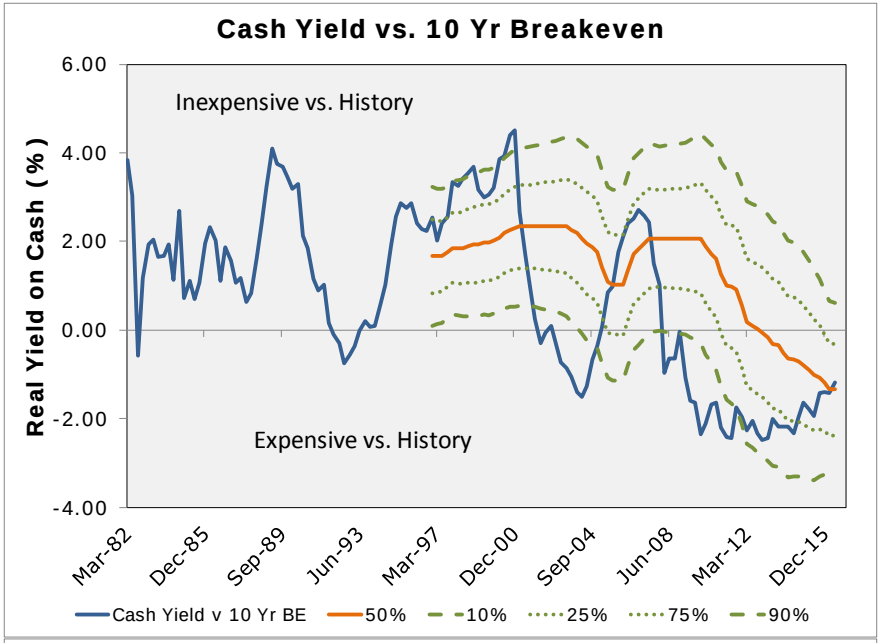


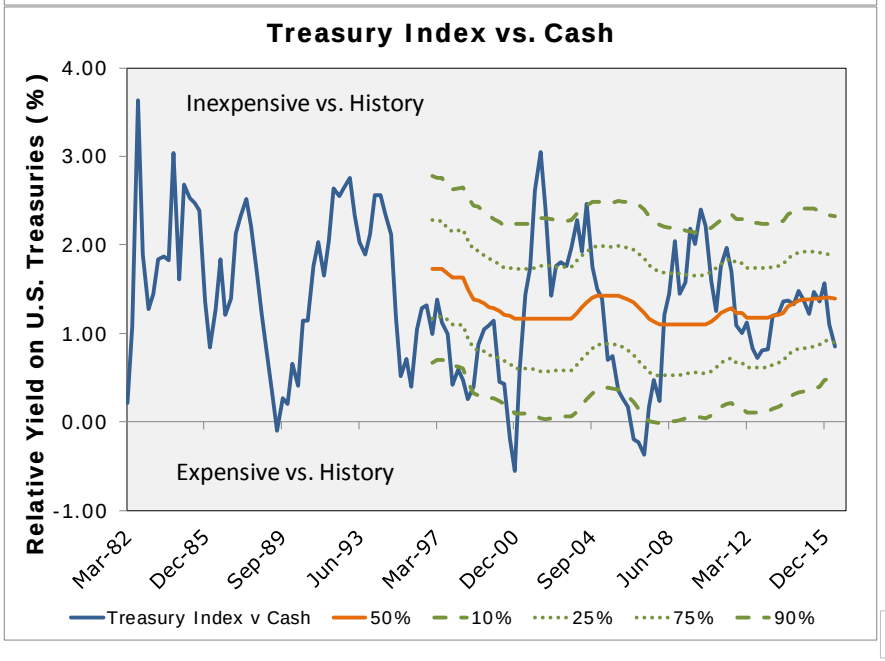
Data sources: Wilshire Compass, Barclays Capital, U.S. Treasury

Cash and Treasury Environment

Wilshire

- Real yield on cash is still negative but has been improving
  - Median for the past 15 years is actually negative
  - 3-month Treasury moved away from zero during Q4 2015, currently at 0.26%
- Spread between the broad Treasury market and cash is well below the 15-year median



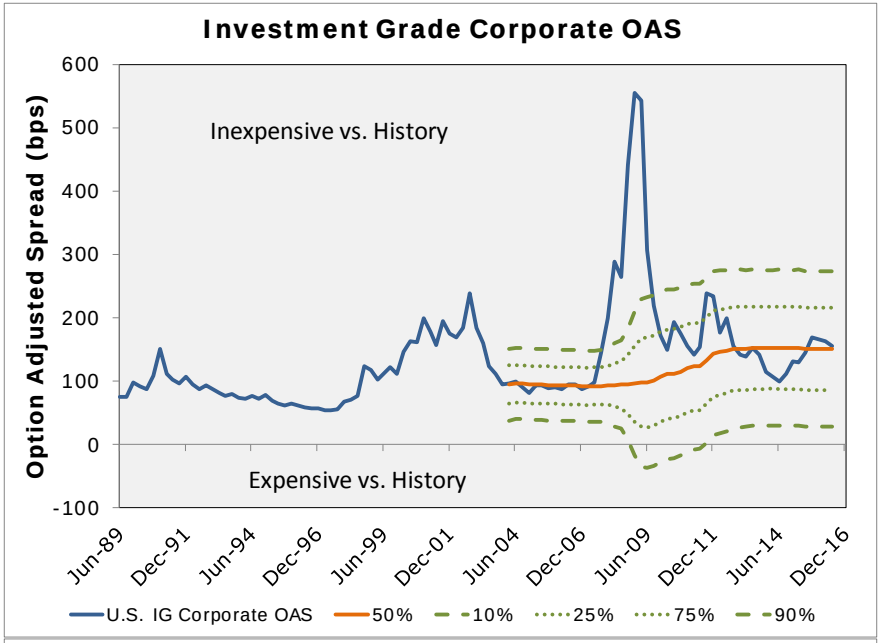


Source: Wilshire Compass, U.S. Treasury, Barclays Capital

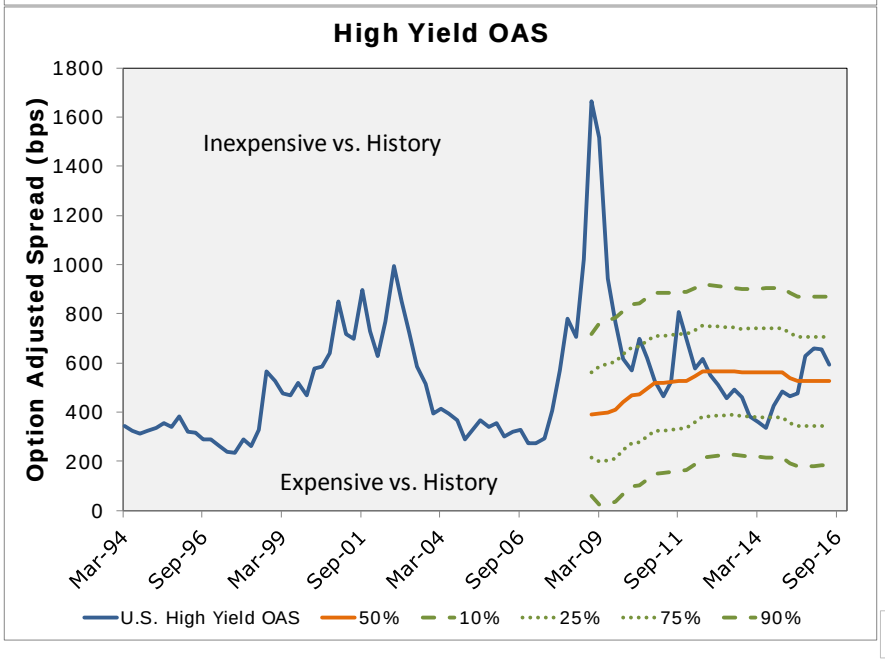
Relative Fixed Income Yields

Wilshire

- Spread versus Treasuries on the investment grade index is above its 15 year historical median, at the 52%-percentile outcome



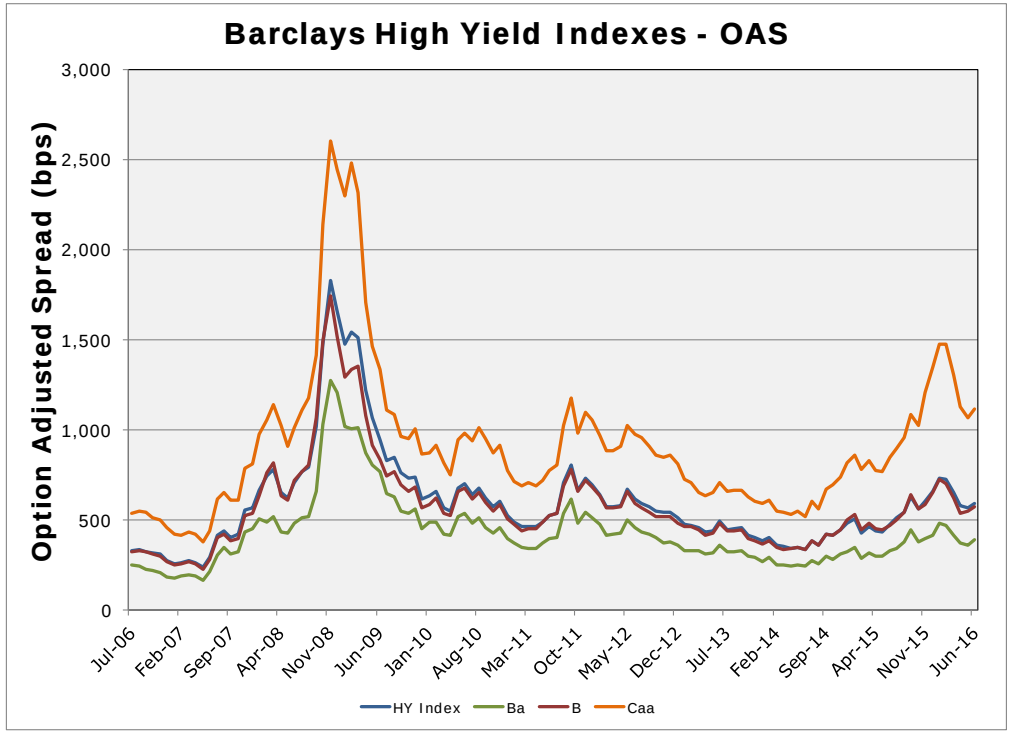
- Spread on high yield bonds is above the historical median, currently at the 60%-percentile outcome



Source: Barclays Capital

High Yield Bond Market

June 30, 2016	Weight	Qtr	Ytd	1 Yr	3 Yr
Barclays High Yield Index	100%	5.5	9.1	1.6	4.2
Quality Distribution					
Ba U.S. High Yield	45.5%	3.6	7.6	4.1	5.6
B U.S. High Yield	38.8%	4.8	7.4	-0.6	3.3
Caa U.S. High Yield	14.5%	11.8	16.0	-0.5	2.9
Ca to D U.S. High Yield	1.1%	33.2	39.4	-22.5	-26.9
Non-Rated U.S. High Yield	0.1%	10.4	6.4	-12.6	-1.8

