

CITY OF OAKLAND

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OAKLAND

2018 APR 12 PM 12:13

# AGENDA REPORT

**TO:** Sabrina B. Landreth  
City Administrator

**FROM:** Katano Kasaine  
Finance Director

**SUBJECT:** Informational Report on PFRS'  
Investment Portfolio and Actuarial  
Valuation

**DATE:** March 19, 2018

City Administrator Approval

Date:

4/10/18

## RECOMMENDATION

**Staff Recommends That The City Council Receive An Informational Report On The Oakland Police And Fire Retirement System ("PFRS") Investment Portfolio As Of December 31, 2017.**

## EXECUTIVE SUMMARY

Attached is the Quarterly Investment Performance report provided by the PFRS Investment Consultant, Pension Consulting Alliance (PCA). It summarizes the performance of the PFRS investment portfolio for the quarter ended December 31, 2017 as **Attachment A**, herein.

During the most recent quarter, the PFRS Total Portfolio generated an absolute return of 4.7 percent, gross of fees, outperforming its policy benchmark by 0.4 percent. The portfolio also outperformed its benchmark over the latest one, three and five year periods. This is discussed in more detail in the "Investment Performance" section of this report.

	Quarter	1 Year	3 Year	5 Year
Total Portfolio	4.7	18.4	8.9	9.7
Policy Benchmark	4.3	16.7	8.6	9.2
<b>Excess Return</b>	<b>0.4</b>	<b>1.7</b>	<b>0.3</b>	<b>0.5</b>

## BACKGROUND / LEGISLATIVE HISTORY

The Oakland Police and Fire Retirement System (the "PFRS") is a closed defined benefit plan established by the City of Oakland's (the "City") Charter. PFRS is governed by a board of seven trustees (the "PFRS Board"). PFRS covers the City's sworn police and fire employees hired prior to July 1, 1976. PFRS was closed to new members on June 30, 1976. As of December 31, 2017, PFRS had 863 retired members and no active members.

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Finance and Management Committee  
April 24, 2018

The System's investment portfolio is governed by the investment policy set by the PFRS Board. The PFRS Board sets an investment policy that authorizes investments in a variety of domestic and international equity and fixed income securities. 12 external investment managers currently manage the System's portfolio. Most the portfolio is held in custody at Northern Trust. In accordance with the City Charter, the PFRS Board makes investment decisions in accordance with the prudent person standard as defined by applicable court decisions and as required by the California Constitution.

In March 1997, the City issued Taxable Pension Obligation Bonds, Series 1997 ("1997 POBs") and as a result deposited \$417 million into the System to pay the City's contributions through June 2011. As a result of the funding agreement entered at the time the 1997 POBs were issued, City payments to PFRS were suspended from February 25, 1997 to June 30, 2011. The City of Oakland resumed contributing to PFRS effective July 1, 2011 and contributed \$45.5 million for the fiscal year ended June 30, 2012.

In July 2012, the City issued \$212.5 million of Taxable Pension Obligation Bonds, Series 2012 ("2012 POBs"). The City subsequently deposited \$210 million into the System and entered a funding agreement with the PFRS Board. Thus, no additional contributions were required until July 1, 2017. As of the most recent actuary study dated July 1, 2016, the System's Unfunded Actuarial Liability is approximately \$309.37 million and the System had a Funded Ratio of 53.7 percent on a Market Value of Assets (MVA) basis. The City of Oakland is currently making monthly payments to the Plan for the FY 2017/2018 required contribution of \$44.86 million.

## **ANALYSIS AND POLICY ALTERNATIVES**

### ***PFRS' Membership***

The City Charter establishes plan membership, contribution, and benefit provisions. The System serves the City's sworn employees hired prior to July 1, 1976 who have not transferred to the California Public Employees' Retirement System ("CalPERS"). As of December 31, 2017, the System's membership was 863, as shown on **Table 1**.

<b>Table 1</b>			
PFRS Membership			
as of December 31, 2017			
<b>Membership</b>	<b>POLICE</b>	<b>FIRE</b>	<b>TOTAL</b>
Retiree	370	228	598
Beneficiary	135	130	265
<b>Total Membership</b>	<b>505</b>	<b>358</b>	<b>863</b>

**PFRS Investment Portfolio**

As of December 31, 2017, the PFRS' portfolio had an aggregate value of \$380.5 million as shown in **Table 2** below.

<b>Table 2</b> PFRS Investment Portfolio as of December 31, 2017 (in thousands)	
<b>Investment</b>	<b>Fair Value</b>
Domestic Equities	\$180,626
Fixed Income	64,217
International Equities	50,507
Covered Calls	76,220
Cash and Cash Equivalents	8,888
<b>Total Portfolio</b>	<b>\$380,458</b>

Over the past quarter, the PFRS investment portfolio increased \$14.0 million in value, net of \$15 million in benefit payments. During the previous one-year period, the PFRS Total Portfolio increased \$25.0 million, net of \$60 million in withdrawals during the period as shown in **Table 3** below. The investment drawdowns for benefit payments are less City of Oakland Contributions to the PFRS Plan of \$11.8 million for the Quarter and \$24.0 million for the Calendar Year.

<b>Table 3</b> Change in PFRS Portfolio Valuation as of December 31, 2017 (in thousands)		
<b>Total Plan Value</b>	<b>1 Quarter</b>	<b>1 Year</b>
Beginning Market Value	\$366,459	\$355,572
Investment Drawdowns for Benefit Payments	(3,208)	(35,998)
Gain/Loss on Investment	17,207	60,884
<b>Ending Market Value</b>	<b>\$380,458</b>	<b>\$380,458</b>

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**PFRS Investment Performance**

During the most recent quarter, the PFRS Total Portfolio generated an absolute return of 4.7 percent, gross of fees, outperforming its policy benchmark by 0.4 percent. The portfolio outperformed its benchmark by 1.7 percent over the one-year period, outperformed by 0.3 percent over the three-year period, and outperformed by 0.5 percent over the five-year period.

Over the most recent quarter, the Plan's Domestic Equity allocation outperformed its benchmark by 0.6 percent. The Plan's International Equity allocation underperformed its benchmark by 0.6 percent. The Plan's Fixed Income allocation outperformed its benchmark by 0.5 percent, while the Covered Calls allocation outperformed its benchmark by 2.8 percent. **Table 4** below shows PFRS recent investment performance in comparison to its corresponding benchmarks.

<b>Table 4</b>				
<b>PFRS ASSET CLASS PERFORMANCE</b>				
as of December 31, 2017				
	<b>Quarter</b>	<b>1 Year</b>	<b>3 Year</b>	<b>5 Year</b>
<b>PFRS Total Fund</b>	4.7%	18.4%	8.9%	9.7%
PFRS Policy Benchmark	4.3%	16.7%	8.6%	9.2%
<b>PFRS Domestic Equity</b>	6.9%	22.1%	11.4%	15.7%
Benchmark: Russell 3000	6.3%	21.1%	11.1%	15.6%
<b>PFRS International Equity</b>	4.5%	31.3%	10.3%	8.8%
Benchmark: MSCI ACWI Ex US	5.1%	27.8%	8.3%	7.3%
<b>PFRS Fixed Income</b>	0.9%	4.9%	3.3%	2.7%
Benchmark: Bloomberg Barclays Universal	0.4%	4.1%	2.8%	2.5%
<b>PFRS Covered Calls</b>	3.6%	15.8%	10.1%	---
Benchmark: CBOE BXM	2.8%	13.0%	8.4%	---
<b>Cash</b>	0.4%	1.1%	0.6%	0.3%
Citigroup 3 Month T-Bill Index	0.3%	0.8%	0.4%	0.2%

**PFRS Actuarial Valuation**

As of the latest actuarial valuation dated July 1, 2016, the PFRS Funded Ratio (actuarial value of assets divided by present value of future benefits) is 53.7 percent. As a result of the funding agreement and the City's deposit of \$210 million in 2012 POBs to the System, no contributions were required until fiscal year 2017/2018. The City resumed contributions to the System on July 1, 2017. The required contribution for fiscal year 2017/2018 is \$44.86 million. **Table 5** below shows a summary of the July 1, 2016 PFRS Actuarial valuation results.

<b>Table 5</b> Summary of Plan Results (\$ in thousands)	
	<b>July 01, 2016</b>
Actuarial Liability	\$ 672,916
Less: Actuarial Value of Assets	(363,550)
Unfunded Actuarial Liability	<u>\$ 309,366</u>
Funded Ratio (MVA) liability	<u>53.7%</u>

**Projected City of Oakland Contributions**

Article XXVI Section 2619 (6) required that the City fully fund the PFRS Plan by 2026. **Table 6** below summarizes the projected employer contributions.

<b>Table 6</b> Projected Employer Contributions Police and Fire Retirement System (in millions)	
<b>Fiscal Year Ending</b>	<b>Employer Contribution</b>
2017	\$ 0.0
2018	44.9
2019	46.4
2020	47.9
2021	49.5
2022	51.1
2023	52.8
2024	54.6
2025	56.4
2026	58.4

**FISCAL IMPACT**

This is an informational report. There are no budget implications associated with this report.

**PUBLIC OUTREACH / INTEREST**

This item did not require public outreach other than the required posting on the City's website.

**COORDINATION**

This report was prepared in coordination with the PFRS' Investment Consultant (PCA) and PFRS' Actuary (Cheiron).

**SUSTAINABLE OPPORTUNITIES**

***Economic:*** Whenever possible, the PFRS Board seeks to benefit the local Oakland based economy. In 2006, the PFRS Board, along with staff, created the PFRS Local Broker provision. This provision mandates that the PFRS Investment Managers consider using Oakland based brokers for all trades conducted on behalf of the fund based on best execution. This program aims to regenerate some of the commissions generated by the System into the Oakland economy.

***Environmental:*** There are no environmental opportunities associated with this report.

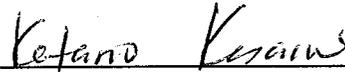
***Social Equity:*** There are no social equity opportunities associated with this report.

**ACTION REQUESTED OF THE CITY COUNCIL**

Staff recommends that the Council receive this informational report on the Oakland Police and Fire Retirement System ("PFRS") Investment Portfolio as of December 31, 2017.

For questions regarding this report, please contact Katano Kasaine, Director of Finance, at (510) 238-2989.

Respectfully submitted,



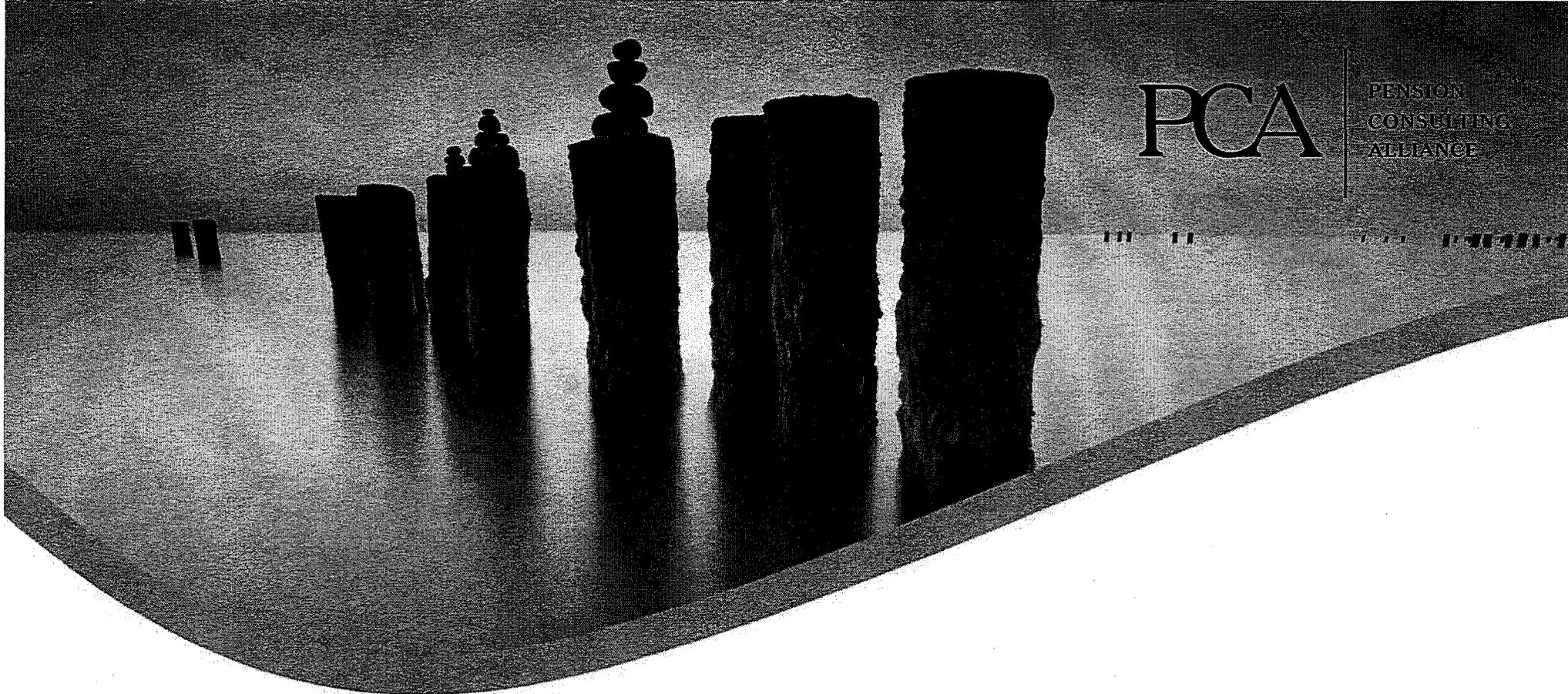
KATANO KASAINÉ  
Finance Director

Prepared by:  
Téir Jenkins, Investment Officer  
Retirement Division

**Attachment A:** Oakland Police and Fire Quarterly Investment Performance Report as of December 31, 2017

Item: \_\_\_\_\_  
Finance and Management Committee  
April 24, 2018

**ATTACHMENT A:  
PFRS INVESTMENT PERFORMANCE  
AS OF DECEMBER 31, 2017**



PCA

PENSION  
CONSULTING  
ALLIANCE

Q4 2017

Oakland Police and Fire Retirement  
System  
Quarterly Report

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## TOTAL PORTFOLIO SUMMARY

As of December 31, 2017, the City of Oakland Police and Fire Retirement System (OPFRS) portfolio had an aggregate value of \$380.5 million. This represents a \$17.2 million increase in value, and (\$3.2) million in benefit payments, over the quarter. During the previous one-year period, the OPFRS Total Portfolio increased in value by \$60.9 million, and withdrew (\$36.0) million for benefit payments.

### Asset Allocation Trends

The asset allocation targets (see table on page 20) reflect those as of December 31, 2017. Target weightings do not yet reflect the interim phase of the Plan's recently approved asset allocation (effective 5/31/2017).

With respect to policy targets, the portfolio ended the latest quarter **overweight International Equity and Cash, while underweight Domestic Equity and Fixed Income.**

### Recent Investment Performance

During the most recent quarter, the OPFRS Total Portfolio generated an absolute return of 4.7%, gross of fees, outperforming its policy benchmark by 0.4%. The portfolio outperformed its benchmark by 1.7% over the 1-year period, outperformed by 0.3% over the 3-year period, and outperformed by 0.5% over the 5-year period.

The Total Portfolio outperformed the Median fund's return over all time periods measured. Performance differences with respect to the Median Fund continue to be attributed largely to differences in asset allocation.

	Quarter	Fiscal YTD	1 Year	3 Year	5 Year
Total Portfolio <sup>1</sup>	4.7	9.0	18.4	8.9	9.7
Policy Benchmark <sup>2</sup>	4.3	8.1	16.7	8.6	9.2
<b>Excess Return</b>	<b>0.4</b>	<b>0.9</b>	<b>1.7</b>	<b>0.3</b>	<b>0.5</b>
Reference: Median Fund <sup>3</sup>	3.7	7.2	15.3	7.3	9.2
Reference: Total Net of Fees <sup>4</sup>	4.6	8.8	18.0	8.5	9.3

<sup>1</sup> Gross of Fees. Performance since 2005 includes securities lending.

<sup>2</sup> Evolving Policy Benchmark consists of 48% Russell 3000, 12% MSCI ACWI ex U.S., 20% Bbg BC Universal, and 20% CBOE BXM

<sup>3</sup> Investment Metrics < \$1 Billion Public Plan Universe.

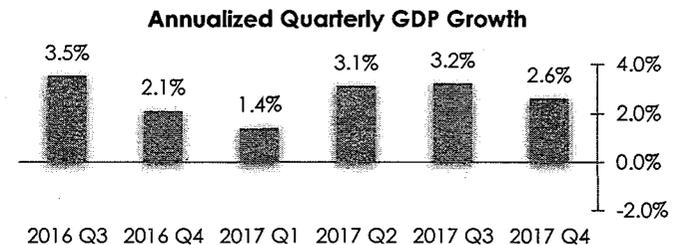
<sup>4</sup> Longer-term (>1 year) Net of fee returns are estimated based on OPFRS manager fee schedule (approximately 42 bps).

## ECONOMIC & MARKET OVERVIEW – 4Q 2017

**Overview:** Real US GDP growth increased by 2.6% (advance estimate) in the fourth quarter of 2017. GDP growth was driven by increases in consumer spending, business investment, housing investment, as well as federal and state local government spending. At quarter-end, the unemployment rate was unchanged at 4.1%. The seasonally adjusted Consumer Price Index for All Urban Consumers increased by 2.6% on an annualized basis during the quarter. Commodities increased during the fourth quarter, bringing the 1-year return into positive territory at 1.7%. Global equity returns were positive for the quarter at 5.8% (MSCI ACWI). The US Dollar depreciated against the Euro and the Pound by (1.6%) and (0.9%), respectively. Conversely, the US Dollar appreciated against the Yen by 20 basis points.

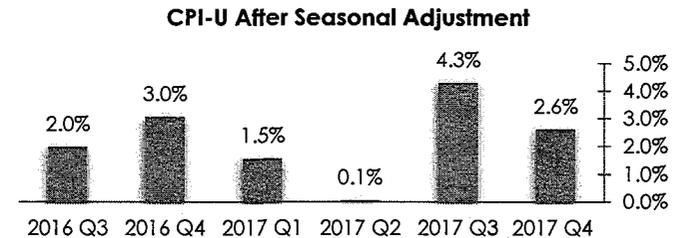
### Economic Growth

- Real GDP increased at an annualized rate of 2.6 percent in the fourth quarter of 2017.
- Real GDP growth was driven by increases in consumer spending, business investment, housing investment, as well as federal and state and local government spending.
- GDP growth was partially offset during the quarter by declines in inventories and an increase in imports.



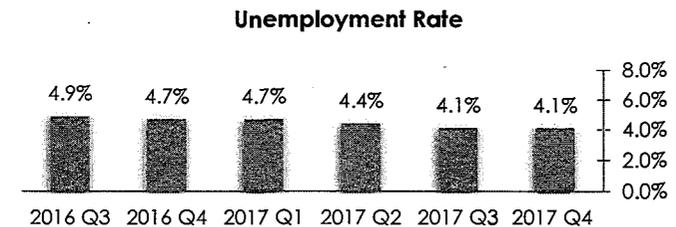
### Inflation

- The Consumer Price Index for All Urban Consumers (CPI-U) increased 2.6 percent during the fourth quarter on an annualized basis after seasonal adjustment.
- Quarterly percentage changes may be adjusted between data publications due to periodic updates in seasonal factors.
- Core CPI-U increased by 0.9 percent for the quarter on an annualized basis after seasonal adjustment.
- Over the last 12 months, core CPI-U increased 1.4 percent after seasonal adjustment



### Unemployment

- The US economy gained approximately 611,000 jobs in the fourth quarter of 2017.
- The unemployment rate remained unchanged at 4.1% at quarter-end.
- The majority of jobs gained occurred in goods-producing, leisure and hospitality, and professional and business services. The primary contributors to jobs lost were in utilities and retail trade.

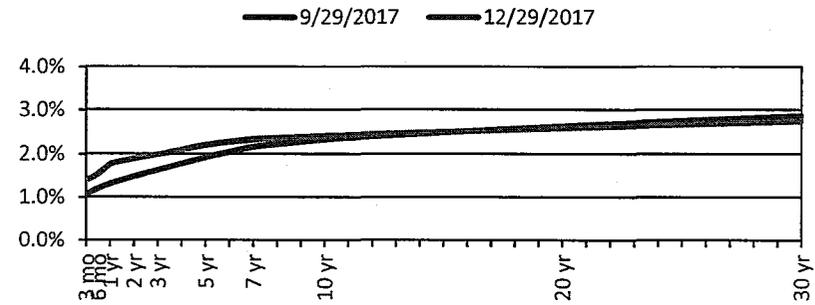


# ECONOMIC & MARKET OVERVIEW – 4Q 2017

## Interest Rates & US Dollar

- The yield curve marginally flattened over the quarter with shorter yields rising, middle yields staying relatively unchanged, and longer-term yields declining.
- The Federal Reserve increased the federal funds rate to between 1.25 percent and 1.50 percent.
- The US Dollar depreciated against the Euro and the Pound by (1.6%) and (0.9%), respectively. Conversely the US Dollar appreciated against the Yen by 0.2%.

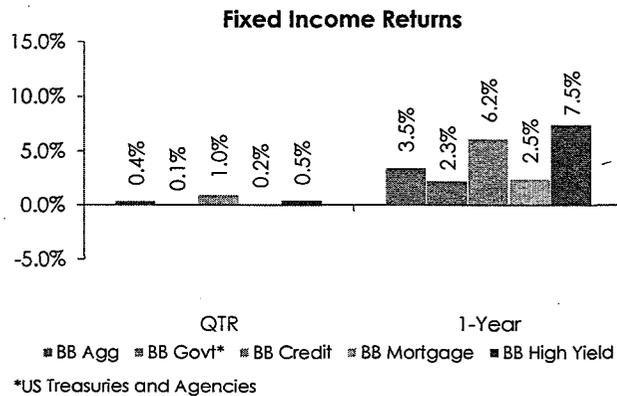
Treasury Yield Curve Changes



Source: US Treasury Department

## Fixed Income

- US bonds were essentially flat over the quarter except for Credit which returned 1.0%.
- Over the trailing 1-year period, High Yield materially outperformed all other sectors producing a 7.5% return. Government bonds (US Treasuries and Agencies) trailed all other bond sectors with a return of 2.3%.



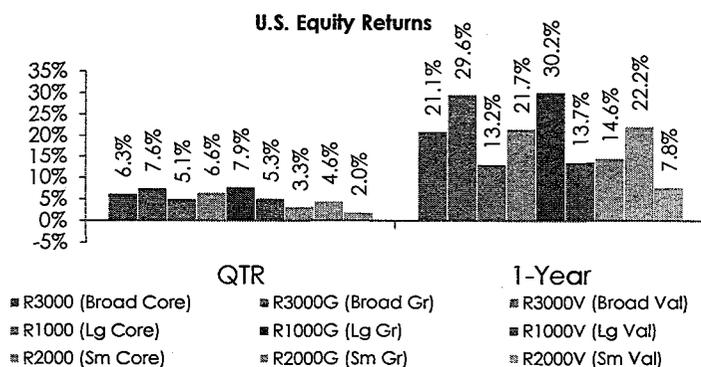
Sector	Weight	QTR	1 Year
Governments*	40.5%	0.3%	2.6%
Agencies	3.4%	0.1%	3.0%
Inv. Grade Credit	25.6%	1.2%	6.4%
MBS	28.1%	0.2%	2.5%
ABS	0.5%	0.0%	1.6%
CMBS	1.8%	0.4%	3.4%

\*US Treasuries and Government Related

# ECONOMIC & MARKET OVERVIEW – 4Q 2017

## US Equities

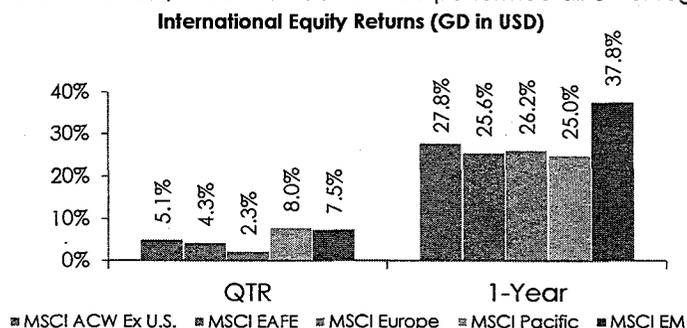
- During the quarter, growth stocks outperformed value stocks across the market cap spectrum. In terms of market capitalization, large cap stocks provided the strongest returns across styles. Large cap growth stocks returned this quarter's strongest return at 7.9%, and small cap value provided the weakest result at 2.0%.
- During the trailing 1-year period, US equities provided positive double-digit returns, with the top performer, large cap growth, returning 30.2%. Conversely, small cap value trailed all other market caps and styles with a return of 7.8%.



Sector	Weight	QTR	1 Year
Information Tech.	22.8%	9.1%	39.7%
Financials	15.1%	8.2%	22.4%
Health Care	13.3%	3.5%	31.3%
Consumer Disc.	12.5%	10.5%	28.4%
Industrials	11.0%	8.0%	29.8%
Consumer Staples	7.3%	7.3%	14.7%
Energy	5.8%	7.2%	0.5%
Real Estate	3.9%	3.1%	12.8%
Materials	3.5%	7.5%	26.3%
Utilities	3.0%	1.6%	14.4%
Telecom.	1.9%	3.4%	0.8%

## International Equities

- International equities performed well over the quarter as each region provided positive returns. The best performer was the Pacific with a return of 8.0%. Europe trailed all other regions with a return of 2.3%.
- Over the trailing 1-year period, international equities provided double digit returns across the board. Emerging markets led all other regions with a return of 37.8%, while the Pacific underperformed all other regions with a 25.0% return.



