Wilshire

Numbers In Context – 1Q16

Asset Class Performance

Wilshire

Annual Asset Class Returns - Best to Worst

2011	2012	2013	2014	2015	**YTD 2016**
MLPs 13.9%	Emrg Mrkts 18.6%	U.S. Equity 33.1%	REITs 31.8%	REITs 4.2%	Emrg Mrkts 5.8%
U.S. TIPS 13.6%	Developed 17.9%	MLPs 27.6%	U.S. Equity 12.7%	U.S. Equity 0.7%	REITs 5.2%
REITs 9.2%	REITs 17.6%	Developed 23.3%	Core Bond 6.0%	Core Bond 0.6%	U.S. TIPS 4.5%
Core Bond 7.8%	U.S. Equity 16.1%	High Yield 7.4%	MLPs 4.8%	T-Bills 0.1%	High Yield 3.4%
High Yield 5.0%	High Yield 15.8%	REITs 1.9%	U.S. TIPS 3.6%	Developed -0.4%	Core Bond 3.0%
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. Equity 1.2%
T-Bills 0.1%	MLPs 4.8%	Core Bond -2.0%	T-Bills 0.0%	High Yield -4.5%	Commodities 0.4%
Developed -11.7%	Core Bond 4.2%	Emrg Mrkts -2.3%	Emrg Mrkts -1.8%	Emrg Mrkts -14.6%	T-Bills 0.1%
Commodities -13.3%	T-Bills 0.1%	U.S. TIPS -8.6%	Developed -4.5%	Commodities -24.7%	Developed -2.9%
Emrg Mrkts -18.2%	Commodities -1.0%	Commodities -9.5%	Commodities -17.0%	MLPs -32.6%	MLPs -4.2%

Annualized 5-Year as of Mar. '16
REITs 12.1%
U.S. Equity 11.0%
High Yield 4.9%
Core Bond 3.8%
U.S. TIPS 3.0%
Developed 2.8%
T-Bills 0.1%
MLPs -0.6%
Emrg Mrkts -3.8%
Commodities -14.1%

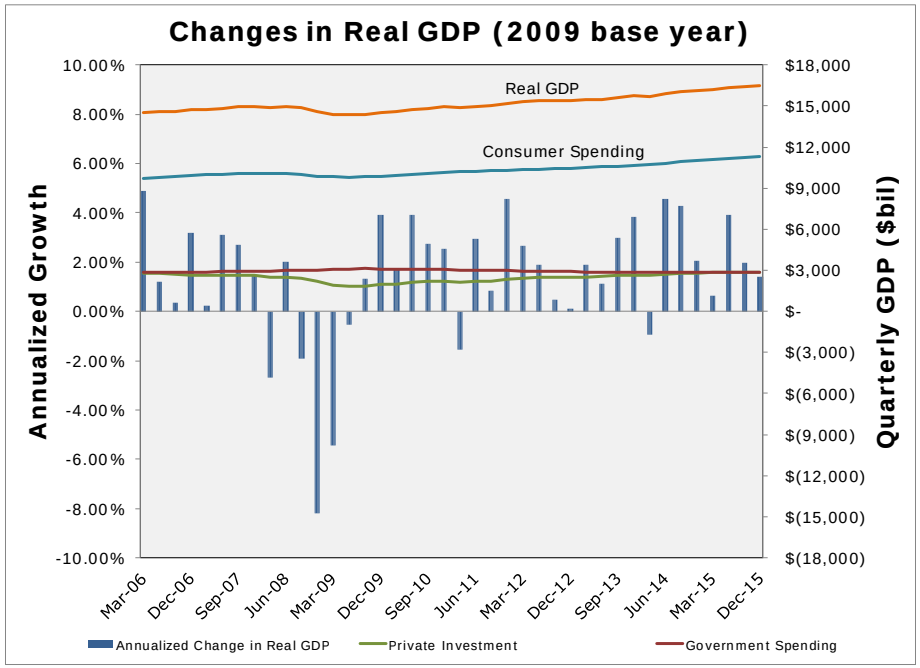
Data sources: Wilshire Compass

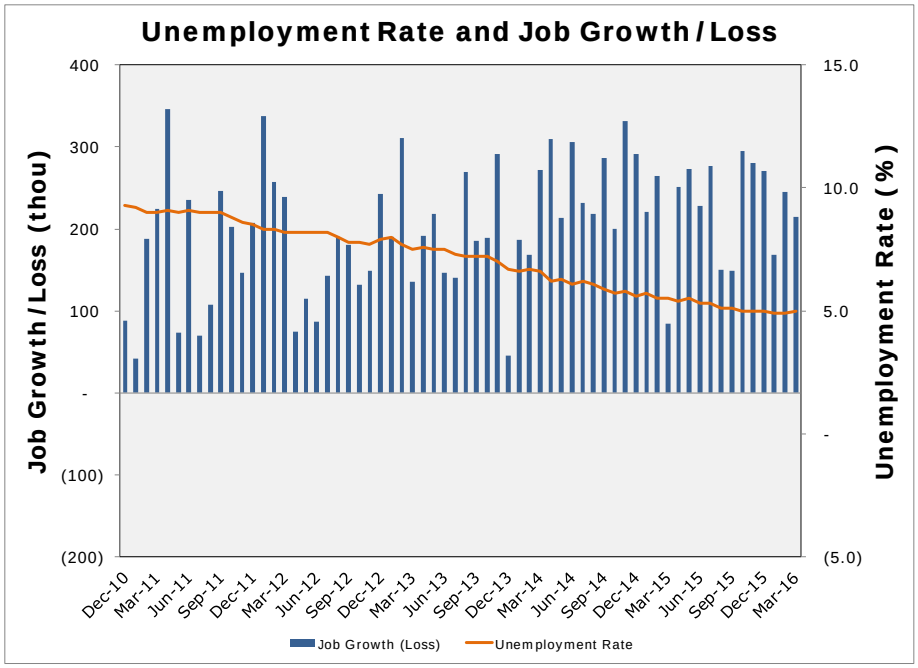
Note: Developed asset class is developed markets ex-U.S., ex-Canada.

Economic Review

March 31, 2016	Key Economic Indicators			
CPI (all items)	Monthly Change		Cumulative Change	
Seasonally adjusted	Mar-16	0.2	3-Month	0.1
	Feb-16	-0.2	12-Month	1.0
	Jan-16	0.0	10-Yr Annual	1.8
Breakeven Inflation	10-Year	1.6		
Consumer Sentiment	Mar-16	91.0		
Unv. of Michigan Survey	Feb-16	91.7		
	1-Yr Ago	93.0	10-Yr Avg	77.6
Manufacturing	Mar-16	51.8	Change in Manufacturing Sector	
Inst. for Supply Mgmt	Feb-16	49.5	>50	Expansion
Purchasing Mngrs' Idx	1-Yr Avg	50.5	<50	Contraction

Note: Seasonally adjusted CPI data is utilized to better reflect short-term pricing activity.
Mar/2016 CPI is based on Federal Reserve of Philadelphia Survey of Professional Forecasters





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

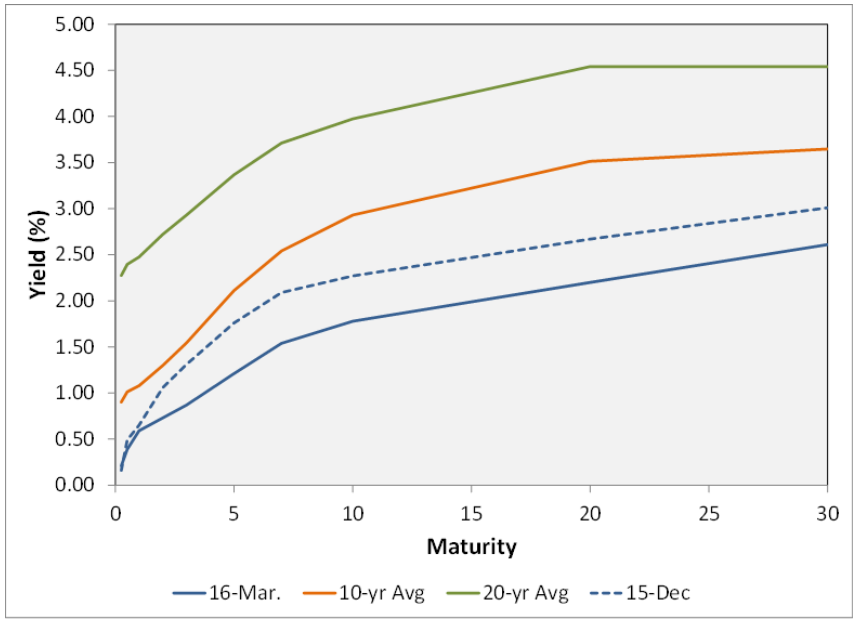
Update to Returns Assumptions (as of 3/31/16)

Wilshire

	Total Return (%)			Risk (%)
	Dec. 2015	Q1 2016	Change vs YE	Dec. 2015
Investment Categories:				
U.S. Stocks	6.50	6.50	-	17.00
Dev ex-U.S. Stocks	6.50	6.50	-	18.00
Emerging Mkt Stocks	6.50	6.50	-	26.00
Global Stocks	6.70	6.70	-	17.10
Private Markets	9.50	9.40	(0.10)	27.50
Cash Equivalents	1.25	1.40	0.15	1.25
Core Bonds	3.50	3.10	(0.40)	5.00
LT Core Bonds	4.30	3.65	(0.65)	10.00
TIPS	3.25	2.70	(0.55)	6.00
High Yield Bonds	6.35	6.30	(0.05)	10.00
EMD Local Currency (h)	5.60	5.15	(0.45)	5.00
U.S. RE Securities	5.00	5.00	-	17.00
Private Real Estate	5.80	5.95	0.15	14.00
Commodities	3.55	3.65	0.10	15.00
MLPs	9.65	10.05	0.40	17.00
Real Asset Basket	6.40	6.40	-	8.40
Inflation:	1.55	1.65	0.10	1.75
Returns minus Inflation:				
U.S. Stocks	4.95	4.85	(0.10)	
U.S. Bonds	1.95	1.45	(0.50)	
Cash Equivalents	(0.30)	(0.25)	0.05	
Stocks minus Bonds:	3.00	3.40	0.40	
Bonds minus Cash:	2.25	1.70	(0.55)	

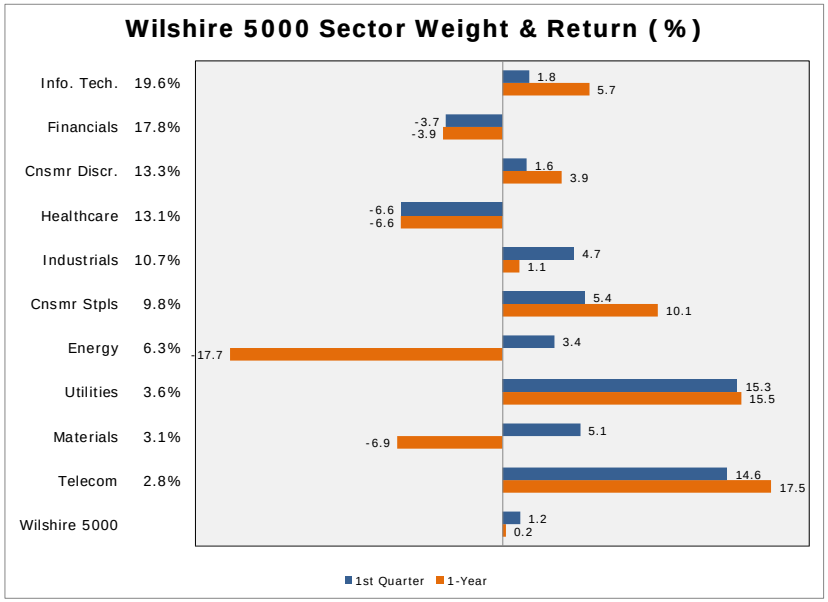
- Slight increase in breakeven inflation from year-end
  - Real asset forecasts are up slightly, as well
- Fixed income assumptions are down substantially on big drop in the yield curve
  - Yield curve down across all maturities greater than 3 months

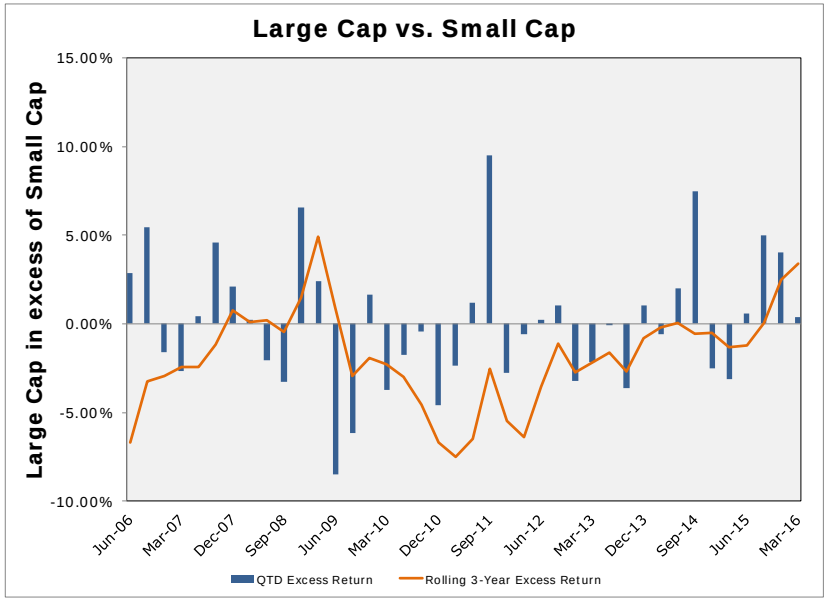
Yield Curve

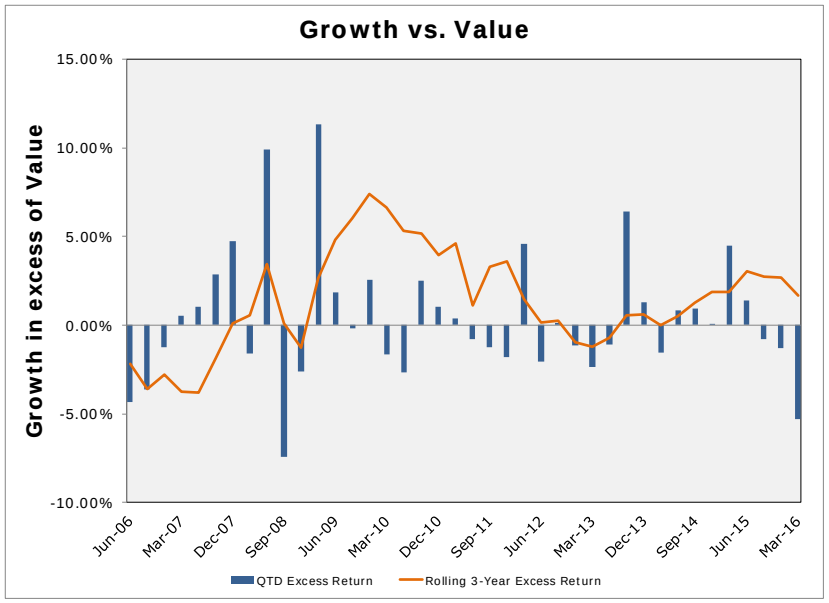


U.S. Equity Market

March 31, 2016	Qtr	Ytd	1 Yr	3 Yr	5 Yr	10 Yr
Wilshire 5000	1.2	1.2	0.2	11.3	11.0	7.0
Wilshire U.S. Large Cap	1.3	1.3	1.3	11.6	11.3	7.0
Wilshire U.S. Small Cap	0.9	0.9	-8.2	8.0	8.5	7.0
Wilshire U.S. Large Growth	-1.7	-1.7	-1.9	12.8	11.4	7.7
Wilshire U.S. Large Value	3.7	3.7	3.9	10.6	11.2	6.3
Wilshire U.S. Small Growth	-2.8	-2.8	-12.9	7.1	7.6	6.8
Wilshire U.S. Small Value	4.1	4.1	-3.8	8.8	9.4	7.1
Wilshire REIT Index	5.2	5.2	4.8	11.1	12.1	6.3
MSCI USA Minimum Volatility Index	5.5	5.5	8.2	12.1	13.5	8.1
FTSE RAFI U.S. 1000 Index	2.0	2.0	-0.9	10.4	10.9	7.9





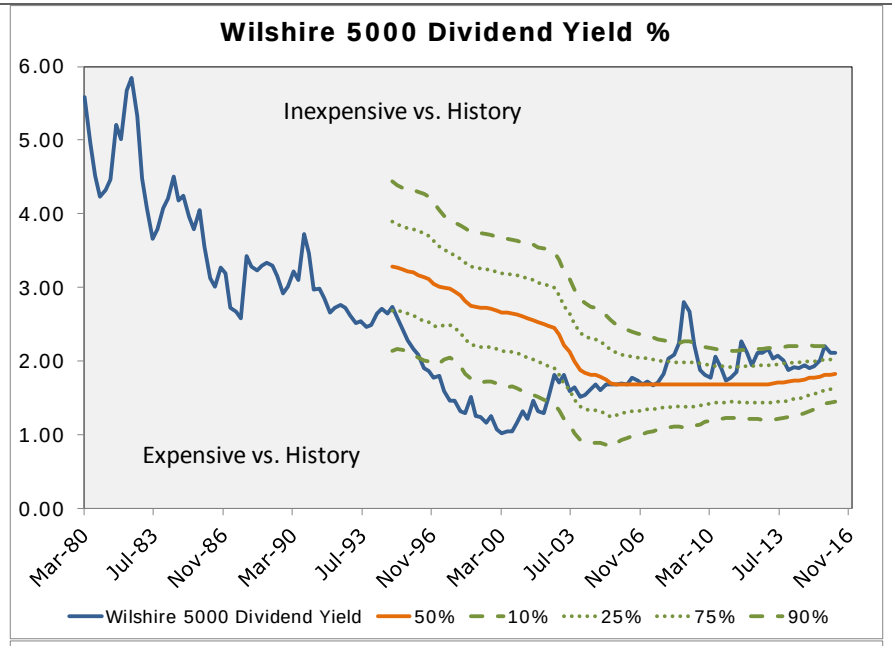


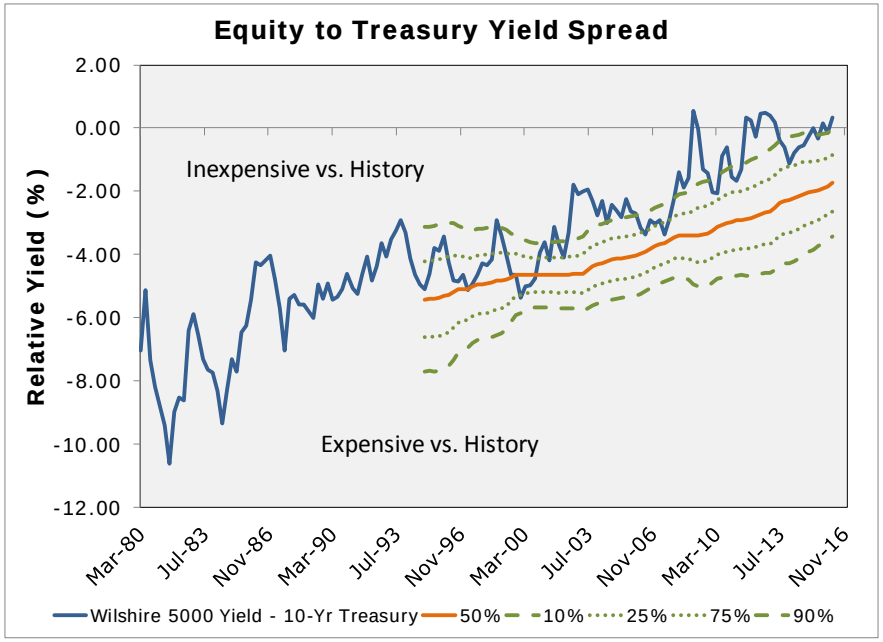
Data sources: Wilshire Compass, Wilshire Atlas