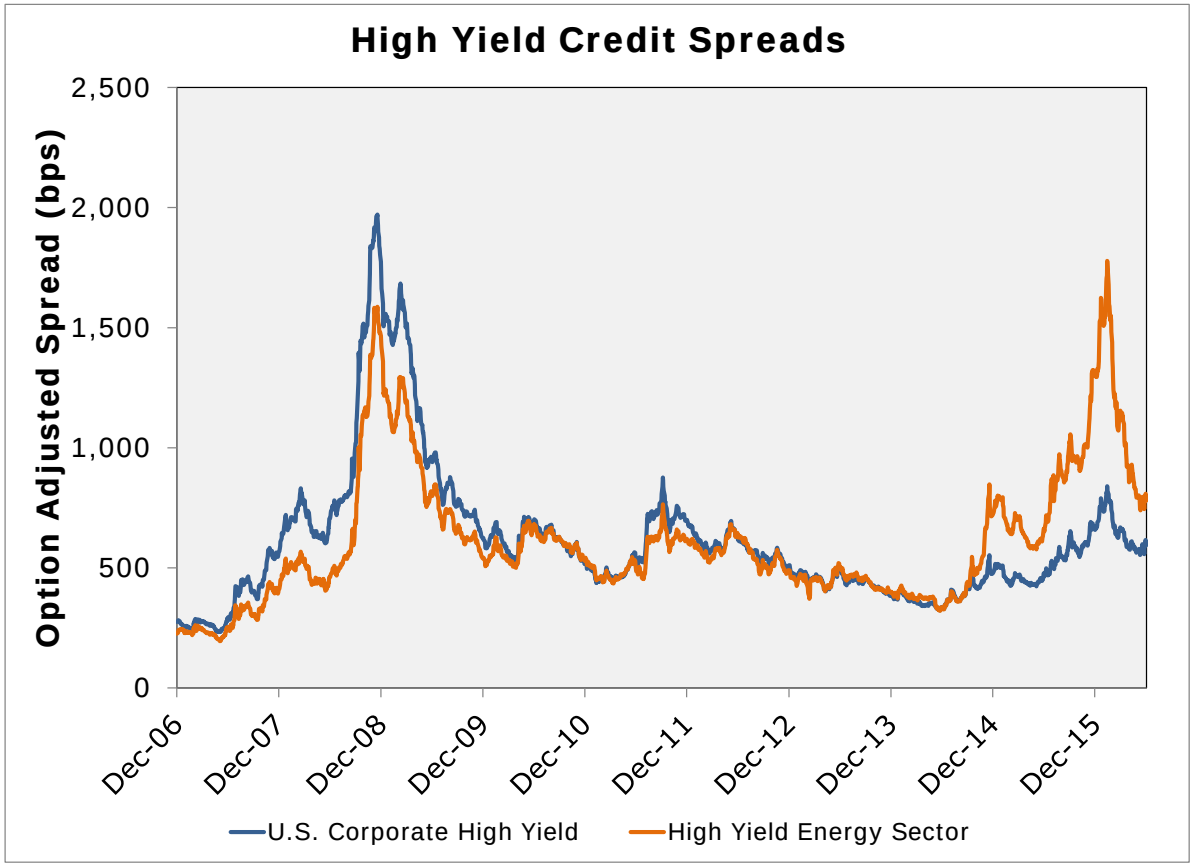


Data sources: Barclays Capital

Energy Sector Credit Conditions

Wilshire

- Heavy borrowing within the Energy sector resulted in a debt squeeze when revenues fell
- Producers responded by slashing capital expenditures
- Although improving, energy spreads are still a bit wide due to meaningful debt and lower commodity prices



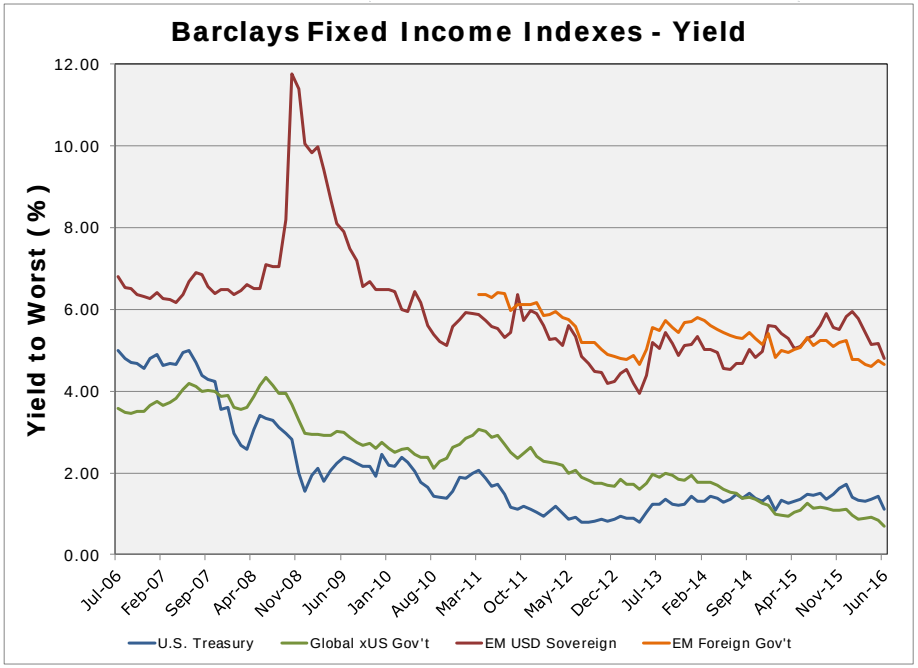
Source: Barclays

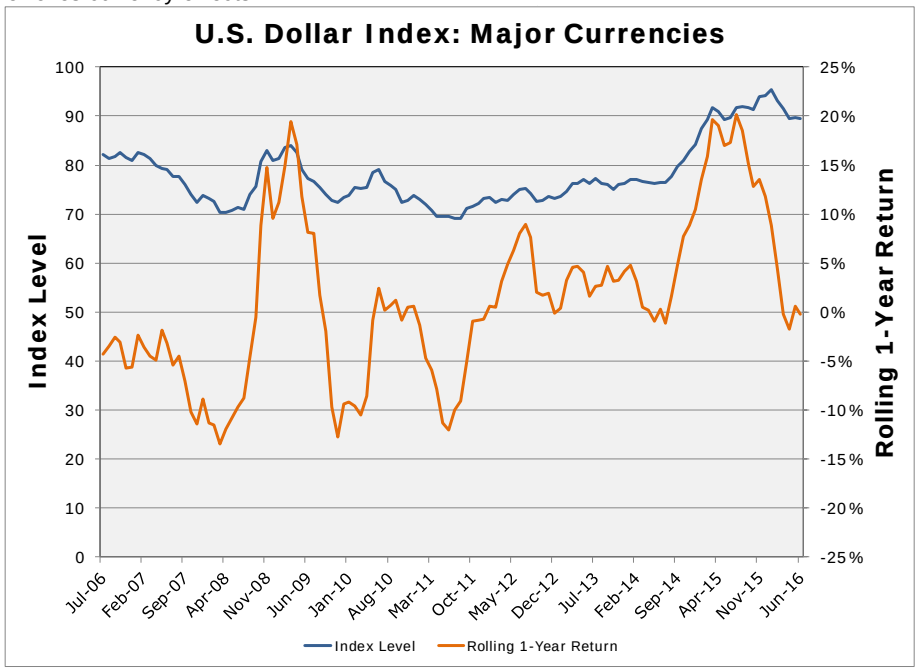
Non-U.S. Fixed Income Market

Wilshire

June 30, 2016	Qtr	Ytd	1 Yr	3 Yr	5 Yr	10 Yr
Developed Markets						
Barclays Global Aggregate xUS	3.4	11.9	11.2	1.9	0.3	3.8
Barclays Global Aggregate xUS *	2.7	6.3	8.5	5.9	5.5	5.0
Barclays Wrld Govt xUS IL Bond	1.6	6.6	1.3	3.0	1.6	4.0
Barclays Wrld Govt xUS IL Bond *	6.3	10.1	9.8	7.6	6.3	5.8
Emerging Mrkts (Hard Currency)						
Barclays EM USD Aggregate	4.7	9.4	7.8	6.0	6.0	7.7
Emerging Mrkts (Foreign Currency)						
Barclays EM Local Currency Gov't	2.2	11.0	2.9	-0.2	0.0	n.a.
Barclays EM Local Currency Gov't *	1.9	5.2	5.3	3.2	3.5	n.a.
Euro vs. Dollar	-2.5	2.3	-0.3	-5.1	-5.2	-1.4
Yen vs. Dollar	9.6	17.3	19.3	-1.1	-4.7	1.1
Pound vs. Dollar	-7.0	-9.3	-15.0	-4.1	-3.6	-3.2

* Returns are reported in terms of local market investors, which removes currency effects.



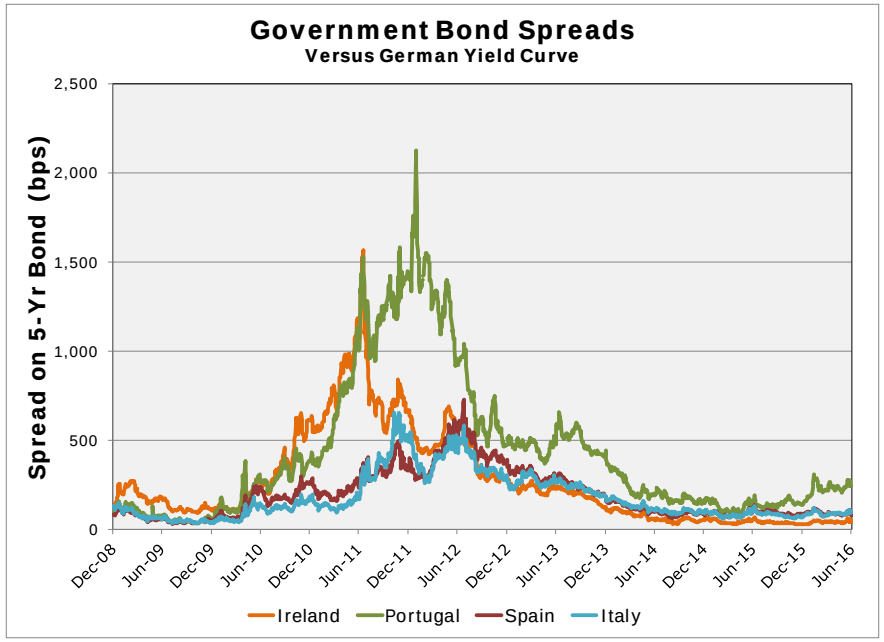


Data sources: Wilshire Compass, Barclays Capital

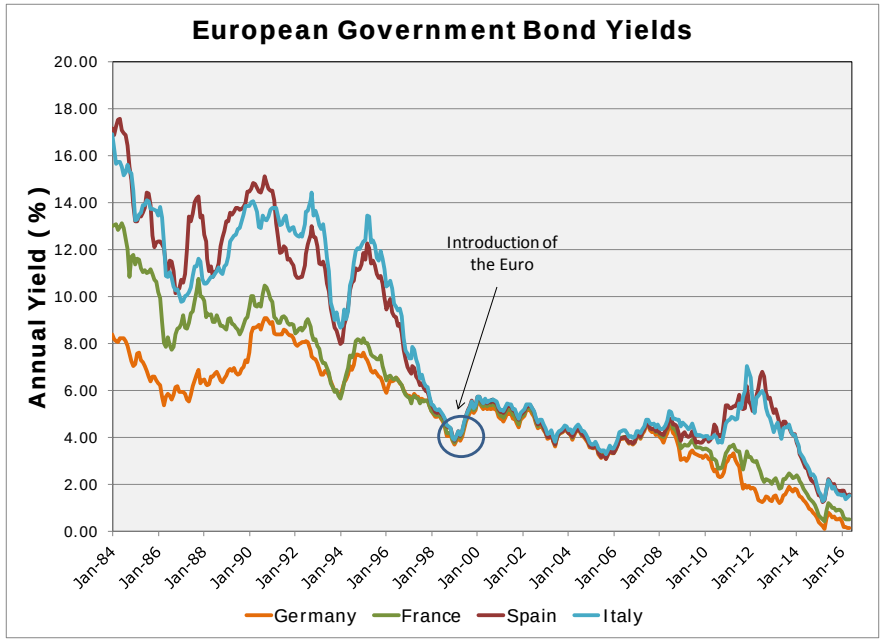
European Debt

Wilshire

- Spreads on Portugal's government debt are on the rise as the country faces a banking crisis and the prospect of a downgrade