Sector	Weight	QTR	1 Year
Europe Ex. UK	31.5%	1.0%	27.8%
Emerging Markets	24.8%	7.5%	37.8%
Japan	16.6%	8.5%	24.4%
United Kingdom	12.3%	5.7%	22.4%
Pacific Ex. Japan	8.3%	7.1%	26.0%
Canada	6.6%	4.5%	16.9%

## ECONOMIC & MARKET OVERVIEW – 4Q 2017

### Market Summary – Long-term Performance\*

Indexes	Month	Quarter	1-Year	3-Years	5 Years	10 Years	20 Years
<b>Global Equity</b>							
MSCI AC World Index	1.6%	5.8%	24.6%	9.9%	11.4%	5.2%	6.6%
<b>Domestic Equity</b>							
S&P 500	1.1%	6.6%	21.8%	11.4%	15.8%	8.5%	7.2%
Russell 3000	1.0%	6.3%	21.1%	11.1%	15.6%	8.6%	7.4%
Russell 3000 Growth	0.7%	7.6%	29.6%	13.5%	17.2%	9.9%	6.8%
Russell 3000 Value	1.3%	5.1%	13.2%	8.7%	14.0%	7.2%	7.5%
Russell 1000	1.1%	6.6%	21.7%	11.2%	15.7%	8.6%	7.4%
Russell 1000 Growth	0.8%	7.9%	30.2%	13.8%	17.3%	10.0%	6.9%
Russell 1000 Value	1.5%	5.3%	13.7%	8.7%	14.0%	7.1%	7.4%
Russell 2000	-0.4%	3.3%	14.6%	10.0%	14.1%	8.7%	7.9%
Russell 2000 Growth	0.1%	4.6%	22.2%	10.3%	15.2%	9.2%	6.7%
Russell 2000 Value	-1.0%	2.0%	7.8%	9.5%	13.0%	8.2%	8.6%
Russell Microcap	-0.5%	1.8%	13.2%	8.9%	14.3%	7.7%	—
CBOE BXM Index	0.7%	2.8%	13.0%	8.4%	8.8%	4.9%	6.2%
<b>International Equity (GD)</b>							
MSCI AC World Index ex USA	2.3%	5.1%	27.8%	8.3%	7.3%	2.3%	6.1%
MSCI EAFE	1.6%	4.3%	25.6%	8.3%	8.4%	2.4%	5.7%
MSCI Pacific	1.7%	8.0%	25.0%	10.4%	9.2%	3.6%	5.3%
MSCI Europe	1.5%	2.3%	26.2%	7.3%	8.0%	2.0%	5.9%
MSCI EM (Emerging Markets)	3.6%	7.5%	37.8%	9.5%	4.7%	2.0%	8.1%
<b>Fixed Income</b>							
BB Universal	0.4%	0.4%	4.1%	2.8%	2.5%	4.3%	5.2%
Global Agg. - Hedged	0.2%	0.8%	3.0%	2.7%	3.1%	4.2%	5.0%
BB Aggregate Bond	0.5%	0.4%	3.5%	2.2%	2.1%	4.0%	5.0%
BB Government	0.3%	0.0%	2.3%	1.4%	1.3%	3.2%	4.6%
BB Credit Bond	0.8%	1.0%	6.2%	3.6%	3.2%	5.4%	5.7%
BB Mortgage Backed Securities	0.3%	0.2%	2.5%	1.9%	2.0%	3.8%	4.9%
BB High Yield	0.3%	0.5%	7.5%	6.4%	5.8%	8.0%	6.8%
BB WGIL All Maturities - Hedged	1.1%	2.5%	3.4%	4.1%	3.0%	4.6%	—
Emerging Markets Debt	0.4%	0.6%	8.2%	6.4%	3.9%	7.0%	8.5%
<b>Real Estate</b>							
NCREIF	0.7%	2.1%	7.6%	10.4%	11.5%	5.0%	8.9%
FTSE NAREIT All Equity Index	-0.1%	2.4%	9.3%	6.9%	9.9%	7.7%	8.7%
<b>Commodity Index</b>							
Bloomberg Commodity Index	3.0%	4.7%	1.7%	-5.0%	-8.5%	-6.8%	0.8%

\* Performance is annualized for periods greater than one year.

## Investment Market Risk Metrics

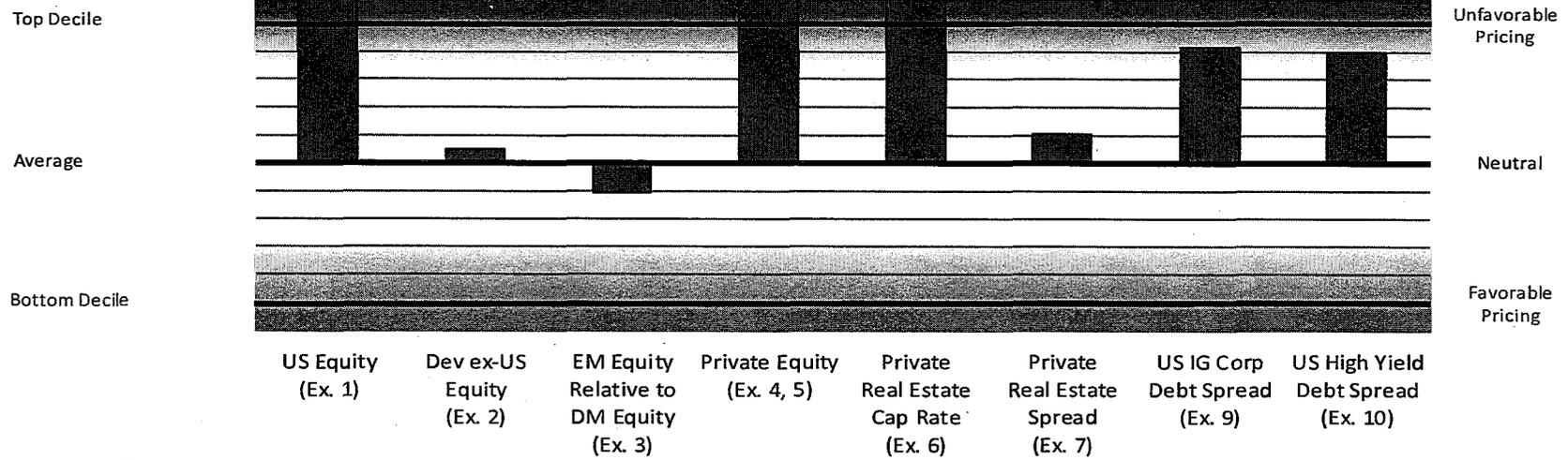
### Takeaways

- December completed an extremely strong calendar year for nearly all growth risk-based assets. Despite material divergences within certain areas (e.g., value vs. growth, small vs. large, etc.), aggregate growth risk-based indices produced moderate-to-strong returns in the fourth quarter and throughout 2017. Additionally, traditional safe-haven assets (e.g., U.S. Treasuries) also produced positive returns over the course of 2017.
- The yield curve marginally flattened over the quarter with shorter yields rising, middle yields staying relatively unchanged, and longer-term yields declining.
- Implied equity market volatility (i.e., VIX) remained near historic lows throughout the quarter. This behavior has been directly mirrored by actual equity market volatility as well as macroeconomic data volatility throughout the globe.
- Due to recent price increases, Non-U.S. Developed and Emerging Market equity valuations are no longer as cheap relative to their own histories (currently in-line with long-term averages), but they remain modestly cheap relative to U.S. levels.
- Credit spreads remain tight (risk seeking) in both U.S. investment grade and high yield markets.
- Inflation indicators generally remain well behaved. Commodity prices and breakeven inflation levels experienced modest increases in December. Recent macroeconomic data (e.g., GDP, CPI, wages, etc.) suggest that modest inflation may finally return in the intermediate-term.
- PCA's sentiment indicator (page 4) remains positive. The sentiment indicator remains solidly **green**.

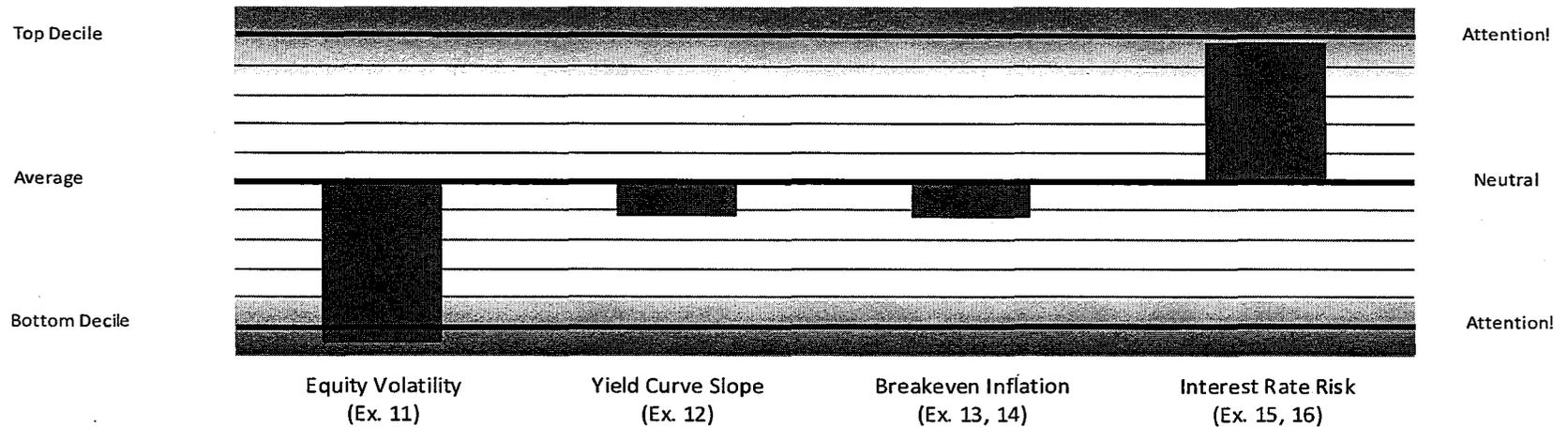
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<sup>1</sup> See Appendix for the rationale for selection and calculation methodology used for the risk metrics.

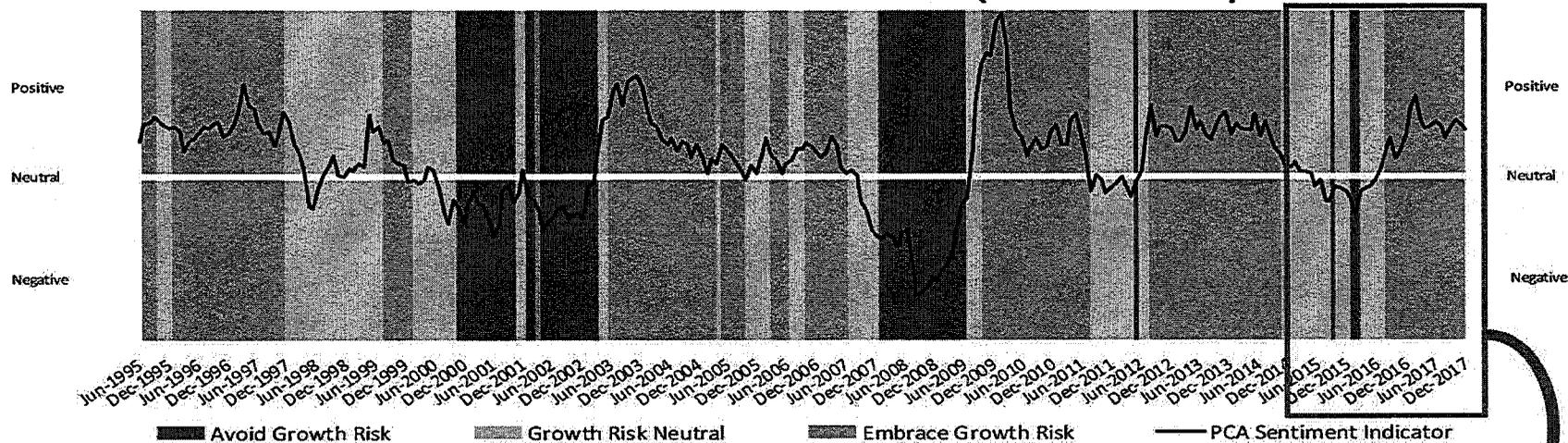
## Valuation Metrics versus Historical Range A Measure of Risk



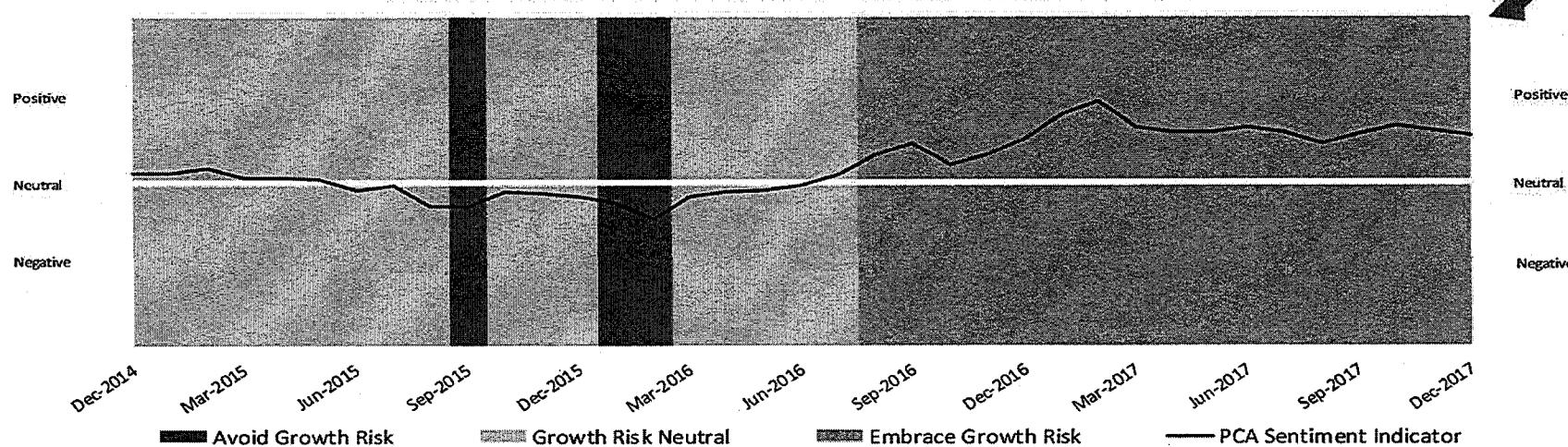
## Other Important Metrics within their Historical Ranges Pay Attention to Extreme Readings



## PCA Market Sentiment Indicator (1995-Present)



## PCA Market Sentiment Indicator - Most Recent 3-Year Period



### Information Behind Current Sentiment Reading

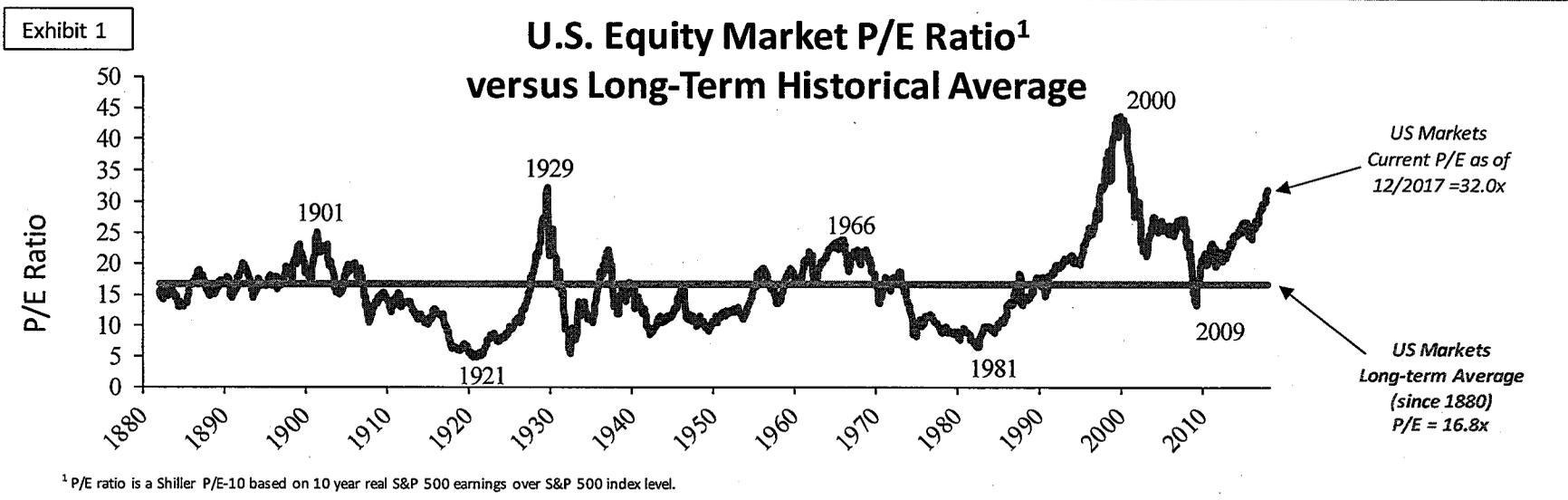
Bond Spread Momentum Trailing-Twelve Months  
 Equity Return Momentum Trailing-Twelve Months  
 Agreement Between Bond and Equity Momentum Measures?

Positive  
 Positive  
 Agree

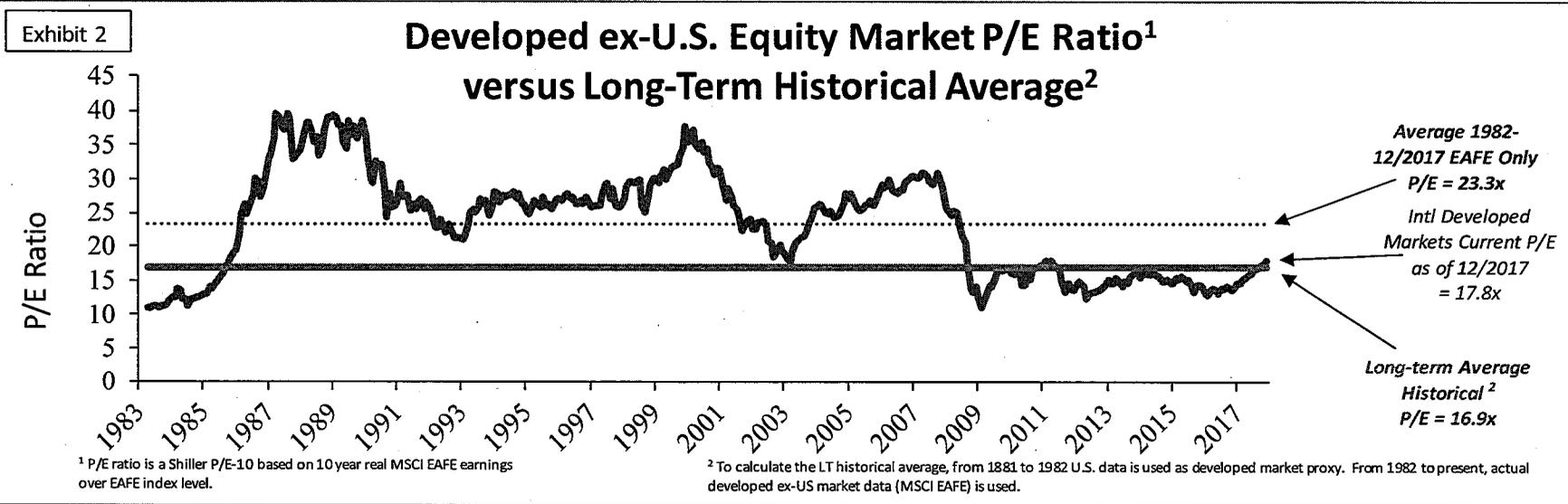
### Growth Risk Visibility (Current Overall Sentiment)

Positive

Developed Public Equity Markets



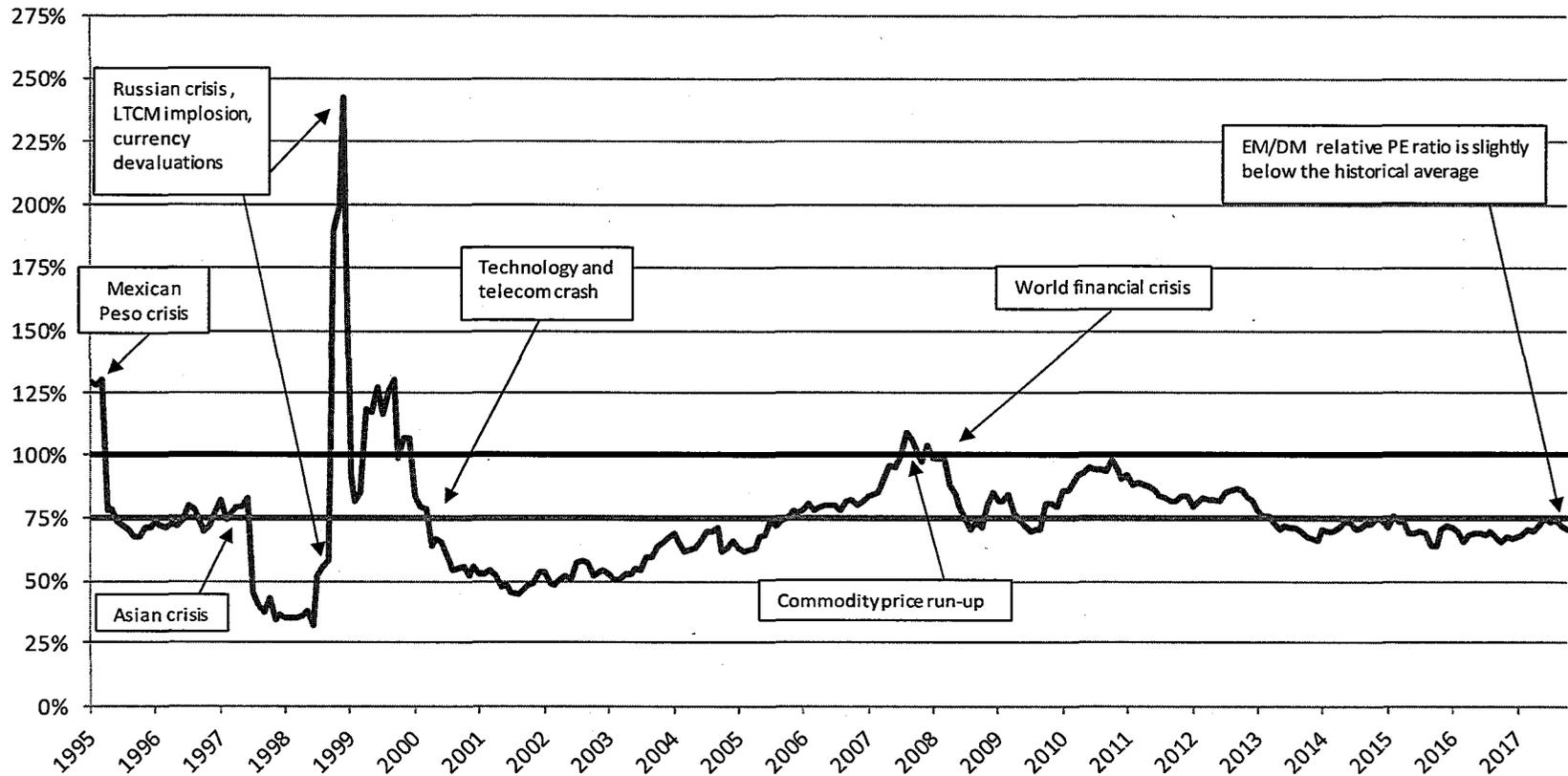
(Please note different time scales)



## Emerging Markets Public Equity Markets

Exhibit 3

### Emerging Markets PE / Developed Markets PE (100% = Parity between PE Ratios)



Source: Bloomberg, MSCI World, MSCI EMF

— EM/DM PE

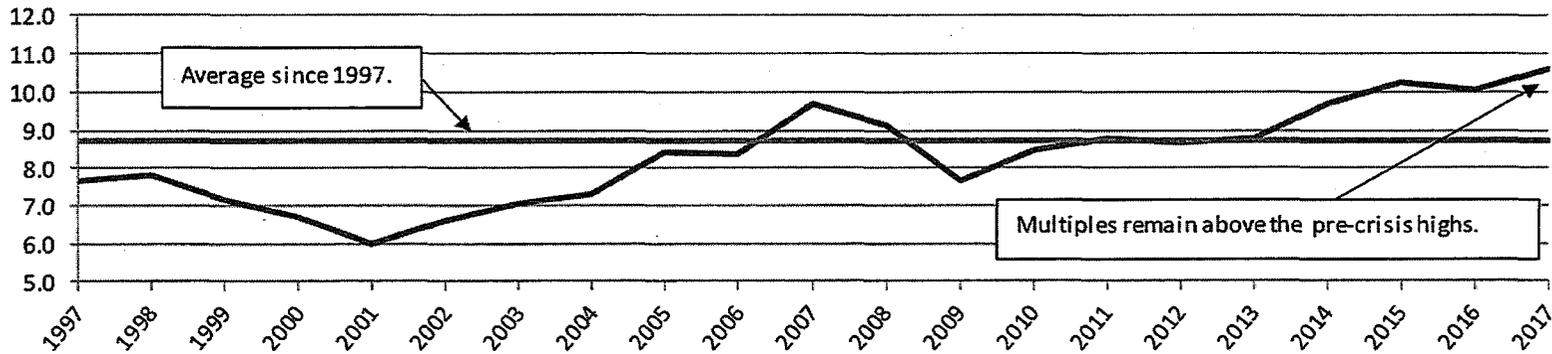
- - - Average EM/DM PE

— Parity

## U.S. Private Equity Markets

Exhibit 4

### Price to EBITDA Multiples Paid in LBOs

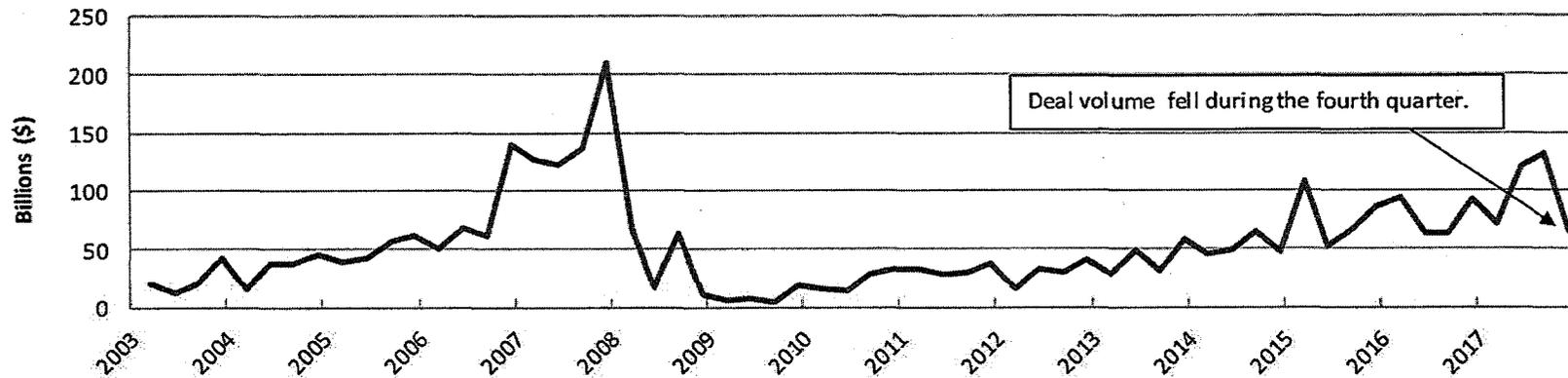


Source: S&PLCD study

(Please note different time scales)

Exhibit 5

### Disclosed U.S. Quarterly Deal Volume\*

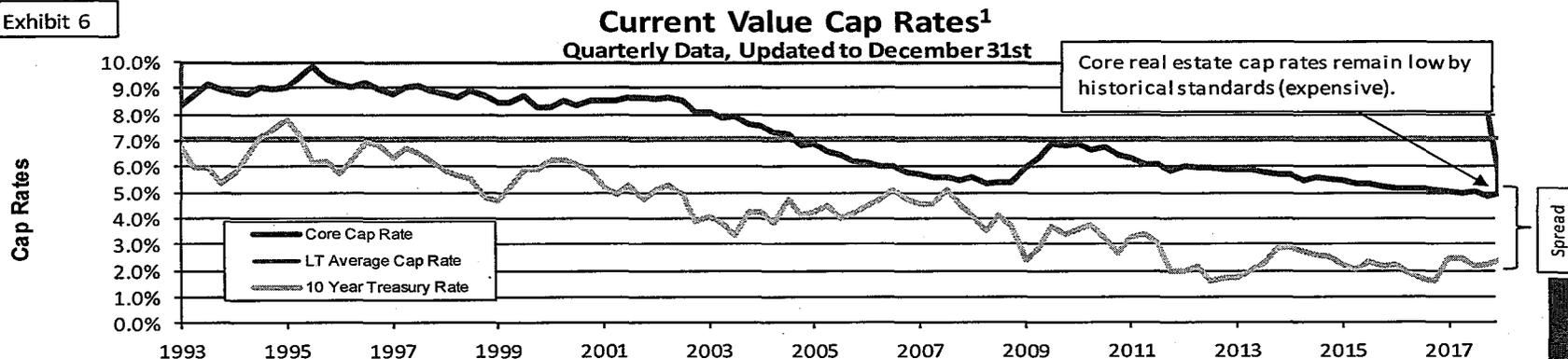


Source: Thomson Reuters Buyouts

\* quarterly total deal size (both equity and debt)

## Private Real Estate Markets

Exhibit 6



Source: NCREIF

<sup>1</sup>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.

