

SWIB Board Meeting of December 11, 2024

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Name of Meeting: Regular Meeting of the Board of Trustees
Date/Time: Tuesday, December 10, 2024 5:30 pm
Location: Vintage Brewing Co. Madison West
Address: 674 S. Whitney Way, Madison, WI 53711

Estimated Time	OPEN SESSION
5:30 pm	Reception* Vintage Brewing Co. 674 S. Whitney Way Madison, WI 53711 Adjourn until Wednesday, December 11, 2024

**The Reception is open to the public. If a member of the public wishes to attend, please notify SWIB at 608-261-9341 or email dawn.tuescher@swib.state.wi.us on or before December 10th.*

Name of Meeting: Regular Meeting of the Board of Trustees
Date/Time: Wednesday, December 11, 2024 Approx. 9:45 am (following Benchmark)
Room: 1st Floor Conference Room
Address: 4703 Madison Yards Way, Madison, WI 53705
Virtual: [Join the meeting now](#); 608-267-3179 code 884072122

OPEN SESSION	
1.	Committee Reports – Open Session Items <ul style="list-style-type: none"> A. Audit and Finance Committee B. Benchmark and Performance Committee C. Compensation and Workforce Development Committee D. Strategic Planning and Corporate Governance Committee
2.	Consent Agenda <ul style="list-style-type: none"> A. Open Session Minutes of September 11 and October 15-16, 2024 B. Recommended Actions from Committee Agendas – Open Session Items
3.	Investment Performance and Market Updates <ul style="list-style-type: none"> A. Board Investment Performance Report, Q3 2024 B. Callan Quarterly Report
4.	Annual Presentation on Cost Benchmarking
5.	Asset Allocation Recommendations for 2025
6.	Committee Open Session Business <ul style="list-style-type: none"> A. Amendments to Enterprise Risk and Compliance Committee Charter B. Amendments to WRS Investment Committee Investment Guidelines C. Approved Open Session Investment Committee Meeting Minutes of August 27, September 24, and October 22, 2024 D. Final Open Session Investment Committee Agenda for November 26, 2024 and Draft Open Session Agendas for December 19, 2024 and January 28, 2025
7.	Quarterly Investment Update, Q3 2024
CLOSED SESSION*	

* The motion to go into closed session at this meeting is made pursuant to: (i) Sections 19.36(5) and 19.85(1)(e) of the Wisconsin Statutes to consider confidential and proprietary strategies for the investment of public funds relating to specific proprietary investment strategies of internal WRS portfolios, asset allocation, and risk management, and/or for any comments or discussion on prior closed session minutes that discuss the same; (ii) Section 19.85(1)(c) of the Wisconsin Statutes to discuss the compensation and performance evaluation data of specific SWIB employees, including SWIB’s executive director/chief investment officer and SWIB’s board of trustees, and/or for any comments or discussion on prior closed session minutes that discuss the same; and (iii) Section 19.85(1)(g) of the Wisconsin Statutes to confer with SWIB’s chief legal counsel to receive advice concerning legal strategy for ongoing and potential litigation, and/or for any comments or discussion on prior closed session minutes that discuss the same. The Board may convene in additional closed sessions or announce additional closed session items at the meeting in accordance with the procedure outlined in the Attorney General’s Opinion reported at 66 OAG 106 (1977). Whenever a closed session is held, the Board will subsequently reconvene in open session to cover remaining agenda items.

RECONVENE IN OPEN SESSION

8. Announcement of Matters Taken Up in Closed Session

9. In the Absence of Questions, the Following Reports will be Filed Without Comment (For informational purposes):

- A. Quarterly Charges to Funds Reports, Q3 2024
- B. Private Markets and Funds Alpha Commitments, Q3 2024
- C. Board Contact Log

10. Future Items for Discussion

- A. 2025 Board Meeting and Agenda Plan

11. Motion to Adjourn

NOTES: Items may be taken in order other than listed.

Estimated times are for planning purposes only. Agenda items will last until discussion is concluded.

The meeting site is physical accessible. Upon prior request, reasonable accommodations will be provided.

*For further details on virtual format of meeting, please contact Dawn Tuescher (608-261-9341 or dawn.tuescher@swib.state.wi.us).

Board Meeting

Tab 1 – Committee Reports – Open Session Items

- A. Audit and Finance Committee
- B. Benchmark and Performance Committee
- C. Compensation and Workforce Development Committee
- D. Strategic Planning and Corporate Governance Committee

Board Meeting

Tab 2 – Consent Agenda

- A. Open Session Minutes of September 11 and October 15-16, 2024
- B. Recommended Actions from Committee Agendas – Open Session Items

Summary: Any Trustee may request to move a consent agenda item to the regular agenda for further discussion.

Review and Action

Proposed Motion: Move to approve the consent agenda, as presented.

Regular Meeting of the Board of Trustees

Wednesday, December 11, 2024

STATE OF WISCONSIN INVESTMENT BOARD

CONSENT AGENDA – OPEN SESSION ITEMS

Proposed Motions:

1. Move to approve the Open Session Minutes of September 11 and October 15-16, 2024, as presented.
2. Move to approve the Total Cost of Management Plan for Calendar Year 2025, as recommended by the Audit and Finance Committee and as set forth in the Committee's meeting materials.
3. Move to approve the changes to the Benchmark and Performance Committee Charter, the Committee Policies, and the SWIB Benchmarking Philosophy, as recommended by the Benchmark and Performance Committee and as set forth in the Committee's meeting materials.
4. Move to approve, as recommended by the Benchmark and Performance Committee, the benchmark changes highlighted and described in the Committee's meeting materials, to be effective on or after January 1, 2025, and that all other benchmarks remain unchanged.
5. Move to approve the amended Compensation Plan, as recommended by the Compensation and Workforce Development Committee and as set forth in the Committee's meeting materials.
6. Move to approve, as recommended by the Compensation and Workforce Development Committee, (i) the Relative Performance Maximum (RPM) for the TBA Strategy effective beginning in 2025, as presented in the Committee's meeting materials; and (ii) all other RPMs remain unchanged.
7. Move to approve the changes to the Strategic Planning and Corporate Governance Committee Charter, as recommended by the Strategic Planning and Corporate Governance Committee and as set forth in the Committee's meeting materials.

STATE OF WISCONSIN INVESTMENT BOARD
Board Meeting – Open Session

Wednesday, September 11, 2024

Office of the Investment Board
4703 Madison Yards Way, Madison, WI

Board Members Present: Clyde Tinnen, Chair
Esther Ancel, Trustee
Barb Bolens, Trustee
Kathy Blumenfeld, Trustee
Jeff DeAngelis, Trustee
Tom Merfeld, Trustee
Dave Schalow, Trustee
Robert Scott, Trustee
John Voelker, Trustee

Staff/Others Present: Nathan Ballard, Senior Legal Counsel
Eric Barber, Chief Legal Counsel
Zach Berghouse, Internal Auditor
Brandon Brickner, Head of Internal Audit
Sara Chandler, Chief of Staff & Strategy
Hassan Chehime, Head of Risk Management
Edwin Denson, Executive Director/Chief Investment Officer
Anne-Marie Fink, Private Markets & Funds Alpha CIO
Greg Fletcher, Performance Director
Shannon Gannon, Communications Director
Jameson Greenfield, Chief Financial Officer
Dan Gyorog, Internal Auditor
Phil Johnson, Senior Portfolio Manager
Rochelle Klaskin, Deputy Executive Director/Chief Operating Officer
Leo Kropywiansky, Senior Portfolio Manager
Jon Loboda, Performance Measurement Operations Manager
Todd Mattina, Head Economist, Asset & Risk Allocation CIO
Frank Mazzucco, Senior Legal Counsel
Mike Shearer, Head of Fixed Income Strategies
Dawn Tuescher, Executive Administrative Assistant
Randy Miller, Funston Advisory Services
Sam Rebenstorf, Legislative Audit Bureau
Alfred McQuire, Bain Capital
Muskan Arora, Markets Group
Mc Cyril Espanol, With Intelligence
Susan Freiss, Public Attendee
Stefania Sani, Public Attendee
Kelly Kearns, Public Attendee
Judith Stadler, Public Attendee

(Some individuals may have attended only portions of the meeting.)

Trustee Tinnen, Chair of the Board of Trustees, declared a quorum was present and called the Board of Trustees meeting to order at 9:00 a.m. on September 11, 2024.

1. Committee Reports – Open Session Items

A. Audit and Finance Committee

Trustee Voelker, Vice Chair of the Audit and Finance Committee, reported that in open session, the Committee: (i) approved prior meeting minutes; (ii) received an open audit issues report; (iii) approved the draft State of Investment Fund audit report; (iv) received a 2024 Internal Audit Plan Status update and reviewed the 2025 Internal Audit Plan Preview; and (v) received a Quarterly Cost of Management Update for Q2 2024.

B. Benchmark and Performance Committee

Trustee Schalow, Chair of the Benchmark and Performance Committee, reported that in open session the Committee approved prior meeting minutes and received a preview of the Comprehensive Benchmark Review.

C. Compensation and Workforce Development Committee

Trustee DeAngelis, Chair of the Compensation and Workforce Development Committee, reported that in open session, the Committee approved prior meeting minutes and received a Talent Acquisition and Employee Engagement Update.

D. Strategic Planning and Corporate Governance Committee

Trustee Tinnen, Chair of the Strategic Planning and Corporate Governance Committee, reported that in its open session meeting, the Committee: (i) approved prior meeting minutes; (ii) received Private Equity and Private Debt Strategy Reports and Markets Outlook presentation from Aksia, the new Private Equity and Private Debt Strategies Consultant; (iii) considered changes to the Corporate Governance Proxy Voting Guidelines and recommended that the Board approve the same; (iv) received an overview of the annual review of Board policies in the Trustee Manual; (v) received a preview of the October Board Workshop; and (vi) received a progress report on Project Centum.

2. Consent Agenda

Eric Barber, Chief Legal Counsel, distributed a proposed consent agenda. Trustee Tinnen asked whether there were any motions listed on the consent agenda that should be removed for further discussion and individual action. Hearing none, he referred to the following items on the consent agenda:

- Move to approve the Open Session Minutes of June 12, 2024, as presented.
- Move to approve the changes to the Corporate Governance Proxy Voting Guidelines, as recommended by the Strategic Planning and Corporate Governance Committee and as set forth in the Committee's materials.

Motion: A motion was made by Trustee Tinnen and seconded by Trustee Blumenfeld to approve the consent agenda, as presented. The motion passed unanimously.

3. Investment Forum Recap

Eric Barber, Chief Legal Counsel, reviewed the topics and format of the June 2024 Investment Forum and asked for Trustee feedback. Mr. Barber stated that the virtual format made it easier to secure desired speakers and increased attendance, noting that over 200 participants attended the Forum including WRS participants, CFA members, SWIB staff, and Trustees.

4. Fiduciary & Public Records Topics

Mr. Barber noted the resources on the topics of Fiduciary Duties will be sent to the Trustees via email, including materials from the Board manual, BoardSmart, and other resources, for their review prior to the next Board meeting.

5. Investment Performance and Market Updates

A. Board Investment Performance Report, Q2 2024

Greg Fletcher, Performance Director, presented the *Investment Performance Report*, as of June 30, 2024, included on pages 29-44 of the meeting materials. Mr. Fletcher reported that: (i) the Core Trust Fund (CTF) returned 1.34% net of all fees and expenses in Q2 2024, resulting in excess performance of 29 basis points (bps) for the quarter; (ii) the CTF returned 9.69% net of all fees and expenses for the one-year period, resulting in an excess return of 125 bps; (iii) the CTF five-year return net of all fees and expenses was 7.82% and outperformed the Policy Benchmark by 71 bps on an annualized basis; and (iv) the CTF net of external manager fee return outperformed the 60/40 Reference Portfolio return by 37.4% (cumulative) over the past twenty years, which equates to an excess value add of \$18.3 billion over the same period.

Mr. Fletcher highlighted: (i) the CTF net of all fees and expenses return outperformed its benchmark for the year-to-date, one-, three-, and five-year time periods; (ii) the CTF net of external manager fee return outperformed its benchmark for the ten-, fifteen-, and twenty-year time periods; (iii) the CTF gross of fee return outperformed its benchmark for the thirty-year time period; (iv) the Variable Trust Fund (VTF) net of all fees and expenses return outperformed for the year-to-date and one-year time periods and underperformed for the three-, and five-year periods; (v) the VTF net of external manager fee return underperformed its benchmark for the ten-year and twenty-year time periods and outperformed its benchmark for the fifteen-year period; and (vi) the VTF gross of fee return outperformed its benchmark for the thirty-year time period. Mr. Fletcher then noted that SWIB's investment management has added more than \$4.0 billion above benchmark returns to the WRS over the last five years.

Mr. Fletcher reviewed the overall assets under management (AUM) of SWIB, noting that the gross market value of assets increased by almost \$9 billion over the past year. He then referenced that the percentage of WRS assets that are actively managed has declined, driven by a variety of factors, and the percentage of WRS assets that are internally managed remained consistent. Next, Mr. Fletcher: (i) provided a breakdown of CTF asset class exposures, noting that the portfolio remains well diversified and all asset classes are within asset allocation target ranges; (ii) reviewed the asset class performance for the CTF over various time periods and discussed the performance of the alpha pool overlay; (iii) reviewed VTF performance and asset class exposures, noting that asset class exposures were within target ranges; and (iv) presented return information for the Separately Managed Funds.

Mr. Fletcher concluded by reviewing the *Leverage Performance*, included on page 46 of the meeting materials. He noted that policy leverage contributed 13 bps to CTF absolute performance year-to-date and

remained a positive contributor over the one- and five-year periods.

B. Callan Quarterly Report

Mr. Fletcher noted that the *Callan Quarterly Report Summary*, as of June 30, 2024, was included on pages 48-61 of the meeting materials. He highlighted that the CTF's total fund unadjusted performance exceeds policy target for all periods, are near median of the peer group over the last quarter, five-, and ten-year periods but are below median of the peer group for one- and three-year periods. On an asset allocation adjusted basis, the CTF's rankings are in the first quartile for the last quarter and the one-year period, and in the second quartile for three-, five- and ten-year periods. When comparing the CTF ten-year cumulative performance to peers, Mr. Fletcher noted the CTF exhibits low tracking error relative to its peers and produces stable, ascending cumulative performance over 10 years.

6. Committee Open Session Business

A. Amendments to WRS Investment Committee Investment Guidelines

Mr. Barber discussed amendments to the *SWIB Investment Committee Wisconsin Retirement System Investment Guidelines*, approved by the Investment Committee on June 25, 2024 and included on pages 63-110 of the meeting materials. He noted that the proposed changes: (i) update language across several portfolios to make the permitted use of derivative instruments consistent; (ii) update the governance structure for exposure management, moving approval to the head of Asset & Risk Allocation (ARA) within risk limits or ED/CIO; and (iii) align language regarding the hedge fund portfolio classifications to those used by the portfolio's external investment consultant, Aksia, and adjust the target allocations and maximums for the strategy.

B. Approved Open Session Investment Committee Minutes

Mr. Barber stated that the approved open session minutes of the May 28, June 25, and July 23, 2024 Investment Committee meetings were included on pages 111-128 of the meeting materials for the Board's review and noted that staff had previously reviewed the agendas for these meetings with the Board.

D. Agendas for Upcoming Meetings

Mr. Barber also stated that the final open session agenda for the August 27, 2024 Investment Committee meeting and the draft open session agendas for the September 24 and October 22, 2024 meetings were included on pages 129-134 of the meeting materials for the Board's review.

E. Draft Open Session Enterprise Risk and Compliance Committee Minutes

Mr. Barber noted the draft open session minutes of the May 14, 2024 Enterprise Risk and Compliance Committee meeting were included on pages 135-137 of the meeting materials for the Board's review.

7. Quarterly Investment Update, Q4 2024

Todd Mattina, Head Economist, Asset & Risk Allocation CIO, presented the *Performance Trends & Outlook*, included on pages 140-145 of the meeting materials. Mr. Mattina began with a review of the CTF five-year rolling annualized net of external manager fee return compared to the CTF twenty-year net of fee return and the actuarial target rate of return. He noted that despite volatility over the last few years, the five-year rolling return continues to outperform the actuarial target as well as the policy benchmark.

Mr. Mattina then provided a brief commentary on the CTF five-year return estimate, which projected a five-year annualized return of 6.9% using NEPC’s assumptions for 2024. He also discussed the five-year forward estimate and highlighted the potential negative impact to the five-year annualized return as the 2019, 2020, and 2021 performance years, which had meaningfully positive performance of 19.5%, 15.3%, and 17.0%, respectively, fall out of the five-year performance time period and are replaced with the NEPC 10-year expected return assumption of 6.5%. Mr. Mattina also presented a new slide projecting the average return required to avoid any negative dividend adjustment, reporting that a 9.5% average return for 2024-2026 would avoid any such negative dividend adjustment.

Leo Kropywiansky, Senior Portfolio Manager–Asset & Risk Allocation, presented the *Economic Update*, included on pages 146-165 of the meeting materials. He began with a discussion on economic growth, noting that growth is slowing down, and that he predicts approximately 1.7% growth for 2024. He pointed to the exhaustion of covid stimulus balances and a slowing of state and local investment spending as primary drivers of this slowing growth. Mr. Kropywiansky next discussed inflation and the labor markets. He commented that higher inflation from earlier in the year has stemmed later into the year, opening the door to Fed rate cuts. With respect to the labor market, Mr. Kropywiansky believes that supply and demand are close to balanced now and that wage growth has moderated but remains somewhat high. He concluded by noting that market is currently pricing 100 bps of Fed cuts by year end, implying at least one 50bps rate cut with three remaining meetings.

8. Motion to Convene in Closed Session

Motion: A motion to convene in closed session pursuant to: (i) Sections 19.36(5) and 19.85(1)(e) of the Wisconsin Statutes to consider confidential and proprietary strategies for the investment of public funds relating to specific proprietary investment strategies of internal WRS portfolios, asset allocation, and risk management and/or for any comments or discussion on prior closed session minutes that discuss the same; (ii) Section 19.85(1)(c) of the Wisconsin Statutes to discuss the compensation and performance evaluation data of specific SWIB employees, including SWIB’s executive director/chief investment officer and SWIB’s board of trustees, and/or for any comments or discussion on prior closed session minutes that discuss the same; and (iii) Section 19.85(1)(g) of the Wisconsin Statutes to confer with SWIB’s chief legal counsel to receive advice concerning legal strategy for ongoing and potential litigation, and/or for any comments or discussion on prior closed session minutes that discuss the same, was made by Trustee Tinnen and seconded by Trustee Merfeld.

The Chair called for a roll call vote.

Ancel–Aye	Blumenfeld–Aye	Bolens–Aye	DeAngelis–Aye	Merfeld–Aye
Schalow–Aye	Scott–Aye	Tinnen–Aye	Voelker–Aye	

There being eight ayes and no nays, the Chair declared the motion passed. The Board convened in closed session at 10:16 a.m. and reconvened in open session at 12:20 p.m.

9. Announcement of Board Actions Relating to Items Taken up in Closed Session

Trustee Tinnen announced that while in closed session the Board (i) received a closed session quarterly investment update, (ii) received a risk management update; and (iii) discussed Investment Committee closed session business. While in executive closed session, the Board (i) received a report on committee closed session meetings; (ii) approved prior meeting minutes and items from the committee meetings’

executive closed sessions, (iii) received an update on litigation matters from the Chief Legal Counsel, and (iv) met with the Board Governance consultant to review the Board self-evaluation.

10. Reports Filed Without Comment

In the absence of questions, the following reports, included on pages 258-271 of the meeting materials, were filed without comment: (i) Quarterly Charges to Funds Report, Q2 2024; (ii) Private Markets and Funds Alpha Commitments, Q2 2024, and (iii) Board Contact Log.

11. Future Items for Discussion

Mr. Barber noted that the Annual Agenda Plan was included on pages 273-276 in the meeting materials for the Board’s information.

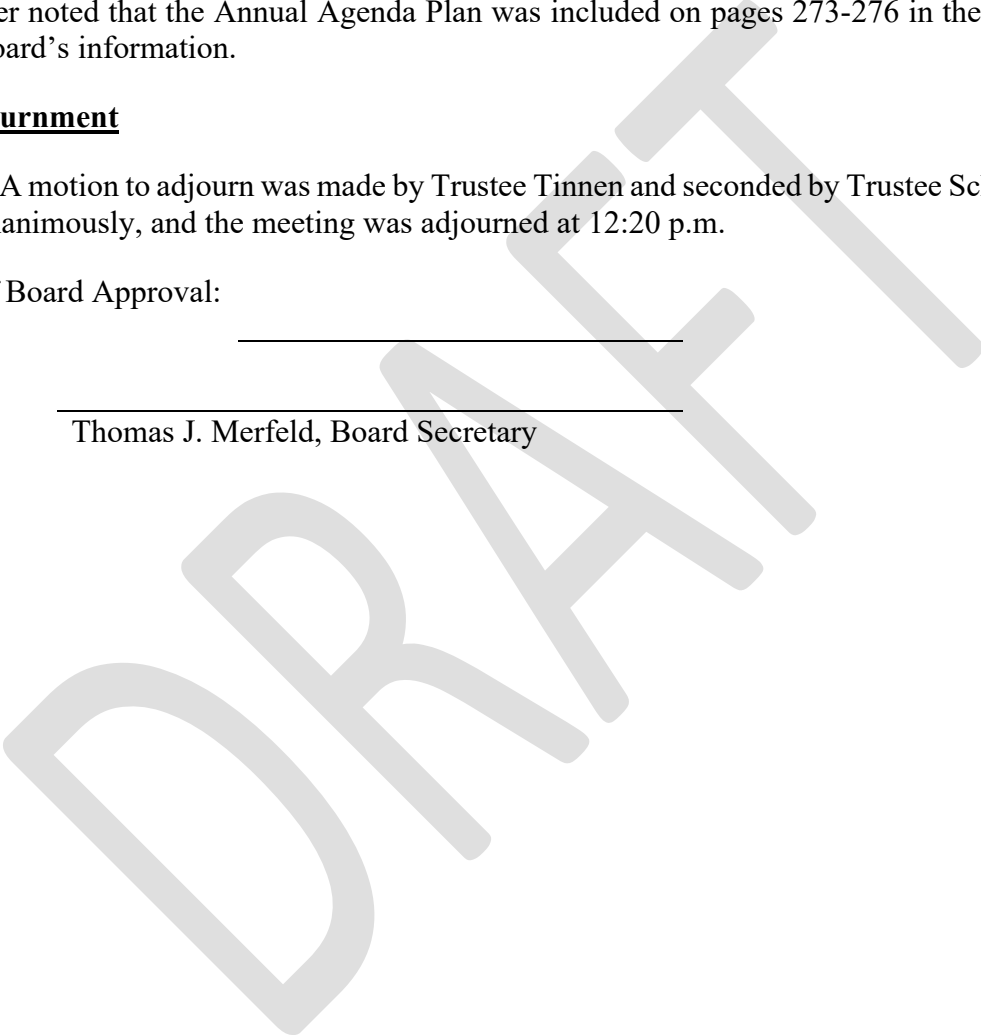
12. Adjournment

Motion: A motion to adjourn was made by Trustee Tinnen and seconded by Trustee Schalow. The motion passed unanimously, and the meeting was adjourned at 12:20 p.m.

Date of Board Approval:

Signed:

Thomas J. Merfeld, Board Secretary



STATE OF WISCONSIN INVESTMENT BOARD

Board of Trustees Meeting – Open Session

Tuesday/Wednesday, October 15-16, 2024

Lake Lawn Resort
Delavan, Wisconsin

Board Members Present for Both Days:

Clyde Tinnen, Chair
Tom Merfeld, Vice Chair & Secretary
Esther Ancel, Trustee
Kathy Blumenfeld, Trustee
Barb Bolens, Trustee
Jeff DeAngelis, Trustee
Dave Schalow, Trustee
Robert Scott, Trustee
John Voelker, Trustee

Staff/Others Present:

Nathan Ballard, Senior Legal Counsel
Eric Barber, Chief Legal Counsel
Brandon Brickner, Head of Internal Audit
Sara Chandler, Chief of Staff and Strategy
Hassan Chehime, Head of Risk Management
Edwin Denson, Executive Director/Chief Investment Officer
Derek Drummond, Head of Funds Alpha
Anne-Marie Fink, Private Markets & Funds Alpha Chief Investment Officer
Jameson Greenfield, Chief Financial Officer
Brian Heimsoth, Senior Portfolio Manager
Rochelle Klaskin, Deputy Executive Director/Chief Administrative Officer
Leo Kropywiansky, Senior Portfolio Manager
Diane Linn, Senior Portfolio Manager
Todd Mattina, Head Economist, Asset & Risk Allocation CIO
Chase Nicholson, Senior Portfolio Manager
Scott Parrish, Head of Private Equity
Cefe Quesada, Chief Technology Officer
Jason Rector, Portfolio Manager – Funds Alpha
Jason Rothenberg, Head of Real Estate
Andrea Ruiz, Senior Portfolio Manager
Mike Shearer, Head of Fixed Income Strategies
Nick Stanton, Head of Multi-Asset Strategies
Dawn Tuescher, Executive Administrative Assistant
Ivy Zhang, Senior Portfolio Manager
Joe Nankof, NEPC
Frank Kelly, Fulcrum Macro Advisors
Kevin Sheehan, DWS Distributors
Chris Ailman, Ailman Advisors
Chris Connor, Ardmore Road
Michael Jordan, Dockside
Sam Rebenstorf, Legislative Audit Bureau
Peter Knotek, Public Attendee

(Some individuals may have attended only portions of the meeting.)

TUESDAY, OCTOBER 15, 2024

Open Session

Trustee Tinnen, Chair of the Board of Trustees, declared a quorum was present and called the Board of Trustees meeting to order at 1:00 p.m.

1. Workshop Welcome & Kickoff

Trustee Tinnen welcomed staff, Trustees, and guests to SWIB's annual workshop and introduced Edwin Denson, Executive Director/Chief Investment Officer. Mr. Denson also welcomed attendees to the workshop and reviewed the topics to be covered over the two-day meeting.

2. Public Policy: U.S. Election and Market Perspective

Todd Mattina, Head Economist & Asset and Risk Allocation Chief Investment Officer, introduced, Frank Kelly, Founder & Managing Partner at Fulcrum Macro Advisors. Mr. Mattina then conducted a fireside chat with Mr. Kelly who discussed (i) the upcoming United States election and its implications on markets and global politics, (ii) the current geo-political climate, including China's economic condition, the impact of India's growing population and economy, and the impact of current military conflicts around the globe and the perceived alliance between China, Russia, and North Korea, and (iii) finally, the impact of GLP-1 drugs, noting that the economic impact of these drugs could have a wide-ranging effect on life and health insurance costs, retirement planning, and the treatment of alcohol and drug addiction.

3. Enhancing Capital Efficiency: Dockside

Anne-Marie Fink, Private Markets & Funds Alpha Chief Investment Officer, introduced Michael Jordan, Chief Executive Officer of Dockside Platforms; Chris Connor, Founder and Chief Investment Officer, Ardmore Road; and Derek Drummond, Head of Funds Alpha at SWIB. Ms. Fink moderated a discussion relating to SWIB's innovative partnership with Dockside to employ a multi-manager managed account platform to improve SWIB's capital efficiency and investment transparency, as well as provide other structural economic benefits. The panel discussed the changing perception of managed account platforms, noting a trend of more willingness for high-quality managers to manage assets through these structures. Mr. Connor reflected on the positive relationship with SWIB and the value of having managed accounts with high-quality partners like SWIB.

4. 2025 Asset Allocation Preview: Long-Term Private Market Allocation

Joe Nankof, NEPC, and Todd Mattina, Head Economist & Asset and Risk Allocation Chief Investment Officer, presented the Asset Allocation Review, included on pages 53-108 of the meeting materials. With respect to the 2025 asset allocation recommendations, Mr. Nankof reviewed the recommendation for the Core Trust Fund (CTF) to increase the private equity/debt target by 2% from 18% to 20%, with a corresponding 2% decrease in the public equity target from 40% to 38%. No changes were recommended for the Variable Trust Fund (VTF).

Mr. Nankof discussed the recommended asset allocation for 2025 as well as the market assumptions upon which the recommendations were based, including (i) a review of the 10- and 30-year return expectations for various asset classes, including year-over-year changes to those expected returns; (ii) that recent strong equity performance had further stretched valuations and

weighed on forward-looking public equity returns; and (iii) that the recommended increase in private equity/debt is consistent with the overall long-term private markets pacing plan.

