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AGENDA REPORT

TO: Sabrina B. Landreth
City Administrator

FROM: Katano Kasaine
Treasurer

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

DATE: November 14, 2016

City Administrator Approval

Date: 11/22/16

RECOMMENDATION

Staff Recommends That The Council Accept An Informational Report On The Oakland Police And Fire Retirement System ("PFRS") Investment Portfolio As Of September 30, 2016 And Actuarial Valuation As Of July 1, 2016.

EXECUTIVE SUMMARY

The attached Quarterly Investment Performance report provided by the PFRS Investment Consultant, Pension Consulting Alliance, and (PCA) summarizes the performance of the PFRS investment portfolio for the quarter ended September 30, 2016 as **Attachment A**, herein. In addition, the Council is being provided the recently updated PFRS' Actuarial Valuation (**Attachment B**) as of July 1, 2016.

During the most recent quarter, the PFRS Total Portfolio generated an absolute return of 4.2 percent, gross of fees, outperforming its policy benchmark by 0.7 percent. The portfolio also underperformed its benchmark over the latest one and three year periods, while continuing to outperform over the five year period. This is discussed in more detail in the "Investment Performance" section of this report.

	Quarter	1 Year	3 Year	5 Year
Total Portfolio	4.2	10.3	6.3	9.5
Policy Benchmark	3.5	11.0	6.6	9.1
Excess Return	0.7	(0.7)	(0.3)	0.4

As of 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 next required City contribution is projected to be approximately \$44.86 million in fiscal year (FY) 2017/2018.

Item: _____
Finance and Management Committee
December 06, 2016

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 September 30, 2016, PFRS had 921 retired members and no active members.

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. The System's portfolio is currently managed by twelve external investment managers. The majority of 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. In accordance with the funding agreement entered into 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 into a funding agreement with the PFRS Board. As a result, no additional contributions are required until July 1, 2017. This report is being provided in accordance with the funding agreement between the City and the PFRS Board pursuant to the issuance of the 2012 POBs.

ANALYSIS

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 September 30, 2016, the System's membership was 921, as shown on **Table 1**.

Table 1			
PFRS Membership			
as of September 30, 2016			
Membership	POLICE	FIRE	TOTAL
Retiree	391	244	635
Beneficiary	149	137	286
Total Membership	540	381	921

PFRS Investment Portfolio

As of September 30, 2016, the PFRS' portfolio had an aggregate value of \$363.2 million as shown in **Table 2** below.

Table 2 PFRS Investment Portfolio as of September 30, 2016	
Investment	Fair Value
Domestic Equities	\$178,940,227
Fixed Income	67,650,568
International Equities	44,084,963
Covered Calls	69,383,799
Cash and Cash Equivalents	3,108,948
Total Portfolio	\$363,168,505

During the latest quarter, the portfolio increased by \$0.3 million, including (\$15.0) million in net benefit payments. Over the latest year, the portfolio decreased by (\$24.7) million, including (\$60.5) million in net benefit payments as shown in **Table 3**.

Table 3
Investment Portfolio Valuation as of September 30, 2016*

	September 30, 2016	June 30, 2015	Quarterly Change	Percentage Change	September 30, 2015	Annual Change	Percentage Change
PFRS	\$363.2	\$362.9	\$0.3	0.1%	\$387.9	(\$24.7)	(6.4%)

*The calculations listed above represent change in dollar value and not investment returns.

PFRS Investment Performance

During the latest quarter ending September 30, 2016, the PFRS Total Portfolio generated a return of 4.2 percent, gross of fees, outperforming its benchmark. The Plan's Domestic Equity allocation also outperformed its benchmark with a return of 4.8 percent, while the Plan's International Equity allocation outperformed its benchmark by 1.0 percent. The Plan's Fixed Income allocation outperformed its benchmark by 0.4 percent, while the Covered Calls allocation returned 3.4 percent, outperforming its index by 1.6 percent. Relative to the actuarial expected rate of return, the PFRS Total Portfolio outperformed the actuarial expected rate for the one and five year time periods, while slightly underperforming over the three year period. The Actuarial Rate of Return was gradually lowered from 8.0 percent in FY 2008 to a blended rate of 6.44 percent in 2016. **Table 4** below compares PFRS Total Portfolio performance to other pension funds and benchmarks.

Table 4
PFRS TOTAL FUND PERFORMANCE
 as of September 30, 2016

	Quarter	1 Year	3 Year	5 Year
PFRS Fund	4.21%	10.27%	6.27%	9.55%
Comparisons:				
PFRS Actuarial Expected Rate of Return (blend) (a) (b)	1.59%	6.44%	6.56%	6.64%
Policy Target (blend) (c)	3.51%	11.04%	6.65%	9.06%
Median Fund (d)	3.73%	9.91%	6.33%	9.33%
CalPERS Investment Returns	3.61%	10.03%	6.52%	9.37%
CalSTRS Investment Returns	3.94%	10.26%	7.64%	10.57%
East Bay Mud Investment Returns	3.59%	10.66%	7.58%	6.40%
Colorado F&P Investment Returns	3.72%	6.50%	6.15%	8.80%

- (a) The actuarial expected rate of return was 8% through 6/30/2009, 7.5% through 6/30/2010, 7% through 6/30/2011, and 6.75% through 6/30/2014 and 6.50% currently.
- (b) The quarterly actuarial expected rate of return is calculated based on the 6.50% annual return assumption.
- (c) The Policy Benchmark consists of 48% Russell 3000, 12% MSCI ACWI ex U.S., 20% BC Universal, and 20% CBOE BXM.
- (d) Mellon Total Fund Public Universe Fund.

PFRS Actuarial Valuation

The latest actuarial valuation as of July 1, 2016 was performed by Actuary, Cheiron Associates. As of this report, the PFRS Funded Ratio (actuarial value of assets divided by present value of future benefits) is 53.7 percent. The City's next Annual Required Contribution to the System is due next fiscal year (FY 2017/2018) and is projected to be \$44.86 million. **Table 5** below shows a summary of the July 1, 2016 PFRS Actuarial valuation results.

Table 5 Summary of Plan Results (\$ in thousands)	
	July 01, 2016
Actuarial Liability	\$ 672,916
Less: Actuarial Value of Assets	(363,550)
Unfunded Actuarial Liability	<u>\$ 309,366</u>
Funded Ratio (MVA) liability	<u>54%</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. The contributions are base on as assumed blended future market value returns of 6.44 percent. The assumed rate is blended because its currently 7% and trends down to 3.25% in 2036. The assumed blended is shown in additional detail on page 28 of the attached actuarial valuation.

Table 6 Projected Employer Contributions Police and Fire Retirement System (in millions)	
Fiscal Year Ending	Employer Contribution
2016	\$ 0.0
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

Since this is an informational report, there are no budget implications associated with the report.

PUBLIC OUTREACH / INTEREST

This item did not require any additional 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 accept this informational report on the Oakland Police and Fire Retirement System ("PFRS") Investment Portfolio as of September 30, 2016 and Actuary Valuation as of July 1, 2016.

Respectfully submitted,


KATANO KASAINÉ
Treasurer/ Plan Administrator

Prepared by:
Téir Jenkins, Investment Officer
Retirement Division

Attachments (2): Attachment A: PFRS Performance Report as of September 30, 2016
Attachment B: PFRS Actuary Valuation as of July 1, 2016

Item: _____
Finance and Management Committee
December 06, 2016

**ATTACHMENT A:
PFRS INVESTMENT PERFORMANCE
AS OF SEPTEMBER 30, 2016**

3Q

2016

OAKLAND POLICE & FIRE RETIREMENT SYSTEM
QUARTERLY PERFORMANCE REPORT



This report is solely for the use of the client pursuant to the terms of the relevant contract. It may be subject to audit, modification or withdrawal at any time without notice and will be subject to the standard disclaimer on page 11 of this report.

The information is intended to serve as a guide only and is not a guarantee of any particular investment or any other financial product. It is not intended to be used as a basis for any investment decision. It is not intended to be used as a basis for any investment decision.

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- D** TOTAL PORTFOLIO REVIEW
- E** MANAGER MONITORING / PROBATION LIST
- F** INDIVIDUAL MANAGER PERFORMANCE

Appendix

TOTAL PORTFOLIO SUMMARY

As of September 30, 2016, the City of Oakland Police and Fire Retirement System (OPFRS) portfolio had an aggregate value of \$363.2 million. This represents a \$0.3 million increase in value, which includes (\$15) million in benefit payments, over the quarter. During the previous one-year period, the OPFRS Total Portfolio decreased by (\$24.7) million, including (\$60) million in withdrawals during the period.

Asset Allocation Trends

The asset allocation targets (see table on page 80) reflect those as of September 30, 2016. Target weightings reflect the Plan's evolving asset allocation (effective 3/31/2014).

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

Recent Investment Performance

During the most recent quarter and fiscal YTD, the OPFRS Total Portfolio generated an absolute return of 4.2%, gross of fees, outperforming its policy benchmark. The portfolio underperformed its benchmark over the 1- and 3-year period while outperforming over the 5-year period.

The Total Portfolio outperformed the Median fund's return over the most recent quarter, 1- and 5-year periods while matching the Median fund over the 3-year period. 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 ¹	4.2	4.2	10.3	6.3	9.5
Policy Benchmark ²	3.5	3.5	11.0	6.6	9.1
Excess Return	0.7	0.7	(0.7)	(0.3)	0.4
Reference: Median Fund ³	3.7	3.7	9.9	6.3	9.3
Reference: Total Net of Fees ⁴	4.1	4.1	9.9	5.9	9.1

¹ Gross of Fees. Performance since 2005 includes securities lending.

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

³ Mellon Total Funds Public Universe.

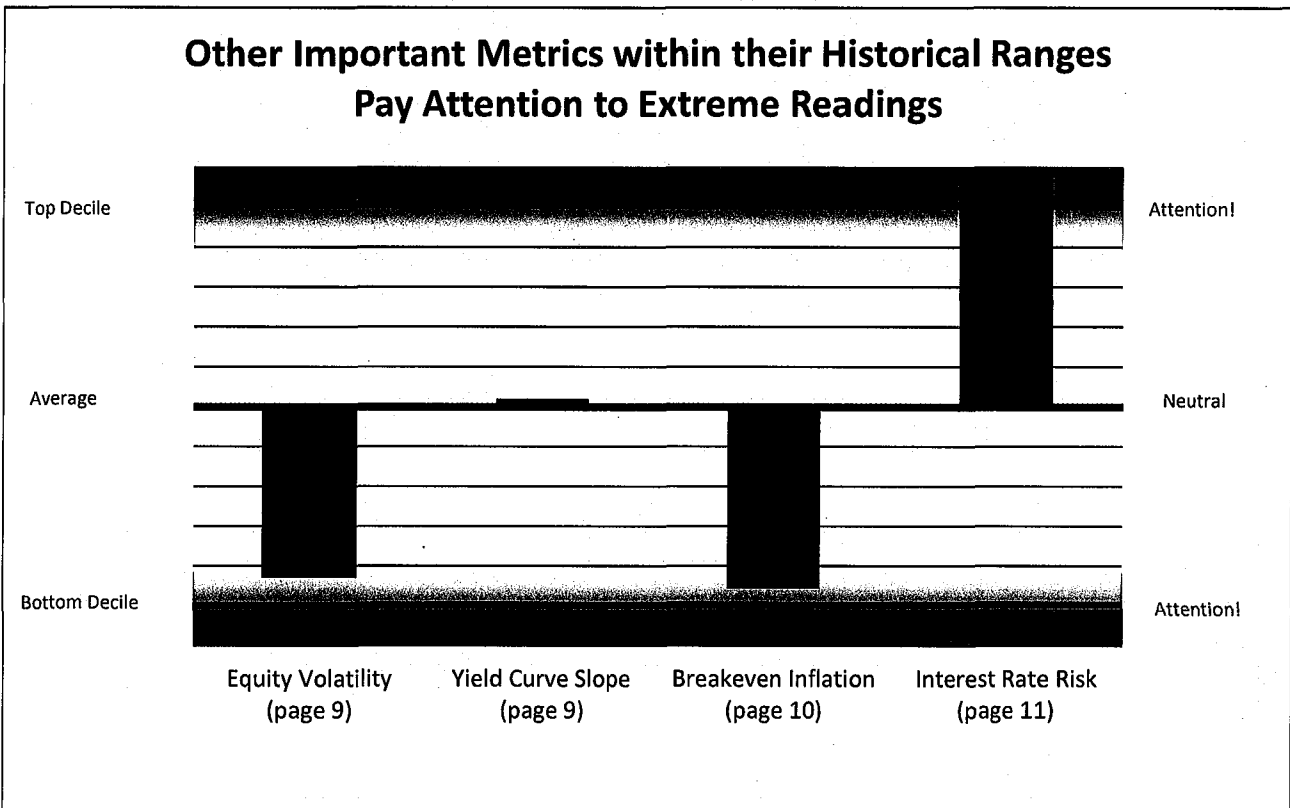
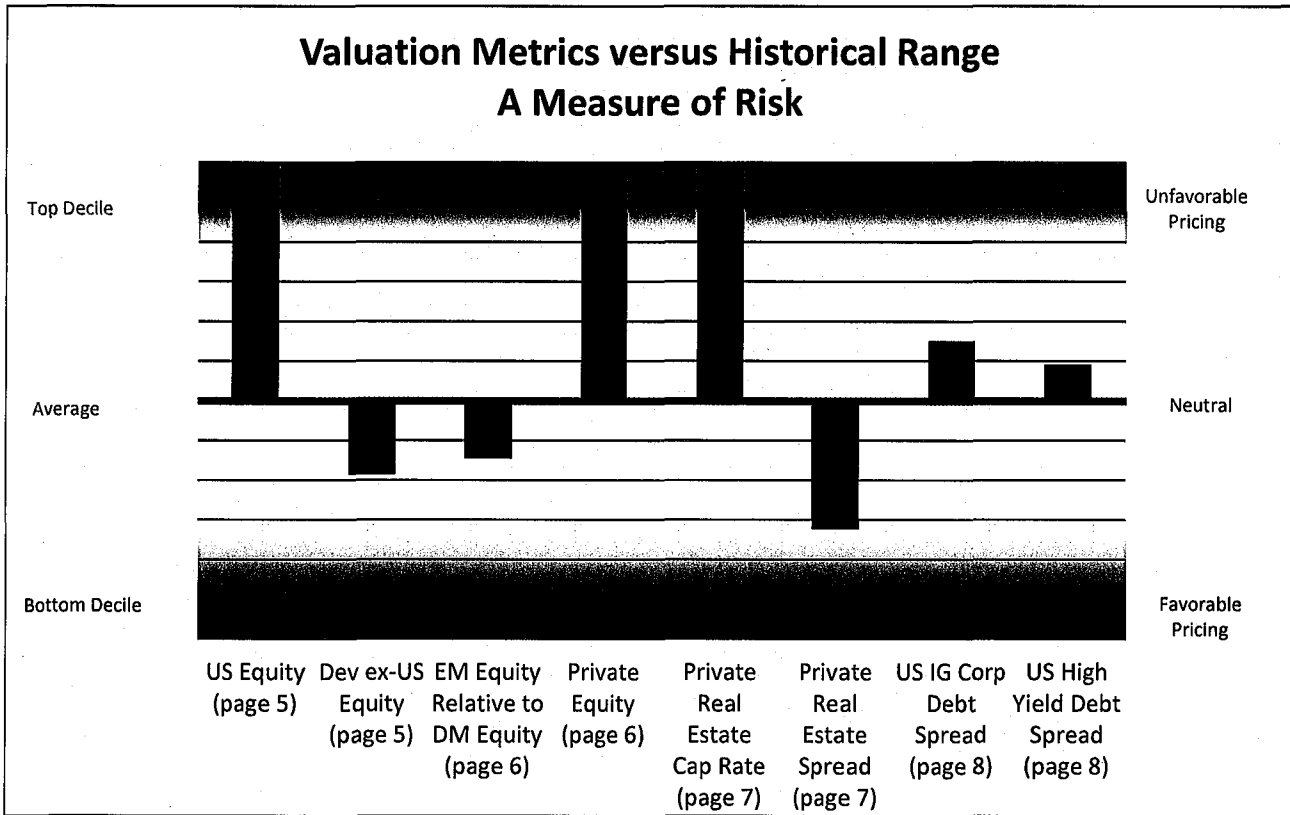
⁴ Net of fee returns are estimated based on OPFRS manager fee schedule (approximately 42 bps).

Takeaways

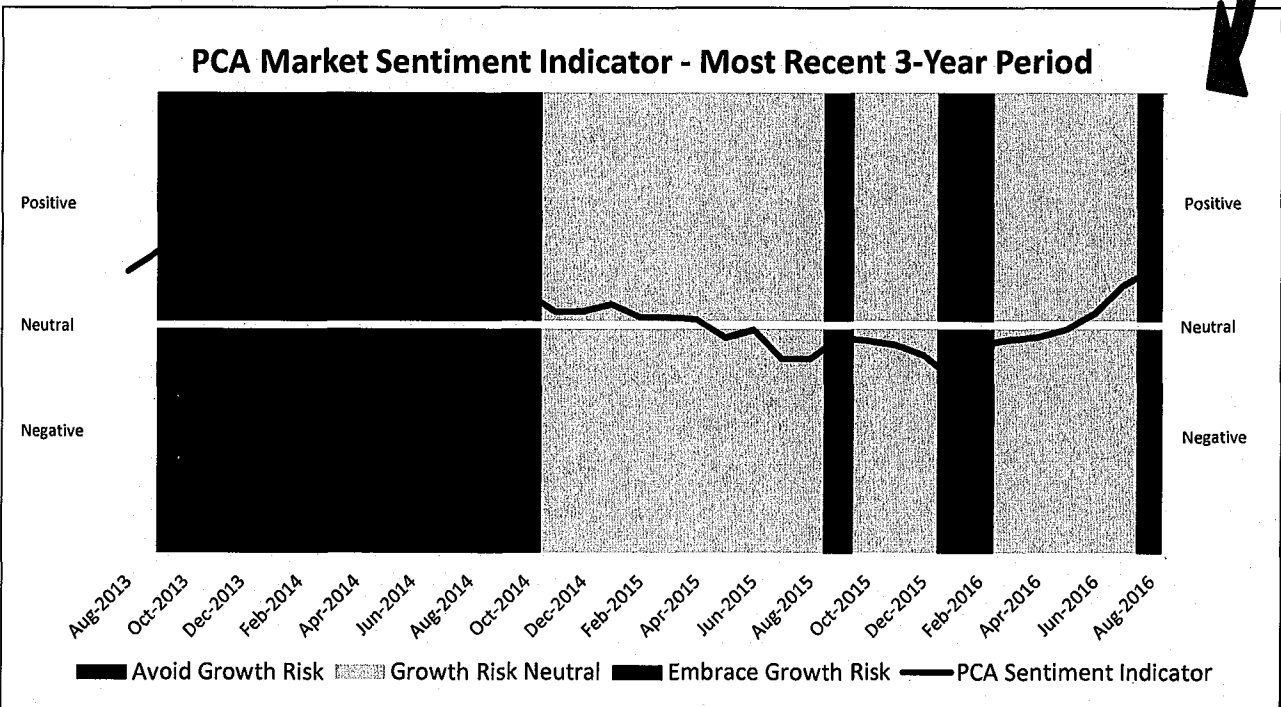
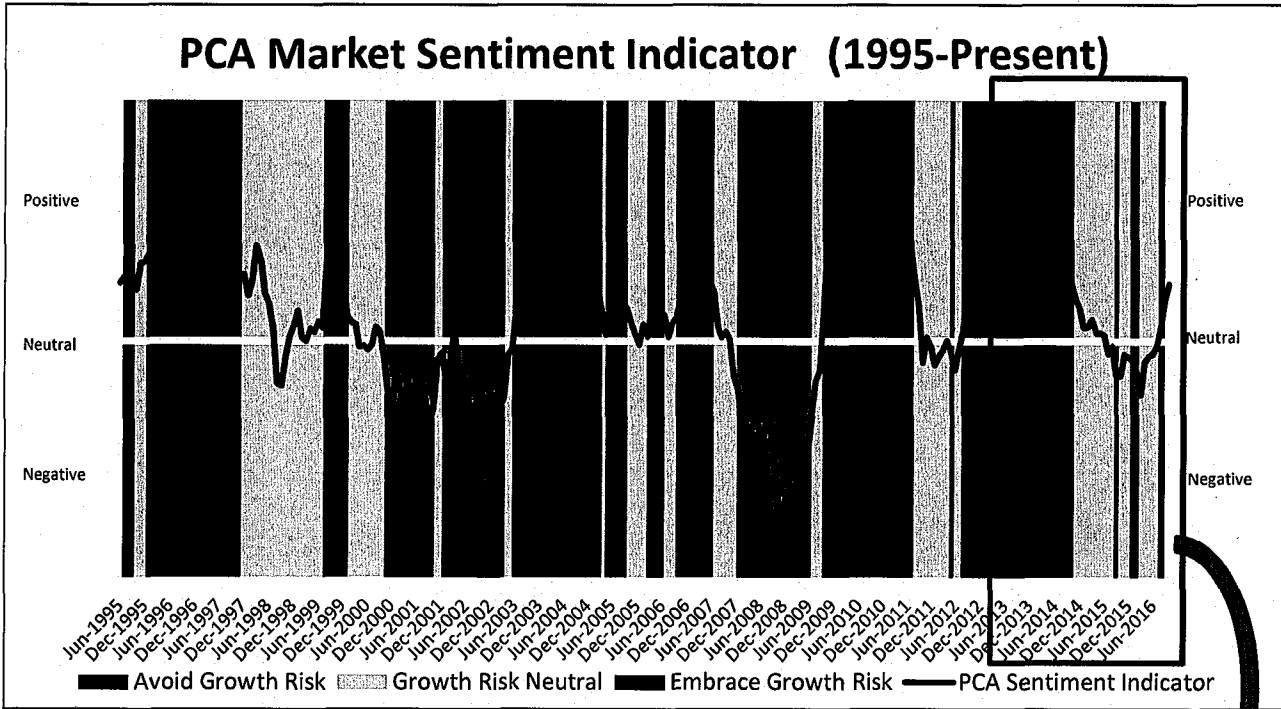
- The 10-year Treasury interest rate ended the month at 1.6%, near all-time lows.
- Real yields (page 9) are revisiting negative levels seen in 2011 to 2013, indicating growth concerns, particularly outside the U.S.
- U.S. public equity and private equity valuations remain extended.
- Private real estate valuations are historically high, but not relative to their financing, which tends to be driven by 10-year Treasury rates.
- Non-U.S. developed and emerging market valuations are historically cheap.
- Bond spreads continued tightened and are picking up some positive (tightening) momentum.
- 10-year breakeven inflation moved up slightly to 1.6%, (still bottom decile territory), but commodity prices remain at decades-low levels inflation adjusted. (page 10)
- The yield curve steepened slightly (page 9), as Fed decided not to hike in September and the 10-year Treasury yield remained unchanged.
- The PCA Market Sentiment Indicator remained **green** at the end of September (page 4), with spreads narrowing year-over-year and equities delivering a positive year-over-year return, resulting in a positive sentiment reading.

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

Risk Overview



Market Sentiment



Information Behind Current Sentiment Reading

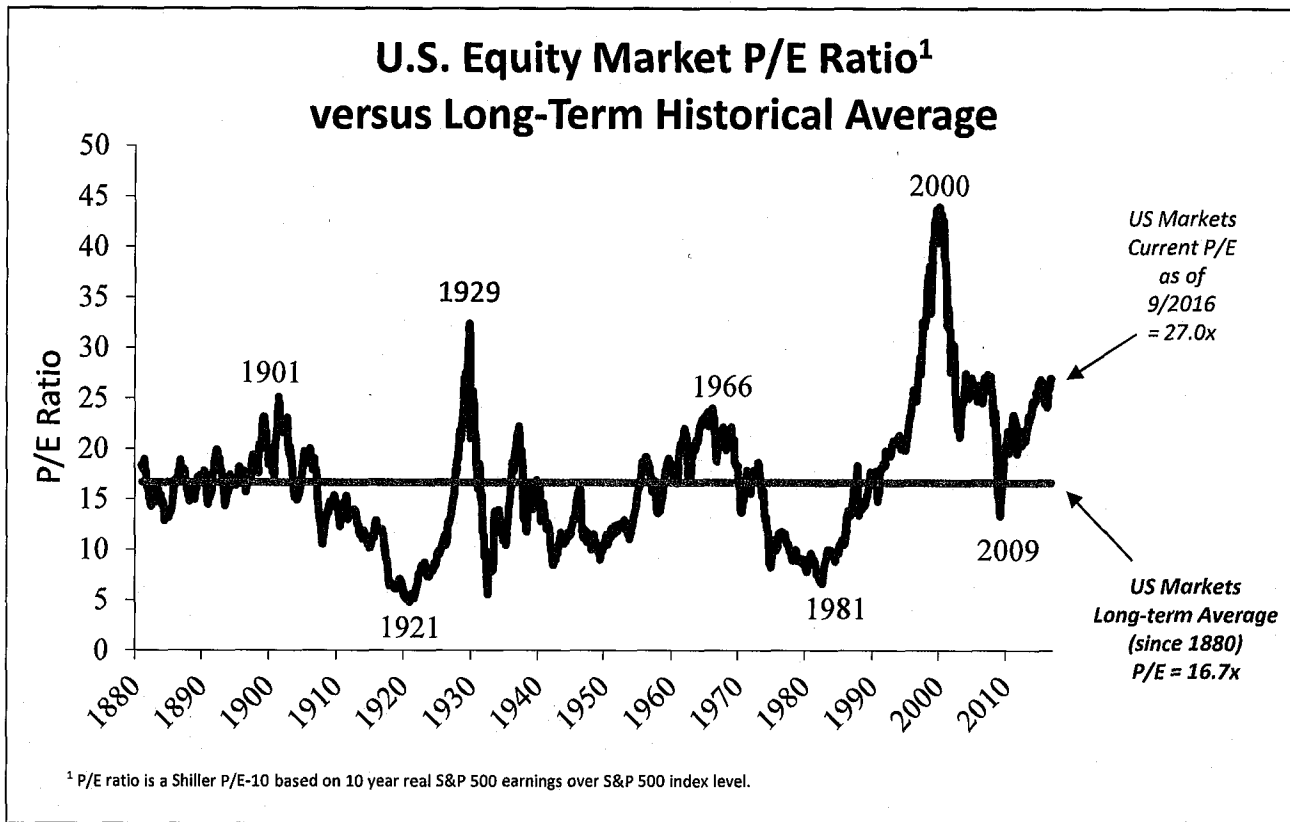
Bond Spread Momentum Trailing-Twelve Months
 Equity Return Momentum Trailing-Twelve Months
 Agreement Between Bond Spread and Equity Spread Momentum Measures?

