MCERA INVESTMENT RETIREMENT BOARD AGENDA
THURSDAY, FEBRUARY 27, 2020
MERCED COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
3199 M STREET, MERCED, CA 95348

Please turn your cell phone or other electronic device to non-audible mode.

CALL TO ORDER: 8:15 A.M.

- ROLL CALL.
- APPROVAL OF MINUTES – February 13, 2020.

PUBLIC COMMENT

Members of the public may comment on any item under the Board's jurisdiction. Matters presented under this item will not be discussed or acted upon by the Board at this time. For agenda items, the public may make comments at the time the item comes up for Board consideration. Persons addressing the Board will be limited to a maximum of five (5) minutes in total. Please state your name for the record.

CLOSED SESSION

As provided in the Ralph M. Brown Act, Government Code sections 54950 et seq., the Board may meet in closed session with members of its staff, county employees and its attorneys. These sessions are not open to the public and may not be attended by members of the public. The matters the Board will meet on in closed session are identified below. Any public reports of action taken in the closed session will be made in accordance with Government Code sections 54957.1.

(1) **DISCUSSION AND POSSIBLE ACTION REGARDING THREAT TO PUBLIC SERVICES OR FACILITIES** (Govt. Code § 54957)
Consultation with Plan Administrator and Benefits and Administrative Manager.

RETURN TO OPEN SESSION

Report on any action taken in closed session.

BOARD ACTION[1]/DISCUSSION

Pursuant to Govt. Code § 31594 and MCERA's Investment Objectives & Policy Statement due diligence analysis requirement:

1. Discussion and possible action to approve MCERA's annual actuarial valuation and experience study as of June 30, 2019 - Cheiron.
2. Presentation and discussion of the 2019/2020 Quarterly and Monthly Investment Performance Report with update on capital markets and quarter lag reporting for private markets with possible board action on any item or funds/managers – Meketa.
3. Discussion and possible action to approve staff to execute contract with CPAS to enter the CPAS cloud – Staff.

[1] "Action" means that the Board may dispose of any item by any action, including but not limited to the following acts: approve, disapprove, authorize, modify, defer, table, take no action, or receive and file.

4. Discussion and possible action to approve MCERA's Investment Policy Statement with updated benchmarks per Meketa's recommendation at the January 23, 2020 Investment meeting – Staff.
5. Discussion and possible action on update of property purchase located at 690 W. 19th Street, Merced, CA – Staff.
6. Review calendar of any training sessions and authorize expenditures for Trustees and Plan Administrator. Pursuant to Govt. Code § 31522.8 and MCERA's Trustees Education and Training Policy requirements. Examples of upcoming training and educational sessions:
    a. Carmel Partners Annual Investors Conference, March 5-6, 2020, San Francisco, CA.
    b. CALAPRS General Assembly, March 7-10, 2020, Rancho Mirage, CA.
    c. TCV Annual Investor Meeting, March 24, 2020, San Francisco, CA.
    d. Advanced Principles of Pension Management for Trustees, March 30–April 1, 2020, Los Angeles, CA.
    e. Pension Bridge Annual Conference, April 14-15, 2020, San Francisco, CA.
    f. NCPERS Trustee Educational Seminal, May 9-10, 2020, Las Vegas, NV.
    g. NCPERS Accredited Fiduciary Program (Modules 1&2 and 3&4), May 9-10, 2020, Las Vegas, NV.
    h. NCPERS Annual Conference & Exhibition, May 10-13, 2020, Las Vegas, NV.
    i. SACRS Spring Conference, May 12-15, 2020, San Diego, CA.
    j. 2020 PIMCO Institute, Newport Beach, CA: June 8-11, 2020 or October 19-22, 2020.
    k. KKR's 2020 Global Investor Meeting, July 29 – July 1, 2020, Rancho Palos Verdes, CA.
    l. SACRS Public Pension Investment Management Program, July 26-29, 2020, Berkeley, CA.
    m. Principles of Pension Governance for Trustees, August 25-28, 2020 Malibu, CA.
    n. Nossaman Fiduciary Forum, October 1-2, 2020, Los Angeles, CA.
    o. SACRS Fall Conference, November 10-13, 2020, Indian Wells, CA.

INFORMATION ONLY

Investment Subcommittee meeting immediately following regular investment meeting.

MCERA Upcoming Board Meetings:

Please note: The MCERA Board Meeting and/or Education Day times and dates may be changed in accordance with the Ralph M. Brown Act by the MCERA Board as required.

- March 12, 2020
- March 26, 2020

ADJOURNMENT

All supporting documentation is available for public review in the office of the Merced County Employees' Retirement Association, 3199 M Street, Merced, California, 95348 during regular business hours, 8:00 a.m. – 5:00 p.m., Monday through Friday.

The agenda is available online at www.co.merced.ca.us/retirement

Any material related to an item on this Agenda submitted to the Merced County Employees' Retirement Association, after distribution of the Agenda packet is available for public inspection in the office of the Merced County Employees' Retirement Association.

Persons who require accommodation for a disability in order to review an agenda, or to participate in a meeting of the Merced County Employees' Retirement Association per the American Disabilities

Act (ADA), may obtain assistance by requesting such accommodation in writing addressed to Merced County Employees' Association, 3199 M Street, Merced, CA 95348 or telephonically by calling (209) 726-2724. Any such request for accommodation should be made at least 48 hours prior to the scheduled meeting for which assistance is requested.

Minutes

MCERA RETIREMENT BOARD MEETING AGENDA
THURSDAY, FEBRUARY 13, 2020
MERCED COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
3199 M STREET, MERCED, CA 95348

ROLL CALL: 8:15 A.M.

Board Members Present: Ryan Paskin, Scott Johnston, Al Peterson, David Ness, Darlene Ingersoll *(left at 10:25 A.M.)*, Jason Goins, Kalisa Rochester, Scott Silveira *(left at 10:43 A.M.)*, Karen Adams, Michael Rhodes and Janey Cabral. ***Counsel:*** Forrest Hansen. ***Staff:*** Kristen Santos, Alexis Curry, Mark Harman, Ninebra Maryoonani, Brenda Mojica and Sheri Villagrana. *(Trustee Kalisa Rochester voted for Trustee Darlene Ingersoll after departure).*

APPROVAL OF MINUTES: 01/23/2020
Motion to approve the January 23, 2020 meeting minutes with note that Trustee Rochester voted for Trustee Ingersoll (absent).
Silveira/Goins U/A (9-0)

PUBLIC COMMENT

None.

CLOSED SESSION

The meeting went into closed session.

RETURN TO OPEN SESSION

DISABILITY RETIREMENT APPLICATIONS: PERSONNEL EXCEPTION
(Govt. Code §54957, 31532; Cal Const. art. I, § 1)
Motion to grant a non-service connected disability and deny a service connected disability for Linda Ramirez.
Cabral/Ingersoll U/A (9-0)

CONSENT CALENDAR

RETIREMENTS: Pursuant to Govt. Code § 31663.25 or § 31672
All items of earnable compensation for service or disability retirements listed below are in compliance with the pay code schedule approved by the Board of Retirement. The retirement is authorized; however, administrative adjustments may be necessary to alter the amount due to: audit, late arrival of data, court order, etc.

a.	Maravilla, Maria	HSA	11 Yrs. Svc.	Eff. 01/14/2020
b.	Sanchez, Gustavo	Beh. Health	14 Yrs. Svc.	Eff. 01/20/2020
c.	Berber, Jubenal	Sheriffs Dept.	17 Yrs. Svc.	Eff. 01/16/2020
d.	Pacheco, Jeannette	Admin Svcs	26 Yrs. Svc.	Eff. 01/18/2020
e.	Tapia, Nancy	Health Dept.	21 Yrs. Svc.	Eff. 02/01/2020

f. Flores, Pamela Animal Control 13 Yrs. Svc. Eff. 01/02/2020

YTD fiscal year 2018/2019 retirees: 57
YTD fiscal year 2017/2018 retirees: 082
YTD fiscal year 2016/2017 retirees: 065

REFUND OF SERVICE PURCHASE: None
DEATH BENEFIT: Patricia McDermott
MONTHLY BUDGET REPORT: Submitted

Motion to approve Consent Calendar.
Adams/Cabral U/A (9-0)

BOARD ACTION[1]/DISCUSSION
Action items were re-ordered by the Board Chair.

1. Discussion and possible action on proposed draft building plans to determine feasibility for a single tenant building located at the vacant lot at 690 W. 19th Street, in Merced – Staff. **No action taken**.
2. Discussion and possible action on IS support person with the County of Merced – Staff. **The MCERA board motioned to table this discussion to a future regular meeting while staff obtains more information. Silveira/Peterson U/A (9-0)**
3. Discussion and possible action to approve Cost of Living (COLA) for Tier 1 members, effective April 1, 2020 – Staff
The MCERA board voted to approve 2.5% Cost of Living (COLA) for Tier 1 members, effective April 1, 2020. Ness/Cabral (Trustees Michael Rhodes and Scott Johnston recused themselves from voting) (8-0)
4. Discussion and possible action to approve pay codes as proposed by the Merced County Superior Courts and the County of Merced – Staff.
The MCERA board voted to adopt 5 pay codes as recommended by staff.
Ness/Silveira U/A (9-0)
5. Discussion and possible action to approve CPAS Data Cleansing and Training plan for MCERA – Staff.
The MCERA board voted to authorize the Plan Administrator to sign the contract with CPAS for data cleansing and a training plan for MCERA. Adams/Cabral U/A (8-0)
6. Discussion and possible action to work with Merced County purchasing to use another 1937 Act RFP for a new branding and website design – Staff.
The MCERA board voted for MCERA to "piggy back" off of another system (San Bernardino County Employees' Retirement Association) branding and website design then bring back a final bid to MCERA Board. Rhodes/Adams U/A (8-0)
7. Discussion and possible action for Trustees to apply for an elected seat on the SACRS Board – Staff.
No action taken.
8. Discussion on SACS Leg Update – Staff
No action taken.
9. Review calendar of any training sessions and authorize expenditures for Trustees and Plan Administrator. Pursuant to Govt. Code § 31522.8 and MCERA's Trustees Education and Training Policy requirements. Examples of upcoming training and educational sessions:

[1] "Action" means that the Board may dispose of any item by any action, including but not limited to the following acts: approve, disapprove, authorize, modify, defer, table, take no action, or receive and file.

a. 2020 PIMCO Institute, Newport Beach, CA: February 24-27, 2020 <u>or</u> June 8-11, 2020 <u>or</u> October 19-22, 2020.
b. Carmel Partners Annual Investors Conference, March 5-6, 2020, San Francisco, CA.
c. CALAPRS General Assembly, March 7-10, 2020, Rancho Mirage, CA.
d. TCV Annual Investor Meeting, March 24, 2020, San Francisco, CA.
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m. Principles of Pension Governance for Trustees, August 25-28, 2020 Malibu, CA.
n. Nossaman Fiduciary Forum, October 1-2, 2020, Los Angeles, CA.
o. SACRS Fall Conference, November 10-13, 2020, Indian Wells, CA.

The MCERA board voted to approve the following travel:

- **Trustees Scott Silveira and Janey Cabral to attend the Advance Principles of Pension Management for Trustees.**
- **Trustee Kalisa Rochester to attend the NCPERS Accredited Fiduciary Program.**
- **Plan Administrator, Kristie Santos to attend SACRS Spring Conference.**
- **Trustee Ness will no longer be able to attend SACRS Spring Conference.**

Rhodes/Ness U/A (8-0)

<u>INFORMATION ONLY</u>

All rebalancing trades have been completed – Mark Harmen, Fiscal Manager.

<u>ADJOURNMENT</u>

The meeting adjourned at 10:57 A.M

Respectfully submitted,

____
Ryan Paskin, Chair

____
Al Peterson, Secretary

____
Date

Classic Values, Innovative Advice

Item 1

Merced County Employees' Retirement Association

Actuarial Valuation Report as of June 30, 2019

Produced by Cheiron

February 2020

www.cheiron.us 1.877.CHEIRON (243.4766)

TABLE OF CONTENTS

February 20, 2020

Retirement Board of Merced
County Employees' Retirement Association
3199 M Street
Merced, CA 95348

Dear Members of the Board:

At your request, we have conducted an actuarial valuation of the Merced County Employees' Retirement Association (MCERA, the Fund, the Plan) as of June 30, 2019. This report contains information on the Plan's assets, liabilities, and discloses employer and employee contribution levels. 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 MCERA. This report is for the use of the Retirement Board of MCERA and its 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.

This report was prepared for the Retirement Board of MCERA for the purposes described herein and for the use by the plan auditor in completing an audit related to the matters herein. Other users of this valuation report are not intended users as defined in the Actuarial Standards of Practice, and Cheiron assumes no duty or liability to such other users.

This report and its contents have been prepared in accordance with generally recognized and accepted actuarial principles and practices and our understanding of the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board as well as applicable laws and regulations. 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, FCA, MAAA, EA
Consulting Actuary

Anne D. Harper, FSA, MAAA, EA
Principal Consulting Actuary

FOREWORD

Cheiron has performed the actuarial valuation of the Merced County Employees' Retirement Association as of June 30, 2019. 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 – Identification and Assessment of Risks
    - Section III – Assets
    - Section VI – Liabilities
    - Section V – Contributions
    - Section VI – Comprehensive Annual Financial Reporting Information

- 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), tables containing member contribution rates (Appendix D), and a glossary of key actuarial terms (Appendix E).

Future results may differ significantly from the current results presented in this valuation report due to such factors as the following: plan experience differing from that anticipated by the assumptions; changes in assumptions; and, changes in plan provisions or applicable law.

In preparing our report, we relied on information (some oral and written) supplied by the MCERA 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,
- Employer and employee contribution rates for Fiscal Year 2021,
- An assessment and disclosure of key risks, and
- Information required by the GFOA for the Comprehensive Annual Financial Report.

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 determines the employer contributions for the fiscal year ending June 30, 2021. The Plan's funding policy is to collect contributions from the employers and employees equal to the sum of:

- The normal cost under the Entry Age Normal Cost Method,
- Amortization of the Unfunded Actuarial Liability, and
- The Plan's expected administrative expenses.

The Unfunded Actuarial Liability payment is determined as the amount needed to fund the outstanding Unfunded Actuarial Liability (UAL). The UAL as of June 30, 2013 is amortized over a closed 16-year period. Effective with the June 30, 2014 valuation, any new sources of UAL due to actuarial gains and losses or method changes are amortized over a closed 24-year period, with a five-year ramp up period at the beginning of the period, a four-year ramp down at the end of the period, and 15 years of level payments as a percentage of payroll between the ramping periods. Assumption changes will be amortized over a closed 22-year period, with a three-year ramp up period, two-year ramp down period, and 17 years of level payments as a percentage of payroll. This amortization method is similar to a traditional five or three year asset smoothing and a 20-year amortization period with level payments as a percentage of payroll. The Board also adopted a policy to replace the smoothed Actuarial Value of Assets with the Market Value of Assets for valuation purposes. These amortization and funding policies in conjunction are a type of policy known as direct rate smoothing.

Experience studies are performed every three years. This valuation was performed on the basis of the economic and demographic assumptions and methods that were determined in the Actuarial Experience Study dated February 2020. A summary of the assumptions and methods used in the current valuation is shown in Appendix B.

SECTION I – EXECUTIVE SUMMARY

This valuation was prepared based on the Plan provisions shown in Appendix C. Employee contribution rates are shown in Appendix D. The rates for PEPRA members will be recomputed each year to be one-half of the total normal cost rate.

B. Key Findings of this Valuation

The following discussion summarizes the key results of the June 30, 2019 valuation and how they compare to the results from the June 30, 2018 valuation.

Summary of Key Valuation Results

Table I-1 summarizes the key results of the valuation with respect to assets, liabilities, and contributions.

Table I-1
Merced County Employees' Retirement Association
Summary of Key Valuation Results
(in millions)

Valuation Date Fiscal Year End	June 30, 2019 2021	June 30, 2018 2020
Actuarial Liability	$ 1,370.2	$ 1,301.9
Market Value of Assets	866.5	826.7
Unfunded Actuarial Liability	$ 503.7	$ 475.3
Funded Ratio	63.2%	63.5%
Net Employer Contribution Rate	51.25%	49.15%

More discussion of the factors that affected these results can be found in the remainder of this section, but some key points are as follows:

- The employer contribution rate increased from 49.15% to 51.25%.
- The Unfunded Actuarial Liability (UAL) is the excess of the Plan's Actuarial Liability over the Market Value of Assets. The Plan's UAL increased from $475.3 million to $503.7 million. This increase in UAL was primarily due to investment losses from assets and assumption changes (including a reduction in the discount rate from 7.25% to 7.00%).
- The Plan's funded ratio, the ratio of market assets over Actuarial Liability, decreased from 63.5% last year to 63.2% as of June 30, 2019.

SECTION I – EXECUTIVE SUMMARY

Plan Membership

Table I-2 summarizes Plan membership as of June 30, 2019 and June 30, 2018. More detailed membership statistics are shown in Appendix A.

Table I-2
Membership Total

Item	June 30, 2019	June 30, 2018	% Change
Actives	2,177	2,149	1.3%
Deferred Members	942	850	10.8%
Retired Members	2,373	2,310	2.7%
Total Members	5,492	5,309	3.4%
Active Member Payroll	$ 142,328,413	$ 137,667,629	3.4%
Average Pay per Active	65,378	64,061	2.1%

Some key points are as follows:

- Total Plan membership increased by 3.4%, mostly driven by the increase in deferred members, in particular non-vested members who have left their contributions on account. The active membership count increased by 1.3%, deferred membership increased by 10.8%, and retired membership increased by 2.7%.

- The pay figures reflect the annualized rate as of June 30, plus expected increases for the upcoming year. Total payroll increased by 3.4% compared to the assumed payroll growth of 2.75% while the average pay per active member increased by 2.1%.

SECTION I – EXECUTIVE SUMMARY

Components of UAL Change between June 30, 2018 and June 30, 2019

Table I-3 is a detailed reconciliation of the components that affected the UAL between June 30, 2018 and June 30, 2019.

Table I-3
Change in Unfunded Actuarial Liability

Experience		in millions
Unfunded actuarial liability, 6/30/2018	$	475.3
Expected change in unfunded actuarial liability	$	(21.0)
Unfunded increase due to investment losses		20.2
Unfunded increase due to contributions less than expected		1.5
Unfunded increase due to liability loss		7.0
Unfunded increase due to assumption changes		20.7
Total change in unfunded actuarial liability		28.4
Unfunded actuarial liability, 6/30/2019	$	503.7

The Plan's UAL increased from $475.3 million as of June 30, 2018 to$503.7 million as of June 30, 2019. As shown above, the largest contributing factors were investment losses of $20.2 million and assumption change losses of $20.7 million, offset by UAL contributions which paid off $21.0 million of principal on the UAL. Contributions less than expected increased the UAL by $1.5 million. There were losses on Actuarial Liabilities of $ 7.0 million, most of which was from cost-of-living adjustments for Tier 1 retirees that were higher than assumed.

Employer Contribution Reconciliation

Table I-4 is a detailed reconciliation between the Fiscal Year 2020 and Fiscal Year 2021 employer contribution rates, in total and by component.

Table I-4
Employer Contribution Reconciliation

Item	Total	Normal Cost	Amortization	Expenses
FYE 2020 Net Employer Contribution Rate	49.15%	8.78%	38.93%	1.44%
Expected Change due to phase-in	0.83%	0.00%	0.83%	0.00%
Change due to investment loss	0.23%	0.00%	0.23%	0.00%
Change due to contributions less than expected	0.02%	0.00%	0.02%	0.00%
Change due to PEPRA new hires	-0.23%	-0.23%	0.00%	0.00%
Change due to liability changes	0.17%	0.09%	0.08%	0.00%
Change due to effect of payroll on amort / expense	-0.06%	0.00%	-0.04%	-0.02%
Change due to change in assumptions	1.14%	1.43%	-0.29%	0.00%
Total change	2.10%	1.29%	0.83%	-0.02%
FYE 2021 Net Employer Contribution Rate	51.25%	10.07%	39.76%	1.42%

The employer contribution rate increased from 49.15% for Fiscal Year 2020 to 51.25% for Fiscal Year 2021:

- The phase-in of the net UAL experience from the last four years due to the direct rate smoothing method (based on net gains in FYE 2017 and FYE 2018, and net losses in FYE 2015 and FYE 2016, including assumption changes) increased the contribution rate by 0.83% this year. The expected phase-in for the 2020 valuation from previous years' gains and losses in addition to the new assumption change is 0.76%. However, the impacts of the prior bases on UAL rates are expected to be generally offsetting for the following few years.

- Any increases are expected to be partially offset by reductions in the employer normal cost rates, as more PEPRA members enter the system. For the current valuation, the replacement of legacy members by PEPRA members decreased the employer normal cost rate by about 0.23% of pay.

- The investment loss for the current fiscal year increased the current year contribution rate by 0.23% of pay. The assets of the Plan returned 4.81% (net of investment expenses) on a market basis, which is lower than the assumed rate of 7.25%. The amortization payment for the current year investment losses will continue to be phased-in over the next four years.

SECTION I – EXECUTIVE SUMMARY

- A larger than expected increase in the projected payroll decreased the employer contribution rate by 0.06% of pay, since it results in the Plan's Unfunded Actuarial Liability and administrative expenses being spread over a larger-than-anticipated payroll base.

- Contributions less than expected increased the employer contribution rate by 0.02% of pay, due to actual pensionable compensation being less than expected during FY2018-19.

- Demographic experience resulted in a net increase in cost of about 0.17% of pay, 0.09% of which was for changes in the employer normal cost rates within tiers and 0.08% of which was for changes in the UAL amortization payment. As with the investment losses, the changes in the UAL payment for demographic experience will continue to be phased-in over the next four years.

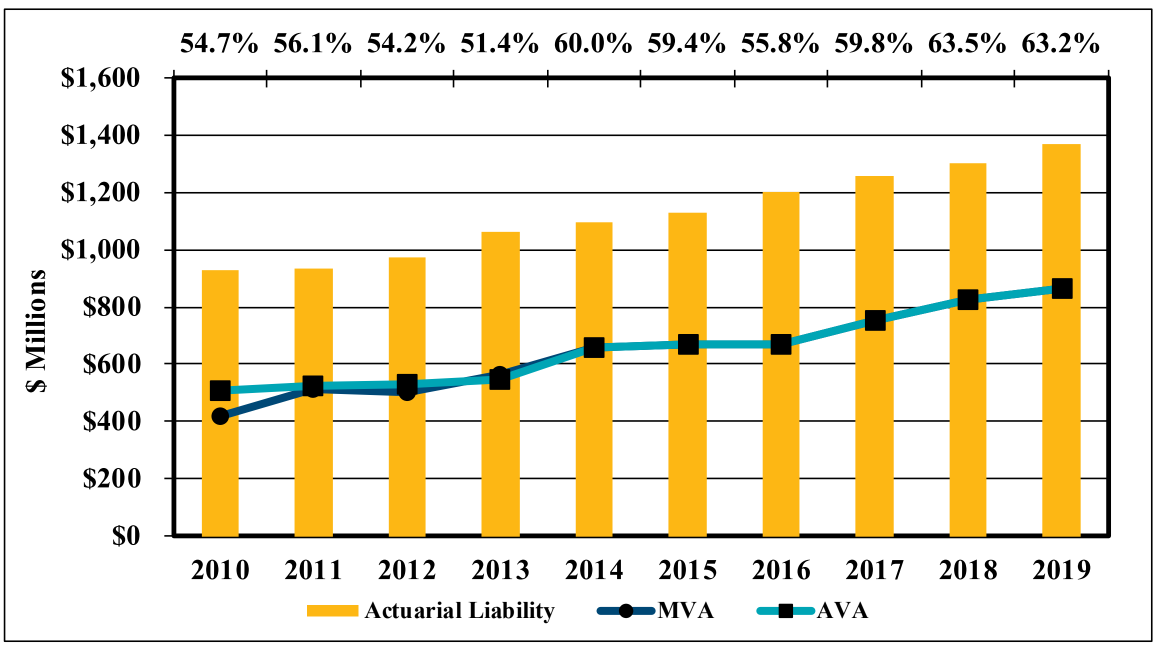
- The assumption changes from the experience study increased the employers' contribution rate by 1.14% of pay, 1.43% of which represented an increase in the employer normal cost rate. This was offset by a reduction in the current UAL rate by 0.29% of pay, driven by the recalculation of the amortization payments established for prior UAL bases under the new economic assumptions resulting in a lower effective interest rate. The UAL payments associated with the $21 million increase in liability resulting from the new assumptions (primarily the lower discount rate) will continue to be phased-in over the next two years.

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 following chart compares the Market Value of Assets (MVA) and Actuarial Value of Assets (AVA) to the Actuarial Liabilities. The percentage shown at the top of each bar is the ratio of the Actuarial Value of Assets to the Actuarial Liability (the funded ratio). Beginning June 30, 2014, the Actuarial Value of Assets is equal to the market value, and thus the funded ratios shown in 2014 and after are based on the Market Value of Assets. The funded ratio has increased from 54.7% in 2010 to 63.2% as of June 30, 2019.

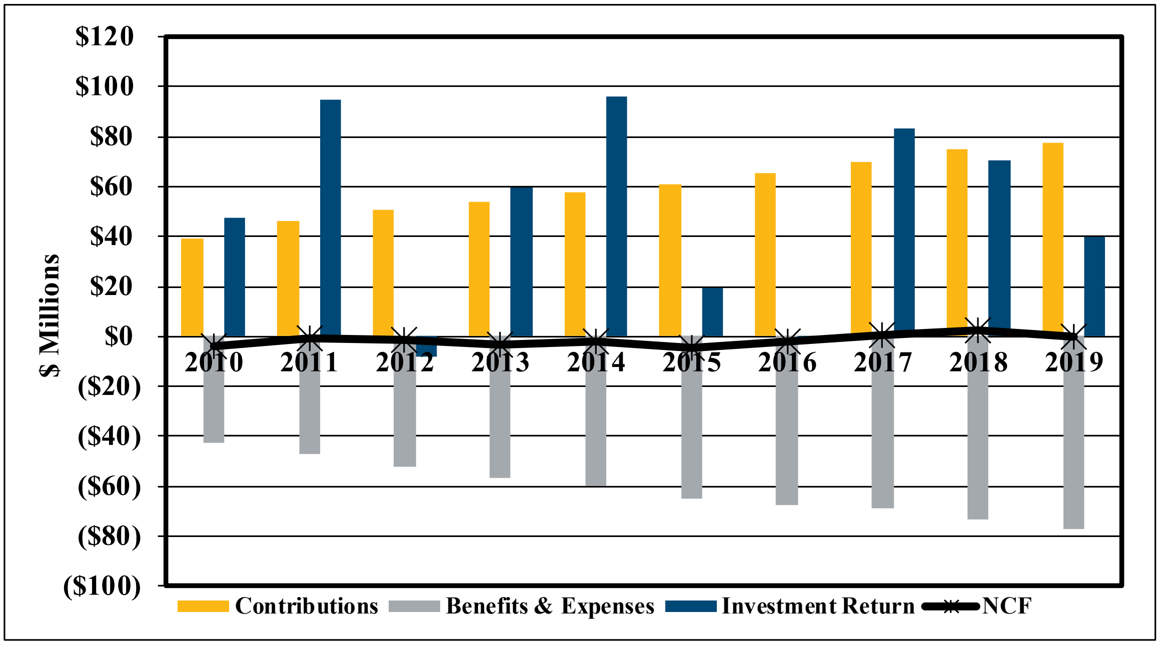


The extraordinary asset loss of 2008 adversely affected the funded ratio from 2010 to 2013. The 2014 funded ratio increased as a result of asset and liability gains in 2014, and as a result of resetting the Actuarial Value of Assets to the market value. The 2016 funded ratio decreased as a result of investment losses and assumption changes. The 2017 and 2018 funded ratios increased as a result of investment gains and contributions by the members and employers. The 2019 funded ratio remained relatively flat, with investment losses and assumption changes offsetting the progress expected due to contributions.

SECTION I – EXECUTIVE SUMMARY

Cash Flows

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



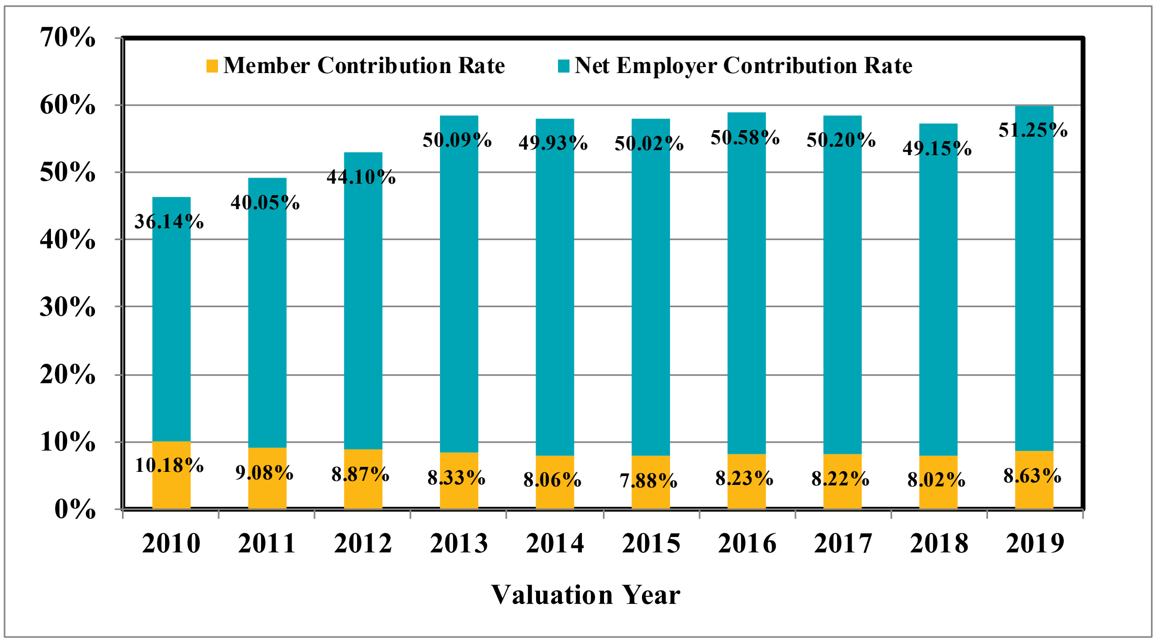
In the chart above, the contributions, outflows (benefit payments and expenses), and investment returns are shown as bars and the Plan's net cash flow (NCF) is shown as a black line. The NCF, which is equal to contributions less benefits and expenses, has been close to zero for the entire period shown. A plan in a significantly negative cash flow position magnifies the losses during a market decline hindering the Plan in its ability to absorb market fluctuations; however, this is not currently the case for MCERA.

SECTION I – EXECUTIVE SUMMARY

Contributions

The chart below shows the historical member and employer contribution rates. The steady increase in the employer contribution rate from 36.14% to 50.09% during 2010-2013 is a result of the 2008-2009 investment losses that were recognized over a 5-year period. Since 2013, the employer contribution rate has remained relatively stable. There was an increase in 2019 mostly due to assumption changes and the phase-in of the net UAL experience from the last four years due to the direct rate smoothing method.

With the implementation of PEPRA in 2013, the employee rates have gradually decreased since the contribution rates for PEPRA members are generally lower than the Non-PEPRA member rates. There was a slight increase in 2016 as projected mortality improvements increased. There was an increase in 2019 due to assumption changes.



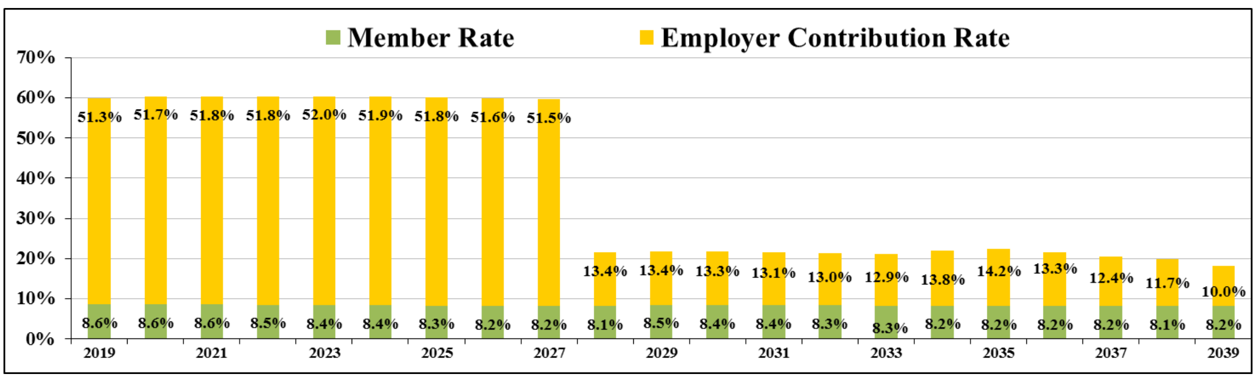
D. Future Expected Financial Trends

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 June 30, 2019 valuation results in terms of contributions and benefit security (assets compared to liabilities). All the projections in this section are based on the current interest rate assumption of 7.00%. We have assumed increases in future pensionable payroll of 2.75% per year.

Contribution Projections:

The following graph shows the expected employer and member contribution rates based on actually achieving the 7.00% assumption each year for the next 20 years, which is clearly impossible.

Projection of Employer and Member Contributions, 7.00% return each year



The graph above shows employer contributions peaking at 52.0% in the June 30, 2023 valuation (for Fiscal Year 2025), decreasing slightly in the subsequent years, and then dropping off significantly in 2028 once the amortization of the bulk of the Unfunded Actuarial Liability is complete.

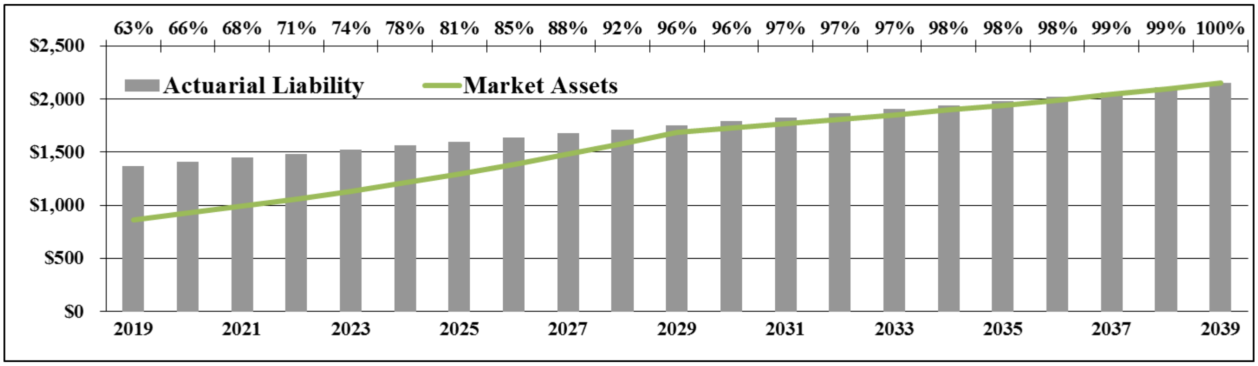
Note that the graph above does not forecast any actuarial gains or losses. Even relatively modest losses relative to the 7.00% assumed return could push the employer contribution rate above even higher in the next few years.

SECTION I – EXECUTIVE SUMMARY

Asset and Liability Projections:

The graph shows the projection of assets and liabilities assuming that assets will earn the 7.00% assumption each year during the projection period. The percentages along the top of the graph represent the funded ratio or status of the System.

Projection of Assets and Liabilities, 7.00% return each year



The graph shows that the projected funded status increases over the next 20 years to 100%, assuming the actuarial assumptions are achieved. However, as noted on the previous page, it is the actual return on plan assets that will determine the future funded status and contribution rates.

SECTION II – DISCLOSURE RELATED TO RISK

Actuarial valuations are based on a set of assumptions about future economic and demographic experience. These assumptions represent a reasonable estimate of future experience, but actual future experience will undoubtedly be different and may vary significantly. A new Actuarial Standard of Practice (ASOP 51) has been issued which requires actuaries to identify and assess risks that "may reasonably be anticipated to significantly affect the plan's future financial condition." This section of the report is intended to identify the primary risks to the Plan, provide some background information about those risks, and provide an assessment of those risks.

Identification of Risks

A fundamental risk to a pension plan is that the contributions needed to pay the benefits become unaffordable. While MCERA cannot determine on its own what contribution level is unaffordable, we can project expected contribution rates and illustrate the potential impact of key sources of risk on those contribution rates so the employers can assess affordability. While there are a number of factors that could lead to contribution amounts becoming unaffordable, we believe the primary risks are:

- Investment risk,
- Assumption change risk, and
- Contribution risk.

Other risks that we have not identified may also turn out to be important.

Investment Risk is the potential for investment returns to be different than expected. Lower investment returns than anticipated will increase the unfunded actuarial liability necessitating higher contributions in the future unless there are other gains that offset these investment losses. The potential volatility of future investment returns is determined by the Plan's asset allocation and the affordability of the investment risk is determined by the amount of assets invested relative to the size of the plan sponsors or other contribution base.

Assumption change risk is the potential for the environment to change such that future valuation assumptions are different than the current assumptions. For example, declines in interest rates over the last three decades resulted in higher investment returns for fixed income investments, but lower expected future returns necessitating either a change in investment policy, a reduction in discount rate, or some combination of the two. Assumption change risk is an extension of the other risks identified, but rather than capturing the risk as it is experienced, it captures the cost of recognizing a change in environment when the current assumption is no longer reasonable.

Contribution risk is the potential for actual future contributions to deviate from expected future contributions. There are different sources of contribution risk such as the sponsor failing to make contributions in accordance with the funding policy or the contribution requirement becoming such a financial strain on the sponsor as a result of material changes in the contribution base (e.g., covered employees, covered payroll) that affects the amount of contributions the Plan can collect.

SECTION II – DISCLOSURE RELATED TO RISK

The chart below shows the components contributing to the Unfunded Actuarial Liability (UAL) from June 30, 2009 through June 30, 2019. Over the last 10 years, the UAL has increased by approximately $177 million. The investment losses (gold bar) of $139 million on the actuarial value of assets (AVA), assumptions changes (purple bar) of $117 and liability losses (gray bar) of $12 million are the primary sources in the UAL growth. Contributions in excess of the "tread water" level (red bar) of $43 million and method changes (green bar) of $48 million have decreased the UAL since June 30, 2009.

Chart II-1

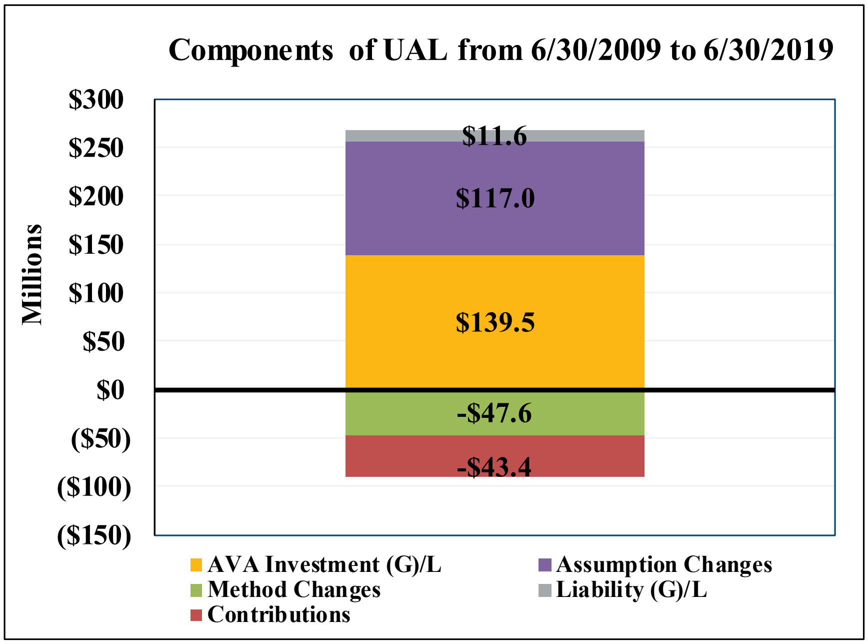
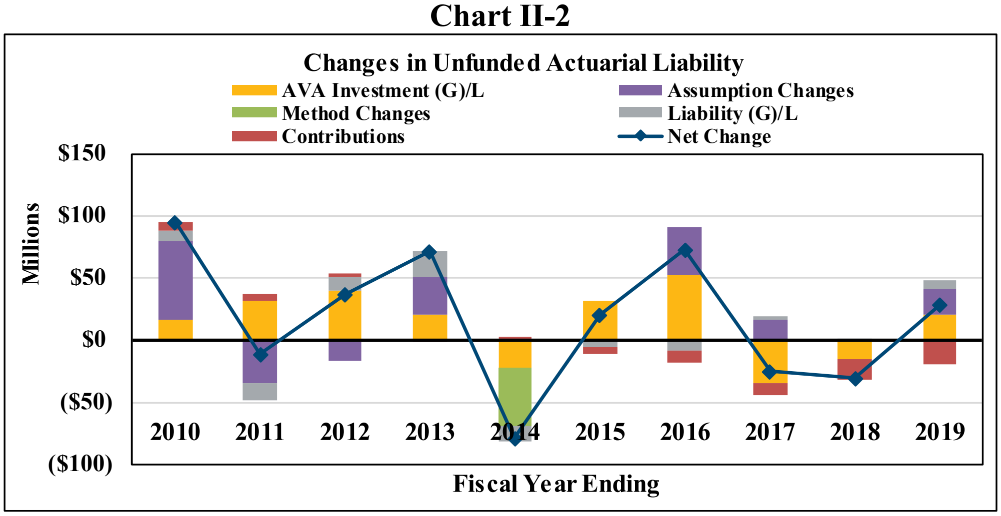


Chart II-2 below details the annual sources of the UAL change (colored bars) for the plan years ending June 30. The net UAL change for each year is represented by the blue diamonds.

Chart II-2



SECTION II – DISCLOSURE RELATED TO RISK

Table II-1

Unfundeded Actuarial Liability (UAL) Change by Source (in millions)						
FYE	Investment Experience	Liability Experience	Assumption Changes	Method Changes	Contributions	Total UAL Change
2010	$16.2	$8.1	$63.4	$0.0	$7.1	$94.7
2011	31.0	(13.8)	(34.8)	0.0	6.4	(11.3)
2012	40.1	11.4	(16.1)	0.0	1.6	36.9
2013	20.7	20.9	29.7	0.0	(0.2)	71.2
2014	(22.1)	(12.5)	0.0	(47.6)	3.0	(79.1)
2015	31.5	(5.1)	0.0	0.0	(6.5)	19.9
2016	52.4	(8.3)	38.1	0.0	(9.9)	72.3
2017	(34.5)	2.7	16.0	0.0	(9.4)	(25.2)
2018	(16.0)	1.2	0.0	0.0	(15.9)	(30.7)
2019	20.2	7.0	20.7	0.0	(19.5)	28.4
Total	**$139.5**	**$11.6**	**$117.0**	**($47.6)**	**($43.4)**	**$177.2**

On an actuarial value basis, the average annual geometric return over the 10-year period is 5.4% that has resulted in investment losses on the AVA in seven of the last ten years, increasing the UAL. The recent gains in 2017 and 2018 are still being phased-in under the direct rate smoothing amortization method.

Over the same time period, the assumed rate of return decreased from 8.16% to 7.00%. It is important to note that these changes simply reflect a downward revision to the estimate of future investment earnings and ultimately costs will be determined by actual investment earnings. Based on Meketa's current capital market assumptions (including their inflation assumption of 2.60%) and the Plan's asset allocation, the expected 20-year average annual return is 8.04% compared to the Plan's current assumption of 7.00%.

The impact of all assumption changes is represented by the purple bars and also includes decreases in mortality rates projected in the future which had a significant impact on the measurement of the UAL.

The method change in 2014 represents the impact of changing amortization and asset valuation methods to the direct smoothing method, which set the actuarial value of assets equal to the market value of assets.

Each year the UAL is expected to increase for benefits earned in the current year (the normal cost), administrative expenses, and interest on the UAL. This expected increase is referred to as the tread water level. The difference between actual contributions and the tread water level are shown by the red bars. If contributions are greater than the tread water level, the UAL is expected to decrease. Conversely, if contributions are less than the tread water level, the UAL is expected to increase. The amortization policy (as well as the contribution-timing lag) can impact

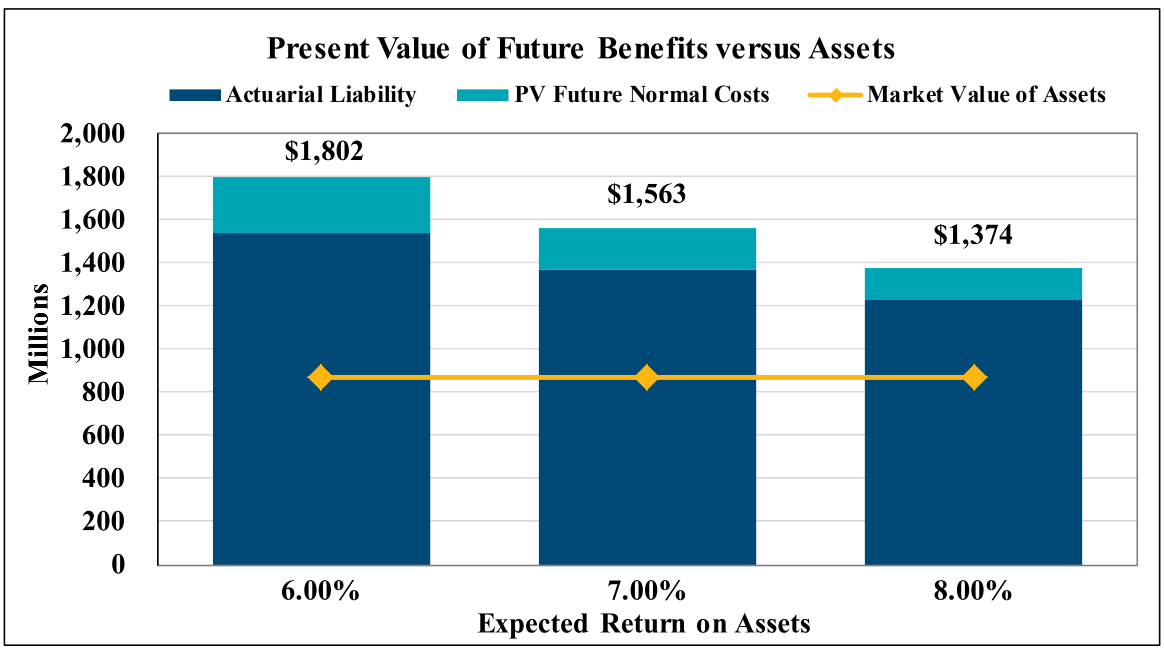
SECTION II – DISCLOSURE RELATED TO RISK

whether or not the contributions exceed the tread water level. The Board changed the amortization policy in 2014 to amortize new sources of actuarial gains and losses or method changes over a 24-year period, with a five-year ramp up period at the beginning of the period, and a four-year ramp down at the end of the period, and 15 years of level payments as a percentage of payroll. Assumption changes will be amortized over a closed 22-year period, with a three-year ramp up period, two-year ramp down period, and 17 years of level payments as a percentage of payroll. Contributions have been above the tread water level since 2015. The single period equivalent amortization period – i.e., the length of time required to amortize the overall UAL as a level percentage of payroll based on the total current amortization payment – is approximately 11 years.

Assessing Costs and Risks

Sensitivity to Investment Returns

The chart below compares assets to the present value of all projected future benefits discounted at the current expected rate of return and at discount rates 100 basis points above and below the expected rate of return. The present value of future benefits is shown as a bar with the portion attributable to past service in dark blue (Actuarial Liability) and the portion attributable to future service in teal (Present Value of Future Normal Costs). The Market Value of Assets is shown by the gold line.



If investments return 7.00% annually, the Plan would need approximately $1.6 billion in assets today to pay all projected benefits compared to current assets of $0.9 billion. If investment returns are only 6.00%, the Plan would need approximately $1.8 billion in assets today, and if investment returns are 8.00%, the Plan would need approximately $1.4 billion in assets today.

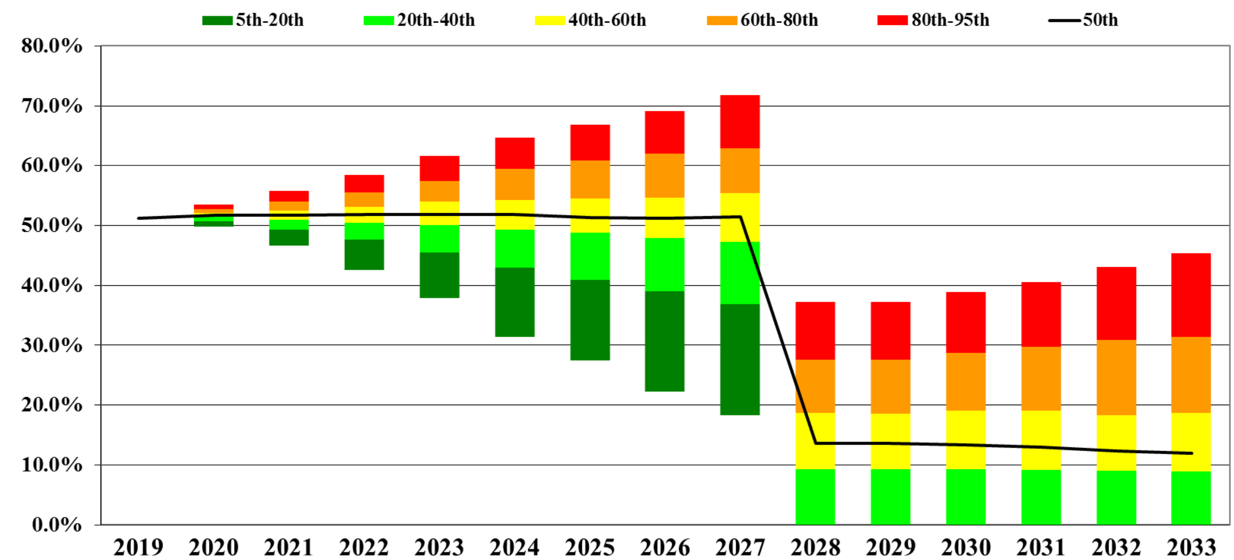
SECTION II – DISCLOSURE RELATED TO RISK

Sensitivity to Investment Returns - Stochastic Projections

Stochastic projections serve to show the range of probable outcomes of various measurements. The graphs below and on the following page show the projected range of the employer contribution rate and the funded ratio on an actuarial value of assets basis. The range in both scenarios is driven by the volatility of investment returns (assumed to be based on a 12.4% standard deviation of annual returns, as indicated in Meketa's current capital market assumptions).

Stochastic Projection of Employer Contributions as a Percent of Pay

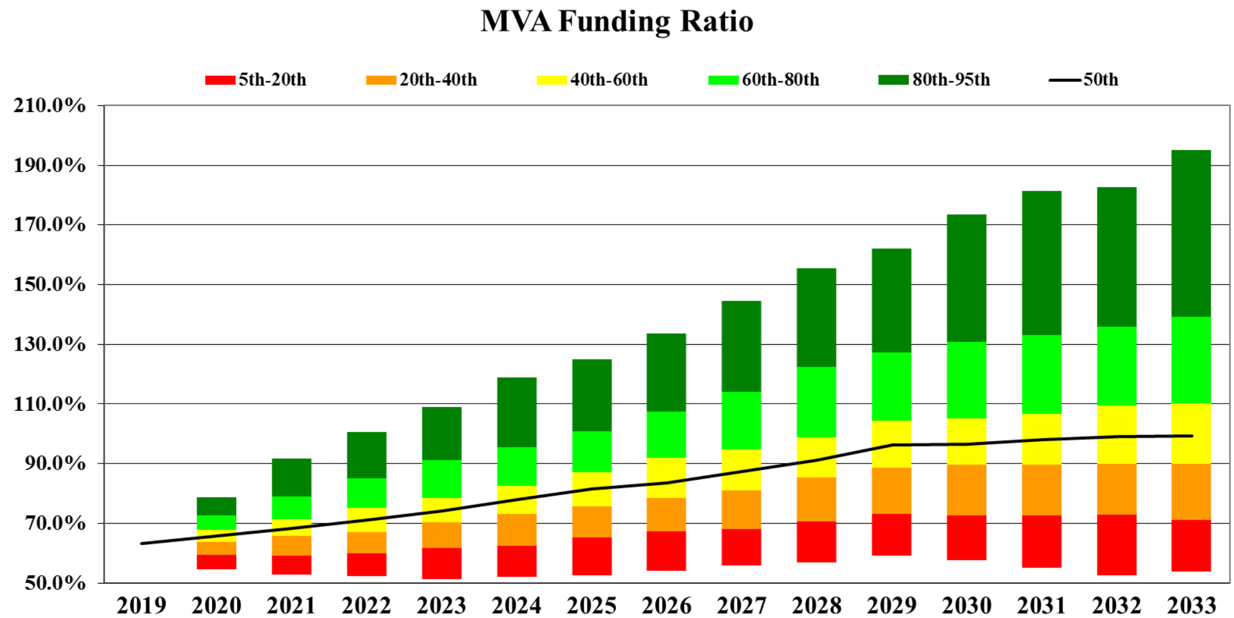
Plan Sponsor Contribution Rate



The stochastic projection of employer contributions as a percent of pay shows the probable range of future contribution rates. The baseline contribution rate (black line), which is based on the median of the simulations using an average return of 7.00%, assumes actual investment returns will equal expected returns of 7.00% each year, aligns with the projections discussed in subsection D of the Executive Summary of this report. In the most pessimistic scenario shown, the 95th percentile, the projected employer contribution rate slightly exceeds 70% of pay in 2027. Conversely, the most optimistic scenario shown, the 5th percentile, the projected employer contribution rate declines to 0% in 2028. We note that these projections allow the employer contribution to drop below the normal cost only if the Plan becomes extremely over-funded (above 120%), as required under PEPRA.

SECTION II – DISCLOSURE RELATED TO RISK

Stochastic Projection of Funded Ratio on a Market Value of Assets Basis



The graph above shows the projection of the funded ratio based on the market value of assets. While the baseline-funded ratio (black line) is projected to be approximately 97% at the end of the 15-year period shown here, there is a wide range of potential outcomes. Good investment returns have the likelihood of bringing the funded ratio well over 100%. Due to the current funding policy of the Plan, even in scenarios with unfavorable investment returns, the Plan is projected to remain over 50% funded as long as the actuarially determined contributions continue to be made.

Contribution Risk

While investment returns are typically the dominant factor in volatility, contribution rates can also be sensitive to future salary increases and the hiring of new members. When member payroll growth stagnates or even declines, the dollar level of contributions made to the Plan also stagnate or decline since contributions are based on payroll levels, though this will generally only present a funding issue if there is an extended pattern of payroll reductions.

There is also a risk of the contribution rate increasing even higher when payroll decreases since the Plan's funding policy amortizes the UAL as a level percentage of pay. This means that the UAL payments increase at the assumed payroll growth rate of 2.75%, so that the payment is expected to remain constant as a percentage of payroll. If payroll growth is less than the expected 2.75% or there is a decline in payroll, the UAL payments are spread over a smaller payroll base and the contribution rate as a percentage of pay increases, making the Plan less affordable.

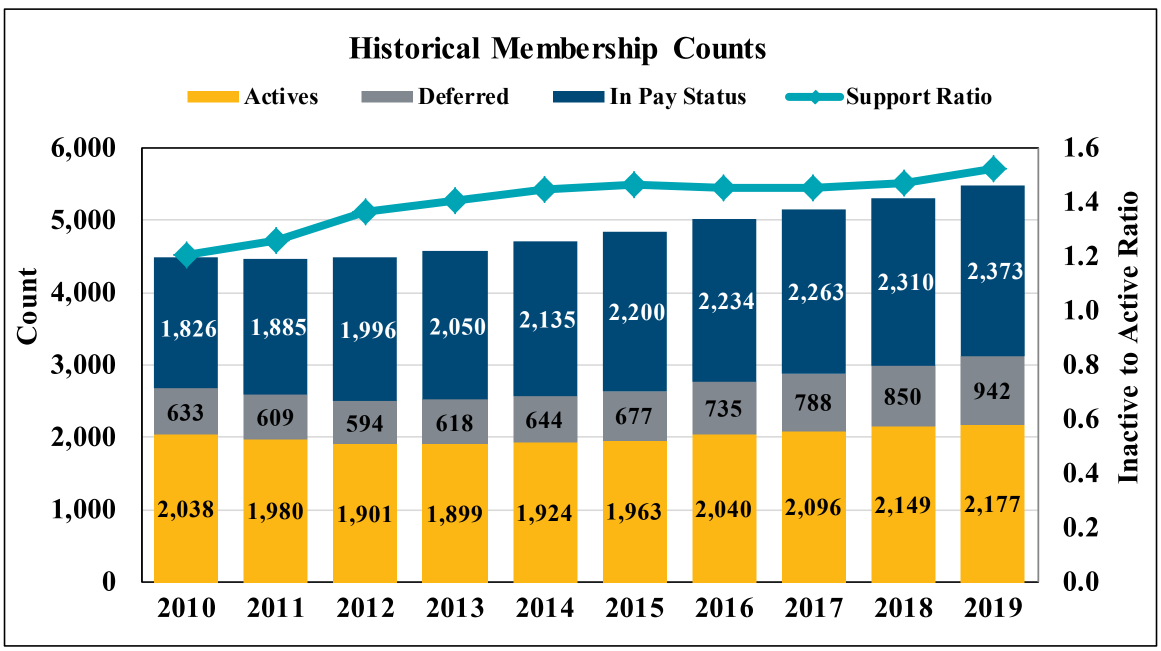
Plan Maturity Measures

The future financial condition of a mature pension plan is more sensitive to each of the risks identified above than a less mature plan. It is important to understand the maturity of the Plan and how the maturity has changed over time.

Plan maturity can be measured in a variety of ways, but they all get at one basic dynamic - the larger the plan is compared to the contribution or revenue base that supports it; the more sensitive the plan will be to risk. The measures below have been selected as the most important in understanding the primary risks identified for the Plan.

Inactives per Active (Support Ratio)

One simple measure of plan maturity is the ratio of the number of inactive members (those receiving benefits or those entitled to a deferred benefit) to the number of active members. The Support Ratio is expected to increase gradually as a plan matures. The chart below shows the growth in the Support Ratio from 2010 to 2019 as the number of retirees increased relative to the number of actives.

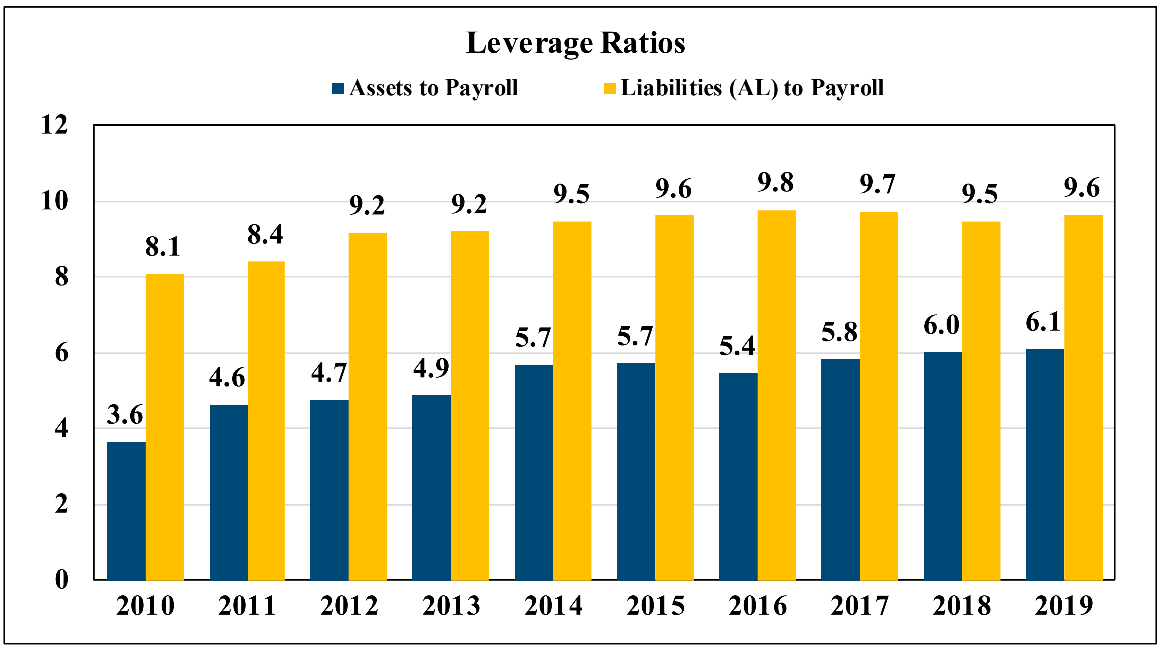


SECTION II – DISCLOSURE RELATED TO RISK

Leverage Ratios

Leverage or volatility ratios measure the size of the plan compared to it's revenue base more directly. The asset leverage ratio is simply the Market Value of Assets to active member payroll and indicates the sensitivity of the Plan to investment returns. The liability leverage ratio is the Plan's Actuarial Liability to active member payroll and indicates the sensitivity of the Plan to assumption changes or demographic experience.

The following chart shows the historical leverage ratios of the Plan. Both leverage ratios have gradually increased since 2010, but the asset to payroll ratio still lags well behind the liability to payroll ratio, due to the low funded status of the Plan. We expect these ratios to converge over time as the Plan becomes better funded. Therefore, the Plan is likely to become more sensitive to market variation in the future than it is today.



To appreciate the impact of the ratio of assets to payroll on contributions rates, consider the situation for a new plan with almost no assets. Even if the assets suffer a bad year of investment returns, the impact on the contribution rate is nil, because the assets are so small.

On the other hand, consider the situation for MCERA. Suppose MCERA's assets lose 10% of their value in a year. Since they were assumed to earn 7.00%, there is an actuarial loss of 17.00% of plan assets. Based on the current ratio of assets to payroll (610%), that means the loss in assets is about 103.7% of active payroll (610% of the 17.00% loss). There is only one source of funding to make up for this loss: contributions. Consequently, barring future offsetting investment gains, the employers must make up the asset loss in future contributions. In this example of a one-year loss of 10%, this shortfall will eventually require an additional amortization payment of

SECTION II – DISCLOSURE RELATED TO RISK

approximately 8.5% payroll once fully phased-in, if amortized over the Plan's 24-year schedule for gains and losses.

More Detailed Assessment

While a more detailed assessment is always valuable to enhance the understanding of the risks identified above, we believe the scenarios illustrated above cover the primary risks facing the Plan at this time. We would be happy to provide the Board with a more in-depth analysis at their request.

SECTION III – 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, 2018 and June 30, 2019,
- Statement of the **changes** in market values during the year,
- Comparison of the actual and expected investment performance during the year, and
- Historical **investment performance.**

As of June 30, 2014, an Actuarial Value of Assets distinct from the Market Value of Assets, is no longer used in the calculations of the Unfunded Actuarial Liability or funded status due to the implementation of the new funding policy adopted by the Board on January 22, 2015. This policy change was made in conjunction with 24-year (22-year for assumption changes) layered amortization of any unexpected changes in the Unfunded Actuarial Liability starting with the June 30, 2014 valuation. The calculation of the Actuarial Value of Assets is no longer shown in the valuation report, except to show the history of returns on the actuarial assets in Table III-3.

Also in prior valuations, a distinction was made between actuarial assets and valuation assets, with the latter reduced for non-valuation reserves, such as the Contingency Reserve. Since there are no such reserves as of June 30, 2018 and June 30, 2019, the two asset values are equal, and throughout this report we have used the term Market Value of Assets exclusively, except to show the history of returns on the valuation assets in Table III-3.

Disclosure

The market value represents "snap-shot" or "cash-out" values that provide the principal basis for measuring financial performance from one year to the next.

Table III-1 on the next page discloses and compares each asset value as of June 30, 2018 and June 30, 2019.

SECTION III – ASSETS

Table III-1
Statement of Assets at Market Value

Assets		**June 30, 2019**		**June 30, 2018**
Cash and Short-Term Investments:				
Cash invested with Merced County Treasurer	$	5,357,275	$	5,842,004
Cash invested with Northern Trust		12,994,323		10,944,975
Other cash and cash equivalents with Northern Trust		714,829		2,265,078
Total Cash and Short-Term Investments	$	$19,066,427	$	19,052,057
Receivables:				
Bond interest	$	695,557	$	815,971
Dividends		66,725		81,839
Contributions		1,614,362		1,597,575
Distributions		479,675		8,485,104
Securities sold		960,340		0
Other		61,370		67,218
Total Receivables	$	3,878,029	$	11,047,707
Investments at Market Value:				
U.S. government and agency obligations	$	31,156,159	$	72,311,297
Domestic fixed income		176,798,283		95,697,250
Common stocks (domestic)		36,017,951		43,334,808
Common stocks (index funds)		196,606,512		198,239,163
Common stocks (international)		88,893,320		82,837,521
Common stocks (international index funds)		86,579,292		115,367,843
Real estate		59,849,041		62,191,187
Alternative investments		169,514,879		126,076,024
Total Investments at Market Value	$	845,415,437	$	796,055,093
Other Assets:				
Prepaid expense	$	22,598	$	35,470
Capital assets, net of accumulated depreciation of $1,368,129 and $1,110,948 respectively		1,630,517		1,849,495
Total Assets		870,013,008		828,039,822
Liabilities				
Accounts payable	$	625,964	$	715,680
Securities purchased		877,676		577,731
Unclaimed contributions		85,403		112,441
Capital Calls		1,920,681		0
Total Liabilities		3,509,724		1,385,852
Market Value of Assets	**$**	**866,503,284**	**$**	**826,653,970**

SECTION III – 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 III-2 shows the components of change in the Market Value of Assets during 2018 and 2019.

Table III-2
Changes in Market Values

Additions		**Fiscal Year ending June 30, 2019**		**Fiscal Year ending June 30, 2018**
Contributions:				
Employer	$	66,586,464	$	64,757,288
Plan members		10,695,680		10,441,876
Total Contributions	$	77,282,144	$	75,199,164
Investment Income/(Loss) from Investment Activities:				
Net appreciation/(depreciation) in fair value of investments	$	33,767,403	$	66,985,134
Investment income		9,130,417		6,926,711
Other revenue		85,689		42,618
Less investment expenses		(3,254,559)		(3,265,379)
Total Investment Income/(Loss) from Investment Activities	$	39,728,950	$	70,689,084
Total Additions		117,011,094		145,888,248
Deductions				
Benefits paid	$	74,238,692	$	69,836,223
Refunds of contributions		571,983		883,987
Administrative expense		2,271,779		2,177,186
Actuarial expense		79,326		106,210
Total Deductions		77,161,780		73,003,606
Net Increase/(Decrease)	$	39,849,314	$	72,884,642
Market Value of Assets, Beginning of Year		826,653,970		753,769,328
Market Value of Assets, End of Year	**$**	**866,503,284**	**$**	**826,653,970**

SECTION III – ASSETS

Investment Performance

The following table shows the development of the asset gain/(loss) and investment return.

Table III-3
Development of Asset Return

Market Value of Assets, Beginning of Year	$	826,653,970
Contributions		77,282,144
Benefit Paid and Refunds of Contributions		(74,810,675)
Administrative Expense		(2,351,105)
Expected Investment Earnings (7.25%)		59,936,700
Expected Market Value of Assets, End of Year	$	886,711,034
Investment Gain / (Loss)		(20,207,750)
Market Value of Assets, End of Year		$866,503,284
Actual Investment Earnings	$	39,728,950
Return		4.81%

SECTION III – ASSETS

The table below shows the historical annual asset returns on a market value and actuarial value basis, as well in the increase in the Consumer Price Index (CPI) since 1995. Beginning June 30, 2014, the Actuarial Value of Assets is equal to the Market Value of Assets, so the net returns are the same for FY 2015 onwards.

Table III-4
Net Return on Assets vs. Increase in Consumer Price Index

Year Ended June 30	Net Return at Market Value	Net Return at Actuarial Value	Increase in Consumer Price Index[1]
2000	9.1%	11.5%	3.7%
2001	-3.6%	8.6%	3.2%
2002	-5.6%	4.9%	1.1%
2003	4.6%	3.3%	2.1%
2004	12.6%	3.3%	3.3%
2005	8.7%	2.5%	2.5%
2006	7.6%	4.7%	4.3%
2007	16.3%	8.9%	2.7%
2008	-6.7%	1.2%	5.0%
2009	-22.1%	-4.9%	-1.4%
2010	12.7%	7.0%	1.1%
2011	22.6%	2.6%	3.6%
2012	-1.6%	0.6%	1.7%
2013	11.8%	3.8%	1.8%
2014	17.1%	11.8%	2.1%
2015	2.9%	2.9%	0.1%
2016	-0.1%	-0.1%	1.0%
2017	12.4%	12.4%	1.6%
2018	9.4%	9.4%	2.9%
2019	4.8%	4.8%	1.6%
15-Year Compound Average	**5.8%**	**4.4%**	**2.0%**
10-Year Compound Average	**9.0%**	**5.4%**	**1.7%**
5-Year Compound Average	**5.8%**	**5.8%**	**1.4%**

[1] *Based on All Urban Consumers - U.S. City Average, June indices.*

SECTION IV – LIABILITIES

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

- **Disclosure** of Plan liabilities at June 30, 2018 and June 30, 2019, and
- Plan liabilities by **tier** as of June 30, 2019.

Disclosure

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

- **Present Value of Future Benefits:** Used for measuring all future Plan obligations, represents the amount of money needed today to fully fund all benefits of the Plan both earned as of the valuation date and those to be earned in the future by current plan participants, under the current Plan provisions.

- **Actuarial Liability:** Used for funding calculations, this liability is calculated taking the Present Value of Future Benefits and subtracting the present value of future Member Contributions and future employer normal costs under an acceptable actuarial funding method. The method used for this Plan is called the **Entry Age Normal** (EAN) funding method.

- **Unfunded Actuarial Liability:** The excess of the Actuarial Liability over the Market Value of Assets.

Table IV-1 on the following page discloses each of these liabilities for the current and prior valuations.

SECTION IV – LIABILITIES

Table IV-1
Present Value of Future Benefits and Actuarial Liability
(in thousands)

Item	June 30, 2019	June 30, 2018
Present Value of Future Benefits		
Actives	$ 573,917	$ 535,293
Deferred Members	56,231	51,294
Retirees	808,862	750,337
Disabled	68,686	68,049
Beneficiaries	55,360	52,709
Total MCERA	$ 1,563,057	$ 1,457,682
Actuarial Liability		
Total Present Value of Benefits	$ 1,563,057	$ 1,457,682
Present Value of Future Normal Costs		
Employer Portion	99,555	79,385
Employee Portion	93,307	76,379
Actuarial Liability	$ 1,370,195	$ 1,301,919
Market Value of Assets	$ 866,503	$ 826,654
Unfunded Actuarial Liability/(Surplus)	$ 503,692	$ 475,265

SECTION IV – LIABILITIES

Table IV-2 discloses the liabilities of the Plan as of June 30, 2019, split by tier.

Table IV-2
Liabilities by Group as of June 30, 2019
(in thousands)

Present Value of	General						Safety						All
Future Benefits	Tier 1	Tier 2	Tier 3	Tier 3R	Tier 4	Total	Tier 1	Tier 2	Tier 3	Tier 3R	Tier 4	Total	Total
Actives	$ 75,193	$ 290,002	$ 8,176	$ 1,947	$ 78,845	$ 454,163	$ 23,598	$ 74,369	$ 1,128	$ 186	$ 20,473	$ 119,754	$ 573,917
Deferred Members	14,606	30,048	252	0	968	45,873	963	9,079	49	0	266	10,358	56,231
Retirees	582,031	95,177	131	0	0	677,339	124,419	7,104	0	0	0	131,523	808,862
Disabled	16,536	6,982	0	0	0	23,519	35,981	9,187	0	0	0	45,168	68,686
Beneficiaries	33,577	2,855	0	0	0	36,432	18,153	776	0	0	0	18,928	55,360
Total	**$ 721,943**	**$ 425,064**	**$ 8,559**	**$ 1,947**	**$ 79,813**	**$ 1,237,327**	**$ 203,114**	**$ 100,514**	**$ 1,177**	**$ 186**	**$ 20,739**	**$ 325,731**	**$ 1,563,057**
Actuarial Liability													
Actives	$ 67,742	$ 211,070	$ 2,855	$ 45	$ 19,068	$ 300,780	$ 22,076	$ 53,197	$ 347	$ 17	$ 4,638	$ 80,275	$ 381,055
Deferred Members	14,606	30,048	252	0	968	45,873	963	9,079	49	0	266	10,358	56,231
Retirees	582,031	95,177	131	0	0	677,339	124,419	7,104	0	0	0	131,523	808,862
Disabled	16,536	6,982	0	0	0	23,519	35,981	9,187	0	0	0	45,168	68,686
Beneficiaries	33,577	2,855	0	0	0	36,432	18,153	776	0	0	0	18,928	55,360
Total	**$ 714,493**	**$ 346,131**	**$ 3,238**	**$ 45**	**$ 20,036**	**$ 1,083,943**	**$ 201,592**	**$ 79,343**	**$ 395**	**$ 17**	**$ 4,905**	**$ 286,252**	**$ 1,370,195**

SECTION V – 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 (EAN) C**ost Method. There are three primary components to the total contribution: the **normal cost rate** (employee and employer), the **Unfunded Actuarial Liability rate** (UAL rate), and the **administrative expense rate**.

The normal cost rate is determined in the following steps. First, an individual normal cost rate is determined by taking the value, as of entry age into the Plan, of each member's projected future benefits. This value is then divided by the value, also at entry age, of the member's expected future salary producing a normal cost rate that should remain relatively constant over a member's career.

The total normal cost is computed by adding the expected dollar amount of each active member's normal cost for the current year - known as the Individual Entry Age Method. The total normal cost is adjusted with interest to the middle of the year, to reflect the fact that the normal cost contributions are paid throughout the year as member payroll payments are made. Finally, the total normal cost rate, calculated by dividing the total normal cost by expected payroll of the closed group, is reduced by the member contribution rate to produce the employer normal cost rate.

Starting with the June 30, 2014 valuation, the Unfunded Actuarial Liability (UAL) is the difference between the EAN Actuarial Liability and the Market Value of Assets. The Unfunded Actuarial Liability payment is determined as the amount needed to fund the outstanding Unfunded Actuarial Liability as of June 30, 2013 over a closed period of 16 years (with 10 years remaining as of the current valuation), as a level percentage of pay. Any subsequent unexpected change in the Unfunded Actuarial Liability after June 30, 2013 is amortized over 24 years (22 years for assumption changes) that includes a five-year phase-in/four-year phase-out (three-year phase-in/two-year phase-out for assumption changes) of the payments/credits for each annual layer.

The administrative expenses are assumed to be $2.4 million for the current Plan year, and are expected to increase by the inflation rate in future years. The administrative expenses are split between the employees and employers based on each group's share of the normal cost and UAL rates.

SECTION V – CONTRIBUTIONS

The table below and on the next page present the employer contribution rates for the Plan for this valuation.

Table V-1
Development of the Net Employer Contribution Rate as of June 30, 2019 for FYE 2021

	June 30, 2019	June 30, 2018
1. Total Normal Cost Rate	18.46%	16.56%
2. Member Contribution Rate[1]	8.39%	7.78%
3. Employer Normal Cost Rate (1-2)	10.07%	8.78%
4. UAL Amortization Rate	39.76%	38.93%
5. Administrative Expense Rate	1.42%	1.44%
6. Net Employer Contribution Rate (3+4+5)	51.25%	49.15%

[1] *Not including member's share of administrative expenses.*

SECTION V – CONTRIBUTIONS

Table V-2
FYE 2021 Net Employer Contribution Rate by Group

			General					Safety			All
	Tier 1	Tier 2	Tier 3	Tier 4	Total	Tier 1	Tier 2	Tier 3	Tier 4	Total	Total
County											
1. Total Normal Cost Rate	27.50%	19.98%	15.24%	13.47%	17.50%	34.38%	23.61%	22.29%	20.75%	23.24%	18.46%
2. Member Contribution Rate[1]	12.65%	9.27%	6.45%	6.73%	8.28%	12.07%	8.96%	8.69%	10.38%	8.91%	8.39%
3. Employer Normal Cost Rate (1-2)	14.85%	10.71%	8.79%	6.74%	9.22%	22.31%	14.65%	13.60%	10.37%	14.33%	10.07%
4. UAL Amortization Rate	37.62%	37.62%	37.62%	37.62%	37.62%	50.45%	50.45%	50.45%	50.45%	50.45%	39.76%
5. Administrative Expense Rate	1.50%	1.38%	1.32%	1.26%	1.33%	2.07%	1.86%	1.83%	1.73%	1.85%	1.42%
6. Net Employer Contribution Rate (3+4+5)	**53.97%**	**49.71%**	**47.73%**	**45.62%**	**48.17%**	**74.83%**	**66.96%**	**65.88%**	**62.55%**	**66.63%**	**51.25%**
		Courts Tier 2R	County Tier 3R					Tier 3R			
1. Total Normal Cost Rate		19.77%	17.62%					24.81%			
2. Member Contribution Rate[1]		9.13%	6.69%					10.86%			
3. Employer Normal Cost Rate (1-2)		10.64%	10.93%					13.95%			
4. UAL Amortization Rate		37.62%	37.62%					50.45%			
5. Administrative Expense Rate		1.38%	1.38%					1.84%			
6. Net Employer Contribution Rate (3+4+5)		**49.64%**	**49.93%**					**66.24%**			

[1] *Not including member's share of administrative expenses.*

SECTION V – CONTRIBUTIONS

The assets of the Plan are allocated between the General and Safety groups based on their share of the liability for non-active members. If the assets of the Plan exceed the liabilities of the non-active members, the remaining assets are allocated between the General and Safety groups based on their share of the liabilities for active members.

