

**Kentucky Retirement Systems
CERS Board of Trustees Annual Board Meeting
April 21, 2021, 2 p.m. EDT (1 p.m. CDT)
Live Video Conference/Facebook Live**

AGENDA

1. Call to Order Betty Pendergrass
2. Roll Call Alane Foley
3. Public Comment
4. Approval of Minutes- April 1, 2021* Betty Pendergrass
5. CEO & General Counsel* Betty Pendergrass
6. By-laws* Betty Pendergrass
7. Investments
 - a. Wilshire Consulting acquisition Dave Lindberg
 - b. 2020 Asset Liability Study Dave Lindberg
 - c. Investment Training, May 18 Betty Pendergrass
8. Ethics Training Betty Pendergrass
9. Adjourn

*Board may take action on these items.

**MINUTES OF MEETING
BOARD OF TRUSTEES COUNTY EMPLOYEES RETIREMENT SYSTEM
SPECIAL CALLED MEETING APRIL 1, 2021 AT 2:00 P.M.
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 meeting of the County Employees Retirement System Board of Trustees held on April 1, 2021 the following members were present: Betty Pendergrass (Chair), Joe Brothers, George Cheatham, Michael Foster, JT Fulkerson, Merl Hackbart, William O'Mara and Jerry Powell. Patricia Carver was also present. Staff members present were David Eager, Rebecca Adkins, Erin Surratt, Kathy Rupinen, Carrie Bass, Victoria Hale, Steven Herbert, Kristen Coffey, Connie Pettyjohn, Shaun Case, Phillip Cook, and Alane Foley.

Mr. David Eager called the meeting to order.

Ms. Kathy Rupinen read the Special Called Meeting COVID-19 statement due to SB 150.

Mr. David Eager introduced agenda item *Swearing-In Ceremony*. Ms. Alane Foley, as Notary, swore in all Trustees. Alane proceeded to take the Roll Call.

There was no public comment submitted.

Mr. Eager introduced agenda item *Chair Election*. Mr. O'Mara nominated Ms. Pendergrass as Chair, the nomination was seconded by Mr. Powell. With no further nominations, Mr. Cheatham made a motion and Dr, Hackbart seconded to elect Ms. Pendergrass as the Chair of the County Employees Retirement System Board of Trustees. The motion passed unanimously.

Ms. Pendergrass thanked the CERS Ad-Hoc Planning Committee and internal staff for all their hard work during this transition. Ms. Pendergrass also welcomed Mr. Webber, who was attending via Facebook, to the meeting and thank him for his efforts on the legislation to create the separate CERS governance structure.

Ms. Pendergrass introduced agenda item *Vice-Chair Election*. Mr. O'Mara nominated Mr. Powell as Vice-Chair, the nomination was seconded by Dr. Hackbart. With no further nominations, Dr. Hackbart made a motion and Mr. Fulkerson seconded to confirm Mr. Powell as the Vice-Chair of the County Employees Retirement System Board of Trustees. The motion passed unanimously.

Ms. Pendergrass introduced agenda item *Ratification of CERS Election Results*. Mr. Powell made a motion and Mr. Fulkerson seconded to ratify the election results calculated by Yes Elections and audited by Dean Dorton. The motion passed unanimously.

Ms. Pendergrass introduced agenda item *CERS Trustee Vacancy*, Dr. Patricia Carver was elected by the members as the third CERS elected Trustee and her term normally would start on November 1, 2021. The CERS Trustee, David Rich, who would be serving until October 31, 2021 has tendered his resignation effective March 31, 2021 to allow Dr. Carver to start her term immediately. Ms. Pendergrass expressed appreciation on behalf of the CERS Board and CERS members for Mr. Rich's commitment to the Board and members and his hard work during his tenure on the Board. State law requires that the CERS Board send a vacancy notice to the membership regarding the vacancy. Ms. Pendergrass would like to amend the notice with two parts, 1) request comments regarding allowing Dr. Carver to extend her term and start serving immediately and 2) details on how to submit an application if someone would like to apply for the March 31-Oct 31, 2021 term. The Board approved a deadline for submitting applications no later than April 29, 2021. The Board discussed how to distribute the notice via email, KPPA website, KPPA Facebook page, employers and employee groups. Mr. O'Mara made a motion and Mr. Fulkerson seconded to approve the notice with changes discussed. The motion passed unanimously.

Ms. Pendergrass introduced agenda item *KPPA Appointments* and combined *Committee Assignments* in the discussion. Ms. Pendergrass has discussed options with each Trustee and developed the following appointments. Dr. Hackbart (Chair), Me. O'Mara, Mr. Cheatham, Mr. Powell and Mr. Fulkerson will serve on the Investment Committee. Mr. Omara (Chair), Mr. Cheatham, Mr. Fulkerson and Mr. Brothers will serve on the Finance Committee. Retiree Health Plan Committee will be discussed further at the KPPA Board meeting. Ms. Pendergrass, Jerry

Powell, and one other Trustee will serve on the DAC/AAC. One additional Trustee will be appointed later and Ms. Pendergrass asked for volunteers. Mr. Foster (Chair) and Dr. Hackbart will serve on the Actuarial Committee and Ms. Pendergrass will appoint one other person later. This list is subject to change once the Trustee vacancy is filled. Ms. Pendergrass as Chair of the CERS Board, Dr. Hackbart as the Investment Committee Chair, are automatically appointed to the KPPA Board. Ms. Pendergrass also appointed Mr. O'Mara and Mr. Powell to serve on KPPA.

Ms. Pendergrass introduced agenda item *CERS Ad-Hoc Planning Committee Report*. Ms. Pendergrass submitted this report to the last Ad-Hoc Planning Committee meeting on March 24, 2021. She has incorporated changes discussed in that meeting into the report and it is now a part of the official meeting material.

Ms. Pendergrass introduced agenda item *CEO & General Counsel*, and presented the job descriptions that were discussed during the ad-hoc planning committee meetings. These job descriptions are now ready for approval. Mr. Fulkerson made a motion and Mr. Powell seconded to approve the CEO & General Counsel job descriptions as presented. The motion passed unanimously.

Ms. Pendergrass introduced agenda item *Bylaws*. Ms. Pendergrass asked the Trustees to review the following items:

- 1) Section 1.2 Item D – Personnel Management Policy,
- 2) Section 1.2 Item O – Collaboration with KPPA for Business Continuity and Disaster Recovery,
- 3) Section 1.3 Item H – Chief Executive Officer interaction with Investment Staff and Managers,
- 4) Section 1.3 Item O – Chief Executive Officer Collaboration with KPPA Administrative Staff,
- 5) Section 2.2 Item C – Finance Committee Hazardous Duty Position Approval Language,
- 6) Section 2.2 Item E – Investment Committee Composition (Possible Robert's Rules Exception), and
- 7) Section 2.2 Item G – Retiree Health Plan Committee Structure.

The Board discussed each of these items and suggested minor edits to the language in each section. Ms. Pendergrass asked Mr. Powell to provide more background on the Retiree Health Plan Committee Structure. He explained how the Board of Trustees had previously interacted with the Retiree Health Care staff, the Personnel Cabinet's Kentucky Employees Health Plan (KEHP), and an advisory group that assists KEHP. Mr. Powell then made a motion and Mr. Brothers seconded to have a Joint Retiree Health Plan Committee with the KRS Board of Trustees. CERS Board could also appoint an Ad-Hoc Committee when necessary. The motion passed unanimously.

Ms. Pendergrass introduced agenda item *Board & Committee Meeting Schedule*. CERS meetings are scheduled on Mondays and Wednesdays. The Board discussed having these meetings at 2:00 PM ET, so that Trustees in western Kentucky could meet after lunch. There was also a discussion regarding virtual meetings if/when meetings resume the in-person format.

Ms. Pendergrass introduced agenda item *Investment Management*. Mr. Powell advised there was nothing new to report since his report to the Ad-Hoc CERS Transition Planning Committee. Dr. Hackbart will Chair the Investment Committee.

Ms. Pendergrass introduced agenda item *Actuarial Planning*. Mr. O'Mara recommended that the Board provide actuarial training for the new Trustees. Mr. O'Mara, Mr. Eager, and Danny White (GRS) have already worked on a training session. There will be an Actuarial Training Session on April 27, 2021 at 2:00 p.m. with GRS presenting. Mr. Eager also advised that he will send the Trustees a copy of the book *Penchant for Pensions*, by Leslie L. Thompson and Pamela M. Feely.

Ms. Pendergrass advised that Committee Chairs have the availability to call special called meetings when needed. These meetings require a 24-hour notice to the public. The CERS Board will meet again on April 21, 2021, for the "annual" meeting. Ms. Pendergrass may call additional special Board meetings as the Board continues its organizational planning.

Mr. Fulkerson made a motion and Mr. Powell seconded to adjourn the meeting. The motion passed unanimously.

Copies of all documents presented are incorporated as part of the Minutes of the Board of Trustees held April 1, 2021 except documents provided during a closed session conducted pursuant to the open meetings act and exempt under the open records act.

CERTIFICATION

I do certify that I was present at this meeting, and I have recorded the above actions of the Trustees 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 conjunction with this meeting.

Recording Secretary

We, the Chair of the Board of Directors of the Kentucky Retirement Systems and Chief Administrative Officer of the County Employees Retirement System, do certify that the Minutes of Meeting held on April 1, 2021 were approved on April 21, 2021.

Chair of the Board of Trustees

Chief Administrative Officer

I have reviewed the Minutes of the April 1, 2021 Board of Trustees Meeting for content, form, and legality.

Executive Director
Office of Legal Services



NOTICE OF REQUEST FOR PROPOSALS

The CERS Board of Trustees, created on April 1, 2021, is seeking proposals for a Chief Executive Officer who be responsible for all functions relating to efficient operations of the CERS Board of Trustees, develop policies and procedures, and collaborate with the KPPA Administrative staff to implement critical system administration duties. The CEO will also develop core mission statement and organize Board's strategic planning. The CEO will report directly to the CERS Board of Trustees. A detailed job description is available on the CERS Board page of the KPPA website, [CERS - Kentucky Public Pensions Authority](#).

The CERS Board anticipates that this position will be a part-time position and is seeking proposals for hourly rates for a personal service contract. Proposals should include a description of the applicant's qualifications, experience, and professional credentials, three professional references, and permission to conduct a background check prior to the Interview process. The CERS Board is looking for candidates with experience in pension, governmental, and/or investment management, plus actuarial and legislative analysis to assist the CERS Board with its public employee retirement system governance responsibilities.

Proposals, including the references and permission for the background check, should be submitted to Mr. Powell, jerry.powell@kyret.ky.gov, no later than **5pm on May 12, 2021**.



Position Description Chief Executive Officer CERS Board of Trustees

SUMMARY OF DUTIES

Responsible for all functions relating to efficient operations of the CERS Board of Trustees, develops policies and procedures; collaborates with KPPA Administrative staff; serves as legislative liaison; and develops a strategic plan for governance of CERS.

CERS BOARD MISSION

Develop core mission statement and organize Board's strategic planning. Develops collaborative team strategy with KRS and KPPA Board and staff. Develop relationships with key stakeholders. Recommend policy revisions to improve costs, efficiency, and effectiveness. Recommend communications improvements for members and stakeholders. Furnishes written reports, as requested by the CERS Board.

INVESTMENT OVERSIGHT

Coordinate with KPPA CIO and investment staff to oversee CERS Investment portfolio. Review monthly investment performance reporting and collaborate with CERS Investment consultant(s) to monitor investment strategy. Ensure that materials and advisor communications are organized for CERS Investment Committee and Board discussions of investments.

ACTUARIAL ANALYSIS

Facilitate Board's discussion of actuarial assumptions, annual valuations, studies, and presentations to PPOB. Coordinate with Actuary selected by KPPA to complete annual actuarial valuation and periodic experience studies. Monitor CERS compliance with statutory requirements for actuarial analysis and reporting. Facilitate Actuarial Analysis required for proposed legislation.

LEGISLATIVE LIAISON

Collaborate with stakeholders to develop legislative goals. Monitor legislation that impacts CERS. Develop reporting & communication to PPOB. Develop CERS Board biennial budget request for CERS approval. Coordinate with KPPA to integrate CERS Board budget with the KPPA Administrative biennial agency budget request. Respond to legislative inquiries for actuarial or financial data.

PROCUREMENT COORDINATION

Prepares, or oversees preparation of, Request for Proposals for various contractual services. Serves as the liaison with the CERS outside advisors. Represents CERS Board on task forces, committees, councils or meetings as assigned. Plans, develops, initiates and evaluates research projects. Analyze CERS cash flow reporting. Develop SAFR reporting strategy.

COMPLIANCE

Confer with General Counsel. Provide technical assistance, advice and interpretation of rules and regulations, policies/procedures to legislators, CERS Board & Committees for CERS plan management. Coordinates with KPPA Executive Director to implement administrative policies. Develops and implements policy/procedures to ensure compliance with state and federal laws, rules and regulations.

OTHER DUTIES

Performs other duties as assigned.

Position Description Chief Executive Officer CERS Board of Trustees (Continued)

QUALIFICATIONS AND EXPERIENCE:

The following list is not the minimum qualifications, but does outline the types of qualifications and experience that CERS Board will consider to evaluate candidates. Candidates should describe their specific expertise, training, or experience with any of these areas in their proposal.

- Bachelor's degree in the fields of Accounting, Public Administration, Finance, Law, or a field related to governmental management or governing board administration.
- Professional certifications in finance, accounting, pension, or investment management, such as a CPA, CMA, CFA, Accredited Fiduciary, Certified Retirement Administrator, or a related profession.
- Significant management experience with governing board organization, pension administration, financial services, legislative analysis, educational development, and/or governmental management operations.
- Understanding of the fiduciary role of Trustees and a CEO for management of a public employee retirement system.
- Knowledge of federal and Kentucky laws and regulations governing open meetings, open records, ethics, public pension systems, governmental accounting, auditing, finance, retirement benefits administration, actuarial science and institutional investing.
- Experience communicating with stakeholders, legislators, and the media in a governmental environment.



NOTICE OF REQUEST FOR PROPOSALS

The CERS Board of Trustees, created on April 1, 2021, is seeking proposals for a General Counsel who will serve as the primary legal advisor to the CERS Board of Trustees and CERS Chief Executive Officer. In addition, the CERS General Counsel may collaborate with the KPPA Legal staff to research specific issues. The General Counsel will report directly to the CERS Board of Trustees. A detailed job description is available on the CERS Board page of the KPPA website, [CERS - Kentucky Public Pensions Authority](#).

The CERS Board is seeking proposals for hourly rates for a legal services retainer contract. Proposals should include a description of the applicant's qualifications, experience, and professional credentials, three professional references, and permission to conduct a background check prior to the Interview process. The CERS Board is looking for candidates with legal experience related to pension, governmental, and/or investment management, plus actuarial and legislative analysis to assist the CERS Board with its public employee retirement system governance responsibilities.

Proposals, including the references and permission for the background check, should be submitted to Mr. Powell, jerry.powell@kyret.ky.gov, no later than **5pm on May 12, 2021**.



Position Description General Counsel CERS Board of Trustees

SUMMARY OF DUTIES

Serves as the primary legal advisor to the CERS Board of Trustees and CERS Chief Executive Officer and assists with the collaboration with the KPPA Legal staff.

LEGAL ANALYSIS

Provides legal analysis of issues relating to the CERS Board of Trustees, and provides legal and policy advice. Attends and participates in meetings where legal analysis and judgment is critical to planning and decision-making. Provides advice and consultation to other legal staff within the organization. Develops and participates in training programs. Drafts legal policy and makes recommendations. Coordinates with KPPA General Counsel on administrative issues affecting the CERS plan administration or CERS Board of Trustees.

LEGAL REPRESENTATION

Represents CERS in all phases of civil litigation and coordinates legal services with KPPA Legal as well as outside legal counsel.

CONTRACT REVIEWS

Drafts and reviews CERS Board of Trustees contracts and CERS Board of Trustees business procedures for legal sufficiency. Drafts and/or reviews major agreements between the organization and other entities, both public and private. Prepares reports for board. Responds to member inquiries. Handles more significant legal issues before CERS.

QUALIFICATIONS AND EXPERIENCE

The following list outlines the types of qualifications and experience that CERS Board will consider to evaluate candidates. Candidates should describe their specific expertise, training, or experience with any of these areas in their proposal.

- Juris Doctor from an accredited law school and license to practice law in the Commonwealth of Kentucky upon hire.
- Broad and extensive experience of five or more years in the practice of law relating to retirement systems, employee benefits, investments and financial markets, or a closely related field.
- Previous General Counsel experience, and/or law firm experience in advising public pension plans will be viewed favorably.
- Litigation experience will be viewed favorably.
- Knowledge of federal laws, Kentucky laws, tax laws, and regulations pertaining to issues that confront public pension plans (i.e. including, but not limited to, tax compliance, SEC, and/or fiduciary duties)
- Knowledge of the principles and practice of administrative law.
- General familiarity with Kentucky state government processes and procedures.
- Experience working for and with a governing Board; understanding the appropriate roles and responsibilities of the Board and the General Counsel.
- Experience working with stakeholders, elected officials, and the media in the governmental environment.

COUNTY EMPLOYEES' RETIREMENT SYSTEM
BOARD OF TRUSTEES
STATEMENT OF BYLAWS AND COMMITTEE ORGANIZATION

[As Adopted: April xx, 2021]

Section 1.1 GENERAL ADMINISTRATION.

This Statement of Bylaws and Committee Organization of the Board of Trustees of the County Employees Retirement System (CERS) is adopted pursuant to the authority of KRS 78.782(2). State and Federal law shall control any inconsistency that exists or may exist between the law and this Statement of Bylaws and Committee Organization.

a. Definitions.

1. AAC: "AAC" refers to the Joint CERS and Kentucky Retirement Systems Administrative Appeals Committee.
2. Board: "The CERS Board" refers to the CERS Board of Trustees of the County Employees Retirement System.
3. Board Year: The CERS Board Year shall be from April 1 of each calendar year through March 31 of the following year.
4. Bylaws: "Bylaws" refers to the Statement of Bylaws and Committee Organization.
5. CEO: "CEO" refers to CERS Chief Executive Officer, as outlined in KRS 78.782(9) & (10).
6. CIO: "CIO" refers to KPPA Executive Director Office of Investments.
7. DAC: "DAC" refers to the Joint CERS and Kentucky Retirement Systems Disability Appeals Committee.
8. KPPA: "KPPA" refers to the Kentucky Public Pensions Authority.
9. KRS: "KRS" refers to the Kentucky Revised Statutes.
10. Committee member: "Committee member" or "member" used in relation to a Committee refers to a member of the CERS Board of Trustees of the County Employee Retirement System serving on its Standing or ad hoc Committees.
11. Member: "Member" or "members" used in relation to individuals participating in a system (or System) administered by the Kentucky Public Pensions Authority refers to individuals who are active members (i.e., currently participating as an employee), inactive members (i.e., formerly participated as an employee, but is not currently participating as an employee, has not retired, and has not taken a refund), or retired.
12. Retirement Office: "Retirement Office" refers to the offices of the KPPA located at 1260 Louisville Road, Frankfort, Kentucky 40601.
13. Take action on: "Take action on" used in relation to the Board refers a motion being made, seconded, and voted upon by the Board in compliance with Robert's Rules of Order. [RONR (11th ed., as amended)].
14. Trustee: "Trustee" refers to a member of the Board of Trustees of the County Employees Retirement System.

b. Quorum; Parliamentary Authority.

1. CERS Board of Trustees: As required by KRS 78.782(8)(c), a majority of the trustees shall constitute a quorum and all actions taken by the CERS Board shall be by affirmative vote of a majority of the trustees present.
2. Committees of the CERS Board of Trustees: A majority of the trustees on any Committee of the Board appointed pursuant to Sections 2.1-2.5 of these Bylaws shall constitute a quorum of

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[As Adopted: [date]]

the Committee and all actions taken by the Committee shall be by affirmative vote of a majority of the Committee trustees present.

3. The most recent edition of Robert's Rules of Order shall be the parliamentary authority. [RONR (11th ed., as amended)], except that if any Committee of the Board is comprised of five (5) or more trustees, the Committee shall not constitute a quorum of the Board and the Board shall be required to action on all preliminary decision made by the Committee, unless otherwise specified by these Bylaws.

- c. Meetings. Meetings of the CERS Board and its Committees shall be conducted consistent with the Open Meetings Act, KRS 61.805 to 61.850. The Open Meetings Act shall control if any inconsistency exists between the Open Meetings Act and these Bylaws.
- d. Annual Meeting. The annual meeting of the CERS Board shall be held on the third Wednesday of April of each Board Year.
- e. Regular Meetings. Regular meetings of the Board shall be held on the third Wednesday of February and May, the second Wednesday of September and November, and on the first Wednesday of December.
- f. Special Meetings.
 - 1. Special meetings of the Board shall be held upon the call of the Chair of the CERS Board or the CERS CEO.
 - 2. Special meetings of a Standing or ad hoc Committee of the CERS Board of Trustees shall be held upon the call of the CERS Committee Chair or the CERS CEO.
 - 3. A trustee may request that the CERS CEO, Chair of the CERS Board (in the case of a special meeting of the CERS Board), or CERS Committee Chair (in the case of a special meeting of a Committee) call a special meeting by email or other written means. Upon receipt of email or other written requests to call a special meeting from a majority of the trustees, the CERS CEO, CERS Board Chair, or CERS Committee Chair shall call the requested special meeting.
- g. Notice of Meetings.
 - 1. Regular Meetings. Notice of a regular meeting of the CERS Board shall be posted at least ten (10) days (inclusive of weekends and holidays) before the meeting is scheduled. The notice of a regular meeting shall include the date, time, and location of the meeting, and the agenda for the meeting. The agenda shall be determined under the direction of and approval by the Chair of the CERS Board. Changes or revisions to the agenda may be proposed by the CERS CEO or a trustee; provided such proposal shall be delivered to the CERS Chair for approval not less than ninety-six (96) hours before the meeting is scheduled; and further provided that nothing in this sentence shall deprive a trustee from introducing new items of business during a regular meeting. Approved changes or revisions to the agenda shall be posted not less than seventy-two (72) hours before the meeting is scheduled.
 - 2. Special Meetings. When circumstances warrant a special meeting of the CERS Board or of a Committee, notice shall be posted as soon as reasonably possible, but not less than twenty-four (24) hours before the meeting is scheduled. The notice of a special meeting shall include the date, time, and location of the special meeting and the agenda for the meeting. Discussions and action at the meeting shall be limited to items listed on the agenda in the notice.
- h. Change in Meeting Dates. Any regular or special meeting of the CERS Board may be changed by following the procedure prescribed in these Bylaws for calling special meetings.
- i. Records of Proceedings. All official acts of the CERS Board shall be recorded in the minutes of the regular or special meeting at which the action was approved or adopted. The CERS CEO shall cause the minutes to be transcribed and presented for approval or amendment at the next regular or special meeting. An electronic copy (certified by the Chair of the CERS Board and CERS CEO) shall be on

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file in the Retirement Office for public inspection and posted to the KPPA website hosted for CERS. Electronic copies are maintained on the KPPA Website for Board and Committee actions. Copies that have been archived from the website are available on request.

- j. Chair and Vice-Chair of the CERS Board. The CERS Board shall elect a Chair and a Vice-Chair at each annual meeting to hold office for the ensuing CERS Board Year or until their successors are elected. The CERS Chair shall not serve more than four (4) consecutive years as Chair or Vice-Chair of the CERS Board. The CERS Vice-Chair shall not serve more than four (4) consecutive years as Chair or Vice-Chair of the CERS Board. A trustee who has served four (4) consecutive years as Chair or Vice-Chair of the CERS Board may be elected Chair or Vice-Chair of the CERS Board after an absence of two (2) years from both positions.
- k. CERS Committees. The CERS Board may create CERS Committees with such powers and duties as established by the CERS Board. The Chair of the CERS Board, unless otherwise stipulated or determined by the CERS Board, shall appoint the members of each CERS Standing or CERS Ad Hoc Committee, and such appointments shall be recorded in the minutes of the current or next-following regular or special CERS Board meeting. CERS Committee members shall serve concurrently with the appointing Chair.
- l. Conflicts of Interest.
 - 1. CERS Trustees shall file a statement of financial disclosure with the Executive Branch Ethics Commission within thirty (30) days of taking office.
 - 2. CERS Trustees shall also file a statement of financial disclosure by April 15 of each calendar year, and within thirty (30) days following departure from office as a CERS Trustee, or as otherwise provided by law.
 - 3. CERS Trustees shall also file a written conflict of interest statement as required pursuant to the County Employees Retirement System' Conflict of Interest.
- m. Confidentiality. CERS Trustees shall file a written confidentiality statement as required by the CERS Confidentiality Policy.
- n. Travel Policy Guidelines.
 - 1. All travel for official business of the County Employees Retirement System must be done in accordance with the requirements of and be consistent with KRS Chapter 45A and the County Employees Retirement System Board of Trustees Per Diem and Reimbursement Policy.
 - 2. No more than four (4) CERS Trustees may be passengers in the same common carrier. A Maximum of one (1) executive staff of the County Employees Retirement System may be passengers in the same common carrier.
 - 3. To avoid an accidental violation of Kentucky Open Meetings Laws, other than for CERS scheduled meetings, no more than four (4) CERS Trustees may attend the same off-site conference, training, etc., at the same time. The CERS CEO shall review Trustee travel requests to coordinate attendance and avoid noncompliance with Kentucky Open Meetings Laws.
- n. Election Policy Guidelines. All elections for elected trustees of the CERS Board must be conducted in accordance with the provisions of KRS 78.782(4), 105 KAR 1:445 and the County Employees Retirement System Board of Trustees Election Policy and Procedures adopted by the CERS Board.
- o. Violations of Board Policies and Guidelines. If a complaint is made that a CERS Trustee violated these Bylaws or any policy approved by the CERS Board, the CERS Board shall follow the procedure found in the CERS Conflict of Interest or the CERS Confidentiality Policy in investigating the complaint.

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Section 1.2 CERS BOARD RESPONSIBILITIES.

- a. The CERS Board shall make and maintain Bylaws.
- b. The CERS Board shall appoint a CEO and fix the CERS CEO's compensation.
- c. The CERS Board shall appoint a General Counsel and fix the CERS General Counsel's compensation.
- d. The CERS Board shall adopt a Personnel Management policy to outline the job descriptions, qualifications, education, and skills for both the CEO and the General Counsel. This policy should also describe recruitment strategies, performance evaluations, and succession planning for these two positions.
- e. The CERS Board may act on contracts for rental of office space, and professional services, including, but not limited to, the auditor, legal counsel, in accordance with the requirements of the Commonwealth of Kentucky Model Procurement Act (KRS Chapter 45A).
- f. The CERS Board shall consider and take action on changes to administrative regulations proposed by the staff of the CERS and KPPA.
- g. The CERS Board shall take action on the audited financial statements.
- h. The CERS Board shall consider and take action on the recommendations of all of its Committees, except that:
 - 1. AAC and DAC shall have the authority to act upon the recommendations and reports of the hearing officer on behalf of the CERS Board in accordance with KRS Chapter 13B, and
 - 2. Pursuant to KRS 78.790(1)(b)(2), The CERS Board's Investment Committee shall have the authority to act on behalf of the CERS Board on all investment-related matters, though the CERS Board shall be kept informed of all such matters and shall be responsible for providing oversight on all investment-related matters in compliance with the fiduciary responsibilities of the CERS Board, state and federal law, and the CERS Board's Bylaws and Policies. All investment policies shall be adopted by the CERS Board and the CERS Investment Committee shall implement those policies.
- i. The CERS Board shall work with an actuary, who shall be a Fellow of the Conference of Consulting Actuaries or a member of the American Academy of Actuaries. KPPA will select and contract with the actuary pursuant to KRS 78.782(2) which allows the Board to carry out its obligations in accordance with KRS 78.784. The Board shall consider and take action on the recommendations of its actuary, including, but not limited to, determining the recommended contribution rates for employers in accordance with KRS 78.510 to 78.852.
- j. The CERS Board shall adopt contribution rates toward medical insurance premiums.
- k. The CERS Board shall provide oversight concerning programs and services for County Employees Retirement System members, beneficiaries, recipients, and participating employers.
- l. Legislative Issues. The Board will review and recommend statutory changes to the General Assembly related to the administration of benefits and compliance with federal law and determine which changes are in the best interests of the CERS plans. The Board will also review legislation proposed by the General Assembly that is likely to have significant impact on the funded status, existing member benefits, or system administration for any of the CERS plans.
- m. The CERS Board shall select candidates for each trustee ballot as provided in KRS 78.782(4), and 105 KAR 1:445.
- n. The CERS Board shall establish a formal trustee education program for all trustees of the CERS Board, pursuant to the requirements of KRS 78.782(17) and 105 KAR 1:440, and ensure that CEO organizes process for this trustee education to occur.
- o. The CERS Board shall collaborate with KPPA on Business Continuity and Disaster Recovery to ensure that CERS records and operations are adequately protected and that critical business operations will

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continue efficiently. The CERS Board may rely on policies and procedures developed by KPPA to address Business Continuity and Disaster Recovery issues. The CERS Board Chair shall act as temporary CERS CEO in the event the CERS CEO is not available to perform duties outlined in these Bylaws.

- p. The CERS Board, and individual trustees, should ordinarily refer all news media inquiries to the CERS CEO and/or the CERS Board Chair, and should not speak on behalf of the CERS Board or County Employees Retirement System with the news media. However, nothing in this subsection is intended to prevent individual trustees from speaking to the media concerning their actions, opinions, and decisions as individual Trustees, The Board designates the Executive Director of the KPPA, or his designee as the custodian of records for the CERS.

Section 1.3 CHIEF EXECUTIVE OFFICER RESPONSIBILITIES.

- a. The CERS CEO shall ensure that all Board and/or Committee meeting materials are distributed to Trustees at least one week in advance of the meeting to allow Trustees ample time to review documents. The CERS CEO will collaborate with the KPPA Executive Director to identify materials that will be relevant to Board or Committee discussions and assist with compilation of those materials for distribution.
- b. The CERS CEO shall develop a biennial budget and necessary budget amendments for approval by CERS Board. The CERS CEO will coordinate approved budget requests with the KPPA Executive Director to ensure that CERS budget requests are integrated with the KPPA budget request for submission to the Governor’s office. The CERS CEO (or designee) shall present a budget-to-actual expenditure analysis to the CERS Board at each regular quarterly meeting of the CERS Board.
- c. The CERS CEO shall be responsible for working with the KPPA Executive Director to ensuring compliance with meeting notice and open records legal and regulatory requirements. The CERS CEO shall also be responsible (in collaboration with KPPA staff) for compiling all relevant materials for consideration by the CERS Board or its Committees and strive to distribute materials to Trustees at least one week prior to the Board or Committee meeting. All materials must be distributed to Trustees in a timely fashion to ensure adequate time for Trustees to review and analyze information prior to the Board or Committee meeting.
- d. The CERS CEO shall coordinate with KPPA staff to ensure that information and record management is comprehensive and efficient, and shall ensure that a disaster recovery plan, continuity of operations plan, and policies to ensure cyber security are developed and maintained.
- e. The CERS CEO shall be responsible for implementing a formal trustee education program for all trustees of the CERS Board, pursuant to the requirements of KRS 78.782(17).
- f. The CERS CEO shall develop recommendations for improvements and revisions of CERS Board policies and submit such revisions for CERS Board approval. CERS CEO shall ensure that approved policies are implemented in conformance with statutes, regulations, and CERS Board policies.
- g. The CERS CEO shall collaborate with CERS General Counsel and KPPA Legal staff to monitor litigation affecting CERS plans. CERS CEO and CERS General Counsel shall report significant developments to the CERS Board.
- h. The CERS CEO shall be responsible for oversight of CERS investment management to ensure that CERS investments are made in a manner consistent with policies promulgated by the CERS Investment Committee and approved by the CERS Board. In carrying out such responsibilities, the CERS CEO will monitor CERS investment policy compliance, investment performance, and ensure timely reporting to the CERS Board of oversight and monitoring concerns and actions.

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- i. The CERS CEO will ensure that the KPPA Legislation Status Chart is provided to CERS Trustees and will schedule meetings based on an assessment of the impact of proposed legislation. The CERS CEO and CERS General Counsel may also prepare draft changes to Kentucky Revised Statutes based on CERS Board or an ad-hoc CERS Legislative Committee recommendations, as well as housekeeping revisions to address technical issues and present them to Committee members prior to the date of a meeting. CERS CEO and General Counsel will research the impact of proposed changes and report the results to the Committee. CERS CEO and General Counsel will also make preliminary contacts with legislators, employers and interest groups to assist in formulating legislation to accommodate all interested parties. CERS CEO, General Counsel, and CERS Board Chair will work with the General Assembly, Legislative Research Commission, the Governor's Office, KPPA, and interest groups to advocate for passage of the Board's legislative proposals, or advocate for other interests supported by the Board.
- j. The CERS CEO shall act as legislative liaison, and represent the CERS Board at legislative hearings and other legislative meetings. CERS CEO and General Counsel will review proposed legislation that is likely to impact CERS plan or administrative management and advise the CERS Board about pending legislation.
- k. The CERS CEO shall provide technical assistance to the members of the General Assembly, Governor's office, and state and local government officials, as well as members, recipients, and beneficiaries of the County Employees Retirement System.
- l. The CERS CEO shall recommend legislative or regulatory changes and propose draft language. These recommendations shall be presented to the CERS Board for review and approval.
- o. The CERS CEO shall implement any statutory or regulatory changes and take appropriate action to conform to federal law. CERS CEO shall also collaborate with KPPA Executive Director to monitor implementation of any changes designated as KPPA's responsibilities.
- m. The CERS CEO shall sign all documents necessary to promulgate or amend an administrative regulation on behalf of the CERS Board as the head of the County Employees Retirement System in accordance with KRS 13A.220.
- n. The CERS CEO shall communicate with the mass media and other agencies, entities or institutions, and CERS stakeholders, including responding to correspondence or inquiries addressed to the CERS Board.
- o. The CERS CEO shall develop written procedures for completing the responsibilities outlined in these Bylaws. The CERS CEO shall collaborate with the KPPA administrative staff to coordinate key operational provisions specific to CERS, including but not limited to access codes for CERS Board files, equipment, and software maintained by the CERS CEO, key Trustee and vendor contact information, or other organizational information in the event that the CERS CEO is not available to perform the duties outlined in these Bylaws.
- p. The CERS CEO shall collaborate with the KPPA Executive Director on issues related to benefits administration and to coordinate reciprocal benefits with the other state administered retirement systems in Kentucky.
- q. In the case of emergency conditions that threaten the functioning of the County Employees Retirement System, the preservation or protection County Employees Retirement System' property or assets, vital data, or the health and safety of any person, and where a quorum of the CERS Board is unavailable, the CERS CEO may take actions necessary to prevent or mitigate the threat, even if a vote of the CERS Board would otherwise be necessary to take such action. When a quorum of the CERS Board becomes available, any such actions taken by the CERS CEO shall be reviewed and ratified as necessary.

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Section 2.1 STANDING COMMITTEES.

The CERS Board shall have the Standing Committees specified in Section 2.2, each of them to have the duties and responsibilities as therein set forth, together with such other duties and responsibilities as the CERS Board may by resolution determine. In each CERS Board Year, the Chair, elected at the annual meeting, shall appoint trustees to Committees as specified in Section 2.2, unless otherwise determined by the CERS Board. Each CERS Committee shall have a Chair and the CERS Board Chair shall appoint the Chair of each Committee, unless otherwise determined by the CERS Board. A CERS Committee may (but is not required to) elect a Vice-Chair from among its CERS Committee members by a majority vote of the Committee. A Vice-Chair so elected shall preside at meetings of the CERS Committee in the absence or inability to act of the Committee Chair. Any trustee may attend any meeting of any Committee of which he or she is not a Committee member, but shall not have a vote.

Section 2.2 STANDING COMMITTEES; DUTIES AND RESPONSIBILITIES.

The Standing Committees of the CERS Board are, and shall have respective duties and responsibilities, as follows:

- a. Actuarial Committee. The CERS Actuarial Committee shall include (i) one (1) trustee with retirement administration experience appointed by the Governor pursuant to KRS 78.782(2)(b)(1-3); (ii) one (1) trustee elected by members of the County Employees Retirement System; and (iii) one (1) trustee with investment experience appointed by the Governor pursuant to KRS 78.782(2)(b)(4-6).
 - 1. Committee Responsibilities.
 - A. The Committee will meet semi-annually, with authority to convene additional meetings, as circumstances require. The regular meetings shall be held on the second Wednesday of March and the first Monday of November. Additional meetings may be convened in conjunction with experience studies or significant changes to federal or state statutory guidance for CERS.
 - B. The CERS Actuarial Committee will review and evaluate actuarial assumptions, funding methods and tables proposed by the actuary (including without limitation all economic, mortality, disability, etc., assumptions) for each plan within County Employees Retirement System that affect: (i) the annual determination of the actuarial valuation of assets and liabilities of the System within the meaning of KRS 78.784; (ii) the factors that apply to amounts payable to members (e.g., early commencement, commutation, repayment, etc.); and (iii) the actuarially recommended contribution rate for employers required under KRS 78, except as otherwise determined by law or regulation,
 - C. The CERS Actuarial Committee will report its findings and recommendations of each such review or evaluation to the CERS Board for the CERS Board to determine appropriate implementation and action.
- b. Administrative Appeals Committee. The CERS Board shall collaborate with the Kentucky Retirement System Board to develop a timely disability and administrative appeals process. The CERS Board and the KRS Board will coordinate the Administrative Appeals process with one AAC for each Board. These AAC's may be combined with the DACs (Section 2.2(d), in compliance KRS 61.645(16) and KRS 78.782(16). Consistent with the provisions of KRS Chapter 13B, the AACs shall meet in alternate months, as needed, to act in matters of administrative appeals. Each Committee shall consist of three (3) members; however, the members appointed to one committee may also serve from time to time on the other Committee. One of the AAC shall consist of two (2) CERS Trustees and one (1) Kentucky Retirement Systems trustee. The other AAC shall consist of one (1) CERS Trustee and two (2) Kentucky Retirement Systems trustees. The AACs shall ensure that the laws

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governing CERS are administered impartially and uniformly, and that the actions of the CERS resulting in the appeal were correct and fair under the applicable statutes and regulations.

1. AAC Responsibilities: In matters of administrative appeals; the Committee members shall consider the administrative record, including the recommended order and any exceptions filed in compliance with KRS 13B.120. The AAC shall act on behalf of the entire CERS Board as the agency head in making a final order of the CERS Board in accordance with KRS 13B.120. The Committee may adopt the hearing officer's recommended order; or it may reject or modify, in whole or in part, the recommended order; or it may remand the matter, in whole or in part, to the hearing officer for further proceedings as appropriate; or it may act on cases properly remanded by a court of competent jurisdiction. The Committee may also recommend legislative changes to improve the administration of the benefits. Any recommended legislative changes shall be referred to the CERS CEO for study and development for the CERS review and approval.
2. KPPA Executive Director Office of Benefits Responsibilities. The Executive Director, KPPA Office of Benefits or designated staff, in coordination with KPPA Legal Staff, will coordinate meeting dates and determine which cases will be reviewed by each AAC. Designated staff will compile the administrative records and distribute the files to the Committee members prior to each meeting. KPPA Legal Staff may provide legal or technical advice to the Committee,
- c. Finance Committee. The Committee shall consist of not less than three (3) and not more than four (4) members and will act on behalf of the CERS Board in fulfilling its oversight responsibilities for the financial reporting process, the system of internal control, the internal and external audit processes, and the process for monitoring compliance with laws, regulations, and the applicable codes of conduct.
 1. Committee Responsibilities.
 - A. The Finance Committee will meet quarterly, with authority to convene additional meetings, as circumstances require. The regular quarterly meetings shall be held on the first Wednesday of February, May, September, and November.
 - B. The Finance Committee shall have the authority to review reports by the KPPA Internal Audit Administration and to recommend appropriate policies and procedures to KPPA.
 - C. The Finance Committee shall review the job descriptions for the employees whose names have been certified by the applicable authority to meet the criteria of KRS 61.592 and 105 KAR 1:130 for hazardous duty, and also those employees who have been so certified who are not, or who no longer are, working in a hazardous duty position. Upon review and approval, the Finance Committee shall forward the results and its recommendations for the appropriate classification as hazardous or nonhazardous duty to the CERS Board for approval and ratification.
 2. The Finance Committee shall review interim financial reports and budget-to-actual comparisons for administrative budgets. Financial reports shall include, but are not limited to, statement of net position, statement of changes in net financial position, cash flow reports, accounts receivable, and collection activity reports for each plan (pension and insurance, nonhazardous and hazardous).
 3. The Finance Committee may request internal audits to analyze specific issues relevant to CERS plan management, investment performance, or administration.
 4. Audit Charters. The KPPA Division of Internal Audit Charter are hereby incorporated by reference.
 5. Budget. The Finance Committee shall review the County Employees Retirement System's biennial administrative budget and necessary budget amendments.

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- d. Disability Appeals Committee. The CERS Board shall collaborate with the Kentucky Retirement System Board to develop a timely disability and administrative appeals process. The CERS Board and the KRS Board will coordinate the Disability Appeals process with one DAC for each Board. These DAC's may be combined with the AACs (Section 2.2(b), in compliance KRS 61.645(16) and KRS 78.782(16). Consistent with the provisions of KRS Chapter 13B, the DACs shall meet in alternate months, as needed, to act in matters of administrative appeals. Each Committee shall consist of three (3) members; however, the members appointed to one committee may also serve from time to time on the other Committee. One of the DAC shall consist of two (2) CERS Trustees and one (1) Kentucky Retirement Systems trustee. The other DAC shall consist of one (1) CERS Trustee and two (2) Kentucky Retirement Systems trustees. The DACs shall ensure that the laws governing CERS are administered impartially and uniformly, and that the actions of the CERS resulting in the appeal were correct and fair under the applicable statutes and regulations.
 - 1. Committee Responsibilities. In matters of disability appeals, the Committee members shall consider the administrative record, including the recommended order and any exceptions filed in compliance with KRS 13B.120. The Committee shall act on behalf of the entire CERS Board as the agency head in making a final order of the CERS Board in accordance with KRS 13B.120. The Committee may adopt the hearing officer's recommended order; or it may reject or modify, in whole or in part, the recommended order; or it may remand the matter, in whole or in part, to the hearing officer for further proceedings as appropriate; or it may act on cases properly remanded by a court of competent jurisdiction. The Committee may also recommend legislative changes to improve the administration of the benefits. Any recommended legislative changes shall be referred to the CERS CEO for study and development for the CERS Board review and approval.
 - 2. KPPA Executive Director Office of Benefits Responsibilities. The Executive Director, KPPA Office of Benefits, or designated staff, in coordination with KPPA Office of Legal Services staff, will coordinate meeting dates and determine which cases will be reviewed. Designated staff will compile the administrative records and distribute the files to the Committee members prior to each meeting. Staff may provide legal or technical advice to the Committee.
- e. Investment Committee. The Committee shall consist of five (5) members, as follows: the three (3) trustees appointed by the Governor pursuant to KRS 78.782(2)(b)(4-6) (investment experience), and one (1) trustees appointed by the CERS Board Chair, and one (1) Trustee elected by the membership (KRS 78.782(4) or one (1) Trustee appointed by the Governor pursuant to KRS 78.782(2)(b)(1-3) (retirement administration).
 - 1. Committee Responsibilities.
 - A. Pursuant to KRS 78.790, the CERS Investment Committee shall have authority to implement the investment policies adopted by the Board, including without limitation the CERS Board's Statement of Investment Policy (pensions and health), and to act on behalf of the CERS Board on all investment-related matters, and to acquire, sell, safeguard, monitor, and manage the assets and securities of the several funds.
 - B. The CERS Investment Committee will meet at least quarterly to review reports from investment staff, investment consultants, and investment managers with authority to convene additional meetings as circumstances require. The regular quarterly meetings shall be held on the second Wednesday of February and May, the fourth Wednesday of August, and the second Monday of November.
 - C. The CERS Investment Committee will monitor investment performance and management practices and make reports and recommendations to the CERS Board. The CERS Investment Committee will approve the selection and termination of service providers. The

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CERS Investment Committee will evaluate whether the Investment Policy, the investment activities, and management controls and processes continue to be consistent with meeting the County Employees Retirement System's financial and plan management goals, and perform other duties specified in the Statement of investment Policy.

- D. The Investment Committee may also recommend legislative changes to the CERS CEO and CERS Board to improve the administration of investment related matters.
- 2. Collaboration with KPPA Executive Director, Office of Investments (CIO).
 - A. The CIO shall administer the assets of the County Employees Retirement System consistent with the policies, guidelines, and limits established by the law, the CERS Investment Committee and the CERS Statement of Investment Policy.
 - B. The CERS CEO will collaborate with the KPPA CIO to develop and monitor investment management and investment performance reporting for the CERS Investment Committee and CERS Board.
 - C. The KPPA CIO and CERS CEO shall provide members of the CERS Investment Committee with assessments of service providers and performance reports.
 - D. The KPPA CIO and CERS CEO shall identify issues for consideration by the CERS Investment Committee and prepare recommendations regarding those issues.
 - E. The CIO and CERS CEO shall recommend changes to the Investment Committee regarding service providers, statutes, policies or guidelines, as needed, to maintain a productive relationship between the investment program and its goals.
 - F. The CIO and/or CERS CEO shall communicate with the mass media and other agencies, entities, or institutions regarding investment related issues.
- 3. CERS Investment Policy. The "CERS Investment Policy Statement: Pension Funds," the "CERS Investment Policy Statement: Insurance," and the "CERS Investment Procurement Policy" are hereby incorporated by reference.

f. Joint Kentucky Retirement Systems and CERS Retiree Health Plan Committee. The Committee shall consist of four (4) Trustees, including two (2) Trustees appointed from the CERS Board by the CERS Chair and two (2) Trustees appointed from the Kentucky Retirement Systems Board by the Kentucky Retirement Systems' Chair. The Committee shall elect a Chair and Vice Chair and shall assist the CERS and KRS Boards in providing a group hospital and medical insurance plan for present and future recipients of a retirement allowance from the systems administered by County Employees Retirement Systems as required by KRS 61.702.