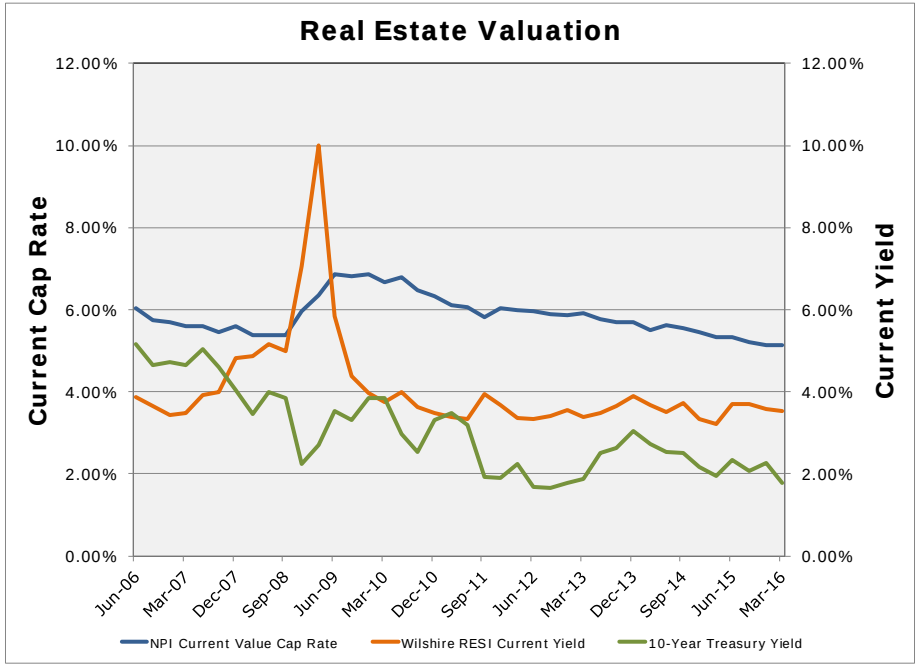
- Yields on government bonds are again falling after a brief uptick; Germany actually sold 10-year debt at a negative yield in July

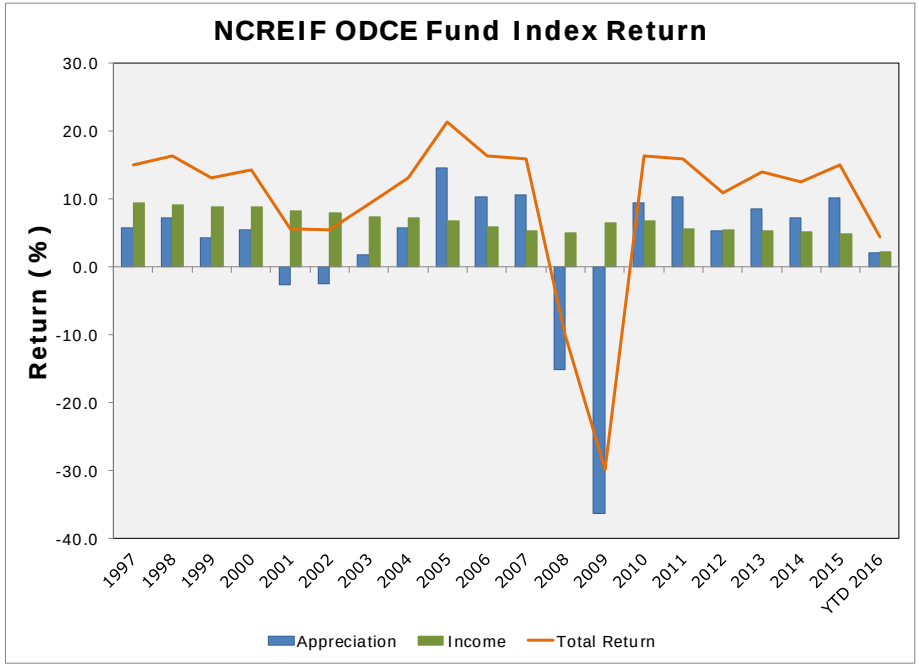


Source: Barclays Capital, International Monetary Fund

Real Assets

June 30, 2016	Qtr	Ytd	1 Yr	3 Yr	5 Yr	10 Yr
Barclays U.S. TIPS Index	1.7	6.2	4.4	2.3	2.6	4.7
Bloomberg Commodity Index	12.8	13.3	-13.3	-10.6	-10.8	-5.6
Wilshire Global RESI Index	4.4	10.0	14.7	10.6	9.9	5.9
NCREIF ODCE Fund Index	2.1	4.4	11.8	13.0	12.7	6.2
NCREIF Timberland Index	1.1	0.8	3.5	7.8	6.7	6.4
Alerian MLP Index (Oil & Gas)	19.7	14.7	-13.1	-5.4	3.2	9.5



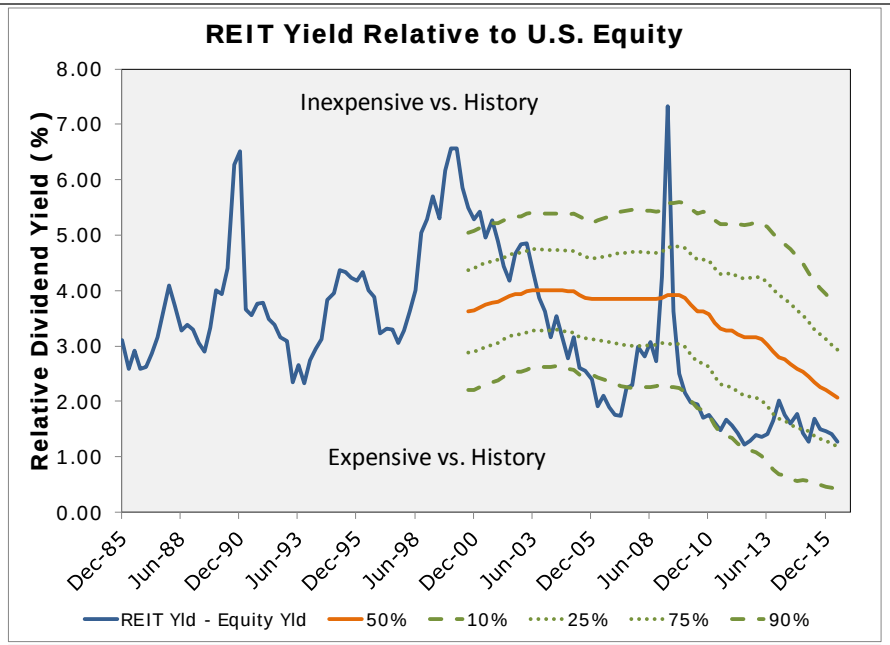


Data sources: Wilshire Compass, National Council of Real Estate Investment Fiduciaries

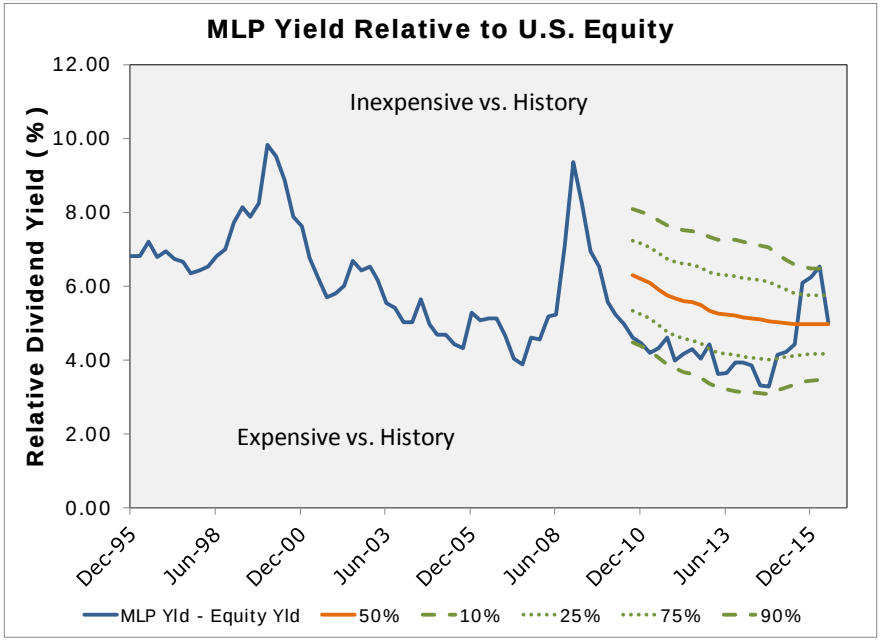
Relative Yield on Real Assets

Wilshire

- REIT yields typically run higher than the earnings yield for the broad equity market
- Current relative yield at the 27%-percentile outcome



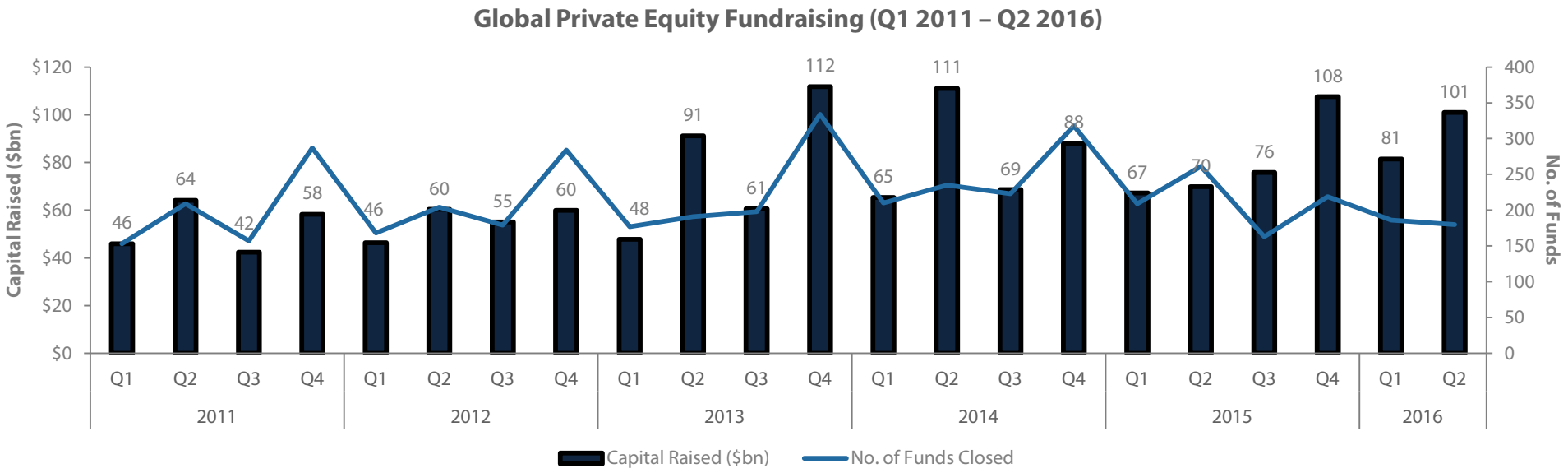
- Major swing in relative MLP yield since September of 2014
- Alerian MLP Index up ~20% during Q2
- Current relative yield at the 52%-percentile outcome

