CITY OF OAKLAND

AGENDA REPORT

TO: Sabrina B. Landreth
City Administrator

FROM: Katano Kasaine
Finance Director

SUBJECT: Oakland PFRS's Investment Portfolio and Actuarial Valuation

DATE: May 6, 2019

City Administrator Approval Date: 5/29/19

RECOMMENDATION

Staff Recommends That the City Council Receive an Informational Report on the Oakland Police and Fire Retirement System's ("PFRS", or "System") Investment Portfolio as of March 31, 2019 and the PFRS Actuarial Valuation as of July 1, 2018.

EXECUTIVE SUMMARY

The attached Quarterly Investment Performance report (***Attachment A***) provided by the PFRS Investment Consultant, Meketa Investment Group (MIG) summarizes the performance of the PFRS investment portfolio for the quarter ended March 31, 2019. In addition, the Council is being provided the recently updated PFRS' Actuarial Valuation (***Attachment B***) as of July 1, 2018.

During the most recent quarter, the PFRS Total Portfolio generated an absolute return of 9.6 percent, gross of fees, outperforming its policy benchmark by 1.0 percent. The portfolio outperformed its benchmark over the latest one-, three-, and five-year periods. This is discussed in more detail in the "Investment Performance" section of this report.

	Quarter	1 Year	3 Year	5 Year
Total Portfolio	9.6	4.8	10.4	7.1
Policy Benchmark	8.6	4.2	9.1	6.9
Excess Return	**1.0**	**0.6**	**1.3**	**0.2**

As of July 1, 2018, the System's Unfunded Actuarial Liability is approximately $299.78 million and the System had a Funded Ratio of 58.1 percent on a Market Value of Assets (MVA) basis. This is discussed in more detail in the "PFRS Actuarial Valuation" section of this report.

Item: _____
Finance and Management Committee
June 11, 2019

BACKGROUND / LEGISLATIVE HISTORY

The Oakland Police and Fire Retirement System 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 March 31, 2019, PFRS had 804 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. Twelve external investment managers currently manage the System's portfolio. Most 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. As a result of the funding agreement entered at the time the 1997 POBs were issued, City payments to PFRS were suspended from February 25, 1997 to June 30, 2011. The City of Oakland resumed contributing to PFRS effective July 1, 2011 and contributed $45.5 million for the fiscal year (FY) ended June 30, 2012.

In July 2012, the City issued $212.5 million of Taxable Pension Obligation Bonds, Series 2012 ("2012 POBs"). The City subsequently deposited $210 million into the System and entered a funding agreement with the PFRS Board. Thus, no additional contributions were required until July 1, 2017. As of the most recent actuary study dated July 1, 2018, the System's Unfunded Actuarial Liability is approximately $299.78 million and the System had a Funded Ratio of 58.1 percent on a Market Value of Assets (MVA) basis. The City of Oakland is currently making monthly payments to the Plan for the FY 2019/2020 required contribution of $43.4 million.

ANALYSIS AND POLICY ALTERNATIVES

PFRS' Membership

The City Charter establishes plan membership, contribution, and benefit provisions. The System serves the City's sworn employees hired prior to July 1, 1976 who have not transferred to the California Public Employees' Retirement System ("CalPERS"). As of March 31, 2019, the System's membership was 804, as shown on ***Table 1*** *below.*

Table 1
PFRS Membership
as of March 31, 2019

Membership	POLICE	FIRE	TOTAL
Retiree	351	199	550
Beneficiary	127	127	254
Total Membership	478	326	804

PFRS Investment Portfolio

As of March 31, 2019, the PFRS' portfolio had an aggregate value of $380.73 million as shown in ***Table 2***.

Table 2
PFRS Investment Portfolio
as of March 31, 2019
(in thousands)

Investment	Fair Value
Domestic Equities	$153,270
Fixed Income	102,563
Covered Calls	47,389
International Equities	45,111
Crisis Risk Offset	24,521
Cash	7,879
Total Portfolio	$380,733

As of March 31, 2019, the PFRS portfolio had an aggregate value of $380.7 million. This represents a $33.5 million increase in investment value and ($2.8) million in benefit payments over the quarter. During the previous one-year period, the PFRS Total Portfolio increased in value by $17.4 million and withdrew ($12.4) million for benefit payments as shown in ***Table 3*** below. The investment drawdowns for benefit payments are less City of Oakland Contributions to the PFRS Plan of $11.2 million for the Quarter and $44.8 million for the Year.

Table 3
Change in PFRS Portfolio Valuation
as of March 31, 2019
(in thousands)

Total Plan Value	1 Quarter	1 Year
Beginning Market Value	$350,053	$375,740
Investment Drawdowns for Benefit Payments	(2,843)	(12,403)
Gain/Loss on Investment	33,522	17,396
Ending Market Value	$380,733	$380,733

PFRS Investment Performance

During the most recent quarter ending March 31, 2019, the PFRS Total Portfolio generated an absolute return of 9.6 percent, gross of fees, outperforming its policy benchmark by 1.0 percent. The portfolio outperformed its benchmark by 0.6 percent over the one-year period, 1.3 percent over the three-year period, and 0.2 percent over the five-year period.

Over the most recent quarter ending March 31, 2019, the Plan's Domestic Equity allocation outperformed its benchmark by 0.8 percent. The Plan's International Equity allocation outperformed its benchmark by 1.2 percent. The Plan's Fixed Income allocation outperformed its benchmark of 0.2 percent. The Plan's Crisis Risk Offset allocation outperformed its benchmark by 2.7 percent, while the Covered Calls allocation outperformed its benchmark by 2.8 percent. ***Table 4*** shows PFRS recent investment performance in comparison to its corresponding benchmarks.

Table 4
PFRS Asset Class Performance
as of March 31, 2019

Investment Type	Quarter	1 Year	3 Year	5 Year
PFRS Total Fund	9.6	4.8	10.4	7.1
PFRS Policy Benchmark	8.6	4.2	9.1	6.9
Excess Returns	1.0	0.6	1.3	0.2
PFRS Domestic Equity	14.8	6.9	13.8	10.1
Benchmark: Russell 3000	14.0	8.8	13.5	10.4
Excess Returns	0.8	(1.9)	(0.3)	(0.3)

Table 4
PFRS Asset Class Performance
as of March 31, 2019 (*cont'd*)

Investment Type	Quarter	1 Year	3 Year	5 Year
PFRS International Equity	11.6	(4.8)	9.2	4.0
Benchmark: MSCI ACWI Ex US	10.4	(3.7)	8.6	3.0
Excess Returns	1.2	(1.1)	0.6	1.0
PFRS Fixed Income	3.5	4.7	3.6	3.5
Benchmark: Bloomberg Barclays Universal	3.3	4.5	2.6	3.0
Excess Returns	0.2	0.2	1.0	0.5
PFRS Crisis Risk Offset	5.9	-	-	-
Benchmark: SG Multi Alternative Risk Premia	3.2	-	-	-
Excess Returns	2.7	-	-	-
PFRS Covered Calls	9.6	7.2	9.9	7.9
Benchmark: CBOE BXM	6.8	3.3	7.4	5.9
Excess Returns	2.8	3.9	2.5	2.0
Cash	0.5	2.0	1.3	0.8
Citigroup 3 Month T-Bill Index	0.6	2.1	1.2	0.7
Excess Returns	(0.1)	(0.1)	0.1	0.1

Table 5 compares PFRS Total Portfolio performance to other pension funds and benchmarks.

Table 5
PFRS Total Fund Performance
as of March 31, 2019

	Quarter	1 Year	3 Year	5 Year
PFRS Fund (Gross of Fees)	9.6%	4.8%	10.4%	7.1%
Comparisons:				
PFRS Actuarial Expected Rate of Return (blend) (a) (b)	1.5%	6.0%	6.3%	6.4%
Policy Target (blend) (c)	8.6%	4.2%	9.1%	6.9%
Median Fund (d)	8.8%	4.2%	8.3%	6.0%
CalSTRS Investment Returns (Gross of Fees)	7.3%	4.2%	9.3%	7.3%
East Bay Mud Investment Returns (Gross of Fees)(d)	8.8%	5.5%	9.6%	7.2%
San Joaquin County Investment Returns (Gross of Fees)(d)	5.9%	4.7%	7.8%	5.2%

a) 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, 6.5% through 12/31/2017, and 6.0% currently.
b) The quarterly actuarial expected rate of return is calculated based on the 6.0% annual return assumption.
c) The Policy Benchmark consists of 40% Russell 3000, 12% MSCI ACWI ex U.S., 33% Bbg BC Universal, 5% CBOE BXM, 6.7% SG Multi-Asset Risk Premia, 3.3% Bbg BC Long Treasury.
d) Preliminary.

PFRS Actuarial Valuation

As of the latest actuarial valuation dated July 1, 2018, the PFRS Funded Ratio (actuarial value of assets divided by present value of future benefits) is 58.1 percent. As a result of the funding agreement and the City's deposit of $210 million in 2012 POBs to the System, no contributions were required until fiscal year 2017/2018. The City resumed contributions to the System on July 1, 2017. The required contribution for fiscal year 2018/2019 is $44.82 million. ***Table 6*** below shows a summary of the July 1, 2018 PFRS Actuarial valuation results.

Table 6
Summary of Plan Results
($ in thousands)

	July 01, 2018
Actuarial Liability	$ 647,251
Less: Actuarial Value of Assets	(347,467)
Unfunded Actuarial Liability	$ 299,784
Funded Ratio (MVA) liability	58.1%

Projected City of Oakland Contributions

Article XXVI Section 2619 (6) required that the City fully fund the PFRS Plan by 2026. ***Table 7*** summarizes the projected employer contributions.

Table 7
Projected Employer Contributions
Police and Fire Retirement System
(in millions)

Fiscal Year Ending	Employer Contribution
2019	$44.8
2020	43.4
2021	43.8
2022	44.3
2023	44.7
2024	45.1
2025	45.1
2026	44.2

FISCAL IMPACT

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

PUBLIC OUTREACH / INTEREST

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

COORDINATION

This report was prepared in coordination with the PFRS' Investment Consultant (MIG) 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: The PFRS Board supports a sustainable environment. On June 29, 2016, the PFRS Board passed Resolution No. 6927 prohibiting PFRS investment managers from investing PFRS funds in any publicly-traded company which derives at least 50 percent of its revenue from the mining and extracting of thermal coal.

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

ACTION REQUESTED OF THE CITY COUNCIL

Staff recommends that the Council receive this informational report on the Oakland Police and Fire Retirement System ("PFRS") Investment Portfolio as of March 31, 2019 and the PFRS Actuarial Valuation as of July 1, 2018.

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

Respectfully submitted,

KATANO KASAINE
Director of Finance

Prepared by:
Téir Jenkins,
Investment Officer

Reviewed by:
David Jones,
Treasury Administrator

Attachments (2):

Attachment A: Oakland Police and Fire System Quarterly Investment Performance Report as of March 31, 2019

Attachment B: Oakland Police and Fire System Actuarial Valuation Report as of July 1, 2018

ATTACHMENT A:
PFRS INVESTMENT PERFORMANCE REPORT
AS OF MARCH 31, 2019

Q1 2019

Oakland Police and Fire Retirement System

Quarterly Report

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TOTAL PORTFOLIO SUMMARY

As of March 31, 2019, the City of Oakland Police and Fire Retirement System (OPFRS) portfolio had an aggregate value of $380.7 million. This represents a $33.5 million increase in investment value and ($2.8) million in benefit payments over the quarter. During the previous one-year period, the OPFRS Total Portfolio increased in value by $17.4 million and withdrew ($12.4) million for benefit payments.

Asset Allocation Trends

The asset allocation targets (see table on page 21) reflect those as of March 31, 2019. Target weightings reflect the interim phase (CRO = 10%) of the Plan's previously approved asset allocation (effective 5/31/2017).

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

Recent Investment Performance

During the most recent quarter, the OPFRS Total Portfolio generated an absolute return of 9.6%, gross of fees, outperforming its policy benchmark by 1.0% basis points. The portfolio outperformed its benchmark by 0.6% and 1.3% basis points over the 1- and 3-year periods, respectively, while also outperforming by 20 basis points over the 5-year period.

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

	Quarter	Fiscal YTD	1 Year	3 Year	5 Year
Total Portfolio[1]	9.6	2.9	4.8	10.4	7.1
Policy Benchmark[2]	*8.6*	*2.0*	*4.2*	*9.1*	6.9
Excess Return	**1.0**	**0.9**	**0.6**	**1.3**	**0.2**
Reference: Median Fund[3]	8.8	3.1	4.2	8.3	6.0
Reference: Total Net of Fees[4]	9.5	2.6	4.4	10.0	6.7

[1] Gross of Fees. Performance since 2005 includes securities lending.
[2] Evolving Policy Benchmark consists of 40% Russell 3000, 12% MSCI ACWI ex U.S., 33% Bbg BC Universal, 5% CBOE BXM , 6.7% SG Multi Asset Risk Premia, 3.3% Bbg BC Long Treasury
[3] Investment Metrics < $1 Billion Public Plan Universe.
[4] Longer-term (>1 year) Net of fee returns are estimated based on OPFRS manager fee schedule (approximately 34 bps)

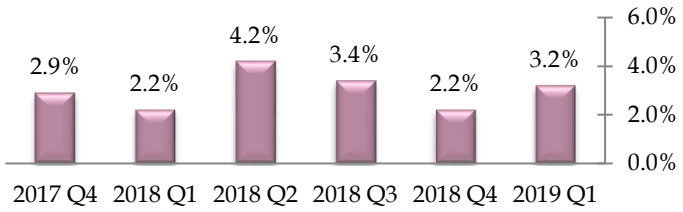
Economic & Market Overview – 1Q 2019

Overview: Real U.S. GDP increased by 3.2% in the first quarter of 2019. Growth was driven by increases in personal consumption expenditures, private inventory investment, exports, state and local government spending, and nonresidential fixed investment, while a decrease in residential fixed investment detracted from GDP growth over the quarter. At quarter-end, the unemployment rate decreased to 3.8%. The seasonally adjusted Consumer Price Index for All Urban Consumers increased by 2.3% on an annualized basis during the quarter. Commodities were up in the first quarter, but the 1-year return for a basket of commodities was negative at -5.3%. Global equity returns were strong over the quarter as the MSCI ACWI was up 12.7%. The U.S. Dollar appreciated against the Euro and Yen by 2.2% and 1.1%, respectively, but depreciated against the Pound by 2.2%.

Economic Growth

- Real GDP increased at an annualized rate of 3.2 percent in the first quarter of 2019.
- Real GDP growth was driven by increases in personal consumption expenditures, private inventory investment, exports, state and local government spending, and nonresidential fixed investments.
- GDP growth was partially offset during the quarter by a decrease in residential investment.

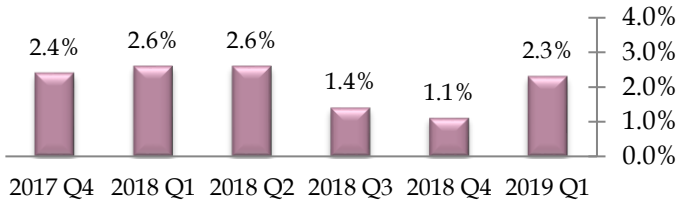
Annualized Quarterly GDP Growth



Inflation

- The Consumer Price Index for All Urban Consumers (CPI-U) increased by 2.3 percent during the first 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 2.0 percent for the quarter on an annualized basis after seasonal adjustment.
- Over the last 12 months, core CPI-U increased by 2.0 percent after seasonal adjustment.

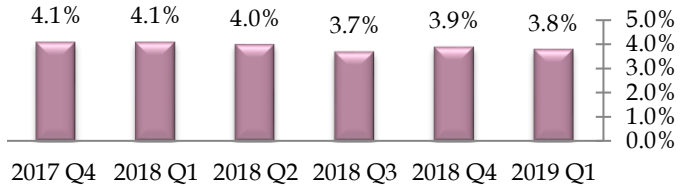
CPI-U After Seasonal Adjustment



Unemployment

- The U.S. economy gained approximately 541,000 jobs in the first quarter of 2019.
- The unemployment rate decreased to 3.8% at quarter-end.
- The majority of jobs gained occurred in education and health services, professional and business services, and leisure and hospitality. Job loss in temporary help services, retail trade, as well as manufacturing in motor vehicles and parts detracted from job growth over the quarter.

Unemployment Rate

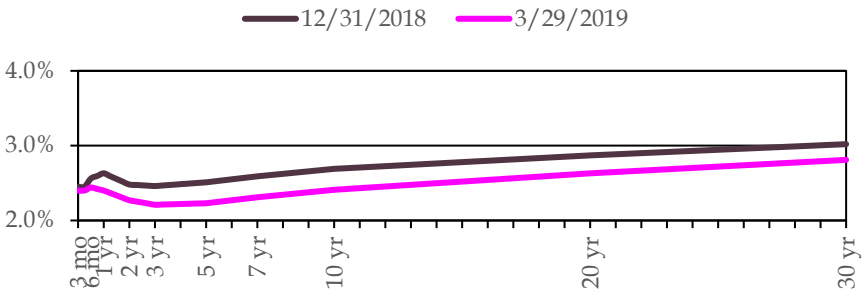


Economic & Market Overview – 1Q 2019

Interest Rates & US Dollar

- Certain parts of the yield curve remained slightly inverted over the quarter as longer term yields decreased more than shorter-term yields.
- The Federal Fund Rate was unchanged in the first quarter. The current target is between 2.25 and 2.50 percent.
- The U.S. Dollar appreciated against the Euro and Yen by 2.2% and 1.1%, respectively, but depreciated against the Pound by 2.2%.

Treasury Yield Curve Changes

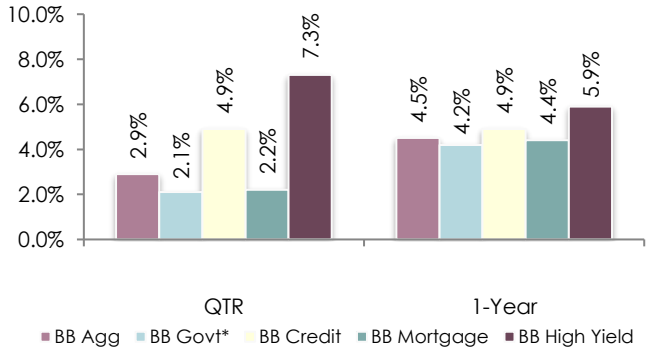


Source: US Treasury Department

Fixed Income

- Investment Grade bonds performed well over the quarter, generally producing returns between 2% and 5%. High Yield bonds provided the strongest performance as they were up 7.3% for the quarter.
- Over the trailing 1-year period, all bonds sectors performed favorably as they were all in excess of 4%. High Yield led all other sectors as they were up nearly 6% over the 1-year period.

Fixed Income Returns



*U.S. Treasuries and Agencies

US Fixed Income Sector Performance (BB Aggregate Index)			
Sector	**Weight**	**QTR**	**1 Year**
Governments*	42.3%	2.2%	4.2%
Agencies	2.7%	2.5%	3.8%
Inv. Grade Credit	24.7%	5.1%	4.9%
MBS	27.8%	2.2%	4.4%
ABS	0.5%	1.5%	3.7%
CMBS	2.0%	3.2%	5.4%

*U.S. Treasuries and Government Related

Economic & Market Overview – 1Q 2019

U.S. Equities

- U.S. equities experienced an exceptional first quarter as they provided double-digit returns across styles and market capitalizations. Growth stocks outperformed value stocks and small cap stocks outperformed large cap stocks. Small cap growth outperformed all other styles and capitalizations as they returned 17.3% over the quarter. Broad, large, and small cap value stocks each returned 11.9% over the quarter.
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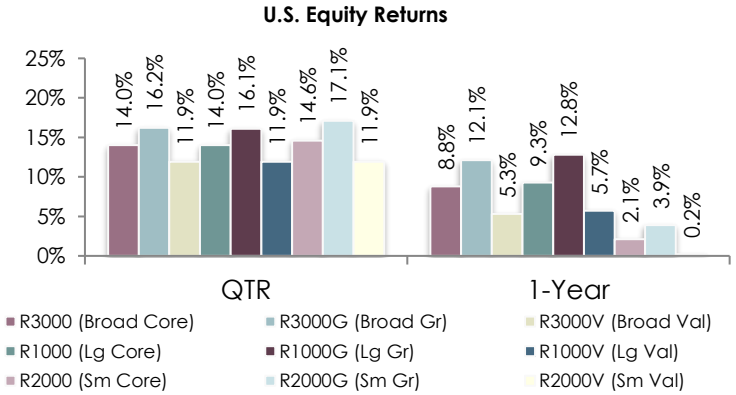
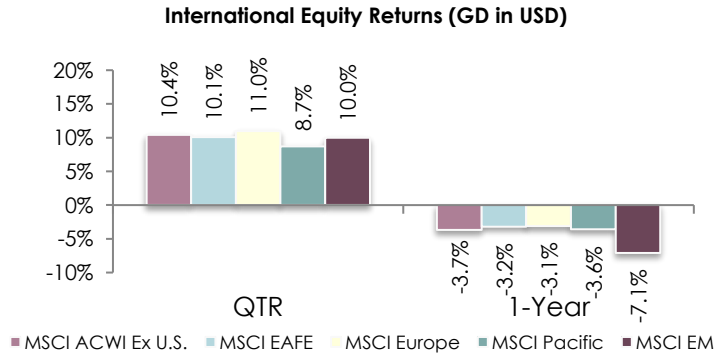
- During the trailing 1-year period, U.S. equities were mixed as large cap growth stocks performed well returning 12.8% over the time period, while small cap value stocks were essentially flat.



U.S. Equity Sector Performance (Russell 3000 Index)			
Sector	**Weight**	**QTR**	**1 Year**
Information Tech.	20.5%	20.8%	18.0%
Health Care	14.4%	8.2%	14.1%
Financials	13.8%	8.8%	-4.7%
Industrials	10.4%	16.7%	2.1%
Consumer Disc.	10.2%	14.7%	10.5%
Comm. Services	9.1%	14.2%	10.5%
Consumer Staples	6.4%	11.7%	9.8%
Energy	5.0%	16.6%	-0.2%
Real Estate	3.9%	17.3%	19.3%
Utilities	3.2%	11.4%	20.3%
Materials	3.0%	11.6%	-2.3%

International Equities

- International equities provided strong performance across the board during the first quarter. Europe led all major regions with a return of 11.0% while the Pacific trailed all other major regions with a return of 8.7%.
- Over the trailing 1-year period, Europe led all other major regions with a return of -3.1%, while Emerging Markets trailed all other major regions with a -7.1% return.



International Equity Region Performance (GD in USD) (MSCI ACWI ex US)			
Sector	**Weight**	**QTR**	**1 Year**
Europe Ex. UK	30.7%	10.7%	-4.3%
Emerging Markets	26.1%	10.0%	-7.1%
Japan	16.1%	6.9%	-7.5%
United Kingdom	11.5%	11.9%	0.0%
Pacific Ex. Japan	8.5%	12.3%	4.7%
Canada	6.8%	15.6%	3.9%

Economic & Market Overview – 1Q 2019

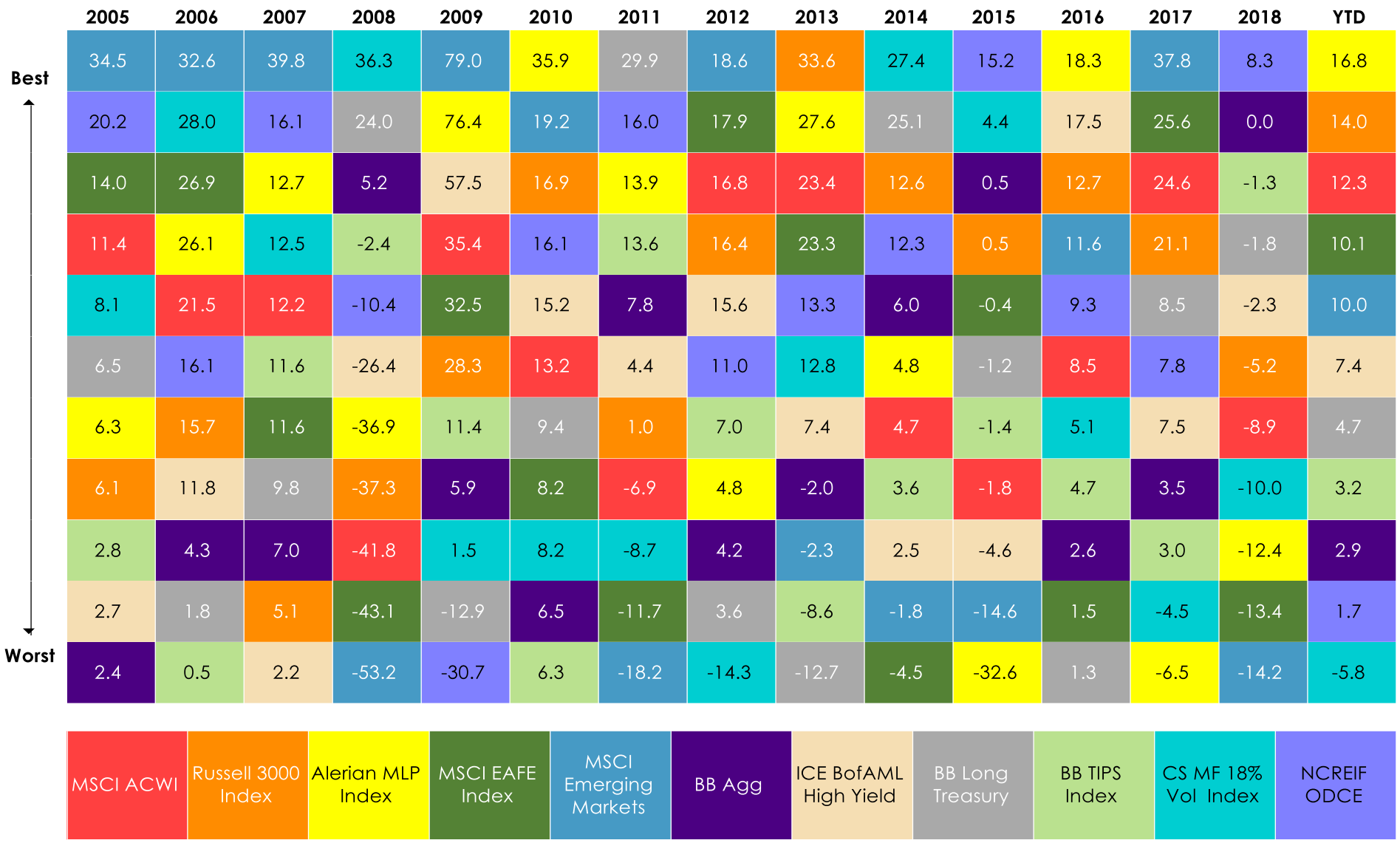
Market Summary – Multi-term Performance*

Indexes	Month	Quarter	1 Year	3 Years	5 Years	10 Years	20 Years
Global Equity							
MSCI AC World Index	1.3%	12.3%	3.2%	11.3%	7.0%	12.6%	5.4%
Domestic Equity							
S&P 500	1.9%	13.6%	9.5%	13.5%	10.9%	15.9%	6.0%
Russell 3000	1.5%	14.0%	8.8%	13.5%	10.4%	16.0%	6.5%
Russell 3000 Growth	2.5%	16.2%	12.1%	16.4%	13.1%	17.4%	5.6%
Russell 3000 Value	0.4%	11.9%	5.3%	10.5%	7.6%	14.5%	6.9%
Russell 1000	1.7%	14.0%	9.3%	13.5%	10.6%	16.0%	6.3%
Russell 1000 Growth	2.8%	16.1%	12.7%	16.5%	13.5%	17.5%	5.5%
Russell 1000 Value	0.6%	11.9%	5.7%	10.5%	7.7%	14.5%	6.7%
Russell 2000	-2.1%	14.6%	2.0%	12.9%	7.1%	15.4%	8.4%
Russell 2000 Growth	-1.4%	17.1%	3.9%	14.9%	8.4%	16.5%	7.1%
Russell 2000 Value	-2.9%	11.9%	0.2%	10.9%	5.6%	14.1%	9.4%
Russell Microcap	-3.0%	13.1%	-2.4%	12.3%	5.0%	15.0%	---
Alerian MLP Index	3.4%	16.8%	15.1%	5.7%	-4.7%	10.1%	11.5%
CBOE BXM Index	1.8%	6.8%	3.3%	7.4%	5.9%	9.0%	5.0%
International Equity							
MSCI AC World Index ex USA	0.7%	10.4%	-3.7%	8.6%	3.0%	9.3%	5.0%
MSCI EAFE	0.7%	10.1%	-3.2%	7.8%	2.8%	9.5%	4.4%
MSCI Pacific	0.8%	8.7%	-3.6%	9.1%	5.2%	9.3%	4.4%
MSCI Europe	0.7%	11.0%	-3.1%	7.2%	1.6%	9.6%	4.4%
MSCI EM (Emerging Markets)	0.9%	10.0%	-7.1%	11.1%	4.1%	9.3%	8.7%
Fixed Income							
BB Universal	1.8%	3.3%	4.5%	2.6%	3.0%	4.4%	5.0%
Global Agg. - Hedged	1.8%	3.0%	4.9%	2.8%	3.6%	4.1%	4.7%
BB Aggregate Bond	1.9%	2.9%	4.5%	2.0%	2.7%	3.8%	4.7%
BB Government	1.9%	2.1%	4.2%	1.1%	2.1%	2.4%	4.3%
BB Credit Bond	2.4%	4.9%	4.9%	3.5%	3.6%	6.2%	5.5%
BB Mortgage Backed Securities	1.5%	2.2%	4.4%	1.8%	2.6%	3.1%	4.6%
BB High Yield	0.9%	7.3%	5.9%	8.6%	4.7%	11.3%	6.8%
BB WGIL All Maturities - Hedged	3.1%	3.9%	4.0%	4.4%	4.5%	4.8%	---
Emerging Markets Debt	1.4%	5.4%	4.4%	5.4%	4.8%	8.5%	9.1%
Real Estate							
NCREIF	0.5%	1.4%	7.5%	8.0%	10.2%	8.7%	8.5%
FTSE NAREIT All Equity Index	4.2%	16.7%	19.9%	8.1%	9.9%	18.3%	10.7%
Commodity Index							
Bloomberg Commodity Index	-0.2%	6.3%	-5.3%	2.2%	-8.9%	-2.6%	1.8%