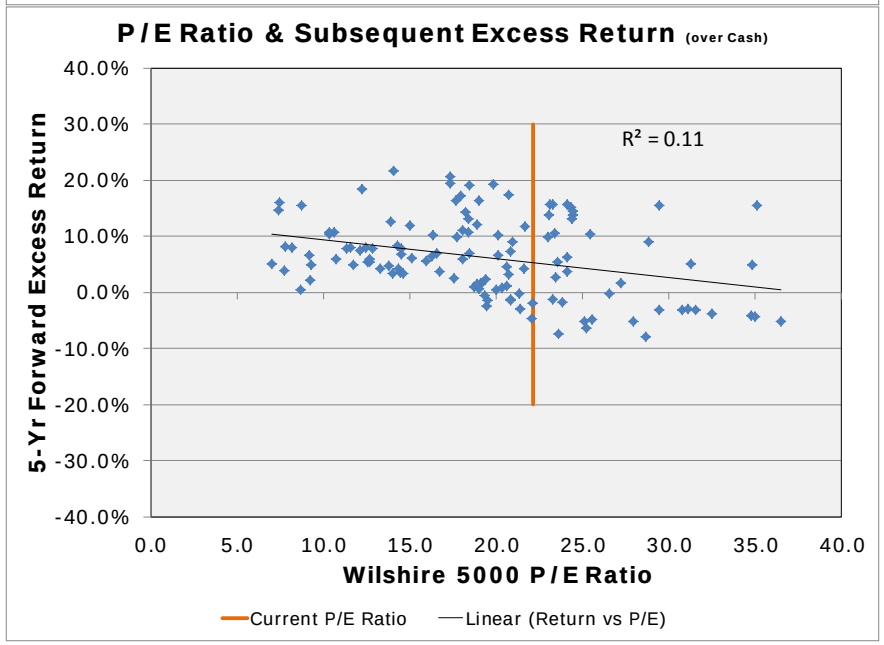
U.S. Equity Valuations

Wilshire

- Distribution of historical dividend yield is tight; current observation at the 85%-percentile outcome
- Spread (discount) between the dividend yield and Treasuries has decreased as yields have fallen through the years





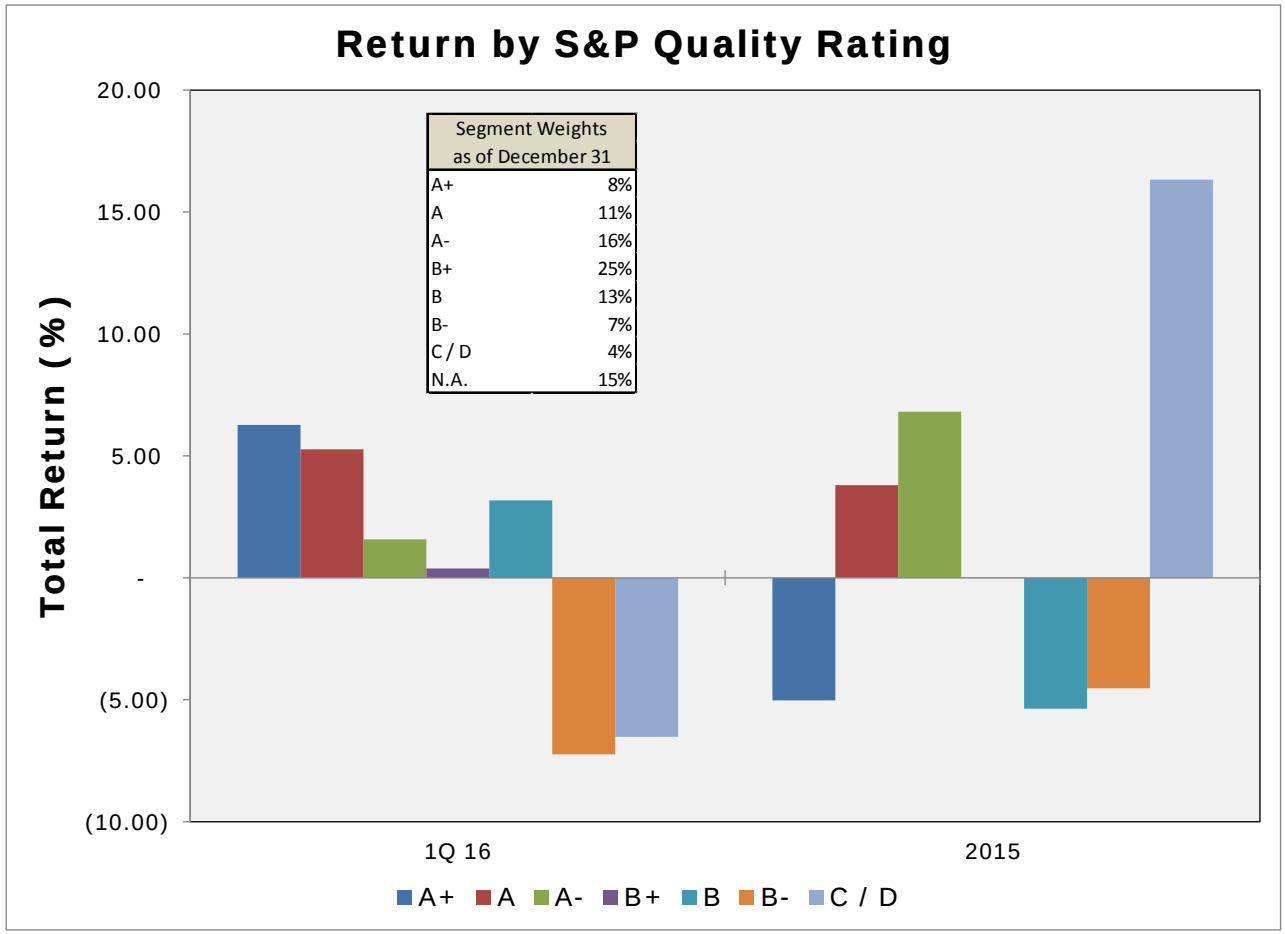


Source: Wilshire Compass, Wilshire Atlas, Barclays Capital

Returns by Quality Segment

Wilshire

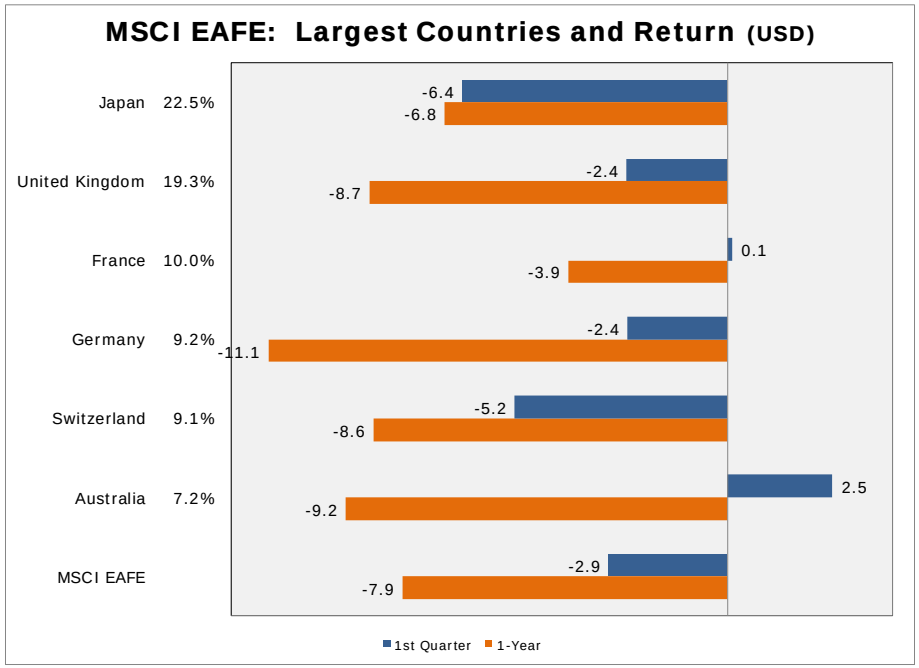
Returns decreased with quality to begin 2016 with A+ and A rated names leading the pack

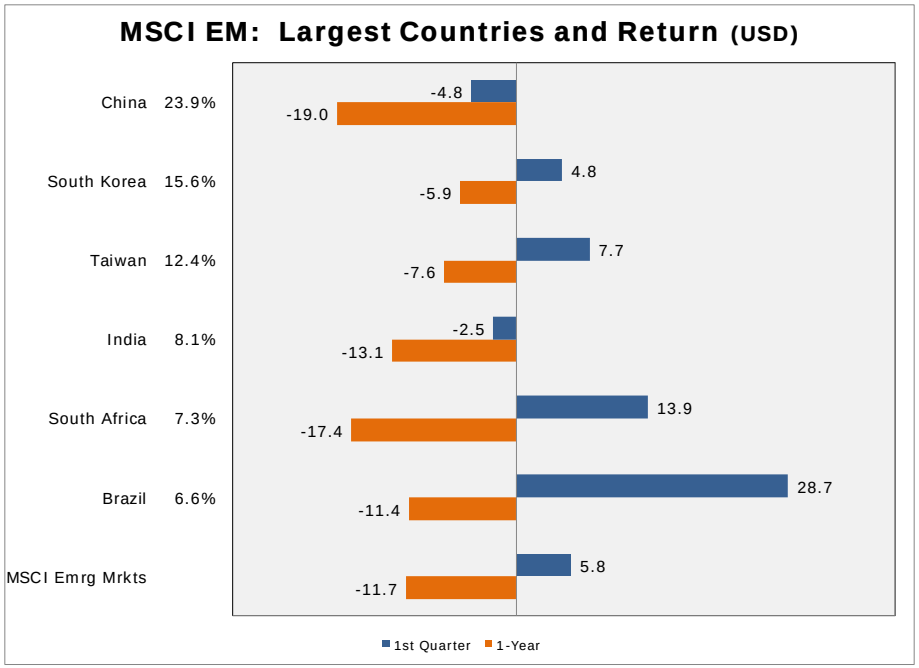


Data sources: Wilshire Atlas

Non-U.S. Equity Market

March 31, 2016	Qtr	Ytd	1 Yr	3 Yr	5 Yr	10 Yr
MSCI ACWI ex-US ($g)	-0.3	-0.3	-8.8	0.8	0.8	2.4
MSCI EAFE ($g)	-2.9	-2.9	-7.9	2.7	2.8	2.3
MSCI Emerging Markets ($g)	5.8	5.8	-11.7	-4.2	-3.8	3.3
MSCI Frontier Markets ($g)	-0.8	-0.8	-12.1	2.2	1.7	-0.3
MSCI ACWI ex-US Growth ($g)	-0.2	-0.2	-5.8	2.3	2.0	3.1
MSCI ACWI ex-US Value ($g)	-0.3	-0.3	-11.8	-0.8	-0.5	1.7
MSCI ACWI ex-US Small ($g)	0.8	0.8	-0.3	4.0	2.8	4.3
MSCI EAFE Minimum Volatility Idx	2.2	2.2	4.0	7.2	8.4	6.7
FTSE RAFI Developed ex-US Index	-2.5	-2.5	-10.3	2.5	0.9	2.6
MSCI EAFE LC (g)	-6.4	-6.4	-10.8	6.9	6.7	2.2
MSCI Emerging Markets LC (g)	2.8	2.8	-7.3	2.3	1.7	5.7



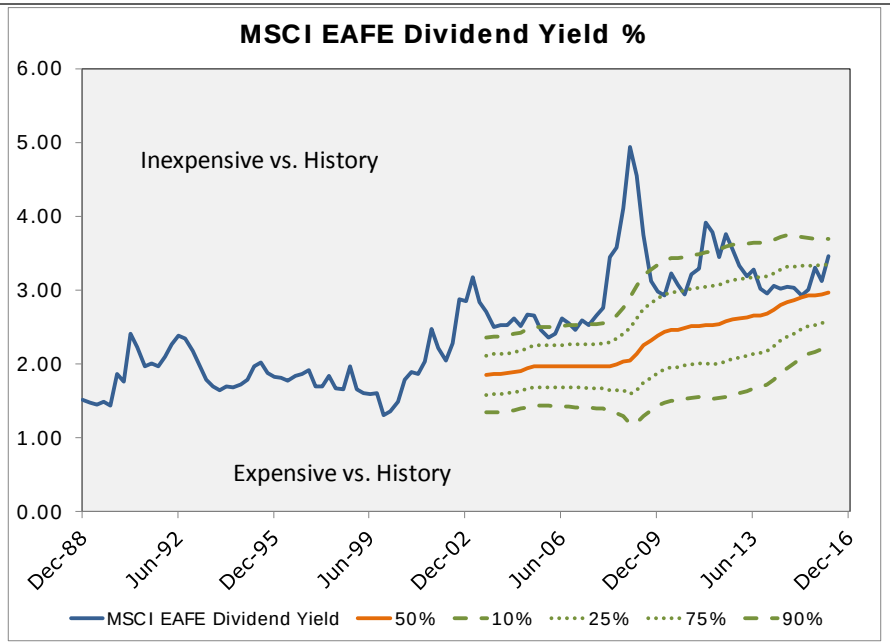


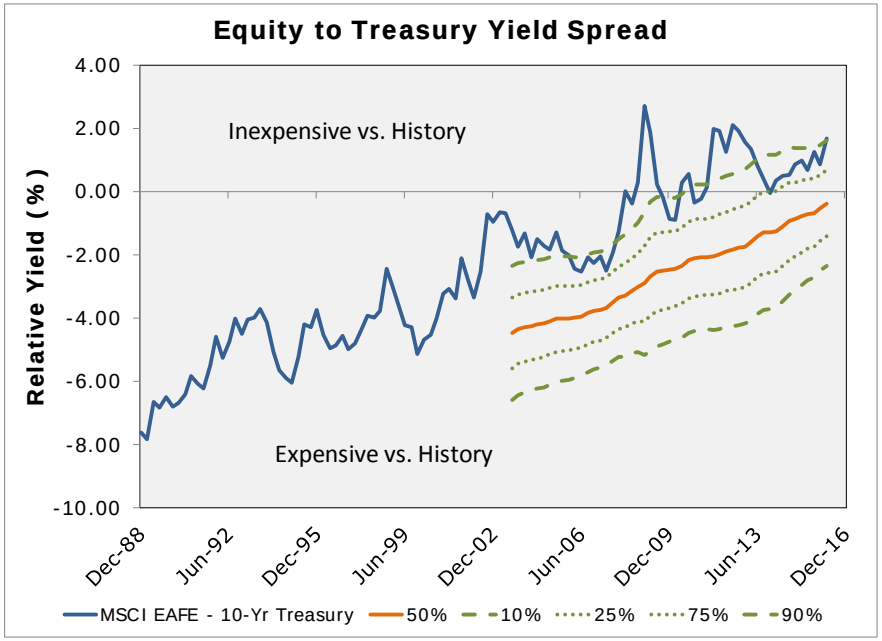
Data sources: Wilshire Compass

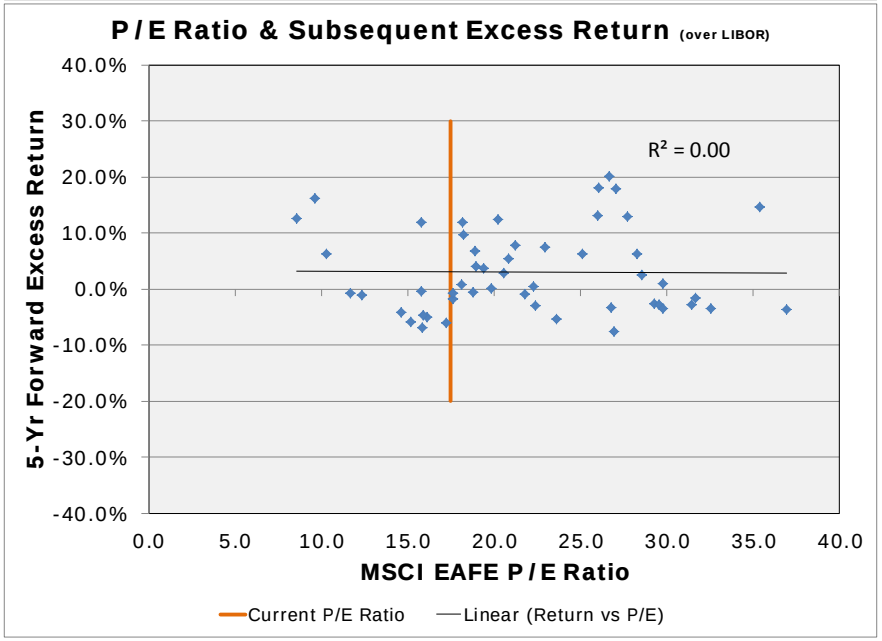
Developed Market Equity Valuations

Wilshire

- Dividend yield is above the 15-year median; at the 81%-percentile outcome
- Spread between Developed Equity and the 10-Year Treasury has been narrowing





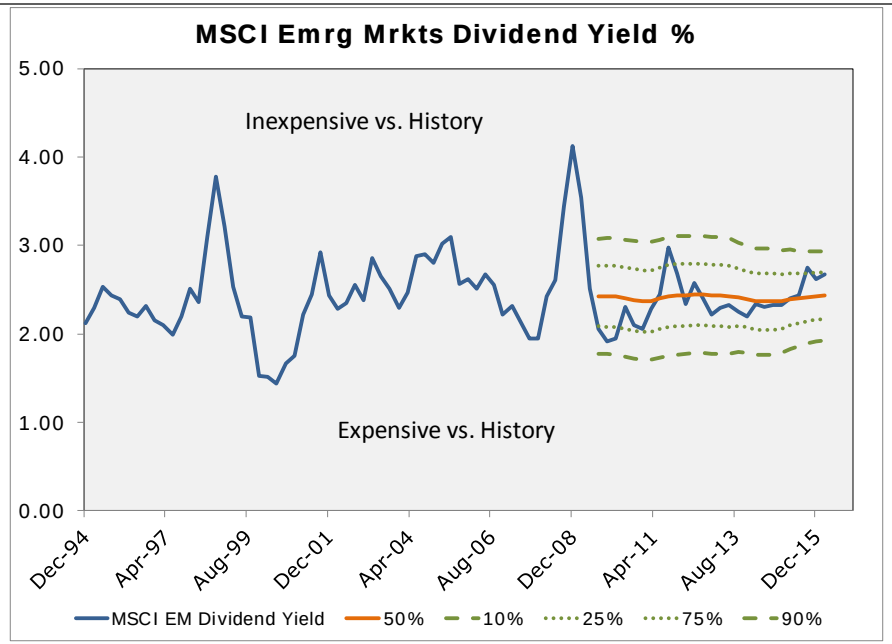


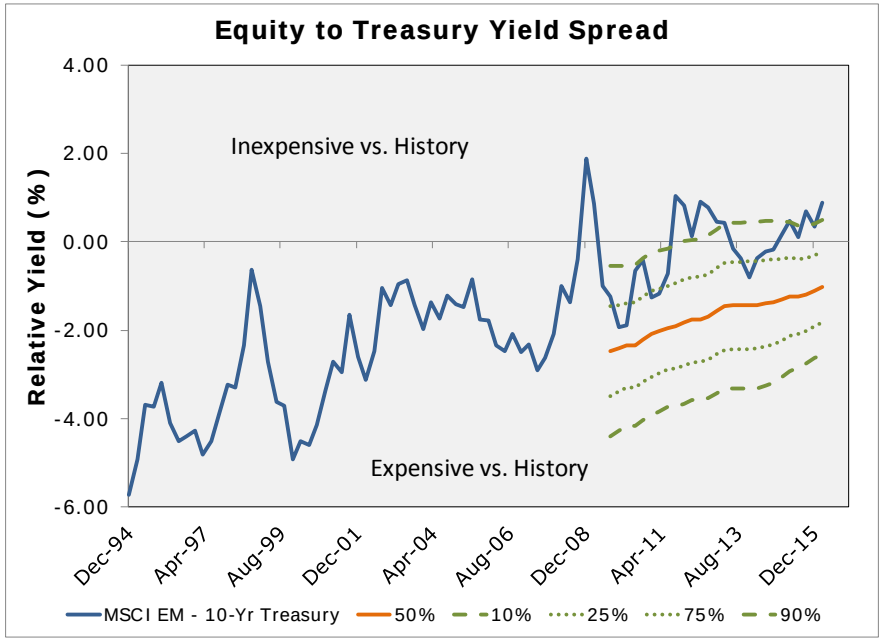
Source: Wilshire Compass, Wilshire Atlas, Barclays Capital

