

**KENTUCKY RETIREMENT SYSTEMS
INVESTMENT COMMITTEE MEETING
Tuesday, August 24, 2021 at 10:00 a.m.
AGENDA**

- 10:00 A.M. Call to Order
- 10:01 A.M. Roll Call – Carol Johnson
- 10:03 A.M. Public Comment – Carol Johnson
- 10:05 A.M. Approval of Minutes*- May 4, 2021 – Prewitt Lane
- 10:08 A.M. Discussion of Standard Reports – Steven Herbert
- 10:15 A.M. Performance Report – Steven Herbert
- 10:30 A.M. Public Equity Search* – Prewitt Lane and Joe Gilbert
- 10:50 A.M. Research Management System Presentation – Steven Herbert
- 11:20 A.M. GRS Stress Test – Janie Shaw and Danny White
- 11:50 A.M. Adjourn

** Committee Action May be Taken*

**MINUTES OF MEETING
KENTUCKY RETIREMENT SYSTEMS
INVESTMENT COMMITTEE SPECIAL CALLED
MAY 4, 2021, 10:00 A.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 May 4, 2021 Special Called Kentucky Retirement Systems Investment Committee Meeting, the following Committee members were present: Prewitt Lane (Chair), Joseph Grossman, Kelly Downard, Keith Peercy, and John Cheshire, III. Staff members present were David Eager, Steven Herbert, Victoria Hale, Rebecca Adkins, Erin Surratt, Steve Willer, Anthony Chiu, Joseph Gilbert, Alane Foley and Carol Johnson. Also in attendance were David Lindberg, Chris Tessman, Craig Morton, Shawn Quinn and Marc Friedberg from Wilshire.

Mr. Prewitt Lane called the meeting to order and Ms. Alane Foley called roll.

Mr. Prewitt Lane introduced agenda item *Public Comment*. Ms. Alane Foley stated that no public comments were submitted.

Mr. Prewitt Lane introduced agenda item *Approval of Minutes March 25, 2021*. Mr. Joseph Grossman moved and was seconded by Mr. Kelly Downard to approve the minutes as presented. The motion passed unanimously.

Mr. Prewitt Lane introduced agenda item *Personnel Update*. Mr. Steven Herbert welcomed Mr. Jared Crawford to the KPPA Investment Team. Mr. Steven Herbert stated that Jared joined us last month and that he came from Internal Audit and has a deep understanding of financials and statistical analysis. Mr. Steven Herbert further stated that Mr. Jared Crawford will be our research analyst of investments and our compliance officer and will be overseeing external managers and staff and entrust we are in compliance with all investment policies.

Mr. Prewitt Lane introduced agenda item *Discussion of Standard Reports*. Mr. Steven Herbert outlined the standard reports that were included in Board Books. Mr. Herbert asked if there were any questions regarding any of the reports and there were none. This was provided for informational purposes only.

Mr. Prewitt Lane introduced agenda item *Performance*. Mr. Steven Herbert reviewed the Kentucky Retirement Systems Pension and Insurance Funds net returns and plan net returns charts that were included in Board Books with the Investment Committee members. Mr. Steven Herbert stated that the format of these charts are currently being revised to highlight the plans much better and to reflect the April 1, 2021 changes going forward. Mr. Joseph Grossman asked if the revised reports would include how our allocation is compared to our investment policy statement. Mr. Steven Herbert stated that the revised report will have that information outlined.

Mr. Prewitt Lane introduced agenda item *Real Estate Fund Investments Increased Allocation*. Mr. Steven Herbert reviewed the proposals contained in Board Books to increase the allocations

to existing real estate funds. Mr. Herbert first reviewed the memorandum regarding Harrison Street Core Property Fund with the Investment Committee members. Mr. Herbert stated that Harrison Street Core Property Fund is an open-end fund that was originally allocated assets in 2011 and had a commitment of roughly 90 basis points in the plan. Mr. Steven Herbert stated that an additional 200 million has been committed to Harrison Street Core Property Fund and will be added over this year as capital gets called. This is an increase of approximately another 90 basis points in the plan.

Mr. Steven Herbert stated that the second fund we added to was Prologis Targeted US Logistics Fund and he reviewed the memorandum regarding Prologis with the Investment Committee members. Mr. Herbert stated that it was an open-end fund that was originally allocated assets in 2012 and that we had a commitment of roughly 100 basis points in the plan. Mr. Herbert further stated that an additional 100 million in assets have been committed and will be added over this year as that capital gets called. This is an increase of approximately 50 basis points in the plan.

Mr. Steven Herbert stated that the real estate fund investments increased allocation increased the real estate allocation by approximately 1.5%. Mr. Steven Herbert further stated that the real estate allocation is now at approximately 5% with the target goal being 10%. This was provided for informational purposes only.

There being no further business, Mr. Kelly Downard moved and was seconded by Mr. Joseph Grossman to adjourn the meeting at 10:30 a.m. The next meeting of the Kentucky Retirement Systems Investment Committee is scheduled for 10:00 a.m. on August 24, 2021. Copies of all

documents presented are incorporated as part of the minutes of the Special Called Kentucky Retirement Systems Investment Committee meeting held May 4, 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 Kentucky Retirement Systems Investment Committee of the Board of Trustees of the Kentucky Retirement Systems, do certify that the Minutes of the meeting held on March 25, 2021 were approved by the Kentucky Retirement Systems Investment Committee on May 4, 2021.

Committee Chair

I have reviewed the Minutes of the Special Called Kentucky Retirement Systems Investment

Committee Meeting on May 4, 2021 for form, content, and legality.

Office of Legal Services

Standard Reports

Monthly Report
Commissions Report
Internal Holdings Report
Security Litigation Report
Capital Calls - Capital Calls Pension and Capital Calls Insurance
Management Fees
Meeting Report



Kentucky Public Pensions Authority, Office of Investments

Fiscal Year 2021

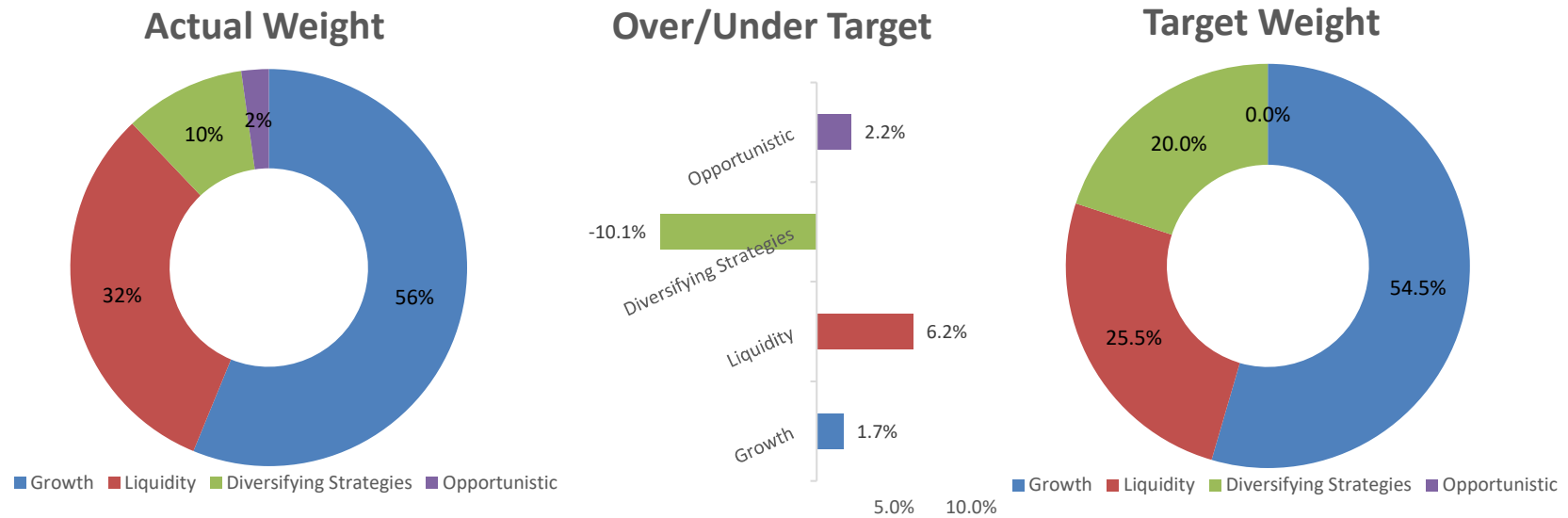
Investment Review for the Quarter Ended June 30, 2021

Presented to the Kentucky Retirement Systems

Investment Committee

Total KERS: Asset Allocation vs Targets As of June 30, 2021

Actual vs Target Weights



Growth	\$1,708,368,442	56.2%	54.5%	1.7%
Liquidity	\$964,158,548	31.7%	25.5%	6.2%
Diversifying Strategies	\$299,580,594	9.9%	20.0%	-10.1%
Opportunistic	\$67,526,074	2.2%	0.0%	2.2%

Asset Allocation	Actual	Target	Target Difference	IPS Min	IPS Max
US Equity	16.88%	16.25%	0.63%	11.38%	21.13%
Non-US Equity	16.35%	16.25%	0.10%	11.38%	21.13%
Private Equity	5.73%	7.00%	-1.27%	4.90%	9.10%
High Yield/Specialty Credit	16.86%	15.00%	1.86%	10.50%	19.50%
Core Fixed Income	23.26%	20.50%	2.76%	16.40%	24.60%
Cash	8.86%	5.00%	3.86%	0.00%	10.00%
Real Return	6.33%	10.00%	-3.67%	7.00%	13.00%
Real Estate	3.44%	10.00%	-6.56%	7.00%	13.00%
Opportunistic	2.23%	0.00%	2.23%	0.00%	5.00%

Total KERS Risk Categorization Summary

As of June 30, 2021

	Market Value (\$USD)	% of Portfolio	MTD	QTD	YTD	1 Year
Total Portfolio	\$ 3,039,487,623	100.0%	1.8%	5.3%	8.7%	22.6%
Growth	\$ 1,708,368,442	56.2%	1.9%	6.9%	12.1%	34.0%
<i>Growth Custom Benchmark</i>			1.5%	6.0%	11.9%	38.1%
Liquidity	\$ 964,158,548	31.7%	0.1%	0.7%	0.5%	3.0%
<i>Liquidity Custom Benchmark</i>			0.6%	1.7%	-1.5%	-0.3%
Diversifying Strategies	\$ 299,580,594	9.9%	2.1%	5.6%	9.3%	18.7%
<i>Diversifying Strategies Custom</i>			1.1%	2.7%	4.4%	7.6%
Opportunistic	\$ 67,526,074	2.2%	0.8%	3.1%	5.6%	

Total KERS Risk Categorization Summary

As of June 30, 2021

	Market Value (\$USD)	% of Portfolio	MTD	QTD	YTD	1 Year
Total Portfolio	\$ 3,039,487,623	100.0%	1.8%	5.3%	8.7%	22.6%
<i>KERS Pension IPS Policy Index</i>			1.8%	4.9%	7.1%	20.6%
Growth	\$ 1,708,368,442	56.2%	1.9%	6.9%	12.1%	34.0%
<i>Growth Custom Benchmark</i>			1.5%	6.0%	11.9%	38.1%
Public Equity	\$ 995,260,417	32.7%	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	\$ 506,498,496	16.7%	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	\$ 488,761,920	16.1%	-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	\$ 202,160,768	6.7%	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	\$ 510,947,257	16.8%	1.4%	2.9%	5.8%	15.3%
<i>High Yield Custom Benchmark</i>			0.8%	2.1%	3.4%	13.5%
Liquidity	\$ 964,158,548	31.7%	0.1%	0.7%	0.5%	3.0%
<i>Liquidity Custom Benchmark</i>			0.6%	1.7%	-1.5%	-0.3%
Liquidity (Other)	\$ 266,071,892	8.8%	0.1%	0.4%	0.4%	1.2%
<i>Liquidity Custom Benchmark</i>			0.6%	1.7%	-1.5%	-0.3%
Core Fixed Income	\$ 698,086,655	23.0%	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	\$ 299,580,594	9.9%	2.1%	5.6%	9.3%	18.7%
<i>Diversifying Strategies Custom</i>			1.1%	2.7%	4.4%	7.6%
Real Return	\$ 190,516,970	6.3%	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	\$ 109,063,625	3.6%	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	\$ 67,526,074	2.2%	0.8%	3.1%	5.6%	

Total KERS Detailed Performance As of June 30, 2021

	Market Value (\$USD)	% of Portfolio	MTD	QTD	YTD	1 Year
Total Portfolio	\$ 3,039,487,623	100.0%	1.8%	5.3%	8.7%	22.6%
<i>KERS Pension IPS Policy Index</i>			1.8%	4.9%	7.1%	20.6%
Growth	\$ 1,708,368,442	56.2%	1.9%	6.9%	12.1%	34.0%
<i>Growth Custom Benchmark</i>			1.5%	6.0%	11.9%	38.1%
Public Equity	\$ 995,260,417	32.7%	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	\$ 506,498,496	16.7%	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	\$ 6,057	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	\$ 7,198	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	\$ 33,684,325	1.1%	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	\$ 29,730,080	1.0%	-1.1%	3.5%	17.5%	52.9%
Next Century Small Micro Cap Growth	\$ 21,753,093	0.7%	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	\$ 40,940,667	1.3%	1.1%	4.4%	19.7%	60.8%
<i>Russell 2000 Index</i>			1.9%	4.3%	17.5%	62.0%
River Road FAV	\$ 38,542,113	1.3%	-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	\$ 302,910,782	10.0%	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	\$ 5,522	0.0%	0.0%	0.0%	-1.5%	-1.4%
Westfield All Cap Growth	\$ 38,918,660	1.3%	4.7%	10.8%	14.0%	42.5%
<i>Russell 3000 Growth Index</i>			6.2%	11.4%	12.7%	43.0%
Non U.S. Equity	\$ 488,761,920	16.1%	-1.1%	5.9%	9.6%	37.8%

Total KERS 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	\$ 72,189,842	2.4%	-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	\$ 149,787,937	4.9%	-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	\$ 54,240,178	1.8%	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	\$ 29,084,754	1.0%	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	\$ 572	0.0%	-0.1%	0.0%	0.1%	25.6%
KRS Non-US Transition Account	\$ 151,710	0.0%	-2.5%	-7.7%	-10.1%	-14.1%
Lazard Emerging Markets Equity	\$ 77,759,107	2.6%	-2.4%	4.3%	8.7%	36.3%
LSV Emerging Markets Value Equity	\$ 63,583,409	2.1%	-2.1%	5.3%	14.4%	36.2%
NTGI International Small Cap	\$ 15,512,111	0.5%	-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	\$ 26,452,300	0.9%	-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	\$ 202,160,768	6.7%	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	\$ 510,947,257	16.8%	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	\$ 147,715,638	4.9%	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	\$ 23,485,560	0.8%	0.0%	-0.2%	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	\$ 4,062	0.0%	0.0%	0.0%	0.0%	-0.9%
<i>Bloomberg Barclays U.S. Corporate High Yield</i>			1.3%	2.8%	3.6%	15.4%

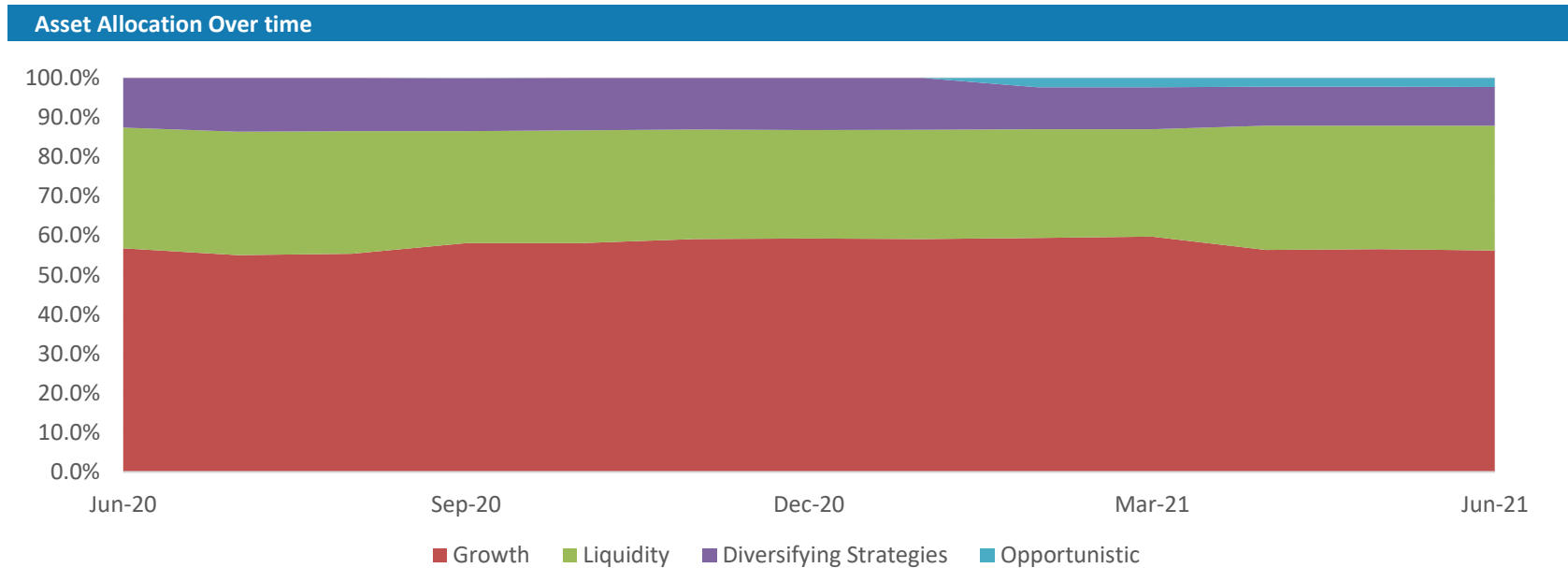
Total KERS Detailed Performance As of June 30, 2021

	Market Value (\$USD)	% of Portfolio	MTD	QTD	YTD	1 Year
Manulife Strategic Fixed Income	\$ 39,218,679	1.3%	-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	\$ 126,475,621	4.2%	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	\$ 19,639,394	0.6%	0.2%	1.4%	2.7%	10.8%
Waterfall High Yield ABS Composite	\$ 40,942,626	1.3%	0.7%	2.7%	8.3%	19.9%
Liquidity	\$ 964,158,548	31.7%	0.1%	0.7%	0.5%	3.0%
<i>Liquidity Custom Benchmark</i>			0.6%	1.7%	-1.5%	-0.3%
Liquidity (Other)	\$ 266,071,892	8.8%	0.1%	0.4%	0.4%	1.2%
<i>Liquidity Custom Benchmark</i>			0.6%	1.7%	-1.5%	-0.3%
Cash Account	\$ 266,071,892	8.8%	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	\$ 698,086,655	23.0%	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	\$ 1	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	\$ 136,501,454	4.5%	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	\$ 512,971,618	16.9%	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	\$ 48,613,583	1.6%	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	\$ 299,580,594	9.9%	2.1%	5.6%	9.3%	18.7%
<i>Diversifying Strategies Custom</i>			1.1%	2.7%	4.4%	7.6%
Real Return	\$ 190,516,970	6.3%	1.8%	6.1%	11.0%	24.0%
<i>Pension Real Return Custom Bmk</i>			1.8%	6.1%	11.0%	24.0%
Blackstone Strategic Opportunities Fund	\$ 285,098	0.0%	0.0%	1.9%	-5.0%	

Total KERS Detailed Performance As of June 30, 2021

	Market Value (\$USD)	% of Portfolio	MTD	QTD	YTD	1 Year
<i>HFRI Fund of Funds Diversified Index</i>			0.4%	2.5%	4.4%	
Daniel Boone Fund	\$ 17,802,754	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	\$ 27,042	0.0%	0.0%	0.0%	0.0%	0.0%
Luxor Capital	\$ 207,946	0.0%	0.0%	-2.4%	-4.8%	
Myriad Opportunities US Fund Limited	\$ 2,808,010	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	\$ 40,728	0.0%	-2.3%	-0.8%	-7.0%	-216.8%
Pine River Fund LP	\$ 15,578	0.0%	0.0%	-0.3%	1.5%	
Putnam Dynamic Asset Allocation Balanced	\$ 127,509,815	4.2%	2.0%	6.7%	10.2%	26.4%
SRS Partners Master Fund	\$ 978,324	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	\$ 29,813,759	1.0%	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	\$ 241,308	0.0%	0.0%	0.0%	0.0%	
<i>HFRI Fund of Funds Diversified Index</i>			0.4%	2.5%	4.4%	
Real Estate	\$ 109,063,625	3.6%	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	\$ 16,910,854	0.6%	0.0%	1.4%	1.4%	4.0%
Perimeter Park West	\$ 1,879,905	0.1%	0.0%	0.0%	0.0%	0.0%
Prologis Targeted U.S. Logistics Holdings	\$ 30,171,718	1.0%	0.0%	4.6%	10.9%	12.5%
Stockbridge Smart Markets	\$ 22,342,589	0.7%	0.0%	0.0%	2.3%	4.6%
Opportunistic	\$ 67,526,074	2.2%	0.8%	3.1%	5.6%	
ArrowMark Fundamental Opportunity Fund	\$ 67,526,074	2.2%	0.0%	2.3%	4.8%	
<i>S&P LSTA Leveraged Loan Index</i>			0.4%	1.5%	2.1%	

Total KERS Asset Allocation Over Time As of June 30, 2021

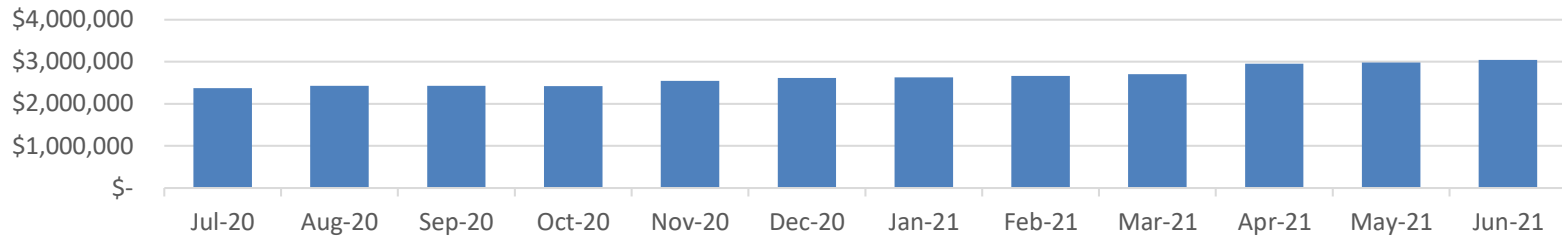


Risk Categorization	January 2021	February 2021	March 2021	April 2021	May 2021	June 2021
Growth	59.17%	59.45%	59.80%	56.40%	56.58%	56.21%
Liquidity	27.73%	27.56%	27.19%	31.51%	31.32%	31.72%
Diversifying Strategies	13.11%	10.71%	10.69%	9.94%	9.89%	9.86%
Opportunistic	0.00%	2.29%	2.32%	2.16%	2.20%	2.22%

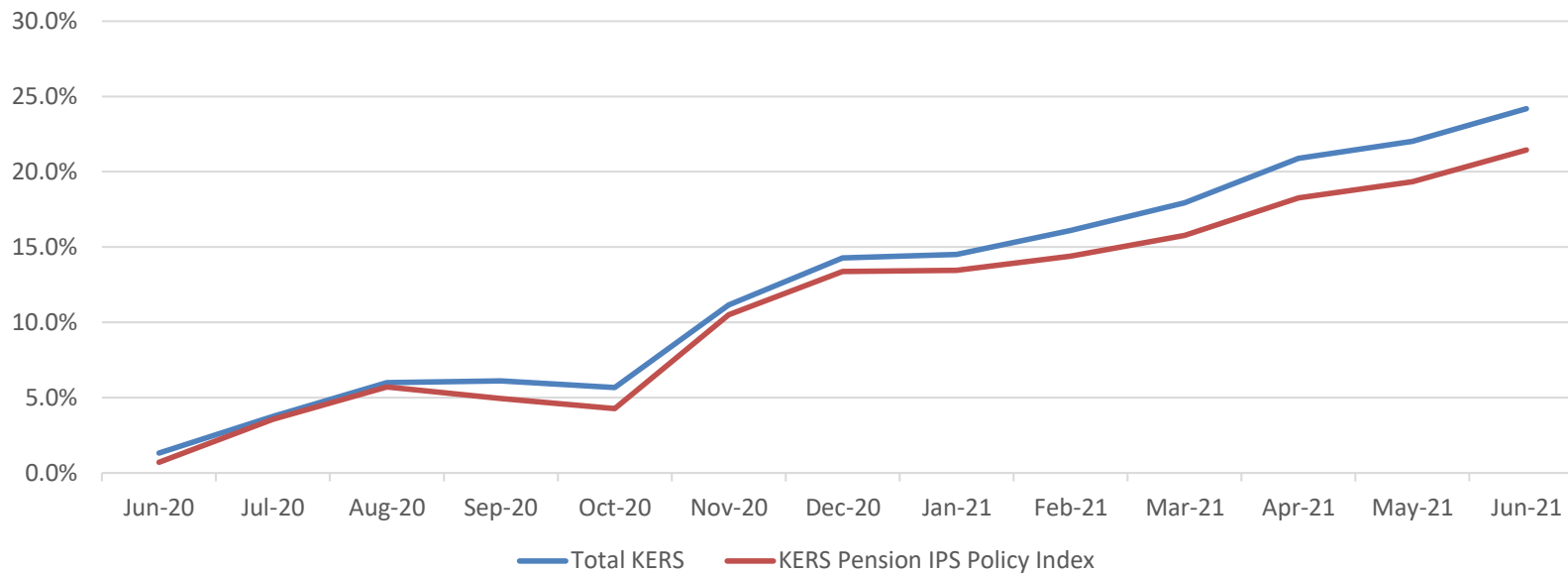


Total KERS Summary As of June 30, 2021

Market Value Over Time (\$USD 000)

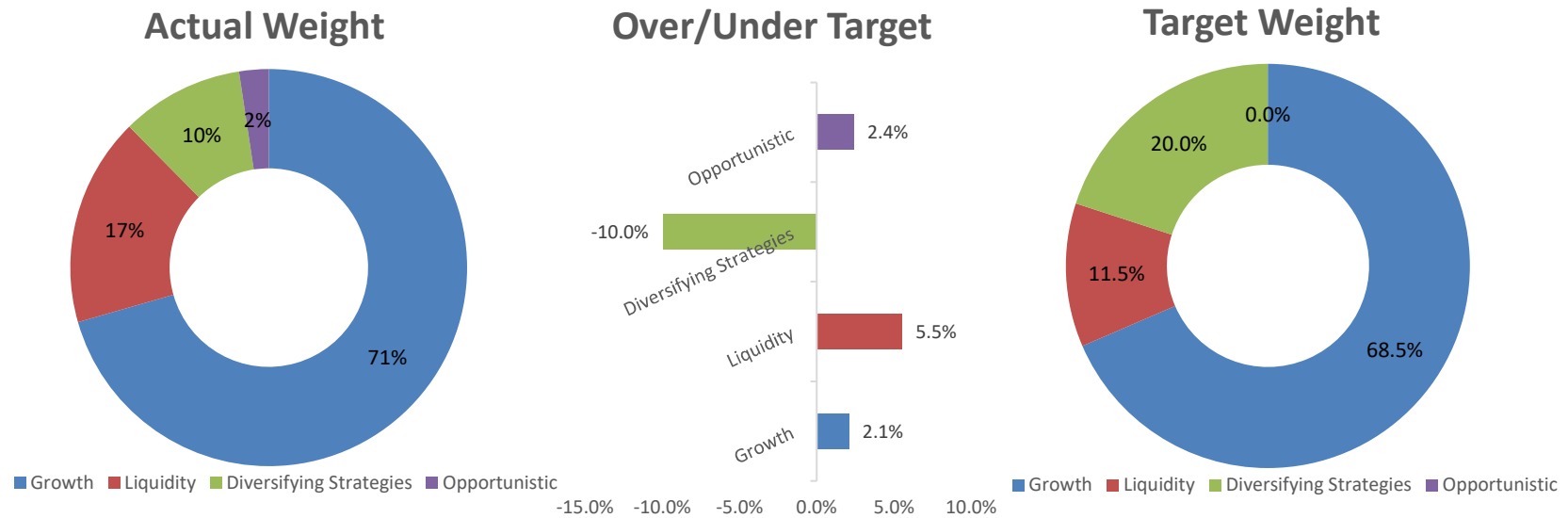


Cumulative Performance Over 1 Year



Total KERS-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	\$614,862,104	70.6%	68.5%	2.1%
Liquidity	\$148,311,070	17.0%	11.5%	5.5%
Diversifying Strategies	\$87,252,772	10.0%	20.0%	-10.0%
Opportunistic	\$20,935,044	2.4%	0.0%	2.4%

Asset Allocation	Actual	Target	Target Difference	IPS Min	IPS Max
US Equity	23.51%	21.75%	1.76%	15.23%	28.28%
Non-US Equity	23.01%	21.75%	1.26%	15.23%	28.28%
Private Equity	6.82%	10.00%	-3.18%	7.00%	13.00%
High Yield/Specialty Credit	17.07%	15.00%	2.07%	10.50%	19.50%
Core Fixed Income	13.44%	10.00%	3.44%	8.00%	12.00%
Cash	3.74%	1.50%	2.24%	0.00%	3.00%
Real Return	6.36%	10.00%	-3.64%	7.00%	13.00%
Real Estate	3.46%	10.00%	-6.54%	7.00%	13.00%
Opportunistic	2.41%	0.00%	2.41%	0.00%	5.00%

Total KERS-H Risk Categorization Summary As of June 30, 2021

	Market Value (\$USD)	% of Portfolio	MTD	QTD	YTD	1 Year
Total Portfolio	\$ 871,318,978	100.0%	1.5%	5.5%	9.5%	25.2%
Growth	\$ 614,862,104	70.6%	1.9%	6.9%	12.1%	34.0%
<i>Growth Custom Benchmark</i>			1.5%	6.0%	11.9%	38.1%
Liquidity	\$ 148,311,070	17.0%	0.1%	0.7%	0.5%	3.0%
<i>Liquidity Custom Benchmark</i>			0.6%	1.7%	-1.5%	-0.3%
Diversifying Strategies	\$ 87,252,772	10.0%	2.1%	5.6%	9.3%	18.7%
<i>Diversifying Strategies Custom</i>			1.1%	2.7%	4.4%	7.6%
Opportunistic	\$ 20,935,044	2.4%	0.8%	3.1%	5.6%	

Total KERS-H Risk Categorization Summary As of June 30, 2021

	Market Value (\$USD)	% of Portfolio	MTD	QTD	YTD	1 Year
Total Portfolio	\$ 871,318,978	100.0%	1.5%	5.5%	9.5%	25.2%
<i>KERS-H Pension IPS Policy Index</i>			2.1%	6.0%	9.4%	25.7%
Growth	\$ 614,862,104	70.6%	1.9%	6.9%	12.1%	34.0%
<i>Growth Custom Benchmark</i>			1.5%	6.0%	11.9%	38.1%
Public Equity	\$ 400,841,755	46.0%	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	\$ 202,937,022	23.3%	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	\$ 197,904,733	22.7%	-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	\$ 65,396,287	7.5%	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	\$ 148,624,061	17.1%	1.4%	2.9%	5.8%	15.3%
<i>High Yield Custom Benchmark</i>			0.8%	2.1%	3.4%	13.5%
Liquidity	\$ 148,311,070	17.0%	0.1%	0.7%	0.5%	3.0%
<i>Liquidity Custom Benchmark</i>			0.6%	1.7%	-1.5%	-0.3%
Liquidity (Other)	\$ 32,253,447	3.7%	0.0%	0.0%	0.1%	-0.1%
<i>Liquidity Custom Benchmark</i>			0.6%	1.7%	-1.5%	-0.3%
Core Fixed Income	\$ 116,057,624	13.3%	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	\$ 87,252,772	10.0%	2.1%	5.6%	9.3%	18.7%
<i>Diversifying Strategies Custom</i>			1.1%	2.7%	4.4%	7.6%
Real Return	\$ 54,840,226	6.3%	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	\$ 32,412,546	3.7%	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	\$ 20,935,044	2.4%	0.8%	3.1%	5.6%	

Total KERS-H Detailed Performance

As of June 30, 2021

	Market Value (\$USD)	% of Portfolio	MTD	QTD	YTD	1 Year
Total Portfolio	\$ 871,318,978	100.0%	1.5%	5.5%	9.5%	25.2%
<i>KERS-H Pension IPS Policy Index</i>			2.1%	6.0%	9.4%	25.7%
Growth	\$ 614,862,104	70.6%	1.9%	6.9%	12.1%	34.0%
<i>Growth Custom Benchmark</i>			1.5%	6.0%	11.9%	38.1%
Public Equity	\$ 400,841,755	46.0%	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	\$ 202,937,022	23.3%	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	\$ 2,447	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	\$ 2,837	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	\$ 13,607,249	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	\$ 11,717,637	1.3%	-1.1%	3.5%	17.5%	52.9%
Next Century Small Micro Cap Growth	\$ 8,573,635	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	\$ 16,136,111	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	\$ 15,190,759	1.7%	-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	\$ 122,365,002	14.0%	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	\$ 2,176	0.0%	0.0%	0.0%	-1.5%	-1.4%
Westfield All Cap Growth	\$ 15,339,169	1.8%	4.7%	10.8%	14.0%	42.5%
<i>Russell 3000 Growth Index</i>			6.2%	11.4%	12.7%	43.0%
Non U.S. Equity	\$ 197,904,733	22.7%	-1.1%	5.9%	9.6%	37.8%

Total KERS-H 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	\$ 29,711,293	3.4%	-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	\$ 58,392,651	6.7%	-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	\$ 22,323,720	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	\$ 11,970,460	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	\$ 235	0.0%	-0.1%	0.0%	0.1%	25.6%
KRS Non-US Transition Account	\$ 62,440	0.0%	-2.5%	-7.7%	-10.1%	-14.1%
Lazard Emerging Markets Equity	\$ 32,003,444	3.7%	-2.4%	4.3%	8.7%	36.3%
LSV Emerging Markets Value Equity	\$ 26,169,129	3.0%	-2.1%	5.3%	14.4%	36.2%
NTGI International Small Cap	\$ 6,384,345	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	\$ 10,887,017	1.2%	-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	\$ 65,396,287	7.5%	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	\$ 148,624,061	17.1%	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	\$ 32,335,729	3.7%	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	\$ 4,005,750	0.5%	0.0%	-0.2%	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	\$ 1,990	0.0%	0.0%	0.0%	0.0%	-0.9%
<i>Bloomberg Barclays U.S. Corporate High Yield</i>			1.3%	2.8%	3.6%	15.4%

Total KERS-H Detailed Performance As of June 30, 2021

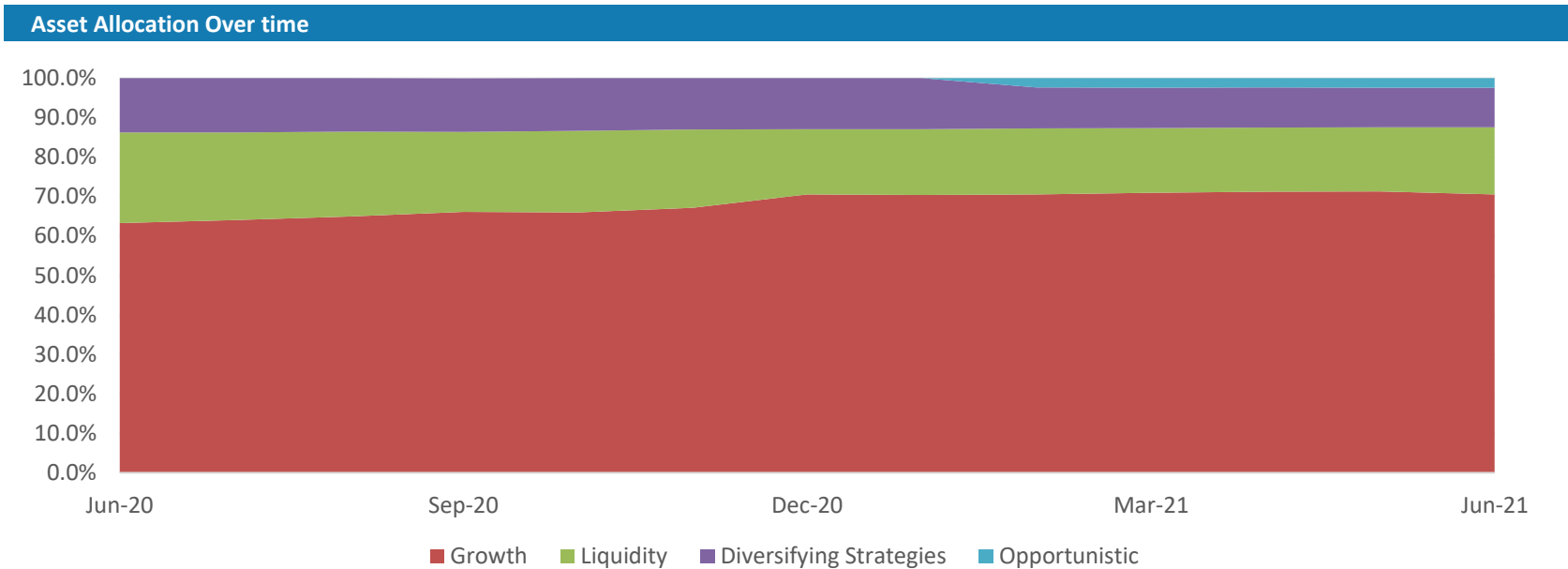
	Market Value (\$USD)	% of Portfolio	MTD	QTD	YTD	1 Year
Manulife Strategic Fixed Income	\$ 19,213,378	2.2%	-0.4%	1.3%	1.9%	11.4%
<i>Bloomberg Barclays U.S. Universal Index</i>			0.7%	2.0%	-1.1%	1.1%
Marathon Blue Grass Credit Fund	\$ 21,367,841	2.5%	0.0%	2.4%	8.0%	17.6%
<i>Bloomberg Barclays U.S. Corporate High Yield</i>			1.3%	2.8%	3.6%	15.4%
Shenkman Capital High Yield Corporate Bond & Debt	\$ 19,116,596	2.2%	0.2%	1.4%	2.7%	10.8%
Waterfall High Yield ABS Composite	\$ 12,710,358	1.5%	0.7%	2.7%	8.3%	19.9%
Liquidity	\$ 148,311,070	17.0%	0.1%	0.7%	0.5%	3.0%
<i>Liquidity Custom Benchmark</i>			0.6%	1.7%	-1.5%	-0.3%
Liquidity (Other)	\$ 32,253,447	3.7%	0.0%	0.0%	0.1%	-0.1%
<i>Liquidity Custom Benchmark</i>			0.6%	1.7%	-1.5%	-0.3%
Cash Account	\$ 32,253,447	3.7%	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	\$ 116,057,624	13.3%	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	\$ 0	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	\$ 22,693,507	2.6%	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	\$ 85,282,059	9.8%	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	\$ 8,082,058	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	\$ 87,252,772	10.0%	2.1%	5.6%	9.3%	18.7%
<i>Diversifying Strategies Custom</i>			1.1%	2.7%	4.4%	7.6%
Real Return	\$ 54,840,226	6.3%	1.8%	6.1%	11.0%	24.0%
<i>Pension Real Return Custom Bmk</i>			1.8%	6.1%	11.0%	24.0%
Blackstone Strategic Opportunities Fund	\$ 74,384	0.0%	0.0%	1.9%	-5.0%	

Total KERS-H Detailed Performance

As of June 30, 2021

	Market Value (\$USD)	% of Portfolio	MTD	QTD	YTD	1 Year
<i>HFRI Fund of Funds Diversified Index</i>			0.4%	2.5%	4.4%	
Daniel Boone Fund	\$ 4,644,843	0.5%	0.0%	-1.0%	-0.1%	
<i>S&P 500 Total Return Index</i>			2.3%	8.5%	15.3%	
KRS Internal Tips	\$ 6,773	0.0%	0.0%	0.0%	0.0%	0.0%
Luxor Capital	\$ 54,254	0.0%	0.0%	-2.4%	-4.8%	
Myriad Opportunities US Fund Limited	\$ 732,626	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	\$ 10,201	0.0%	-2.3%	-0.8%	-7.0%	-195.0%
Pine River Fund LP	\$ 4,064	0.0%	0.0%	-0.3%	1.5%	
Putnam Dynamic Asset Allocation Balanced	\$ 31,938,085	3.7%	2.0%	6.7%	10.2%	26.4%
SRS Partners Master Fund	\$ 255,250	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	\$ 7,467,616	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	\$ 62,959	0.0%	0.0%	0.0%	0.0%	
<i>HFRI Fund of Funds Diversified Index</i>			0.4%	2.5%	4.4%	
Real Estate	\$ 32,412,546	3.7%	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	\$ 4,190,552	0.5%	0.0%	1.4%	1.4%	4.0%
Perimeter Park West	\$ 1,540,723	0.2%	0.0%	0.0%	0.0%	0.0%
Prologis Targeted U.S. Logistics Holdings	\$ 8,253,612	0.9%	0.0%	4.7%	10.9%	12.5%
Stockbridge Smart Markets	\$ 4,447,968	0.5%	0.0%	0.0%	2.3%	4.6%
Opportunistic	\$ 20,935,044	2.4%	0.8%	3.1%	5.6%	
ArrowMark Fundamental Opportunity Fund	\$ 20,935,044	2.4%	0.0%	2.3%	4.8%	
<i>S&P LSTA Leveraged Loan Index</i>			0.4%	1.5%	2.1%	

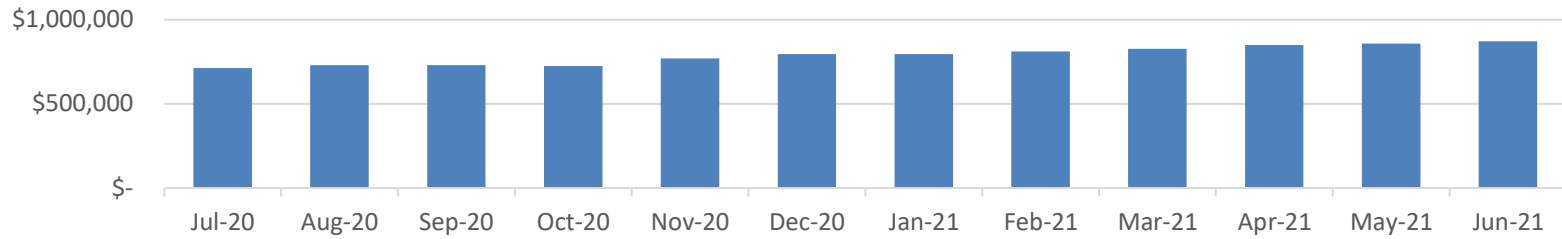
Total KERS-H: Asset Allocation Over Time As of June 30, 2021



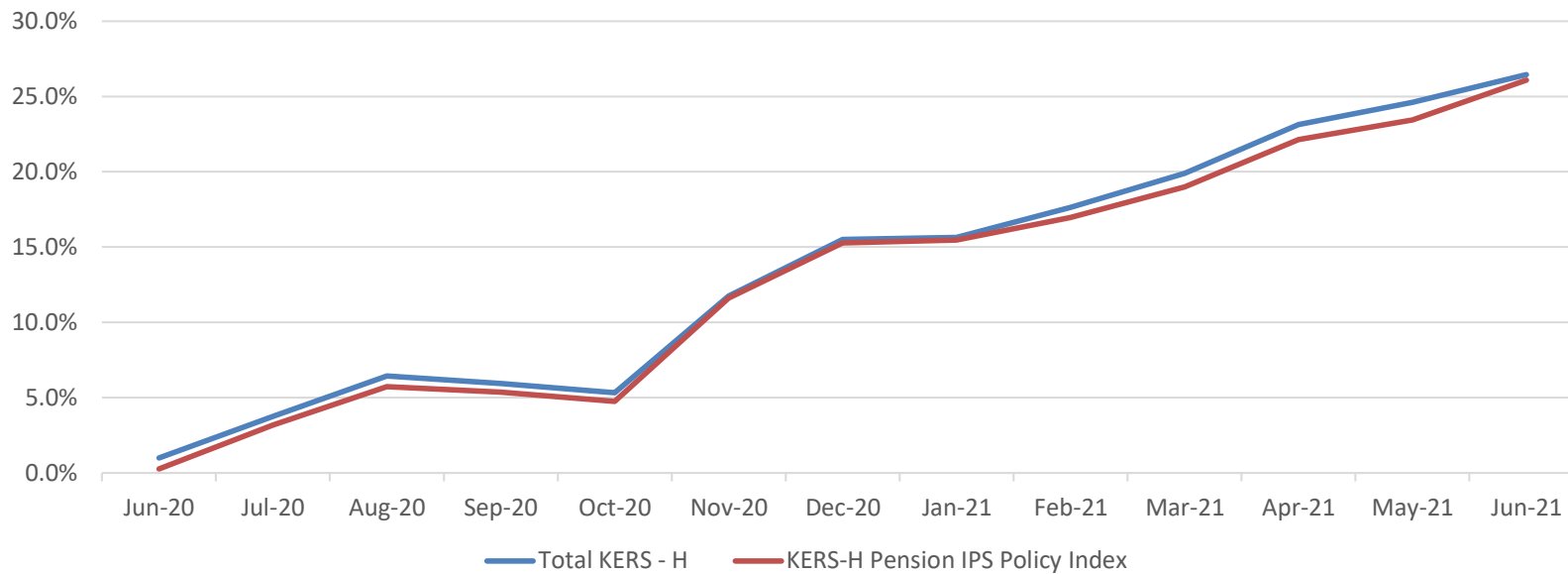
Risk Categorization	January 2021	February 2021	March 2021	April 2021	May 2021	June 2021
Growth	70.39%	70.59%	70.99%	71.26%	71.35%	70.57%
Liquidity	16.72%	16.74%	16.38%	16.29%	16.21%	17.02%
Diversifying Strategies	12.89%	10.35%	10.28%	10.13%	10.07%	10.01%
Opportunistic	0.00%	2.33%	2.36%	2.33%	2.37%	2.40%

Total KERS-H Summary As of June 30, 2021

Market Value Over Time (\$USD 000)

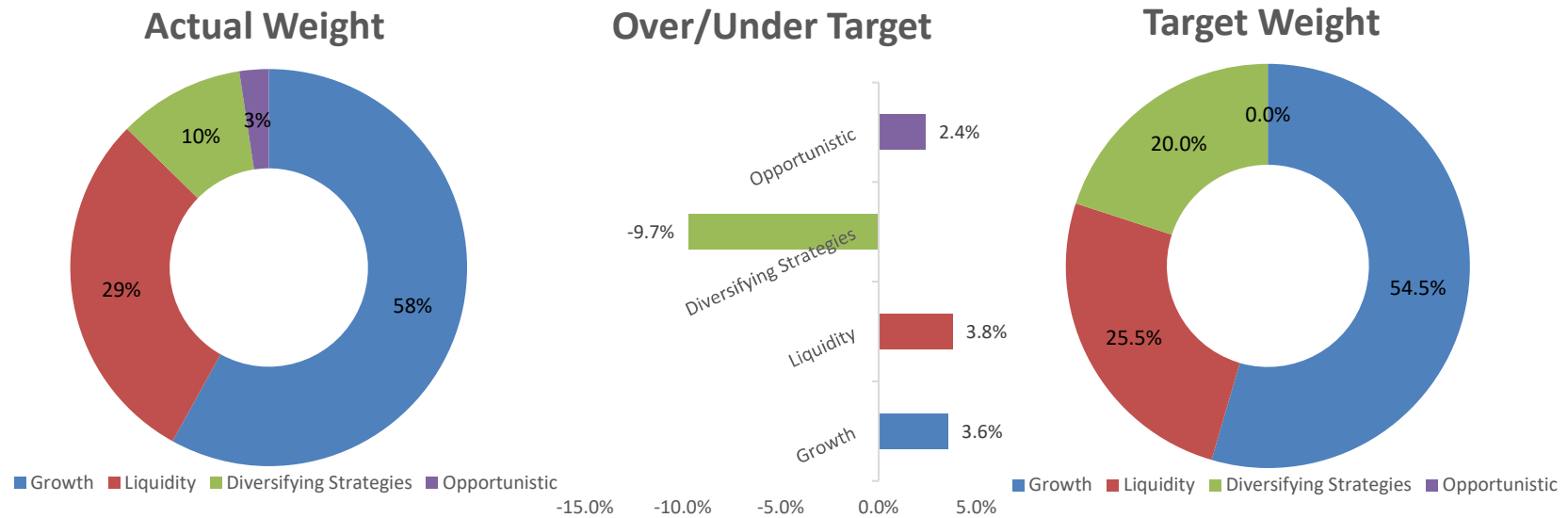


Cumulative Performance Over 1 Year



Total SPRS 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	\$202,829,020	58.1%	54.5%	3.6%
Liquidity	\$102,303,381	29.3%	25.5%	3.8%
Diversifying Strategies	\$35,905,867	10.3%	20.0%	-9.7%
Opportunistic	\$8,340,786	2.4%	0.0%	2.4%