Exhibit 7

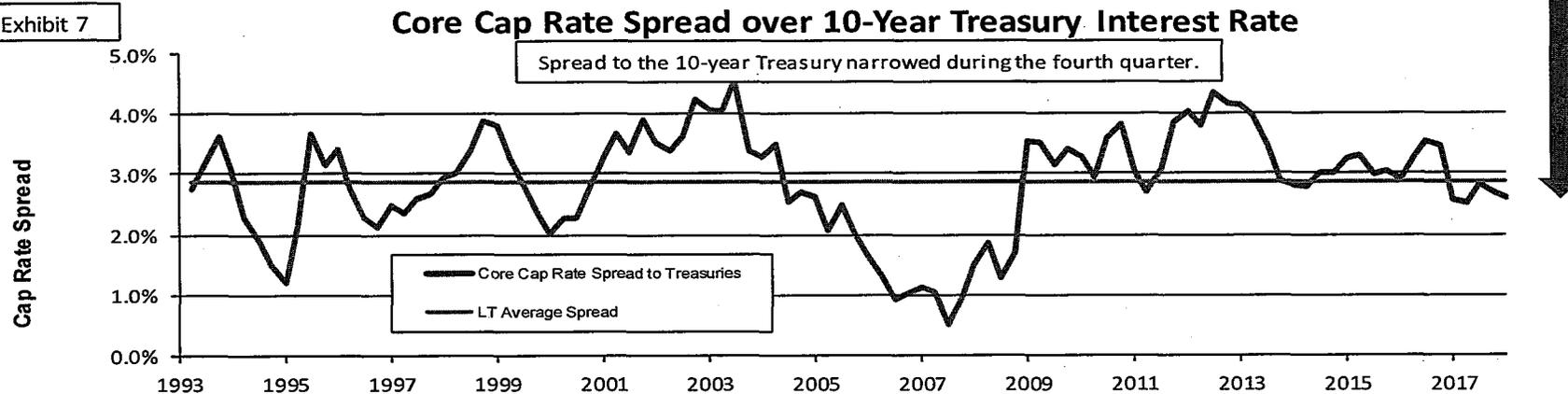


Exhibit 8

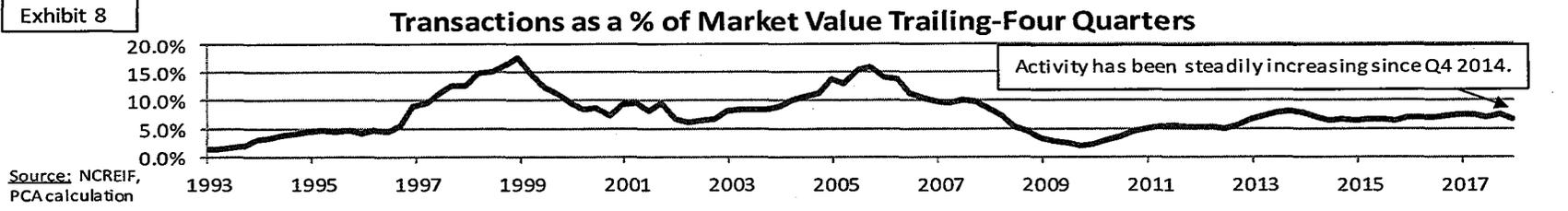
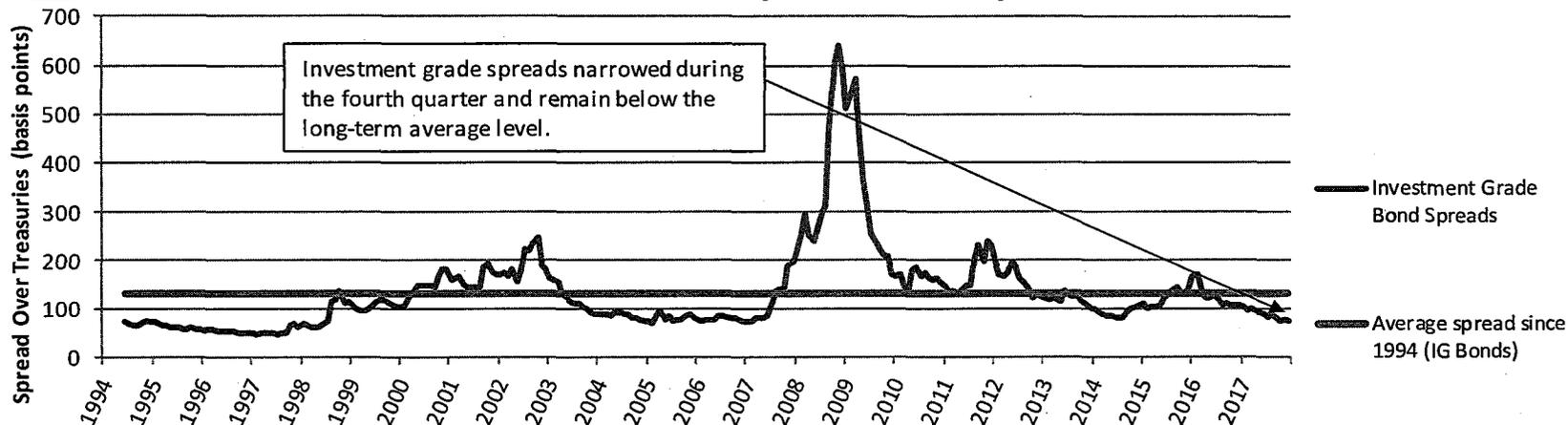


Exhibit 9

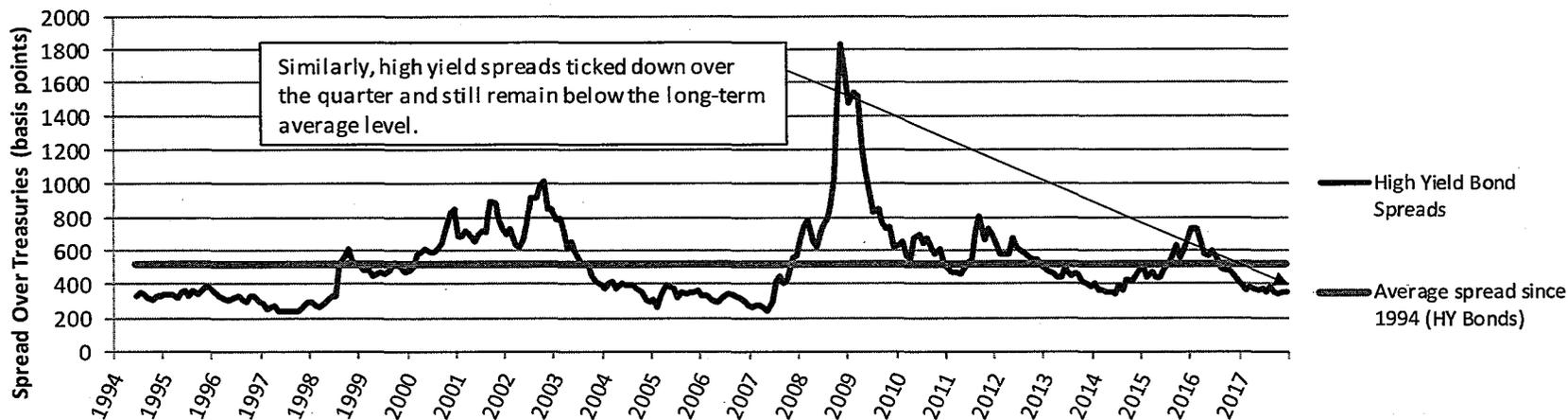
### Investment Grade Corporate Bond Spreads



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

Exhibit 10

### High Yield Corporate Bond Spreads

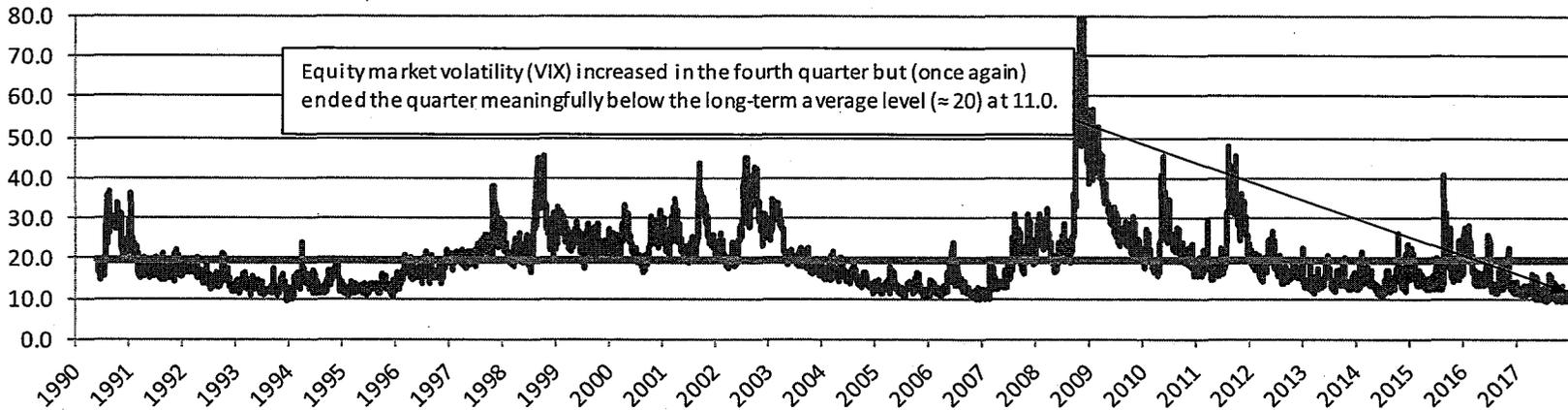


Source: LehmanLive: Barclays Capital U.S. Corporate High Yield Index.

Other Market Metrics

Exhibit 11

VIX - a measure of equity market fear / uncertainty

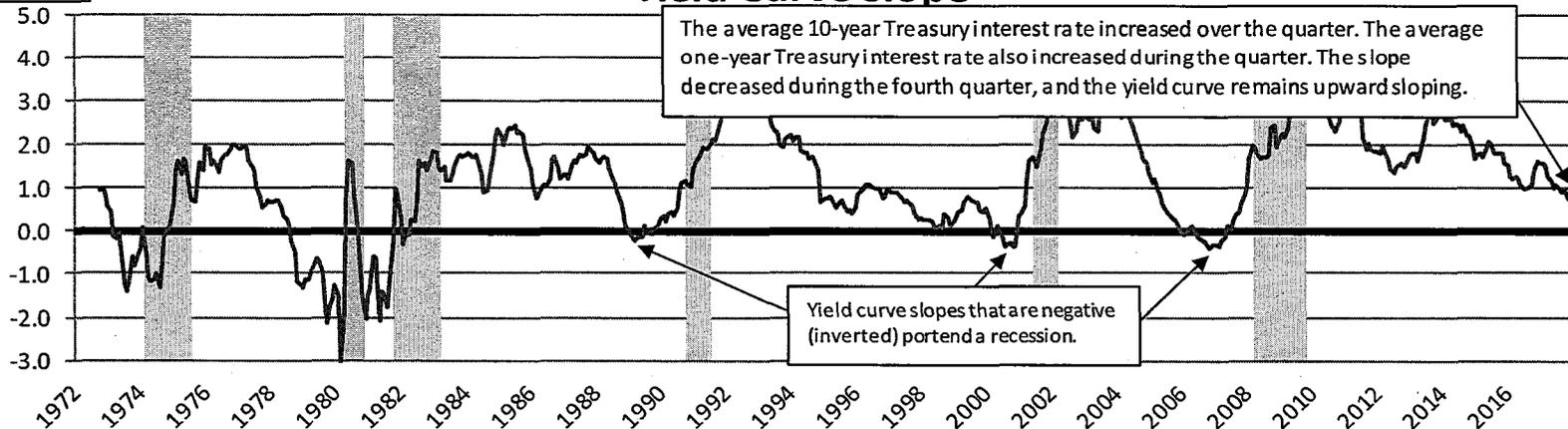


Source: <http://www.cboe.com/micro/vix/historical.aspx>

(Please note different time scales)

Exhibit 12

Yield Curve Slope



Source: [www.ustreas.gov](http://www.ustreas.gov) (10-year treasury yield minus 1-year treasury yield)

Measures of Inflation Expectations

Exhibit 13

**10-Year Breakeven Inflation**  
(10-year nominal Treasury yield minus 10-year TIPS yield)



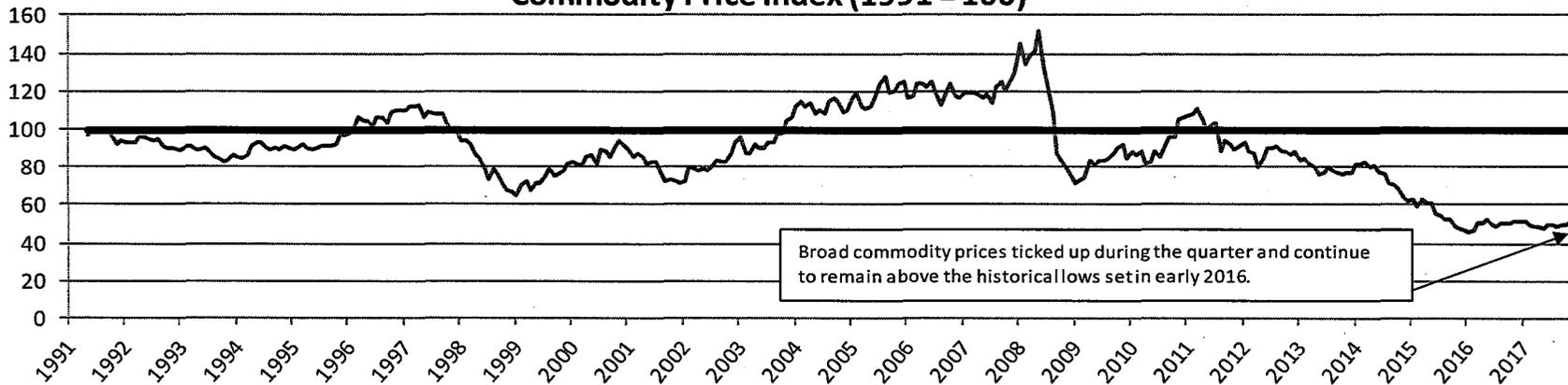
Breakeven inflation ended December at 1.96%, increasing from the end of September. The 10-year TIPS real-yield decreased to 0.44%, and the nominal 10-year Treasury yield ticked up, ending the quarter at 2.40%.

Source: [www.ustreas.gov](http://www.ustreas.gov)  
Daily Yield Curve Rates (10-year nominal treasury yield minus 10-year TIPS yield)

(Please note different time scales)

Exhibit 14

**Inflation Adjusted Bloomberg**  
**Commodity Price Index (1991 = 100)**



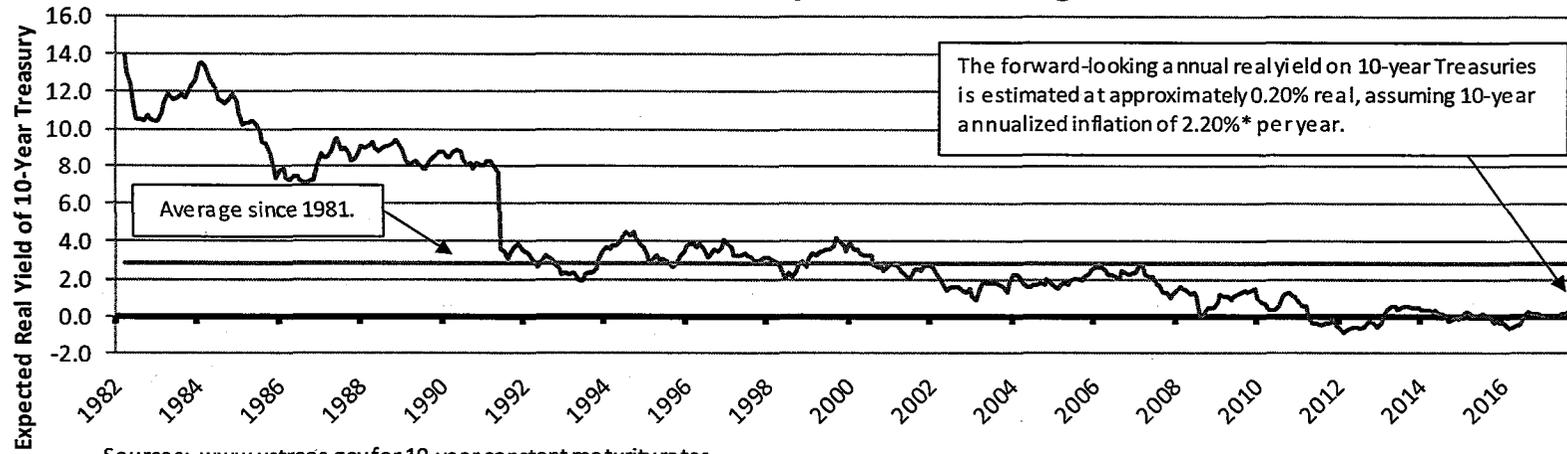
Broad commodity prices ticked up during the quarter and continue to remain above the historical lows set in early 2016.

Source: Bloomberg Commodity Index, St. Louis Fed for US CPI all urban consumers.

## Measures of U.S. Treasury Interest Rate Risk

Exhibit 15

### Estimate of 10-Year Treasury Forward-Looking Real Yield

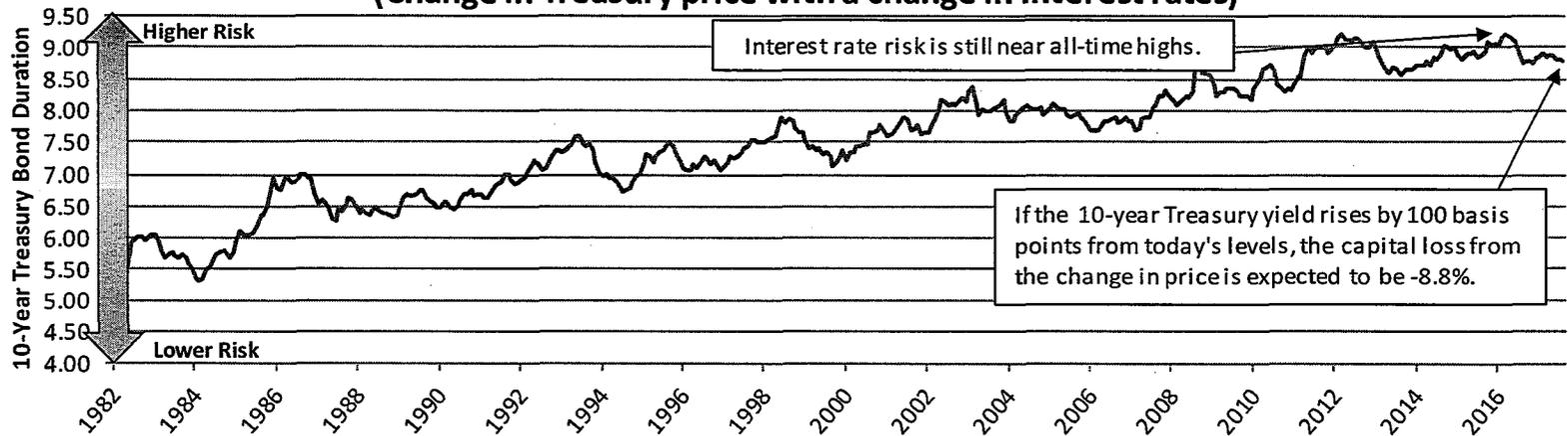


Sources: [www.ustreas.gov](http://www.ustreas.gov) for 10-year constant maturity rates

\*Federal Reserve Bank of Philadelphia survey of professional forecasts for inflation estimates

Exhibit 16

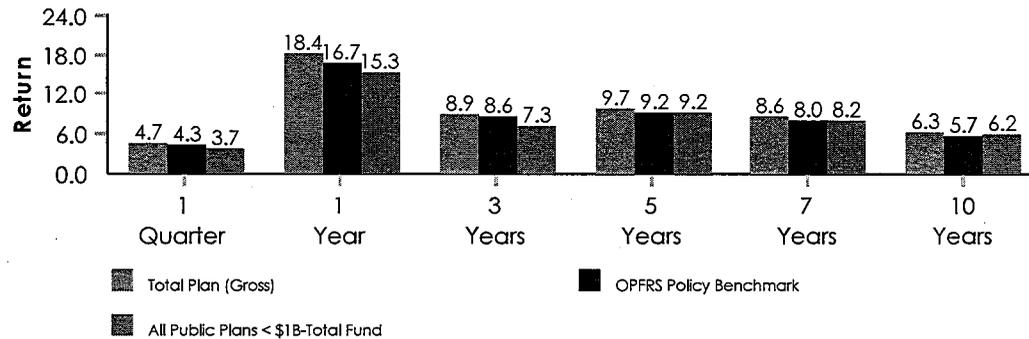
### 10-Year Treasury Duration (Change in Treasury price with a change in interest rates)



Source: [www.ustreas.gov](http://www.ustreas.gov) for 10-year constant maturity rates, calculation of duration

## Performance and Market Values As of December 31, 2017

### Investment Performance



### Portfolio Valuation (000's)

	1 Quarter	1 Year
<b>OPFRS Total Plan</b>		
Beginning Market Value	366,459	355,573
Net Contributions	-3,208	-35,998
Gain/Loss	17,207	60,884
<b>Ending Market Value</b>	<b>380,459</b>	<b>380,459</b>

### Asset Class Performance (gross of fees)

	1 Quarter	1 Year	3 Years	5 Years	7 Years	10 Years
OPFRS Total Plan	4.7	18.4	8.9	9.7	8.6	6.3
OPFRS Policy Benchmark*	4.3	16.7	8.6	9.2	8.0	5.7
Domestic Equity	6.9	22.1	11.4	15.7	13.6	9.0
Russell 3000 (Blend)**	6.3	21.1	11.1	15.6	13.5	8.6
International Equity	4.5	31.3	10.3	8.8	6.3	2.5
MSCI ACWI Ex US (Blend)^	5.1	27.8	8.3	7.3	5.4	2.3
Fixed Income	0.9	4.9	3.3	2.7	3.9	4.7
Bloomberg Barclays Universal (Blend)^^	0.4	4.1	2.8	2.5	3.6	4.3
Covered Calls	3.6	15.8	10.1	-	-	-
CBOE BXM	2.8	13.0	8.4	-	-	-
Cash	0.4	1.1	0.6	0.3	-	-
Citigroup 3 Month T-Bill Index	0.3	0.8	0.4	0.2	-	-

\* Starting on 5/1/2016, Policy Benchmark consists of 48% Russell 3000, 12% MSCI ACWI ex U.S., 20% BC Universal, 20% CBOE BXM

\*\* Domestic Equity Benchmark consists of S&P 500 thru 3/31/98, 10% R1000, 20% R1000V, 5% RMC from 4/1/98 - 12/31/04, and Russell 3000 from 1/1/05 to present

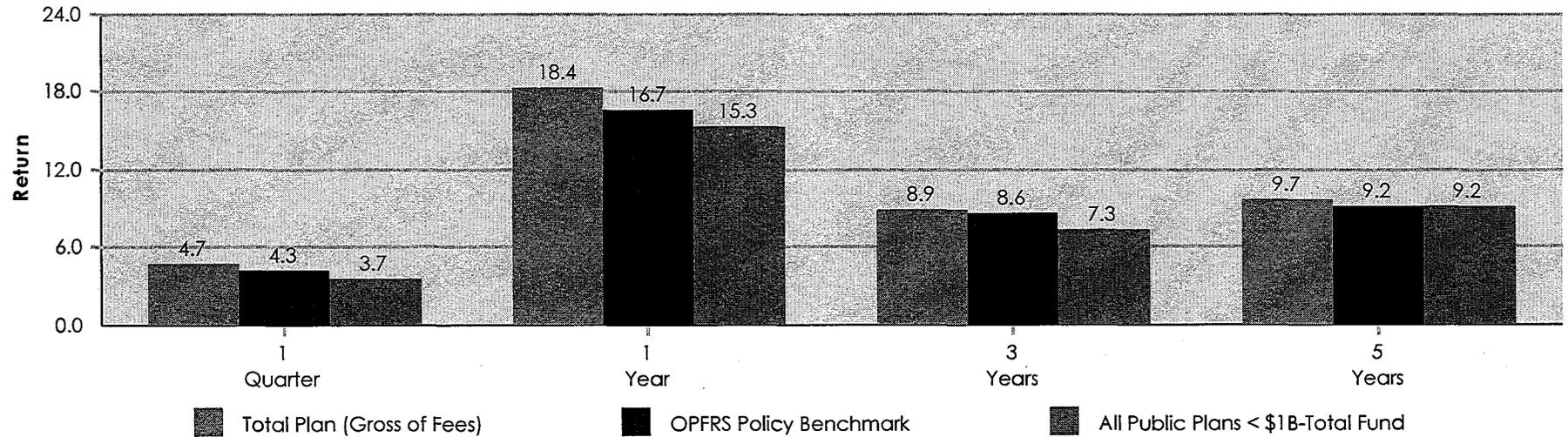
^ International Equity Benchmark consists of MSCI EAFE thru 12/31/04, and MSCI ACWI x US thereafter.