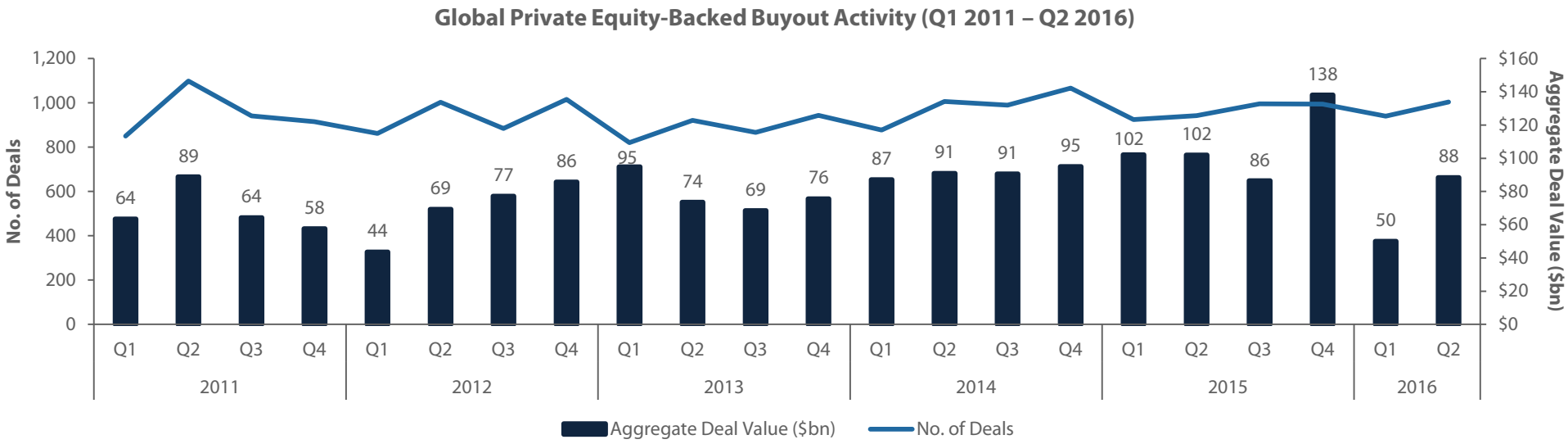


Source: Wilshire Compass, Wilshire Atlas, Alerian

Private Equity – Fundraising & Investment Activity

Wilshire

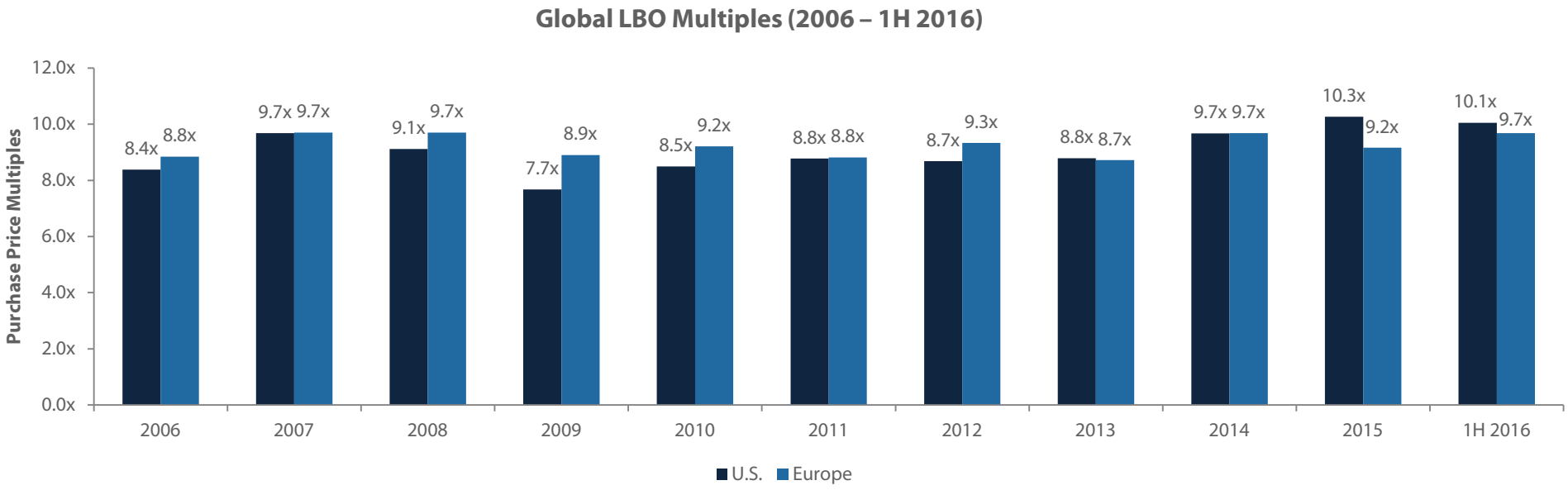


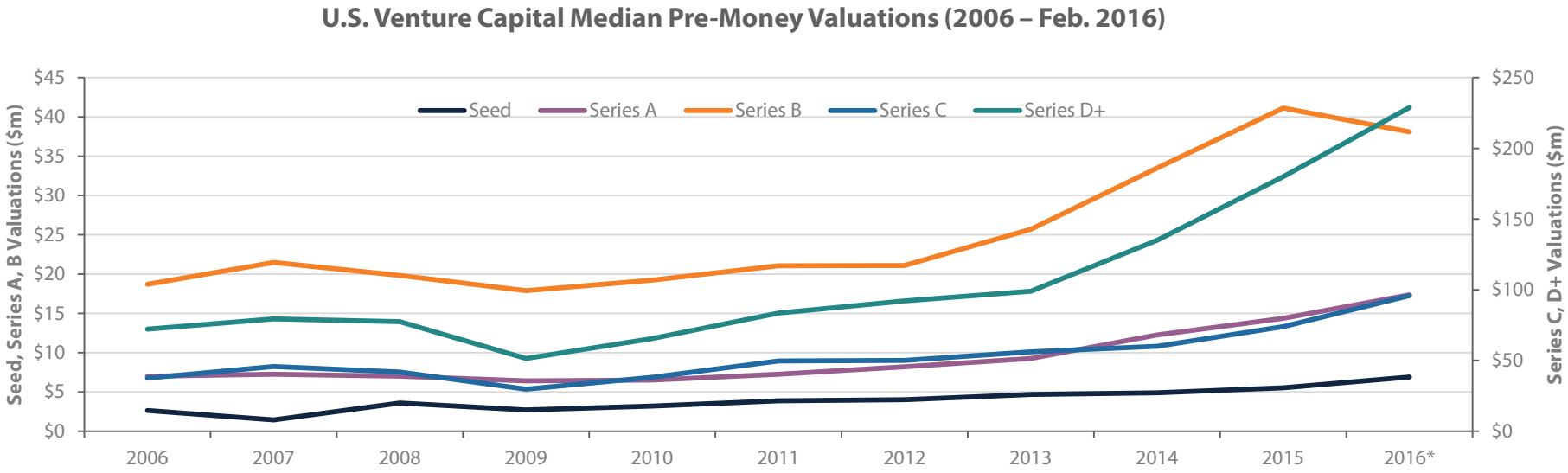


Sources: Preqin.

Private Equity – Pricing & Valuations

Wilshire

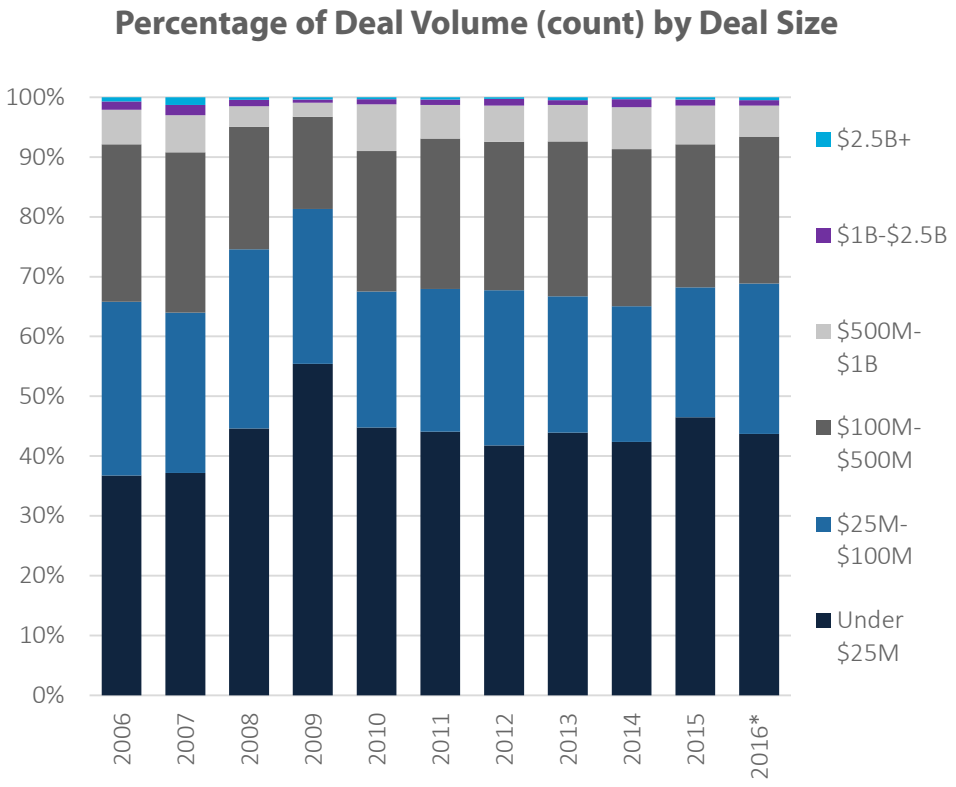


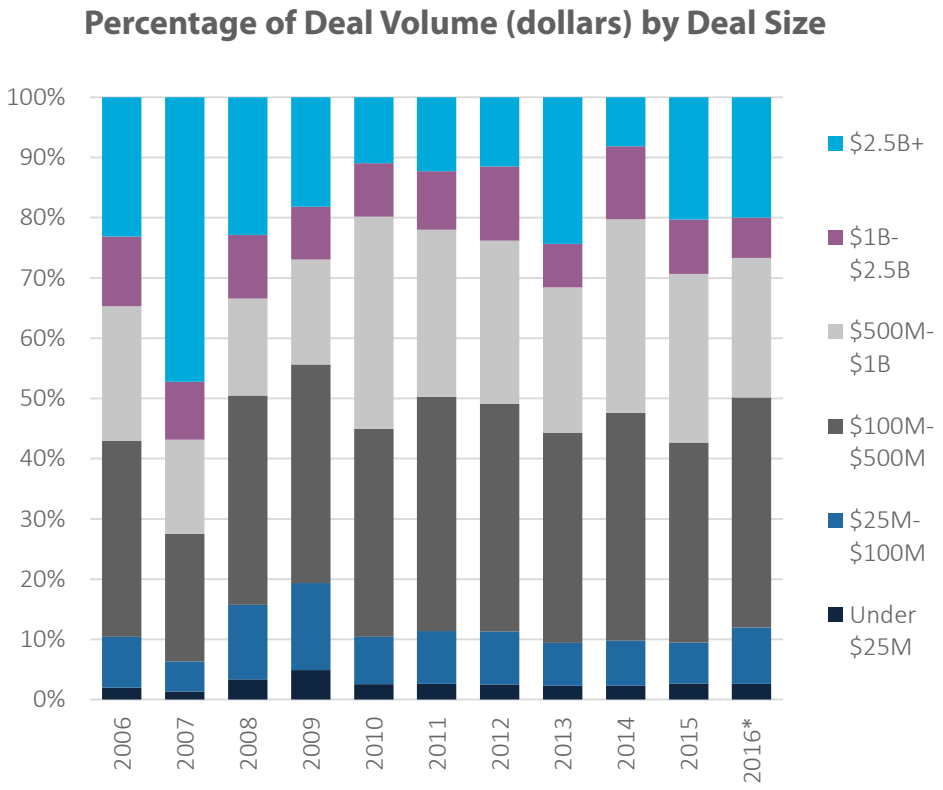


Source: S&P LCD, through 6/30/2016; Pitchbook, 2016 through 2/29/16.