Mr. Mattina then presented the long-term private investment framework. He noted that the long-term private markets pacing plan, developed collaboratively among NEPC and SWIB's Asset & Risk Allocation (ARA) and Private Markets & Funds Alpha (PMFA) divisions, projects that the private markets allocation will peak at approximately 35% of the CTF over the next ten years. Mr. Mattina highlighted that (i) private markets investments contribute meaningfully to the CTF's long-term expected returns, including by offering a higher long-term expected return relative to comparable public market assets; (ii) increases in target allocations to private markets investments are considered in the context of evolving CTF liquidity needs, sensitivity to potential market stress, and ensuring sufficient vintage year diversification; and (iii) adjusting the size and pacing of commitments permits staff to control private markets allocations over time. He also emphasized that the pacing plan preserves significant excess CTF liquidity relative to anticipated cashflow needs, and that stress test analysis confirms that the pacing model maintains sufficient excess liquidity even in the most challenging market environments. Lastly, Mr. Mattina and Mr. Nankof answered questions regarding the importance of liquidity, the illiquidity premium of private markets opportunities, and the results of the stress test analysis on liquidity coverage ratio.

5. CIO Perspective

Edwin Denson, Executive Director/Chief Investment Officer, introduced Chris Ailman, former Chief Investment Officer of California State Teachers' Pension Plan (CalSTRS), who served as its CIO for twenty-four years. Mr. Ailman discussed a variety of topics related to public pensions, reflecting on his tenure at CalSTRS and the many changes he saw throughout that time, including the importance of technological advancement and the growing importance and diversity of "alternative" investment approaches. He addressed several key issues affecting public pensions today including (i) the role of private equity in public pension portfolios and the balance between the added value and illiquidity of private equity; (ii) the importance of succession planning; and (iii) the challenges of ESG-related focus in investing. With respect to climate change, Mr. Ailman while passionate about reducing climate-related effects and that investors needed to consider climate-related risks, recommended against divestment as an approach and commented that CalSTRS had tracked the effect on its divestment in six categories and that it has had a predominantly negative impact on the performance of CalSTRS portfolio, including a \$9 billion negative impact related to tobacco divestment alone and that none of the divestment strategies had a net positive impact on returns. He emphasized the importance of firm culture and commended SWIB on its commitment to culture and strong reputation in the market more generally.

The Board recessed at 5:50 p.m.

WEDNESDAY, OCTOBER 16, 2024

Open Session

Chair Tinnen declared that a quorum was present and called the second session of the Board Workshop to order at 9:02 a.m.

6. Motion to Convene in Closed Session

Motion: A motion to convene in closed session pursuant to: (i) Section 19.85(1)(d) of the Wisconsin Statutes to consider strategies for crime detection and prevention with respect to SWIB’s information technology systems and/or for any comments or discussion on prior closed session minutes that discuss the same; (ii) Sections 19.36(5) and 19.85(1)(e) of the Wisconsin Statutes to consider confidential and proprietary strategies for the investment of public funds relating to specific proprietary investment strategies and/or for any comments or discussion on prior closed session minutes that discuss the same; and (iii) Section 19.85(1)(c) of the Wisconsin Statutes to discuss performance evaluation data of specific SWIB employees, including SWIB’s executive director/chief investment officer and SWIB’s board of trustees, and/or for any comments or discussion on prior closed session minutes that discuss the same was made by Trustee Tinnen and seconded by Trustee Merfeld.

The Chair called for a roll call vote.

Ancel-Aye Blumenfeld-Aye Bolens-Aye DeAngelis-Aye Merfeld-Aye
Schalow-Aye Scott-Aye Tinnen-Aye Voelker- Aye

There being nine ayes and no nays, the Chair declared the motion passed. The Board then convened in closed session at 9:04 a.m. and reconvened in open session at 1:00 p.m.

7. Announcement of Board Actions Relating to Items Taken up in Closed Session

Trustee Tinnen announced that while in closed session the Board received an update on SWIB technology, data management and information governance, as well as a presentation on SWIB’s commercial paper pilot. During the executive closed session, the Board met with the ED/CIO and Chief of Staff and Strategy to receive a strategy update.

The Board adjourned at 1:01 p.m.

Date of Approval:

Signed:

Thomas J. Merfeld, Board Secretary

Board Meeting

Tab 3 – Investment Performance and Market Updates

- A. Board Investment Performance Report, Q3 2024
- B. Callan Quarterly Report



Investment Performance Report

as of September 30, 2024

Executive Summary

September 30, 2024

- The Core Trust Fund returned 5.01% net of all fees and expenses in Q3, resulting in excess performance of +15 bps. For one year, the Core Trust Fund has returned 17.87% net of all fees and expenses, resulting in an excess return of +108 bps.
- The Core Trust Fund five-year net of all fees and expenses return of 8.61% outperforms the Policy Benchmark by +73 bps on an annualized basis.
- The Core Trust Fund net of external manager fee return outperformed the 60/40 Reference Portfolio return by 37.2% (cumulative) over a 20-year period, which equates to an excess value add of \$19.1 billion over the same period.

WRS Performance

as of September 30, 2024

Fund	Net of All Fees and Expenses Return %			
	Calendar – YTD	1 Year	3 Year	5 Year
Core Trust Fund	10.13	17.87	3.93	8.61
Core Trust Fund Benchmark	9.03	16.79	3.31	7.88
Excess	+1.10	+1.08	+0.62	+0.73
Net Excess Value Add (\$M)	+\$1,252.6	+\$1,160.8	+\$2,231.8	+\$4,186.8
Variable Trust Fund	19.22	32.66	8.63	13.01
Variable Trust Fund Benchmark	18.83	32.42	8.67	13.14
Excess	+0.39	+0.24	(0.04)	(0.13)
Net Excess Value Add (\$M)	+\$31.4	+\$16.1	(\$7.1)	(\$48.0)

SWIB's investment management has added more than \$4.1 billion above benchmark returns over the last five years to the WRS.

(Annualized Return shown for all periods greater than 1 yr)

Fund	Net of External Manager Fee Return %			Gross of Fee Return %
	10 Year	15 Year	20 Year	30 Year
Core Trust Fund	7.65	8.27	7.46	8.31
Core Trust Fund Benchmark	7.14	7.76	7.07	7.87
Excess	+0.51	+0.51	+0.39	+0.43
Variable Trust Fund	10.69	11.51	9.28	9.31
Variable Trust Fund Benchmark	10.69	11.42	9.24	9.08
Excess	+0.00	+0.09	+0.03	+0.23

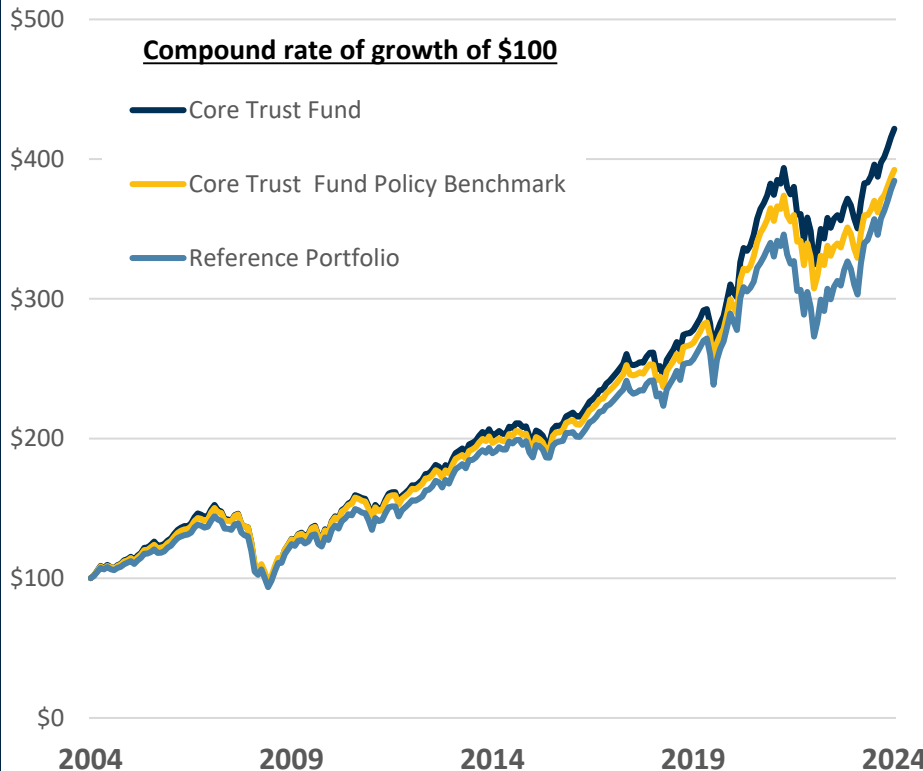
(Annualized Return shown for all periods greater than 1 yr)

Excess returns may contain rounding differences

CTF NoF Performance vs. 60/40 Reference Portfolio

20-year cumulative return¹: October 1, 2004, to September 30, 2024

Indexed Benefit of CTF's Asset Allocation & Active Management Over Time



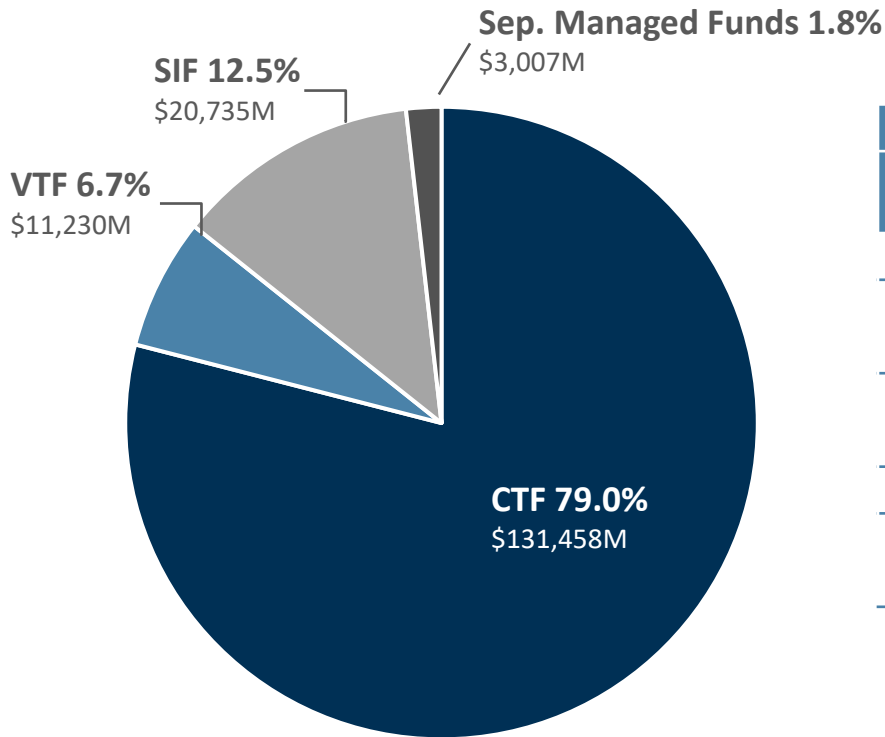
Net of External Manager Fee Return & EVA			
Portfolio / Benchmark	Annualized Return	Cumulative Return	Cumulative \$ Excess Value Added
Reference Portfolio ² (60% equity/40% bonds)	7.0%	284.6%	= Passive Market Return
Benefit of CTF Asset Allocation			
CTF Policy Benchmark	7.1%	292.3%	+\$7.4B
Benefit of CTF Active Management			
CTF Fund	7.5%	321.8%	+\$11.7B
CTF Excess Return vs. Reference Portfolio	+0.5% pts	+37.2% pts	+\$19.1B

¹ Core Trust Fund beginning market value, as of October 1, 2004, was \$58.9B and ending market value, as of September 30, 2024, was \$131.4B

² Reference Portfolio is composed of 60% MSCI World and 40% Bloomberg US Gov't / Credit (rebalanced monthly)

Total Assets Under Management (AUM)

as of September 30, 2024



Gross Market Value of Assets (\$millions)			
By Fund	9/30/2023	9/30/2024	1 Year Change
Total WRS	124,565	142,688	+18,123
Core Trust Fund	115,657	131,458	+15,802
Variable Trust Fund	8,908	11,230	+2,322
State Investment Fund (SIF) ¹	19,995	20,735	+741
Separately Managed Funds	2,627	3,007	+380
Total SWIB AUM	\$147,186	\$166,430	+\$19,243

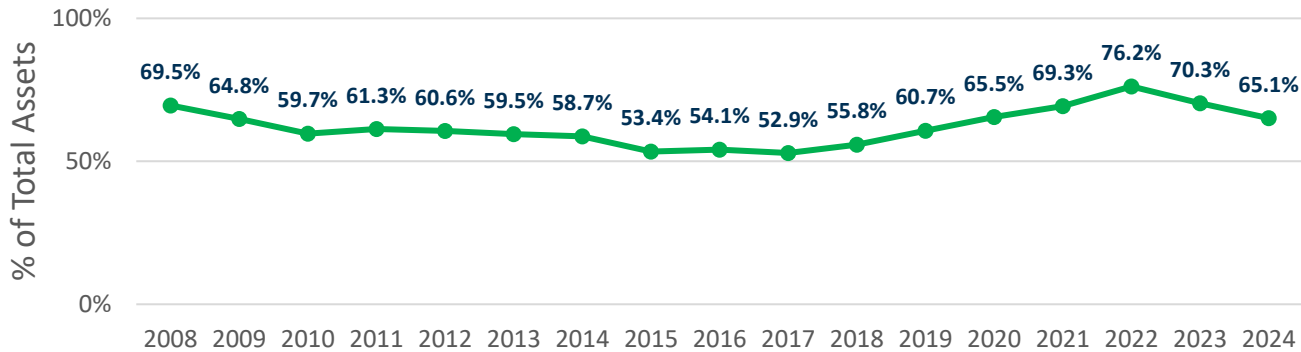
¹ Excludes cash invested in SIF held on behalf of CTF and VTF

Refer to the disclosure section for additional details

WRS Assets as of September 30, 2024

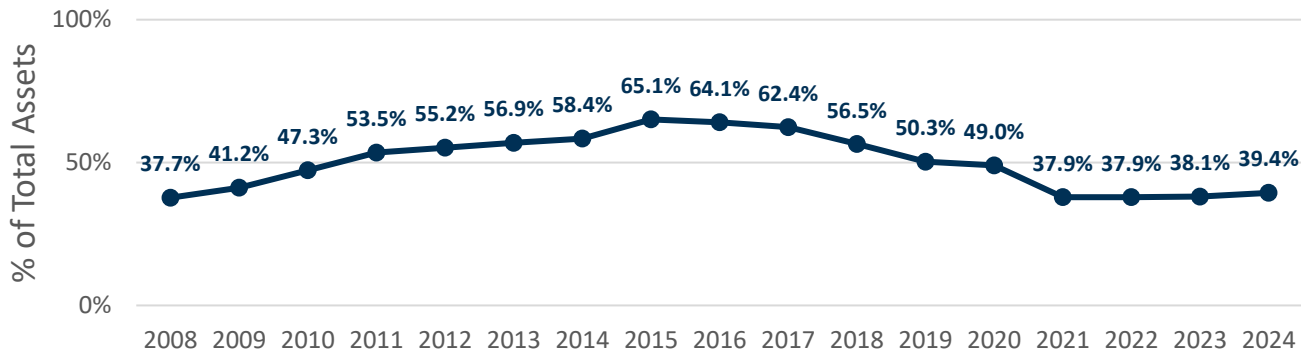
Breakdown of Active vs. Passive and Internal vs. External

Actively Managed Assets



Actively managed assets are a larger share of WRS AUM

Internally Managed Assets



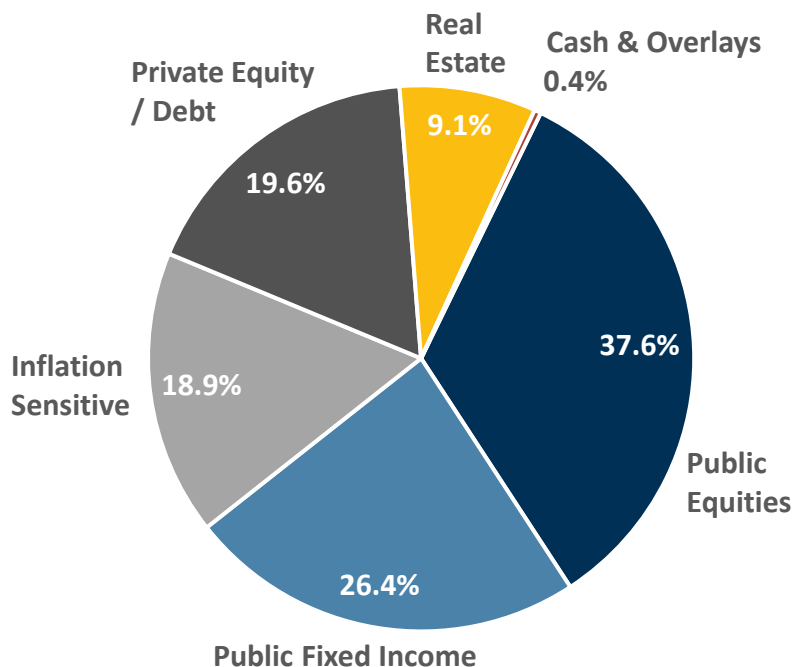
46% of Total SWIB Assets (including SIF) are internally managed

Refer to the disclosure section for additional details

Core Trust Fund Assets Under Management

Breakdown by Asset Class as of September 30, 2024

**Total Exposure - % of Total
9/30/2024**



Total CTF by Asset Class	Total Exposure \$ & Adjusted AUM (\$millions)		
	Total Exposure \$ 9/30/2023	Total Exposure \$ 9/30/2024	Year over Year Change
Public Equities	49,082	49,400	+318
Public Fixed Income	27,570	34,688	+7,118
Inflation Sensitive	21,822	24,860	+3,038
Real Estate	12,038	11,905	(133)
Private Equity / Debt	22,971	25,714	+2,743
Cash & Overlays	(40)	579	+619
Total Exposure	\$133,443	\$147,146	+13,703
<i>Less: Policy Leverage</i>	<i>17,781</i>	<i>15,686</i>	<i>(2,095)</i>
Total CTF AUM	\$115,662	\$131,460	+15,798

Total Exposure is composed of the gross market value of investments, plus beta exposure added or offset through derivative instruments

The Real Estate and Private Equity / Debt asset classes (29% of the Core Trust Fund) contain Illiquid Investments, as defined in "Report Disclosures: Glossary, Definitions & Data Sources", below.

Core Trust Fund Allocation

All exposures shown as of September 30, 2024

Allocation – Exposure View

Strategies	(\$ millions)	As % of Total Fund		Target Range %	Notes
	Total Exposure	Portfolio Exposure %	Benchmark Target %		
Public Equities	49,400	37.58	37.91	31.91 – 43.91	Public & Private exposures include cash Strategies include exposure management investments Cash / Overlays: Includes liquidity, overlay cash, cash used to fund synthetic beta related to Alpha Pool. Benchmark Target weights are adjusted monthly to reflect the actual exposure to Private Equity/Debt and Real Estate. Offsetting adjustments are made to Public Equities and Public Fixed Income. Additional CTF leverage details available in disclosure section
Global Developed	39,760	30.24	30.59		
US Small Cap	2,859	2.17	2.19		
International Small Cap	2,625	2.00	2.01		
Emerging Markets	4,156	3.16	3.12		
Public Fixed Income	34,688	26.39	26.47	20.47 – 32.47	
Investment Grade	20,834	15.85	15.88		
Non-Investment Grade	10,374	7.89	7.94		
Emerging Market Debt	3,480	2.65	2.65		
Inflation Sensitive	24,860	18.91	19.00	14.00 – 24.00	
Real Estate	11,905	9.06	9.06	5.06 – 13.06	
Private Equity / Debt	25,714	19.56	19.56	10.00 – 26.00	
Cash / Overlays	579	0.44	0.00		
Leverage	(15,686)	(11.93)	(12.00)	(20.00) to (4.00)	
Total Fund – Total Exposure	\$147,146	111.93	112.00	104.00 – 120.00	
Total Fund – Market Value	\$131,460	100.00	100.00		

Asset \$ exposures and % weights may contain rounding differences

Core Trust Fund: Asset Class Returns

as of September 30, 2024

Asset Class Group: Public Equities	Performance Start Date	Total Exposure Value (\$millions)	Net of External Manager Fee Return %				
			Calendar YTD	1 Year	3 Year	5 Year	10 Year or ITD
Public Equities	12/31/2002	\$49,582	18.65	31.85	8.07	12.37	9.74
Benchmark			18.05	31.58	8.14	12.63	9.90
Excess			+0.60	+0.27	(0.07)	(0.25)	(0.16)
Global Developed	2/28/2017	\$38,151	19.55	33.15	9.36	13.15	11.88
Benchmark			19.25	33.00	9.58	13.57	12.19
Excess			+0.30	+0.15	(0.22)	(0.42)	(0.31)
Global Equities w/EM	5/31/2021	\$2,133	22.04	36.33	8.97		9.10
Benchmark			19.02	32.27	8.54		7.77
Excess			+3.02	+4.06	+0.43		+1.33
US Small Cap	2/28/2017	\$2,859	14.75	29.15	4.18	10.90	9.35
Benchmark			11.04	26.43	3.03	10.15	8.42
Excess			+3.71	+2.72	+1.15	+0.75	+0.93
International Small Cap	1/31/2020	\$2,616	14.85	23.84	0.78		6.03
Benchmark			12.21	23.61	0.70		5.90
Excess			+2.64	+0.23	+0.08		+0.13
Emerging Market ex China	3/31/2022	\$3,215	11.75	25.72			4.37
Benchmark			12.78	27.51			5.19
Excess			(1.03)	(1.79)			(0.82)
Emerging Market China	3/31/2022	\$584	25.71	20.63			(0.53)
Benchmark			29.23	23.76			1.69
Excess			(3.52)	(3.13)			(2.22)

Core Trust Fund: Asset Class Returns

as of September 30, 2024

Asset Class Group: Public Fixed Income & Inflation Sensitive	Performance Start Date	Total Exposure Value (\$millions)	Net of External Manager Fee Return %				
			Calendar YTD	1 Year	3 Year	5 Year	10 Year or ITD
Public Fixed Income	12/31/2003	\$34,990	6.28	13.94	(0.07)	1.67	2.62
Benchmark			5.35	12.76	(0.04)	1.37	2.43
Excess			+0.93	+1.17	(0.03)	+0.30	+0.19
Investment Grade US Credit	2/28/2022	\$8,300	5.92	15.12			0.87
Benchmark			5.23	13.81			0.61
Excess			+0.69	+1.31			+0.26
US Treasuries	2/28/2022	\$8,390	3.72	9.61			(1.40)
Benchmark			3.84	9.72			(1.15)
Excess			(0.11)	(0.11)			(0.25)
US Long Treasuries	9/30/2022	\$1,191	2.90	16.11			2.69
Benchmark			2.42	15.43			2.44
Excess			+0.48	+0.68			+0.25
MBS	4/30/2020	\$2,761	7.11	15.46	(0.57)		(0.08)
Benchmark			4.50	12.32	(1.20)		(0.88)
Excess			+2.61	+3.14	+0.63		+0.80

(periods greater than 1 yr show annualized return, since inception returns shown for strategies with less than 10-year history)

Excess returns may contain rounding differences
Refer to the disclosure section for additional details

Core Trust Fund: Asset Class Returns

as of September 30, 2024

Asset Class Group: Public Fixed Income & Inflation Sensitive	Performance Start Date	Total Exposure Value (\$millions)	Net of External Manager Fee Return %				
			Calendar YTD	1 Year	3 Year	5 Year	10 Year or ITD
High Yield	7/31/2019	\$6,916	8.11	15.66	1.05	3.99	4.03
Benchmark			7.08	14.71	2.82	4.28	4.36
Excess			+1.03	+0.95	(1.77)	(0.29)	(0.33)
Leveraged Loans	3/31/2023	\$3,459	6.69	10.32			11.28
Benchmark			6.07	9.49			10.81
Excess			+0.62	+0.83			+0.47
Emerging Market Debt - USD	6/30/2005	\$1,724	9.06	19.12	0.02	1.41	3.48
Benchmark			8.64	18.60	(0.40)	0.87	3.28
Excess			+0.42	+0.52	+0.42	+0.54	+0.20
Emerging Market Debt - Local	7/31/2017	\$1,750	5.17	14.70	0.98	0.79	0.69
Benchmark			4.95	13.42	0.60	0.59	0.89
Excess			+0.22	+1.28	+0.38	+0.20	(0.20)
Inflation Sensitive	12/31/2003	\$24,857	4.83	9.78	(0.55)	2.73	2.13
Benchmark			4.85	9.79	(0.57)	2.62	2.05
Excess			(0.02)	(0.01)	+0.02	+0.10	+0.08

(periods greater than 1 yr show annualized return, since inception returns shown for strategies with less than 10-year history)

Excess returns may contain rounding differences
Refer to the disclosure section for additional details

Core Trust Fund: Asset Class Returns

as of September 30, 2024

Asset Class Group: Private Markets & Other Strategies	Performance Start Date	Total Exposure Value (\$millions)	Net of External Manager Fee Return %				
			Calendar YTD	1 Year	3 Year	5 Year	10 Year or ITD
Real Estate	12/31/2003	\$11,905	(3.27)	(5.52)	3.96	4.62	7.22
Benchmark			(8.06)	(9.99)	1.02	2.27	5.43
Excess			+4.79	+4.47	+2.94	+2.35	+1.79
Private Equity / Debt	11/30/2006	\$25,714	6.23	7.84	7.58	14.82	13.45
Benchmark			6.19	7.54	6.42	12.83	11.33
Excess			+0.04	+0.30	+1.16	+1.99	+2.12
<i>Other strategies:</i>							
Alpha Pool Overlay	1/31/2011	\$12,935	2.50	2.82	2.26	4.38	2.53
Benchmark (set to zero as of 1/1/2019)		(at 1/1/22 = \$6,336)	0.00	0.00	0.00	0.00	0.68
Excess			+2.50	+2.82	+2.26	+4.38	+1.85

(periods greater than 1 yr show annualized return, since inception returns shown for strategies with less than 10-year history)

Excess returns may contain rounding differences
Refer to the disclosure section for additional details

Core Trust Fund: Asset Class Returns

Net of External Mgr Fee - Excess Returns as of September 30, 2024



Excess Return - % points

¹ Either 10-year annualized return or Since Inception (ITD) annualized return is used if there is insufficient return history

Excess returns may contain rounding differences
Refer to the disclosure section for additional details

Core Trust Fund: Alpha Pool Overlay

as of September 30, 2024

Alpha Pool Return	Performance Start Date	Market Value (\$ millions)	Net of External Manager Fee Return %				
			Calendar YTD	1 Year	3 Year	5 Year	10 Year
Total Alpha Pool Composite	1/31/2011	\$12,935	2.50	2.82	2.26	4.38	2.53

- Prior to 2022, Hedge Fund sub strategy assets composed > 90% of the Alpha Pool Composite
- Each sub strategy in the composite incurs the cost of implementation expense (assessed on a pro rata basis using AUM). Hence, each sub strategy is assigned a Zero Benchmark.