*Performance is annualized for periods greater than one year

Economic & Market Overview – 1Q 2019

Annual Asset Class Performance

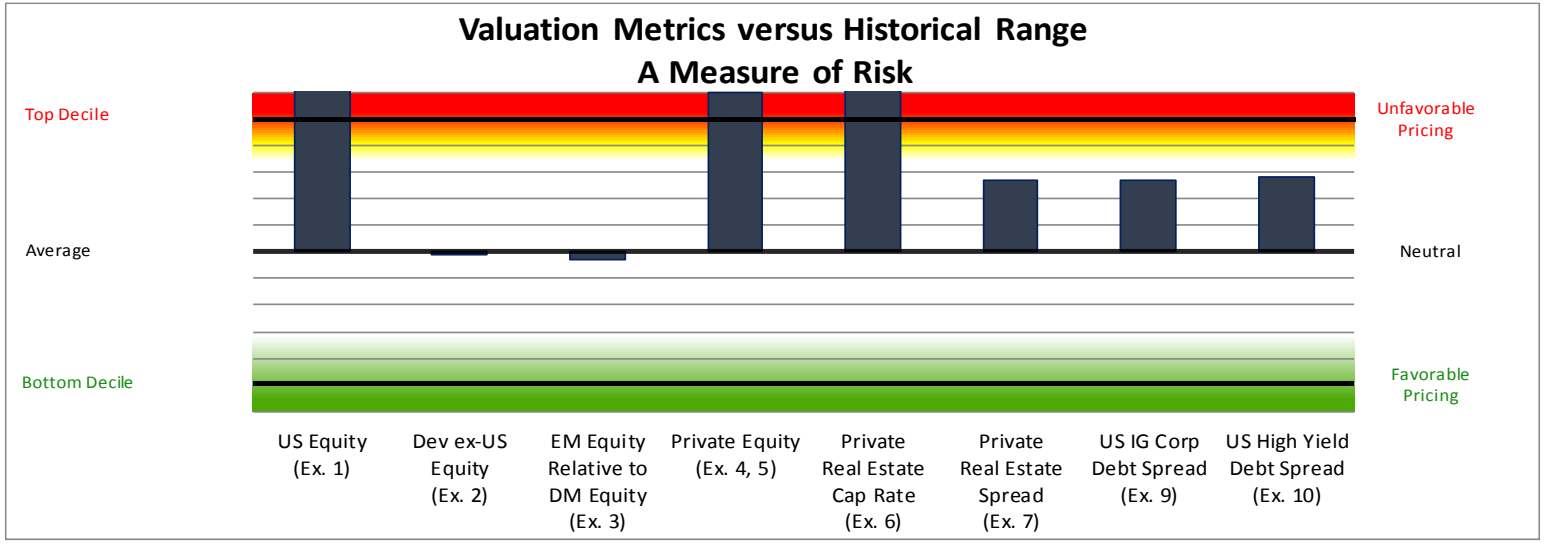


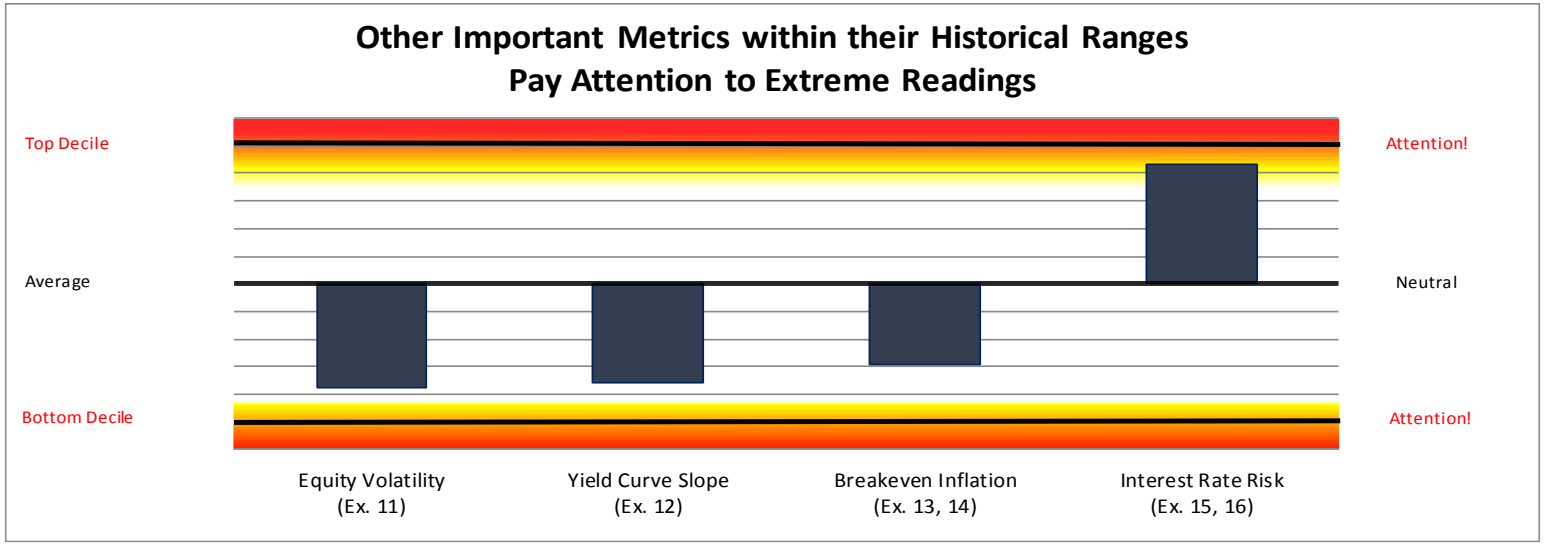
Takeaways

- Although March was a relatively muted period for most asset classes, the month capped off a historically strong quarter for most risk-based assets. Across the globe, the strong returns for broad equity markets in Q1 2019 effectively nullified the material drawdowns seen in Q4 2018. During the quarter, U.S. equity markets outperformed Non-U.S. markets, with most U.S. indices producing returns in the low-to-mid teens.
- Due to the strong rebound in public market risk-based assets to start 2019, private market assets are likely to show only a modest impact from the volatile trailing six-month period.
- U.S. equity markets remain expensive whereas Non-U.S. equity markets remain reasonably valued.
- The U.S. yield curve continued to flatten during the first quarter, with intermediate and long rates compressing by roughly 20-30 bps over the quarter. The yield curve is currently at its flattest point since the Great Financial Crisis.
- Implied equity market volatility decreased during the first quarter, as the VIX Index finished the quarter meaningfully below the long-term historical average.
- The Market Sentiment Indicator[1] remained neutral (gray).
- **Market uncertainty is higher than numbers might indicate**. Diverging global economic growth, nuanced monetary policies, and ongoing geopolitical turmoil has resulted in increased uncertainty in the global capital markets. Moreover, equity and credit markets are currently producing different macroeconomic signals when compared to sovereign bond markets.

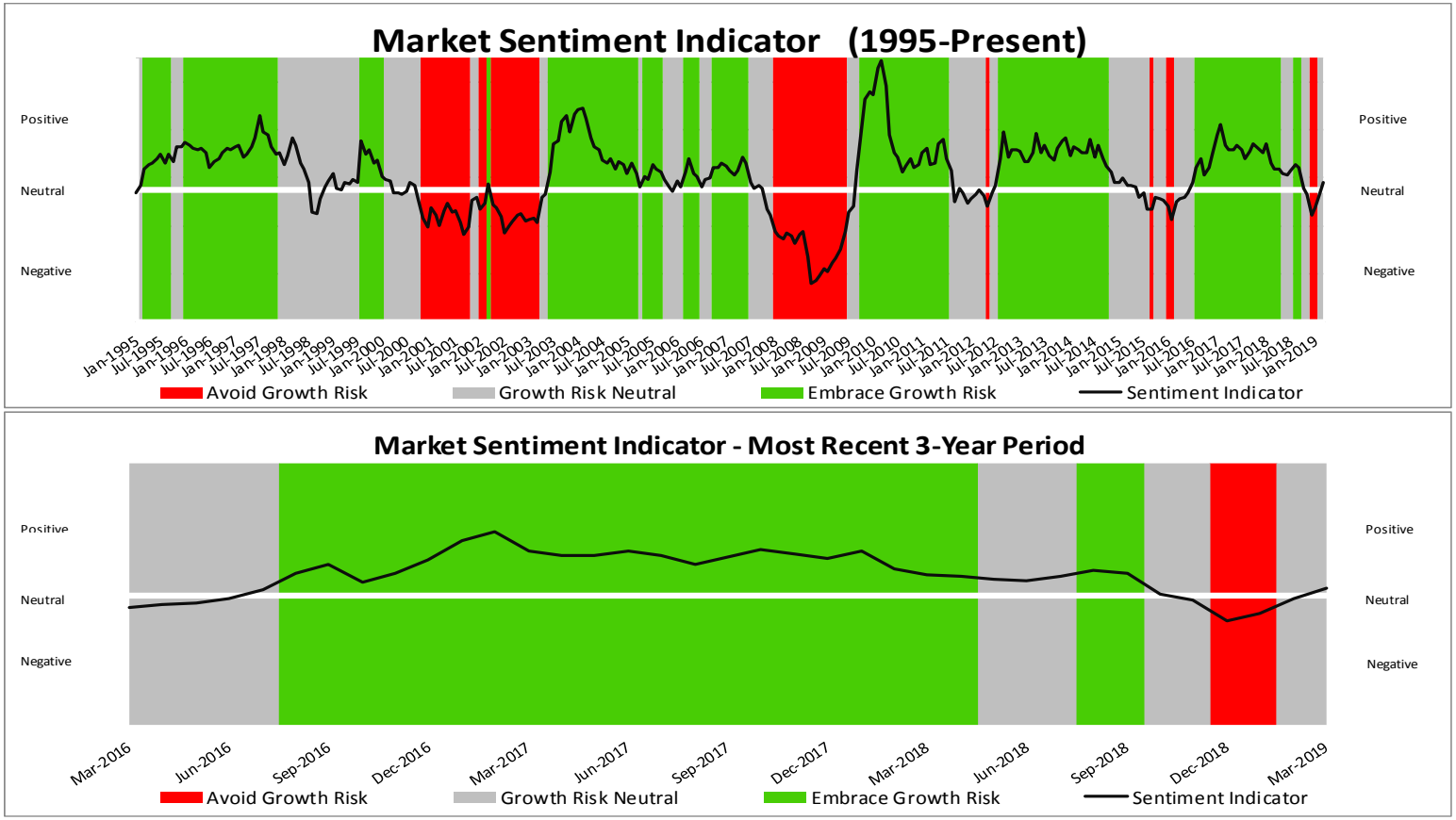
[1] See Appendix for the rationale for selection and calculation methodology used for the risk metrics.

Risk Overview





Market Sentiment



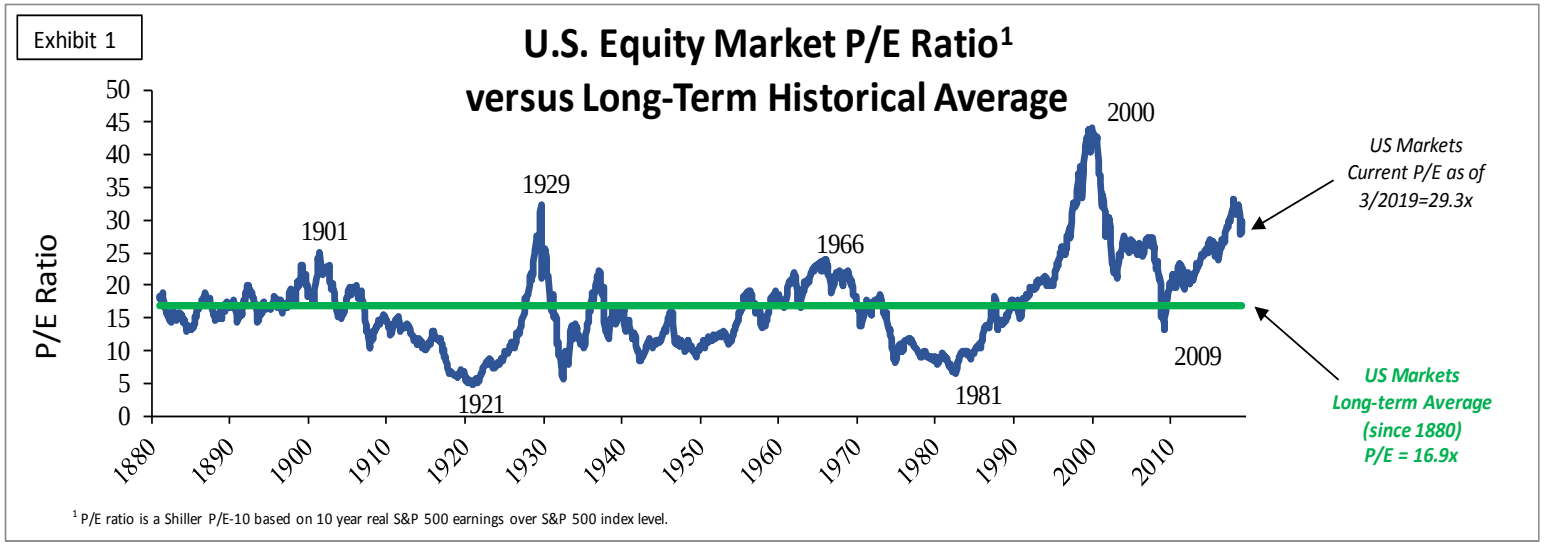
Information Behind Current Sentiment Reading

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

Growth Risk Visibility (Current Overall Sentiment)	**Neutral**

Developed Public Equity Markets

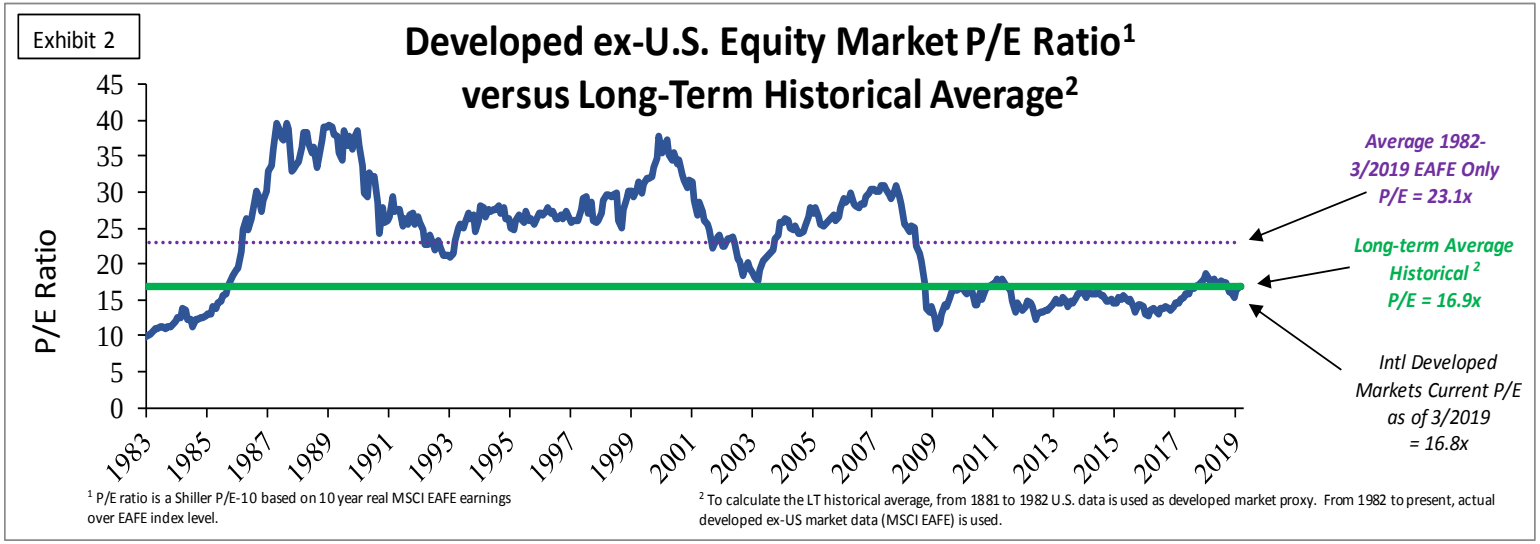
Exhibit 1



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

(Please note different time scales)

Exhibit 2



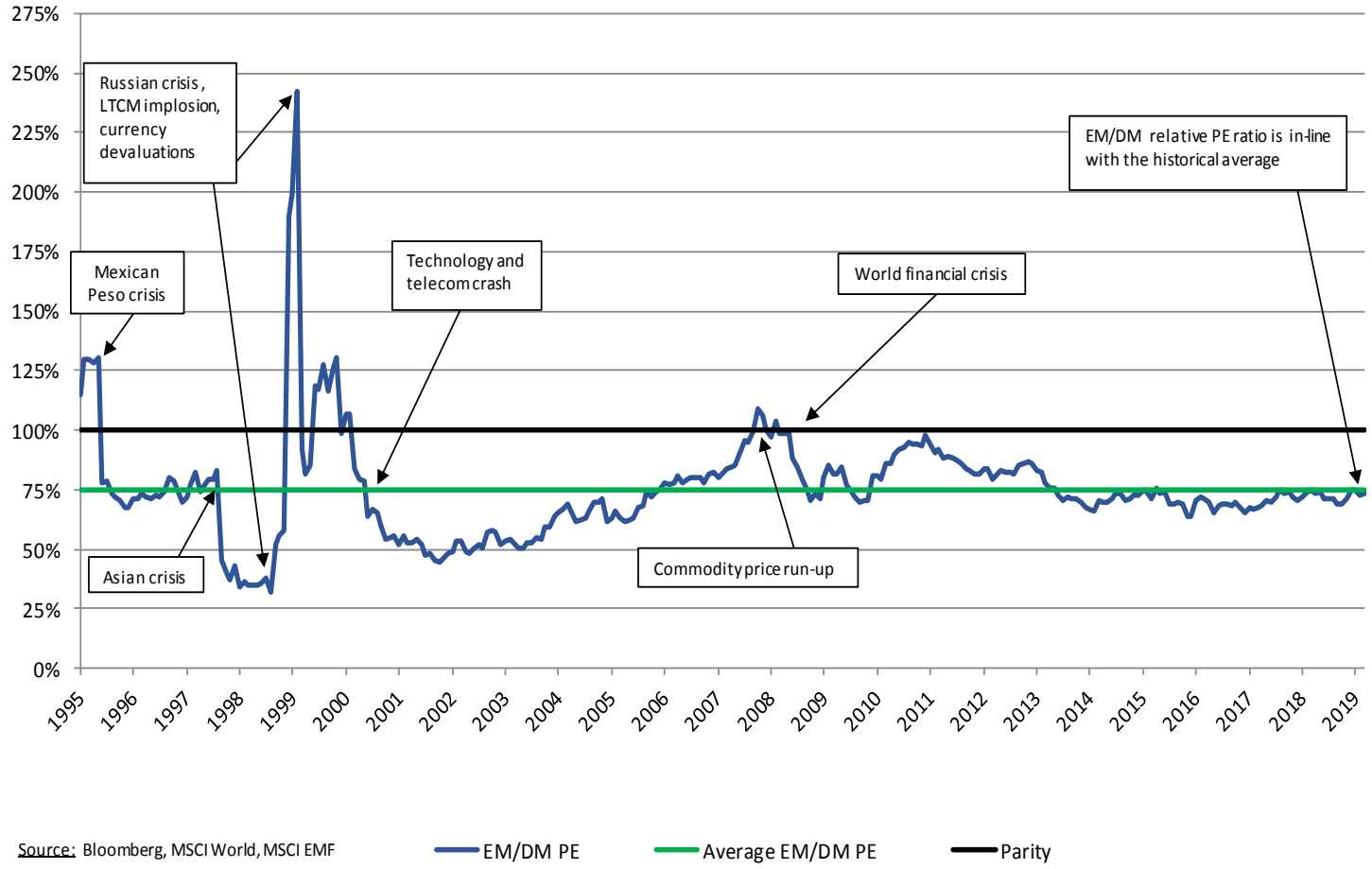
[1] P/E ratio is a Shiller P/E-10 based on 10 year real MSCI EAFE earnings over EAFE index level.

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

Emerging Market Public Equity Markets

Exhibit 3

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

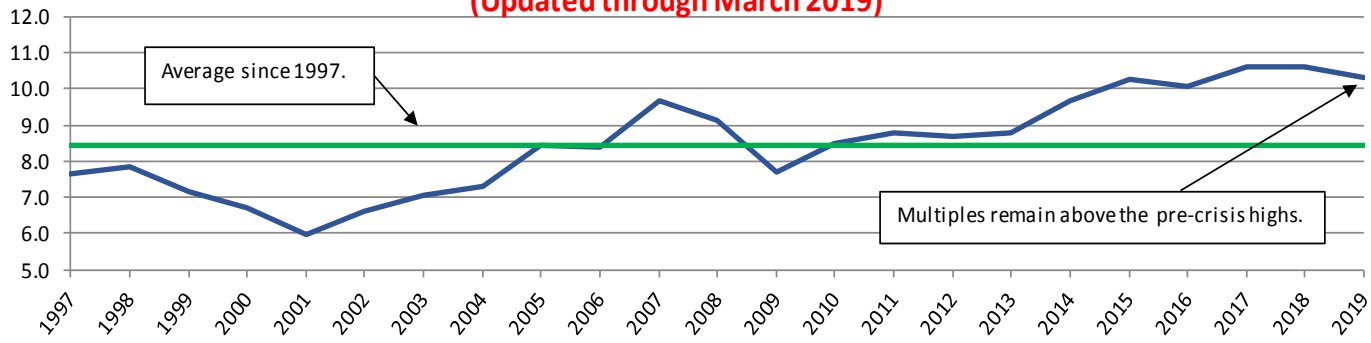


Private Equity

Exhibit 4

Price to EBITDA Multiples Paid in LBOs

(Updated through March 2019)



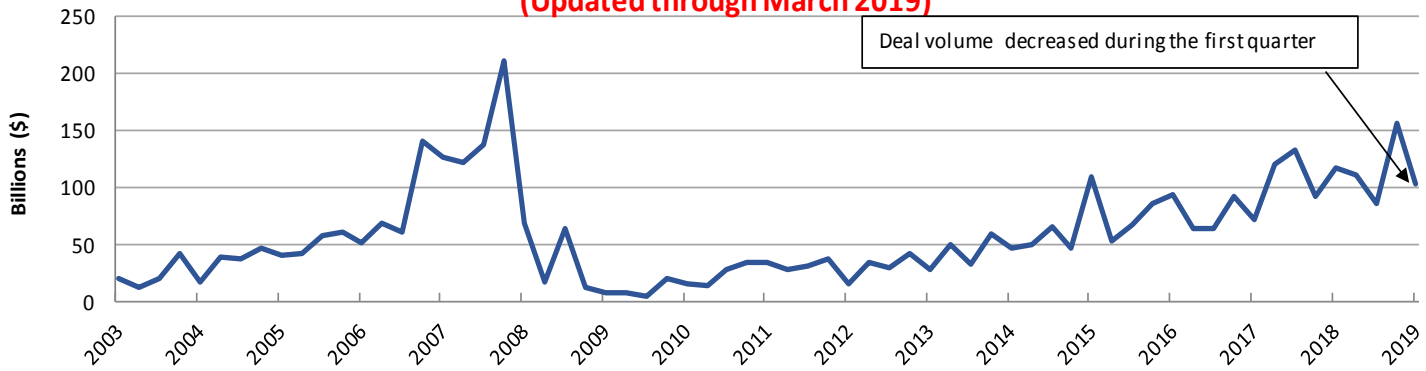
Source: S&P LCD study

(Please note different time scales)

Exhibit 5

Disclosed U.S. Quarterly Deal Volume*

(Updated through March 2019)



Source: Thomson Reuters Buyouts

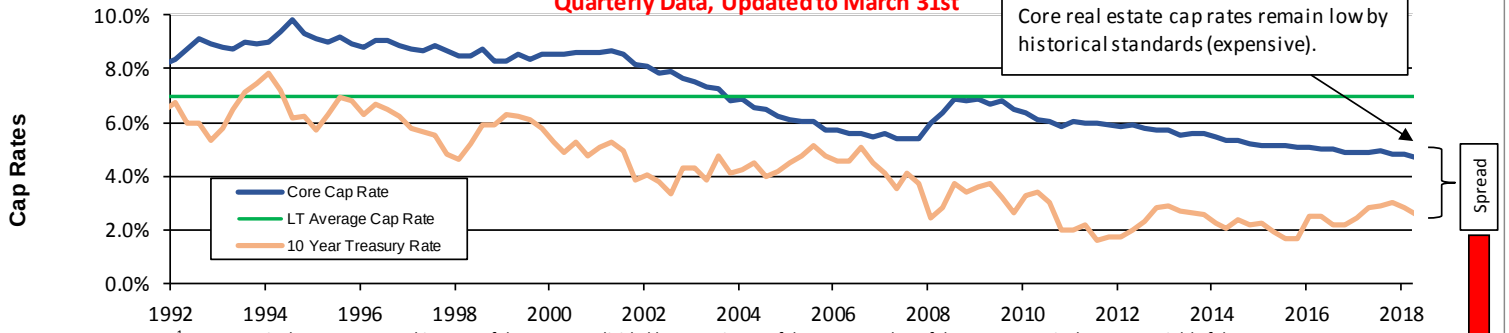
* quarterly total deal size (both equity and debt)

Private Real Estate

Exhibit 6

Current Value Cap Rates[1]

Quarterly Data, Updated to March 31st



Source: NCRIEF

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

Exhibit 7

Core Cap Rate Spread over 10-Year Treasury Interest Rate

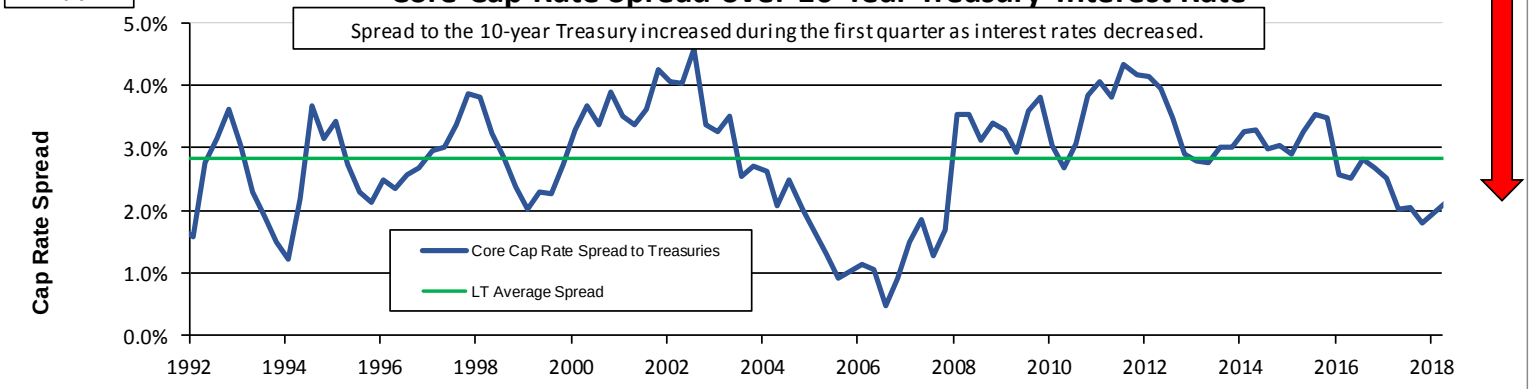
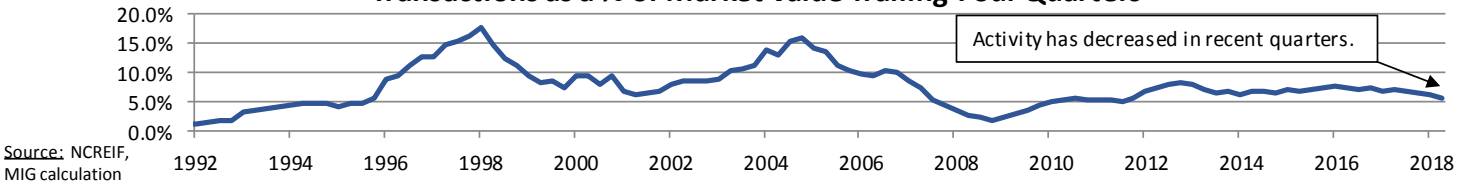


Exhibit 8

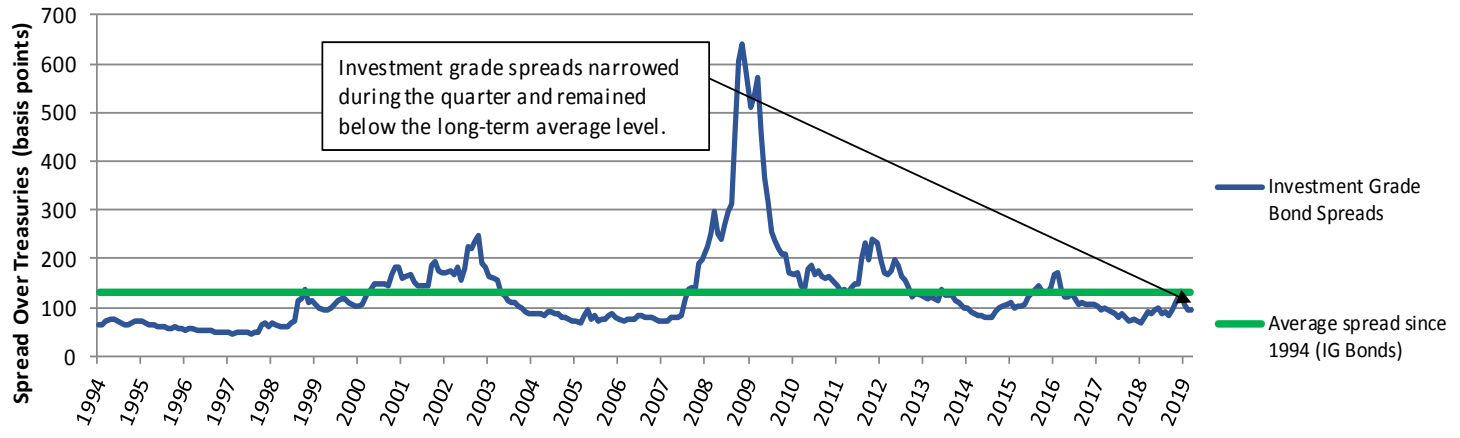
Transactions as a % of Market Value Trailing-Four Quarters



