

**Kentucky Public Pensions Authority
CERS Board of Trustees Special Called Investment Committee Meeting
August 25, 2021, 10 a.m. ET (9 a.m. CT)
1270 Louisville Road, Frankfort, KY/Facebook Live**

AGENDA

- | | |
|--|-----------------------------------|
| 1. Call to Order | Dr. Merl Hackbart |
| 2. Roll Call | Carol Johnson |
| 3. Public Comment | Carol Johnson |
| 4. Approval of Minutes* - July 14, 2021 | Dr. Merl Hackbart |
| 5. Actuarial Stress Test | Janie Shaw
Danny White |
| 6. Review of FY2021 Investment Results | Steven Herbert |
| 7. RMS Platform Development | Steven Herbert |
| 8. Public Equity Manager Search | Joe Gilbert |
| 9. Investment Policy | Dr. Merl Hackbart |
| 10. Adjourn | |

***Committee Action May Be Taken**

**MINUTES OF MEETING
COUNTY EMPLOYEES RETIREMENT SYSTEM
INVESTMENT COMMITTEE SPECIAL CALLED
JULY 14, 2021, 1:00 P.M., E.T.
VIA LIVE VIDEO TELECONFERENCE DUE TO SB 150,
SIGNED INTO LAW BY THE GOVERNOR ON MARCH 30, 2020,
AND EXECUTIVE ORDER 2020-215 DECLARING A STATE OF
EMERGENCY EFFECTIVE MARCH 6, 2020 DUE TO COVID-19**

At the July 14, 2021 Special Called County Employees Retirement System Investment Committee Meeting, the following Committee members were present: Dr. Merl Hackbart (Chair), George Cheatham, II, Jerry Powell, Dr. Martin Milkman and William O'Mara. CEO Ed Owens and Trustees Betty Pendergrass, J.T. Fulkerson and Michael Foster were also present. Staff members present were David Eager, Steven Herbert, Kathy Rupinen, Victoria Hale, Crystal Smith, Rebecca Adkins, Erin Surratt, Anthony Chiu, Joseph Gilbert, Jared Crawford, Ann Case, Natalie Young, Shaun Case, Phillip Cook and Carol Johnson. Also in attendance were David Lindberg, Chris Tessman, Craig Morton, John Patterson and Marc Friedberg from Wilshire, Joe Bowman, Eric Branco from Johnson, Bowman, Branco, LLP, and Anna Lucchese and Dalton Green.

Dr. Merl Hackbart called the meeting to order and Ms. Carol Johnson called roll.

Dr. Merl Hackbart introduced agenda item *Public Comment*. Ms. Carol Johnson stated that no public comments were submitted.

Dr. Merl Hackbart introduced agenda item *Approval of Minutes – May 12, 2021*. Mr. Jerry Powell moved and was seconded by Mr. William O’Mara to approve the minutes as presented. The motion passed unanimously.

Dr. Merl Hackbart introduced agenda item *Investment Policy Statement*. Dr. Merl Hackbart stated that the Committee is using the current KRS Investment Policy Statement. Dr. Merl Hackbart stated that with the separation of KRS and CERS that the Investment Policy Statement needed to be revised to correct the terminology and to look at other adjustments and changes that might need to be made. Dr. Hackbart stated that the current KRS Investment Policy Statement was sent out to the Committee members and staff for comments and suggestions and that the redlined copy that was produced was attached in Board Books for their review. Dr. Merl Hackbart stated that the updated clean draft CERS Investment Policy Statement was attached which was a product of the redlined KRS Investment Policy Statement. Dr. Merl Hackbart then introduced Mr. Ed Owens to review the clean draft copy of the CERS Investment Policy Statement. Mr. Ed Owens reviewed and outlined the changes that were made to the document with the Committee members. Mr. Ed Owens stated that prior to a vote on the CERS Investment Policy Statement that the Committee needs to ensure that the benchmarks are updated. Dr. Merl Hackbart stated that staff are checking to see if the benchmarks are current. Mr. Ed Owens asked the Committee members if they wanted to add a bullet item on page 24 of the clean draft CERS Investment Policy Statement under Performance Review to add a set percentage to include the private equity line item and any private equity that resides in the diversification portfolio was well. Dr. Merl Hackbart stated that the last item that needed to be addressed was on page 19 of the clean draft copy of the CERS Investment Policy Statement with regard to the additional CERS Investment Administrative Policies. Dr.

Merl Hackbart stated that these policies would be administrative policies of KPPA and would apply to all plans, including KRS and CERS. Therefore, Dr. Hackbart stated that these should be approved first at the KPPA Board level and not at the CERS Investment Committee level. Dr. Merl Hackbart further stated that the CERS Investment Committee can adopt them after they are approved by KPPA. Ms. Betty Pendergrass stated that the definition of long term investment should be defined as to the length of the investment in the CERS Investment Policy Statement. Ms. Betty Pendergrass stated that the language that was used in the past will be distributed to the Committee members for their review and possible insertion into the CERS Investment Policy Statement. Dr. Merl Hackbart stated that a vote on the CERS Investment Policy Statement will be postponed until the next CERS Investment Committee meeting to allow the Committee members time to make the necessary changes and submit any additional comments or questions that they may have.

Dr. Merl Hackbart introduced agenda item *Asset Allocation*. Mr. David Lindberg from Wilshire introduced himself, Mr. Craig Morton and Mr. Chris Tessman as well as staff attending by video conferencing, Mr. Marc Friedberg and Mr. John Patterson. Mr. David Lindberg reviewed the Asset Allocation global approach. Mr. David Lindberg stated that CERS is currently set up globally with 50 percent invested in the U.S. market and 50 percent invested in the non U.S. market. Mr. David Lindberg also reviewed the chart from the clean draft of the Investment Policy Statement on page 13 of Board Books. Mr. David Lindberg stated that they normally do an asset allocation study every two to three years. Dr. Merl Hackbart asked Mr. David Lindberg to explain to the new members the services that Wilshire provides to the CERS as well as to the KPPA staff. Mr. David Lindberg stated that Wilshire is in contract with the Board and

works to be an extension of the staff. Mr. David Lindberg stated that Wilshire has a lot of interaction with KPPA staff between meetings, going through the daily process of managing the portfolio. Mr. David Lindberg stated that Wilshire is paid a set retainer fee and there is no charge for projects. Mr. David Lindberg said the most important service that they provide is the asset allocation process. Mr. David Lindberg stated that they will revisit the asset allocations as frequently as the Committee would like and that it takes approximately two months to go through that process.

Dr. Merl Hackbart then introduced Mr. George Lisle Cheatham, II to discuss the market risk and risk tolerance analysis that he had provided. This was presented for informational purposes only. Mr. Cheatham reviewed the Riskalyze Analysis Presentation, CERS Target Portfolio, Current Portfolio Stress Test, Target Portfolio Stress Test and Investment Roadmap documentation with the Committee members. Mr. Cheatham stated that if the Committee members had any questions regarding the documentation to contact him and that he would be happy to answer them.

Dr. Merl Hackbart introduced agenda item *Investment Procurement Policy*. Dr. Merl Hackbart stated that the draft Investment Procurement Policy was attached in Board Books on page 127. Ms. Betty Pendergrass stated that there were no technical changes made to this document and the only changes made to the policy were to the names and statute references. Ms. Betty Pendergrass stated that this is the Investment Procurement Policy that is currently in effect and that was approved by the Kentucky Finance Cabinet. Mr. Jerry Powell made a motion to approve for

transmittal to the Kentucky Finance Cabinet the CERS Investment Procurement Policy as modified and the motion was seconded by Mr. George Cheatham, II. The motion passed unanimously.

Dr. Merl Hackbart introduced agenda item *Investment Administrative Policies*. Dr. Merl Hackbart suggested that the Committee table the approval of the Investment Administrative Policies until after the Kentucky Public Pensions Authority Board approves them. Jerry Powell made a motion to table the approval of the Investment Administrative Policies until after they are approved by KPPA and George Cheatham, II seconded the motion. The motion passed unanimously.

There being no further business, Mr. Jerry Powell moved and was seconded by Mr. William O'Mara to adjourn the meeting at 3:15 p.m. The next meeting of the County Employees Retirement System Investment Committee is scheduled for 2:00 p.m. on August 25, 2021. Copies of all documents presented are incorporated as part of the minutes of the Special Called County Employees Retirement System Investment Committee meeting held July 14, 2021.

CERTIFICATION

I do certify that I was present at this meeting and I have recorded above the action of the Committee on the various items considered by it at this meeting. Further, I certify that all requirements of KRS 61.805-61.850 were met in connection with this meeting.

Recording Secretary

I, as Chair of the County Employees Retirement System Investment Committee of the Board of Trustees of the County Employees Retirement System, attest that the matters contained in these minutes are what was discussed during the meeting held on July 14, 2021.

Committee Chair

I have reviewed the Minutes of the Special Called County Employees Retirement System Investment Committee Meeting on July 14, 2021 for form, content, and legality.

Office of Legal Services

Kentucky Retirement Systems

2020 Stress Test Analysis for
County Employees Retirement System





February 1, 2021

Board of Trustees
Kentucky Retirement Systems
1260 Louisville Road
Frankfort, KY 40601

Subject: 2020 Stress Test Analysis for the County Employees Retirement System

Dear Trustees of the Board:

This report summarizes the results of a financial stress test analysis on the County Employees Retirement System (Non-Hazardous and Hazardous).

Background

Revenue to pay member benefits comes from investment income and employer and member contributions. The Kentucky Retirement Systems (KRS) Board has a responsibility for maintaining both the investment and funding policies, where not set in Statute.

A principle purpose of a stress test is to identify and quantify the investment and contribution risk to help determine if funding methods or policies need to be changed to substantially improve the sustainability of the System. The analysis is not as much about the scenario outcomes, but about the decisions to be considered by stakeholders as a result of the test outcomes.

Process

The stress test analysis is calculated for a variety of financial measures with an emphasis on downside economic financial scenarios that have been previously identified by KRS with assistance from GRS. The analysis will review the results using both deterministic and stochastic methods. A deterministic projection simulates certain predefined scenarios and is relatively easy to understand, but, with this type of projection, it can be more difficult to quantify the likelihood that particular event will occur. On the other hand, a stochastic projection is more complex to prepare and interpret, but this type of projection can provide useful information regarding the probability or chance of an outcome.

The intention is to perform this analysis on a periodic basis using these same scenarios to provide stakeholders an additional awareness of any emerging trends in the System's risk. This is the first year this analysis has been performed.

Board of Trustees
February 1, 2021
Page 2

Data, Assumptions, and Methods

The projection information is based on the results of the June 30, 2020 actuarial valuation. Please refer to that report for a summary of the census data, actuarial assumptions, and benefit provisions. Additional assumptions unique to the analysis performed in this report are described in Section 2 of this report. Our calculations are based upon assumptions regarding future events, which may or may not materialize. Depending on actual plan experience, actual results could deviate significantly from our projections.

Contribution Policy

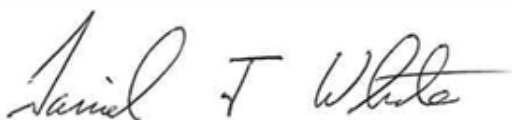
The methods used for calculating the actuarially determined contributions rates are established in Statute. Sections 3 and 4 provide analysis regarding the contribution risk (i.e. the risk of receiving insufficient contributions) for each fund. Please refer to Part A and Part E of these sections for additional discussion regarding the contribution risk for each fund.

Certification

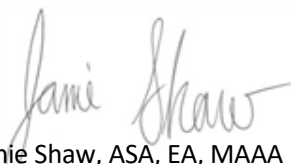
All of our work conforms with generally accepted actuarial principles and practices, and is in conformity with the Actuarial Standards of Practice issued by the Actuarial Standards Board. Also, nothing in this report should be construed as providing investment or tax advice. Both of the undersigned are Enrolled Actuaries, members of the American Academy of Actuaries, and meet all of the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein. In addition, both of the undersigned are experienced in performing valuations for large public retirement systems.

Respectfully submitted,

Gabriel, Roeder, Smith & Company



Daniel J. White, FSA, EA, MAAA
Senior Consultant



Jamie Shaw, ASA, EA, MAAA
Consultant



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SECTION 1

EXECUTIVE SUMMARY OF PRINCIPAL RESULTS

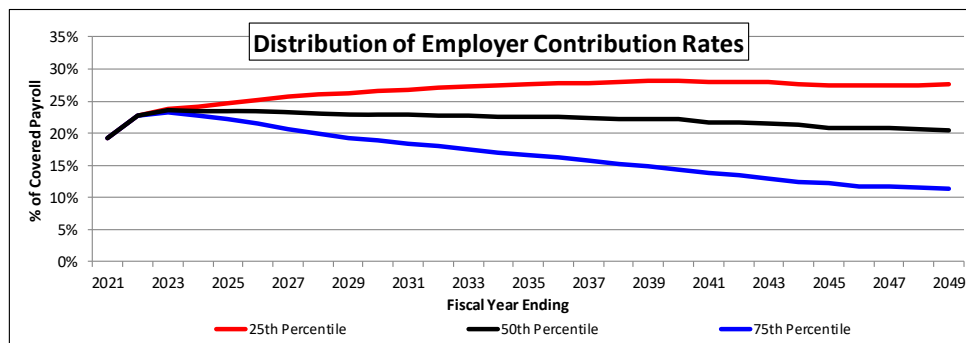
Section 1.

Executive Summary of Principal Results

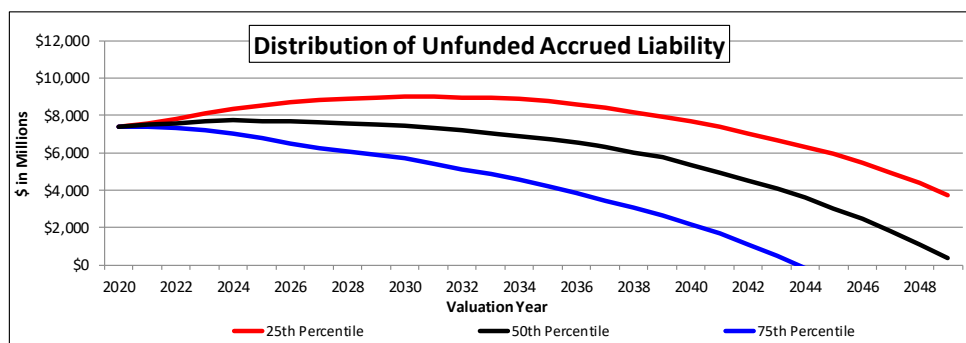
The following is an Executive Summary of the results of the stress test analysis for the County Employees Retirement System (Non-Hazardous and Hazardous) pension funds. Details regarding the methodology and additional results of the analysis for each System are provided in the following Sections.

County Employees Retirement System (Non-Hazardous Pension Fund)

- Compared to the other non-hazardous pension fund maintained by KRS, the CERS Non-Hazardous Pension Fund has materially more investment risk, as measured by the change in contribution rate, because it is relatively better funded. The chart below shows the projected “more likely than not” contribution rates over the next 30 years.



- The unfunded liability of the fund is currently expected to increase for another four years before beginning to decrease. The chart below shows the projected “more likely than not” unfunded liability over the next 30 years and the possibility that, with investment volatility, the unfunded liability could increase beyond its current level.

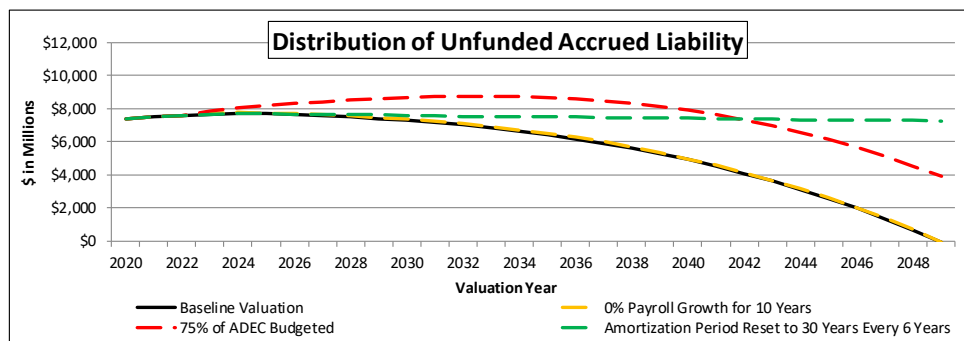


Section 1.

Executive Summary of Principal Results

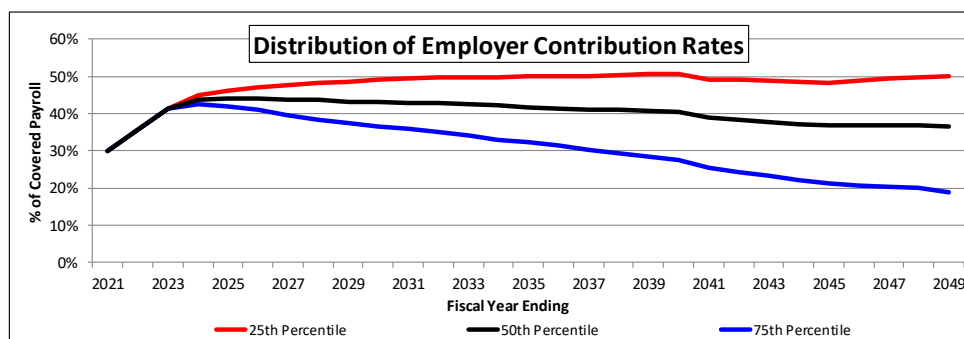
County Employees Retirement System (Non-Hazardous Pension Fund) – Continued

- **This fund also has considerable risk if the General Assembly continues the pattern of resetting the amortization period back to 30 years.** Periodically resetting the amortization period to 30 years has short-term benefits to the employers because it lowers the contribution rate. However, this becomes a detriment to financing, or paying down, the existing unfunded liability (e.g. the dotted green line in the chart below). Note the risk is much greater for the CERS Systems compared to the KERS Systems due to the 2.00% payroll growth assumption used by the CERS Systems to develop the amortization cost, which backloads the amortization payments.



County Employees Retirement System (Hazardous Pension Fund)

- **Similar to the CERS Non-Hazardous Pension Fund, the CERS Hazardous Pension Fund has comparable investment risk, as measured by the change in contribution rate, because it is also relatively better funded.** The chart below shows the projected “more likely than not” contribution rates over the next 30 years.



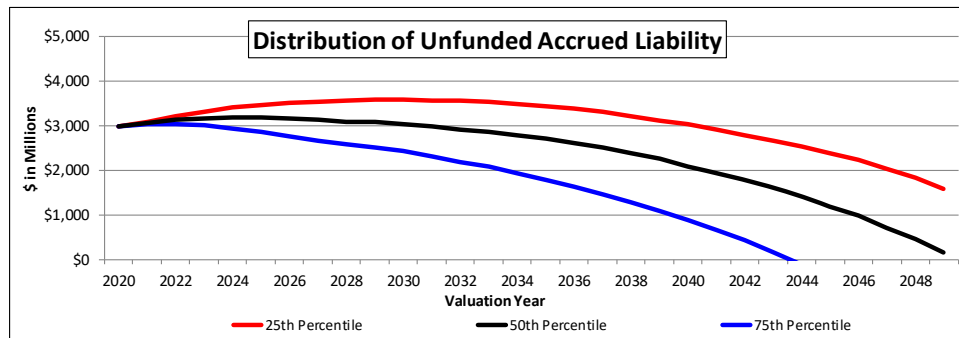
The distribution of the contribution rate ranges is wider than the CERS Non-Hazardous Pension Fund because the CERS Hazardous Pension Fund has a slightly higher leverage of liability to payroll. For example, the Hazardous Pension Fund has \$9.6 in liability for every \$1 in covered payroll whereas the Non-Hazardous Pension Fund has \$5.7 in liability for every \$1 in covered payroll.

Section 1.

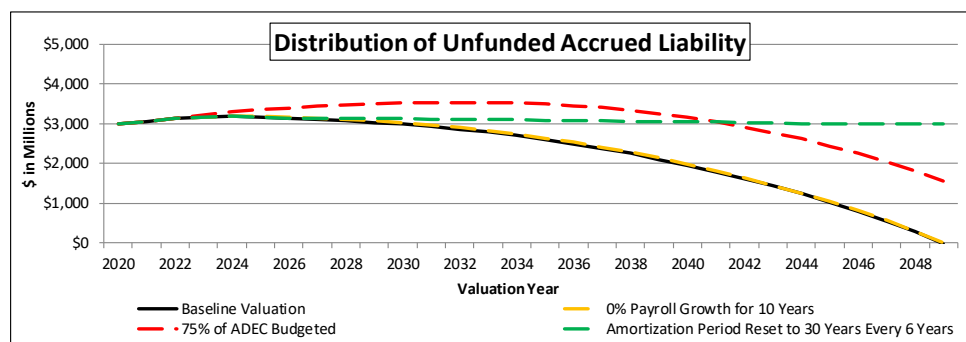
Executive Summary of Principal Results

County Employees Retirement System (Hazardous Pension Fund) – Continued

- Again, like the CERS Non-Hazardous Pension Fund, the unfunded liability of the Hazardous Pension Fund is currently expected to increase for another four years before beginning to decrease. The chart below shows the projected “more likely than not” unfunded liability over the next 30 years and the possibility that, with investment volatility, the unfunded liability could increase beyond its current level.



- Similar to the CERS Non-Hazardous Pension Fund, the CERS Hazardous Pension Fund has considerable risk if the General Assembly continues the pattern of resetting the amortization period back to 30 years. As discussed in the previous page, resetting the amortization period results in a lower contribution rate, resulting in a short-term benefit for the employers. However, it is a detriment to the pension fund because the unfunded liability is no longer being effectively financed.



SECTION 2

METHODOLOGY AND RETURN SCENARIOS

Section 2.

Methodology and Return Scenarios

Assumptions

The projection information included in this report is based on the results of the June 30, 2020 actuarial valuation. Please refer to that report for a summary of the census data, actuarial assumptions, and benefit provisions. Additionally, the analysis in this report is performed solely on the retirement funds for the County Employees Retirement System (CERS). Analysis for the insurance funds was outside the scope of the analysis documented in this report. Any analysis related to the Kentucky Employees Retirement System or the State Police Retirement System has been included in a separate report.

Except where noted in this report, the projections are based on the following assumptions:

- (1) All actuarial assumptions described in the June 30, 2020 actuarial valuation are realized.
- (2) New active members are assumed to be hired as the current active members are projected to terminate employment or retire, such that the total active membership population maintains a level headcount.
- (3) The contribution rate certified by the Board of Trustees is assumed to be equal to the full actuarially determined contribution rate, except where limited by the phase-in provisions established by the House Bill 362, passed during the 2018 legislative session, which limited annual increases in the total contribution rate (pension plus insurance) to 12% over the previous fiscal year from July 1, 2018 to June 30, 2028. Additionally, Senate Bill 249, passed during the 2020 legislative session, set the CERS contribution rates for FYE 2021 equal to the contribution rates in effective for FYE 2020.

Part A. Deterministic Projection Modeling Results - Contribution Risk

Deterministic projections are useful for quantifying the magnitude of the financial impact on the System due to certain events. This analysis is extremely useful for stakeholders to identify the magnitude of the financial impact due to certain events, but a limitation of this modeling technique is that it is difficult to determine the likelihood that a particular deterministic scenario will occur.

The deterministic scenarios analyzed in each section's Part A are designed to illustrate the risk to the fund of receiving insufficient contributions. The scenarios include:

- (1) *Covered Payroll Risk* – The fund's actual covered payroll growth experience is assumed to be approximately 2% less than the current 2% payroll growth assumption for 10 years.
 - a. To illustrate this scenario, the analysis assumes a 2% reduction in active membership for 10 years, which results in roughly flat covered payroll for 10 years (compared to the 2% payroll growth assumption).
- (2) *Budgeted Contribution Risk* – The Board of Trustees is assumed to certify contribution rates that are 75% of the actuarially determined contribution rate each year, starting in FYE 2023 and throughout the entire length of the projection.
- (3) *Re-Amortization Risk* – The funding period for amortizing the unfunded liability is assumed to be reset to 30 years every six years by the General Assembly.



Section 2.

Methodology and Return Scenarios

Part B. Financial Impact Due to Volatility in Investment Returns

Baseline projection scenarios commonly assume that the System will earn the investment return assumption each and every year. In reality, the System will experience volatility in investment returns each year. The purpose of this analysis is to illustrate to stakeholders that this volatility in investment returns will result in variability in the future financial condition of the System.

For purposes of this analysis, we are providing a baseline projection that assumes emerging investment experience is exactly the same as the investment return assumption (i.e. no volatility) and four additional projection scenarios that result in the same investment return over a 30-year period but have volatility in the year-to-year investment experience. In other words, all five scenarios (the baseline and the four additional scenarios) result in an average annual return of 6.25% over a 30-year period.

Part C. Stochastic Simulation Results

The stochastic simulation analysis used 5,000 return scenarios that were generated using a random return generator developed from a lognormal return distribution based on the mean and standard deviation information that was developed and provided by the Retirement System's internal investment team and is documented below. The results of the generated return scenarios were used to identify the probability of the following events occurring in the next 5, 10, 15, 20, and 30 years:

- (1) Probability of a 5% of pay increase in the required employer contribution rate
- (2) Probability of a 10% of pay increase in the required employer contribution rate
- (3) Probability of a 5% of pay decrease in the required employer contribution rate
- (4) Probability of a 10% of pay increase in the required employer contribution rate
- (5) Probability of a 1.0% decrease in the funded ratio of the fund
- (6) Probability of a 5.0% decrease in the funded ratio of the fund

Additionally, the results were used to provide the distribution of the funded ratio among the stochastic scenarios between the years 2035 and 2049, as well as the 25th, 50th, and 75th percentile of employer contributions, unfunded liability, and funded ratios for the next 30 years.

Table 1. Assumptions for Stochastic Analysis*

Retirement Fund	Mean	Standard Deviation
CERS Non-Hazardous Fund	5.96%	10.83%
CERS Hazardous Fund	5.96%	10.83%

* Note, a slightly different target asset mix was adopted by the System in December 2020; however, the modifications to the target asset mix were immaterial in the analysis and results provided in this report.



Section 2.

Methodology and Return Scenarios

Part D. Deterministic Projection Modeling Results - Investment Risk

The deterministic scenarios analyzed in each section's Part D are designed to illustrate the short-term investment risk to the fund. The scenarios include:

- (1) *Baseline Scenario*: 6.25% annual returns for all years
- (2) *Mild Correction*: -5.00% annual return for Year 1; 3.50% annual returns for the five years; and 6.25% annual returns for all years thereafter
- (3) *Significant Correction*: -15.00% annual return for Year 1; and 6.25% annual returns for all years thereafter
- (4) *Repeat of Dot Com Bust*: investment returns (documented below), modeled after historical returns for asset classes for the years 2000-2003. Investment returns used in the analysis have been modeled based on the fund's current asset allocation.
- (5) *Repeat of the 08/09 Financial Crisis*: investment returns (documented below), modeled after historical returns for asset classes for the years 2008-2011. Investment returns used in the analysis have been modeled based on the fund's current asset allocation.

**Table 2a. Investment Return Assumptions for Deterministic Analysis
(Repeat of Dot Com Bust)**

Retirement Fund	Year 1	Year 2	Year 3	Year 4	Thereafter
CERS Non-Hazardous Fund	1.10%	-5.00%	-7.30%	19.00%	6.25%
CERS Hazardous Fund	1.10%	-5.00%	-7.30%	19.00%	6.25%

**Table 2b. Investment Return Assumptions for Deterministic Analysis
(Repeat of 08/09 Financial Crisis)**

Retirement Fund	Year 1	Year 2	Year 3	Year 4	Thereafter
CERS Non-Hazardous Fund	-15.90%	13.50%	13.50%	10.40%	6.25%
CERS Hazardous Fund	-15.90%	13.50%	13.50%	10.40%	6.25%



Section 2.

Methodology and Return Scenarios

Part E. Identified Outcome Based Events Results

This analysis identifies the scenario that is necessary to result in a certain financial outcome. Stated another way, the targeted financial outcome is established and the stress test determines the economic or financial requirement that is necessary to obtain that target.

The following is a list of targeted financial outcomes that were modeled:

Investment Return Scenarios

- (1) Identify the one-year annual investment return that would result in a 2.5% of pay and a 5.0% of pay increase in the required employer contribution rate in a future year.
- (2) Identify the two-year annual investment return that would result in a 2.5% of pay and a 5.0% of pay increase in the required employer contribution rate in a future year.
- (3) Identify the five-year annual investment return that would result in a 2.5% of pay and a 5.0% of pay increase in the required employer contribution rate in a future year.

Budgeted Contribution Rate Scenarios

- (1) Identify the percentage of the actuarially determined contribution actually paid over a one-year period that would result in a 2.5% of pay and a 5.0% of pay increase in the required employer contribution rate in a future year.
- (2) Identify the percentage of the actuarially determined contribution actually paid over a two-year period that would result in a 2.5% of pay and a 5.0% of pay increase in the required employer contribution rate in a future year.
- (3) Identify the percentage of the actuarially determined contribution actually paid over a five-year period that would result in a 2.5% of pay and a 5.0% of pay increase in the required employer contribution rate in a future year.



SECTION 3

STRESS TESTING RESULTS FOR COUNTY EMPLOYEES RETIREMENT SYSTEM NON-HAZARDOUS PENSION FUND

Section 3.

Stress Testing Results for County Employees Retirement System (Non-Hazardous Pension Fund)

Part A. Deterministic Projection Modeling Results - Contribution Risk

The analysis in Part A provides the results of the deterministic simulation analysis on the employer contributions (both as a dollar amount and as a percentage of payroll), the unfunded accrued liability, and the funded ratio of the fund. The deterministic scenarios analyzed in this section are designed to illustrate the risk to the fund of receiving insufficient contributions. The scenarios include:

- (1) a 2% reduction in active membership for 10 years, which is intended to illustrate, approximately, flat covered payroll for 10 years (compared to the 2% payroll growth assumption);
- (2) 75% of the actuarially determined contribution rate being certified by the Board of Trustees each year, starting in FYE 2023 throughout the entire length of the projection; and
- (3) the funding period for amortizing the unfunded liability being reset to 30 years every six years by the General Assembly.

Baseline Valuation – In general, employer contributions are expected to remain relatively level as a percentage of payroll and employer contributions as a dollar amount will increase as payroll increases, until the contribution rates drop to the normal cost rates in FYE 2050 (when the unfunded liability is expected to be paid off). Employer contribution rates will slightly decrease throughout the projection as Tier 3 members are hired to replace Tier 1 members and the normal cost rate gradually declines. The unfunded liability is systematically paid off, with the fund expected to reach 100% funded in 2049.

0% Payroll Growth for 10 Years – In general, employer contributions as a dollar amount are relatively close to the baseline projection. They are slightly lower than the baseline projection for the first few years because when payroll is lower than expected, the fund receives less than the actuarially determined contribution, which must be made up in future years. Employer contributions as a percentage of payroll increase beyond the baseline projection, as payroll decreases. However, because the full actuarially determined contribution rates are expected to be paid (after the phase-in period), the funded ratio is expected to increase throughout the projection, reaching approximately 100% funded in 2049.

75% of ADEC Budgeted – When less than the actuarially determined employer contributions (ADEC) are paid, the unpaid amount must be made up in future contributions. As the following exhibits show, the contribution requirement (both as a dollar amount and as a percentage of pay) will continue to grow each year. The unfunded liability will continue to increase for the next 15 years, only decreasing down to the current level of \$7.3 billion of unfunded liability in 2042. Additionally, contribution rates will not reduce to the normal cost rates in FYE 2050, as there is still \$3.9 billion of unfunded liability remaining in 2049.

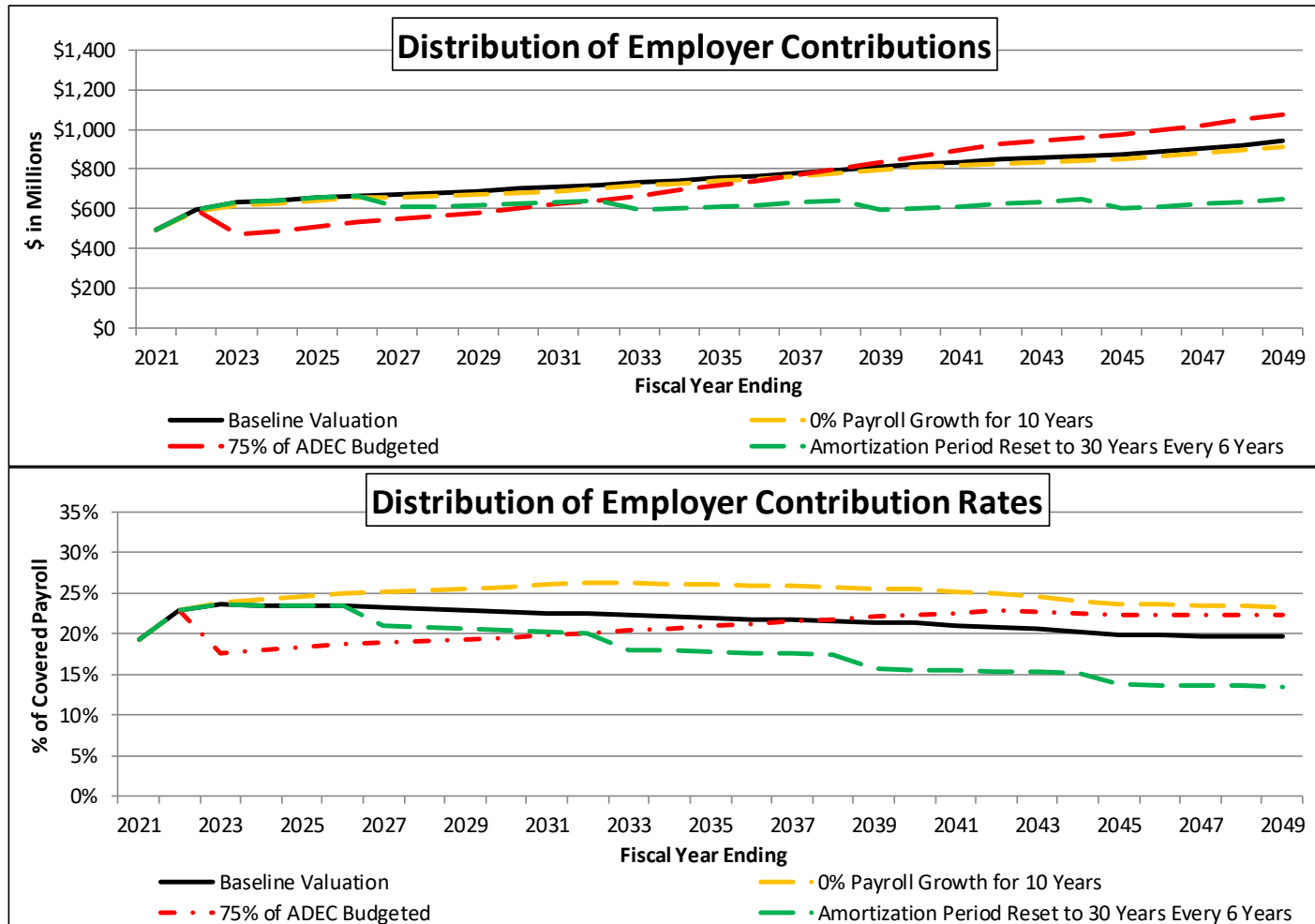
Amortization Period Reset to 30 Years every 6 Years – When the amortization period is reset to 30 years, there is an immediate decrease in the annual employer contribution requirement; however, the period to pay off the unfunded liability is increased. As the following exhibits show, no progress will be made in paying off the unfunded liability with the unfunded liability rising slightly and then remaining at the current level of \$7.3 billion. Additionally, contribution rates will not reduce to the normal cost rates in FYE 2050, as there is still \$7.3 billion of unfunded liability remaining in 2049.



Section 3.

Stress Testing Results for County Employees Retirement System (Non-Hazardous Pension Fund)

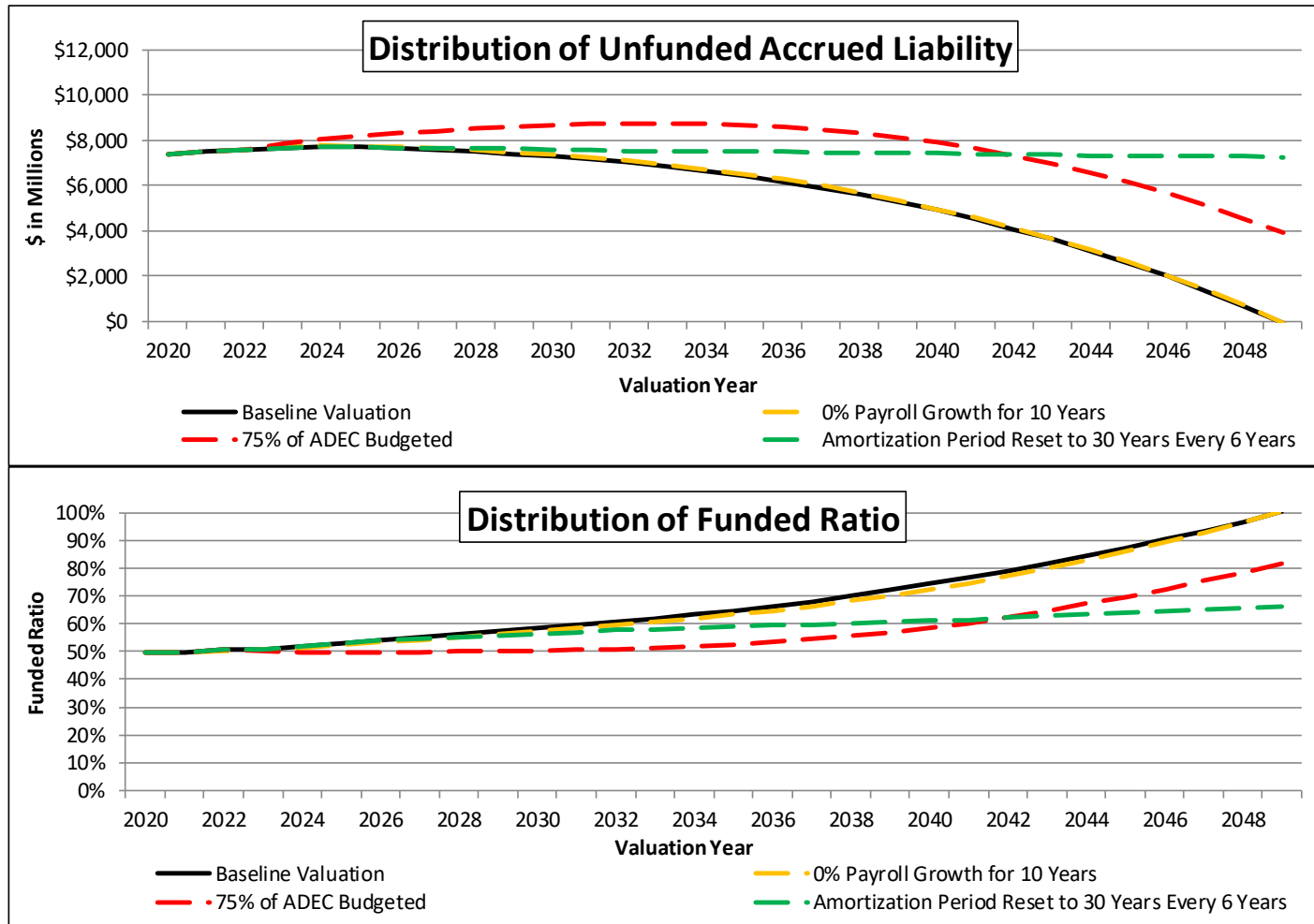
Part A. Deterministic Projection Modeling Results - Contribution Risk (continued)



Section 3.

Stress Testing Results for County Employees Retirement System (Non-Hazardous Pension Fund)

Part A. Deterministic Projection Modeling Results - Contribution Risk (continued)

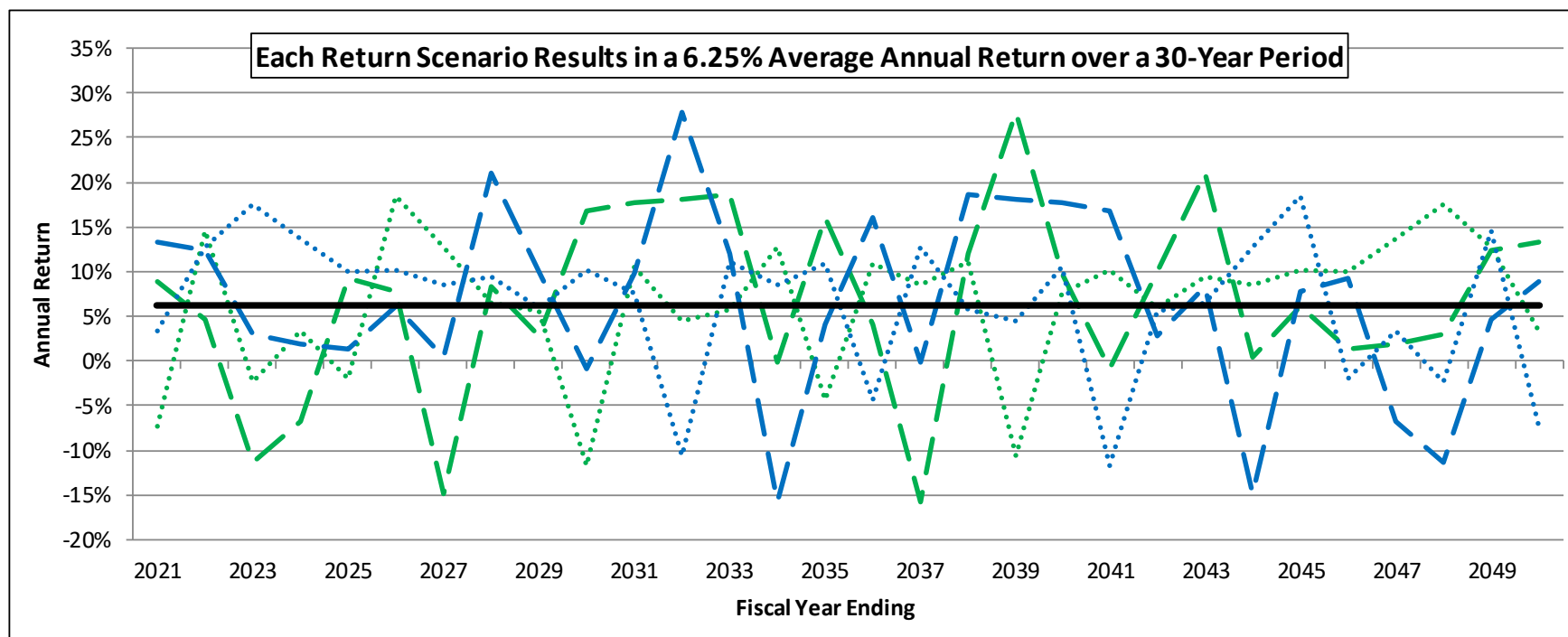


Section 3.

Stress Testing Results for County Employees Retirement System (Non-Hazardous Pension Fund)

Part B. Financial Impact Due to Volatility in Investment Returns

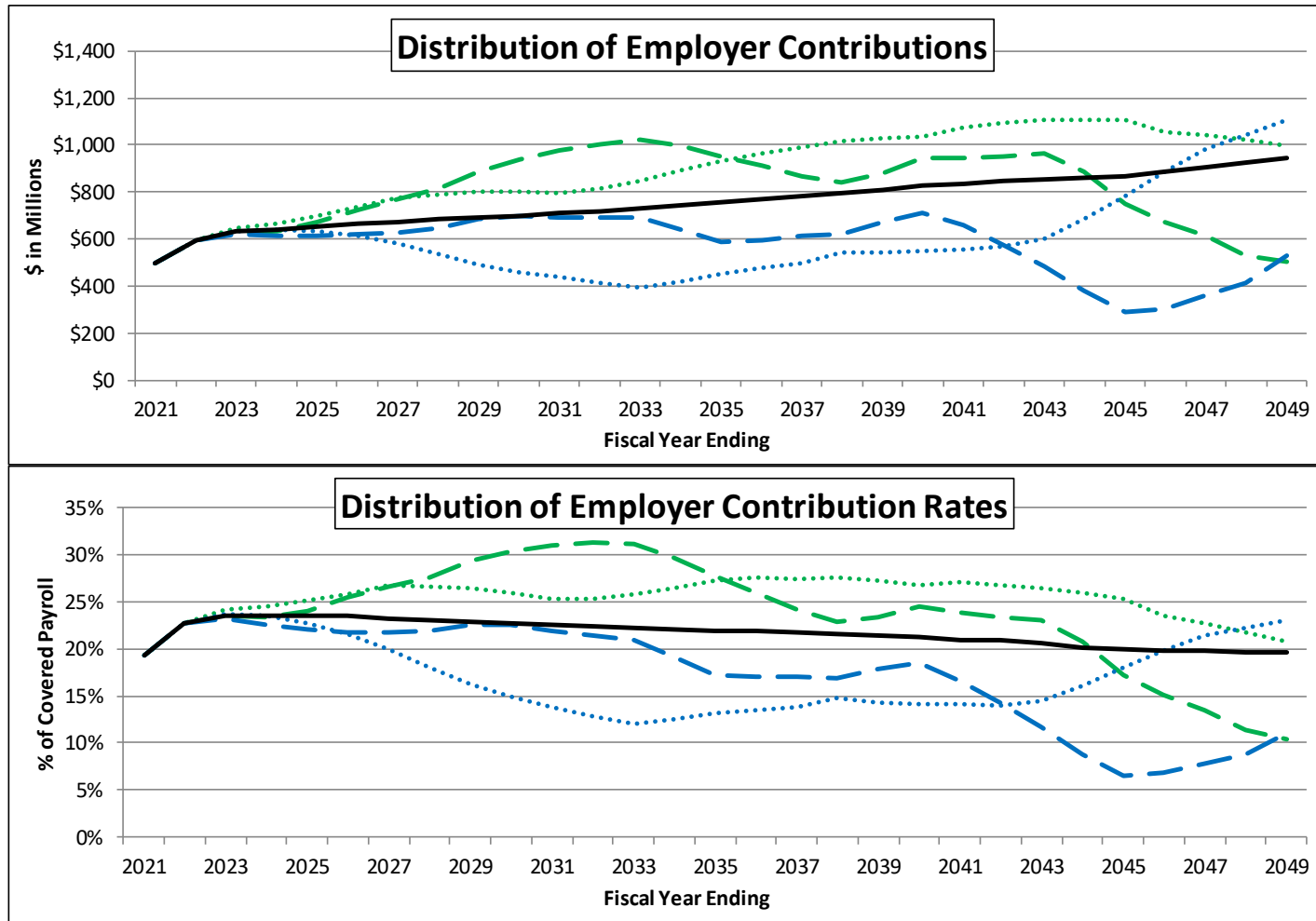
Below is a chart with five investment return scenarios that each result in a 6.25% average compound investment return over a 30-year period. The black line is representative of a common baseline projection with no investment return volatility. The other four scenarios were selected to illustrate the effect of volatility on employer contributions, the unfunded liability, and funded ratio of the fund. **Stakeholders need to understand that even if the System earns an average 6.25% over the next thirty years, there is no guarantee that contribution rates will not have to be increased above current amounts during that time period and the System may be less than 100% funded in 2049.**



Section 3.

Stress Testing Results for County Employees Retirement System (Non-Hazardous Pension Fund)

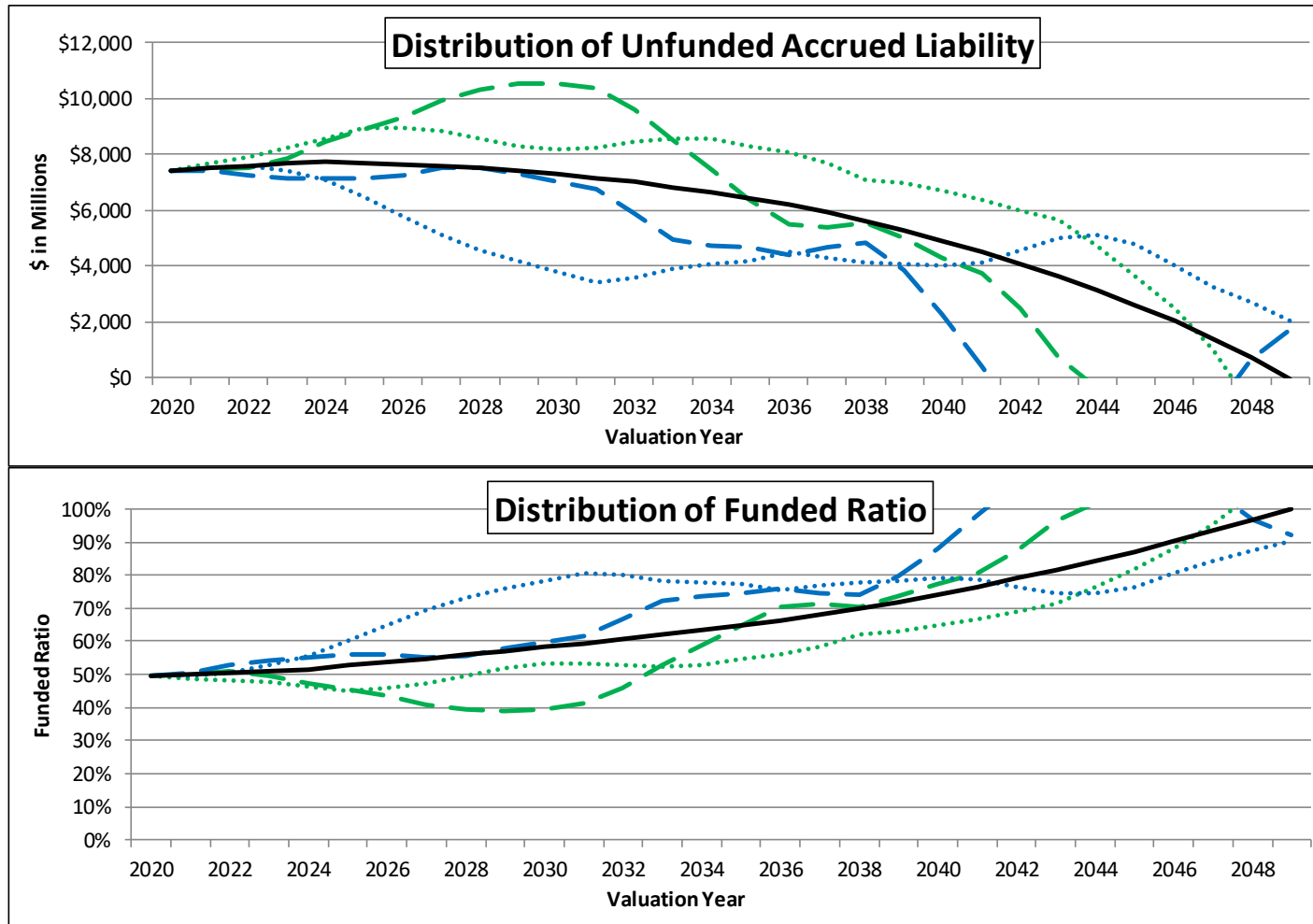
Part B. Financial Impact Due to Volatility in Investment Returns (continued)



Section 3.

Stress Testing Results for County Employees Retirement System (Non-Hazardous Pension Fund)

Part B. Financial Impact Due to Volatility in Investment Returns (continued)



Section 3.

Stress Testing Results for County Employees Retirement System (Non-Hazardous Pension Fund)

Part C. Stochastic Simulation Results

The analysis in Part C provides the results of the stochastic simulation analysis for the fund. Further in this section, the projected employer contributions, unfunded liability, and funded ratio of the fund are provided at the 25th, 50th, and 75th percentiles of the stochastic scenarios. The chart below provides the percentage of the 5,000 stochastic scenarios that resulted in the prescribed outcome (i.e. an increase/decrease in the employer contribution rate or a decrease in the funded ratio) within a certain number of years (5, 10, 15, 20, or 30 years).

Probability of Prescribed Outcome					
	5 Years	10 Years	15 Years	20 Years	30 Years
1. Probability of a 5% of pay increase in the required contribution rate within the next X Years ¹	5%	18%	28%	35%	45%
2. Probability of a 10% of pay increase in the required contribution rate within the next X Years ¹	<1%	2%	6%	10%	17%
3. Probability of a 5% of pay decrease in the required contribution rate within the next X Years ¹	14%	34%	47%	55%	98%
4. Probability of a 10% of pay decrease in the required contribution rate within the next X Years ¹	2%	14%	25%	34%	89%
5. Probability of a 1.0% decrease in the funded ratio within the next X Years ²	34%	45%	51%	53%	54%
6. Probability of a 5.0% decrease in the funded ratio within the next X Years ²	14%	25%	30%	32%	32%
¹ Percentage of stochastic scenarios that the employer contribution rate in a year after FYE 2022 is greater/lower than the FYE 2022 actuarially determined contribution rate of 23.88% of pay					
² Percentage of stochastic scenarios that the funded ratio in a year after 2020 is less than the 2020 funded ratio of 49.4% of pay					

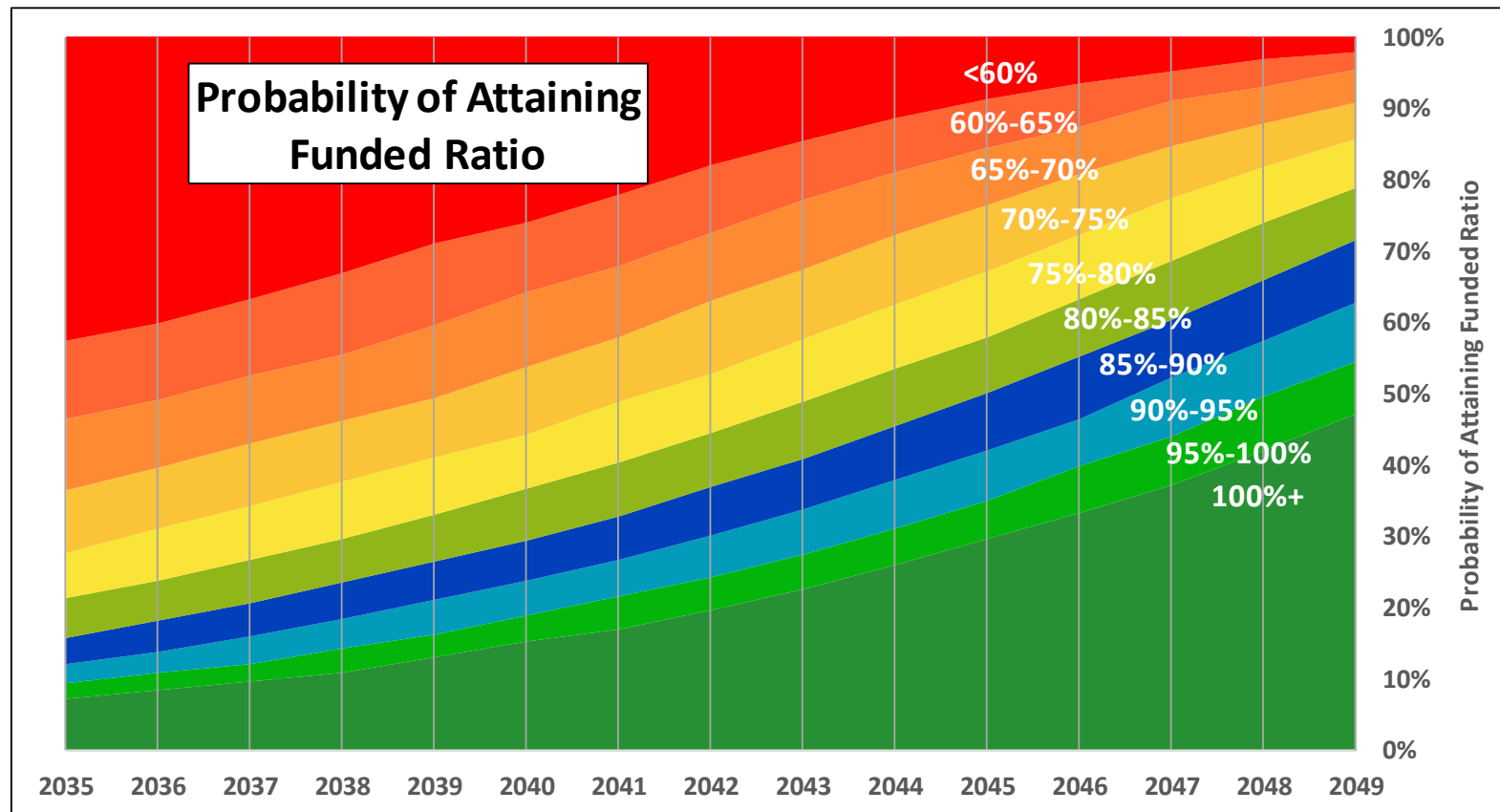


Section 3.

