Investment Committee
Agenda Item 5a

June 13, 2016

Item Name: Interim Asset Allocation Targets Review (Including Capital Markets Outlook)

Program: Asset Allocation & Risk Management

Item Type: Action

Recommendation
Maintain the interim strategic asset allocation targets, as approved in 2015, with no change.

Executive Summary
This item provides the following:

1. An informational market-based valuation analysis at the mid-point of CalPERS' four-year Asset Liability Management (ALM) cycle.
2. A recommendation for continued use of CalPERS' existing interim asset allocation targets, for consideration and action by the Investment Committee.
3. An informational update on the capital markets outlook, including market trends since the 2013 adoption of CalPERS' capital market assumptions.

Opinion letters from Wilshire Associates and Pension Consulting Alliance (PCA) are provided as Attachments 1 and 2, respectively. A presentation including information on market outlooks from Wilshire Associates is provided as Attachment 3. Additionally, PCA's May 2016 Investment Market Risk Metrics package, containing additional insights into market valuations and outlooks, is provided as Attachment 4.

Strategic Plan
This agenda item supports the CalPERS Strategic Plan goal of improving long-term pension and health benefit sustainability.

Investment Beliefs
This agenda item supports the following CalPERS Investment Beliefs:

- Investment Belief 2, that a long term investment horizon is a responsibility and an advantage.
- Investment Belief 3, that CalPERS investment decisions may reflect wider stakeholder views provided they are consistent with its fiduciary duty to members and beneficiaries.
- Investment Belief 6, that strategic asset allocation is the dominant determinant of portfolio risk and return.
- Investment Belief 8, that costs matter and need to be effectively managed.

Background

1. Market Valuation Analysis

In May of 2014, the Investment Committee (Committee) took action to revise the Total Fund Investment Policy (Total Fund Policy) to reflect the outcomes of the 2013-14 ALM process. Several changes were made, including:

1. Solidifying the linkage between the work of the Investment Office and Actuarial Office in the ALM process by aligning key ALM activities on the same four-year cycle.

2. Requiring a market valuation-based analysis be brought to the Committee at the midpoint of the four-year ALM cycle, or as warranted by changes in market conditions.

This agenda item represents the first instance of the market valuation-based analysis.

2. Interim Asset Allocation Target

In May of 2014, CalPERS established interim asset allocation targets for use during the process of implementing the approved strategic policy targets (as selected by the Board of Administration in February 2014). CalPERS' Total Fund Policy states that interim asset allocation targets will be reviewed annually while in use. The Committee last reviewed the interim asset allocation targets in 2015. The 2015 review culminated in actions to:

- Establish interim targets for the Liquidity and Global Fixed Income asset classes.

- Maintain the interim targets for Global Equity, Private Equity, and Real Assets classes, as established in 2014 with no change.

3. Capital Markets Outlook

This item makes reference to capital market assumptions and their role in CalPERS strategic asset allocation process. In 2013, capital market assumptions were developed by Staff and the Board's Investment Consultants. The process involved market surveys and collaborative discussion to arrive at a consensus set of expectations which were presented to the Committee and adopted as inputs to the ALM process.

In preview to the next ALM analysis taking place in 2017, this item reflects current capital market assumptions as collected from several market intermediaries and compares them to the estimates used in 2013.

Analysis

Additional information on the key components of this agenda items is available in the sections below:

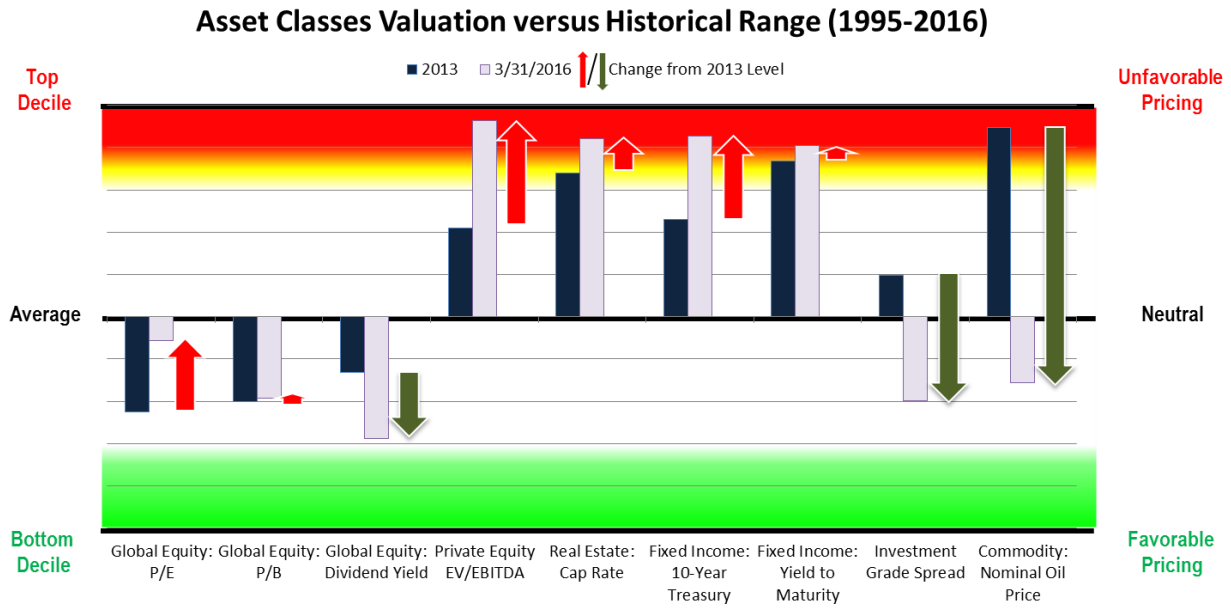
1. Market Valuation Analysis
2. Interim Asset Allocation Targets
3. Capital Markets Outlook

1. Market Valuation Analysis

The valuation metrics reflected in Figure 1 were selected based on their common usage within the financial markets, to understand asset class valuation. The base line or "average" shown in Figure 1 represents a 22 year period from 1995 through 2016. For each specific metric, the levels reflecting 2013 and 2016 are shown. In addition, arrows showing the direction and magnitude of change over the 3 year period are included. The breadth of the bands above and below the base line can be thought of as representing a percentile ranking of the deviation from the historical average.

Current valuation levels, when compared to 2013, suggest that the asset classes of private equity, real estate and government issued fixed income have become more fully valued. Global public equities, corporate credit, and commodities appear more fairly to somewhat under-valued.

Figure 1: Asset Classes Valuation versus Historical Ranges



Compared to 22-year historical data starting in 1995, global public equities appear to be fairly valued from a Price-to-Earnings (P/E) perspective and slightly under-valued based on the Price-to-Book (P/B) ratio. Dividend Yields also appear to have become more attractive over this time period. Dividend Yields are an important valuation metric because they have historically contributed between 35-40% of total returns in global public equity.

Valuation metrics for private equity, real estate, and U.S. Treasuries, are at all-time high levels for the 22 year period. The ratio of Enterprise Value (EV) to the Earnings before Interest Taxes Depreciation and Amortization (EBITDA) is a widely accepted valuation metric for company investments made by the private equity industry. EV/EBITDA considers the total capital of the company relative to EBITDA which more accurately reflects the cash flow generation of the company than net income. In real estate, capitalization rates (Cap rates) are an indication of the cash yield expected as they reflect the ratio of net operating income to the market value of the property. For fixed income, Yield-to-Maturity (YTM) is a very strong indicator of future fixed income returns. Investment Grade Spreads represent the incremental return that can be earned over U.S. Treasuries in high quality corporate credit and are an additional fixed income metric.

Oil prices are an important inflation indicators as the dominate CalPERS' commodities benchmark.

The current levels of each of these valuation metrics are closely tied to the Federal Reserve's monetary policy which has resulted in an extended period of low short-term and long-term interest rates. This monetary policy has had a number of implications across CalPERS asset classes, including:

- Inexpensive financing has led to higher P/E ratios, particularly in the United States, in private and public equity markets.

- Higher public market valuations have facilitated the exit/sales of domestic private equity deals, resulting in distributions to CalPERS.

- A large amount of unfunded private equity commitments have led to competitive pricing of private assets (high valuations).

- Low fixed income yield levels have led to high demand for other income producing assets such as real estate and infrastructure, resulting in high valuations for these assets.

While government-issued fixed income assets are at high valuation levels, Investment Grade Spreads have widened from their 2013 levels, leading to a more favorable valuation. This may reflect the market's expectation that the business cycle has matured and could be approaching a turning point, increasing the potential for a global economic slowdown. Finally, current oil price levels have fallen below the 22-year average, reflecting structural shifts in supply and demand in the industry.

Interim Asset Allocation Targets

Last discussed in 2015, the interim targets represent asset class exposure levels staff believe to be achievable given market conditions. The primary direction of adjustment between the strategic versus interim targets has been to reduce the level of exposure to private assets. These adjustments reflect market valuation and activity levels. In 2015, the Committee adopted an interim target of 1% for Liquidity (a decline from 2%) with the weight shifting to Global Fixed Income. Staff recommends that all current interim strategic asset allocation targets be maintained with no change at this time. Staff's recommendation is based on the following:

- The established asset class ranges, relative to the allocation targets, provide investment staff with sufficient ability to react to market conditions.

- CalPERS is a long term investor. Maintenance of systematic exposures in Fixed Income, Real Assets, and Private Equity provide important diversification benefits to the Total Fund.

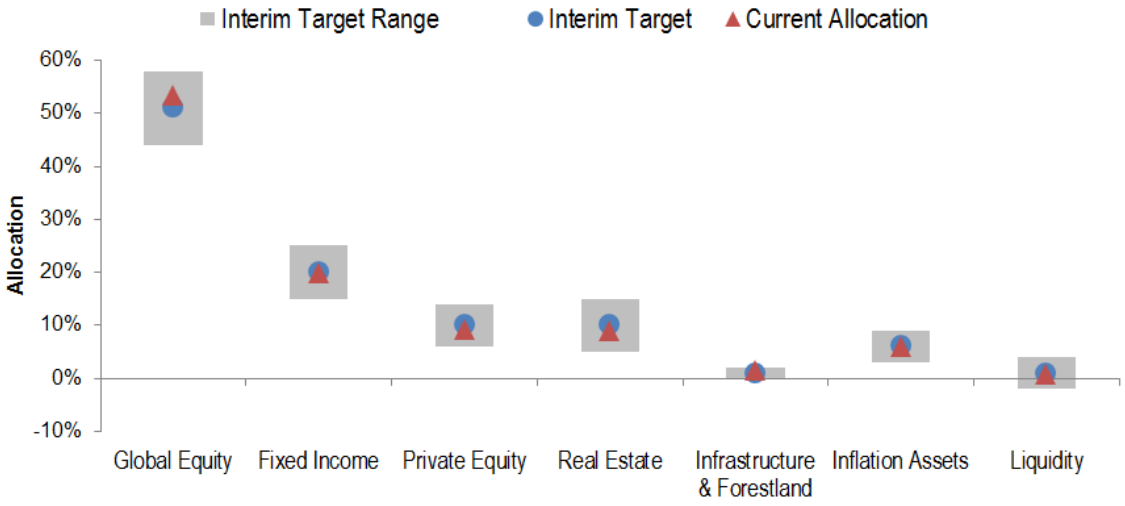
- Market conditions that drove the use of interim targets in 2014 for CalPERS' Real Assets and Private Equity asset classes remain materially unchanged.

- The interim asset allocation targets for Liquidity and Global Fixed Income support CalPERS' Borrowed Liquidity Process, providing an operational liquidity management tool.

- CalPERS' next four-year ALM process, which includes the review of capital market conditions and CalPERS' policy portfolio, is scheduled to formally commence in approximately one year (2017-18).

All asset classes, with the exception of Inflation Assets, are utilizing an interim allocation target as of July 1, 2015. Figure 2 below outlines CalPERS' current asset allocation (as of March 31, 2016), interim targets and ranges.

Figure 2: Current Asset Allocation with Interim Target & Ranges



Max (%)	58	25	14	15	2	9	4
Min (%)	44	15	6	5	0	3	-2
Interim Target (%)	51	20	10	10	2	6	1
Strategic Target (%)	47	19	12	11	3	6	2

Implicit in staff's recommendation to maintain the current interim asset allocation targets is the continuation of investment commitments in Private Equity. Private Equity investment has been a topic of significant discussion by the Committee and various CalPERS' stakeholders.

As presented at the November 2015 Private Equity Workshop, CalPERS' Private Equity investments are primarily executed through capital commitments as a limited partner, into commingled funds managed by various general partners. CalPERS represents a small minority of private equity industry fundraising from limited partners; CalPERS annual commitments have ranged from 0.3%-2.8% of the industry's yearly commitments for the time period spanning 2002 to 2015. The supply of institutional private equity funds is significantly less than the demand for these funds from limited partners. Further, the capacity to commit to highly sought after, top performing private equity funds is limited. As a result of this market dynamic, CalPERS is largely a "term taker" with respect to most economic and governance terms. Table 1 is representative of current governance and transparency terms for typical private equity buyout funds.

Table 1: Typical Private Equity Buyout Fund Terms

Term Type	Commingled Funds Market Terms
Economic	
Management fee rate	1.5-2%
Management fee base	Committed capital
Carry fee	20%+
Waterfall type	Deal-by-deal
Hurdle rate	0-8%
Catch-up provision	80-100%
Clawback	Net of tax at end of fund
Fee offsets	50-100%
Accelerated monitoring fees	Allowed
Governance	
Investment period	Five years with limited ability to terminate
general partner removal	Limited to cause or non-existent
Indemnification	Broad; carve outs for gross negligence, fraud and willful malfeasance
Fiduciary obligation	Limited or waived; fiduciary to fund vs. limited partner
Role of Limited Partner Advisory Committee (LPAC)	Broad (extensions, other term changes, conflicts)
Transparency	Limited and not uniform

Despite the disadvantages highlighted above, CalPERS' Private Equity program plays a significant role in supporting one of CalPERS' Portfolio Priorities, to achieve the long-term required rate of return. Private Equity commands the highest expected returns, for example:

- Private Equity has out-performed the Global Equity benchmark (global public equity) in all periods.

- Without its contribution, expected annual returns for the Public Employees' Retirement Fund would be reduced by an estimated 30 to 70 basis points.

The annualized historical returns of the Private Equity portfolio versus the Global Equity benchmark over various horizons, as of March 31, 2016 are shown below in Table 2.

Table 2: Historical Private Equity vs. Global Equity Benchmark Returns

Returns	1-Year	3-Year	5-Year	10-Year	20-Year
Private Equity Portfolio (%)	6.0	11.6	11.1	10.7	11.5
Private Equity Policy Benchmark (%)	1.3	13.7	11.9	13.1	10.2
Global Equity Policy Benchmark (%)	-4.6	6.1	5.7	4.7	6.7

The lower observed volatility in private equity valuations further supports another Portfolio Priority, stabilizing employer contribution rates.

- Private Equity has experienced lower annual volatility than Global Equity during the past 10 years (17.5% for Private Equity versus 19.2% for Global Equity).

- However, it should be noted that the lack of frequent valuations in Private Equity results in more difficult performance and volatility measurement and attribution.

Recognizing the challenges inherent in the private equity industry, CalPERS has been engaged in efforts to increase transparency and seek improved economics where possible. CalPERS has worked with the Institutional Limited Partners Association (ILPA) and other limited partners to gain consistent, standardized disclosure around fees and expenses paid by private equity partnerships. ILPA has over 300 institutional investors as members and represents over $1 trillion of private equity assets. CalPERS has been working with ILPA since 2011 to set industry standards for a capital call and distribution reporting template, finalized in 2012. A recent success was the establishment of the ILPA Fee Reporting Template, finalized in January 2016, which captures greater detail on fees, expenses and profit sharing (carried interest) paid to private equity managers and their affiliates. This new quarterly template is now being evaluated and adopted by industry participants.

Staff continues work today on fee and expense disclosure issues.

- CalPERS has endorsed the new Fee Reporting Template with respect to its Private Equity portfolio.

- Staff has been diligently engaging with our general partners to encourage adoption and compliance with the template.

- To date, staff has received ILPA Fee Reporting information for slightly over half of CalPERS' Private Equity portfolio.