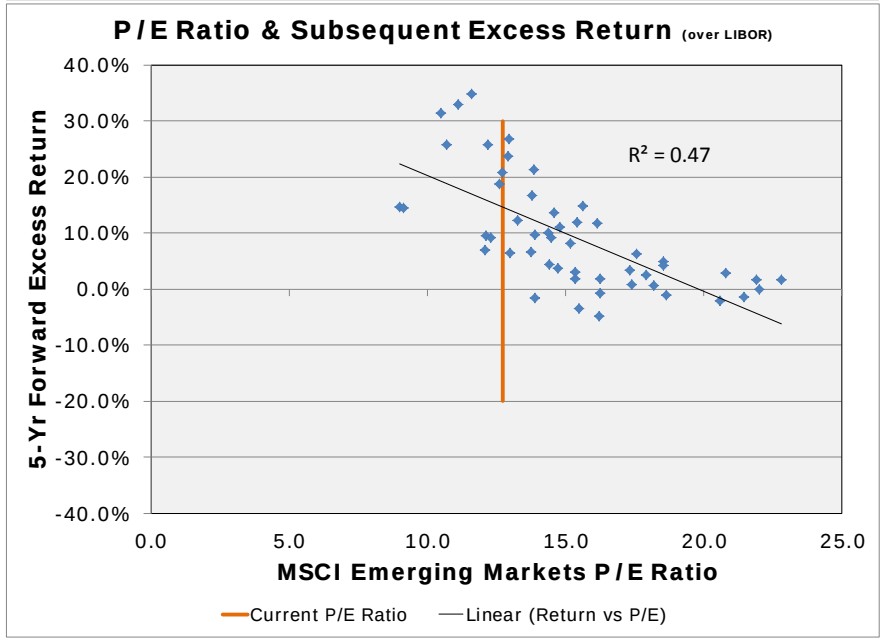
Emerging Market Equity Valuations

Wilshire

- Current dividend yield above its 15-year median; at the 73%-percentile outcome
- Spread between Emerging Market Equity and the 10-Year Treasury has been narrowing



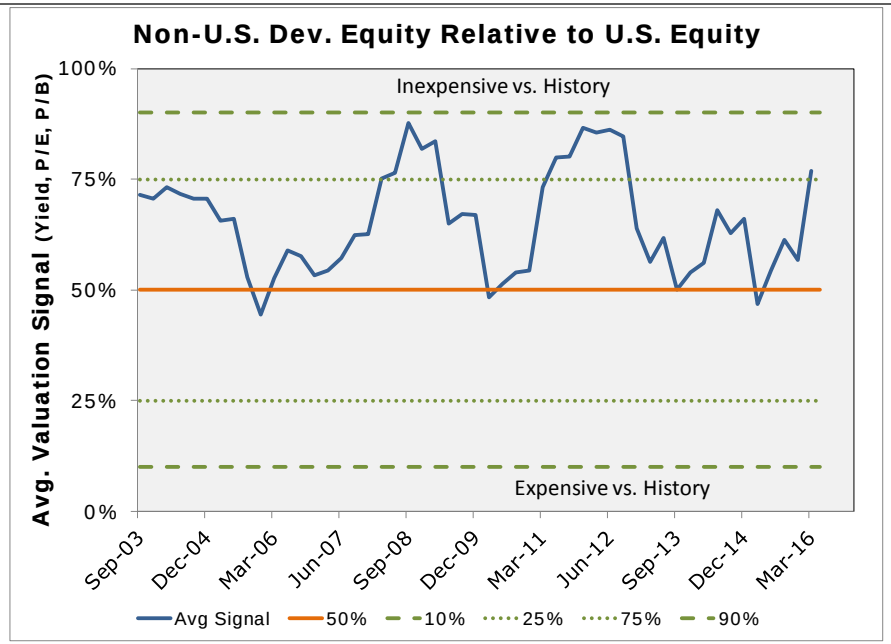


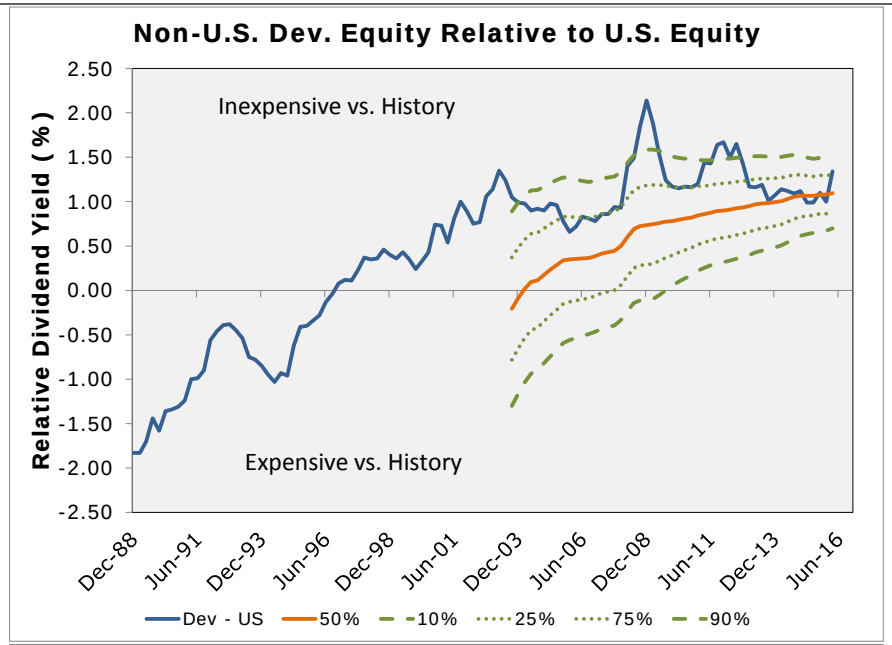


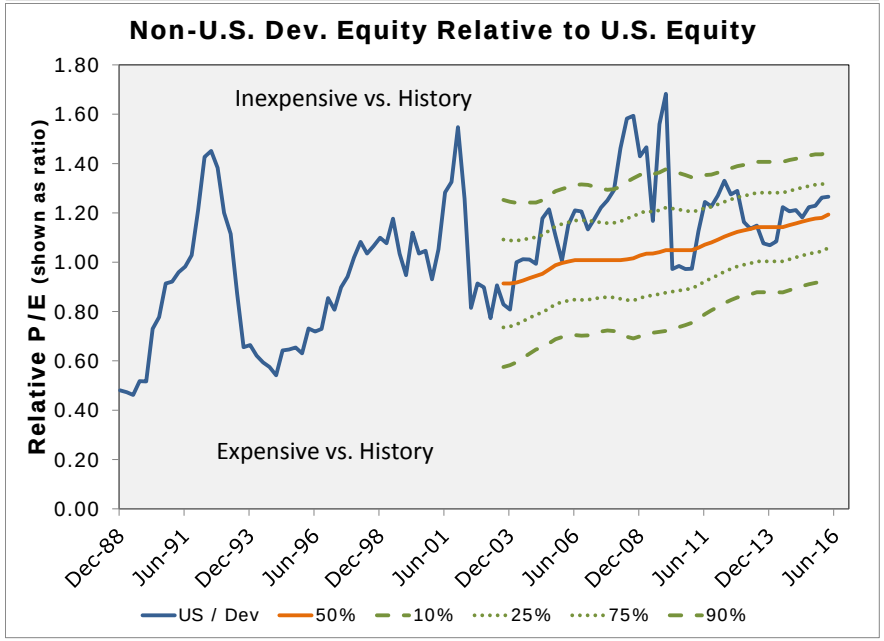
Source: Wilshire Compass, Wilshire Atlas, Barclays Capital

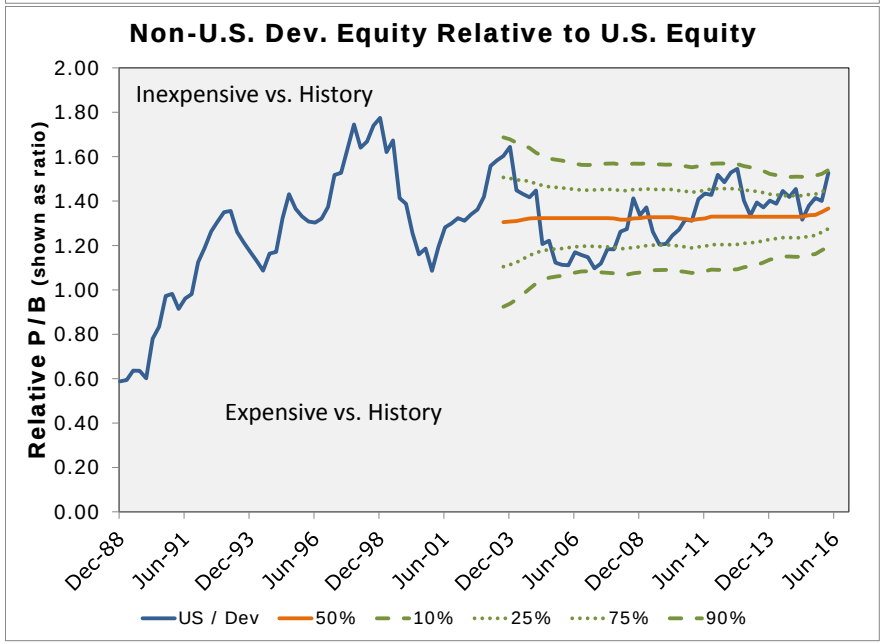
Developed (Non-U.S.) Equity vs. U.S. Equity

Wilshire





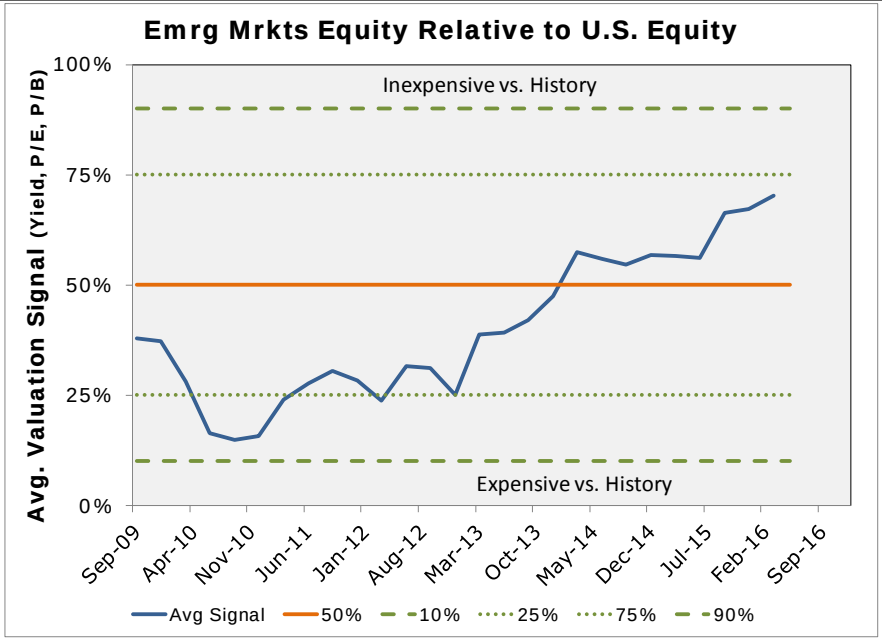


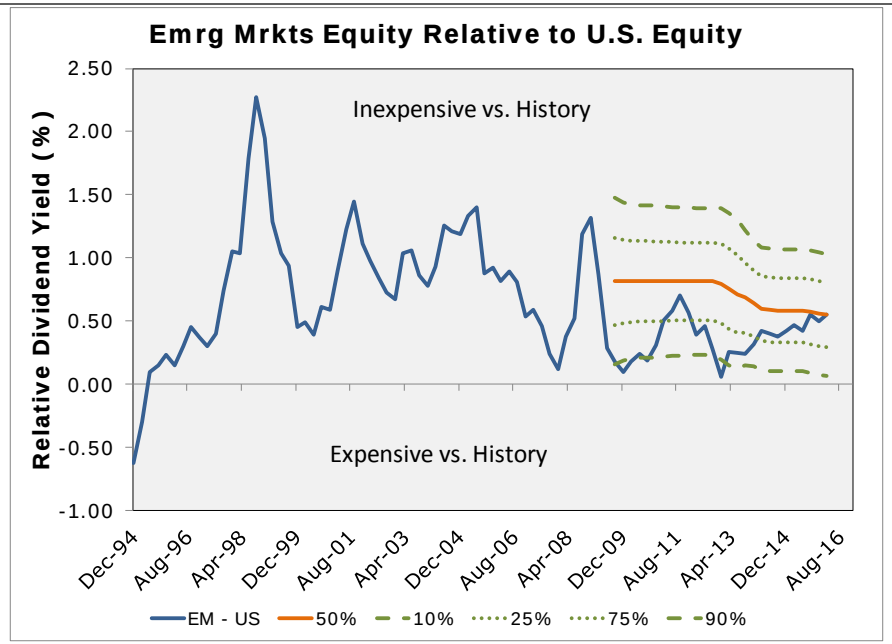


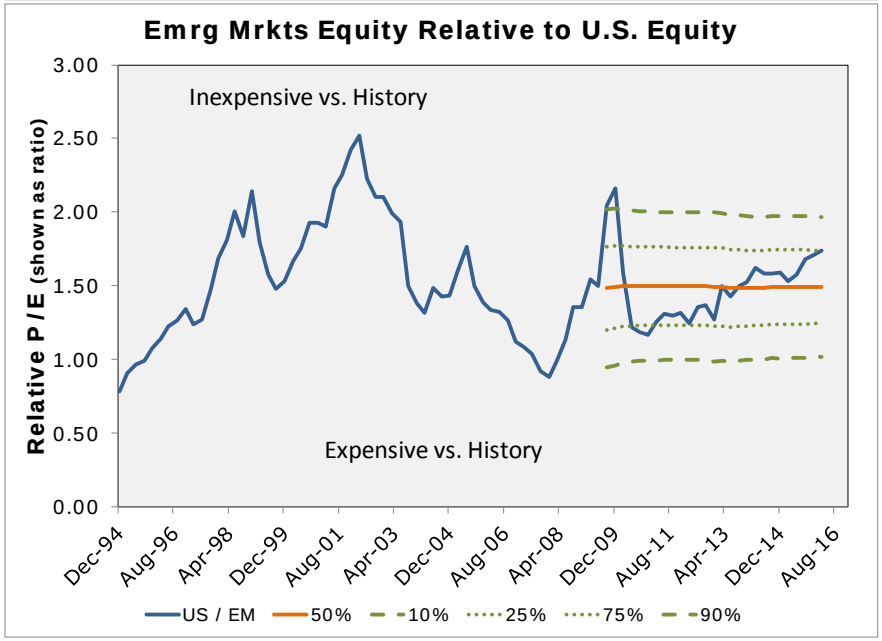
Source: Wilshire Compass, Wilshire Atlas

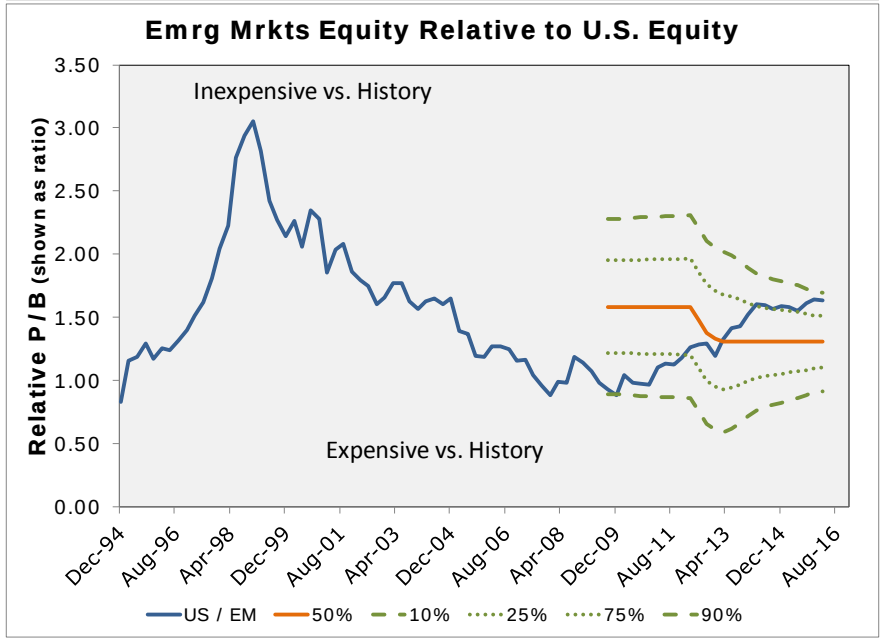
Emerging Markets Equity vs. U.S. Equity

Wilshire





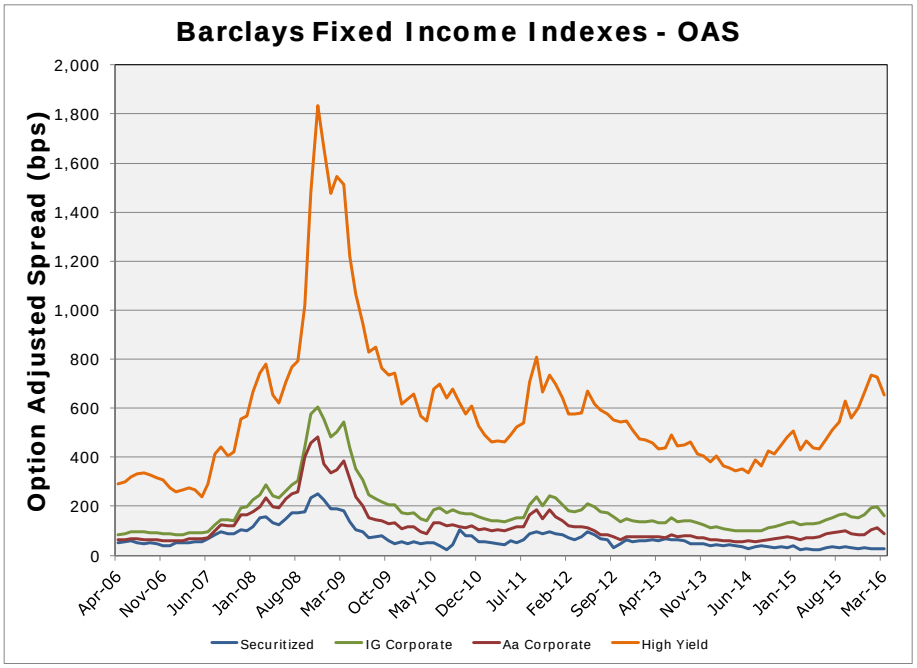


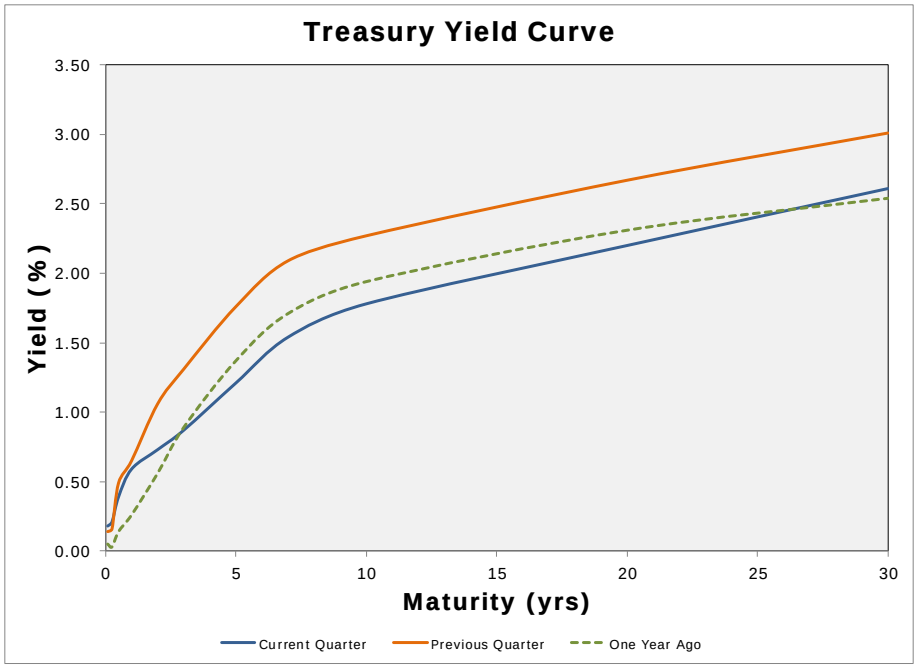


Source: Wilshire Compass, Wilshire Atlas

U.S. Fixed Income Market

March 31, 2016	Qtr	Ytd	1 Yr	3 Yr	5 Yr	10 Yr
Barclays Aggregate Bond Index	3.0	3.0	2.0	2.5	3.8	4.9
Barclays Treasury Index	3.2	3.2	2.4	2.1	3.6	4.6
Barclays Gov't-Related Index	3.1	3.1	1.3	2.1	3.4	4.6
Barclays Securitized Index	2.1	2.1	2.4	2.7	3.3	4.8
Barclays Corporate IG Index	4.0	4.0	0.9	3.0	5.2	5.8
Barclays LT Gov't/Credit Index	7.3	7.3	0.4	4.8	8.5	7.6
Barclays LT Treasury Index	8.2	8.2	2.8	6.1	9.7	8.0
Barclays LT Gov't-Related Index	6.7	6.7	0.4	3.8	8.1	7.5
Barclays LT Corporate IG Index	6.8	6.8	-1.3	4.3	7.7	7.2
Barclays U.S. TIPS Index	4.5	4.5	1.5	-0.7	3.0	4.6
Barclays High Yield Index	3.4	3.4	-3.7	1.8	4.9	7.0
Treasury Bills	0.1	0.1	0.1	0.1	0.1	1.1