Asset Allocation	Actual	Target	Target Difference	IPS Min	IPS Max
US Equity	18.35%	16.25%	2.10%	11.38%	21.13%
Non-US Equity	17.53%	16.25%	1.28%	11.38%	21.13%
Private Equity	4.89%	7.00%	-2.11%	4.90%	9.10%
High Yield/Specialty Credit	17.03%	15.00%	2.03%	10.50%	19.50%
Core Fixed Income	23.22%	20.50%	2.72%	16.40%	24.60%
Cash	6.33%	5.00%	1.33%	0.00%	10.00%
Real Return	6.45%	10.00%	-3.55%	7.00%	13.00%
Real Estate	3.70%	10.00%	-6.30%	7.00%	13.00%
Opportunistic	2.39%	0.00%	2.39%	0.00%	5.00%

Total SPRS Risk Categorization Summary As of June 30, 2021

	Market Value (\$USD)	% of Portfolio	MTD	QTD	YTD	1 Year
Total Portfolio	\$ 349,362,280	100.0%	1.4%	4.8%	8.2%	21.7%
Growth	\$ 202,829,020	58.1%	1.9%	6.9%	12.1%	34.0%
<i>Growth Custom Benchmark</i>			1.5%	6.0%	11.9%	38.1%
Liquidity	\$ 102,303,381	29.3%	0.1%	0.7%	0.5%	3.0%
<i>Liquidity Custom Benchmark</i>			0.6%	1.7%	-1.5%	-0.3%
Diversifying Strategies	\$ 35,905,867	10.3%	2.1%	5.6%	9.3%	18.7%
<i>Diversifying Strategies Custom</i>			1.1%	2.7%	4.4%	7.6%
Opportunistic	\$ 8,340,786	2.4%	0.8%	3.1%	5.6%	

Total SPRS Risk Categorization Summary As of June 30, 2021

	Market Value (\$USD)	% of Portfolio	MTD	QTD	YTD	1 Year
Total Portfolio	\$ 349,362,280	100.0%	1.4%	4.8%	8.2%	21.7%
<i>SPRS Pension IPS Policy Index</i>			1.8%	4.9%	7.1%	20.6%
Growth	\$ 202,829,020	58.1%	1.9%	6.9%	12.1%	34.0%
<i>Growth Custom Benchmark</i>			1.5%	6.0%	11.9%	38.1%
Public Equity	\$ 123,991,218	35.5%	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	\$ 63,530,702	18.2%	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	\$ 60,460,516	17.3%	-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	\$ 19,399,202	5.6%	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	\$ 59,438,601	17.0%	1.4%	2.9%	5.8%	15.3%
<i>High Yield Custom Benchmark</i>			0.8%	2.1%	3.4%	13.5%
Liquidity	\$ 102,303,381	29.3%	0.1%	0.7%	0.5%	3.0%
<i>Liquidity Custom Benchmark</i>			0.6%	1.7%	-1.5%	-0.3%
Liquidity (Other)	\$ 21,907,670	6.3%	0.1%	0.2%	0.2%	0.7%
<i>Liquidity Custom Benchmark</i>			0.6%	1.7%	-1.5%	-0.3%
Core Fixed Income	\$ 80,395,711	23.0%	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	\$ 35,905,867	10.3%	2.1%	5.6%	9.3%	18.7%
<i>Diversifying Strategies Custom</i>			1.1%	2.7%	4.4%	7.6%
Real Return	\$ 22,295,283	6.4%	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	\$ 13,610,584	3.9%	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	\$ 8,340,786	2.4%	0.8%	3.1%	5.6%	

Total SPRS Detailed Performance As of June 30, 2021

	Market Value (\$USD)	% of Portfolio	MTD	QTD	YTD	1 Year
Total Portfolio	\$ 349,362,280	100.0%	1.4%	4.8%	8.2%	21.7%
<i>SPRS Pension IPS Policy Index</i>			1.8%	4.9%	7.1%	20.6%
Growth	\$ 202,829,020	58.1%	1.9%	6.9%	12.1%	34.0%
<i>Growth Custom Benchmark</i>			1.5%	6.0%	11.9%	38.1%
Public Equity	\$ 123,991,218	35.5%	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	\$ 63,530,702	18.2%	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	\$ 739	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	\$ 953	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	\$ 4,107,357	1.2%	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	\$ 3,934,905	1.1%	-1.1%	3.5%	17.5%	52.9%
Next Century Small Micro Cap Growth	\$ 2,879,116	0.8%	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	\$ 5,418,675	1.6%	1.1%	4.4%	19.7%	60.8%
<i>Russell 2000 Index</i>			1.9%	4.3%	17.5%	62.0%
River Road FAV	\$ 5,101,216	1.5%	-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	\$ 36,935,957	10.6%	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	\$ 731	0.0%	0.0%	0.0%	-1.5%	-1.4%
Westfield All Cap Growth	\$ 5,151,053	1.5%	4.7%	10.8%	14.0%	42.5%
<i>Russell 3000 Growth Index</i>			6.2%	11.4%	12.7%	43.0%
Non U.S. Equity	\$ 60,460,516	17.3%	-1.1%	5.9%	9.6%	37.8%

Total SPRS 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	\$ 8,690,905	2.5%	-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	\$ 19,651,581	5.6%	-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	\$ 6,529,952	1.9%	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	\$ 3,501,501	1.0%	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	\$ 69	0.0%	-0.1%	0.0%	0.1%	25.6%
KRS Non-US Transition Account	\$ 18,264	0.0%	-2.5%	-7.7%	-10.1%	-14.1%
Lazard Emerging Markets Equity	\$ 9,361,386	2.7%	-2.4%	4.3%	8.7%	36.3%
LSV Emerging Markets Value Equity	\$ 7,654,780	2.2%	-2.1%	5.3%	14.4%	36.2%
NTGI International Small Cap	\$ 1,867,496	0.5%	-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	\$ 3,184,581	0.9%	-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	\$ 19,399,202	5.6%	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	\$ 59,438,601	17.0%	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	\$ 13,834,595	4.0%	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	\$ 1,978,824	0.6%	0.0%	-0.2%	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	\$ 833	0.0%	0.0%	0.0%	0.0%	-0.9%
<i>Bloomberg Barclays U.S. Corporate High Yield</i>			1.3%	2.8%	3.6%	15.4%

Total SPRS Detailed Performance As of June 30, 2021

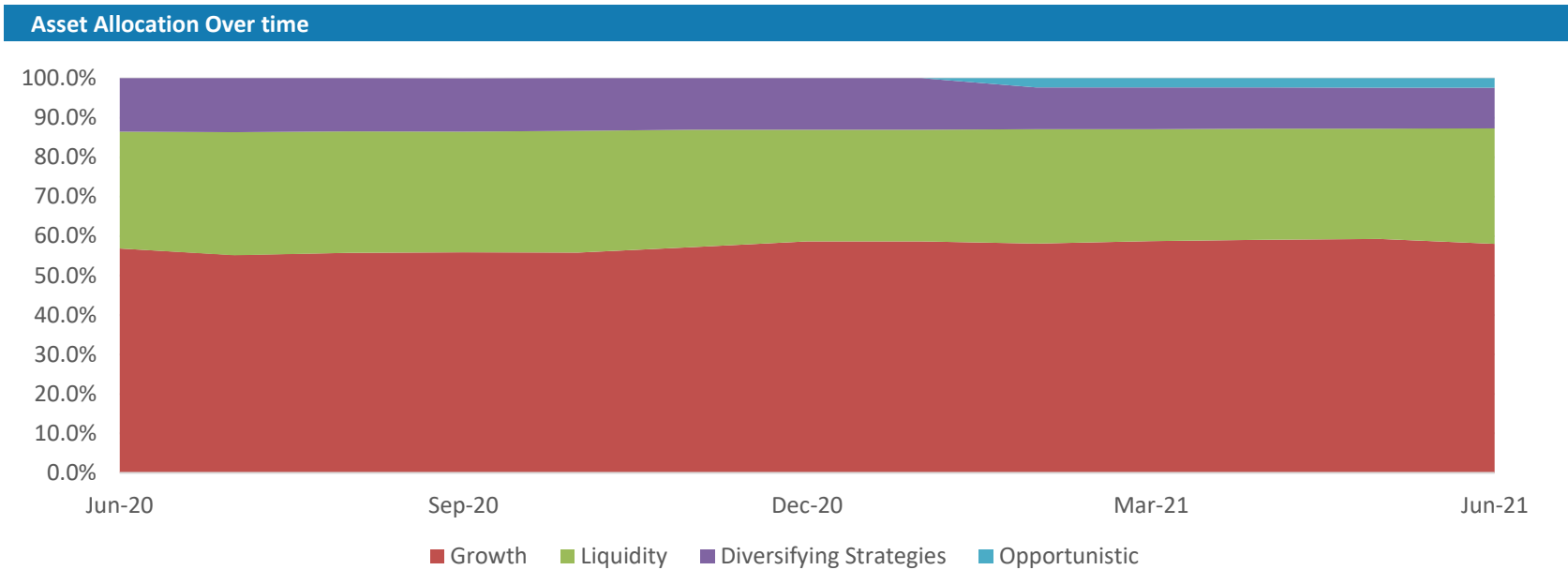
	Market Value (\$USD)	% of Portfolio	MTD	QTD	YTD	1 Year
Manulife Strategic Fixed Income	\$ 8,045,830	2.3%	-0.4%	1.3%	1.9%	11.4%
<i>Bloomberg Barclays U.S. Universal Index</i>			0.7%	2.0%	-1.1%	1.1%
Marathon Blue Grass Credit Fund	\$ 11,418,743	3.3%	0.0%	2.4%	8.0%	17.6%
<i>Bloomberg Barclays U.S. Corporate High Yield</i>			1.3%	2.8%	3.6%	15.4%
Shenkman Capital High Yield Corporate Bond & Debt	\$ 5,043,493	1.4%	0.2%	1.4%	2.7%	10.8%
Waterfall High Yield ABS Composite	\$ 7,042,815	2.0%	0.7%	2.7%	8.3%	19.9%
Liquidity	\$ 102,303,381	29.3%	0.1%	0.7%	0.5%	3.0%
<i>Liquidity Custom Benchmark</i>			0.6%	1.7%	-1.5%	-0.3%
Liquidity (Other)	\$ 21,907,670	6.3%	0.1%	0.2%	0.2%	0.7%
<i>Liquidity Custom Benchmark</i>			0.6%	1.7%	-1.5%	-0.3%
Cash Account	\$ 21,907,670	6.3%	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	\$ 80,395,711	23.0%	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	\$ 0	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	\$ 15,720,300	4.5%	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	\$ 59,076,789	16.9%	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	\$ 5,598,622	1.6%	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	\$ 35,905,867	10.3%	2.1%	5.6%	9.3%	18.7%
<i>Diversifying Strategies Custom</i>			1.1%	2.7%	4.4%	7.6%
Real Return	\$ 22,295,283	6.4%	1.8%	6.1%	11.0%	24.0%
<i>Pension Real Return Custom Bmk</i>			1.8%	6.1%	11.0%	24.0%
Blackstone Strategic Opportunities Fund	\$ 30,863	0.0%	0.0%	1.9%	-5.0%	

Total SPRS Detailed Performance As of June 30, 2021

	Market Value (\$USD)	% of Portfolio	MTD	QTD	YTD	1 Year
<i>HFRI Fund of Funds Diversified Index</i>			0.4%	2.5%	4.4%	
Daniel Boone Fund	\$ 1,927,197	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	\$ 2,705	0.0%	0.0%	0.0%	0.0%	0.0%
Luxor Capital	\$ 22,511	0.0%	0.0%	-2.4%	-4.8%	
Myriad Opportunities US Fund Limited	\$ 303,975	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	\$ 4,074	0.0%	-2.3%	-0.8%	-7.0%	-197.9%
Pine River Fund LP	\$ 1,686	0.0%	0.0%	-0.3%	1.5%	
Putnam Dynamic Asset Allocation Balanced	\$ 12,753,363	3.7%	2.0%	6.7%	10.2%	26.4%
SRS Partners Master Fund	\$ 105,906	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	\$ 2,981,933	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	\$ 26,122	0.0%	0.0%	0.0%	0.0%	
<i>HFRI Fund of Funds Diversified Index</i>			0.4%	2.5%	4.4%	
Real Estate	\$ 13,610,584	3.9%	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	\$ 1,999,384	0.6%	0.0%	1.4%	1.4%	4.0%
Perimeter Park West	\$ 365,213	0.1%	0.0%	0.0%	0.0%	0.0%
Prologis Targeted U.S. Logistics Holdings	\$ 3,488,806	1.0%	0.0%	4.6%	10.9%	12.5%
Stockbridge Smart Markets	\$ 2,154,969	0.6%	0.0%	0.0%	2.3%	4.6%
Opportunistic	\$ 8,340,786	2.4%	0.8%	3.1%	5.6%	
ArrowMark Fundamental Opportunity Fund	\$ 8,340,786	2.4%	0.0%	2.3%	4.8%	
<i>S&P LSTA Leveraged Loan Index</i>			0.4%	1.5%	2.1%	



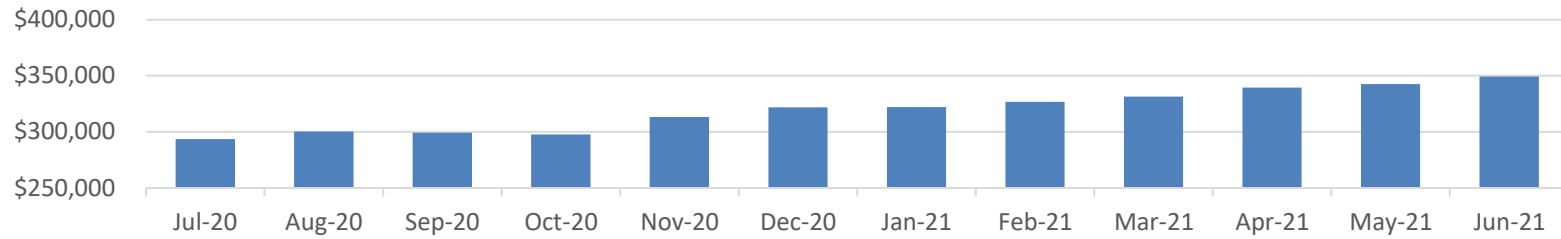
Total SPRS Asset Allocation Over Time As of June 30, 2021



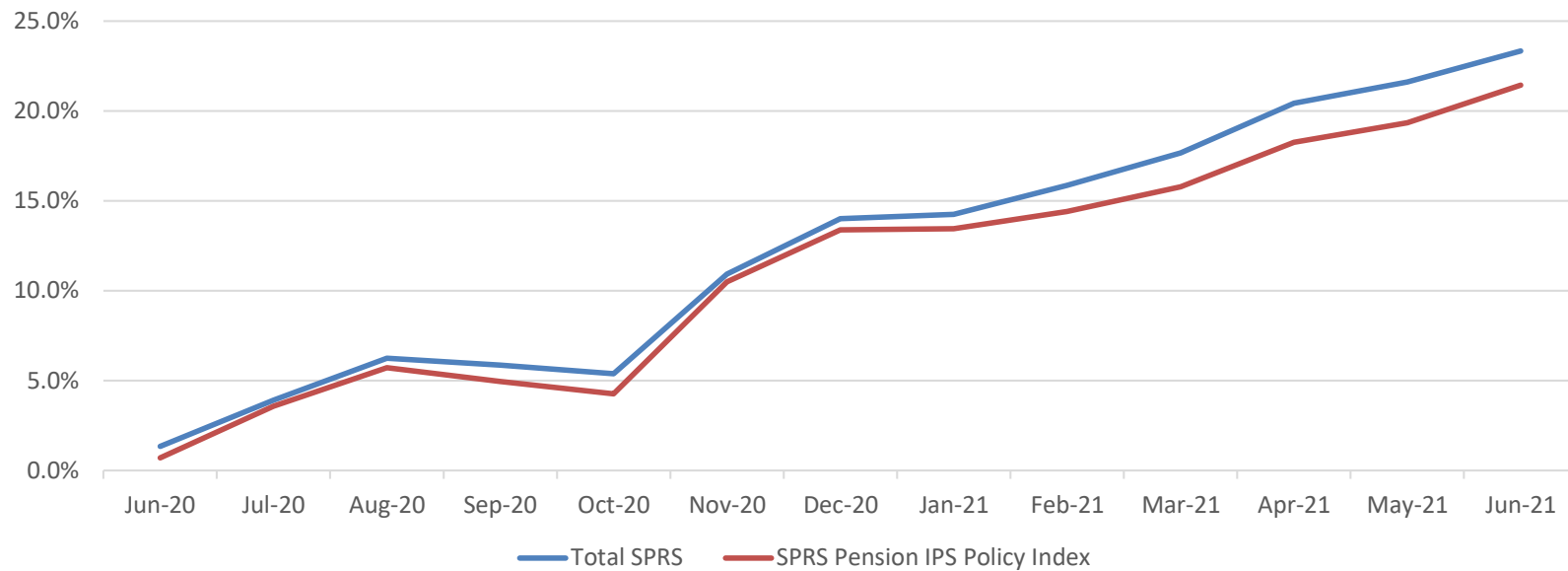
Risk Categorization	January 2021	February 2021	March 2021	April 2021	May 2021	June 2021
Growth	58.64%	58.13%	58.71%	59.09%	59.30%	58.06%
Liquidity	28.32%	28.99%	28.39%	28.17%	27.94%	29.28%
Diversifying Strategies	13.04%	10.58%	10.56%	10.43%	10.39%	10.28%
Opportunistic	0.00%	2.30%	2.34%	2.32%	2.37%	2.39%

Total SPRS 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

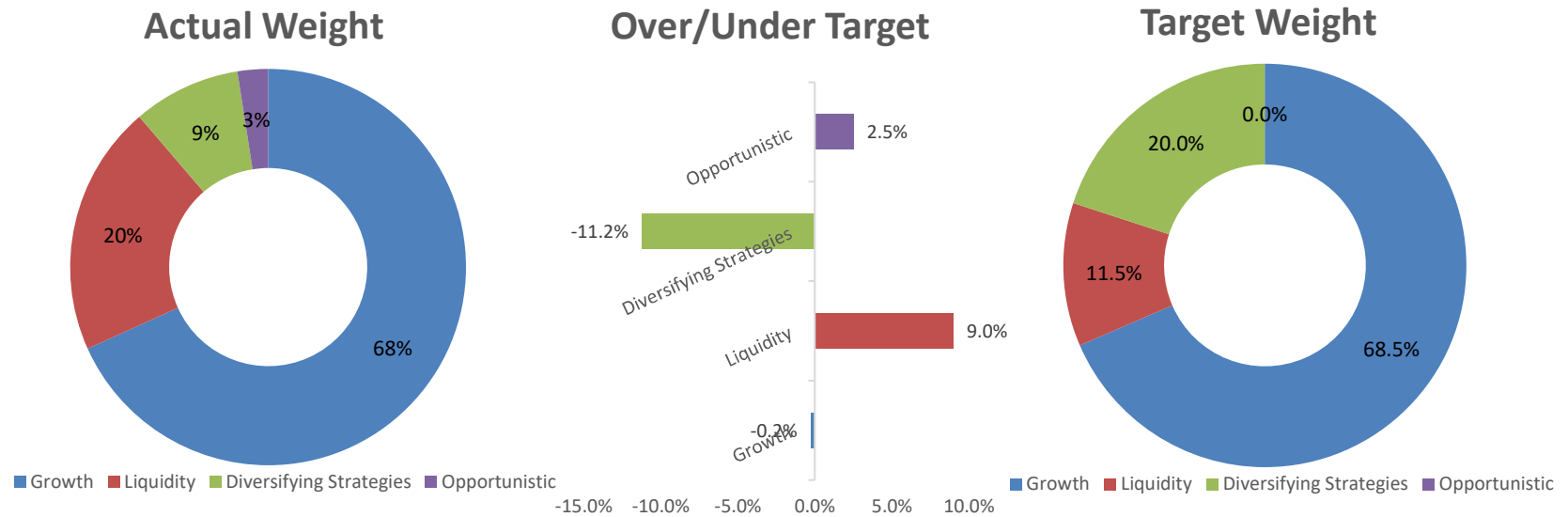
Insurance Investment Review for the Quarter Ended June 30, 2021

Presented to the Kentucky Retirement Systems

Investment Committee

Total KERS Insurance: 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	\$913,410,527	68.3%	68.5%	-0.2%
Liquidity	\$273,997,243	20.5%	11.5%	9.0%
Diversifying Strategies	\$117,599,446	8.8%	20.0%	-11.2%
Opportunistic	\$33,336,908	2.5%	0.0%	2.5%

Asset Allocation	Actual	Target	Target Difference	IPS Min	IPS Max
US Equity	24.94%	21.75%	3.19%	15.23%	28.28%
Non-US Equity	21.94%	21.75%	0.19%	15.23%	28.28%
Private Equity	4.80%	10.00%	-5.20%	7.00%	13.00%
High Yield/Specialty Credit	16.51%	15.00%	1.51%	10.50%	19.50%
Core Fixed Income	13.07%	10.00%	3.07%	8.00%	12.00%
Cash	7.52%	1.50%	6.02%	0.00%	3.00%
Real Return	6.05%	10.00%	-3.95%	7.00%	13.00%
Real Estate	2.70%	10.00%	-7.30%	7.00%	13.00%
Opportunistic	2.49%	0.00%	2.49%	0.00%	5.00%

Total KERS Insurance Risk Categorization Summary As of June 30, 2021

	Market Value (\$USD)	% of Portfolio	MTD	QTD	YTD	1 Year
Total Portfolio	\$ 1,338,254,449	100.0%	1.1%	5.2%	9.1%	25.1%
Growth	\$ 913,410,527	68.3%	1.6%	6.4%	11.6%	33.1%
<i>Growth Custom Benchmark</i>			1.5%	6.0%	11.9%	38.1%
Liquidity	\$ 273,997,243	20.5%	0.1%	0.7%	0.4%	2.8%
<i>Liquidity Custom Benchmark</i>			0.6%	1.7%	-1.5%	-0.3%
Diversifying Strategies	\$ 117,599,446	8.8%	1.9%	5.2%	8.6%	18.0%
<i>Diversifying Strategies Custom</i>			1.1%	2.7%	4.4%	7.6%
Opportunistic	\$ 33,336,908	2.5%	0.8%	3.1%	5.6%	

Total KERS Insurance Risk Categorization Summary As of June 30, 2021

	Market Value (\$USD)	% of Portfolio	MTD	QTD	YTD	1 Year
Total Portfolio	\$ 1,338,254,449	100.0%	1.1%	5.2%	9.1%	25.1%
<i>KERS Insurance IPS Policy Index</i>			1.7%	5.3%	8.7%	24.3%
Growth	\$ 913,410,527	68.3%	1.6%	6.4%	11.6%	33.1%
<i>Growth Custom Benchmark</i>			1.5%	6.0%	11.9%	38.1%
Public Equity	\$ 622,820,493	46.5%	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	\$ 331,888,520	24.8%	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	\$ 290,931,973	21.7%	-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	\$ 68,957,942	5.2%	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	\$ 221,632,091	16.6%	1.4%	2.8%	5.8%	15.0%
<i>High Yield Custom Benchmark</i>			0.8%	2.1%	3.4%	13.5%
Liquidity	\$ 273,997,243	20.5%	0.1%	0.7%	0.4%	2.8%
<i>Liquidity Custom Benchmark</i>			0.6%	1.7%	-1.5%	-0.3%
Liquidity (Other)	\$ 100,072,406	7.5%	0.1%	0.2%	0.2%	0.4%
<i>Liquidity Custom Benchmark</i>			0.6%	1.7%	-1.5%	-0.3%
Core Fixed Income	\$ 173,924,837	13.0%	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	\$ 117,599,446	8.8%	1.9%	5.2%	8.6%	18.0%
<i>Diversifying Strategies Custom</i>			1.1%	2.7%	4.4%	7.6%
Real Return	\$ 80,461,840	6.0%	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	\$ 37,137,606	2.8%	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	\$ 33,336,908	2.5%	0.8%	3.1%	5.6%	

Total KERS Insurance Detailed Performance As of June 30, 2021

	Market Value (\$USD)	% of Portfolio	MTD	QTD	YTD	1 Year
Total Portfolio	\$ 1,338,254,449	100.0%	1.1%	5.2%	9.1%	25.1%
<i>KERS Insurance IPS Policy Index</i>			1.7%	5.3%	8.7%	24.3%
Growth	\$ 913,410,527	68.3%	1.6%	6.4%	11.6%	33.1%
<i>Growth Custom Benchmark</i>			1.5%	6.0%	11.9%	38.1%
Public Equity	\$ 622,820,493	46.5%	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	\$ 331,888,520	24.8%	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	\$ 3,774	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	\$ 22,145,403	1.7%	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	\$ 19,013,251	1.4%	-1.1%	3.5%	17.5%	53.0%
Next Century Small Micro Cap Growth	\$ 14,279,392	1.1%	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	\$ 26,089,530	1.9%	1.1%	4.4%	19.7%	60.7%
<i>Russell 2000 Index</i>			1.9%	4.3%	17.5%	62.0%
River Road FAV	\$ 25,714,445	1.9%	-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	\$ 198,544,366	14.8%	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	\$ 189	0.0%	0.0%	0.0%	-47.9%	-47.9%
Westfield All Cap Growth	\$ 26,098,170	2.0%	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	\$ 290,931,973	21.7%	-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	\$ 43,752,390	3.3%	-0.3%	7.4%	7.9%	41.9%

Total KERS Insurance Detailed Performance

As of June 30, 2021

	Market Value (\$USD)	% of Portfolio	MTD	QTD	YTD	1 Year
<i>MSCI ACWI ex US Index</i>			-0.6%	5.6%	9.4%	36.3%
BlackRock ACWI Ex US Small Cap	\$ 9,388,040	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	\$ 85,343,395	6.4%	-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	\$ 32,500,850	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	\$ 17,612,417	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	\$ 220	0.0%	0.0%	0.0%	0.0%	0.0%
KRS Non-US Transition Account	\$ 86,244	0.0%	-2.0%	-6.5%	-8.5%	-12.1%
Lazard Emerging Markets Equity	\$ 47,186,173	3.5%	-2.5%	4.3%	8.6%	36.2%
LSV Emerging Markets Value Equity	\$ 38,905,243	2.9%	-2.2%	5.5%	14.7%	35.9%
Pzena Emerging Markets	\$ 16,157,002	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	\$ 68,957,942	5.2%	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	\$ 221,632,091	16.6%	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	\$ 39,613,750	3.0%	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	\$ 4,739,265	0.4%	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	\$ 6,153	0.0%	0.0%	0.0%	0.0%	-0.2%
<i>Bloomberg Barclays U.S. Corporate High Yield</i>			1.3%	2.8%	3.6%	15.4%
Manulife Strategic Fixed Income	\$ 24,396,230	1.8%	-0.2%	1.6%	2.2%	11.7%
<i>Bloomberg Barclays U.S. Universal Index</i>			0.7%	2.0%	-1.1%	1.1%

Total KERS Insurance Detailed Performance As of June 30, 2021

	Market Value (\$USD)	% of Portfolio	MTD	QTD	YTD	1 Year
Marathon Blue Grass Credit Fund	\$ 33,759,556	2.5%	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	\$ 38,192,995	2.9%	0.2%	1.4%	2.6%	10.7%
Waterfall High Yield ABS Composite	\$ 23,084,028	1.7%	1.4%	3.6%	9.3%	21.4%
Liquidity	\$ 273,997,243	20.5%	0.1%	0.7%	0.4%	2.8%
<i>Liquidity Custom Benchmark</i>			0.6%	1.7%	-1.5%	-0.3%
Liquidity (Other)	\$ 100,072,406	7.5%	0.1%	0.2%	0.2%	0.4%
<i>Liquidity Custom Benchmark</i>			0.6%	1.7%	-1.5%	-0.3%
Cash Account	\$ 100,072,406	7.5%	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	\$ 173,924,837	13.0%	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	\$ 1	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	\$ 32,780,682	2.4%	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	\$ 120,804,166	9.0%	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	\$ 20,339,988	1.5%	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	\$ 117,599,446	8.8%	1.9%	5.2%	8.6%	18.0%
<i>Diversifying Strategies Custom</i>			1.1%	2.7%	4.4%	7.6%
Real Return	\$ 80,461,840	6.0%	1.2%	5.3%	9.7%	22.5%
<i>Insurance Real Return Custom Bmk</i>			1.2%	5.3%	9.7%	22.5%
Blackstone Strategic Opportunities Fund	\$ 96,851	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	\$ 6,374,851	0.5%	0.2%	-0.8%	0.0%	

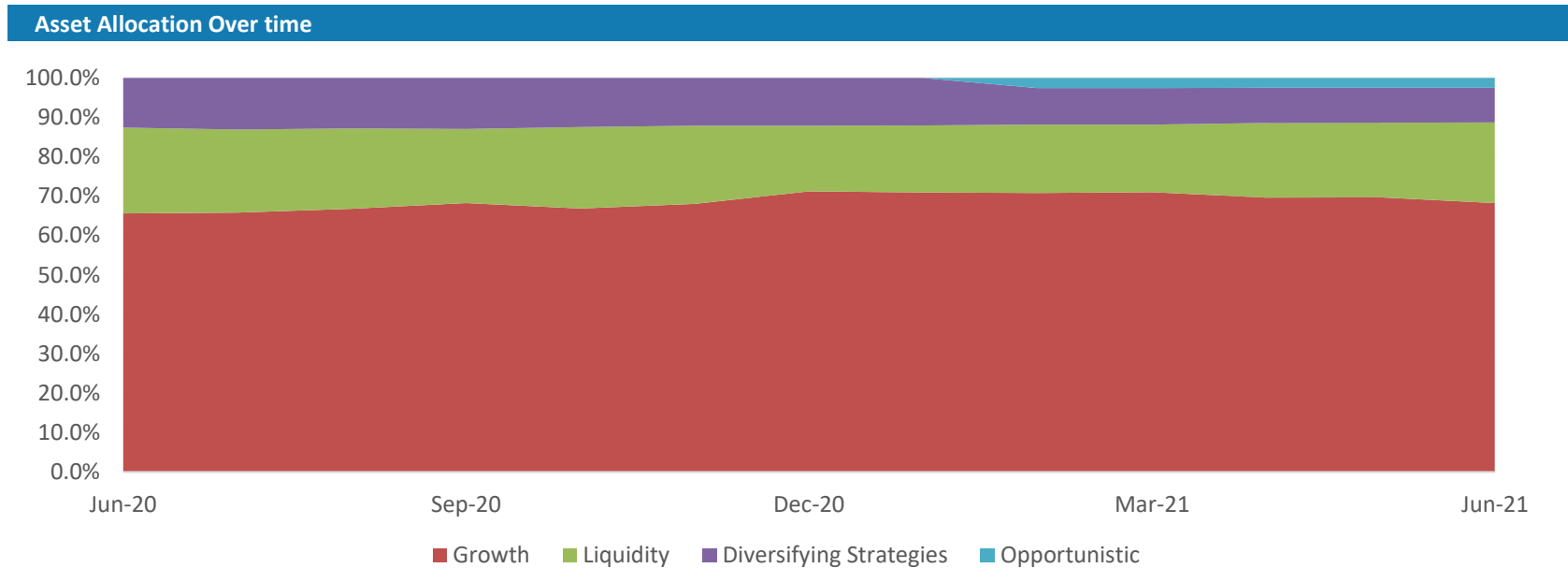
Total KERS Insurance Detailed Performance

As of June 30, 2021

	Market Value (\$USD)	% of Portfolio	MTD	QTD	YTD	1 Year
<i>S&P 500 Total Return Index</i>			2.3%	8.5%	15.3%	
KRS Internal Tips	\$ 53,668	0.0%	0.0%	0.0%	0.0%	0.0%
Luxor Capital	\$ 59,747	0.0%	9.1%	6.5%	3.9%	
Myriad Opportunities US Fund Limited	\$ 965,568	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	\$ 12,719	0.0%	-3.1%	-0.6%	-6.5%	-10.3%
Pine River Fund LP	\$ 4,476	0.0%	2.4%	2.1%	3.9%	
Putnam Dynamic Asset Allocation Balanced	\$ 52,444,665	3.9%	1.4%	6.3%	9.9%	26.1%
SRS Partners Master Fund	\$ 332,349	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	\$ 8,816,196	0.7%	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	\$ 81,975	0.0%	0.0%	0.0%	0.0%	
<i>HFRI Fund of Funds Diversified Index</i>			0.4%	2.5%	4.4%	
Real Estate	\$ 37,137,606	2.8%	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	\$ 6,002,642	0.4%	0.0%	1.5%	1.5%	4.2%
Prologis Targeted U.S. Logistics Holdings	\$ 8,880,161	0.7%	0.0%	4.7%	10.9%	12.5%
Stockbridge Smart Markets	\$ 6,918,097	0.5%	7.3%	7.3%	9.8%	12.3%
Opportunistic	\$ 33,336,908	2.5%	0.8%	3.1%	5.6%	
ArrowMark Fundamental Opportunity Fund	\$ 33,336,908	2.5%	0.8%	3.1%	5.6%	
<i>S&P LSTA Leveraged Loan Index</i>			0.4%	1.5%	2.1%	



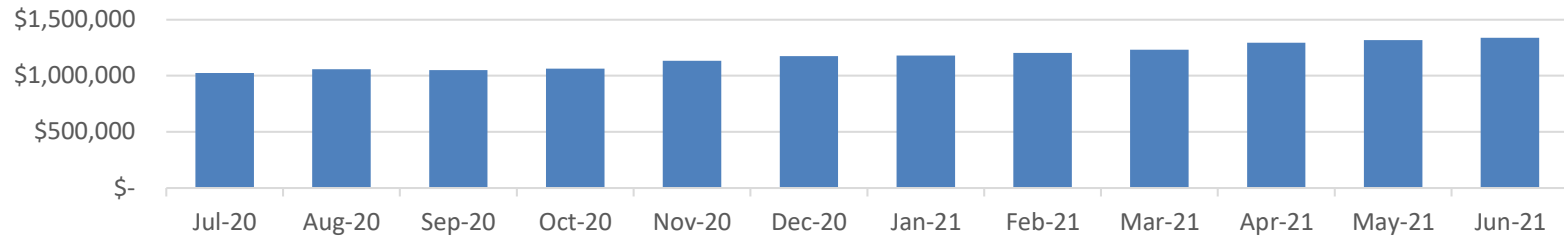
Total KERS Insurance Asset Allocation Over Time As of June 30, 2021



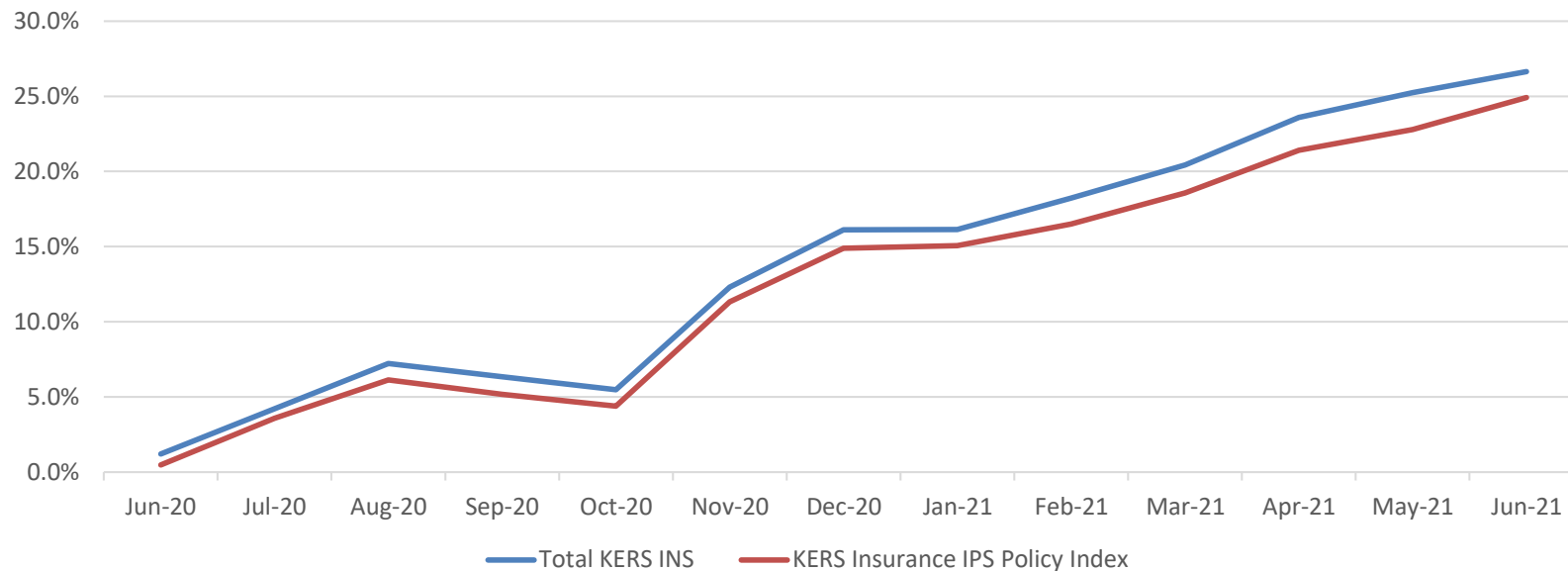
Risk Categorization	January 2021	February 2021	March 2021	April 2021	May 2021	June 2021
Growth	70.96%	70.86%	71.02%	69.67%	69.75%	68.25%
Liquidity	17.03%	17.32%	17.22%	18.98%	18.94%	20.47%
Diversifying Strategies	12.02%	9.33%	9.25%	8.93%	8.85%	8.79%
Opportunistic	0.00%	2.49%	2.52%	2.43%	2.47%	2.49%

Total KERS Insurance Summary As of June 30, 2021

Market Value Over Time (\$USD 000)

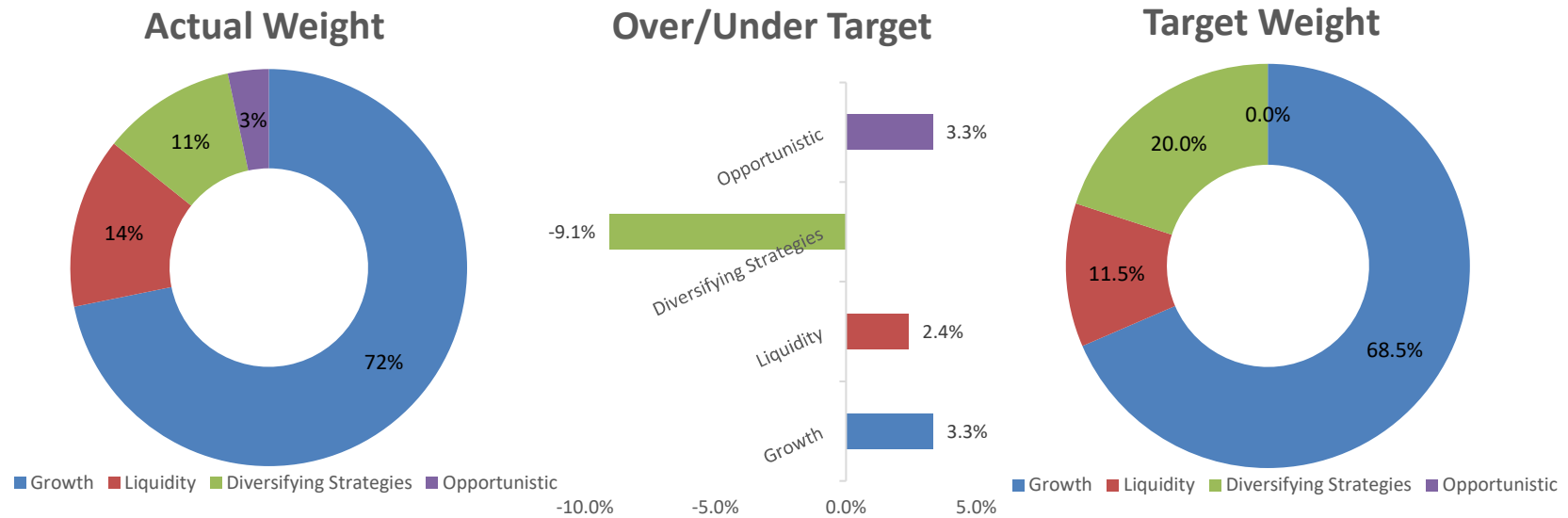


Cumulative Performance Over 1 Year



Total KERS-H Insurance: 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	\$448,632,777	71.8%	68.5%	3.3%
Liquidity	\$86,869,563	13.9%	11.5%	2.4%
Diversifying Strategies	\$68,283,644	10.9%	20.0%	-9.1%
Opportunistic	\$20,723,892	3.3%	0.0%	3.3%

Asset Allocation	Actual	Target	Target Difference	IPS Min	IPS Max
US Equity	22.69%	21.75%	0.94%	15.23%	28.28%
Non-US Equity	22.72%	21.75%	0.97%	15.23%	28.28%
Private Equity	8.09%	10.00%	-1.91%	7.00%	13.00%
High Yield/Specialty Credit	18.24%	15.00%	3.24%	10.50%	19.50%
Core Fixed Income	12.31%	10.00%	2.31%	8.00%	12.00%
Cash	1.73%	1.50%	0.23%	0.00%	3.00%
Real Return	6.63%	10.00%	-3.37%	7.00%	13.00%
Real Estate	4.27%	10.00%	-5.73%	7.00%	13.00%
Opportunistic	3.32%	0.00%	3.32%	0.00%	5.00%

Total KERS-H Insurance Risk Categorization Summary As of June 30, 2021

	Market Value (\$USD)	% of Portfolio	MTD	QTD	YTD	1 Year
Total Portfolio	\$ 624,467,843	100.0%	1.4%	5.3%	9.5%	25.0%
Growth	\$ 448,632,777	71.8%	1.6%	6.4%	11.6%	33.1%
<i>Growth Custom Benchmark</i>			1.5%	6.0%	11.9%	38.1%
Liquidity	\$ 86,869,563	13.9%	0.1%	0.7%	0.4%	2.9%
<i>Liquidity Custom Benchmark</i>			0.6%	1.7%	-1.5%	-0.3%
Diversifying Strategies	\$ 68,283,644	10.9%	1.9%	5.2%	8.6%	18.0%
<i>Diversifying Strategies Custom</i>			1.1%	2.7%	4.4%	7.6%
Opportunistic	\$ 20,723,892	3.3%	0.8%	3.1%	5.6%	

Total KERS-H Insurance Risk Categorization Summary As of June 30, 2021

	Market Value (\$USD)	% of Portfolio	MTD	QTD	YTD	1 Year
Total Portfolio	\$ 624,467,843	100.0%	1.4%	5.3%	9.5%	25.0%
<i>KERS-H Insurance IPS Policy Index</i>			1.7%	5.3%	8.7%	24.7%
Growth	\$ 448,632,777	71.8%	1.6%	6.4%	11.6%	33.1%
<i>Growth Custom Benchmark</i>			1.5%	6.0%	11.9%	38.1%
Public Equity	\$ 280,499,219	44.9%	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	\$ 140,415,685	22.5%	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	\$ 140,083,535	22.4%	-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	\$ 54,119,699	8.7%	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	\$ 114,013,859	18.3%	1.4%	2.8%	5.8%	15.0%
<i>High Yield Custom Benchmark</i>			0.8%	2.1%	3.4%	13.5%
Liquidity	\$ 86,869,563	13.9%	0.1%	0.7%	0.4%	2.9%
<i>Liquidity Custom Benchmark</i>			0.6%	1.7%	-1.5%	-0.3%
Liquidity (Other)	\$ 10,677,031	1.7%	-0.8%	-2.4%	-2.0%	-2.8%
<i>Liquidity Custom Benchmark</i>			0.6%	1.7%	-1.5%	-0.3%
Core Fixed Income	\$ 76,192,531	12.2%	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	\$ 68,283,644	10.9%	1.9%	5.2%	8.6%	18.0%
<i>Diversifying Strategies Custom</i>			1.1%	2.7%	4.4%	7.6%
Real Return	\$ 40,981,528	6.6%	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	\$ 27,302,116	4.4%	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	\$ 20,723,892	3.3%	0.8%	3.1%	5.6%	

Total KERS-H Insurance Detailed Performance

As of June 30, 2021

	Market Value (\$USD)	% of Portfolio	MTD	QTD	YTD	1 Year
Total Portfolio	\$ 624,467,843	100.0%	1.4%	5.3%	9.5%	25.0%
<i>KERS-H Insurance IPS Policy Index</i>			1.7%	5.3%	8.7%	24.7%
Growth	\$ 448,632,777	71.8%	1.6%	6.4%	11.6%	33.1%
<i>Growth Custom Benchmark</i>			1.5%	6.0%	11.9%	38.1%
Public Equity	\$ 280,499,219	44.9%	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	\$ 140,415,685	22.5%	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	\$ 1,598	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	\$ 9,377,715	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	\$ 8,029,797	1.3%	-1.1%	3.5%	17.5%	53.0%
Next Century Small Micro Cap Growth	\$ 6,030,564	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	\$ 11,018,297	1.8%	1.1%	4.4%	19.7%	60.7%
<i>Russell 2000 Index</i>			1.9%	4.3%	17.5%	62.0%
River Road FAV	\$ 10,859,888	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	\$ 84,075,801	13.5%	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	\$ 80	0.0%	0.0%	0.0%	-47.9%	-47.9%
Westfield All Cap Growth	\$ 11,021,945	1.8%	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	\$ 140,083,535	22.4%	-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	\$ 20,764,047	3.3%	-0.3%	7.4%	7.9%	41.9%

Total KERS-H Insurance Detailed Performance As of June 30, 2021

	Market Value (\$USD)	% of Portfolio	MTD	QTD	YTD	1 Year
<i>MSCI ACWI ex US Index</i>			-0.6%	5.6%	9.4%	36.3%
BlackRock ACWI Ex US Small Cap	\$ 4,455,384	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	\$ 42,515,127	6.8%	-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	\$ 15,424,282	2.5%	0.8%	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	\$ 8,358,516	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	\$ 105	0.0%	0.0%	0.0%	0.0%	0.0%
KRS Non-US Transition Account	\$ 40,930	0.0%	-2.0%	-6.5%	-8.5%	-12.1%
Lazard Emerging Markets Equity	\$ 22,393,655	3.6%	-2.5%	4.3%	8.6%	36.2%
LSV Emerging Markets Value Equity	\$ 18,463,684	3.0%	-2.2%	5.5%	14.7%	35.9%
Pzena Emerging Markets	\$ 7,667,804	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	\$ 54,119,699	8.7%	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	\$ 114,013,859	18.3%	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	\$ 17,495,574	2.8%	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	\$ 3,655,703	0.6%	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	\$ 3,831	0.0%	0.0%	0.0%	0.0%	-0.2%
<i>Bloomberg Barclays U.S. Corporate High Yield</i>			1.3%	2.8%	3.6%	15.4%
Manulife Strategic Fixed Income	\$ 15,188,227	2.4%	-0.2%	1.6%	2.2%	11.7%
<i>Bloomberg Barclays U.S. Universal Index</i>			0.7%	2.0%	-1.1%	1.1%