It is also important to recognize the increased engagement of the Securities and Exchange Commission (SEC) with private equity funds as a result of the Dodd-Frank Act (the Act). The Act mandated that private equity fund managers become Registered Investment Advisors in 2012; previously, registration was voluntary for most private equity fund managers. SEC interaction with private equity managers over the last few years has led to much greater clarity surrounding the need for transparency with respect to fees charged to private equity funds and portfolio companies.

Both ILPA and the SEC are having important impacts on the private equity industry with respect to increased transparency and disclosure from private equity general partners. Andrew Ceresney, Director, SEC, Division of Enforcement was quoted, at the Securities Enforcement Forum West 2016 Keynote Address: Private Equity Enforcement, on May 12, 2016, as follows:

> "…it is my belief that awareness and transparency of fees generally will lead investors and advisors to reach an appropriate balance in terms of types and allocation of fees. In short, I think our private equity actions have led to significant change in the private equity industry, all to the benefit of investors."

Staff believes the above efforts will bring additional clarity and information symmetry to the private equity market place, however it is important to note that the underlying economics will

largely still be driven by the supply and demand dynamics. We expect to dynamics to remain in favor of the general partners for some years to come.

3. Capital Markets Outlook

As discussed in the previous sections, CalPERS' strategic asset allocation decision is informed by market-based analysis. CalPERS utilizes a consensus-based approach to develop capital market assumptions.

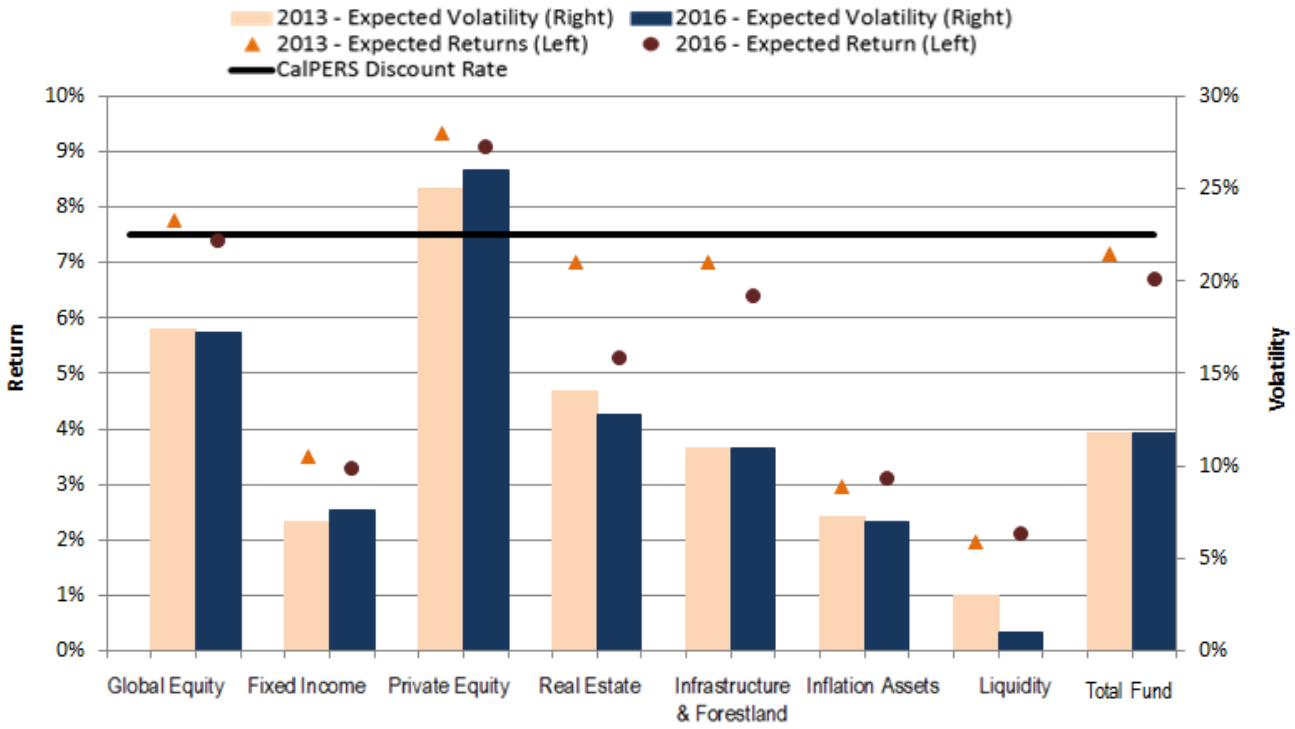
Consensus forecasts are a good starting point, as they establish a high hurdle for any institution to be reasonably confident that it has a unique insight or better accuracy in predicting asset class returns. As discussed in 2013, forecasting capital market assumptions for asset classes:

- Entails a meaningful level of uncertainty, particularly for more volatile asset classes.
- Requires the use of valuations (such as dividend yield, price to earnings ratio, yield to maturity, and capitalization rates) to inform projections about the future.

Staff conducted a survey of 2016 capital market assumptions from six sources utilized in CalPERS 2013 capital market assumption development process. These included Wilshire Associates, PCA, J.P. Morgan, Bank of New York Mellon, Callan, and Voya (known as ING U.S. prior to 2014).

Figure 3 below compares the median of the surveyed 2016 capital market assumptions to CalPERS' 2013 adopted capital market assumptions by the estimated range of volatility, and expected rates of return.

Figure 3: Expected Returns and Volatility Ranges - 2016 Survey Median vs. 2013 Adopted Assumptions



It is notable that current capital market expectations, when compared to three years ago, have been lowered across almost all asset classes, particularly for real assets. Further exploration of these topics and emerging trends will be taken up in the course of the 2017-18 ALM process, and the development of updated capital market assumptions.

Budget and Fiscal Impacts
Not applicable.

Benefits and Risks
Continued use of CalPERS' current interim asset allocation targets provides the following benefits:

- Enhanced risk and return characteristics of the Public Employees' Retirement Fund.
- Continued provision of a "time buffer" to facilitate the investment decision process and maximize CalPERS' economic interests through the use of CalPERS' Borrowed Liquidity Process.
- Continued sensitivity to current market conditions for CalPERS' investment strategies and support for the prudent deployment of capital while preserving pricing discipline.
- Making the highest use of Committee and staff resources considering the proximity of the next four-year ALM process, and the recent revision of the Total Fund Statement of Investment Policy (to include asset allocation targets for use in the instance of Funding Risk Mitigation Events based on the current interim targets).

Continued investment in CalPERS' Private Equity program will entail the ongoing exposure to the challenges of the industry, including issues related to transparency, cost, and governance, as well as pressure from stakeholder and advocacy groups. Recognizing Investment Belief 3, which further states that CalPERS' primary stakeholders are members/beneficiaries, employers and California taxpayers (as these stakeholders bear the economic consequences of CalPERS investment decisions), staff believes that investment in private equity remains prudent and necessary in consideration of CalPERS' Portfolio Priorities and current circumstances.

Adopting different asset allocation targets at this time would pose the following risks:

- Compromised pricing discipline if goals for capital deployment are incongruous with asset class strategies and current market conditions.
- Redirection of staff resources away from preparation for the upcoming ALM process.
- Reducing the utility of recent work to establish the Borrowed Liquidity Process, an operational liquidity management tool for the Investment Office.
- Potential impairment of the risk and return characteristics of the Public Employees' Retirement Fund.

Attachments
Attachment 1 – Wilshire Associates Opinion Letter
Attachment 2 – PCA Opinion Letter
Attachment 3 – Interim Asset Allocation Targets Review (Including Capital Markets Outlook)
Attachment 4 – PCA May 2016 Investment Market Risk Metrics Package

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Eric Baggesen
Managing Investment Director
Asset Allocation and Risk Management

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Theodore Eliopoulos
Chief Investment Officer

Steven J. Foresti
CIO, Wilshire Consulting

June 2, 2016

Mr. Henry Jones
Chair of the Investment Committee
California Public Employees' Retirement System
400 Q Street
Sacramento, CA 95814

Re: Interim Asset Allocation Targets Review

Dear Mr. Jones:

You requested Wilshire's opinion with respect to the interim asset allocation targets review. In May of 2014, at the culmination of CalPERS' 2013-14 ALM process, the Investment Committee (Committee) took action to revise the Total Fund Investment Policy (Total Fund Policy). The Committee's action in setting the Total Fund Policy also required that a market-valuation-based analysis be brought to the Committee at the midpoint of the established four-year ALM cycle, or as warranted by changes in market conditions. This is the first such midpoint asset allocation review.

Consistent with CalPERS' Investment Belief #6, which states that strategic asset allocation is the dominant determinant of portfolio risk and return, establishing an appropriate asset allocation mix is the primary means by which CalPERS can manage its investment risk profile. Other Investment Beliefs that are related to setting and monitoring the strategic asset allocation policy include Investment Beliefs #2 - that a long-term investment horizon is a responsibility and an advantage, #3 - that CalPERS investment decisions may reflect wider stakeholder views provided they are consistent with its fiduciary duty to members and beneficiaries, and #8 - that costs matter and need to be effectively managed.

Similar to the economic backdrop that existed when CalPERS' 2013 capital market assumptions were established – those that were used to set the current allocation policy - current market pricing and valuation levels are reflective of a general low yield environment. Despite a mild tightening by the U.S. Federal Reserve, global monetary policy remains quite accommodative. However, we are now three additional years removed from the global financial crisis and further along in the current credit cycle. These are all important considerations when reviewing the asset allocation policy.

Wilshire

Below we present Wilshire's current forward-looking assumptions across CalPERS' major asset class groupings and contrast them with the same forecasts from three years earlier to provide some context on how our view of long-term market prospects have changed; the third panel of figures shows the change in return and risk assumptions over this three-year period.

	March 2013		March 2016		Difference	
	Return	Risk	Return	Risk	Return	Risk
Global Equity	7.75	17.30	6.70	17.1	-1.05	-0.2
Fixed Income	3.35	6.90	3.20	6.9	-0.15	0.0
Private Equity	10.45	27.50	9.40	27.5	-1.05	0.0
Real Estate	6.00	12.25	5.95	14.0	-0.05	1.8
Infrastructure & Forestland	7.10	10.40	6.75	10.8	-0.35	0.4
Inflation Assets	3.30	6.05	3.15	6.4	-0.15	0.4
Liquidity	1.50	1.25	1.40	1.3	-0.10	0.0
Total Fund	7.10	12.10	6.40	12.4	-0.70	0.3

Applying the above asset class assumptions to CalPERS' current interim asset allocation targets, suggests a 6.40% forecast today versus 7.10% three years ago. The 70 basis points reduction in return expectation at comparable risk levels suggests a modest decrease in return per unit of risk taken (i.e. a lower expected Sharpe Ratio).

While the reduced portfolio return expectation versus three years ago could encourage additional risk-taking in an attempt to maintain a higher expected return, such action would seem contrary to the Committee's long-term plans for portfolio de-risking. Along with Wilshire's standard asset class assumptions, which are meant to represent a ten-year horizon, we maintain a set of equilibrium assumptions for assessing return prospects over longer-term horizons. Using these assumptions to generate a 30-year forecast – something that is more in line with CalPERS' investment horizon - we forecast a portfolio level return of 7.80% today versus 8.05% three years ago, or just a quarter-percent reduction.

As can be seen in the table above, the lower return at the total fund level results from broad reductions in return expectations across asset class groupings. These similar directional moves in asset class assumptions suggest that current long-term market prospects remain generally consistent with the risk profile expressed within the current interim target allocation.

Wilshire, therefore, supports Staff's recommendation to maintain the interim strategic asset allocation targets, as approved in 2015. It should be noted that the recommendation to maintain current interim asset allocation targets does not take into consideration future de-risking shifts that may occur as part of the preplanned investment risk mitigation strategy. Furthermore, the Committee will have the opportunity to explore the strategic asset allocation policy along with updated capital market assumptions in the course of the 2017-18 ALM process.

Please do not hesitate to contact us should you have questions or require anything further.

Best regards,

Wilshire Associates
370 Interlocken Boulevard Suite 620 Broomfield, CO 80021 **TEL** 303.626.7444 **FAX** 303.466.1537
www.wilshire.com

PCA PENSION CONSULTING ALLIANCE

June 1, 2016

Mr. Henry Jones, Chairman
Investment Committee
California Public Employees' Retirement System
Sacramento, California 95814

Re: Review of Interim Asset Allocation Targets

Dear Mr. Jones,

The purpose of this letter is to provide the Investment Committee (IC) with Pension Consulting Alliance's (PCA's) opinion regarding Agenda Item 5a for the June Investment Committee meeting. In summary, PCA supports the staff's recommendations to maintain the interim asset allocation targets at their current levels. As staff indicates, these levels are appropriate as preparation for the 2017 Asset-Liability Study is about to begin. The results of the 2017 Asset-Liability Study could have material impact upon future allocation levels and it is prudent and reasonable to maintain the current interim target levels pending results from the upcoming Asset-Liability Study.

Discussion

Item 5a is a procedural request to set or affirm interim proportional target allocation levels for each of CalPERS' major strategic investment classes. The interim targets are designed so that CalPERS is progressing toward its long-term target allocation levels in a prudent and timely manner, taking into account key factors that may impact specific investment classes. As discussed in the cover memo and staff presentation materials, the interim targets for the private markets classes (in particular Private Equity) are essential for CalPERS to continue to meet its long-term objectives. PCA concurs with these findings.

In relation to return expectations, staff has included information that touches on the theme that future long-term returns will likely be lower than what CalPERS has experienced in the past. PCA concurs with this viewpoint.

We look forward to addressing any questions or comments on these matters at the Investment Committee meeting.

Respectfully,

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Interim Asset Allocation Targets Review (Including Capital Markets Outlook)

