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MINNESOTA STATE BOARD OF INVESTMENT

Board Members:

Governor
Mark Dayton

State Auditor
Rebecca Otto

Secretary of State
Steve Simon

Attorney General
Lori Swanson

Executive Director & Chief Investment Officer:

Mansco Perry

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An Equal Opportunity Employer

DATE: January 13, 2017

TO: Legislative Reference Library

FROM: Mansco Perry III MP3

SUBJECT: Investment Consultant Report

As required by Minnesota Statutes, Section 11A.27, attached is the State Board of Investment's Report on Investment Consultant Activities.

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DATE: January 13, 2017

FROM: State Board of Investment

SUBJECT: Report on Investment Consultant Activities

The provisions of Minnesota Statutes, Section 11A.27 require the State Board of Investment to file with the Legislative Reference Library a report on investment consultant activities.

The State Board of Investment (SBI) contracts with Callan Associates, Chicago, Illinois and Pension Consulting Alliance (PCA), Encino, California for certain investment consulting services. Callan serves as the SBI's general consultant, and PCA serves as the SBI's special projects consultant. The current contracts with these consultants, effective July 1, 2012 to June 30, 2017, call for payment of $450,000 to Callan annually and $40,000 to PCA annually.

During the period November 1, 2015 through October 31, 2016, Callan was involved in the following projects:

- Availability to the Board, staff and Investment Advisory Council to provide perspective, counsel and input on relevant investment related issues.
- Periodic background information for evaluating SBI investment managers.

During the period November 1, 2015 through October 31, 2016, PCA was involved in the following projects:

- Availability to staff to provide perspective, counsel and input on relevant investment related issues.

Attached is an example of the work product each has provided.

PCA | PENSION CONSULTING ALLIANCE

PCA INVESTMENT MARKET RISK METRICS

Monthly Report

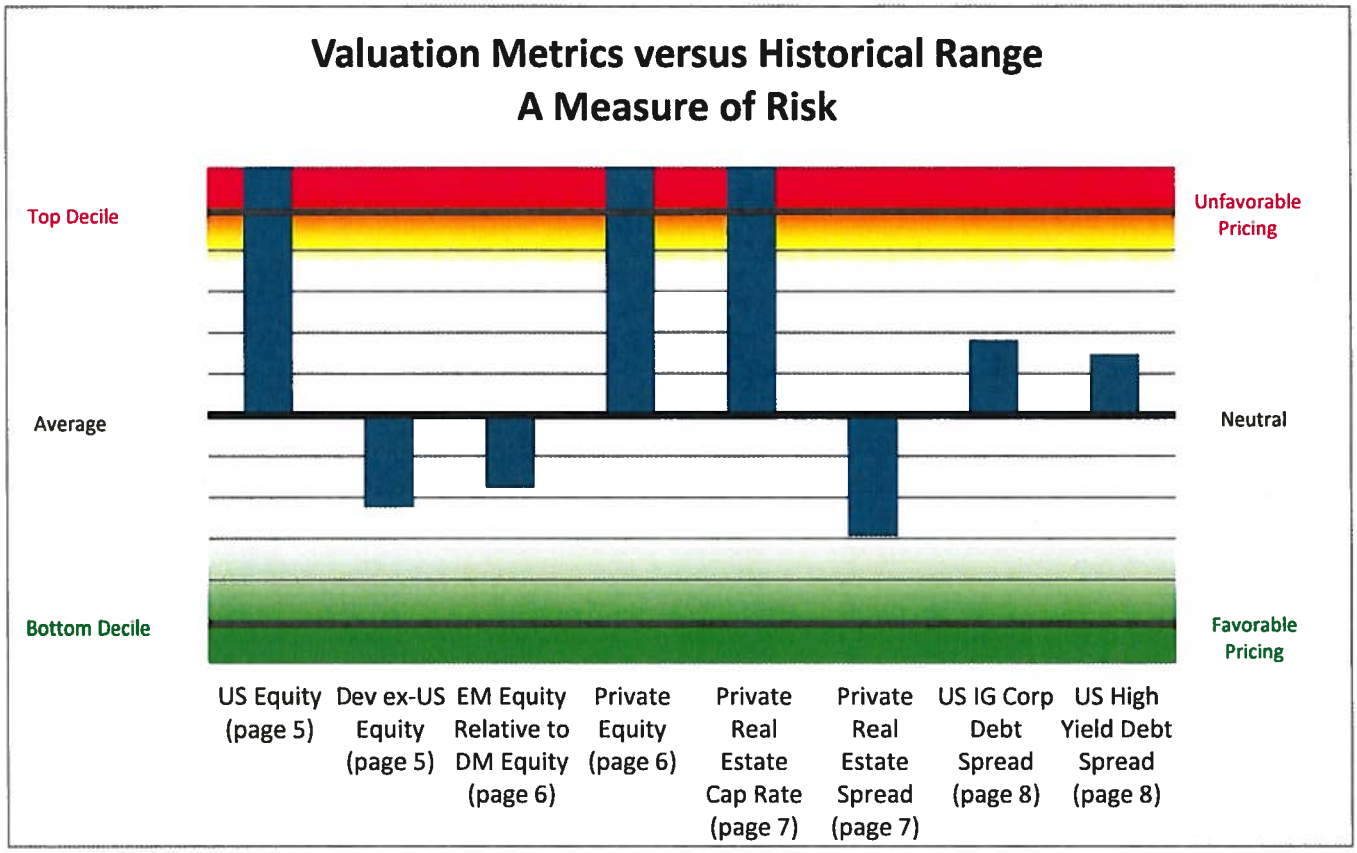
December 2016

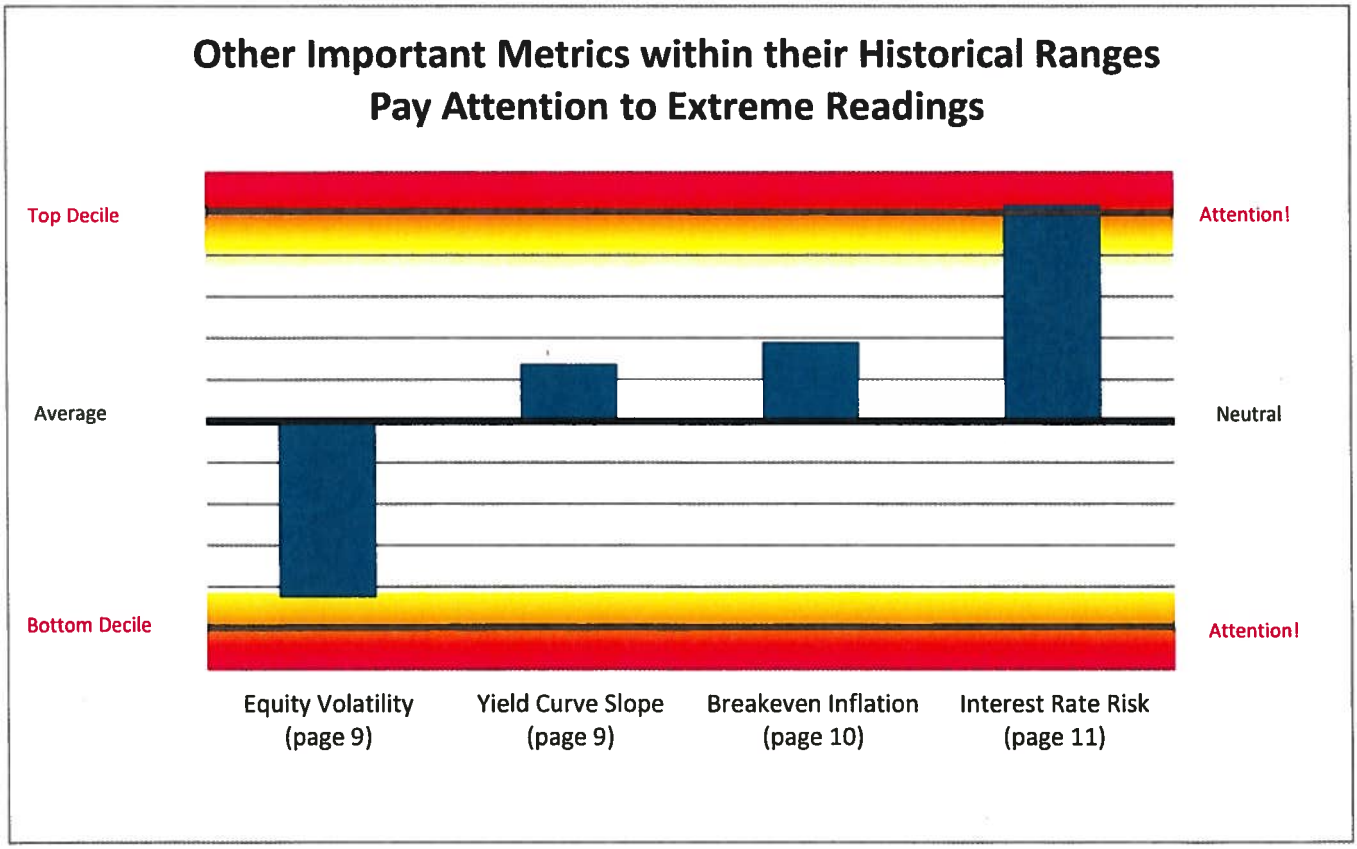
Takeaways

- While sentiment remains positive, U.S. public equity and private equity valuations remain extended.
- Non-U.S. developed and emerging market valuations are historically cheap relative to their own histories.
- The 10-year Treasury interest rate moved up sharply, ending the month at 2.4%, from near all-time lows in September and October of 1.4%. Treasuries sold off broadly.
- Historically high, private-real-estate valuations may be worth worrying about, given the 100 basis point rise in rates since October. Real estate financing tends to be driven by expectations for the 10-year Treasury rates. However, fundamental momentum remains positive in most US markets and rents are expected to move up with interest rates.
- Inflation indicators split, with the 10-year breakeven inflation level jumping up convincingly to 2.4%, and commodity prices remain at decades-low levels inflation adjusted. (page 10)
- While real yields (page 9) moved up, they remain negative, indicating growth concerns, particularly outside the U.S.
- The yield curve slope steepened, potentially indicting higher rates / growth / inflation to come, with the new administration's policies.
- With election uncertainty behind us, U.S. equity markets and the U.S. Dollar rallied hard in the second half of November. The VIX index (fear index) fell.
- The PCA Market Sentiment Indicator remained **green** at the end of November (page 4), with spreads narrowing year-over-year and equities delivering a positive year-over-year return.