Source: NCREIF, MIG calculation

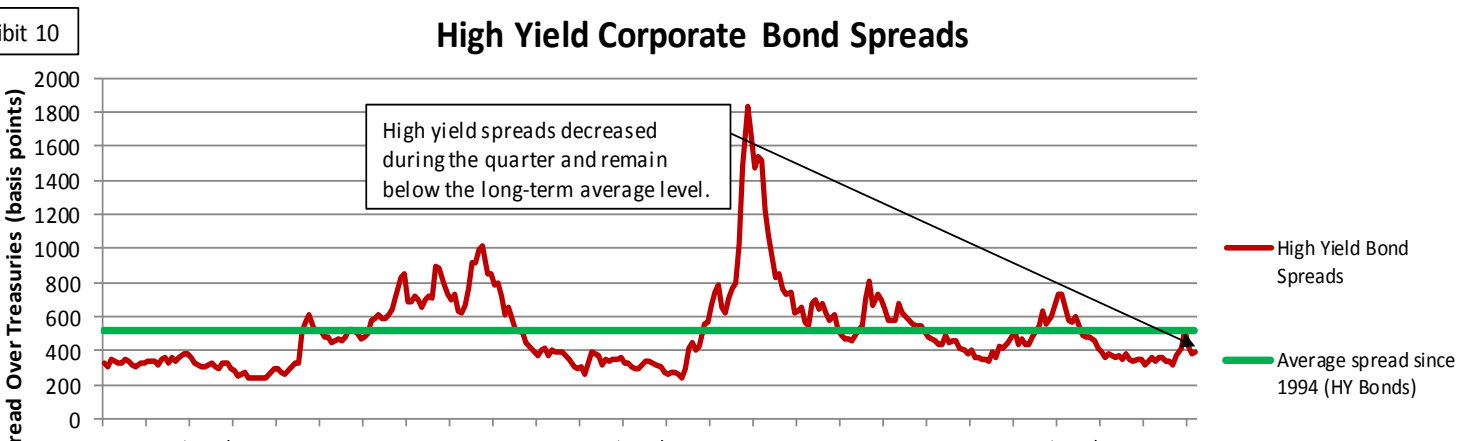
Credit Market U.S. Fixed Income

Exhibit 9



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

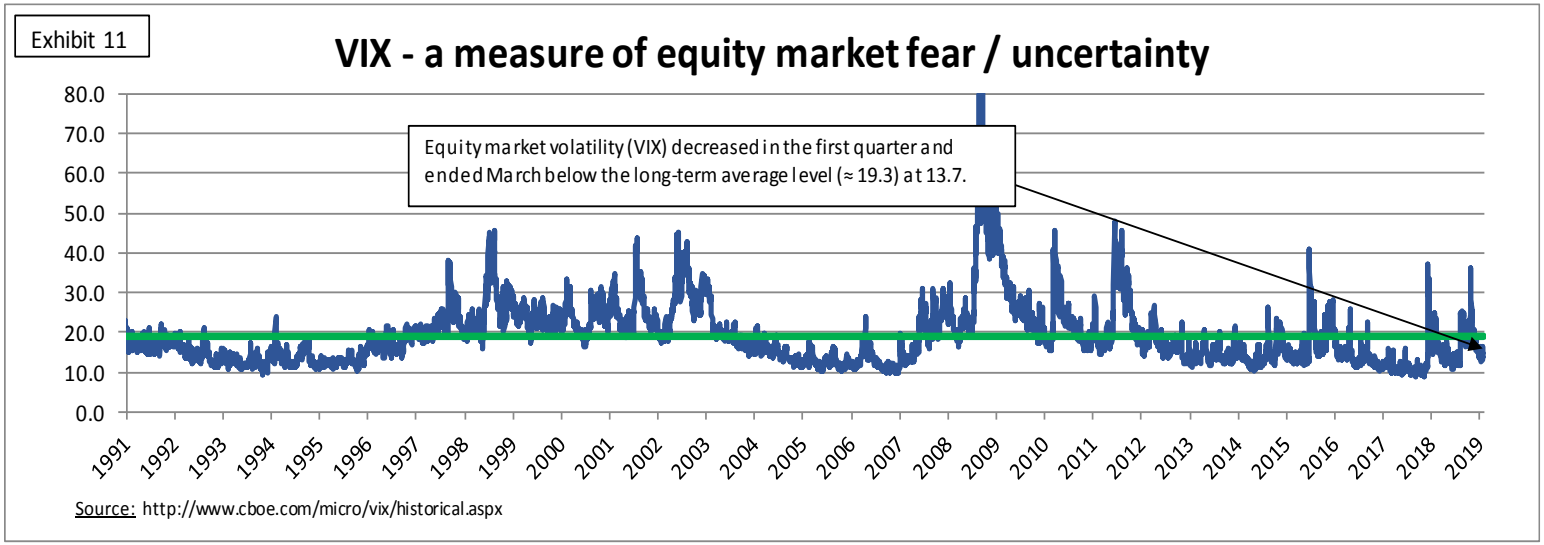
Exhibit 10



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

Other Market Metrics

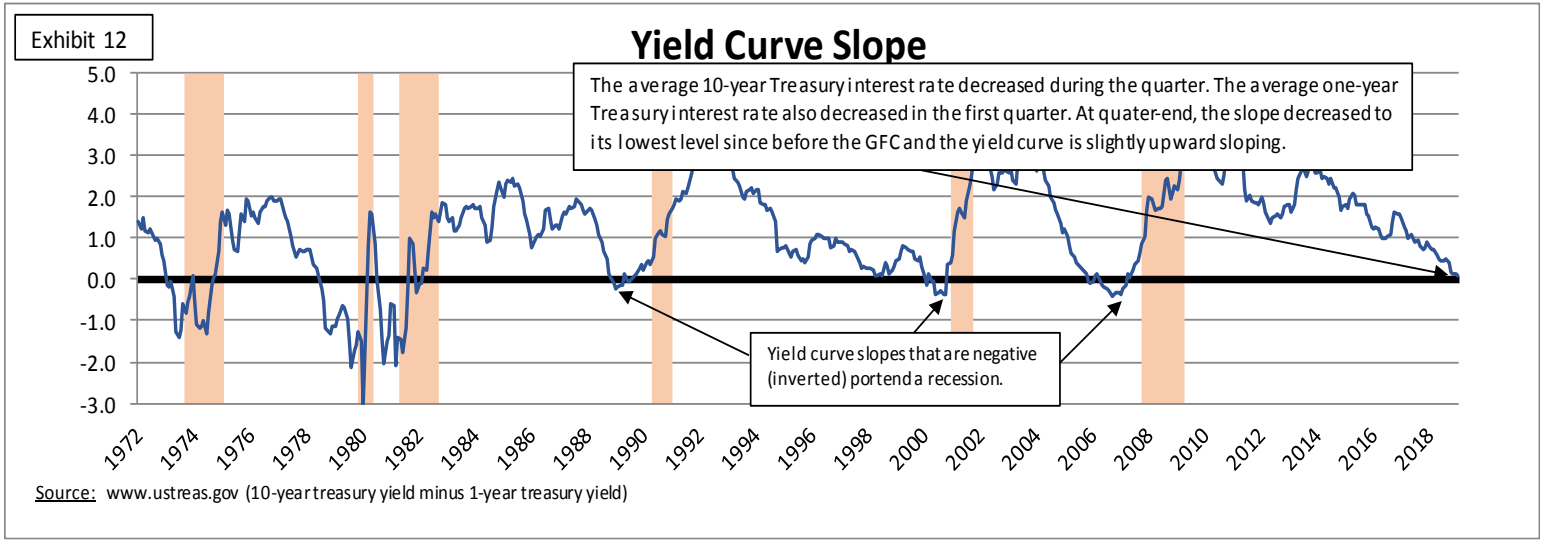
Exhibit 11



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

(Please note different time scales)

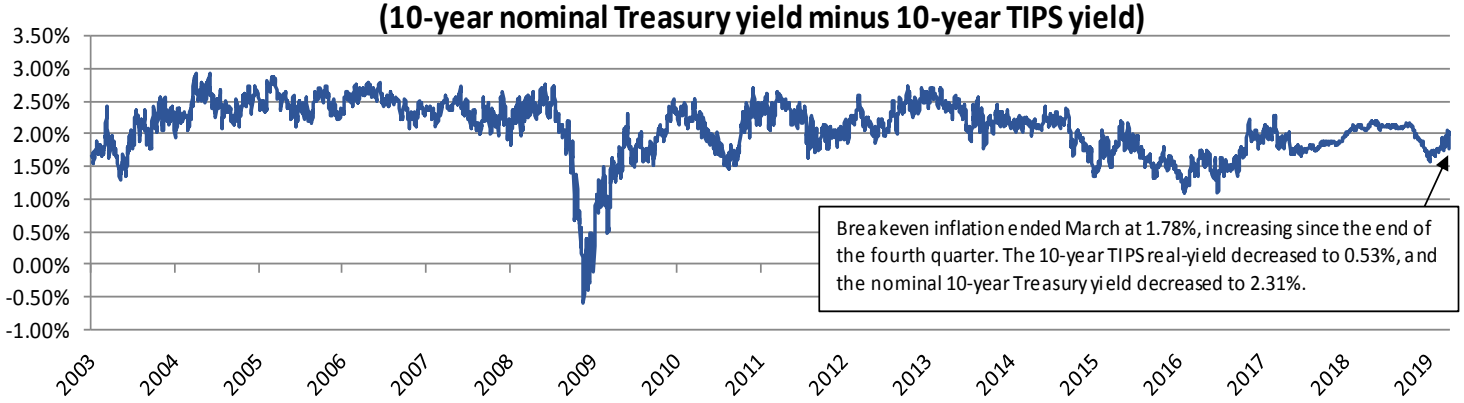
Exhibit 12



Source: www.ustreas.gov (10-year treasury yield minus 1-year treasury yield)

Measures of Inflation Expectations

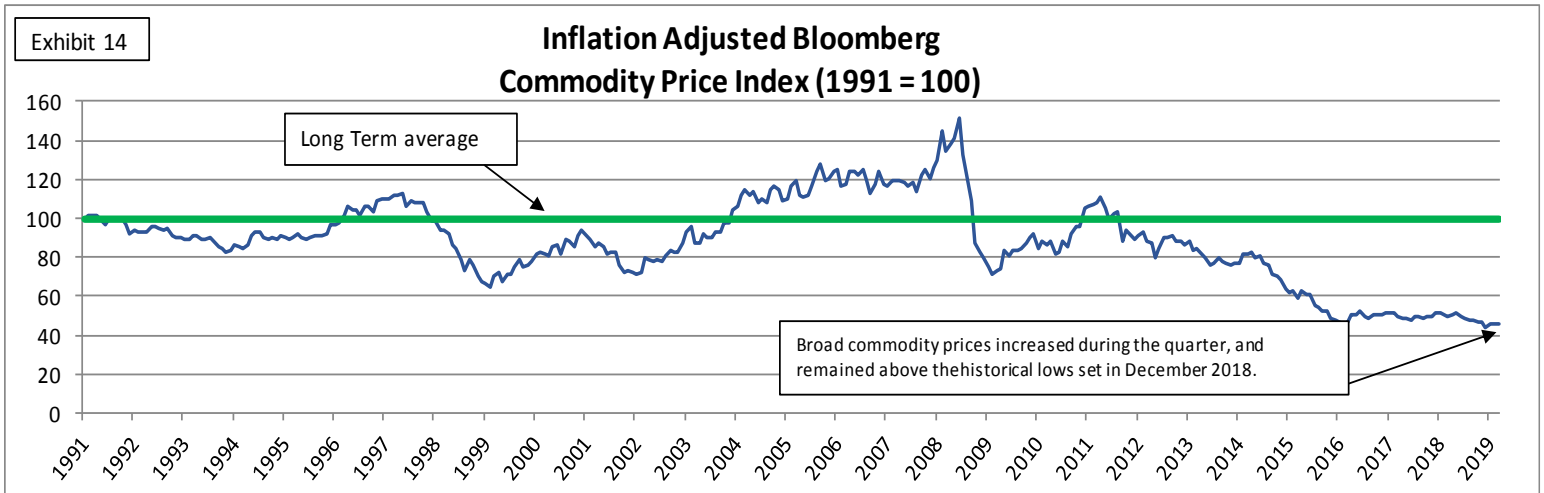
Exhibit 13



Source: www.ustreas.gov
Daily Yield Curve Rates (10-year nominal treasury yield minus 10-year TIPs yield)

(Please note different time scales)

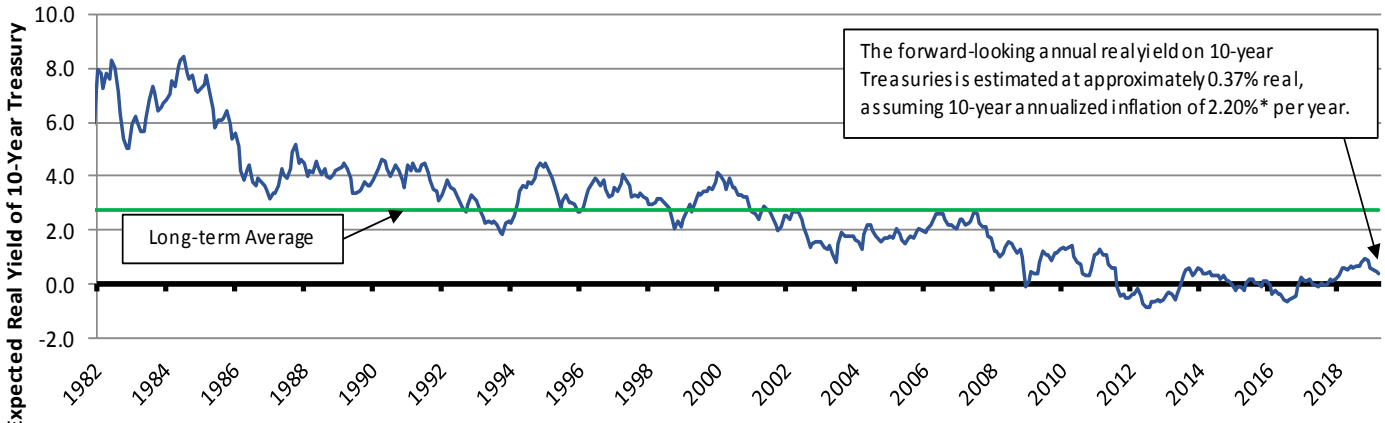
Exhibit 14



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

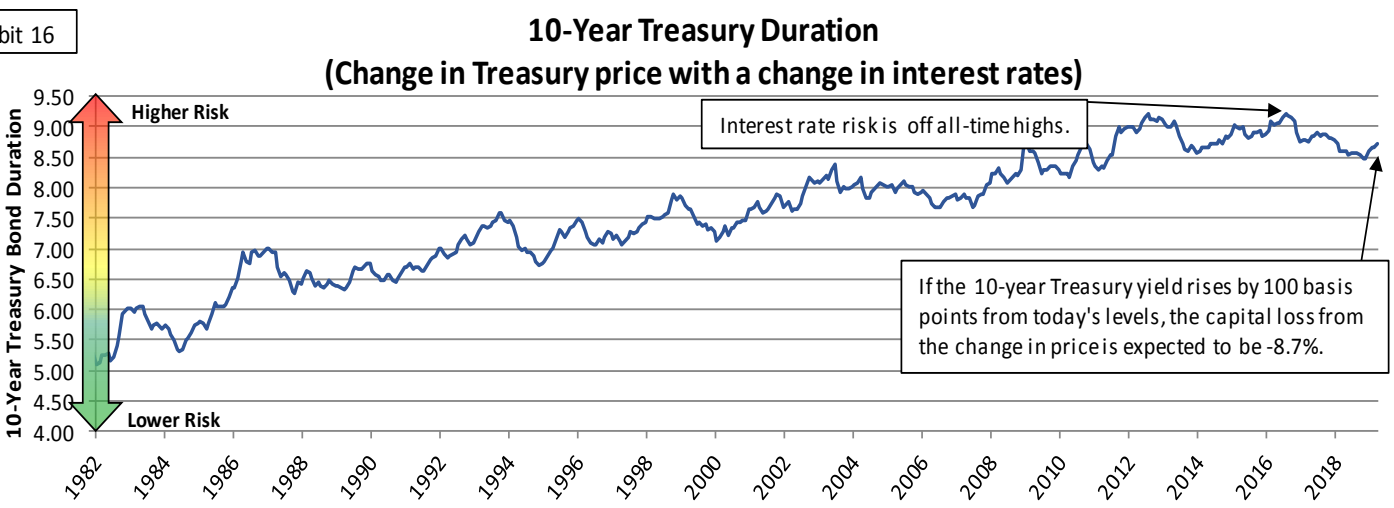
Measures of U.S. Treasury Forward-Looking Real Yield

Exhibit 15



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

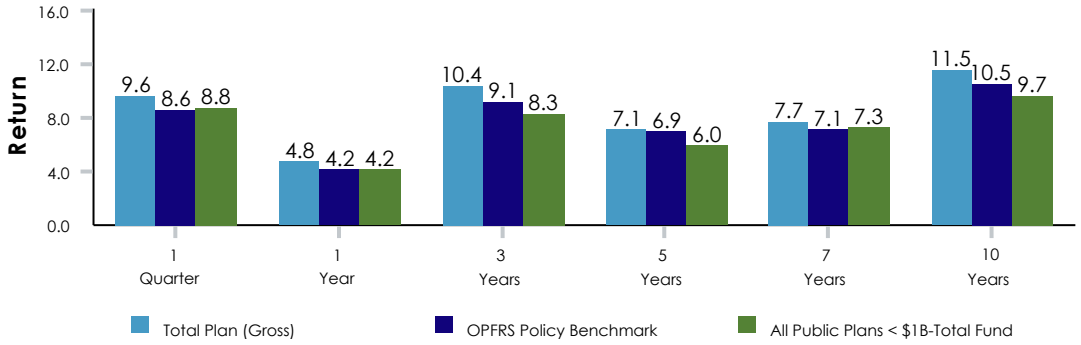
Exhibit 16



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

Performance and Market Values As of March 31, 2019

Investment Performance



Portfolio Valuation (000's)

	1 Quarter	1 Year
OPFRS Total Plan		
Beginning Market Value	350,053	375,740
Net Contributions	-2,843	-12,403
Gain/Loss	33,522	17,396
Ending Market Value	**380,733**	**380,733**

Asset Class Performance (gross of fees)

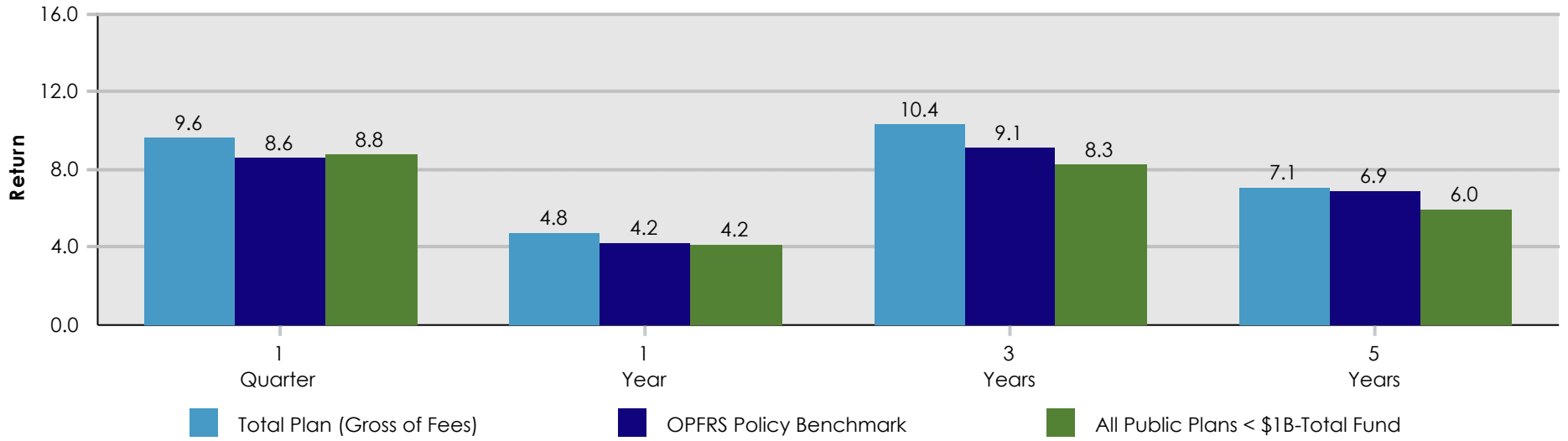
	1 Quarter	1 Year	3 Years	5 Years	7 Years	10 Years
OPFRS Total Plan	9.6	4.8	10.4	7.1	7.7	11.5
*OPFRS Policy Benchmark**	*8.6*	*4.2*	*9.1*	*6.9*	*7.1*	*10.5*
Excess Return	1.0	0.6	1.3	0.2	0.6	1.0
Domestic Equity	14.8	6.9	13.8	10.1	12.6	16.3
*Russell 3000 (Blend)***	*14.0*	*8.8*	*13.5*	*10.4*	*12.6*	*16.0*
Excess Return	0.8	-1.9	0.3	-0.3	0.0	0.3
International Equity	11.6	-4.8	9.2	4.0	5.9	9.9
*MSCI ACWI Ex US (Blend)^*	*10.4*	*-3.7*	*8.6*	*3.0*	*5.2*	*9.3*
Excess Return	1.2	-1.1	0.6	1.0	0.7	0.6
Fixed Income	3.5	4.7	3.6	3.5	3.2	6.0
*Bloomberg Barclays Universal (Blend)^^*	*3.3*	*4.5*	*2.6*	*3.0*	*2.9*	*4.4*
Excess Return	0.2	0.2	1.0	0.5	0.3	1.6
Crisis Risk Offset	5.9	-	-	-	-	-
SG Multi Alternative Risk Premia	*3.2*	*-*	*-*	*-*	*-*	*-*
Excess Return	2.7	-	-	-	-	-
Covered Calls	9.6	7.2	9.9	7.9	-	-
CBOE BXM	*6.8*	*3.3*	*7.4*	*5.9*	*-*	*-*
Excess Return	2.8	3.9	2.5	2.0	-	-
Cash	0.5	2.0	1.3	0.8	0.6	-
FTSE 3 Month T-Bill	*0.6*	*2.1*	*1.2*	*0.7*	*0.5*	*-*
Excess Return	-0.1	-0.1	0.1	0.1	0.1	-

Evolving Policy Benchmark consists of 40% Russell 3000, 12% MSCI ACWI ex U.S., 33% Bbg BC Universal, 5% CBOE BXM , 6.7% SG Multi Asset Risk Premia, 3.3% Bbg BC Long Treasury
** Domestic Equity Benchmark consists of S&P 500 thru 3/31/98, 10% R1000, 20% R1000V, 5% RMC from 4/1/98 - 12/31/04, and Russell 3000 from 1/1/05 to present
^ International Equity Benchmark consists of MSCI EAFE thru 12/31/04, and MSCI ACWI x US thereafter.
^^ Fixed Income Benchmark consists of Bbg BC Aggregate prior to 4/1/06, and Bbg BC Universal thereafter.

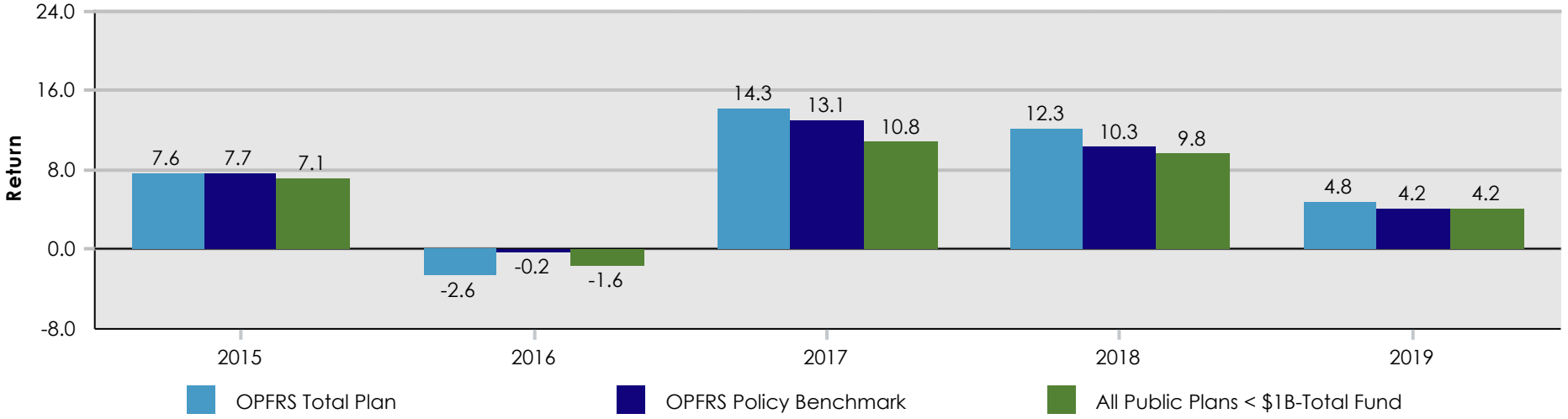
OPFRS Portfolio Relative Performance Results

As of March 31, 2019

Trailing Period Perfomance (annualized)



12-month Performance- As of March 31, 2019



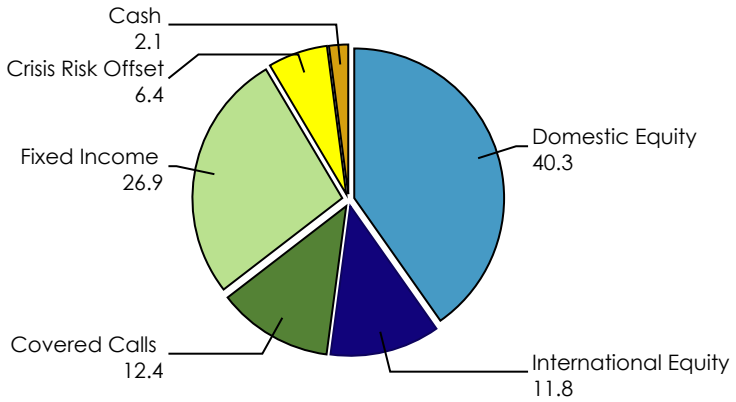
Actual vs. Target Allocation
As of March 31, 2019

	Asset Allocation ($000)	Asset Allocation (%)	Target Allocation* (%)	Variance (%)
OPFRS Total Plan	380,733	100.0	100.0	0.0
Domestic Equity	153,270	40.3	40.0	0.3
International Equity	45,111	11.8	12.0	-0.2
Total Fixed Income	102,563	26.9	33.0	-6.1
Covered Calls	47,389	12.4	5.0	7.4
Crisis Risk Offset	24,521	6.4	10.0	-3.6
Cash	7,879	2.1	0.0	2.1

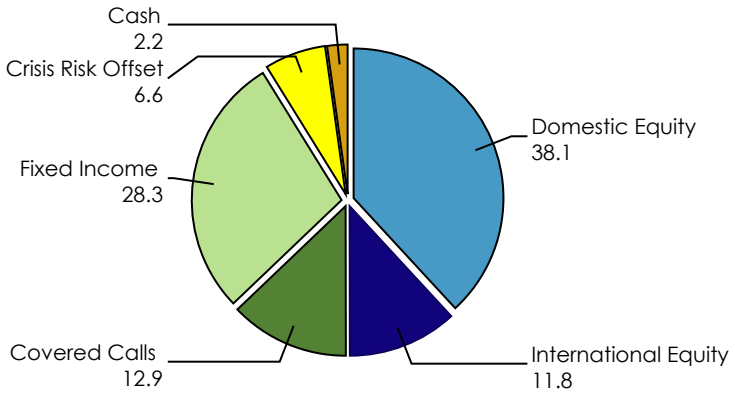
*Target weightings reflect the Plan's evolving asset allocation (effective 5/31/2017).

Actual Asset Allocation Comparison

March 31, 2019 : $380,733,117



December 31, 2018 : $350,053,340



Manager Performance - Gross of Fees

As of March 31, 2019

Domestic Equity

Manager - Style	Mkt Value ($000)	1 Quarter	1 Year	3 Years	5 Years	Since Inception*	Inception Date
Large Cap Core							
Northern Trust Russell 1000 Index	83,179	14.0	9.3	13.5	10.6	13.7	06/2010
Russell 1000 Index		*14.0*	*9.3*	*13.5*	*10.6*	*13.7*	
Excess Return		0.0	0.0	0.0	0.0	0.0	
Large Cap Value							
SSgA Russell 1000 Value Index	8,159	12.0	5.7	10.5	---	7.2	11/2014
Russell 1000 Value Index		*11.9*	*5.7*	*10.5*	*---*	*7.1*	
Excess Return		0.1	0.0	0.0	---	0.1	
Large Cap Growth							
SSgA Russell 1000 Growth Index	9,679	16.1	12.7	16.5	---	13.1	11/2014
Russell 1000 Growth Index		*16.1*	*12.7*	*16.5*	*---*	*13.1*	
Excess Return		0.0	0.0	0.0	---	0.0	
Mid Cap Core							
EARNEST Partners - Active	30,831	20.1 (7)	8.3 (17)	16.4 (11)	11.4 (19)	9.6 (25)	04/2006
Russell Midcap Index		*16.5*	*6.5*	*11.8*	*8.8*	*8.4*	
Excess Return		3.6	1.8	4.6	2.6	1.2	
Small Cap Value							
NWQ - Active	9,244	12.7 (54)	-6.5 (90)	8.1 (80)	5.9 (63)	6.9 (83)	02/2006
Russell 2000 Value Index		*11.9*	*0.2*	*10.9*	*5.6*	*6.2*	
Excess Return		0.8	-6.7	-2.8	0.3	0.7	
Small Cap Growth							
Rice Hall James - Active	12,178	10.1 (98)	-3.7 (98)	---	---	9.0 (80)	07/2017
Russell 2000 Growth Index		*17.1*	*3.9*	*---*	*---*	*9.9*	
Excess Return		-7.0	-7.6	---	---	-0.9	

Over the latest three-month period ending March 31, 2019, two of OPFRS's active Domestic Equity managers outperformed their respective benchmarks.

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

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

Manager Performance - Gross of Fees

As of March 31, 2019

Domestic Equity

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, outperformed its Russell Midcap benchmark by 3.6% over the quarter, placing it in the 7th percentile of its peer group. The portfolio has also outperformed its benchmark over the 1-year period by 1.8% and contiunes to outperform over the 3- and 5-year periods by 4.6% and 2.6% respectively. The portfolio also ranks in the top quartile of its peer group over all time periods measured.

NWQ, the Plan's small cap value manager, outperformed the Russell 2000 Value Index by 0.8% over the latest quarter, placing the portfolio in the 54th percentile of its peer group. NWQ continues to underperform over the 1- and 3-year periods by (6.7%) and (2.8%), respectively. NWQ continues to outperform its benchmark over the 5-year period by 0.3% with an annualized return of 5.9%.

Rice Hall James, the Plan's small cap growth manager, underperformed its Russell 2000 Growth benchmark over the most recent quarter by (7.0%), placing the portfolio in the 98th percentile of its peer group. Two straight difficult quarters have caused the portfolio to trail its benchmark over the 1 -year period by (7.6%) and rank in the 98th percentile of its peer group.

Manager Performance - Gross of Fees

As of March 31, 2019

International Equity

Manager - Style	Mkt Value ($000)	1 Quarter	1 Year	3 Years	5 Years	Since Inception	Inception Date
Active International							
Fisher Investments	16,157	12.9 (13)	-3.6 (38)	8.9 (22)	4.0 (26)	4.4 (78)	04/2011
MSCI AC World ex USA		*10.4*	*-3.7*	*8.6*	*3.0*	*3.6*	
Excess Return		2.5	0.1	0.3	1.0	0.8	
Hansberger	15,780	11.5 (66)	-7.4 (88)	10.8 (25)	5.0 (38)	4.4 (76)	02/2006
MSCI AC World ex USA		*10.4*	*-3.7*	*8.6*	*3.0*	*4.0*	
Excess Return		1.1	-3.7	2.2	2.0	0.4	
Passive International							
SSgA	13,175	10.1	-3.4	7.7	2.7	7.0	08/2002
MSCI EAFE Index		*10.1*	*-3.2*	*7.8*	*2.8*	*7.1*	
Excess Return		0.0	-0.2	-0.1	-0.1	-0.1	

Over the latest three-month period ending March 31, 2019, both of OPFRS's 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 1.1%, placing the fund in the 66th percentile of its peer group. Over the 12-month period, Hansberger underperformed its benchmark by (3.7%) with an absolute return of (7.4%). Hansberger continues to outperform over the 3- and 5-year periods with excess returns of 2.2% and 2.0%, respectively.

Fisher, one of OPFRS' active international equity managers, outperformed the MSCI ACWI x US Index by 2.5% during the quarter, ranking the fund in the 13th percentile of its peer group. Over the most recent 1- and 3-year periods, Fisher has outperformed its benchmark by 0.1% and 0.3%, respectively, and continues to outperform by 1.0% over the five year period.