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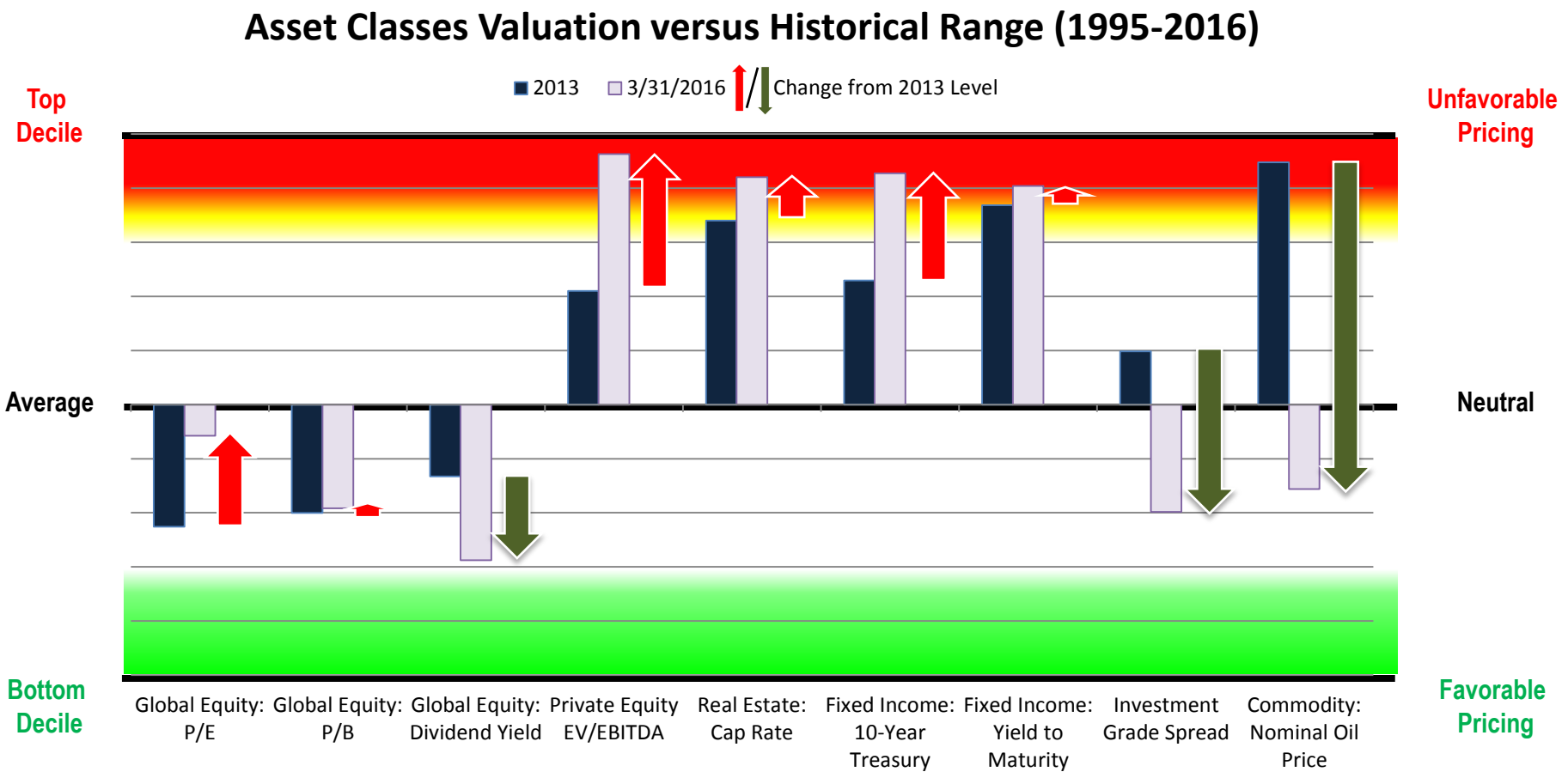
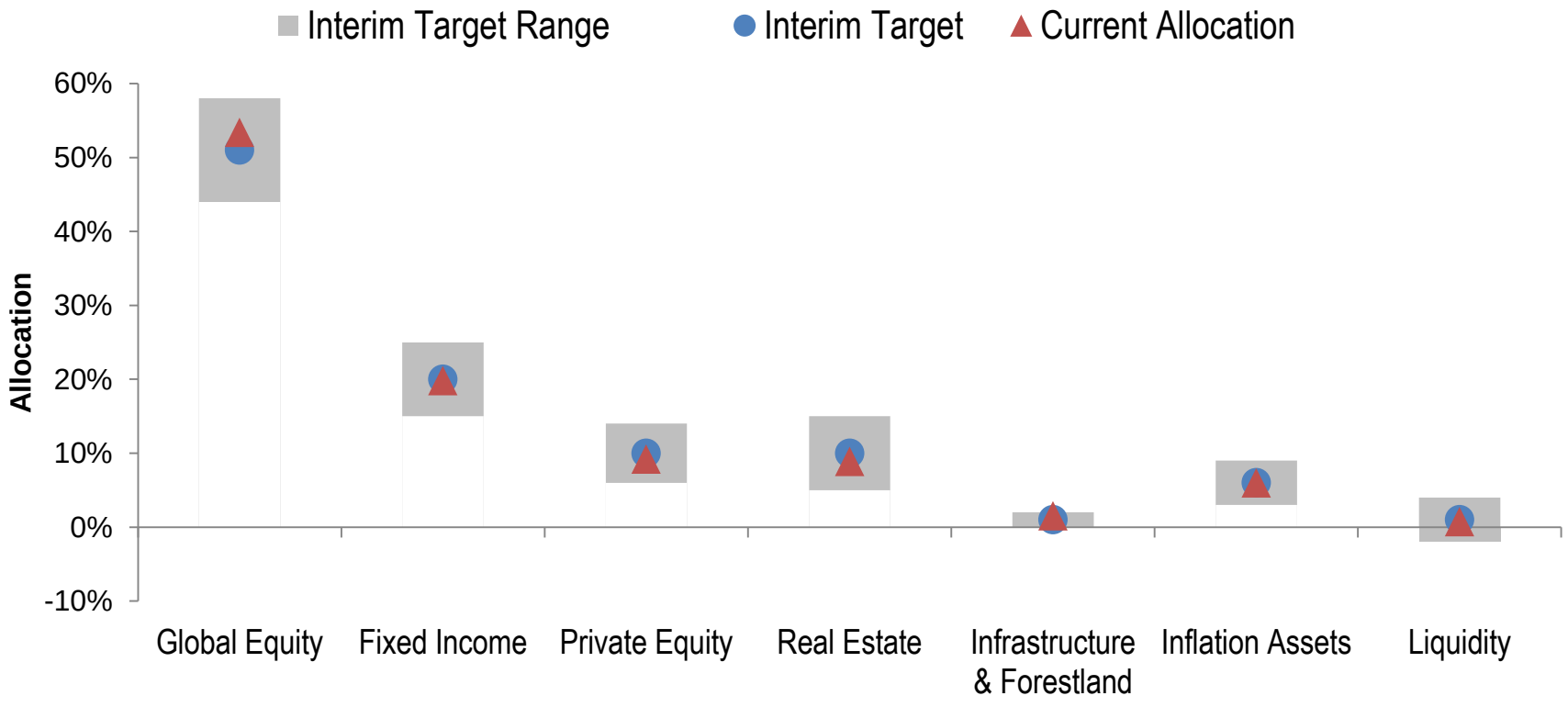
Asset Allocation/Risk Management

Valuation Indicators versus Historical Range



Current Asset Allocation Compared to Interim Targets



Max (%)	58	25	14	15	2	9	4
Min (%)	44	15	6	5	0	3	-2
Interim Target (%)	51	20	10	10	2	6	1
Strategic Target (%)	47	19	12	11	3	6	2

Current asset allocation as of March 31, 2016

Historical Private Equity Returns

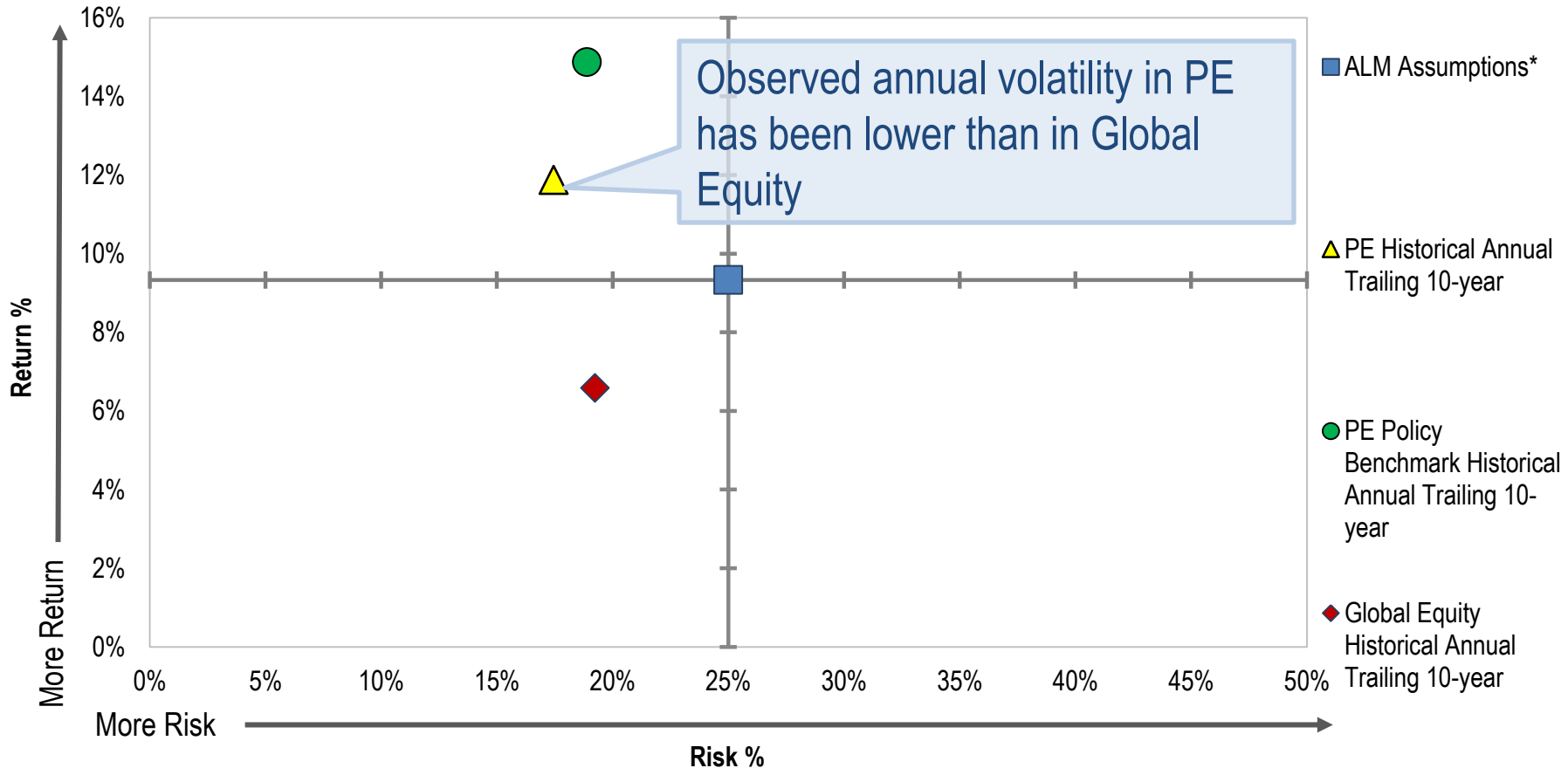
- Private Equity has outperformed the Global Equity (GE) Benchmark, supporting Portfolio Priority 3

- Without its contribution, expected annual returns for the Public Employees' Retirement Fund would be reduced by an estimated 30 to 70 basis points.

Returns (as of 3/31/16)	**1-Year**	**3-Year**	**5-Year**	**10-Year**	**20-Year**
PE Portfolio (%)	6.0	11.6	11.1	10.7	11.5
PE Policy Benchmark (%)	1.3	13.7	11.9	13.1	10.2
GE Policy Benchmark (%)	-4.6	6.1	5.7	4.7	6.7

Private Equity Actual vs. Expected Returns/Risk

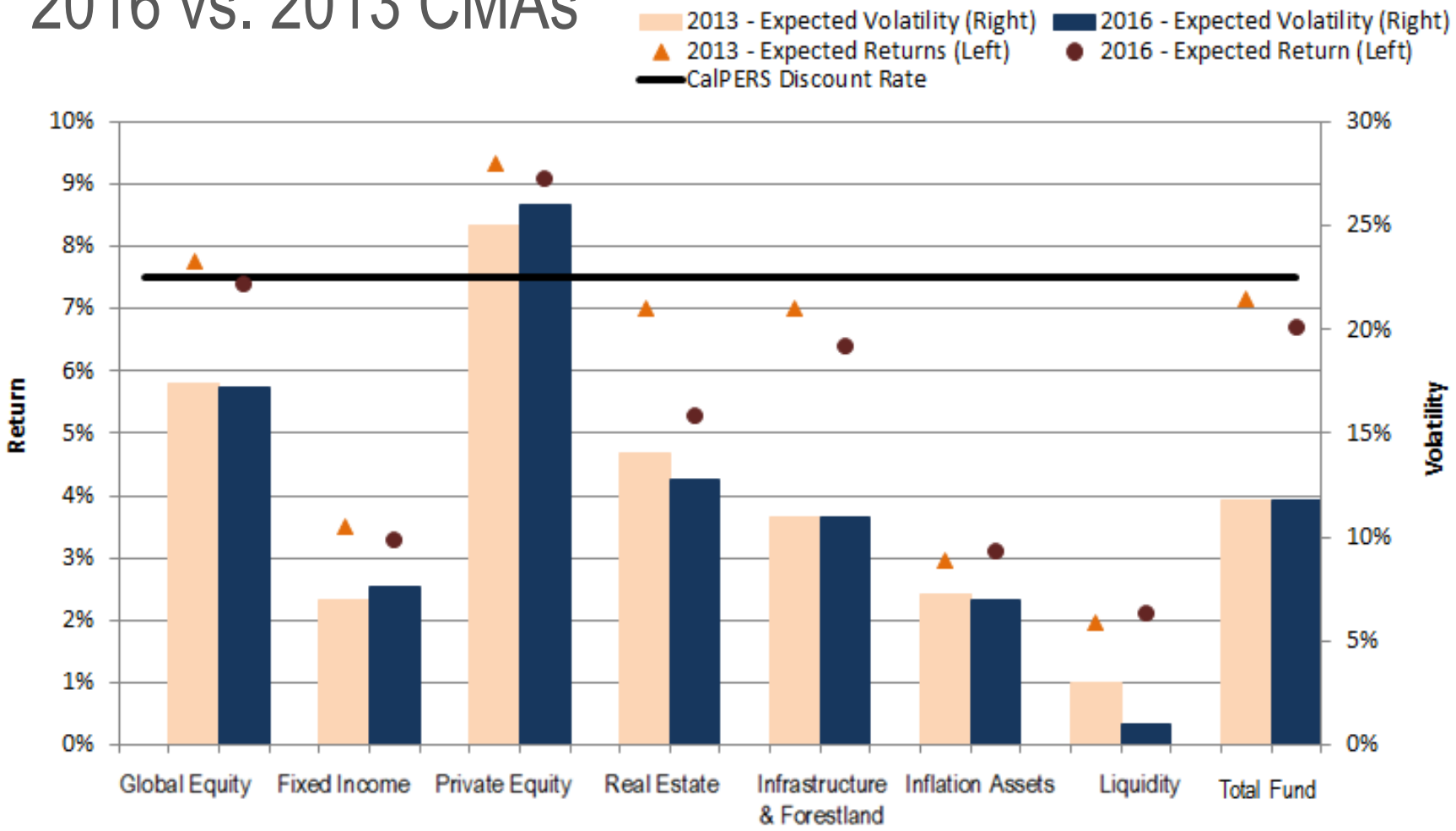
CalPERS Private Equity (PE)
Annual Trailing 10-Year Return vs. Annual Trailing 10-year Risk [1]



CalPERS Investment Office
Asset Allocation/Risk Management

**Capital Market Assumptions used in the 2013-14 ALM Process*
[1]Trailing 10-year returns and risks were calculated based on fiscal year ending data at annual frequency from FY2004/05 to FY2014/15
Source: My State Street

10-year Expected Returns & Volatilities: 2016 vs. 2013 CMAs



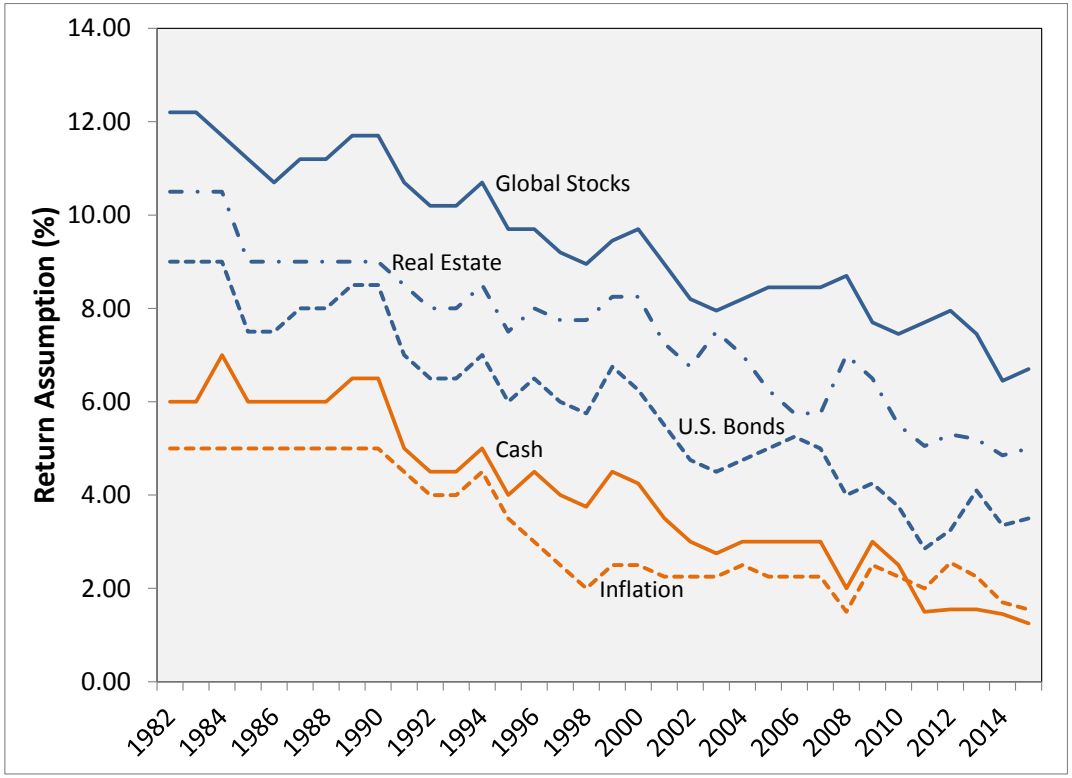
CalPERS | Investment Office
Asset Allocation/Risk Management

Median expected returns and volatilities for 2016 were taken from six sources: Wilshire, PCA, J. P. Morgan, BNY Mellon, Callan, and Voya.