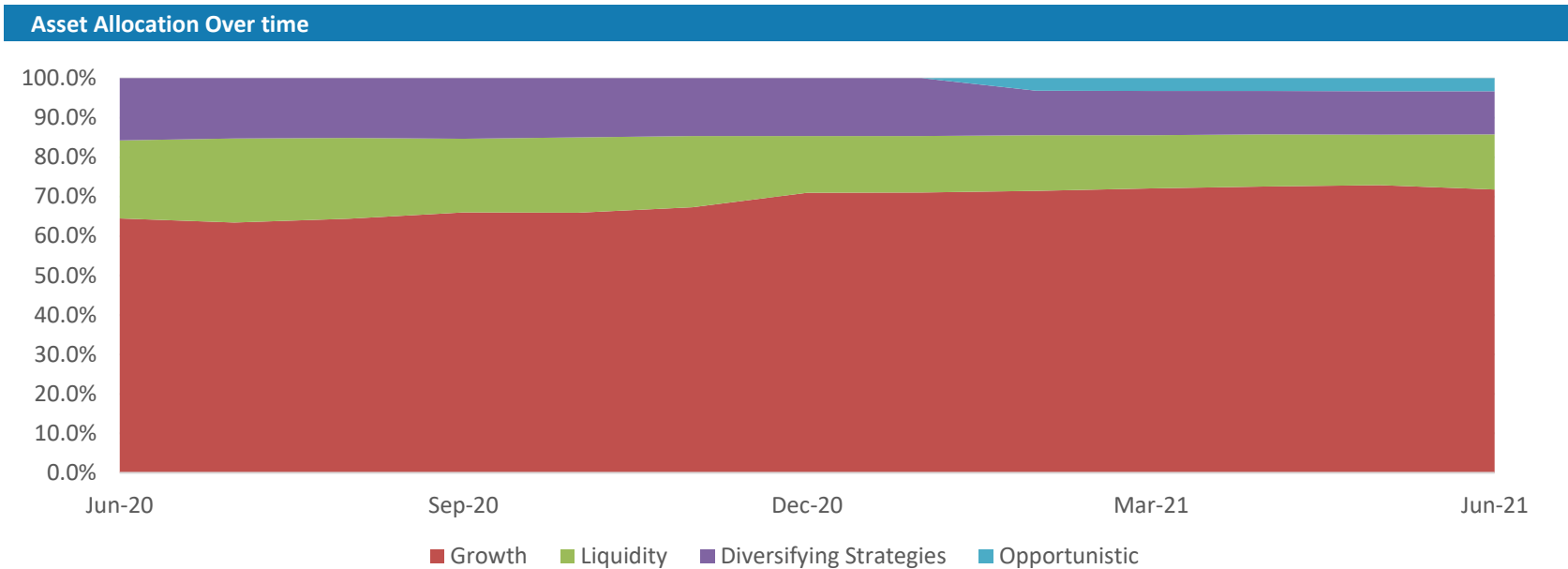
Total KERS-H Insurance Detailed Performance As of June 30, 2021

	Market Value (\$USD)	% of Portfolio	MTD	QTD	YTD	1 Year
Marathon Blue Grass Credit Fund	\$ 20,200,261	3.2%	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	\$ 9,108,778	1.5%	0.2%	1.4%	2.6%	10.7%
Waterfall High Yield ABS Composite	\$ 12,867,022	2.1%	1.4%	3.6%	9.3%	21.4%
Liquidity	\$ 86,869,563	13.9%	0.1%	0.7%	0.4%	2.9%
<i>Liquidity Custom Benchmark</i>			0.6%	1.7%	-1.5%	-0.3%
Liquidity (Other)	\$ 10,677,031	1.7%	-0.8%	-2.4%	-2.0%	-2.8%
<i>Liquidity Custom Benchmark</i>			0.6%	1.7%	-1.5%	-0.3%
Cash Account	\$ 10,677,031	1.7%	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	\$ 76,192,531	12.2%	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	\$ 1	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	\$ 14,360,474	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	\$ 52,921,568	8.5%	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	\$ 8,910,488	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	\$ 68,283,644	10.9%	1.9%	5.2%	8.6%	18.0%
<i>Diversifying Strategies Custom</i>			1.1%	2.7%	4.4%	7.6%
Real Return	\$ 40,981,528	6.6%	1.2%	5.3%	9.7%	22.5%
<i>Insurance Real Return Custom Bmk</i>			1.2%	5.3%	9.7%	22.5%
Blackstone Strategic Opportunities Fund	\$ 64,311	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	\$ 4,233,033	0.7%	0.2%	-0.8%	0.0%	

Total KERS-H Insurance Detailed Performance As of June 30, 2021

	Market Value (\$USD)	% of Portfolio	MTD	QTD	YTD	1 Year
<i>S&P 500 Total Return Index</i>			2.3%	8.5%	15.3%	
KRS Internal Tips	\$ 24,541	0.0%	0.0%	0.0%	0.0%	0.0%
Luxor Capital	\$ 39,673	0.0%	9.1%	6.5%	3.9%	
Myriad Opportunities US Fund Limited	\$ 641,157	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	\$ 5,816	0.0%	-3.1%	-0.6%	-6.5%	-10.3%
Pine River Fund LP	\$ 2,972	0.0%	2.4%	2.1%	3.9%	
Putnam Dynamic Asset Allocation Balanced	\$ 23,981,055	3.8%	1.4%	6.3%	9.9%	26.1%
SRS Partners Master Fund	\$ 220,687	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	\$ 4,031,329	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	\$ 54,433	0.0%	0.0%	0.0%	0.0%	
<i>HFRI Fund of Funds Diversified Index</i>			0.4%	2.5%	4.4%	
Real Estate	\$ 27,302,116	4.4%	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	\$ 4,348,050	0.7%	0.0%	1.5%	1.5%	4.2%
Prologis Targeted U.S. Logistics Holdings	\$ 6,641,360	1.1%	0.0%	4.7%	10.9%	12.5%
Stockbridge Smart Markets	\$ 4,879,812	0.8%	7.3%	7.3%	9.8%	12.3%
Opportunistic	\$ 20,723,892	3.3%	0.8%	3.1%	5.6%	
ArrowMark Fundamental Opportunity Fund	\$ 20,723,892	3.3%	0.8%	3.1%	5.6%	
<i>S&P LSTA Leveraged Loan Index</i>			0.4%	1.5%	2.1%	

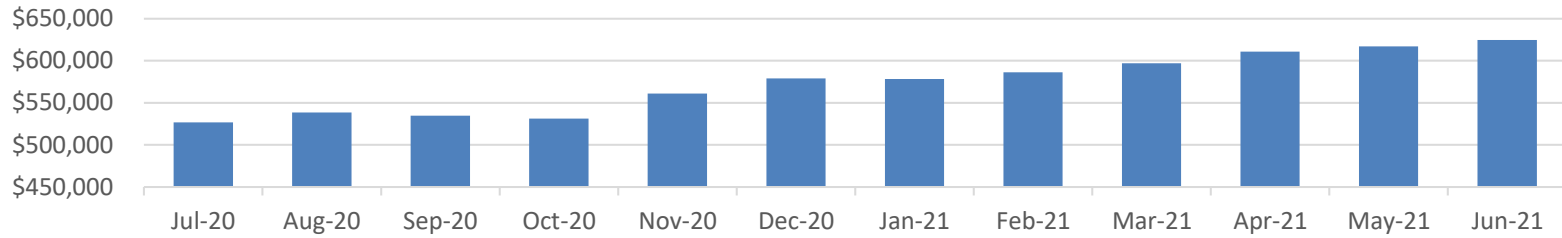
Total KERS-H Insurance: Asset Allocation Over Time As of June 30, 2021



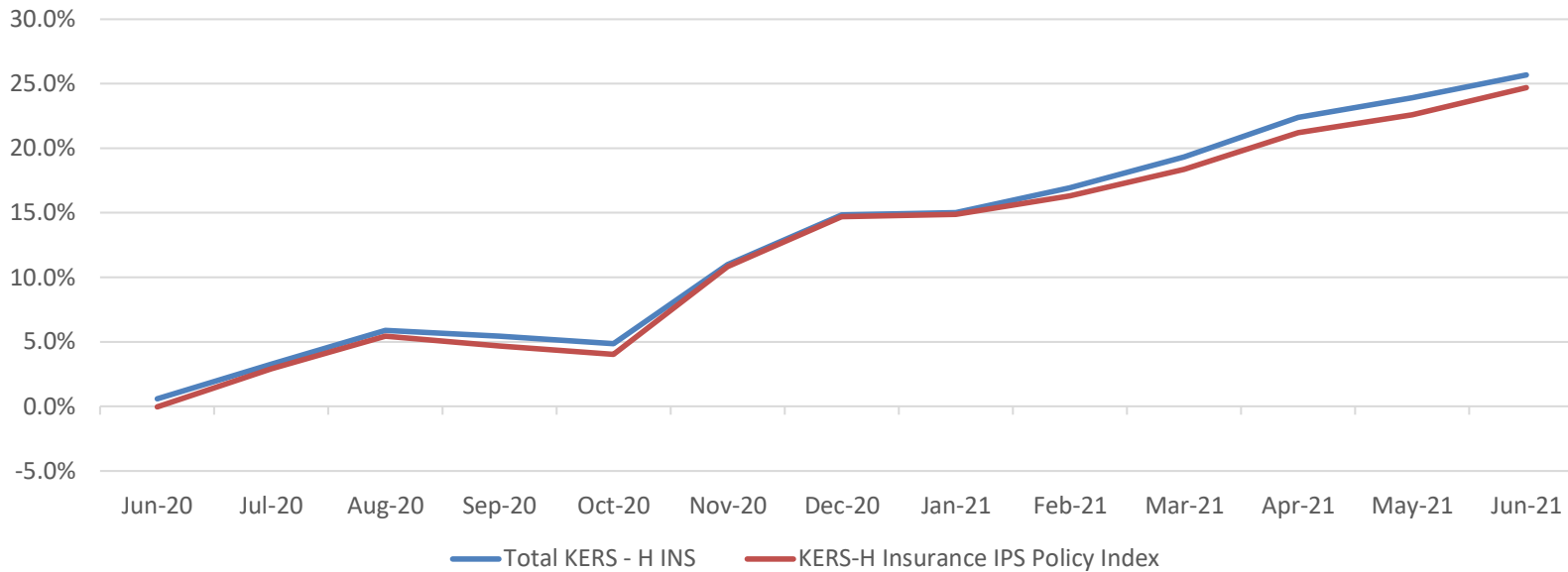
Risk Categorization	January 2021	February 2021	March 2021	April 2021	May 2021	June 2021
Growth	71.01%	71.44%	72.09%	72.60%	72.88%	71.84%
Liquidity	14.34%	14.12%	13.50%	13.15%	12.86%	13.91%
Diversifying Strategies	14.65%	11.26%	11.19%	11.06%	10.99%	10.93%
Opportunistic	0.00%	3.18%	3.23%	3.20%	3.27%	3.32%

Total KERS-H Insurance Summary As of June 30, 2021

Market Value Over Time (\$USD 000)

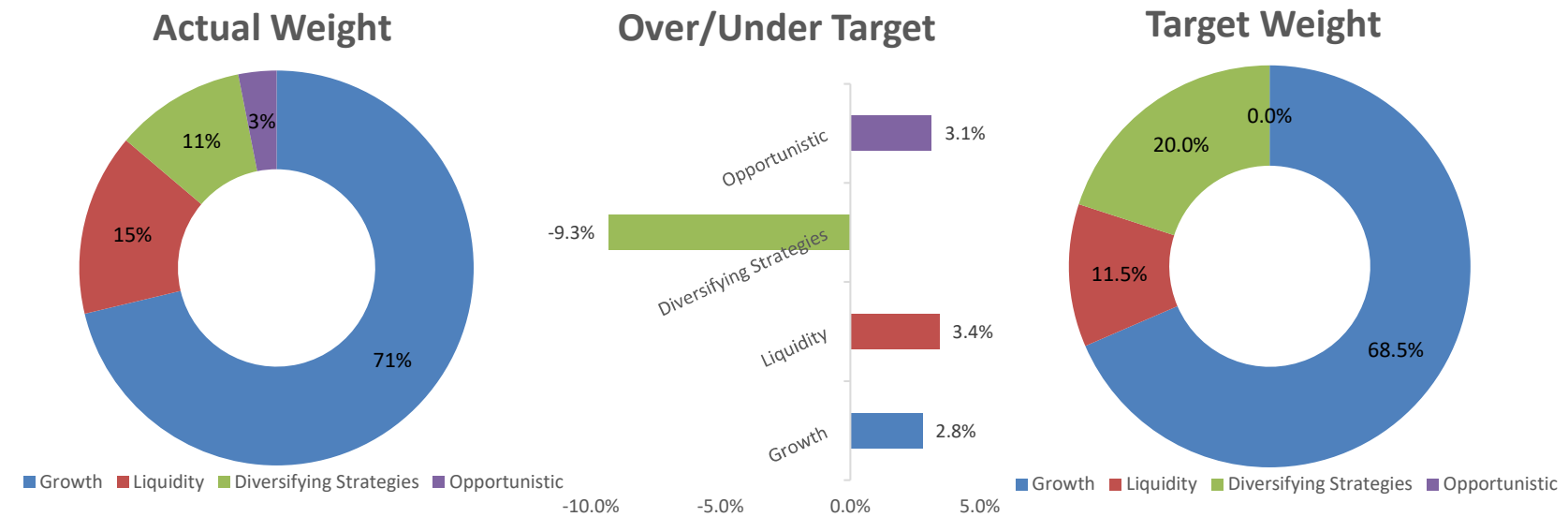


Cumulative Performance Over 1 Year



Total SPRS Insurance 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	\$174,725,786	71.3%	68.5%	2.8%
Liquidity	\$36,590,210	14.9%	11.5%	3.4%
Diversifying Strategies	\$26,207,489	10.7%	20.0%	-9.3%
Opportunistic	\$7,652,667	3.1%	0.0%	3.1%

Asset Allocation	Actual	Target	Target Difference	IPS Min	IPS Max
US Equity	22.35%	21.75%	0.60%	15.23%	28.28%
Non-US Equity	22.69%	21.75%	0.94%	15.23%	28.28%
Private Equity	9.31%	10.00%	-0.69%	7.00%	13.00%
High Yield/Specialty Credit	16.78%	15.00%	1.78%	10.50%	19.50%
Core Fixed Income	12.32%	10.00%	2.32%	8.00%	12.00%
Cash	2.76%	1.50%	1.26%	0.00%	3.00%
Real Return	6.51%	10.00%	-3.49%	7.00%	13.00%
Real Estate	4.16%	10.00%	-5.84%	7.00%	13.00%
Opportunistic	3.13%	0.00%	3.13%	0.00%	5.00%

Total SPRS Insurance Risk Categorization Summary As of June 30, 2021

	Market Value (\$USD)	% of Portfolio	MTD	QTD	YTD	1 Year
Total Portfolio	\$ 245,159,681	100.0%	1.5%	5.4%	9.6%	25.3%
Growth	\$ 174,725,786	71.3%	1.6%	6.4%	11.6%	33.1%
<i>Growth Custom Benchmark</i>			1.5%	6.0%	11.9%	38.1%
Liquidity	\$ 36,590,210	14.9%	0.1%	0.7%	0.4%	2.8%
<i>Liquidity Custom Benchmark</i>			0.6%	1.7%	-1.5%	-0.3%
Diversifying Strategies	\$ 26,207,489	10.7%	1.9%	5.2%	8.6%	18.0%
<i>Diversifying Strategies Custom</i>			1.1%	2.7%	4.4%	7.6%
Opportunistic	\$ 7,652,667	3.1%	0.8%	3.1%	5.6%	

Total SPRS Insurance Risk Categorization Summary As of June 30, 2021

	Market Value (\$USD)	% of Portfolio	MTD	QTD	YTD	1 Year
Total Portfolio	\$ 245,159,681	100.0%	1.5%	5.4%	9.6%	25.3%
<i>SPRS Insurance IPS Policy Index</i>			1.7%	5.3%	8.7%	24.7%
Growth	\$ 174,725,786	71.3%	1.6%	6.4%	11.6%	33.1%
<i>Growth Custom Benchmark</i>			1.5%	6.0%	11.9%	38.1%
Public Equity	\$ 109,123,133	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	\$ 54,246,417	22.1%	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	\$ 54,876,716	22.4%	-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	\$ 24,476,719	10.0%	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	\$ 41,125,933	16.8%	1.4%	2.8%	5.8%	15.0%
<i>High Yield Custom Benchmark</i>			0.8%	2.1%	3.4%	13.5%
Liquidity	\$ 36,590,210	14.9%	0.1%	0.7%	0.4%	2.8%
<i>Liquidity Custom Benchmark</i>			0.6%	1.7%	-1.5%	-0.3%
Liquidity (Other)	\$ 6,690,798	2.7%	-0.2%	-0.8%	-0.6%	-1.5%
<i>Liquidity Custom Benchmark</i>			0.6%	1.7%	-1.5%	-0.3%
Core Fixed Income	\$ 29,899,412	12.2%	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	\$ 26,207,489	10.7%	1.9%	5.2%	8.6%	18.0%
<i>Diversifying Strategies Custom</i>			1.1%	2.7%	4.4%	7.6%
Real Return	\$ 15,773,566	6.4%	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	\$ 10,433,923	4.3%	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	\$ 7,652,667	3.1%	0.8%	3.1%	5.6%	

Total SPRS Insurance Detailed Performance As of June 30, 2021

	Market Value (\$USD)	% of Portfolio	MTD	QTD	YTD	1 Year
Total Portfolio	\$ 245,159,681	100.0%	1.5%	5.4%	9.6%	25.3%
<i>SPRS Insurance IPS Policy Index</i>			1.7%	5.3%	8.7%	24.7%
Growth	\$ 174,725,786	71.3%	1.6%	6.4%	11.6%	33.1%
<i>Growth Custom Benchmark</i>			1.5%	6.0%	11.9%	38.1%
Public Equity	\$ 109,123,133	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	\$ 54,246,417	22.1%	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	\$ 605	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	\$ 3,553,394	1.4%	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	\$ 3,220,515	1.3%	-1.1%	3.5%	17.5%	53.0%
Next Century Small Micro Cap Growth	\$ 2,418,681	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	\$ 4,419,114	1.8%	1.1%	4.4%	19.7%	60.7%
<i>Russell 2000 Index</i>			1.9%	4.3%	17.5%	62.0%
River Road FAV	\$ 4,355,581	1.8%	-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	\$ 31,857,918	13.0%	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	\$ 32	0.0%	0.0%	0.0%	-47.9%	-47.9%
Westfield All Cap Growth	\$ 4,420,577	1.8%	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	\$ 54,876,716	22.4%	-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	\$ 8,184,534	3.3%	-0.3%	7.4%	7.9%	41.9%

Total SPRS Insurance Detailed Performance As of June 30, 2021

	Market Value (\$USD)	% of Portfolio	MTD	QTD	YTD	1 Year
<i>MSCI ACWI ex US Index</i>			-0.6%	5.6%	9.4%	36.3%
BlackRock ACWI Ex US Small Cap	\$ 1,756,172	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	\$ 16,418,321	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	\$ 6,079,766	2.5%	0.8%	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	\$ 3,294,664	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	\$ 41	0.0%	0.0%	0.0%	0.0%	0.0%
KRS Non-US Transition Account	\$ 16,133	0.0%	-2.0%	-6.5%	-8.5%	-12.1%
Lazard Emerging Markets Equity	\$ 8,826,874	3.6%	-2.5%	4.3%	8.6%	36.2%
LSV Emerging Markets Value Equity	\$ 7,277,803	3.0%	-2.2%	5.5%	14.7%	35.9%
Pzena Emerging Markets	\$ 3,022,407	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	\$ 24,476,719	10.0%	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	\$ 41,125,933	16.8%	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	\$ 6,807,360	2.8%	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	\$ 1,405,325	0.6%	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	\$ 1,395	0.0%	0.0%	0.0%	0.0%	-0.2%
<i>Bloomberg Barclays U.S. Corporate High Yield</i>			1.3%	2.8%	3.6%	15.4%
Manulife Strategic Fixed Income	\$ 5,529,933	2.3%	-0.2%	1.6%	2.2%	11.7%
<i>Bloomberg Barclays U.S. Universal Index</i>			0.7%	2.0%	-1.1%	1.1%

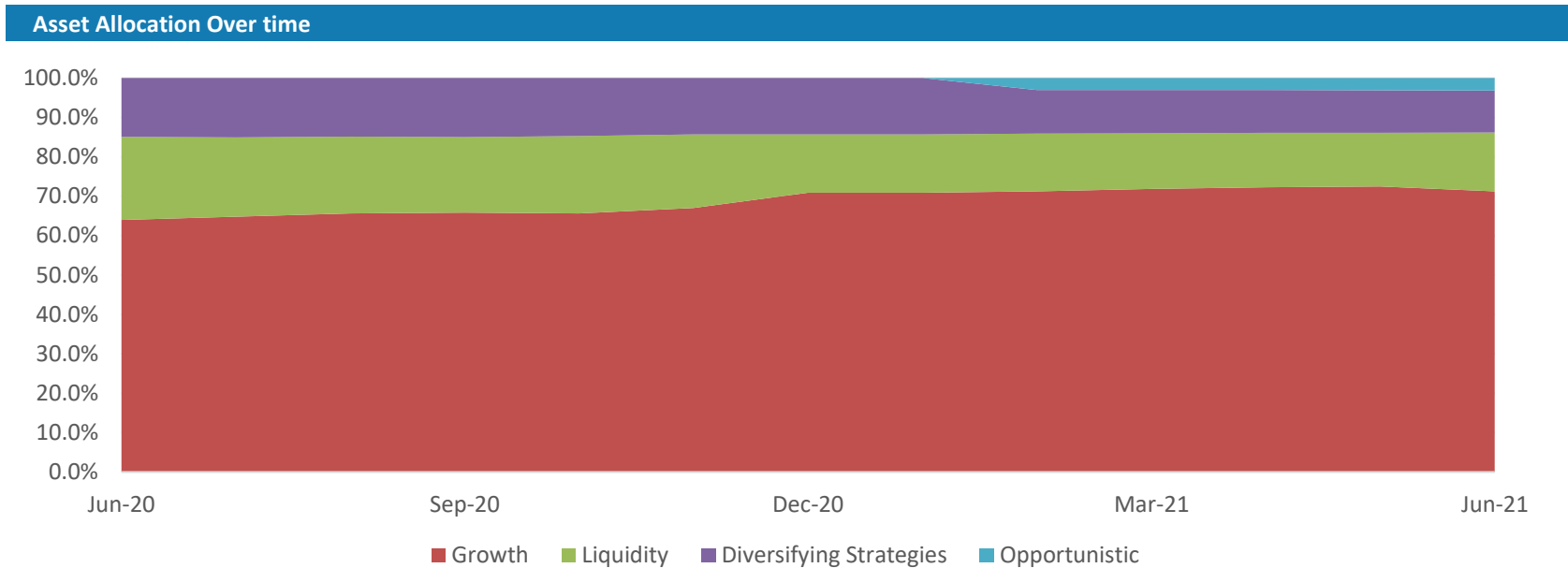
Total SPRS Insurance Detailed Performance As of June 30, 2021

	Market Value (\$USD)	% of Portfolio	MTD	QTD	YTD	1 Year
Marathon Blue Grass Credit Fund	\$ 6,974,503	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	\$ 3,193,940	1.3%	0.2%	1.4%	2.6%	10.7%
Waterfall High Yield ABS Composite	\$ 4,160,653	1.7%	1.4%	3.6%	9.3%	21.4%
Liquidity	\$ 36,590,210	14.9%	0.1%	0.7%	0.4%	2.8%
<i>Liquidity Custom Benchmark</i>			0.6%	1.7%	-1.5%	-0.3%
Liquidity (Other)	\$ 6,690,798	2.7%	-0.2%	-0.8%	-0.6%	-1.5%
<i>Liquidity Custom Benchmark</i>			0.6%	1.7%	-1.5%	-0.3%
Cash Account	\$ 6,690,798	2.7%	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	\$ 29,899,412	12.2%	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	\$ 0	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	\$ 5,635,326	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	\$ 20,767,440	8.5%	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	\$ 3,496,647	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	\$ 26,207,489	10.7%	1.9%	5.2%	8.6%	18.0%
<i>Diversifying Strategies Custom</i>			1.1%	2.7%	4.4%	7.6%
Real Return	\$ 15,773,566	6.4%	1.2%	5.3%	9.7%	22.5%
<i>Insurance Real Return Custom Bmk</i>			1.2%	5.3%	9.7%	22.5%
Blackstone Strategic Opportunities Fund	\$ 24,117	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	\$ 1,587,411	0.6%	0.2%	-0.8%	0.0%	

Total SPRS Insurance Detailed Performance As of June 30, 2021

	Market Value (\$USD)	% of Portfolio	MTD	QTD	YTD	1 Year
<i>S&P 500 Total Return Index</i>			2.3%	8.5%	15.3%	
KRS Internal Tips	\$ 9,579	0.0%	0.0%	0.0%	0.0%	0.0%
Luxor Capital	\$ 14,878	0.0%	9.1%	6.5%	3.9%	
Myriad Opportunities US Fund Limited	\$ 240,437	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	\$ 2,270	0.0%	-3.1%	-0.6%	-6.5%	-10.3%
Pine River Fund LP	\$ 1,115	0.0%	2.4%	2.1%	3.9%	
Putnam Dynamic Asset Allocation Balanced	\$ 9,360,796	3.8%	1.4%	6.3%	9.9%	26.1%
SRS Partners Master Fund	\$ 82,759	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	\$ 1,573,594	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	\$ 20,413	0.0%	0.0%	0.0%	0.0%	
<i>HFRI Fund of Funds Diversified Index</i>			0.4%	2.5%	4.4%	
Real Estate	\$ 10,433,923	4.3%	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	\$ 1,665,251	0.7%	0.0%	1.5%	1.5%	4.2%
Prologis Targeted U.S. Logistics Holdings	\$ 2,538,976	1.0%	0.0%	4.7%	10.9%	12.5%
Stockbridge Smart Markets	\$ 1,869,686	0.8%	7.3%	7.3%	9.8%	12.3%
Opportunistic	\$ 7,652,667	3.1%	0.8%	3.1%	5.6%	
ArrowMark Fundamental Opportunity Fund	\$ 7,652,667	3.1%	0.8%	3.1%	5.6%	
<i>S&P LSTA Leveraged Loan Index</i>			0.4%	1.5%	2.1%	

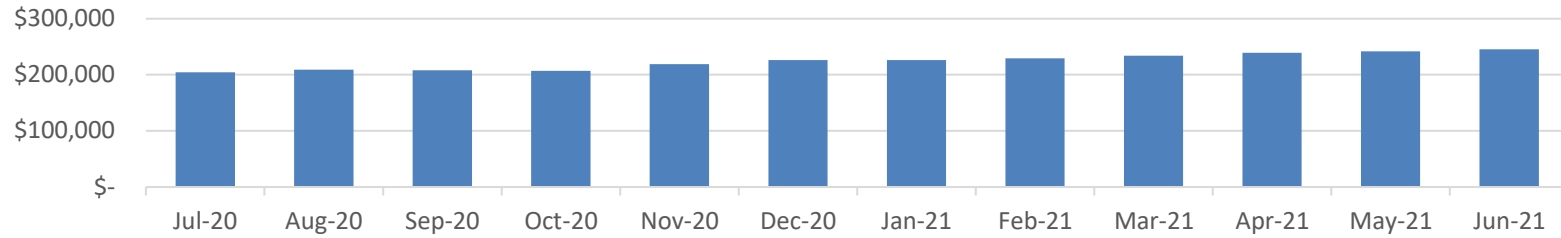
Total SPRS Insurance Asset Allocation Over Time As of June 30, 2021



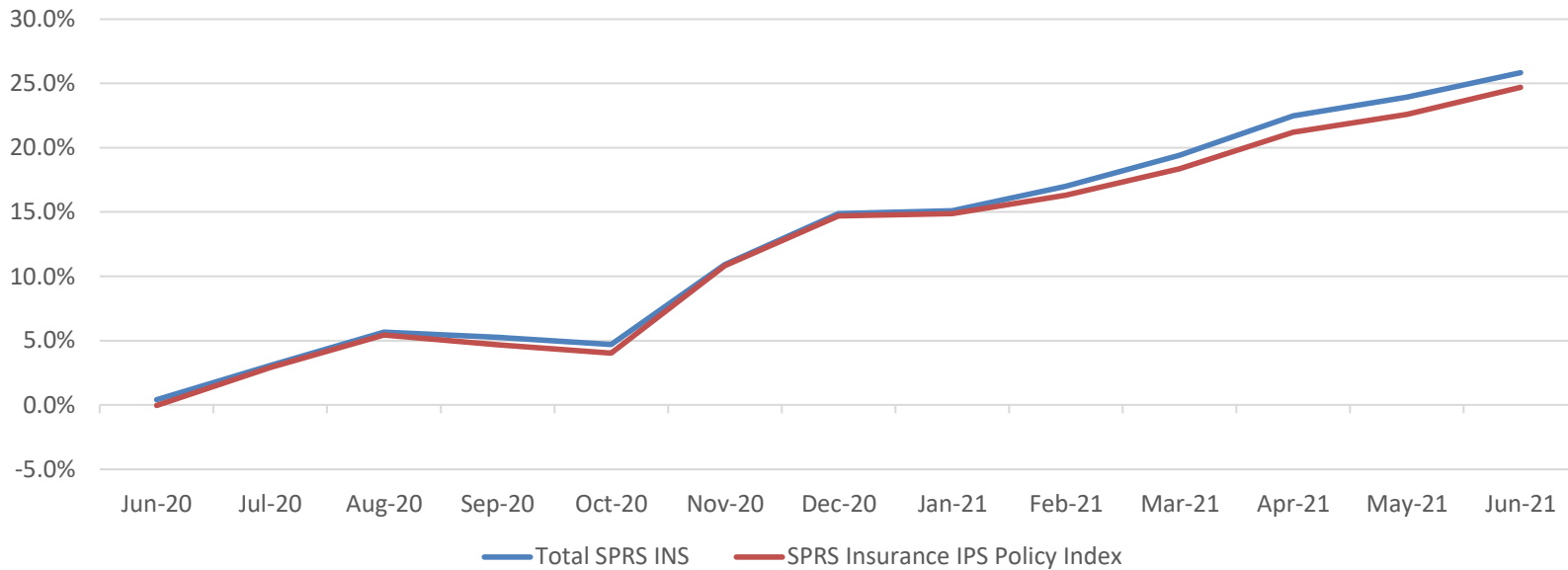
Risk Categorization	January 2021	February 2021	March 2021	April 2021	May 2021	June 2021
Growth	70.88%	71.26%	71.87%	72.29%	72.47%	71.27%
Liquidity	14.86%	14.69%	14.13%	13.87%	13.69%	14.93%
Diversifying Strategies	14.28%	11.05%	10.96%	10.83%	10.77%	10.69%
Opportunistic	0.00%	3.00%	3.04%	3.01%	3.08%	3.12%

Total SPRS Insurance Summary As of June 30, 2021

Market Value Over Time (\$USD 000)



Cumulative Performance Over 1 Year





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.)

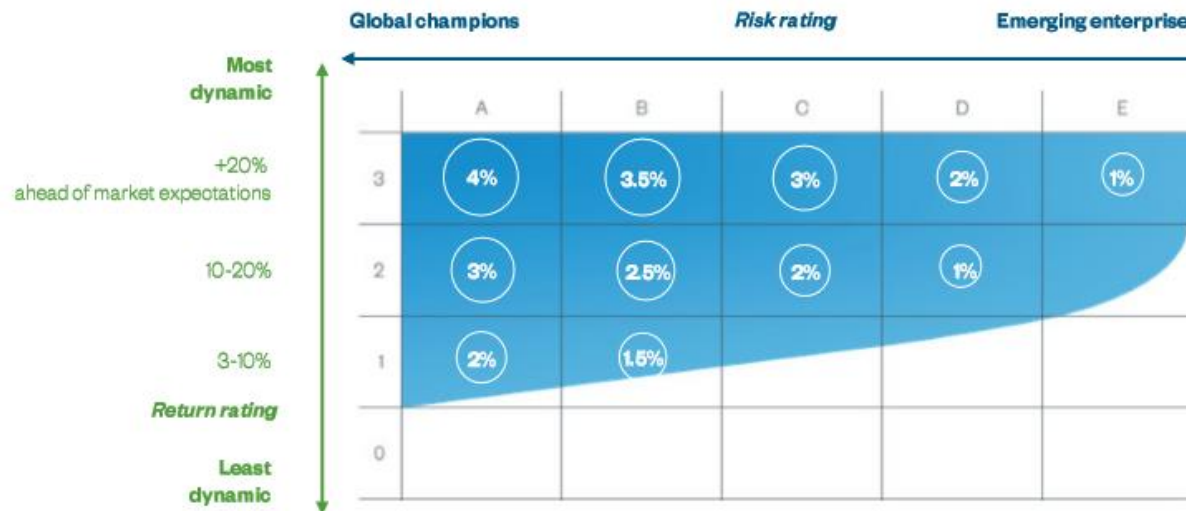


- Investment Philosophy
 - To invest in companies that are dynamically growing as evidenced by positive change that manifest in sustainable earnings, occurring more rapidly than expected, and where those positives changes have not yet been reflected in the stock's valuations.
- Investment Process
 - 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

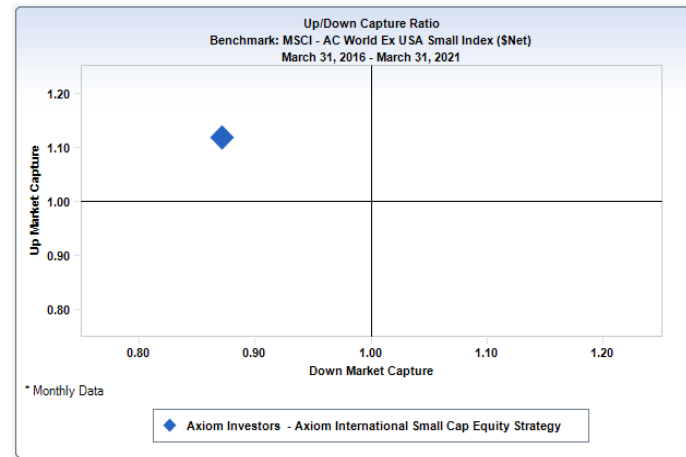
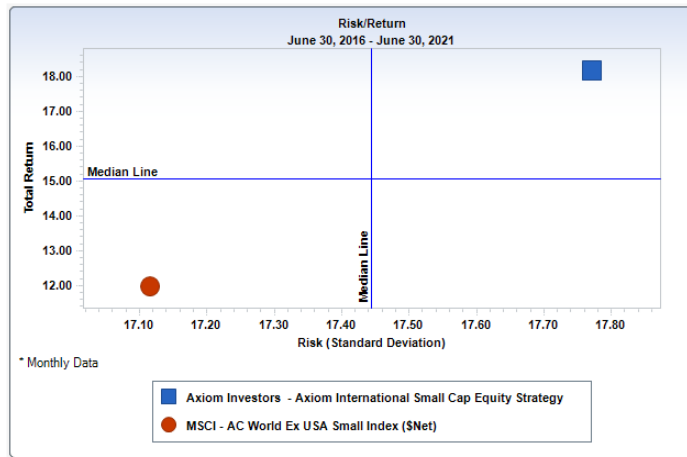


Axiom (cont.)



- Performance

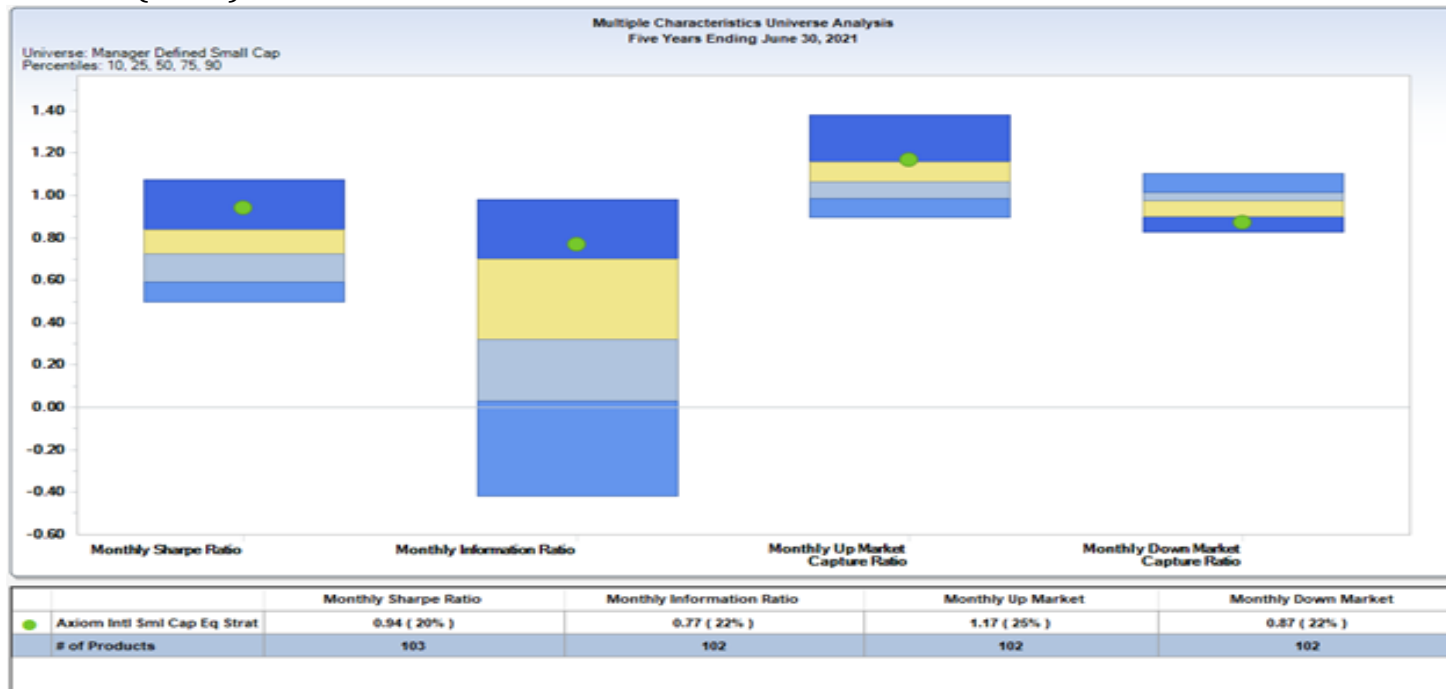
Axiom Investors					
As of: 06/30/21	1 YR	3 YRS	5 YRS	7YRS	SI
Axiom International Small Cap - Gross	44.06	16.92	18.19	15.89	15.56
MSCI ACWI ex US Small Cap Index Net	47.04	9.78	11.97	7.07	7.58
<i>Relative Performance (+/-)</i>	-2.98	7.14	6.22	8.82	7.98
*Inception Date: 01/01/14					



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.

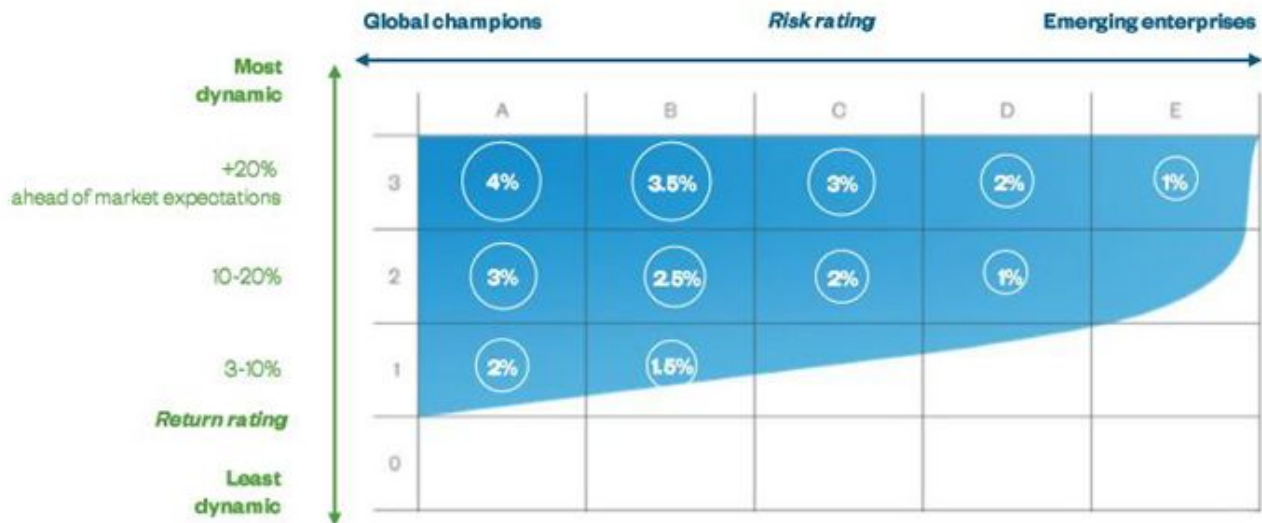
Investment Philosophy and Process

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.

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 a 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.

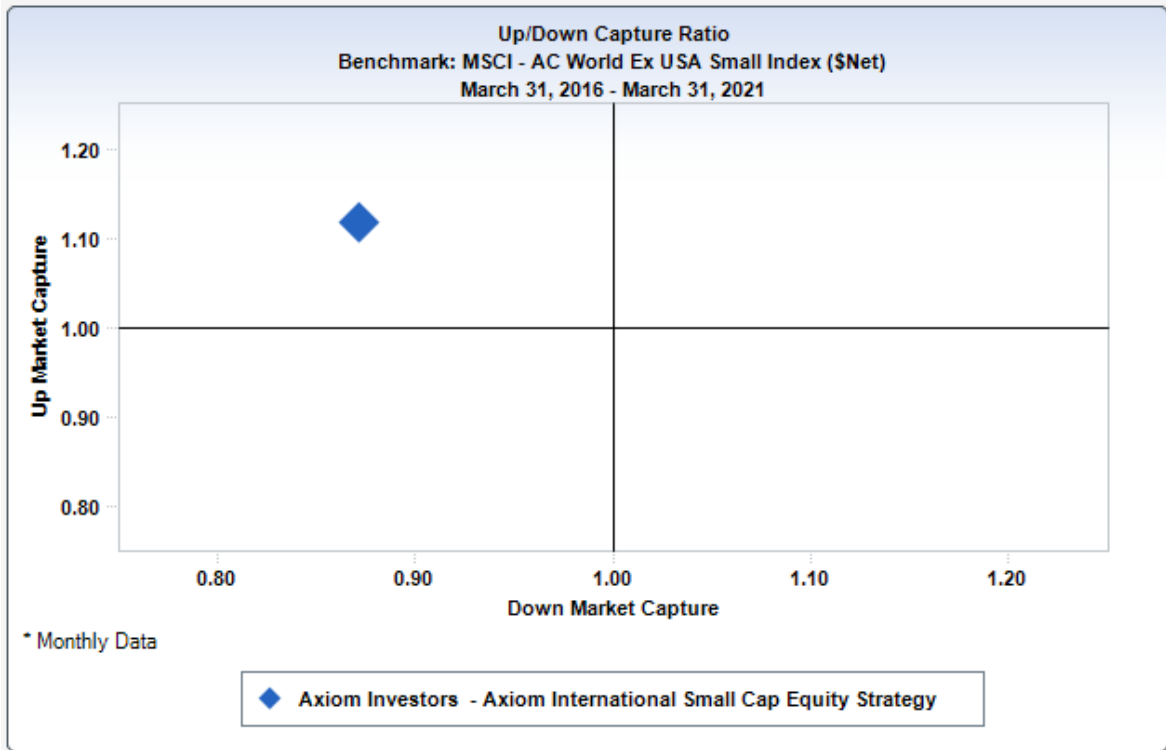
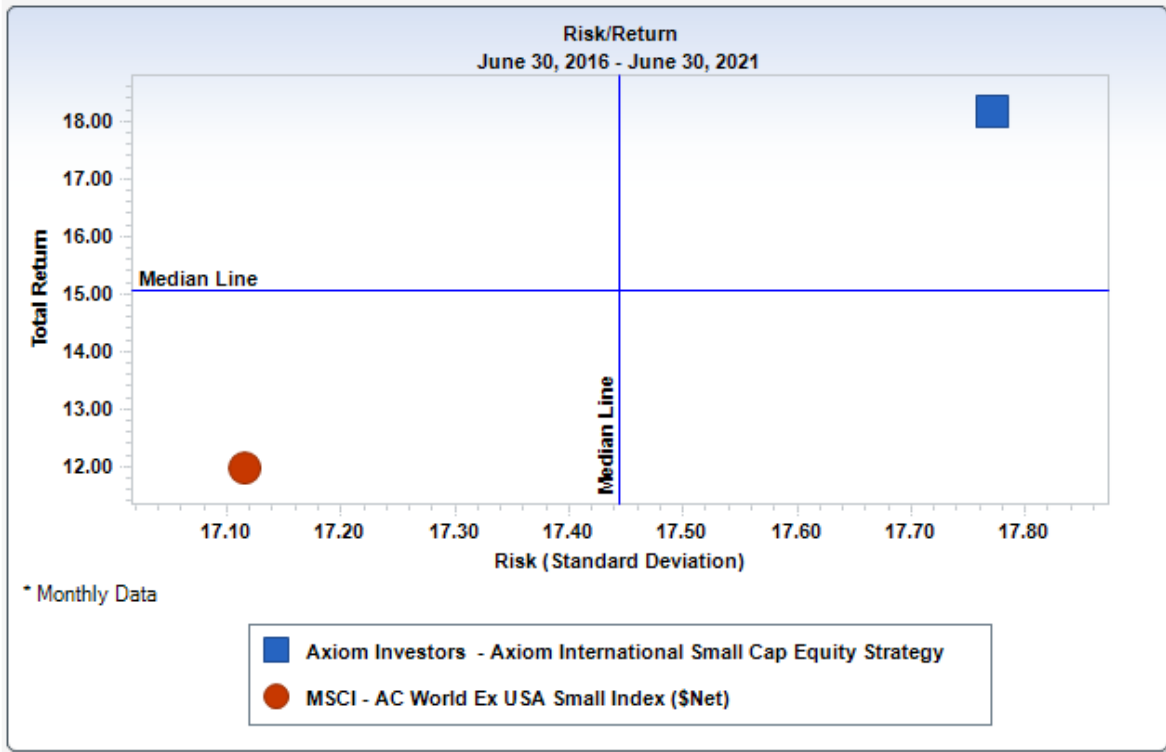
Client Stability

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

<i>(In Deciles)</i>	Overall Rating Organization Information Forecasting Portfolio Construction Implementation Attribution						
		(20%)	(20%)	(20%)	(20%)	(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

	Rating Scale									
Decile	1	2	3	4	5	6	7	8	9	10
Corresponding Grade	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

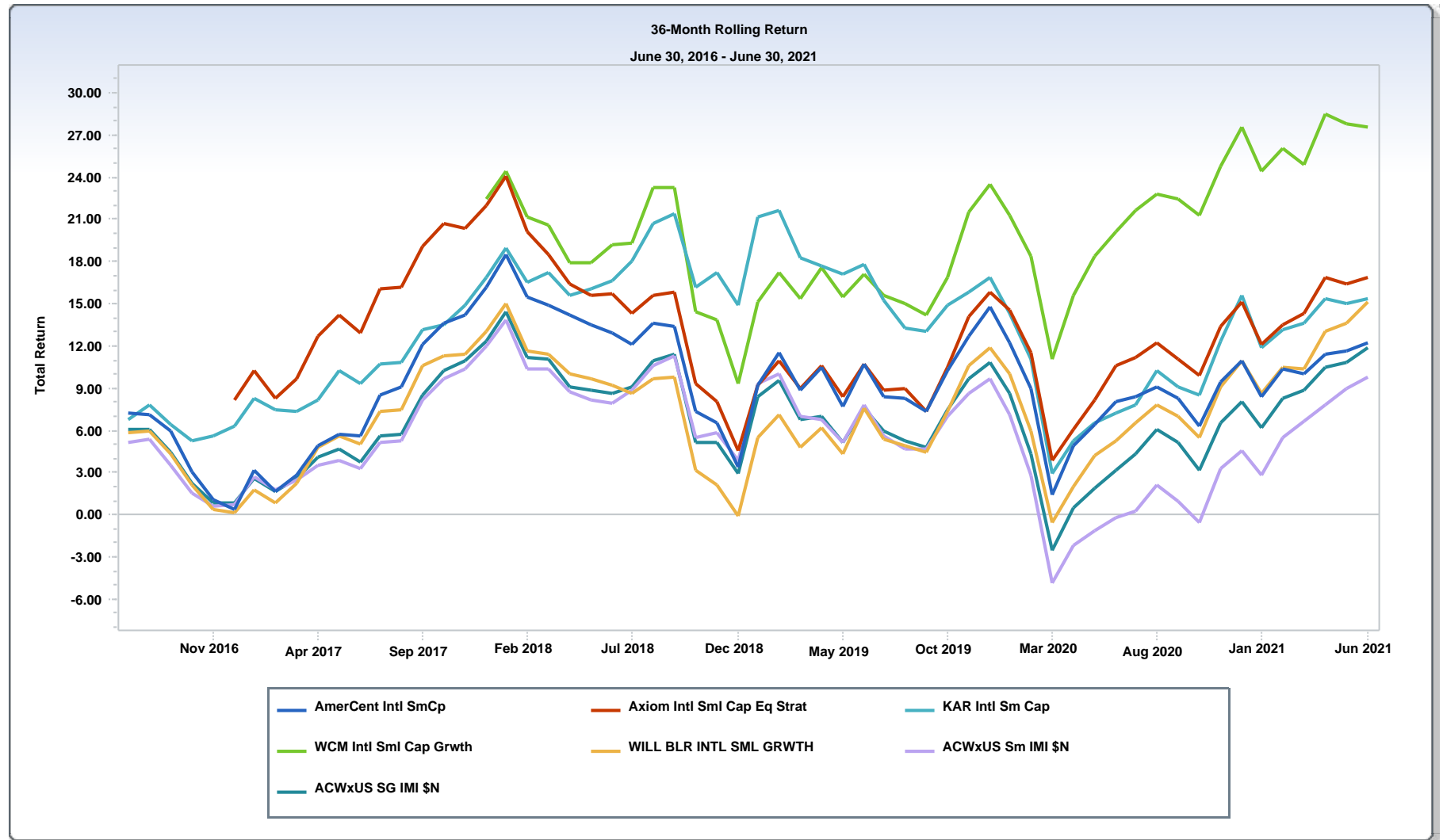
<i>Value Added (vs. MSCI AC World ex US Small Index)</i>	Quarter	Year-to-date	One Year	Three Years	Five Years	Seven Years	Ten Years
Axiom Investors - International Small-Cap Equity Strategy	3.57	(3.98)	(2.99)	7.14	6.18	8.80	-
Kayne Anderson Rudnick Investment Mgmt, LLC - International Small Cap	0.87	(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

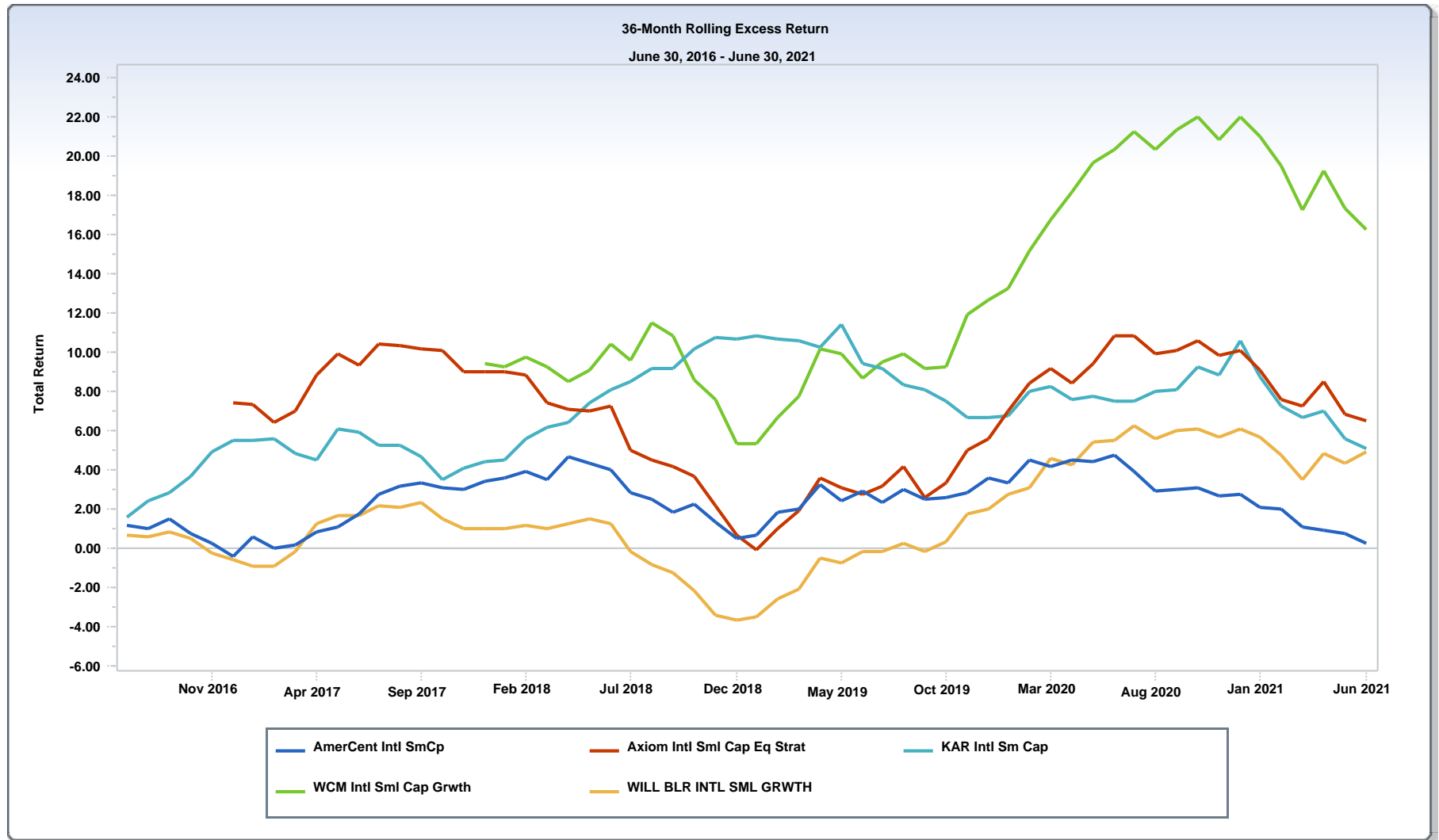
Rolling Absolute Performance



*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

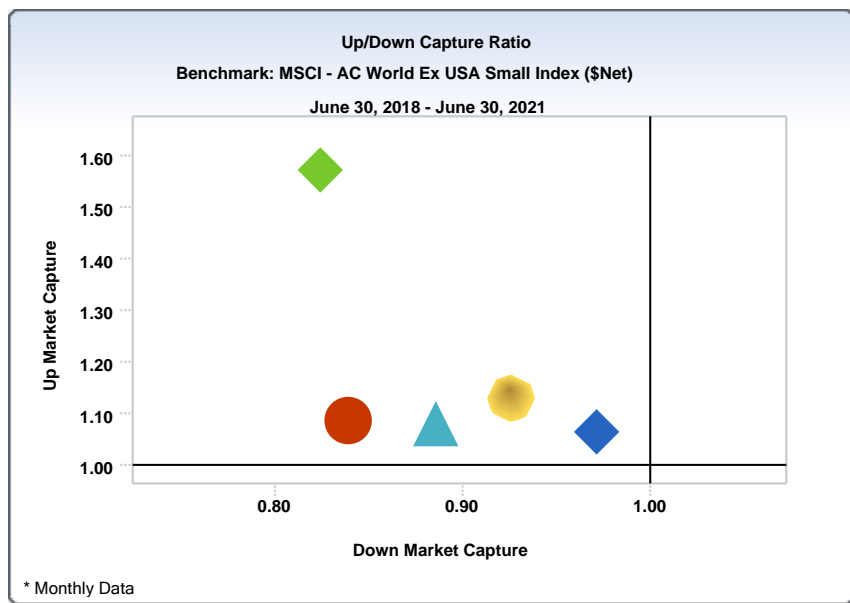


* Excess performance calculated using manager defined benchmark. Axiom, KAR, WCM, and William Blair are benchmarked to the MSCI AC World ex US Small Index. American Century is benchmarked to the MSCI ACWI ex US Small Growth IMI Index.