^^ Fixed Income Benchmark consists of Bbg BC Aggregate prior to 4/1/06, and Bbg BC Universal thereafter.

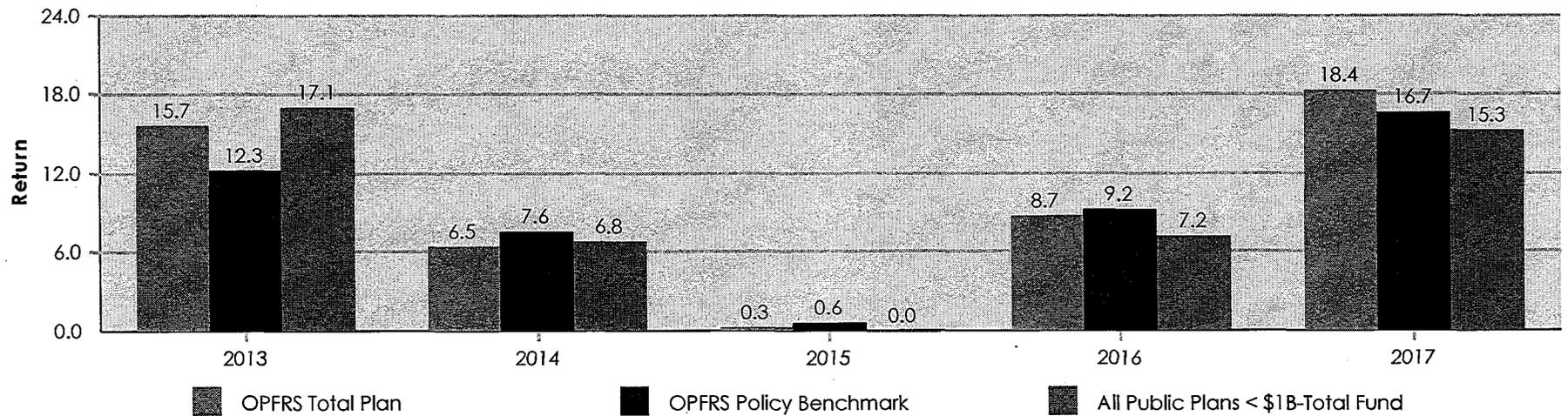
# OPFRS Portfolio Relative Performance Results

As of December 31, 2017

## Trailing Period Performance (annualized)



## 12-month Performance- As of December 31, 2017



**Actual vs. Target Allocation**  
**As of December 31, 2017**

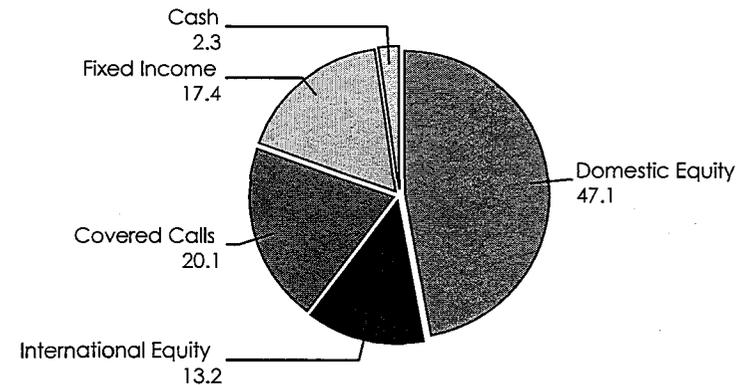
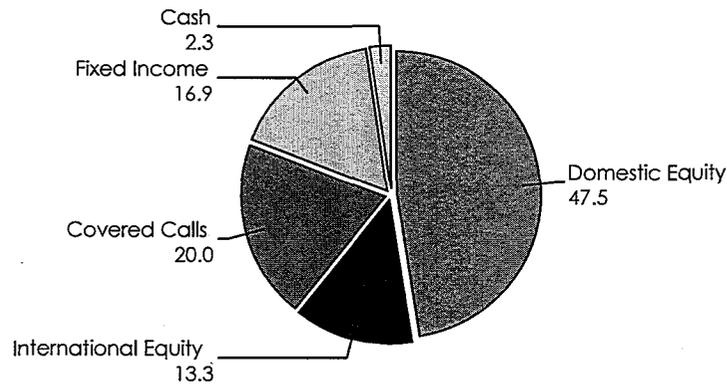
	Asset Allocation (\$000)	Asset Allocation (%)	Target Allocation* (%)	Variance (%)
OPFRS Total Plan	380,459	100.0	100.0	0.0
Domestic Equity	180,626	47.5	48.0	-0.5
International Equity	50,507	13.3	12.0	1.3
Total Fixed Income	64,217	16.9	20.0	-3.1
Covered Calls	76,220	20.0	20.0	0.0
Cash	8,888	2.3	0.0	2.3

\*Target weightings reflect the Plan's evolving asset allocation (effective 3/31/2014).

**Actual Asset Allocation Comparison**

**December 31, 2017 : \$380,457,349**

**September 30, 2017 : \$366,457,715**



## Manager Performance - Gross of Fees

As of December 31, 2017

### Domestic Equity

Manager - Style	Mkt Value (\$000)	1 Quarter	1 Year	3 Years	5 Years	Since Inception*	Inception Date
<b>Large Cap Core</b>							
Northern Trust Russell 1000 Index	76,601	6.6	21.7	11.2	15.7	14.9	06/2010
Russell 1000 Index		6.6	21.7	11.2	15.7	14.9	
Excess Return		0.0	0.0	0.0	0.0	0.0	
<b>Large Cap Value</b>							
SSgA Russell 1000 Value Index	25,165	5.4	13.8	8.8	---	9.2	11/2014
Russell 1000 Value Index		5.3	13.7	8.7	---	9.1	
Excess Return		0.1	0.1	0.1	---	0.1	
<b>Large Cap Growth</b>							
SSgA Russell 1000 Growth Index	27,648	7.9	30.1	13.8	---	13.8	11/2014
Russell 1000 Growth Index		7.9	30.2	13.8	---	13.8	
Excess Return		0.0	-0.1	0.0	---	0.0	
<b>Mid Cap Core</b>							
EARNST Partners - Active	29,427	7.8 (11)	26.2 (7)	14.2 (3)	16.6 (30)	9.9 (37)	04/2006
Russell Midcap Index		6.1	18.5	9.6	15.0	8.8	
Excess Return		1.7	7.7	4.6	1.6	1.1	
<b>Small Cap Value</b>							
NWQ - Active	9,985	5.9 (15)	13.9 (29)	10.6 (48)	15.9 (27)	8.4 (68)	02/2006
Russell 2000 Value Index		2.0	7.8	9.5	13.0	7.1	
Excess Return		3.9	6.1	1.1	2.9	1.3	
<b>Small Cap Growth</b>							
Rice Hall James	11,800	8.8 (3)	---	---	---	12.6 (31)	07/2017
Russell 2000 Growth Index		4.6	---	---	---	11.7	
Excess Return		4.2	---	---	---	1.5	

Over the latest three-month period ending December 31, 2017, All three of OPFRS's active Domestic Equity managers outperformed their respective benchmarks.

All of OPFRS's passive Domestic Equity mandates performed in-line with their respective benchmarks.

**Northern Trust**, the Plan's passive large cap core transition account, continues to perform in-line with its benchmark over all time periods measured. This performance is within expectations for a passive mandate.

**SSgA Russell 1000 Value**, the Plan's passive large cap value account, has continued to perform within expectations for a passive mandate.

## Manager Performance - Gross of Fees

As of December 31, 2017

### Domestic Equity

**SSgA Russell 1000 Growth**, the Plan's passive large cap growth account, has continued to perform within expectations for a passive mandate.

**EARNEST Partners**, the Plan's mid cap core manager, completed another strong quarter, outperforming its Russell Midcap benchmark by 1.7%. Performance continues to be especially strong over the 1-year period as the portfolio has returned 26.2%, outperforming the benchmark by 7.7%. EARNEST has also outperformed over the 3- and 5-year periods by 4.6% and 1.6%, respectively.

**NWQ**, the Plan's small cap value manager, outperformed the Russell 2000 Value Index by 3.9% over the latest quarter. Thanks in part to its strong quarter, NWQ now outperforms its benchmark over the 1-, 3-, and 5-year periods by 6.1%, 1.1%, and 2.9%, respectively.

**Rice Hall James**, the Plan's new small cap growth manager had a very strong first full quarter managing OPFRS funds, returning 8.8% over the 3-month period, outperforming the Russell 2000 Growth index by 4.2%.

## Manager Performance - Gross of Fees

As of December 31, 2017

### International Equity

Manager - Style	Mkt Value (\$000)	1 Quarter	1 Year	3 Years	5 Years	Since Inception	Inception Date
<b>Active International</b>							
Fisher Investments	17,772	2.9 (87)	29.7 (24)	9.4 (35)	8.4 (67)	5.9 (77)	04/2011
MSCI AC World ex USA		5.1	27.8	8.3	7.3	5.1	
Excess Return		-2.2	1.9	1.1	1.1	0.8	
Hansberger	17,759	6.5 (14)	38.3 (11)	12.9 (10)	9.9 (32)	5.5 (69)	02/2006
MSCI AC World ex USA		5.1	27.8	8.3	7.3	4.8	
Excess Return		1.4	10.5	4.6	2.6	0.7	
<b>Passive International</b>							
SSgA	14,976	4.2	25.5	8.2	8.2	7.9	08/2002
MSCI EAFE Index		4.3	25.6	8.3	8.4	8.0	
Excess Return		-0.1	-0.1	-0.1	-0.2	-0.1	

Over the latest three-month period ending December 31, 2017, one of OPFRS's active International Equity managers outperformed its respective benchmark.

The **SSgA** account has performed roughly in-line with its benchmark over all time periods measured. This performance is within expectations for a passive mandate.

**Hansberger**, one of OPFRS' active international equity managers, outperformed the MSCI ACWI x US Index during the quarter by 1.4%. Hansberger has had an especially impressive 12-month period, outperforming its benchmark by 10.5% with an absolute return of 38.3%. Hansberger has also outperformed over the 3- and 5-year periods by 4.6% and 2.6%, respectively.

**Fisher**, one of OPFRS' active international equity managers, underperformed the MSCI ACWI x US Index by (2.2%) during the quarter. However, over the latest 1-, 3-, and 5-year periods the fund has outperformed its benchmark by 1.9%, 1.1%, 1.1%, respectively.

## Manager Performance - Gross of Fees

As of December 31, 2017

### Fixed Income

Manager - Style	Mkt Value (\$000)	1 Quarter	1 Year	3 Years	5 Years	Since Inception	Inception Date
<b>Core Fixed Income</b>							
Ramirez	33,988	1.1 (1)	5.2 (6)	—	—	5.2 (6)	01/2017
Bloomberg Barclays U.S. Aggregate Index		0.4	3.5	—	—	3.5	
Excess Return		0.7	1.7	—	—	1.7	
<b>Core-Plus Fixed Income</b>							
Reams	22,656	0.3 (94)	3.4 (95)	2.6 (87)	2.3 (94)	5.7 (59)	02/1998
Bbg Barclays Universal (Blend)		0.4	4.1	2.8	2.5	5.1	
Excess Return		-0.1	-0.7	-0.2	-0.2	0.6	
<b>High Yield / Bank Loans</b>							
DDJ Capital	7,573	1.8 (3)	11.8 (2)	—	—	7.6 (12)	02/2015
BofA Merrill Lynch U.S. High Yield Index		0.4	7.5	—	—	6.3	
Excess Return		1.4	4.3	—	—	1.3	

Over the latest three-month period, ending December 31, 2017, two of OPFRS' three active Fixed Income managers outperformed their respective benchmarks.

**Ramirez**, the Plan's core fixed income manager, produced an excess quarterly return of 70 basis points by returning 1.1% compared to the Bbg BC US Aggregate return of 0.4%. Over its first full year managing OPFRS assets, Ramirez has returned 5.2% and outperformed its benchmark by 1.7%.

**Reams**, the Plan's core plus fixed income manager, trailed its benchmark, the Bbg BC Universal, by (10) basis points over the quarter. During the latest 1-year period, the portfolio underperformed its benchmark by (70) basis points and also underperformed over the 3-year period by (20) basis points. Reams has also underperformed by (20) basis points over the 5-year period, returning an annualized 2.3%.

**DDJ**, the Plan's High Yield & Bank Loan manager, outperformed its benchmark, the BofAML US High Yield Master II index, by 1.4% over the most recent quarter. The DDJ portfolio has returned 11.8% over the latest 1-year period, outperforming the benchmark by 4.3%, and has now earned an annualized excess return of 1.3% since its inception in early 2015.

## Manager Performance - Gross of Fees

As of December 31, 2017

### Covered Calls

Manager - Style	Mkt Value (\$000)	1 Quarter	1 Year	3 Years	5 Years	Since Inception	Inception Date
<b>Covered Calls Composite</b>							
Covered Calls	76,220	3.6	15.8	10.1	—	9.4	04/2014
CBOE BXM		2.8	13.0	8.4	—	7.5	
Excess Return		0.8	2.8	1.7	—	1.9	
<b>CC - Passive Allocation</b>							
Parametric BXM	36,873	2.9	13.5	9.3	—	8.3	04/2014
CBOE BXM		2.8	13.0	8.4	—	7.5	
Excess Return		0.1	0.5	0.9	—	0.8	
<b>CC - Active Allocation</b>							
Parametric DeltaShift	39,346	4.3	18.0	10.4	—	11.3	04/2014
CBOE BXM		2.8	13.0	8.4	—	7.5	
Excess Return		1.5	5.0	2.0	—	3.8	

During the latest three-month period ending December 31, 2017, OPFRS' aggregate Covered Calls portfolio has outperformed its benchmark over all time periods measured.

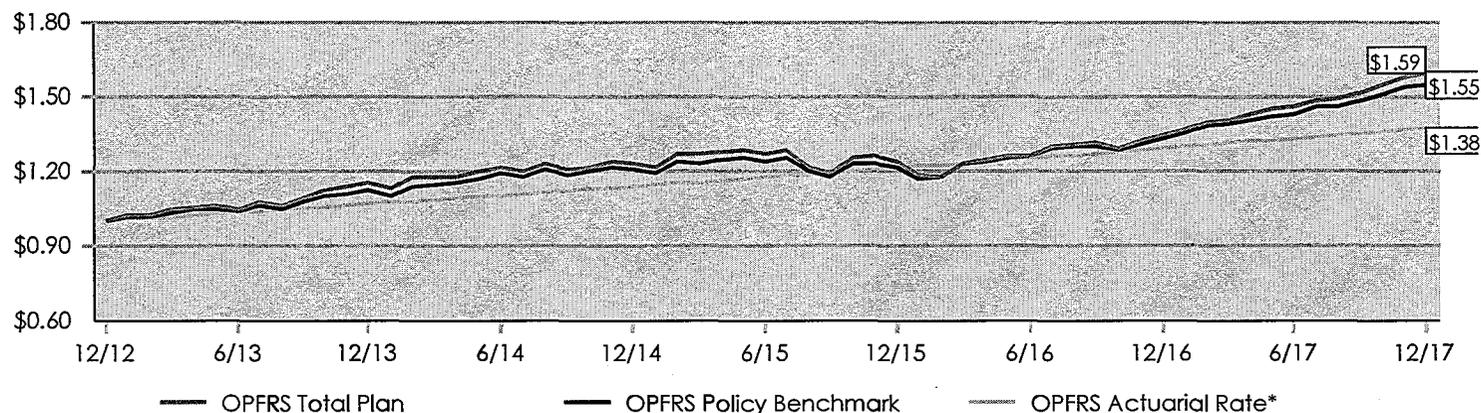
**Parametric BXM Portfolio**, the Plan's passive covered calls allocation outperformed its CBOE BXM index by 10 basis points over the most recent quarter. Over the most recent 1- and 3-year periods, the replication strategy has outperformed its benchmark by 50 and 90 basis points, respectively.

**Parametric Delta Shift Portfolio**, the Plan's active covered calls allocation has outperformed the CBOE BXM benchmark by 1.5% over the most recent quarter, and has outperformed the benchmark by 5.0% and 2.0% over the most recent 1- and 3-year periods, respectively.

# OPFRS Total Portfolio 5-Year Performance

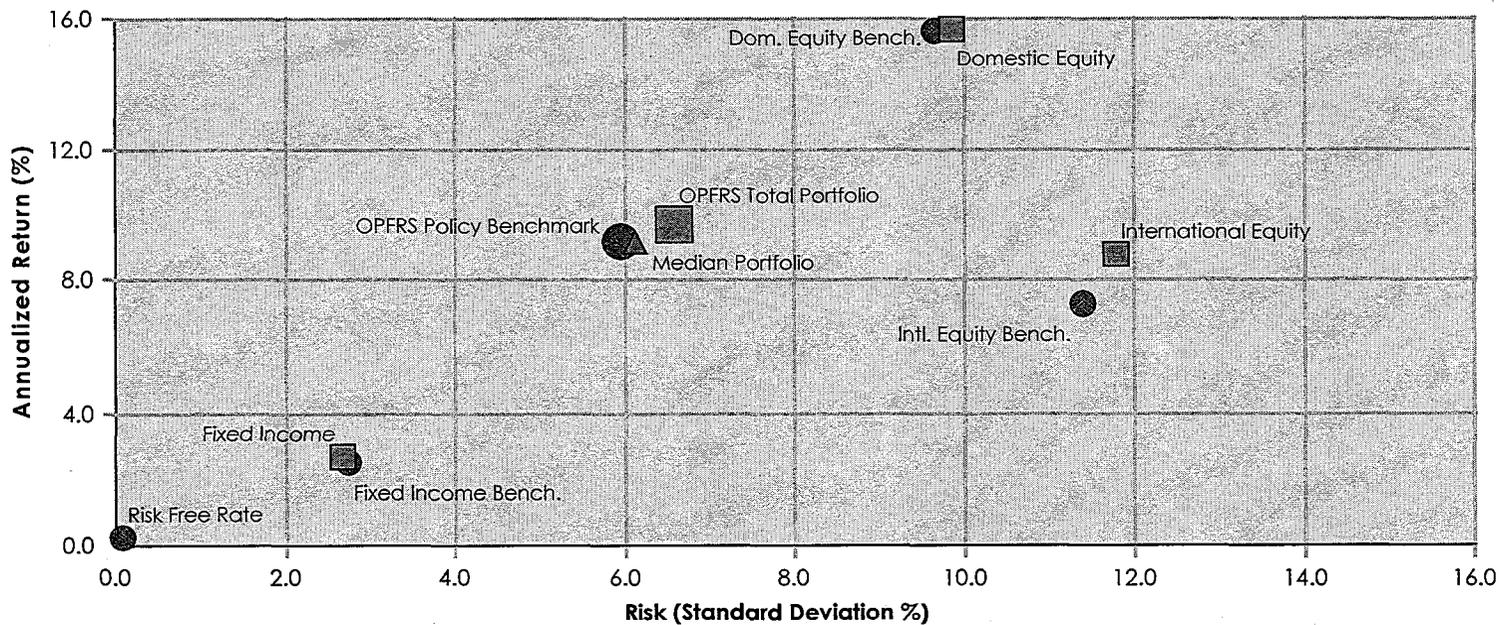
As of December 31, 2017

### Growth of \$1 (5-year)

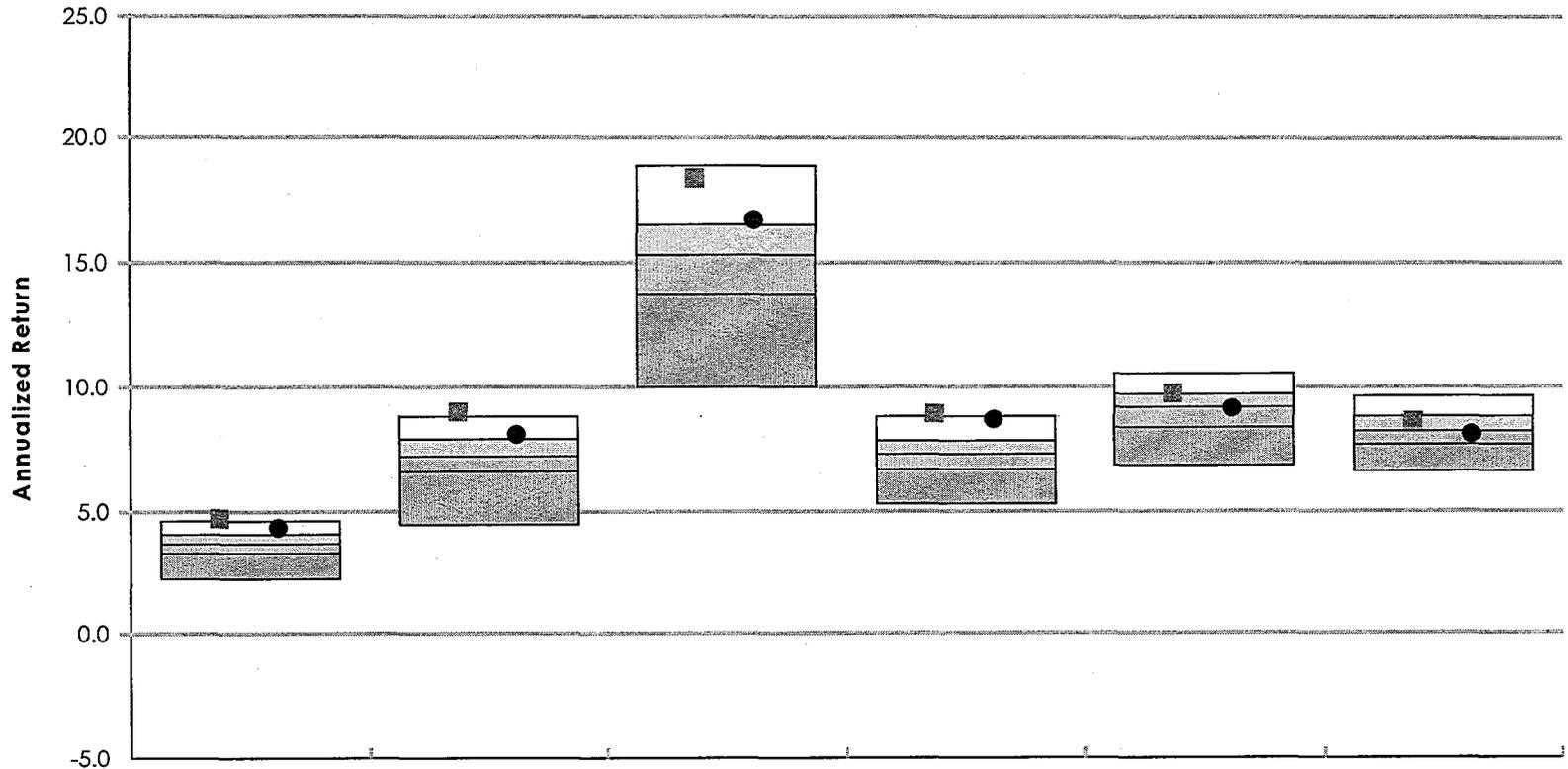


\* The actuarial expected rate of return was 8% through 6/30/2009, 7.5% through 6/30/2010, 7% through 6/30/2011, 6.75% through 6/30/2014, and 6.5% currently