Wilshire

Future Return Expectations

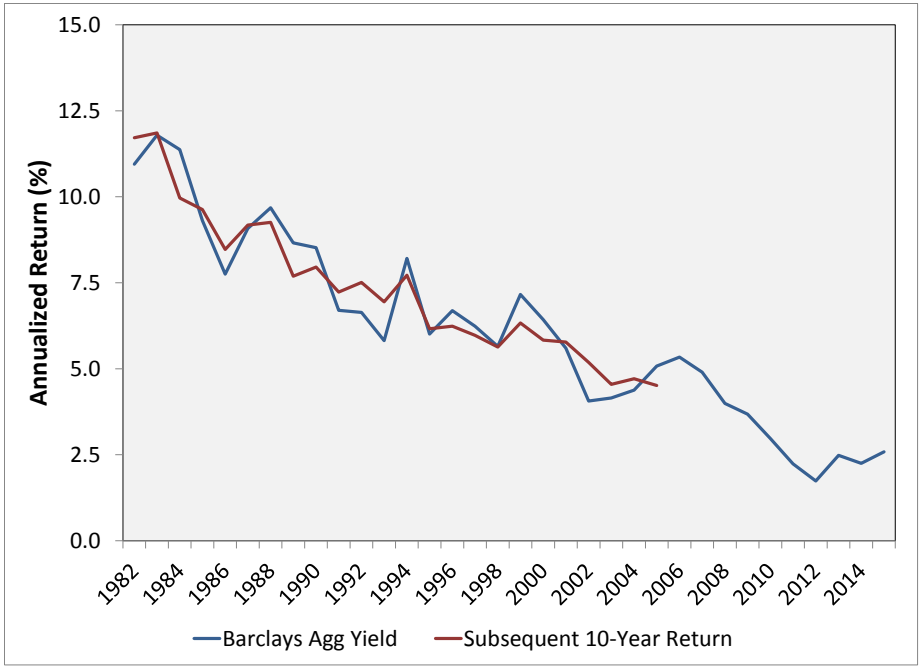
- Forward-looking assumptions are quite low
- Analyzing current market conditions can help investors understand why



Wilshire

Future Return Expectations: Why So Low?

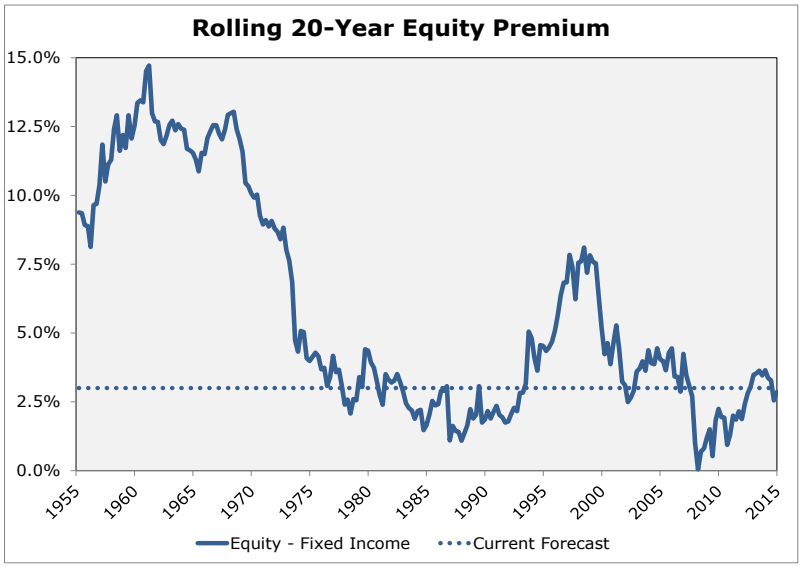
- Yield environment is key to understanding return prospects
  - Asset class returns are "linked" to interest rates
  - Fairly direct methodology in forecasting fixed income
- High predictive accuracy in forecasting future bond returns is directly tied to the "going in" yield

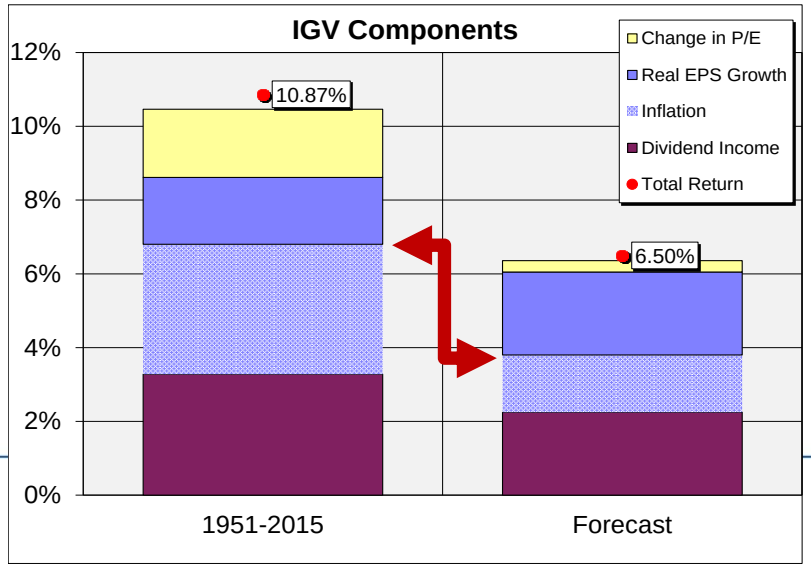


Yield-to-Worst (as of December 2015)	
Barclays Treasury Index	1.73%
Barclays U.S. Aggregate Index	2.59%
Barclays Corporate Index	3.67%

Future Return Expectations: Why So Low?

- What about other asset classes, like stocks?
  - Forecast of equity risk premium not dramatically different from recent history
  - Yield environment anchors all return expectations
  - Investors price assets to provide adequate compensation for bearing various incremental risks





PENSION CONSULTING ALLIANCE

PCA INVESTMENT MARKET RISK METRICS

Monthly Report

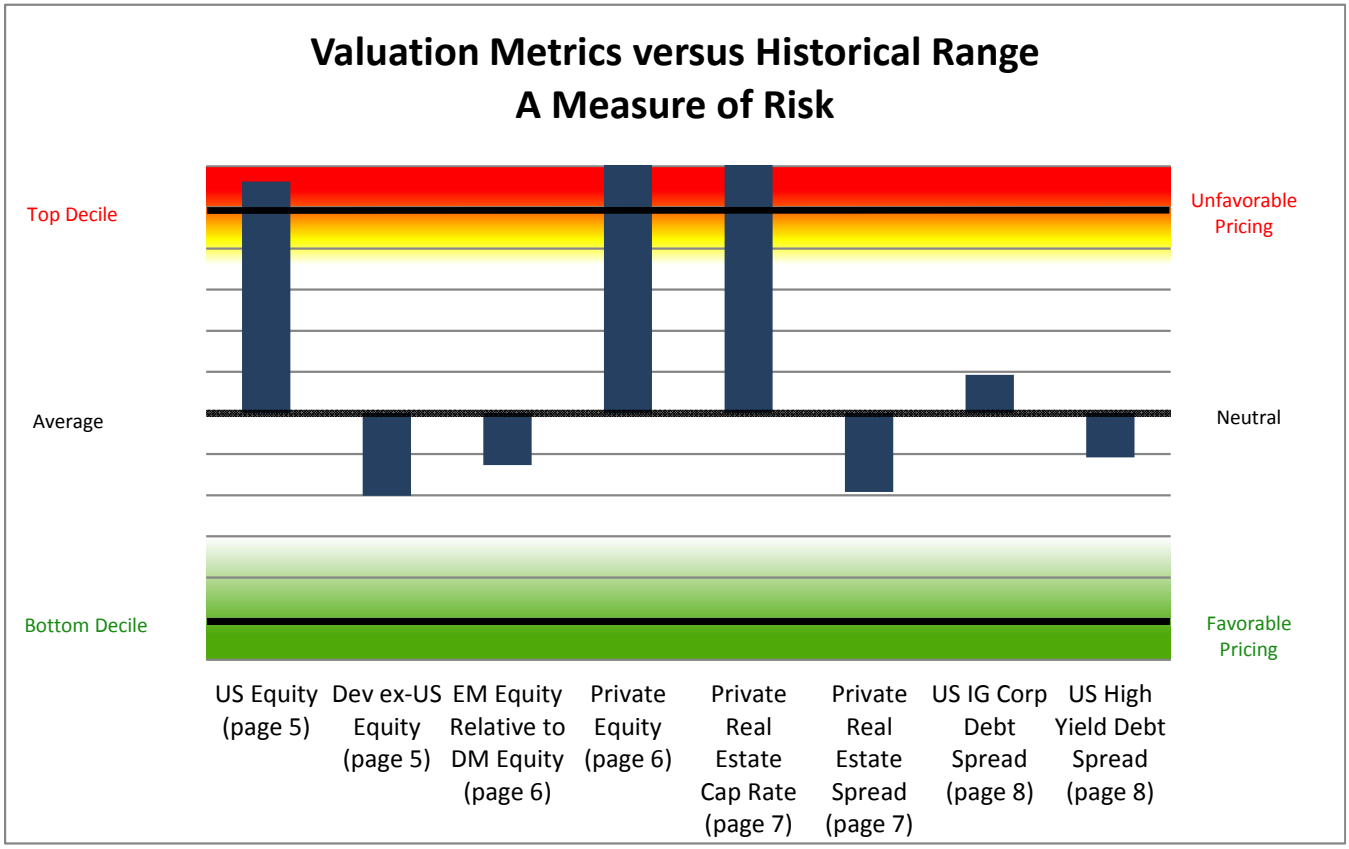
May 2016

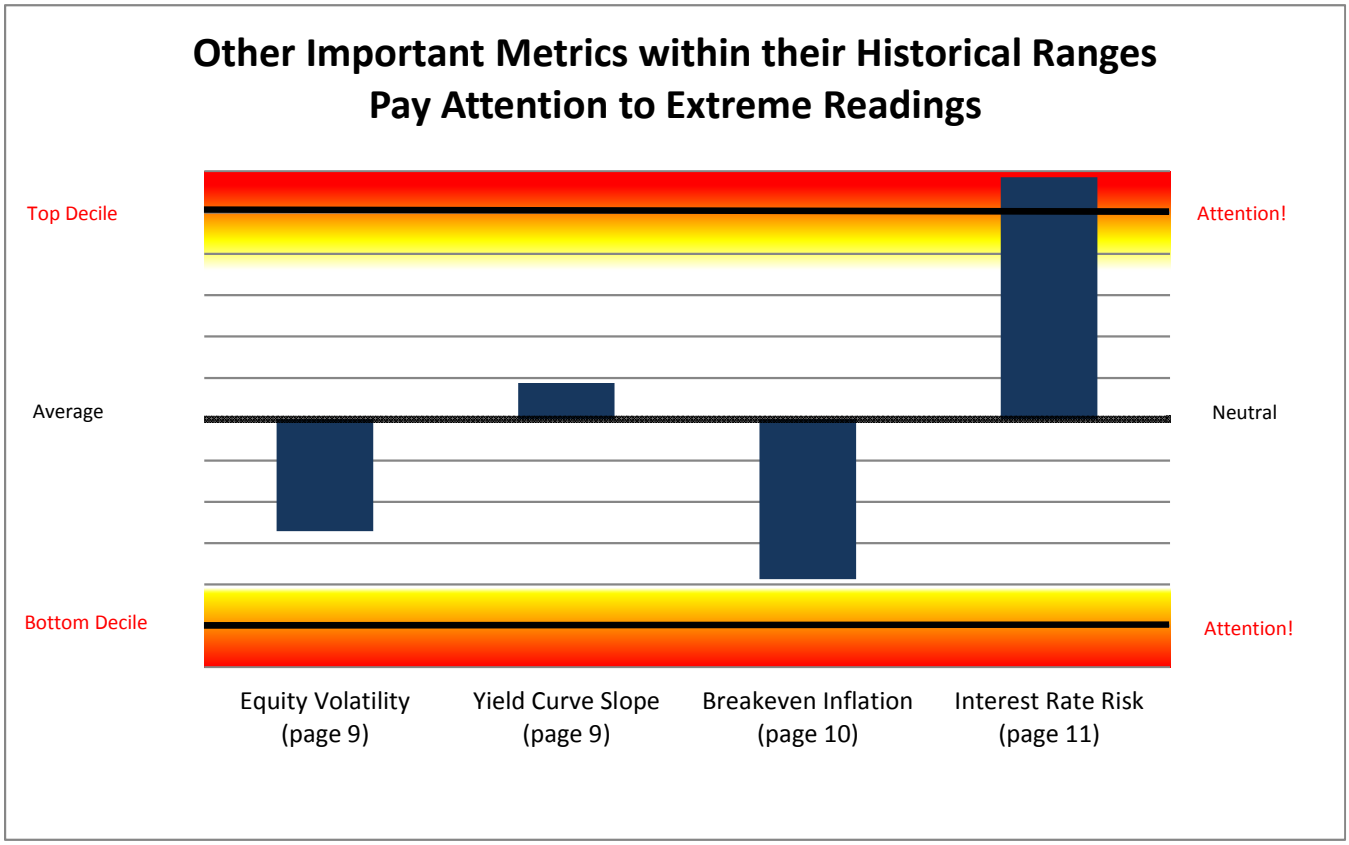
Takeaways

- Equity markets stabilized in April after a Fed induced February and March relief rally.
- Bond spreads also continued to tighten, reverting towards average levels.
- Prices of U.S. public equity, private equity, and real estate equity remain expensive relative to U.S. credit and non-U.S. equities. (page 3)
- Commodity prices ticked up again in April delivering back-to-back monthly increases for the first time in two years.
- The PCA Market Sentiment Indicator remained **neutral** in April; however, since the January / February nadir, showed the biggest increase in sentiment over the past three years **(page 4)**.
- Breakeven inflation (page 10) increased, moving above 1.7%.
- The 10-year Treasury yield remains below 2%, ending the month at 1.8%, indicating real rates very near (if not below) zero.