Table V-3
Allocation of the June 30, 2019 UAL and Development of UAL Amortization Rates for FYE 2021

	General	Safety	Total
1. Market Value of Assets			$ 866,503,284
2. Inactive Actuarial Liability	783,163,345	205,976,681	989,140,026
3. Allocation of Assets for Inactives	79.18%	20.82%	100.00%
4. Total Assets for Inactives	686,064,250	180,439,034	866,503,284
5. Net Assets for Distribution (4 - 2 not less than zero)			$ 0
6. Active Actuarial Liability	$ 300,780,088	$ 80,275,193	$ 381,055,281
7. Allocation of Remaining Assets	78.93%	21.07%	100.00%
8. Total Assets for Actives (7 x 5)	0	0	0
9. Market Value of Assets (4 + 8)	$ 686,064,250	$ 180,439,034	$ 866,503,284
10. Total Actuarial Liability	1,083,943,433	286,251,874	1,370,195,307
11. Unfunded Actuarial Liability (UAL) (10 - 9)	**$ 397,879,183**	**$ 105,812,840**	**$ 503,692,023**
12. UAL Amortization (see table V-4)	44,581,736	12,011,049	56,592,785
13. Total Payroll	118,519,671	23,808,742	142,328,413
14. UAL Amortization Rate (12 divided by 13)	**37.62%**	**50.45%**	**39.76%**

SECTION V – CONTRIBUTIONS

Table V-4 presents the calculation of the UAL payments for the System.

Table V-4
Development of Amortization Payment
For the June 30, 2019 Actuarial Valuation

Type of Base	Date Established	Initial Amount	Initial Amortization Years	June 30, 2019 Outstanding Balance	Remaining Amortization Years	Current Phase In/Out Percentage	Amortization Amount	% of Pay	% of Pay After Phase-In
1. Initial UAL	6/30/2013	$ 518,034,325	16	$ 432,441,279	10	100%	$ 53,319,866	37.46%	37.46%
2. (Gain)/Loss Base	6/30/2014	(71,384,203)	24	(80,443,214)	19	100%	(6,648,767)	-4.67%	-4.67%
3. (Gain)/Loss Base	6/30/2015	34,000,650	24	38,599,622	20	100%	3,067,080	2.15%	2.15%
4. (Gain)/Loss Base	6/30/2016	47,466,429	24	53,294,024	21	80%	3,315,684	2.33%	2.91%
5. (Gain)/Loss Assumption	6/30/2016	38,112,827	22	40,262,079	19	100%	3,195,911	2.25%	2.25%
6. (Gain)/Loss Base	6/30/2017	(29,098,191)	24	(31,923,143)	22	60%	(1,481,587)	-1.04%	-1.73%
7. (Gain)/Loss Assumption	6/30/2017	15,960,129	22	17,001,515	20	100%	1,301,368	0.91%	0.91%
8. (Gain)/Loss Base	6/30/2018	(14,219,151)	24	(15,008,290)	23	40%	(468,967)	-0.33%	-0.82%
9. (Gain)/Loss Base	6/30/2019	28,753,231	24	28,753,231	24	20%	460,566	0.32%	1.62%
10. (Gain)/Loss Assumption	6/30/2019	20,714,918	22	20,714,918	22	33%	531,631	0.37%	1.12%
Total				$ 503,692,023			$ 56,592,785	39.76%	41.20%

The single period equivalent amortization period – i.e., the length of time required to amortize the overall UAL as a level percentage of payroll based on the total current amortization payment – is approximately 11 years.

SECTION VI – COMPREHENSIVE ANNUAL FINANCIAL REPORTING INFORMATION

The GASB adopted Statement Nos. 67 and 68 that replaced GASB Statement Nos. 25 and 27. GASB 67 is effective for periods beginning after June 15, 2013 (first effective for the fiscal year ending June 30, 2014 for the Plan) and GASB 68 is effective for fiscal years beginning after June 15, 2014 (first effective for the fiscal year ending June 30, 2015 for the Employer). The disclosures needed to satisfy the new GASB requirements can be found in the MCERA GASB 67/68 Report as of June 30, 2019.

In accordance with Governmental Finance Officers Association (GFOA) and their recommended checklist for Comprehensive Annual Financial Reports (CAFRSs), we continue to prepare the following disclosures:

Analysis of Financial Experience

This schedule shows the history of gains or losses arising from investment and liability sources, as well as non-recurring items.

Schedule of Funded Liabilities by Type

The schedule of funded liabilities by type (formerly referred to as the solvency test) shows the portion of Actuarial Liabilities for active member contributions, inactive members, and the employer financed portion of the active members that are covered by the Actuarial Value of Assets.

Actuarial Balance Sheet

The actuarial balance sheet shows the components of the Actuarial Liabilities of the Plan and the actuarial assets that are intended to satisfy those liabilities.

SECTION VI – COMPREHENSIVE ANNUAL FINANCIAL REPORTING INFORMATION

Table VI-1
Analysis of Financial Experience
Gain (or Loss) in Actuarial Liability During Years Ended June 30
Resulting from Differences Between Assumed Experience
and Actual Experience
(in thousands)

	Gain (or Loss) for Year Ending June 30									
Type of Activity	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010
Investment Income and Expenses	$ (20,208)	$ 15,963	$ 34,498	$ (52,420)	$ (31,459)	$ 22,058	$ (20,749)	$ (40,054)	$ (30,955)	$ (16,151)
Combined Liability Experience	(7,038)	(1,158)	(2,720)	8,327	5,096	12,533	(4,199)	(11,401)	13,824	(8,100)
Gain (or Loss) During Year from Financial Experience	$ (27,246)	$ 14,805	$ 31,778	$ (44,093)	$ (26,363)	$ 34,591	$ (24,948)	$ (51,455)	$ (17,131)	$ (24,251)
Non-Recurring Gain (or Loss) Items	(22,230)	(576)	(18,639)	(41,488)	(7,636)	36,803	(49,294)	16,069	12,918	(63,410)
Composite Gain (or Loss) During Year	$ (49,476)	$ 14,229	$ 13,139	$ (85,581)	$ (33,999)	$ 71,394	$ (74,242)	$ (35,386)	$ (4,213)	$ (87,661)

SECTION VI – COMPREHENSIVE ANNUAL FINANCIAL REPORTING INFORMATION

Table VI-2
Schedule of Funded Liabilities by Type
(dollars in thousands)

Valuation Date June 30,	(A) Active Member Contributions	(B) Retirees And Beneficiaries	(C) Remaining Active Members' Liabilities[1]	Reported Assets[2]	Portion of Actuarial Liabilities Covered by Reported Assets (A)	(B)	(C)
2019[3]	$ 86,356	$ 932,909	$ 350,930	$ 866,503	100%	84%	0%
2018	86,585	871,095	344,239	826,654	100%	85%	0%
2017	85,150	834,643	339,909	753,769	100%	80%	0%
2016[3]	81,880	804,658	314,657	670,016	100%	73%	0%
2015	78,078	765,738	287,365	672,319	100%	78%	0%
2014	75,582	739,428	281,231	657,325	100%	79%	0%
2013[3]	73,311	694,137	297,850	547,264	100%	68%	0%
2012[4]	66,407	632,319	276,882	528,728	100%	73%	0%
2011[5]	65,723	558,483	309,711	523,980	100%	82%	0%
2010[3]	64,917	532,695	333,220	509,561	100%	83%	0%

[1] *Includes deferred members.*

[2] *Actuarial Value of Assets. As of June 30, 2014, the Market Value of Assets is used.*

[3] *Reflects revised economic and demographic assumptions.*

[4] *Reflects revised demographic assumptions.*

[5] *Reflects revised EAN methodology and economic assumptions.*

Table VI-3
Actuarial Balance Sheet as of June 30, 2019

Assets		
1. Market value of assets	$	866,503,284
2. Present value of future contributions by members		93,307,225
3. Present value of future employer contributions for normal cost		99,554,920
4. Present value of other future employer contributions (UAL)		503,692,023
5. **Total actuarial assets**	**$**	**1,563,057,452**
Liabilities		
6. Present value of retirement allowances payable to retired/disabled members and their survivors	$	932,909,107
7. Present value of service retirement allowances payable to presently active members and their survivors		484,101,512
8. Present value of allowances payable to current and future vested terminated and their survivors		107,495,830
9. Present value of disability retirement allowances payable to presently active members and their survivors		26,805,871
10. Present value of death benefits payable on behalf of presently active members		4,673,710
11. Present value of members' contributions to be returned upon withdrawal		7,071,422
12. Special Reserves		-
13. **Total actuarial liabilities**	**$**	**1,563,057,452**

APPENDIX A – MEMBERSHIP INFORMATION

Summary of Participant Data (By Group) As of June 30, 2019	General	Safety	Total
Active Participants			
Number	1,861	316	2,177
Average Age	43.28	38.59	42.60
Average Service	9.48	10.09	9.57
Average Pay	$59,789	$71,197	$61,445
Service Retired			
Number	1,658	205	1,863
Average Age	70.82	65.67	70.25
Average Annual Total Benefit	$33,766	$47,495	$35,277
Beneficiaries & QDROs			
Number	254	68	322
Average Age	75.28	70.33	74.23
Average Annual Total Benefit	$16,128	$26,983	$18,421
Duty Disabled			
Number	53	89	142
Average Age	69.11	62.31	64.85
Average Annual Total Benefit	$27,474	$34,605	$31,944
Non-Duty Disabled			
Number	43	3	46
Average Age	70.51	64.72	70.14
Average Annual Total Benefit	$16,125	$22,597	$16,548
Total Receiving Benefits			
Number	2,008	365	2,373
Average Age	71.33	65.72	70.47
Average Annual Total Benefit	$30,991	$40,326	$32,427
Terminated Vested			
Number	292	47	339
Average Age	49.11	41.99	48.12
Average Service	10.84	9.74	10.69
Transfers			
Number	192	54	246
Average Age	51.02	44.01	49.48
Average Service	19.53	18.03	19.20
Funds on Account			
Number	314	43	357
Average Age	40.35	32.68	39.42
Average Service	1.53	1.39	1.52
Total Deferred			
Number	798	144	942
Average Age	46.12	39.97	45.18
Average Service	9.27	10.35	9.44

APPENDIX A – MEMBERSHIP INFORMATION

Summary of Participant Data (General) As of June 30, 2019	General Tier 1	General Tier 2	General Tier 3	General Tier 4	General Tier 3R	General Total
Active Participants						
Number	82	811	48	906	14	1,861
Average Age	56.26	48.35	41.48	37.64	44.92	43.28
Average Service	25.82	15.24	10.64	2.77	10.99	9.48
Average Pay	$85,836	$65,126	$75,856	$51,422	$84,455	$59,789
Service Retired						
Number	1,252	401	5	N/A	N/A	1,658
Average Age	72.14	66.80	62	N/A	N/A	70.82
Average Annual Total Benefit	$37,871	$21,346	1,974	N/A	N/A	$33,766
Beneficiaries & QDROs						
Number	222	32	N/A	N/A	N/A	254
Average Age	77.20	61.92	N/A	N/A	N/A	75.28
Average Annual Total Benefit	$17,216	$8,583	N/A	N/A	N/A	$16,128
Duty Disabled						
Number	35	18	N/A	N/A	N/A	53
Average Age	73.76	60.06	N/A	N/A	N/A	69.11
Average Annual Total Benefit	$28,532	$25,419	N/A	N/A	N/A	$27,474
Non-Duty Disabled						
Number	31	12	N/A	N/A	N/A	43
Average Age	74.08	61.30	N/A	N/A	N/A	70.51
Average Annual Total Benefit	$17,987	$11,316	N/A	N/A	N/A	$16,125
Total Receiving Benefits						
Number	1,540	463	5	N/A	N/A	2,008
Average Age	72.95	66.06	62	N/A	N/A	71.33
Average Annual Total Benefit	$34,281	$20,362	1,974	N/A	N/A	$30,991
Terminated Vested						
Number	46	220	16	10	N/A	292
Average Age	58.55	47.81	42.33	45.15	N/A	49.11
Average Service	11.30	10.80	11.35	8.89	N/A	10.84
Transfers						
Number	38	145	0	9	N/A	192
Average Age	57.44	50.11	N/A	38.67	N/A	51.02
Average Service	30.16	17.69	N/A	4.32	N/A	19.53
Funds on Account						
Number	7	87	10	210	N/A	314
Average Age	60.36	46.85	38.08	37.09	N/A	40.35
Average Service	1.88	2.09	3.58	1.20	N/A	1.53
Total Deferred						
Number	91	452	26	229	N/A	798
Average Age	58.23	48.36	40.70	37.50	N/A	46.12
Average Service	18.45	11.33	8.36	1.65	N/A	9.27

APPENDIX A – MEMBERSHIP INFORMATION

Summary of Participant Data (Safety) As of June 30, 2019	Safety Tier 1	Safety Tier 2	Safety Tier 3	Safety Tier 4	Safety Tier 3R	Safety Total
Active Participants						
Number	17	164	6	128	1	316
Average Age	53.42	42.31	35.96	31.97	38.98	38.59
Average Service	25.21	14.18	9.46	2.85	13.47	10.09
Average Pay	$107,084	$76,230	$69,025	$60,023	$78,998	$71,197
Service Retired						
Number	184	21	N/A	N/A	N/A	205
Average Age	66.36	59.65	N/A	N/A	N/A	65.67
Average Annual Total Benefit	$49,736	$27,858	N/A	N/A	N/A	$47,495
Beneficiaries & QDROs						
Number	65	3	N/A	N/A	N/A	68
Average Age	71.34	48.52	N/A	N/A	N/A	70.33
Average Annual Total Benefit	$27,324	$19,589	N/A	N/A	N/A	$26,983
Duty Disabled						
Number	64	25	N/A	N/A	N/A	89
Average Age	66.54	51.50	N/A	N/A	N/A	62.31
Average Annual Total Benefit	$37,563	$27,033	N/A	N/A	N/A	$34,605
Non-Duty Disabled						
Number	2	1	N/A	N/A	N/A	3
Average Age	61.19	71.78	N/A	N/A	N/A	64.72
Average Annual Total Benefit	$24,317	$19,156	N/A	N/A	N/A	$22,597
Total Receiving Benefits						
Number	315	50	N/A	N/A	N/A	365
Average Age	67.39	55.15	N/A	N/A	N/A	65.72
Average Annual Total Benefit	$42,477	$26,775	N/A	N/A	N/A	$40,326
Terminated Vested						
Number	2	43	1	1	N/A	47
Average Age	58.60	41.42	43.89	30.98	N/A	41.99
Average Service	12.67	9.60	11.39	8.26	N/A	9.74
Transfers						
Number	6	45	0	3	N/A	54
Average Age	50.12	43.77	N/A	35.38	N/A	44.01
Average Service	30.12	17.04	N/A	8.80	N/A	18.03
Funds on Account						
Number	0	7	1	35	N/A	43
Average Age	N/A	41.33	30.73	31.00	N/A	32.68
Average Service	N/A	1.58	0.09	1.38	N/A	1.39
Total Deferred						
Number	8	95	2	39	N/A	144
Average Age	52.24	42.53	37.31	31.34	N/A	39.97
Average Service	25.76	12.53	5.74	2.13	N/A	10.35

APPENDIX A – MEMBERSHIP INFORMATION

Change in Plan Membership: Total									
	Actives	Transfers	Non-Vested Terminations	Vested Terminations	Non - Duty Disabled	Duty Disabled	Retired	Beneficiaries & QDROs	Total
July 1, 2018	**2,149**	**235**	**308**	**307**	**46**	**139**	**1,808**	**317**	**5,309**
New Entrants	267	0	25	0	0	0	0	0	292
Rehires	10	0	(5)	(4)	0	0	(1)	0	0
Duty Disabilities	(3)	(2)	0	0	0	7	(2)	0	0
Non-Duty Disabilities	0	(1)	0	0	1	0	0	0	0
Retirements	(71)	(10)	0	(16)	0	0	97	0	0
Dual Service Retirements	0	0	0	0	0	0	0	0	0
Vested Terminations	(45)	(2)	(2)	49	0	0	0	0	0
Transfers	(4)	8	(3)	(1)	0	0	0	0	0
Non-Vested Terminations with Funds on Account	(56)	0	56	0	0	0	0	0	0
Withdrawals Paid	(69)	(5)	(22)	(2)	0	0	0	0	(98)
Died, With Beneficiary	0	0	0	0	0	(4)	(20)	24	0
Died, Without Beneficiary	(1)	0	0	0	(1)	(2)	(23)	0	(27)
Beneficiary Deaths	0	0	0	0	0	0	0	(26)	(26)
Domestic Relations Orders	0	0	0	0	0	0	0	6	6
Data Corrections	0	23	0	6	0	2	4	1	36
July 1, 2019	**2,177**	**246**	**357**	**339**	**46**	**142**	**1,863**	**322**	**5,492**

APPENDIX A – MEMBERSHIP INFORMATION

Change in Plan Membership: General									
	Actives	Transfers	Non-Vested Terminations	Vested Terminations	Non - Duty Disabled	Duty Disabled	Retired	Beneficiaries & QDROs	Total
July 1, 2018	**1,827**	**186**	**268**	**261**	**43**	**51**	**1,613**	**253**	**4,502**
New Entrants	242	0	22	0	0	0	0	0	264
Rehires	10	0	(5)	(4)	0	0	(1)	0	0
Duty Disabilities	(1)	0	0	0	0	3	(2)	0	0
Non-Duty Disabilities	0	(1)	0	0	1	0	0	0	0
Retirements	(60)	(9)	0	(14)	0	0	83	0	0
Dual Service Retirements	0	0	0	0	0	0	0	0	0
Vested Terminations	(43)	(2)	(2)	47	0	0	0	0	0
Transfers	(3)	5	(2)	0	0	0	0	0	0
Non-Vested Terminations with Funds on Account	(52)	0	52	0	0	0	0	0	0
Withdrawals Paid	(58)	(5)	(20)	(2)	0	0	0	0	(85)
Died, With Beneficiary	0	0	0	0	0	(1)	(18)	19	0
Died, Without Beneficiary	(1)	0	0	0	(1)	(1)	(22)	0	(25)
Beneficiary Deaths	0	0	0	0	0	0	0	(24)	(24)
Domestic Relations Orders	0	0	0	0	0	0	0	5	5
Data Corrections	0	18	1	4	0	1	5	1	30
July 1, 2019	**1,861**	**192**	**314**	**292**	**43**	**53**	**1,658**	**254**	**4,667**

APPENDIX A – MEMBERSHIP INFORMATION

Change in Plan Membership: Safety

	Actives	Transfers	Non-Vested Terminations	Vested Terminations	Non - Duty Disabled	Duty Disabled	Retired	Beneficiaries & QDROs	Total
July 1, 2018	**322**	**49**	**40**	**46**	**3**	**88**	**195**	**64**	**807**
New Entrants	25	0	3	0	0	0	0	0	28
Rehires	0	0	0	0	0	0	0	0	0
Duty Disabilities	(2)	(2)	0	0	0	4	0	0	0
Non-Duty Disabilities	0	0	0	0	0	0	0	0	0
Retirements	(11)	(1)	0	(2)	0	0	14	0	0
Dual Service Retirements	0	0	0	0	0	0	0	0	0
Vested Terminations	(2)	0	0	2	0	0	0	0	0
Transfers	(1)	3	(1)	(1)	0	0	0	0	0
Non-Vested Terminations with Funds on Account	(4)	0	4	0	0	0	0	0	0
Withdrawals Paid	(11)	0	(2)	0	0	0	0	0	(13)
Died, With Beneficiary	0	0	0	0	0	(3)	(2)	5	0
Died, Without Beneficiary	0	0	0	0	0	(1)	(1)	0	(2)
Beneficiary Deaths	0	0	0	0	0	0	0	(2)	(2)
Domestic Relations Orders	0	0	0	0	0	0	0	1	1
Data Corrections	0	5	(1)	2	0	1	(1)	0	6
July 1, 2019	**316**	**54**	**43**	**47**	**3**	**89**	**205**	**68**	**825**

APPENDIX A – MEMBERSHIP INFORMATION

Active Member Data by Plan					
Valuation at Year End	Plan Type	Member Count	Annual Payroll	Average Annual Salary	Average Salary Increase
2010	General	1,708	$94,915,436	$55,571	3.45%
	Safety	330	$19,692,515	$59,674	5.40%
	Total	**2,038**	**$114,607,951**	**$56,236**	**3.81%**
2011	General	1,659	$94,976,978	$57,250	3.02%
	Safety	321	$19,768,859	$61,585	3.20%
	Total	**1,980**	**$114,745,837**	**$57,952**	**3.05%**
2012	General	1,596	$90,706,280	$56,834	-0.73%
	Safety	305	$19,145,091	$62,771	1.93%
	Total	**1,901**	**$109,851,371**	**$57,786**	**-0.29%**
2013	General	1,604	$91,737,348	$57,193	0.63%
	Safety	295	$18,699,145	$63,387	0.98%
	Total	**1,899**	**$110,436,493**	**$58,155**	**0.64%**
2014	General	1,624	$91,704,083	$56,468	-1.27%
	Safety	300	$18,620,870	$62,070	-2.08%
	Total	**1,924**	**$110,324,953**	**$57,341**	**-1.40%**
2015	General	1,664	$93,938,857	$56,454	-0.03%
	Safety	298	$18,397,233	$61,736	-0.54%
	Total	**1,962**	**$112,336,090**	**$57,256**	**-0.15%**
2016	General	1,729	$97,337,917	$56,297	-0.28%
	Safety	311	$19,394,922	$62,363	1.02%
	Total	**2,040**	**$116,732,839**	**$57,222**	**-0.06%**
2017	General	1,783	$102,498,328	$57,486	2.11%
	Safety	313	$20,136,322	$64,333	3.16%
	Total	**2,096**	**$122,634,651**	**$58,509**	**2.25%**
2018	General	1,827	$108,067,248	$59,150	2.89%
	Safety	322	$22,018,174	$68,379	6.29%
	Total	**2,149**	**$130,085,423**	**$60,533**	**3.46%**
2019	General	1,861	$111,267,187	$59,789	1.08%
	Safety	316	$22,498,224	$71,197	4.12%
	Total	**2,177**	**$133,765,412**	**$61,445**	**1.51%**

Payroll figures represent active members' annualized pay rates on June 30.

APPENDIX A – MEMBERSHIP INFORMATION

Retirants and Beneficiaries Added to and Removed from Retiree Payroll										
Fiscal Year	Beginning of Year	Added During Year	Allowances Added	Removed During Year	Allowances Removed	End of Year	Annual Retirement Payroll (in 000s)	Total Allowance Percentage Increase	Average Annual Allowance	Average Allowance Percentage Increase
2005	1,441	109	2,445,000	49	450,000	1,501	24,867,000	9.16%	16,567	4.80%
2006	1,477	98	2,007,000	53	785,000	1,522	27,297,000	9.77%	16,836	1.62%
2007	1,521	136	4,419,000	38	560,000	1,619	31,823,000	16.58%	17,947	6.60%
2008	1,620	105	2,757,000	67	902,000	1,658	34,603,000	8.74%	19,644	9.46%
2009	1,658	105	3,402,523	52	812,828	1,711	37,747,525	9.09%	22,062	12.31%
2010	1,711	171	6,097,956	56	981,465	1,826	43,653,374	15.65%	23,907	8.36%
2011	1,826	103	2,627,234	44	781,283	1,885	46,116,686	5.64%	24,465	2.34%
2012	1,885	175	6,484,652	64	960,185	1,996	52,887,845	14.68%	26,497	8.31%
2013	1,996	103	3,028,612	49	855,980	2,050	56,048,022	5.98%	27,340	3.18%
2014	2,050	116	3,950,045	31	590,636	2,135	60,297,112	7.58%	28,242	3.30%
2015	2,135	100	2,508,828	35	720,242	2,200	63,254,229	4.90%	28,752	1.80%
2016	2,200	68	1,716,361	34	946,189	2,234	65,505,679	3.56%	29,322	1.98%
2017	2,234	85	2,282,779	56	1,022,708	2,263	68,476,111	4.53%	30,259	3.20%
2018	2,263	120	3,617,034	73	1,671,956	2,310	72,002,829	5.15%	31,170	3.01%
2019	2,310	141	4,908,365	78	1,805,138	2,373	76,948,959	6.87%	32,427	4.03%

APPENDIX A – MEMBERSHIP INFORMATION

GENERAL

Count

Age	Service: Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & up	Total
Under 20	0	0	0	0	0	0	0	0	0	0	0
20 to 25	24	6	0	0	0	0	0	0	0	0	30
25 to 29	53	106	14	0	0	0	0	0	0	0	173
30 to 34	49	140	68	18	0	0	0	0	0	0	275
35 to 39	28	124	74	83	22	1	0	0	0	0	332
40 to 44	21	91	36	71	58	14	0	0	0	0	291
45 to 49	26	38	34	46	43	36	8	1	0	0	232
50 to 54	9	29	15	35	52	44	16	4	0	0	204
55 to 59	9	11	20	28	53	32	19	14	0	0	186
60 to 64	5	11	16	18	28	18	3	2	0	0	101
65 to 69	0	1	7	10	3	8	2	0	1	0	32
70 & up	0	2	1	1	1	0	0	0	0	0	5
Total	224	559	285	310	260	153	48	21	1	0	1,861

Average Compensation

Age	Service: Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & up	Total
Under 20	0	0	0	0	0	0	0	0	0	0	0
20 to 25	37,304	37,270	0	0	0	0	0	0	0	0	37,297
25 to 29	39,782	46,087	56,242	0	0	0	0	0	0	0	44,977
30 to 34	42,451	49,100	60,618	55,301	0	0	0	0	0	0	51,169
35 to 39	48,336	50,602	61,275	68,209	66,646	42,598	0	0	0	0	58,231
40 to 44	51,434	53,680	63,677	67,617	69,593	74,103	0	0	0	0	62,309
45 to 49	43,819	51,361	66,213	74,665	65,610	72,282	63,143	49,550	0	0	63,599
50 to 54	61,791	62,070	67,399	64,247	66,974	74,453	82,743	95,253	0	0	69,016
55 to 59	52,155	61,147	78,620	56,017	68,693	68,302	59,557	82,825	0	0	66,669
60 to 64	71,648	62,356	76,932	62,882	61,592	72,418	102,922	62,144	0	0	68,001
65 to 69	0	239,658	76,456	72,727	42,952	78,775	53,426	0	91,388	0	76,857
70 & up	0	67,652	49,109	32,882	51,769	0	0	0	0	0	53,813
Total	44,823	51,212	64,512	66,456	66,740	72,402	70,339	81,638	91,388	0	59,789

APPENDIX A – MEMBERSHIP INFORMATION

SAFETY

Count

	Service										
Age	Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & up	Total
Under 20	0	0	0	0	0	0	0	0	0	0	0
20 to 25	10	6	0	0	0	0	0	0	0	0	16
25 to 29	8	38	3	0	0	0	0	0	0	0	49
30 to 34	2	20	15	11	0	0	0	0	0	0	48
35 to 39	2	14	13	38	3	0	0	0	0	0	70
40 to 44	1	3	3	28	19	5	0	0	0	0	59
45 to 49	0	6	1	11	8	6	1	0	0	0	33
50 to 54	0	2	1	5	6	5	6	1	0	0	26
55 to 59	0	2	0	2	1	3	2	2	0	0	12
60 to 64	0	0	0	2	0	0	0	1	0	0	3
65 to 69	0	0	0	0	0	0	0	0	0	0	0
70 & up	0	0	0	0	0	0	0	0	0	0	0
Total	23	91	36	97	37	19	9	4	0	0	316

Average Compensation

	Service										
Age	Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & up	Total
Under 20	0	0	0	0	0	0	0	0	0	0	0
20 to 25	41,764	44,794	0	0	0	0	0	0	0	0	42,900
25 to 29	57,249	59,424	58,598	0	0	0	0	0	0	0	59,019
30 to 34	51,844	64,263	65,452	80,748	0	0	0	0	0	0	67,895
35 to 39	47,258	58,583	70,648	76,966	69,870	0	0	0	0	0	70,963
40 to 44	78,998	81,945	82,737	71,990	78,967	111,481	0	0	0	0	78,755
45 to 49	0	67,906	59,635	73,445	78,229	88,429	150,042	0	0	0	78,225
50 to 54	0	97,993	59,388	71,698	70,033	83,622	95,541	89,709	0	0	81,351
55 to 59	0	92,938	0	60,105	59,738	91,206	80,687	80,118	0	0	80,088
60 to 64	0	0	0	95,754	0	0	0	197,902	0	0	129,803
65 to 69	0	0	0	0	0	0	0	0	0	0	0
70 & up	0	0	0	0	0	0	0	0	0	0	0
Total	50,123	62,280	67,867	75,327	76,102	93,669	98,296	111,962	0	0	71,197

APPENDIX A – MEMBERSHIP INFORMATION

Service Retired Benefits						
	General		Safety		Total	
Current Age	Number	Annual Average Benefit	Number	Annual Average Benefit	Number	Annual Average Benefit
0-24	0	$0	0	$0	0	$0
25-29	0	$0	0	$0	0	$0
30-34	0	$0	0	$0	0	$0
35-39	0	$0	0	$0	0	$0
40-44	0	$0	0	$0	0	$0
45-49	0	$0	3	$47,384	3	$47,384
50-54	14	$23,635	20	$49,798	34	$39,025
55-59	138	$32,560	39	$51,902	177	$36,822
60-64	286	$36,920	37	$50,905	323	$38,522
65-69	379	$37,888	37	$44,998	416	$38,521
70-74	357	$35,942	39	$45,772	396	$36,910
75-79	240	$30,237	18	$36,199	258	$30,653
80-84	131	$26,974	8	$51,491	139	$28,385
85-89	79	$23,254	2	$45,311	81	$23,798
90-94	21	$25,095	2	$43,245	23	$26,673
95+	13	$19,627	0	$0	13	$19,627
All Ages	1,658	$33,766	205	$47,495	1,863	$35,277

Duty Disabled Benefits						
	General		Safety		Total	
Current Age	Number	Annual Average Benefit	Number	Annual Average Benefit	Number	Annual Average Benefit
0-24	0	$0	0	$0	0	$0
25-29	0	$0	0	$0	0	$0
30-34	0	$0	0	$0	0	$0
35-39	0	$0	5	$19,959	5	$19,959
40-44	1	$27,030	3	$29,208	4	$28,664
45-49	2	$37,166	8	$37,525	10	$37,453
50-54	1	$24,256	7	$40,238	8	$38,240
55-59	4	$33,770	9	$46,109	13	$42,312
60-64	11	$23,123	15	$22,772	26	$22,920
65-69	10	$29,051	17	$30,924	27	$30,230
70-74	10	$25,445	13	$49,513	23	$39,048
75-79	6	$28,963	11	$30,159	17	$29,737
80-84	3	$22,466	1	$52,897	4	$30,074
85-89	3	$17,466	0	$0	3	$17,466
90-94	2	$51,284	0	$0	2	$51,284
95+	0	$0	0	$0	0	$0
All Ages	53	$27,474	89	$34,605	142	$31,944

APPENDIX A – MEMBERSHIP INFORMATION

Non-Duty Disabled Benefits						
	General		Safety		Total	
Current Age	Number	Annual Average Benefit	Number	Annual Average Benefit	Number	Annual Average Benefit
0-24	0	$0	0	$0	0	$0
25-20	0	$0	0	$0	0	$0
30-34	0	$0	0	$0	0	$0
35-39	0	$0	0	$0	0	$0
40-44	0	$0	0	$0	0	$0
45-49	2	$8,194	1	$30,556	3	$15,648
50-54	2	$13,482	0	$0	2	$13,482
55-59	4	$23,657	0	$0	4	$23,657
60-64	4	$14,402	0	$0	4	$14,402
65-69	8	$16,098	0	$0	8	$16,098
70-74	6	$15,447	2	$18,617	8	$16,240
75-79	8	$14,795	0	$0	8	$14,795
80-84	4	$21,064	0	$0	4	$21,064
85-89	4	$18,028	0	$0	4	$18,028
90-94	1	$1,614	0	$0	1	$1,614
95+	0	$0	0	$0	0	$0
All Ages	43	$16,125	3	$22,597	46	$16,548

Surviving Beneficiary & QDRO Benefits						
	General		Safety		Total	
Current Age	Number	Annual Average Benefit	Number	Annual Average Benefit	Number	Annual Average Benefit
0-24	1	$14,577	0	$0	1	$14,577
25-29	0	$0	0	$0	0	$0
30-34	1	$1,430	0	$0	1	$1,430
35-39	2	$19,437	1	$36,028	3	$24,967
40-44	1	$24,229	1	$45,728	2	$34,978
45-49	5	$3,388	3	$6,921	8	$4,713
50-54	7	$6,613	1	$0	8	$5,787
55-59	18	$14,250	8	$16,207	26	$14,852
60-64	19	$12,023	6	$23,520	25	$14,782
65-69	20	$18,271	7	$35,633	27	$22,772
70-74	39	$19,699	19	$30,568	58	$23,259
75-79	35	$16,441	8	$32,780	43	$19,481
80-84	49	$15,457	8	$17,878	57	$15,797
85-89	29	$17,493	5	$39,741	34	$20,765
90-94	19	$20,805	1	$27,346	20	$21,132
95+	9	$11,144	0	$0	9	$11,144
All Ages	254	$16,128	68	$26,983	322	$18,421

APPENDIX B -- STATEMENT OF CURRENT ACTUARIAL ASSUMPTIONS AND METHODS

The assumptions and methods used in the actuarial valuation reflect the results of an experience study performed by Cheiron covering the period from July 1, 2016 through June 30, 2019 and adopted by the Board at their December 12, 2019 meeting. More details on the rationale for the demographic and economic assumptions can be found in the experience analysis dated February 2020.

A. Actuarial Assumptions

1. Rate of Return

Assets are assumed to earn 7.00% net of investment expenses.

2. Administrative Expenses

Administrative expenses are assumed to be $2.369 million for the next year to be allocated between the employer and employees based on each group's share of the non-expense related contributions. Administrative expenses in future years are expected to increase with the Consumer Price Index (CPI).

3. Cost of Living

The cost of living as measured by the Consumer Price Index (CPI) will increase at the rate of 2.50% per year.

4. Post Retirement COLA

Benefits are assumed to increase after retirement at the rate of 2.40% per year for Tier 1 members.

5. Increases in Pay

Wage inflation component: 2.75%
Additional longevity and promotion component:

Years of Service	General	Safety	Years of Service	General	Safety
0	7.00%	8.50%	11	2.50%	1.00%
1	6.50%	7.50%	12	2.25%	1.00%
2	6.00%	6.50%	13	2.00%	1.00%
3	5.50%	5.50%	14	1.85%	1.00%
4	5.00%	4.50%	15	1.70%	1.00%
5	4.50%	3.50%	16	1.55%	1.00%
6	4.00%	3.00%	17	1.40%	1.00%
7	3.50%	2.50%	18	1.25%	1.00%
8	3.25%	2.00%	19	1.10%	1.00%
9	3.00%	1.50%	20+	1.00%	1.00%
10	2.75%	1.00%			

APPENDIX B -- STATEMENT OF CURRENT ACTUARIAL ASSUMPTIONS AND METHODS

6. Final Average Compensation Load

The final average compensation (FAC) for members projected to receive a service retirement benefit has increased based on the assumption that members will have elements of pay included in their FAC which are not included in the annual pay provided to the actuary (Ventura decision pays). The FAC for General Tier 1 members has been increased by 5.50%, the FAC for Safety Tier 1 members has been increased by 8.00%, and the FAC for all Tier 2 and Tier 3 members by 1.50%.

7. Family Composition

55% of female General members, 75% of male General members and 85% of Safety members are assumed to be married at retirement. Male members are assumed to be three years older than their spouses are and female members are assumed to be two years younger than their spouses are.

8. Rates of Mortality

Mortality rates for actives, retirees, disabled members, beneficiaries, terminated vesteds, and reciprocal transfers are based on the sex-distinct employee and annuitant mortality tables as described below. Future mortality improvements are reflected by applying the SOA MP-2019 projection scale on a generational basis from the base year of 2009 for the CalPERS tables and the base year of 2010 for the Below Median Safety member Pub-2010 tables.

Category	Base Mortality Table	
	General	Safety
Healthy Annuitant	CalPERS 2009 Healthy Annuitant Mortality Table	1.05 times the 2010 Public Safety Below Median Mortality Table for Healthy Retirees
Duty Disabled Annuitants	CalPERS 2009 Industrial Disability Mortality Table	CalPERS 2009 Industrial Disability Mortality Table
Non-Duty Disabled Annuitant	CalPERS 2009 Non-Industrial Disability Mortality Table	CalPERS 2009 Non-Industrial Disability Mortality Table
Active Employees	CalPERS 2009 Non-Industrial Employees Mortality Table	2010 Public Safety Below Median Mortality Table for Healthy Employees
Actives, Line of Duty (Safety only)	N/A	CalPERS 2009 Industrial Employees Mortality Table

For determining mortality rates for future disabled members, 50% of future General disabilities are assumed to be duty related and 50% are assumed to be non-duty related. 100% of future Safety disabilities are assumed to be duty related.

APPENDIX B -- STATEMENT OF CURRENT ACTUARIAL ASSUMPTIONS AND METHODS

9. Rates of Termination

Sample rates of termination[1] are shown in the following table.

Years of Service	General Male	General Female	Safety
0	20.0%	20.0%	21.0%
5	8.2%	8.2%	6.5%
10	4.5%	4.5%	4.75%
15	4.5%	3.0%	3.5%
20	4.5%	3.0%	0.0%
25	4.5%	3.0%	0.0%
30	0.0%	0.0%	0.0%

[1] *Termination rates do not apply once a member is eligible for retirement.*

There are three types of terminations: withdrawals, reciprocal transfers, and vested terminations. Rates of withdrawal apply to active Members who terminate their employment and withdraw their member contributions, forfeiting entitlement to future Plan benefits. Rates of reciprocal transfer are for members who leave their member contributions on deposit and engage in employment covered by a pension plan with a reciprocal relationship with MCERA. Finally, rates of vested termination apply to active Members who terminate their employment and leave their member contributions on deposit with the Plan.

The table below shows the percentages of total terminations falling into these categories.

	Years of Service						
	General				Safety		
	0 – 4	5 – 9	10-14	15+	0 – 4	5-9	10+
Withdrawals	92.5%	30.0%	20.0%	5.0%	92.5%	25.0%	15.0%
Transfers	7.5%	35.0%	40.0%	47.5%	7.5%	50.0%	56.7%
Vested Terminations	0.0%	35.0%	40.0%	47.5%	0.0%	25.0%	28.3%

Vested terminated General Members are assumed to begin receiving benefits at age 60; Vested terminated Safety Members are assumed to begin receiving benefits at age 51. Future reciprocal transfer General members are assumed to begin receiving benefits at age 61; future reciprocal transfer Safety members are assumed to begin receiving benefits at age 57. Current reciprocal transfer members are assumed to begin receiving benefits based on the probabilities of retirement applied to the active members.

Future reciprocal transfers' pay growth is assumed to be 3.75% while employed by a reciprocal employer. Current reciprocal transfers' pay growth is assumed to increase according to the assumptions applied to the active members until the assumed retirement age.

APPENDIX B -- STATEMENT OF CURRENT ACTUARIAL ASSUMPTIONS AND METHODS

10. Rates of Retirement

Rates of retirement are based on age and service according to the following table.

General			Safety		
	Years of Service			Years of Service	
Age	10 – 29	30+	Age	10 – 19	20+
50	10.00%	20.00%	40	0.00%	1.50%
51	10.00%	20.00%	41	0.00%	1.50%
52	10.00%	20.00%	42	0.00%	1.50%
53	10.00%	20.00%	43	0.00%	1.50%
54	10.00%	20.00%	44	0.00%	1.50%
55	10.00%	25.00%	45	0.00%	1.50%
56	10.00%	25.00%	46	0.00%	5.00%
57	10.00%	30.00%	47	0.00%	10.00%
58	15.00%	35.00%	48	0.00%	15.00%
59	20.00%	35.00%	49	0.00%	20.00%
60	20.00%	35.00%	50	15.00%	20.00%
61	20.00%	35.00%	51	7.50%	20.00%
62	20.00%	35.00%	52	7.50%	20.00%
63	20.00%	35.00%	53	7.50%	20.00%
64	20.00%	35.00%	54	20.00%	20.00%
65	35.00%	35.00%	55	30.00%	30.00%
66	35.00%	35.00%	56	30.00%	30.00%
67	35.00%	35.00%	57	30.00%	30.00%
68	35.00%	35.00%	58	30.00%	30.00%
69	35.00%	35.00%	59	30.00%	30.00%
70+	100.00%	100.00%	60	100.00%	100.00%

APPENDIX B -- STATEMENT OF CURRENT ACTUARIAL ASSUMPTIONS AND METHODS

11. Rates of Disability

Sample disability rates of active participants are provided in the table.

	General		Safety	
Age	Service-Connected	Non-Service Connected[1]	Service-Connected	Non-Service Connected[1]
20	0.0165%	0.0165%	0.0000%	0.0050%
25	0.0165%	0.0165%	0.0825%	0.0050%
30	0.0190%	0.0190%	0.2380%	0.0100%
35	0.0390%	0.0390%	0.3940%	0.0150%
40	0.0806%	0.0806%	0.5500%	0.0200%
45	0.1447%	0.1447%	0.7060%	0.0250%
50	0.1829%	0.1829%	0.9230%	0.0400%
55	0.1442%	0.1442%	2.3925%	0.0650%
60	0.1196%	0.1196%	3.0120%	0.1000%
65	0.1196%	0.1196%	3.6385%	0.1000%

[1] *Rates are applied once members have at least five years of service*

12. Member Contribution Balance Crediting Rate

5.00% (2.00% less than the assumed rate of return of 7.00%).

13. Changes Since Last Valuation

All demographic and economic assumptions were updated based on the most recent experience study covering the period from July 1, 2016 through June 30, 2019. Please refer to the full experience study report for detail on the specific changes.

APPENDIX B -- STATEMENT OF CURRENT ACTUARIAL ASSUMPTIONS AND METHODS

B. Actuarial Methods

1. Actuarial Funding Method

The Entry Age Normal actuarial funding method was used for active employees, whereby the normal cost is computed as the level annual percentage of pay required to fund the retirement benefits between each Member's date of hire and assumed retirement. The Actuarial Liability is the difference between the Present Value of Future Benefits and the Present Value of Future Normal Cost. The Unfunded Actuarial Liability is the difference between the Actuarial Liability and the Actuarial Value of Assets.

The UAL (or Surplus Funding) is amortized as a percentage of the projected salaries of present and future members of MCERA. Effective with the June 30, 2013 valuation, the UAL as of June 30, 2013 is amortized over a closed 16-year period. Effective with the June 30, 2014 valuation, any new sources of UAL due to actuarial gains and losses or method changes is amortized over a closed 24-year period, with five-year ramp up period at the beginning of the period, a four-year ramp down at the end of the period, and 15 years of level payments as a percentage of payroll. Assumption changes will be amortized over a closed 22-year period, with a three-year ramp up period, two-year ramp down period, and 17 years of level payments as a percentage of payroll. This method is a type of direct rate smoothing method.

2. Asset Valuation Method

As of June 30, 2014, the Market Value of Assets is used to determine the System's UAL.

3. Changes Since Last Valuation

None

APPENDIX C – SUMMARY OF PLAN PROVISIONS

A. Definitions

Compensation: Compensation means the cash remuneration for services paid by the employer. It includes base pay and certain differential, incentive, and special pay allowances defined by the Board of Retirement. Overtime is excluded, with the exception of overtime paid under the Fair Labor Standards Act that is regular and recurring.

PEPRA: For members joining the Plan on and after January 1, 2013 (Tier 4 Members), only pensionable compensation up to the Social Security Taxable Wage Base ($113,700 for 2013) will count for computing Plan benefits and employee contributions and employer contributions for those participating in Social Security. For those not participating in Social Security, the compensation cap is 120% of the Taxable Wage Base ($136,440 for 2013.) In future years, the cap on pensionable compensation will increase with the increase in the CPI-U, rather than the increase in the Taxable Wage Base. In addition, it is possible that some sources of compensation, such as any payments deemed to be terminal or special pays, may be excluded from benefit and contribution computations for Tier 4 Members.

Credited Service: In general, Credited Service is earned for the period during which Member Contributions are paid. One year of service credit is earned for each 2,080 hours worked (not including overtime), not to exceed one year of service per year.

Temporary service for which the Member was not credited, or service for which the Member withdrew his or her Member Contributions, may be purchased by paying or repaying the Member Contributions with interest. The categories of services for which credit may be purchased are listed below:

Prior Part-Time Service: If a Member worked for an employer within the Association on a part-time or 'extra help' basis before his membership in the Retirement Association, the Member may buyback this service.

Intermittent Part-Time Service.

Prior Full-Time Service: Member may buyback full-time service that may have been cashed out upon termination.

Leave of Absence (Including Absence with State Disability or Worker's Compensation): No unpaid leave of absence can be bought back except for absence due to medical reasons up to one year.

APPENDIX C – SUMMARY OF PLAN PROVISIONS

Public Service: Members may purchase service credit for prior service in the following public agencies: Federal Civil Service, Military Service, and some public employers in California. This service is only eligible for purchase when the Board of Supervisors opens the window for purchase.

Military Time: Members who resign or obtain a leave of absence to enter the military may purchase service credit for the period of military service. Members must re-enter employment within one year of terminating military service to be eligible to purchase service.

At retirement, Members have the option to convert 100% of sick leave time into retirement years of service credit. Unrepresented Management and Unit 7 will instead have some or all of their sick leave contributed to the Post Employment Health Plan.

Final Compensation: For Tier 1 Members, Final Compensation means the highest average Compensation earned during any 26 consecutive pay periods of the Member's employment. For Tier 2 and Tier 3 Members, Final Compensation means the highest average Compensation earned during any 78 consecutive pay periods of the Member's employment.

The following compensation may be included in the Final Compensation computation:

- Loyalty Bonus
- Up to 160 hours of vacation payoff
- Sick Leave sold back during 25th pay period
- Vacation sold back during 25th pay period (management only)

The vacation payoff amounts are not included in the Final Compensation computation for members of Tier 3R (Courts Tier 2R) or Tier 4.

For Tier 4 Members, highest average Compensation will be based on the highest 36 consecutive months of the Member's employment.

General Member: Any Member who is not a Safety Member is a General Member.

Public Service: During designated periods of time authorized by the County Board of Supervisors, Members may elect to purchase Public Service for time spent while employed in another recognized public agency. The public agency must have a reciprocal agreement with the Plan or be one of several specified municipalities, counties, special districts, or State and Federal agencies. Public Service cannot be purchased if it is used for eligibility for another pension.

APPENDIX C – SUMMARY OF PLAN PROVISIONS

The cost to purchase Public Service is twice the Member Contributions and interest applicable for the period of time purchased. Public Service is used to compute benefits, but does not count toward eligibility for benefits or vesting.

Safety Member: Any sworn Member engaged in law enforcement or as a probation officer is a Safety Member.

B. Membership

Eligibility: All full-time and variable-shift permanent employees of Merced County and other participating employers become Members on their first date of service. Membership is mandatory; only elected officials and those entering employment at age 60 or older who are not reciprocal members of another system may choose not to participate.

PEPRA: A New Member is any Member joining the Plan for the first time on or after January 1, 2013. Employees who transfer from and are eligible for reciprocity with another public employer will not be Tier 4 Members if their service in the reciprocal system was under a pre-PEPRA tier. Employees who were Members of MCERA prior to January 1, 2013, experienced a break in service of more than six months, and then were re-employed by a *different* MCERA-participating employer on or after January 1, 2013 will be considered Tier 4 Members for all subsequent service.

Member Contributions: Each Member contributes a percentage of Compensation to the Plan through a pre-tax payroll deduction. The percentage contributed depends on the Member's age upon joining the Plan. Complete Rates are shown in Appendix D.

Members covered by Social Security have their contributions reduced by one-third on the first $161.54 of biweekly Compensation. General Members who joined the Plan prior to March 7, 1973, and who have earned 30 years of Credited Service do not contribute; Safety Members do not contribute after earning 30 years of Credited Service.

PEPRA: Tier 4 Members must contribute half of the normal cost of the Plan. Contributions for these Members will be based on the Normal Cost associated with their benefits; General and Safety members will pay different Rates.

Tier 4 Members will pay a single contribution rate, not a rate based on entry age. All Tier 4 Members are expected to continue contributing after earning 30 years of service.

APPENDIX C – SUMMARY OF PLAN PROVISIONS

Interest is credited semi-annually to each Member's accumulated contributions. The crediting rate is set by the Board, and will fluctuate between zero and two percent less than the assumed rate of return (currently 7.00% – 2.00% = 5.00%), based in part on the investment earnings during that period.

C. Service Retirement

Eligibility: Tier 1 General Members are eligible to retire at age 50 if they have earned 10 years of Credited Service. Tier 1 General Members hired prior to December 31, 1978, may retire upon reaching age 65 with no service requirement.

Tier 2 and Tier 3 General Members are eligible to retire at age 55 if they have earned 10 years of Credited Service or upon reaching age 70 with no service requirement.

Alternatively, all Tier 1, 2, and 3 General Members are eligible to retire at any age after having earned 30 years of Credited Service, or upon reaching age 70 with no service requirement.

Safety Members are eligible to retire at age 50 if they have earned 10 years of Credited Service. Alternatively, Safety Members are eligible to retire at any age after having earned 20 years of Credited Service, or upon reaching age 70 with no service requirement. All Tier 1, 2, and 3 Safety Members hired prior to December 31, 1978, may retire upon reaching age 65 with no service requirement.

PEPRA: Tier 4 General Members are eligible to retire upon attaining age 52 and completing five or more years of service. Tier 4 Safety Members are eligible to retire upon attaining age 50 and completing five or more years of service. Tier 4 Members are eligible to retire, regardless of service, after attaining age 70.

Benefit Amount: The Service Retirement Benefit payable to the Member is equal to the Member's Final Compensation multiplied by credited service, the benefit factor from Table 1, and the age factor from Table 2 corresponding to the Member's code section. The appropriate code sections for each group are listed in Table 1. For General Members in the Merced County Cemetery District and those in Deferred Inactive Reciprocity status prior to March 15, 2005, benefits are calculated using the formula in Government Code Section 31676.11 or 31676.1.

APPENDIX C – SUMMARY OF PLAN PROVISIONS

For Tiers 1, 2, and 3, the percentage of Final Compensation may not exceed 100%. For those members integrated with Social Security, Retirement Benefits based on the first $350 of monthly Final Average Compensation are reduced by one-third.

Table 1:

Group	Open or Closed	FAP	Max COLA	Code Section	Description	Top Retirement Factor Age	Benefit Factor
General Tier 1	Closed	1	3	31676.17	3% at 60	60	2.00%
General Tier 2	Closed	3	0	31676.17	3% at 60	60	2.00%
General Tier 2R (Courts)	Open	3	0	31676.17	3% at 60	60	2.00%
General Tier 2 (Cemetery)	Closed	3	0	31676.11	2% at 58 1/2	65	1.67%
General Tier 2R (Cemetery)	Open	3	0	31676.11	2% at 58 1/2	65	1.67%
General Tier 3	Closed	3	0	31676.1	2.43% at 65	65	1.67%
General Tier 3R	Open	3	0	31676.1	2.43% at 65	65	1.67%
General Tier 4	Open	3	0	7522.20(a)	PEPRA	67	1.00%
Safety Tier 1	Closed	1	3	31664.1	3% at 50	50	3.00%
Safety Tier 2	Closed	3	0	31664.1	3% at 50	50	3.00%
Safety Tier 3	Closed	3	0	31664	2% at 50	55	2.00%
Safety Tier 3R	Open	3	0	31664	2% at 50	55	2.00%
Safety Tier 4	Open	3	0	7522.25(d)	PEPRA	57	1.00%

APPENDIX C – SUMMARY OF PLAN PROVISIONS

Table 2:

Age	General 3% @ 60 CERL: 31676.17	General 2% @ 58 1/2 CERL: 31676.11	General 2.43% @ 65 CERL: 31676.1	General PEPRA GC: 7522.20(a)	Safety 3% @ 50 CERL: 31664.1	Safety 2% @ 50 CERL: 31664	Safety PEPRA GC: 7522.25(d)
41	N/A	N/A	N/A	N/A	0.6258	0.6258	N/A
42	N/A	N/A	N/A	N/A	0.6625	0.6625	N/A
43	N/A	N/A	N/A	N/A	0.7004	0.7004	N/A
44	N/A	N/A	N/A	N/A	0.7397	0.7397	N/A
45	N/A	N/A	N/A	N/A	0.7805	0.7805	N/A
46	N/A	N/A	N/A	N/A	0.8226	0.8226	N/A
47	N/A	N/A	N/A	N/A	0.8678	0.8678	N/A
48	N/A	N/A	N/A	N/A	0.9085	0.9085	N/A
49	N/A	N/A	N/A	N/A	0.9522	0.9522	N/A
50	1.0000	0.7454	0.7091	N/A	1.0000	1.0000	2.0000
51	1.0500	0.7882	0.7457	N/A	1.0000	1.0516	2.1000
52	1.1000	0.8346	0.7816	1.0000	1.0000	1.1078	2.2000
53	1.1500	0.8850	0.8181	1.1000	1.0000	1.1692	2.3000
54	1.2000	0.9399	0.8556	1.2000	1.0000	1.2366	2.4000
55	1.2500	1.0000	0.8954	1.3000	1.0000	1.3099	2.5000
56	1.3000	1.0447	0.9382	1.4000	1.0000	1.3099	2.6000
57	1.3500	1.1048	0.9846	1.5000	1.0000	1.3099	2.7000
58	1.4000	1.1686	1.0350	1.6000	1.0000	1.3099	2.7000
59	1.4500	1.2365	1.0899	1.7000	1.0000	1.3099	2.7000
60	1.5000	1.3093	1.1500	1.8000	1.0000	1.3099	2.7000
61	1.5000	1.3608	1.1947	1.9000	1.0000	1.3099	2.7000
62	1.5000	1.4123	1.2548	2.0000	1.0000	1.3099	2.7000
63	1.5000	1.4638	1.3186	2.1000	1.0000	1.3099	2.7000
64	1.5000	1.5153	1.3865	2.2000	1.0000	1.3099	2.7000
65	1.5000	1.5668	1.4593	2.3000	1.0000	1.3099	2.7000
66	1.5000	1.5668	1.4593	2.4000	1.0000	1.3099	2.7000
67	1.5000	1.5668	1.4593	2.5000	1.0000	1.3099	2.7000

Form of Benefit: The Service Retirement Benefit will be paid monthly beginning at retirement and for the life of the Member. If the member selects the unmodified benefit form, in the event of the Member's death 60% of the benefit will continue for the life of the Member's eligible spouse, domestic partner, or to the age of majority of dependent minor children if there is no eligible spouse or domestic partner. To be eligible to receive this benefit, a surviving spouse or domestic partner must be married or state-registered at least one year prior to retirement. In the event there is no eligible surviving spouse, domestic partner, or minor children, any unpaid remainder of the Member's accumulated contributions will be paid to the Member's designated beneficiary.

Actuarially equivalent optional benefit forms are also available.

APPENDIX C – SUMMARY OF PLAN PROVISIONS

Annually on April 1, Tier 1 benefits are increased to reflect increases in the CPI for the San Francisco Bay Area. Annual increases may not exceed 3%, but CPI increases in excess of 3% are "banked" and used for future increases when the CPI increases by less than 3%.

A lump sum benefit of $3,000 will be payable upon the death of a retired member.

D. Service-Connected Disability

Eligibility: Members are eligible for Service-Connected Disability Retirement benefits at any age if they are permanently disabled as a result of injuries or illness sustained in the line of duty.

Benefit Amount: The Service-Connected Disability Retirement Benefit payable to Members is equal to the greater of 50% of their Final Compensation or – if the Member is eligible at disability for a Service Retirement Benefit – the Service Retirement Benefit accrued on the date of disability.

Members who return to work at a different position with lower pay may receive a Supplemental Disability Allowance that, when added to their new pay, may bring the Member's total income up to the current pay for his or her position at the time of disability. The Supplemental Disability Allowance may not exceed the Service-Connected Disability Retirement benefit.

Form of Benefit: The Service-Connected Disability Retirement Benefit will be paid monthly beginning at the effective date of disability retirement and for the life of the Member; in the event of the Member's death, 100% of the benefit will continue for the life of the Member's eligible spouse, domestic partner, or to the age of majority of dependent minor children if there is no eligible spouse or domestic partner. In the event there is no eligible surviving spouse, domestic partner, or minor children, any unpaid remainder of the Member's accumulated contributions will be paid to the Member's designated beneficiary.

Actuarially equivalent optional benefit forms are also available.

Annually on April 1, Tier 1 benefits are increased to reflect increases in the CPI for the San Francisco Bay Area. Annual increases may not exceed 3%, but CPI increases in excess of 3% are "banked" and used for future increases when the CPI increases by less than 3%.

A lump sum benefit of $3,000 will be payable upon the death of a retired member.

APPENDIX C – SUMMARY OF PLAN PROVISIONS

E. Non Service-Connected Disability

Eligibility: Members are eligible for Non Service-Connected Disability Retirement benefits if they are permanently disabled at any age after earning five years of Credited Service or after becoming eligible for a deferred vested benefit.

Benefit Amount: The Non Service-Connected Disability Retirement Benefit payable to General Members is equal to the greatest of:

- 1.5% of Final Compensation at disability multiplied by years of Credited Service at disability,
- 1.5% of Final Compensation at disability multiplied by years of Credited Service projected to age 65, but not to exceed one-third of Final Compensation, or
- If the Member is eligible at disability for a Service Retirement Benefit, the Service Retirement Benefit accrued on the date of disability.

The Non Service-Connected Disability Retirement Benefit payable to Safety Members is equal to the greatest of:

- 1.8% of Final Compensation at disability multiplied by years of Credited Service at disability,
- 1.8% of Final Compensation at disability multiplied by years of Credited Service projected to age 55, but not to exceed one-third of Final Compensation, or
- If the Member is eligible at disability for a Service Retirement Benefit, the Service Retirement Benefit accrued on the date of disability.

Members who return to work at a different position with lower pay may receive a Supplemental Disability Allowance that, when added to their new pay, may bring the Member's total income up to the current pay for his or her position at the time of disability. The Supplemental Disability Allowance may not exceed the Non Service-Connected Disability Retirement benefit.

APPENDIX C – SUMMARY OF PLAN PROVISIONS

Form of Benefit: The Non Service-Connected Disability Retirement Benefit will be paid monthly beginning at the effective date of disability retirement, and for the life of the Member; in the event of the Member's death, 60% of the benefit will continue for the life of the Member's eligible spouse, domestic partner, or to the age of majority of dependent minor children if there is no spouse. In the event there is no eligible surviving spouse, domestic partner, or minor children, any unpaid remainder of the Member's accumulated contributions will be paid to the Member's designated beneficiary.

Actuarially equivalent optional benefit forms are also available.

Annually on April 1, Tier 1 benefits are increased to reflect increases in the CPI for the San Francisco Bay Area. Annual increases may not exceed 3%, but CPI increases in excess of 3% are "banked" and used for future increases when the CPI increases by less than 3%.

A lump sum benefit of $3,000 will be payable upon the death of a retired member.

F. Service-Connected Death

Eligibility: A Member's survivors are eligible to receive Service-Connected Death benefits if the Member's death resulted from injury or illness sustained in connection with the Member's duties.

Benefit Amount: The Service-Connected Death benefit payable to an eligible surviving spouse, domestic partner, or minor children will be 50% of the Member's Final Compensation.

Furthermore, for Safety Members only, there will be an additional lump sum benefit of 12 months of pay at the time of death. An additional benefit of 25% of the above basic benefit will be paid for the first minor child, 15% for the second, and 10% for the third.

Form of Benefit: The Service-Connected Death Benefit will be paid monthly beginning at the Member's death and for the life of the eligible surviving spouse, domestic partner, or to the age of majority of dependent minor children if there is no eligible surviving spouse or domestic partner.

Annually on April 1, Tier 1 benefits are increased to reflect increases in the CPI for the San Francisco Bay Area. Annual increases may not exceed 3%, but CPI increases in excess of 3% are "banked" and used for future increases when the CPI increases by less than 3%.

APPENDIX C – SUMMARY OF PLAN PROVISIONS

G. Non Service-Connected Death

Eligibility: A Member's survivors are eligible to receive Non Service-Connected Death benefits if the Member's death arose from causes unrelated to the Member's duties.

Benefit Amount: In the event the Member had earned fewer than five years of Credited Service and has no or insufficient reciprocity service from another system, the Non Service-Connected Death benefit will be a refund of the Member's accumulated contributions with interest plus a payment of one month of Final Compensation for each year of Credited Service, not to exceed six months.

In the event the Member had earned five or more years of Credited Service, the Non Service-Connected Death benefit payable to an eligible surviving spouse, domestic partner, or minor children will be 60% of the amount the Member would have received as a Non Service-Connected Disability Retirement Benefit on the date of death.

Form of Benefit: For Members who had earned fewer than five years of Credited Service at death, the benefit will be paid as a lump sum.

For Members with five or more years of Credited Service, the Non Service-Connected Death Benefit will be paid monthly beginning at the Member's death and for the life of the eligible surviving spouse, domestic partner, or to the age of majority of dependent minor children if there is no eligible spouse or domestic partner.

Annually on April 1, Tier 1 benefits are increased to reflect increases in the CPI for the San Francisco Bay Area. Annual increases may not exceed 3%, but CPI increases in excess of 3% are "banked" and used for future increases when the CPI increases by less than 3%.

H. Withdrawal Benefit

Eligibility: A Member is eligible for a Withdrawal Benefit upon termination of employment.

Benefit Amount: The Withdrawal Benefit is a refund of the Member's accumulated Contributions with interest. Upon receipt of the Withdrawal Benefit, the Member forfeits all Credited Service.

Form of Benefit: The Withdrawal Benefit is paid in a lump sum upon election by the Member.

APPENDIX C – SUMMARY OF PLAN PROVISIONS

I. Deferred Vested Benefit

Eligibility: A Member is eligible for a Deferred Vested Benefit upon termination of employment after earning five years of Credited Service, including reciprocity service from another system. The Member must leave his or her Member Contributions with interest on deposit with the Plan.

Benefit Amount: The Deferred Vested Benefit is computed in the same manner as the Service Retirement Benefit, but it is based on Credited Service and Final Compensation on the date of termination.

Form of Benefit: The Deferred Vested Benefit will be paid monthly beginning at retirement and for the life of the Member; in the event of the Member's death, 60% of the benefit will continue for the life of the Member's eligible surviving spouse, domestic partner, or to the age of majority of dependent minor children if there is no eligible surviving spouse or domestic partner. In the event there is no eligible surviving spouse, domestic partner, or minor children, any unpaid remainder of the Member's accumulated contributions will be paid to the Member's designated beneficiary.

Actuarially equivalent optional benefit forms are also available.

Annually on April 1, Tier 1 benefits are increased to reflect increases in the CPI for the San Francisco Bay Area. Annual increases may not exceed 3%, but CPI increases in excess of 3% are "banked" and used for future increases when the CPI increases by less than 3%.

A lump sum benefit of $3,000 will be payable upon the death of a retired member.

J. Reciprocal Benefit

Eligibility: A Member is eligible for a Reciprocal Benefit upon termination of employment and entry, within a specified period of time, into another retirement system recognized as a reciprocal system by the Plan. In addition, the Member must leave his or her Member Contributions with interest on deposit with the Plan.

Benefit Amount: The Reciprocal Benefit is computed in the same manner as the Service Retirement Benefit, but it is based on Credited Service on the date of termination and Final Compensation on the date of retirement; Final Compensation is based on the highest of the Compensation earned under this Plan or the reciprocal plan.

APPENDIX C – SUMMARY OF PLAN PROVISIONS

Form of Benefit: The Reciprocal Benefit will be paid monthly beginning at retirement and for the life of the Member; in the event of the Member's death, 60% of the benefit will continue for the life of the Member's eligible surviving spouse, domestic partner, or to the age of majority of dependent minor children if there is no eligible surviving spouse or domestic partner. In the event there is no eligible surviving spouse, domestic partner, or minor children, any unpaid remainder of the Member's accumulated contributions will be paid to the Member's designated beneficiary.

Actuarially equivalent optional benefit forms are also available.

Annually on April 1, Tier 1 benefits are increased to reflect increases in the CPI for the San Francisco Bay Area. Annual increases may not exceed 3%, but CPI increases in excess of 3% are "banked" and used for future increases when the CPI increases by less than 3%.

A lump sum benefit may be payable upon the death of a retired Member by the last system under which the Member's service was covered.

K. Changes Since Last Valuation

None

APPENDIX D – MEMBER CONTRIBUTION RATES

Contribution Rates

Employee contribution rates vary by member Group and Tier. For non-PEPRA members, the rates were updated this year, following an experience study covering the period July 1, 2016 – June 30, 2019. For PEPRA members, the Rates were also re-computed, in accordance with the requirement that employees pay half of the total normal cost rate from the actuarial valuation.

Non-PEPRA Members

- The basic rates are determined based on Government Code Section 31621.8 for General Tier 1 and Tier 2 members (31621.1 for Tier 2 members under benefit section 31676.11), 31621 for General Tier 3 members, and Section 31639.25 for Safety members. The COLA Rates for members in Tier 1 are determined based on 50% of the normal cost associated with the expected COLA benefits, including joint and survivor benefits, determined for each individual entry age.
- The rates are determined based on an interest rate of 7.00% per annum, an average salary increase of 2.75% per year (plus service-based increases for merit/longevity and the additional final average compensation load – except for the new County Tier 3R and Court Tier 2R), and the healthy annuitant mortality tables used in the most recent valuation, projected using Projection Scale MP-2019 to 2041. The rates are blended based on a male/female weighting of 30% male / 70% female for General members, and 70% male / 30% female for Safety members.
- Effective with the June 30, 2013 valuation, an administrative expense load was added to the rates. The expense load added is currently 2.86%. This load was determined to account for the employees' share of the assumed administrative expense assumption, assuming the employer and employees would share administrative expenses in proportion to their overall share of the contributions. The load produces an average increase in the employee rates of approximately 0.24% of payroll.

PEPRA Members

- Employee contribution rates are equal to half of the total normal cost rate from the actuarial valuation, determined separately for General and Safety. Due to the passage of SB13, contribution rates for PEPRA members are not rounded, and will be recomputed each year.
- An administrative expenses load of 2.86% was applied to the PEPRA rates.

APPENDIX D – MEMBER CONTRIBUTION RATES

Current Year Contribution Rates (General Non-PEPRA):

	Tier 1						Tier 2		Tier 2R (Courts)		Tier 3		Tier 3R	
	Basic		COLA		Total		Basic		Basic		Basic		Basic	
Entry Age	First $350	Over $350	First $350	Over $350	First $350	Over $350	First $350	Over $350	First $350	Over $350	First $350	Over $350	First $350	Over $350
16	5.44%	8.16%	1.47%	2.20%	6.91%	10.36%	5.04%	7.56%	4.97%	7.45%	3.61%	5.42%	3.56%	5.34%
17	5.44%	8.16%	1.47%	2.20%	6.91%	10.36%	5.04%	7.56%	4.97%	7.45%	3.61%	5.42%	3.56%	5.34%
18	5.44%	8.16%	1.47%	2.20%	6.91%	10.36%	5.04%	7.56%	4.97%	7.45%	3.61%	5.42%	3.56%	5.34%
19	5.44%	8.16%	1.47%	2.20%	6.91%	10.36%	5.04%	7.56%	4.97%	7.45%	3.61%	5.42%	3.56%	5.34%
20	5.44%	8.16%	1.47%	2.20%	6.91%	10.36%	5.04%	7.56%	4.97%	7.45%	3.61%	5.42%	3.56%	5.34%
21	5.54%	8.31%	1.51%	2.27%	7.05%	10.58%	5.14%	7.71%	5.07%	7.60%	3.68%	5.52%	3.63%	5.44%
22	5.66%	8.49%	1.56%	2.35%	7.22%	10.84%	5.25%	7.87%	5.16%	7.75%	3.75%	5.64%	3.70%	5.55%
23	5.77%	8.65%	1.61%	2.42%	7.38%	11.07%	5.35%	8.02%	5.28%	7.91%	3.84%	5.75%	3.77%	5.66%
24	5.88%	8.83%	1.66%	2.49%	7.54%	11.32%	5.46%	8.19%	5.38%	8.06%	3.91%	5.86%	3.85%	5.77%
25	6.00%	9.00%	1.72%	2.57%	7.72%	11.57%	5.56%	8.35%	5.48%	8.23%	3.98%	5.98%	3.93%	5.89%
26	6.12%	9.19%	1.76%	2.64%	7.88%	11.83%	5.68%	8.52%	5.60%	8.39%	4.06%	6.10%	4.00%	6.01%
27	6.24%	9.37%	1.81%	2.72%	8.05%	12.09%	5.79%	8.69%	5.71%	8.57%	4.15%	6.22%	4.08%	6.13%
28	6.38%	9.57%	1.86%	2.79%	8.24%	12.36%	5.91%	8.88%	5.83%	8.74%	4.23%	6.35%	4.17%	6.25%
29	6.51%	9.77%	1.90%	2.86%	8.41%	12.63%	6.04%	9.06%	5.96%	8.93%	4.31%	6.47%	4.25%	6.38%
30	6.66%	9.98%	1.95%	2.93%	8.61%	12.91%	6.16%	9.25%	6.08%	9.11%	4.40%	6.60%	4.33%	6.50%
31	6.79%	10.18%	2.00%	2.99%	8.79%	13.17%	6.30%	9.44%	6.20%	9.31%	4.49%	6.74%	4.42%	6.63%
32	6.94%	10.41%	2.05%	3.08%	8.99%	13.49%	6.43%	9.65%	6.34%	9.50%	4.58%	6.87%	4.52%	6.77%
33	7.09%	10.64%	2.10%	3.15%	9.19%	13.79%	6.57%	9.85%	6.47%	9.71%	4.68%	7.02%	4.61%	6.91%
34	7.25%	10.87%	2.15%	3.23%	9.40%	14.10%	6.72%	10.07%	6.61%	9.92%	4.77%	7.16%	4.70%	7.06%
35	7.41%	11.11%	2.20%	3.30%	9.61%	14.41%	6.85%	10.28%	6.75%	10.12%	4.88%	7.31%	4.80%	7.20%
36	7.56%	11.34%	2.26%	3.39%	9.82%	14.73%	6.98%	10.47%	6.88%	10.32%	4.98%	7.47%	4.91%	7.35%
37	7.70%	11.56%	2.32%	3.49%	10.02%	15.05%	7.11%	10.67%	7.00%	10.51%	5.09%	7.63%	5.01%	7.52%
38	7.86%	11.79%	2.39%	3.58%	10.25%	15.37%	7.23%	10.85%	7.13%	10.70%	5.19%	7.80%	5.12%	7.68%
39	8.00%	12.00%	2.45%	3.67%	10.45%	15.67%	7.35%	11.04%	7.25%	10.87%	5.31%	7.96%	5.23%	7.84%
40	8.14%	12.21%	2.52%	3.77%	10.66%	15.98%	7.48%	11.21%	7.36%	11.05%	5.42%	8.13%	5.34%	8.00%
41	8.28%	12.42%	2.54%	3.82%	10.82%	16.24%	7.58%	11.37%	7.47%	11.20%	5.52%	8.28%	5.44%	8.16%
42	8.40%	12.61%	2.57%	3.86%	10.97%	16.47%	7.68%	11.52%	7.56%	11.35%	5.63%	8.43%	5.54%	8.31%
43	8.52%	12.78%	2.59%	3.89%	11.11%	16.67%	7.77%	11.64%	7.65%	11.48%	5.72%	8.58%	5.64%	8.46%
44	8.63%	12.94%	2.60%	3.91%	11.23%	16.85%	7.85%	11.77%	7.72%	11.59%	5.81%	8.72%	5.73%	8.60%
45	8.71%	13.07%	2.62%	3.93%	11.33%	17.00%	7.91%	11.86%	7.79%	11.68%	5.91%	8.87%	5.82%	8.73%
46	8.80%	13.21%	2.62%	3.93%	11.42%	17.14%	7.96%	11.94%	7.85%	11.77%	6.00%	8.99%	5.90%	8.86%
47	8.88%	13.32%	2.62%	3.94%	11.50%	17.26%	7.99%	11.99%	7.88%	11.82%	6.07%	9.10%	5.98%	8.97%
48	8.93%	13.39%	2.62%	3.93%	11.55%	17.32%	8.00%	12.00%	7.89%	11.83%	6.14%	9.21%	6.05%	9.07%
49	8.95%	13.42%	2.60%	3.90%	11.55%	17.32%	7.98%	11.97%	7.87%	11.80%	6.20%	9.30%	6.11%	9.16%
50	8.94%	13.41%	2.55%	3.83%	11.49%	17.24%	7.94%	11.91%	7.83%	11.74%	6.25%	9.38%	6.16%	9.24%
51	8.90%	13.35%	2.50%	3.75%	11.40%	17.10%	7.87%	11.81%	7.76%	11.63%	6.30%	9.44%	6.20%	9.30%
52	8.84%	13.26%	2.46%	3.68%	11.30%	16.94%	7.79%	11.67%	7.66%	11.50%	6.33%	9.48%	6.22%	9.34%
53	8.75%	13.12%	2.41%	3.61%	11.16%	16.73%	8.03%	12.06%	7.92%	11.88%	6.33%	9.48%	6.23%	9.35%
54	8.63%	12.95%	2.36%	3.54%	10.99%	16.49%	8.30%	12.46%	8.18%	12.27%	6.31%	9.46%	6.22%	9.33%
55	8.55%	12.83%	2.30%	3.46%	10.85%	16.29%	8.23%	12.34%	8.11%	12.16%	6.27%	9.41%	6.18%	9.28%
56	8.47%	12.70%	2.22%	3.33%	10.69%	16.03%	8.15%	12.22%	8.03%	12.04%	6.22%	9.34%	6.13%	9.20%
57	8.38%	12.57%	2.15%	3.22%	10.53%	15.79%	8.06%	12.10%	7.94%	11.91%	6.15%	9.23%	6.06%	9.09%
58	8.29%	12.44%	2.08%	3.12%	10.37%	15.56%	7.97%	11.96%	7.86%	11.79%	6.36%	9.54%	6.26%	9.39%
59+	8.19%	12.28%	2.03%	3.03%	10.22%	15.31%	7.88%	11.82%	7.77%	11.64%	6.56%	9.84%	6.47%	9.70%

APPENDIX D – MEMBER CONTRIBUTION RATES

Current Year Contribution Rates (Safety Non-PEPRA):

	Tier 1						Tiers 2 and 3		Tier 3R	
	Basic		COLA		Total		Basic		Basic	
Entry Age	First $350	Over $350	First $350	Over $350	First $350	Over $350	First $350	Over $350	First $350	Over $350
20	5.94%	8.90%	2.30%	3.46%	8.24%	12.36%	5.38%	8.06%	5.30%	7.95%
21	6.05%	9.07%	2.37%	3.55%	8.42%	12.62%	5.48%	8.22%	5.40%	8.10%
22	6.16%	9.24%	2.44%	3.65%	8.60%	12.89%	5.59%	8.37%	5.50%	8.25%
23	6.27%	9.41%	2.50%	3.74%	8.77%	13.15%	5.69%	8.53%	5.61%	8.40%
24	6.40%	9.60%	2.56%	3.85%	8.96%	13.45%	5.79%	8.69%	5.71%	8.57%
25	6.52%	9.78%	2.62%	3.94%	9.14%	13.72%	5.90%	8.86%	5.82%	8.73%
26	6.64%	9.97%	2.68%	4.03%	9.32%	14.00%	6.02%	9.03%	5.94%	8.90%
27	6.77%	10.15%	2.75%	4.12%	9.52%	14.27%	6.14%	9.21%	6.04%	9.06%
28	6.90%	10.35%	2.80%	4.20%	9.70%	14.55%	6.25%	9.38%	6.16%	9.24%
29	7.04%	10.55%	2.83%	4.25%	9.87%	14.80%	6.38%	9.57%	6.28%	9.42%
30	7.17%	10.76%	2.85%	4.27%	10.02%	15.03%	6.50%	9.75%	6.41%	9.61%
31	7.31%	10.98%	2.90%	4.35%	10.21%	15.33%	6.63%	9.95%	6.53%	9.79%
32	7.46%	11.19%	2.94%	4.41%	10.40%	15.60%	6.76%	10.14%	6.66%	9.99%
33	7.62%	11.43%	2.99%	4.48%	10.61%	15.91%	6.90%	10.35%	6.80%	10.19%
34	7.78%	11.66%	3.04%	4.57%	10.82%	16.23%	7.05%	10.56%	6.94%	10.41%
35	7.94%	11.91%	3.13%	4.69%	11.07%	16.60%	7.19%	10.79%	7.09%	10.63%
36	8.12%	12.17%	3.21%	4.81%	11.33%	16.98%	7.35%	11.03%	7.24%	10.86%
37	8.30%	12.45%	3.30%	4.95%	11.60%	17.40%	7.52%	11.27%	7.41%	11.11%
38	8.50%	12.74%	3.38%	5.08%	11.88%	17.82%	7.68%	11.53%	7.57%	11.36%
39	8.71%	13.06%	3.48%	5.22%	12.19%	18.28%	7.84%	11.76%	7.72%	11.58%
40	8.90%	13.35%	3.57%	5.36%	12.47%	18.71%	7.97%	11.96%	7.86%	11.79%
41	9.06%	13.60%	3.58%	5.37%	12.64%	18.97%	8.08%	12.13%	7.97%	11.95%
42	9.21%	13.81%	3.63%	5.44%	12.84%	19.25%	8.18%	12.26%	8.05%	12.09%
43	9.33%	14.00%	3.69%	5.53%	13.02%	19.53%	8.24%	12.35%	8.12%	12.17%
44	9.43%	14.15%	3.75%	5.63%	13.18%	19.78%	8.25%	12.37%	8.13%	12.19%
45	9.47%	14.22%	3.79%	5.68%	13.26%	19.90%	8.22%	12.32%	8.10%	12.14%
46	9.46%	14.19%	3.81%	5.71%	13.27%	19.90%	8.13%	12.19%	8.01%	12.01%
47	9.39%	14.08%	3.84%	5.76%	13.23%	19.84%	7.99%	11.99%	7.87%	11.81%
48	9.26%	13.89%	3.90%	5.85%	13.16%	19.74%	8.25%	12.37%	8.14%	12.20%
49+	9.07%	13.61%	3.99%	5.99%	13.06%	19.60%	8.53%	12.79%	8.40%	12.60%