Manager Performance - Gross of Fees

As of March 31, 2019

Fixed Income

Manager - Style	Mkt Value ($000)	1 Quarter	1 Year	3 Years	5 Years	Since Inception	Inception Date
Core Fixed Income							
Ramirez	70,985	3.6 (10)	4.8 (34)	---	---	3.9 (10)	01/2017
Blmbg. Barc. U.S. Aggregate Index		*2.9*	*4.5*	*---*	*---*	*2.9*	
Excess Return		0.7	0.3	---	---	1.0	
Core-Plus Fixed Income							
Reams	23,647	2.8 (95)	5.4 (6)	2.7 (80)	3.1 (74)	5.5 (52)	02/1998
Bbg Barclays Universal (Hybrid)		*3.3*	*4.5*	*2.6*	*3.0*	*4.9*	
Excess Return		-0.5	0.9	0.1	0.1	0.6	
High Yield / Bank Loans							
DDJ Capital	7,931	4.1 (88)	2.1 (98)	10.2 (6)	---	6.4 (11)	02/2015
ICE BofAML High Yield Master II		*7.4*	*5.9*	*8.7*	*---*	*5.6*	
Excess Return		-3.3	-3.8	1.5	---	0.8	

Over the latest three-month period, ending March 31, 2019, one of OPFRS's three active Fixed Income managers outperformed their respective benchmarks.

Ramirez, the Plan's core fixed income manager, returned 3.6% compared to the benchmark return of 2.9% during the quarter, ranking the portfolio in the 10th percentile of its peer group. Over the 1-year period, Ramirez has outperformed its benchmark by 0.3% and ranked in the 34th percentile of its peer group.

Reams, the Plan's core plus fixed income manager, underperformed its benchmark by (0.5%) during the quarter and ranked in the 95th percentile of its peer group. Despite the poor quarter, Reams still managed to outperform its benchmark by 0.9% over the most recent 12-month period, good enough for a 6th percentile ranking. The portfolio has slightly outperformed its benchmark by 0.1% over the 3- and 5-year periods.

DDJ, the Plan's High Yield & Bank Loan manager, returned 4.1% during the most recent quarter but was unable to keep up with the benchmark's 7.4% return. A string of underperforming quarters has left DDJ trailing its benchmark by (3.8%) over the most recent 12-month period and ranking in the 98th percentile of its peer group. DDJ's returns over the 3-year period remain strong, outperforming its benchmark by 1.5% and ranking in the 6th percentile of its peer group.

Manager Performance - Gross of Fees

As of March 31, 2019

Covered Calls

Manager - Style	Mkt Value ($000)	1 Quarter	1 Year	3 Years	5 Years	Since Inception	Inception Date
Covered Calls Composite							
Covered Calls	47,389	9.6	7.2	9.9	7.9	7.9	04/2014
CBOE BXM		*6.8*	*3.3*	*7.4*	*5.9*	*5.9*	
Excess Return		2.8	3.9	2.5	2.0	2.0	
CC - Passive Allocation							
Parametric BXM	23,421	7.5	6.6	8.5	6.8	6.8	04/2014
CBOE BXM		*6.8*	*3.3*	*7.4*	*5.9*	*5.9*	
Excess Return		0.7	3.3	1.1	0.9	0.9	
CC - Active Allocation							
Parametric DeltaShift	23,969	11.8	7.8	11.2	9.5	9.5	04/2014
CBOE BXM		*6.8*	*3.3*	*7.4*	*5.9*	*5.9*	
Excess Return		5.0	4.5	3.8	3.6	3.6	

During the latest three-month period ending March 31, 2019, OPFRS' aggregate Covered Calls portfolio outperformed its benchmark by 2.8%.

Parametric BXM Portfolio, the Plan's passive covered calls allocation outperformed its CBOE BXM index by 0.7% over the most recent quarter. Over the most recent 1-year period the portfolio has outperformed by 3.3% and has outperformed over the 3- and 5-year periods by 1.1% and 0.9%, respectively.

Parametric Delta Shift Portfolio, the Plan's active covered calls allocation has outperformed the CBOE BXM benchmark by 5.0% over the most recent quarter and has outperformed by 4.5% over the 1-year period. The portfolio continues to outperform over the 3-year period by 3.8% and has earned an annualized 9.5% over the most recent 5-year period, outperforming its benchmark by 3.6%.

Manager Performance - Gross of Fees

As of March 31, 2019

Crisis Risk Offset

Manager - Style	Mkt Value ($000)	1 Quarter	1 Year	3 Years	5 Years	Since Inception	Inception Date
Crisis Risk Offset Composite							
Crisis Risk Offset	24,521	5.9	---	---	---	-1.5	09/2018
CRO Composite Benchmark		*3.2*	---	---	---	*1.8*	
Excess Return		2.7	---	---	---	-3.3	
CRO - Risk Premia / Trend Following							
Parametric S.A.R.P.	24,521	5.9	---	---	---	-1.5	09/2018
SG Multi Alternative Risk Premia		*3.2*	---	---	---	*1.8*	
Excess Return		2.7	---	---	---	-3.3	
CRO - Long Duration							
Pending Long Duration Manager	---	0.0	---	---	---	0.0	12/2018

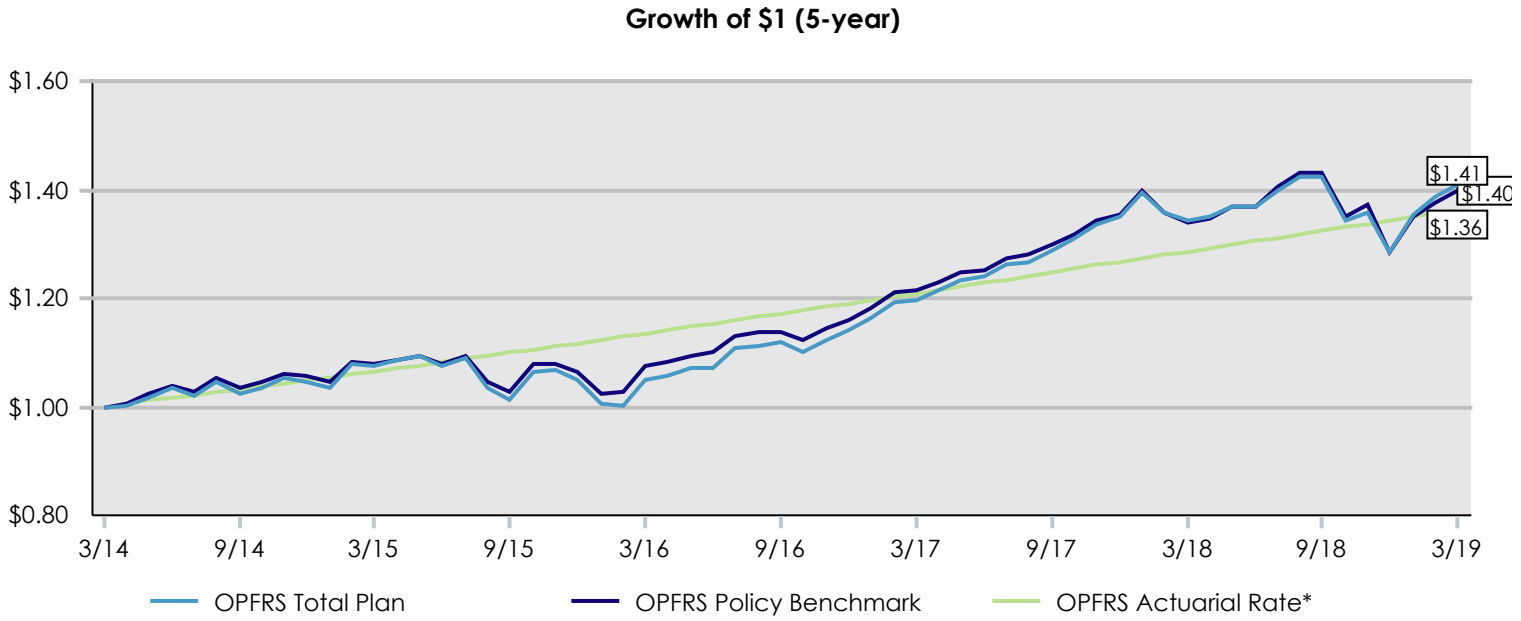
During the latest three-month period ending March 31, 2019, OPFRS's partially funded aggregate Crisis Risk Offset portfolio outperformed its benchmark by 2.7%.

Parametric Systematic Alternative Risk Premia, the Plan's Risk Premia / Trend Following manager outperformed its benchmark by 2.7% during its first full quarter in the portfolio. Despite a much improved first quarter, the portfolio continues to trail its benchmark by (3.3%) since its funding in September 2018.

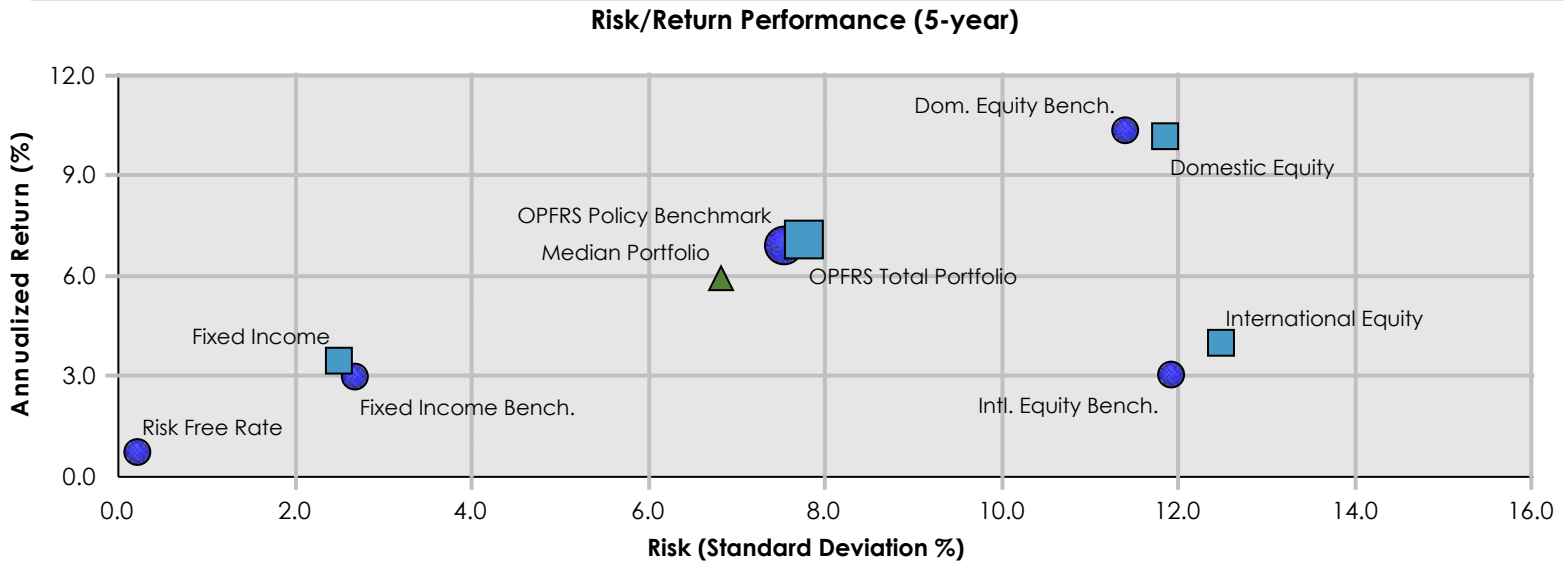
Pending Long Duration Manager, the Plan's Long Duration manager remains unfunded pending further discussion with the OPFRS Board.

OPFRS Total Portfolio 5-Year Performance

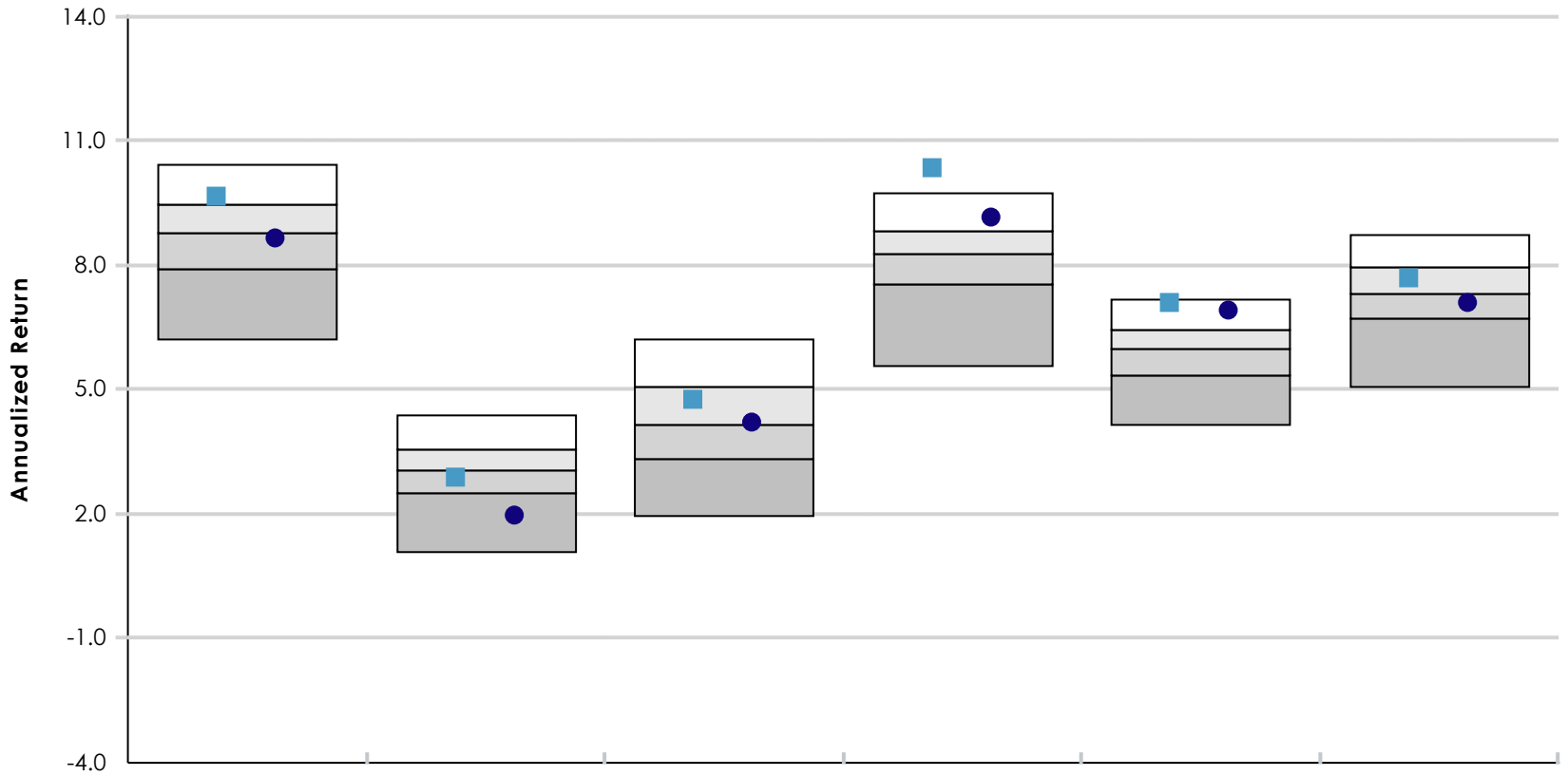
As of March 31, 2019



* 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, 6.5% through 12/31/2017 and 6.0% currently



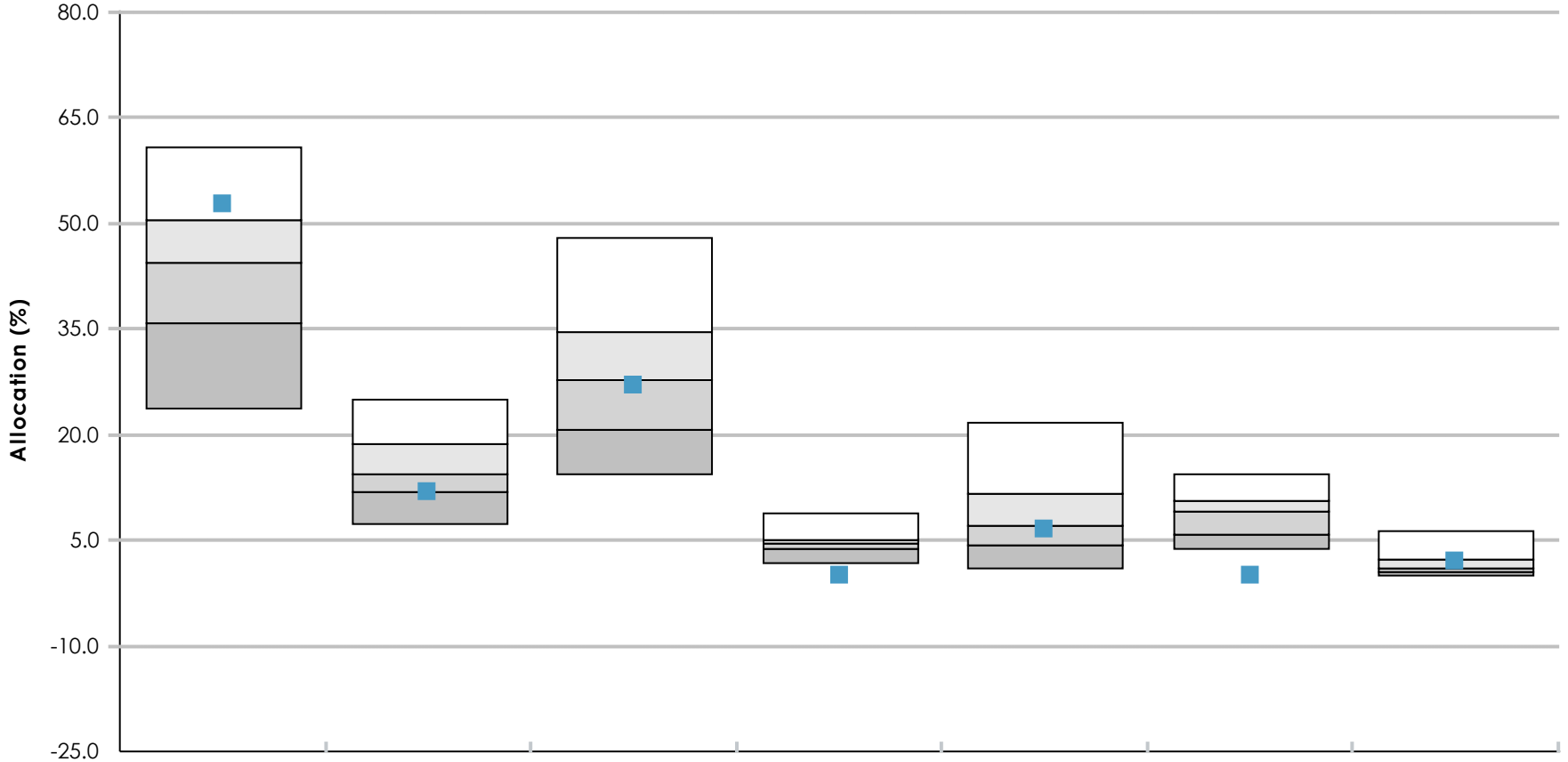
Plan Sponsor Peer Group Analysis
As of March 31, 2019



	1 Quarter	Fiscal YTD	1 Year	3 Years	5 Years	7 Years
OPFRS Total Plan	**9.6 (21)**	**2.9 (60)**	**4.8 (33)**	**10.4 (3)**	**7.1 (6)**	**7.7 (39)**
OPFRS Policy Benchmark	*8.6 (55)*	*2.0 (86)*	*4.2 (49)*	*9.1 (17)*	*6.9 (9)*	*7.1 (59)*
5th Percentile	10.4	4.4	6.2	9.8	7.2	8.7
1st Quartile	9.4	3.5	5.1	8.8	6.4	8.0
Median	8.8	3.1	4.2	8.3	6.0	7.3
3rd Quartile	7.9	2.5	3.3	7.6	5.3	6.7
95th Percentile	6.2	1.1	2.0	5.6	4.1	5.1
Population	265	261	258	248	241	231

Parentheses contain percentile rankings.
Calculation based on monthly periodicity.

Plan Sponsor TF Asset Allocation
As of March 31, 2019



	US Equity	Intl. Equity	US Fixed Income	Intl. Fixed Income	Alternative Inv.	Real Estate	Cash
OPFRS Total Plan	**52.7 (18)**	**11.8 (75)**	**26.9 (54)**	**0.0**	**6.4 (52)**	**0.0**	**2.1 (28)**
5th Percentile	60.8	25.0	48.0	8.9	21.7	14.4	6.2
1st Quartile	50.4	18.6	34.5	4.9	11.7	10.5	2.2
Median	44.3	14.4	27.8	4.4	7.0	9.2	1.0
3rd Quartile	35.9	11.8	20.7	3.8	4.2	5.8	0.5
95th Percentile	23.8	7.2	14.3	1.7	1.1	3.9	0.1
Population	447	408	407	139	91	254	330

Parentheses contain percentile rankings.
Calculation based on monthly periodicity.

Monitoring/Probation Status

As of March 31, 2019
Return vs. Benchmark since Corrective Action

Portfolio	Status	Concern	Months Since Corrective Action	Performance^ Since Corrective Action (Gross)	Peer Group Percentile Ranking	Date of Corrective Action*
Hansberger	On Watch	Organizational	16	-3.4%	75	11/30/2017
MSCI ACWI ex-USA	---	---	16	-2.0%		
NWQ	On Watch	Organizational	14	-5.3%	80	1/31/2018
Russell 2000 Value	---	---	14	-2.7%		

^. 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

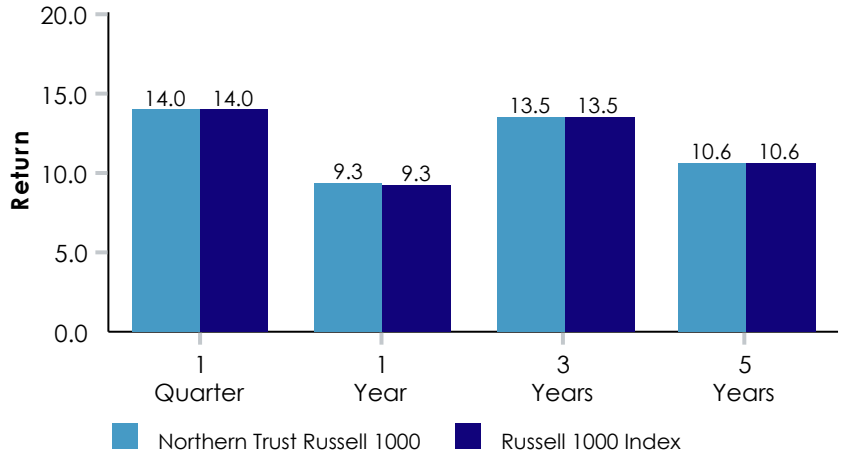
VRR – Value Relative Ratio – is calculated as: manager cumulative return / benchmark cumulative return.

Northern Trust Russell 1000 - gross of fees

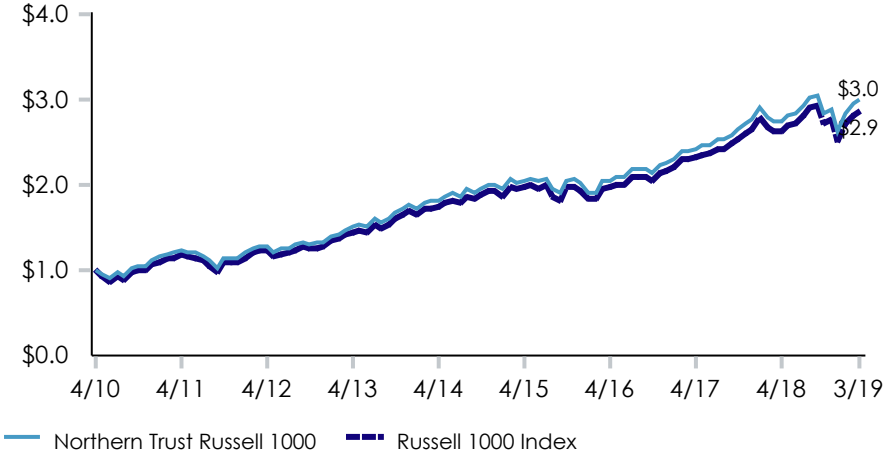
As of March 31, 2019

	Alpha	Beta	Information Ratio	Sharpe Ratio	Tracking Error	R-Squared	Up Market Capture	Down Market Capture	Inception Date
Northern Trust Russell 1000	0.84	0.97	0.33	1.03	1.33	0.99	99.56	95.23	05/01/2010
Russell 1000 Index	0.00	1.00	-	0.97	0.00	1.00	100.00	100.00	05/01/2010

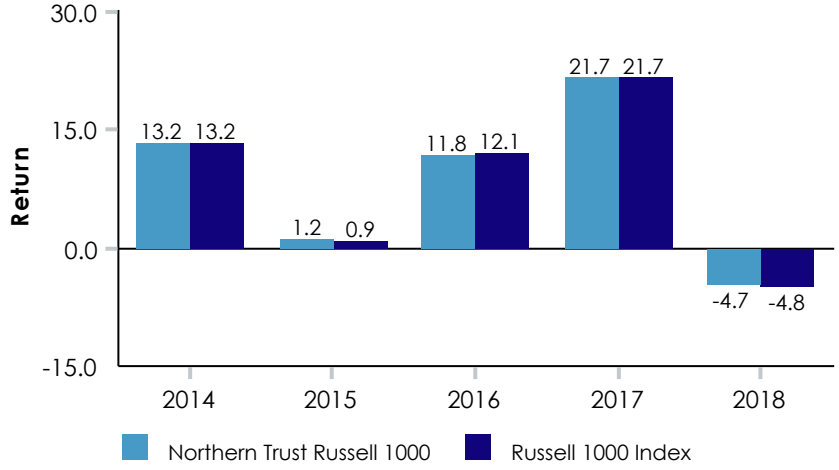
Trailing Period Performance



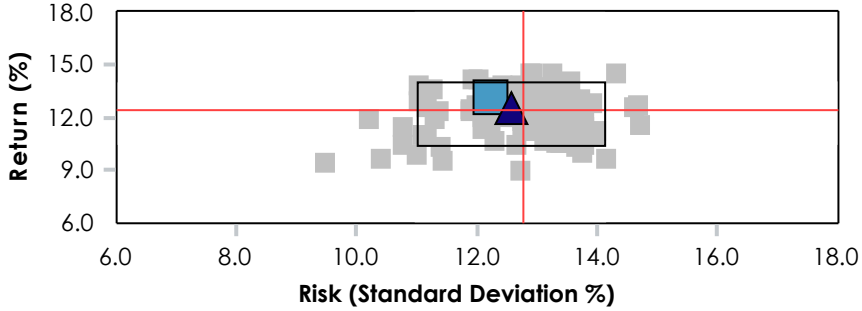
Growth of $1 - Since Inception



Calendar Year Performance



Risk/Return - Since Inception



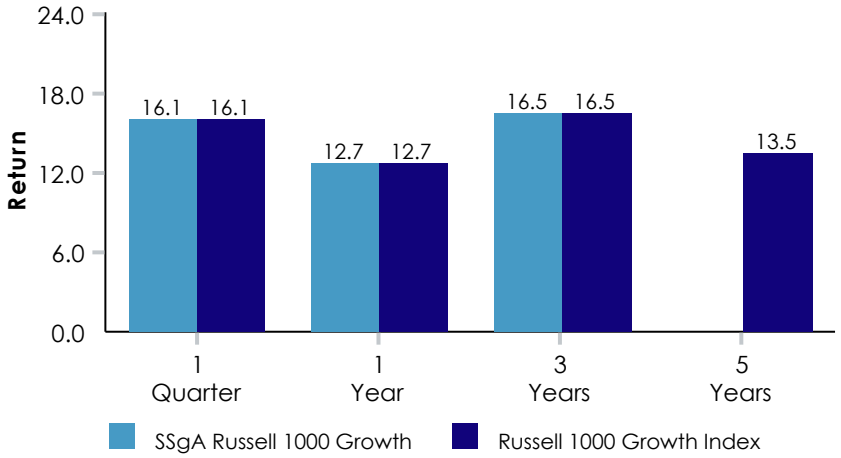
	Return	Standard Deviation
Northern Trust Russell 1000	13.1	12.3
Russell 1000 Index	12.5	12.6
Median	12.5	12.8

SSgA Russell 1000 Growth - gross of fees

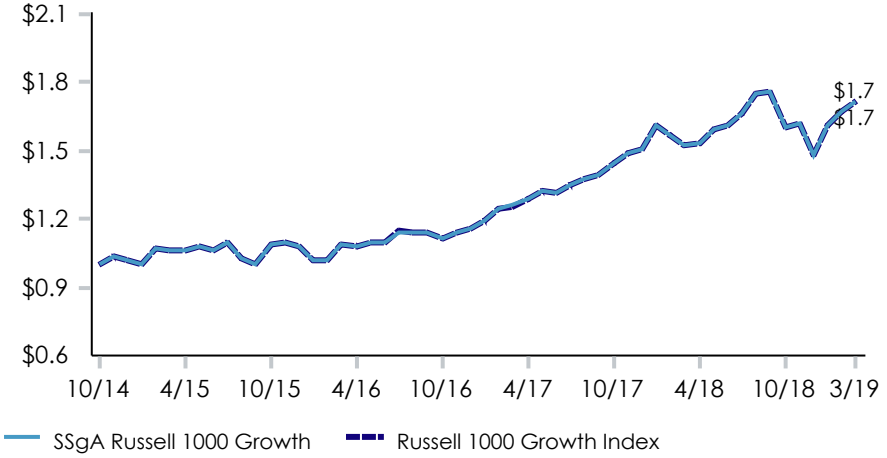
As of March 31, 2019

	Alpha	Beta	Information Ratio	Sharpe Ratio	Tracking Error	R-Squared	Up Market Capture	Down Market Capture	Inception Date
SSgA Russell 1000 Growth	0.01	1.00	0.06	0.98	0.03	1.00	99.99	99.96	11/01/2014
Russell 1000 Growth Index	0.00	1.00	-	0.98	0.00	1.00	100.00	100.00	11/01/2014