Alpha Pool: Key Sub Strategies	Inclusion Date	Market Value (\$ millions)	Calendar YTD NoF Return %	1 Year NoF Return %
Hedge Funds	1/31/2011	\$8,822 (68%)	3.73	4.21
Multi Strat	2/1/2022	\$2,517 (19%)	2.59	0.93

Alpha Pool Overlay Return (Alpha Pool + Beta Return)	Calendar YTD	1 Year	3 Year	5 Year	10 Year
CTF Policy Benchmark (Beta)	9.03	16.79	3.31	7.88	7.14
Alpha Pool Overlay Return (Alpha Pool + Beta)	11.53	19.61	5.57	12.26	9.67

(Annualized Return shown for all periods greater than 1 yr)

Excess returns may contain rounding differences
Refer to the disclosure section for additional details

Variable Trust Fund

as of September 30, 2024

Performance

Fund	Performance Start Date	Market Value (\$ millions)	Net of External Manager Fee Return %				
			Calendar YTD	1 Year	3 Year	5 Year	10 Year
Variable Trust Fund	6/30/77	\$11,229	19.27	32.73	8.69	13.07	10.69
Variable Trust Fund Benchmark			18.83	32.42	8.67	13.14	10.69
Excess			+0.44	+0.31	+0.02	(0.07)	+0.00

(Annualized Return shown for all periods greater than 1 yr)

Portfolio Allocation

By Portfolio	(\$ millions)		As % of Total Fund		Target Range
	Total Exposure	Portfolio Exposure	Exposure Target		
Public Equities	11,214	99.86	100.00		
US Equities	7,867	70.05	70.00		65.0 – 75.0%
International Equities	3,347	29.81	30.00		25.0 – 35.0%
Cash & Overlays	16	0.14	0.00		
Total Fund	\$11,230	100.00	100.00		

- *Asset class exposures are within the Target Range*

Excess returns may contain rounding differences
Refer to the disclosure section for additional details

Separately Managed Funds

as of September 30, 2024

Fund	Performance Start Date	Market Value (\$ millions)	Net of External Manager Fee Return %				
			Calendar YTD	1 Year	3 Year	5 Year	10 Year or ITD
State Investment Fund (SIF)	6/30/1975	\$22,822	4.10	5.52	3.61	2.35	1.69
SIF Benchmark			3.98	5.35	3.56	2.28	1.64
Excess			+0.12	+0.17	+0.06	+0.07	+0.05
State Life Insurance Fund	10/31/1994	\$100	3.89	14.99	(3.30)	(0.26)	2.58
No Benchmark							
Historical Society Endowment Fund	12/31/1993	\$29	17.11	29.88	7.72	12.15	10.51
Historical Society Endowment Benchmark			16.42	28.77	7.52	11.69	10.24
Excess			+0.69	+1.11	+0.19	+0.46	+0.27
Injured Patients & Families Comp. Fund	10/31/1993	\$1,547	6.95	15.02	0.48	3.06	4.02
IP&FC Benchmark			6.56	14.35	0.31	2.58	3.54
Excess			+0.39	+0.67	+0.17	+0.48	+0.48
UW System Long Term Fund	3/31/2018	\$605	11.37	19.56	3.81	8.16	7.72
UW System Benchmark			11.30	19.51	3.71	8.00	7.53
Excess			+0.07	+0.04	+0.10	+0.16	+0.19
UW Cash Management Fund	4/30/2022	\$727	7.43	13.69			5.65
UW Cash Management Benchmark			7.42	13.68			5.69
Excess			+0.02	+0.01			(0.05)

(periods greater than 1 yr show annualized return, since inception returns shown for strategies with less than 10-year history)

Excess returns may contain rounding differences
Refer to the disclosure section for additional details

Leverage Performance

As of September 30, 2024

CTF Policy Leverage Performance

as of September 30, 2024

Core Trust Fund	Net of All Fees and Expenses Return %			
	Calendar YTD	1 Year	3 Year	5 Year
Unlevered Returns (as estimated):				
Portfolio ¹	9.60	16.52	4.14	8.15
CTF Benchmark Return ¹	8.50	15.43	3.52	7.43
Excess Return	+1.10	+1.09	+0.62	+0.72
<hr/>				
Portfolio Return (Unlevered)	9.60	16.51	4.14	8.15
Absolute Return from Leverage ^{1,2}	0.53	1.36	(0.21)	0.45
Implementation (+) or (-)	0.00	(0.01)	0.00	0.01
<hr/>				
Levered Returns (as reported):				
Portfolio	10.13	17.87	3.93	8.61
CTF Benchmark	9.03	16.79	3.31	7.88
Excess	+1.10	+1.08	+0.62	+0.73

(Annualized Return shown for all periods greater than 1 yr)

Leverage notes:

¹ The Unlevered Portfolio Return, Unlevered CTF Benchmark Return, Absolute Return from Leverage and Implementation (+) or (-) are estimated

² Policy leverage was first introduced into the CTF and the benchmark at the end of April 2012

- Policy leverage at SWIB is implemented passively. Therefore, it generally does not contribute to active risk or excess returns¹
- Policy leverage amplifies absolute returns (whether positive or negative), which is an important component in SWIB’s strategy to meet the 6.8% actuarial target over the long-term
- The CTF benchmark return is levered to create an apples-to-apples comparison for evaluating relative performance of the CTF (i.e., excess return)

Excess returns may contain rounding differences
Refer to the disclosure section for additional details

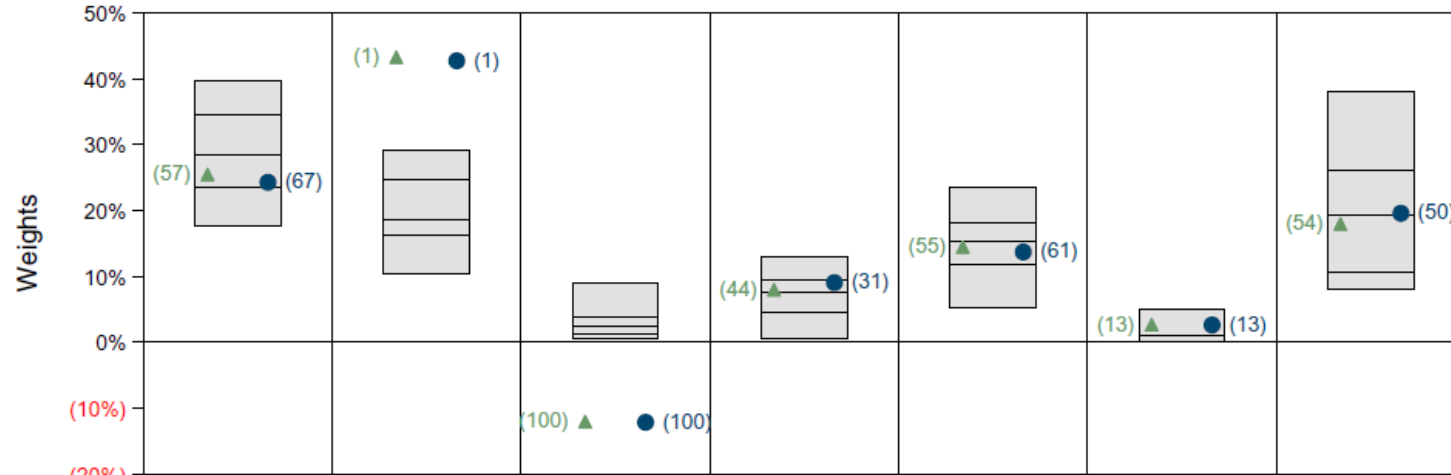
Callan Quarterly Report Summary

3rd Quarter 2024

Callan Peer Rank Update

CTF Asset Allocation Comparison to Peer Group (9.30.2024)

Asset Class Weights vs Callan Public Fund Spons- V Lg DB (>10B)



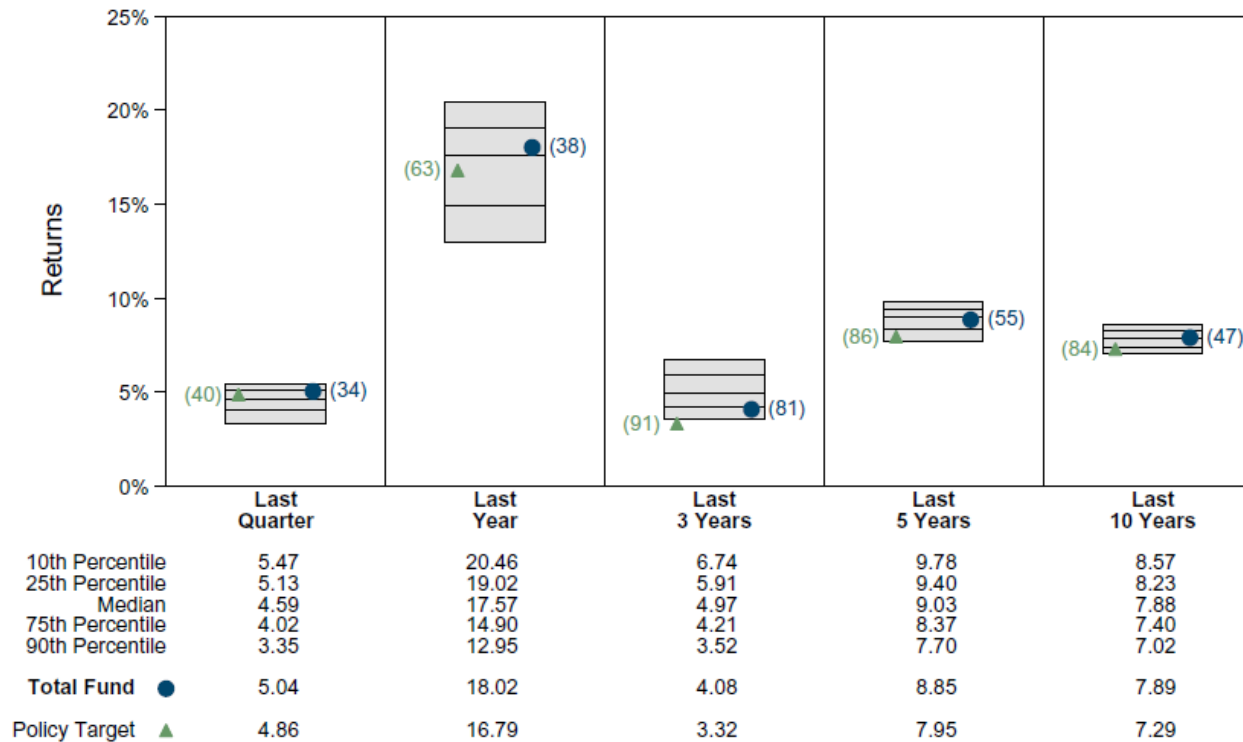
	Domestic Equity	Domestic Fixed	Cash Equivalent	Real Estate	International Equity	International Fixed	Alternatives
10th Percentile	39.75	29.13	9.03	13.01	23.63	5.08	38.11
25th Percentile	34.59	24.80	3.82	9.51	18.09	1.07	26.17
Median	28.48	18.56	2.46	7.66	15.31	0.01	19.43
75th Percentile	23.49	16.26	1.23	4.66	11.90	0.00	10.61
90th Percentile	17.60	10.47	0.63	0.59	5.31	0.00	8.04
Fund ●	24.30	42.76	(12.13)	9.08	13.73	2.65	19.61
Target ▲	25.50	43.30	(12.00)	8.00	14.50	2.70	18.00

- SWIB's use of financial leverage (> 10%) enables more risk reducing/diversifying assets without sacrificing growth assets

Callan Peer Rank Update

CTF Performance vs. Peer Group (Gross Return, 9.30.2024)

Callan Public Fund Spons- V Lg DB (>10B)

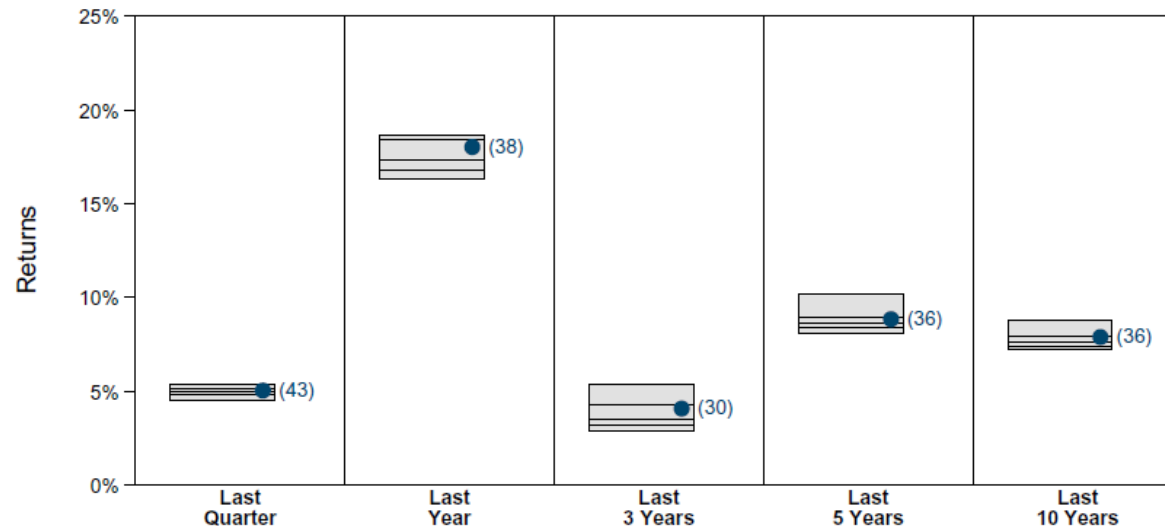


- CTF return exceeds Policy Target over all periods
- 1-year return is 2nd quartile and 3-year return is well below median; longer term 5- and 10-year periods are near median

Callan Peer Rank Update

*CTF Performance on Asset Allocation Adjusted Basis vs. Peer Group
(Gross Return, 9.30.2024)*

Asset Allocation Adjusted Ranking



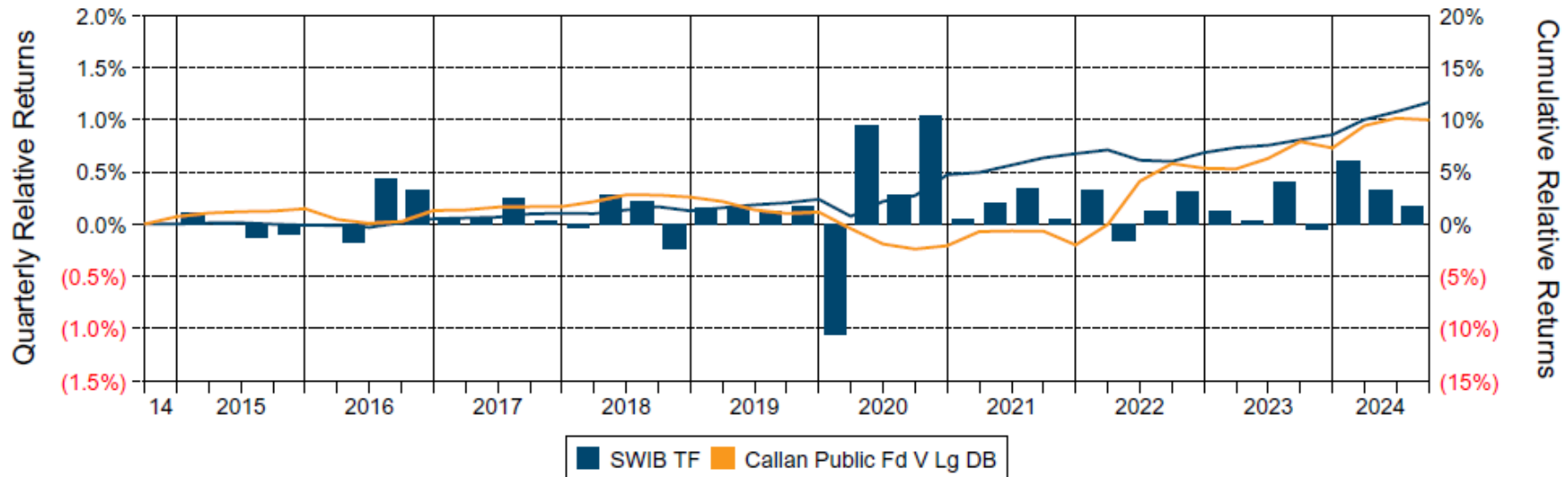
	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	5.37	18.65	5.36	10.16	8.81
25th Percentile	5.11	18.40	4.32	8.94	7.95
Median	5.00	17.31	3.51	8.64	7.62
75th Percentile	4.85	16.78	3.20	8.40	7.37
90th Percentile	4.49	16.31	2.90	8.06	7.21
Total Fund ●	5.04 (43)	18.02 (38)	4.08 (30)	8.85 (36)	7.89 (36)

- Uses adjustment to peer universe to match the CTF risk-balanced allocation
- Delivered 2nd quartile results vs. peers for all periods

Callan Peer Rank Update

10 Year Return Consistency vs. > \$10B Peer Group (9.30.2024)

Cumulative and Quarterly Relative Returns vs Target



- The CTF exhibits low tracking error relative to its peers and produces stable, ascending cumulative performance over 10 years
- CTF Qtrly relative returns vs. Policy Benchmark are generally positive over the 10-year period

Report Disclosures

Glossary, Definitions & Data Sources

Report Disclosures

Key Terms and Portfolio Return Information

Term	Description / Definitions
Gross of Fee Return (“GoF Return”)	The return generated in investment portfolios (or accounts) that include the deduction of transaction expenses incurred as a result of executing a trade or acquiring or disposing of the investment. In some instances, these expenses are not readily separable from the cost of the investment and are not distinctly recorded within accounting records invoiced by third parties. For certain externally managed funds, gross return may include management fees and carried interest. GoF Return is used by SWIB for long-term history (> 20 years), internal analytics and to fulfill consultant data submissions where GoF returns are requested. SWIB’s primary reported return types are Net of External Manager Fee (“NoF Return”) and Net of All Fees and Expenses Return (“NoA Return”).
Net of External Manager Fee Return (“NoF Return”)	The GoF return plus additional deductions for external management fees, performance fees and any identifiable carried interest incurred in investment portfolios. SWIB has account records to support NoF return history over approximately 20 years.
Net of All Fees and Expenses Return (“NoA Return”)	The NoF return plus additional deductions for administrative expenses, categorized by SWIB as either Direct or Indirect expenses, that are permitted to be charged directly to the Trust Funds under statutory authority. The Cost Allocation Protocol governs the allocation methods and booking processes to allocate expenses at the investment account level. Examples of the type of expenses that fall under this category, include custody and banking fees, general operating expenses and investment consulting services. Security Lending expense is included in NoA Return. The recording of official, NoA return at the portfolio or account level began in 2017.
Annualized Return Calculation	SWIB reports containing portfolio and benchmark return calculations for time periods greater than 1 year generally utilize a geometric averaging calculation. Returns shown for periods of less than 1 year are not presented utilizing the annualization calculation method. In this instance, compound returns are reported for the specified calendar period (e.g., month to date, quarter to date or year to date). Annualized Return = $((1 + r^1) \times (1 + r^2) \times (1 + r^3) \dots)^{\wedge} (\text{calendar units} / \text{time interval measured}) - 1$; $r^{(n)}$ = series of holding period returns and calendar units are often expressed as days, months or years
Cumulative Return Calculation	SWIB uses the cumulative return calculation (“cumulative basis”) to reflect the aggregate amount an investment has gained or lost over time for portfolios and benchmarks. This measurement shares aspects of the annualized return calculation, however, it excludes the geometric averaging. Cumulative Return = $((1 + r^1) \times (1 + r^2) \times (1 + r^3) \dots) - 1$; $r^{(n)}$ = series of holding period returns
Compound rate of growth of \$100	The cumulative and compounded rate of growth of portfolio and benchmark returns may also be presented on an indexed basis over time (measurement may be calculated using any return type). Compound rate of growth of \$100 = $(\$100 \times (1 + r^1) \times (1 + r^2) \times (1 + r^3) \dots)$; $r^{(n)}$ = series of holding period returns

Report Disclosures

Key Terms and Portfolio Return Information

Term	Description / Definitions
Excess Return % (“Excess”)	Portfolio return or security level return minus the benchmark return. Portfolio or Composite Returns are generally compared against benchmarks with a similar level of risk. It is widely used as a measure of the value added by the portfolio or investment manager or the manager's ability to outperform the market.
Net Excess Value Add \$ (“NEVA”)	Net Excess Value Add \$ (“NEVA”) calculates the portfolio’s performance NoA return in total dollars relative to a benchmark. NEVA is a measure used to assess the value-add dollars that a particular investment strategy or team generated over specified time periods. NEVA is also used to monitor the return objectives set forth in the annual Active Risk Budget which is prepared for the CTF and VTF funds managed by SWIB.
Net of External Manager Fee Excess Value Add \$	A fund’s Excess Value Add \$ may be calculated using NoF returns. The CTF Fund long-term performance comparisons vs. the 60/40 Reference Portfolio and Policy Benchmark are measured over 20-year time intervals. NoF return historical records date back to 1998.
SWIB Inception To Date Reporting	The Quarterly Performance Summary discloses a reporting period described as 10 years or ITD . The return disclosed in this reporting field yields either 10-year annualized returns for funds or portfolios with at least 10 years of return history or the data field may revert to the return since inception for portfolios with less than 10 years of history. The quarterly report provides a performance start date for those portfolios with the abbreviated return history.
Performance Start Date	The date denotes the initial period of a portfolio or composites’ return data series that is stored and calculated by the SWIB Performance Measurement Service Agent.
Time-weighted Rate of Return	A method of calculating period-by-period returns that reflects the change in value and negates the effects of external cash flows. This methodology is applied to portfolios that are processed with daily frequency and where daily valuation updates of the underlying instruments are available.
Modified Dietz Total Rate of Return	A measurement that evaluates a portfolio's return based on a weighted calculation of its cash flow. The method considers the timing of cash flows and assumes a constant rate of return over the specified time period. This methodology is applied to portfolios and composites that are processed with monthly frequency (and where only monthly valuation updates are available).

Report Disclosures

Key Terms and Portfolio Return Information

Term	Description / Definitions
Policy Benchmark	The Fund level Benchmark as approved by the Benchmark Committee. The Benchmark is composed of multiple indices that reflect the Fund's exposure to a diverse set of investment strategies. (can also referred to as "Policy Target" as implemented through SWIB's Asset Allocation plan).
Reference Portfolio	Hypothetical global portfolio comprised of 60% MSCI World Net (using a SWIB custom net variant as of 2010) and 40% Bloomberg Barclays Government Credit Index. The return is presented on a gross of fee basis and assumes no contributions or withdrawals.
Zero or No Benchmark (for Official Measurement purposes)	<p>Zero Benchmark: This designation applies to the Core Trust Fund Alpha Pool Overlay. Since 1/1/2019, the benchmark associated with the Alpha Pool Overlay has been set to zero. The Cost of Implementation (which includes an estimate of financing costs) is directly allocated to the underlying strategies that make up the Alpha Pool Overlay and the effect of the cost allocation will usually result in a deduction from the strategy's return.</p> <p>No Benchmark: In certain instances, a benchmark is not assigned for the purpose of measuring excess performance. For example, SWIB's client, the State Life Insurance Fund (SLIF), has no assigned benchmark for its investment mandate due to the limitations placed on SWIB's investment activities by the SLIF. The SLIF portfolio invests in fixed income securities that approximate the expected life of the Fund's insurance contracts, and SWIB is directed to hold all securities to maturity other than in extraordinary circumstances.</p>
Reported Net Benchmark Returns	<p>The SWIB Benchmark and Performance Committee and its designated benchmark consultant follow the parameters set forth in the SWIB Benchmarking Philosophy. Under the Philosophy, selected benchmarks should exhibit the characteristics described in the <i>Benchmark Qualities</i> criteria to ensure portfolio and benchmark attributes are closely aligned.</p> <p>Net Total Return Benchmarks: benchmark type commonly used for most publicly-traded portfolio strategies. The benchmark returns reflect the price performance, plus the net amount of all special and regular dividends after applying an assumed foreign tax withholding rate (as determined by the benchmark data provider.)</p> <p>SWIB Custom Net Benchmark for non-U.S. Public Equity Strategies: SWIB's custodian bank customizes SWIB's non-U.S. equity benchmarks to reflect the actual, historical reinvestment of withholding tax rates rather than index provider's assumption for varying countries.</p> <p>Net of External Manager Fee-based Benchmarks: benchmark type most frequently used to gain better alignment when the measured SWIB portfolio return is inclusive of external management fees, performance fees and carried interest charges (e.g., private market investments.)</p>

Report Disclosures

Key Terms and Portfolio Return Information

Term	Description / Definitions
Custom Weighted Calculated Benchmarks	<p>SWIB managed funds and / or portfolios may require the construction of custom benchmarks that are created through applying static or asset weighted calculations to achieve a blended benchmark that is representative of the investment strategy. When available or feasible, SWIB will request its third-party benchmark data provider(s) to blend benchmarks as a part of the market data service. If this option is not available, SWIB will calculate the benchmark using market data inputs.</p> <p>In certain cases, SWIB may customize a benchmark to more accurately reflect the SWIB managed Fund's tax status and actual tax rate experience in non-U.S jurisdictions with investment portfolio with-holding taxes applicable to dividends and capital gains. This type of custom benchmark is designated as "SWIB Custom Net".</p>
Gross Market Value	The price at which the fund investor can buy or sell the underlying investment instruments held in the portfolio at a given time multiplied by the quantity held, plus any accrued income. The Gross Market Value of a portfolio is the market value of the portfolio or composite without any deduction for SWIB expenses.
Illiquid Investments	Those investments that may be difficult to sell or be sold quickly because of a lack of market or ready or willing investors.
Total Exposure	For SWIB managed funds governed by the WRS Investment Policy, this measure reflects the total value of the fund's exposure to investable markets by asset class and sub asset class. Total Exposure is inclusive of those instruments utilized under the WRS Leverage Use Policy to achieve the asset exposures approved under the asset allocation strategy and active risk target.
Internally Managed Portfolios	Portfolios managed by SWIB investment professionals. Each internal portfolio is assigned compulsory investment guidelines and is also assigned "soft risk parameters." Soft risk parameters refer to desired characteristics and/or risk exposures.
Externally Managed Portfolios	Portfolios managed by third-party investment managers hired by SWIB. External active and passive managers operate under contractual investment guidelines approved by SWIB's Investment Committee or by SWIB's investment management staff, as designated in the Investment Committee Charter.
Active Management	Actively managed portfolios have the objective of out-performing their respective benchmarks (or generating alpha) by using investment insights or quantitative tools to deploy buy, hold, and sell decisions. This style of management will result in portfolio positioning decisions that will add active risk and generate higher tracking error. Actively managed portfolios are governed through investment guidelines and soft risk parameters.
Passive Management	Passively managed portfolios have the objective of closely tracking the returns and risk of their respective benchmarks. This style of management usually involves mirroring the benchmark security holdings (or constituents) to closely replicate the benchmark risk and return.

Report Disclosures

Key Terms and Portfolio Return Information

Term	Description / Definitions
<p>Note on report data sources and processing</p>	<p><u>Return Calculation Processing</u> Bank of New York Mellon, Global Risk Services (BNYM GRS), an independent 3rd party, provides services related to custodial records, accounting and performance return calculations for SWIB managed funds. BNYM also serves as the source for certain standard, market-based benchmarks and static weight blended benchmarks.</p> <p><u>Return Calculations Prepared on a Notional or Unlevered Basis (Core Trust Fund only)</u> SWIB uses leverage to help achieve the Core Trust Fund’s diversification objectives. A description of the Leverage Use Policy is contained in the Wisconsin Retirement System Investment Committee Investment Guidelines. For those accounts and composites deploying leverage, the calculation of notional or unlevered returns (using gross asset exposure) is required to achieve a comparable return vs. market indices. SWIB has directed its performance agent, BNYM GRS, to configure the performance measurement platform to process this type of calculation. Consistent with Leverage Use Policy guidelines, this calculation may be processed inside reported composites that contain US Large Cap Equity, US Small Cap Equity, MSCI World x US Equity, US TIPS and US Treasury exposures.</p> <p><u>State Investment Fund (SIF) Commingled Fund Processing</u> The State Investment Fund (SIF) pools the cash of the State of Wisconsin and its agencies, the Wisconsin Retirement System (WRS), and various local government units (Local Government Investment Pool) into a commingled fund with the investment objectives of safety of principal and liquidity while earning a competitive money market rate of return. For purposes of calculating earnings to each participant , all investments are valued at amortized cost. SIF returns are calculated using the monthly net earnings distributed to all commingled fund participants. SIF returns are presented net of all allocated SWIB administrative costs and State Controller’s Office costs that are allocated to the participants of the Local Government Investment Pool.</p> <p><u>Benchmark Market Data and Selection Process</u> The data source for this information is provided by multiple investment industry market data vendors and analytics firms depending on the investment strategy. The SWIB Benchmark and Performance Committee governs the benchmark selection process. An independent consultant (selected by the Board of Trustees or “Board”) makes recommendations to initially select or change benchmarks.</p> <p><u>Peer Rank Return Comparison Data</u> This information is provided and processed by industry consultants that consume return information for SWIB managed funds and then provide investor universe return comparisons and analytics using proprietary databases. When consultant info is included in the Quarterly Performance Summary the preparer of the work is identified.</p> <p>SWIB Annual Reports: Additional WRS disclosures can be found in the Annual Reports, available at https://www.swib.state.wi.us/list-of-investments.</p>

Report Disclosures

Key Terms and Portfolio Return Information

Term	Description / Definitions
<p>(continued)</p> <p>Note on report data sources and processing</p>	<p><u>Project Centum Platform Migration Changes</u></p> <p>On 1/1/2024, the BNYM ABOR RAM processing platform became the primary source for Core and Variable Trust Fund return calculations and market value amounts contained in this report. The State Investment Fund (SIF) and the SWIB-managed Separately Managed Funds continues to be processed using the BNYM IBOR market value and return calculation source.</p> <p>This report contains return calculations that are processed using Total Exposed (Notional-based) Assets for accounts with substantial derivative positions that generate leverage for the Core Trust Fund. The objective of this calculation is to generate meaningful returns that compare to the account or composite’s benchmark. This processing continues to be performed on the BNYM IBOR platform and applies to following composites:</p> <ul style="list-style-type: none">CTF – Public Equities (pg. 9)CTF – Global Developed (pg. 9)CTF – Public Fixed Income (pg. 10)CTF – US Treasuries (pg. 10)CTF – Inflation Sensitive (pg. 11)