### Risk/Return Performance (5-year)



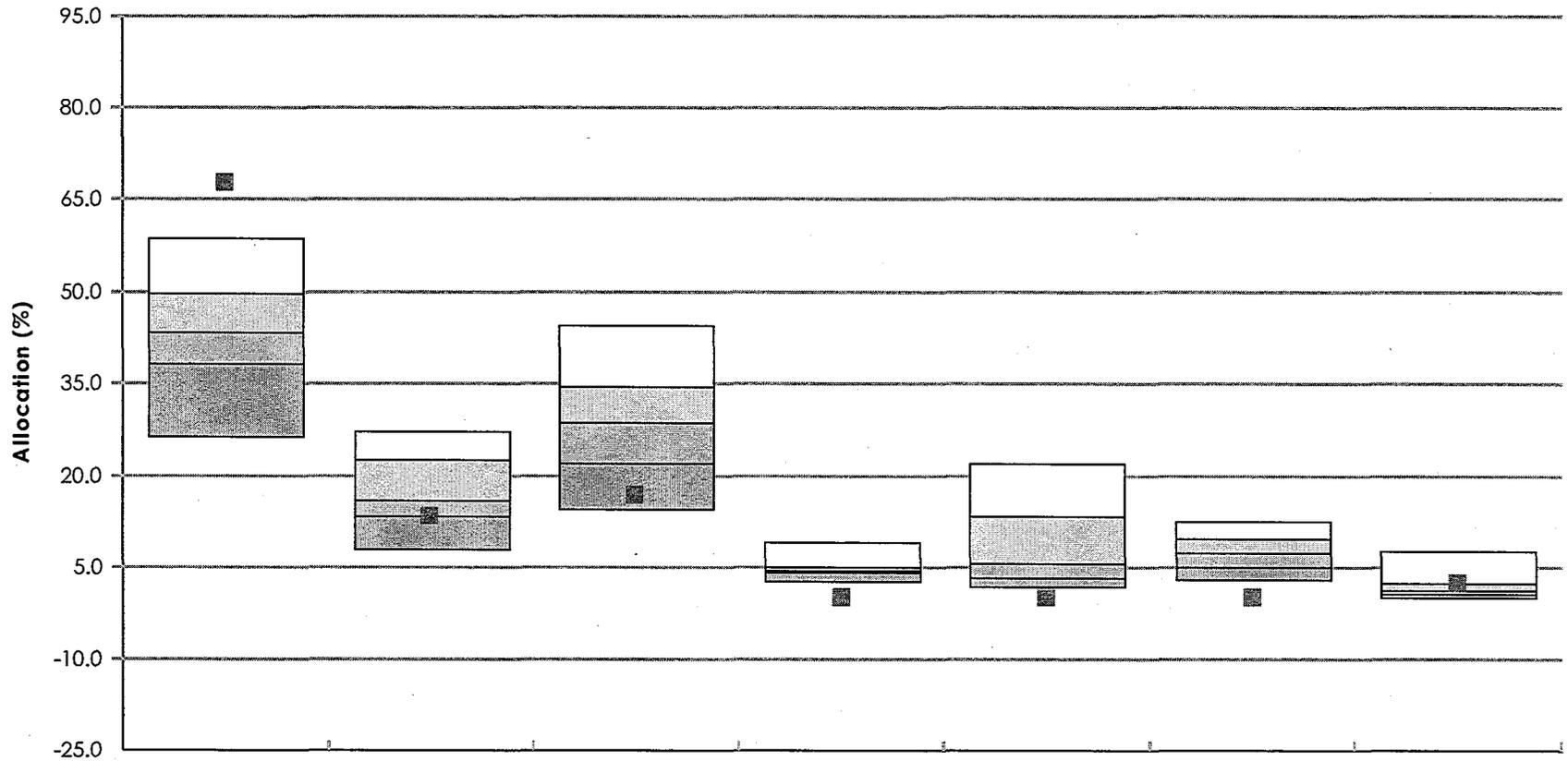
**Plan Sponsor Peer Group Analysis**  
**As of December 31, 2017**



	1 Quarter	Fiscal YTD	1 Year	3 Years	5 Years	7 Years
■ OPFRS Total Plan	<b>4.7 (5)</b>	<b>9.0 (4)</b>	<b>18.4 (7)</b>	<b>8.9 (5)</b>	<b>9.7 (26)</b>	<b>8.6 (37)</b>
● OPFRS Policy Benchmark	4.3 (15)	8.1 (18)	16.7 (20)	8.6 (8)	9.2 (52)	8.0 (61)
5th Percentile	4.6	8.8	18.9	8.8	10.6	9.6
1st Quartile	4.0	7.9	16.5	7.9	9.7	8.8
Median	3.7	7.2	15.3	7.3	9.2	8.2
3rd Quartile	3.3	6.6	13.8	6.7	8.3	7.7
95th Percentile	2.2	4.5	10.0	5.3	6.8	6.6
Population	453	453	448	432	418	403

Parentheses contain percentile rankings.  
 Calculation based on monthly periodicity.

**Plan Sponsor TF Asset Allocation  
As of December 31, 2017**



	US Equity	Intl. Equity	US Fixed Income	Intl. Fixed Income	Alternative Inv.	Real Estate	Cash
<b>■ OPFRS Total Plan</b>	<b>67.5 (2)</b>	<b>13.3 (76)</b>	<b>16.9 (92)</b>	<b>0.0</b>	<b>0.0 (100)</b>	<b>0.0</b>	<b>2.3 (24)</b>
5th Percentile	58.8	27.2	44.6	9.2	22.1	12.6	7.7
1st Quartile	49.7	22.5	34.3	5.1	13.4	9.8	2.3
Median	43.3	15.9	28.7	4.5	5.5	7.2	1.3
3rd Quartile	38.3	13.3	21.9	4.1	3.3	4.9	0.7
95th Percentile	26.4	8.0	14.6	2.6	1.7	2.9	0.1
Population	485	458	482	127	114	296	433

**Monitoring/Probation Status**

**As of December 31, 2017**  
**Return vs. Benchmark since Corrective Action**

Portfolio	Status	Concern	Months Since Corrective Action	Performance <sup>^</sup> Since Corrective Action	Date of Corrective Action*
Reams	On Watch	Organizational	7	1.1%	5/31/2017
BBG BC Universal (Blend)	—	—	7	1.3%	—
Hansberger	On Watch	Organizational	1	15.8%	11/30/2017
MSCI ACWI ex-USA			1	12.0%	

<sup>^</sup> Annualized performance if over one year.

\* Approximate date based on when Board voted to either monitor a manager at a heightened level or place it on probation.

**Investment Performance Criteria**  
**For Manager Monitoring/Probation Status**

Asset Class	Short-term (rolling 12 mth periods)	Medium-term (rolling 36 mth periods)	Long-term (60 + months)
<b>Active Domestic Equity</b>	Fd return < bench return – 3.5%	Fd annlzd return < bench annlzd return – 1.75% for 6 consecutive months	VRR < 0.97 for 6 consecutive months
<b>Active International Equity</b>	Fd return < bench return – 4.5%	Fd annlzd return < bench annlzd return – 2.0% for 6 consecutive months	VRR < 0.97 for 6 consecutive months
<b>Passive International Equity</b>	Tracking Error > 0.50%	Tracking Error > 0.45% for 6 consecutive months	Fd annlzd return < bench annlzd return – 0.40% for 6 consecutive months
<b>Fixed Income</b>	Fd return < bench return – 1.5%	Fd annlzd return < bench annlzd return – 1.0% for 6 consecutive months	VRR < 0.98 for 6 consecutive months

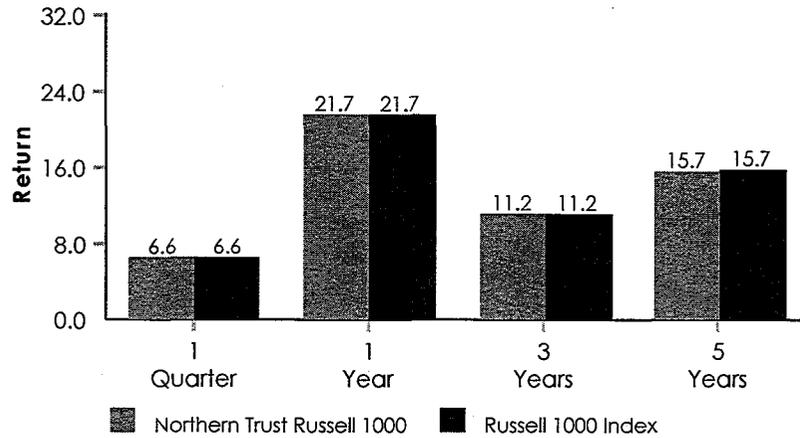
VRR – Value Relative Ratio – is calculated as: manager cumulative return / benchmark cumulative return.

# Northern Trust Russell 1000 - gross of fees

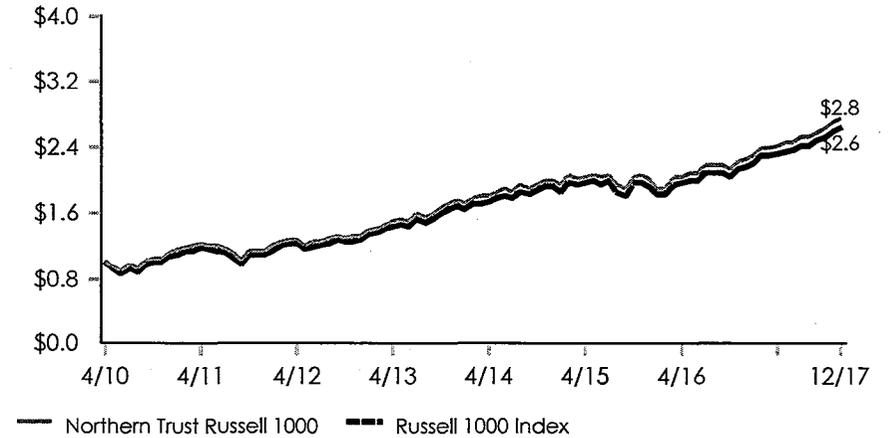
As of December 31, 2017

	Alpha	Beta	Information Ratio	Sharpe Ratio	Tracking Error	R-Squared	Up Market Capture	Down Market Capture	Inception Date
Northern Trust Russell 1000	1.04	0.96	0.35	1.18	1.44	0.99	99.50	93.97	05/01/2010
Russell 1000 Index	0.00	1.00	-	1.10	0.00	1.00	100.00	100.00	05/01/2010

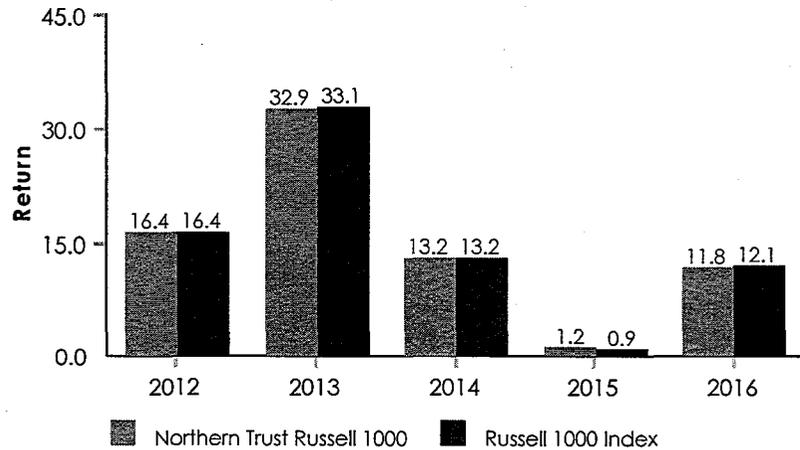
## Trailing Period Performance



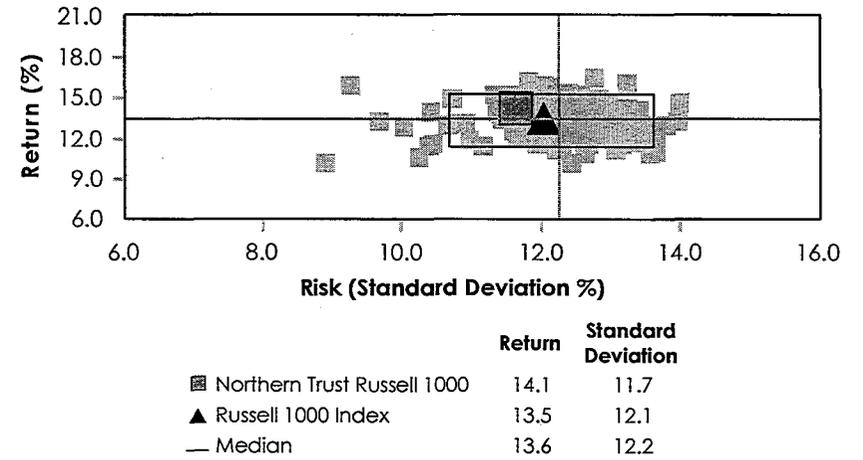
## Growth of \$1 - Since Inception



## Calendar Year Performance



## Risk/Return - Since Inception

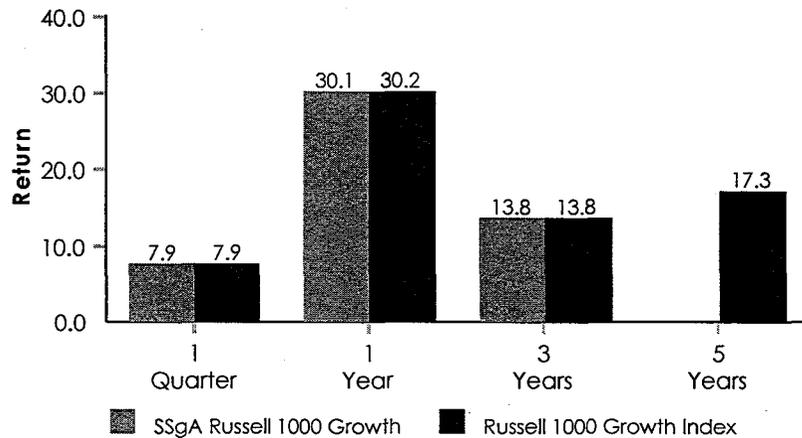


# SSgA Russell 1000 Growth - gross of fees

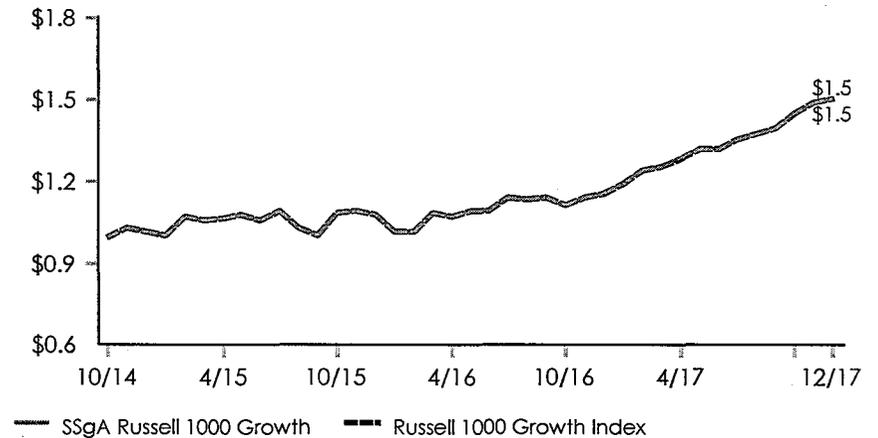
As of December 31, 2017

	Alpha	Beta	Information Ratio	Sharpe Ratio	Tracking Error	R-Squared	Up Market Capture	Down Market Capture	Inception Date
SSgA Russell 1000 Growth	0.01	1.00	0.20	1.27	0.04	1.00	100.02	99.96	11/01/2014
Russell 1000 Growth Index	0.00	1.00	-	1.27	0.00	1.00	100.00	100.00	11/01/2014

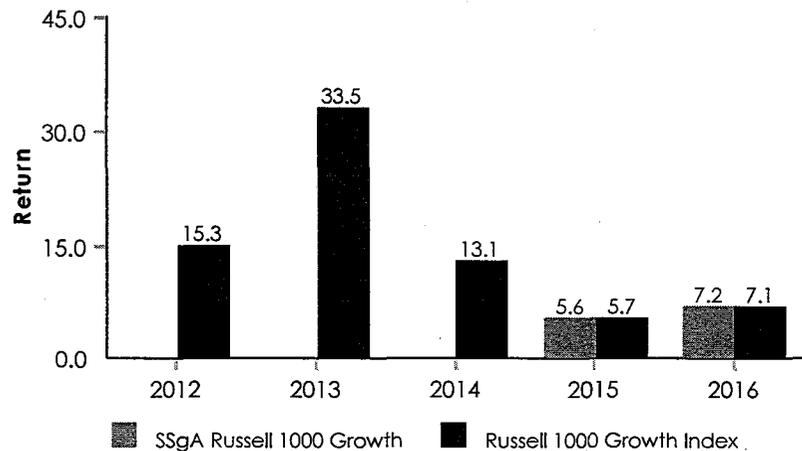
## Trailing Period Performance



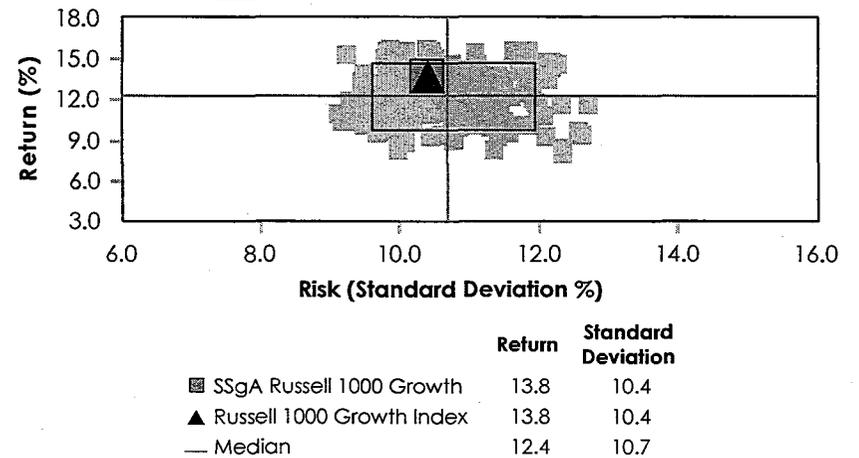
## Growth of \$1 - Since Inception



## Calendar Year Performance



## Risk/Return - Since Inception

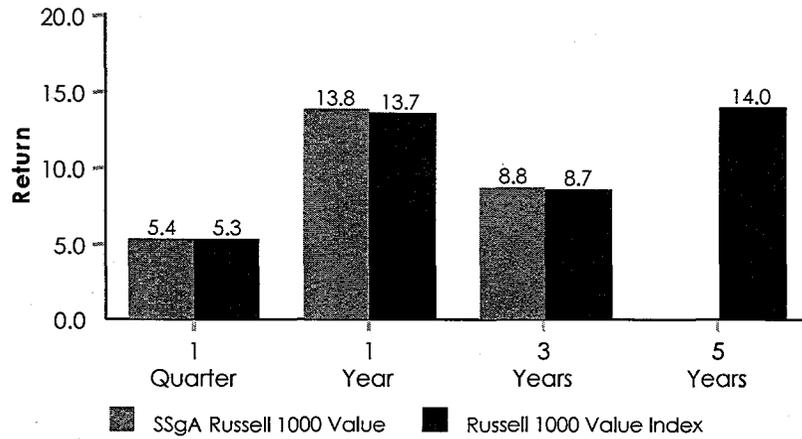


# SSgA Russell 1000 Value - gross of fees

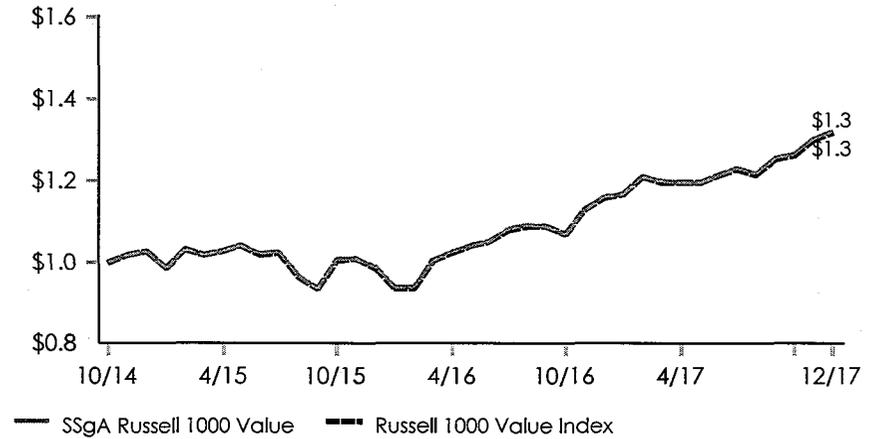
As of December 31, 2017

	Alpha	Beta	Information Ratio	Sharpe Ratio	Tracking Error	R-Squared	Up Market Capture	Down Market Capture	Inception Date
SSgA Russell 1000 Value	0.12	1.00	1.51	0.90	0.07	1.00	100.25	99.31	11/01/2014
Russell 1000 Value Index	0.00	1.00	-	0.89	0.00	1.00	100.00	100.00	11/01/2014

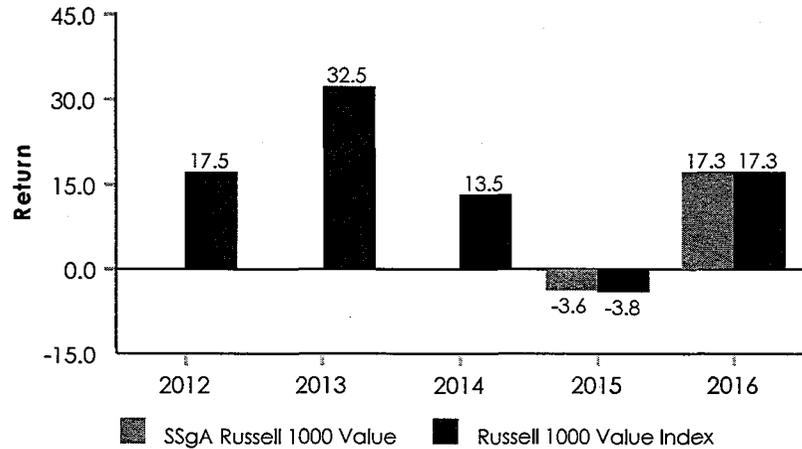
## Trailing Period Performance



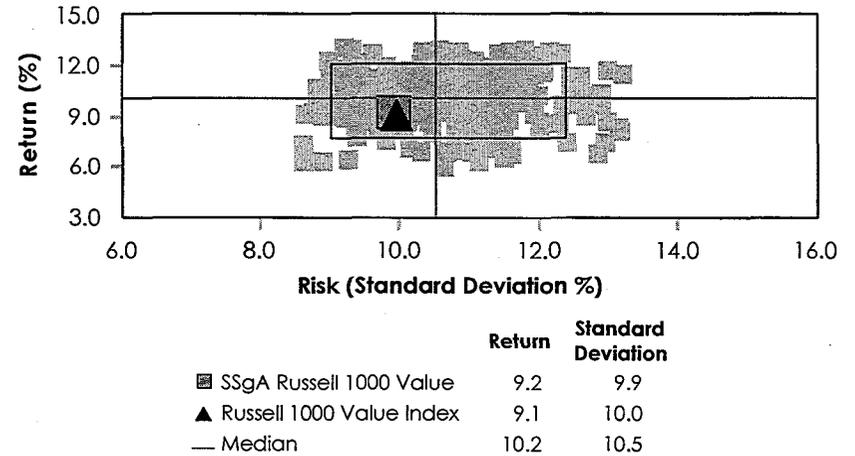
## Growth of \$1 - Since Inception



## Calendar Year Performance



## Risk/Return - Since Inception

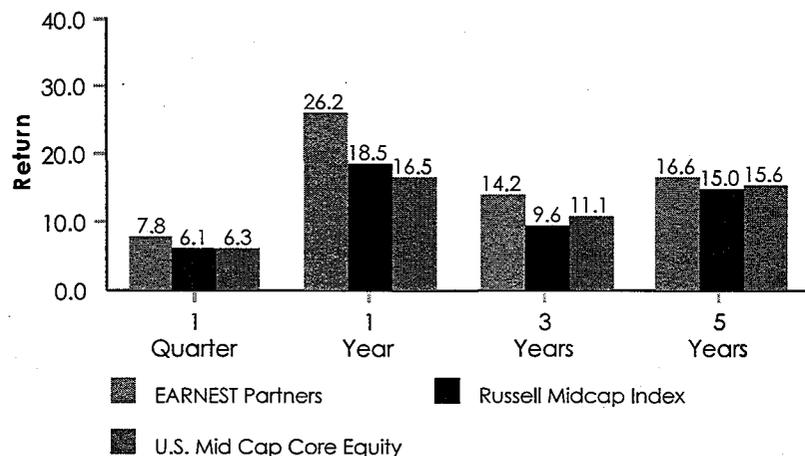


# EARNEST Partners - gross of fees

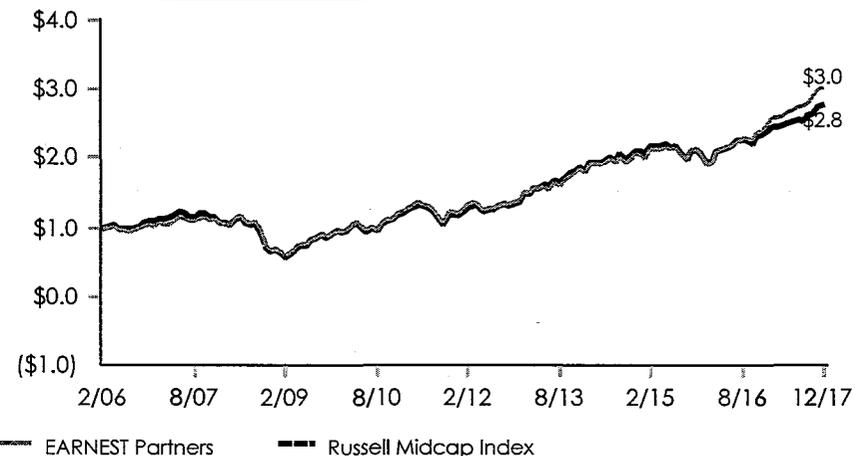
As of December 31, 2017

	Alpha	Beta	Information Ratio	Sharpe Ratio	Tracking Error	R-Squared	Up Market Capture	Down Market Capture	Inception Date
EARNEST Partners	0.90	0.99	0.24	0.58	3.45	0.96	100.00	95.06	03/01/2006
Russell Midcap Index	0.00	1.00	-	0.54	0.00	1.00	100.00	100.00	03/01/2006
U.S. Mid Cap Core Equity Median	-	-	-	-	-	-	-	-	-