Positive	■
Positive	■
Agree	■

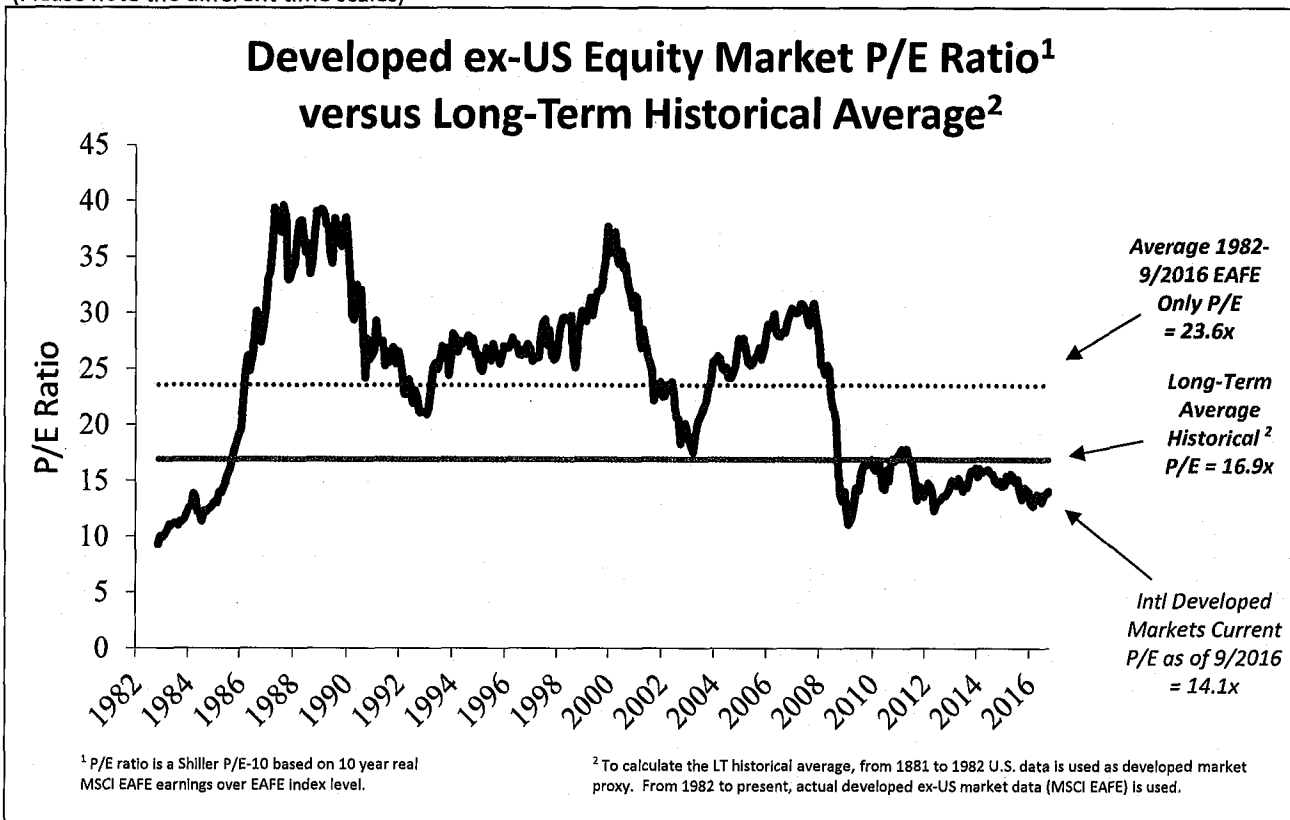
Growth Risk Visibility (Current Overall Sentiment)

Positive	■
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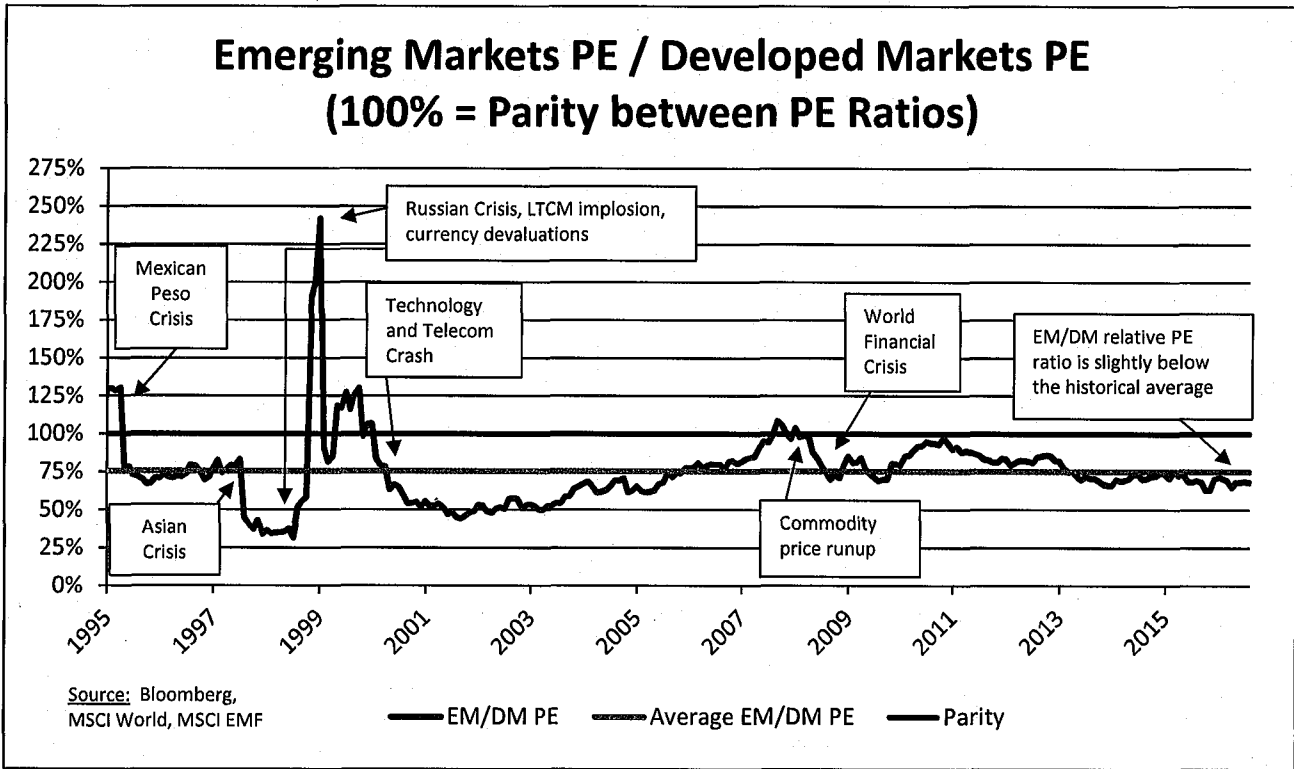
Developed Public Equity Markets



(Please note the different time scales)

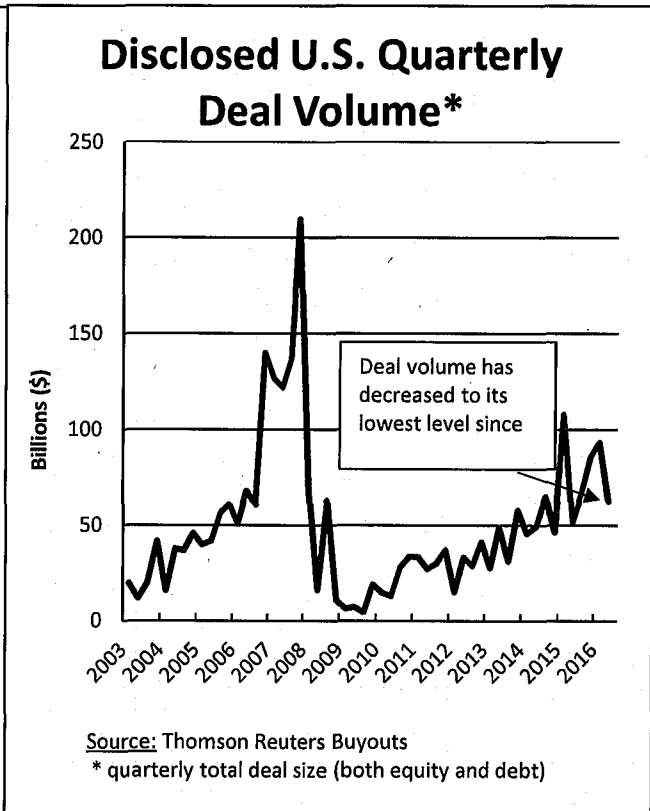
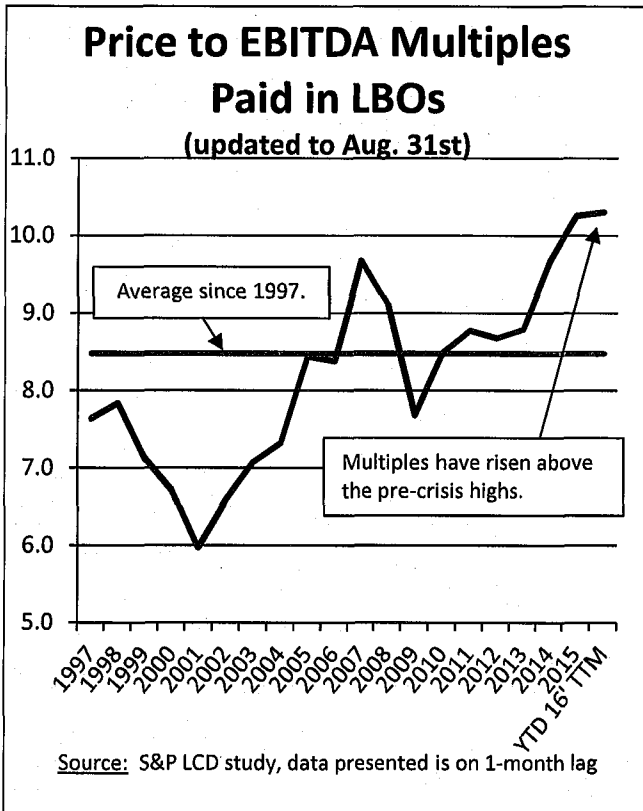


Emerging Market Public Equity Markets



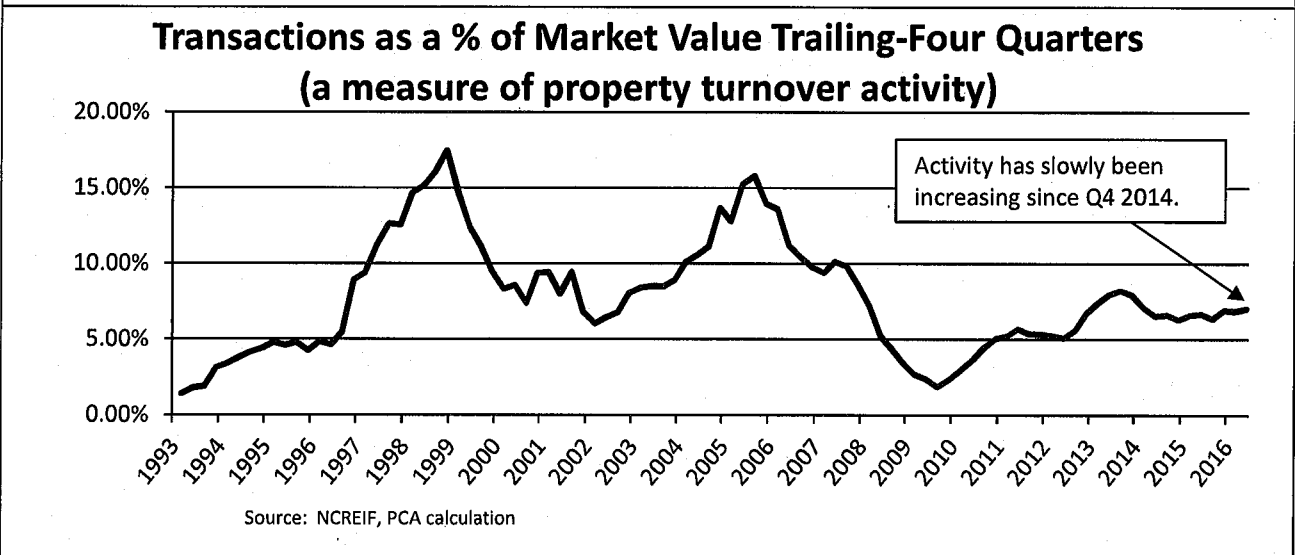
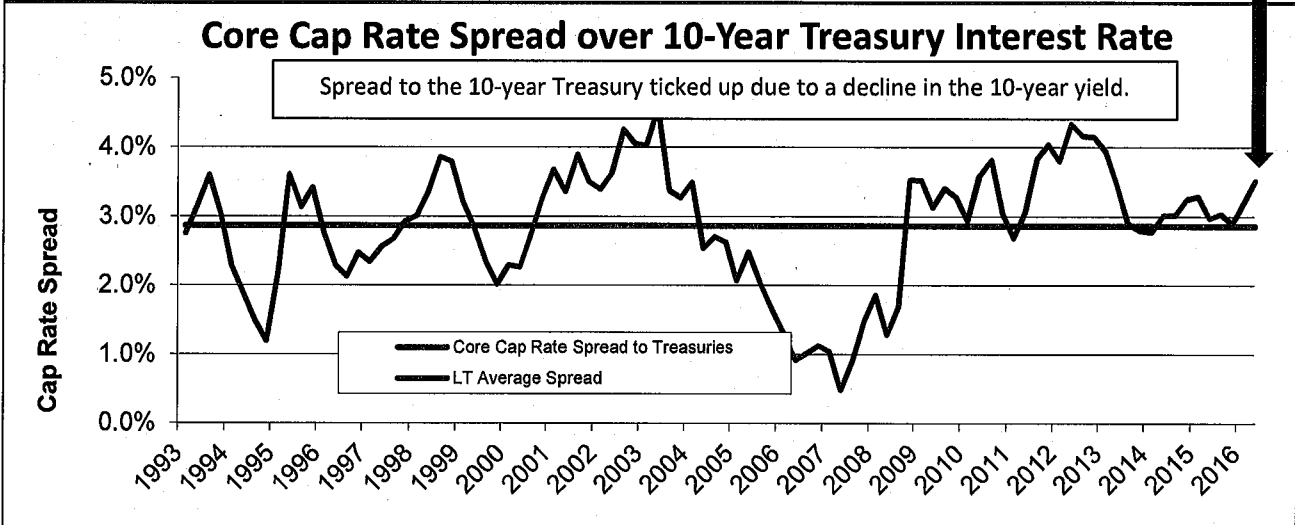
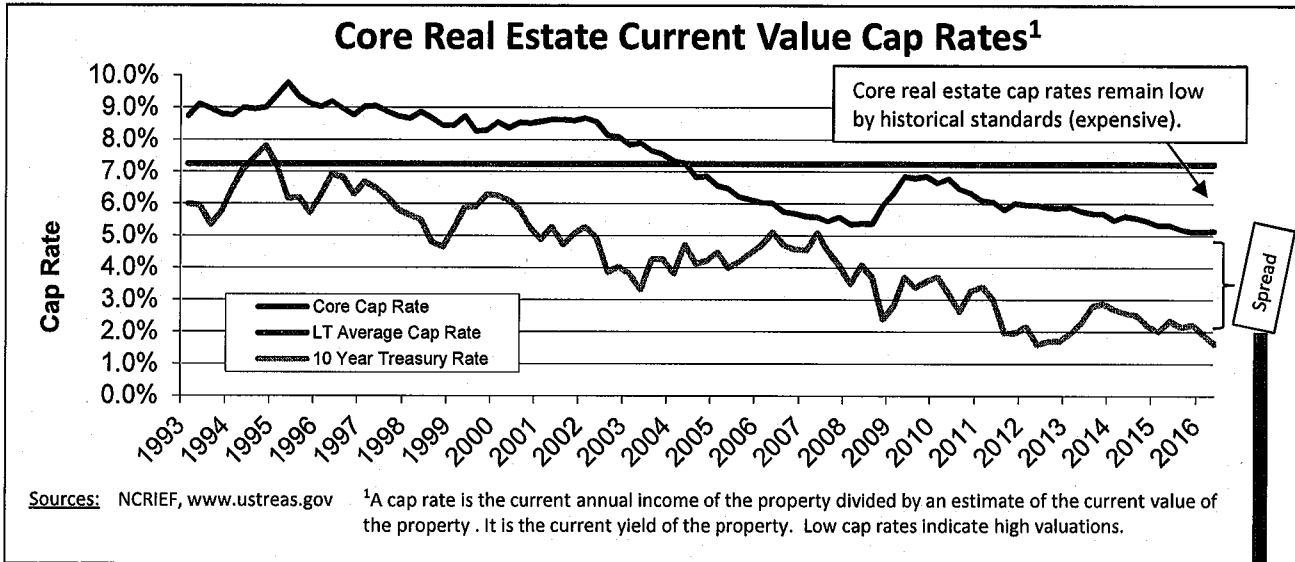
US Private Equity

Quarterly Data, Updated to June 30th.



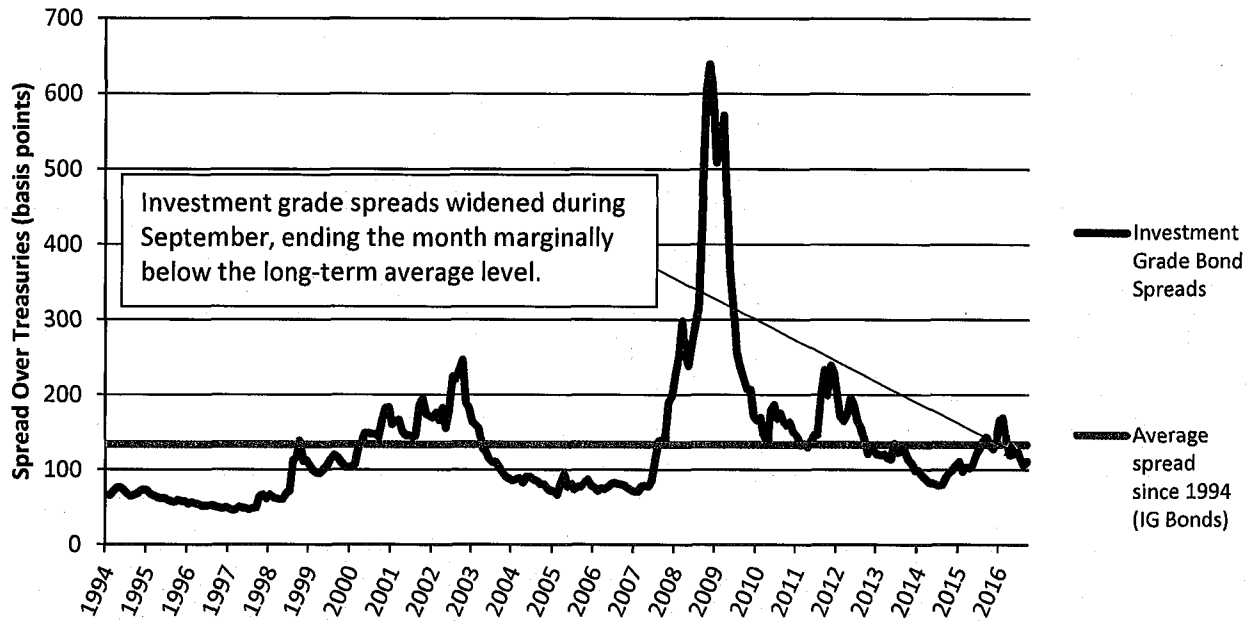
Private Real Estate Markets

Quarterly Data, Updated to June. 30th



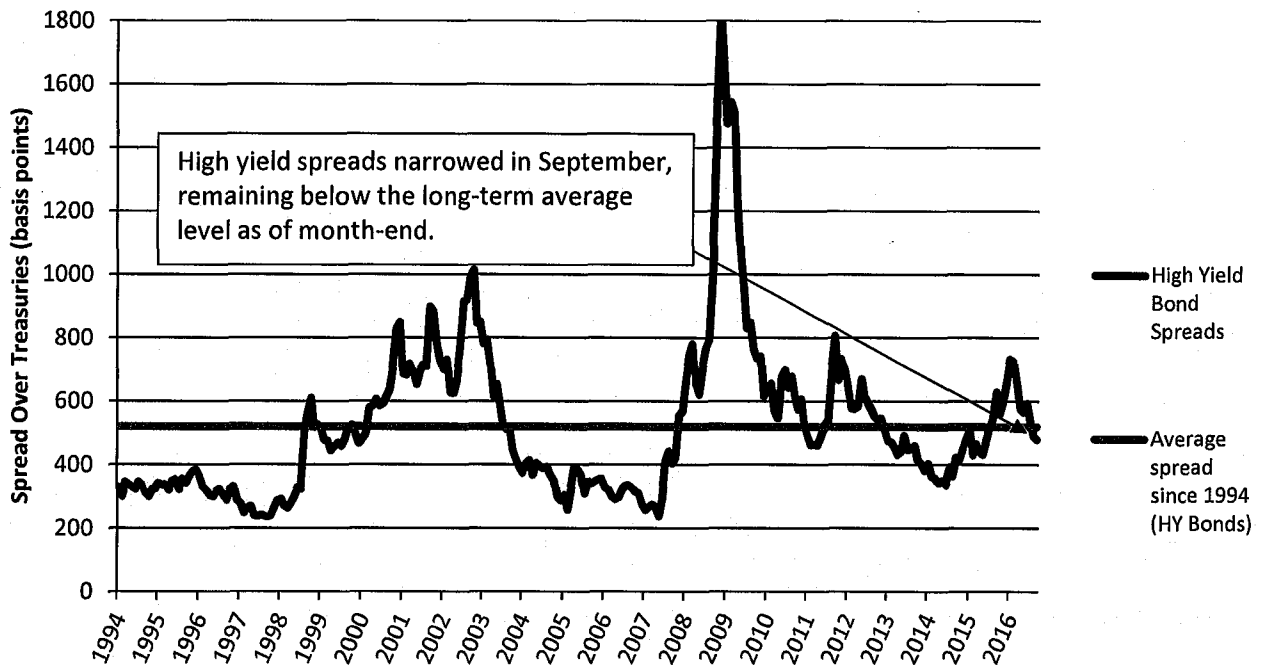
Credit Markets US Fixed Income

Investment Grade Corporate Bond Spreads



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

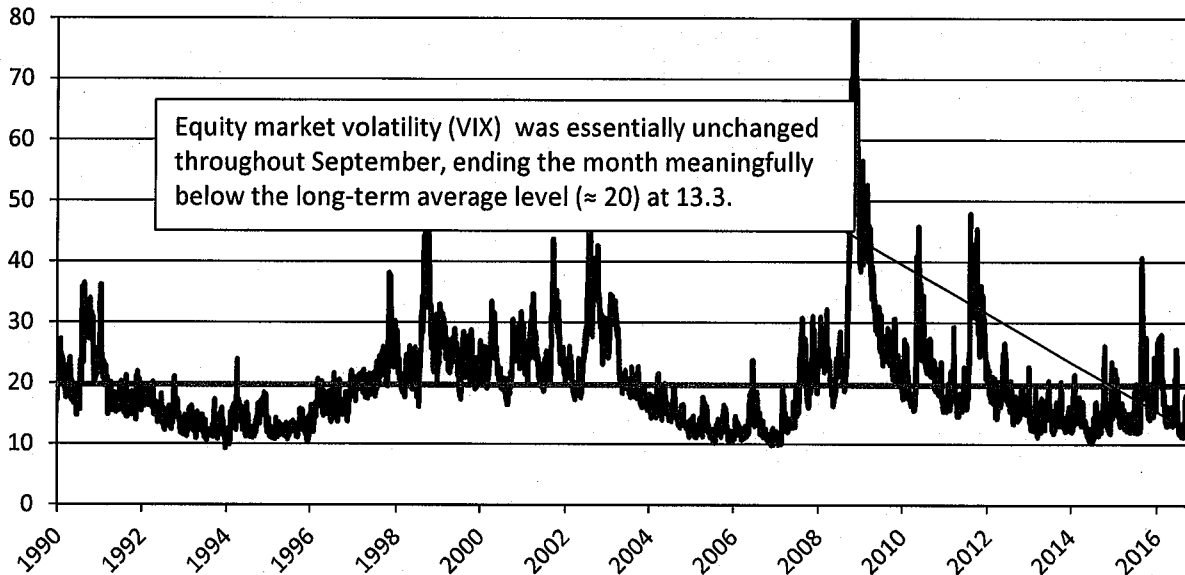
High Yield Corporate Bond Spreads



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

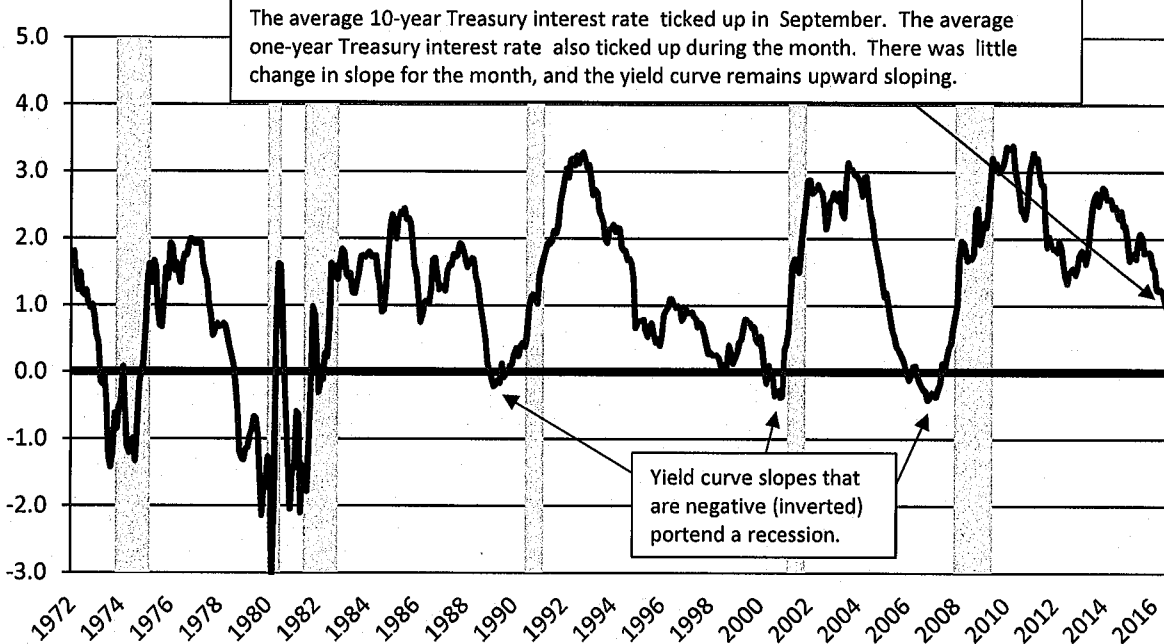
Other Market Metrics

VIX - a measure of equity market fear / uncertainty



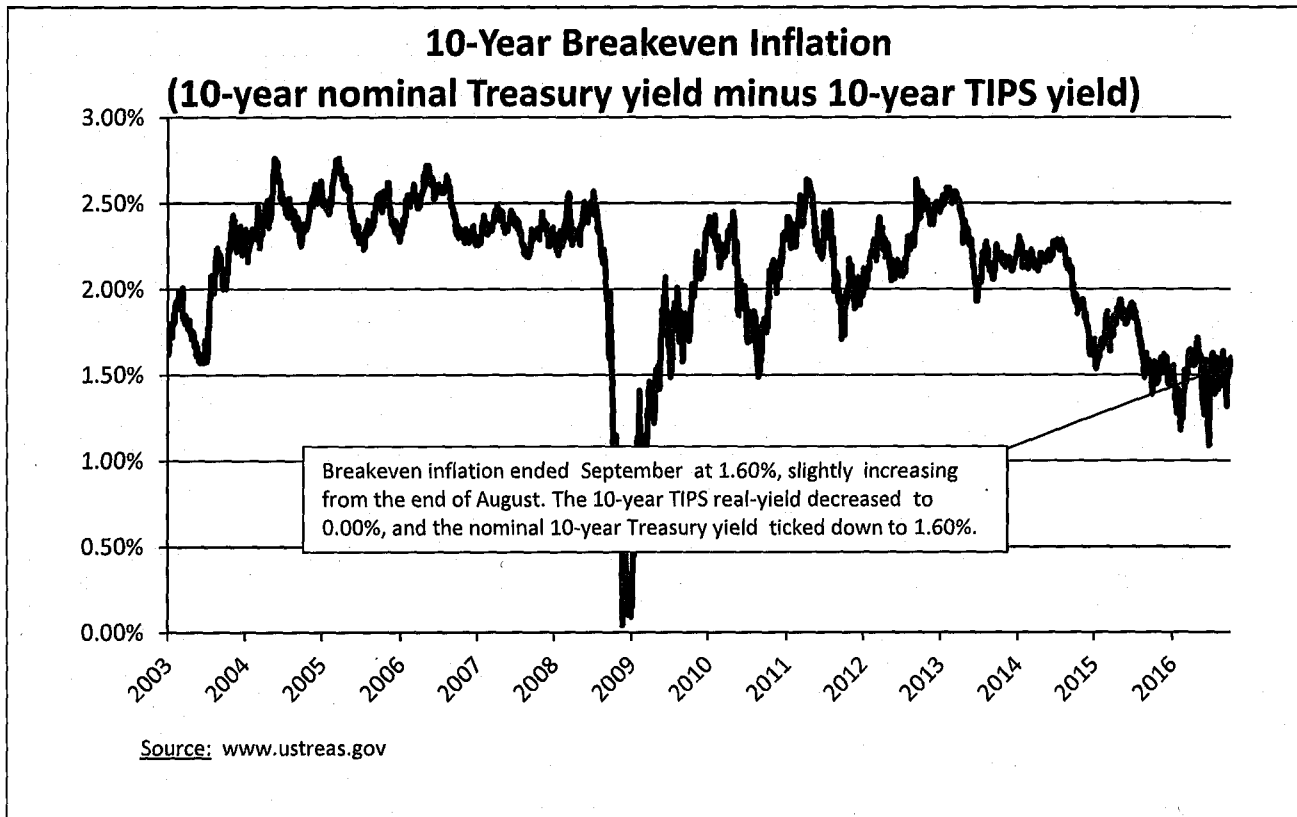
Source: <http://www.cboe.com/micro/vix/historical.aspx>