Leverage Disclosures

Calculation formulas to estimate impact

Report Disclosures

Notes on CTF Leverage Analysis

Term	Description / Definitions
Portfolio Return (Unlevered)	<p>This is an estimated-only CTF return because SWIB does not implement a CTF unlevered portfolio to calculate actual performance against. Leverage is used to expand the CTF's entire asset base. All definitions that include (unlevered) are ESTIMATES only for this reason.</p> <p>It is estimated by:</p> <ol style="list-style-type: none"> 1) <u>Excess Return (Levered)</u> is first subtracted from the <u>Portfolio Return (Levered)</u>¹; 2) The result of Step 1 is then divided by the <u>Policy Leverage Factor</u>; then 3) <u>Excess Return (Levered)</u> is added back to the result of Step 2 and that number is then adjusted to account for the cost of financing (i.e., the expense of acquiring leverage, which would not be applicable to an unlevered portfolio). $\text{Portfolio Return (Unlevered)} = \left(\frac{\text{Portfolio Return (Levered)} - \text{Excess Return (Levered)}}{\text{Policy Leverage Factor}} \right) + \text{Excess Return (Levered)} - \text{cost of implementation}$ <p>¹ Note, because <u>Excess Return (Levered)</u> is the difference between two similarly “levered” portfolios (Portfolio Return (Levered) and Benchmark Return (Levered)), it represents outperformance that is not attributable to leverage. Accordingly, it is subtracted first as it would be inaccurate to reduce such amount by the Policy Leverage Factor for purposes of this calculation.</p> <p><u>Policy Leverage Factor</u> is the amount of the approved Policy Leverage during any given period, time weighted for multi-year periods. Policy Leverage was first introduced into the CTF Portfolio and Benchmark at the end of April 2012 and was raised from 10% to 15%, effective Calendar Year 2021.</p>
CTF Benchmark Return (Unlevered)	<p>Estimated by the <u>Benchmark Return (Levered)</u> divided by the <u>Policy Leverage Factor</u> for the period.</p>

Report Disclosures

Notes on CTF Leverage Analysis

Term	Description / Definitions
Excess Return (Unlevered)	<p>The Excess Return (Unlevered) is the excess return that it is estimated SWIB would have achieved if it did not implement leverage for the CTF.</p> <p>Estimated as <u>Portfolio Return (Unlevered)</u> minus <u>Benchmark Return (Unlevered)</u>.</p> <p>Can also be estimated by taking the actual <u>Excess Return (Levered)</u> minus <u>Implementation (+) or (-)</u> (see below for definition).</p>
Absolute Return from Leverage	<p>Estimated by the <u>Portfolio Return (Levered)</u> minus <u>Portfolio Return (Unlevered)</u> minus <u>Implementation (+) or (-)</u>.</p>
Implementation (+) or (-)	<p>The relative cost of financing (i.e., the actual cost of financing minus the CTF benchmark cost of financing). The CTF benchmark cost of financing is the CTF cash benchmark, previously LIBOR plus 30 bps and now BSBY plus 30 bps. Implementation (+) or (-) can also result from outperformance or underperformance relative to how efficiently SWIB replicates the index in connection with policy leverage (this is called basis risk).</p> <p>Can either be positive or negative. When the leverage implementation is achieved at a cost saving compared to the CTF cash benchmark (i.e., less than the CTF cash benchmark), it is positive (+); but when it is achieved with additional cost compared to the CTF cash benchmark (i.e., more than the CTF cash benchmark), it is negative (-). Cost savings can generate minor excess returns for the CTF. Basis risk can also generate minor contributions to or detractions from relative performance with respect to policy leverage.</p>
Portfolio Return (Levered)	<p>Actual performance of the CTF Portfolio for the period presented, from all strategies including Policy Leverage.</p>
CTF Benchmark Return (Levered)	<p>Actual performance of the CTF Benchmark for the period, taking into account the use of Policy Leverage.</p>
Excess Return (Levered)	<p>Actual excess return of the CTF. Portfolio Return (Levered) minus Benchmark Return (Levered).</p>

Board Meeting

Tab 4 – Annual Presentation on Cost Benchmarking



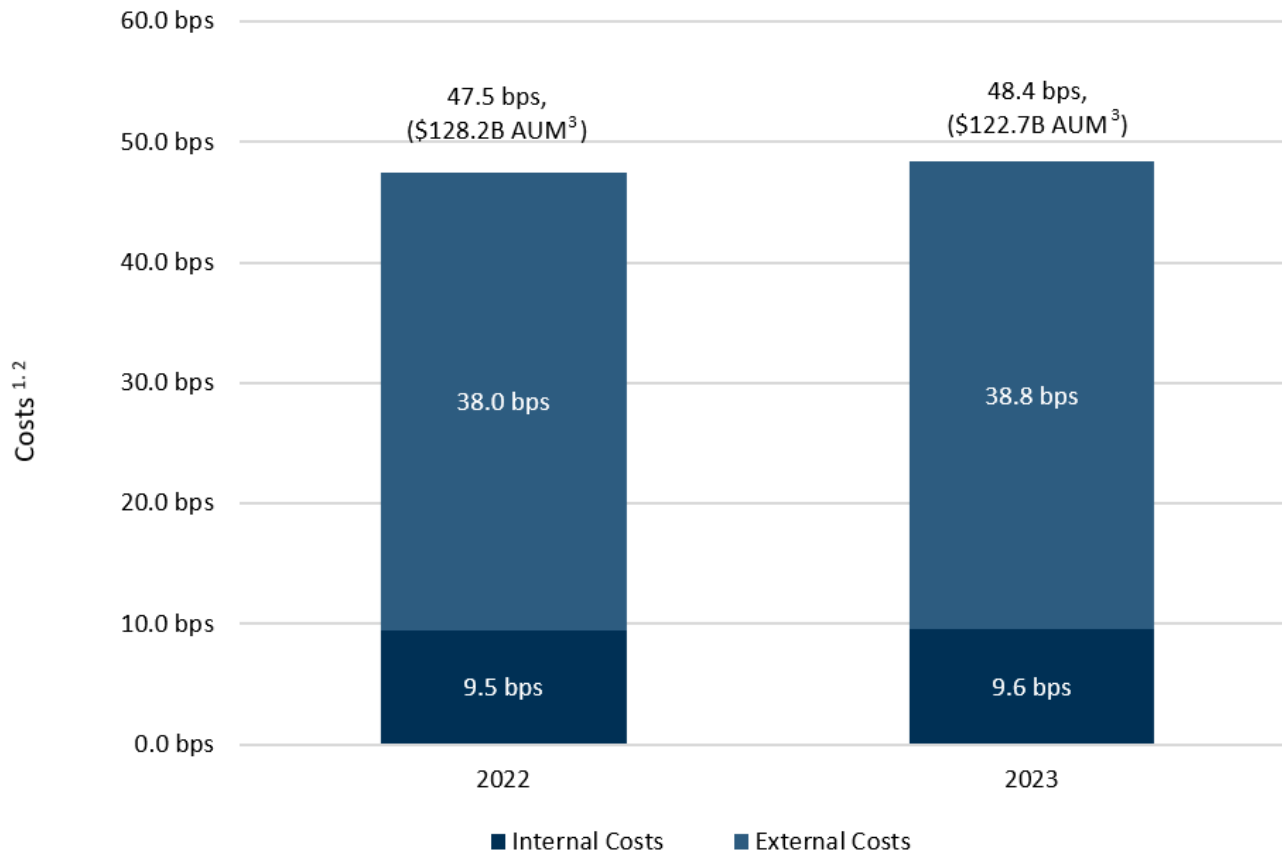
SWIB's Cost Effectiveness Annual Evaluation

December 2024

Data source: CEM Benchmarking, Inc. Reports

STATE OF WISCONSIN
INVESTMENT BOARD

SWIB's Year-Over-Year Cost Composition

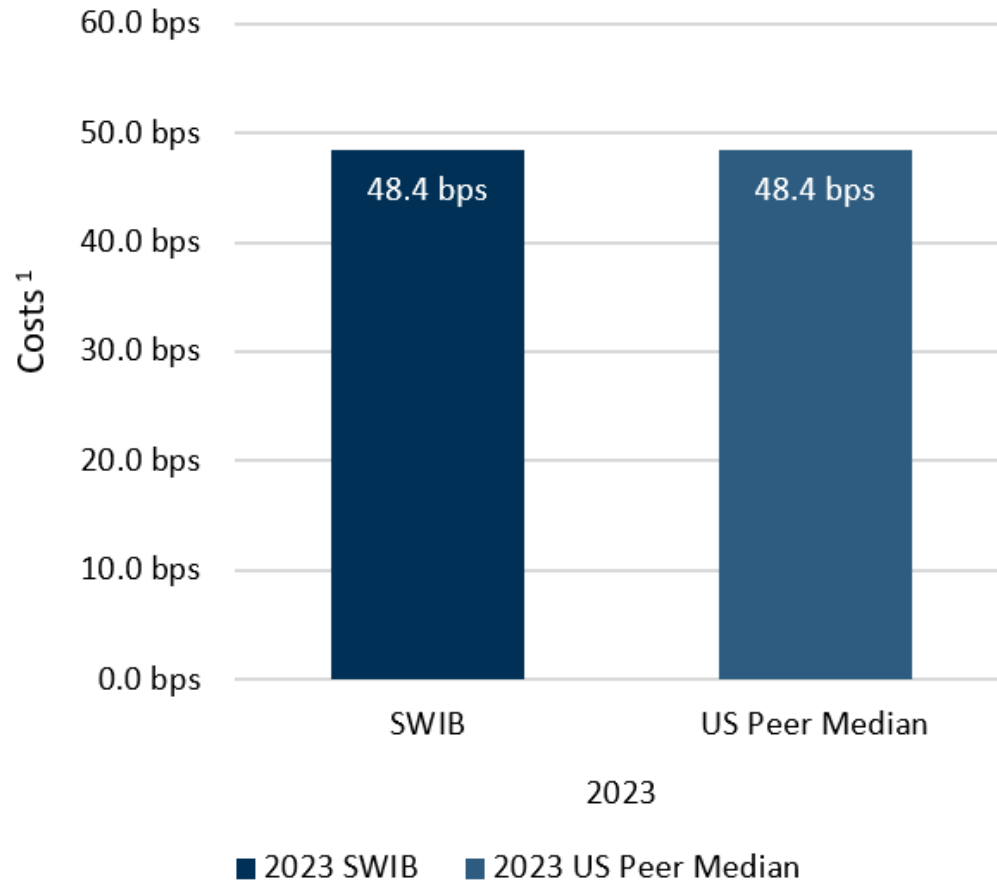


¹ Costs exclude external manager performance fees.

² External Costs presented above include gross base fees for private market assets for 2022 and net base fees for 2023. SWIB estimates net base fees, which are those actually charged to the CTF, approximated 75% of gross base fees during 2022, representing a 4.6 bps difference.

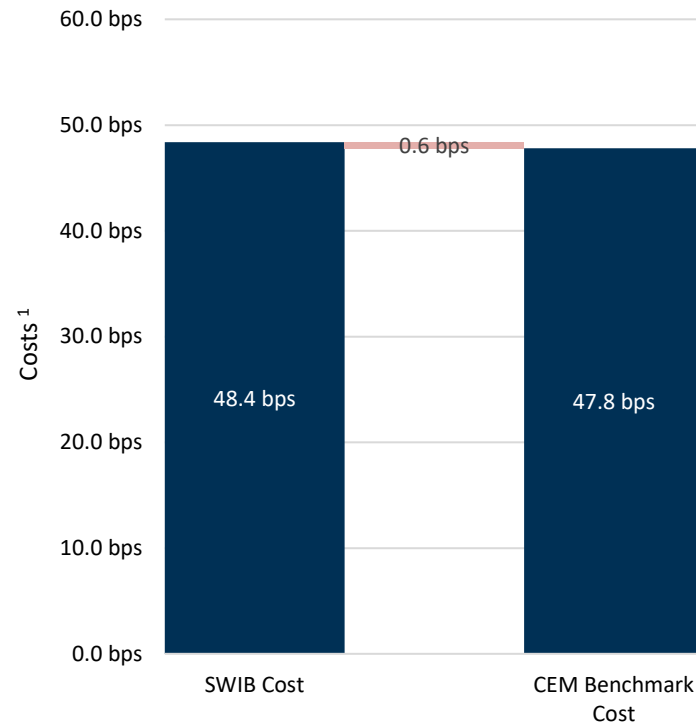
³ AUM represents the average AUM throughout the year based upon each monthly total.

SWIB's Costs, Excluding Performance Fees, Equals SWIB's US Peer Median



¹ Costs exclude external manager performance fees.

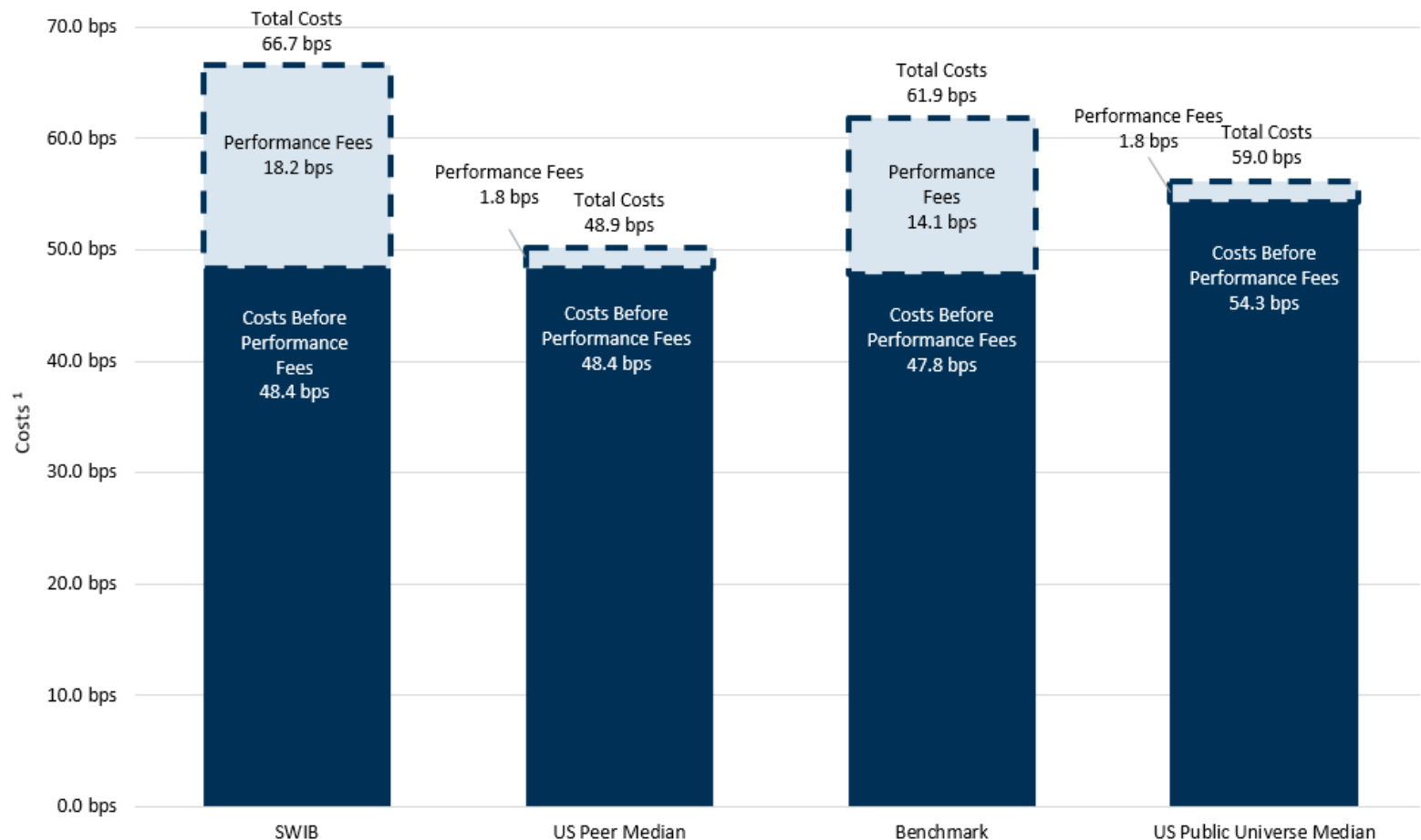
SWIB's Costs, Excluding Performance Fees, Exceed the CEM Benchmark by 0.6 bps in 2023



¹ Costs exclude external manager performance fees.

The CEM Benchmark is a measure that adjusts SWIB's US Pension Peer group to estimate the costs they would incur if they mirrored SWIB's fund size and asset mix.

Median Costs Including Performance Fees



SWIB's total costs are higher than other CEM measures. However, when adjusted for performance fees, SWIB's costs are equal to the peer median, slightly higher than the CEM benchmark, and lower than the US Public Universe.

Performance Fees Driven by Excess Performance

Investment Manager	Performance Fee	2023 Annual Return	Excess Performance
Hedge Fund Managers			
Manager A	2.0 bps	11.88%	6.51%
Manager B	1.7 bps	12.13%	6.76%
Manager C	1.4 bps	9.69%	4.32%
Manager D	0.8 bps	13.11%	7.74%
Manager E	0.7 bps	8.41%	3.04%
Manager F	0.7 bps	10.29%	4.92%
Manager G	0.7 bps	15.62%	10.25%
Manager H	0.7 bps	7.78%	2.41%
Manager I	0.7 bps	15.65%	10.28%
Manager J	0.6 bps	16.43%	11.06%
Total	10.0 bps		6.36%

Excess performance generated by the hedge fund managers detailed above accounts for over half of the 2023 performance fees included within SWIB's CEM results.

Internal Management Is More Cost Effective

2023

Asset Type (active strategies)	Internal Mgmt Cost (bps)	External Mgmt Cost (bps) ¹
Small Cap Equity	17.3	57.4
Domestic Fixed Income	9.3	13.2
High Yield Fixed Income	6.9	32.9

¹ External management costs represent the median cost for SWIB's CEM public fund peers for each asset class. SWIB engages external managers for Domestic Fixed Income at a cost of 15.8 bps (14.2 bps in base fees & 1.6 bps of internal costs). SWIB engages external managers for High Yield Fixed Income at a cost of 30.8 bps (29.3 bps in base fees & 1.5 bps of internal costs).

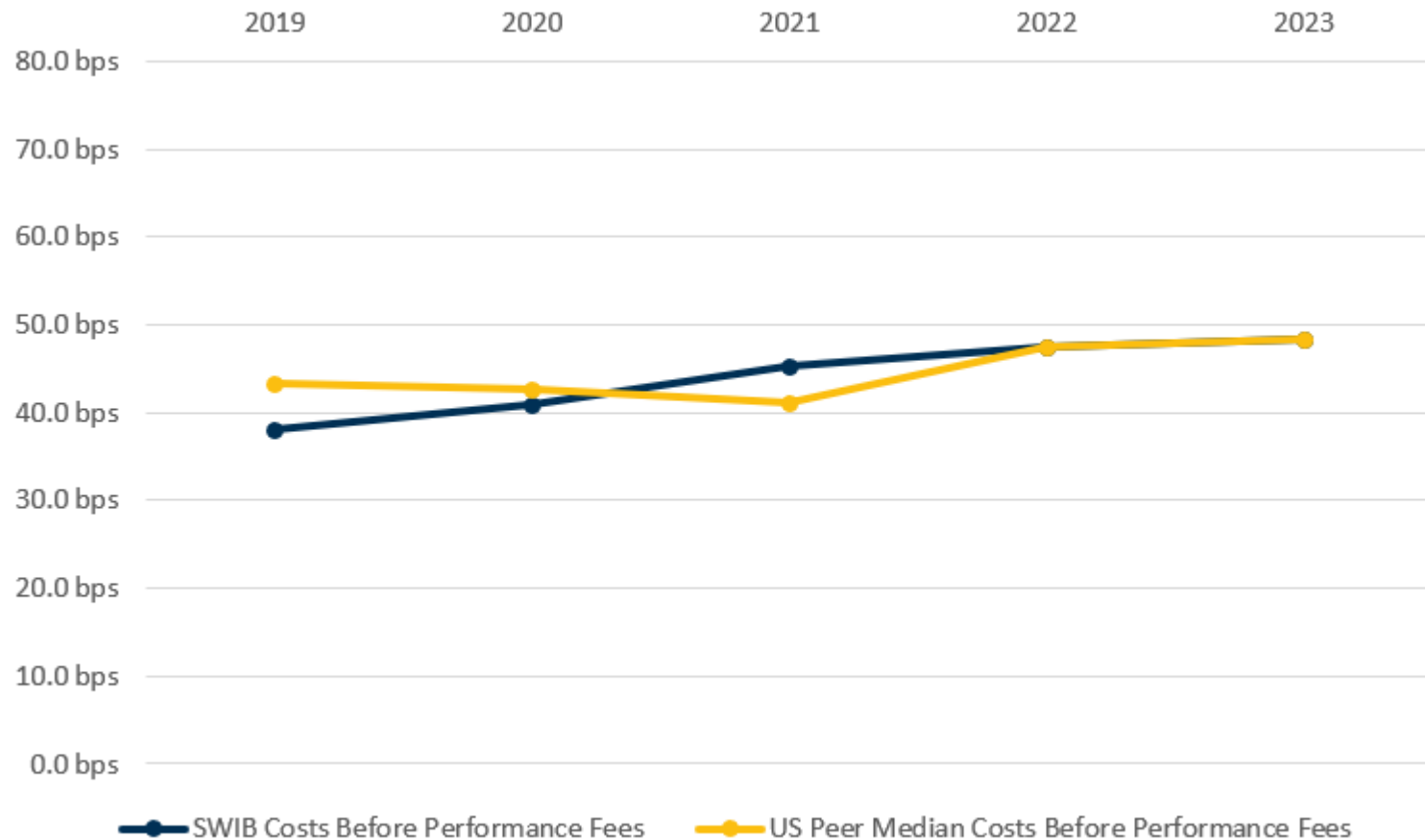
SWIB's cost for internal active management remains considerably lower than the cost for external active management.

Appendix

U.S. Public Universe In 2023 CEM Report

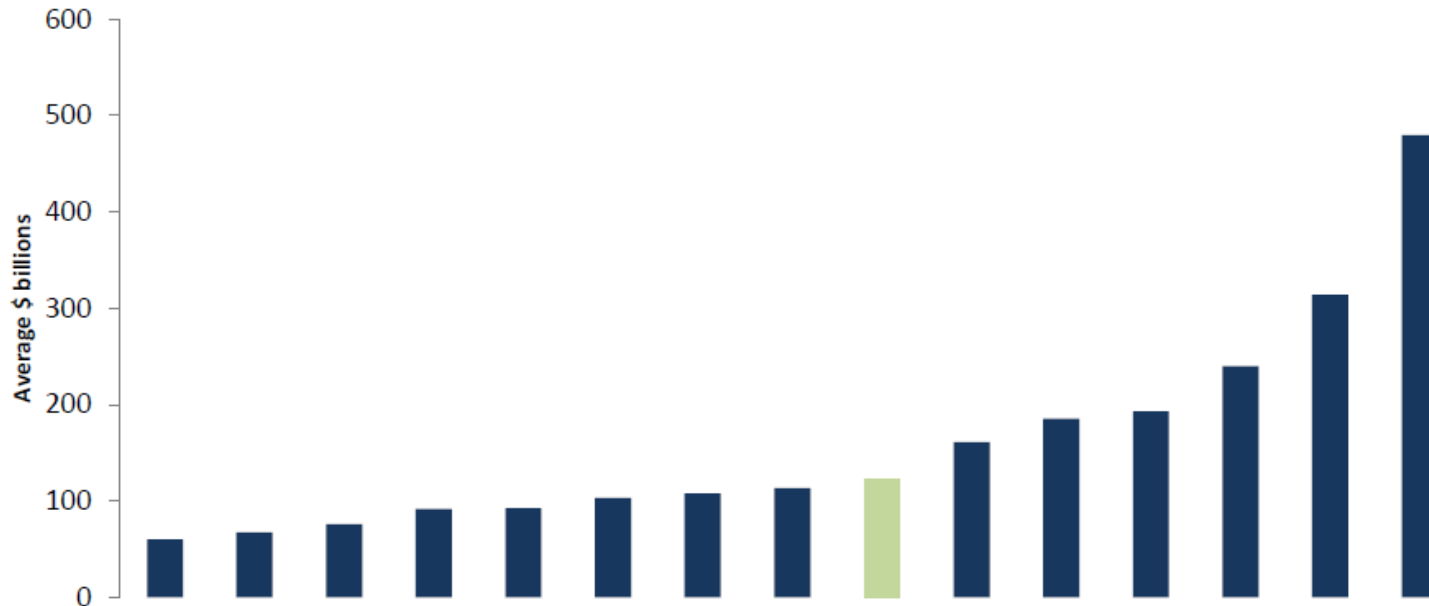
1	AC Transit (Alameda - Contra Costa Transit)	22	Montana Board of Investments
2	<i>Anonymous U.S. Fund No. 1</i>	23	<i>New York City Retirement Systems</i>
3	Arlington County	24	<i>North Carolina Retirement Systems</i>
4	<i>California State Teachers' Retirement System</i>	25	Ohio Police and Fire Pension Fund
5	<i>CalPERS</i>	26	Oklahoma Teachers' Retirement System
6	District of Columbia Retirement Board	27	<i>Oregon Public Employees Retirement Fund</i>
7	East Bay Municipal Utility District	28	Public Employees Retirement Association of New Mexico
8	Educational Employees' Supplementary Retirement - Fairfax County Virginia	29	<i>Public Employees Retirement System of Nevada</i>
9	<i>Florida State Board of Administration</i>	30	San Diego City ERS
10	Houston Police Officers Pension System	31	Seattle City Employees' Retirement System
11	Illinois Municipal Retirement Fund	32	South Carolina Retirement System Investment Commission
12	Indiana Public Retirement System	33	<i>State of Tennessee</i>
13	Iowa Public Employees' Retirement System	34	<i>State of Wisconsin Investment Board</i>
14	Kansas Public Employees Retirement System	35	State Universities Retirement System of Illinois
15	Kentucky Retirement Systems	36	<i>STRS Ohio</i>
16	Kentucky Teachers' Retirement System	37	<i>Teacher Retirement System of Texas</i>
17	<i>LACERA</i>	38	Teachers' Retirement System of Louisiana
18	Los Angeles City Employees' Retirement System	39	Teachers' Retirement System of the State of Illinois
19	Los Angeles County Metropolitan Transit	40	<i>Virginia Retirement System</i>
20	Los Angeles Water & Power Employees Retirement Plan	41	<i>Washington State Investment Board</i>
21	Missouri State Employees' Retirement System		
	<i>Funds in italics are also included in peer group</i>		

Median Costs Excluding Performance Fees – 5-year Comparison



SWIB Peer Group

- 15 U.S. public sponsors from \$60.4 billion to \$479.3 billion
- Median size of \$113.4 billion versus SWIB \$122.7 billion



To preserve client confidentiality, given potential access to documents as permitted by the Freedom of Information Act, we do not disclose your peers' names in this document. For some of the peers, 2022 cost data was used as a proxy for 2023.

SWIB's Total Cost Exceeds the CEM Benchmark in 2023 Due To...

	Excess Cost/ (Savings)	
	\$000s	bps
1. Lower cost implementation style		
• More active management, less lower cost passive	7,087	0.6
• Less external management, more lower cost internal	(5,250)	(0.4)
• More LPs as a percentage of external	12,475	1.0
• Less fund of funds	(6,779)	(0.6)
• More co-investment as a percentage of LP/Co	(14,781)	(1.2)
• More overlays	5,282	0.4
	<hr/>	<hr/>
	(1,967)	(0.2)
2. Paying more than peers for some services		
• External investment management costs	(1,398)	(0.1)
• Internal investment management costs	26,316	2.1
• Oversight, custodial & other costs	36,149	2.9
	<hr/>	<hr/>
	61,066	5.0
Total excess cost	<hr/>	<hr/>
	59,099	4.8

The above chart details the drivers of the difference between SWIB's 2023 total costs including performance fees and the total cost of its CEM benchmark (both presented on slide 5). The effect of performance fees influences several categories above.