1. Committee Responsibilities.

- A. The Committee will meet quarterly to review reports from KPPA staff and retiree health insurance consultants with authority to convene additional meetings, as circumstances require. The regular quarterly meetings shall be held on the second Tuesday of February and May, the first Thursday of September, and the second Tuesday of November.
- B. The Committee will monitor retiree health insurance matters and make reports and recommendations to the CERS and KRS Boards. The Committee will evaluate retiree health insurance issues and obligations set forth in state and federal law. The Committee may, as deemed necessary, evaluate health insurance companies, health maintenance organizations, self-insurance proposals, and other ways of providing a group hospital and medical insurance plan for retired members as provided in KRS 61.702.
- C. The Committee may negotiate and recommend appropriate contracts for execution by the CERS & KRS Boards, in accordance with the requirements of the Commonwealth of Kentucky Model Procurement Act (KRS 45A). The Committee may solicit reports and actuarial analyses in order to analyze issues regarding retiree health insurance. The

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Committee may also recommend legislative changes to improve the administration of retiree health insurance related matters. Any recommended legislative changes shall be referred to the CEO for study and development.

2. **KPPA Executive Director Responsibilities.** The KPPA Executive Director and designated staff will maintain and provide the Committee with necessary information to execute its responsibilities. The KPPA Executive Director or designated staff will provide advice regarding state and federal laws and regulations. KPPA Administrative Staff will identify issues for consideration by the Committee and prepare recommendations regarding those issues.

g. **Joint Kentucky Retirement Systems and CERS Audit Committee.** The Committee shall consist of four (4) Trustees, including two (2) Trustees appointed from the CERS Board by the CERS Chair and two (2) Trustees appointed from the Kentucky Retirement Systems Board by the Kentucky Retirement Systems' Chair. The Committee shall elect a Chair and Vice Chair. The Committee will act on behalf of the Board in fulfilling its oversight responsibilities for the system of internal control, the internal and external audit processes, and the process for monitoring compliance with laws, regulations and the code of conduct.

1. **Committee Responsibilities.** The Committee will meet quarterly, with authority to convene additional meetings, as circumstance require. The regular quarterly meetings shall be held on the first Thursday of February and May, the fourth Thursday of August, and the first Thursday of November.

A. The Committee shall have the authority to review reports by the Internal Auditor and to recommend appropriate policies and procedures. Additional responsibilities are enumerated in the Audit Committee Charter.

B. The Committee shall have the authority to receive communications and audit reports from the KPPA external auditor and recommend actions to the KRS & CERS Boards and KPPA for improving internal controls, financial reporting, and management.

2. **Internal Auditor Responsibilities.** The KPPA Internal Auditor will be responsible for the planning, implementation, and reporting of audits and internal audit plans. The Internal Auditor will also be responsible for the functional control and audit activities in the relation to the objectives of the KPPA Division of Internal Audit. Additional responsibilities are enumerated in the KPPA Division of Internal Audit Charter.

3. **Audit Charters.** The Audit Committee Charter and the KPPA Division of Internal Audit Charter are hereby incorporated by reference.

h. In addition to the duties and responsibilities described in this Section 2.2, each Standing Committee may develop appropriate additional policies and proposals to be ratified by the CERS Board.

Section 2.3 DELEGATIONS OF AUTHORITY BY THE CERS BOARD.

Delegation of Authority. Except as may be prohibited by or inconsistent with law, the CERS Board may delegate to any CERS Standing Committee of the Board any power, authority, duty, or responsibility conferred on the Board by law. In the case of any such delegation, the decision or action of the CERS Committee within the scope of its delegated authority shall constitute the decision or action of the CERS Board. The CERS Board may at any time rescind the delegated authority as a whole or in part, except that a rescission of authority with respect to quasi-judicial matters delegated to a CERS Committee shall not operate to affect the proceedings or the final action of any such matter pending before the Committee when the CERS Board acts to rescind. This exception is designed to preclude the CERS Board from using its authority to rescind a delegation to interfere with the process or outcome of a quasi-judicial proceeding then in progress before a CERS Committee which had properly commenced the proceeding within the scope of its authority.

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Section 2.4 AD HOC COMMITTEES.

In addition to the CERS Standing Committees specified in Section 2.2, the Chair or the CERS Board may at any time establish an ad hoc Committee of the CERS Board and fix its duties and responsibilities for any purpose which, in the judgment of the CERS Chair or the CERS Board, is better served by a temporary rather than CERS Standing Committee. Each such Committee shall consist of such number of members as the CERS Chair shall determine, and the CERS Chair shall also then appoint the CERS Chair and designate the other members of the CERS Committee, unless otherwise determined by the CERS Board.

Section 2.5 LIMITATIONS ON AUTHORITY.

No CERS Committee shall have any power or authority, nor shall the CERS Board delegate to itself, power or authority, as to any of the following:

- a. The amendment or repeal of any CERS Board resolution.
- b. Action on other matters committed by CERS Board resolution or by Kentucky law (including the common law of trusts respecting the delegation or the non-delegation of fiduciary responsibilities) to the CERS Board under terms or provisions that make such action non-delegable.

Section 2.6 AMENDMENT OF BYLAWS.

These Bylaws may be amended by presenting the proposed amendments at any regular or special meeting of the CERS Board of Trustees. Proposed amendments shall also be presented at a subsequent regular or special meeting of the CERS Board of Trustees. The subsequent meeting shall be scheduled no less than 48 hours after the meeting to first present the proposed amendments. Proposed amendments shall be posted on the KPPA website between the first and second presentation of the recommendations. Approval of proposed amendments to Bylaws requires a vote of a majority of the entire membership of the CERS Board for approval.

Section 3.0 CERTIFICATION OF STATEMENT OF BYLAWS AND COMMITTEE ORGANIZATION.

We, the Chair of the CERS Board of Trustees and the Chief Executive Officer of the County Employees Retirement System, do certify that this Statement of Bylaws and Committee Organization was approved and adopted by the CERS Board of Trustees on the _ day, of April, 2021.

_____ Date _____
Chair, Board of Trustees
_____ Date _____
CERS Chief Executive Officer



Kentucky Retirement Systems
Audit Committee of the Board of Trustees

Charter

Effective Date: September 12, 2019

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AUDIT COMMITTEE OF THE BOARD OF TRUSTEES

1. The Charter

This Charter establishes the authority and responsibility of the Audit Committee of the Board of Trustees (Board) of Kentucky Retirement Systems (KRS).

2. Purpose

The purpose of the Audit Committee is to assist the Board in fulfilling its oversight responsibilities for the:

- Financial reporting process,
- System of internal control,
- Internal and external audit processes, and
- Process for monitoring compliance with laws and regulations and the code of conduct.

As defined by the Institute of Internal Auditors, internal auditing is *an independent, objective assurance and consulting activity designed to add value and improve an organization's operations. The goal of internal auditing is to help the organization accomplish its objectives by bringing a systematic, disciplined approach to evaluating and improving the effectiveness of risk management, control, and governance processes.*

Consistent with this definition, internal auditing for Kentucky Retirement Systems can be defined as the *independent appraisal of the various operations and systems of control within Kentucky Retirement Systems to determine whether acceptable policies and procedures are followed, legislative requirements and established standards are met, resources are used efficiently and economically, planned missions are accomplished effectively, and the objectives of Kentucky Retirement Systems are being achieved.*

3. Authority

The Audit Committee has authority to conduct or authorize investigations into any matters within its scope of responsibility. The Audit Committee is empowered to:

- Appoint, compensate, and oversee the work of any registered Certified Public Accounting (CPA) firm employed by KRS;
- Resolve any disagreements between management and the internal or external auditor regarding financial reporting;
- Pre-approve the scope of all financial audit and non-financial audit services;
- Retain independent counsel, accountants, or others to advise the Audit Committee or assist in the conduct of an investigation;
- Seek and obtain any necessary information from person(s) employed by KRS (all of whom are directed to cooperate with the Audit Committee's requests) or external parties; and
- Meet with officers, internal and/or external auditor, or outside counsel as necessary.

4. Composition

The Chair of the Board shall name the chair of the Audit Committee and appointment of Audit Committee members. Audit Committee members shall serve concurrently with the appointing Chair of the Board.

The Audit Committee will consist of at least three (3) and no more than seven (7) Board members. A quorum to conduct business is satisfied if a majority of the Audit Committee members are present.

Each Committee member will be independent.¹ For the purposes of the Audit Committee, independent shall mean those individuals who do not report directly to KRS' management and those persons who are not directly responsible for the day-to-day operations of KRS.

At least one member of the Audit Committee will be designated as the "financial expert."² A financial expert is an individual who possesses, among other attributes:

- An understanding of generally accepted accounting principles (GAAP) - in this case, the accounting standards issued by the Governmental Accounting Standards Board (GASB) or the Federal Accounting Standards Advisory Board (FASAB) and financial statements.
- The ability to assess the general application of such principles in connection with the accounting for estimates, accruals, and reserves.
- Experience preparing, auditing, analyzing, or evaluating financial statements that present a breadth, depth, and level of complexity of accounting issues that can reasonably be expected to be raised by the government entity's financial statements or experience actively supervising one or more persons engaged in such activities.
- An understanding of internal control and the procedures for financial reporting.
- An understanding of audit committee functions.

As needed, the KRS Bylaws indicate the Audit Committee Chair may select members of the Audit Committee to form a Hazardous Duty Subcommittee to review participating employer requests for Hazardous Duty employment position classification requests that are submitted to KRS.

5. Meetings

Audit Committee meetings must comply with Kentucky's Open Meetings Act contained in Kentucky Revised Statute Chapter 61. The Audit Committee will meet at least four (4) times a year, with authority to convene additional meetings, as circumstances require. All Audit Committee members and the Internal Audit Director are expected to attend each meeting. The Audit Committee will invite members of management, auditors, or others to attend meetings and provide pertinent information, as deemed necessary. The Audit Committee will conduct

¹ Black's Law Dictionary, Sixth Ed. (1991) (p.520) defines "independent" as "not subject to control, restriction, modification, or limitation from a given outside source."

² See Sarbanes-Oxley Act of 2002 § 407.

closed session meetings with auditors and Executive Management when legally authorized under Kentucky's Open Meetings Act. Meeting agendas will be provided to Audit Committee members, along with appropriate briefing materials. Minutes will also be prepared and approved by the Audit Committee.

6. Responsibilities

The Audit Committee is responsible for the following activities:

Financial Statements

1. Review significant accounting and reporting issues, including accounting policies, practices, judgments, estimates, significant transactions, adjustments, unusual items, complex issues, and business arrangements.
2. Review recent professional and regulatory pronouncements and understand their impact on the financial statements.
3. Review with management and internal and external auditors the results of audits, including any difficulties encountered.
4. Review the annual financial statements and consider whether they are complete, consistent with information known to Audit Committee members, and reflect appropriate accounting principles.
5. Review other sections of the annual report and related regulatory filings before release and consider the accuracy and completeness of the information.
6. Review with management and the external auditor all matters required to be communicated to the Audit Committee under generally accepted auditing standards.
7. Understand how management develops interim financial information and the nature and extent of internal and external auditor involvement in that information.
8. Review interim financial reports with management and the external auditors before filing with regulators and consider whether they are complete and consistent with the information known to Audit Committee members.

Internal Control

1. Evaluate the effectiveness of the internal control system, including information technology security and control.
2. Understand the scope of internal and external auditors' review of internal control over financial reporting and obtain reports on significant findings and recommendations, together with management's responses.

Internal Audit

1. Review with management and the Internal Audit Director the Charter, plans, activities, budget, staffing, and organizational structure of the internal audit function. Annually, review and approve the Internal Audit Charter, Audit Plan, and Internal Audit Budget.
2. Ensure there are no unjustified restrictions or limitations placed on the Division of Internal Audit Administration by KRS management in relation to the completion of audit projects.

3. Review and approve the appointment, dismissal, and replacement of the Internal Audit Director. Review and approve the salary for the Internal Audit Director with the understanding that final salary approval is at the discretion of the Governor.
4. Evaluate the effectiveness of the internal audit function, including compliance with the Institute of Internal Auditors' International Standards for the Professional Practice of Internal Auditing.
5. On a regular basis meet with the Internal Audit Director, including closed session discussions, pursuant to Kentucky's Open Meeting Act in KRS Chapter 61.

External Audit

1. Evaluate the external auditors' proposed audit scope and approach, including coordination of audit effort with internal audit.
2. Evaluate the performance of the external auditors and exercise final approval on the appointment or discharge of the auditors.
3. Evaluate and confirm the independence of the external auditors by obtaining statements from the auditors on relationships between the auditors and KRS, including non-audit services. Discuss the relationships with the auditors.
4. Annually, meet separately with the external auditors to discuss any matters that the Audit Committee or auditors believe should be discussed privately.

Compliance

1. Evaluate the effectiveness of the system for monitoring compliance with laws and regulations and the results of management's investigation and follow-up (including disciplinary action) of any instances of noncompliance.
2. Review the findings of any examinations by regulatory agencies and any auditor observations.
3. Evaluate the process for communicating the code of conduct to personnel and for monitoring noncompliance.
4. Obtain regular updates from management and legal counsel regarding compliance matters.

Reporting

1. Regularly report Audit Committee activities, issues, and related recommendations to the Board.
2. Facilitate open channels of communication between internal auditor, external auditors, and the Board.
3. Review any other reports issued by KRS that relate to Audit Committee responsibilities.

Board of Trustee Elections

1. Review and approve election policies.
2. Review and approve changes to candidate applications.
3. Review and approve election memorandums prepared by Division of Internal Audit Administration staff.
4. Present results of elections to the Board.

Other

1. Perform other activities related to this Charter as requested by the Board.
2. Institute and oversee special investigations, as needed.
3. Review and assess the adequacy of the Audit Committee Charter annually. Request Board approval for proposed changes and ensure appropriate disclosure as may be required by law or regulation.
4. Confirm annually that all responsibilities outlined in this Charter have been completed.
5. Evaluate the Audit Committee's and individual members' performance on a regular basis.

7. Responsibilities of Other Parties

- The independent auditor is responsible for planning and conducting audits.
- Management personnel within KRS are responsible for preparing and fairly presenting the KRS financial statements in accordance with GAAP, maintaining effective internal control over financial reporting, and ensuring KRS complies with applicable laws, regulations, and other requirements.

8. Approvals

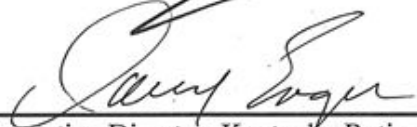
We, the undersigned of the Kentucky Retirement Systems, do certify that this Charter was approved by the Board of Trustees on September 12, 2019.

 9/12/19

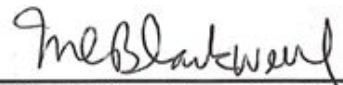
Chair, Audit Committee



Chair, Board of Trustees



Executive Director, Kentucky Retirement Systems



Reviewed by Office of Legal Services



Kentucky Retirement Systems
Division of Internal Audit Administration

Charter

Effective Date: September 12, 2019

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DIVISION OF INTERNAL AUDIT ADMINISTRATION

1. The Charter

This Charter establishes the authority and responsibility of the Division of Internal Audit Administration as conferred by the Audit Committee of the Board of Trustees (Board) of the Kentucky Retirement Systems (KRS).

2. Mission of Internal Audit

To enhance and protect organizational value by providing risk-based and objective assurance, advice, and insight.

3. Purpose of Internal Audit

As defined by the Institute of Internal Auditors, internal auditing is *an independent, objective assurance and consulting activity designed to add value and improve an organization's operations. The goal of internal auditing is to help the organization accomplish its objectives by bringing a systematic, disciplined approach to evaluating and improving the effectiveness of risk management, control, and governance processes.* The Division of Internal Audit Administration helps KRS accomplish its objectives by bringing a systematic, disciplined approach to evaluating and improving the effectiveness of risk management, control, and governance processes.

4. Core Principles of Internal Audit

- Remain objective and free from undue influence (independent).
- Demonstrate competence and due professional care.
- Demonstrate integrity.
- Support the strategies, objectives, and risks of the organization.
- Report directly to the Audit Committee and remain adequately resourced.
- Promote quality and continuous organizational improvement by communicating effectively; providing risk-based assurance; and remaining insightful, proactive, and future-focused.

5. Role and Objective of Internal Audit

The internal audit function is established to assist the KRS Executive Director, management, and Board to attest to its governance role and achieve sound managerial control over all operational aspects of KRS including, but not limited to, accounting, benefits, legal compliance, asset management, and information management and control systems.

The primary objective of the Division of Internal Audit Administration is to assist all levels of management in achieving the effective discharge of assigned responsibilities by providing independent analysis, appraisals, advice, and recommendations concerning the activities reviewed. Accomplishment of this objective may involve:

- Evaluating the adequacy and effectiveness of the system of internal control.
- Evaluating the relevance, reliability, and integrity of management, financial and operating data and reports.
- Evaluating the systems established to ensure compliance with those policies, plans, procedures, statutory requirements, and regulations which could have a significant impact on operations.
- Evaluating the means of safeguarding assets and, as appropriate, verifying the existence of such assets.
- Evaluating the economy, efficiency, and effectiveness with which resources are employed.
- Evaluating operations or programs to ascertain whether results are consistent with KRS' established objectives and goals and whether the operations or programs are being carried out as planned.
- Assessing the adequacy of established systems and procedures.
- Conducting special assignments and investigations on behalf of the Audit Committee and/or Executive Director into any matter or activity affecting the probity, interests, and operating efficiency of KRS.

6. Independence

Internal auditing is an advisory function having independent status within KRS. The Internal Audit Director:

- Shall be independent of any other section, branch, division, or officer and shall have direct access to the Audit Committee and/or Executive Director, if required.
- Shall have no executive or managerial powers, functions, or duties except those relating to the management of the Division of Internal Audit Administration.
- Shall not be involved in the day-to-day operation of KRS.
- Shall not be responsible for the detailed development and/or implementation of new systems, but should be consulted during the system development process on the control measures to be incorporated in new or amended systems, and be advised of approved variations or new developments.

7. Authority

The Internal Audit Director will report functionally to the Audit Committee. Functionally meaning the Audit Committee approves items including, but not limited to the Audit Plan, various audit Charters, the audit budget, staffing, and organizational structure of the internal audit function.

The Internal Audit Director will report administratively to the KRS Executive Director. Administratively meaning the Internal Audit Director and KRS Executive Director work together on day-to-day activities including, but not limited to leave reporting, training, travel, development of the Audit Plan, and staffing requirements.

The Internal Audit Director of KRS shall:

- Have access, at all reasonable times, to all books, documents, accounts, property, vouchers, records, correspondence, and other data of KRS necessary for the proper performance of the internal audit function.
- Have the right, at all reasonable times, to enter any premises of KRS and to request and promptly receive from any officer all information and such explanations deemed necessary for the Internal Audit Director to formulate an opinion on the probity of action, adequacy of systems, and/or of controls.

It is incumbent that all KRS officers shall render assistance to the Internal Audit Director in carrying out his/her audit duties.

8. Responsibilities

The Internal Audit Director shall be responsible to the Audit Committee for the functional control of audit activities in relation to:

- Development, implementation, and oversight of internal audit methods and procedures.
- Development and control of an efficient internal audit program.
- Scope and boundaries of internal audits.
- Documentation of audit findings.
- Assistance in the investigation of significant suspected fraudulent activities and promptly notifying the Audit Committee and Executive Director of the results of any findings and conclusions.
- Maintenance of certain records such as, but not limited to, records related to internal audits, Board elections, and investment compliance.
- Considering the scope of work of the external auditors and regulators, as appropriate, for providing optimal audit coverage at a reasonable overall cost.
- Fulfilling the objectives of the Division of Internal Audit Administration.
- Utilizing the Division of Internal Audit Administration resources to maximize the efficiency and effectiveness of the internal audit function.
- Adherence to appropriate auditing standards.
- Review of the Annual Independent Audit Report, Management's Discussion and Analysis, Financial Statements, and footnotes prior to presentation to the Audit Committee. The Internal Audit Director will discuss with Executive Management and the external auditor any perceived errors and discrepancies. Executive Management, not the Internal Audit Director, will retain responsibility for the substantive content, accuracy, consistency, and completeness of Management's Discussion and Analysis, Financial Statements, and footnotes.

9. Scope of the Division of Internal Audit Administration

The scope of the Division of Internal Audit Administration shall be sufficiently comprehensive to enable the effective and regular review of all operational, financial, and related activities. The internal audit coverage may extend to all areas of KRS and include financial, accounting, benefits, administrative, computing, and other operational activities. The extent and frequency of internal audits will depend upon varying circumstances such as results of previous audits,

relative risk associated with activities, materiality, the adequacy of the system of internal control, and resources available to the Division of Internal Audit Administration.

The Division of Internal Audit Administration provides the following assurance services to KRS: independent appraisals of the various operations and systems of control within KRS to determine whether acceptable policies and procedures are followed, legislative requirements and established standards are met, resources are used efficiently and economically, planned missions are accomplished effectively, and the objectives of KRS are achieved. Assurance services are not provided to entities outside of KRS.

The Division of Internal Audit Administration provides the following consulting services to KRS: advice and guidance to management concerning controls in new systems, drafting policies, and participation on the Information Technology Governance team and other similar KRS teams.

10. Audit Plans

Consistent with the long-term strategic plan, the Internal Audit Director shall prepare an annual Audit Plan providing for the review of significant operations of KRS based on an assessment of risks pertaining to the achievement of KRS' objectives. The Annual Audit Plan shall be presented to the Audit Committee for deliberation and finalization.

Upon approval by the Audit Committee, the annual Audit Plan will be presented at the May Board meeting, if practicable.

11. Audit Committee

The purpose, authority, composition, and responsibilities of the Audit Committee are outlined in the KRS Audit Committee of the Board of Trustees Charter and the [Statement of Bylaws and Committee Organization](#).

12. Audit Methodology

For all audit projects, the person responsible for the activity under review shall be advised and given the opportunity to discuss the following:

- Objectives and scope of the audit to be conducted, prior to the commencement of such audit.
- Findings and proposed recommendations upon the completion of an audit, including providing an official response to the findings.

13. Audit Reports

A comprehensive written report will be prepared and issued by the Division of Internal Audit Administration at the conclusion of each audit and will be distributed as considered appropriate. A copy of each report is to be made available on a timely basis to the Audit Committee and the Executive Director.

Audit reports will normally explain the scope and objectives of the audit, present findings and conclusions in an objective manner relevant to the specific user's needs, and make recommendations where appropriate.

14. Relationship with External Auditors

Upon request, the Internal Audit Director shall make available to the external auditors all internal audit working papers, programs, flowcharts, and reports. The Internal Audit Director shall work with the external auditors to:

- Foster a cooperative working relationship.
- Reduce the incidence of duplication of effort.
- Ensure appropriate sharing of information.
- Ensure coordination of the overall audit effort.

15. Audit Standards

Internal auditing shall adhere to the *International Standards for the Professional Practice of Internal Auditing* (Standards). Where applicable, the Division of Internal Audit Administration will observe standards and statements issued by other accounting and auditing organizations located within the United States of America. The Division of Internal Audit Administration is expected to abide by the Institute of Internal Auditors (IIA) Code of Ethics (Exhibit A).

The Division of Internal Audit Administration will adhere to the IIA's Mandatory Guidance, which includes the Core Principles for the Professional Practice of Internal Auditing (see section 4), the Code of Ethics (see Exhibit A), the *Standards*¹, and the definition of internal auditing (see section 3). The Mandatory Guidance constitutes the fundamental requirements for the professional practice of internal auditing and the principles against which to evaluate the effectiveness of the Division of Internal Audit Administration's performance.

16. Quality Assurance and Improvement Plan

The Division of Internal Audit Administration will maintain a quality assurance and improvement program that covers all aspects of the internal audit function. The program will include an evaluation of the Division of Internal Audit Administration's conformance with the Standards and an evaluation of whether internal auditors apply the IIA's Code of Ethics. The program will also assess the efficiency and effectiveness of the Division of Internal Audit Administration and identify opportunities for improvement.

The Division of Internal Audit Administration will conduct both ongoing and periodic internal assessments and a qualified, independent assessor (or assessment team) will conduct an external assessment at least once every five (5) years. The Internal Audit Director will provide the results of the quality assurance and improvement program, including results of internal and external assessments, to the Audit Committee and Executive Director.

¹ <https://na.theiia.org/standards-guidance/Pages/Standards-and-Guidance-IPPF.aspx>

17. Approvals

We, the undersigned of KRS, do certify that this Charter was approved by the Board on September 12, 2019.



Chair, Board of Trustees



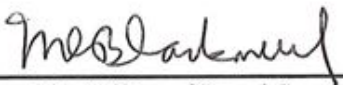
Chair, Audit Committee



Executive Director, Kentucky Retirement Systems



Internal Audit Director



Reviewed by Office of Legal Services

EXHIBIT A

{ CODE of ETHICS... }

// PRINCIPLES

Internal auditors are expected to apply and uphold the following principles:

- **Integrity**

The integrity of internal auditors establishes trust and thus provides the basis for reliance on their judgment.

- **Objectivity**

Internal auditors exhibit the highest level of professional objectivity in gathering, evaluating, and communicating information about the activity or process being examined. Internal auditors make a balanced assessment of all the relevant circumstances and are not unduly influenced by their own interests or by others in forming judgments.

- **Confidentiality**

Internal auditors respect the value and ownership of information they receive and do not disclose information without appropriate authority unless there is a legal or professional obligation to do so.

- **Competency**

Internal auditors apply the knowledge, skills, and experience needed in the performance of internal audit services.

// RULES OF CONDUCT

1. **Integrity**

Internal Auditors:

- 1.1. Shall perform their work with honesty, diligence, and responsibility.
- 1.2. Shall observe the law and make disclosures expected by the law and the profession.
- 1.3. Shall not knowingly be a party to any illegal activity, or engage in acts that are discreditable to the profession of internal auditing or to the organization.
- 1.4. Shall respect and contribute to the legitimate and ethical objectives of the organization.

2. **Objectivity**

Internal Auditors:

- 2.1. Shall not participate in any activity or relationship that may impair or be presumed to impair their unbiased assessment. This participation includes those activities or relationships that may be in conflict with the interests of the organization.
- 2.2. Shall not accept anything that may impair or be presumed to impair their professional judgment.
- 2.3. Shall disclose all material facts known to them that, if not disclosed, may distort the reporting of activities under review.

3. **Confidentiality**

Internal Auditors:

- 3.1. Shall be prudent in the use and protection of information acquired in the course of their duties.
- 3.2. Shall not use information for any personal gain or in any manner that would be contrary to the law or detrimental to the legitimate and ethical objectives of the organization.

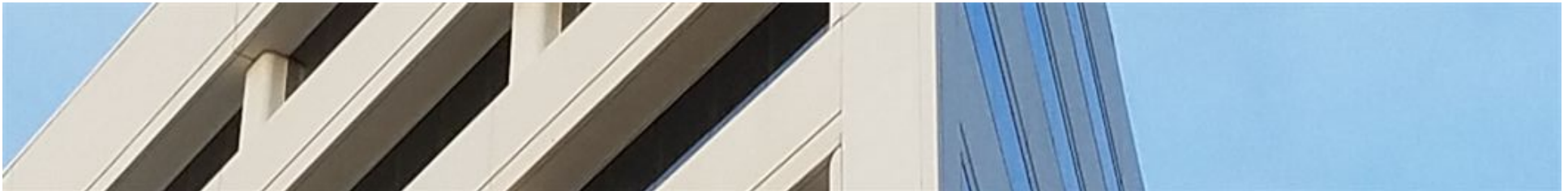
4. **Competency**

Internal Auditors:

- 4.1. Shall engage only in those services for which they have the necessary knowledge, skills, and experience.
- 4.2. Shall perform internal audit services in accordance with the *International Standards for the Professional Practice of Internal Auditing*.
- 4.3. Shall continually improve their proficiency and the effectiveness and quality of their services.



WILSHIRE ASSOCIATES



Kentucky Retirement Systems Pension

November 2020

Wilshire Associates
AGENDA

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Background & Overview	Page 7
Asset Allocation Approach	Page 10
Asset Allocation Inputs	Page 14
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Executive Summary

Wilshire Associates



Executive Summary

- Asset class assumptions down across the board vs. last time Wilshire performed Asset Liability Study for KRS
- Current policies fail to reach stated plan discount rates of 5.25% and 6.25%
- Wilshire has provided three portfolios for the IC/Board to select from
 - Similar Risk (shortfall of stated discount rates)
 - Similar Return (shortfall of stated discount rates with slight increase of current risk levels)
 - Discount Rate Policy Portfolio
 - » 5.25% plans are able to select a portfolio expected to hit the discount rate with small increases to risk levels
 - » 6.25% plans need to allocate approximately 6% more to public equities, bringing the Growth bucket to 68.5%, to have a 50% chance of meeting discount rate
- Decision comes down to risk tolerances for each set of plans



Wilshire Associates

Executive Summary – KERS (NH) & SPRS

- Efficient policies shown result in increase targets to Cash and Real Estate, with a reduction to Real Return
- Total Fixed Income (Liquidity bucket) increases by various levels across all efficient portfolios
- Total Diversifying assets reduced to 20% across all efficient portfolios

Asset Class	Current Policy	Similar Risk Policy	Similar Return Policy	5.25% Return Policy
U.S. Equity	15.75%	15.75%	16.00%	16.25%
Non-U.S. Equity	15.75%	15.75%	16.00%	16.25%
High Yield / Specialty Credit	15.00%	15.00%	15.00%	15.00%
Private Equity	0.00%	0.00%	0.00%	0.00%
Private Equity (Revised)	<u>7.00%</u>	<u>6.00%</u>	<u>6.75%</u>	<u>7.00%</u>
Total Growth Assets	53.50%	52.50%	53.75%	54.50%
Core Fixed Income	20.50%	22.50%	21.25%	20.50%
Cash	<u>3.00%</u>	<u>5.00%</u>	<u>5.00%</u>	<u>5.00%</u>
Total Fixed Income	23.50%	27.50%	26.25%	25.50%
Real Estate	5.00%	10.00%	10.00%	10.00%
Opportunistic	3.00%	0.00%	0.00%	0.00%
Real Return	<u>15.00%</u>	<u>10.00%</u>	<u>10.00%</u>	<u>10.00%</u>
Total Diversifying	23.00%	20.00%	20.00%	20.00%
Total Assets	100.0%	100.0%	100.0%	100.0%
Total Illiquid Assets ²	21.75%	21.50%	22.25%	22.50%

¹ Non-U.S. Equity is constrained to be no more than U.S. Equity.

² Illiquid Assets are comprised of 20% of High Yield / Specialty Credit, Private Equity, Real Estate, Opportunistic and 25% of Real Return.

³ Private Equity is assumed to be 80% U.S. Equity and 20% of Private Equity (standard assumption).



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Executive Summary – KERS/CERS Hazardous, CERS (NH), and Insurance Plans

- Efficient policies shown result in increase targets to Cash and Real Estate, with a reduction to Real Return
- Total Growth assets increased by 6% to reach 6.25%
- Total Fixed Income (Liquidity bucket) increased in Similar Risk/Return policies, but decreased in order to reach 6.25%
- Total Diversifying assets reduced to 20% across all efficient portfolios

Asset Class	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy
U.S. Equity	18.75%	18.25%	18.75%	21.75%
Non-U.S. Equity	18.75%	18.25%	18.75%	21.75%
High Yield / Specialty Credit	15.00%	15.00%	15.00%	15.00%
Private Equity	10.00%	10.00%	10.00%	10.00%
Private Equity (Revised)	<u>0.00%</u>	<u>0.00%</u>	<u>0.00%</u>	<u>0.00%</u>
Total Growth Assets	62.50%	61.50%	62.50%	68.50%
Core Fixed Income	13.50%	15.50%	14.50%	10.00%
Cash	<u>1.00%</u>	<u>3.00%</u>	<u>3.00%</u>	<u>1.50%</u>
Total Fixed Income	14.50%	18.50%	17.50%	11.50%
Real Estate	5.00%	10.00%	10.00%	10.00%
Opportunistic	3.00%	0.00%	0.00%	0.00%
Real Return	<u>15.00%</u>	<u>10.00%</u>	<u>10.00%</u>	<u>10.00%</u>
Total Diversifying	23.00%	20.00%	20.00%	20.00%
Total Assets	100.0%	100.0%	100.0%	100.0%
Total Illiquid Assets ²	21.75%	25.50%	25.50%	25.50%

¹ Non-U.S. Equity is constrained to be no more than U.S. Equity.

² Illiquid Assets are comprised of 20% of High Yield / Specialty Credit, Private Equity, Real Estate, Opportunistic and 25% of Real Return.

³ Private Equity is assumed to be 80% U.S. Equity and 20% of Private Equity (standard assumption).



Wilshire Associates

Asset Class Assumptions as of 6/30/2020

- Wilshire's asset class return, risk and correlation assumptions are developed based on 10-year forward looking expectations, adjusted to incorporate recent trends.
- Return expectations represent a passive investment (beta) and do not reflect any value added from active management (alpha).

	U.S. Equity	Non-U.S. Equity	High Yield / Specialty Credit	Private Equity	Private Equity (Revised)	Core Fixed Income	Cash	Real Estate	Opportunistic	Real Return
Return - 10-Year (%)	6.00	6.75	5.40	8.15	6.65	1.25	0.75	6.80	3.75	5.45
Return - 30-Year (%)	7.05	7.55	6.60	9.55	7.80	3.30	2.05	7.40	5.10	6.60
Risk (%)	17.00	18.95	7.30	28.00	18.15	5.15	1.25	14.00	4.60	8.75
Correlations										
U.S. Equity	1.00									
Non-U.S. Equity	0.83	1.00								
High Yield / Specialty Credit	0.58	0.50	1.00							
Private Equity	0.74	0.67	0.32	1.00						
Private Equity (Revised)	0.98	0.83	0.53	0.86	1.00					
Core Fixed Income	0.28	0.09	0.19	0.31	0.31	1.00				
Cash	-0.05	-0.08	-0.10	0.00	-0.04	0.19	1.00			
Real Estate	0.54	0.47	0.63	0.51	0.56	0.19	-0.05	1.00		
Opportunistic	0.43	0.54	0.62	0.42	0.46	0.07	0.07	0.32	1.00	
Real Return	0.43	0.48	0.60	0.43	0.46	0.24	0.01	0.69	0.50	1.00

* Illiquid Assets are comprised of 20% of High Yield / Specialty Credit, Private Equity, Real Estate, Opportunistic and 25% of Real Return.

** Private Equity is assumed to be 80% U.S. Equity and 20% of Private Equity (standard assumption).



BACKGROUND & OVERVIEW

Wilshire Associates



BACKGROUND & OVERVIEW

- The asset allocation decision is the most important decision an investor can make
 - The asset allocation decision drives 90% of return variability among portfolios
- Wilshire recommends revisiting the asset allocation decision every three to five years, or sooner, as market conditions warrant
 - Wilshire/KRS last reviewed the asset allocation in June 2018
 - Wilshire made recommendations across two different strategic asset allocations
 - » KERS (NH) & SPRS
 - » Other Plans
 - KRS adopted the Wilshire recommendations
- Given recent economic events, as well as pending governance changes within KRS, Wilshire & Staff thought an updated asset liability study was warranted

Wilshire Associates



CONSIDERATIONS

- Board has allowed the asset allocation decision to be long-term focused
 - Current long-term capital market assumptions, specifically low yields within fixed income, present challenges to meet discount rate without plans assuming additional risks
 - Changes to asset allocation have been modest
- Focus of the 2020 asset allocation review
 - Continue to remain focused on long-term performance vs. stated discount rates
 - Review assumptions used within Private Equity for KERS (NH) and SPRS
 - » Mature private markets composite with no new allocations
 - » Temper return expectations
 - Provide Staff with an Opportunistic bucket within Asset Allocation
 - » Take advantage of potential market dislocations
 - » Additive to Total Plan return above discount rate

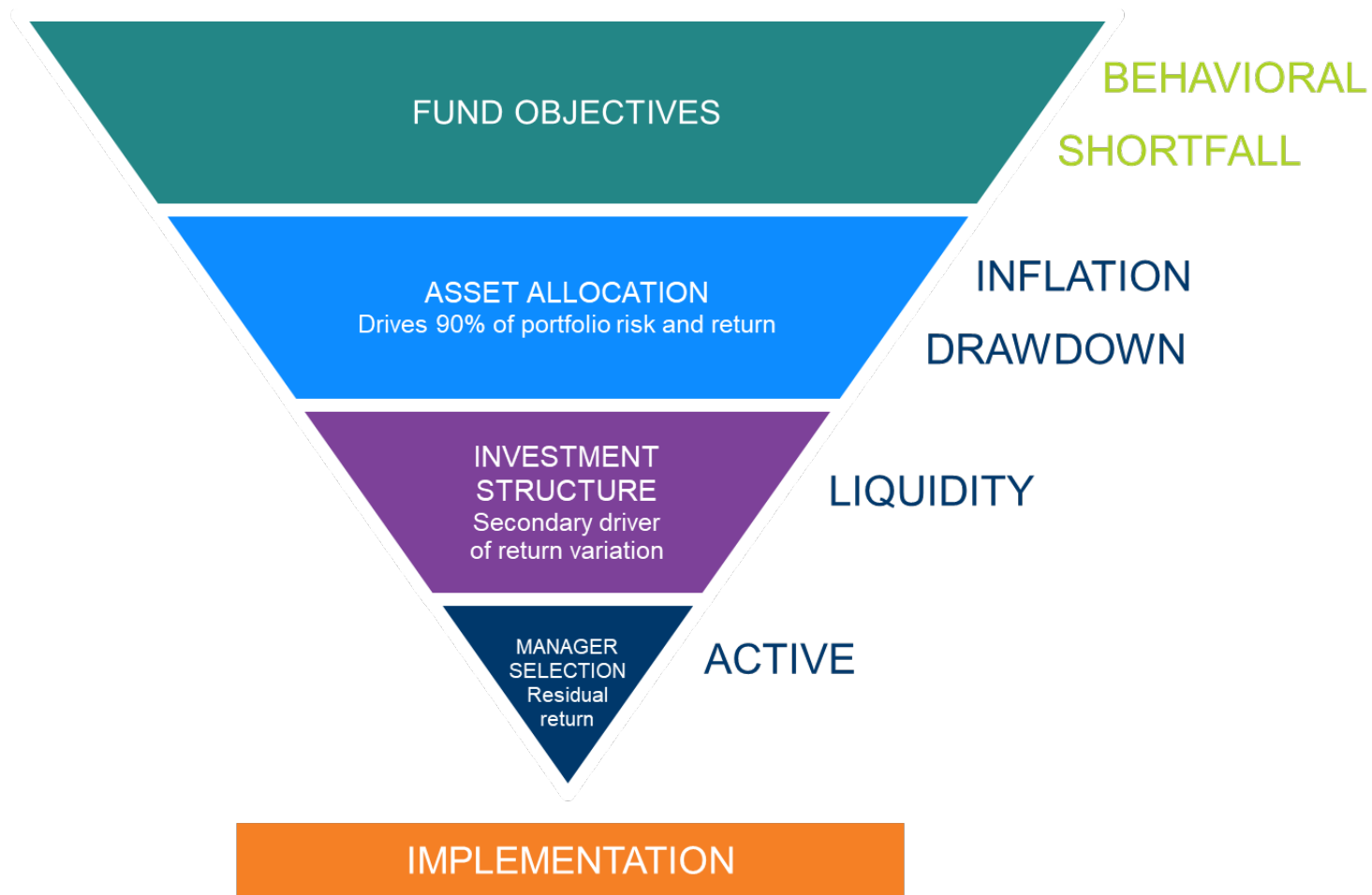


ASSET ALLOCATION APPROACH

Wilshire Associates



FOCUS ON DECISIONS THAT MATTER





Wilshire Associates

RISK ASSESSMENT FRAMEWORK

Wilshire’s multi-dimensional view of risk integrates organizational and investment considerations into a comprehensive framework for evaluating strategic decisions.

- **Shortfall:** Support distributions and long-term growth
- **Behavioral:** Instill strong governance
- **Drawdown:** Limit portfolio losses
- **Inflation:** Preserve long-term purchasing power
- **Liquidity:** Balance near-term needs, long-term opportunities
- **Active:** Ensure unique exposures
- **Emerging & Long-Term:** Environmental, Social & Governance risks, such as externalities, intangibles and reputation may be linked to various risk lenses

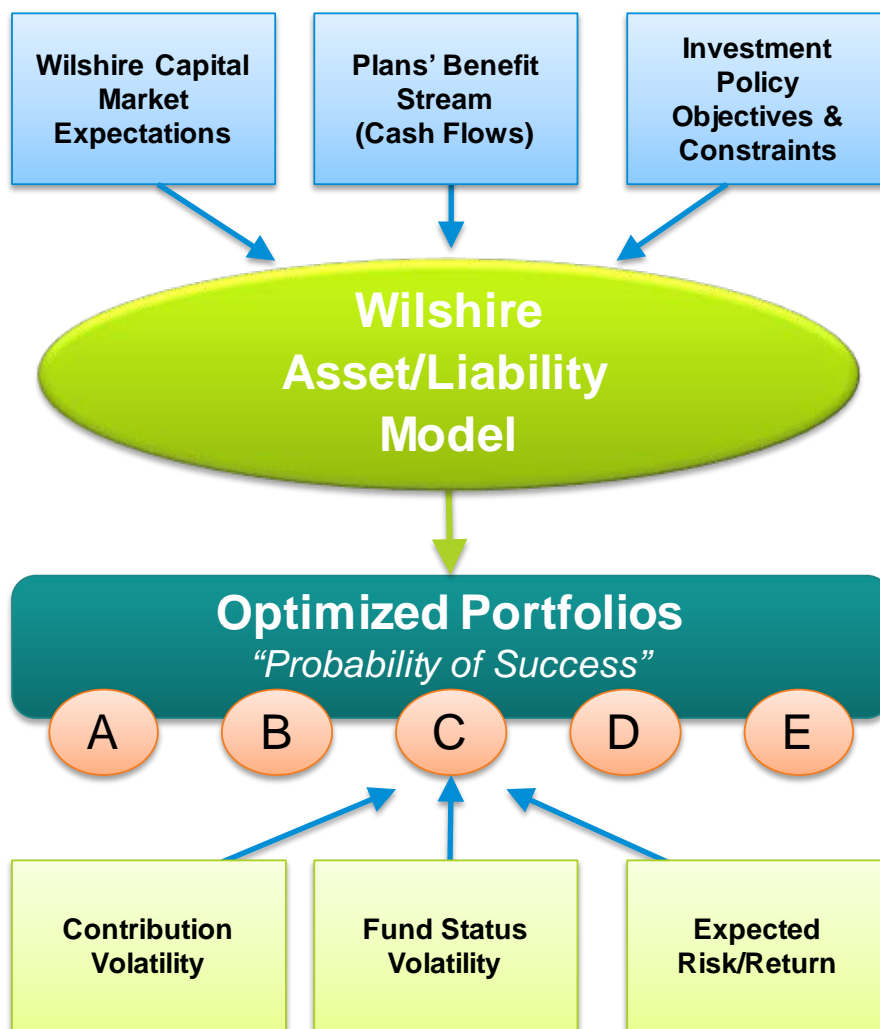


EMERGING & LONG-TERM RISKS



Wilshire Associates

ASSET ALLOCATION PROCESS





ASSET ALLOCATION INPUTS

Wilshire Associates



PLAN STATUS – PENSION – AS OF JUNE 30, 2020

	<u>KERS</u> <u>Non-Hazardous</u>	<u>KERS</u> <u>Hazardous</u>	<u>CERS</u> <u>Non-Hazardous</u>	<u>CERS</u> <u>Hazardous</u>	<u>SPRS</u>
Asset and Liability Data (\$ - Millions)					
1. Market Value of Assets	\$2,316	\$694	\$7,046	\$2,377	\$287
2. Actuarial Accrued Liability	<u>16,493</u>	<u>1,255</u>	<u>14,726</u>	<u>5,407</u>	<u>1,050</u>
3. MVA Funded Ratio (1. / 2.)	14.04%	55.28%	47.85%	43.96%	27.30%
4. Actuarial Value of Assets	<u>\$2,483</u>	<u>\$701</u>	<u>\$7,435</u>	<u>\$2,547</u>	<u>\$299</u>
5. AVA Funded Ratio (4. / 2.)	15.06%	55.88%	50.49%	47.11%	28.50%
Economic Assumptions					
Discount Rate	5.25%	6.25%	6.25%	6.25%	5.25%

- KERS Non-Hazardous and SPRS plans are severely underfunded and require significant near term contributions.
- KERS Hazardous, CERS Non-Hazardous and CERS Hazardous plans are better funded.
- Wilshire Consulting's 2020 Report on U.S. State Retirement Systems estimates the aggregate funded ratio of over 100 U.S. state-sponsored defined benefit plans to be 71.8% at fiscal year-end 2019.