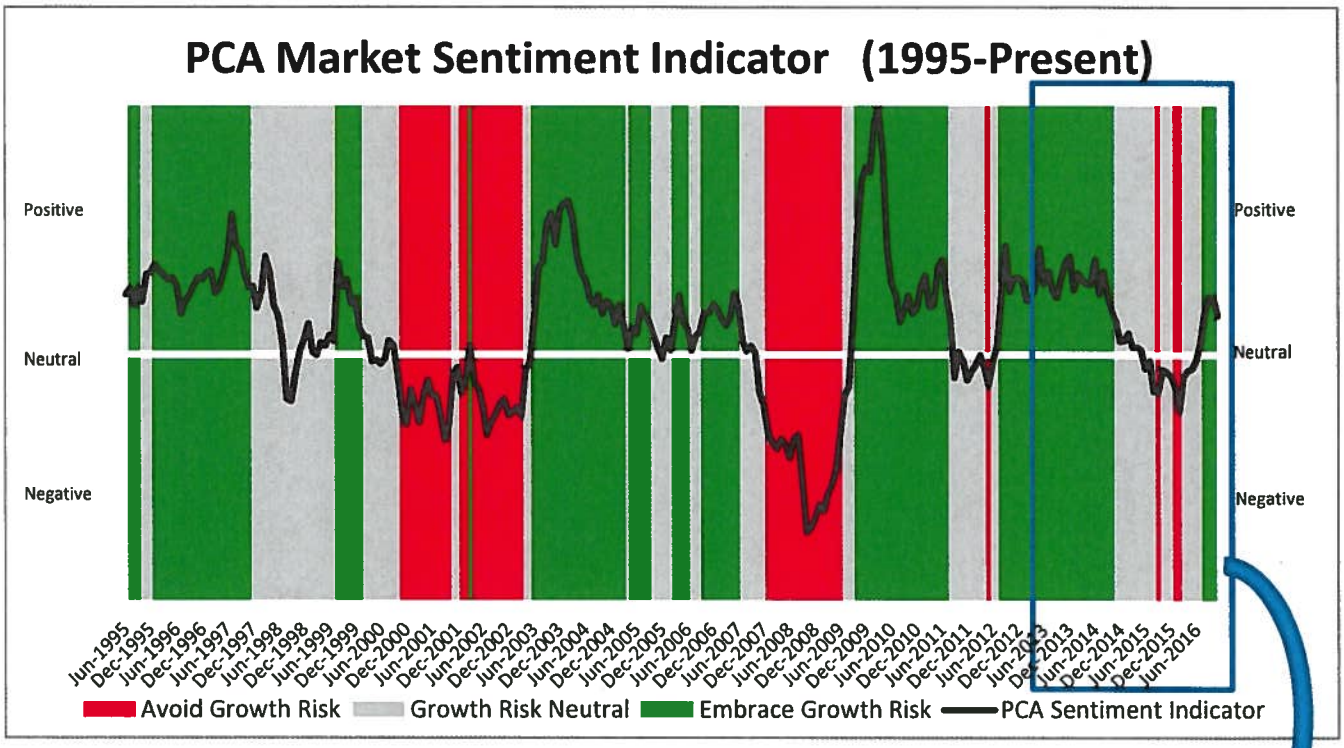
[1]See Appendix for the rationale for selection and calculation methodology used for the risk metrics.

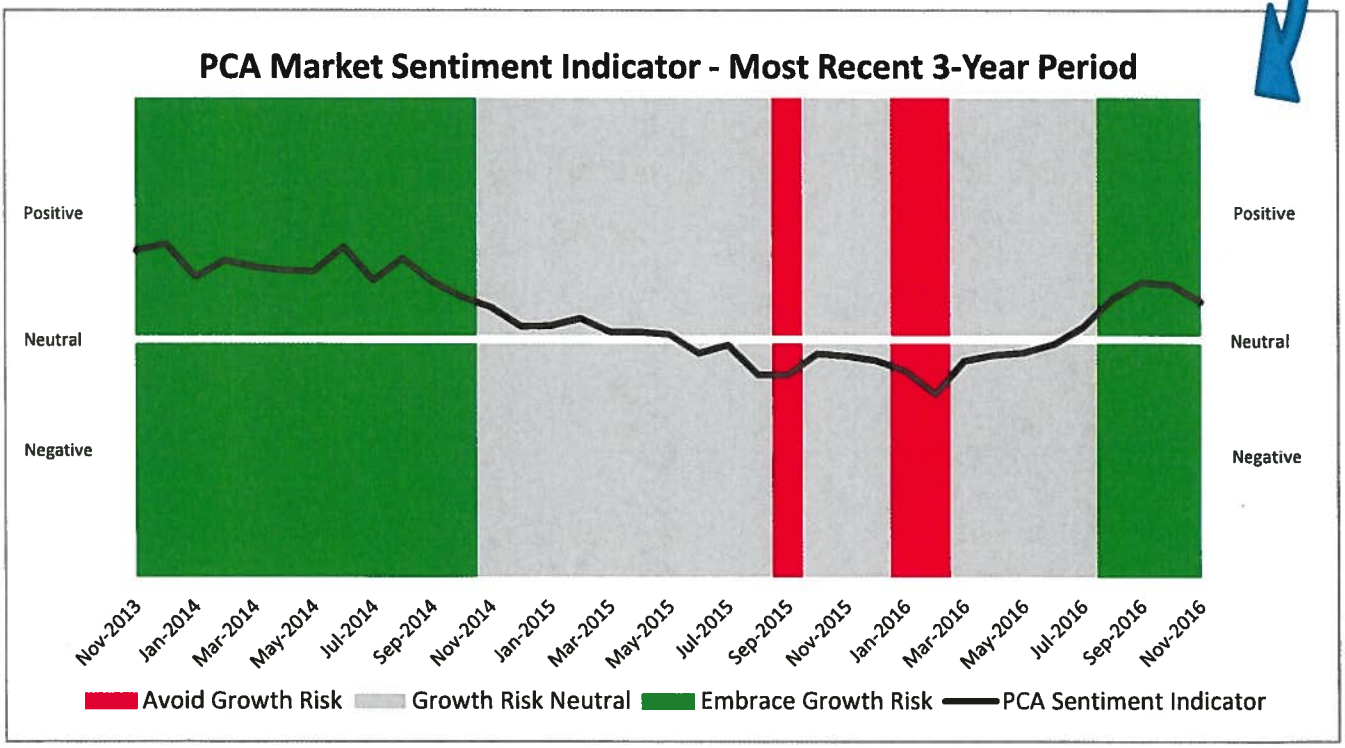
Risk Overview





Market Sentiment

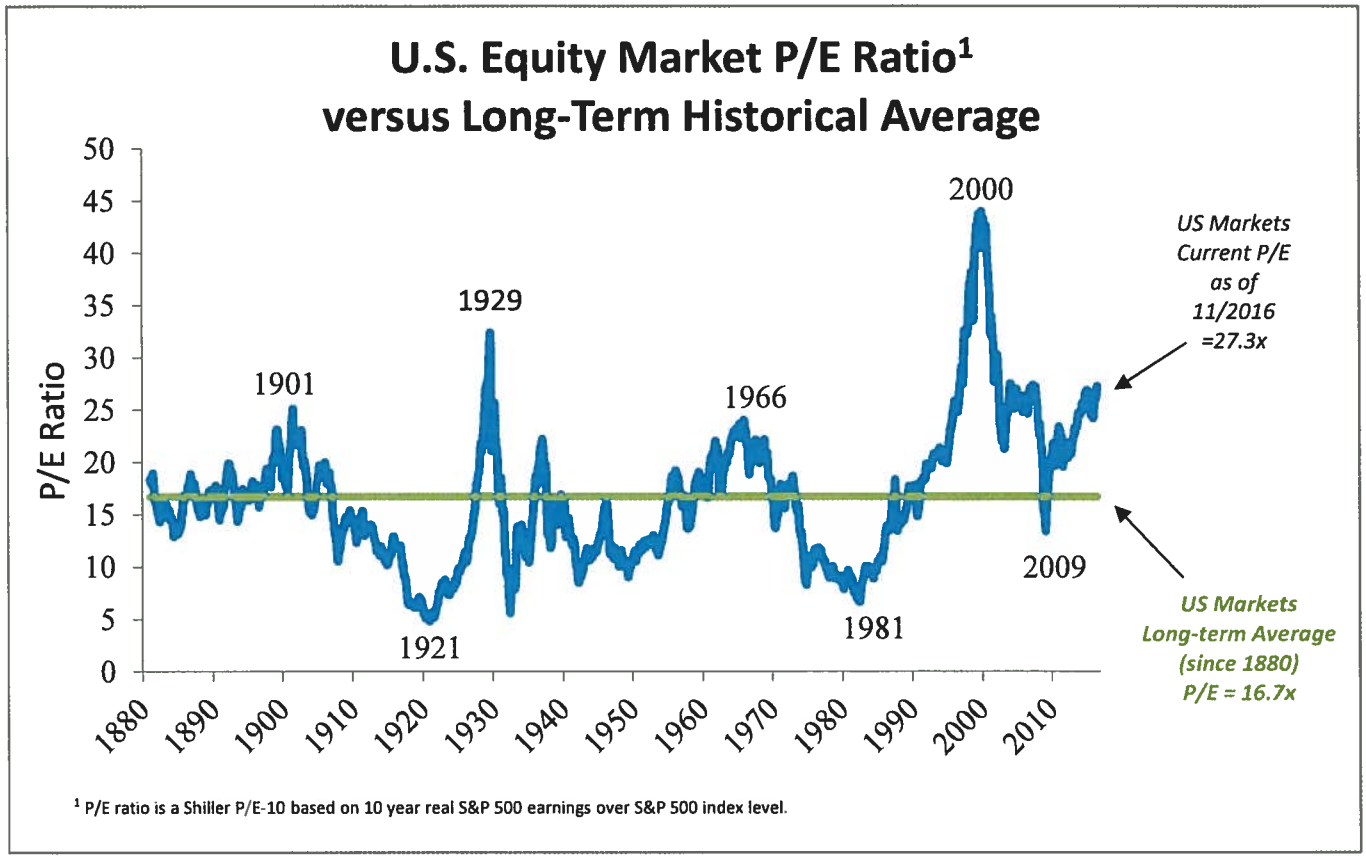




Information Behind Current Sentiment Reading

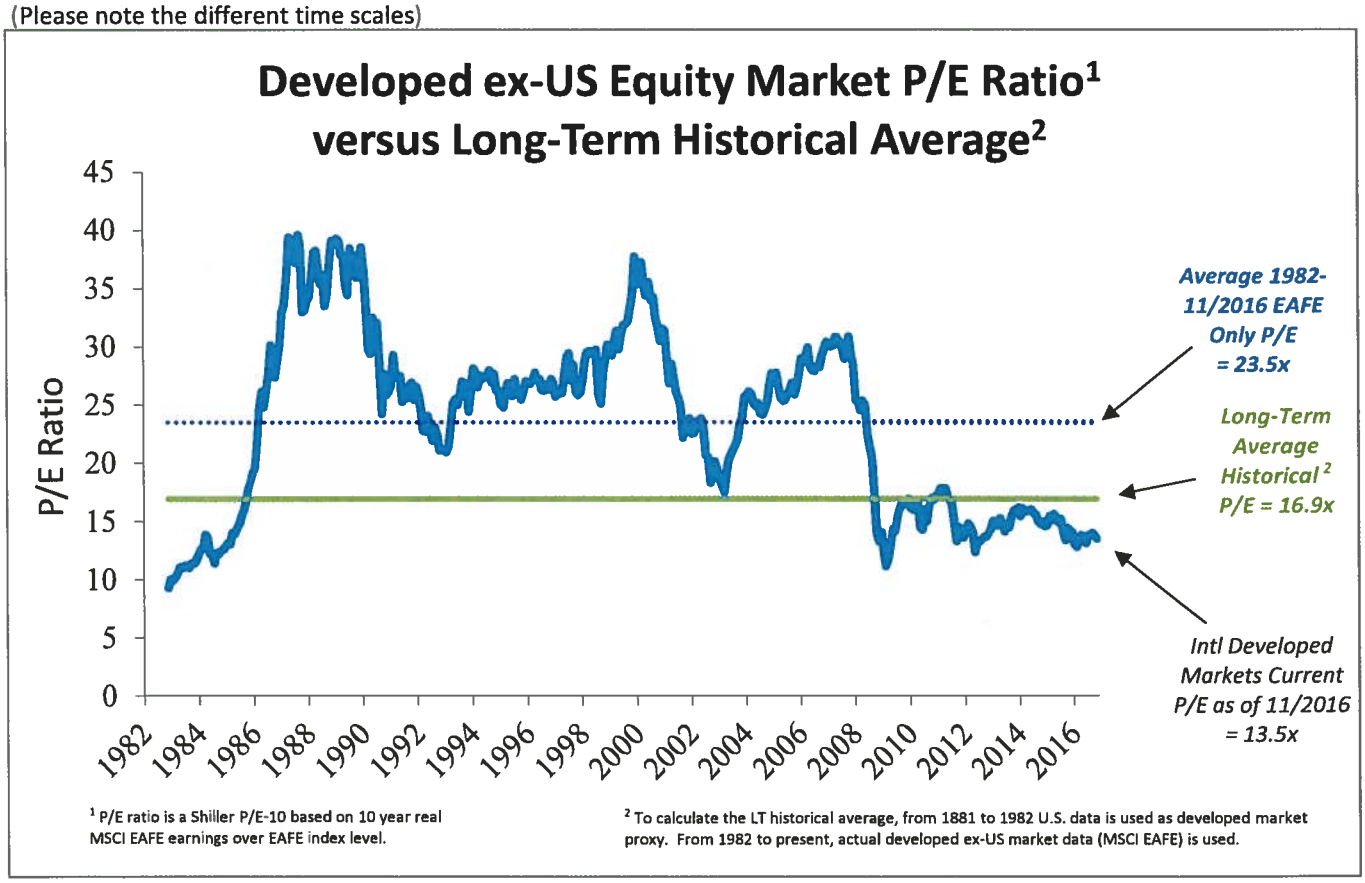
Bond Spread Momentum Trailing-Twelve Months	Positive	
Equity Return Momentum Trailing-Twelve Months	Positive	
Agreement Between Bond Spread and Equity Spread Momentum Measures?	Agree	
Growth Risk Visibility (Current Overall Sentiment)	**Positive**	

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.