Board Meeting

Tab 5 – Asset Allocation Recommendations for 2025

ASSET ALLOCATION REVIEW

NOVEMBER INVESTMENT
COMMITTEE MEETING
OPEN SESSION

DECEMBER 2024

Joe Nankof, Partner

Todd Mattina, Asset and Risk Allocation CIO



OUTLINE

- **Executive Summary**
- **2025 Asset Allocation Recommendations**
- **Capital Market Assumptions and Economic Outlook**
- **Conclusion**
- **Appendices**



EXECUTIVE SUMMARY

- **NEPC and ARA recommend an increase in the CTF target allocation in Private Equity/Debt by 2% of CTF and reduce the Public Equity allocation by 2%:**
 - Increase the target allocation in Private Equity/Debt to 20% from 18% of the CTF
 - Lower the target allocation in Public Equity from 40% to 38% of the CTF
- **The proposed annual asset allocation changes in the CTF Policy Portfolio follow a deliberate 10-year pacing plan to increase private market allocations over time**
 - An increase in Private Equity/Debt by 2% of CTF in 2025 is consistent with SWIB's pacing plan
- **NEPC capital market assumptions imply that the proposed policy changes would only have a limited impact on the CTF target return and volatility**
- **NEPC and ARA do not propose changes in the CTF active risk target, sub-asset allocations or the VTF policy allocation**

2025 ASSET ALLOCATION RECOMMENDATIONS



CURRENT CTF POLICY AND RECOMMENDATION

Decision	Current Policy Targets	Recommended Targets
Public Markets Allocation	40% Equity 27% Fixed Income 19% TIPS	38% Equity 27% Fixed Income 19% TIPS
Private Markets Allocation	18% Private Equity & Debt 8% Real Estate	20% Private Equity & Debt 8% Real Estate
Policy Leverage	12% of CTF	No Change
Active Risk Target	1.2% of CTF	No Change



CURRENT AND RECOMMENDED ALLOCATIONS

SUMMARY

Asset Class	10 Year Return Geometric Return	10 Year Sharpe Ratio	30 Year Return Geometric Return	30 Year Sharpe Ratio	Standard Deviation	Current Policy	Recommended Policy	Recommended Rebalance Ranges
Public Equity	5.0%	0.05	7.0%	0.19	18.0%	40%	38%	32 - 44%
Public Fixed Income	5.9%	0.28	6.1%	0.42	6.3%	27%	27%	21 - 33%
Private Equity/Debt	8.1%	0.19	9.5%	0.29	20.6%	18%	20%	12 - 28%
Real Estate	6.0%	0.12	6.5%	0.20	15.0%	8%	8%	4 - 12%
TIPS	4.8%	0.11	4.8%	0.22	6.0%	19%	19%	14 - 24%
Cash	4.2%	N/A	3.5%	N/A	0.6%	0%	0%	
Policy Leverage*	4.3%	N/A	3.7%	N/A	0.7%	-12%	-12%	-4% to -20%
Total						100%	100%	
10 Year Compound Return						6.3%	6.4%	
10 Year Sharpe Ratio						0.17	0.17	
30 Year Compound Return						7.5%	7.5%	
30 Year Sharpe Ratio						0.32	0.32	
Standard Deviation						12.5%	12.6%	
Target Active Risk**						1.2%	1.2%	

* SWIB staff are allowed to eliminate Policy Leverage, i.e., down to zero

** Active risk range of +/- 0.6%



VARIABLE RETIREMENT TRUST ALLOCATION

	Current & Recommended Policy Portfolio	Rebalancing Range
US Equities	70%	65 - 75%
Int'l Equities incl. Emerging	30%	25 - 35%
10 Year Compound Return	4.9%	
30 Year Compound Return	6.9%	
Standard Deviation	18.0%	
10 Year Sharpe Ratio	0.04	
30 Year Sharpe Ratio	0.19	
Target Active Risk*	0.6%	

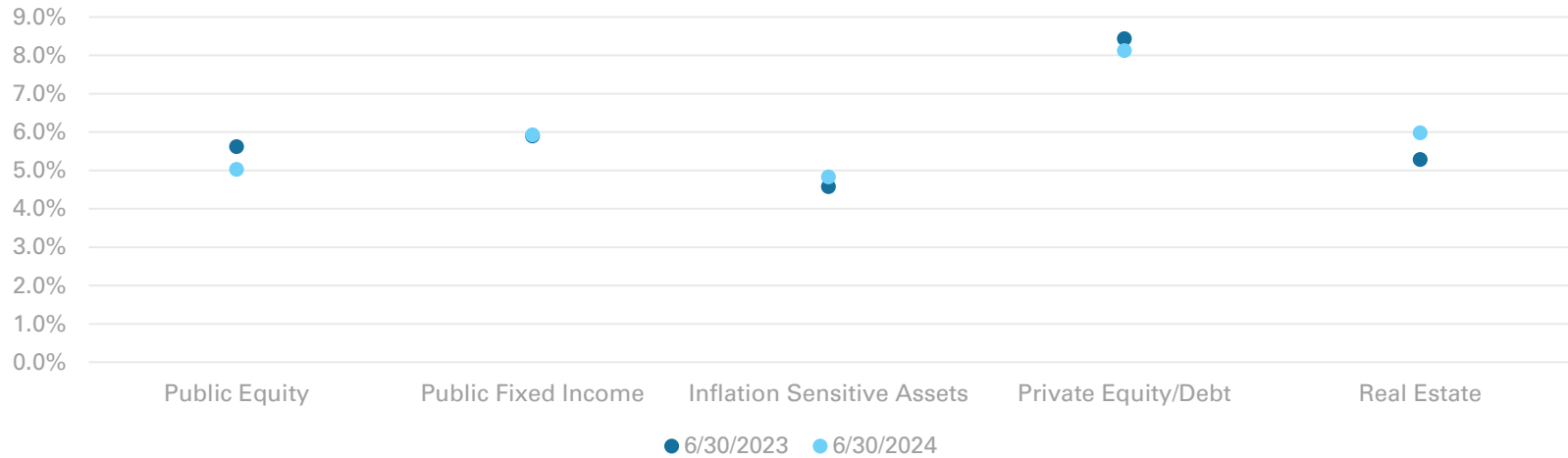
* Active risk range of +/- 0.3%

CAPITAL MARKET ASSUMPTIONS

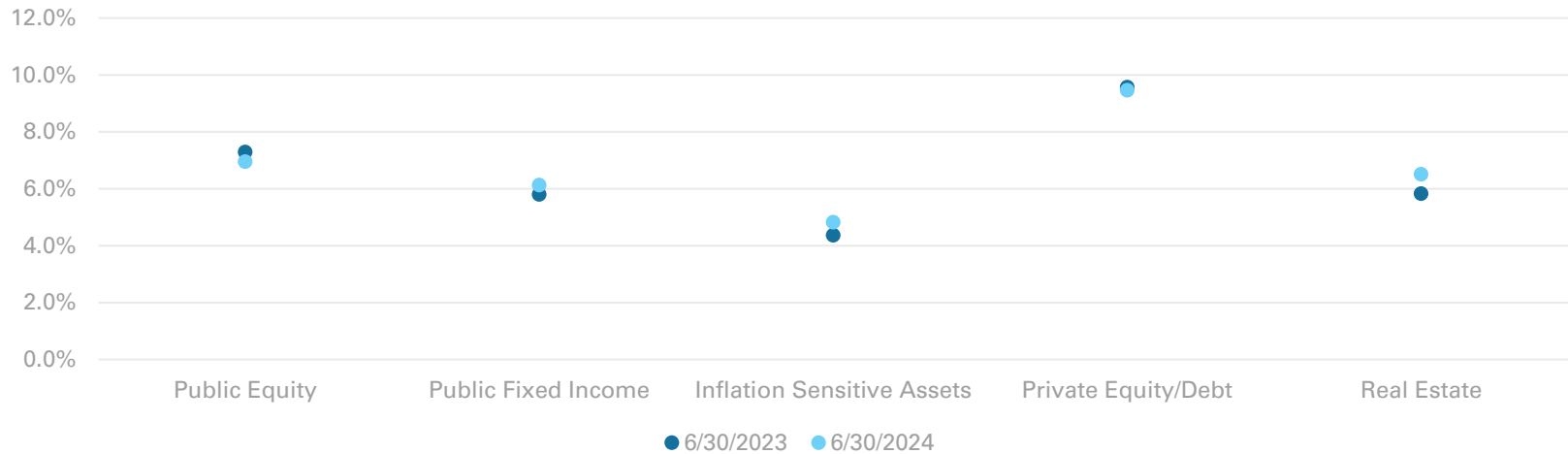


2024 & 2023 ASSUMPTIONS

10 Year Expected Return



30 Year Expected Return



Sources: S&P, FactSet



ASSET CLASS ASSUMPTIONS

DEVELOPMENT

- **Assumptions are published for over 70 asset classes**
 - NEPC publishes return forecasts for 10-year and 30-year periods
- **Market data as of 06/30/2024**
 - Assumptions are developed with NEPC valuations models and rely on a building block approach
- **The 10-year return outlook is intended to support strategic asset allocation analysis**
- **30-year return assumptions are used for actuarial inputs and long-term planning**

Asset Allocation Process

1. Finalize list of new asset classes
2. Calculate asset class volatility and correlation assumptions
3. Set model terminal values, growth, and inflation inputs
4. Model data updated at quarter-end
5. Review model outputs and produce asset class return assumptions
6. Assumptions released on the 15th calendar day after quarter-end

ASSET CLASS BUILDING BLOCKS

METHODOLOGY

- **Asset models reflect current and forecasted market data to inform expected returns**
- **Systematic inputs are paired with a long-term trend to terminal values**
- **Model inputs are aggregated to capture key return drivers for each asset class**
- **Building block inputs will differ across asset class categories**



U.S. INFLATION ASSUMPTIONS

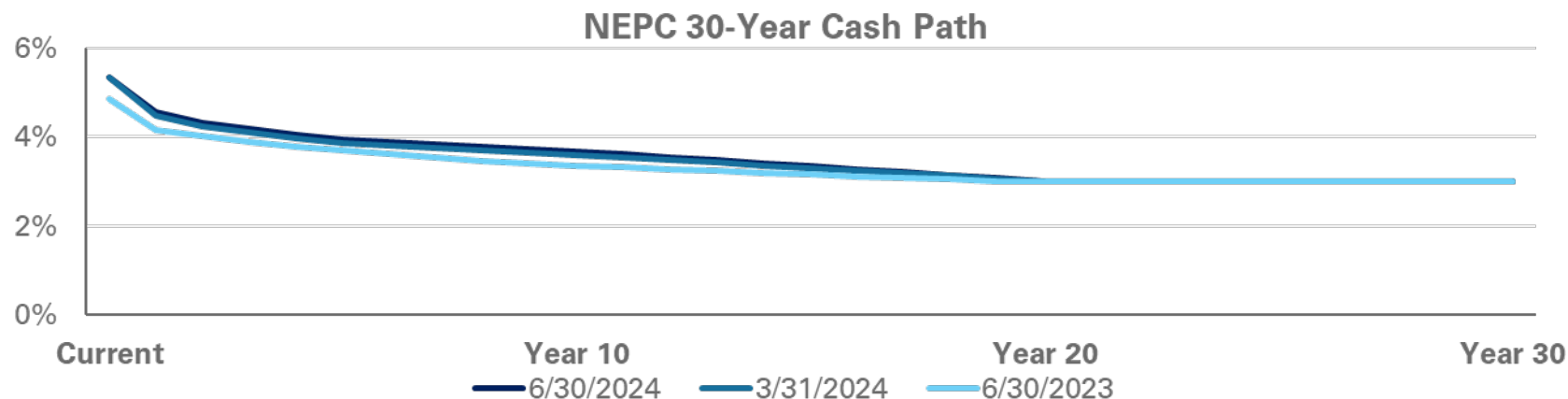
OVERVIEW

- Inflation is a key building block to develop asset class assumptions
- Inflation assumptions are model-driven and informed by multiple inputs for both the U.S. and global assets
- NEPC's inflation assumption forecasts near-term paths for major Consumer Price Index (CPI) components including food, energy, core services, and shelter costs
 - CPI is expected to converge with breakeven inflation forecast over the long-term
- The composite inflation assumption reflects a blend of NEPC's inflation forecast and market-implied breakeven inflation rates

U.S. Inflation Assumption		
Time Horizon	Current	12-Month Change
10-Year	2.6%	-0.1%
30-Year	2.6%	-0.1%

U.S. CASH

EXPECTATIONS



- **Cash is a foundational input for all asset class return expectations that reflects forward expectations of inflation and real interest rates**
 - Cash + risk premia is an input for long-term asset class return projections
- **The composite cash assumption is built from a blend of NEPC’s cash forecast and market forward pricing of short-term interest rates**

Time Horizon	Current	12-Month Change
10-Year	4.2%	+0.2%
30-Year	3.5%	+0.1%

Sources: Bloomberg, FactSet, NEPC



CORE ASSET CLASS RETURN ASSUMPTIONS

	Asset Class	06/30/24 10-Year Return	06/30/23 10-Year Return	Delta
	Cash	4.2%	4.0%	+0.2%
	U.S. Inflation	2.6%	2.7%	-0.1%
Equity	U.S. Large-Cap Equity	4.0%	4.6%	-0.6%
	Non-U.S. Developed Equity	4.5%	5.0%	-0.5%
	Emerging Market Equity	7.8%	9.2%	-1.4%
	Global Equity*	5.0%	5.7%	-0.7%
	Private Equity*	8.7%	9.1%	-0.4%
Fixed Income	U.S. Treasury Bond	4.6%	4.2%	+0.4%
	U.S. Municipal Bond	3.8%	4.1%	-0.3%
	U.S. Aggregate Bond*	5.0%	4.7%	+0.3%
	U.S. TIPS	4.8%	4.6%	+0.2%
	U.S. High Yield Corporate Bond	6.3%	6.8%	-0.5%
	Private Debt*	8.3%	8.6%	-0.3%
Real Assets	Commodity Futures	4.4%	4.8%	-0.4%
	REIT	6.3%	6.4%	-0.1%
	Gold	5.0%	5.3%	-0.3%
	Real Estate - Core	6.0%	5.3%	+0.7%
	Private Real Assets - Infrastructure	6.6%	6.3%	+0.3%
Multi-Asset	60% S&P 500 & 40% U.S. Aggregate	4.7%	4.9%	-0.2%
	60% MSCI ACWI & 40% U.S. Agg.	5.3%	5.6%	-0.3%
	Hedge Fund*	6.2%	6.3%	-0.1%

*Calculated as a blend of other asset classes



CORE ASSET CLASS RETURN ASSUMPTIONS

	Asset Class	6/30/24 30-Year Return	6/30/23 30-Year Return	Delta
	Cash	3.5%	3.4%	+0.1%
	U.S. Inflation	2.6%	2.7%	-0.1%
Equity	U.S. Large-Cap Equity	6.3%	6.7%	-0.4%
	Non-U.S. Developed Equity	6.1%	6.5%	-0.4%
	Emerging Market Equity	9.0%	9.4%	-0.4%
	Global Equity*	7.0%	7.4%	-0.4%
	Private Equity*	10.0%	10.2%	-0.2%
Fixed Income	U.S. Treasury Bond	4.6%	4.1%	+0.5%
	U.S. Municipal Bond	4.0%	3.8%	+0.2%
	U.S. Aggregate Bond*	5.1%	4.7%	+0.4%
	U.S. TIPS	4.8%	4.4%	+0.4%
	U.S. High Yield Corporate Bond	7.3%	7.1%	+0.2%
	Private Debt*	9.0%	9.1%	-0.1%
Real Assets	Commodity Futures	3.8%	3.6%	+0.2%
	REIT	7.4%	7.4%	—
	Gold	4.9%	4.9%	—
	Real Estate - Core	6.5%	5.8%	+0.4%
	Private Real Assets - Infrastructure	7.0%	6.9%	+0.1%
Multi-Asset	60% S&P 500 & 40% U.S. Aggregate	6.1%	6.2%	-0.1%
	60% MSCI ACWI & 40% U.S. Agg.	6.6%	6.6%	—
	Hedge Fund*	6.5%	6.5%	—

*Calculated as a blend of other asset classes





CONCLUSIONS



CONCLUSIONS

- **NEPC and ARA recommend a modest change in the 2025 CTF policy allocation**
 - Increase the target allocation in Private Equity /Debt by 2% of fund
 - Decrease the target allocation in Public Equity by 2% of fund
- **NEPC capital market assumptions imply a limited change in the 10- and 30-year target return and volatility of the CTF**
- **No changes are recommended in other CTF parameters, such as the policy asset class bands, sub-asset allocations or active risk target of 120 basis points**
- **NEPC and ARA do not recommend changes in the VTF policy allocation**

APPENDIX 1:

PUBLIC EQUITY AND FIXED INCOME STRUCTURE

REFERENCE PORTFOLIO ATTRIBUTION



PUBLIC EQUITY STRUCTURE

	Current Equity Allocation*
Global Equities	78.9%
US Small Cap Equities	7.8%
Int'l Small Cap Equities	3.6%
Emerging Market Large Cap	
China	1.2%
x-China	6.9%
Emerging Market Small Cap	1.6%
Total	
10 Year Compound Return	5.0%
30 Year Compound Return	7.0%
Standard Deviation	18.0%
10 Year Sharpe Ratio	0.05
30 Year Sharpe Ratio	0.19

* Market capitalization weights as of June 30, 2024; Actual market capitalization weights will float with market moves over time. Provided for informational purposes. Based on NEPC capital market assumptions as of June 30, 2024.



PUBLIC FIXED INCOME STRUCTURE

	Current Fixed Income Allocation	Recommnded Fixed Income Allocation
US Treasuries	24.0%	24.0%
US Investment Grade Credit	24.0%	24.0%
Mortgage-Backed	8.0%	8.0%
Long Treasuries	4.0%	4.0%
High Yield Bonds	20.0%	20.0%
Leveraged Loans	10.0%	10.0%
Emerging Market Debt*	10.0%	10.0%
Total		
10 Year Compound Return	5.9%	5.9%
30 Year Compound Return	6.1%	6.1%
Standard Deviation	6.3%	6.3%
10 Year Sharpe Ratio	0.28	0.28
30 Year Sharpe Ratio	0.42	0.42

*Blended 50% / 50% external and local. Based on NEPC capital market assumptions as of June 30, 2024.

REFERENCE PORTFOLIO ATTRIBUTION

	10 Year Expected Return	Standard Deviation	30 Year Expected Return
Reference Portfolio	5.34%	11.40%	6.56%
Private Markets	0.69%	0.21%	0.55%
Portfolio Structure	0.14%	0.31%	0.14%
Leverage	0.18%	0.66%	0.29%
Recommended Portfolio	6.35%	12.58%	7.54%

Note: Based on NEPC capital market assumptions as of June 30, 2024.



APPENDIX 2: CAPITAL MARKETS ASSUMPTIONS



PUBLIC EQUITY ASSUMPTIONS

BUILDING BLOCKS

Illiquidity Premium	The return expected for assets with illiquidity risk
Valuation	Represents P/E multiple contraction or expansion relative to long-term trend
Inflation	Market-specific inflation based on country-level revenue exposure
Real Earnings Growth	Market-specific real growth based on a weighted-average of country revenue exposure and GDP growth
Dividend Yield	Income distributed to shareholders adjusted to reflect market trends

Asset Class	06/30/24 10-Yr Return	12-Month Change
U.S. Large-Cap Equity	4.0%	-0.6%
U.S. Small/Mid-Cap Equity	6.2%	-0.3%
Non-U.S. Developed Equity	4.5%	-0.5%
Non-U.S. Developed Small-Cap Equity	6.7%	-0.6%
Emerging Market Equity	7.8%	-1.4%
Emerging Market Small-Cap Equity	7.1%	-1.5%
China Equity	9.8%	-0.1%
Hedge Fund - Equity	5.5%	-0.2%
Global Equity*	5.0%	-0.7%
Private Equity*	8.7%	-0.4%

Source: NEPC

*Calculated as a blend of other asset classes



FIXED INCOME ASSUMPTIONS

BUILDING BLOCKS

Illiquidity Premium	The return expected for assets with illiquidity risk
Government Rates Price Change	Change due to shifts in current yields relative to forecasted rates
Credit Deterioration	The average loss for credit assets due to defaults and recovery rates
Spread Price Change	Valuation change due to changes in credit spreads relative to long-term targets
Credit Spread	Yield premium provided by securities with credit risk
Government Rates	The yield attributed to sovereign bonds that do not have credit risk

Asset Class	06/30/24 10-Yr Return	12-Month Change
U.S. TIPS	4.8%	+0.2%
U.S. Treasury Bond	4.6%	+0.4%
U.S. Corporate Bond	5.7%	-
U.S. MBS	4.8%	+0.3%
U.S. High Yield Corporate	6.3%	-0.5%
U.S. Leveraged Loan	7.4%	-0.2%
EMD External Debt*	7.7%	-
EMD Local Currency Debt	6.9%	+0.4%
Non-U.S. Govt. Bond	2.7%	+0.1%
U.S. Muni Bond (1-10 Year)	3.4%	+0.2%
U.S. High Yield Muni Bond	4.2%	-1.6%
Hedge Fund – Credit	6.7%	-0.2%
U.S. Aggregate Bond*	5.0%	+0.3%
Private Debt*	8.3%	-0.3%

Source: NEPC

*Calculated as a blend of other asset classes



REAL ASSET ASSUMPTIONS

BUILDING BLOCKS

Illiquidity Premium	The return expected for assets with illiquidity risk
Valuation	The change in price of the asset moving to a terminal value or real average level
Inflation	Based on the inflation path as defined by breakeven-inflation rates and NEPC assumptions
Growth	Market-specific real growth based on a weighted-average of country-level revenue exposure and GDP growth
Real Income	The inflation-adjusted income produced by the asset

Asset Class	06/30/24 10-Yr Return	12-Month Change
Commodity Futures	4.4%	-0.4%
Midstream Energy	5.0%	-1.0%
REIT	6.3%	-0.1%
Global Infrastructure Equity	6.2%	+0.3%
Global Natural Resources Equity	6.4%	-0.4%
Gold	5.0%	-0.3%
Real Estate - Core	6.0%	+0.7%
Real Estate - Non-Core	7.8%	+1.1%
Private Debt - Real Estate	6.6%	+0.3%
Private Real Assets - Natural Resources	8.1%	-0.4%
Private Real Assets - Infrastructure	6.6%	+0.3%

Source: NEPC

*Calculated as a blend of other asset classes



10-YEAR RETURN FORECASTS

EQUITY

Geometric Expected Return			
Asset Class	06/30/2024	06/30/2023	Delta
U.S. Large-Cap Equity	4.0%	4.6%	-0.6%
U.S. Small/Mid-Cap Equity	6.2%	6.5%	-0.3%
Non-U.S. Developed Equity	4.5%	5.0%	-0.5%
Non-U.S. Developed Equity (USD Hedge)	4.7%	5.1%	-0.4%
Non-U.S. Developed Small-Cap Equity	6.7%	7.3%	-0.6%
Emerging Market Equity	7.8%	9.2%	-1.4%
Emerging Market Small-Cap Equity	7.1%	8.6%	-1.5%
Hedge Fund - Equity	5.5%	5.7%	-0.2%
Private Equity - Buyout	7.2%	7.5%	-0.3%
Private Equity - Growth	8.5%	8.8%	-0.3%
Private Equity - Early Stage Venture	9.7%	10.0%	-0.3%
Private Equity - Secondary	6.7%	7.0%	-0.3%
Non-U.S. Private Equity	9.7%	10.7%	-1.0%
China Equity	9.8%	9.9%	-0.1%
Global Equity*	5.0%	5.7%	-0.7%
Private Equity*	8.7%	9.1%	-0.4%



*Calculated as a blend of other asset classes

10-YEAR RETURN FORECASTS

FIXED INCOME

Geometric Expected Return			
Asset Class	06/30/2024	06/30/2023	Delta
Cash	4.2%	4.0%	+0.2%
US TIPS	4.8%	4.6%	+0.2%
US Treasury Bond	4.6%	4.2%	+0.4%
US Corporate Bond	5.7%	5.7%	-
US Corporate Bond - AAA	4.9%	4.7%	+0.2%
US Corporate Bond - AA	5.1%	4.9%	+0.2%
US Corporate Bond - A	5.5%	5.5%	-
US Corporate Bond - BBB	6.0%	6.1%	-0.1%
US Mortgage-Backed Securities	4.8%	4.5%	+0.3%
US Securitized Bond	5.4%	5.3%	+0.1%
US Collateralized Loan Obligation	5.7%	5.8%	-0.1%
US Municipal Bond	3.8%	4.1%	-0.3%
US Municipal Bond (1-10 Year)	3.4%	3.2%	+0.2%
US Taxable Municipal Bond	5.5%	5.3%	+0.2%

10-YEAR RETURN FORECASTS

FIXED INCOME

Geometric Expected Return			
Asset Class	06/30/2024	06/30/2023	Delta
Non-US Government Bond	2.7%	2.6%	+0.1%
Non-US Government Bond (USD Hedge)	3.0%	2.8%	+0.2%
Non-US Inflation-Linked Bond (USD Hedge)	3.7%	3.8%	-0.1%
US Short-Term TIPS (1-3 Year)	4.8%	4.6%	+0.2%
US Short-Term Treasury Bond (1-3 Year)	4.7%	4.3%	+0.4%
US Short-Term Corporate Bond (1-3 Year)	5.6%	5.4%	+0.2%
US Intermediate-Term TIPS (3-10 Year)	4.8%	4.6%	+0.2%
US Intermediate-Term Treasury Bond (3-10 Year)	4.6%	4.3%	+0.3%
US Intermediate-Term Corporate Bond (3-10 Year)	6.0%	6.0%	-
US Long-Term TIPS (10-30 Year)	4.9%	4.5%	+0.4%
US Long-Term Treasury Bond (10-30 Year)	4.3%	3.9%	+0.4%
US Long-Term Corporate Bond (10-30 Year)	5.4%	5.6%	-0.2%
20+ Year US Treasury STRIPS	4.2%	3.8%	+0.4%
10 Year US Treasury Bond	4.7%	4.0%	+0.7%
10 Year Non-US Government Bond (USD Hedge)	2.6%	2.1%	+0.5%
US Aggregate Bond*	5.0%	4.7%	+0.3%

*Calculated as a blend of other asset classes



10-YEAR RETURN FORECASTS

FIXED INCOME

Geometric Expected Return			
Asset Class	06/30/2024	06/30/2023	Delta
US High Yield Corporate Bond	6.3%	6.8%	-0.5%
US Corporate Bond - BB	6.9%	7.5%	-0.6%
US Corporate Bond - B	6.4%	6.9%	-0.5%
US Corporate Bond - CCC/Below	0.8%	2.0%	-1.2%
US Short-Term High Yield Corporate Bond (1-3 Year)	5.8%	5.9%	-0.1%
US Leveraged Loan	7.4%	7.6%	-0.2%
Emerging Market Investment Grade External Debt	5.4%	-	-
Emerging Market High Yield External Debt	9.7%	-	-
Emerging Market Local Currency Debt	6.9%	6.5%	+0.4%
US High Yield Securitized Bond	9.3%	8.9%	+0.4%
US High Yield Collateralized Loan Obligation	8.0%	8.5%	-0.5%
US High Yield Municipal Bond	4.2%	5.8%	-1.6%
Hedge Fund - Credit	6.7%	6.9%	-0.2%
Private Debt - Credit Opportunities	7.7%	8.0%	-0.3%
Private Debt - Distressed	8.5%	8.8%	-0.3%
Private Debt - Direct Lending	8.3%	8.6%	-0.3%
Private Debt*	8.3%	8.6%	-0.3%

*Calculated as a blend of other asset classes



10-YEAR RETURN FORECASTS

REAL ASSETS

Geometric Expected Return			
Asset Class	06/30/2024	06/30/2023	Delta
Commodity Futures	4.4%	4.8%	-0.4%
Midstream Energy	5.0%	6.0%	-1.0%
REIT	6.3%	6.4%	-0.1%
Global Infrastructure Equity	6.2%	5.9%	+0.3%
Global Natural Resources Equity	6.4%	6.8%	-0.4%
Gold	5.0%	5.3%	-0.3%
Real Estate - Core	6.0%	5.3%	+0.7%
Real Estate – Value-Add	7.2%	6.7%	+0.5%
Real Estate - Opportunistic	8.3%	8.2%	+0.1%
Private Debt - Real Estate	6.6%	6.3%	+0.3%
Private Real Assets - Natural Resources	8.1%	8.5%	-0.4%
Private Real Assets - Infrastructure	6.6%	6.3%	+0.3%



30-YEAR RETURN FORECASTS

EQUITY

Geometric Expected Return			
Asset Class	06/30/2024	06/30/2023	Delta
U.S. Large-Cap Equity	6.3%	6.7%	-0.4%
U.S. Small/Mid-Cap Equity	7.5%	7.5%	-
Non-U.S. Developed Equity	6.1%	6.5%	-0.4%
Non-U.S. Developed Equity (USD Hedge)	6.4%	6.7%	-0.3%
Non-U.S. Developed Small-Cap Equity	7.9%	7.8%	+0.1%
Emerging Market Equity	9.0%	9.4%	-0.4%
Emerging Market Small-Cap Equity	8.5%	9.3%	-0.8%
Hedge Fund - Equity	6.0%	6.1%	-0.1%
Private Equity - Buyout	8.7%	8.8%	-0.1%
Private Equity - Growth	9.7%	9.8%	-0.1%
Private Equity - Early Stage Venture	10.5%	10.6%	-0.1%
Private Equity - Secondary	8.2%	8.3%	-0.1%
Non-U.S. Private Equity	10.6%	10.9%	-0.3%
China Equity	9.5%	9.5%	-
Global Equity*	7.0%	7.4%	-0.4%
Private Equity*	10.0%	10.2%	-0.2%



*Calculated as a blend of other asset classes

30-YEAR RETURN FORECASTS

FIXED INCOME

Geometric Expected Return			
Asset Class	06/30/2024	06/30/2023	Delta
Cash	3.5%	3.4%	+0.1%
US TIPS	4.8%	4.4%	+0.4%
US Treasury Bond	4.6%	4.1%	+0.5%
US Corporate Bond	6.1%	5.8%	+0.3%
US Corporate Bond - AAA	5.4%	5.0%	+0.4%
US Corporate Bond - AA	5.4%	4.9%	+0.5%
US Corporate Bond - A	5.8%	5.4%	+0.4%
US Corporate Bond - BBB	6.4%	6.0%	+0.4%
US Mortgage-Backed Securities	4.8%	4.3%	+0.5%
US Securitized Bond	5.5%	5.1%	+0.4%
US Collateralized Loan Obligation	5.1%	5.1%	-
US Municipal Bond	4.0%	3.8%	+0.2%
US Municipal Bond (1-10 Year)	3.7%	3.4%	+0.3%
US Taxable Municipal Bond	6.2%	5.8%	+0.4%