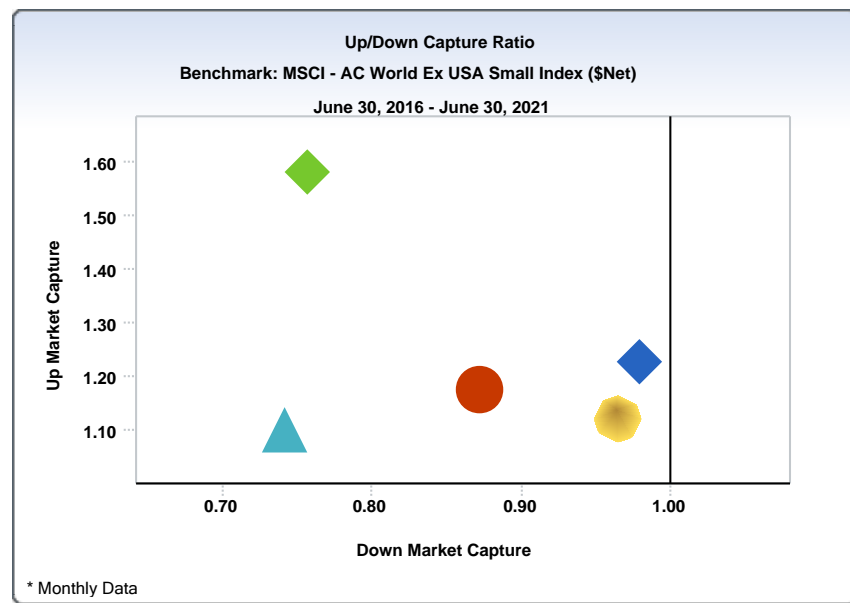
INTERNATIONAL SMALL CAP MANAGER SEARCH

Up/Down Capture Ratio Analysis

Three Year



Five Year

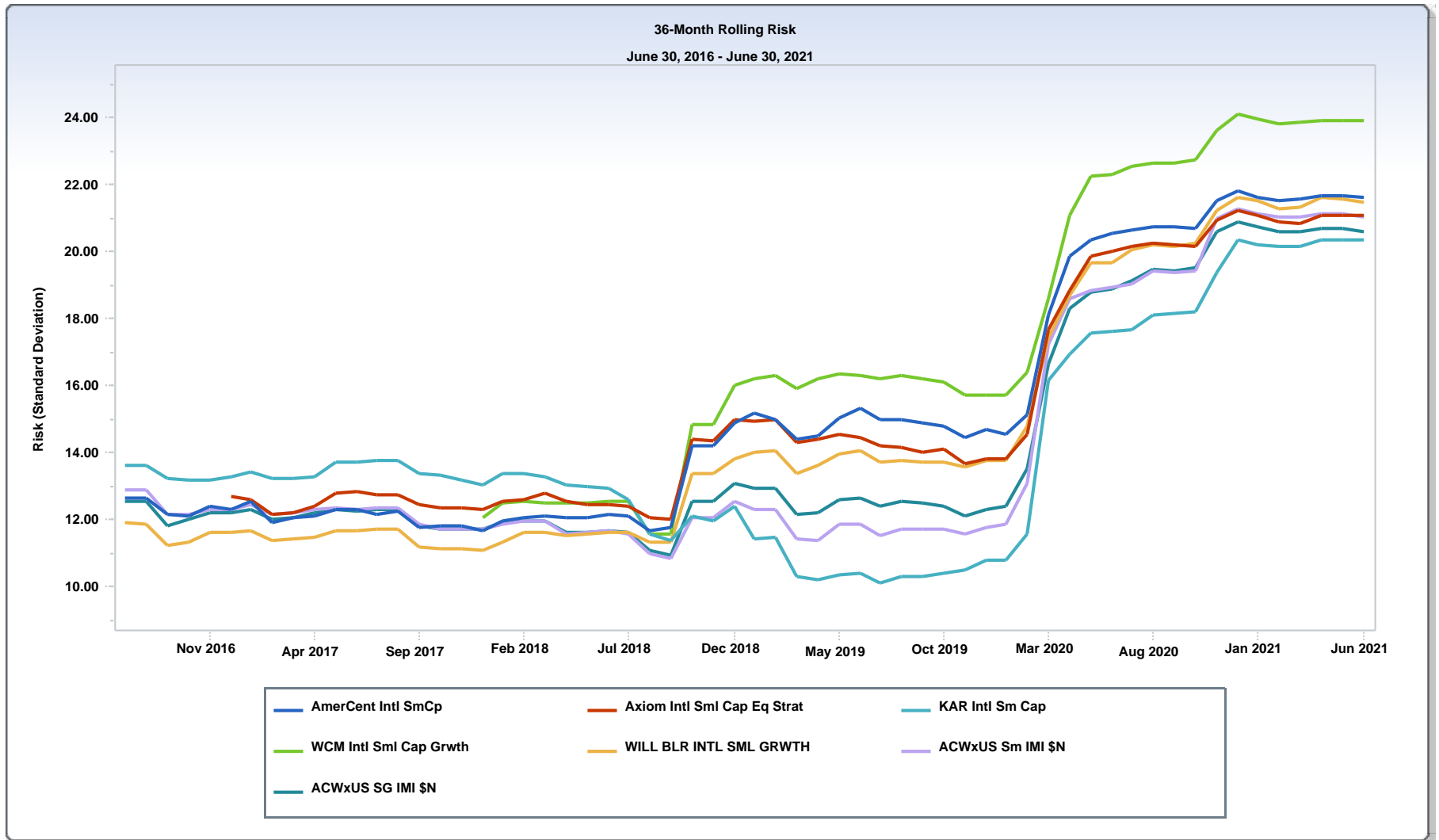


- ◆ American Century Investment Management, Inc. - Non-U.S. Small Cap
- Axiom Investors - Axiom International Small Cap Equity Strategy
- ▲ Kayne Anderson Rudnick Investment Mgmt, LLC - International Small Cap
- ◆ WCM Investment Management - International Small Cap Growth
- William Blair - International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

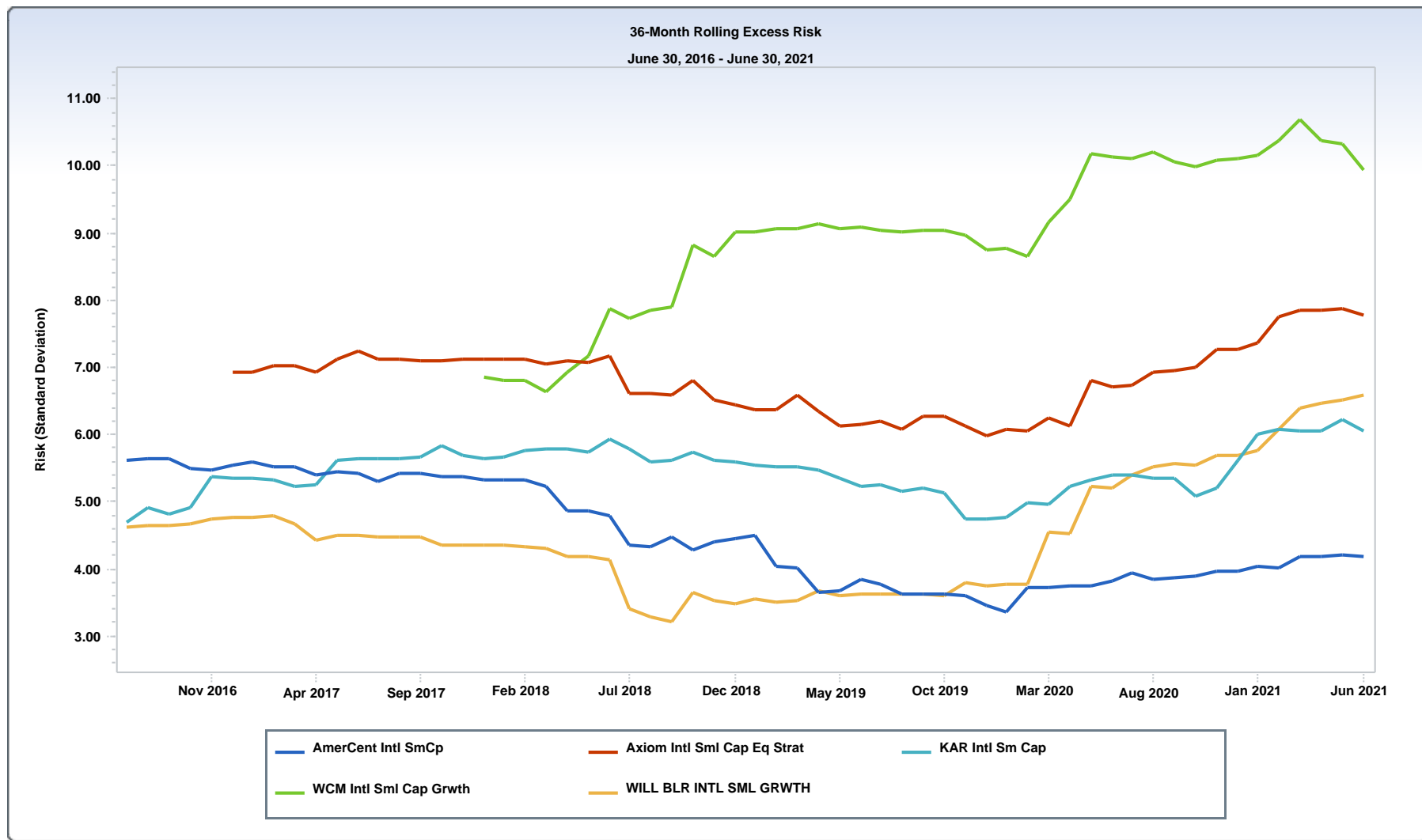
Rolling Absolute Risk



*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

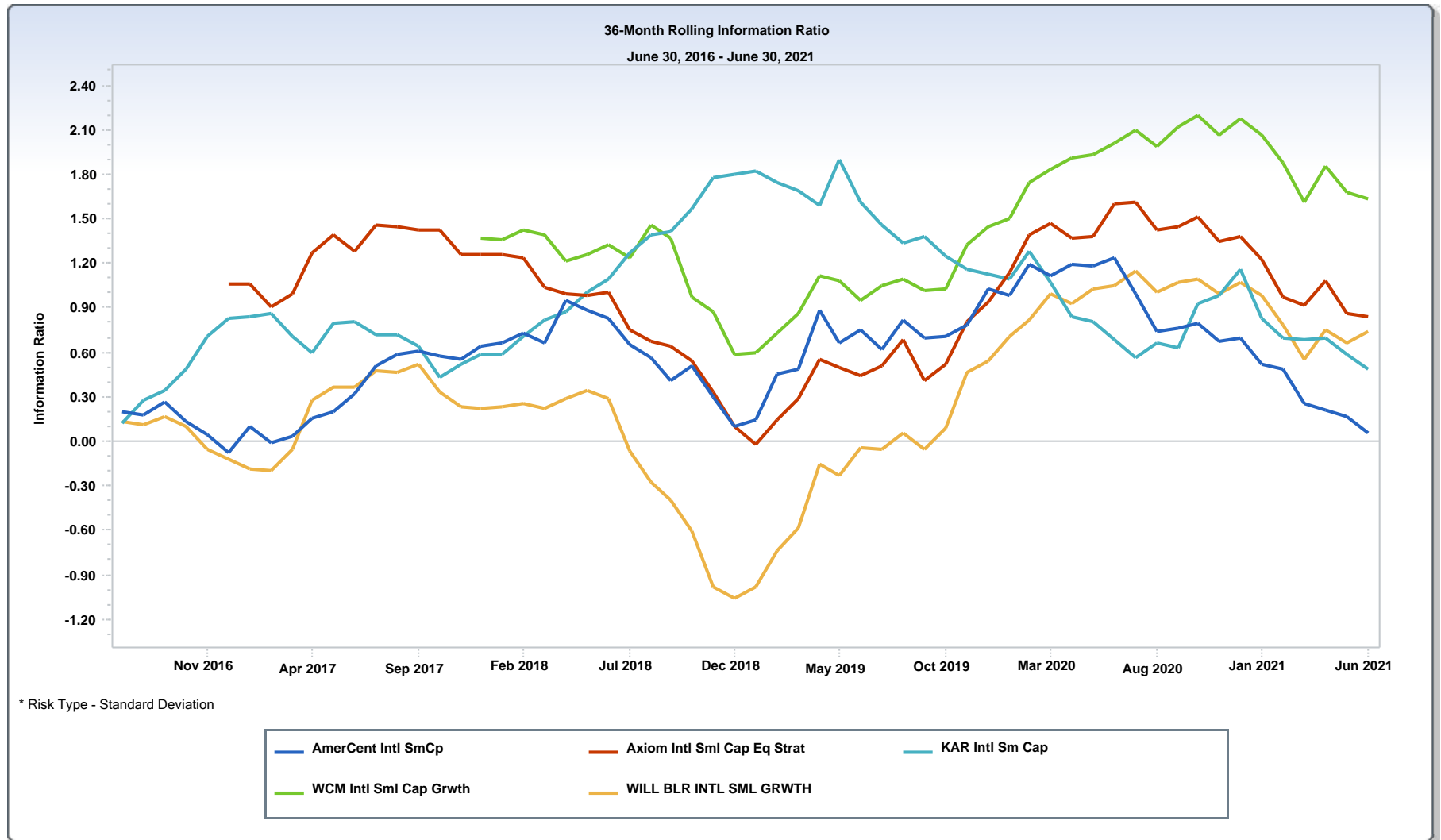
Rolling Excess Risk



* 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

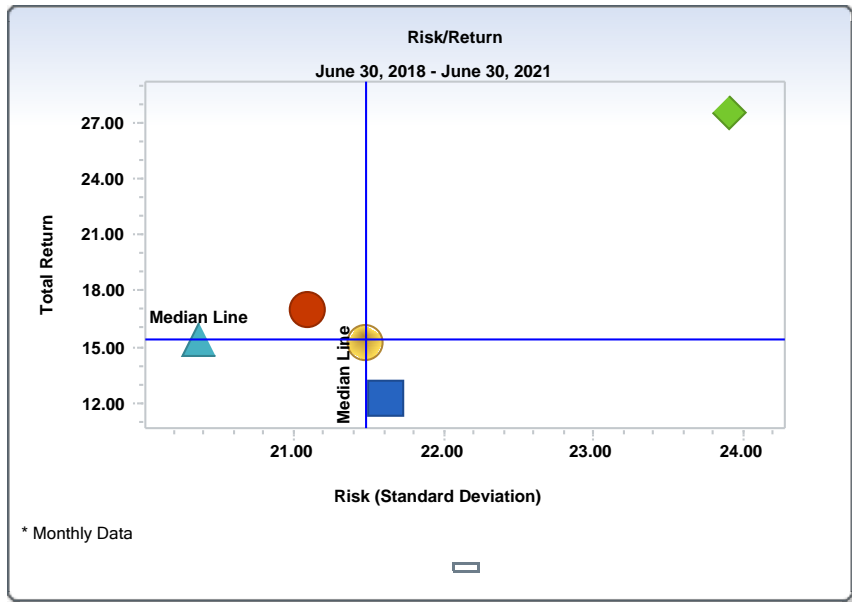


* Information Ratio calculated using manager defined benchmark. Axiom, KAR, WCM, and William Blair are benchmarked to the MSCI AC World ex US Small Index. American Century is benchmarked to the MSCI ACWI ex US Small Growth IMI Index.

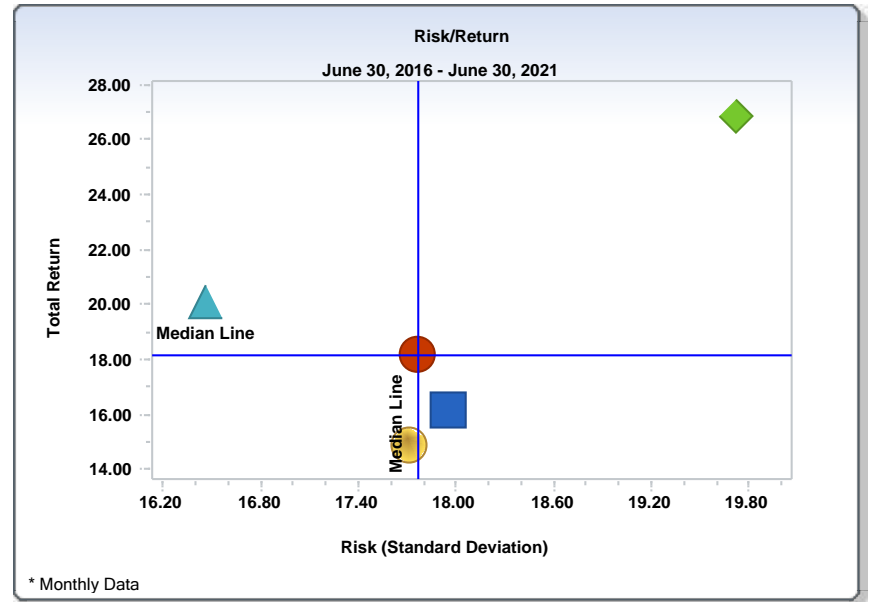
INTERNATIONAL SMALL CAP MANAGER SEARCH

Risk/Return Analysis

Three Year



Five Year



- 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
- MSCI - AC World Ex USA Small Index (\$Net)
- MSCI - AC World Ex USA Small Growth Index (\$Net)

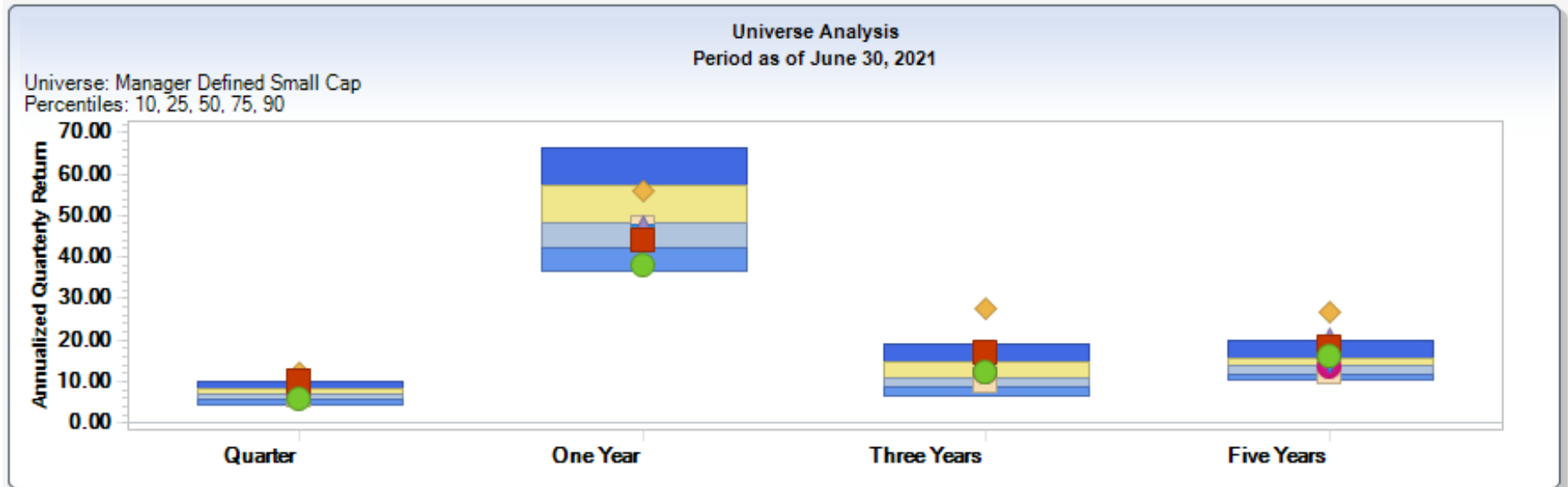
*Axiom, KAR, WCM, and William Blair are benchmarked to the MSCI AC World ex US Small Index. American Century is benchmarked to the MSCI ACWI ex US Small Growth IMI Index. All funds and indices are shown.

Universe Analysis

Wilshire

INTERNATIONAL SMALL CAP MANAGER SEARCH

Universe Ranking - Performance

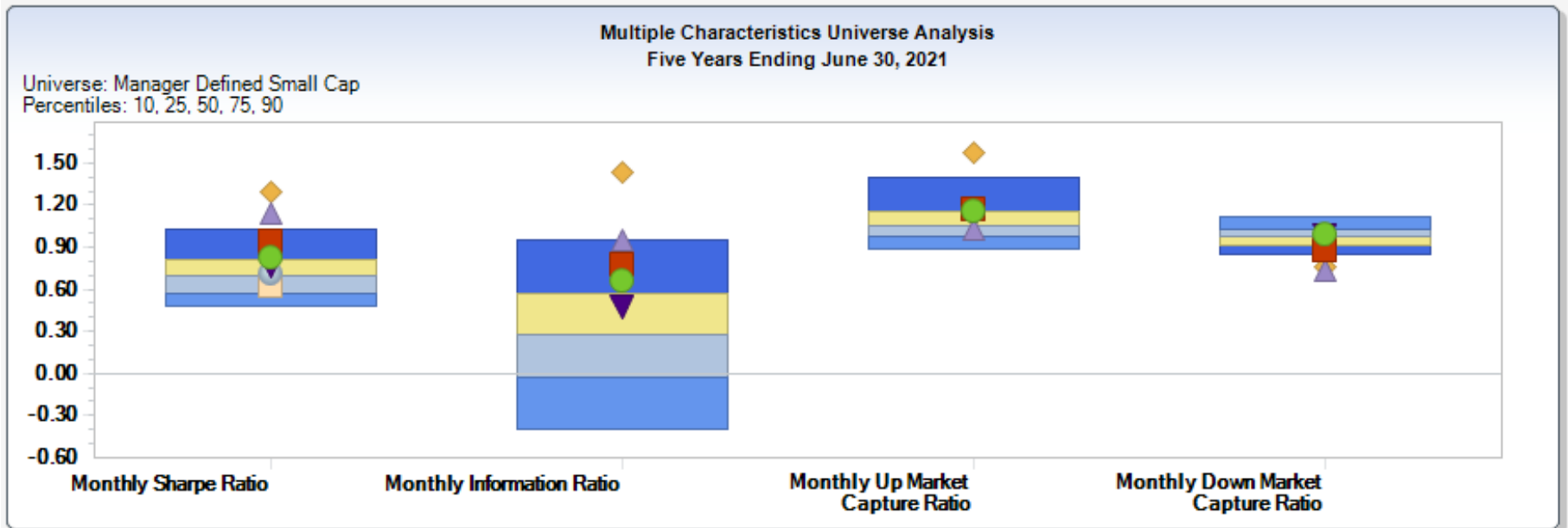


		Quarter	One Year	Three Years	Five Years
●	AmerCent Intl SmCp	5.62 (72%)	37.98 (85%)	12.18 (39%)	16.14 (22%)
■	Axiom Intl Sml Cap Eq Strat	9.92 (12%)	44.05 (65%)	16.92 (15%)	18.15 (14%)
▲	KAR Intl Sm Cap	7.22 (43%)	47.34 (54%)	15.33 (21%)	20.10 (10%)
◆	WCM Intl Sml Cap Grwth	11.92 (3%)	56.04 (28%)	27.54 (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



		Monthly Sharpe Ratio	Monthly Information Ratio	Monthly Up Market	Monthly Down Market
●	AmerCent Intl SmCp	0.82 (24%)	0.66 (23%)	1.16 (25%)	0.99 (57%)
■	Axiom Intl Sml Cap Eq Strat	0.94 (16%)	0.77 (18%)	1.17 (25%)	0.87 (19%)
▲	KAR Intl Sm Cap	1.14 (4%)	0.95 (9%)	1.03 (56%)	0.74 (4%)
◆	WCM Intl Sml Cap Grwth	1.29 (2%)	1.43 (2%)	1.58 (5%)	0.76 (4%)
▼	WILL BLR INTL SML GRWTH	0.76 (33%)	0.47 (32%)	1.12 (29%)	0.97 (43%)
●	ACWxUS SG IMI \$N	0.71 (48%)			
■	ACWxUS Sm IMI \$N	0.62 (67%)			

*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

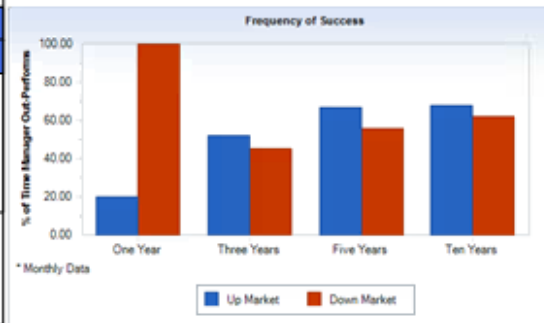
Wilshire

INTERNATIONAL SMALL CAP MANAGER SEARCH

Performance Review

Historical Returns	Annualized Ended 6/30/2021				Annual Returns										
	1 Year	3 Years	5 Years	10 Years	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011	
AmerCent Intl SmCp	37.98	12.18	16.14	11.56	32.55	30.50	-21.02	46.65	-4.68	12.24	-5.61	33.23	26.58	-13.73	
ACWxUS SG IMI \$N	44.91	11.91	13.29	7.89	23.69	24.62	-18.28	33.63	-0.28	6.49	-3.59	18.52	16.87	-17.86	
Risk - Standard Deviation															
AmerCent Intl SmCp	13.68	21.61	17.96	16.88	29.55	14.59	16.18	4.38	15.73	9.08	11.71	12.00	15.41	22.75	
ACWxUS SG IMI \$N	14.64	20.61	16.88	16.01	30.57	12.18	13.94	3.75	15.07	12.35	9.51	11.58	16.31	19.76	
Risk - Semi-Variance															
AmerCent Intl SmCp	8.67	16.20	13.62	12.95	23.40	10.69	12.92	3.21	9.91	7.33	7.42	9.36	13.48	17.37	
ACWxUS SG IMI \$N	9.36	15.66	12.90	12.06	24.06	9.20	11.07	3.09	10.47	8.12	6.33	8.16	13.16	14.40	
Excess Returns															
Arithmetic Excess	-6.93	0.27	2.85	3.67	8.86	5.88	-2.74	13.02	-4.40	5.75	-2.02	14.71	9.71	4.13	
Geometric Excess	-4.78	0.24	2.52	3.40	7.16	4.72	-3.35	9.74	-4.41	5.40	-2.10	12.41	8.31	5.03	

Excess Statistics Manager vs. Benchmark	Annualized Ended 6/30/2021			
	1 Year	3 Years	5 Years	10 Years
Tracking Error	3.31	4.18	3.82	4.74
Information Ratio	-1.45	0.06	0.66	0.72
Downside Deviation	2.25	2.86	2.77	3.56
Skewness	0.20	0.31	-0.06	-0.39
Kurtosis	-0.84	-0.08	-0.10	0.49
Alpha	-2.05	-0.03	2.07	3.31
Beta	0.91	1.03	1.04	1.01
Residual Risk	3.11	4.11	3.76	4.73
R Squared	0.95	0.96	0.96	0.92



INTERNATIONAL SMALL CAP MANAGER SEARCH

Performance Review

Historical Returns	Annualized Ended 6/30/2021				Annual Returns									
	1 Year	3 Years	5 Years	10 Years	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011
Axiom Intl Sml Cap Eq Strat	44.05	16.92	18.15	N/A	38.87	34.82	-18.59	41.39	-0.83	29.59	-1.48	N/A	N/A	N/A
ACWxUS Sm IMI \$N	47.04	9.78	11.97	7.02	14.24	22.42	-18.20	31.64	3.91	2.60	-4.03	19.73	18.52	-18.50
Risk - Standard Deviation														
Axiom Intl Sml Cap Eq Strat	13.76	21.10	17.77	N/A	29.63	10.68	16.36	7.60	15.78	10.59	10.35	N/A	N/A	N/A
ACWxUS Sm IMI \$N	15.72	21.04	17.12	16.33	32.21	12.27	12.68	3.49	15.01	12.78	9.48	11.95	17.39	19.51
Risk - Semi-Variance														
Axiom Intl Sml Cap Eq Strat	8.65	16.06	13.49	N/A	23.75	8.38	13.16	5.46	10.06	8.32	6.52	N/A	N/A	N/A
ACWxUS Sm IMI \$N	9.83	16.28	13.30	12.37	25.49	9.21	9.78	2.59	10.37	7.97	6.53	8.54	13.93	14.39
Excess Returns														
Arithmetic Excess	-2.99	7.14	6.18	N/A	24.63	12.40	-0.39	9.75	-4.74	26.99	2.55	N/A	N/A	N/A
Geometric Excess	-2.03	6.50	5.52	N/A	21.56	10.13	-0.48	7.41	-4.56	26.31	2.66	N/A	N/A	N/A

Excess Statistics Manager vs. Benchmark	Annualized Ended 6/30/2021			
	1 Year	3 Years	5 Years	10 Years
Tracking Error	8.06	7.78	7.15	N/A
Information Ratio	-0.25	0.84	0.77	N/A
Downside Deviation	5.71	5.57	5.02	N/A
Skewness	-0.04	0.10	0.17	N/A
Kurtosis	-1.87	-0.02	-0.14	N/A
Alpha	6.76	7.05	6.03	N/A
Beta	0.74	0.93	0.95	N/A
Residual Risk	7.31	7.74	7.16	N/A
R Squared	0.72	0.87	0.84	N/A

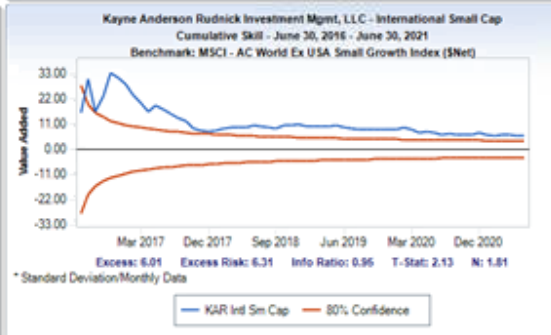
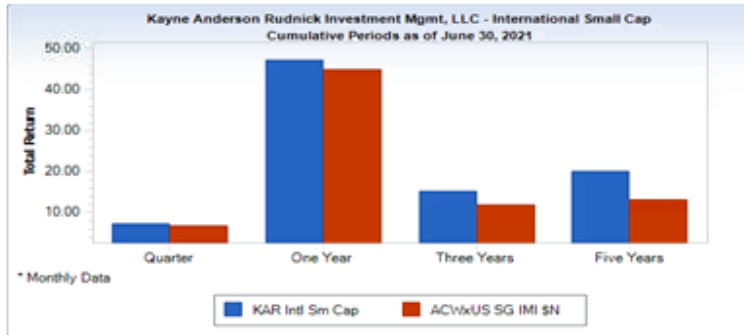


INTERNATIONAL SMALL CAP MANAGER SEARCH

Performance Review

Historical Returns	Annualized Ended 6/30/2021				Annual Returns									
	1 Year	3 Years	5 Years	10 Years	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011
KAR Intl Sm Cap	47.34	15.33	20.10	N/A	25.96	29.49	-5.32	30.30	22.81	-0.28	-1.92	32.42	24.87	N/A
ACWxUS SG IMI \$N	44.91	11.91	13.29	7.89	23.69	24.62	-18.28	33.63	-0.28	6.49	-3.59	18.52	16.87	-17.86
Risk - Standard Deviation														
KAR Intl Sm Cap	17.81	20.36	16.46	N/A	31.51	11.22	11.58	7.01	15.87	14.23	8.65	11.39	14.29	N/A
ACWxUS SG IMI \$N	14.64	20.61	16.88	16.01	30.57	12.18	13.94	3.75	15.07	12.35	9.51	11.58	16.31	19.76
Risk - Semi-Variance														
KAR Intl Sm Cap	11.19	15.20	12.32	N/A	24.84	8.45	8.21	4.35	11.94	9.83	5.86	7.96	12.12	N/A
ACWxUS SG IMI \$N	9.36	15.66	12.90	12.06	24.06	9.20	11.07	3.09	10.47	8.12	6.33	8.16	13.16	14.40
Excess Returns														
Arithmetic Excess	2.43	3.42	6.81	N/A	2.27	4.87	12.96	-3.33	23.09	-6.77	1.67	13.90	8.00	N/A
Geometric Excess	1.68	3.06	6.01	N/A	1.84	3.91	15.86	-2.49	23.15	-6.36	1.73	11.73	6.85	N/A

Excess Statistics Manager vs. Benchmark	Annualized Ended 6/30/2021			
	1 Year	3 Years	5 Years	10 Years
Tracking Error	7.05	6.30	6.31	N/A
Information Ratio	0.24	0.49	0.95	N/A
Downside Deviation	4.88	4.41	4.30	N/A
Skewness	0.35	0.17	0.24	N/A
Kurtosis	0.92	0.52	0.31	N/A
Alpha	-1.79	3.63	7.07	N/A
Beta	1.11	0.94	0.91	N/A
Residual Risk	7.14	6.22	6.11	N/A
R Squared	0.84	0.91	0.86	N/A

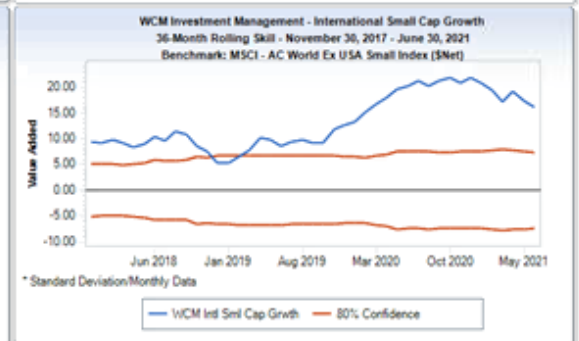


INTERNATIONAL SMALL CAP MANAGER SEARCH

Performance Review

Historical Returns	Annualized Ended 6/30/2021				Annual Returns									
	1 Year	3 Years	5 Years	10 Years	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011
WCM Intl Sml Cap Grwth	56.04	27.54	26.85	N/A	58.55	45.72	-10.12	43.98	0.93	26.41	N/A	N/A	N/A	N/A
ACWxUS Sm IMI \$N	47.04	9.78	11.97	7.02	14.24	22.42	-18.20	31.64	3.91	2.60	-4.03	19.73	18.52	-18.50
Risk - Standard Deviation														
WCM Intl Sml Cap Grwth	16.71	23.91	19.72	N/A	32.66	12.12	21.37	7.17	14.23	12.19	N/A	N/A	N/A	N/A
ACWxUS Sm IMI \$N	15.72	21.04	17.12	16.33	32.21	12.27	12.68	3.49	15.01	12.78	9.48	11.95	17.39	19.51
Risk - Semi-Variance														
WCM Intl Sml Cap Grwth	10.55	17.48	14.43	N/A	24.21	8.77	17.66	5.08	9.82	10.08	N/A	N/A	N/A	N/A
ACWxUS Sm IMI \$N	9.83	16.28	13.30	12.37	25.49	9.21	9.78	2.59	10.37	7.97	6.53	8.54	13.93	14.39
Excess Returns														
Arithmetic Excess	9.00	17.76	14.88	N/A	44.31	23.30	8.08	12.34	-2.98	23.81	N/A	N/A	N/A	N/A
Geometric Excess	6.12	16.18	13.29	N/A	38.79	19.03	9.88	9.37	-2.87	23.21	N/A	N/A	N/A	N/A

Excess Statistics Manager vs. Benchmark	Annualized Ended 6/30/2021			
	1 Year	3 Years	5 Years	10 Years
Tracking Error	7.54	9.94	9.31	N/A
Information Ratio	0.81	1.63	1.43	N/A
Downside Deviation	5.32	7.07	6.48	N/A
Skewness	-0.03	-0.06	0.13	N/A
Kurtosis	-0.94	0.68	0.47	N/A
Alpha	8.12	15.86	13.12	N/A
Beta	0.94	1.04	1.02	N/A
Residual Risk	7.74	9.83	9.26	N/A
R Squared	0.79	0.83	0.78	N/A



INTERNATIONAL SMALL CAP MANAGER SEARCH

Performance Review

Historical Returns	Annualized Ended 6/30/2021				Annual Returns									
	1 Year	3 Years	5 Years	10 Years	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011
WILL BLR INTL SML GRWTH	44.89	15.11	14.84	10.15	30.95	35.87	-23.27	34.21	-3.00	10.95	-6.62	28.85	21.70	-10.44
ACWxUS Sm IMI \$N	47.04	9.78	11.97	7.02	14.24	22.42	-18.20	31.64	3.91	2.60	-4.03	19.73	18.52	-18.50
Risk - Standard Deviation														
WILL BLR INTL SML GRWTH	16.06	21.48	17.71	15.87	30.15	13.07	14.64	5.08	15.14	9.48	9.70	10.27	13.53	18.91
ACWxUS Sm IMI \$N	15.72	21.04	17.12	16.33	32.21	12.27	12.68	3.49	15.01	12.78	9.48	11.95	17.39	19.51
Risk - Semi-Variance														
WILL BLR INTL SML GRWTH	10.29	16.00	13.17	11.77	23.53	9.94	11.83	3.75	10.23	6.47	6.65	7.16	11.63	13.43
ACWxUS Sm IMI \$N	9.83	16.28	13.30	12.37	25.49	9.21	9.78	2.59	10.37	7.97	6.53	8.54	13.93	14.39
Excess Returns														
Arithmetic Excess	-2.15	5.33	2.87	3.13	16.71	13.45	-5.07	2.57	-6.91	8.35	-2.59	9.12	3.18	8.06
Geometric Excess	-1.46	4.86	2.56	2.92	14.63	10.99	-6.20	1.95	-6.65	8.14	-2.70	7.62	2.68	9.89

Excess Statistics Manager vs. Benchmark	Annualized Ended 6/30/2021			
	1 Year	3 Years	5 Years	10 Years
Tracking Error	7.42	6.59	5.42	5.13
Information Ratio	-0.20	0.74	0.47	0.57
Downside Deviation	5.16	4.51	3.57	3.50
Skewness	0.04	0.28	0.57	0.33
Kurtosis	-1.47	0.42	1.64	0.97
Alpha	1.73	5.09	2.71	3.40
Beta	0.90	0.97	0.99	0.92
Residual Risk	7.55	6.53	5.39	4.96
R Squared	0.78	0.91	0.91	0.90



Manager Evaluations

Wilshire



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
3rd	20%
3rd	50%
3rd	50%

I. Organization

Firm

Team

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
3rd	20%

II. Information

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.

Rating Decile	Weight
2nd	20%

III. Forecasting

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.

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.

Rating Decile	Weight
3rd	20%

IV. Portfolio Construction

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.

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.

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.

Decile	Rating									
	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

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Manager Research

Axiom Investors

Axiom International Small Cap Equity Strategy

Rating Decile	Weight
1st	100%

Summary

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>	1st	50%
<i>Team</i>	1st	50%

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
1st	20%

III. Forecasting

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 ACWI 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
3rd	20%

IV. Portfolio Construction

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
1st	10%

V. Implementation

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
1st	10%

VI. Attribution

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

Rating Decile	Weight
3rd	100%

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.

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 Advana 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
3rd	20%

II. Information

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.

Rating Decile	Weight
1st	20%

III. Forecasting

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.

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.

Rating Decile	Weight
3rd	20%

IV. Portfolio Construction

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.

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.

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.

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.

	Rating									
Decile	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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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
1st	20%

II. Information

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.

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.

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.

Rating Decile	Weight
1st	20%

III. Forecasting

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.

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.

Rating Decile	Weight
2nd	20%

IV. Portfolio Construction

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.

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.

Decile	Rating									
	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

Firm Information**WCM Investment Management**

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Manager Research

William Blair

International Small Cap Growth

Rating Decile	Weight
2nd	100%

Summary

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%
	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
1st	20%

II. Information

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.

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.

Rating Decile	Weight
2nd	20%

III. Forecasting

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.

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.

Rating Decile	Weight
3rd	20%

IV. Portfolio Construction

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.

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.

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, Analytics, 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.

Decile	Rating									
	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**

150 North Riverside Plaza
Chicago, IL-60606
USA

CONTACT :

Wally Fikri
Partner
Phone: 312-364-8089
Email: wfikri@williamblair.com

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www.wilshire.com

INTERNATIONAL SMALL CAP MANAGER SEARCH

Important Information

In preparing the analysis in this report, Wilshire has used information and data provided to us by third parties believed to be reliable, including the investment managers and market index providers discussed herein, . We have relied on such data and information as being complete and accurate. We have not independently verified and make no representations or warranties as to the accuracy or completeness of the data or information. Wilshire accepts no responsibility or liability (including for indirect, consequential or incidental damages) for any error, omission or inaccuracy in such information and for results obtained from its use. Information and opinions are as of the date indicated, and are subject to change without notice. Wilshire assumes no duty to update this material.

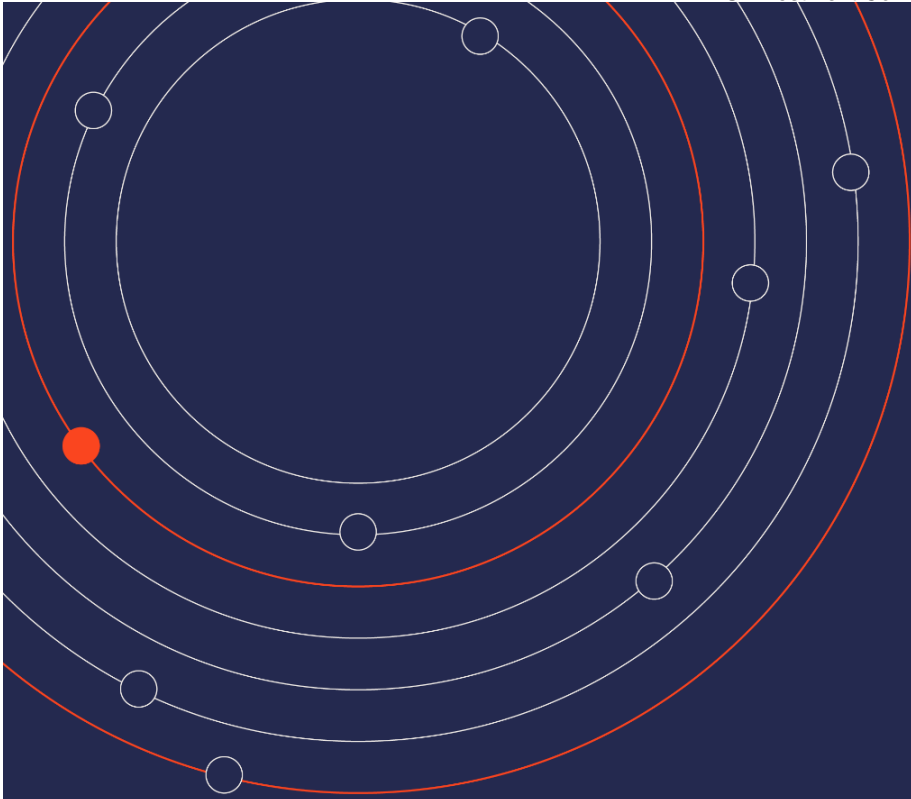
Research viewpoints may be based on investment due diligence conducted by Wilshire and do not include any form of operational due diligence. This material is intended for informational purposes only and should not be construed as legal, accounting, tax, investment, or other professional advice.