APPENDIX D – MEMBER CONTRIBUTION RATES

Prior Year Contribution Rates (General Non-PEPRA):

	Tier 1						Tier 2		Tier 2 (Cemetery)		Tier 2R (Cemetery)		Tier 2R (Courts)		Tier 3		Tier 3R	
	Basic		COLA		Total		Basic		Basic		Basic		Basic		Basic		Basic	
Entry Age	First $350	Over $350	First $350	Over $350	First $350	Over $350	First $350	Over $350	First $350	Over $350	First $350	Over $350	First $350	Over $350	First $350	Over $350	First $350	Over $350
16	4.63%	6.94%	1.09%	1.64%	5.72%	8.58%	4.29%	6.43%	3.58%	5.36%	3.50%	5.24%	4.20%	6.29%	3.00%	4.50%	2.94%	4.40%
17	4.63%	6.94%	1.09%	1.64%	5.72%	8.58%	4.29%	6.43%	3.58%	5.36%	3.50%	5.24%	4.20%	6.29%	3.00%	4.50%	2.94%	4.40%
18	4.63%	6.94%	1.09%	1.64%	5.72%	8.58%	4.29%	6.43%	3.58%	5.36%	3.50%	5.24%	4.20%	6.29%	3.00%	4.50%	2.94%	4.40%
19	4.63%	6.94%	1.09%	1.64%	5.72%	8.58%	4.29%	6.43%	3.58%	5.36%	3.50%	5.24%	4.20%	6.29%	3.00%	4.50%	2.94%	4.40%
20	4.63%	6.94%	1.09%	1.64%	5.72%	8.58%	4.29%	6.43%	3.58%	5.36%	3.50%	5.24%	4.20%	6.29%	3.00%	4.50%	2.94%	4.40%
21	4.73%	7.10%	1.14%	1.71%	5.87%	8.81%	4.39%	6.59%	3.66%	5.49%	3.58%	5.37%	4.30%	6.44%	3.08%	4.62%	3.01%	4.51%
22	4.86%	7.28%	1.19%	1.78%	6.05%	9.06%	4.50%	6.75%	3.75%	5.63%	3.67%	5.50%	4.40%	6.60%	3.15%	4.73%	3.08%	4.63%
23	4.98%	7.46%	1.24%	1.86%	6.22%	9.32%	4.61%	6.92%	3.84%	5.77%	3.75%	5.63%	4.50%	6.76%	3.23%	4.84%	3.16%	4.74%
24	5.10%	7.65%	1.29%	1.93%	6.39%	9.58%	4.73%	7.09%	3.94%	5.91%	3.85%	5.78%	4.62%	6.93%	3.31%	4.97%	3.24%	4.86%
25	5.23%	7.83%	1.33%	2.00%	6.56%	9.83%	4.84%	7.27%	4.03%	6.06%	3.94%	5.92%	4.73%	7.10%	3.39%	5.09%	3.32%	4.98%
26	5.35%	8.03%	1.38%	2.07%	6.73%	10.10%	4.96%	7.44%	4.13%	6.20%	4.05%	6.07%	4.86%	7.28%	3.47%	5.22%	3.40%	5.10%
27	5.48%	8.23%	1.43%	2.15%	6.91%	10.38%	5.08%	7.63%	4.23%	6.36%	4.14%	6.21%	4.97%	7.45%	3.57%	5.35%	3.48%	5.23%
28	5.62%	8.43%	1.49%	2.24%	7.11%	10.67%	5.22%	7.82%	4.35%	6.52%	4.24%	6.37%	5.09%	7.64%	3.65%	5.47%	3.57%	5.35%
29	5.76%	8.65%	1.55%	2.32%	7.31%	10.97%	5.35%	8.02%	4.46%	6.68%	4.36%	6.53%	5.23%	7.83%	3.74%	5.62%	3.66%	5.48%
30	5.91%	8.86%	1.60%	2.40%	7.51%	11.26%	5.47%	8.22%	4.56%	6.85%	4.46%	6.69%	5.35%	8.03%	3.83%	5.75%	3.74%	5.62%
31	6.06%	9.09%	1.66%	2.48%	7.72%	11.57%	5.62%	8.42%	4.68%	7.02%	4.58%	6.87%	5.49%	8.24%	3.93%	5.90%	3.84%	5.76%
32	6.22%	9.32%	1.71%	2.57%	7.93%	11.89%	5.76%	8.64%	4.80%	7.20%	4.69%	7.03%	5.63%	8.44%	4.03%	6.04%	3.94%	5.91%
33	6.38%	9.57%	1.76%	2.65%	8.14%	12.22%	5.90%	8.84%	4.92%	7.37%	4.80%	7.21%	5.76%	8.65%	4.13%	6.20%	4.03%	6.05%
34	6.55%	9.81%	1.82%	2.73%	8.37%	12.54%	6.03%	9.05%	5.03%	7.54%	4.92%	7.37%	5.90%	8.84%	4.24%	6.35%	4.13%	6.21%
35	6.68%	10.02%	1.88%	2.81%	8.56%	12.83%	6.16%	9.25%	5.13%	7.71%	5.02%	7.53%	6.02%	9.03%	4.34%	6.50%	4.24%	6.36%
36	6.82%	10.24%	1.94%	2.91%	8.76%	13.15%	6.30%	9.44%	5.25%	7.87%	5.13%	7.69%	6.15%	9.23%	4.44%	6.67%	4.35%	6.52%
37	6.98%	10.46%	2.00%	3.00%	8.98%	13.46%	6.43%	9.65%	5.36%	8.04%	5.24%	7.86%	6.29%	9.43%	4.57%	6.84%	4.46%	6.69%
38	7.12%	10.69%	2.06%	3.09%	9.18%	13.78%	6.57%	9.84%	5.48%	8.20%	5.35%	8.03%	6.42%	9.63%	4.67%	7.01%	4.57%	6.85%
39	7.29%	10.94%	2.11%	3.17%	9.40%	14.11%	6.69%	10.04%	5.58%	8.37%	5.46%	8.18%	6.55%	9.81%	4.77%	7.16%	4.67%	7.01%
40	7.42%	11.13%	2.16%	3.25%	9.58%	14.38%	6.81%	10.23%	5.68%	8.53%	5.55%	8.33%	6.66%	9.99%	4.88%	7.32%	4.77%	7.15%
41	7.56%	11.34%	2.19%	3.28%	9.75%	14.62%	6.94%	10.41%	5.78%	8.68%	5.66%	8.48%	6.79%	10.18%	4.99%	7.48%	4.88%	7.31%
42	7.71%	11.57%	2.21%	3.31%	9.92%	14.88%	7.08%	10.62%	5.90%	8.85%	5.77%	8.64%	6.92%	10.37%	5.09%	7.64%	4.98%	7.47%
43	7.87%	11.79%	2.23%	3.34%	10.10%	15.13%	7.21%	10.80%	6.01%	9.00%	5.87%	8.81%	7.04%	10.57%	5.21%	7.80%	5.08%	7.63%
44	8.02%	12.03%	2.25%	3.37%	10.27%	15.40%	7.33%	11.00%	6.11%	9.17%	5.97%	8.96%	7.16%	10.75%	5.30%	7.95%	5.18%	7.77%
45	8.15%	12.24%	2.27%	3.40%	10.42%	15.64%	7.45%	11.18%	6.21%	9.32%	6.08%	9.11%	7.29%	10.93%	5.40%	8.10%	5.28%	7.92%
46	8.30%	12.45%	2.28%	3.41%	10.58%	15.86%	7.59%	11.38%	6.33%	9.48%	6.18%	9.27%	7.41%	11.12%	5.49%	8.25%	5.37%	8.06%
47	8.46%	12.70%	2.29%	3.43%	10.75%	16.13%	7.71%	11.57%	6.43%	9.64%	6.28%	9.43%	7.54%	11.31%	5.61%	8.41%	5.47%	8.22%
48	8.65%	12.97%	2.30%	3.45%	10.95%	16.42%	7.78%	11.67%	6.48%	9.73%	6.34%	9.51%	7.61%	11.41%	5.70%	8.56%	5.58%	8.37%
49	8.77%	13.16%	2.32%	3.47%	11.09%	16.63%	7.80%	11.70%	6.50%	9.75%	6.35%	9.53%	7.62%	11.43%	5.80%	8.71%	5.68%	8.51%
50	8.77%	13.15%	2.32%	3.48%	11.09%	16.63%	7.79%	11.69%	6.49%	9.74%	6.35%	9.52%	7.62%	11.42%	5.91%	8.85%	5.77%	8.66%
51	8.77%	13.15%	2.30%	3.45%	11.07%	16.60%	7.74%	11.62%	6.45%	9.68%	6.32%	9.47%	7.58%	11.36%	6.01%	9.01%	5.88%	8.81%
52	8.78%	13.17%	2.26%	3.39%	11.04%	16.56%	7.67%	11.50%	6.39%	9.58%	6.24%	9.37%	7.49%	11.24%	6.11%	9.16%	5.97%	8.96%
53	8.67%	13.01%	2.22%	3.32%	10.89%	16.33%	7.93%	11.89%	6.61%	9.91%	6.45%	9.68%	7.74%	11.62%	6.16%	9.25%	6.02%	9.03%
54	8.57%	12.85%	2.16%	3.25%	10.73%	16.10%	8.19%	12.30%	6.83%	10.25%	6.68%	10.02%	8.01%	12.02%	6.17%	9.27%	6.04%	9.06%
55	8.49%	12.74%	2.12%	3.19%	10.61%	15.93%	8.13%	12.19%	6.78%	10.16%	6.63%	9.93%	7.95%	11.92%	6.17%	9.26%	6.03%	9.05%
56	8.41%	12.62%	2.05%	3.08%	10.46%	15.70%	8.05%	12.08%	6.71%	10.07%	6.56%	9.83%	7.87%	11.80%	6.13%	9.21%	6.00%	9.00%
57	8.33%	12.49%	1.99%	2.99%	10.32%	15.48%	7.97%	11.96%	6.64%	9.97%	6.49%	9.74%	7.79%	11.69%	6.07%	9.11%	5.94%	8.91%
58	8.24%	12.36%	1.93%	2.90%	10.17%	15.26%	7.89%	11.82%	6.58%	9.85%	6.42%	9.63%	7.70%	11.56%	6.28%	9.41%	6.13%	9.21%
59+	8.14%	12.21%	1.88%	2.81%	10.02%	15.02%	7.79%	11.69%	6.49%	9.74%	6.35%	9.52%	7.62%	11.42%	6.49%	9.74%	6.35%	9.52%

APPENDIX D – MEMBER CONTRIBUTION RATES

Prior Year Contribution Rates (Safety Non-PEPRA):

	Tier 1						Tiers 2 and 3		Tier 3R	
	Basic		COLA		Total		Basic		Basic	
Entry Age	First $350	Over $350	First $350	Over $350	First $350	Over $350	First $350	Over $350	First $350	Over $350
20	5.22%	7.82%	2.09%	3.13%	7.31%	10.95%	4.83%	7.25%	4.72%	7.08%
21	5.34%	8.01%	2.15%	3.24%	7.49%	11.25%	4.95%	7.42%	4.83%	7.26%
22	5.47%	8.21%	2.24%	3.35%	7.71%	11.56%	5.07%	7.61%	4.96%	7.43%
23	5.60%	8.40%	2.30%	3.45%	7.90%	11.85%	5.20%	7.79%	5.08%	7.62%
24	5.74%	8.61%	2.38%	3.57%	8.12%	12.18%	5.32%	7.98%	5.20%	7.79%
25	5.88%	8.81%	2.44%	3.67%	8.32%	12.48%	5.45%	8.17%	5.33%	7.99%
26	6.02%	9.03%	2.52%	3.77%	8.54%	12.80%	5.58%	8.37%	5.45%	8.18%
27	6.17%	9.26%	2.58%	3.87%	8.75%	13.13%	5.72%	8.58%	5.59%	8.38%
28	6.32%	9.48%	2.64%	3.96%	8.96%	13.44%	5.84%	8.77%	5.72%	8.58%
29	6.48%	9.72%	2.70%	4.05%	9.18%	13.77%	5.98%	8.97%	5.84%	8.76%
30	6.61%	9.92%	2.75%	4.13%	9.36%	14.05%	6.09%	9.14%	5.96%	8.94%
31	6.74%	10.11%	2.79%	4.19%	9.53%	14.30%	6.22%	9.33%	6.08%	9.12%
32	6.88%	10.32%	2.82%	4.24%	9.70%	14.56%	6.34%	9.51%	6.20%	9.30%
33	7.02%	10.52%	2.87%	4.30%	9.89%	14.82%	6.47%	9.71%	6.33%	9.49%
34	7.16%	10.74%	2.92%	4.38%	10.08%	15.12%	6.61%	9.92%	6.46%	9.69%
35	7.31%	10.97%	2.98%	4.47%	10.29%	15.44%	6.75%	10.12%	6.59%	9.89%
36	7.47%	11.20%	3.07%	4.61%	10.54%	15.81%	6.89%	10.33%	6.73%	10.10%
37	7.63%	11.44%	3.16%	4.74%	10.79%	16.18%	7.04%	10.56%	6.88%	10.32%
38	7.80%	11.70%	3.26%	4.89%	11.06%	16.59%	7.18%	10.77%	7.02%	10.53%
39	7.98%	11.97%	3.36%	5.04%	11.34%	17.01%	7.33%	10.99%	7.16%	10.74%
40	8.13%	12.19%	3.47%	5.21%	11.60%	17.40%	7.46%	11.19%	7.29%	10.94%
41	8.29%	12.43%	3.48%	5.23%	11.77%	17.66%	7.61%	11.41%	7.43%	11.15%
42	8.46%	12.70%	3.52%	5.27%	11.98%	17.97%	7.77%	11.66%	7.60%	11.39%
43	8.66%	12.99%	3.56%	5.34%	12.22%	18.33%	7.91%	11.86%	7.73%	11.60%
44	8.88%	13.32%	3.62%	5.42%	12.50%	18.74%	7.99%	11.99%	7.81%	11.72%
45	9.02%	13.53%	3.68%	5.51%	12.70%	19.04%	8.01%	12.02%	7.83%	11.75%
46	9.02%	13.53%	3.72%	5.58%	12.74%	19.11%	7.97%	11.95%	7.78%	11.67%
47	9.05%	13.58%	3.76%	5.65%	12.81%	19.23%	7.87%	11.80%	7.69%	11.53%
48	8.92%	13.38%	3.84%	5.76%	12.76%	19.14%	8.13%	12.19%	7.95%	11.93%
49+	8.79%	13.18%	3.94%	5.91%	12.73%	19.09%	8.41%	12.62%	8.23%	12.34%

APPENDIX D – MEMBER CONTRIBUTION RATES

Current Year Contribution Rates (PEPRA):

PEPRA Rates		
	General	**Safety**
	6.92%	10.68%
Assumptions:		
Interest	7.00%	
Salary	2019 Valuation Scale (service-based, includes inflation at 2.5%)	
Mortality	CalPERS 2009 / PubS(B) 2010 tables, projected with MP-2019	
Other	Same as June 30, 2019 valuation (see Appendix B)	

Prior Year Contribution Rates (PEPRA):

PEPRA Rates		
	General	**Safety**
	5.95%	10.29%
Assumptions:		
Interest	7.25%	
Salary	2018 Valuation Scale (service-based, includes inflation at 2.5%)	
Mortality	CalPERS 2009 tables, projected with MP-2016	
Other	Same as June 30, 2018 valuation (see Appendix B)	

APPENDIX E – GLOSSARY

1. Actuarial Assumptions

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

2. Actuarial Cost Method

A procedure for determining the Actuarial Present Value of Pension Plan Benefits and expenses and for developing an allocation of such value to each year of service, usually in the form of a normal cost and an Actuarial Liability.

3. Actuarial Gain (Loss)

The difference between actual experience and that expected based upon a set of actuarial assumptions during the period between two actuarial valuation dates, as determined in accordance with a particular actuarial cost method.

4. Actuarial Liability

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

5. Actuarial Present Value (Present Value)

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

6. Actuarial Valuation

The determination, as of a specified date, of the normal cost, Actuarial Liability, Actuarial Value of Assets, and related actuarial present values for a pension plan.

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. No longer applicable as of the June 30, 2014 actuarial valuation.

APPENDIX E – GLOSSARY

8. Actuarially Equivalent

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

9. Amortization Payment

The portion of the pension plan contribution 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 Market 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 Market Value of Assets.

CHEIRON

Classic Values, Innovative Advice

Classic Values, Innovative Advice

Item 1

Merced County Employees' Retirement Association

Actuarial Experience Study for July 1, 2016 through June 30, 2019

Produced by Cheiron

February 2020

TABLE OF CONTENTS

February 19, 2020

Retirement Board of Merced
County Employees' Retirement Association
3199 M Street
Merced, CA 95348

Dear Members of the Board:

The purpose of this report is to provide the results of an Actuarial Experience Study of the Merced County Employees' Retirement Association (MCERA) covering actuarial experience from July 1, 2016 through June 30, 2019. This report is for the use of the MCERA Retirement Board in selecting assumptions to be used in actuarial valuations beginning June 30, 2019.

In preparing our report, we relied on information (some oral and some written) supplied by MCERA. This information includes, but is not limited to, the 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.

This report and its contents have been prepared in accordance with generally recognized and accepted actuarial principles and practices and our understanding of the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board as well as applicable laws and regulations. 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.

This report was prepared for the Retirement Board of MCERA for the purposes described herein. This report is not intended to benefit any other party, and Cheiron assumes no duty or liability to any such party.

If you have any questions about the report or would like additional information, please let us know.

Sincerely,
Cheiron

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

Anne Harper, FSA, MAAA, EA
Principal Consulting Actuary

SECTION I – EXECUTIVE SUMMARY

Actuarial assumptions (economic and demographic) are intended to be long-term in nature, and should be both individually reasonable and consistent in the aggregate. The purpose of this experience study is to evaluate whether or not the current assumptions adequately reflect the long-term expectations for MCERA, and if not, to recommend adjustments. It is important to note that frequent and significant changes in the actuarial assumptions are not typically recommended, unless there are known fundamental changes in expectations of the economy, or with respect to MCERA's membership or assets that would warrant such frequent or significant changes.

SUMMARY OF ECONOMIC ASSUMPTION ANALYSIS

The specific economic assumptions analyzed in this report are price inflation, wage inflation, COLA growth, and the discount rate. These assumptions have a significant impact on the contribution rates in the short-term and the risk of negative outcomes in the long-term.

The Retirement Board recently adopted the following economic assumptions at their December 12, 2019 Board Meeting:

- Long-term rate of return on Plan assets decreased to 7.00% from 7.25%,
- Maintain price inflation measured by the Consumer Price Index (CPI) of 2.50%,
- Maintain annual wage increase of 2.75%, and
- Post-retirement COLA average growth rate of 2.40% for Tier 1 members.

The nominal discount rate assumption is considerably less than the geometric average 20-year return of 8.00% for the current target portfolio based on the 2019 capital market assumptions provided by Meketa, the Plan's investment consultant. Based on these capital market assumptions, the real return adopted by the Board (4.50%) has a 59% chance of being achieved. We note that the capital market assumptions from 2018 provided by Meketa would have projected a significantly lower likelihood of achieving these benchmarks, though still greater than 50%: 53% for the 7.00% nominal return and 52% for the 4.50% real return. We also reviewed the 2018 and 2019 capital market assumptions from other investment consultants, and in aggregate they forecast a slightly higher than 50% chance of achieving the 7.00% nominal return and the 4.50% real return.

Other data presented in this report support the finding that the discount rate and other economic assumptions adopted by the Retirement Board are reasonable.

SUMMARY OF DEMOGRAPHIC ASSUMPTION ANALYSIS

This experience study specifically analyzes and makes the following recommendations for the demographic assumptions:

- **Retirement rates**
    - General – Change from gender specific to unisex tables; and combine of service groupings for less than 20 years and 20-29 years.
    - Safety – Adjustments to rates at all service levels.
    - No change to the approach recommended for PEPRA tiers due to lack of experience.
- **Termination rates**
    - General – Adjustments to the male rates for years of service less than two and female rates for years of service less than 15.
    - Safety – Adjustments to rates for years of service less than 19.
- **Disability rates**
    - General – Change the rates to the CalPERS Public Agency State Miscellaneous Non-Industrial Table, blended 30% male and 70% female.
    - Safety – No change.
- **Mortality base rates**
    - General – No change (i.e. CalPERS base tables, with generational improvement for all members.
    - Safety – Change to 2010 Public Safety Below Median tables, with generational improvement, for healthy annuitants (adjusted by 105%) and active employees (no adjustment). No change to disabled members and line-of-duty active deaths (i.e. continue to use CalPERS base tables).
- **Mortality improvement -** Update improvement scale from SOA MP-2016 to MP-2019 for all groups.
- **Merit salary increases** – Increase ultimate rate and the rates for most service points for both General and Safety.
- **Other assumptions** – Adjustments to other assumptions, including the withdrawal and reciprocal transfer rates, deferred retirement commencement age, family composition and terminal pay load assumptions.

The body of this report provides additional detail and support for our conclusions and recommendations.

COST OF ECONOMIC AND DEMOGRAPHIC ASSUMPTION CHANGES

The change in the discount rate had the largest impact on the total Plan (employer plus employee) cost. Among the demographic assumptions, the recommended changes to termination type and merit salary increases have the largest impact on the overall contribution rates. These tables summarize the estimated total cost impact – for the General, Safety, and combined membership – of the recommended changes to economic and demographic assumptions

SECTION I – EXECUTIVE SUMMARY

contained in this report in the first year and after the impacts are fully phased in, based on the three-year phase-in policy for changes to the UAL amortization rates.

Table I-1

Initial Impact on Employer Contribution Rates from Recommended Assumption Changes

	General Contribution Rate	Safety Contribution Rate	Total Contribution Rate
Retirement Rates	-0.24%	-0.29%	-0.25%
Disability Rates	0.28%	-0.01%	0.22%
Termination Rates	-0.02%	-0.68%	-0.12%
Termination Type	0.45%	0.42%	0.44%
Vested / Reciprocal Deferral Age	-0.07%	-0.05%	-0.06%
Percent Married	0.08%	-0.09%	0.04%
Mortality	-0.44%	-0.70%	-0.47%
Merit Scale	1.07%	0.68%	0.99%
FAC Load (percentage)	-0.08%	-0.01%	-0.06%
Total Effect of Demographic Changes	**1.03%**	**-0.73%**	**0.73%**
Impact of Reducing Discount Rate to 7.0%	1.15%	1.55%	1.22%
Employee Contribution Crediting Rate	-0.02%	-0.02%	-0.02%
Updating Employee Contribution Rates	-0.79%	-0.41%	-0.82%
Total Effect of Assumption Changes	**1.37%**	**0.39%**	**1.11%**

Ultimate Impact on Employer Contribution Rates from Recommended Assumption Changes (After Phase-In)

	General Contribution Rate	Safety Contribution Rate	Total Contribution Rate
Retirement Rates	-0.45%	-0.57%	-0.47%
Disability Rates	0.25%	0.00%	0.20%
Termination Rates	0.01%	-0.65%	-0.10%
Termination Type	0.55%	0.49%	0.53%
Vested / Reciprocal Deferral Age	-0.12%	-0.08%	-0.11%
Percent Married	0.12%	-0.15%	0.07%
Mortality	-1.10%	-1.73%	-1.18%
Merit Scale	1.39%	0.89%	1.28%
FAC Load (percentage)	-0.12%	0.05%	-0.09%
Total Effect of Demographic Changes	**0.53%**	**-1.75%**	**0.13%**
Impact of Reducing Discount Rate to 7.0%	2.46%	3.29%	2.59%
Employee Contribution Crediting Rate	-0.02%	-0.02%	-0.01%
Updating Employee Contribution Rates	-0.78%	-0.40%	-0.85%
Total Effect of Assumption Changes	**2.19%**	**1.12%**	**1.86%**

SECTION II – ECONOMIC ASSUMPTIONS
PRICE INFLATION

The economic assumptions used in actuarial valuations are intended to be long-term in nature, and should be both individually reasonable and consistent with each other. The specific assumptions analyzed in this report are:

- **Price inflation** – used indirectly as an underlying component of other economic assumptions.
- **Wage inflation** – across the board wage growth used to project benefits and to amortize the unfunded liability as a level percentage of expected payroll.
- **COLA growth** – rate at which inflation-linked post-retirement COLAs are expected to change.
- **Discount rate** – used both to project long-term asset growth and to discount future cash flows in calculating the liabilities and costs of the Plan.

In order to develop recommendations for each of these assumptions, we considered historical data, both nationally and for the Plan, and expectations for the future, as expressed by the Plan's and other external investment consultants and the Board.

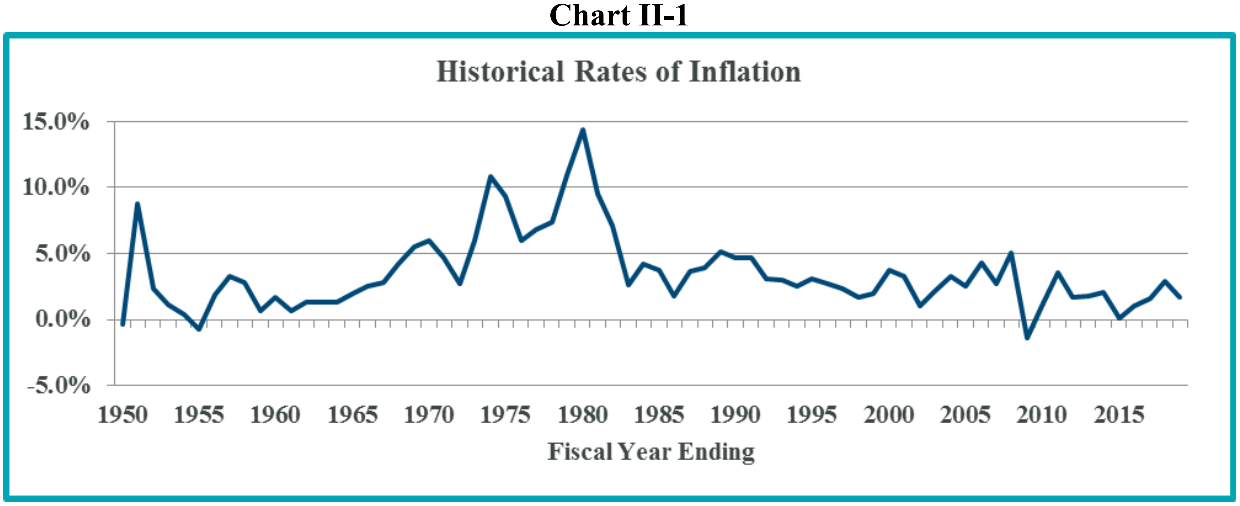
PRICE INFLATION

Long-term price inflation rates are the foundation of other economic assumptions. In a growing economy, wages, and investments are expected to grow at the underlying inflation rate plus some additional real growth rate, whether it reflects productivity in terms of wages or risk premiums in terms of investments.

Historical Data

Chart II-1 below shows inflation for the U.S. by Plan year (ending June 30) since 1950.

Chart II-1



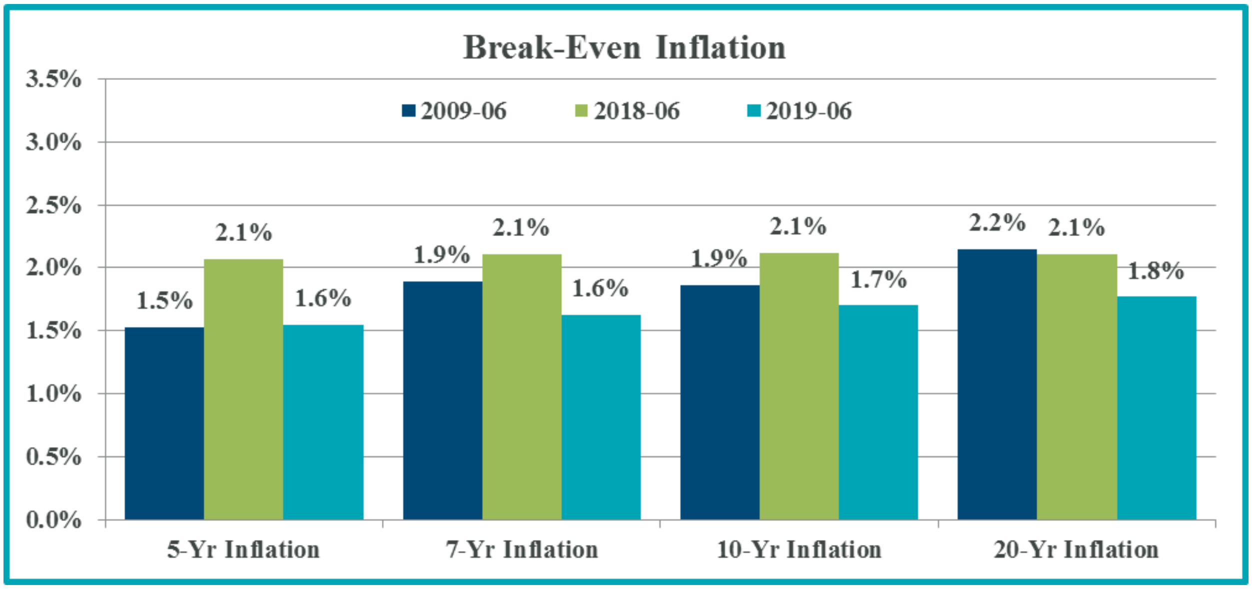
SECTION II – ECONOMIC ASSUMPTIONS
PRICE INFLATION

Over the 50 years ending June 2019, the geometric average inflation rate for the U.S. has been about 4.0%, but this average is heavily influenced by the high inflation rates in the 1970s and early 1980s. Over the last 20 years, the geometric average inflation rate has been 2.2%, and only about 1.7% over the past 10 years.

Future Expectations

A measure of the market consensus of expected future inflation rates is the difference in yields between conventional treasury bonds and Treasury Inflation-Protected Securities (TIPS) at the same maturity. Chart II-2 shows the break-even inflation rate as of June 2009, June 2018, and June 2019. Break-even inflation is the level of inflation needed for an investment in TIPS to "break even" with an investment in conventional treasury bonds of the same maturity.

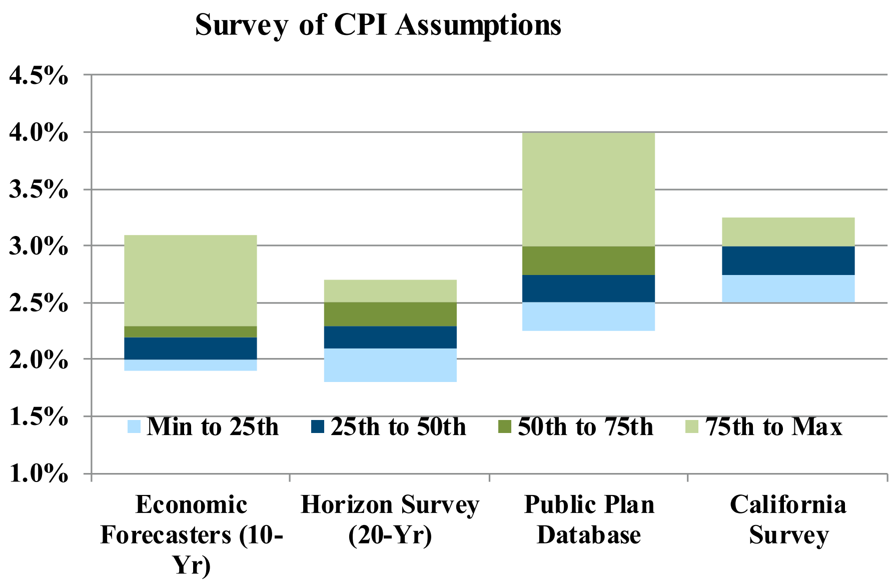
Chart II-2



SECTION II – ECONOMIC ASSUMPTIONS
PRICE INFLATION

The Federal Reserve Bank of Philadelphia publishes a quarterly survey of professional economic forecasters. Chart II-3 shows the distribution of the professionals forecasts for average inflation over the next 10 years compared to the distribution of 20-year inflation assumptions used investment consultants in Horizon Actuarial Service's 2019 survey, 2018 assumptions used by the plans in the Public Plans Database, and 2018 assumptions used by California public pension plans from Cheiron's survey.

Chart II-3



	Economic Forecasters (10-Yr)	Horizon Survey (20-Yr)	Public Plan Database	California Survey
Minimum	1.90%	1.80%	2.25%	2.50%
25th Percentile	2.00%	2.10%	2.50%	2.75%
50th Percentile	2.20%	2.30%	2.75%	3.00%
75th Percentile	2.30%	2.50%	3.00%	3.00%
Maximum	3.10%	2.70%	4.00%	3.25%

Finally, Meketa, the Board's investment consultant, uses an inflation assumption of around 2.60%.

Based on all of these considerations, we believe a reasonable range for long-term price inflation for use in the Plan's actuarial valuations is between 2.00% and 3.00%. Therefore, we support the Board's recent action to maintain the assumption at 2.50%. Although the comparison between the conventional Treasury bond and TIPS yields indicates a breakeven inflation rate below 2.00%, we note that this spread (as well as other market indicators of inflation) can be quite volatile.

WAGE INFLATION

Wage inflation can be thought of as the annual across-the-board increase in wages. Individuals often receive salary increases in excess of the wage inflation rate, and we study these increases as a part of the merit salary scale assumption. Wage inflation generally exceeds price inflation by some margin reflecting the history of increased purchasing power.

Wage inflation is used in the actuarial valuation as the minimum expected salary increase for an individual and, for purposes of amortizing the Unfunded Actuarial Liability, the rate at which payroll is expected to grow over the long term, assuming a stable active member population.

Since 2002, the Social Security Average Wage Index has grown by 2.7%, which is 0.7% higher than inflation. However, over the same time period the increase in the median wage was only 0.3% per year, as much of the growth in wages was clustered at the top end of the wage scale.

It is acceptable to assume some additional level of base payroll increase beyond general inflation. Potential reasons contributing to the increase may include the presence of strong union representation in the collective bargaining process, competition in hiring among other similar employers, and regional factors – such as the local inflation index exceeding the national average, as has sometimes proven the case in parts of California. Also, the Social Security Administration projects real wage growth of 0.6% - 1.8% going forward in their Social Security solvency projections. However, governmental entities remain under financial stress, and other areas of employee compensation – most notably health care costs and pension contributions – have continued to increase faster than the CPI.

Cheiron supports the Board’s recent action to maintain a non-inflationary base payroll growth assumption of 0.25% annually. As a result, the annual expected increase in base payroll will remain at 2.75% (0.25% wage inflation + 2.50% price inflation). This rate will be applied to all continuing active members, and to starting pay for new entrants when projections of future populations are required. This rate will also be used in the calculation of the unfunded liability amortization payment as a level percentage of payroll.

COLA GROWTH

Tier 1 members of MCERA are eligible to receive automatic Cost-of-Living Adjustments (COLAs), based on the growth in the Bay Area Consumer Price Index (CPI) with a 3% cap on the annual COLA increase. Any increase in the CPI above the 3% maximum increase can be banked for future years in which the change in the CPI is below 3%.

It is necessary to determine an assumed rate of COLA growth, reflecting both inflation (i.e., the growth in the CPI), and the interaction of the CPI with the COLA cap and banking mechanism. Simulations of inflation show us that the average growth in the COLA is expected to be below the cap, even if the expected increase in the CPI is equal to or higher than the cap itself. This is because if there is not a significant bank already in existence (such as in the early years of retirement) and there are years in which inflation is below the cap, this shortfall will not be made up in future years.

As part of the prior experience study, we previously produced statistical simulations of inflation and then modeled how the COLA maximum and the banking process interact with changes in CPI for Merced. For a given long-term estimate of inflation, we used two sets of inputs and then blended the results: a 50% autocorrelation factor with 1.5% annual inflation volatility, and a 25% autocorrelation factor with 1.0% annual inflation volatility. Based on the results of the prior analysis, and given the decision by the Board to maintain the 2.50% inflation assumption, we recommend maintaining the COLA growth assumption at 2.40%.

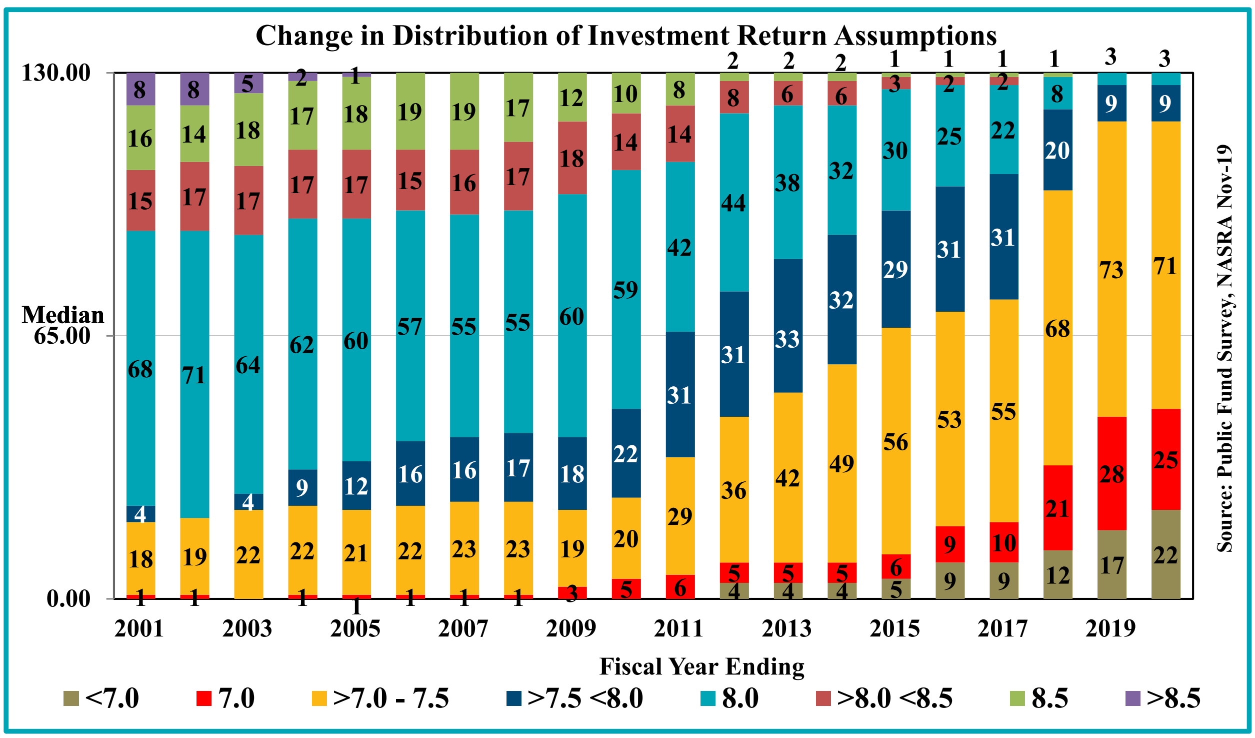
DISCOUNT RATE

The discount rate assumption is generally the most significant of all the assumptions employed in actuarial valuations. The discount rate is based on the long-term expected return on plan investments. In the short-term, a higher discount rate results in lower expected contributions. However, over the long term, actual contributions will depend on actual investment returns and not the discount rate (or expected investment returns). If actual investment returns are lower than expected, contribution rates will increase in the future. It is important to set a realistic discount rate so that projections of future contributions for budgeting purposes will not be significantly biased, particularly to be too low.

Other Large Public Retirement Plans

Based on the Public Fund Survey, developed by the National Association of State Retirement Administrators (NASRA) covering most of the largest public retirement systems in the country, there has been a general movement over at least the last decade to reduce the discount rate used in actuarial valuations. The latest data includes results collected through November 2019, and covers 130 retirement plans. Chart II-4 below shows the change in the distribution of assumptions since 2001. The median assumption is now 7.25% and the number of plans using a discount rate of 7.50% or lower has increased significantly.

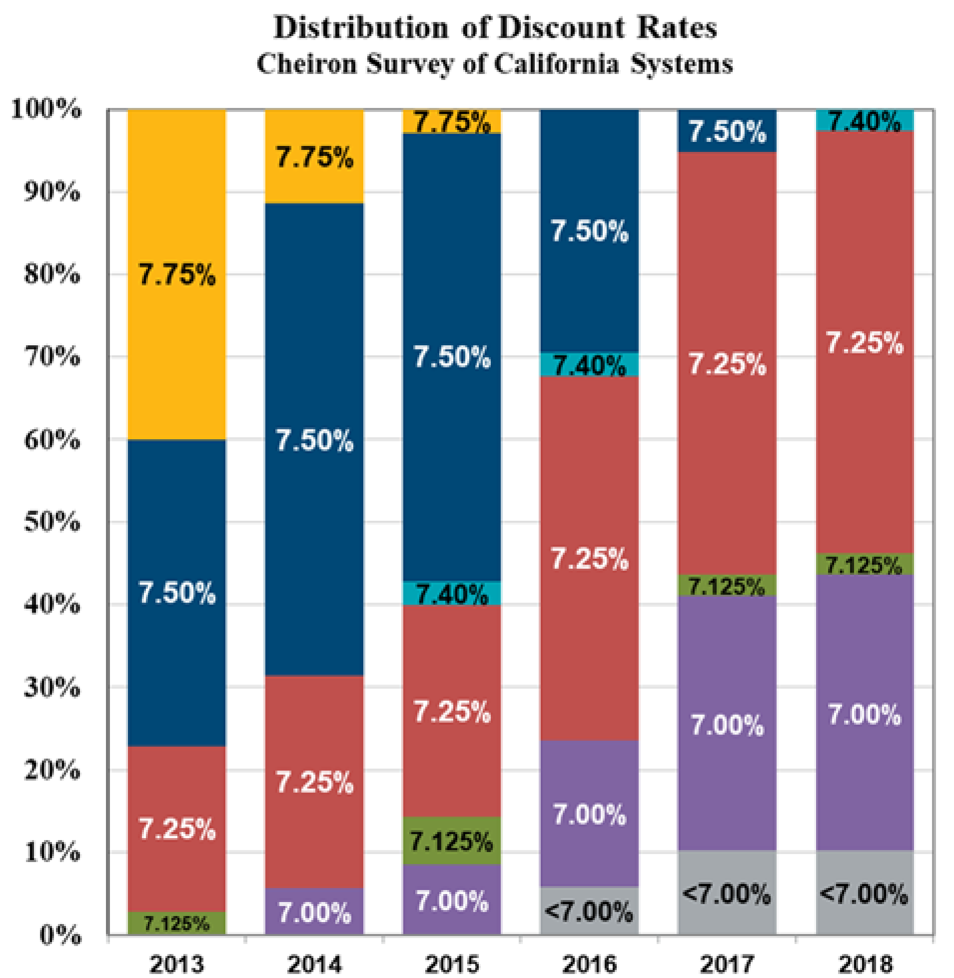
Chart II-4



SECTION II – ECONOMIC ASSUMPTIONS
DISCOUNT RATE

Our survey of California retirement systems has the same median assumption of 7.25%, with 20 of the 39 systems using the median rate and only one system above the median rate. Chart II-5 below shows the change in discount rate assumptions for California systems from 2013 to 2018.

Chart II-5



Target Asset Allocation and Future Expectations

The discount rate assumption depends on the anticipated average level of inflation and the anticipated average *real rate of return.* The real rate of return is the investment return in excess of underlying inflation. The expected average real rate of return is heavily dependent on asset mix: the portion of assets in stocks, bonds, and other asset classes. Table II-1 shows the current asset allocation for MCERA.

SECTION II – ECONOMIC ASSUMPTIONS
DISCOUNT RATE

Table II-1

Summary of Meketa Long-Term Capital Market Projections (for MERCED)	MCERA Portfolio Geometric 2019 Expectations
Annual Standard Deviation	12.36%
Expected Return 20 yrs Nominal	8.04%
Inflation Expectation 20 yrs	2.60%
Expected Return 20 yrs Real	5.30%
Sharpe Ratio	0.42
Asset Classes	**Weights**
Short-term Investment Grade Bonds	4.0%
Investment Grade Bonds	14.0%
High Yield Bonds	2.5%
Bank Loans	2.5%
US Equity	21.0%
Developed Market Equity (non-US)	10.0%
Emerging Market Equity	8.0%
Private Equity/Debt	15.0%
Real Estate	8.0%
Natural Resources (Private)	2.5%
Core Infrastructure	2.5%
Hedge Funds	10.0%

Based on the current target allocation and Meketa's 2019 capital market assumptions, we calculated an expected return of 8.00%, which is very close to the geometric return expectation provided by Meketa for this portfolio (8.04%). This correlates to a 5.40% real expected return based on the Meketa inflation assumption of 2.60%. We note that the 2019 capital market expectations were significantly higher than those provided in 2018, as a result of the market conditions existing in December 2018, when the 2019 expectations were developed. Meketa and other investment consultants have indicated that if current market conditions hold, it is likely that the 2020 expectations may look more like their 2018 expectations than their 2019 expecations, therefore we also calculated the expected returns for the portfolio under the 2018 assumptions. These results are significantly lower than the 2019 expectations, generating a 7.29% expected nominal return and a 4.69% real return.

We also reran the results using Verus' 10 and 30-year expectations (30-year for 2019 only) and using a broader survey of capital market assumptions conducted by Horizon Actuarial Services using 10 and 20-year expectations. The results are shown in Tables II-2 and II-3, for the 2019 and 2018 assumptions, respectively.

SECTION II – ECONOMIC ASSUMPTIONS

DISCOUNT RATE

Table II-2

MercedCERA Target Portfolio Return Expectations (2019 Capital Market Expectations)			
Source	Nominal	Inflation	Real
Meketa (20-year)	8.00%	2.60%	5.40%
Verus (10-year)	6.97%	2.00%	4.97%
Verus (30-year)	7.01%	1.80%	5.21%
Verus (Average)	6.99%	1.90%	5.09%
Horizon (Survey, 10-year)	6.84%	2.22%	4.62%
Horizon (Survey, 20-year)	7.83%	2.29%	5.54%
Horizon (Average)	7.33%	2.26%	5.08%
Average (Mek/Ver/Hor)	7.44%	2.25%	5.19%

Table II-3

MercedCERA Target Portfolio Return Expectations (2018 Capital Market Expectations)			
Source	Nominal	Inflation	Real
Meketa (20-year)	7.29%	2.60%	4.69%
Verus (10-year)	6.19%	2.10%	4.09%
Verus (30-year)	N/A	N/A	N/A
Verus (Average)	6.19%	2.10%	4.09%
Horizon (Survey, 10-year)	6.65%	2.24%	4.41%
Horizon (Survey, 20-year)	7.84%	2.48%	5.36%
Horizon (Average)	7.25%	2.36%	4.89%
Average (Mek/Ver/Hor)	6.91%	2.35%	4.56%

As of the 2013 valuation, the expected rate of return is expressed net of investment, but not administrative expenses. The returns above were modeled based on the expected returns of the portfolio benchmark indices, which are expected to have minimal expenses. The actuarial standards on selecting a return assumption (ASOP 27) state that in general, superior or inferior returns (net of fees) should not be assumed for active versus passive management; therefore, we do not recommend a significant adjustment to the modeled returns for the fees of the asset managers. However, a slight margin is appropriate to reflect the investment-related expenses other than those of the investment managers, which would include the investment advisor and custodian.

SECTION II – ECONOMIC ASSUMPTIONS
DISCOUNT RATE

Based on each set of 2019 and 2018 capital market assumptions, we also calculated the likelihood of achieving various nominal and real returns over various periods, as shown in Tables II-4 and II-5.

Table II-4

Likelihood of Achieving Average Returns (2019)				
	Nominal		Real	
Consultant	7.00%	7.25%	4.50%	4.75%
Meketa (20)	60%	58%	59%	57%
Verus (10)	50%	47%	55%	52%
Verus (30)	50%	47%	58%	55%
Horizon (10)	48%	45%	51%	49%
Horizon (20)	63%	59%	66%	62%
Average	54%	51%	58%	55%

Table II-5

Likelihood of Achieving Average Returns (2018)				
	Nominal		Real	
Consultant	7.00%	7.25%	4.50%	4.75%
Meketa (20)	53%	50%	52%	49%
Verus (10)	42%	39%	46%	43%
Horizon (10)	46%	44%	49%	46%
Horizon (20)	63%	59%	63%	59%
Average	51%	48%	53%	49%

We note that the average likelihood of achieving the nominal (7.00%) and real (4.50%) return assumptions exceeds 50% in both time periods. We therefore find the current discount rate of 7.00% recently adopted by the Board to be a reasonable assumption.

MEMBER CONTRIBUTION BALANCE CREDITING RATE

Interest is credited semi-annually to each Member’s accumulated contribution balance. The crediting rate is set by the Board, and Board policy limits the interest crediting rate to between 0% and 2.00% less than the assumed rate of return. The prior assumption was 5.25% (2.00% less than the previous assumed rate of return of 7.25%). Although the rate credited in recent years has been less than assumed, past actuarial practice had been to set it to a rate 2.00% less than the assumed rate of return. We believe the rate assumed to be credited to member contribution balances should be reduced to 5.00% (2.00% less than the updated assumed rate of return of 7.00%).

Demographic assumptions are used to predict membership behavior, including rates of retirement, termination, disability, and mortality. These assumptions are based primarily on the historical experience of MCERA, with some adjustments where future experience is expected to differ from historical experience and with deference to standard tables where MCERA experience is not fully credible and a standard table is available. For purposes of this study, merit salary increases are also considered a demographic assumption because the assumption is based primarily on MCERA's historical experience.

MERIT SALARY INCREASES

Salary increases consist of three components: Increases due to cost-of-living maintenance (inflation), increases related to non-inflationary pressures on base pay (such as productivity increases), and increases in individual pay due to merit, promotion, and longevity. Increases due to cost-of-living and non-inflationary base pay factors were addressed in an earlier section of this report.

The merit salary increase assumption is analyzed by employee group and by service. Generally, newer employees are more likely to earn a longevity increase or receive a promotion, so their salary increases tend to be greater than those for longer service employees.

The merit salary increase assumption is added to the wage inflation assumption to calculate the total salary increase expected for an individual. To analyze the merit component, we subtracted the Plan's real wage growth from the total pay increases experienced by each member during the experience study period. We have computed the real wage growth by calculating the increase in the average salary across all active members (calculated separately for General and Safety) each year, and adjusting for changes in the average service level.

The analysis of the merit salary increase assumption is based on experience from 2013 through 2019. Chart III-1 and III-2 on the following page show the information graphically, with the charts showing the actual experience (blue line) compared to the current assumption (red line) and the proposed assumption (green line).

Merit salary increases have been higher than expected for most years of service. We propose to partially reflect this pattern by increasing the current merit salary increase assumption for most years of service for General members and increasing the rates for less than 9 years of service and more than 19 years of service for Safety members.

SECTION III – DEMOGRAPHIC ASSUMPTIONS
MERIT SALARY INCREASES

Chart III-1: General

General Merit Salary Increase by Service

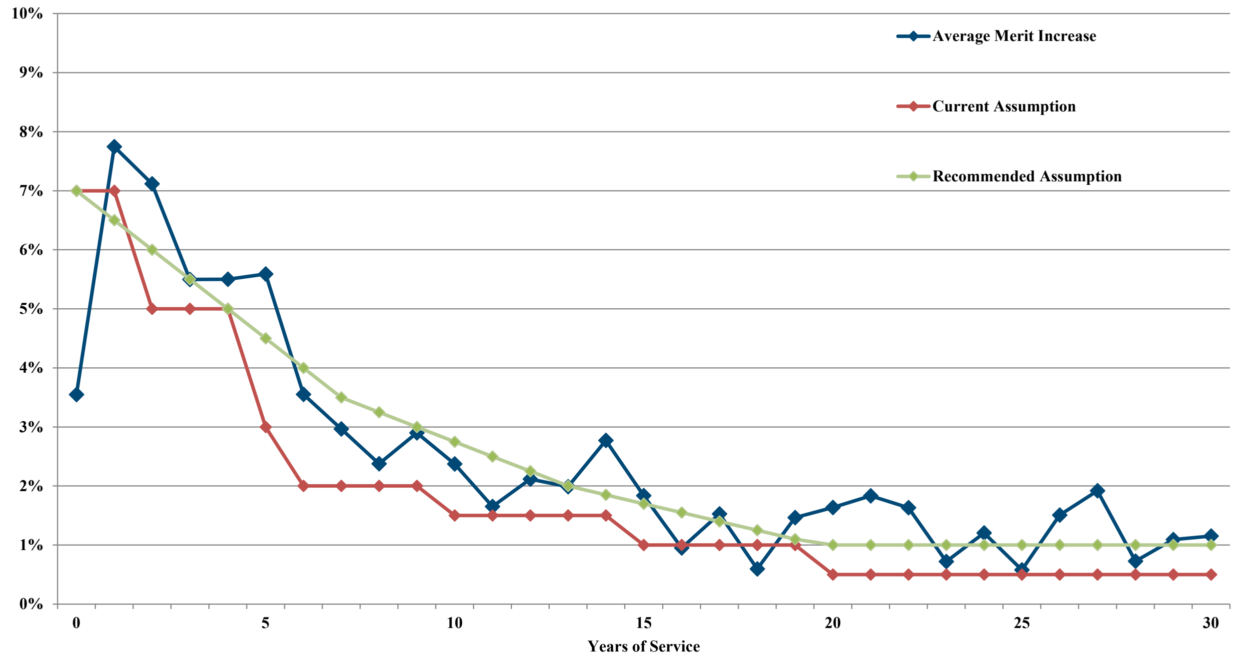
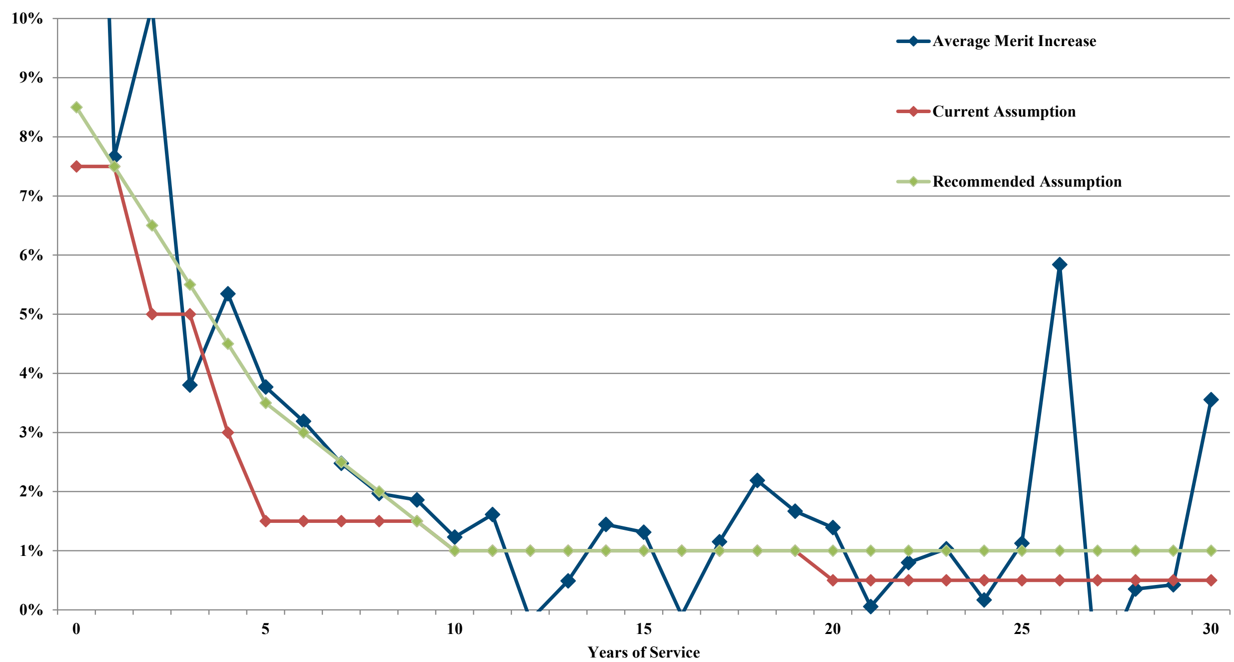


Chart III-2: Safety

Safety Merit Salary Increase by Service



FUTURE RECIPROCAL TRANSFERS' PAY GROWTH

In the past, the pay growth for future reciprocal transfers, while employed by a reciprocal employer, was assumed to be the wage inflation assumption plus the ultimate merit salary scale increase. We recommend no change to this methodology, but since we are recommending an increase in the ultimate merit salary scale rate from 0.50% to 1.00%, we also recommend increasing the assumption for pay growth for future reciprocal transfers from 3.25% to 3.75% (2.75% wage inflation + 1.00% ultimate merit increase).

We are not recommending a change to the assumed pay growth of current reciprocal transfers. Their pay is assumed to increase according to the assumptions applied to the active members until their assumed retirement age.

TERMINAL (VENTURA) PAY LOAD

Under the Ventura Settlement, members have been able to cash out some or all of their leave time (up to 160 hours) in the year prior to retirement; the cashed out pay was then included in the members' final average compensation.

The current actuarial assumptions include a load of 6.92% for Tier 1 members and 2.31% for Tier 2 members to Final Average Compensation to account for this cash out. This is equivalent to assuming that members will cash out 90% of the maximum allowable time in the year of retirement: 90% x 160 hours / 2080 hours worked per year = 6.92% for Tier 1. The load is divided by 3 for Tier 2 (6.92% / 3 = 2.31%) to account for the fact that these members use three year averaging for their final compensation.

We performed an analysis of the retirement calculations that occurred between July 1, 2016 and June 30, 2019. As part of this analysis, we calculated the percentage increase in the final average compensation resulting from the terminal cash outs.

For the 62 General Tier 1 members who retired from active status, the cash outs increased the final average compensation by around 5.11%. For the 100 Tier 2 and 3 members, the figure was 1.49%.

For the 16 Safety Tier 1 members who retired from active status, the cash outs increased the final average compensation by around 9.51%. For the 14 Tier 2 and 3 members, the figure was 0.94%.

We recommend updating the FAC load to 5.50% for General Tier 1 members, 8.00% for Safety Tier 1 members, and 1.50% for all Tier 2 and 3 members. We recommend that no load be applied to the benefits of the Tier 4 (PEPRA) members, as they are not eligible to receive the final compensation cash outs.

SECTION III – DEMOGRAPHIC ASSUMPTIONS

MERIT SALARY INCREASES

We also recommend applying this load to the maximum benefit amount applicable to Tiers 1-3 (i.e. the 100% of pay maximum). Previously, we had not been applying the load to the maximum benefit amount, just the standard service-based benefit.

We will continue to monitor terminal pay experience and adjust this assumption as necessary. Modifications may also be necessary if there are any changes to the terminal payout policies, or if there are any changes to the policies that govern the accumulation of leave.

ANALYSIS OF OTHER DEMOGRAPHIC ASSUMPTIONS

For all of the remaining demographic assumptions, we determined the ratio of the actual number of decrements for each membership group compared to the expected number of decrements (A/E ratio or actual-to-expected ratio). If the assumption is perfect, this ratio will be 100%. Otherwise, any recommended assumption change should move from the current A/E ratio towards 100% unless future experience is expected to be different than the experience during the period of study.

We also calculate an r-squared statistic for each assumption. R-squared measures how well the assumption fits the actual data and can be thought of as the percentage of the variation in actual data explained by the assumption. Ideally, r-squared would equal 1.00 although this is never the case. Any recommended assumption change should increase the r-squared compared to the current assumption making it closer to 1.00 unless the pattern of future decrements is expected to be different from the pattern experienced during the period of study.

In addition, we calculated the 90% confidence interval, which represents the range within which the true decrement rate during the experience study period fell with 90% confidence. If there is insufficient data to calculate a confidence interval, the confidence interval is shown as the entire range of the graph. We generally propose assumption changes when the current assumption is outside the 90% confidence interval of the observed experience. However, adjustments are made to account for differences between future expectations and historical experience, to account for the past experience represented by the current assumption, and to maintain a neutral to slight conservative bias in the selection of the assumption. For mortality rates, we compare MCERA's experience to that of a standard table and adjust the tables to bring the proposed assumption closer to an A/E ratio of 100%.

Finally, since the amount of data that is available over a three-year period to analyze the decrements is somewhat limited, we have added data from the prior study where noted to add more credibility to these calculations.

RETIREMENT RATES

The current retirement rates vary by group, gender, age, and service, and are applied to all members who are eligible to retire. We have combined the experience of the past three years with that of the prior three-year period in order to have a more robust dataset to review.

Generally, at any given age, members with more service are generally more likely to retire than members with fewer years of service. We reviewed the MCERA actual retirement rates based on service groupings since MCERA is not large enough to justify assumptions for each age and service combination.

We recommend separate assumptions by age for the following two service groups for General members; members with less than 30 years of service and members with 30 or more years of service. We found that recent retirement experience was not materially different between males and females for General members, so we recommend changing to unisex rates.

We recommend maintaining separate assumptions by age for the following two service groups for Safety members; members with less than 20 years of service and members with 20 or more years of service. There is very little female Safety experience, so we recommend keeping unisex rates.

There is some expectation that PEPRA members may retire later than those in other tiers due to their lower benefit levels, particularly for the General members. For example, CalPERS has developed assumed retirement rates for their 2% at 62 members (the same formula as MCERA's General PEPRA members) that anticipate an average retirement age around two years later than for their 3% @ 60 members (the same formula as the bulk of MCERA's non-PEPRA members).

However, when we applied the CalPERS 2% at 62 retirement assumptions to MCERA's General PEPRA population, it showed only a modest impact on the total normal cost for these members (under 5% of the normal cost), even though it had a significant impact on the expected retirement age (nearly four years later). We believe it would be hasty to assume such a drastic change in behavior without any existing evidence for MCERA's population. Therefore if we were to propose a separate set of retirement rates for General PEPRA members, the impact on behavior and the associated average retirement age would likely be less than the impact of the CalPERS 2% at 62 retirement assumptions and thus the impact on the normal cost would be even more moderate.

In addition, although there has been very little retirement data thus far on the PEPRA members, by the time of the next scheduled experience study (in 2022), we anticipate that there could be as many as 70 General PEPRA members eligible to retire. Even though that may not represent a large enough population to produce a distinct set of retirement rates at all age and service levels, we may be able to at least determine whether there appears to be an overall difference in behavior for the PEPRA population, which could act as a guide in helping to develop a reasonable set of retirement rates.

SECTION III – DEMOGRAPHIC ASSUMPTIONS
RETIREMENT RATES

Therefore, we recommend the continued use of the same assumptions for all PEPRA members as the other members, since we do not yet have any plan experience to support a different set of assumptions, and our initial analysis shows very little impact - around 0.15% of pay on both the member and employer General PEPRA rates - if a modest change in behavior were anticipated (something akin to a two year delay in the average retirement age).

Table III-R1 shows the calculation of actual-to-expected ratios and the r-squared statistic for General members with less than 30 years of service. Chart III-R1 shows the information graphically along with the 90% confidence interval.

The data shows generally lower actual retirement rates than expected under the current assumption. The proposed assumption decreases the aggregate assumed rate of retirement and increases the aggregate A/E ratio from 87% to 100%. The r-squared increases from 81% to 91%.

Table III-R1 – General

General Retirement Rates For Less than 30 Years of Service												
		Retirements			Retirement Rates						A/E Ratios	
Age	Exposures	Actual	Current	Proposed	Actual	Current Male 10-19	Current Male 20-29	Current Female 10-19	Current Female 20-29	Proposed	Current	Proposed
50	42	3	3	4	7.1%	5.0%	10.0%	2.5%	7.5%	10.0%	89%	71%
51	46	4	4	5	8.7%	5.0%	10.0%	2.5%	7.5%	10.0%	108%	87%
52	50	7	6	5	14.0%	5.0%	10.0%	5.0%	12.5%	10.0%	126%	140%
53	48	5	5	5	10.4%	5.0%	10.0%	5.0%	12.5%	10.0%	94%	104%
54	53	5	6	5	9.4%	5.0%	10.0%	5.0%	12.5%	10.0%	91%	94%
55	210	26	30	21	12.4%	10.0%	12.5%	12.0%	25.0%	10.0%	85%	124%
56	208	15	27	21	7.2%	10.0%	12.5%	8.5%	25.0%	10.0%	56%	72%
57	200	22	26	20	11.0%	10.0%	12.5%	8.5%	25.0%	10.0%	84%	110%
58	180	28	22	27	15.6%	10.0%	12.5%	8.5%	25.0%	15.0%	125%	104%
59	147	27	20	29	18.4%	10.0%	12.5%	10.0%	30.0%	20.0%	135%	92%
60	121	22	24	24	18.2%	20.0%	25.0%	15.0%	30.0%	20.0%	93%	91%
61	109	25	30	22	22.9%	20.0%	25.0%	27.5%	40.0%	20.0%	84%	115%
62	89	22	23	18	24.7%	20.0%	25.0%	27.5%	40.0%	20.0%	94%	124%
63	64	10	17	13	15.6%	20.0%	25.0%	27.5%	40.0%	20.0%	59%	78%
64	56	7	14	11	12.5%	20.0%	25.0%	27.5%	40.0%	20.0%	48%	63%
65	52	19	21	18	36.5%	35.0%	50.0%	40.0%	50.0%	35.0%	89%	104%
66	33	15	14	12	45.5%	35.0%	50.0%	45.0%	50.0%	35.0%	105%	130%
67	17	5	8	6	29.4%	35.0%	50.0%	50.0%	50.0%	35.0%	65%	84%
68	13	4	7	5	30.8%	35.0%	50.0%	60.0%	60.0%	35.0%	59%	88%
69	9	2	5	3	22.2%	35.0%	50.0%	80.0%	80.0%	35.0%	38%	63%
Total	**1,747**	**273**	**313**	**273**	**15.6%**					**15.6%**	**87%**	**100%**
Confidence Interval %				**95.0%**								
R-squared			**80.7%**	**91.2%**								

SECTION III – DEMOGRAPHIC ASSUMPTIONS

RETIREMENT RATES

Chart III-R1 – General

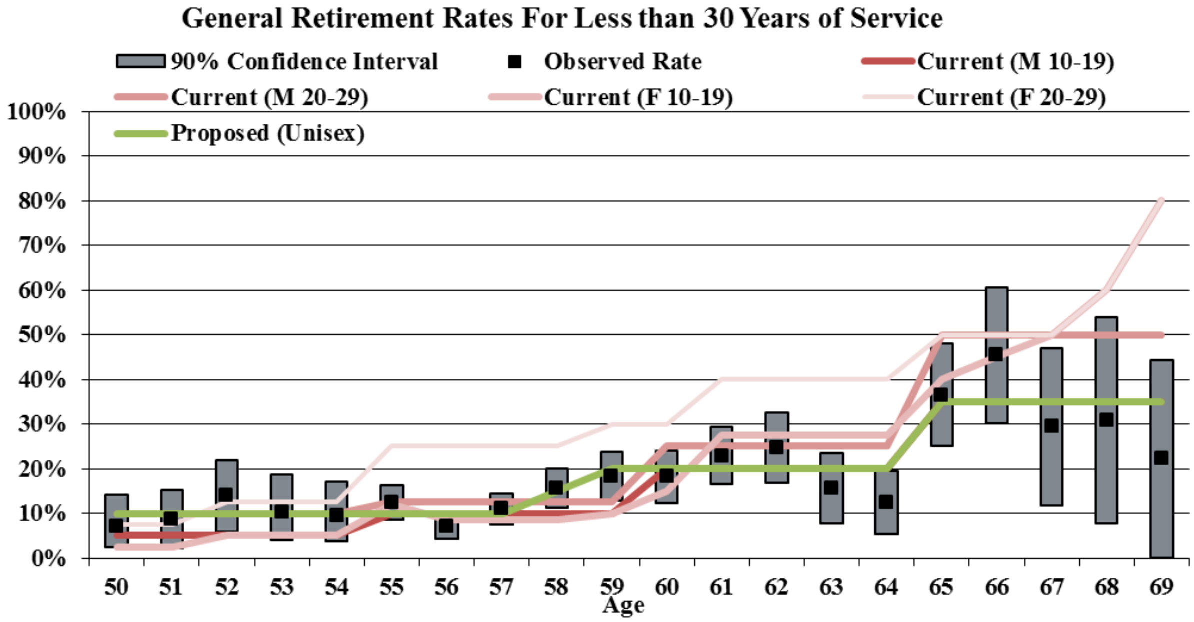


Table III-R2 shows the calculation of actual-to-expected ratios and the r-squared statistic for General members with 30 or more years of service. Chart III-R2 shows the information graphically along with the 90% confidence interval.

The data shows lower actual retirement rates than expected under the current assumption. The proposed assumption decreases the aggregate assumed rate of retirement and increases the aggregate A/E ratio from 90% to 101%. The r-squared remains level at 82%.

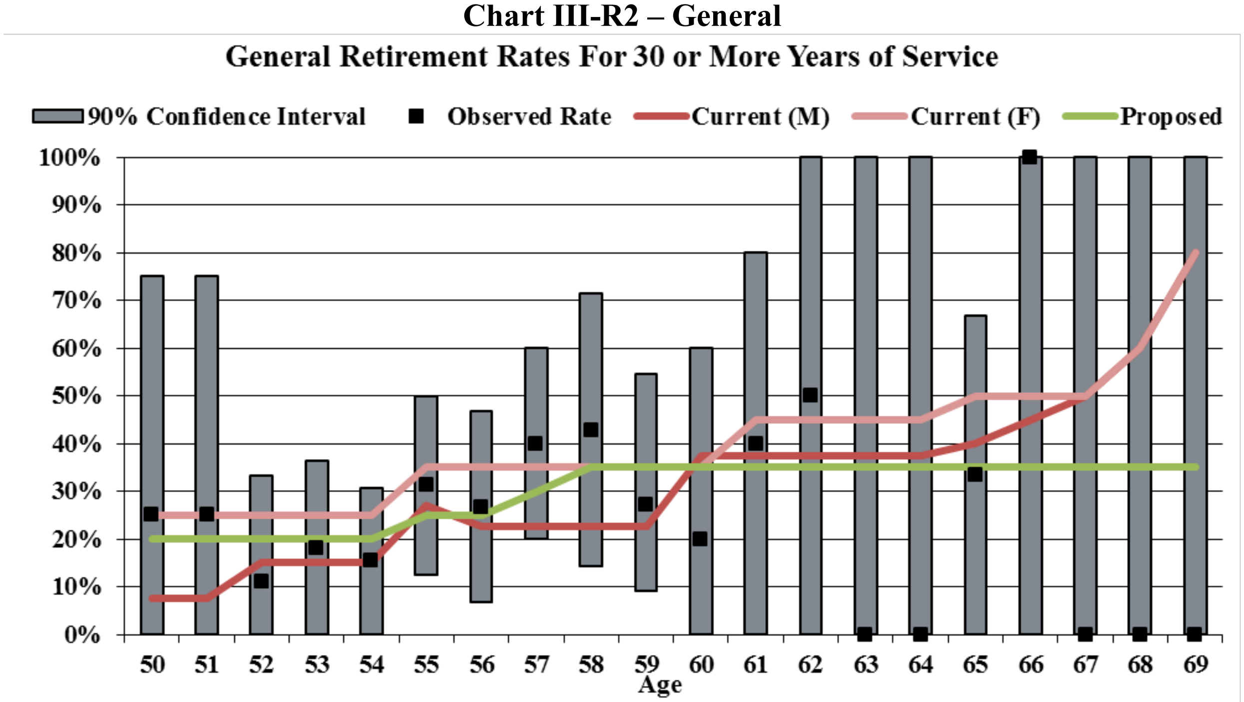
SECTION III – DEMOGRAPHIC ASSUMPTIONS

RETIREMENT RATES

Table III-R2 – General

General Retirement Rates For 30 or More Years of Service										
		Retirements			Retirement Rates				A/E Ratios	
Age	Exposures	Actual	Current	Proposed	Actual	Current Male	Current Female	Proposed	Current	Proposed
50	4	1	1	1	25.0%	7.5%	25.0%	20.0%	100%	125%
51	4	1	1	1	25.0%	7.5%	25.0%	20.0%	121%	125%
52	9	1	2	2	11.1%	15.0%	25.0%	20.0%	47%	56%
53	11	2	3	2	18.2%	15.0%	25.0%	20.0%	75%	91%
54	13	2	3	3	15.4%	15.0%	25.0%	20.0%	68%	77%
55	16	5	5	4	31.3%	27.0%	35.0%	25.0%	96%	125%
56	15	4	5	4	26.7%	22.5%	35.0%	25.0%	84%	107%
57	15	6	5	5	40.0%	22.5%	35.0%	30.0%	130%	133%
58	7	3	2	2	42.9%	22.5%	35.0%	35.0%	129%	122%
59	11	3	3	4	27.3%	22.5%	35.0%	35.0%	93%	78%
60	5	1	2	2	20.0%	37.5%	35.0%	35.0%	55%	57%
61	5	2	2	2	40.0%	37.5%	45.0%	35.0%	95%	114%
62	4	2	2	1	50.0%	37.5%	45.0%	35.0%	116%	143%
63	4	0	2	1	0.0%	37.5%	45.0%	35.0%	0%	0%
64	2	0	1	1	0.0%	37.5%	45.0%	35.0%	0%	0%
65	3	1	1	1	33.3%	40.0%	50.0%	35.0%	77%	95%
66	2	2	1	1	100.0%	45.0%	50.0%	35.0%	211%	286%
67	0	0	0	0	0.0%	50.0%	50.0%	35.0%	0%	0%
68	0	0	0	0	0.0%	60.0%	60.0%	35.0%	0%	0%
69	0	0	0	0	0.0%	80.0%	80.0%	35.0%	0%	0%
Total	**130**	**36**	**40**	**36**	**27.7%**			**27.3%**	**90%**	**101%**
Confidence Interval %				**100.0%**						
R-squared			**81.9%**	**81.7%**						

Chart III-R2 – General



SECTION III – DEMOGRAPHIC ASSUMPTIONS

RETIREMENT RATES

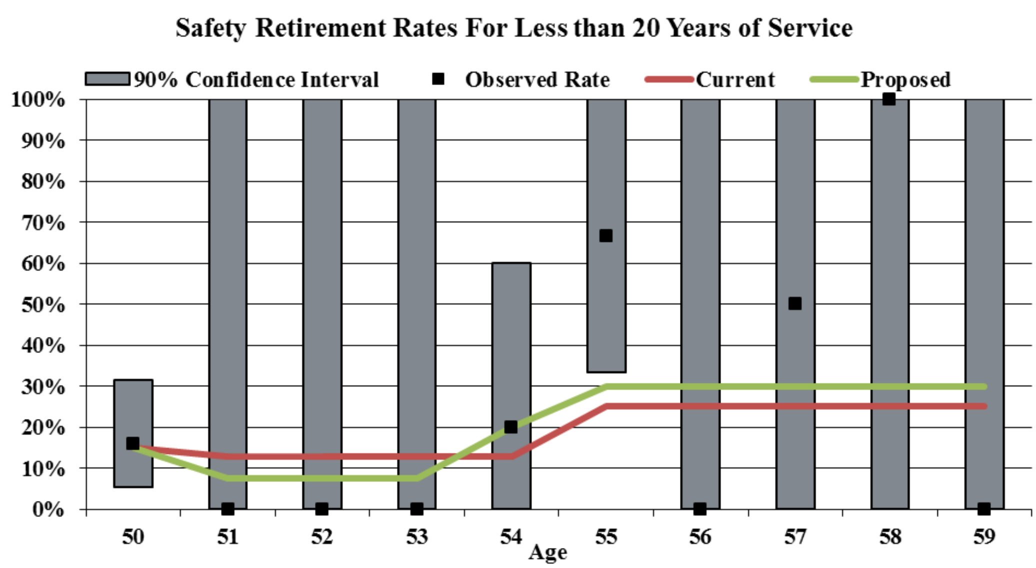
Table III-R3 shows the calculation of actual-to-expected ratios and the r-squared statistic for Safety members with less than 20 years of service. Chart III-R3 shows the information graphically along with the 90% confidence interval.

The data shows lower actual retirement rates than expected under the current assumption. The proposed assumption decreases the aggregate assumed rate of retirement and increases the aggregate A/E ratio from 79% to 85%. The r-squared increases from 29% to 53%.

Table III-R3 – Safety

Safety Retirement Rates For Less than 20 Years of Service										
		Retirements			Retirement Rates			A/E Ratios	
Age	Exposures	Actual	Current	Proposed	Actual	Current	Proposed	Current	Proposed
50	19	3	3	3	15.8%	15.0%	15.0%	105%	105%
51	13	0	2	1	0.0%	12.8%	7.5%	0%	0%
52	10	0	1	1	0.0%	12.8%	7.5%	0%	0%
53	7	0	1	1	0.0%	12.8%	7.5%	0%	0%
54	5	1	1	1	20.0%	12.8%	20.0%	156%	100%
55	3	2	1	1	66.7%	25.0%	30.0%	267%	222%
56	4	0	1	1	0.0%	25.0%	30.0%	0%	0%
57	2	1	1	1	50.0%	25.0%	30.0%	200%	167%
58	1	1	0	0	100.0%	25.0%	30.0%	400%	333%
59	1	0	0	0	0.0%	25.0%	30.0%	0%	0%
Total	**65**	**8**	**10**	**9**	**6.2%**	**7.8%**	**7.2%**	**79%**	**85%**
Confidence Interval %			**90.0%**	**90.0%**					
R-squared			**29.0%**	**53.0%**					

Chart III-R3 – Safety



SECTION III – DEMOGRAPHIC ASSUMPTIONS
RETIREMENT RATES

Table III-R4 shows the calculation of actual-to-expected ratios and the r-squared statistic for Safety members with 20 or more years of service. Chart III-R4 shows the information graphically along with the 90% confidence interval.