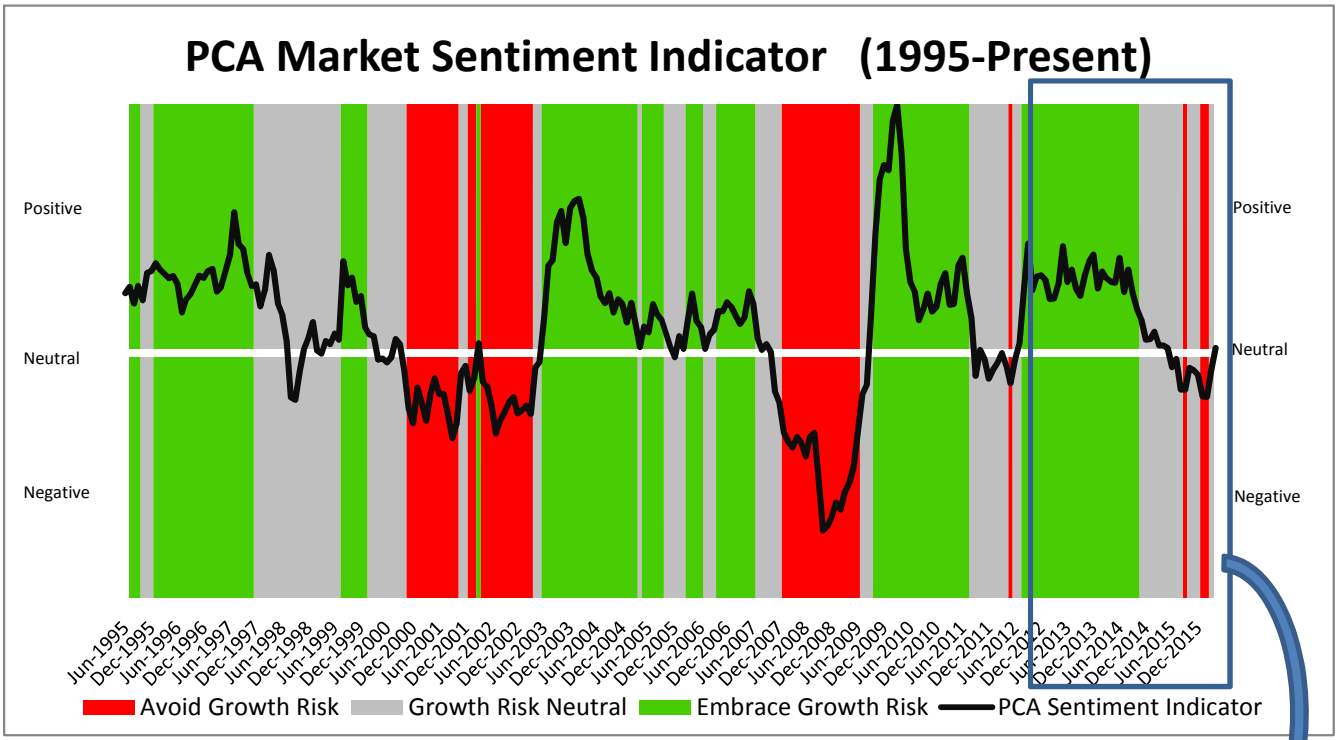
[1]See Appendix for the rationale for selection and calculation methodology used for the risk metrics.

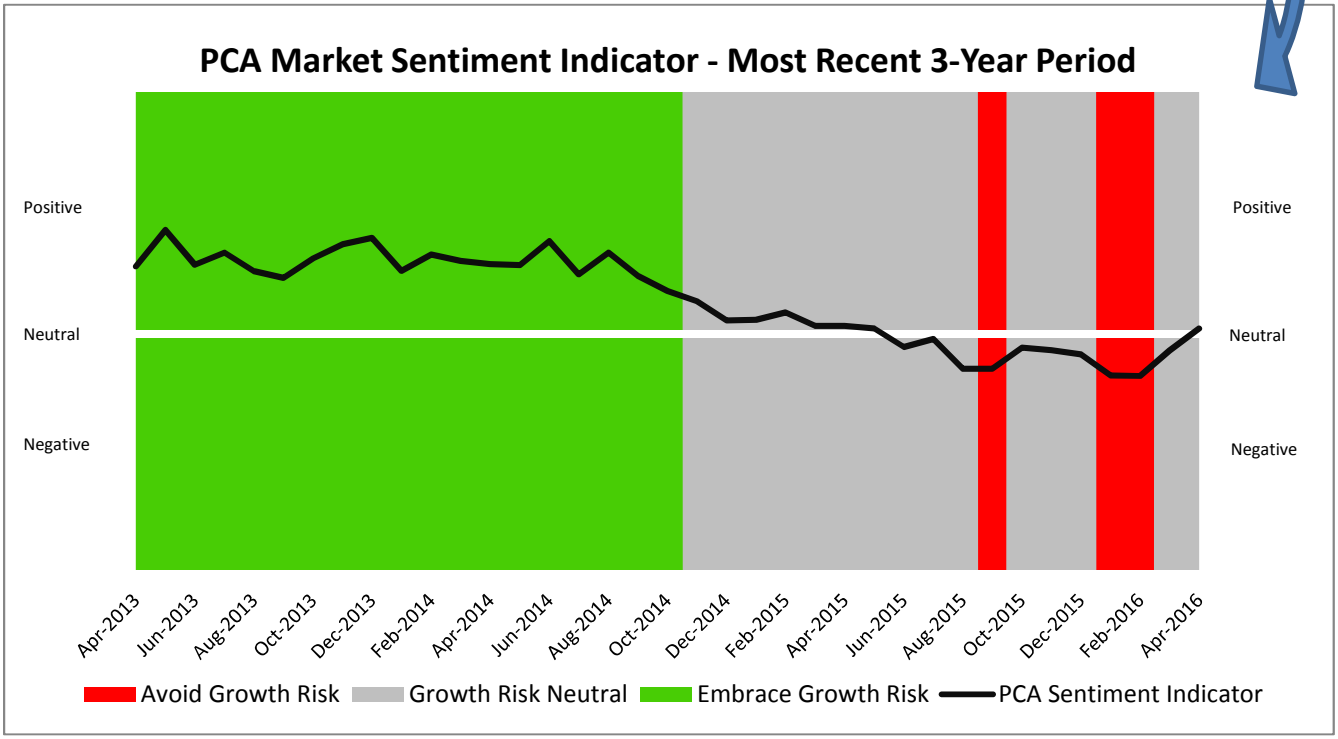
Risk Overview





Market Sentiment

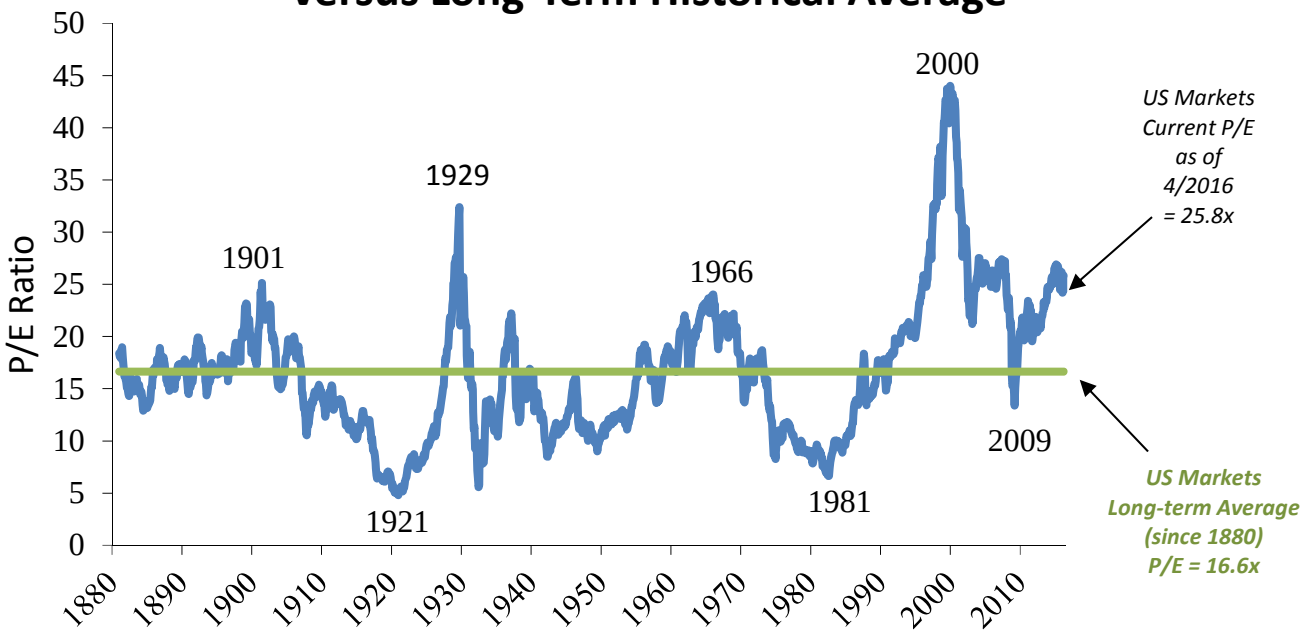




Information Behind Current Sentiment Reading

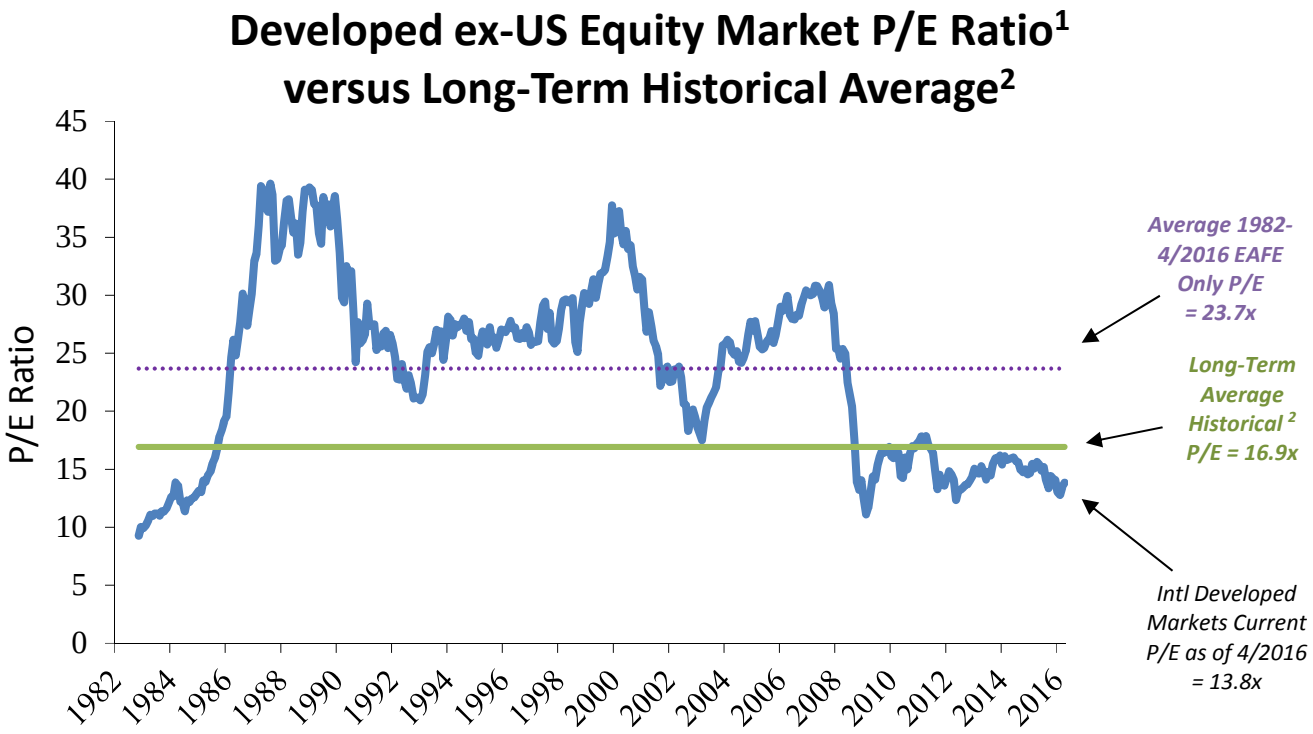
Bond Spread Momentum Trailing-Twelve Months	Negative
Equity Return Momentum Trailing-Twelve Months	Positive
Agreement Between Bond Spread and Equity Spread Momentum Measures?	Disagree
Growth Risk Visibility (Current Overall Sentiment)	**Neutral**

Developed Public Equity Markets



[1] P/E ratio is a Shiller P/E-10 based on 10 year real S&P 500 earnings over S&P 500 index level.

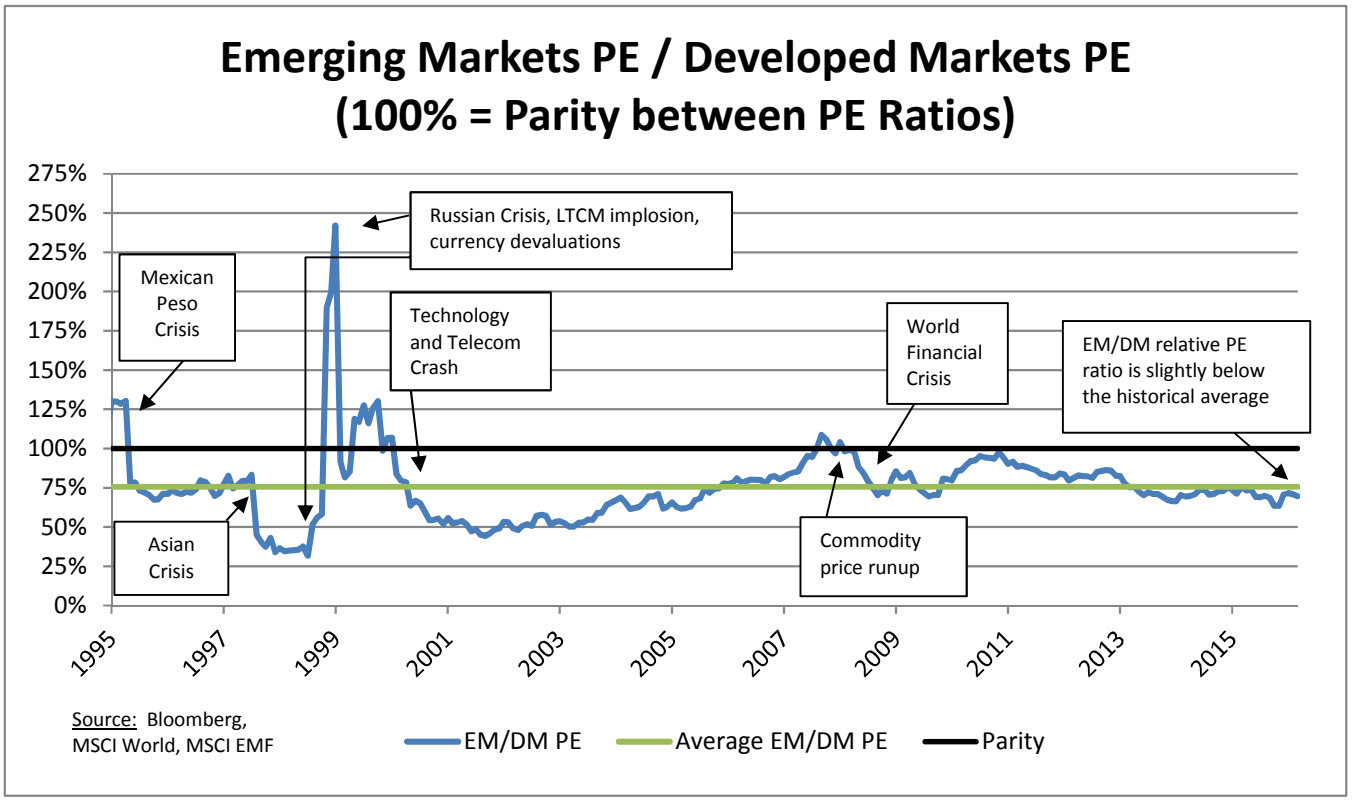
(Please note the different time scales)



[1] P/E ratio is a Shiller P/E-10 based on 10 year real MSCI EAFE earnings over EAFE index level.

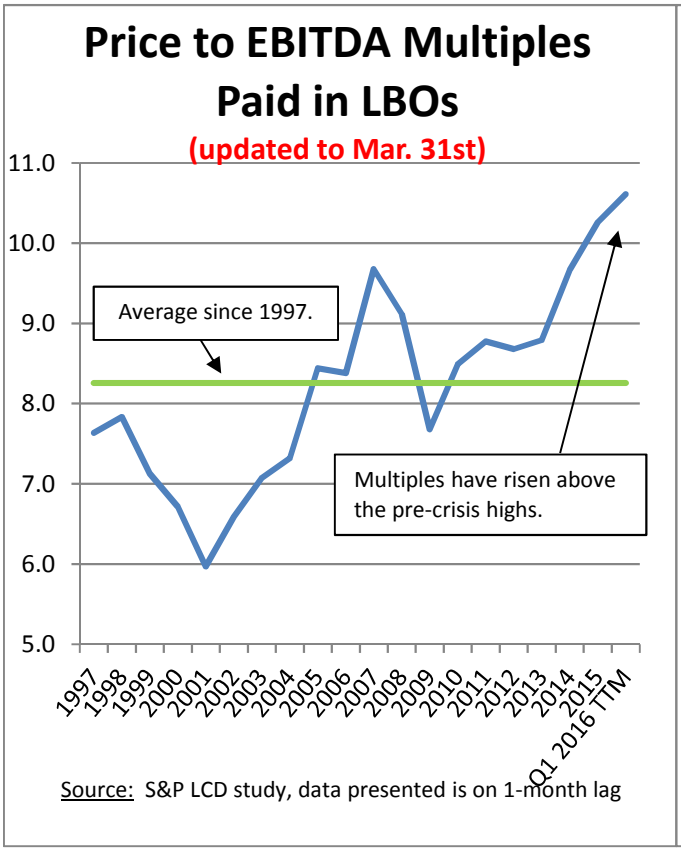
[2] To calculate the LT historical average, from 1881 to 1982 U.S. data is used as developed market proxy. From 1982 to present, actual developed ex-US market data (MSCI EAFE) is used.