Wilshire Associates



PLAN STATUS – INSURANCE – AS OF JUNE 30, 2020

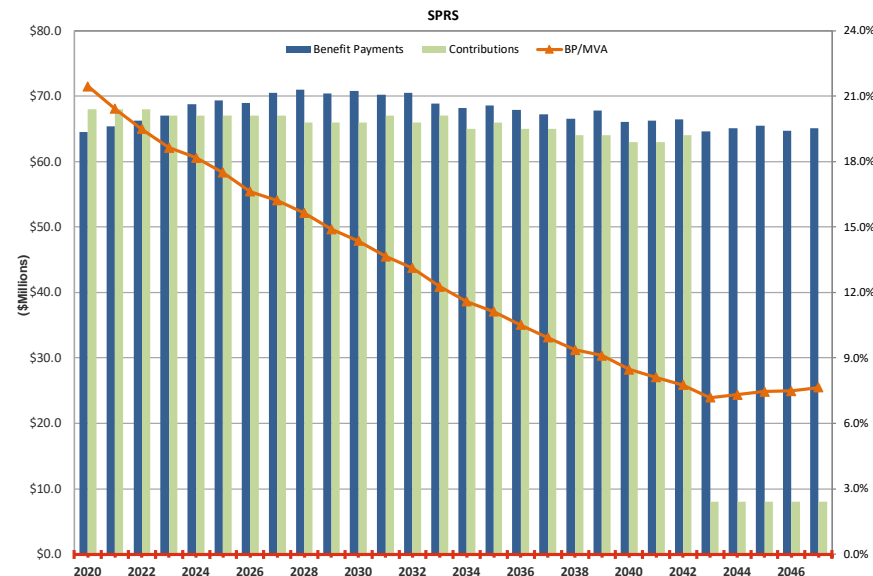
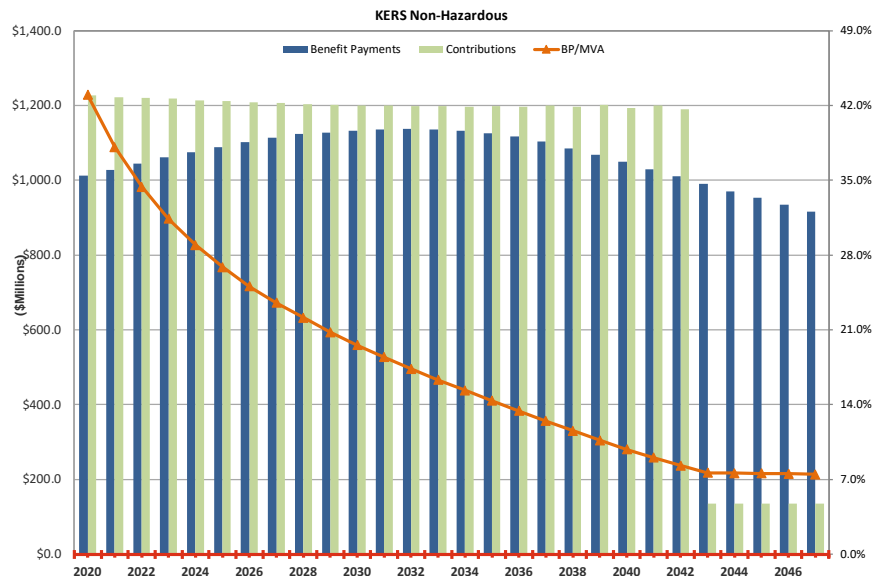
	<u>KERS</u> <u>Non-Hazardous</u>	<u>KERS</u> <u>Hazardous</u>	<u>CERS</u> <u>Non-Hazardous</u>	<u>CERS</u> <u>Hazardous</u>	<u>SPRS</u>
Asset and Liability Data (\$ - Millions)					
1. Market Value of Assets	\$990	\$514	\$2,482	\$1,300	\$199
2. Actuarial Accrued Liability	<u>2,808</u>	<u>440</u>	<u>3,728</u>	<u>1,795</u>	<u>284</u>
3. MVA Funded Ratio (1. / 2.)	35.26%	116.79%	66.57%	72.43%	70.08%
4. Actuarial Value of Assets	<u>\$1,078</u>	<u>\$534</u>	<u>\$2,662</u>	<u>\$1,371</u>	<u>\$205</u>
5. AVA Funded Ratio (4. / 2.)	38.38%	121.31%	71.41%	76.38%	72.16%
Economic Assumptions					
Discount Rate	6.25%	6.25%	6.25%	6.25%	6.25%

- KERS Non-Hazardous plan is severely underfunded and requires significant near term contributions.
- CERS Non-Hazardous, CERS Hazardous and SPRS are better funded.
- KERS Hazardous plans is overfunded.

Wilshire Associates



PROJECTED CASH IN AND OUTFLOWS - PENSION



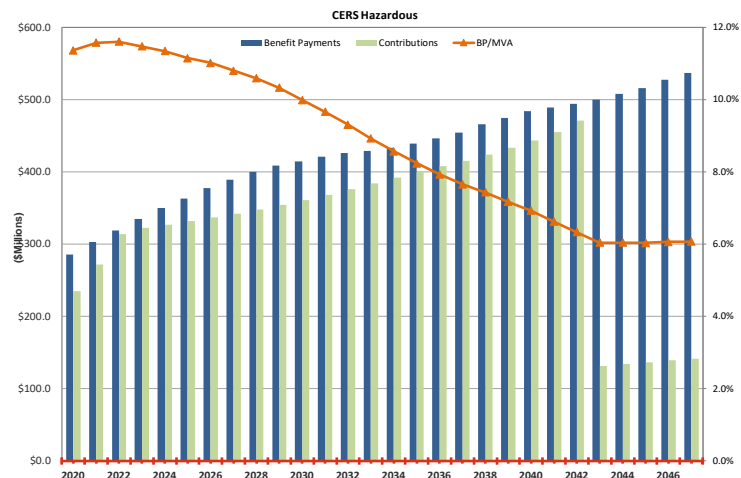
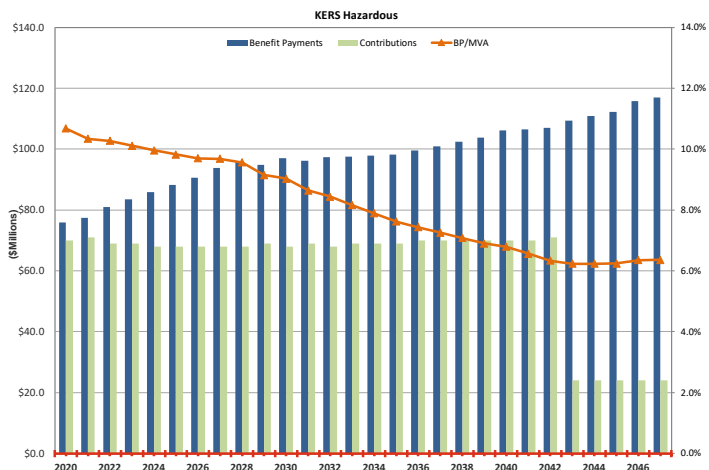
Data provided by KRS actuary

- In addition to being severely underfunded, both the KERS Non-Hazardous and SPRS have significant expected near-term contributions.

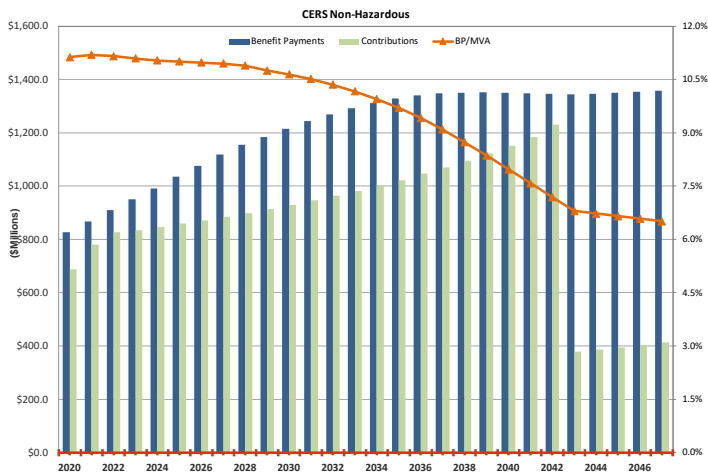
Wilshire Associates



PROJECTED CASH IN AND OUTFLOWS - PENSION



Data provided by KRS actuary

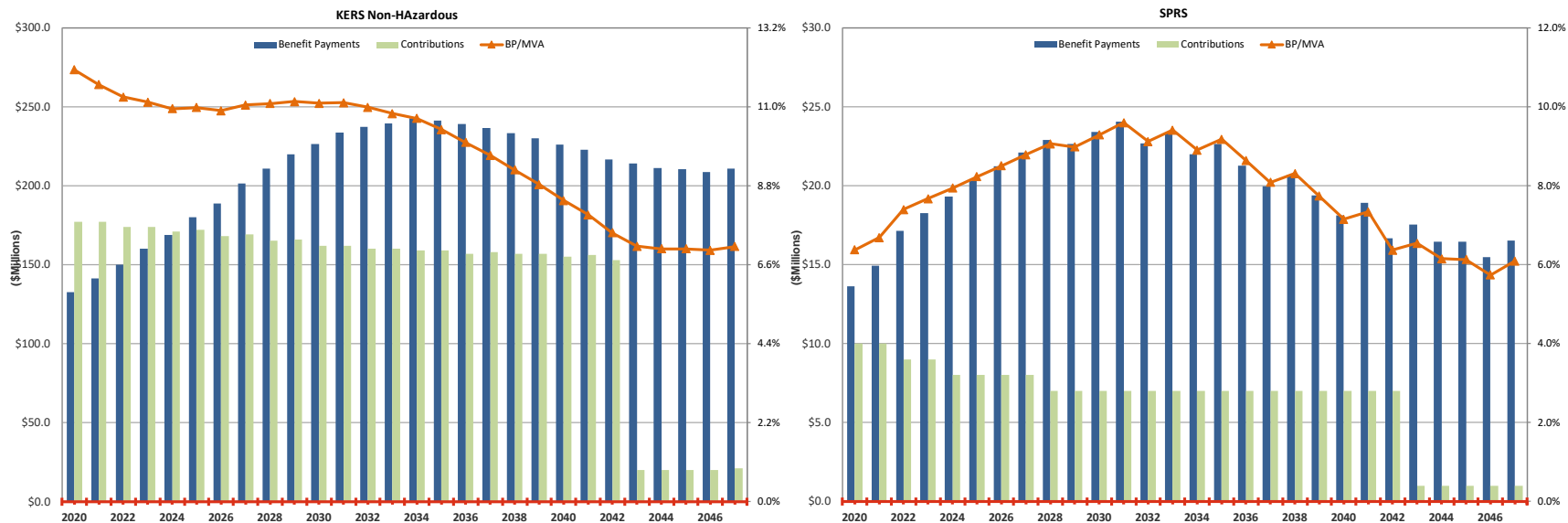


- KERS Hazardous, CERS Non-Hazardous and CERS Hazardous plans small liquidity needs given projected contributions.

Wilshire Associates



PROJECTED CASH IN AND OUTFLOWS - INSURANCE



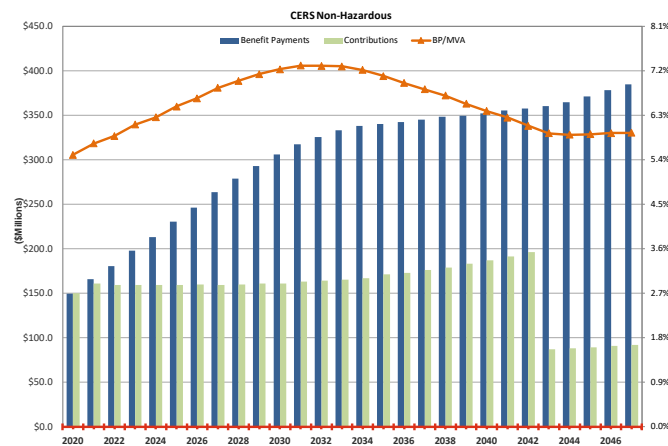
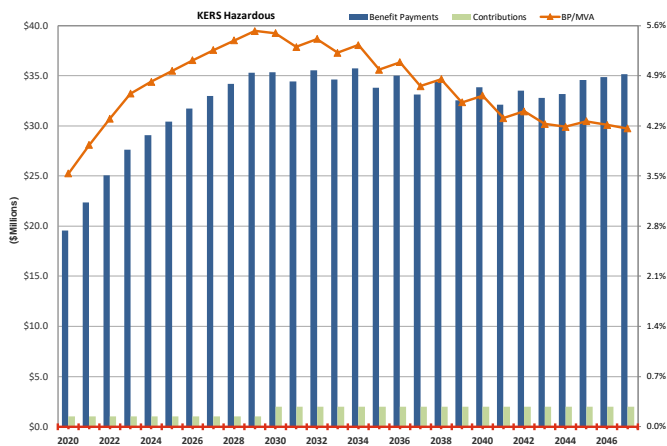
Data provided by KRS actuary

- KERS Non-Hazardous has minimal near-term liquidity needs given significant projected contributions.
- SPRS has growing liquidity needs given low projected contributions.

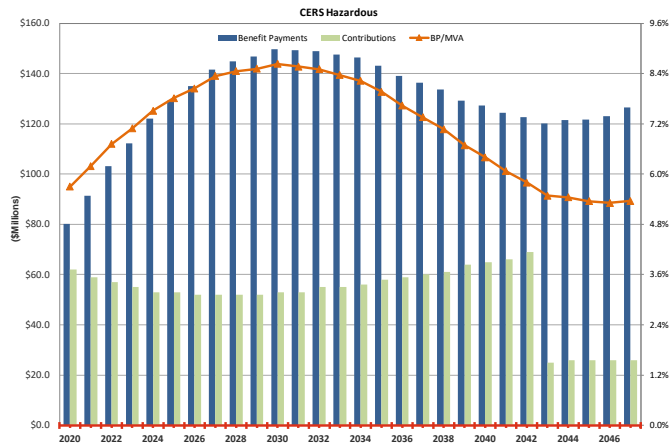
Wilshire Associates



PROJECTED CASH IN AND OUTFLOWS - INSURANCE



Data provided by KRS actuary



- KERS Hazardous, CERS Non-Hazardous and CERS Hazardous plans have moderate-to-low liquidity needs.



Wilshire Associates

CAPITAL MARKET ASSUMPTIONS (as of June 30, 2020)

- Wilshire's asset class return, risk and correlation assumptions are developed on multi-year forward looking expected rates of return and historical risk and correlation, adjusted to incorporate recent trends
- Public market return expectations represent a passive investment in the asset class (beta). They do not reflect value added from active management (alpha).

Asset Classes	Expected Return 10 Years	Expected Return 30 Years	Risk	Cash Yield	Factor Exposure Growth	Factor Exposure Inflation	Liquidity Market Level	Liquidity Stressed Metric
U.S. Equity	6.00	7.05	17.00	2.00	8.00	0.00	1.00	0.15
Non-U.S. Equity	6.75	7.55	18.95	2.85	8.60	5.45	0.90	0.05
High Yield / Specialty Credit	5.40	6.60	7.30	6.55	3.50	1.50	0.00	0.00
Private Equity	8.15	9.55	28.00	0.00	14.00	1.00	0.00	0.00
Private Equity (Revised)	6.65	7.80	18.15	1.60	9.20	0.20	0.00	0.00
Core Fixed Income	1.25	3.30	5.15	1.85	-0.90	-2.50	1.00	0.85
Cash	0.75	2.05	1.25	0.75	0.00	0.00	1.00	1.00
Real Estate	6.80	7.40	14.00	2.60	5.50	0.00	0.00	0.00
Opportunistic	3.75	5.10	4.60	0.00	1.25	1.85	0.30	0.00
Real Return	5.45	6.60	8.75	2.25	1.90	4.40	0.00	0.00

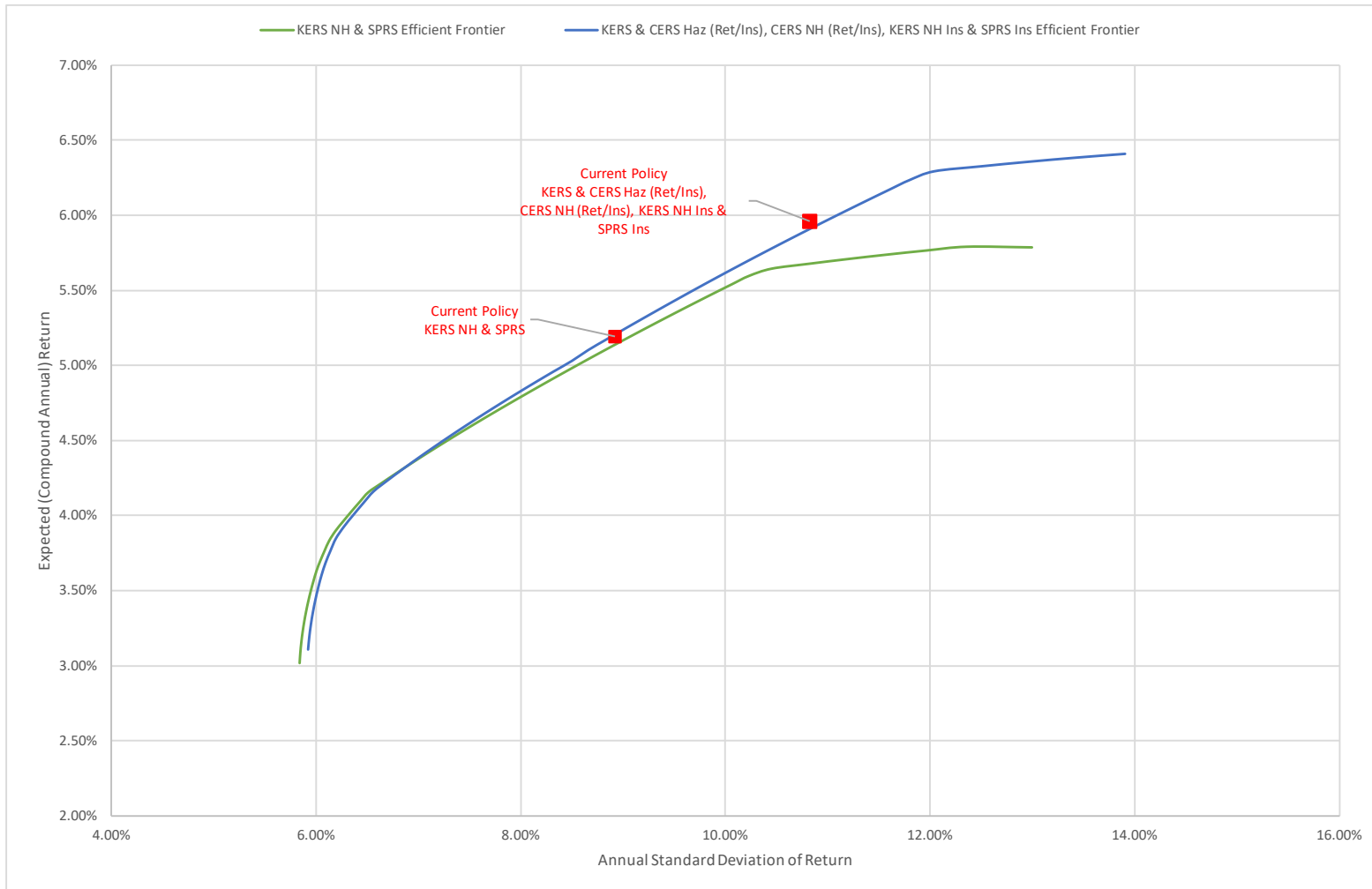
High Yield/Specialty Credit is a mix of 50% High Yield and 50% Bank Loans plus 1% alpha

Private Equity (Revised) is a mix of 80% US Equity and 20% Private Equity.

Opportunistic is a mix of 25% Equity Market Neutral, 12.5% Global Macro & 62.5% Relative Value Hedge Funds.

Real Return is a mix of 25% US TIPS, 7.5% Global REITS, 15% Private Real Estate, 10% Commodity, 17.5% Timber, 15% Oil & Gas & 7.5% MLPs.

ASSET ONLY EFFICIENT FRONTIERS



- The Current policies lie very close to the efficient frontiers.



Wilshire Associates MODELED POLICIES

Asset Class	Current Policy KERS NH & SPRS	Optimization Constraints	Similar Risk Policy	Similar Return Policy	5.25% Return Policy	Current Policy KERS & CERS Haz, CERS NH & KERS NH Ins.	Optimization Constraints	Similar Risk Policy	Similar Return Policy	6.25% Return Policy
U.S. Equity	15.75%	10% - 100% ¹	15.75%	16.00%	16.25%	18.75%	10% - 100% ¹	18.25%	18.75%	21.75%
Non-U.S. Equity	15.75%	10% - 100% ¹	15.75%	16.00%	16.25%	18.75%	10% - 100% ¹	18.25%	18.75%	21.75%
High Yield / Specialty Credit	15.00%	0% - 15%	15.00%	15.00%	15.00%	15.00%	0% - 15%	15.00%	15.00%	15.00%
Private Equity	0.00%	0.0%	0.00%	0.00%	0.00%	10.00%	0% - 10%	10.00%	10.00%	10.00%
Private Equity (Revised)	<u>7.00%</u>	0% - 7% ³	<u>6.00%</u>	<u>6.75%</u>	<u>7.00%</u>	<u>0.00%</u>	0.0%	<u>0.00%</u>	<u>0.00%</u>	<u>0.00%</u>
Total Growth Assets	53.50%	20% - 70%	52.50%	53.75%	54.50%	62.50%	20% - 70%	61.50%	62.50%	68.50%
Core Fixed Income	20.50%	15% - 100%	22.50%	21.25%	20.50%	13.50%	10% - 100%	15.50%	14.50%	10.00%
Cash	<u>3.00%</u>	3% - 5%	<u>5.00%</u>	<u>5.00%</u>	<u>5.00%</u>	<u>1.00%</u>	1% - 3%	<u>3.00%</u>	<u>3.00%</u>	<u>1.50%</u>
Total Fixed Income	23.50%		27.50%	26.25%	25.50%	14.50%		18.50%	17.50%	11.50%
Real Estate	5.00%	5% - 10%	10.00%	10.00%	10.00%	5.00%	5% - 10%	10.00%	10.00%	10.00%
Opportunistic	3.00%	0.0%	0.00%	0.00%	0.00%	3.00%	0.0%	0.00%	0.00%	0.00%
Real Return	15.00%	5% - 10%	10.00%	10.00%	10.00%	15.00%	5% - 10%	10.00%	10.00%	10.00%
Total Diversifying	23.00%	10% - 20%	20.00%	20.00%	20.00%	23.00%	10% - 20%	20.00%	20.00%	20.00%
Total Assets	100.0%		100.0%	100.0%	100.0%	100.0%		100.0%	100.0%	100.0%
Total Illiquid Assets²	21.75%		21.50%	22.25%	22.50%	24.75%		25.50%	25.50%	25.50%
Expected Return - 10 Years (%)	5.19		5.13	5.20	5.24	5.96		5.90	5.95	6.26
Expected Return - 30 Years (%)	6.44		6.37	6.43	6.46	7.16		7.09	7.13	7.38
Standard Deviation of Return (%)	8.92		8.91	9.09	9.20	10.83		10.82	10.96	11.88
<i>(bps)</i>			(6)	1	5			(6)	(1)	30
<i>(bps)</i>			(7)	(1)	2			(7)	(3)	22
<i>+ / (-) in SD of Return (bps)</i>			(1)	17	28			(1)	13	105
Value At Risk (Year 1, 95th%)*	-9.48		-9.52	-9.75	-9.90	-11.85		-11.89	-12.08	-13.28
Sharpe Ratio	0.50		0.49	0.49	0.49	0.48		0.48	0.47	0.46

¹ Non-U.S. Equity is constrained to be no more than U.S. Equity.

² Illiquid Assets are comprised of 20% of High Yield / Specialty Credit, Private Equity, Real Estate, Opportunistic and 25% of Real Return.

³ Private Equity is assumed to be 80% U.S. Equity and 20% of Private Equity (standard assumption).



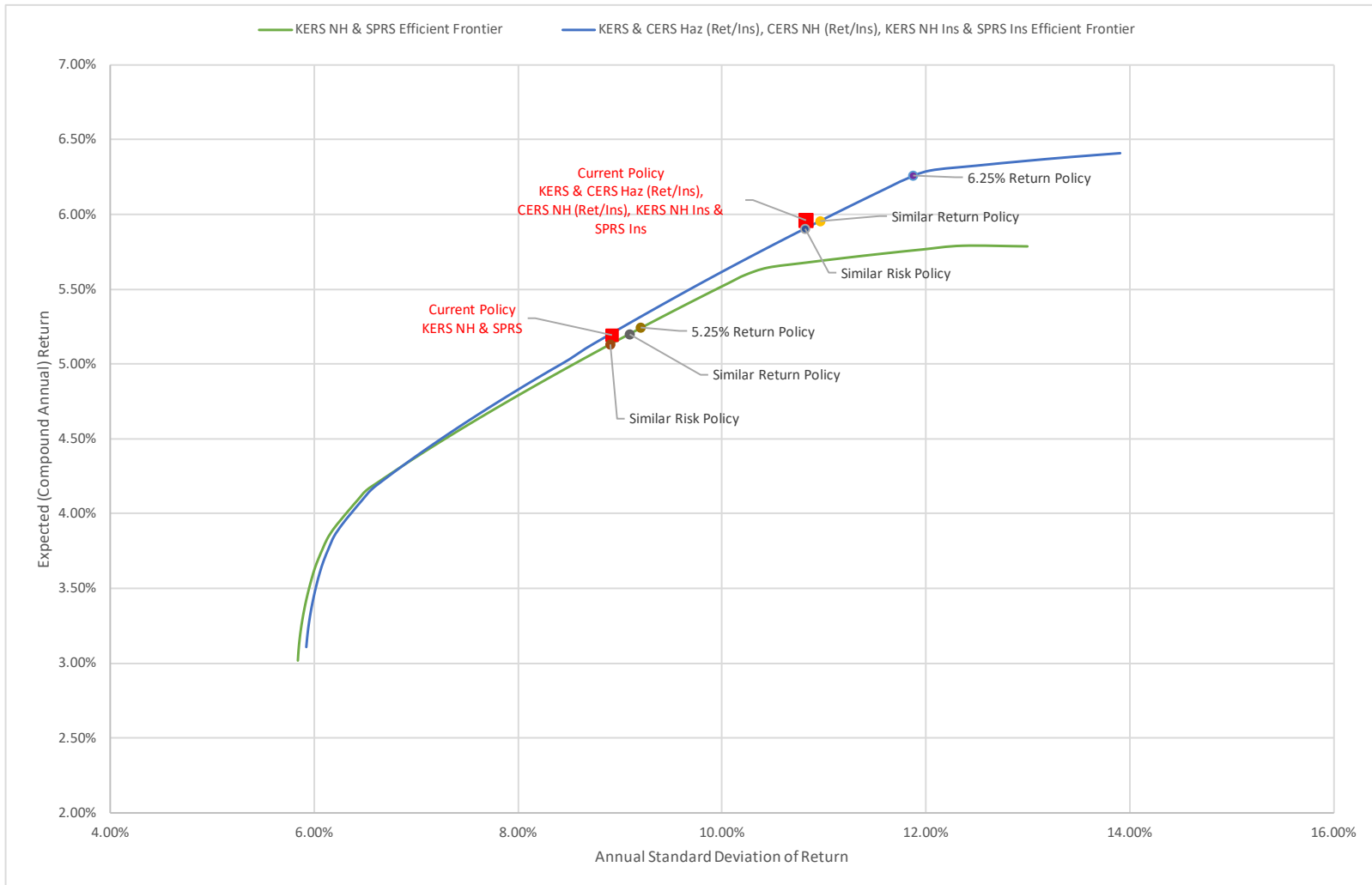
Wilshire Associates MODELED POLICIES

Asset Class	Current Policy KERS NH & SPRS	Similar Risk Policy	Similar Return Policy	5.25% Return Policy	Current Policy KERS & CERS Haz, CERS NH & KERS NH Ins.	Similar Risk Policy	Similar Return Policy	6.25% Return Policy
Total Growth Assets	53.50%	52.50%	53.75%	54.50%	62.50%	61.50%	62.50%	68.50%
Total Fixed Income	23.50%	27.50%	26.25%	25.50%	14.50%	18.50%	17.50%	11.50%
Total Diversifying	23.00%	20.00%	20.00%	20.00%	23.00%	20.00%	20.00%	20.00%
Total Assets	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Expected Return - 10 Years (%)	5.19	5.13	5.20	5.24	5.96	5.90	5.95	6.26
Expected Return - 30 Years (%)	6.44	6.37	6.43	6.46	7.16	7.09	7.13	7.38
Standard Deviation of Return (%)	8.92	8.91	9.09	9.20	10.83	10.82	10.96	11.88
(bps)		(6)	1	5		(6)	(1)	30
(bps)		(7)	(1)	2		(7)	(3)	22
+ / (-) in SD of Return (bps)		(1)	17	28		(1)	13	105
Contribution to Asset Volatility (%):								
Growth	79.7	77.6	78.5	79.0	85.1	83.4	83.8	86.0
Fixed Income	4.2	4.7	4.2	4.0	2.0	2.4	2.2	1.3
Diversifying	16.1	17.7	17.3	17.0	12.9	14.2	14.0	12.7
Cash Yield	2.7	2.8	2.8	2.8	2.6	2.7	2.7	2.7
Growth Factor	4.2	4.2	4.4	4.4	5.5	5.6	5.6	6.2
Inflation Factor	1.3	1.0	1.0	1.1	1.7	1.4	1.4	1.7
Liquidity (%)								
Market	54.3	57.4	56.7	56.4	51.0	53.2	53.1	52.8
Stressed	23.6	27.3	26.3	25.7	16.2	19.8	19.1	14.4
Probability of Reaching Actuarial Return of 5.25%								
Year 10	49.2	48.3	49.3	49.9	58.3	57.7	58.1	60.7
Year 30	77.1	75.7	76.3	76.7	83.7	82.8	83.0	84.1
Actuarial Return of 6.25%								
Year 10	35.4	34.6	35.7	36.4	46.6	46.0	46.6	50.1
Year 30	54.8	53.0	54.3	55.0	67.9	66.7	67.2	70.1



Wilshire Associates

ASSET ONLY EFFICIENT FRONTIERS



- The Current policies lie very close to the efficient frontiers.

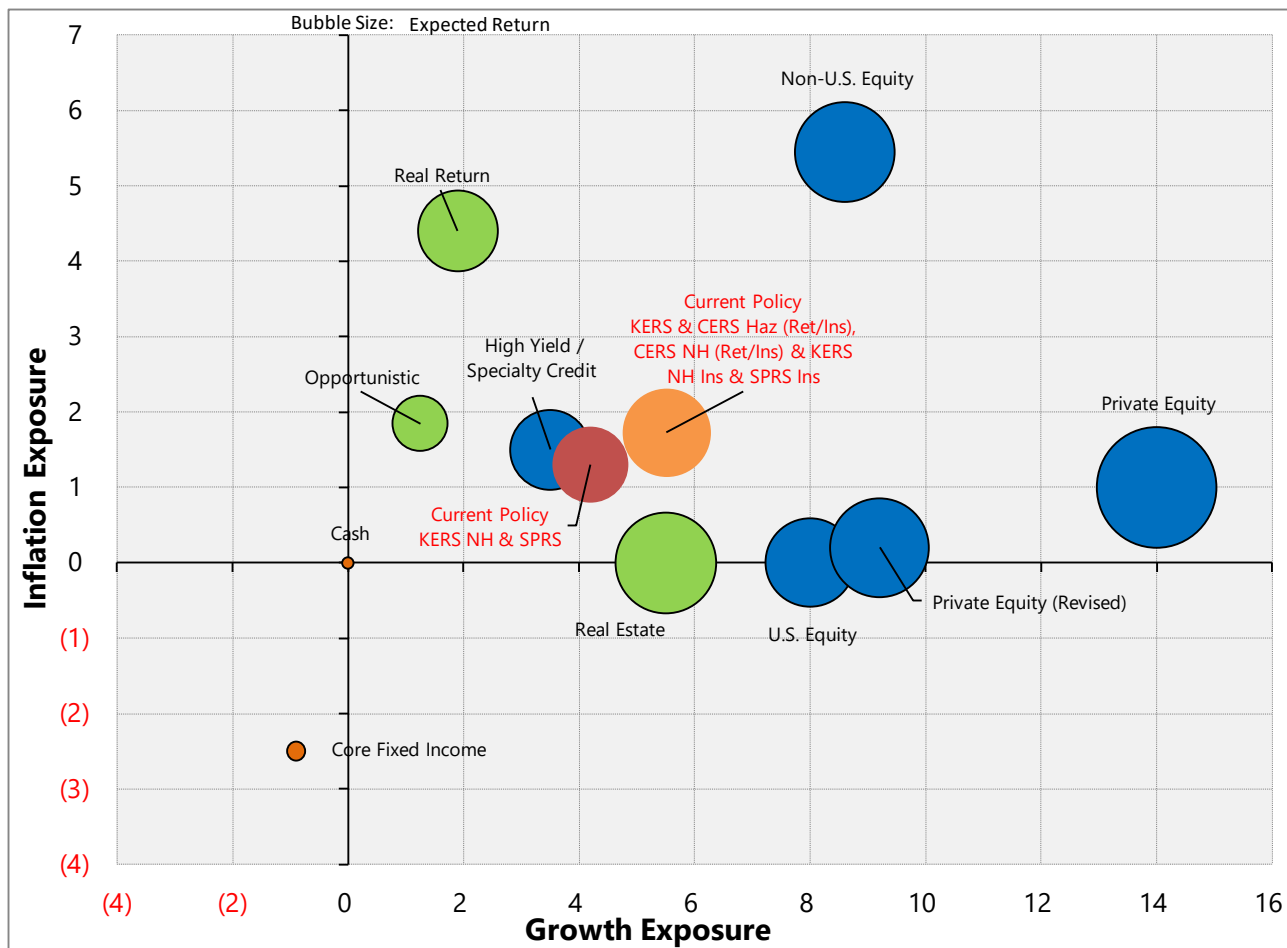


Wilshire Associates

ECONOMIC FACTOR EXPOSURES

Concentrated factor tilts can represent portfolio vulnerability

To the extent possible, portfolios with factor neutrality are desirable



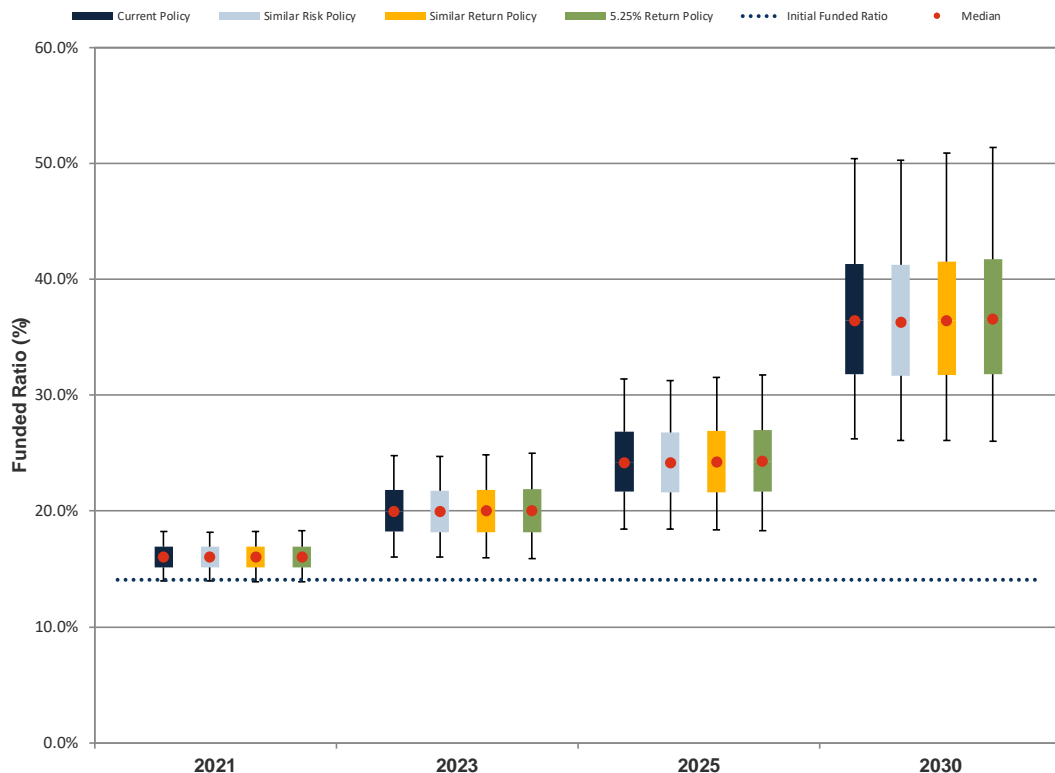


ASSET-LIABILITY PROJECTIONS



PENSION – KERS Non-Hazardous

Wilshire Associates MVA FUNDED RATIO



Shortfall Risk:

The potential for the alternatives to have a lower median funded ratio than the current policy.

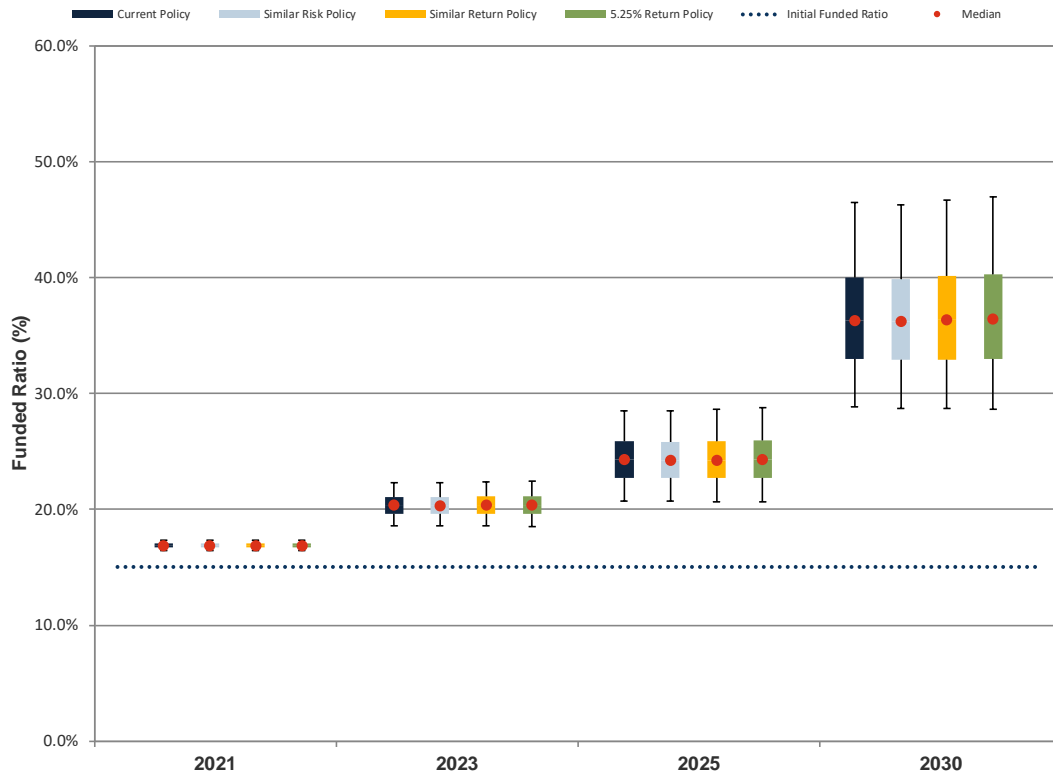
Drawdown Risk:

The potential for the alternatives to have a lower "very pessimistic" funded ratio than the current policy.

Initial Funded Ratio = 14.04%

(%)	2021				2023				2025				2030			
	Current Policy	Similar Risk Policy	Similar Return Policy	5.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	5.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	5.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	5.25% Return Policy
Very Optimistic	18.24	18.20	18.27	18.32	24.79	24.75	24.89	25.01	31.41	31.28	31.51	31.72	50.44	50.28	50.87	51.36
Optimistic	16.92	16.91	16.93	16.95	21.79	21.76	21.84	21.91	26.83	26.76	26.90	27.00	41.34	41.23	41.54	41.74
Median (Expected)	16.04	16.03	16.04	16.05	20.00	19.97	20.01	20.03	24.18	24.13	24.22	24.28	36.40	36.29	36.45	36.57
Pessimistic	15.16	15.15	15.15	15.14	18.23	18.19	18.20	18.20	21.68	21.63	21.65	21.66	31.82	31.70	31.76	31.80
Very Pessimistic	13.95	13.94	13.91	13.88	16.02	16.01	15.96	15.92	18.44	18.44	18.38	18.32	26.22	26.12	26.07	26.03

Wilshire Associates AVA FUNDED RATIO



Shortfall Risk:
The potential for the alternatives to have a lower median funded ratio than the current policy.

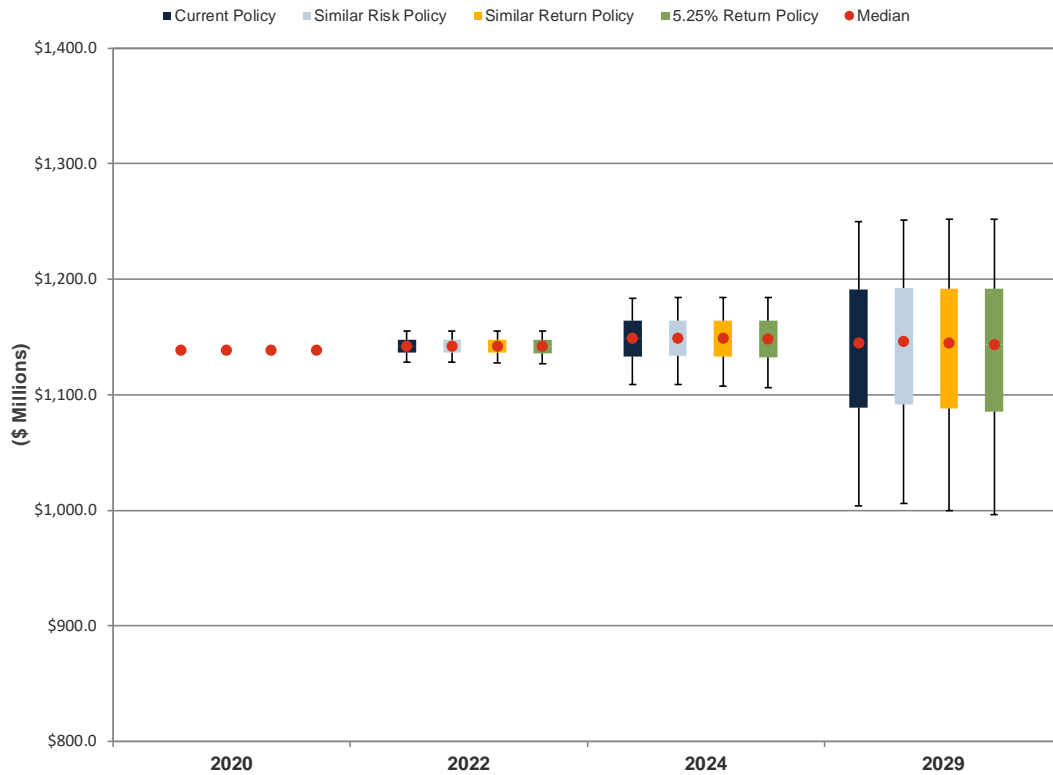
Drawdown Risk:
The potential for the alternatives to have a lower "very pessimistic" funded ratio than the current policy.

Initial Funded Ratio = 15.06%

(%)	2021				2023				2025				2030			
	Current Policy	Similar Risk Policy	Similar Return Policy	5.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	5.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	5.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	5.25% Return Policy
Very Optimistic	17.32	17.31	17.33	17.34	22.32	22.31	22.36	22.42	28.54	28.49	28.64	28.77	46.45	46.25	46.71	46.99
Optimistic	17.06	17.06	17.06	17.06	21.10	21.07	21.11	21.14	25.87	25.82	25.90	25.96	40.00	39.90	40.14	40.30
Median (Expected)	16.88	16.88	16.88	16.88	20.35	20.34	20.36	20.37	24.28	24.22	24.27	24.29	36.29	36.19	36.33	36.42
Pessimistic	16.71	16.70	16.70	16.70	19.61	19.59	19.60	19.60	22.74	22.69	22.70	22.71	32.96	32.88	32.92	32.96
Very Pessimistic	16.46	16.46	16.46	16.45	18.60	18.58	18.56	18.55	20.75	20.71	20.68	20.65	28.84	28.73	28.71	28.67



Wilshire Associates PLAN YEAR CONTRIBUTIONS



Shortfall Risk:
The potential for the alternatives to have higher median contributions than the current policy.