Yield Curve Slope

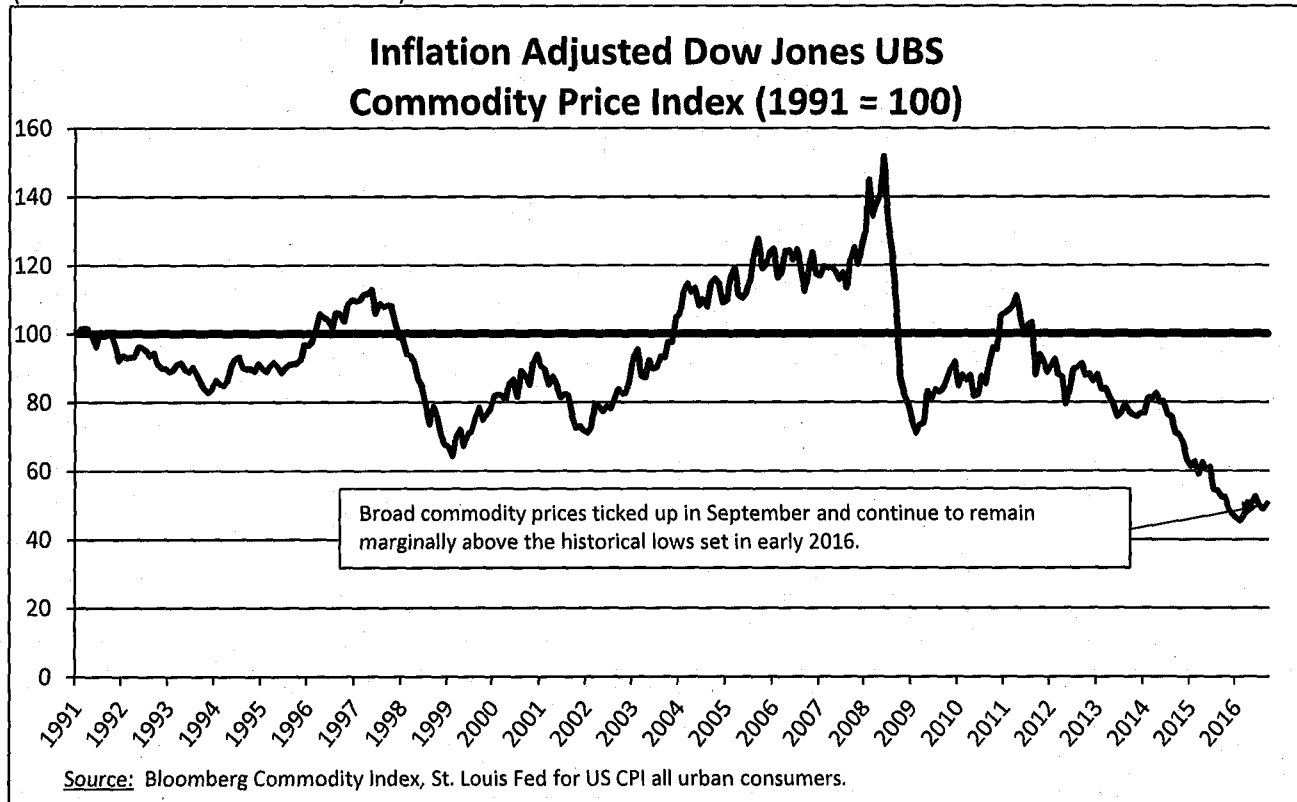


Source: www.ustreas.gov (10 yr treasury yield minus 1 year treasury yield)
 Recession Dating: NBER <http://www.nber.org/cycles.html>

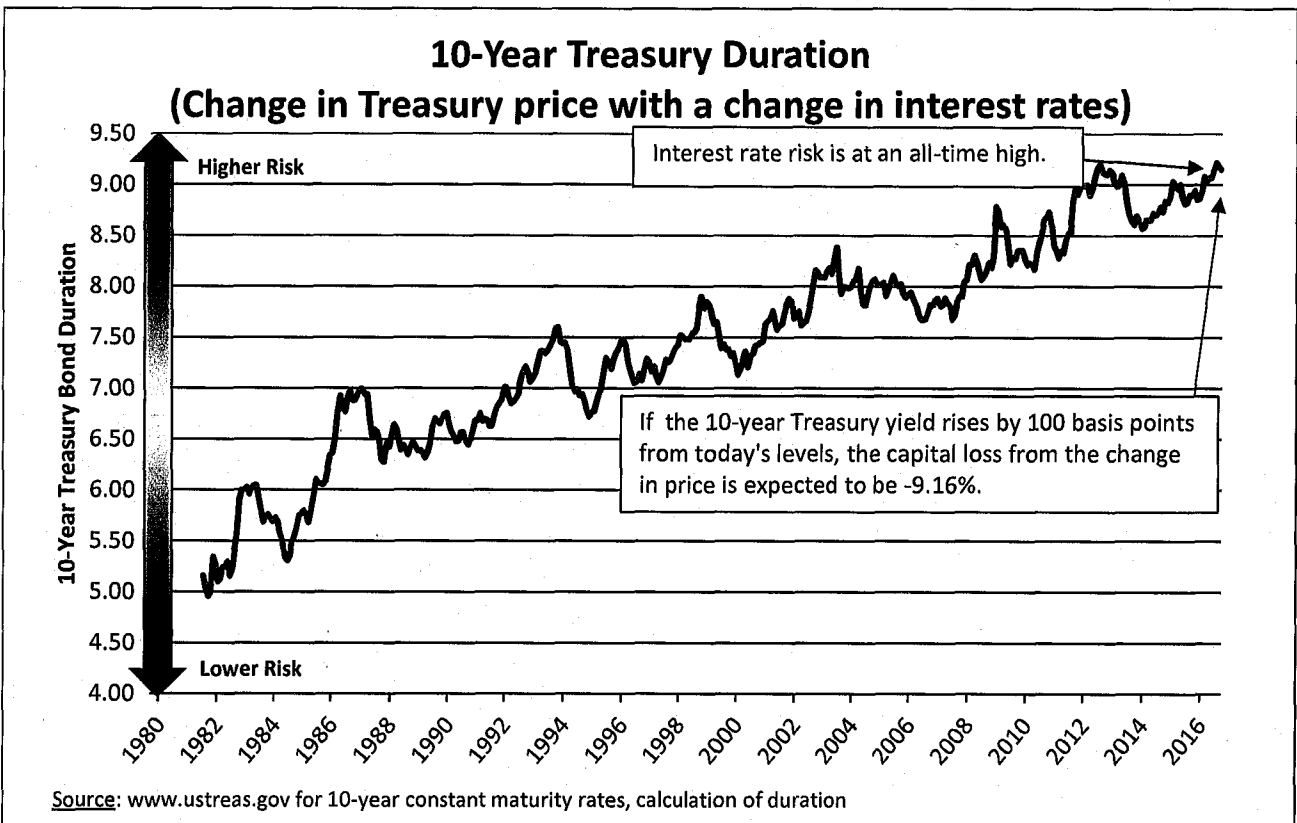
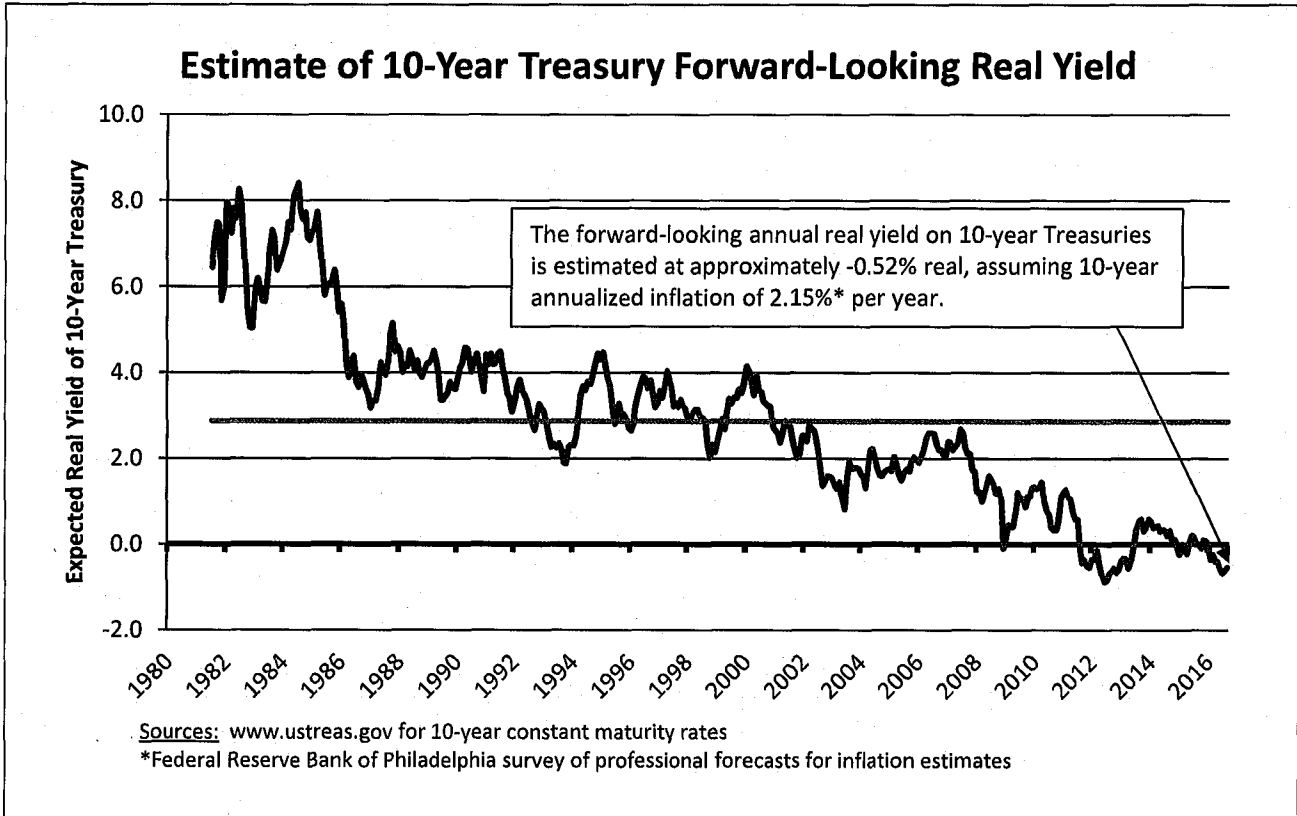
Measures of Inflation Expectations



(Please note the different time scales)



Measures of U.S. Treasury Interest Rate Risk



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:

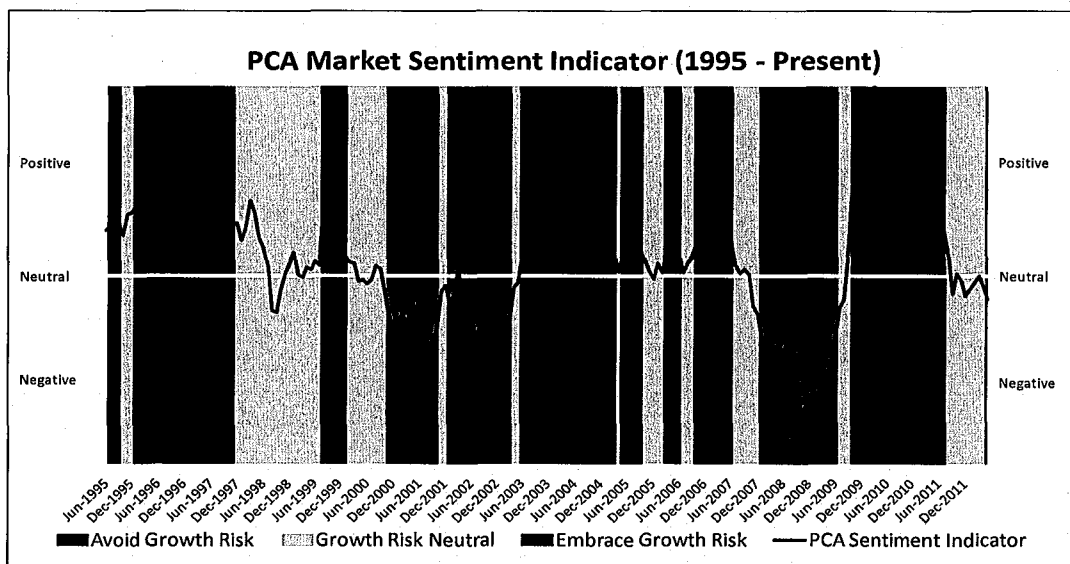
What is the PCA Market Sentiment Indicator (PMSI)?

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.

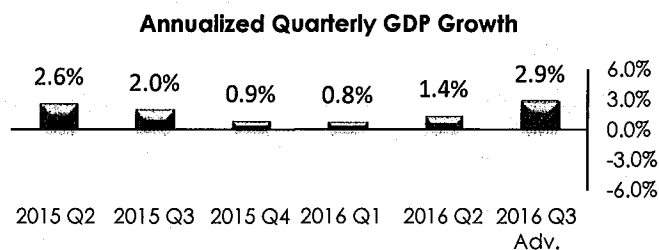
Momentum as we are defining it is the use of the past behavior of a series as a predictor of its future behavior.



Overview: US GDP growth increased by 2.9% in the third quarter, the largest quarterly increase since the third quarter of 2014. GDP growth during the third quarter was driven mostly by consumer spending on housing, utilities, and healthcare. The unemployment rate remained unchanged from the prior quarter at 4.9%. The seasonally adjusted Consumer Price Index for All Urban Consumers increased by 1.8% on an annualized basis during the quarter. Commodities declined during the third quarter and are now down (2.6%) over the trailing 1-year period. Global equities were positive for the quarter, returning 5.4% (MSCI ACWI). The US dollar depreciated against the Yen and Euro, but continued to appreciate against the British Pound. Bond markets produced a modest return over the quarter as the BC Universal increased by 1.0%.

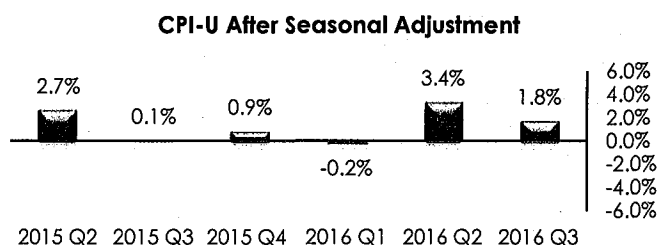
Economic Growth

- Real GDP increased at an annualized rate of 2.9 percent in the third quarter of 2016.
- Consumer spending was the biggest contributor to real GDP growth in the quarter, driven by spending on housing, utilities, and healthcare.
- GDP growth gains were partially offset during the quarter by a decline in residential housing investment, consumer spending on non-durable goods, and state and local government spending.



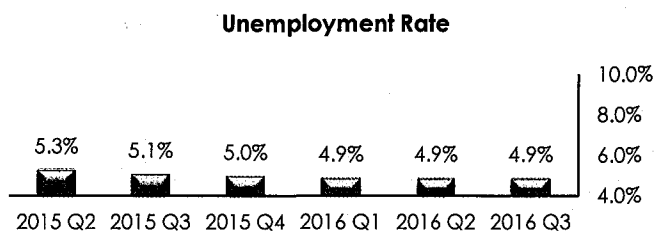
Inflation

- The Consumer Price Index for All Urban Consumers (CPI-U) increased 1.8 percent in the 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 1.9 percent for the quarter on an annualized basis after seasonal adjustment.
- Over the last 12 months, core CPI-U increased 2.2 percent after seasonal adjustment.



Unemployment

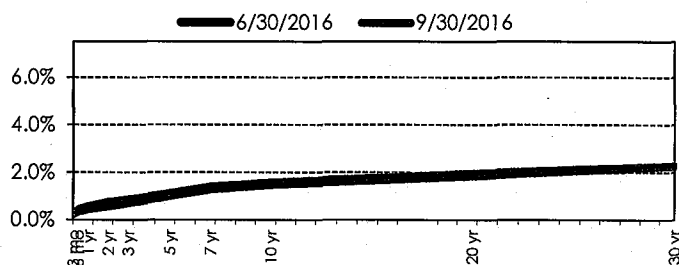
- The US economy gained approximately 575,000 jobs in the quarter.
- The unemployment rate remained at 4.9% at quarter end.
- The majority of jobs gained occurred in professional and businesses services, education, health care, and social assistance. The majority of jobs lost occurred in information, durable goods, and manufacturing.



Interest Rates & US Dollar

- US Treasury yields rose on average over the quarter.
- The Federal Reserve has continued to maintain the federal funds rate between 0.25 percent and 0.50 percent.
- The US dollar depreciated against the Yen and Euro by 1.8% and 1.2, respectively, and appreciated against the Pound by 2.6%.

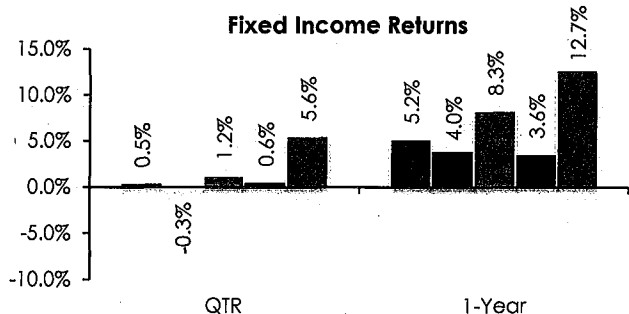
Treasury Yield Curve Changes



Source: US Treasury Department

Fixed Income

- US bonds delivered mostly marginal positive returns for the quarter, with high yield performing the best, returning 5.6%, while government performed the worst at (0.3%).
- Over the trailing 1-year period, credit materially outperformed all other sectors with investment grade credit producing an 8.6% return and high yield producing a 12.7% return.



■ BC Agg ■ BC Govt* ■ BC Credit ■ BC Mortgage ■ BC High Yield

*US Treasuries and Agencies

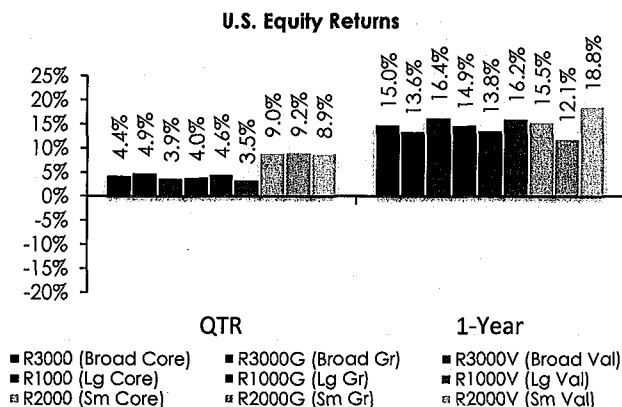
US Fixed Income Sector Performance (BC Aggregate Index)

Sector	Weight	QTR	1 Year
Governments*	40.2%	-0.2%	4.4%
Agencies	4.0%	0.3%	3.7%
Inv. Grade Credit	26.0%	1.4%	8.6%
MBS	27.6%	0.6%	3.6%
ABS	0.5%	0.2%	2.2%
CMBS	1.7%	0.6%	5.2%

*US Treasuries and Government Related

US Equities

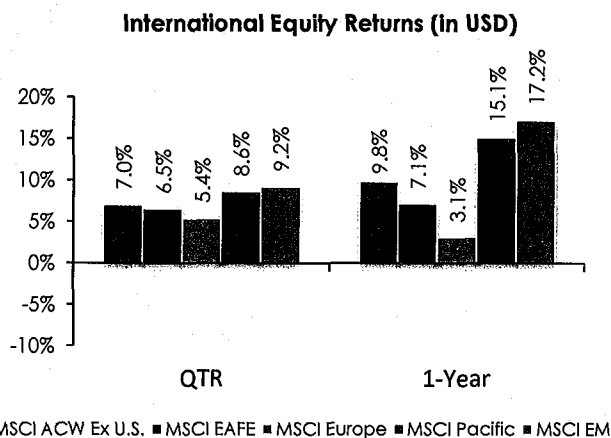
- During the quarter, growth stocks outperformed value stocks across the market capitalization spectrum. In terms of market capitalization, small cap stocks provided the strongest returns across styles. Large cap value stocks returned this quarter's weakest return at 3.5%.
- During the 1-year period, US equities provided positive double digit returns, with the top performer, small cap value, returning 18.8%. Conversely, small cap growth trailed all other market caps and styles with a return of 12.1%.



Sector	Weight	QTR	1 Year
Information Tech.	20.6%	13.9%	25.8%
Financials	13.4%	7.8%	8.0%
Health Care	14.1%	4.1%	15.0%
Consumer Disc.	12.8%	4.7%	14.4%
Industrials	10.3%	5.5%	21.5%
Consumer Staples	8.8%	-2.0%	17.2%
Energy	6.7%	4.2%	21.9%
Real Estate	4.3%	-0.5%	22.6%
Utilities	3.3%	-5.5%	20.5%
Materials	3.3%	5.7%	31.3%
Telecomm. Serv.	2.4%	-4.4%	26.6%

International Equities

- International equities performed well over the quarter, led by emerging markets with a return of 9.2%. Europe trailed all other major regions with a 5.4% return.
- Over the trailing 1-year period, international equities were positive across the board. Emerging markets and Pacific provided double digit returns of 17.2%, and 15.1%, respectively.



Sector	Weight	QTR	1 Year
Europe Ex. UK	31.2%	6.1%	3.8%
Emerging Markets	23.2%	9.2%	17.2%
Japan	16.8%	8.8%	12.5%
United Kingdom	13.3%	4.0%	1.6%
Pacific Ex. Japan	8.7%	8.2%	20.2%
Canada	6.8%	5.0%	15.4%

Market Summary – Long-term Performance*

Indexes	Month	Quarter	1 Year	3 Years	5 Years	10 Years	20 Years
Global Equity							
MSCI AC World Index	0.7%	5.4%	12.6%	5.7%	11.2%	4.9%	6.3%
Domestic Equity							
S&P 500	0.0%	3.9%	15.4%	11.2%	16.4%	7.2%	7.9%
Russell 3000	0.2%	4.4%	15.0%	10.4%	16.4%	7.4%	8.0%
Russell 3000 Growth	0.4%	4.9%	13.6%	11.4%	16.6%	8.8%	7.0%
Russell 3000 Value	-0.1%	3.9%	16.4%	9.5%	16.1%	5.8%	8.5%
Russell 1000	0.1%	4.0%	14.9%	10.8%	16.4%	7.4%	8.1%
Russell 1000 Growth	0.4%	4.6%	13.8%	11.8%	16.6%	8.8%	7.1%
Russell 1000 Value	-0.2%	3.5%	16.2%	9.7%	16.2%	5.9%	8.5%
Russell 2000	1.1%	9.0%	15.5%	6.7%	15.8%	7.1%	8.1%
Russell 2000 Growth	1.4%	9.2%	12.1%	6.6%	16.1%	8.3%	6.1%
Russell 2000 Value	0.8%	8.9%	18.8%	6.8%	15.4%	5.8%	9.5%
CBOE BXM Index	0.1%	1.8%	8.5%	7.5%	9.9%	4.4%	6.9%
International Equity							
MSCI AC World Index ex USA	1.3%	7.0%	9.8%	0.6%	6.5%	2.6%	5.1%
MSCI EAFE	1.3%	6.5%	7.1%	0.9%	7.9%	2.3%	4.7%
MSCI Pacific	2.1%	8.6%	15.1%	2.6%	7.5%	2.7%	2.3%
MSCI Europe	0.9%	5.4%	3.1%	0.0%	8.1%	2.1%	6.3%
MSCI EM (Emerging Markets)	1.3%	9.2%	17.2%	-0.2%	3.4%	4.3%	5.9%
Fixed Income							
BC Universal	0.0%	1.0%	6.1%	4.3%	3.6%	5.0%	5.8%
Global Agg. - Hedged	0.0%	0.5%	6.5%	5.0%	4.3%	4.7%	5.6%
BC Aggregate Bond	-0.1%	0.5%	5.2%	4.0%	3.1%	4.8%	5.6%
BC Government	-0.1%	-0.3%	4.0%	3.3%	2.2%	4.3%	5.3%
BC Credit Bond	-0.3%	1.2%	8.3%	5.4%	4.8%	5.8%	6.3%
BC Mortgage Backed Securities	0.3%	0.6%	3.6%	3.6%	2.6%	4.7%	5.5%
BC High Yield	0.7%	5.6%	12.7%	5.3%	8.3%	7.7%	7.1%
BC WGIL All Maturities - Hedged	0.1%	3.8%	11.4%	6.1%	4.5%	5.2%	--
Emerging Markets Debt	0.2%	3.1%	13.9%	6.6%	7.3%	7.4%	9.1%
Real Estate							
NCREIF UNLAGGED	0.6%	1.8%	9.2%	11.3%	11.2%	7.2%	9.8%
FTSE NAREIT All Equity Index	-1.4%	-1.0%	20.6%	13.7%	15.7%	6.0%	10.2%
Commodity Index							
Bloomberg Commodity Index	3.1%	-3.9%	-2.6%	-12.3%	-9.4%	-5.3%	0.6%

* Performance is annualized for periods greater than one year.

TOTAL PORTFOLIO REVIEW

OPFRS Portfolio Performance

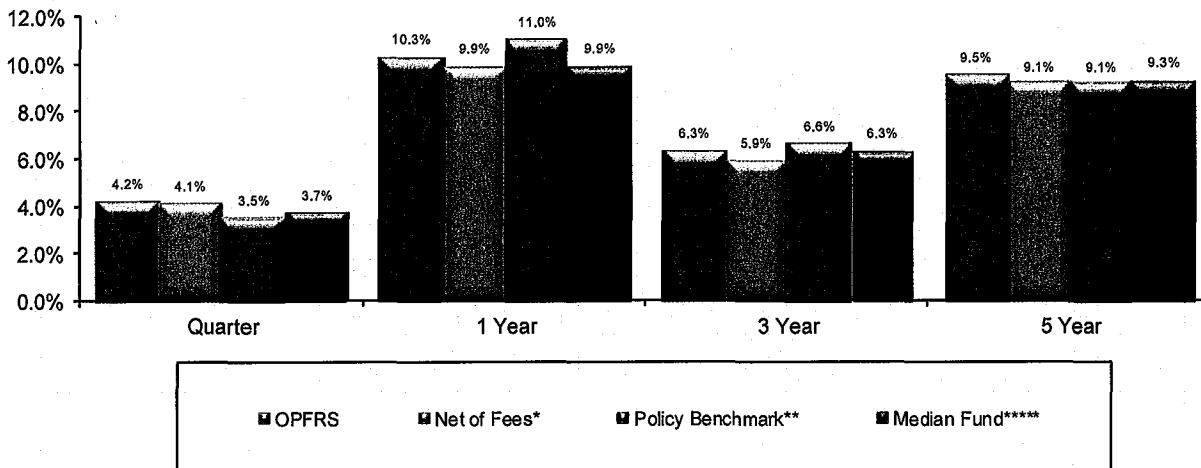
This section includes an overview of the performance of the OPFRS investment portfolio, as well as a detailed analysis of asset classes and specific mandates.

Portfolio Performance Overview

During the latest quarter ending September 30, 2016, the OPFRS Total Portfolio generated a return of 4.2%, gross of fees, outperforming its benchmark. The Plan's Domestic Equity allocation also outperformed its benchmark with a return of 4.8%, while the Plan's International Equity allocation outperformed its benchmark by 1.0%. The Plan's Fixed Income allocation outperformed its benchmark by 40 basis points, while the Covered Calls allocation returned 3.4%, outperforming its index by 1.6%.

The Total Portfolio produced positive relative results versus the policy benchmark over the quarter but has produced negative relative results over the 1- and 3-year periods while outperforming over the 5-year period, gross of fees. Relative to the Median Fund, The Total Portfolio outperformed over the quarter, 1-, and 5-year periods while matching the Median fund over the 3-year period. Performance differences with respect to the Median Fund continue to be attributed largely to differences in asset allocation.