Private Equity – U.S. Investment Activity by Deal Size

Wilshire



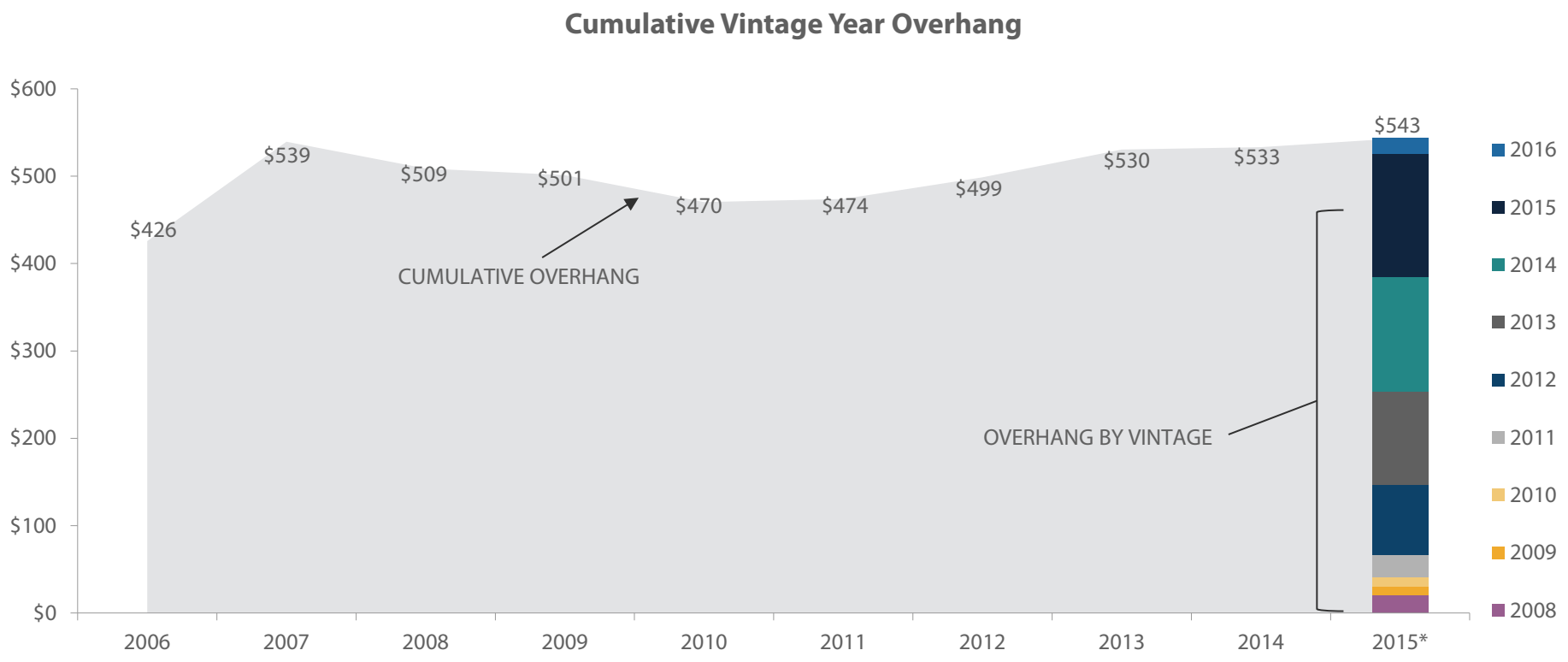


- Smaller deals continue to dominant deal activity by count
- Mega transaction ($2.5B+) volume remains significant in the first half of 2016

Source: Pitchbook. * As of 6/30/16.

Private Equity – Capital Overhang

Wilshire



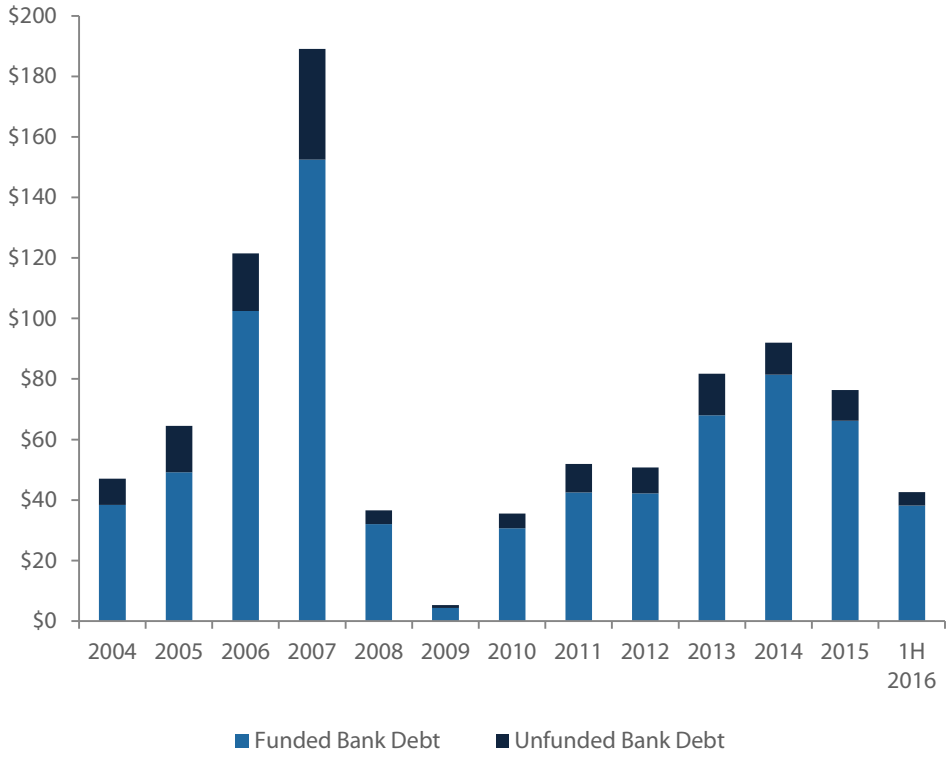
- Total private equity overhang significantly grew to an estimated $539 billion during the run-up to the financial crisis
- While the overhang slightly decreased across 2007 to 2010, the overhang has increased back to 2007 peak levels

Source: Pitchbook. As of June 30, 2015.

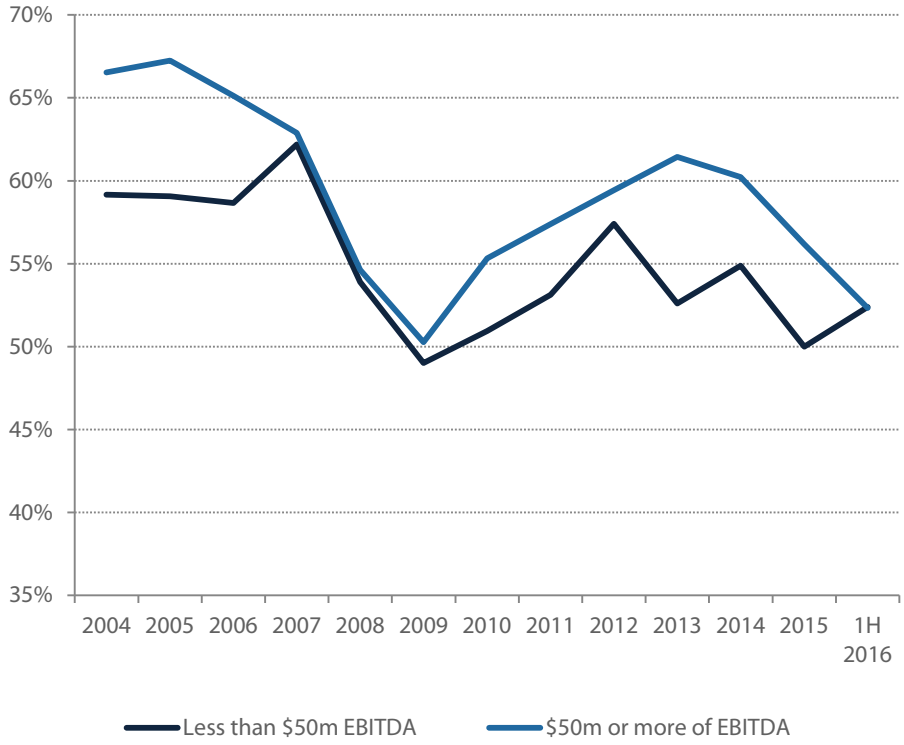
Private Equity – U.S. Debt Markets

Wilshire

Total U.S. Leveraged Buyout Loan Volume ($bn) (2004 – 1H 2016)



Percentage of Debt Used in Buyouts (2004 – 1H 2016)

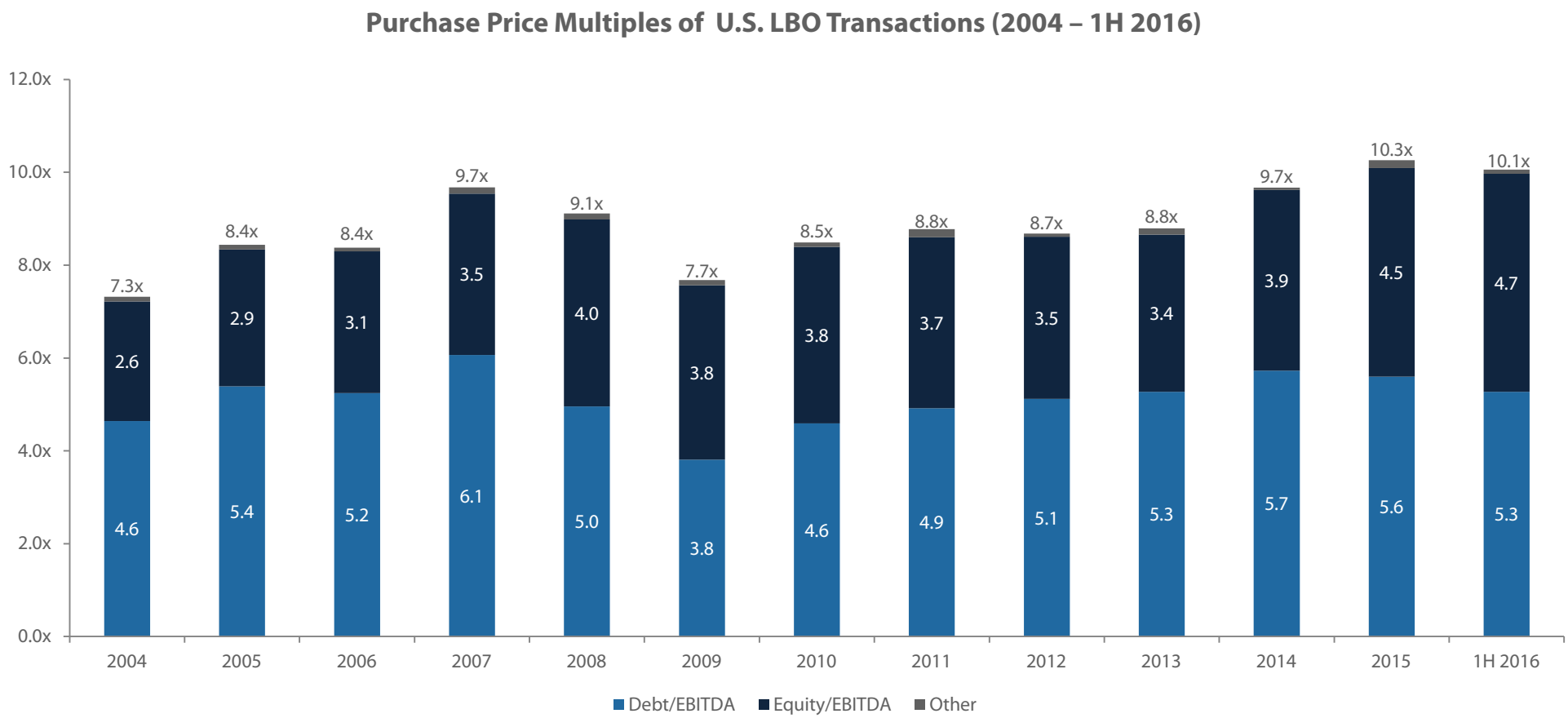


- The amount of capital available for leverage has decreased considerably since its peak volume in 2007; loan volume seems consistent in last few years
- Historically, middle-market transactions apply less leverage than large-cap deals

Source: S&P LCD.