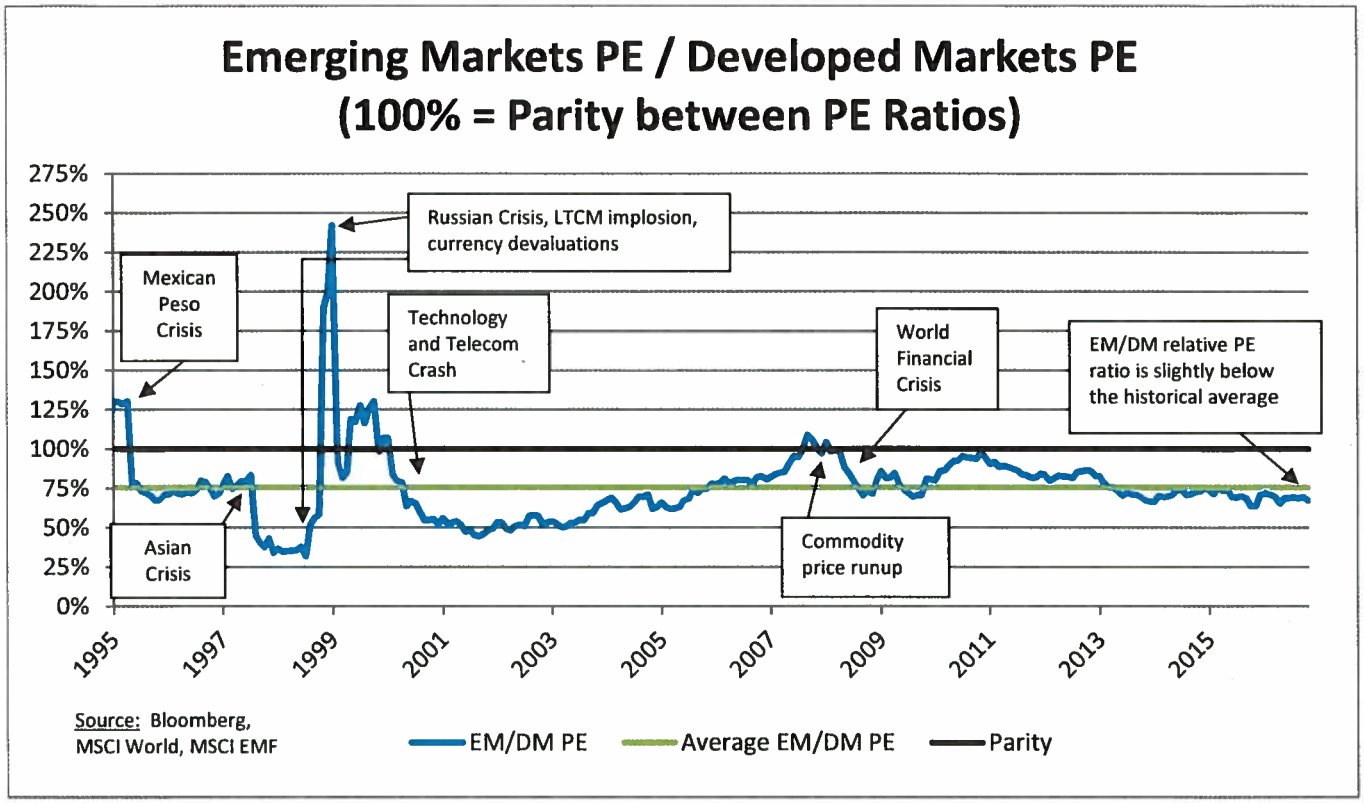
(Please note the different time scales)



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

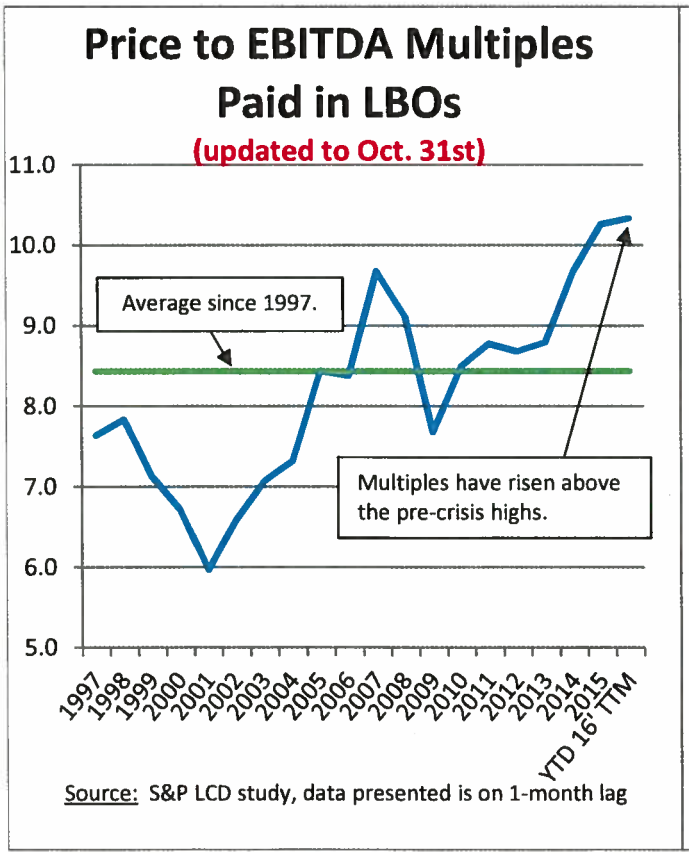
[2] To calculate the LT historical average, from 1881 to 1982 U.S. data is used as developed market proxy. From 1982 to present, actual developed ex-US market data (MSCI EAFE) is used.

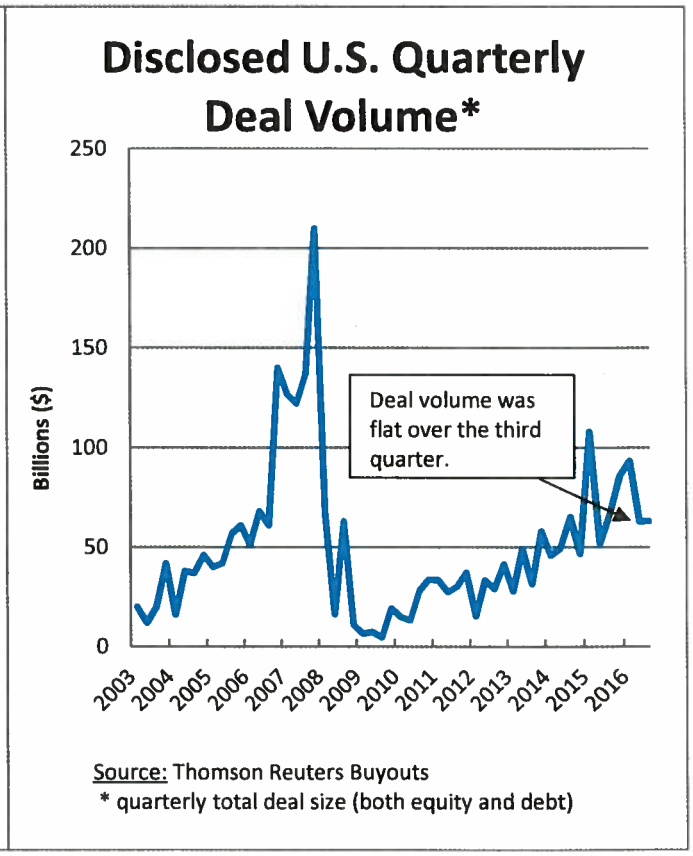
Emerging Market Public Equity Markets



US Private Equity

Quarterly Data, Updated to Sep. 30th.

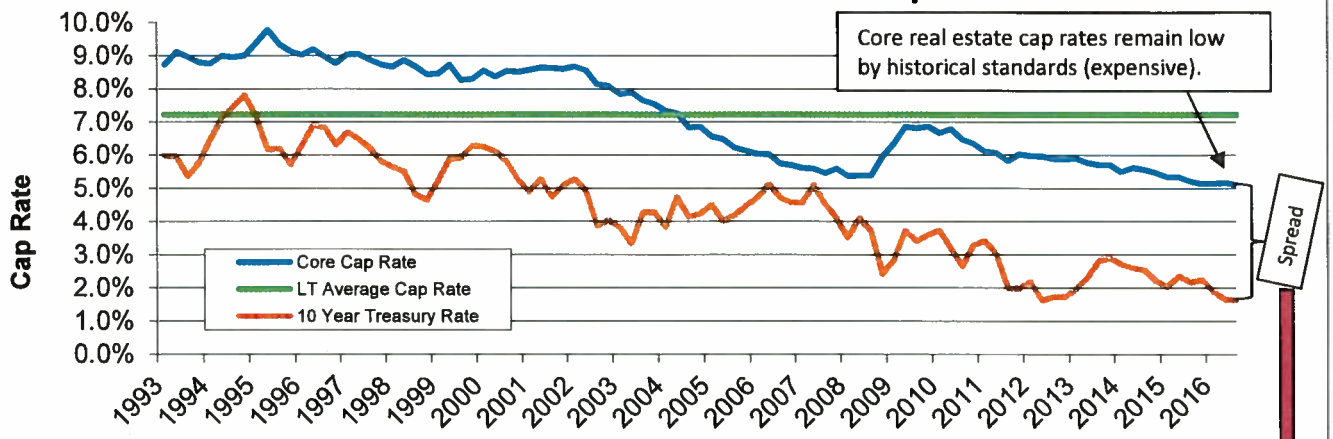




Private Real Estate Markets

Quarterly Data, Updated to Sep. 30th

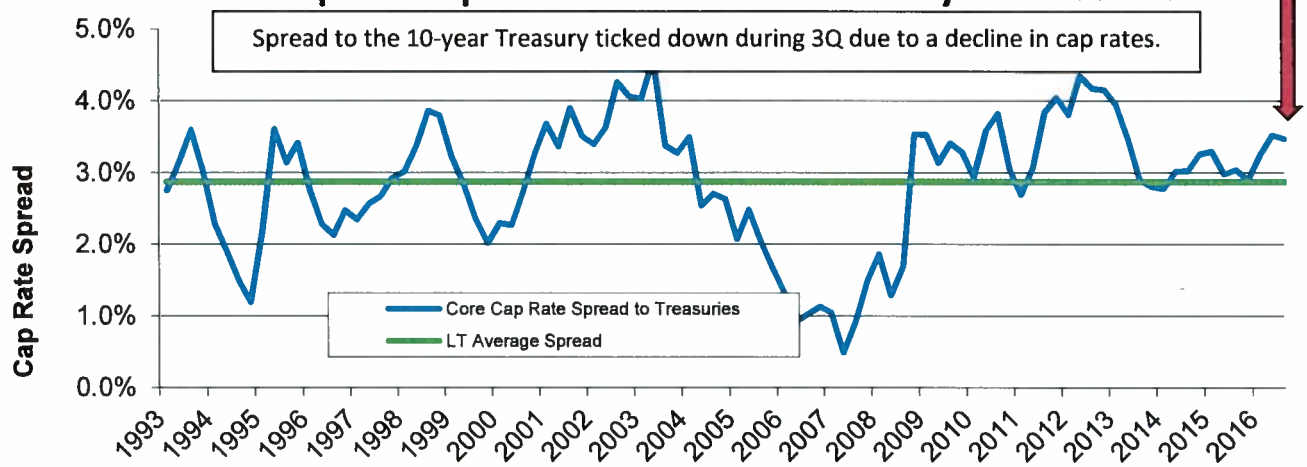
Core Real Estate Current Value Cap Rates[1]