Stress Testing Results for County Employees Retirement System (Non-Hazardous Pension Fund)

Part C. Stochastic Simulation Results (continued)

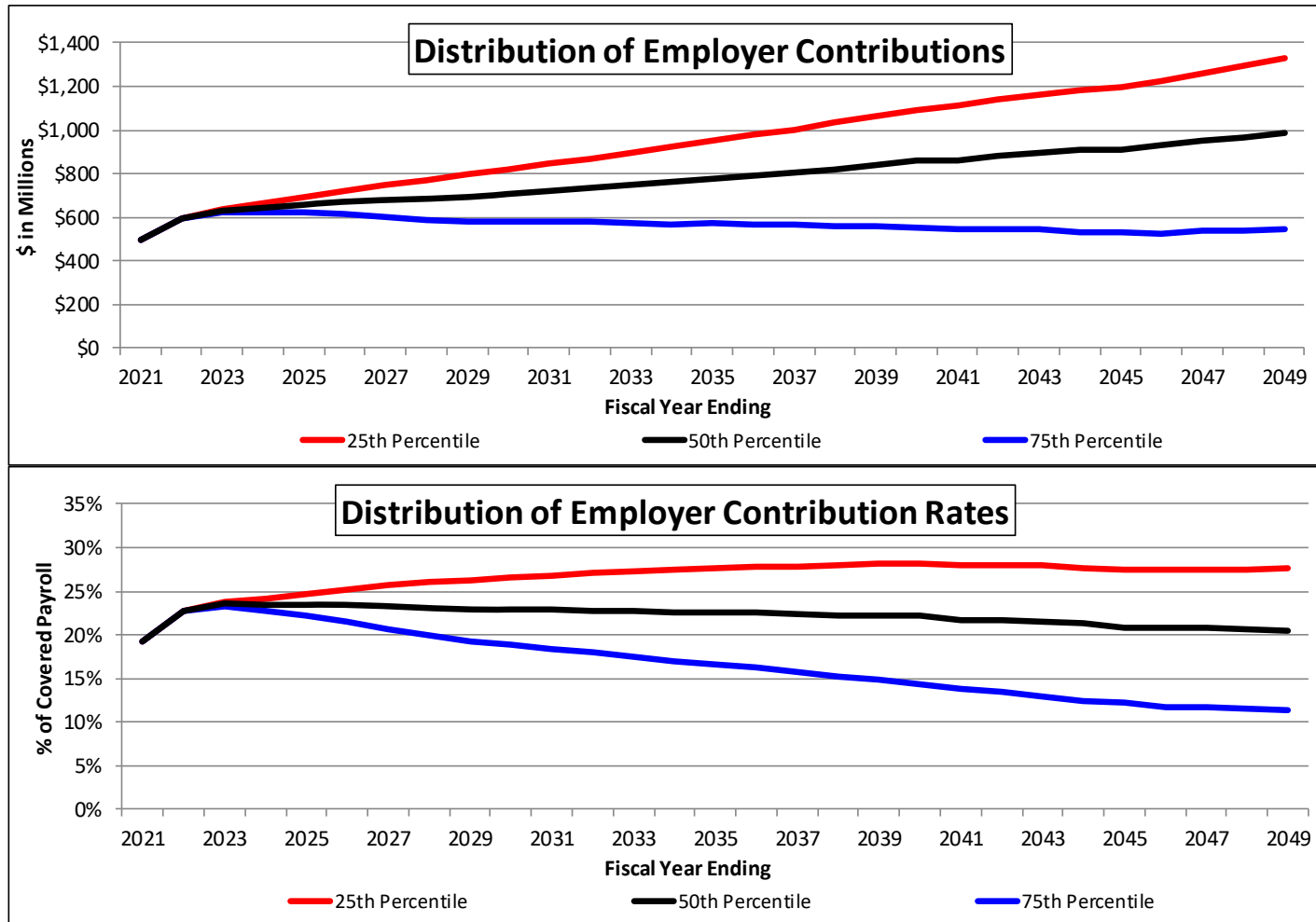
The chart below provides the distribution of the funded ratio among the stochastic scenarios between the years 2035 and 2049. Absent investment volatility and future gains or losses, the fund is expected to be 100% funded in 2049; however, as the chart shows below, only approximately 50% of the stochastic scenarios are 100% funded in 2049.



Section 3.

Stress Testing Results for County Employees Retirement System (Non-Hazardous Pension Fund)

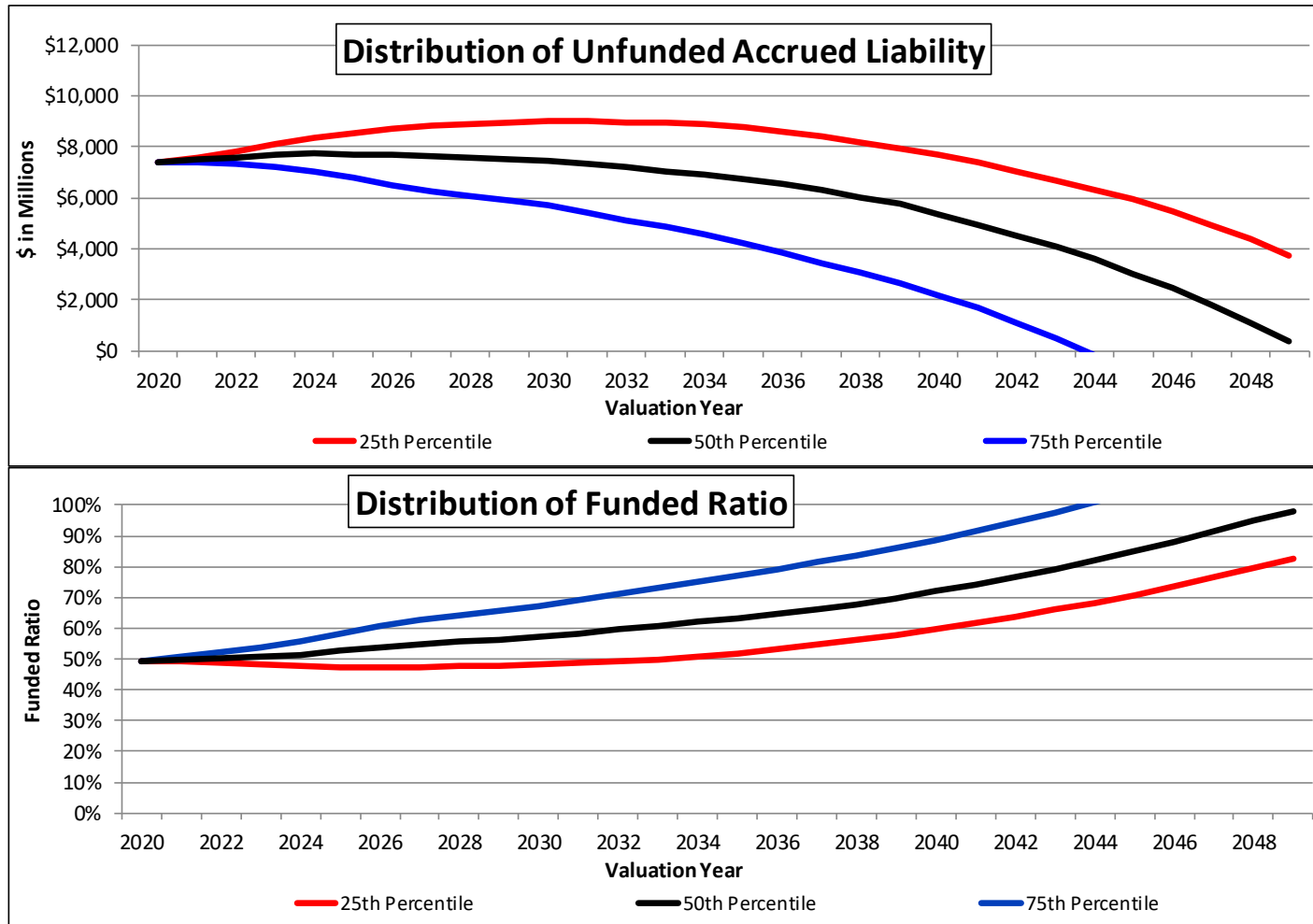
Part C. Stochastic Simulation Results (continued)



Section 3.

Stress Testing Results for County Employees Retirement System (Non-Hazardous Pension Fund)

Part C. Stochastic Simulation Results (continued)

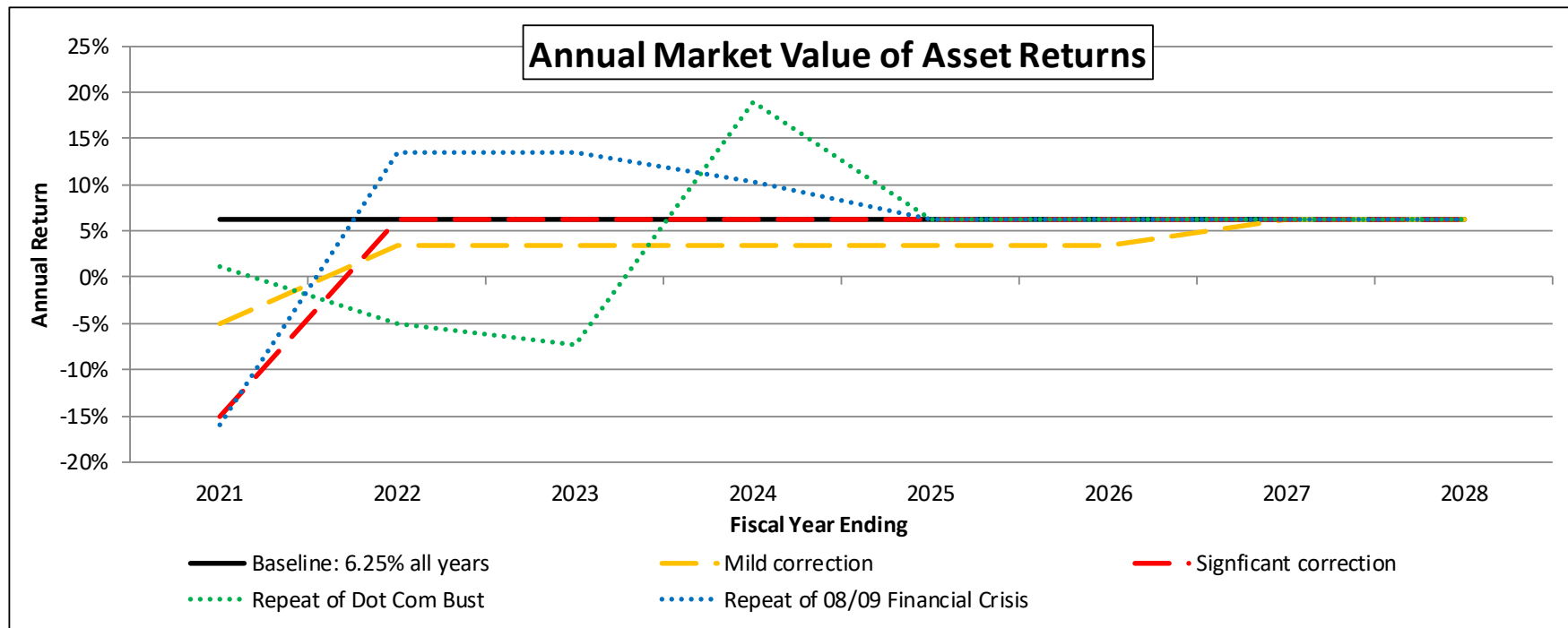


Section 3.

Stress Testing Results for County Employees Retirement System (Non-Hazardous Pension Fund)

Part D. Deterministic Projection Modeling Results - Investment Risk

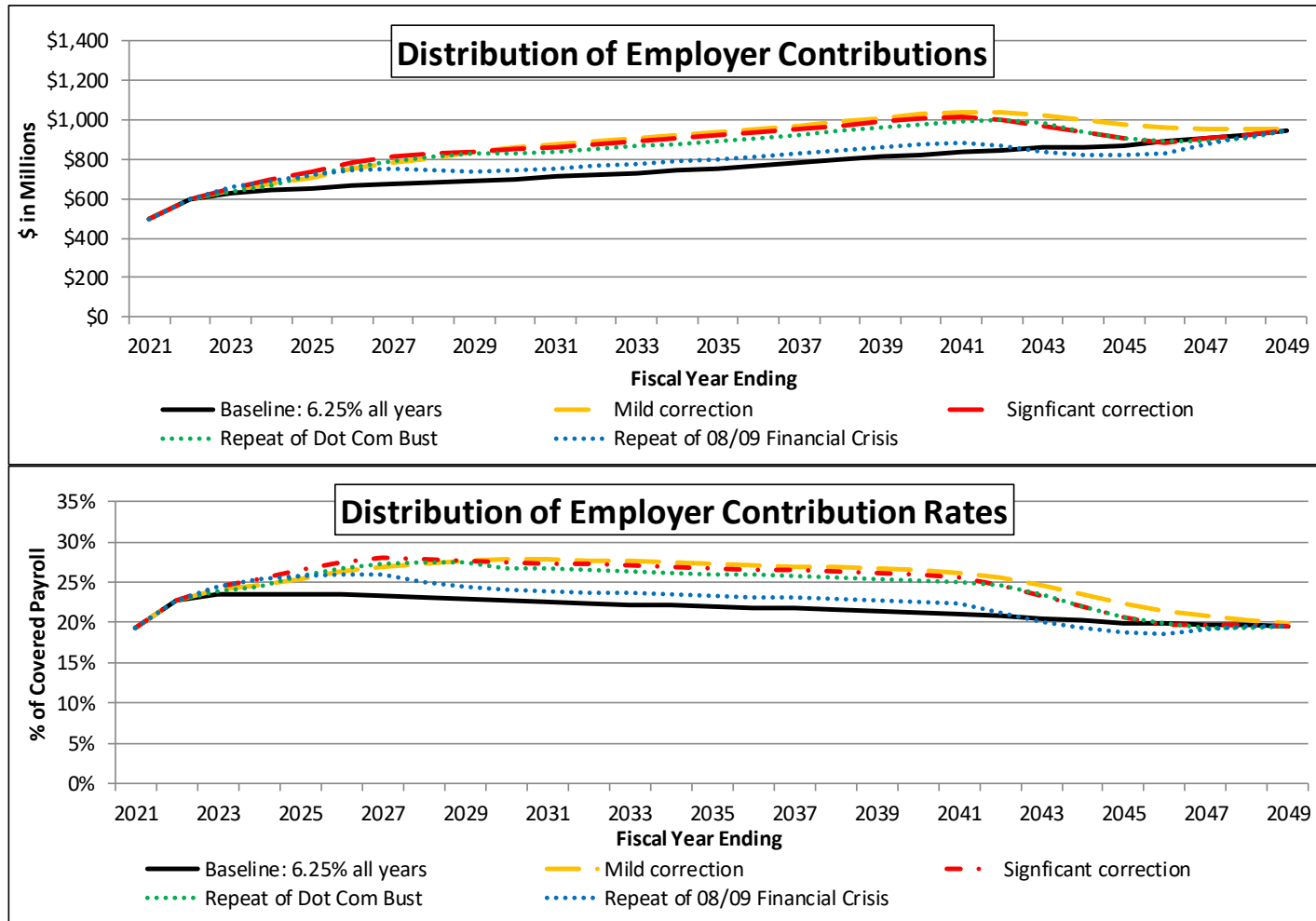
The analysis in Part D provides the results of the deterministic simulation on the employer contributions (both as a dollar amount and as a percentage of payroll), the unfunded accrued liability, and the funded ratio of the fund to illustrate the fund's exposure to short-term investment risk. The chart below provides the annual market value of asset return assumed in each scenario. Annual returns of 6.25% are assumed after FYE 2028.



Section 3.

Stress Testing Results for County Employees Retirement System (Non-Hazardous Pension Fund)

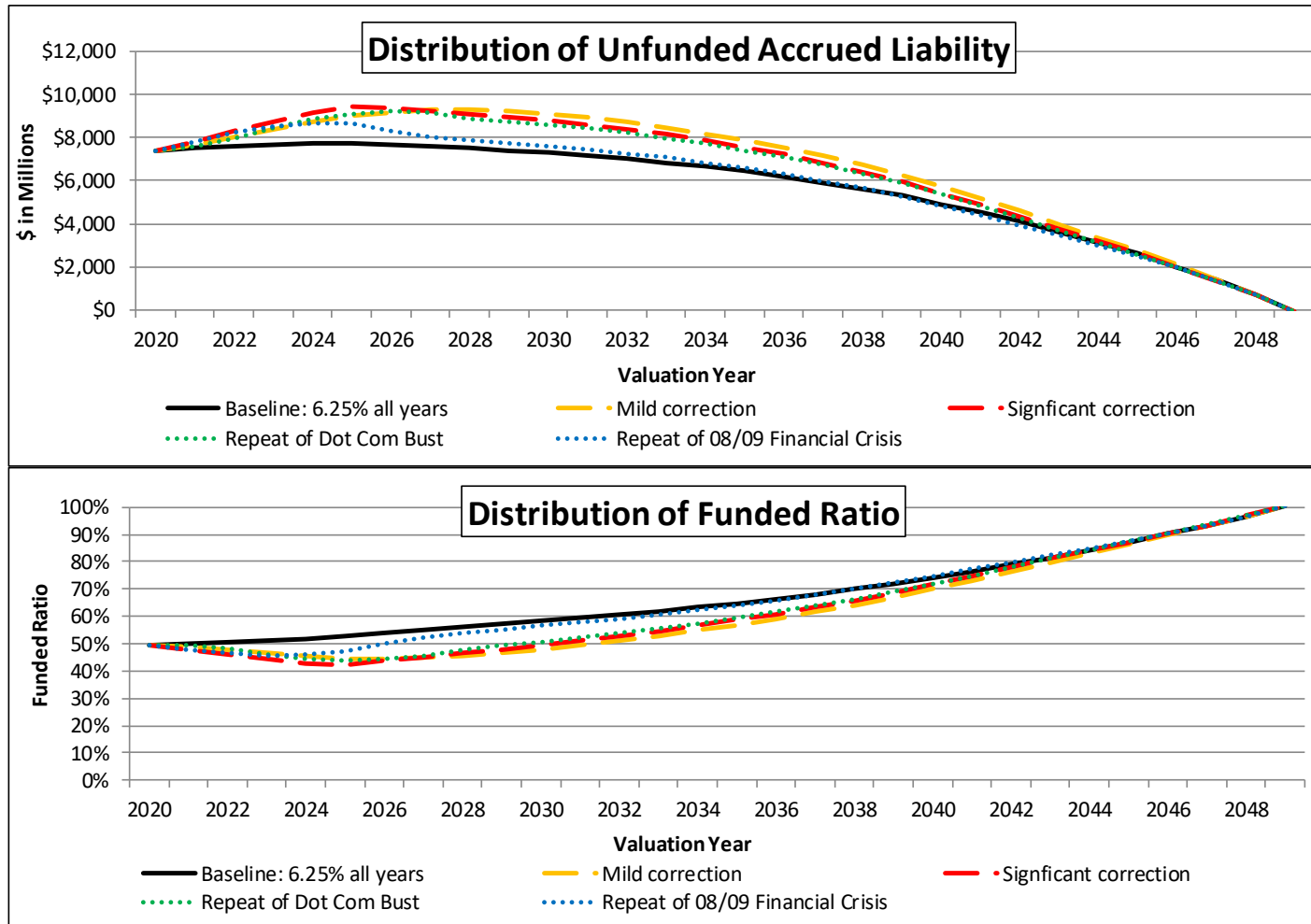
Part D. Deterministic Projection Modeling Results - Investment Risk (continued)



Section 3.

Stress Testing Results for County Employees Retirement System (Non-Hazardous Pension Fund)

Part D. Deterministic Projection Modeling Results - Investment Risk (continued)



Section 3.

Stress Testing Results for County Employees Retirement System (Non-Hazardous Pension Fund)

Part E. Identified Outcome Based Events Results

The analysis in Part E identifies the magnitude of a certain scenario necessary to result in a certain financial outcome.

Investment Return Scenarios – The following table provides the annual investment return over a one-, two-, and five-year period necessary to increase the employer contribution rate by 2.5% and 5.0% of covered payroll. The County Employees Retirement System Non-Hazardous Pension Fund is assumed to earn 6.25% annually, per the assumptions used in the June 30, 2020 actuarial valuation.

Investment Return Scenarios	
1. One-year annual investment return resulting in a	
(a) 2.50% increase in the employer contribution rate*	-4.8%
(b) 5.00% increase in the employer contribution rate*	-15.8%
2. Two-year annual investment return resulting in a	
(a) 2.50% increase in the employer contribution rate*	0.6%
(b) 5.00% increase in the employer contribution rate*	-5.4%
3. Five-year annual investment return resulting in a	
(a) 2.50% increase in the employer contribution rate*	4.0%
(b) 5.00% increase in the employer contribution rate*	1.6%

* Ultimate increase in contribution rate after investment losses have been fully phased-in, per the fund's asset smoothing policy.

* Increase in contribution rate payable for approximately 20 years, after final Investment loss recognition (i.e. the amortization period of new gains/losses incurring after June 30, 2019)



Section 3.

Stress Testing Results for County Employees Retirement System (Non-Hazardous Pension Fund)

Part E. Identified Outcome Based Events Results (continued)

Budgeted Contribution Rate Scenarios – The following table provides the percent of the actuarially determined contribution (ADEC) that is certified by the Board of Trustees for payment by the employers that is necessary over a one-, two-, and five-year period to increase future employer contribution rates by 2.5% and 5.0% of covered payroll. Employer contribution rates for the County Employees Retirement System (CERS) funds are currently limited by the phase-in provisions established by HB 362 passed during the 2018 legislation session. These provisions cap annual increases in the total employer contribution rate (pension plus insurance) at 12% over the prior fiscal year for the period of July 1, 2018 to June 30, 2028. Additionally, SB 249, passed during the 2020 legislative session, froze the CERS contribution rates for FYE 2021 at the level budgeted for FYE 2020.

As a comparison, the Board-certified contribution rates for the CERS Non-Hazardous Pension Fund for FYE 2021 and FYE 2022 were 19.30% of pay and 22.78% of pay, respectively, which are 81% and 95% of the actuarially determined contribution rates. Employer contribution rates for this fund are expected to be fully phased in starting with contribution rates in FYE 2023.

Budgeted Contribution Rate Scenarios	
1. Percent of ADEC budgeted over a one-year period resulting in a	
(a) 2.50% increase in the employer contribution rate*	N/A**
(b) 5.00% increase in the employer contribution rate*	N/A**
2. Percent of ADEC budgeted over a two-year period resulting in a	
(a) 2.50% increase in the employer contribution rate*	32%
(b) 5.00% increase in the employer contribution rate*	N/A**
3. Percent of ADEC budgeted over a five-year period resulting in a	
(a) 2.50% increase in the employer contribution rate*	73%
(b) 5.00% increase in the employer contribution rate*	49%

* Increase in contribution rate payable for approximately 20 years
(the amortization period of new gains/losses incurring after June 30, 2019)

** Negative contribution amount would be necessary to achieve identified Increase in contribution rate



SECTION 4

STRESS TESTING RESULTS FOR COUNTY EMPLOYEES RETIREMENT SYSTEM HAZARDOUS PENSION FUND

Section 4.

Stress Testing Results for County Employees Retirement System (Hazardous Pension Fund)

Part A. Deterministic Projection Modeling Results - Contribution Risk

The analysis in Part A provides the results of the deterministic simulation analysis on the employer contributions (both as a dollar amount and as a percentage of payroll), the unfunded accrued liability, and the funded ratio of the fund. The deterministic scenarios analyzed in this section are designed to illustrate the risk to the fund of receiving insufficient contributions. The scenarios include:

- (1) a 2% reduction in active membership for 10 years, which is intended to illustrate, approximately, flat covered payroll for 10 years (compared to the 2% payroll growth assumption);
- (2) 75% of the actuarially determined contribution rate being certified by the Board of Trustees each year, starting in FYE 2023 throughout the entire length of the projection; and
- (3) the funding period for amortizing the unfunded liability being reset to 30 years every six years by the General Assembly.

Baseline Valuation – In general, employer contributions are expected to remain relatively level as a percentage of payroll and employer contributions as a dollar amount will increase as payroll increases, until the contribution rates drop to the normal cost rates in FYE 2050 (when the unfunded liability is expected to be paid off). Employer contribution rates will slightly decrease throughout the projection as Tier 3 members are hired to replace Tier 1 members and the normal cost rate gradually declines. The unfunded liability is systematically paid off, with the fund expected to reach 100% funded in 2049.

0% Payroll Growth for 10 Years – In general, employer contributions as a dollar amount are relatively close to the baseline projection. They are slightly lower than the baseline projection for the first few years because when payroll is lower than expected, the fund receives less than the actuarially determined contribution, which must be made up in future years. Employer contributions as a percentage of payroll increase beyond the baseline projection, as payroll decreases. However, because the full actuarially determined contribution rates are expected to be paid (after the phase-in period), the funded ratio is expected to increase throughout the projection, reaching approximately 100% funded in 2049.

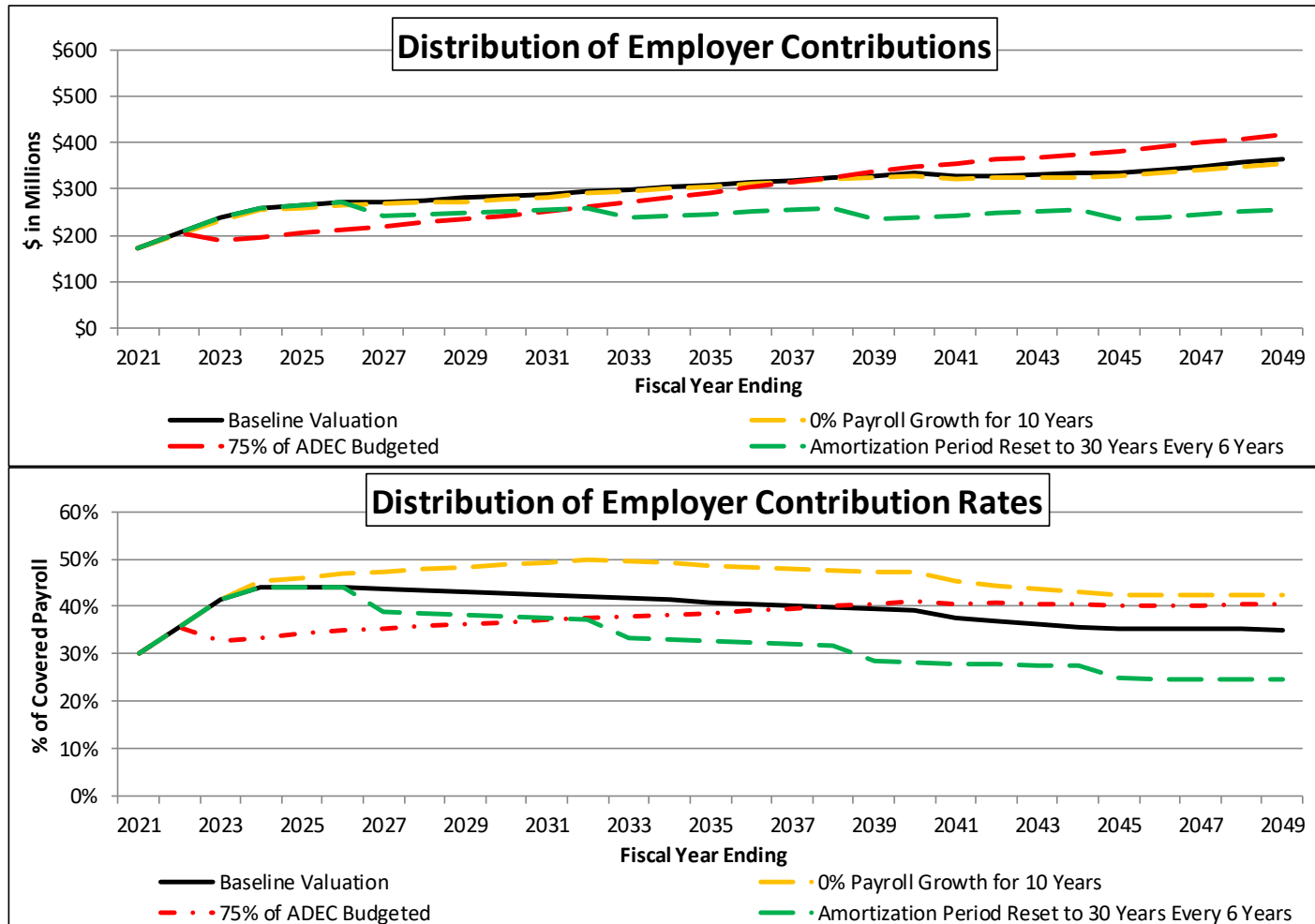
75% of ADEC Budgeted – When less than the actuarially determined employer contributions (ADEC) are paid, the unpaid amount must be made up in future contributions. As the following exhibits show, the contribution requirement (both as a dollar amount and as a percentage of pay) will continue to grow each year. The unfunded liability will continue to increase for the next 15 years, only decreasing down to the current level of \$3.0 billion of unfunded liability in 2042. Additionally, contribution rates will not reduce to the normal cost rates in FYE 2050, as there is still \$1.6 billion of unfunded liability remaining in 2049.

Amortization Period Reset to 30 Years every 6 Years – When the amortization period is reset to 30 years, there is an immediate decrease in the annual employer contribution requirement; however, the period to pay off the unfunded liability is increased. As the following exhibits show, no progress will be made in paying off the unfunded liability with the unfunded liability rising slightly and then remaining at the current level of \$3.0 billion. Additionally, contribution rates will not reduce to the normal cost rates in FYE 2050, as there is still \$3.0 billion of unfunded liability remaining in 2049.



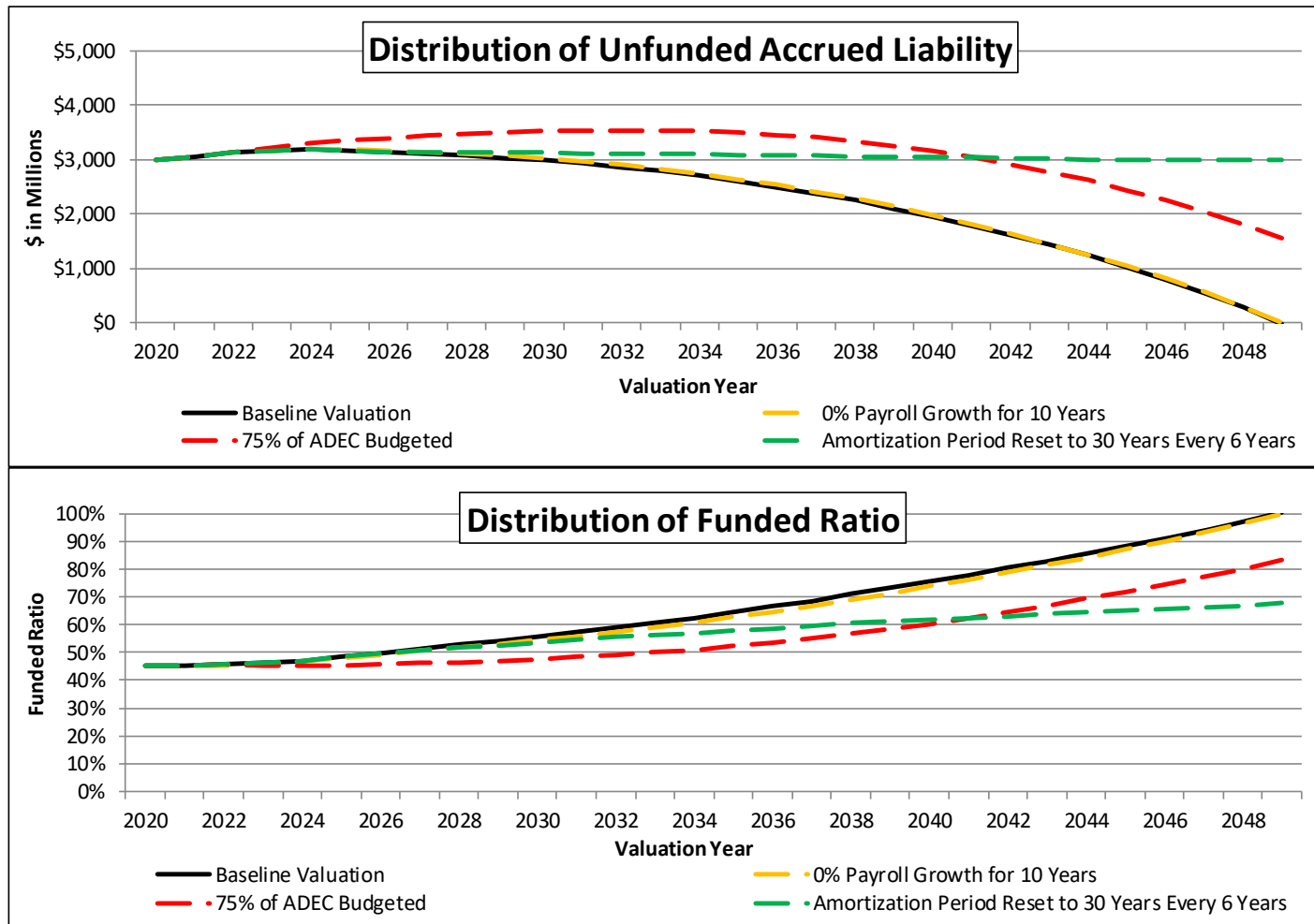
Section 4. Stress Testing Results for County Employees Retirement System (Hazardous Pension Fund)

Part A. Deterministic Projection Modeling Results - Contribution Risk (continued)



Section 4. Stress Testing Results for County Employees Retirement System (Hazardous Pension Fund)

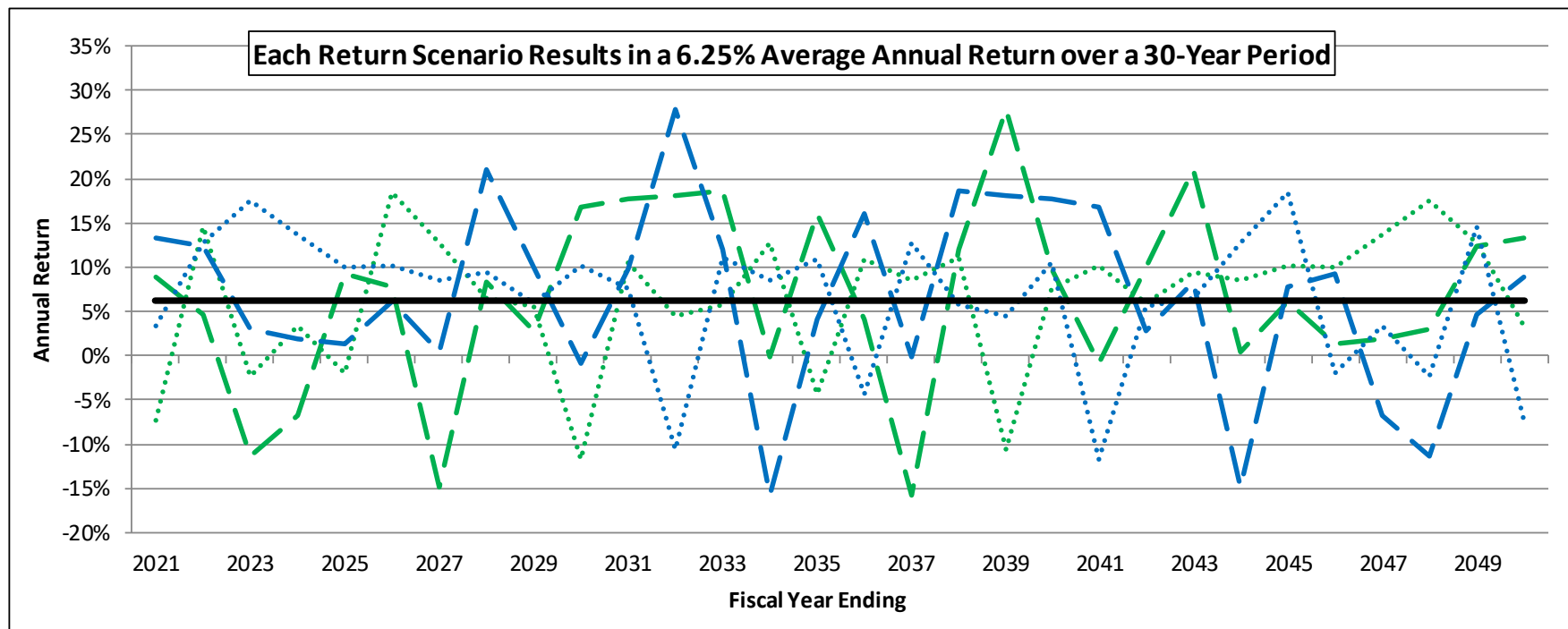
Part A. Deterministic Projection Modeling Results - Contribution Risk (continued)



Section 4. Stress Testing Results for County Employees Retirement System (Hazardous Pension Fund)

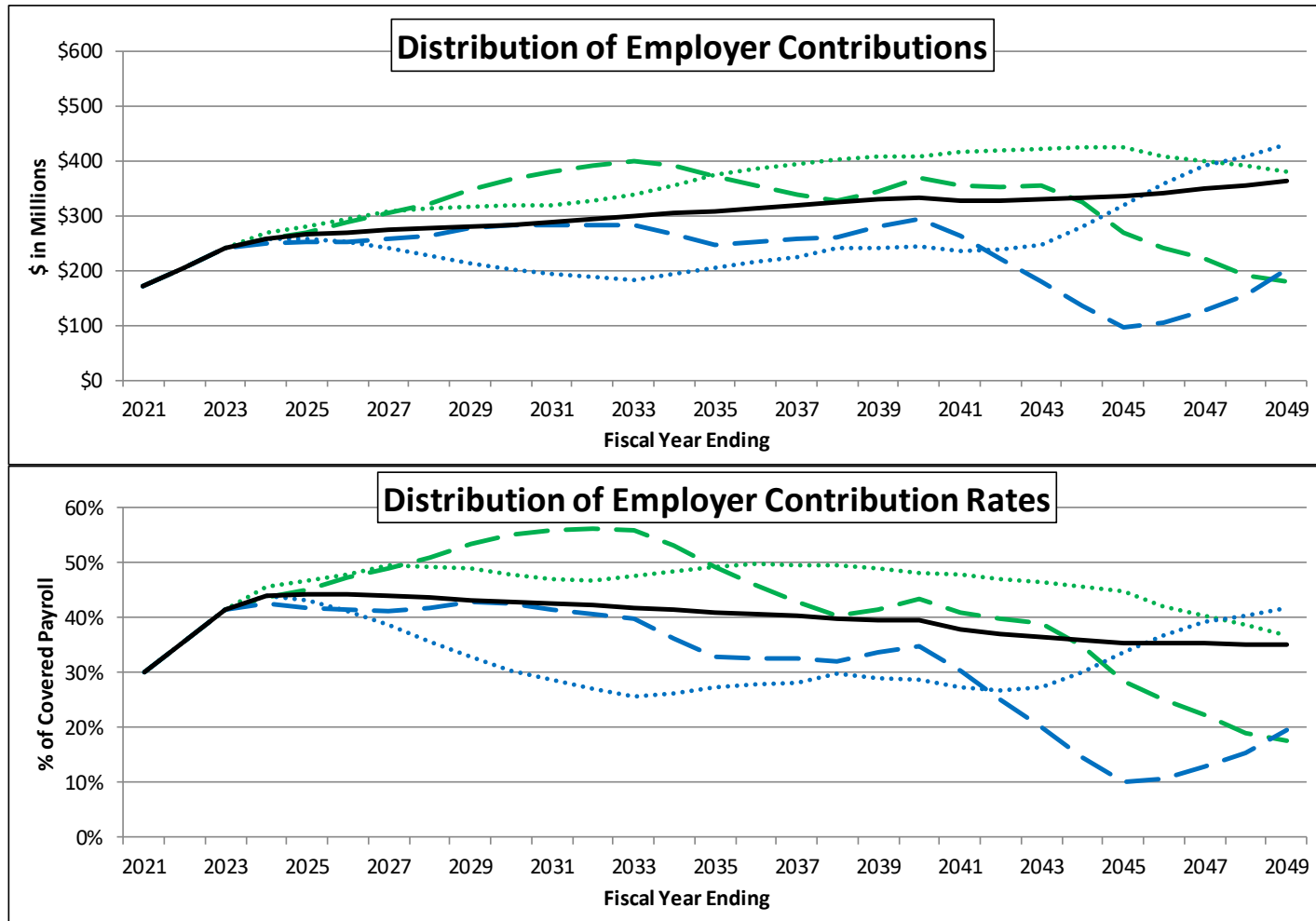
Part B. Financial Impact Due to Volatility in Investment Returns

Below is a chart with five investment return scenarios that each result in a 6.25% average compound investment return over a 30-year period. The black line is representative of a common baseline projection with no investment return volatility. The other four scenarios were selected to illustrate the effect of volatility on employer contributions, the unfunded liability, and funded ratio of the fund. **Stakeholders need to understand that even if the System earns an average 6.25% over the next thirty years, there is no guarantee that contribution rates will not have to be increased above current amounts during that time period and the System may be less than 100% funded in 2049.**



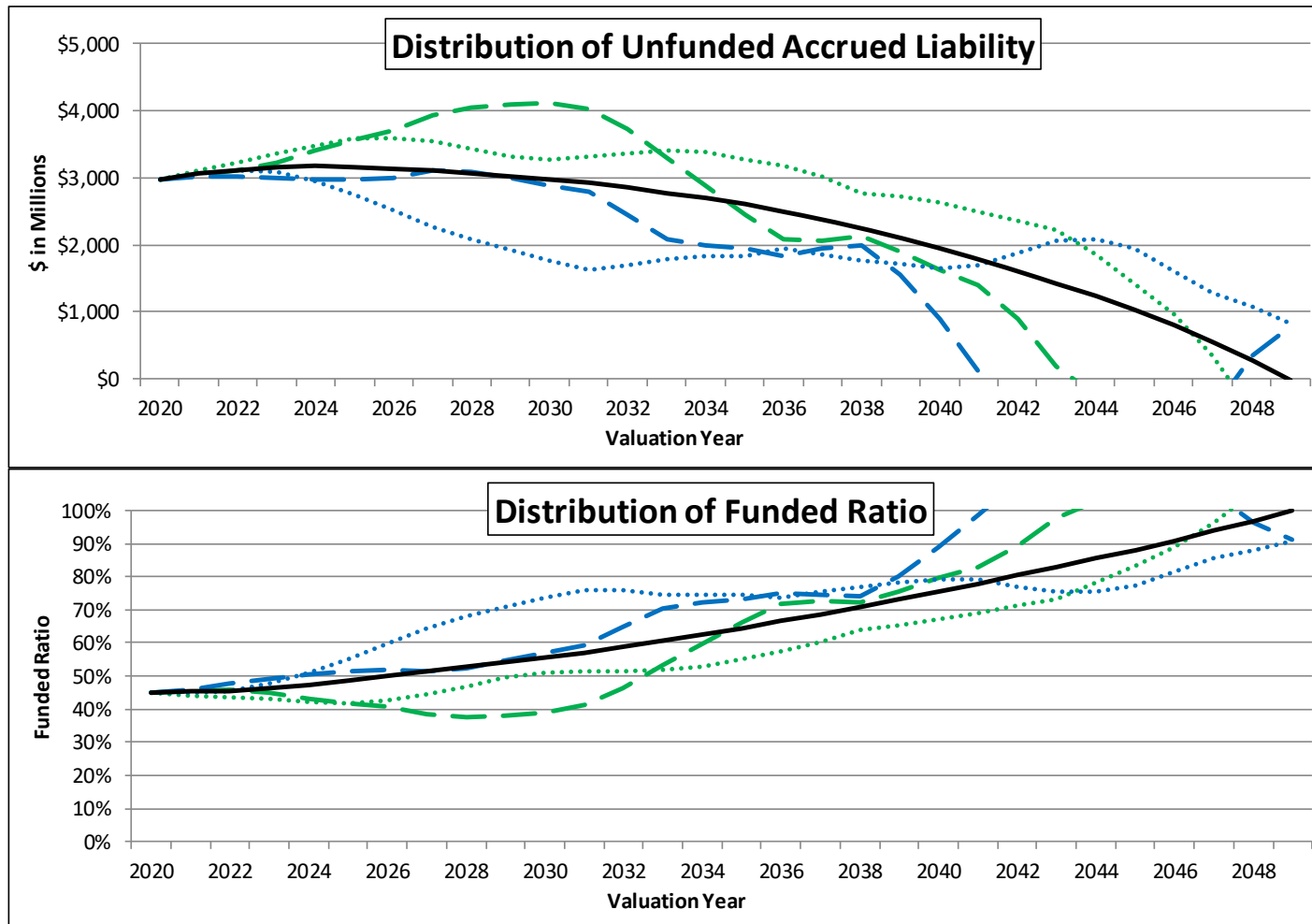
Section 4. Stress Testing Results for County Employees Retirement System (Hazardous Pension Fund)

Part B. Financial Impact Due to Volatility in Investment Returns (continued)



Section 4. Stress Testing Results for County Employees Retirement System (Hazardous Pension Fund)

Part B. Financial Impact Due to Volatility in Investment Returns (continued)



Section 4.

Stress Testing Results for County Employees Retirement System (Hazardous Pension Fund)

Part C. Stochastic Simulation Results

The analysis in Part C provides the results of the stochastic simulation analysis for the fund. Further in this section, the projected employer contributions, unfunded liability, and funded ratio of the fund are provided at the 25th, 50th, and 75th percentiles of the stochastic scenarios. The chart below provides the percentage of the 5,000 stochastic scenarios that resulted in the prescribed outcome (i.e. an increase/decrease in the employer contribution rate or a decrease in the funded ratio) within a certain number of years (5, 10, 15, 20, or 30 years).

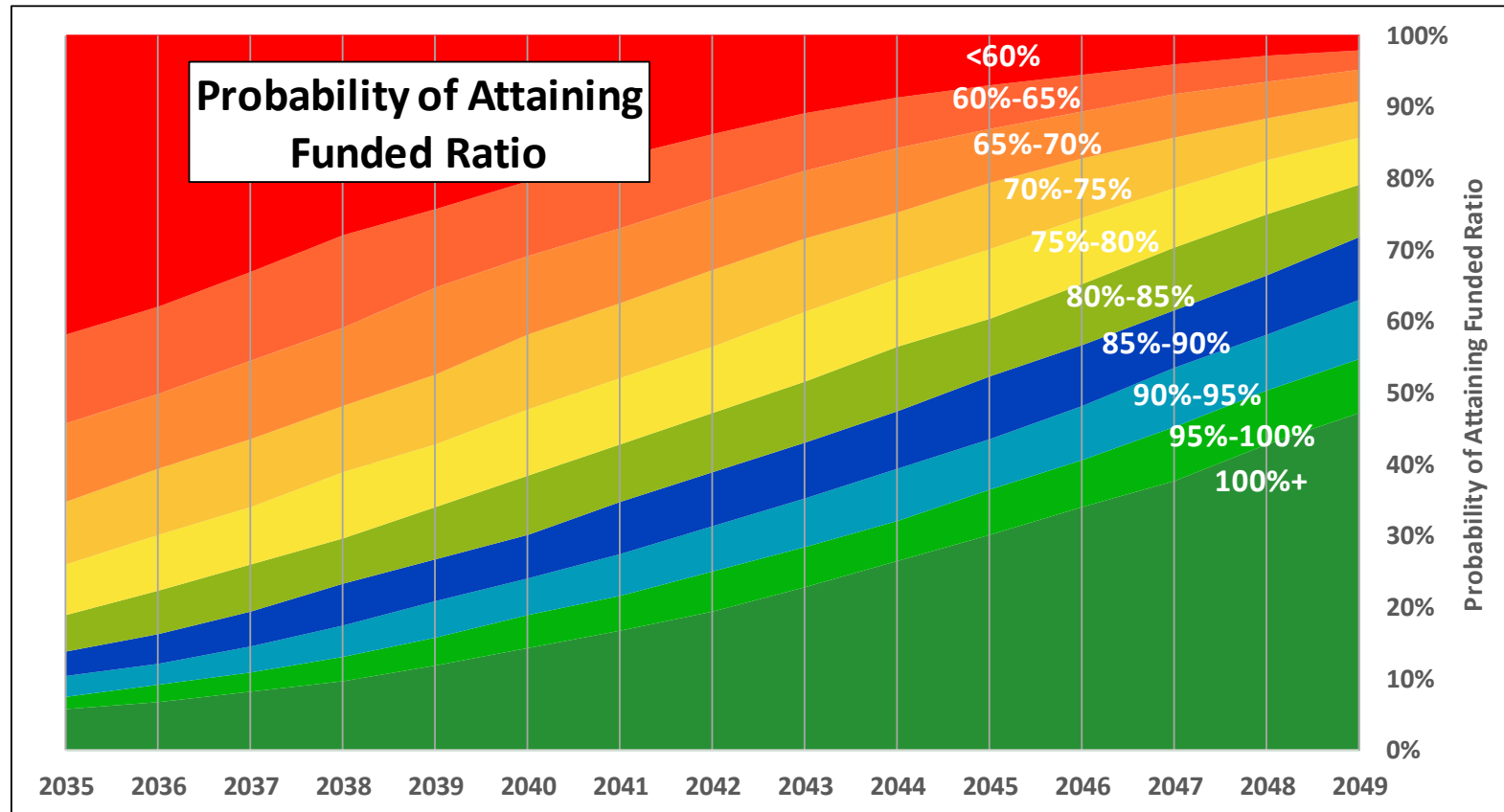
Probability of Prescribed Outcome					
	5 Years	10 Years	15 Years	20 Years	30 Years
1. Probability of a 5% of pay increase in the required contribution rate within the next X Years ¹	22%	39%	48%	53%	63%
2. Probability of a 10% of pay increase in the required contribution rate within the next X Years ¹	4%	16%	25%	31%	42%
3. Probability of a 5% of pay decrease in the required contribution rate within the next X Years ¹	19%	41%	55%	65%	99%
4. Probability of a 10% of pay decrease in the required contribution rate within the next X Years ¹	6%	24%	38%	50%	96%
5. Probability of a 1.0% decrease in the funded ratio within the next X Years ²	36%	43%	46%	46%	47%
6. Probability of a 5.0% decrease in the funded ratio within the next X Years ²	12%	18%	20%	20%	20%
¹ Percentage of stochastic scenarios that the employer contribution rate in a year after FYE 2022 is greater/lower than the FYE 2022 actuarially determined contribution rate of 43.23% of pay					
² Percentage of stochastic scenarios that the funded ratio in a year after 2020 is less than the 2020 funded ratio of 45.1% of pay					



Section 4. Stress Testing Results for County Employees Retirement System (Hazardous Pension Fund)

Part C. Stochastic Simulation Results (continued)

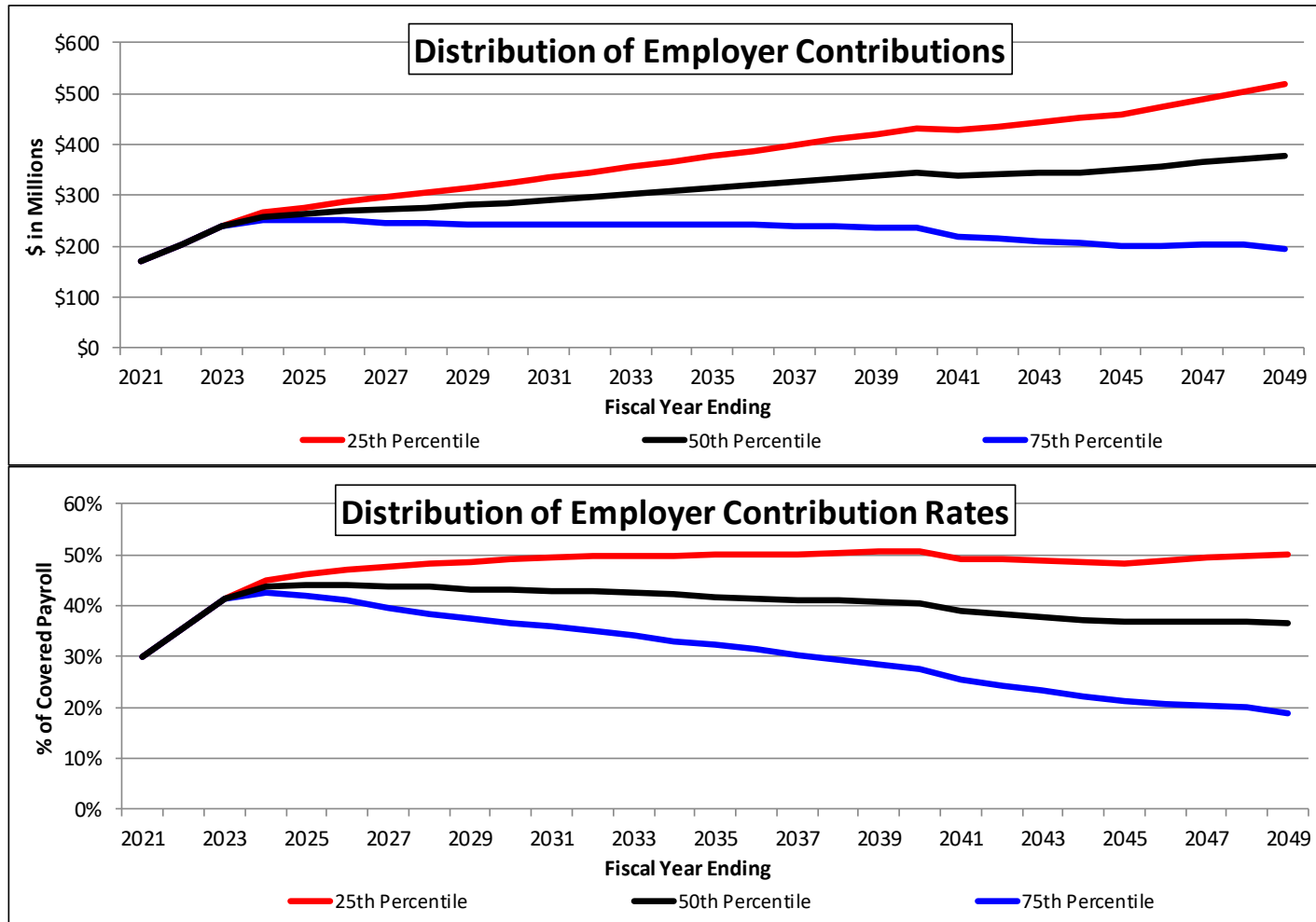
The chart below provides the distribution of the funded ratio among the stochastic scenarios between the years 2035 and 2049. Absent investment volatility and future gains or losses, the fund is expected to be 100% funded in 2049; however, as the chart shows below, only approximately 50% of the stochastic scenarios are 100% funded in 2049.