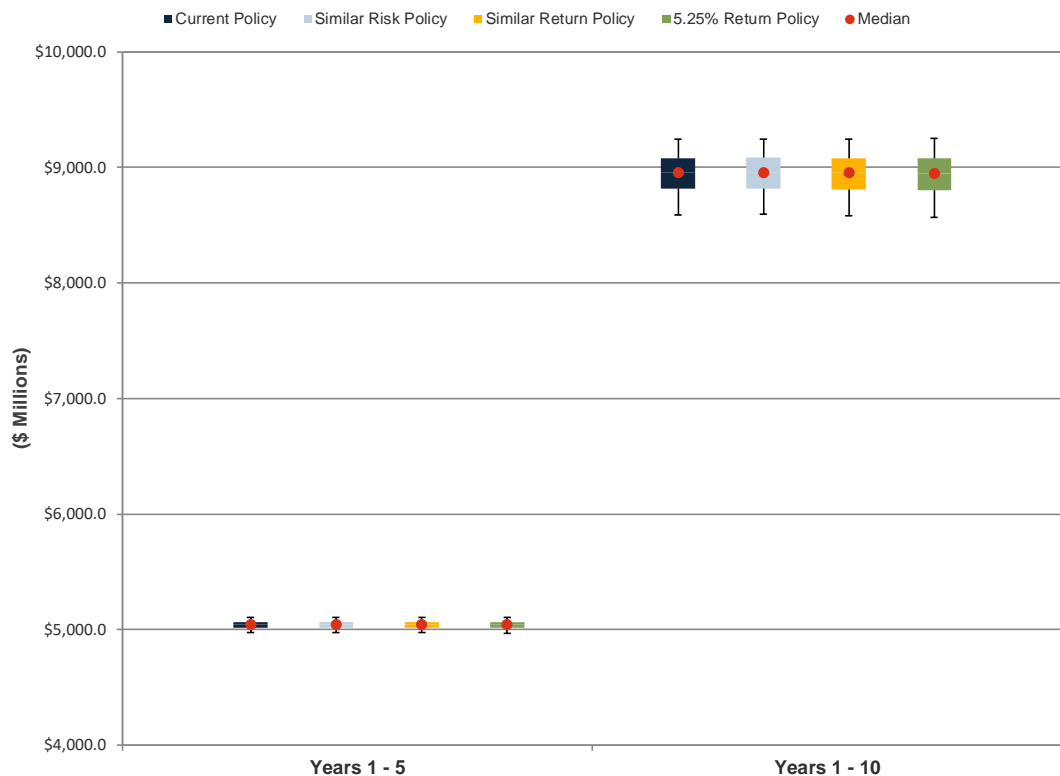
Drawdown Risk:
The potential for the alternatives to have higher "very pessimistic" contributions than the current policy.

(\$ Millions)	2020				2022				2024				2029			
	Current Policy	Similar Risk Policy	Similar Return Policy	5.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	5.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	5.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	5.25% Return Policy
Very Pessimistic	1,138.9	1,138.9	1,138.9	1,138.9	1,154.9	1,155.1	1,155.2	1,155.4	1,183.4	1,183.9	1,184.3	1,184.5	1,250.1	1,251.6	1,251.8	1,251.6
Pessimistic	1,138.9	1,138.9	1,138.9	1,138.9	1,147.5	1,147.5	1,147.6	1,147.6	1,164.1	1,164.5	1,164.5	1,164.4	1,190.8	1,192.5	1,192.0	1,191.5
Median (Expected)	1,138.9	1,138.9	1,138.9	1,138.9	1,141.9	1,141.9	1,141.8	1,141.7	1,149.0	1,149.3	1,148.8	1,148.5	1,145.1	1,146.4	1,144.5	1,143.1
Optimistic	1,138.9	1,138.9	1,138.9	1,138.9	1,136.4	1,136.5	1,136.3	1,136.1	1,133.2	1,133.7	1,132.9	1,132.4	1,089.1	1,091.3	1,088.1	1,085.7
Very Optimistic	1,138.9	1,138.9	1,138.9	1,138.9	1,127.9	1,127.9	1,127.5	1,127.2	1,108.7	1,109.0	1,107.6	1,106.3	1,003.6	1,005.5	1,000.0	996.2



Wilshire Associates

PRESENT VALUE OF CONTRIBUTIONS



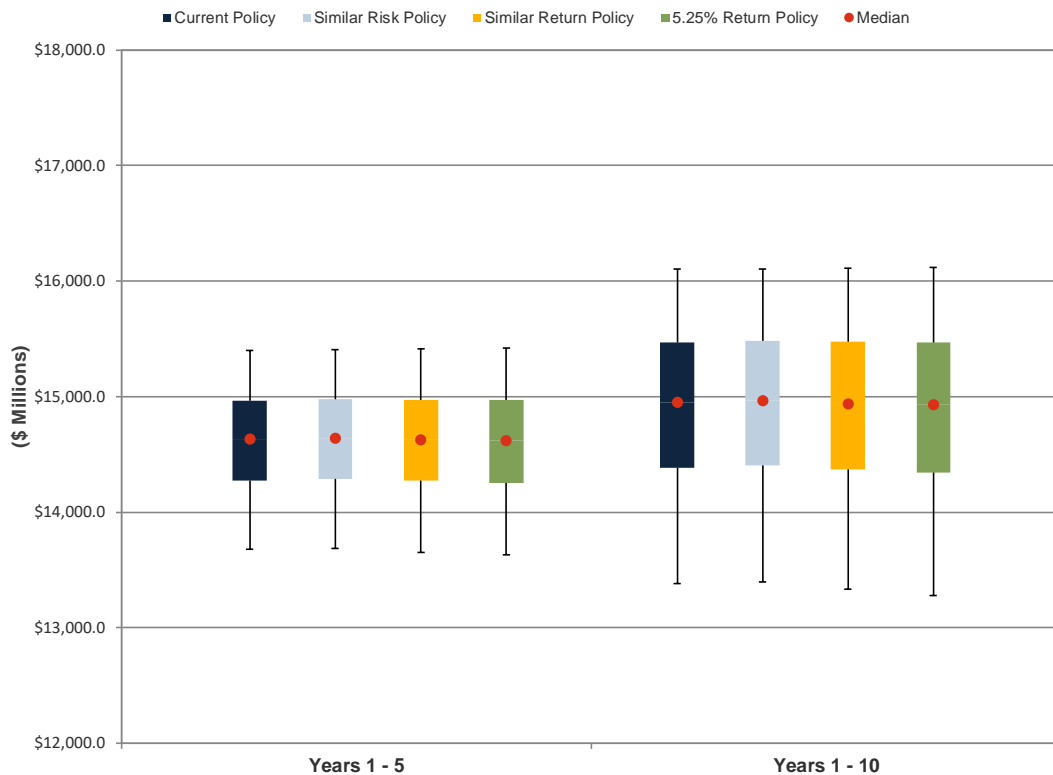
Shortfall Risk:
 The potential for the alternatives to have a higher median present value of contributions than the current policy.

Drawdown Risk:
 The potential for the alternatives to have a higher "very pessimistic" present value of contributions than the current policy.

EROA = 5.25%

(\$ Millions)	Years 1 - 5				Years 1 - 10			
	Current Policy	Similar Risk Policy	Similar Return Policy	5.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	5.25% Return Policy
Very Pessimistic	5,101.6	5,102.0	5,102.7	5,103.1	9,242.2	9,246.4	9,248.4	9,249.6
Pessimistic	5,066.0	5,066.8	5,066.8	5,066.7	9,078.5	9,083.5	9,082.0	9,081.6
Median (Expected)	5,039.9	5,040.4	5,039.8	5,039.4	8,951.7	8,956.0	8,951.4	8,948.2
Optimistic	5,013.8	5,014.7	5,013.8	5,013.0	8,813.3	8,815.5	8,807.3	8,801.2
Very Optimistic	4,971.7	4,972.7	4,970.4	4,968.7	8,591.2	8,594.0	8,580.6	8,569.9

Wilshire Associates MVA ECONOMIC COST



(\$ Millions)	Years 1 - 5				Years 1 - 10			
	Current Policy	Similar Risk Policy	Similar Return Policy	5.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	5.25% Return Policy
Very Pessimistic	15,396.5	15,404.7	15,413.8	15,421.4	16,104.3	16,106.3	16,111.6	16,118.1
Pessimistic	14,967.4	14,977.4	14,974.2	14,972.7	15,468.0	15,481.2	15,472.7	15,467.9
Median (Expected)	14,632.6	14,639.0	14,628.8	14,621.5	14,949.2	14,962.0	14,939.6	14,926.2
Optimistic	14,276.1	14,290.1	14,270.8	14,254.2	14,386.3	14,407.7	14,371.8	14,344.6
Very Optimistic	13,679.3	13,685.2	13,653.7	13,629.7	13,384.0	13,391.9	13,332.3	13,274.4

Shortfall Risk:

The potential for the alternatives to have a higher median economic cost than the current policy.

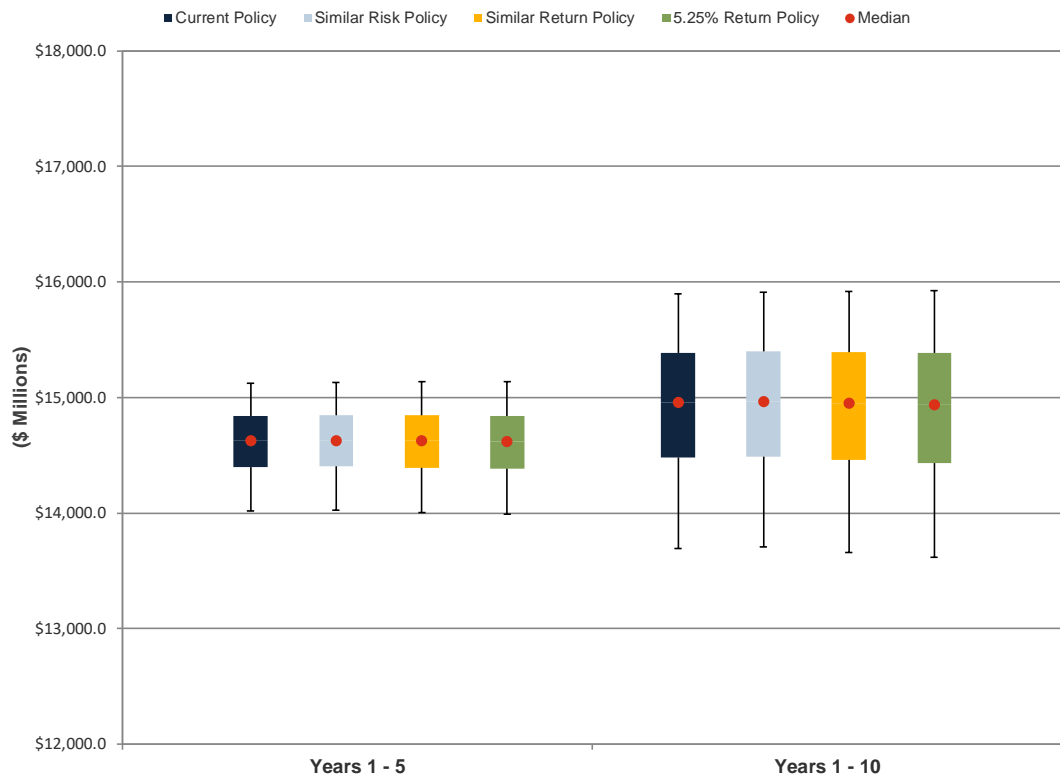
Drawdown Risk:

The potential for the alternatives to have a higher "very pessimistic" economic cost than the current policy.

EROA = 5.25%

Economic Cost is defined as the present value of contributions plus contributions necessary to fully fund the plan at the end of the projection period.

Wilshire Associates AVA ECONOMIC COST



(\$ Millions)	Years 1 - 5				Years 1 - 10			
	Current Policy	Similar Risk Policy	Similar Return Policy	5.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	5.25% Return Policy
Very Pessimistic	15,124.2	15,130.4	15,135.0	15,138.6	15,898.7	15,912.7	15,916.7	15,923.3
Pessimistic	14,840.2	14,844.2	14,843.4	14,842.5	15,384.5	15,401.8	15,392.9	15,388.0
Median (Expected)	14,623.6	14,628.1	14,623.4	14,619.4	14,959.2	14,966.6	14,950.9	14,938.5
Optimistic	14,394.2	14,402.2	14,390.6	14,380.7	14,479.7	14,489.8	14,457.4	14,434.5
Very Optimistic	14,015.5	14,025.7	14,005.4	13,987.2	13,693.6	13,708.5	13,657.3	13,614.5

Shortfall Risk:

The potential for the alternatives to have a higher median economic cost than the current policy.

Drawdown Risk:

The potential for the alternatives to have a higher "very pessimistic" economic cost than the current policy.

EROA = 5.25%

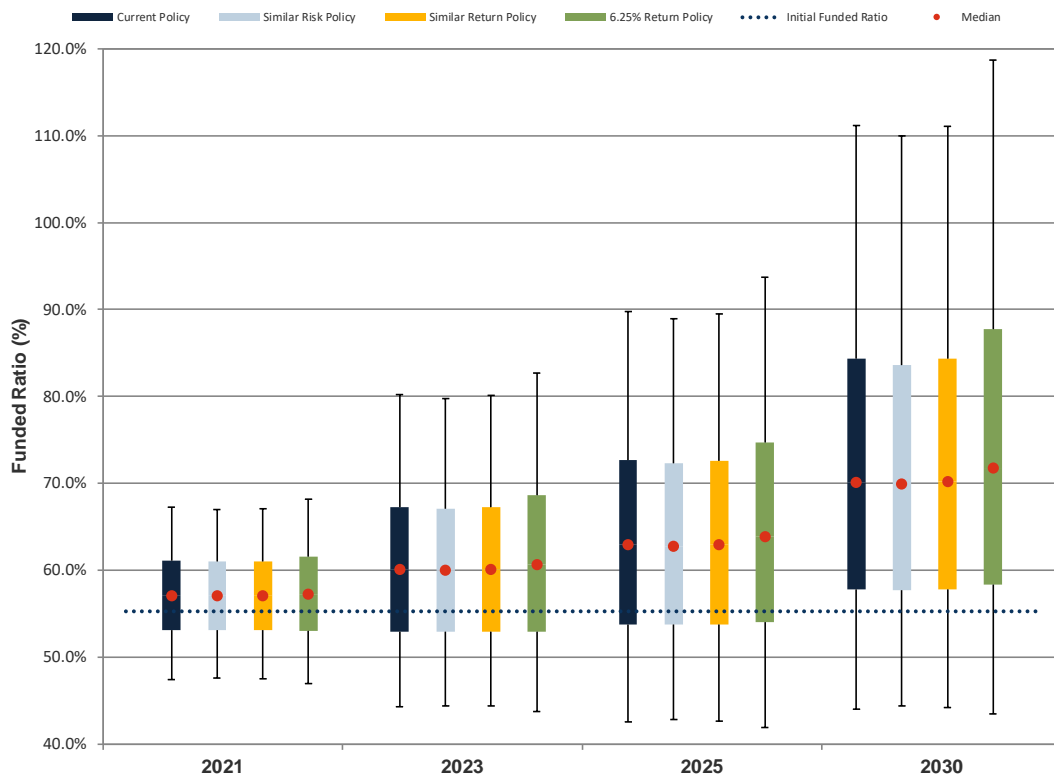
Economic Cost is defined as the present value of contributions plus contributions necessary to fully fund the plan at the end of the projection period.



PENSION – KERS Hazardous



Wilshire Associates MVA FUNDED RATIO



Shortfall Risk:
The potential for the alternatives to have a lower median funded ratio than the current policy.

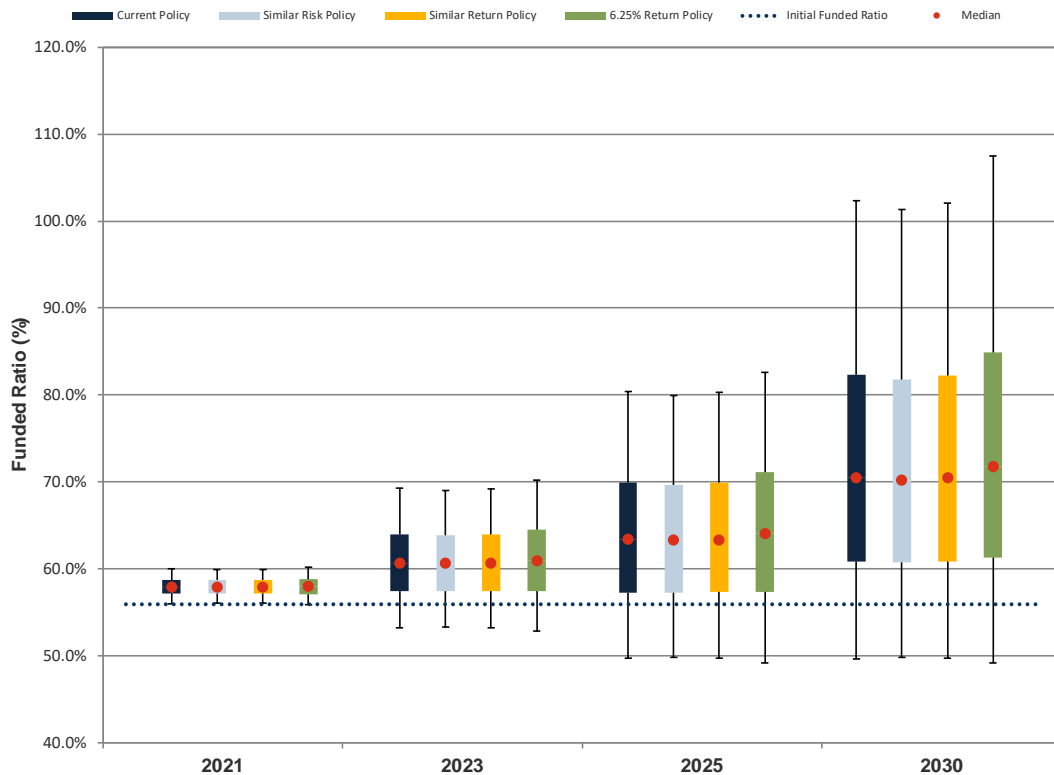
Drawdown Risk:
The potential for the alternatives to have a lower "very pessimistic" funded ratio than the current policy.

Initial Funded Ratio = 55.28%

(%)	2021				2023				2025				2030			
	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy
Very Optimistic	67.23	66.98	67.10	68.19	80.23	79.71	80.14	82.69	89.76	88.91	89.50	93.75	111.18	109.95	111.06	118.71
Optimistic	61.07	60.97	61.05	61.53	67.27	67.04	67.24	68.65	72.71	72.34	72.56	74.67	84.36	83.65	84.32	87.74
Median (Expected)	57.10	57.07	57.10	57.29	60.12	59.97	60.07	60.66	62.96	62.77	62.92	63.91	70.15	69.93	70.18	71.78
Pessimistic	53.11	53.13	53.12	52.98	52.92	52.93	52.93	52.92	53.75	53.77	53.77	54.00	57.78	57.73	57.77	58.39
Very Pessimistic	47.46	47.62	47.52	47.00	44.26	44.44	44.37	43.71	42.55	42.79	42.66	41.94	44.07	44.40	44.25	43.51



Wilshire Associates AVA FUNDED RATIO



Shortfall Risk:
The potential for the alternatives to have a lower median funded ratio than the current policy.

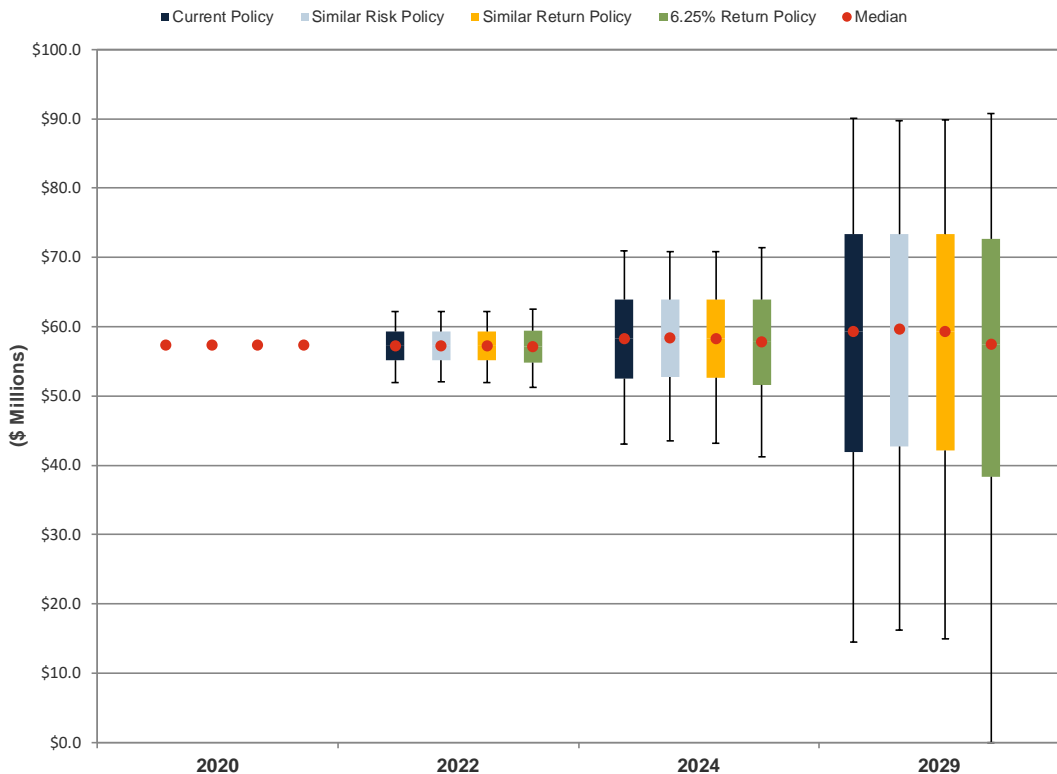
Drawdown Risk:
The potential for the alternatives to have a lower "very pessimistic" funded ratio than the current policy.

Initial Funded Ratio = 55.88%

(%)	2021				2023				2025				2030			
	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy
Very Optimistic	59.96	59.91	59.94	60.15	69.25	68.98	69.15	70.25	80.40	79.97	80.30	82.61	102.35	101.33	102.08	107.46
Optimistic	58.73	58.71	58.73	58.82	63.95	63.82	63.92	64.47	69.96	69.64	69.88	71.11	82.31	81.81	82.23	84.93
Median (Expected)	57.94	57.93	57.94	57.98	60.67	60.61	60.65	60.92	63.40	63.27	63.36	64.05	70.48	70.19	70.46	71.81
Pessimistic	57.14	57.14	57.14	57.11	57.45	57.44	57.45	57.48	57.27	57.29	57.31	57.37	60.81	60.73	60.83	61.32
Very Pessimistic	56.01	56.04	56.02	55.92	53.19	53.29	53.23	52.82	49.68	49.86	49.74	49.15	49.59	49.78	49.72	49.13



Wilshire Associates PLAN YEAR CONTRIBUTIONS



Shortfall Risk:
The potential for the alternatives to have higher median contributions than the current policy.

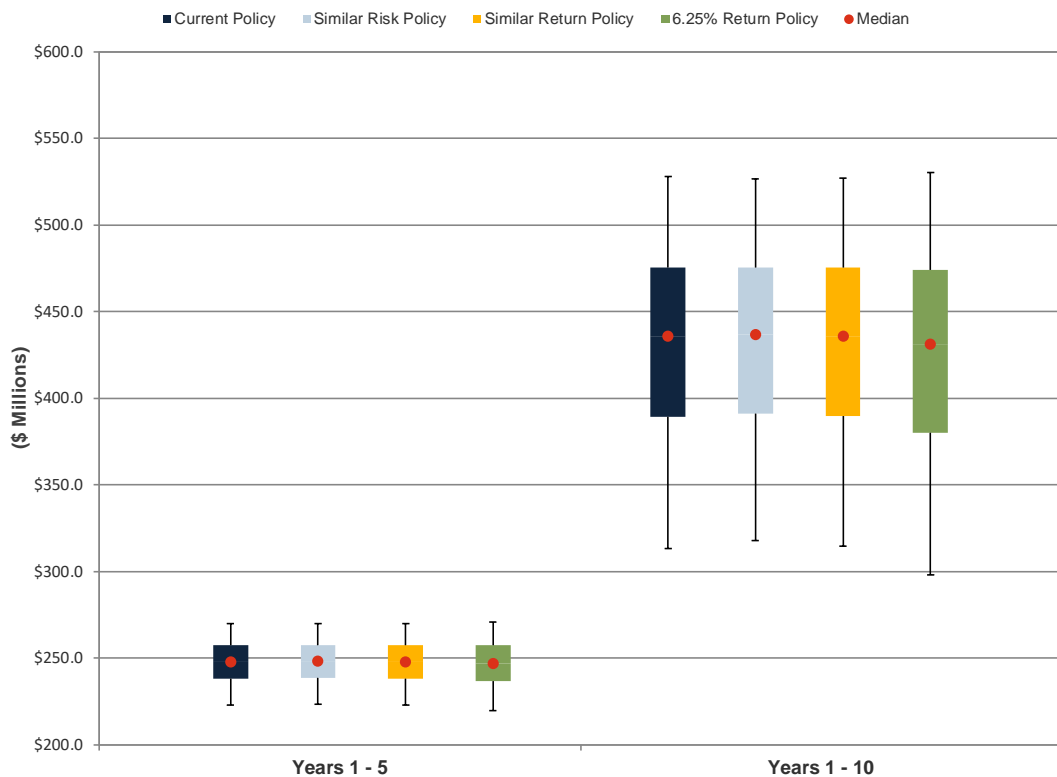
Drawdown Risk:
The potential for the alternatives to have higher "very pessimistic" contributions than the current policy.

(\$ Millions)	2020				2022				2024				2029			
	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy
Very Pessimistic	57.3	57.3	57.3	57.3	62.2	62.2	62.2	62.5	70.9	70.8	70.9	71.4	90.1	89.7	89.9	90.8
Pessimistic	57.3	57.3	57.3	57.3	59.3	59.3	59.4	59.4	63.9	63.9	63.9	63.9	73.3	73.4	73.3	72.7
Median (Expected)	57.3	57.3	57.3	57.3	57.2	57.3	57.2	57.1	58.3	58.4	58.3	57.8	59.3	59.7	59.3	57.4
Optimistic	57.3	57.3	57.3	57.3	55.1	55.2	55.1	54.8	52.5	52.8	52.6	51.6	41.9	42.7	42.1	38.4
Very Optimistic	57.3	57.3	57.3	57.3	51.9	52.0	52.0	51.3	43.0	43.5	43.2	41.2	14.5	16.2	15.0	0.0

Wilshire Associates



PRESENT VALUE OF CONTRIBUTIONS



Shortfall Risk:
The potential for the alternatives to have a higher median present value of contributions than the current policy.

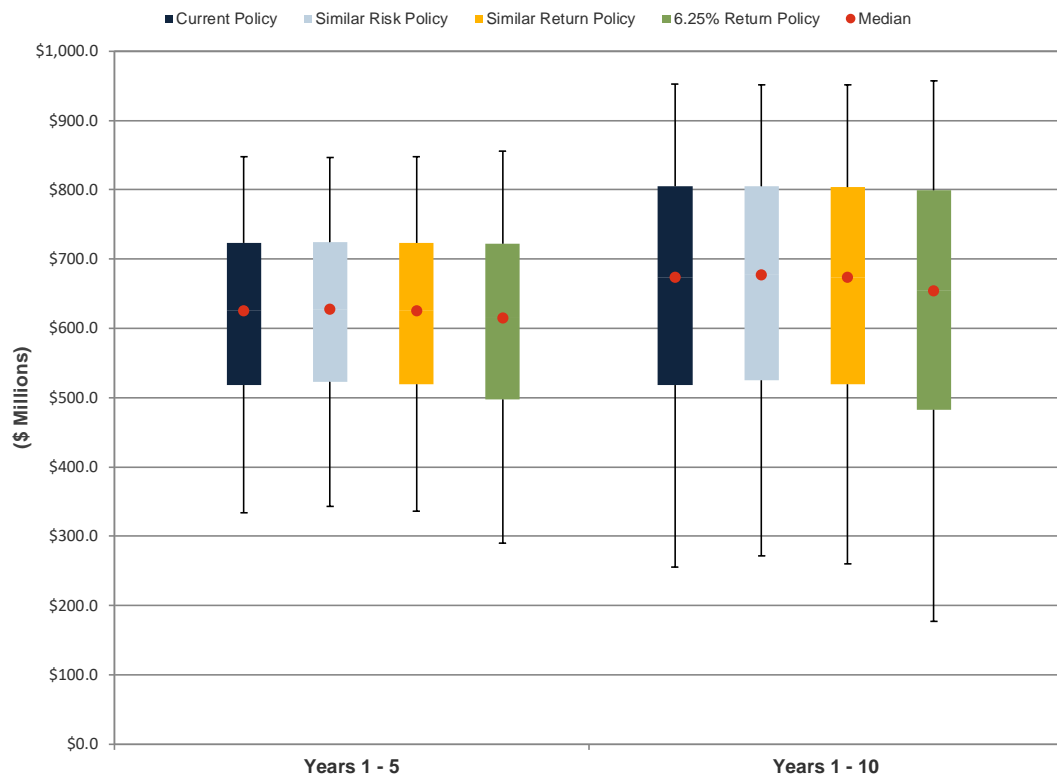
Drawdown Risk:
The potential for the alternatives to have a higher "very pessimistic" present value of contributions than the current policy.

EROA = 6.25%

(\$ Millions)	Years 1 - 5				Years 1 - 10			
	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy
Very Pessimistic	270.0	269.8	269.9	270.9	527.9	526.8	527.3	530.2
Pessimistic	257.5	257.6	257.5	257.5	475.6	475.7	475.5	474.2
Median (Expected)	247.9	248.1	247.9	247.1	435.6	436.7	436.0	431.1
Optimistic	238.3	238.6	238.3	236.7	389.2	391.3	389.8	380.0
Very Optimistic	222.9	223.5	223.0	219.9	313.5	318.1	314.7	298.0



Wilshire Associates MVA ECONOMIC COST



Shortfall Risk:
The potential for the alternatives to have a higher median economic cost than the current policy.

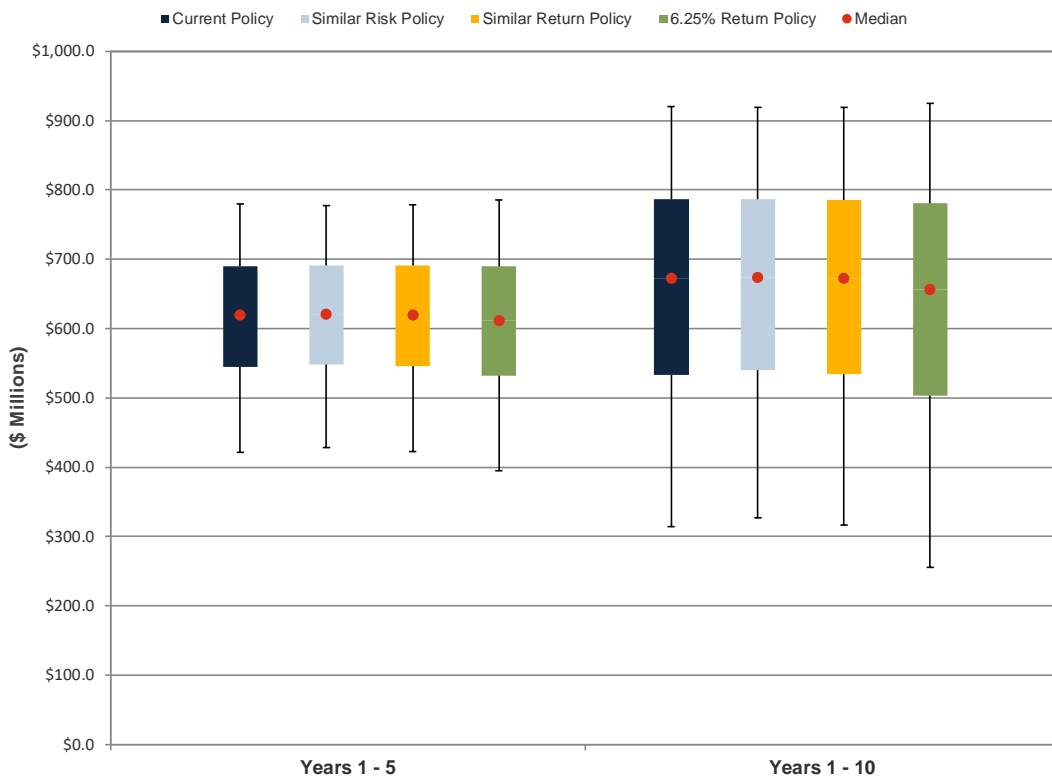
Drawdown Risk:
The potential for the alternatives to have a higher "very pessimistic" economic cost than the current policy.

EROA = 6.25%

(\$ Millions)	Years 1 - 5				Years 1 - 10			
	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy
Very Pessimistic	848.0	846.1	847.2	855.8	952.6	951.0	951.8	957.5
Pessimistic	723.8	724.5	723.5	722.0	804.7	805.6	804.4	798.8
Median (Expected)	625.7	627.9	625.3	614.5	673.7	676.9	673.8	654.3
Optimistic	518.2	522.9	519.4	497.1	518.3	525.4	519.1	482.7
Very Optimistic	334.2	343.4	336.7	290.0	256.1	272.0	260.6	177.8

Economic Cost is defined as the present value of contributions plus contributions necessary to fully fund the plan at the end of the projection period.

Wilshire Associates AVA ECONOMIC COST



(\$ Millions)	Years 1 - 5				Years 1 - 10			
	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy
Very Pessimistic	779.2	777.8	778.6	786.0	920.6	919.1	919.2	924.8
Pessimistic	690.3	690.4	690.7	689.5	786.5	786.5	785.8	780.7
Median (Expected)	619.3	620.8	619.6	611.7	672.3	674.0	672.3	656.2
Optimistic	544.9	548.0	545.8	531.5	532.6	539.9	534.5	503.3
Very Optimistic	421.1	428.0	423.0	395.3	314.6	327.2	316.7	255.1

Shortfall Risk:
The potential for the alternatives to have a higher median economic cost than the current policy.

Drawdown Risk:
The potential for the alternatives to have a higher "very pessimistic" economic cost than the current policy.

EROA = 6.25%

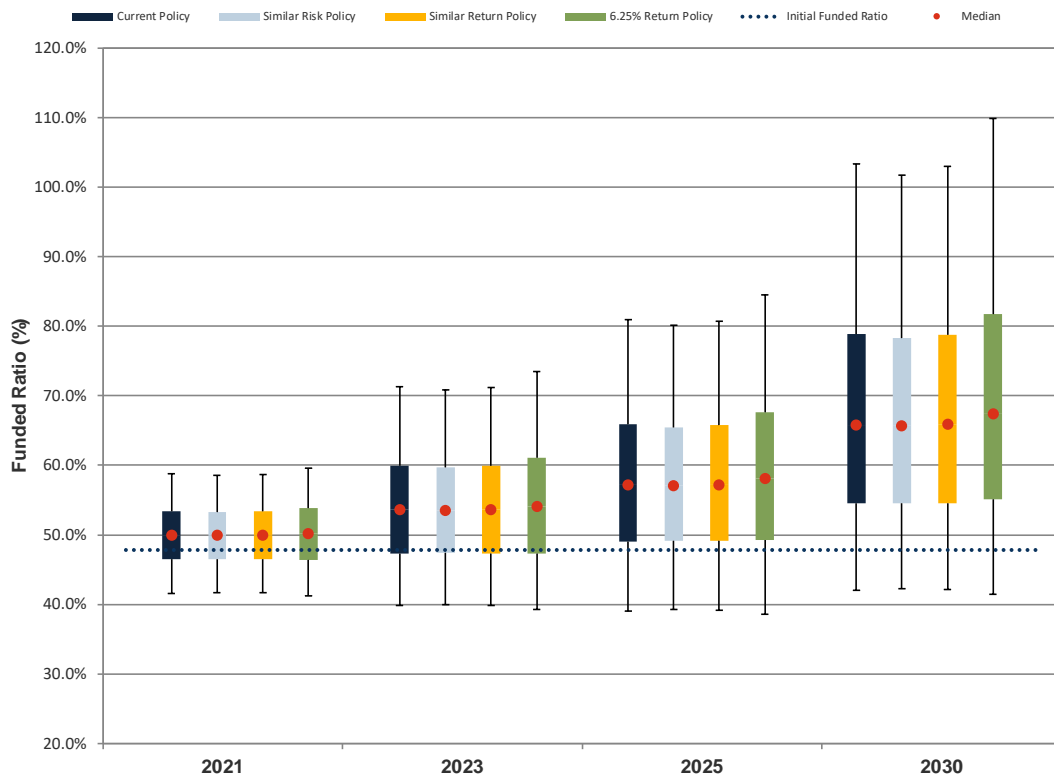
Economic Cost is defined as the present value of contributions plus contributions necessary to fully fund the plan at the end of the projection period.



PENSION – CERS Non-Hazardous



Wilshire Associates MVA FUNDED RATIO



Shortfall Risk:
The potential for the alternatives to have a lower median funded ratio than the current policy.

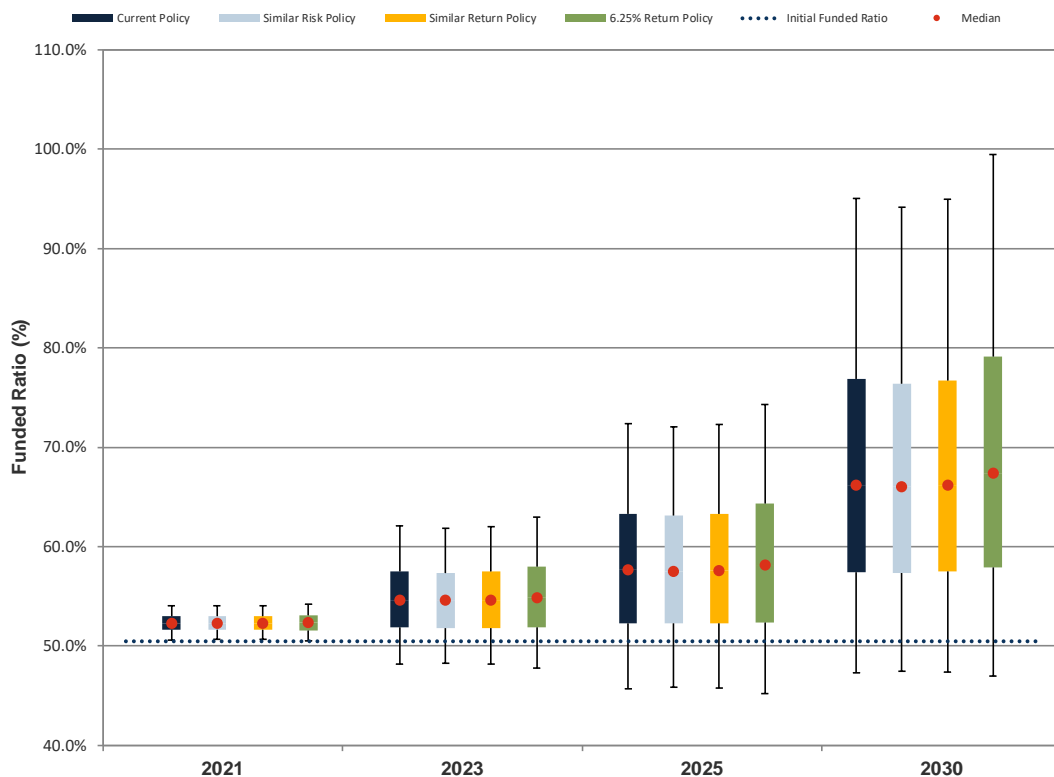
Drawdown Risk:
The potential for the alternatives to have a lower "very pessimistic" funded ratio than the current policy.

Initial Funded Ratio = 47.85%

(%)	2021				2023				2025				2030			
	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy
Very Optimistic	58.77	58.54	58.65	59.59	71.30	70.80	71.15	73.47	80.90	80.18	80.71	84.48	103.31	101.77	102.93	109.85
Optimistic	53.41	53.33	53.40	53.81	59.98	59.71	59.92	61.06	65.88	65.46	65.79	67.63	78.83	78.31	78.76	81.80
Median (Expected)	49.96	49.94	49.97	50.13	53.64	53.54	53.63	54.11	57.23	57.09	57.17	58.05	65.84	65.70	65.93	67.40
Pessimistic	46.50	46.51	46.50	46.39	47.33	47.36	47.35	47.33	49.08	49.09	49.12	49.28	54.57	54.49	54.59	55.10
Very Pessimistic	41.58	41.72	41.64	41.18	39.79	39.91	39.83	39.22	39.09	39.22	39.13	38.53	42.07	42.28	42.14	41.43



Wilshire Associates AVA FUNDED RATIO



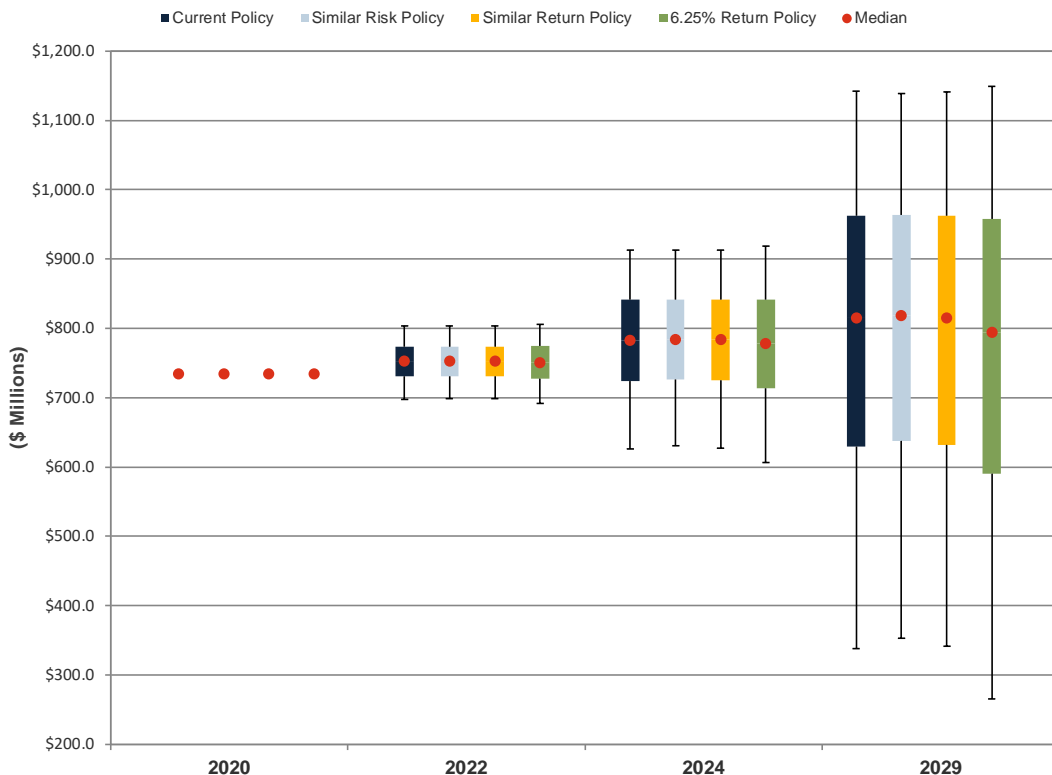
Shortfall Risk:
The potential for the alternatives to have a lower median funded ratio than the current policy.

Drawdown Risk:
The potential for the alternatives to have a lower "very pessimistic" funded ratio than the current policy.

Initial Funded Ratio = 50.49%

(%)	2021				2023				2025				2030			
	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy
Very Optimistic	54.07	54.03	54.05	54.24	62.09	61.88	62.02	62.97	72.36	72.07	72.28	74.34	95.07	94.12	94.93	99.46
Optimistic	53.00	52.98	53.00	53.08	57.49	57.38	57.47	57.95	63.33	63.10	63.27	64.36	76.84	76.36	76.73	79.12
Median (Expected)	52.31	52.31	52.31	52.34	54.65	54.60	54.64	54.87	57.64	57.52	57.61	58.18	66.21	66.01	66.22	67.39
Pessimistic	51.62	51.62	51.62	51.59	51.85	51.83	51.84	51.88	52.28	52.29	52.29	52.37	57.46	57.37	57.47	57.92
Very Pessimistic	50.63	50.66	50.65	50.55	48.16	48.23	48.17	47.82	45.69	45.83	45.74	45.20	47.27	47.45	47.39	46.97

Wilshire Associates PLAN YEAR CONTRIBUTIONS



Shortfall Risk:

The potential for the alternatives to have higher median contributions than the current policy.

Drawdown Risk:

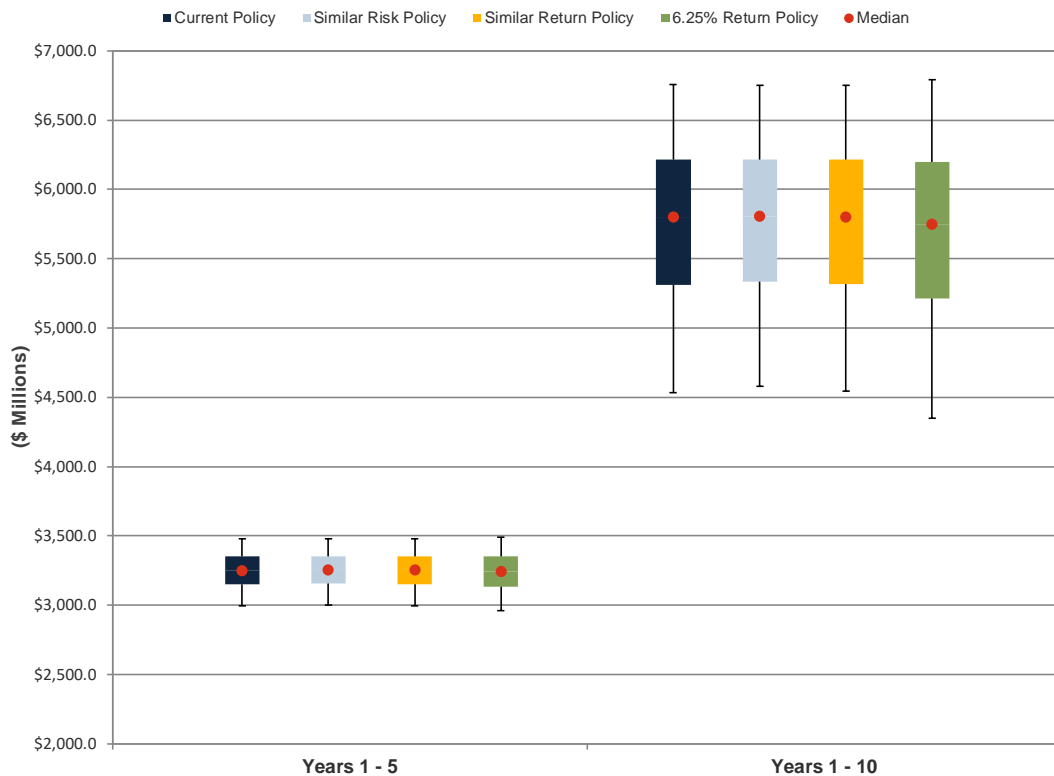
The potential for the alternatives to have higher "very pessimistic" contributions than the current policy.