The data shows lower actual retirement rates than expected under the current assumption. The proposed assumption decreases the aggregate assumed rate of retirement and increases the aggregate A/E ratio from 77% to 91%. The r-squared increases from 41% to 69%.

Table III-R4 – Safety

Safety Retirement Rates For 20 or More Years of Service									
		Retirements			Retirement Rates			A/E Ratios	
Age	Exposures	Actual	Current	Proposed	Actual	Current	Proposed	Current	Proposed
40	0	0	0	0	0.0%	3.1%	1.5%	0%	0%
41	0	0	0	0	0.0%	3.1%	1.5%	0%	0%
42	1	0	0	0	0.0%	3.1%	1.5%	0%	0%
43	6	0	0	0	0.0%	3.1%	1.5%	0%	0%
44	9	0	0	0	0.0%	3.1%	1.5%	0%	0%
45	11	0	1	0	0.0%	7.6%	1.5%	0%	0%
46	17	1	1	1	5.9%	7.6%	5.0%	77%	118%
47	19	2	1	2	10.5%	7.6%	10.0%	139%	105%
48	19	0	1	3	0.0%	7.6%	15.0%	0%	0%
49	26	7	2	5	26.9%	7.6%	20.0%	354%	135%
50	21	5	7	4	23.8%	32.9%	20.0%	72%	119%
51	12	4	4	2	33.3%	32.9%	20.0%	101%	167%
52	11	0	4	2	0.0%	32.9%	20.0%	0%	0%
53	11	1	4	2	9.1%	32.9%	20.0%	28%	45%
54	13	4	4	3	30.8%	32.9%	20.0%	94%	154%
55	8	1	3	2	12.5%	32.9%	30.0%	38%	42%
56	5	1	2	2	20.0%	32.9%	30.0%	61%	67%
57	5	2	2	2	40.0%	32.9%	30.0%	122%	133%
58	1	0	0	0	0.0%	32.9%	30.0%	0%	0%
59	1	0	0	0	0.0%	32.9%	30.0%	0%	0%
Total	**196**	**28**	**36**	**31**	**21.5%**	**28.0%**	**23.7%**	**77%**	**91%**
Confidence Interval %			**90.0%**	**100.0%**					
R-squared			**40.9%**	**69.1%**					

SECTION III – DEMOGRAPHIC ASSUMPTIONS
RETIREMENT RATES

Chart III-R4 – Safety

SECTION III – DEMOGRAPHIC ASSUMPTIONS

TERMINATION RATES

Termination rates reflect the frequency at which active members leave employment for reasons other than retirement, death, or disability. Currently, the termination rates are based on service for both Safety and General members. We have found that the rate of termination is more related to years of service rather than age. This methodology also avoids under-weighting the liabilities that can occur if using age-based rates only. The termination rates do not apply once members are eligible for a service retirement benefit. Again, we have combined the experience of the past three years with that of the prior three-year period in order to have a more robust dataset to review.

To make the best use of the available member data, we study all terminations together – vested terminations, terminating members who withdraw their contributions, and members who transfer to a reciprocal pension plan – to determine an overall termination rate. We then analyze the percentages of terminating members who withdraw their contributions, transfer, or are eligible for a vested benefit.

Table III-T1 shows the calculation of actual-to-expected ratios and the r-squared statistic for General male members, and Chart III-T1 shows the information graphically along with the 90% confidence interval.

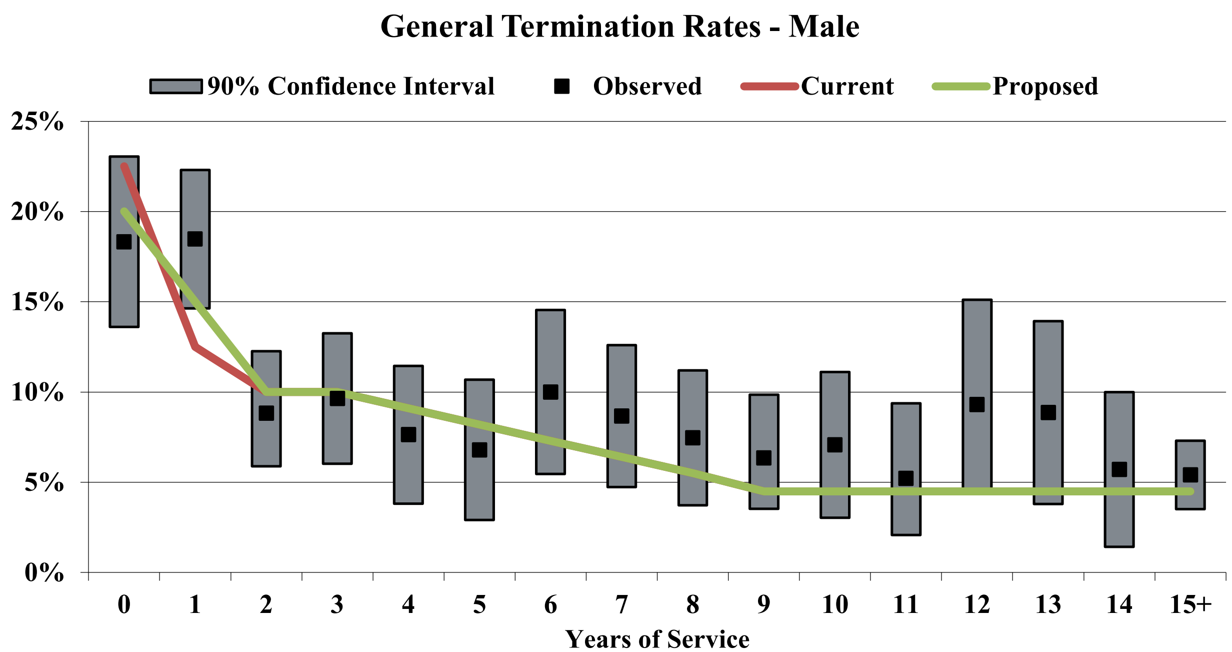
The data shows higher actual termination rates than expected under current assumption. The proposed assumption increases the aggregate assumed rates of termination and decreases the aggregate A/E ratio from 114% to 113%. The r-squared increases from 88% to 95%.

SECTION III – DEMOGRAPHIC ASSUMPTIONS
TERMINATION RATES

Table III-T1 – General Male

General Termination Rates - Male										
		Terminations			Termination Rates			A/E Ratios	
Service	Exposures	Actual	Current	Proposed	Actual	Current	Proposed	Current	Proposed
0	191	35	43	38	18.32%	22.50%	20.00%	81%	92%
1	287	53	36	43	18.47%	12.50%	15.00%	148%	123%
2	204	18	20	20	8.82%	10.00%	10.00%	88%	88%
3	166	16	17	17	9.64%	10.00%	10.00%	96%	96%
4	131	10	12	12	7.63%	9.10%	9.10%	84%	84%
5	103	7	8	8	6.80%	8.20%	8.20%	83%	83%
6	110	11	8	8	10.00%	7.30%	7.30%	137%	137%
7	127	11	8	8	8.66%	6.40%	6.40%	135%	135%
8	134	10	7	7	7.46%	5.50%	5.50%	136%	136%
9	142	9	6	6	6.34%	4.50%	4.50%	141%	141%
10	99	7	4	4	7.07%	4.50%	4.50%	157%	157%
11	96	5	4	4	5.21%	4.50%	4.50%	116%	116%
12	86	8	4	4	9.30%	4.50%	4.50%	207%	207%
13	79	7	4	4	8.86%	4.50%	4.50%	197%	197%
14	70	4	3	3	5.71%	4.50%	4.50%	127%	127%
15+	370	20	17	17	5.41%	4.50%	4.50%	120%	120%
Total	**2,395**	**231**	**202**	**205**	**9.65%**	**8.44%**	**8.54%**	**114%**	**113%**
Confidence Interval %			**87.5%**	**93.8%**					
R-squared			**87.9%**	**95.2%**					

Chart III-T1 – General Male



SECTION III – DEMOGRAPHIC ASSUMPTIONS

TERMINATION RATES

Table III-T2 shows the calculation of actual-to-expected ratios and the r-squared statistic for General female members, and Chart III-T2 shows the information graphically along with the 90% confidence interval.

The data shows higher actual termination rates than expected under the current assumption. The proposed assumption increases the aggregate assumed rate of termination and decreases the aggregate A/E ratio from 120% to 105%. The r-squared increases from 90% to 98%.

Table III-T2 – General Female

General Termination Rates - Female									
		Terminations			Termination Rates			A/E Ratios	
Service	Exposures	Actual	Current	Proposed	Actual	Current	Proposed	Current	Proposed
0	443	102	53	89	23.02%	12.00%	20.00%	192%	115%
1	645	91	77	97	14.11%	12.00%	15.00%	118%	94%
2	474	50	50	47	10.55%	10.50%	10.00%	100%	105%
3	390	35	29	39	8.97%	7.50%	10.00%	120%	90%
4	308	32	23	28	10.39%	7.50%	9.10%	139%	114%
5	231	24	17	19	10.39%	7.50%	8.20%	139%	127%
6	249	18	19	18	7.23%	7.50%	7.30%	96%	99%
7	282	12	21	18	4.26%	7.50%	6.40%	57%	66%
8	304	21	21	17	6.91%	7.00%	5.50%	99%	126%
9	296	16	16	13	5.41%	5.50%	4.50%	98%	120%
10	235	13	8	11	5.53%	3.60%	4.50%	154%	123%
11	245	12	9	10	4.90%	3.60%	4.00%	136%	122%
12	249	9	9	9	3.61%	3.60%	3.50%	100%	103%
13	234	6	8	7	2.56%	3.60%	3.00%	71%	85%
14	212	9	8	6	4.25%	3.60%	3.00%	118%	142%
15+	1,101	35	33	33	3.18%	3.00%	3.00%	106%	106%
Total	**5,898**	**485**	**403**	**460**	**8.22%**	**6.83%**	**7.81%**	**120%**	**105%**
Confidence Interval %			**87.5%**	**93.8%**					
R-squared			**89.6%**	**98.0%**					

Chart III-T2 – General Female

Table III-T3 shows the calculation of actual-to-expected ratios and the r-squared statistic for Safety members, and Chart III-T3 shows the information graphically along with the 90% confidence interval.

The data shows higher actual termination rates than expected under the current assumption. The proposed assumption increases the aggregate assumed rate of termination and decreases the aggregate A/E ratio from 130% to 111%. The r-squared increases from 87% to 88%.

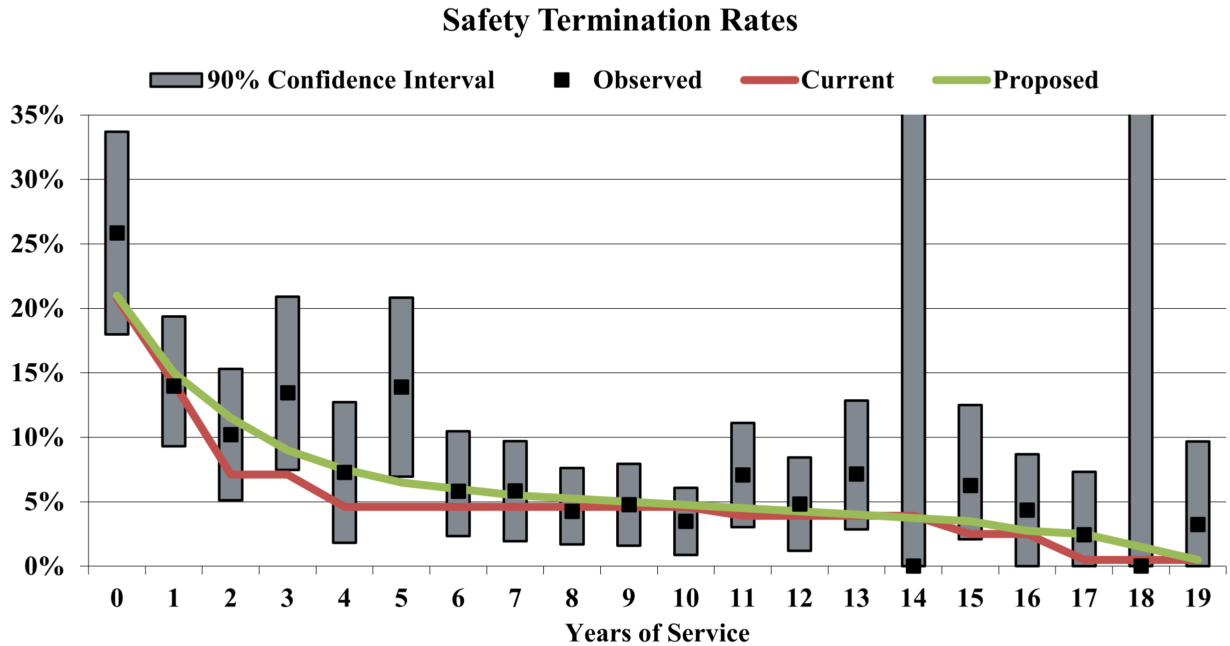
SECTION III – DEMOGRAPHIC ASSUMPTIONS
TERMINATION RATES

Table III-T3 – Safety

Safety Termination Rates									
		Terminations			Termination Rates			A/E Ratios	
Service	Exposures	Actual	Current	Proposed	Actual	Current	Proposed	Current	Proposed
0	89	23	19	19	25.84%	20.80%	21.00%	124%	123%
1	129	18	18	19	13.95%	14.20%	15.00%	98%	93%
2	98	10	7	11	10.20%	7.10%	11.50%	144%	89%
3	67	9	5	6	13.43%	7.10%	9.00%	189%	149%
4	55	4	3	4	7.27%	4.60%	7.50%	158%	97%
5	72	10	3	5	13.89%	4.60%	6.50%	302%	214%
6	86	5	4	5	5.81%	4.60%	6.00%	126%	97%
7	103	6	5	6	5.83%	4.60%	5.50%	127%	106%
8	118	5	5	6	4.24%	4.60%	5.25%	92%	81%
9	126	6	6	6	4.76%	4.60%	5.00%	104%	95%
10	115	4	5	5	3.48%	4.60%	4.75%	76%	73%
11	99	7	4	4	7.07%	3.90%	4.50%	181%	157%
12	83	4	3	4	4.82%	3.90%	4.25%	124%	113%
13	70	5	3	3	7.14%	3.90%	4.00%	183%	179%
14	60	0	2	2	0.00%	3.90%	3.75%	0%	0%
15	48	3	1	2	6.25%	2.50%	3.50%	250%	179%
16	46	2	1	1	4.35%	2.50%	2.75%	174%	158%
17	41	1	0	1	2.44%	0.50%	2.50%	488%	98%
18	35	0	0	1	0.00%	0.50%	1.50%	0%	0%
19	31	1	0	0	3.23%	0.50%	0.50%	645%	645%
Total	**1,571**	**123**	**95**	**111**	**7.83%**	**6.02%**	**7.04%**	**130%**	**111%**
Confidence Interval %			**90.0%**	**95.0%**					
R-squared			**86.9%**	**88.3%**					

SECTION III – DEMOGRAPHIC ASSUMPTIONS
TERMINATION RATES

Chart III-T3 – Safety



SECTION III – DEMOGRAPHIC ASSUMPTIONS
TERMINATION RATES

TYPES OF TERMINATION

When a vested member terminates employment, the member has the option of receiving a refund of contributions with interest or a deferred annuity. If an employee terminates employment and works for a reciprocal employer (also referred to as a transfer), the employees' retirement benefit is based on the employee's service with MCERA and Final Compensation based on employment with the reciprocal employer.

Table III-T4 and III-T5 show the results of our analysis of terminations for General and Safety members, as well as our recommendations regarding rates of withdrawal, vested termination, and transfer.

The number of both General and Safety members taking a withdrawal of their employee contributions when they terminate decreased for all service levels above four years for both General and Safety members. Our recommended assumptions for withdrawal is shown in the table below.

Table III-T4

Termination from Active Status							
	Years of Service						
	General				Safety		
Type	0 to 4	5-9	10-14	15+	0 to 4	5-9	10+
Withdrawal							
Current Assumption	90.0%	40.0%	40.0%	10.0%	90.0%	30.0%	30.0%
Actual Experience	95.0%	32.1%	19.1%	5.3%	95.4%	30.0%	0.0%
Proposed Assumption	92.5%	30.0%	20.0%	5.0%	92.5%	25.0%	15.0%
Transfers							
Current Assumption	10.0%	10.0%	10.0%	10.0%	10.0%	25.0%	25.0%
Actual Experience	4.7%	6.9%	5.6%	10.5%	4.6%	8.0%	0.0%
Proposed Assumption	7.5%	35.0%	40.0%	47.5%	7.5%	50.0%	56.7%
Vested Terms							
Current Assumption	0.0%	50.0%	50.0%	80.0%	0.0%	45.0%	45.0%
Actual Experience	0.0%	61.1%	75.3%	84.2%	0.0%	62.0%	0.0%
Proposed Assumption	0.0%	35.0%	40.0%	47.5%	0.0%	25.0%	28.3%

For the analysis of the rates of reciprocity, we have performed the analysis from two different perspectives. The first method, shown in Table III-T4, looks at the number of members who notify MCERA that they have been employed at a reciprocal retirement system when they leave MCERA employment. The second method, shown in Table III-T5, looks at the number of

SECTION III – DEMOGRAPHIC ASSUMPTIONS
TERMINATION RATES

members who retired from a terminated status at MCERA and were employed at a reciprocal system.

The first analysis results in lower rates of reciprocity, most likely due to members not reporting to MCERA that they were hired at a reciprocal system and the information only becoming available once the member retires from the reciprocal system. Based on the second analysis, we are recommending significant increases in the percentage of reciprocal transfers and corresponding decreases in the percentage of vested terms.

Table III-T5

Retirement from Terminated Status				
	General		Safety	
Type	Retirements	Fraction	Retirements	Fraction
Transfers	70	50.4%	15	78.9%
Vested Terms	69	49.6%	4	21.1%

DEFERRED RETIREMENT COMMENCEMENT AGE

For General participants, the current assumption is that terminated vested members will retire at 59 and future reciprocal transfers will retire at age 61. The data for the three-year period studied showed the average retirement age was 60.0 for terminated vested members and 60.5 for reciprocal transfers. We recommend increasing the assumption for terminated vested members to 60 and maintaining the assumption for future reciprocal transfers at 61.

For Safety participants, the current assumption is that terminated vested members will retire at 53 and future reciprocal transfers will retire at age 55. The data for the three-year period studied showed the average retirement age was 50.3 for terminated vested members and 58.9 for reciprocal transfers, but this only represented two vested terminations and five reciprocal transfers. We recommend decreasing the assumption for terminated vested members to 51 and increasing the assumption for future reciprocal transfers to 57.

Current reciprocal transfers are assumed to begin receiving benefits based on the probabilities of retirement applied to the active members. We do not recommend a change to this assumption.

SECTION III – DEMOGRAPHIC ASSUMPTIONS
DISABILITY RATES

This section analyzes the incidence of disability by the age of the employee. All disabilities for members with less than five years of service are assumed to be service-related. The amount of disability experience is fairly limited; only 24 disabilities have occurred during the last three years for Safety and General members combined. To improve the credibility of the data, we have aggregated the experience of the past three years with that of the prior experience study (2013-2016).

Table III-D1 shows the calculation of actual-to-expected ratios and the r-squared statistic for all disabilities for General members, and Chart III-D1 shows the information graphically along with the 90% confidence interval.

The data shows that actual disability rates are higher than expected disability rates in aggregate. We recommend changing the assumption to the CalPERS Public Agency State Miscellaneous Non Industrial Disability table, based on a blend of 30% of the male rates and 70% of the female rates. We also recommend that 50% of disabilities are assumed to be duty related and 50% are assumed to be non-duty related.

The proposed assumption decreases the aggregate A/E ratio from 162% to 100% and the r-squared decreases from 35.13% to 25.13%.

See Appendix A or B for a sample listing of the rates.

Table III-D1 – General

Disability Rates - General						
Age		Disabilities			Actual to Expected Ratios	
Band	Exposures	Actual	Current	Recommended	Current	Recommended
20 - 24	91	0	0	0	0%	0%
25 - 29	868	0	0	0	0%	0%
30 - 34	1,377	0	0	1	0%	0%
35 - 39	1,650	1	1	2	131%	59%
40 - 44	1,463	3	1	3	299%	97%
45 - 49	1,233	3	1	4	211%	74%
50 - 54	1,394	4	3	5	157%	82%
55 - 59	1,304	5	4	3	142%	149%
60 - 64	636	4	2	2	166%	263%
65 - 69	178	0	-	0	0%	0%
70 +	36	0	-	0	0%	0%
Total	**10,230**	**20**	**12**	**20**	**162%**	**100%**
R-squared			**0.3513**	**0.2513**		

SECTION III – DEMOGRAPHIC ASSUMPTIONS
DISABILITY RATES

Chart III-D1 – General

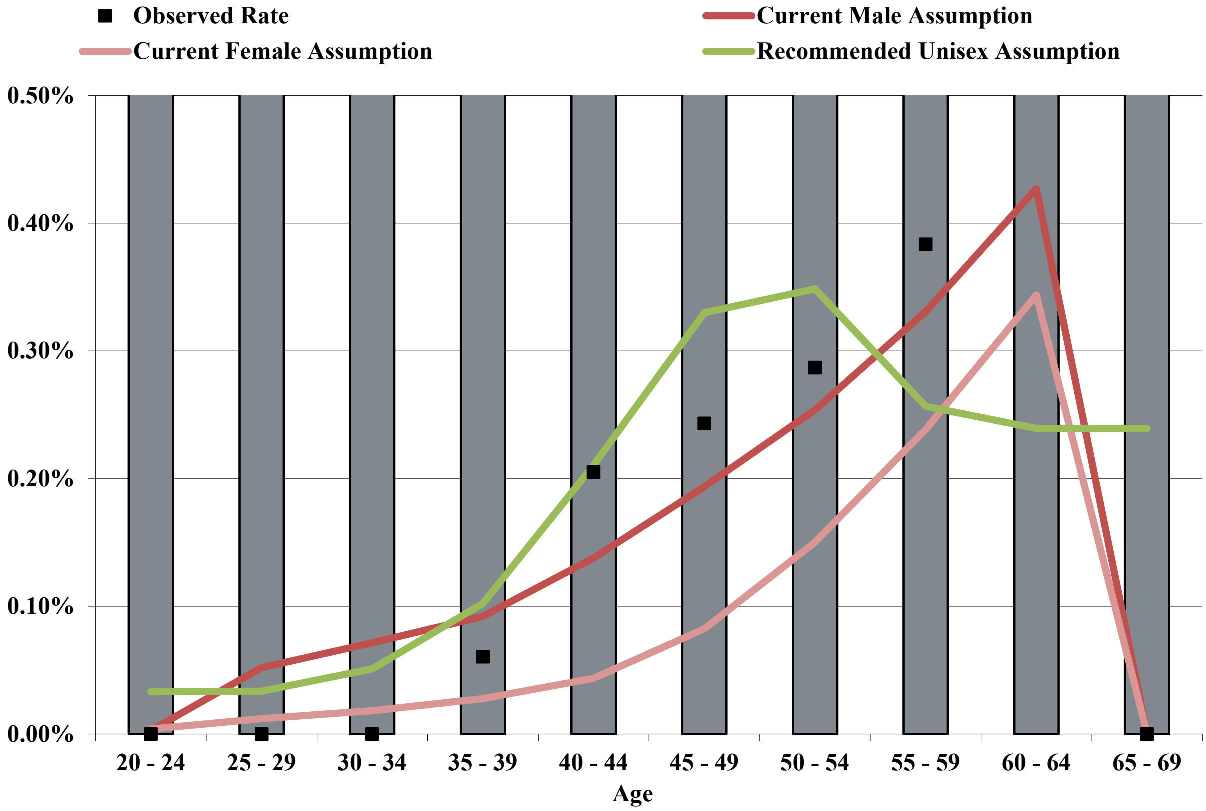


Table III-D2 shows the calculation of actual-to-expected ratios and the r-squared statistic for Safety members, and Chart III-D2 shows the information graphically along with the 90% confidence interval.

The data shows that the number of disabilities is higher than the number expected under the current assumption. As with the General members, the amount of experience upon which to base credible assumptions is limited, so Cheiron recommends maintaining the rates at 50% of the CalPERS industrial disability rates for Public Agency Police for duty-related disabilities and 50% of the CalPERS non-industrial disability rates for Public Agency Police for non-duty related disabilities.

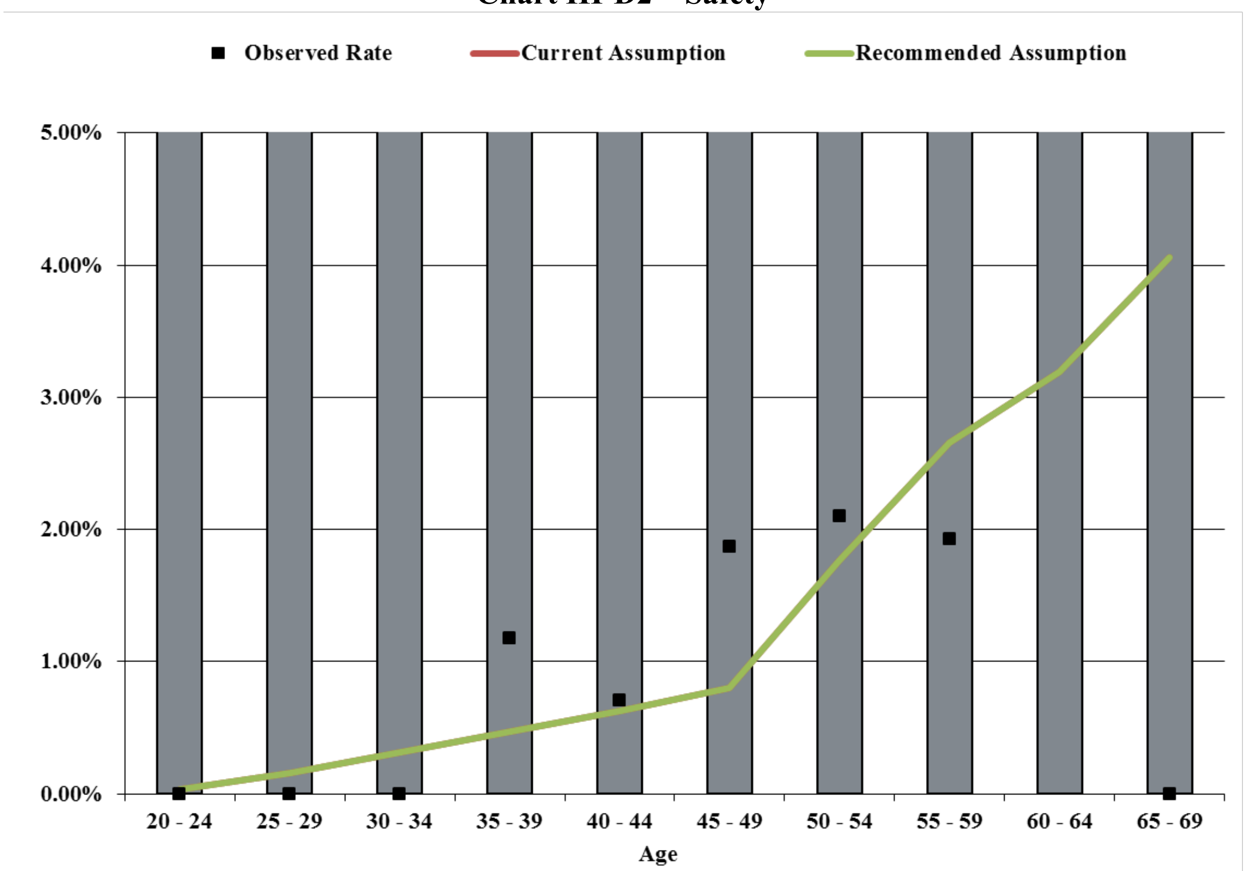
See Appendix A or B for a sample listing of the rates.

SECTION III – DEMOGRAPHIC ASSUMPTIONS
DISABILITY RATES

Table III-D2 – Safety

Disability Rates - Safety						
Age Band	Exposures	Disabilities			Actual to Expected Ratios	
		Actual	Current	Recommended	Current	Recommended
20 - 24	51	0	0	0	0%	0%
25 - 29	232	0	0	0	0%	0%
30 - 34	371	0	1	1	0%	0%
35 - 39	425	5	2	2	251%	251%
40 - 44	284	2	2	2	112%	112%
45 - 49	267	5	2	2	234%	234%
50 - 54	143	3	3	3	119%	119%
55 - 59	52	1	1	1	72%	72%
60 - 64	8	3	0	0	1176%	1176%
65 - 69	4	0	0	0	0%	0%
70 +	1	0	0	0	0%	0%
Total	**1,838**	**19**	**12**	**12**	**161%**	**161%**
R-squared			**0.1677**	**0.1677**		

Chart III-D2 – Safety



SECTION III – DEMOGRAPHIC ASSUMPTIONS

MORTALITY RATES

Post-retirement mortality assumptions are typically developed separately by sex for both healthy annuitants and disabled annuitants. Pre-retirement mortality assumptions are also developed separately by sex. Unlike most of the other demographic assumptions that rely exclusively on the experience of the plan, for mortality, standard mortality tables and projection scales serve as the primary basis for the assumption.

The Retirement Plans Experience Committee (RPEC) of the SOA recently completed an extensive mortality study and published a new set of mortality tables for U.S. public pension plans, the Pub-2010 Mortality Tables, with separate tables for teachers, safety members, and other public employees. The experience covered 35 public systems with 78 plans. Since benefits for retirees and salaries for active members are a significant predictor of mortality differences, separate tables were also developed for Above-Median and Below-Median.

RPEC also published the most recent mortality improvement projection scale, MP-2019, in late 2019. We used these tables as the basis for our analysis.

The steps in our analysis are as follows:

1. Select a standard mortality table that is, based on experience, most closely matching the anticipated experience of MCERA.
2. Compare actual MCERA experience to what would have been predicted by the selected standard table for the period of the experience study.
3. Adjust the standard table either fully or partially depending on the level of credibility for MCERA experience. This adjusted table is called the base table.
4. Select an appropriate standard mortality improvement projection scale and apply it to the base table.

As we have done in prior experience studies, we have combined the experience of the past three years with that of the prior three-year period in order to have a more robust dataset to review.

In the prior study, MCERA elected to use the following assumptions:

Active members

- CalPERS 2009 Non-Industrial Employees Mortality Table, with no adjustment.
- CalPERS 2009 Industrial Employee Mortality, with no adjustment (Line-of-Duty, Safety only).

Healthy retirees and beneficiaries

- CalPERS 2009 Healthy Annuitant Mortality Table, with no adjustment.

Disabled members

- CalPERS 2009 Industrial Disability Mortality Table.

SECTION III – DEMOGRAPHIC ASSUMPTIONS
MORTALITY RATES

Since the prior study, the Society of Actuaries' Retirement Plans Experience Committee (RPEC) has released a new mortality improvement scale, Scale MP-2019, which reflects three more years of data than was used in the development of Scale MP-2016.

MP-2019 represents the Society of Actuaries' most advanced actuarial methodology in incorporating mortality improvement trends with actual recent mortality rates, by using rates that vary not only by age but also by calendar year – known as a two-dimensional approach to projecting mortality improvements. Scale MP-2019 was designed with the intent of being applied to mortality on a generational basis. The effect of this is to build in an automatic expectation of future improvements in mortality. Recent reports issued by RPEC suggest that using generational mortality is a preferable approach, as it allows for an explicit declaration of the amount of future mortality improvement included in the assumptions.

For General members, MCERA's experience over the past six years matches well with the existing assumption of the CalPERS rates, after applying the improvement projections from the base year of the tables (2009) using the new MP-2019 mortality improvement projections through the mid-point of the six-year period (2016).

For Safety members, MCERA's experience is higher than the rates of most of the standard tables, although this is based on an extremely limited dataset. The closest match is with the new Below Median Safety Pub-2010 rates, after applying the improvement projections from the base year of the tables (2010) using the new MP-2019 mortality improvement projections through the mid-point of the six-year period (2016).

Even with the use of six years of data, the MCERA experience is only partially credible, based on standard statistical theory, particularly for Safety members. We therefore recommend partially adjusting the Below Median Safety Pub-2010 base tables to fit MCERA's experience to develop a new base table. The rates for each age in the standard table are adjusted by a factor, where the factor is determined by multiplying the actual-to-expected ratio for the group by a credibility factor, which will bring the A/E results closer – but not all the way – to 100%.

Rather than weighting the experience based on the number of members living and dying, we have weighted the experience based on benefit size. This approach has been recommended by RPEC, since members with larger benefits are expected to live linger, and a benefit-weighted approach helps avoid underestimating the liabilities.

Based on this information, we are recommending the following base mortality table assumptions:

Active members

- General - CalPERS 2009 Non-Industrial Employees Mortality Table
- Safety
  - 2010 Public Safety Below Median Employee Mortality Table
  - CalPERS 2009 Industrial Employee Mortality (Line-of-Duty only)

SECTION III – DEMOGRAPHIC ASSUMPTIONS
MORTALITY RATES

Healthy retirees and beneficiaries
- General - CalPERS 2009 Healthy Annuitant Mortality Table
- Safety - 105% times the 2010 Public Safety Below Median Healthy Retiree Mortality Table

Disabled members
- Duty Related - CalPERS 2009 Industrial Disability Mortality Table
- Non-Duty Related - CalPERS 2009 Non-Industrial Disability Mortality Table

We also recommend projecting these base tables generationally using the MP-2019 mortality improvement scale described above for all types of mortality.

As shown in the following tables and charts, our proposed mortality rates for healthy annuitants (i.e. service-retired members and their beneficiaries) are closer to recent experience than the current mortality rates (reflecting an A/E ratio closer to 100%), although there is still some conservatism in the General female and the Safety rates.

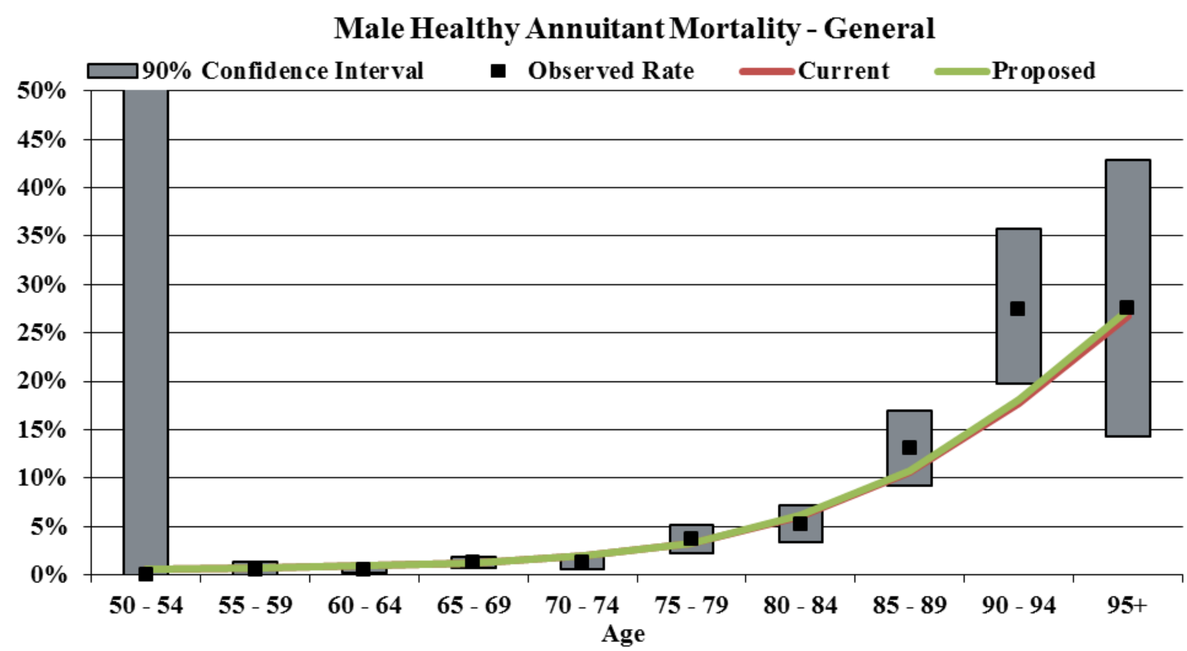
SECTION III – DEMOGRAPHIC ASSUMPTIONS

MORTALITY RATES

Table III-M1

Healthy Annuitant Mortality - Base Table for Males - General								
Age		Actual	Weighted	Weighted Deaths			A/E Ratios	
Band	Exposures	Deaths	Exposures	Actual	Current	Proposed	Current	Proposed
50 - 54	69	-	149,852	-	822	841	0%	0%
55 - 59	291	3	692,347	3,644	4,874	4,947	75%	74%
60 - 64	619	4	2,216,445	10,853	20,205	20,223	54%	54%
65 - 69	863	8	3,281,858	40,567	40,065	39,749	101%	102%
70 - 74	654	13	2,296,219	28,605	45,727	45,648	63%	63%
75 - 79	489	20	1,317,402	48,558	43,219	43,444	112%	112%
80 - 84	349	22	674,686	35,460	41,115	41,445	86%	86%
85 - 89	218	26	460,803	60,099	48,995	49,519	123%	121%
90 - 94	81	21	179,155	49,094	31,839	32,427	154%	151%
95 +	28	6	41,797	11,503	11,175	11,450	103%	100%
Total	**3,661**	**123**	**11,310,566**	**288,382**	**288,036**	**289,692**	**100%**	**100%**

Chart III-M1

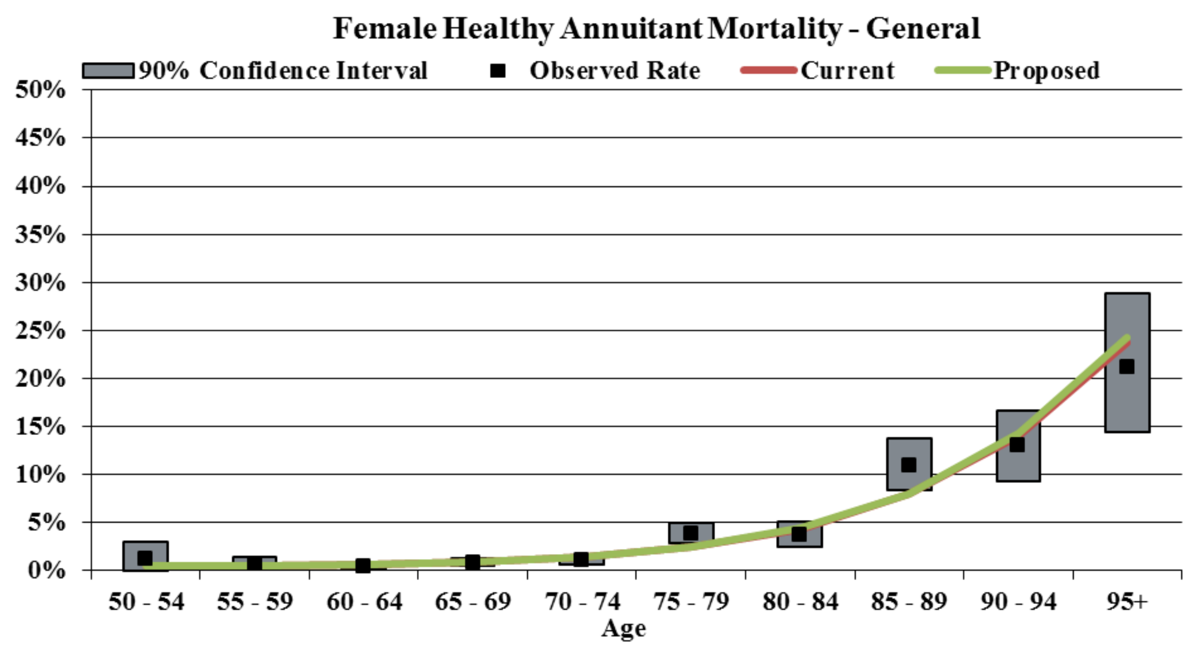


SECTION III – DEMOGRAPHIC ASSUMPTIONS
MORTALITY RATES

Table III-M2

Healthy Annuitant Mortality - Base Table for Females - General								
Age Band	Exposures	Actual Deaths	Weighted Exposures	Weighted Deaths			A/E Ratios	
				Actual	Current	Proposed	Current	Proposed
50 - 54	99	1	187,232	2,250	917	934	245%	241%
55 - 59	579	5	1,440,500	10,120	7,006	7,053	144%	143%
60 - 64	1,209	7	3,114,968	13,666	18,141	18,131	75%	75%
65 - 69	1,440	11	3,460,112	29,978	29,361	29,304	102%	102%
70 - 74	1,279	16	2,372,983	25,319	33,410	33,554	76%	75%
75 - 79	834	24	1,357,378	53,070	33,571	33,848	158%	157%
80 - 84	575	23	951,829	35,711	41,369	41,705	86%	86%
85 - 89	357	33	517,906	56,559	41,133	41,522	138%	136%
90 - 94	235	35	297,246	38,888	41,709	42,422	93%	92%
95 +	83	19	115,531	24,450	27,431	28,017	89%	87%
Total	**6,690**	**174**	**13,815,685**	**290,012**	**274,048**	**276,490**	**106%**	**105%**

Chart III-M2

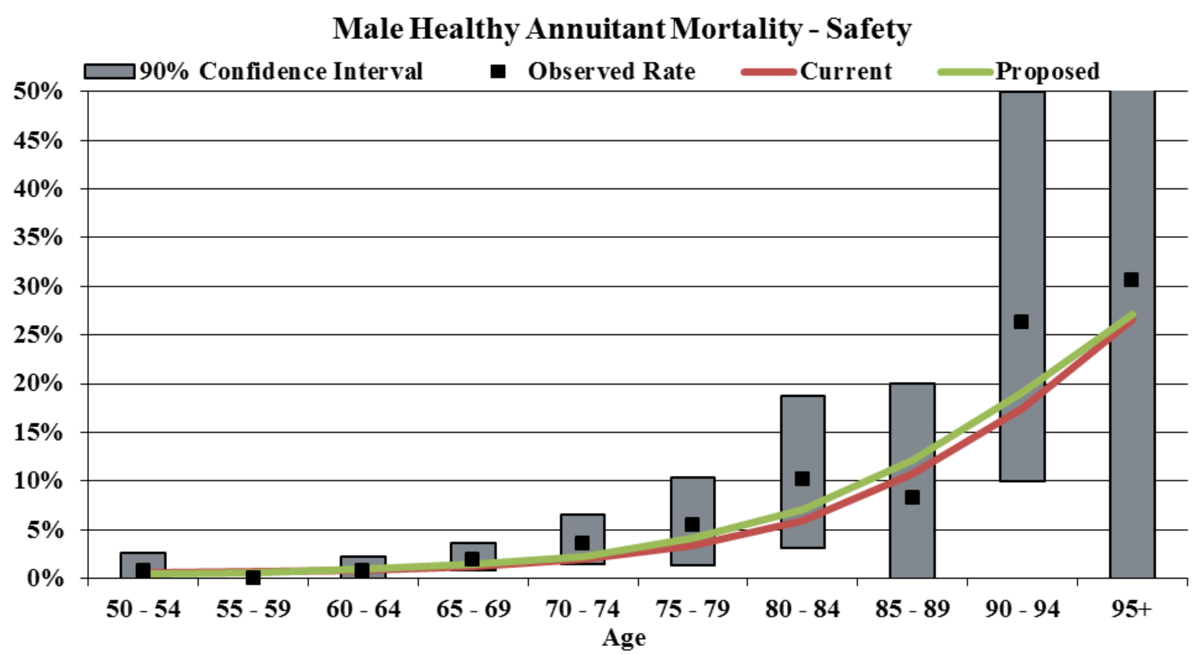


SECTION III – DEMOGRAPHIC ASSUMPTIONS
MORTALITY RATES

Table III-M3

Healthy Annuitant Mortality - Base Table for Males - Safety								
Age Band	Exposures	Actual Deaths	Weighted Exposures	Weighted Deaths			A/E Ratios	
				Actual	Current	Proposed	Current	Proposed
50 - 54	112	2	455,540	3,602	2,432	1,871	148%	193%
55 - 59	165	1	583,458	78	4,016	3,660	2%	2%
60 - 64	176	1	648,776	5,207	5,874	6,161	89%	85%
65 - 69	246	3	910,192	18,027	11,057	12,932	163%	139%
70 - 74	137	5	403,908	14,202	7,817	9,273	182%	153%
75 - 79	77	5	243,787	13,374	8,196	10,037	163%	133%
80 - 84	32	3	125,579	12,812	7,502	8,814	171%	145%
85 - 89	25	3	68,290	5,672	7,327	8,330	77%	68%
90 - 94	10	3	42,129	11,067	7,386	8,057	150%	137%
95 +	7	2	16,103	4,934	4,290	4,362	115%	113%
Total	**987**	**28**	**3,497,761**	**88,975**	**65,899**	**73,496**	**135%**	**121%**

Chart III-M3

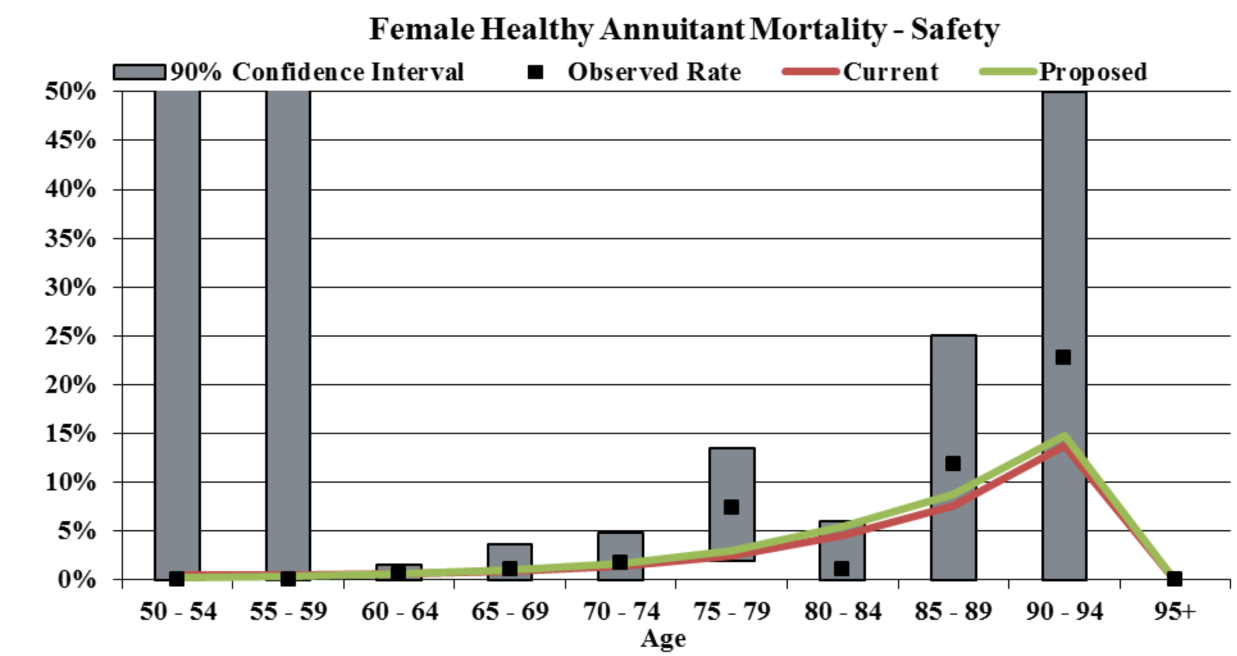


SECTION III – DEMOGRAPHIC ASSUMPTIONS
MORTALITY RATES

Table III-M4

Healthy Annuitant Mortality - Base Table for Females - Safety								
Age Band	Exposures	Actual Deaths	Weighted Exposures	Weighted Deaths			A/E Ratios	
				Actual	Current	Proposed	Current	Proposed
50 - 54	30	0	86,068	0	423	202	0%	0%
55 - 59	60	0	184,871	0	892	707	0%	0%
60 - 64	62	1	201,338	1,029	1,164	1,236	88%	83%
65 - 69	82	2	214,796	2,302	1,879	2,239	123%	103%
70 - 74	83	3	278,527	4,818	3,828	4,632	126%	104%
75 - 79	52	2	120,133	8,854	2,946	3,579	300%	247%
80 - 84	33	1	72,095	812	3,294	3,989	25%	20%
85 - 89	20	3	44,926	5,307	3,431	3,940	155%	135%
90 - 94	8	2	15,630	3,560	2,146	2,316	166%	154%
95 +	0	0	0	0	0	0	0%	0%
Total	**430**	**14**	**1,218,384**	**26,682**	**20,003**	**22,842**	**133%**	**117%**

Chart III-M4



SECTION III – DEMOGRAPHIC ASSUMPTIONS

MORTALITY RATES

We have not shown the data for the disabled and active member mortality experience, as the number of deaths is very low – 36 total disabled deaths and six total active deaths – over the six-year period, which is not enough data to produce sufficiently credible assumptions. We have used our professional judgement to recommend the continued use of the CalPERS base tables based on the CalPERS rates, and applied the same generational improvement scales as recommended for the healthy annuitant members. We note that the CalPERS tables, unlike the Pub-2010 tables, include distinct assumptions for duty versus non-duty related disabilities, which we believe supports the use of the CalPERS tables, since experience has shown that duty-related disabled members experience lower rates of death, at least in the initial years of retirement, and particularly for Safety members.

Mortality Assumptions for Employee Contribution Rates

For purposes of determining employee contribution rates, the use of generational mortality improvements is impractical from an administrative perspective. Therefore, we recommend using the base mortality tables described above projected using Scale MP-2019 to 2041. These static projections are intended to approximate generational mortality improvements.

The projection periods are based upon the duration of active liabilities for the respective impacted groups, and the period during which the associated employee contribution rates will be in use. The employee contribution rates are also blended using a male/female weighting of 30%/70% for General Members and 70%/30% for Safety members.

We anticipate that these mortality assumptions will be used to determine the employee contribution rates in effect for the period of July 1, 2020 through June 30, 2023. We also anticipate that the mortality assumptions for this purpose will be updated again after the next experience study covering the period from July 1, 2019 through June 30, 2022.

FAMILY COMPOSITION

Members who are married at the time of retirement are entitled to an unreduced 60% joint and survivor annuity.

An analysis of newly retiring General members showed that 77% of males are married and 53% of females are married. We recommend increasing the assumption for future male General retires from 70% to 75% and increasing the assumption for future female General retirees from 50% to 55%.

An analysis of newly retiring Safety members showed that 80% are married, with no significant difference between males and females. We recommend decreasing the assumption for future Safety retirees from 90% to 85%.

An analysis of newly retiring General and Safety members showed that male members are 3.0 years older than their spouses and female members are 1.5 years younger than their spouses. We recommend maintaining the current assumption that male members are three years older than their spouses and female members are two years younger than their spouses.

PLAN EXPENSES

An allowance of $2,200,000 for Plan administrative expenses was included in the annual cost calculation for FYE 2017 after the prior study, and was expected to increase with the assumed price inflation annually. An assumed allowance of $2,311,000 was made for FYE 2019. Actual administrative expenses for the FYE 2019 were $2,351,000. Based on experience we propose no change to the plan expense assumption, which is the prior year's assumed expense increased with the price inflation annually. This results in an assumed administrative expense of $2,369,000 for FYE 2020.

These expenses are split between employees and employers based on their share of the overall contributions.

APPENDIX A – SUMMARY OF PROPOSED ASSUMPTIONS

The recommended assumptions were adopted by the Board at their December 12, 2019 meeting. The assumptions are based on an experience study covering the period from July 1, 2016 through June 30, 2019.

1. Rate of Return

Assets are assumed to earn 7.00% net of investment expenses.

2. Administrative Expenses

Administrative expenses are assumed to be $2.369 million for the next year, to be allocated between the employer and employees based on each group's share of the non-expense related contributions. Administrative expenses in future years are expected to increase with the Consumer Price Index (CPI).

3. Cost of Living

The cost of living as measured by the Consumer Price Index (CPI) will increase at the rate of 2.50% per year.

4. Post Retirement COLA

Benefits are assumed to increase after retirement at the rate of 2.40% per year for Tier 1 members.

5. Increases in Pay

Wage inflation component: 2.75%
Additional longevity and promotion component:

Years of Service	General	Safety	Years of Service	General	Safety
0	7.00%	8.50%	11	2.50%	1.00%
1	6.50%	7.50%	12	2.25%	1.00%
2	6.00%	6.50%	13	2.00%	1.00%
3	5.50%	5.50%	14	1.85%	1.00%
4	5.00%	4.50%	15	1.70%	1.00%
5	4.50%	3.50%	16	1.55%	1.00%
6	4.00%	3.00%	17	1.40%	1.00%
7	3.50%	2.50%	18	1.25%	1.00%
8	3.25%	2.00%	19	1.10%	1.00%
9	3.00%	1.50%	20+	1.00%	1.00%
10	2.75%	1.00%			

APPENDIX A – SUMMARY OF PROPOSED ASSUMPTIONS

6. Final Average Compensation Load

The final average compensation (FAC) for members projected to receive a service retirement benefit has been increased based on the assumption that members will have elements of pay included in their FAC which are not included in the annual pay provided to the Actuary (Ventura decision pays). The FAC for General Tier 1 members has been increased by 5.50%, the FAC for Safety Tier 1 members has been increased by 8.00%, and the FAC for all Tier 2 and Tier 3 members by 1.50%.

7. Family Composition

55% of female General members, 75% of male General members and 85% of Safety members are assumed to be married at retirement. Male members are assumed to be three years older than their spouses are and female members are assumed to be two years younger than their spouses are.

8. Rates of Mortality

Mortality rates for actives, retirees, disabled members, beneficiaries, terminated vesteds, and reciprocal transfers are based on the sex-distinct employee and annuitant mortality tables as described below. Future mortality improvements are reflected by applying the SOA MP-2019 projection scale on a generational basis from the base year of 2009 for the CalPERS tables and the base year of 2010 for the Below Median Safety member Pub-2010 tables.

Category	Base Mortality Table	
	General	Safety
Healthy Annuitant	CalPERS 2009 Healthy Annuitant Mortality Table	1.05 times the 2010 Public Safety Below Median Mortality Table for Healthy Retirees
Duty Disabled Annuitants	CalPERS 2009 Industrial Disability Mortality Table	CalPERS 2009 Industrial Disability Mortality Table
Non-Duty Disabled Annuitant	CalPERS 2009 Non-Industrial Disability Mortality Table	CalPERS 2009 Non-Industrial Disability Mortality Table
Active Employees	CalPERS 2009 Non-Industrial Employees Mortality Table	2010 Public Safety Below Median Mortality Table for Healthy Employees
Actives, Line of Duty (Safety only)	N/A	CalPERS 2009 Industrial Employees Mortality Table

For determining mortality rates for future disabled members, 50% of future General disabilities are assumed to be duty related and 50% are assumed to be non-duty related. 100% of future Safety disabilities are assumed to be duty related.

APPENDIX A – SUMMARY OF PROPOSED ASSUMPTIONS

9. Rates of Termination

Sample rates of termination[1] are shown in the following table.

Years of Service	General Male	General Female	Safety
0	20.0%	20.0%	21.0%
5	8.2%	8.2%	6.5%
10	4.5%	4.5%	4.75%
15	4.5%	3.0%	3.5%
20	4.5%	3.0%	0.0%
25	4.5%	3.0%	0.0%
30	0.0%	0.0%	0.0%

[1] *Termination rates do not apply once a member is eligible for retirement.*

There are three types of terminations: withdrawals, reciprocal transfers, and vested terminations. Rates of withdrawal apply to active Members who terminate their employment and withdraw their member contributions, forfeiting entitlement to future Plan benefits. Rates of reciprocal transfer are for members who leave their member contributions on deposit and engage in employment covered by a pension plan with a reciprocal relationship with MCERA. Finally, rates of vested termination apply to active Members who terminate their employment and leave their member contributions on deposit with the Plan.

The table below shows the percentages of total terminations falling into these categories.

	Years of Service						
	General				Safety		
	0 – 4	5 – 9	10-14	15+	0 – 4	5-9	10+
Withdrawals	92.5%	30.0%	20.0%	5.0%	92.5%	25.0%	15.0%
Transfers	7.5%	35.0%	40.0%	47.5%	7.5%	50.0%	56.7%
Vested Terminations	0.0%	35.0%	40.0%	47.5%	0.0%	25.0%	28.3%

Vested terminated General Members are assumed to begin receiving benefits at age 60; Vested terminated Safety Members are assumed to begin receiving benefits at age 51. Future reciprocal transfer General members are assumed to begin receiving benefits at age 61; future reciprocal transfer Safety members are assumed to begin receiving benefits at age 57. Current reciprocal transfer members are assumed to begin receiving benefits based on the probabilities of retirement applied to the active members.

Future reciprocal transfers' pay growth is assumed to be 3.75% while employed by a reciprocal employer. Current reciprocal transfers' pay growth is assumed to increase according to the assumptions applied to the active members until the assumed retirement age.

APPENDIX A – SUMMARY OF PROPOSED ASSUMPTIONS

10. Rates of Retirement

Rates of retirement are based on age according to the following table, and are applied once members are eligible for a service retirement benefit.

General Years of Service			Safety Years of Service		
Age	<30	30+	Age	<20	20+
50	10.00%	20.00%	40	0.00%	1.50%
51	10.00%	20.00%	41	0.00%	1.50%
52	10.00%	20.00%	42	0.00%	1.50%
53	10.00%	20.00%	43	0.00%	1.50%
54	10.00%	20.00%	44	0.00%	1.50%
55	10.00%	25.00%	45	0.00%	1.50%
56	10.00%	25.00%	46	0.00%	5.00%
57	10.00%	30.00%	47	0.00%	10.00%
58	15.00%	35.00%	48	0.00%	15.00%
59	20.00%	35.00%	49	0.00%	20.00%
60	20.00%	35.00%	50	15.00%	20.00%
61	20.00%	35.00%	51	7.50%	20.00%
62	20.00%	35.00%	52	7.50%	20.00%
63	20.00%	35.00%	53	7.50%	20.00%
64	20.00%	35.00%	54	20.00%	20.00%
65	35.00%	35.00%	55	30.00%	30.00%
66	35.00%	35.00%	56	30.00%	30.00%
67	35.00%	35.00%	57	30.00%	30.00%
68	35.00%	35.00%	58	30.00%	30.00%
69	35.00%	35.00%	59	30.00%	30.00%
70+	100.00%	100.00%	60	100.00%	100.00%

APPENDIX A – SUMMARY OF PROPOSED ASSUMPTIONS

11. Rates of Disability

Sample service-connected disability rates of active participants are provided in the table below.

	General		Safety	
Age	Service-Connected	Non-Service Connected[1]	Service-Connected	Non-Service Connected[1]
20	0.0165%	0.0165%	0.0000%	0.0050%
25	0.0165%	0.0165%	0.0825%	0.0050%
30	0.0190%	0.0190%	0.2380%	0.0100%
35	0.0390%	0.0390%	0.3940%	0.0150%
40	0.0806%	0.0806%	0.5500%	0.0200%
45	0.1447%	0.1447%	0.7060%	0.0250%
50	0.1829%	0.1829%	0.9230%	0.0400%
55	0.1442%	0.1442%	2.3925%	0.0650%
60	0.1196%	0.1196%	3.0120%	0.1000%
65	0.1196%	0.1196%	3.6385%	0.1000%

[1] *Rates are applied once members have at least five years of service.*

12. Member Contribution Balance Crediting Rate

5.00% (2.00% less than the assumed rate of return of 7.00%).

APPENDIX B – SUMMARY OF PRIOR ASSUMPTIONS

The assumptions and methods used in the June 30, 2018 actuarial valuation reflect the results of an Experience Study performed by Cheiron covering the period from July 1, 2013 through June 30, 2016 and adopted by the Board.

1. Rate of Return

Assets are assumed to earn 7.25% net of investment expenses.

2. Administrative Expenses

Administrative expenses are assumed to be $2.31 million for the next year, to be allocated between the employer and employees based on each group's share of the non-expense related contributions. Administrative expenses in future years are expected to increase with the Consumer Price Index (CPI).

3. Cost of Living

The cost of living as measured by the Consumer Price Index (CPI) will increase at the rate of 2.50% per year.

4. Post Retirement COLA

Benefits are assumed to increase after retirement at the rate of 2.40% per year for Tier 1 members.

5. Increases in Pay

Wage inflation component: 2.75%
Additional longevity and promotion component:

Years of Service	General	Safety
0-1	7.00%	7.50%
2-3	5.00%	5.00%
4	5.00%	3.00%
5	3.00%	1.50%
6-9	2.00%	1.50%
10-14	1.50%	1.00%
15-19	1.00%	1.00%
20+	0.50%	0.50%

APPENDIX B – SUMMARY OF PRIOR ASSUMPTIONS

Final Average Compensation Load

The final average compensation (FAC) for members projected to receive a service retirement benefit has increased based on the assumption that members will have elements of pay included in their FAC which are not included in the annual pay provided to the actuary (Ventura decision pays). The FAC for Tier 1 members has been increased by 6.92% and the FAC for Tier 2 and Tier 3 members by 2.31%.

6. Family Composition

50% of female General members, 70% of male General members and 90% of Safety members are assumed to be married at retirement. Male members are assumed to be three years older than their spouses are and female members are assumed to be two years younger than their spouses are.

7. Rates of Mortality

Mortality rates for actives, retirees, disabled members, beneficiaries, terminated vesteds, and reciprocal transfers are based on the sex-distinct employee and annuitant CALPERS mortality tables as described below. Future mortality improvements are reflected by applying the SOA MP-2016 projection scale on a generational basis from the base year of 2009.

Category	Base Mortality Table
Healthy Annuitant	CalPERS 2009 Healthy Annuitant Mortality Table
Disabled Annuitant	CalPERS 2009 Industrial Disability Mortality Table
Healthy Non-Annuitant	CalPERS 2009 Non-Industrial Employees Mortality Table
Actives, Line of Duty (Safety only)	CalPERS 2009 Industrial Employees Mortality Table

APPENDIX B – SUMMARY OF PRIOR ASSUMPTIONS

8. Rates of Termination

Sample rates of termination[1] are shown in the following table.

Years of Service	General Male	General Female	Safety
0	22.5%	12.0%	20.8%
5	8.2%	7.5%	4.6%
10	4.5%	3.6%	4.6%
15	4.5%	3.0%	2.5%
20	4.5%	3.0%	0.0%
25	4.5%	3.0%	0.0%
30	0.0%	0.0%	0.0%

[1] *Termination rates do not apply once a member is eligible for retirement.*

There are three types of terminations: withdrawals, reciprocal transfers, and vested terminations. Rates of withdrawal apply to active Members who terminate their employment and withdraw their member contributions, forfeiting entitlement to future Plan benefits. Rates of reciprocal transfer are for members who leave their member contributions on deposit and engage in employment covered by a pension plan with a reciprocal relationship with MCERA. Finally, rates of vested termination apply to active Members who terminate their employment and leave their member contributions on deposit with the Plan.

The table below shows the percentages of total terminations falling into these categories.

	Years of Service				
	General			Safety	
	0 – 4	5 – 14	15+	0 – 4	5+
Withdrawals	90.0%	40.0%	10.0%	90.0%	30.0%
Transfers	10.0%	10.0%	10.0%	10.0%	25.0%
Vested Terminations	0.0%	50.0%	80.0%	0%	45.0%

Vested terminated General Members are assumed to begin receiving benefits at age 59; vested terminated Safety Members are assumed to begin receiving benefits at age 53. Future reciprocal transfer General members are assumed to begin receiving benefits at age 61; future reciprocal transfer safety members are assumed to begin receiving benefits at age 55. Current reciprocal transfer members are assumed to begin receiving benefits based on the probabilities of retirement applied to the active members.

Future reciprocal transfers' pay growth is assumed to be 3.25% while employed by a reciprocal employer. Current reciprocal transfers' pay growth is assumed to increase according to the assumptions applied to the active members until the assumed retirement age.

APPENDIX B – SUMMARY OF PRIOR ASSUMPTIONS

9. Rates of Service-Connected Disability

Sample service-connected disability rates of active participants are provided in the table.

	Safety	General	
Age	All	Male	Female
20	0.0000%	0.0027%	0.0040%
25	0.0825%	0.0053%	0.0075%
30	0.2380%	0.0133%	0.0115%
35	0.3940%	0.0240%	0.0150%
40	0.5500%	0.0320%	0.0190%
45	0.7060%	0.0480%	0.0340%
50	0.9230%	0.0640%	0.0600%
55	2.3925%	0.0800%	0.1050%
60	3.0120%	0.1120%	0.1575%
65	3.6385%	0.0000%	0.0000%

10. Rates of Non Service-Connected Disability

Sample non service-connected disability rates of active participants are provided in the table. Rates are applied once members have at least five years of service.

	Safety	General	
Age	All	Male	Female
20	0.0050%	0.0000%	0.0000%
25	0.0050%	0.0267%	0.0033%
30	0.0100%	0.0533%	0.0067%
35	0.0150%	0.0533%	0.0100%
40	0.0200%	0.0867%	0.0133%
45	0.0250%	0.1267%	0.0300%
50	0.0400%	0.1600%	0.0600%
55	0.0650%	0.2133%	0.0933%
60	0.1000%	0.2800%	0.1533%
65	0.1000%	0.0000%	0.0000%

APPENDIX B – SUMMARY OF PRIOR ASSUMPTIONS

11. Rates of Retirement

Rates of retirement are based on age according to the following table, and are applied once members are eligible for a service retirement benefit.

	General Male			General Female			Safety		
	Years of Service			Years of Service				Years of Service	
Age	10 – 19	20 – 29	30+	10 – 19	20 – 29	30+	Age	10 – 19	20+
50	5.00%	10.00%	7.50%	2.50%	7.50%	25.00%	40	0.00%	3.10%
51	5.00%	10.00%	7.50%	2.50%	7.50%	25.00%	41	0.00%	3.10%
52	5.00%	10.00%	15.00%	5.00%	12.50%	25.00%	42	0.00%	3.10%
53	5.00%	10.00%	15.00%	5.00%	12.50%	25.00%	43	0.00%	3.10%
54	5.00%	10.00%	15.00%	5.00%	12.50%	25.00%	44	0.00%	3.10%
55	10.00%	12.50%	27.00%	12.00%	25.00%	35.00%	45	0.00%	7.60%
56	10.00%	12.50%	22.50%	8.50%	25.00%	35.00%	46	0.00%	7.60%
57	10.00%	12.50%	22.50%	8.50%	25.00%	35.00%	47	0.00%	7.60%
58	10.00%	12.50%	22.50%	8.50%	25.00%	35.00%	48	0.00%	7.60%
59	10.00%	12.50%	22.50%	10.00%	30.00%	35.00%	49	0.00%	7.60%
60	20.00%	25.00%	37.50%	15.00%	30.00%	35.00%	50	15.00%	32.90%
61	20.00%	25.00%	37.50%	27.50%	40.00%	45.00%	51	12.80%	32.90%
62	20.00%	25.00%	37.50%	27.50%	40.00%	45.00%	52	12.80%	32.90%
63	20.00%	25.00%	37.50%	27.50%	40.00%	45.00%	53	12.80%	32.90%
64	20.00%	25.00%	37.50%	27.50%	40.00%	45.00%	54	12.80%	32.90%
65	35.00%	50.00%	40.00%	40.00%	50.00%	50.00%	55	25.00%	32.90%
66	35.00%	50.00%	45.00%	45.00%	50.00%	50.00%	56	25.00%	32.90%
67	35.00%	50.00%	50.00%	50.00%	50.00%	50.00%	57	25.00%	32.90%
68	35.00%	50.00%	60.00%	60.00%	60.00%	60.00%	58	25.00%	32.90%
69	35.00%	50.00%	80.00%	80.00%	80.00%	80.00%	59	25.00%	32.90%
70+	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	60	100.00%	100.00%

12. Member Contribution Balance Crediting Rate

5.25% (2.00% less than the assumed rate of return of 7.25%).

Classic Values, Innovative Advice

Item 2

MEKETA

INVESTMENT GROUP

Merced County Employees' Retirement Association

As of December 31, 2019

Fourth Quarter Review

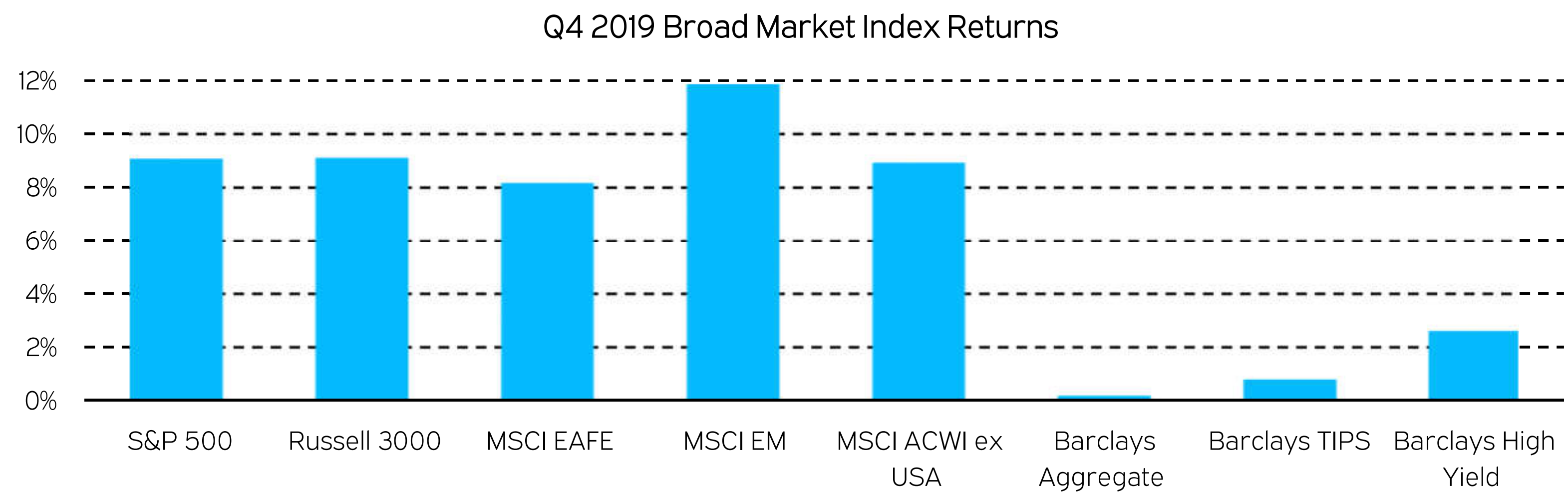
Table of Contents

Executive Summary

As of December 31, 2019

Market Summary for the Fourth Quarter 2019

During the fourth quarter, global equity markets surged on the prospect of a U.S- China trade agreement being signed, improving economic data in Europe, Brexit uncertainty moving closer toward resolution, and further commitment to monetary policy easing in the US and China. U.S Equity markets were up +9.1%, International Developed Equity was up +8.2%, as expressed by the Russell 3000 and MSCI EAFE indexes. Emerging Markets posted the highest returns, with the MSCI Emerging Markets Index returning +11.8%. Fixed Income markets were up for the quarter, reflecting expectations for a sustained low interest rate environment, and the yield curve steepening as short term rates fell while long term rates increased.



Growth > Value   US Treasury 10 yr: +24 basis point   Small Cap > Large Cap

Executive Summary – Q4 2019

Total Market Value		Q4 Results		QTD Relative Results
Q4 2019	$909,213,596	MCERA	4.9%	MCERA vs Policy Benchmark +0.2%
Q3 2019	$866,302,483	Policy Benchmark	4.7%	

Contribution to QTD Return

Major aggregates were mostly positive for Q4 2019.

The Total Equity sleeve was the key positive contributor during Q4 2019. Within that sleeve, US Equity led with +9.1% for the quarter. Developed International Equity and Emerging Markets Equity were also positive, returning +9.0% and +12.8% respectively.

Private Real Estate and Private Equity were the only asset classes that reported negative returns for the quarter, posting -2.8% and -0.1% respectively.

Public Manager Highlights Q4 2019

7 out of 9 Public Active Managers[1] either outpaced or matched their respective benchmarks for Q4 2019.

Total Equity (Active)

- US Equity (+9.1%) trailed its benchmark by 10 basis points. Mellon Dynamic US Equity (+9.2%) was the only manager in this sleeve to outpace its benchmark (+9.1%).
- Developed International Equity returned +9.0% to outperform its benchmark, the MSCI EAFE, by +0.8%. Both active managers in this sleeve, Driehaus and Acadian outperformed their respective benchmarks by +0.6% and +1.6% respectively.
- Emerging Markets Equity posted +12.8%, to beat its benchmark by +0.9%. This outperformance was entirely attributable to Wells Capital, which returned +13.3% for the quarter. Large cash movements at the end of December to fund new managers created a cash drag on performance.

Total Fixed Income (Active)

- All three active managers in the Total Fixed Income sleeve outpaced their benchmarks. Barrow Hanley returned +0.3% beating its benchmark by +0.1%. GoldenTree returned +2.4% while PIMCO Income returned +2.5%, to beat their benchmarks by +0.3% and +2.3% respectively and produce outperformance of +1.3% for the Opportunistic Credit sleeve.

[1] Excludes Public Managers that do not have a full quarter of performance, Private Markets and Hedge Fund Managers.

Manager Updates/ Recommendations/ Watch List

Asset Allocation and Manager Update

- Decision made by the Board to replace Mellon International with a 50/50 allocation to GQG International Equity and First Eagle International Value Equity was implemented in December.
- The Board had also approved the termination of Wells Fargo Berkeley Street Emerging Markets, and replacement with a 70/30 allocation to Artisan Developing World and RWC Emerging Markets Equity. The termination and replacement was implemented in December.

Performance Report Update

The Board approved Meketa's proposed benchmark changes. These will go into effect in Q1 2020 reporting.

Watch List

No funds on the watch list.

Active Manager Expectations

Manager	Strategy Description	Beta (High/Neutral/Low)	Tracking Error Range (bps)	Environments Manager Underperforms
Domestic Equity				
DFA U.S. Small Cap Trust	Very diversified small cap portfolio, tilts toward value	Neutral	2.0% to 2.7%	In growth-oriented markets
PanAgora U.S. Small Cap Core Stock Selector	Diversified, quantitatively managed small cap portfolio	Neutral	2.5% to 4.0%	In low quality rallies or at market inflection points
Mellon Capital MCM Dynamic U.S. Equity	Very diversified, quantitative, large cap core portfolio	Neutral (higher in more recent periods)	2.5% to 5.0%	When investors misprice forward looking return/risk characteristics; when returns are concentrated in one sector
Developed Markets Equity (Non-U.S.)				
Driehaus International Small Cap Growth	Diversified growth manager that seeks to invest in companies experiencing positive growth inflections, using a combination of fundamental and macroeconomic analysis.	Low	4.0% to 7.0%	At market inflection points, with abrupt leadership change. Deep value, low quality market environments.
Acadian ACWI ex US Small Cap Equity	Very diversified international small cap portfolio, employing highly adaptive quantitative models	Neutral	2.5% to 4.5%	During narrow markets, abrupt changes in leadership. In "value" challenged periods.
First Eagle International Value Fund	Benchmark agnostic, diversified international value manager with strategic gold allocation and willingness to utilize cash when valuations are elevated across the market	Low	5.0% to 10.0%	In growth- and momentum-led rallies, where value discipline and an allocation to cash will be headwinds, and if physical gold underperforms.
GQG International Equity	Benchmark agnostic, concentrated international quality-growth equity manager with valuation discipline and macro awareness. Willing to invest in US-listed companies.	Low	5.0% to 10.0%	In cyclical recoveries where deep value, asset-heavy, smaller cap stocks, rally.

Active Manager Expectations (continued)

Manager	Strategy Description	Beta (High/Neutral/Low)	Tracking Error Range (bps)	Environments Manager Underperforms
Emerging Markets Equity				
Artisan Developing World	Concentrated, benchmark agnostic emerging markets strategy focused on high quality companies, overlaid with top-down macro (currency) awareness.	Neutral	5.0% to 10.0%	During cyclical rallies concentrated in deeper value, smaller cap stocks.
RWC Emerging Markets	Concentrated, growth-at-a-reasonable-price emerging markets equity strategy focused on mid cap stocks	High	6.0% to 10.0%	Narrow rallies in large cap stocks where small and mid caps lag, periods of heightened market volatility, deep drawdowns in asset-heavy cyclicals
Investment Grade Bonds				
Barrow Hanley Core Fixed Income	Conservative, low tracking-error core strategy focused on bottom-up security selection	Neutral	0.2% to 0.7%	At market Inflection points, but should track the index very closely
Opportunistic Credit				
PIMCO Income	Global multi-sector, benchmark agnostic approach, utilizing firm's resources to identify best income ideas while staying senior in the capital structure	Low	1.5% to 3.5%	During periods of lower quality bond rallies and volatility in interest rates and certain currencies
GoldenTree Multi-Sector Credit	Bottom-up security selection, managing risk and adding value through credit sector rotation	Low	2.5% to 4.5%	During initial periods of economic recovery and rapid spread tightening

Manager Monitor

Manager	Significant Events (Yes/No)	Last Meeting with Board of Retirement	Last Meeting with MIG	Comments
Domestic Equity Assets				
Mellon Capital BNY Mellon MCM Dynamic US Equity Fund	No	-	Mar-17	Merger of smaller boutiques – Met Mellon in March 2017 to go over HY Beta Strategy & conference call for Carbon Efficiency strategy.
Mellon Capital EB DV Large Cap Stock Index Fund	No	-	Mar-17	Merger of smaller boutiques – Met Mellon in March 2017 to go over HY Beta Strategy & conference call for Carbon Efficiency strategy.
DFA US Small Cap Trust	No	-	Sep-19	On site with DFA to discuss non-U.S. equities in September of this year.
PanAgora US Small Cap Core Stock Selector	No	-	Aug-18	CEO Eric Sorensen, who is credited with turning the firm around, has not announced a plan to retire and no formal succession plan is in place. We do not recommend any changes at this time.
Developed Markets Equity (Non-U.S.) Assets				
Driehaus International Small Cap Growth	No	-	Oct-19	Review of strategy, no changes to conviction level.
Acadian ACWI ex US Small Cap Equity	No	-	Mar-19	Review of strategy, no changes to conviction level.
First Eagle International Value Fund			Nov-19	Review of strategy, no changes to conviction level.
GQG International Equity	No	-	Feb-19	Review of strategy, no changes to conviction level.
Emerging Markets Equity Assets				
Artisan Developing World			Apr- 19	Review of strategy, no changes to conviction level.
RWC Emerging Markets	No	-	Feb-19	Review of strategy, no changes to conviction level.
US Fixed Income Assets				
Barrow Hanley Core Fixed Income Fund	No	Apr-19	Apr-19	Standard update from Barrow team – review of Core Fixed and Short Duration.
Vanguard Total Bond Market				
Vanguard Short Term Treasury Index Fund	No	-	Aug-19	Review of High Yield strategy.
Opportunistic Credit				
PIMCO Income Fund	No	-	Jun-19	Regular high-level meeting discussing positioning and detractors for Income and Total Return strategies.
GoldenTree Multi-Sector Credit	No	-	Jul-19	Meeting in London for regular strategy update.
Private Equity Program	N/A	N/A	N/A	Oversight by Cliffwater.
Real Assets Program	N/A	N/A	N/A	Oversight by Cliffwater.
Hedge Fund Program	N/A	N/A	N/A	Oversight by Cliffwater.