30-YEAR RETURN FORECASTS

FIXED INCOME

Geometric Expected Return			
Asset Class	06/30/2024	06/30/2023	Delta
Non-US Government Bond	3.2%	3.1%	+0.1%
Non-US Government Bond (USD Hedge)	3.4%	3.3%	+0.1%
Non-US Inflation-Linked Bond (USD Hedge)	3.7%	3.7%	-
US Short-Term TIPS (1-3 Year)	4.5%	3.9%	+0.6%
US Short-Term Treasury Bond (1-3 Year)	4.4%	3.8%	+0.6%
US Short-Term Corporate Bond (1-3 Year)	5.4%	4.9%	+0.5%
US Intermediate-Term TIPS (3-10 Year)	4.8%	4.4%	+0.4%
US Intermediate-Term Treasury Bond (3-10 Year)	4.6%	4.2%	+0.4%
US Intermediate-Term Corporate Bond (3-10 Year)	6.3%	5.9%	+0.4%
US Long-Term TIPS (10-30 Year)	5.1%	4.6%	+0.5%
US Long-Term Treasury Bond (10-30 Year)	4.7%	4.2%	+0.5%
US Long-Term Corporate Bond (10-30 Year)	6.3%	6.0%	+0.3%
20+ Year US Treasury STRIPS	4.7%	4.2%	+0.5%
10 Year US Treasury Bond	5.1%	4.0%	+1.1%
10 Year Non-US Government Bond (USD Hedge)	3.3%	3.0%	+0.3%
US Aggregate Bond*	5.1%	4.7%	+0.4%

*Calculated as a blend of other asset classes



30-YEAR RETURN FORECASTS

FIXED INCOME

Geometric Expected Return			
Asset Class	06/30/2024	06/30/2023	Delta
US High Yield Corporate Bond	7.3%	7.1%	+0.2%
US Corporate Bond - BB	7.6%	7.7%	-0.1%
US Corporate Bond - B	7.1%	7.0%	+0.1%
US Corporate Bond - CCC/Below	1.5%	1.8%	-0.3%
US Short-Term High Yield Corporate Bond (1-3 Year)	5.9%	5.4%	+0.5%
US Leveraged Loan	6.7%	6.8%	-0.1%
Emerging Market Investment Grade External Debt	6.1%	-	-
Emerging Market High Yield External Debt	8.7%	-	-
Emerging Market Local Currency Debt	5.9%	5.7%	+0.2%
US High Yield Securitized Bond	8.6%	8.1%	+0.5%
US High Yield Collateralized Loan Obligation	7.4%	7.7%	-0.3%
US High Yield Municipal Bond	4.9%	5.7%	-0.8%
Hedge Fund - Credit	7.1%	7.0%	+0.1%
Private Debt - Credit Opportunities	8.4%	8.4%	-
Private Debt - Distressed	9.4%	9.3%	+0.1%
Private Debt - Direct Lending	8.9%	9.0%	-0.1%
Private Debt*	9.0%	9.1%	-0.1%

*Calculated as a blend of other asset classes



30-YEAR RETURN FORECASTS

REAL ASSETS

Geometric Expected Return			
Asset Class	06/30/2024	06/30/2023	Delta
Commodity Futures	3.8%	3.6%	+0.2%
Midstream Energy	6.4%	6.8%	-0.4%
REIT	7.4%	7.4%	-
Global Infrastructure Equity	6.8%	6.7%	+0.1%
Global Natural Resources Equity	7.2%	7.2%	-
Gold	4.9%	4.9%	-
Real Estate - Core	6.5%	5.8%	+0.7%
Real Estate – Value-Add	7.8%	7.5%	+0.3%
Real Estate - Opportunistic	8.7%	9.0%	-0.3%
Private Debt - Real Estate	6.8%	6.3%	+0.5%
Private Real Assets - Natural Resources	8.9%	8.8%	+0.1%
Private Real Assets - Infrastructure	7.0%	6.9%	+0.1%



VOLATILITY FORECASTS

EQUITY

Volatility			
Asset Class	12/31/2023	12/31/2022	Delta
U.S. Large-Cap Equity	17.2%	16.9%	+0.3%
U.S. Small/Mid-Cap Equity	21.0%	20.8%	+0.2%
Non-U.S. Developed Equity	19.7%	19.6%	+0.1%
Non-U.S. Developed Equity (USD Hedge)	17.7%	17.6%	+0.1%
Non-U.S. Developed Small-Cap Equity	24.2%	24.2%	-
Emerging Market Equity	28.1%	28.6%	-0.5%
Emerging Market Small-Cap Equity	31.4%	31.9%	-0.5%
Hedge Fund - Equity	11.0%	11.1%	-0.1%
Private Equity - Buyout	20.0%	20.0%	-
Private Equity - Growth	31.5%	31.4%	+0.1%
Private Equity - Early Stage Venture	46.5%	45.0%	+1.5%
Private Equity - Secondary	20.4%	21.0%	-0.6%
Non-U.S. Private Equity	32.0%	32.0%	-
China Equity	30.6%	30.7%	-0.1%
Global Equity*	18.2%	18.1%	+0.1%
Private Equity*	25.9%	25.7%	+0.2%



*Calculated as a blend of other asset classes

VOLATILITY FORECASTS

FIXED INCOME

Volatility			
Asset Class	12/31/2023	12/31/2022	Delta
Cash	0.6%	0.6%	-
US TIPS	6.0%	6.1%	-0.1%
US Treasury Bond	5.4%	5.4%	-
US Corporate Bond	7.7%	7.6%	+0.1%
US Corporate Bond - AAA	6.8%	6.5%	+0.3%
US Corporate Bond - AA	6.6%	6.4%	+0.2%
US Corporate Bond - A	7.6%	7.5%	+0.1%
US Corporate Bond - BBB	8.4%	8.4%	-
US Mortgage-Backed Securities	6.5%	6.5%	-
US Securitized Bond	8.0%	8.2%	-0.2%
US Collateralized Loan Obligation	7.7%	7.6%	+0.1%
US Municipal Bond	6.0%	6.0%	-
US Municipal Bond (1-10 Year)	4.5%	4.5%	-
US Taxable Municipal Bond	7.5%	7.5%	-

VOLATILITY FORECASTS

FIXED INCOME

Volatility			
Asset Class	12/31/2023	12/31/2022	Delta
Non-US Government Bond	9.5%	9.5%	-
Non-US Government Bond (USD Hedge)	4.1%	4.1%	-
Non-US Inflation-Linked Bond (USD Hedge)	6.7%	6.6%	+0.1%
US Short-Term TIPS (1-3 Year)	3.3%	3.4%	-0.1%
US Short-Term Treasury Bond (1-3 Year)	2.3%	2.3%	-
US Short-Term Corporate Bond (1-3 Year)	2.8%	2.8%	-
US Intermediate-Term TIPS (3-10 Year)	6.0%	6.0%	-
US Intermediate-Term Treasury Bond (3-10 Year)	5.9%	5.9%	-
US Intermediate-Term Corporate Bond (3-10 Year)	7.1%	7.1%	-
US Long-Term TIPS (10-30 Year)	12.4%	12.4%	-
US Long-Term Treasury Bond (10-30 Year)	11.8%	11.8%	-
US Long-Term Corporate Bond (10-30 Year)	11.9%	12.1%	-0.2%
20+ Year US Treasury STRIPS	20.7%	20.7%	-
10 Year US Treasury Bond	7.5%	7.5%	-
10 Year Non-US Government Bond (USD Hedge)	5.0%	5.1%	-0.1%
US Aggregate Bond*	5.8%	5.8%	-

*Calculated as a blend of other asset classes



VOLATILITY FORECASTS

FIXED INCOME

Volatility			
Asset Class	12/31/2023	12/31/2022	Delta
US High Yield Corporate Bond	11.2%	11.1%	+0.1%
US Corporate Bond - BB	9.7%	9.7%	-
US Corporate Bond - B	11.6%	11.7%	-0.1%
US Corporate Bond - CCC/Below	20.3%	20.3%	-
US Short-Term High Yield Corporate Bond (1-3 Year)	8.2%	8.5%	-0.3%
US Leveraged Loan	9.1%	9.1%	-
Emerging Market Investment Grade External Debt	8.7%	-	-
Emerging Market High Yield External Debt	17.5%	-	-
Emerging Market Local Currency Debt	12.7%	13.0%	-0.3%
US High Yield Securitized Bond	11.2%	11.1%	+0.1%
US High Yield Collateralized Loan Obligation	10.4%	10.4%	-
US High Yield Municipal Bond	12.0%	12.0%	-
Hedge Fund - Credit	9.9%	10.0%	-0.1%
Private Debt - Credit Opportunities	14.5%	14.8%	-0.3%
Private Debt - Distressed	14.4%	14.6%	-0.2%
Private Debt - Direct Lending	11.0%	11.0%	-
Private Debt*	11.8%	11.8%	-

*Calculated as a blend of other asset classes



VOLATILITY FORECASTS

REAL ASSETS

Volatility			
Asset Class	12/31/2023	12/31/2022	Delta
Commodity Futures	18.5%	18.5%	-
Midstream Energy	28.2%	28.8%	-0.6%
REIT	21.8%	21.7%	+0.1%
Global Infrastructure Equity	19.4%	20.6%	-1.2%
Global Natural Resources Equity	23.3%	23.5%	-0.2%
Gold	16.4%	16.3%	+0.1%
Real Estate - Core	15.0%	15.0%	-
Real Estate – Value-Add	23.4%	20.4%	+3.0%
Real Estate - Opportunistic	25.8%	23.3%	+2.5%
Private Debt - Real Estate	11.9%	11.9%	-
Private Real Assets - Natural Resources	32.3%	32.5%	-0.2%
Private Real Assets - Infrastructure	12.4%	12.4%	-

INFORMATION DISCLAIMER

Past performance is no guarantee of future results.

The goal of this report is to provide a basis for substantiating asset allocation recommendations. The opinions presented herein represent the good faith views of NEPC as of the date of this report and are subject to change at any time.

Information on market indices was provided by sources external to NEPC. While NEPC has exercised reasonable professional care in preparing this report, we cannot guarantee the accuracy of all source information contained within.

All investments carry some level of risk. Diversification and other asset allocation techniques do not ensure profit or protect against losses.

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ASSET ALLOCATION

Overview and Recommendations for 2025

December 12, 2024

Edwin Denson
Executive Director/Chief Investment Officer

Todd Mattina
Head Economist & Asset and Risk Allocation CIO

In Consultation with NEPC and the Investment Committee

2025 RECOMMENDATIONS SUMMARY

Strategic Asset Allocation Targets and Ranges

2025 Core Trust Fund recommendation and expectations:

	<u>Policy Targets*</u>	<u>Ranges*</u>
Public Equity	38%	32% - 44%
Public Fixed Income	27%	21% - 33%
Inflation Sensitive Assets	19%	14% - 24%
Private Equity/Debt	20%	12% - 28%
Real Estate	8%	4% - 12%
Leverage	<u>-12%</u>	-4% [†] to -20%
Total (Including Leverage)	100%	
<i>10 Yr. Expected Return</i>	<i>6.4%</i>	
<i>30 Yr. Expected Return</i>	<i>7.5%</i>	
<i>Expected Standard Deviation</i>	<i>12.6%</i>	
<i>10 Yr. Expected Sharpe Ratio</i>	<i>0.17</i>	
<i>30 Yr. Expected Sharpe Ratio</i>	<i>0.32</i>	
Target Active Risk	120bps +/- 60bps	

The Board of Trustees' external asset allocation consultant, NEPC, provided the following capital market assumptions used to develop the asset allocation recommendation and expectations:

<u>Asset Class</u>	<u>Long Term Expected Return</u>	<u>10 Year Expected Return</u>	<u>Standard Deviation</u>
Public Equity	7.0%	5.0%	18.0%
Public Fixed Income	6.1%	5.9%	6.3%
Inflation Sensitive Assets	4.8%	4.8%	6.0%
Private Equity/Debt	9.5%	8.1%	20.6%
Real Estate	6.5%	6.0%	15.0%

* Policy Targets and Ranges will vary from the above table. This is due to the Asset Allocation Corridor Treatment which requires that Private Equity/Debt and Real Estate asset class Policy Targets be derived from actual AUM, and then corresponding Policy Targets and Ranges for Public Equities and Public Fixed Income are adjusted. Mandatory rebalancing for Public Equities and Public Fixed Income as set forth in the Board of Trustees WRS Investment Policy is not triggered by the ranges in the above table, but by these adjusted ranges.

[†] SWIB Staff allowed to eliminate leverage (i.e., 0%).

- The recommended 2025 Policy Target for Public Equity (38%) is 2% lower than the 2024 target, reducing the volatility impact on the Core Trust Fund from a higher recommended target allocation in Private Equity/Debt.
- The recommended 2025 Policy Targets for Public Fixed Income (27%) and Inflation Sensitive Assets (19%) remain unchanged.
- The recommended 2025 Policy Target for Private Equity/Debt (20%) is 2% higher than the 2024 target as capital deployments track closely with SWIB’s multi-year pacing model. The recommended Policy Target for Real Estate (8%) is unchanged.
- The recommended 2025 Policy Target for Policy Leverage (-12%) does not change from last year reflecting an offsetting increase in both the long-term expected return of the Core Trust Fund and leverage financing costs, implying no change in the “return to leverage”.
- The Target Active Risk of 120 basis points \pm 60 basis points will be maintained for the Core Trust Fund in 2025.

The recommended 2025 Policy Targets may be implemented at any time after approval by the Board of Trustees as determined and approved by the ED/CIO, subject to market conditions and operational readiness.

2025 Variable Trust Fund recommendation and expectations:

	<u>Policy Targets</u>	<u>Ranges</u>
U.S. Equities	70.0%	65.0-75.0%
International Equities	30.0%	25.0-35.0%
	100.0%	
<i>10 Yr. Expected Return</i>	<i>4.9%</i>	
<i>30 Yr. Expected Return</i>	<i>6.9%</i>	
<i>Expected Standard Deviation</i>	<i>18.0%</i>	
<i>10 Yr. Expected Sharpe Ratio</i>	<i>0.04</i>	
<i>30 Yr. Expected Sharpe Ratio</i>	<i>0.19</i>	
Target Active Risk	60bps +/- 30bps	

- The recommended 2025 Policy Targets and Ranges are unchanged from 2024.
- The Target Active Risk of 60 basis points \pm 30 basis points will be maintained for the Variable Trust Fund in 2025.

2025 ASSET ALLOCATION OVERVIEW

Since the late 1980s, SWIB has conducted an asset allocation exercise annually, leading to policy and funding recommendations at the beginning of each calendar year. In the late 1990s, the process was expanded to include several planning sessions with investment staff, senior staff, consultants, and Trustees. SWIB’s process includes a full asset/liability modeling process, stress testing, and discussion sessions with the Board every other year, opening the schedule to consideration of other

strategic issues or structural asset allocation adjustments in the “off years”. SWIB launched the current “off-year” process for the 2025 asset allocation during the 2024 October Board Workshop attended by Trustees, staff and consultants.

A key theme in the discussion this year was the higher recommended allocation to Private Equity/Debt. For long-term investors with a strong liquidity position, Private Equity/Debt offers an attractive vehicle to implement equity exposure while increasing opportunities to add value. In this context, the higher target allocation in Private Equity/Debt is funded by a lower target allocation in Public Equity, controlling overall investment volatility of the Core Trust Fund while increasing the long-term expected return.

The review centered around the 10-year pacing plan of private market allocations in the context of the fund’s overall liquidity and risk profile. Allocations in Private Equity/Debt and Real Estate were modeled through time based on projected returns, commitments by staff, capital contributions and distributions by general partners. The private market allocations were also assessed in stress-test scenarios to understand how the allocations would evolve in adverse market environments. Two key metrics were used to evaluate the fund’s liquidity position, including the Liquidity Coverage Ratio and an indicator of ‘excess liquidity’. The conclusion of the stress-test analysis was that the fund’s liquidity profile is sufficiently robust to allow for higher private market allocations in line with the current pacing plan of capital commitments. In addition, staff can adjust the pace of annual capital commitments to align the private markets allocation with the pacing plan over time.

Consistent with the pacing model, the recommended allocation to Private Equity/Debt and Real Estate is expected to increase further over the medium term. While the pacing plan supports SWIB staff with medium-term business and investment planning, the Board of Trustees will continue to review and approve further proposed increases in the target allocation as part of the annual asset allocation review process.

The 2025 asset allocation recommendations at the asset class and sub-asset class levels are discussed further below.

1. While the recommended allocation is lower for Public Equity, the sub-asset class targets within Public Equity continue to align with the global investible market in both the regional and market capitalization dimensions as represented by the MSCI ACWI IMI, while preserving a half weight to China large cap equities.
2. Both the recommended allocation to Public Fixed Income and the relative allocations to the sub-asset classes within Public Fixed Income do not change this year (see proposed sub-asset class targets on the next page).
3. The recommended increase in Private Equity/Debt from 18% to 20% reflects both longer term liquidity and pacing aspects of the asset classes.
4. Active return (return in excess of the policy benchmark) is an important contributor to overall fund return and diversifies risk. Consistent with recent years, the recommended Target Active Risk is 120 basis points +/- 60 basis points in the Core Trust Fund and 60 basis points +/- 30 basis points for the Variable Trust Fund.

Strategic Sub-Asset Class Allocation Targets

2025 Core Trust Fund recommendation and expectations for information:

<u>Public Equity</u>	<u>Policy Target[‡]</u>
Global	30.0%
US Small Cap	3.0%
Int'l Small Cap	1.4%
EME Large Cap China	0.5%
EME Large Cap ex China	2.6%
EME Small Cap	<u>0.6%</u>
	38.0%
<u>Public Fixed Income</u>	<u>Policy Target</u>
US Government	6.5%
US Investment Grade Credit	6.5%
MBS	2.2%
Long Treasuries	1.1%
High Yield Bonds	5.4%
Levered Loans	2.7%
EMD (External)	1.35%
EMD (Local Currency)	<u>1.35%</u>
	27.0%

[‡] Public Equity sub-asset class targets are informational and reflect the market capitalization of the MSCI ACWI Investable Market Index (IMI) with a 50% weight to the China large cap component as of 6/30/2024.

Board Meeting

Tab 6 – Committee Open Session Business

- A. Amendments to Enterprise Risk and Compliance Committee Charter
- B. Amendments to WRS Investment Committee Investment Guidelines
- C. Approved Open Session Investment Committee Meeting Minutes of August 27, September 24, and October 22, 2024
- D. Final Open Session Investment Committee Agenda for November 26, 2024 and Draft Open Session Agendas for December 19, 2024 and January 28, 2025

SWIB ENTERPRISE RISK AND COMPLIANCE COMMITTEE CHARTER

Board Approval Date: June 2011

Last Amended December [2024]3

The State of Wisconsin Investment Board (SWIB) Enterprise Risk and Compliance Committee, in conjunction with SWIB management and the Board of Trustees, has developed the following policies and procedures relating to enterprise risk and compliance.

Enterprise Risk and Compliance Committee Membership:

Head of Risk Management (Co-Chair)

Director of Compliance & Senior Legal Counsel (Co-Chair)

Chief Financial Officer (Vice Chair)

Chief Legal Counsel (Secretary)

Executive Director/Chief Investment Officer

Deputy Executive Director/Chief Operating Officer

Chief Technology Officer

Head Economist & Asset and Risk Allocation CIO (Section 25.167 CIO)

Head of Internal Audit ~~Director~~ (non-voting)

I. Committee Purpose and Charter

The Enterprise Risk and Compliance Committee (the “Committee”) is created to oversee that significant enterprise and compliance risks are identified, monitored, and managed to aid in accomplishing SWIB’s goals and objectives. The Committee shall not be responsible for oversight of investment-related risks, which are monitored by the Risk Management Division and the Investment Committee.

The Committee will provide management input to help scope risk analysis activities and will support staff’s risk management activities to ensure operational reality drives risk analysis. The Committee oversees the development and periodically reviews the maintenance of a sound framework for enterprise risk management. The Committee will also monitor and provide consultation for the activities of the Enterprise Risk and Compliance functions. The Committee is part of the overall control structure of the organization and is responsible for reviewing and assessing the effectiveness of the organization’s enterprise-wide risk assessment processes and compliance program to ensure they are reasonably designed to prevent violations of SWIB’s investment guidelines and other investment-related policies and procedures, state statutes, and other laws and applicable regulations. When appropriate, the Committee may recommend improvements to such policies, procedures, or processes. Further, the Committee may discuss any other enterprise risk matter it deems prudent and take necessary action.

ENTERPRISE RISK & COMPLIANCE COMMITTEE CHARTER

State of Wisconsin Investment Board

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In conjunction with the Section 25.167 CIO's exercise of the duties assigned in Wisconsin Statute Section 25.167, the Committee relies on the Head of Risk Management and Director of Compliance & Senior Legal Counsel for insight into SWIB's compliance with investment policies and guidelines and the development and implementation of operating procedures intended to ensure such compliance.

II. Authority

- A. The Committee may examine methodology, staffing, technology needs, reporting processes, middle and back-office operational needs, and such other matters as the Committee deems appropriate for the purpose of understanding, measuring, controlling, monitoring and reporting SWIB's risk exposure.
- B. For purposes of fulfilling its risk management and oversight responsibilities, the Committee will act as liaison between SWIB staff and SWIB Trustees on issues concerning enterprise risk management and compliance.
- C. The Committee may review and analyze all matters directed to the attention of the Committee by the Trustees, Head of Internal Audit ~~Director~~, Legislative Audit Bureau, Committee members, or others and report as appropriate.
- D. Unless related to confidential personnel matters, the Committee shall review all compliance related issues associated with SWIB operations including compliance with statutes, administrative rules, internal and external manager Investment Guidelines, regulatory reporting requirements and such other compliance matters as the Committee deems appropriate or as otherwise requested. For any such confidential personnel matters, the following Committee members will be separately notified by Human Resources of such compliance related issues: Executive Director/Chief Investment Officer, Deputy Executive Director/Chief Operating Officer, Director of Compliance & Senior Legal Counsel, Chief Legal Counsel and Head of Internal Audit ~~Director~~. The Committee's Minutes shall include all compliance violations reviewed by the Committee, management's action to remedy the violations, and management's actions to avoid any risk of reoccurrence. Immediate notification of the chair of the Audit and Finance Committee is required for any issue that appears to involve fraud or would otherwise be considered material for financial statement purposes.
- E. The Committee may review all risk related issues associated with enterprise risk management. From time to time, the Committee may ask SWIB staff to research, analyze and report on areas of risk.
- F. Upon the request of the Head of Risk Management ~~Chief Financial Officer~~, in consultation with the Operational, Financing and Counterparty Risk Director and the Head of Internal Audit, the Committee will review SWIB's Internal

ENTERPRISE RISK & COMPLIANCE COMMITTEE CHARTER

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Control Plan, which is submitted annually to the Department of Administration (DOA) pursuant to statute.

III. General Committee Procedures

- A.** A majority of the voting members of the Committee constitute a quorum, and a majority of a quorum is required to take Committee action. The Committee shall meet at least semi-annually, but meetings may be called by any Committee Member with sufficient lead time to provide appropriate notice of the meeting to the public. The Committee may invite members from the Investment Committee or other SWIB staff to respond to questions on specific risks related to investments or areas of concern.
- B.** The Committee Charter shall be approved by the Board of Trustees. The Committee will review the Charter at least annually and make recommendations (if any) to the Board of Trustees for approval.
- C.** The Committee may establish a standard reporting format and procedures for performing reviews of risk and compliance. Minutes of Committee meetings shall be kept and provided to the Board.

SWIB Investment Committee
WISCONSIN RETIREMENT SYSTEM
INVESTMENT GUIDELINES

Revised as of

~~June 25,~~ November 26, 2024

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I. INTRODUCTION

The SWIB Board of Trustees (the “Board”) has delegated to the investment staff of SWIB standing authority to manage the assets of the Core Retirement Trust Fund (the “Core Fund”) and the Variable Retirement Trust Fund (the “Variable Fund”), which together make up the Wisconsin Retirement System (the “WRS”), pursuant to the Board’s WRS Investment Policy and to section 25.15(2) of the Wisconsin Statutes and section IB 2.02 of the Wisconsin Administrative Code. The Investment Committee was created to provide oversight of WRS¹ investments within the parameters established by the Board and pursuant to the Investment Committee’s Charter approved by the Board. To properly and prudently execute its delegated authority and oversight functions, the Investment Committee has established guiding policies, guidelines and procedures, which are set forth in this document, the Investment Committee Investment Guidelines (these “IC Guidelines”). These IC Guidelines articulate the policies and guidelines that are employed in the day-to-day management of the WRS assets by SWIB’s staff. This document will be reviewed periodically and updated as necessary by the Investment Committee to reflect changes in investment strategies and to reflect best industry practices for prudent investors. Notwithstanding the delegation of authority by the Board to the Investment Committee for the establishment, approval, and amendment of the policies, guidelines and procedures included in these IC Guidelines, the Board reserves all rights to modify and amend these IC Guidelines at any time in its discretion. Any changes to these IC Guidelines will be periodically reported to the Board. In addition to these IC Guidelines, SWIB staff may also have to comply with Risk, Compliance Division or legal requirements, and review operational readiness with Operations staff prior to the trading of the instruments and securities authorized herein.

II. LEVERAGE USE POLICY

Introduction

Leverage is an exposure to an asset that is not fully collateralized by cash assets or an exposure to an asset acquired that has not been fully funded. Leverage by itself does not necessarily create additional market risk or variation in market returns. Leverage may result in greater diversification and lower market risk than an unlevered portfolio under normal market conditions. The funds managed by SWIB can have exposure to leverage through different structures, instruments and vehicles.

SWIB uses leverage in two primary ways. The first is to express the overall policy asset allocation, which includes leverage (“Policy Leverage”). Generally, Policy Leverage is implemented passively. The total amount of Policy Leverage is approved by the Board through the WRS asset allocation process. The Board-approved asset allocation targets for each asset

¹ The Investment Committee also has oversight of the State Investment Fund and other funds managed by SWIB as described in the Board’s SIF and Separately Managed Funds Investment Policy and Guidelines.

class together with the approved Policy Leverage is called the “Policy Portfolio.” The second use of leverage is to fund the alpha pool (“Alpha Pool Leverage”), which overlays alpha-producing strategies on the overall Core Fund Policy Portfolio. Those alpha strategies are funded with additional leverage but are not part of the Policy Portfolio. The total amount of Alpha Pool Leverage is limited by the Board-approved active risk target and range.

Certain internal active portfolios are also authorized to use portfolio-specific leverage. The Core Fund may provide limited unallocated cash to such internal active portfolios, and to other portfolios, to fund short-term financing needs, and charge a market-based funding rate to the applicable portfolio. Active internal and external portfolios may also fund portfolio leverage by financing assets within the portfolio.

Use of leverage introduces distinct liquidity risk that can vary based on leverage sources and margin requirements. Often, leverage requires liquid assets to satisfy margin obligations. Liquidity risk is managed by monitoring the level of liquidity required in various market scenarios and ensuring that an adequate reserve of liquid assets is available to meet commitments in times of market stress. Having a variety of leverage sources diversifies the refinancing risk and mitigates cost under varied market scenarios.

Alpha Pool and Policy Leverage can be generated through several different mechanisms. These mechanisms may be utilized in different proportions given market conditions and asset allocations. Each of these mechanisms have unique counterparty dynamics and risks, all of which are addressed by SWIB’s counterparty risk framework.

Derivative instruments. Leverage can be gained by replacing a physical instrument with a derivative instrument such as a futures contract, a swap contract, or a forward contract. Most of the proceeds generated from the sale of the physical instrument can then be used to finance further investment. The cost of the leverage is imbedded in the price of the derivative instrument. Use of derivative instruments provides the ability to source large scale leverage across many different asset classes in a standardized format. There is a risk of tracking error, or basis risk, between the physical instrument and the derivative instrument that could result in the returns of the two instruments diverging.

Securities Lending Cash Collateral. Through the course of securities lending, cash collateral may be received from borrowers. This cash may be used to finance leverage needs without creating basis risk. The available cash fluctuates day to day and is governed by the borrowing demand of and choice of collateral posted by market participants.

Repurchase Agreements (Repo). Repo is another way to gain leverage from physical instruments, like securities lending, without using derivative instruments. While securities lending relies on borrowing demand for the physical instrument, repo can generate leverage from physical instruments that do not have borrow demand, and also creates zero basis risk. The repo and the underlying asset management may be executed internally, externally or a mix of the two. An agency repo model can be used to facilitate

operational scale, collateral efficiency, and market access by partnering with an external agent.

Secured Borrow Agreements. Physical instruments can be pledged as collateral in a secured borrow agreement to gain financing from a bank or other financial institution, as and when needed. This form of financing creates zero basis risk and may have maturities ranging from three to six months. The stability of the available capital can vary based on the financing bank's or financial institution's balance sheet constraints.