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CONTACT

contactus@wilshire.com

HEADQUARTERS

1299 Ocean Avenue, Suite 700
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

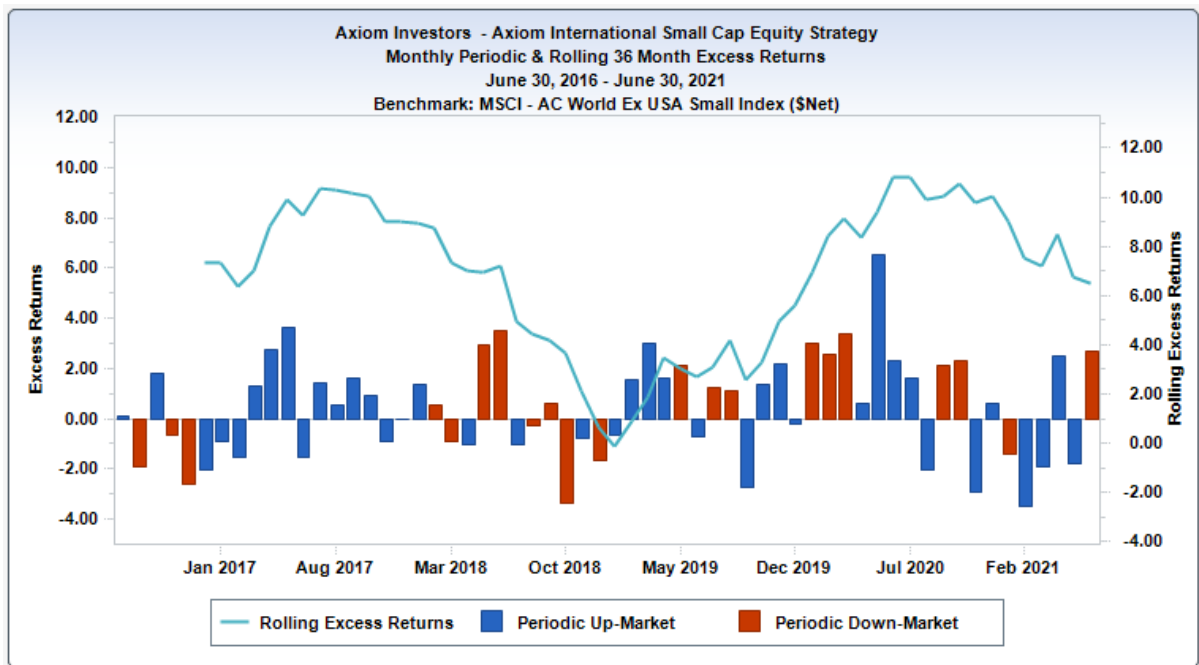
Axiom employs a growth-oriented, fundamental, bottom-up approach across its investment strategies. The application of the process is reliant on the collection and parsing of data that contributes to what Axiom calls "key business drivers." Key business drivers are defined as the company-specific, industry, 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

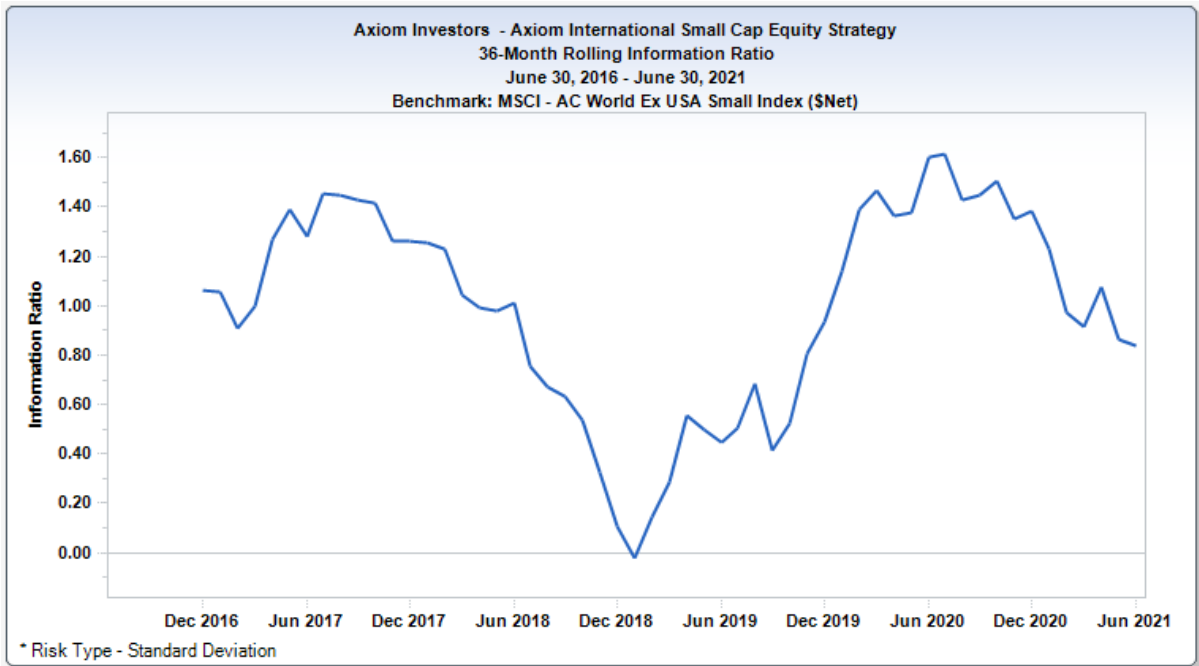
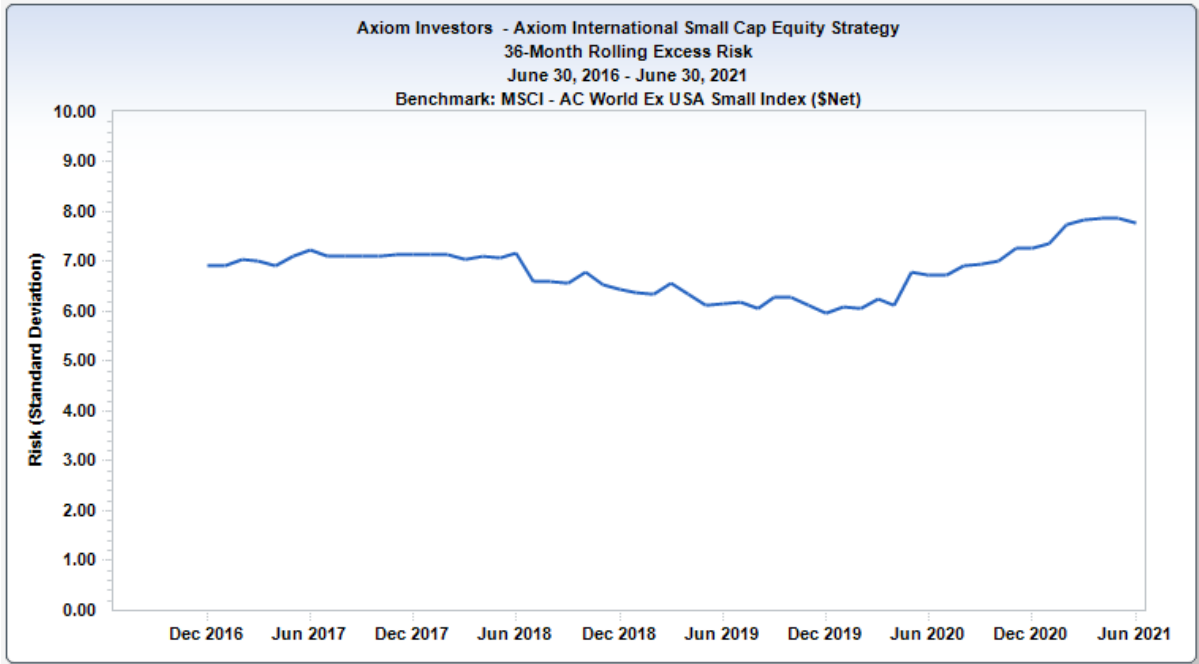


EXHIBIT B – Conflict of Interest Statement

**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: 

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.

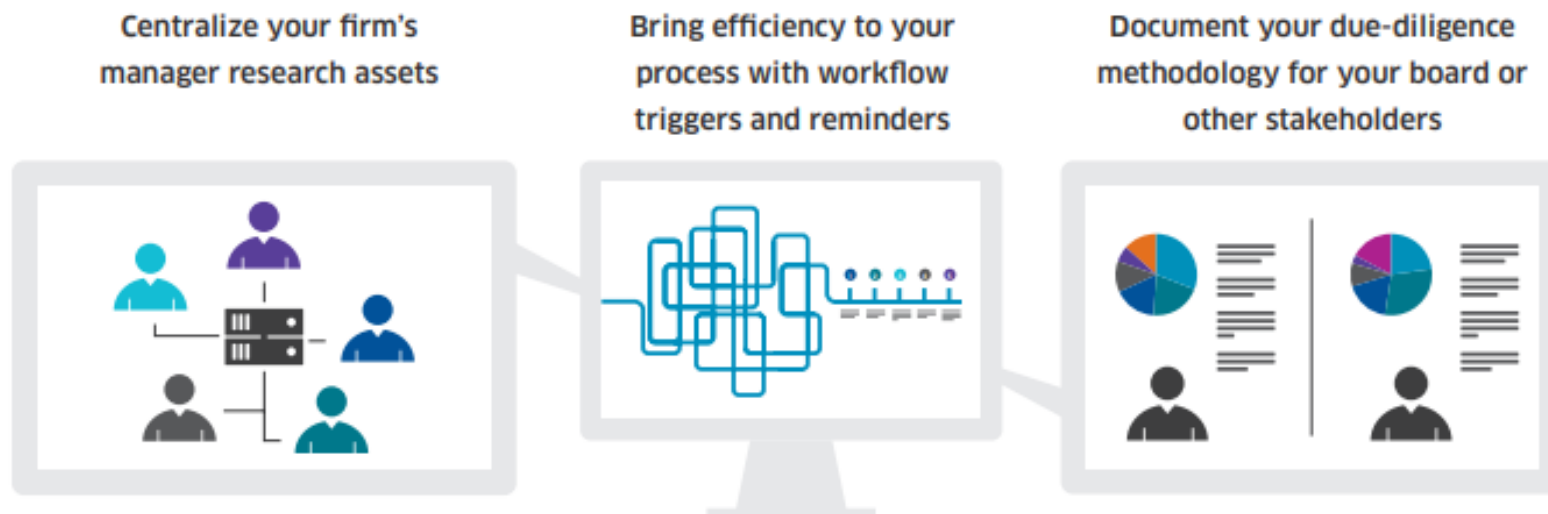
DocuSigned by:

EDWARD AJIMI
External Manager Signature

6/29/2021
Date

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 dashboard is titled "RESEARCH RESOURCES DASHBOARD" and includes a search bar with "Filter & Search". It is divided into several sections:

- STRATEGY:** Shows a profile for "Microcap Equity" with filters for "Geography | US" and "Market Cap | Micro Cap". It includes a bar chart for performance over time (MRQ to 10 Yrs) and a text description of the strategy.
- ASSESSMENTS by As of Date:** A list of 21 assessments with columns for "Manager Recommendation", "Date", and "Confidence".
- DOCUMENTS by Name:** A list of 15 documents including "Internal Analysis" and "Marketing" materials with their respective dates.
- NOTES by As of Date:** A list of 39 notes such as "Onsite Review", "Research Note", and "Performance Update" with dates and tags like "Mentioned".
- STRATEGIES by Name:** A section for "Small Cap Value" with a "Subadvisor" button.
- COMPANIES by Name:** A section for "Parent Company" with "4 Strategies, 7 Employees".
- PEOPLE by Last Name:** A list of 5 people with roles like "Primary Lead Analyst", "Director of Research", and "Analyst".

At the bottom, there are summary cards for "Monitoring Rules" (4), "Research Activity" (978), and "Due Diligence Checklists" (4). Navigation buttons for "+ QUICK CREATE" and "+ REPORT AN ISSUE" are also present.

Compliance Governance

RESEARCH RESOURCES DASHBOARD
Filter & Search

ACTIVITY AND NOTES | **MONITORING RULES** | **CHECKLISTS**

RULES

QUARTERLY PERFORMANCE UPDATE	Quarterly	114
APPROVED MANAGER ONSITE	Rolling 12 Months	21
ANNUAL DDQ	Annually	116
ADV REVIEW	Rolling 12 Months	117
INTEREST FOLLOW UP	Rolling 12 Months	5

118 CALENDAR by Status

Business Morning Equity	Last Interaction Performance Update PA 2020, Apr 23	Next Interaction 2020, Sep 30
Business Street Smart Equity Fund III	Last Interaction Performance Update PA 2020, Mar 25	Next Interaction 2020, Jun 30
Gulfstar Real Assets U.S. II	Last Interaction Perf Update PA 2020, Mar 26	Next Interaction 2020, Jun 30
Gulfstar Offshore Emerging Markets III Cap Equity	Last Interaction perf update q1 2020 DE 2020, Apr 9	Next Interaction 2020, Sep 30
Gulfstar Real Dividend III Cap Value	Last Interaction Performance Update PA 2019, May 22	Next Interaction 2020, Jun 30
Gulfstar U.S. Private Equity II	Last Interaction Performance Update PA 2019, June 6	Next Interaction 2020, Jun 30
Gulfstar Capital Community Investment	Last Interaction Q3 Update PA 2019, June 6	Next Interaction 2020, Jun 30
Gulfstar Real Assets U.S. II	Last Interaction Update PA 2019, Jan 24	Next Interaction 2020, Jun 30

Name **Quarterly Performance Update** Frequency **Quarterly** Applicable Ranks

Applicable Status Approved

Asset Classes

Rule Satisfied by

+ QUICK CREATE | + REPORT AN ISSUE
RESEARCH MANAGEMENT

Linked to eVestment data on +26,000 strategies

RESEARCH RESOURCES DASHBOARD Filter & Search

MICROCAP EQUITY Approved Expanded View

STRATEGY

DETAILS

ACTIVITY

ANALYTICS PROFILE

RELATED RESOURCES

21 ASSESSMENTS

15 DOCUMENTS

38 NOTES

LINKED RESOURCES

0 STRATEGIES

1 COMPANIES

5 PEOPLE

RESEARCH TRACKING

3 MONITORING RULES

4 DUE DILIGENCE CHECKLISTS

3RD PARTY PLATFORMS

EVRFIELDS

ANALYTICS PROFILE

MICROCAP EQUITY ASSET CLASS: Equity

As of Mar, 31

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

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 X

Annualized Returns						Universe Rankings								
As of Mar, 31														
Percentile	MRQ	YTD	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs	MRQ	YTD	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs

+ QUICK CREATE | **+ REPORT AN ISSUE** RESEARCH MANAGEMENT

Kentucky Retirement Systems

2020 Stress Test Analysis for
Kentucky Employees Retirement System and
State Police Retirement System





February 1, 2021

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

Subject: 2020 Stress Test Analysis for the Kentucky Employees Retirement System and the State Police Retirement System

Dear Trustees of the Board:

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

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

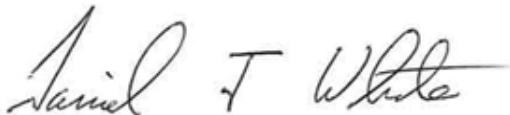
The methods used for calculating the actuarially determined contributions rates are established in Statute. Sections 3, 4 and 5 provide analysis regarding the contribution risk (i.e. the risk of receiving insufficient contributions) for each fund. Please refer to Part A and Part E of these sections for additional discussion regarding the contribution risk for each fund.

Certification

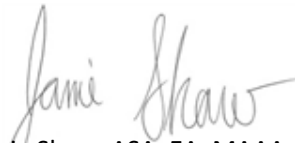
All of our work conforms with generally accepted actuarial principles and practices, and is in conformity with the Actuarial Standards of Practice issued by the Actuarial Standards Board. Also, nothing in this report should be construed as providing investment or tax advice. Both of the undersigned are 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 2 Methodology and Return Scenarios	6
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Section 3 Kentucky Employees Retirement System (Non-Hazardous Pension Fund).....	11
Section 4 Kentucky Employees Retirement System (Hazardous Pension Fund).....	28
Section 5 State Police Retirement System (Pension Fund)	44



SECTION 1

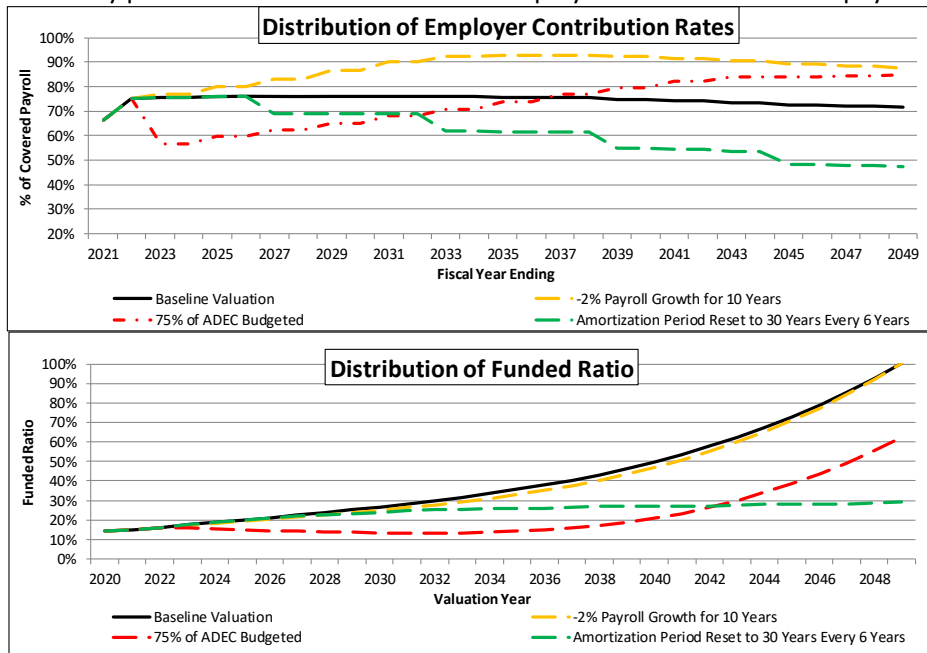
EXECUTIVE SUMMARY OF PRINCIPAL RESULTS

Section 1. Executive Summary of Principal Results

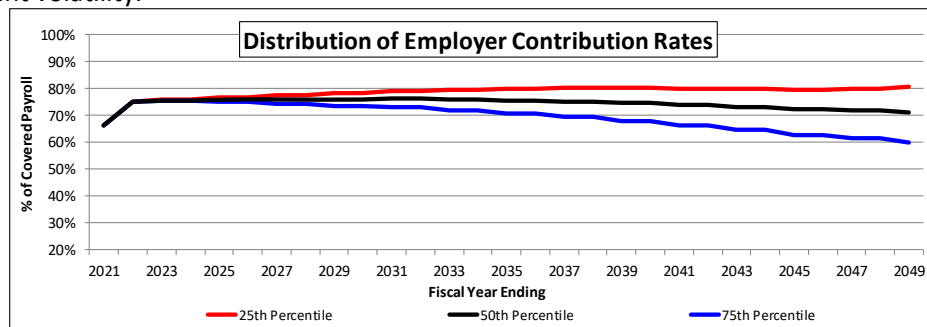
The following is an Executive Summary of the results of the stress test analysis for the Kentucky Employees Retirement System (Non-Hazardous and Hazardous) and State Police Retirement System pension funds. Details regarding the methodology and additional results of the analysis for each System are provided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

Kentucky Employees Retirement System (Non-Hazardous Pension Fund)

- **The most significant risk to the KERS Non-Hazardous Pension Fund is receiving less than the actuarially determined employer contribution (ADEC).** While the assets of the fund are not projected to be exhausted under the scenario where the General Assembly budgets only 75% of the ADEC each year, the financial security of the fund fails to meaningfully improve over the next 30 years.
- **Absent legislative change, a continual decline in covered payroll is a significant risk to the participating employers.** Contribution rates will continue to increase if covered payroll continues to decline, which may provide additional incentive for employers to reduce covered payroll.



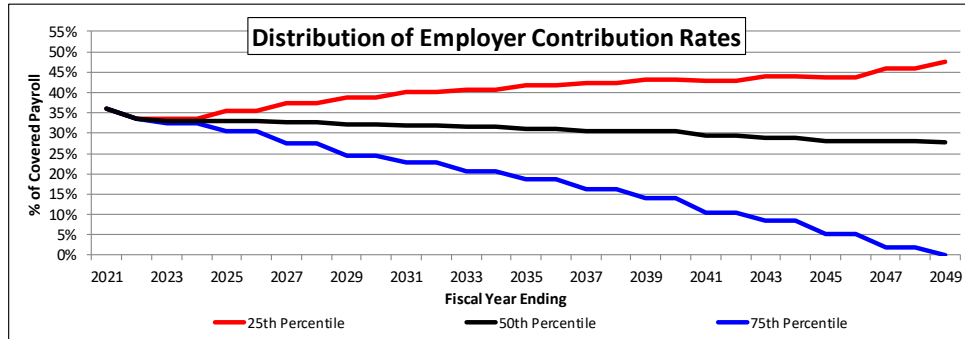
- **The fund has relatively little investment risk, as measured by the change in the employer contribution rate compared to the other funds, because of the low level of assets relative to liabilities.** The following graph shows the range of “more likely than not” contribution rates due to investment volatility.



Section 1. Executive Summary of Principal Results

Kentucky Employees Retirement System (Hazardous Pension Fund)

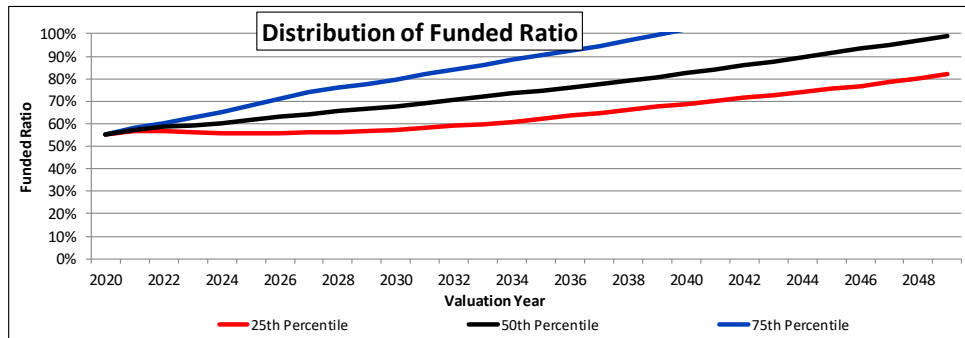
- Compared to the KERS Non-Hazardous and SPRS Pension Funds, the KERS Hazardous Pension Fund has the most investment risk, as measured by the change in contribution rate, because it is significantly better funded than the other two funds. The chart below shows the projected “more likely than not” contribution rates over the next 30 years.



- Analyzed another way, the probability of a 5% and 10% increase and/or decrease in the contribution rate (compared to the current 55.3% of pay contribution rate) over the next 5, 10, 20, and 30 years is as follows:

Prescribed Outcome	5 Years	10 Years	20 Years	30 Years
(1)	(2)	(3)	(4)	(5)
1. Probability of a 5% of pay increase	21%	36%	55%	68%
2. Probability of a 5% of pay decrease	29%	46%	68%	92%
3. Probability of a 10% of pay increase	5%	18%	38%	54%
4. Probability of a 10% of pay decrease	12%	30%	55%	85%

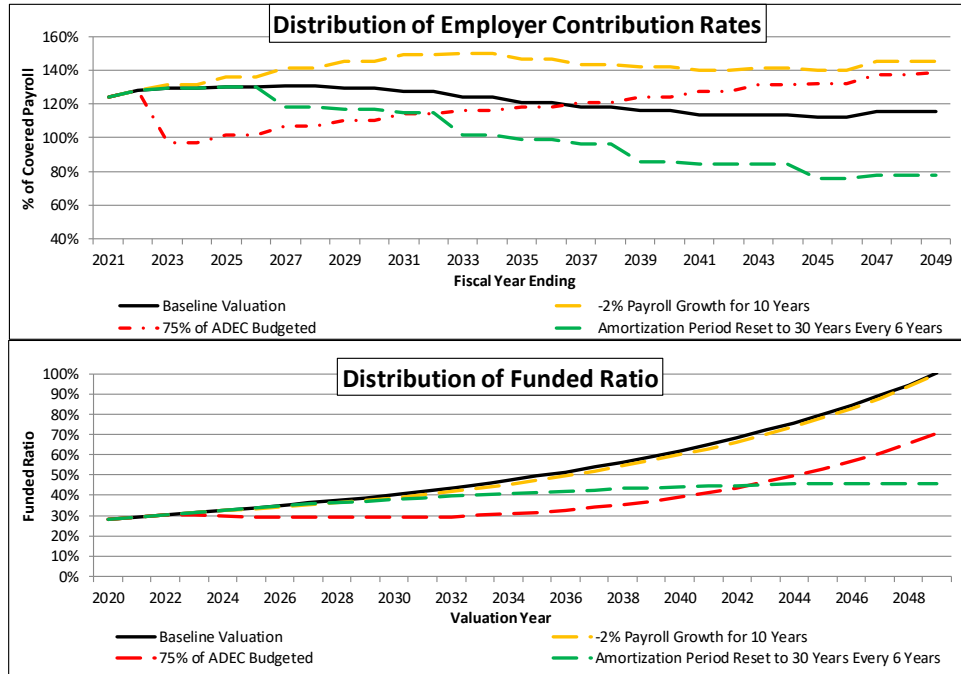
- The projected funded ratio of the system is expected to improve under the “more likely than not” scenarios, in part because of the relatively strong funding policy in place.



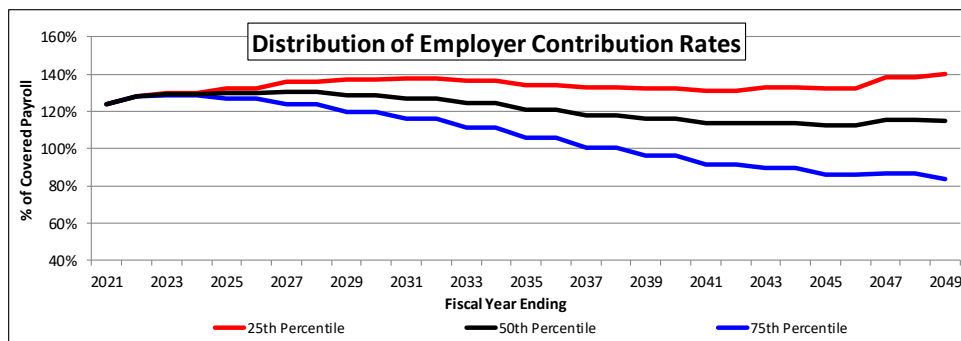
Section 1. Executive Summary of Principal Results

State Police Retirement System (Pension Fund)

- **Similar to the KERS Non-Hazardous Pension Fund, the most significant risk to the SPRS Pension Fund is receiving less than the actuarially determined employer contribution (ADEC).** While the assets of the system are not projected to be exhausted under the scenario where the General Assembly budgets only 75% of the ADEC, the financial security of the fund fails to meaningfully improve over the next 30 years.
- Also, contribution rates will continue to increase if covered payroll continues to decline.



- **The potential volatility in future contribution rates for the SPRS Pension Fund is relatively high because the System has a higher leverage of liability to payroll.** For example, the SPRS Pension Fund has \$22 in liability for every \$1 in covered payroll whereas the KERS Non-Hazardous Pension Fund has \$11 in liability for every \$1 in covered payroll. The following graph shows the range of “more likely than not” contribution rates due to investment volatility.



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 Kentucky Employees Retirement System (KERS) and the State Police Retirement System (SPRS). Analysis for the insurance funds was outside the scope of the analysis documented in this report. Any analysis related to the County Employees 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 decreases at the rate of 2% each year for each of the next 30 years.
- (3) The contribution rate established in the Commonwealth's biennium budget is assumed to be equal to the full actuarially determined contribution rate. Since the employer contribution rates for FYE 2022 are not yet established in the State's budget, the employer contribution rates for FYE 2022 are assumed to be based on the June 30, 2020 actuarial valuation.

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 0% payroll growth assumption for 10 years.
 - a. To illustrate this scenario, the analysis assumes a 4% reduction in active membership for 10 years, which results in roughly a 2% annual reduction in covered payroll for 10 years (compared to the 0% payroll growth assumption).
- (2) *Budgeted Contribution Risk* – The General Assembly is assumed to budget contribution rates that are 75% of the actuarially determined contribution rate each biennium, 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 5.25% for the KERS Non-Hazardous fund and SPRS and 6.25% for KERS Hazardous 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
KERS Non-Hazardous Fund	5.19%	8.92%
KERS Hazardous Fund	5.96%	10.83%
SPRS	5.19%	8.92%

* 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*: 5.25% annual returns for the KERS Non-Hazardous fund and SPRS and 6.25% annual returns for the KERS Hazardous fund for all years
- (2) *Mild Correction*: -5.00% annual return for Year 1; 3.50% annual returns for the five years; and 5.25% annual returns for the KERS Non-Hazardous fund and SPRS and 6.25% annual returns for the KERS Hazardous fund for all years thereafter
- (3) *Significant Correction*: -15.00% annual return for Year 1; and 5.25% annual returns for the KERS Non-Hazardous fund and SPRS and 6.25% annual returns for the KERS Hazardous fund 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
KERS Non-Hazardous Fund	3.10%	-3.00%	-3.90%	16.90%	5.25%
KERS Hazardous Fund	1.10%	-5.00%	-7.30%	19.00%	6.25%
SPRS	3.10%	-3.00%	-3.90%	16.90%	5.25%

**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
KERS Non-Hazardous Fund	-11.80%	11.40%	13.30%	11.80%	5.25%
KERS Hazardous Fund	-15.90%	13.50%	13.50%	10.40%	6.25%
SPRS	-11.80%	11.40%	13.30%	11.80%	5.25%



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 KENTUCKY EMPLOYEES RETIREMENT SYSTEM NON-HAZARDOUS PENSION FUND

Section 3.

Stress Testing Results for Kentucky 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 4% reduction in active membership for 10 years, which is intended to illustrate, approximately, a 2% annual reduction in covered payroll for 10 years (compared to the 0% payroll growth assumption);
- (2) 75% of the actuarially determined contribution rate being budgeted by the General Assembly each biennium, starting in FYE 2023 and 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 – Employer contributions (both as a dollar amount and as a percentage of payroll) are expected to remain relatively level until the contribution rates drop to the normal cost rates in FYE 2050 (when the unfunded liability is expected to be paid off). Contribution rates decrease slightly 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.

-2% 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 significantly compared to the baseline projection, as payroll decreases. However, because the General Assembly is still assumed to budget these increasing actuarially determined contribution rates every biennium, the funded ratio is expected to increase throughout the projection, reaching approximately 100% funded at June 30, 2049.

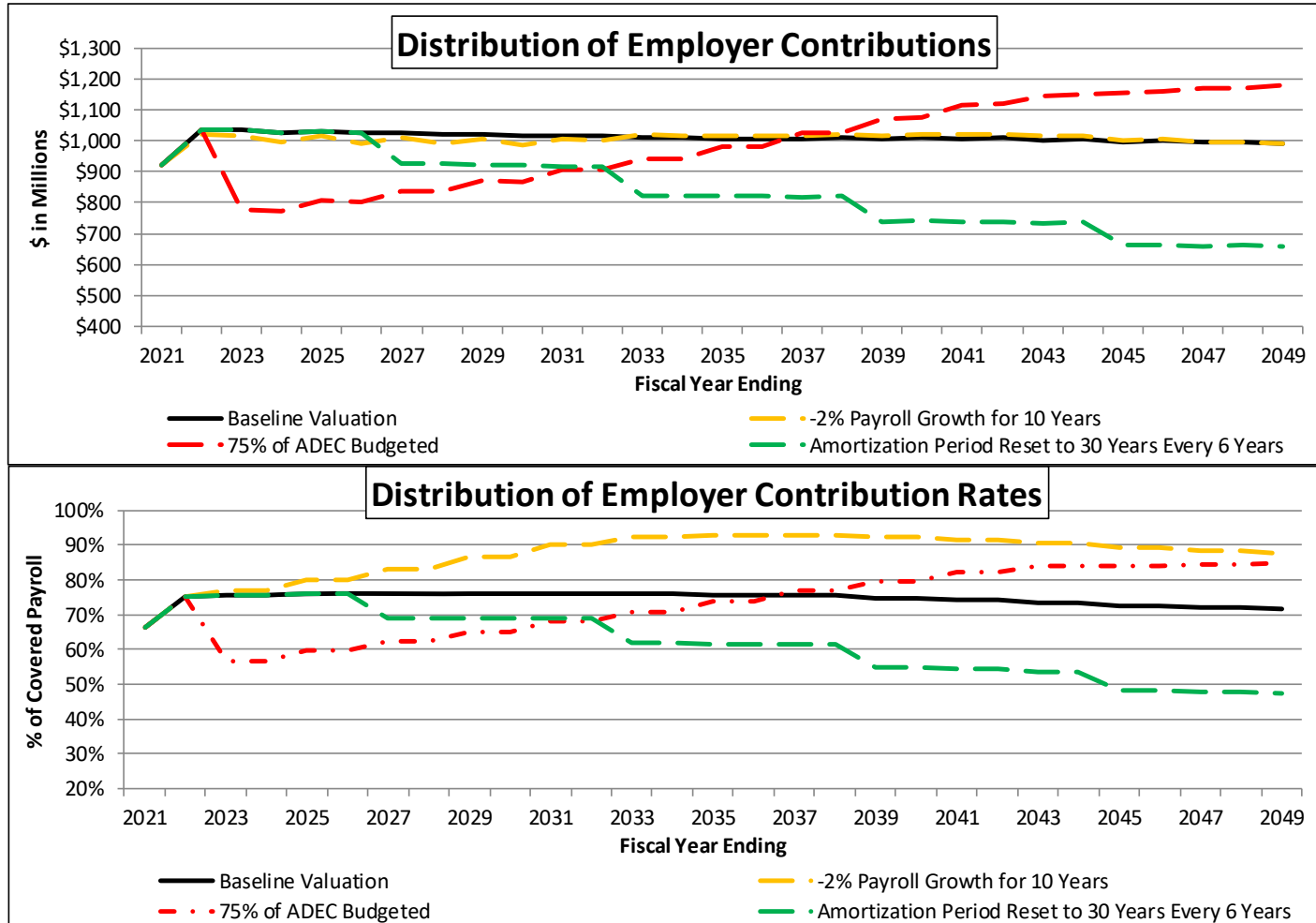
75% of ADEC Budgeted – When less than the actuarially determined employer contributions (ADEC) are paid, the unpaid amount must be made up in future contributions. As the following exhibits show, the contribution requirement will continue to grow each year. The unfunded liability is also paid off significantly slower compared to the baseline projection, resulting in the unfunded liability staying above \$12 billion for the next 15 years. Additionally, rather than reaching 100% funded in 2049 (in the baseline projection), the fund only achieves a 62% funded ratio under this scenario.

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, the unfunded liability is paid off significantly slower compared to the baseline projection, resulting in the unfunded liability staying above \$8 billion for the next 30 years. Additionally, rather than reaching 100% funded in 2049 (in the baseline projection), the fund only achieves a 29% funded ratio under this scenario.



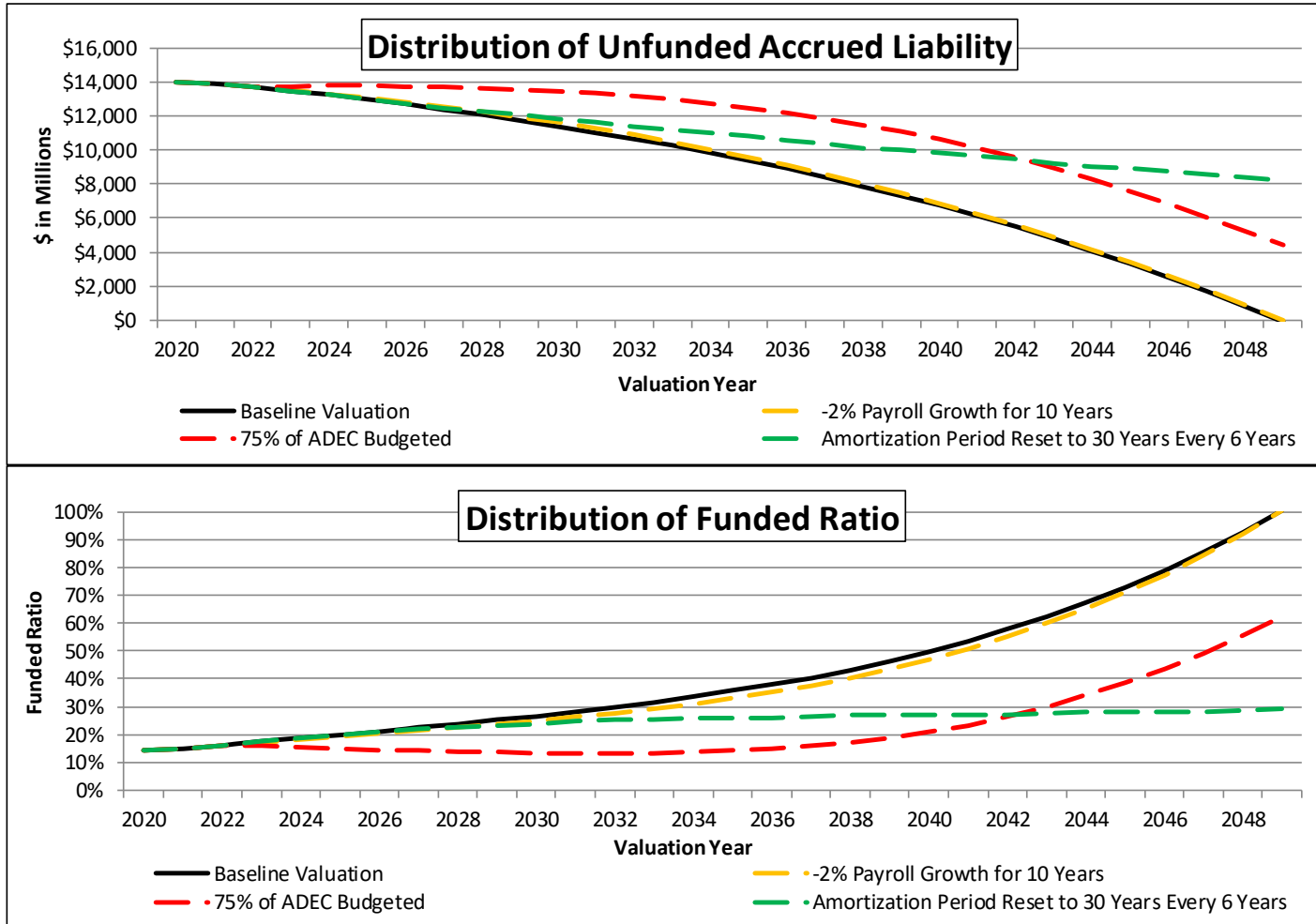
Section 3. Stress Testing Results for Kentucky Employees Retirement System (Non-Hazardous Pension Fund)

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



Section 3. Stress Testing Results for Kentucky Employees Retirement System (Non-Hazardous Pension Fund)

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



Section 3. Stress Testing Results for Kentucky Employees Retirement System (Non-Hazardous Pension Fund)

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

For FYE 2020, the KERS non-hazardous retirement fund distributed \$1,023 million in benefit payments and administrative expenses, and received \$1,045 million in employer and employee contributions. As of June 30, 2020, plan assets for this system were \$2,308 million. **To stabilize the financial condition of this system, it is imperative that the fund receive the full actuarially determined employer contribution and that contributions to the system continue to exceed the benefit payments.**

Currently, KRS collects contributions from participating employers based on the employer's total payroll of employees who are earning benefits in KERS. The contribution rate calculated in the June 30, 2020 actuarial valuation was 85.03% of payroll for FYE 2021 (pension plus insurance fund). Because of the current level of required contributions, it is not surprising to see many participating employers performing deliberate workforce actions to reduce their payroll reported to the System (e.g. through use of technology improvements or contractors and outsourcing agencies) in order to reduce their pension cost. The reported payroll and active membership in the KERS Non-Hazardous System has decreased from \$1.732 billion in payroll and 46.6 thousand active members in 2011 to \$1.388 billion in payroll and 31.7 thousand active members in 2020. This is a 20% decrease in covered payroll and a 32% reduction in active membership over the last nine years. This decrease in the covered payroll requires subsequent increases in the contribution rate (as a percentage of covered payroll) in order to maintain the same contribution dollars to the System.

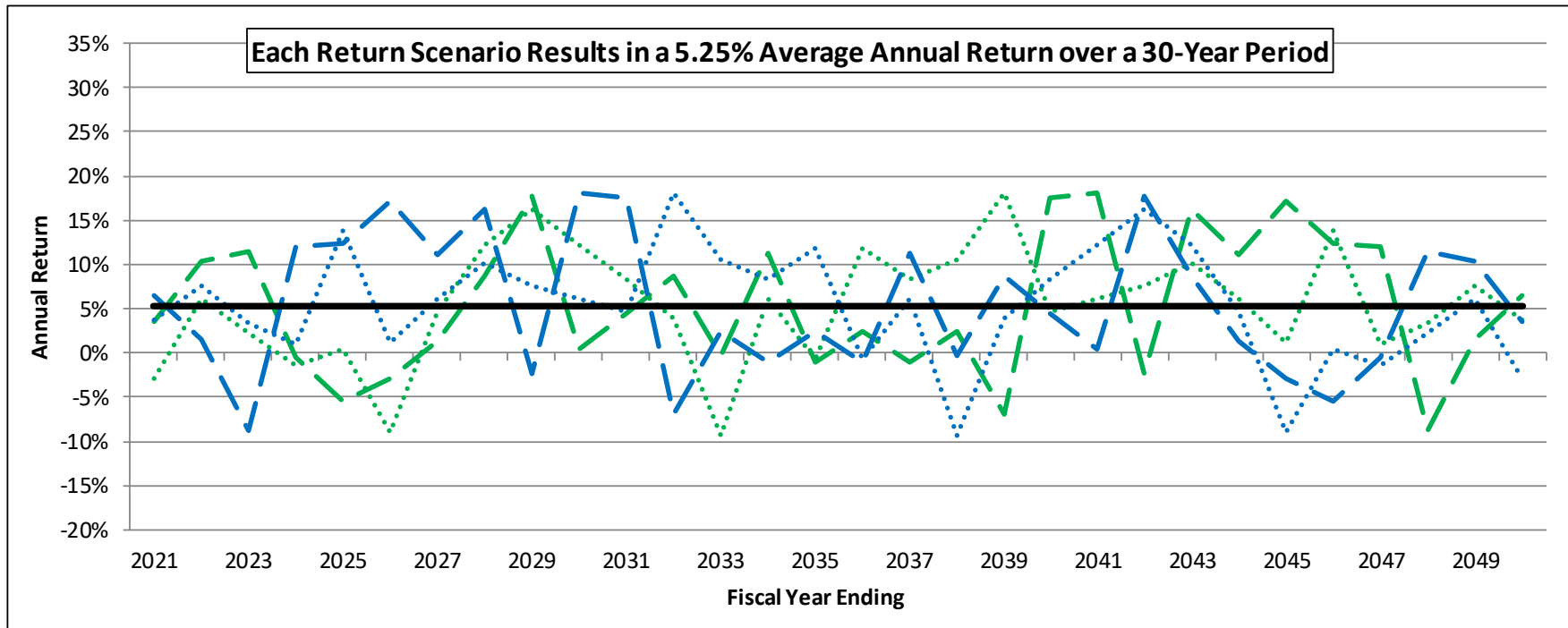
As contribution rates increase for this fund, there becomes increased incentive for participating employers to make business decisions to reduce their covered payroll to decrease their pension cost, thereby resulting in a continual pattern of additional increases in contribution rates. As a result, **we recommend Kentucky Retirement Systems work with the legislators of the Commonwealth to change the method for collecting the amortization cost of the unfunded liability such that it is no longer dependent on covered payroll.**



Section 3. Stress Testing Results for Kentucky Employees Retirement System (Non-Hazardous Pension Fund)

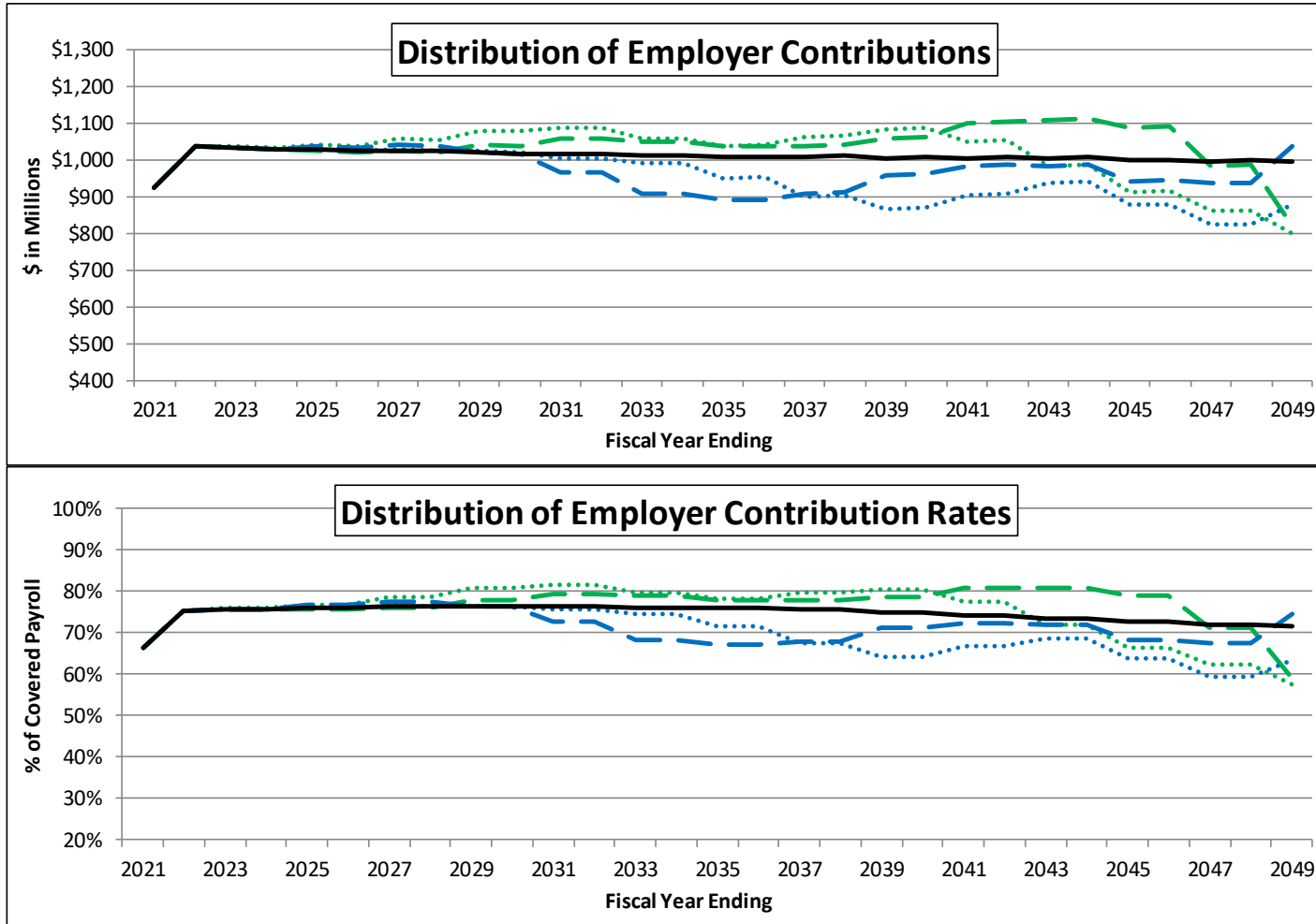
Part B. Financial Impact Due to Volatility in Investment Returns

Below is a chart with five investment return scenarios that each result in a 5.25% 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 5.25% 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.**



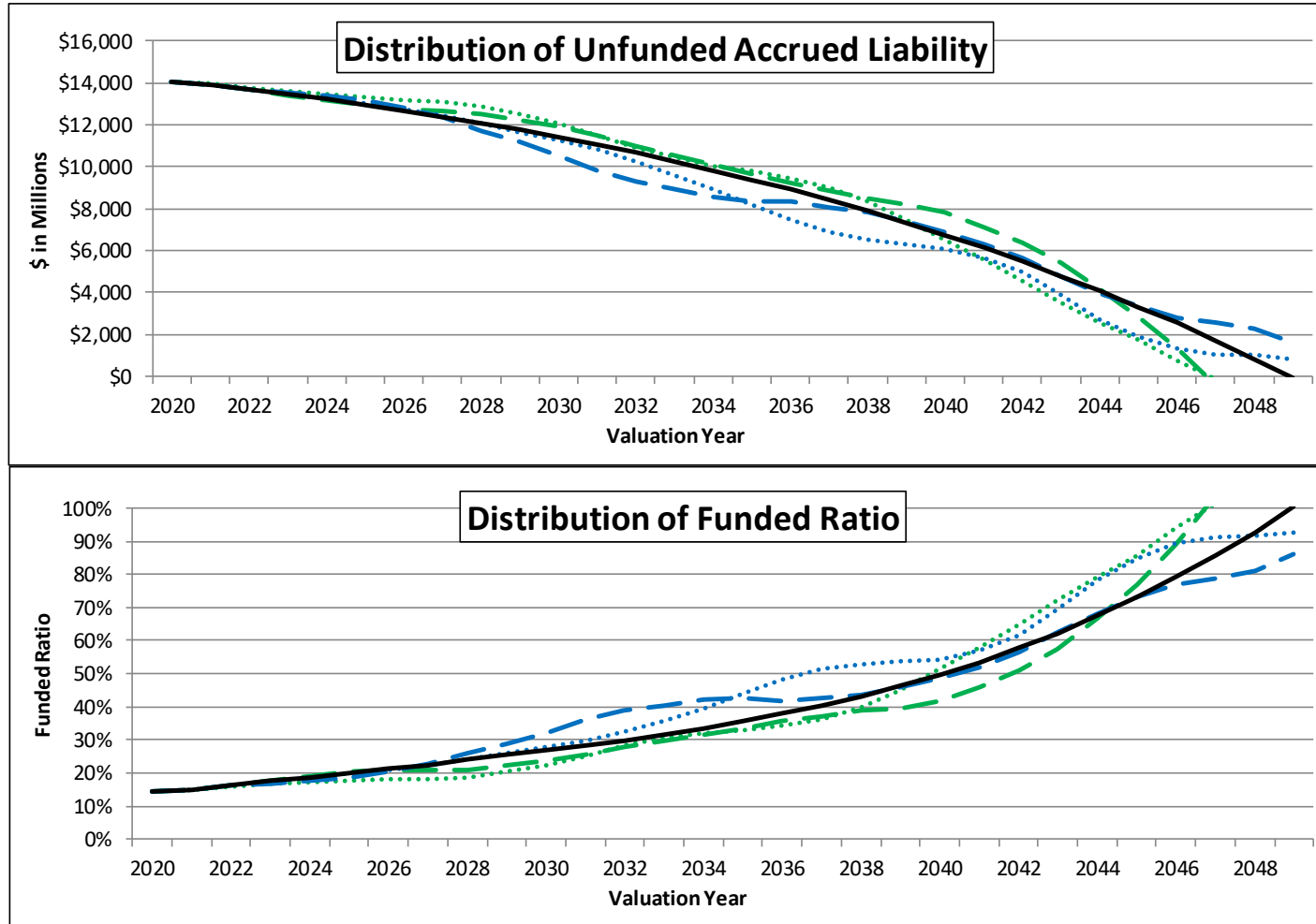
Section 3. Stress Testing Results for Kentucky Employees Retirement System (Non-Hazardous Pension Fund)

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



Section 3. Stress Testing Results for Kentucky Employees Retirement System (Non-Hazardous Pension Fund)

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



Section 3. Stress Testing Results for Kentucky 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).