Private Equity – U.S. LBO Purchase Price Multiples

Wilshire

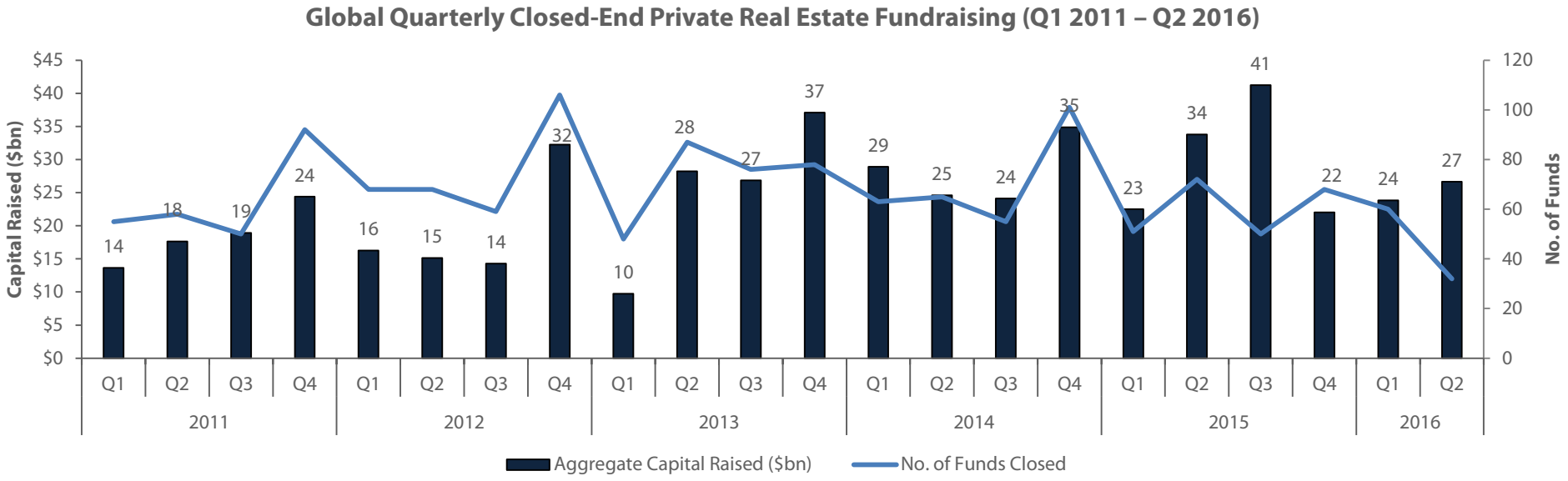


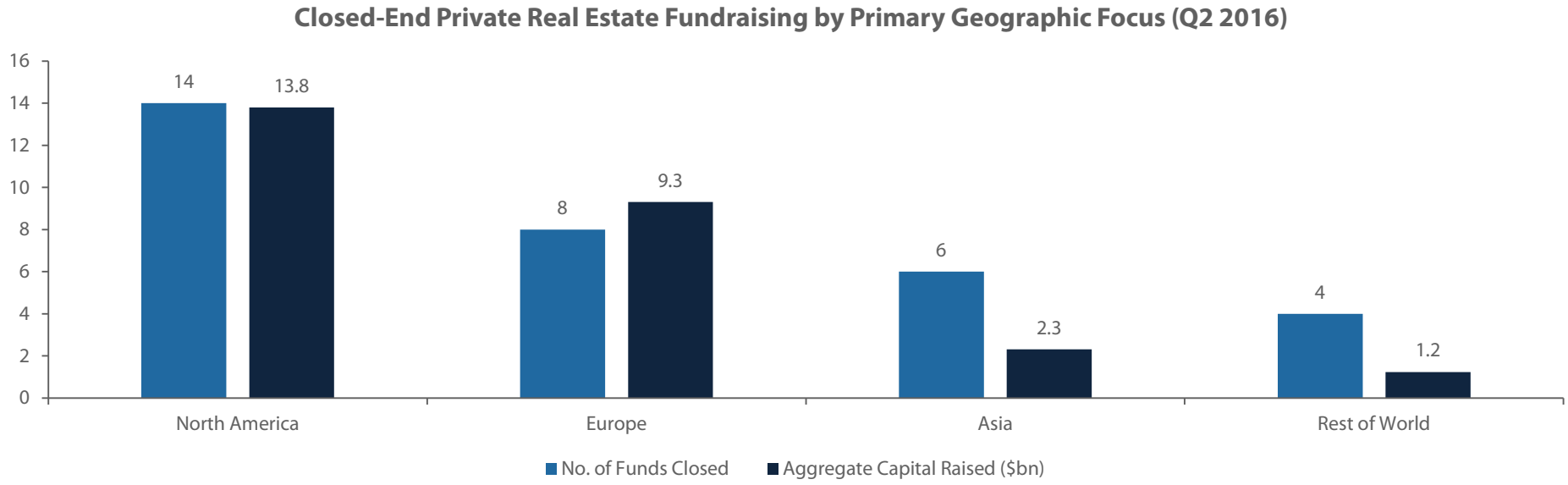
- As debt has become more readily available, purchase price multiples have increased from the low point in 2009
- Pricing in 1H 2016 has slightly decreased from the recent high in 2015

Source: S&P LCD.

Private Real Estate – Fundraising Activity

Wilshire



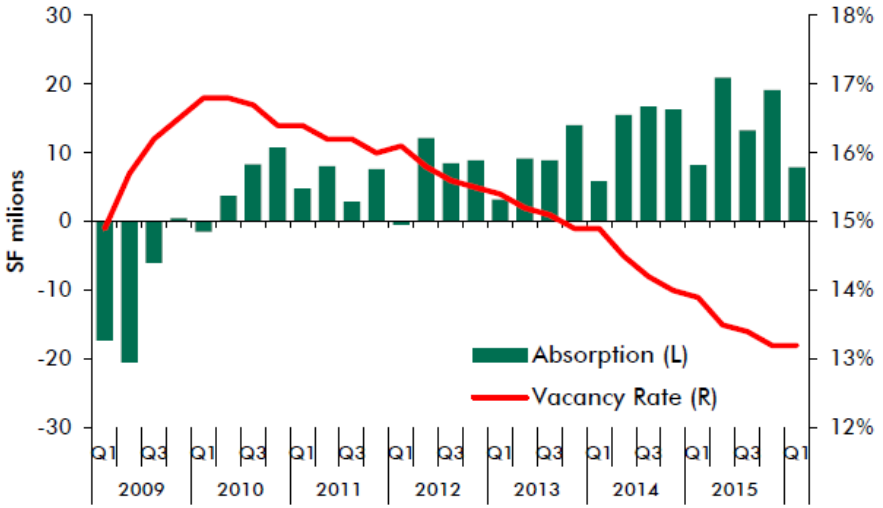


Sources: Preqin.

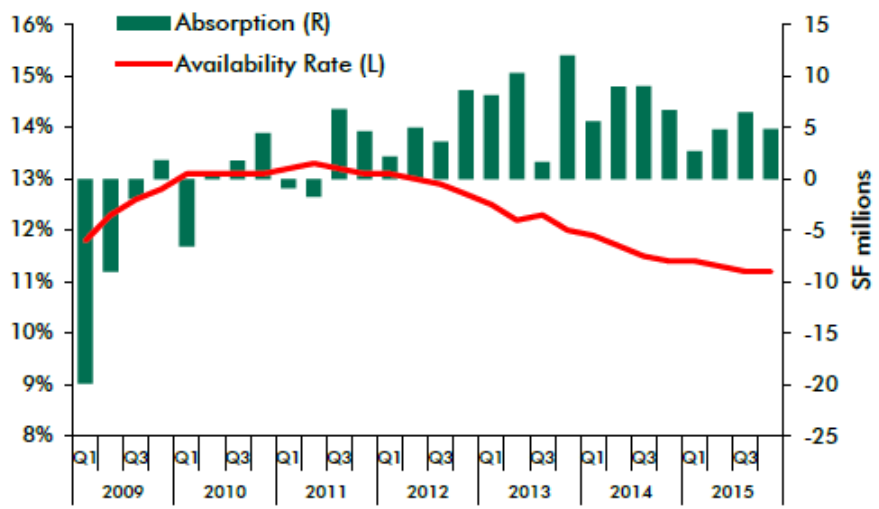
Commercial Property (as of Q1 2016)