Unsecured Borrowing. [Unsecured borrowing, such as the issuance of commercial paper, is another way to gain leverage without encumbering assets or requiring collateral. This form of borrowing can diversify the cash providers purchasing the debt providing SWIB with access to new borrowing sources.](#)

New mechanisms may be added from time to time and included herein.

Leverage Use Philosophy

Leverage is used where it can improve investment portfolio efficiency in terms of return for risk versus alternative choices that do not use leverage. Leverage will also be used to improve portfolio diversification and reduce portfolio concentration.

Leverage Monitoring

Detailed reporting is regularly (i.e., daily, monthly and quarterly) produced by SWIB to provide feedback regarding leverage exposures for review by portfolio managers, the head of Asset and Risk Allocation (ARA), the Risk Management Division, and the Executive Director/Chief Investment Officer (ED/CIO). Leverage use risk metrics are reported at least quarterly to the Investment Committee. Leverage use is also periodically reported by the ED/CIO to the Board.

Policy and Alpha Pool Leverage Guidelines

1. Leverage ratios govern leverage derived from beta sources (i.e., from levered asset class exposures). Established leverage ratio ranges for each levered asset class are set forth below. Current Leverage Ratio is defined as the ratio of notional exposure to capital available in the portfolio (or total exposure to unencumbered exposure in the case of repo). If the Current Leverage Ratio for any levered asset class exceeds the Maximum Target Leverage Ratio, SWIB will, within 30 days (unless such time limit is waived with majority approval of the rebalancing task force), reduce exposure or add capital to bring the Current Leverage Ratio within the established range. A Current Leverage Ratio below the Minimum Target Leverage Ratio will be monitored as part of the overall optimization of capital and funding costs.

Levered Asset Class	Minimum Target Leverage Ratio	Target Leverage Ratio	Maximum Target Leverage Ratio
<i>US Large Cap Equity</i>	2.7	3.3	4.0
<i>US Small Cap Equity</i>	2.7	3.3	4.0
<i>MSCI World xUS Equity</i>	2.7	3.3	4.0
<i>US TIPS</i>	6.0	8.0	10.0
<i>US Treasuries</i>	8.0	10.0	12.0

III. DERIVATIVES USE POLICY

Introduction

A "derivative instrument" is an investment instrument which usually derives its value and marketability from an underlying instrument which represents direct ownership of an asset or a direct obligation of an issuer (e.g. a "spot" or cash market instrument). SWIB recognizes that derivatives provide a means through which SWIB can implement investment strategies in a more cost and time efficient manner than through the physical investment of the underlying securities. Additionally, derivatives can be used to facilitate SWIB's risk management activities including risk mitigation. Derivatives include such instruments as futures, swaps, options and currency forwards and may be exchange traded, traded over-the-counter (OTC) and/or cleared.

Derivatives Use Objectives

The overall strategic objective of SWIB's use of derivatives is to facilitate risk exposure management and to manage the cost of investing. Objectives for derivatives use include:

1. Constructing portfolios with risk and return characteristics that could not efficiently be created using underlying physical securities,
2. Changing systematic exposures without executing trades in the underlying physical securities,
3. Hedging or managing risks, and
4. Effecting varying active and passive investment strategies including, but not limited to: portable alpha, currency hedging, equitization, relative value trades, transition management, and rebalancings.

Derivatives Use Monitoring and Reporting

Derivatives use exposures will be monitored by portfolio managers that employ derivatives, the ED/CIO and the Risk Management Division. The Investment Committee will monitor derivatives use exposures and risk metrics on a quarterly basis or more frequently as needed.

Derivatives Guidelines Applicable to all WRS Internal Portfolios:

1. Exchange-traded derivatives must be traded on a recognized exchange approved by the Investment Committee, except for exchange-traded derivatives that are traded pursuant to Exchange for Related Position (EFRP) transactions, which are traded off-exchange and not subject to this requirement. Such approved exchanges are listed on *Appendix 1*. As additional exchanges are approved *Appendix 1* shall be updated without amendment to these IC Guidelines.
2. OTC derivatives may only be traded with counterparties with which SWIB has a current International Swap and Derivative Association (ISDA) agreement that includes a Credit Support Annex (CSA).

In addition:

- a) The counterparty, or its guarantor, must, on each date on which a transaction is entered into, have an actual credit rating of not less than: (1) "A2/P2" on short-term debt from S&P or Moody's; and/or (2) "Baa2/BBB" on long-term debt from S&P or Moody's.
 - b) The collateral that SWIB holds under a CSA may be invested in the following:
 - i. Bank deposit accounts;
 - ii. Any money market fund having a rating of at least "Aaa" by Moody's or at least "AAA" by S&P;
 - iii. Overnight commercial paper having a rating of at least "P-1" by Moody's and "A-1" by S&P;
 - iv. Overnight repurchase agreements with U.S. government, agency or dollar cash collateral;
 - v. Overnight reverse repurchase agreements with U.S. government, agency or dollar cash collateral; and
 - vi. The State Investment Fund or similar short term investment funds.
3. For clarity, Items 1 and 2 do not apply to exchange-traded funds (ETFs), or to over-the-counter derivatives entered into on behalf of SWIB, or a title-holding entity that is wholly-owned by SWIB, by either an external manager or advisor in connection with a real estate separate account.
 4. Investments may be made in exchange-traded notes (ETNs) which are traded on exchanges included on an approved-exchange list maintained by the Compliance Division. The Risk and Compliance Divisions shall be notified upon any investment in a new ETN.

5. Investments may be made in put option contracts and call option contracts on securities, futures or an index of a group of securities. Put and call options may be purchased or sold on investments that could be held in the portfolio if the options were exercised.
6. Currency exposure management is permitted (but not required) through the use of exchange-traded currency instruments, and through the use of spot and forward contracts in foreign currencies (including FX Swaps). Direct currency hedging is permitted to directly hedge currency exposure back to the U.S. dollar. Cross-currency exposure management to transfer out of an exposed currency and into a benchmark currency is permitted.
7. Guideline limits and soft parameters for each portfolio will be applied to the aggregate exposures which include both physical and synthetic securities.
8. New derivatives instruments will be reviewed and approved by the Investment Committee before their implementation or use.
9. SWIB shall not enter into new derivatives agreements with new counterparties until the ED/CIO has approved the agreement. Each relevant division head or portfolio manager shall submit to the ED/CIO a written summary of any proposed addition of a relationship that may require evaluation of counterparty credit risks. Such relationship may involve (a) entering into a master netting or trading agreement with a new counterparty, which acts either as a principal or as an agent on behalf of multiple principals, or (b) hiring an external manager to implement a strategy that may require the manager to evaluate and monitor counterparty credit risks on SWIB's behalf (excluding external managers selected by Private Markets and Funds Alpha staff and ARA staff pursuant to their portfolio guidelines). The ED/CIO will review all proposals of such new relationships to determine that (i) the addition of the relationship is consistent with SWIB's investment goals and strategies, (ii) the appropriate loss and drawdown limits for the credit risk associated with the proposed counterparty relationship have been considered, and (iii) appropriate due diligence has been conducted. The relevant division head or portfolio manager ("Initial Division User") shall retain responsibility for monitoring any such approved relationship. If another division expects to use the derivatives agreement for trading strategies after its initial approval, the ED/CIO, Initial Division User and the new division lead shall agree on the strategy for monitoring for the counterparty.

IV. Rebalancing Procedures

1. Mandatory rebalancing is triggered by the procedures in the Board's WRS Investment Policy and the procedures below, as applicable. The Core Fund and Variable Fund asset mixes will be reviewed at least monthly for potential rebalancing.
2. A rebalancing task force will consist of the ED/CIO and the heads of ARA, Global Public Markets Strategies (GPMS) and Private Markets & Funds Alpha (PMFA). The ED/CIO may call a meeting of the rebalancing task force to consider a discretionary rebalancing from time to time. In consultation with the rebalancing task force, and with a majority

approval of the task force, a discretionary rebalancing may be initiated pursuant to the plan developed by the ARA Division.

3. Discretionary rebalancing may be used to bring public market asset classes partially or fully back to their strategic target weights, to reduce or use active risk, to otherwise minimize asset allocation drift, or to intentionally overweight or underweight an asset or sub-asset class.
4. In connection with any rebalancing, the ARA Division will develop and implement a plan (a "Rebalancing Plan") to affect the rebalancing. The Rebalancing Plan will include the total amount of each asset class to be bought and sold, the intended market exposures, and the time frame of purchases and sales. The Rebalancing Plan is based on best estimates of market prices, private market valuations, and benefits cash flows for when the rebalance will take effect. To the extent that the market prices are different at the time of a rebalancing from the anticipated market prices, valuations or cash flows, the Rebalancing Plan may be subsequently adjusted for additional purchases and/or sales to true up the market exposures to the anticipated levels of the originally approved rebalancing without further approval by the rebalancing task force.
5. The ARA Division, under the supervision of the head of ARA, has the discretion to approve intra-month allocation adjustments of unallocated fund-level cash to passive portfolios and to manage asset class mis-alignments. Such adjustments may be, for example, to allocate unallocated fund-level cash arising from a distribution, to raise liquidity to fund private markets capital calls, to adjust for benchmark weight changes, or to otherwise make adjustments during the month as conditions may arise to return the asset allocation to its intended allocation targets consistent with most recently approved Rebalancing Plan. The manner in which intra-month allocation adjustments of unallocated fund-level cash are allocated or cash deficits are funded depends on the source of such unallocated cash or cash deficit and shall follow Guideline 8 below, as applicable. Only passive portfolios may be utilized for allocations or deallocations. Once unallocated fund level cash is allocated to a passive portfolio, investment of such cash shall be made in accordance with the underlying passive portfolio's guidelines. Aggregate daily portfolio allocations or deallocations shall not exceed \$250 million unless approved by the ED/CIO.
6. Exchange-traded and OTC options or other derivatives may be purchased or sold in conjunction with managing asset class exposure and rebalancing. The aggregate notional value of the options will be limited to 2% of the market value of the trust fund at the date of purchase. The term of options used for this purpose may not exceed one year.
7. Cleared derivatives traded on a swap execution facility (SEF) may only be traded on or pursuant to the rules of the SEFs of which SWIB is a member or participant.
8. In connection with any rebalancing, the following procedures will be followed with respect to the following asset classes:

- ~~a. The Multi-Asset Strategy Class will rebalance 50% to Public Equities and 50% to Public Fixed Income. Accordingly, in connection with any rebalancing, for any percentage increase of assets in Multi-Asset, there will be a corresponding 50% reduction to Public Equities and a corresponding 50% reduction to Public Fixed Income, and vice versa if the Multi-Asset assets decrease. The rebalancing does not have to be proportional through the sub-asset classes.~~
- ~~b.a.~~ The Real Estate Asset Class will rebalance 50% to Public Equities and 50% to Public Fixed Income. Accordingly, in connection with any rebalancing, for any percentage increase in Real Estate there will be a corresponding 50% reduction to Public Equities and a corresponding 50% reduction to Public Fixed Income, and vice versa if the Real Estate assets decrease. The rebalancing does not have to be proportional through the sub-asset classes.
- ~~b.~~ The Private Equity Asset Class will rebalance on a 1 for 1 basis to Public Equities. Accordingly, in connection with any rebalancing, for any percentage increase in Private Equity there will be a corresponding 1% reduction to Public Equities. The rebalancing does not have to be proportional through the sub-asset classes.

V. Drawdown Procedures

1. On an annual basis, the Investment Committee shall approve the active risk budget for the next calendar year and the relative drawdown limits per strategy (based on percentage of assets under management (AUM)) for the Core Fund. The relative drawdowns are measured against the benchmark for each strategy on a monthly basis by the Risk Management Division. Relative drawdown limits are intended to protect the Core Fund from large relative drawdowns. Given the active risk that each strategy is expected to take and achieve, the Investment Committee acknowledges that (1) the relative drawdown limits may be reached in any given market environment, and (2) the probability of reaching the drawdown limits is not remote for the levels of active risk approved in the active risk budget.
2. If and when 60% of the relative drawdown limit is reached during the calendar year for any given strategy, the division head, the strategy head, the head of Risk Management, and the ED/CIO will all meet to discuss the relative drawdown limit, attribution, and outlook for the calendar year. The meeting will be documented by email confirmation sent to the Chief Legal Counsel and the head of Compliance.
3. If and when 90% of the relative drawdown limit is reached during the calendar year for any given strategy, the division head, strategy head, the head of Risk Management, and the ED/CIO will all meet to create a plan to address the drawdown for the strategy. The plan may require the strategy to reduce risk, stay the course until a given set of market conditions exist, make certain trades, and/or provide timing for implementation of the plan. A copy of the plan will be presented to the Investment Committee, generally at the next scheduled meeting.

VI. WRS General and Portfolio Guidelines – Internal Management

Each internal portfolio is assigned compulsory investment guidelines. Portfolio managers are generally not allowed to deviate from compulsory guidelines. If a deviation from compulsory guidelines occurs or is expected to occur, the staff member who becomes aware of it must immediately notify the head of the Compliance and Risk Management divisions, ED/CIO, and the division head of the asset class in which the deviation occurred. Upon receiving notice of a deviation or potential deviation, the ED/CIO and relevant division head will either take action to correct the deviation or obtain a waiver approved by the ED/CIO. If the ED/CIO is not available, then the waiver may be granted by any division head (other than the division head of the portfolio that is requesting the waiver) and the Deputy Executive Director, in consultation with the head of Risk Management. All waivers will be reported to the Investment Committee and documented in the Investment Committee’s meeting minutes.

All internal portfolios are also assigned “soft risk parameters.” Soft risk parameters refer to desired characteristics and/or risk exposures. Portfolio managers are allowed, however, to deviate from soft parameters in pursuit of excess return or efficiency, subject to Investment Committee inquiry, discussion and concurrence of the continued exposure. Soft risk parameters for each portfolio are detailed in *Appendix 2*.

The following general compulsory guidelines (“General Guidelines”) are applicable to all internally managed portfolios. Individual portfolio guidelines appear subsequently.

1. All portfolios must be managed in accordance with the fiduciary standards set forth in section 25.15(2) of the Wisconsin Statutes.
2. Credit quality rating requirements refer to an entire rating level, e.g., “A or better” includes “A-” and better ratings. The lower of split ratings is used. Investment grade securities are those rated “BBB-” or better (or the equivalent rating agency rating). Portfolios may invest in unrated securities, provided that the unrated securities have been assigned an internal SWIB rating by portfolio management staff using similar rating methodologies as the rating agencies.²
3. Fixed income securities backed by the full faith and credit of the U.S. government will be classified as U.S. government securities for purposes of these guidelines.
4. Any sovereign debt obligation (or the issuer in the event the obligation is unrated) in which SWIB invests must be rated “B3/B-” or above, unless otherwise approved in advance by the Investment Committee based on its guidelines for individual business case determinations.
5. Public equity investments in markets designated as “developed” or “emerging” are investments in entities that are incorporated or organized in countries included in the

² Using ratings models that are reviewed by Risk and Compliance staff.

MSCI World Index or the MSCI Emerging Market Index, respectively. Public fixed income investments in markets designated as “emerging” are investments in the debt of countries (or of companies incorporated or organized in countries) included in the JP Morgan Emerging Markets Diversified Index. Public fixed income investments in the debt of countries (or of companies incorporated or organized in countries) not included in the JP Morgan Emerging Markets Diversified Index will be designated as “developed.”

6. The Board approves the benchmarks for the Core Fund and Variable Fund, which are listed in *Appendix 3*. When new benchmarks are approved by the Board or modified by the Board, *Appendix 3* shall be updated without amendment to these IC Guidelines.
7. The Risk Management Division will monitor the risk exposures of all WRS portfolios. The head of Risk Management may recommend modifications to portfolio exposures to manage risk exposures. With the ED/CIO’s concurrence, the manager of a portfolio will make changes as recommended by the head of Risk Management. In addition to such recommendations, drawdown control procedures for all active internal WRS portfolios will be implemented and monitored by the Risk Management Division and adhered to by the portfolios.
8. Portfolios may utilize cash instruments or derivatives in their investment strategy. All investments used will be subjected to the risk analysis and monitoring processes at the portfolio, asset class and fund levels. New derivative and investment instruments will be reviewed with and approved by the Investment Committee prior to implementation.
9. Exposure limits and credit quality exposure limits are to be applied at the time of purchase. Unless otherwise indicated, “value” shall mean market value including un-invested cash.
10. Covered Agency Transactions as defined in FINRA Rule 4210³ may be traded only with a counterparty with which SWIB has a current Master Securities Forward Transaction Agreement (MSFTA), and the settlement of any such transaction shall not be more than 90 days from the date of the trade.
 - a. The counterparty, or its guarantor, must, on each date on which a transaction is initiated, have a credit rating of not less than “Baa2/BBB” on long-term debt from S&P or Moody’s.
 - b. If the counterparty is not rated, then its parent must have such a rating and must guarantee the obligations of the counterparty.
 - c. If a counterparty or its parent is downgraded to a credit rating below “Baa2/BBB” after the initiation of a trade, then trades may be initiated with that same counterparty only to reduce the existing exposure to that downgraded counterparty.

³ “Covered Agency Transactions” include certain to-be-announced (TBA) transactions, specified pooled transactions and collateralized mortgage obligations (CMOs).

A. Small Cap Portfolio

The Small Cap Portfolio is invested primarily in publicly traded equity securities that are registered with the Securities and Exchange Commission, including common stocks, preferred stocks, ETFs, American Depository Receipts (ADRs), American Depository Shares (ADSs), convertible bonds, securities issued in initial public offerings, and when-issued securities. The Small Cap Portfolio may also be invested in equity securities that are publicly traded on stock exchanges in other developed countries, or that are issued through private placements.

1. No more than 5% (long or short) of outstanding shares of any single issuer, excluding shares held in commingled funds and ETFs, may be held.
2. No single issuer's equity securities may represent (long or short) more than the greater of (a) 7% of the total market value of the Small Cap Portfolio, or (b) 5% over the percentage of such issuer's equity securities in the portfolio's benchmark. Shares held in commingled funds and ETFs are excluded from this guideline.
3. Up to 10% of the portfolio's market value may be invested in international and emerging markets companies through common stocks, ADRs, ADSs, or country-specific ETFs.
4. The portfolio may use exchange-traded futures contracts or ETFs to equitize cash and receivables.
5. The portfolio may sell short any securities that may be purchased under applicable guidelines and may then use the proceeds from the short sale to purchase additional approved securities. The total value of the short sales in the portfolio may not exceed 50% of the portfolio's net market value.
6. The portfolio's aggregate ex-ante tracking error will not exceed 8.75% as measured by SWIB's standard model used at any given time by SWIB's Risk Management Division. If market conditions (compared to active management actions) cause the portfolio's ex-ante tracking error to exceed this limit, then the portfolio will not be deemed to be out of compliance with these guidelines and this guideline will not be deemed to be violated; except that, if the portfolio's ex-ante tracking error exceeds 8.75% then the portfolio may not trade or take any other action which is predicted to increase the ex-ante tracking error of the portfolio.
7. Except as provided in 3 above, securities must be issued by an entity (a) that is incorporated in the United States or (b) incorporated outside the United States if (1) the company's headquarters are located in the U.S. or (2) the primary exchange for the issuer's securities is located in the U.S. The issuers in (b) shall not count toward the 10% limit in 3 above.
8. The aggregate notional value of long or short puts and calls is limited to 5% of the market value of the portfolio.

9. Gross exposure for the portfolio shall not exceed 205% of the portfolio's market value, and net exposure for the portfolio shall not exceed 105% of the portfolio's market value, in each case unless approved by the ED/CIO.

~~B.~~ **Global Equity Portfolio**

~~The Global Equity Portfolio is authorized to invest long or short in any publicly traded equity securities, including common stocks, preferred stocks, convertible bonds, ADRs, ADSs, ETFs, securities issued in initial public offerings, and when issued securities, in each case that are issued and traded in U.S. and non U.S. developed or emerging markets. For ETFs, the underlying securities shall be equity securities or indices that are permitted herein. The portfolio is also authorized to trade derivatives as outlined below.~~

- ~~1. Derivatives on which the pricing reference is equity based may be used for hedging or speculative purposes. Derivatives on which the pricing reference is non-equity based may be used for hedging purposes but not speculative positioning.~~
- ~~2. The portfolio may hold no more than 10% (long or short) of outstanding shares of a single issuer, excluding shares held in commingled funds and ETFs.~~
- ~~3. The portfolio's aggregate ex ante tracking error will not exceed 20% as measured by SWIB's standard model used at any given time by SWIB's Risk Management Division. If market conditions (compared to active management actions) cause the portfolio's ex ante tracking error to exceed this limit, then the portfolio will not be deemed to be out of compliance with these guidelines and this guideline will not be deemed to be violated; except that, if the portfolio's ex ante tracking error exceeds 20% then the portfolio may not trade or take any other action which is predicted to increase the ex ante tracking error of the portfolio.~~
- ~~4. For the purpose of managing cash in the portfolio's cash account, the portfolio is authorized to invest long or short in any Investment Committee approved instrument or derivative to create a low risk return on the cash within the portfolio, subject to the General Guidelines and Derivatives Guidelines contained herein.~~
- ~~5. Gross notional exposure for the portfolio shall not exceed \$20 Billion unless approved by the ED/CIO.~~

~~C.B.~~ **Passive Portfolios**

The objective of the passive portfolios is to closely track the returns and risk of their respective benchmarks. Passive portfolios may also be used for strategies that are intended to provide liquidity or leverage as part of their prime directive.

1. The universe for inclusion in the portfolio shall be the full respective benchmark for each portfolio. Non-benchmark securities may be held from time-to time as a result of corporate actions, purchases or sales in advance of expected changes to the benchmark

or to provide synthetic/derivative exposure to the underlying benchmark. Activity or retention of physical non-benchmark securities will only occur after the portfolio is entitled to receive the security and if the portfolio manager deems it beneficial to performance and not significantly detrimental to tracking error. Portfolios that provide liquidity or leverage will hold primarily non-benchmark securities in the form of derivatives that replicate the underlying target beta exposure.

2. Securities offered or sold to U.S. investors pursuant to Regulation D or Rule 144A under the Securities Act of 1933 may be purchased if they are publicly traded on a stock exchange in a developed country.
3. Portfolios may use physical securities or synthetic instruments, including exchange-traded futures contracts, ETFs, swaps, or other Investment Committee-reviewed derivative instruments to equitize cash and receivables, to achieve policy fund level leverage within Trustee-approved limits; for liquidity purposes; to replicate beta for the alpha-beta overlay; or for other passive investment strategies. Passive portfolios used to achieve policy fund level leverage shall be monitored by the ARA Division so that the Policy Leverage does not exceed Board-approved limits.
4. Portfolios may sell short from time to time as a result of corporate actions, benchmark changes or other similar events to more closely, more efficiently and/or more cost effectively track the returns and risk of their respective benchmarks if the portfolio manager deems it beneficial to performance and not significantly detrimental to tracking error. Short positions may not be used to intentionally take active risk. The portfolios may short any securities that may be purchased under Guidelines #1-3 and may then use the proceeds from the short sale to purchase additional approved securities.

D.C. ARA Passive External Managers

The ARA Passive External Managers will be comprised primarily of direct or commingled passive investments in strategies of external managers that are intended to generate a beta or SWIB policy benchmark return.

1. Investments in ARA Passive External Managers will be comprised of the following investment vehicles:
 - a. *Separately Managed Accounts ("SMAs")*: SWIB intends for its portfolio to be comprised primarily of direct investments in various strategies via SMAs, the assets of which would reside at SWIB's custodial bank.
 - b. *Commingled Investments or Fund Investments*: Investments can be made in commingled funds or in a Fund-of-One structure where SWIB is the sole investor, the assets of which may not reside at SWIB's custodial bank.

2. Investment Strategies and Broad Guidelines for ARA External Managers:
 - a. *Equities* –Strategies will be invested in traditional long only portfolios and other public equity securities approaches across various geographies and market cap weights. Derivatives may be used and will be set forth in the individual manager guidelines.
 - b. *Fixed Income* –Strategies will primarily be invested in traditional long only portfolios across the credit quality spectrum, varying geographies, including emerging and frontier market debt, high yield and structured securities. Derivatives may be used and will be set forth in the individual manager guidelines.
 - c. *Levered Strategies* – Strategies that are designed to provide fund-level leverage will be subject to both the external manager guidelines in this section, as well as the applicable Leverage Use Policy guidelines in Section II above. The individual managers will also be subject to any additional guidelines outlined in the investment management agreement with respect to strategy and/or leverage management tool.

3. Approvals: ARA Passive External Manager allocations are subject to the following approvals:

Investment	Head of ARA	ED/CIO
New Manager Relationship	Up to \$1.75 billion	More than \$1.75 billion
Additional Allocations to Existing Manager	Up to \$2 billion	More than \$2 billion
Includes all ARA investments aggregated with the Manager, regardless of vehicle, strategy or portfolio.		

4. Other guideline limitations notwithstanding, the head of ARA or other staff authorized by the head of ARA may modify, amend or waive terms of ARA Passive External Manager investment management agreements and generally take any and all other actions that are necessary and reasonable to protect, maintain, or enhance the value of SWIB’s position in the investments.

5. All redemptions, terminations or reductions of capital will be at the discretion of the head of ARA for rebalancing, liquidity management, leverage management and/or policy benchmark exposure consideration.

E.D. Investment Grade Credit Portfolio

The Investment Grade Credit Portfolio is primarily invested in publicly traded and Rule 144A investment grade corporate bonds or other fixed income instruments, primarily in the United

States and other developed markets. Subject to the limitations set forth below, the portfolio may also invest in bank loans, convertible, and equity securities.

1. Maximum single issuer concentration is limited to 8% of the portfolio's market value on a net basis for developed markets investment grade issuers and 3% for all other issuers, in each case, excluding Treasuries, Treasury futures and ETFs.
2. Positions may be purchased long and sold short, and the use of leverage will be incorporated in ex-ante risk assessments and active risk/tracking error contributions. The portfolio may take short exposure by shorting individual securities, including cash bonds and equity securities, utilizing single name CDS and CDX index securities, and shorting ETFs that have been approved by Compliance and included on an approved ETF trading list (including put or call options thereon).
3. Derivatives use is permitted as allowed by the Derivatives Use Policy for the purposes of credit, duration, yield curve exposure, and volatility management. Derivatives use is permitted through the use of (a) exchange-traded and over-the-counter interest rate instruments, including forwards, futures and options, (b) interest rate swaps and swaptions, (c) total return swaps (TRS) with index or underlying basket of permitted instruments, (d) options on permitted ETFs and indices, (e) other volatility derivatives (including options), (f) credit index swaps (e.g., CDX) and single-name CDS, including options on these instruments, and (g) options on equity securities, indices and ETFs for purposes of tail hedging.
4. Effective duration of the portfolio shall remain within two years of the assigned benchmark's duration.
5. Emerging market (EM) debt investment is limited to securities rated "B-" or above and:
 - a. EM sovereign debt must be of countries in the JP Morgan Emerging Market Bond Index Global Diversified ("JP Morgan EM Bond Index").
 - b. EM corporate debt must be denominated in U.S. Dollars.
 - c. Gross EM debt shall not exceed 15% of the portfolio's market value on a long or short basis (i.e., long % + short %). EM FX forwards used to hedge currency risk will not be counted against the EM debt exposure threshold.

6. Further limits:
 - a. Non-investment grade securities shall not exceed 20% of the portfolio's market value on a gross basis.
 - b. Exposure to bank loans, including CLOs, shall not exceed 15% of the portfolio's market value on a net basis.
 - c. Exposure to convertible securities shall not exceed 10% of the portfolio's market value on a net basis.
 - d. Equity exposure shall not exceed 2% of the portfolio's market value on a net basis.
7. Ex-ante tracking error shall not exceed 2.5% as measured by SWIB's standard model used at any given time by SWIB's Risk Management Division. If market conditions (compared to active management actions) cause the portfolio's ex-ante tracking error to exceed this limit, then the portfolio will not be deemed to be out of compliance with these guidelines and this guideline will not be deemed to be violated; except that, if the portfolio's ex-ante tracking error exceeds 2.5% then the portfolio may not trade or take any other action which is predicted to increase the ex-ante tracking error of the portfolio.
8. Gross exposure for the portfolio shall not exceed 300% of the portfolio's market value, and net exposure for the portfolio shall not exceed 200% of the portfolio's market value, in each case unless approved by the ED/CIO.

F.E. U.S. TIPS Index Portfolio

The U.S. TIPS Index Portfolio is invested in U.S. Treasury Inflation-Protected Securities (TIPS).

1. Individual securities must be U.S. TIPS which are included in the Barclays U.S. TIPS benchmark.
2. The portfolio's option adjusted duration should be +/- 1 year of the benchmark duration.

G.F. Exposure Management Portfolios

Portfolios may be established at the asset class level for multi-asset, public equity and public fixed income asset classes to provide for adjustment and management of the Core Fund and Variable Fund exposures and to utilize or adjust active risk of the Core Fund and Variable Fund. In determining portfolio investments, exposures held in both internally and externally managed portfolios will be considered. These portfolios may also be used to express investment strategies and ideas where the sizing of the investment requires it to be outside of an individual internal portfolio.