Section 4.

Stress Testing Results for County Employees Retirement System (Hazardous Pension Fund)

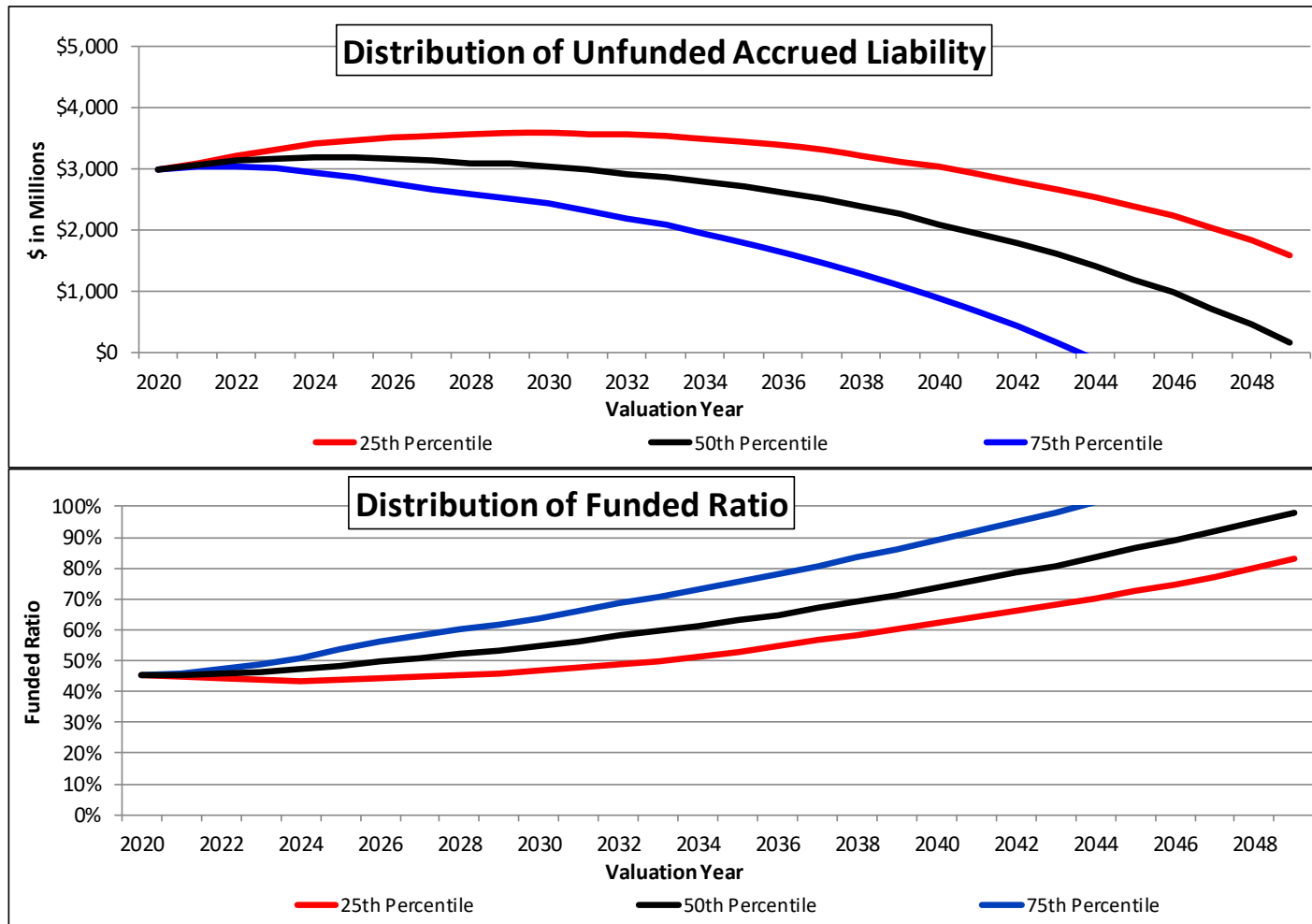
Part C. Stochastic Simulation Results (continued)



Section 4.

Stress Testing Results for County Employees Retirement System (Hazardous Pension Fund)

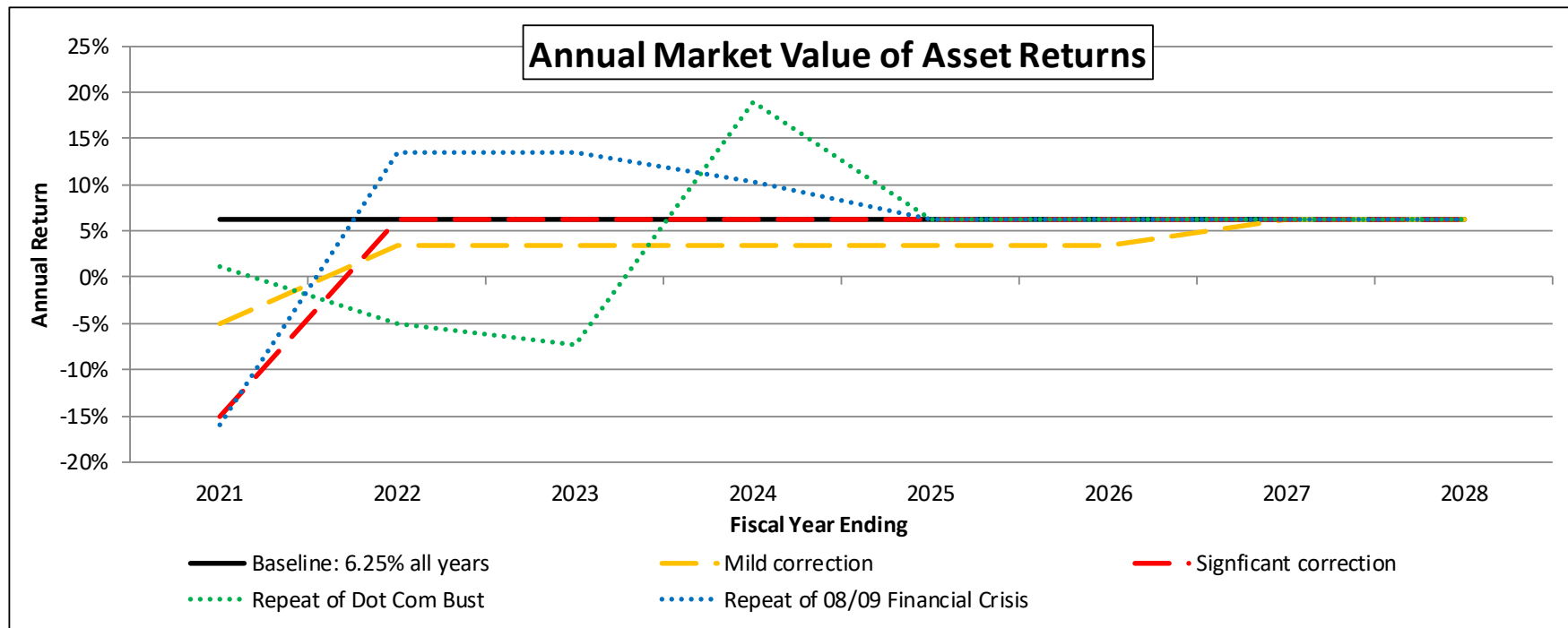
Part C. Stochastic Simulation Results (continued)



Section 4. Stress Testing Results for County Employees Retirement System (Hazardous Pension Fund)

Part D. Deterministic Projection Modeling Results - Investment Risk

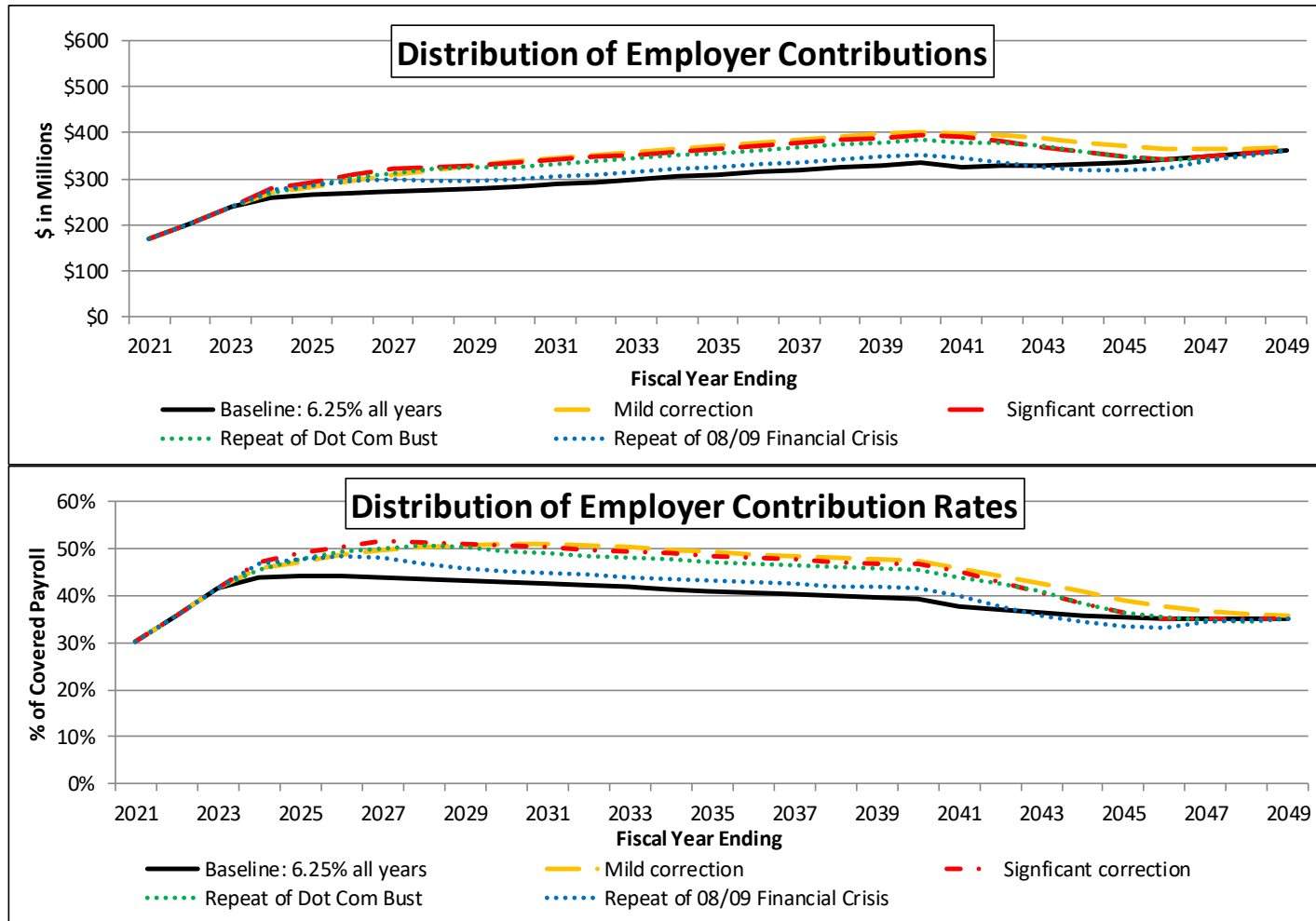
The analysis in Part D provides the results of the deterministic simulation on the employer contributions (both as a dollar amount and as a percentage of payroll), the unfunded accrued liability, and the funded ratio of the fund to illustrate the fund's exposure to short-term investment risk. The chart below provides the annual market value of asset return assumed in each scenario. Annual returns of 6.25% are assumed after FYE 2028.



Section 4.

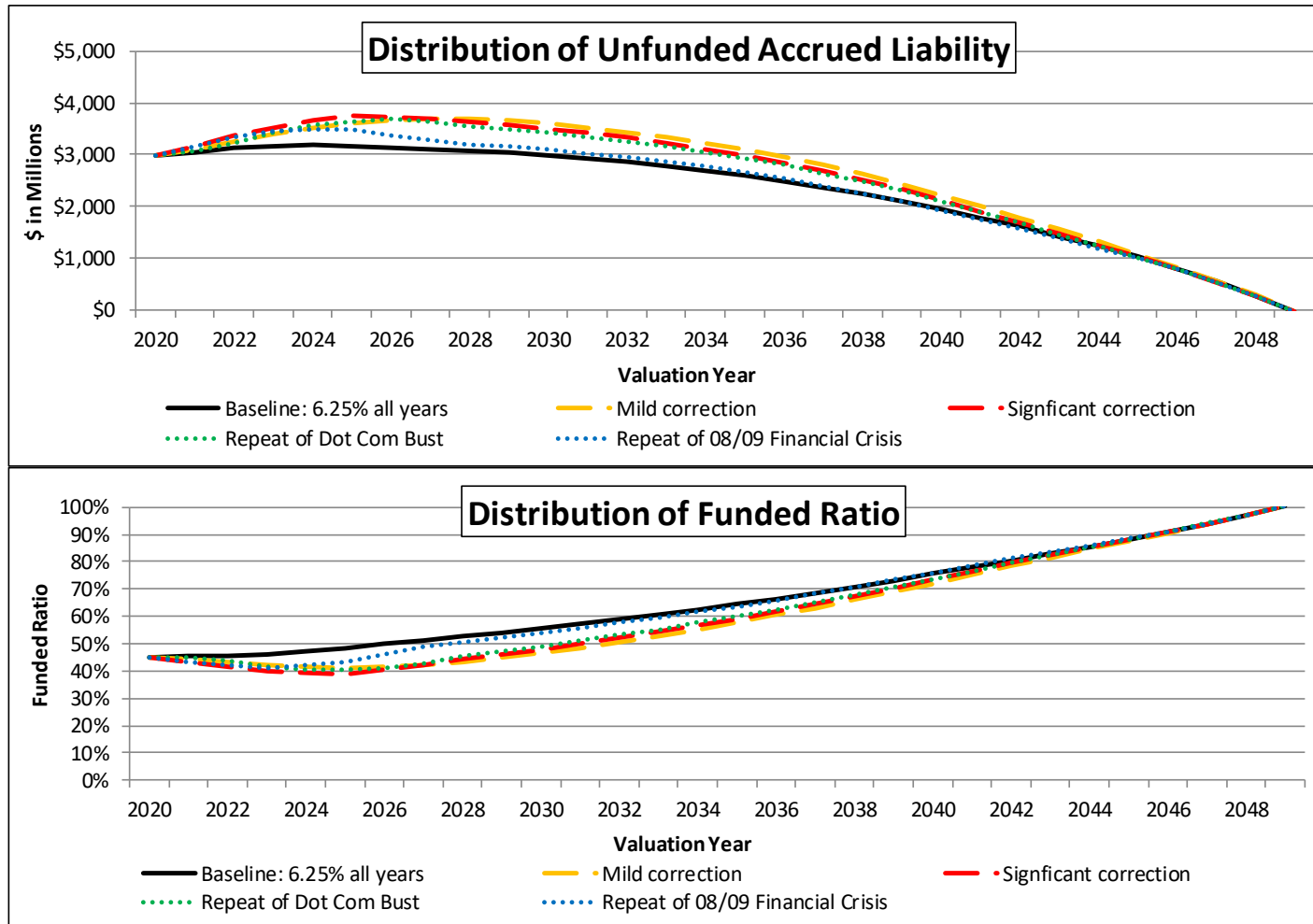
Stress Testing Results for County Employees Retirement System (Hazardous Pension Fund)

Part D. Deterministic Projection Modeling Results - Investment Risk (continued)



Section 4. Stress Testing Results for County Employees Retirement System (Hazardous Pension Fund)

Part D. Deterministic Projection Modeling Results - Investment Risk (continued)



Section 4.

Stress Testing Results for County Employees Retirement System (Hazardous Pension Fund)

Part E. Identified Outcome Based Events Results

The analysis in Part E identifies the magnitude of a certain scenario necessary to result in a certain financial outcome.

Investment Return Scenarios – The following table provides the annual investment return over a one-, two-, and five-year period necessary to increase the employer contribution rate by 2.5% and 5.0% of covered payroll. The County Employees Retirement System Hazardous Pension Fund is assumed to earn 6.25% annually, per the assumptions used in the June 30, 2020 actuarial valuation.

Investment Return Scenarios	
1. One-year annual investment return resulting in a	
(a) 2.50% increase in the employer contribution rate*	-0.7%
(b) 5.00% increase in the employer contribution rate*	-7.6%
2. Two-year annual investment return resulting in a	
(a) 2.50% increase in the employer contribution rate*	2.7%
(b) 5.00% increase in the employer contribution rate*	-0.9%
3. Five-year annual investment return resulting in a	
(a) 2.50% increase in the employer contribution rate*	4.8%
(b) 5.00% increase in the employer contribution rate*	3.4%

* Ultimate increase in contribution rate after investment losses have been fully phased-in, per the fund's asset smoothing policy.

* Increase in contribution rate payable for approximately 20 years, after final Investment loss recognition (i.e. the amortization period of new gains/losses incurring after June 30, 2019)



Section 4.

Stress Testing Results for County Employees Retirement System (Hazardous Pension Fund)

Part E. Identified Outcome Based Events Results (continued)

Budgeted Contribution Rate Scenarios – The following table provides the percent of the actuarially determined contribution (ADEC) that is certified by the Board of Trustees for payment by the employers that is necessary over a one-, two-, and five-year period to increase future employer contribution rates by 2.5% and 5.0% of covered payroll. Employer contribution rates for the County Employees Retirement System (CERS) funds are currently limited by the phase-in provisions established by HB 362 passed during the 2018 legislation session. These provisions cap annual increases in the total employer contribution rate (pension plus insurance) at 12% over the prior fiscal year for the period of July 1, 2018 to June 30, 2028. Additionally, SB 249, passed during the 2020 legislative session, froze the CERS contribution rates for FYE 2021 at the level budgeted for FYE 2020.

As a comparison, the Board-certified contribution rates for the CERS Hazardous Pension Fund for FYE 2021 and FYE 2022 were 30.06% of pay and 35.60% of pay, respectively, which are 72% and 82% of the actuarially determined contribution rates. Employer contribution rates for this fund are expected to be fully phased in starting with contribution rates in FYE 2024.

Budgeted Contribution Rate Scenarios	
1. Percent of ADEC budgeted over a one-year period resulting in a	
(a) 2.50% increase in the employer contribution rate*	21%
(b) 5.00% increase in the employer contribution rate*	N/A**
2. Percent of ADEC budgeted over a two-year period resulting in a	
(a) 2.50% increase in the employer contribution rate*	61%
(b) 5.00% increase in the employer contribution rate*	26%
3. Percent of ADEC budgeted over a five-year period resulting in a	
(a) 2.50% increase in the employer contribution rate*	84%
(b) 5.00% increase in the employer contribution rate*	70%

* Increase in contribution rate payable for approximately 20 years
(the amortization period of new gains/losses incurring after June 30, 2019)

** Negative contribution amount would be necessary to achieve identified Increase in contribution rate



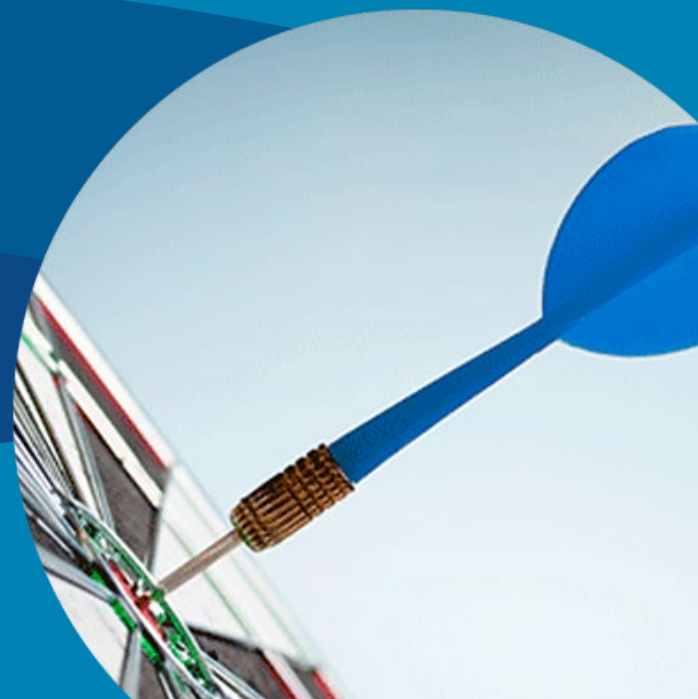


County Employees Retirement Systems 2020 Stress Test

August 25, 2021

Janie Shaw, Consultant

Danny White, Senior Consultant



Stress Test Discussion

- Purpose
- Process and Analysis
 - Based on June 30, 2020 Actuarial Valuation
 - Does not reflect 2021 legislation
 - Does not reflect FYE 2021 investment experience
- Key Takeaways
 - CERS Funds



Stress Test – Purpose

- A stress test is an analysis designed to determine the ability of a given financial institution to deal with an economic crisis or certain stressors
- The purpose of a stress test is to:
 - Identify the stressors to the System
 - Monitor and possibly adjust policies and procedures in order to improve sustainability
 - Educate stakeholders of those potential risks

Stress Test – Purpose

- The focus is not on the outcomes, but the decisions that should be considered, or improvements to current processes, based on the outcomes
- Stakeholders should be asking:
 - What kinds of potential scenarios may result in further reform action?
 - What is the likelihood of those scenarios?

Stress Test - Process

- Identify the outcomes to be tested and modeled
- Use appropriate projection analysis to identify potential outcomes. Analysis types include:
 - Contribution risk
 - Investment return volatility
 - Stochastic simulations
 - Deterministic projections
 - Outcome based events



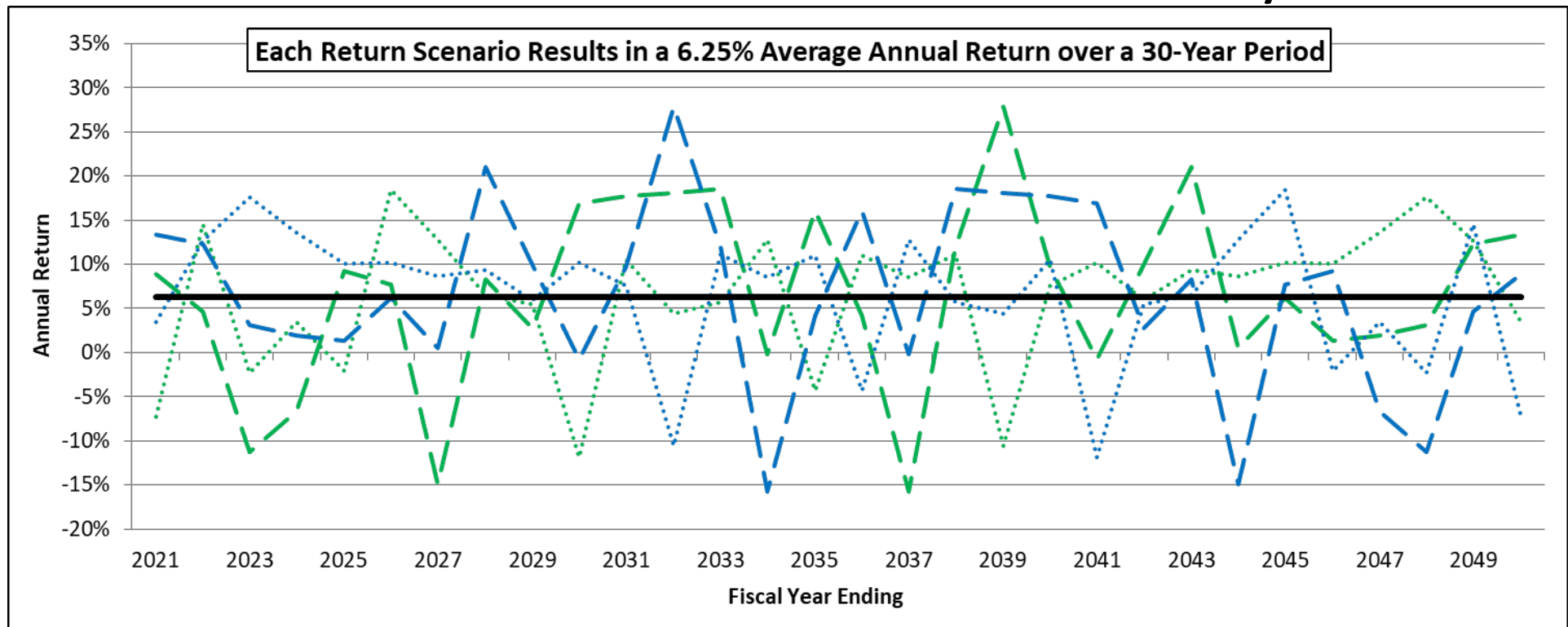
Contribution Risk

- Analysis of the funds' risk due receiving insufficient contributions.
- Scenarios include:
 - Covered payroll decreasing 2% less than assumed, or
 - Budget risk, or
 - Contribution rates that are 75% of the full actuarially determined rate
 - Re-amortization risk
 - The funding period is reset to 30-years every six years
- Scenarios analyzed separately



Investment Return Volatility

- Measure potential volatility in employer contributions, unfunded liability, and funded ratio due to investment return volatility



Stochastic Simulations

- Monte Carlo simulation that produces 5,000 randomly generated investment return scenarios
 - Return / volatility parameters are provided by KPPA
- Identify the probability of the following in the next 5, 10, 15, 20, and 30 years:
 - Probability of a 5%/10% increase in the contribution rate
 - Probability of a 5%/10% decrease in the contribution rate
 - Probability of a 1%/5% decrease in the funded ratio
- Charts with funded ratio distribution by year
- Charts with 25th, 50th, and 75th percentile outcomes



Deterministic Scenarios

- Scenario-based analysis where the particular event is identified:
 - Mild correction:
 - -5% return followed by five years of 3.5% returns
 - Significant correction:
 - -15% return followed by the assumed rate of return thereafter
 - Repeat the Dot Com bust
 - Repeat the 2008/2009 financial crisis

Outcome Based Events

- Identify the event that would result in the targeted outcome in a future year
 - 1-year, 2-year, and 5-year returns that result in a 2.5% or 5.0% of pay increase in the contribution rate
 - Find the percentage of actuarially determined contribution that is actually paid over a 1-year, 2-year, and 5-year period that would result in a 2.5% and 5.0% of pay increase in the contribution rate



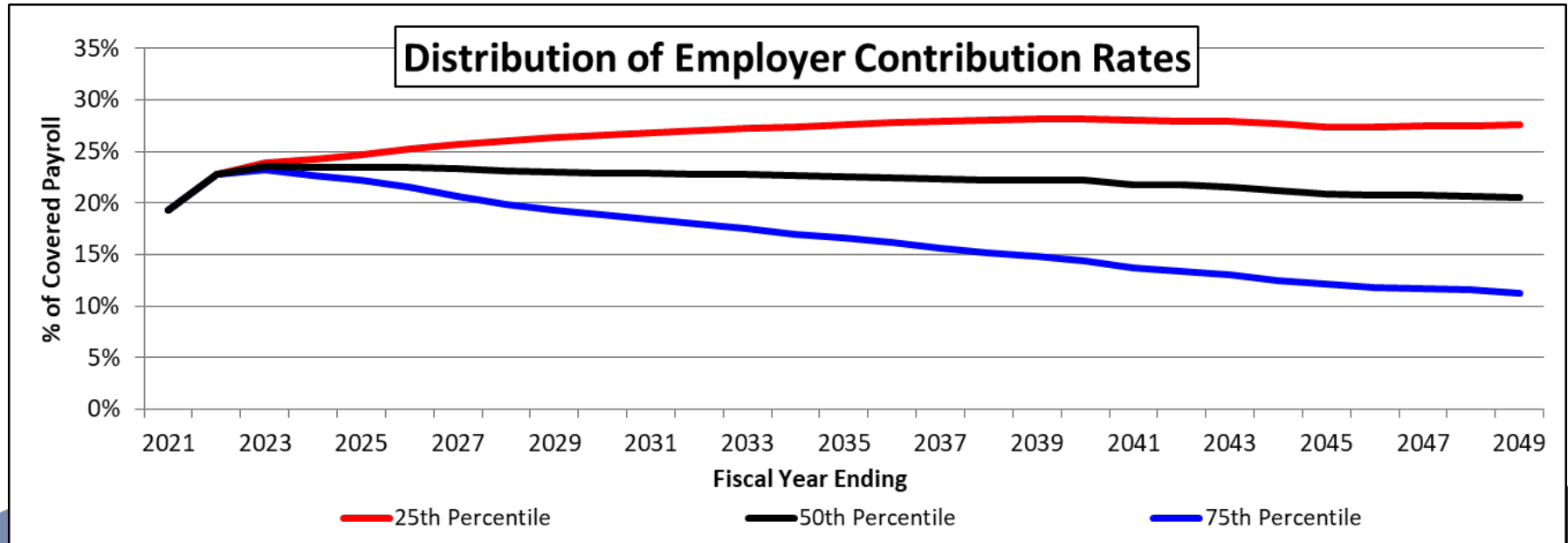
Key Takeaways

CERS Non-Hazardous Pension Fund



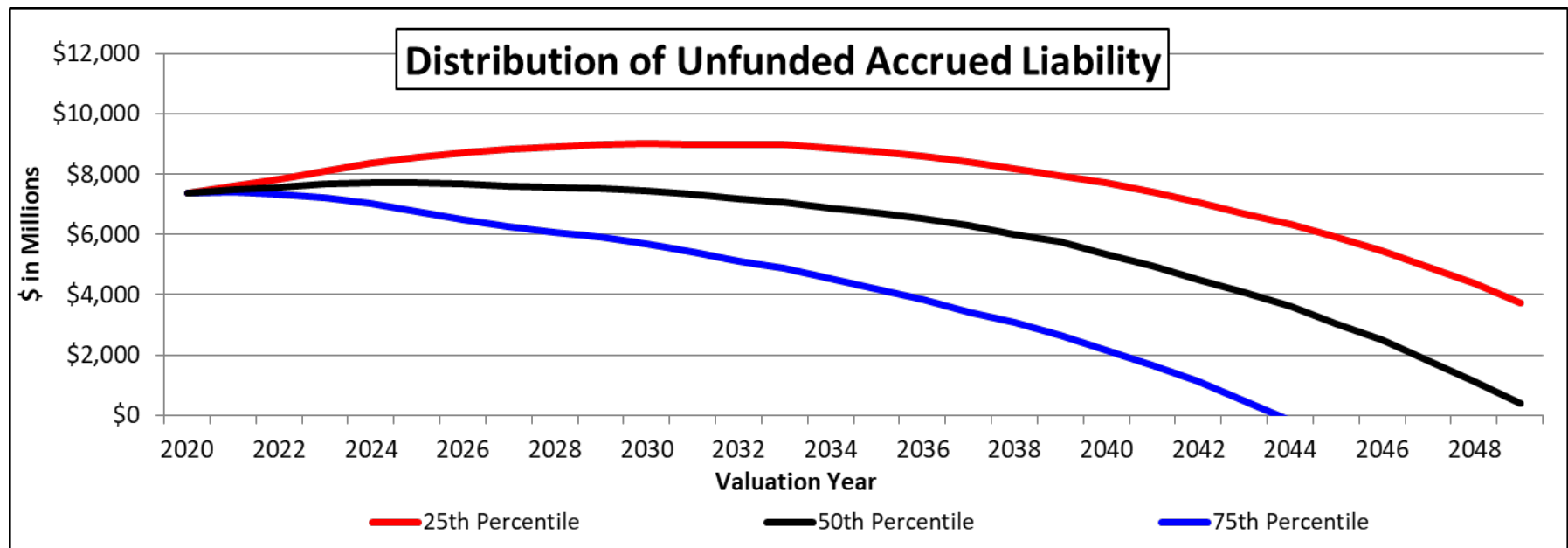
Key Takeaways – CERS Non-Haz Pension Fund

- Compared to the KERS Non-Hazardous and SPRS Pension Funds, the CERS Non-Hazardous Pension Fund has materially more investment risk, as measured by the change in contribution rate, because it is significantly better funded



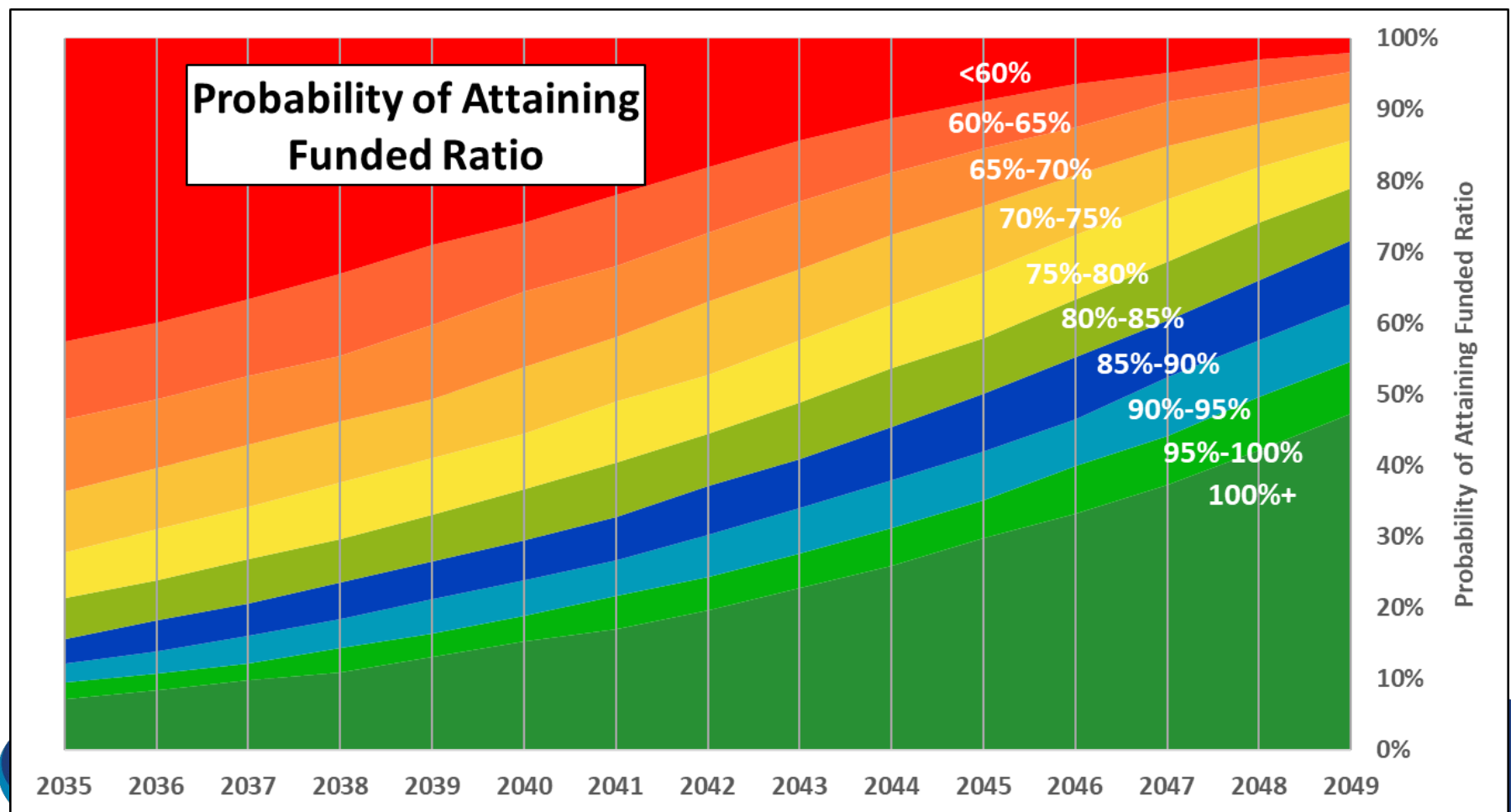
Key Takeaways – CERS Non-Haz Pension Fund

- Unfunded liability is currently expected to increase for another four years before beginning to decrease
- Unfunded liability could increase beyond its current level with investment volatility under “more likely than not” scenariosD



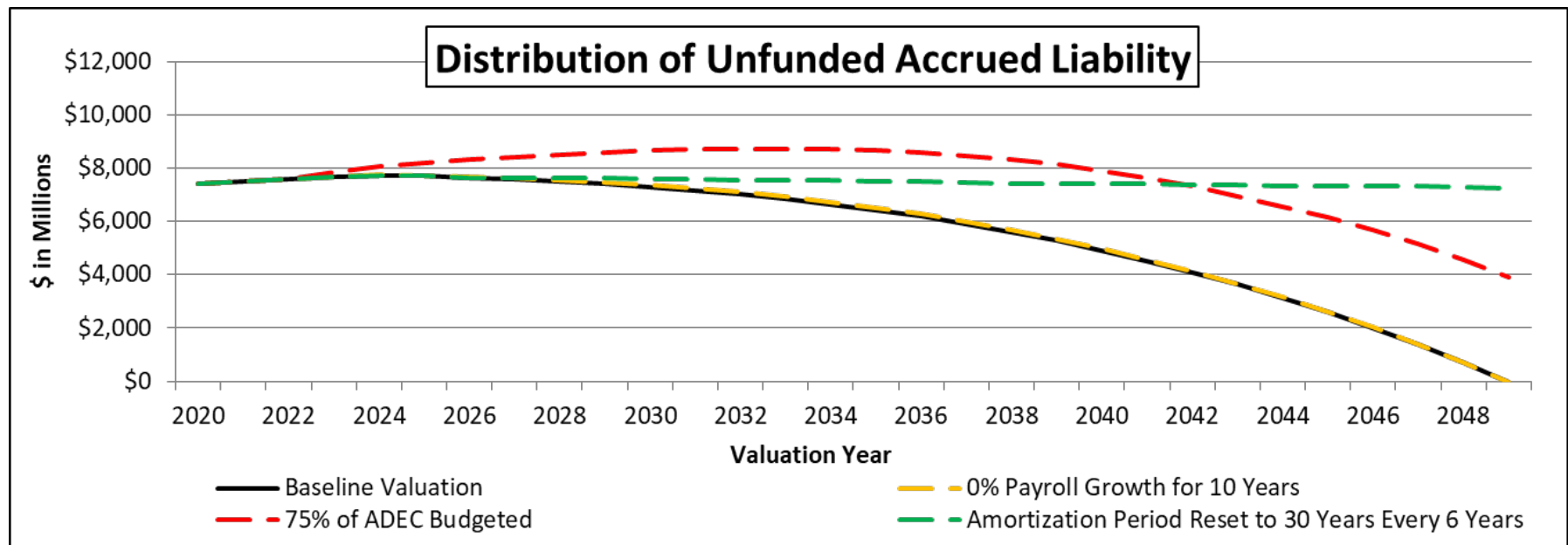
Key Takeaways – CERS Non-Haz Pension Fund

- Absent investment volatility and future gains or losses, the fund is expected to be 100% funded in 2049



Key Takeaways – CERS Non-Haz Pension Fund

- Considerable risk to the fund if the pattern of resetting the amortization period continues
 - Unfunded liability no longer being effectively financed



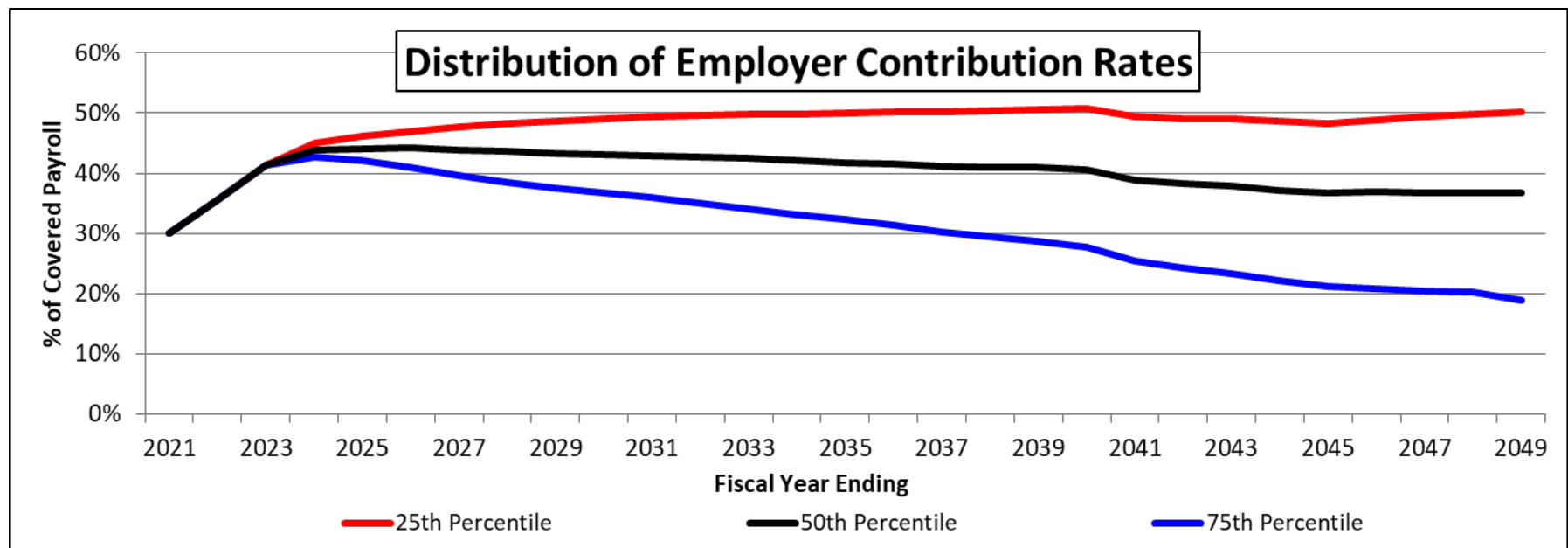
Key Takeaways

CERS Hazardous Pension Fund



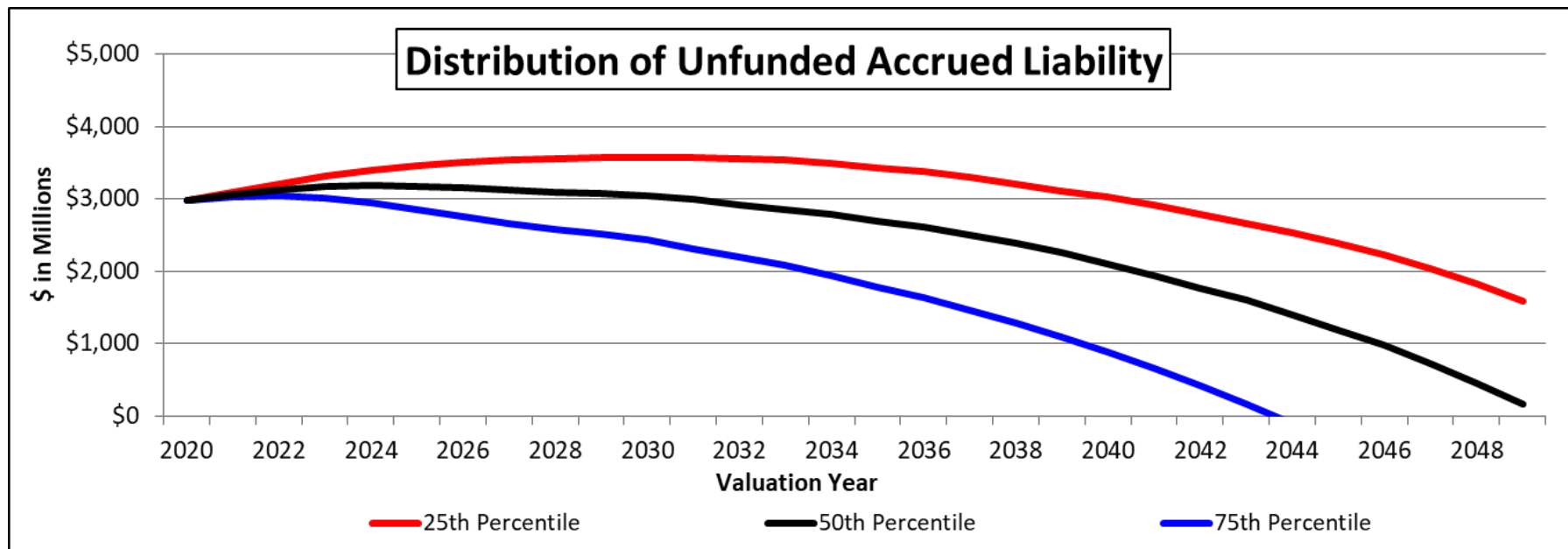
Key Takeaways – CERS Haz Pension Fund

- The potential volatility in future contribution rates for the CERS Haz Pension Fund is higher than the non-hazardous fund because the Fund has a higher leverage of liability to payroll
 - CERS Haz: Pension Fund: \$9.6 in liability for every \$1 in covered payroll
 - CERS Non-Haz Pension Fund: \$5.7 in liability for every \$1 in covered payroll.



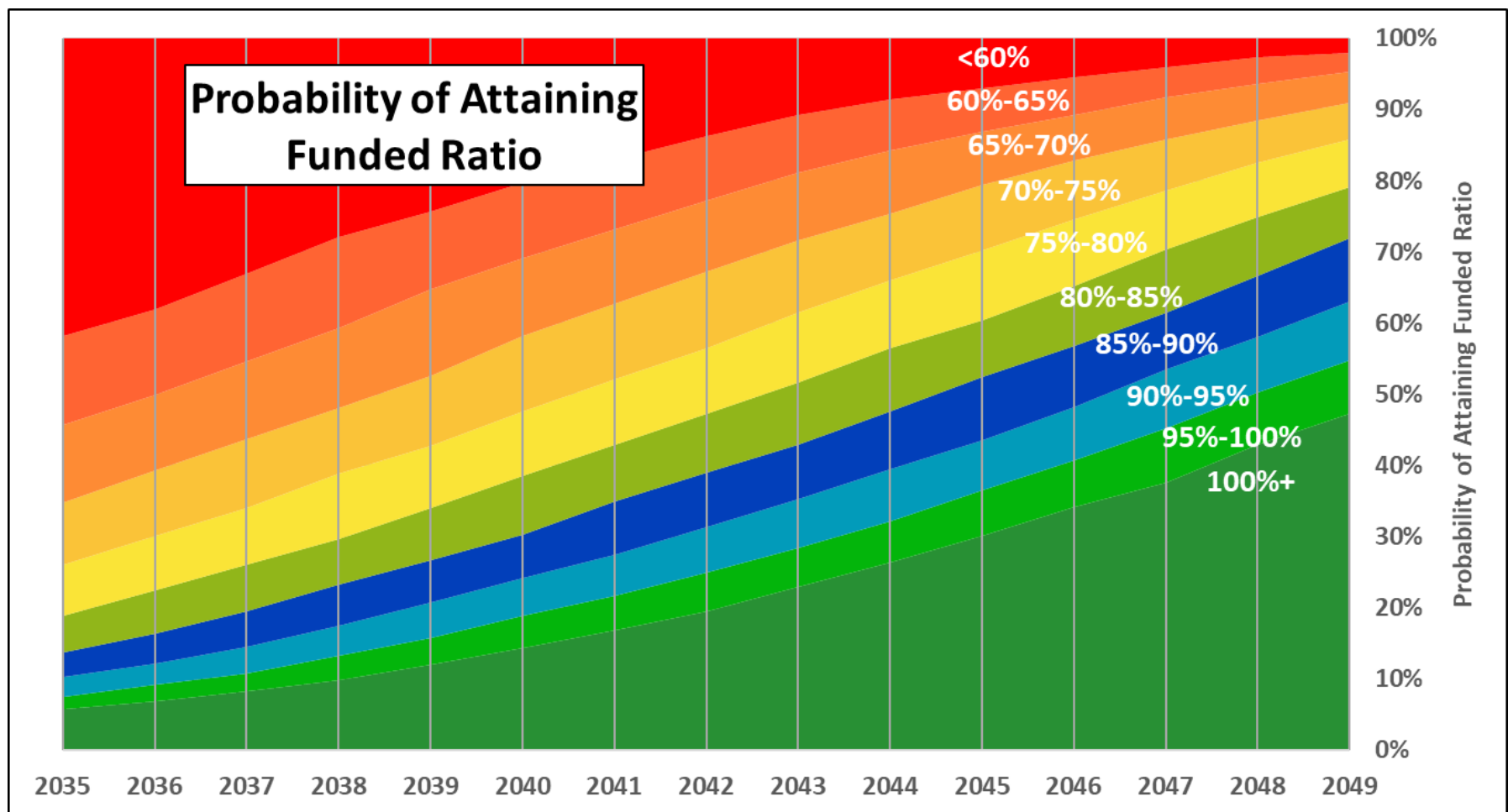
Key Takeaways – CERS Haz Pension Fund

- Similar to the non-hazardous fund, unfunded liability is currently expected to increase for another four years before beginning to decrease
 - Unfunded liability could increase beyond its current level with investment volatility under “more likely than not” scenarios



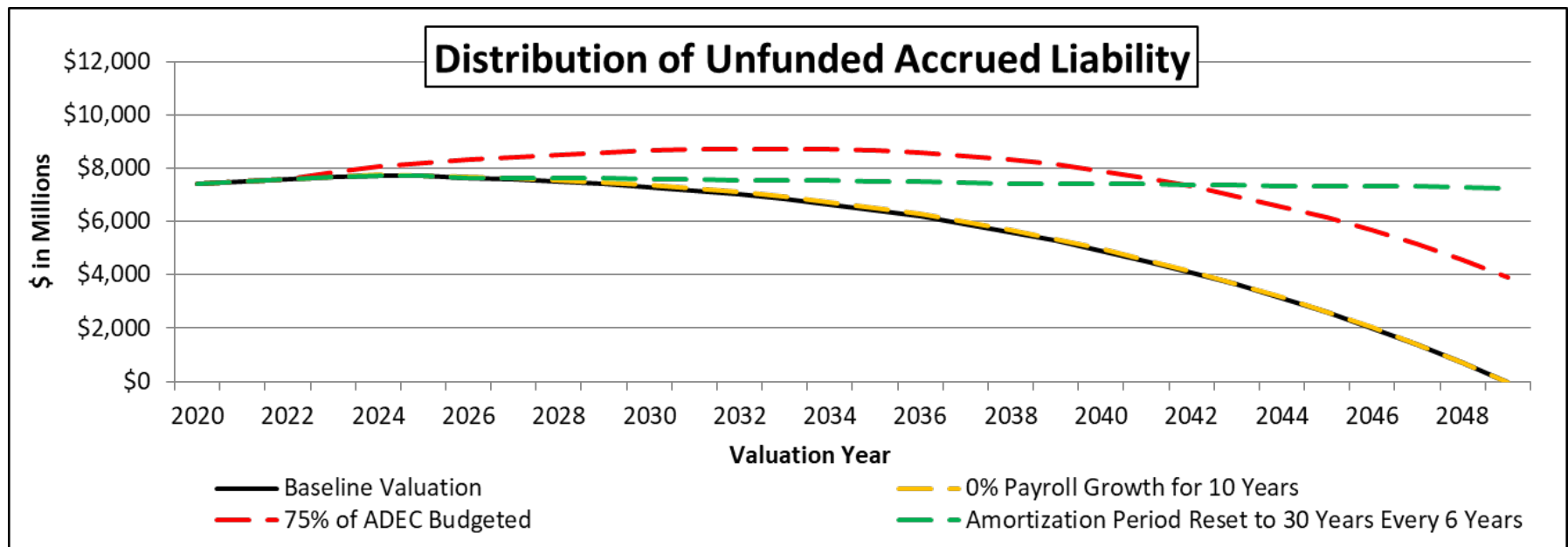
Key Takeaways – CERS Haz Pension Fund

- Absent investment volatility and future gains or losses, the fund is expected to be 100% funded in 2049



Key Takeaways – CERS Haz Pension Fund

- Similar to the non-hazardous fund, unfunded liability is no longer effectively being financed if the amortization period continues to be re-set back to 30 years



Disclaimers

- This presentation is intended to be used in conjunction with the 2020 Stress Test Analysis Report. This presentation should not be relied on for any purpose other than the purpose described in the report.
- This presentation shall not be construed to provide tax advice, legal advice or investment advice.
- Readers are cautioned to examine original source materials and to consult with subject matter experts before making decisions related to the subject matter of this presentation.
- This presentation expresses the views of the author and does not necessarily express the views of Gabriel, Roeder, Smith & Company.