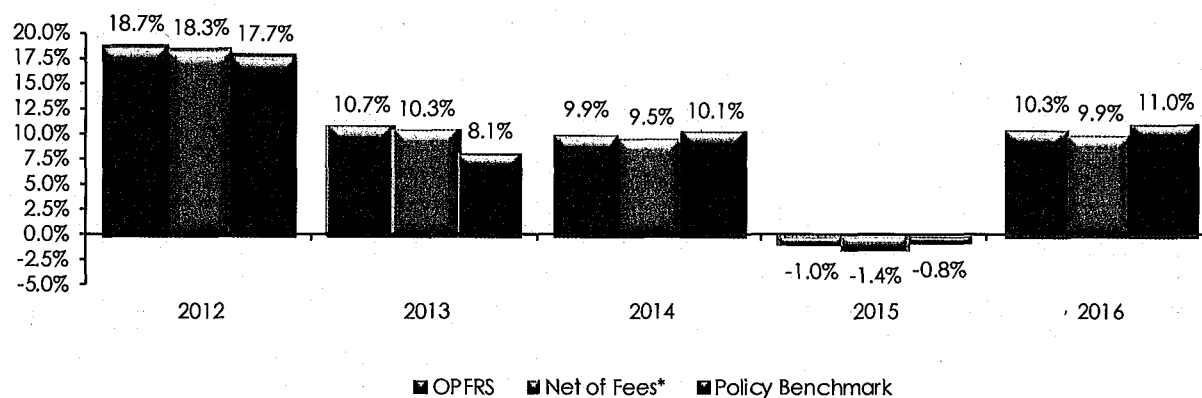
Periods Ending September 30, 2016 (annualized)



* Net of fee returns are estimated based on OPFRS manager fee schedule.
 ** The Evolving Policy Benchmark consists of 48% Russell 3000, 12% MSCI ACWI ex U.S., 20% BC Universal, and 20% CBOE BXM.
 *** Asset Allocation Benchmark by Asset Class is calculated using actual weightings of the broad asset classes.
 **** Asset Allocation Benchmark by Manager consists of weighted average returns of individual manager benchmarks, based on managers' actual allocations.
 ***** Median Fund is the Mellon Total Public Funds Universe.

Absolute performance results have been positive in four of the last five 12-month periods ending September 30. The Plan also outperformed or matched its policy benchmark in two out of the last five 1-year periods, gross of fees.

12-Month Performance – Periods Ending September 30



*Net of fee returns are estimated based on OPFRS manager fee schedule

Portfolio Valuation

The OPFRS portfolio had an aggregate value of \$363.2 million as of September 30, 2016. During the latest quarter, the portfolio increased by \$0.3 million, including (\$15.0) million in net benefit payments. Over the latest year, the portfolio decreased by (\$24.7) million, including (\$60.) million in net benefit payments.

Investment Portfolio Valuation as of September 30, 2016*

	September 30, 2016	June 30, 2016	Quarterly Change	Percentage Change	September 30, 2015	Annual Change	Percentage Change
OPFRS	\$363.2	\$362.9	\$0.3	0.1%	\$387.9	(\$24.7)	(6.4%)

*The calculations listed above represent change in dollar value and not investment returns.

Actual vs. Target Allocations

With respect to policy targets, the portfolio ended the latest quarter **overweight Domestic Equity, International Equity, and Cash, while underweight Covered Calls and Fixed Income**. Target weightings reflect the Plan's evolving asset allocation (effective 3/31/2014).

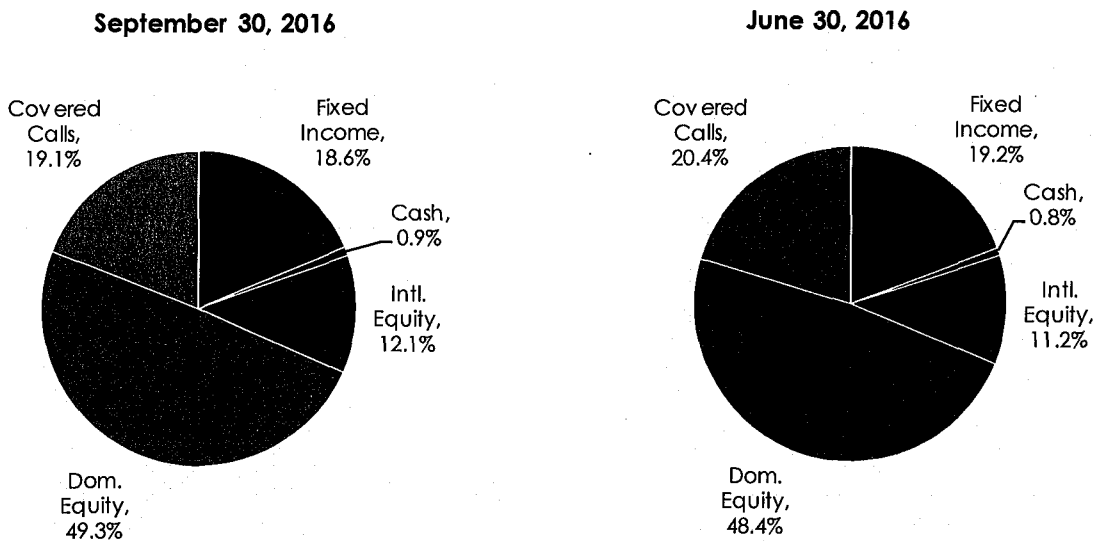
As of September 30, 2016

Segment	Actual \$(000)	Actual %*	Target %	Variance
Total Investment Portfolio	363,170	100.0%	100.0%	---
Domestic Equity	178,940	49.3%	48.0%	0.4%
Large Cap Equity	127,308	35.0%	34.0%	1.0%
Mid Cap Equity	31,889	8.8%	8.0%	0.8%
Small Cap Equity	19,743	5.4%	6.0%	-0.6%
International Equity	44,085	12.1%	12.0%	0.1%
Total Equity	223,025	61.4%	60.0%	1.4%
Fixed Income	67,650	18.6%	20.0%	-1.4%
Covered Calls	69,384	19.1%	20.0%	-0.9%
Cash	3,109	0.9%	0.0%	0.9%

* In aggregate, asset class allocations equal 100% of total investment portfolio. Differences due to rounding.

During the latest quarter, Domestic Equity's weighting increased by 0.9%, Fixed Income decreased its weighting by (0.6%), and International Equity's weighting increased by 0.9%. Actual weighting for Covered Calls decreased by (1.3%) and Cash weighting increased by 0.1%.

Investment Portfolio Actual Asset Allocation Comparison



Asset Class Performance

The **Domestic Equity** asset class outperformed its benchmark 40 basis points over the most recent quarter. Over the 1- and 3-year periods, the Domestic Equity portfolio underperformed its benchmark by (6) and (4) basis points, while underperforming by (20) basis points of the 5-year period.

The **International Equity** portfolio returned 8.0% during the most recent quarter, outperforming its policy benchmark by 1.0%. Over the most recent 1-year period, the International Equity portfolio trailed its benchmark by (0.5%), while outperforming over the 3- and 5-year periods by 1.1% and 1.7%, respectively.

The **Fixed Income** asset class outperformed its benchmark by 40 basis points over the most recent quarter, and underperformed by (20) basis points over the 1-year period. Over the longer-term, the Fixed Income portfolio matched its benchmark over the 3-year period, while outperforming over the 5-year period by 20 basis points.

The **Covered Calls** asset class outperformed its index by 1.6% over the quarter and outperformed the benchmark by 4.4% over the 1-year period.

Periods ending September 30, 2016

Asset Class	Quarter	1-Year	3-Year	5-Year
Total Investment Portfolio	4.2	10.3	6.3	9.5
<i>Policy Benchmark¹</i>	3.5	11.0	6.6	9.1
Public Equity	5.4	13.3	8.3	14.5
<i>Policy Benchmark²</i>	4.9	13.9	8.4	14.2
Domestic Equity	4.8	14.4	10.0	16.2
<i>Blended Benchmark⁴</i>	4.4	15.0	10.4	16.4
Large Cap	4.0	14.9	10.7	16.3
<i>Russell 1000</i>	4.0	14.9	10.8	16.4
Mid Cap	5.4	16.0	10.8	16.7
<i>Russell Midcap</i>	4.5	14.2	9.7	16.7
Small Cap	8.6	9.7	5.2	16.1
<i>Russell 2000</i>	9.0	15.5	6.7	15.8
International Equity	8.0	9.3	1.7	8.2
<i>Blended Benchmark⁵</i>	7.0	9.8	0.6	6.5
Fixed Income	1.4	5.9	4.3	3.8
<i>BC Universal (blend)⁶</i>	1.0	6.1	4.3	3.6
Covered Calls	3.4	12.9	---	---
<i>CBOE BXM</i>	1.8	8.5	---	---

¹ The Evolving Policy Benchmark consists of 48% Russell 3000, 12% MSCI ACWI ex U.S., 20% BC Universal, and 20% CBOE BXM.

² The Public Equity benchmark consists of 80% Russell 3000 and 20% MSCI ACWI ex U.S.

⁴ Domestic Equity Benchmark consists of S&P 500 thru 3/31/98, 29% R1000, 57% R1000V, 14% RMC from 4/1/98 - 12/31/04, and Russell 3000 from 1/1/05 to the present.

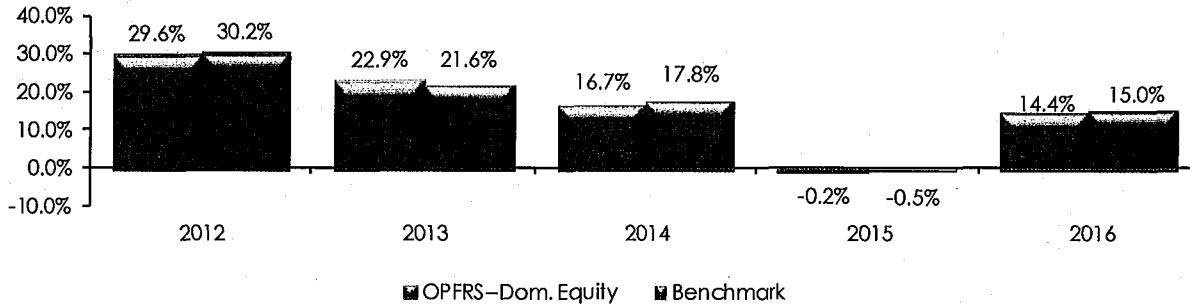
⁵ International Equity Benchmark consists of MSCI EAFE thru 12/31/04, and MSCI ACWI x U.S. thereafter.

⁶ Fixed Income Benchmark consists of BC Aggregate prior to 4/1/06, BC Universal prior to 7/1/2012, and a blend of 75% bills, 25% BC Universal thereafter.

Asset Class Performance

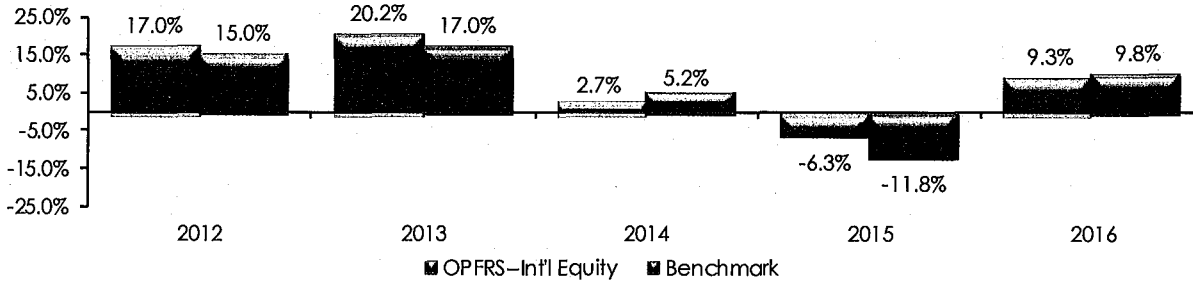
The Domestic Equity portfolio outperformed the policy benchmark in two out of five of latest 12-month periods. The Plan finished the latest 12-month period, ending September 30, 2016, with a return of 14.4%, underperforming the policy benchmark by (0.6%).

Domestic Equity 12-Month Performance – Periods Ending September 30



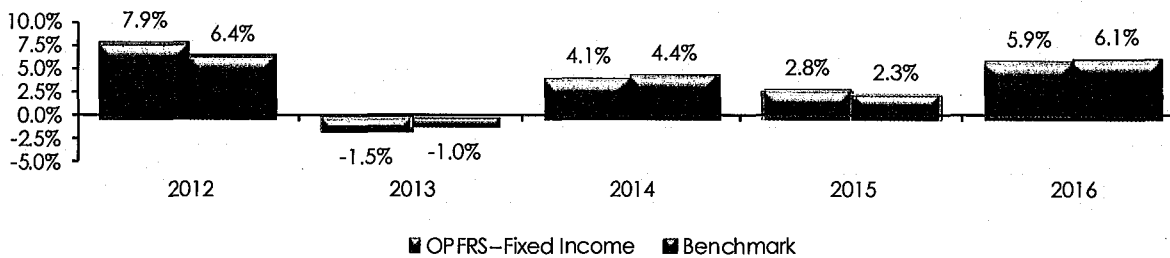
The International Equity portfolio outperformed the policy benchmark in three of the five latest 12-month periods. The Plan finished the latest 12-month period, ending September 30, 2016, with a return of 9.3%, underperforming the policy benchmark by (50) basis points.

International Equity 12-Month Performance – Periods Ending September 30



The Fixed Income portfolio outperformed the policy benchmark in two of the last five 12-month periods. The Plan finished the latest 12-month period, ending September 30, 2016, with a return of 5.9%, underperforming the policy benchmark by (20) basis points.

Fixed Income 12-Month Performance – Periods Ending September 30



Manager Performance**Domestic Equity – Periods ending September 30, 2016**

Manager	Mkt Value (\$000)	Asset Class	Quarter	1 YR	3 YR	5 YR	Since Inception*	Inception Date**
Northern Trust R1000 Index	73,402	Large Cap Core	4.0	14.7	10.8	16.4	12.9	5/2010
Russell 1000 Index	---	---	4.0	14.9	10.8	16.4	12.2	---
SSgA Russell 1000 Value	27,010	Large Cap Value	3.5	16.3	---	---	4.5	10/2014
Russell 1000 Value Index	---	---	3.5	16.2	---	---	4.4	---
SSgA Russell 1000 Growth	26,897	Large Cap Growth	4.6	13.8	---	---	7.3	10/2014
Russell 1000 Growth Index	---	---	4.6	13.8	---	---	7.3	---
Earnest	31,889	Mid Cap Core	5.4	16.0	10.8	16.7	8.1	3/2006
Russell MidCap	---	---	4.5	14.2	9.7	16.7	8.0	---
NWQ	10,618	Small Cap Value	8.5	19.4	9.4	18.4	7.1	1/2006
Russell 2000 Value Index	---	---	8.9	18.8	6.8	15.4	5.9	---
Russell 200 Growth ETF	9,125	Small Cap Growth	---	---	---	---	---	8/2010
Russell 2000 Growth Index	---	---	---	---	---	---	---	---

* Performance is calculated based on the first full month of performance since funding.

** Inception date reflects the month when portfolio received initial funding.

During the latest three-month period ending September 30, 2016, one of OPFRS' two active domestic equity managers outperformed its respective benchmark.

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.

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 the quarter with an 5.4% return, outperforming the Russell Midcap Index by 90 basis points. Over the latest 1- and 3-year periods, Earnest outperformed its benchmark by 1.8% and 1.1%, respectively, while matching the benchmark over the 5-year period.

NWQ, the Plan's small cap value manager, underperformed the Russell 2000 Value Index by (40) basis points over the latest quarter. Over the 1-year period, NWQ outperformed its benchmark by 0.6% while also outperforming over the 3- and 5-year periods by 2.6% and 3.0%, respectively.

Russell 2000 Growth ETF, the Plan's former small cap growth manager, Lord Abbett, was terminated in July and has been temporarily replaced with a Russell 2000 Growth ETF until a new Small Cap Growth manager can be found.

International Equity – Periods ending September 30, 2016

Manager	Mkt Value (\$000)	Asset Class	Quarter	1 YR	3 YR	5 YR	Since Inception*	Inception Date**
SSgA	12,487	International	6.5	6.9	0.8	7.7	7.0	7/2002
MSCI EAFE Index	---	---	6.5	7.1	0.9	7.9	7.0	---
Hansberger	16,226	International	9.1	11.3	1.9	8.6	3.3	1/2006
MSCI ACWI x US	---	---	7.0	9.8	0.6	6.5	3.1	---
Fisher	15,372	International	8.0	9.2	2.1	8.2	2.6	3/2011
MSCI ACWI x US	---	---	7.0	9.8	0.6	6.5	1.8	---

* Performance is calculated based on the first full month of performance since funding.

** Inception date reflects the month when portfolio received initial funding.

During the latest three-month period, ending September 30, 2016, both of OPFRS' two active International Equity managers outperformed their 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 2.1%. The portfolio has also outperformed over the 1-, 3-, and 5-year periods by 1.5%, 1.3%, and 2.1%, respectively.

Fisher, one of OPFRS' active international equity managers, outperformed the MSCI ACWI x US Index by 1.0% during the quarter. Over the latest 1-year period, Fisher trailed its benchmark target by (60) basis points, but outperformed over the 3- and 5-year periods by 1.5% and 1.7%, respectively.

Fixed Income – Periods ending September 30, 2016

Manager	Mkt Value (\$000)	Asset Class	Quarter	1 YR	3 YR	5 YR	Since Inception **	Inception Date ***
Reams	22,532	Core Plus	0.5	5.5	4.2	4.5	6.0	1/1998
BC Universal Index (blend)*	---	---	1.0	6.1	4.3	3.6	5.4	---
T. Rowe Price	36,659	Core	0.8	6.0	4.6	3.7	4.1	4/2011
BC Aggregate Index	---	---	0.5	5.2	4.0	3.1	3.7	---
DDJ	8,414	H.Y. / B.L.	6.4	7.6	---	---	4.2	1/2015
BofAML US HY Master II	---	---	5.5	12.8	---	---	5.4	---

* Previously the benchmark for Reams was the BC Aggregate; this was changed to the BC Universal beginning 4/1/2006.

** Performance is calculated based on the first full month of performance since funding.

*** Inception date reflects the month when portfolio received initial funding.

During the latest three-month period, ending September 30, 2016, two of OPFRS' three active Fixed Income managers outperformed their respective benchmarks.

Reams, the Plan's core plus fixed income manager, produced a quarterly return of 0.5%, underperforming the BC Universal (blend) Index by (50) basis points. During the latest 1-year period, the portfolio trailed its benchmark by (60) basis points while underperforming its benchmark by (10) basis points over the 3-year period. Reams outperformed its benchmark over the 5-year period by 90 basis points.

T. Rowe Price, the Plan's core fixed income manager, produced a quarterly return of 0.8%, outperforming the BC Aggregate Index by 30 basis points. The portfolio outperformed its benchmark over the 1-year period by 80 basis points, while beating the benchmark by 60 basis points over both the 3- and 5-year periods.

DDJ, the Plan's High Yield & Bank Loan manager, outperformed its benchmark, the BofAML US High Yield Master II index, by 90 basis points over the most recent quarter, and underperformed over the 1-year period by (5.2%).

Covered Calls – Periods ending September 30, 2016

Manager	Mkt Value (\$000)	Asset Class	Quarter	1 YR	3 YR	5 YR	Since Inception **	Inception Date ***
Parametric	69,384	Covered Calls	3.4	12.9	---	---	6.6	3/2014
CBOE BXM	---	---	1.8	8.5	---	---	5.1	---

** Performance is calculated based on the first full month of performance since funding.

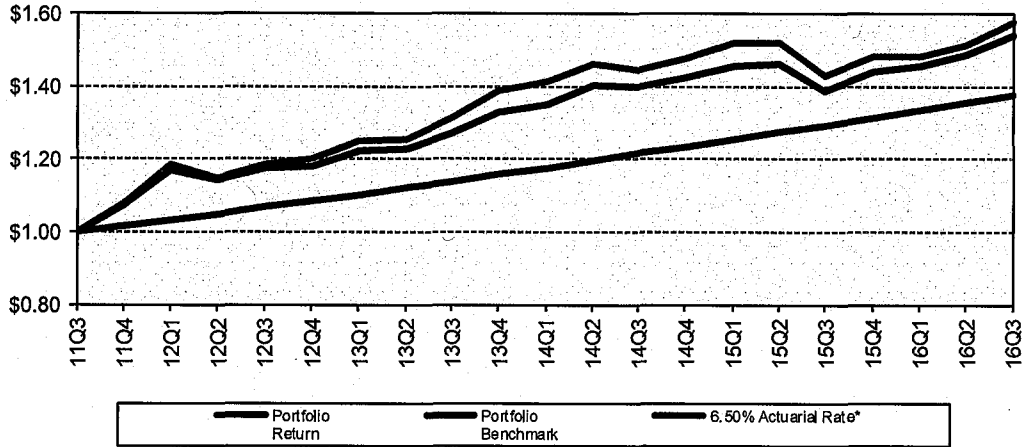
*** Inception date reflects the month when portfolio received initial funding.

During the latest three-month period ending September 30, 2016, OPFRS' Covered Calls manager outperformed its benchmark.

Parametric, the Plan's Covered Calls manager, produced a quarterly return of 3.4%, outperforming its benchmark by 1.6%. Over the most recent 1-year period, the portfolio has outperformed its benchmark by 4.4%.

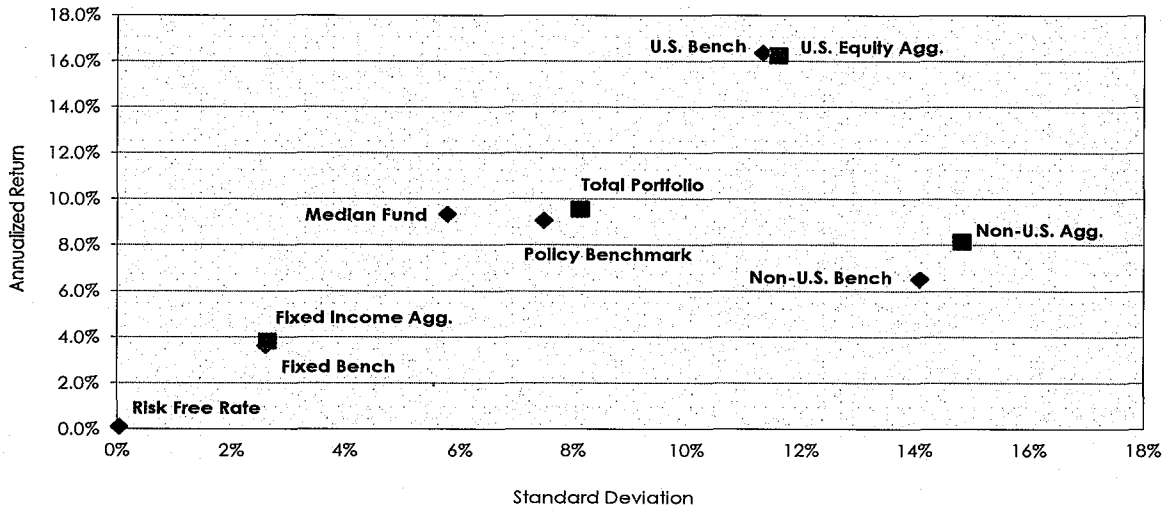
OPFRS Risk/Return Analysis
Period ending September 30, 2016

Growth of a Dollar
Past 5 Years



* 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

Five-Year Annualized Risk/Return



**City of Oakland Police & Fire Retirement, Asset Allocation
as of September 30, 2016**

Manager	Style	Market Value \$(000)	Target	Actual ¹	Difference
Total Plan		\$363,170	100.0%	100.0%	0.0%
Public Equity		\$223,026	60.0%	61.4%	1.4%
Domestic Equity		\$178,941	48.0%	49.3%	1.3%
Large Cap Equity					
Northern Trust	Large Cap Core	73,402	19.2%	20.2%	1.0%
SSgA Russell 1000 Value	Large Cap Value	27,010	7.4%	7.4%	0.0%
SSgA Russell 1000 Growth	Large Cap Growth	26,897	7.4%	7.4%	0.0%
Mid Cap Equity					
Earnest Partners	Mid Cap Core	31,889	8.0%	8.8%	0.8%
Small Cap Equity					
NWQ	Small Cap Value	10,618	3.0%	2.9%	-0.1%
Lord Abbett	Small Cap Growth	9,125	3.0%	2.5%	-0.5%
International Equity		\$44,085	12.0%	12.1%	0.1%
SSgA	International	12,487	3.6%	3.4%	-0.2%
Hansberger	International	16,226	4.2%	4.5%	0.3%
Fisher	International	15,372	4.2%	4.2%	0.0%
Fixed Income		\$67,650	20.0%	18.6%	-1.4%
Reams	Core Plus	22,532	8.0%	6.2%	-1.8%
T. Rowe Price	Core	36,659	10.0%	10.1%	0.1%
DDJ	High Yield/Bank Loans	8,414	2.0%	2.3%	0.3%
Transition (Reams) ³	Transition Portfolio	45	0.0%	0.0%	—
Covered Calls		\$69,384	20.0%	19.1%	-0.9%
Parametric (Eaton Vance)	Active/Replication	69,384	—	19.1%	—
Total Cash²		\$3,109	0.0%	0.9%	0.9%

1. In aggregate, asset class allocations equal to 100% of total investment portfolio.

2. Preliminary estimated balance includes cash balance with City Treasury and Torrey Pines Bank as of 9/30/2016.

3. Includes a residual \$44,509 in the Reams transition account.

MANAGER MONITORING / PROBATION LIST

Monitoring/Probation Status**As of September 30, 2016
Return vs. Benchmark since Corrective Action**

Portfolio	Status	Concern	Months Since Corrective Action	Performance [^] Since Corrective Action	Date of Corrective Action*
DDJ Capital	On Watch	Organizational	4	6.7%	5/25/2016
BofAML US High Yield M2	---	---	4	6.6%	---

[^] 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)
Active Domestic Equity	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
Active International Equity	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
Passive International Equity	Tracking Error > 0.50%	Tracking Error > 0.45% for 6 consecutive months	Fd annlzd return < bench annlzd return – 0.40% for 6 consecutive months
Fixed Income	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

All critelized basis.

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

**Oakland Police & Fire
Performance Summary and Universe Rankings
Period Ending September 30, 2016**

Mellon Total Funds - Public Universe				
	Quarter	1-Year	3-Year	5-Year
Maximum	5.4	13.0	8.9	13.2
Percentile 25	4.2	10.7	6.9	10.4
Median	3.7	9.9	6.3	9.3
Percentile 75	3.1	8.7	5.8	8.4
Minimum	0.4	2.0	1.0	1.5
Number of Portfolios	70	70	70	70
Oakland Police & Fire Total				
Return	4.2	10.3	6.3	9.5
Quartile Rank	1st	2nd	2nd	2nd

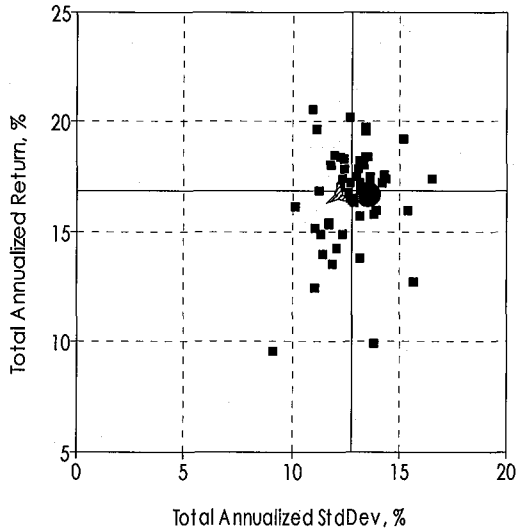
Notes:

Source: Mellon Total Public Funds Universe

All performance is shown **gross of fees**.