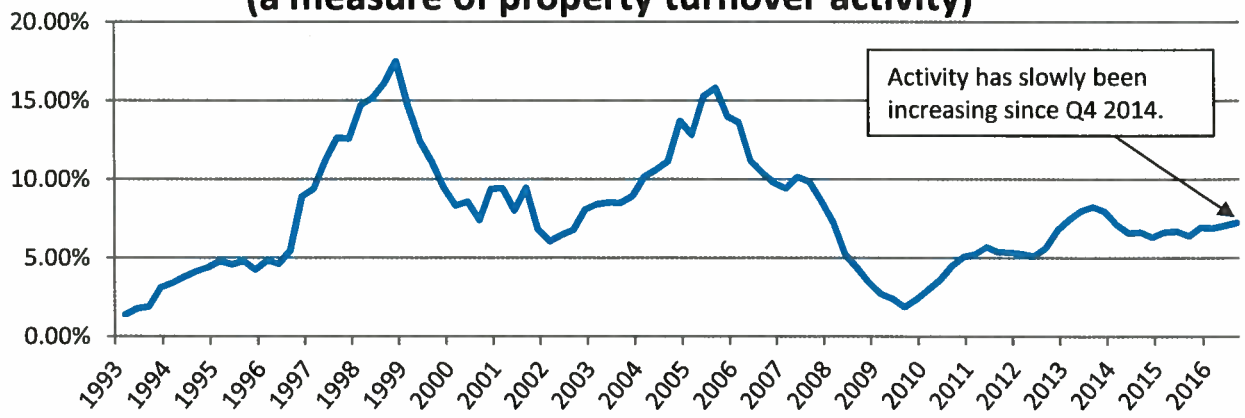
Sources: NCRIEF, www.ustreas.gov

[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

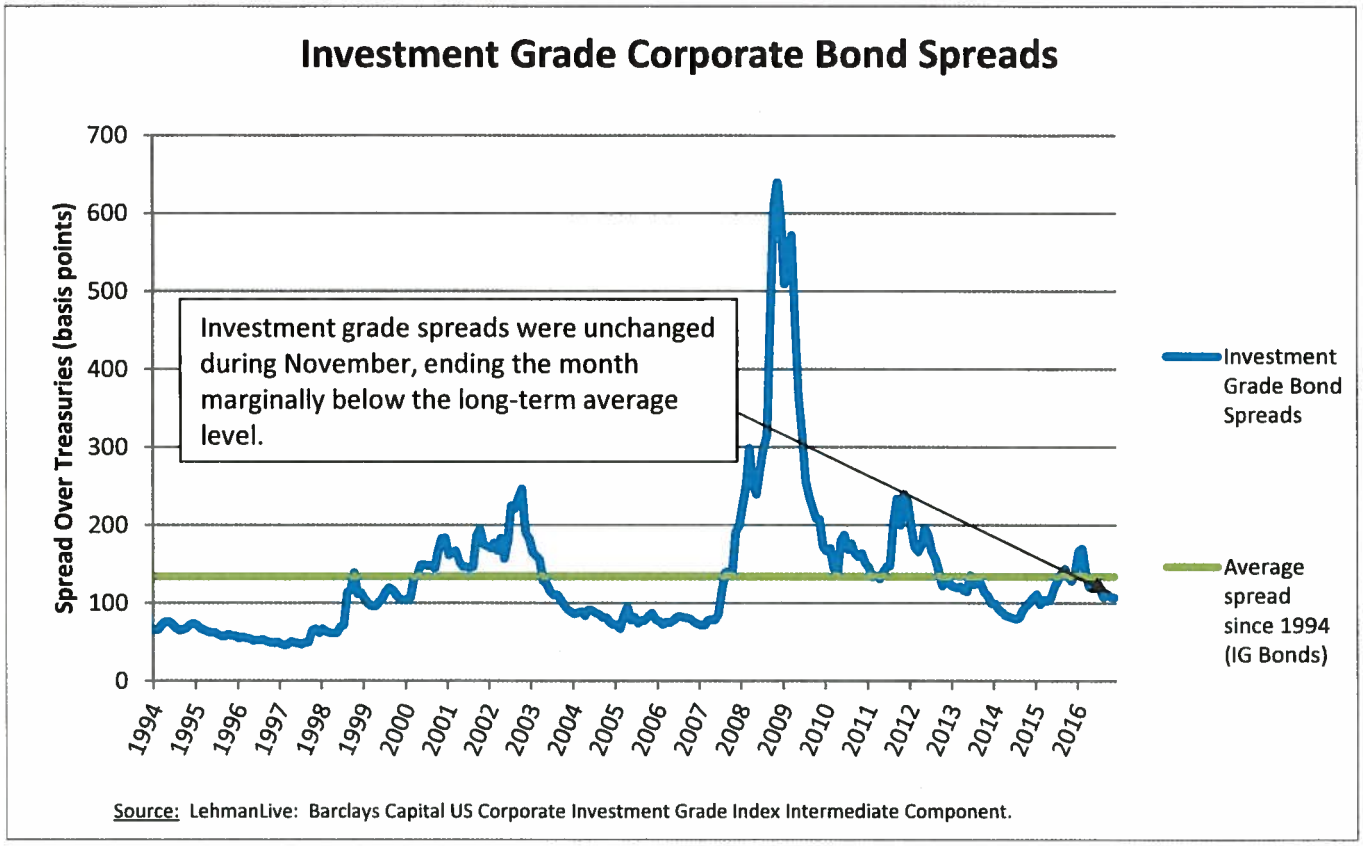


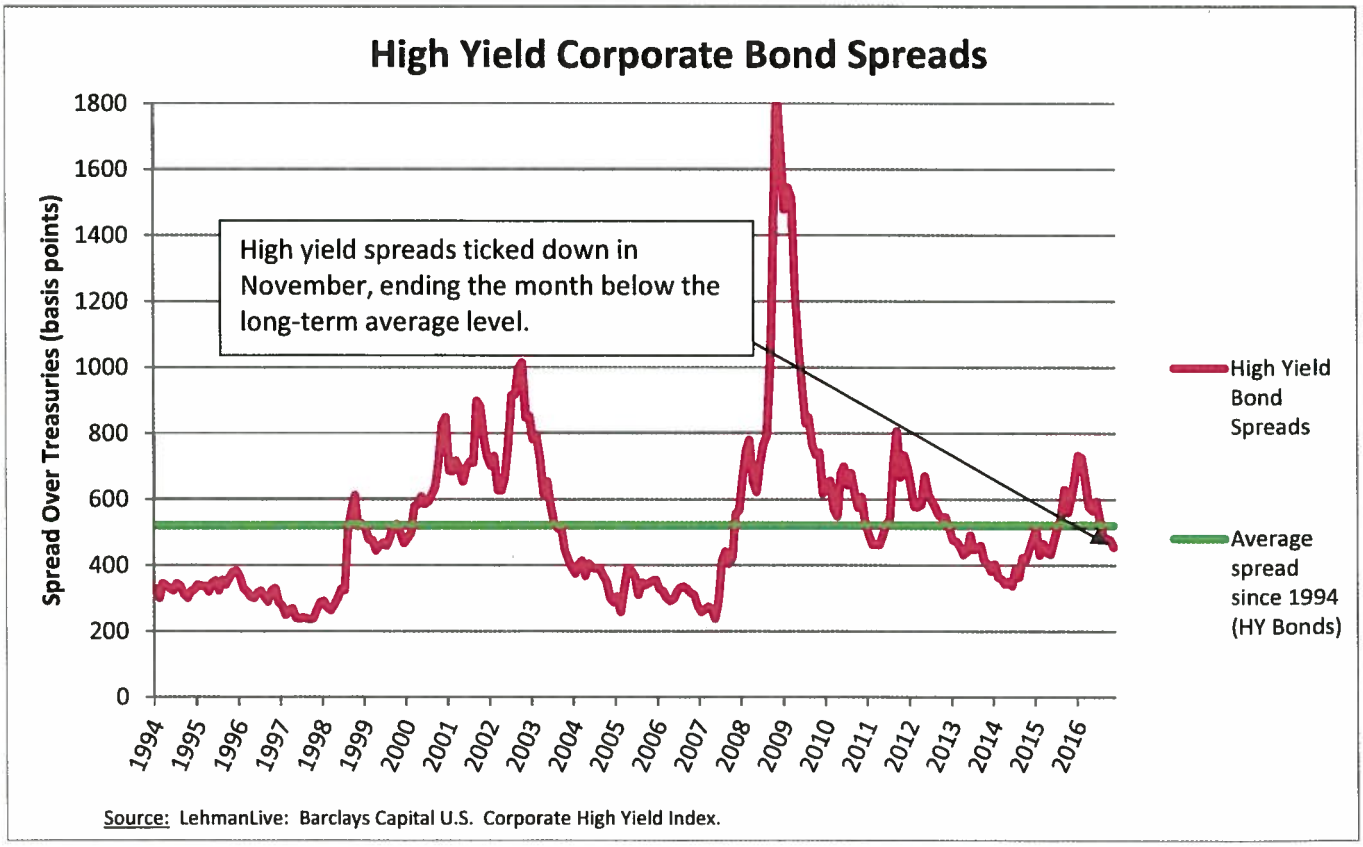
Transactions as a % of Market Value Trailing-Four Quarters (a measure of property turnover activity)