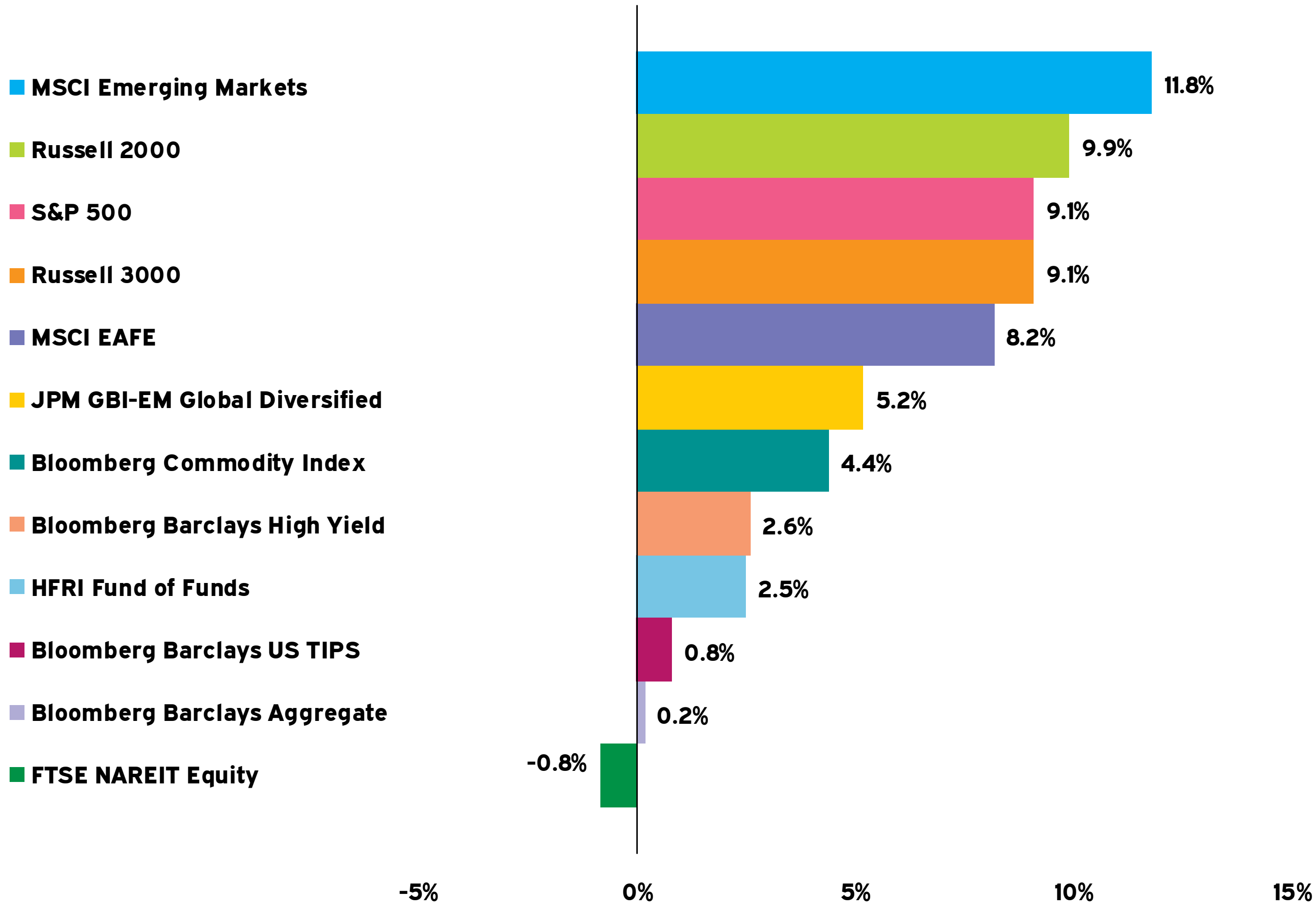
Active Manager Peer Rankings[1]

Investment Managers	Product	Peer Group	Market Value ($ mm)	1YR	3YR	5YR	10YR	Client Inception	Years in Portfolio
DFA	US Small Cap Equity Strategy	US Small Cap Core	19	70	74	61	52	14-Jun	5.6
PanAgora	US Small Cap Core Stock Selector	US Small Cap Core	20	35	48	60	5	13-Sep	6.3
Mellon Capital	Dynamic US Equity Strategy	US Large Cap Core	103	2	5	1	1	12-Dec	7.1
Acadian	All-Country World ex US Small Cap	Non-US Div Small Cap	11	60	42	18	31	19-May	0.6
Driehaus	International Small Cap Growth	Non-US Div Small Cap	12	11	6	9	14	19-May	0.6
GQG	International Equity	All ACWI ex US Equity	45	7	4			19-Dec	--
First Eagle	International Value	EAFE Value Equity	45	85	90	62	50	19-Dec	--
Artisan	Developing World	Emerging Markets	56	1	2			19-Dec	--
RWC	Emerging Markets	Emerging Markets	22	15	67	32		19-Dec	--
Barrow Hanley	Core Fixed Income	US Core Fixed Income	61	50	55	53	77	10-Mar	9.8
PIMCO	Income Fund	Global Multi-Sector Fixed Income	21	95	98	91		19-May	0.6
GoldenTree	Multi-Sector Credit Strategy	Global Multi-Sector Fixed Income	21	52	25	9		19-Jun	0.6

[1] Source: eVestment. Ranks are greyed out for periods before MCERA was invested.

Q4 Market Review and Capital Markets Outlook

The World Markets[1]
Fourth Quarter of 2019



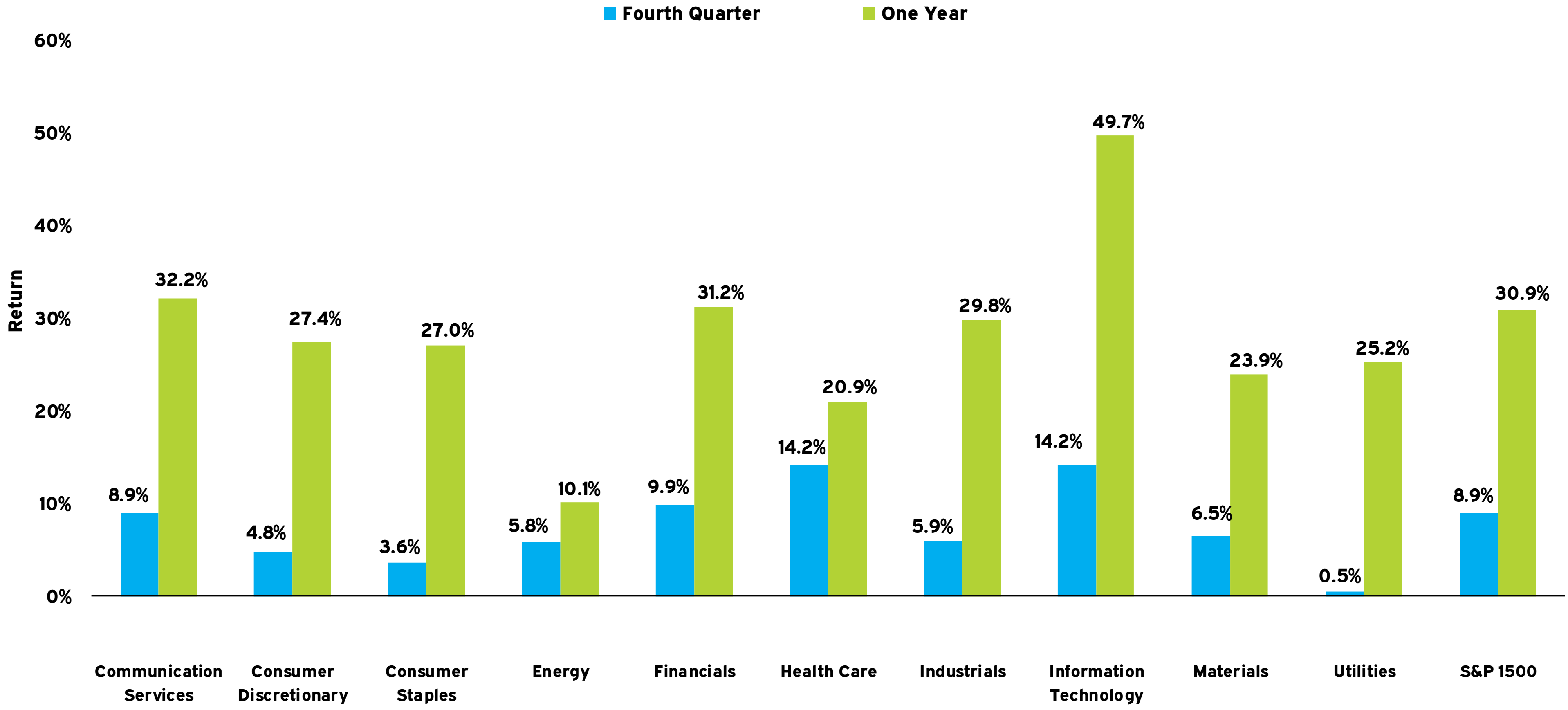
1 Source: InvestorForce.

Index Returns[1]

	4Q19 (%)	1 YR (%)	3 YR (%)	5 YR (%)	10 YR (%)
Domestic Equity					
S&P 500	9.1	31.5	15.3	11.7	13.6
Russell 3000	9.1	31.0	14.6	11.2	13.4
Russell 1000	9.0	31.4	15.0	11.5	13.5
Russell 1000 Growth	10.6	36.4	20.5	14.6	15.2
Russell 1000 Value	7.4	26.5	9.7	8.3	11.8
Russell MidCap	7.1	30.5	12.1	9.3	13.2
Russell MidCap Growth	8.2	35.5	17.4	11.6	14.2
Russell MidCap Value	6.4	27.1	8.1	7.6	12.4
Russell 2000	9.9	25.5	8.6	8.2	11.8
Russell 2000 Growth	11.4	28.5	12.5	9.3	13.0
Russell 2000 Value	8.5	22.4	4.8	7.0	10.6
Foreign Equity					
MSCI ACWI (ex. US)	8.9	21.5	9.9	5.5	5.0
MSCI EAFE	8.2	22.0	9.6	5.7	5.5
MSCI EAFE (Local Currency)	5.2	21.7	7.7	6.7	7.2
MSCI EAFE Small Cap	11.5	25.0	10.9	8.9	8.7
MSCI Emerging Markets	11.8	18.4	11.6	5.6	3.7
MSCI Emerging Markets (Local Currency)	9.5	18.1	11.5	7.5	6.1
Fixed Income					
Bloomberg Barclays Universal	0.5	9.3	4.3	3.4	4.1
Bloomberg Barclays Aggregate	0.2	8.7	4.0	3.0	3.7
Bloomberg Barclays US TIPS	0.8	8.4	3.3	2.6	3.4
Bloomberg Barclays High Yield	2.6	14.3	6.4	6.1	7.6
JPM GBI-EM Global Diversified	5.2	13.5	7.0	2.8	2.7
Other					
FTSE NAREIT Equity	-0.8	26.0	8.1	7.2	11.9
Bloomberg Commodity Index	4.4	7.7	-0.9	-3.9	-4.7
HFRI Fund of Funds	2.5	7.8	3.7	2.2	2.8

[1] Source: InvestorForce.

S&P Sector Returns[1]



[1] Source: InvestorForce. Represents S&P 1500 (All Cap) data.

Capital Markets Outlook

Takeaways

- In a reverse from calendar year 2019, most risk-oriented markets produced slight drawdowns in January 2020. Several of the themes that have dominated recent years also returned in a material way as US equity markets fared better than Non-US equity markets, growth outperformed value, and large caps bested small caps. Long US Treasury bonds produced some of the strongest performance as they generated nearly a 7% return over the month.
- While it is still too early to determine the economic impacts, the viral outbreak of the coronavirus was designated as one of the reasons behind the recent market selloff.
- The US yield curve flattened in January as the long end of the curve declined by roughly 30 basis points whereas the short end of the curve remained relatively stable. As a reminder, the Federal Reserve lowered rates three times in 2019 but have since indicated a pause. The current target federal funds rate is 1.50-1.75%.
- Due in part to strong returns across nearly all asset classes in 2019, most practitioner's long-term, forward-looking returns are lower as of early-2020 when compared to early-2019 capital market assumptions.
- US equity markets remain expensive whereas non-US equity markets remain reasonably valued relative to their histories. US credit and emerging markets debt spreads remain reasonably valued relative to their histories, although the richness of US high yield has recently increased (i.e., is now more expensive).

Capital Markets Outlook

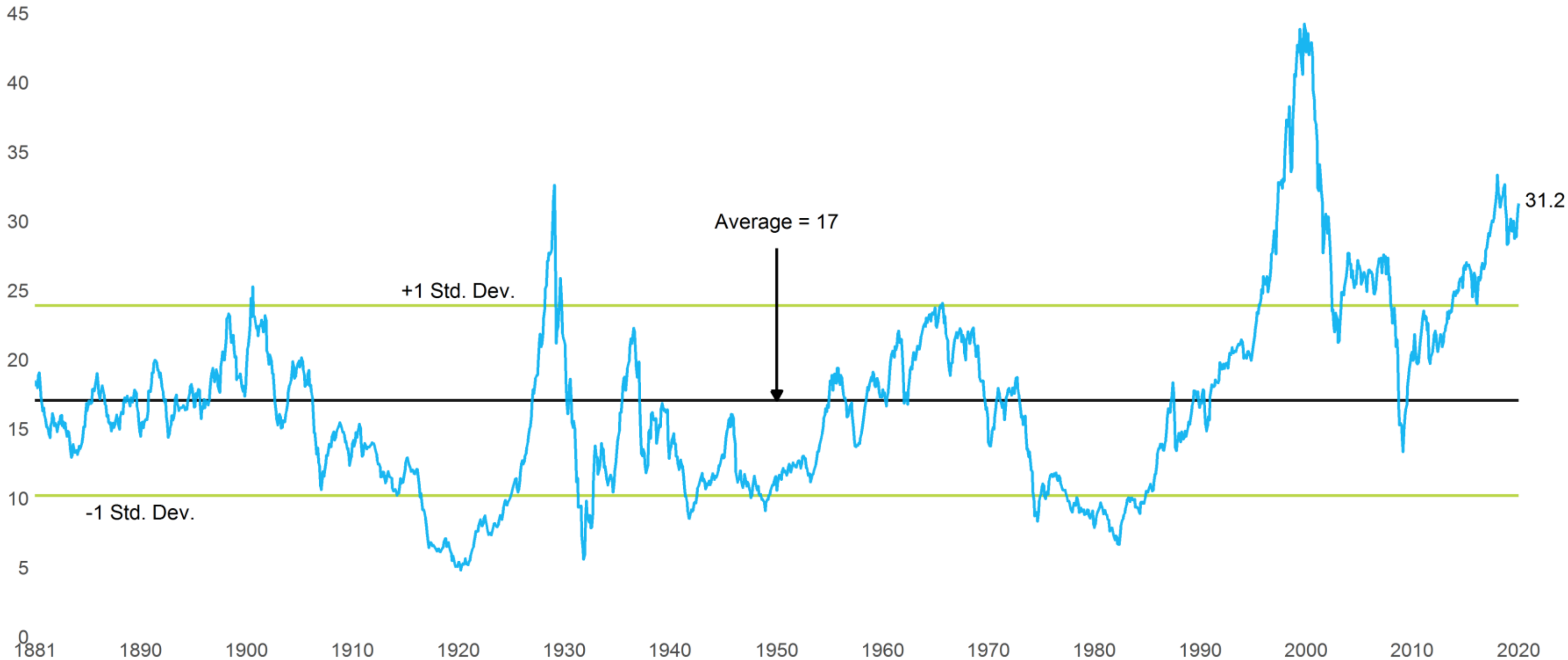
Takeaways

- Relative to their counterparts (growth and large cap), value and small cap equities continue to remain attractive from a valuation perspective.
- Although implied equity market volatility[1] remained at relatively low levels (~12-14) throughout most of January, the VIX Index did jump to near its long-term average (~19) at month-end.
- The Market Sentiment Indicator[2] stayed green at month end.

[1] As measured by VIX Index.

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

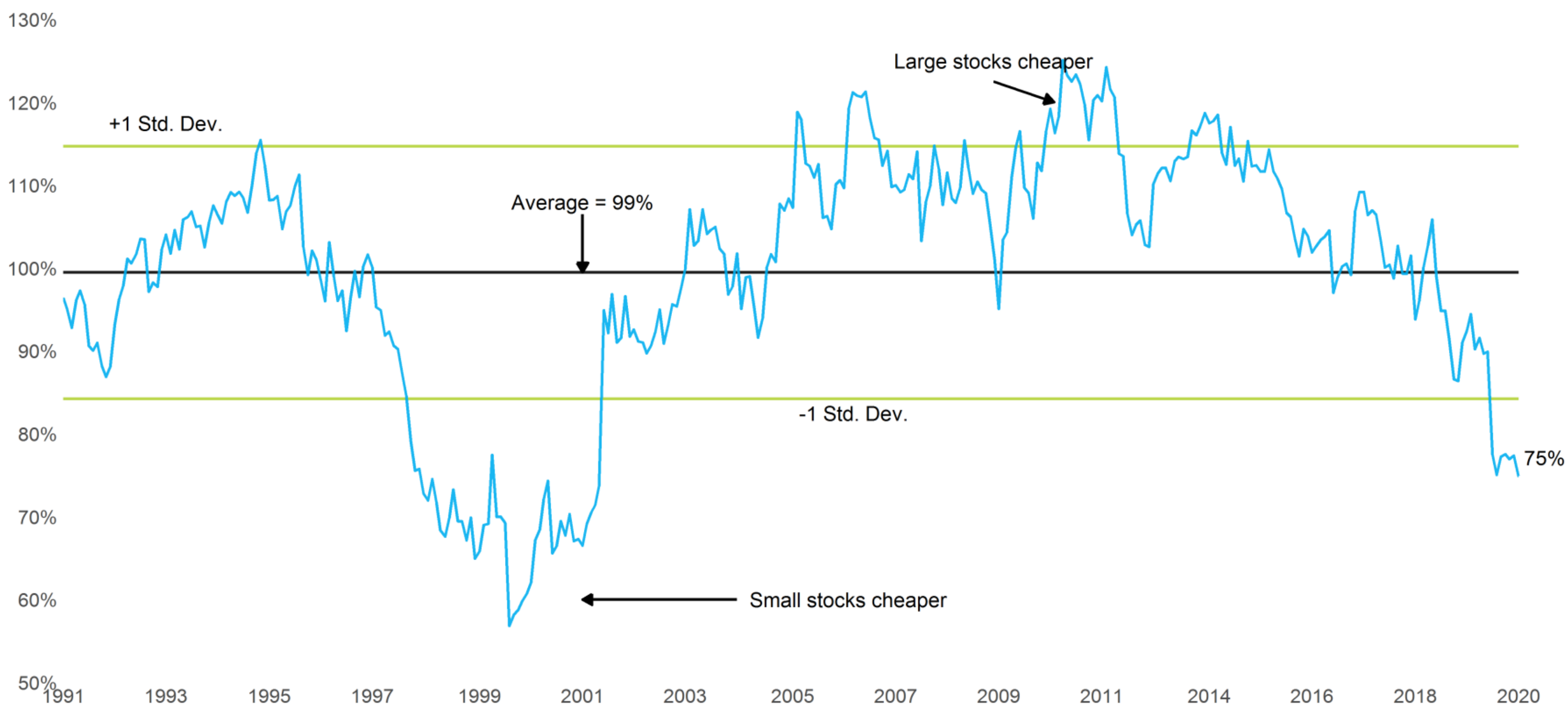
US Equity Cyclically Adjusted P/E[1]
(As of January 31, 2020)



- This chart details one valuation metric for US equities. A higher (lower) figure indicates more expensive (cheaper) valuation relative to history.

[1] US Equity Cyclically Adjusted P/E on S&P 500 Index – Source: Robert Shiller, Yale University and Meketa Investment Group.

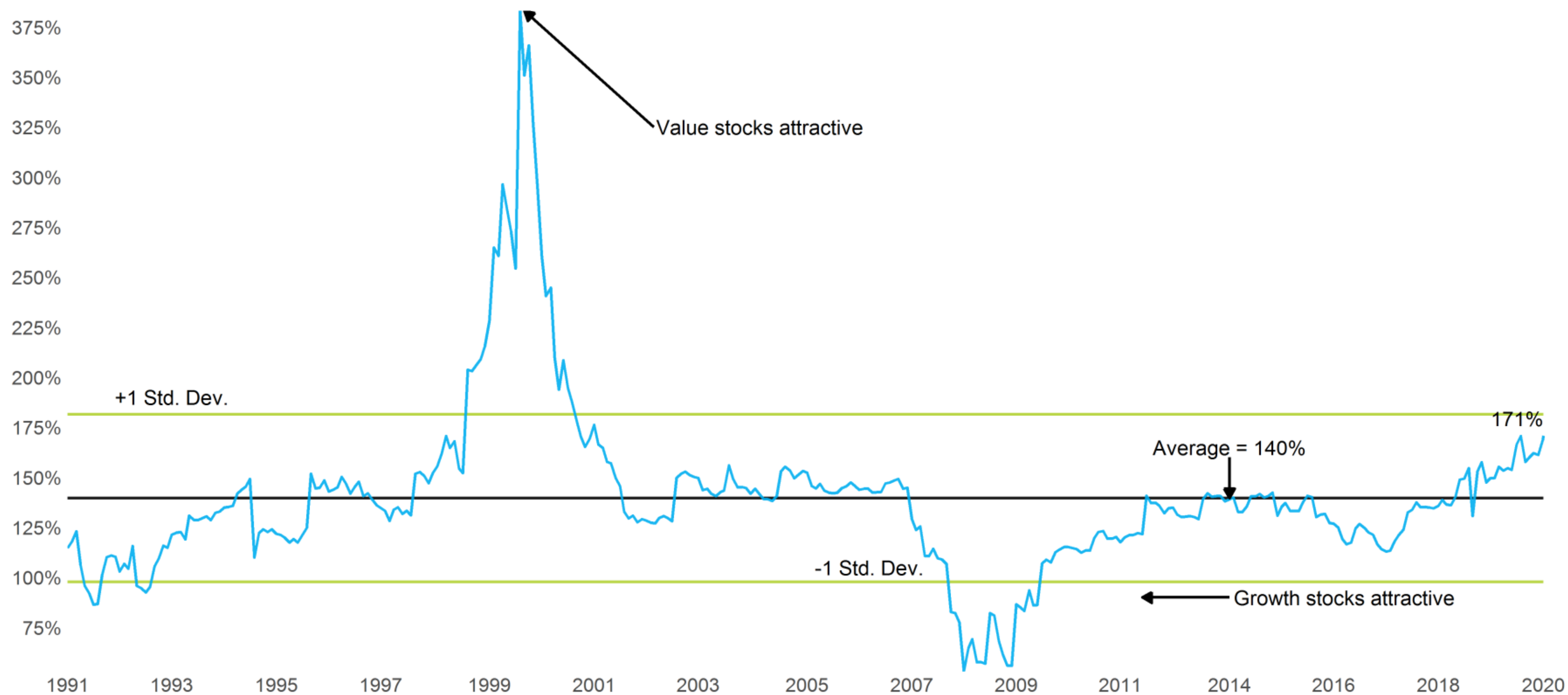
Small Cap P/E vs. Large Cap P/E[1]
(As of January 31, 2020)



- This chart compares the relative attractiveness of small cap US equities vs. large cap US equities on a valuation basis. A higher (lower) figure indicates that large cap (small cap) is more attractive.

[1] Small Cap P/E (Russell 2000 Index) vs. Large Cap P/E (Russell 1000 Index) - Source: Russell Investments. Earnings figures represent 12-month "as reported" earnings.

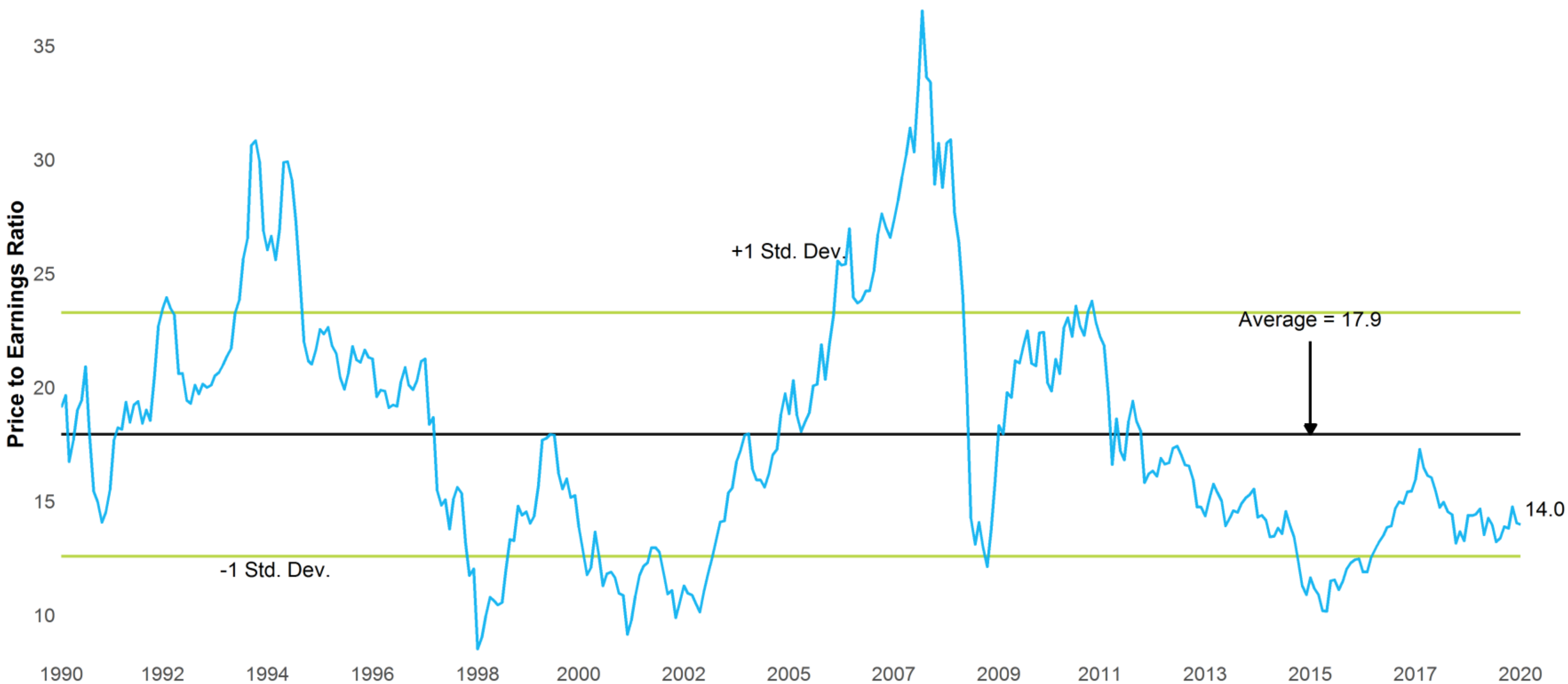
Growth P/E vs. Value P/E[1]
(As of January 31, 2020)



- This chart compares the relative attractiveness of US growth equities vs. US value equities on a valuation basis. A higher (lower) figure indicates that value (growth) is more attractive.

[1] Growth P/E (Russell 3000 Growth Index) vs. Value (Russell 3000 Value Index) P/E - Source: Bloomberg, MSCI, and Meketa Investment Group. Earnings figures represent 12-month "as reported" earnings.

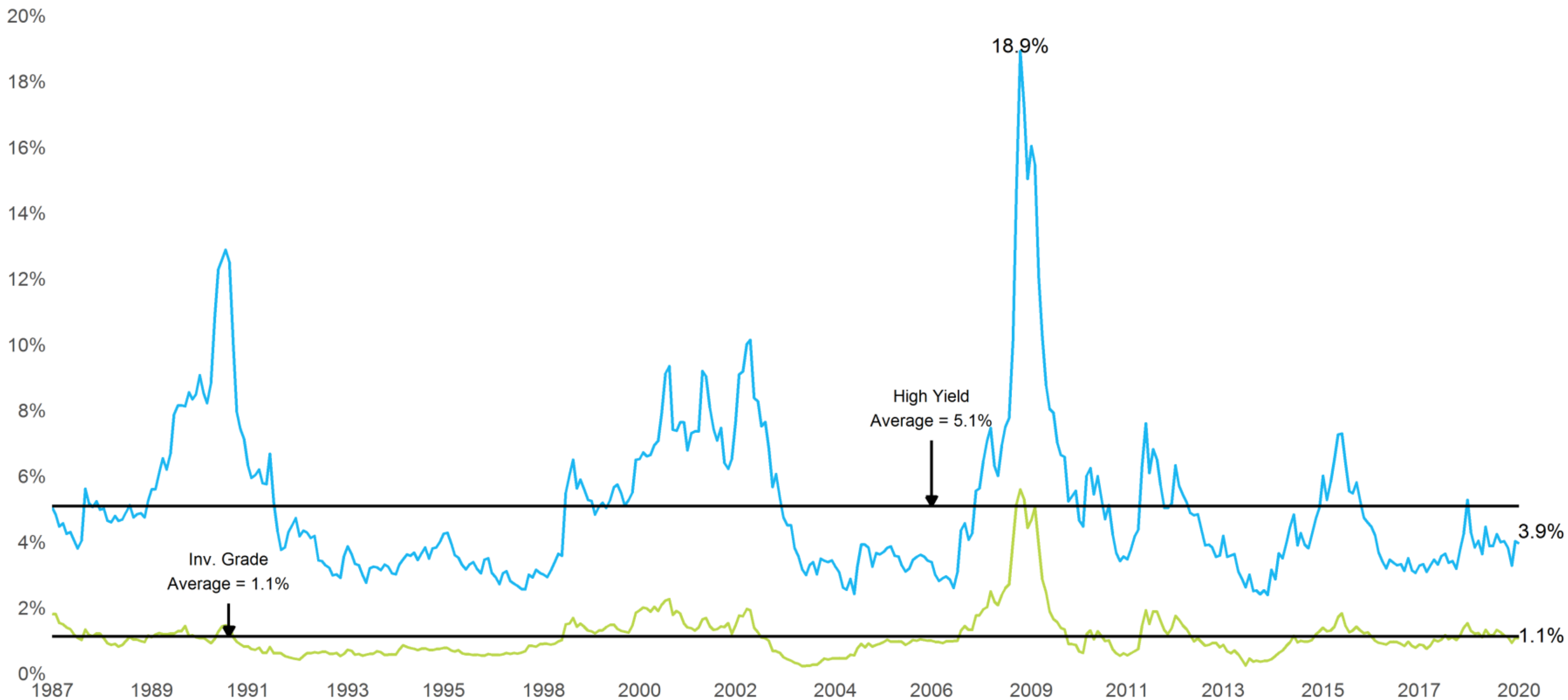
Emerging Market Equity Cyclically Adjusted P/E[1]
(As of December 31, 2019)



- This chart details one valuation metric for emerging markets equities. A higher (lower) figure indicates more expensive (cheaper) valuation relative to history.

[1] Emerging Market Equity (MSCI Emerging Markets Index) Cyclically Adjusted P/E – Source: MSCI and Bloomberg. Earnings figures represent the average of monthly "as reported" earnings over the previous ten years.

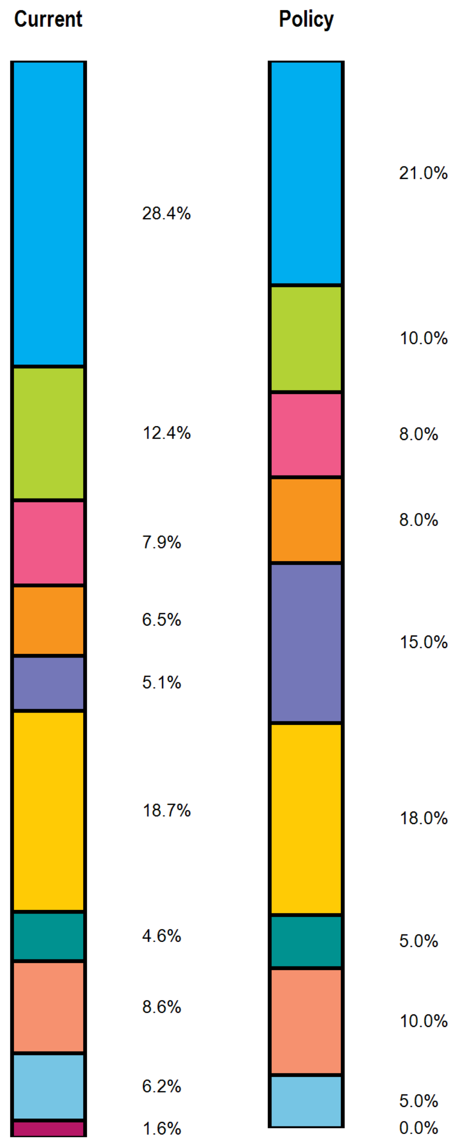
Credit Spreads[1]
(As of January 31, 2020)



- This chart details one valuation metric for the US credit markets. A higher (lower) figure indicates cheaper (more expensive) valuation relative to history.

[1] Credit Spreads – Source: Barclays Capital. High Yield is proxied by the Barclays High Yield index and Investment Grade Corporates are proxied by the Barclays US Corporate Investment Grade index.

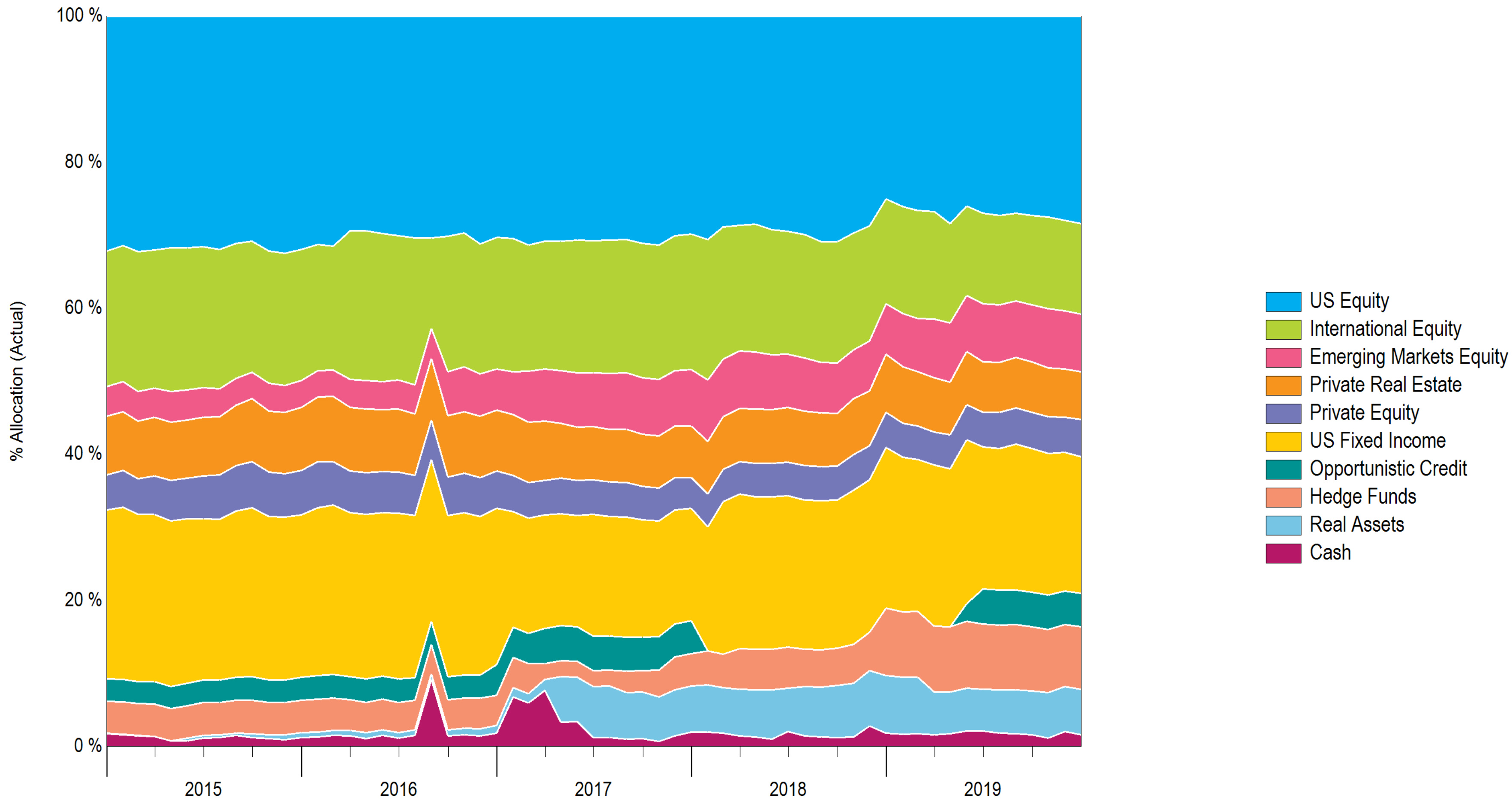
Quarterly Review As of December 31, 2019



Allocation vs. Targets and Policy

	Current Balance	Current Allocation	Policy	Difference	Policy Range	Within IPS Range?
US Equity	$257,917,114	28.4%	21.0%	7.4%	15.0% - 26.0%	No
International Equity	$112,735,966	12.4%	10.0%	2.4%	5.0% - 15.0%	Yes
Emerging Markets Equity	$72,026,006	7.9%	8.0%	-0.1%	4.0% - 12.0%	Yes
Private Real Estate	$59,306,144	6.5%	8.0%	-1.5%	6.0% - 10.0%	Yes
Private Equity	$46,605,241	5.1%	15.0%	-9.9%	5.0% - 20.0%	Yes
US Fixed Income	$169,785,805	18.7%	18.0%	0.7%	13.0% - 23.0%	Yes
Opportunistic Credit	$41,893,524	4.6%	5.0%	-0.4%	3.0% - 7.0%	Yes
Hedge Funds	$77,792,596	8.6%	10.0%	-1.4%	5.0% - 15.0%	Yes
Real Assets	$56,433,241	6.2%	5.0%	1.2%	3.0% - 7.0%	Yes
Cash	$14,717,960	1.6%	0.0%	1.6%	0.0% - 5.0%	Yes
Total	**$909,213,596**	**100.0%**	**100.0%**			

Asset Allocation History
5 Years Ending December 31, 2019



Asset Class Performance Summary

	Market Value ($)	% of Portfolio	QTD (%)	Fiscal YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
Total Fund (Net)*	**909,213,596**	**100.0**	**4.9**	**5.6**	**17.1**	**9.3**	**7.0**	**8.2**	**8.0**	**Dec-94**
Total Fund (Gross)*			**4.9**	**5.7**	**17.3**	**9.5**	**7.3**	**8.5**	**8.2**	
Policy Index			*4.7*	*5.5*	*16.8*	*9.4*	*7.4*	*8.7*	*6.1*	*Dec-94*
Total Fund w/o Alternatives (Net)	**654,358,415**	**72.0**	**6.6**	**7.5**	**22.1**	**10.4**	**7.4**	**--**	**--**	**Dec-94**
Total Fund w/o Alternatives (Gross)			**6.7**	**7.6**	**22.4**	**10.7**	**7.7**	**--**	**--**	
Policy Index w/o Al			*6.6*	*6.8*	*20.4*	*10.0*	*7.3*	*--*	*--*	*Dec-94*
US Equity (Net)	**257,917,114**	**28.4**	**9.1**	**10.7**	**32.7**	**14.9**	**11.9**	**13.7**	**10.3**	**Dec-94**
US Equity (Gross)			**9.1**	**10.9**	**33.0**	**15.2**	**12.1**	**13.9**	**10.4**	
Custom Blended US Equity Benchmark			*9.2*	*9.9*	*30.3*	*13.8*	*10.9*	*13.2*	*10.1*	*Dec-94*
International Equity (Net)	**184,761,972**	**20.3**	**10.6**	**9.5**	**25.4**	**11.2**	**5.9**	**6.0**	**5.5**	**Dec-98**
International Equity (Gross)			**10.7**	**9.7**	**25.9**	**11.6**	**6.4**	**6.6**	**5.8**	
International Equity Custom			*9.9*	*7.2*	*21.0*	*10.6*	*6.1*	*5.6*	*4.6*	*Dec-98*
Developed International Equity (Net)	**112,735,966**	**12.4**	**9.0**	**7.8**	**23.3**	**9.9**	**5.3**	**6.2**	**3.7**	**Jan-08**
Developed International Equity (Gross)			**9.0**	**7.9**	**23.4**	**10.1**	**5.7**	**6.7**	**4.2**	
Custom Blended Developed International Equity Benchmark			*8.2*	*7.0*	*22.0*	*9.6*	*5.7*	*5.5*	*2.9*	*Jan-08*
Emerging Markets Equity (Net)	**72,026,006**	**7.9**	**12.8**	**11.8**	**29.0**	**14.1**	**7.9**	**--**	**4.8**	**Apr-12**
Emerging Markets Equity (Gross)			**13.0**	**12.2**	**30.1**	**15.1**	**8.9**	**--**	**5.7**	
Custom Blended Emerging Markets Benchmark			*11.9*	*7.3*	*18.9*	*12.0*	*6.0*	*4.0*	*4.0*	*Apr-12*
US Fixed Income (Net)	**169,785,805**	**18.7**	**0.2**	**2.1**	**7.5**	**3.8**	**3.4**	**4.2**	**5.3**	**Dec-94**
US Fixed Income (Gross)			**0.3**	**2.2**	**7.6**	**4.0**	**3.6**	**4.6**	**5.5**	
Custom Blended US Fixed Income Benchmark			*0.2*	*2.1*	*7.7*	*4.0*	*3.5*	*3.9*	*5.6*	*Dec-94*
Opportunistic Credit (Net)	**41,893,524**	**4.6**	**2.5**	**2.6**	**--**	**--**	**--**	**--**	**4.2**	**May-19**
Opportunistic Credit (Gross)			**2.5**	**2.6**	**--**	**--**	**--**	**--**	**4.2**	
50% Barclays US Aggregate / 25% Barclays US High Yield / 25% Credit Suisse Leveraged Loans			*1.2*	*2.9*	*--*	*--*	*--*	*--*	*4.7*	*May-19*

Data prior to March 2018 provided by prior consultant.

	Market Value ($)	% of Portfolio	QTD (%)	Fiscal YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
Private Real Estate (Net)	**59,306,144**	**6.5**	**-2.8**	**-3.6**	**-1.2**	**4.7**	**5.9**	**--**	**--**	**Mar-99**
Private Real Estate (Gross)			**-2.8**	**-3.6**	**-1.2**	**4.7**	**6.5**	**9.1**	**8.2**	
Custom Blended Real Estate Benchmark			*1.3*	*2.4*	*4.4*	*6.1*	*8.0*	*10.4*	*7.3*	*Mar-99*
Private Equity (Net)	**46,605,241**	**5.1**	**-0.1**	**2.9**	**6.8**	**12.0**	**9.7**	**10.3**	**8.0**	**Jun-05**
Private Equity (Gross)			**-0.1**	**2.9**	**6.8**	**12.0**	**9.7**	**10.5**	**8.2**	
Custom Blended Private Equity Benchmark			*1.2*	*6.4*	*17.2*	*17.3*	*14.3*	*--*	*--*	*Jun-05*
Russell 3000 +3% 1-Quarter Lag			*1.9*	*6.9*	*6.0*	*16.2*	*13.7*	*16.4*	*12.1*	*Jun-05*
Hedge Fund (Net)	**77,792,596**	**8.6**	**2.4**	**1.2**	**7.4**	**6.0**	**3.6**	**--**	**3.9**	**Jun-14**
Hedge Fund (Gross)			**2.7**	**1.5**	**7.9**	**6.3**	**3.8**	**--**	**4.0**	
Hedge Fund Custom			*3.1*	*2.1*	*8.4*	*3.9*	*3.0*	*--*	*3.0*	*Jun-14*
Real Assets (Net)	**56,433,241**	**6.2**	**2.9**	**4.4**	**13.6**	**8.3**	**8.0**	**--**	**--**	**Mar-99**
Real Assets (Gross)			**3.0**	**4.4**	**13.7**	**8.4**	**8.6**	**--**	**--**	
Custom Blended Real Assets Benchmark			*7.3*	*4.4*	*22.2*	*11.1*	*9.2*	*--*	*--*	*Mar-99*
CPI + 5% (Seasonally Adjusted)			*2.1*	*3.7*	*7.4*	*7.2*	*6.9*	*--*	*--*	*Mar-99*
Private Infrastructure (Net)	**23,780,002**	**2.6**	**2.4**	**5.2**	**11.7**	**13.5**	**7.8**	**--**	**7.8**	**Dec-14**
Private Infrastructure (Gross)			**2.4**	**5.2**	**11.7**	**13.5**	**7.8**	**--**	**7.8**	
S&P Global Infrastructure Net TR USD			*4.9*	*5.3*	*25.8*	*10.3*	*5.6*	*6.8*	*5.6*	*Dec-14*
Private Natural Resources (Net)	**15,388,400**	**1.7**	**3.3**	**5.3**	**11.6**	**11.1**	**--**	**--**	**16.7**	**Sep-15**
Private Natural Resources (Gross)			**3.3**	**5.3**	**11.6**	**11.1**	**--**	**--**	**16.7**	
S&P Global Natural Resources Index TR USD			*9.5*	*2.9*	*17.2*	*7.9*	*4.8*	*1.6*	*12.9*	*Sep-15*
Cash (Net)	**14,717,960**	**1.6**	**0.4**	**0.8**	**1.4**	**--**	**--**	**--**	**--**	
Cash (Gross)			**0.4**	**0.8**	**1.4**	**--**	**--**	**--**	**--**	

**One or more accounts have been excluded from the composite for the purposes of performance calculations and market value.*

Real Assets includes State Street Real Asset NL Fund

Trailing Net Performance

	Market Value ($)	% of Portfolio	% of Sector	QTD (%)	Fiscal YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
Total Fund*	**909,213,596**	**100.0**	**--**	**4.9**	**5.6**	**17.1**	**9.3**	**7.0**	**8.2**	**8.0**	**Dec-94**
Policy Index				*4.7*	*5.5*	*16.8*	*9.4*	*7.4*	*8.7*	*6.1*	*Dec-94*
InvMetrics Public DB $250mm-$1B Net Median				*5.5*	*6.0*	*18.7*	*9.6*	*6.9*	*8.3*	*8.0*	*Dec-94*
InvMetrics Public DB $250mm-$1B Net Rank				*78*	*77*	*79*	*60*	*49*	*53*	*48*	*Dec-94*
Total Fund w/o Alternatives	**654,358,415**	**72.0**	**72.0**	**6.6**	**7.5**	**22.1**	**10.4**	**7.4**	**--**	**--**	**Dec-94**
Policy Index w/o AI				*6.6*	*6.8*	*20.4*	*10.0*	*7.3*	*--*	*--*	*Dec-94*
InvMetrics Public DB $250mm-$1B Net Median				*5.5*	*6.0*	*18.7*	*9.6*	*6.9*	*8.3*	*8.0*	*Dec-94*
InvMetrics Public DB $250mm-$1B Net Rank				*7*	*1*	*4*	*12*	*24*	*--*	*--*	*Dec-94*
US Equity	**257,917,114**	**28.4**	**39.4**	**9.1**	**10.7**	**32.7**	**14.9**	**11.9**	**13.7**	**10.3**	**Dec-94**
Custom Blended US Equity Benchmark				*9.2*	*9.9*	*30.3*	*13.8*	*10.9*	*13.2*	*10.1*	*Dec-94*
InvMetrics All DB US Eq Net Median				*8.6*	*9.5*	*30.1*	*13.7*	*10.5*	*12.7*	*9.9*	*Dec-94*
InvMetrics All DB US Eq Net Rank				*23*	*6*	*6*	*13*	*5*	*7*	*23*	*Dec-94*
Mellon Large Cap	116,210,494	12.8	45.1	9.0	10.6	31.4	15.0	--	--	15.0	Mar-16
Russell 1000				*9.0*	*10.6*	*31.4*	*15.0*	*11.5*	*13.5*	*15.0*	*Mar-16*
eV US Large Cap Core Equity Net Median				*8.0*	*9.7*	*28.9*	*13.6*	*10.3*	*12.8*	*13.5*	*Mar-16*
eV US Large Cap Core Equity Net Rank				*28*	*29*	*29*	*27*	*--*	*--*	*22*	*Mar-16*
Mellon Dynamic US Equity	103,016,896	11.3	39.9	9.2	12.4	37.8	18.6	13.9	--	17.9	Dec-12
S&P 500				*9.1*	*10.9*	*31.5*	*15.3*	*11.7*	*13.6*	*14.7*	*Dec-12*
eV US Large Cap Core Equity Net Median				*8.0*	*9.7*	*28.9*	*13.6*	*10.3*	*12.8*	*13.6*	*Dec-12*
eV US Large Cap Core Equity Net Rank				*26*	*8*	*2*	*5*	*1*	*--*	*1*	*Dec-12*
PanAgora	19,606,675	2.2	7.6	9.4	7.8	26.2	8.3	7.9	--	9.5	Sep-13
Russell 2000				*9.9*	*7.3*	*25.5*	*8.6*	*8.2*	*11.8*	*8.8*	*Sep-13*
eV US Small Cap Core Equity Net Median				*8.3*	*6.6*	*24.3*	*8.2*	*8.5*	*12.1*	*9.1*	*Sep-13*
eV US Small Cap Core Equity Net Rank				*28*	*32*	*35*	*48*	*60*	*--*	*41*	*Sep-13*

Historical returns for the US Equity Composite prior to January 2012 and for the International Equity Composite prior to December 2010 are gross only.

	Market Value ($)	% of Portfolio	% of Sector	QTD (%)	Fiscal YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
DFA Small Cap	19,083,048	2.1	7.4	8.1	6.4	21.7	6.2	7.7	--	7.5	Jun-14
Russell 2000				*9.9*	*7.3*	*25.5*	*8.6*	*8.2*	*11.8*	*7.8*	*Jun-14*
eV US Small Cap Core Equity Net Median				*8.3*	*6.6*	*24.3*	*8.2*	*8.5*	*12.1*	*7.8*	*Jun-14*
eV US Small Cap Core Equity Net Rank				*55*	*58*	*70*	*74*	*61*	*--*	*62*	*Jun-14*
International Equity	**184,761,972**	**20.3**	**28.2**	**10.6**	**9.5**	**25.4**	**11.2**	**5.9**	**6.0**	**5.5**	**Dec-98**
International Equity Custom				*9.9*	*7.2*	*21.0*	*10.6*	*6.1*	*5.6*	*4.6*	*Dec-98*
InvMetrics All DB ex-US Eq Net Median				*9.7*	*7.7*	*22.8*	*9.9*	*5.8*	*5.5*	*5.4*	*Dec-98*
InvMetrics All DB ex-US Eq Net Rank				*18*	*6*	*17*	*24*	*43*	*28*	*43*	*Dec-98*
Developed International Equity	**112,735,966**	**12.4**	**61.0**	**9.0**	**7.8**	**23.3**	**9.9**	**5.3**	**6.2**	**3.7**	**Jan-08**
Custom Blended Developed International Equity Benchmark				*8.2*	*7.0*	*22.0*	*9.6*	*5.7*	*5.5*	*2.9*	*Jan-08*
First Eagle International Value Fund	45,000,000	4.9	39.9	--	--	--	--	--	--	0.0	Dec-19
MSCI EAFE				*8.2*	*7.0*	*22.0*	*9.6*	*5.7*	*5.5*	*3.2*	*Dec-19*
MSCI World ex USA				*7.9*	*6.9*	*22.5*	*9.3*	*5.4*	*5.3*	*3.2*	*Dec-19*
GQG International Equity	45,000,000	4.9	39.9	--	--	--	--	--	--	0.0	Dec-19
MSCI ACWI ex USA				*8.9*	*7.0*	*21.5*	*9.9*	*5.5*	*5.0*	*4.3*	*Dec-19*
Driehaus International Small Cap Growth	11,647,208	1.3	10.3	11.8	12.1	--	--	--	--	14.8	May-19
MSCI ACWI ex US Small Cap Growth NR USD				*11.2*	*9.7*	*24.6*	*10.8*	*7.6*	*7.3*	*8.7*	*May-19*
eV ACWI ex-US Small Cap Equity Net Median				*11.6*	*8.6*	*24.9*	*12.8*	*8.8*	*9.4*	*8.9*	*May-19*
eV ACWI ex-US Small Cap Equity Net Rank				*46*	*11*	*--*	*--*	*--*	*--*	*6*	*May-19*
Acadian ACWI ex U.S. Small Cap Equity	11,088,758	1.2	9.8	12.6	9.2	--	--	--	--	9.0	May-19
MSCI ACWI ex US Small Cap				*11.0*	*9.7*	*22.4*	*9.6*	*7.0*	*6.9*	*8.6*	*May-19*
eV ACWI ex-US Small Cap Equity Net Median				*11.6*	*8.6*	*24.9*	*12.8*	*8.8*	*9.4*	*8.9*	*May-19*
eV ACWI ex-US Small Cap Equity Net Rank				*31*	*36*	*--*	*--*	*--*	*--*	*50*	*May-19*

Developed International Equity and Emerging Markets Equity composites were only reported as one composite prior to March 2018.

	Market Value ($)	% of Portfolio	% of Sector	QTD (%)	Fiscal YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
Emerging Markets Equity	**72,026,006**	**7.9**	**39.0**	**12.8**	**11.8**	**29.0**	**14.1**	**7.9**	**--**	**4.8**	**Apr-12**
Custom Blended Emerging Markets Benchmark				*11.9*	*7.3*	*18.9*	*12.0*	*6.0*	*4.0*	*4.0*	*Apr-12*
Artisan Developing World TR	50,426,006	5.5	70.0	--	--	--	--	--	--	0.1	Dec-19
MSCI Emerging Markets				*11.8*	*7.1*	*18.4*	*11.6*	*5.6*	*3.7*	*7.5*	*Dec-19*
RWC	21,600,000	2.4	30.0	--	--	--	--	--	--	0.0	Dec-19
MSCI Emerging Markets				*11.8*	*7.1*	*18.4*	*11.6*	*5.6*	*3.7*	*7.5*	*Dec-19*
Wells Capital	0	0.0	0.0	13.3	12.2	29.5	14.2	8.0	--	4.6	Mar-12
MSCI Emerging Markets				*11.8*	*7.1*	*18.4*	*11.6*	*5.6*	*3.7*	*3.4*	*Mar-12*
eV Emg Mkts Equity Net Median				*11.4*	*7.0*	*19.3*	*10.7*	*5.5*	*4.4*	*4.2*	*Mar-12*
eV Emg Mkts Equity Net Rank				*14*	*3*	*6*	*16*	*11*	*--*	*37*	*Mar-12*
US Fixed Income	**169,785,805**	**18.7**	**25.9**	**0.2**	**2.1**	**7.5**	**3.8**	**3.4**	**4.2**	**5.3**	**Dec-94**
Custom Blended US Fixed Income Benchmark				*0.2*	*2.1*	*7.7*	*4.0*	*3.5*	*3.9*	*5.6*	*Dec-94*
InvMetrics All DB US Fix Inc Net Median				*0.4*	*2.4*	*8.7*	*4.2*	*3.4*	*4.5*	*5.9*	*Dec-94*
InvMetrics All DB US Fix Inc Net Rank				*60*	*66*	*71*	*68*	*52*	*61*	*85*	*Dec-94*
Barrow Hanley	60,905,967	6.7	35.9	0.3	2.7	9.0	4.1	3.1	--	3.7	Mar-10
BBgBarc US Aggregate TR				*0.2*	*2.5*	*8.7*	*4.0*	*3.0*	*3.7*	*3.7*	*Mar-10*
eV US Core Fixed Inc Net Median				*0.2*	*2.5*	*9.0*	*4.1*	*3.1*	*4.0*	*3.8*	*Mar-10*
eV US Core Fixed Inc Net Rank				*21*	*15*	*50*	*55*	*53*	*--*	*67*	*Mar-10*
Vanguard Total Bond Market Index Fund	60,089,182	6.6	35.4	0.0	2.5	--	--	--	--	5.6	May-19
BBgBarc US Aggregate TR				*0.2*	*2.5*	*8.7*	*4.0*	*3.0*	*3.7*	*5.6*	*May-19*
eV US Core Fixed Inc Net Median				*0.2*	*2.5*	*9.0*	*4.1*	*3.1*	*4.0*	*5.5*	*May-19*
eV US Core Fixed Inc Net Rank				*71*	*49*	*--*	*--*	*--*	*--*	*48*	*May-19*
Vanguard Short-Term Treasury Index Fund	48,790,657	5.4	28.7	0.4	1.1	3.5	--	--	--	2.9	Feb-18
BBgBarc US Govt 1-3 Yr TR				*0.5*	*1.1*	*3.6*	*1.9*	*1.4*	*1.2*	*3.0*	*Feb-18*

Historical returns for the US Fixed Income Composite prior to December 2010 and for Barrow Hanley prior to June 2010 are gross only.

	Market Value ($)	% of Portfolio	% of Sector	QTD (%)	Fiscal YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
BBgBarc US Govt 1-5 Yr TR				*0.3*	*1.1*	*4.2*	*2.1*	*1.7*	*1.7*	*3.5*	*Feb-18*
eV US Short Duration Fixed Inc Net Median				*0.5*	*1.3*	*4.3*	*2.4*	*1.9*	*1.9*	*3.3*	*Feb-18*
eV US Short Duration Fixed Inc Net Rank				*80*	*92*	*90*	*--*	*--*	*--*	*85*	*Feb-18*
Opportunistic Credit	**41,893,524**	**4.6**	**6.4**	**2.5**	**2.6**	**--**	**--**	**--**	**--**	**4.2**	**May-19**
50% Barclays US Aggregate / 25% Barclays US High Yield / 25% Credit Suisse Leveraged Loans				*1.2*	*2.9*	*--*	*--*	*--*	*--*	*4.7*	*May-19*
GoldenTree Multi-Sector Credit	21,299,026	2.3	50.8	2.4	2.7	--	--	--	--	4.1	Jun-19
50% BBgBarc US High Yield TR/50% Credit Suisse Leveraged Loans				*2.1*	*3.3*	*11.2*	*5.4*	*5.3*	*6.4*	*4.6*	*Jun-19*
PIMCO Income Fund	20,594,498	2.3	49.2	2.5	2.4	--	--	--	--	4.0	Apr-19
BBgBarc US Aggregate TR				*0.2*	*2.5*	*8.7*	*4.0*	*3.0*	*3.7*	*5.6*	*Apr-19*
Multisector Bond MStar MF Median				*1.5*	*2.7*	*10.7*	*5.1*	*4.4*	*5.7*	*4.9*	*Apr-19*
Multisector Bond MStar MF Rank				*5*	*66*	*--*	*--*	*--*	*--*	*76*	*Apr-19*
Private Real Estate	**59,306,144**	**6.5**	**6.5**	**-2.8**	**-3.6**	**-1.2**	**4.7**	**5.9**	**--**	**--**	**Mar-99**
Custom Blended Real Estate Benchmark				*1.3*	*2.4*	*4.4*	*6.1*	*8.0*	*10.4*	*7.3*	*Mar-99*
InvMetrics All DB Real Estate Pub+Priv Net Median				*1.2*	*2.4*	*5.3*	*6.5*	*8.0*	*10.5*	*8.1*	*Mar-99*
InvMetrics All DB Real Estate Pub+Priv Net Rank				*99*	*99*	*95*	*89*	*91*	*--*	*--*	*Mar-99*
UBS Trumbull Property	40,670,827	4.5	68.6	0.9	-3.0	-0.9	2.8	5.2	8.2	6.9	Mar-99
Greenfield Gap VII	8,825,230	1.0	14.9	1.0	10.8	15.5	14.4	13.4	--	13.4	Dec-14
Patron Capital V	5,016,146	0.6	8.5	-30.9	-27.0	-25.5	8.8	--	--	3.3	Jan-16
Taconic CRE Dislocation Fund II	2,838,129	0.3	4.8	5.3	8.8	8.7	--	--	--	7.4	Nov-18

Private Real Estate results prior to 1/1/2019 were included in the Real Assets composite. All results for the Private Real Estate composite that include the period prior to 1/1/2019 will reflect only the latest lineup of managers that Meketa received information for, therefore it may not reflect the entire Private Real Estate composite at that given time.

All private markets performance and market values reflect a 9/30/2019 capital account balance unless otherwise noted.
Historical returns for Invesco IV prior to April 2012 are gross only.

	Market Value ($)	% of Portfolio	% of Sector	QTD (%)	Fiscal YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
AG Realty Value Fund X, L.P.	967,383	0.1	1.6	-1.2	-17.9	--	--	--	--	-17.9	Jun-19
Carlyle Realty VIII	865,839	0.1	1.5	2.5	5.4	-2.7	--	--	--	-26.5	Dec-17
Carmel Partners Investment Fund VII	122,589	0.0	0.2	-16.7	-32.9	--	--	--	--	-46.6	Apr-19
Private Equity	**46,605,241**	**5.1**	**5.1**	**-0.1**	**2.9**	**6.8**	**12.0**	**9.7**	**10.3**	**8.0**	**Jun-05**
Custom Blended Private Equity Benchmark				*1.2*	*6.4*	*17.2*	*17.3*	*14.3*	*--*	*--*	*Jun-05*
Russell 3000 +3% 1-Quarter Lag				*1.9*	*6.9*	*6.0*	*16.2*	*13.7*	*16.4*	*12.1*	*Jun-05*
InvMetrics All DB Private Eq Net Median				*1.2*	*3.5*	*7.7*	*11.7*	*10.3*	*10.5*	*10.1*	*Jun-05*
InvMetrics All DB Private Eq Net Rank				*83*	*58*	*59*	*47*	*61*	*54*	*80*	*Jun-05*
Ocean Avenue II	9,893,781	1.1	21.2	-0.9	4.4	15.4	24.9	16.3	--	12.0	Jun-14
Adams Street	7,104,660	0.8	15.2	-1.3	-1.5	3.1	11.0	11.0	12.3	6.9	Sep-05
Invesco VI	6,586,534	0.7	14.1	0.4	7.1	9.9	14.0	14.3	--	12.1	Jun-13
Pantheon II	3,835,159	0.4	8.2	-3.8	0.8	6.1	13.9	11.7	--	11.3	Dec-11
Davidson Kempner Long-Term Distressed Opportunities Fund IV	3,682,239	0.4	7.9	1.3	1.6	5.4	--	--	--	10.4	Apr-18
Raven Asset Fund II	3,471,659	0.4	7.4	2.3	3.9	8.2	1.0	-0.1	--	-0.1	Aug-14
Cortec Group Fund VII	2,890,529	0.3	6.2	--	--	--	--	--	--	0.0	Dec-19
Genstar Capital Partners IX	1,572,115	0.2	3.4	-0.4	--	--	--	--	--	-0.4	Jul-19
TCV X	1,549,032	0.2	3.3	-3.0	-9.5	--	--	--	--	-9.5	Apr-19
GTCR Fund XII	1,481,133	0.2	3.2	18.4	29.1	-6.9	--	--	--	-4.4	Jun-18

Adams Street includes Adams Street 2005, Adams Street 2007, and Adams Street 2011.

Pantheon I includes Pantheon US Fund VI and Pantheon Europe Fund IV.
Pantheon II Includes Pantheon US Fund IX, Pantheon Asia Fund VI, and Pantheon Europe Fund VII.
Pantheon Secondary includes Pantheon GLO SEC III B.

	Market Value ($)	% of Portfolio	% of Sector	QTD (%)	Fiscal YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
Carrick Capital Partners III	1,318,509	0.1	2.8	0.1	20.2	8.2	--	--	--	2.1	Aug-18
Cressey & Company Fund VI	1,061,715	0.1	2.3	1.0	3.9	-12.3	--	--	--	-12.3	Jan-19
Pantheon Secondary	822,421	0.1	1.8	1.2	-0.7	0.3	7.0	4.0	3.8	3.9	Jun-07
Pantheon I	785,079	0.1	1.7	-9.8	-10.7	-11.6	2.1	2.1	6.2	2.7	Dec-05
Accel-KKR Growth Capital Partners III	550,677	0.1	1.2	-16.1	-16.1	--	--	--	--	-16.1	Jul-19
Invesco IV	0	0.0	0.0								
Hedge Fund	**77,792,596**	**8.6**	**8.6**	**2.4**	**1.2**	**7.4**	**6.0**	**3.6**	**--**	**3.9**	**Jun-14**
Hedge Fund Custom				*3.1*	*2.1*	*8.4*	*3.9*	*3.0*	*--*	*3.0*	*Jun-14*
InvMetrics All DB Hedge Funds Net Median				*2.5*	*2.3*	*6.8*	*4.4*	*3.0*	*4.1*	*2.7*	*Jun-14*
InvMetrics All DB Hedge Funds Net Rank				*52*	*69*	*46*	*22*	*36*	*--*	*28*	*Jun-14*
Wellington-Archipelago	12,470,062	1.4	16.0	5.5	4.0	15.0	--	--	--	5.7	Aug-17
Silver Point Capital	12,333,154	1.4	15.9	2.5	-0.4	3.7	--	--	--	1.5	Nov-17
Sculptor (OZ) Domestic II	10,895,361	1.2	14.0	5.8	2.8	16.8	8.9	6.1	--	6.3	Jun-14
Taconic Opportunity Fund	10,428,275	1.1	13.4	0.8	0.9	4.7	--	--	--	4.7	Dec-18
KLS Diversified	9,088,522	1.0	11.7	-0.4	-1.4	0.1	--	--	--	0.8	Oct-17
Graham Absolute Return	7,611,040	0.8	9.8	2.0	0.3	8.2	--	--	--	3.3	Aug-17
Winton	6,233,755	0.7	8.0	-0.7	2.3	2.3	--	--	--	2.0	Oct-17
Laurion Capital	5,337,280	0.6	6.9	0.5	-1.4	4.4	--	--	--	5.4	Aug-18
Marshall Wace Eureka	3,395,147	0.4	4.4	3.7	4.4	10.5	--	--	--	5.0	Nov-17

	Market Value ($)	% of Portfolio	% of Sector	QTD (%)	Fiscal YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
Real Assets	**56,433,241**	**6.2**	**6.2**	**2.9**	**4.4**	**13.6**	**8.3**	**8.0**	**--**	**--**	**Mar-99**
Custom Blended Real Assets Benchmark				*7.3*	*4.4*	*22.2*	*11.1*	*9.2*	*--*	*--*	*Mar-99*
CPI + 5% (Seasonally Adjusted)				*2.1*	*3.7*	*7.4*	*7.2*	*6.9*	*--*	*--*	*Mar-99*
InvMetrics All DB Real Assets/Commodities Net Median				*1.6*	*2.9*	*8.2*	*5.9*	*4.1*	*7.0*	*--*	*Mar-99*
InvMetrics All DB Real Assets/Commodities Net Rank				*34*	*20*	*19*	*24*	*23*	*--*	*--*	*Mar-99*
SSgA	17,264,839	1.9	30.6	3.5	2.7	13.3	--	--	--	4.6	Apr-17
Real Asset NL Custom Blended Index				*3.7*	*3.0*	*13.9*	*--*	*--*	*--*	*5.0*	*Apr-17*
Private Infrastructure	**23,780,002**	**2.6**	**42.1**	**2.4**	**5.2**	**11.7**	**13.5**	**7.8**	**--**	**7.8**	**Dec-14**
S&P Global Infrastructure Net TR USD				*4.9*	*5.3*	*25.8*	*10.3*	*5.6*	*6.8*	*5.6*	*Dec-14*
KKR Global II	11,307,757	1.2	47.6	1.5	4.3	9.5	13.5	10.3	--	10.3	Dec-14
North Haven Infrastructure II	8,662,119	1.0	36.4	2.0	5.5	13.6	14.2	--	--	8.0	May-15
ISQ Global Infrastructure Fund II	2,216,124	0.2	9.3	4.4	6.4	17.9	--	--	--	-13.6	Jul-18
KKR Global Infrastructure Investors III	1,404,527	0.2	5.9	3.4	0.4	-15.1	--	--	--	-15.1	Jan-19
Ardian Infrastructure Fund V	189,475	0.0	0.8	--	--	--	--	--	--	0.0	Oct-19
Private Natural Resources	**15,388,400**	**1.7**	**27.3**	**3.3**	**5.3**	**11.6**	**11.1**	**--**	**--**	**16.7**	**Sep-15**
S&P Global Natural Resources Index TR USD				*9.5*	*2.9*	*17.2*	*7.9*	*4.8*	*1.6*	*12.9*	*Sep-15*
Taurus Mining	4,023,695	0.4	26.1	4.0	7.0	16.9	11.0	--	--	17.6	Sep-15
Taurus Mining Annex	3,770,973	0.4	24.5	7.1	12.2	25.0	28.1	--	--	29.0	Jan-17
GSO Energy Opportunities	3,623,832	0.4	23.5	-0.9	0.1	2.6	9.0	--	--	14.7	Nov-15
EnCap XI	1,289,184	0.1	8.4	-4.2	-6.9	-11.7	--	--	--	-28.0	Jul-17
EnCap IV	1,122,326	0.1	7.3	8.1	8.2	24.4	--	--	--	1.8	Feb-18
Tailwater Energy Fund IV, LP	846,614	0.1	5.5	0.0	--	--	--	--	--	0.0	Oct-19

	Market Value ($)	% of Portfolio	% of Sector	QTD (%)	Fiscal YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
BlackRock Global Energy and Power Infrastructure Fund III LP	711,776	0.1	4.6	17.7	--	--	--	--	--	--	Jul-19
Cash	**14,717,960**	**1.6**	**1.6**	**0.4**	**0.8**	**1.4**	--	--	--	--	
Cash	10,825,261	1.2	73.6	0.5	1.1	2.0	1.4	1.1	--	--	Sep-03
Treasury Cash	3,892,698	0.4	26.4								

**One or more accounts have been excluded from the composite for the purposes of performance calculations and market value.*

Benchmark History
As of December 31, 2019

Total Fund		
7/1/2019	Present	21% US Equity Custom / 18% International Equity Custom / 18% US Fixed Custom / 10% Hedge Fund Custom / 15% Thomson Reuters Cambridge Private Equity Index / 5% Real Asset Custom / 8% NCREIF ODCE (net) / 5% 50% Barclays US Aggregate / 25% Barclays US High Yield / 25% Credit Suisse Leveraged Loans
1/1/2019	6/30/2019	21% US Equity Custom / 18% International Equity Custom / 23% US Fixed Custom / 10% Hedge Fund Custom / 15% Thomson Reuters Cambridge Private Equity Index / 5% Real Asset Custom / 8% NCREIF ODCE (net)
1/1/2017	12/31/2018	27% US Equity Custom / 23% International Equity Custom / 22% US Fixed Custom / 5% Hedge Fund Custom / 9% Thomson Reuters Cambridge Private Equity Index / 14% Real Asset Custom
US Equity		
1/1/2020	Present	Russell 3000
International Equity		
1/1/2019	Present	56% MSCI EAFE Gross / 44% MSCI Emerging Markets Gross
1/1/2017	12/31/2018	69.56% MSCI EAFE Gross / 30.44% MSCI Emerging Markets Gross
7/1/2013	12/31/2016	MSCI ACWI ex USA Gross
US Fixed Income		
1/1/2020	Present	BBgBarc US Aggregate TR
12/31/1994	12/31/2019	US Fixed Custom
Hedge Fund		
7/1/2017	Present	100% HFRI Fund of Funds Composite Index
1/1/2015	6/30/2017	50% HFRI Fund of Funds Composite Index / 50% HFRI RV: Multi-Strategy Index
Real Assets		
1/1/2020	Present	50% Cambridge Infrastructure (1 Quarter Lagged) / 50% Cambridge Energy Upstream & Royalties & Private Energy
3/31/1999	12/31/2019	Real Asset Custom

Benchmark History

As of December 31, 2019

SSgA		
4/30/2017	Present	25% Bloomberg Roll Select Commodities Index TR USD / 25% S&P Global LargeMidCap Commodity and Resources NR USD / 10% S&P Global Infrastructure TR USD / 15% DJ US Select REIT TR USD / 25% BBgBarc US TIPS TR

Statistics Summary

5 Years Ending December 31, 2019

	Anlzd Return	Anlzd Standard Deviation	Information Ratio	Beta	Sharpe Ratio	Tracking Error
Total Fund	6.99%	6.68%	-0.35	1.03	0.89	1.24%
Policy Index	7.42%	6.40%	--	1.00	0.99	0.00%
InvMetrics Public DB $250mm-$1B Net Median	6.95%	7.00%	-0.09	0.99	0.83	0.99%

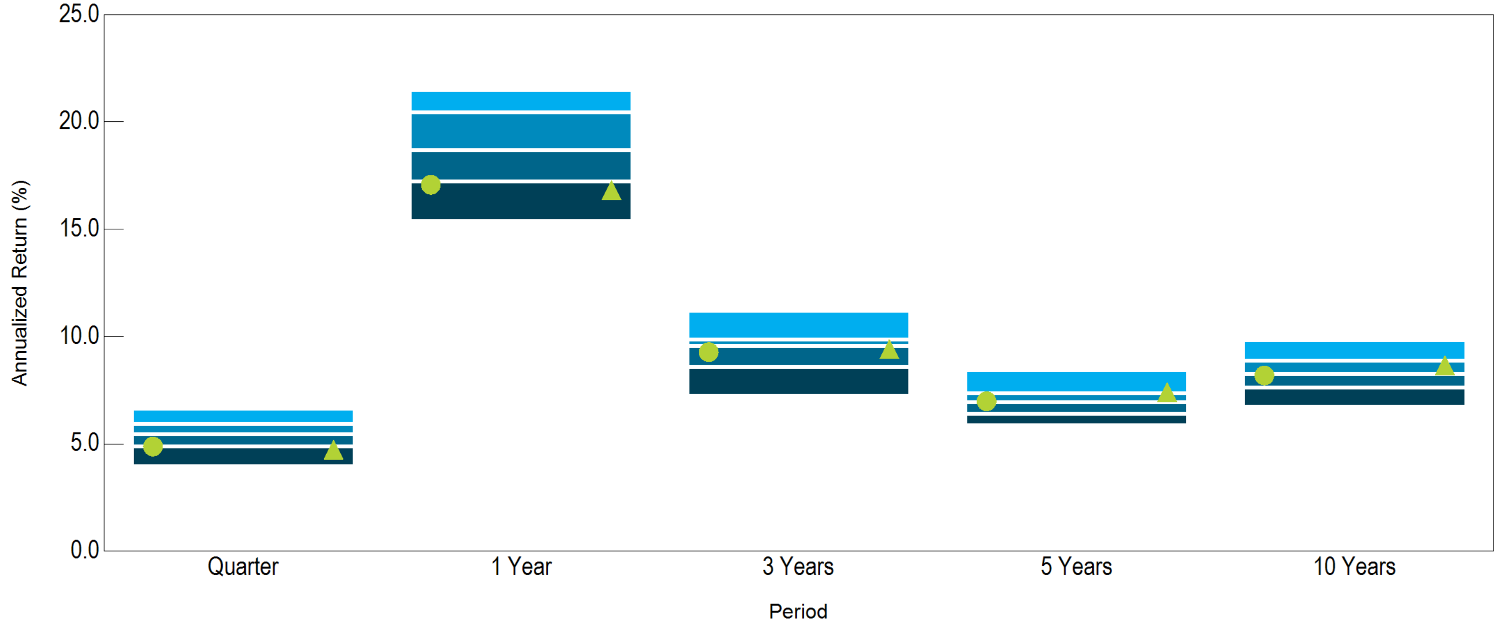
Annual Investment Expense Analysis
As Of December 31, 2019