(\$ Millions)	2020				2022				2024				2029			
	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy
Very Pessimistic	734.9	734.9	734.9	734.9	803.6	803.0	803.3	806.2	913.4	912.3	913.3	918.5	1,141.7	1,138.7	1,140.8	1,149.5
Pessimistic	734.9	734.9	734.9	734.9	774.0	773.9	774.0	774.3	841.1	841.3	841.0	841.0	962.5	963.3	962.9	957.5
Median (Expected)	734.9	734.9	734.9	734.9	752.4	752.7	752.4	750.9	783.2	784.3	783.7	777.9	815.2	818.0	814.8	794.7
Optimistic	734.9	734.9	734.9	734.9	730.6	731.4	730.9	727.3	724.3	726.6	725.0	714.1	629.4	637.6	631.6	590.2
Very Optimistic	734.9	734.9	734.9	734.9	697.5	699.1	698.1	691.2	626.0	631.1	627.7	606.2	337.7	353.5	341.6	265.0

Wilshire Associates



PRESENT VALUE OF CONTRIBUTIONS



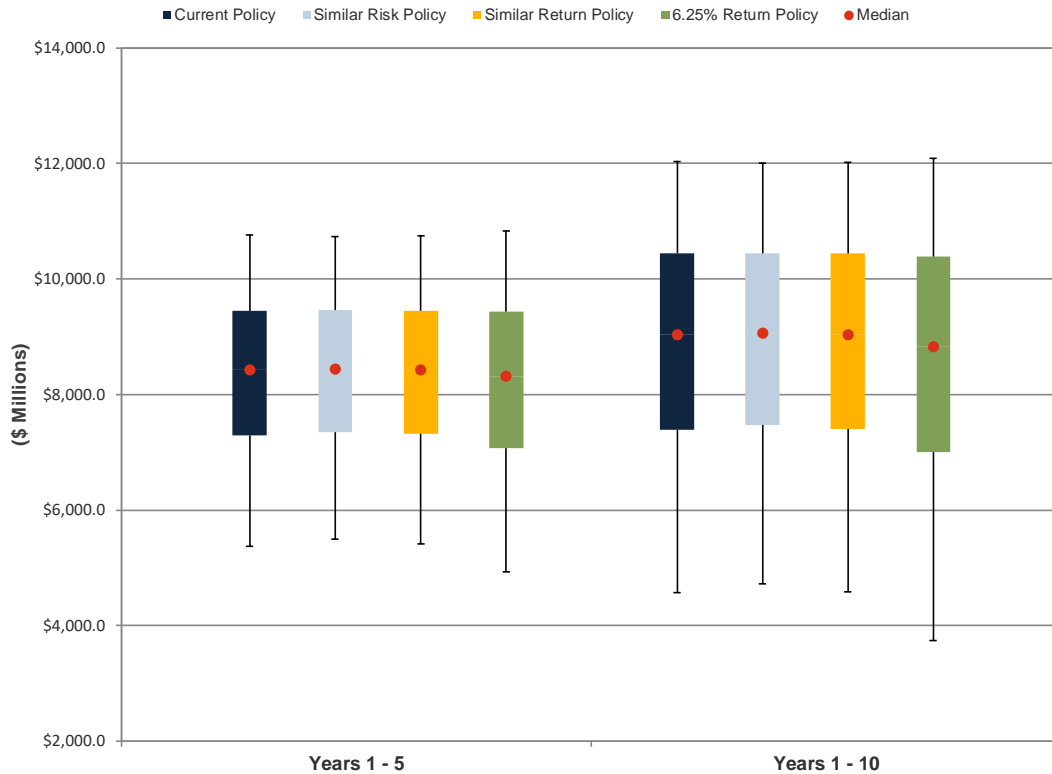
Shortfall Risk:
 The potential for the alternatives to have a higher median present value of contributions than the current policy.

Drawdown Risk:
 The potential for the alternatives to have a higher “very pessimistic” present value of contributions than the current policy.

EROA = 6.25%

(\$ Millions)	Years 1 - 5				Years 1 - 10			
	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy
Very Pessimistic	3,478.5	3,477.2	3,478.3	3,488.9	6,757.9	6,749.5	6,751.3	6,788.5
Pessimistic	3,350.5	3,350.9	3,350.7	3,350.8	6,212.7	6,215.8	6,212.7	6,198.1
Median (Expected)	3,251.9	3,253.9	3,252.5	3,243.5	5,798.2	5,808.6	5,799.4	5,747.7
Optimistic	3,153.1	3,156.6	3,154.0	3,136.7	5,311.3	5,335.0	5,316.9	5,212.1
Very Optimistic	2,994.2	3,001.6	2,997.1	2,963.7	4,533.5	4,580.9	4,544.5	4,352.0

Wilshire Associates MVA ECONOMIC COST



Shortfall Risk:
The potential for the alternatives to have a higher median economic cost than the current policy.

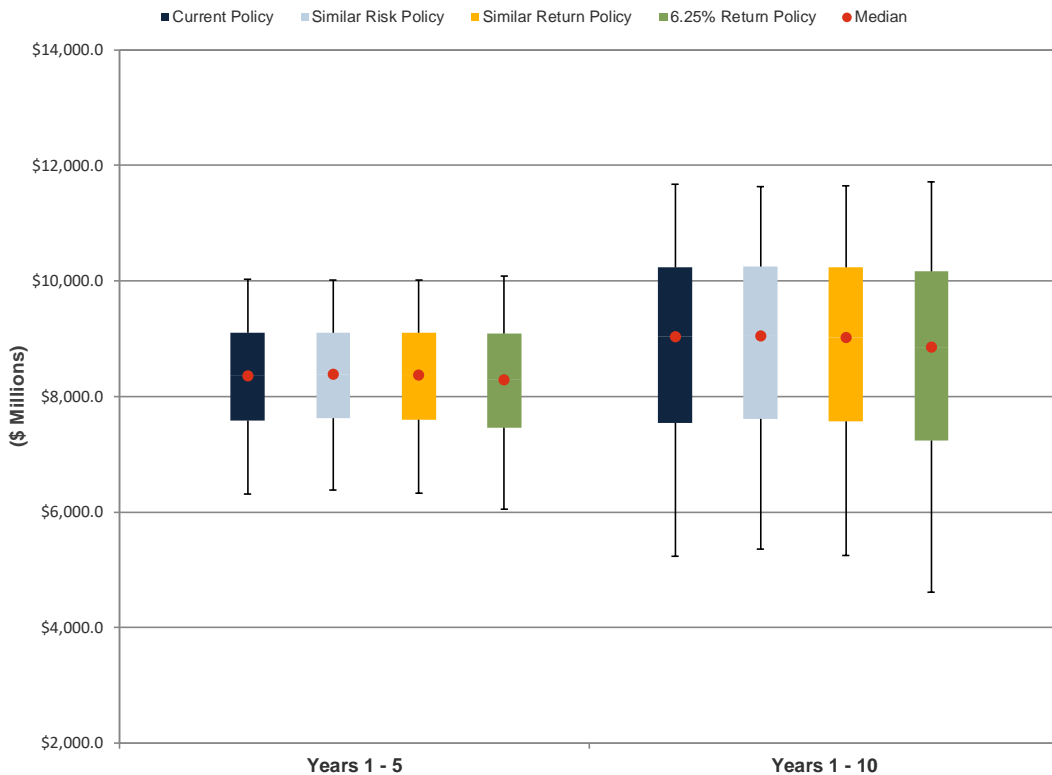
Drawdown Risk:
The potential for the alternatives to have a higher "very pessimistic" economic cost than the current policy.

EROA = 6.25%

(\$ Millions)	Years 1 - 5				Years 1 - 10			
	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy
Very Pessimistic	10,762.9	10,734.5	10,750.3	10,836.0	12,035.2	12,010.8	12,022.0	12,091.3
Pessimistic	9,455.3	9,460.8	9,454.9	9,433.7	10,448.9	10,446.9	10,441.8	10,382.4
Median (Expected)	8,425.9	8,444.2	8,422.8	8,311.4	9,032.2	9,061.3	9,038.7	8,821.4
Optimistic	7,298.3	7,354.3	7,314.3	7,072.0	7,391.4	7,470.2	7,401.6	7,005.9
Very Optimistic	5,377.6	5,490.0	5,409.1	4,929.9	4,570.2	4,715.1	4,580.0	3,745.4

Economic Cost is defined as the present value of contributions plus contributions necessary to fully fund the plan at the end of the projection period.

Wilshire Associates AVA ECONOMIC COST



Shortfall Risk:
The potential for the alternatives to have a higher median economic cost than the current policy.

Drawdown Risk:
The potential for the alternatives to have a higher "very pessimistic" economic cost than the current policy.

EROA = 6.25%

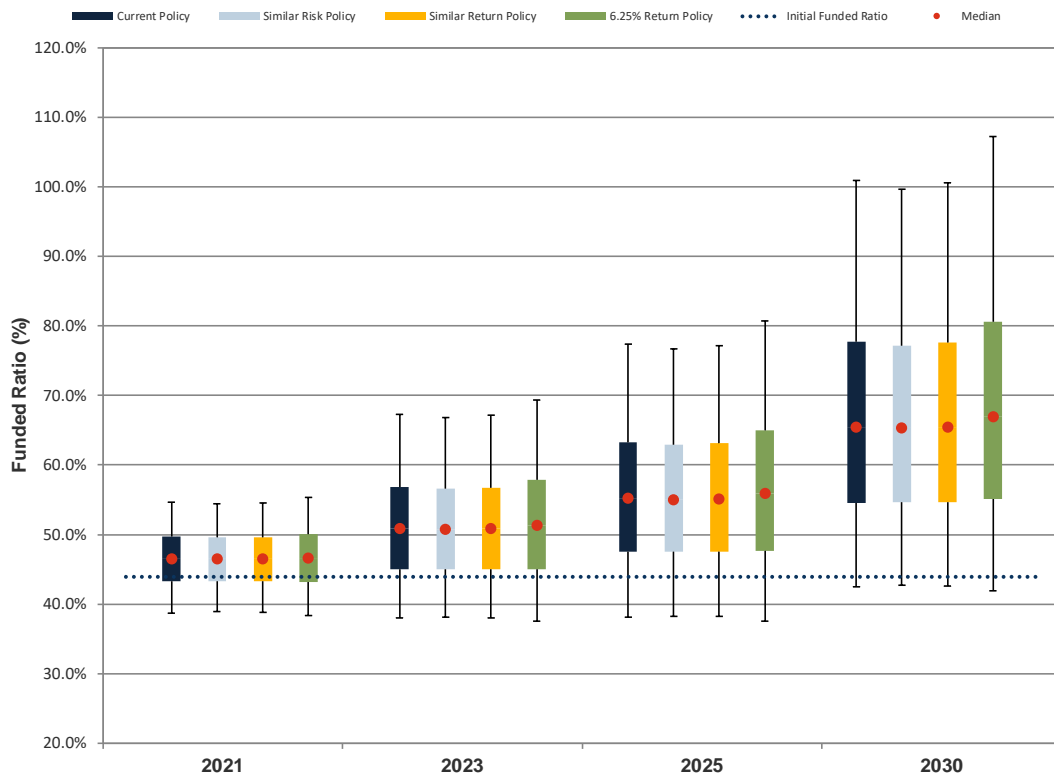
(\$ Millions)	Years 1 - 5				Years 1 - 10			
	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy
Very Pessimistic	10,023.2	10,009.5	10,017.2	10,084.6	11,667.8	11,635.7	11,643.5	11,712.6
Pessimistic	9,096.9	9,098.4	9,098.9	9,088.6	10,239.0	10,245.1	10,240.0	10,172.5
Median (Expected)	8,357.3	8,379.4	8,364.8	8,285.6	9,031.0	9,047.6	9,023.6	8,853.7
Optimistic	7,586.0	7,621.7	7,595.9	7,454.1	7,546.1	7,614.6	7,563.2	7,239.6
Very Optimistic	6,307.9	6,376.3	6,327.6	6,052.2	5,225.9	5,358.0	5,248.5	4,610.9

Economic Cost is defined as the present value of contributions plus contributions necessary to fully fund the plan at the end of the projection period.



PENSION – CERS Hazardous

Wilshire Associates MVA FUNDED RATIO



Shortfall Risk:

The potential for the alternatives to have a lower median funded ratio than the current policy.

Drawdown Risk:

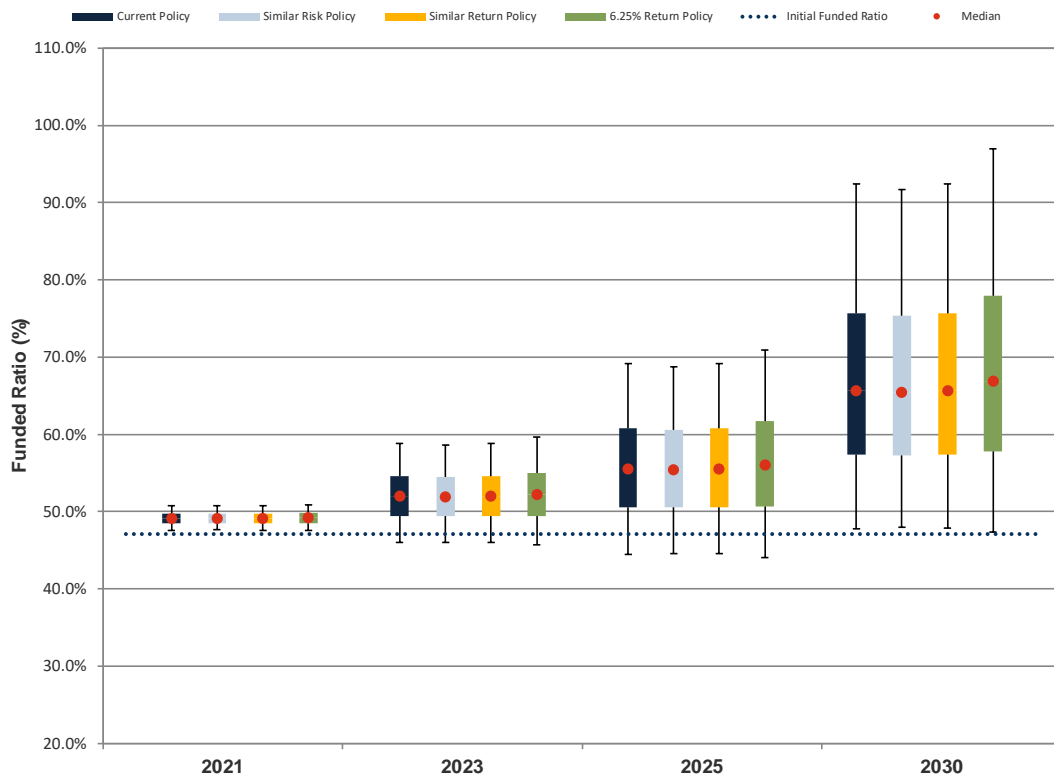
The potential for the alternatives to have a lower "very pessimistic" funded ratio than the current policy.

Initial Funded Ratio = 43.96%

(%)	2021				2023				2025				2030			
	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy
Very Optimistic	54.61	54.40	54.50	55.37	67.25	66.78	67.14	69.34	77.34	76.66	77.15	80.70	100.96	99.60	100.58	107.25
Optimistic	49.67	49.60	49.66	50.04	56.79	56.59	56.77	57.83	63.31	62.88	63.14	64.97	77.75	77.20	77.60	80.55
Median (Expected)	46.49	46.46	46.49	46.64	50.90	50.80	50.87	51.37	55.18	55.00	55.15	55.91	65.44	65.28	65.49	66.95
Pessimistic	43.29	43.30	43.29	43.19	45.06	45.05	45.04	45.04	47.55	47.52	47.56	47.66	54.60	54.60	54.68	55.16
Very Pessimistic	38.75	38.88	38.80	38.38	37.99	38.12	38.04	37.54	38.12	38.29	38.19	37.60	42.50	42.70	42.59	41.87



Wilshire Associates AVA FUNDED RATIO



Shortfall Risk:
The potential for the alternatives to have a lower median funded ratio than the current policy.

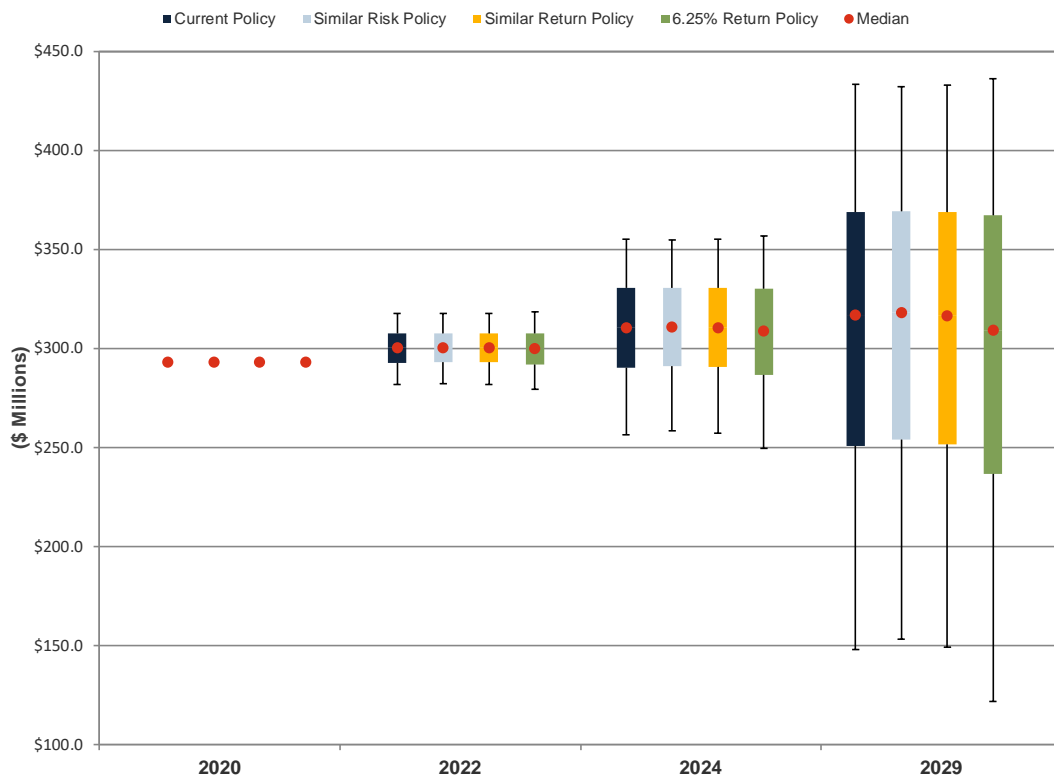
Drawdown Risk:
The potential for the alternatives to have a lower "very pessimistic" funded ratio than the current policy.

Initial Funded Ratio = 47.11%

(%)	2021				2023				2025				2030			
	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy
Very Optimistic	50.77	50.73	50.75	50.93	58.88	58.65	58.79	59.66	69.21	68.75	69.13	70.95	92.46	91.69	92.39	96.92
Optimistic	49.78	49.77	49.78	49.86	54.62	54.52	54.59	55.05	60.80	60.57	60.75	61.76	75.72	75.32	75.64	77.90
Median (Expected)	49.15	49.14	49.15	49.18	52.00	51.94	51.99	52.17	55.56	55.44	55.50	56.03	65.66	65.49	65.69	66.88
Pessimistic	48.51	48.51	48.51	48.49	49.41	49.39	49.39	49.43	50.59	50.57	50.59	50.68	57.39	57.33	57.41	57.78
Very Pessimistic	47.60	47.63	47.61	47.53	45.98	46.06	46.00	45.70	44.52	44.61	44.55	44.08	47.73	47.94	47.86	47.41



Wilshire Associates PLAN YEAR CONTRIBUTIONS



Shortfall Risk:
The potential for the alternatives to have higher median contributions than the current policy.

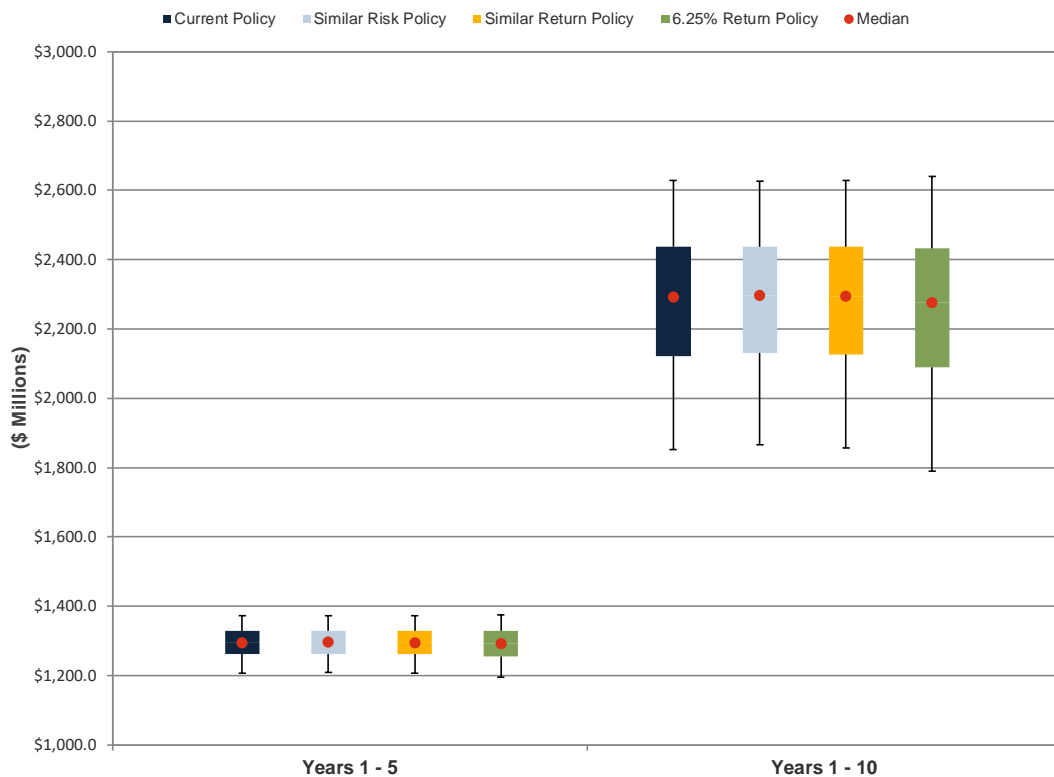
Drawdown Risk:
The potential for the alternatives to have higher "very pessimistic" contributions than the current policy.

(\$ Millions)	2020				2022				2024				2029			
	Current	Similar	Similar	6.25%	Current	Similar	Similar	6.25%	Current	Similar	Similar	6.25%	Current	Similar	Similar	6.25%
	Policy	Risk Policy	Return Policy	Return Policy	Policy	Risk Policy	Return Policy	Return Policy	Policy	Risk Policy	Return Policy	Return Policy	Policy	Risk Policy	Return Policy	Return Policy
Very Pessimistic	293.1	293.1	293.1	293.1	317.8	317.5	317.7	318.6	355.2	354.9	355.1	356.9	433.6	432.1	433.0	436.2
Pessimistic	293.1	293.1	293.1	293.1	307.6	307.6	307.6	307.8	330.4	330.5	330.5	330.1	369.0	369.3	368.9	367.3
Median (Expected)	293.1	293.1	293.1	293.1	300.2	300.4	300.3	299.8	310.5	310.8	310.6	308.6	316.9	317.9	316.6	309.3
Optimistic	293.1	293.1	293.1	293.1	292.8	293.1	292.9	291.7	290.2	291.0	290.5	286.7	250.8	254.0	251.6	236.5
Very Optimistic	293.1	293.1	293.1	293.1	281.6	282.1	281.8	279.5	256.5	258.3	257.1	249.6	147.8	153.2	149.2	121.7

Wilshire Associates



PRESENT VALUE OF CONTRIBUTIONS



Shortfall Risk:
The potential for the alternatives to have a higher median present value of contributions than the current policy.

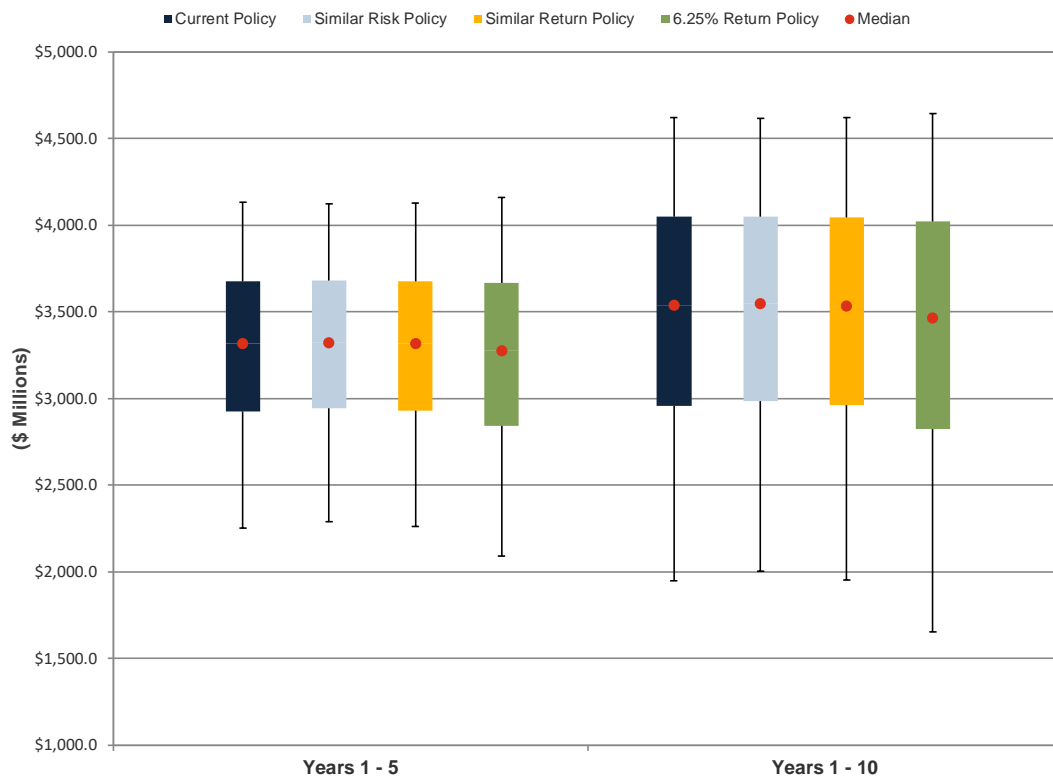
Drawdown Risk:
The potential for the alternatives to have a higher "very pessimistic" present value of contributions than the current policy.

EROA = 6.25%

(\$ Millions)	Years 1 - 5				Years 1 - 10			
	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy
Very Pessimistic	1,372.7	1,372.3	1,372.5	1,376.0	2,629.7	2,625.9	2,627.4	2,639.0
Pessimistic	1,328.9	1,329.0	1,328.8	1,328.8	2,437.6	2,438.4	2,438.0	2,433.3
Median (Expected)	1,295.1	1,295.8	1,295.3	1,292.1	2,292.1	2,296.2	2,293.5	2,276.3
Optimistic	1,261.3	1,262.6	1,261.7	1,255.6	2,122.8	2,131.6	2,125.4	2,089.1
Very Optimistic	1,206.8	1,209.7	1,207.8	1,196.1	1,851.4	1,867.0	1,856.4	1,788.8



Wilshire Associates MVA ECONOMIC COST



Shortfall Risk:
The potential for the alternatives to have a higher median economic cost than the current policy.

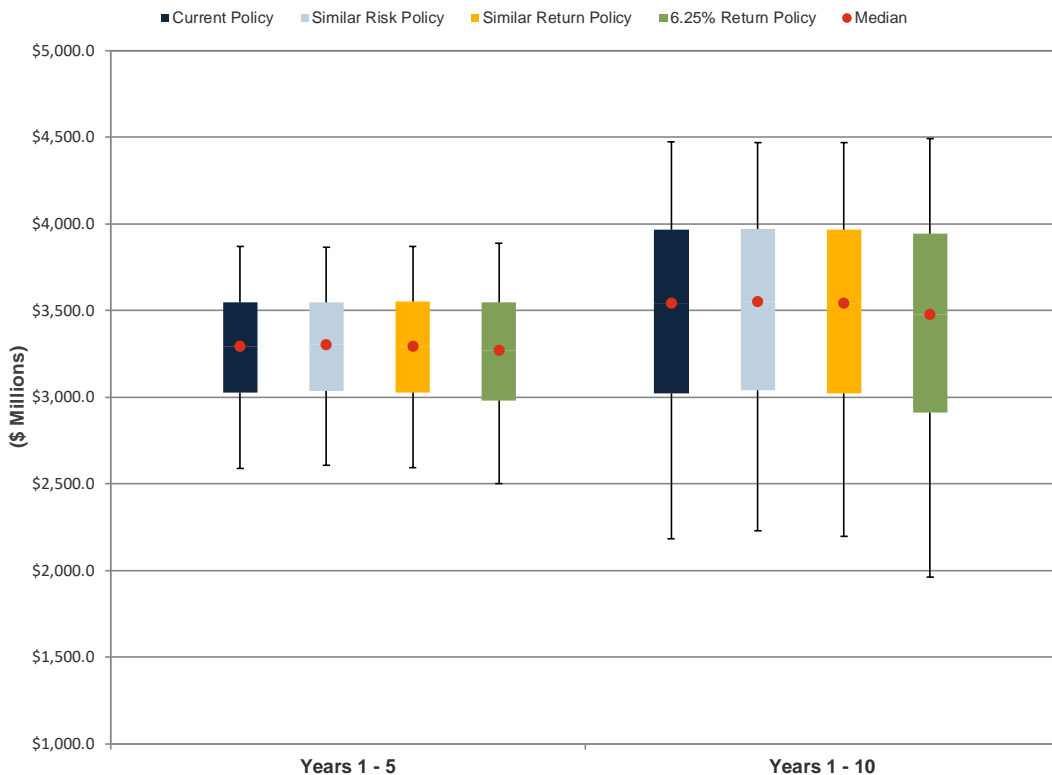
Drawdown Risk:
The potential for the alternatives to have a higher “very pessimistic” economic cost than the current policy.

EROA = 6.25%

(\$ Millions)	Years 1 - 5				Years 1 - 10			
	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy
Very Pessimistic	4,134.6	4,123.0	4,128.6	4,160.6	4,623.1	4,615.5	4,621.7	4,645.1
Pessimistic	3,677.2	3,678.8	3,677.9	3,669.4	4,047.9	4,050.0	4,045.2	4,021.6
Median (Expected)	3,315.6	3,320.8	3,315.1	3,277.9	3,537.6	3,548.0	3,535.8	3,465.4
Optimistic	2,924.1	2,943.4	2,928.2	2,844.1	2,957.4	2,985.3	2,962.0	2,822.9
Very Optimistic	2,251.6	2,289.6	2,261.2	2,093.5	1,949.0	2,004.1	1,954.7	1,652.1

Economic Cost is defined as the present value of contributions plus contributions necessary to fully fund the plan at the end of the projection period.

Wilshire Associates AVA ECONOMIC COST



Shortfall Risk:
The potential for the alternatives to have a higher median economic cost than the current policy.

Drawdown Risk:
The potential for the alternatives to have a higher “very pessimistic” economic cost than the current policy.

EROA = 6.25%

(\$ Millions)	Years 1 - 5				Years 1 - 10			
	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy
Very Pessimistic	3,870.1	3,863.5	3,868.2	3,889.9	4,471.8	4,467.4	4,470.1	4,493.6
Pessimistic	3,548.6	3,549.6	3,549.9	3,545.9	3,966.7	3,970.6	3,966.9	3,944.6
Median (Expected)	3,294.3	3,301.1	3,296.3	3,269.5	3,541.3	3,549.9	3,541.4	3,480.3
Optimistic	3,025.9	3,036.5	3,028.7	2,980.0	3,020.3	3,042.2	3,023.9	2,910.2
Very Optimistic	2,589.8	2,608.5	2,591.8	2,500.8	2,183.2	2,230.3	2,195.3	1,960.9

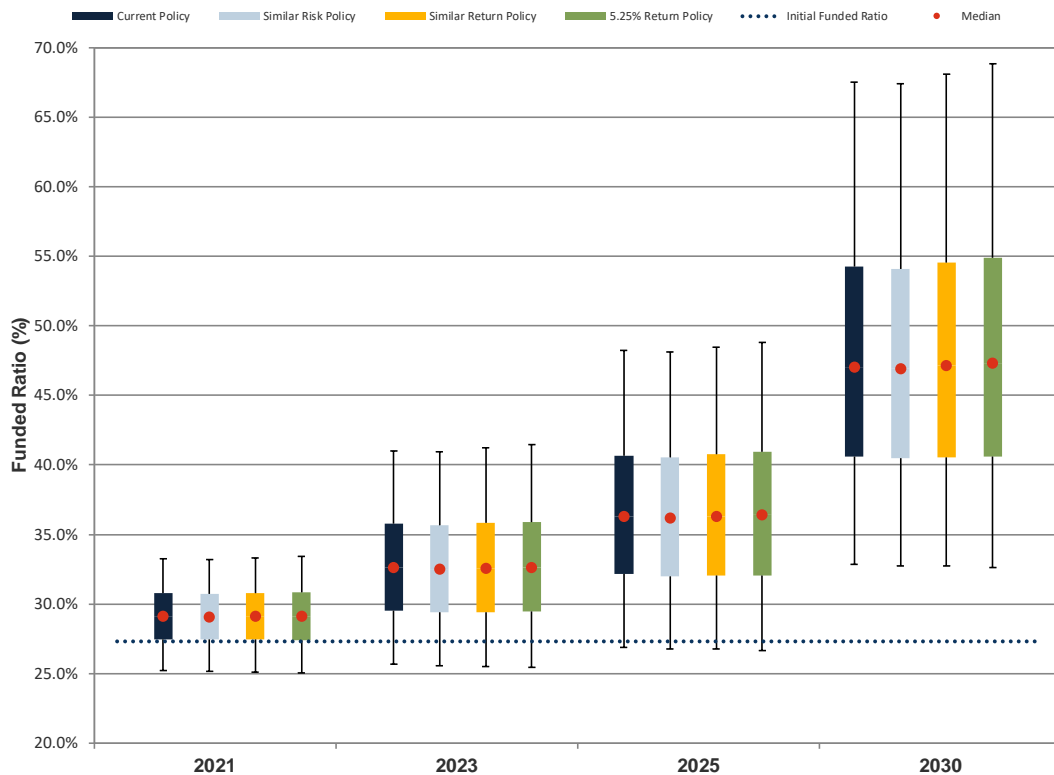
Economic Cost is defined as the present value of contributions plus contributions necessary to fully fund the plan at the end of the projection period.



PENSION – SPRS



Wilshire Associates MVA FUNDED RATIO



Shortfall Risk:
The potential for the alternatives to have a lower median funded ratio than the current policy.

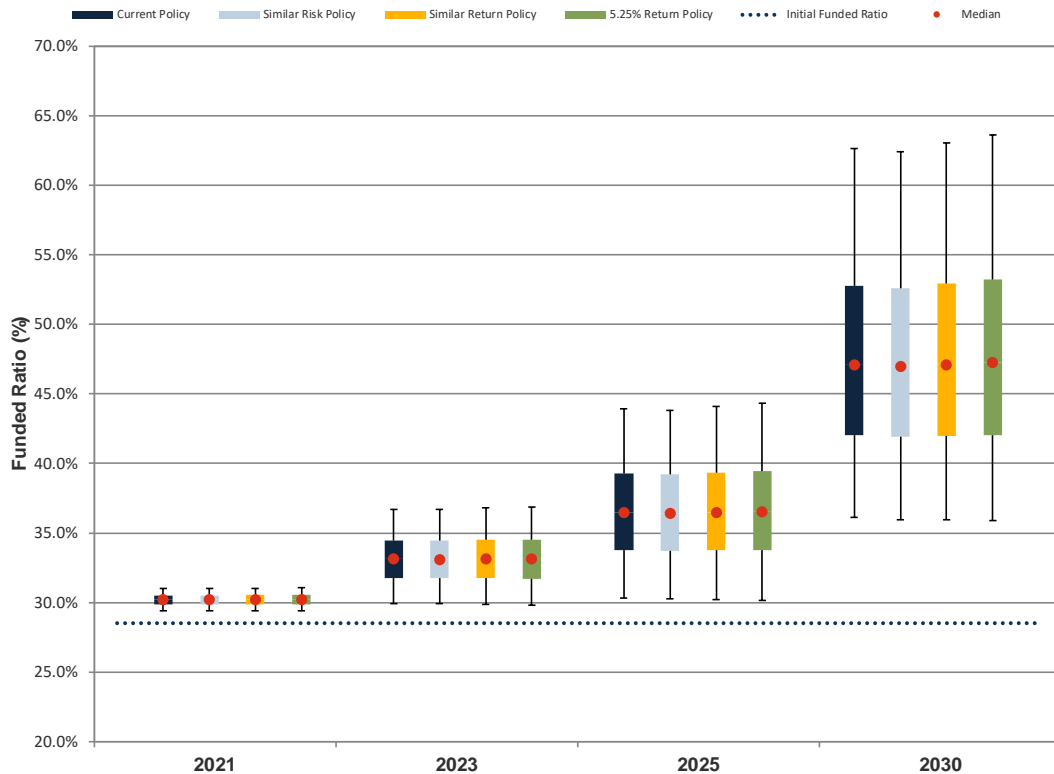
Drawdown Risk:
The potential for the alternatives to have a lower "very pessimistic" funded ratio than the current policy.

Initial Funded Ratio = 27.30%

(%)	2021				2023				2025				2030			
	Current Policy	Similar Risk Policy	Similar Return Policy	5.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	5.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	5.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	5.25% Return Policy
Very Optimistic	33.24	33.18	33.31	33.40	41.00	40.94	41.22	41.45	48.21	48.09	48.48	48.78	67.50	67.39	68.08	68.84
Optimistic	30.76	30.74	30.78	30.82	35.77	35.68	35.81	35.92	40.66	40.54	40.75	40.91	54.27	54.11	54.55	54.88
Median (Expected)	29.12	29.09	29.11	29.13	32.59	32.51	32.58	32.63	36.29	36.19	36.31	36.40	47.05	46.89	47.12	47.32
Pessimistic	27.47	27.45	27.44	27.42	29.49	29.42	29.43	29.44	32.15	32.01	32.04	32.07	40.61	40.49	40.55	40.63
Very Pessimistic	25.19	25.18	25.12	25.07	25.66	25.57	25.52	25.44	26.87	26.79	26.74	26.64	32.86	32.74	32.72	32.62



Wilshire Associates AVA FUNDED RATIO



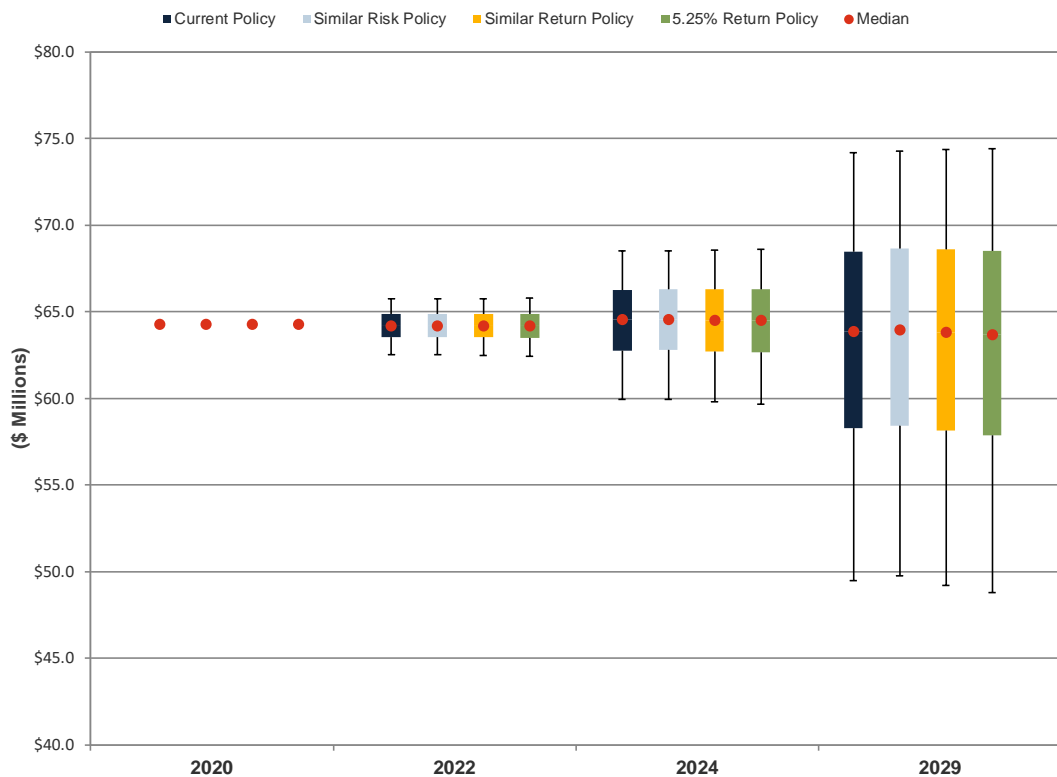
Shortfall Risk:
The potential for the alternatives to have a lower median funded ratio than the current policy.

Drawdown Risk:
The potential for the alternatives to have a lower "very pessimistic" funded ratio than the current policy.

Initial Funded Ratio = 28.50%

(%)	2021				2023				2025				2030			
	Current Policy	Similar Risk Policy	Similar Return Policy	5.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	5.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	5.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	5.25% Return Policy
Very Optimistic	31.02	31.01	31.03	31.05	36.71	36.67	36.79	36.88	43.95	43.84	44.13	44.31	62.63	62.43	63.05	63.64
Optimistic	30.52	30.52	30.53	30.54	34.47	34.43	34.49	34.54	39.27	39.20	39.34	39.45	52.78	52.59	52.95	53.22
Median (Expected)	30.19	30.19	30.19	30.20	33.12	33.11	33.13	33.15	36.45	36.38	36.46	36.51	47.06	46.94	47.10	47.25
Pessimistic	29.86	29.86	29.86	29.85	31.78	31.73	31.74	31.73	33.79	33.74	33.76	33.77	42.05	41.94	41.99	42.03
Very Pessimistic	29.41	29.41	29.40	29.38	29.93	29.90	29.86	29.83	30.33	30.27	30.24	30.17	36.11	35.97	35.93	35.88

Wilshire Associates PLAN YEAR CONTRIBUTIONS

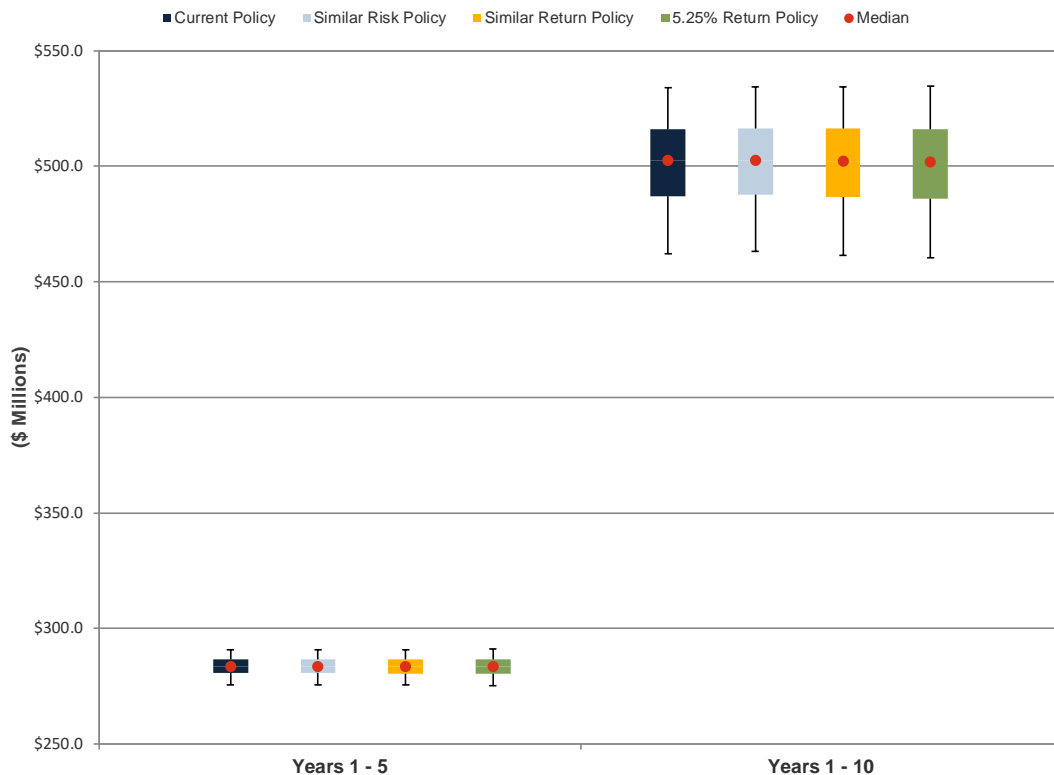


Shortfall Risk:
The potential for the alternatives to have higher median contributions than the current policy.