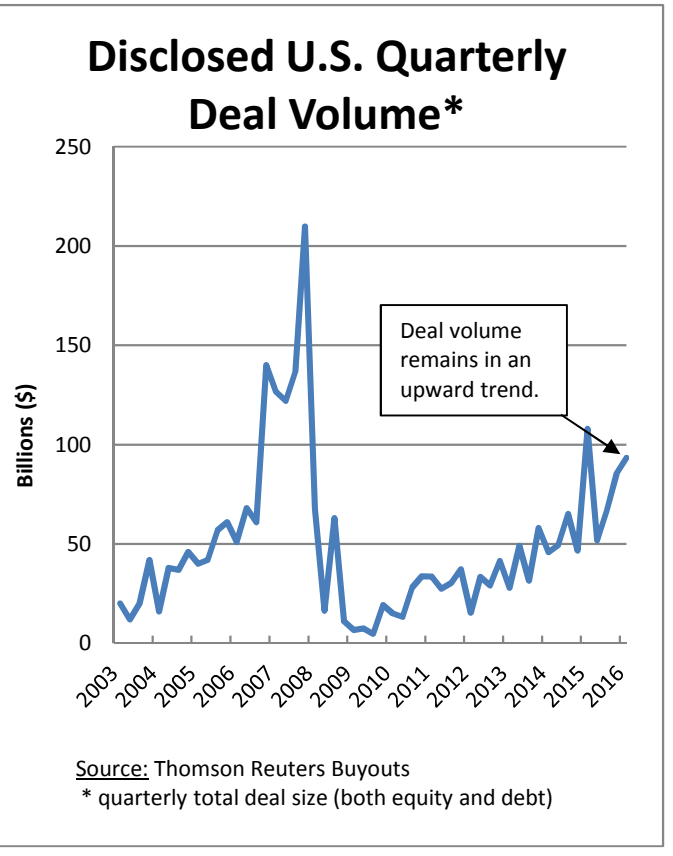
Emerging Market Public Equity Markets



US Private Equity

Quarterly Data, Updated to Mar. 31st

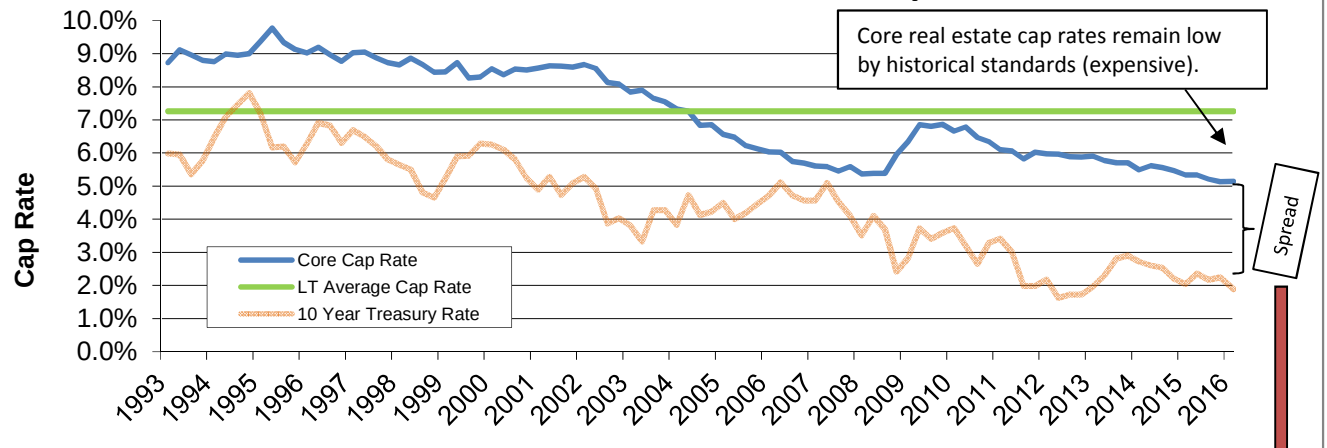




Private Real Estate Markets

Quarterly Data, Updated to Mar. 31st

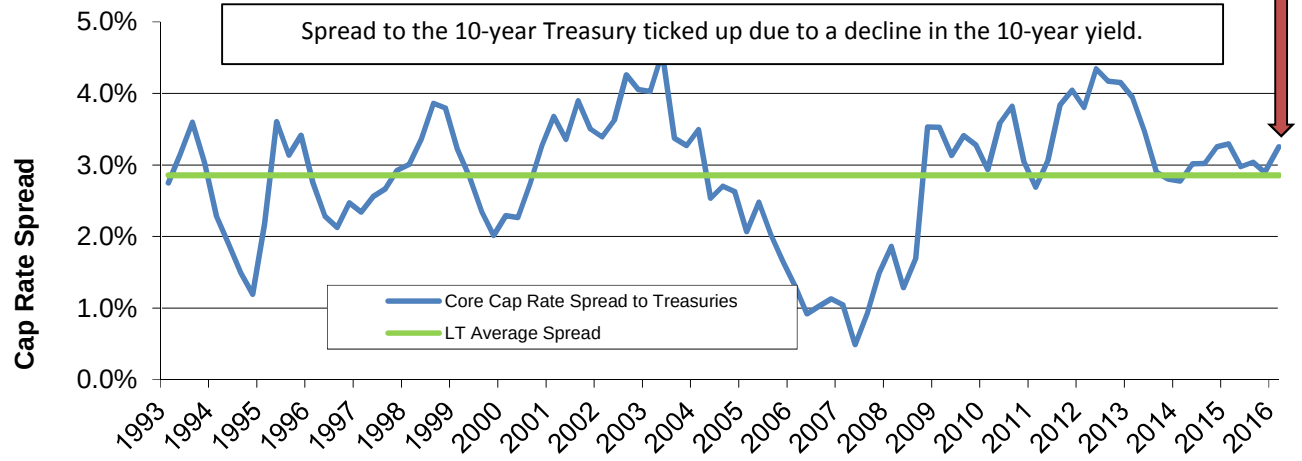
Core Real Estate Current Value Cap Rates[1]



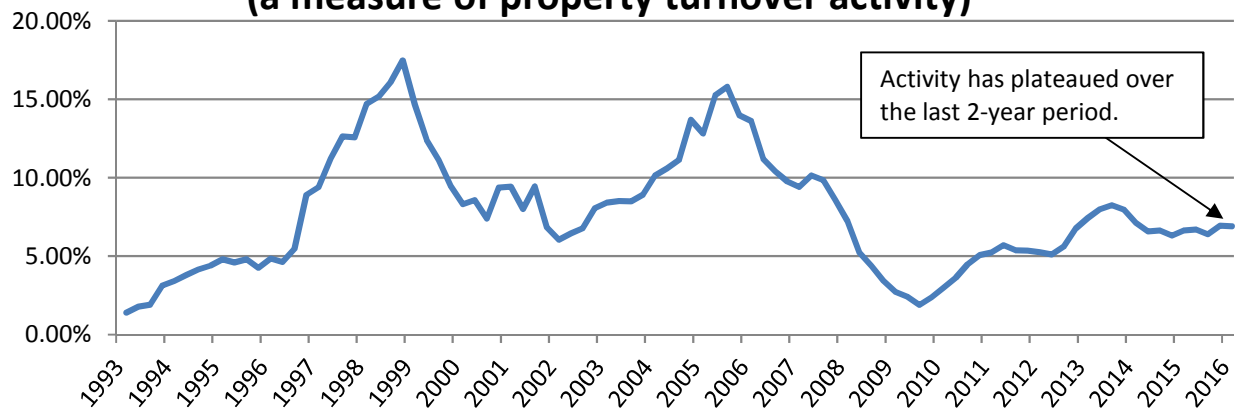
Sources: NCRIEF, www.ustreas.gov

[1]A cap rate is the current annual income of the property divided by an estimate of the current value of the property . It is the current yield of the property. Low cap rates indicate high valuations.

Core Cap Rate Spread over 10-Year Treasury Interest Rate

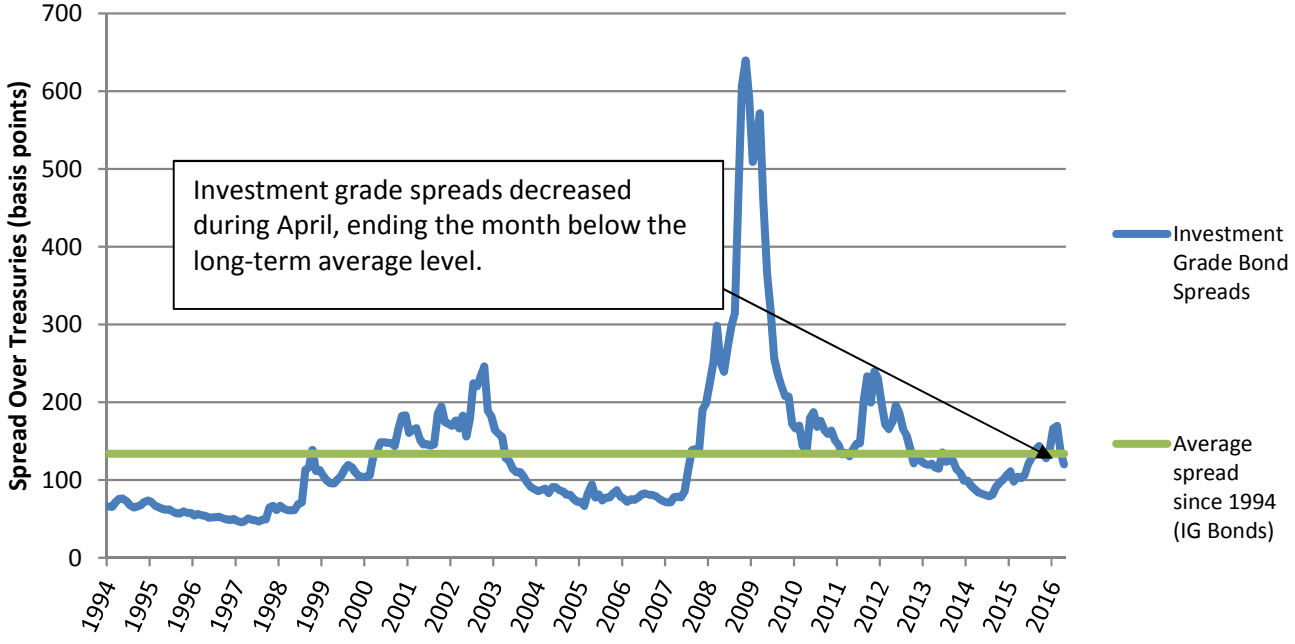


Transactions as a % of Market Value Trailing-Four Quarters (a measure of property turnover activity)

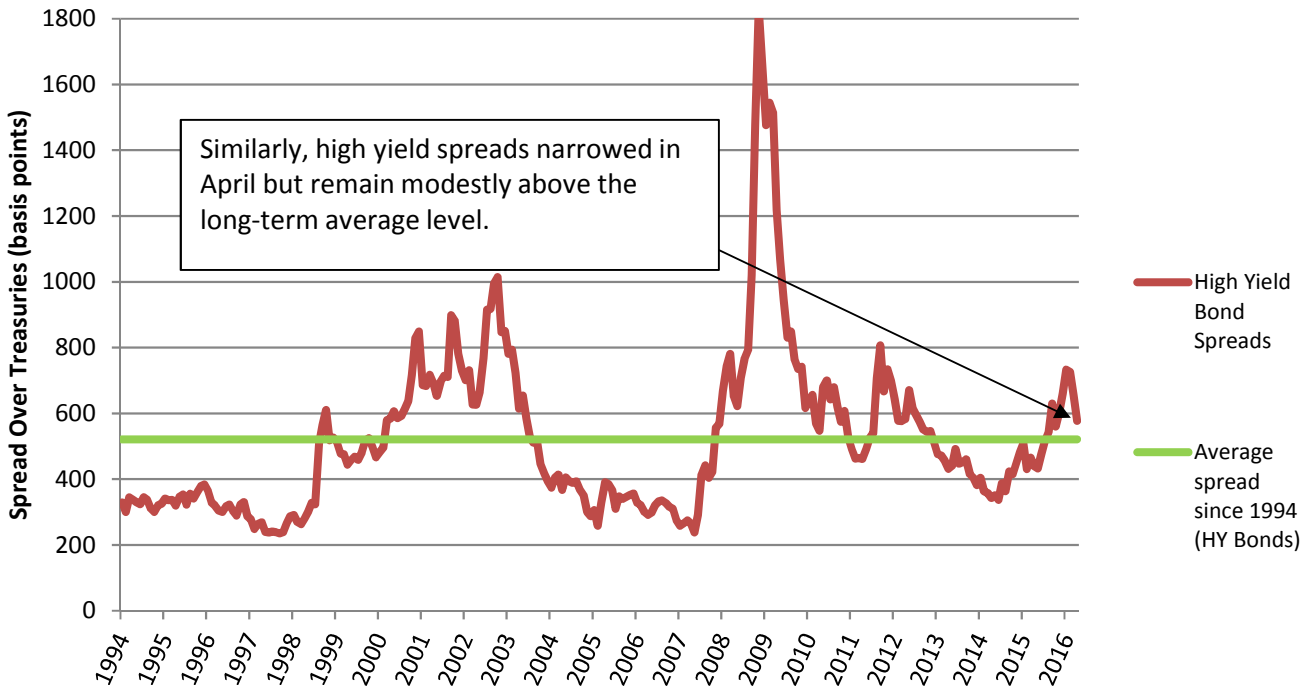


Source: NCREIF, PCA calculation

Credit Markets US Fixed Income

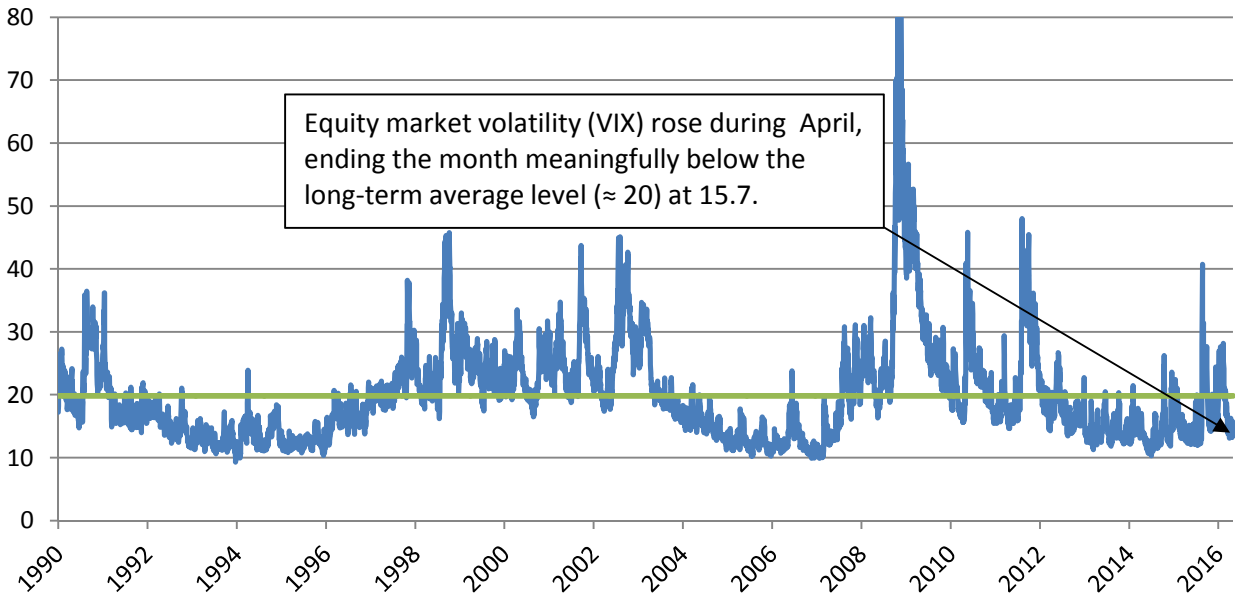


Source: LehmanLive: Barclays Capital US Corporate Investment Grade Index Intermediate Component.