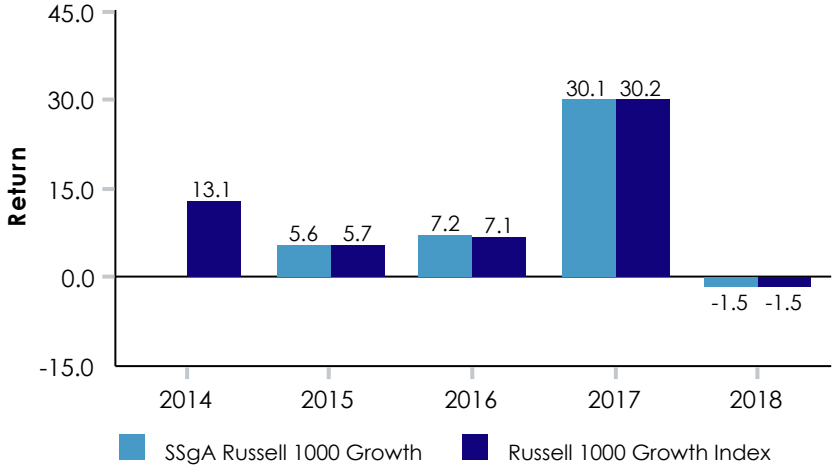
Trailing Period Performance



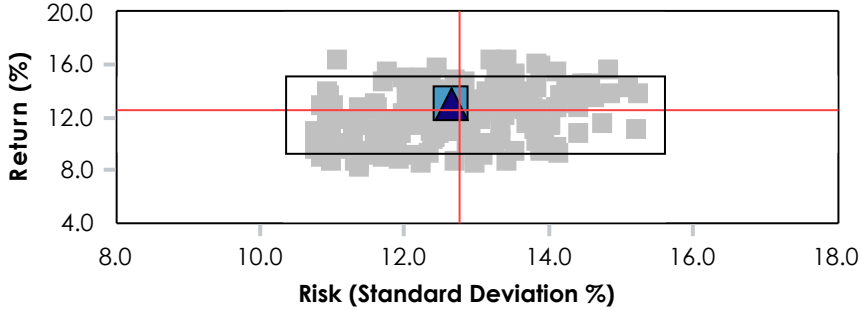
Growth of $1 - Since Inception



Calendar Year Performance



Risk/Return - Since Inception



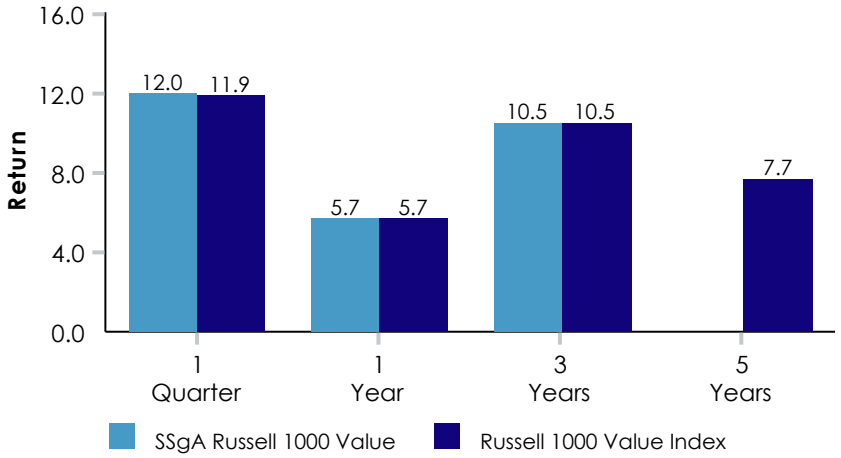
	Return	Standard Deviation
SSgA Russell 1000 Growth	13.1	12.6
Russell 1000 Growth Index	13.1	12.7
Median	12.6	12.8

SSgA Russell 1000 Value - gross of fees

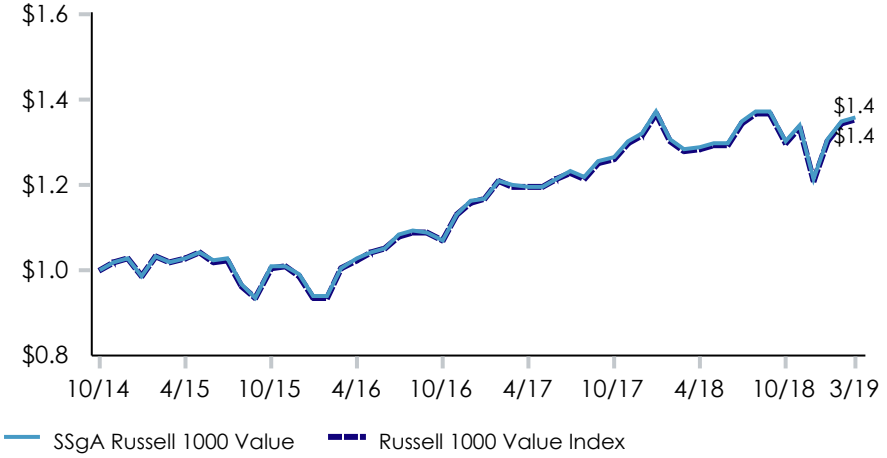
As of March 31, 2019

	Alpha	Beta	Information Ratio	Sharpe Ratio	Tracking Error	R-Squared	Up Market Capture	Down Market Capture	Inception Date
SSgA Russell 1000 Value	0.10	1.00	1.44	0.60	0.06	1.00	100.25	99.57	11/01/2014
Russell 1000 Value Index	0.00	1.00	-	0.59	0.00	1.00	100.00	100.00	11/01/2014

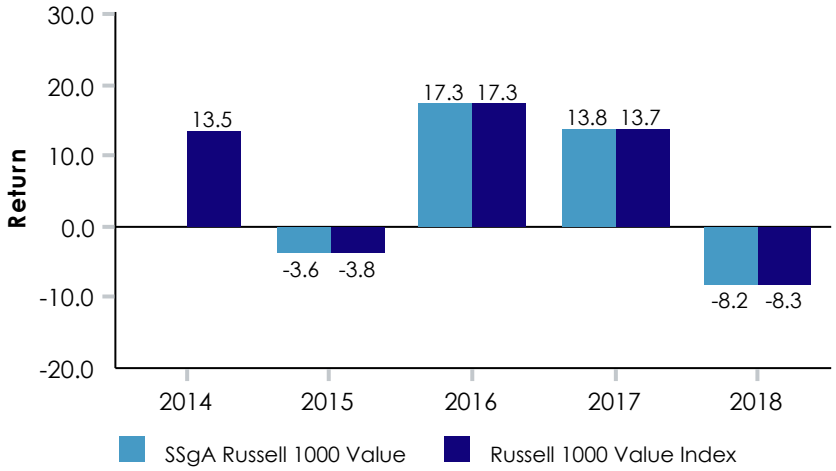
Trailing Period Performance



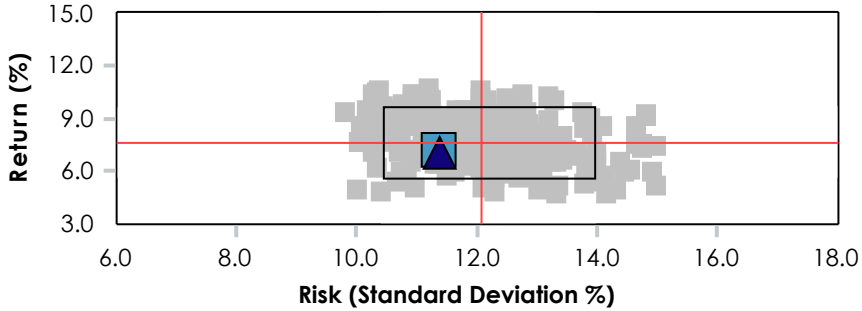
Growth of $1 - Since Inception



Calendar Year Performance



Risk/Return - Since Inception



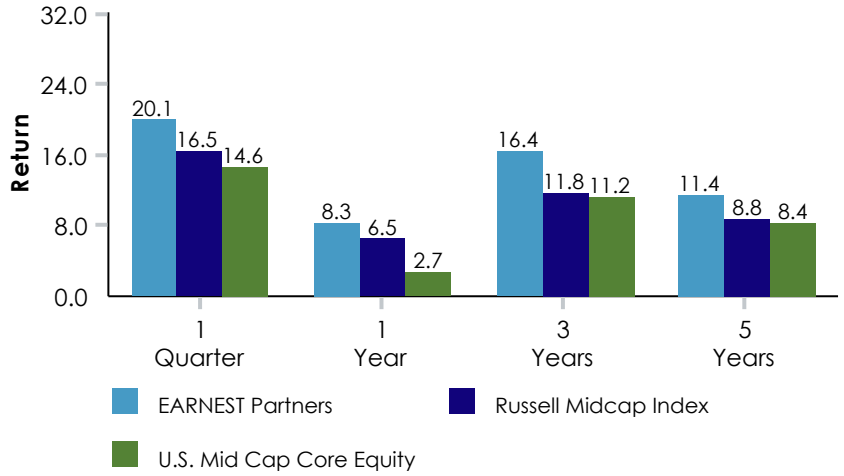
	Return	Standard Deviation
SSgA Russell 1000 Value	7.2	11.4
Russell 1000 Value Index	7.1	11.4
Median	7.6	12.1

EARNEST Partners - gross of fees

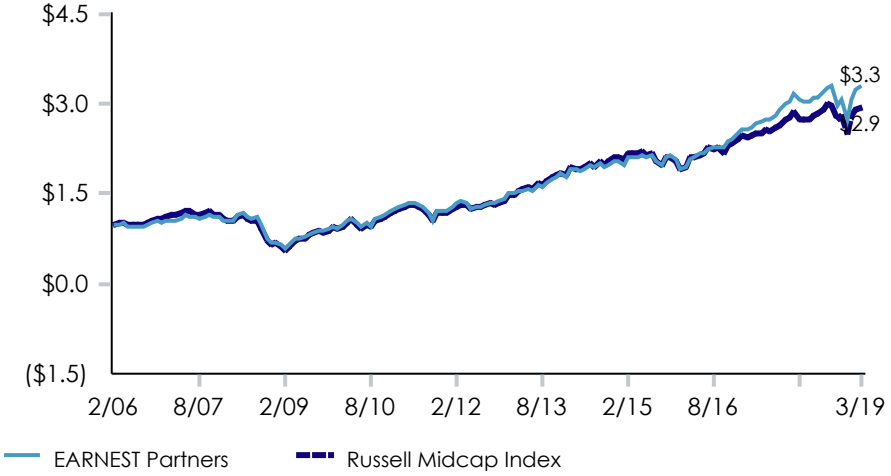
As of March 31, 2019

	Alpha	Beta	Information Ratio	Sharpe Ratio	Tracking Error	R-Squared	Up Market Capture	Down Market Capture	Inception Date
EARNEST Partners	0.93	1.00	0.28	0.56	3.38	0.96	100.68	95.42	03/01/2006
Russell Midcap Index	0.00	1.00	-	0.51	0.00	1.00	100.00	100.00	03/01/2006
U.S. Mid Cap Core Equity Median	-	-	-	-	-	-	-	-	

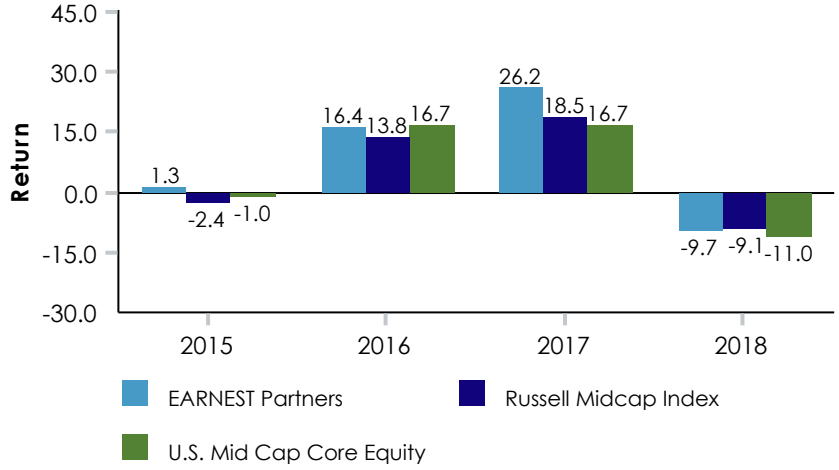
Trailing Period Performance



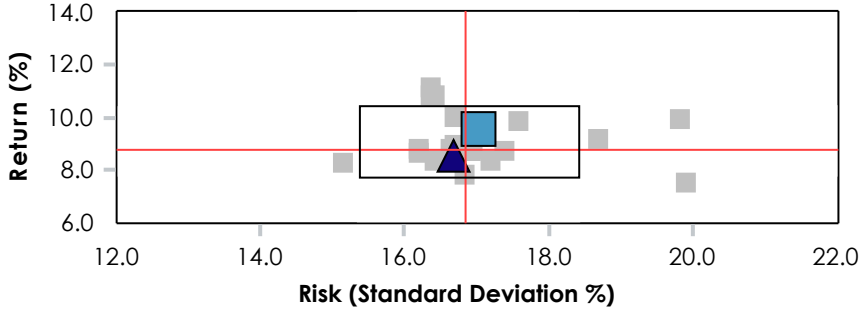
Growth of $1 - Since Inception



Calendar Year Performance



Risk/Return - Since Inception



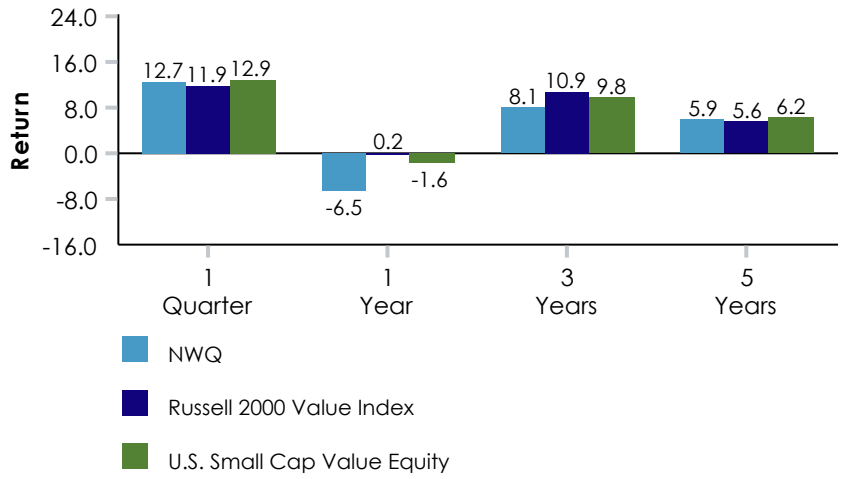
	Return	Standard Deviation
EARNEST Partners	9.5	17.0
Russell Midcap Index	8.6	16.7
Median	8.8	16.9

NWQ - gross of fees

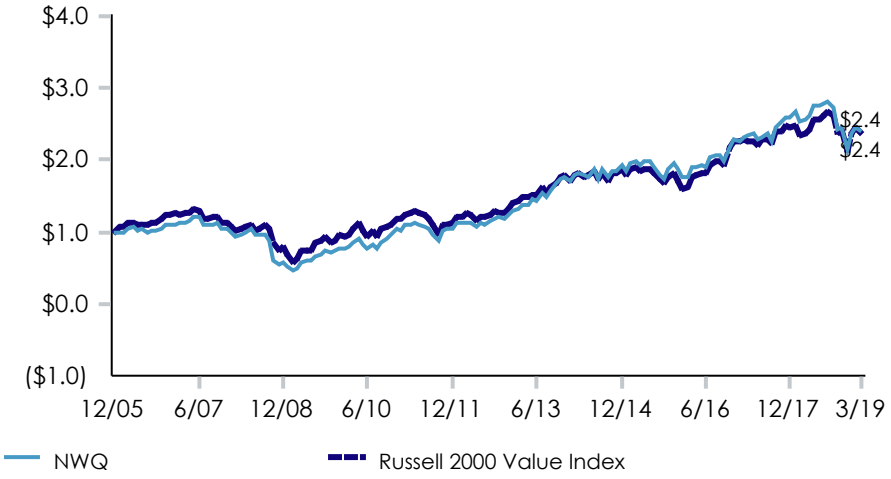
As of March 31, 2019

	Alpha	Beta	Information Ratio	Sharpe Ratio	Tracking Error	R-Squared	Up Market Capture	Down Market Capture	Inception Date
NWQ	0.31	1.01	0.06	0.38	6.78	0.89	101.48	100.16	01/01/2006
Russell 2000 Value Index	0.00	1.00	-	0.38	0.00	1.00	100.00	100.00	01/01/2006
U.S. Small Cap Value Equity Median	-	-	-	-	-	-	-	-	

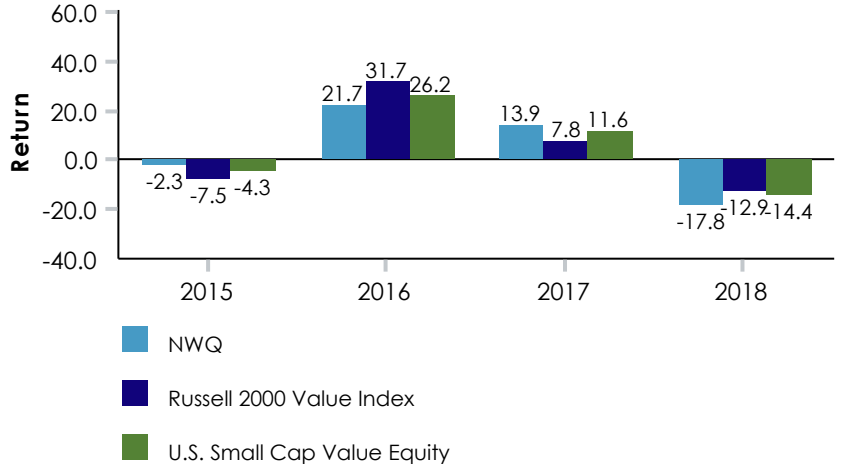
Trailing Period Performance



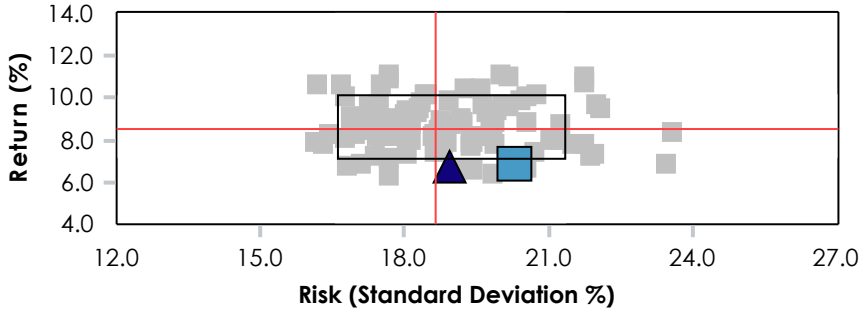
Growth of $1 - Since Inception



Calendar Year Performance



Risk/Return - Since Inception



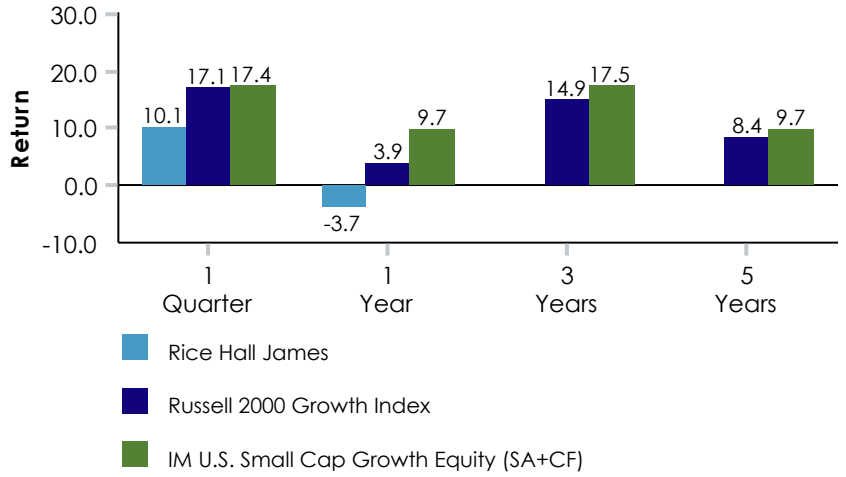
	Return	Standard Deviation
NWQ	6.9	20.3
Russell 2000 Value Index	6.8	18.9
Median	8.5	18.6

Rice Hall James - gross of fees

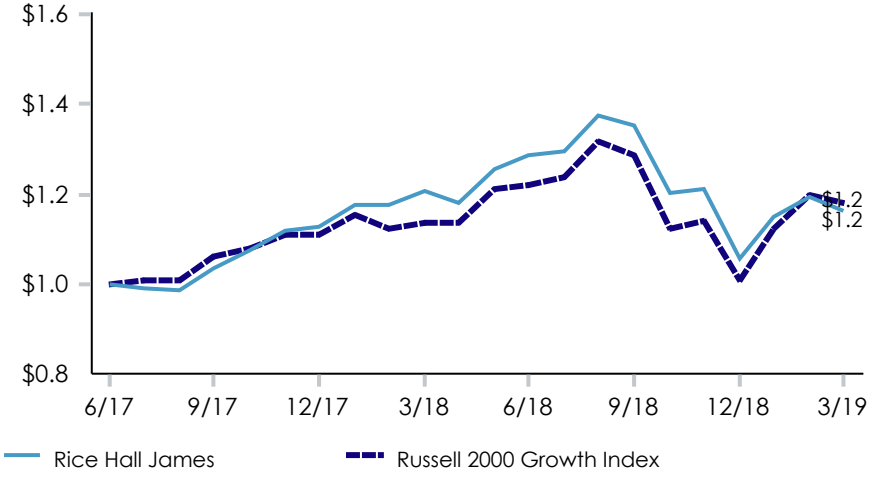
As of March 31, 2019

	Alpha	Beta	Information Ratio	Sharpe Ratio	Tracking Error	R-Squared	Up Market Capture	Down Market Capture	Inception Date
Rice Hall James	-0.02	0.91	-0.20	0.48	5.33	0.92	91.25	91.69	07/01/2017
Russell 2000 Growth Index	0.00	1.00	-	0.51	0.00	1.00	100.00	100.00	07/01/2017
IM U.S. Small Cap Growth Equity (SA+CF) Median	-	-	-	-	-	-	-	-	

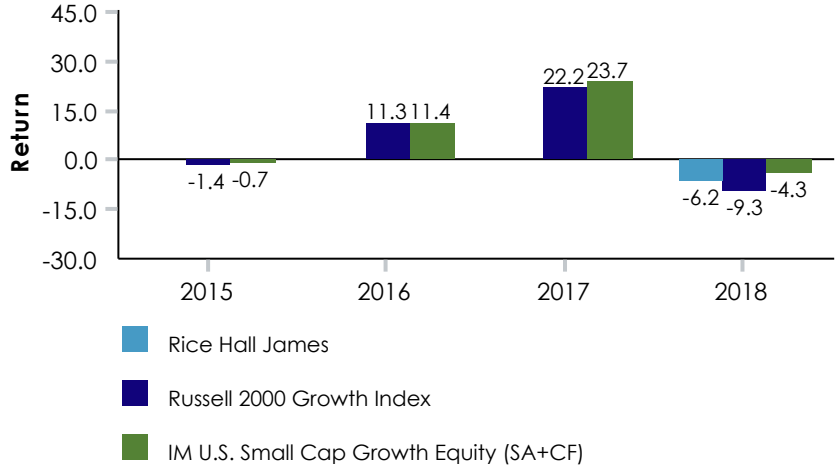
Trailing Period Performance



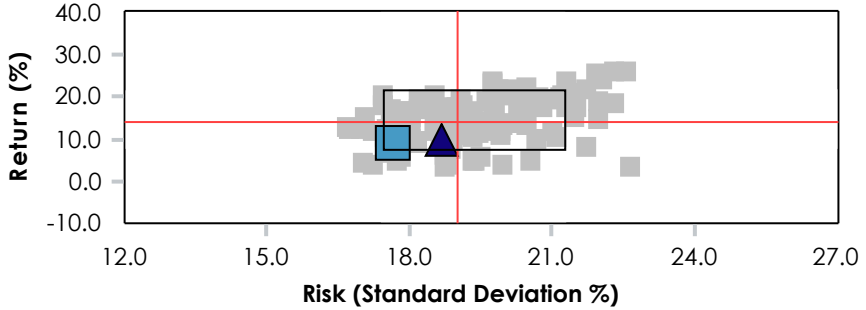
Growth of $1 - Since Inception



Calendar Year Performance



Risk/Return - Since Inception



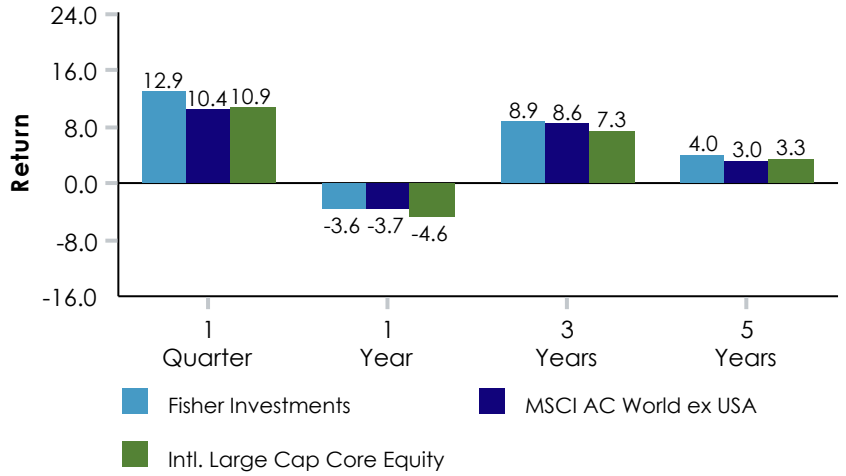
	Return	Standard Deviation
Rice Hall James	9.0	17.7
Russell 2000 Growth Index	9.9	18.7
Median	14.1	19.0

Fisher Investments - gross of fees

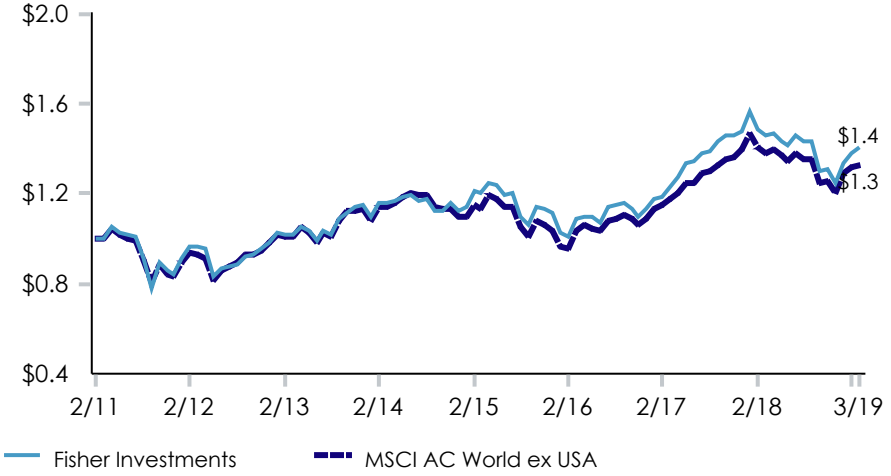
As of March 31, 2019

	Alpha	Beta	Information Ratio	Sharpe Ratio	Tracking Error	R-Squared	Up Market Capture	Down Market Capture	Inception Date
Fisher Investments	0.56	1.09	0.27	0.32	3.48	0.95	106.84	102.88	03/01/2011
MSCI AC World ex USA	0.00	1.00	-	0.29	0.00	1.00	100.00	100.00	03/01/2011
Intl. Large Cap Core Equity Median	-	-	-	-	-	-	-	-	

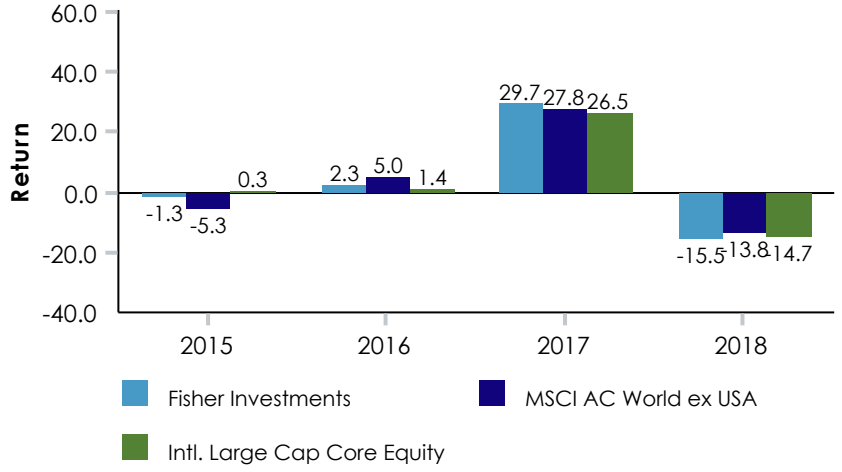
Trailing Period Performance



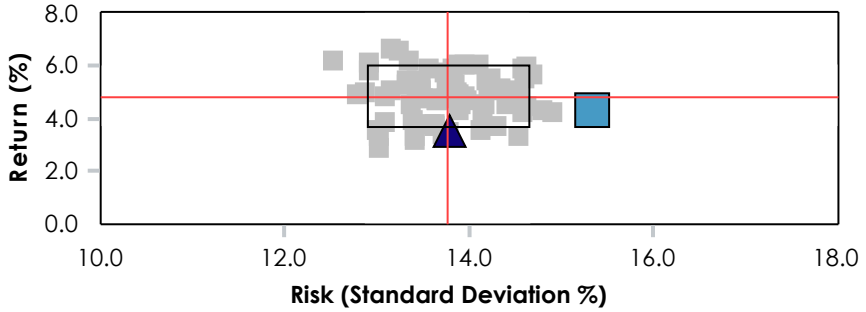
Growth of $1 - Since Inception



Calendar Year Performance



Risk/Return - Since Inception



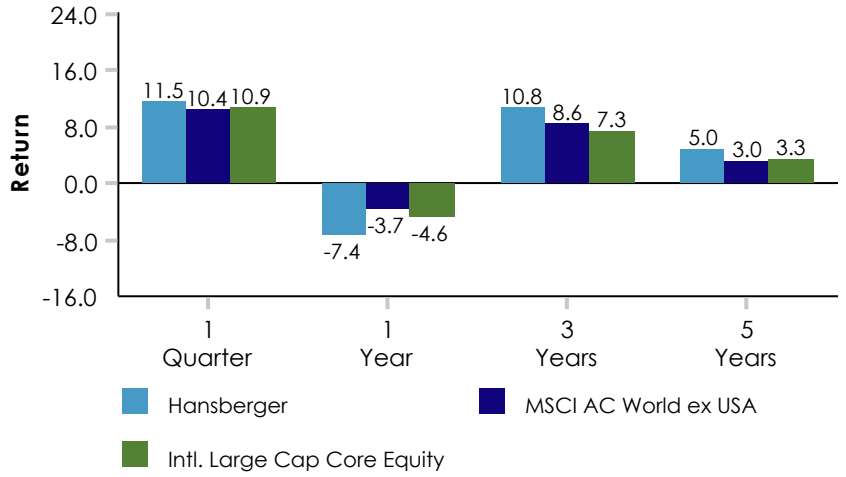
	Return	Standard Deviation
Fisher Investments	4.3	15.4
MSCI AC World ex USA	3.6	13.8
Median	4.9	13.8