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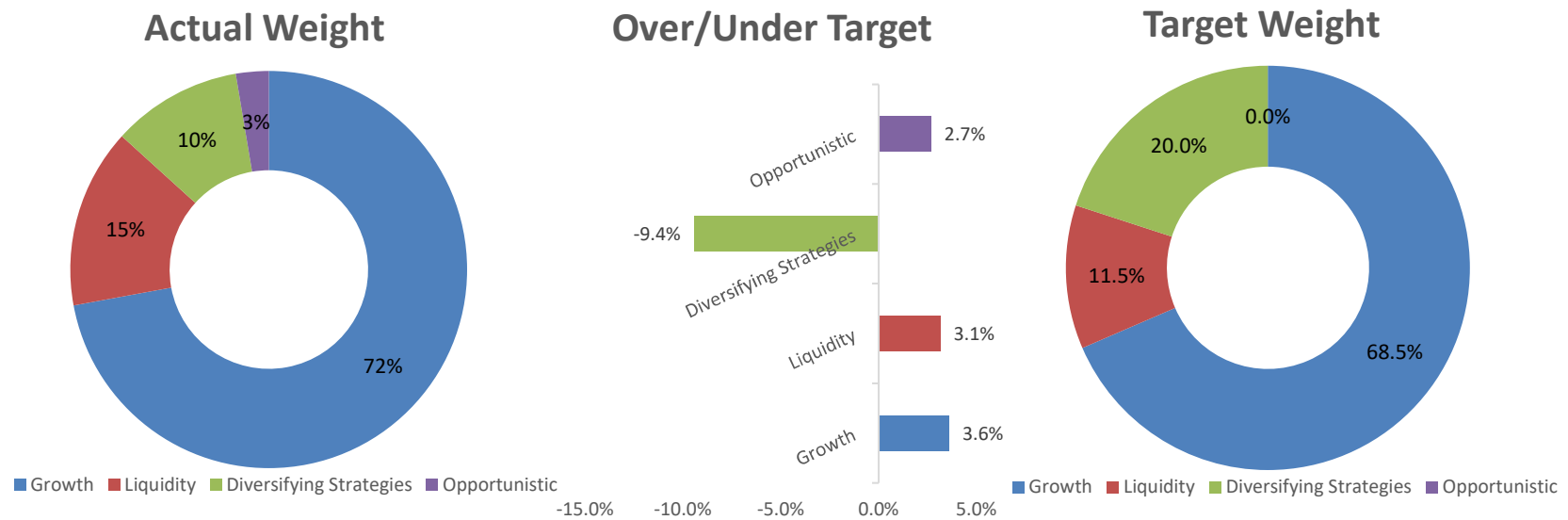
Investment Review for the Quarter Ended June 30, 2021

Presented to the County Employees Retirement Systems

Investment Committee

Total CERS and CERS-H: Asset Allocation vs Targets As of June 30, 2021

Actual vs Target Weights



Risk Categorization	Ending Market Value (\$USD)	Actual Weight	Target Weight	Relative
Growth	\$8,306,672,990	72.1%	68.5%	3.6%
Liquidity	\$1,687,069,696	14.6%	11.5%	3.1%
Diversifying Strategies	\$1,221,359,549	10.6%	20.0%	-9.4%
Opportunistic	\$307,266,751	2.7%	0.0%	2.7%

Asset Allocation	Actual	Target	Target Difference	IPS Min	IPS Max
US Equity	24.11%	21.75%	2.36%	15.23%	28.28%
Non-US Equity	23.59%	21.75%	1.84%	15.23%	28.28%
Private Equity	7.54%	10.00%	-2.46%	7.00%	13.00%
High Yield/Specialty Credit	16.72%	15.00%	1.72%	10.50%	19.50%
Core Fixed Income	13.03%	10.00%	3.03%	8.00%	12.00%
Cash	1.77%	1.50%	0.27%	0.00%	3.00%
Real Return	6.73%	10.00%	-3.27%	7.00%	13.00%
Real Estate	3.84%	10.00%	-6.16%	7.00%	13.00%
Opportunistic	2.67%	0.00%	2.67%	0.00%	5.00%

Total CERS and CERS-H: Risk Categorization Summary As of June 30, 2021

	Market Value (\$USD)	% of Portfolio	MTD	QTD	YTD	1 Year
Total Portfolio	\$ 11,521,812,380	100.0%	1.5%	5.6%	9.8%	25.7%
Growth	\$ 8,306,672,990	72.1%	1.9%	6.9%	12.1%	34.0%
<i>Growth Custom Benchmark</i>			1.5%	6.0%	11.9%	38.1%
Liquidity	\$ 1,687,069,696	14.6%	0.1%	0.7%	0.5%	3.0%
<i>Liquidity Custom Benchmark</i>			0.6%	1.7%	-1.5%	-0.3%
Diversifying Strategies	\$ 1,221,359,549	10.6%	2.2%	5.6%	9.3%	18.7%
<i>Diversifying Strategies Custom</i>			1.1%	2.7%	4.4%	7.6%
Opportunistic	\$ 307,266,751	2.7%	0.8%	3.1%	5.6%	

Total CERS and CERS-H: Risk Categorization Performance As of June 30, 2021

	Market Value (\$USD)	% of Portfolio	MTD	QTD	YTD	1 Year
Total Portfolio	\$ 11,521,812,380	100.0%	1.5%	5.6%	9.8%	25.7%
<i>CERS Pension IPS Policy Index</i>			2.1%	6.0%	9.4%	25.7%
<i>CERS-H Pension IPS Policy Index</i>			2.1%	6.0%	9.4%	25.7%
Growth	\$ 8,306,672,990	72.1%	1.9%	6.9%	12.1%	34.0%
<i>Growth Custom Benchmark</i>			1.5%	6.0%	11.9%	38.1%
Public Equity	\$ 5,432,020,173	47.1%	0.5%	6.8%	12.7%	41.3%
<i>Global Equity Blended Index</i>			0.9%	6.9%	12.4%	40.7%
U.S. Equity	\$ 2,750,399,557	23.9%	2.1%	7.8%	15.8%	44.8%
<i>KY Domestic Equity Blend</i>			2.5%	8.2%	15.1%	44.2%
Non U.S. Equity	\$ 2,681,620,616	23.3%	-1.1%	5.9%	9.6%	37.8%
<i>KY Ret. Int'l Eq. Blended Index</i>			-0.6%	5.6%	9.6%	37.2%
Private Equity	\$ 949,207,681	8.2%	11.8%	16.7%	23.7%	42.0%
<i>Pension Private Equity Custom Benchmark</i>			11.8%	15.5%	32.2%	78.1%
High Yield/Specialty Credit	\$ 1,925,445,135	16.7%	1.4%	2.9%	5.8%	15.3%
<i>High Yield Custom Benchmark</i>			0.8%	2.1%	3.4%	13.5%
Liquidity	\$ 1,687,069,696	14.6%	0.1%	0.7%	0.5%	3.0%
<i>Liquidity Custom Benchmark</i>			0.6%	1.7%	-1.5%	-0.3%
Liquidity (Other)	\$ 200,849,513	1.7%	-0.2%	-1.1%	-0.8%	-1.3%
<i>Liquidity Custom Benchmark</i>			0.6%	1.7%	-1.5%	-0.3%
Core Fixed Income	\$ 1,486,220,184	12.9%	0.2%	0.8%	0.6%	3.4%
<i>Bloomberg Barclays U.S. Aggregate Bond Index</i>			0.7%	1.8%	-1.6%	-0.3%
Diversifying Strategies	\$ 1,221,359,549	10.6%	2.2%	5.6%	9.3%	18.7%
<i>Diversifying Strategies Custom</i>			1.1%	2.7%	4.4%	7.6%
Real Return	\$ 766,232,499	6.7%	1.8%	6.1%	11.0%	24.0%
<i>Pension Real Return Custom Bmk</i>			1.8%	6.1%	11.0%	24.0%
Real Estate	\$ 455,127,050	4.0%	2.8%	4.9%	6.6%	10.1%
<i>NCREIF NFI ODCE Net 1Qtr in Arrears Index</i>			1.9%	1.9%	3.0%	1.5%
Opportunistic	\$ 307,266,751	2.7%	0.8%	3.1%	5.6%	

Total CERS and CERS-H: Detailed Performance

As of June 30, 2021

	Market Value (\$USD)	% of Portfolio	MTD	QTD	YTD	1 Year
Total Portfolio	\$ 11,521,812,380	100.0%	1.5%	5.6%	9.8%	25.7%
<i>CERS Pension IPS Policy Index</i>			2.1%	6.0%	9.4%	25.7%
<i>CERS-H Pension IPS Policy Index</i>			2.1%	6.0%	9.4%	25.7%
Growth	\$ 8,306,672,990	72.1%	1.9%	6.9%	12.1%	34.0%
<i>Growth Custom Benchmark</i>			1.5%	6.0%	11.9%	38.1%
Public Equity	\$ 5,432,020,173	47.1%	0.5%	6.8%	12.7%	41.3%
<i>Global Equity Blended Index</i>			0.9%	6.9%	12.4%	40.7%
U.S. Equity	\$ 2,750,399,557	23.9%	2.1%	7.8%	15.8%	44.8%
<i>KY Domestic Equity Blend</i>			2.5%	8.2%	15.1%	44.2%
Abel Noser Transition Fund	\$ 33,139	0.0%	0.0%	0.0%	0.0%	
<i>S&P Mid Cap 400 Index</i>			-1.0%	3.6%	17.6%	
Invesco US Equity Large Cap Core	\$ 38,498	0.0%	0.0%	0.0%	0.0%	4.8%
<i>S&P 500 Total Return Index</i>			2.3%	8.5%	15.3%	40.8%
KRS Internal US Equity	\$ 184,298,263	1.6%	0.7%	7.1%	14.8%	38.4%
<i>S&P Mid Cap 400 Index</i>			-1.0%	3.6%	17.6%	53.2%
KRS Internal US Mid Cap	\$ 159,019,307	1.4%	-1.1%	3.5%	17.5%	52.9%
Next Century Small Micro Cap Growth	\$ 116,352,252	1.0%	8.3%	11.4%	27.7%	116.1%
<i>Russell Micro Cap Growth Index</i>			6.4%	3.2%	20.6%	65.8%
NTGI Structured	\$ 218,982,141	1.9%	1.1%	4.4%	19.7%	60.8%
<i>Russell 2000 Index</i>			1.9%	4.3%	17.5%	62.0%
River Road FAV	\$ 206,152,827	1.8%	-0.2%	5.1%	13.0%	41.9%
<i>Russell 3000 Value Index</i>			-1.1%	5.2%	17.7%	45.4%
S&P 500 Index	\$ 1,657,326,702	14.4%	2.2%	8.4%	15.1%	40.5%
<i>S&P 500 Total Return Index</i>			2.3%	8.5%	15.3%	40.8%
State Street Transition Account	\$ 29,535	0.0%	0.0%	0.0%	-1.5%	-1.4%
Westfield All Cap Growth	\$ 208,166,894	1.8%	4.7%	10.8%	14.0%	42.5%
<i>Russell 3000 Growth Index</i>			6.2%	11.4%	12.7%	43.0%

Total CERS and CERS-H: Detailed Performance

As of June 30, 2021

	Market Value (\$USD)	% of Portfolio	MTD	QTD	YTD	1 Year
Non U.S. Equity	\$ 2,681,620,616	23.3%	-1.1%	5.9%	9.6%	37.8%
<i>KY Ret. Int'l Eq. Blended Index</i>			-0.6%	5.6%	9.6%	37.2%
American Century	\$ 399,624,950	3.5%	-0.2%	7.4%	7.9%	41.8%
<i>MSCI ACWI ex US Index</i>			-0.6%	5.6%	9.4%	36.3%
BlackRock World Ex Us	\$ 805,145,250	7.0%	-0.4%	6.8%	11.3%	35.5%
<i>MSCI World Ex-US Composite</i>			-1.0%	5.9%	10.3%	34.2%
Franklin Templeton Non-US Equity	\$ 300,260,086	2.6%	0.9%	7.9%	5.6%	32.6%
<i>MSCI ACWI ex US GD</i>			-0.6%	5.6%	9.4%	36.3%
JP Morgan Emerging Markets	\$ 161,005,940	1.4%	2.1%	9.6%	8.0%	50.0%
<i>MSCI Emerging Markets Net Dividend Index</i>			0.2%	5.0%	7.4%	40.9%
KRS Non-US ACWI Ex US Small Cap	\$ 3,164	0.0%	-0.1%	0.0%	0.1%	25.6%
KRS Non-US Transition Account	\$ 839,829	0.0%	-2.5%	-7.7%	-10.1%	-14.1%
Lazard Emerging Markets Equity	\$ 430,455,009	3.7%	-2.4%	4.3%	8.7%	36.3%
LSV Emerging Markets Value Equity	\$ 351,981,880	3.1%	-2.1%	5.3%	14.4%	36.2%
NTGI International Small Cap	\$ 85,871,174	0.7%	-0.1%	6.9%	12.5%	47.0%
<i>MSCI ACWI ex US Small Cap Net Index</i>			-0.6%	6.4%	12.2%	47.0%
Pzena Emerging Markets	\$ 146,433,333	1.3%	-1.8%	1.7%	12.5%	51.4%
<i>MSCI Emerging Markets Net Dividend Index</i>			0.2%	5.0%	7.4%	40.9%
Private Equity	\$ 949,207,681	8.2%	11.8%	16.7%	23.7%	42.0%
<i>Pension Private Equity Custom Benchmark</i>			11.8%	15.5%	32.2%	78.1%
High Yield/Specialty Credit	\$ 1,925,445,135	16.7%	1.4%	2.9%	5.8%	15.3%
<i>High Yield Custom Benchmark</i>			0.8%	2.1%	3.4%	13.5%
Columbia High Yield Corporate Bond	\$ 321,837,247	2.8%	1.4%	2.7%	3.0%	13.8%
<i>Bloomberg Barclays U.S. Corporate High Yield</i>			1.3%	2.8%	3.6%	15.4%
H-2 Credit Partners	\$ 59,408,468	0.5%	0.0%	-0.3%	11.9%	29.1%
<i>Bloomberg Barclays U.S. Corporate High Yield</i>			1.3%	2.8%	3.6%	15.4%
Loomis High Yield Corporate Bond	\$ 30,177	0.0%	0.0%	0.0%	0.0%	-0.9%

Total CERS and CERS-H: Detailed Performance

As of June 30, 2021

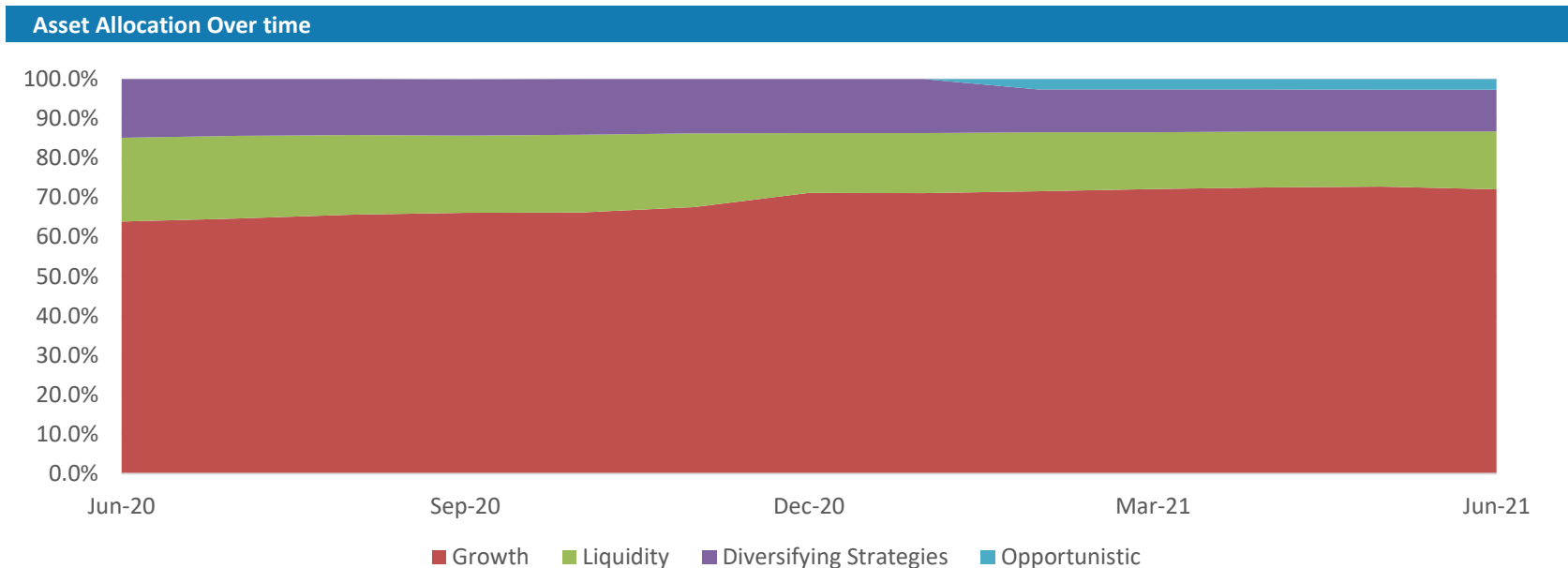
	Market Value (\$USD)	% of Portfolio	MTD	QTD	YTD	1 Year
<i>Bloomberg Barclays U.S. Corporate High Yield</i>			1.3%	2.8%	3.6%	15.4%
Manulife Strategic Fixed Income	\$ 291,359,306	2.5%	-0.4%	1.3%	1.9%	11.4%
<i>Bloomberg Barclays U.S. Universal Index</i>			0.7%	2.0%	-1.1%	1.1%
Marathon Blue Grass Credit Fund	\$ 318,503,602	2.8%	0.0%	2.4%	8.0%	17.6%
<i>Bloomberg Barclays U.S. Corporate High Yield</i>			1.3%	2.8%	3.6%	15.4%
Shenkman Capital High Yield Corporate Bond & Debt	\$ 161,238,063	1.4%	0.2%	1.4%	2.7%	10.8%
Waterfall High Yield ABS Composite	\$ 195,809,592	1.7%	0.7%	2.7%	8.3%	19.9%
Liquidity	\$ 1,687,069,696	14.6%	0.1%	0.7%	0.5%	3.0%
<i>Liquidity Custom Benchmark</i>			0.6%	1.7%	-1.5%	-0.3%
Liquidity (Other)	\$ 200,849,513	1.7%	-0.2%	-1.1%	-0.8%	-1.3%
<i>Liquidity Custom Benchmark</i>			0.6%	1.7%	-1.5%	-0.3%
Cash Account	\$ 200,849,513	1.7%	0.0%	0.0%	0.1%	0.1%
<i>FTSE Treasury Bill-3 Month</i>			0.0%	0.0%	0.0%	0.1%
Core Fixed Income	\$ 1,486,220,184	12.9%	0.2%	0.8%	0.6%	3.4%
<i>Bloomberg Barclays U.S. Aggregate Bond Index</i>			0.7%	1.8%	-1.6%	-0.3%
KRS IG Credit Fixed Income Unit	\$ 4	0.0%	0.0%	0.0%	0.0%	0.0%
<i>Bloomberg Barclays U.S. Credit-Intermediate Index</i>			0.3%	1.6%	-0.5%	2.2%
Loomis Short Duration Core Fixed Income	\$ 290,610,362	2.5%	0.1%	0.9%	-0.7%	0.9%
<i>Bloomberg Barclays Intermediate Aggregate Bond Index</i>			0.0%	0.8%	-0.8%	0.1%
Lord Abbett Short Duration Credit	\$ 1,092,111,939	9.5%	0.1%	0.7%	1.2%	4.5%
<i>ICE BofA US Corporates 1-3 Years Index</i>			-0.1%	0.3%	0.4%	1.9%
NISA Core Broad Market Fixed Income	\$ 103,497,878	0.9%	0.8%	1.9%	-1.6%	0.2%
<i>Bloomberg Barclays U.S. Aggregate Bond Index</i>			0.7%	1.8%	-1.6%	-0.3%
Diversifying Strategies	\$ 1,221,359,549	10.6%	2.2%	5.6%	9.3%	18.7%
<i>Diversifying Strategies Custom</i>			1.1%	2.7%	4.4%	7.6%
Real Return	\$ 766,232,499	6.7%	1.8%	6.1%	11.0%	24.0%
<i>Pension Real Return Custom Bmk</i>			1.8%	6.1%	11.0%	24.0%

Total CERS and CERS-H: Detailed Performance

As of June 30, 2021

	Market Value (\$USD)	% of Portfolio	MTD	QTD	YTD	1 Year
Blackstone Strategic Opportunities Fund	\$ 1,168,213	0.0%	0.0%	1.9%	-5.0%	
<i>HFRI Fund of Funds Diversified Index</i>			0.4%	2.5%	4.4%	
Daniel Boone Fund	\$ 72,948,309	0.6%	0.0%	-1.0%	-0.1%	
<i>S&P 500 Total Return Index</i>			2.3%	8.5%	15.3%	
KRS Internal Tips	\$ 91,413	0.0%	0.0%	0.0%	0.0%	0.0%
Luxor Capital	\$ 852,077	0.0%	0.0%	-2.4%	-4.8%	
Myriad Opportunities US Fund Limited	\$ 11,506,063	0.1%	0.0%	2.3%	13.0%	
<i>HFRI Fund of Funds Diversified Index</i>			0.4%	2.5%	4.4%	
Nuveen Liquid Asset Income	\$ 137,677	0.0%	-2.3%	-0.8%	-7.0%	-186.5%
Pine River Fund LP	\$ 63,830	0.0%	0.0%	-0.3%	1.5%	
Putnam Dynamic Asset Allocation Balanced	\$ 431,027,975	3.7%	2.0%	6.7%	10.2%	26.4%
SRS Partners Master Fund	\$ 4,008,766	0.0%	0.0%	3.4%	16.3%	
<i>HFRI Fund of Funds Diversified Index</i>			0.4%	2.5%	4.4%	
Tortoise Capital Master Limited Partnership Fund	\$ 100,780,981	0.9%	5.6%	20.6%	42.4%	52.6%
<i>Alerian MLP Index</i>			5.2%	21.2%	47.8%	64.0%
Tricadia Select Financials Fund	\$ 988,781	0.0%	0.0%	0.0%	0.0%	
<i>HFRI Fund of Funds Diversified Index</i>			0.4%	2.5%	4.4%	
Real Estate	\$ 455,127,050	4.0%	2.8%	4.9%	6.6%	10.1%
<i>NCREIF NFI ODCE Net 1Qtr in Arrears Index</i>			1.9%	1.9%	3.0%	1.5%
Harrison Street Core Property Fund	\$ 61,945,137	0.5%	0.0%	1.4%	1.4%	4.0%
Perimeter Park West	\$ 3,514,161	0.0%	0.0%	0.0%	0.0%	0.0%
Prologis Targeted U.S. Logistics Holdings	\$ 119,604,692	1.0%	0.0%	4.7%	10.9%	12.5%
Stockbridge Smart Markets	\$ 66,967,029	0.6%	0.0%	0.0%	2.3%	4.6%
Opportunistic	\$ 307,266,751	2.7%	0.8%	3.1%	5.6%	
ArrowMark Fundamental Opportunity Fund	\$ 307,266,751	2.7%	0.0%	2.3%	4.8%	
<i>S&P LSTA Leveraged Loan Index</i>			0.4%	1.5%	2.1%	

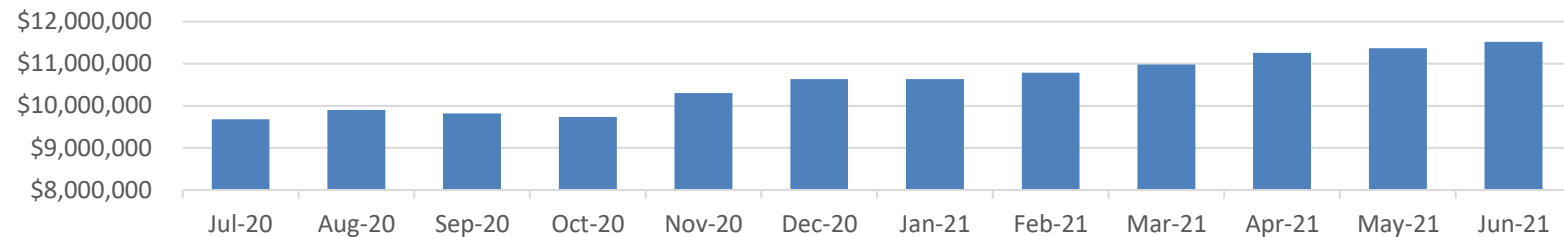
Total CERS and CERS-H: Asset Allocation Over Time As of June 30, 2021



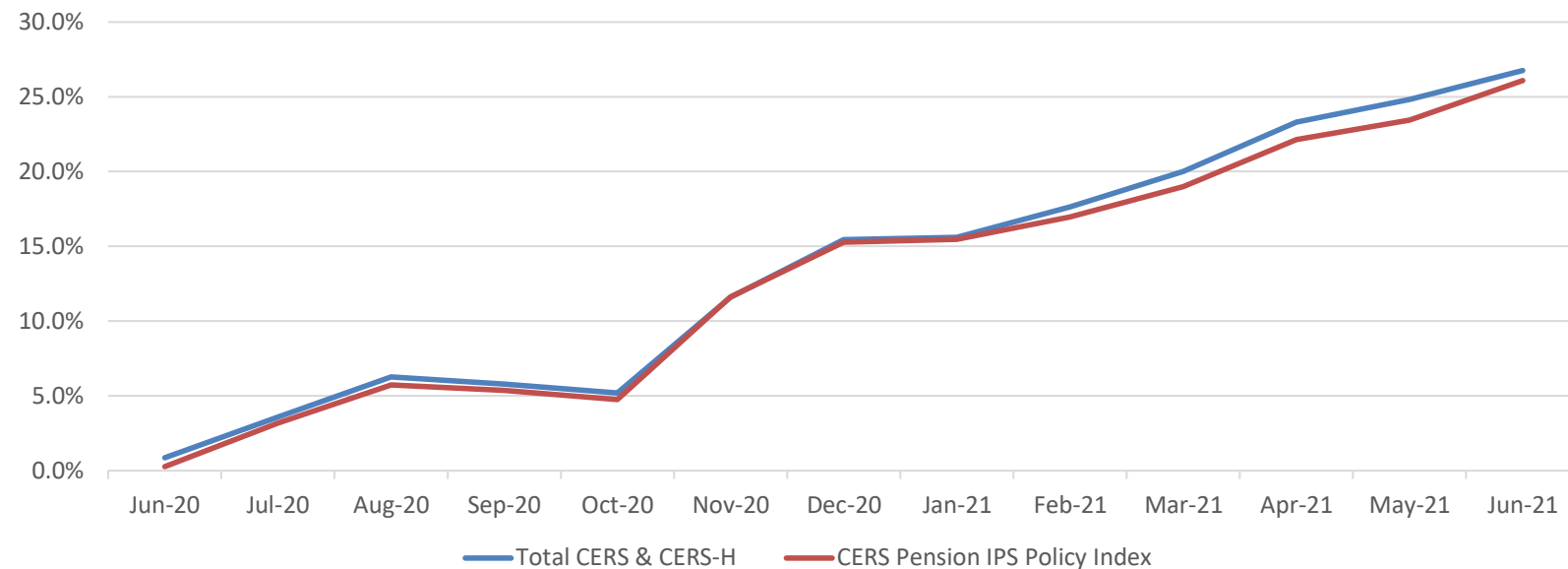
Risk Categorization	January 2021	February 2021	March 2021	April 2021	May 2021	June 2021
Growth	71.13%	71.57%	72.13%	72.59%	72.80%	72.10%
Liquidity	15.22%	14.96%	14.42%	14.14%	13.93%	14.64%
Diversifying Strategies	13.66%	10.91%	10.85%	10.70%	10.64%	10.60%
Opportunistic	0.00%	2.57%	2.60%	2.57%	2.63%	2.67%

Total CERS and CERS-H: Summary As of June 30, 2021

Market Value Over Time (\$USD 000)



Cumulative Performance Over 1 Year





Kentucky Public Pensions Authority, Office of Investments

Fiscal Year 2021

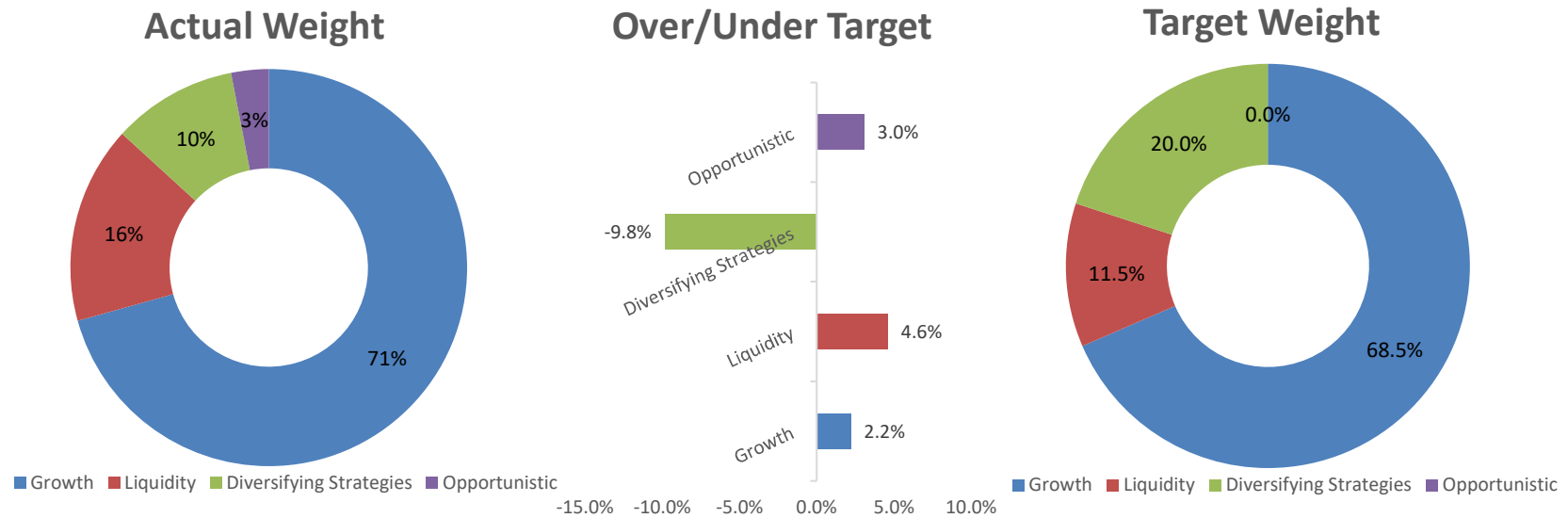
Insurance Investment Review for the Quarter Ended June 30, 2021

Presented to the County Employees Retirement Systems

Investment Committee

Total CERS INS and CERS-H INS: Asset Allocation vs Targets As of June 30, 2021

Actual vs Target Weights



Risk Categorization	Ending Market Value (\$USD)	Actual Weight	Target Weight	Relative
Growth	\$3,343,062,722	70.7%	68.5%	2.2%
Liquidity	\$760,600,729	16.1%	11.5%	4.6%
Diversifying Strategies	\$482,033,509	10.2%	20.0%	-9.8%
Opportunistic	\$144,040,781	3.0%	0.0%	3.0%

Asset Allocation	Actual	Target	Target Difference	IPS Min	IPS Max
US Equity	22.53%	21.75%	0.78%	15.23%	28.28%
Non-US Equity	22.44%	21.75%	0.69%	15.23%	28.28%
Private Equity	8.69%	10.00%	-1.31%	7.00%	13.00%
High Yield/Specialty Credit	16.93%	15.00%	1.93%	10.50%	19.50%
Core Fixed Income	12.50%	10.00%	2.50%	8.00%	12.00%
Cash	3.83%	1.50%	2.33%	0.00%	3.00%
Real Return	6.38%	10.00%	-3.62%	7.00%	13.00%
Real Estate	3.79%	10.00%	-6.21%	7.00%	13.00%
Opportunistic	3.05%	0.00%	3.05%	0.00%	5.00%

Total CERS INS and CERS-H INS: Risk Categorization Summary As of June 30, 2021

	Market Value (\$USD)	% of Portfolio	MTD	QTD	YTD	1 Year
Total Portfolio	\$ 4,729,420,057	100.0%	1.4%	5.2%	9.3%	24.8%
Growth	\$ 3,343,062,722	70.7%	1.6%	6.4%	11.6%	33.1%
<i>Growth Custom Benchmark</i>			1.5%	6.0%	11.9%	38.1%
Liquidity	\$ 760,600,729	16.1%	0.1%	0.7%	0.4%	2.8%
<i>Liquidity Custom Benchmark</i>			0.6%	1.7%	-1.5%	-0.3%
Diversifying Strategies	\$ 482,033,509	10.2%	1.9%	5.2%	8.6%	18.0%
<i>Diversifying Strategies Custom</i>			1.1%	2.7%	4.4%	7.6%
Opportunistic	\$ 144,040,781	3.0%	0.8%	3.1%	5.6%	

Total CERS INS and CERS-H INS: Risk Categorization Performance As of June 30, 2021

	Market Value (\$USD)	% of Portfolio	MTD	QTD	YTD	1 Year
Total Portfolio	\$ 4,729,420,057	100.0%	1.4%	5.2%	9.3%	24.8%
<i>CERS Insurance IPS Policy Index</i>			1.7%	5.3%	8.7%	24.7%
<i>CERS-H Insurance IPS Policy Index</i>			1.7%	5.3%	8.7%	24.7%
Growth	\$ 3,343,062,722	70.7%	1.6%	6.4%	11.6%	33.1%
<i>Growth Custom Benchmark</i>			1.5%	6.0%	11.9%	38.1%
Public Equity	\$ 2,104,156,194	44.5%	0.5%	6.8%	12.7%	41.3%
<i>Global Equity Blended Index</i>			0.9%	6.9%	12.4%	40.7%
U.S. Equity	\$ 1,056,259,907	22.3%	2.0%	7.7%	15.7%	44.7%
<i>KY Domestic Equity Blend</i>			2.5%	8.2%	15.1%	44.2%
Non U.S. Equity	\$ 1,047,896,287	22.2%	-1.1%	5.9%	9.6%	37.8%
<i>KY Ret. Int'l Eq. Blended Index</i>			-0.6%	5.6%	9.6%	37.2%
Private Equity	\$ 437,865,646	9.3%	8.1%	11.1%	18.3%	34.3%
<i>Insurance Private Equity Custom Benchmark</i>			8.1%	8.1%	8.1%	
High Yield/Specialty Credit	\$ 801,040,882	16.9%	1.4%	2.8%	5.8%	15.0%
<i>High Yield Custom Benchmark</i>			0.8%	2.1%	3.4%	13.5%
Liquidity	\$ 760,600,729	16.1%	0.1%	0.7%	0.4%	2.8%
<i>Liquidity Custom Benchmark</i>			0.6%	1.7%	-1.5%	-0.3%
Liquidity (Other)	\$ 174,622,361	3.7%	-0.1%	-0.2%	-0.2%	-0.4%
<i>Liquidity Custom Benchmark</i>			0.6%	1.7%	-1.5%	-0.3%
Core Fixed Income	\$ 585,978,368	12.4%	0.2%	0.9%	0.6%	3.3%
<i>Bloomberg Barclays U.S. Aggregate Bond Index</i>			0.7%	1.8%	-1.6%	-0.3%
Diversifying Strategies	\$ 482,033,509	10.2%	1.9%	5.2%	8.6%	18.0%
<i>Diversifying Strategies Custom</i>			1.1%	2.7%	4.4%	7.6%
Real Return	\$ 298,692,326	6.3%	1.2%	5.3%	9.7%	22.5%
<i>Insurance Real Return Custom Bmk</i>			1.2%	5.3%	9.7%	22.5%
Real Estate	\$ 183,341,183	3.9%	2.9%	4.9%	6.6%	10.2%
<i>NCREIF NFI ODCE Net 1Qtr in Arrears Index</i>			1.9%	1.9%	3.0%	1.5%
Opportunistic	\$ 144,040,781	3.0%	0.8%	3.1%	5.6%	

Total CERS INS and CERS-H INS: Detailed Performance As of June 30, 2021

	Market Value (\$USD)	% of Portfolio	MTD	QTD	YTD	1 Year
Total Portfolio	\$ 4,729,420,057	100.0%	1.4%	5.2%	9.3%	24.8%
<i>CERS Insurance IPS Policy Index</i>			1.7%	5.3%	8.7%	24.7%
<i>CERS-H Insurance IPS Policy Index</i>			1.7%	5.3%	8.7%	24.7%
Growth	\$ 3,343,062,722	70.7%	1.6%	6.4%	11.6%	33.1%
<i>Growth Custom Benchmark</i>			1.5%	6.0%	11.9%	38.1%
Public Equity	\$ 2,104,156,194	44.5%	0.5%	6.8%	12.7%	41.3%
<i>Global Equity Blended Index</i>			0.9%	6.9%	12.4%	40.7%
U.S. Equity	\$ 1,056,259,907	22.3%	2.0%	7.7%	15.7%	44.7%
<i>KY Domestic Equity Blend</i>			2.5%	8.2%	15.1%	44.2%
Abel Noser Transition Fund	\$ 12,033	0.0%	0.0%	0.0%	0.0%	
<i>S&P Mid Cap 400 Index</i>			-1.0%	3.6%	17.6%	
KRS Internal US Equity	\$ 70,615,922	1.5%	0.7%	7.1%	14.8%	38.4%
<i>S&P Mid Cap 400 Index</i>			-1.0%	3.6%	17.6%	53.2%
KRS Internal US Mid Cap	\$ 60,278,435	1.3%	-1.1%	3.5%	17.5%	53.0%
Next Century Small Micro Cap Growth	\$ 45,270,499	1.0%	8.2%	11.3%	27.6%	115.9%
<i>Russell Micro Cap Growth Index</i>			6.4%	3.2%	20.6%	65.8%
NTGI Structured	\$ 82,712,632	1.7%	1.1%	4.4%	19.7%	60.7%
<i>Russell 2000 Index</i>			1.9%	4.3%	17.5%	62.0%
River Road FAV	\$ 81,523,484	1.7%	-0.2%	5.1%	12.9%	41.9%
<i>Russell 3000 Value Index</i>			-1.1%	5.2%	17.7%	45.4%
S&P 500 Index	\$ 633,106,278	13.4%	2.3%	8.4%	15.1%	40.5%
<i>S&P 500 Total Return Index</i>			2.3%	8.5%	15.3%	40.8%
State Street Transition Account	\$ 601	0.0%	0.0%	0.0%	-47.9%	-47.9%
Westfield All Cap Growth	\$ 82,740,023	1.7%	4.6%	10.8%	14.0%	42.5%
<i>Russell 3000 Growth Index</i>			6.2%	11.4%	12.7%	43.0%
Non U.S. Equity	\$ 1,047,896,287	22.2%	-1.1%	5.9%	9.6%	37.8%

Total CERS INS and CERS-H INS: Detailed Performance As of June 30, 2021

	Market Value (\$USD)	% of Portfolio	MTD	QTD	YTD	1 Year
<i>KY Ret. Int'l Eq. Blended Index</i>			-0.6%	5.6%	9.6%	37.2%
American Century	\$ 155,320,224	3.3%	-0.3%	7.4%	7.9%	41.9%
<i>MSCI ACWI ex US Index</i>			-0.6%	5.6%	9.4%	36.3%
BlackRock ACWI Ex US Small Cap	\$ 33,327,378	0.7%	-0.4%	6.4%	12.2%	46.8%
<i>MSCI ACWI ex US Small Cap Net Index</i>			-0.6%	6.4%	12.2%	47.0%
BlackRock World Ex Us	\$ 318,060,404	6.7%	-1.4%	5.7%	10.0%	33.9%
<i>MSCI World Ex-US Composite</i>			-1.0%	5.9%	10.3%	34.2%
Franklin Templeton Non-US Equity	\$ 115,377,451	2.4%	0.7%	7.9%	5.7%	32.0%
<i>MSCI ACWI ex US GD</i>			-0.6%	5.6%	9.4%	36.3%
JP Morgan Emerging Markets	\$ 62,523,775	1.3%	1.9%	9.4%	7.8%	52.1%
<i>MSCI Emerging Markets Net Dividend Index</i>			0.2%	5.0%	7.4%	40.9%
KRS Non-US ACWI Ex US Small Cap	\$ 782	0.0%	0.0%	0.0%	0.0%	0.0%
KRS Non-US Transition Account	\$ 306,164	0.0%	-2.0%	-6.5%	-8.5%	-12.1%
Lazard Emerging Markets Equity	\$ 167,510,094	3.5%	-2.5%	4.3%	8.6%	36.2%
LSV Emerging Markets Value Equity	\$ 138,112,937	2.9%	-2.2%	5.5%	14.7%	35.9%
Pzena Emerging Markets	\$ 57,357,078	1.2%	-2.2%	0.7%	11.4%	50.4%
<i>MSCI Emerging Markets Net Dividend Index</i>			0.2%	5.0%	7.4%	40.9%
Private Equity	\$ 437,865,646	9.3%	8.1%	11.1%	18.3%	34.3%
<i>Insurance Private Equity Custom Benchmark</i>			8.1%	8.1%	8.1%	
High Yield/Specialty Credit	\$ 801,040,882	16.9%	1.4%	2.8%	5.8%	15.0%
<i>High Yield Custom Benchmark</i>			0.8%	2.1%	3.4%	13.5%
Columbia High Yield Corporate Bond	\$ 148,407,924	3.1%	1.5%	2.7%	3.0%	13.5%
<i>Bloomberg Barclays U.S. Corporate High Yield</i>			1.3%	2.8%	3.6%	15.4%
H-2 Credit Partners	\$ 24,763,607	0.5%	0.1%	-0.2%	12.0%	29.2%
<i>Bloomberg Barclays U.S. Corporate High Yield</i>			1.3%	2.8%	3.6%	15.4%
Loomis High Yield Corporate Bond	\$ 26,422	0.0%	0.0%	0.0%	0.0%	-0.2%

Total CERS INS and CERS-H INS: Detailed Performance As of June 30, 2021

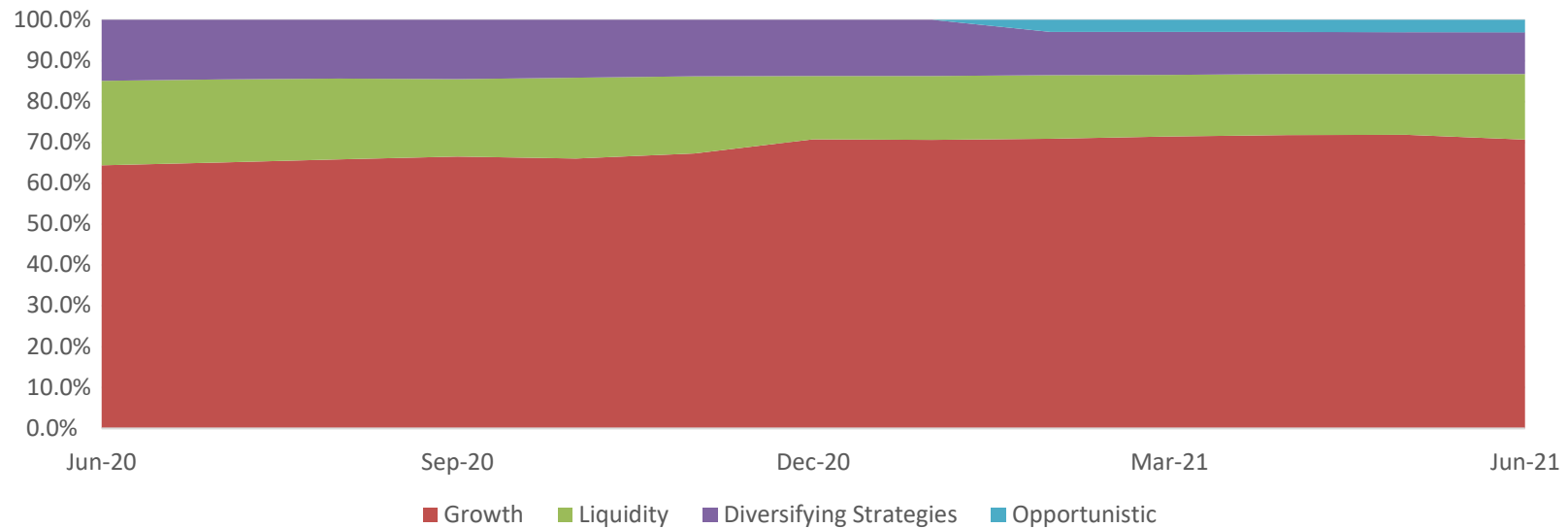
	Market Value (\$USD)	% of Portfolio	MTD	QTD	YTD	1 Year
<i>Bloomberg Barclays U.S. Corporate High Yield</i>			1.3%	2.8%	3.6%	15.4%
Manulife Strategic Fixed Income	\$ 104,760,761	2.2%	-0.2%	1.6%	2.2%	11.7%
<i>Bloomberg Barclays U.S. Universal Index</i>			0.7%	2.0%	-1.1%	1.1%
Marathon Blue Grass Credit Fund	\$ 130,315,293	2.8%	1.8%	4.3%	10.1%	20.1%
<i>Bloomberg Barclays U.S. Corporate High Yield</i>			1.3%	2.8%	3.6%	15.4%
Shenkman Capital High Yield Corporate Bond & Debt	\$ 65,119,408	1.4%	0.2%	1.4%	2.6%	10.7%
Waterfall High Yield ABS Composite	\$ 84,841,412	1.8%	1.4%	3.6%	9.3%	21.4%
Liquidity	\$ 760,600,729	16.1%	0.1%	0.7%	0.4%	2.8%
<i>Liquidity Custom Benchmark</i>			0.6%	1.7%	-1.5%	-0.3%
Liquidity (Other)	\$ 174,622,361	3.7%	-0.1%	-0.2%	-0.2%	-0.4%
<i>Liquidity Custom Benchmark</i>			0.6%	1.7%	-1.5%	-0.3%
Cash Account	\$ 174,622,361	3.7%	0.0%	0.0%	0.0%	0.1%
<i>FTSE Treasury Bill-3 Month</i>			0.0%	0.0%	0.0%	0.1%
Core Fixed Income	\$ 585,978,368	12.4%	0.2%	0.9%	0.6%	3.3%
<i>Bloomberg Barclays U.S. Aggregate Bond Index</i>			0.7%	1.8%	-1.6%	-0.3%
KRS IG Credit Fixed Income Unit	\$ 6	0.0%	0.0%	0.0%	0.0%	0.0%
<i>Bloomberg Barclays U.S. Credit-Intermediate Index</i>			0.3%	1.6%	-0.5%	2.2%
Loomis Short Duration Core Fixed Income	\$ 110,442,940	2.3%	0.1%	0.9%	-0.7%	0.8%
<i>Bloomberg Barclays Intermediate Aggregate Bond Index</i>			0.0%	0.8%	-0.8%	0.1%
Lord Abbett Short Duration Credit	\$ 407,007,010	8.6%	0.1%	0.7%	1.3%	4.7%
<i>ICE BofA US Corporates 1-3 Years Index</i>			-0.1%	0.3%	0.4%	1.9%
NISA Core Broad Market Fixed Income	\$ 68,528,412	1.4%	0.8%	1.9%	-1.5%	-0.5%
<i>Bloomberg Barclays U.S. Aggregate Bond Index</i>			0.7%	1.8%	-1.6%	-0.3%
Diversifying Strategies	\$ 482,033,509	10.2%	1.9%	5.2%	8.6%	18.0%
<i>Diversifying Strategies Custom</i>			1.1%	2.7%	4.4%	7.6%
Real Return	\$ 298,692,326	6.3%	1.2%	5.3%	9.7%	22.5%

Total CERS INS and CERS-H INS: Detailed Performance As of June 30, 2021

	Market Value (\$USD)	% of Portfolio	MTD	QTD	YTD	1 Year
<i>Insurance Real Return Custom Bmk</i>			1.2%	5.3%	9.7%	22.5%
Blackstone Strategic Opportunities Fund	\$ 428,971	0.0%	0.3%	2.2%	-4.7%	
<i>HFRI Fund of Funds Diversified Index</i>			0.4%	2.5%	4.4%	
Daniel Boone Fund	\$ 28,235,464	0.6%	0.2%	-0.8%	0.0%	
<i>S&P 500 Total Return Index</i>			2.3%	8.5%	15.3%	
KRS Internal Tips	\$ 183,818	0.0%	0.0%	0.0%	0.0%	0.0%
Luxor Capital	\$ 264,631	0.0%	9.1%	6.5%	3.9%	
Myriad Opportunities US Fund Limited	\$ 4,276,690	0.1%	0.1%	2.4%	13.1%	
<i>HFRI Fund of Funds Diversified Index</i>			0.4%	2.5%	4.4%	
Nuveen Liquid Asset Income	\$ 43,562	0.0%	-3.1%	-0.6%	-6.5%	-10.3%
Pine River Fund LP	\$ 19,824	0.0%	2.4%	2.1%	3.9%	
Putnam Dynamic Asset Allocation Balanced	\$ 179,627,572	3.8%	1.4%	6.3%	9.9%	26.1%
SRS Partners Master Fund	\$ 1,472,039	0.0%	5.8%	9.4%	23.0%	
<i>HFRI Fund of Funds Diversified Index</i>			0.4%	2.5%	4.4%	
Tortoise Capital Master Limited Partnership Fund	\$ 30,196,243	0.6%	5.5%	20.5%	42.3%	52.6%
<i>Alerian MLP Index</i>			5.2%	21.2%	47.8%	64.0%
Tricadia Select Financials Fund	\$ 363,085	0.0%	0.0%	0.0%	0.0%	
<i>HFRI Fund of Funds Diversified Index</i>			0.4%	2.5%	4.4%	
Real Estate	\$ 183,341,183	3.9%	2.9%	4.9%	6.6%	10.2%
<i>NCREIF NFI ODCE Net 1Qtr in Arrears Index</i>			1.9%	1.9%	3.0%	1.5%
Harrison Street Core Property Fund	\$ 29,397,399	0.6%	0.0%	1.5%	1.5%	4.2%
Prologis Targeted U.S. Logistics Holdings	\$ 44,475,849	0.9%	0.0%	4.7%	10.9%	12.5%
Stockbridge Smart Markets	\$ 32,967,159	0.7%	7.3%	7.3%	9.8%	12.3%
Opportunistic	\$ 144,040,781	3.0%	0.8%	3.1%	5.6%	
ArrowMark Fundamental Opportunity Fund	\$ 144,040,781	3.0%	0.8%	3.1%	5.6%	
<i>S&P LSTA Leveraged Loan Index</i>			0.4%	1.5%	2.1%	

Total CERS INS and CERS-H INS: Asset Allocation Over Time As of June 30, 2021

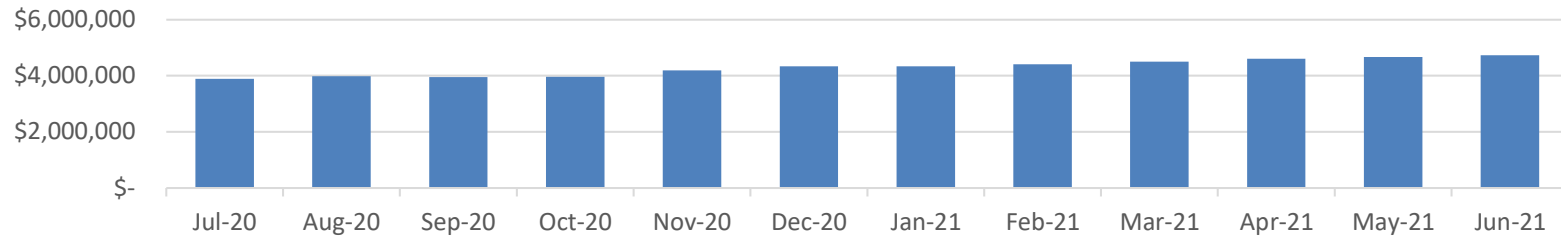
Asset Allocation Over time



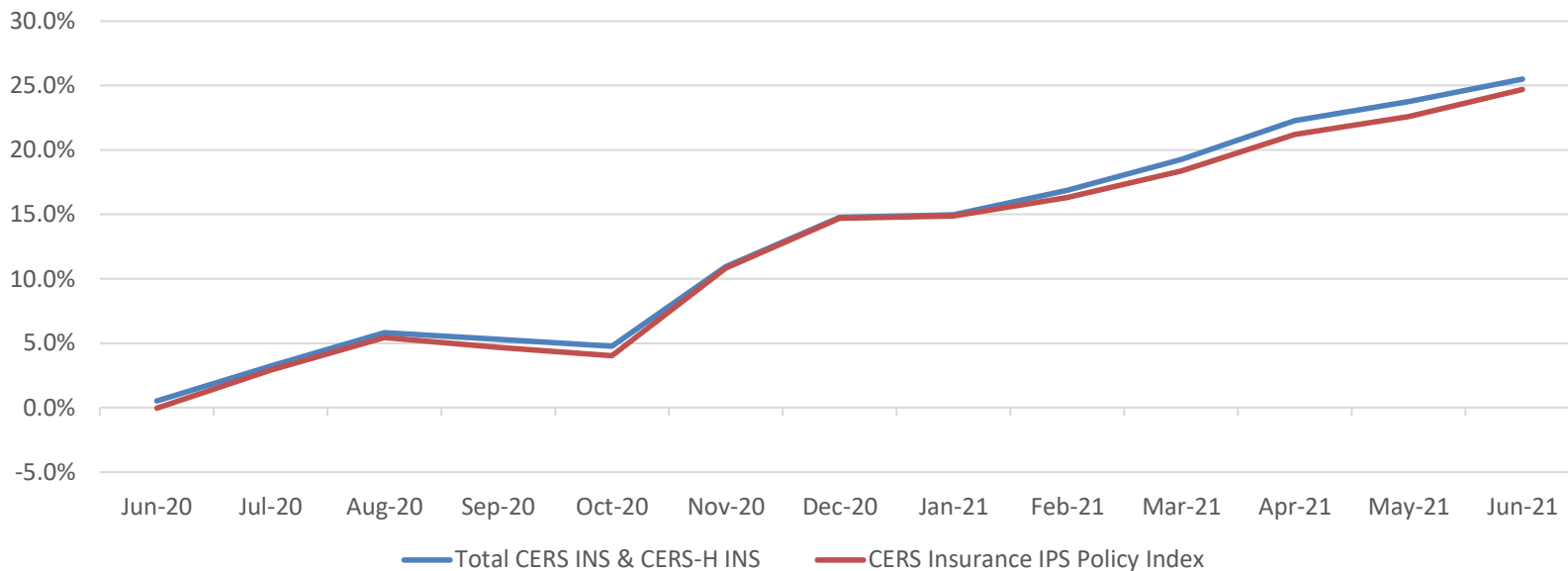
Risk Categorization	January 2021	February 2021	March 2021	April 2021	May 2021	June 2021
Growth	70.60%	70.91%	71.43%	71.81%	71.88%	70.69%
Liquidity	15.68%	15.59%	15.13%	14.91%	14.86%	16.08%
Diversifying Strategies	13.73%	10.56%	10.47%	10.34%	10.26%	10.19%
Opportunistic	0.00%	2.94%	2.98%	2.95%	3.01%	3.05%

Total CERS INS and CERS-H INS: Summary As of June 30, 2021

Market Value Over Time (\$USD 000)

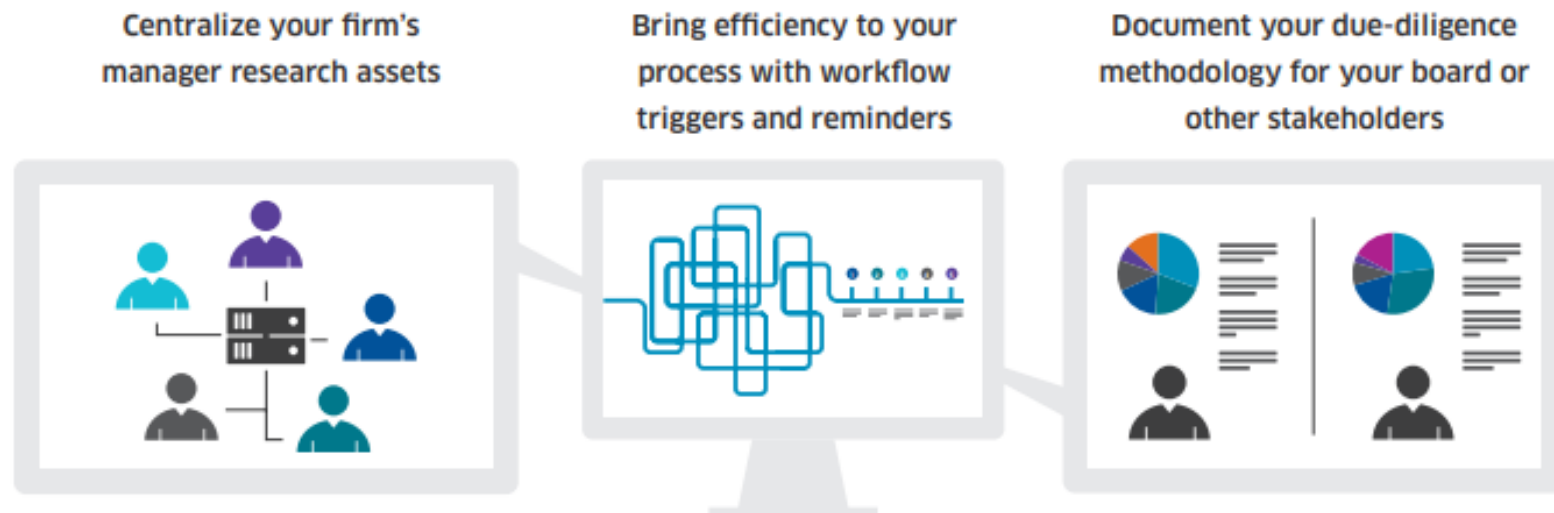


Cumulative Performance Over 1 Year



Scale Your Research With Research Management

Centralize your research – from documents and notes to commentary and reviews



Use Research Management To

- Centralize your manager research assets
- Bring efficiency to your research process
- Educate Board and stakeholders
- Drag-and-drop files and emails
- Compliance Governance
- Track Activity
- Capture Interactions
- Linked to eVestment data

Screenshots from Research Management

Centralized Manager Research & Intelligence

The screenshot displays the eVRM Fields Research Management System dashboard, which is organized into several key sections:

- Top Navigation:** Includes 'RESEARCH', 'RESOURCES', and 'DASHBOARD' tabs, along with a search bar and an 'Overview' button.
- Left Sidebar (STRATEGY):**
 - Geography: US | Market Cap: Micro Cap
 - eVRM Fields logo
 - Analytics Profile link
 - Microcap Equity section with a bar chart showing performance over 10 years (MRQ, YTD, 1 Yr, 3 Yrs, 5 Yrs, 7 Yrs, 10 Yrs).
 - Text description: 'This strategy uses a multi-manager approach focused on domestic microcap equities. It generally considers U.S. microcap to include those companies below \$1 billion in market cap and seeks to remain invested down the cap spectrum to take greatest advantage of market inefficiencies. The product utilizes the Russell Microcap Index as its benchmark. Created 2019, Jan 08'.
 - Summary statistics: 4 Monitoring Rules, 978 Research Activity, 4 Due Diligence Checklists.
- 21 ASSESSMENTS by As of Date:**
 - Manager Recommendation (PA 2021, Sep 02) - Average Confidence
 - Idea Generation - High Confidence
 - Implementation - High Confidence
 - Portfolio Construction - High Confidence
 - Business Management - Average Confidence
 - Impact - No Rank
 - Manager Recommendation (PA 2021, Sep 02) - Average Confidence
 - Manager Recommendation (PA 2020, Sep 02) - Average Confidence
 - Manager Recommendation (PA 2020, Sep 01) - High Confidence
- 15 DOCUMENTS by Name:**
 - Internal Analysis - Packet 6 Versions (PA 2020, Feb 18)
 - Internal Analysis - Quant Profile 32 Versions (PA 2020, Mar 26)
 - Internal Analysis - RFP 2 Versions (PA 2019, May 15)
 - Marketing - Factsheet 71 Versions (PA 2020, Apr 23)
 - Marketing - GIPS Performance 2 Versions (PA 2019, Apr 25)
 - Marketing - Pitch Deck 1 Version (PA 2019, Feb 04)
- 39 NOTES by As of Date:**
 - Onsite Review (On-site Meeting) (PA 2019, Feb 14)
 - Research Note (Conference Call) (PA 2019, Feb 14)
 - Performance Update (Performance Update) (PA 2019, Feb 14)
 - ADV Review (Mentioned) (Conference Call) (PA 2019, Feb 12)
 - DD Checklist (Conference Call) (PA 2019, Jan 25)
 - Research Note (Research Note) (PA 2019, Jan 17)
 - Meeting Minutes (Investment Committee Mentioned) (Conference Call) (PA 2019, Jan 17)
- 1 STRATEGIES by Name:**
 - Small Cap Value (Subadvisor)
- 1 COMPANIES by Name:**
 - 4 Strategies, 7 Employees (Parent Company)
- 5 PEOPLE by Last Name:**
 - Primary Lead Analyst
 - Director of Research
 - Analyst
 - Analyst
- Bottom Bar:** Includes '+ QUICK CREATE', '+ REPORT AN ISSUE', and 'RESEARCH MANAGEMENT'.