Drawdown Risk:
The potential for the alternatives to have higher "very pessimistic" contributions than the current policy.

(\$ Millions)	2020				2022				2024				2029			
	Current Policy	Similar Risk Policy	Similar Return Policy	5.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	5.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	5.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	5.25% Return Policy
Very Pessimistic	64.3	64.3	64.3	64.3	65.7	65.8	65.8	65.8	68.5	68.5	68.6	68.6	74.2	74.3	74.4	74.4
Pessimistic	64.3	64.3	64.3	64.3	64.9	64.9	64.9	64.9	66.3	66.3	66.3	66.3	68.5	68.6	68.6	68.5
Median (Expected)	64.3	64.3	64.3	64.3	64.2	64.2	64.2	64.2	64.5	64.6	64.5	64.5	63.9	64.0	63.8	63.7
Optimistic	64.3	64.3	64.3	64.3	63.5	63.6	63.5	63.5	62.8	62.8	62.7	62.7	58.3	58.4	58.1	57.9
Very Optimistic	64.3	64.3	64.3	64.3	62.5	62.5	62.5	62.4	59.9	60.0	59.8	59.7	49.5	49.7	49.2	48.8

PRESENT VALUE OF CONTRIBUTIONS



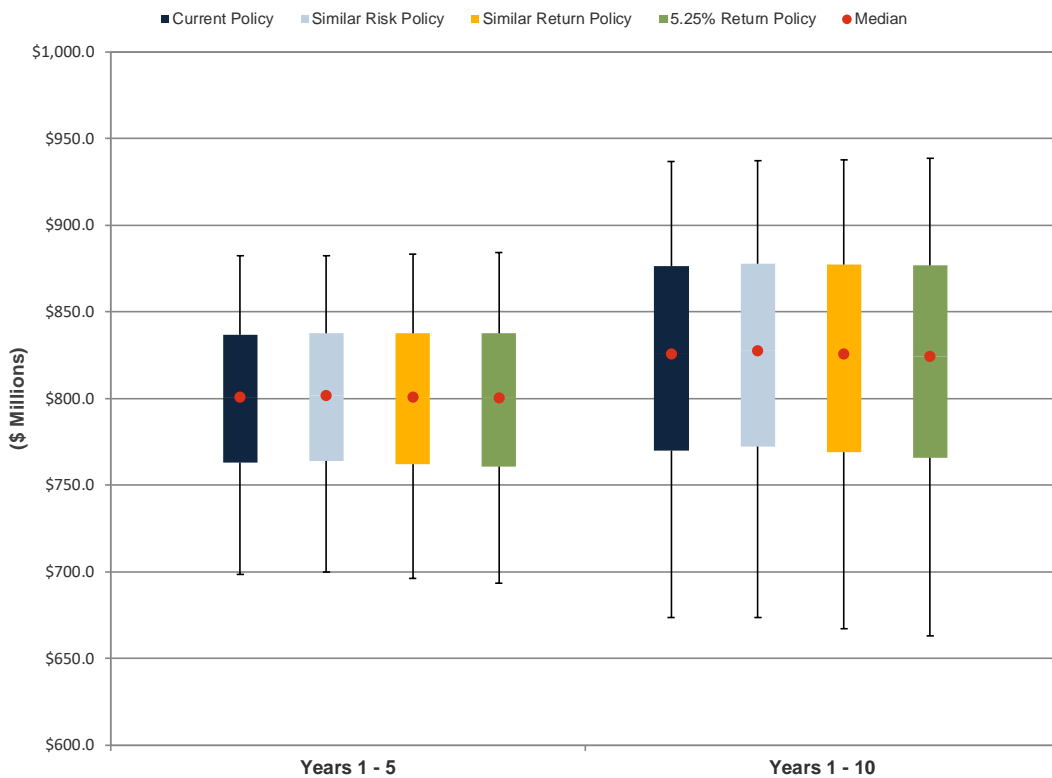
Shortfall Risk:
The potential for the alternatives to have a higher median present value of contributions than the current policy.

Drawdown Risk:
The potential for the alternatives to have a higher "very pessimistic" present value of contributions than the current policy.

EROA = 5.25%

(\$ Millions)	Years 1 - 5				Years 1 - 10			
	Current Policy	Similar Risk Policy	Similar Return Policy	5.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	5.25% Return Policy
Very Pessimistic	290.8	290.8	290.9	290.9	534.0	534.2	534.5	534.6
Pessimistic	286.6	286.7	286.7	286.7	516.1	516.5	516.3	516.2
Median (Expected)	283.5	283.6	283.5	283.5	502.5	502.7	502.2	501.9
Optimistic	280.5	280.6	280.5	280.4	487.1	487.6	486.7	486.1
Very Optimistic	275.6	275.7	275.4	275.2	462.3	463.0	461.5	460.3

Wilshire Associates MVA ECONOMIC COST



(\$ Millions)	Years 1 - 5				Years 1 - 10			
	Current Policy	Similar Risk Policy	Similar Return Policy	5.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	5.25% Return Policy
Very Pessimistic	882.5	882.4	883.3	884.3	936.5	937.3	937.7	938.8
Pessimistic	837.0	837.9	837.6	837.5	876.5	877.8	877.4	876.9
Median (Expected)	800.9	801.9	801.0	800.2	825.9	827.8	825.6	824.2
Optimistic	763.1	764.2	762.2	760.8	770.2	772.4	768.9	766.0
Very Optimistic	698.7	700.0	696.4	693.3	673.8	673.8	667.3	662.9

Shortfall Risk:

The potential for the alternatives to have a higher median economic cost than the current policy.

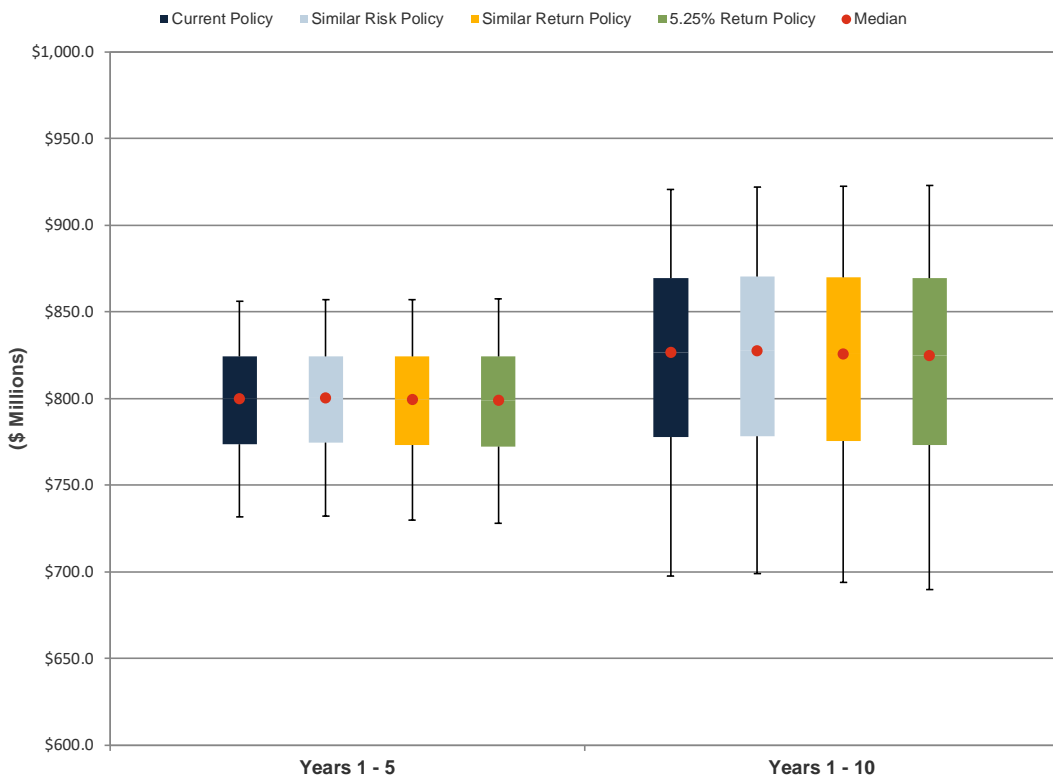
Drawdown Risk:

The potential for the alternatives to have a higher "very pessimistic" economic cost than the current policy.

EROA = 5.25%

Economic Cost is defined as the present value of contributions plus contributions necessary to fully fund the plan at the end of the projection period.

Wilshire Associates AVA ECONOMIC COST



Shortfall Risk:
The potential for the alternatives to have a higher median economic cost than the current policy.

Drawdown Risk:
The potential for the alternatives to have a higher “very pessimistic” economic cost than the current policy.

EROA = 5.25%

(\$ Millions)	Years 1 - 5				Years 1 - 10			
	Current Policy	Similar Risk Policy	Similar Return Policy	5.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	5.25% Return Policy
Very Pessimistic	856.1	856.9	857.1	857.5	920.7	922.0	922.4	922.8
Pessimistic	824.1	824.5	824.3	824.3	869.3	870.4	869.8	869.4
Median (Expected)	799.9	800.3	799.6	799.0	826.9	827.5	825.9	824.6
Optimistic	773.5	774.4	773.3	772.2	777.7	778.1	775.4	773.2
Very Optimistic	731.8	732.2	729.9	727.8	697.5	699.1	694.1	689.9

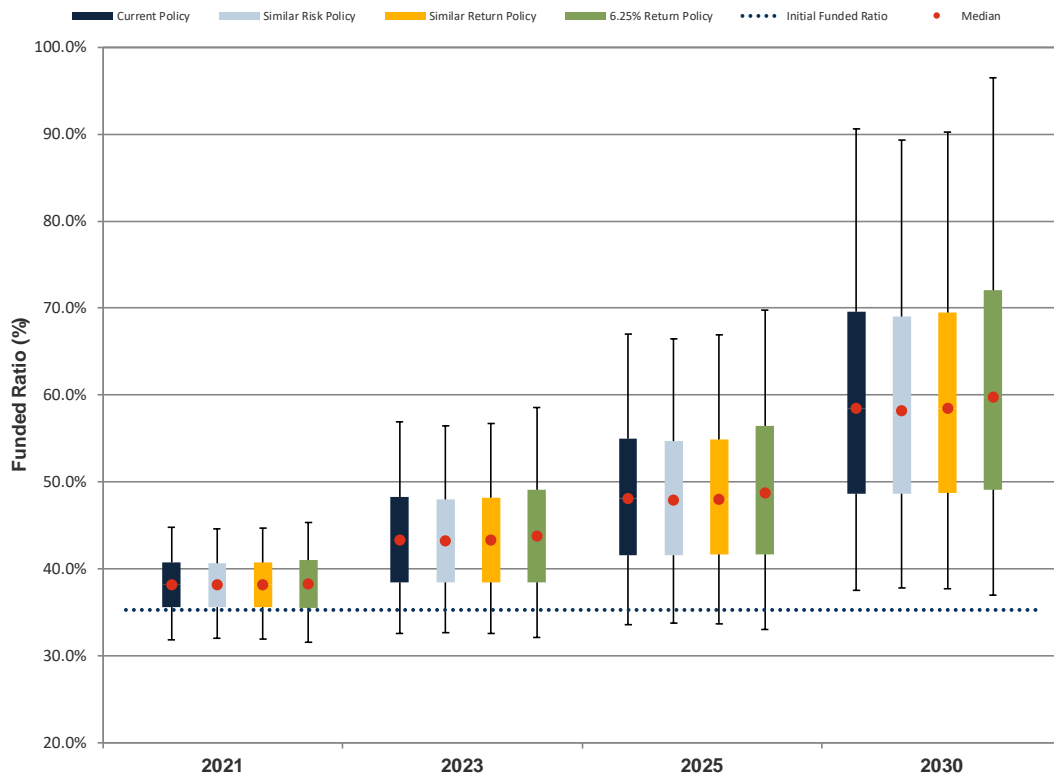
Economic Cost is defined as the present value of contributions plus contributions necessary to fully fund the plan at the end of the projection period.



INSURANCE – KERS Non-Hazardous



Wilshire Associates MVA FUNDED RATIO



Shortfall Risk:

The potential for the alternatives to have a lower median funded ratio than the current policy.

Drawdown Risk:

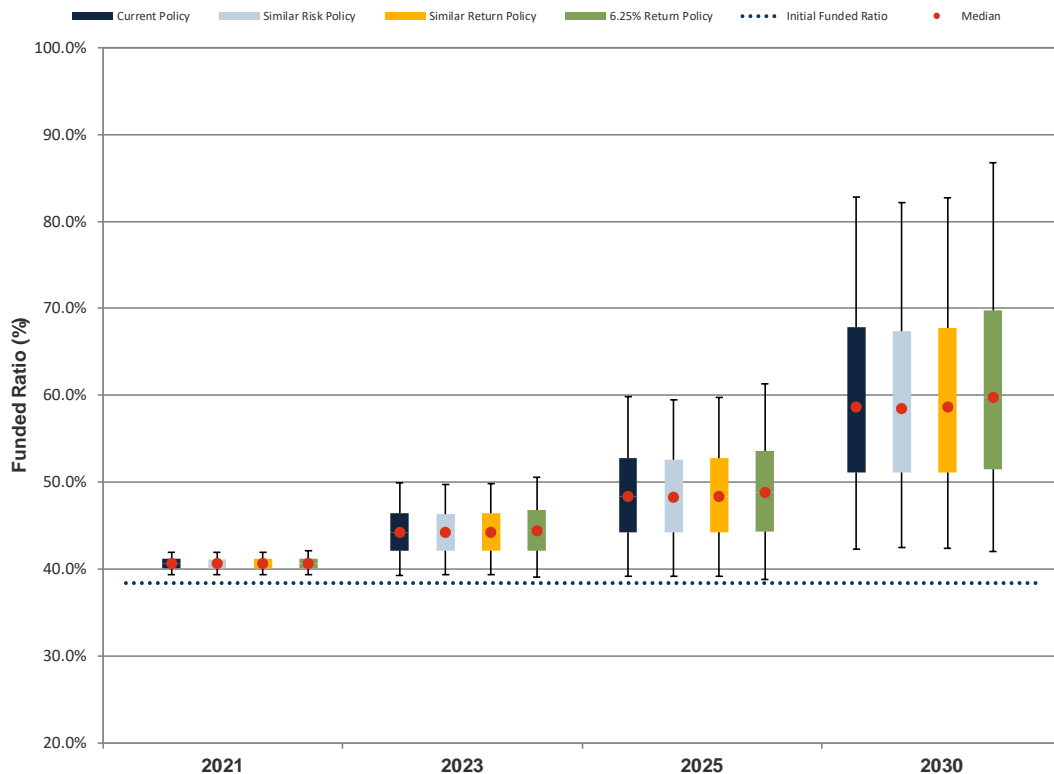
The potential for the alternatives to have a lower "very pessimistic" funded ratio than the current policy.

Initial Funded Ratio = 35.26%

(%)	2021				2023				2025				2030			
	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy
Very Optimistic	44.75	44.59	44.67	45.37	56.87	56.45	56.70	58.56	66.98	66.45	66.89	69.74	90.64	89.29	90.22	96.45
Optimistic	40.75	40.69	40.74	41.05	48.25	48.03	48.17	49.09	55.02	54.71	54.91	56.44	69.55	69.04	69.49	72.09
Median (Expected)	38.16	38.14	38.16	38.29	43.29	43.20	43.28	43.73	48.06	47.90	48.02	48.72	58.45	58.21	58.44	59.76
Pessimistic	35.56	35.57	35.57	35.48	38.46	38.43	38.45	38.45	41.61	41.61	41.64	41.69	48.60	48.64	48.72	49.12
Very Pessimistic	31.87	31.98	31.92	31.57	32.53	32.64	32.56	32.15	33.61	33.78	33.68	32.98	37.55	37.79	37.70	37.02



Wilshire Associates AVA FUNDED RATIO



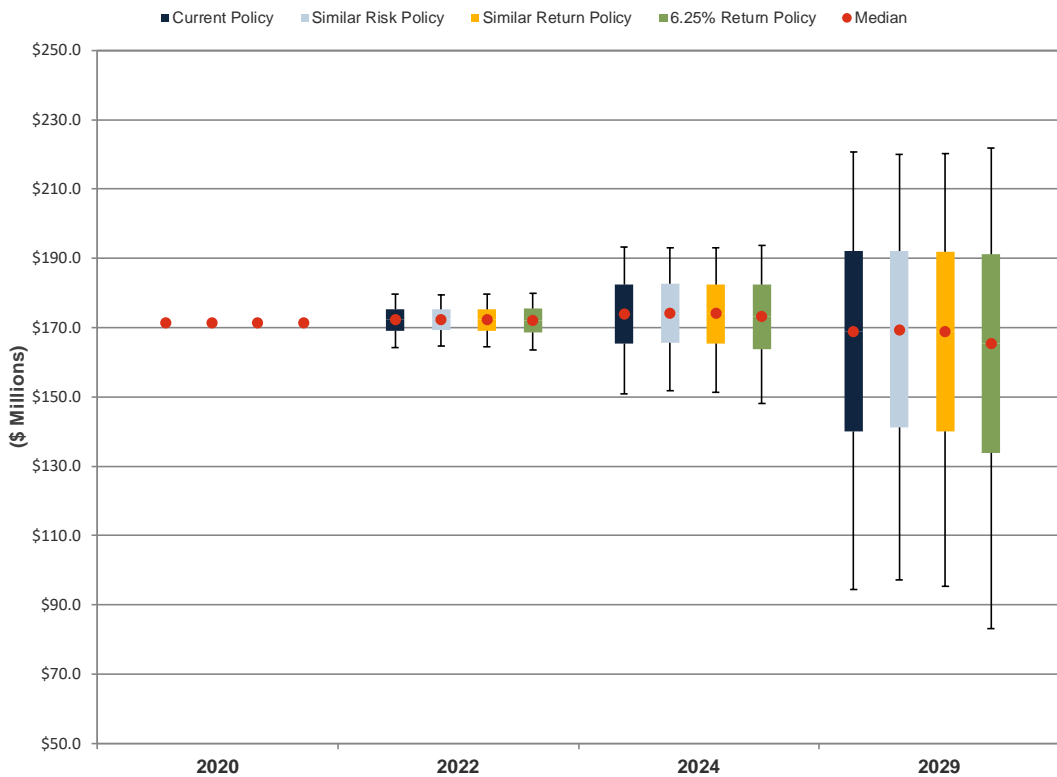
Shortfall Risk:
The potential for the alternatives to have a lower median funded ratio than the current policy.

Drawdown Risk:
The potential for the alternatives to have a lower "very pessimistic" funded ratio than the current policy.

Initial Funded Ratio = 38.38%

(%)	2021				2023				2025				2030			
	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy
Very Optimistic	41.96	41.93	41.95	42.09	49.91	49.73	49.86	50.57	59.82	59.52	59.73	61.33	82.76	82.13	82.75	86.74
Optimistic	41.16	41.15	41.16	41.22	46.42	46.34	46.40	46.76	52.80	52.62	52.75	53.60	67.79	67.37	67.71	69.74
Median (Expected)	40.65	40.64	40.65	40.67	44.25	44.21	44.24	44.41	48.39	48.31	48.37	48.80	58.65	58.51	58.65	59.74
Pessimistic	40.13	40.13	40.13	40.11	42.11	42.11	42.13	42.13	44.23	44.22	44.24	44.28	51.13	51.10	51.16	51.45
Very Pessimistic	39.39	39.41	39.40	39.33	39.32	39.36	39.33	39.09	39.14	39.22	39.18	38.80	42.35	42.46	42.39	42.05

Wilshire Associates PLAN YEAR CONTRIBUTIONS

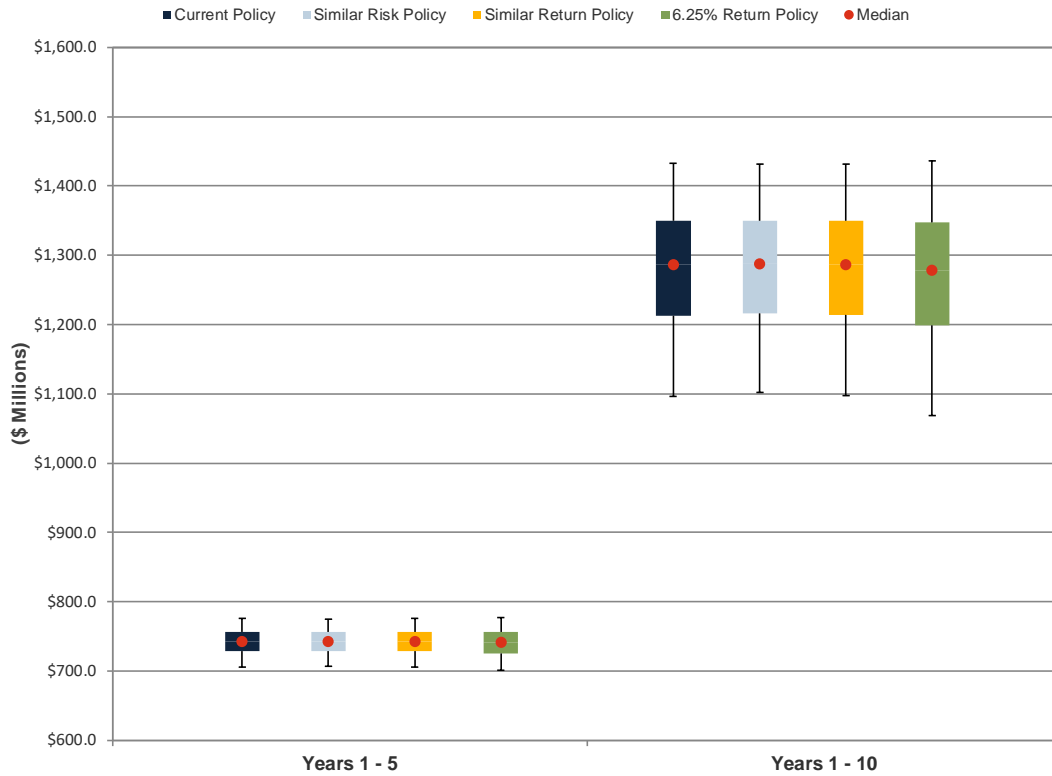


Shortfall Risk:
The potential for the alternatives to have higher median contributions than the current policy.

Drawdown Risk:
The potential for the alternatives to have higher “very pessimistic” contributions than the current policy.

(\$ Millions)	2020				2022				2024				2029			
	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy
Very Pessimistic	171.5	171.5	171.5	171.5	179.6	179.6	179.6	180.0	193.2	193.1	193.1	193.8	220.6	220.0	220.1	221.9
Pessimistic	171.5	171.5	171.5	171.5	175.4	175.4	175.4	175.4	182.5	182.6	182.5	182.4	192.0	192.0	191.8	191.2
Median (Expected)	171.5	171.5	171.5	171.5	172.3	172.3	172.3	172.0	174.0	174.2	174.1	173.3	168.8	169.3	168.8	165.5
Optimistic	171.5	171.5	171.5	171.5	169.1	169.2	169.1	168.6	165.4	165.7	165.5	163.8	140.0	141.2	140.1	133.8
Very Optimistic	171.5	171.5	171.5	171.5	164.4	164.6	164.4	163.5	150.9	151.7	151.2	148.2	94.5	97.2	95.4	83.2

PRESENT VALUE OF CONTRIBUTIONS



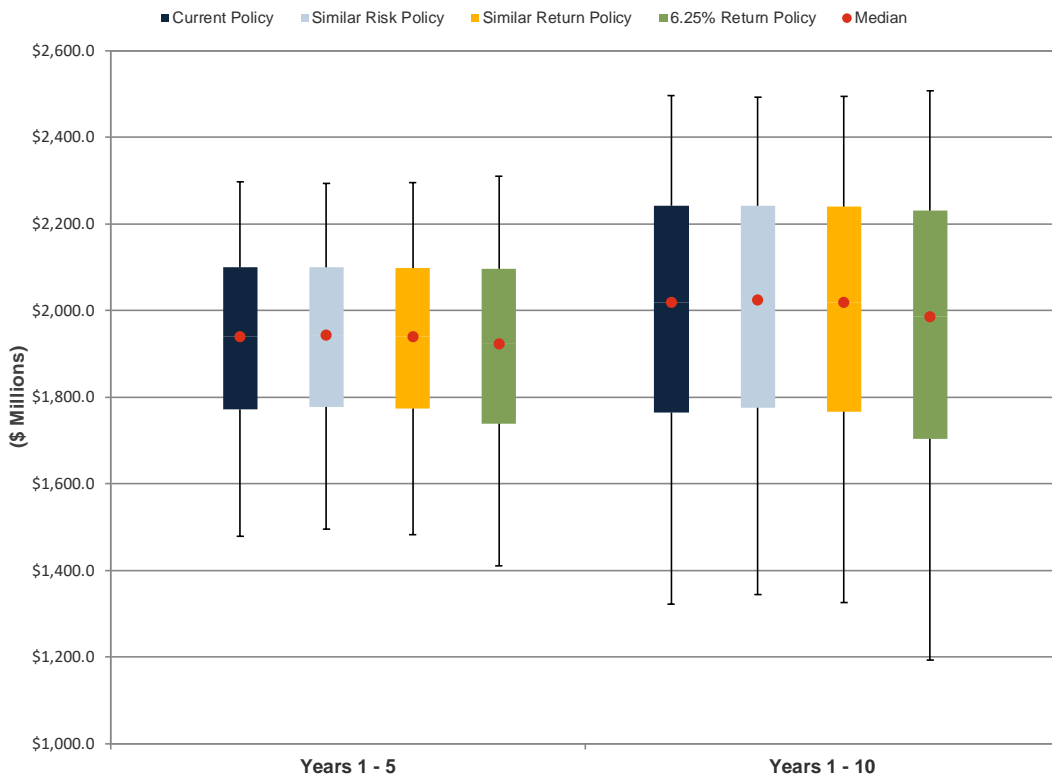
Shortfall Risk:
 The potential for the alternatives to have a higher median present value of contributions than the current policy.

Drawdown Risk:
 The potential for the alternatives to have a higher “very pessimistic” present value of contributions than the current policy.

EROA = 6.25%

(\$ Millions)	Years 1 - 5				Years 1 - 10			
	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy
Very Pessimistic	775.7	775.4	775.6	777.0	1,432.3	1,431.2	1,431.9	1,435.8
Pessimistic	757.0	757.0	757.0	756.9	1,349.3	1,349.7	1,349.3	1,347.1
Median (Expected)	742.7	743.0	742.8	741.4	1,286.1	1,288.1	1,286.6	1,278.7
Optimistic	728.3	728.8	728.4	725.9	1,212.8	1,216.2	1,213.8	1,198.3
Very Optimistic	705.4	706.5	705.7	700.9	1,096.1	1,102.3	1,097.9	1,068.9

Wilshire Associates MVA ECONOMIC COST



Shortfall Risk:
The potential for the alternatives to have a higher median economic cost than the current policy.

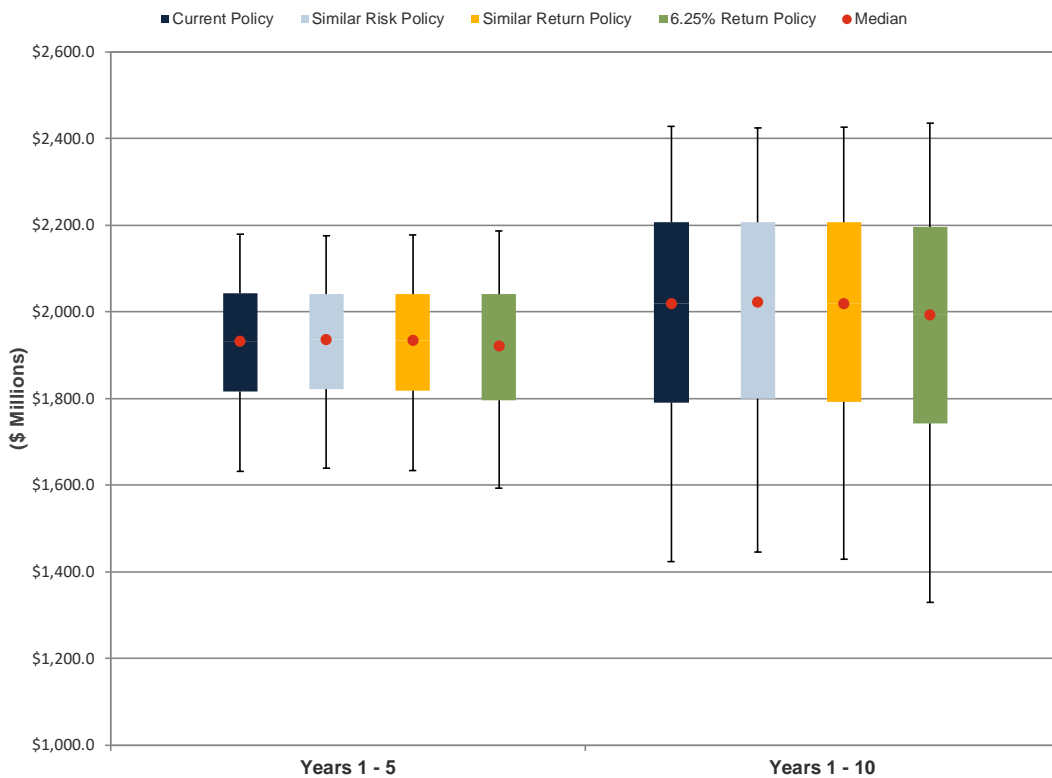
Drawdown Risk:
The potential for the alternatives to have a higher “very pessimistic” economic cost than the current policy.

EROA = 6.25%

(\$ Millions)	Years 1 - 5				Years 1 - 10			
	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy
Very Pessimistic	2,298.1	2,293.8	2,295.9	2,310.7	2,496.0	2,493.2	2,494.1	2,507.1
Pessimistic	2,099.6	2,100.3	2,099.1	2,096.0	2,241.3	2,241.8	2,239.6	2,230.6
Median (Expected)	1,940.6	1,943.3	1,940.2	1,924.0	2,018.7	2,024.0	2,019.0	1,985.6
Optimistic	1,771.6	1,778.4	1,773.1	1,738.0	1,763.9	1,776.3	1,766.4	1,704.5
Very Optimistic	1,479.6	1,496.4	1,483.4	1,411.4	1,321.8	1,345.1	1,325.4	1,192.7

Economic Cost is defined as the present value of contributions plus contributions necessary to fully fund the plan at the end of the projection period.

Wilshire Associates AVA ECONOMIC COST



Shortfall Risk:
The potential for the alternatives to have a higher median economic cost than the current policy.

Drawdown Risk:
The potential for the alternatives to have a higher "very pessimistic" economic cost than the current policy.

EROA = 6.25%

(\$ Millions)	Years 1 - 5				Years 1 - 10			
	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy
Very Pessimistic	2,178.8	2,175.5	2,177.7	2,187.6	2,427.7	2,424.4	2,426.6	2,436.2
Pessimistic	2,042.2	2,041.7	2,041.6	2,040.6	2,206.1	2,206.7	2,206.2	2,196.3
Median (Expected)	1,932.9	1,935.7	1,933.4	1,921.8	2,019.3	2,023.5	2,019.5	1,992.4
Optimistic	1,816.9	1,822.2	1,817.6	1,796.8	1,790.9	1,800.4	1,793.1	1,742.4
Very Optimistic	1,632.3	1,640.0	1,633.0	1,594.1	1,423.7	1,445.7	1,429.0	1,330.3

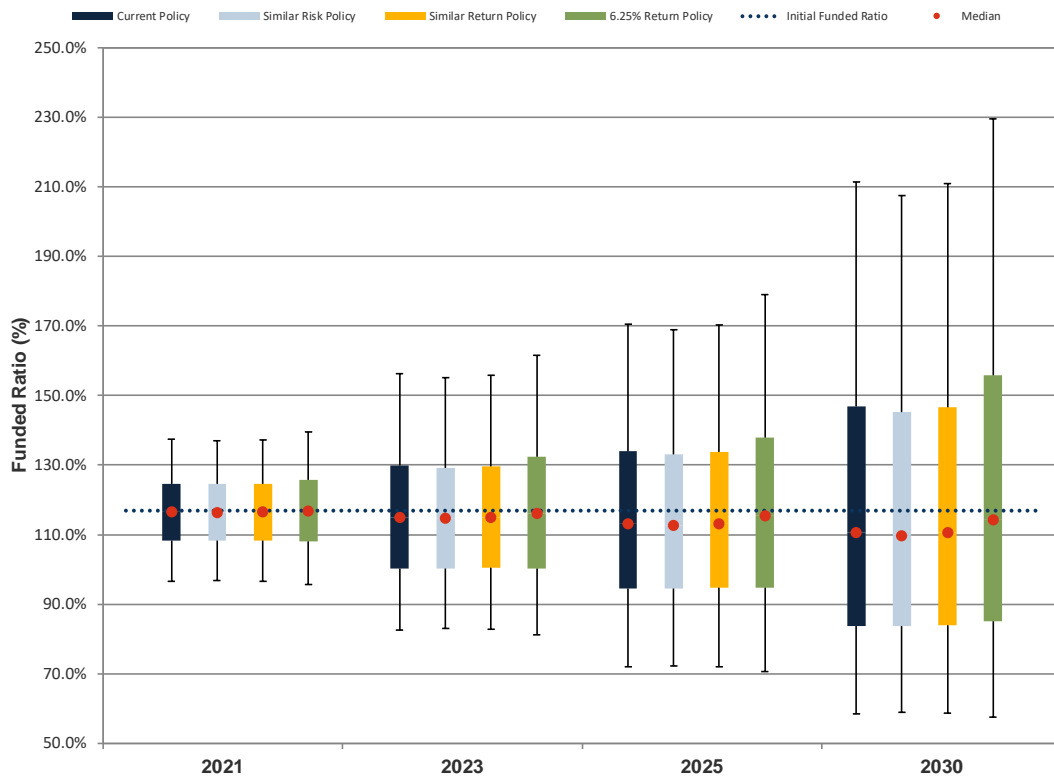
Economic Cost is defined as the present value of contributions plus contributions necessary to fully fund the plan at the end of the projection period.



INSURANCE – KERS Hazardous



Wilshire Associates MVA FUNDED RATIO



Shortfall Risk:
The potential for the alternatives to have a lower median funded ratio than the current policy.

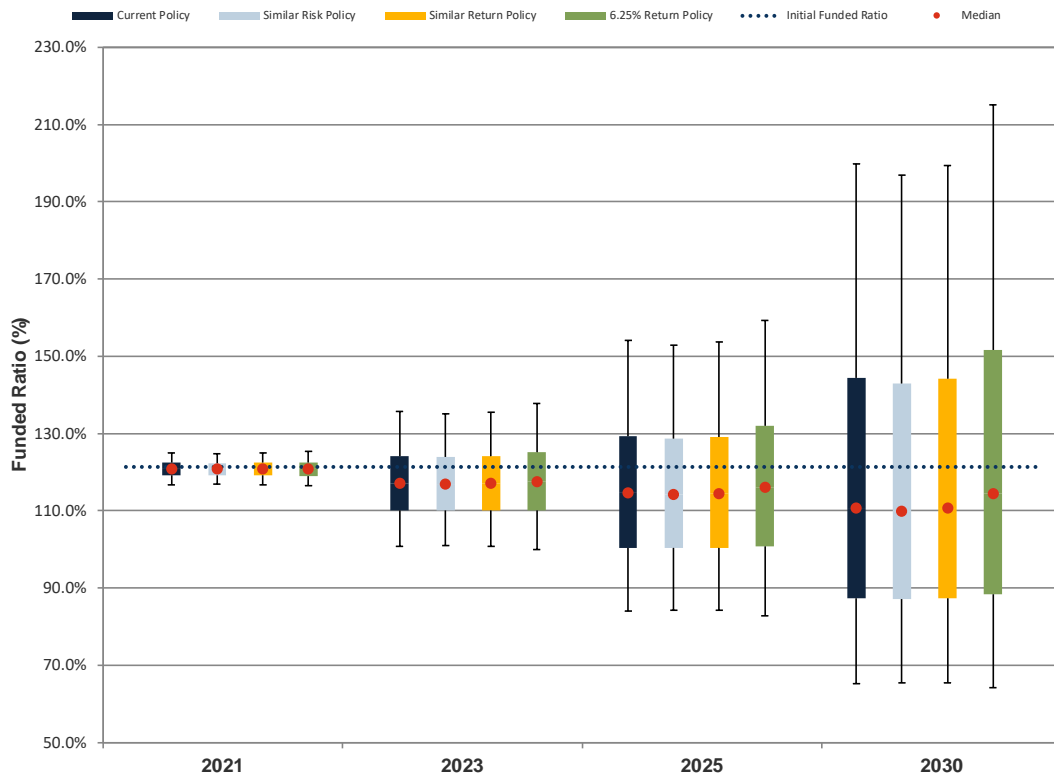
Drawdown Risk:
The potential for the alternatives to have a lower "very pessimistic" funded ratio than the current policy.

Initial Funded Ratio = 116.79%

(%)	2021				2023				2025				2030			
	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy
Very Optimistic	137.43	136.90	137.15	139.40	156.27	155.03	155.84	161.51	170.51	168.82	170.18	178.98	211.35	207.44	210.89	229.42
Optimistic	124.67	124.48	124.64	125.63	129.79	129.17	129.53	132.28	133.96	133.11	133.67	138.01	146.94	145.36	146.62	155.87
Median (Expected)	116.47	116.41	116.47	116.86	114.94	114.68	114.87	116.10	113.12	112.75	113.06	115.42	110.56	109.63	110.53	114.36
Pessimistic	108.23	108.25	108.24	107.96	100.33	100.34	100.39	100.34	94.51	94.59	94.63	94.83	83.77	83.75	83.90	85.03
Very Pessimistic	96.55	96.87	96.68	95.59	82.62	82.98	82.72	81.10	71.91	72.28	71.99	70.57	58.46	58.85	58.60	57.58



Wilshire Associates AVA FUNDED RATIO



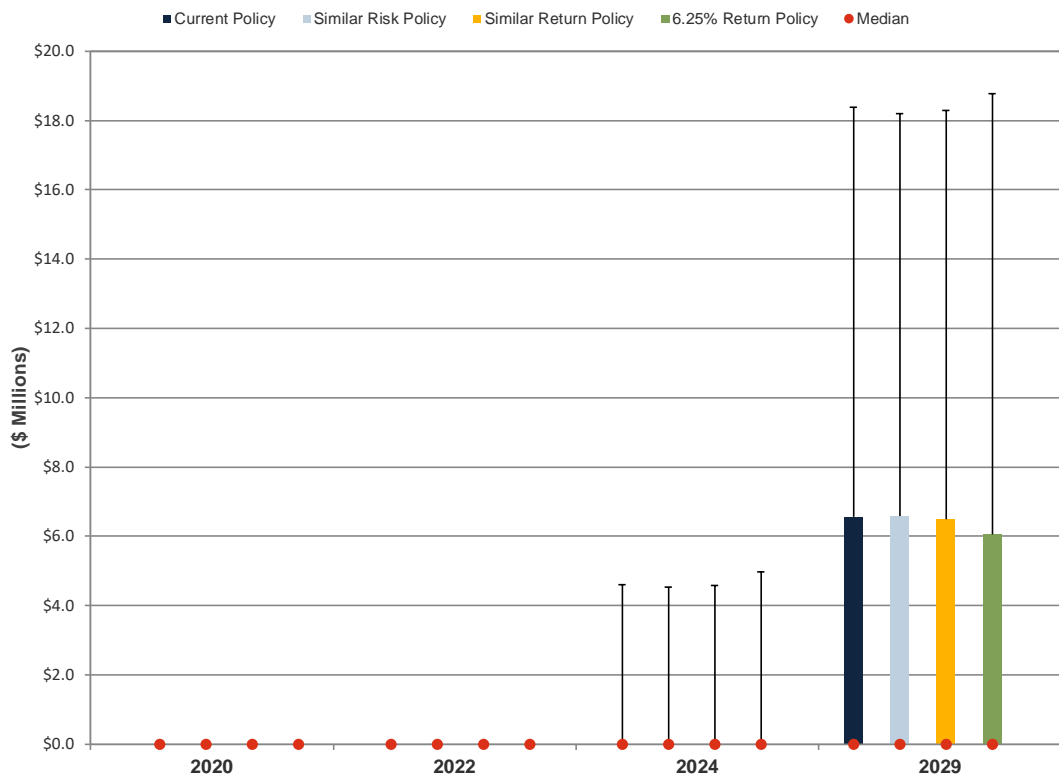
Shortfall Risk:
The potential for the alternatives to have a lower median funded ratio than the current policy.

Drawdown Risk:
The potential for the alternatives to have a lower "very pessimistic" funded ratio than the current policy.

Initial Funded Ratio = 121.31%

(%)	2021				2023				2025				2030			
	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy
Very Optimistic	124.96	124.85	124.90	125.35	135.76	135.15	135.53	137.79	154.05	152.96	153.81	159.35	199.80	196.83	199.39	215.12
Optimistic	122.41	122.37	122.40	122.60	124.11	123.86	124.06	125.28	129.29	128.70	129.15	131.93	144.50	143.01	144.18	151.59
Median (Expected)	120.77	120.75	120.77	120.85	117.07	116.99	117.07	117.64	114.56	114.22	114.48	116.02	110.63	109.96	110.65	114.38
Pessimistic	119.12	119.12	119.12	119.07	110.07	110.07	110.07	110.03	100.49	100.42	100.41	100.75	87.27	87.20	87.38	88.44
Very Pessimistic	116.78	116.85	116.81	116.59	100.77	100.95	100.84	99.94	84.17	84.37	84.24	82.77	65.27	65.57	65.46	64.32

Wilshire Associates PLAN YEAR CONTRIBUTIONS



Shortfall Risk:
The potential for the alternatives to have higher median contributions than the current policy.

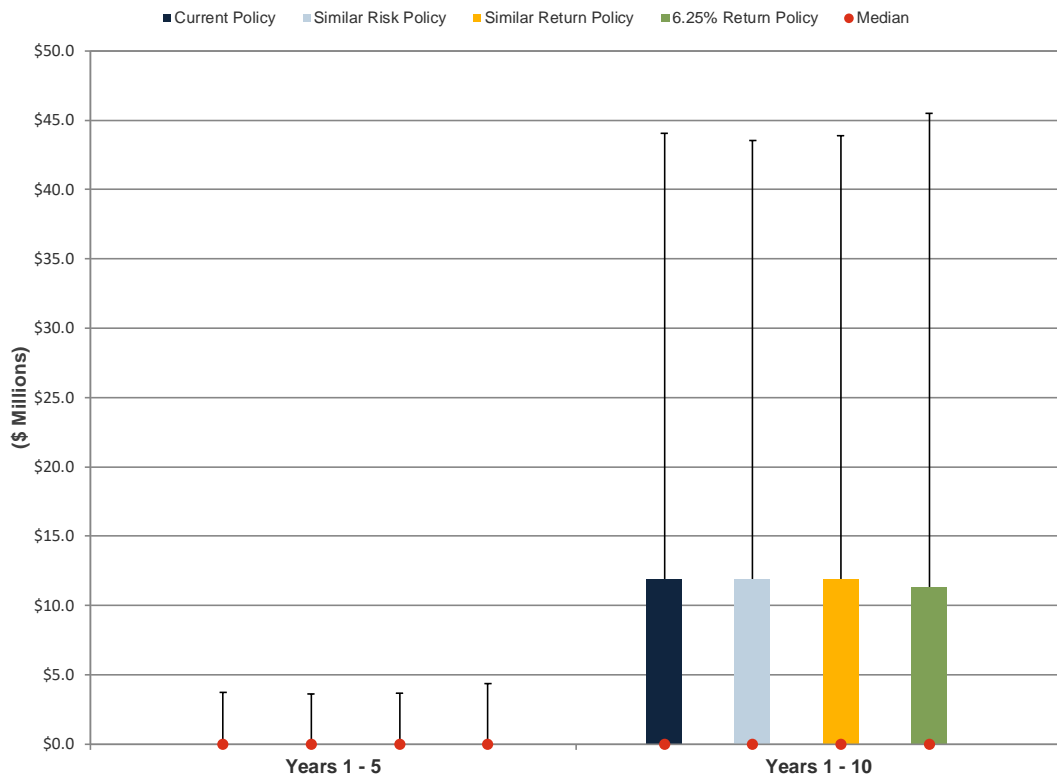
Drawdown Risk:
The potential for the alternatives to have higher “very pessimistic” contributions than the current policy.

(\$ Millions)	2020				2022				2024				2029			
	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy
Very Pessimistic	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.6	4.5	4.6	5.0	18.4	18.2	18.3	18.8
Pessimistic	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.6	6.6	6.5	6.1
Median (Expected)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Optimistic	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Very Optimistic	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Wilshire Associates



PRESENT VALUE OF CONTRIBUTIONS



Shortfall Risk:
The potential for the alternatives to have a higher median present value of contributions than the current policy.