Oakland Mid Cap Core Manager Comparisons as of September 30, 2016

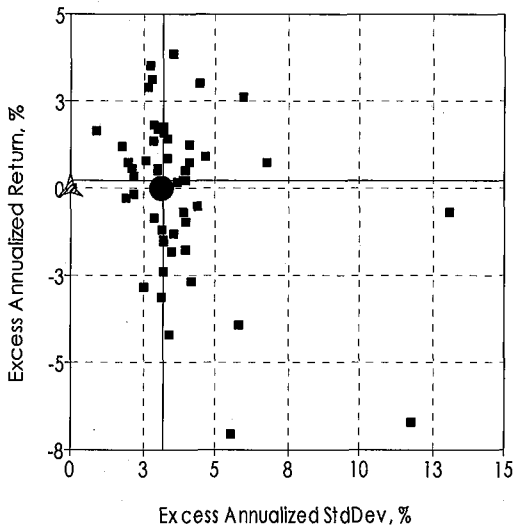
5-Year Total Risk/Return



	Annualized Return, %	Annualized StdDev, %	Sharpe Ratio
Earnest Partners	16.67	13.52	1.23
Russell Mid-Cap Index	16.67	12.21	1.37
Mid Cap Core Universe Median	16.88	12.78	1.29

● Earnest Partners ▲ Russell Mid-Cap Index

5-Year Excess Risk/Return

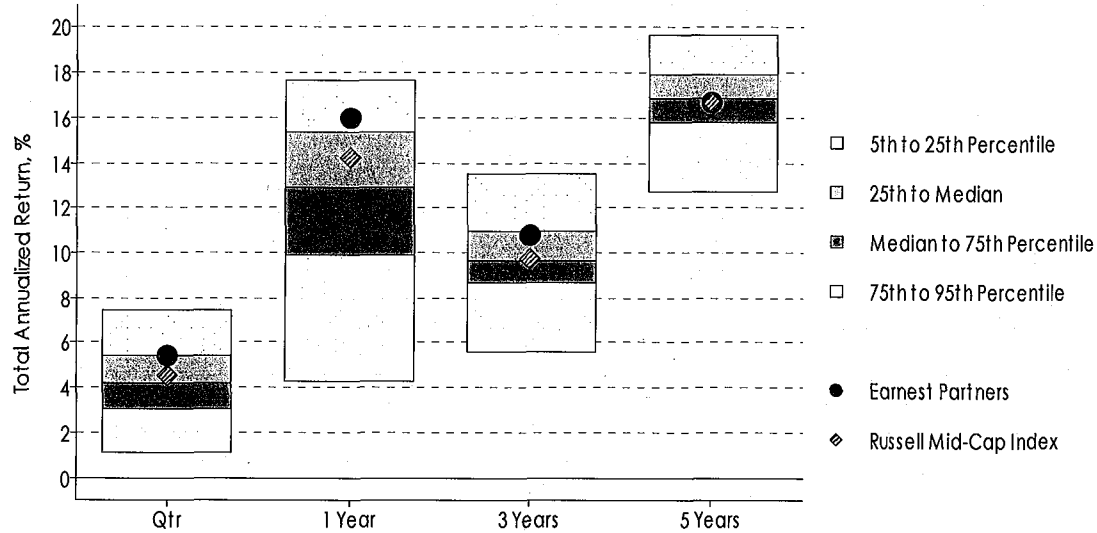


	Annualized Excess Return, %	Annualized Excess StdDev, %	Sharpe Ratio, Excess
Earnest Partners	0.00	3.18	0.00
Russell Mid-Cap Index	0.00	0.00	NA
Mid Cap Core Universe Median	0.20	3.20	0.05

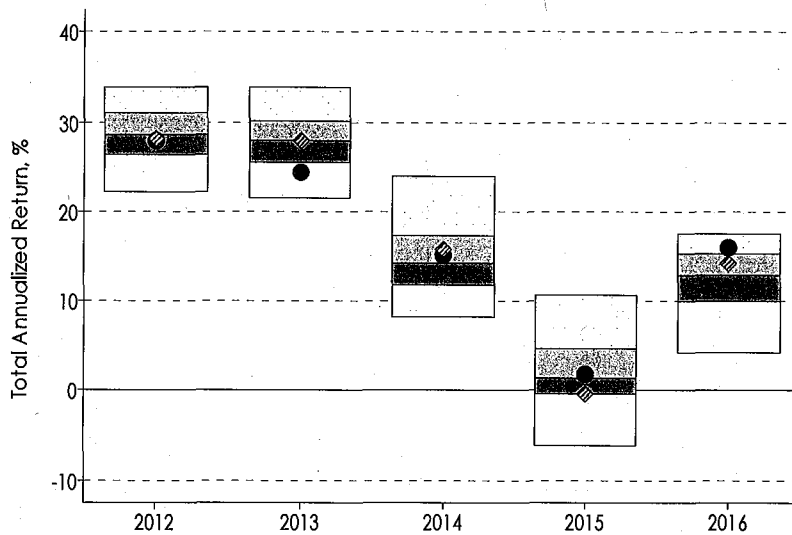
● Earnest Partners ▲ Russell Mid-Cap Index

Oakland Mid Cap Core Manager Comparisons as of September 30, 2016

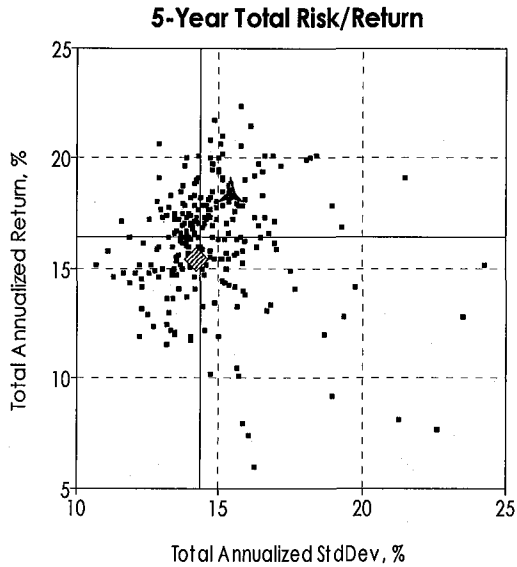
Annualized Universe Returns



12-Month Performance

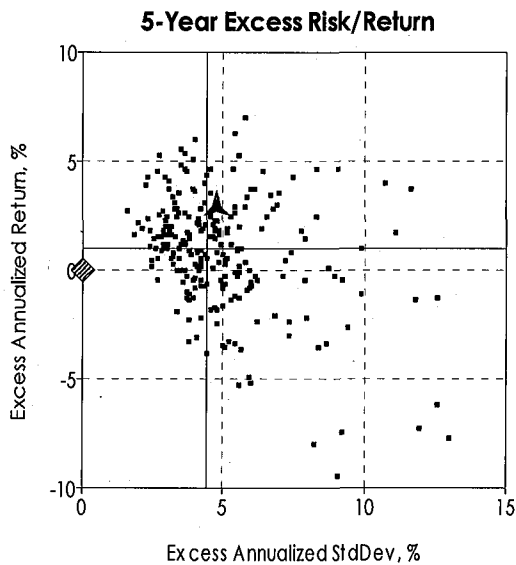


Oakland Small Cap Value Manager Comparisons as of September 30, 2016



	Annualized Return, %	Annualized StdDev, %	Sharpe Ratio
NW Q	18.39	15.36	1.20
Russell 2000 Value Index	15.45	14.24	1.09
Small Cap Value Universe Median	16.49	14.35	1.17

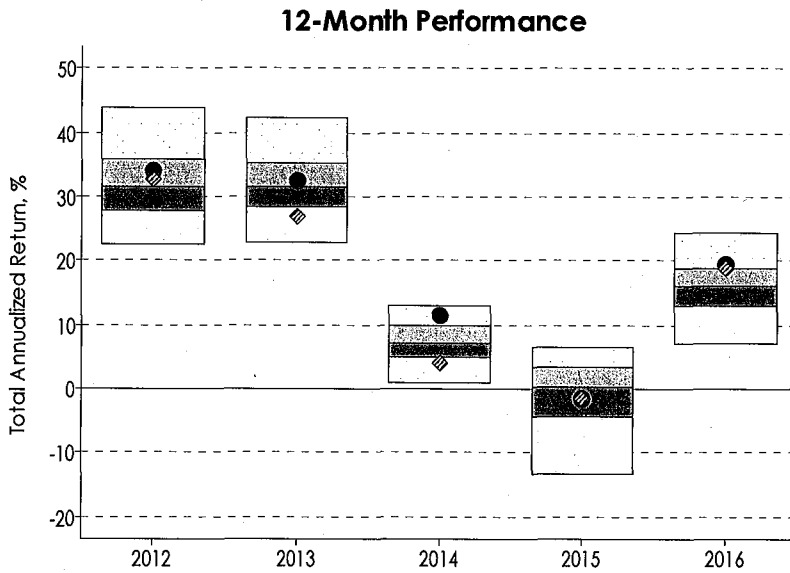
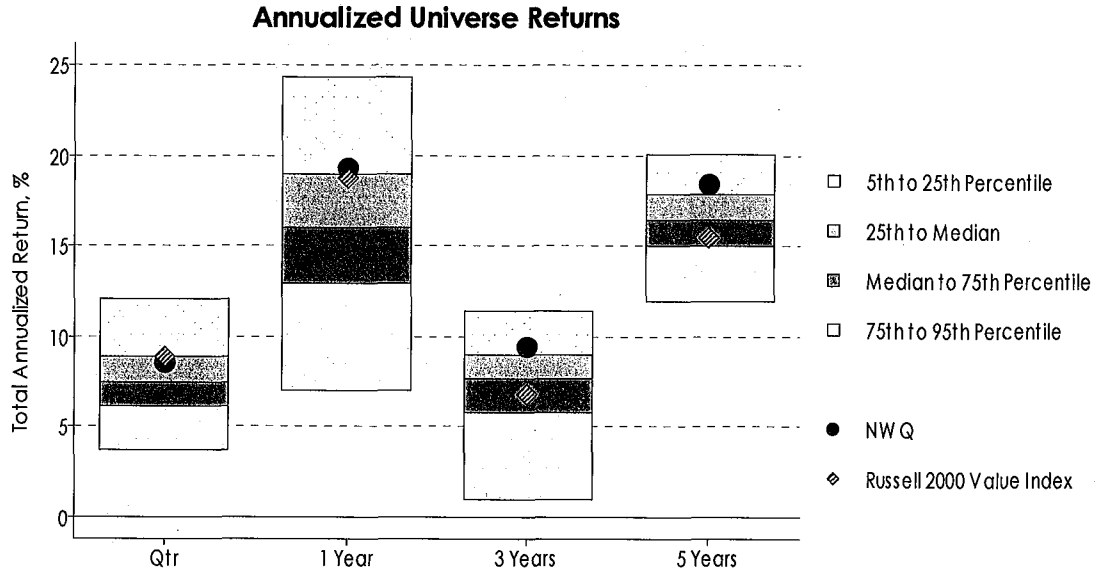
▲ NW Q ◆ Russell 2000 Value Index



	Annualized Excess Return, %	Annualized Excess StdDev, %	Sharpe Ratio, Excess
NW Q	2.94	4.76	0.62
Russell 2000 Value Index	0.00	0.00	NA
Small Cap Value Universe Median	1.04	4.39	0.26

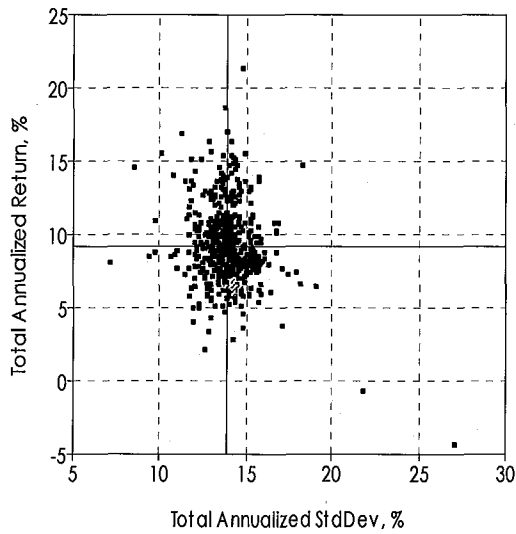
▲ NW Q ◆ Russell 2000 Value Index

Oakland Small Cap Value Manager Comparisons as of September 30, 2016



Oakland International Equity Manager Comparisons as of September 30, 2016

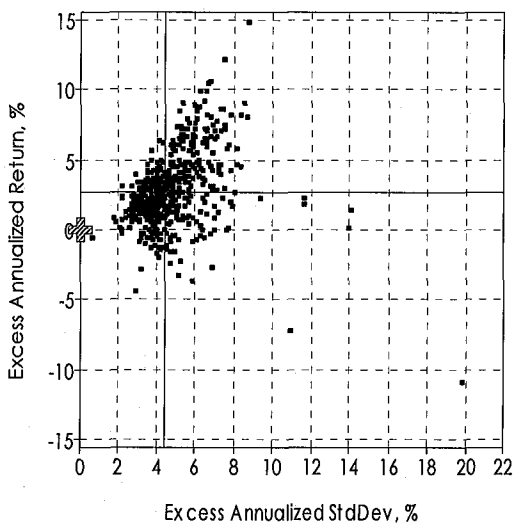
5-Year Total Risk/Return



▲ Hansberger ◆ Fisher ◻ MSCI AC World Index ex USA

	Annualized Return, %	Annualized StdDev, %	Sharpe Ratio
Hansberger	8.62	15.43	0.56
Fisher	8.15	15.49	0.53
MSCI AC World Index ex USA	6.52	14.22	0.46
International Equity Universe Median	9.14	13.85	0.67

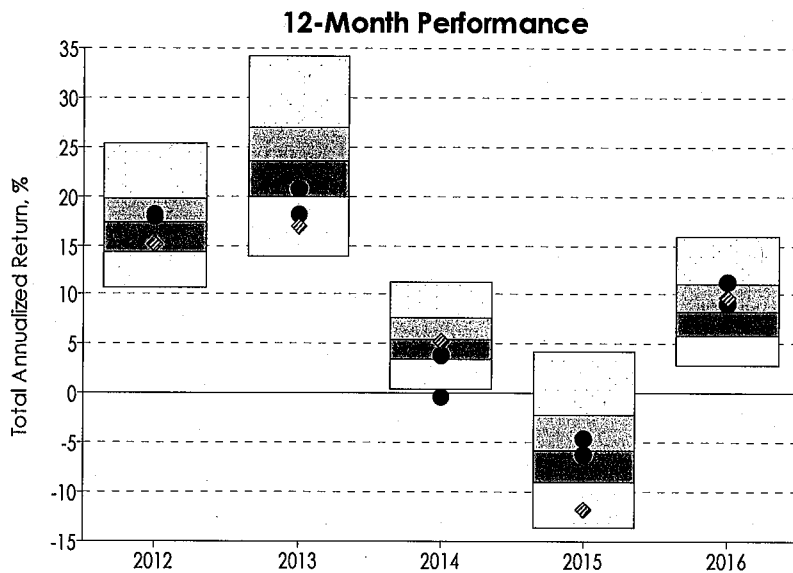
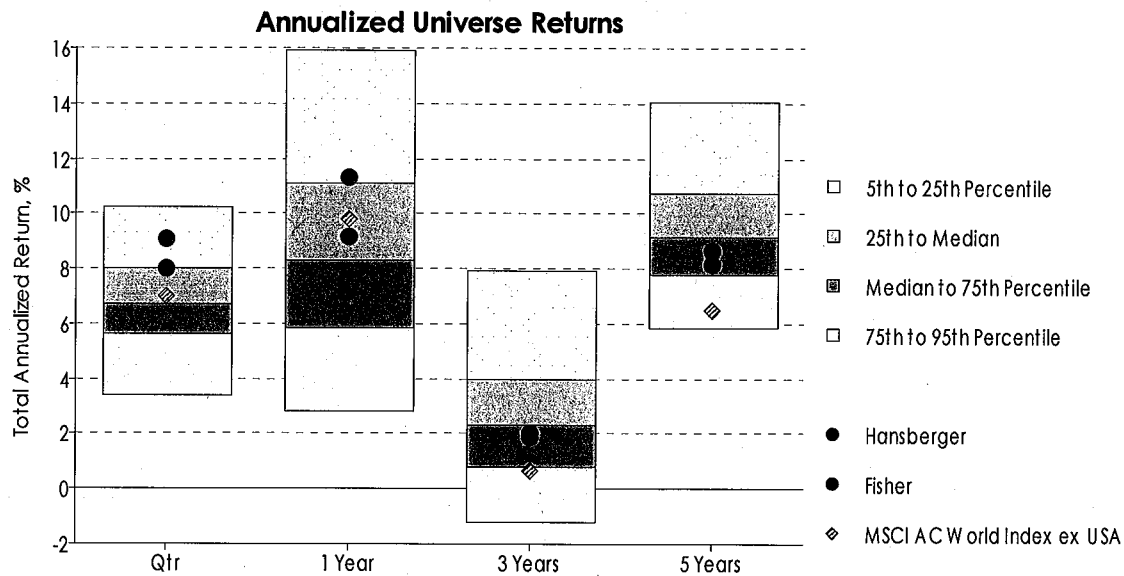
5-Year Excess Risk/Return



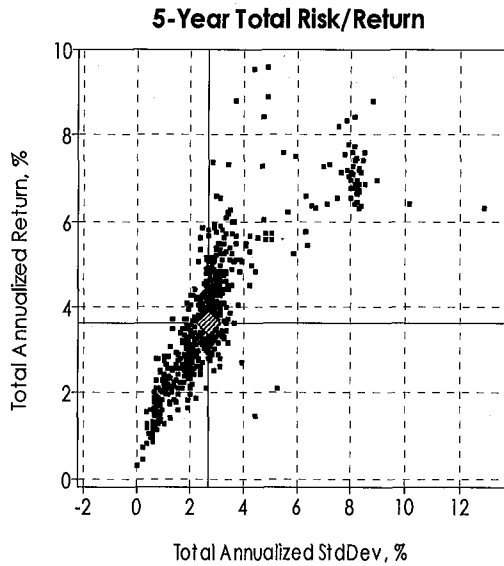
▲ Hansberger ◆ Fisher ◻ MSCI AC World Index ex USA

	Annualized Excess Return, %	Annualized Excess StdDev, %	Sharpe Ratio Excess
Hansberger	2.10	3.78	0.55
Fisher	1.63	3.67	0.44
MSCI AC World Index ex USA	0.00	0.00	NA
International Equity Universe Median	2.62	4.45	0.61

Oakland International Equity Manager Comparisons as of September 30, 2016

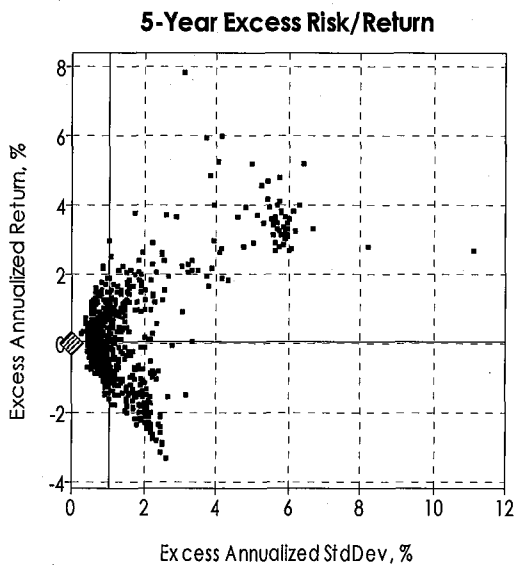


Oakland Core Plus Fixed Income Manager Comparisons as of September 30, 2016



	Annualized Return, %	Annualized StdDev, %	Sharpe Ratio
Reams	4.49	2.81	1.60
Oakland BC Universal Blend	3.62	2.63	1.38
U.S. F.I. Manager Universe Median	3.64	2.65	1.46

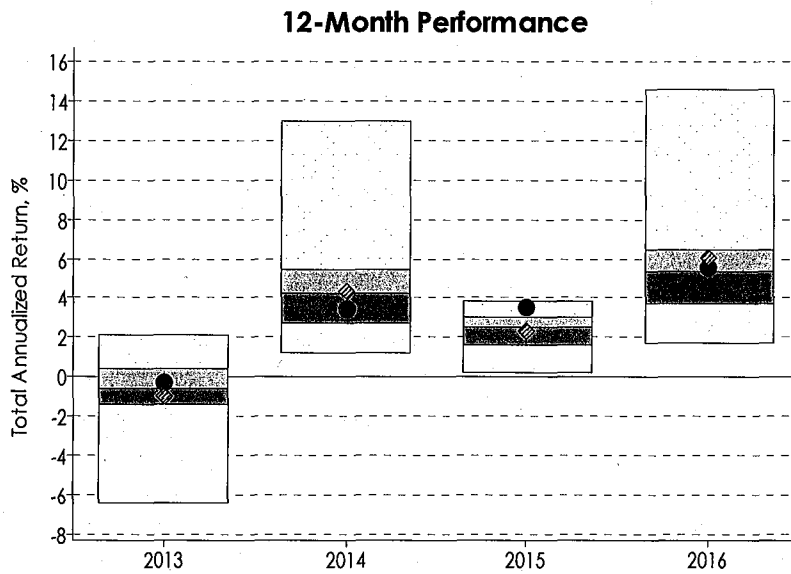
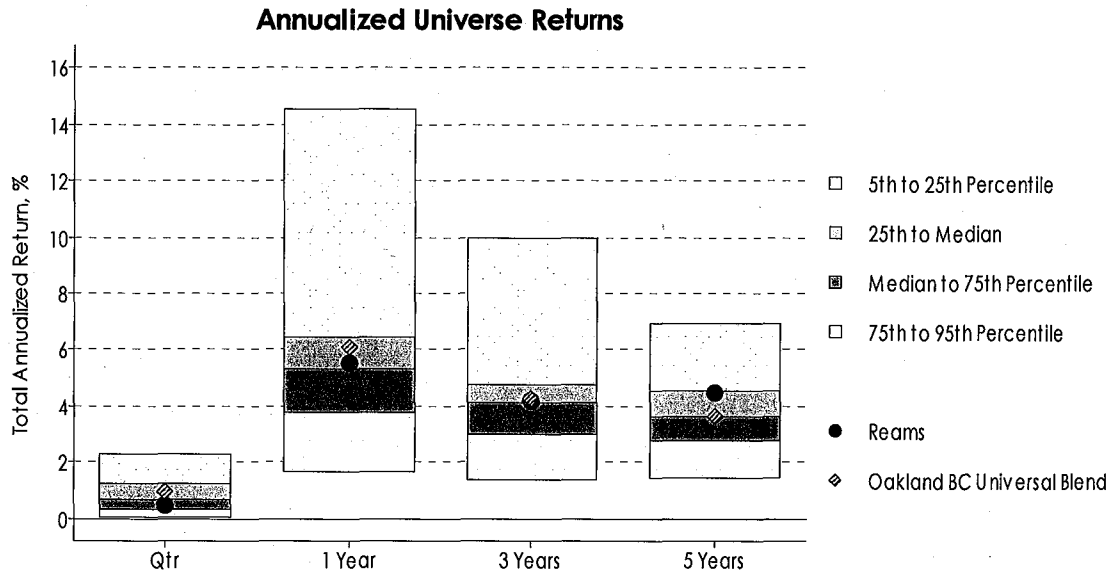
▲ Reams ◆ Oakland BC Universal Blend



	Annualized Excess Return, %	Annualized Excess StdDev, %	Sharpe Ratio, Excess
Reams	0.87	1.17	0.75
Oakland BC Universal Blend	0.00	0.00	NA
U.S. F.I. Manager Universe Median	0.02	1.04	0.03

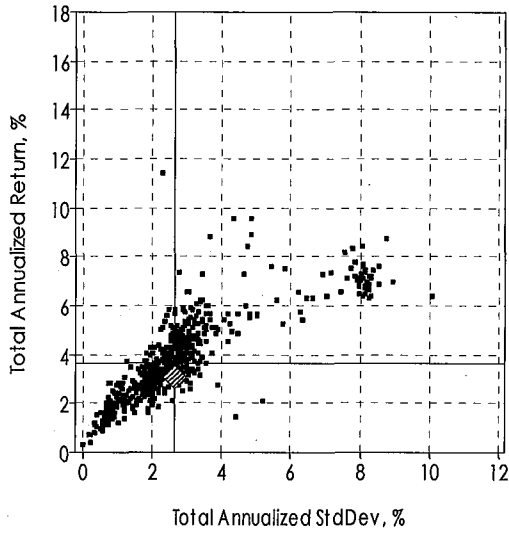
▲ Reams ◆ Oakland BC Universal Blend

Oakland Core Plus Fixed Income Manager Comparisons as of September 30, 2016



Oakland Core Fixed Income Manager Comparisons as of September 30, 2016

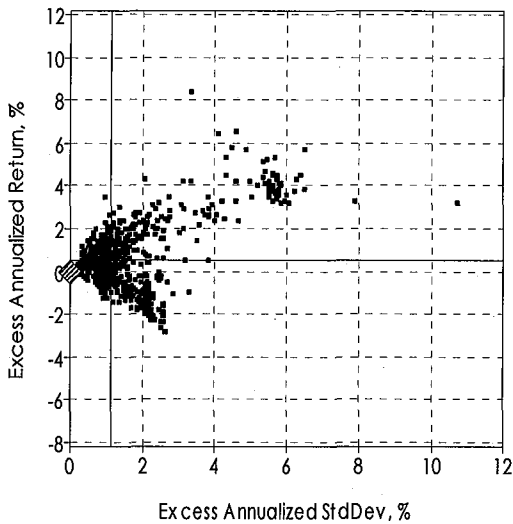
5-Year Total Risk/Return



▲ T. Rowe Price ◆ BC Aggregate Bond

	Annualized Return, %	Annualized StdDev, %	Sharpe Ratio
T. Rowe Price	3.70	2.64	1.40
BC Aggregate Bond	3.08	2.66	1.16
U.S. F.I. Manager Universe Median	3.64	2.65	1.46

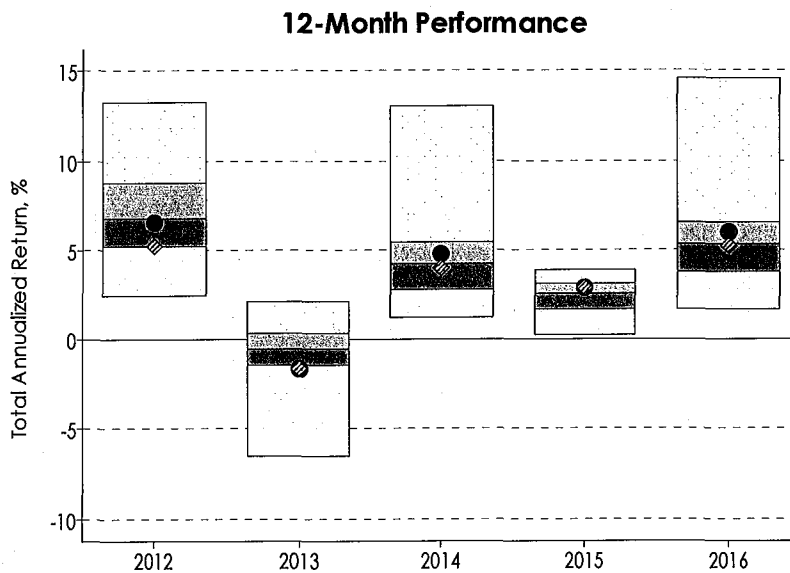
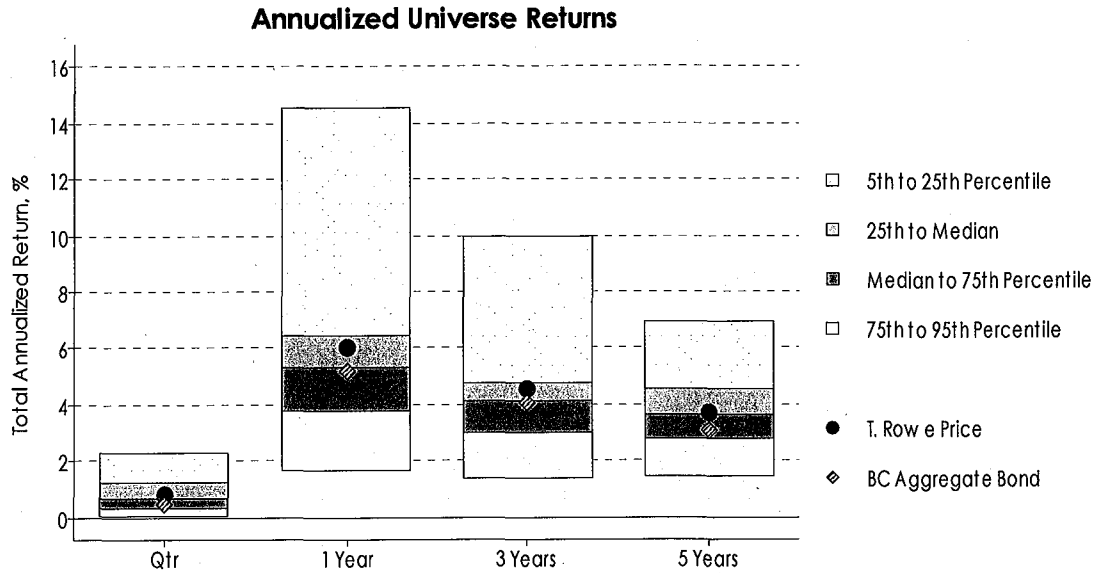
5-Year Excess Risk/Return