ACTIVITY AND NOTES MONITORING RULES CHECKLISTS

118 CALENDAR by Status		
Netflix Working Equity Netflix Investments, LLC	Last Interaction Performance Update PA 2020, Apr 23	Next Interaction 2020, Sep 30
Netflix Stock Growth Equity Fund III Netflix Stock Partners	Last Interaction Performance Update PA 2020, Mar 25	Next Interaction 2020, Jun 30
Netflix Real Assets U.S. II Netflix Investments Partners, LLC	Last Interaction Perf Update PA 2020, Mar 26	Next Interaction 2020, Jun 30
Netflix Offord - Emerging Markets III Cap Equities Netflix Offords Co.	Last Interaction perf update q1 2020 DS 2020, Apr 9	Next Interaction 2020, Sep 30
Netflix Real Dividend III Cap Value Netflix Real Asset Management, LLC		Next Interaction 2020, Jun 30
Netflix U.S. Private Equity III Netflix Asset Management	Last Interaction Performance Update PA 2019, May 22	Next Interaction 2020, Jun 30
Netflix Capital Community Investment Netflix Asset Management	Last Interaction Q3 Update PA 2019, June 6	Next Interaction 2020, Jun 30
Netflix Real Assets U.S. II Netflix Offords		Next Interaction 2020, Jun 30
Netflix Real Assets III U.S. II Netflix Investments Partners, LLC		Next Interaction 2020, Jun 30
Netflix Real Assets III U.S. II Netflix Investments Partners, LLC	Last Interaction Update PA 2019, Jan 24	Next Interaction 2020, Jun 30

Name		Frequency	Applicable Ranks
Quarterly Performance Update		Quarterly	
Asset Classes		Applicable Status	Approved
Rule Satisfied by		Performance Update	

Linked to eVestment data on +26,000 strategies

The screenshot displays the 'ANALYTICS PROFILE' for 'MICROCAP EQUITY' as of March 31. The interface includes a left-hand navigation menu with sections like STRATEGY, DETAILS, ACTIVITY, ANALYTICS PROFILE, RELATED RESOURCES, LINKED RESOURCES, RESEARCH TRACKING, and 3RD PARTY PLATFORMS. The main content area provides a comprehensive overview of the strategy's performance and characteristics.

ANALYTICS PROFILE
MICROCAP EQUITY
 As of Mar, 31

ASSET CLASS
 Equity

Category	Value	Change
GEOGRAPHY	United States	
PRIMARY CAPITALIZATION	Micro Cap	
PRIMARY EQUITY STYLE	Core	
TOTAL PRODUCT AUM	\$467.7MM	(-41.28%)
PRODUCT INSTITUTIONAL AUM	\$467.7MM	(-41.28%)
TOTAL FIRM AUM	\$504.3MM	(-40.33%)
PREFERRED BENCHMARK	Russell Microcap	
PRIMARY UNIVERSE	eA US Micro Cap Core Equity	
DEFAULT VEHICLE	Microcap Composite	

Key Product Updates
 As of Mar, 31

- Microcap Equity is underperforming the Russell Microcap with a -0.86% 3-year excess return, falling into the 3rd quartile of the US Micro Cap Core Equity with a percentile rank of 62.
- Institutional AUM has decreased by 41.28% to \$468M since the past quarter.

Vehicle

Microcap Composite
 Separate/Segregated Account in [Microcap Equity](#)

Active

Annualized Returns
 As of Mar, 31

Percentile	MRQ	YTD	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs

Universe Rankings
 As of Mar, 31

MRQ	YTD	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs

+ QUICK CREATE | + REPORT AN ISSUE

RESEARCH MANAGEMENT



EXTERNAL MANAGER SEARCH AND SELECTION REPORT: NON-US SMALL CAP EQUITY

IN CONJUNCTION WITH WILSHIRE ASSOCIATES

RECOMMENDATION



- Kentucky Public Pensions Authority (KPPA) Staff and Wilshire recommend the Investment Committee fund an actively managed Non-U.S. Small Cap Equity mandate to be managed by Axiom Investors pending successful investment management agreement negotiations.
- Funded through liquidation of current Non-U.S. small cap equity mandates.
- No placement agents have been involved or will be compensated as a result of this recommendation.

INTRODUCTION



- Continue to work to create greater efficiencies within the structure of the public equity allocation
 - Access to different market segments
 - Not only an eye to efficient market access, but also an efficient allocation of fees
 - Spend fee dollars where the chances of outperforming the market is greatest
 - Non-U.S. developed markets are less efficient than U.S. and therefore warrant a greater degree of active management
- This report serves as a review of the competitive search process utilized by staff in accordance with the Investment Policy Statement and Investment Procurement Policy in its pursuit to improve market access within the Non-U.S. equity allocation.

ESTABLISHED CRITERIA



- Screening Criteria
 - Benchmark: MSCI ACWI-Ex US SC, MSCI World-Ex US SC, or MSCI EAFE-Ex US SC
 - Active Management: majority of holdings must be Non-US small cap stocks
 - Firm AUM: great than \$1billion
 - Strategy AUM: greater than \$200million
 - Minimum five year track record
 - Firm / Team ranked by Wilshire's Manager Research Team fourth decile or better
 - Separate Account Offering
 - Relative Returns (1,3,&5Yrs): Excess of 2% or greater versus benchmark
 - Tracking Error (1,3,&5Yrs): Above 3%
 - Information Ratios (1,3,&5Yrs): Above 0.50
 - Up / Down Capture Ratios (1,3,&5Yrs): Above 1.0 / Below 1.0
 - Correlation with Existing Mandates: 0.60 or Less (closer to zero / negative preferred)

CANDIDATE POOL



- Preliminary screening provided a broad candidate list of 83 potential strategies
- Additional screening culled the list down to 11 firms, who received a Request for Information (RFI)
- Short list created for further review
 - American Century Investment Management: Non-U.S. Small Cap
 - Axiom Investors: Axiom International Small Cap Equity Strategy
 - Kayne Anderson Rudnick Investment Management: International Small Cap
 - WCM Investment Management: International Small Cap Growth
 - William Blair: International Small Cap Growth

GENERAL PROCESS



- Start with Wilshire Investment Management database (over 12,000 strategies)
- Applied minimum criteria to cull list to a more manageable size (qualitative)
- Staff may add managers to the list that may not participate in the database
- Additional cut (quantitative)
- Distribute a Request for Information (RFI) to remaining candidates (11)
- Staff and consultant having read the RFI responses narrowed down the candidate list (5)
- Hosted presentations from / discussions with final five candidates
- Additional discussions with front-runner prior to final decision

Axiom



- Organization Structure
 - Founded in 1998 & headquartered in Greenwich, CT
 - 100% employee owned
 - Focus on global, international, and emerging market strategies
 - As of 06/30/21: Firm AUM: \$19.8b / Strategy AUM: \$1.1b (capacity of \$2b)
- Investment Team
 - Consists of 2 PM (senior generalist researchers), a dedicated research associate, & supported by a team of 7 global sector / industry research analysts
- Client / Product Stability
 - Strategy has steadily gained assets for last several years (Inception 2014)
 - Added approximately 45 clients amounting to \$900m in net asset inflows

Axiom (cont.)

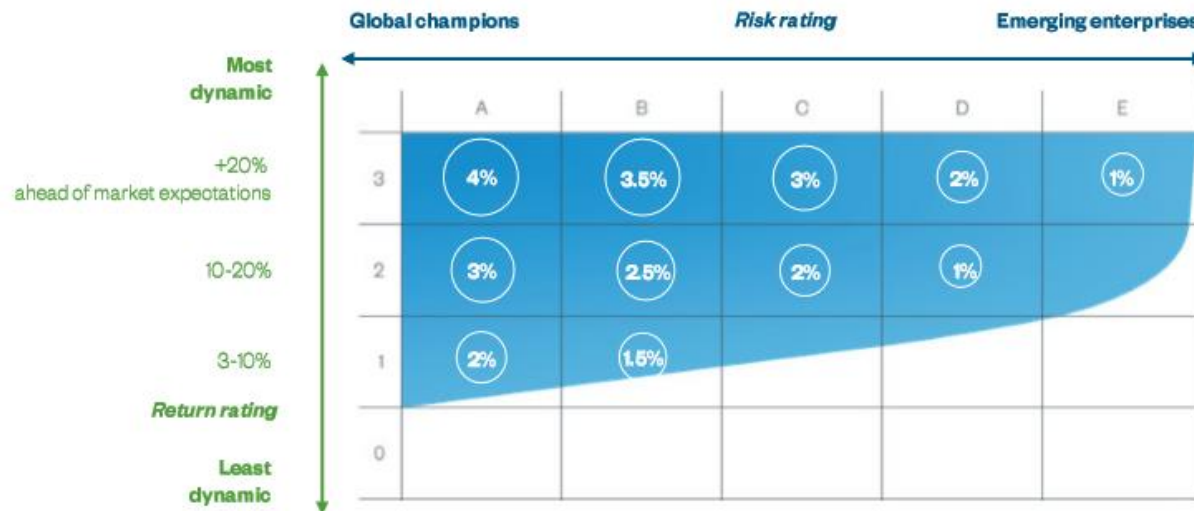


- Investment Philosophy
 - To invest in companies that are dynamically growing as evidenced by positive change that manifest in sustainable earnings, occurring more rapidly than expected, and where those positives changes have not yet been reflected in the stock's valuations.
- Investment Process
 - Team collects, scores, and monitors forward looking operational data (companies, industries, and sectors)
 - Database maintained to help identify quantifiable accelerations in a specific area
 - Team accesses key industry, secular, macro, and country drivers
 - Assessments weighed against market consensus
 - Those likely to exceed consensus expectations become the focus of the team
 - Additional fundamental analysis is conducted, including assigning a company a risk / return rating
 - Valuations are made relative to peers, the company's historical valuation, and on an absolute basis versus peers both from a sector perspective and globally
 - Helps the team confirm that the potential growth prospects have not been factored into the share price

Axiom (cont.)



- Investment Process (cont.)
 - Perceived risk / return of a company is assigned on two intersecting axis's (think X,Y)
 - From a risk rating perspective companies are ranked A through E
 - From a return perspective, companies are ranked 0 through 3 based on how a security is tracking market expectations

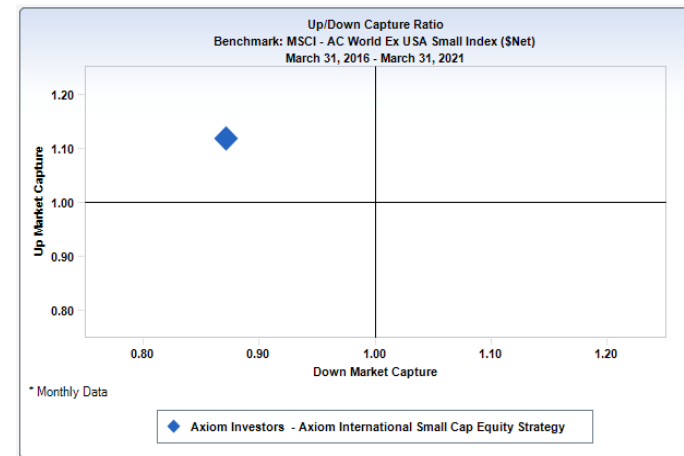
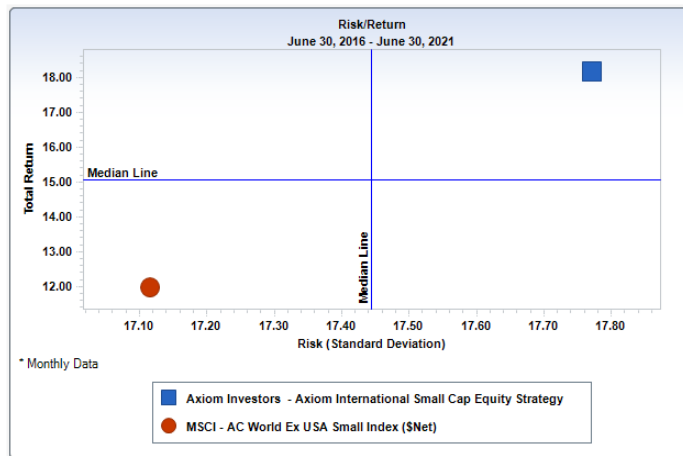


Axiom (cont.)



- Performance

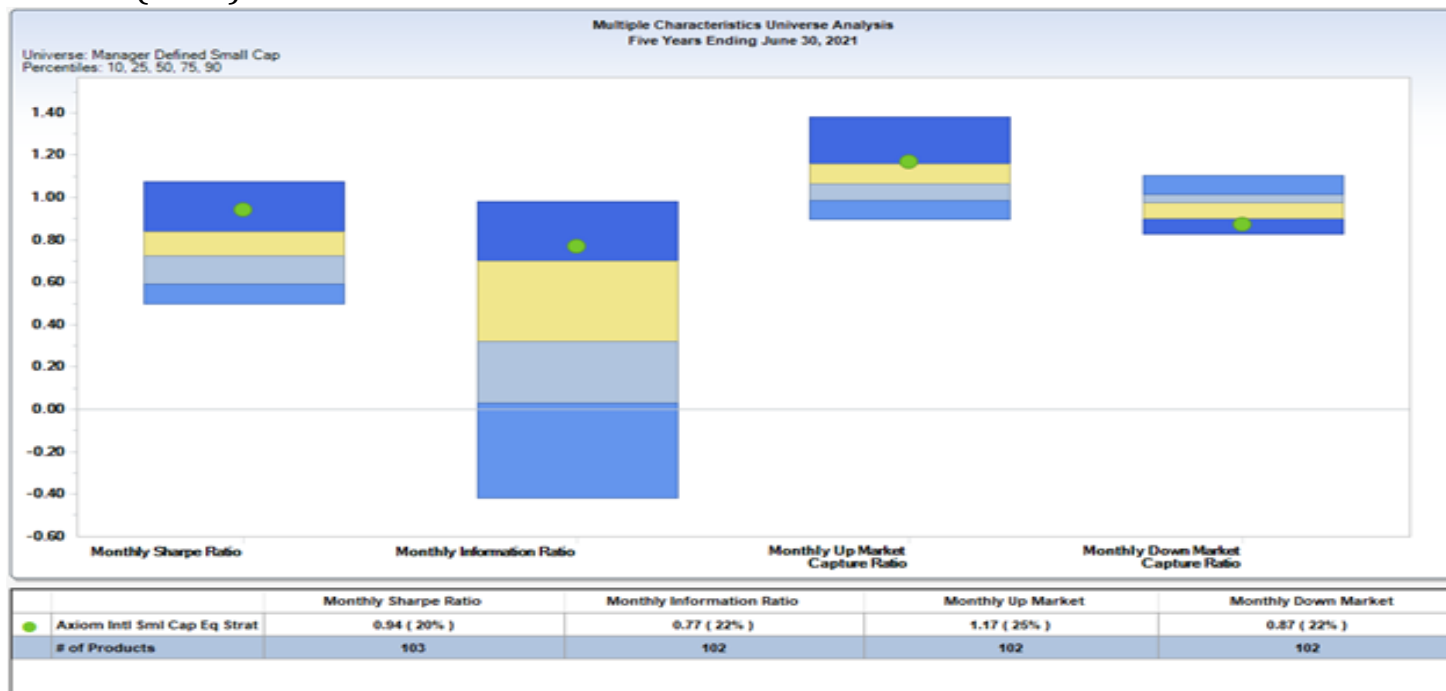
Axiom Investors					
As of: 06/30/21	1 YR	3 YRS	5 YRS	7YRS	SI
Axiom International Small Cap - Gross	44.06	16.92	18.19	15.89	15.56
MSCI ACWI ex US Small Cap Index Net	47.04	9.78	11.97	7.07	7.58
Relative Performance (+/-)	-2.98	7.14	6.22	8.82	7.98
*Inception Date: 01/01/14					



Axiom (cont.)



- Performance (cont.)



Axiom (cont.)



- Implementation and Portfolio Sizing
 - As of 06/30/21, KPPA invested \$159.2m in Non-U.S. small cap strategies (3.2% on Non-U.S. portfolio)
 - Recommend funding Axiom from the existing Non-U.S. small cap mandates
 - Northern Trust (Pension)
 - BlackRock (Insurance)
 - Target initial funding at current levels and seek approval for up to 5% to allow for future growth or rebalancing

Approximate Plan Participation based on 06/30/21 Allocations				
KERS	16,000,000.00	KERS INS	10,300,000.00	26,300,000.00
KERS - H	6,300,000.00	KERS - H INS	4,400,000.00	10,700,000.00
CERS	64,100,000.00	CERS INS	21,700,000.00	85,800,000.00
CERS - H	21,500,000.00	CERS - H INS	11,100,000.00	32,600,000.00
SPRS	2,100,000.00	SPRS INS	1,700,000.00	3,800,000.00
	110,000,000.00		49,200,000.00	159,200,000.00

- Management Fee
 - Proposed an annual fee of 68bps
 - Competitive rate based on data supplied by Wilshire (5th percentile among 61 managers)
- Third-Party Provider & Placement Agent Disclosure
 - Axiom has provided a Statement of Conflict of Interest and Placement Agent questionnaire (attached to report)

RECOMMENDATION



- Seek to create greater efficiencies within the public equity allocation
 - Optimal method for structuring the portfolio and accessing different segments of the market
 - Less efficient market segments provide greater opportunity for outperformance
 - International small cap market
- Axiom will be a positive addition to the KPPA investment program
 - Philosophy of investing in companies experiencing positive change in the context of sustainable earnings growth at attractive valuations
 - Systematic portfolio constructions process (repeatable process)
 - Resulting in a concentrated, high active share, high quality portfolio that has demonstrated its ability to add value in both up and down markets
- ***Axiom Investors – International Small Cap Equity Strategy***
 - ***Initial Funding of approximately \$159.2 million (3.2%) with the option to grow / add to total 5.0% of the Non-U.S. Equity allocation. Primary funding to come from the existing Northern Trust (Pension) and BlackRock (Insurance) Non-U.S. small cap mandates***



**EXTERNAL MANAGER
SEARCH AND
SELECTION REPORT:
NON-US SMALL CAP
EQUITY**

**IN CONJUNCTION WITH
WILSHIRE ASSOCIATES**

Recommendation

Kentucky Public Pensions Authority (KPPA) Staff and Wilshire recommend the Investment Committee fund an actively managed Non-U.S. Small Cap Equity mandate to be managed by Axiom Investors pending successful investment management agreement negotiations.

No placement agents have been involved or will be compensated as a result of this recommendation.

Introduction

In a continued effort to create greater efficiencies within the structure of the public equity allocation, staff and consultant have worked together to study how KPPA accesses different segments of the market. The team completed this exercise with not only an eye towards efficient market access, but also to an efficient allocation of fee dollars. The focus of this process is to spend fee dollars where the chances of outperforming the market are greatest, and conserve, if not eliminate, fees in those areas where more difficult to add value. Non-U.S. developed markets are less efficient than their U.S. counterparts, and therefore warrant a greater degree of active management within the portfolio, particularly within the small cap and emerging market segments.

This report serves as a review of the competitive, open search process in accordance with the Investment Policy Statement and the Investment Procurement Policy, and serves as a recommendation to the Investment Committee to fund the strategy within the Non-U.S. public equity allocation.

Established Criteria

The initial screening was established through collaboration with our independent investment consultant, Wilshire. The criteria was designed to capture as many strategies as possible, while at the same time ensuring they meet certain minimum qualifications. The initial screening criteria was as follows:

- Benchmark: MSCI ACWI-Ex US, MSCI World-Ex US, or MSCI EAFE-Ex US
- Active Management: majority of holdings must be Non-US small cap stocks as defined by the investment manager
- Firm AUM: greater than \$1billion
- Strategy AUM: greater than \$200million
- Minimum five year track record
- Firm/Team ranked by Wilshire's Manager Research Team fourth decile or better (qualitative)
- Separate Account Offering
- Relative Returns (1,3,&5Years): Excess of 2% or greater versus benchmark
- Tracking Error (1,3,&5Year Periods): Above 3%
- Information Ratios (1,3,&5Year Periods): Above 0.50
- Up/Down Capture Ratios (1,3,&5Year Periods): Above 1.0/Below 1.0
- Relative Correlation With Existing Mandates: 0.60 or less (closer to zero/negative preferred)

Candidate Pool

Preliminary screening from the Wilshire Investment Management database provided a candidate broad list of 83 potential strategies. Additional screening and staff input culled this list down to 11 firms. These firms were provided a Request For Information (RFI), and from those responses, a short list was created for further interview.

The short list consisted of the following five firms/strategies:

- American Century Investment Management: Non-U.S. Small
- Axiom Investors: Axiom International Small-Cap Equity Strategy
- Kayne Anderson Rudnick Investment Management: International Small Cap
- WCM Investment Management: International Small Cap Growth
- William Blair: International Small Cap Growth



General Process

Staff and consultant employed the same systematic process used in prior searches to narrow the potential candidates down to the finalist. The Wilshire Investment Management database, which consists over 12,000 strategies, is the starting point for setting the universe of potential ideas. This database is self-populated by external managers and contains a significant amount of information regarding their specific firm and its product(s). Minimum criteria are set in order to cull the potential candidate list down to a more manageable size, regarded as the short list. This criteria includes, but is not limited to qualitative assessments of the firm and portfolio management team, firm / product asset under management, available capacity, demonstrated ability to add value over varying periods, length of track record, etc. Staff may add managers to the list that may not have either made it through the initial screen or who may not participate in the database. From this point, an additional cut is made based on additional quantitative evaluation including, but not limited to, capture ratios, risk/return profiles, active share, etc. Staff then sent a Request For Information (RFI) to the remaining candidates (11) designed to generate insight into the firm's structure, staffing, product stability, investment team/philosophy/process, and other meaningful data points. Staff and consultant having read the RFI responses narrowed down the candidate list further for presentations and discussions (5) via the internet in response to the Covid-19 virus. An additional discussion was held with the perceived frontrunner prior to making the final decision to bring the finalist for presentation to the Investment Committee.

Organization Structure and Stability

Axiom Investors was established in 1998 and is headquartered in Greenwich, Connecticut. The firm is 100% employee owned and consists of approximately 50 employees, with its primary focus on global, international, and emerging market equity strategies. The firm managed approximately \$19.8 billion as of close 06/30/21. The international small cap strategy had roughly \$1.1 billion invested at the end of the quarter, with a capacity estimation of \$2.0 billion.

Investment Team

The investment team consists of two portfolio managers who also serve as senior generalist researchers, a dedicated research associate, and is supported by a team of seven global sector/industry research analysts. The portfolio managers have over 26 years of industry experience and average a 14-year tenure with the firm. The team has been very stable, with no portfolio manager turnover, and minimal research analyst turnover.

Investment Philosophy and Process

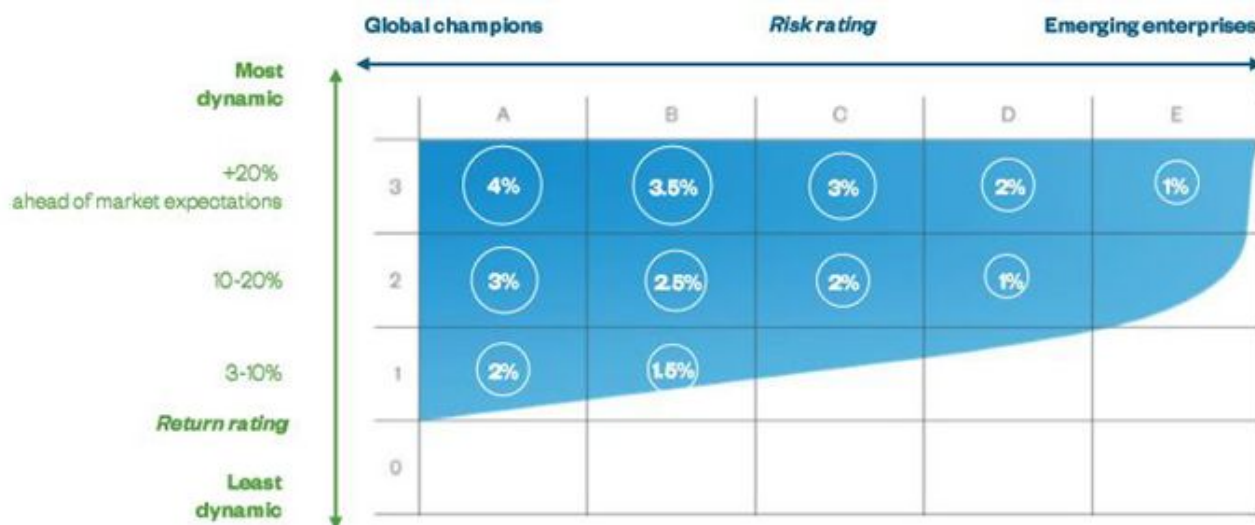
Axiom strives to invest in companies that are dynamically growing and experiencing positive change more rapidly than generally expected, and where those positive changes have not yet been reflected in the stock's expectations and valuations. The strategy seeks to outperform the MSCI ACWI Ex US Small Cap Index by 200-300 bps over a market cycle with an expected tracking error of 5-7%.

Axiom's dynamic growth philosophy can be described by the intersection of three key elements. The process is forward-looking, and strives to find potential inflections in a business's key operational catalysts that could ultimately affect its earnings projections. The most attractive candidate for the portfolio will have positive fundamental changes that manifest in sustainable earnings, and an attractive valuation. A critical point to the strategy's alpha generation relies on exceeding investor consensus growth expectations, and the ability to quantify that gap. In summary, those holdings with the highest conviction will have forward looking key business drivers that are changing for the better, at a rate faster than expected by the consensus, and where those changes have not yet been reflected in their valuation.

The strategy employs a repeatable process to narrow the universe down to a portfolio of 60-100 names weighted by conviction level. First, the team collects, scores, and monitors forward looking operational data related to specific companies, industries, and sectors. This information is contained in a proprietary database, which helps to identify quantifiable accelerations in a specific area. When a positive acceleration is found, the team assesses the key company, industry, secular, macro and country drivers. These assessments are weighed against the market's consensus. Companies likely to exceed consensus expectations become the focus of the team.

Non-U.S. Small Cap Search 4

Once a potential candidate for inclusion is identified, the team assigns the company a risk/return rating. Valuations play an important role in the investment decision; they are made relative to peers, to the company's historical valuation, and on an absolute basis versus peers both from a sector perspective and globally. This assessment helps the team confirm that the potential growth prospects have not already been factored into the share price. The perceived risk/return of company is assigned on two intersecting axis's (think X, Y). From a risk rating perspective companies are labeled as A through E. A's and B's are large, well-capitalized, profitable, less volatile global companies. C's solid businesses that lead in a particular region or sub-sector. D's and E's are either emerging companies in developed markets or established companies in emerging markets. From a return perspective, companies are assigned a rating from 0-3 based on how the security is tracking relative to market expectations (ie: a rating of 2 means the company's business drivers are tracking 10-20% ahead of market expectations). The manager uses the intersection of the two rating scales to help determine the sizing of the positions within the portfolio.



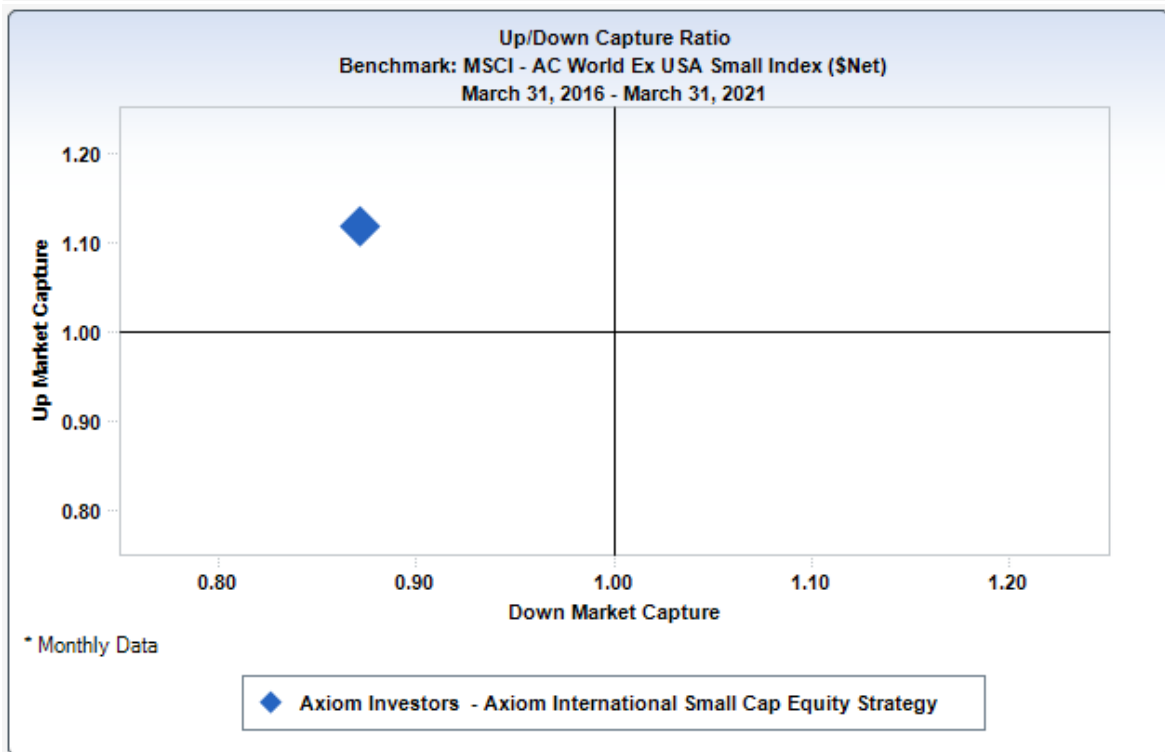
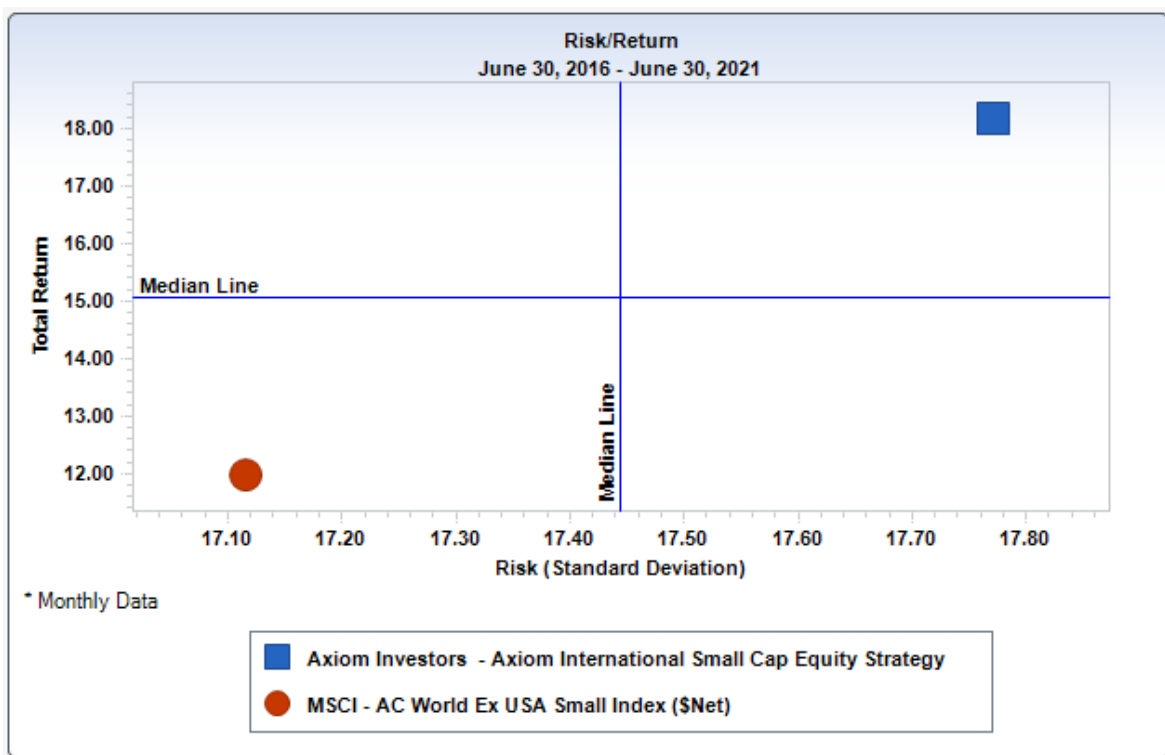
The process is fundamental in nature and repeatable. The risk reward matrix helps to ensure the manager's level of conviction is consistently informed through defined position sizing. This helps to ensure a well diversified portfolio in terms of sources of alpha.

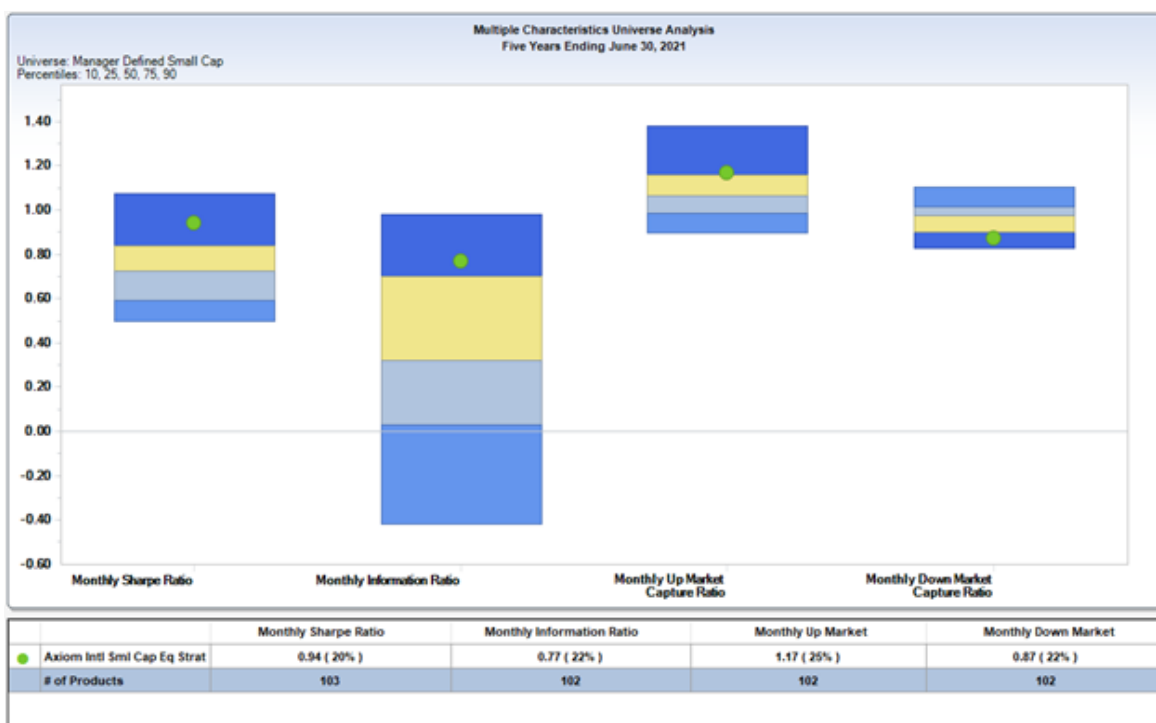
Client Stability

Axiom Investors International Small Cap strategy has steadily gained assets for the last several years. The strategy has added approximately 45 clients amounting to over \$900 million in net asset inflows.

Performance

Axiom Investors					
As of: 06/30/21	1 YR	3 YRS	5 YRS	7YRS	SI
Axiom International Small Cap - Gross	44.06	16.92	18.19	15.89	15.56
MSCI ACWI ex US Small Cap Index Net	47.04	9.78	11.97	7.07	7.58
Relative Performance (+/-)	-2.98	7.14	6.22	8.82	7.98
*Inception Date: 01/01/14					





Implementation and Portfolio Sizing

As of close June 30, 2021, KPPA invested approximately \$159.2 million in dedicated Non-U.S. small cap strategies, which equates to roughly 3.2% of the Non-U.S. equity portfolio. Given the premise of Non-U.S. small cap being a moderately inefficient market segment, staff and consultant would recommend funding the Axiom investment from the international small cap investment dollars invested in other vehicles within the portfolio. Specifically, funding will come from the existing, and less active, Northern Trust (Pension) and BlackRock (Insurance) Non-U.S. small cap mandates. Staff will target initial funding at current corresponding levels, and is seeking approval of up to 5.0% to allow for future growth or rebalancing as opportunity allows.

Approximate Plan Participation based on 06/30/21 Allocations				
KERS	16,000,000.00	KERS INS	10,300,000.00	26,300,000.00
KERS - H	6,300,000.00	KERS - H INS	4,400,000.00	10,700,000.00
CERS	64,100,000.00	CERS INS	21,700,000.00	85,800,000.00
CERS - H	21,500,000.00	CERS - H INS	11,100,000.00	32,600,000.00
SPRS	2,100,000.00	SPRS INS	1,700,000.00	3,800,000.00
	110,000,000.00		49,200,000.00	159,200,000.00

Management Fees

The manager has proposed an annual fee for the strategy of 68 bps based on an allocation size of \$159.2 million across both the pension and insurance funds. This would appear to be a competitive rate based on the universe data supplied by Wilshire for similar strategies of like sizes. The proposed rate ranks in the 5th percentile among the 61 managers in the universe data.

Third-Party Provider and Placement Agent Disclosure

In accordance with KRS' & CERS' gating practices, staff has requested the finalist to acknowledge transparency requirements, and to complete a conflict of interest statement and placement agent form. No placement agents have been



involved or will be compensated as a result of this recommendation. A copy of the manager's Statement of Conflict of Interest and Placement Agent questionnaire have been attached to this recommendation.

Recommendation

As previously stated, staff and consultant are working to create greater efficiencies within the public equity allocation. This requires determining the optimal method for structuring the portfolio and accessing different segments of the market. In an effort to do this while being mindful of fee dollar expense, those market segments that are less efficient provide greater opportunity for outperformance, such as in the international small cap market space.

Staff and consultant believe Axiom's International Small Cap strategy will be a positive addition to the KPPA investment program. The philosophy of investing in those companies with positive change in the context of sustainable earnings growth at attractive valuations married with a systematic portfolio construction process demonstrates a repeatable process for developing an investment portfolio. The result being a concentrated, high active share, high quality portfolio that has demonstrated its ability to add value in both up and down markets.

Because of the above viewpoint and the search process completed, KPPA Staff and Wilshire put forth the following recommendation for the Investment Committee's consideration:

Axiom Investors – International Small Cap Equity Strategy

Initial Funding of approximately \$159.2 million (3.2%) with the option to grow/add to total 5.0% of the Non-U.S. Equity allocation. Primary funding to come from the existing Northern Trust (Pension) and BlackRock (Insurance) Non-U.S. small cap mandates.

We welcome any comments or questions by the Committee.

Appendix

- Wilshire: International Small Cap Manager Search Packet (Contains Short-list Candidate Pool – 5 managers)
- Wilshire Recommendation Memo
- Axiom Conflict of Interest and Placement Agent Disclosure

International Small Cap Manager Search

July 2021

Wilshire

INTERNATIONAL SMALL CAP MANAGER SEARCH

Firm and Product Comparison

Firm Name	Established	Firm Assets (\$MM)
American Century Investment Management, Inc.	1958	\$ 235,127
Axiom Investors	1998	\$ 19,836
Kayne Anderson Rudnick Investment Mgmt, LLC	1984	\$ 61,161
WCM Investment Management	1976	\$ 98,048
William Blair	1935	\$ 73,962

Firm Name	Product Name	Product AUM (\$MM)	Mandate Size (\$100 MM) vs. Product Assets
American Century Investment Management, Inc.	Non-U.S. Small Cap	\$ 1,864	5.4%
Axiom Investors	International Small-Cap Equity Strategy	\$ 1,136	8.8%
Kayne Anderson Rudnick Investment Mgmt, LLC	International Small Cap	\$ 3,577	2.8%
WCM Investment Management	International Small Cap Growth	\$ 1,798	5.6%
William Blair	International Small Cap Growth	\$ 3,259	3.1%

*Firm Assets and Product AUM as of 6/30/21

INTERNATIONAL SMALL CAP MANAGER SEARCH

Qualitative Scores by Wilshire's Manager Research on Candidates

(In Deciles)	Overall Rating	Organization	Information	Forecasting	Portfolio Construction	Implementation	Attribution
	(20%)	(20%)	(20%)	(20%)	(10%)	(10%)	(10%)
American Century Investment Management, Inc. - Non-U.S. Small Cap	3rd	3rd	3rd	2nd	3rd	3rd	3rd
Axiom Investors - International Small-Cap Equity Strategy	1st	1st	1st	1st	3rd	1st	1st
Kayne Anderson Rudnick Investment Mgmt, LLC - International Small Cap	3rd	4th	3rd	1st	3rd	4th	4th
WCM Investment Management - International Small Cap Growth	1st	1st	1st	1st	2nd	3rd	1st
William Blair - International Small Cap Growth	2nd	1st	1st	2nd	3rd	2nd	1st

Decile	Rating Scale									
	1	2	3	4	5	6	7	8	9	10
	A		B		C		D		E	

- **Organization:** Scores organizational structure and stability
- **Information:** Scores the ability to gather and process unique sources of information
- **Forecasting:** Scores the discipline and consistency of a forecasting process
- **Portfolio Construction:** Scores portfolio construction and risk management
- **Implementation:** Scores a manager's ability to transact in the market
- **Attribution:** Scores the use of attribution information and portfolio feedback
- **Overall Rating =** Weighted sum product of the individual criteria

Performance Analysis

Wilshire

INTERNATIONAL SMALL CAP MANAGER SEARCH

Performance Comparison – Calendar Year

<i>Absolute</i>	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010
Axiom Investors - International Small-Cap Equity Strategy	38.87	34.82	-18.59	41.39	-0.83	29.59	-1.48	-	-	-	-
Kayne Anderson Rudnick Investment Mgmt, LLC - International Small Ca	25.96	29.49	-5.32	30.30	22.81	-0.28	-1.92	32.42	24.87		
WCM Investment Management - International Small Cap Growth	58.55	45.72	-10.12	43.98	0.93	26.41	-	-	-	-	-
William Blair - International Small Cap Growth	30.95	35.87	-23.27	34.21	-3.00	10.95	-6.62	28.85	21.70	-10.44	27.61
MSCI AC World ex US Small Index	14.24	22.42	-18.20	31.64	3.91	2.60	-4.03	19.73	18.52	-18.50	25.21

<i>Absolute</i>	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010
American Century Investment Management, Inc. - Non-U.S. Small Cap	32.55	30.50	-21.02	46.65	-4.68	12.24	-5.61	33.23	26.58	-13.73	24.55
MSCI ACWI ex US Small Growth IMI Index	23.69	24.62	-18.28	33.63	-0.28	6.49	-3.59	18.52	16.87	-17.86	27.30

<i>Value Added (vs. MSCI AC World ex US Small Index)</i>	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010
Axiom Investors - International Small-Cap Equity Strategy	24.63	12.40	-0.39	9.76	-4.74	26.98	2.55	-	-	-	-
Kayne Anderson Rudnick Investment Mgmt, LLC - International Small Ca	11.72	7.07	12.88	-1.34	18.90	-2.88	2.12	12.69	6.35	-	-
WCM Investment Management - International Small Cap Growth	44.31	23.30	8.08	12.34	-2.98	23.80	-	-	-	-	-
William Blair - International Small Cap Growth	16.71	13.45	-5.07	2.57	-6.91	8.34	-2.59	9.12	3.19	8.06	2.41

<i>Value Added (vs. MSCI ACWI ex US Small Growth IMI Index)</i>	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010
American Century Investment Management, Inc. - Non-U.S. Small Cap	8.86	5.89	-2.75	13.02	-4.40	5.74	-2.03	14.71	9.71	4.13	-2.76

*Axiom, KAR, WCM, and William Blair are benchmarked to the MSCI AC World ex US Small Index. American Century is benchmarked to the MSCI ACWI ex US Small Growth IMI Index.

INTERNATIONAL SMALL CAP MANAGER SEARCH

Performance Comparison – As of June 30, 2021

<i>Absolute</i>	Quarter	Year-to-date	One Year	Three Years	Five Years	Seven Years	Ten Years
Axiom Investors - International Small-Cap Equity Strategy	9.92	8.26	44.05	16.92	18.15	15.87	-
Kayne Anderson Rudnick Investment Mgmt, LLC - International Small Cap	7.22	7.91	47.34	15.33	20.10	13.17	-
WCM Investment Management - International Small Cap Growth	11.92	11.95	56.04	27.54	26.85	-	-
William Blair - International Small Cap Growth	10.14	8.11	44.89	15.11	14.84	10.04	10.15
MSCI AC World ex US Small Index	6.35	12.24	47.04	9.78	11.97	7.07	7.02

<i>Absolute</i>	Quarter	Year-to-date	One Year	Three Years	Five Years	Seven Years	Ten Years
American Century Investment Management, Inc. - Non-U.S. Small Cap	5.62	6.08	37.98	12.18	16.14	10.80	11.56
MSCI ACWI ex US Small Growth IMI Index	6.75	10.32	44.91	11.91	13.29	8.59	7.89

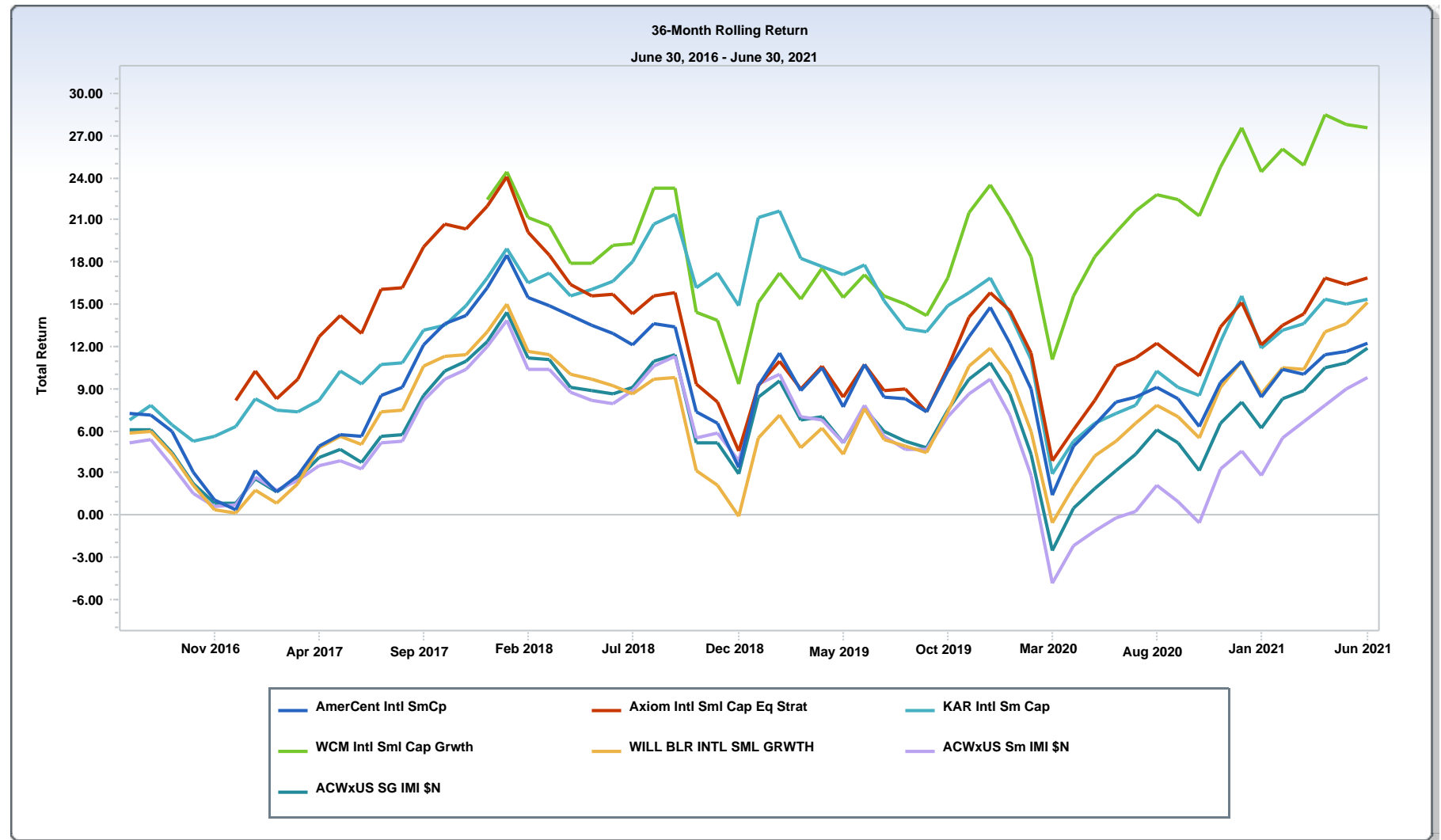
<i>Value Added (vs. MSCI AC World ex US Small Index)</i>	Quarter	Year-to-date	One Year	Three Years	Five Years	Seven Years	Ten Years
Axiom Investors - International Small-Cap Equity Strategy	3.57	(3.98)	(2.99)	7.14	6.18	8.80	-
Kayne Anderson Rudnick Investment Mgmt, LLC - International Small Cap	0.87	(4.33)	0.30	5.56	8.14	6.11	-
WCM Investment Management - International Small Cap Growth	5.57	(0.29)	9.00	17.76	14.89	-	-
William Blair - International Small Cap Growth	3.79	(4.13)	(2.15)	5.34	2.88	2.98	3.13

<i>Value Added (vs. MSCI ACWI ex US Small Growth IMI Index)</i>	Quarter	Year-to-date	One Year	Three Years	Five Years	Seven Years	Ten Years
American Century Investment Management, Inc. - Non-U.S. Small Cap	(1.13)	(4.24)	(6.93)	0.27	2.84	2.20	3.66

*Axiom, KAR, WCM, and William Blair are benchmarked to the MSCI AC World ex US Small Index. American Century is benchmarked to the MSCI ACWI ex US Small Growth IMI Index.