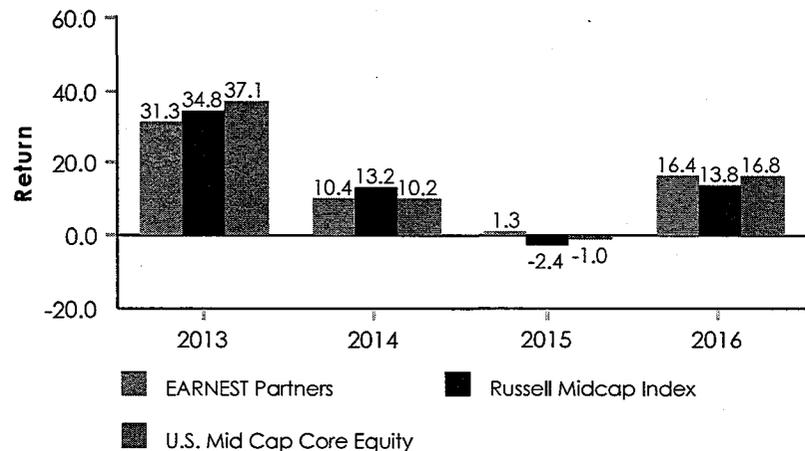
## Trailing Period Performance



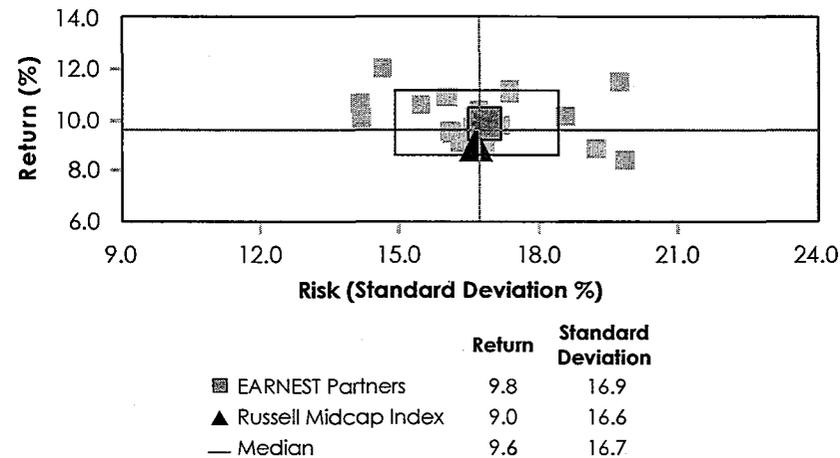
## Growth of \$1 - Since Inception



## Calendar Year Performance



## Risk/Return - Since Inception



# NWQ - gross of fees

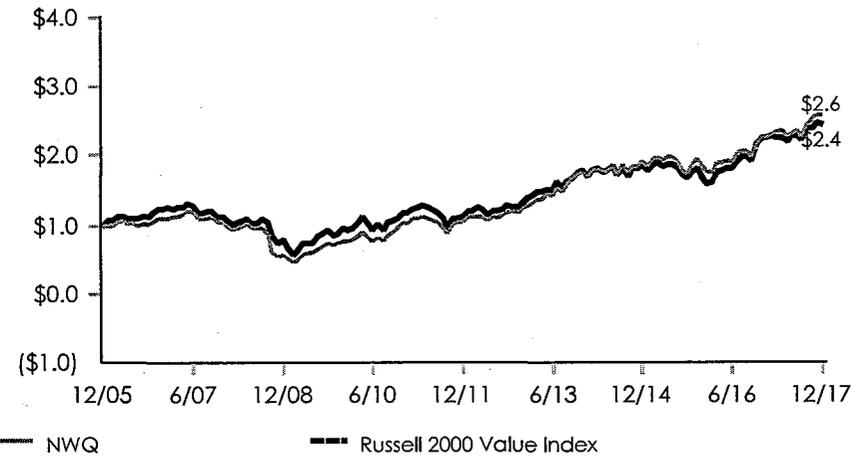
As of December 31, 2017

	Alpha	Beta	Information Ratio	Sharpe Ratio	Tracking Error	R-Squared	Up Market Capture	Down Market Capture	Inception Date
NWQ	0.78	1.01	0.12	0.45	7.07	0.88	102.52	99.43	01/01/2006
Russell 2000 Value Index	0.00	1.00	-	0.43	0.00	1.00	100.00	100.00	01/01/2006
U.S. Small Cap Value Equity Median	-	-	-	-	-	-	-	-	-

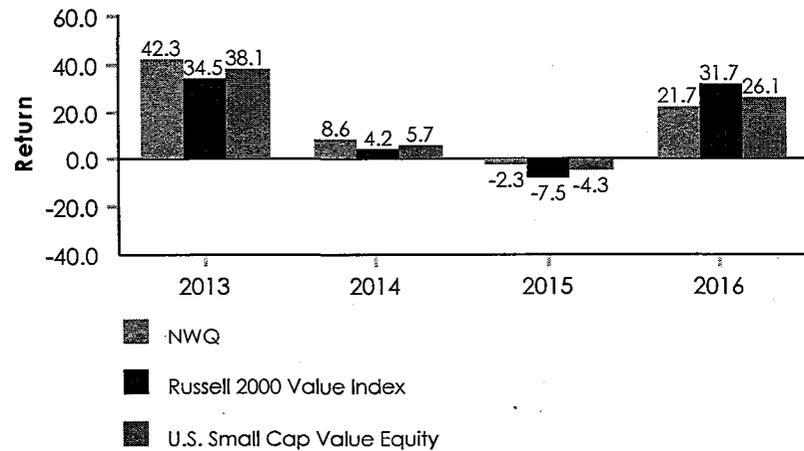
## Trailing Period Performance



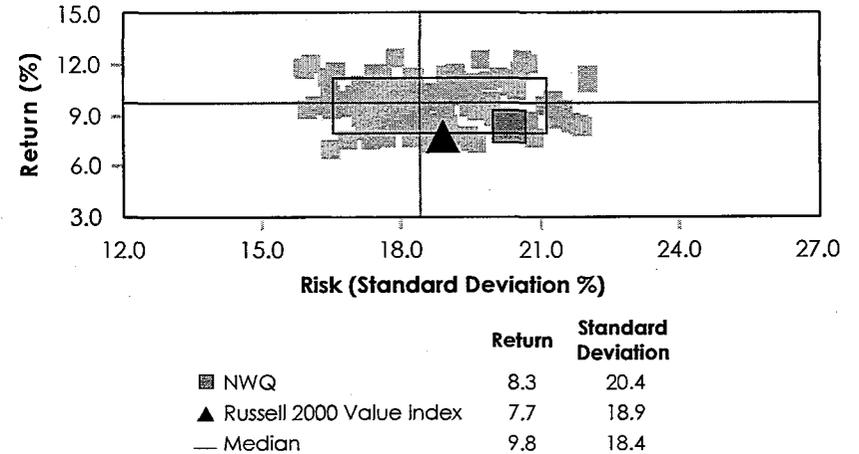
## Growth of \$1 - Since Inception



## Calendar Year Performance



## Risk/Return - Since Inception

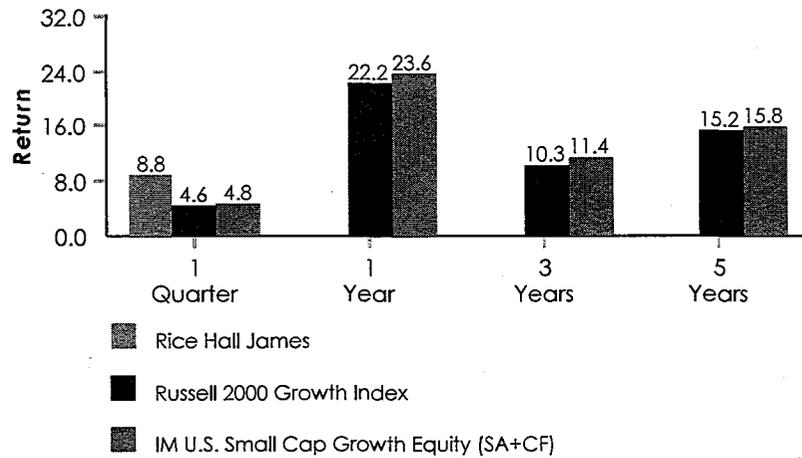


# Rice Hall James - gross of fees

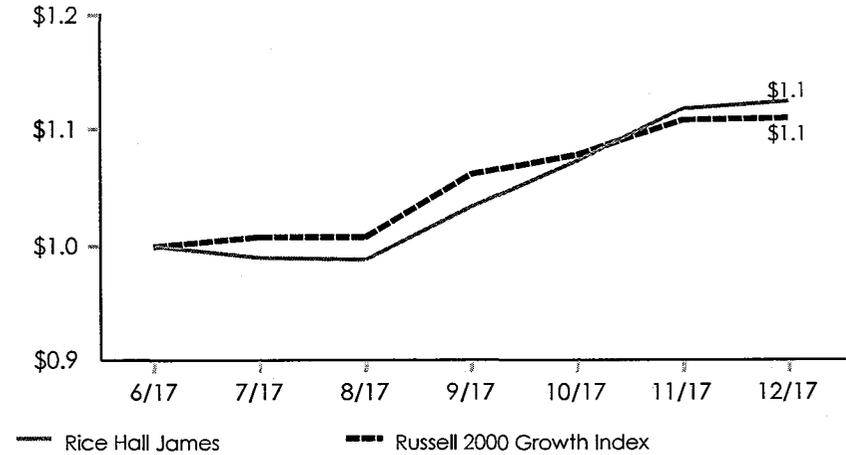
As of December 31, 2017

	Alpha	Beta	Information Ratio	Sharpe Ratio	Tracking Error	R-Squared	Up Market Capture	Down Market Capture	Inception Date
Rice Hall James	0.26	0.99	0.18	0.84	1.32	0.67	114.21	204.88	07/01/2017
Russell 2000 Growth Index	0.00	1.00	-	0.89	0.00	1.00	100.00	100.00	07/01/2017
IM U.S. Small Cap Growth Equity (SA+CF) Median	-	-	-	-	-	-	-	-	-

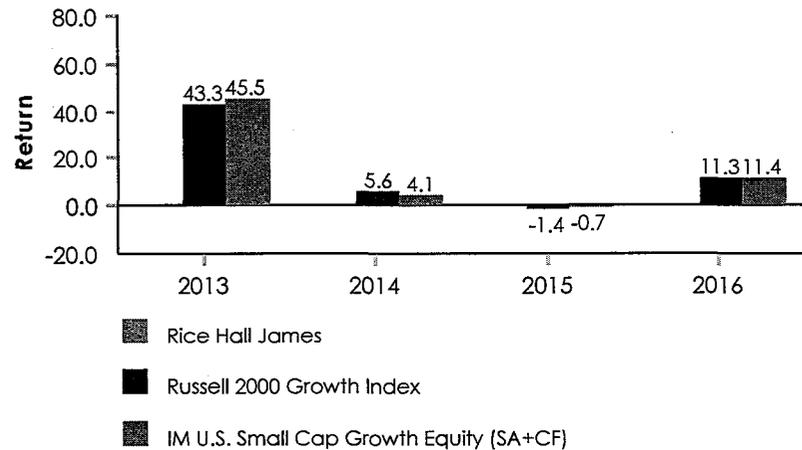
## Trailing Period Performance



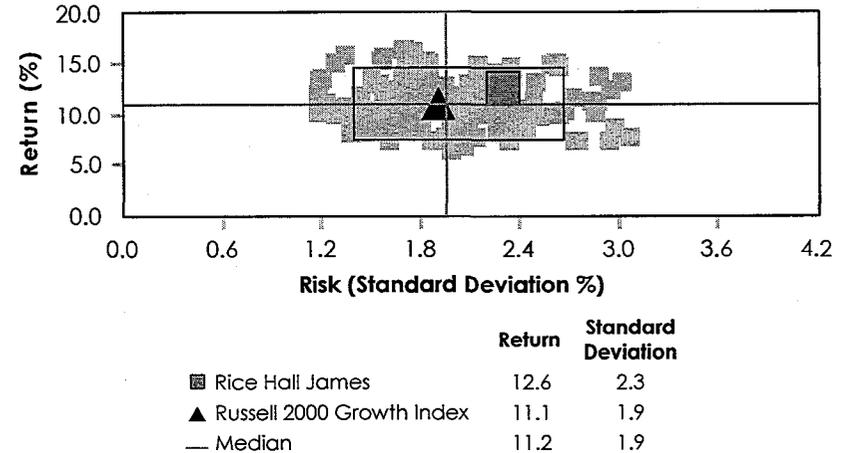
## Growth of \$1 - Since Inception



## Calendar Year Performance



## Risk/Return - Since Inception

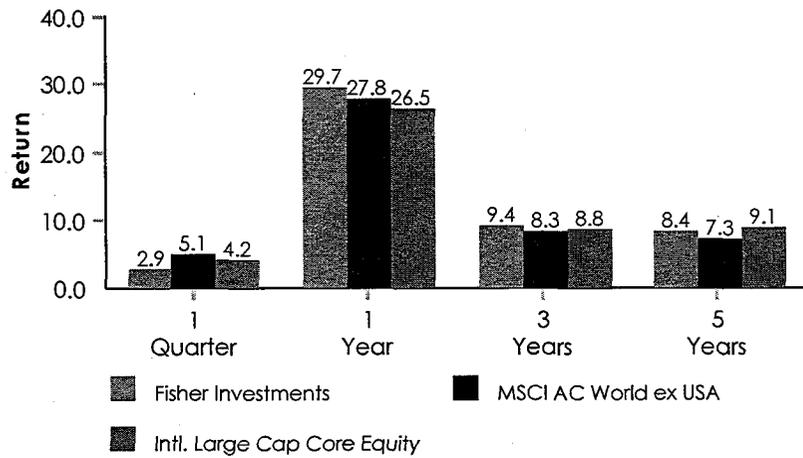


# Fisher Investments - gross of fees

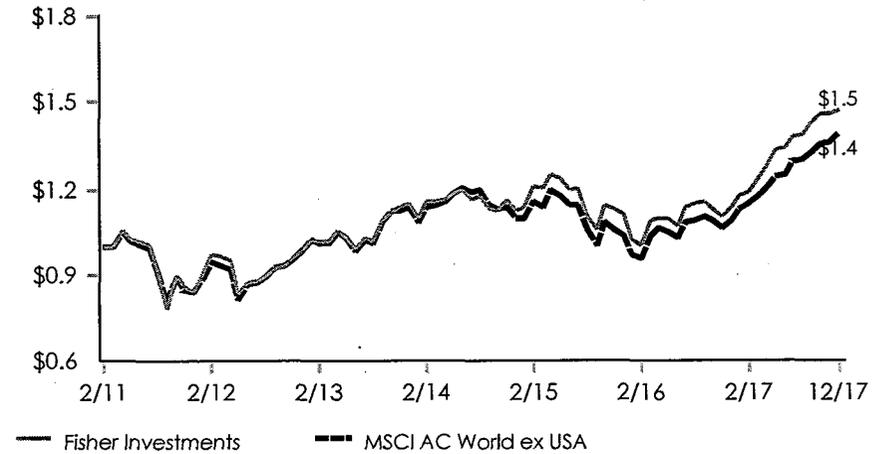
As of December 31, 2017

	Alpha	Beta	Information Ratio	Sharpe Ratio	Tracking Error	R-Squared	Up Market Capture	Down Market Capture	Inception Date
Fisher Investments	0.55	1.09	0.29	0.43	3.62	0.95	106.59	102.24	03/01/2011
MSCI AC World ex USA	0.00	1.00	-	0.41	0.00	1.00	100.00	100.00	03/01/2011
Intl. Large Cap Core Equity Median	-	-	-	-	-	-	-	-	-

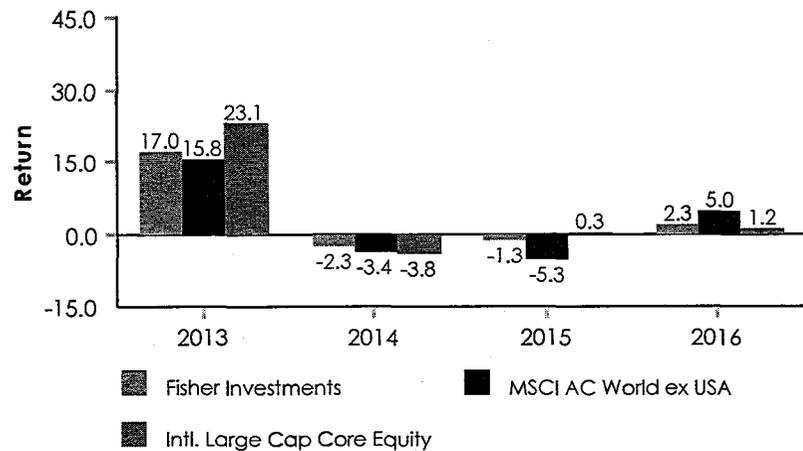
## Trailing Period Performance



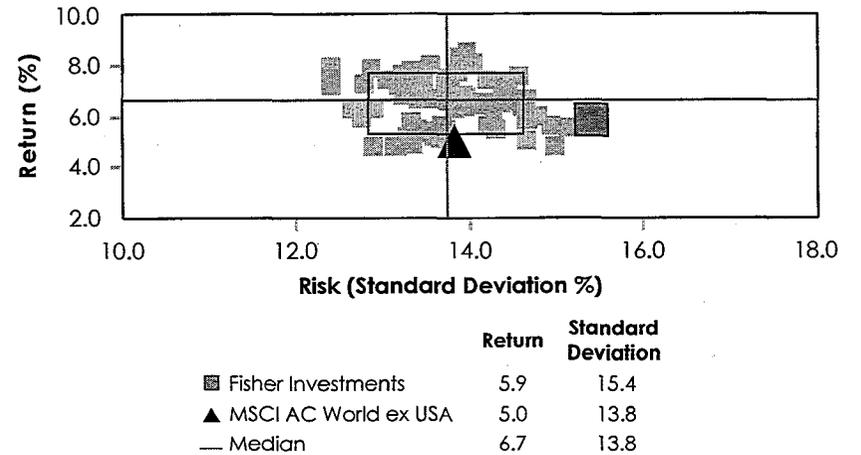
## Growth of \$1 - Since Inception



## Calendar Year Performance



## Risk/Return - Since Inception

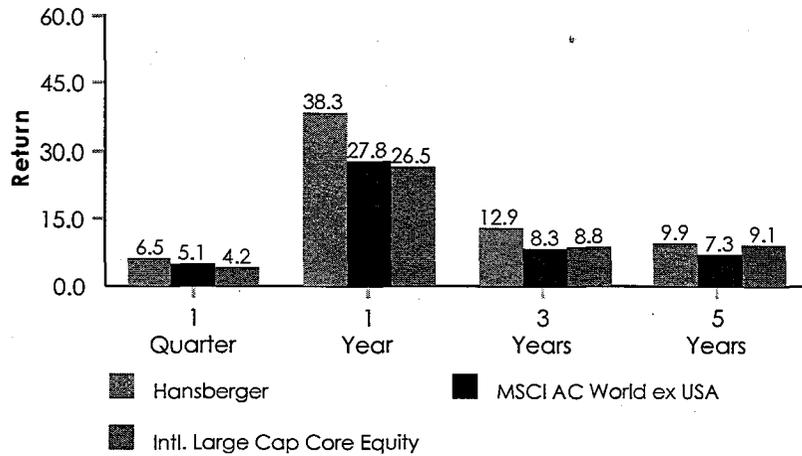


# Hansberger - gross of fees

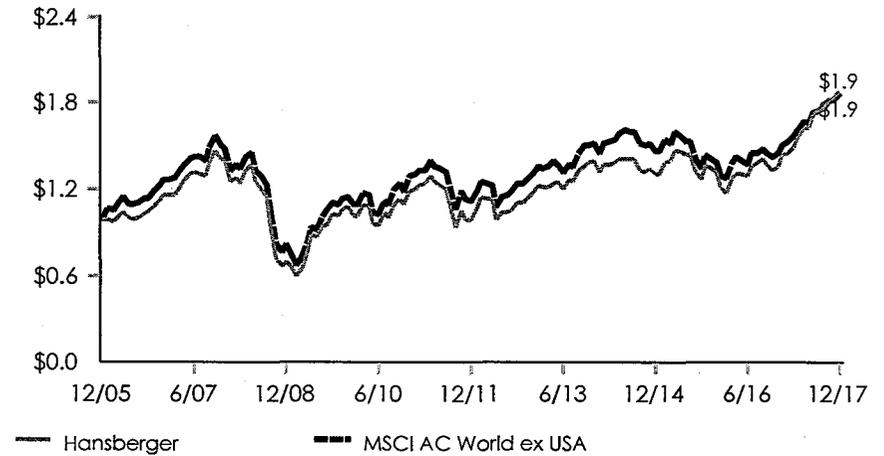
As of December 31, 2017

	Alpha	Beta	Information Ratio	Sharpe Ratio	Tracking Error	R-Squared	Up Market Capture	Down Market Capture	Inception Date
Hansberger	-0.09	1.08	0.10	0.32	4.48	0.95	105.23	104.83	01/01/2006
MSCI AC World ex USA	0.00	1.00	-	0.33	0.00	1.00	100.00	100.00	01/01/2006
Intl. Large Cap Core Equity Median	-	-	-	-	-	-	-	-	-

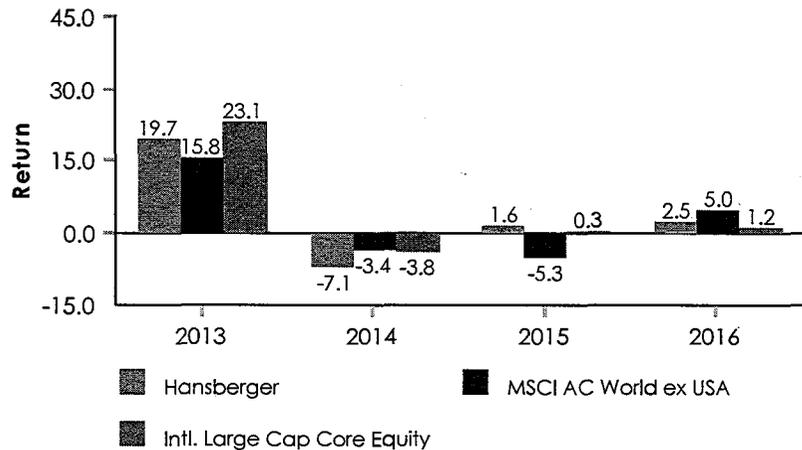
## Trailing Period Performance



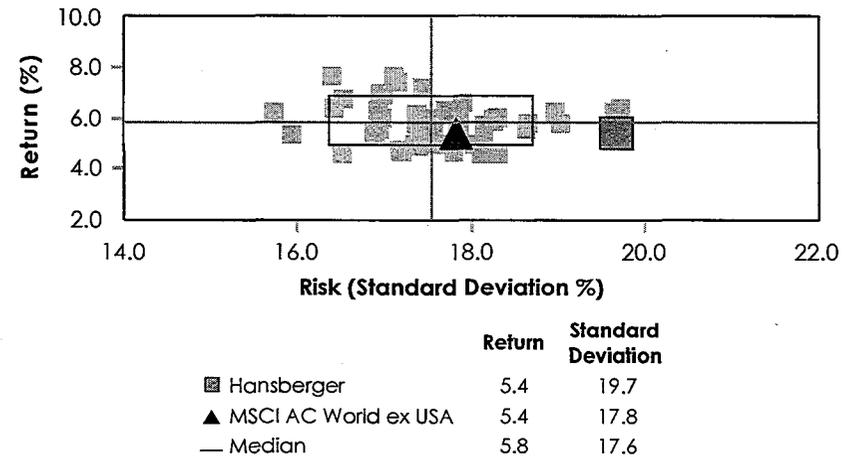
## Growth of \$1 - Since Inception



## Calendar Year Performance



## Risk/Return - Since Inception

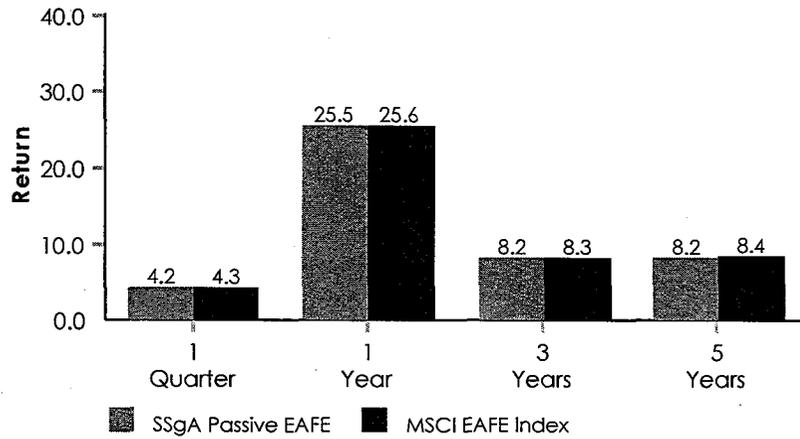


# SSgA Passive EAFE - gross of fees

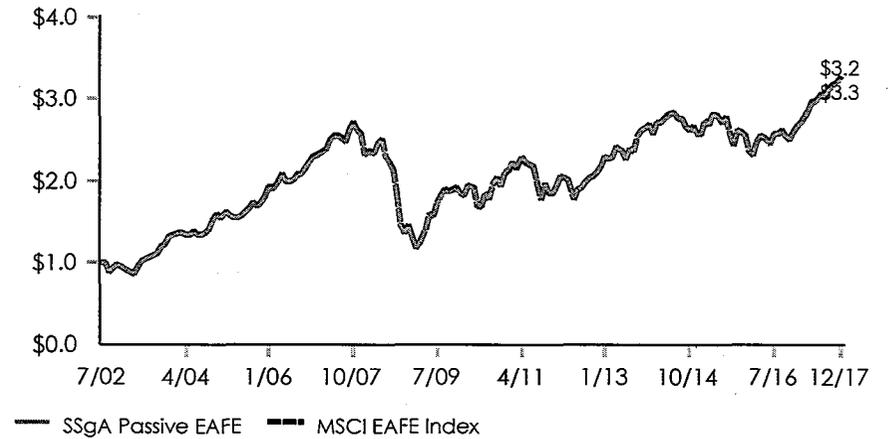
As of December 31, 2017

	Alpha	Beta	Information Ratio	Sharpe Ratio	Tracking Error	R-Squared	Up Market Capture	Down Market Capture	Inception Date
SSgA Passive EAFE	0.01	0.99	-0.14	0.48	0.45	1.00	99.27	99.24	08/01/2002
MSCI EAFE Index	0.00	1.00	-	0.48	0.00	1.00	100.00	100.00	08/01/2002