▲ T. Rowe Price ◆ BC Aggregate Bond

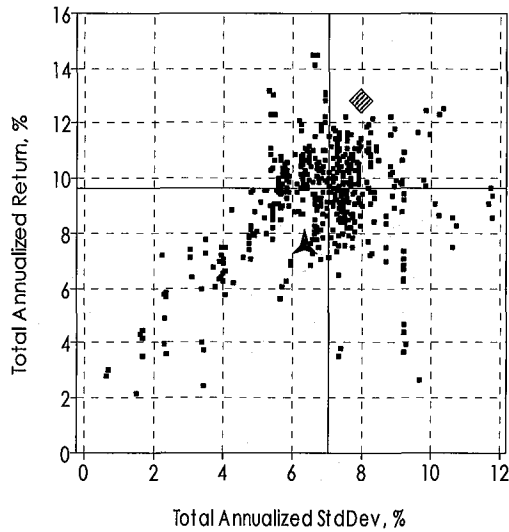
	Annualized Excess Return, %	Annualized Excess StdDev, %	Sharpe Ratio, Excess
T. Rowe Price	0.61	0.48	1.29
BC Aggregate Bond	0.00	0.00	NA
U.S. F.I. Manager Universe Median	0.56	1.16	0.59

Oakland Core Fixed Income Manager Comparisons as of September 30, 2016



Oakland HY/BL Fixed Income Manager Comparisons as of September 30, 2016

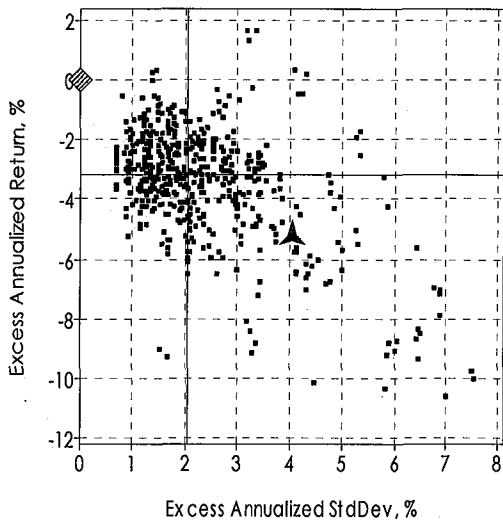
1-Year Total Risk/Return



	Annualized Return, %	Annualized StdDev, %	Sharpe Ratio
DDJ	7.55	6.38	1.18
The BofA Merrill Lynch US High Yield Index	12.82	7.95	1.61
High Yield Universe Median	9.65	7.06	1.41

▲ DDJ ◆ The BofA Merrill Lynch US High Yield Index

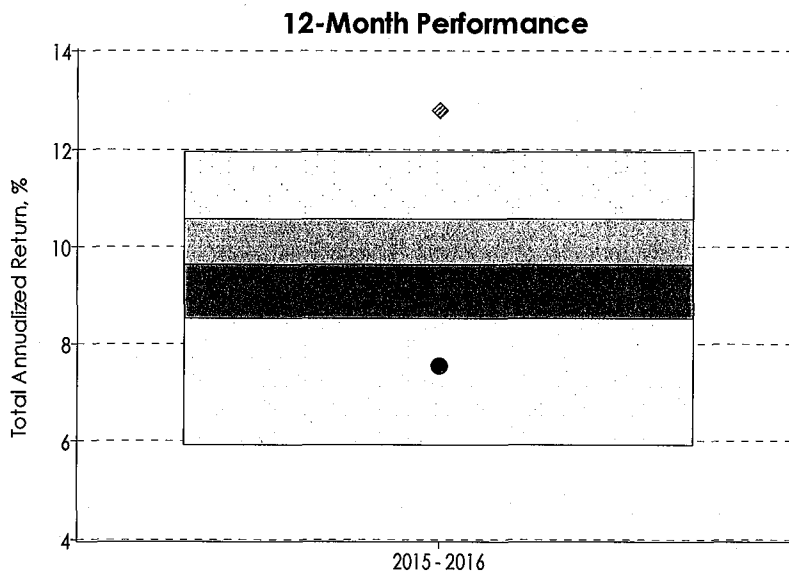
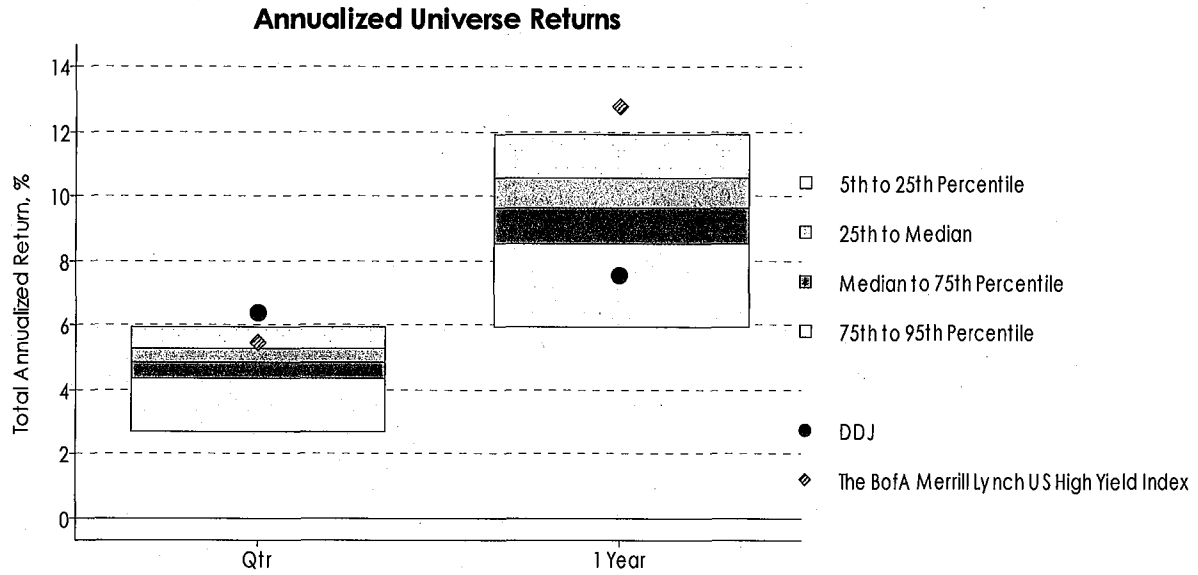
1-Year Excess Risk/Return



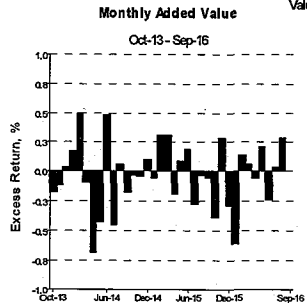
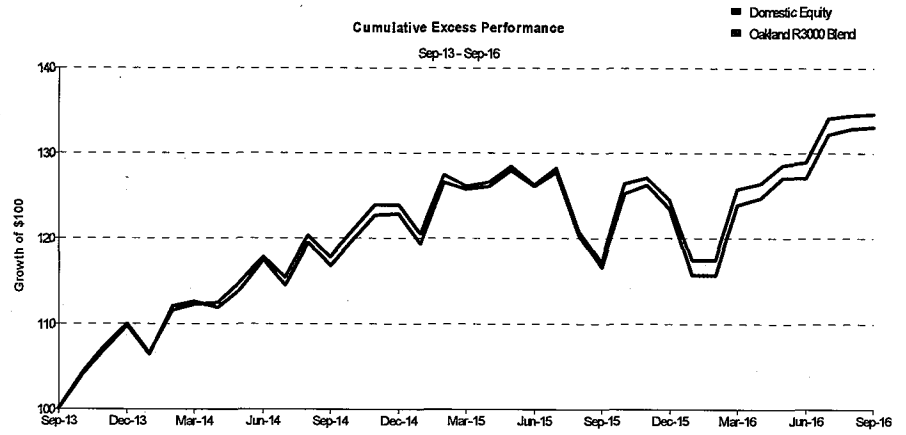
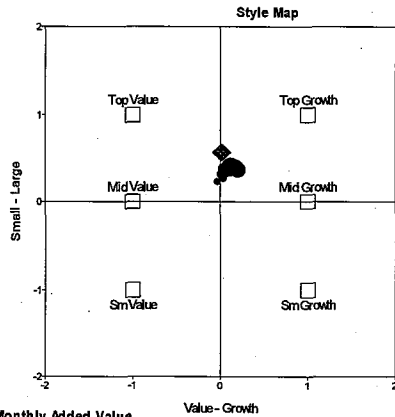
	Annualized Excess Return, %	Annualized Excess StdDev, %	Sharpe Ratio, Excess
DDJ	-5.26	4.06	-1.30
The BofA Merrill Lynch US High Yield Index	0.00	0.00	NA
High Yield Universe Median	-3.17	2.05	-1.45

▲ DDJ ◆ The BofA Merrill Lynch US High Yield Index

Oakland HY/BL Fixed Income Manager Comparisons as of September 30, 2016

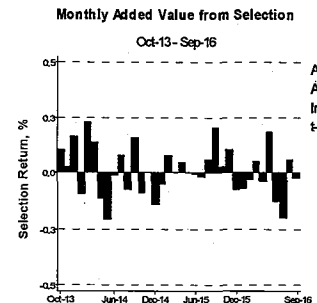


Domestic Equity



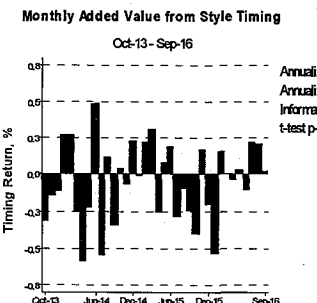
Annualized Return, %
 Annualized StdDev, %
 Information Ratio
 t-test p-value, %

-0.4
 1.0
 -0.4
 74.3



Annualized Return, %
 Annualized StdDev, %
 Information Ratio
 t-test p-value, %

0.1
 0.4
 72.3

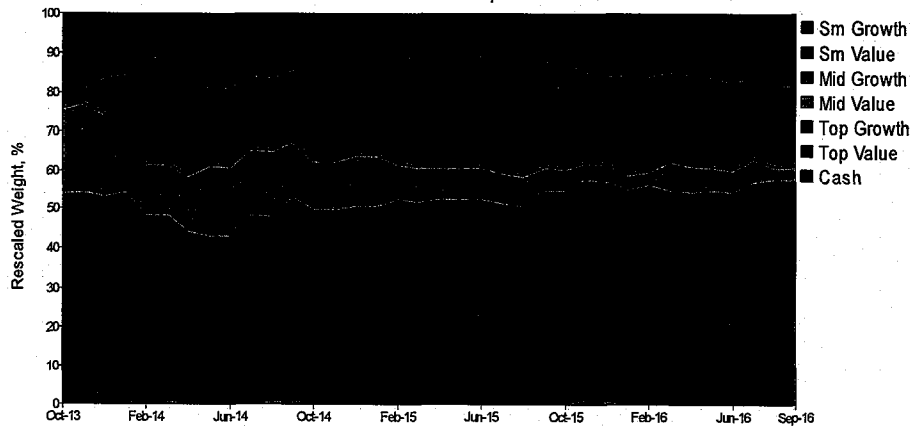


Annualized Return, %
 Annualized StdDev, %
 Information Ratio
 t-test p-value, %

-0.6
 0.9
 -0.7
 85.2

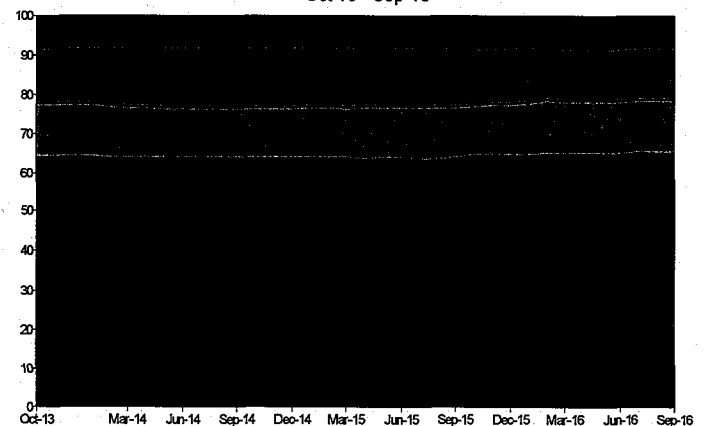
Asset Loadings - Manager

Oct-13 - Sep-16

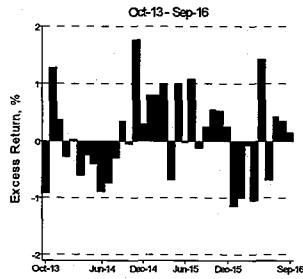
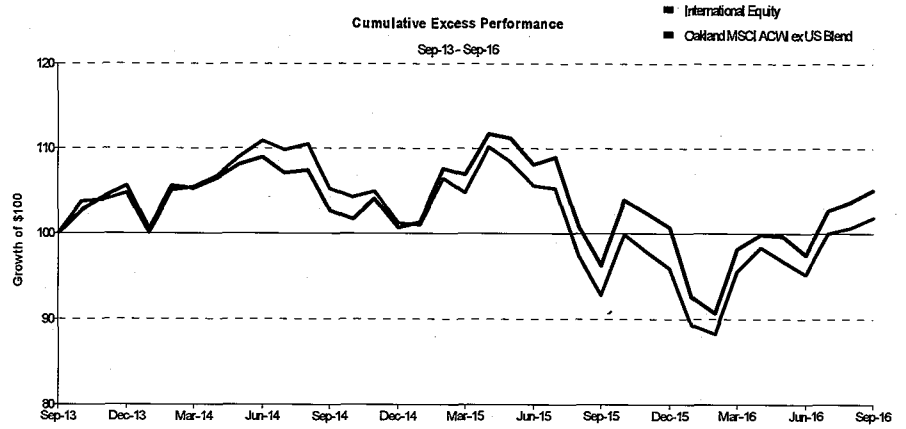
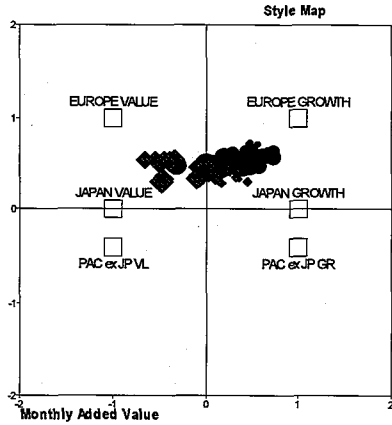


Asset Loadings - Benchmark

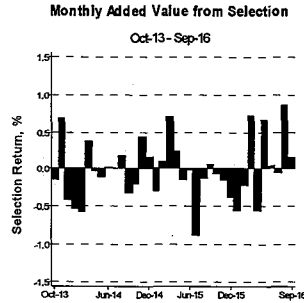
Oct-13 - Sep-16



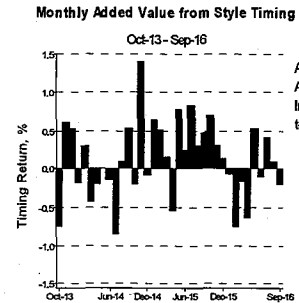
International Equity



Annualized Return, % 1.1
 Annualized StdDev, % 2.6
 Information Ratio 0.4
 t-test p-value, % 75.4



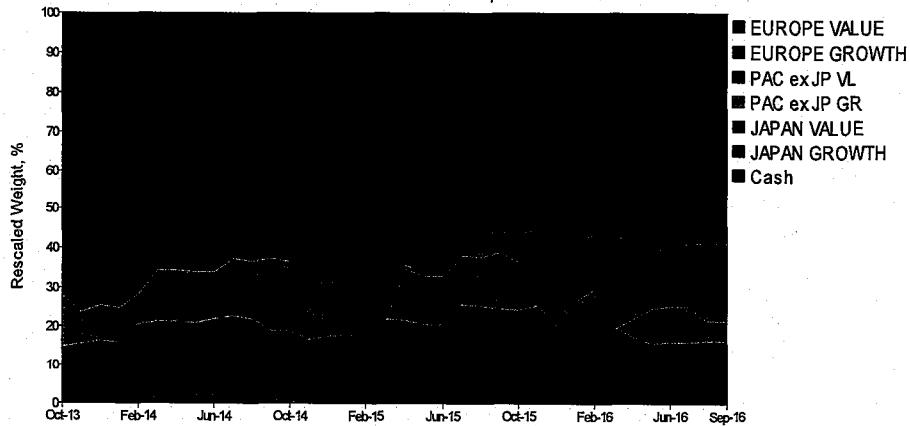
Annualized Return, % -0.1
 Annualized StdDev, % 1.4
 Information Ratio -0.1
 t-test p-value, % 56.9



Annualized Return, % 1.4
 Annualized StdDev, % 1.8
 Information Ratio 0.8
 t-test p-value, % 91.8

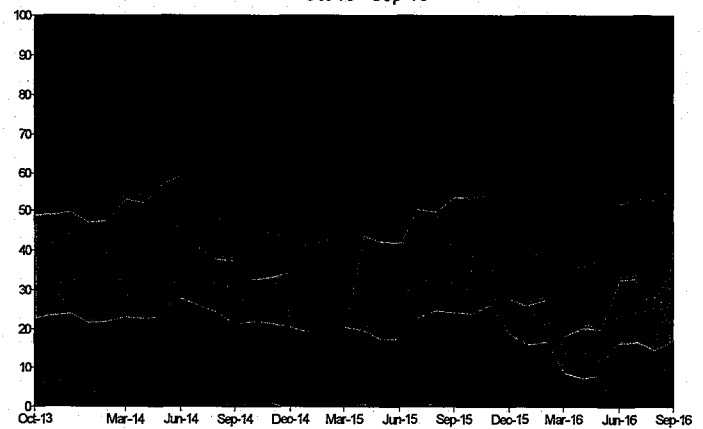
Asset Loadings - Manager

Oct-13 - Sep-16

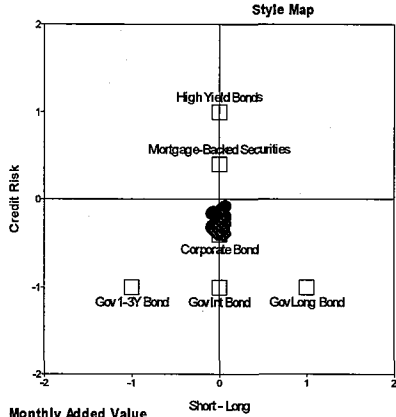


Asset Loadings - Benchmark

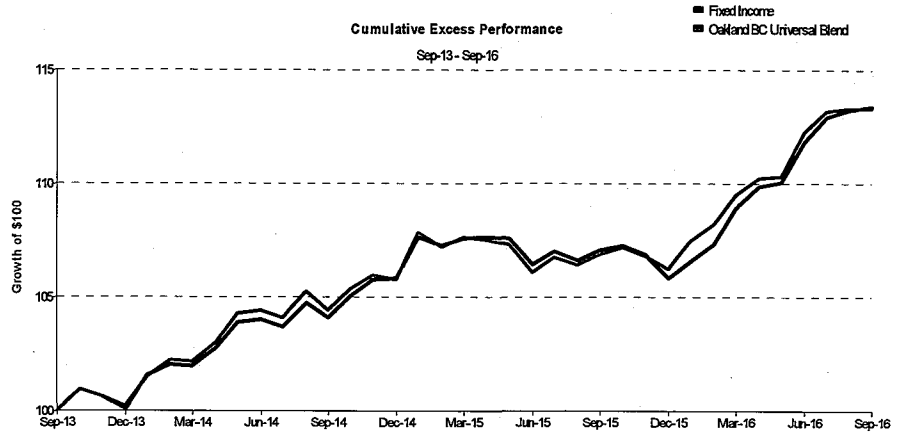
Oct-13 - Sep-16



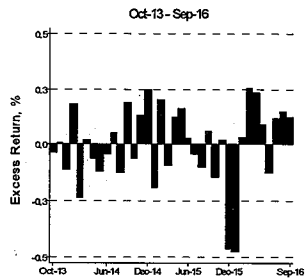
Fixed Income



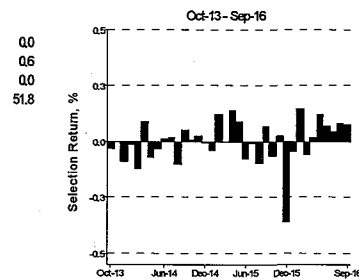
□ Style Map
● Fixed Income
◆ Oakland BC Universal Blend



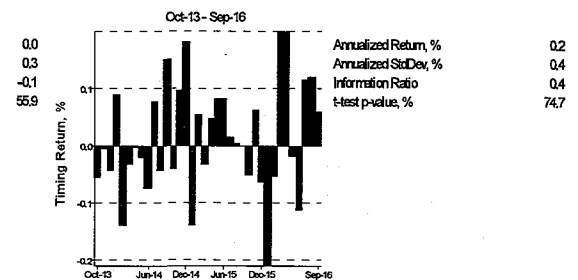
Monthly Added Value



Monthly Added Value from Selection

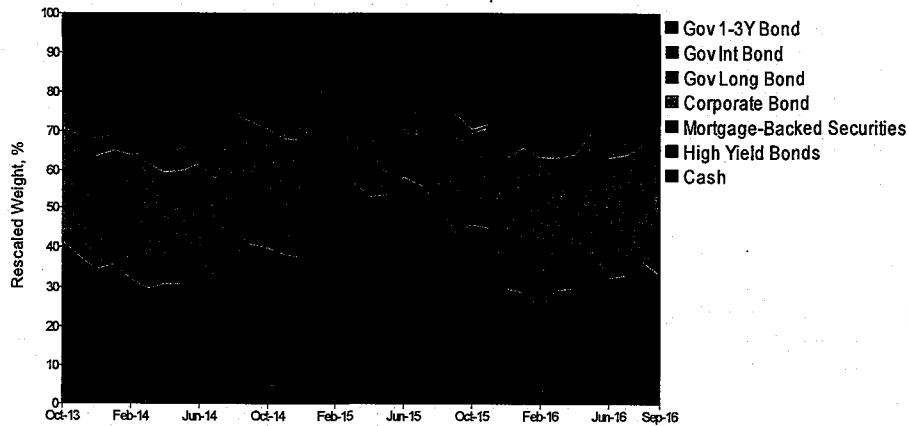


Monthly Added Value from Style Timing



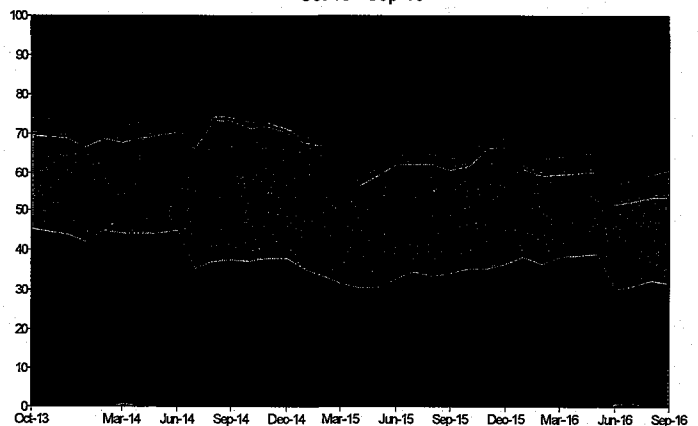
Asset Loadings - Manager

Oct-13 - Sep-16



Asset Loadings - Benchmark

Oct-13 - Sep-16



Appendix

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 a security's 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 period 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 Stocks

Common stock of a company that has an opportunity to invest money and earn more than the 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 a regression model. A measure of the quality of fit. 100% R-square means 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 product's 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 performance 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 one-fourth of the assets of the fund.

Value Stocks

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 P/E ratios) in a variety of countries.

Benchmark Definitions

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 MidCap: 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.

CPI + 3%: measures changes in the price level of the Consumer Price Index (CPI) with the addition of an additional 300 basis points. The CPI is a sample estimate which tracks the price level changes of a market basket of consumer goods and services purchased by households.

RISK METRIC DESCRIPTION – Rationale for selection and calculation methodologyUS 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.

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.

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 METRICS DESCRIPTION – PCA Market Sentiment Indicator

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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**ATTACHMENT B:
PFRS ACTUARY VALUATION
AS OF JULY 1, 2016**

DRAFT

**Oakland Police and Fire
Retirement System**

**Actuarial Valuation Report
as of July 1, 2016**

Produced by Cheiron

November 2016

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November 10, 2016

City of Oakland Police and Fire
Retirement System Board
150 Frank H. Ogawa Plaza
Oakland, CA 94612

Dear Members of the Board:

At your request, we have conducted an actuarial valuation of the Oakland Police and Fire Retirement System (PFRS, the Plan) as of July 1, 2016. This report contains information on the Plan's assets and liabilities. This report also discloses the employer contributions in accordance with the funding agreement between the City of Oakland and PFRS, based on the current financial status of the Plan. Your attention is called to the Foreword in which we refer to the general approach employed in the preparation of this report.

The purpose of this report is to present the results of the annual actuarial valuation of the Plan. This report is for the use of the Retirement Board and the auditors in preparing financial reports in accordance with applicable law and accounting requirements. Any other user of this report is not an intended user and is considered a third party.

Cheiron's report was prepared solely for the Retirement Board for the purposes described herein, except that the plan auditor may rely on this report solely for the purpose of completing an audit related to the matters herein. Other users of this report are not intended users as defined in the Actuarial Standards of Practice, and Cheiron assumes no duty or liability to such other users.

To the best of our knowledge, this report and its contents have been prepared in accordance with generally recognized and accepted actuarial principles and practices which are consistent with the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board. Furthermore, as credentialed actuaries, we meet the Qualification Standards of the American Academy of Actuaries to render the opinion contained in this report. This report does not address any contractual or legal issues. We are not attorneys and our firm does not provide any legal services or advice.

Sincerely,
Cheiron

David Holland, FSA, EA, FCA, MAAA
Consulting Actuary

Graham A. Schmidt, ASA, EA, FCA, MAAA
Consulting Actuary

**OAKLAND POLICE AND FIRE RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JULY 1, 2016**

FOREWORD

Cheiron has performed the actuarial valuation of the Oakland Police and Fire Retirement System (PFRS, the Plan) as of July 1, 2016. The valuation is organized as follows:

- In Section I, the **Executive Summary**, we describe the purpose of an actuarial valuation, summarize the key results found in this valuation, and disclose important trends;
- The **Main Body** of the report presents details on the Plan's
 - Section II - Assets
 - Section III - Liabilities
 - Section IV- Contributions
 - Section V - Head Count and Benefit Payment Projections
- In the **Appendices**, we conclude our report with detailed information describing plan membership (Appendix A), actuarial assumptions and methods employed in the valuation (Appendix B), a summary of pertinent plan provisions (Appendix C), and a glossary of key actuarial terms (Appendix D).

The results of this report rely on future plan experience conforming to the underlying assumptions. To the extent that actual plan experience deviates from the underlying assumptions, the results would vary accordingly.

In preparing our report, we relied on information (some oral and some written) supplied by the Plan's staff. This information includes, but is not limited to, plan provisions, employee data, and financial information. We performed an informal examination of the obvious characteristics of the data for reasonableness and consistency in accordance with Actuarial Standard of Practice No. 23.

**OAKLAND POLICE AND FIRE RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JULY 1, 2016**

SECTION I – EXECUTIVE SUMMARY

The primary purpose of the actuarial valuation and this report is to measure, describe, and identify the following as of the valuation date:

- The financial condition of the Plan,
- Past and expected trends in the financial progress of the Plan, and
- Calculation of the actuarially determined contributions for years beginning in Fiscal Year 2017-2018.