Hansberger - gross of fees

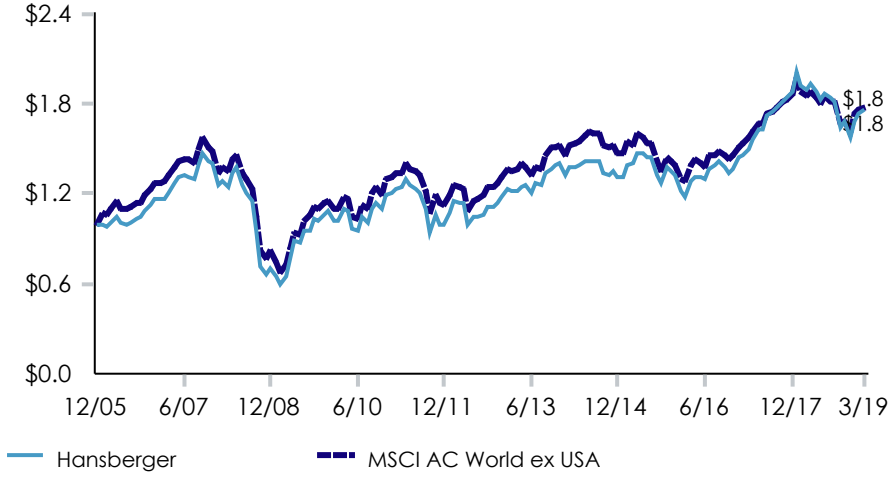
As of March 31, 2019

	Alpha	Beta	Information Ratio	Sharpe Ratio	Tracking Error	R-Squared	Up Market Capture	Down Market Capture	Inception Date
Hansberger	-0.21	1.08	0.06	0.26	4.41	0.95	105.46	105.81	01/01/2006
MSCI AC World ex USA	0.00	1.00	-	0.27	0.00	1.00	100.00	100.00	01/01/2006
Intl. Large Cap Core Equity Median	-	-	-	-	-	-	-	-	

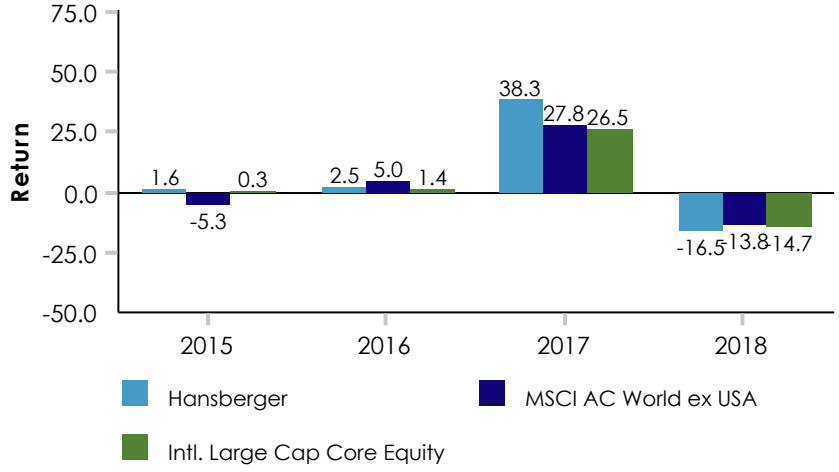
Trailing Period Performance



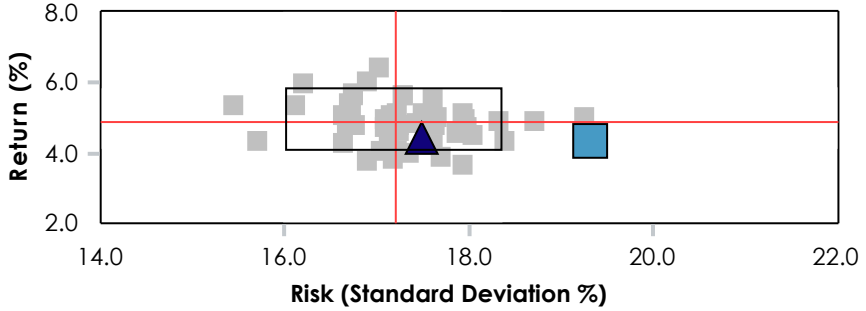
Growth of $1 - Since Inception



Calendar Year Performance



Risk/Return - Since Inception



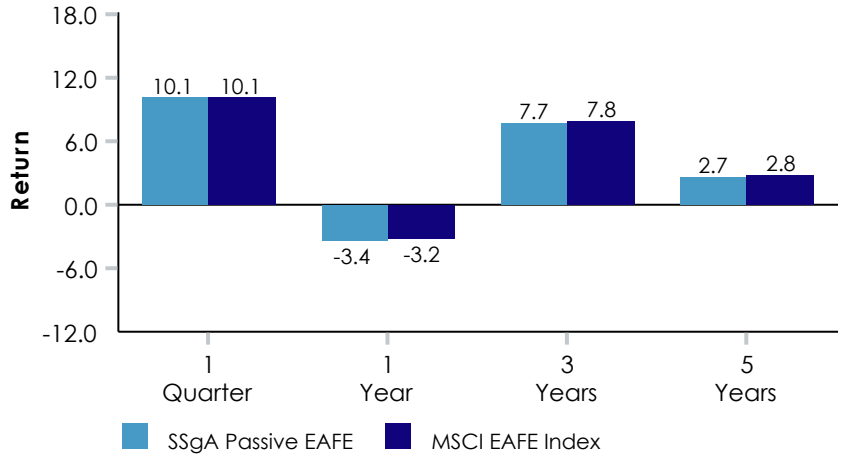
	Return	Standard Deviation
Hansberger	4.3	19.3
MSCI AC World ex USA	4.5	17.5
Median	4.9	17.2

SSgA Passive EAFE - gross of fees

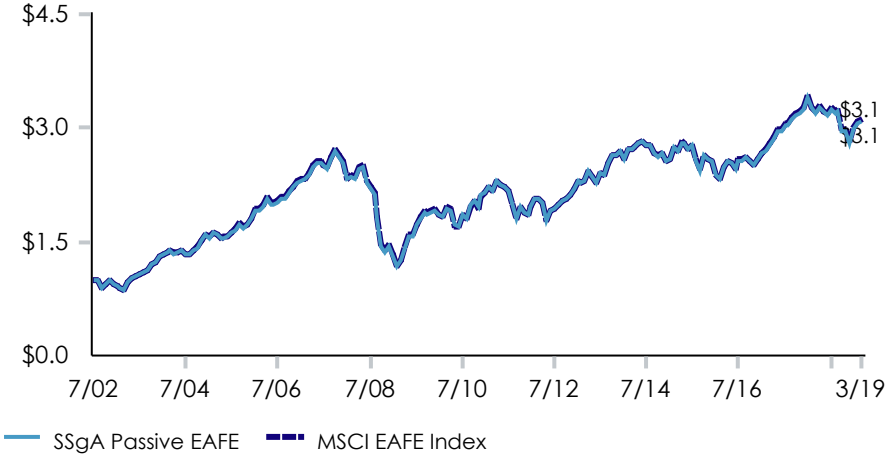
As of March 31, 2019

	Alpha	Beta	Information Ratio	Sharpe Ratio	Tracking Error	R-Squared	Up Market Capture	Down Market Capture	Inception Date
SSgA Passive EAFE	-0.01	0.99	-0.15	0.42	0.43	1.00	99.29	99.34	08/01/2002
MSCI EAFE Index	0.00	1.00	-	0.42	0.00	1.00	100.00	100.00	08/01/2002

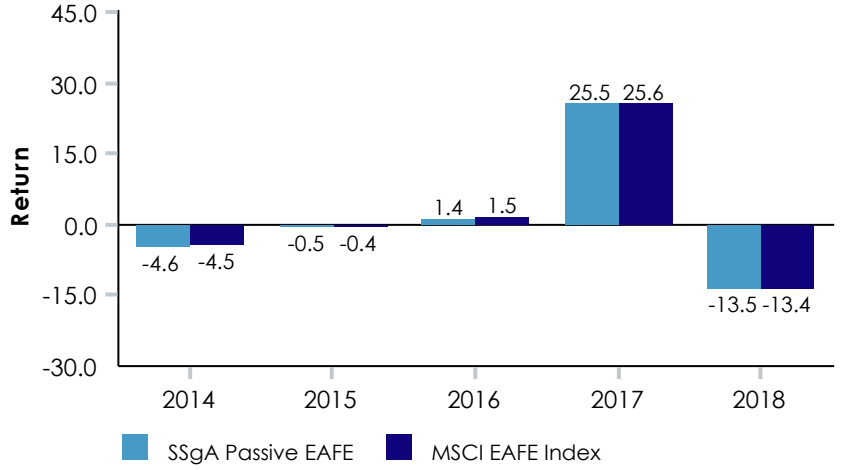
Trailing Period Performance



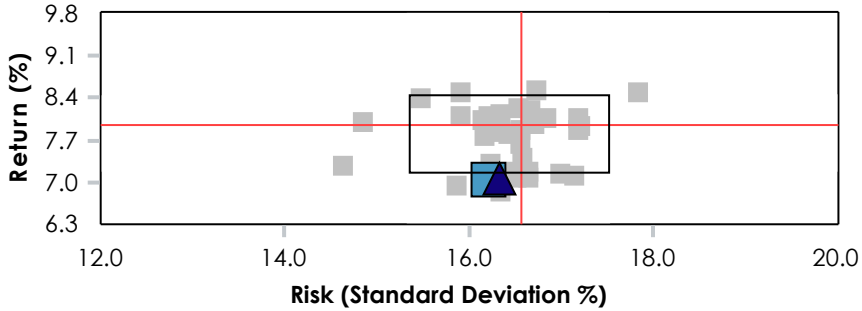
Growth of $1 - Since Inception



Calendar Year Performance



Risk/Return - Since Inception



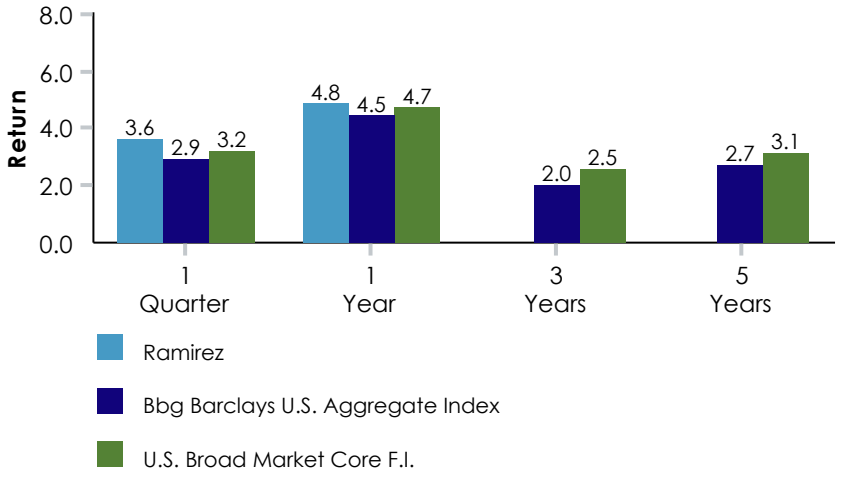
	Return	Standard Deviation
SSgA Passive EAFE	7.0	16.2
MSCI EAFE Index	7.1	16.3
Median	7.9	16.6

Ramirez - gross of fees

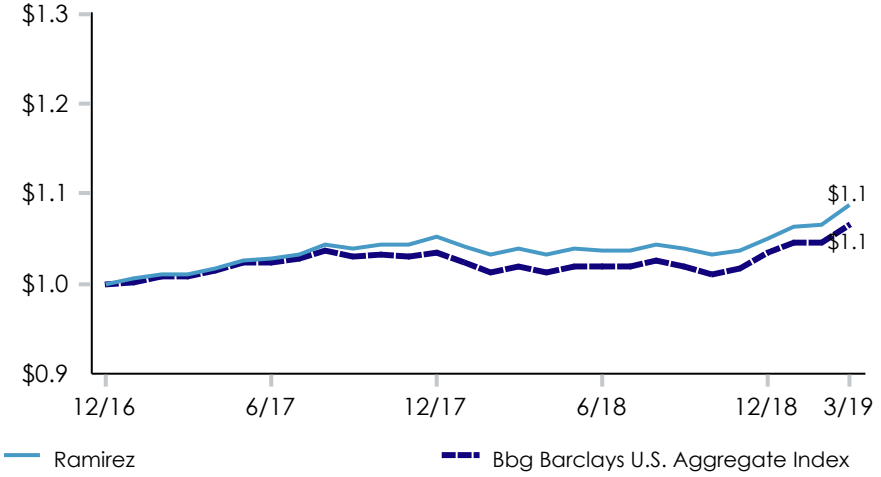
As of March 31, 2019

	Alpha	Beta	Information Ratio	Sharpe Ratio	Tracking Error	R-Squared	Up Market Capture	Down Market Capture	Inception Date
Ramirez	1.23	0.90	1.49	0.98	0.63	0.94	105.70	72.28	01/01/2017
Bbg Barclays U.S. Aggregate Index	0.00	1.00	-	0.55	0.00	1.00	100.00	100.00	01/01/2017
U.S. Broad Market Core F.I. Median	-	-	-	-	-	-	-	-	

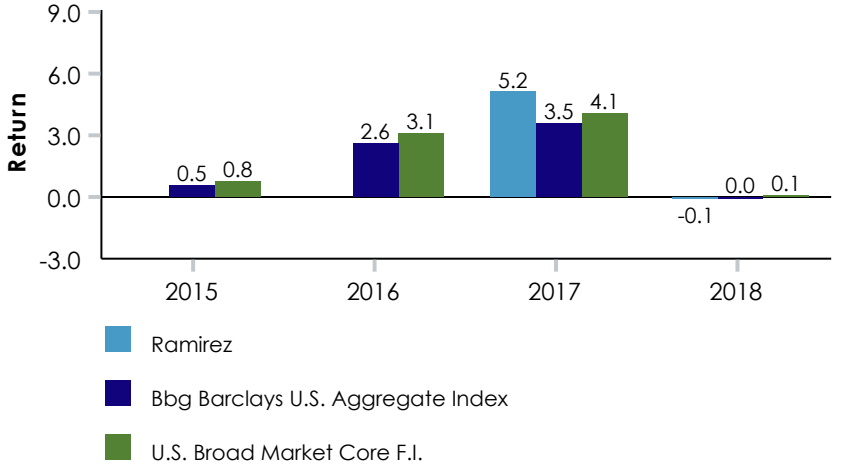
Trailing Period Performance



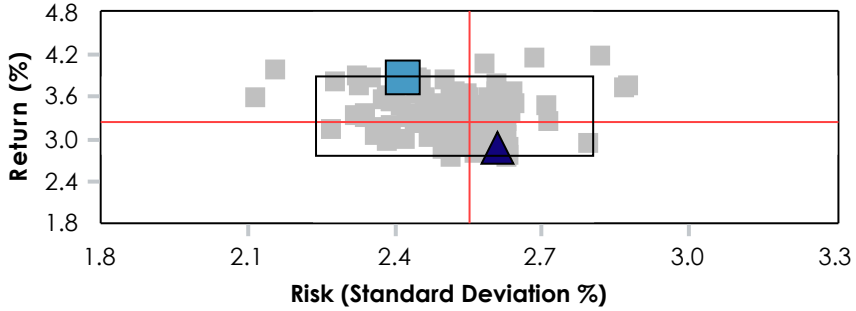
Growth of $1 - Since Inception



Calendar Year Performance



Risk/Return - Since Inception



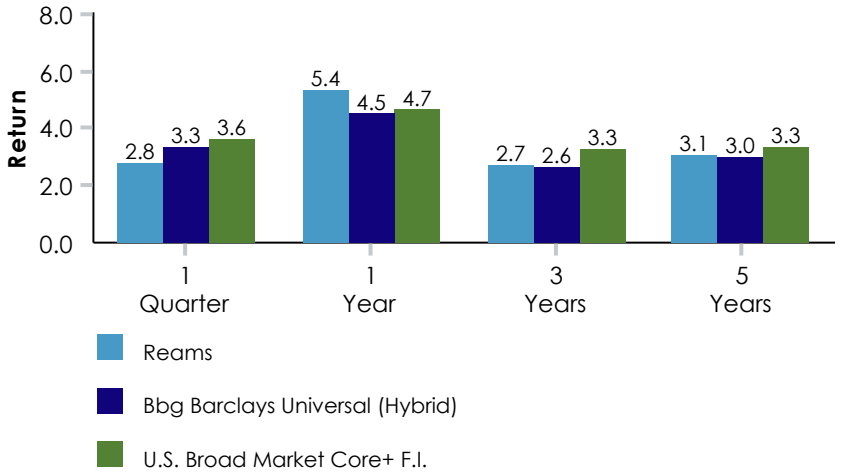
	Return	Standard Deviation
Ramirez	3.9	2.4
Bbg Barclays U.S. Aggregate Index	2.9	2.6
Median	3.2	2.6

Reams - gross of fees

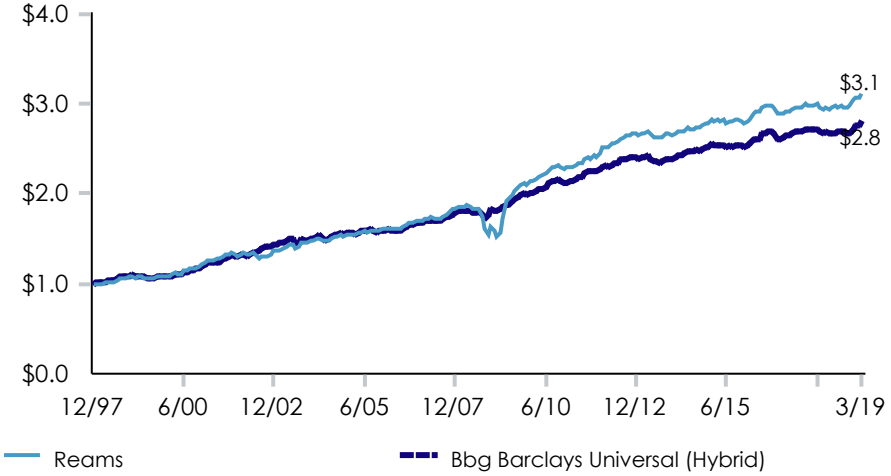
As of March 31, 2019

	Alpha	Beta	Information Ratio	Sharpe Ratio	Tracking Error	R-Squared	Up Market Capture	Down Market Capture	Inception Date
Reams	0.31	1.06	0.15	0.67	3.98	0.44	109.06	103.42	01/01/1998
Bbg Barclays Universal (Hybrid)	0.00	1.00	-	0.89	0.00	1.00	100.00	100.00	01/01/1998
U.S. Broad Market Core+ F.I. Median	-	-	-	-	-	-	-	-	

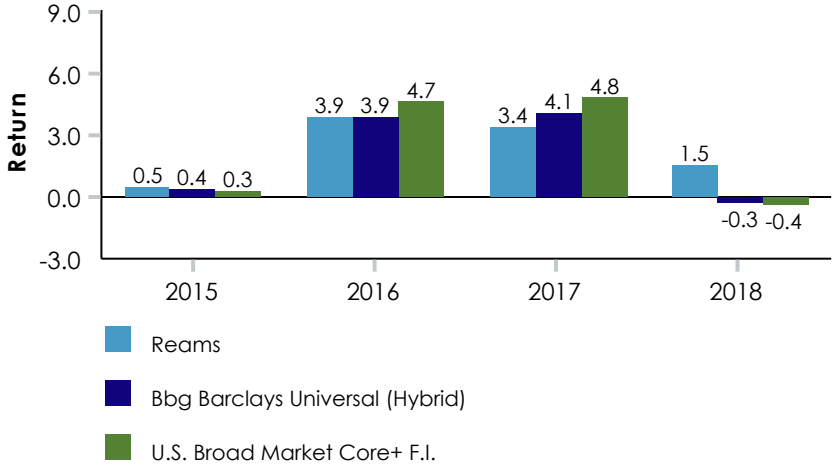
Trailing Period Performance



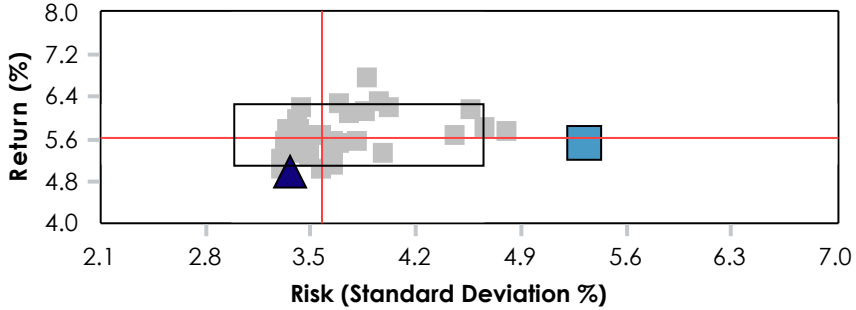
Growth of $1 - Since Inception



Calendar Year Performance



Risk/Return - Since Inception



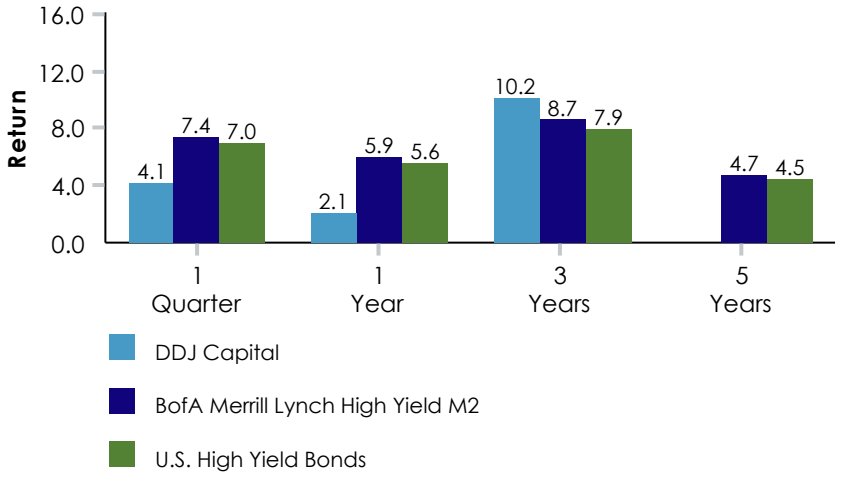
	Return	Standard Deviation
Reams	5.5	5.3
Bbg Barclays Universal (Hybrid)	5.0	3.4
Median	5.6	3.6

DDJ Capital - gross of fees

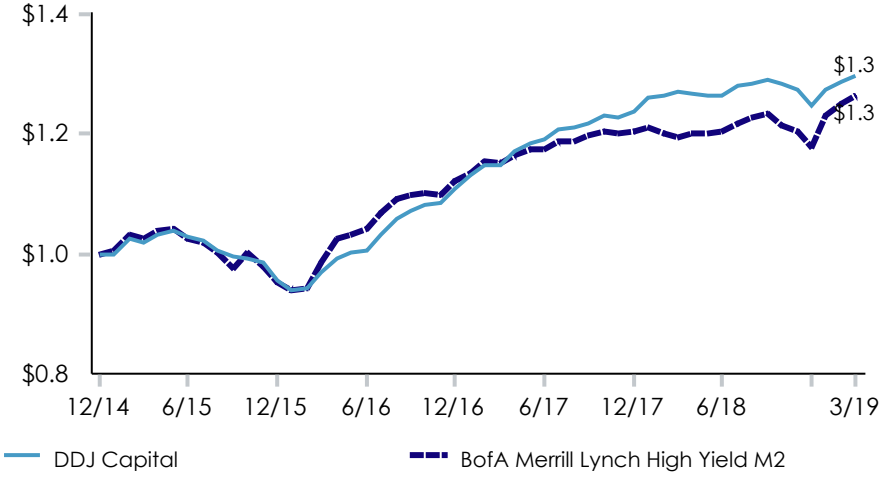
As of March 31, 2019

	Alpha	Beta	Information Ratio	Sharpe Ratio	Tracking Error	R-Squared	Up Market Capture	Down Market Capture	Inception Date
DDJ Capital	2.42	0.68	0.19	1.21	3.00	0.71	88.97	64.46	01/01/2015
BofA Merrill Lynch High Yield M2	0.00	1.00	-	0.87	0.00	1.00	100.00	100.00	01/01/2015
U.S. High Yield Bonds Median	-	-	-	-	-	-	-	-	

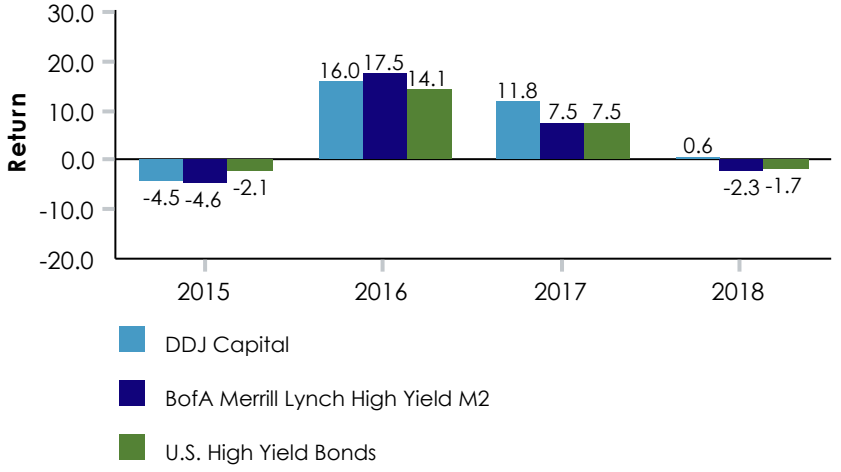
Trailing Period Performance



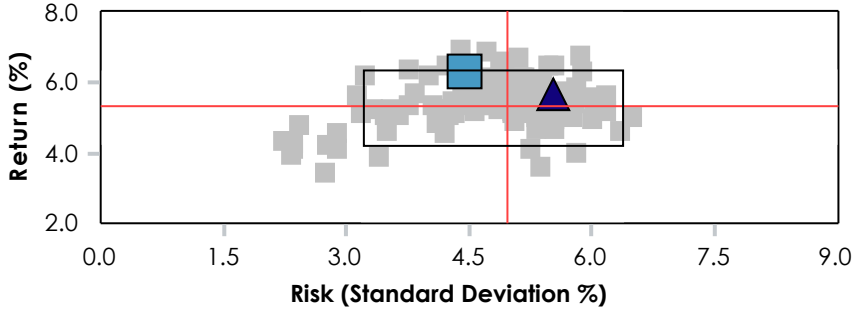
Growth of $1 - Since Inception



Calendar Year Performance



Risk/Return - Since Inception



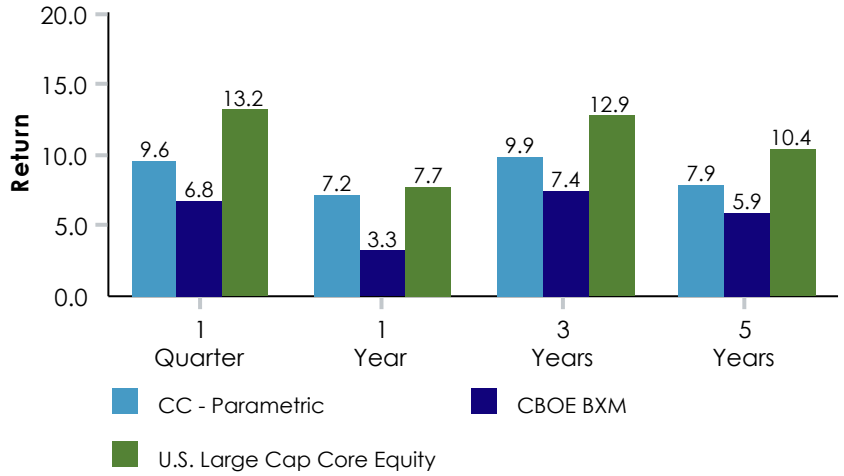
	Return	Standard Deviation
DDJ Capital	6.3	4.5
BofA Merrill Lynch High Yield M2	5.7	5.5
Median	5.4	5.0

CC - Parametric - gross of fees

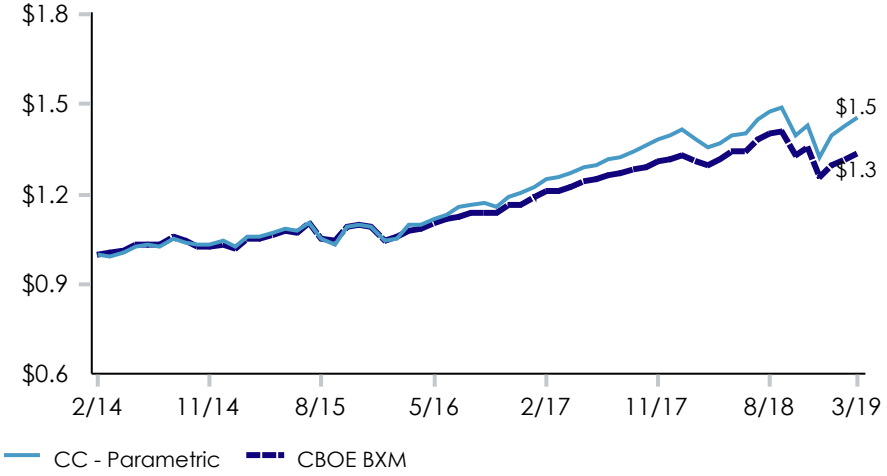
As of March 31, 2019

	Alpha	Beta	Information Ratio	Sharpe Ratio	Tracking Error	R-Squared	Up Market Capture	Down Market Capture	Inception Date
CC - Parametric	1.26	1.07	0.73	0.88	2.28	0.92	117.03	106.51	03/01/2014
CBOE BXM	0.00	1.00	-	0.75	0.00	1.00	100.00	100.00	03/01/2014
U.S. Large Cap Core Equity Median	-	-	-	-	-	-	-	-	