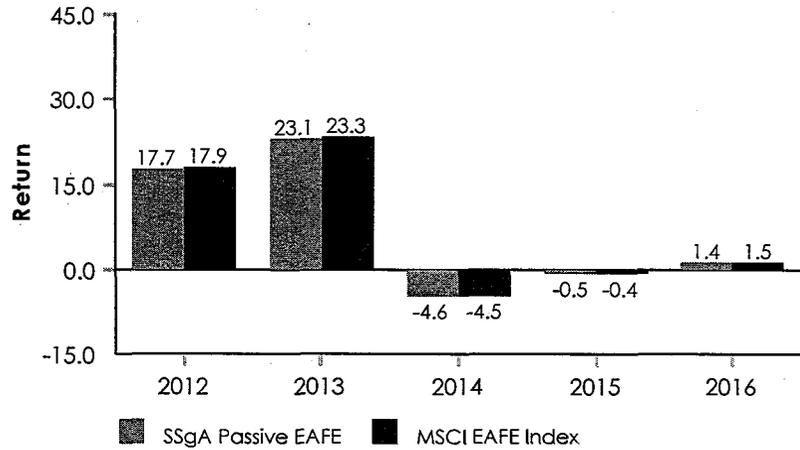
## Trailing Period Performance



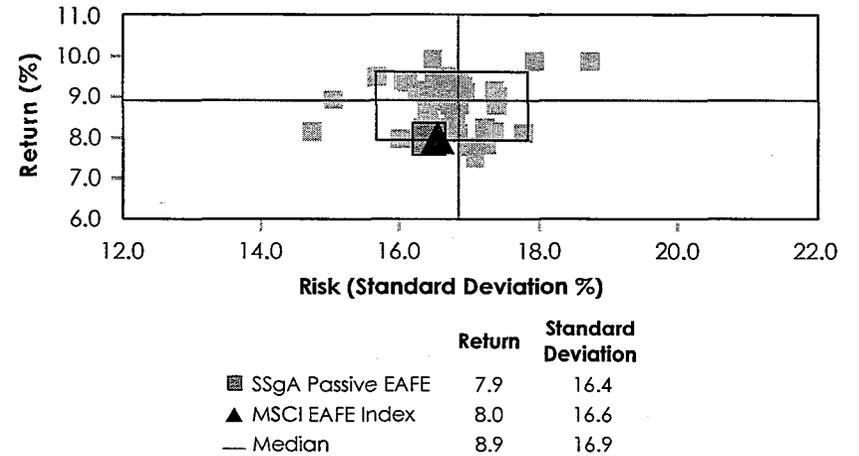
## Growth of \$1 - Since Inception



## Calendar Year Performance



## Risk/Return - Since Inception

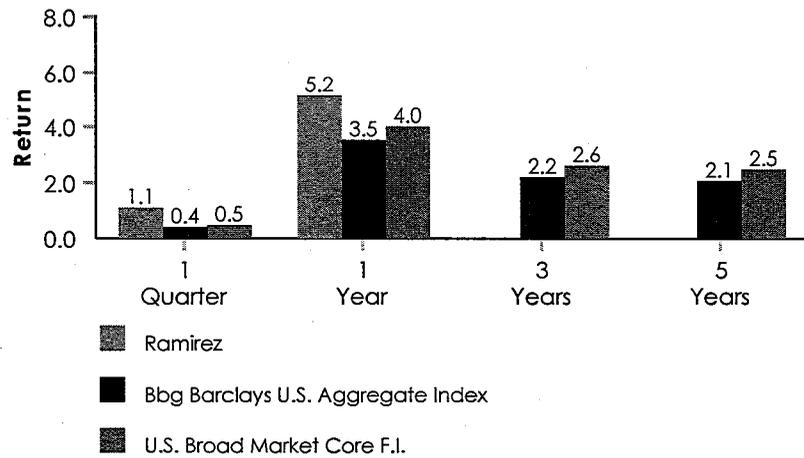


# Ramirez - gross of fees

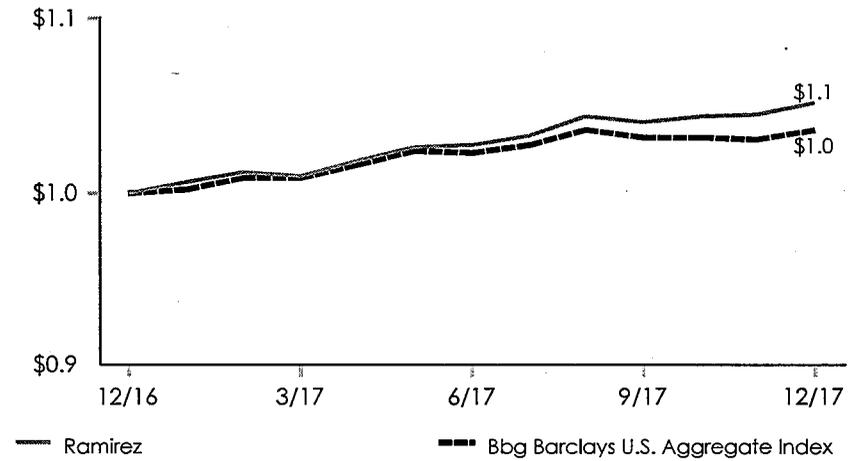
As of December 31, 2017

	Alpha	Beta	Information Ratio	Sharpe Ratio	Tracking Error	R-Squared	Up Market Capture	Down Market Capture	Inception Date
Ramirez	1.81	0.93	3.04	2.91	0.51	0.88	126.65	45.48	01/01/2017
Bbg Barclays U.S. Aggregate Index	0.00	1.00	-	1.81	0.00	1.00	100.00	100.00	01/01/2017
U.S. Broad Market Core F.I. Median	-	-	-	-	-	-	-	-	-

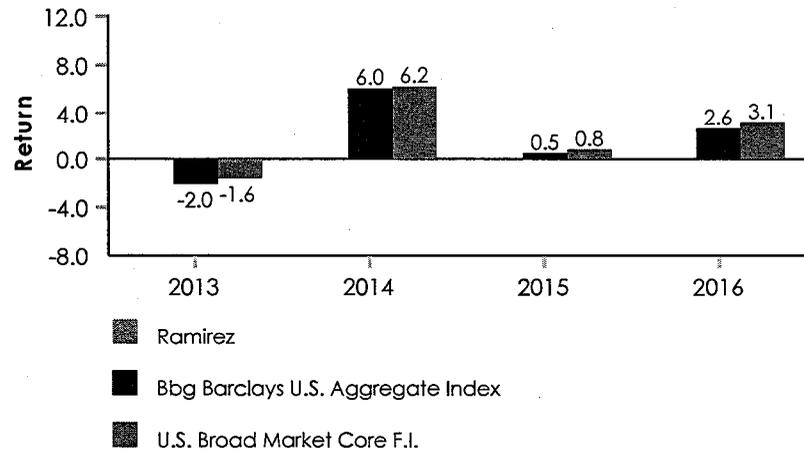
## Trailing Period Performance



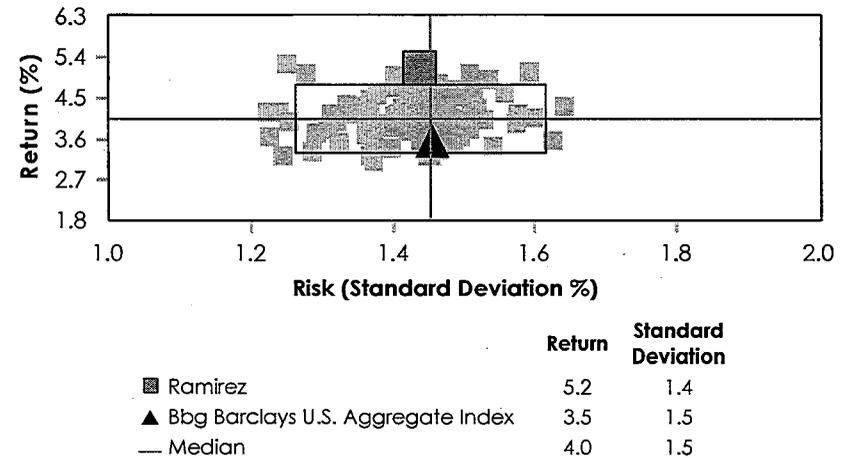
## Growth of \$1 - Since Inception



## Calendar Year Performance



## Risk/Return - Since Inception

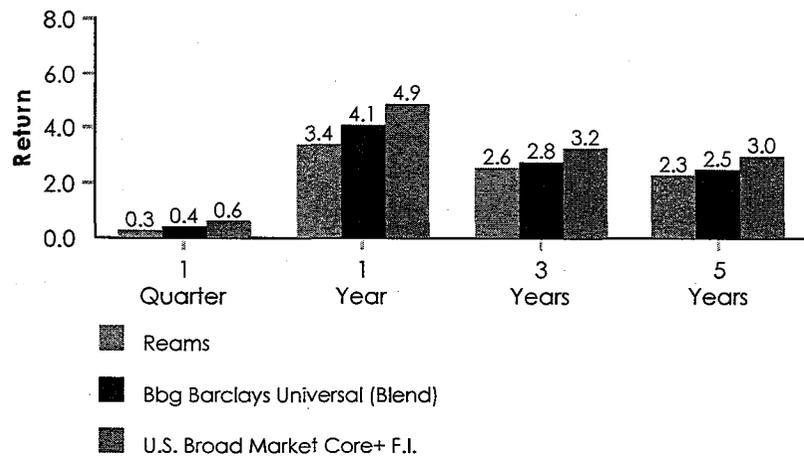


# Reams - gross of fees

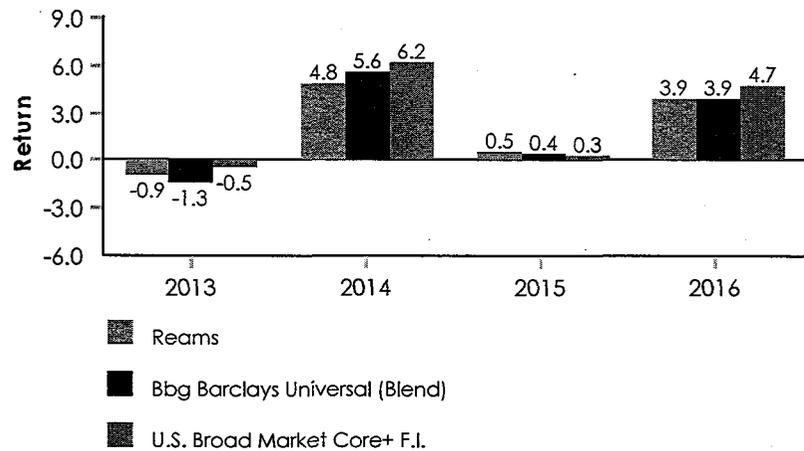
As of December 31, 2017

	Alpha	Beta	Information Ratio	Sharpe Ratio	Tracking Error	R-Squared	Up Market Capture	Down Market Capture	Inception Date
Reams	0.27	1.06	0.14	0.68	4.09	0.43	108.77	104.11	01/01/1998
Bbg Barclays Universal (Blend)	0.00	1.00	-	0.93	0.00	1.00	100.00	100.00	01/01/1998
U.S. Broad Market Core+ F.I. Median	-	-	-	-	-	-	-	-	-

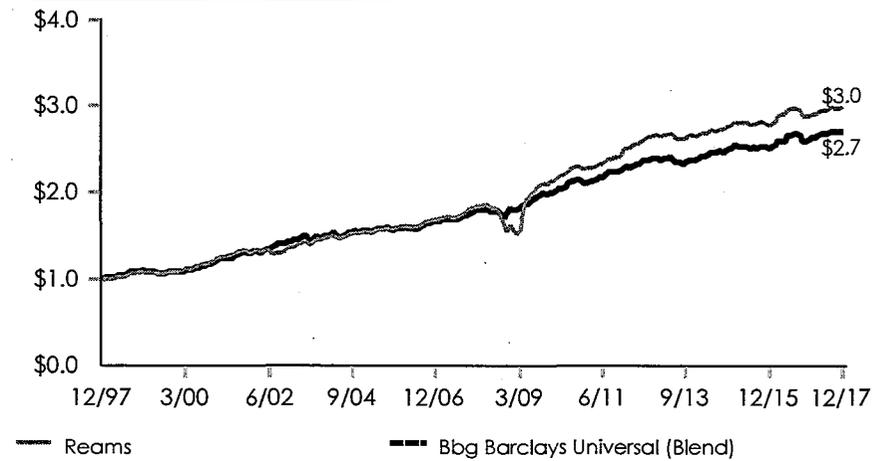
## Trailing Period Performance



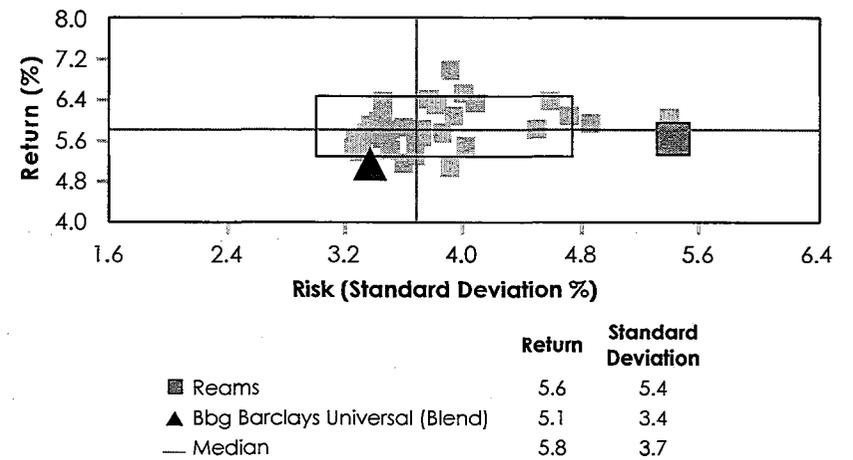
## Calendar Year Performance



## Growth of \$1 - Since Inception



## Risk/Return - Since Inception

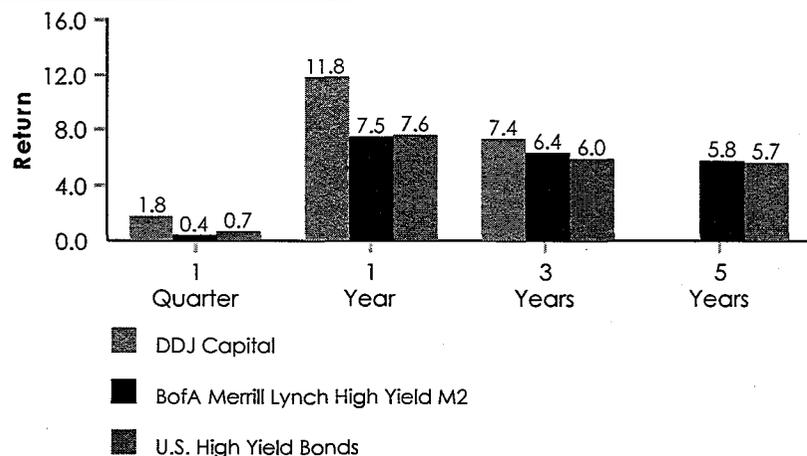


# DDJ Capital - gross of fees

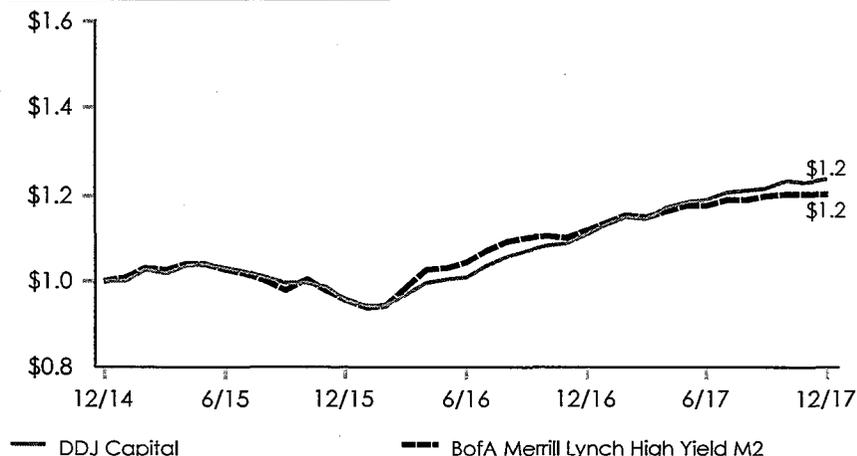
As of December 31, 2017

	Alpha	Beta	Information Ratio	Sharpe Ratio	Tracking Error	R-Squared	Up Market Capture	Down Market Capture	Inception Date
DDJ Capital	2.71	0.72	0.31	1.47	2.89	0.73	97.03	74.06	01/01/2015
BofA Merrill Lynch High Yield M2	0.00	1.00	-	1.07	0.00	1.00	100.00	100.00	01/01/2015
U.S. High Yield Bonds Median	-	-	-	-	-	-	-	-	-

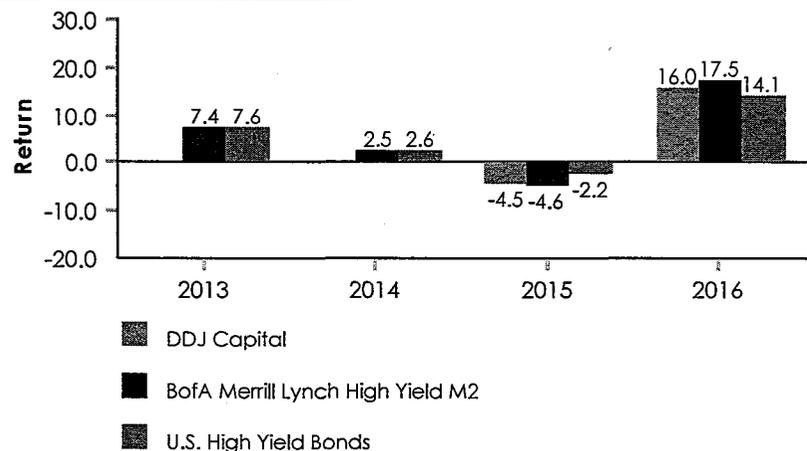
## Trailing Period Performance



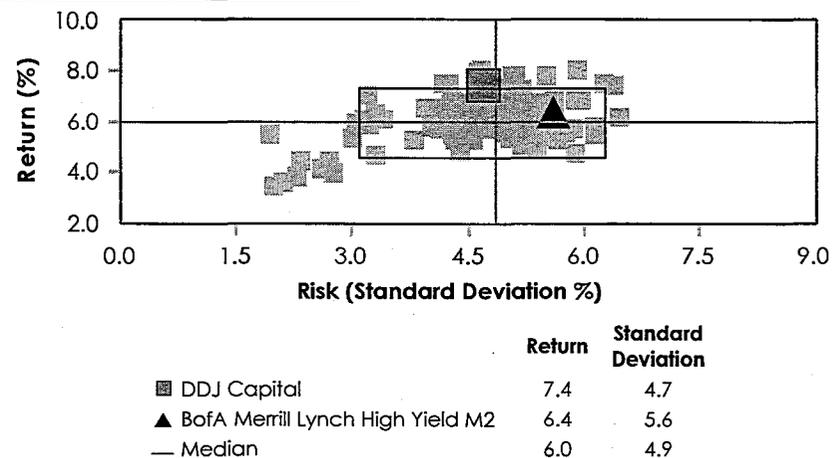
## Growth of \$1 - Since Inception



## Calendar Year Performance



## Risk/Return - Since Inception

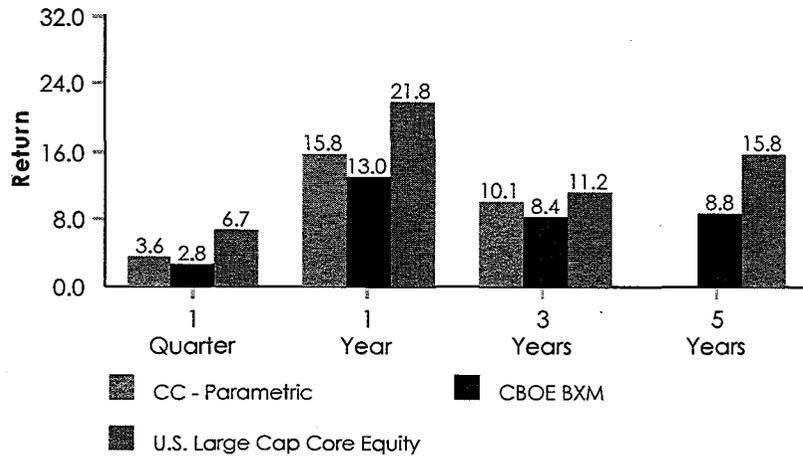


# CC - Parametric - gross of fees

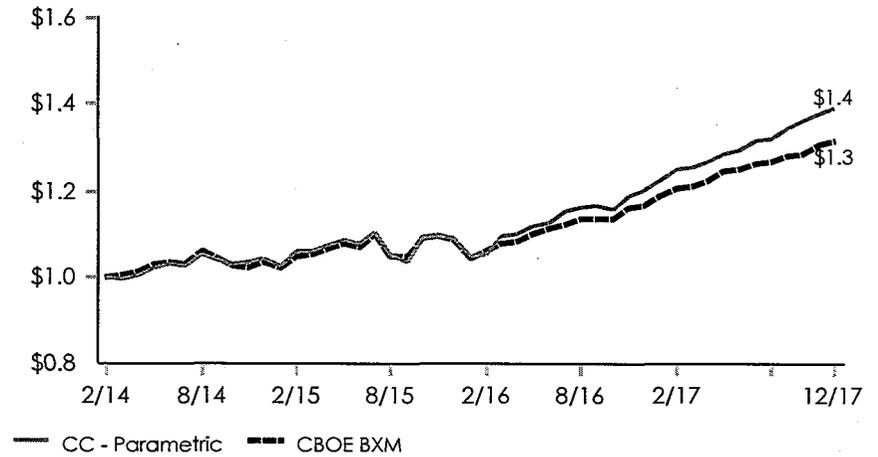
As of December 31, 2017

	Alpha	Beta	Information Ratio	Sharpe Ratio	Tracking Error	R-Squared	Up Market Capture	Down Market Capture	Inception Date
CC - Parametric	1.13	1.05	0.70	1.38	2.17	0.88	113.86	101.90	03/01/2014
CBOE BXM	0.00	1.00	-	1.28	0.00	1.00	100.00	100.00	03/01/2014
U.S. Large Cap Core Equity Median	-	-	-	-	-	-	-	-	-