Name	Fee Schedule	Market Value	Estimated Fee	Estimated Fee Value
Total Fund w/o Alternatives		**$654,358,415**		
US Equity		**$257,917,114**		
Mellon Dynamic US Equity	0.30% of Assets	$103,016,896	0.30%	$309,051
Mellon Large Cap	0.04% of First 100.0 Mil, 0.02% Thereafter	$116,210,494	0.04%	$43,242
DFA Small Cap	0.35% of Assets	$19,083,048	0.35%	$66,791
PanAgora	0.80% of Assets	$19,606,675	0.80%	$156,853
International Equity		**$184,761,972**		
Developed International Equity		**$112,735,966**		
Acadian ACWI ex U.S. Small Cap Equity	0.99% of Assets	$11,088,758	0.99%	$109,779
Driehaus International Small Cap Growth	0.90% of Assets	$11,647,208	0.90%	$104,825
GQG International Equity		$45,000,000		
First Eagle International Value Fund		$45,000,000		
Emerging Markets Equity		**$72,026,006**		
Wells Capital	0.90% of First 100.0 Mil, 0.85% Thereafter	$0	0.84%	$0
Artisan Developing World TR	1.05% of Assets	$50,426,006	1.05%	$529,473
RWC	0.87% of Assets	$21,600,000	0.87%	$187,920
US Fixed Income		**$169,785,805**		
Barrow Hanley	0.30% of First 50.0 Mil, 0.20% of Next 100.0 Mil, 0.15% Thereafter	$60,905,967	0.28%	$171,812
Vanguard Short-Term Treasury Index Fund	0.05% of Assets	$48,790,657	0.05%	$24,395
Vanguard Total Bond Market Index Fund	0.04% of Assets	$60,089,182	0.04%	$21,031
Opportunistic Credit		**$41,893,524**		
PIMCO Income Fund	0.50% of Assets	$20,594,498	0.50%	$102,972
GoldenTree Multi-Sector Credit	0.75% of Assets	$21,299,026	0.75%	$159,743
Private Real Estate		**$59,306,144**		
Greenfield Gap VII		$8,825,230		
Patron Capital V		$5,016,146		
UBS Trumbull Property		$40,670,827		

Name	Fee Schedule	Market Value	Estimated Fee	Estimated Fee Value
Carlyle Realty VIII		$865,839		
Taconic CRE Dislocation Fund II		$2,838,129		
Carmel Partners Investment Fund VII		$122,589		
AG Realty Value Fund X, L.P.		$967,383		
Invesco IV		$0		
Invesco VI		$6,586,534		
Ocean Avenue II		$9,893,781		
Pantheon I		$785,079		
Pantheon II		$3,835,159		
Pantheon Secondary		$822,421		
Raven Asset Fund II		$3,471,659		
Davidson Kempner Long-Term Distressed Opportunities Fund IV		$3,682,239		
GTCR Fund XII		$1,481,133		
Carrick Capital Partners III		$1,318,509		
Cressey & Company Fund VI		$1,061,715		
TCV X		$1,549,032		
Accel-KKR Growth Capital Partners III		$550,677		
Genstar Capital Partners IX		$1,572,115		
Cortec Group Fund VII		$2,890,529		
Hedge Fund		**$77,792,596**		
Sculptor (OZ) Domestic II	Performance-based 1.50 and 20.00	$10,895,361	1.90%	$207,090
Graham Absolute Return	Performance-based 1.75 and 20.00	$7,611,040	2.04%	$154,998
Wellington-Archipelago	Performance-based 1.00 and 20.00	$12,470,062	1.46%	$182,419
KLS Diversified	Performance-based 2.00 and 20.00	$9,088,522	2.32%	$210,490
Winton	Performance-based 0.90 and 20.00	$6,233,755	1.18%	$73,371
Marshall Wace Eureka	Performance-based 2.00 and 20.00	$3,395,147	2.41%	$81,852
Silver Point Capital	Performance-based 2.00 and 20.00	$12,333,154	2.42%	$298,399
Laurion Capital		$5,337,280		
Taconic Opportunity Fund		$10,428,275		

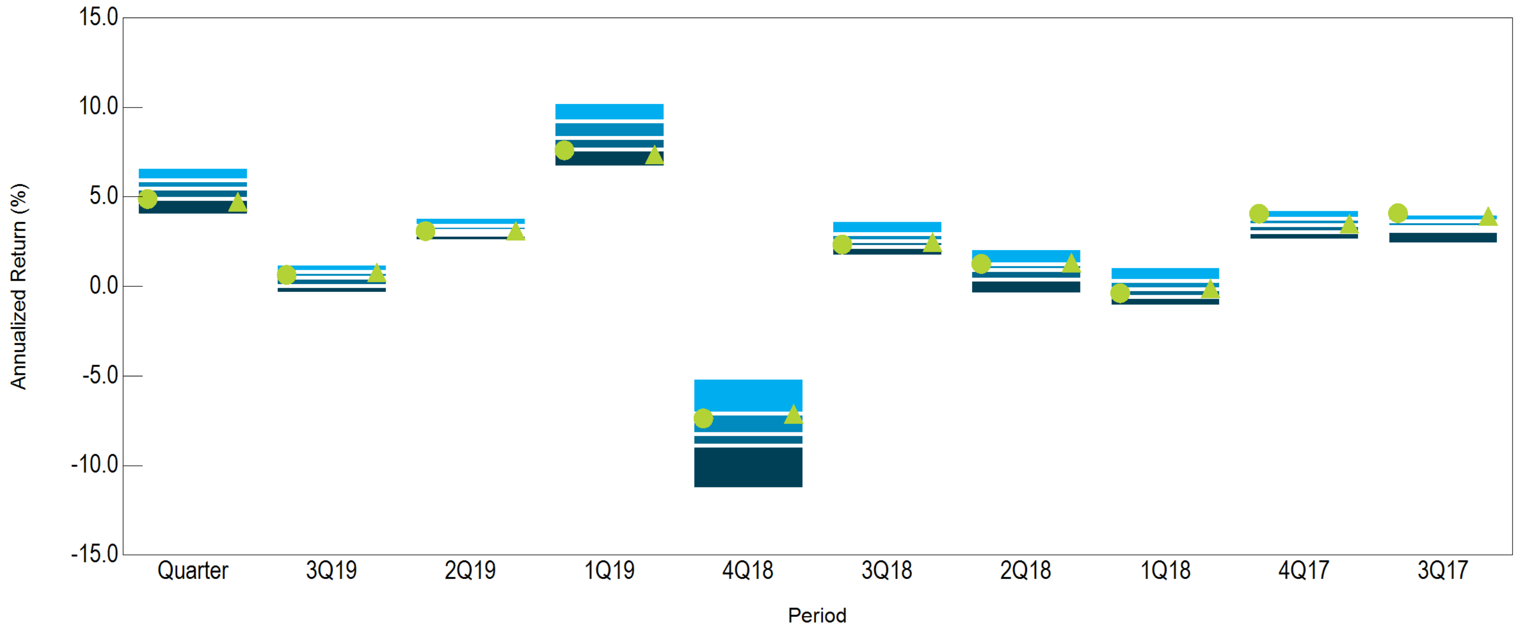
Name	Fee Schedule	Market Value	Estimated Fee	Estimated Fee Value
Real Assets		**$56,433,241**		
SSgA	0.30% of First 50.0 Mil, 0.27% of Next 50.0 Mil, 0.25% Thereafter	$17,264,839	0.30%	$51,795
Private Infrastructure		**$23,780,002**		
KKR Global II		$11,307,757		
North Haven Infrastructure II		$8,662,119		
ISQ Global Infrastructure Fund II		$2,216,124		
KKR Global Infrastructure Investors III		$1,404,527		
Ardian Infrastructure Fund V		$189,475		
Private Natural Resources		**$15,388,400**		
EnCap XI		$1,289,184		
EnCap IV		$1,122,326		
GSO Energy Opportunities		$3,623,832		
Taurus Mining		$4,023,695		
Taurus Mining Annex		$3,770,973		
BlackRock Global Energy and Power Infrastructure Fund III LP		$711,776		
Tailwater Energy Fund IV, LP		$846,614		
Cash		**$14,717,960**		
Cash		$10,825,261		
Treasury Cash		$3,892,698		

InvMetrics Public DB $250mm-$1B Net Return Comparison
Ending December 31, 2019



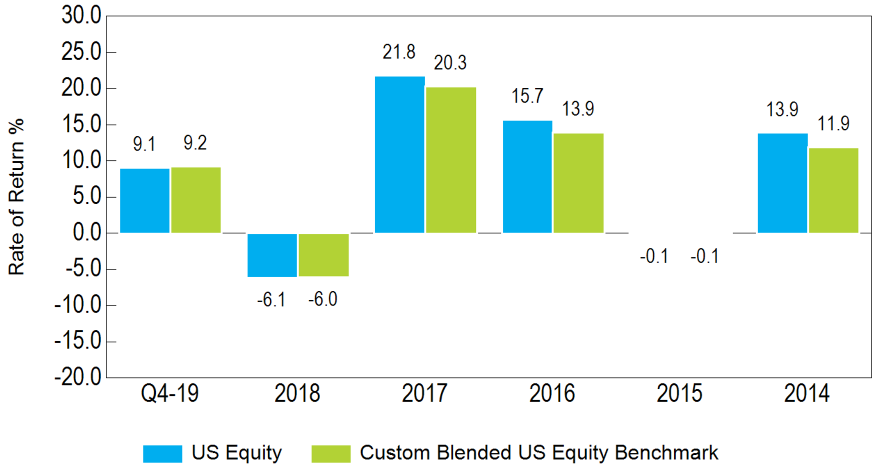
	Return (Rank)									
5th Percentile	6.6		21.5		11.2		8.4		9.8	
25th Percentile	5.9		20.5		9.9		7.4		8.9	
Median	5.5		18.7		9.6		6.9		8.3	
75th Percentile	4.9		17.2		8.6		6.4		7.7	
95th Percentile	4.0		15.4		7.3		5.9		6.8	
# of Portfolios	77		77		75		68		53	
Total Fund	4.9	(78)	17.1	(79)	9.3	(60)	7.0	(49)	8.2	(53)
Policy Index	4.7	(82)	16.8	(79)	9.4	(55)	7.4	(24)	8.7	(35)

InvMetrics Public DB $250mm-$1B Net Return Comparison
Ending December 31, 2019

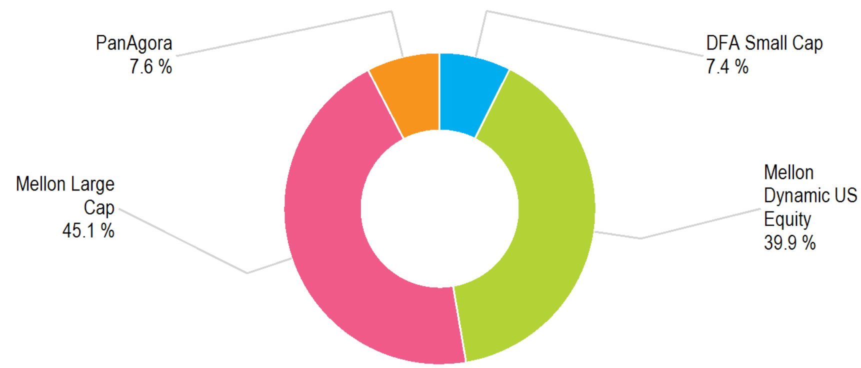


Return (Rank)	Quarter		3Q19		2Q19		1Q19		4Q18		3Q18		2Q18		1Q18		4Q17		3Q17	
5th Percentile	6.6		1.3		3.9		10.3		-5.1		3.7		2.1		1.1		4.3		4.1	
25th Percentile	5.9		0.8		3.4		9.2		-7.1		2.9		1.3		0.3		3.8		3.6	
Median	5.5		0.5		3.1		8.3		-8.2		2.5		0.9		-0.1		3.4		3.3	
75th Percentile	4.9		0.0		2.9		7.6		-8.9		2.2		0.4		-0.6		3.1		3.1	
95th Percentile	4.0		-0.4		2.5		6.7		-11.3		1.7		-0.4		-1.1		2.6		2.4	
# of Portfolios	77		69		74		77		73		57		61		56		59		61	
● Total Fund	4.9	(78)	0.6	(38)	3.1	(55)	7.6	(77)	-7.4	(33)	2.3	(68)	1.3	(25)	-0.4	(66)	4.1	(16)	4.1	(4)
▲ Policy Index	4.7	(82)	0.8	(31)	3.1	(53)	7.4	(84)	-7.1	(29)	2.5	(56)	1.3	(23)	-0.1	(50)	3.5	(43)	3.9	(10)

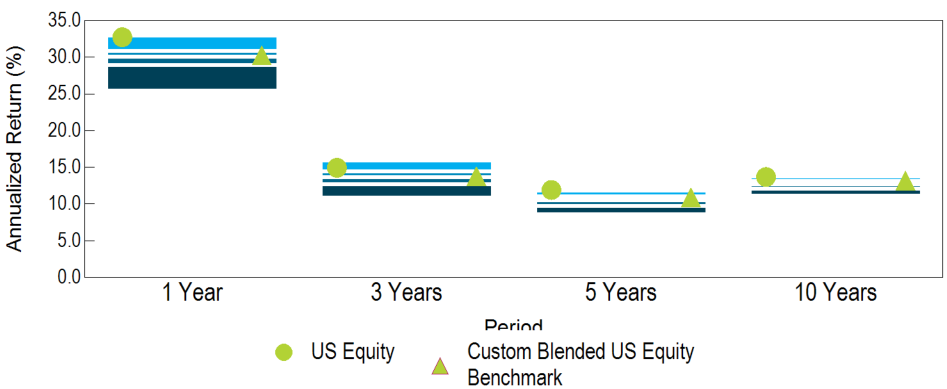
Return Summary



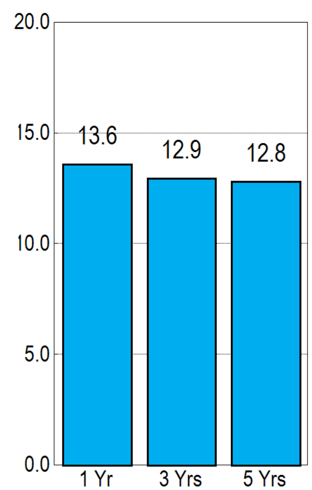
Current Allocation



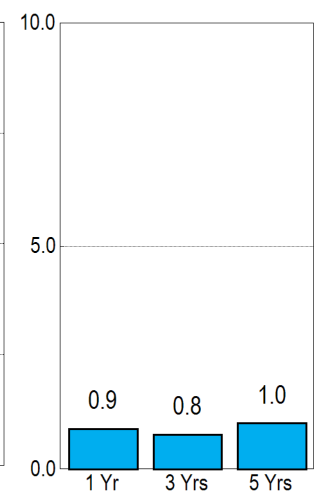
	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)
US Equity	**32.7**	**14.9**	**11.9**	**13.7**
Custom Blended US Equity Benchmark	*30.3*	*13.8*	*10.9*	*13.2*
InvMetrics All DB US Eq Net Median	*30.1*	*13.7*	*10.5*	*12.7*
InvMetrics All DB US Eq Net Rank	*6*	*13*	*5*	*7*



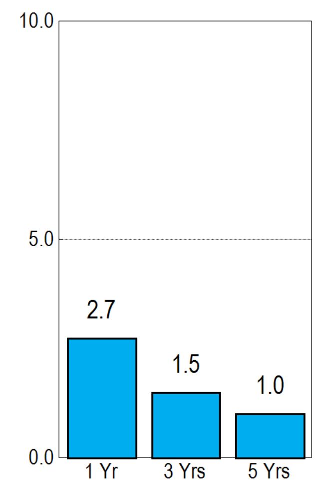
Anzld. Std. Deviation



Tracking Error



Information Ratio



US Equity Characteristics vs Russell 3000	Portfolio Q4-19	Index Q4-19
Characteristics		
Weighted Avg. Market Cap. ($B)	214.6	230.5
Median Market Cap ($B)	2.5	1.8
P/E Ratio	22.2	22.8
Yield	1.7	1.8
EPS Growth - 5 Yrs.	12.6	13.1
Price to Book	3.5	3.6
Beta (holdings; domestic)	1.0	1.0

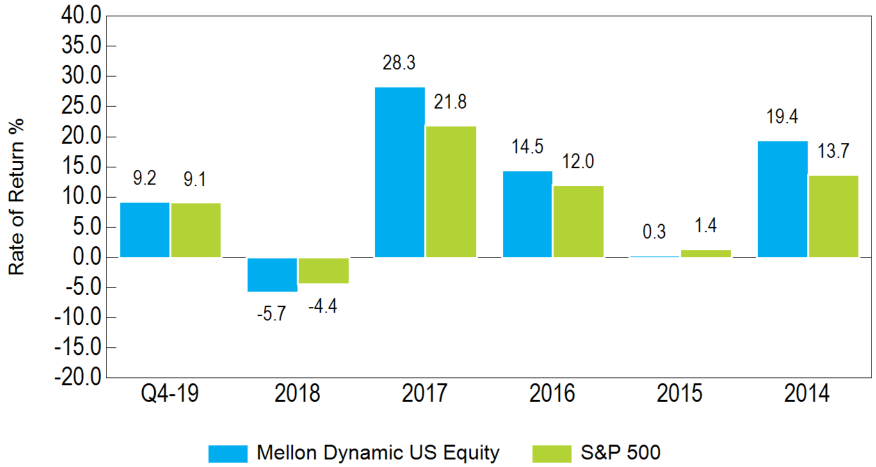
US Equity Sector Distribution vs Russell 3000	Portfolio Q4-19	Index Q4-19
Sector Distribution		
Energy	3.8	4.1
Materials	2.8	2.9
Industrials	9.9	9.9
Consumer Discretionary	9.6	10.0
Consumer Staples	6.0	6.4
Health Care	13.0	14.2
Financials	13.0	13.5
Information Technology	19.6	22.4
Communication Services	8.2	9.4
Utilities	3.1	3.2
Real Estate	3.0	4.0

Top Holdings	
UST Bill 03/19/20 When Iss	5.8%
APPLE	3.4%
MICROSOFT	3.2%
CASH - USD	2.2%
AMAZON.COM	2.1%
FACEBOOK CLASS A	1.3%
BERKSHIRE HATHAWAY 'B'	1.2%
JP MORGAN CHASE & CO.	1.2%
ALPHABET A	1.1%
ALPHABET 'C'	1.1%

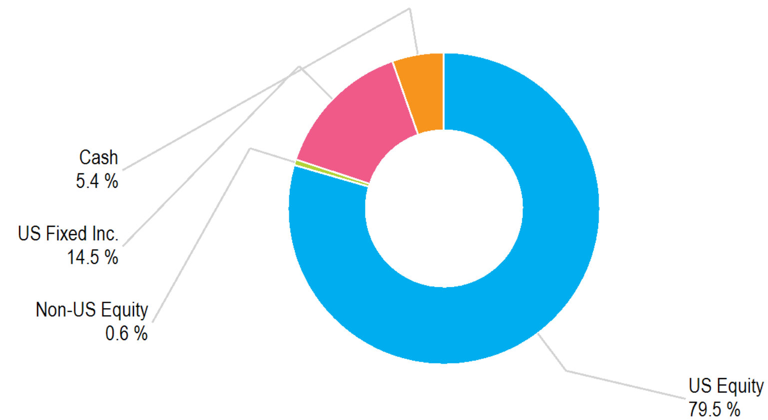
Best Performers	Return %
IVERIC BIO	666.1%
CHEMOCENTRYX	483.3%
INTRA CELLULAR THERAPIES	359.3%
NEOLEUKIN THERAPEUTICS	332.3%
STAGE STORES	331.9%
SUPERIOR ENERGY SVCS	285.4%
MERSANA THERAPEUTICS	262.7%
NANTKWEST	210.7%
ARQULE	178.4%
CLOVIS ONCOLOGY	165.3%

Worst Performers	Return %
CELADON GROUP	-98.8%
DEAN FOODS	-94.8%
NUVECTRA	-93.0%
HORNBECK OFFS.SVS.	-86.2%
LSC COMMUNICATIONS	-85.1%
MCCLATCHY 'A'	-83.0%
BASIC ENERGY SERVICES	-81.6%
UNIT	-79.4%
CYCLERION THERAPEUTICS	-77.6%
INTELSAT	-69.2%

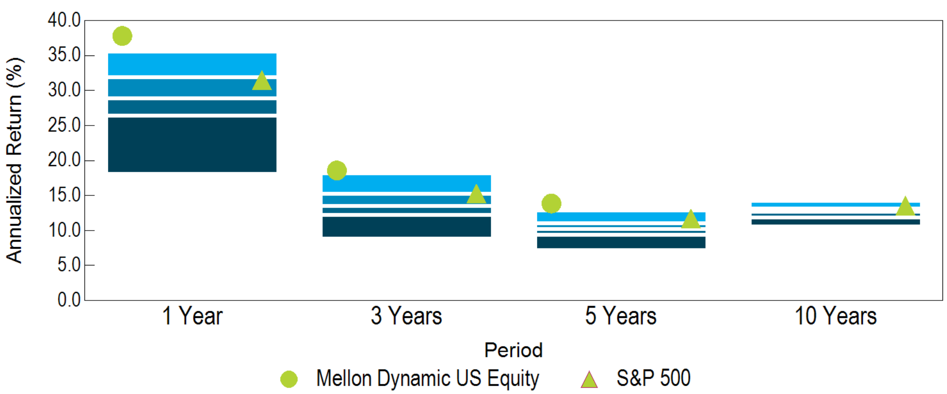
Return Summary



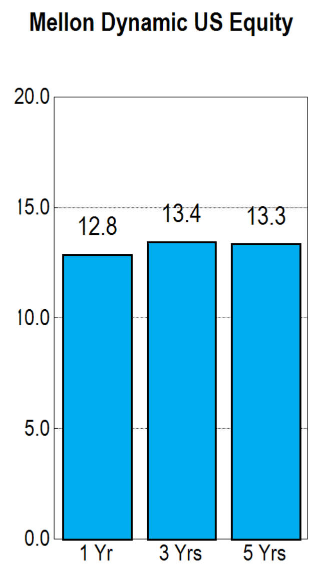
Current Allocation



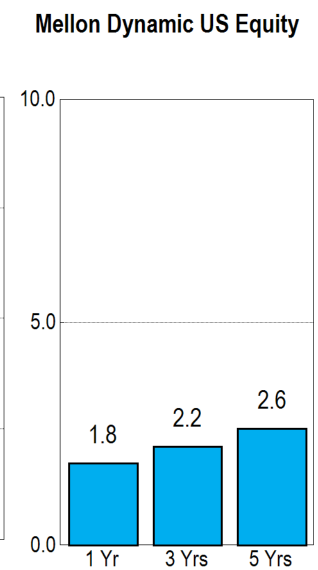
	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)
Mellon Dynamic US Equity	37.8	18.6	13.9	--
S&P 500	*31.5*	*15.3*	*11.7*	*13.6*
eV US Large Cap Core Equity Net Median	*28.9*	*13.6*	*10.3*	*12.8*
eV US Large Cap Core Equity Net Rank	*2*	*5*	*1*	*--*



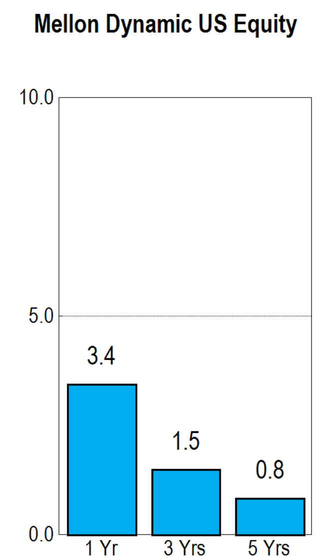
Anzld. Std. Deviation



Tracking Error



Information Ratio



Mellon Dynamic US Equity | As of December 31, 2019

Account Information

Account Name	**Mellon Dynamic US Equity**
Account Structure	**Commingled Fund**
Investment Style	**Active**
Inception Date	**12/31/12**
Account Type	**US Equity**
Benchmark	**S&P 500**
Universe	**eV US Large Cap Core Equity Net**

Account Characteristics

	Portfolio Q4-19	Index Q4-19
Characteristics		
Weighted Avg. Market Cap. ($B)	269.6	272.0
Median Market Cap ($B)	23.6	23.6
P/E Ratio	23.0	23.0
Yield	1.9	1.8
EPS Growth - 5 Yrs.	12.9	12.8
Price to Book	3.9	3.9
Beta (holdings; domestic)	1.0	1.0

Sector Distribution

	Portfolio Q4-19	Index Q4-19
Sector Distribution		
Energy	3.5	4.2
Materials	2.1	2.6
Industrials	7.3	9.0
Consumer Discretionary	7.8	10.1
Consumer Staples	5.8	7.8
Health Care	11.4	13.8
Financials	10.4	13.3
Information Technology	18.6	22.8
Communication Services	8.3	10.4
Utilities	2.7	3.2
Real Estate	2.3	2.8

Top Holdings

UST Bill 03/19/20 When Iss	14.5%
CASH - USD	5.4%
APPLE	3.7%
MICROSOFT	3.6%
AMAZON.COM	2.3%
FACEBOOK CLASS A	1.5%
BERKSHIRE HATHAWAY 'B'	1.3%
JP MORGAN CHASE & CO.	1.3%
ALPHABET A	1.2%
ALPHABET 'C'	1.2%

Best Performers

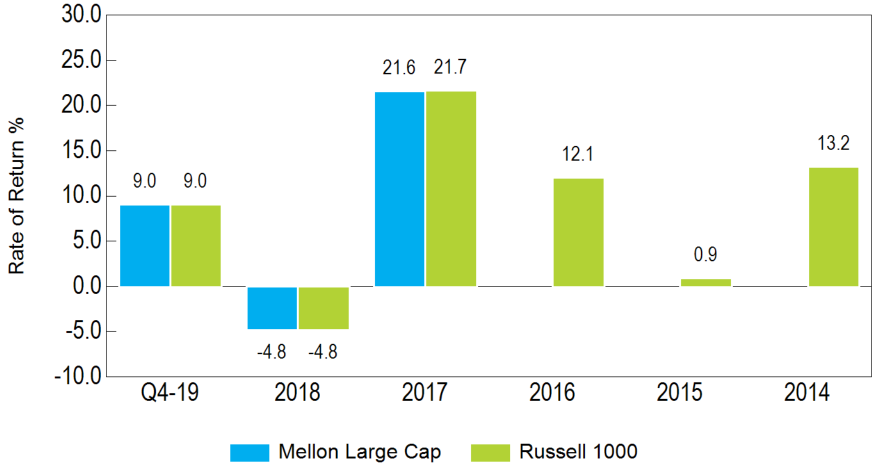
	Return %
ADVANCED MICRO DEVICES	58.2%
QORVO	56.8%
ALIGN TECHNOLOGY	54.2%
SKYWORKS SOLUTIONS	53.2%
CENTENE	45.3%
TIFFANY & CO	44.9%
HUMANA	43.6%
FORTINET	39.1%
FREEPORT-MCMORAN	37.8%
UNITEDHEALTH GROUP	35.8%

Worst Performers

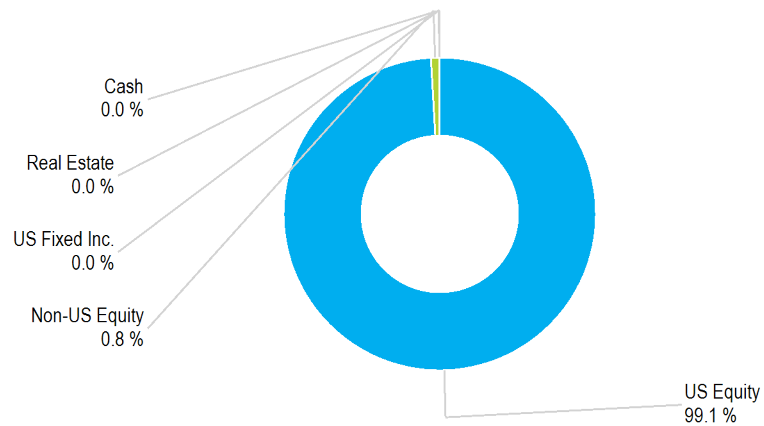
	Return %
TWITTER	-22.2%
VENTAS	-19.9%
EXPEDIA GROUP	-19.3%
DOLLAR TREE	-17.6%
ARISTA NETWORKS	-14.9%
BOEING	-13.9%
MACERICH	-12.5%
PUBLIC STORAGE	-12.3%
ALLIANCE DATA SYSTEMS	-11.9%
TRIPADVISOR 'A'	-11.7%

Current Allocations do not depict asset class weights based on long/short positions.

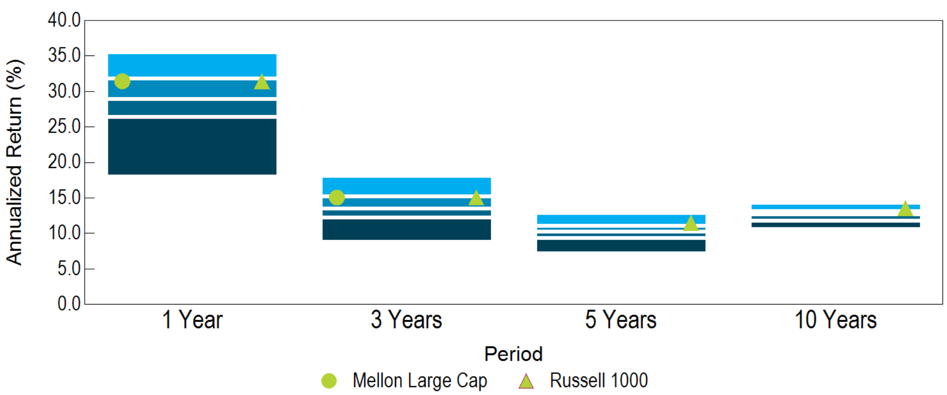
Return Summary



Current Allocation

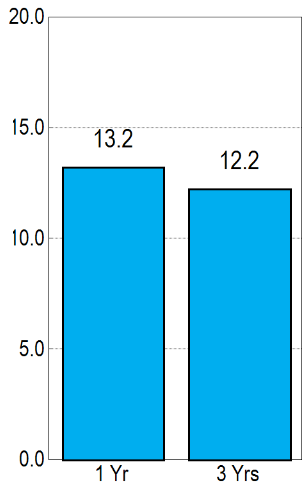


	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)
Mellon Large Cap	31.4	15.0	--	--
Russell 1000	*31.4*	*15.0*	*11.5*	*13.5*
eV US Large Cap Core Equity Net Median	*28.9*	*13.6*	*10.3*	*12.8*
eV US Large Cap Core Equity Net Rank	*29*	*27*	*--*	*--*



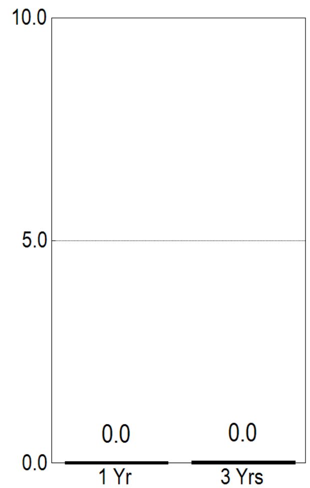
Anzld. Std. Deviation

Mellon Large Cap



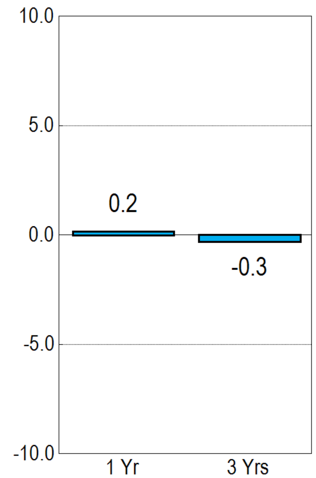
Tracking Error

Mellon Large Cap



Information Ratio

Mellon Large Cap



Account Information	
Account Name	**Mellon Large Cap**
Account Structure	**Commingled Fund**
Investment Style	**Passive**
Inception Date	**3/31/16**
Account Type	**US Stock Large**
Benchmark	**Russell 1000**
Universe	**eV US Large Cap Core Equity Net**

Account Characteristics	Portfolio Q4-19	Index Q4-19
Characteristics		
Weighted Avg. Market Cap. ($B)	246.7	246.6
Median Market Cap ($B)	10.4	10.4
P/E Ratio	23.1	23.1
Yield	1.8	1.8
EPS Growth - 5 Yrs.	13.4	13.4
Price to Book	3.8	3.8
Beta (holdings; domestic)	1.0	1.0

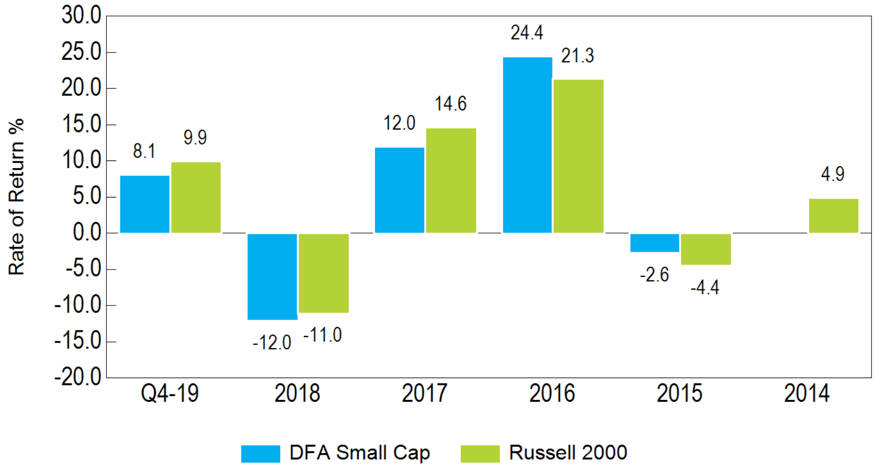
Sector Distribution	Portfolio Q4-19	Index Q4-19
Sector Distribution		
Energy	4.1	4.1
Materials	2.8	2.8
Industrials	9.5	9.5
Consumer Discretionary	10.0	10.0
Consumer Staples	6.7	6.7
Health Care	13.9	13.9
Financials	13.2	13.2
Information Technology	23.0	23.1
Communication Services	9.9	9.9
Utilities	3.2	3.2
Real Estate	3.7	3.7

Top Holdings	
APPLE	4.4%
MICROSOFT	4.0%
AMAZON.COM	2.6%
FACEBOOK CLASS A	1.6%
BERKSHIRE HATHAWAY 'B'	1.5%
JP MORGAN CHASE & CO.	1.5%
ALPHABET A	1.3%
ALPHABET 'C'	1.3%
JOHNSON & JOHNSON	1.3%
VISA 'A'	1.1%

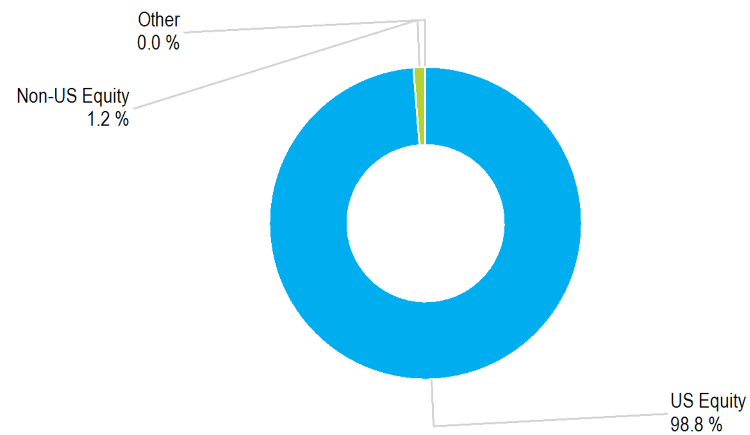
Best Performers	Return %
TESLA	73.7%
SAREPTA THERAPEUTICS	71.3%
UBIQUITI	60.1%
ADVANCED MICRO DEVICES	58.2%
QORVO	56.8%
ZILLOW GROUP CLASS A	54.8%
ALIGN TECHNOLOGY	54.2%
ZILLOW GROUP CLASS C	54.1%
TRANSOCEAN	53.9%
SKYWORKS SOLUTIONS	53.2%

Worst Performers	Return %
BEYOND MEAT	-49.1%
SAGE THERAPEUTICS	-48.5%
CHESAPEAKE ENERGY	-41.4%
SERVICEMASTER GLB.HDG.	-30.8%
TWITTER	-22.2%
TAUBMAN CENTERS	-22.1%
ELASTIC	-21.9%
ETSY	-21.6%
SINCLAIR BROADCAST 'A'	-21.5%
VENTAS	-19.9%

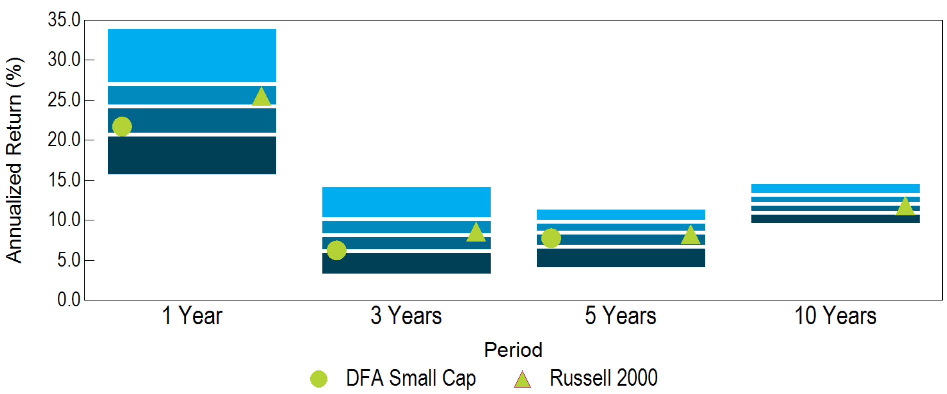
Return Summary



Current Allocation

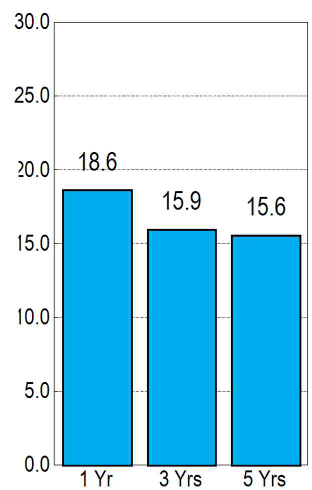


	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)
DFA Small Cap	21.7	6.2	7.7	--
Russell 2000	*25.5*	*8.6*	*8.2*	*11.8*
eV US Small Cap Core Equity Net Median	*24.3*	*8.2*	*8.5*	*12.1*
eV US Small Cap Core Equity Net Rank	*70*	*74*	*61*	*--*



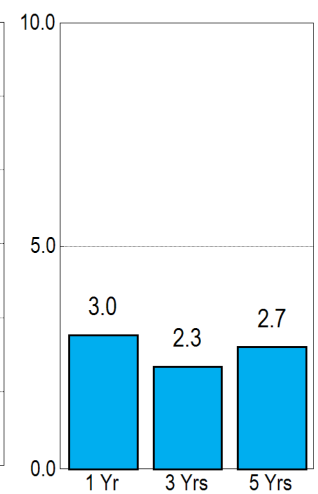
Anzld. Std. Deviation

DFA Small Cap



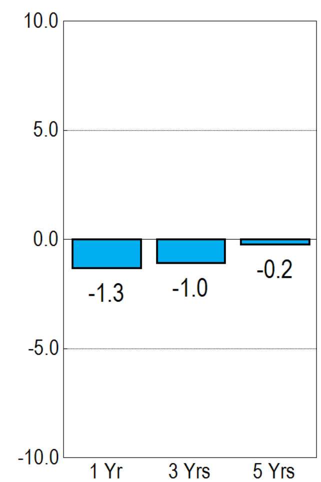
Tracking Error

DFA Small Cap



Information Ratio

DFA Small Cap



Account Information	
Account Name	**DFA Small Cap**
Account Structure	**Commingled Fund**
Investment Style	**Active**
Inception Date	**6/30/14**
Account Type	**US Stock Small**
Benchmark	**Russell 2000**
Universe	**eV US Small Cap Core Equity Net**

Account Characteristics	Portfolio Q4-19	Index Q4-19
Characteristics		
Weighted Avg. Market Cap. ($B)	2.4	2.5
Median Market Cap ($B)	0.8	0.8
P/E Ratio	18.7	19.8
Yield	1.3	1.4
EPS Growth - 5 Yrs.	9.1	9.3
Price to Book	2.4	2.5
Beta (holdings; domestic)	1.2	1.2

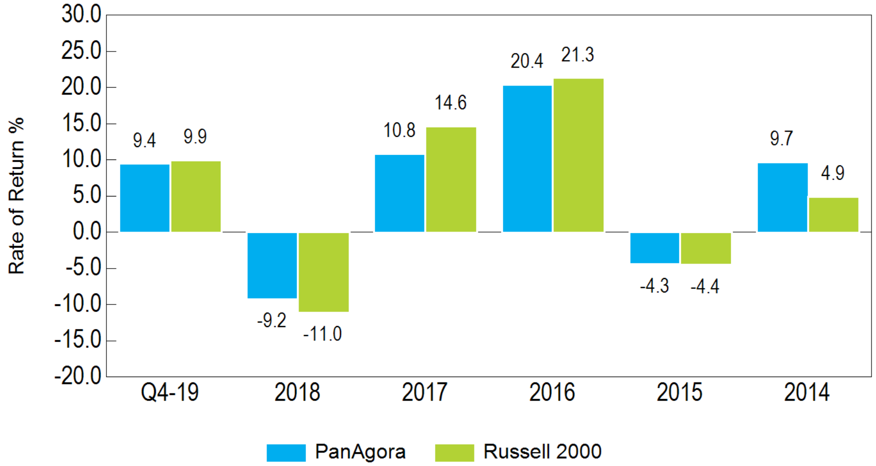
Sector Distribution	Portfolio Q4-19	Index Q4-19
Sector Distribution		
Energy	4.1	3.1
Materials	5.9	3.9
Industrials	20.6	15.8
Consumer Discretionary	14.5	10.9
Consumer Staples	4.4	3.0
Health Care	9.1	18.2
Financials	19.9	17.7
Information Technology	13.9	13.6
Communication Services	3.4	2.3
Utilities	3.7	3.7
Real Estate	0.6	7.8

Top Holdings	
TCF FINANCIAL	0.3%
ACI WORLDWIDE	0.3%
HELEN OF TROY	0.3%
TETRA TECH	0.3%
AMEDISYS	0.3%
DECKERS OUTDOOR	0.3%
SEABOARD	0.3%
ARMSTRONG WORLD INDS.	0.3%
NEXSTAR MEDIA GROUP CL.A	0.3%
FTI CONSULTING	0.3%

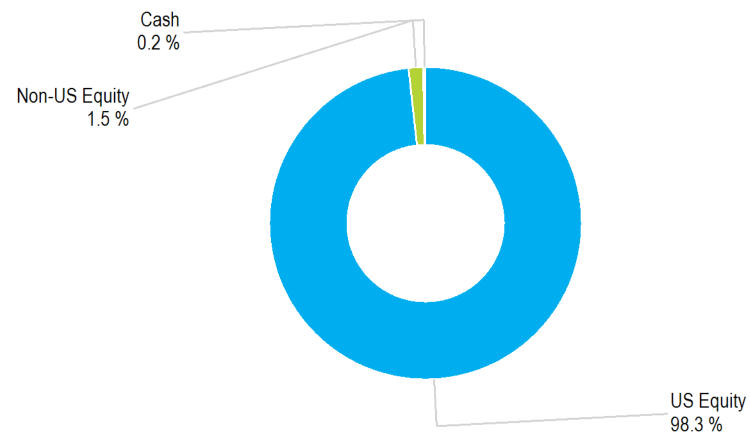
Best Performers	Return %
IVERIC BIO	666.1%
CHEMOCENTRYX	483.3%
INTRA CELLULAR THERAPIES	359.3%
NEOLEUKIN THERAPEUTICS	332.3%
STAGE STORES	331.9%
SUPERIOR ENERGY SVCS	285.4%
NANTKWEST	210.7%
JOUNCE THERAPEUTICS	162.2%
COMSCORE	158.6%
EPIZYME	138.5%

Worst Performers	Return %
CELADON GROUP	-98.8%
DEAN FOODS	-94.8%
NUVECTRA	-93.0%
HORNBECK OFFS.SVS.	-86.2%
LSC COMMUNICATIONS	-85.1%
MCCLATCHY 'A'	-83.0%
BASIC ENERGY SERVICES	-81.6%
UNIT	-79.4%
INTELSAT	-69.2%
MCDERMOTT INTL.	-66.5%

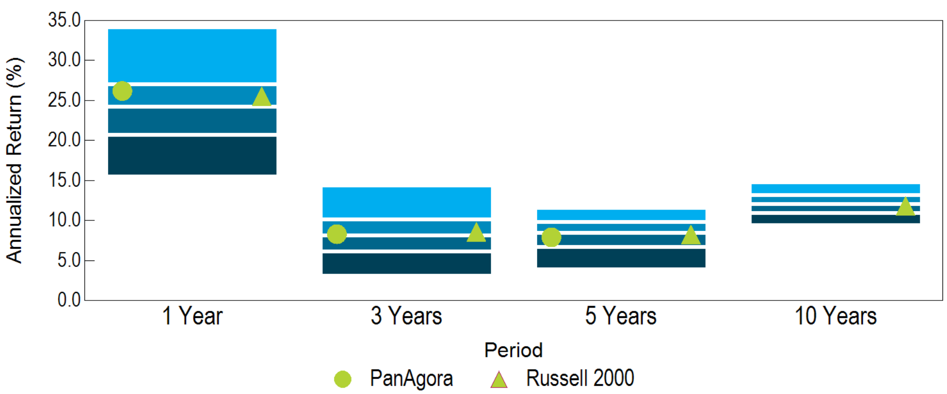
Return Summary



Current Allocation

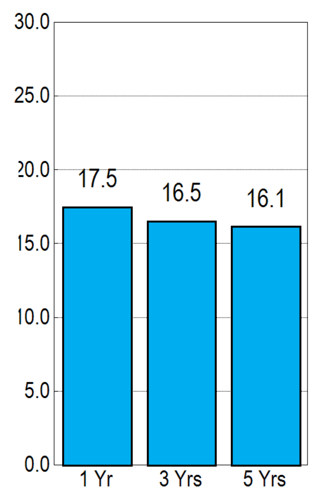


	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)
PanAgora	26.2	8.3	7.9	--
Russell 2000	*25.5*	*8.6*	*8.2*	*11.8*
eV US Small Cap Core Equity Net Median	*24.3*	*8.2*	*8.5*	*12.1*
eV US Small Cap Core Equity Net Rank	*35*	*48*	*60*	*--*



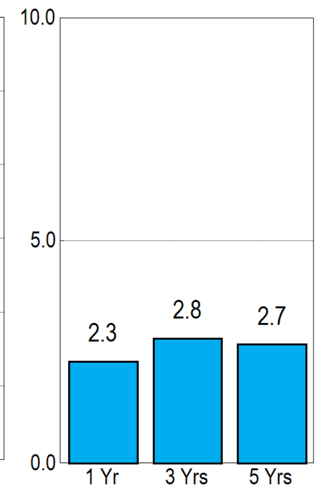
Anzld. Std. Deviation

PanAgora



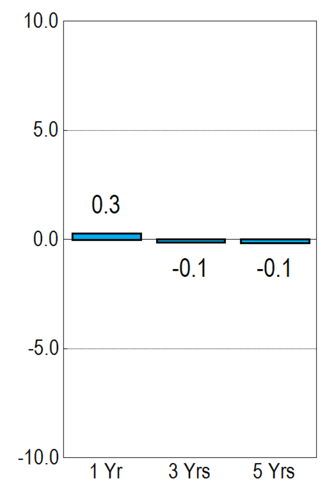
Tracking Error

PanAgora



Information Ratio

PanAgora



Account Information

Account Name	**PanAgora**
Account Structure	**Commingled Fund**
Investment Style	**Active**
Inception Date	**9/30/13**
Account Type	**US Stock Small Cap Core**
Benchmark	**Russell 2000**
Universe	**eV US Small Cap Core Equity Net**

Account Characteristics

	Portfolio Q4-19	Index Q4-19
Characteristics		
Weighted Avg. Market Cap. ($B)	2.5	2.5
Median Market Cap ($B)	0.8	0.8
P/E Ratio	18.0	19.8
Yield	1.4	1.4
EPS Growth - 5 Yrs.	9.3	9.3
Price to Book	2.5	2.5
Beta (holdings; domestic)	1.2	1.2

Sector Distribution

	Portfolio Q4-19	Index Q4-19
Sector Distribution		
Energy	4.0	3.1
Materials	3.1	3.9
Industrials	16.1	15.8
Consumer Discretionary	12.2	10.9
Consumer Staples	5.1	3.0
Health Care	19.8	18.2
Financials	18.7	17.7
Information Technology	10.1	13.6
Communication Services	2.5	2.3
Utilities	3.6	3.7
Real Estate	4.4	7.8

Top Holdings

FIVE9	1.4%
PORTLAND GEN.ELEC.	1.4%
PNM RESOURCES	1.3%
SKYWEST	1.2%
DECKERS OUTDOOR	1.2%
INSIGHT ENTS.	1.1%
SUNSTONE HTL.INVRS.	1.1%
INTERNATIONAL BCSH.	1.0%
PERFORMANCE FOOD GROUP	1.0%
UNITED COMMUNITY BANKS	1.0%

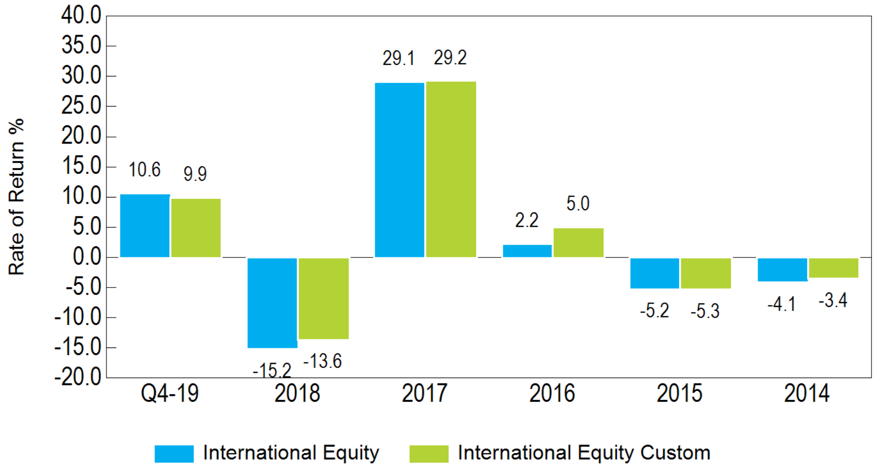
Best Performers

	Return %
CHEMOCENTRYX	483.3%
MERSANA THERAPEUTICS	262.7%
ARQULE	178.4%
CLOVIS ONCOLOGY	165.3%
DERMIRA	137.2%
MOLECULAR TEMPLATES	112.2%
IMMUNOGEN	111.0%
RECRO PHARMA	84.5%
OSMOTICA PHARMACEUTICALS	82.0%
COLLEGIUM PHARMACEUTICAL	79.3%

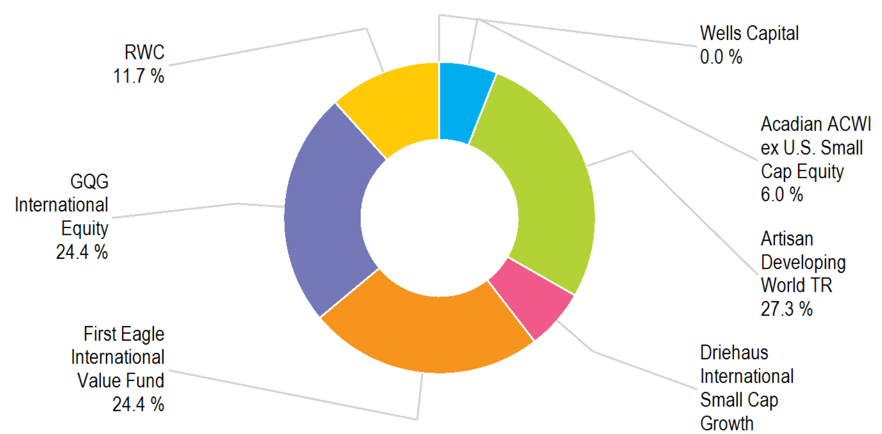
Worst Performers

	Return %
LSC COMMUNICATIONS	-85.1%
UNIT	-79.4%
CYCLERION THERAPEUTICS	-77.6%
AKORN	-60.5%
SPECTRUM PHARMS.	-56.1%
SMILEDIRECTCLUB A	-37.0%
FOSSIL GROUP	-37.0%
MODINE MANUFACTURING	-32.3%
IDT 'B'	-31.5%
LEE ENTERPRISES	-30.4%

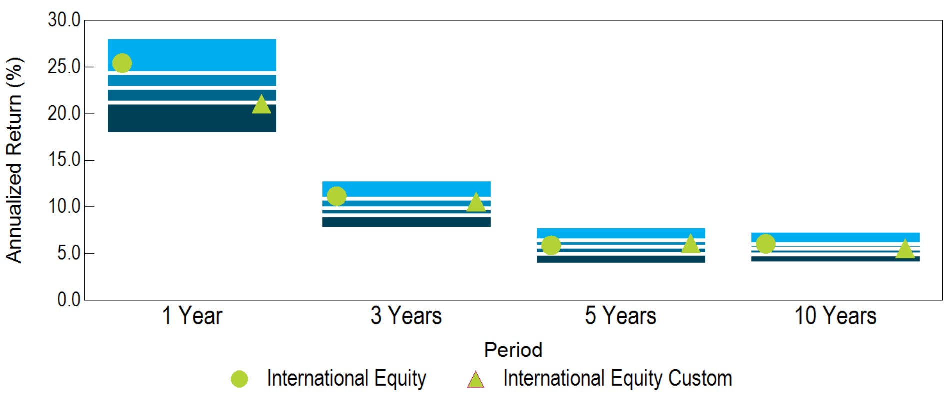
Return Summary

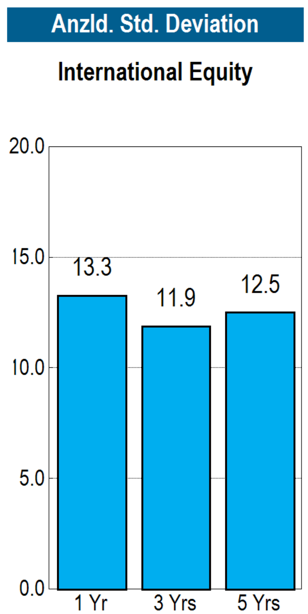


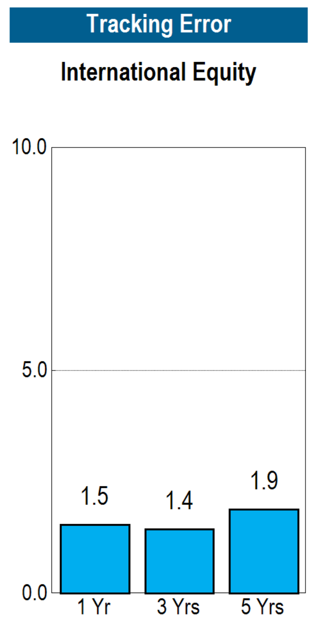
Current Allocation

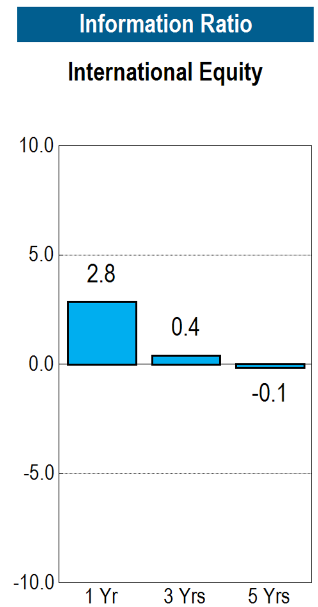


	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)
International Equity	**25.4**	**11.2**	**5.9**	**6.0**
International Equity Custom	*21.0*	*10.6*	*6.1*	*5.6*
InvMetrics All DB ex-US Eq Net Median	*22.8*	*9.9*	*5.8*	*5.5*
InvMetrics All DB ex-US Eq Net Rank	*17*	*24*	*43*	*28*









International Equity Characteristics vs MSCI ACWI ex USA	Portfolio Q4-19	Index Q4-19
Characteristics		
Weighted Avg. Market Cap. ($B)	80.3	74.1
Median Market Cap ($B)	0.6	8.2
P/E Ratio	19.2	16.3
Yield	2.0	3.0
EPS Growth - 5 Yrs.	14.5	9.1
Price to Book	3.1	2.4
Beta (holdings; domestic)	1.0	1.0

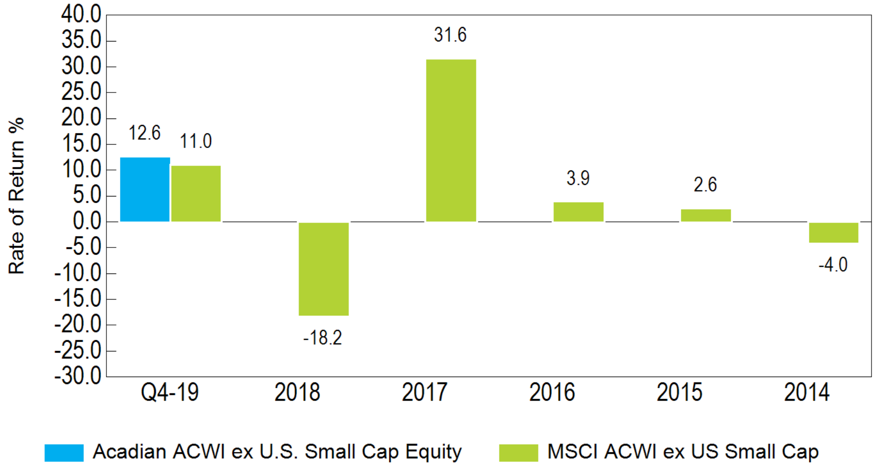
International Equity Sector Distribution vs MSCI ACWI ex USA	Portfolio Q4-19	Index Q4-19
Sector Distribution		
Energy	1.5	6.5
Materials	9.5	7.4
Industrials	6.0	12.0
Consumer Discretionary	9.6	11.8
Consumer Staples	7.3	9.4
Health Care	6.6	8.8
Financials	13.8	21.5
Information Technology	12.3	9.3
Communication Services	6.9	6.6
Utilities	1.1	3.4
Real Estate	6.2	3.2

Top Holdings	
CASH - USD	8.5%
HOA PHAT GROUP	4.5%
VINCOM RETAIL	4.3%
MISCELLANEOUS SECURITIES	3.7%
ALIBABA GROUP HOLDING ADR 1:8	2.4%
GOLD-PHYSICAL	2.2%
HDFC BANK ADR 1:3	2.2%
VISA 'A'	1.6%
NVIDIA	1.4%
NESTLE 'N'	1.3%

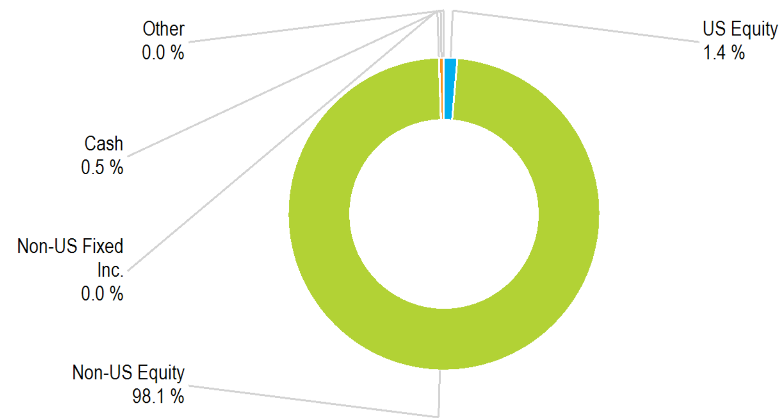
Best Performers	Return %
AUGEAN	114.0%
WAH SEONG CORPORATION	101.4%
CSU CARDSYSTEM ON	100.3%
SING TAO NEWS	100.0%
DART GROUP	99.4%
UCHIDA YOKO	90.5%
CROPENERGIES	84.3%
ZYMEWORKS (NYS)	83.3%
MCBRIDE	82.9%
OSMOTICA PHARMACEUTICALS	82.0%

Worst Performers	Return %
TULLOW OIL	-67.8%
TORSTAR 'B'	-48.9%
REITMANS (CANADA) 'A'	-48.5%
SMARTGROUP CORPORATION	-40.8%
JIANPU TECHNOLOGY ADR 2:5	-40.4%
ARCELORMITTAL SA.	-39.7%
MEDICAL FACILITIES	-37.6%
JUMBO INTERACTIVE	-35.8%
QUDIAN ADR 1:1	-31.6%
ADCORP	-31.4%

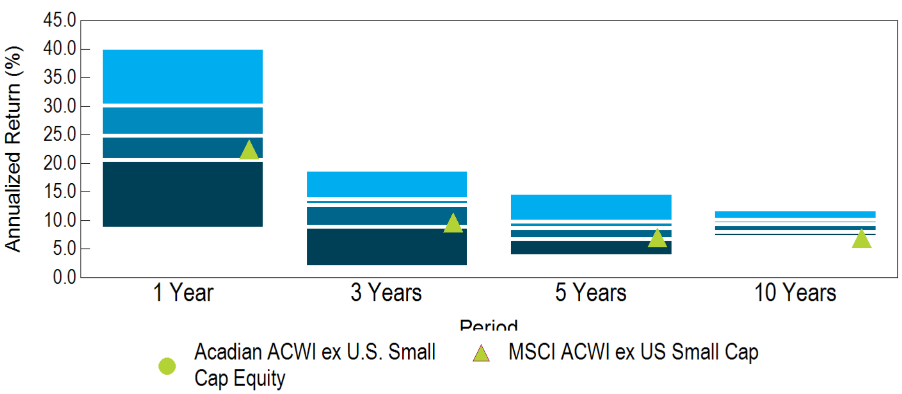
Return Summary



Current Allocation



	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)
Acadian ACWI ex U.S. Small Cap Equity	--	--	--	--
MSCI ACWI ex US Small Cap	*22.4*	*9.6*	*7.0*	*6.9*
eV ACWI ex-US Small Cap Equity Net Median	*24.9*	*12.8*	*8.8*	*9.4*
eV ACWI ex-US Small Cap Equity Net Rank	--	--	--	--



Acadian ACWI ex U.S. Small Cap Equity | As of December 31, 2019

Account Information

Account Name	**Acadian ACWI ex U.S. Small Cap Equity**
Account Structure	**Commingled Fund**
Investment Style	**Active**
Inception Date	**5/01/19**
Account Type	**International**
Benchmark	**MSCI ACWI ex US Small Cap**
Universe	**eV ACWI ex-US Small Cap Equity Net**

Account Characteristics

	Portfolio Q4-19	Index Q4-19
Characteristics		
Weighted Avg. Market Cap. ($B)	2.1	2.8
Median Market Cap ($B)	0.3	1.1
P/E Ratio	12.1	17.2
Yield	2.9	2.5
EPS Growth - 5 Yrs.	14.2	10.7
Price to Book	2.1	2.2
Beta (holdings; domestic)	1.0	0.9

Sector Distribution

	Portfolio Q4-19	Index Q4-19
Sector Distribution		
Energy	2.4	3.5
Materials	8.5	9.7
Industrials	15.3	21.1
Consumer Discretionary	12.7	12.1
Consumer Staples	1.4	5.9
Health Care	7.5	6.9
Financials	16.2	10.6
Information Technology	18.1	9.7
Communication Services	5.3	4.4
Utilities	0.9	2.7
Real Estate	6.9	13.2

Top Holdings

CANADIAN WESTERN BANK	1.6%
BOYD GROUP INCOME	1.5%
IA FINANCIAL	1.4%
BRP	1.2%
QUEBECOR 'B'	1.2%
ASR NEDERLAND	1.1%
QILIANSHAN ORD A	1.1%
UNIPOL GRUPPO FINANZIARI	1.0%
PHOENIX GROUP HDG.	0.9%
CYBER ARK SOFTWARE	0.9%

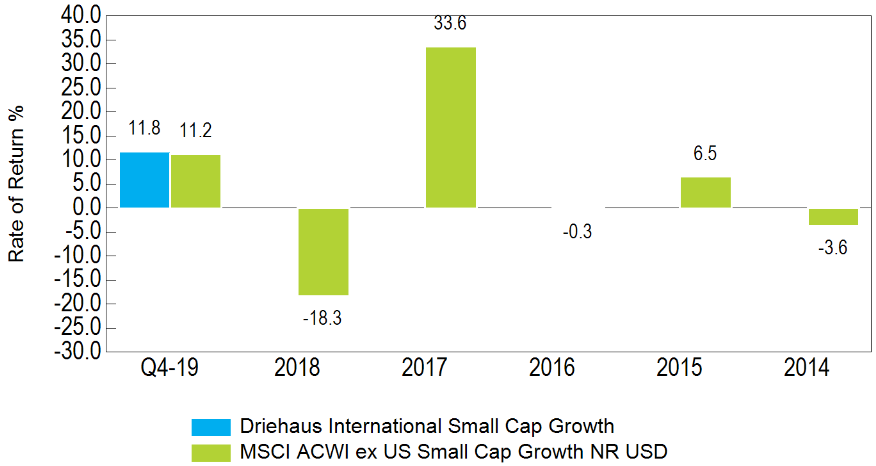
Best Performers

	Return %
AUGEAN	114.0%
WAH SEONG CORPORATION	101.4%
CSU CARDSYSTEM ON	100.3%
SING TAO NEWS	100.0%
DART GROUP	99.4%
UCHIDA YOKO	90.5%
CROPENERGIES	84.3%
ZYMEWORKS (NYS)	83.3%
MCBRIDE	82.9%
OSMOTICA PHARMACEUTICALS	82.0%

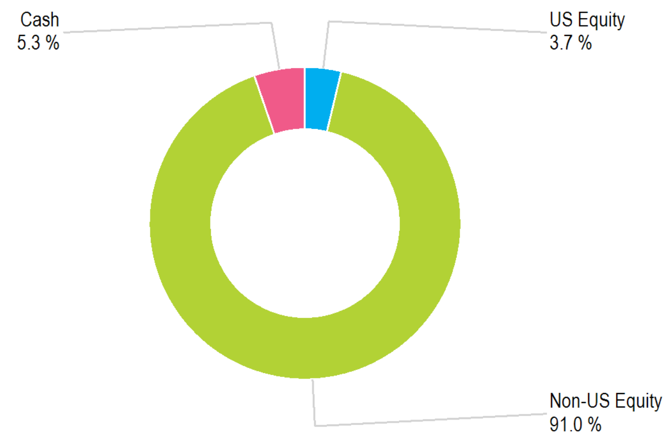
Worst Performers

	Return %
TORSTAR 'B'	-48.9%
REITMANS (CANADA) 'A'	-48.5%
SMARTGROUP CORPORATION	-40.8%
ARCELORMITTAL SA.	-39.7%
MEDICAL FACILITIES	-37.6%
JUMBO INTERACTIVE	-35.8%
QUDIAN ADR 1:1	-31.6%
ADCORP	-31.4%
XIWANG SPECIAL STEEL CO.	-30.6%
JUST ENERGY GROUP	-29.1%

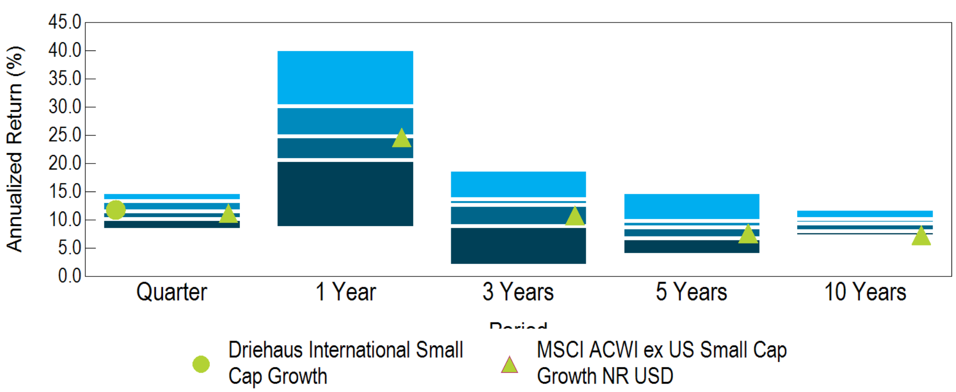
Return Summary



Current Allocation



	3 Mo (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)
Driehaus International Small Cap Growth	11.8	--	--	--	--
MSCI ACWI ex US Small Cap Growth NR USD	*11.2*	*24.6*	*10.8*	*7.6*	*7.3*
eV ACWI ex-US Small Cap Equity Net Median	*11.6*	*24.9*	*12.8*	*8.8*	*9.4*
eV ACWI ex-US Small Cap Equity Net Rank	*46*	--	--	--	--



Account Information

Account Name	**Driehaus International Small Cap Growth**
Account Structure	**Commingled Fund**
Investment Style	**Active**
Inception Date	**5/01/19**
Account Type	**International**
Benchmark	**MSCI ACWI ex US Small Cap Growth NR USD**
Universe	**eV ACWI ex-US Small Cap Equity Net**

Account Characteristics

	Portfolio Q4-19	Index Q4-19
Characteristics		
Weighted Avg. Market Cap. ($B)	4.5	2.8
Median Market Cap ($B)	3.8	1.1
P/E Ratio	25.0	17.2
Yield	3.4	2.5
EPS Growth - 5 Yrs.	12.4	10.7
Price to Book	3.3	2.2
Beta (holdings; domestic)	0.8	0.9

Sector Distribution

	Portfolio Q4-19	Index Q4-19
Sector Distribution		
Energy	3.5	3.5
Materials	5.2	9.7
Industrials	21.2	21.1
Consumer Discretionary	12.7	12.1
Consumer Staples	6.9	5.9
Health Care	10.3	6.9
Financials	5.8	10.6
Information Technology	18.7	9.7
Communication Services	5.4	4.4
Utilities	0.0	2.7
Real Estate	3.9	13.2

Top Holdings

NORTHERN INSTITUTIONAL U.S. GOVERNMENT SELECT PORTFOLIO	5.3%
PARKLAND FUEL	1.9%
TEAMVIEWER (WBO)	1.7%
LEONARDO	1.6%
SQUARE ENIX HOLDINGS	1.5%
CAE	1.5%
SUL AMERICA UNITS	1.5%
TOKYO TATEMONO	1.5%
GREGGS	1.5%
SERCO GROUP	1.4%

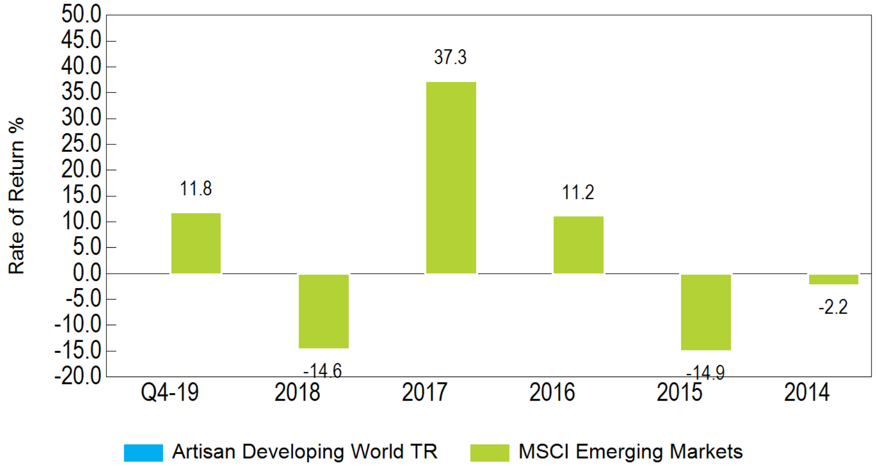
Best Performers

	Return %
LASERTEC	64.0%
NICHIAS	44.9%
ASCENDIS PHARMA ADR 1:1	44.4%
KOBE BUSSAN	43.3%
KELT EXPLORATION	42.9%
CKD	42.4%
ARGENX	42.0%
WH SMITH	40.7%
TEAMVIEWER (WBO)	37.5%
M&A CAPITAL PARTNERS	36.0%

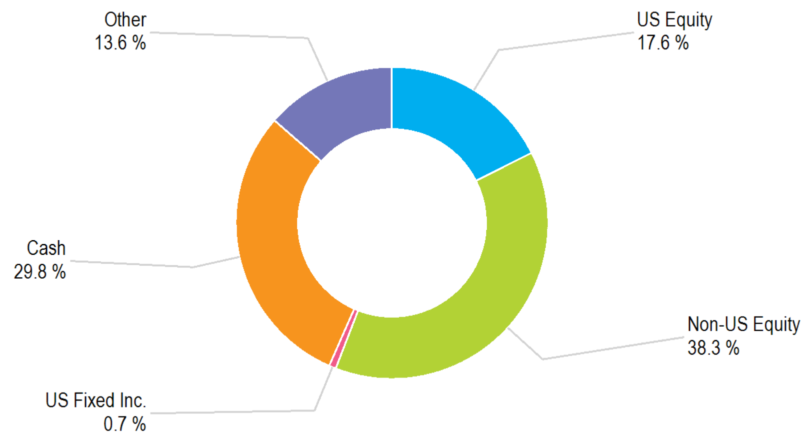
Worst Performers

	Return %
EMPIRE 'A'	-13.0%
OCI	-10.9%
BK BRA.OPEAS.A RTR. ON	-10.7%
RHEINMETALL	-9.9%
SG HOLDINGS	-7.5%
STOCK SPIRITS GROUP	-4.7%
NET ONE SYSTEMS	-4.5%
UBISOFT ENTM.	-4.4%
YOKOGAWA ELECTRIC	-3.0%
DINO POLSKA SA	-2.9%

Return Summary



Current Allocation



	3 Mo (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)
RWC	--	--	--	--	--
MSCI Emerging Markets	--	--	--	--	--

Artisan Developing World TR | As of December 31, 2019

Account Information	
Account Name	**Artisan Developing World TR**
Account Structure	**Commingled Fund**
Investment Style	**Active**
Inception Date	**12/01/19**
Account Type	**International Emerging Stocks**
Benchmark	**MSCI Emerging Markets**
Universe	

Account Characteristics	Portfolio Q4-19	Index Q4-19
Characteristics		
Weighted Avg. Market Cap. ($B)	139.5	106.2
Median Market Cap ($B)	25.5	5.9
P/E Ratio	36.9	15.0
Yield	0.5	2.7
EPS Growth - 5 Yrs.	27.3	13.1
Price to Book	10.7	2.6
Beta (holdings; domestic)	1.2	1.1

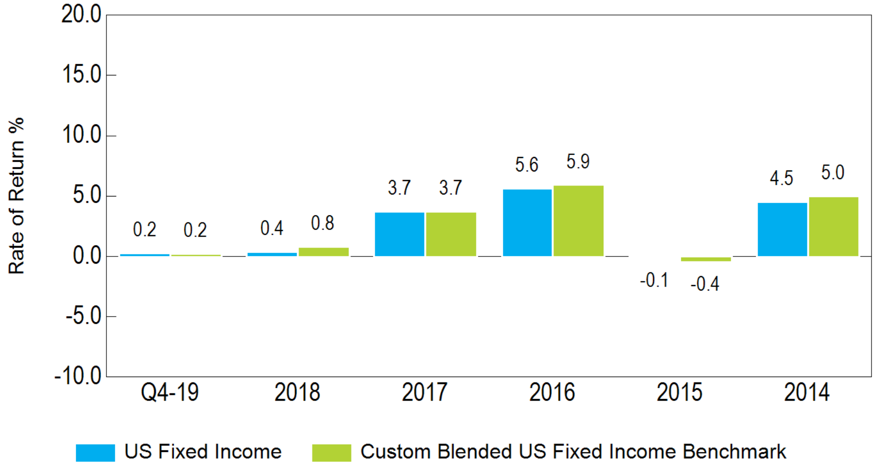
Sector Distribution	Portfolio Q4-19	Index Q4-19
Sector Distribution		
Energy	0.0	7.4
Materials	0.0	7.3
Industrials	0.0	5.3
Consumer Discretionary	15.3	14.3
Consumer Staples	6.3	6.2
Health Care	1.9	2.7
Financials	8.1	24.5
Information Technology	12.7	15.6
Communication Services	10.8	11.0
Utilities	0.0	2.6
Real Estate	0.0	3.0

Top Holdings	
ALIBABA GROUP HOLDING ADR 1:8	7.8%
HDFC BANK ADR 1:3	7.6%
SEA 'A' SPN.ADR 1:1	7.5%
MERCADOLIBRE	6.9%
TAL EDUCATION GROUP CL.A ADR 3:1	6.6%
AIA GROUP (OTC)	6.6%
ADYEN UNSPONSORED NETHERL 50 ADR 50:1	6.6%
NVIDIA	6.6%
TENCENT HOLDINGS (OTC)	6.1%
VISA 'A'	6.1%

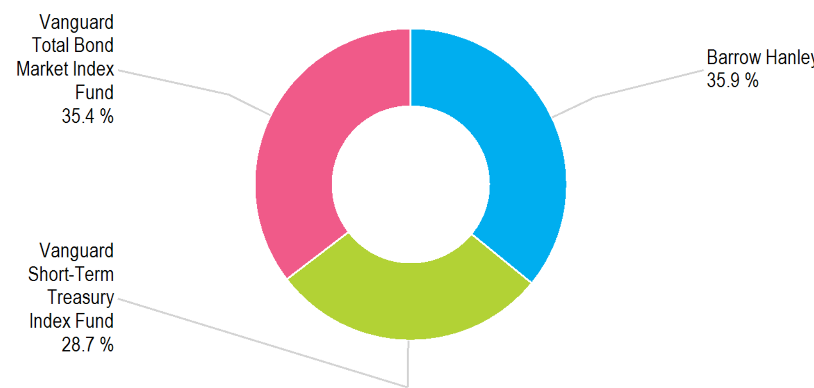
Best Performers	Return %
TAL EDUCATION GROUP CL.A ADR 3:1	40.8%
NVIDIA	35.3%
SEA 'A' SPN.ADR 1:1	30.0%
ALIBABA GROUP HOLDING ADR 1:8	26.8%
YANDEX	24.2%
HUAZHU GROUP ADR 1:1	21.4%
NETFLIX	20.9%
ASML HLDG.ADR 1:1	19.6%
RAIA DROGASIL ADR 1:1	16.8%
TENCENT HOLDINGS (OTC)	15.7%

Worst Performers	Return %
ARCO PLATFORM A	-12.8%
VEEVA SYSTEMS CL.A	-7.9%
REMY COINT.UNSP. FRN.ADR 10:1	-7.9%
CP ALL FB	-5.5%
DNP SELECT INCOME FUND	0.8%
DIAGEO (OTC)	1.7%
MERCADOLIBRE	3.8%
ESTEE LAUDER COS.'A'	4.1%
HERMES INTL. (OTC)	8.2%
VISA 'A'	9.4%

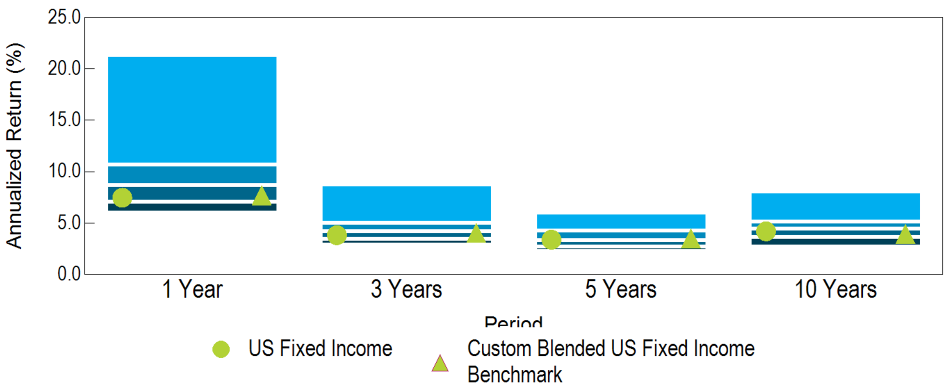
Return Summary



Current Allocation

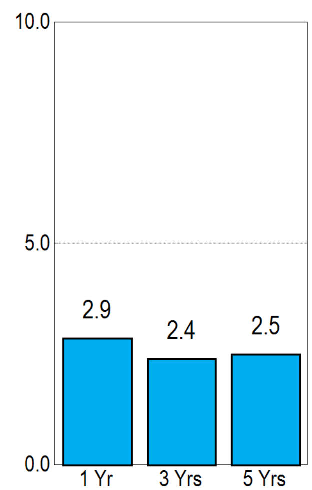


	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)
US Fixed Income	**7.5**	**3.8**	**3.4**	**4.2**
Custom Blended US Fixed Income Benchmark	*7.7*	*4.0*	*3.5*	*3.9*
InvMetrics All DB US Fix Inc Net Median	*8.7*	*4.2*	*3.4*	*4.5*
InvMetrics All DB US Fix Inc Net Rank	*71*	*68*	*52*	*61*



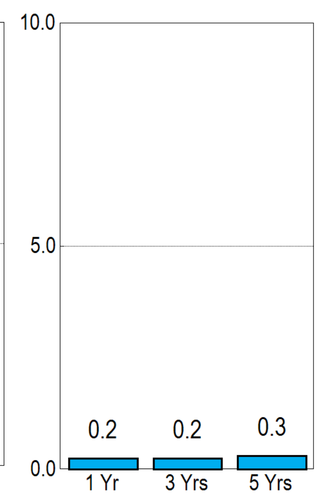
Anzld. Std. Deviation

US Fixed Income



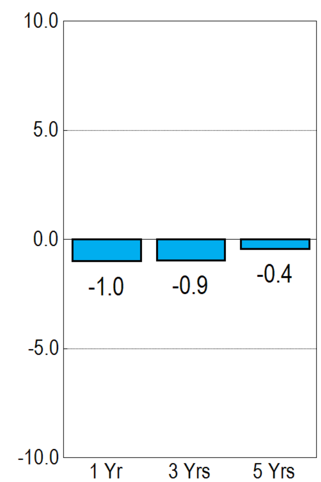
Tracking Error

US Fixed Income



Information Ratio

US Fixed Income

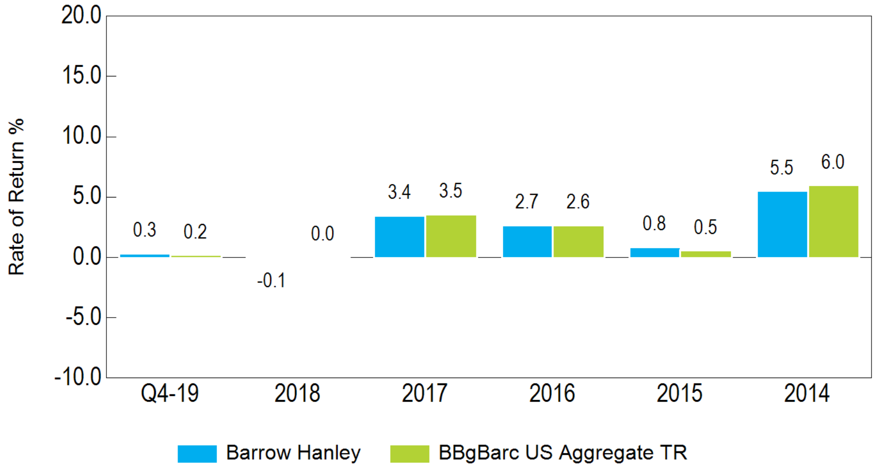


US Fixed Income Fixed Income Characteristics vs. BBgBarc US Aggregate TR	Portfolio Q4-19	Index Q4-19	Portfolio Q3-19	Index Q3-19
Fixed Income Characteristics				
Yield to Maturity	2.13	2.31	2.13	2.27
Average Duration	4.88	6.32	4.81	6.32
Average Quality	AA	AA	AA	AA
Weighted Average Maturity	8.11	13.12	8.14	13.11

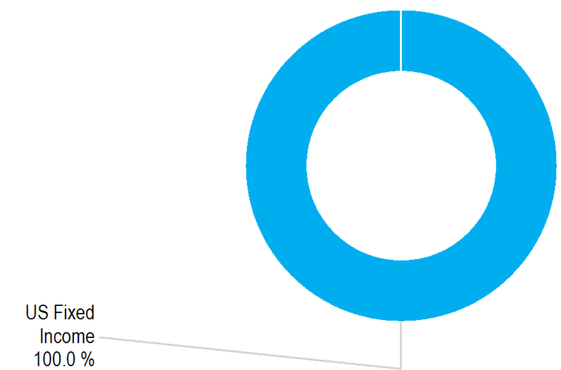
US Fixed Income Fixed Income Duration vs. BBgBarc US Aggregate TR	Portfolio Q4-19	Index Q4-19	Portfolio Q3-19	Index Q3-19
Credit Quality Allocation				
AAA	73.85	72.03	74.51	71.98
AA	2.54	3.38	2.52	3.46
A	10.70	10.78	10.27	10.68
BBB	12.91	13.80	12.71	13.86

US Fixed Income Fixed Income Sector Allocation vs. BBgBarc US Aggregate TR	Portfolio Q4-19	Index Q4-19	Portfolio Q3-19	Index Q3-19
US Sector Allocation				
UST/Agency	47.60	42.06	52.10	42.29
Corporate	23.80	25.05	23.06	25.15
MBS	20.41	29.14	19.50	28.87
ABS	2.66	0.45	2.41	0.45
Foreign	1.71	2.34	2.36	2.31
Muni	0.65	0.95	--	0.93
Other	--	--	0.02	--
Cash	3.18	--	0.54	--

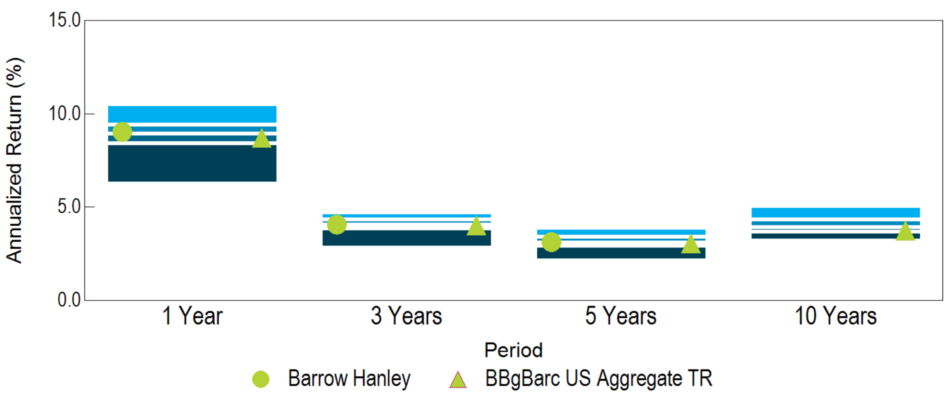
Return Summary



Current Allocation

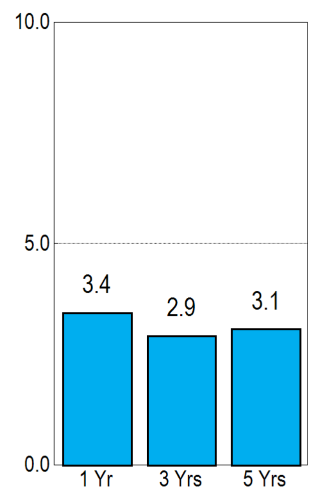


	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)
Barrow Hanley	9.0	4.1	3.1	--
BBgBarc US Aggregate TR	*8.7*	*4.0*	*3.0*	*3.7*
eV US Core Fixed Inc Net Median	*9.0*	*4.1*	*3.1*	*4.0*
eV US Core Fixed Inc Net Rank	*50*	*55*	*53*	*--*



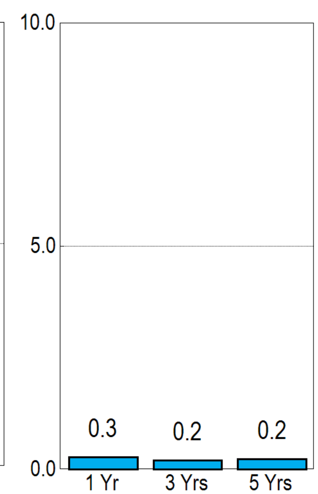
Anzld. Std. Deviation

Barrow Hanley



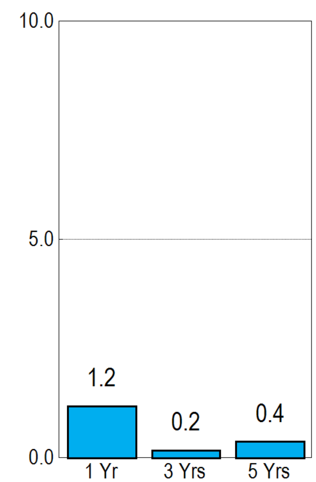
Tracking Error

Barrow Hanley



Information Ratio

Barrow Hanley



Account Information	
Account Name	**Barrow Hanley**
Account Structure	**Separate Account**
Investment Style	**Active**
Inception Date	**3/31/10**
Account Type	**US Fixed Income Core**
Benchmark	**BBgBarc US Aggregate TR**
Universe	**eV US Core Fixed Inc Net**

Fixed Income Characteristics		
	Portfolio Q4-19	Index Q4-19
Fixed Income Characteristics		
Yield to Maturity	2.37	2.31
Average Duration	5.77	6.32
Average Quality	AA	AA
Weighted Average Maturity	7.92	13.12

Fixed Income Characteristics		
	Portfolio Q4-19	Index Q4-19
Credit Quality Allocation		
AAA	59.12	72.03
AA	3.70	3.38
A	18.60	10.78
BBB	18.58	13.80

Description:

The investment seeks to track the performance of a market-weighted Treasury index with a short-term dollar-weighted average maturity.
The fund employs an indexing investment approach designed to track the performance of the Bloomberg Barclays US Treasury 1-3 Year Bond Index. This index includes fixed income securities issued by the U.S. Treasury (not including inflation-protected securities), all with maturities between 1 and 3 years. At least 80% of the fund's assets will be invested in bonds included in the index.