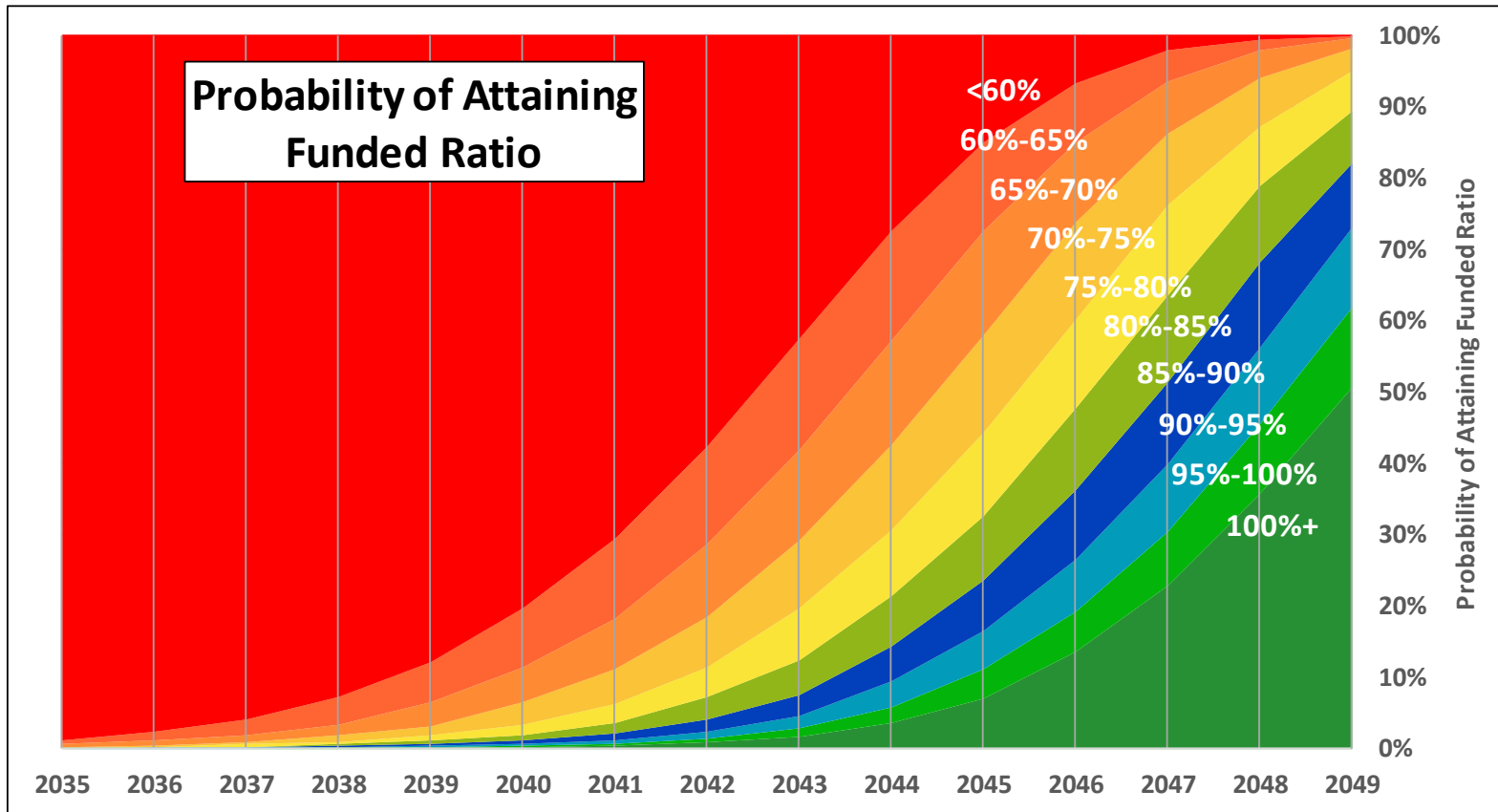
	Probability of Prescribed Outcome				
	5 Years	10 Years	15 Years	20 Years	30 Years
1. Probability of a 5% of pay increase in the required contribution rate within the next X Years ¹	3%	18%	34%	40%	53%
2. Probability of a 10% of pay increase in the required contribution rate within the next X Years ¹	<1%	1%	7%	12%	24%
3. Probability of a 5% of pay decrease in the required contribution rate within the next X Years ¹	2%	13%	32%	44%	100%
4. Probability of a 10% of pay decrease in the required contribution rate within the next X Years ¹	<1%	3%	15%	26%	100%
5. Probability of a 1.0% decrease in the funded ratio within the next X Years ²	<1%	<1%	<1%	<1%	<1%
6. Probability of a 5.0% decrease in the funded ratio within the next X Years ²	<1%	<1%	<1%	<1%	<1%
¹ Percentage of stochastic scenarios that the employer contribution rate in a year after FYE 2022 is greater/lower than the FYE 2022 contribution rate of 75.32% of pay					
² Percentage of stochastic scenarios that the funded ratio in a year after 2020 is less than the 2020 funded ratio of 14.2% of pay					



Section 3. Stress Testing Results for Kentucky Employees Retirement System (Non-Hazardous Pension Fund)

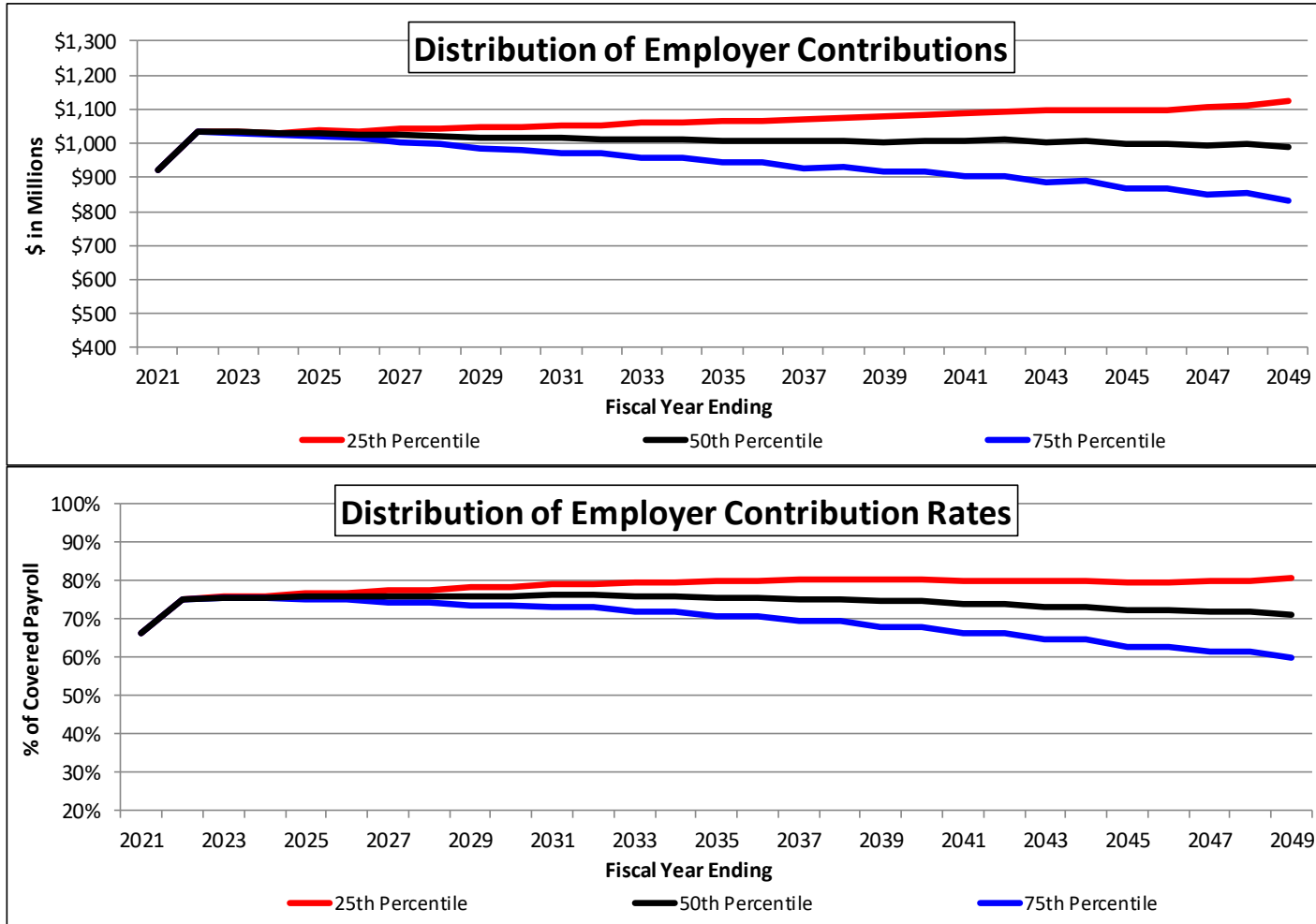
Part C. Stochastic Simulation Results (continued)

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.



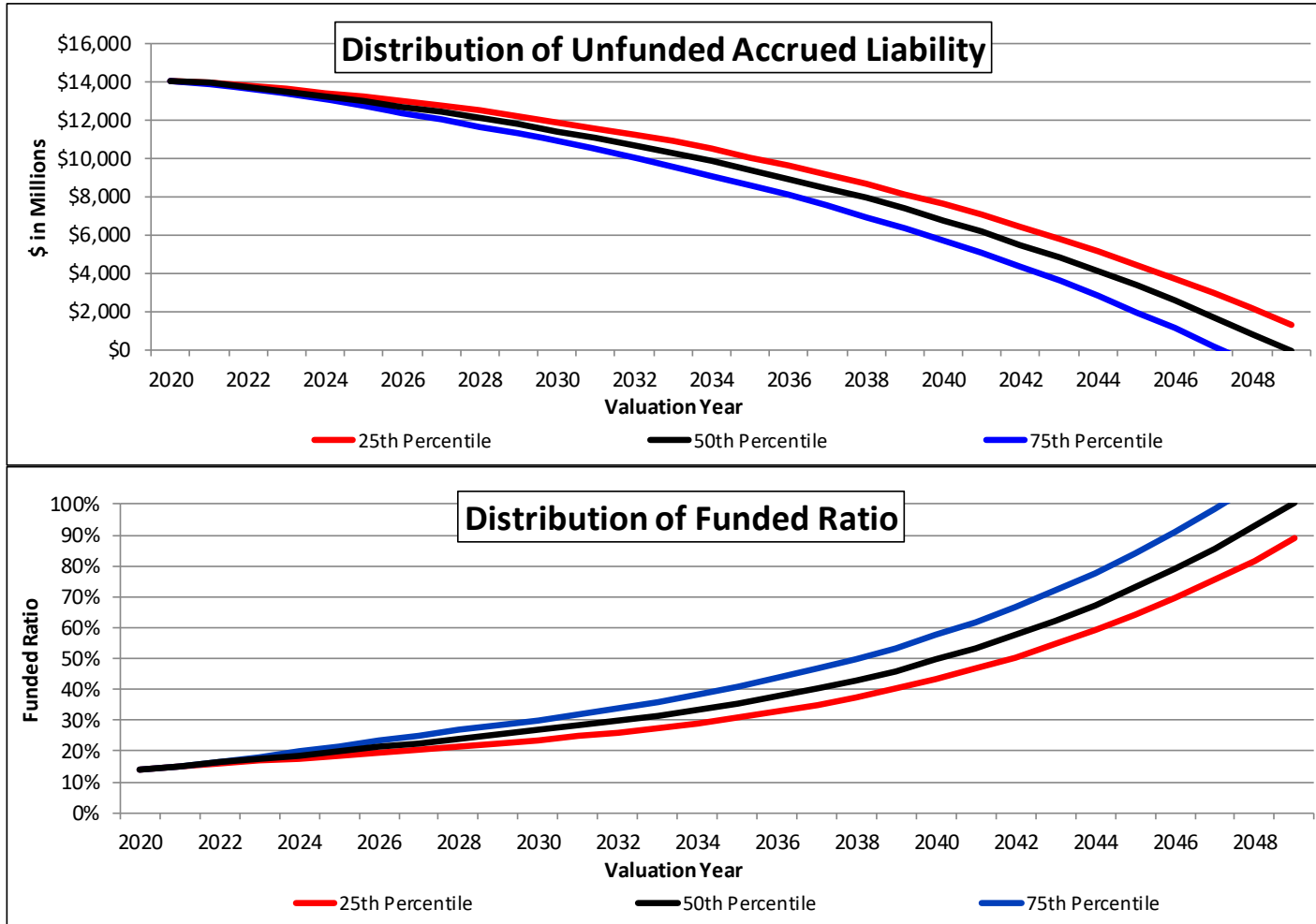
Section 3. Stress Testing Results for Kentucky Employees Retirement System (Non-Hazardous Pension Fund)

Part C. Stochastic Simulation Results (continued)



Section 3. Stress Testing Results for Kentucky Employees Retirement System (Non-Hazardous Pension Fund)

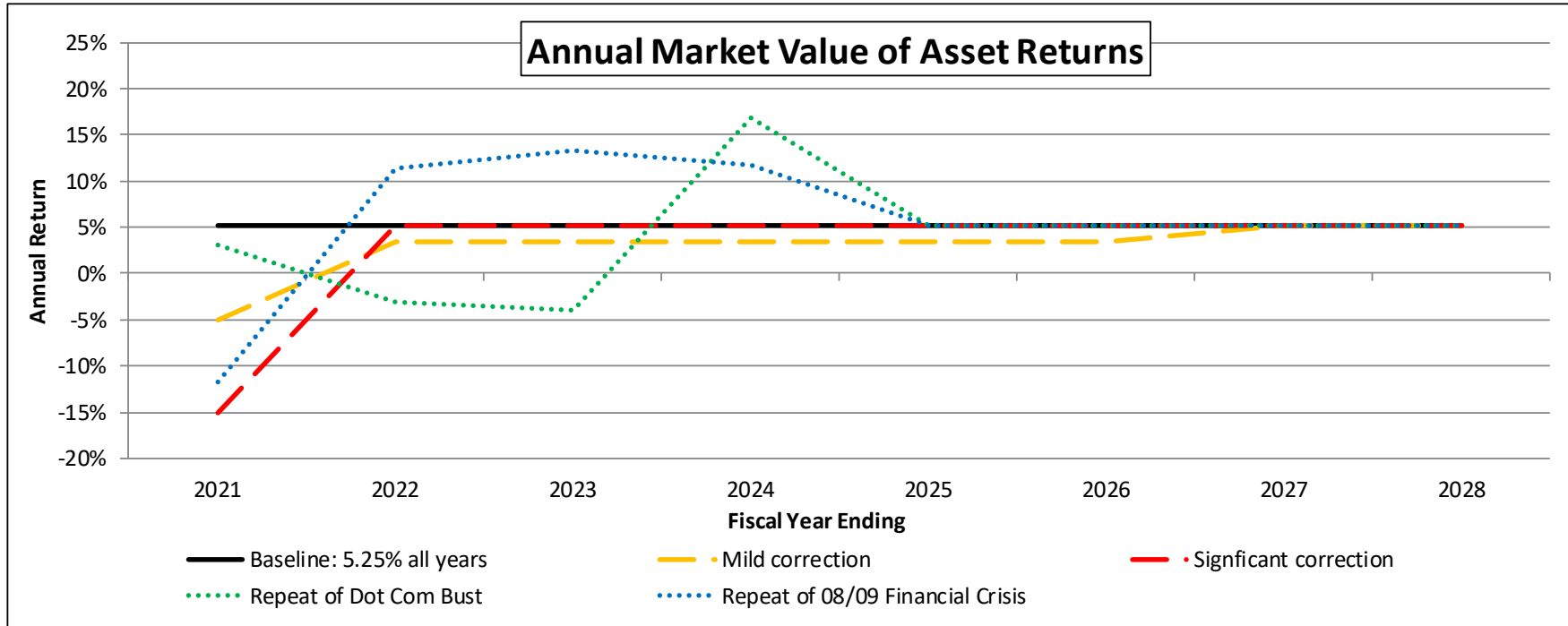
Part C. Stochastic Simulation Results (continued)



Section 3. Stress Testing Results for Kentucky Employees Retirement System (Non-Hazardous Pension Fund)

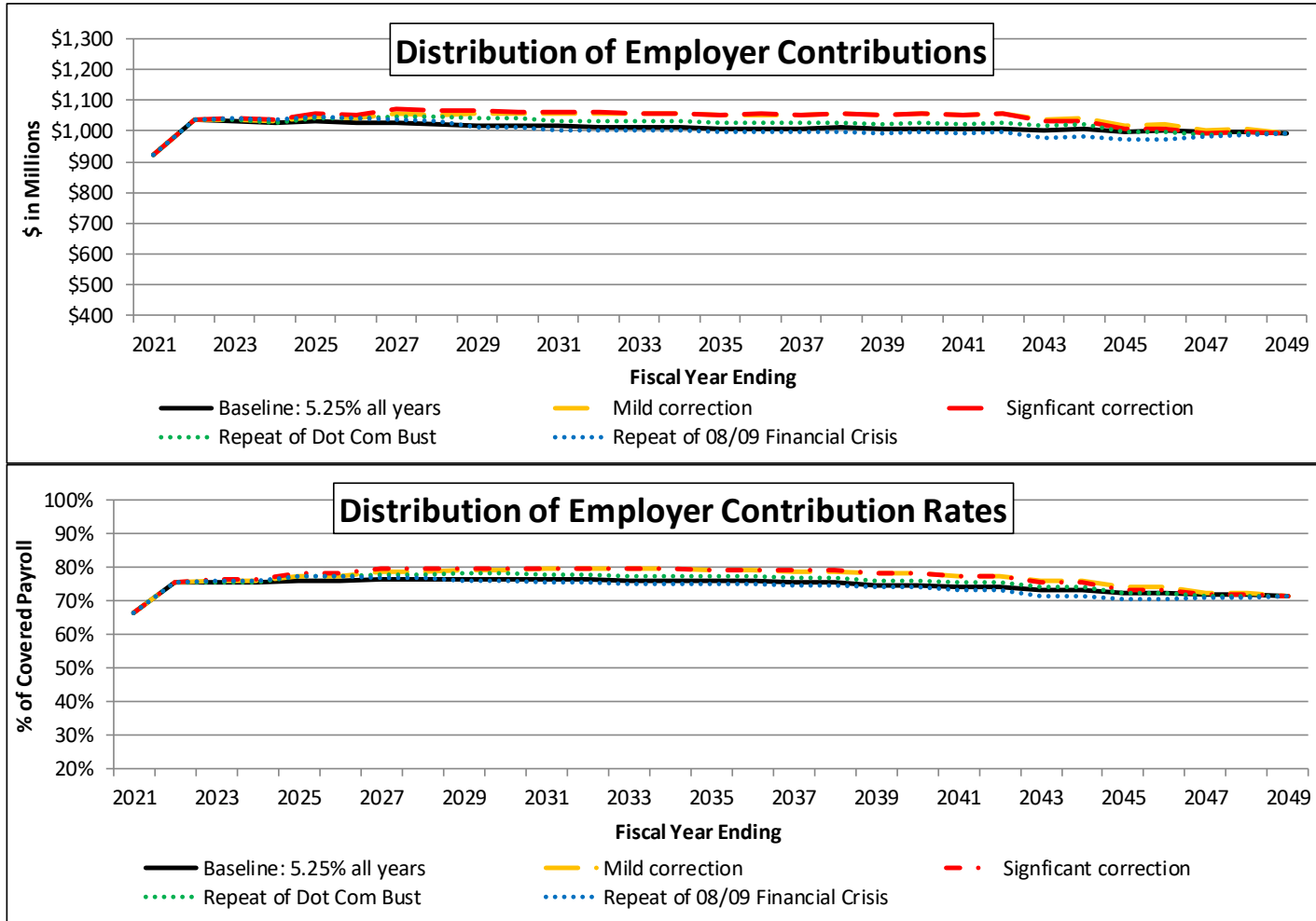
Part D. Deterministic Projection Modeling Results - Investment Risk

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 5.25% are assumed after FYE 2028.



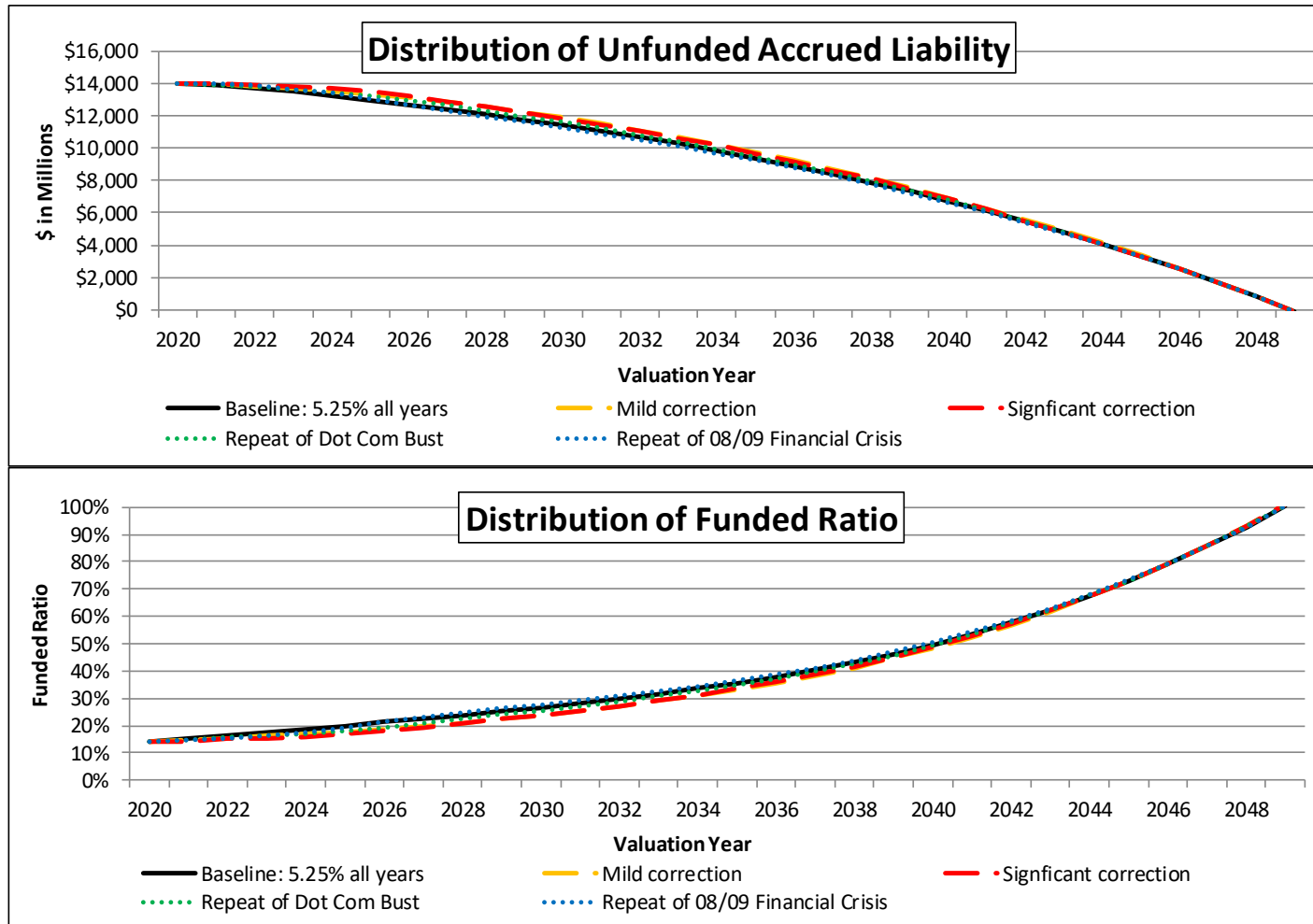
Section 3. Stress Testing Results for Kentucky Employees Retirement System (Non-Hazardous Pension Fund)

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



Section 3. Stress Testing Results for Kentucky Employees Retirement System (Non-Hazardous Pension Fund)

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



Section 3. Stress Testing Results for Kentucky 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 Kentucky Employees Retirement System Non-Hazardous Pension Fund is assumed to earn 5.25% 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*	-9.3%
(b) 5.00% increase in the employer contribution rate*	-23.8%
2. Two-year annual investment return resulting in a	
(a) 2.50% increase in the employer contribution rate*	-2.0%
(b) 5.00% increase in the employer contribution rate*	-9.9%
3. Five-year annual investment return resulting in a	
(a) 2.50% increase in the employer contribution rate*	2.6%
(b) 5.00% increase in the employer contribution rate*	-0.4%

* 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 3.

Stress Testing Results for Kentucky 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) budgeted by the General Assembly 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. As a comparison, for FYE 2019 through FYE 2021, certain employers were allowed to contribute less than the actuarially determined contribution rate, which resulted in roughly 90% of the ADEC being contributed by employers.

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*	65%
(b) 5.00% increase in the employer contribution rate*	30%
2. Percent of ADEC budgeted over a two-year period resulting in a	
(a) 2.50% increase in the employer contribution rate*	81%
(b) 5.00% increase in the employer contribution rate*	63%
3. Percent of ADEC budgeted over a five-year period resulting in a	
(a) 2.50% increase in the employer contribution rate*	92%
(b) 5.00% increase in the employer contribution rate*	85%

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



SECTION 4

STRESS TESTING RESULTS FOR KENTUCKY EMPLOYEES RETIREMENT SYSTEM HAZARDOUS PENSION FUND

Section 4.

Stress Testing Results for Kentucky 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 4% reduction in active membership for 10 years, which is intended to illustrate, approximately, a 2% annual reduction in covered payroll for 10 years (compared to the 0% payroll growth assumption);
- (2) 75% of the actuarially determined contribution rate being budgeted by the General Assembly each biennium, starting in FYE 2023 and 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 – Employer contributions (both as a dollar amount and as a percentage of payroll) are expected to remain relatively level until the contribution rates drop to the normal cost rates in FYE 2050 (when the unfunded liability is expected to be paid off). Contribution rates decrease slightly 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.

-2% 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 compared to the baseline projection, as payroll decreases. However, because the General Assembly is still assumed to budget the actuarially determined contribution rates every biennium, the funded ratio is expected to increase throughout the projection, reaching approximately 100% funded at June 30, 2049.

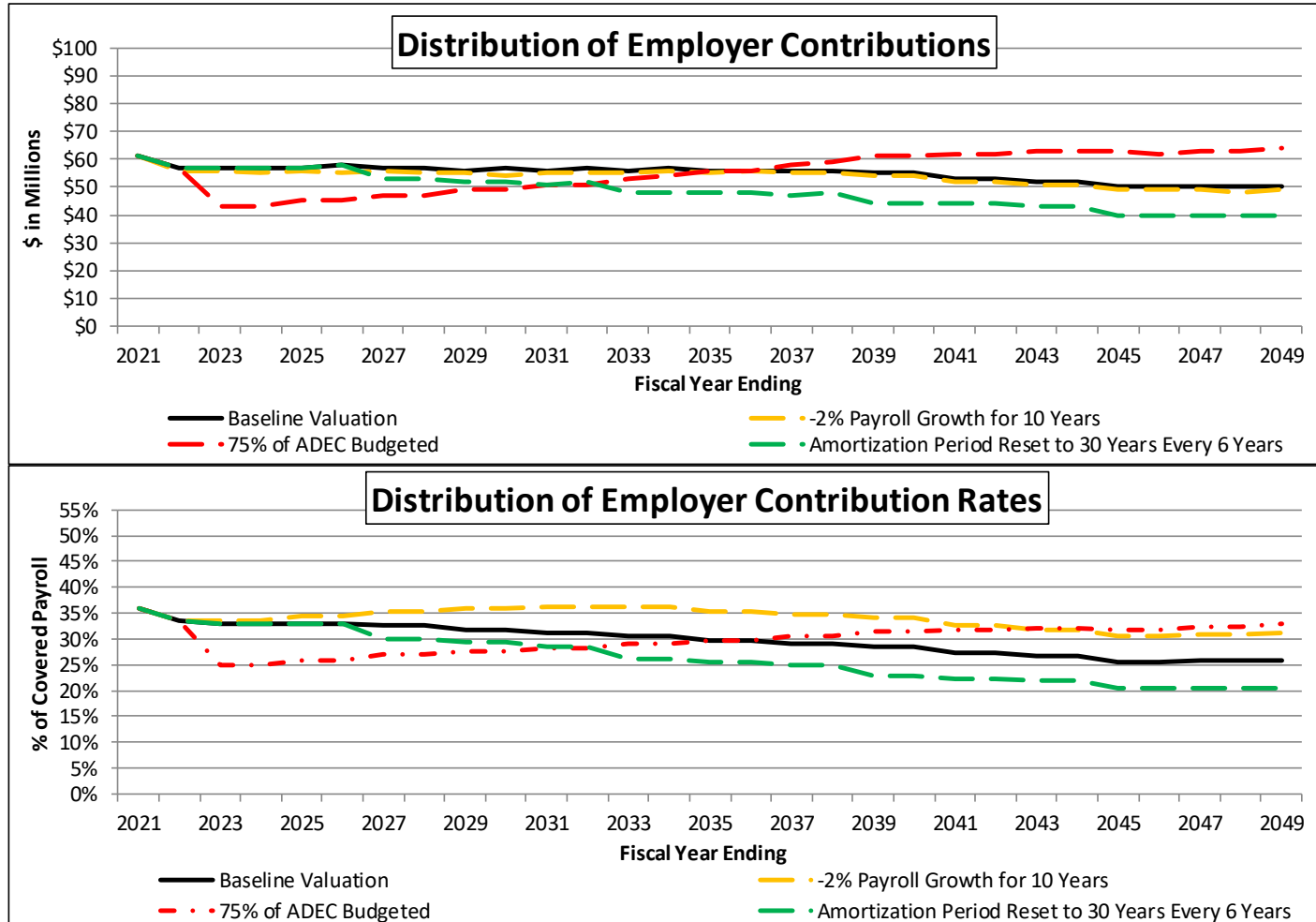
75% of ADEC Budgeted – When less than the actuarially determined employer contributions (ADEC) are paid, the unpaid amount must be made up in future contributions. As the following exhibits show, the contribution requirement will continue to grow each year. The unfunded liability is also paid off significantly slower compared to the baseline projection, resulting in contribution rates not reducing to the normal cost rates in FYE 2050 (as there is still \$250 million in 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, the unfunded liability is paid off significantly slower compared to the baseline projection, resulting in the unfunded liability staying above \$400 million for the next 25 years. Additionally, contribution rates will not reduce to the normal cost rates in FYE 2050, as there is still \$360 million in unfunded liability remaining in 2049.



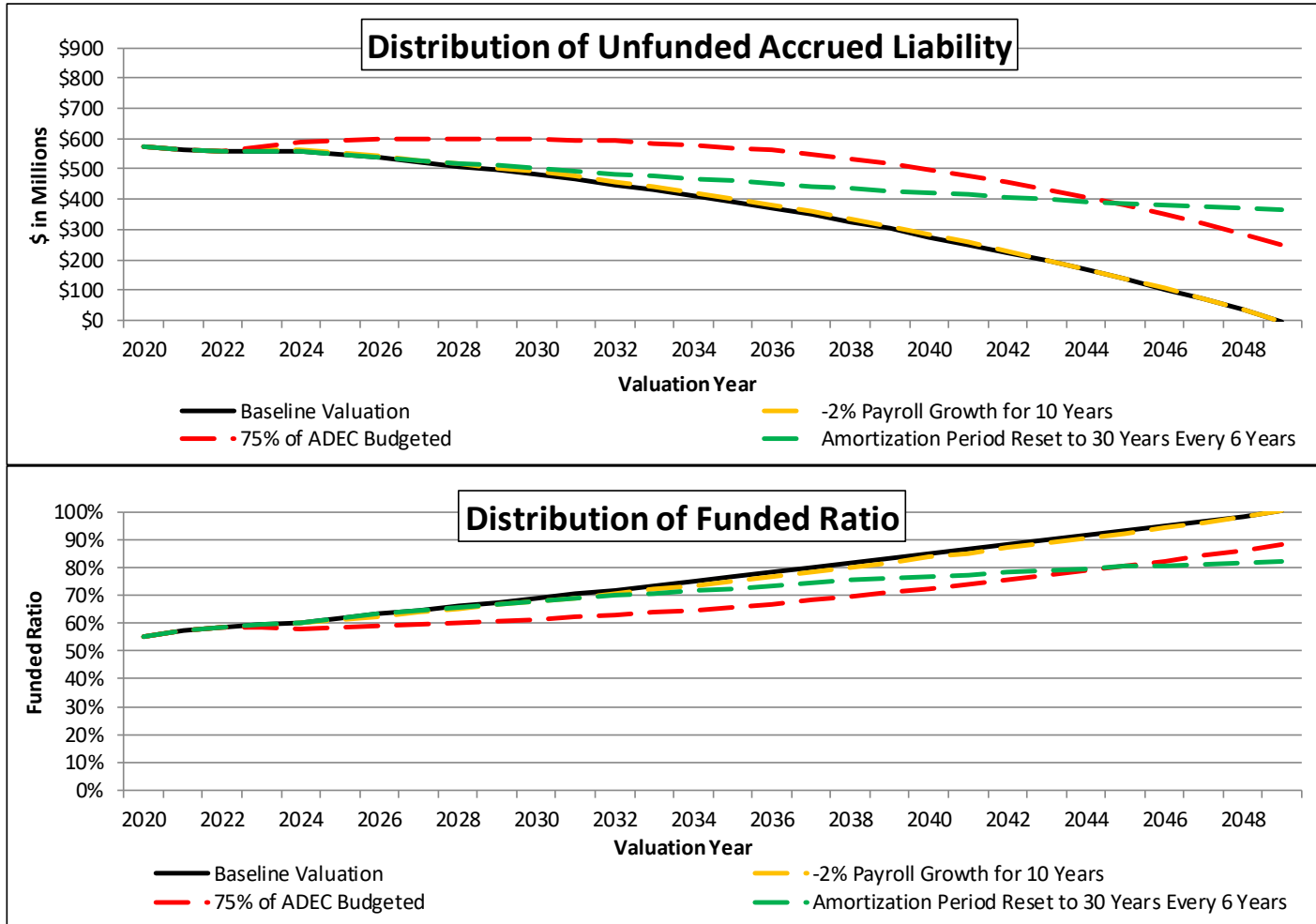
Section 4. Stress Testing Results for Kentucky Employees Retirement System (Hazardous Pension Fund)

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



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

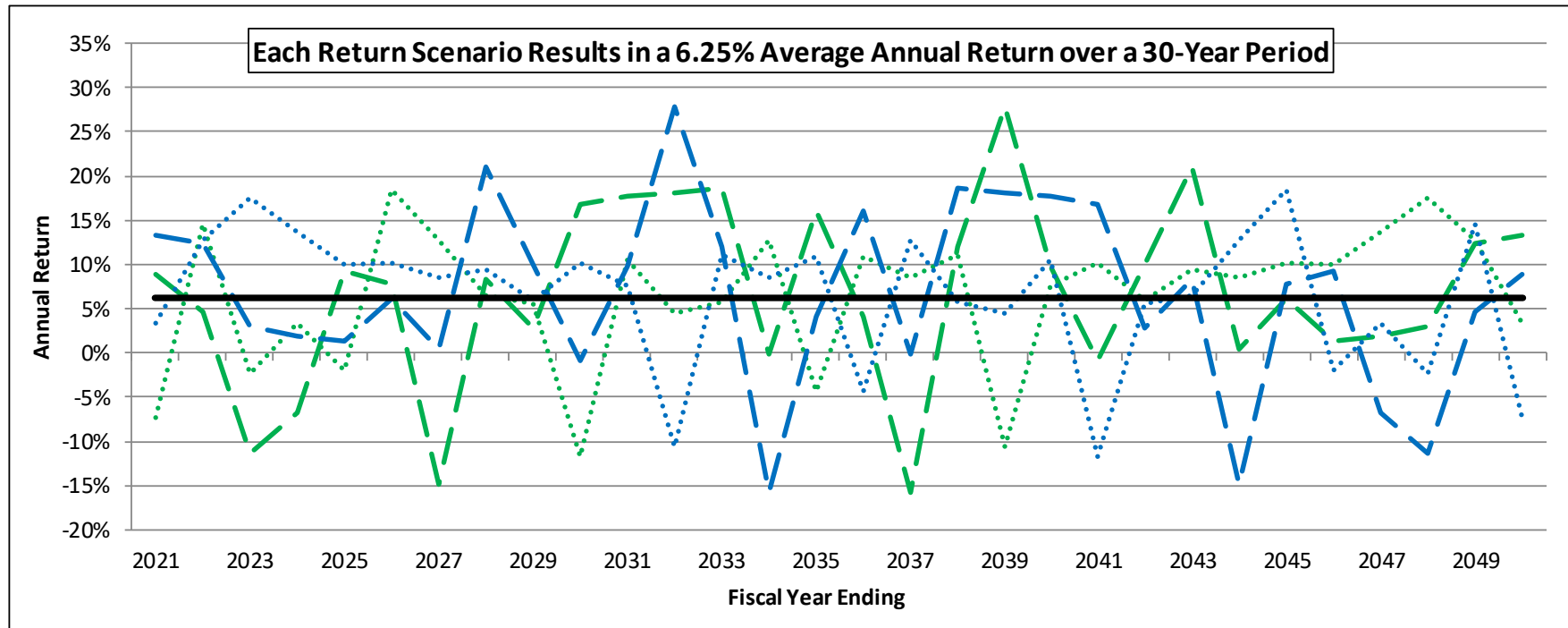
Part A. Deterministic Projection Modeling Results - Contribution Risk (continued)



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

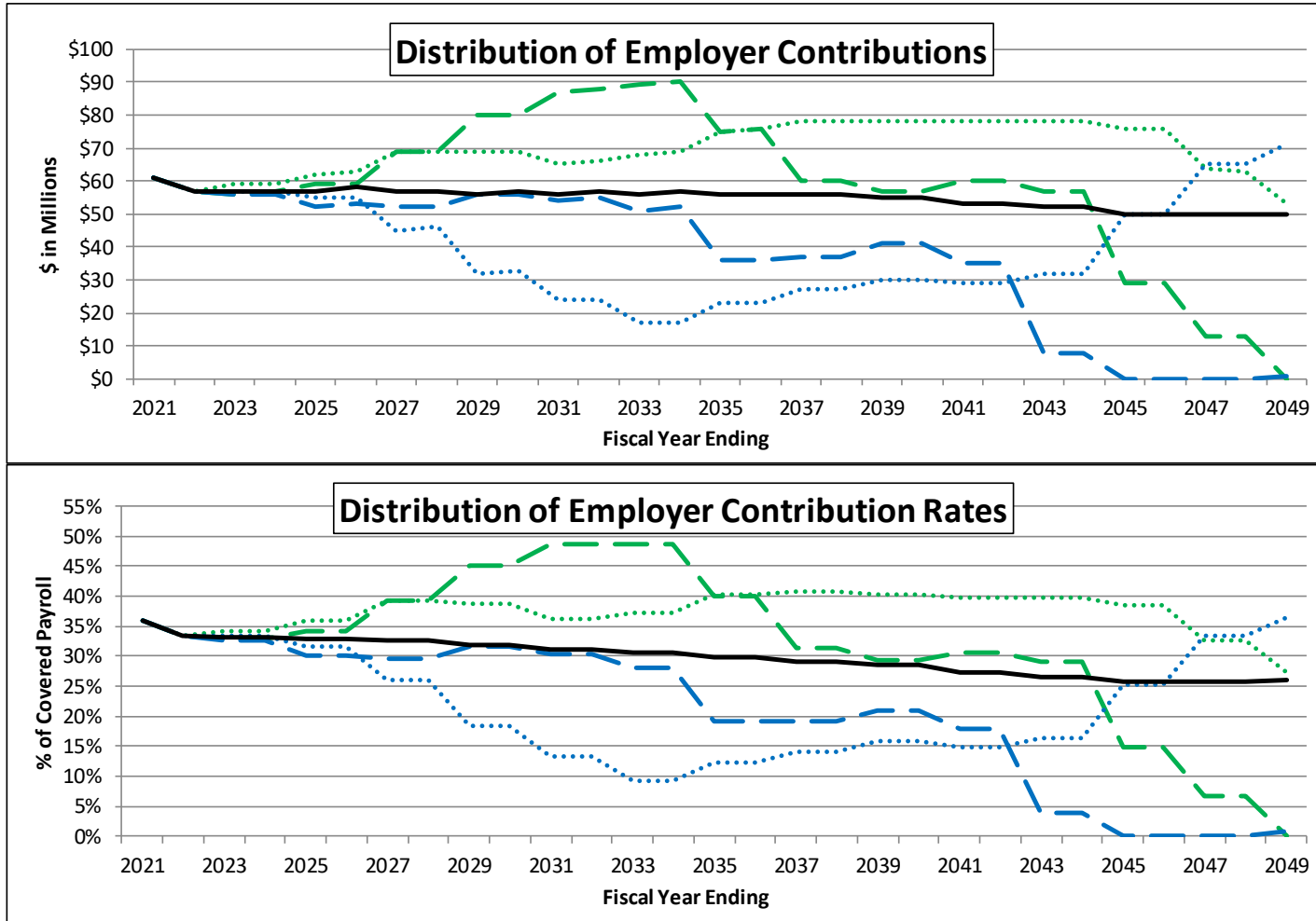
Part B. Financial Impact Due to Volatility in Investment Returns

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.**



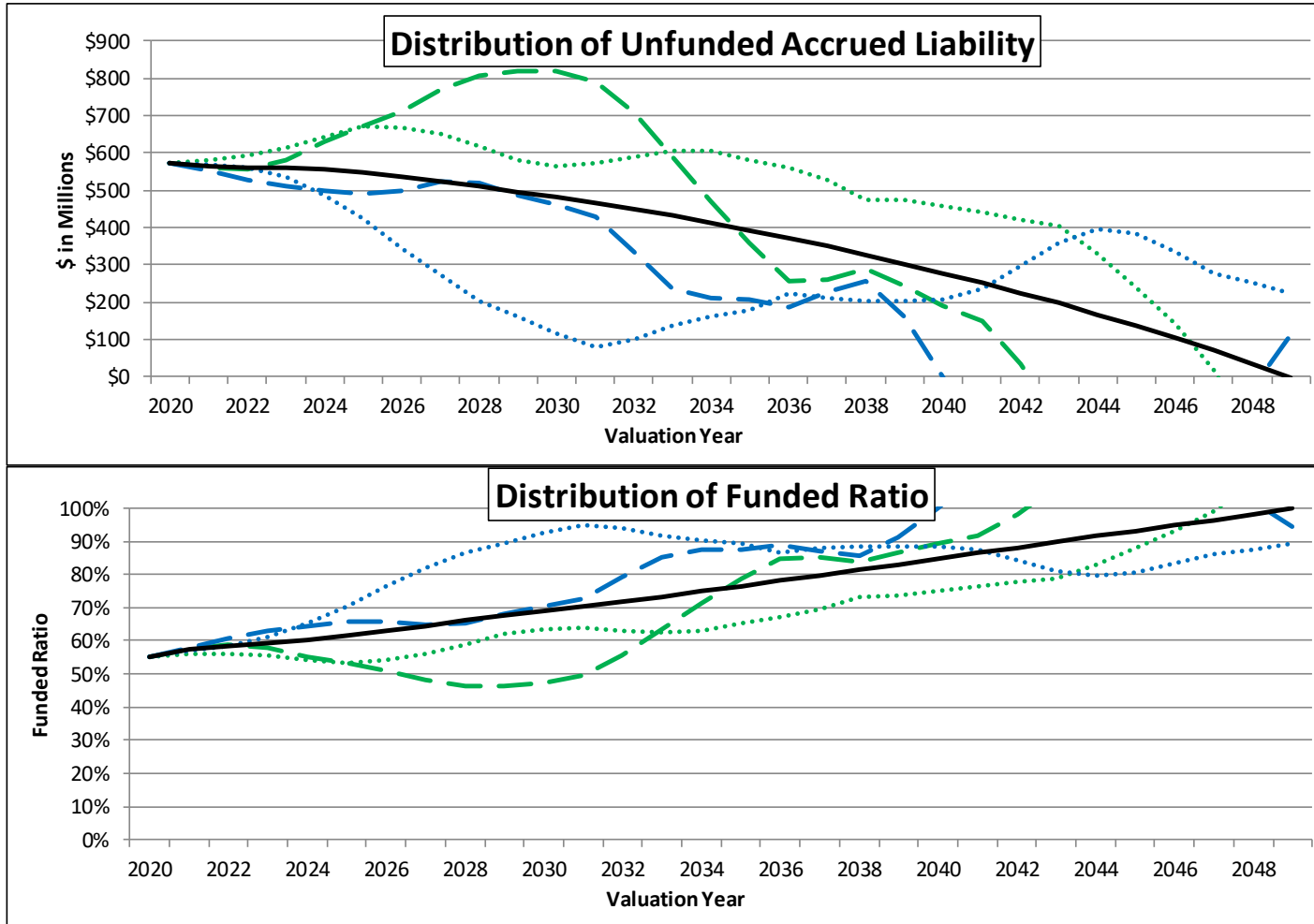
Section 4. Stress Testing Results for Kentucky Employees Retirement System (Hazardous Pension Fund)

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



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

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



Section 4.