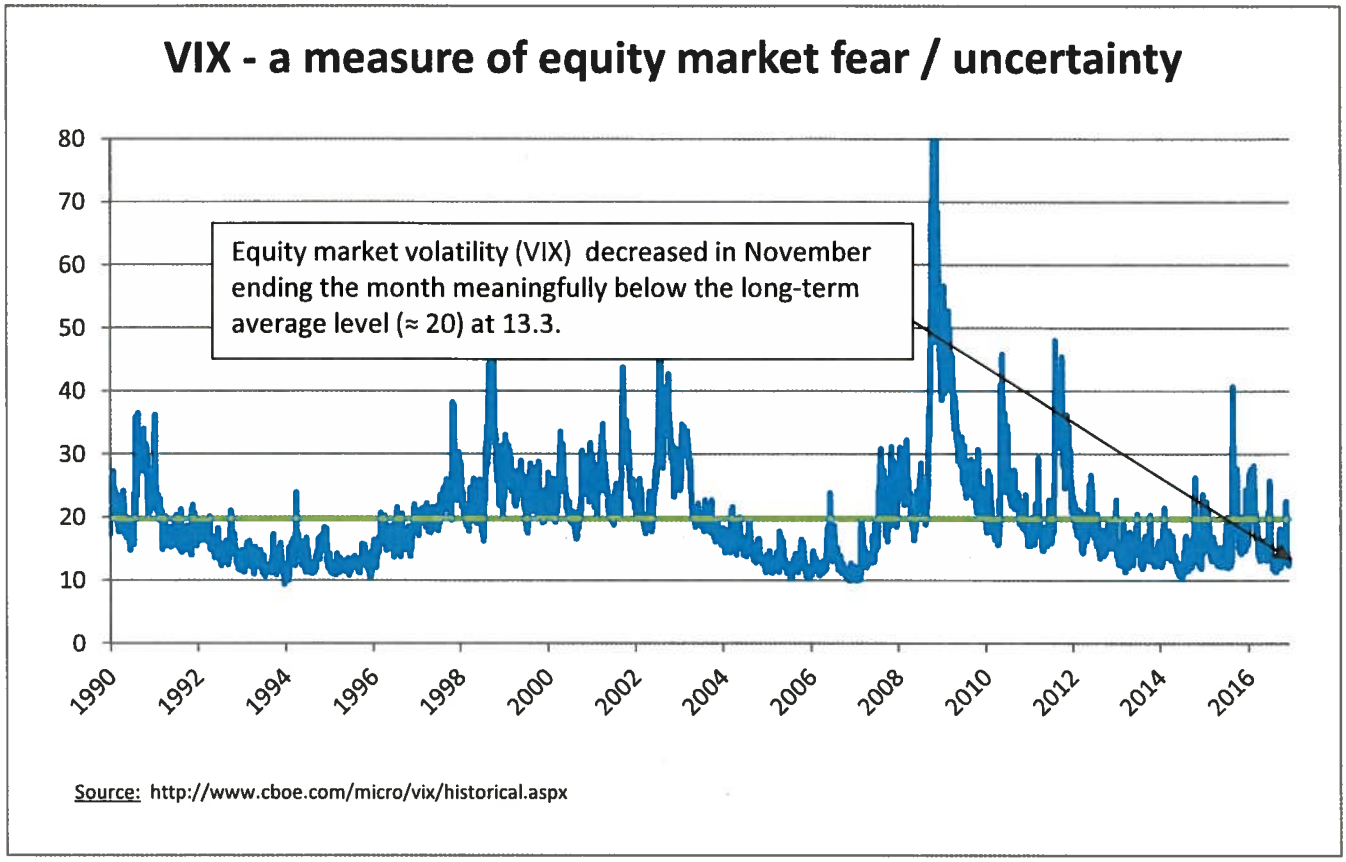
Source: NCREIF, PCA calculation

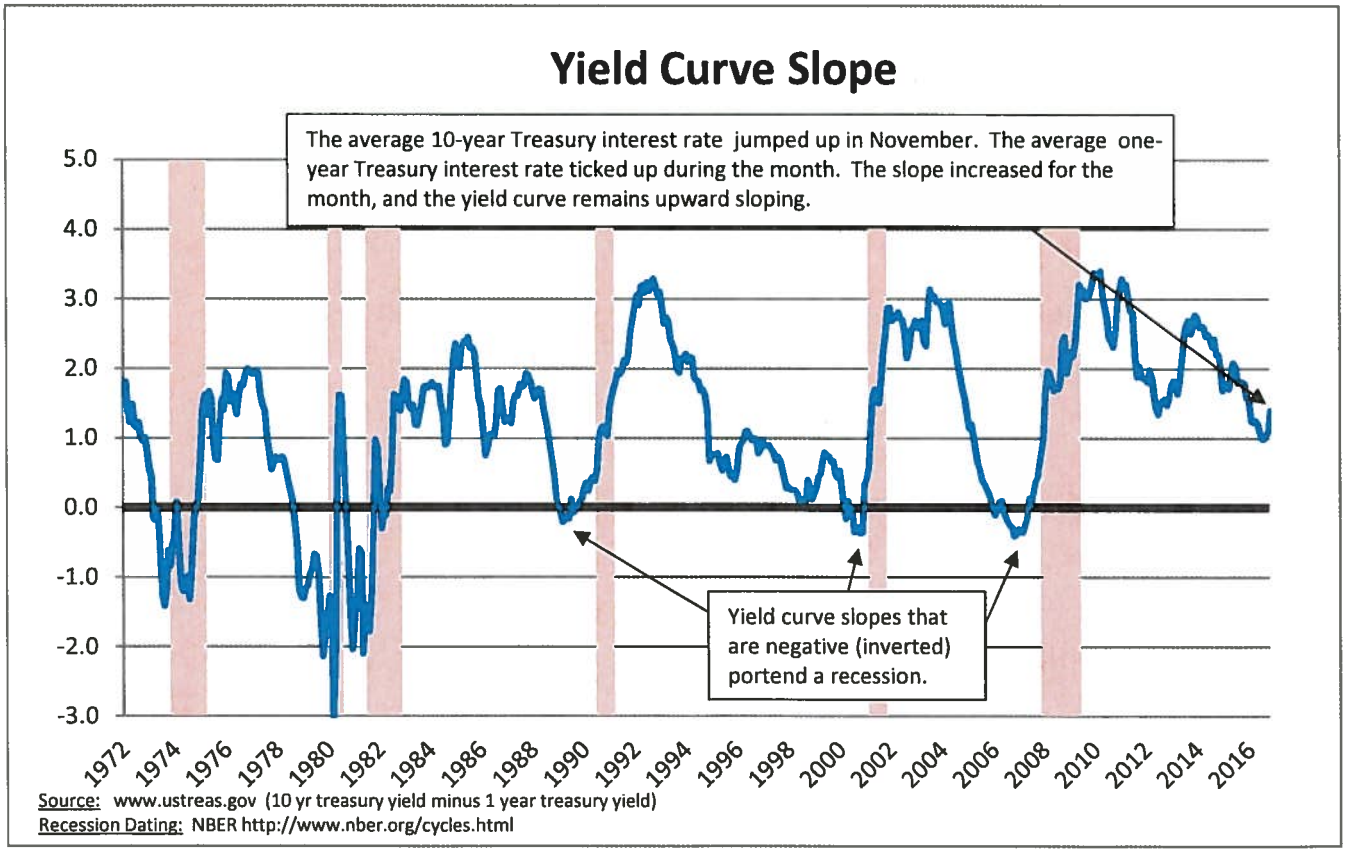
Credit Markets US Fixed Income



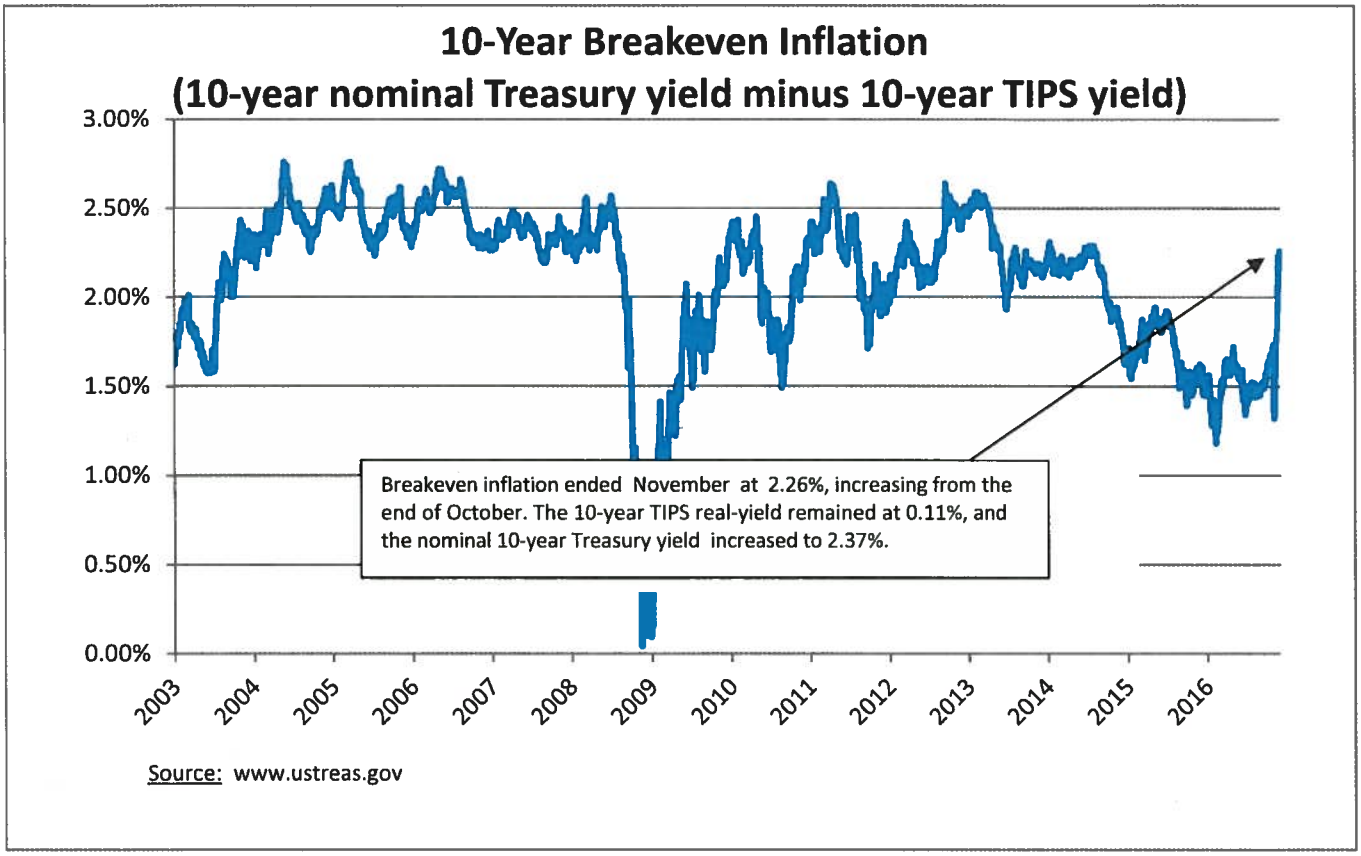


Other Market Metrics

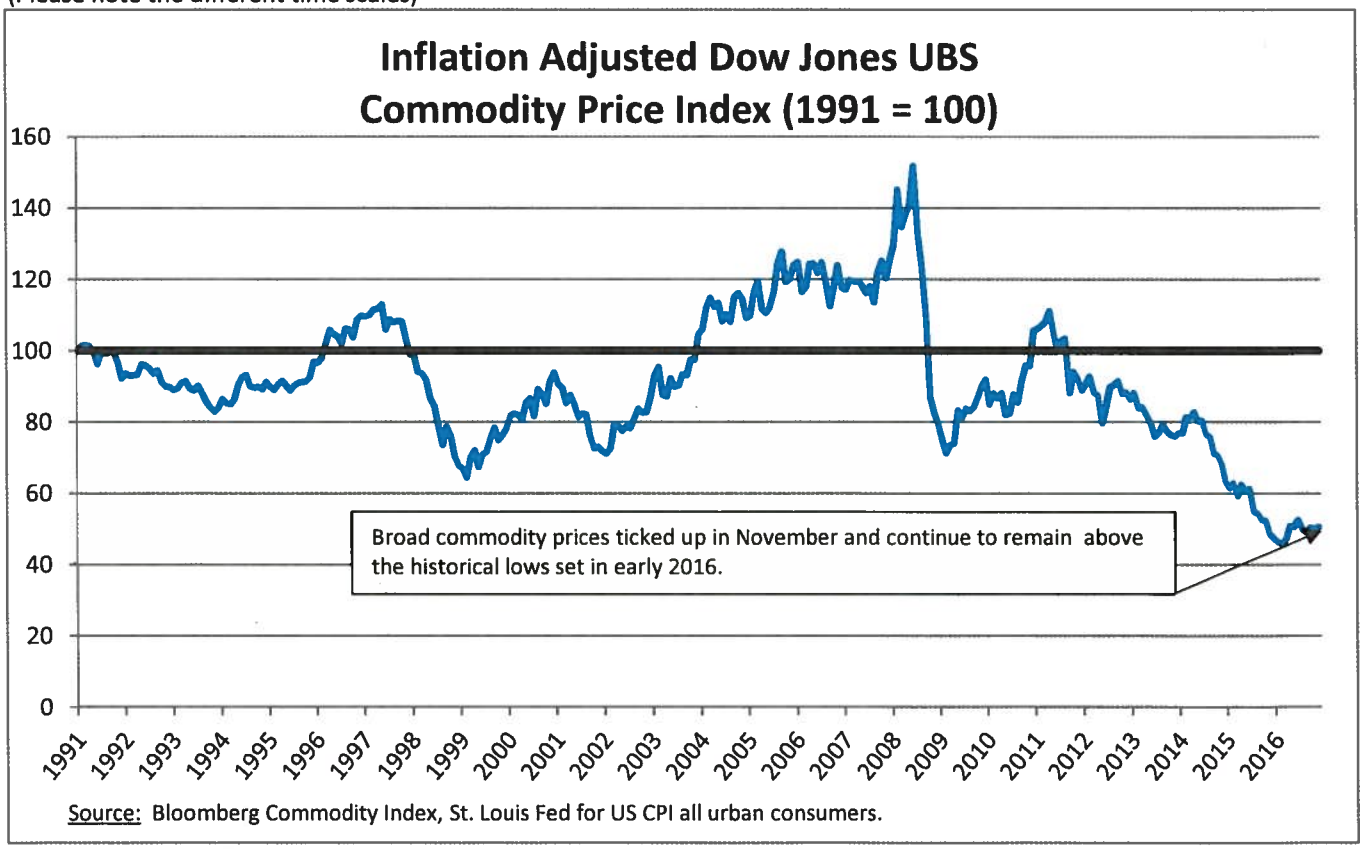




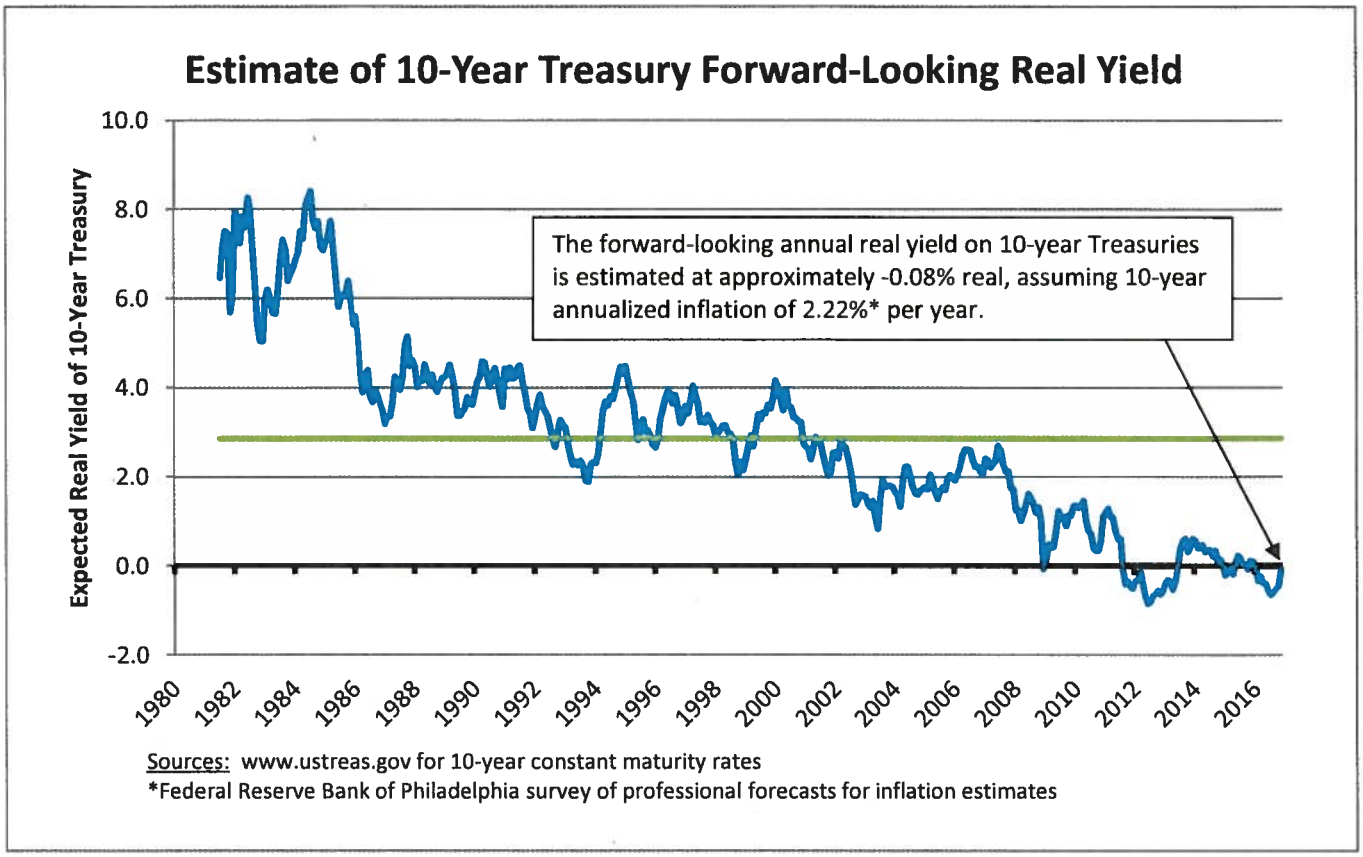
Measures of Inflation Expectations

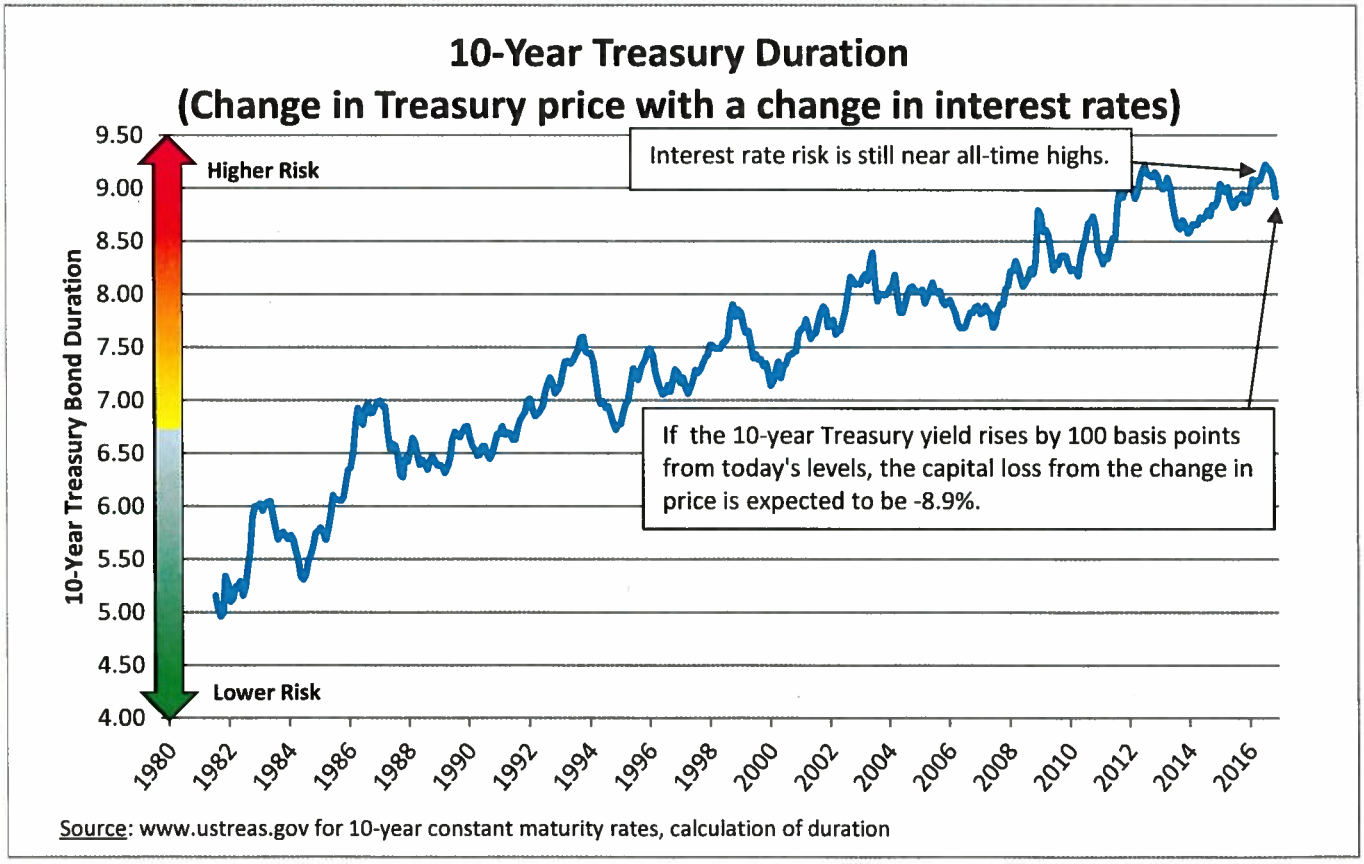