In the balance of this Executive Summary, we present (A) the basis upon which this year's valuation was completed, (B) the key findings of this valuation including a summary of all key financial results, (C) an examination of the historical trends, and (D) the projected financial outlook for the Plan.

A. Valuation Basis

This valuation estimates the projected employer contributions in accordance with the funding agreement dated July 1, 2012 between the City of Oakland and the PFRS. Based on that agreement, employer contributions will be suspended until fiscal year 2017-2018, at which time they will resume at a level based upon the recommendation of the actuary. Section IV of this report shows the development of the employer contribution for fiscal year 2017-2018.

The Plan's funding policy is to contribute an amount equal to the sum of:

- The normal cost under the Entry Age Normal Cost Method (which is zero, as there are no active members),
- Amortization of the unfunded actuarial liability, and
- The Plan's expected administrative expenses.

This valuation was prepared based on the plan provisions shown in Appendix C. There have been no changes in plan provisions since the prior valuation.

A summary of the assumptions and methods used in the current valuation is shown in Appendix B. New Memorandums of Understanding (MOUs) went into effect for Police members since the previous valuation, increasing Police retirees' Cost of Living Adjustments (COLAs). There have been no other changes to the assumptions or methods since the prior valuation.

**OAKLAND POLICE AND FIRE RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JULY 1, 2016**

SECTION I – EXECUTIVE SUMMARY

B. Key Findings of this Valuation

The key results of the July 1, 2016 actuarial valuation are as follows:

- The actuarially determined employer contribution amount for Fiscal Year 2017-2018 is \$44.9 million, based on projecting the actuarial liabilities and the Actuarial Value of Assets to the end of the 2016-2017 Fiscal Year. This represents an increase of \$7.6 million from the amount determined in the prior valuation for the same Fiscal Year.

New Memorandums of Understanding (MOUs) went into effect for Police members between the previous and current valuation dates, increasing Police retirees' Cost of Living Adjustments (COLAs). The increase in the projected contribution is the combined result of asset and liability losses and the changes in Police MOUs described above.

- The City of Oakland issued Pension Obligation Bonds (POBs) in July 2012. The City then contributed \$210 million from the bond proceeds to the Plan. These proceeds acted as prepayments for Oakland PFRS contributions from the fiscal year beginning July 1, 2012 through the fiscal year beginning July 1, 2016. Contributions will resume during the fiscal year beginning July 1, 2017, in accordance with the funding agreement dated July 1, 2012 between the City and the PFRS.
- During the year ended June 30, 2016, the return on Plan assets was -0.36% on a market value basis net of investment expenses, as compared to the 7.00% assumption for the 2015-2016 Plan year. This resulted in a market value loss on investments of \$28.8 million. The Actuarial Value of Assets (AVA) is calculated as the expected Actuarial Value of Assets plus 20% of the difference between the Market Value and the expected Actuarial Value of Assets. This smoothed value of assets returned 6.88%, for an actuarial asset loss of \$0.5 million.
- The Plan experienced a loss on the actuarial liability of \$2.8 million, the net result of changes in the population. Combining the liability and asset gains, the Plan experienced a total loss of \$3.3 million.
- New MOUs increased Police retirees' Cost of Living Adjustments (COLAs). These changes increased the Plan's actuarial liability by \$40.6 million.
- The Plan's smoothed funded ratio, the ratio of actuarial assets over actuarial liability, decreased from 61.4% last year to 54.0% on an AVA basis as of June 30, 2016. The reduction in the funded ratio is primarily the result of no contribution being made to the fund during the year and the new MOUs for Police members.

**OAKLAND POLICE AND FIRE RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JULY 1, 2016**

SECTION I – EXECUTIVE SUMMARY

- The Plan's funded ratio decreased from 65.3% to 53.7% on a Market Value of Assets (MVA) basis. The decrease in the Market Value funded ratio was primarily the result of the lack of contributions and the effect of the new Police MOUs, as well as the market value loss on investments, compared to the 7.00% assumption.
- The unfunded actuarial liability (UAL) is the excess of the Plan's actuarial liability over the actuarial value of assets. The Plan experienced an increase in the UAL from \$247.5 million to \$309.4 million as of July 1, 2016.
- Overall participant membership decreased compared to last year. 29 members died, 13 of whom who had their benefits continue to a surviving spouse. In addition, 16 surviving beneficiaries died. There are no active members of the Plan.
- If the contribution were determined using a projected asset value based on the current market (i.e., non-smoothed) value of assets, the contribution for FY 2017-2018 would be \$45.1 million. The contribution is larger than that determined using the projected AVA, because the current market value reflects the full amount of recent investment losses, while under the AVA projection a portion of those losses are deferred until years after FY 2017-2018.

**OAKLAND POLICE AND FIRE RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JULY 1, 2016**

SECTION I – EXECUTIVE SUMMARY

Below we present Table I-1 which summarizes all the key results of the valuation with respect to membership, assets and liabilities, and contributions. The results are presented and compared for both, the current and prior plan year.

TABLE I-1				
Summary of Principal Plan Results				
(\$ in thousands)				
	July 1, 2015	July 1, 2016	% Change	
<u>Participant Counts</u>				
Active Participants	0	0		
Participants Receiving a Benefit	961	929		-3.33%
Total	961	929		-3.33%
Annual Pay of Active Members	\$ 0	\$ 0		
<u>Assets and Liabilities</u>				
Actuarial Liability (AL)	\$ 642,110	\$ 672,916		4.80%
Actuarial Value of Assets (AVA)	394,573	363,550		-7.86%
Unfunded Actuarial Liability (UAL)	\$ 247,537	\$ 309,366		24.98%
Funded Ratio (AVA)	61.4%	54.0%		-7.42%
Funded Ratio (MVA)	65.3%	53.7%		-11.56%
<u>Contributions</u>				
Employer Contribution (FY2016-17)	\$ 0	\$ 0		0.00%
Employer Contribution (FY2017-18)	\$ 37,285	\$ 44,860		20.32%

C. Historical Trends

Despite the fact that for most retirement plans the greatest attention is given to the current valuation results and in particular, the size of the current unfunded actuarial liability and the employer contribution, it is important to remember that each valuation is merely a snapshot in the long-term progress of a pension fund. It is more important to judge a current year's valuation result relative to historical trends, as well as trends expected into the future.

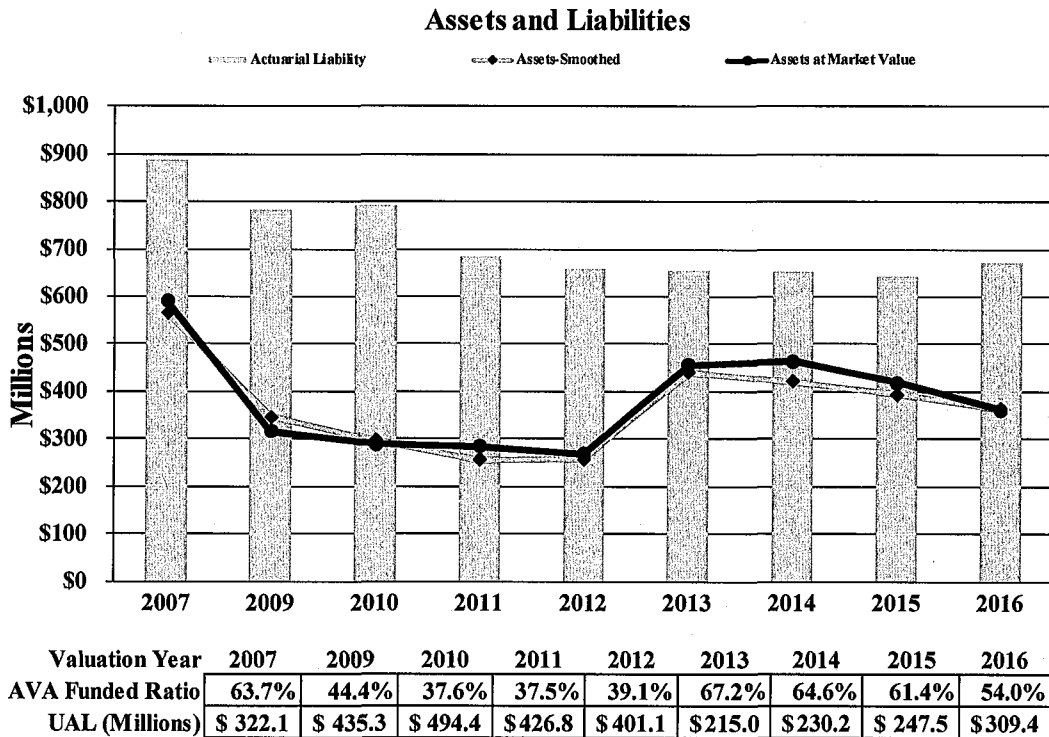
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ACTUARIAL VALUATION REPORT AS OF JULY 1, 2016**

SECTION I – EXECUTIVE SUMMARY

Assets and Liabilities

The chart below compares the Market Value of Assets (MVA) and Actuarial Value of Assets (AVA) to the Actuarial Liabilities. The percentages shown in the table below the chart are the ratios of the Actuarial Value of Assets to the Actuarial Liability (the funded ratio). We note that for the GASB disclosure report, this ratio is now disclosed using the MVA.

The funded ratio declined from 63.7% in 2007 to 37.5% in 2011 due to negative market returns and no contributions being made in that period (\$417 million in proceeds from a POB were deposited in 1997 which acted as prepayments for 15 years of contributions). The funded ratio increased between 2012 and 2013 due to a \$210 million contribution in July 2012. The funded ratio has decreased from 67.2% to 54.0% over the last three years due to assumption changes, liability losses, new Police MOUs, and the lack of contributions since the July 2012 payment.

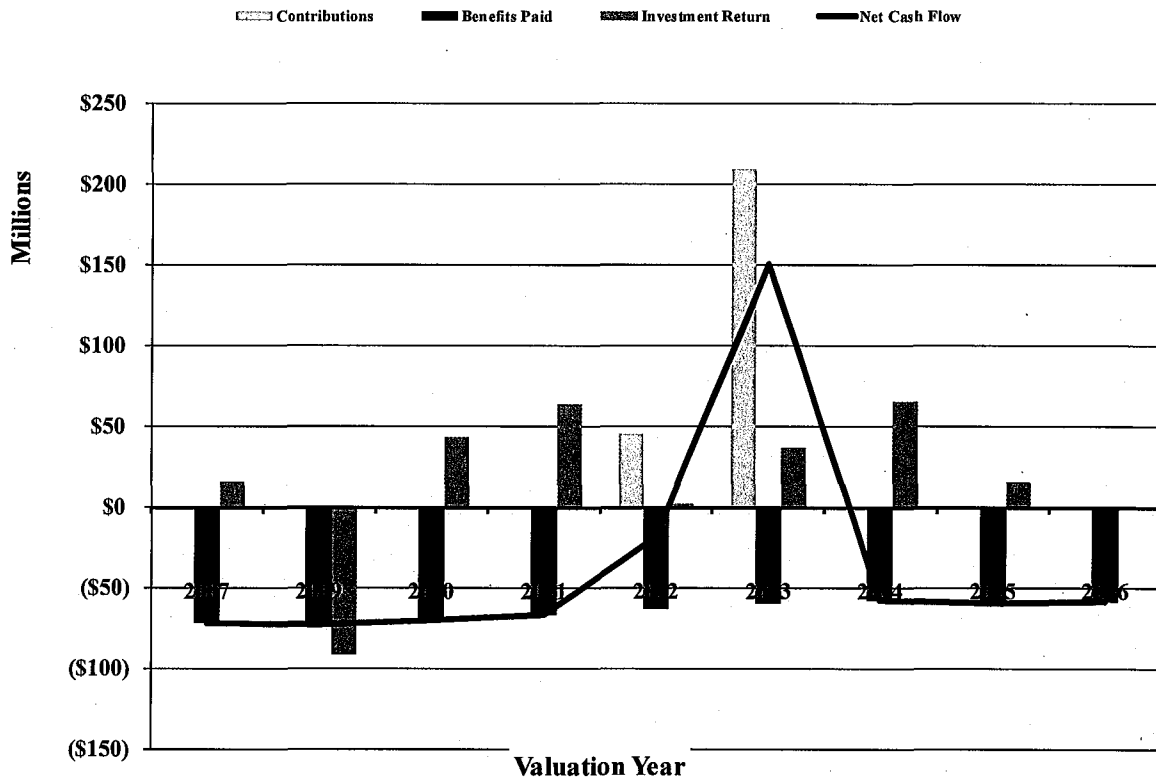


**OAKLAND POLICE AND FIRE RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JULY 1, 2016**

SECTION I – EXECUTIVE SUMMARY

Cash Flows

The chart below shows the Plan’s cash flow, excluding investment returns and expenses (i.e., contributions less benefit payments). This is a critical measure, as it reflects the ability to have funds available to meet benefit payments without having to make difficult investment decisions, especially during volatile markets.



The contributions, benefit payments, investment returns, and net cash flow (NCF) excluding investment returns and expenses are represented by the scale on the left. The Plan’s net cash flow has been negative five of the last six fiscal years primarily due to no contributions being made between 2007 and 2011, becoming positive in 2013 when a \$210 million contribution was made.

A negative cash flow magnifies the losses during a market decline, hindering the Plan in its ability to absorb market fluctuations. The implications of a plan in negative cash flow are that the impact of market fluctuations can be more severe: as assets are being depleted to pay benefits in down markets, there is less principal available to be reinvested during favorable return periods. The Plan is expected to remain in a negative cash flow position going forward, since the Plan is closed.

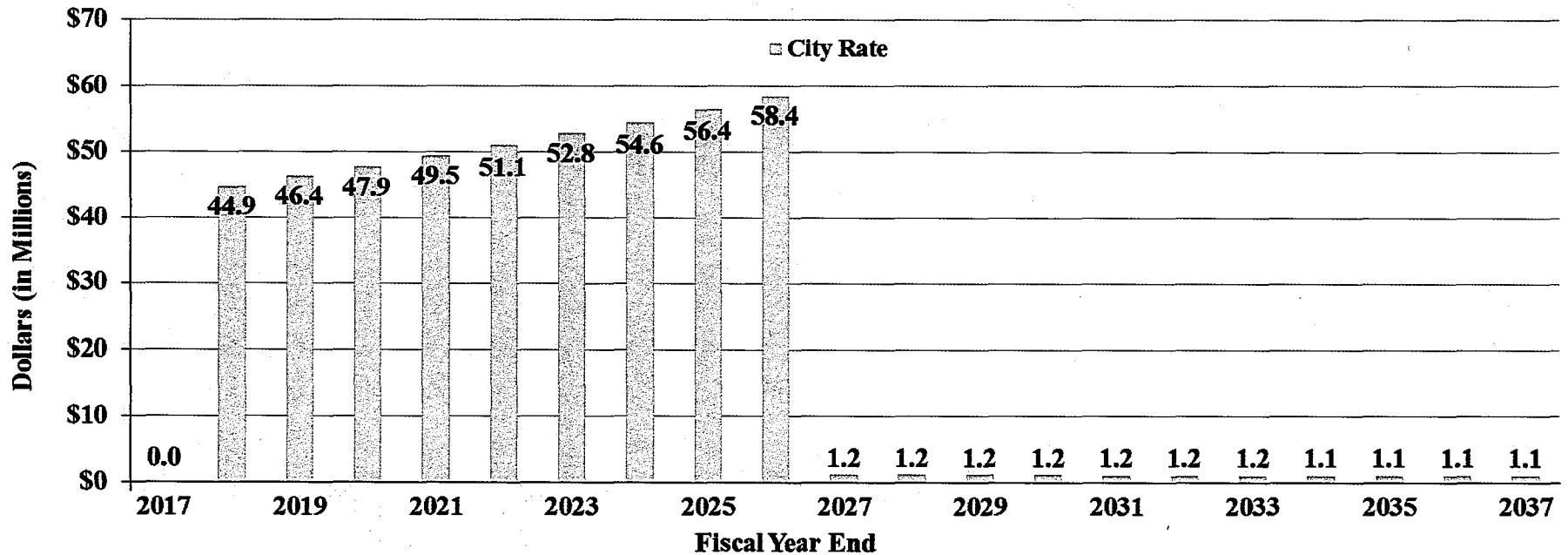
**OAKLAND POLICE AND FIRE RETIREMENT SYSTEM
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SECTION I – EXECUTIVE SUMMARY

D. Future Expected Financial Trends

The analysis of projected financial trends is perhaps the most important component of this valuation. In this section, we present our assessment of the implications of the July 1, 2016 valuation results in terms of benefit security (assets over liabilities) and contribution levels. All the projections in this section are based on the assumption that the Plan will exactly achieve the assumed rate of return each year (7.0% per year until 2027, then trending down to an annual return of 3.25% over ten years).

Projection of Employer Contributions



The above graph shows that the City’s contributions are expected to resume in fiscal 2017-2018, starting at \$44.9 million and eventually increasing to \$58.4 million as the current unfunded liability is fully amortized. This assumes that the annual payments by

**OAKLAND POLICE AND FIRE RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JULY 1, 2016**

SECTION I – EXECUTIVE SUMMARY

the City will equal the administrative expenses, plus an amount needed to amortize the remaining unfunded liability as a level percentage of overall Safety payroll by July 1, 2026, as is required under the City's charter.

After July 1, 2026, the UAL is expected to be fully amortized, and the contribution would generally be equal to the administrative expense, beginning in 2026-2027. However, under the current asset smoothing method there are still expected to be some deferred asset losses, which will not be recognized until after 2026; the deferred recognition of these losses is expected to add a small contribution amount to the administrative expenses in the final years of the graph on the previous page.

Note that the graph on the previous page does not forecast any future actuarial gains or losses or changes to the amortization policy. Even relatively modest losses relative to the assumed return could push the employer contribution rate over \$70 million in the next few years. We also note that the occurrence of any future gains or losses in the years leading up to or following the required full amortization date (July 1, 2026) may require a reconsideration of the funding policy for those gains or losses, as otherwise these changes would need to be recognized over an extremely short period.

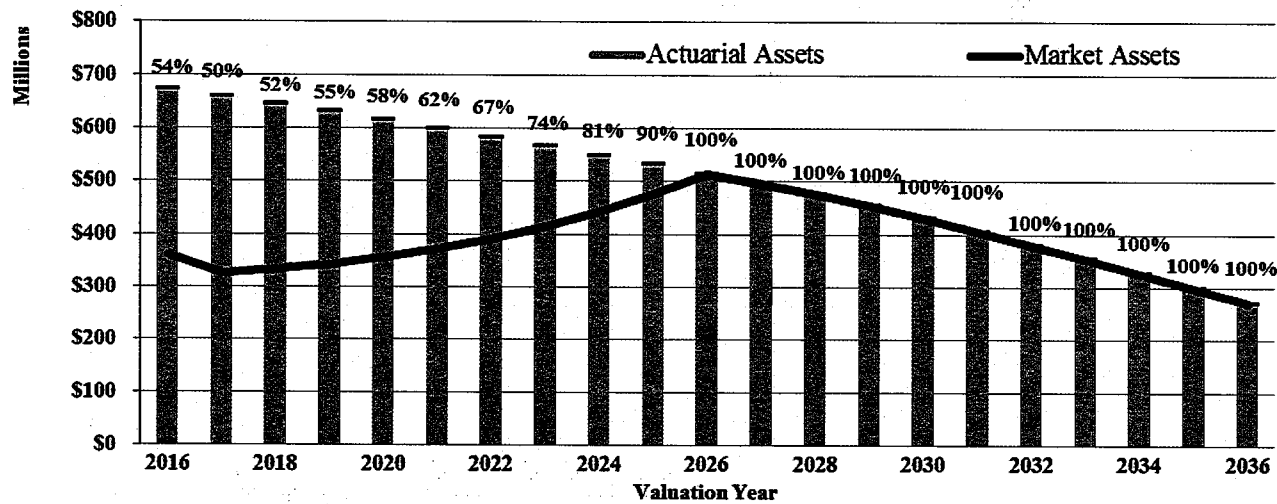
OAKLAND POLICE AND FIRE RETIREMENT SYSTEM
 ACTUARIAL VALUATION REPORT AS OF JULY 1, 2016

SECTION I – EXECUTIVE SUMMARY

Asset and Liability Projections:

The following graph shows the projection of assets and liabilities assuming that assets will earn the assumed rate of return each year during the projection period.

Projection of Assets and Liabilities



The graph shows that the projected funded status decreases for the next valuation, when contributions are assumed to resume. At that point, funded status increases as the current unfunded liability is fully amortized, assuming all actuarial assumptions are met.

OAKLAND POLICE AND FIRE RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JULY 1, 2016

SECTION II – ASSETS

Pension Plan assets play a key role in the financial operation of the Plan and in the decisions the Board may make with respect to future deployment of those assets. The level of assets, the allocation of assets among asset classes, and the methodology used to measure assets will likely impact benefit levels, employer contributions, and the ultimate security of participants' benefits.

In this section, we present detailed information on Plan assets including:

- **Disclosure** of Plan assets as of June 30, 2015 and June 30, 2016;
- Statement of the **changes** in market values during the year; and,
- Development of the **Actuarial Value of Assets**.

Disclosure

There are two types of asset values disclosed in the valuation, the market value of assets and the actuarial value of assets. The market value represents “snap-shot” or “cash-out” values which provide the principal basis for measuring financial performance from one year to the next. Market values, however, can fluctuate widely with corresponding swings in the marketplace. As a result, market values are sometimes not as suitable for long-range planning as are the actuarial value of assets which reflect smoothing of annual investment returns.

Table II-1 on the next page discloses and compares each component of the market asset value as of June 30, 2015 and June 30, 2016.

**OAKLAND POLICE AND FIRE RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JULY 1, 2016**

SECTION II – ASSETS

TABLE II-1				
Statement of Assets at Market Value				
June 30,				
(in thousands)				
	2015		2016	
Cash and Cash Equivalents:	\$	3,108	\$	2,536
Receivables:				
Interest Receivable	\$	325	\$	271
Dividends Receivable		301		262
Investments Receivable		5,254		3,743
Retired Members and Beneficiaries		0		3,288
Miscellaneous		177		167
Total Receivables		<u>6,057</u>		<u>7,731</u>
Investments, at Fair Value:				
Short-term Investments		8,970		6,897
Bonds		71,539		63,787
Domestic Equities and Mutual Funds		206,303		174,113
International Equities and Mutual Funds		48,115		40,223
Alternative Investments		83,970		73,592
Securities Lending Collateral		55,226		45,042
Total Investments		<u>474,123</u>		<u>403,653</u>
Total Assets		483,288		413,920
Liabilities:				
Accounts Payable		59		42
Benefits Payable		4,767		4,834
Investments Payable		3,587		2,056
Accrued Investment Management Fees		395		335
Securities Lending Liabilities		55,226		45,042
Total Liabilities		<u>64,034</u>		<u>52,309</u>
Market Value of Assets	\$	419,254	\$	361,611

**OAKLAND POLICE AND FIRE RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JULY 1, 2016**

SECTION II – ASSETS

Changes in Market Value

The components of asset change are:

- Contributions (employer and employee)
- Benefit payments
- Expenses (investment and administrative)
- Investment income (realized and unrealized)

Table II-2 shows the components of a change in the market value of assets during 2015 and 2016.

TABLE II-2		
Changes in Market Values		
June 30,		
(in thousands)		
	<u>2015</u>	<u>2016</u>
Contributions		
Contributions of Plan Members	\$ 0	\$ 0
Contributions from the City	0	0
Total Contributions	<u>0</u>	<u>0</u>
Investment Income		
Miscellaneous Income	103	3,593
Investment Income	<u>15,335</u>	<u>(1,419)</u>
Total Investment Income	<u>15,439</u>	<u>2,174</u>
Disbursements		
Benefit Payments	(59,008)	(58,441)
Administrative Expenses	<u>(985)</u>	<u>(1,376)</u>
Total Disbursements	<u>(59,993)</u>	<u>(59,817)</u>
Net increase (Decrease)	(44,554)	(57,643)
Net Assets Held in Trust for Benefits:		
Beginning of Year	<u>463,808</u>	<u>419,254</u>
End of Year	<u>\$ 419,254</u>	<u>\$ 361,611</u>
Approximate Return	3.5%	-0.4%

**OAKLAND POLICE AND FIRE RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JULY 1, 2016**

SECTION II – ASSETS

Actuarial Value of Assets (AVA)

The actuarial value of assets represents a “smoothed” value developed by the actuary to reduce the volatile results which could develop due to short-term fluctuations in the market value of assets. For this Plan, the actuarial value of assets is calculated on a modified market-related value. The actuarial value of assets recognizes one-fifth of the difference between the expected asset value (based on the 7.00% return assumption from 2015-2016) and the actual market value each year. The actuarial value is restricted to fall between 90% and 110% of the market value.

Table II-3 Development of Actuarial Value of Assets (in thousands)	
1) Calculate Expected Actuarial Value of Assets	
a) Value of Actuarial Value of Assets - July 1, 2015	\$ 394,573
b) Total Contributions and Misc Income	3,593
c) Administrative Expense	(1,376)
d) Benefit Payments	(58,441)
e) Expected Investment Earnings	25,686
f) Value of Actuarial Value of Assets - July 1, 2016 [1a + 1b + 1c + 1d + 1e]	\$ 364,034
2) Calculate Final Actuarial Value of Assets	
a) Value of Market Value of Assets - July 1, 2016	\$ 361,611
b) Excess of MVA over Expected AVA [2a - 1f]	(2,423)
c) Preliminary AVA [1f + 0.2 * 2b]	363,550
d) 90% of MVA [90% * 2a]	325,450
e) 110% of MVA [110% * 2a]	397,772
3) Final Actuarial Value of Assets [2c, not less than 2d or greater than 2e]	\$ 363,550

**OAKLAND POLICE AND FIRE RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JULY 1, 2016**

SECTION II – ASSETS

Investment Performance

The following table calculates the investment related gain/loss for the plan year on both a Market Value and an Actuarial Value basis. The Market Value gain/loss is an appropriate measure for comparing the actual asset performance to the previous valuation's 7.00% assumption.

TABLE II-4		
Asset Gain/(Loss)		
(in thousands)		
	Market Value	Actuarial Value
July 1, 2015 value	\$ 419,254	\$ 394,573
Contributions of Plan Members	0	0
Contributions from the City	0	0
Miscellaneous Income	3,593	3,593
Benefit Payments	(58,441)	(58,441)
Administrative Expenses	(1,376)	(1,376)
Expected Investment Earnings (7.00%)	27,413	25,686
Expected Value June 30, 2016	\$ 390,443	\$ 364,034
Investment Gain / (Loss)	(28,832)	(485)
July 1, 2016 value	361,611	363,550
Return	-0.36%	6.88%

**OAKLAND POLICE AND FIRE RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JULY 1, 2016**

SECTION III – LIABILITIES

In this section, we present detailed information on Plan liabilities including:

- **Disclosure** of Plan liabilities at July 1, 2015 and July 1, 2016,
- Statement of **changes** in these liabilities during the year.

Disclosure

Several types of liabilities are calculated and presented in this report. Each type is distinguished by the people ultimately using the figures and the purpose for which they are using them. Note that these liabilities are not applicable for settlement purposes, including the purchase of annuities and the payment of lump sums.

- **Present Value of Future Benefits:** Used for measuring all future Plan obligations, the obligations of the Plan earned as of the valuation date and those to be earned in the future by current plan participants under the current Plan provisions, if all assumptions are met.
- **Actuarial Liability:** Used for funding calculations, this liability is calculated taking the Present Value of Future Benefits and subtracting the present value of future Normal Costs under an acceptable actuarial funding method. Because the Plan has no active members, the Actuarial Liability is equal to the Present Value of Future Benefits (i.e., all benefits are fully accrued).
- **Unfunded Actuarial Liability:** The excess of the Actuarial Liability over the Actuarial Value of Assets.

Table III-1 below discloses each of these liabilities for the current and prior valuations.