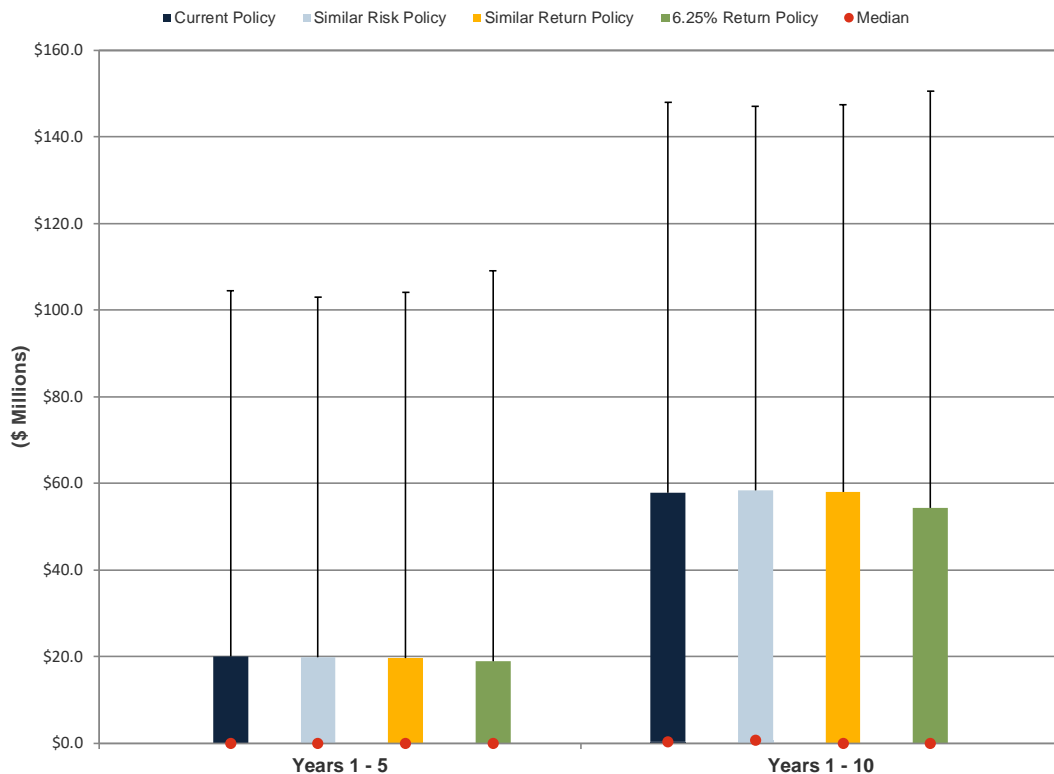
Drawdown Risk:
The potential for the alternatives to have a higher "very pessimistic" present value of contributions than the current policy.

EROA = 6.25%

(\$ Millions)	Years 1 - 5				Years 1 - 10			
	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy
Very Pessimistic	3.7	3.6	3.7	4.4	44.0	43.5	43.9	45.5
Pessimistic	0.0	0.0	0.0	0.0	11.9	11.9	11.9	11.4
Median (Expected)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Optimistic	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Very Optimistic	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0



Wilshire Associates MVA ECONOMIC COST



Shortfall Risk:
The potential for the alternatives to have a higher median economic cost than the current policy.

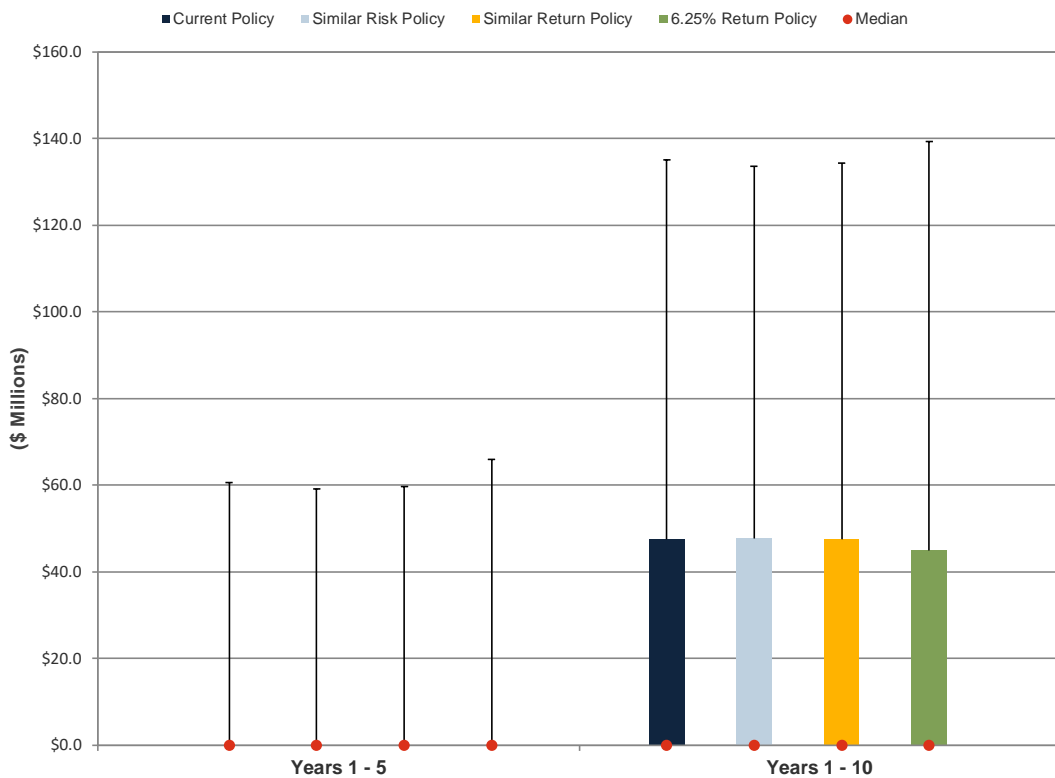
Drawdown Risk:
The potential for the alternatives to have a higher "very pessimistic" economic cost than the current policy.

EROA = 6.25%

(\$ Millions)	Years 1 - 5				Years 1 - 10			
	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy
Very Pessimistic	104.5	103.1	104.1	109.0	148.1	147.1	147.4	150.5
Pessimistic	20.1	19.9	19.7	19.0	57.9	58.3	58.0	54.4
Median (Expected)	0.0	0.0	0.0	0.0	0.4	0.7	0.0	0.0
Optimistic	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Very Optimistic	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Economic Cost is defined as the present value of contributions plus contributions necessary to fully fund the plan at the end of the projection period.

Wilshire Associates AVA ECONOMIC COST



(\$ Millions)	Years 1 - 5				Years 1 - 10			
	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy
Very Pessimistic	60.7	59.2	59.8	66.0	135.1	133.7	134.3	139.3
Pessimistic	0.0	0.0	0.0	0.0	47.5	47.7	47.5	44.9
Median (Expected)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Optimistic	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Very Optimistic	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Shortfall Risk:
The potential for the alternatives to have a higher median economic cost than the current policy.

Drawdown Risk:
The potential for the alternatives to have a higher "very pessimistic" economic cost than the current policy.

EROA = 6.25%

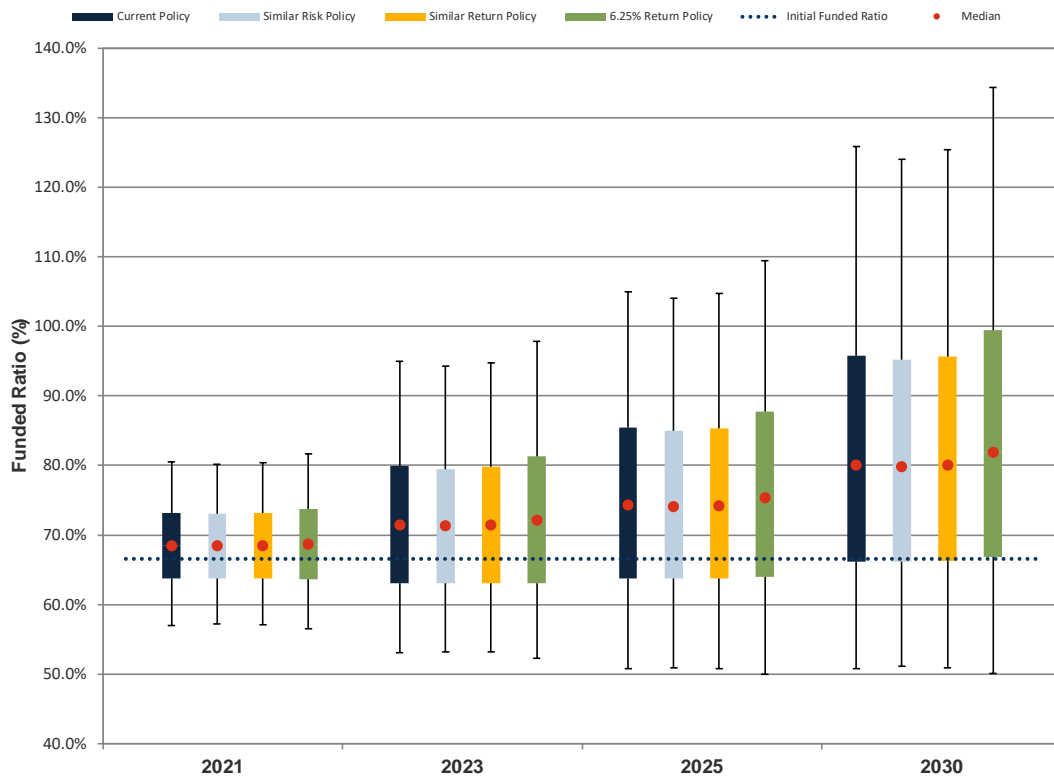
Economic Cost is defined as the present value of contributions plus contributions necessary to fully fund the plan at the end of the projection period.



INSURANCE – CERS Non-Hazardous



Wilshire Associates MVA FUNDED RATIO



Shortfall Risk:
The potential for the alternatives to have a lower median funded ratio than the current policy.

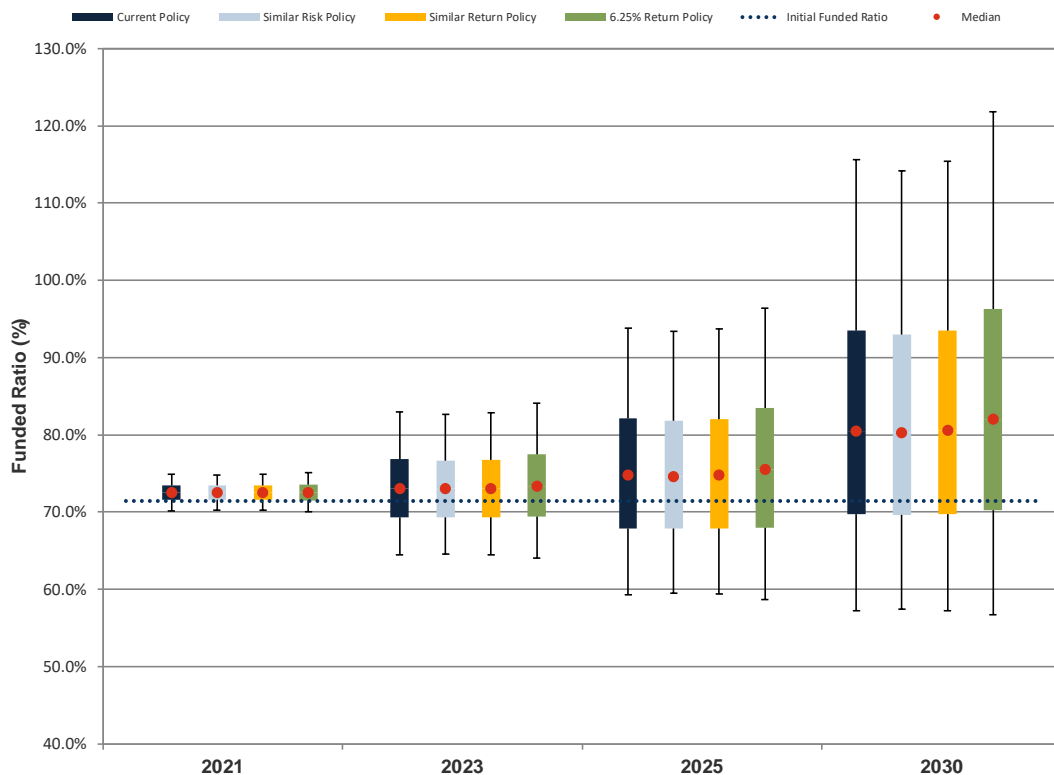
Drawdown Risk:
The potential for the alternatives to have a lower "very pessimistic" funded ratio than the current policy.

Initial Funded Ratio = 66.57%

(%)	2021				2023				2025				2030			
	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy
Very Optimistic	80.52	80.22	80.36	81.65	94.94	94.26	94.77	97.80	104.95	104.04	104.73	109.49	125.86	123.99	125.44	134.33
Optimistic	73.20	73.09	73.18	73.75	79.89	79.53	79.81	81.31	85.45	84.94	85.35	87.73	95.74	95.16	95.66	99.49
Median (Expected)	68.48	68.44	68.48	68.71	71.47	71.34	71.45	72.10	74.30	74.10	74.21	75.34	80.03	79.83	80.10	81.93
Pessimistic	63.74	63.75	63.74	63.58	63.08	63.11	63.09	63.07	63.75	63.73	63.76	63.96	66.17	66.10	66.22	66.86
Very Pessimistic	57.01	57.20	57.09	56.46	53.07	53.21	53.14	52.33	50.77	50.92	50.81	50.01	50.82	51.07	50.93	50.04



Wilshire Associates AVA FUNDED RATIO



Shortfall Risk:

The potential for the alternatives to have a lower median funded ratio than the current policy.

Drawdown Risk:

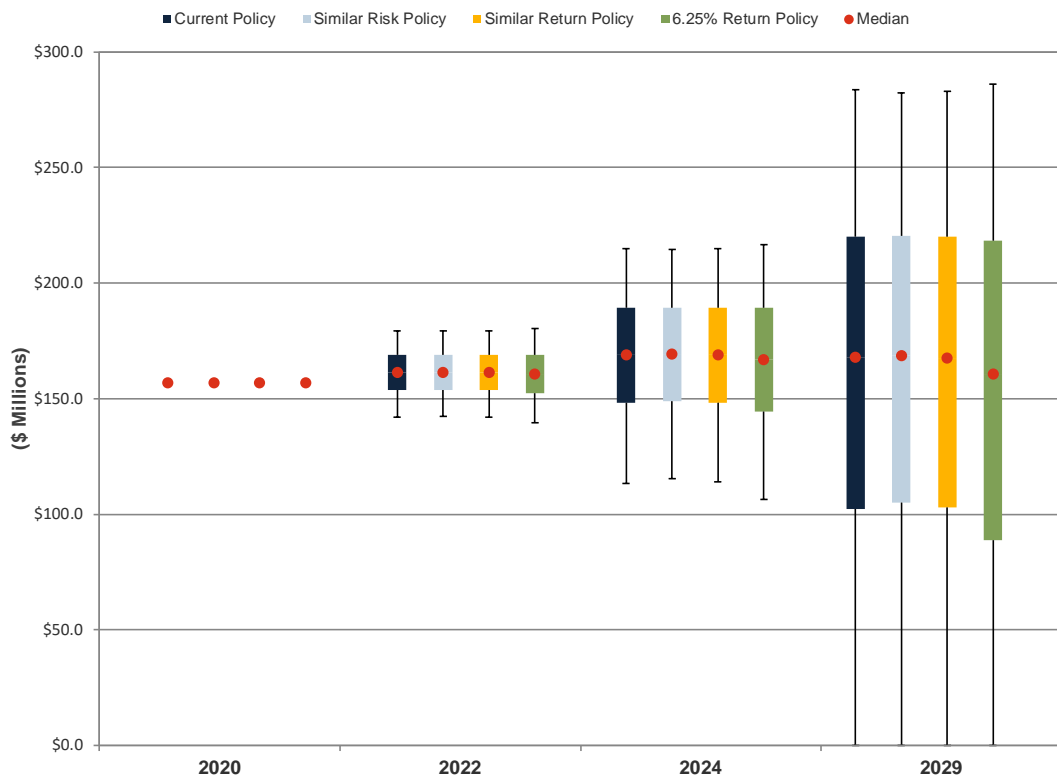
The potential for the alternatives to have a lower "very pessimistic" funded ratio than the current policy.

Initial Funded Ratio = 71.41%

(%)	2021				2023				2025				2030			
	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy
Very Optimistic	74.91	74.85	74.88	75.13	82.94	82.65	82.84	84.09	93.83	93.41	93.73	96.37	115.65	114.16	115.37	121.81
Optimistic	73.44	73.42	73.44	73.55	76.83	76.69	76.81	77.44	82.15	81.86	82.06	83.49	93.55	93.00	93.49	96.29
Median (Expected)	72.50	72.49	72.50	72.54	73.07	73.00	73.06	73.35	74.80	74.63	74.77	75.48	80.54	80.32	80.57	82.01
Pessimistic	71.55	71.55	71.55	71.52	69.35	69.33	69.33	69.40	67.85	67.85	67.87	67.97	69.73	69.61	69.75	70.29
Very Pessimistic	70.21	70.24	70.22	70.10	64.44	64.54	64.47	64.01	59.31	59.53	59.40	58.72	57.19	57.40	57.28	56.73



Wilshire Associates PLAN YEAR CONTRIBUTIONS

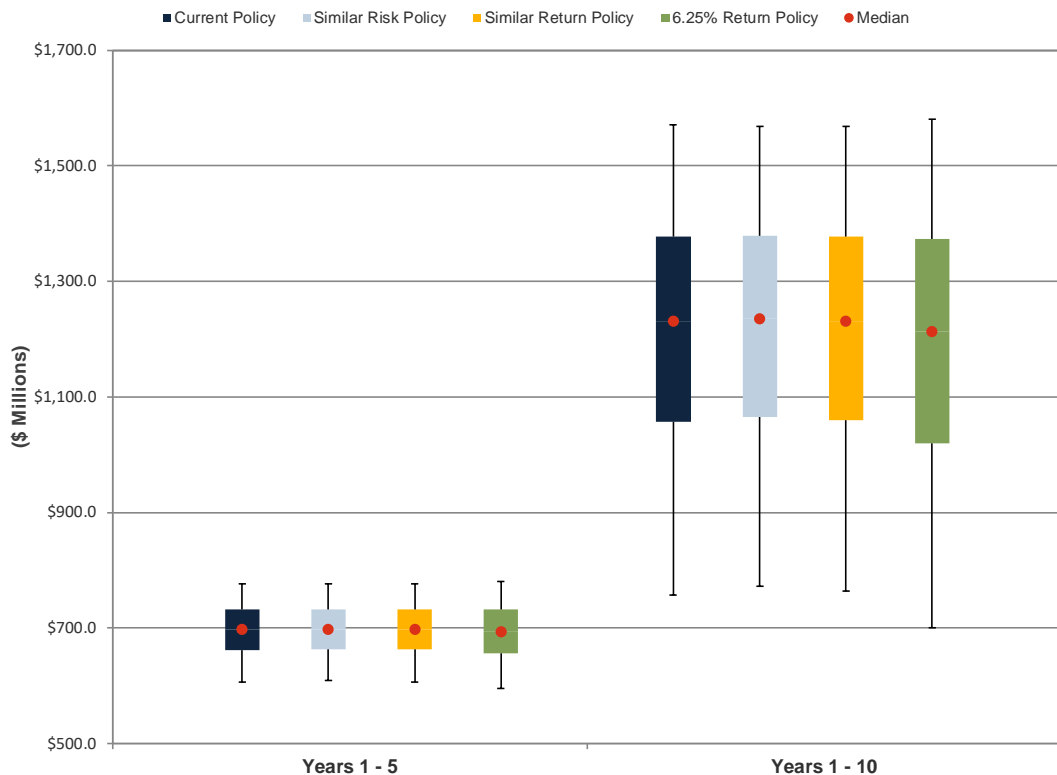


Shortfall Risk:
The potential for the alternatives to have higher median contributions than the current policy.

Drawdown Risk:
The potential for the alternatives to have higher "very pessimistic" contributions than the current policy.

(\$ Millions)	2020				2022				2024				2029			
	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy
Very Pessimistic	157.0	157.0	157.0	157.0	179.4	179.2	179.3	180.3	214.9	214.5	214.8	216.7	283.5	282.4	283.1	286.3
Pessimistic	157.0	157.0	157.0	157.0	168.9	168.9	168.9	169.0	189.3	189.5	189.3	189.3	220.0	220.3	220.0	218.3
Median (Expected)	157.0	157.0	157.0	157.0	161.3	161.4	161.3	160.8	168.9	169.3	169.1	167.0	167.8	168.7	167.7	160.6
Optimistic	157.0	157.0	157.0	157.0	153.6	153.9	153.7	152.5	148.1	148.9	148.3	144.5	102.3	105.0	103.0	88.9
Very Optimistic	157.0	157.0	157.0	157.0	142.0	142.5	142.1	139.7	113.4	115.3	113.9	106.3	0.0	0.0	0.0	0.0

PRESENT VALUE OF CONTRIBUTIONS



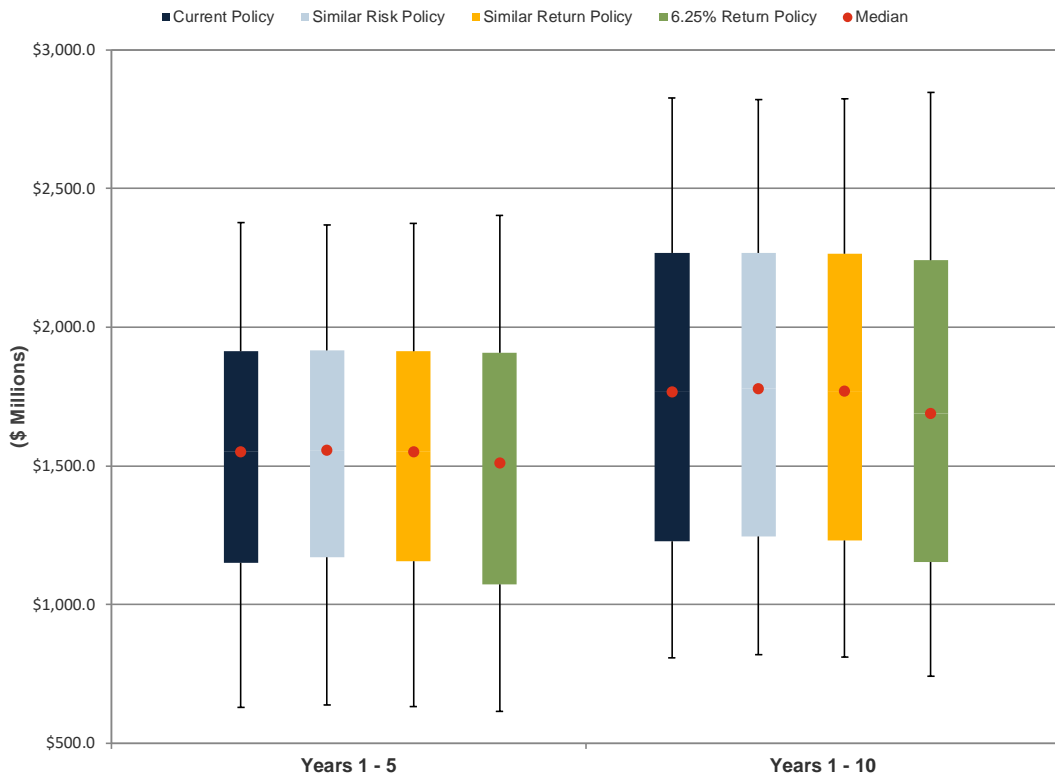
Shortfall Risk:
 The potential for the alternatives to have a higher median present value of contributions than the current policy.

Drawdown Risk:
 The potential for the alternatives to have a higher "very pessimistic" present value of contributions than the current policy.

EROA = 6.25%

(\$ Millions)	Years 1 - 5				Years 1 - 10			
	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy
Very Pessimistic	776.9	776.4	776.7	780.6	1,571.3	1,567.8	1,568.7	1,581.5
Pessimistic	731.7	731.8	731.7	731.8	1,377.6	1,378.8	1,377.7	1,372.9
Median (Expected)	696.8	697.5	697.1	693.9	1,231.2	1,234.6	1,231.4	1,213.2
Optimistic	662.0	663.3	662.3	656.2	1,056.3	1,065.5	1,059.0	1,020.0
Very Optimistic	605.8	608.5	606.9	595.0	757.5	771.8	763.2	700.0

Wilshire Associates MVA ECONOMIC COST



(\$ Millions)	Years 1 - 5				Years 1 - 10			
	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy
Very Pessimistic	2,378.0	2,367.3	2,373.1	2,404.0	2,826.6	2,820.2	2,822.9	2,846.0
Pessimistic	1,915.0	1,917.5	1,914.7	1,906.9	2,267.9	2,267.5	2,264.8	2,242.2
Median (Expected)	1,549.9	1,557.4	1,549.8	1,509.8	1,765.4	1,777.7	1,768.5	1,689.6
Optimistic	1,151.0	1,171.3	1,156.6	1,071.4	1,229.5	1,245.1	1,230.2	1,152.3
Very Optimistic	629.8	636.4	632.4	614.2	807.6	819.6	811.7	740.9

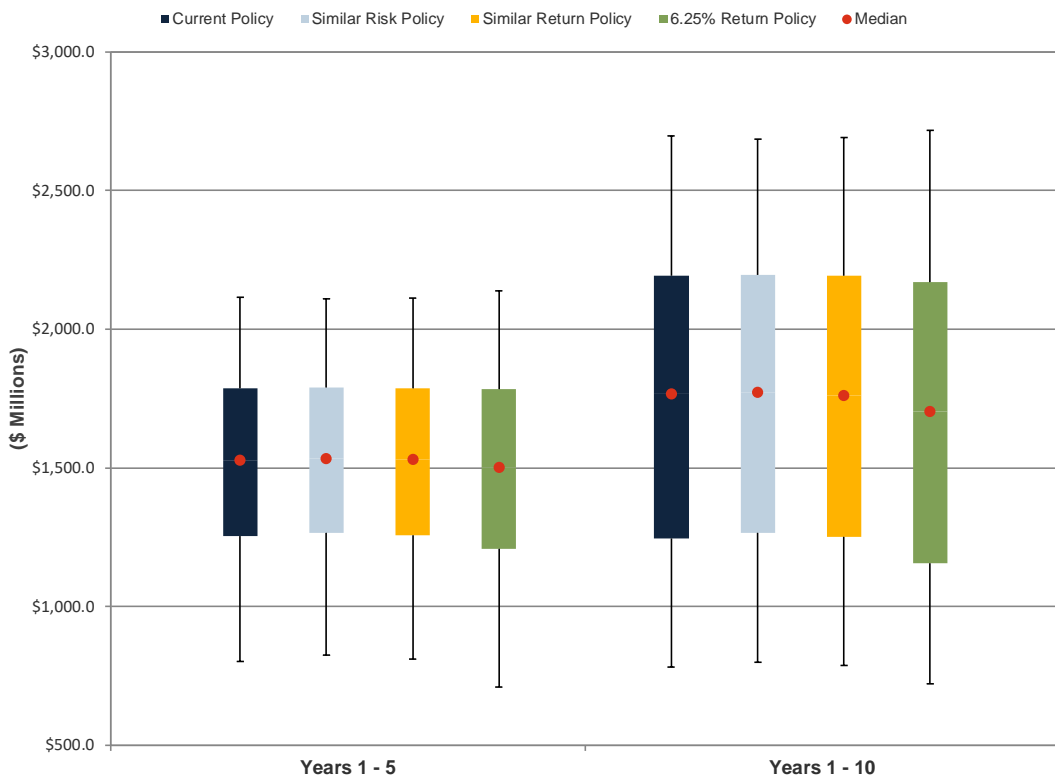
Shortfall Risk:
The potential for the alternatives to have a higher median economic cost than the current policy.

Drawdown Risk:
The potential for the alternatives to have a higher "very pessimistic" economic cost than the current policy.

EROA = 6.25%

Economic Cost is defined as the present value of contributions plus contributions necessary to fully fund the plan at the end of the projection period.

Wilshire Associates AVA ECONOMIC COST



(\$ Millions)	Years 1 - 5				Years 1 - 10			
	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy
Very Pessimistic	2,115.8	2,110.5	2,113.6	2,137.0	2,697.3	2,686.7	2,689.9	2,716.2
Pessimistic	1,788.3	1,788.4	1,788.3	1,784.5	2,193.9	2,195.4	2,193.7	2,169.5
Median (Expected)	1,526.4	1,534.4	1,529.3	1,501.1	1,765.3	1,771.3	1,762.4	1,704.2
Optimistic	1,252.9	1,265.8	1,256.7	1,206.8	1,244.5	1,266.2	1,250.0	1,156.5
Very Optimistic	801.9	825.8	809.4	710.8	782.8	798.3	787.9	722.7

Shortfall Risk:
The potential for the alternatives to have a higher median economic cost than the current policy.

Drawdown Risk:
The potential for the alternatives to have a higher “very pessimistic” economic cost than the current policy.

EROA = 6.25%

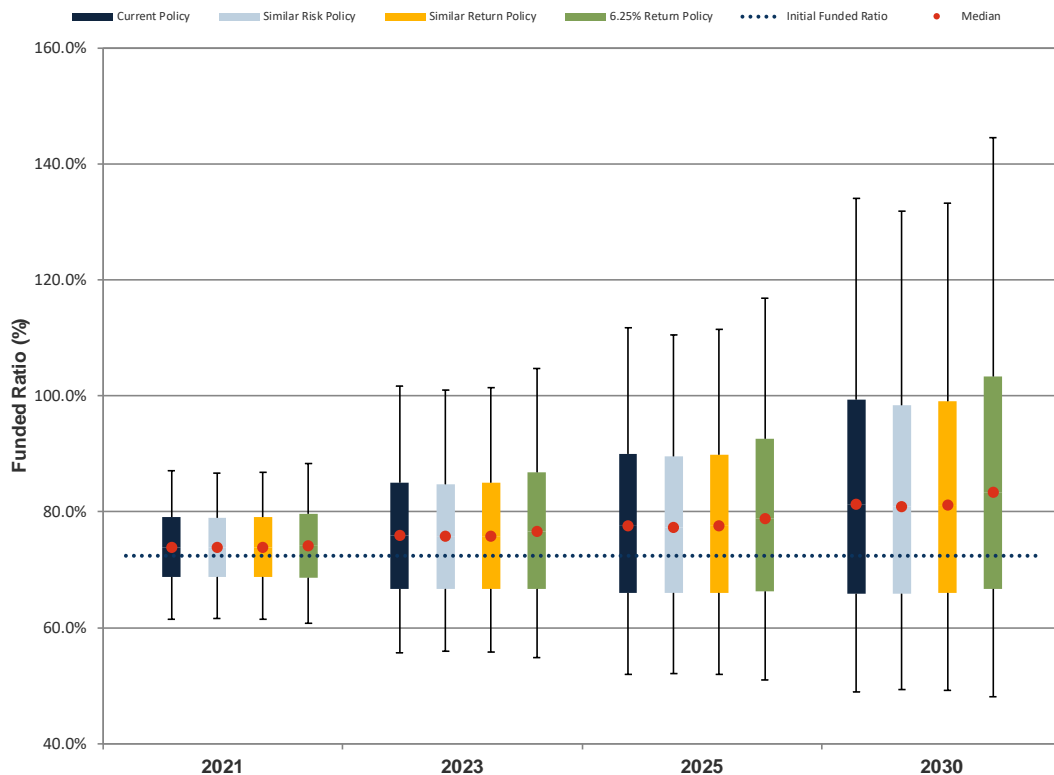
Economic Cost is defined as the present value of contributions plus contributions necessary to fully fund the plan at the end of the projection period.



INSURANCE – CERS Hazardous



Wilshire Associates MVA FUNDED RATIO



Shortfall Risk:
The potential for the alternatives to have a lower median funded ratio than the current policy.

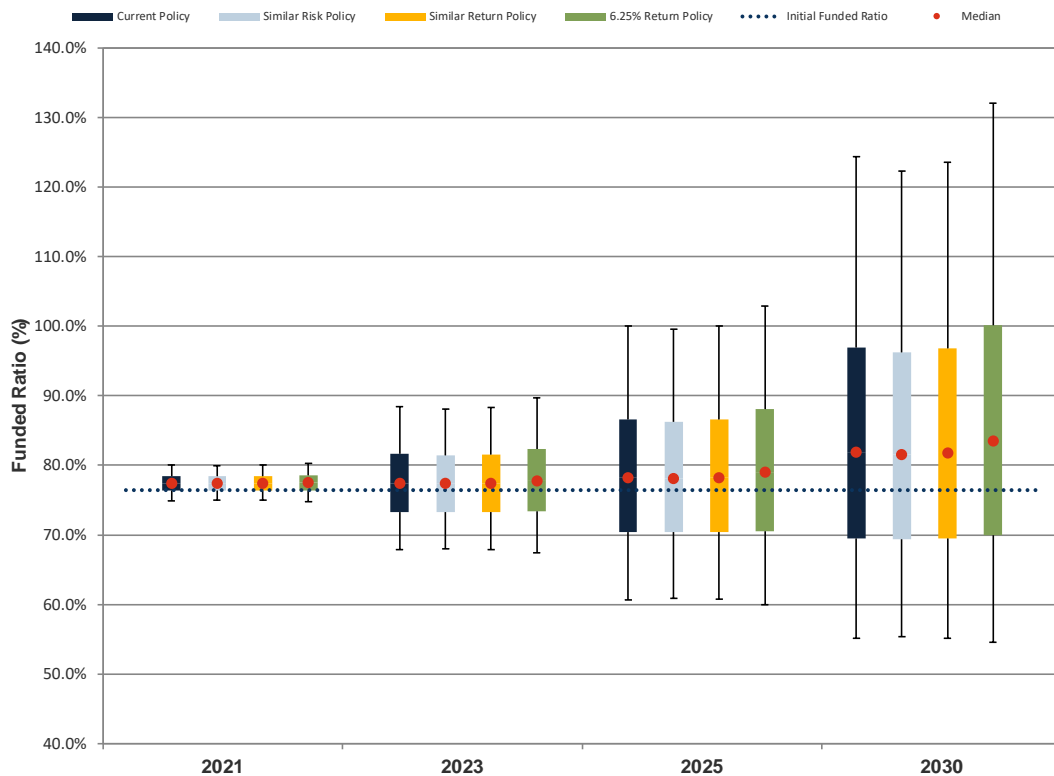
Drawdown Risk:
The potential for the alternatives to have a lower "very pessimistic" funded ratio than the current policy.

Initial Funded Ratio = 72.43%

(%)	2021				2023				2025				2030			
	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy
Very Optimistic	87.06	86.73	86.89	88.29	101.68	100.97	101.48	104.75	111.73	110.50	111.46	116.79	134.03	131.90	133.30	144.51
Optimistic	79.07	78.95	79.05	79.67	85.08	84.72	85.00	86.77	90.05	89.53	89.89	92.60	99.30	98.39	99.13	103.35
Median (Expected)	73.93	73.89	73.93	74.18	75.93	75.75	75.85	76.62	77.62	77.38	77.60	78.80	81.24	80.86	81.18	83.36
Pessimistic	68.76	68.78	68.77	68.60	66.76	66.72	66.75	66.73	66.05	66.03	66.06	66.27	65.91	65.89	65.99	66.73
Very Pessimistic	61.44	61.64	61.52	60.84	55.69	55.90	55.77	54.91	51.90	52.09	51.93	51.01	48.99	49.32	49.17	48.18



Wilshire Associates AVA FUNDED RATIO



Shortfall Risk:
The potential for the alternatives to have a lower median funded ratio than the current policy.

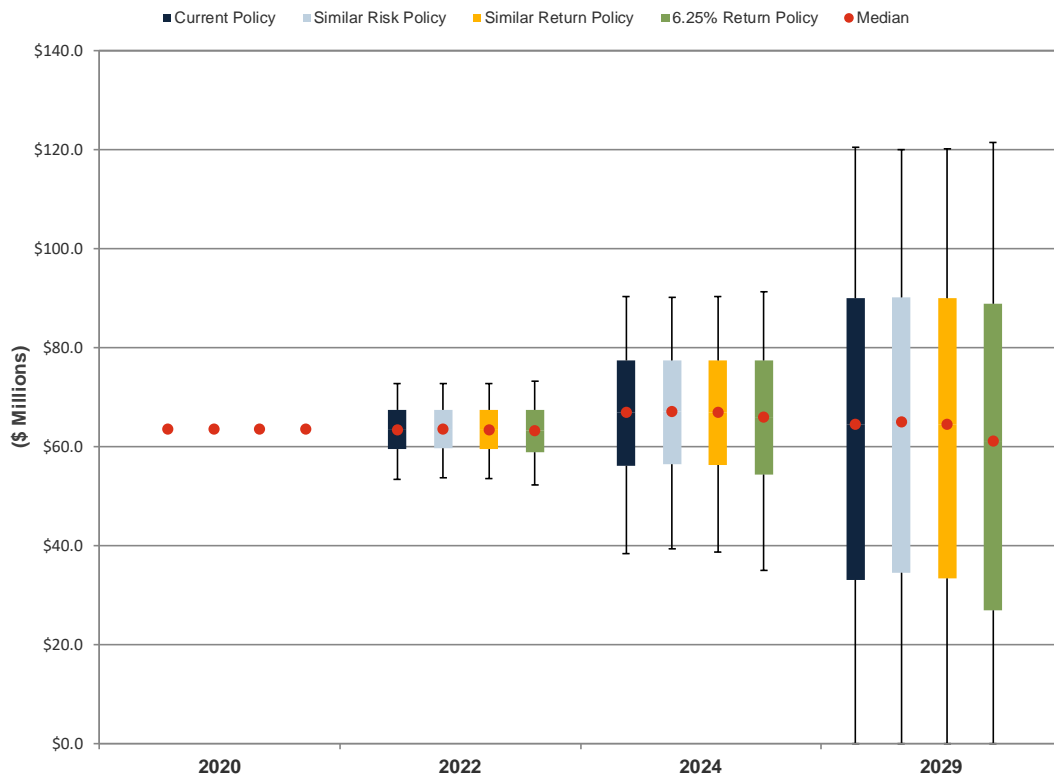
Drawdown Risk:
The potential for the alternatives to have a lower "very pessimistic" funded ratio than the current policy.

Initial Funded Ratio = 76.38%

(%)	2021				2023				2025				2030			
	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy
Very Optimistic	80.06	79.99	80.02	80.30	88.43	88.09	88.32	89.69	100.06	99.54	100.03	102.84	124.38	122.31	123.60	132.04
Optimistic	78.46	78.43	78.45	78.58	81.64	81.47	81.60	82.32	86.64	86.29	86.58	88.09	96.93	96.24	96.79	100.13
Median (Expected)	77.43	77.42	77.43	77.48	77.44	77.36	77.41	77.76	78.25	78.08	78.20	79.06	81.87	81.54	81.82	83.51
Pessimistic	76.40	76.40	76.40	76.36	73.31	73.31	73.32	73.35	70.40	70.40	70.42	70.51	69.44	69.36	69.43	69.95
Very Pessimistic	74.93	74.97	74.95	74.81	67.85	67.98	67.91	67.39	60.63	60.86	60.73	60.01	55.10	55.40	55.19	54.53



Wilshire Associates PLAN YEAR CONTRIBUTIONS



Shortfall Risk:
The potential for the alternatives to have higher median contributions than the current policy.

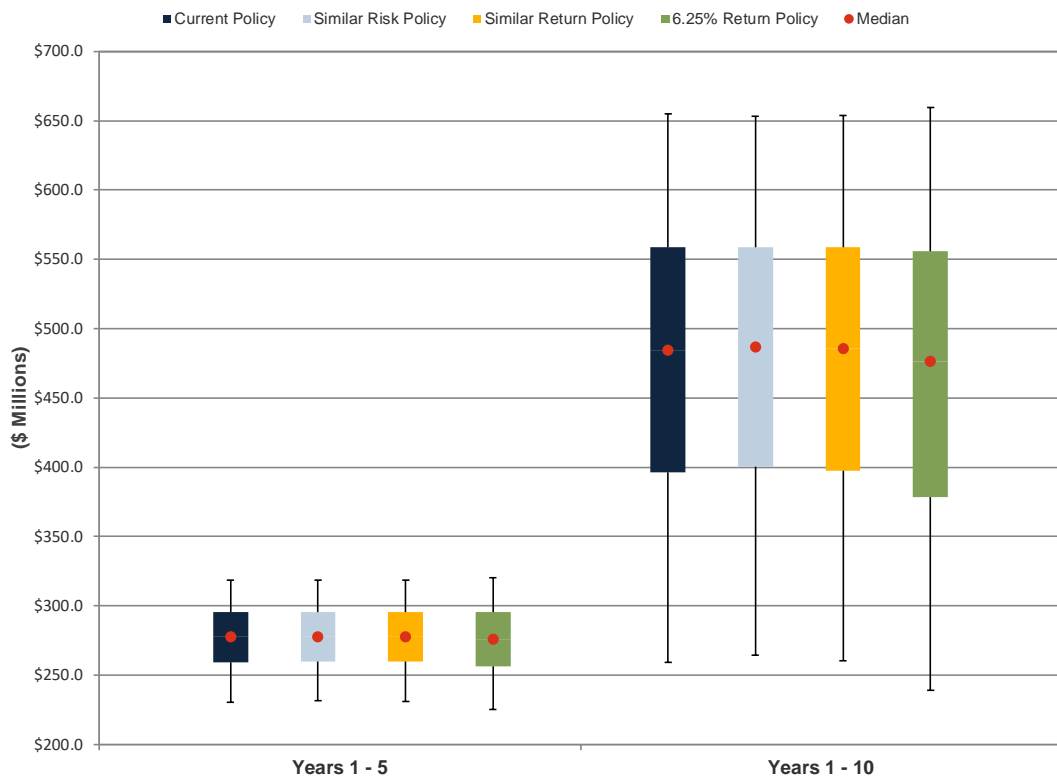
Drawdown Risk:
The potential for the alternatives to have higher "very pessimistic" contributions than the current policy.

(\$ Millions)	2020				2022				2024				2029			
	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy
Very Pessimistic	63.5	63.5	63.5	63.5	72.8	72.7	72.7	73.2	90.3	90.1	90.3	91.3	120.4	120.0	120.1	121.4
Pessimistic	63.5	63.5	63.5	63.5	67.4	67.4	67.4	67.4	77.3	77.4	77.3	77.3	89.9	90.1	89.9	88.8
Median (Expected)	63.5	63.5	63.5	63.5	63.4	63.5	63.4	63.2	66.8	67.0	66.9	65.9	64.5	64.9	64.4	61.1
Optimistic	63.5	63.5	63.5	63.5	59.5	59.6	59.5	58.9	56.1	56.5	56.2	54.3	33.1	34.5	33.4	27.0
Very Optimistic	63.5	63.5	63.5	63.5	53.4	53.7	53.5	52.3	38.3	39.3	38.6	34.9	0.0	0.0	0.0	0.0

Wilshire Associates



PRESENT VALUE OF CONTRIBUTIONS



Shortfall Risk:
The potential for the alternatives to have a higher median present value of contributions than the current policy.

Drawdown Risk:
The potential for the alternatives to have a higher "very pessimistic" present value of contributions than the current policy.

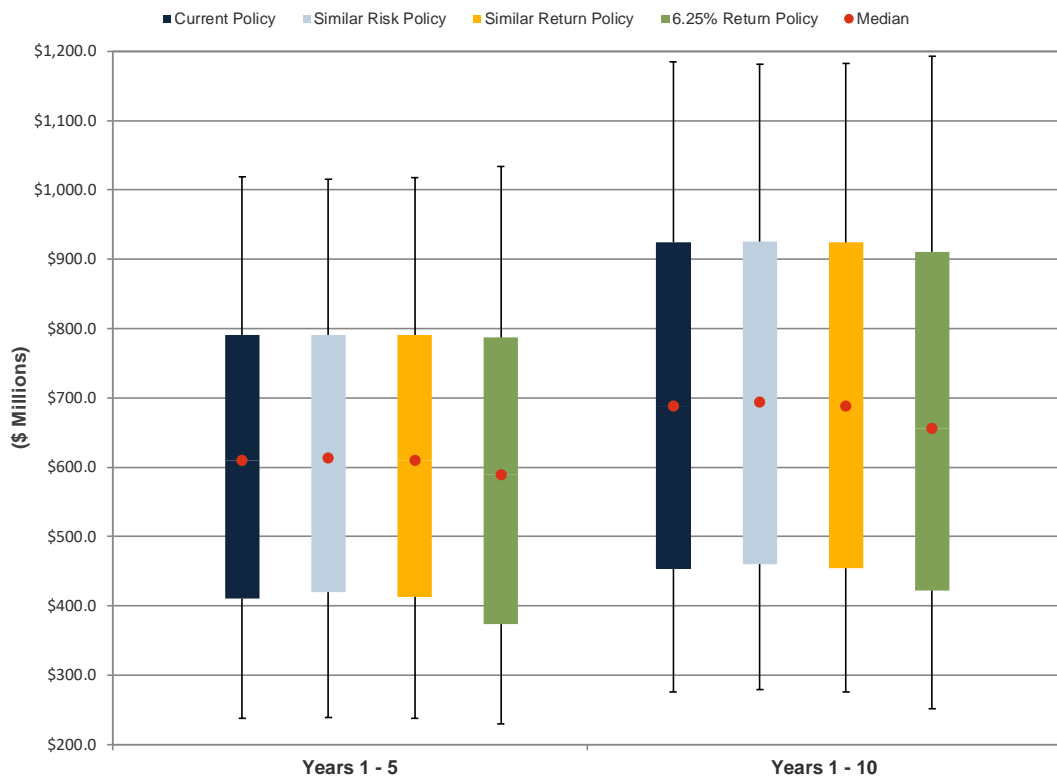
EROA = 6.25%

(\$ Millions)	Years 1 - 5				Years 1 - 10			
	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy
Very Pessimistic	318.7	318.4	318.5	320.5	654.9	653.3	653.9	659.4
Pessimistic	295.4	295.5	295.4	295.4	558.8	558.8	558.5	555.8
Median (Expected)	277.5	277.9	277.6	275.9	484.6	486.5	485.4	476.3
Optimistic	259.4	260.1	259.6	256.5	396.5	400.6	397.5	378.5
Very Optimistic	230.5	231.7	230.9	225.3	259.4	264.4	260.6	238.9

Wilshire Associates



MVA ECONOMIC COST



Shortfall Risk:
The potential for the alternatives to have a higher median economic cost than the current policy.