(Please note the different time scales)



Measures of U.S. Treasury Interest Rate Risk





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?

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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:

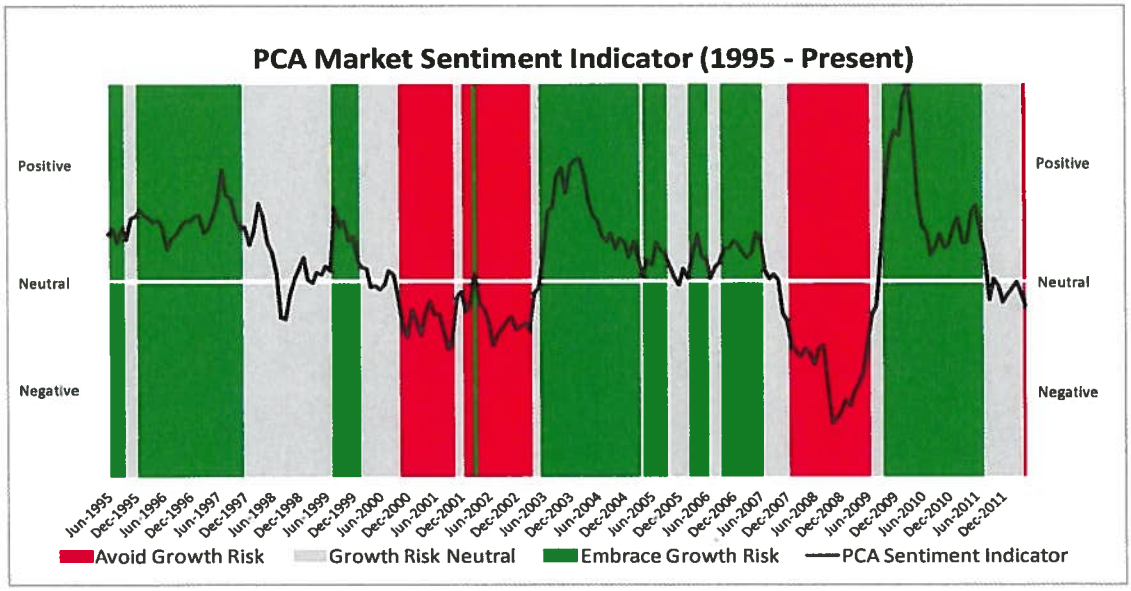
What is the PCA Market Sentiment Indicator (PMSI)?