INTERNATIONAL SMALL CAP MANAGER SEARCH

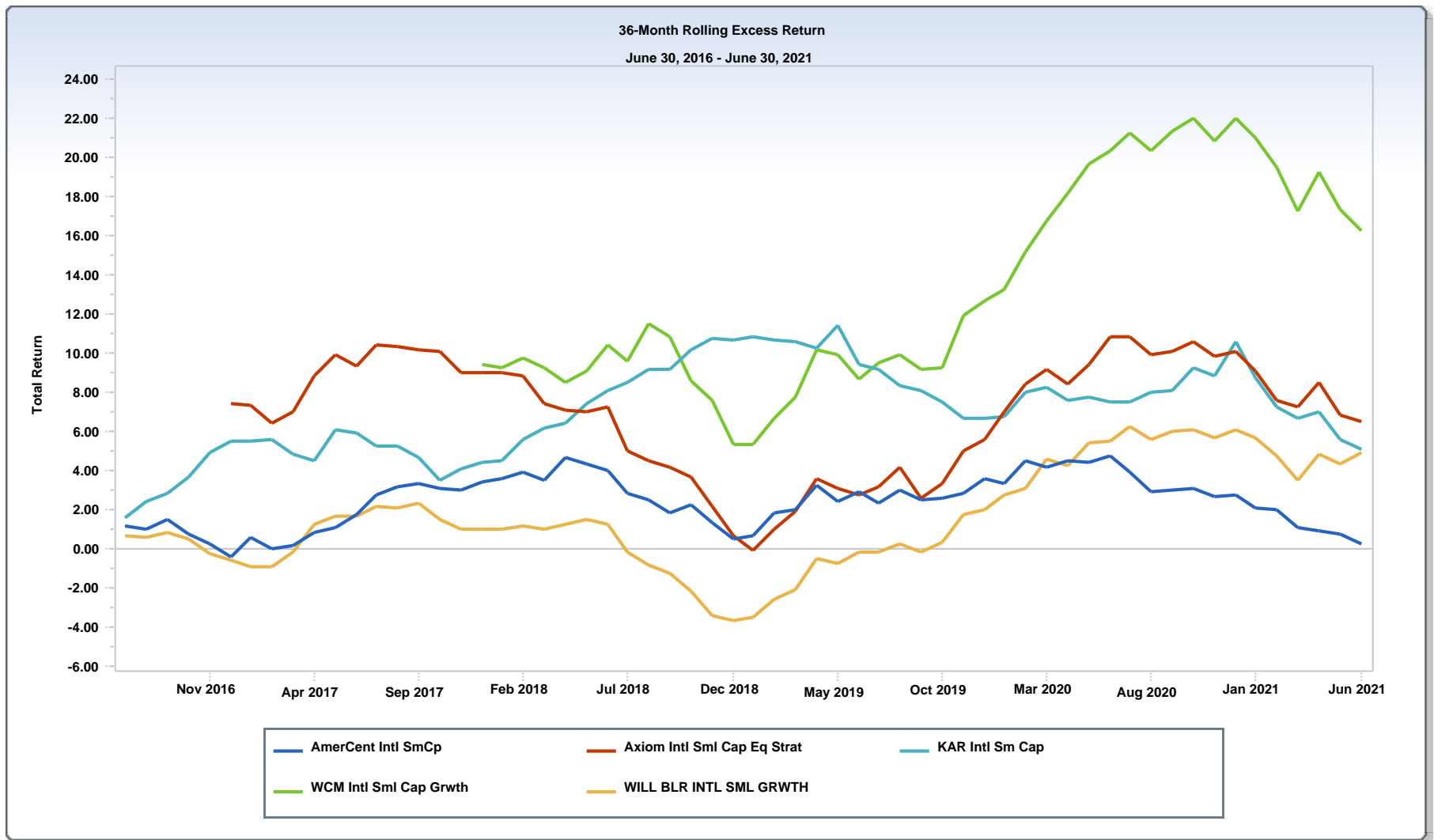
Rolling Absolute Performance



*Axiom, KAR, WCM, and William Blair are benchmarked to the MSCI AC World ex US Small Index. American Century is benchmarked to the MSCI ACWI ex US Small Growth IMI Index. All funds and indices are shown.

INTERNATIONAL SMALL CAP MANAGER SEARCH

Rolling Excess Performance

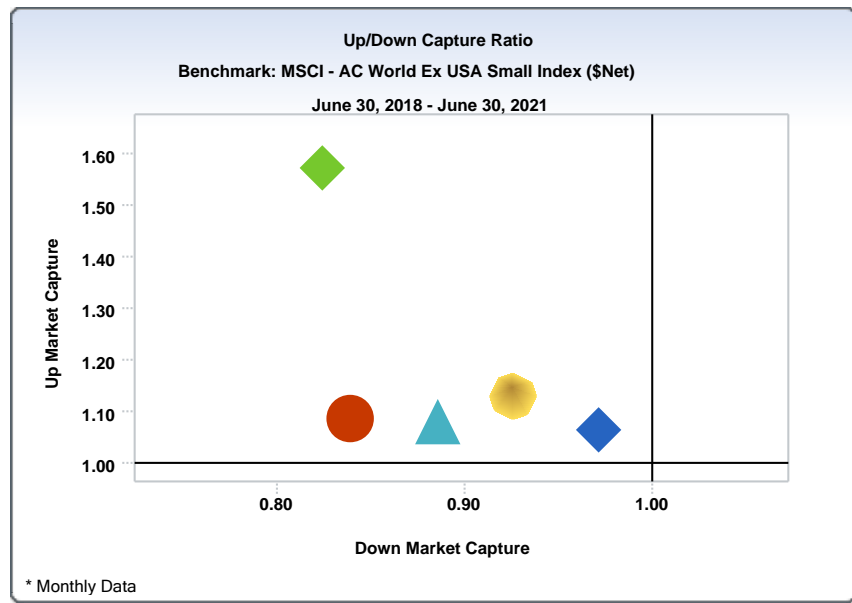


* Excess performance calculated using manager defined benchmark. Axiom, KAR, WCM, and William Blair are benchmarked to the MSCI AC World ex US Small Index. American Century is benchmarked to the MSCI ACWI ex US Small Growth IMI Index.

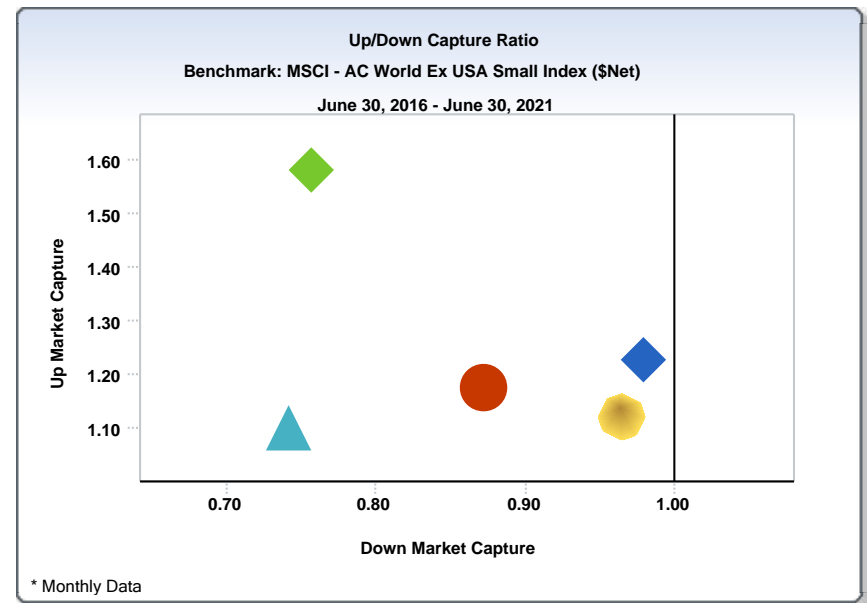
INTERNATIONAL SMALL CAP MANAGER SEARCH

Up/Down Capture Ratio Analysis

Three Year



Five Year

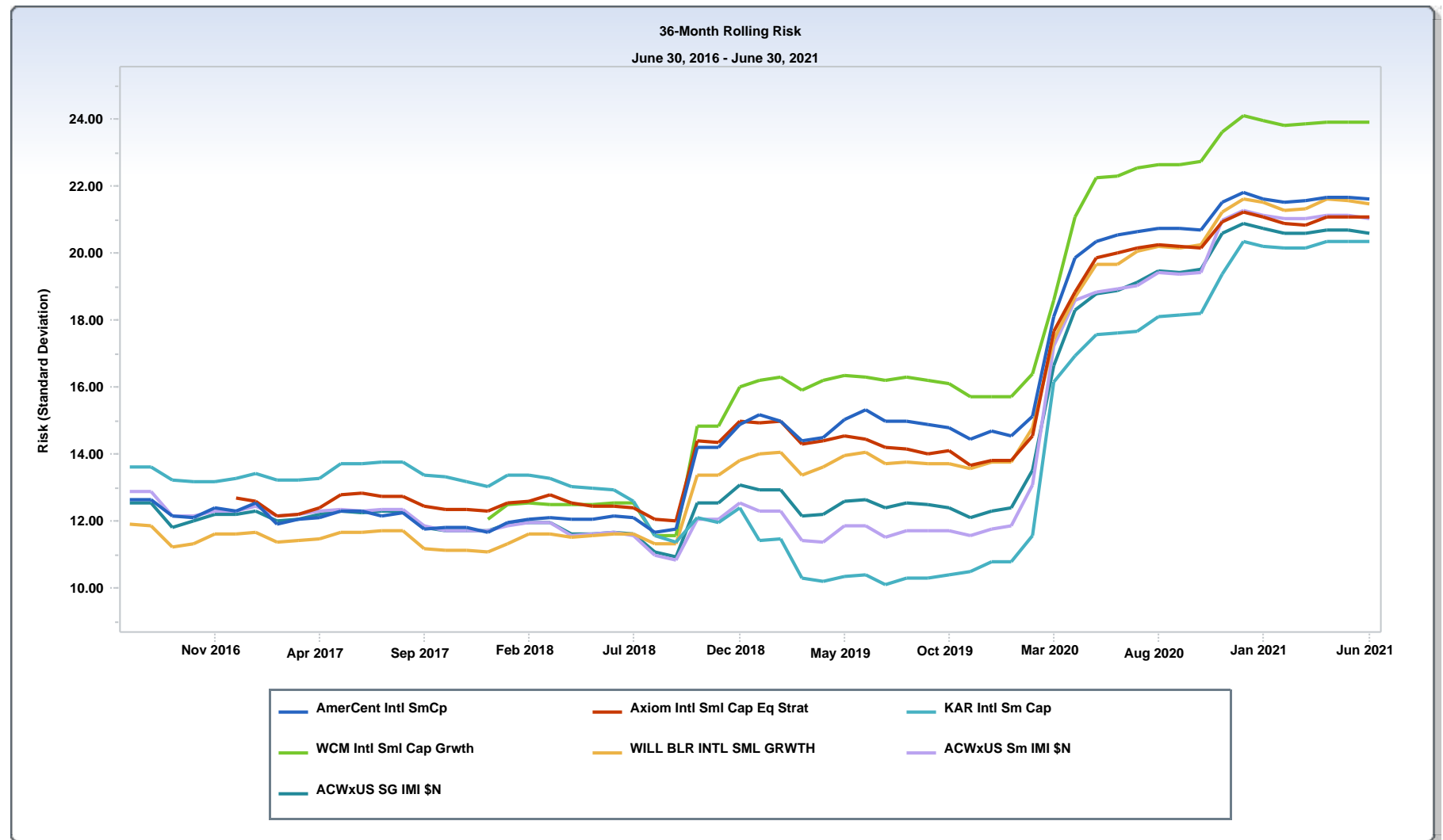


- ◆ American Century Investment Management, Inc. - Non-U.S. Small Cap
 ● Axiom Investors - Axiom International Small Cap Equity Strategy
 ▲ Kayne Anderson Rudnick Investment Mgmt, LLC - International Small Cap
- ◆ WCM Investment Management - International Small Cap Growth
 ● William Blair - International Small Cap Growth

* Up/Down Capture Ratio calculated using manager defined benchmark. Axiom, KAR, WCM, and William Blair are benchmarked to the MSCI AC World ex US Small Index. American Century is benchmarked to the MSCI ACWI ex US Small Growth IMI Index.

INTERNATIONAL SMALL CAP MANAGER SEARCH

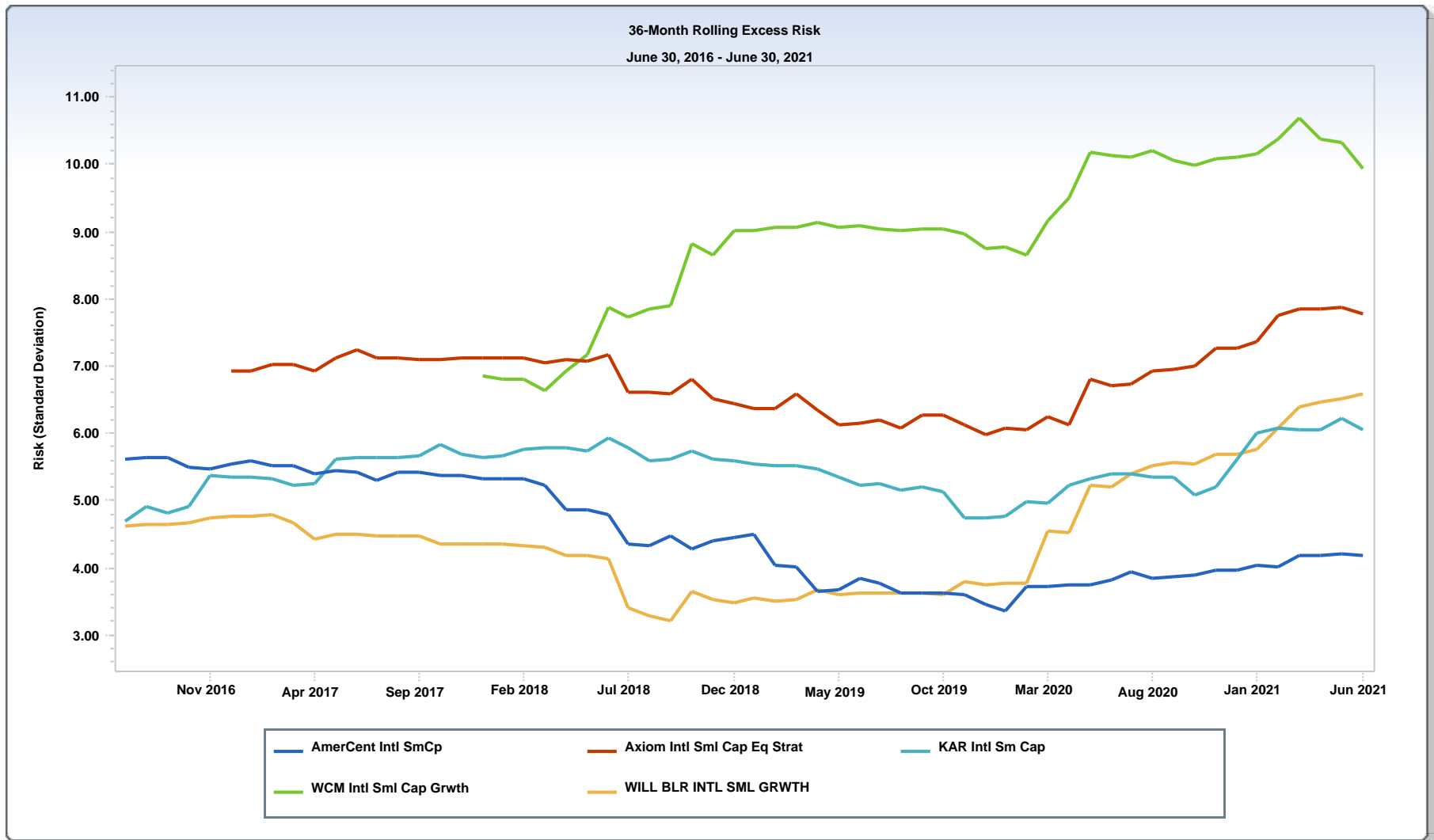
Rolling Absolute Risk



*Axiom, KAR, WCM, and William Blair are benchmarked to the MSCI AC World ex US Small Index. American Century is benchmarked to the MSCI ACWI ex US Small Growth IMI Index. All funds and indices are shown.

INTERNATIONAL SMALL CAP MANAGER SEARCH

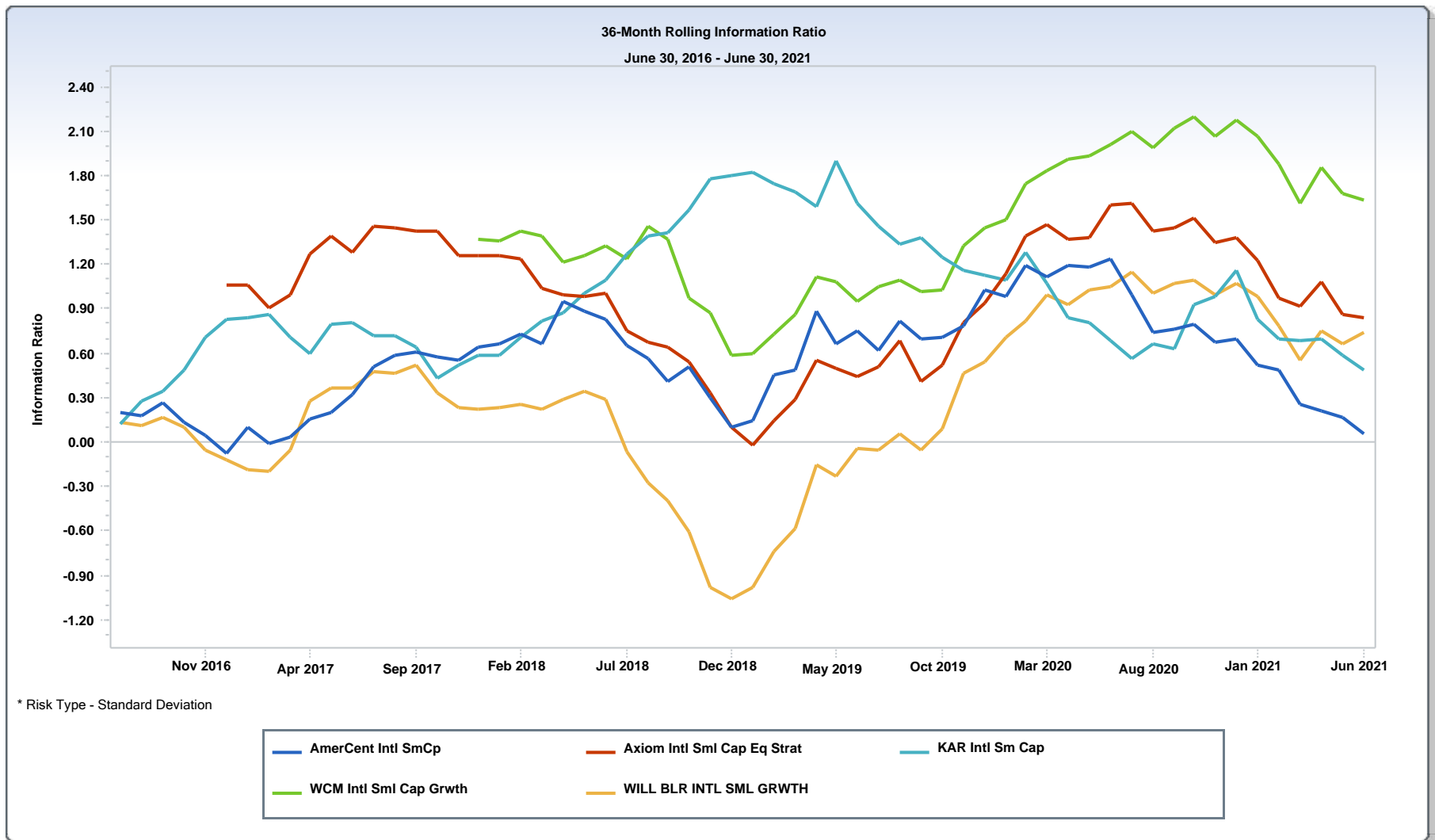
Rolling Excess Risk



* Excess risk calculated using manager defined benchmark. Axiom, KAR, WCM, and William Blair are benchmarked to the MSCI AC World ex US Small Index. American Century is benchmarked to the MSCI ACWI ex US Small Growth IMI Index.

INTERNATIONAL SMALL CAP MANAGER SEARCH

Rolling Information Ratio

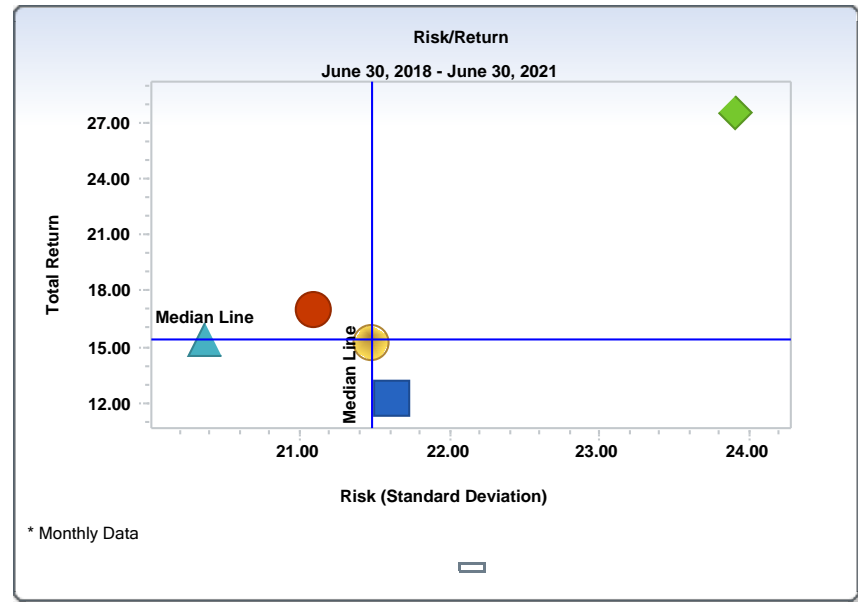


* Information Ratio calculated using manager defined benchmark. Axiom, KAR, WCM, and William Blair are benchmarked to the MSCI AC World ex US Small Index. American Century is benchmarked to the MSCI ACWI ex US Small Growth IMI Index.

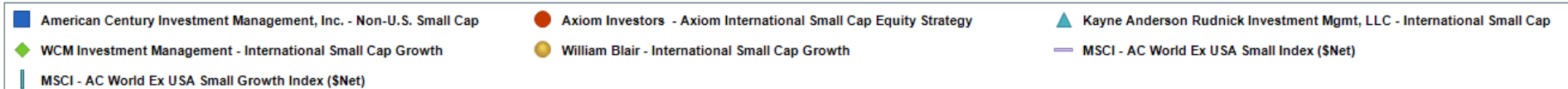
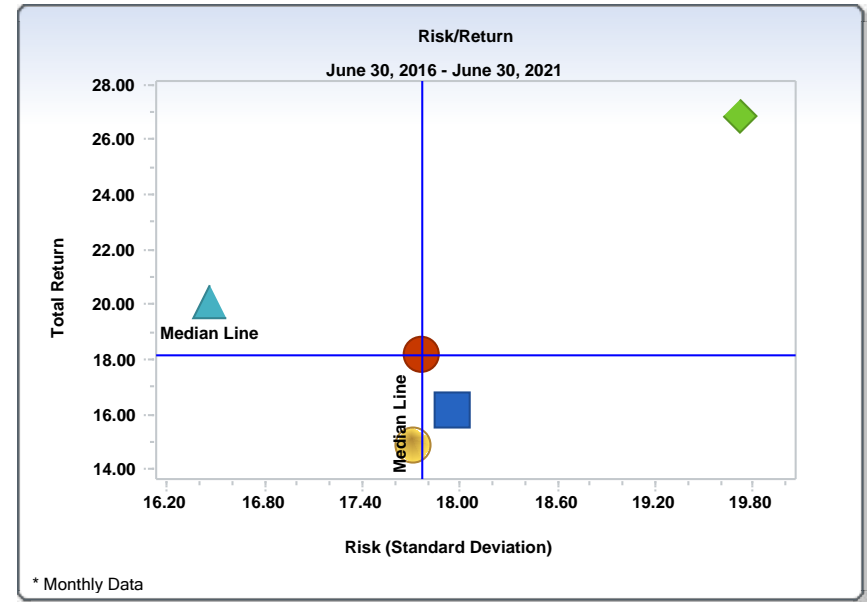
INTERNATIONAL SMALL CAP MANAGER SEARCH

Risk/Return Analysis

Three Year



Five Year



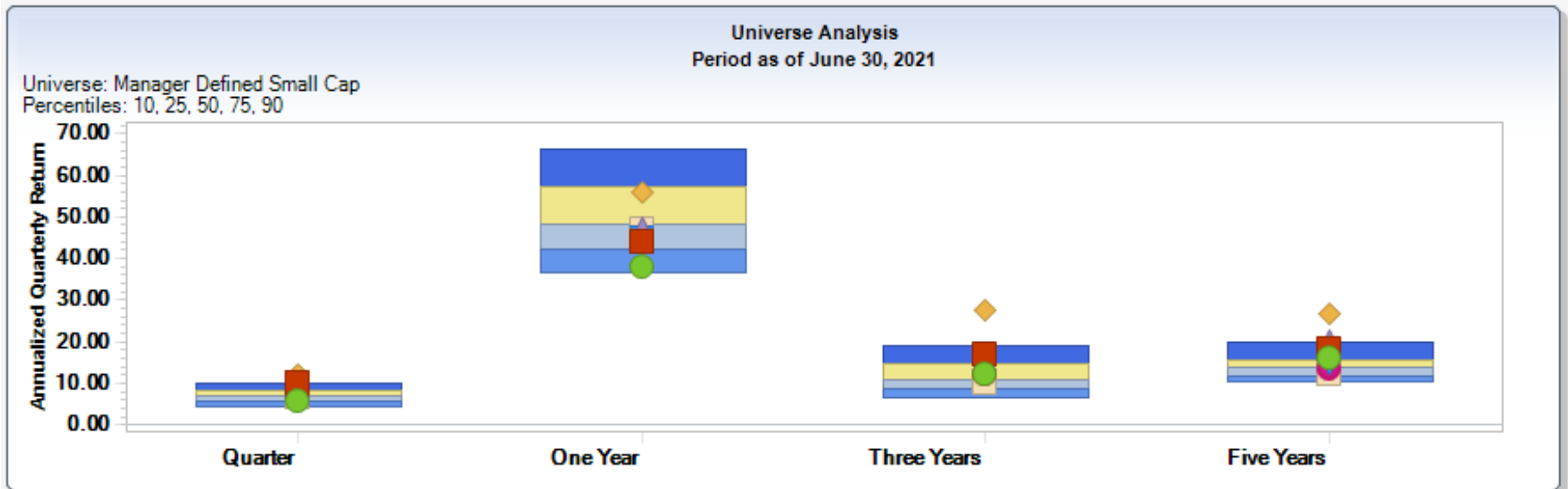
*Axiom, KAR, WCM, and William Blair are benchmarked to the MSCI AC World ex US Small Index. American Century is benchmarked to the MSCI ACWI ex US Small Growth IMI Index. All funds and indices are shown.

Universe Analysis

Wilshire

INTERNATIONAL SMALL CAP MANAGER SEARCH

Universe Ranking - Performance

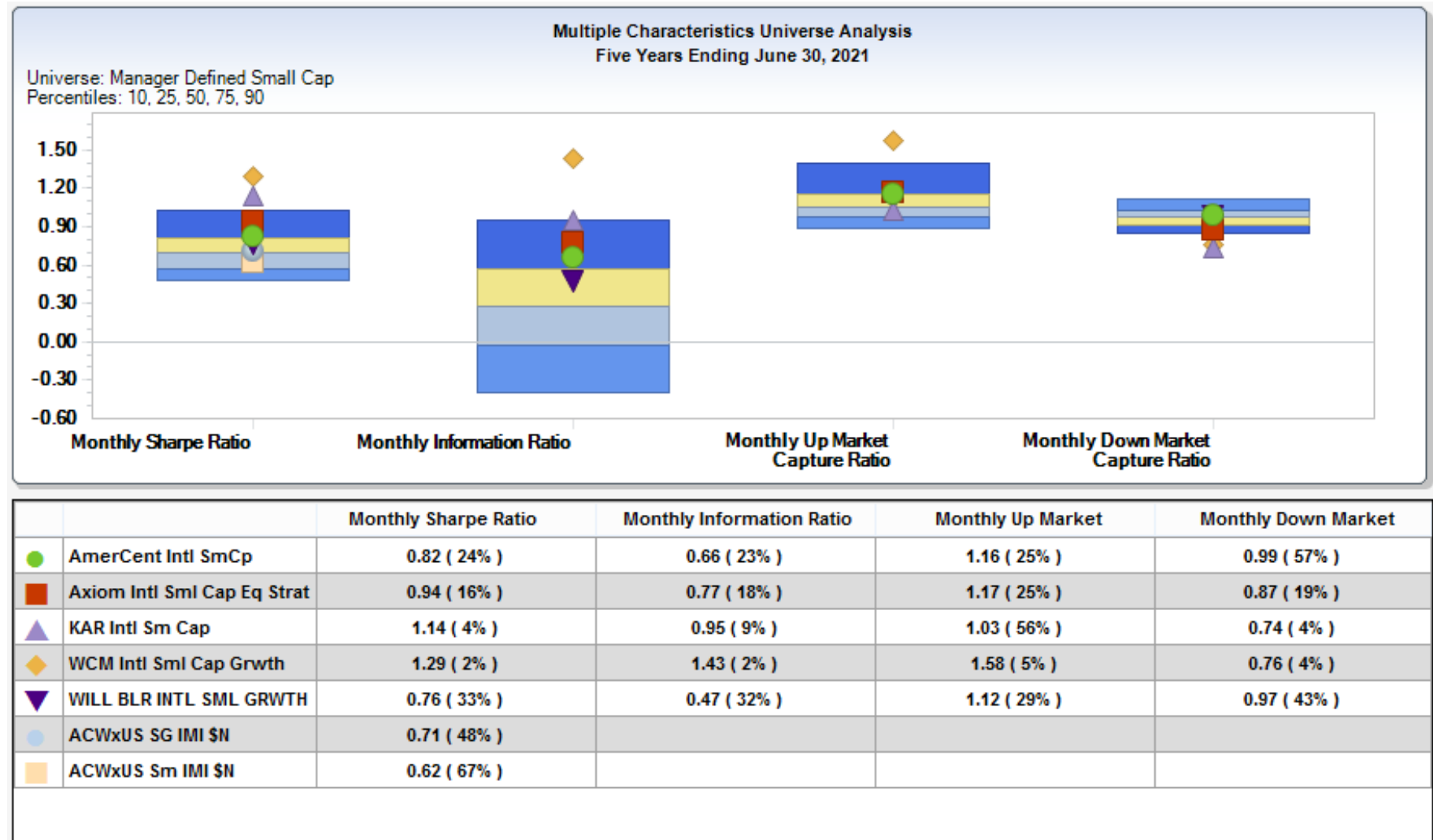


		Quarter	One Year	Three Years	Five Years
●	AmerCent Intl SmCp	5.62 (72%)	37.98 (85%)	12.18 (39%)	16.14 (22%)
■	Axiom Intl Sml Cap Eq Strat	9.92 (12%)	44.05 (65%)	16.92 (15%)	18.15 (14%)
▲	KAR Intl Sm Cap	7.22 (43%)	47.34 (54%)	15.33 (21%)	20.10 (10%)
◆	WCM Intl Sml Cap Grwth	11.92 (3%)	56.04 (28%)	27.54 (2%)	26.85 (1%)
▼	WILL BLR INTL SML GRWTH	10.14 (11%)	44.89 (63%)	15.11 (22%)	14.84 (34%)
●	ACWxUS SG IMI \$N	6.75 (52%)	44.91 (63%)	11.91 (41%)	13.29 (63%)
■	ACWxUS Sm IMI \$N	6.35 (61%)	47.04 (56%)	9.78 (63%)	11.97 (74%)
	# of Products	165	164	152	135

*Axiom, KAR, WCM, and William Blair are benchmarked to the MSCI AC World ex US Small Index. American Century is benchmarked to the MSCI ACWI ex US Small Growth IMI Index. All funds and indices are shown.

INTERNATIONAL SMALL CAP MANAGER SEARCH

Universe Ranking - Statistics



*Statistics calculated using manager defined benchmark. Axiom, KAR, WCM, and William Blair are benchmarked to the MSCI AC World ex US Small Index. American Century is benchmarked to the MSCI ACWI ex US Small Growth IMI Index.

Appendix

Wilshire

INTERNATIONAL SMALL CAP MANAGER SEARCH

Disclosures

Firm	Date of Review	ADV Part I		ADV Part IIA		
		Item 11: Disclosure Information		Item 9: Disciplinary Information		Item 19 (D): Requirements for State-Registered Advisors
		Form ADV Part I Date	Disclosure (Yes/No)	Form ADV Part IIA Date	Disclosure (Yes/No)	Disclosure (Yes/No)
American Century Investment Management, Inc.	10/16/2020	10/2/2020	No	3/16/2020	No	N/A
Axiom Investors	10/16/2020	3/27/2020	No	3/27/2020	No	N/A
Kayne Anderson Rudnick Investment Mgmt, LLC	10/16/2020	6/26/2020	No	6/26/2020	Yes	N/A
WCM Investment Management	10/16/2020	5/29/2020	No	3/20/2020	No	N/A
William Blair	10/16/2020	10/5/2020	Yes	3/27/2020	Yes	N/A

Performance Review

Wilshire

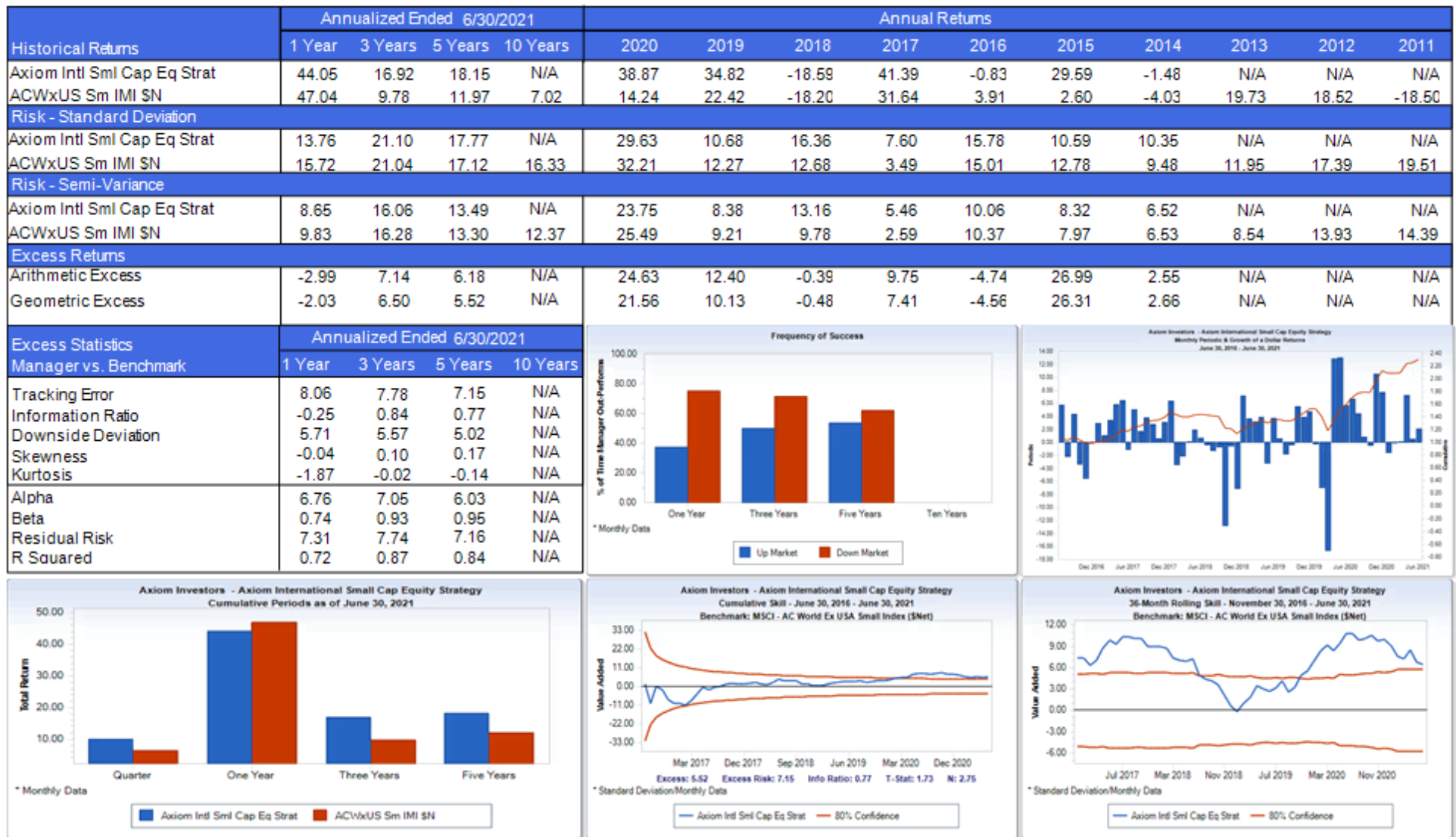
INTERNATIONAL SMALL CAP MANAGER SEARCH

Performance Review



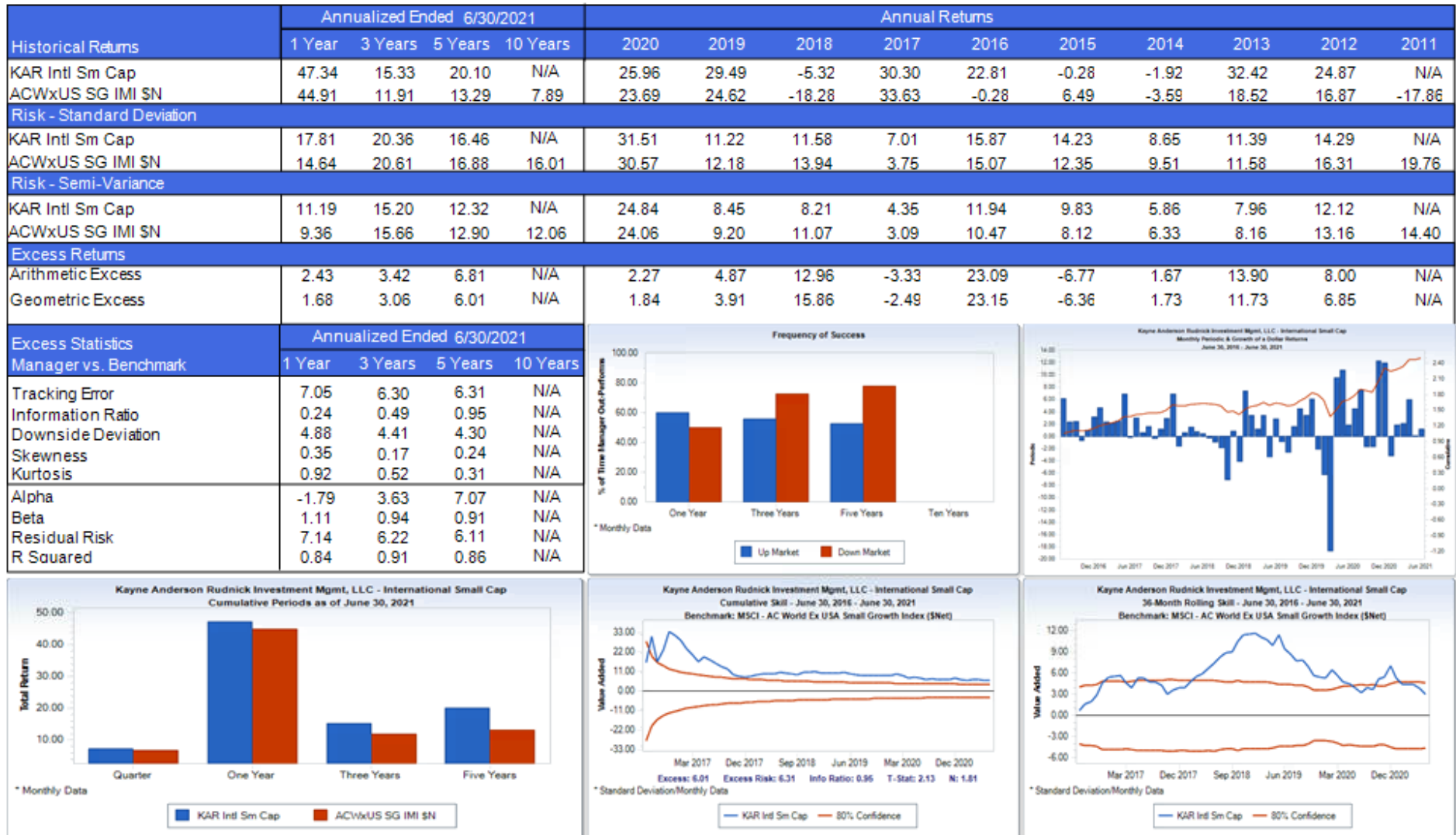
INTERNATIONAL SMALL CAP MANAGER SEARCH

Performance Review



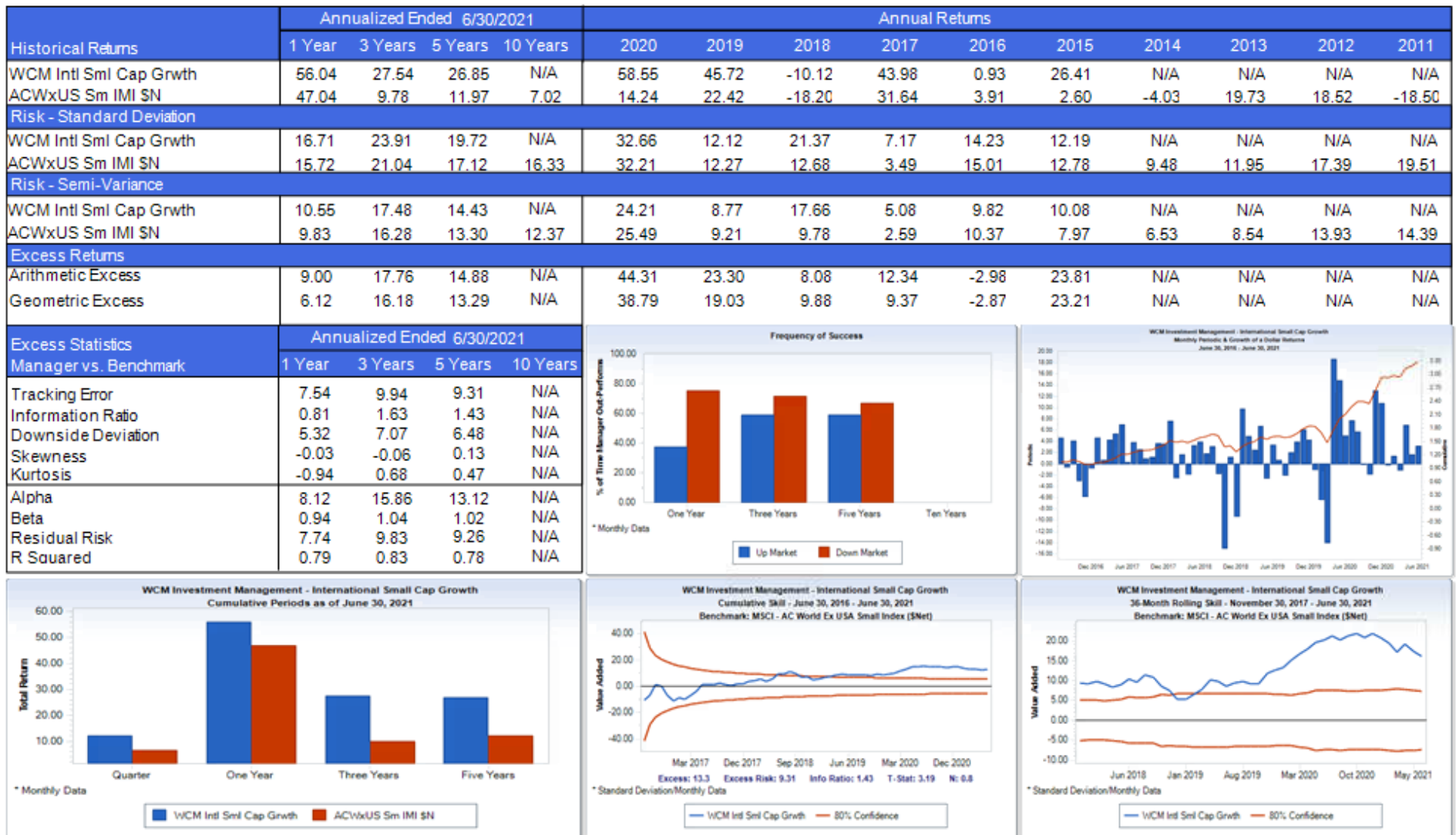
INTERNATIONAL SMALL CAP MANAGER SEARCH

Performance Review



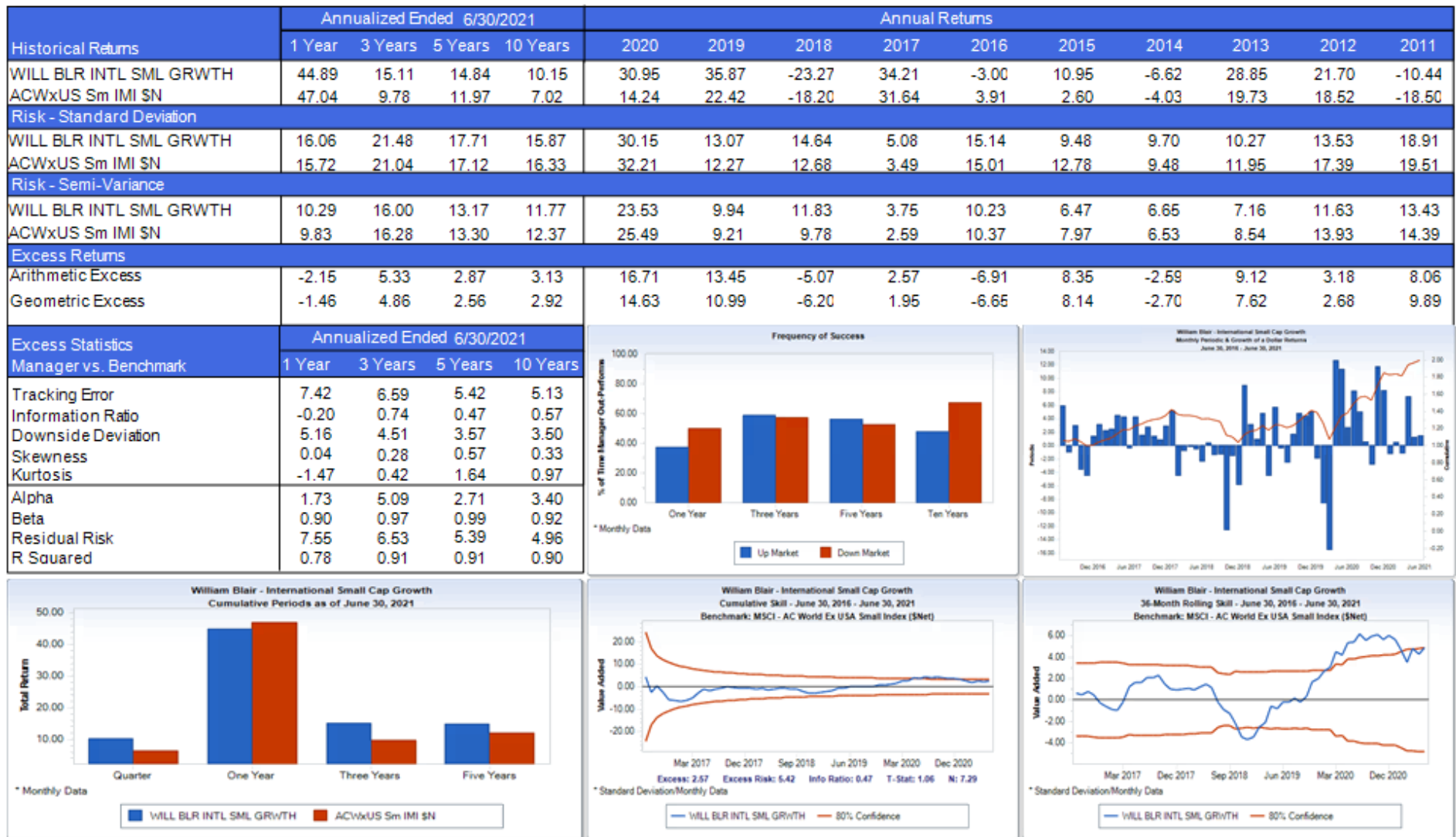
INTERNATIONAL SMALL CAP MANAGER SEARCH

Performance Review



INTERNATIONAL SMALL CAP MANAGER SEARCH

Performance Review



Manager Evaluations

Wilshire

January 27, 2021



Manager Research

American Century Investment Management, Inc.

Non-U.S. Small Cap

Rating Decile	Weight
3rd	100%

Summary

American Century's Non-U.S. Small Cap ex-EM strategy is based on fundamental, bottom-up investing to target quality growth companies experiencing a sustainable earnings growth. The approach focuses on identifying inflection points in a company's earnings profile rather than emphasizing its absolute level of growth for stock selection. The strategy is led by seasoned investors Trevor Gurwich, Federico Laffan, and Pratik Patel who are supported by a team of eight analysts. This process results in a diversified growth portfolio consisting of approximately 100-135 names with an intended alpha target of 3-4% amid a tracking error range of 6-8% relative to the MSCI EAFE Small Cap Index. The portfolio is expected to exhibit high turnover of between 100-150% per year as the manager is nimble in re-orienting the portfolio in favor of areas experiencing a sustainable change in earnings growth.

In early 2019, the firm rolled up the Non-US Small-Mid strategy into this strategy after a review of their product suites. The Small-Mid strategy no longer exists, but the same process and philosophy are used in managing this Non-US Small Cap strategy.

	Rating Decile	Weight
I. Organization	3rd	20%
<i>Firm</i>	3rd	50%
<i>Team</i>	3rd	50%

American Century Investment Management, Inc. (ACIM) was founded in 1958 in Kansas City, MO, and originally operated under the name Twentieth Century Investors. The original founder, James Stowers, Jr., unfortunately passed away in 1Q14 and his family along with the Stowers Institute of Research (focused on cancer and gene-based diseases research), maintains a 44% equity stake and 70% of the voting rights. The firm pays out more than 40% of its dividends to the Stowers Institute. The next largest owner is Nomura Holdings Inc., with 40% economic interest and 10% of the voting stock. This stake was previously owned by CIBC, a leading Canadian financial institution, which had originally purchased its stake from JPM in August 2011. However, CIBC sold its stake to Nomura in 4Q15 for \$1B after unsuccessful attempts to acquire more ownership. The transaction closed in May 2016. Employees hold the remaining percentages.

Based in the firm's New York office, the Non-U.S. Small Cap team is led by portfolio managers Trevor Gurwich, Federico Laffan, and Pratik Patel. All three individuals are experienced investors on the team and in the asset class, and are supported by eight dedicated non-U.S. small analysts who have coverage divided by region. The team is also able to leverage the insights of the roughly 20 other investors in the New York office who manage the firm's Global Growth, Non-U.S. Growth (large cap), and Emerging Markets strategies under the same process. This strategy and the others mentioned are all under the oversight of Keith Creveling, CIO of Global & Non-U.S. Equity and lead PM of Global Growth.

From 2014 until April 2018, the strategy was co-managed by lead/Senior PM Brian Brady and Mr. Patel, as PM. However, Mr. Brady who had been with the firm since 1994 was unexpectedly asked to leave the firm after it performed a review of its investment team. A previously existing Non-US SMID strategy (co-managed by Messrs. Brady and Patel) was rolled up into the Non-US Small Cap strategy and it was at this time that the strategy changed to a three PM structure, with Messrs. Gurwich and Laffan joining Mr. Patel as named PMs. The team has seen muted turnover at the analyst level in recent years, with the most recent departure occurring in March 2019 and the replacement joining at the end of the year. The turnover has hampered the team rating, but the team is well resourced and led by an experienced PM team that has added value over the long term, resulting in an above-average rating.