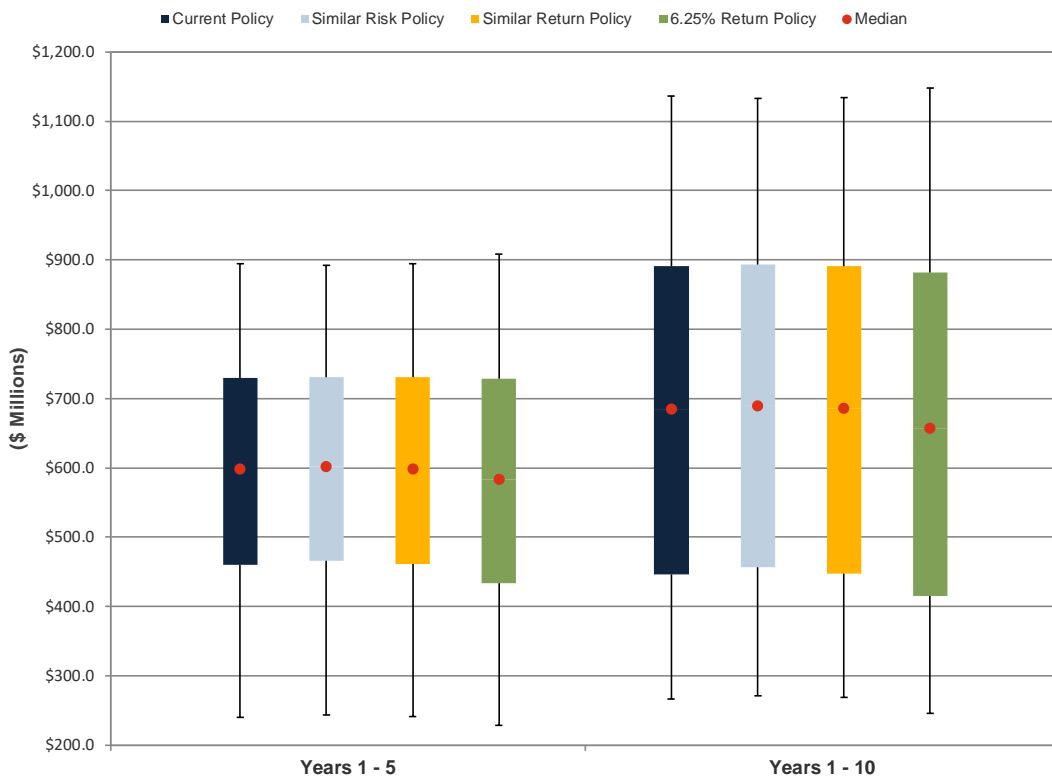
Drawdown Risk:
The potential for the alternatives to have a higher “very pessimistic” economic cost than the current policy.

EROA = 6.25%

(\$ Millions)	Years 1 - 5				Years 1 - 10			
	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy
Very Pessimistic	1,019.3	1,015.5	1,017.6	1,033.8	1,185.0	1,181.6	1,183.0	1,192.5
Pessimistic	790.5	791.2	790.5	787.5	924.7	925.4	924.4	911.2
Median (Expected)	610.1	613.9	609.7	589.4	688.3	694.0	688.2	655.6
Optimistic	410.7	419.8	413.2	373.3	453.3	460.2	454.9	422.6
Very Optimistic	237.4	239.3	237.6	229.9	275.5	279.8	275.7	252.2

Economic Cost is defined as the present value of contributions plus contributions necessary to fully fund the plan at the end of the projection period.

Wilshire Associates AVA ECONOMIC COST



Shortfall Risk:
The potential for the alternatives to have a higher median economic cost than the current policy.

Drawdown Risk:
The potential for the alternatives to have a higher “very pessimistic” economic cost than the current policy.

EROA = 6.25%

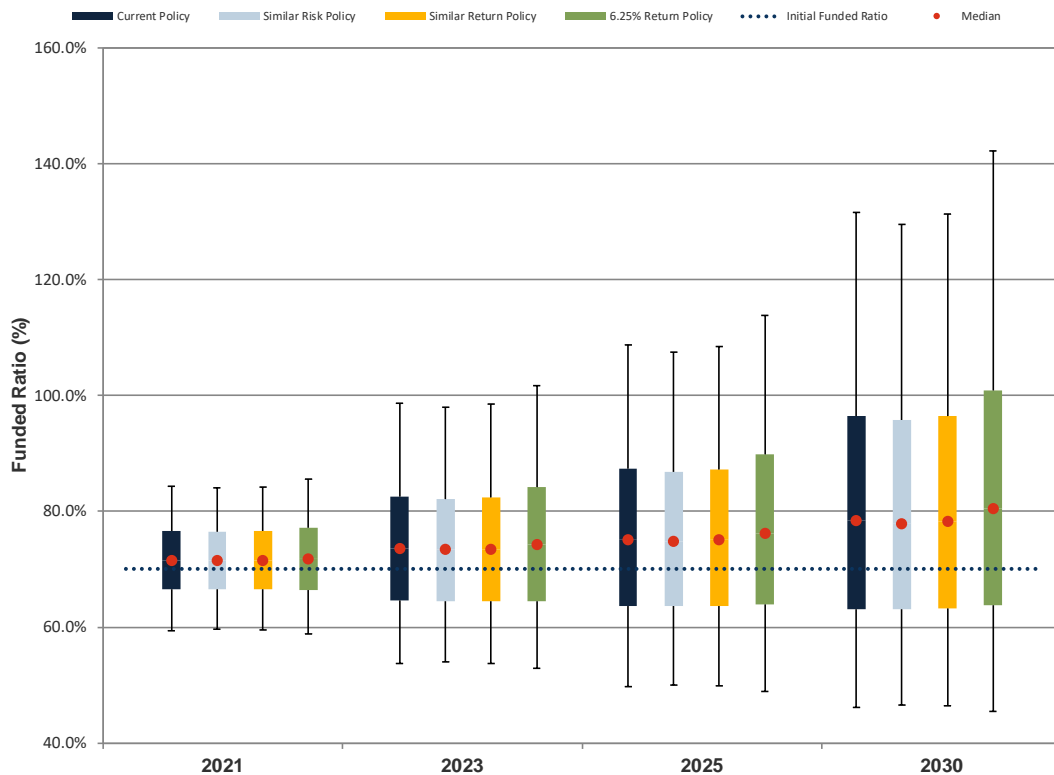
(\$ Millions)	Years 1 - 5				Years 1 - 10			
	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy
Very Pessimistic	894.4	892.3	894.1	908.3	1,136.1	1,132.8	1,134.3	1,147.5
Pessimistic	730.2	730.5	730.5	728.6	891.6	893.1	890.9	882.1
Median (Expected)	598.2	601.6	598.8	583.3	685.3	689.7	685.7	656.9
Optimistic	459.9	465.8	461.3	434.2	446.6	456.3	448.0	414.8
Very Optimistic	240.7	244.1	241.6	229.0	266.9	271.5	268.8	245.8

Economic Cost is defined as the present value of contributions plus contributions necessary to fully fund the plan at the end of the projection period.



INSURANCE – SPRS

Wilshire Associates MVA FUNDED RATIO



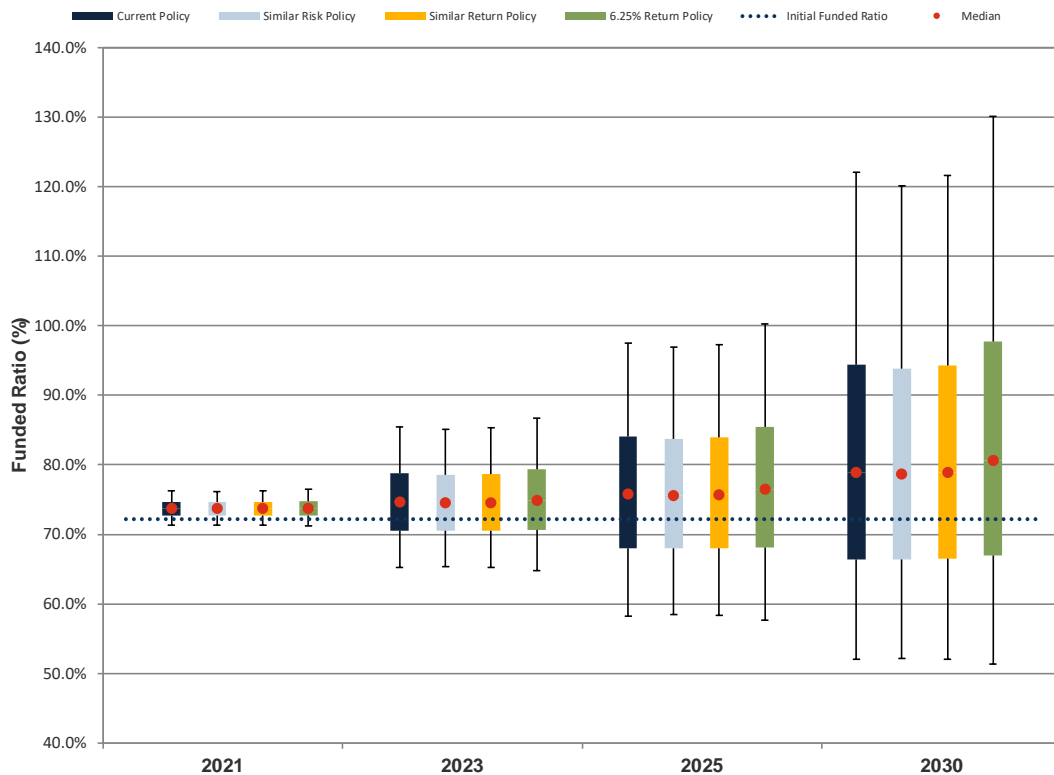
Shortfall Risk:
The potential for the alternatives to have a lower median funded ratio than the current policy.

Drawdown Risk:
The potential for the alternatives to have a lower "very pessimistic" funded ratio than the current policy.

Initial Funded Ratio = 70.08%

(%)	2021				2023				2025				2030			
	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy
Very Optimistic	84.35	84.02	84.18	85.55	98.67	98.02	98.52	101.74	108.70	107.48	108.40	113.80	131.54	129.54	131.35	142.23
Optimistic	76.59	76.47	76.57	77.17	82.53	82.17	82.41	84.15	87.35	86.82	87.24	89.88	96.49	95.76	96.45	100.82
Median (Expected)	71.59	71.56	71.60	71.83	73.54	73.40	73.50	74.23	75.07	74.84	75.05	76.24	78.35	77.92	78.35	80.47
Pessimistic	66.58	66.59	66.58	66.41	64.59	64.54	64.55	64.53	63.68	63.72	63.74	63.94	63.16	63.10	63.20	63.83
Very Pessimistic	59.46	59.66	59.54	58.88	53.78	53.98	53.82	52.98	49.77	50.00	49.88	48.89	46.23	46.54	46.44	45.44

Wilshire Associates AVA FUNDED RATIO



Shortfall Risk:
The potential for the alternatives to have a lower median funded ratio than the current policy.

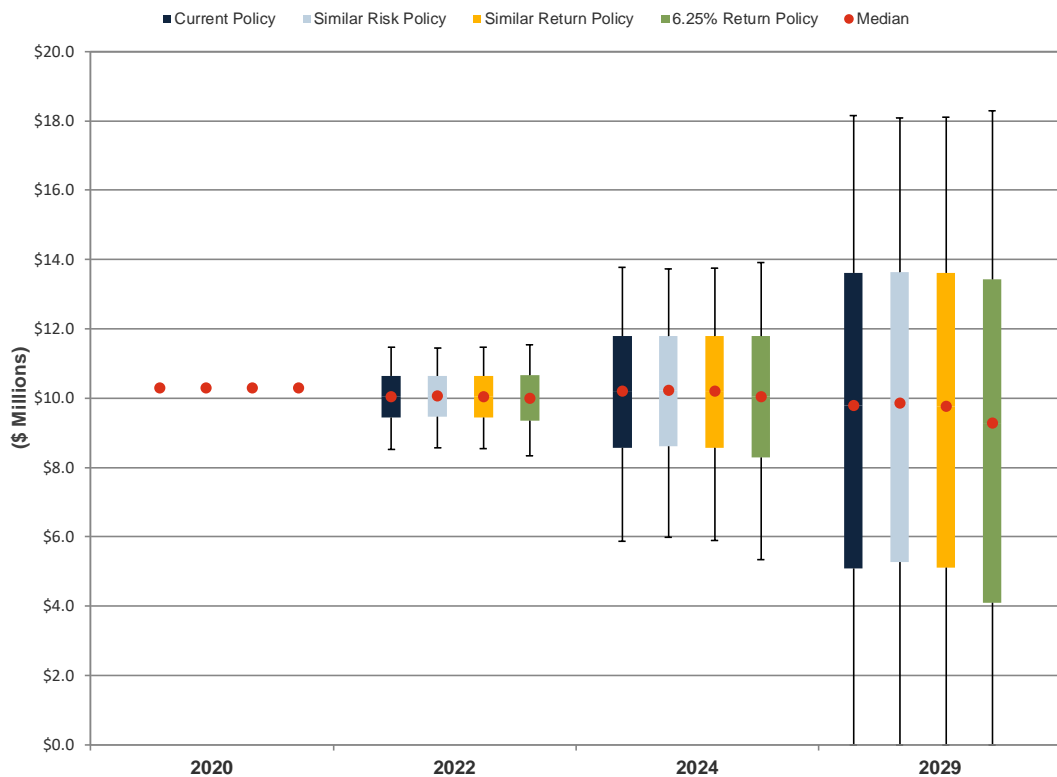
Drawdown Risk:
The potential for the alternatives to have a lower "very pessimistic" funded ratio than the current policy.

Initial Funded Ratio = 72.16%

(%)	2021				2023				2025				2030			
	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy
Very Optimistic	76.25	76.19	76.22	76.49	85.41	85.08	85.31	86.66	97.46	96.88	97.32	100.21	122.03	120.12	121.62	130.06
Optimistic	74.70	74.68	74.70	74.82	78.74	78.58	78.71	79.40	84.02	83.70	83.96	85.42	94.39	93.83	94.26	97.70
Median (Expected)	73.70	73.70	73.70	73.75	74.62	74.55	74.59	74.94	75.75	75.54	75.67	76.51	78.89	78.62	78.91	80.62
Pessimistic	72.70	72.70	72.70	72.67	70.58	70.56	70.57	70.60	67.96	67.94	67.96	68.09	66.42	66.38	66.45	67.01
Very Pessimistic	71.28	71.32	71.29	71.16	65.21	65.34	65.27	64.75	58.21	58.45	58.32	57.63	52.05	52.15	52.07	51.38



Wilshire Associates PLAN YEAR CONTRIBUTIONS



Shortfall Risk:
The potential for the alternatives to have higher median contributions than the current policy.

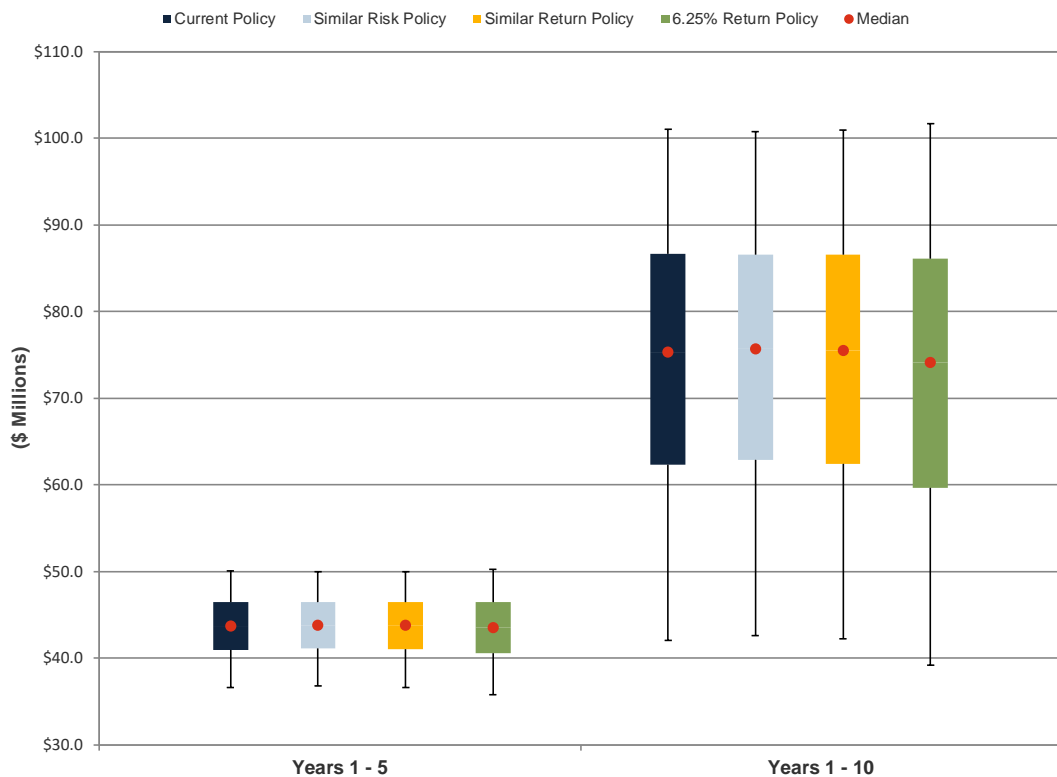
Drawdown Risk:
The potential for the alternatives to have higher "very pessimistic" contributions than the current policy.

(\$ Millions)	2020				2022				2024				2029			
	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy
	Very Pessimistic	10.3	10.3	10.3	10.3	11.5	11.5	11.5	11.5	13.8	13.7	13.8	13.9	18.1	18.1	18.1
Pessimistic	10.3	10.3	10.3	10.3	10.6	10.6	10.7	10.7	11.8	11.8	11.8	11.8	13.6	13.6	13.6	13.4
Median (Expected)	10.3	10.3	10.3	10.3	10.0	10.1	10.0	10.0	10.2	10.2	10.2	10.1	9.8	9.9	9.8	9.3
Optimistic	10.3	10.3	10.3	10.3	9.4	9.5	9.4	9.4	8.6	8.6	8.6	8.3	5.1	5.3	5.1	4.1
Very Optimistic	10.3	10.3	10.3	10.3	8.5	8.6	8.5	8.3	5.9	6.0	5.9	5.3	0.0	0.0	0.0	0.0

Wilshire Associates



PRESENT VALUE OF CONTRIBUTIONS



Shortfall Risk:
The potential for the alternatives to have a higher median present value of contributions than the current policy.

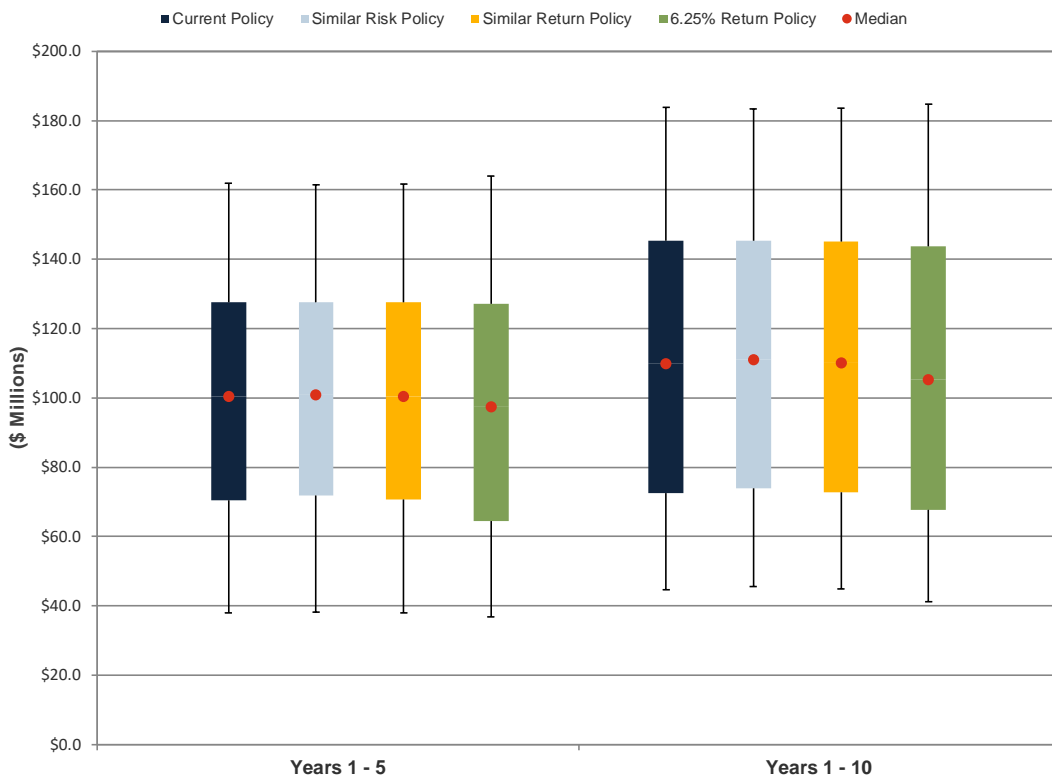
Drawdown Risk:
The potential for the alternatives to have a higher "very pessimistic" present value of contributions than the current policy.

EROA = 6.25%

(\$ Millions)	Years 1 - 5				Years 1 - 10			
	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy
Very Pessimistic	50.0	50.0	50.0	50.3	101.0	100.8	101.0	101.7
Pessimistic	46.5	46.5	46.5	46.5	86.6	86.6	86.6	86.1
Median (Expected)	43.7	43.8	43.8	43.5	75.4	75.7	75.5	74.1
Optimistic	41.0	41.1	41.0	40.6	62.3	62.8	62.4	59.6
Very Optimistic	36.6	36.8	36.7	35.8	42.1	42.7	42.3	39.2

Wilshire Associates

MVA ECONOMIC COST



Shortfall Risk:
The potential for the alternatives to have a higher median economic cost than the current policy.

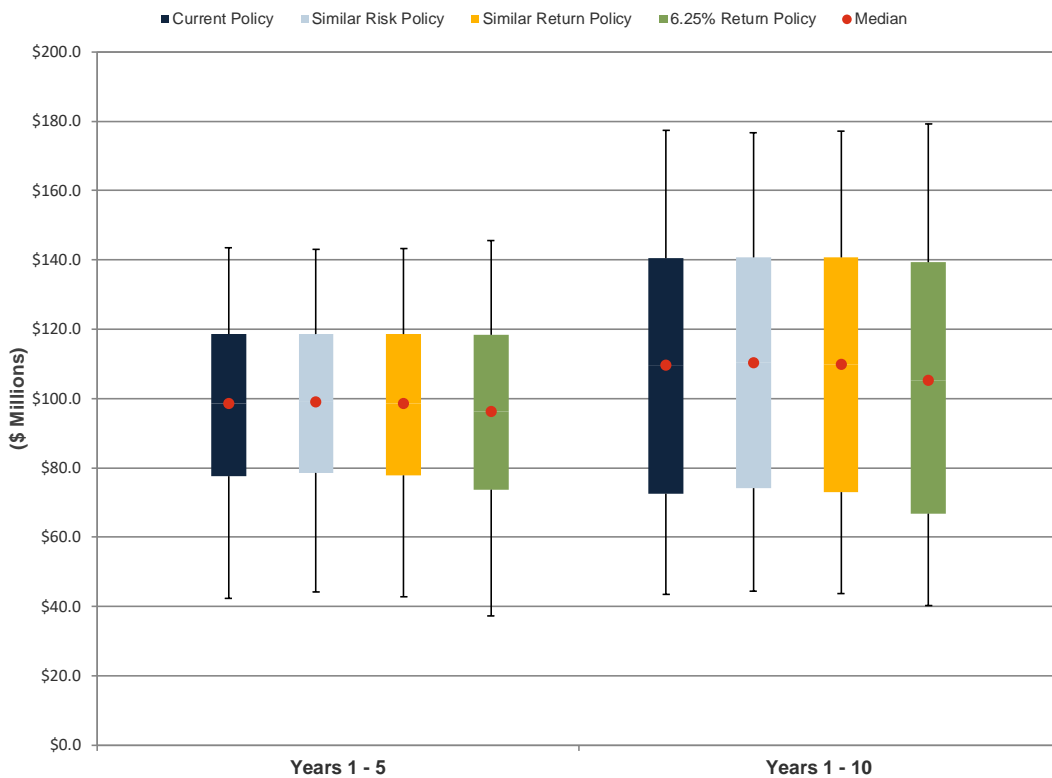
Drawdown Risk:
The potential for the alternatives to have a higher "very pessimistic" economic cost than the current policy.

EROA = 6.25%

(\$ Millions)	Years 1 - 5				Years 1 - 10			
	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy
Very Pessimistic	162.0	161.4	161.7	163.9	183.9	183.3	183.6	184.8
Pessimistic	127.5	127.7	127.5	127.2	145.3	145.4	145.2	143.7
Median (Expected)	100.5	101.0	100.5	97.3	109.9	111.1	110.1	105.4
Optimistic	70.4	71.8	70.8	64.4	72.6	73.9	72.8	67.7
Very Optimistic	38.0	38.1	38.0	36.9	44.7	45.5	44.9	41.3

Economic Cost is defined as the present value of contributions plus contributions necessary to fully fund the plan at the end of the projection period.

Wilshire Associates AVA ECONOMIC COST



(\$ Millions)	Years 1 - 5				Years 1 - 10			
	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy	Current Policy	Similar Risk Policy	Similar Return Policy	6.25% Return Policy
Very Pessimistic	143.4	143.2	143.3	145.6	177.3	176.6	177.1	179.2
Pessimistic	118.6	118.6	118.7	118.3	140.5	140.8	140.6	139.3
Median (Expected)	98.6	99.0	98.6	96.3	109.7	110.4	109.8	105.4
Optimistic	77.6	78.5	77.8	73.7	72.6	74.2	73.0	66.7
Very Optimistic	42.3	44.1	42.9	37.3	43.5	44.4	43.7	40.4

Shortfall Risk:
The potential for the alternatives to have a higher median economic cost than the current policy.

Drawdown Risk:
The potential for the alternatives to have a higher "very pessimistic" economic cost than the current policy.

EROA = 6.25%

Economic Cost is defined as the present value of contributions plus contributions necessary to fully fund the plan at the end of the projection period.



APPENDIX – CORRELATION MATRIX



Wilshire Associates

ASSET CLASS ASSUMPTIONS

- Wilshire's asset class return, risk and correlation assumptions are developed on multi-year forward looking expected rates of return and historical risk and correlation, adjusted to incorporate recent trends.
- Public market return expectations represent a passive investment in the asset class (beta). They do not reflect value added from active management (alpha).

	U.S. Equity	Non-U.S. Equity	High Yield / Specialty Credit	Private Equity	Private Equity (Revised)	Core Fixed Income	Cash	Real Estate	Opportunistic	Real Return
Return - 10-Year (%)	6.00	6.75	5.40	8.15	6.65	1.25	0.75	6.80	3.75	5.45
Return - 30-Year (%)	7.05	7.55	6.60	9.55	7.80	3.30	2.05	7.40	5.10	6.60
Risk (%)	17.00	18.95	7.30	28.00	18.15	5.15	1.25	14.00	4.60	8.75
Correlations										
U.S. Equity	1.00									
Non-U.S. Equity	0.83	1.00								
High Yield / Specialty Credit	0.58	0.50	1.00							
Private Equity	0.74	0.67	0.32	1.00						
Private Equity (Revised)	0.98	0.83	0.53	0.86	1.00					
Core Fixed Income	0.28	0.09	0.19	0.31	0.31	1.00				
Cash	-0.05	-0.08	-0.10	0.00	-0.04	0.19	1.00			
Real Estate	0.54	0.47	0.63	0.51	0.56	0.19	-0.05	1.00		
Opportunistic	0.43	0.54	0.62	0.42	0.46	0.07	0.07	0.32	1.00	
Real Return	0.43	0.48	0.60	0.43	0.46	0.24	0.01	0.69	0.50	1.00

High Yield/Specialty Credit is a mix of 50% High Yield and 50% Bank Loans plus 1% alpha

Private Equity (Revised) is a mix of 80% US Equity and 20% Private Equity.

Opportunistic is a mix of 25% Equity Market Neutral, 12.5% Global Macro & 62.5% Relative Value Hedge Funds.

Real Return is a mix of 25% US TIPS, 7.5% Global REITS, 15% Private Real Estate, 10% Commodity, 17.5% Timber, 15% Oil & Gas & 7.5% MLPs.



APPENDIX – EFFICIENT FRONTIER



Wilshire Associates

KERS NH & SPRS

EFFICIENT FRONTIER PORTFOLIOS

Asset Class	Current Policy KERS NH & SPRS	Optimization Constraints	Minimum Risk	Portfolio 2	Portfolio 3	Portfolio 4	Portfolio 5	Portfolio 6	Portfolio 7	Portfolio 8	Portfolio 9	Maximum Risk
U.S. Equity	15.75%	10% - 100% ¹	10.00%	10.43%	13.61%	15.05%	15.89%	18.43%	21.33%	24.46%	27.58%	31.50%
Non-U.S. Equity	15.75%	10% - 100% ¹	10.00%	10.43%	13.61%	15.05%	15.89%	18.43%	21.33%	24.46%	27.58%	31.50%
High Yield / Specialty Credit	15.00%	0% - 15%	0.00%	15.00%	15.00%	15.00%	15.00%	15.00%	12.34%	6.09%	0.00%	0.00%
Private Equity	0.00%	0.0%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Private Equity (Revised)	7.00%	0% - 7% ³	0.00%	0.00%	0.00%	2.81%	6.79%	7.00%	7.00%	7.00%	7.00%	7.00%
Total Growth Assets	53.50%	20% - 70%	20.00%	35.86%	42.22%	47.92%	53.57%	58.86%	62.00%	62.00%	62.17%	70.00%
Core Fixed Income	20.50%	15% - 100%	65.00%	39.14%	32.78%	27.08%	21.43%	16.14%	15.00%	15.00%	15.00%	15.00%
Cash	3.00%	3% - 5%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	3.00%	3.00%	3.00%	3.00%
Total Fixed Income	23.50%		70.00%	44.14%	37.78%	32.08%	26.43%	21.14%	18.00%	18.00%	18.00%	18.00%
Real Estate	5.00%	5% - 10%	5.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	7.00%
Opportunistic	3.00%	0.0%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Real Return	15.00%	5% - 10%	5.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	9.83%	5.00%
Total Diversifying	23.00%	10% - 20%	10.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	19.83%	12.00%
Total Assets	100.0%		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Total Illiquid Assets ²	21.75%		6.25%	15.50%	15.50%	18.31%	22.29%	22.50%	21.97%	20.72%	19.46%	15.25%
Expected Return - 10 Years (%)	5.19		3.02	4.20	4.56	4.88	5.19	5.47	5.66	5.73	5.78	5.79
Standard Deviation of Return (%)	8.92		5.84	6.62	7.43	8.23	9.07	9.84	10.66	11.40	12.17	13.00
+ / (-) in Expected Return - 10 Years (bps)			(217)	(99)	(63)	(31)	0	28	47	54	59	60
+ / (-) in SD of Return (bps)			(308)	(230)	(149)	(69)	15	92	174	248	325	408
Sharpe Ratio	0.50		0.39	0.52	0.51	0.50	0.49	0.48	0.46	0.44	0.41	0.39

¹ Non-U.S. Equity is constrained to be no more than U.S. Equity.

² Illiquid Assets are comprised of 20% of High Yield / Specialty Credit, Private Equity, Real Estate, Opportunistic and 25% of Real Return.

³ Private Equity is assumed to be 80% U.S. Equity and 20% of Private Equity (standard assumption).



Wilshire Associates

HAZ & CERS NH PENSION AND ALL INSURANCE EFFICIENT FRONTIER PORTFOLIOS

Asset Class	Current Policy KERS & CERS Haz (Ret/Ins), CERS NH (Ret/Ins) & KERS NH Ins & SPRS Ins	Optimization Constraints	Minimum Risk	Portfolio 2	Portfolio 3	Portfolio 4	Portfolio 5	Portfolio 6	Portfolio 7	Portfolio 8	Portfolio 9	Maximum Risk
U.S. Equity	18.75%	10% - 100% ¹	10.00%	10.00%	10.00%	12.06%	13.87%	16.78%	19.67%	22.41%	26.19%	30.00%
Non-U.S. Equity	18.75%	10% - 100% ¹	10.00%	10.00%	10.00%	12.06%	13.87%	16.78%	19.67%	22.41%	26.19%	30.00%
High Yield / Specialty Credit	15.00%	0% - 15%	0.00%	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%	14.19%	6.63%	0.00%
Private Equity	10.00%	0% - 10%	0.00%	1.47%	5.97%	7.43%	9.62%	10.00%	10.00%	10.00%	10.00%	10.00%
Private Equity (Revised)	0.00%	0.0%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Total Growth Assets	62.50%	20% - 70%	20.00%	36.47%	40.97%	46.56%	52.37%	58.57%	64.34%	69.00%	69.00%	70.00%
Core Fixed Income	13.50%	10% - 100%	67.00%	40.53%	36.03%	30.44%	24.63%	18.43%	12.66%	10.00%	10.00%	10.00%
Cash	1.00%	1% - 3%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	1.00%	1.00%	1.00%
Total Fixed Income	14.50%		70.00%	43.53%	39.03%	33.44%	27.63%	21.43%	15.66%	11.00%	11.00%	11.00%
Real Estate	5.00%	5% - 10%	5.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%
Opportunistic	3.00%	0.0%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Real Return	15.00%	5% - 10%	5.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	9.00%
Total Diversifying	23.00%	10% - 20%	10.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	19.00%
Total Assets	100.0%		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Total Illiquid Assets ²	24.75%		6.25%	16.97%	21.47%	22.93%	25.12%	25.50%	25.50%	25.34%	23.83%	22.25%
Expected Return - 10 Years (%)	5.96		3.02	4.30	4.69	5.05	5.42	5.76	6.05	6.29	6.35	6.41
Standard Deviation of Return (%)	10.83		5.91	6.82	7.68	8.52	9.49	10.39	11.23	12.06	12.97	13.90
+ / (-) in Expected Return - 10 Years (bps)			(294)	(166)	(127)	(91)	(54)	(20)	9	33	39	45
+ / (-) in SD of Return (bps)			(492)	(401)	(315)	(231)	(134)	(44)	40	123	214	307
Sharpe Ratio	0.48		0.38	0.52	0.51	0.50	0.49	0.48	0.47	0.46	0.43	0.41

¹ Non-U.S. Equity is constrained to be no more than U.S. Equity.

² Illiquid Assets are comprised of 20% of High Yield / Specialty Credit, Private Equity, Real Estate, Opportunistic and 25% of Real Return.

³ Private Equity is assumed to be 80% U.S. Equity and 20% of Private Equity (standard assumption).



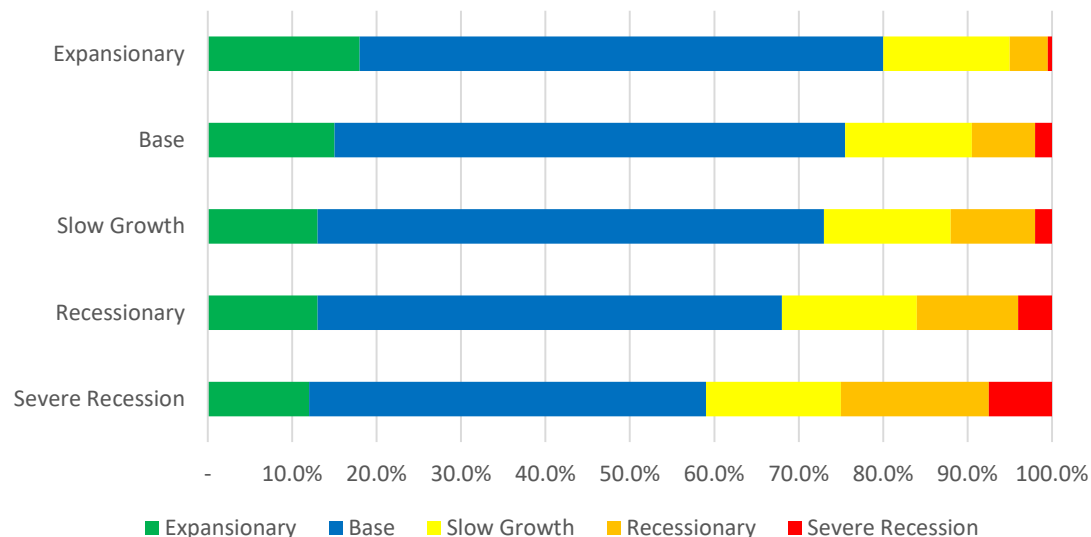
APPENDIX – REGIMES

STRESS TESTING: REGIME SWITCHING MODEL

Managing drawdown risk – the “uncertainty around the uncertainty”

- Most simulation models assume returns are log-normally distributed
- Though reasonable in most years, left-tail events occur more frequently than predicted
- A regime switching model can help us pre-experience uncomfortable return paths that fall outside a normal distribution’s field of view

		expansionary	base	slow growth	recessionary	severe recession
expansionary	18.0%	62.0%	15.0%	4.5%	0.5%	
base	15.0%	60.5%	15.0%	7.5%	2.0%	
slow growth	13.0%	60.0%	15.0%	10.0%	2.0%	
recessionary	13.0%	55.0%	16.0%	12.0%	4.0%	
severe recession	12.0%	47.0%	16.0%	17.5%	7.5%	



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STRESS TESTING: REGIME ASSUMPTIONS

	US Equity	Dev xUS Equity	EM Equity	Private Equity	Cash	Core Bonds	Long Core Bonds	US TIPS	HY	US Real Estate	Private RE	Commodities	Portfolio KERS NH & SPRS	Portfolio KERS & CERS Haz (Ret/Ins), CERS NH (Ret/Ins), KERS NH Ins & SPRS Ins
Expansionary/Above Trend Growth														
Return (%)	11.00	11.50	11.50	15.65	1.00	0.75	1.60	(0.20)	6.00	10.10	11.80	5.25	7.97	9.38
Risk (%)	12.00	13.00	21.00	20.50	1.25	5.65	10.85	6.50	8.00	13.00	11.00	15.00	6.70	8.06
Baseline/Trend Growth														
Return (%)	6.00	6.50	6.50	8.15	0.75	1.25	2.10	0.30	4.00	5.10	6.80	2.25	5.19	5.96
Risk (%)	17.00	18.00	26.00	28.00	1.25	5.15	9.85	6.00	10.00	17.00	14.00	15.00	8.92	10.83
Slow Growth/Below Trend														
Return (%)	4.00	4.50	4.50	5.15	0.50	2.25	3.60	0.80	3.00	3.10	4.80	1.25	4.36	4.83
Risk (%)	22.00	23.00	31.00	35.50	1.25	6.15	11.85	7.00	12.00	21.00	17.00	17.00	11.48	14.05
Recessionary/Negative Growth														
Return (%)	(4.00)	(3.50)	(3.50)	(6.85)	0.25	3.25	5.10	1.80	0.00	(4.90)	(3.20)	(1.75)	0.09	(0.52)
Risk (%)	27.00	28.00	36.00	43.00	1.25	7.15	13.85	8.00	15.00	25.00	20.00	20.00	14.16	17.36
Severe Recession/Deflation														
Return (%)	(44.00)	(43.50)	(43.50)	(41.85)	(0.25)	13.75	22.10	10.30	(16.00)	(44.90)	(43.20)	(4.75)	(19.02)	(23.66)
Risk (%)	42.00	43.00	51.00	53.00	1.25	15.15	19.85	16.00	20.00	42.00	34.00	25.00	21.57	25.43

- In below trend and worse environments, the portfolios' return expectations is materially lower and the volatility is materially higher



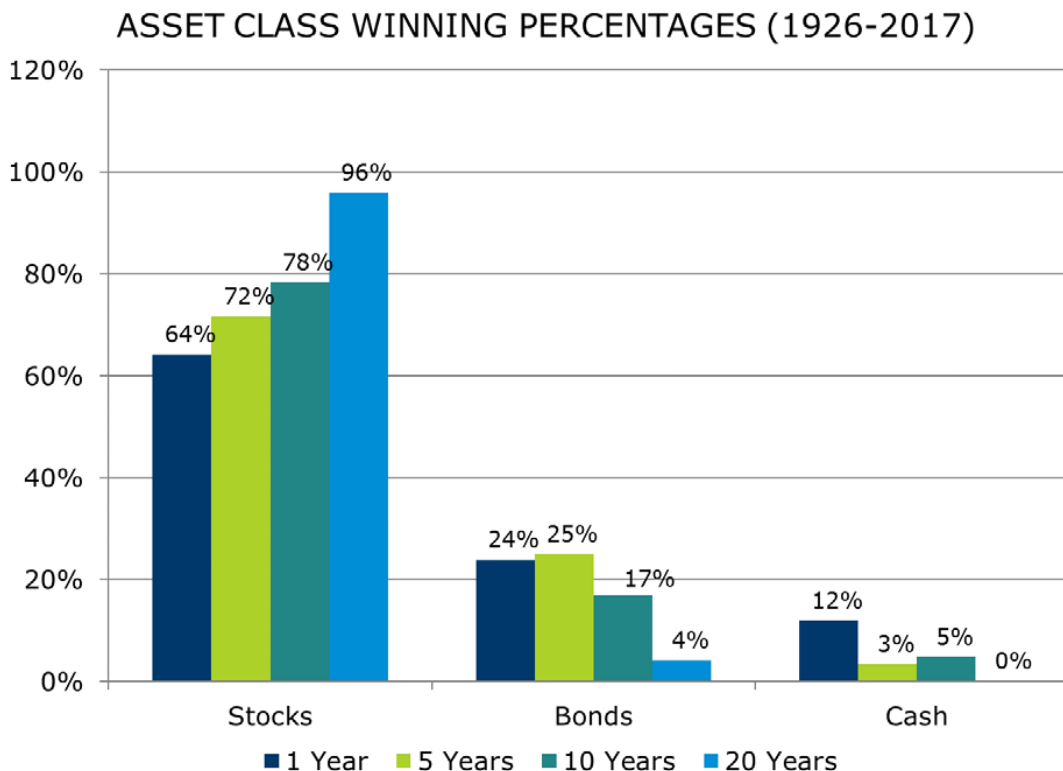
APPENDIX – LIQUIDITY

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LIQUIDITY RISK: WHAT ARE THE CONSEQUENCES?

- Default/Insolvency is the most severe outcome from having insufficient liquidity, but...
- There are many other, more likely, disruptive impacts that a lack of liquidity can impose on an investment portfolio
- Liquidity breaches can rob an investor of their biggest advantage: a long-term investment horizon
- The timing and price of such sales dictated by liquidity needs rather than by explicit investment rationale
- Can destroy portfolio value and effectively strip a portfolio from its ability to recover from market sell-offs



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WILSHIRE LIQUIDITY METRIC

Wilshire's Liquidity Metric framework has two levels

1. Market Level of Liquidity
2. Stressed Level of Liquidity Metric

Market Level of liquidity

- Quantified on scale from 0% (low liquidity) to 100% (high liquidity)
- Designed to capture general notion of marketable versus private/off-market transactions
 - Marketable asset classes typically reflect a 90% or 100%
 - Private asset classes reflect 0%
- Goal is to reflect the tradability of assets, which is helpful in connecting these values back to our definitional framework (i.e., to quantify the differences between Convertible Liquidity and Delayed Liquidity)

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WILSHIRE LIQUIDITY METRIC

Stressed Level of Liquidity Metric

Includes a penalty process to reflect the loss in practical liquidity due to asset class volatility and sensitivity to particular economic environments

Penalty components:

1. Growth Penalty:

- Impacts asset classes with vulnerability to slowing growth
- Recognizes the hit to liquidity that can occur during growth related bear markets

2. Inflation Penalty:

- Impacts asset classes with vulnerability to rising inflation
- Recognizes the hit to liquidity that can occur during inflation driven bear markets

3. Volatility Penalty:

- Impacts higher volatility asset classes
- Recognizes the hit to liquidity that can occur from any form of volatility

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WILSHIRE STRESSED LIQUIDITY METRIC

Stressed Level of Liquidity Metric

Asset Class	Market Liquidity	Liquidity Penalty Components			Applied Penalty	Stressed Liquidity
		Growth	Inflation	Volatility		
US Equity	100	50		24	50	13
Dev ex-US Equity	100	50		26	50	13
EM Equity	90	50		40	50	3
Private Equity	0	50		40	0	0
Cash Equivalents	100				0	100
Core Bonds	100		8		8	86
High Yield Bonds	80	40		10	40	10
US Real Estate Securities	90	50		24	50	3
Private Real Estate	0	50		18	0	0
Commodities	90			20	20	55

Applied Penalty = $\text{Min}(\text{Max}(\text{Growth} + \text{Inflation}, \text{Volatility}), \text{Market Liquidity})$

Stressed Liquidity Metric = $\text{Market Liquidity} - (1.75 \times \text{Applied Penalty})$



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