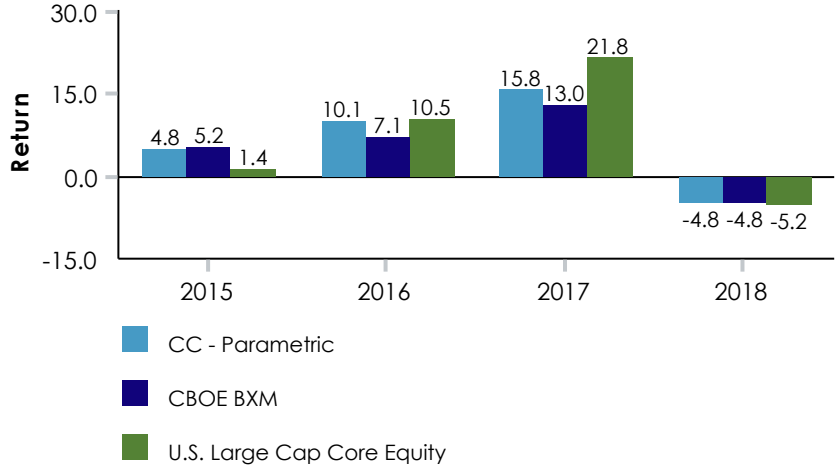
Trailing Period Performance



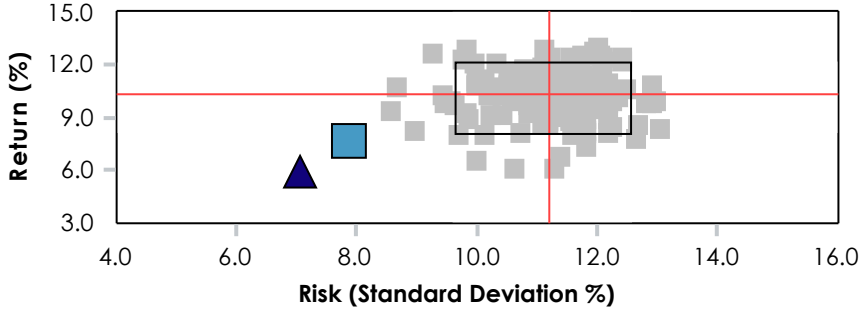
Growth of $1 - Since Inception



Calendar Year Performance



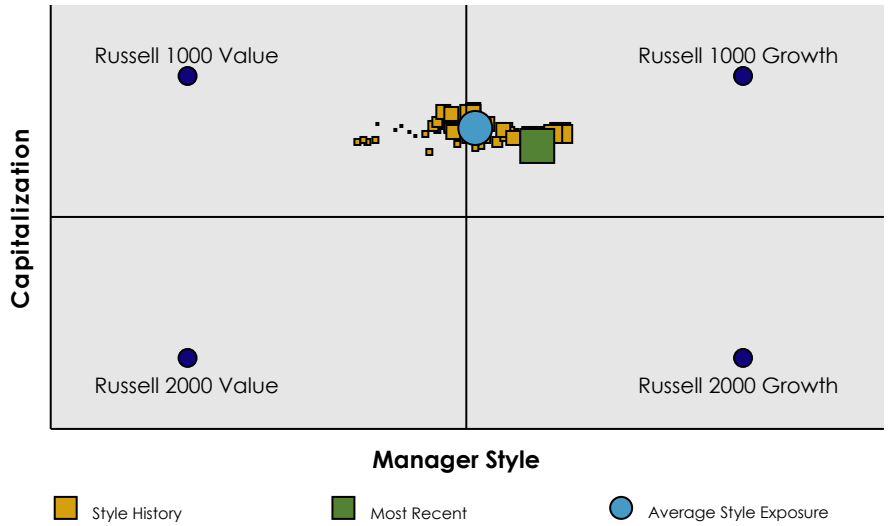
Risk/Return - Since Inception



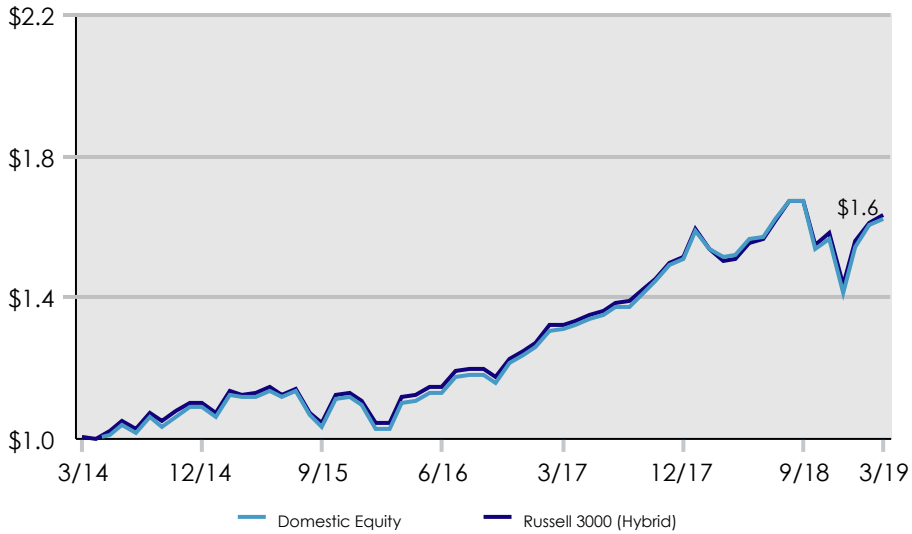
	Return	Standard Deviation
CC - Parametric	7.6	7.9
CBOE BXM	5.9	7.1
Median	10.4	11.2

Domestic Equity Analysis
As of March 31, 2019

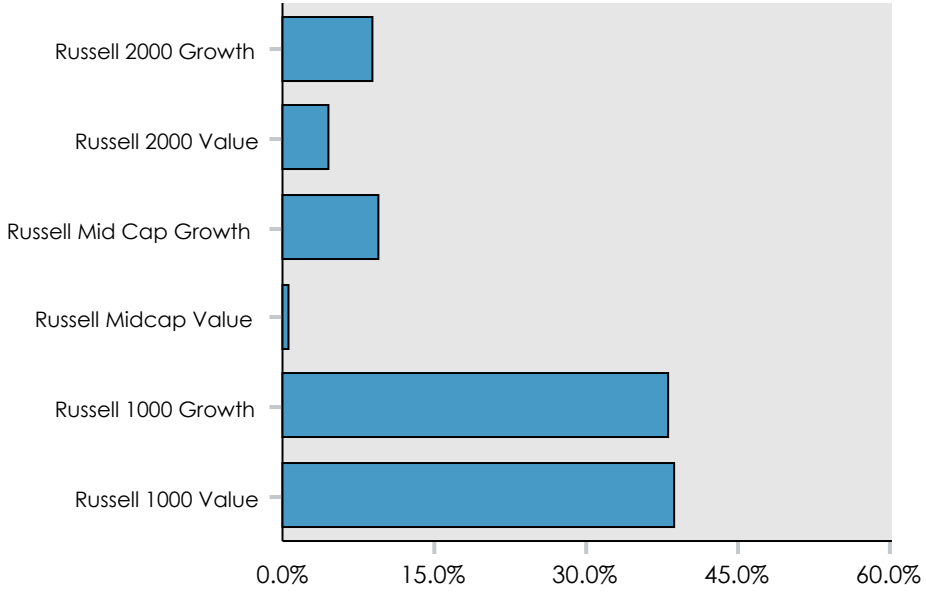
Style Map (5-Year)



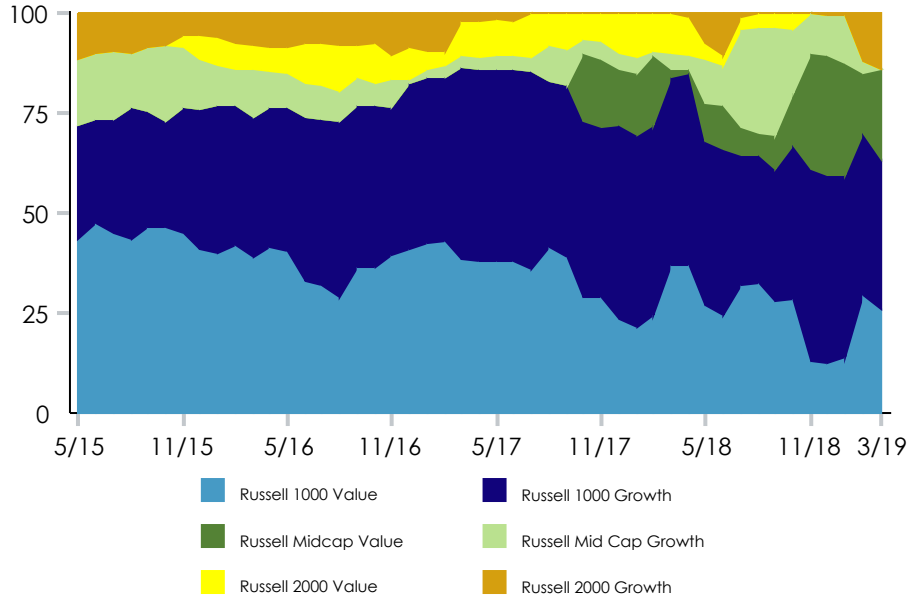
Growth of $1 (5-Year)



Style Exposure

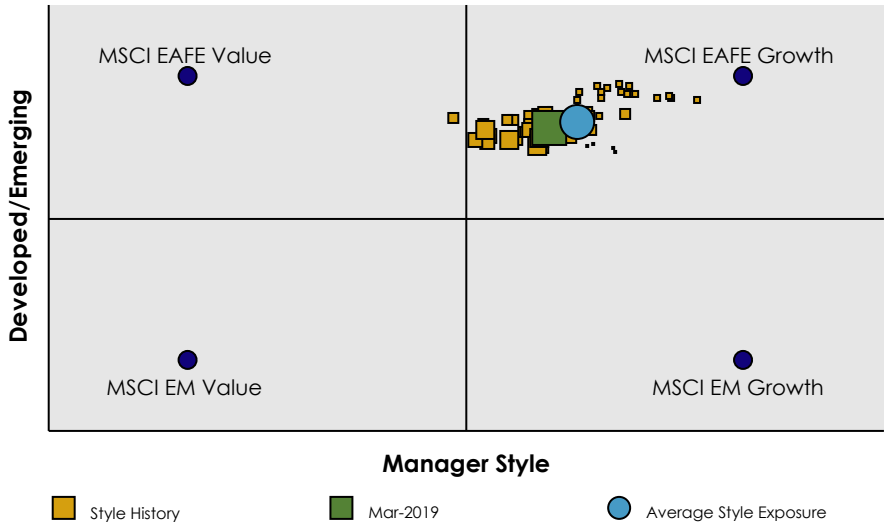


Style History (5-Year)

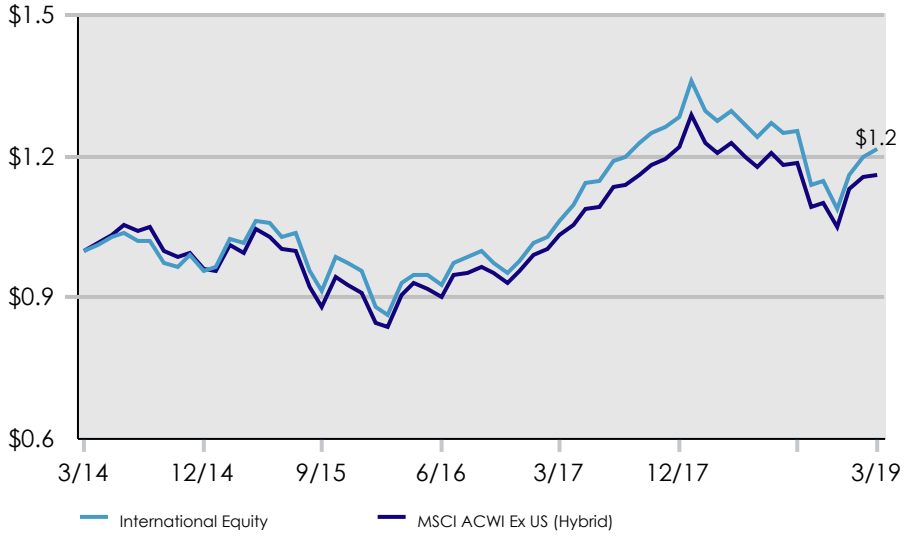


International Equity Analysis
As of March 31, 2019

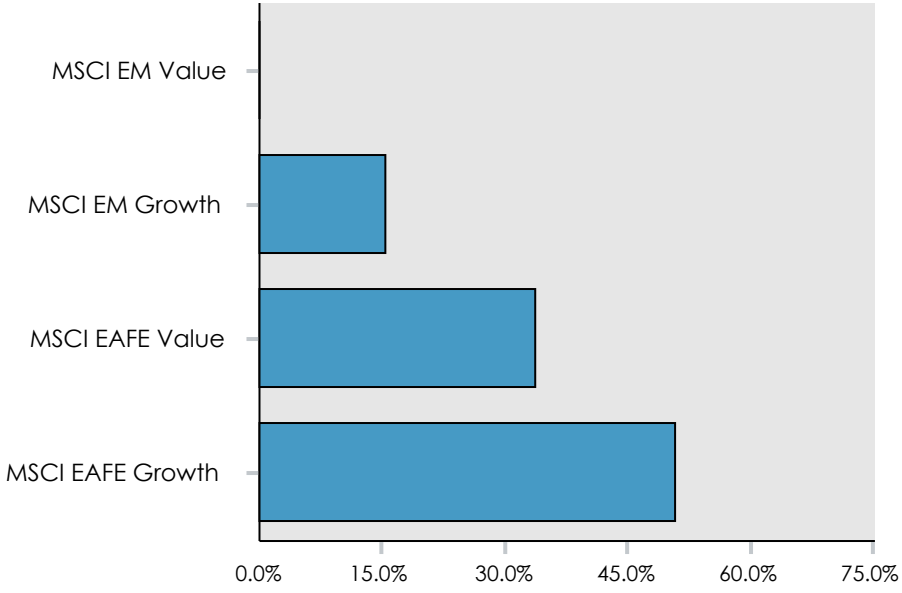
Style Map (5-Year)



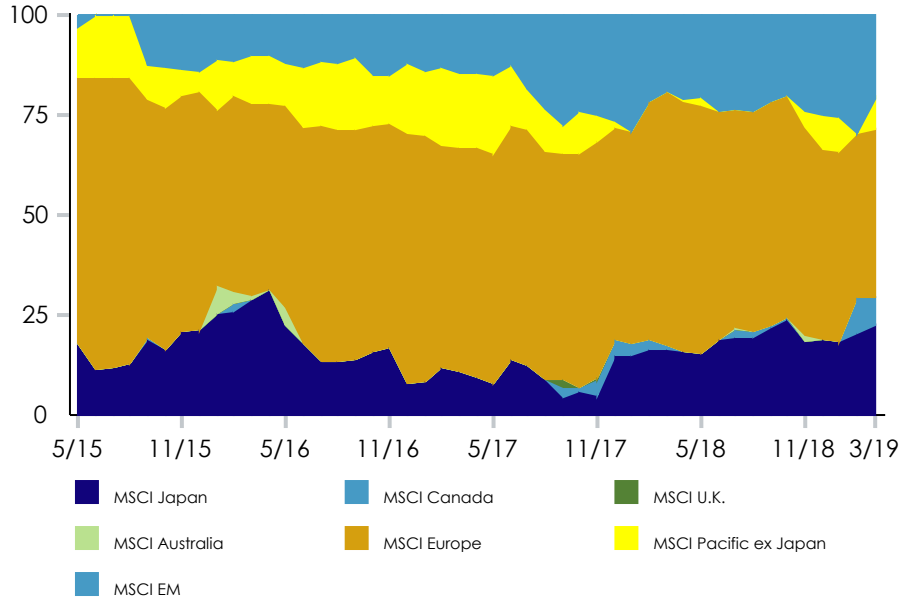
Growth of $1 (5-Year)



Style Exposure

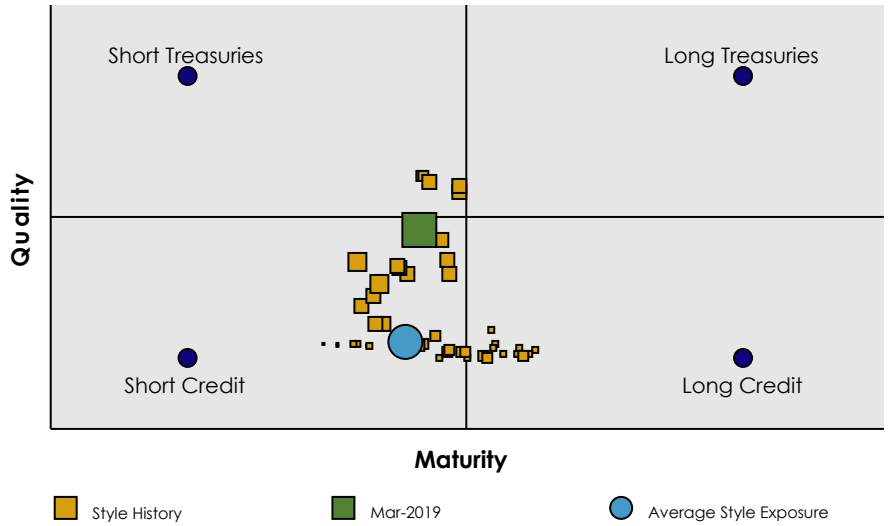


Style History (5-Year)

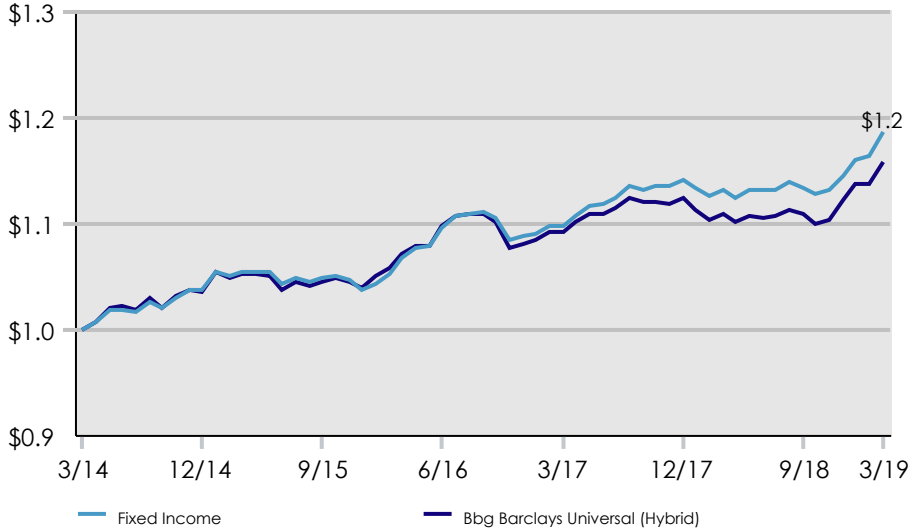


Fixed Income Analysis
As of March 31, 2019

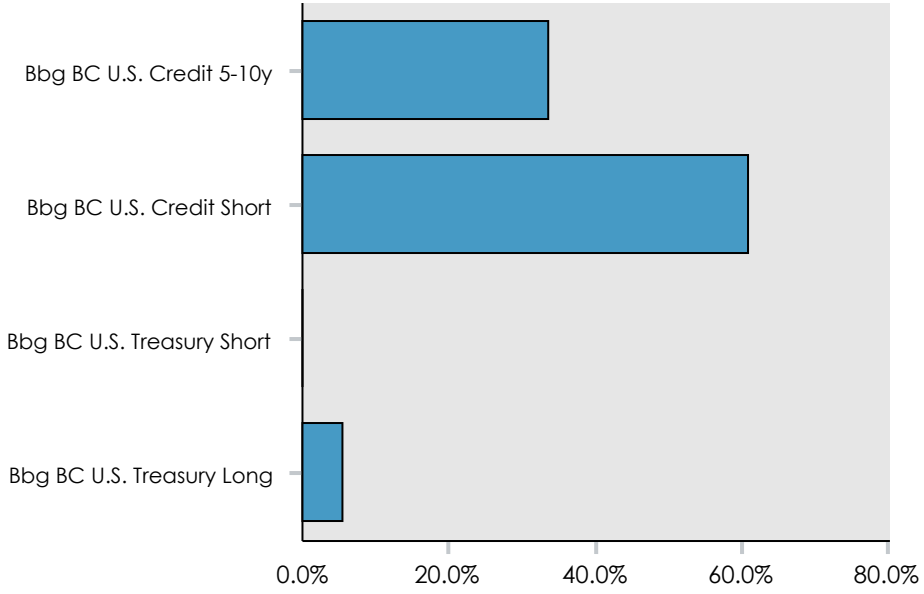
Style Map (5-Year)



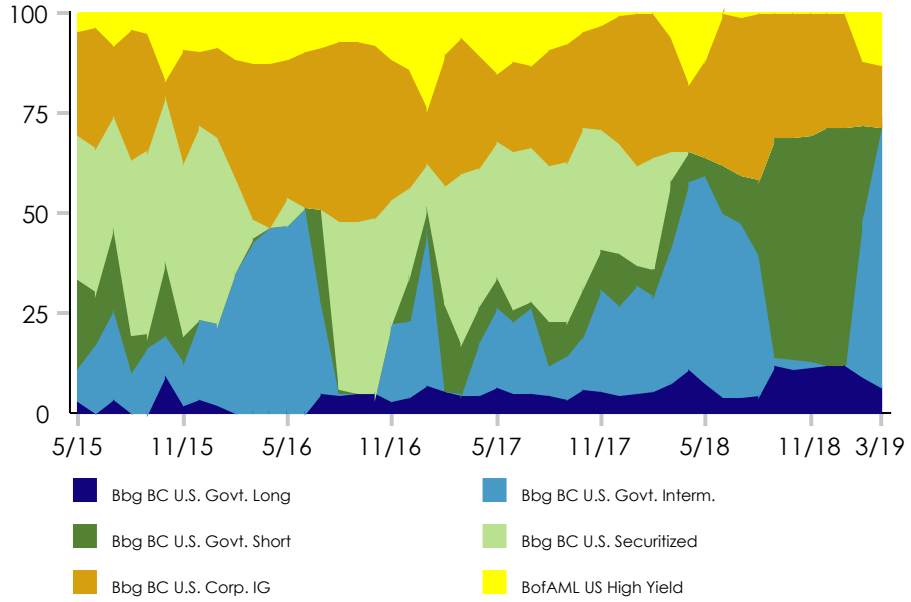
Growth of $1 (5-Year)



Style Exposure



Style History (5-Year)



Glossary

Alpha

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

Annualized Performance

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

Batting Average

Percentage of periods a portfolio outperforms a given index.

Beta

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

Bottom-up

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

Dividend Discount Model

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

Growth Stock

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

Information Ratio

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

R - Squared

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

Standard Deviation

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

Sharpe Ratio

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

Style Analysis

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

Top-Down

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

Tracking Error

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

Turnover

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

Value Stock

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

Benchmark Definitions

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

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

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

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

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

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

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

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

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

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

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

ICE BofA ML U.S. High Yield Master II: Tracks the performance of US dollar denominated below investment grade rated corporate debt publically issued in the US domestic market. All securities in index must have a below investment grade rating and an investment grade rated country of risk (based on foreign currency long term sovereign debt ratings). Each securities have > 1 year remaining maturity, fixed coupon schedule, and a minimum amount outstanding of $100 million.

Societe Generale (SG) Multi-Alternative Risk Premia: Represents risk premia managers with programs diversified across multiple asset classes utilizing multiple risk premia factors. These managers trade multiple asset classes such as equities, fixed income, currencies, and in many cases commodities, and aim to capture a diversity of discrete risk premia, including most prevalently value, carry, and momentum. These multi-asset, multi-risk premia strategies are typically systematic. Single asset class and risk premia programs are excluded. The SG Multi Alternative Risk Premia Index is an equally weighed, non-investable index of funds

RISK METRIC DESCRIPTION – Rationale for selection and calculation methodology

US Equity Markets:

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

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

Developed Equity Markets Excluding the US:

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

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

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

Emerging Market Equity Markets

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

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

RISK METRIC DESCRIPTION – Rationale for selection and calculation methodology

US Private Equity Markets:

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

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

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

U.S Private Real Estate Markets:

Metrics: US Cap rates and Annual US Real Estate Deal Volume

Real estate cap rates are a measure of the price paid in the market to acquire properties versus their annualized income generation before financing costs (NOI=net operating income). The date 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 to1979, providing a long data series for valuation comparison. Data is published quarterly.

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

Measure of Equity Market Fear / Uncertainty

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

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

Measure of Monetary Policy

Metric: Yield Curve Slope

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

RISK METRIC DESCRIPTION – Rationale for selection and calculation methodology

Definition of "extreme" metric readings

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

Credit Markets US Fixed Income:

Metric: Spreads

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

Measures of US Inflation Expectations

Metrics: Breakeven Inflation and Inflation Adjusted Commodity Prices

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

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

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

Measures of US Treasury Bond Interest Rate Risk

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

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

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

RISK METRIC DESCRIPTION – Rationale for selection and calculation methodology

What is the MIG 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 MIG 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 MIG 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 MIG 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.

DISCLAIMER:

WE HAVE PREPARED THIS REPORT (THIS "REPORT") FOR THE SOLE BENEFIT OF THE INTENDED RECIPIENT (THE "RECIPIENT").

SIGNIFICANT EVENTS MAY OCCUR (OR HAVE OCCURRED) AFTER THE DATE OF THIS REPORT AND THAT IT IS NOT OUR FUNCTION OR RESPONSIBILITY TO UPDATE THIS REPORT. ANY OPINIONS OR RECOMMENDATIONS PRESENTED HEREIN REPRESENT OUR GOOD FAITH VIEWS AS OF THE DATE OF THIS REPORT AND ARE SUBJECT TO CHANGE AT ANY TIME. ALL INVESTMENTS INVOLVE RISK. THERE CAN BE NO GUARANTEE THAT THE STRATEGIES, TACTICS, AND METHODS DISCUSSED HERE WILL BE SUCCESSFUL.

INFORMATION USED TO PREPARE THIS REPORT WAS OBTAINED FROM INVESTMENT MANAGERS, CUSTODIANS, AND OTHER EXTERNAL SOURCES. WHILE WE HAVE EXERCISED REASONABLE CARE IN PREPARING THIS REPORT, WE CANNOT GUARANTEE THE ACCURACY OF ALL SOURCE INFORMATION CONTAINED HEREIN.

CERTAIN INFORMATION CONTAINED IN THIS REPORT MAY CONSTITUTE "FORWARD - LOOKING STATEMENTS," WHICH CAN BE IDENTIFIED BY THE USE OF TERMINOLOGY SUCH AS "MAY," "WILL," "SHOULD," "EXPECT," "AIM", "ANTICIPATE," "TARGET," "PROJECT," "ESTIMATE," "INTEND," "CONTINUE" OR "BELIEVE," OR THE NEGATIVES THEREOF OR OTHER VARIATIONS THEREON OR COMPARABLE TERMINOLOGY. ANY FORWARD - LOOKING STATEMENTS, FORECASTS, PROJECTIONS, VALUATIONS, OR RESULTS IN THIS PRESENTATION ARE BASED UPON CURRENT ASSUMPTIONS. CHANGES TO ANY ASSUMPTIONS MAY HAVE A MATERIAL IMPACT ON FORWARD LOOKING STATEMENTS, FORECASTS, PROJECTIONS, VALUATIONS, OR RESULTS. ACTUAL RESULTS MAY THEREFORE BE MATERIALLY DIFFERENT FROM ANY FORECASTS, PROJECTIONS, VALUATIONS, OR RESULTS IN THIS PRESENTATION.

PERFORMANCE DATA CONTAINED HEREIN REPRESENT PAST PERFORMANCE. PAST PERFORMANCE IS NO GUARANTEE OF FUTURE RESULTS.

ATTACHMENT B:
PFRS ACTUARY VALUATION REPORT
AS OF JULY 1, 2018

CHEIRON Classic Values, Innovative Advice

Oakland Police and Fire Retirement System

Actuarial Valuation Report as of July 1, 2018

Produced by Cheiron

February 2019

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February 15, 2019

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, 2018. 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

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

Timothy S. Doyle, ASA, EA, MAAA
Associate Actuary

FOREWORD

Cheiron has performed the actuarial valuation of the Oakland Police and Fire Retirement System (PFRS, the Plan) as of July 1, 2018. 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.

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 2019-2020.

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 were suspended until fiscal year 2017-2018, at which time they resumed 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 2019-2020.

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 both Police and Fire members since the previous valuation, changing Police and Fire retirees' Cost-of-Living Adjustments (COLAs), and adding a benefit based on Longevity Pay to Fire benefits. There have been no other changes to the assumptions or methods since the prior valuation.

B. Key Findings of this Valuation

The key results of the July 1, 2018 actuarial valuation are as follows:

- The actuarially determined employer contribution amount for Fiscal Year 2019-2020 is $43.4 million, based on projecting the Actuarial Liabilities and the Actuarial Value of Assets to the end of the 2018-2019 Fiscal Year. This represents a decrease of $2.3 million from the amount determined in the prior valuation for the same Fiscal Year. The contribution is assumed to be paid in equal installments throughout the year, or on average at approximately January 1, 2020.

- New Memorandums of Understanding (MOUs) went into effect for Police members between the previous and current valuation dates, changing Police retirees' Cost-of-Living Adjustments (COLAs). The change in COLAs from the new Police MOUs lowered the liability by $6.4 million since the scheduled increases under the new MOUs were lower than the amounts originally assumed, in aggregate.

- New Memorandums of Understanding (MOUs) went into effect for Fire members between the previous and current valuation dates, changing Fire retirees' Cost-of-Living Adjustments (COLAs) and granting Longevity Pay to Fire retirees. The change in COLAs from the new Fire MOUs increased the liability by $3.4 million since the scheduled increases under the new MOUs were higher than the amounts originally assumed, in aggregate. Longevity Pay increased the liability by about $1.5 million.

- During the year ended June 30, 2018, the return on Plan assets was 10.22% on a market value basis net of investment expenses, as compared to the 6.00% assumption for the 2017-2018 Plan year. This resulted in a market value gain on investments of $13.3 million. The Actuarial Value of Assets (AVA) is calculated as the expected AVA plus 20% of the difference between the market value and the expected AVA. This smoothed value of assets returned 8.18%, for an actuarial asset gain of $7.1 million.

- The Plan experienced a gain on the Actuarial Liability of $7.5 million, the net result of changes in the population, in particular more deaths than expected among disabled retirees and beneficiaries. Combining the liability losses and asset gains, the Plan experienced a total gain of $14.6 million.

- The Plan's smoothed funded ratio, the ratio of actuarial assets over Actuarial Liability, increased from 49.5% last year to 53.7% on an AVA basis as of June 30, 2018.

- The Plan's funded ratio increased from 52.4% to 58.1% on a Market Value of Assets (MVA) basis.

- The Unfunded Actuarial Liability (UAL) is the excess of the Plan's Actuarial Liability over the Actuarial Value of Assets. The Plan experienced a decrease in the UAL from $340.1 million to $299.8 million as of July 1, 2018.

SECTION I – EXECUTIVE SUMMARY

- Overall participant membership decreased compared to last year. 41 members died, 19 of whom had their benefits continue to a surviving spouse. In addition, 27 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 2019-2020 would be $39.6 million. The contribution is smaller than that determined using the projected AVA, because the current market value reflects the full amount of recent investment gains, while under the AVA projection a portion of those gains are deferred until years after FY 2019-2020.

Below we present Table I-1 that 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, 2017	July 1, 2018	% Change
Participant Counts			
Active Participants	0	0	
Participants Receiving a Benefit	886	837	-5.53%
Total	**886**	**837**	**-5.53%**
Annual Pay of Active Members	$ 0	$ 0	
Assets and Liabilities			
Actuarial Liability (AL)	$ 673,441	$ 647,251	-3.89%
Actuarial Value of Assets (AVA)	333,373	347,467	4.23%
Unfunded Actuarial Liability (UAL)	$ 340,068	$ 299,784	-11.85%
Funded Ratio (AVA)	49.5%	53.7%	4.18%
Funded Ratio (MVA)	52.4%	58.1%	5.64%
Contributions			
Employer Contribution (FY2018-19)	$ 44,821	N/A	
Employer Contribution (FY2019-20)	$ 45,722	$ 43,409	-5.06%

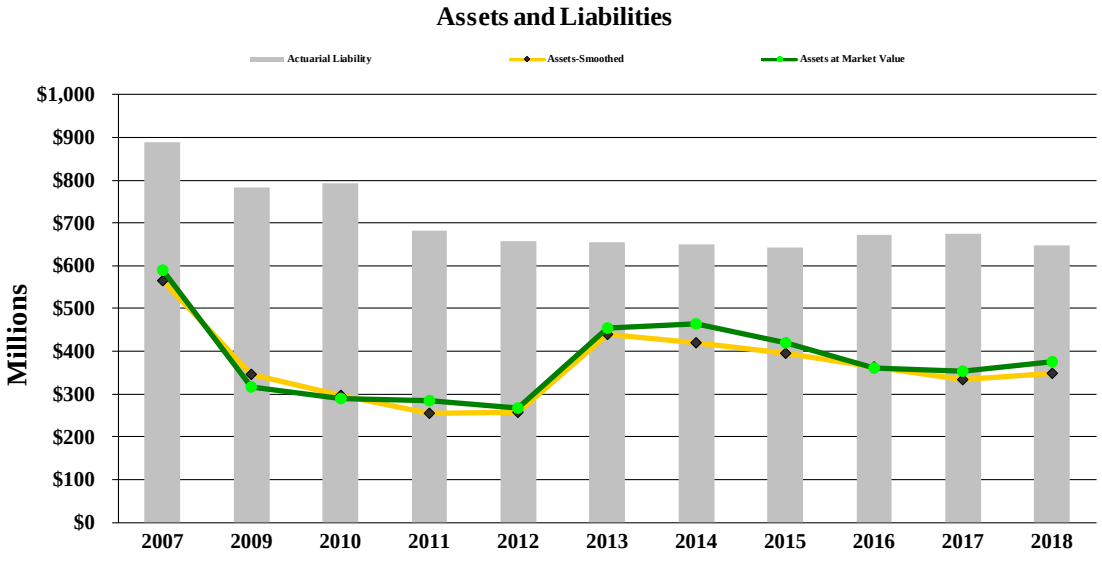
C. Historical Trends

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.