TABLE III-1		
Liabilities/Net (Surplus)/Unfunded		
(in thousands)		
	July 1, 2015	July 1, 2016
<u>Present Value of Future Benefits</u>		
Active Participant Benefits	\$ 0	\$ 0
Retiree and Inactive Benefits	642,110	672,916
Present Value of Future Benefits (PVB)	\$ 642,110	\$ 672,916
<u>Actuarial Liability</u>		
Present Value of Future Benefits (PVB)	\$ 642,110	\$ 672,916
Present Value of Future Normal Costs (PVFNC)	0	0
Actuarial Liability (AL = PVB - PVFNC)	\$ 642,110	\$ 672,916
Actuarial Value of Assets (AVA)	394,573	363,550
Net (Surplus)/Unfunded (AL - AVA)	\$ 247,537	\$ 309,366

**OAKLAND POLICE AND FIRE RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JULY 1, 2016**

SECTION IV – CONTRIBUTIONS

Changes in Liabilities

Each of the liabilities disclosed in the prior table are expected to change at each valuation. The components of that change, depending upon which liability is analyzed, can include:

- New hires since the last valuation (not applicable for this Plan)
- Benefits accrued since the last valuation (not applicable for this Plan)
- Plan amendments
- Passage of time which adds interest to the prior liability
- Benefits paid to retirees since the last valuation
- Participants retiring, terminating, dying, or receiving COLA adjustments at rates different than expected
- A change in actuarial or investment assumptions
- A change in the actuarial funding method or software

Unfunded liabilities will change because of all of the above, and also due to changes in Plan assets resulting from:

- Employer contributions different than expected
- Investment earnings different than expected
- A change in the method used to measure plan assets

TABLE III-2	
Changes in Actuarial Liability	
(in thousands)	
Actuarial Liability at July 1, 2015	\$ 642,110
Actuarial Liability at July 1, 2016	\$ 672,916
Liability Increase (Decrease)	\$ 30,806
Change due to:	
Actuarial Methods / Software Changes	\$ 0
Assumption Change	40,636
Accrual of Benefits	0
Actual Benefit Payments	(58,441)
Interest	45,781
Data Corrections	0
Actuarial Liability (Gain)/Loss	\$ 2,830

OAKLAND POLICE AND FIRE RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JULY 1, 2016

SECTION IV – CONTRIBUTIONS

	Police	Fire	Total
Actuarial Accrued Liability			
Active	\$ 0	\$ 0	0
Service Retirees	249,822	94,137	343,958
Disabled Retirees	105,127	96,957	202,084
Beneficiaries	<u>69,191</u>	<u>57,682</u>	<u>126,873</u>
Total Accrued Liability	\$ 424,140	\$ 248,775	\$ 672,916

**OAKLAND POLICE AND FIRE RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JULY 1, 2016**

SECTION IV – CONTRIBUTIONS

TABLE III-4 Development of Actuarial Gain / (Loss) (in thousands)		
1. Unfunded Actuarial Liability at Start of Year (not less than zero)	\$	247,537
2. Employer Normal Cost at Start of Year		0
3. Change in Unfunded Actuarial Liability Due to Changes in Assumptions		40,636
4. Interest on 1. 2. and 3. to End of Year		20,172
5. Contributions and Miscellaneous Income for Prior Year		3,593
6. Administrative Expenses		(1,376)
7. Interest on 4. and 5. to End of Year		76
8. Change in Unfunded Actuarial Liability Due to Changes in Actuarial Methods		0
9. Change in Unfunded Actuarial Liability Due to Changes in Plan Design		0
10. Change in Unfunded Actuarial Liability Due to Data Corrections		0
11. Expected Unfunded Actuarial Liability at End of Year [1. + 2. + 3. + 4. - 5. - 6. - 7. + 8. + 9. + 10.]	\$	306,051
12. Actual Unfunded Actuarial Liability at End of Year (not less than zero)		309,366
13. Unfunded Actuarial Liability Gain / (Loss) [11. - 12.]	\$	(3,315)

OAKLAND POLICE AND FIRE RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JULY 1, 2016

SECTION IV – CONTRIBUTIONS

In the process of evaluating the financial condition of any pension plan, the actuary analyzes the assets and liabilities to determine what level (if any) of contributions is needed to properly maintain the funding status of the Plan. Typically, the actuarial process will use a funding technique that will result in a pattern of contributions that are both stable and predictable.

For this Plan, the actuarial funding method used to determine the normal cost and the unfunded actuarial liability is the **Entry Age Normal** cost method.

The normal cost rate is determined with the normal cost percentage equal to the total Projected Value of Benefits at Entry Age, divided by Present Value of Future Salary at Entry Age. Since there are no longer any active employees, the normal cost for this plan is \$0.

The unfunded actuarial liability is the difference between the EAN actuarial liability and the actuarial value of assets. For the contribution projections, the UAL payment is based on the unfunded liability of the Plan being fully amortized by June 30, 2026, in accordance with the City Charter. Amortization payments are determined based on an assumption that payments will increase by 3.25% each year, reflecting the assumed ultimate rate of increase in overall City Safety member salaries.

An amount equal to the expected administrative expenses for the Plan is added directly to the actuarial cost calculation.

Table IV-1 on the next page shows the employer contribution amount for the 2017-2018 Fiscal Year. The projected assets and liabilities assume that all actuarial assumptions are met and that no contributions are made between now and June 30, 2017.

For this calculation, we have shown the contribution amount using both the projected actuarial and market value of assets. The current funding policy uses the AVA to determine the UAL and the associated amortization payment. We have included the contribution amount as determined using the current market value of assets to demonstrate what the actuarial cost would be if all deferred asset gains were fully recognized at the time the contributions commence. In both cases, the contribution is based on an assumption that the investment returns will exactly equal the assumed rate of return during the 2016-2017 Fiscal Year.

**OAKLAND POLICE AND FIRE RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JULY 1, 2016**

SECTION IV – CONTRIBUTIONS

**TABLE IV-I
Development of Projected 2017-2018 Employer Contribution Amount
(in thousands)**

	Actuarial Value of Assets	Market Value of Assets
1. Value of Assets at June 30, 2016:	\$ 363,550	\$ 361,611
a. Expected Contributions and Misc Income	\$ 0	\$ 0
b. Expected Administrative Expense	\$ (952)	\$ (952)
c. Expected Benefit Payments	\$ (57,642)	\$ (57,642)
d. Expected Investment Earnings	\$ 23,432	\$ 23,297
2. Expected Value of Assets at June 30, 2017:	\$ 328,388	\$ 326,314
a. Excess of Expected MVA over Expected AVA	\$ (2,074)	
b. Preliminary AVA [Expected AVA + 20% * 2a]	\$ 327,973	
c. 90% of Expected MVA	\$ 293,682	
d. 110% of Expected MVA	\$ 358,945	
3. Final Expected AVA [2b, not less than 2c or greater than 2d]	\$ 327,973	\$ 326,314
4. Entry Age Liability at June 30, 2016:	\$ 672,916	\$ 672,916
5. Expected Benefit Payments	\$ (57,642)	\$ (57,642)
6. Expected Interest	\$ 45,121	\$ 45,121
7. Expected Entry Age Liability at June 30, 2017:	\$ 660,394	\$ 660,394
8. Projected Unfunded Actuarial Liability: (7) - (3)	332,421	334,081
9. Funded Ratio: (3) / (7)	49.7%	49.4%
10. Unfunded Actuarial Liability Amortization at Middle of Year as a Level Percentage of Payroll (9 Years Remaining) as of June 30, 2017:	43,881	44,100
11. Expected Administrative Expenses for Fiscal 2017-2018:	\$979	\$979
12. Total Contribution: (10) + (11)	44,860	45,079

**OAKLAND POLICE AND FIRE RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JULY 1, 2016**

SECTION V – HEADCOUNT AND BENEFIT PAYMENT PROJECTIONS

Benefit Payment and Headcount Projection								
Fiscal Year	Police			Fire		Total		
	Ending June 30,	Count	Benefits (in thousands)	Count	Benefits (in thousands)	Count	Benefits (in thousands)	
2017	545.0	\$	33,508	384.0	\$	24,134	929.0	57,642
2018	528.1	\$	34,231	366.0	\$	23,640	894.1	57,871
2019	511.3	\$	34,743	348.4	\$	23,144	859.8	57,887
2020	494.7	\$	35,051	331.5	\$	22,644	826.2	57,695
2021	478.2	\$	34,889	315.1	\$	22,137	793.3	57,026
2022	461.9	\$	34,693	299.1	\$	21,620	761.0	56,313
2023	445.8	\$	34,461	283.6	\$	21,089	729.5	55,550
2024	429.9	\$	34,189	268.6	\$	20,542	698.6	54,731
2025	414.2	\$	33,871	254.0	\$	19,979	668.2	53,850
2026	398.6	\$	33,503	239.8	\$	19,396	638.4	52,899
2027	383.0	\$	33,078	226.1	\$	18,793	609.1	51,871
2028	367.5	\$	32,587	212.7	\$	18,170	580.1	50,757
2029	351.8	\$	32,026	199.7	\$	17,524	551.5	49,550
2030	336.1	\$	31,386	187.0	\$	16,857	523.1	48,243
2031	320.2	\$	30,662	174.8	\$	16,165	495.0	46,827
2032	304.1	\$	29,846	162.8	\$	15,451	467.0	45,297
2033	287.8	\$	28,935	151.2	\$	14,713	439.1	43,649
2034	271.3	\$	27,926	140.0	\$	13,953	411.3	41,878
2035	254.5	\$	26,816	129.0	\$	13,171	383.5	39,987
2036	237.6	\$	25,608	118.4	\$	12,370	355.9	37,978
2037	220.4	\$	24,305	108.1	\$	11,553	328.5	35,858
2038	203.3	\$	22,916	98.1	\$	10,724	301.4	33,639
2039	186.1	\$	21,452	88.5	\$	9,888	274.6	31,340
2040	169.2	\$	19,930	79.3	\$	9,054	248.5	28,984
2041	152.6	\$	18,367	70.6	\$	8,228	223.2	26,595
2042	136.5	\$	16,783	62.3	\$	7,419	198.8	24,202
2043	121.0	\$	15,198	54.6	\$	6,635	175.5	21,833
2044	106.2	\$	13,634	47.4	\$	5,883	153.6	19,517
2045	92.4	\$	12,110	40.8	\$	5,171	133.2	17,281
2046	79.5	\$	10,647	34.8	\$	4,502	114.3	15,149

**OAKLAND POLICE AND FIRE RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JULY 1, 2016**

SECTION V – HEADCOUNT AND BENEFIT PAYMENT PROJECTIONS

Benefit Payment and Headcount Projection							
Fiscal Year Ending June 30.	Police		Fire		Total		
	Count	Benefits (in thousands)	Count	Benefits (in thousands)	Count	Benefits (in thousands)	
2047	67.8	\$ 9,262	29.4	\$ 3,883	97.1	13,145	
2048	57.1	\$ 7,969	24.6	\$ 3,317	81.7	11,286	
2049	47.6	\$ 6,779	20.3	\$ 2,806	67.9	9,586	
2050	39.2	\$ 5,700	16.7	\$ 2,352	55.9	8,052	
2051	31.9	\$ 4,734	13.5	\$ 1,953	45.4	6,688	
2052	25.6	\$ 3,884	10.9	\$ 1,607	36.5	5,492	
2053	20.3	\$ 3,148	8.7	\$ 1,311	29.0	4,459	
2054	16.0	\$ 2,520	6.8	\$ 1,061	22.8	3,581	
2055	12.4	\$ 1,996	5.3	\$ 853	17.7	2,848	
2056	9.5	\$ 1,565	4.2	\$ 681	13.6	2,246	
2057	7.2	\$ 1,215	3.2	\$ 542	10.4	1,758	
2058	5.4	\$ 936	2.5	\$ 431	7.9	1,367	
2059	4.1	\$ 717	1.9	\$ 341	5.9	1,058	
2060	3.0	\$ 546	1.4	\$ 269	4.5	815	
2061	2.2	\$ 415	1.1	\$ 211	3.3	626	
2062	1.7	\$ 315	0.8	\$ 165	2.5	480	
2063	1.2	\$ 238	0.6	\$ 128	1.8	366	
2064	0.9	\$ 179	0.5	\$ 98	1.3	277	
2065	0.7	\$ 133	0.3	\$ 74	1.0	207	
2066	0.5	\$ 97	0.2	\$ 55	0.7	152	
2067	0.3	\$ 69	0.2	\$ 40	0.5	109	
2068	0.2	\$ 47	0.1	\$ 28	0.3	75	
2069	0.1	\$ 31	0.1	\$ 19	0.2	50	
2070	0.1	\$ 19	0.1	\$ 13	0.1	31	
2071	0.1	\$ 11	0.0	\$ 8	0.1	18	
2072	0.0	\$ 6	0.0	\$ 4	0.1	10	
2073	0.0	\$ 3	0.0	\$ 2	0.0	5	
2074	0.0	\$ 1	0.0	\$ 1	0.0	2	
2075	0.0	\$ 0	0.0	\$ 0	0.0	1	
2076	0.0	\$ 0	0.0	\$ 0	0.0	0	

**OAKLAND POLICE AND FIRE RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JULY 1, 2016**

APPENDIX A – MEMBERSHIP INFORMATION

Active Participants	July 1, 2015			July 1, 2016		
	Police	Fire	Total	Police	Fire	Total
Number	0	0	0	0	0	0
Number Vested	0	0	0	0	0	0
Average Age	0.0	0.0	0.0	0.0	0.0	0.0
Average Service	0.0	0.0	0.0	0.0	0.0	0.0
Average Pay	\$0	\$0	\$0	\$0	\$0	\$0
Service Retirees						
Number	275	143	418	268	129	397
Average Age	72.9	79.6	75.2	73.6	80.0	75.7
Average Annual Benefit	\$63,427	\$70,838	\$65,963	\$68,602	\$73,664	\$70,247
Disabled Retirees						
Number	131	119	250	124	118	242
Average Age	72.8	74.1	73.4	73.3	74.9	74.1
Average Annual Benefit	\$60,810	\$65,827	\$63,198	\$65,477	\$68,757	\$67,076
Beneficiaries						
Number	152	141	293	153	137	290
Average Age	80.7	82.8	81.7	81.3	83.2	82.2
Average Annual Benefit	\$45,212	\$49,653	\$47,349	\$49,101	\$51,798	\$50,375
All Inactives						
Number	558	403	961	545	384	929
Average Age	75.0	79.1	76.7	75.7	79.6	77.3
Average Annual Benefit	\$57,851	\$61,946	\$59,568	\$62,416	\$64,355	\$63,218

Data pertaining to active and inactive Members and their beneficiaries as of the valuation date was supplied by the Plan Administrator on electronic media.

**OAKLAND POLICE AND FIRE RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JULY 1, 2016**

APPENDIX A – MEMBERSHIP INFORMATION

Changes in Plan Membership: Police

	Actives	Service Retirees	Disabled Retirees	Beneficiaries	Total
July 1, 2015	0	275	131	152	558
Retired	0	0	0	0	0
Disabled	0	(7)	0	0	(7)
Deceased	0	0	(7)	(5)	(12)
New Beneficiary	0	0	0	6	6
July 1, 2016	0	268	124	153	545

Changes in Plan Membership: Fire

	Actives	Service Retirees	Disabled Retirees	Beneficiaries	Total
July 1, 2015	0	143	119	141	403
Retired	0	0	0	0	0
Disabled	0	(3)	3	0	0
Deceased	0	(11)	(4)	(11)	(26)
New Beneficiary	0	0	0	7	7
July 1, 2016	0	129	118	137	384

Changes in Plan Membership: All

	Actives	Service Retirees	Disabled Retirees	Beneficiaries	Total
July 1, 2015	0	418	250	293	961
Retired	0	0	0	0	0
Disabled	0	(10)	3	0	(7)
Deceased	0	(11)	(11)	(16)	(38)
New Beneficiary	0	0	0	13	13
July 1, 2016	0	397	242	290	929

**OAKLAND POLICE AND FIRE RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JULY 1, 2016**

APPENDIX A – MEMBERSHIP INFORMATION

Service Retired Participants

Age	Police		Fire		Total	
	Number	Total Annual Benefit	Number	Total Annual Benefit	Number	Total Annual Benefit
< 50	0	\$0	0	\$0	0	\$0
50-54	0	\$0	0	\$0	0	\$0
55-59	0	\$0	0	\$0	0	\$0
60-64	14	\$912,329	0	\$0	14	\$912,329
65-69	68	\$4,810,265	18	\$1,139,889	86	\$5,950,154
70-74	106	\$6,821,368	34	\$2,501,394	140	\$9,322,762
75-79	42	\$2,880,652	14	\$1,078,122	56	\$3,958,773
80-84	12	\$1,038,360	21	\$1,562,564	33	\$2,600,924
85-89	15	\$1,044,038	21	\$1,555,010	36	\$2,599,048
90-94	9	\$731,580	16	\$1,268,832	25	\$2,000,412
95-99	2	\$146,633	4	\$311,492	6	\$458,126
100+	0	\$0	1	\$85,396	1	\$85,396
Total	268	\$18,385,223	129	\$9,502,700	397	\$27,887,923

Disability Retired Participants

Age	Police		Fire		Total	
	Number	Total Annual Benefit	Number	Total Annual Benefit	Number	Total Annual Benefit
< 50	0	\$0	0	\$0	0	\$0
50-54	0	\$0	0	\$0	0	\$0
55-59	0	\$0	0	\$0	0	\$0
60-64	2	\$125,118	3	\$214,062	5	\$339,180
65-69	49	\$3,224,474	30	\$1,841,545	79	\$5,066,020
70-74	37	\$2,285,171	35	\$2,412,226	72	\$4,697,396
75-79	17	\$1,154,919	23	\$1,707,860	40	\$2,862,780
80-84	8	\$532,415	13	\$925,319	21	\$1,457,733
85-89	5	\$351,489	8	\$634,869	13	\$986,357
90-94	6	\$445,529	5	\$306,267	11	\$751,796
95-99	0	\$0	1	\$71,208	1	\$71,208
100+	0	\$0	0	\$0	0	\$0
Total	124	\$8,119,114	118	\$8,113,356	242	\$16,232,470

**OAKLAND POLICE AND FIRE RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JULY 1, 2016**

APPENDIX A – MEMBERSHIP INFORMATION

Beneficiaries

Age	Police		Fire		Total	
	Number	Total Annual Benefit	Number	Total Annual Benefit	Number	Total Annual Benefit
< 50	0	\$0	0	\$0	0	\$0
50-54	0	\$0	0	\$0	0	\$0
55-59	2	\$106,763	2	\$128,495	4	\$235,258
60-64	8	\$441,236	4	\$243,734	12	\$684,970
65-69	19	\$856,379	10	\$559,110	29	\$1,415,489
70-74	21	\$958,284	14	\$704,648	35	\$1,662,932
75-79	11	\$477,599	15	\$779,053	26	\$1,256,652
80-84	23	\$1,243,200	24	\$1,179,665	47	\$2,422,865
85-89	35	\$1,729,418	32	\$1,552,430	67	\$3,281,849
90-94	25	\$1,212,390	26	\$1,322,831	51	\$2,535,221
95-99	8	\$444,859	9	\$548,002	17	\$992,861
100+	1	\$42,281	1	\$78,291	2	\$120,571
Total	153	\$7,512,409	137	\$7,096,259	290	\$14,608,668

OAKLAND POLICE AND FIRE RETIREMENT SYSTEM
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APPENDIX B – STATEMENT OF ACTUARIAL ASSUMPTIONS AND METHODS

The assumptions and methods used in the actuarial valuation as of July 1, 2016 are:

Actuarial Method

The Entry Age Normal Actuarial Cost Method is used. Under this method, the Plan's Actuarial Liability (AL) is determined as the Present Value of Future Benefits (PVFB) less the Present Value of Future Normal Costs (PVFNC). Since all of the Plan's members are retired, the AL and the PVFB are the same.

The excess of the AL over the Actuarial Value of Assets (AVA) is the Unfunded Actuarial Liability (UAL). In accordance with the Plan's funding agreement with the City of Oakland, the UAL must be amortized by July 1, 2026, with contributions resuming in the 2017-2018 fiscal year. The projected fiscal year 2017-2018 contribution has been calculated using level percent of pay amortization, based on total projected City payroll for all Safety employees.

Actuarial Value of Plan Assets

In determining the recommended employer contribution to the PFRS, we use a smoothed actuarial value of assets. The asset smoothing method dampens the volatility in asset values that could occur because of the fluctuations in market conditions. Use of an asset smoothing method is consistent with the long-term nature of the actuarial valuation process. Assets are assumed to be used exclusively for the provision of retirement benefits and expenses.

The actuarial value of assets is equal to 100% of the *expected actuarial value of assets* plus 20% of the difference between the current market value of assets and the expected actuarial value of assets. In no event will the actuarial value of assets ever be less than 90% of the market value of assets or greater than 110% of the market value of assets.

The expected actuarial value of assets is equal to the prior year's actuarial value of assets increased with actual contributions made, decreased with actual disbursements made, all items (prior assets, contributions, and disbursements) further adjusted with expected investment returns for the year.

**OAKLAND POLICE AND FIRE RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JULY 1, 2016**

APPENDIX B – STATEMENT OF ACTUARIAL ASSUMPTIONS AND METHODS

Actuarial Assumptions

The assumptions used in this report reflect the results of an Experience Study performed by Cheiron covering the period from July 1, 2011 through June 30, 2014 and adopted by the Board. More details on the rationale for the demographic and economic assumptions can be found in the Experience Analysis presented to the Board on December 17, 2014. There were no changes to the assumptions from the prior valuation, other than the changes in the projected COLAs as a result of the new Police MOU.

1. Rate of Return

The expected annual rates of return, net of investment expenses, on all Plan assets are shown in the table below. The equivalent single discount rate for these returns using the Plan's expected projected benefit payments is 6.44%.

Benefit Payment Year	Expected Return
2016-2026	7.000%
2027	6.625%
2028	6.250%
2029	5.875%
2030	5.500%
2031	5.125%
2032	4.750%
2033	4.375%
2034	4.000%
2035	3.625%
2036+	3.250%

2. Inflation

The assumed rate of general inflation is 2.75% (entire US) and local inflation is 2.85% (Bay Area). The general inflation rate is used in the determination of the investment return assumptions. The local inflation rate is used in the determination of the growth in expenses and salaries (which determine the COLA increases).

3. Administrative Expenses

Annual administrative expenses are assumed to be \$952,031, growing at 2.85% per year.

4. Cost-of-Living Adjustments

Cost-of-living adjustments are based on salary increases for a retiree's rank at retirement.

**OAKLAND POLICE AND FIRE RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JULY 1, 2016**

APPENDIX B – STATEMENT OF ACTUARIAL ASSUMPTIONS AND METHODS

The long-term rate of salary increase is assumed to be 3.25% (2.85% inflation plus 0.4% productivity). The following schedule shows salary increases based on the current Police and Fire contracts, which expire on June 30, 2019 and October 31, 2017, respectively. All increases shown after those dates are assumptions.

Post-Retirement Benefit Increases (Based on Salary Increases for Rank at Retirement)		
Date of Increase	Police	Fire
January 1, 2017	1.00%	n/a
May 1, 2017	4.00%	n/a
July 1, 2017	n/a	3.25%
January 1, 2018	2.50% & 1.00%	n/a
July 1, 2018	2.00%	3.25%
January 1, 2019	2.50%	n/a
Annual Increases		
Starting	3.25%	3.25%
July 1, 2019		

5. Rates of Termination

None.

6. Rates of Disability

None.

7. Rates of Retirement

None.

8. Rates of Mortality for Healthy Lives

CalPERS Healthy Table from the 2006-2011 Experience Study, excluding the 20-year projection using Scale BB.

9. Rates of Mortality for Disabled Retirees

CalPERS Industrial Disability Mortality Table from the 2006-2011 Experience Study, excluding the 20-year projection using Scale BB.

OAKLAND POLICE AND FIRE RETIREMENT SYSTEM
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APPENDIX B – STATEMENT OF ACTUARIAL ASSUMPTIONS AND METHODS

10. Mortality Improvement

The mortality tables are projected to improve with MP-2014 generational mortality improvement tables, with improvements projected from a base year of 2009 (the mid-point of the CalPERS base tables).

11. Survivor Continuance

30% of disabled retirees' deaths are assumed to be related to injuries arising out of the performance of duty, entitling the surviving spouse to a 100% continuance.

12. Changes in Assumptions Since the Last Valuation

New Memorandums of Understanding (MOUs) went into effect for Police members after the previous valuation, increasing Police retirees' Cost of Living Adjustments (COLAs). No other changes have been made to the actuarial assumptions.

OAKLAND POLICE AND FIRE RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JULY 1, 2016

APPENDIX C – SUMMARY OF PLAN PROVISIONS

1. Plan Year

July 1 to June 30.

2. Membership

The Plan has been closed to new members since June 30, 1976.

3. Salary

Retirement allowances are based on the pensionable compensation attached to the average rank held during the three years immediately preceding retirement.

4. Employee Contributions

There are no active employees in the Plan, and thus no employee contributions.

5. Service Retirement

Eligibility

25 years of service, or 20 years of service and age 55, or age 65. A reduced early retirement is available with 20 years of service.

Benefit Amount

50% of Salary plus 1.67% for each additional year of service beyond that required for service retirement eligibility, to a maximum of 10 years. For retirements with less than 20 years of service, benefits are pro-rated.

6. Duty-Related Disability Retirement

Equivalent to service retirement benefit if 25 or more years of service.

7. Non-Duty Related Disability Retirement

Equivalent to service retirement benefit if age 55 is attained.

8. Post-Retirement Death Benefit

For retirees without a spouse at death, a \$1,000 lump sum is paid to designated beneficiary.

9. Cost-of-Living Adjustments

Benefit increases are based on increases in salary for rank at retirement (see above definition of Salary).

OAKLAND POLICE AND FIRE RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JULY 1, 2016

APPENDIX C – SUMMARY OF PLAN PROVISIONS

10. Benefit Forms

Benefit is paid for the lifetime of the member. For non-duty related deaths after retirement, a 66-2/3% continuance is paid for the lifetime of the spouse. If the death is duty-related, a continuance of 100% is paid.

11. Changes in Plan Provisions Since the Last Valuation

None. Benefit amounts changed as a result of cost-of-living adjustments, but these were considered as part of the assumption changes for the current valuation.

APPENDIX D – GLOSSARY

1. Actuarial Assumptions

Assumptions as to the occurrence of future events affecting pension costs such as mortality, withdrawal, disability, retirement, changes in compensation, and rates of investment return.

2. Actuarial Cost Method

A procedure for determining the Actuarial Present Value of pension plan benefits and expenses and for developing an allocation of such value to each year of service, usually in the form of a Normal Cost and an Actuarial Liability.

3. Actuarial Gain (Loss)

The difference between actual experience and that expected based upon a set of Actuarial Assumptions during the period between two Actuarial Valuation dates, as determined in accordance with a particular Actuarial Cost Method.

4. Actuarial Liability

The portion of the Actuarial Present Value of Projected Benefits which will not be paid by future Normal Costs. It represents the value of the past Normal Costs with interest to the valuation date.

5. Actuarial Present Value (Present Value)

The value as of a given date of a future amount or series of payments. The Actuarial Present Value discounts the payments to the given date at the assumed investment return and includes the probability of the payment being made.

6. Actuarial Valuation

The determination, as of a specified date, of the Normal Cost, Actuarial Liability, Actuarial Value of Assets, and related Actuarial Present Values for a pension plan.

OAKLAND POLICE AND FIRE RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JULY 1, 2016

APPENDIX D – GLOSSARY

7. Actuarial Value of Assets

The value of cash, investments, and other property belonging to a pension plan as used by the actuary for the purpose of an Actuarial Valuation. The purpose of an Actuarial Value of Assets is to smooth out fluctuations in market values.

8. Actuarially Equivalent

Of equal Actuarial Present Value, determined as of a given date, with each value based on the same set of actuarial assumptions.

9. Amortization Payment

The portion of the pension plan contribution which is designed to pay interest and principal on the Unfunded Actuarial Liability in order to pay for that liability in a given number of years.

10. Entry Age Normal Actuarial Cost Method

A method under which the Actuarial Present Value of the Projected Benefits of each individual included in an Actuarial Valuation is allocated on a level basis over the earnings of the individual between entry age and assumed exit ages.

11. Funded Ratio

The ratio of the Actuarial Value of Assets to the Actuarial Liabilities.

12. Normal Cost

That portion of the Actuarial Present Value of pension plan benefits and expenses which is allocated to a valuation year by the Actuarial Cost Method.

13. Projected Benefits

Those pension plan benefit amounts which are expected to be paid in the future under a particular set of Actuarial Assumptions, taking into account such items as increases in future compensation and service credits.

14. Unfunded Actuarial Liability

The excess of the Actuarial Liability over the Actuarial Value of Assets.



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