Stress Testing Results for Kentucky 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).

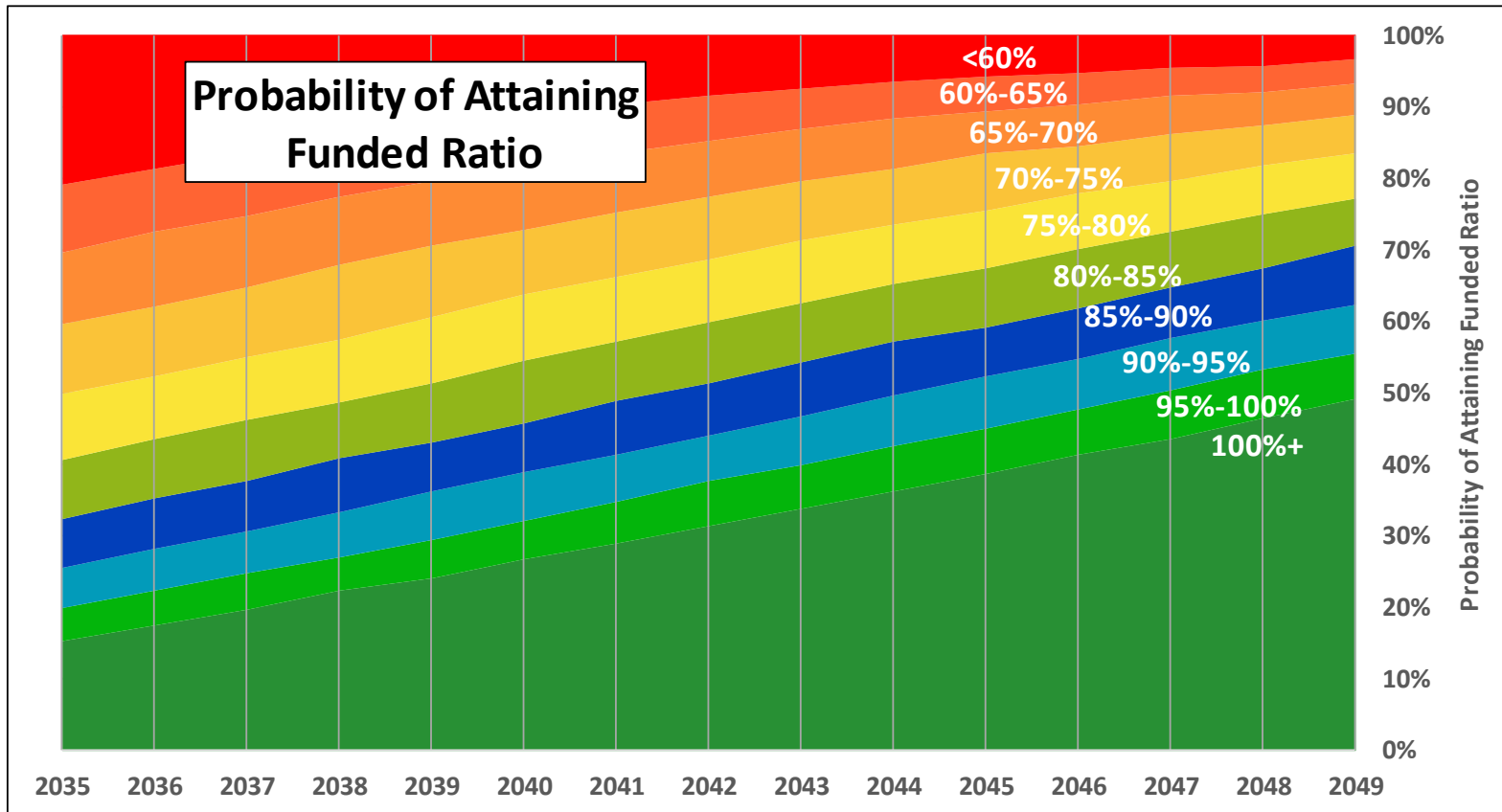
	Probability of Prescribed Outcome				
	5 Years	10 Years	15 Years	20 Years	30 Years
1. Probability of a 5% of pay increase in the required contribution rate within the next X Years ¹	21%	36%	49%	55%	68%
2. Probability of a 10% of pay increase in the required contribution rate within the next X Years ¹	5%	18%	32%	38%	54%
3. Probability of a 5% of pay decrease in the required contribution rate within the next X Years ¹	29%	46%	61%	68%	92%
4. Probability of a 10% of pay decrease in the required contribution rate within the next X Years ¹	12%	30%	47%	55%	85%
5. Probability of a 1.0% decrease in the funded ratio within the next X Years ²	22%	33%	38%	41%	43%
6. Probability of a 5.0% decrease in the funded ratio within the next X Years ²	10%	18%	22%	24%	25%
¹ Percentage of stochastic scenarios that the employer contribution rate in a year after FYE 2022 is greater/lower than the FYE 2022 contribution rate of 33.43% of pay					
² Percentage of stochastic scenarios that the funded ratio in a year after 2020 is less than the 2020 funded ratio of 55.3% of pay					



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

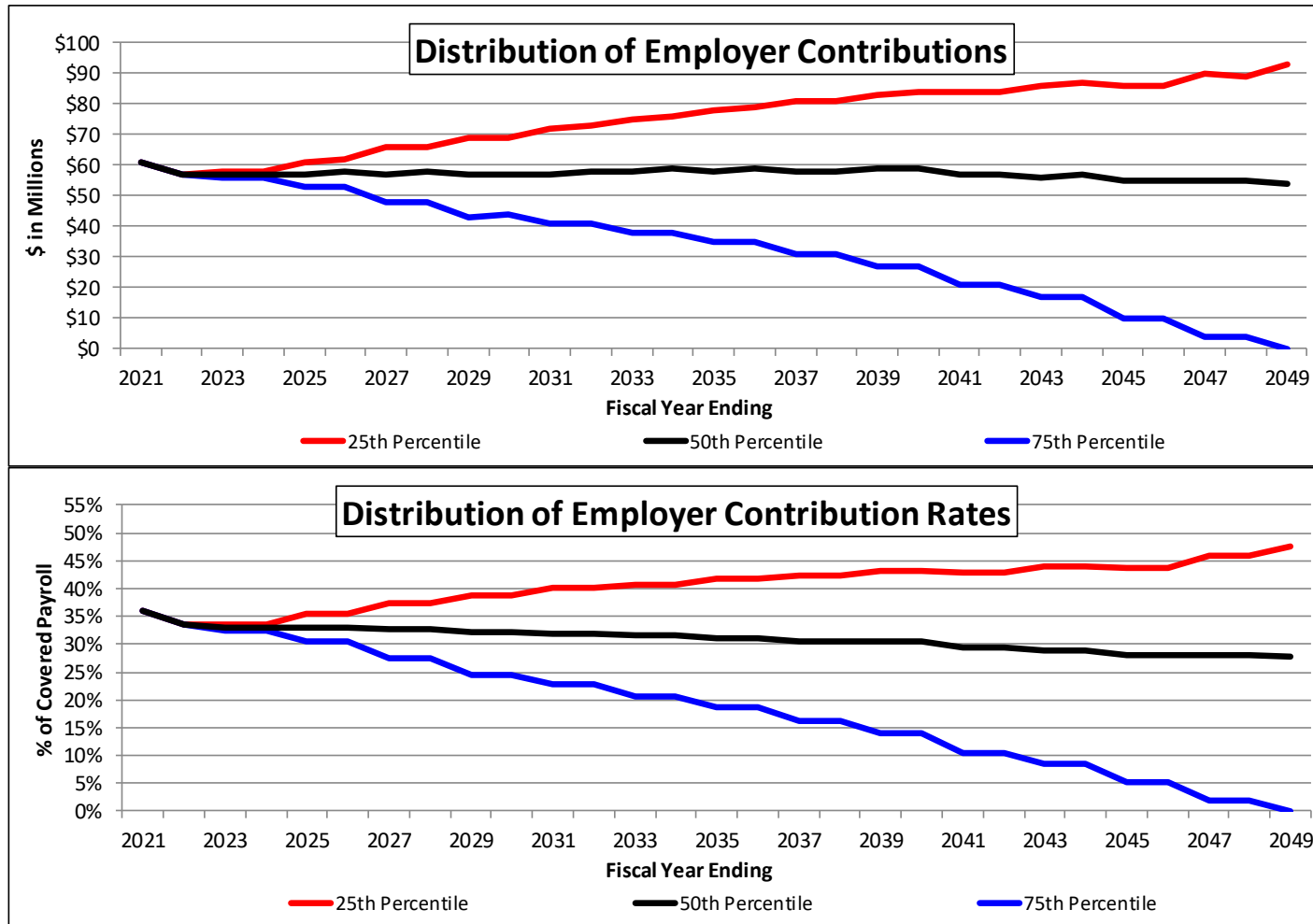
Part C. Stochastic Simulation Results (continued)

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.



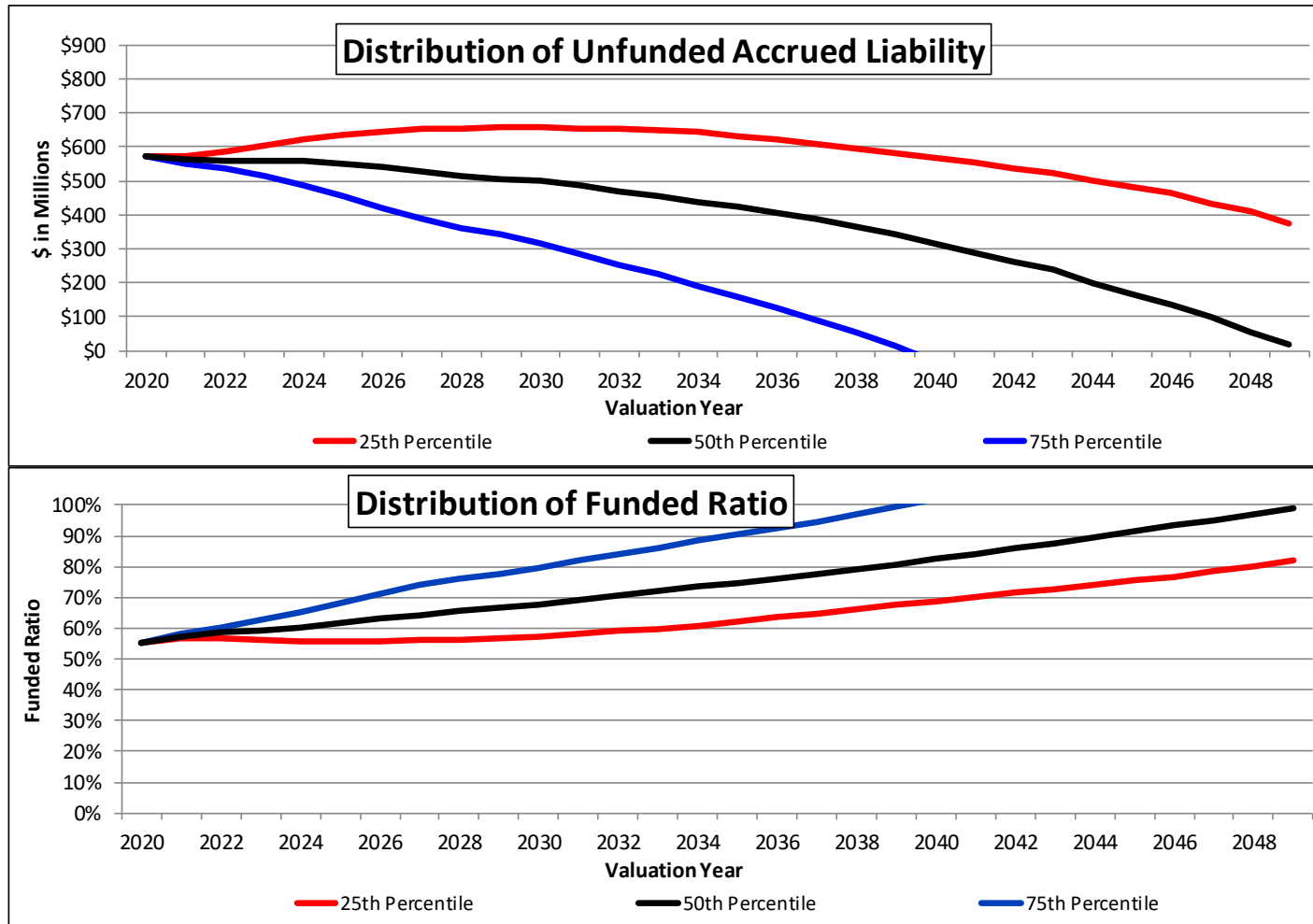
Section 4. Stress Testing Results for Kentucky Employees Retirement System (Hazardous Pension Fund)

Part C. Stochastic Simulation Results (continued)



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

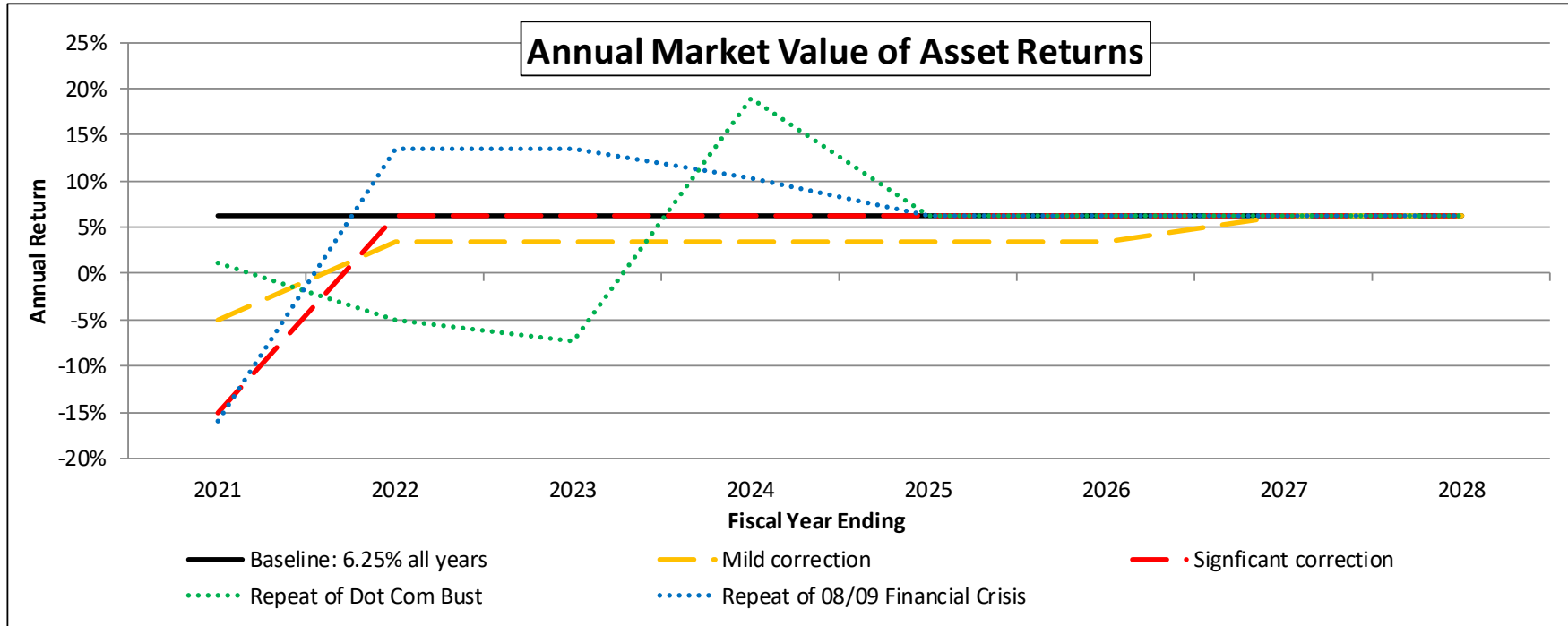
Part C. Stochastic Simulation Results (continued)



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

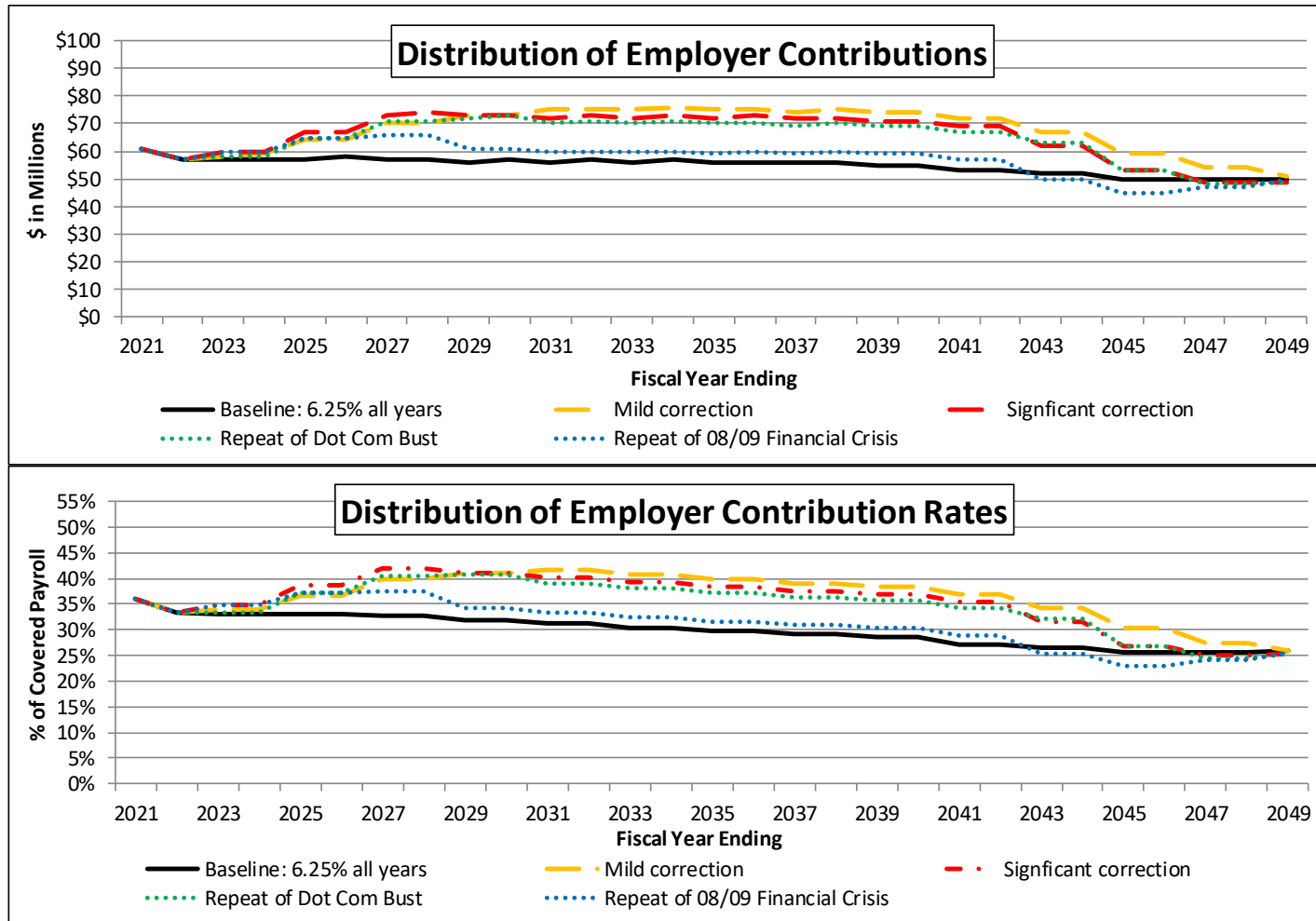
Part D. Deterministic Projection Modeling Results - Investment Risk

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.



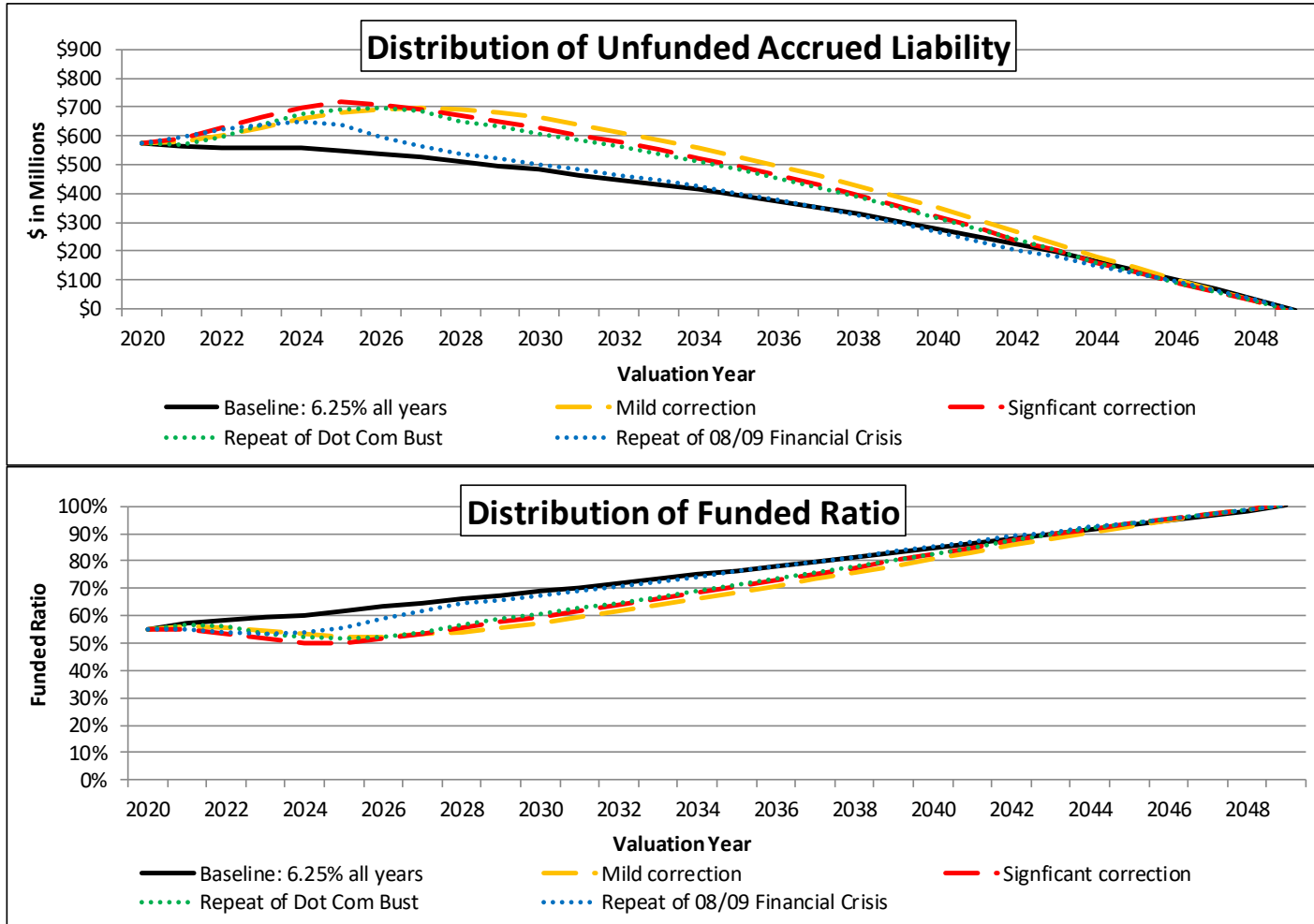
Section 4. Stress Testing Results for Kentucky Employees Retirement System (Hazardous Pension Fund)

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



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

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



Section 4.

Stress Testing Results for Kentucky 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 Kentucky 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*	0.5%
(b) 5.00% increase in the employer contribution rate*	-5.3%
2. Two-year annual investment return resulting in a	
(a) 2.50% increase in the employer contribution rate*	3.4%
(b) 5.00% increase in the employer contribution rate*	0.4%
3. Five-year annual investment return resulting in a	
(a) 2.50% increase in the employer contribution rate*	5.1%
(b) 5.00% increase in the employer contribution rate*	4.0%

* 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 Kentucky 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) budgeted by the General Assembly 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.

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*	23%
(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*	60%
(b) 5.00% increase in the employer contribution rate*	20%
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*	69%

* 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 5

STRESS TESTING RESULTS FOR STATE POLICE RETIREMENT SYSTEM PENSION FUND

Section 5.

Stress Testing Results for State Police Retirement System (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 4% reduction in active membership for 10 years, which is intended to illustrate, approximately, a 2% annual reduction in covered payroll for 10 years (compared to the 0% payroll growth assumption);
- (2) 75% of the actuarially determined contribution rate being budgeted by the General Assembly each biennium, starting in FYE 2023 and 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 – Employer contributions (both as a dollar amount and as a percentage of payroll) are expected to remain relatively level until the contribution rates drop to the normal cost rates in FYE 2050 (when the unfunded liability is expected to be paid off). Contribution rates decrease slightly 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.

-2% 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 significantly compared to the baseline projection, as payroll decreases. However, because the General Assembly is still assumed to budget these increasing actuarially determined contribution rates every biennium, the funded ratio is expected to increase throughout the projection, reaching approximately 100% funded at June 30, 2049.

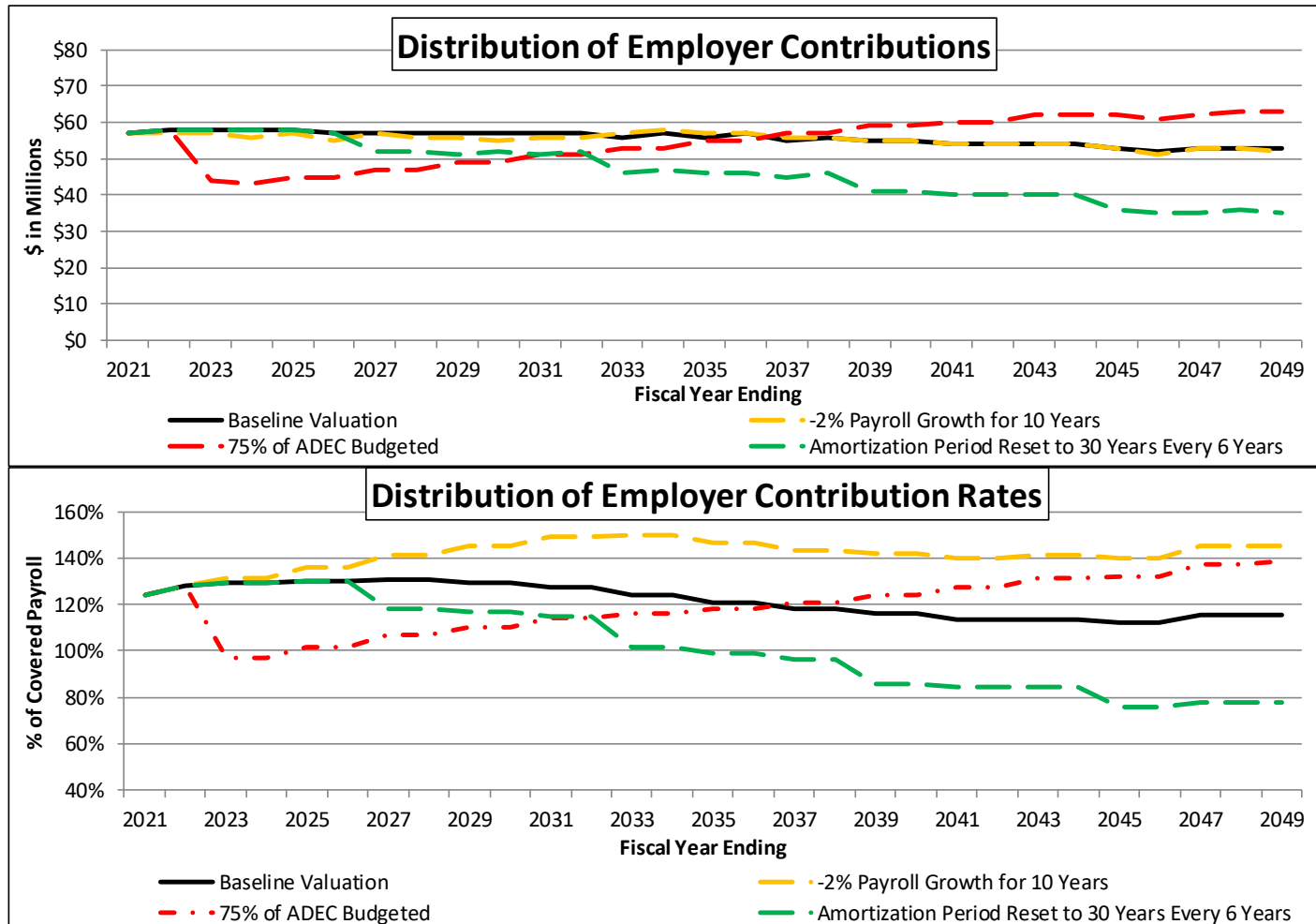
75% of ADEC Budgeted – When less than the actuarially determined employer contributions (ADEC) are paid, the unpaid amount must be made up in future contributions. As the following exhibits show, the contribution requirement will continue to grow each year. The unfunded liability is also paid off significantly slower compared to the baseline projection, resulting in contribution rates not reducing to the normal cost rates in FYE 2050 (as there is still \$240 million in 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, the unfunded liability is paid off significantly slower compared to the baseline projection, resulting in the unfunded liability staying above \$500 million for the next 25 years. Additionally, contribution rates will not reduce to the normal cost rates in FYE 2050, as there is still \$440 million in unfunded liability remaining in 2049.



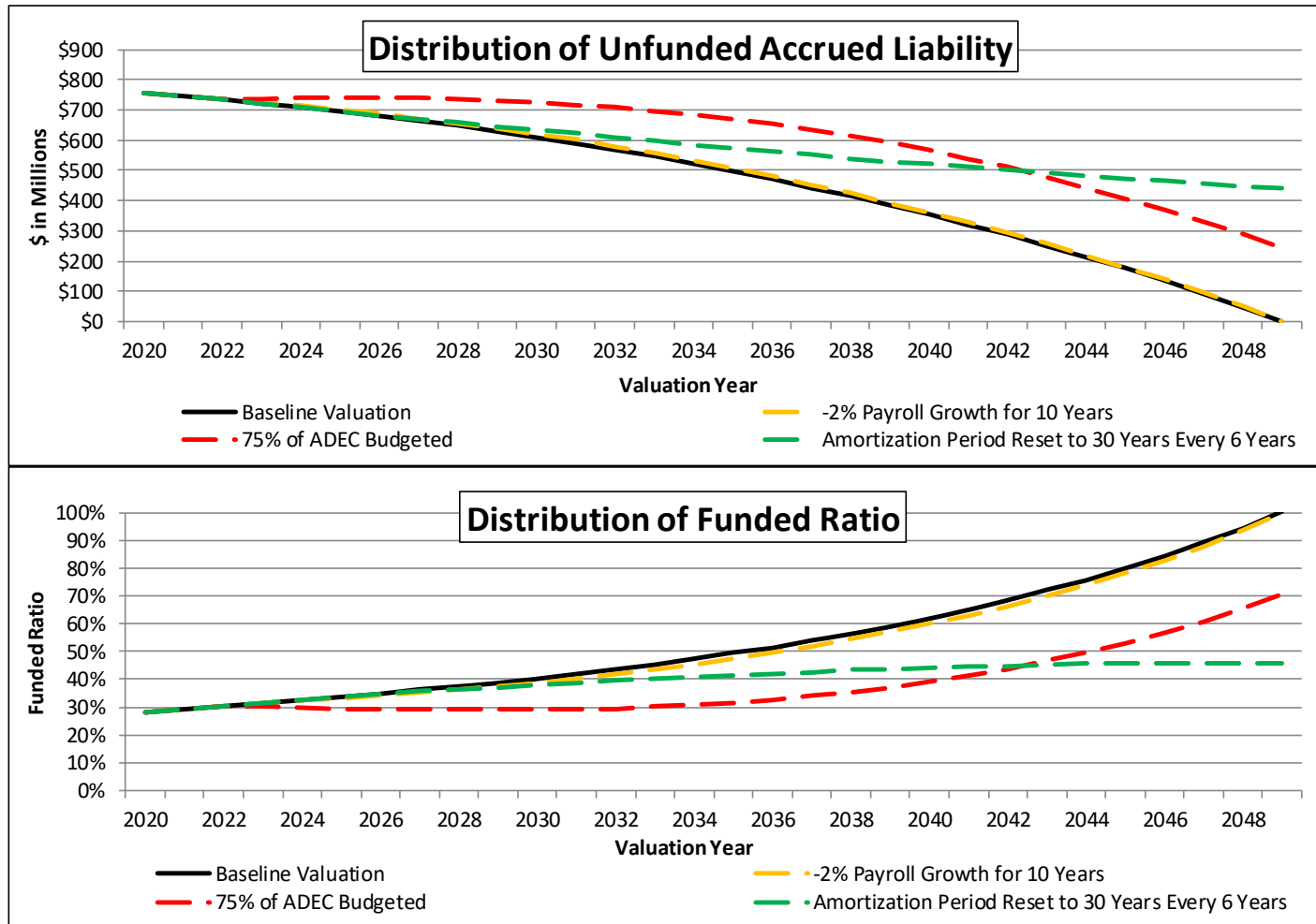
Section 5. Stress Testing Results for State Police Retirement System (Pension Fund)

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



Section 5. Stress Testing Results for State Police Retirement System (Pension Fund)

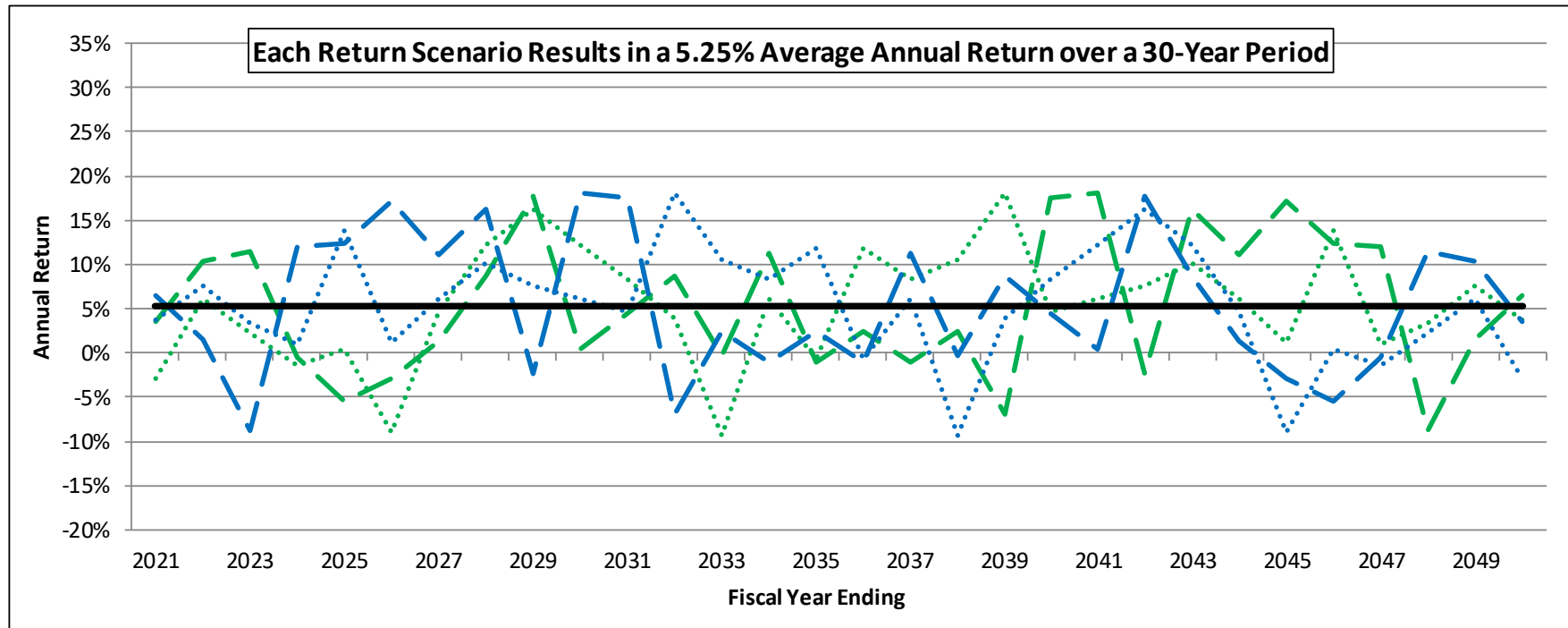
Part A. Deterministic Projection Modeling Results - Contribution Risk (continued)



Section 5. Stress Testing Results for State Police Retirement System (Pension Fund)

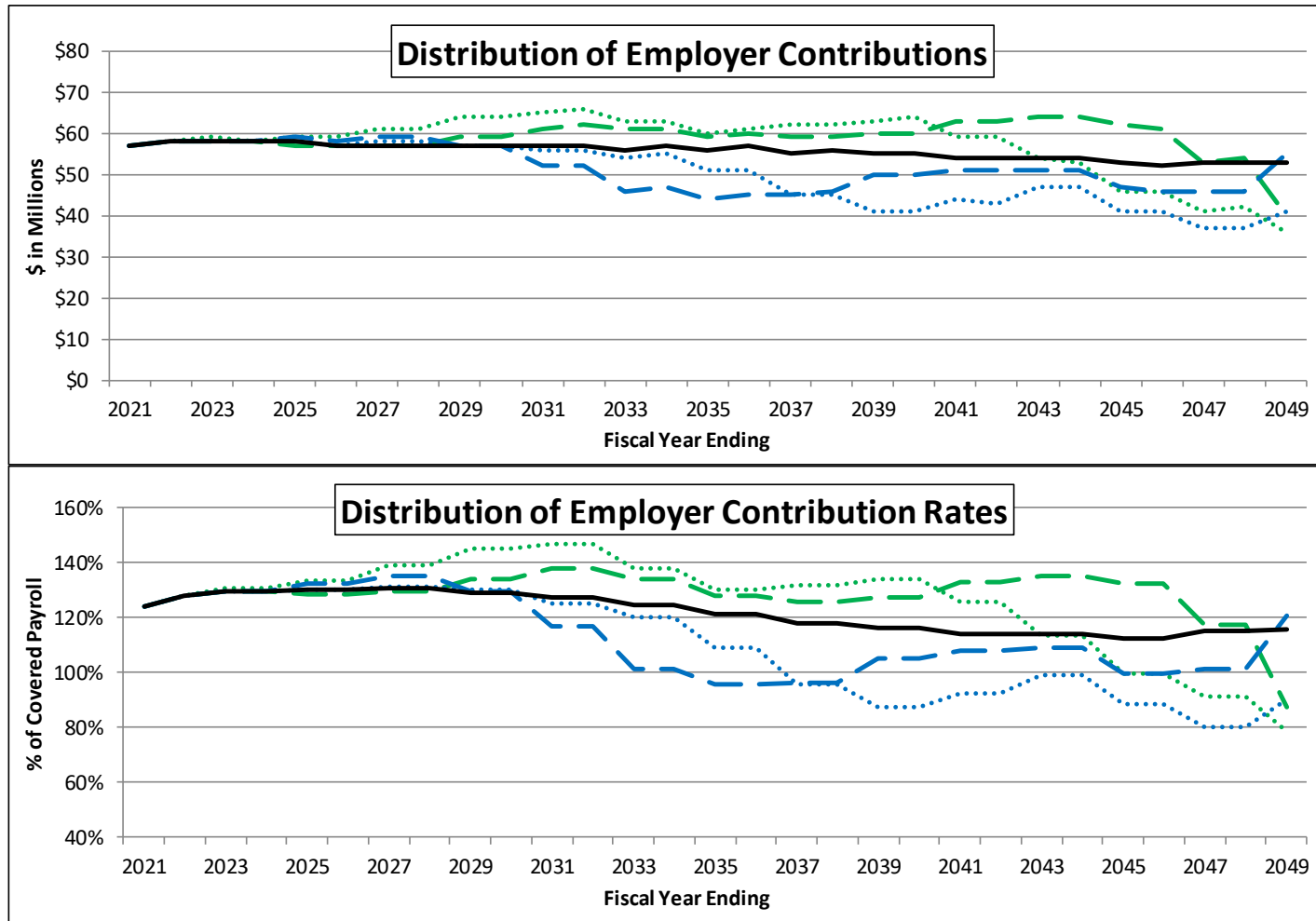
Part B. Financial Impact Due to Volatility in Investment Returns

Below is a chart with five investment return scenarios that each result in a 5.25% 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 5.25% 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.**



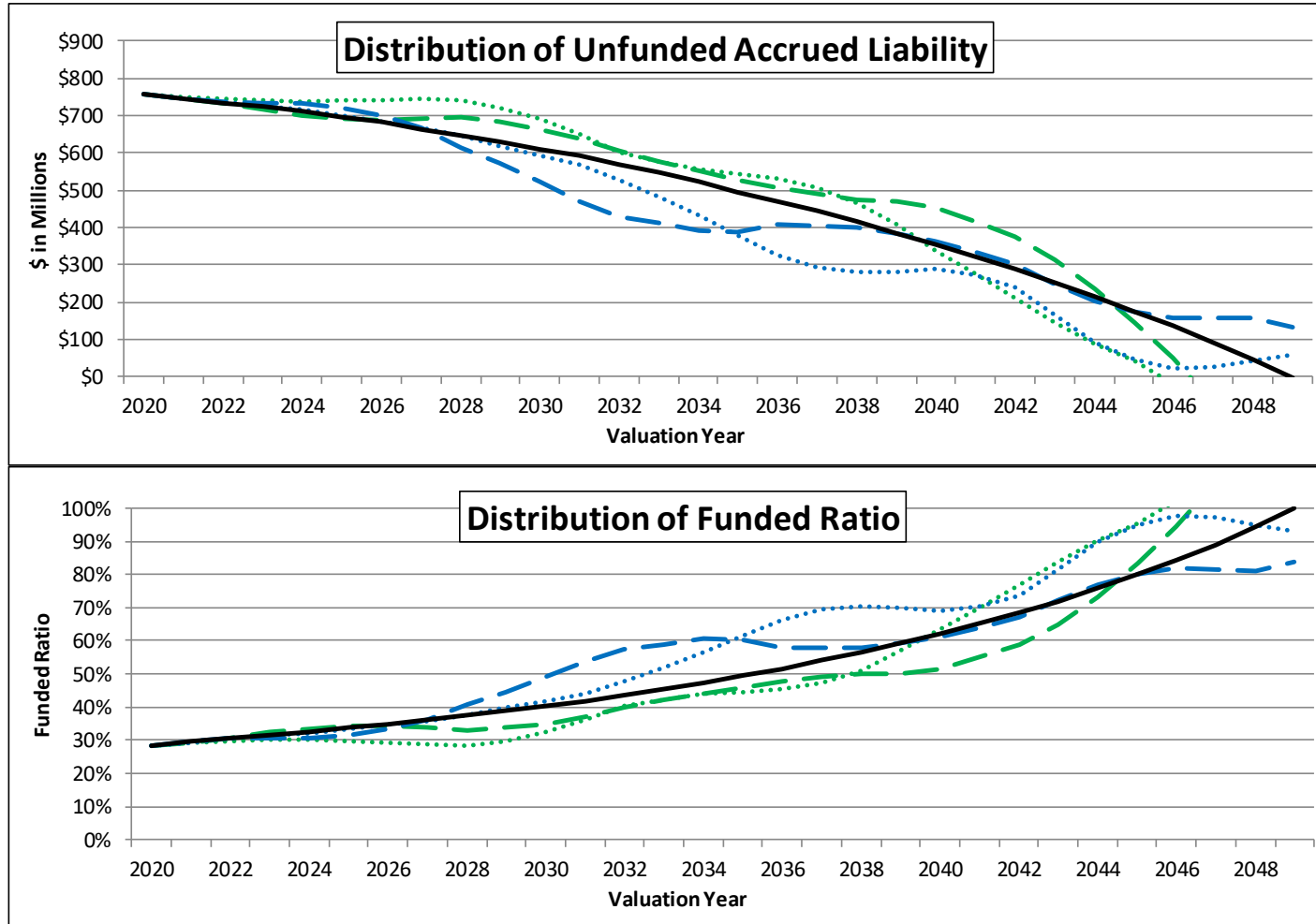
Section 5. Stress Testing Results for State Police Retirement System (Pension Fund)

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



Section 5. Stress Testing Results for State Police Retirement System (Pension Fund)

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



Section 5. Stress Testing Results for State Police Retirement System (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).