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 that 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 decreased from 67.2% to 49.5% between 2013 and 2017 due to assumption changes, liability losses, new Police MOUs, and the lack of contributions since the July 2012 payment. The funded ratio has increased from 49.5% to 53.7% over the past year due to the commencement of contributions, and to a lesser extent, asset and liability gains.

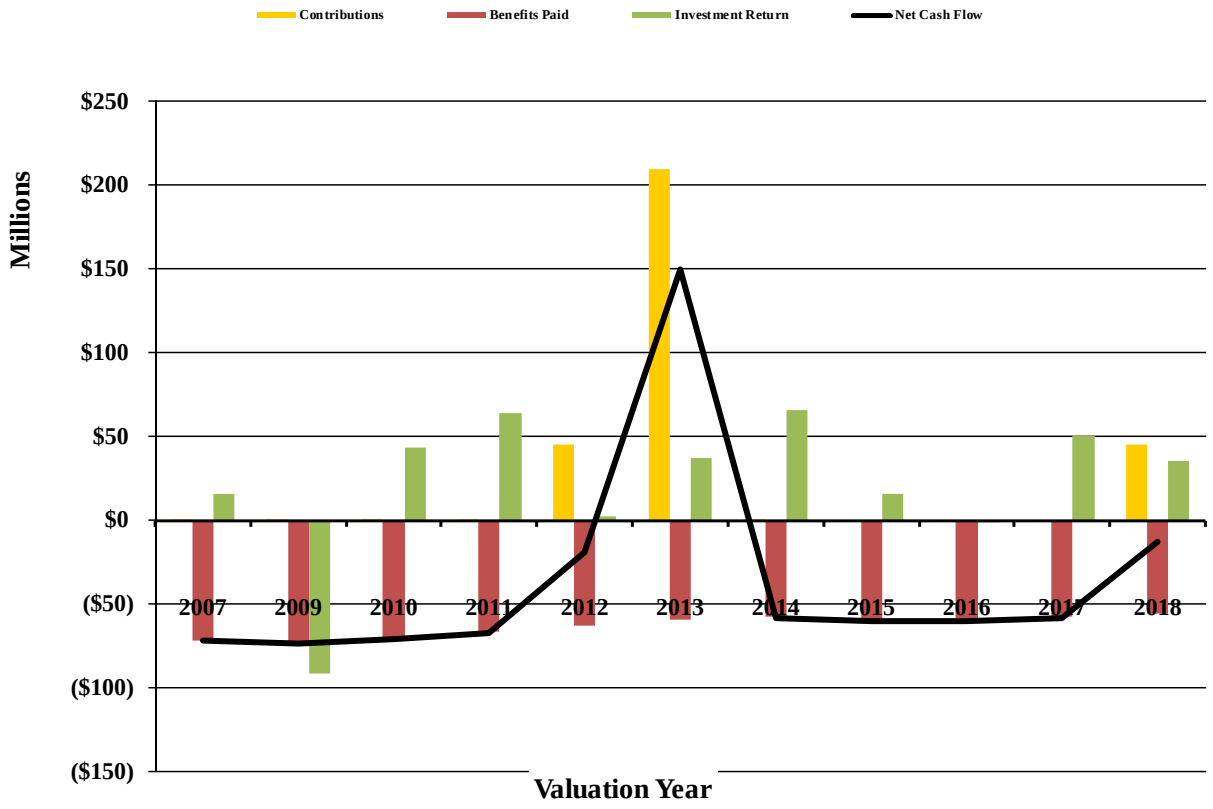


Valuation Year	2007	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
AVA Funded Ratio	63.7%	44.4%	37.6%	37.5%	39.1%	67.2%	64.6%	61.4%	54.0%	49.5%	53.7%
UAL (Millions)	$ 322.1	$ 435.3	$ 494.4	$426.8	$ 401.1	$215.0	$230.2	$ 247.5	$309.4	$340.1	$299.8

SECTION I – EXECUTIVE SUMMARY

Cash Flows

The chart below shows the Plan's cash flow, excluding investment returns (i.e., contributions less benefit payments and expenses). 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 six of the last seven fiscal years primarily due to no contributions being made between 2007 and 2011, becoming positive in 2013 when a $210 million contribution was made.

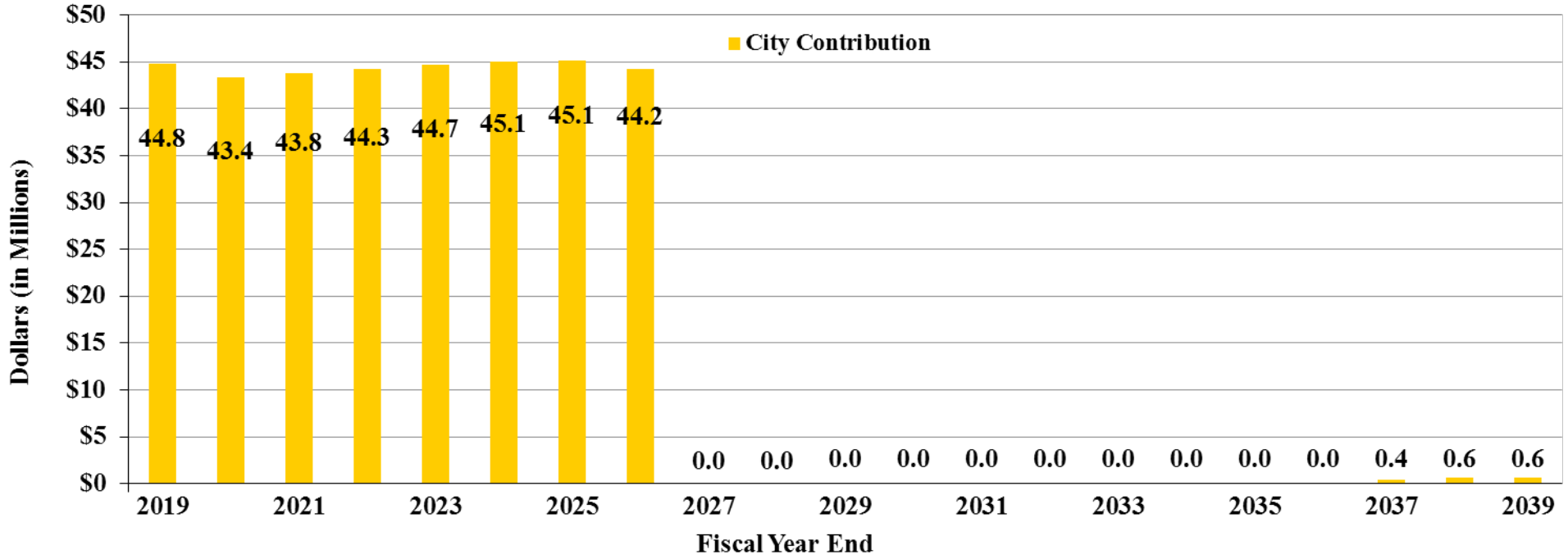
A negative cash flow magnifies the losses during a market decline, hindering the Plan in its ability to absorb market fluctuations. The implications of a plan in negative cash flow are that the impact of market fluctuations can be more severe: as assets are being depleted to pay benefits in down markets, 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.

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, 2018 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 (6.0% per year until 2027, then trending down to an annual return of 3.25% over 10 years).

Projection of Employer Contributions



The above graph shows that the City's required contribution declined from $44.8 million in fiscal year 2019 to $43.4 million in fiscal year 2020, and then is expected to increase slightly as the current unfunded liability is fully amortized. This assumes that the annual

SECTION I – EXECUTIVE SUMMARY

payments by 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 gains, which will not be recognized until after 2026; the deferred recognition of these gains is expected to offset a small portion of the administrative expenses in the final years of the graph on the previous page.

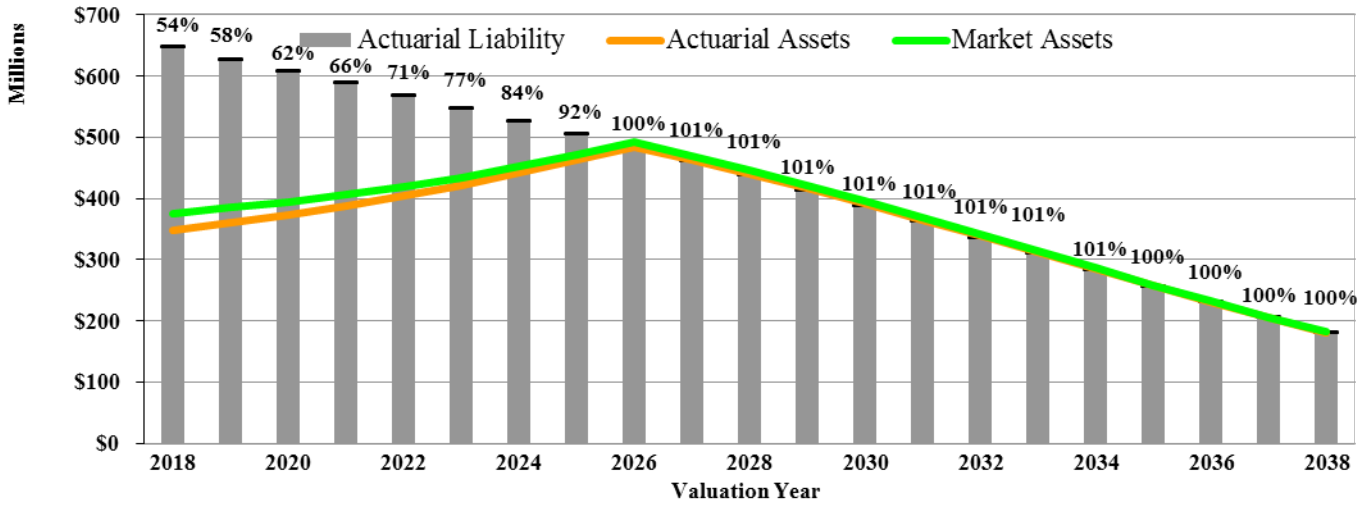
Note that the graph on the previous page does not forecast any future actuarial gains or losses or changes to the amortization policy. Even relatively modest losses could push the employer contribution over $50 million in the next few years. We also note that the occurrence of any future gains or losses 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.

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 increases as the current unfunded liability is fully amortized, assuming all actuarial assumptions are met.

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, 2017 and June 30, 2018,
- 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, 2017 and June 30, 2018.

SECTION II – ASSETS

TABLE II-1
Statement of Assets at Market Value
June 30,
(in thousands)

	2017	2018
Cash and Cash Equivalents:	$ 3,382	$ 7,821
Receivables:		
Interest Receivable	$ 355	$ 671
Dividends Receivable	227	234
Investments Receivable	4,008	3,001
Retired Members and Beneficiaries	2,477	1,641
Miscellaneous	187	136
Total Receivables	7,255	5,683
Investments, at Fair Value:		
Short-term Investments	5,576	4,287
Bonds	63,600	98,313
Domestic Equities and Mutual Funds	168,467	151,601
International Equities and Mutual Funds	44,590	46,770
Alternative Investments	70,511	71,132
Securities Lending Collateral	31,042	43,818
Total Investments	383,785	415,921
Total Assets	394,422	429,425
Liabilities:		
Accounts Payable	23	95
Benefits Payable	4,763	4,609
Investments Payable	5,118	4,586
Accrued Investment Management Fees	281	344
Securities Lending Liabilities	31,034	43,815
Total Liabilities	41,220	53,448
Market Value of Assets	**$ 353,203**	**$ 375,976**

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 2017 and 2018.

TABLE II-2
Changes in Market Values
June 30,
(in thousands)

	2017	2018
Contributions		
Contributions of Plan Members	$ 0	$ 0
Contributions from the City	0	44,860
Total Contributions	0	44,860
Investment Income		
Miscellaneous Income	70	20
Investment Income	50,159	35,435
Total Investment Income	50,229	35,455
Disbursements		
Benefit Payments	(57,376)	(55,999)
Administrative Expenses	(1,262)	(1,543)
Total Disbursments	(58,637)	(57,542)
Net increase (Decrease)	(8,408)	22,773
Net Assets Held in Trust for Benefits:		
Beginning of Year	361,611	353,203
End of Year	$ 353,203	$ 375,976
Approximate Return	15.1%	10.2%

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 6.00% return assumption from 2017-2018) 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, 2017	$ 333,373
b. Total Contributions and Misc Income	44,880
c. Administrative Expense	(1,543)
d. Benefit Payments	(55,999)
e. Expected Investment Earnings	19,628
f. Expected Actuarial Value of Assets - July 1, 2018 [1a + 1b + 1c + 1d + 1e]	$ 340,340
2. Calculate Final Actuarial Value of Assets	
a. Value of Market Value of Assets - July 1, 2018	$ 375,976
b. Excess of MVA over Expected AVA [2a - 1f]	35,637
c. Preliminary AVA [1f + 0.2 * 2b]	347,467
d. 90% of MVA [90% * 2a]	338,379
e. 110% of MVA [110% * 2a]	413,574
3. Final Actuarial Value of Assets [2c, not less than 2d or greater than 2e]	**$ 347,467**

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 6.00% assumption.

TABLE II-4
Asset Gain/(Loss)
(in thousands)

	Market Value	Actuarial Value
July 1, 2017 value	**$ 353,203**	**$ 333,373**
Contributions of Plan Members	0	0
Contributions from the City	44,860	44,860
Miscellaneous Income	20	20
Benefit Payments	(55,999)	(55,999)
Administrative Expenses	(1,543)	(1,543)
Expected Investment Earnings (6.00%)	22,183	19,628
Expected Value June 30, 2018	**$ 362,724**	**$ 340,340**
Investment Gain / (Loss)	13,252	7,127
July 1, 2018 value	**375,976**	**$ 347,467**
Return	10.22%	8.18%

SECTION III – LIABILITIES

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

- **Disclosure** of Plan liabilities at July 1, 2017 and July 1, 2018
- Statement of **changes** in these liabilities during the year

Disclosure

Several types of liabilities are typically shown in an actuarial valuation 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, 2017	July 1, 2018
Present Value of Future Benefits		
Active Participant Benefits	$ 0	$ 0
Retiree and Inactive Benefits	673,441	647,251
Present Value of Future Benefits (PVB)	**$ 673,441**	**$ 647,251**
Actuarial Liability		
Present Value of Future Benefits (PVB)	$ 673,441	$ 647,251
Present Value of Future Normal Costs (PVFNC)	0	0
Actuarial Liability (AL = PVB – PVFNC)	**$ 673,441**	**$ 647,251**
Actuarial Value of Assets (AVA)	333,373	347,467
Net (Surplus)/Unfunded (AL – AVA)	**$ 340,068**	**$ 299,784**

SECTION III – LIABILITIES

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, 2017	$	673,441
Actuarial Liability at July 1, 2018	$	647,251
Liability Increase (Decrease)	$	(26,190)
Change due to:		
Actuarial Methods / Software Changes	$	0
Assumption Change		(1,475)
Accrual of Benefits		0
Actual Benefit Payments		(55,999)
Interest		38,751
Data Corrections		0
Actuarial Liability (Gain)/Loss	$	(7,467)

SECTION III – LIABILITIES

Table III-3
Liabilities by Group as of July 1, 2018
(in thousands)

	Police	Fire	Total
Actuarial Accrued Liability			
Active	$ 0	$ 0	$ 0
Service Retirees	246,781	83,476	330,256
Disabled Retirees	99,538	86,922	186,460
Beneficiaries	68,900	61,635	130,535
Total Accrued Liability	$ 415,218	$ 232,033	$ 647,251

SECTION III – LIABILITIES

TABLE III-4
Development of Actuarial Gain / (Loss)
(in thousands)

1. Unfunded Actuarial Liability at Start of Year (not less than zero)	$	340,068
2. Employer Normal Cost at Start of Year		0
3. Interest on 1. and 2. to End of Year		20,404
4. Contributions and Miscellaneous Income for Prior Year		44,880
5. Administrative Expenses		(1,543)
6. Interest on 4. and 5. to End of Year		1,281
7. Change in Unfunded Actuarial Liability Due to Changes in Assumptions		(1,475)
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.]	$	314,379
12. Actual Unfunded Actuarial Liability at End of Year (not less than zero)		299,784
13. Unfunded Actuarial Liability Gain / (Loss) [11. – 12.]	$	14,595

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 2019-2020 Fiscal Year. The projected assets and liabilities assume that all actuarial assumptions are met and that contributions are made as expected between now and June 30, 2019.

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 2018-2019 Fiscal Year.

SECTION IV – CONTRIBUTIONS

TABLE IV-I
Development of Projected 2019-2020 Employer Contribution Amount
(in thousands)

	Actuarial Value of Assets	Market Value of Assets
1. Value of Assets at June 30, 2018:	$ 347,467	$ 375,976
a. Expected Contributions and Misc Income	$ 44,821	$ 44,821
b. Expected Administrative Expense	$ (1,007)	$ (1,007)
c. Expected Benefit Payments	$ (56,825)	$ (56,825)
d. Expected Investment Earnings	$ 20,463	$ 22,174
2. Expected Value of Assets at June 30, 2019:	$ 354,920	$ 385,140
a. Excess of Expected MVA over Expected AVA	$ 30,220	
b. Preliminary AVA [Expected AVA + 20% * 2a]	$ 360,964	
c. 90% of Expected MVA	$ 346,626	
d. 110% of Expected MVA	$ 423,654	
3. Final Expected AVA [2b, not less than 2c or greater than 2d]	$ 360,964	$ 385,140
4. Entry Age Liability at June 30, 2018	$ 647,251	$ 647,251
5. Expected Benefit Payments	$ (56,825)	$ (56,825)
6. Expected Interest	$ 37,155	$ 37,155
7. Expected Entry Age Liability at June 30, 2019	$ 627,581	$ 627,581
8. Projected Unfunded Actuarial Liability: (7) - (3)	266,617	242,442
9. Funded Ratio: (3) / (7)	57.5%	61.4%
10. Unfunded Actuarial Liability Amortization at Middle of Year as a Level Percentage of Payroll (7 Years Remaining) as of June 30, 2019	42,373	38,531
11. Expected Administrative Expenses for Fiscal 2018-2019	1,036	1,036
12. Total Contribution: (10) + (11)	43,409	39,567

SECTION V – HEADCOUNT AND BENEFIT PAYMENT PROJECTIONS

Table V-1
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)
2019	492.0	$ 34,331	345.0	$ 22,493	837.0	56,825
2020	477.2	$ 33,594	326.3	$ 21,834	803.5	55,428
2021	462.3	$ 33,229	308.3	$ 21,362	770.6	54,592
2022	447.4	$ 32,983	291.1	$ 20,747	738.5	53,731
2023	432.4	$ 32,850	274.6	$ 20,125	707.0	52,975
2024	417.3	$ 32,668	258.8	$ 19,499	676.2	52,167
2025	402.3	$ 32,353	243.6	$ 18,868	645.9	51,221
2026	387.2	$ 31,979	229.1	$ 18,229	616.2	50,208
2027	372.0	$ 31,538	215.1	$ 17,581	587.0	49,119
2028	356.6	$ 31,023	201.6	$ 16,919	558.1	47,942
2029	341.0	$ 30,425	188.5	$ 16,243	529.5	46,668
2030	325.1	$ 29,735	176.0	$ 15,551	501.0	45,286
2031	308.8	$ 28,948	163.8	$ 14,839	472.6	43,787
2032	292.3	$ 28,056	152.0	$ 14,108	444.3	42,163
2033	275.3	$ 27,056	140.5	$ 13,356	415.8	40,411
2034	258.0	$ 25,948	129.4	$ 12,584	387.4	38,532
2035	240.4	$ 24,737	118.6	$ 11,795	359.0	36,531
2036	222.7	$ 23,428	108.1	$ 10,991	330.8	34,419
2037	204.9	$ 22,033	98.0	$ 10,178	302.8	32,211
2038	187.1	$ 20,566	88.2	$ 9,361	275.3	29,927
2039	169.5	$ 19,043	78.9	$ 8,547	248.4	27,590
2040	152.4	$ 17,484	70.0	$ 7,744	222.4	25,228
2041	135.7	$ 15,911	61.7	$ 6,961	197.4	22,873
2042	119.9	$ 14,348	53.9	$ 6,206	173.7	20,554
2043	104.8	$ 12,816	46.6	$ 5,486	151.4	18,302
2044	90.8	$ 11,336	40.0	$ 4,808	130.8	16,144
2045	77.9	$ 9,927	34.0	$ 4,178	111.9	14,104
2046	66.1	$ 8,603	28.7	$ 3,599	94.8	12,202
2047	55.5	$ 7,379	24.0	$ 3,074	79.5	10,452
2048	46.1	$ 6,261	19.9	$ 2,603	66.0	8,864

SECTION V – HEADCOUNT AND BENEFIT PAYMENT PROJECTIONS

Table V-1
Benefit Payment and Headcount Projection (Continued)

Fiscal Year Ending June 30,	Police		Fire		Total	
	Count	Benefits (in thousands)	Count	Benefits (in thousands)	Count	Benefits (in thousands)
2049	37.9	$ 5,258	16.3	$ 2,186	54.2	7,444
2050	30.9	$ 4,369	13.3	$ 1,821	44.1	6,190
2051	24.9	$ 3,594	10.7	$ 1,505	35.5	5,100
2052	19.8	$ 2,927	8.6	$ 1,236	28.4	4,163
2053	15.6	$ 2,361	6.8	$ 1,008	22.4	3,369
2054	12.2	$ 1,886	5.4	$ 817	17.6	2,703
2055	9.5	$ 1,494	4.2	$ 659	13.7	2,152
2056	7.3	$ 1,173	3.3	$ 528	10.5	1,701
2057	5.5	$ 914	2.5	$ 421	8.1	1,335
2058	4.2	$ 708	1.9	$ 334	6.1	1,042
2059	3.1	$ 545	1.5	$ 264	4.6	809
2060	2.3	$ 417	1.1	$ 208	3.5	624
2061	1.7	$ 317	0.9	$ 162	2.6	479
2062	1.3	$ 239	0.6	$ 126	1.9	365
2063	0.9	$ 179	0.5	$ 97	1.4	275
2064	0.7	$ 132	0.4	$ 73	1.0	206
2065	0.5	$ 97	0.3	$ 55	0.7	152
2066	0.3	$ 70	0.2	$ 41	0.5	111
2067	0.2	$ 50	0.1	$ 29	0.4	79
2068	0.2	$ 34	0.1	$ 21	0.3	55
2069	0.1	$ 23	0.1	$ 14	0.2	37
2070	0.1	$ 14	0.0	$ 9	0.1	24
2071	0.0	$ 9	0.0	$ 6	0.1	15
2072	0.0	$ 5	0.0	$ 4	0.0	8
2073	0.0	$ 2	0.0	$ 2	0.0	4
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
2077	0.0	$ 0	0.0	$ 0	0.0	0
2078	0.0	$ 0	0.0	$ 0	0.0	0

APPENDIX A – MEMBERSHIP INFORMATION

Summary of Participant Data as of

	July 1, 2017			July 1, 2018		
Active Participants	**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	260	120	380	250	110	360
Average Age	74.3	80.2	76.1	75.0	80.8	76.8
Average Annual Benefit	$72,011	$73,308	$72,420	$77,420	$77,216	$77,358
Disabled Retirees						
Number	117	114	231	109	101	210
Average Age	73.8	75.6	74.6	74.2	75.6	74.9
Average Annual Benefit	$68,956	$68,799	$68,879	$73,959	$72,635	$73,322
Beneficiaries						
Number	139	136	275	133	134	267
Average Age	80.6	83.9	82.2	80.5	83.4	82.0
Average Annual Benefit	$52,291	$51,846	$52,071	$55,952	$54,306	$55,126
All Inactives						
Number	516	370	886	492	345	837
Average Age	75.9	80.1	77.6	76.3	80.3	77.9
Average Annual Benefit	$66,006	$64,030	$65,181	$70,850	$66,976	$69,253

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

APPENDIX A – MEMBERSHIP INFORMATION

Changes in Plan Membership: Police

	Actives	Service Retirees	Disabled Retirees	Beneficiaries	Total
July 1, 2017	0	260	117	139	516
Retired	0	0	0	0	0
Disabled	0	0	0	0	0
Deceased	0	(10)	(8)	(12)	(30)
New Beneficiary	0	0	0	6	6
July 1, 2018	**0**	**250**	**109**	**133**	**492**

Changes in Plan Membership: Fire

	Actives	Service Retirees	Disabled Retirees	Beneficiaries	Total
July 1, 2017	0	120	114	136	370
Retired	0	0	0	0	0
Disabled	0	0	0	0	0
Deceased	0	(10)	(13)	(15)	(38)
New Beneficiary	0	0	0	13	13
July 1, 2018	**0**	**110**	**101**	**134**	**345**

Changes in Plan Membership: All

	Actives	Service Retirees	Disabled Retirees	Beneficiaries	Total
July 1, 2017	0	380	231	275	886
Retired	0	0	0	0	0
Disabled	0	0	0	0	0
Deceased	0	(20)	(21)	(27)	(68)
New Beneficiary	0	0	0	19	19
July 1, 2018	**0**	**360**	**210**	**267**	**837**

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	2	$180,986	0	$0	2	$180,986
65-69	43	$3,432,355	5	$293,341	48	$3,725,697
70-74	97	$7,193,936	30	$2,235,561	127	$9,429,496
75-79	72	$5,391,215	24	$1,872,484	96	$7,263,698
80-84	16	$1,484,219	18	$1,473,484	34	$2,957,703
85-89	10	$761,713	12	$864,969	22	$1,626,682
90-94	8	$744,746	15	$1,286,872	23	$2,031,617
95-99	2	$165,871	6	$467,041	8	$632,911
100+	0	$0	0	$0	0	$0
Total	250	$19,355,040	110	$8,493,751	360	$27,848,791

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	0	$0	0	$0	0	$0
65-69	18	$1,374,158	18	$1,173,872	36	$2,548,029
70-74	51	$3,662,356	38	$2,664,960	89	$6,327,317
75-79	25	$1,817,543	26	$1,921,611	51	$3,739,154
80-84	12	$907,855	9	$777,041	21	$1,684,896
85-89	2	$185,176	8	$671,763	10	$856,939
90-94	1	$114,473	2	$126,839	3	$241,312
95-99	0	$0	0	$0	0	$0
100+	0	$0	0	$0	0	$0
Total	109	$8,061,561	101	$7,336,085	210	$15,397,647

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	$116,871	1	$81,377	3	$198,248
60-64	4	$239,806	4	$202,166	8	$441,973
65-69	13	$702,921	12	$706,884	25	$1,409,805
70-74	28	$1,446,498	13	$711,007	41	$2,157,505
75-79	20	$1,018,632	16	$827,609	36	$1,846,241
80-84	14	$870,859	22	$1,191,379	36	$2,062,238
85-89	19	$1,148,869	26	$1,217,755	45	$2,366,624
90-94	25	$1,425,349	29	$1,662,162	54	$3,087,511
95-99	7	$395,347	7	$355,737	14	$751,084
100+	1	$76,482	4	$320,966	5	$397,448
Total	133	$7,441,635	134	$7,277,041	267	$14,718,675

APPENDIX B – STATEMENT OF ACTUARIAL ASSUMPTIONS AND METHODS

The assumptions and methods used in the actuarial valuation as of July 1, 2018 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 2019-2020 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.

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, 2014 through June 30, 2017 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 February 28, 2018.

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 5.50%.

Benefit Payment Year	Expected Return
2018-2026	6.000%
2027	5.725%
2028	5.450%
2029	5.175%
2030	4.900%
2031	4.625%
2032	4.350%
2033	4.075%
2034	3.800%
2035	3.525%
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 $1,007,070, growing at 2.85% per year.

4. Cost-of-Living Adjustments and Long-Term Salary Increases

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

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 contract that expires on June 30, 2023, and the Fire contract which expires on October 31, 2020. All increases shown after those dates are assumptions (we have an assumed a 3.25% increase for Fire will occur in FY2020-21).

Post-Retirement Benefit Increases (Based on Salary Increases for Rank at Retirement)		
Date of Increase	Police	Fire
November 1, 2018	0.00%	1.00%
January 1, 2019	2.50%	1.00%
November 1, 2019	0.00%	2.00%
July 1, 2020	2.50%	3.25%
July 1, 2021	3.00%	3.25%
July 1, 2022	3.50%	3.25%
July 1, 2023	3.50%	3.25%
Annual Increases Starting July 1, 2024	3.25%	3.25%

5. Longevity Pay for Fire Retirees

Longevity Pay payments for Fire retirees are assumed to be the dollar amount below multiplied by the retiree's benefit percentage at retirement. Surviving spouses are assumed to receive the same payment, multiplied by their assumed continuance percentage.

Benefit Payment Year	Fire Longevity Pay
2019	$ 1,250
2020	$ 1,300
2021+	$ 1,350

6. Rates of Termination

None

7. Rates of Disability

None

APPENDIX B – STATEMENT OF ACTUARIAL ASSUMPTIONS AND METHODS

8. Rates of Retirement

None

9. Rates of Mortality for Healthy Lives

CalPERS Healthy Annuitant Table from the 2012-2015 experience study, excluding the 15-year projection using 90% of Scale MP-2016.

10. Rates of Mortality for Disabled Retirees

CalPERS Industrial Disability Mortality Table from the 2012-2015 experience study, excluding the 15-year projection using 90% of Scale MP-2016.

11. Mortality Improvement

The mortality tables are projected to improve with MP-2017 generational mortality improvement tables, with improvements projected from a base year of 2014 (the mid-point of the CalPERS base tables).

12. 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.

13. Changes in Assumptions Since the Last Valuation

New Memorandums of Understanding (MOUs) went into effect for Police and Fire members after the previous valuation, changing Police and Fire retirees' Cost-of-Living Adjustments (COLAs) and adding benefits tied to Longevity Pay for Fire retirees. No other changes have been made to the actuarial assumptions.

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).

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

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 that 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.

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.

APPENDIX D – GLOSSARY

9. Amortization Payment

The portion of the pension plan contribution that 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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