Manager Research

American Century Investment Management, Inc.

Non-U.S. Small Cap

	Rating Decile	Weight
II. Information	3rd	20%
<p>The team follows a fundamental, bottom-up approach to information gathering with small caps defined as the smallest 15% of companies per country. The team is looking for companies with accelerating earnings trends, revenue growth, and sufficient liquidity. With these companies, the team employs in-depth fundamental research, which incorporates financial statement analysis and meetings with management. American Century's global and non-U.S. teams, combined, conduct approximately 2,000 management visits annually. The teams will also meet with competitors, suppliers, and customers to provide comparative insights with industries. Roughly 85% of research is generated internally by the team's analysts located in New York. The remainder of the research is complemented by third-party research from bulge bracket firms and data sources such as Bloomberg. The team's information gathering effort is well resourced in the Non-U.S. Small Cap space, resulting in an above-average rating.</p>		
III. Forecasting	2nd	20%
<p>The Non-U.S. Small Cap ex-EM strategy uses a traditional growth process intended to identify companies with sustainable acceleration in revenues and earnings. As such, the process begins with a proprietary initial screen designed to identify acceleration within companies in the bottom 15% market capitalization by country. The team builds out earnings models for stocks deemed to have sustainable growth potential, with analyst recommendations based on four attributes: inflection, sustainability (12-18 month time horizon), gap (in earnings estimates vs. market expectation), and valuation. Ultimately, the team arrives at a portfolio list of between 100-135 stocks and each analyst maintains a follow list of around 50-75 companies. Additionally, there are around 50 names that are debated continuously for inclusion, though this number fluctuates as the opportunity set changes.</p> <p>The team's forecasting approach exhibits consistency and repeatability, especially in a market segment that is relatively inefficient and allows for value to be added from security selection. The portfolio typically exhibits a larger-cap bias relative to the MSCI EAFE Small Cap Index and a universe analysis shows top performance over longer time periods. Forecasting receives an above average rating.</p>		
IV. Portfolio Construction	3rd	20%
<p>The portfolio is constructed from the bottom-up to hold approximately 100-135 securities. Weightings of individual securities in the portfolio are as a result of conviction, with maximum positions constrained to an active weight of +3% over the benchmark. Additionally, regional (excluding EM) and sector exposures are constrained to +/-10% over the benchmark weight. Tracking error is expected to range between 6-8% and out-of-benchmark names typically make up roughly 20% of the portfolio. The team employs FactSet and the BARRA GEM-2 model for risk analysis and attribution. Sell decisions are made by the portfolio managers and primarily driven by a change in investment thesis with risk considerations playing a secondary role.</p> <p>Overall, the portfolio construction process is fairly subjective, with the final decision up to the portfolio managers. By way of the process, the portfolio exhibits a growth orientation and has traditionally exhibited a lower weighted average market cap than peers. Portfolio construction receives an above-average rating.</p>		

Manager Research

American Century Investment Management, Inc.

Non-U.S. Small Cap

Rating Decile	Weight
3rd	10%

V. Implementation

American Century's international trading desk and four international traders are based in the firm's New York office. The trading team is led by Chris Spurlock and, relative to peers, is very experienced with each trader possessing over 20 years of experience. This team is not dedicated to the Non-U.S. Small Cap strategy, but instead is responsible for trading each of the strategies managed out of the New York office.

The firm has an integrated trading platform, giving it the ability to measure best execution and trading efficiency on both a trade-by-trade basis and from a holistic standpoint. The firm uses a proprietary order management system which connects it to most brokers and alternative trading platforms via a variety of financial information exchange connections. Through its alternative trading systems and ECNs, the firm has access to numerous trading options allowing them to execute the best trades available. Trading costs are monitored and analyzed using proprietary systems and compared to analysis done by Virtu, a third-party TCA consultant. Compliance, both pre- and post-trade, is monitored and ensured by the Fidessa Sentinel system, and soft-dollar arrangements are used by the firm. Annual dollar turnover is expected to average between 100-150%, and capacity for the strategy is estimated to be \$2.5 billion by the team. The firm has adequate trading systems in place to manage a product that navigates in a less liquid market segment, resulting in an above-average rating for implementation.

Rating Decile	Weight
3rd	10%

VI. Attribution

The benchmark used for the Non-U.S. Small Cap strategy is the MSCI EAFE Small Cap Index. Relative to this benchmark, the team aims to provide 3-4% in excess returns annually over a full market cycle. The firm uses FactSet as its primary performance attribution tool, and in review of the attribution the team focuses on the contributions to performance from security, industry, and sector decisions. The team also employs the use of the BARRA GEM-2 model for risk analysis and attribution, and spends a considerable portion of time reviewing its risk budget. Attribution efforts by the team receive an above-average rating.

	Rating									
Decile	1	2	3	4	5	6	7	8	9	10
Corresponding Grade	A		B		C		D		F	

Manager Research

American Century Investment Management, Inc.

Non-U.S. Small Cap

Firm Information**American Century Investment Management, Inc.**

4500 Main Street

Kansas City, MO-64111

USA

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www.wilshire.com



Manager Research

Axiom Investors

Axiom International Small Cap Equity Strategy

Summary

Rating Decile	Weight
1st	100%

Axiom's International Small Cap Equity strategy offers an attractive growth-oriented approach to investing in ex-U.S. small cap markets. The strategy is managed by lead portfolio manager Matt Franco and co-portfolio manager Yogesh Borkar, who are supported on the strategy by the firm's 15-person equity analyst and research associate pool. Mr. Franco has been with the firm since inception in 1998 and Mr. Borkar most recently served as an associate portfolio manager on similar products at Pyramis (Fidelity) before joining Axiom in 2013. Both PMs are owners of the firm and average nearly 25 years of investment experience in the asset class.

The investment process, used on all strategies at the firm, focuses on identifying key business drivers for each company. Since these drivers can vary from stock to stock, the team collects volumes of pointed data and spends much of its time on this phase of the process. The eventual application of the data is not systematic in nature, but rather is based on bottom-up fundamentals with the goal of identifying what specifically will drive each business over the next 12-18 months. The resulting portfolio will hold between 60 and 100 stocks that are conviction-weighted based on a rating matrix used in the process. The goal of the portfolio is to add 300 bps over the MSCI ACWI ex-U.S. Small Cap Index over a full market cycle. Tracking error is not targeted in the process, and specific portfolio construction guidelines relative to the benchmark are fairly loose relative to peers. As a result, tracking error has ranged between 6-7% per year but the strategy has also shown notable downside protection in past. The team's focus on data monitoring and analysis enables quick movements in and out of securities that leads to an expected turnover of roughly 100% per year.

Despite the short track record of the strategy since inception in 2014, Wilshire has high conviction in the firm and investment process employed through our due diligence on this and other Axiom strategies. To this point, Wilshire has high conviction opinions of several other strategies managed by the firm. The International Small Cap Equity strategy is a logical extension of the process to capitalize on the vast opportunity set in ex-U.S. small cap markets. Assets in the strategy as of June 2017 are roughly \$270 million, making capacity constraints a non-issue for clients today.

	Rating Decile	Weight
I. Organization	1st	20%
<i>Firm</i>	<i>1st</i>	<i>50%</i>
<i>Team</i>	<i>1st</i>	<i>50%</i>

Established in Greenwich, CT in 1998, Axiom International Investors is an independent investment advisor specializing primarily in global, international, and emerging markets equity strategies. The firm also offers several long-short investment strategies as well as a long-only US Small Cap Equity strategy. Firm ownership is held in its entirety by current employees, with the largest shareholder being founder and CIO Andrew Jacobson. The remaining ownership stake is distributed across approximately 20 of the firm's employees, with intentions to continue broadening employee equity participation. Employee compensation is a function of base salary, semi-annual bonus, profit-sharing plan, and equity ownership. All Axiom strategies are uniformly managed by the same process with \$14.6 billion in firm-wide assets as of June 2020.

The International Small Cap strategy is led by lead portfolio manager Matt Franco and co-portfolio manager Yogesh Borkar. Both PMs are owners of the firm and average nearly 25 years of experience. Mr. Franco was one of the founding members of the firm in 1998 and launched this strategy in 2014. He has also led the firm's International Micro Cap Fund (long/short) and Global Micro Cap Fund (long/short) since inceptions in 2004 and 2008, respectively, as well as co-managed the U.S. Equity Small Cap strategy since inception in 2007. Conversely, Mr. Borkar joined the firm in 2013 after most recently serving as associate PM for eight years at Pyramis (Fidelity) and devotes 100% of his time to this strategy. The two portfolio managers have ultimate decision-making authority and act as senior generalist researchers who are expected to generate roughly 50% of the new investment ideas for the strategy.

The PMs are supported by the firm's experienced team of seven global sector analysts and six junior, generalist research associates. The analysts are tasked with contributing new ideas within their sectors for all strategies firm-wide. While some analyst turnover has occurred in the past, the majority of the turnover took place in 2012-2013 when the firm purposely restructured the team to create the career-oriented global sector analyst roles in place today. Going forward, the stability of these seven global sector analysts is very important due to their contributions across all strategies. However, any potential turnover at the research associate level is less meaningful as these individuals typically do not possess prior investment experience and do not have specific sector coverage. Positively, the firm continues to attract talented investors to build the team, as recently seen with the hire of experienced health care analyst Carl Brown from Royce & Associates in 2016 to be a global sector analyst on the team.

Overall, the investment team for the International Small Cap strategy is viewed very highly. The PMs have spent the majority of their careers focused on the asset class, and they are supported by a team of veteran sector analysts. It's worth noting that the PMs represent some key-person risk, but their ownership stakes in the firm, among other reasons, should act as powerful retention tools. The organization receives a high rating.

	Rating Decile	Weight
II. Information	1st	20%

Axiom employs a growth-oriented, fundamental, bottom-up approach across its investment strategies. The application of the process is reliant on the collection and parsing of data that contributes to what Axiom calls "key business drivers." Key business drivers are defined as the company-specific, industry, macro, and political factors expected to have a substantial impact on future financial performance. External data represents a portion of the information processed by the analysts, with sell-side research playing an important role. Sell-side research can be used to generate ideas and is used to establish benchmarks against which the analysts can measure their own expectations in determining whether stocks are attractive.

Idea generation is sourced, in roughly equal parts, from meetings with company management, sell-side research, and internal data collection. New ideas developed internally often come through Axware, the firm's proprietary SQL database. Axware tracks, stores, and displays data points relevant to portfolio and universe securities, and much of this Axware data is manually added by team members. For example, a team member may add information, such as strong new product sales, that was alerted to them through brokerage research, meetings with company management, suppliers, vendors, or industry experts. Analysts, portfolio managers, and traders add 50-100 data points per week that they must also rank by relevance upon submission. As data points are added, the ranking of the relevant stock must be verified to ensure a full and proper reflection of the available information. In doing so, the database can be used to observe trends in data and its effects on the related stocks.

The goal of the information gathering effort is to use the vast amount of data available to identify companies showing positive growth that is not yet reflected in expectations or valuations. Through the use of the Axware system, the incorporation of this systematically gathered data with the fundamental insights from the analysts is viewed very positively relative to peers. For this reason, the strategy receives a high rating for information gathering.

	Rating									
Decile	1	2	3	4	5	6	7	8	9	10
Corresponding Grade	A		B		C		D		F	

Manager Research

Axiom Investors

Axiom International Small Cap Equity Strategy

	Rating Decile	Weight
III. Forecasting	1st	20%

The process begins with an investable universe of non-U.S. equities with market caps typically between \$100 million and \$3 billion with coverage by at least one brokerage. The strategy uses the MSCI AWC ex-U.S. Small Cap Index for performance purposes, but roughly 50% of the investment universe lies outside of this index. The goal of the process is to identify the dozen or so key business drivers critical to each company for analysis; however, these drivers are not standardized and may be company-specific. The present condition of the drivers is then compared to consensus expectations in order to determine growth prospects.

The process targets stocks that have key drivers tracking ahead of expectations and attractive valuations relative to historical levels and peers. Quality is a significant component as well; the portfolio managers prefer companies with histories of strong corporate governance and a high level of managerial control. Inputs into the key driver analysis are comprehensive of a company's operating environment, including not only company-specific and industry factors, but also exchange rate, inflation, and other impactful information.

The key business drivers are analyzed in order to assign an alphanumeric rating to securities. The first part, a letter on a scale of A through E, assesses a firm's industry presence from Established (A) to Emerging (E). Factors involved in this component of the ratings include profitability, country rating, balance sheet, market cap, and competitive position. The second part, a number from -3 to +3, assesses the dynamism of a firm's aggregate business drivers from most dynamic (+3) to most disappointing (-3). Dynamism captures a company's ability to outperform expectations and is determined through factors such as leading indicators, earnings revisions, valuation, and earnings growth. The ideal portfolio holding is rated A3, though these are incredibly rare. More often than not, the portfolio invests in C2 and D2 rated stocks. In recommending stocks, analysts will create a summary model demonstrating a firm's key business drivers relative to consensus expectations and a ranking worksheet that compares the stock to alternative portfolio holdings. Stocks are evaluated on a 12-18 month time horizon.

While the visible track record only dates back to 2014, the robust process is expected to be driven by stock selection over time. Forecasting rates highly relative to peers.

	Rating Decile	Weight
IV. Portfolio Construction	3rd	20%

The International Small Cap portfolio is comprised of 60-100 conviction-weighted securities. Using the ranking grid described in the process so as to reflect conviction, positions are sized based on the alphanumeric rating assigned to each company. This results in positions that are generally less than 3%, with a maximum limit at 5%. New positions are typically initiated at less than 1% and are built methodically by adding 10-15 bps every two to three days. Sector and industry allocations are constrained to 40%, while individual countries and emerging markets (in aggregate) are constrained to 30%. The exceptions to this are Japan and the U.K., which are allowed up to 45% of the portfolio. All holdings must be covered by at least one sell-side analyst and have an average daily trading value of roughly \$2 million, both of which help to keep the historical non-benchmark exposure low at roughly 20%. Currency exposure is explicitly considered in the research process and, as such, is not hedged at the portfolio level.

As a result of the team's emphasis on constant data collection and monitoring, risk is keenly monitored in the portfolio by way of changing company fundamentals and through the use of Bloomberg Alpha. However, Bloomberg Alpha is not a driver in the portfolio construction process, but instead is used for monitoring of VaR, tracking error, performing stress testing, and the like. The strategy does not specify a tracking error target and the portfolio seeks to add 300 bps over the MSCI ACWI ex-U.S. Small Cap Index over a full market cycle.

Overall, the portfolio is constructed in a benchmark-agnostic approach to reflect the best ideas of the team from the bottom-up. This process affords the team wider portfolio construction guidelines compared to most peers. In addition, while risk is closely managed from a stock fundamentals perspective, specific tools and risk management processes are slightly lacking compared to similar peers. Portfolio construction efforts by the team still rate above-average, but our rating is mitigated for these reasons.

Manager Research

Axiom Investors

Axiom International Small Cap Equity Strategy

	Rating Decile	Weight
V. Implementation	1st	10%

Trading is performed by a 24-hour desk of four experienced traders at the firm. This trading team is led by head trader Melinda Luc, and individual trading responsibilities on the desk are arranged by region. Relative to peers, this team is very experienced and tenured, averaging 20 years of trading experience and 13 years of tenure at the firm. In February 2017, the firm reduced the trading staff from five to four individuals when it let go of trader Sal LoCascio. Mr. LoCascio shared responsibility for trading Asia and Japan with trader Michael DeCarlo. This reduction was due to new technology added by the firm that increased automation on the desk, making the dual-coverage of Messrs. LoCascio and DeCarlo unnecessary. As a result, the firm decided to retain Mr. DeCarlo who possesses over 25 years of experience, compared to the 10 years of experience of Mr. LoCascio.

Traders manage order flow and work trades through the Eze Castle Traders Console. Traders Console enables a fully automated trading process complete with internal pre- and post-trade compliance capabilities. Trades are typically executed with traditional brokers, in dark pools, or in crossing networks such as Liquidnet. While Axiom does not contract with any third parties to monitor trade efficiency, Ms. Luc is charged with doing so internally by examining daily trade blotters and comparing execution prices versus VWAP. Soft dollar transactions are used and typically represent a small percentage of all commissions. Relative to peers, turnover in the strategy is higher at roughly 100% per year. However, this is not a concern for Wilshire as it is a result of the team's process of continually adding/trimming names to reflect conviction. Capacity for the strategy is estimated to be around \$2 billion, which at assets of roughly \$490 million as of September 2018, is not a concern for clients today.

The implementation efforts at the firm are deep and experienced relative to international small cap peers. Wilshire views this favorably as trading, by way of the higher turnover investment approach, is integral to the process used across the firm. While some international small cap peers possess dedicated traders for their strategy, Axiom's focus on improving the trading efforts as a whole and the experience of the team makes up for this fact. Furthermore, three of the four traders are owners of the firm, which should provide stability to this team going forward. Implementation receives a high rating.

	Rating Decile	Weight
VI. Attribution	1st	10%

Attribution analysis is performed using Bloomberg and FactSet. Typically run on a monthly and quarterly basis, the analysis is primarily used to identify any key market changes the team may have missed that could lead to changes on the margin. Beyond traditional attribution analysis, formal investment meetings are held twice daily: once for the product and once for the firm-wide team. In addition, the team has a formal weekly portfolio review where they reassess portfolio positioning and analyze potential holdings. Lastly, the team examines its stock ratings by reviewing up-down revisions on a quarterly basis to assess the accuracy and quality of its analytical work.

Attribution is also used for individual performance evaluation on a bi-annual basis. While the majority of an individual's bonus is tied to firm-wide performance, roughly 25% of the sector analysts' bonuses are tied to the performance of their ideas for alignment with clients.

Attribution efforts at the firm receive a high rating. Individuals on the team are monitored regularly and rewarded for their contributions, and the attribution itself is discussed by the team to identify any shortcomings of the process or decisions made in order to avoid similar mistakes in the future.

	Rating									
Decile	1	2	3	4	5	6	7	8	9	10
Corresponding Grade	A		B		C		D		F	

Manager Research

Axiom Investors

Axiom International Small Cap Equity Strategy

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Manager Research

Kayne Anderson Rudnick Investment Mgmt, LLC

International Small Cap

Summary

The KAR International Small Cap strategy was inception beginning in 2012 and takes a concentrated, benchmark-agnostic approach to investing in the space with a focus on high quality stocks with strong business models. The final portfolio typically holds between 40 - 50 stocks and tracking error has fallen between 5 - 7% historically. A team of four individuals is tasked with managing the strategy and takes a generalist approach to coverage. Prior to any valuation work, the team assesses the quality of the business from both a financial and competitive perspective, favoring companies in predictable industries that are experiencing tailwinds. The team takes a mosaic approach to valuation and uses relative and absolute metrics. Consensus is generally reached when adding a name to the portfolio, but Craig Thrasher holds decision making authority in the rare instances where the team does not reach consensus. The strategy tends to hold companies for at least three years and turnover is consistently below the peer average, with 10 - 15 new ideas being added to the portfolio on an annual basis. Overall, the strategy is viewed favorably within the international small cap space.

Rating Decile	Weight
3rd	100%

I. Organization

	Rating Decile	Weight
<i>Firm</i>	4th	20%
<i>Team</i>	4th	50%

Kayne Anderson Rudnick Investment Management (KAR) was founded in 1984 by Richard Kayne and John Anderson. The traditional investment-management business began in 1989 when Allan Rudnick joined the firm. In 2000, the name of the firm officially changed from Kayne Anderson Investment Management to KAR. Today the firm includes both investment management and wealth management businesses. The firm offers a variety of investment strategies primarily focused on small & mid-cap solutions across styles and geographies. KAR has also experienced notable asset growth with total firm AUM increasing from \$9B at the end of 2014 to ~\$56B as of 1Q21. Firm assets are broadly diversified across institutional (approximately 42%), retail/model portfolio (approximately 40%), and high net worth (approximately 18%) clients.

KAR is a wholly owned subsidiary of Virtus Investment Partners (NASDAQ: VRTS). In 2002, the firm sold a majority ownership to VRTS (aka Phoenix Investment Partners, Ltd) with the balance being sold to VRTS in 2005. VRTS completed its spin-off from The Phoenix Companies Inc. at the end of 2008, and it is currently an independent, publicly traded asset management firm. It should be noted that KAR operates under a revenue-sharing agreement with the parent company and largely functions as an autonomous investment boutique with control over its own operating expenses, opening/closing strategies, and personnel decisions.

Investment professionals are compensated with competitive base salaries and bonus potential. The overall bonus pool for the firm is determined by the profitability of KAR with bonuses for portfolio managers directly tied to 1-, 3-, and 5-year performance of managed strategies relative to both the benchmark and peer group. Additionally, 15% of the bonus for portfolio managers is paid in VRTS stock which vests over a 3-year period. However, starting in 2018, portfolio managers will have the opportunity to take VRTS stock or invest this portion of the bonus in their own investment strategies. While there have been some concerns in the past regarding KAR's autonomy and retail-oriented client base, the firm has made positive strides over the past 5 years to grow the firm's institutional business and continues to demonstrate autonomous decision-making abilities. Overall the firm is noted for its personnel stability, performance-driven investment culture, and disciplined asset growth.

A team of four individuals is responsible for the International Small Cap (ISC) strategy. The portfolio is co-managed by Craig Thrasher and Hyung Kim, who each have over 15 years of experience and have been with the firm for twelve and three years, respectively. Mr. Thrasher began running the portfolio in 2012 and was an analyst at the time. Craig Stone, a PM on KAR's US portfolios, co-ran the portfolio with Mr. Thrasher until 2017, though Mr. Thrasher was essentially the lead PM during this time. In 2017, Mr. Stone stepped down from his ISC portfolio duties to focus his attention on the firm's US portfolios. Mr. Kim was added as a Co-PM to the strategy beginning in 2019. The two PMs manage other strategies at the firm and, when called for, Mr. Thrasher remains the lead in decision-making for the ISC portfolio. It is worth noting that Mr. Kim takes the lead for the firm's EM Small Cap strategy and the Co-PM structure holds with the EM Small Cap strategy as well. The PMs are supported by two analysts in Ekaterina Advena and David Forward, who have been with the firm for five and two years, respectively. Portfolio managers and analysts have research responsibilities and the team takes a generalist approach to dividing coverage. The team experienced one departure in 2016 and this individual was replaced by Mr. Kim in 2017. The team is relatively small but focuses on a narrow subset of the ISC universe, which limits concerns around the smaller team size. The team rates slightly above average for these reasons.

Manager Research

Kayne Anderson Rudnick Investment Mgmt, LLC

International Small Cap

	Rating Decile	Weight
II. Information	3rd	20%
<p>The team applies a fundamental, bottom-up approach to investing that is grounded in independent research on specific companies. The research philosophy is founded on the principle that high-quality companies will outperform lower quality companies over a complete market cycle. On average, each PM covers approximately 10 - 15 companies analysts cover about 20 - 25 names. Idea generation is typically generated by the analysts who will then work closely with the PMs for further vetting; however, PMs can also push ideas to the analysts for further assessment. The majority of the research is performed internally by the investment team. To gather independent information, the team will meet with company management, attend major company sponsored analyst meetings, attend quarterly research calls, and conduct on-site meetings with competitors. However, management meetings are not required prior to investing. The team also will use external research sources such as Wall Street research, company annual reports, and SEC filings to add additional insight into the company evaluation. In addition, KAR leverages Bloomberg, FactSet, and Reuters for information sources. Overall, the firm boasts a strong research culture and a systematic approach to investing. Given the concentrated, low turnover investment approach, the investment team can achieve considerable depth when researching investment candidates. Information gathering rates highly.</p>		
III. Forecasting	1st	20%
<p>The team uses FactSet and Bloomberg in screening for quality companies in the universe, but most of the investment ideas are sourced from company meetings, conferences, and the other aspects of the team's bottom-up due diligence. The process begins with an assessment of the business model sustainability and overall quality of the company, which is driven by the management team, company culture, balance sheet strength, and tailwinds within the stock's industry. The process prefers to invest in industries that exhibit consistency, where industry leaders tend to remain the leaders. The valuation component of the process incorporates a variety of metrics on both an absolute and industry-relative basis, with a preference for superior capital allocation and free cash flow generation. The result of this is a set of target prices and a formal research report. The team updates research on holdings on a quarterly basis and will formally review a position upon a negative event. Sells may be triggered by a significant premium to intrinsic value, a decline of 20% or more, or the emergence of a better investment idea.</p> <p>The strategy's performance ranks well among ISC peers. The focus on quality companies has protected from drawdowns on both a calendar-year and trailing period basis. The core approach has historically exhibited lower P/E and debt levels than the benchmark with a higher ROE and weighted average market cap. Performance is designed to outperform in most environments and may struggle in more macro-driven markets or when international inflation is high and foreign currencies are depreciating. Forecasting rates highly relative peers.</p>		
IV. Portfolio Construction	3rd	20%
<p>The strategy is benchmarked against the MSCI ACWI ex-US Small Cap Index and the final portfolio may hold between 30 - 60 stocks. Tracking error has historically fallen between 5 - 7% and the strategy has outperformed the benchmark meaningfully since inception. Positions may be initiated between 1 - 5% and may appreciate up to 10%, at which point they are trimmed. Sizing is ultimately driven by a stock's upside potential and the overall quality assessment with the final decision resting with the PMs, though Mr. Thrasher holds veto power in the rare instances that consensus is not reached. The portfolio is benchmark-agnostic, but the team seeks to be diversified across geographies and sectors, and the final construction will be always be driven by bottom-up analysis. The strategy is typically a longer-term holder of companies and averages a holding period between 3 - 5 years, though some names have been held as long as nine years. The EM exposure has ranged between 15 - 30% and the holdings are limited to a market cap of \$10 billion.</p> <p>The team uses MSCI Barra risk models for risk management on monitoring the portfolio's exposures overall; however, risk is primarily managed throughout the strategy's fundamental process that focuses on high quality companies with durable business models. The PMs are responsible for liquidity monitoring and regularly work with the trading to determine the appropriate method and timeframe for executing a trade.</p> <p>Sector weights may deviate significantly from the benchmark due to the index-agnostic approach, and the strategy has historically favored sectors like IT, industrials, and communication services. The utility, materials, and real estate sectors have been persistent underweights. As a conviction-weighted portfolio, the portfolio tends to have a 30 - 40% concentration in the top ten names with a tail of holdings with smaller weights. Historically, the standard deviation of the portfolio has been in-line with benchmark while providing Sharpe ratios and information ratios above peer averages. Portfolio construction receives an above average rating.</p>		

Manager Research

Kayne Anderson Rudnick Investment Mgmt, LLC

International Small Cap

Rating Decile	Weight
4th	10%

V. Implementation

KAR employs four generalist equity traders that are responsible for implementing all trades for each of the firm's equity portfolios. The team utilizes Fiserv APL STP via FIX for individual and wrap accounts as well as proprietary wrap trading platforms for some sponsors and Longview trading system for mutual funds and institutional investors. Trades are initiated by the portfolio manager and communicated to the traders through the Access database. KAR utilizes both human and electronic channels to maximize reach while attempting to minimize impact on the market. For transaction cost analysis, the firm has established an internal "Best Execution Committee" that evaluates and documents the firm's best execution practices and monitors broker quality and performance. Global Trading Analytics is also utilized to provide an external TCA report. Annual turnover for the strategy is below average typically falling between 25 - 5 %. The firm utilizes soft dollars with approximately one-third of trading volume being conducted via soft dollar relationships. The strategy remains open as assets have reached \$2.2 billion and capacity is estimated to be \$2 - billion. Capacity management should be closely monitored given the overlap in holdings across the firm's global small cap and non-US SMID cap strategies.

Rating Decile	Weight
4th	10%

VI. Attribution

KAR employs FactSet analytics software to monitor the relative performance and risk of each portfolio in relation to the benchmark. Attribution is available on a daily, weekly, monthly, and quarterly basis by sector as well as by various characteristics. During weekly research meetings, the team formally discusses and evaluates prior decisions that were unsuccessful and determines ways to avoid similar occurrences in the future.

Decile	Rating									
	1	2	3	4	5	6	7	8	9	10
Corresponding Grade	A		B		C		D		F	

Manager Research

Kayne Anderson Rudnick Investment Mgmt, LLC

International Small Cap

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October 20, 2020



Manager Research

WCM Investment Management

International Small Cap Growth

Summary

WCM's International Small Cap Growth strategy uses a process consistent across the firm that ultimately builds a portfolio of companies with strong economic moats, positive work cultures, and sector tailwinds. The process starts by reducing the vast non-US small cap universe down to roughly 4500 names through a market cap and financial strength screen, eliminating companies perceived as unpredictably valued. The subsequent screen introduces rising margins and ROIC, low debt levels, and consistent, sustainable growth. With this universe of roughly 300 names, analysts are given the freedom to pick what they perceive as strong candidates and produce a DCF model, which is the primary valuation method, and a write-up that is shared with the broader team. With the team's feedback, analysts can complete the research on a given stock, where it may then be placed on either the Focus List or the Short List. The final portfolio is constructed by the Investment Strategy Group of five PMs with weighting driven by a stock's relative value and moat trajectory. In the case of tie between two attractive investment options, the company's culture is often the tiebreaker. Between 50 - 70 names are held at any given time and positions are typically initiated at 2%. Capacity for the strategy is estimated to be \$2 billion and AUM as of June 2020 was around \$600MM.

Rating Decile	Weight
1st	100%

I. Organization

*Firm**Team*

Rating Decile	Weight
1st	20%
1st	50%
1st	50%

WCM Investment Management is an equity long-only investment management firm located in Laguna Beach, CA that was founded in 1976. In 1998, the firm's leadership completed an employee-led buyout, purchasing 100% of the firm's equity from its founder. More recently, the firm decided to sell a 24.9% equity stake to French-based Natixis Investment Management in July 2018 which stands to provide the firm with distribution in overseas markets. The transaction and strategic partnership is not intended to disrupt the autonomy of the firm, rather it should provide the manager with access to a broader client opportunity set. The Natixis equity stake will hold at 24.9% with no remaining capacity for the passive owner to take on a longer stake. WCM will thus remain majority employee owned by its two key principals: Paul Black and Kurt Winrich. Other key owners of the firm continue to include James Owens, Sloan Payne, David Brewer, Michael Trigg, Peter Hunkel and Sanjay Ayer. Collectively, these employees represent the majority of the firm's ownership with the remainder held by other employees. The firm's compensation package includes a base salary, bonuses tied to overall company success and individual performance. Overall, we view this organization in high regards due to its attractive ownership structure, personnel compensation package, the experience level of its senior investment personnel, and the firm's stability since the employee-led buyout.

The Investment Strategy Group (ISG) consists of five senior investment professionals (Pete Hunkel, Mike Trigg, Sanjay Ayer, Greg Ise, Mike Tian) and is ultimately responsible for managing the firm's strategies. The International Small Cap strategy was inceptioned in 2014 by Sanjay Ayer and Greg Ise, who are the lead PMs for this portfolio and require unanimity when making and buy and sell decisions. Ten additional Business Analysts (averaging over ten years of experience), a Business Culture Analyst, and a Special Projects Analyst support the PMs/Analysts in conducting in-depth fundamental research. Greg Ise and Mike Tian were added to the ISG in 1Q18. The investment team, which also supports WCM's Focused Growth International, Quality Global Growth, and Emerging Market strategies, operates in a collegial small team setting and has been very stable over time. The team rates highly given its stability, breadth, and experience.

Manager Research

WCM Investment Management

International Small Cap Growth

	Rating Decile	Weight
II. Information	1st	20%
<p>Analysts are given freedom to pursue ideas that they find interesting. Screens are used to help narrow the universe, including such things as a market capitalization between \$400MM - \$7B, high return on invested capital, and predictable growth. The universe is screened down in increments to 4500, then 300, and the team actively follows roughly 150 of these. While there is a screening process in place, the freedom afforded to the analyst team results in ideas emerging from personal experiences, expert/proprietary networks, customers/suppliers/competitors, and thematic research.</p> <p>Since the firm's philosophy is rooted in identifying tailwinds (thematic strength), strong corporate cultures, and expanding economic moats (competitive advantages), a lot of the team's research bandwidth is spent on understanding these dynamics and can include more general or macro research, such as demographic/cultural/behavioral trends or industry shift analysis. They then strive to understand how a company benefits from such trends and can furthermore insulate itself through things such as economies of scale, intellectual property advantages, and cost competitiveness. The team emphasizes internally generated research and the approach is fundamentally driven.</p> <p>Wilshire believes the research process to be superlative in nature, as it extends beyond performing extensive research on company fundamentals. Rather, the team rigorously endeavors for early identification of shifts in industry/cultural/behavioral dynamics that may not be fully understood by the market. The strategy's universe is relatively focused which enables the team to successfully pry into these areas of research and analysis. Overall, WCM's focus on the cultural and governance structures of companies is particularly unique, resulting in a strong information gathering score.</p>		
III. Forecasting	1st	20%
<p>The primary valuation method for the strategy is a DCF model, though in practice the team uses several absolute and relative valuation methods to build a holistic understanding of a stock's market value. The process emphasizes economic moats, culture, and tailwinds as important qualities for a company to have in order to make it into the portfolio. Analysts are given the freedom to find new ideas and once an analyst has developed an investment thesis on a name, the write-up is sent to the members of the broader team who are given one week to respond with questions and areas where additional research is necessary. When an idea is fully vetted, it is placed on either the Short List or Focus List. The reasons for a name being added to the shortlist are due to valuation or a lack of space in the portfolio. The reasons for a name being added to the Focus List are more geared toward the underlying investment thesis, whether it's the firm's culture, it's pricing dynamics, or some other qualitative aspect. In the event of a "tie" between two equally attractive names, the company culture is often the tiebreaker, especially if the tailwinds and economic moat are strong.</p> <p>The strategy's performance in the International Small Cap Growth universe is top quartile across 1-, 3-, and 5-year trailing periods. The strategy should benefit from quality and growth-driven markets and may struggle during cyclical rallies. WCM as a firm is materially focused on a given company's culture and it can be argued that culture plays a more prominent role in the small cap space relative to the large cap space. Given WCM's firm-wide focus on culture, the portfolio's performance, and the repeatable process employed, forecasting rates very highly relative to Non-US Small Cap peers.</p>		
IV. Portfolio Construction	2nd	20%
<p>The portfolio is benchmarked to the MSCI ACWI ex-US Small Cap Index and targets a long-term CAGR of 3% or more above the benchmark and 2/3 of downside capture. The portfolio holds between 50 - 70 names and the top 10 holdings generally comprise 20% of the portfolio. The following requirements/constraints are imposed: at least 15 global industries must be represented, max industry weight of 25%, max sector weight of 35%, max position weight around 5%, max emerging markets weight of 50%. It should be noted that historical EM exposure has ranged between 15 - 30%. Positions are typically initiated at 2%, but sizing is ultimately determined by a two-factor model, which includes moat trajectory and relative valuation. Ultimately, the largest weighted names should have the best combination of the two, with the goal of diversifying the portfolio's factor exposures. Risk is primarily identified as permanent capital loss, or downside capture. As such, the team seeks to mitigate this risk through portfolio construction and buying high quality stocks. The team monitors standard industry risk measures and uses FactSet and Axioma for analytics. Occasionally, the team uses Bloomberg's analytics platform, which is mostly used for scenario analysis. The team uses a systematic and differentiated approach to building the final portfolio, and the downside capture since inception is around 60%. Portfolio construction receives a high rating for these reasons.</p>		

Manager Research

WCM Investment Management

International Small Cap Growth

Rating Decile	Weight
3rd	10%

V. Implementation

WCM employs one head trader, Ryan Bracci (19 years of experience), who is supported by Ming Tran (over 25 years of experience) and AK Lengsfeld (over 8 years of experience). Trading is not segmented by strategy, so this structure is consistent across WCM's platform. The firm uses INDATA's portfolio management system, which has accounting, trading, and transaction cost analysis capabilities. Trades are executed based on instruction from the ISG and trader use NYFIX, Omgeo, all major ECNs, as well as crossing networks. The firm has a Best Execution Committee to monitor the quality and execution of trades. Assets as of September 2020 were around \$850MM and capacity is estimated to be \$2 billion. WCM maintains soft dollar arrangements, though the overwhelming majority of research is produced internally. Trading is not perceived to be a major competitive advantage of WCM, and relative to their other strategies, the ISCG portfolio is slightly higher in both the number of holdings and turnover. Implementation receives an above-average rating relative to peers.

Rating Decile	Weight
1st	10%

VI. Attribution

The team employs FactSet for attribution purposes and reviews the reports generated by the system at its weekly ISG meetings. The attribution analysis is mainly used to gauge the success and failures of their historical theses associated with a particular securities purchase/sale. The FactSet reports, but more importantly the discussion involving these reports, helps continually test the strength of the decision-making process. We find the team's attribution efforts to be notably strong, as they endeavor repeatedly to maintain a sound decision-making process, especially in light of the portfolio's concentrated nature.

	Rating									
Decile	1	2	3	4	5	6	7	8	9	10
Corresponding Grade	A		B		C		D		F	

Manager Research

WCM Investment Management

International Small Cap Growth

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Manager Research

William Blair

International Small Cap Growth

Summary

Rating Decile	Weight
2nd	100%

William Blair's International Small Cap Growth strategy can be summarized as a quality GARP approach to the international small cap equity space. It is managed by Simon Fennell and Andy Flynn who are supported by a team of 17 equity analysts. The investment team starts with a list of stocks that analysts prioritize based off their knowledge of the company and stocks that rank well in terms of valuation. From this list, the investment team develops the research agenda of 50-75 stocks on which the analysts will focus their research. If the analysts determine the stock should be considered for the portfolio, they will present their research to the investment team during a weekly meeting where the stock is fully vetted, and more due diligence may be required. The team is looking to invest in what they consider to be quality growth companies and look at valuation as a risk factor, seeking to avoid paying too large a premium for a consistent growth profile. The portfolio generally holds between 110-150 stocks and tracking error tends to be between 4-5%. AUM as of 9/30/2019 was \$2.6 billion and the strategy has been closed to new investors since 2011.

I. Organization

	Rating Decile	Weight
<i>Firm</i>	1st	20%
<i>Team</i>	1st	50%

William Blair & Company, LLC was founded in 1935 as a Chicago-based full service financial firm offering asset management, investment banking, and equity research amongst other functions. Asset management accounts for the majority of revenues, and the firm offers a competitive compensation plan with 100% of its equity being broadly distributed amongst over 180 active principals with a profit sharing program available to all employees. The firm is registered with the SEC as both an investment manager and broker dealer, and its broker dealer activities are regulated by FINRA. Assets under management have grown steadily over the years, primarily on the success of the firm's offerings in the international and emerging markets equity space. William Blair does offer alternatives and fixed income products, but equity products dominate the firm's overall product mix.

All professionals at William Blair have the opportunity to become a partner and there are partner-level career paths for portfolio managers and research analysts. The investment professionals who are partners of the firm have compensation consisting of a base salary, a share of the firm's profits, and a discretionary bonus. Each partner's ownership stake and bonus (if any) can vary over time, and is determined by the individual's sustained contribution to the firm's revenue, profitability, and long-term investment performance. We maintain a high opinion of the firm and its partnership culture.

In early 2016, the firm received a Wells Notice from the SEC after opening a non-public investigation with respect to the administrative fees paid by a subset of the William Blair Mutual Funds. In early 2017, the firm paid a \$4.5 million settlement to the SEC for minor payment errors (that were reimbursed to the Funds with interest) and administrative fees disclosure issues associated with the non-public investigation.

Simon Fennell and Andy Flynn are the PMs for the International Small Cap Growth (ISCG) portfolio. Mr. Fennell joined William Blair in 2011 as an analyst covering the tech, media, and telecommunications sectors. He was previously a managing director for Goldman Sachs, overseeing institutional equity research for European and international stocks. In addition to the ISCG strategy, Mr. Fennell is a Co-PM on the International Growth and International Leaders strategies. Mr. Flynn joined the firm in 2005 and covered multiple sectors globally and was previously an analyst at Northern Trust covering mid- and small-cap growth companies. Mr. Flynn is also a co-PM on the Global Leaders and Global Leaders SRI strategies. Messrs. Fennell and Flynn are partners of the firm and are both invested in the ISCG strategy. They are supported by 17 global equity analysts and four quantitative analysts. Research analysts average 13 years at William Blair and turnover at the analyst level is relatively muted. The PM and analysts teams are experienced and exhibit an affinity to the firm, evidenced by the team's tenure and low turnover. The team rates highly for these reasons.

Manager Research

William Blair

International Small Cap Growth

	Rating Decile	Weight
II. Information	1st	20%
<p>The strategy's philosophy is based on the belief that markets inefficiently distinguish between average quality companies and high quality companies, with quality growth companies being able to achieve a higher growth rate for a longer period of time than the market expects. The investable universe consists of roughly 9000 stocks and these are filtered using various metrics such as ROE, growth of earnings and revenue, consistency of growth, and financial strength. The stocks that pass this initial screen are incorporated into the "eligibility list", which also includes stocks that analysts and PMs believe warrant inclusion based on their respective company contacts and meetings. Research is prioritized by (1) how well a stock scores quantitatively in terms of fundamentals versus valuation, (2) how attractive an analyst finds a company, and (3) how attractive a PM finds a company, which produces a list of 50 75 names on average. These names are put on the weekly "to do list" where the appropriate analyst carries out their due diligence and if the analysts gives it a "buy", they conclude research with in a formal presentation to the team.</p> <p>During a weekly meeting, the team reviews the research agenda and analysts provide updates on their due diligence and priorities. During these meetings, PMs may submit names for analysts to include in their research. The firm maintains a dashboard called "Summit" that communicates trading activity, analyst views, and external data, allowing for seamless dissemination of information. Analysts seek to meet with a company prior to purchasing and spend 30 40% of their time traveling for company meetings. Third party economic research is used to inform sector and country analysis, but analysts and PMs rely on internal research for decision making. Information gathering rates highly.</p>		
III. Forecasting	2nd	20%
<p>The team starts with the eligibility list and selects stocks exhibiting strong fundamentals and attractive valuation to construct the research agenda (or to do list). The research agenda is refreshed on a weekly basis and typically includes 50 75 names in a given week. Analysts and PMs are free to add names to the agenda based on their intimate knowledge of company if it is not on the research agenda. With this to do list, analysts carry out further research as they see fit and this research ultimately decides whether or not a stock is purchased. A name can screen well quantitatively, but an analyst must be comfortable with the company's management and strategy to keep it on the research agenda. Moreover, the analyst must be comfortable with the company's ability to produce and sustain above-average growth over the long term. To conclude the research process, analysts produce a short research summary on the potential addition, which is formally vetted by the broader team. While the team is primarily interested in buying quality growth companies, this growth is evaluated against the current valuation and the team uses this approach to exclude companies from the research agenda.</p> <p>The strategy can be expected to outperform in normal market environments where fundamentals drive valuations and growth-led markets provide notable tailwinds. Performance may struggle in value-led markets or when market leadership is concentrated in a few names. Performance is largely in line with what should be expected and the strategy has outperformed in most trailing periods and calendar years, resulting in a high rating.</p>		
IV. Portfolio Construction	3rd	20%
<p>The portfolio is benchmarked against the MSCI ACWI ex-US Small Cap Index and tracking error is historically between 4 6%. The team has established weight ranges across sectors and regions and limits mid cap companies to 5% weights and small caps to 2.5%; however, these weights will be a residual of bottom-up stock selection. While the research process is heavily driven by the analyst team, Messrs. Fennell and Flynn determine individual weightings at the end of the day given the extensive team discussion. The team considers valuation when exiting a position, but the sell discipline is ultimately driven by the team's conviction in the stock's place in the portfolio, its investment thesis, and the opportunity set.</p> <p>Risk is managed within the investment process by investing in high quality companies. The team also uses quant models to evaluate company fundamentals and high valuations and uses factors from these models as an input to a custom risk model. The custom risk model combines internal inputs with factors and covariances from third-party vendors. Country and company risks are mitigated through the aforementioned bands and currency risk is incorporated in the fundamentals during the research process. The PM team is primarily responsible for risk management, but there is also a Risk Oversight Committee that assists the PMs in this effort. A systematic research team helps develop and maintain the team's qualitative models, which help the PMs better understand the portfolio's risk profile. The portfolio construction process is controlled and risk-aware, but there is room for size drift as the portfolio exhibits a larger weight to mid-caps, resulting in an above average rating.</p>		

Manager Research

William Blair

International Small Cap Growth

Rating Decile	Weight
2nd	10%

V. Implementation

William Blair has a 24-hour trading platform, with trading desks in Chicago and London. The Trading and Implementation team, led by Terry O'Bryan, has grown over the past several years. There are currently three traders assigned to Europe and three traders assigned to Asia. In addition, the team has two individuals assigned to data analytics and two to portfolio administration. William Blair utilizes the Longview Order Management System and the process involves identifying natural liquidity where available to mitigate any market impact from transactions. The traders make use of "third market" and electronic trading systems such as Instinet and LiquidNet where applicable. The firm's trading data is reviewed by the Best Execution Committee to ensure that every effort is being made to obtain best execution. The firm uses ITG, Able Noser, and Bloomberg as third-party TCA providers. In addition, the Linedata Compliance system is used for monitoring client and regulatory restrictions. Annual turnover typically falls around 75% and soft dollars represent only a small portion of the firm's total commissions. It is important to note that the trading team plays a notable role in the daily investment team meetings and continues to make notable enhancements in terms of trading efficiencies and use of data analytics. Implementation receives a high rating.

Rating Decile	Weight
1st	10%

VI. Attribution

After utilizing third-party systems, such as FactSet and Barra, William Blair now employs its own proprietary attribution system that is integrated into the firm's Summit platform. Performance and risk attribution can now be run in real-time and analyzed across multiple vectors. In addition to analyzing risk and performance attribution, the firm has also hired a third-party vendor, Inalytics, to analyze historical trading behavior and decision making for its investment strategies. There is a clear feedback loop from this analysis to positive enhancements to the investment process over time. We appreciate the improvements the firm has made in this category over the past few years.

	Rating									
Decile	1	2	3	4	5	6	7	8	9	10
Corresponding Grade	A		B		C		D		F	

Manager Research

William Blair

International Small Cap Growth

Firm Information**William Blair**

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Chicago, IL-60606
USA

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Partner
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INTERNATIONAL SMALL CAP MANAGER SEARCH

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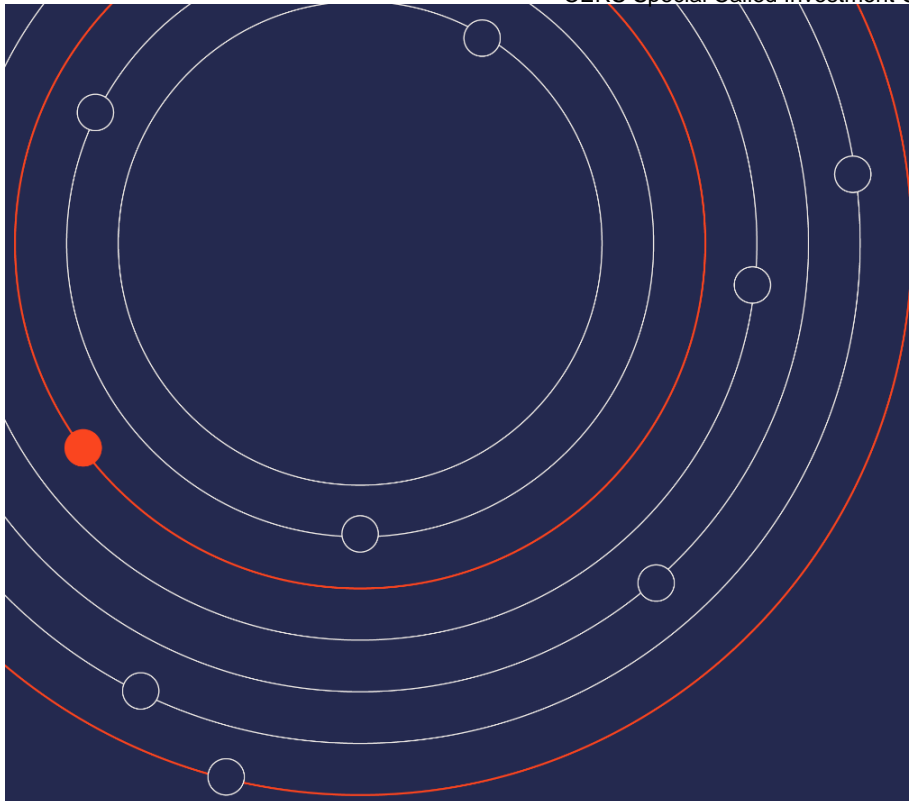
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HEADQUARTERS

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Santa Monica, CA 90401

Wilshire

Wilshire

MEMORANDUM

To: CERS Investment Committee, KRS Investment Committee

From: Wilshire

Subject: Axiom Investors International Small Cap Equity

Date: August 5, 2021

Summary:

The purpose of this memorandum is to support the recommendation made by staff to invest in the Axiom Investors ("Axiom") International Small Cap Equity Strategy ("The Strategy" or "Strategy"). Wilshire's review confirms that an investment in the Strategy is consistent with the guidelines and purpose of the Non-U.S. segment of the Growth basket of the portfolio, as outlined by the KRS Statement of Investment Policy. The Strategy is highly rated by Wilshire, receiving a 1st decile score as of the most recent review June 10, 2021. An allocation to the Strategy is also consistent with philosophy of utilizing active management in less efficient markets.

Axiom Investors International Small Cap Equity:

Axiom is a well-established investment advisor specializing primarily in global, international, and emerging markets equity strategies.

Organization

Established in Greenwich, CT in 1998, Axiom is an independent investment advisor owned entirely by current employees, with the largest shareholder being founder and CIO Andrew Jacobson. All Axiom strategies are uniformly managed by the same process with over \$19 billion in firm-wide assets as of June 2021.

Team

The Strategy is led by lead portfolio manager Matt Franco and co-portfolio manager Yogesh Borkar. Both PMs are owners of the firm and average nearly 25 years of experience. Mr. Franco was one of the founding members of the firm in 1998 and launched this strategy in 2014. Mr. Borkar joined the firm in 2013 after most recently serving as associate PM for eight years at Pyramis (Fidelity). The two portfolio managers have ultimate decision-making authority and act as senior generalist researchers who are expected to generate roughly 50% of the new investment ideas for the strategy.

Investment Philosophy & Process

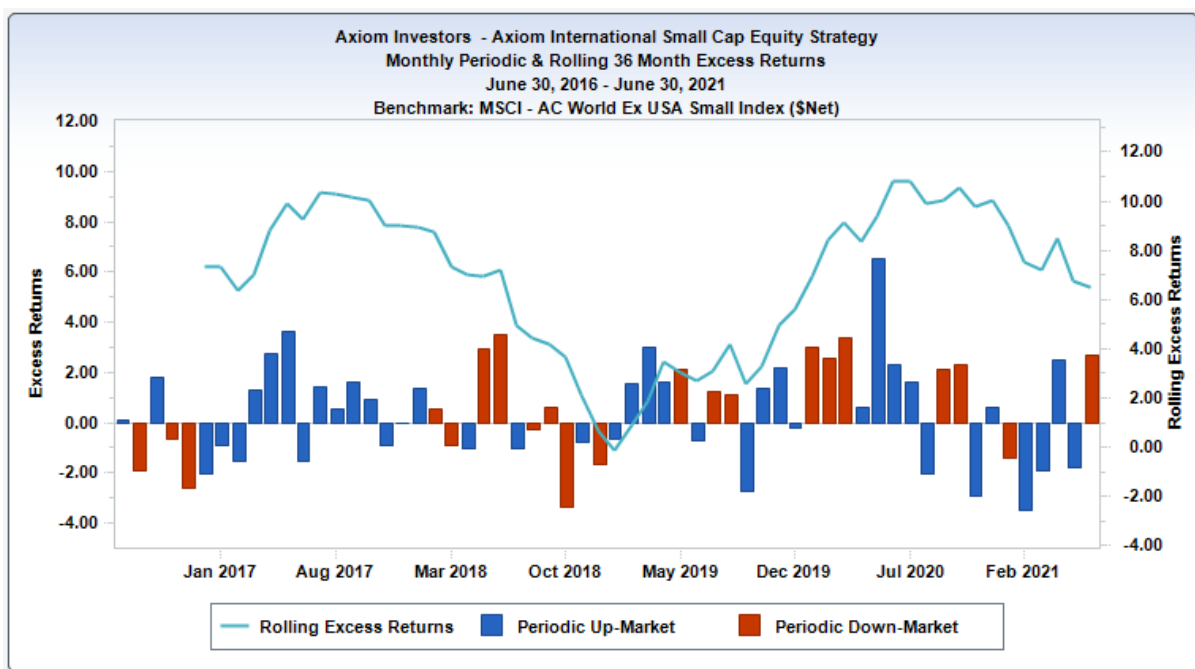
Axiom employs a growth-oriented, fundamental, bottom-up approach across its investment strategies. The application of the process is reliant on the collection and parsing of data that contributes to what Axiom calls "key business drivers." Key business drivers are defined as the company-specific, industry, macro, and political factors expected to have a substantial impact on future financial performance. The goal of the information gathering effort is to use the vast amount of data available to identify companies with growth potential that is not yet reflected in expectations or valuations. The Axware system enables systematically gathered data to be incorporated with the fundamental insights from the analysts.

Wilshire

The key business drivers are analyzed in order to assign an alphanumeric rating to securities. The first part, a letter on a scale of A through E, assesses a firm's industry presence from Established (A) to Emerging (E). Factors involved in this component of the ratings include profitability, country rating, balance sheet, market cap, and competitive position. The second part, a number from -3 to +3, assesses the dynamism of a firm's aggregate business drivers from most dynamic (+3) to most disappointing (-3). Dynamism captures a company's ability to outperform expectations and is determined through factors such as leading indicators, earnings revisions, valuation, and earnings growth. The ideal portfolio holding is rated A3, though these are incredibly rare. More often than not, the portfolio invests in C2 and D2 rated stocks. In recommending stocks, analysts will create a summary model demonstrating a firm's key business drivers relative to consensus expectations and a ranking worksheet that compares the stock to alternative portfolio holdings. Stocks are evaluated on a 12-18 month time horizon.

Performance

The Strategy has provided strong performance in a variety of market conditions, exhibiting an ability to add value in up and down markets, which has resulted in consistent excess returns on a rolling three-year basis. The Strategy has exhibited a consistent level of tracking error and strong information ratio, averaging 6.83% and 0.99 respectively, again on a rolling three-year basis.