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

Callan

April, 2016

Minnesota Deferred Compensation Plan
Target Date Fund Review

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Target Date Review – Agenda

- Product Composition
- Past Performance & Fees
- Forward Looking Assumptions and Analysis
- Summary

Target Date Review – Introduction

In February 2013, the Employee Benefits Security Administration (EBSA) released its guide on Target Date Retirement Funds - Tips for ERISA Plan Fiduciaries. According to the EBSA, the general guidance is geared "to assist plan fiduciaries in selecting and monitoring TDFs and other investment options in 401(k) and similar participant-directed individual account plans."

The guide establishes eight elements for plan sponsors to remember when choosing target date funds (TDFs):

1. Establish a process for comparing and selecting TDFs.
2. Establish a process for the periodic review of selected TDFs.
3. Understand the fund's investments – the allocation in different asset classes (stocks, bonds, cash), individual investments, and how these will change over time.
4. Review the fund's fees and investment expenses.
5. Inquire about whether a custom or non-proprietary target date fund would be a better fit for your plan.
6. Develop effective employee communications.
7. Take advantage of available sources of information to evaluate the TDF and recommendations you received regarding the TDF selection.
8. Document the process.

Callan believes that from the Department of Labor's (DOL) perspective, a higher standard may apply to target date fund decision-making going forward than has been applied in the past.

EBSA in a letter to the GAO (in response to the GAO's letter on QDIAs) voiced support for innovative QDIA approaches. Although the plan is not explicitly governed under the auspices of ERISA, Callan believes the ERISA framework serves as an industry wide-best practice.

1 Product Composition

Product Description

- The Minnesota Deferred Compensation plan utilizes a modified version of the State Street Global Advisor's ("SSgA") Target Retirement Funds. The funds utilize a "5-year slipped" glide path whereby each vintage allocation for MN mirrors SSGA's off-the-shelf allocation that is 5-years ahead in terms of de-risking. For example the 2030 fund that Minnesota offers is equivalent to the off-the-shelf 2025 fund. The end result is a more conservative glide path and one that reaches a terminal static allocation at age 65.

Asset Class Exposure

DOL Tip: Understand the fund's investments – the allocation in different asset classes (stocks, bonds, cash), individual investments, and how these will change over time.

Asset Class	SSgA's Benchmark
Domestic Large-Cap Equity	S&P 500 Index
Domestic Small/Mid-Cap Equity	Russell Small Cap Completeness Index
Non-US Equity	MSCI ACWI ex-USA IMI Index
US Fixed Income	Barclay's Cap US Aggregate Bond Index
Long Term Government	Barclays Cap US Long Gov't Bond Index
Short Term Government	Barclays Cap US 1-3 Yr Government/Credit Index
High Yield	Barclays Cap US High Yield Very Liquid Index
TIPS	Barclays Cap US Treasury TIPS Index, Barclays Cap 1-10 Year Gov't Inflation Linked Bond Index
REITS	FTSE EPRA/NAREIT Developed Liquid Index
Commodities	Bloomberg Roll Select Commodity Index

There are constraints to which asset classes can be utilized, namely those that SSgA believes can be efficiently implemented with a passive product.

TDF Family Exposure	SSgA
Large-Cap U.S. Equity	X
Small/Mid-Cap U.S. Equity	X
Developed Non-U.S Equity	X
Emerging Markets Equity	X
Natural Resource Equity	
Global REITS	X
Commodities	X
Core Fixed Income	X
Core Plus Fixed Income	
High Yield Fixed Income	X
Short-Term Government Fixed	X
Long Term Government Fixed	X
TIPS	X
Non-U.S. Fixed Income	
Opportunistic	

State Street : Recent Developments

- In 2013 SSgA reduced the allocation to long-term government bonds. Additionally there was a marginal increase in the non-US equity exposure.

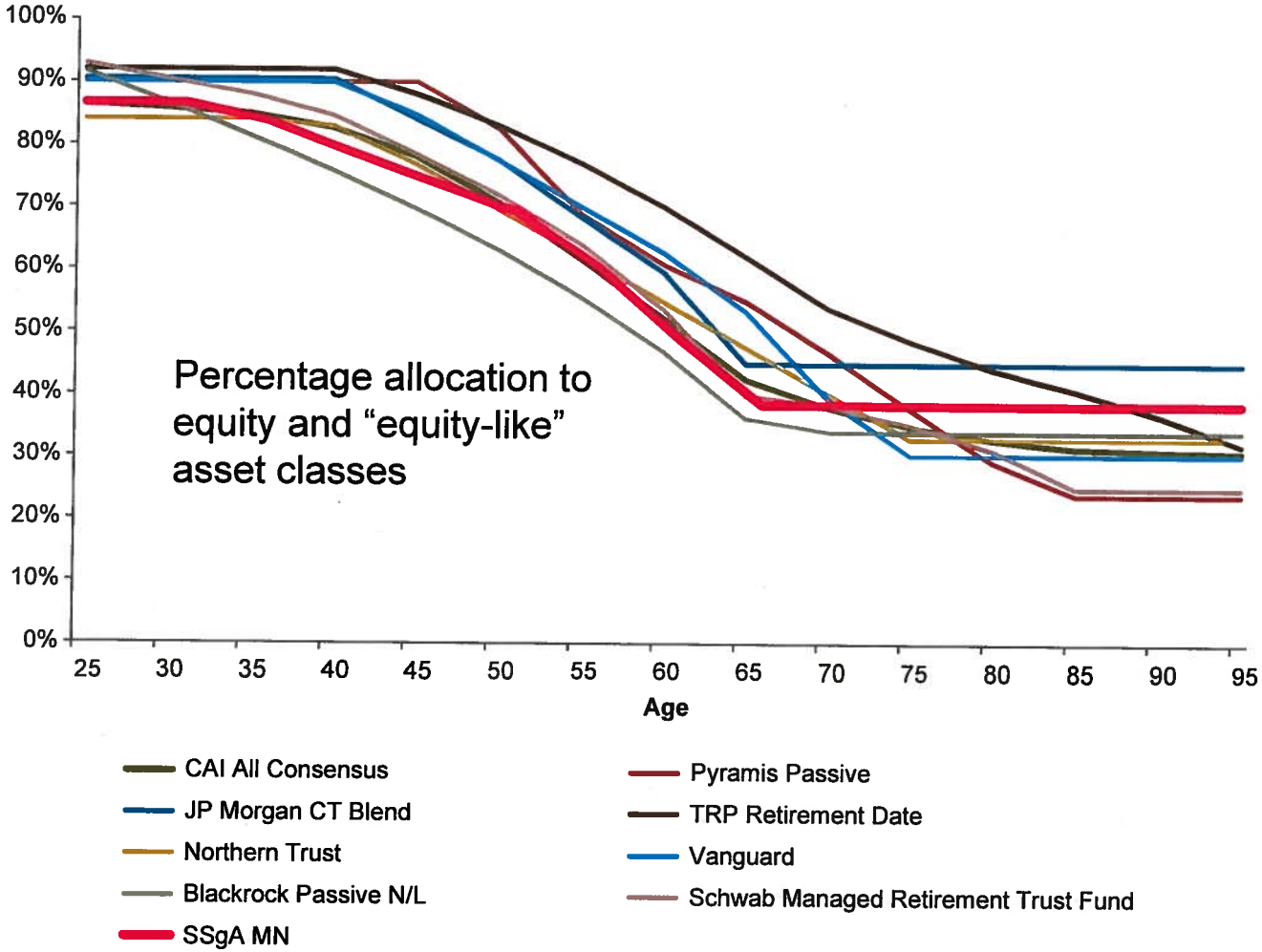
- In 2014 Intermediate TIPS were introduced while the allocation of Long Government Bonds near retirement was reduced. The final step in increasing the allocation to non-US equity was completed.

Changes that were discussed for 2016

For 2016, SSGA decided against adding Emerging Market Debt to its Target Date glide path. The decision was made in the context of evaluating whether the asset class is desirable, investable and suitable. In the end, they felt that it passed the investable and desirable criteria but fell short on suitability due to volatility and a higher correlation to equities. SSgA's DC Investment Group, in conjunction with their London based Fixed Income Team will continue to evaluate the asset class over the coming year. Specifically they will:

- Explore the continued structural improvements in Emerging Market countries
- Evaluate the appropriate benchmark (rules based, transparent, liquid, high credit quality)
- Consider the optimal point and size for an allocation to emerging market debt
- Discuss emerging market debt with plan sponsors and consultants to determine the suitability of the asset class

Growth Asset Rolldown*



This rolldown chart takes into consideration equity as well as equity-like asset classes (e.g., high yield fixed income and REITS) and gives a more accurate image of a "risk rolldown" than equity only illustrations.

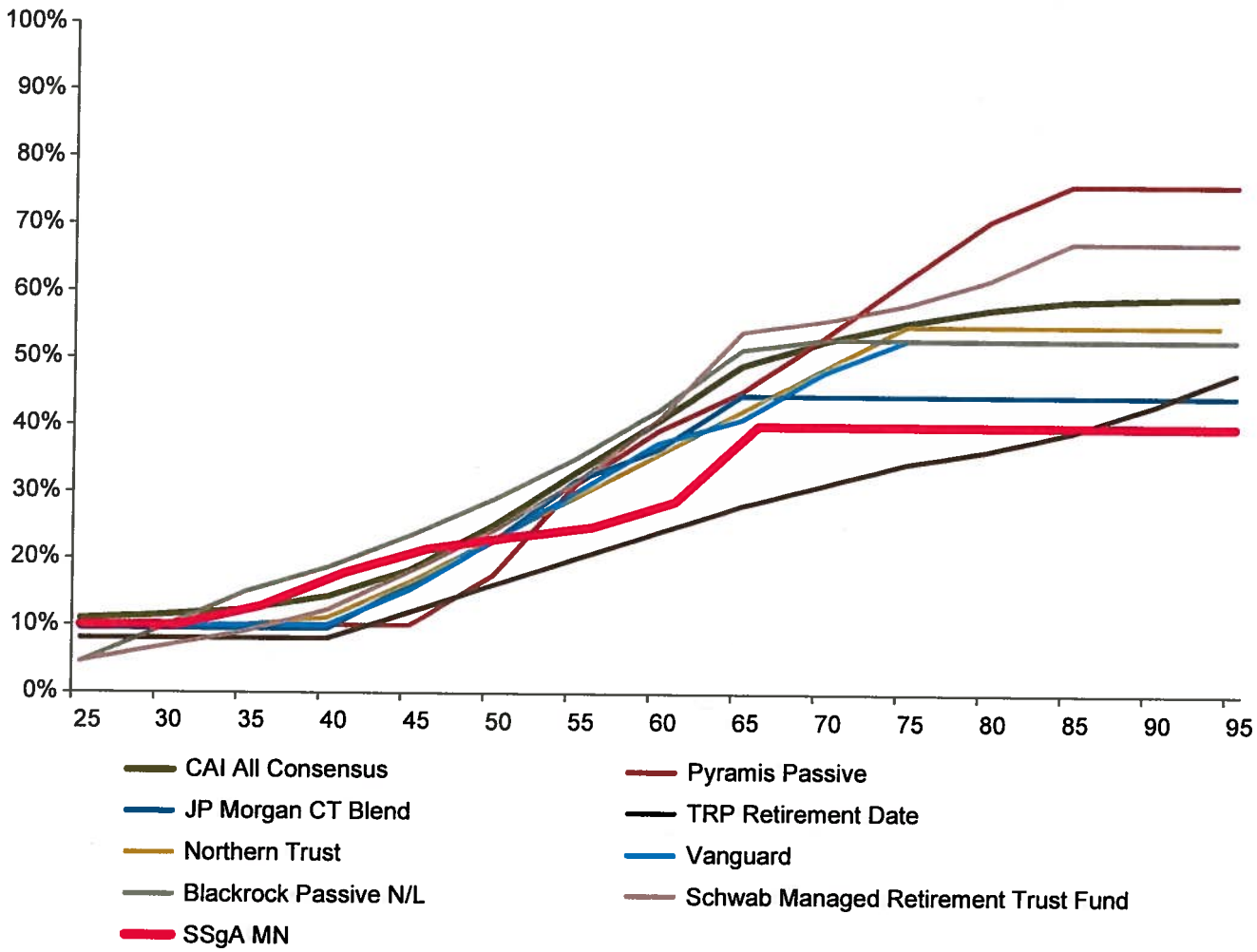
Relative to Callan All Consensus the glide path is slightly less allocated to growth assets. Later on (roughly age 70) the reverse is true.