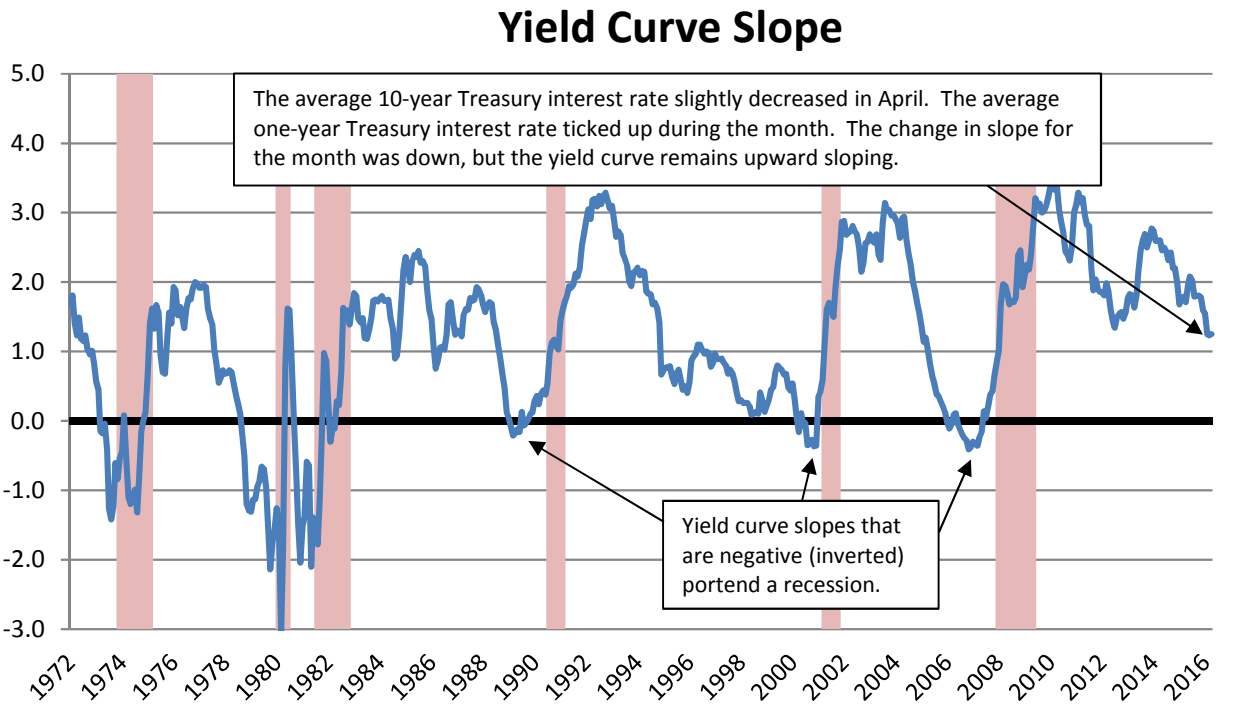


Source: LehmanLive: Barclays Capital U.S. Corporate High Yield Index.

Other Market Metrics

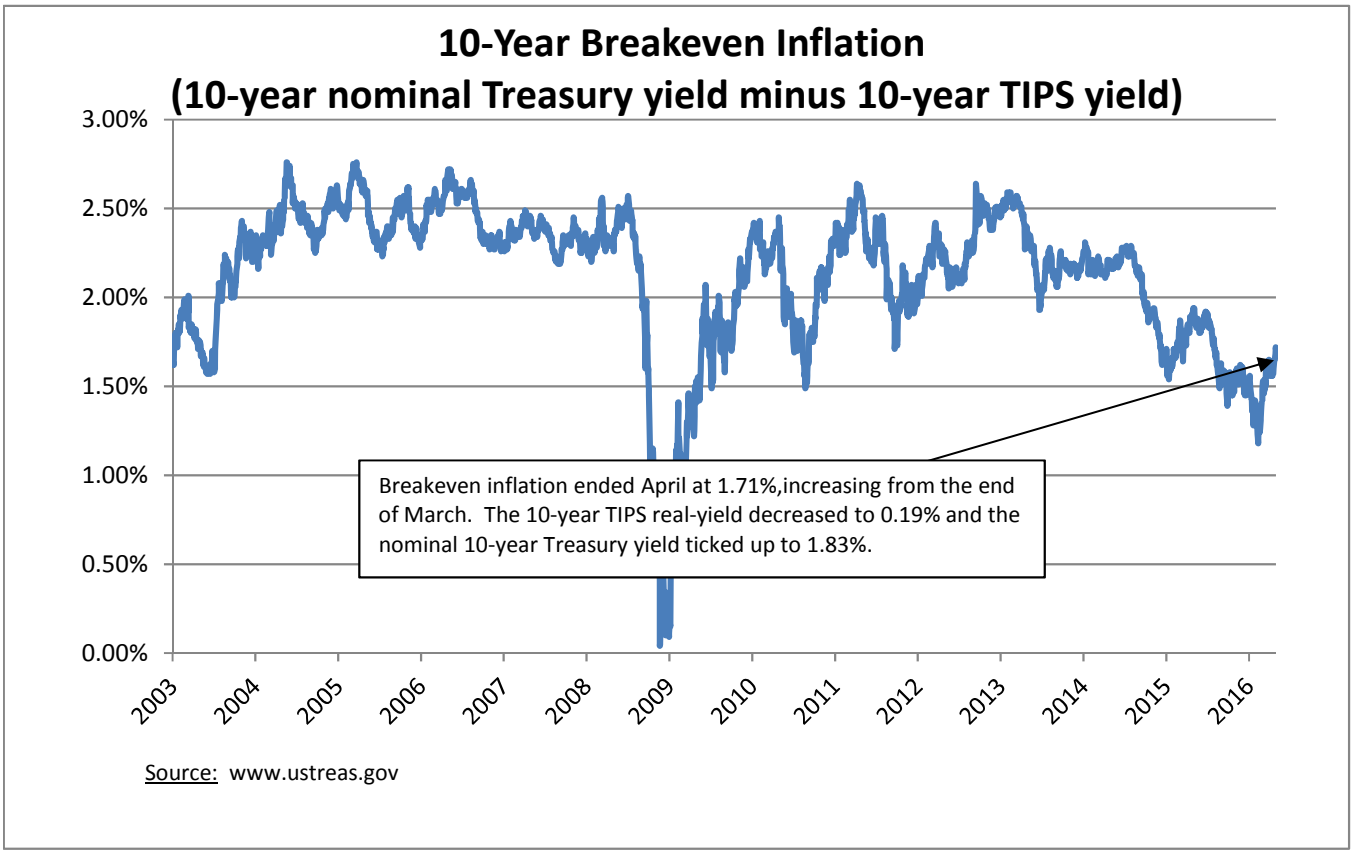


Source: http://www.cboe.com/micro/vix/historical.aspx



Source: www.ustreas.gov (10 yr treasury yield minus 1 year treasury yield)
Recession Dating: NBER http://www.nber.org/cycles.html

Measures of Inflation Expectations



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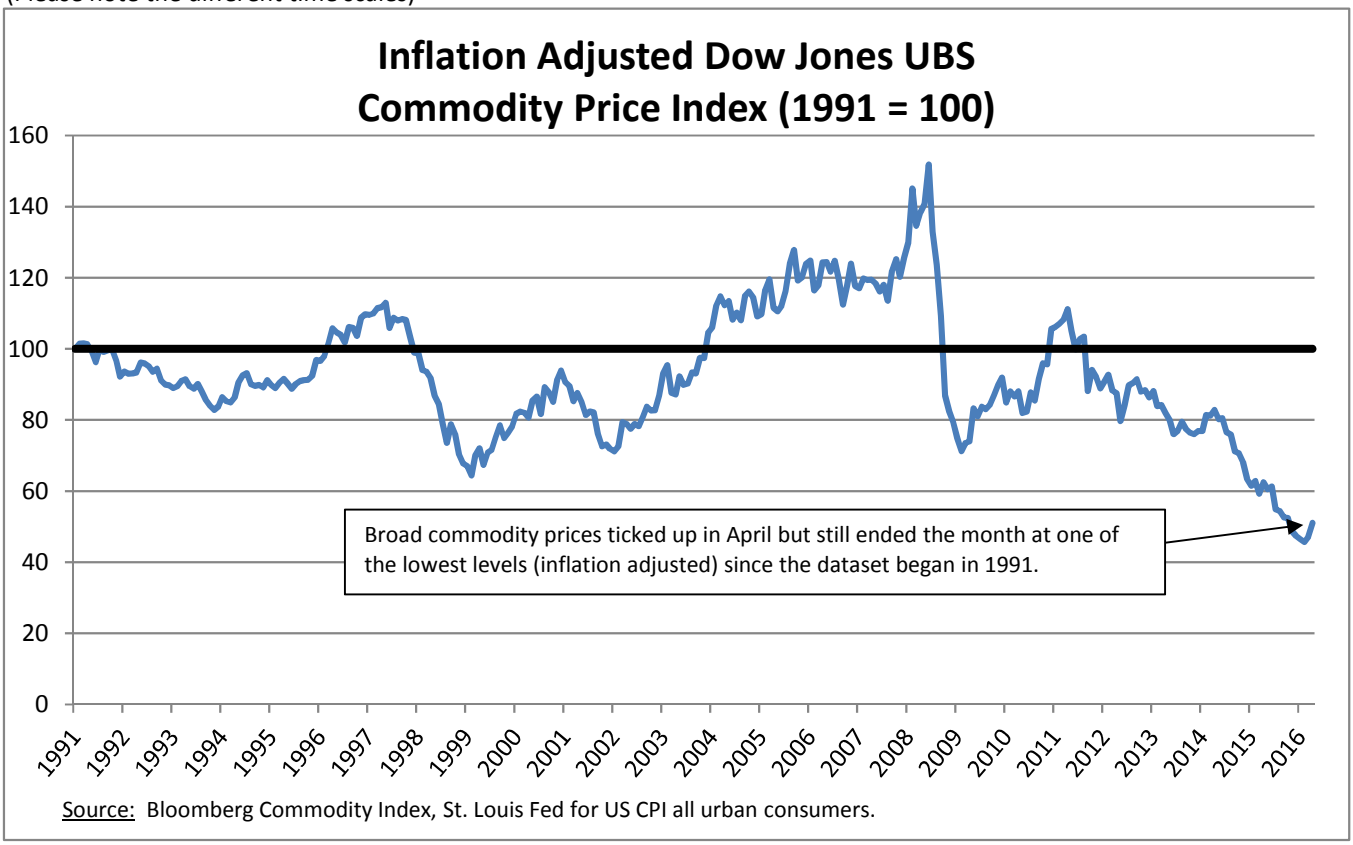
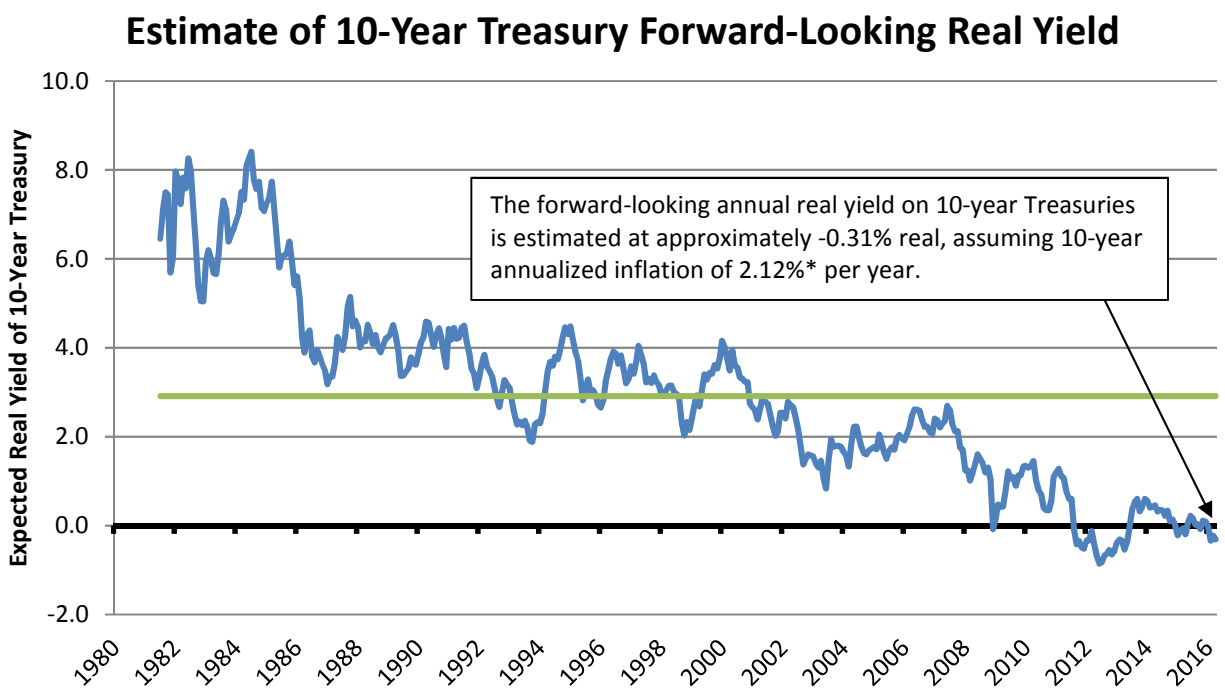
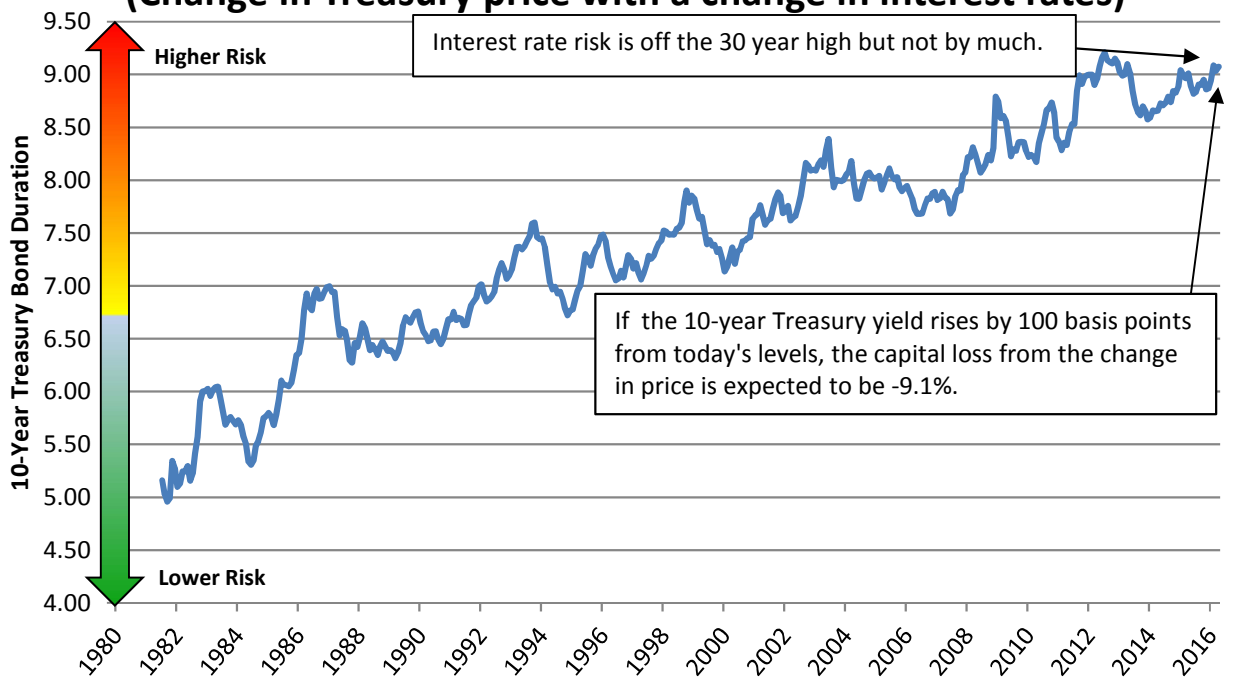


Measures of U.S. Treasury Interest Rate Risk



Sources: www.ustreas.gov for 10-year constant maturity rates
*Federal Reserve Bank of Philadelphia survey of professional forecasts for inflation estimates



Source: www.ustreas.gov for 10-year constant maturity rates, calculation of duration

Appendix

Appendix

METRIC DESCRIPTION, RATIONALE FOR SELECTION AND CALCULATION METHODOLOGY

US Equity Markets:

Metric: P/E ratio = Price / "Normalized" earnings for the S&P 500 Index

To represent the price of US equity markets, we have chosen the S&P 500 index. This index has the longest published history of price, is well known, and also has reliable, long-term, published quarterly earnings. The price=P of the P/E ratio is the current price of the market index (the average daily price of the most recent full month for the S&P 500 index). Equity markets are very volatile. Prices fluctuate significantly during normal times and extremely during periods of market stress or euphoria. Therefore, developing a measure of earnings power (E) which is stable is vitally important, if the measure is to provide insight. While equity prices can and do double, or get cut in half, real earnings power does not change nearly as much. Therefore, we have selected a well known measure of real, stable earnings power developed by Yale Professor Robert Shiller known as the Shiller E-10. The calculation of E-10 is simply the average real annual earnings over the past 10 years. Over 10 years, the earnings shenanigans and boom and bust levels of earnings tend to even out (and often times get restated). Therefore, this earnings statistic gives a reasonably stable, slow-to-change estimate of average real earnings power for the index. Professor Shiller's data and calculation of the E-10 are available on his website at http://www.econ.yale.edu/~shiller/data.htm. We have used his data as the base for our calculations. Details of the theoretical justification behind the measure can be found in his book *Irrational Exuberance* [Princeton University Press 2000, Broadway Books 2001, 2nd ed., 2005].