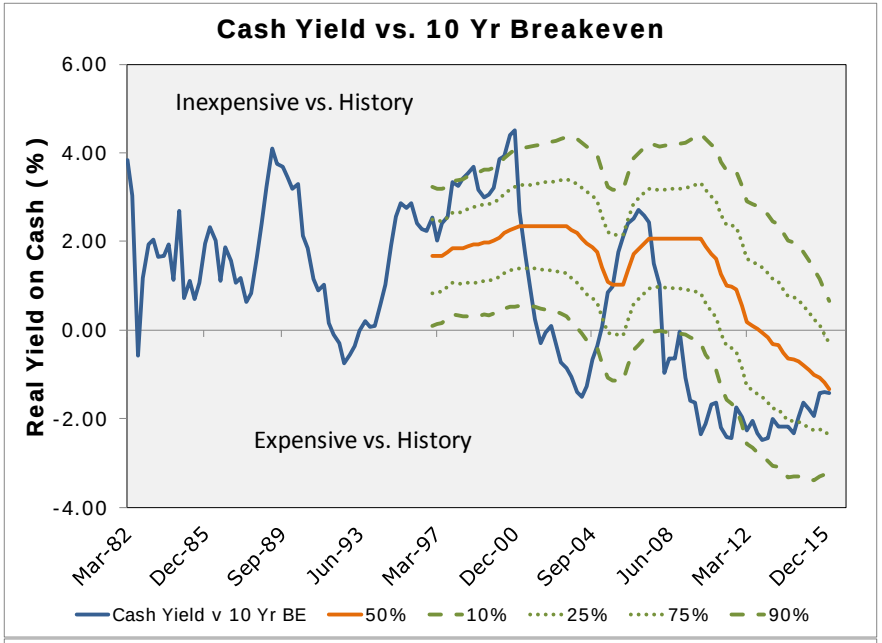


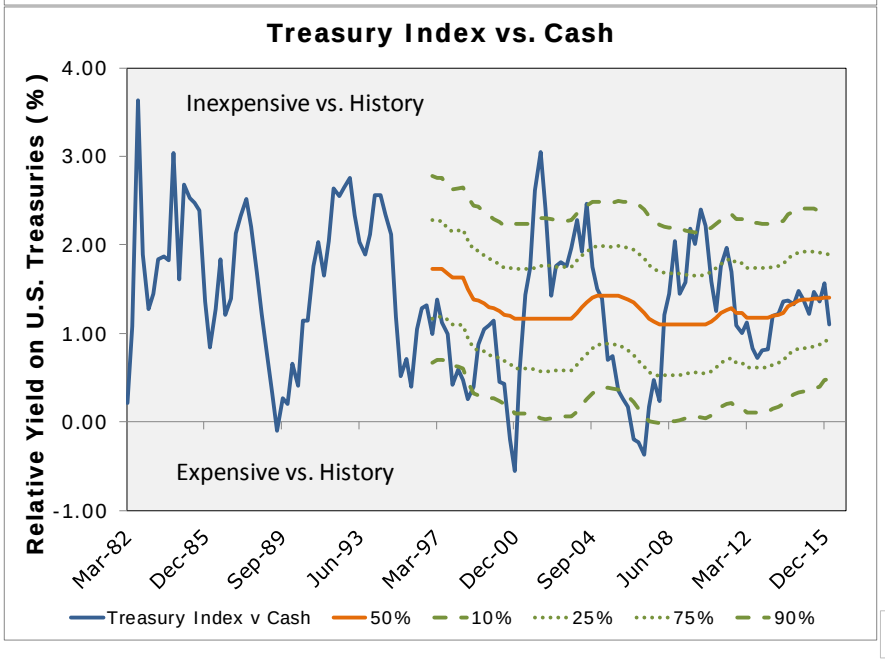
Data sources: Wilshire Compass, Barclays Capital, U.S. Treasury

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 0.21%
- Spread between the broad Treasury market and cash is below the 15-year median

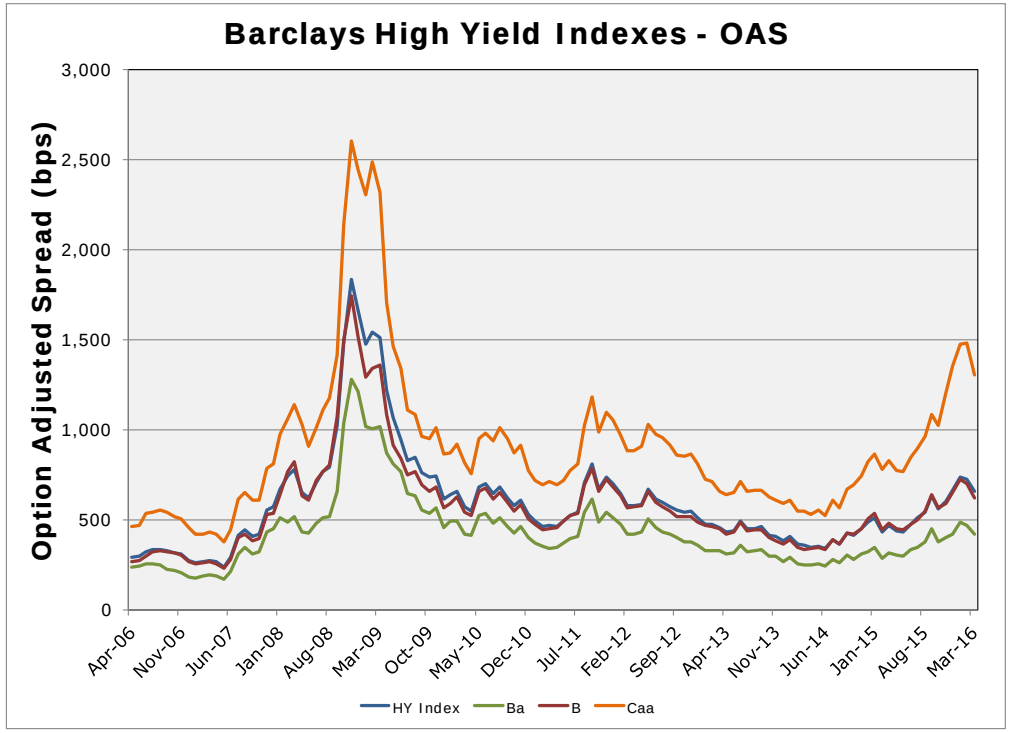




Source: Wilshire Compass, U.S. Treasury, Barclays Capital

High Yield Bond Market

March 31, 2016	Weight	Qtr	Ytd	1 Yr	3 Yr
Barclays High Yield Index	100%	3.4	3.4	-3.7	1.8
Quality Distribution					
Ba U.S. High Yield	46.2%	3.9	3.9	0.1	3.7
B U.S. High Yield	38.0%	2.5	2.5	-4.9	1.1
Caa U.S. High Yield	14.8%	3.8	3.8	-10.6	-1.0
Ca to D U.S. High Yield	0.8%	4.7	4.7	-52.8	-33.2
Non-Rated U.S. High Yield	0.1%	-3.6	-3.6	-19.3	-5.7

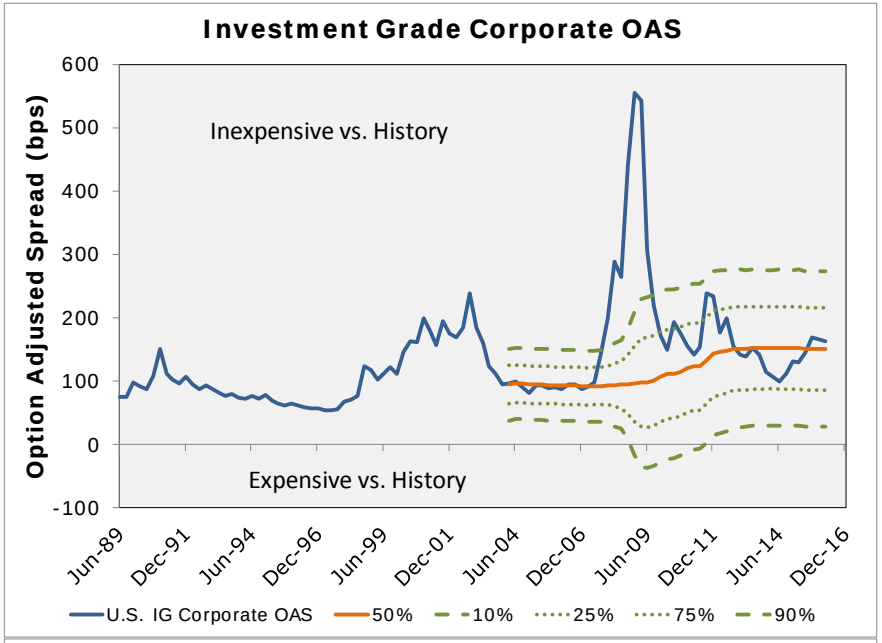


Data sources: Barclays Capital

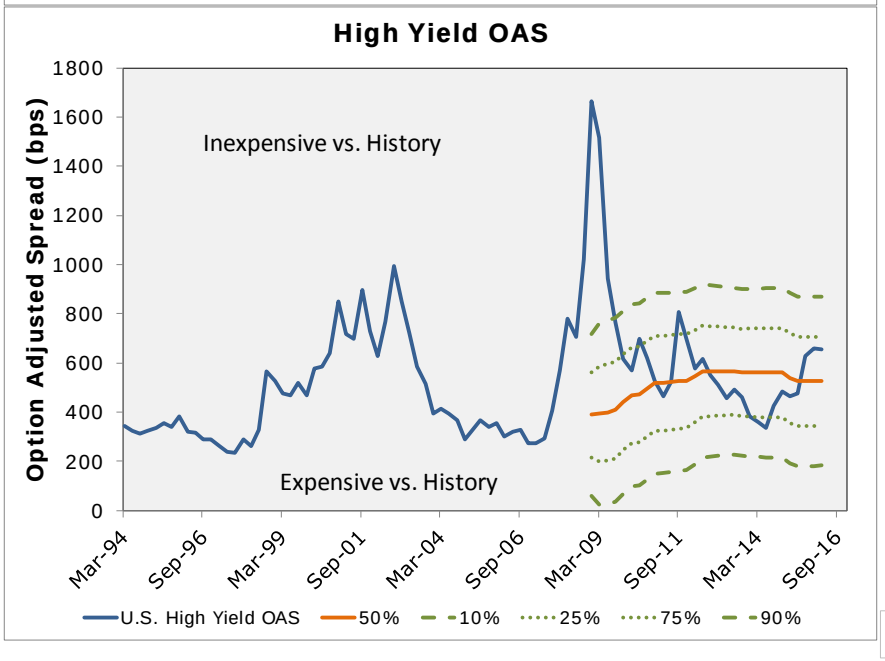
Relative Fixed Income Yields

Wilshire

- Spread versus Treasuries on the investment grade index is above its 15 year historical median, at the 55%-percentile outcome



- Spread on high yield bonds also above the historical median, currently at the 69%-percentile outcome

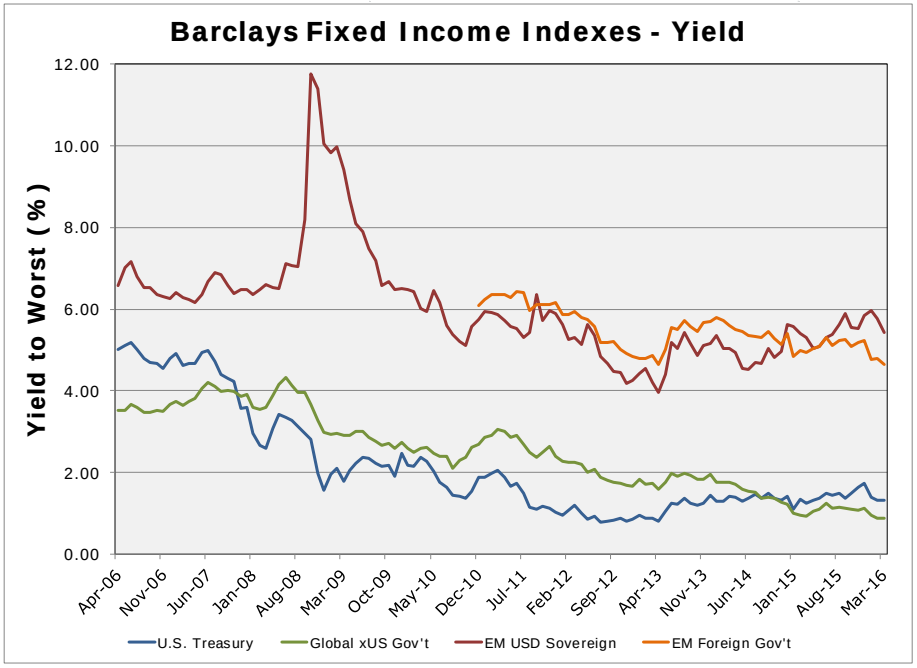


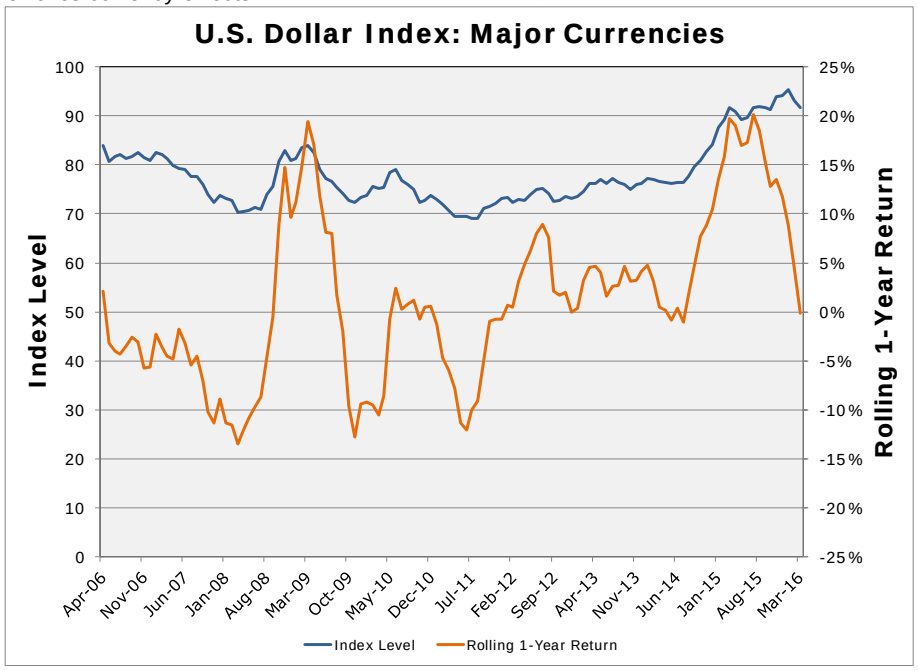
Source: Barclays Capital

Non-U.S. Fixed Income Market

March 31, 2016	Qtr	Ytd	1 Yr	3 Yr	5 Yr	10 Yr
Developed Markets						
Barclays Global Aggregate xUS	8.3	8.3	6.7	-0.3	0.4	3.9
Barclays Global Aggregate xUS *	3.5	3.5	2.8	4.6	5.2	4.7
Barclays Wrld Govt xUS IL Bond	4.9	4.9	0.7	0.4	2.1	4.4
Barclays Wrld Govt xUS IL Bond *	3.6	3.6	-0.2	3.5	5.7	5.0
Emerging Mrkts (Hard Currency)						
Barclays EM USD Aggregate	4.5	4.5	3.5	2.6	5.7	7.1
Emerging Mrkts (Foreign Currency)						
Barclays EM Local Currency Govt	8.6	8.6	0.1	-3.0	0.5	n.a.
Barclays EM Local Currency Govt *	3.2	3.2	1.9	1.5	3.4	n.a.
Euro vs. Dollar	4.9	4.9	6.1	-3.9	-4.3	-0.6
Yen vs. Dollar	7.0	7.0	6.7	-5.8	-5.9	0.5
Pound vs. Dollar	-2.5	-2.5	-3.2	-1.8	-2.2	-1.9

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



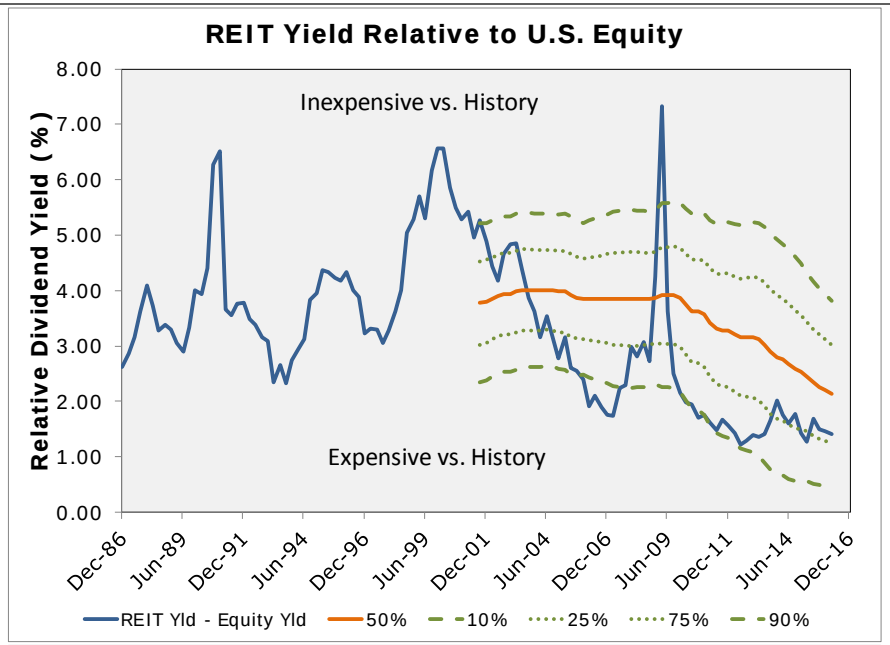


Data sources: Wilshire Compass, Barclays Capital

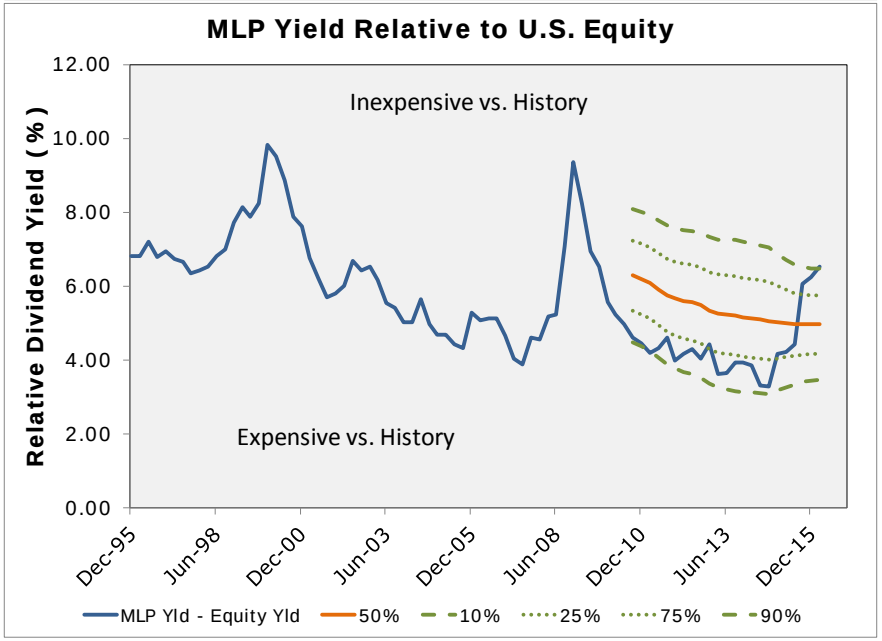
Relative Yield on Real Assets

Wilshire

- REIT yields typically run higher than the earnings yield for the broad equity market
- Current relative yield at the 29%-percentile outcome