The glide path is less aggressive than many competitors early on, however once the glide path reaches a terminal allocation (age 65) it carries a somewhat larger allocation to growth assets than many competitors.

Within growth assets the glide path features a slight overweight to SMID (relative to capitalization weights) early on and later is underweight SMID.

*See Appendix II for full definition

Downside Protection Assets*

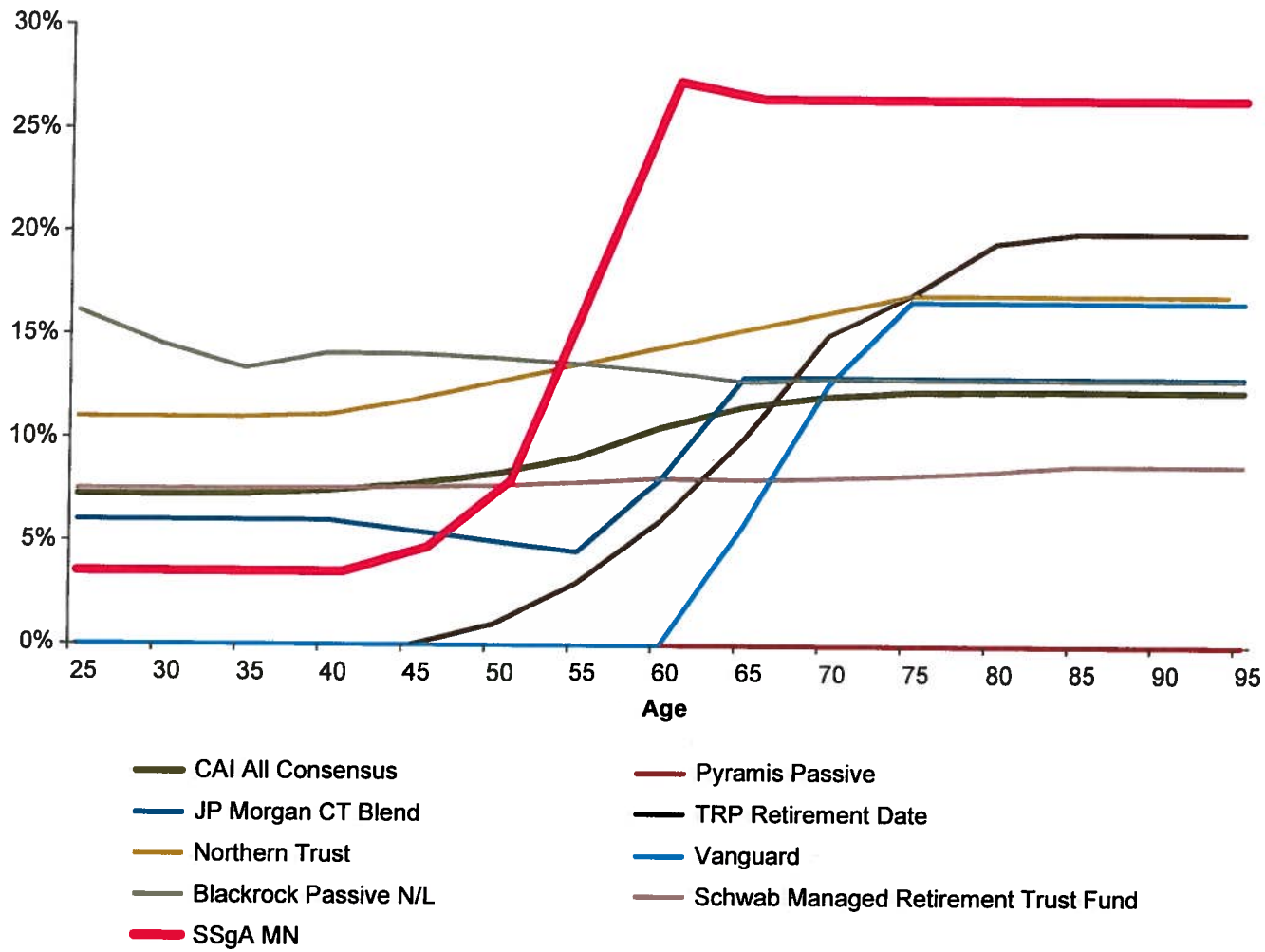


Downside protection assets include core and short-term fixed income, international fixed income as well as cash.

The lack of downside protection assets is largely offset by the allocation to TIPS later on in the glide path (see next slide).

See Appendix II for precise definition

Inflation Protection Assets*



Inflation protection assets include TIPS and inflation focused stocks (Real Asset Fund).

The SSgA series' allocation to inflation protection assets comes from TIPS, REITS and commodity exposures.

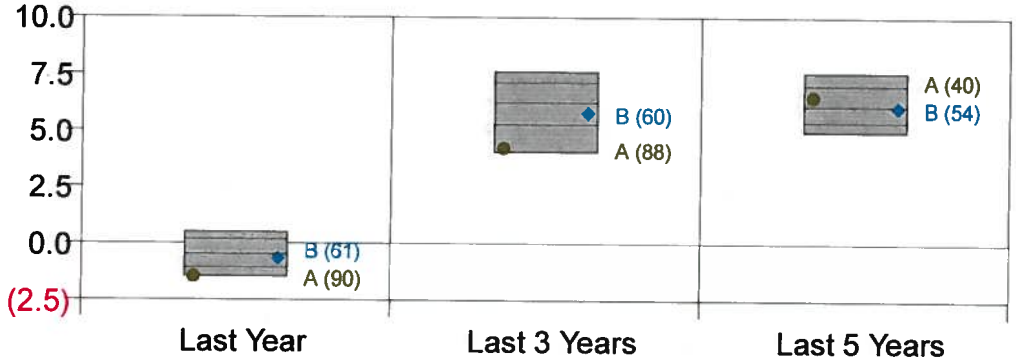
Over the long term equity itself may also provide a correlated return to inflation. Please see appendix VIII for the Callan's expected correlations with inflation.

*See Appendix II for precise definition

1 Past Performance and Fees

Target Date Review – Performance (late career, e.g. 2020 fund)

Returns
for Periods Ended December 31, 2015
Group: CAI Target Date 2020



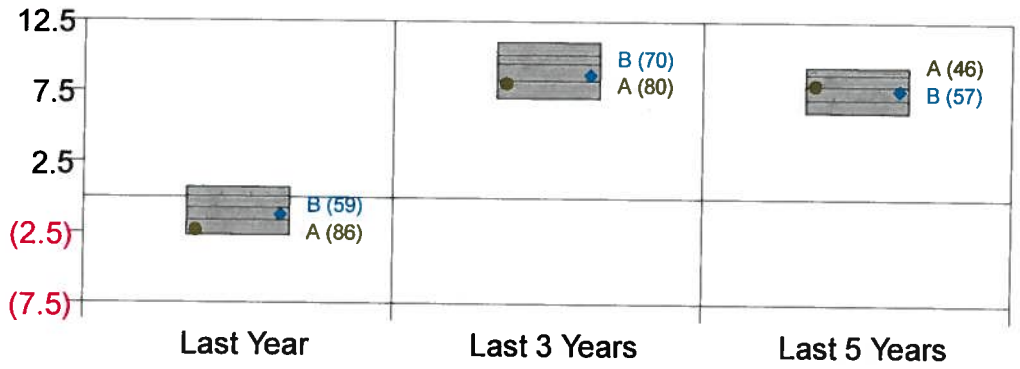
	Last Year	Last 3 Years	Last 5 Years
10th Percentile	0.48	7.64	7.61
25th Percentile	0.17	7.15	7.03
Median	(0.49)	6.27	6.11
75th Percentile	(1.10)	5.29	5.39
90th Percentile	(1.48)	4.05	4.97
Member Count	66	55	48
MN 2020 Fund ● A	(1.47)	4.23	6.52
CAI Tgt Dt Idx 2020 ◆ B	(0.69)	5.81	6.07

Source: Callan, SSgA , net of fees

- Performance longer term (5-years) has bested the median peer as well as the Callan Consensus glide path.
- Shorter term performance has trailed, largely a result of the more conservative glide path.

Target Date Review – Performance (early career, e.g. 2050 fund)

Returns
for Periods Ended December 31, 2015
Group: CAI Target Date 2050



	Last Year	Last 3 Years	Last 5 Years
10th Percentile	0.70	11.03	9.32
25th Percentile	0.05	10.08	8.81
Median	(0.75)	9.48	7.98
75th Percentile	(1.64)	8.30	7.03
90th Percentile	(2.69)	7.03	6.13
Member Count	59	49	40
MN 2050 Fund ● A	(2.33)	8.11	8.03
CAI Tgt Dt Idx 2050 ◆ B	(1.22)	8.70	7.70

Source: Callan, SSgA, net of fees

- As with the 2020 fund, the 2050 fund has bested the median peer over the longer term time period, but trailed when viewed over the shorter time horizons.

Target Date Review – Fees

DOL Tip: Review the fund's fees and investment expenses.

Investment Management Fees
Across Target Date Universe

Percentile	Median Fee
90th	0.75%
75th	0.72%
Median	0.60%
25th	0.39%
10th	0.18%
SSgA	0.12%
Median Passive CIT	0.10%

- The table to the left contains the investment management fee distribution across the entire off-the-shelf target date universe. This universe includes mutual funds as well as collective trusts.
- The 12 basis points shown *nets out the 5 basis point administrative charge* to make the comparison valid.
- The funds compare well to the median for the entire universe and are slightly above the median for other passive CIT providers. The funds however do differentiate themselves from other passive providers by having a wider array of underlying assets. Additionally there is a degree of customization involved with Minnesota's offering as each vintage is 5 years ahead of the SSgA off-the-shelf product (e.g., MN 2025 Fund = SSgA 2020 Fund).