Wilshire

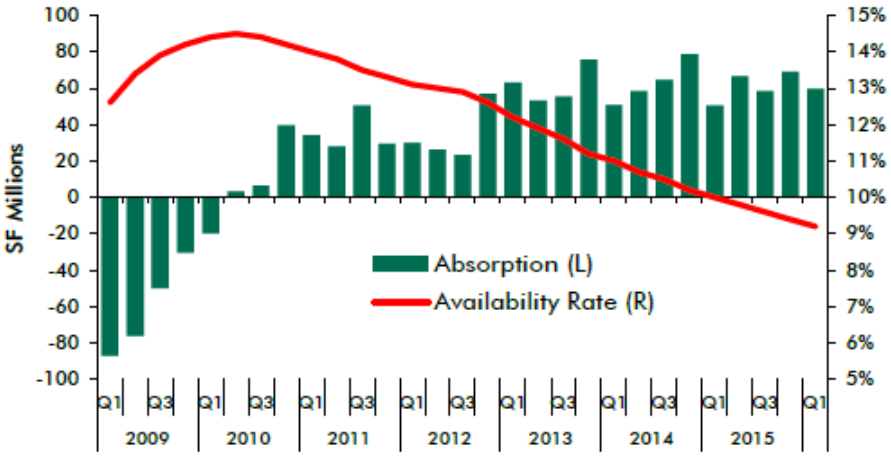
Office



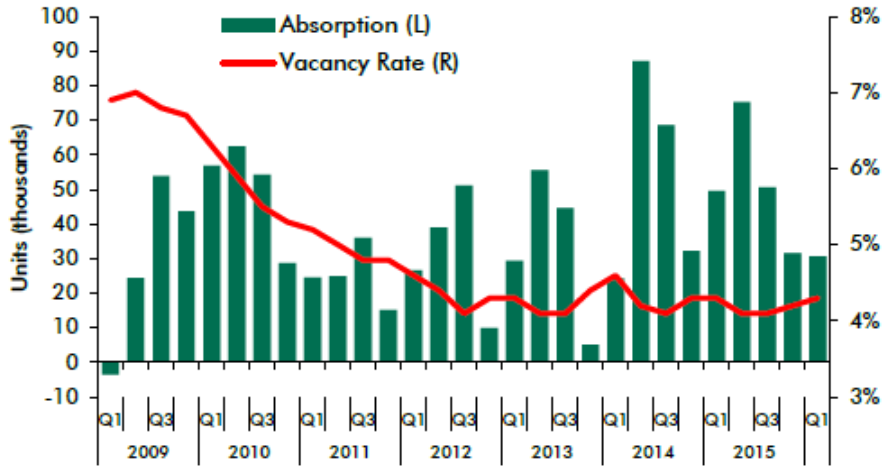
Retail



Industrial



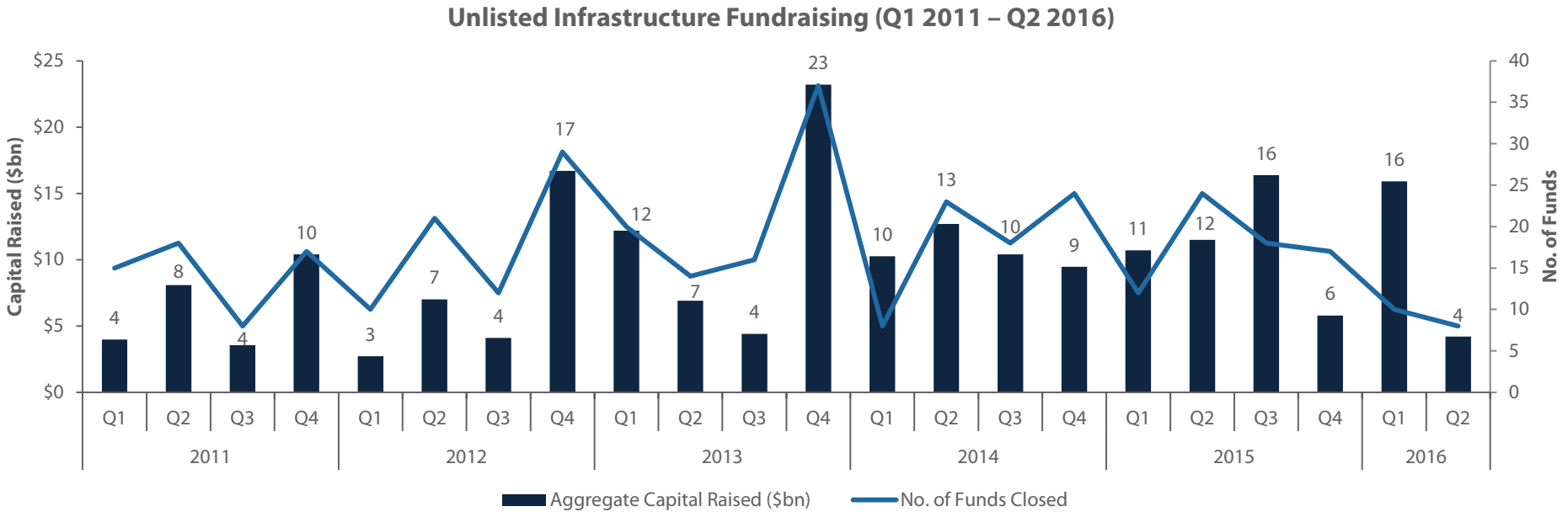
Apartment

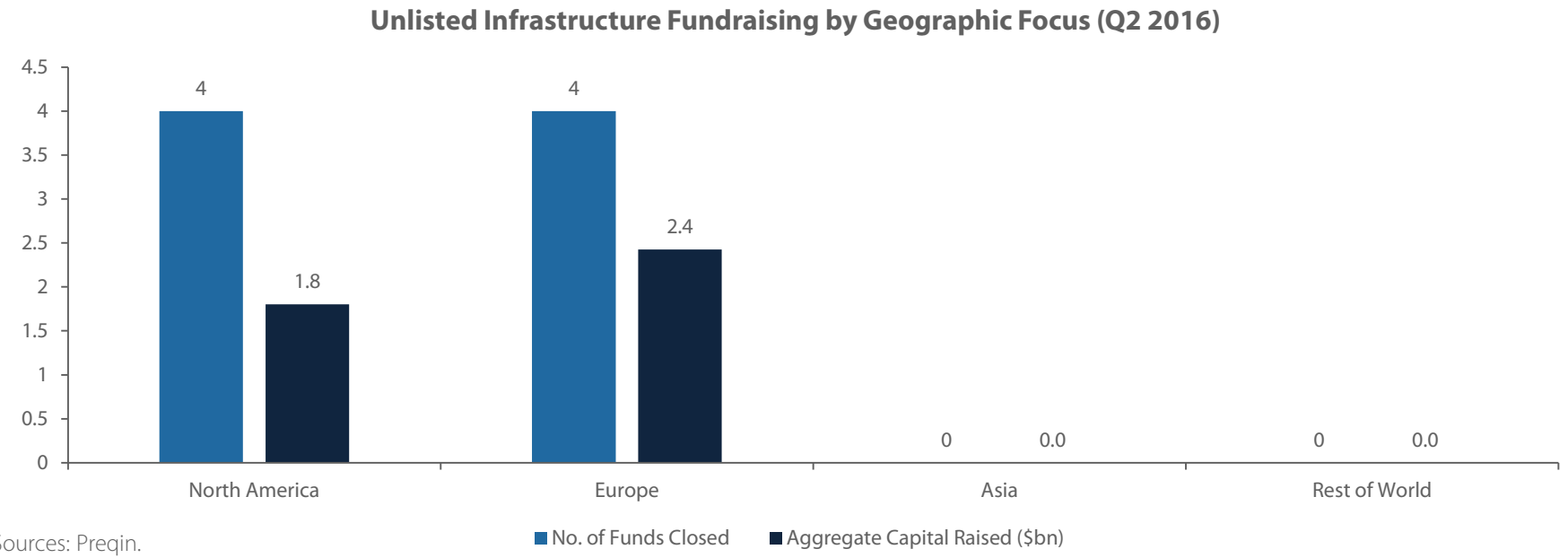


Source: CB Richard Ellis

Unlisted Infrastructure – Fundraising & Investment Activity

Wilshire



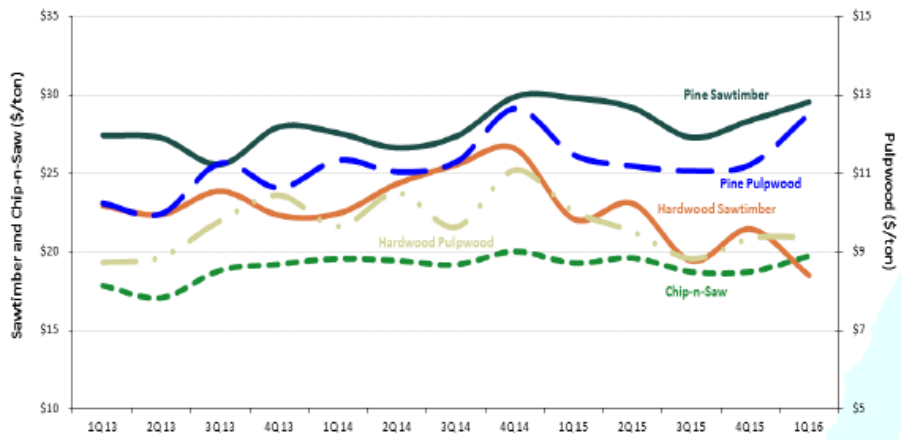


Sources: Preqin.

Timber

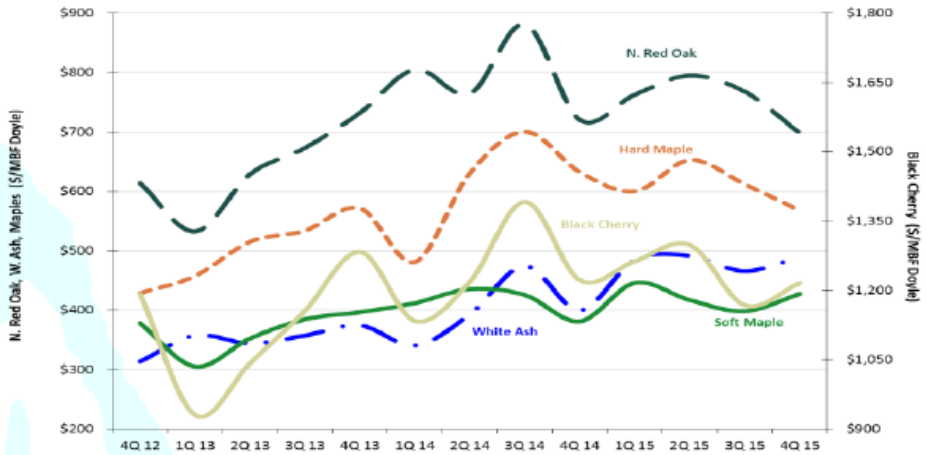
Wilshire

Southeastern Timber Prices



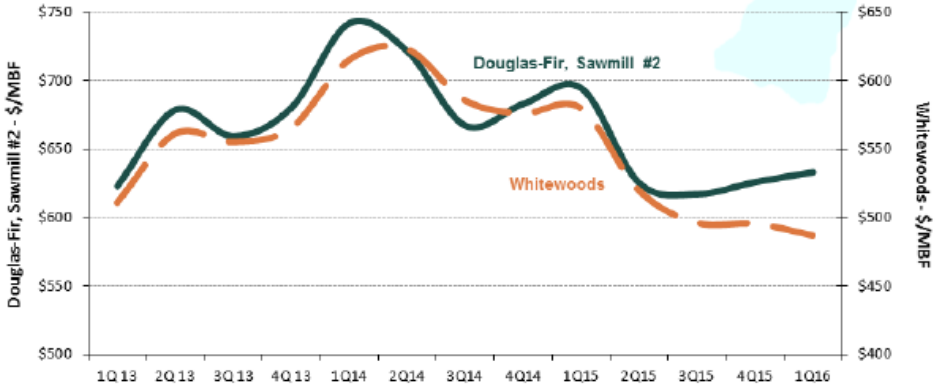
Source: Forest2Market®

Northeastern Hardwood Timber Prices



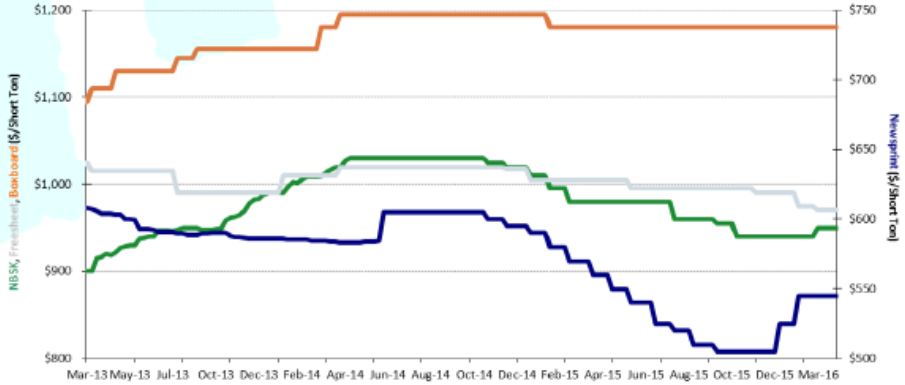
Source: Pennsylvania Woodlands Timber Market Report - Northwest Region