- Major swing in relative MLP yield since September of 2014
- Current relative yield at the 91%-percentile outcome

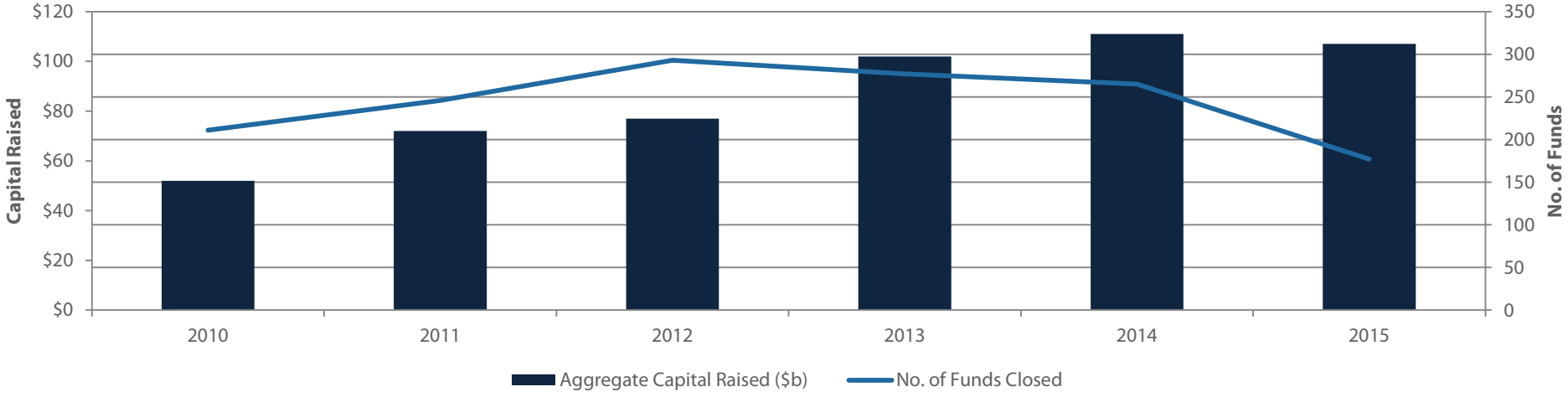


Source: Wilshire Compass, Wilshire Atlas, Alerian

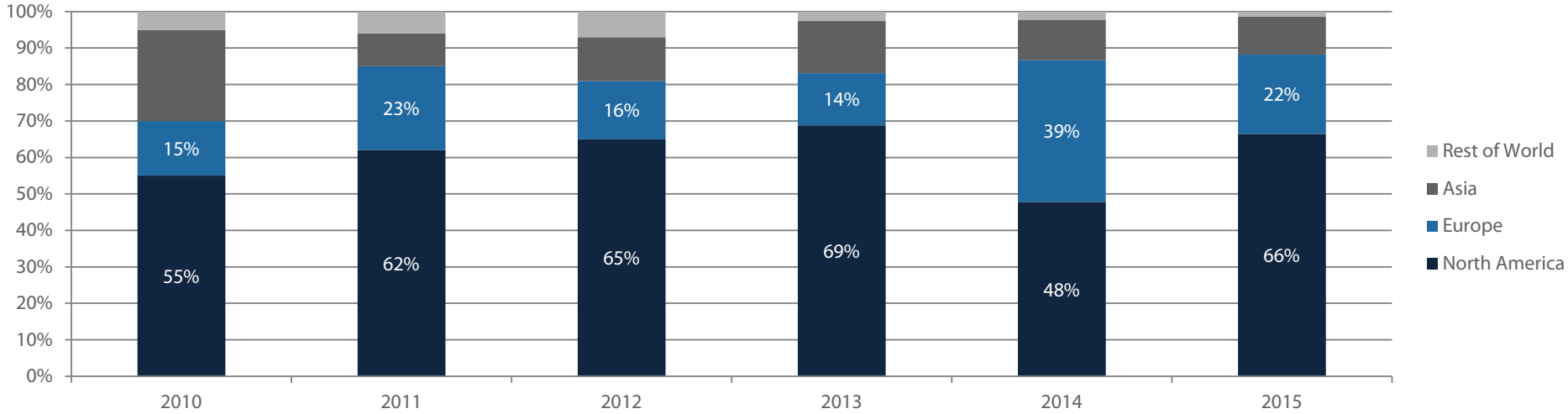
Private Real Estate – Fundraising Activity

Wilshire

Quarterly Closed-End Private Real Estate Fundraising (2010 – 2015)



Proportion of Aggregate Capital Raised by Closed-End Private Real Estate Funds by Fund Geographic Focus (2010 – 2015)

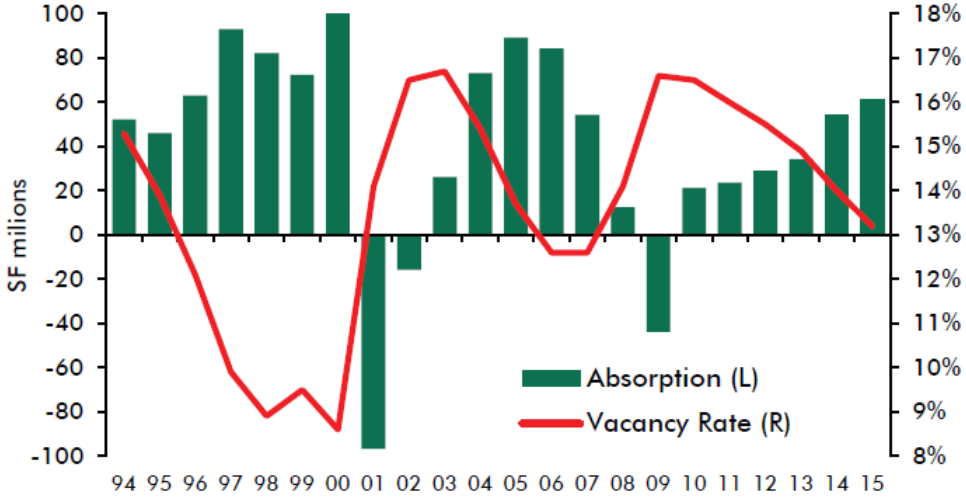


Sources: Preqin.

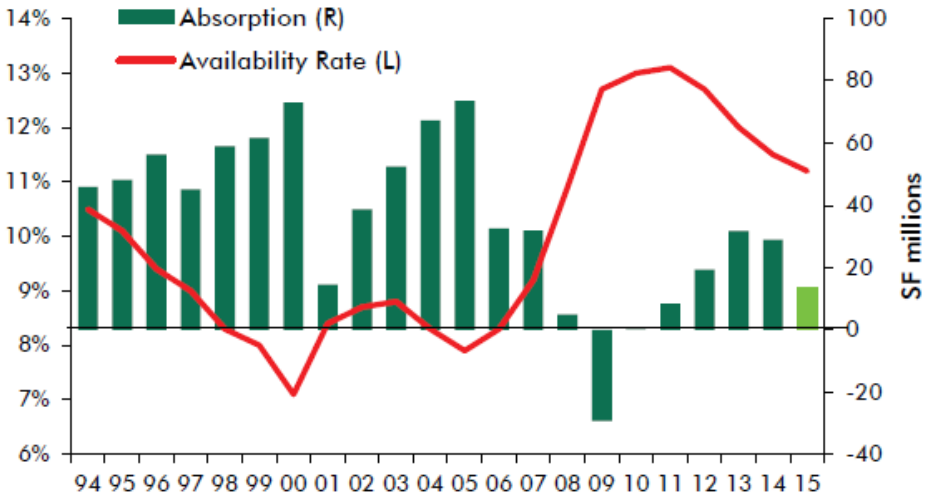
Commercial Property (as of 4Q 2015)

Wilshire

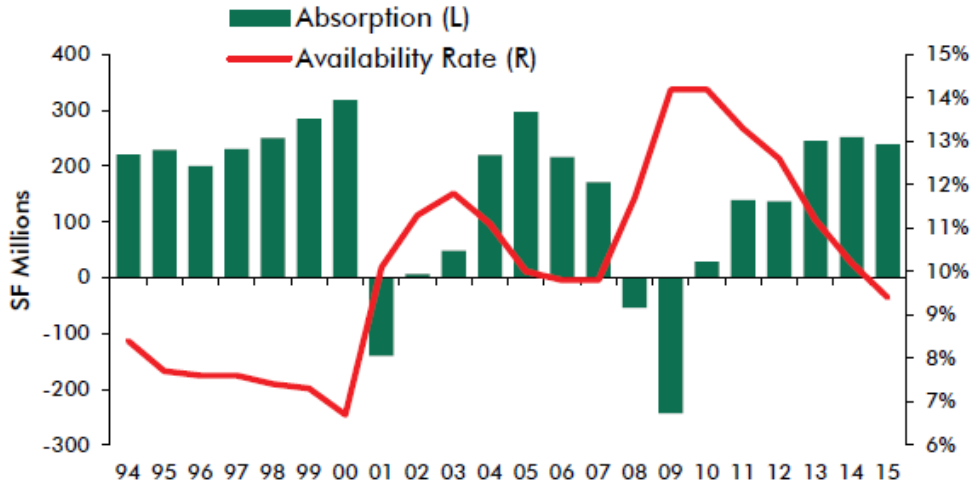
Office



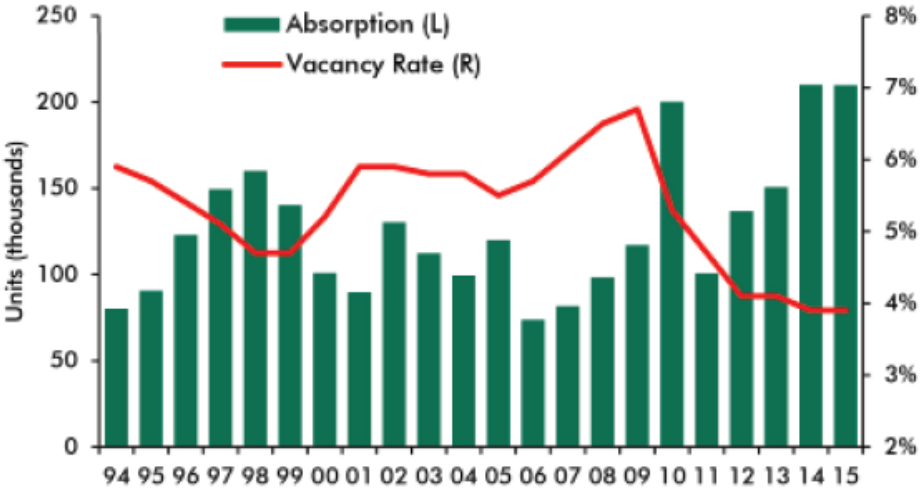
Retail



Industrial



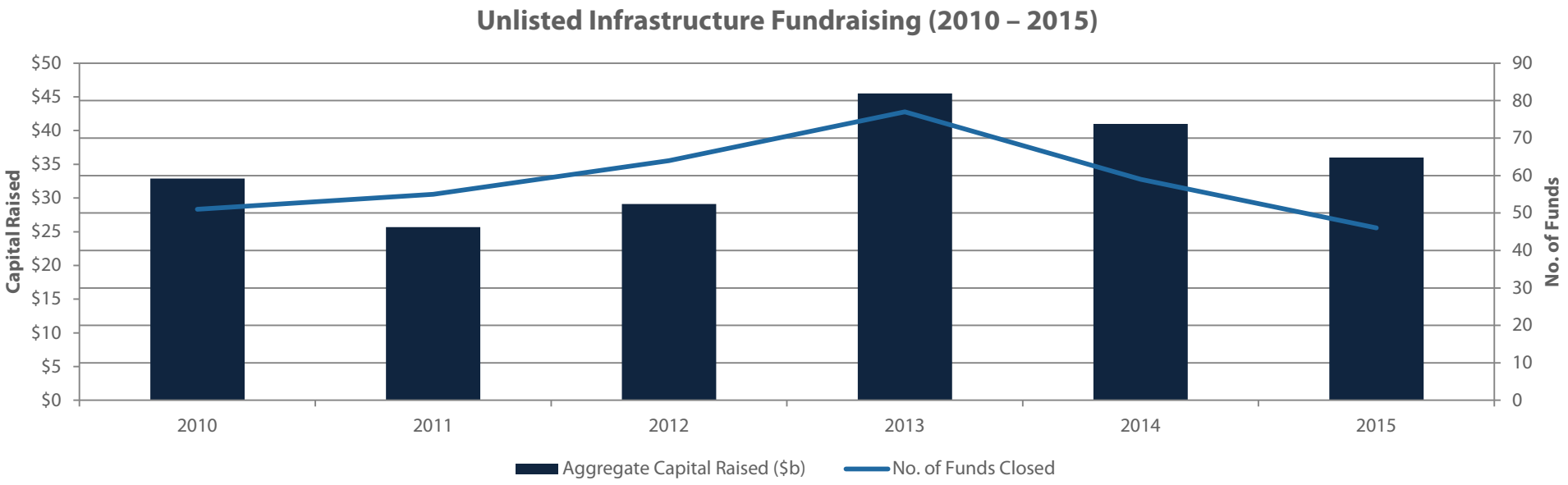
Apartment

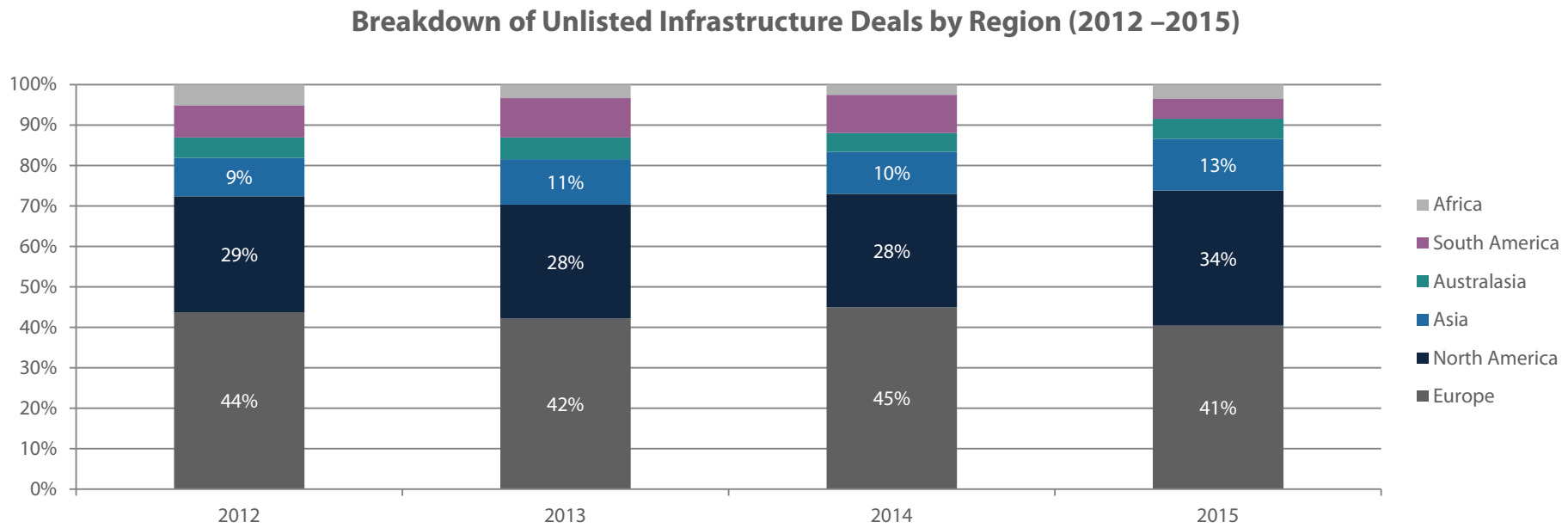


Source: CB Richard Ellis

Unlisted Infrastructure – Fundraising & Investment Activity

Wilshire



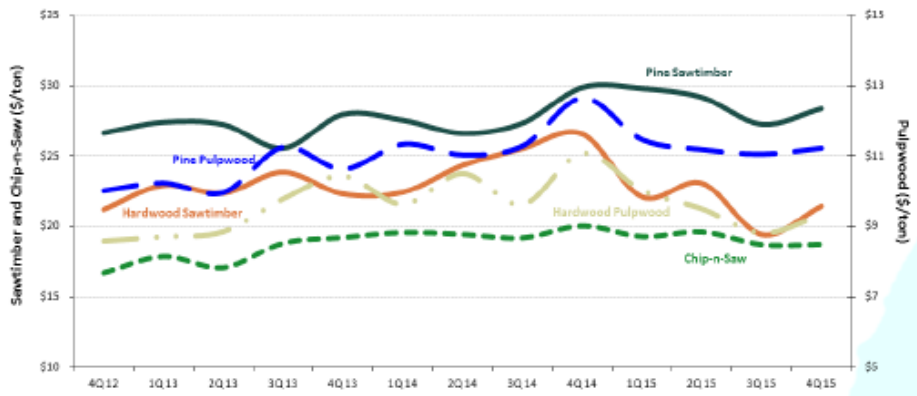


Sources: Preqin.

Timber

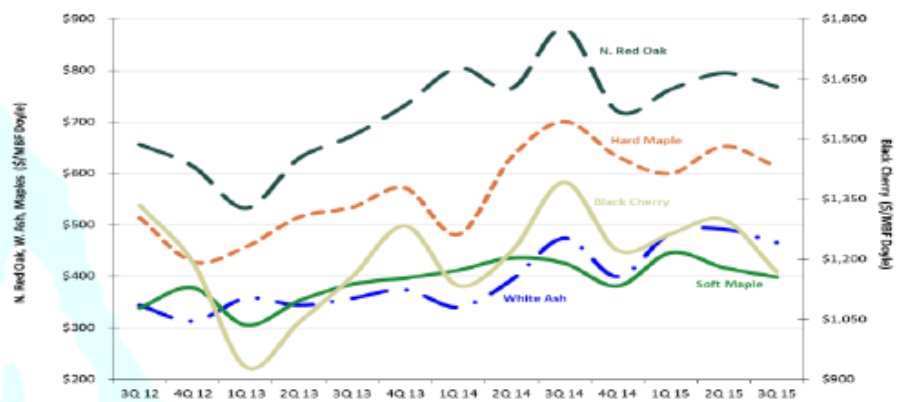
Wilshire

Southeastern Timber Prices



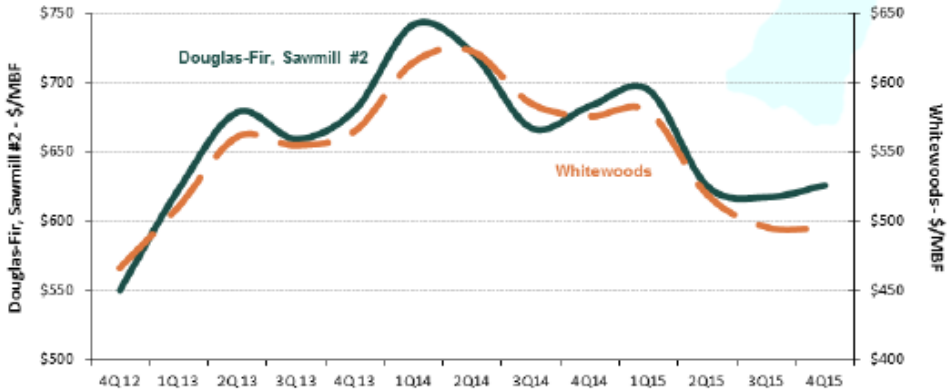
Source: Forest2Market®

Northeastern Hardwood Timber Prices



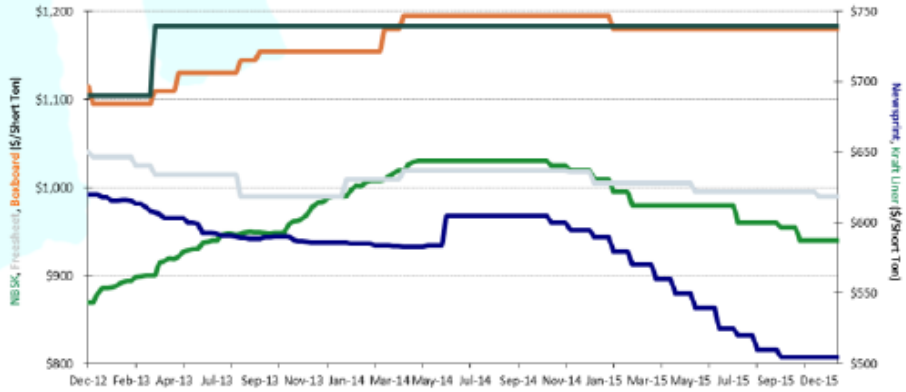
Source: Pennsylvania Woodlands Timber Market Report - Northwest Region