Portfolio Fund Information as of December 31, 2019	
Ticker	VSBIX
Morningstar Category	Short Government
Average Market Cap ($mm)	
Net Assets ($mm)	1,090.69
% Assets in Top 10 Holdings	23.62
Total Number of Holdings	98
Manager Name	Joshua C. Barrickman
Manager Tenure	7
Expense Ratio	0.05%
Closed to New Investors	No

Top Holdings as of December 31, 2019	
UNITED STATES TREASURY NOTES 1.5%	2.65%
UNITED STATES TREASURY NOTES 2.25%	2.52%
UNITED STATES TREASURY NOTES 1.75%	2.48%
UNITED STATES TREASURY NOTES 2.62%	2.43%
UNITED STATES TREASURY NOTES 1.62%	2.38%
UNITED STATES TREASURY NOTES 1.62%	2.29%
UNITED STATES TREASURY NOTES 1.38%	2.28%
UNITED STATES TREASURY NOTES 1.25%	2.22%
UNITED STATES TREASURY NOTES 2.88%	2.19%
UNITED STATES TREASURY NOTES 1.88%	2.18%

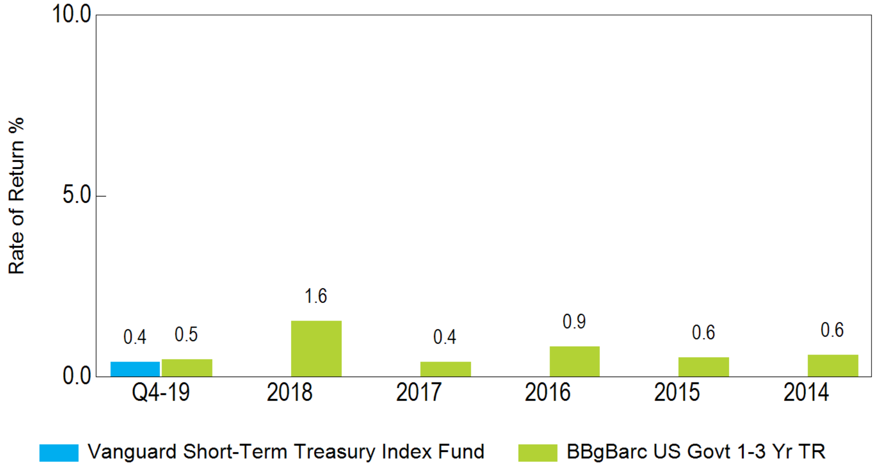
Fund Characteristics as of December 31, 2019	
Sharpe Ratio (3 Year)	
Average Duration	1.92
Effective Duration	1.92
Modified Duration	
Average Coupon	1.97%
Average Effective Maturity	2.00
R-Squared (3 Year)	
Alpha (3 Year)	
Beta (3 Year)	

Maturities as of December 31, 2019	
1 to 3 Years	98.31%
3 to 5 Years	1.33%
5 to 7 Years	0.00%
7 to 10 Years	0.00%
10 to 15 Years	0.00%
15 to 20 Years	0.00%
20 to 30 Years	0.00%
Greater than 30 Years	0.00%

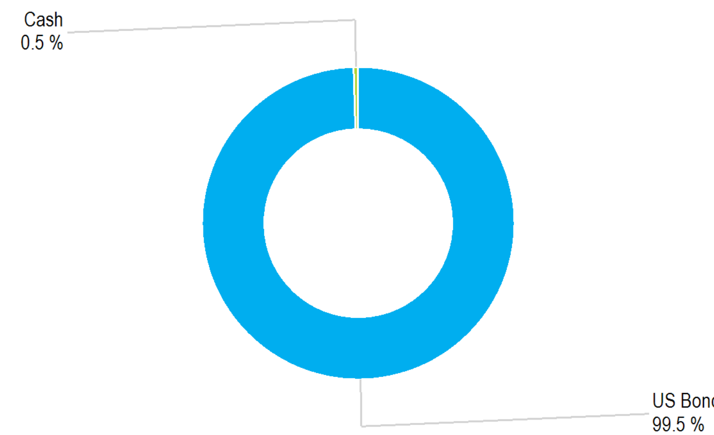
Fixed Income Sectors as of December 31, 2019	
GOVERNMENT	99.52%
MUNICIPAL	0.00%
CORPORATE	0.00%
SECURITIZED	0.00%
CASH & EQUIVALENTS	0.48%
DERIVATIVE	0.00%

Credit Quality as of November 30, 2019	
AAA	96.63%
AA	0.00%
A	0.00%
BBB	3.37%
BB	0.00%
B	0.00%
Below B	0.00%
Not Rated	0.00%

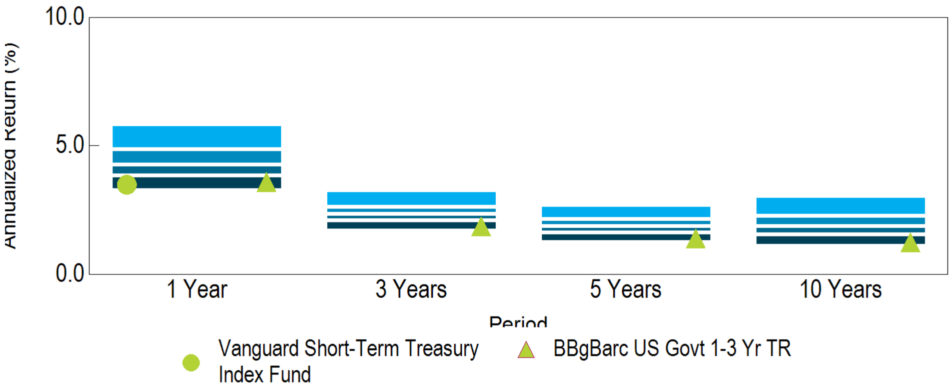
Return Summary



Mutual Fund Allocation as of December 31, 2019

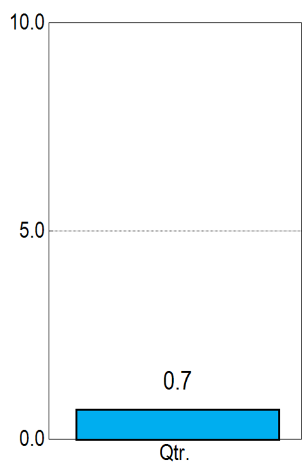


	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)
Vanguard Short-Term Treasury Index Fund	3.5	--	--	--
BBgBarc US Govt 1-3 Yr TR	*3.6*	*1.9*	*1.4*	*1.2*
eV US Short Duration Fixed Inc Net Median	*4.3*	*2.4*	*1.9*	*1.9*
eV US Short Duration Fixed Inc Net Rank	*90*	*--*	*--*	*--*



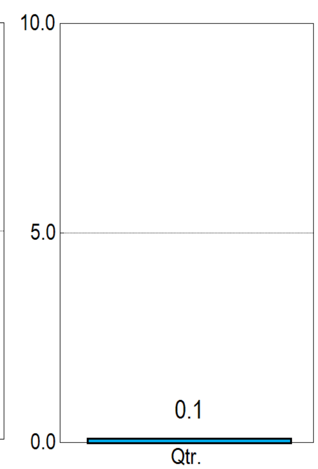
Anzld. Std. Deviation

Vanguard Short-Term Treasury Index Fund



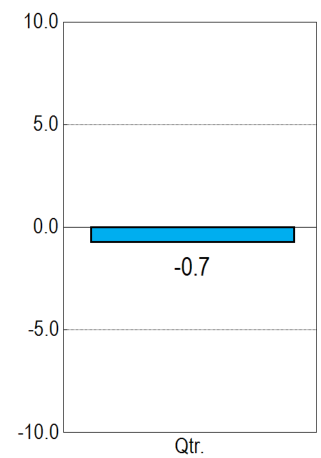
Tracking Error

Vanguard Short-Term Treasury Index Fund

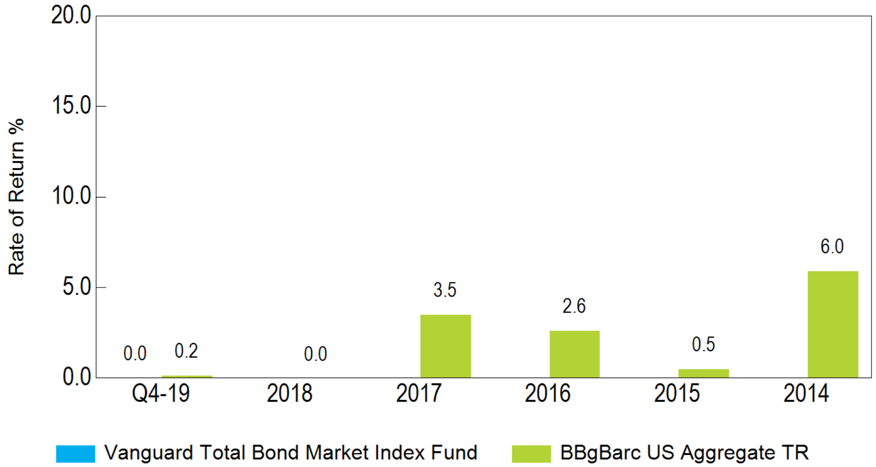


Information Ratio

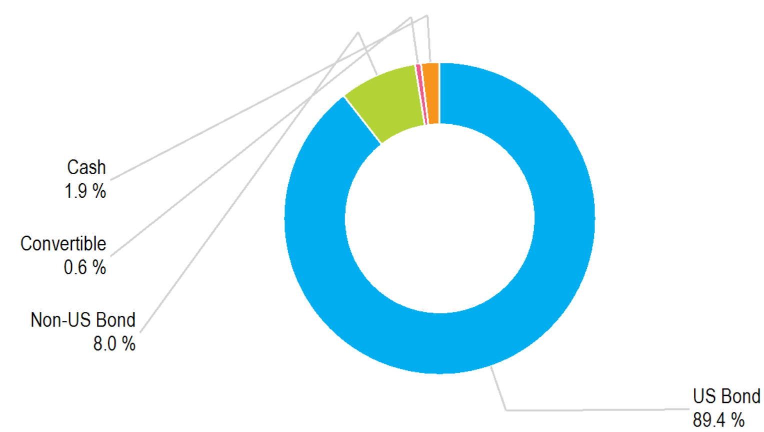
Vanguard Short-Term Treasury Index Fund



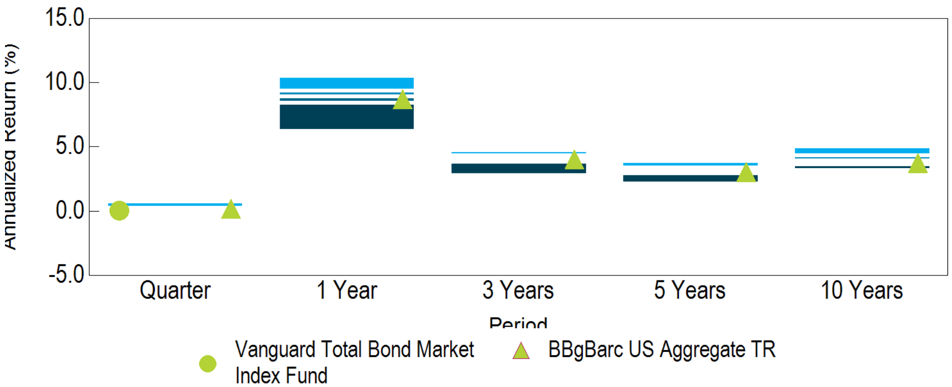
Return Summary



Mutual Fund Allocation as of December 31, 2019



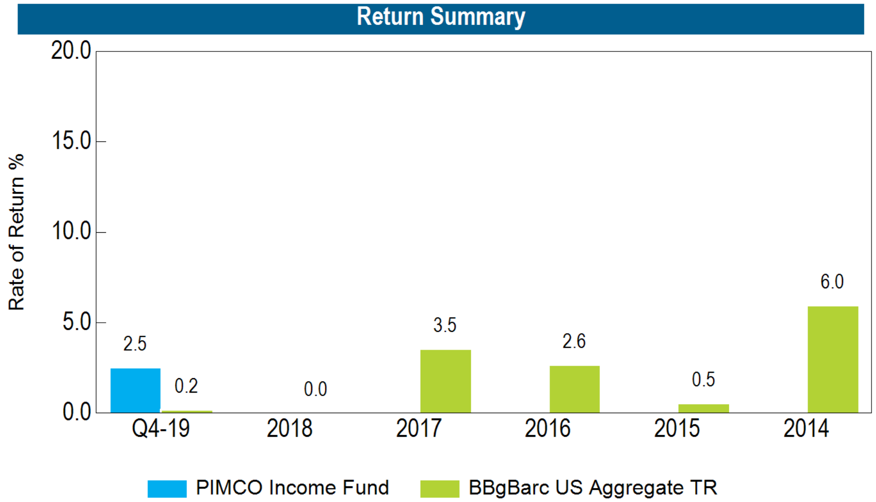
	3 Mo (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)
Vanguard Total Bond Market Index Fund	0.0	--	--	--	--
BBgBarc US Aggregate TR	*0.2*	*8.7*	*4.0*	*3.0*	*3.7*
eV US Core Fixed Inc Net Median	*0.2*	*9.0*	*4.1*	*3.1*	*4.0*
eV US Core Fixed Inc Net Rank	*71*	--	--	--	--

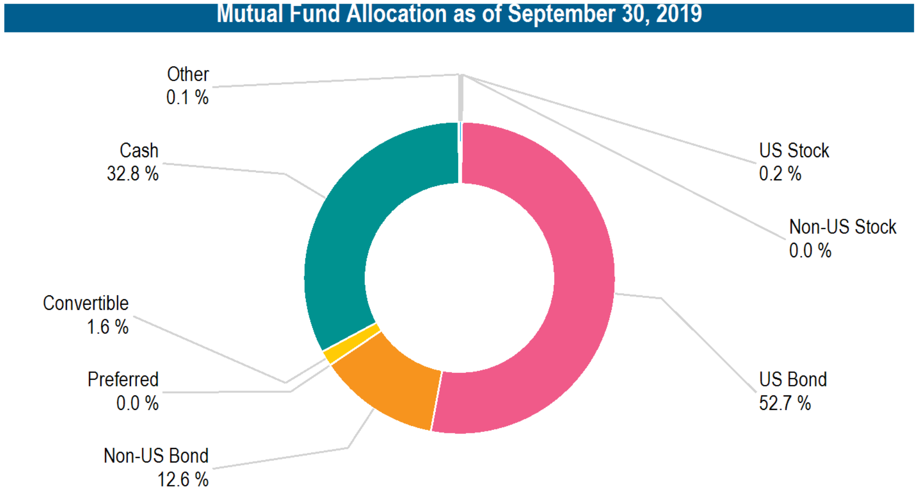


Account Information	
Account Name	**Vanguard Total Bond Market Index Fund**
Account Structure	**Mutual Fund**
Investment Style	**Passive**
Inception Date	**5/01/19**
Account Type	**US Fixed Income**
Benchmark	**BBgBarc US Aggregate TR**
Universe	**eV US Core Fixed Inc Net**

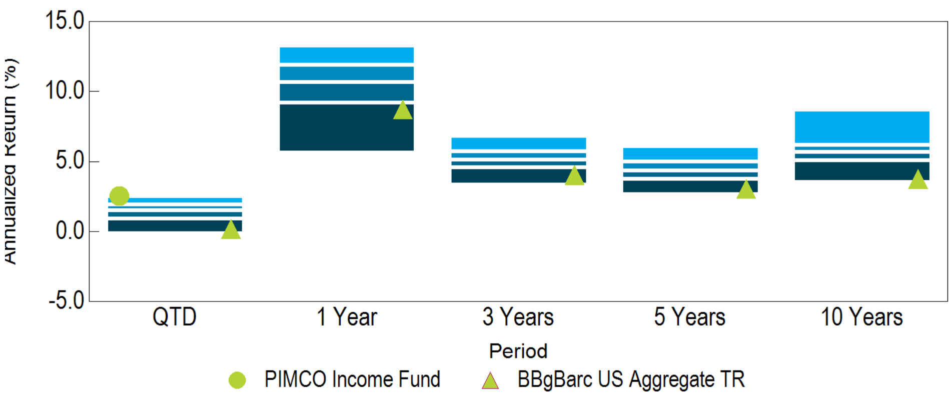
Fixed Income Characteristics	Portfolio	Index
	Q4-19	Q4-19
Fixed Income Characteristics		
Yield to Maturity	2.30	2.31
Average Duration	6.22	6.32
Average Quality	AA	AA
Weighted Average Maturity	8.30	13.12

Fixed Income Characteristics	Portfolio	Index
	Q4-19	Q4-19
Credit Quality Allocation		
AAA	67.55	72.03
AA	3.43	3.38
A	11.37	10.78
BBB	17.65	13.80





	3 Mo (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)
PIMCO Income Fund	2.5	--	--	--	--
BBgBarc US Aggregate TR	*0.2*	*8.7*	*4.0*	*3.0*	*3.7*
Multisector Bond MStar MF Median	*1.5*	*10.7*	*5.1*	*4.4*	*5.7*
Multisector Bond MStar MF Rank	*5*	--	--	--	--

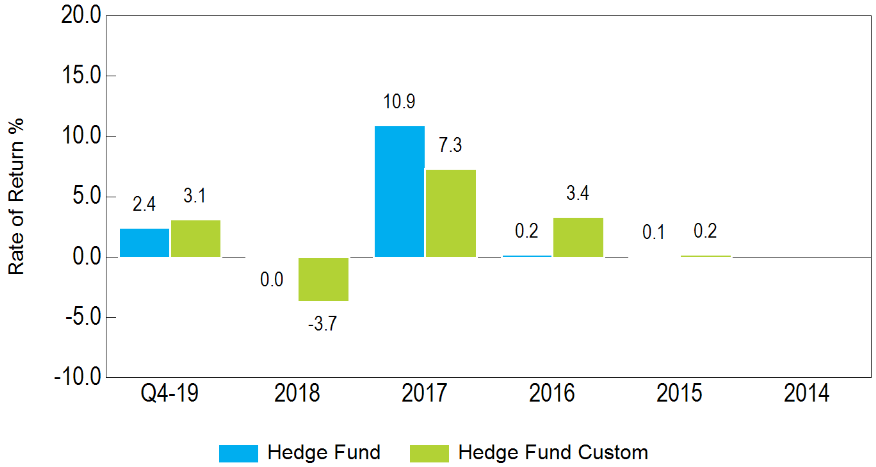


Account Information	
Account Name	**PIMCO Income Fund**
Account Structure	**Mutual Fund**
Investment Style	**Active**
Inception Date	**4/30/19**
Account Type	**Client Directed Opportunistic**
Benchmark	**BBgBarc US Aggregate TR**
Universe	**Multisector Bond MStar MF**

Fixed Income Characteristics		
	Portfolio	Index
	Q4-19	Q4-19
Fixed Income Characteristics		
Yield to Maturity	--	2.31
Average Duration	0.91	6.32
Average Quality	BBB	AA
Weighted Average Maturity	--	13.12

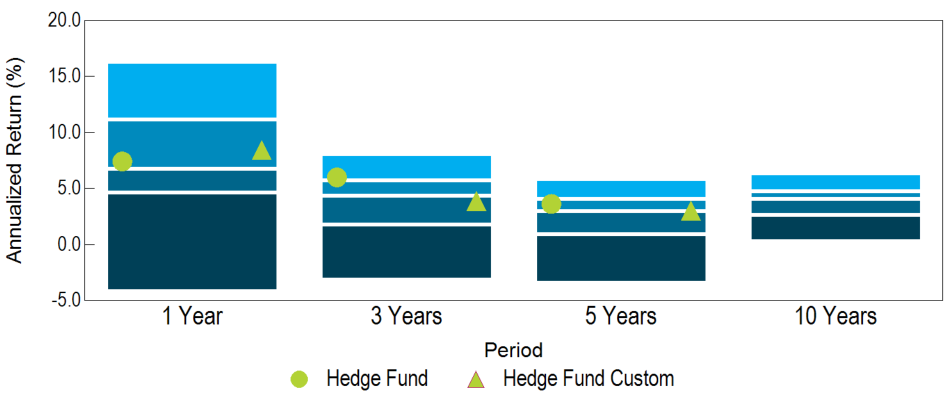
Fixed Income Characteristics		
	Portfolio	Index
	Q4-19	Q4-19
Credit Quality Allocation		
AAA	37.80	72.03
AA	5.50	3.38
A	7.60	10.78
BBB	9.30	13.80
BB	9.70	--
B	16.40	--
CCC	13.70	--

Return Summary

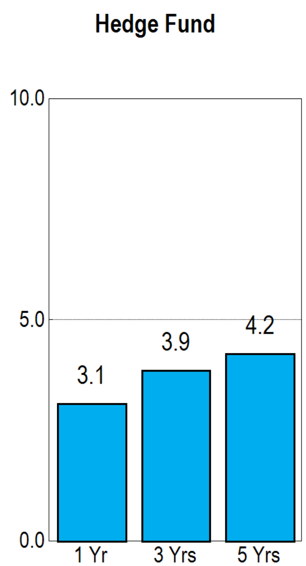


Current Allocation

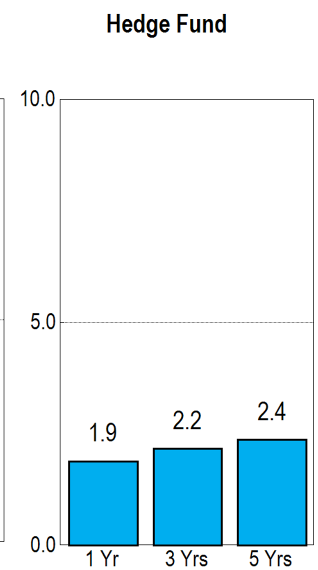
	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)
Hedge Fund	**7.4**	**6.0**	**3.6**	--
Hedge Fund Custom	*8.4*	*3.9*	*3.0*	--
InvMetrics All DB Hedge Funds Net Median	*6.8*	*4.4*	*3.0*	*4.1*
InvMetrics All DB Hedge Funds Net Rank	*46*	*22*	*36*	--



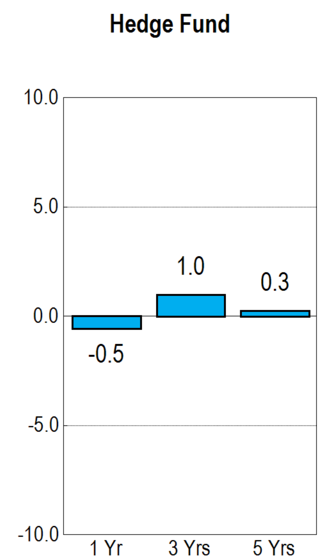
Anzld. Std. Deviation



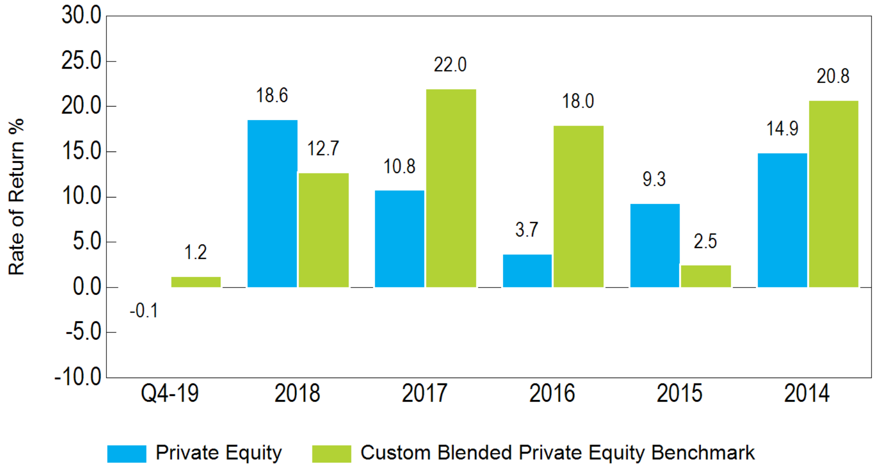
Tracking Error



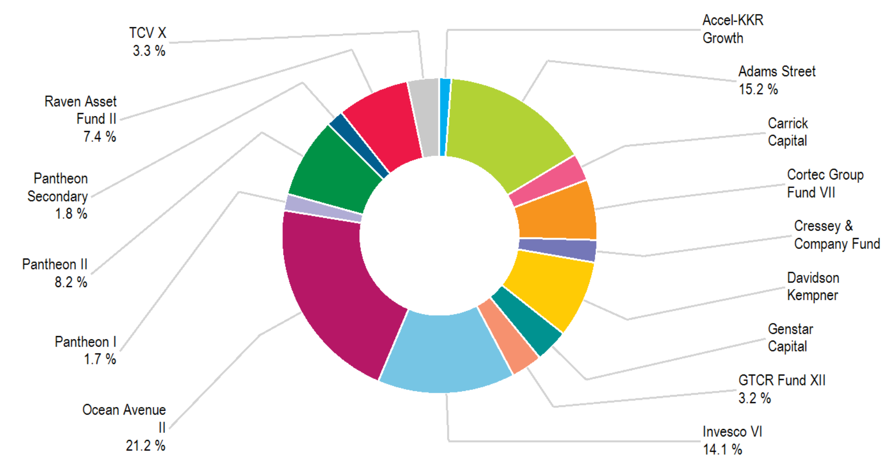
Information Ratio



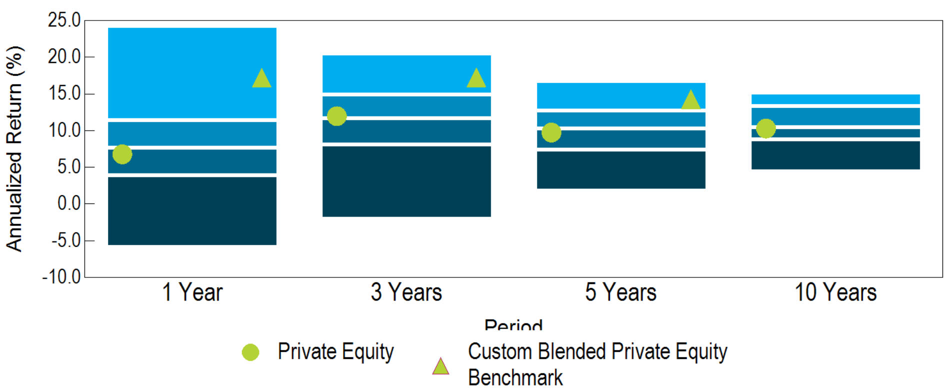
Return Summary



Current Allocation

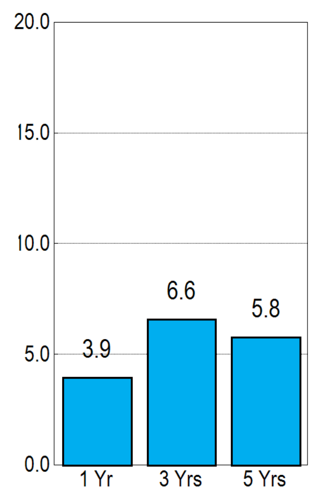


	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)
Private Equity	**6.8**	**12.0**	**9.7**	**10.3**
Custom Blended Private Equity Benchmark	*17.2*	*17.3*	*14.3*	*--*
InvMetrics All DB Private Eq Net Median	*7.7*	*11.7*	*10.3*	*10.5*
InvMetrics All DB Private Eq Net Rank	*59*	*47*	*61*	*54*



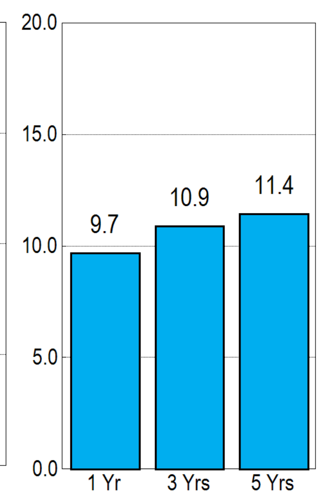
Anzld. Std. Deviation

Private Equity



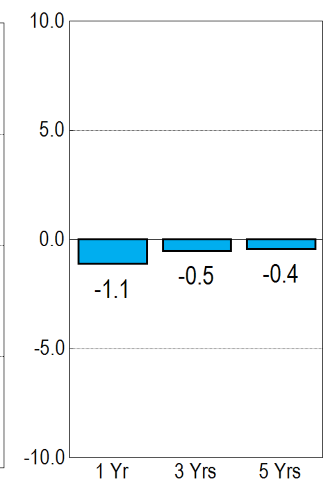
Tracking Error

Private Equity

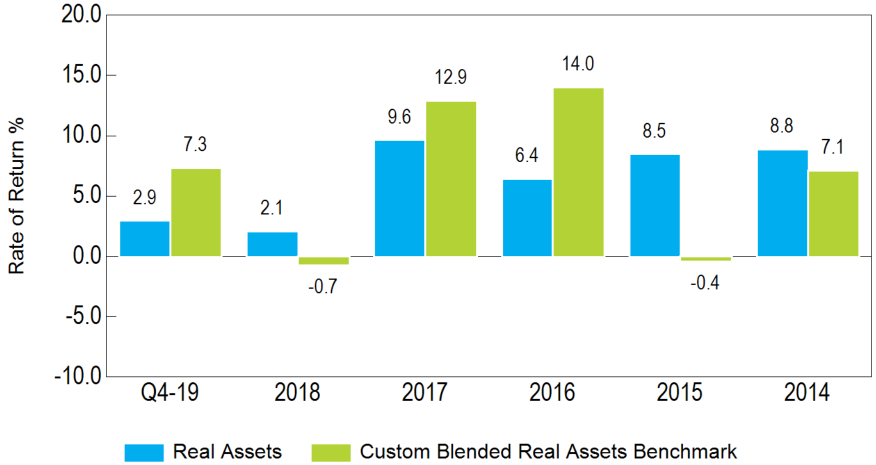


Information Ratio

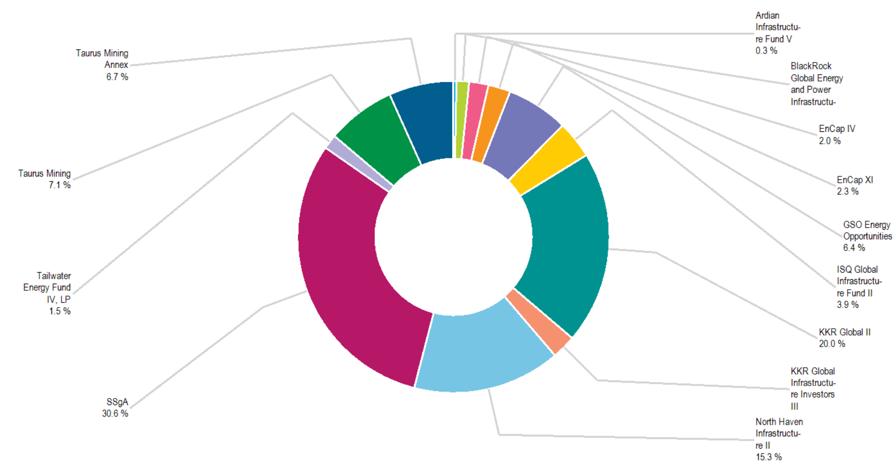
Private Equity



Return Summary



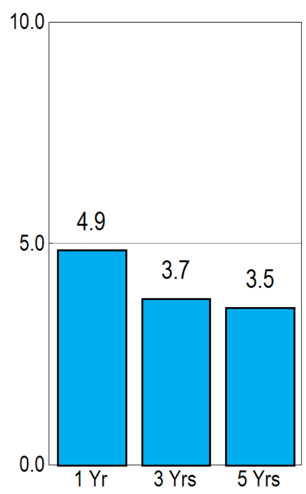
Current Allocation



	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)
Real Assets	**13.6**	**8.3**	**8.0**	**--**
Custom Blended Real Assets Benchmark	*22.2*	*11.1*	*9.2*	*--*
InvMetrics All DB Real Assets/Commodities Net Median	*8.2*	*5.9*	*4.1*	*7.0*
InvMetrics All DB Real Assets/Commodities Net Rank	*19*	*24*	*23*	*--*

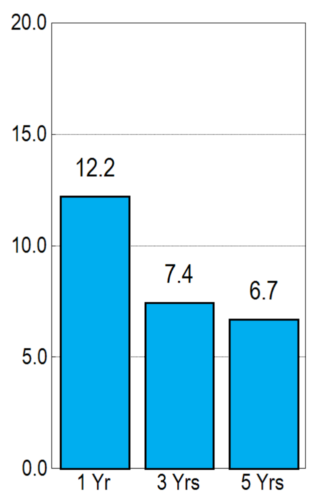
Anzld. Std. Deviation

Real Assets



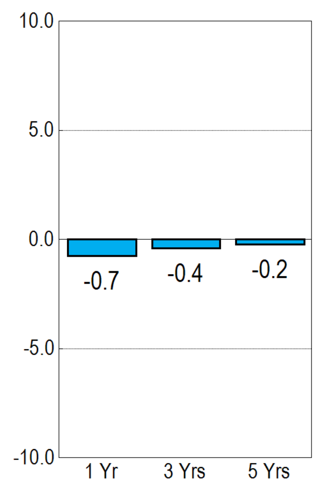
Tracking Error

Real Assets

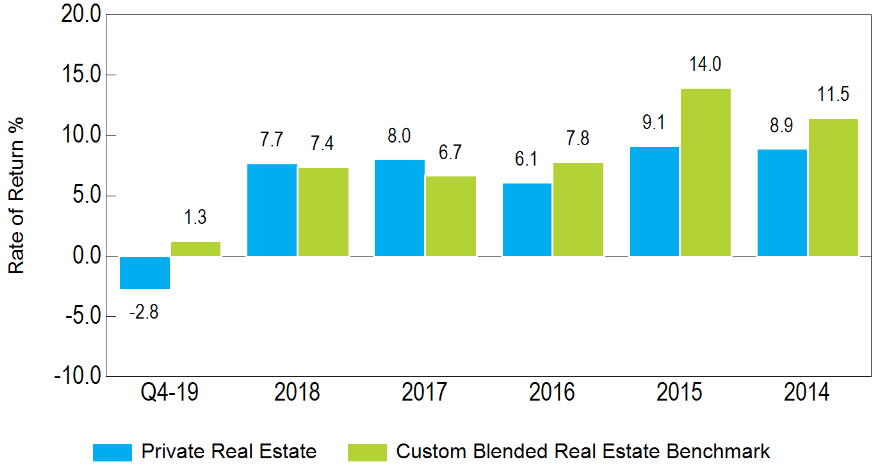


Information Ratio

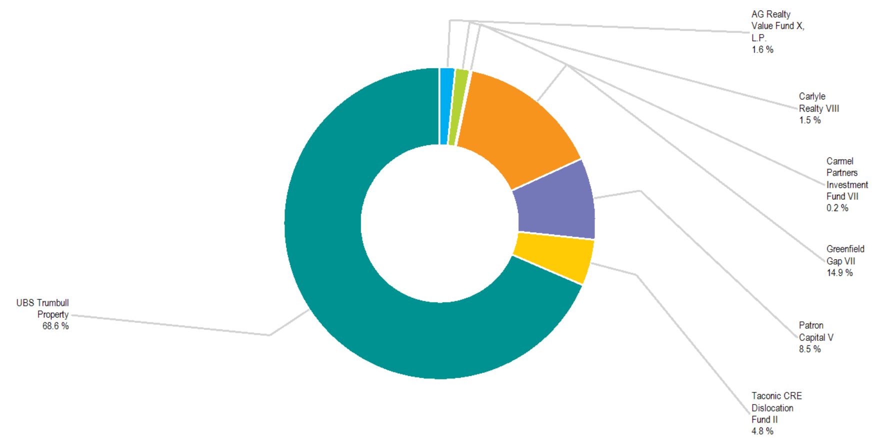
Real Assets



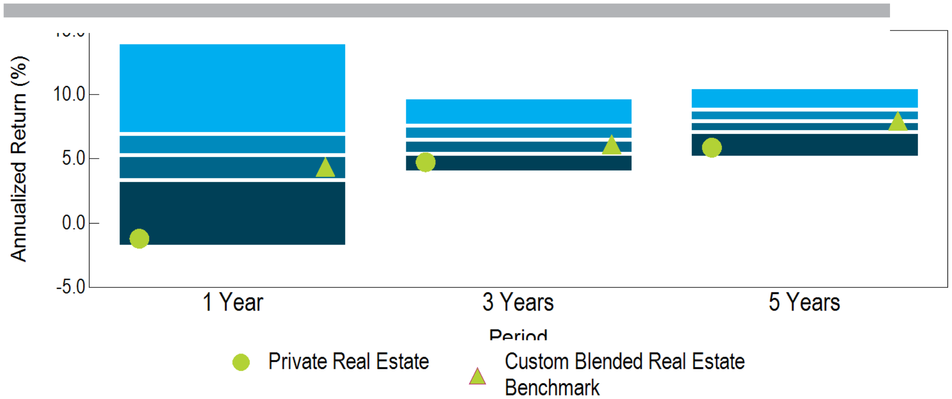
Return Summary



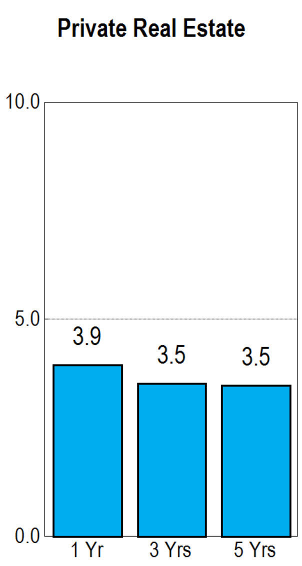
Current Allocation



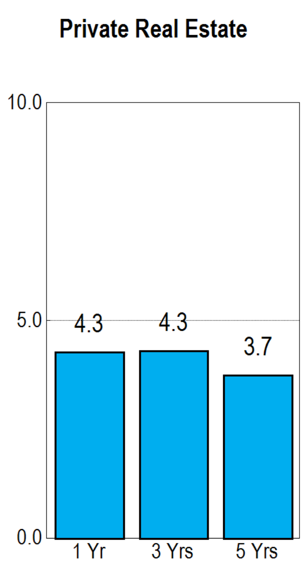
	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)
Private Real Estate	**-1.2**	**4.7**	**5.9**	**--**
Custom Blended Real Estate Benchmark	*4.4*	*6.1*	*8.0*	*10.4*
InvMetrics All DB Real Estate Pub+Priv Net Rank	*95*	*89*	*91*	*--*
InvMetrics All DB Real Estate Pub+Priv Net Median	*5.3*	*6.5*	*8.0*	*10.5*



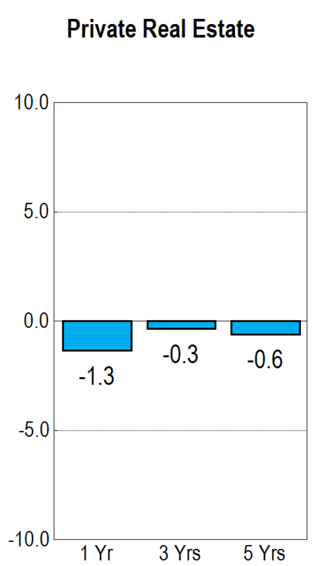
Anzld. Std. Deviation



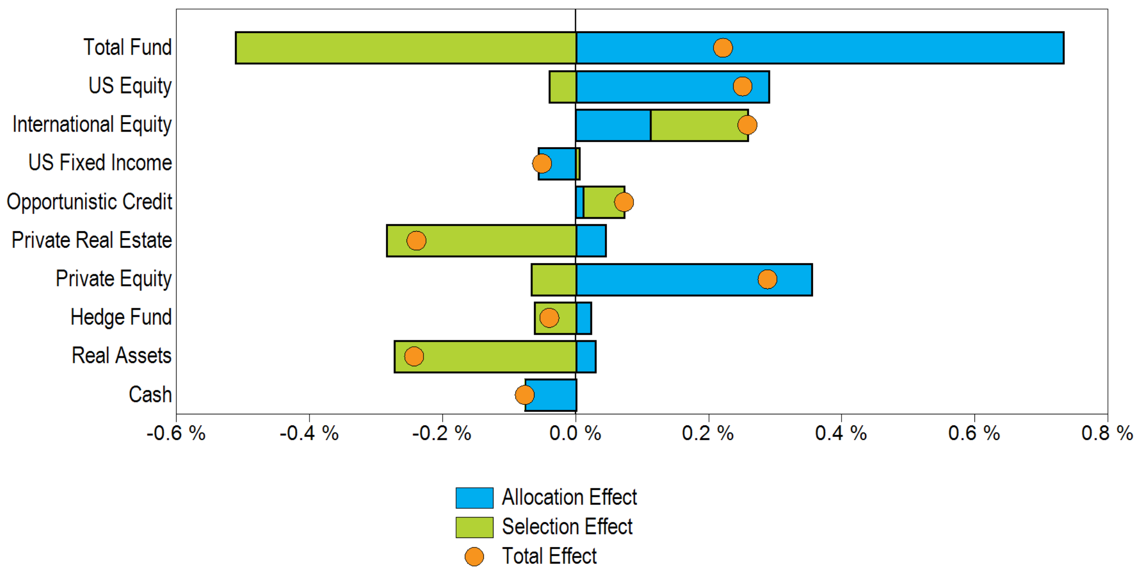
Tracking Error



Information Ratio



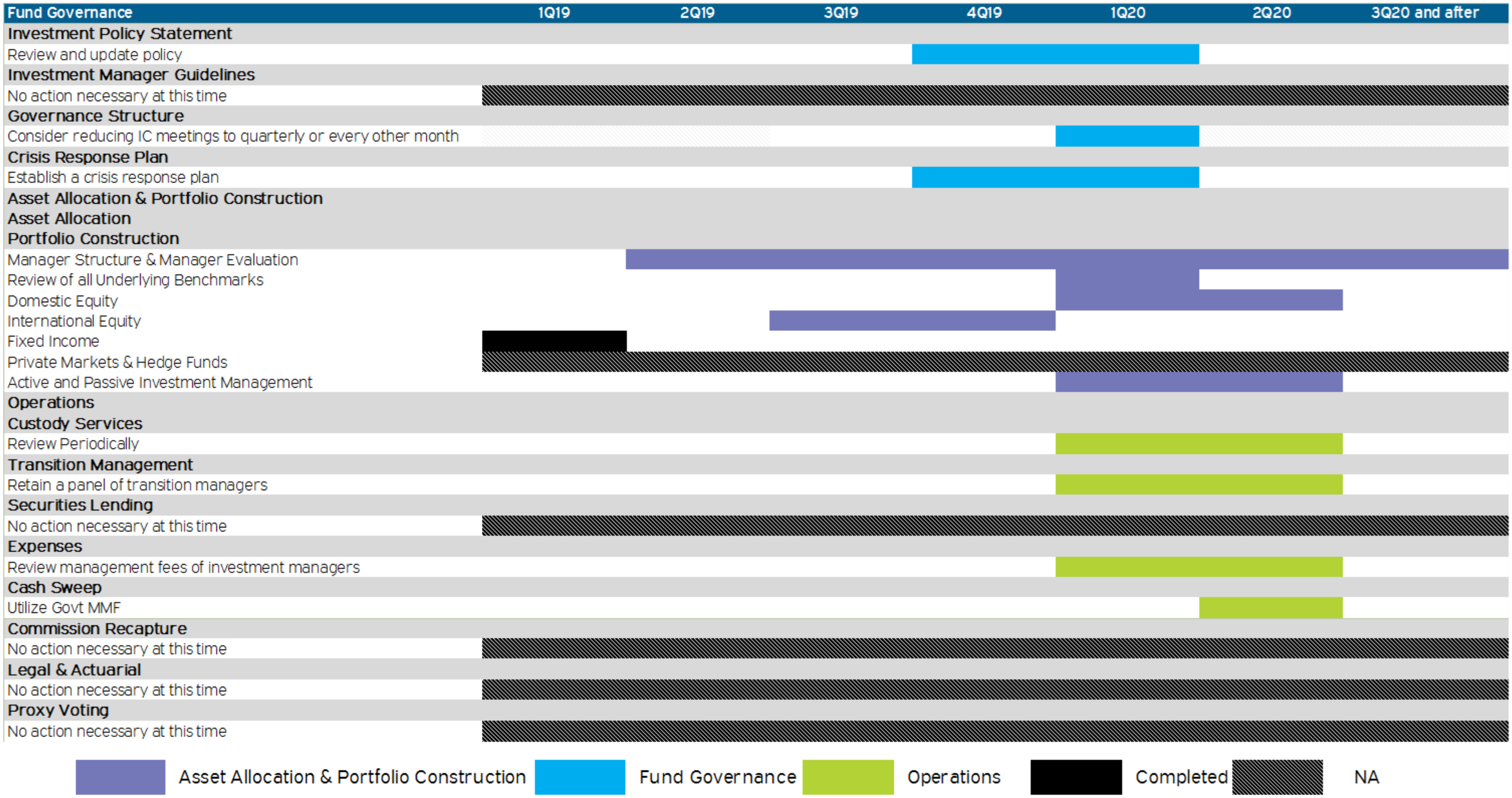
Attribution Effects
3 Months Ending December 31, 2019



3 Months Ending December 31, 2019	Policy Weight	Wtd. Actual Return	Wtd. Index Return	Excess Return	Selection Effect	Allocation Effect	Total Effects
US Equity	21.0%	9.1%	9.2%	-0.1%	0.0%	0.3%	0.3%
International Equity	18.0%	10.6%	9.9%	0.7%	0.1%	0.1%	0.3%
US Fixed Income	18.0%	0.2%	0.2%	0.0%	0.0%	-0.1%	-0.1%
Opportunistic Credit	5.0%	2.5%	1.2%	1.3%	0.1%	0.0%	0.1%
Private Real Estate	8.0%	-2.8%	1.3%	-4.1%	-0.3%	0.0%	-0.2%
Private Equity	15.0%	-0.1%	1.2%	-1.3%	-0.1%	0.4%	0.3%
Hedge Fund	10.0%	2.4%	3.1%	-0.7%	-0.1%	0.0%	0.0%
Real Assets	5.0%	2.9%	7.3%	-4.4%	-0.3%	0.0%	-0.2%
Cash	0.0%	0.4%	0.4%	0.0%	0.0%	-0.1%	-0.1%
Total	**100.0%**	**5.0%**	**4.7%**	**0.2%**	**-0.5%**	**0.7%**	**0.2%**

IFR Checklist

IFR Checklist



Disclaimer, Glossary, and Notes

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.

Credit Risk: Refers to the risk that the issuer of a fixed income security may default (i.e., the issuer will be unable to make timely principal and/or interest payments on the security.)

Duration: Measure of the sensitivity of the price of a bond to a change in its yield to maturity. Duration summarizes, in a single number, the characteristics that cause bond prices to change in response to a change in interest rates. For example, the price of a bond with a duration of three years will rise by approximately 3% for each 1% decrease in its yield to maturity. Conversely, the price will decrease 3% for each 1% increase in the bond's yield. Price changes for two different bonds can be compared using duration. A bond with a duration of six years will exhibit twice the percentage price change of a bond with a three-year duration. The actual calculation of a bond's duration is somewhat complicated, but the idea behind the calculation is straightforward. The first step is to measure the time interval until receipt for each cash flow (coupon and principal payments) from a bond. The second step is to compute a weighted average of these time intervals. Each time interval is measured by the present value of that cash flow. This weighted average is the duration of the bond measured in years.

Information Ratio: This statistic is a measure of the consistency of a portfolio's performance relative to a benchmark. It is calculated by subtracting the benchmark return from the portfolio return (excess return), and dividing the resulting excess return by the standard deviation (volatility) of this excess return. A positive information ratio indicates outperformance versus the benchmark, and the higher the information ratio, the more consistent the outperformance.

Jensen's Alpha: A measure of the average return of a portfolio or investment in excess of what is predicted by its beta or "market" risk. Portfolio Return- [Risk Free Rate+Beta*(market return-Risk Free Rate)].

Market Capitalization: For a firm, market capitalization is the total market value of outstanding common stock. For a portfolio, market capitalization is the sum of the capitalization of each company weighted by the ratio of holdings in that company to total portfolio holdings; thus it is a weighted-average capitalization. Meketa Investment Group considers the largest 65% of the broad domestic equity market as large capitalization, the next 25% of the market as medium capitalization, and the smallest 10% of stocks as small capitalization.

Market Weighted: Stocks in many indices are weighted based on the total market capitalization of the issue. Thus, the individual returns of higher market-capitalization issues will more heavily influence an index's return than the returns of the smaller market-capitalization issues in the index.

Maturity: The date on which a loan, bond, mortgage, or other debt/security becomes due and is to be paid off.

Prepayment Risk: The risk that prepayments will increase (homeowners will prepay all or part of their mortgage) when mortgage interest rates decline; hence, investors' monies will be returned to them in a lower interest rate environment. Also, the risk that prepayments will slow down when mortgage interest rates rise; hence, investors will not have as much money as previously anticipated in a higher interest rate environment. A prepayment is any payment in excess of the scheduled mortgage payment.

Price-Book Value (P/B) Ratio: The current market price of a stock divided by its book value per share. Meketa Investment Group calculates P/B as the current price divided by Compustat's quarterly common equity. Common equity includes common stock, capital surplus, retained earnings, and treasury stock adjusted for both common and nonredeemable preferred stock. Similar to high P/E stocks, stocks with high P/B's tend to be riskier investments.

Price-Earnings (P/E) Ratio: A stock's market price divided by its current or estimated future earnings. Lower P/E ratios often characterize stocks in low growth or mature industries, stocks in groups that have fallen out of favor, or stocks of established blue chip companies with long records of stable earnings and regular dividends. Sometimes a company that has good fundamentals may be viewed unfavorably by the market if it is an industry that is temporarily out of favor. Or a business may have experienced financial problems causing investors to be skeptical about is future. Either of these situations would result in lower relative P/E ratios. Some stocks exhibit above-average sales and earnings growth or expectations for above average growth. Consequently, investors are willing to pay more for these companies' earnings, which results in elevated P/E ratios. In other words, investors will pay more for shares of companies whose profits, in their opinion, are expected to increase faster than average. Because future events are in no way assured, high P/E stocks tend to be riskier and more volatile investments. Meketa Investment Group calculates P/E as the current price divided by the I/B/E/S consensus of twelve-month forecast earnings per share.

Quality Rating: The rank assigned a security by such rating services as Fitch, Moody's, and Standard & Poor's. The rating may be determined by such factors as (1) the likelihood of fulfillment of dividend, income, and principal payment of obligations; (2) the nature and provisions of the issue; and (3) the security's relative position in the event of liquidation of the company. Bonds assigned the top four grades (AAA, AA, A, BBB) are considered investment grade because they are eligible bank investments as determined by the controller of the currency.

Sharpe Ratio: A commonly used measure of risk-adjusted return. It is calculated by subtracting the risk free return (usually three-month Treasury bill) from the portfolio return and dividing the resulting excess return by the portfolio's total risk level (standard deviation). The result is a measure of return per unit of total risk taken. The higher the Sharpe ratio, the better the fund's historical risk adjusted performance.

STIF Account: Short-term investment fund at a custodian bank that invests in cash-equivalent instruments. It is generally used to safely invest the excess cash held by portfolio managers.

Standard Deviation: A measure of the total risk of an asset or a portfolio. Standard deviation measures the dispersion of a set of numbers around a central point (e.g., the average return). If the standard deviation is small, the distribution is concentrated within a narrow range of values. For a normal distribution, about two thirds of the observations will fall within one standard deviation of the mean, and 95% of the observations will fall within two standard deviations of the mean.

Style: The description of the type of approach and strategy utilized by an investment manager to manage funds. For example, the style for equities is determined by portfolio characteristics such as price-to-book value, price-to-earnings ratio, and dividend yield. Equity styles include growth, value, and core.

Tracking Error: A divergence between the price behavior of a position or a portfolio and the price behavior of a benchmark, as defined by the difference in standard deviation.

Yield to Maturity: The yield, or return, provided by a bond to its maturity date; determined by a mathematical process, usually requiring the use of a "basis book." For example, a 5% bond pays $5 a year interest on each $100 par value. To figure its current yield, divide $5 by $95—the market price of the bond—and you get 5.26%. Assume that the same bond is due to mature in five years. On the maturity date, the issuer is pledged to pay $100 for the bond that can be bought now for $95. In other words, the bond is selling at a discount of 5% below par value. To figure yield to maturity, a simple and approximate method is to divide 5% by the five years to maturity, which equals 1% pro rata yearly. Add that 1% to the 5.26% current yield, and the yield to maturity is roughly 6.26%.

$$\frac{5\%\ \text{(discount)}}{5\ \text{(yrs. to maturity)}} = \begin{array}{l}1\%\ \text{pro rata, plus} \\ 5.26\%\ \text{(current yield)}\end{array} = 6.26\%\ \text{(yield to maturity)}$$

Yield to Worst: The lowest potential yield that can be received on a bond without the issuer actually defaulting. The yield to worst is calculated by making worst-case scenario assumptions on the issue by calculating the returns that would be received if provisions, including prepayment, call, or sinking fund, are used by the issuer.

NCREIF Property Index (NPI): Measures unleveraged investment performance of a very large pool of individual commercial real estate properties acquired in the private market by tax-exempt institutional investors for investment purposes only. The NPI index is capitalization-weighted for a quarterly time series composite total rate of return.

NCREIF Fund Index - Open End Diversified Core Equity (NFI-ODCE): Measures the investment performance of 28 open-end commingled funds pursuing a core investment strategy that reflects funds' leverage and cash positions. The NFI-ODCE index is equal-weighted and is reported gross and net of fees for a quarterly time series composite total rate of return.

Sources: Investment Terminology, International Foundation of Employee Benefit Plans, 1999.
The Handbook of Fixed Income Securities, Fabozzi, Frank J., 1991

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Throughout this report, numbers may not sum due to rounding.

Returns for periods greater than one year are annualized throughout this report.

Values shown are in millions of dollars, unless noted otherwise.

Item 2

MEKETA

INVESTMENT GROUP

Merced County Employees' Retirement Association

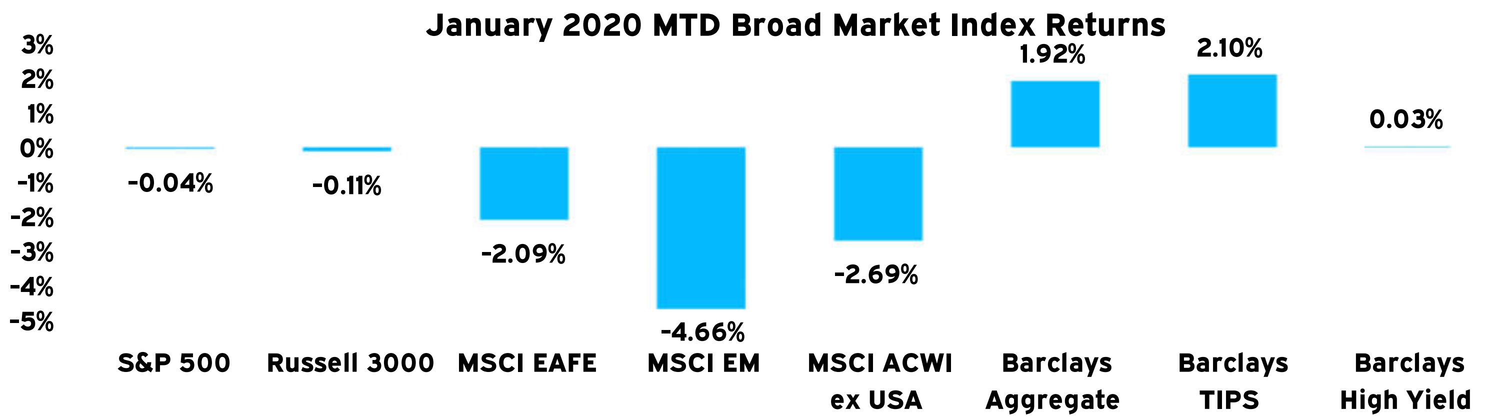
As of January 31, 2020

Performance Review

Performance Highlights

As of January 31, 2020

Market Review and Preliminary Performance Summary for January 2020



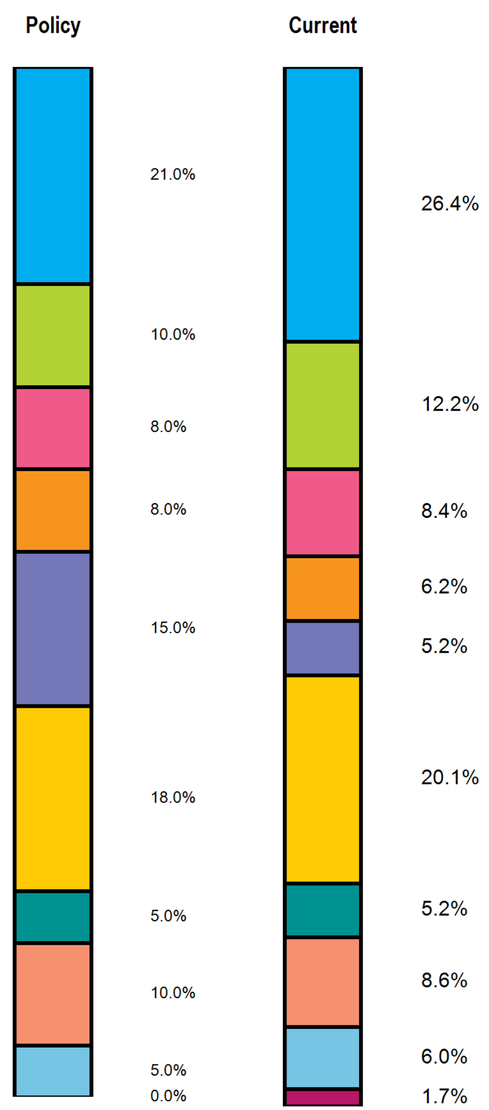
Growth > Value   US Treasury 10 yr: -41 basis point   Large Cap > Small Cap

- Global equity markets were down, generally in the -2 to -5% range during the month, with EM equity declining the most.
- Rate compression at the intermediate and long end of the yield curve resulted in strong returns for interest rate sensitive instruments, especially those with extended duration.
- Implied equity market volatility (as measured by VIX index) remained relatively low during the month.

As of January 31, 2020, preliminary total assets for the MCERA Portfolio stood at $909.5 million.

- MCERA reported an overall monthly return of +0.1%.
- Within the MCERA Portfolio, US Fixed Income posted the strongest returns for the month (+1.7%)
- Opportunistic Credit and Hedge Funds returned +0.9% and +0.8% respectively.
- Public equity segments delivered returns in the range of 0.0 to -1.3%.

Performance Review
As of January 31, 2020

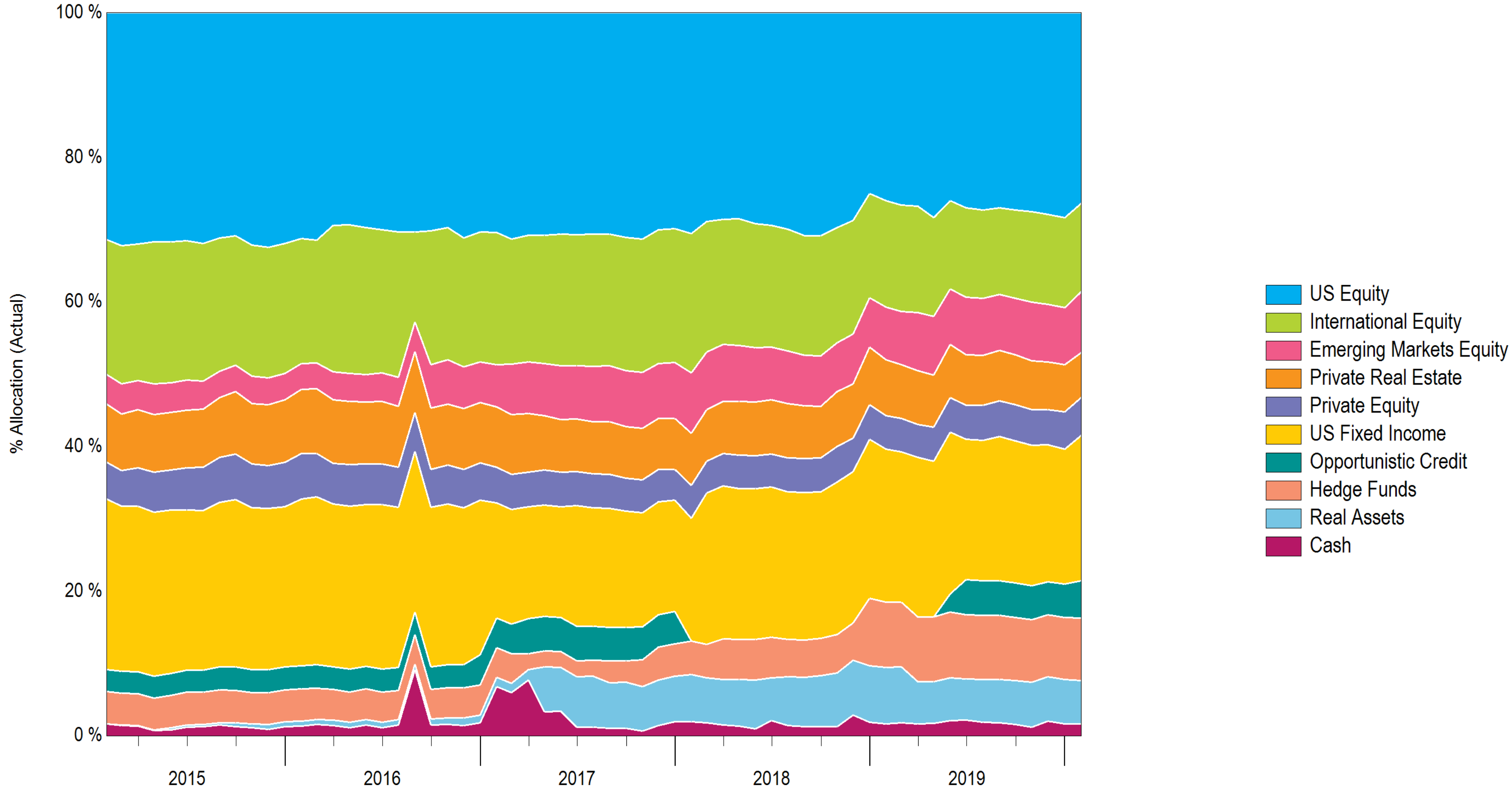


Allocation vs. Targets and Policy

	Current Balance	Current Allocation	Policy	Difference	Policy Range	Within IPS Range?
US Equity	$239,954,251	26.4%	21.0%	5.4%	15.0% - 26.0%	No
International Equity	$111,279,248	12.2%	10.0%	2.2%	5.0% - 15.0%	Yes
Emerging Markets Equity	$76,244,794	8.4%	8.0%	0.4%	4.0% - 12.0%	Yes
Private Real Estate	$56,798,368	6.2%	8.0%	-1.8%	6.0% - 10.0%	Yes
Private Equity	$47,523,429	5.2%	15.0%	-9.8%	5.0% - 20.0%	Yes
US Fixed Income	$182,383,755	20.1%	18.0%	2.1%	13.0% - 23.0%	Yes
Opportunistic Credit	$47,194,653	5.2%	5.0%	0.2%	3.0% - 7.0%	Yes
Hedge Funds	$78,499,547	8.6%	10.0%	-1.4%	5.0% - 15.0%	Yes
Real Assets	$54,493,182	6.0%	5.0%	1.0%	3.0% - 7.0%	Yes
Cash	$15,114,112	1.7%	0.0%	1.7%	0.0% - 5.0%	Yes
Total	**$909,485,339**	**100.0%**	**100.0%**			

Cash range displayed for illustrative purposes only.