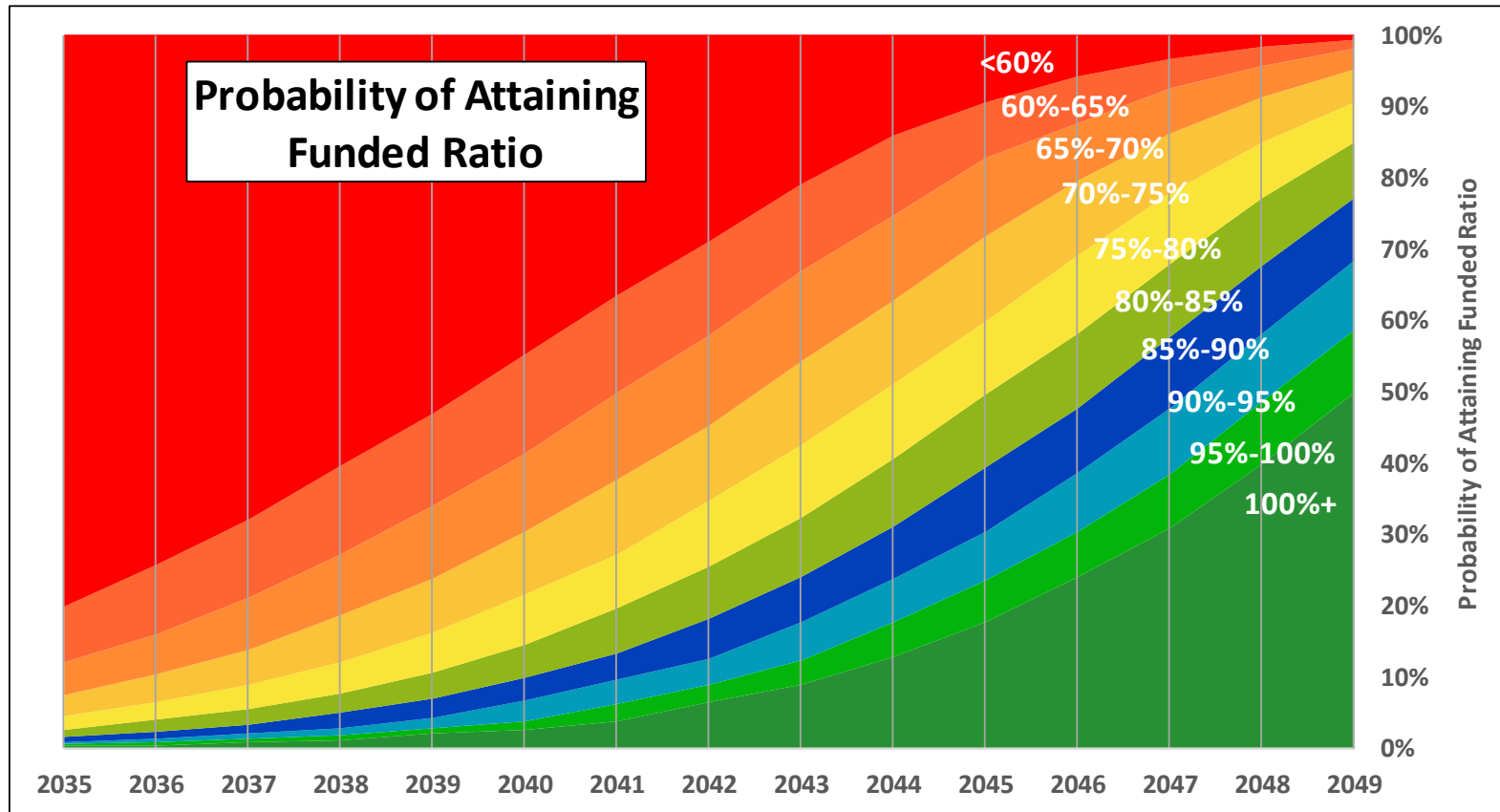
	Probability of Prescribed Outcome				
	5 Years	10 Years	15 Years	20 Years	30 Years
1. Probability of a 5% of pay increase in the required contribution rate within the next X Years ¹	38%	48%	54%	57%	69%
2. Probability of a 10% of pay increase in the required contribution rate within the next X Years ¹	19%	30%	37%	40%	55%
3. Probability of a 5% of pay decrease in the required contribution rate within the next X Years ¹	23%	44%	67%	75%	100%
4. Probability of a 10% of pay decrease in the required contribution rate within the next X Years ¹	10%	31%	57%	66%	100%
5. Probability of a 1.0% decrease in the funded ratio within the next X Years ²	4%	7%	7%	7%	7%
6. Probability of a 5.0% decrease in the funded ratio within the next X Years ²	<1%	1%	1%	1%	1%
¹ Percentage of stochastic scenarios that the employer contribution rate in a year after FYE 2022 is greater/lower than the FYE 2022 contribution rate of 127.99% of pay					
² Percentage of stochastic scenarios that the funded ratio in a year after 2020 is less than the 2020 funded ratio of 28.1% of pay					



Section 5. Stress Testing Results for State Police Retirement System (Pension Fund)

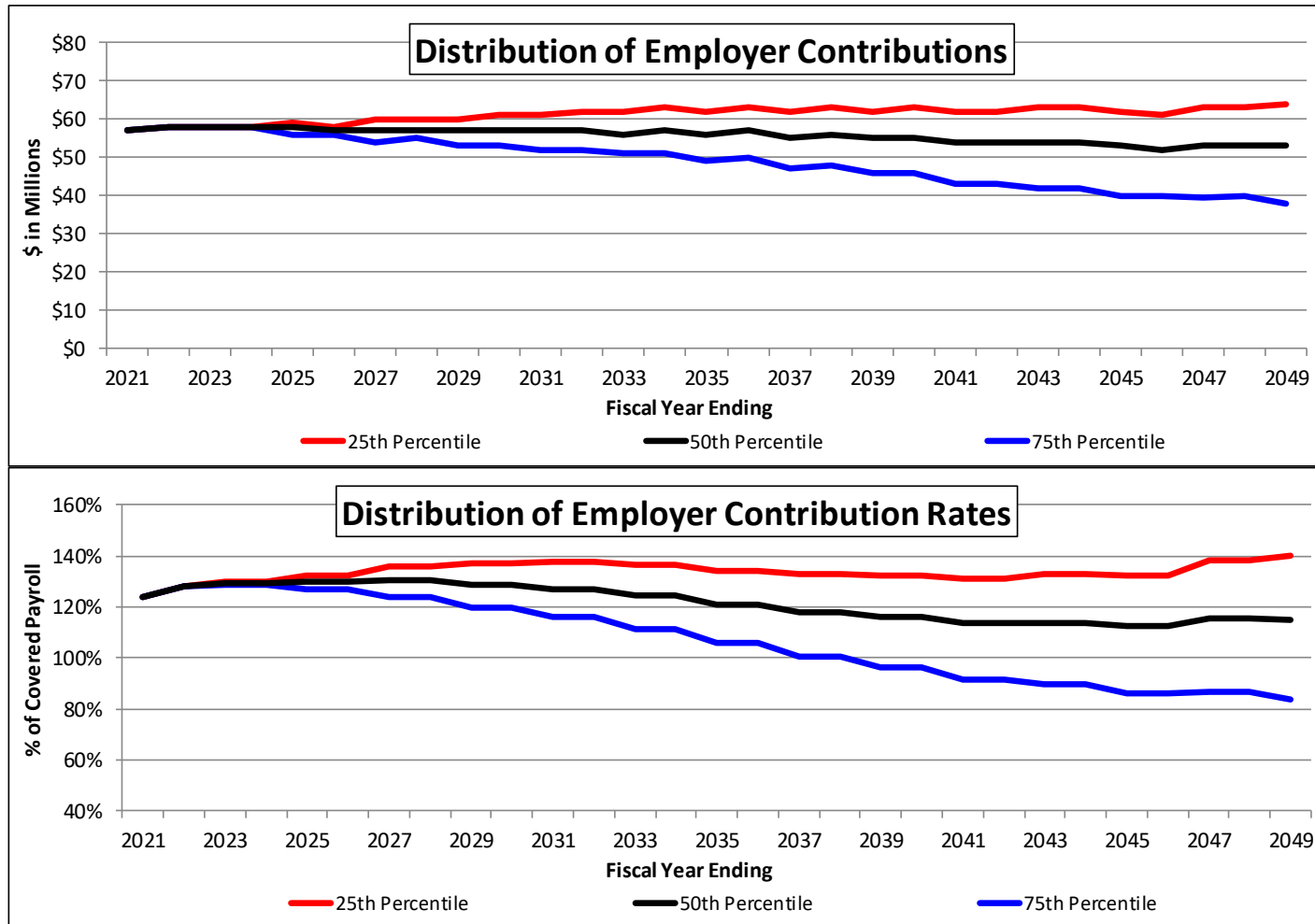
Part C. Stochastic Simulation Results (continued)

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.



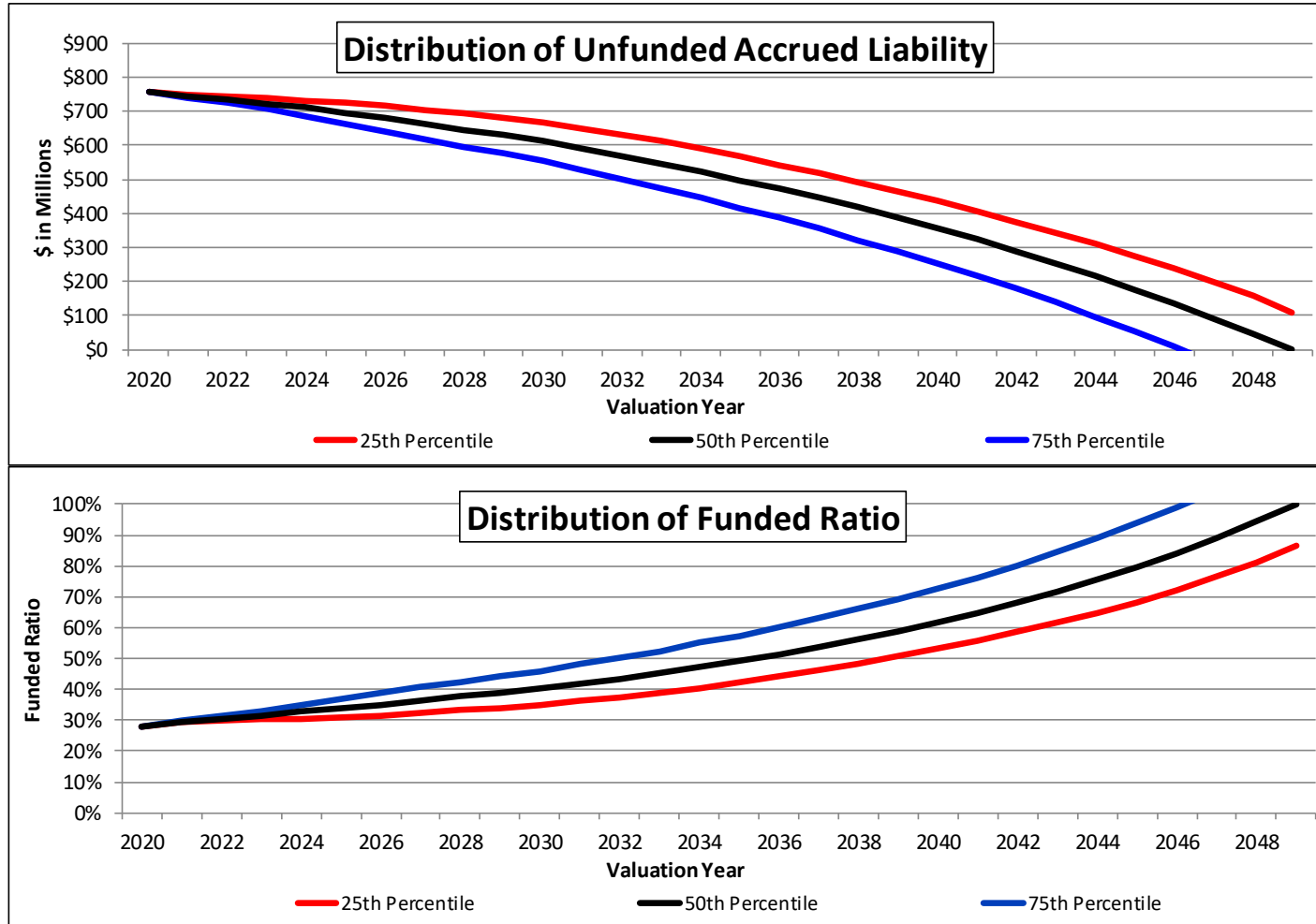
Section 5. Stress Testing Results for State Police Retirement System (Pension Fund)

Part C. Stochastic Simulation Results (continued)



Section 5. Stress Testing Results for State Police Retirement System (Pension Fund)

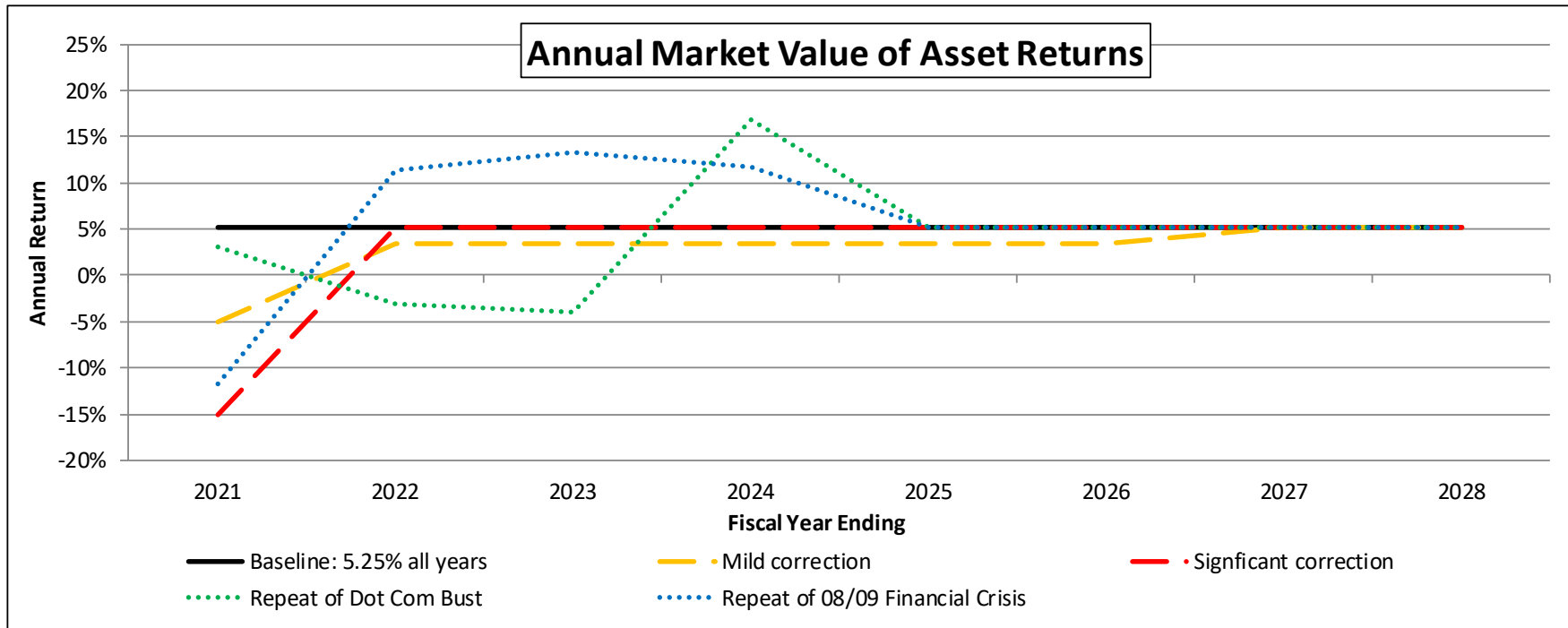
Part C. Stochastic Simulation Results (continued)



Section 5. Stress Testing Results for State Police Retirement System (Pension Fund)

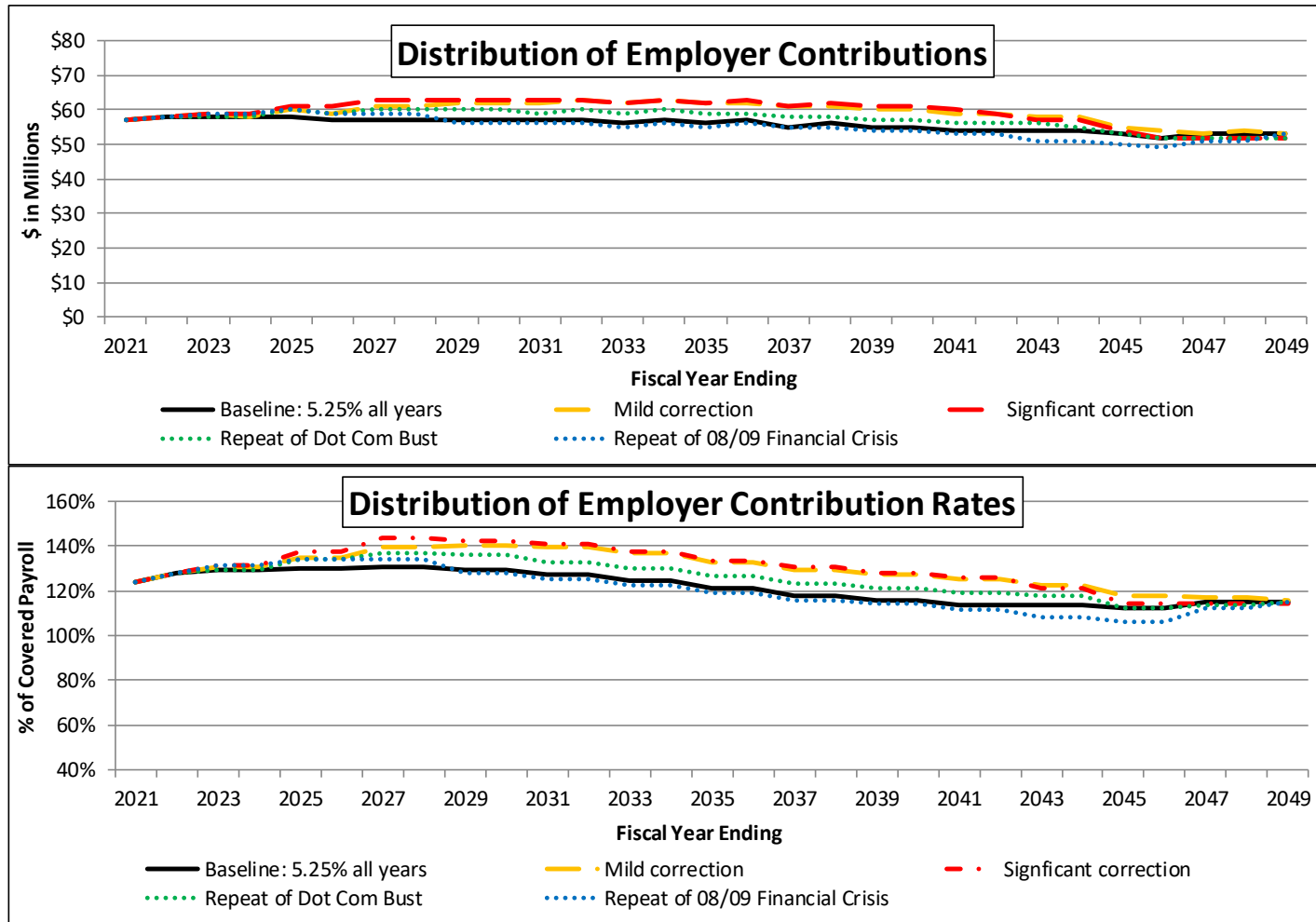
Part D. Deterministic Projection Modeling Results - Investment Risk

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 5.25% are assumed after FYE 2028.



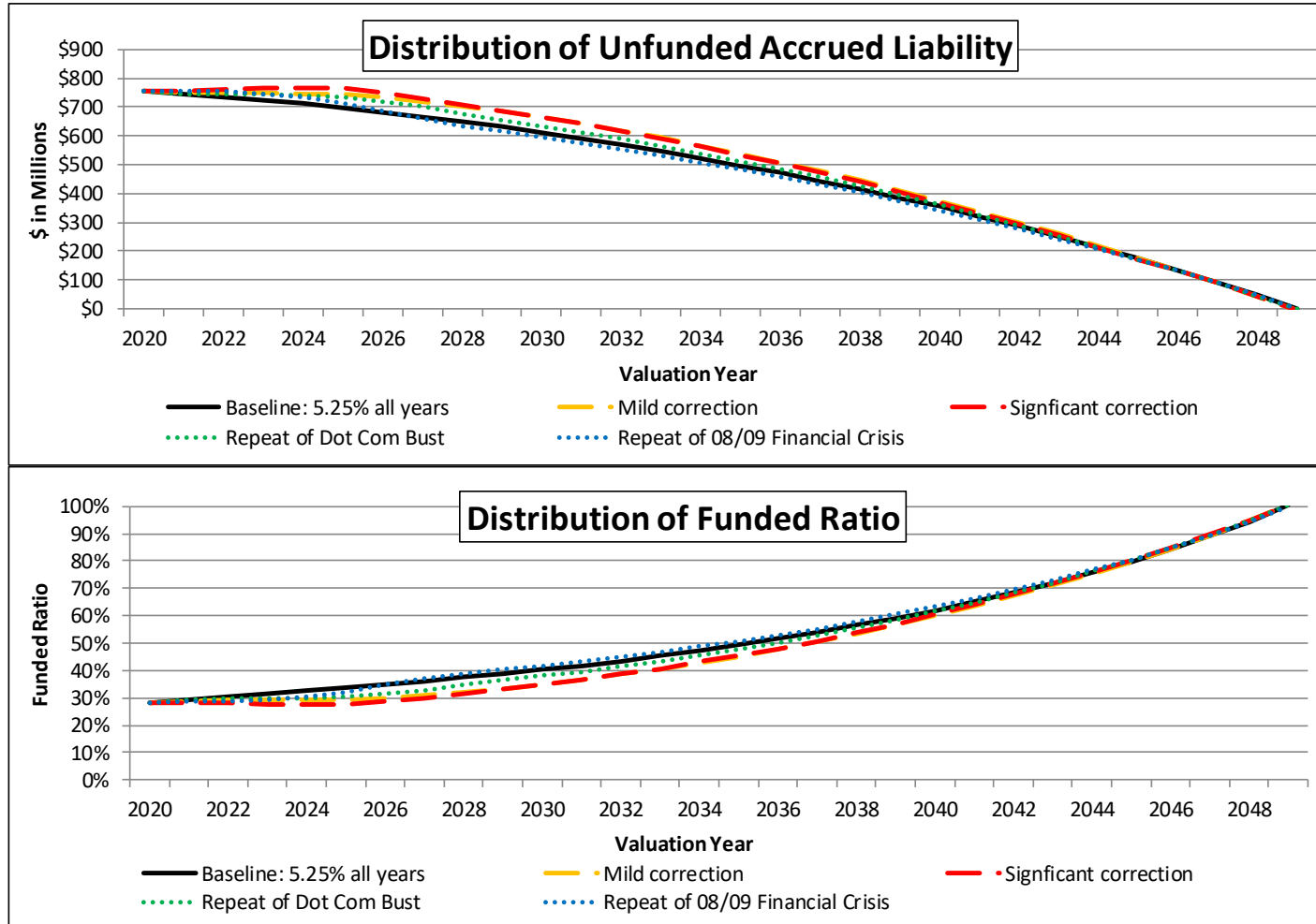
Section 5. Stress Testing Results for State Police Retirement System (Pension Fund)

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



Section 5. Stress Testing Results for State Police Retirement System (Pension Fund)

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



Section 5.

Stress Testing Results for State Police Retirement System (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 State Police Retirement System Pension Fund is assumed to earn 5.25% 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*	1.4%
(b) 5.00% increase in the employer contribution rate*	-2.4%
2. Two-year annual investment return resulting in a	
(a) 2.50% increase in the employer contribution rate*	3.3%
(b) 5.00% increase in the employer contribution rate*	1.4%
3. Five-year annual investment return resulting in a	
(a) 2.50% increase in the employer contribution rate*	4.5%
(b) 5.00% increase in the employer contribution rate*	3.8%

* 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 5.

Stress Testing Results for State Police Retirement System (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) budgeted by the General Assembly 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.

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*	79%
(b) 5.00% increase in the employer contribution rate*	58%
2. Percent of ADEC budgeted over a two-year period resulting in a	
(a) 2.50% increase in the employer contribution rate*	89%
(b) 5.00% increase in the employer contribution rate*	78%
3. Percent of ADEC budgeted over a five-year period resulting in a	
(a) 2.50% increase in the employer contribution rate*	95%
(b) 5.00% increase in the employer contribution rate*	91%

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



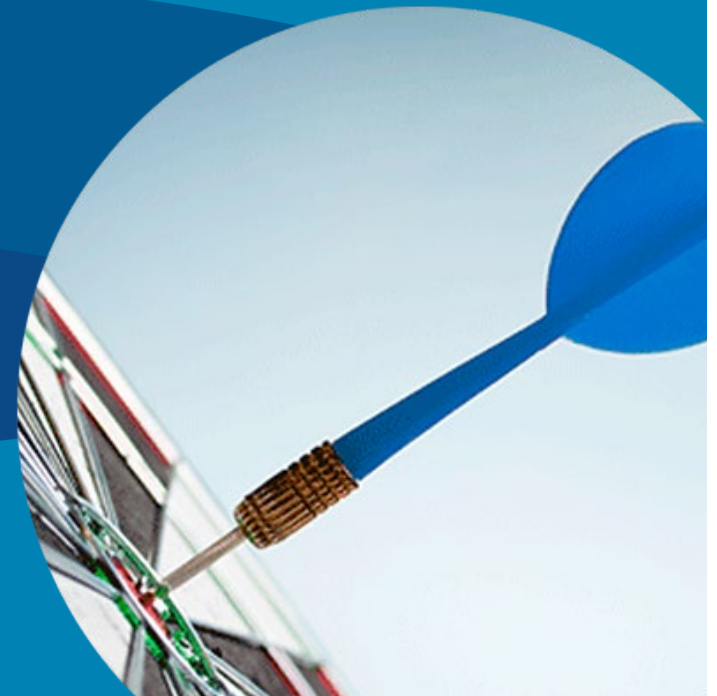


Kentucky Retirement Systems 2020 Stress Test

August 24, 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 (i.e. HB 8)
 - Does not reflect FYE 2021 investment experience
- Key Takeaways
 - KERS Funds
 - SPRS 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

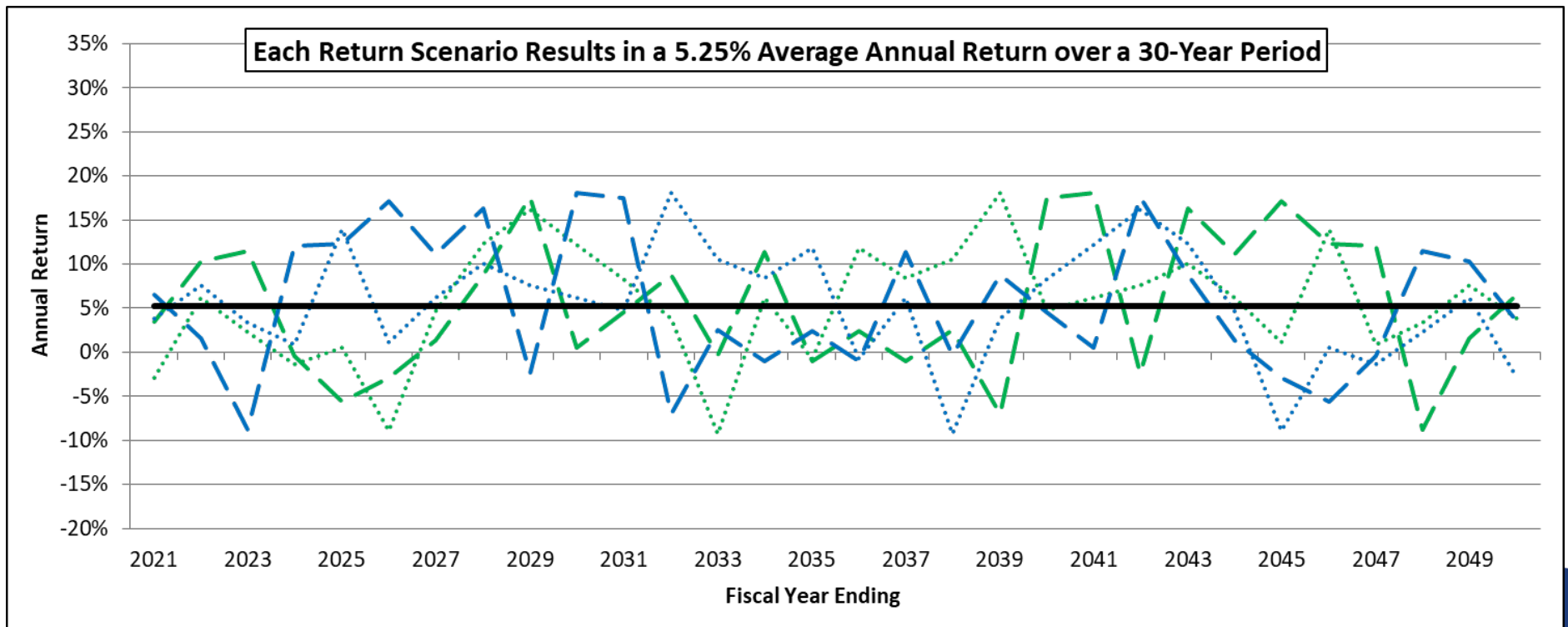
Contribution Risk

- Analysis of the funds' risk due receiving insufficient contributions.
- Scenarios include:
 - Covered payroll decreasing 2% less than assumed
 - Budget risk
 - 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

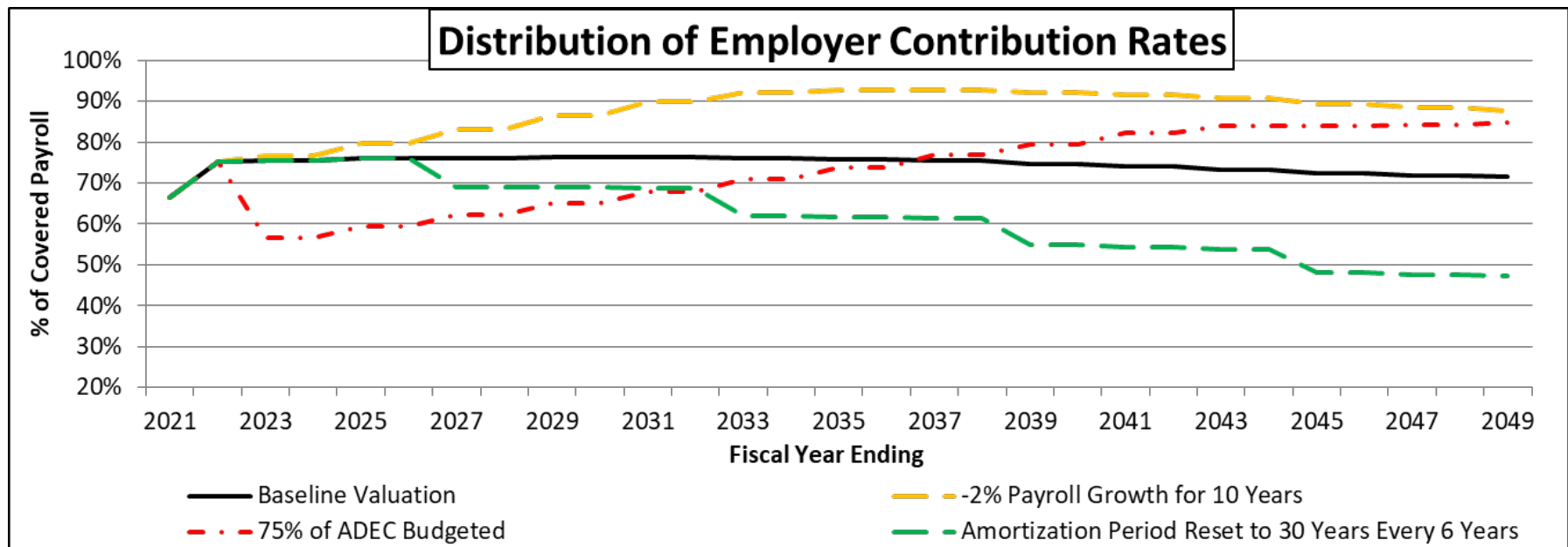
Key Takeaways

KERS Non-Hazardous Pension Fund



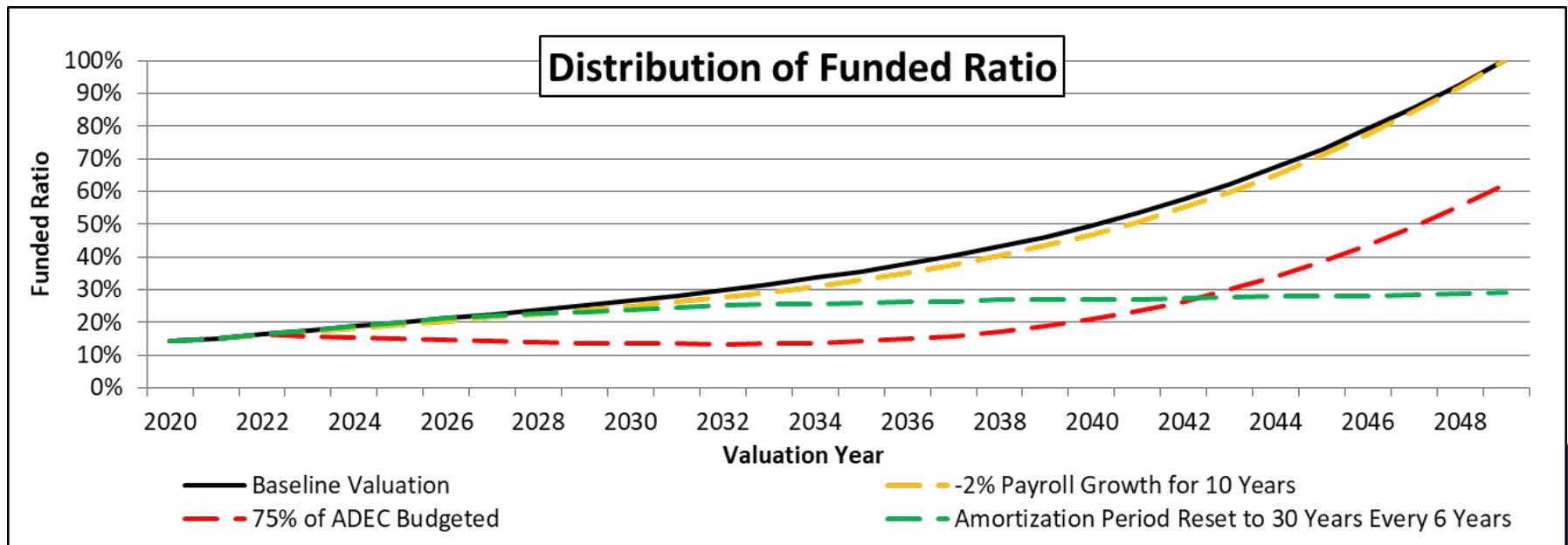
Key Takeaways – KERS NH Pension Fund

- Prior to the passing of HB8, a continual decline in covered payroll was a significant risk to the participating employers



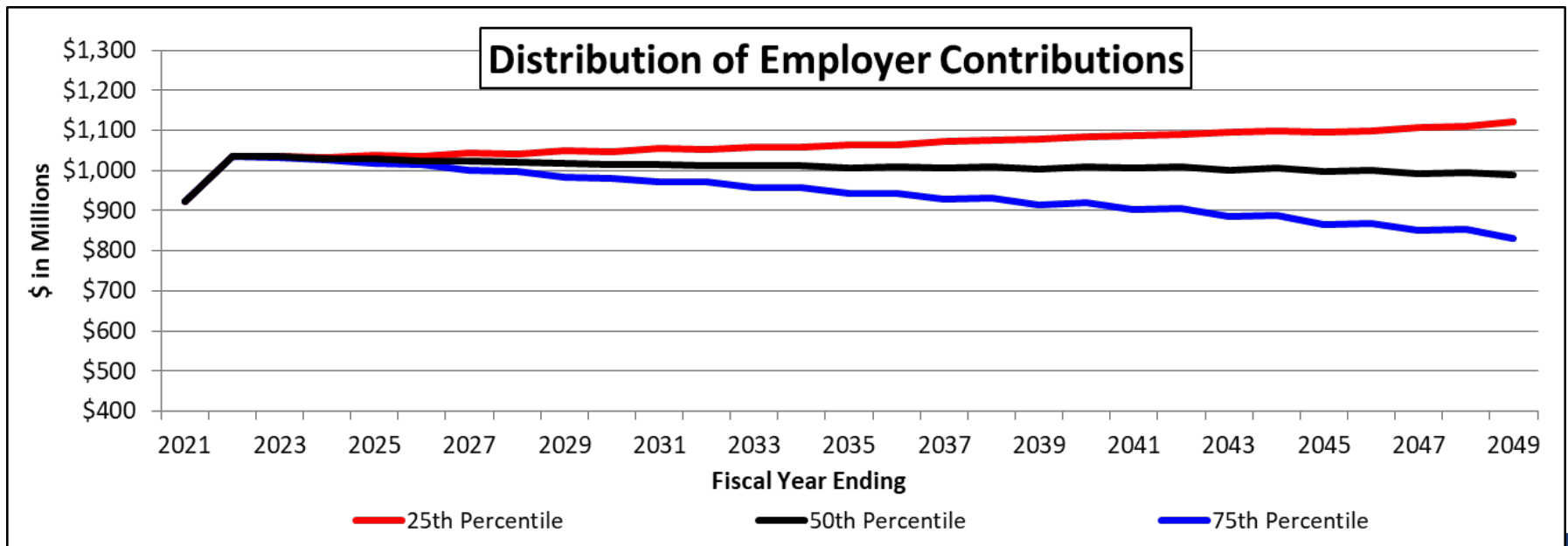
Key Takeaways – KERS NH Pension Fund

- However, the biggest risk to the KERS Non-Hazardous Pension Fund is still receiving less than the actuarially determined contributions
- Resetting the amortization period is also detrimental to the fund



Key Takeaways – KERS NH Pension Fund

- The KERS Non-Hazardous Pension Fund has significantly less investment risk, as measured by the change in required contributions, because it has a relatively lower funded ratio than the other Systems



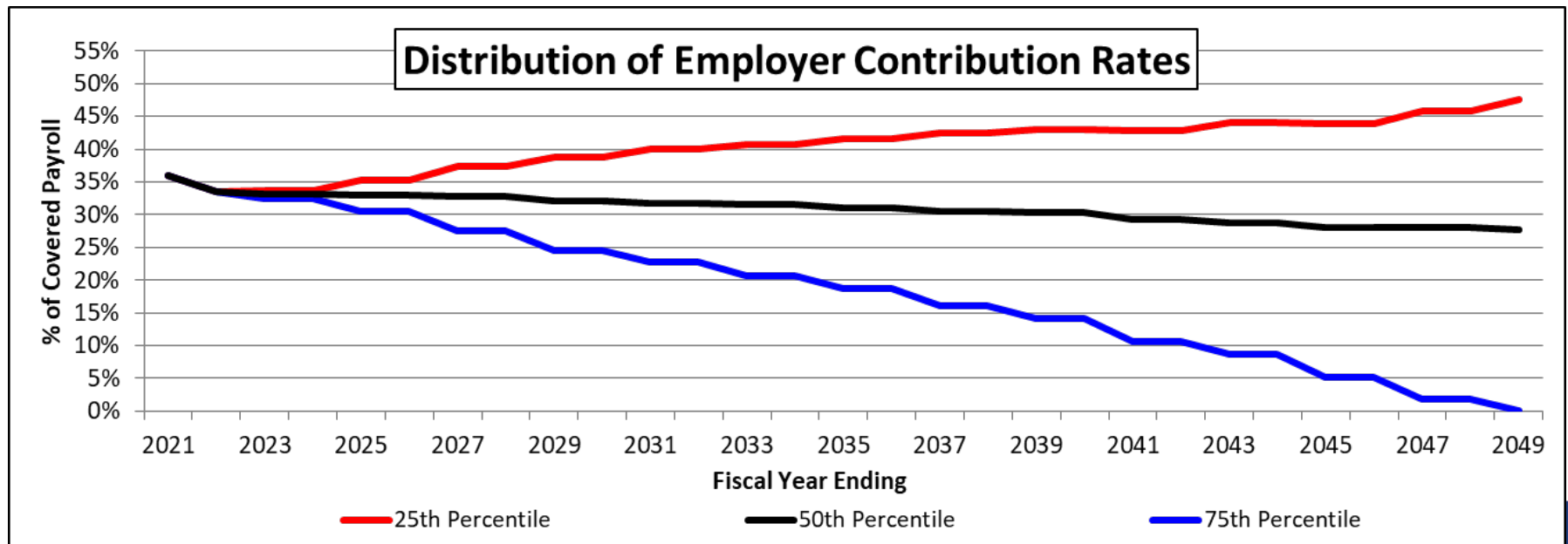
Key Takeaways

KERS Hazardous Pension Fund



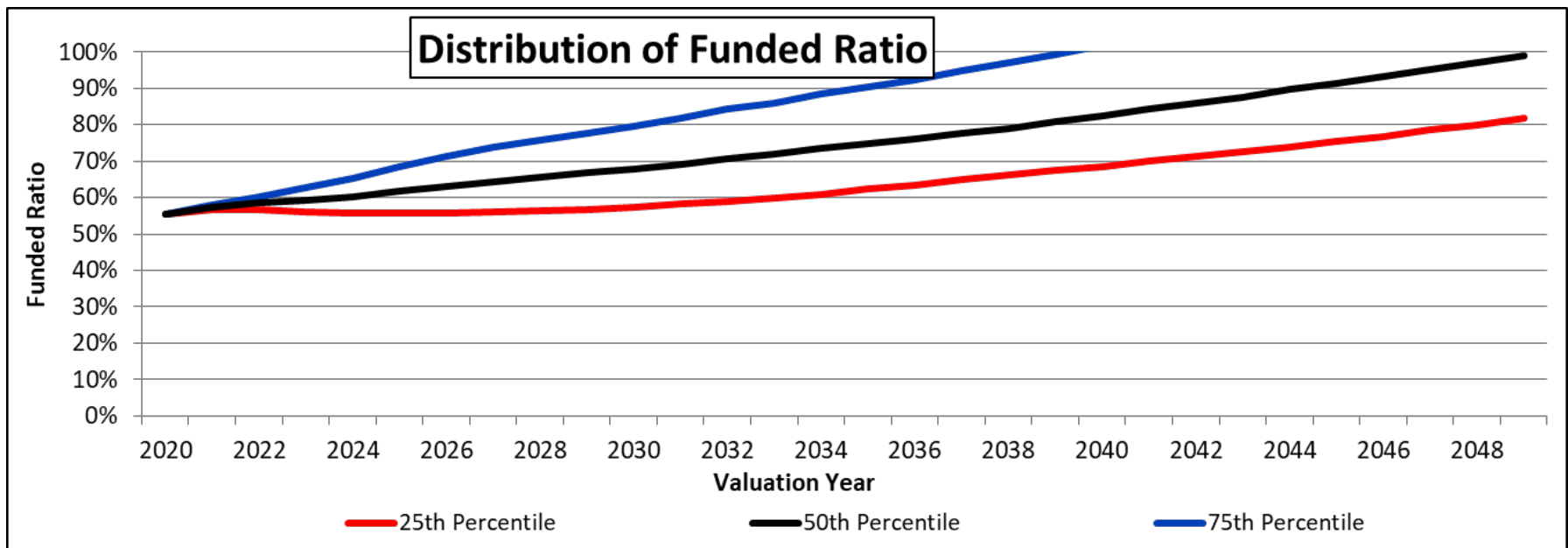
Key Takeaways – KERS Haz Pension Fund

- Compared to the KERS Non-Hazardous and SPRS Pension Funds, the KERS Hazardous Pension Fund has the most investment risk, as measured by the change in contribution rate, because it is significantly better funded than the other two funds



Key Takeaways – KERS Haz Pension Fund

- The projected funded ratio is expected to improve under the “more likely than not” scenarios, in part because of the relatively strong funding policy.

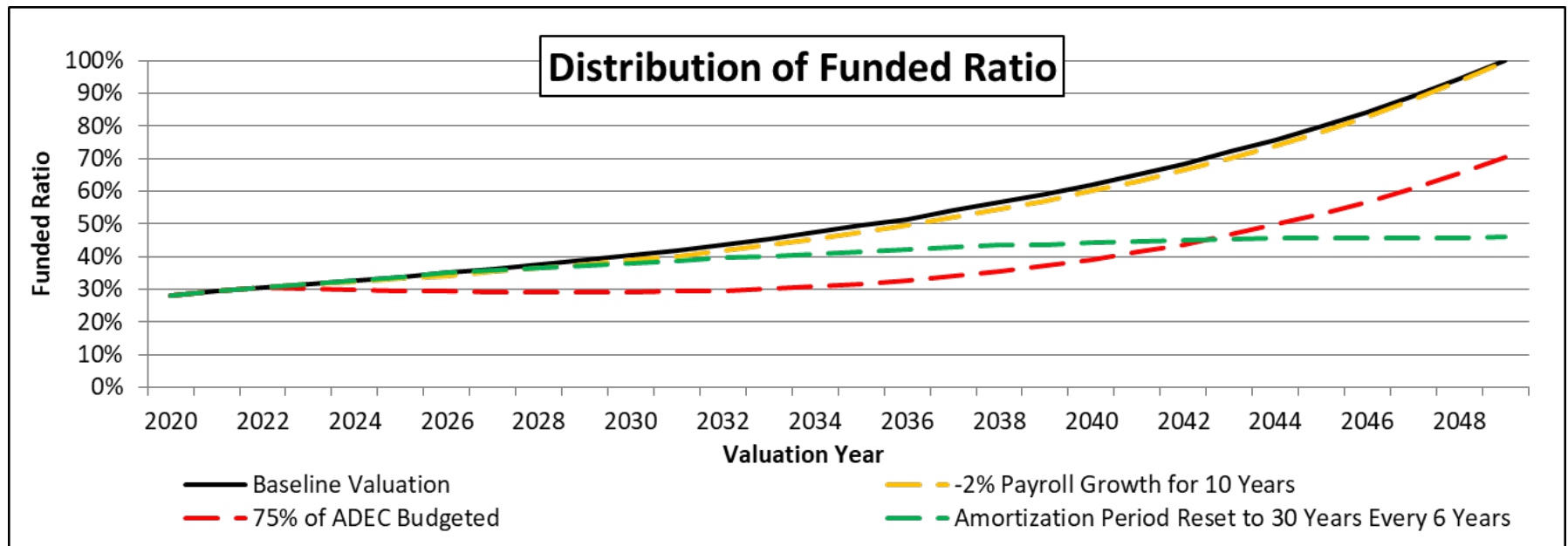


Key Takeaways SPRS Pension Fund



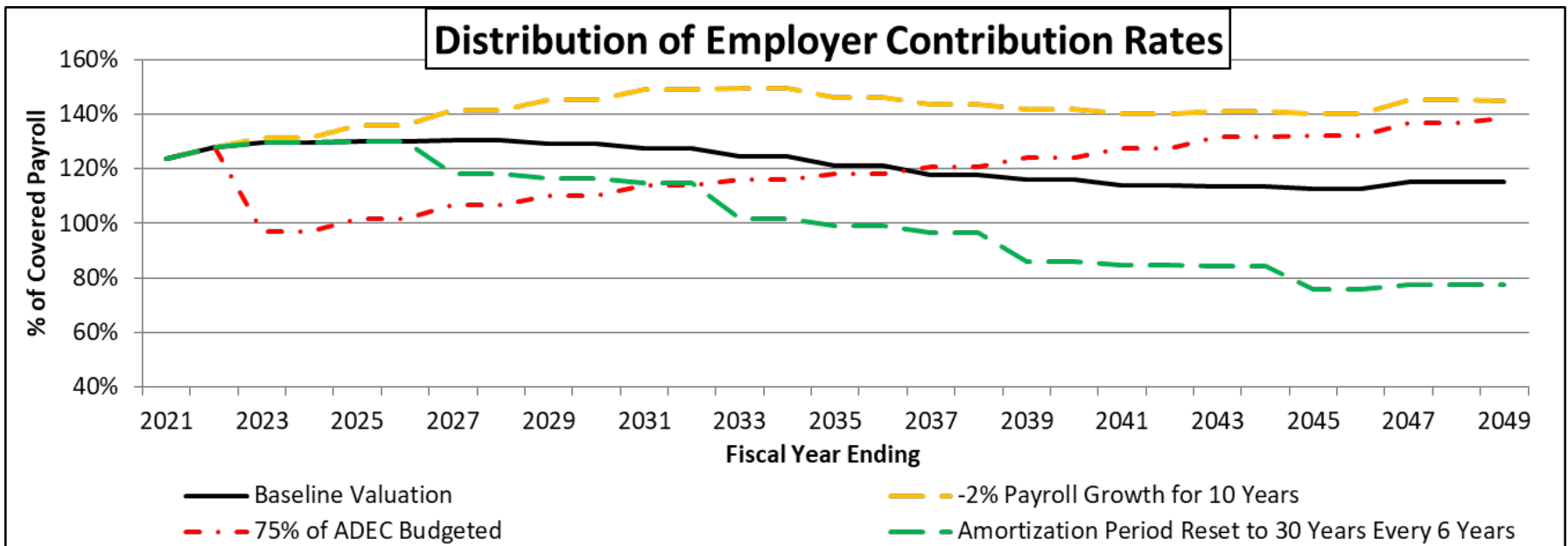
Key Takeaways – SPRS Pension Fund

- Similar to the KERS Non-Hazardous Pension Fund, the biggest risk to the SPRS Pension Fund is receiving less than the actuarially determined contributions



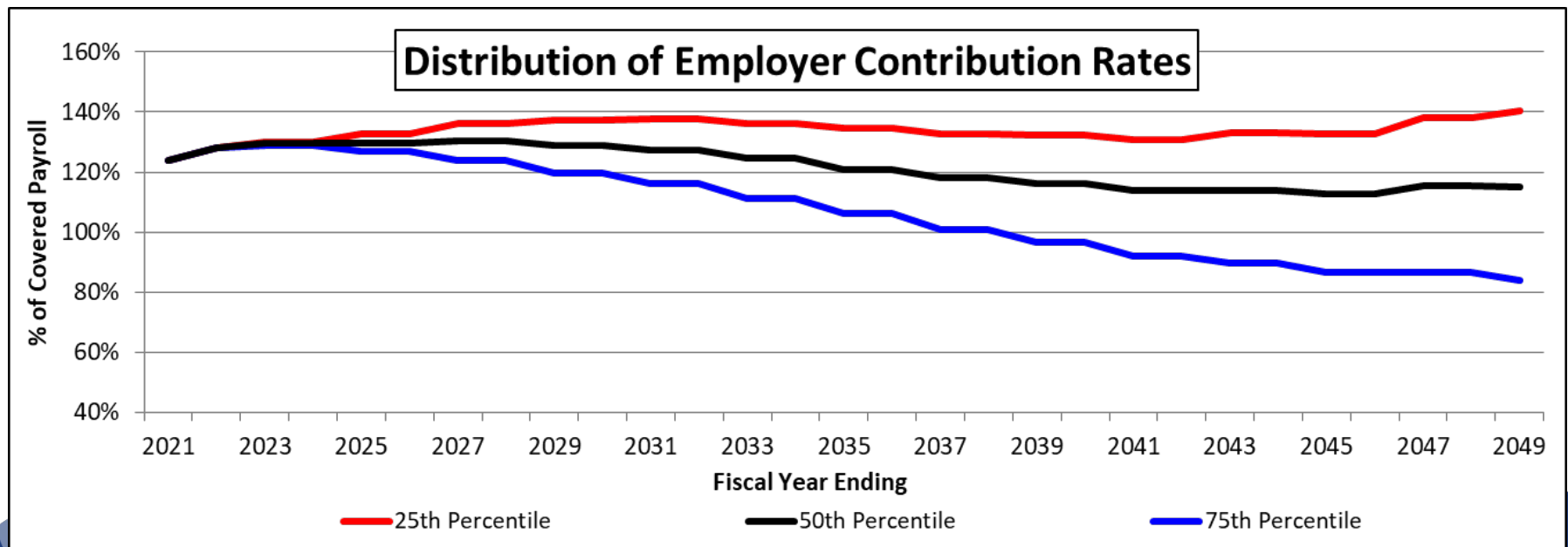
Key Takeaways – SPRS Pension Fund

- Contribution rates will continue to increase if covered payroll continues to decline.



Key Takeaways – SPRS Pension Fund

- The potential volatility in future contribution rates for the SPRS Pension Fund is relatively high because the Fund has a higher leverage of liability to payroll
 - SPRS Pension Fund: \$22 in liability for every \$1 in covered payroll
 - KERS Non-Haz Pension Fund: \$11 in liability for every \$1 in covered payroll.



Disclaimers

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