Wilshire

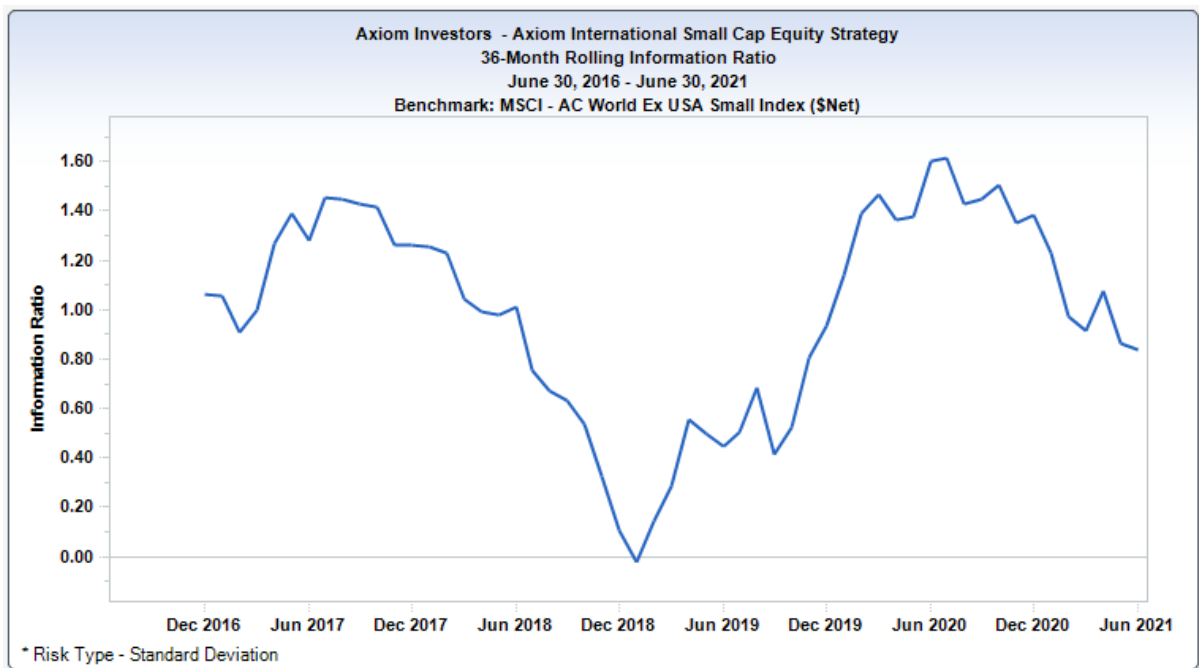
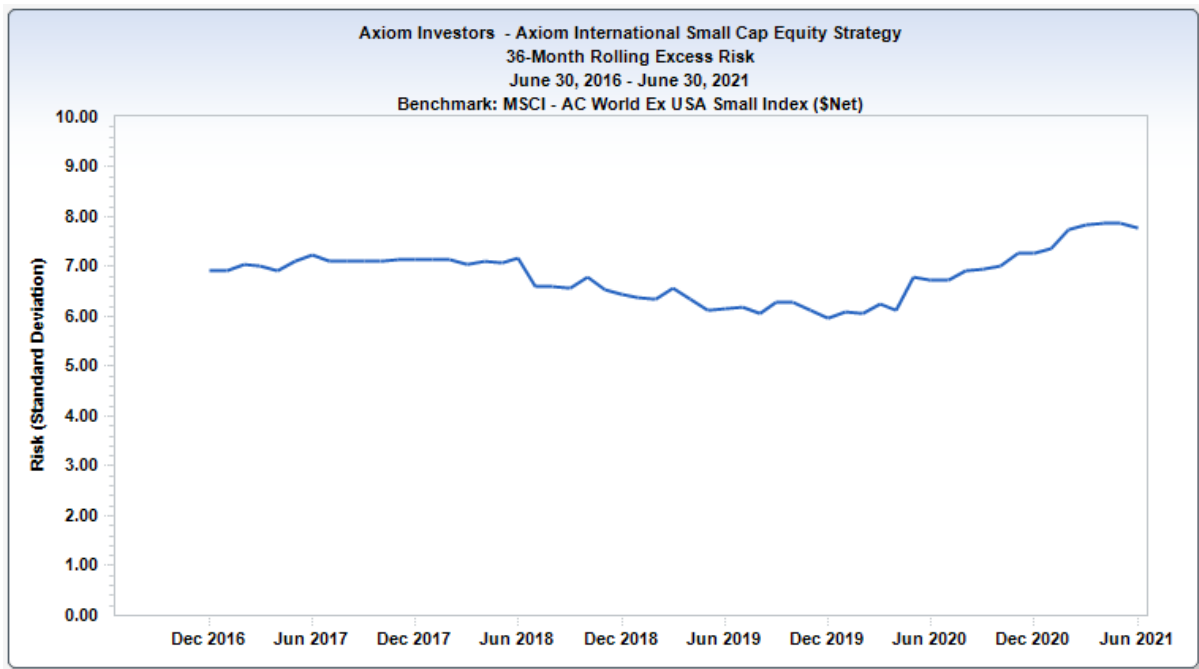


EXHIBIT B – Conflict of Interest Statement

**KENTUCKY RETIREMENT SYSTEMS
CONFLICT OF INTEREST STATEMENT**

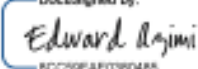
In consideration of the investment by Kentucky Retirement Systems and Kentucky Retirement Systems Insurance Trust Fund (collectively, "KRS") in a vehicle or account ("Account") managed by [Axiom Investors] (the "Manager"), the Manager acknowledges the need to maintain the public's confidence and trust in the integrity of KRS and the Commonwealth of Kentucky. In light of the forgoing, the Manager agrees to:

- Diligently identify, disclose, avoid and manage conflicts of interest that may arise through its relationship with KRS.
- Conduct activities with KRS so as not to advance or protect its own interests or the private interests of others with whom it has a relationship in a way that is detrimental to the interests of KRS.
- Conduct its activities in a manner to best promote the interests of KRS, but subject to the Manager's duty which requires it not to put the interests of one investor ahead of those of another investor.
- Upon discovery of an actual or potential conflict of interest involving KRS, disclose such conflict of interest to KRS and work with KRS in good faith to resolve or mitigate such conflict.
- Not engage directly or indirectly in any financial or other transactions with a trustee or employee of KRS that would violate the standards of the Executive Branch Ethics provisions as set forth in KRS Chapter 11A.

Agreed this the 29th day of June, 2021

MANAGER

For itself and on behalf of the Account

By: 
EDWARD AZIMI

Name: Edward Azimi

Title: Chief Operations Officer

(Rev. Feb 2018)



Kentucky Retirement Systems

Statement of Disclosure and Placement Agents – Manager Questionnaire

1. Did your firm use a placement agent as defined in the KRS “Statement of Disclosure and Placement Agents” policy in an effort to solicit an Investment from KRS Please indicate fund vehicle title if relevant? If yes, please continue to question 2; if no, please proceed to question 10.

No – Axiom did not use a placement agent in an effort to solicit an Investment from KRS.

2. Please disclose the name of the placement agency used, the names of the individuals contracted by the placement agency (either as employees or as sub-agents) in order to solicit an investment from KRS, and the fees paid or payable to the placement agent in connection with a prospective KRS investment.
3. Please represent that any fees paid to placement agents are the sole obligation of the investment manager and not that of KRS or the limited partnership.
4. Please disclose the names of any current or former Kentucky elected or appointed government officials (federal, state, and local government), KRS Board of Trustees members, employees, or consultants of KRS, or any other person, if any, who suggested the retention of the placement agent.
5. Please provide evidence of the regulatory agencies, if any, in any Federal, state or foreign jurisdiction the placement agent or any of its affiliates are registered with, such as the Securities and Exchange Commission (“SEC”), FINRA, or any similar regulatory agency.
6. Please provide a resume for each officer, partner or principal of the Placement Agent detailing the person’s education, professional designations, regulatory licenses and investment and work experience.
7. Please describe the services to be performed by the Placement Agent.
8. Please disclose whether the Placement Agent, or any of its affiliates, is registered as a lobbyist with any and all Kentucky state and local (county) governments.

9. Please disclose any political contributions made by the Placement Agent to any Kentucky official within the prior 2 years.

10. Please disclose the names of any current or former Kentucky elected or appointed government officials (federal, state, and local government) KRS Board of Trustees members, employees, or consultants of KRS that are receiving any fees or compensation from the External Manager and/or placement agent. Please disclose any additional known relationships or conflicts with same.

N/A

11. Please disclose any political contributions made by External Manager or principals of the External Manager in the prior 2 years.

N/A

12. Please disclose whether any principals of the firm have been involved in any regulatory proceedings, and if so, details concerning the same.

N/A

13. Please provide a statement representing and warranting the accuracy of the information provided to KRS regarding the Statement of Disclosure, and acknowledge that similar language will be included in any final written agreement with a continuing obligation to update any such information within 10 business days of any change in the information.

This statement shall serve as a testament to the accuracy of the information provided to KRS regarding the Statement of Disclosure. Axiom acknowledges that similar language will be included in any final written agreement with a continuing obligation to update any such information within 10 business days of any change in the information.

DocuSigned by:

EDWARD AJIMI
External Manager Signature

6/29/2021
Date



County Employees Retirement Systems
Investment Policy Statement
Adopted August 25, 2021

This Investment Policy Statement ("IPS") is issued by the CERS Board of Trustees ("CERS Board" or "CERS Trustees") of the County Employees' Retirement CERS ("CERS") in connection with investing in the pension and insurance trust funds ("Funds") of CERS.

I. Introduction

A. Purpose

The purpose of this IPS is to define the framework for investing the assets of CERS. This IPS is intended to provide general principles for establishing the goals of CERS, the allocation of assets, employment of outside asset management, and monitoring the results of the respective Funds.

The pension plans administered by Kentucky Public Pensions Authority (KPPA) are "Qualified Pension Plans" under Section 401(a) of the Internal Revenue Code. Additionally, Kentucky Revised Statutes 61.701 establishes health insurance benefits to recipients of CERS. Kentucky Revised Statutes 61.702 provides that all amounts necessary to provide for insurance benefits shall be paid to the insurance fund. The CERS Board shall administer the insurance fund in the same manner as the pension funds.

B. Philosophy

The CERS Trustees recognize their fiduciary duty not only to invest CERS' funds in formal compliance with the Prudent Person Rule, but also to manage those assets in continued recognition of the basic long-term nature of CERS. The CERS Trustees interpret this to mean, in addition to the specific guidelines and restrictions set forth in the law and this document, that the assets of CERS shall be proactively managed ~~—that is—~~ that is, investment decisions regarding the particular asset classes, strategies, and securities to be purchased or sold shall be the result of the conscious exercise of discretion.

The CERS Trustees recognize that asset allocation is the primary driver of long-term investment performance, and will therefore review asset allocation and asset-liability studies on a regular basis as outlined in Section III of this document. The Asset Allocation Guidelines represents a strategic decision, with the primary aim that CERS meet their performance objectives in the long-term, but understanding that this may not necessarily occur every year.

The CERS Trustees recognize that there is generally an inverse relationship between market efficiency, and the ability for active management to produce alpha ~~maximum~~ returns. Therefore, investments in efficient markets will be made using index or index-like investments with the goal of replicating or exceeding index returns with low management fees. Active management will be

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pursued in less efficient markets accepting higher tracking error and paying higher management fees with the expectation of producing excess returns over the long term. This allows the [KPPA](#) Office of Investments [staff](#) (~~KPPA Investment Staff~~) and consultant(s) to focus their efforts on identifying, selecting, and monitoring managers, as well as the overall management [of](#) fees paid, in the areas of the market most likely to produce excess returns.

The CERS Trustees recognize that, commensurate with their overall objective of maximizing long-term return given the appropriate level of risk, it is necessary that proper diversification of assets be maintained both across and within the classes of securities held to minimize/mitigate overall portfolio risk. Consistent with carrying out their ~~fiduciary~~ Responsibilities and the concept of Modern Portfolio Theory, the CERS Trustees will not systematically exclude any investments in companies, industries, countries, or geographic areas unless required to do so by statute. Within this context of proactive management and the necessity for adherence to proper diversification, the [CERS](#) Trustees rely upon appropriate professional advice from staff and service providers.

The CERS Trustees recognize the importance of responsible investing. Accordingly, the Trustees will consider adopting an Environment, Social, and Governance (ESG) policy that engages the issue from a risk, opportunity and fiduciary duty perspective. CERS potential ESG focus will be based solely on enhancing or protecting the long-term value to CERS and not on establishing or endorsing social policy. As part of its fiduciary duty, CERS shall consider only those factors that relate to the economic value of CERS' investment and shall not subordinate the interest of CERS' Trust Beneficiaries to unrelated objectives. The Trustees recognize their primary focus, their fiduciary duty, is to provide long-term risk-adjusted returns to their members.

II. Responsibilities

The CERS Trustees and other fiduciaries shall discharge their duties with respect to CERS: (1) solely in the interest of the participants and beneficiaries; (2) for the exclusive purpose of providing benefits to participants and beneficiaries; (3) with the care, skill and caution under the circumstances then prevailing which a prudent person acting in a like capacity and familiar with those matters would use in the conduct of an activity of like character and purpose; (4) impartially; (5) incurring and paying appropriate and reasonable expenses of administration which may not necessarily be the lowest and (6) in accordance with a good faith interpretation of the laws, regulations, and other instruments governing CERS.

Additionally, the Trustees and other ~~fiduciaries~~ [contracted service providers](#) shall not engage in any transaction which results in a substantial diversion of CERS income or assets. Every [contracted service provider shall be a fiduciary and shall fiduciary shall](#) provide adequate security and a reasonable rate of return to a disqualified person or in any other prohibited transaction described in Internal Revenue Code Section 503(b).

A. CERS Board of Trustees

The CERS Investment Committee is created by Kentucky Revised Statutes 78.790(1)(b) and the CERS Board as set forth in the CERS Board's Statement of Bylaws and Committee Organization (Section 2.2(e)). The Chair authorizes and directs the appointment of a CERS Investment Committee with full power to act for the CERS Board in the acquisition, sale and management of the securities and funds of CERS in accordance with the provisions of any applicable statutes, and policies of the CERS Board. The CERS Investment Committee has the power to act on behalf of the CERS Board on all investment related matters, including the acquisition, sale, safeguarding,

monitoring and management of the assets, securities and funds of CERS. The CERS Board shall require a vote of six (6) Trustees to ratify the actions of the CERS Investment Committee at the CERS Board meeting following the CERS Investment Committee meeting where such action was taken.

B. CERS Investment Committee

~~The CERS Investment Committee consists of five (5) members of the CERS Board. The members of the CERS Investment Committee shall include the three (3) Trustees appointed by the Governor to the CERS Board pursuant to Kentucky Revised Statutes 78.782(2)(b)(4-6) (investment experience), plus two additional Trustees appointed by the CERS Board Chair to include one (1) Trustee elected by the membership (Kentucky Revised Statutes KRS 78.782(4) and one (1) Trustee appointed by the Governor pursuant to Kentucky Revised Statutes KRS 78.782(2)(b)(1-3) (retirement administration). The CERS Investment Committee acts on behalf of the CERS Board on investment related matters. The CERS Investment Committee shall be Board with investment experience, the elected members of the CERS Board, and other CERS Board members as determined by the CERS Board Chair. The investment committee may also include nonvoting members who have investment expertise. The CERS Investment Committee has the authority to implement the investment policies adopted by the CERS Board and to act on behalf of the CERS Board on all investment-related matters.~~

The CERS Investment Committee has the following oversight responsibilities:

- ~~A.1.~~ 1. Assure compliance with this IPS and all applicable laws and regulations.
- ~~B.2.~~ 2. Approve the selection and termination of service providers. If the need arises to terminate a manager between CERS Board meetings, the KPPA Executive Director, Office of Investments, ("CIO") will have discretion to do so after receiving approval from either the CERS Board Chair or the CERS Investment Committee Chair. The CERS Investment Committee and the CERS Board must be notified of the manager termination at the next scheduled CERS Investment Committee and CERS Board meetings.
- ~~C.3.~~ 3. Meet no less than quarterly to evaluate whether this IPS, the investment activities and management controls and processes continue to be consistent in meeting CERS' goals. Mandate actions necessary to maintain the overall effectiveness of the investment program.
- ~~D.4.~~ 4. Review assessment of investment program management processes and procedures, and this IPS relative to meeting stated goals.

C. KPPA Investment Staff

The ~~Chief Investment Officer~~CIO, Office of Investments, is responsible for the administration of investment assets of CERS consistent with the policies, guidelines and limits established by the federal and state laws, the CERS Board ~~of Trustees~~, and the CERS Investment Committee.

The ~~Chief Investment Officer~~CIO receives direction from and reports to the KPPA Executive Director. The CIO shall provide information to the CERS Investment Committee on all investment matters, including but not limited to the following:

- i. Maintaining the diversification and risk exposure of the Funds consistent with policies and guidelines.
- ii. Assessing and reporting on the performance and risk exposure of the overall investment program relative to goals, objectives, policies and guidelines.
- iii. Monitoring and assessing service providers to assure that they meet expectations and

- conform to policies and guidelines.
- iv. Recommend~~ing~~ changes to service providers, statutes, policies or guidelines as needed to maintain a productive relationship between the investment program and its goals; ~~and acting~~ as liaison on all investment related matters.
- v. Identify~~ing~~ issues for consideration by the CERS Investment Committee and prepar~~ing~~e recommendations or reports regarding such matters.
- vi. ~~Preparing a memo for the CERS Investment Committee~~ for each proposed investment ~~awhich shall- memo to the CERS Investment Committee covering~~ the pertinent details of the investment, ~~including which should include,~~ but not ~~be~~ limited to: ~~the A~~amount of the investment, type of investment, purpose, opportunity/goal, risks, volatility assumptions, liquidity, structure, fees, background of investment firm with reasons for selection, list of other firms considered, which ~~of~~ CERS funds will invest, and the ~~specific~~ reasons, ~~if any,~~ why a ~~specific~~ CERS plan may be excluded from the investment.
- vii. ~~Engaging in a monthly meeting with the CERS CEO and the CERS General Counsel to discuss market trends and all things relevant to the CERS plans positioning.~~

The ~~Chief Investment Officer, Office of Investments, CIO~~ or designee is authorized to execute trades on fixed income and equity securities (including exchange-traded funds ~~of~~ (-ETF-s-)) and to execute proxies for the CERS Board consistent with this IPS.

To carry out this IPS and any investment related decisions of the CERS Board, the CERS Chief Executive Officer ("CEO"), and the ~~Chief Investment Officer, Office of Investments, CIO,~~ or designee are authorized to execute agreements and other necessary or proper documents pertaining to investment managers, consultants, investment related transactions, or other investment functions.

D. Investment Managers

In instances where the CERS Investment Committee, ~~in consultation with the CIO,~~ has determined it is desirable to employ the services of an external Investment Manager, the following shall be applicable:

- i. Investment Managers shall be qualified and agree to serve as a fiduciary to CERS and should be of institutional quality as deemed by KPPA Investment Staff in conjuncture with the investment consultant(s).
- ii. Investment Managers shall manage assets in accordance with this IPS and any additional guidelines established by contract, as may be modified in writing from time to time.
- iii. Total assets assigned to the selected manager shall not exceed 25% of that firm's total assets under management and shall not exceed 25% of a firm's total assets under management in a commingled product. Separate accounts or funds of one are not included in this 25% limitation for commingled products.
- iv. The assets managed by any one active or passive investment manager shall not exceed 15% of the overall assets in the pension and insurance funds.
- v. All investment management services will be contracted according to the CERS Investment Procurement Policy established by the CERS Board.

E. Custody Bank

~~The~~ KPPA shall hire custodians and other agents who will be fiduciaries to CERS and who will assume responsibility for the safekeeping and accounting of all assets held on behalf of CERS

and other duties as agreed to by contract.

F. Investment Consultants

Qualified independent investment consultants may be retained by the CERS Investment Committee, in consultation with the CIO, by CERS for asset allocation studies, asset allocation recommendations, performance reviews, manager searches, and other investment related consulting functions and duties as set forth by contract.

G. Selection

Qualified investment managers, investment consultants, and other investment related service providers shall be selected by the CERS Investment Committee, in consultation with the CIO, in accordance with the IPS. The selection shall be based upon the demonstrated ability of the professional(s) to provide the required expertise or assistance described in the Request For Proposals (RFP) or/ Request For Information (RFI), (if utilized). In order to create an efficient and effective process, the CERS Investment Committee or Chief Investment Officer, Office of Investments may, in their sole discretion, utilize an Request For Information ("RFI"), an -a Request For Proposals ("RFP"), third party proprietary software or database, review of existing service provider capabilities, or any combination of these or other methods to select a service provider.

III. Asset Allocation Guidelines

In establishing asset allocation guidelines, the CERS Board recognizes that each CERS plan has its own capacity to tolerate investment volatility, or risk. Therefore, each CERS plan has been studied and asset allocation guidelines have been established on a CERS plan by CERS plan basis. The CERS Board will cause-ensure the asset allocation guidelines of each System-plan are-be reviewed annually. The CERS Board will provide the CERS Investment Committee with the results of any asset liability valuation study and guidance for determining the needs of any particular CERS plan CERS.

Based on an asset liability valuation study, which analyzed the expected returns, risk and correlations of various asset classes, projected liabilities, liquidity, and the risks associated with alternative asset mix strategies, the CERS Board has established the following Asset Allocation Guidelines, effective August 25, 2021. The asset classes are "correlated" or grouped macro-asset class allocations (i.e. growth, liquidity and diversifying) based on their expected correlations to one another in order to create a better understanding of risk and diversification, and based on asset class exposures to the economic factors of growth and inflation.

CERS Hazardous and Non-Hazardous Pension -and Insurance Plans				
Asset Class	Target	Relative Range (+/-)*	Minimum	Maximum
Growth	68.50%	16%	58.2347.90%	89.0678.78%
US Equity	21.75%	30%	15.23%	28.28%
Non-US Equity	21.75%	30%	15.23%	28.28%
Private Equity	10.00%	30%	7.00%	13.00%
High Yield / Specialty Credit	15.00%	30%	10.50%	19.50%

Liquidity	11.50%	20%	88.020%	1543.080%
Core Fixed Income	10.00%	20%	8.00%	12.00%
Cash	1.50%	100%	0.00%	3.00%
Diversifying	20.00%	16%	147.00%	236.00%
Real Estate	10.00%	30%	7.00%	13.00%
Real Return	10.00%	30%	7.00%	13.00%
Opportunistic	0.00%	n/a	0.00%	5.00%

The intent of the CERS Board in allocating funds to the investment managers is for the investment managers to fully invest the funds. However, the [CERS](#) Board is aware that from time to time the investment manager will require a portion of the allocated funds to be held in cash provided the cash holdings do not exceed five percent (5%) of the manager's allocation for any given quarter, unless such cash holdings are an integral part of a fixed income manager's investment strategy.

The individual [CERS](#) plan level asset allocations ~~of CERS~~ will be reviewed monthly by KPPA Investment Staff relative to its target asset class allocation, taking into account any tactical asset allocation shift directed by the CERS Investment Committee.

Regarding individual investment manager initial allocations, KPPA Investment Staff will get approval at the CERS Investment Committee meeting for a specific dollar amount intended to be committed to a closed-end fund such as private equity or real estate funds and will get approval for a percent of the appropriate asset class target for open-end investments such as public equity, public fixed income, and Diversifying Strategies managers. For those open-end funds where assets can be added or subtracted, the ~~KPPA Executive Director, Office of Investments, CIO~~ will have discretion to reduce or increase an investment manager's allocation between 50% and 150% of the approved target. The target will not be raised prior to the one-year anniversary of the amount approved by the CERS Investment Committee, and must be reported to the CERS Investment Committee at the next scheduled meeting. If the need arises to terminate a manager between CERS Board meetings, the ~~Chief Investment Officer, Office of Investments, CIO~~ will have discretion to do so after receiving approval from either the CERS Board Chair or the CERS Investment Committee Chair. The CERS Investment Committee and the CERS Board must be notified of the manager termination at the next scheduled CERS Investment Committee and Board meetings.

Short-term market shifts may cause the asset mix to drift from the allocation targets. Should the target percentage fall out of the indicated range for a particular asset class, KPPA Investment Staff shall direct rebalancing transactions to reallocate assets from the over-allocated asset class to the under-allocated asset class. Within the allowable ranges, KPPA Investment Staff should use regular cash flows to rebalance toward targets to avoid incurring additional trading costs to correct minor deviations from asset allocation targets. Except when there is a perceived extraordinary downside risk in a particular asset class, movement outside the normal ranges should be avoided.

Investments in private assets are generally less liquid than investments in public markets securities and are typically implemented via periodic commitments to funds with limited

partnership structures. As a result, actual allocations to these asset classes may deviate from their strategic targets for extended periods. Actual vs. target deviations for these asset classes shall not be considered in violation of the Asset Allocation Guidelines. However, when identified by the KPPA Investment Staff the deviation must be reported to the CERS Investment Committee Chair within ten (10) business days a reasonable time. Under/overweights to these asset classes shall be invested in public markets securities with the most similar risk/return characteristics as a short-term proxy for the private asset classes.

In keeping with its responsibility as a CERS Board and wherever consistent with its fiduciary responsibility, the CERS Board encourages the investment of the fund's assets in investments, funds, and securities of corporations which provide a positive contribution to the economy of the Commonwealth of Kentucky. However, where any security is not a prohibited investment under the governing laws and policies, discretion will be granted to the appointed investment managers in the selection of such securities and timing of transactions consistent with the following guidelines and restrictions.

A. Growth

US Equity

Investments may be made in common stock, securities convertible into common stock, preferred stock of publicly traded companies on stock markets, asset class relevant ETF's or any other type of security contained in a manager's benchmark. Each individual domestic equity account shall have a comprehensive set of investment guidelines prepared by the Chief Investment Officer, Office of Investments CIO, which contains a listing of permissible investments, portfolio restrictions, and standards of performance for the account.

The KPPA Investment Staff internally manages some. The internally managed equity index funds that are intended, consistent with the governing Plan documents, to gain exposure to a broad asset sector to replicate the characteristics of the asset class, to minimize administrative expenses and to help achieve overall portfolio objectives. These objectives can be achieved through several management techniques, including, but not limited to, portfolio optimization, non-reinvestment of index dividends, and other management techniques intended to help achieve the investment objectives of the entire Pension Fund CERS.

Non-US Equity

Investments may be made in common stock, securities convertible into common stock, preferred stock of publicly traded companies on stock markets, asset class relevant ETF's or any other type of security contained in a manager's benchmark. Each individual Non-US equity account shall have a comprehensive set of investment guidelines prepared by the CIO which shall contain a listing of permissible investments, portfolio restrictions, and standards of performance for the account.

High Yield/Specialty Credit

High Yield/Specialty Credit High yield/specialty credit investments will be similar in type to those securities found in the CERS' high yield benchmarks and the characteristics of the portfolio will be similar to the CERS' high yield fixed income benchmarks. The high yield fixed income accounts may include, but are not limited to, the following fixed income securities: non-investment grade

U.S. corporate credit including both bonds and bank loans;³ non-investment grade non-U.S. corporate credit including bonds and bank loans;³ municipal bonds;³ non-U.S. sovereign debt;³ mortgages including residential mortgage backed securities, commercial mortgage backed securities, and whole loans, asset-backed securities;³ and emerging market debt ("EMD") including both sovereign EMD and corporate EMD and asset class relevant ETF-s.

Each individual [High Yield/Specialty Credit](#) ~~high yield/specialty credit~~ account shall have a comprehensive set of investment guidelines [prepared by the CIO](#) which contains a listing of permissible investments, portfolio restrictions, risk parameters, and standards of performance for the account.

Private Equity Investments

Subject to specific approval of the CERS Investment Committee, investments may be made for the purpose of creating a diversified portfolio of alternative investments. Private equity investments are expected to achieve attractive risk-adjusted returns and, by definition, possess a higher degree of risk with a higher return potential than traditional investments. Accordingly, total rates of return from private equity investments are expected to be greater than those that might be obtained from conventional public equity or debt investments. Examples of such investments include, but are not limited to:³ private investments into venture capital;³ leveraged buyouts;³ special situations;³ distressed debt;³ private debt;³ timberland, oil and gas partnerships;³ infrastructure;³ commodities;³ and private placements. While it is expected that the majority of these assets will be invested within the United States, a portion has been allocated to non-US investments. These non-U.S. investments are not restricted by geography.

Guidelines for Private Equity

The private equity market is highly sophisticated and specialized with respect to variety and types of investment structures. There exists major competition for deal flow on the part of both investor and general partners. To a great extent, market forces drive the bargaining of economic terms. Most investment vehicles are structured as commingled vehicles and often blind pool investment partnerships. The most common offering forms are equity private placements where the governing laws of the partnership impose a passive role of the limited partner investor. These contractual arrangements are long-term in nature and provide the general partner or sponsors a reasonable time horizon to wisely invest capital, add value through intensive operational management, then realize the proceeds of such an investment. Moreover, terms of the partnership are proposed by the general partner and are critical to the economic incentives and ultimate net performance of the partnership.

Investment Strategy and Plan Guidelines

To strengthen the diversification of the investments, several guidelines will be utilized in KPPA Investment Staff's formulation and recommended annual investment strategy and plan [for private equity investments](#). These guidelines encompass annual commitment levels to the asset class, types of investment vehicles that can be utilized, controlling financing stage risks, industry, manager and geography concentration/diversification limits, acceptable contract negotiations, appropriate sizes for investments, and the preferred alignment of interests.

Investment Vehicles: CERS [plans](#) will gain exposure to private equity investments by hiring

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external investment managers either directly or through participation in secondary private equity markets. Typically, CERS [plans](#) will subscribe as a Limited Partner ("LP") to limited partnership vehicles sponsored by such specialty external investment managers. CERS will also at times structure separately managed accounts with specific investment objectives to be implemented by external investment managers. CERS [plans](#) may also gain [private equity](#) exposure by utilizing the following vehicles: limited liability companies and co-investments alongside CERS' existing or potential limited partnerships.

Investment Timing Risks: KPPA Investment Staff should limit the potential for any one investment to negatively impact the long-term results of the portfolio by investing across business cycles. Moreover, the portfolio must gain exposure to the array of financing stages by opportunistically exploiting the best investments at different stages of the business cycle. KPPA Investment Staff may also consider purchasing secondary partnership interests to shorten the effective life of the partnership interest and therefore positively impacting the current and long-term net return of the portfolio. In addition, mindful of vintage year diversification, CERS should seek to identify attractive commitments annually, further ensuring the portfolio invests across business cycles.

General Partner Diversification: KPPA Investment Staff will seek to work with a variety of general partners due to their specialized expertise in particular segments of the private equity market and source of their deal flow. No more than fifteen (15) percent of CERS' Pension or Insurance total allocation to private equity investments may be committed to any one partnership, without the approval of the CERS Investment Committee.

Total Exposure to Private Equity: Given the illiquid nature of the asset and the complexity of each private equity transaction, it is important that the CIO actively manage the maximum amount of CERS Plan assets allocated to this asset class. The asset allocation authorizes a maximum of thirteen (13%) percent of total CERS Plan assets to this asset class. Should circumstances arise and the allocation go beyond the maximum allocation, the CIO will inform the Investment Committee Chair within ten (10) business days a reasonable time frame and develop a plan that will bring the allocation back in compliance over time.

B. Fixed Income/Liquidity

Core Fixed Income

Core Fixed Income investments will be similar in type to those securities found in [the CERS' plans](#) core fixed income benchmark(s) and the characteristics of CERS' [plans](#) core fixed income portfolio will be similar to the [System](#) core fixed income benchmarks. The core fixed income accounts may include, but are not limited to the following fixed income securities: U.S. Government and Agency bonds, investment grade U.S. corporate credit, investment grade non-U.S. corporate credit, municipal bonds, Non-U.S. sovereign debt, mortgages including residential mortgage backed securities, commercial mortgage backed securities, and whole loans, asset-backed securities, and asset class relevant ETF-s.

Each individual core fixed income account shall have a comprehensive set of investment guidelines [prepared by the CIO](#) which contains a listing of permissible investments, portfolio restrictions, risk parameters, and standards of performance for the account.

Cash Equivalent Securities

Selection of particular short-term instruments, whether viewed as liquidity reserves or as investment vehicles, should be determined primarily by the safety and liquidity of the investment and only secondarily by the available yield. The following short-term investment vehicles are considered acceptable: Publicly traded investment grade corporate bonds, variable rate demand notes, government and agency bonds, mortgages, municipal bonds, and collective short-term investment funds ("STIFs"), money market funds or instruments (including, but not limited to, certificates of deposit, bank notes, deposit notes, bankers' acceptances and commercial paper) and repurchase agreements relating to the above instruments. Instruments may be selected from among those having an investment grade rating at the time of purchase by at least one recognized bond rating service. In cases where the instrument has a split rating, the lower of the two ratings shall prevail. All instruments shall have a maturity at the time of purchase that does not exceed 397 days. Repurchase agreements shall be deemed to have a maturity equal to the period remaining until the date on which the repurchase of the underlying securities is scheduled to occur. Variable rate securities shall be deemed to have a maturity equal to the time left until the next interest rate reset occurs, but in no case will any security have a stated final maturity of more than three years.

CERS' fixed income managers that utilize cash equivalent securities as an integral part of their investment strategy are exempt from the permissible investments contained in the preceding paragraph. Permissible short-term investments for fixed income managers shall be included in the investment manager's investment guidelines.

C. Diversifying Strategies

Real Estate

~~Subject to specific approval of the CERS Investment Committee, if~~ investments ~~may be~~ made in equity and debt real estate for the purpose of achieving the highest total rate of return possible consistent with a prudent level of risk. Allowable real estate investments include open-end and closed-end commingled real estate funds, joint venture investments, public and private real estate investment trusts ("REITs"), public real estate operating companies, and real estate related debt. CERS has determined that the primary role of the real estate asset class is to provide for the following:

- Attractive risk adjusted returns through active management and ability to access managers with the expertise and capabilities to exploit market inefficiencies in the asset class. The illiquid nature of real estate investments combined with the complexity of investments makes it difficult for casual investors to effectively access the asset class effectively. It is our belief that through active management and by investing in top tier managers with interests aligned through co-investment and ~~incentive-based~~ incentive based compensation, CERS can maximize their risk adjusted returns. This active management approach will be pursued.
- Diversification benefits through low correlations with other asset classes, primarily the U.S. equity markets.
- Provide a hedge against unanticipated inflation, which real estate has historically provided due to lease structures and the increases in material and labor costs during inflationary periods.

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- Permit CERS to invest in unique opportunities that arise due to dislocations in markets that occur from time to time.

Real Return

The purpose of the Real Return Portfolio is to identify strategies that provide both favorable stand-alone risk-adjusted returns as well as the benefit of hedging inflation for the broader plans. Real Return strategies are not necessarily a separate asset class but may include real assets, such as infrastructure, real estate, commodities, and natural resources among others, as well as financial assets that have a positive correlation to inflation. This can include “real” bonds such as Treasury Inflation-Protected Securities (“TIPS”) (and other inflation linkers) or “real” stocks such as REITs, Master Limited Partnerships (“MLPs”), and oil & gas stocks. Additionally, Real Return managers may attempt to add value by tactically allocating to various asset classes according to how each asset class performs across an economic cycle and the manager’s perception of where we are in the cycle. The goal is to invest in inflation sensitive assets during inflationary periods, and avoid those assets in deflationary periods, thus providing a positive real return across the cycle.

The real return opportunity set may include numerous vehicles to access a wide variety of investment styles and strategies. These investment vehicles may include mutual funds, ETFs, separately managed accounts as well as hedge funds (open-end limited partnerships) and private equity (close-end limited partnerships). The list of strategies that CERS’ Real Return Portfolio may use includes, but is not limited to, the following:

- Global Tactical Asset Allocation (“GTAA”)/Global Macro: GTAA or macro strategies are those that make directional bets on major markets or asset classes instead of individual securities. GTAA and macro strategies typically invest in all major assets classes including equity markets, credit and debt instruments, currencies/interest rates, and commodities. These strategies tend to focus on economic factors that would suggest an opportune time to invest in a given asset class, and will change their allocations actively over time. These strategies may use inflation as the economic factor to gain exposure to and will target a real rate of return over time.
- Inflation Linked Securities are securities that directly tie coupon payments or principal increases to an inflation index, such as Consumer Price Index (“CPI”). These strategies could include not only US TIPS, but also global sovereign inflation linked bonds, corporate or infrastructure inflation linked bonds, and possibly short duration floating rate bonds.
- Inflation Sensitive Equities include publicly traded equity and equity related securities in companies which have a high sensitivity to inflation in their profit margins via the nature of their operating assets, such as energy companies, basic materials and miners, natural resource stocks, and listed infrastructure. This category can also include, but are not limited to, REITs, MLPs as well as ETFs and index products on REITS, MLPs, and natural resource stocks.
- Commodities: Commodities are the raw materials that are physical inputs into the production process. Managers that invest in liquid commodity strategies using exchange traded futures can span from simple indexing (matching a long-only commodities index), to enhanced indexing or active long (selecting positions that vary from the index but within fairly tight ranges), as well as unconstrained long-short managers.

- **Private Property:** For the purposes of this IPS, private property refers to the ownership of an idiosyncratic, physical asset that is predominately fixed and/or permanent or at least substantially long-lived. This includes real estate, such as land and any improvements to or on the land, as well as timberland and farmland. Timberland investing involves the institutional ownership of forest for the purpose of growing and harvesting the timber. The timber may be used for furniture, housing lumber, flooring, pulp for paper, woodchips, and charcoal, among other things. Farmland investing entails ownership of land used primarily, if not exclusively, for agricultural production both for crops, including row crops and permanent crops, as well as livestock. Private property can also include infrastructure investing, which refers to financing the manufacture or development of the underlying fundamental assets and basic core infrastructure that are necessary for an economy whereby such assets are largely fixed and long-lived. These tend to be high cost, capital-intensive investments that are vital to a society's prosperity and facilitate the transfer, distribution, or production of basic goods and services.
- **Natural Resources:** Natural resources can include investing in the financing, development, extraction, and production of minerals, basic materials, petroleum products, and water as well as renewable resources such as agricultural commodities and solar energy. As opposed to property, the returns generated in these investment strategies come more from the actual production of the resource itself. Further, these are depleting and/or consumable assets that are also portable and fungible and which in the aggregate comprise a majority of the inputs into most measurements of inflation.
- **Private Assets:** Private assets can include tangible or intangible assets that are not easily sold in the regular course of a business' operations for cash, and which are held for their role in contributing directly to the business' ability to generate profit. As the useful life of the asset tends to extend across many years and the assets tend to be capital intensive as well, they have some similarity to private infrastructure. Further, given that the assets contribute directly to the production process as well as often retaining intrinsic value, there is a fundamental link to inflation somewhat similar to natural resources.
- **Other (Opportunistic Inflation Hedge):** Other/opportunistic strategies include those that have a propensity to provide a positive real return or positive correlation with inflation over time. Liquid strategies such as inflation swaps, diversified inflation hedging mutual funds, or nominal bonds backed by inflation sensitive assets may be included in this allocation, while other illiquid strategies that may provide the same real profile can include private equity in inflation sensitive companies, hard asset-backed private credit, and structured inflation-linked products among others.

Portfolio Guidelines

No more than 50% of the total net assets of the Real Return portfolio may be invested in any one registered investment vehicle, mutual fund, or separately managed account.

No more than 20% of the total net assets of the Real Return portfolio may be invested in any single closed-end or open-end limited partnership or other unregistered investment vehicle.

The relative allocations to the liquid and illiquid portfolios will be determined according to each individual System's liquidity needs, funding status, and allocation targets on an investment by

investment basis.

Opportunistic

Opportunistic investments are intended to capitalize on opportunities outside of the asset classes targeted in the Asset Allocation Guidelines. These allocations are intended to take advantage of market dislocations and unique opportunities and can be short- to medium-term in nature. Opportunistic investments may be implemented through targeted portfolios or multi-asset approaches. Initial allocations are to be made following the same policies and procedures as all other investments as outlined previously in this IPS.

D. Co-Investment Policy

The CIO has discretion to make direct co-investments in companies alongside of current general partners. Any co-investment opportunity must also be part of the main account or fund into which CERS has already invested before it can be considered. For purposes of this IPS, a direct co-investment is defined as a direct investment in a portfolio company alongside an existing CERS' partnership deemed in good standing.

The maximum investment in any co-investment vehicle shall not exceed 50 percent of the total capital committed by all partners at the time of the final closing. The maximum investment in any single direct co-investment shall not exceed 20 percent of the original partnership commitment. Total investment in direct co-investments shall not exceed 20 percent of the asset class portfolio on a cost basis at the time of investment.

IV. Monitoring

Performance Measurement

CERS overall fund performance is measured relative to CERS' Pension or Insurance Total Fund Benchmark. The benchmark is calculated by means of a weighted average methodology. This method is consistent with the CFA Institute Global Investment Performance Standards (GIPS®), a set of standardized, industry-wide ethical principles that guide investment managers and asset owners on how to fairly calculate and present their investment results, with the goal of promoting performance transparency and comparability. It is the product of the various component weights (i.e., asset classes' percentages) by their respective performance (returns). Due to market fluctuations and acceptable divergence, the asset classes' weights (percentages) are often not equivalent to the benchmark's weights. Therefore, the performance may indicate that the Funds have outperformed (underperformed) relative to their respective benchmarks, even when the preponderance of lesser weighted categories have underperformed (outperformed) their indices.

CERS measures its asset classes, sub-asset classes, sectors, strategies, portfolios, and instruments (investment) performance with ~~indexes~~ ~~icesexes~~ that are recognized and published (e.g., ~~S&P 500 & Barclays Aggregate Bond Index~~). These indices are determined to be appropriate measures of investments and composites of investments with identical or similar investments profiles, characteristics, and strategies. The benchmarks and indexes are intended to be objective, investable, replicable, representative and measurable of the investment mandate and, developed from publicly available information that is acceptable to CERS and the investment manager/advisor as the neutral position consistent with the underlying investor status. ~~The~~ CERS investment consultant and KPPA Investment staff recommend the benchmarks and indexes.

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These measures shall be subject to the review and approval of the CERS Investment Committee with ratification by the CERS Board when asset allocation studies are performed, or when a change to existing benchmarks is recommended by KPPA Investment Staff and the CERS investment consultant. The current asset class benchmarks, effective as of July 1, 2018 with the adoption of the asset allocation, are as follows:

Asset Class	Benchmark
Growth	
US Equity	Russell 3000
Non-US Equity	MSCI ACWI ex US IMI
Private Equity	Russell 3000 + 300 bps (lagged)
High Yield / Specialty Credit	50% Bloomberg Barclays US High Yield 50% S&P LSTA Leveraged Loan
Liquidity	
Core Fixed Income	Bloomberg Barclays US Aggregate
Cash	Citi Grp 3-mos Treasury Bill
Diversifying	
Real Estate	NCREIF ODCE
Real Return	US CPI + 3%
Opportunistic	
To Be Determined	Highest Assumed Discount Rate of Participating Plans

The following descriptions represent general standards of measurement that will be used as guidelines for the various classes of investments and managers of CERS. They are to be computed and expressed on a time-weighted total return basis:

Total Public Asset Class Allocations

Short-term

- For periods less than five years or a full market cycle, the Asset Class Allocation should exceed the returns of the appropriate Index.

Intermediate & Long-term

- For periods greater than five years or a full market cycle, the Asset Class Allocation should exceed the appropriate Index, compare favorably on a risk-adjusted basis, and generate returns that rank above the median return of a relevant peer group. Volatility, as measured by the standard deviation of monthly returns, should be comparable to the Index.

Individual Public Security Portfolios: Individual portfolios shall be assigned a market goal or benchmark that is representative of the style or market capitalization of the assignment. Individual accounts should be monitored using the following Standards:

Short-term

- For periods less than five years or a full market cycle, individual portfolios should exceed the returns of their market goal or benchmark.

Intermediate & Long-term

- For periods greater than five years or a full market cycle, individual portfolios should exceed the return of their market goal or benchmark, compare favorably on a risk-adjusted basis, and generate returns that rank above the median return of a relevant peer group. Volatility, as measured by the standard deviation of monthly returns, should be comparable to the benchmark.

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Alternative Assets:**Private Equity**

The Private Equity portfolio should also seek to achieve the following:

Short-term

- Alternative investments should earn a Net Internal Rate of Return ("IRR") that place the investment above the median Net IRR of other similar funds, of the same vintage year, as reported by industry benchmarks.

Intermediate & Long-term

- The private equity portfolio should earn a return that meets or exceeds CERS' Private Equity Index. Individual private equity investments should earn a Net IRR above the median Net IRR of other similar funds, of the same vintage year, as reported by industry benchmarks.

Real Estate

Private Real Estate investments are unique and can be illiquid and long term in nature. Given that this may lead to large short-term performance discrepancies versus public benchmarks, CERS more appropriately measures its real estate investments based on both relative return and absolute return methodologies:

Relative Return: The Real Estate portfolio is expected to generate returns, net of all fees and expenses, in excess of the National Council of Real Estate Investment Fiduciaries Open End Diversified Core Equity Index ("NCREIF ODCE") lagged 1 calendar quarter.

Absolute Return: The long-term real return objective (returns adjusted for inflation) for CERS' Real Estate portfolio is five percent (5%) over the Barclays Capital U.S. 7-10 Year Treasury Bond Index, net of investment management fees. This return shall be calculated on a time-weighted basis using industry standard reporting methodologies.

The total Real Return allocation shall seek to:

1. ~~(1)~~ Short-term benchmark: For periods less than five (5) years or a full market cycle, the allocation should achieve an annual rate of return that exceeds the appropriate benchmark (the weighted average return of the underlying investment benchmarks) annually over a complete market cycle, net of all investment management fees.
2. ~~(2)~~ Strategic objective: For periods greater than five (5) years or a full market cycle, the allocation should not only outperform the short-term benchmark, but also achieve a rate of return that exceeds (CPI + 300 basis points) as well.
3. ~~(3)~~ Achieve a positive risk/reward trade-off when compared to similar style Real Return Investment Managers.

Opportunistic

The total Opportunistic allocation shall seek to:

1. ~~(1)~~ Short-term benchmark: For periods less than five (5) years or a full market cycle, the allocation should achieve an annual rate of return that exceeds the

highest assumed rate of return of the participating plans.

2. ~~(2)~~ Strategic benchmark: For periods greater than five (5) years or a full market cycle, the allocation should achieve an annual rate of return that exceeds the highest assumed rate of return of the participating plans.

Performance Review

On a timely basis, but not less than quarterly, the CERS Investment Committee will review the performance of the portfolio for determination of compliance with this IPS. On an annual basis, a comprehensive review of each asset class and underlying portfolios shall be conducted by the KPPA Investment staff and presented to the CERS Investment Committee. The review shall consist of an organizational, performance and compliance assessment.

The Compliance Officer shall perform tests at least monthly to assure compliance with the restrictions imposed by this IPS. These tests shall be performed at the asset class and total fund level. Quarterly, the Compliance Officer shall prepare a report to the CERS Investment Committee detailing the restrictions tested, exceptions, the cause of the exception and the subsequent resolution. The CERS Investment Committee shall report the findings to the CERS Board at the next regularly scheduled meeting.

The following restrictions shall be tested at least monthly:

1. ➤ The amount of stock in the domestic or international equity allocation in any single corporation shall not exceed 5% of the aggregate market value of CERS' assets.
2. ➤ The amount of stock held in the domestic or international equity allocation shall not exceed 3% of the outstanding shares of any single corporation.
3. ➤ Investment in "frontier" markets (those countries not included in the MSCI EM Index) shall not exceed 5% of CERS' international equity assets.
4. ➤ The duration of the core fixed income portfolios combined shall not vary from that CERS' Fixed Income Index by more than +/- 25% duration as measured by effective duration, modified duration, or dollar duration except when the CERS Investment Committee has determined a target duration to be used for an interim basis.
5. ➤ The amount invested in the debt of a single issuer shall not exceed 5% of the total market value of CERS' fixed income assets, with the exception of U.S. Government issued, guaranteed or agency obligations (or securities collateralized by same), and derivative securities used for exposure, cost efficiency, or risk management purposes in compliance with Section VII of this policy.
6. ➤ 50% of the core fixed income assets must have stated liquidity that is trade date three days or better.

The ~~Chief Investment Officer~~CIO shall develop a comprehensive set of investment guidelines for each externally managed account. These guidelines should ensure, at the total fund and asset class level, that the restrictions set forth above are preserved.

V Additional Items

Derivatives Permitted Use:

CERS permits external managers and KPPA– Investment Staff to invest in derivative securities, or strategies which make use of derivative investments, for exposure, cost efficiency and risk management purposes, if such investments do not cause the portfolio to be leveraged beyond a 100% invested position. Any derivative security shall be sufficiently liquid that it can be expected to be sold at, or near, its most recently quoted market price. Typical uses of derivatives in the portfolio are broadly defined below:

Exposure:

Derivatives are an effective way for a portfolio manager to gain exposure to a security that the manager does not want to purchase in the cash market. Reasons for gaining exposure to a security through the use of derivatives may include cheaper transactions costs, liquidity/lack of supply in the underlying market, and the flexibility to implement investment views with minimum portfolio disruption. An example is a cash ~~equitization~~equalization program.

Cost Efficiency:

Derivatives are often used due to the cost efficiency associated with the contract properties. Given the fact that derivatives can be used as a form of insurance, upfront trading costs must be sufficiently low for investors to purchase the contract and insure their portfolios efficiently. Furthermore, due to properties associated with derivatives and cash outlay characteristics (minimal cash outlay at inception of the contract) derivatives are generally a vehicle of gaining cost efficient exposure. An example is the cost (zero) to purchase a futures contract.

Risk Management:

Derivatives can be used for mitigating risk in the portfolio. When used as a risk management tool, derivatives can significantly reduce an identified financial risk or involuntary risk from investment areas by providing changes in fair values or cash flows that substantially offset the changes in fair values or cash flows of the associated item being hedged. An example is the use of currency forwards to offset periods of dollar strength when international equity markets increase in value, thereby protecting foreign asset gains in the portfolio.

Derivatives Restricted Use:**Settlement:**

Investments in futures contracts are to be cash settled unless physically settled and stored by external managers. At no time shall CERS plans agree to take physical delivery on a futures contract.

Position Limits:

Futures and options positions entered into by CERS, or on its behalf, will comply with all position and aggregate limits established by the local governing authorities within each jurisdiction.

Over-the-Counter (OTC):

Investments in securities not traded on public exchanges that are deemed ~~over-the-counter~~ (OTC) in nature are allowed provided that a counterparty risk monitoring component is delineated in the manager's guideline section of the manager's contract. All counterparties must have a short-term credit rating of at least BBB (Standard and Poor's or Fitch) or Baa2 (Moody's).

All OTC derivative transactions, including those managed through Agency Agreements, must be subject to established International Swaps and Derivatives Association, Inc. (ISDA) Master Agreements and have full documentation of all legal obligations of CERS under the transactions. All ISDA Master Agreements entered into by or on behalf of CERS by the KPPA Investment Staff and external manager pursuant to an Agency Agreement shall provide that ~~netting~~ applies. (Netting allows the parties to an ISDA Master Agreement to aggregate the amounts owed by each of them under all of the transactions outstanding under that ISDA Master Agreement and replace them with a single net amount payable by one party to the other.) The KPPA Investment Staff and external managers may also use collateral arrangements to mitigate counterparty credit or performance risk. If an external manager utilizes a collateral arrangement to mitigate counterparty credit or performance risk the arrangement shall be delineated in the manager's guideline section of the manager's contract.

Derivatives Applications Not Permitted:

Speculation:

Except for investments in Alternative, Opportunistic Diversifying Strategies investments, and Real Return investments, derivatives may not be used for any activity for which the primary purpose is speculation or to profit while materially increasing risk to CERS. Derivatives are considered speculative if their uses have no material relation to objectives and strategies specified by the CERS IPS or applicable to the CERS portfolio. Derivatives may not be used for circumventing any limitations or restrictions imposed by the CERS IPS or applicable regulatory requirements.

Leverage:

Leverage is inherent in derivative contracts since only a small cash deposit is required to establish a much larger economic impact position. Thus, relative to the cash markets, where in most cases the cash outlay is equal to the asset acquired, derivative investments offer the possibility of establishing substantially larger market risk exposures with the same amount of cash as a traditional cash market portfolio. Therefore, risk management and control processes must focus on the total risk, i.e. the net notional value, assumed in a derivative investment.

The above is not intended to limit CERS from borrowing to cover short-term cash flow needs nor prohibit CERS from loaning securities in accordance with a securities lending agreement.

The CERS Board recognizes that the voting of proxies is an important responsibility in assuring the overall performance over a long-time horizon. The CERS Board has delegated the responsibility of voting all proxies to an outside Proxy Voting service provider or contracted external investment manager. The CERS Board expects that the proxy voting service will execute

all proxies in a timely fashion, and in accordance with the voting policy which has been formally adopted.

The CERS Board has adopted the ISS U.S. Proxy Voting Guidelines as the CERS' approved Proxy Voting Policy for all internally voted items. This policy is updated at least annually by ISS is and hereby incorporated by this reference. The policy can be found publicallypublicly using the following link:

<http://www.issgovernance.com/files/2012USSummaryGuidelines1312012.pdf> ISS U.S. Proxy Voting Guidelines.comissgovernance.com

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Additional CERS Investment Administrative Policies

- A. Investment Procurement Policy as amended and the Investment Manager Onboarding Checklist as amended are hereby incorporated by reference.
- B. KPPA Investment Brokerage Policy as amended is hereby incorporated by reference.
- C. KPPA Transactions Procedures Policy as amended is hereby incorporated by reference.
- D. KPPA Securities Litigation Policy and Procedures as amended is hereby incorporated by reference.
- E. KPPA Investment Securities Lending Guidelines as amended is hereby incorporated by reference.
- F. KPPA Securities Trading Policy for Trustees and Employees as amended is hereby incorporated by reference.
- G. KPPA Manager and Placement Agent Statement of Disclosure Policy as amended is hereby incorporated by reference.
- H. KPPA Real Estate Policy as amended and hereby incorporated by reference.
- I. KPPA Conflict of Interest and Confidentiality Policy as amended and hereby incorporated by reference.
- G-J. KPPA Proxy Voting Policy as amended and hereby incorporated by reference.

Commented [HS(5): This is more of an internal documents, and while I agree having it, the references to computer drives an specific job functions within KPPA likely will change often. I recommend folding it into internal procedures that the Compliance Officer will monitor and report. I would take it out of here.

Signatories

As Adopted by the CERS Investment Committee

Date: _____

Signature: _____

Dr. Merl Hackbart

Chair, CERS Investment Committee

As Adopted by the CERS Board of Trustees

Date: _____

Signature: _____

Ms. Betty Pendergrass

Chair, CERS Board of Trustees