Pacific Northwest Timber Prices



Source: Log Lines®

Pulp and Paper

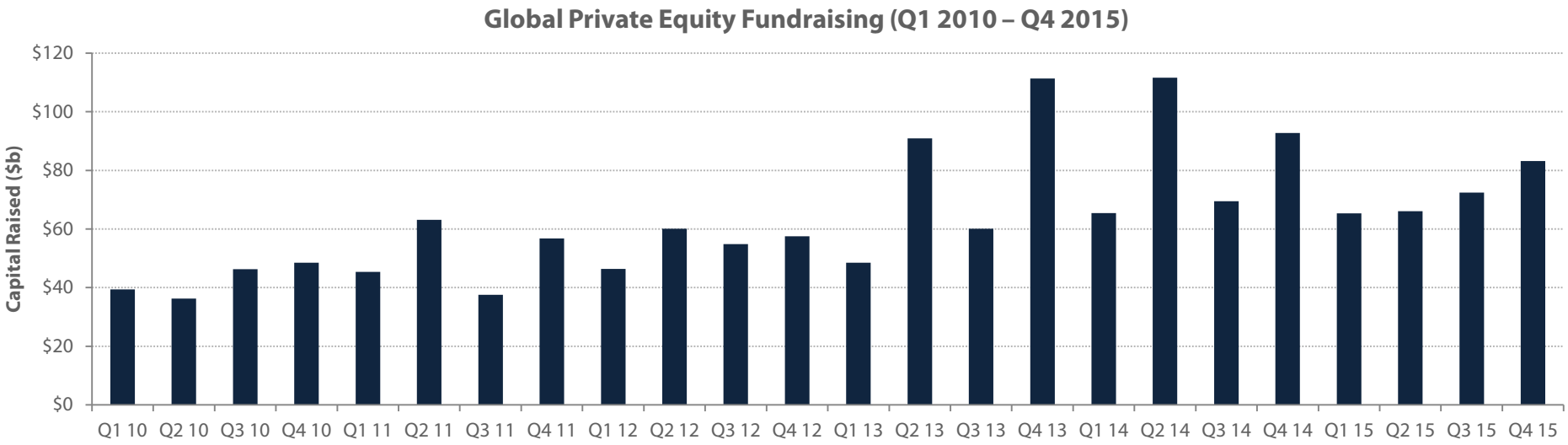


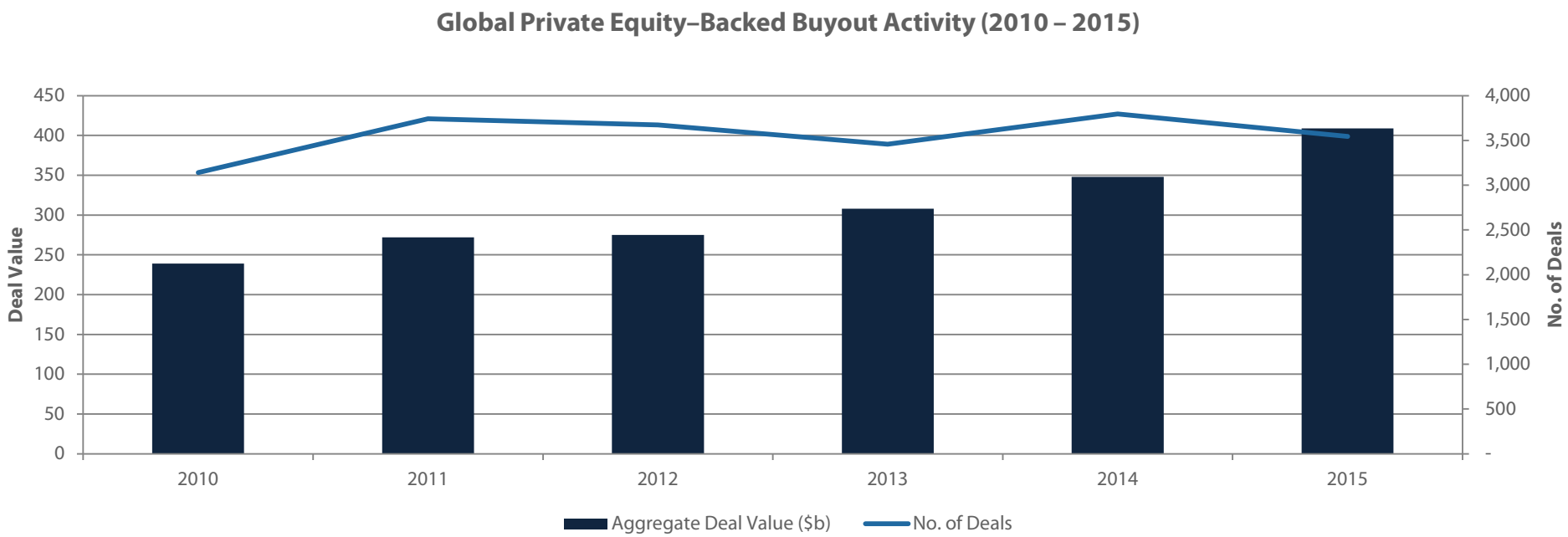
Source: FOEX Indexes, Ltd., RISI Pulp & Paper Week

Source: Forest Investment Associates

Private Equity – Fundraising & Investment Activity

Wilshire

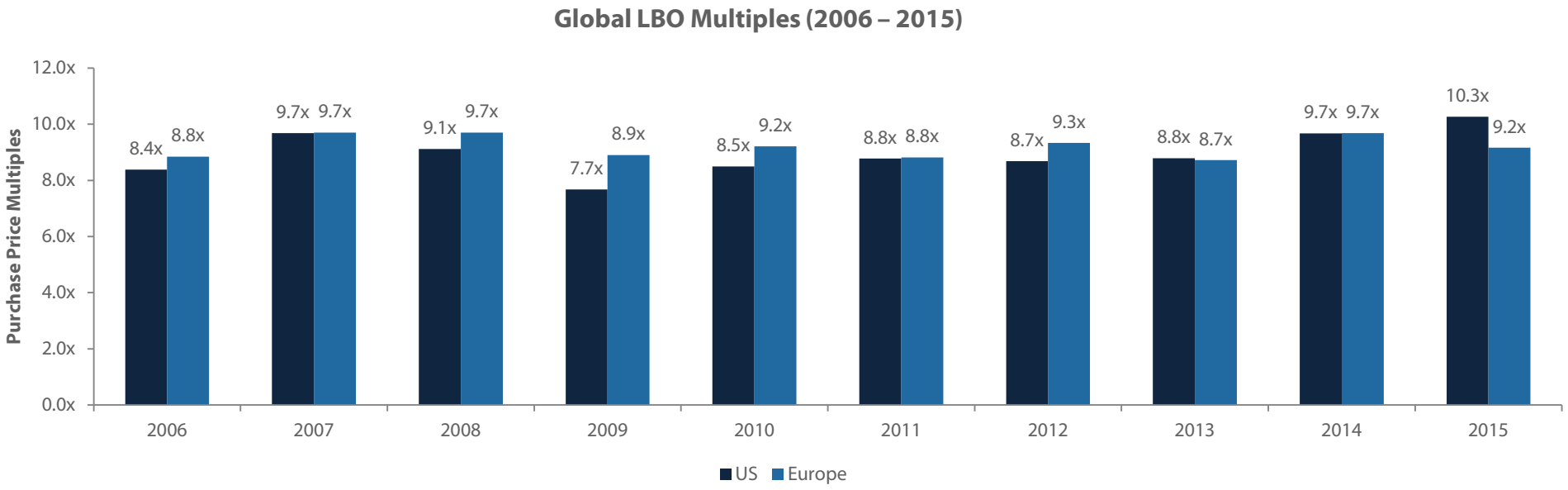


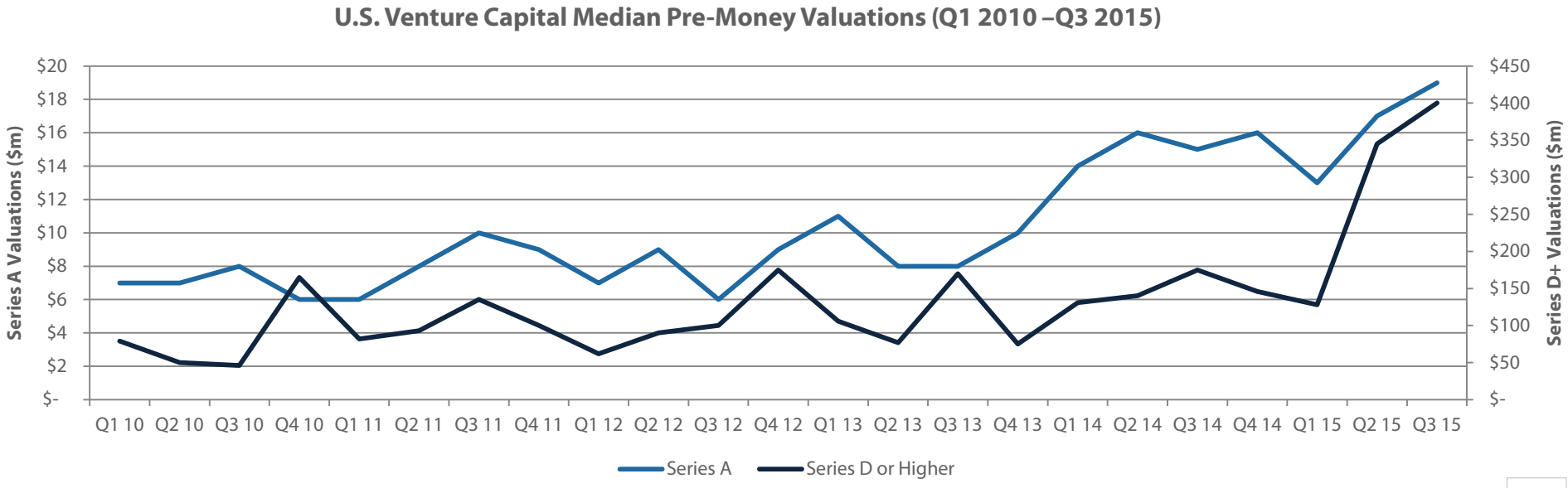


Sources: Preqin.

Private Equity – Pricing & Valuations

Wilshire

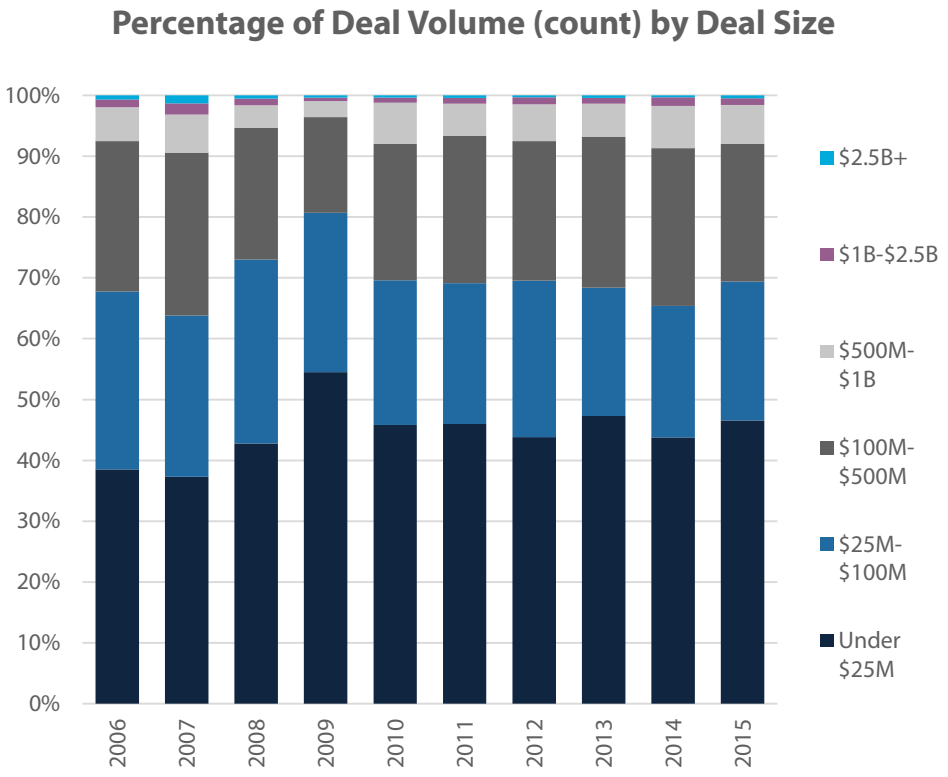


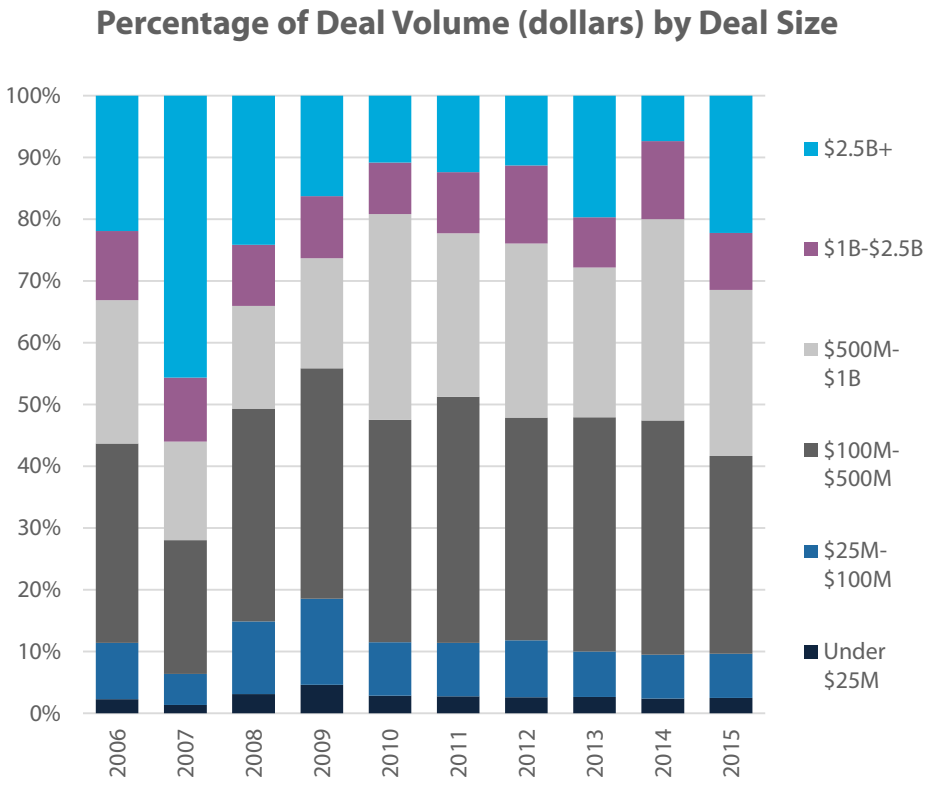


Source: S&P LCD; Cooley.

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

Wilshire





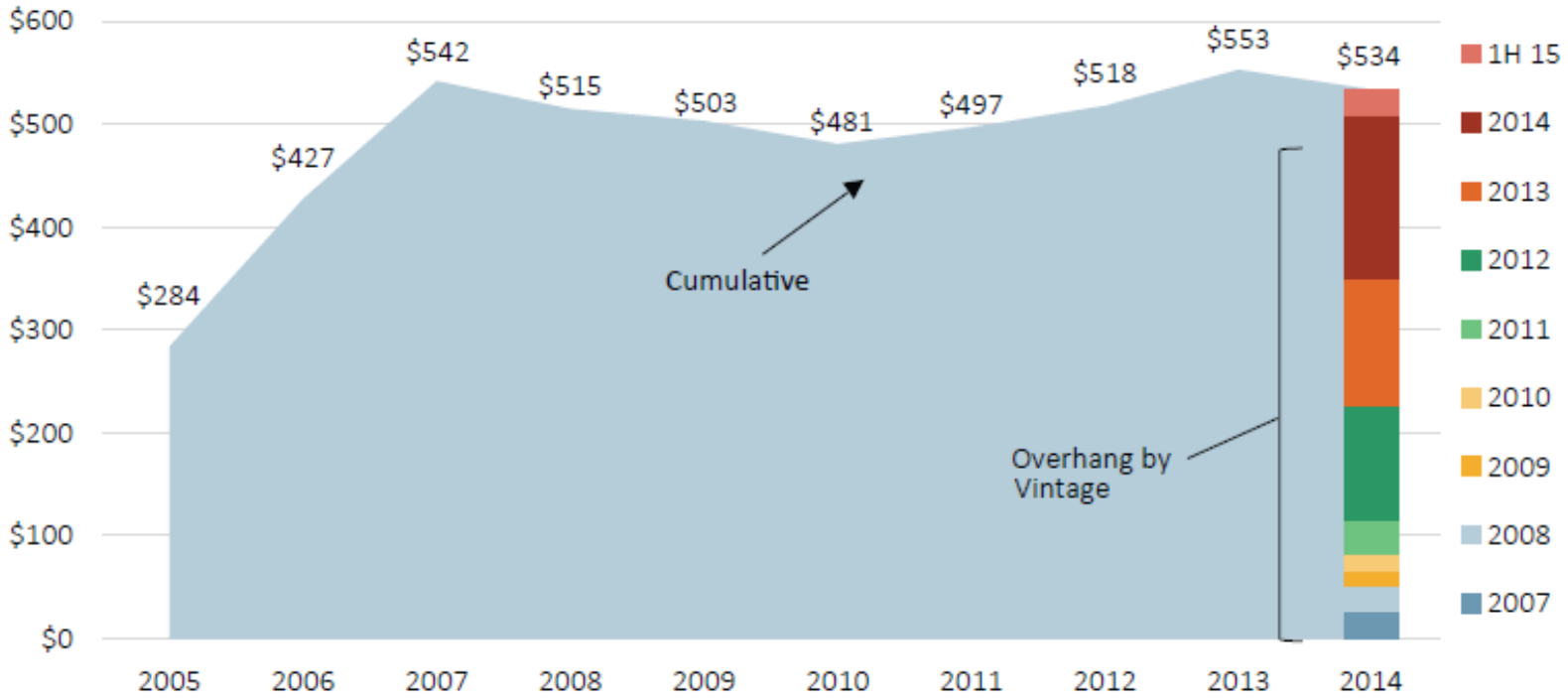
- Smaller deals continue to dominant deal activity by count
- Significantly more mega transaction ($2.5B+) volume in 2015

Source: Pitchbook.

Private Equity – Capital Overhang

Wilshire

Cumulative Vintage Year Overhang



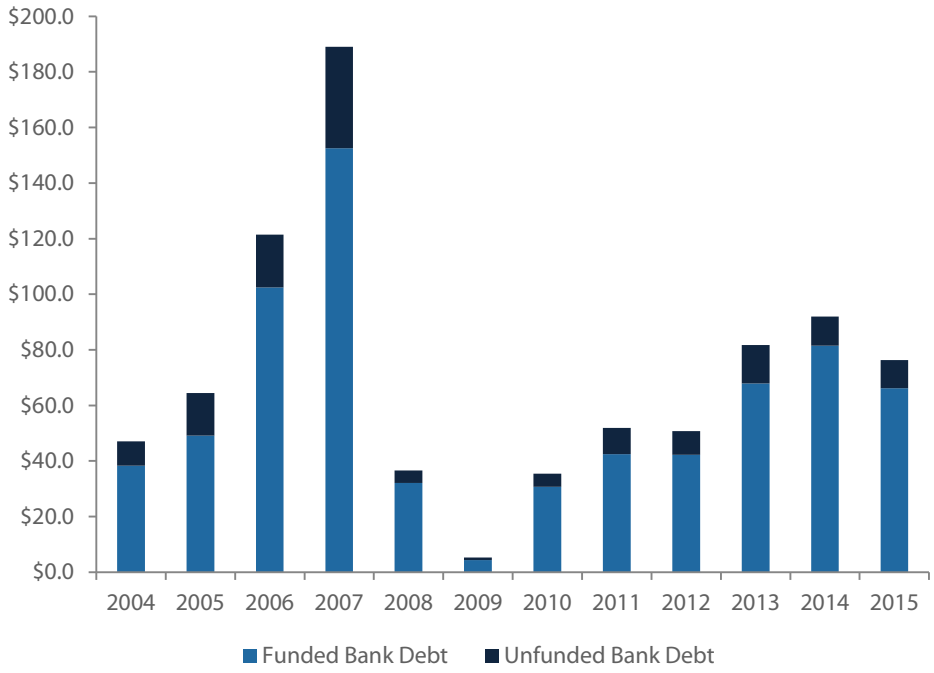
- Total private equity overhang significantly grew to an estimated $542 billion during the run-up to the financial crisis
- While the overhang slightly decreased across 2007 through 2010, the overhang has generally increased since then

Source: Pitchbook. As of August 2015.