Asset Allocation History
5 Years Ending January 31, 2020



Asset Class Performance Summary

	Market Value ($)	% of Portfolio	1 Mo (%)	Fiscal YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
Total Fund (Net)*	**909,485,339**	**100.0**	**0.1**	**5.7**	**11.8**	**8.8**	**7.1**	**8.4**	**8.0**	**Dec-94**
Total Fund (Gross)*			**0.2**	**5.8**	**12.1**	**9.0**	**7.4**	**8.7**	**8.2**	
Policy Index			*-0.2*	*5.3*	*12.0*	*8.8*	*7.4*	*8.6*	*6.1*	*Dec-94*
Total Fund w/o Alternatives (Net)	**657,056,701**	**72.2**	**0.2**	**7.6**	**15.2**	**9.8**	**7.6**	--	--	**Dec-94**
Total Fund w/o Alternatives (Gross)			**0.2**	**7.8**	**15.5**	**10.1**	**7.9**	--	--	
Policy Index w/o Al			*-0.7*	*6.0*	*12.8*	*9.0*	*7.2*	--	--	*Dec-94*
US Equity (Net)	**239,954,251**	**26.4**	**0.0**	**10.7**	**21.8**	**14.3**	**12.5**	**14.0**	**10.2**	**Dec-94**
US Equity (Gross)			**0.0**	**10.8**	**22.1**	**14.5**	**12.7**	**14.2**	**10.3**	
Custom Blended US Equity Benchmark			*-0.1*	*9.8*	*19.4*	*13.1*	*11.5*	*13.6*	*10.1*	*Dec-94*
International Equity (Net)	**187,524,042**	**20.6**	**-1.2**	**8.2**	**14.5**	**9.4**	**5.6**	**6.3**	**5.4**	**Dec-98**
International Equity (Gross)			**-1.2**	**8.4**	**14.9**	**9.8**	**6.1**	**6.9**	**5.7**	
International Equity Custom			*-3.2*	*3.8*	*8.9*	*8.1*	*5.4*	*5.7*	*4.4*	*Dec-98*
Developed International Equity (Net)	**111,279,248**	**12.2**	**-1.3**	**6.4**	**13.8**	**8.4**	**5.1**	**6.4**	**3.6**	**Jan-08**
Developed International Equity (Gross)			**-1.3**	**6.5**	**13.9**	**8.6**	**5.4**	**6.9**	**4.1**	
Custom Blended Developed International Equity Benchmark			*-2.3*	*4.6*	*11.9*	*7.7*	*5.1*	*5.7*	*2.7*	*Jan-08*
Emerging Markets Equity (Net)	**76,244,794**	**8.4**	**-1.0**	**10.6**	**15.3**	**11.6**	**7.6**	--	**4.6**	**Apr-12**
Emerging Markets Equity (Gross)			**-1.0**	**11.0**	**16.2**	**12.5**	**8.6**	--	**5.5**	
Custom Blended Emerging Markets Benchmark			*-4.7*	*2.3*	*4.2*	*8.3*	*4.9*	*4.1*	*3.3*	*Apr-12*
US Fixed Income (Net)	**182,383,755**	**20.1**	**1.7**	**3.9**	**8.3**	**4.3**	**3.4**	**4.2**	**5.4**	**Dec-94**
US Fixed Income (Gross)			**1.7**	**3.9**	**8.4**	**4.4**	**3.6**	**4.6**	**5.5**	
Custom Blended US Fixed Income Benchmark			*1.9*	*4.1*	*8.8*	*4.6*	*3.5*	*4.0*	*5.7*	*Dec-94*
Opportunistic Credit (Net)	**47,194,653**	**5.2**	**0.9**	**3.5**	--	--	--	--	**5.2**	**May-19**
Opportunistic Credit (Gross)			**0.9**	**3.5**	--	--	--	--	**5.2**	
50% Barclays US Aggregate / 25% Barclays US High Yield / 25% Credit Suisse Leveraged Loans			*1.1*	*4.0*	--	--	--	--	*5.9*	*May-19*

Data prior to March 2018 provided by prior consultant

	Market Value ($)	% of Portfolio	1 Mo (%)	Fiscal YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
Private Real Estate (Net)	**56,798,368**	**6.2**	**0.0**	**-3.6**	**-3.6**	**4.3**	**5.8**	--	--	**Mar-99**
Private Real Estate (Gross)			**0.0**	**-3.6**	**-3.6**	**4.3**	**6.3**	**9.2**	**8.2**	
Custom Blended Real Estate Benchmark			*0.0*	*2.4*	*4.4*	*6.1*	*8.0*	*10.4*	*7.3*	*Mar-99*
CPI + 5% (Seasonally Adjusted)			*0.6*	*4.3*	*7.6*	*7.1*	*7.1*	--	--	*Mar-99*
Private Equity (Net)	**47,523,429**	**5.2**	**0.0**	**2.9**	**6.1**	**12.8**	**9.2**	**10.3**	**8.0**	**Jun-05**
Private Equity (Gross)			**0.0**	**2.9**	**6.1**	**12.8**	**9.2**	**10.5**	**8.1**	
Custom Blended Private Equity Benchmark			*0.0*	*6.4*	*17.2*	*18.0*	*13.6*	--	--	*Jun-05*
Russell 3000 +3% 1-Quarter Lag			*2.4*	*9.4*	*16.9*	*17.9*	*13.6*	*17.0*	*12.2*	*Jun-05*
Hedge Fund (Net)	**78,499,547**	**8.6**	**0.8**	**2.0**	**6.6**	**5.9**	**3.8**	--	**4.0**	**Jun-14**
Hedge Fund (Gross)			**0.9**	**2.4**	**7.1**	**6.2**	**3.9**	--	**4.1**	
Hedge Fund Custom			*0.3*	*2.5*	*6.0*	*3.7*	*3.0*	--	*3.0*	*Jun-14*
Real Assets (Net)	**54,493,182**	**6.0**	**-0.9**	**3.5**	**8.8**	**7.6**	**7.7**	--	--	**Mar-99**
Real Assets (Gross)			**-0.9**	**3.5**	**8.9**	**7.7**	**8.2**	--	--	
Custom Blended Real Assets Benchmark			*0.0*	*4.4*	*11.9*	*10.6*	*9.4*	--	--	*Mar-99*
CPI + 5% (Seasonally Adjusted)			*0.6*	*4.3*	*7.6*	*7.1*	*7.1*	--	--	*Mar-99*
Private Infrastructure (Net)	**22,550,357**	**2.5**	**0.0**	**5.2**	**11.3**	**13.9**	**7.8**	--	**7.6**	**Dec-14**
Private Infrastructure (Gross)			**0.0**	**5.2**	**11.3**	**13.9**	**7.8**	--	**7.6**	
S&P Global Infrastructure Net TR USD			*1.6*	*6.9*	*17.5*	*10.4*	*5.9*	*7.4*	*5.8*	*Dec-14*
Private Natural Resources (Net)	**15,154,828**	**1.7**	**0.0**	**5.3**	**10.2**	**10.4**	--	--	**16.4**	**Sep-15**
Private Natural Resources (Gross)			**0.0**	**5.3**	**10.2**	**10.4**	--	--	**16.4**	
S&P Global Natural Resources Index TR USD			*-7.6*	*-4.9*	*-1.2*	*3.6*	*3.7*	*1.7*	*10.6*	*Sep-15*
Cash (Net)	**15,114,112**	**1.7**	**0.2**	**1.0**	**1.4**	--	--	--	--	
Cash (Gross)			**0.2**	**1.0**	**1.4**	--	--	--	--	

**One or more accounts have been excluded from the composite for the purposes of performance calculations and market value.*

Real Assets includes State Street Real Asset NL Fund

Trailing Net Performance

	Market Value ($)	% of Portfolio	% of Sector	1 Mo (%)	Fiscal YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
Total Fund(Net)*	**909,485,339**	**100.0**	**--**	**0.1**	**5.7**	**11.8**	**8.8**	**7.1**	**8.4**	**8.0**	**Dec-94**
Policy Index				*-0.2*	*5.3*	*12.0*	*8.8*	*7.4*	*8.6*	*6.1*	*Dec-94*
Total Fund w/o Alternatives(Net)	**657,056,701**	**72.2**	**72.2**	**0.2**	**7.6**	**15.2**	**9.8**	**7.6**	**--**	**--**	**Dec-94**
Policy Index w/o AI				*-0.7*	*6.0*	*12.8*	*9.0*	*7.2*	*--*	*--*	*Dec-94*
US Equity(Net)	**239,954,251**	**26.4**	**36.5**	**0.0**	**10.7**	**21.8**	**14.3**	**12.5**	**14.0**	**10.2**	**Dec-94**
Custom Blended US Equity Benchmark				*-0.1*	*9.8*	*19.4*	*13.1*	*11.5*	*13.6*	*10.1*	*Dec-94*
Mellon Dynamic US Equity(Net)	104,394,976	11.5	43.5	1.3	13.9	28.1	18.2	14.7	--	17.9	Dec-12
S&P 500				*0.0*	*10.9*	*21.7*	*14.5*	*12.4*	*14.0*	*14.5*	*Dec-12*
Mellon Large Cap(Net)	100,417,830	11.0	41.8	0.1	10.7	21.4	14.3	--	--	14.6	Mar-16
Russell 1000				*0.1*	*10.7*	*21.4*	*14.3*	*12.1*	*14.0*	*14.6*	*Mar-16*
PanAgora(Net)	18,791,104	2.1	7.8	-4.2	3.2	9.4	6.8	7.4	--	8.6	Sep-13
Russell 2000				*-3.2*	*3.9*	*9.2*	*7.3*	*8.2*	*11.9*	*8.1*	*Sep-13*
DFA Small Cap(Net)	16,350,341	1.8	6.8	-4.1	2.1	6.0	4.8	7.7	--	6.5	Jun-14
Russell 2000				*-3.2*	*3.9*	*9.2*	*7.3*	*8.2*	*11.9*	*7.0*	*Jun-14*
International Equity(Net)	**187,524,042**	**20.6**	**28.5**	**-1.2**	**8.2**	**14.5**	**9.4**	**5.6**	**6.3**	**5.4**	**Dec-98**
International Equity Custom				*-3.2*	*3.8*	*8.9*	*8.1*	*5.4*	*5.7*	*4.4*	*Dec-98*
Developed International Equity(Net)	**111,279,248**	**12.2**	**59.3**	**-1.3**	**6.4**	**13.8**	**8.4**	**5.1**	**6.4**	**3.6**	**Jan-08**
Custom Blended Developed International Equity Benchmark				*-2.3*	*4.6*	*11.9*	*7.7*	*5.1*	*5.7*	*2.7*	*Jan-08*
GQG International Equity(Net)	45,074,718	5.0	40.5	0.2	--	--	--	--	--	0.2	Dec-19
MSCI ACWI ex USA				*-2.7*	*4.1*	*9.9*	*7.6*	*5.0*	*5.2*	*1.5*	*Dec-19*
First Eagle International Value Fund(Net)	44,068,500	4.8	39.6	-2.1	--	--	--	--	--	-2.1	Dec-19
MSCI EAFE				*-2.1*	*4.8*	*12.1*	*7.8*	*5.1*	*5.8*	*1.1*	*Dec-19*
MSCI World ex USA				*-1.9*	*4.8*	*12.1*	*7.6*	*5.1*	*5.6*	*1.2*	*Dec-19*

Historical returns for the US Equity Composite prior to January 2012 and for the International Equity Composite prior to December 2010 are gross only.
Developed International Equity and Emerging Markets Equity composites were only reported as one composite prior to March 2018.
First Eagle International Value Fund market value based off manager estimate.

	Market Value ($)	% of Portfolio	% of Sector	1 Mo (%)	Fiscal YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
Driehaus International Small Cap Growth(Net)	11,381,997	1.3	10.2	-2.3	9.6	--	--	--	--	12.1	May-19
MSCI ACWI ex US Small Cap Growth NR USD				*-2.5*	*6.9*	*12.4*	*8.6*	*7.2*	*7.3*	*6.0*	*May-19*
Acadian ACWI ex U.S. Small Cap Equity(Net)	10,754,033	1.2	9.7	-3.0	5.9	--	--	--	--	5.7	May-19
MSCI ACWI ex US Small Cap				*-3.1*	*6.3*	*10.0*	*7.1*	*6.4*	*6.8*	*5.2*	*May-19*
Emerging Markets Equity(Net)	**76,244,794**	**8.4**	**40.7**	**-1.0**	**10.6**	**15.3**	**11.6**	**7.6**	**--**	**4.6**	**Apr-12**
Custom Blended Emerging Markets Benchmark				*-4.7*	*2.3*	*4.2*	*8.3*	*4.9*	*4.1*	*3.3*	*Apr-12*
Artisan Developing World TR(Net)	55,878,154	6.1	73.3	0.9	--	--	--	--	--	0.9	Dec-19
MSCI Emerging Markets				*-4.7*	*2.1*	*3.8*	*7.9*	*4.5*	*3.8*	*2.5*	*Dec-19*
RWC(Net)	20,366,640	2.2	26.7	-5.7	--	--	--	--	--	-5.7	Dec-19
MSCI Emerging Markets				*-4.7*	*2.1*	*3.8*	*7.9*	*4.5*	*3.8*	*2.5*	*Dec-19*
US Fixed Income(Net)	**182,383,755**	**20.1**	**27.8**	**1.7**	**3.9**	**8.3**	**4.3**	**3.4**	**4.2**	**5.4**	**Dec-94**
Custom Blended US Fixed Income Benchmark				*1.9*	*4.1*	*8.8*	*4.6*	*3.5*	*4.0*	*5.7*	*Dec-94*
Vanguard Total Bond Market Index Fund(Net)	90,435,551	9.9	49.6	2.1	4.6	--	--	--	--	7.8	May-19
BBgBarc US Aggregate TR				*1.9*	*4.4*	*9.6*	*4.6*	*3.0*	*3.8*	*7.6*	*May-19*
Barrow Hanley(Net)	66,952,683	7.4	36.7	1.9	4.6	9.8	4.7	3.1	3.8	3.8	Mar-10
BBgBarc US Aggregate TR				*1.9*	*4.4*	*9.6*	*4.6*	*3.0*	*3.8*	*3.8*	*Mar-10*
Vanguard Short-Term Treasury Index Fund(Net)	24,995,521	2.7	13.7	0.6	1.7	3.8	--	--	--	3.1	Feb-18
BBgBarc US Govt 1-3 Yr TR				*0.5*	*1.7*	*3.9*	*2.0*	*1.4*	*1.2*	*3.2*	*Feb-18*
BBgBarc US Govt 1-5 Yr TR				*0.9*	*2.0*	*4.8*	*2.4*	*1.7*	*1.7*	*3.9*	*Feb-18*
Opportunistic Credit(Net)	**47,194,653**	**5.2**	**7.2**	**0.9**	**3.5**	**--**	**--**	**--**	**--**	**5.2**	**May-19**
50% Barclays US Aggregate / 25% Barclays US High Yield / 25% Credit Suisse Leveraged Loans				*1.1*	*4.0*	*--*	*--*	*--*	*--*	*5.9*	*May-19*
PIMCO Income Fund(Net)	25,661,337	2.8	54.4	0.8	3.2	--	--	--	--	4.8	Apr-19
BBgBarc US Aggregate TR				*1.9*	*4.4*	*9.6*	*4.6*	*3.0*	*3.8*	*7.6*	*Apr-19*

RWC market value based off manager estimate.

Historical returns for the US Fixed Income Composite prior to December 2010 and for Barrow Hanley prior to June 2010 are gross only.

	Market Value ($)	% of Portfolio	% of Sector	1 Mo (%)	Fiscal YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
GoldenTree Multi-Sector Credit(Net)	21,533,316	2.4	45.6	1.1	3.9	--	--	--	--	5.2	Jun-19
50% BBgBarc US High Yield TR/50% Credit Suisse Leveraged Loans				*0.3*	*3.6*	*7.9*	*5.2*	*5.3*	*6.3*	*4.9*	*Jun-19*
Private Real Estate(Net)	**56,798,368**	**6.2**	**6.2**	**0.0**	**-3.6**	**-3.6**	**4.3**	**5.8**	**--**	**--**	**Mar-99**
Custom Blended Real Estate Benchmark				*0.0*	*2.4*	*4.4*	*6.1*	*8.0*	*10.4*	*7.3*	*Mar-99*
CPI + 5% (Seasonally Adjusted)				*0.6*	*4.3*	*7.6*	*7.1*	*7.1*	*--*	*--*	*Mar-99*
UBS Trumbull Property(Net)	37,979,309	4.2	66.9	0.0	-3.0	-2.6	2.8	5.2	8.2	6.9	Mar-99
Greenfield Gap VII(Net)	8,655,272	1.0	15.2	0.0	10.8	11.1	12.4	13.5	--	13.2	Dec-14
Patron Capital V(Net)	5,101,833	0.6	9.0	0.0	-27.0	-29.4	8.8	--	--	3.2	Jan-16
Taconic CRE Dislocation Fund II(Net)	2,838,129	0.3	5.0	0.0	8.8	9.5	--	--	--	6.9	Nov-18
Carlyle Realty VIII(Net)	1,102,242	0.1	1.9	0.0	5.4	3.9	--	--	--	-25.6	Dec-17
AG Realty Value Fund X, L.P.(Net)	967,383	0.1	1.7	0.0	-17.9	--	--	--	--	-17.9	Jun-19
Carmel Partners Investment Fund VII(Net)	154,200	0.0	0.3	0.0	-32.9	--	--	--	--	-46.6	Apr-19
Private Equity(Net)	**47,523,429**	**5.2**	**5.2**	**0.0**	**2.9**	**6.1**	**12.8**	**9.2**	**10.3**	**8.0**	**Jun-05**
Custom Blended Private Equity Benchmark				*0.0*	*6.4*	*17.2*	*18.0*	*13.6*	*--*	*--*	*Jun-05*
Russell 3000 +3% 1-Quarter Lag				*2.4*	*9.4*	*16.9*	*17.9*	*13.6*	*17.0*	*12.2*	*Jun-05*
Ocean Avenue II(Net)	9,893,781	1.1	20.8	0.0	4.4	6.9	24.4	14.7	--	11.9	Jun-14

Private Real Estate results prior to 1/1/2019 were included in the Real Assets composite. All results for the Private Real Estate composite that include the period prior to 1/1/2019 will reflect only the latest lineup of managers that Meketa received information for, therefore it may not reflect the entire Private Real Estate composite at that given time.

All private markets performance and market values reflect a 9/30/2019 capital account balance unless otherwise noted.

Adams Street includes Adams Street 2005, Adams Street 2007, and Adams Street 2011.

	Market Value ($)	% of Portfolio	% of Sector	1 Mo (%)	Fiscal YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
Adams Street(Net)	7,085,300	0.8	14.9	0.0	-1.5	4.7	10.8	9.9	12.3	6.8	Sep-05
Invesco VI(Net)	6,586,534	0.7	13.9	0.0	7.1	9.9	12.6	14.3	--	11.9	Jun-13
Pantheon II(Net)	3,777,159	0.4	7.9	0.0	0.8	5.2	13.1	11.2	--	11.2	Dec-11
Davidson Kempner Long-Term Distressed Opportunities Fund IV(Net)	3,682,239	0.4	7.7	0.0	1.6	2.6	--	--	--	9.9	Apr-18
Raven Asset Fund II(Net)	3,471,659	0.4	7.3	0.0	3.9	5.2	8.6	1.4	--	-0.1	Aug-14
Cortec Group Fund VII(Net)	3,001,995	0.3	6.3	0.0	--	--	--	--	--	0.0	Dec-19
GTCR Fund XII(Net)	2,100,474	0.2	4.4	0.0	29.1	37.9	--	--	--	-4.2	Jun-18
Genstar Capital Partners IX(Net)	1,572,115	0.2	3.3	0.0	--	--	--	--	--	-0.4	Jul-19
TCV X(Net)	1,549,032	0.2	3.3	0.0	-9.5	--	--	--	--	-9.5	Apr-19
Carrick Capital Partners III(Net)	1,318,509	0.1	2.8	0.0	20.2	16.3	--	--	--	2.0	Aug-18
Cressey & Company Fund VI(Net)	1,061,715	0.1	2.2	0.0	3.9	-1.3	--	--	--	-11.4	Jan-19
Pantheon Secondary(Net)	822,421	0.1	1.7	0.0	-0.7	4.7	7.5	3.9	3.8	3.9	Jun-07
Accel-KKR Growth Capital Partners III(Net)	815,418	0.1	1.7	0.0	-16.1	--	--	--	--	-16.1	Jul-19
Pantheon I(Net)	785,079	0.1	1.7	0.0	-10.7	-8.9	1.6	1.6	6.2	2.6	Dec-05
Invesco IV(Net)	0	0.0	0.0								

Pantheon I includes Pantheon US Fund VI and Pantheon Europe Fund IV.
Pantheon II includes Pantheon US Fund IX, Pantheon Asia Fund VI, and Pantheon Europe Fund VII.
Pantheon Secondary includes Pantheon GLO SEC III B.
For Invesco IV, cash flow adjusting from the latest valuation (9/30/2019) would provide a negative market value. Showing zero instead. Historical returns for Invesco IV prior to April 2012 are gross only.

	Market Value ($)	% of Portfolio	% of Sector	1 Mo (%)	Fiscal YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
Hedge Fund(Net)	**78,499,547**	**8.6**	**8.6**	**0.8**	**2.0**	**6.6**	**5.9**	**3.8**	**--**	**4.0**	**Jun-14**
Hedge Fund Custom				*0.3*	*2.5*	*6.0*	*3.7*	*3.0*	*--*	*3.0*	*Jun-14*
Silver Point Capital(Net)	12,602,845	1.4	16.1	2.2	1.8	5.5	--	--	--	2.5	Nov-17
Wellington-Archipelago(Net)	12,431,596	1.4	15.8	-0.4	3.6	9.5	--	--	--	5.3	Aug-17
Sculptor (OZ) Domestic II(Net)	11,158,792	1.2	14.2	2.3	5.1	14.9	8.9	6.4	--	6.6	Jun-14
Taconic Opportunity Fund(Net)	10,466,591	1.2	13.3	0.4	1.3	4.7	--	--	--	4.7	Dec-18
KLS Diversified(Net)	9,167,065	1.0	11.7	0.9	-0.6	-0.4	--	--	--	1.2	Oct-17
Graham Absolute Return(Net)	7,602,455	0.8	9.7	-0.3	0.0	4.4	--	--	--	3.1	Aug-17
Winton(Net)	6,227,525	0.7	7.9	-0.2	2.1	4.7	--	--	--	1.8	Oct-17
Laurion Capital(Net)	5,427,838	0.6	6.9	1.7	0.3	7.0	--	--	--	6.3	Aug-18
Marshall Wace Eureka(Net)	3,414,839	0.4	4.4	0.4	4.8	9.2	--	--	--	5.0	Nov-17
Real Assets(Net)	**54,493,182**	**6.0**	**6.0**	**-0.9**	**3.5**	**8.8**	**7.6**	**7.7**	**--**	**--**	**Mar-99**
Custom Blended Real Assets Benchmark				*0.0*	*4.4*	*11.9*	*10.6*	*9.4*	*--*	*--*	*Mar-99*
CPI + 5% (Seasonally Adjusted)				*0.6*	*4.3*	*7.6*	*7.1*	*7.1*	*--*	*--*	*Mar-99*
SSgA(Net)	16,787,997	1.8	30.8	-2.8	-0.1	3.5	--	--	--	3.4	Apr-17
Real Asset NL Custom Blended Index				*-2.8*	*0.1*	*4.0*	*--*	*--*	*--*	*3.7*	*Apr-17*
Private Infrastructure(Net)	**22,550,357**	**2.5**	**41.4**	**0.0**	**5.2**	**11.3**	**13.9**	**7.8**	**--**	**7.6**	**Dec-14**
S&P Global Infrastructure Net TR USD				*1.6*	*6.9*	*17.5*	*10.4*	*5.9*	*7.4*	*5.8*	*Dec-14*
KKR Global II(Net)	10,716,881	1.2	47.5	0.0	4.3	9.2	13.5	10.3	--	10.2	Dec-14
North Haven Infrastructure II(Net)	8,039,283	0.9	35.7	0.0	5.5	13.6	15.2	--	--	7.8	May-15
ISQ Global Infrastructure Fund II(Net)	2,216,124	0.2	9.8	0.0	6.4	11.5	--	--	--	-13.0	Jul-18

	Market Value ($)	% of Portfolio	% of Sector	1 Mo (%)	Fiscal YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
KKR Global Infrastructure Investors III(Net)	1,388,594	0.2	6.2	0.0	0.4	-4.6	--	--	--	-14.0	Jan-19
Ardian Infrastructure Fund V(Net)	189,475	0.0	0.8	0.0	--	--	--	--	--	0.0	Oct-19
Private Natural Resources(Net)	**15,154,828**	**1.7**	**27.8**	**0.0**	**5.3**	**10.2**	**10.4**	--	--	**16.4**	**Sep-15**
S&P Global Natural Resources Index TR USD				*-7.6*	*-4.9*	*-1.2*	*3.6*	*3.7*	*1.7*	*10.6*	*Sep-15*
Taurus Mining(Net)	3,774,731	0.4	24.9	0.0	7.0	11.4	11.0	--	--	17.3	Sep-15
GSO Energy Opportunities(Net)	3,623,832	0.4	23.9	0.0	0.1	4.5	7.2	--	--	14.4	Nov-15
Taurus Mining Annex(Net)	3,439,922	0.4	22.7	0.0	12.2	16.4	28.1	--	--	28.1	Jan-17
EnCap XI(Net)	1,289,184	0.1	8.5	0.0	-6.9	-7.5	--	--	--	-27.2	Jul-17
EnCap IV(Net)	1,145,122	0.1	7.6	0.0	8.2	23.7	--	--	--	1.7	Feb-18
BlackRock Global Energy and Power Infrastructure Fund III LP(Net)	961,238	0.1	6.3	0.0	--	--	--	--	--	--	Jul-19
Tailwater Energy Fund IV, LP(Net)	920,799	0.1	6.1	0.0	--	--	--	--	--	0.0	Oct-19
Cash(Net)	**15,114,112**	**1.7**	**1.7**	**0.2**	**1.0**	**1.4**	--	--	--	--	
Cash(Net)	12,118,103	1.3	80.2	0.2	1.3	2.0	1.5	1.1	--	--	Sep-03
Treasury Cash(Net)	2,996,009	0.3	19.8								

**One or more accounts have been excluded from the composite for the purposes of performance calculations and market value.*

Benchmark History

As of January 31, 2020

Total Fund		
1/1/2020	Present	21% Custom Blended US Equity Benchmark / 10% Custom Blended Developed International Equity Benchmark / 8% Custom Blended Emerging Markets Benchmark / 18% Custom Blended US Fixed Income Benchmark / 10% Hedge Fund Custom / 15% Custom Blended Private Equity Benchmark / 5% Custom Blended Real Assets Benchmark / 8% Custom Blended Real Estate Benchmark / 5% 50% Barclays US Aggregate / 25% Barclays US High Yield / 25% Credit Suisse Leveraged Loans
7/1/2019	12/31/2019	21% US Equity Custom / 18% International Equity Custom / 18% US Fixed Custom / 10% Hedge Fund Custom / 15% Thomson Reuters Cambridge Private Equity Index / 5% Real Asset Custom / 8% NCREIF ODCE (net) / 5% 50% Barclays US Aggregate / 25% Barclays US High Yield / 25% Credit Suisse Leveraged Loans
1/1/2019	6/30/2019	21% US Equity Custom / 18% International Equity Custom / 23% US Fixed Custom / 10% Hedge Fund Custom / 15% Thomson Reuters Cambridge Private Equity Index / 5% Real Asset Custom / 8% NCREIF ODCE (net)
1/1/2017	12/31/2018	27% US Equity Custom / 23% International Equity Custom / 22% US Fixed Custom / 5% Hedge Fund Custom / 9% Thomson Reuters Cambridge Private Equity Index / 14% Real Asset Custom
7/1/2014	12/31/2016	22.7% Russell 1000 / 5.7% Russell 2000 / 23.6% International Equity Custom / 28.5% US Fixed Custom / 4.5% Hedge Fund Custom / 8% NCREIF ODCE (net) / 7% Cambridge Assoc. U.S. Private Equity Legacy Index
Total Fund w/o Alternatives		
1/1/2017	Present	37.5% US Equity Custom / 31.94% International Equity Custom / 30.56% US Fixed Custom
7/1/2014	12/31/2016	28.2% Russell 1000 / 7.1% Russell 2000 / 29.3% International Equity Custom / 35.4% US Fixed Custom
US Equity		
1/1/2020	Present	Russell 3000
12/31/1994	12/31/2019	80% R1000 / 20% R2000
International Equity		
1/1/2019	Present	56% MSCI EAFE Gross / 44% MSCI Emerging Markets Gross
1/1/2017	12/31/2018	69.56% MSCI EAFE Gross / 30.44% MSCI Emerging Markets Gross
7/1/2013	12/31/2016	MSCI ACWI ex USA Gross
Developed International Equity		
1/1/2020	Present	80% MSCI EAFE / 20% MSCI ACWI ex US Small Cap
1/31/2008	12/31/2019	MSCI EAFE
Emerging Markets Equity		
1/1/2020	Present	MSCI Emerging Markets
4/30/2012	12/31/2019	MSCI Emerging Markets Gross
US Fixed Income		
1/1/2020	Present	BBgBarc US Aggregate TR

12/31/1994	12/31/2019	US Fixed Custom
Opportunistic Credit		
5/1/2019	Present	50% BBgBarc US Aggregate TR / 25% BBgBarc US High Yield TR / 25% Credit Suisse Leveraged Loans
Private Real Estate		
1/1/2020	Present	NCREIF ODCE (lagged one quarter)
3/31/1999	12/31/2019	NCREIF ODCE (net)
Private Equity		
1/1/2020	Present	50% Cambridge Associates Global Private Equity Index / 50% Cambridge Venture Capital (1 Quarter Lagged)
6/30/2005	12/31/2019	Thomson Reuters Cambridge Private Equity Index
Hedge Fund		
7/1/2017	Present	100% HFRI Fund of Funds Composite Index
1/1/2015	6/30/2017	50% HFRI Fund of Funds Composite Index / 50% HFRI RV: Multi-Strategy Index
Real Assets		
1/1/2020	Present	50% Cambridge Infrastructure (1 Quarter Lagged) / 50% Cambridge Energy Upstream & Royalties & Private Energy
3/31/1999	12/31/2019	Real Asset Custom
Private Infrastructure		
12/31/2014	Present	S&P Global Infrastructure Net TR USD
SSgA		
4/30/2017	Present	25% Bloomberg Roll Select Commodities Index TR USD / 25% S&P Global LargeMidCap Commodity and Resources NR USD / 10% S&P Global Infrastructure TR USD / 15% DJ US Select REIT TR USD / 25% BBgBarc US TIPS TR

Annual Investment Expense Analysis
As Of January 31, 2020

Name	Fee Schedule	Market Value	Estimated Fee Value	Estimated Fee
Total Fund w/o Alternatives		**$657,056,701**		
US Equity		**$239,954,251**		
Mellon Dynamic US Equity	0.30% of Assets	$104,394,976	$313,185	0.30%
Mellon Large Cap	0.04% of First 100.0 Mil, 0.02% Thereafter	$100,417,830	$40,084	0.04%
DFA Small Cap	0.35% of Assets	$16,350,341	$57,226	0.35%
PanAgora	0.80% of Assets	$18,791,104	$150,329	0.80%
International Equity		**$187,524,042**		
Developed International Equity		**$111,279,248**		
Acadian ACWI ex U.S. Small Cap Equity	0.99% of Assets	$10,754,033	$106,465	0.99%
Driehaus International Small Cap Growth	0.90% of Assets	$11,381,997	$102,438	0.90%
GQG International Equity	0.50% of Assets	$45,074,718	$225,374	0.50%
First Eagle International Value Fund	0.79% of Assets	$44,068,500	$348,141	0.79%
Emerging Markets Equity		**$76,244,794**		
Artisan Developing World TR	1.05% of Assets	$55,878,154	$586,721	1.05%
RWC	0.87% of Assets	$20,366,640	$177,190	0.87%
US Fixed Income		**$182,383,755**		
Barrow Hanley	0.30% of First 50.0 Mil, 0.20% of Next 100.0 Mil, 0.15% Thereafter	$66,952,683	$183,905	0.27%
Vanguard Short-Term Treasury Index Fund	0.05% of Assets	$24,995,521	$12,498	0.05%
Vanguard Total Bond Market Index Fund	0.04% of Assets	$90,435,551	$31,652	0.04%
Opportunistic Credit		**$47,194,653**		
PIMCO Income Fund	0.50% of Assets	$25,661,337	$128,307	0.50%
GoldenTree Multi-Sector Credit	0.75% of Assets	$21,533,316	$161,500	0.75%

Name	Fee Schedule	Market Value	Estimated Fee Value	Estimated Fee
Private Real Estate		**$56,798,368**		
Greenfield Gap VII		$8,655,272		
Patron Capital V		$5,101,833		
UBS Trumbull Property		$37,979,309		
Carlyle Realty VIII		$1,102,242		
Taconic CRE Dislocation Fund II		$2,838,129		
Carmel Partners Investment Fund VII		$154,200		
AG Realty Value Fund X, L.P.		$967,383		
Invesco IV		$0		
Invesco VI		$6,586,534		
Ocean Avenue II		$9,893,781		
Pantheon I		$785,079		
Pantheon II		$3,777,159		
Pantheon Secondary		$822,421		
Raven Asset Fund II		$3,471,659		
Davidson Kempner Long-Term Distressed Opportunities Fund IV		$3,682,239		
GTCR Fund XII		$2,100,474		
Carrick Capital Partners III		$1,318,509		
Cressey & Company Fund VI		$1,061,715		
TCV X		$1,549,032		
Accel-KKR Growth Capital Partners III		$815,418		
Genstar Capital Partners IX		$1,572,115		
Cortec Group Fund VII		$3,001,995		
Hedge Fund		**$78,499,547**		
Sculptor (OZ) Domestic II	Performance-based 1.50 and 20.00	$11,158,792	$218,539	1.96%
Graham Absolute Return	Performance-based 1.75 and 20.00	$7,602,455	$133,043	1.75%

Name	Fee Schedule	Market Value	Estimated Fee Value	Estimated Fee
Wellington-Archipelago	Performance-based 1.00 and 20.00	$12,431,596	$124,316	1.00%
KLS Diversified	Performance-based 2.00 and 20.00	$9,167,065	$199,186	2.17%
Winton	Performance-based 0.90 and 20.00	$6,227,525	$56,048	0.90%
Marshall Wace Eureka	Performance-based 2.00 and 20.00	$3,414,839	$72,258	2.12%
Silver Point Capital	Performance-based 2.00 and 20.00	$12,602,845	$307,175	2.44%
Laurion Capital		$5,427,838		
Taconic Opportunity Fund		$10,466,591		
Real Assets		**$54,493,182**		
SSgA	0.30% of First 50.0 Mil, 0.27% of Next 50.0 Mil, 0.25% Thereafter	$16,787,997	$50,364	0.30%
Private Infrastructure		**$22,550,357**		
KKR Global II		$10,716,881		
North Haven Infrastructure II		$8,039,283		
ISQ Global Infrastructure Fund II		$2,216,124		
KKR Global Infrastructure Investors III		$1,388,594		
Ardian Infrastructure Fund V		$189,475		
Private Natural Resources		**$15,154,828**		
EnCap XI		$1,289,184		
EnCap IV		$1,145,122		
GSO Energy Opportunities		$3,623,832		
Taurus Mining		$3,774,731		
Taurus Mining Annex		$3,439,922		
BlackRock Global Energy and Power Infrastructure Fund III LP		$961,238		
Tailwater Energy Fund IV, LP		$920,799		
Cash		**$15,114,112**		
Cash		$12,118,103		
Treasury Cash		$2,996,009		

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.

MEKETA
INVESTMENT GROUP

Merced County Employees' Retirement Association

February 27, 2020

Moving Private Markets to 1 Quarter Lag Reporting

Officially Moving to 1 Quarter Lag for Private Markets (Private Equity, Real Estate, & Real Assets)

- As discussed within materials presented at the previous meeting on January 23, 2020, Meketa is proposing moving private markets reporting from a 1-month lag to a 1-quarter lag. If approved, this would require a performance holiday or an adjustment of 1 quarter.

We explain below how a performance holiday would affect MCERA's returns :

- Current Q4 Performance: Market values for private assets show up-to-date 9/30 valuations, adjusted for net cash flow activity through October, November and December. That is, cash flow activity for contributions into the fund and distributions out of the fund.
- Private markets would report zero returns through January and February. That is, no 12/31 valuations would be reported.
- Q1 2020 Performance: Market values for private assets would reflect up-to-date 12/31 valuations, adjusted for net cash flow activity through January, February and March.
- Future reporting would omit any intra-quarter performance returns. Performance would only be presented on a quarterly basis, in line with industry best practice. Cash flows would be updated each month.

Item 3

Merced County Employees' Retirement Association (MCERA)
RETIREMENT BOARD AGENDA ITEM

DATE: February 27, 2020

TO: MCERA Board of Retirement

FROM: Kristie Santos, Plan Administrator

SUBJECT: MCERA to enter CPAS Cloud

ITEM NUMBER: 3

ITEM TYPE: Action

DISCUSSION:

The Merced County Employees' Retirement Association ("MCERA") is considering contracting with CPAS to be part of the CPAS Cloud. There are many documented security and performance enhancements which MCERA would realize immediately.

Costs to enter the CPAS cloud would consist of the following costs:

- Yearly cost of $73,284 for hosting services;
- Contract term of 5 years;
- Payments begin after 30 days of signing contract.

There are some fees which are not included in this item such as Cognos licensing fees and any work to upgrade our current version of CPAS from existing IS County servers to the CPAS Cloud.

Staff recommends migrating to the CPAS cloud and authorizing the Plan Administrator to execute a contract with CPAS pending legal review.

MCERA
MERCED COUNTY EMPLOYEES' RETIREMENT ASSOCIATION

INVESTMENT POLICY STATEMENT

Adopted: February 23, 2017
Amended: February 27, 2020

Table of Contents

PART I

POLICY PERSPECTIVES

1.0 INTRODUCTION AND POLICY STATEMENT

1.1 Introduction

The Merced County Employees' Retirement Association's ("MCERA" or "Plan") Investment Policy Statement is a document which establishes and outlines the responsibilities of the various parties that are associated with the management of the MCERA. In addition, this document states various control procedures to ensure that the MCERA is appropriately managed. Reports from investment managers, the custodians, consultants and others must verify that they are operating within the framework of the Plan's guidelines.

1.2 Policy Statement

Notwithstanding any other provisions to the contrary, the policy of the Board of Retirement ("Board") of the Merced County Employees' Retirement Association shall be to invest public funds in a manner that is consistent with the County Employees' Retirement Law of 1937, as well as State and Federal laws. The fundamental mission of MCERA is to provide retirement and other benefits to plan participants and to invest Plan assets solely in the interest of Plan participants and beneficiaries.

2.0 POLICY SCOPE

This policy shall set forth guidance and requirements for the investment activities conducted by the Board. The funds eligible for investment are all those under the direct authority of the Board.

3.0 POLICY OBJECTIVES

The basic objectives of the Board's investment program are the following:

3.1 Board Management Objectives

a) Ensure Plan's ability to pay benefits to Plan Participants;
b) Increase funding ratio to ensure long-term sustainability of MCERA;
c) Keep Plan contributions as low as possible once objectives #1 and #2 are met.

3.2 Basic Goals

The goals of the Board are to fund the Plan's benefit payments, while assuming a risk posture that is consistent with the Board's risk tolerance, protect against loss of purchasing power by achieving rates of return above inflation, and seek to obtain a fully funded pension plan status.

3.3 Investment Objectives

The Board's long-term investment objectives are as follows:

a) At a minimum, achieve a nominal return equivalent to the MCERA's actuarial assumed rate of return.
b) Earn a total return that averages in excess of the Actuarial Inflation Rate.
c) Exceed the return of MCERA's passive, market-based, investment benchmark. Allocations to specific asset classes are based on MCERA's target asset mix, which is based on the MCERA's most recent asset allocation study.

4.0 GOVERNANCE

4.1 Board of Retirement's Role and Responsibilities

The MCERA Board of Retirement (“Board”) holds the fiduciary responsibility for MCERA. The Board understands it may delegate certain responsibilities under the Investment Program for purposes of administrative efficiency and expertise. The areas the Board may not delegate include:

- The governance model of the Investment Program
- Establishing and maintaining investment policy, including:
    - Investment philosophy
    - This Investment Policy Statement (IPS)
    - Investment objectives
    - Strategic asset allocation
    - Allocation-level performance benchmarks
    - Risk philosophy
- Engaging Board consultants and service providers
- Monitoring the Investment Program

The Board shall act according to the "prudent person rule," which shall be applied in the context of MCERA’s investment portfolio. The Board reserves the right to hold all parties doing business with MCERA accountable. The Board reserves the right to delegate an individual to hold an advisory board seat on any Plan investment. The Fund will be invested in a manner consistent with the County Employees' Retirement Law of 1937 and State and Federal laws.

The Investment Policy Statement will be reviewed at least every 3 years.

4.2 Staff Role and Responsibilities

MCERA Staff (“Staff”) is broadly responsible for supporting the Board in the effective execution of the Plan. Staff has been delegated authority to execute specific elements of the Investment Program as outlined herein.

- Prepare and Review Recommendations to the Board
- Monitor all transactions and cash flows
- With Board direction, execute cash flows between manager accounts
- Monitor and reconcile custodial bank and managers
- Maintain Investment Manager Watch List
- Notify Manager(s) of their Watch List status
- Monitor for accuracy and validity of invoices and statements
- Provide external managers with IPS
- Ensure compliance with contractual agreements
- Plan Administrator has the authority to manage the investments managers and consultants
- Staff shall act according to the "prudent person rule," which shall be applied in the context of MCERA’s investment portfolio.
- Staff shall act reasonably as custodians of the public trust, and shall recognize that the investment portfolio is subject to public review and evaluation. The overall management of the Retirement program shall be designed and managed with a degree of professionalism that is worthy of the public trust.

4.3 General Investment Consultant

The General Investment Consultant ("Consultant") is engaged by the Board to provide independent, objective investment advice, free of conflicts of interest. The Consultant is and shall agree to be a fiduciary to the Plan under California law. The Consultant works with Staff in the development of recommendations while recognizing its fiduciary duty is to provide prudent investment advice to the Board. The Consultant provides advice without discretionary authority to execute on its advice. The specific duties of the Consultant are contained in an Agreement for Investment Consulting Services, and generally include providing advice with respect to:

- Investment strategy development and implementation
- Investment policy development
- Asset allocation among classes and subclasses
- Investment manager selection, evaluation and termination
- Investment performance monitoring
- Investment risk monitoring
- Capital markets projections
- Coordination with the Plan's actuary in conducting periodic asset/liability studies and other required reporting
- Board education
- Collaborate with Staff on Maintaining Watch List

4.4 Specialty Investment Consultants

Specialty Investment Consultants may be hired by the Board to work with Staff, the Board, the General Investment Consultant, other consultants hired by the Board. These will typically be asset class consultants (e.g., real estate, private equity, hedge funds) that may operate on a discretionary or non-discretionary basis, as directed by the Board, to meet the objectives of the Investment Program.

4.5 Investment Managers

Investment Managers are delegated the responsibility of investing and managing Plan assets in accordance with this IPS and all other applicable laws and terms of the applicable investment documents evidencing MCERA's acquisition of an interest in an investment vehicle, and other controlling documents. Each Investment Manager must be 1) an investment advisor registered under the Investment Advisors Act of 1940 and with the Securities and Exchange Commission and/or the applicable regulatory authority in their domiciled country; 2) a bank, as defined by the Act; 3)an insurance company qualified under the laws of more than one state to perform the services of managing, acquiring or disposing of the Plan's assets; 4) a trust operating as an investment company under the Investment Company Act of 1940; or 5) a state chartered trust company authorized to carry on a trust banking business. Each Investment Manager shall agree that it is a fiduciary of the Plan under California law. Subject to this IPS and their specific contractual obligations to the Plan, Investment Managers are responsible for making all investment decisions on a discretionary basis regarding assets placed under their jurisdiction and will be accountable for achieving their investment objectives. Such discretion shall include decisions to buy, hold, and sell investments in amounts and proportions that are reflective of the stated investment mandate. Such investment managers will maintain proper and adequate insurance coverage's including errors & omissions, surety bond, fiduciary liability. In addition, MCERA's investment managers agree to notify the Board Chairman and the Plan Administrator, in writing, if they are unable to continue acting in the capacity of a fiduciary or investment advisor. As stated above, investment managers are expected to act as prudent experts in the management of a fully-discretionary account(s) for MCERA and agree to be fiduciaries to the Plan. In fulfilling their roles, managers will continually educate the Board about capital market developments that pertain to their area of investment expertise.

Investment managers are expected to meet applicable investment objectives over the designated time horizon. If such objectives become unreasonable for any reason, it is the manager's responsibility to communicate his/her reservations about the objectives in writing to the Board Chairman and the Plan Administrator. Otherwise, failure to meet these objectives may result in dismissal.

Satisfying the quarterly portfolio reporting and monitoring requirements of the Plan is also an important part of the manager's responsibilities. These requirements are stated in a subsequent section of this document. Past or any anticipated significant portfolio developments, as well as major changes in the firm's ownership, organizational structure and personnel, should be immediately communicated in writing via e-mail to the Board and its investment consultant. Such communication will in turn be provided to the Board members.

It is the responsibility of each investment manager to provide a current version of its internal code of ethics. Additionally, once a year the manager will provide updated copies of investment and other policies developed by the firm that are relevant to MCERA and its portfolio(s). Policies will be given to the MCERA Staff.

Individual investment managers are hired by the Board to achieve the Plan's goals and investment objectives. In addition, managers are hired to implement Plan's asset allocation decisions, as evidenced by stated fund target asset mix in Appendix A. To the extent possible, investment managers will be hired to fulfill the Plan's diversification policies.

Investment managers are required to inform the Board of any regulatory investigations/ judgments and court cases relating to trading activities. If the investment managers conduct on-going internal reviews of trading activities, results of these reviews will be supplied to the Board.

The Board of Retirement reserves the right to terminate an investment management contract in accordance with the investment agreement for any reason.

4.6 Custodial Bank

The Custodial Bank, selected by the Board to act as the principal custodian of assets of the trust, is delegated the responsibility of holding the assets and evidence of interests owned by the MCERA in investment vehicles and cash (and equivalents). The Board may authorize the Custodial Bank to invest in temporary short-term fixed income investments both for the investment strategies and as a part of the cash portion of Plan assets. Such investments will be managed in general accordance with short-term fixed income investment guidelines as detailed in the custodial agreement. The Custodial Bank, according to the custodial bank agreement/contract, may be authorized to conduct a securities lending program within liquidity and risk constraints as authorized by the custodial agreement.

PART II

MCERA's PORTFOLIO MANAGEMENT

5.0 INVESTMENT POLICIES

5.1 Diversification

As it is prudent to diversify investment risk, the Board has adopted an asset allocation mix to invest in several institutionally acceptable asset classes.

5.2 Managers Diversification and Investment Style

As part of the diversified asset class investment approach of MCERA, the Board will also seek to employ a diverse group of investment portfolio managers within a specific asset class, if the size of the asset class commitment warrants more than one investment manager. Investment style and market capitalization will be used to differentiate among managers in the same domestic and international equity asset classes. The purpose of this diversification is to allow participation in various phases of a market cycle. Investment style diversification will also be applied to MCERA's investments in other asset classes if deemed appropriate.

5.3 Asset Allocation

The Board has adopted a strategic asset allocation based on MCERA’s projected actuarial liabilities, liquidity needs, risk tolerance and the risk/return expectations for various asset classes. This asset allocation seeks to optimize long-term returns for the level of risk the Board considers appropriate. The current asset allocation table may be found in Appendix A: Asset Allocation Plan and Target Mix.

Since projected liability and risk/return expectations will change over time, the Board will conduct a periodic review of the strategic asset allocation to maintain an expected optimal allocation. The Board may also revise the asset allocation in response to significantly changing conditions that have affected valuations and/or forward-looking expected returns of asset classes. The Board will review capital market expectations annually.

PART III

INVESTMENT GUIDELINES

6.0 INVESTMENT MANAGERS RESPONSIBILITIES, POLICIES AND GUIDELINES

6.1 Investment Manager Policies

The investment policies governing each investment manager hired by the MCERA are as follows:

a) The investment manager is required to accept the responsibilities in Section 4.5. These responsibilities include acting as a prudent expert and agreeing to be a fiduciary to the MCERA. The investment manager will seek to satisfy the Board's investment objectives. If a problem exists with these objectives, it is the investment manager's responsibility to formally discuss these problems in a written communication to the Board Chairman and the Plan Administrator. Also, the investment manager agrees to satisfy the Board's prescribed quarterly reporting requirements.

b) Under any and all capital market environments, the investment manager agrees to maintain the investment approach that they were hired to implement. Changes to the investment manager's investment decision making process are to be immediately reported in writing to the Board Chairman and Plan Administrator. On-going introspective research of the firm's investment process, analytics, inputs, and decision-making process will be regularly explained in writing to the Board Chairman and Plan Administrator. It is the responsibility of the investment manager to fully educate the Board as to the specifics of its investment process and internal research that may lead to changes in the firm's investment approach.

c) An investment portfolio constructed for the MCERA is expected to generally conform to other portfolios managed by the investment organization, exclusive of specific investment guidelines. When the MCERA's guidelines require the investment manager to manage a portfolio significantly different than its other portfolios, it is the responsibility of the investment manager to communicate in writing the potential impact of the MCERA's guidelines on the portfolio. Notification in writing shall be to the Board Chairman and the Plan Administrator.

d) The investment manager will otherwise treat the MCERA's portfolio in a manner similar to other comparable portfolios in portfolio construction, trading, and all other aspects.

e) The members of the investment management firm's research and portfolio teams are expected to comply with the Chartered Financial Analyst (CFA) Standards of Practice and Code of Ethics. Any industry or regulatory disciplinary action taken against members of the firm's investment staff must be immediately reported in writing to the Board Chairman and Plan Administrator in writing.

f) Portfolios managed for the MCERA are fully discretionary, but must meet the provisions of the MCERA's investment objectives and policies. Investment guidelines also exist for each investment manager within the major asset classes.

g) If the Board delegates proxy voting responsibilities to an investment manager, the manager agrees to vote all proxy ballots according to the best economic interest of the MCERA's members and in a manner consistent with the Board's proxy policies.

h) Investment managers agree to actively support the MCERA's securities lending and commission recapture programs.

6.2 Derivatives Investing Policies

Exposure to risk by use of derivative instruments must be consistent with MCERA’s overall investment policy as well as an individual Manager’s Specific Investment Guidelines. Any other derivative investment purpose may be allowed by the explicit authorization of the Board. Derivatives may not be introduced into the portfolio to create economic leverage or to create investment exposures that are otherwise excluded by MCERA's Investment Policy unless authorization is given by the Board. Should there be any conflict between an individual Manager’s Specific Investment Guidelines and this Policy statement regarding the use of derivative instruments, the MCERA IPS shall control.

6.3 Investment Manager Guidelines

a) Diversification, Liquidity & Restrictions - Portfolio holdings are expected to be well-diversified, so as to avoid excessive volatility and unsystematic risk to the Plan.

b) Cash and Equivalents - Transactional cash, portfolio assets that are temporarily not invested in authorized, longer term securities as stated below, may either be directly invested in allowable high-grade short-term fixed income investments or may be "swept" into the Plan's custodial short-term investment (money market) commingled fund. Allowable high-grade, short-term fixed income investments are as follows: certificates of deposit, commercial paper, U. S. Treasury bills and repurchase agreements. These investments will have short maturities, typically less than 90 days, but none more than 1 year. If an investment is made in the custodian's money market fund, it is the responsibility of the investment manager to make sure that the money market fund has investment guidelines that comply with MCERA's investment objectives and policy statement. At this time, it is not contemplated to allow investment managers to invest in money market funds other than those offered by the custodian. If an investment manager wishes to use non-custodian provided money market funds, this issue must be addressed in writing and directed to the Plan Administrator and the Chair of the Board of Retirement.

c) Domestic Equity Portfolios – Large, Medium and Small Capitalization

The types of assets that may be held in large capitalization, domestic equity accounts are common stock, preferred stock, convertible securities, with the vast majority of holdings in common stock. Large capitalization domestic equity portfolios will primarily invest in stocks with market capitalizations. The vast majority of equity holdings will be in large capitalization issues. Firm's that manage equity portfolios will continually monitor the risk associated with their equity investments. They will be expected to report on the active management decisions they have assumed relative to their respective benchmarks. As a result of this risk/reward analysis, active equity managers will statistically attribute actual performance variance from their benchmarks in each regular quarterly report. Included in this report will be statistics attributing performance to sector weighting decisions versus the benchmark and security selection decisions within each sector relative to the benchmark.

American Depository Receipts (ADR's) of foreign companies and foreign common stocks traded in U. S. dollars and on U. S. exchanges are authorized investments. ADR's and foreign common stocks traded in U. S. dollars and on U. S. exchanges should not exceed 15% of the portfolio.

Derivative securities may not be held in domestic equity portfolios except to mitigate risk, on a temporary basis, of underlying portfolio holdings. Compliance with the previously stated derivatives guidelines must be met.

No single security can represent more than 7% of the market value of a portfolio at the time of purchase, and no single industry (based on Global Industry Classification System - GICS - codes) can represent more than 25% of the market value of the account. If the manager feels another index is more appropriate, this case should be made in writing to the Board Chairman and Plan Administrator.

The above restrictions and guidelines for large capitalization domestic equity portfolios also apply to mid-capitalization domestic equity portfolios, except for the applicable benchmark related requirements. Mid-capitalization, domestic equity portfolios will invest in stocks with market capitalizations consistent with the Plan's policy benchmarks. If the manager feels another index is more appropriate, this case should be made in writing to the Board Chairman and Plan Administrator.

The above restrictions and guidelines for large capitalization domestic equity portfolios also apply to small capitalization domestic equity portfolios, except for the applicable benchmark related requirements. Small capitalization, domestic equity portfolios will invest in stocks with market capitalizations consistent with the Plan's policy benchmarks. If the manager feels another index is more appropriate, this case should be made in writing to the Board Chairman and Plan Administrator.

International Equity (Large & Small Cap) Portfolios - Developed & Emerging Markets
Assets in international equity portfolios will be primarily composed of foreign ordinary shares and ADR's (including ADR's that are 144A securities). Short term, high-grade fixed income securities may be purchased as previously stated, similar types of securities denominated in foreign currencies may be purchased, or the Fund's custodial sweep account may be employed. International equity portfolios will invest in stocks with market capitalizations consistent with their underlying benchmarks. Emerging market equity portfolios can invest in stocks with large, mid and small market capitalizations. Firms will continually monitor the country, currency, sector and security selection risks associated with their international and emerging market equity portfolios. All of the risks will be included in the manager's quarterly reports and performance attribution based on these factors will also be included. Currency hedging, consistent with the previously stated derivative policy, is an acceptable investment activity. However, prior to initiating such hedging activities, the firms must adequately demonstrate their capability and expertise in this area to the Board.

Large capitalization international equity portfolios will be measured against the Plan's policy benchmark. Small capitalization international equity portfolios will be measured against the Plan's policy benchmark for small cap international equities. Emerging market equity portfolios will be measured against the Plan's policy benchmark in emerging market equities. If the manager feels another index is more appropriate, this case should be made in writing to the Board Chairman and Plan Administrator.

d) Hedge Funds

The role of hedge funds is to provide a diversified set of risk exposures, little-to-no correlation to the broader equity and credit markets and achieve an attractive risk-adjusted return. The long term investment objective is to exceed LIBOR by 4%.

It is expected that the hedge fund composite (the aggregation of all hedge funds employed by the Plan) should outperform the Policy benchmark for hedge funds, over rolling 3-5 year period.

The hedge fund program will have the flexibility to invest as it sees fit but will typically invest through multi-strategy hedge funds and/or single strategy hedge funds. The Board shall establish investment guidelines for the hedge fund portfolio in aggregate and shall select Investment Managers it believes are positioned to achieve the stated objectives.

The Fund seeks to be diversified across and within strategies, without regard to the specific vehicle (i.e., recognizing that Portfolio Funds may encompass more than one strategy). The following look-through exposure categories may be represented in the Fund:

Market Neutral strategies such as equity market neutral, fixed income arbitrage, and convertible bond arbitrage.

Event Driven strategies such as risk arbitrage, merger arbitrage, activist and other event-driven strategies.

Credit/Distressed strategies such as capital-structure arbitrage, fixed-income arbitrage, and distressed debt/equity.

Equity long/short strategies where there is combination of long and short positions primarily in publicly-traded equities, with a net market exposure less than that of the overall equity market. Strategies may be focused on U.S., non-U.S., and/or specialty mandates.

Global Macro strategies such as all market portfolios, opportunistic long-only, managed futures, currency, dedicated short selling strategies or other specialty strategies.

Multi-strategies where hedge funds invest using a combination of previously described strategies.

The targeted exposure to each strategy is shown in the below table:

Strategy	Target	Min	Max
Market Neutral	18%	10%	30%
Credit/Event	32%	20%	40%
Equity L/S	25%	15%	35%
Global Macro	15%	10%	20%
Multi-Strat	10%	5%	20%
	100%		

Individual hedge fund investments may have specified liquidity parameters defining lock-up periods and withdrawal frequency. Liquidity risk is managed by monitoring and maintaining a schedule of the liquidity of the individual hedge funds and aggregating it at the total Hedge Fund Program level.

e) Private Equity & Private Real Assets

The private markets are inefficient and illiquid due partially to privately negotiated, non-auction pricing mechanisms. High return premiums are expected by investors who are willing to accept the illiquid and inefficient characteristics of the private markets. Therefore, the long-term expected return from private equity markets should exceed the expected return of public equity markets by at least 3%. The long term expected return from the private real assets portfolio should exceed inflation by 5%.

Controlling risk in the private portfolio is equally as important as seeking higher returns. Because private asset classes cannot measure risk in a traditional manner (using quantitative risk measures like standard deviation and benchmark tracking error), risk will be managed through a combination of quantitative and qualitative constraints, such as diversification of investment type and thorough due diligence.

The criteria used to develop partnership allocations will consist of (and not be limited to) geographic location, industry investment orientation, financial funding stage orientation, source of deal flow, and investment size.

Recognizing the importance of vintage year diversification and adequate portfolio diversification by investing in different types of private asset investments, partnerships or other vehicles with managers representing various investment styles, industries and geographic concentrations, an annual plan will be developed and presented to the Board. The annual plan will reflect the pace of commitments and forecasted cash flows which is expected to achieve MCERA's targeted allocation to the private asset class over a reasonable time period. This annual plan will be integrated with the existing portfolio and will be based on the prevailing economic environment and market conditions.

Performance will be reported on a vintage year internal rate of return (IRR) basis. Internal rate of return is a total dollar weighted rate of return where the discount rate equates the net present value (NPV) of an investment's cash inflows with its cash outflows. Vintage year is the year of fund formation and first takedown of capital. The long-term objective is to outperform the benchmark, net of investment management fees, calculated on an IRR basis over rolling ten-year periods. The individual investment vehicle performance, as measured by the internal rate of return, will be evaluated compared to the performance of respective peer universes and vintage years. It is recognized that immature private equity investments will ordinarily have a “J-curve effect” whereby there are low to negative returns in the initial years due to the payment of investment management fees during a period when investments are typically carried at cost and returns have not been realized.

Asset allocation is a critical driver for the long-term success of the private equity program. To control asset allocation risk, investments are diversified through long-term subclass parameters:

- Leveraged Buyouts/Corporate Finance: the acquisition of a product or business that is typically further along the business life cycle, having relatively predictable cash flows and the ability to raise capital utilizing a significant amount of debt and little or no equity.

- Venture Capital: targets companies in the earliest phases of a business cycle. Companies may be classified as seed, early, middle and late stage. These companies have uncertain revenues and a need for cash to build their businesses and are subject to high failure rates

- Special Situations: includes investments in distressed debt, mezzanine, sector, opportunity, and secondary funds.

- Geography/Domestic vs. Global: investments either made in the United States or investments made outside of the U.S. including Europe, Asia, and Canada.

- Infrastructure: investments will be in companies or assets that fall into the infrastructure sector both in domestic and international markets.

- Natural Resources: investments will be in companies or assets that fall into the energy, mining, agriculture and/or timber industries in both domestic and international markets.

Risk will also be controlled by liquidity, vintage year, investment managers, firm, time and geographic and economic region.

- Private investments are illiquid and typically have expected holding periods of 10-12 years. Investments are typically held until maturity and selling prior to maturity may result in realizing a sales price that reflects a discount to fair market value. Liquidity risk is managed by minimizing the possibility of forced sales that may arise from exceeding maximum exposure limits or lowering asset allocation targets to private equity investments.

- Vintage year reflects the year of fund formation and first takedown of capital. Vintage risk refers to the variability of private equity commitments over time. A secondary investment is a vehicle in the special situation subclass that allows the portfolio to gain prior year vintage exposure, further minimizing vintage risk.

- Manager risk consists of the exposure within a partnership and the number of general partners in the private equity portfolio. Most partnerships require minimum commitments, which help control the exposure of partnerships.

- Commitments will be made over the full course of the business cycle and will not be concentrated in any one year.

- Geographic and Economic Region: In the selection of private equity investments, the portfolio will not favor particular economic or geographic regions. Most likely, the focus will be globally oriented.

- MCERA shall ordinarily direct the sale of any securities distributed by its investment vehicles as soon as practically possible and strive to not impair the value of the security.

- Alignment of Interests: General partnership agreements will be actively negotiated. The partnership agreements will ensure that the interests of the general partner are aligned with the limited partners.

For the Private Equity portfolio, the targeted and range of investment exposures, measured at fair value, to the various private equity investment classes are shown in the following table:

	Target	Ranges
Buyout	60%	40-80%
Venture/Growth Eq	20%	10-30%
Opportunistic	20%	10-30%
	100%	

For the Private Real Assets portfolio, the objective is to have the portfolio comprised of half infrastructure investments and half natural resource investments.

If the manager feels another index is more appropriate, this case should be made in writing to the Board Chairman and Plan Administrator.

f) Domestic Fixed Income Portfolios

Acceptable security types for domestic fixed income portfolios are certificates of deposit, commercial paper, other high grade short-term securities, U. S. Government and Agency securities, corporate bonds, mortgage- and asset-backed securities[1] and Yankee bond securities. In addition, taxable municipal bonds, commercial mortgages and trust preferred securities are acceptable security types. Cash and equivalent holdings may be comprised of high grade certificates of deposit, commercial paper, U. S. Treasury bills and repurchase agreements.

Firm's that manage fixed income portfolios will continually monitor the risk associated with their fixed income investments. They will be expected to report on their active investment management decisions they have assumed relative to their respective benchmarks. Statistics which relate performance variance to effective duration decisions, yield curve positioning, sector allocation, security selection and other portfolio management decisions will be included in each quarterly report. Also, to the extent possible, various interest rate scenarios will be depicted in horizon analysis testing, with time horizons spanning the next six months to one year, or longer.

As mentioned above, investments in Yankee bond securities (U.S. dollar denominated international bonds that are registered with the Securities & Exchange Commission) are an acceptable investment.

No single security can represent more than 5% of the market value of a portfolio at the time of purchase, and no single industry (based on Global Industry Classification System - GICS - codes) can represent more than 15% of the market value of the account. These single security and single industry restrictions do not apply to U. S. Government and Agency bond holdings.

g) Opportunistic

Fixed income portfolios that may include credit. Acceptable security types for opportunistic portfolios may include high yield (or below-investment grade) corporate debt and bank loans, sovereign bonds, emerging market debt, investment grade corporate debt, and securitized debt.

The same fundamentally-based research effort required of domestic fixed income managers is also required of opportunistic managers. The goal of the opportunistic credit allocation, either publicly syndicated or privately originated, is to generate high total returns, and/or hedge rising interest rates,

[1]Please note that convertible debt, traditional zero coupon bonds, mortgage-pass through securities and asset-backed securities are technically derivative securities but for the purposes of this Investment Policy Statement these securities are not classified as derivatives. Such investments must be at least BBB rated and meet the risk requirements discussed in the subsequent footnote.

while investing across the full maturity spectrum of corporate securities. Proper diversification is required; such that reasonable risk/reward expectations are maintained. Performance attribution is required, as is the case of domestic fixed income managers. All other requirements of domestic fixed income managers apply to opportunistic fixed income managers.

h) Treasury Inflation Protected Securities (TIPS)

MCERA has also approved the use of TIPS. Either a passive or an active investment approach may be taken toward the management of TIPS portfolios. For active management, the same fundamental and valuation-based research effort required of domestic fixed income managers is also required of TIPS managers. The goal of the TIPS allocation is to protect against inflation and may be implemented through short-term or traditional duration TIPS portfolios. Proper diversification of TIPS portfolios is required; such that reasonable risk/reward expectations are maintained. Performance attribution is required, as is the case of domestic fixed income managers. All other requirements of domestic fixed income managers apply to TIPS portfolios.

i) Real Estate and Private Real Estate

The above restrictions and guidelines for large and small capitalization domestic equity portfolios also apply to Domestic and Global REIT portfolios, except for the following differences. Investments are expected to be primarily in common stocks. A small percentage (less than 10%) may be in preferred stock. No restrictions exist on the market capitalization of Domestic and Global REIT portfolio holdings. In addition, the Domestic and Global REIT benchmarks may have individual security market capitalization weights greater than 5%. As a result, individual security positions in Domestic and Global REIT portfolios may generally reflect the weights in the underlying benchmarks. (It may be that MCERA's Domestic and Global REIT commitment could be in a commingled fund, and that the MCERA would have to accept the investment guidelines of the Domestic and Global REIT fund.)

While global REIT securities are recognized to have real estate and small cap security characteristics, global REIT security portfolios are primarily viewed as an alternative to direct real estate investments or real estate operating companies. These securities also have a higher level of liquidity than direct real estate investments and this is considered a favorable attribute. As such, there is a desire to maintain the favorable liquidity attributes of these securities and not to become over-concentrated in individual portfolio holdings.

In addition to real estate securities, the MCERA will invest in private real estate investment structures that have an ownership interest, directly or indirectly, in real estate properties through either the debt or equity, either income producing or non-income producing. The objective of these funds is to exceed inflation by 5% and to outperform peer universe benchmarks. Real estate funds will be measured against the Plan's policy benchmark in real estate. Diversification will be obtained both through property type and geographical location. It is expected that investments will be primarily in large metropolitan centers. Relatively conservative levels of debt financing will be used in the purchase of income producing real estate properties often called "Core Real Estate". Investments may also be made in investment strategies defined as "Value-Added" or "Opportunistic". "Value-Added" strategies derive their return from both income and appreciation and may include the use of a moderate amount of leverage while "Opportunistic" strategies derive their return primarily through appreciation and they may use a moderate to high degree of leverage. The Core Real Estate Funds are currently the predominant exposure in the Real Estate portfolio and will be used as a placeholder until other private investment opportunities are identified. The criteria used to evaluate such partnerships, the risk parameters that such partnerships will be managed against and the performance benchmarks the individual partnerships will be evaluated by are the same as those outlined in Section 8. Property valuations will be conducted so as to reflect realistic economic value at quarter-end periods.

6.4 Watch List Policy

Purpose of Watch List
In order to more officially monitor and track existing and potential problems at the fund/portfolio management, the Board has adopted the following "watch list" policy. The watch list has been instituted to specifically monitor portfolios and managers on both quantitative and qualitative factors. The purpose of such a list and its procedures is to identify how performance and other issues will be monitored and how they will be responded to in a timely manner. The Board reserves the right to take any action with respect to its investment managers at any time. The watch list policy does not restrict the Board from any action.

Quantitative Screens
The quantitative portion of the watch list will be primarily focused on performance of the fund vs. the appropriate benchmark and peer group.

Qualitative Factors
In addition to the performance screens, several other factors relating to the portfolio/ fund's management and style will be continually monitored. These factors are:

a) The portfolio's fundamental investment characteristics vs. the appropriate market index (benchmark)
b) The portfolio's ability to adhere to its stated investment style
c) Continuity of the portfolio management and analytical research staff members
d) Continuity of firm's senior management and organizational structure
e) Ownership changes of the organization
f) Style drift or changes

Regulatory Developments
The Board reserves the right to take any action with respect to its investment managers at any time.

Watch list status indicates an increased level of concern, but does not indicate major deficiencies. Managers may be placed on MCERA's Watch list for one or more reasons stated below. The Watch list period will be defined by the Board. The Board, with the help of the General Investment Consultant, shall conduct a comprehensive evaluation of the Manager at the end of the one-year Watch list status period to determine whether the Manager may be removed from Watch list status.

A manager may be added to the MCERA Watch List for any of the following criteria:

- Under/Over Performance
- Style Deviation
- Organization Change
- Non-Compliance
- Poor Client Service
- SEC Filings and Investigations
- Fees
- Other criteria as deemed appropriate by the Board of Retirement

Manager may be removed from MCERA's Watch list if the Manager demonstrates adequate improvement in identified areas of concern. The Board reserves the right to remove a manager from the Watch List at any time.

Termination
The Board reserves the right to terminate an investment management contract in accordance with the investment agreement for any reason it deems appropriate.

PART IV

CONTROLS

7.0 PROXY VOTING

Voting Proxy ballots will be for the exclusive benefit of the members and beneficiaries of the Plan. The Board may delegate proxy voting to each respective investment manager.

8.0 TRANSACTIONS, BROKERAGE, AND COMMISSION RECAPTURE PROGRAM

The Board understands their fiduciary responsibility with respect to transactions and hereby instructs their investment managers to seek best execution when conducting all trades. Managers are instructed to seek to minimize commission and market impact costs when trading securities. Also, either internally or through an externally provided transaction cost evaluation service, investment managers are expected to measure the costs associated with their investment trades.

All securities transactions shall be executed through reputable member-firm broker/dealers.

9.0 BOARD REVIEW AND DUE DILIGENCE POLICY

The Board will conduct the monitoring of investment performance and manager structure. On a monthly basis, the Board will review monthly investment reports, investment strategy, market conditions, portfolio manager performance and the status of MCERA's asset allocation plan. The Board, individual trustees or designated Staff and Investment Consultant(s) will meet the Plan's traditional asset class investment managers once every 18 months.

Providing ongoing oversight of the investment management firms selected to invest MCERA's assets is an important component of the fiduciary duty of prudent investment. This oversight involves not only monitoring investment performance, but also includes: (1) Understanding the reasons for positive or negative performance; (2) Assuring consistency in the investment process and philosophy utilized in managing the portfolio; (3) Monitoring the organizational structure and financial stability of the firm; (4) Staying abreast of any regulatory actions or litigation involving the firm; (5) Monitoring the firm's increase or decrease in assets under management; and (6) Obtaining any other information that is relevant and material to understanding the firm's management of MCERA's assets. Conducting periodic on-site due diligence meetings and reviews with investment managers is an excellent method for addressing these oversight responsibilities and for assuring that the continued engagement of a particular investment management firm is prudent and in the best interests of MCERA. Accordingly, the Board will endeavor to perform on-site due diligence visits with investment managers, as necessary. Such on-site due diligence meetings will focus on in-depth manager specific issues relevant to the engagement and a report on the meeting will be presented to MCERA's Board of Retirement. Additional on-site due diligence visits may be undertaken with an investment management firm. The Board may require bi-annual updates on certain investments. Subsequent meetings may be required of the manager with staff and the investment consultant(s).

10.0 POLICY COMPLIANCE REVIEW

This investment policy shall be reviewed every three years at a minimum to ensure MCERA's compliance with the overall objectives of the Investment Policy Committee.

11.0 PORTFOLIO REBALANCING

a) The investment consultant(s) shall monitor the portfolio regularly and report to the Board not less than quarterly on the advisability of rebalancing the portfolio, unless otherwise specified by the Board.

b) In monitoring the portfolio, the consultant shall be guided by the target asset allocation for each asset class in Appendix A. The Board shall also establish acceptable asset allocation ranges for each of the MCERA's investment classes.

c) The Board has authority to issue instructions to managers to liquidate securities for reallocation to other managers or other asset classes, but shall do so only after considering the recommendation of the Plan Administrator and investment consultant(s).

d) The Plan Administrator, in conjunction with the Investment Consultant(s), may prorate net positive cash flows to asset classes that have fallen beneath their target allocation and are approaching the minimum allocation level. The proration may take into account the asset class' percentage of the total portfolio and the magnitude of the deviation from the target.

    i. When all asset classes are within 2 percent of the target allocation, the Plan Administrator may prorate net positive cash flows to each asset class on a rotating basis in order of the asset class' percentage of the total portfolio.

    ii. The Board may review the allocation of assets to each investment manager as part of the Board's asset allocation review.

Appendix A

ASSET ALLOCATION PLAN AND TARGET ASSET MIX

Based on the MCERA's asset allocation study and acceptance of the proposed target asset mix (as stated in the October 2016 Asset Allocation Study report) the following is the MCERA's target asset mix and allocation ranges. The MCERA will review its asset allocation position as needed or a minimum of once every three to five years.

Allocation Ranges

	Target Mix%	Minimum %	Maximum %
Total Domestic Equity	21.0	15.0	26.0
Developed Market Equity	10.0	5.0	15.0
Emerging Market Equity	8.0	4.0	12.0
Private Equity	15.0	5.0	20.0
Real Estate	8.0	6.0	10.0
Domestic Fixed Income	18.0	13.0	23.0
Opportunistic Fixed Income	5.0	3.0	7.0
Hedge Fund	10.0	5.0	15.0
Real Assets	5.0	3.0	7.0

The market benchmarks for the above asset classes are as follows:

~~Large Cap Equity~~	~~Russell 1000 or S&P 500~~
~~Small Cap Equity~~	~~Russell 2000, Russell 2000 Growth or Value~~
US Equity	Russell 3000
Developed International Equity	80/20 MSCI Europe, Australia & Far East Index (EAFE) Net/MSCI ACWI ex US Small Cap Net
Emerging Markets Equity	MSCI Emerging Markets Index Net
Private Equity*	~~Russell 3000 + 3% with 1Q lag,~~ Primary: Cambridge Global Private Equity & Venture Capital 1 Q Index Lagged~~,~~' Secondary: Russel 3000 + 3% 1 Q Lagged
Real Estate	Primary: NCREIF ODCE Property Index 1 Q Lagged; Secondary: CPI + 5%
~~Domestic~~ US Fixed Income	Barclays Capital US Aggregate Bond Index
Opportunistic Fixed Income	50/25/25 Barc Agg/Barc HY/CS Lev Loans ~~Barclays Capital Universal Index~~
Hedge Funds*	HFRI Fund of Funds Composite Index
Real Assets*	Primary: 50/50 Blend of Cambridge Global Infrastructure ~~and~~/ Cambridge Energy Upstream & Royalties and Private Energy Index 1Q Lagged; Secondary: 50/50 Blend S&P Global Infrastructure and S&P Global Natural Resources.
Total Fund Benchmark	Target asset mix percentages are applied to individual asset class benchmarks to arrive at the total fund

	benchmark. The private equity allocation is scaled in over time.
*Please note that Benchmarks for Private Equity, Real Assets and Hedge Funds presented in MCERA Board of Retirement Meetings by the general investment consultant and the specialized investment consultant may differ.	

Appendix B

PLACEMENT AGENT DISCLOSURE POLICY

1. PURPOSE

This Policy sets forth the circumstances under which the Merced County Employees' Retirement MCERA (MCERA) shall require the disclosure of payments to Placement Agents, in connection with MCERA investments in or through External Managers. This Policy is intended to apply broadly to all of the types of investment partners with whom MCERA does business, including the general partners, managers, investment managers and sponsors of hedge funds, private equity funds, real estate funds and infrastructure funds, as well as investment managers retained pursuant to a contract. MCERA adopts this Policy to require broad, timely, and updated disclosure of all Placement Agent relationships, compensation and fees. The goal of this Policy is to help ensure that MCERA investment decisions are made solely on the merits of the investment opportunity by individuals who owe a fiduciary duty to MCERA.

2. APPLICATION

This Policy applies to all agreements with Investment Managers that are entered into on behalf of MCERA. This Policy also applies to existing agreements with Investment Managers. Agreements may be amended in any way to continue, terminate, or extend the term of the agreement or the investment period, increase the commitment of funds by MCERA or increase or accelerate the fees or compensation payable to the Investment Manager (Referred to hereafter as "Amendment".) In the case of an Amendment, the disclosure provisions of this Policy shall apply to the Amendment and original agreement.

3. RESPONSIBILITIES

A. The Board is responsible for:

1. Not entering into any agreement with an External Manager that does not agree in writing to comply with this policy.
2. Not entering into any agreement with an External Manager who has violated this policy within the previous five years. However, this prohibition may be reduced by a majority vote of the Board at a public meeting upon a showing of good cause, as deemed by the Board.

B. Each External Manager is responsible for:

1. Providing a statement in writing that the External Manager will comply with this policy. Notification in writing shall be made to the Chairman of the Board and Plan Administrator.
2. Providing the following information, in writing, to the MCERA Investment Staff within 45 days of the time investment discussions are initiated by the External Manager, but in any event, prior to the completion of due diligence. In the case of Amendments, the Placement Agent Information Disclosure is required prior to execution of the Amendment. All disclosures and notifications shall be made to the Chairman of the Board and the Plan Administrator.
   a. Disclosure of payments or compensation by the External Manager or any of its

principals, employees, agents or affiliates, directly or indirectly, to any person or entity to act as a Placement Agent in connection with MCERA investments.

b. A resume for each officer, partner, principal of the Placement Agent detailing the person's education, professional designations, regulatory licenses and investment and work experience. If any such person is a current or former MCERA Board trustee, employee or consultant or a member of the immediate family of any such person, this fact shall be specifically noted.

c. A description of any and all compensation of any kind provided or agreed to be provided to a Placement Agent, including the nature, timing and value thereof. Compensation to Placement Agents shall include, but not be limited to, compensation to third parties as well as employees of the External Manager who solicit or market investments to MCERA or who are paid based upon investment commitments secured by such employees.

d. A description of the services to be performed by the Placement Agent and a statement as to whether the Placement Agent is utilized by the External Manager with all prospective clients or only with a subset of the External Manager's prospective clients.

e. A written copy of any and all agreements between the External Manager and the Placement Agent.

f. A statement whether the placement agent, or any of its affiliates, are registered with the Securities and Exchange Commission or the Financial Industry Regulatory Association, or any similar regulatory agent in a country other than the United States, and the details of that registration or explanation as to why no registration is required.

g. A statement whether the placement agent, or any of its affiliates, is registered as a lobbyist with any state or national government.

h. The names of any current or former MCERA Board Trustee, employees, or consultants who suggested the retention of the Placement Agent.

3. Providing an update of any changes to any of the information provided pursuant to section B.2 above within 14 calendar days of the date that the External Manager knew or should have known of the change in information.

4. Representing and warranting the accuracy of the information described in section B.2 above.

5. Causing its engaged Placement Agent to disclose, prior to acting as a Placement Agent to MCERA;

   a. All campaign contributions made by the Placement Agent to any publicly elected MCERA Board Trustee during the prior 24-month period. Additionally, any subsequent campaign contribution made by the Placement Agent to any publicly elected MCERA Board Trustee during the time the Placement Agent is receiving compensation in connection with a MCERA investment shall also be disclosed.

   b. All gifts given by the Placement Agent to any MCERA Board Trustee during the prior 24 - month period. Additionally, any subsequent gift made by the Placement Agent to any MCERA Board Trustee during the time the Placement Agent is receiving compensation in connection with a MCERA investment shall also be disclosed.

6. MCERA reserves the right to deem the failure to disclose the information required by 5(a) and 5(b) as a material breach of the agreement with the External Manager.

C. MCERA Staff ("Staff") are responsible for:

1. Providing External Managers with a copy of this Policy at the time that discussions are initiated with respect to a prospective investment or engagement.

2. Confirming that the information in Appendix B Section B above has been received within 45 days of the time investment discussions are initiated, but in any event, prior to the

completion of due diligence and any recommendation to proceed with the contract or Amendment.

3. For new contracts and amendments to contracts existing as of the date of the initial adoption of this Policy, securing the agreement of the External Manager in the final written agreement between MCERA and the External Manager to provide in the event that there was or is an intentional material omission or inaccuracy in the Placement Agent Information Disclosure or any other violation of this Policy, MCERA is entitled to the greater of the reimbursement of any management or advisory fees paid by MCERA for the prior two years or an amount equal to the amounts paid or promised to be paid to the Placement Agent as a result of the MCERA investment; and
4. Prohibiting any External Manager or Placement Agent from soliciting new investments from MCERA for five years after they have committed a material violation of this Policy; provided, however, that MCERA's Board, by majority vote at a noticed, public meeting, may reduce this prohibition upon a showing of good cause.
5. Providing a quarterly report to the Board containing (a) the names and amount of compensation agreed to be provided to each Placement Agent by each External Manager as reported in the Placement Agent Information Disclosures, and (b) any material violations of this Policy; and maintaining the report as a public record.