Developed Equity Markets Excluding the US:

Metric: P/E ratio = Price / "Normalized" earnings for the MSCI EAFE Index

To represent the price of non-US developed equity markets, we have chosen the MSCI EAFE index. This index has the longest published history of price for non-US developed equities. The price=P of the P/E ratio is the current price of the market index (the average daily price of the most recent full month for the MSCI EAFE index). The price level of this index is available starting in December 1969. Again, for the reasons described above, we elected to use the Shiller E-10 as our measure of earnings (E). Since 12/1972, a monthly price earnings ratio is available from MSCI. Using this quoted ratio, we have backed out the implied trailing-twelve month earnings of the EAFE index for each month from 12/1972 to the present. These annualized earnings are then inflation adjusted using CPI-U to represent real earnings in US dollar terms for each time period. The Shiller E-10 for the EAFE index (10 year average real earnings) is calculated in the same manner as detailed above.

However, we do not believe that the pricing and earnings history of the EAFE markets are long enough to be a reliable representation of pricing history for developed market equities outside of the US. Therefore, in constructing the Long-Term Average Historical P/E for developed ex-US equities for comparison purposes, we have elected to use the US equity market as a developed market proxy, from 1881 to 1982. This lowers the Long-Term Average Historical P/E considerably. We believe this methodology provides a more realistic historical comparison for a market with a relatively short history.

Appendix

METRIC DESCRIPTION, RATIONALE FOR SELECTION AND CALCULATION METHODOLOGY

Emerging Market Equity Markets:

Metric: Ratio of Emerging Market P/E Ratio to Developed Market P/E Ratio

To represent the Emerging Markets P/E Ratio, we have chosen the MSCI Emerging Market Free Index, which has P/E data back to January 1995 on Bloomberg. To represent the Developed Markets PE Ratio, we have chosen the MSCI World Index, which also has data back to January 1995 on Bloomberg. Although there are issues with published, single time period P/E ratios, in which the denominator effect can cause large movements, we feel that the information contained in such movements will alert investors to market activity that they will want to interpret.

US Private Equity Markets:

Metrics: S&P LCD Average EBITDA Multiples Paid in LBOs and US Quarterly Deal Volume

The Average Purchase Price to EBITDA multiples paid in LBOs is published quarterly by S&P in their LCD study. This is the total price paid (both equity and debt) over the trailing-twelve month EBITDA (earnings before interest, taxes, depreciation and amortization) as calculated by S&P LCD. This is the relevant, high-level pricing metric that private equity managers use in assessing deals. Data is published monthly.

US quarterly deal volume for private equity is the total deal volume in $ billions (both equity and debt) reported in the quarter by Thomson Reuters Buyouts. This metric gives a measure of the level of activity in the market. Data is published quarterly.

U.S Private Real Estate Markets:

Metrics: US Cap Rates, Cap Rate Spreads, and Transactions as a % of Market Value

Real estate cap rates are a measure of the price paid in the market to acquire properties versus their annualized income generation before financing costs (NOI=net operating income). The data, published by NCREIF, describes completed and leased properties (core) on an unleveraged basis. We chose to use current value cap rates. These are capitalization rates from properties that were revalued during the quarter. This data relies on estimates of value and therefore tends to be lagging (estimated prices are slower to rise and slower to fall than transaction prices). The data is published quarterly.

Spreads between the cap rate (described above) and the 10-year nominal Treasury yield, indicate a measure of the cost of properties versus a current measure of the cost of financing.

Transactions as a % of Market Value Trailing-Four Quarters is a measure of property turnover activity in the NCREIF Universe. This quarterly metric is a measure of activity in the market.

Credit Markets US Fixed Income:

Metric: Spreads

The absolute level of spreads over treasuries and spread trends (widening / narrowing) are good indicators of credit risk in the fixed income markets. Spreads incorporate estimates of future default, but can also be driven by technical dislocations in the fixed income markets. Abnormally narrow spreads (relative to historical levels) indicate higher levels of valuation risk, wide spreads indicate lower levels of valuation risk and / or elevated default fears. Investment grade bond spreads are represented by the Barclays Capital US Corporate Investment Grade Index Intermediate Component. The high yield corporate bond spreads are represented by the Barclays Capital US Corporate High Yield Index.

Appendix

METRIC DESCRIPTION, RATIONALE FOR SELECTION AND CALCULATION METHODOLOGY

Measure of Equity Market Fear / Uncertainty

Metric: VIX – Measure of implied option volatility for U.S. equity markets

The VIX is a key measure of near-term volatility conveyed by implied volatility of S&P 500 index option prices. VIX increases with uncertainty and fear. Stocks and the VIX are negatively correlated. Volatility tends to spike when equity markets fall.

Measure of Monetary Policy

Metric: Yield Curve Slope

We calculate the yield curve slope as the 10 year treasury yield minus the 1 year treasury yield. When the yield curve slope is zero or negative, this is a signal to pay attention. A negative yield curve slope signals lower rates in the future, caused by a contraction in economic activity. Recessions are typically preceded by an inverted (negatively sloped) yield curve. A very steep yield curve (2 or greater) indicates a large difference between shorter-term interest rates (the 1 year rate) and longer-term rates (the 10 year rate). This can signal expansion in economic activity in the future, or merely higher future interest rates.

Measures of US Inflation Expectations

Metrics: Breakeven Inflation and Inflation Adjusted Commodity Prices

Inflation is a very important indicator impacting all assets and financial instruments. Breakeven inflation is calculated as the 10 year nominal treasury yield minus the 10 year real yield on US TIPS (treasury inflation protected securities). Abnormally low long-term inflation expectations are indicative of deflationary fears. A rapid rise in breakeven inflation indicates an acceleration in inflationary expectations as market participants sell nominal treasuries and buy TIPs. If breakeven inflation continues to rise quarter over quarter, this is a signal of inflationary worries rising, which may cause Fed action and / or dollar decline.

Commodity price movement (above the rate of inflation) is an indication of anticipated inflation caused by real global economic activity putting pressure on resource prices. We calculate this metric by adjusted in the Dow Jones UBS Commodity Index (formerly Dow Jones AIG Commodity Index) by US CPI-U. While rising commodity prices will not necessarily translate to higher US inflation, higher US inflation will likely show up in higher commodity prices, particularly if world economic activity is robust.

These two measures of anticipated inflation can, and often are, conflicting.

Measures of US Treasury Bond Interest Rate Risk

Metrics: 10-Year Treasury Forward-Looking Real Yield and 10-Year Treasury Duration

The expected annualized real yield of the 10 year U.S. Treasury Bond is a measure of valuation risk for U.S. Treasuries. A low real yield means investors will accept a low rate of expected return for the certainly of receiving their nominal cash flows. PCA estimates the expected annualized real yield by subtracting an estimate of expected 10 year inflation (produced by the Survey of Professional Forecasters as collected by the Federal Reserve Bank of Philadelphia), from the 10 year Treasury constant maturity interest rate.

Duration for the 10-Year Treasury Bond is calculated based on the current yield and a price of 100. This is a measure of expected percentage movements in the price of the bond based on small movements in percentage yield. We make no attempt to account for convexity.

Definition of "extreme" metric readings

A metric reading is defined as "extreme" if the metric reading is in the top or bottom decile of its historical readings. These "extreme" reading should cause the reader to pay attention. These metrics have reverted toward their mean values in the past.

PCA PENSION CONSULTING ALLIANCE

PCA Market Sentiment Indicator

Explanation, Construction and Q&A

By:

Pension Consulting Alliance, LLC.

John Linder, CFA, CPA
Neil Rue, CFA

PCA has created the PCA Market Sentiment Indicator (PMSI) to complement our valuation-focused PCA Investment Market Risk Metrics. This measure of sentiment is meant to capture significant and persistent shifts in long-lived market trends of economic growth risk, either towards a risk-seeking trend or a risk-aversion trend.

This paper explores:

- What is the PCA Market Sentiment Indicator (PMSI)?
- How do I read the indicator graph?
- How is the PCA Market Sentiment Indicator (PMSI) constructed?
- What do changes in the indicator mean?

PCA Market Sentiment Indicator

PCA has created a market sentiment indicator for monthly publication (the PMSI – see below) to complement PCA's Investment Market Risk Metrics.

PCA's Investment Market Risk Metrics, which rely significantly on standard market measures of relative valuation, often provide valid early signals of increasing long-term risk levels in the global investment markets. However, as is the case with numerous valuation measures, the Risk Metrics may convey such risk concerns long before a market corrections take place. The PMSI helps to address this early-warning bias by measuring whether the markets are beginning to acknowledge key Risk Metrics trends, and / or indicating non-valuation based concerns. Once the PMSI indicates that the market sentiment has shifted, it is our belief that investors should consider significant action, particularly if confirmed by the Risk Metrics. Importantly, PCA believes the Risk Metrics and PMSI should always be used in conjunction with one another and never in isolation. The questions and answers below highlight and discuss the basic underpinnings of the PCA PMSI:

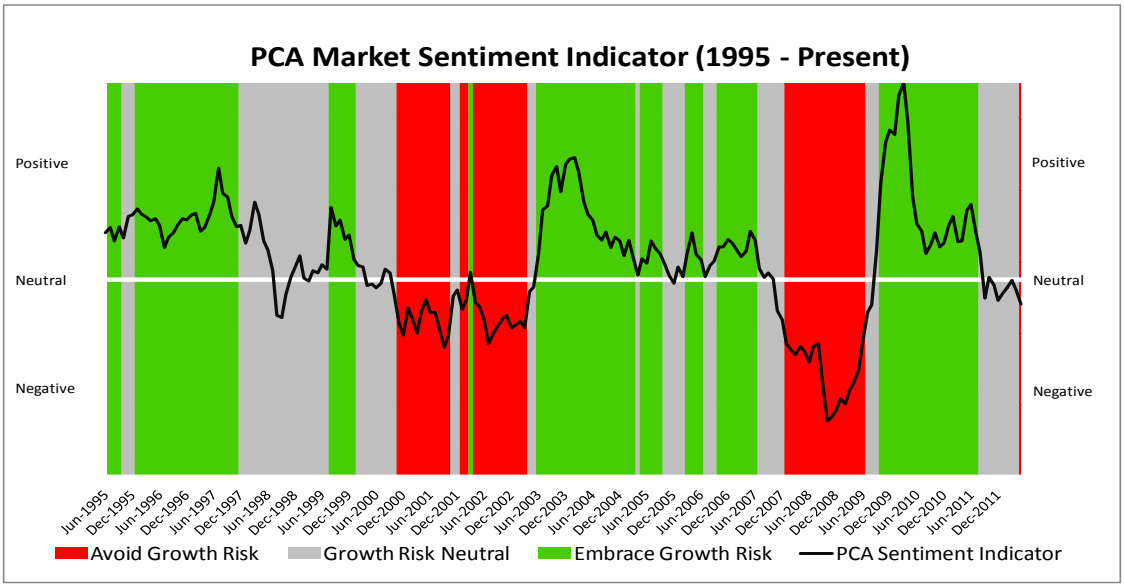
What is the PCA Market Sentiment Indicator (PMSI)?

The PMSI is a measure meant to gauge the market's sentiment regarding economic growth risk. Growth risk cuts across most financial assets, and is the largest risk exposure that most portfolios bear. The PMSI takes into account the momentum (trend over time, positive or negative) of the economic growth risk exposure of publicly traded stocks and bonds, as a signal of the future direction of growth risk returns; either positive (risk seeking market sentiment), or negative (risk averse market sentiment).

How do I read the PCA Market Sentiment Indicator (PMSI) graph?

Simply put, the PMSI is a color coded indicator that signals the market's sentiment regarding economic growth risk. It is read left to right chronologically. A green indicator on the PMSI indicates that the market's sentiment towards growth risk is positive. A gray indicator indicates that the market's sentiment towards growth risk is neutral or inconclusive. A red indicator indicates that the market's sentiment towards growth risk is negative. The black line on the graph is the level of the PMSI. The degree of the signal above or below the neutral reading is an indication the signal's current strength.

Momentum as we are defining it is the use of the past behavior of a series as a predictor of its future behavior.



PCA Market Sentiment Indicator

How is the PCA Market Sentiment Indicator (PMSI) Constructed?

The PMSI is constructed from two sub-elements representing investor sentiment in stocks and bonds:

1. Stock return momentum: Return momentum for the S&P 500 Equity Index (trailing 12-months)
2. Bond yield spread momentum: Momentum of bond yield spreads (excess of the measured bond yield over the identical duration U.S. Treasury bond yield) for corporate bonds (trailing 12-months) for both investment grade bonds (75% weight) and high yield bonds (25% weight). The scale of this measure is adjusted to match that of the stock return momentum measure.

The black line reading on the graph is calculated as the average of the stock return momentum measure and the bonds spread momentum measure. The color reading on the graph is determined as follows:

1. If both stock return momentum and bond spread momentum are positive = GREEN (positive)
2. If one of the momentum indicators is positive, and the other negative = GRAY (inconclusive)
3. If both stock return momentum and bond spread momentum are negative = RED (negative)

What does the PCA Market Sentiment Indicator (PMSI) mean? Why might it be useful?

There is strong evidence that time series momentum is significant and persistent. In particular, across an extensive array of asset classes, the sign of the trailing 12-month return (positive or negative) is indicative of future returns (positive or negative) over the next 12 month period. The PMSI is constructed to measure this momentum in stocks and corporate bond spreads. A reading of green or red is agreement of both the equity and bond measures, indicating that it is likely that this trend (positive or negative) will continue over the next 12 months. When the measures disagree, the indicator turns gray. A gray reading does not necessarily mean a new trend is occurring, as the indicator may move back to green, or into the red from there. The level of the reading (black line) and the number of months at the red or green reading, gives the user additional information on which to form an opinion, and potentially take action.

[i] Momentum as we are defining it is the use of the past behavior of a series as a predictor of its future behavior.

[ii] "Time Series Momentum" Moskowitz, Ooi, Pedersen, August 2010
http://pages.stern.nyu.edu/~lpederse/papers/TimeSeriesMomentum.pdf