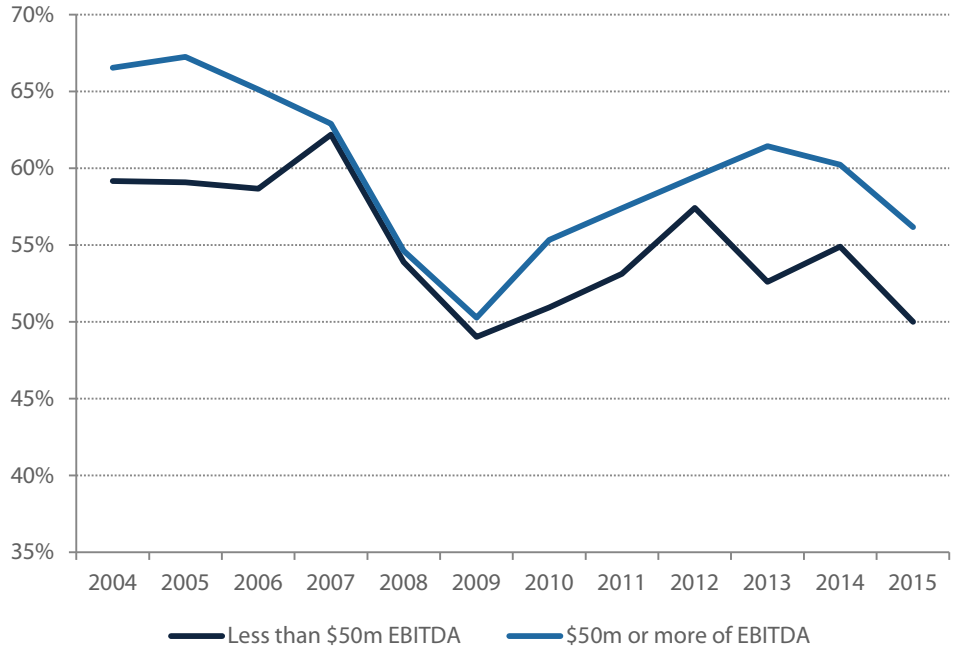
Private Equity – U.S. Debt Markets

Wilshire

Total U.S. Leveraged Buyout Loan Volume ($b)



Percentage of Debt Used in Buyouts

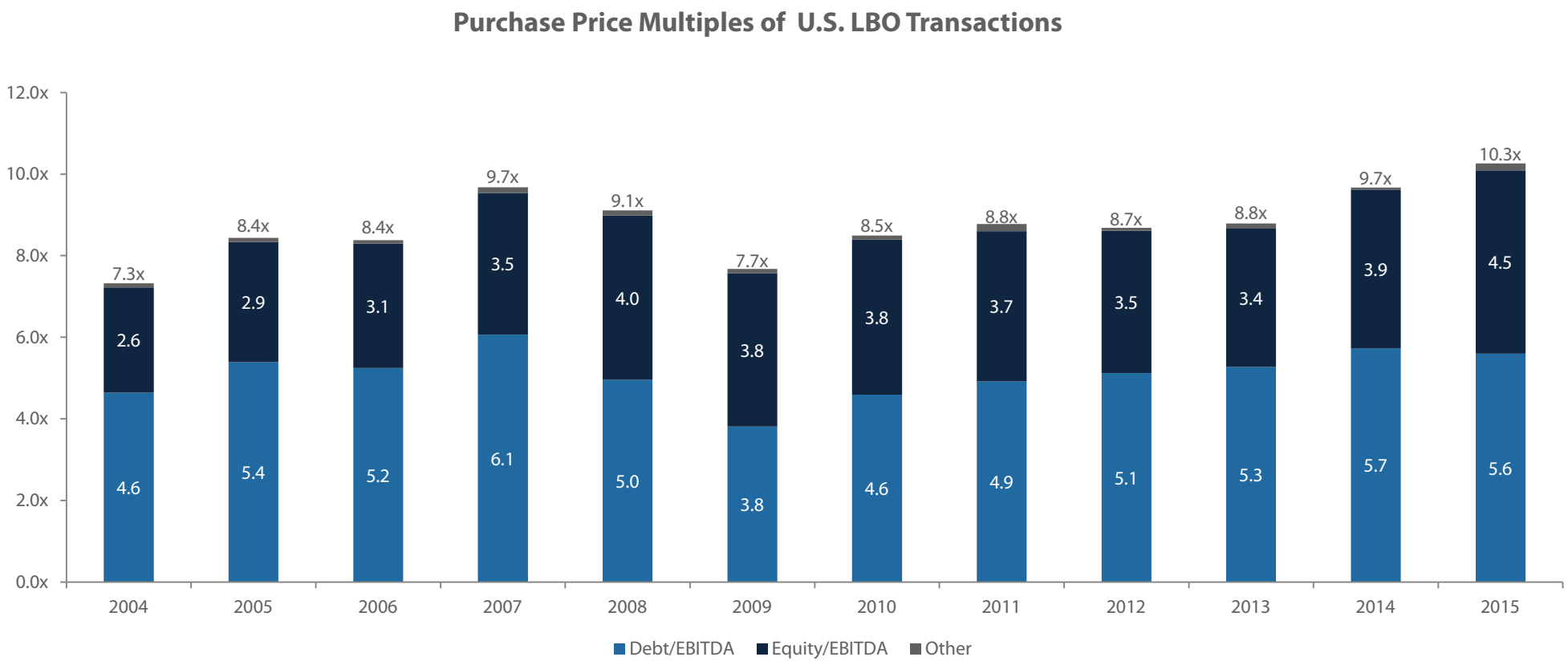


- The amount of capital available for leverage has decreased considerably since its peak volume in 2007; loan volume seems consistent in last few years
- Historically, middle-market transactions apply less leverage than large-cap deals

Source: S&P LCD.

Private Equity – U.S. LBO Purchase Price Multiples

Wilshire

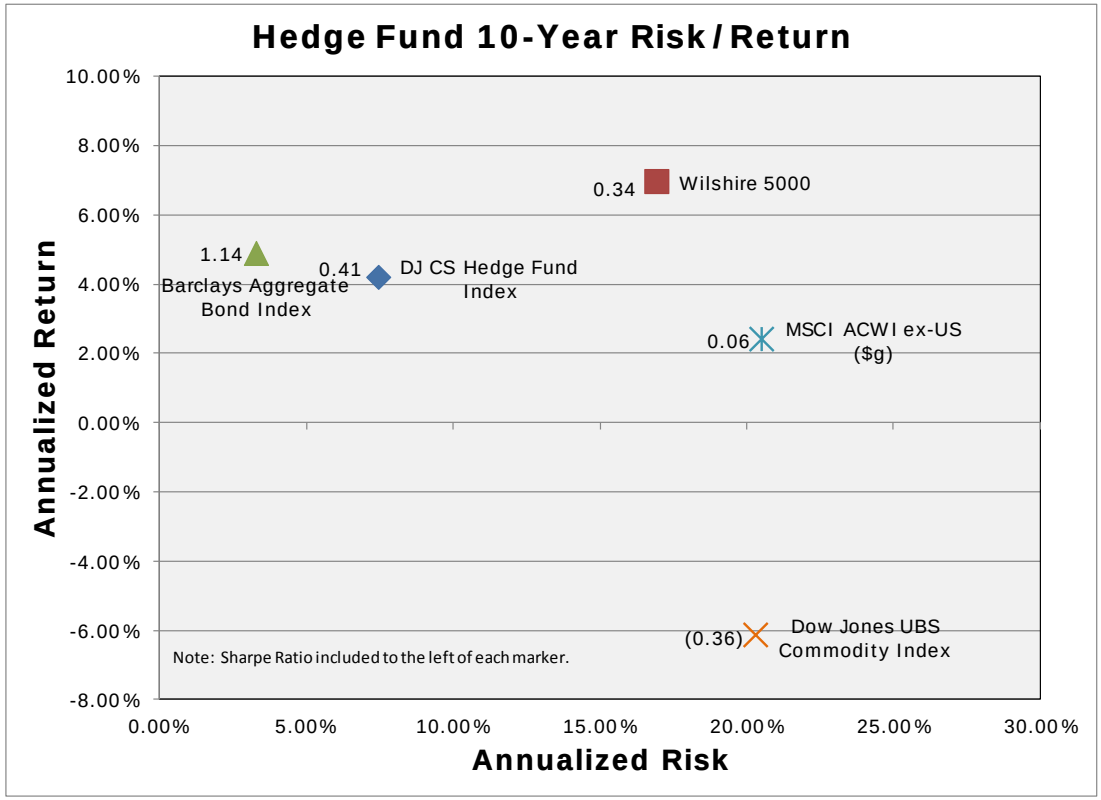


- As debt has become more readily available, purchase price multiples have increased from the low point in 2009
- Pricing in 2015 has eclipsed the 10.x threshold, which is a recent high

Source: S&P LCD.

Hedge Fund Performance

March 31, 2016	Qtr	Ytd	1 Yr	3 Yr	5 Yr	10 Yr
DJ CS Hedge Fund Index	-2.2	-2.2	-5.2	2.3	2.6	4.2
Event Driven Index	-4.5	-4.5	-11.9	0.1	0.5	3.9
Global Macro Index	-2.2	-2.2	-6.2	1.0	3.1	6.0
Long/Short Equity Index	-3.9	-3.9	-2.2	5.6	3.9	4.7
Multi-Strategy Index	-0.6	-0.6	0.2	5.7	5.8	5.5
Wilshire 5000	1.2	1.2	0.2	11.3	11.0	7.0
MSCI ACWI ex-US ($g)	-0.3	-0.3	-8.8	0.8	0.8	2.4
Barclays Aggregate Bond Index	3.0	3.0	2.0	2.5	3.8	4.9
Dow Jones UBS Commodity Index	0.4	0.4	-19.6	-16.9	-14.1	-6.2



Data sources: Wilshire Compass

Summary

Wilshire

- Real yield on cash (versus a market's forecast for inflation) is currently negative and below the historical median
- Credit spreads have pushed higher, above their 15-yr historical medians
- Dividend yield on U.S. Equity relatively high versus the historical median
- Current spread between REITs and U.S. Equity is far below the historical mean; the opposite is true of MLPs

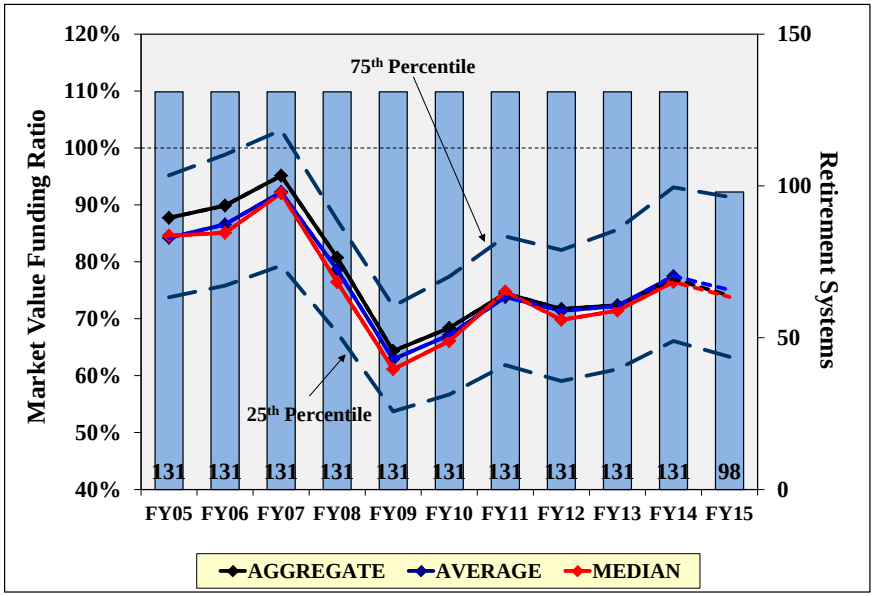
Asset Class	Factor	Current	Historical Median	Current from Median (SD)	Current Valuation %tile
Cash	Real Yield	-1.43	-1.34	(0.05)	48%
U.S. Treasuries	Relative Yield to Cash	1.10	1.41	(0.44)	33%
U.S. IG Corporate	Spread to Treasuries	163	151	0.13	55%
U.S. High Yield	Spread to Treasuries	656	525	0.50	69%
U.S. Equity	Dividend Yield	2.12	1.83	1.04	85%
Non-U.S. Dev. Equity	Dividend Yield	3.46	2.97	0.88	81%
Non-U.S. Emrg Mrkts	Dividend Yield	2.67	2.43	0.61	73%
U.S. REITs	Relative Yield to Eqty	1.41	2.13	(0.55)	29%
MLPs	Relative Yield to Eqty	6.52	4.96	1.34	91%
Small v Large	Relative Yield	-0.53	-0.66	0.67	75%
Value v Growth	Relative Yield	1.00	1.26	(0.77)	22%
Non-U.S. Dev. v U.S.	Relative Yield	1.34	1.10	0.81	79%
Emrg Mrkts v U.S.	Relative Yield	0.55	0.55	0.00	50%

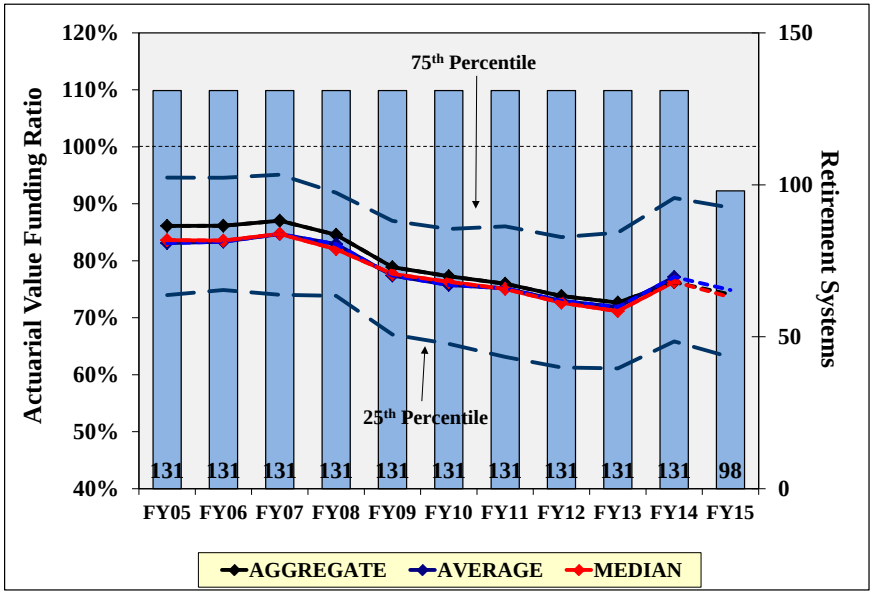
Appendix: Defined Benefit Plan Funding Studies

Wilshire 2016 State Funding Study

Wilshire

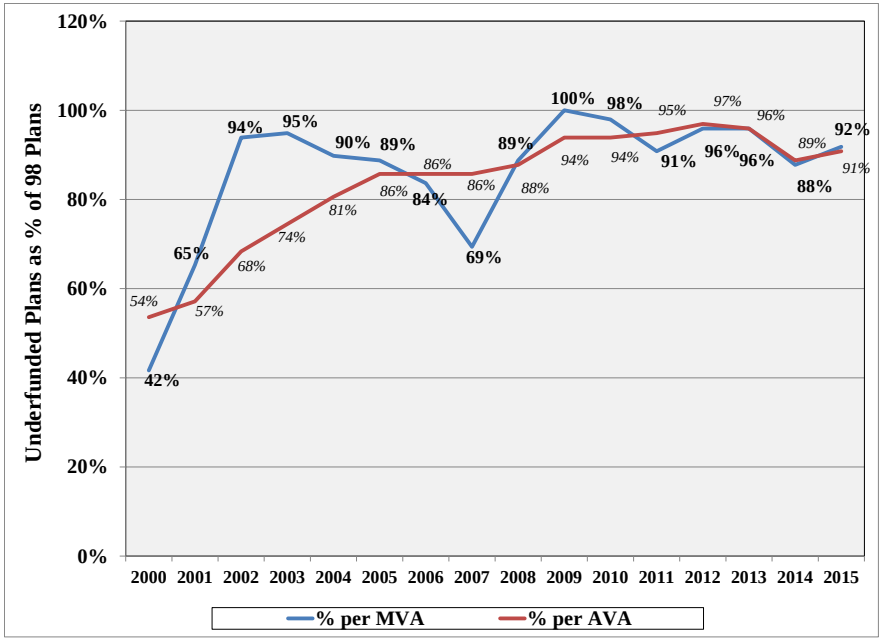
- 98 state retirement systems reported actuarial values on or after June 30, 2015
- Decline in funding ratio fueled by an increase in interest rates during Q2 2015 and weak non-U.S. dollar investments
- Funding ratios based on actuarial values were down for 2015
- Pension assets grew modestly but liabilities were up 4%



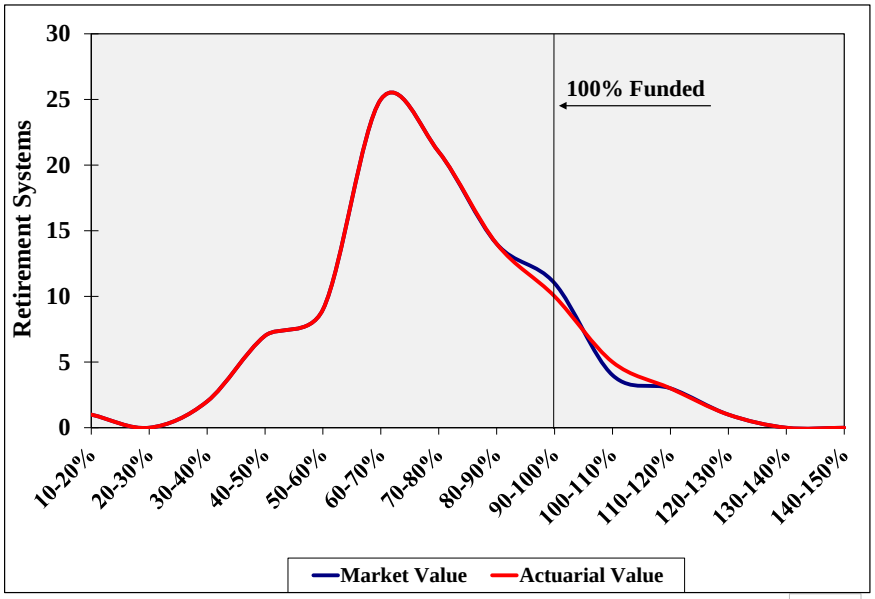


Wilshire 2016 State Funding Study

- Of the 98 plans with 2015 data, 92% of them were underfunded based on market values



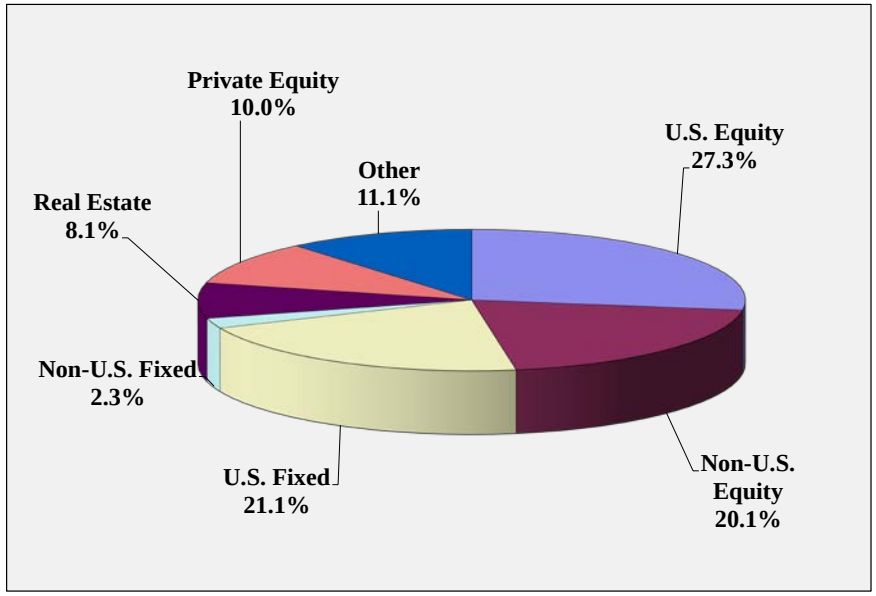
- On a market value basis, a majority of the 98 plans are less than or equal to 80% funded