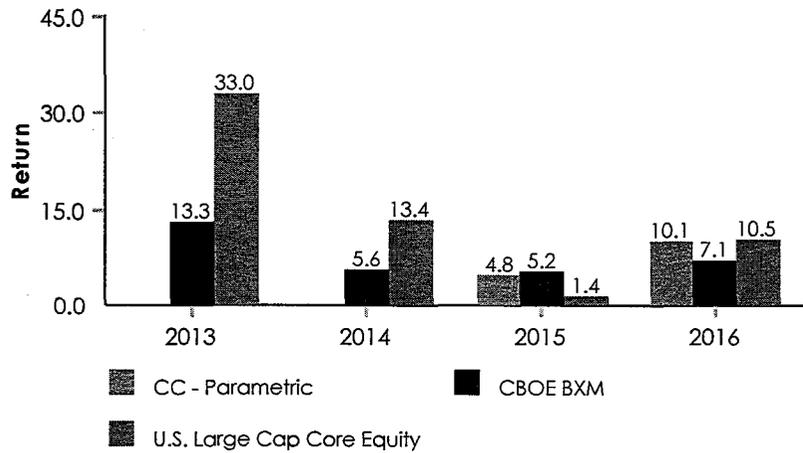
## Trailing Period Performance



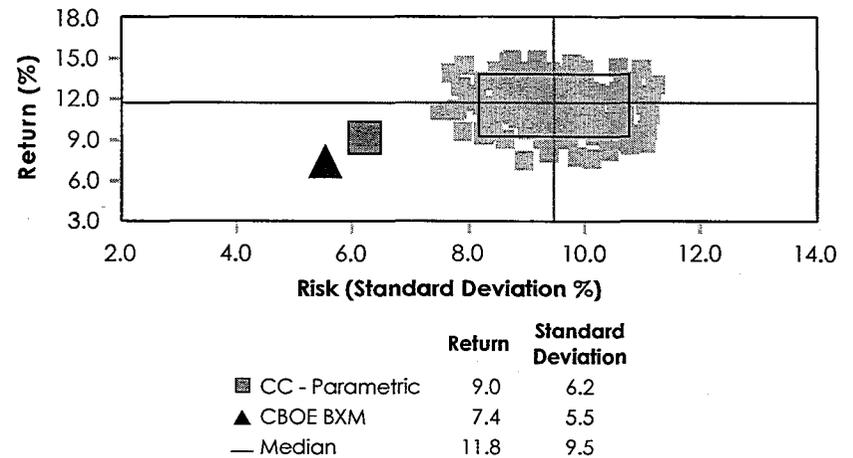
## Growth of \$1 - Since Inception



## Calendar Year Performance

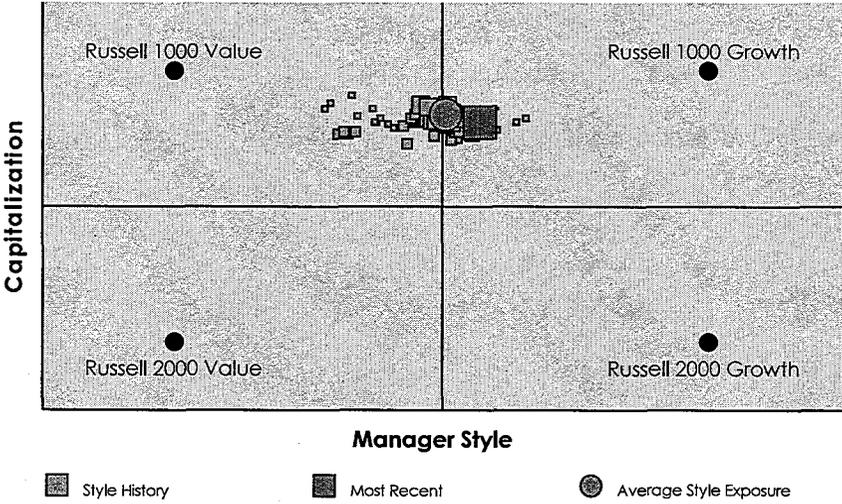


## Risk/Return - Since Inception

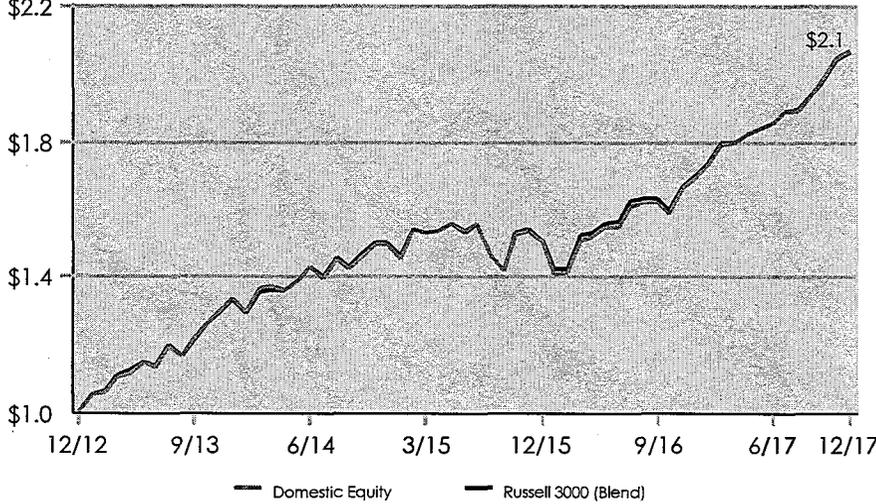


**Domestic Equity Analysis**  
**As of December 31, 2017**

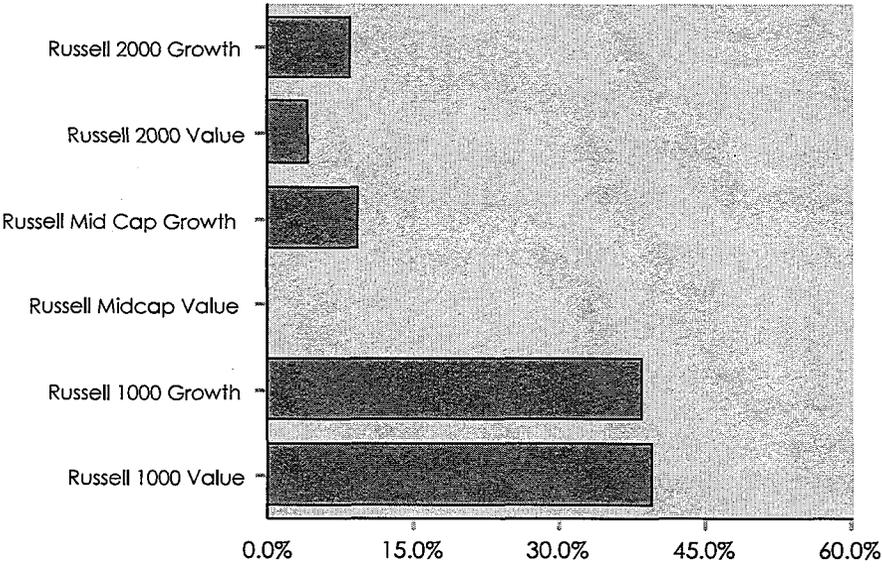
**Style Map (5-Year)**



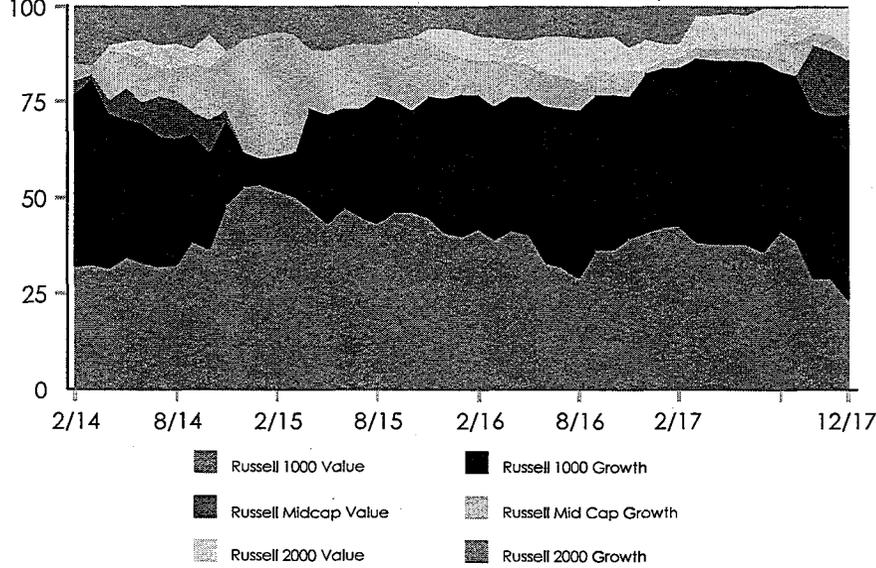
**Growth of \$1 (5-Year)**



**Style Exposure**

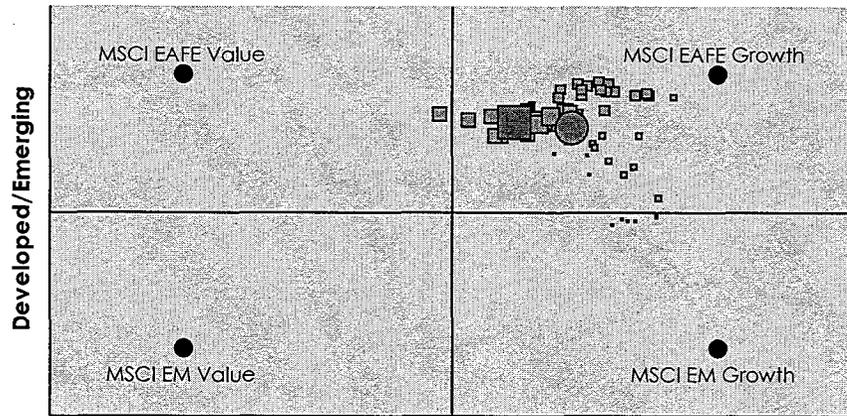


**Style History (5-Year)**



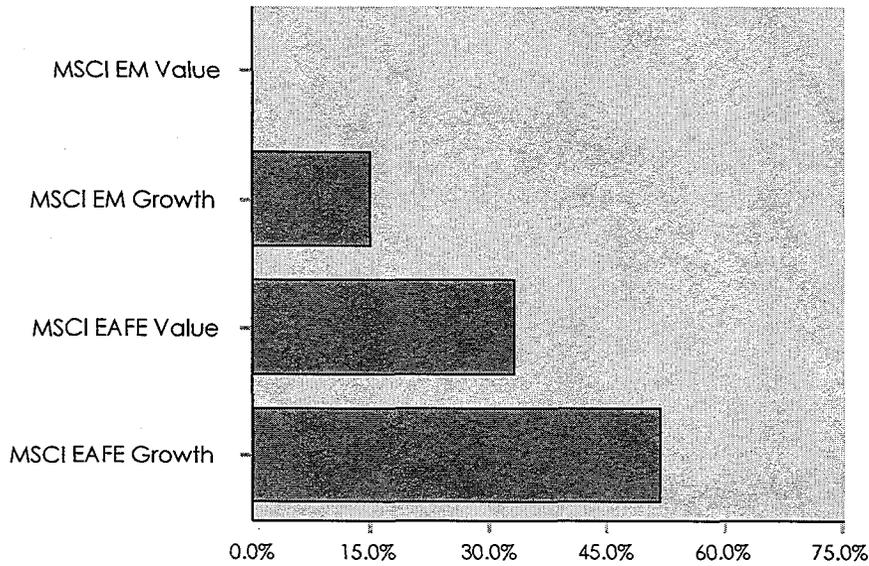
**International Equity Analysis**  
As of December 31, 2017

**Style Map (5-Year)**

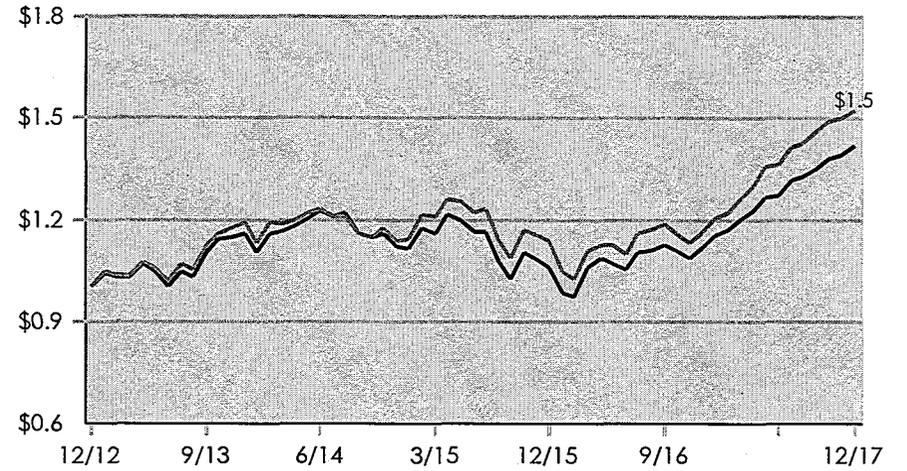


Style History  
 Dec-2017  
 Average Style Exposure

**Style Exposure**

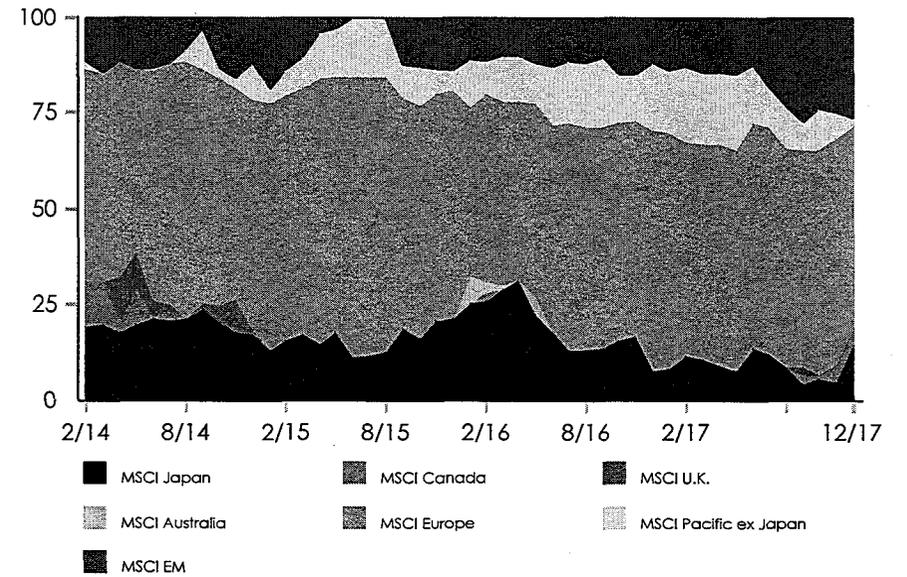


**Growth of \$1 (5-Year)**



International Equity  
 MSCI ACWI Ex US (Blend)

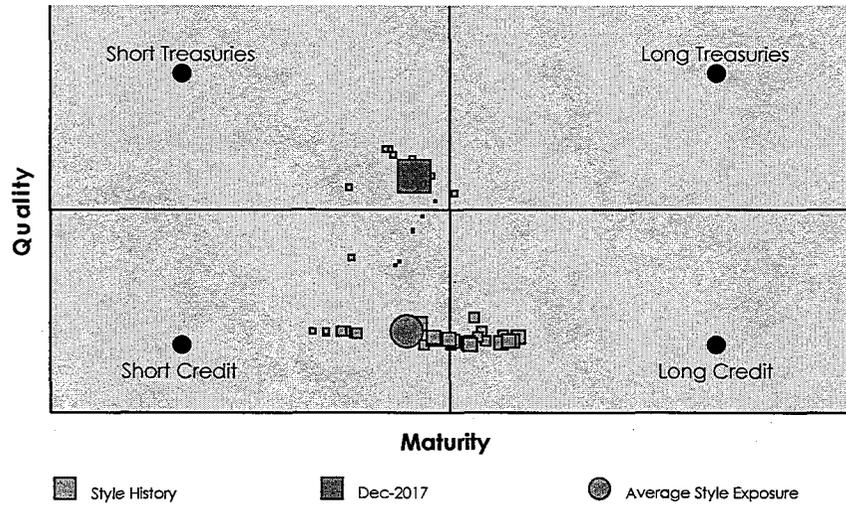
**Style History (5-Year)**



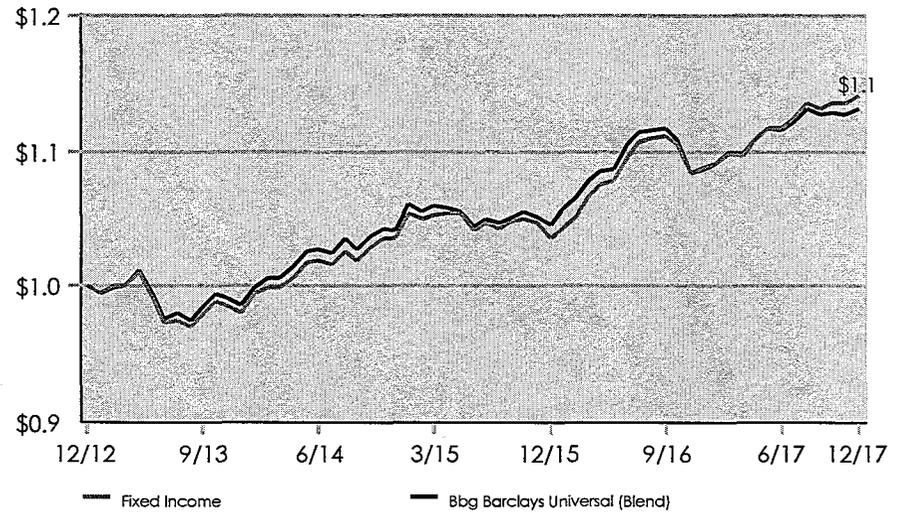
MSCI Japan  
 MSCI Canada  
 MSCI U.K.  
 MSCI Australia  
 MSCI Europe  
 MSCI Pacific ex Japan  
 MSCI EM

**Fixed Income Analysis**  
**As of December 31, 2017**

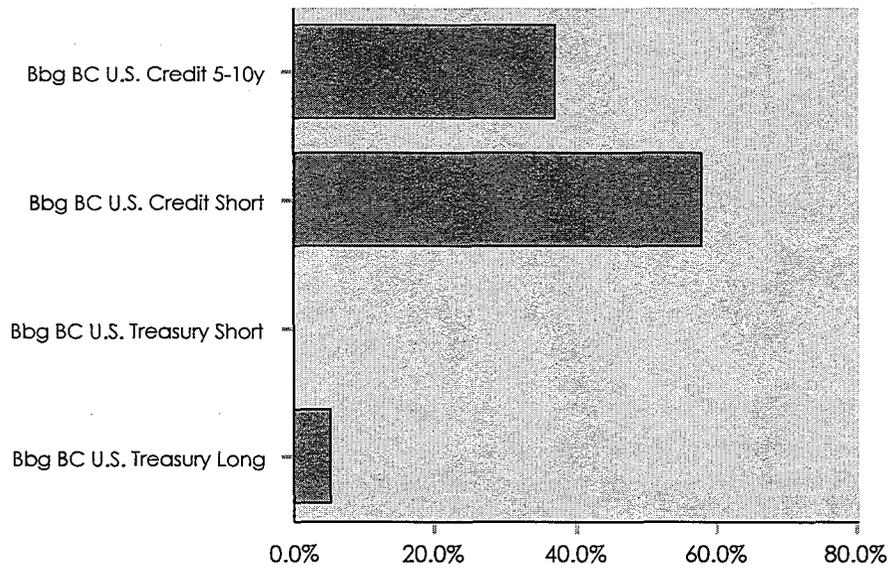
**Style Map (5-Year)**



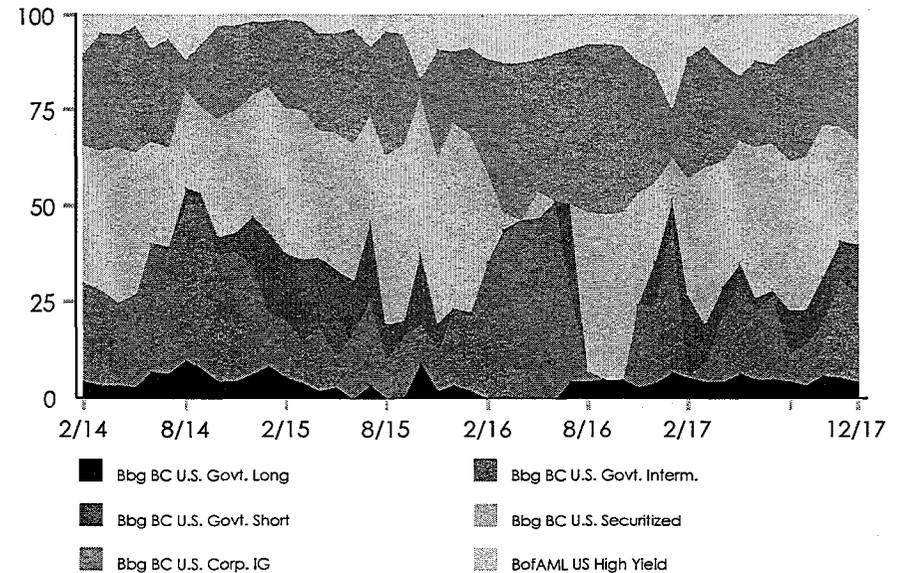
**Growth of \$1 (5-Year)**



**Style Exposure**



**Style History (5-Year)**



## Glossary

### **Alpha**

The premium an investment earns above a set standard. This is usually measured in terms of a common index (i.e., how the stock performs independent of the market). An Alpha is usually generated by regressing excess return on the S&P 500 excess return.

### **Annualized Performance**

The annual rate of return that when compounded (t) times generates the same (t) period holding return as actually occurred from periods (1) to period (t).

### **Batting Average**

Percentage of periods a portfolio outperforms a given index.

### **Beta**

The measure of an asset's risk in relation to the Market (for example, the S&P 500) or to an alternative benchmark or factors. Roughly speaking, a security with a Beta of 1.5 will have moved, on average, 1.5 times the market return.

### **Bottom-up**

A management style that de-emphasizes the significance of economic and market cycles, focusing instead on the analysis of individual stocks.

### **Dividend Discount Model**

A method to value the common stock of a company that is based on the present value of the expected future dividends.

### **Growth Stock**

Common stock of a company that has an opportunity to invest money and earn more than its opportunity cost of capital.

### **Information Ratio**

The ratio of annualized expected residual return to residual risk. A central measurement for active management, value added is proportional to the square of the information ratio.

### **R - Squared**

Square of the correlation coefficient. The proportion of the variability in one series that can be explained by the variability of one or more other series in a regression model. A measure of the quality of fit. 100% R-square means a perfect predictability.

### **Standard Deviation**

The square root of the variance. A measure of dispersion of a set of data from its mean.

### **Sharpe Ratio**

A measure of a portfolio's excess return relative to the total variability of the portfolio.

### **Style Analysis**

A returns-based analysis using a multi-factor attribution model. The model calculates a product's average exposure to particular investment styles over time (i.e., the products normal style benchmark).

### **Top-Down**

Investment style that begins with an assessment of the overall economic environment and makes a general asset allocation decision regarding various sectors of the financial markets and various industries.

### **Tracking Error**

The standard deviation of the difference between the returns of a portfolio and an appropriate benchmark.

### **Turnover**

For mutual funds, a measure of trading activity during the previous year, expressed as a percentage of the average total assets of the fund. A turnover rate of 25% means that the value of trades represented (1/4) of the assets of the fund.

### **Value Stock**

Stocks with low price/book ratios or price/earnings ratios. Historically, value stocks have enjoyed higher average returns than growth stocks (stocks with high price/book or price/earnings ratios) in a variety of countries.

## Benchmark Definitions

**Bloomberg Barclays Capital Universal:** includes market coverage by the Aggregate Bond Index fixed rate debt issues, which are rated investment grade or higher by Moody's Investor Services, Standard and Poor's Corporation, or Fitch Investor's Service, in that order with all issues having at least one year to maturity and an outstanding par value of at least \$100 million) and includes exposures to high yield CMBS securities. All returns are market value weighted inclusive of accrued interest.

**MSCI ACWI x US:** MSCI ACWI (All Country World Index) Free excluding US (gross dividends): is a free-floating adjusted market capitalization index designed to measure equity performance in the global developed and emerging markets. As of April 2002, the index consisted of 49 developed and emerging market country indices.

**MSCI EAFE (Europe, Australasia, Far East):** is a free float-adjusted market capitalization index that is designed to measure developed market equity performance, excluding the US & Canada.

**Russell 1000:** measures the performance of the 1,000 largest securities in the Russell 3000 Index. Russell 1000 is highly correlated with the S&P 500 Index and capitalization-weighted.

**Russell 1000 Growth:** measures the performance of those Russell 1000 securities with a greater-than-average growth orientation. Securities in this index tend to exhibit higher price-to-book and price-earnings ratios, lower dividend yields and higher forecasted growth values than the Value universe.

**Russell 1000 Value:** measures the performance of those Russell 1000 securities with a less-than-average growth orientation. Securities in this index tend to exhibit lower price-to-book and price-earnings ratios, higher dividend yields and lower forecasted growth values than the Growth universe.

**Russell Mid-Cap:** measures the performance of the smallest 800 companies in the Russell 1000 Index, as ranked by total market capitalization.

**Russell 2000:** measures the performance of the 2,000 smallest securities in the Russell 3000 Index. Russell 2000 is market capitalization-weighted.

**Russell 2000 Growth:** measures the performance of those Russell 2000 securities with a greater-than-average growth orientation. Securities in this index tend to exhibit higher price-to-book and price-to-earnings ratios.

**Russell 2000 Value:** measures the performance of those Russell 2000 securities with a less-than-average growth orientation. Securities in this index tend to exhibit lower price-to-book and price-to-earnings ratios.

**CBOE BXM:** measures the performance of a hypothetical buy-write strategy on the S&P 500 Index.

**BofA ML U.S. High Yield Master II:** Tracks the performance of US dollar denominated below investment grade rated corporate debt publically issued in the US domestic market. To qualify for inclusion in the index, securities must have a below investment grade rating (based on an average of Moody's, S&P, and Fitch) and an investment grade rated country of risk (based on an average of Moody's, S&P, and Fitch foreign currency long term sovereign debt ratings). Each security must have greater than 1 year of remaining maturity, a fixed coupon schedule, and a minimum amount outstanding of \$100 million.

## RISK 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.

### 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.

## RISK METRIC DESCRIPTION – Rationale for selection and calculation methodology

### 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 and Annual US Real Estate Deal Volume

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 is published by NCREIF. We chose to use current value cap rate. These are capitalization rates from properties that were revalued during the quarter. While this data does rely on estimates of value and therefore tends to be lagging, (estimated prices are slower to rise and slow to fall than transaction prices), the data series goes back to 1979, providing a long data series for valuation comparison. Data is published quarterly.

Annual US real estate deal volume is the total deal transaction volume in \$ billions (both equity and debt) reported by Real Capital Analytics during the trailing-twelve months. This metric gives the level of activity in the market. Data is published monthly.

### 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.

## RISK METRIC DESCRIPTION – Rationale for selection and calculation methodology

### 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.

### 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.

### 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 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 US Treasury Bond is a measure of valuation risk for US Treasuries. A low real yield means investors will accept a low rate of expected return for the certainty 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.

## RISK METRIC DESCRIPTION – Rationale for selection and calculation methodology

### **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.

### **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.

Momentum is defined as the persistence of relative performance. There is a significant amount of academic evidence indicating that positive momentum (e.g., strong performing stocks over the recent past continue to post strong performance into the near future) exists over near-to-intermediate holding periods. See, for example, "Understanding Momentum," *Financial Analysts Journal*, Scowcroft, Sefton, March, 2005.

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