Pacific Northwest Timber Prices



Source: Log Lines®

Pulp and Paper

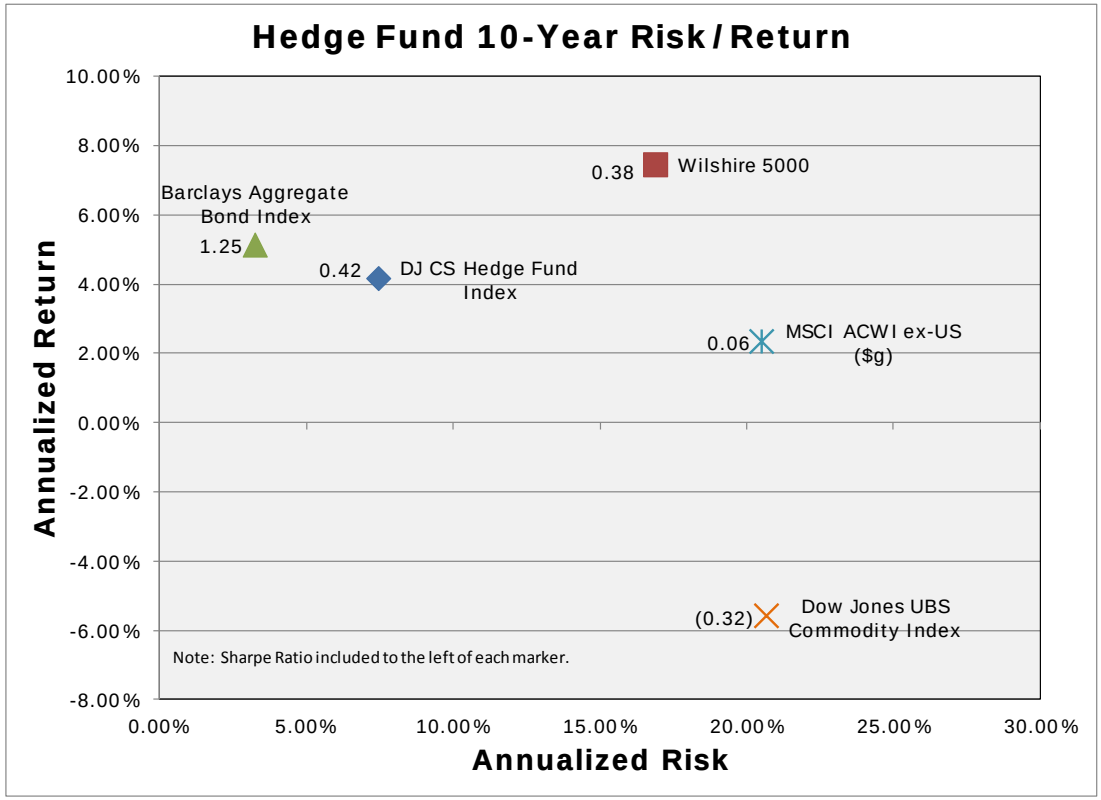


Source: FOEX Indexes, Ltd., RISI Pulp & Paper Week

Source: Forest Investment Associates

Hedge Fund Performance

June 30, 2016	Qtr	Ytd	1 Yr	3 Yr	5 Yr	10 Yr
DJ CS Hedge Fund Index	0.6	-1.6	-4.2	2.5	2.9	4.2
Event Driven Index	2.1	-2.5	-10.4	0.1	1.3	3.9
Global Macro Index	0.7	-1.5	-3.8	1.5	3.1	5.7
Long/Short Equity Index	-1.2	-5.0	-5.0	4.5	4.0	4.7
Multi-Strategy Index	1.2	0.7	1.2	5.9	6.0	5.5
Wilshire 5000	2.8	4.0	3.0	11.3	11.6	7.5
MSCI ACWI ex-US ($g)	-0.4	-0.7	-9.8	1.6	0.6	2.3
Barclays Aggregate Bond Index	2.2	5.3	6.0	4.1	3.8	5.1
Dow Jones UBS Commodity Index	12.8	13.3	-13.3	-10.6	-10.8	-5.6

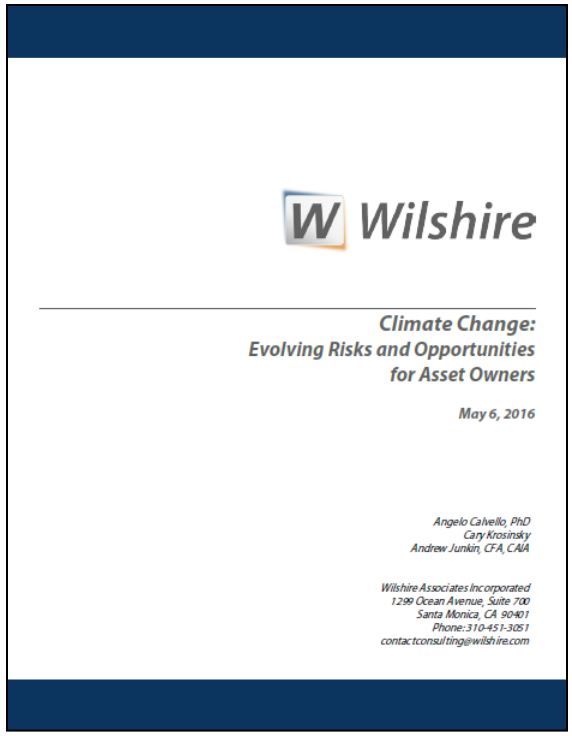


Data sources: Wilshire Compass

Appendix: ClimateLens

ClimateLens

- Regardless of one's own belief on the subject, climate change deserves consideration by investors, in keeping with their mandates, investment horizons, and ultimate goals…Investors may want to consider climate change as part of their investment calculus of risk, return, and governance.
- *ClimateLens* is a four-part program intended to provide our clients with the context-relevant knowledge needed to understand and, if appropriate, make informed decisions about the risks and opportunities associated with climate change.
- Education
- Assessment
- Planning
- Implementation



Wilshire

Climate Change:
Evolving Risks and Opportunities
for Asset Owners

May 6, 2016

Angelo Calvello, PhD
Cary Krosinsky
Andrew Junkin, CFA, CAIA

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ClimateLens: First Step

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- **Education**
- Provides a structured program explaining the fundamental factors related to the intersection of climate change and investing, including a review of climate science, possible resulting economic consequences and the risk-return considerations associated with policy and regulatory responses.
- Topics to be covered include:
- A baseline understanding of climate change and environmental investing
- The relationship between science, economics, and policy and associated systemic natural, human, and financial risks under varying scenarios
- The measurement and management of climate risks
- A taxonomy of environmental investment
- Climate change investing "best practices"
- The potential benefits and downsides to divestment

Potential for Stranded Assets

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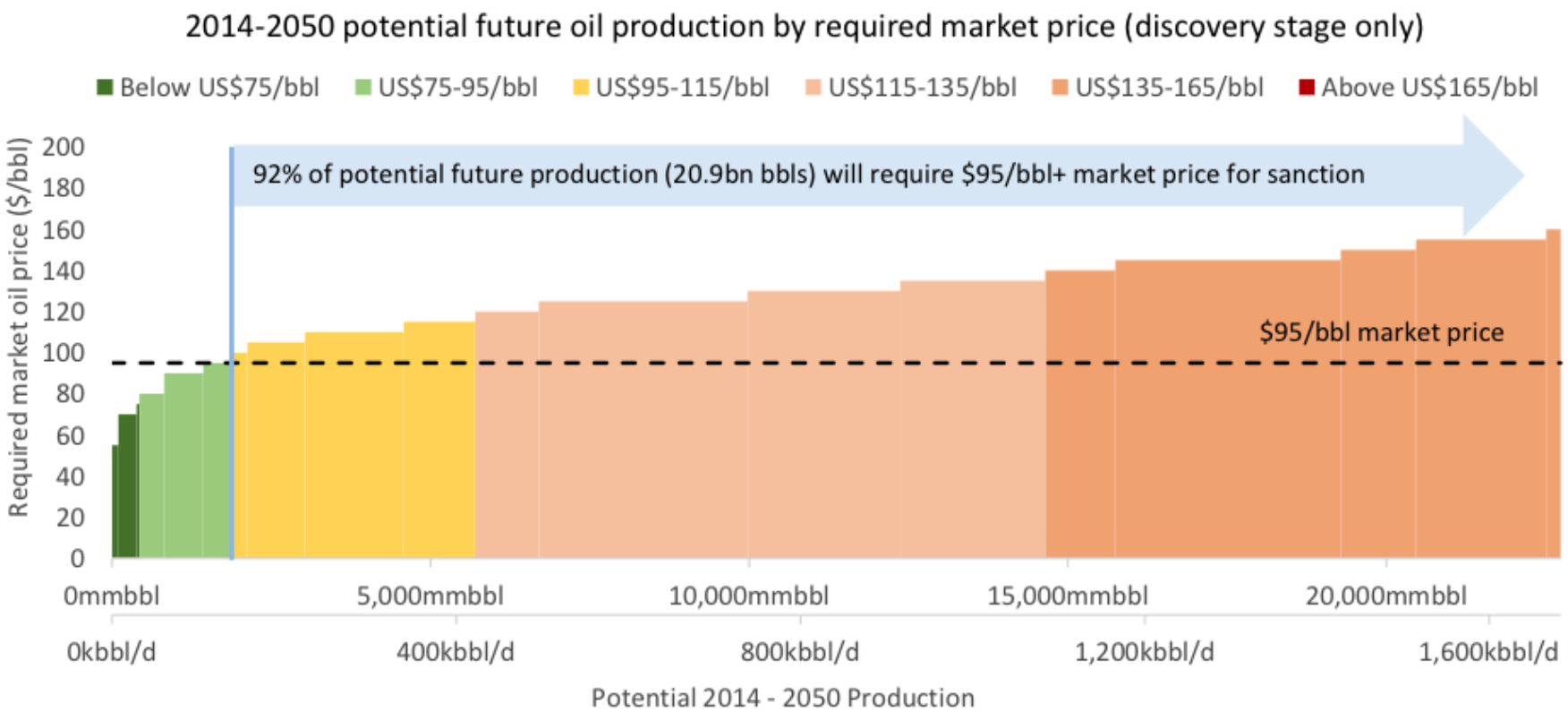
- 50-80% of reserves may well become Stranded Assets
- Understanding oil price sensitivity across different companies is important for investors as there is over $2T in Capex which may be at risk of being unprofitable
- Capital Expenditure is at risk



Source: The Carbon Tracker Initiative (CTI and ETA 2014)

Investors' Perspective

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- Specific Investor Strategies
  - **Stewardship of Capital**: Engaging w/Corporates & Outsourced fund managers, shifting fiduciary duty definitions
  - **Evolving Investment Strategy**: Responding to Client Awareness & Concerns
  - Building the **Capacity to Execute**: through Education & Research - Investors also starting to **Engage with Policymakers**

- State of the **marketplace**
  - $21 Trillion of Assets using ESG
  - Over $60 Trillion of PRI signatories
  - $500B of Primary ESG
  - $100B new in past year
  - $1T net new Fixed Income/Infrastructure per year expected going forward

- **Divestment**: Negative screening usually a bad idea for returns