Wilshire 2016 State Funding Study

Wilshire

- U.S. Equity plus Non-U.S. Equity equals 47.4% of assets

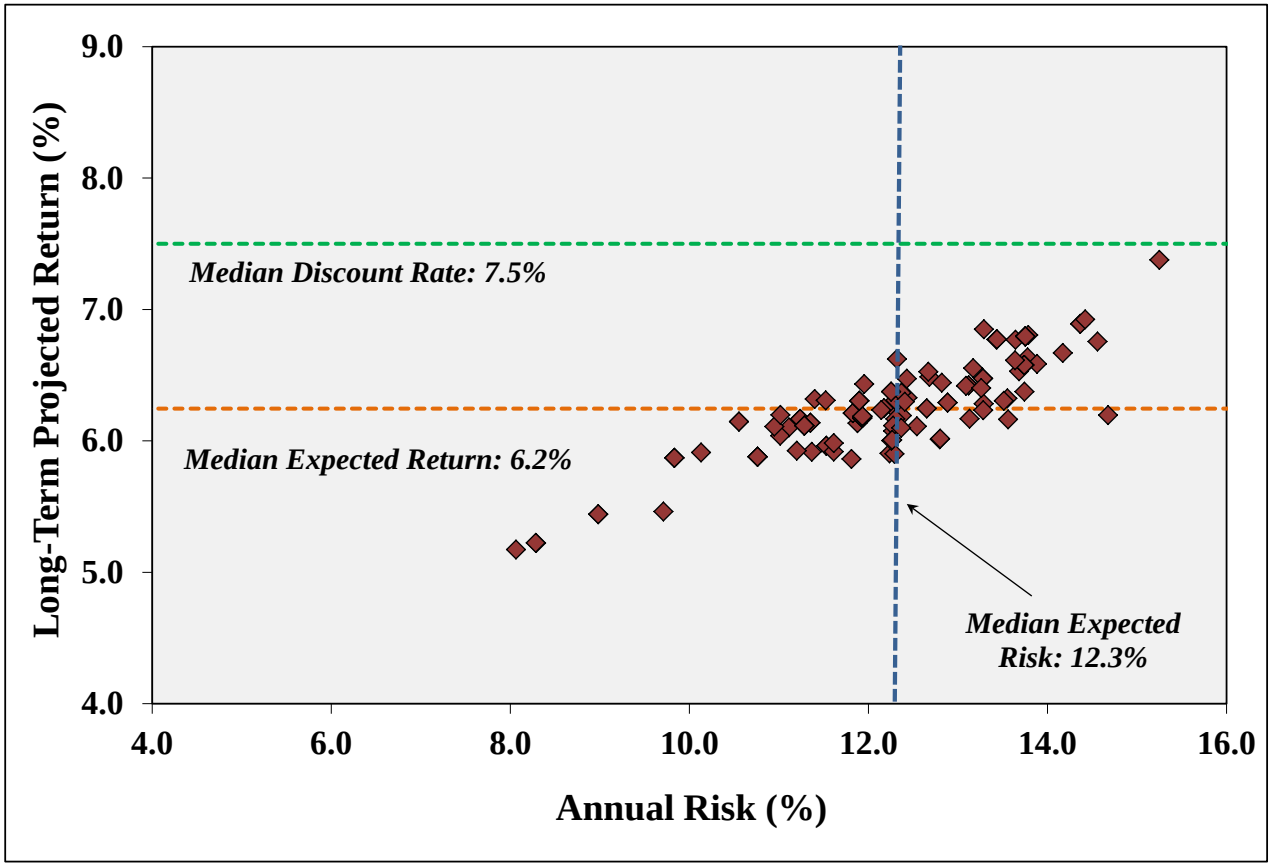


- Average allocations to Non-U.S. Equity, Real Estate and Private Equity have increased while allocation to U.S. Bonds has decreased

				Change in Exposure	
Equity	2005	2010	2015	05-15	10-15
U.S. Equity	44.0 %	31.1 %	27.3 %	-16.7 %	-3.9 %
Non-U.S. Equity	15.0	17.6	20.1	5.1	2.6
Real Estate	4.2	6.0	8.1	3.9	2.1
Private Equity	4.4	9.0	10.0	5.6	1.0
Equity Subtotal	67.6	63.7	65.5	-2.1	1.8
Debt					
U.S. Fixed	28.6	26.6	21.1	-7.5	-5.5
Non-U.S. Fixed	1.2	1.5	2.3	1.1	0.8
Other	2.6	8.2	11.1	8.5	2.9
Debt Subtotal	32.4	36.3	34.5	2.1	-1.8
Return *	6.0	6.2	6.3	0.3	0.1
Risk *	11.9	12.0	12.3	0.4	0.3

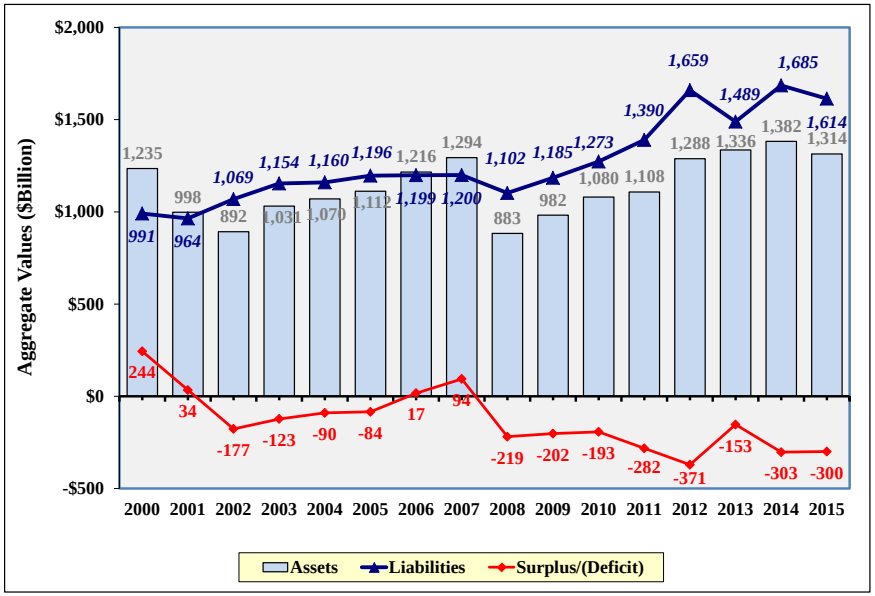
Wilshire 2016 State Funding Study

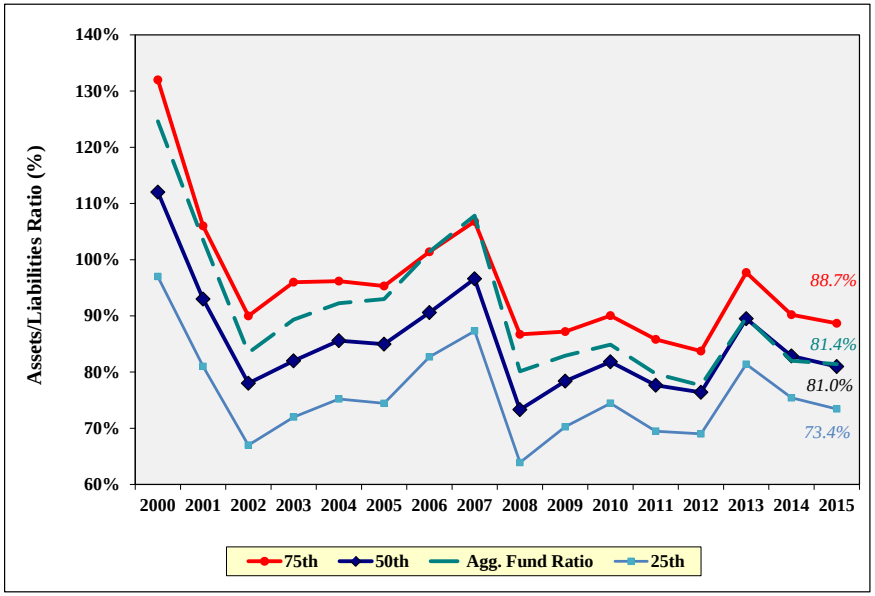
- Using Wilshire Consulting's asset class assumptions to calculate return forecasts for the 131 plans in our study, the median expected return is 6.2% per year
- None of the plans are projected to meet or exceed the median actuarial rate of 7.5%
- Using our 30-year assumptions, the median expected return is 8.3%



Wilshire 2016 Corporate Funding Study

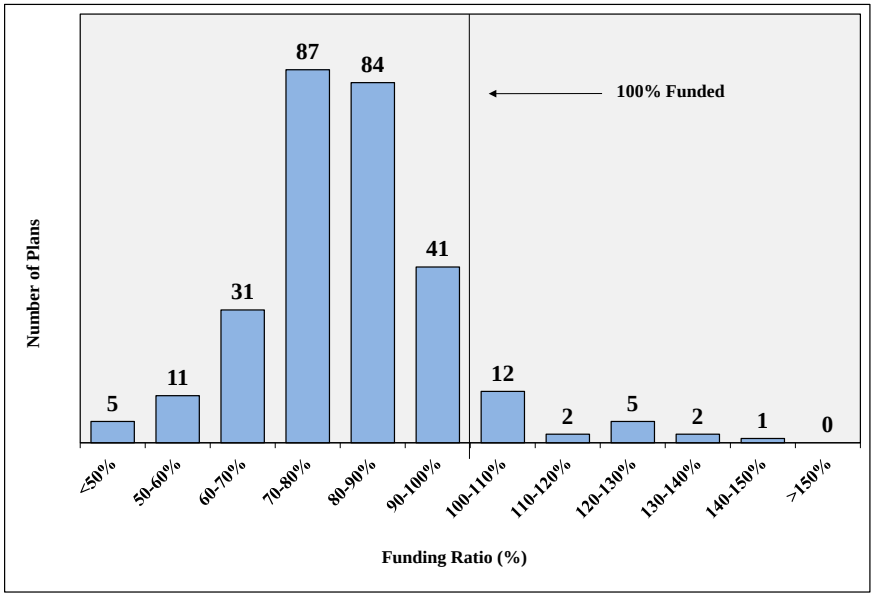
- Data for fiscal years 2015 and 2014 are based on S&P 500 Index constituents as of year-end 2015
- Aggregate funding ratio decreased slightly during 2015, from 82.0% to 81.4%
- Lackluster performance for public-market assets for calendar year 2015 was countered by higher liability discount rates



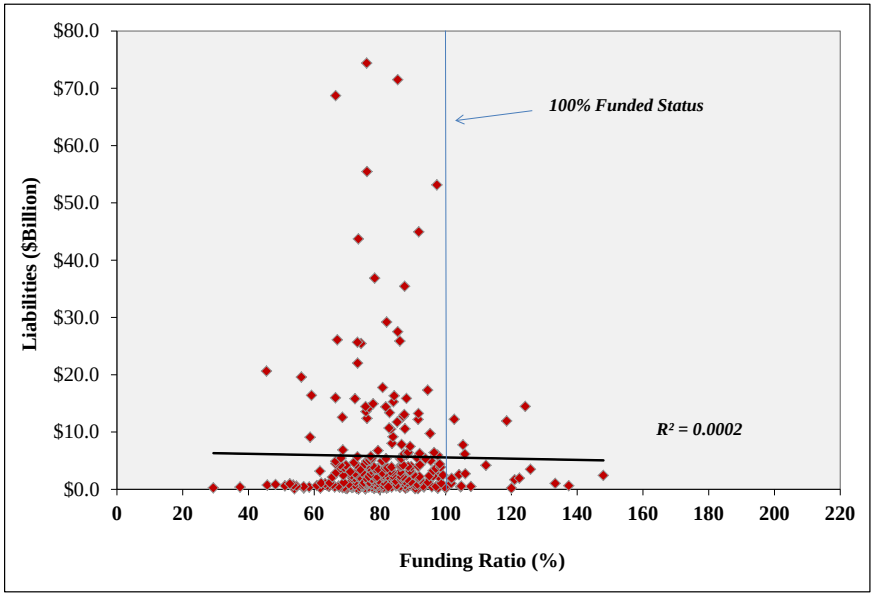


Wilshire 2016 Corporate Funding Study

- 22 out of 281 corporations (7.8%) have pension assets that equal or exceed liabilities



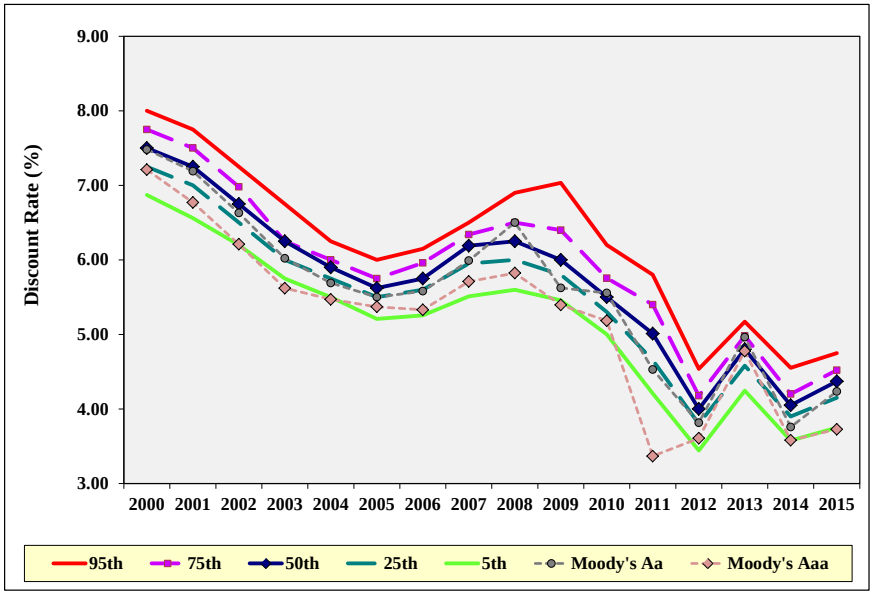
- Almost no relationship between liability size and funding ratio



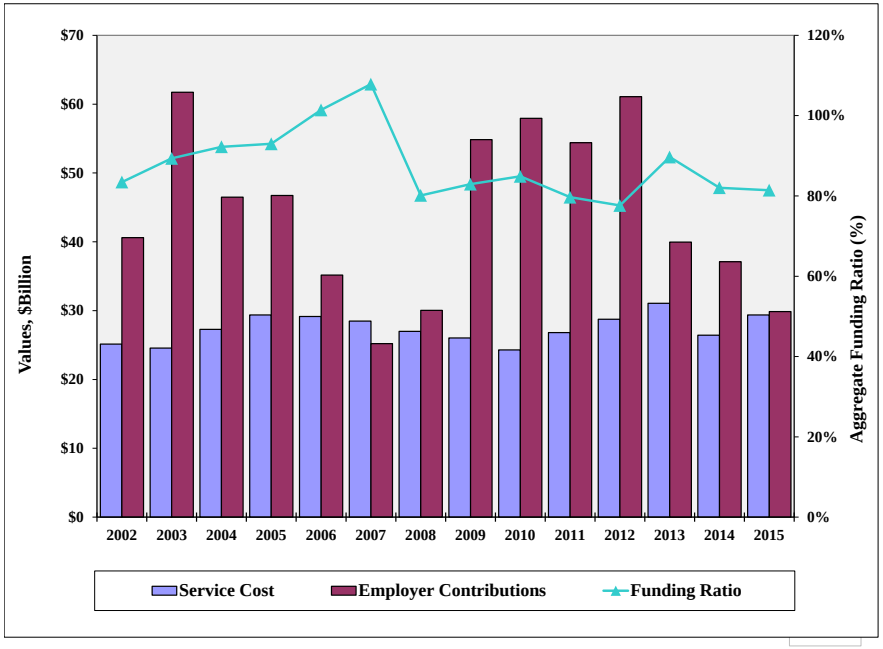
Wilshire 2016 Corporate Funding Study

Wilshire

- Discount rates were back up during 2015 and have been more volatile following a steady, long-term downward trend

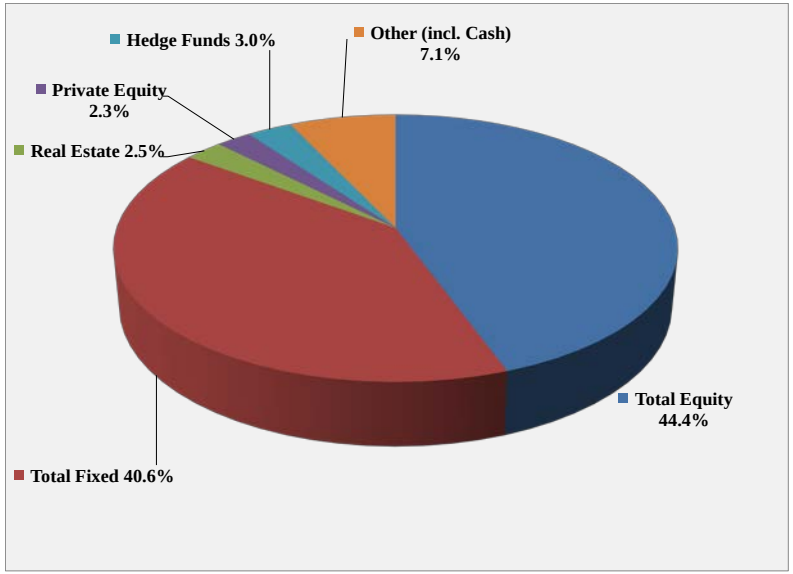


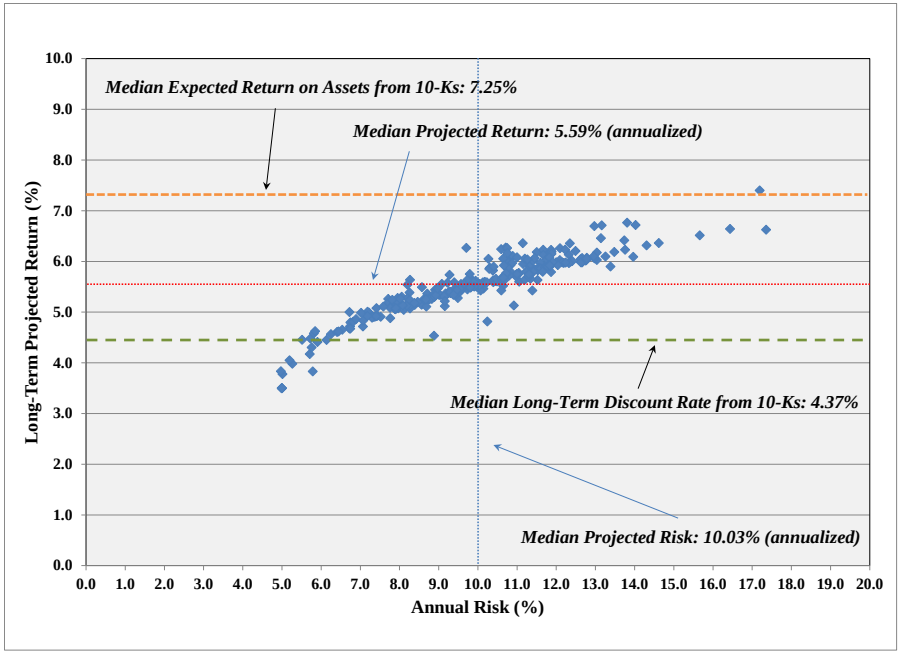
- Company contributions have been trending downward and 2015 marked the first time since the credit crisis that contributions were in-line with service costs



Wilshire 2016 Corporate Funding Study

- The corporate plans in our study had an average 44.4% exposure to public markets equity (U.S. and non-U.S.)
- Using Wilshire Consulting's asset class assumptions to calculate return forecasts for these plans, the median expected return is 5.6% per year
- Only one of the plans is projected to meet or exceed the median expected return on assets of 7.25%
- Using our 30-year assumptions, the median expected return is 7.3%





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