The head of ARA may approve strategies and/or investment ideas in the portfolios up to an ex-ante contribution to overall Core Fund active risk of 0.20% (excluding investments in PMFA overage portfolios), as measured by SWIB's standard model used at any given time by SWIB's Risk Management Division. If, at the time of investment, the portfolios' ex-ante contribution to active risk exceeds 0.20%, then the strategy and/or investment idea must be approved by the ED/CIO. Portfolio implementation, oversight and reporting to the Investment Committee will be the responsibility of the ARA Division. These portfolios may invest in any instrument approved for the relevant asset class portfolios described elsewhere in these guidelines. The portfolios may use derivative instruments. Portfolios will not have a separate benchmark or risk target, but will be included within the benchmark and risk parameters for the applicable aggregated asset class. The portfolios may include, for example, investments strategies to adjust aggregate equity beta, the allocations between specific sectors or sub-asset class exposures, currency exposures, volatility exposure, or credit exposure or duration.

H.G. Multi-Strat Portfolio

1. The Multi-Strat portfolio is authorized to invest in or short any instrument or derivative, subject to guidelines 5 and 6 below and the general guidelines contained herein.
2. Strategies may be managed either by internal investment staff or by an external manager.
3. Leverage and derivatives may be used to implement individual strategies and to adjust the market exposure of the Multi-Strat portfolio.
4. The Multi-Strat portfolio's aggregate ex-ante tracking error will not exceed 12% as measured by SWIB's standard model used at any given time by SWIB's Risk Management Division. If market conditions (compared to active management actions) cause the portfolio's ex-ante tracking error to exceed this limit, then the portfolio will not be deemed to be out of compliance with these guidelines and this guideline will not be deemed to be violated; except that, if the portfolio's ex-ante tracking error exceeds 12% then the portfolio may not trade or take any other action which is predicted to increase the ex-ante tracking error of the portfolio.
5. The ED/CIO and Head of Risk Management must be informed prior to the launch of a new strategy within the Multi-Strat portfolio. New strategies must be reported to the Investment Committee reasonably promptly following the launch.
6. ED/CIO approval, along with notice to the Head of Risk Management, is required prior to the Multi-Strat portfolio investing in an investment instrument or derivative that was previously approved by the Investment Committee for use by other asset class portfolios. Investment in such instruments must be reported reasonably promptly to the Investment Committee. Investment Committee review and approval is required prior to the Multi-Strat portfolio investing in any new investment instruments or derivatives not previously approved by the Investment Committee for any asset class portfolios.

H. Long Treasury Portfolio

The Long Treasury portfolio is a long duration, but not long-only, portfolio primarily invested in US Treasury securities, including nominal and inflation-indexed Treasuries and Treasury strips, and other US Government issued debt such as Agency debentures (which include debt, or bonds, issued by a US federal agency or a government-sponsored enterprise (GSE)). It may also invest in other fixed income securities, certain ETFs, and certain derivatives, as outlined below.

1. Securities other than nominal US Treasury securities including principal and interest strips, US Treasury Futures, and ETFs investing primarily in nominal US Treasury securities, but otherwise permitted in these portfolio guidelines, may not exceed 25%, in the aggregate, of the portfolio's market value.
2. Effective duration of the portfolio shall remain within five years of the assigned benchmark's duration.
3. The portfolio may invest long or short in ETFs that invest primarily in US Treasury securities and that have been approved by Compliance and included on an approved trading list (including put or call options thereon).
4. The portfolio's aggregate ex-ante tracking error will not exceed 3% as measured by SWIB's standard model used at any given time by SWIB's Risk Management Division. If market conditions (compared to active management actions) cause the portfolio's ex-ante tracking error to exceed this limit, then the portfolio will not be deemed to be out of compliance with these guidelines and this guideline will not be deemed to be violated; except that, if the portfolio's ex-ante tracking error exceeds 3% then the portfolio may not trade or take any other action which is predicted to increase the ex-ante tracking error of the portfolio.
5. Except for US Treasury securities, exchange-traded interest rate futures, and ETFs, no single issue may exceed 8% of the portfolio's market value.
6. The portfolio may use repurchase agreements and reverse repurchase agreements for cash management.
7. Derivatives use is permitted as allowed by the Derivatives Use Policy for the purposes of duration, interest rate, yield curve, and volatility management. Derivatives use is permitted through the use of (a) exchange-traded and over-the-counter interest rate instruments, including forwards, futures, and options, (b) interest rate swaps and swaptions, (c) total

return swaps (TRS) with index or underlying basket of permitted instruments, (d) options on permitted ETFs and indices, and (e) other volatility derivatives (including options).

8. All instruments permitted in these guidelines may be traded long or short. Gross exposure for the portfolio shall not exceed 300% of the portfolio's market value, and net exposure for the portfolio shall not exceed 200% of the portfolio's market value, in each case unless approved by the ED/CIO.

4.1. Mortgage-Backed Securities Portfolio

The Mortgage-Backed Securities (MBS) portfolio is primarily invested in Agency-issued mortgage-related securities, including MBS pools, collateralized mortgage obligations (CMOs), credit risk transfer (CRT) securities, as well as other securities in the structured products sector such as TBA MBS, commercial mortgage-backed (CMBS), asset-backed (ABS), and private label mortgage-related securities. It may also invest in other fixed income securities, certain ETFs, and certain derivatives as outlined below.

1. Securities other than agency-issued mortgage-related securities (e.g., pools, CMOs, CRTs), mortgage TBAs, and mortgage ETFs, but otherwise permitted in these portfolio guidelines and with effective duration of greater than one year, may not exceed 25%, in the aggregate, of the portfolio's market value.
2. Effective duration of the portfolio shall remain within two years of the assigned benchmark's duration.
3. Private label MBS may not exceed 10% of the portfolio's market value. Private label mortgage securities backed by borrower collateral other than prime may not exceed 5% of the portfolio's market value.
4. The portfolio may invest long or short in ETFs that invest primarily in U.S. MBS and that have been approved by Compliance and included on an approved trading list (including put or call options thereon).
5. The portfolio's aggregate ex-ante tracking error will not exceed 5% as measured by SWIB's standard model used at any given time by SWIB's Risk Management Division. If market conditions (compared to active management actions) cause the portfolio's ex-ante tracking error to exceed this limit, then the portfolio will not be deemed to be out of compliance with these guidelines and this guideline will not be deemed to be violated; except that, if the portfolio's ex-ante tracking error exceeds 5% then the portfolio may not trade or take any other action which is predicted to increase the ex-ante tracking error of the portfolio.
6. Except for TBA MBS, US Treasuries and ETFs, no single issue may exceed 5% of the portfolio's market value. No single BBB-rated issue may exceed 2% of the portfolio's

market value. The average rating of securities covered by these limits will be “Baa2/BBB” or better. No single issue rated below investment grade may exceed 1% of the portfolio’s market value. Each tranche of a securitized product is considered a separate issue. Total exposure to issues rated below investment grade may not exceed 20% of the portfolio’s market value, in the aggregate.

7. Fixed income securities with an effective duration of one year or less will have an average credit rating of “A” or better. The portfolio may also use repurchase agreements and reverse repurchase agreements for cash management.
8. Derivatives use is permitted as allowed by the Derivatives Use Policy for the purposes of duration, interest rate, yield curve, mortgage and structured products credit, prepayment and volatility management. Derivatives use is permitted through the use of (a) exchange-traded interest rate instruments, including forwards, futures and options, (b) interest rate swaps and swaptions, (c) total return swaps (TRS) with index or underlying basket of permitted instruments, (d) options on permitted ETFs and indices, (e) other volatility derivatives (including options), (f) MBS options, (g) credit index swaps (e.g., CMBX, CDX and similar instruments) and options, and (h) options on equity indices and ETFs for purposes of tail hedging.
9. All instruments permitted in these guidelines may be traded long or short. Excluding the TBA Strategy, gross exposure for the portfolio shall not exceed 300% of the portfolio’s market value, and net exposure for the portfolio shall not exceed 200% of the portfolio’s market value, in each case unless approved by the ED/CIO.
10. CLOs collateralized by corporate bank loans may not exceed 15% of the portfolio’s market value.

K.J. High-Yield Bond Portfolio

The High-Yield Bond Portfolio is eligible to invest in any instruments included in the assigned benchmark — primarily U.S. dollar denominated publicly-traded and Rule 144A high-yield corporate bonds or other fixed income instruments rated between BB+/Ba1 and B-/B3. Subject to the limitations set forth below, the portfolio may also invest in non-U.S. dollar denominated bonds of issuers located outside of the United States, as well as convertible, preferred securities and equity securities.

1. The portfolio shall maintain at minimum a weighted average rating of B-. Subject to the forgoing, the portfolio may hold fixed income instruments rated below B-/B3.
2. Effective duration of the portfolio shall remain within +/- five years of the assigned benchmark’s effective duration.
3. Positions may be purchased long and sold short, and the use of leverage will be incorporated in ex-ante risk assessments and active risk/tracking error contributions. The portfolio may take short exposure by shorting individual securities, cash bonds, buying single name CDS, shorting the CDX index, shorting high-yield and equity ETFs that

have been approved by Compliance and included on an approved ETF trading list (including put or call options thereon), as well as shorting the underlying equity of a leveraged issuer.

4. Instruments not included in the benchmark, but otherwise permitted in these portfolio guidelines, may not exceed 25% of the portfolio's market value on a long or short basis (i.e., long % + short %). For the avoidance of doubt, any instrument that is subsequently removed from the portfolio's benchmark due solely to the instrument's maturity falling below the benchmark's stated thresholds shall not be deemed to be out of benchmark for purposes of the 25% limitation described in this Guideline #4.
5. Maximum single issuer concentration is limited to 5%, excluding Treasuries, Treasury futures and holdings of ETFs, of the portfolio's market value on a net basis.
6. Gross exposure to non-U.S. Dollar denominated instruments shall not exceed 10% of the portfolio's market value on a long or short basis (i.e., long % + short %).
7. Gross exposure to emerging market corporate debt is limited to (a) securities that are rated "B-/B3" or above and (b) issuers incorporated or organized in countries included in the JP Morgan Emerging Markets Diversified Index, and in aggregate shall not exceed 5% of the portfolio's market value on a net basis.
8. Exposure to any single industry sector shall remain within 20% of the assigned benchmark's industry sector weighting on a net basis.
9. Exposure to high-yield bank loans shall not exceed 10% of the portfolio's market value on a net basis.
10. Ex-ante tracking error shall not exceed 5% as measured by SWIB's standard model used at any given time by SWIB's Risk Management Division. If market conditions (compared to active management actions) cause the portfolio's ex-ante tracking error to exceed this limit, then the portfolio will not be deemed to be out of compliance with these guidelines and this guideline will not be deemed to be violated; except that, if the portfolio's ex-ante tracking error exceeds 5% then the portfolio may not trade or take any other action which is predicted to increase the ex-ante tracking error of the portfolio.
11. Derivatives use is permitted as allowed by the Derivatives Use Policy for the purposes of duration, yield curve exposure, and volatility management. Derivatives use is permitted through the use of (a) exchange-traded and over-the-counter interest rate instruments, including forwards, futures and options, (b) interest rate swaps and swaptions, (c) total return swaps (TRS) with index or underlying basket of permitted instruments, (d) options on permitted ETFs and indices, (e) other volatility derivatives (including options), (f) credit index swaps (e.g., CDX) and single-name CDS, including options on these instruments, and (g) options on equity securities, indices and ETFs for purposes of tail hedging.

12. Gross exposure for the portfolio shall not exceed 300% of the portfolio's market value, and net exposure for the portfolio shall not exceed 200% of the portfolio's market value, in each case unless approved by the ED/CIO.
13. The portfolio may invest in debt instruments and loans and may include senior financing, subordinated or mezzanine financing, and "bridge" financing. Debt instruments and loans may be syndicated or privately issued credit. Debt instruments and loans may be of public or private company issuers. Strategies may include, without limitation, specialty and alternative credit opportunities, distressed and opportunistic strategies, or dislocated credit opportunities. Debt instruments and loans may include credit opportunities alongside SWIB external managers. In the aggregate, exposure to special or alternative opportunity financings described in this guideline shall not exceed 5% of the portfolio.

L.K. Leveraged Loan Portfolio

The Leveraged Loan Portfolio is eligible to invest in any instruments included in the assigned benchmark — primarily U.S. dollar denominated publicly-traded and senior secured syndicated leveraged loans. Subject to the limitations set forth below, the portfolio may also invest in non-U.S. dollar denominated loans and/or bonds of issuers located outside of the United States, as well as collateralized loan obligations (CLOs), derivatives, convertible, preferred securities and equity securities.

1. No less than 75% of the portfolio's market value can be invested in single-name first-lien bank loans, total return swaps on leveraged loans, and/or ETFs with a diversified portfolio of first-lien bank loans, in aggregate.
2. The portfolio shall maintain at minimum a weighted average rating of B. Subject to the foregoing, the portfolio may hold fixed income instruments rated below B-/B3 as well as unrated securities, provided the unrated securities have been assigned an internal SWIB rating by portfolio management staff using similar rating methodologies as the rating agencies.
3. Positions may be purchased long and sold short, and the use of leverage will be incorporated in ex-ante risk assessments and active risk/tracking error contributions. The portfolio may take short exposure by shorting individual securities, including cash bonds and equity securities, utilizing single name CDS and CDX index securities, and shorting ETFs that have been approved by Compliance and included on an approved ETF trading list (including put or call options thereon).
4. Instruments not included in the benchmark, but otherwise permitted in these portfolio guidelines, may not exceed 50% of the portfolio's market value on a long or short basis (i.e., long % + short %).
5. Maximum single issuer concentration is limited to 5%, excluding Treasuries, Treasury futures and holdings of ETFs, of the portfolio's market value on a net basis.

6. Gross exposure to non-U.S. Dollar denominated instruments shall not exceed 10% in the aggregate of the portfolio's market value on a long or short basis (i.e., long % + short %).
7. Aggregate exposure to second-lien loan instruments is limited to 15% of the portfolio's market value on a long or short basis (i.e., long % + short %), and maximum exposure to a single second-lien loan instrument is limited to 2.5% of the portfolio's market value on a long or short basis (i.e., long % + short %).
8. Ex-ante tracking error shall not exceed 5% as measured by SWIB's standard model used at any given time by SWIB's Risk Management Division. If market conditions (compared to active management actions) cause the portfolio's ex-ante tracking error to exceed this limit, then the portfolio will not be deemed to be out of compliance with these guidelines and this guideline will not be deemed to be violated; except that, if the portfolio's ex-ante tracking error exceeds 5% then the portfolio may not trade or take any other action which is predicted to increase the ex-ante tracking error of the portfolio.
9. Derivatives use is permitted as allowed by the Derivatives Use Policy for the purposes of duration, yield curve exposure, and volatility management. Derivatives use is permitted through the use of (a) exchange-traded and over-the-counter interest rate instruments, including forwards, futures and options, (b) interest rate swaps and swaptions, (c) total return swaps (TRS) with index or underlying basket of permitted instruments, (d) options on permitted ETFs and indices, (e) other volatility derivatives (including options), (f) credit index swaps (e.g., CDX) and single-name CDS, including options on these instruments and (g) options on equity securities, indices and ETFs for purposes of tail hedging.
10. Gross exposure for the portfolio shall not exceed 300% of the portfolio's market value, and net exposure for the portfolio shall not exceed 200% of the portfolio's market value, in each case unless approved by the ED/CIO.
11. Leveraged loans may include senior financing, subordinated or mezzanine financing, and "bridge" financing. Loans may be syndicated or private credit loans. Loans may be of public or private company issuers. Strategies may include, without limitation, specialty and alternative credit opportunities, distressed and opportunistic strategies, or dislocated credit opportunities. Loans may include credit opportunities alongside SWIB external managers. In the aggregate, exposure to special or alternative opportunity financings described in this guideline shall not exceed 5% of the portfolio.

L. TBA Strategy Portfolio

[The TBA Strategy portfolio is invested primarily in Agency TBA mortgages, as well as Agency MBS pools. It may also invest in ABS, CMBS and other fixed income securities and certain derivatives as outlined below.](#)

1. The portfolio's aggregate ex-ante tracking error will not exceed 25% as measured by SWIB's standard model used at any given time by SWIB's Risk Management Division. If market conditions (compared to active management actions) cause the portfolio's ex-ante tracking error to exceed this limit, then the portfolio will not be deemed to be out of compliance with these guidelines and this guideline will not be deemed to be violated; except that, if the portfolio's ex-ante tracking error exceeds 25% then the portfolio may not trade or take any other action which is predicted to increase the ex-ante tracking error of the portfolio.
2. Derivatives use is permitted as allowed by the Derivatives Use Policy for the purposes of yield curve, mortgage, credit, and volatility management. Derivatives use is permitted through the use of (a) exchange-traded interest rate instruments, including forwards, futures, and options, (b) interest rate swaps and swaptions, (c) volatility derivatives (including options), (d) CDX, and (e) MBS options.
3. The portfolio may invest long and short in any permitted security as described herein.
4. In the event of an Agency MBS trade failure, the head of strategy or designee will promptly notify Risk Management and Compliance.
5. Except for TBA and Agency pass-through MBS, and US Treasuries, no single issue may exceed 8% of the portfolio's market value. Other fixed income securities are allowed with an effective duration of five years or less and must be investment grade. The average rating of these securities will be "A" or better. Each tranche of a securitized product is considered a separate issue. The portfolio may also use repurchase agreements and reverse repurchase agreements for cash management.
6. Effective duration of the portfolio, determined on the gross value of the portfolio, shall be within 0.5 years of the portfolio's benchmark.
7. Gross notional exposure of the portfolio shall not exceed \$20 Billion and net notional exposure of the portfolio shall not exceed \$4 Billion, in each case without the approval of the ED/CIO.

M. Short Term Credit Portfolio

The Short-Term Credit Portfolio is an investment vehicle of cash and short-term investments of the WRS. Its investment objectives are: 1) Safety of principal; 2) Return Objective; and 3) Liquidity.

<u>Portfolio Allocation</u>	
(Percent of Portfolio at Par Value)	
Treasuries, Agencies, and FDIC Insured Bank Deposits	0-100%
Repurchase Agreements	0-100%

Commercial Paper	0-100%
Corporate Notes	0-100%
Certificates of Deposit/Time Deposits	0-50%
Bankers' Acceptances	0-50%
Yankee/Euro Certificates of Deposit/Time Deposits (U.S. Dollars)	0-50%

Maturity Guidelines

(Maximum)

Consistent with the portfolio purpose and objectives, the portfolio weighted average maturity will not exceed one year (the weighted average maturity of floating rate securities is based on interest rate reset dates).

Repurchase Agreements	1 year
Reverse Repurchase Agreements	1 year
U.S. Treasuries and Agencies	5 years
Commercial Paper/Bankers' Acceptances	1 year
Corporate Notes – Fixed Rate	3.1 years
Corporate Notes – Floating Rate	5.1 years
Certificates of Deposit/Time Deposits	5 years
Yankee/Euro Certificates of Deposit/Time Deposits	5 years

Issuer Exposure

(Percent of Portfolio at Par Value)

The maximum exposure for each issuer/guarantor/counterparty shall be in the aggregate as follows:

U.S. Treasury Bills and U.S. Agency Discount Notes	No limit
Repurchase Agreements (Gov't/Agency Collateral)	25%
Repurchase Agreements (Other Collateral)	5%
Commercial Paper and Corporate Notes	5%
Certificates of Deposit/Time Deposits	5%
Bankers' Acceptances	5%
Yankee/Euro Certificates of Deposit/Time Deposits (U.S. Dollars)	5%

Wisconsin CD Program – individual bank
(unless a higher limit from another category applies.)

\$20MM or 3% of bank
assets, whichever is less

Bank Deposits

Up to the amount
guaranteed by the FDIC or
the amount allowable for a
bank instrument, whichever
is higher

CREDIT QUALITY

The minimum rating of an issuer/counterparty shall be the lowest in the event of a split rating and shall be as follows:

U.S. Treasury Bills and U.S. Agency Discount Notes No minimum

Repurchase Agreements BBB

Commercial Paper A-2/P-2

Unrated Wisconsin Company Commercial Paper (maximum
maturity of 90 days and percentage of the portfolio
in unrated CP cannot exceed 15%) Unrated

Corporate Notes, Bankers' Acceptances, Certificates of Deposit/
Time Deposit, Bank Deposits and Yankee/Euro Certificates of
Deposit/Time Deposits (U.S. Dollars) greater than 1 year A

Corporate Notes, Bankers' Acceptances, Certificates of Deposit/
Time Deposit, Bank Deposits and Yankee/Euro Certificates of
Deposits (U.S. Dollars) less than 1 year
(the percentage of the portfolio in BBB cannot exceed 15%). BBB

Wisconsin CD Program – individual bank Unrated

N. General Guidelines specific for Private Markets and Funds Alpha Portfolios

1. The portfolio manager shall be responsible for notifying the ED/CIO of any referrals or significant contacts by or on behalf of SWIB Trustees regarding consideration of an investment opportunity.
2. The Private Markets & Funds Alpha (PMFA) staff shall report to the Trustees all portfolio commitments to non-public investments.
3. Each portfolio manager shall obtain written confirmation from legal counsel (which may be external legal counsel) that documentation has been satisfactorily completed prior to closing of any investment in his or her portfolio that involves negotiated SWIB documentation.
4. Each portfolio manager shall submit to the head of PMFA a written summary of any proposed investment. The head of PMFA will review all such investments to determine that a) the investment falls within the portfolio's investment guidelines, including limits on invested capital, b) the investment is consistent with the portfolio's established strategy, and c) the appropriate due diligence standards are being applied. No such investment may be closed without approval of the head of PMFA or ED/CIO depending upon the nature and amount of the investment as required in the relevant portfolio guidelines. The portfolio manager shall retain responsibility for each investment decision. External managers with delegated investment discretion operate under separate authority. For purposes of this paragraph, "investments" does not include the individual properties within a Real Estate Equity Portfolio separate account tranche, but does include the tranche that holds such properties.
5. Dollar limitations for commitments to funds or other investments do not apply to incidental and customary contractual reinvestment, indemnity, reserve or similar obligations incorporated into the terms of an investment, provided such obligations are not expected to be material.
6. Private equity and venture capital investments in markets designated as "developed" or "emerging" are investments in countries included in the MSCI World Index or the MSCI Emerging Market Index, respectively. Real estate investments in markets designated as "developed" or "emerging" are investments in properties in countries included in the EPRA/NAREIT Developed Index and the EPRA/NAREIT Emerging Market Index, respectively.
7. Funds or commingled investments shall be considered U.S., non-U.S., "developed" or "emerging" based on their primary strategy and not on a look-through basis to the underlying investments.
8. Exposure limits and credit quality exposure limits are to be applied at the time of purchase. The term "exposure" is defined as the net asset value (which includes co-investments) plus unfunded commitments. "Allocations" are calculated as the current net asset value of any existing investment(s) plus the intended subscription.

9. SWIB staff may determine to engage a consultant to review prospective investments, perform operational due diligence on prospective investments, or otherwise assist staff in the evaluation of investment opportunities and/or managers.

O. Private Debt Portfolio

The overall objective of the Private Debt Portfolio (the “Private Debt Portfolio” includes both the Wisconsin Private Debt Portfolio and the Non-Wisconsin Private Debt Portfolio) is to invest funds of the Core Fund in debt instruments consistent with SWIB’s fiduciary responsibilities that are primarily private loans negotiated by SWIB directly or as part of an investor group that includes banks or other institutional investors. Instruments can be fixed or floating rate. The two portfolios are invested as follows:

- Wisconsin Private Debt Portfolio – This portfolio’s investments will consist of loans or fixed income securities issued by companies or entities that are headquartered in Wisconsin, have existing operations in Wisconsin, or intend to apply the proceeds to new business operations in Wisconsin which contribute to the Wisconsin economy.
- Non-Wisconsin Private Debt Portfolio – This portfolio can invest in loans or fixed income securities issued by companies or entities located in or doing business in the United States.

The Private Debt Portfolio may also include securities sold to SWIB pursuant to Rule 144A or in the public fixed income markets. Investments may be made in fixed income instruments and in instruments with both fixed income and equity features.

1. Investments may carry a rating from a national rating agency, the National Association of Insurance Commissioners (NAIC) or SWIB. Notwithstanding the provisions of the General Guidelines above, the head of Private Debt may make investments that carry a “BBB” or better rating from a national rating agency or the NAIC, provided that if the investment carries only a SWIB rating, it shall be approved by the head of PMFA, regardless of size.
2. Investments may be made in below investment grade instruments provided that such investments do not in the aggregate constitute more than 25% of the Private Debt Portfolio’s par value. Any investment below investment grade requires approval from the head of PMFA.
3. The Private Debt Portfolio’s aggregate issuer limits shall be scaled by quality and a purchase may not cause the Private Debt Portfolio’s exposure to a borrower or issuer to exceed the following limits (at par value):

Rating	Maximum Position
U.S. Gov’t/Agency	No Limit
“AA” or higher	\$100 MILLION

“A”	\$75 MILLION
“BBB”	\$50 MILLION
“BB” or less	\$25 MILLION

- The Private Debt Portfolio shall maintain at minimum a weighted average rating of “BBB”, where “AAA”=4, “AA”=3, “A”=2, “BBB”=1, and “BB” or less =0.
- Other guideline limitations notwithstanding, the head of Private Debt or other staff authorized by the head of PMFA may modify or waive terms of investments in the portfolio and generally take any and all other actions that are necessary and reasonable to protect, maintain or enhance the value of SWIB’s position in the investments.

P. Venture Capital Portfolio

The SWIB Venture Capital Portfolio (the “Venture Capital Portfolio” includes both the Wisconsin Venture Capital Portfolio and the Non-Wisconsin Venture Capital Portfolio) consists of venture capital or venture capital-related investments and invests as follows:

- The Non-Wisconsin Venture Capital Portfolio shall make venture capital investments on a global basis in limited partnership or other fund vehicles, strategic partnerships, or in co-investments in venture-backed companies or publicly traded companies that were venture backed.
- The Wisconsin Venture Capital Portfolio shall make venture capital investments in limited partnership or other fund vehicles or strategic partnerships that are either located in Wisconsin and/or which target Wisconsin as a primary market or as co-investments in venture-backed companies or publicly traded companies that were venture backed that are located or have operations in Wisconsin.

- Any other guidelines notwithstanding, the Venture Capital Portfolio commitments are subject to the following approvals:

Approval By:	Head of PMFA	ED/CIO
• Venture Capital Funds	Up to \$65 million	More than \$65 million
• Venture Capital Co-Investments (excluding funds of one)	Up to \$25 million	More than \$25 million

<p>SWIB ownership equal to or greater than 50% of an individual fund (excluding funds of one and a fund/vehicle through which a co-investment is made)</p>	<p>ED/CIO, provided that notice shall be given to the ED/CIO if ownership of an individual fund (excluding funds of one and a fund/vehicle through which a co-investment is made) is equal to or greater than 33 1/3%</p>
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2. No more than 45% of the Venture Capital Portfolio’s exposure may be invested outside of the U.S., without the approval of the ED/CIO. No more than 20% of the Venture Capital Portfolio’s exposure may be invested in emerging markets. No more than 5% of the Venture Capital Portfolio’s exposure may be invested in co-investments located in emerging markets.
3. Venture capital investments may be made through funds, strategic partnerships, or co-investments. Venture capital co-investments (excluding funds of one) must be made in one of the following ways:
 - (1) alongside a fund with the same sponsor or manager as a fund in which SWIB is or has been an investor,
 - (2) alongside a fund with the same sponsor or manager as a fund on which SWIB is conducting due diligence and is actively evaluating for a prospective commitment, or
 - (3) as approved by the ED/CIO.
4. From time to time, SWIB may consider formation of fund investments where it may participate both as a general partner and as limited partner.
5. Co-investments in the Venture Capital Portfolio may not make up more than 15% of the Venture Capital Portfolio’s exposure.
6. Neither the aggregate exposure to any fund manager or sponsor, nor the aggregate amount of investments in any company, may exceed 20% of the Venture Capital Portfolio’s exposure without approval of the ED/CIO.
7. No single co-investment (excluding funds of one) shall exceed 10% of the Venture Capital Portfolio’s exposure.
8. The Venture Capital Portfolio may make co-investments in public company securities through private placements, including PIPEs, or other offerings. Co-investments in public company securities shall not exceed 10% of the Venture Capital Portfolio’s exposure. For purposes of this guideline, public company securities received via a distribution are not counted and are expected to be sold as soon as reasonably practicable.
9. Subject to the approval thresholds and the restrictions above, the head of Venture Capital or other staff authorized by the head of PMFA may modify or waive terms of investments in the portfolio and generally take any and all other actions that are necessary and

reasonable to protect, maintain or enhance the value of SWIB’s position in the investments.

Q. Private Equity Portfolio

The Private Equity Portfolio consists of private equity or private equity-related investments, made on a global basis, in limited partnership or other fund vehicles, strategic partnerships, and co-investments in operating or holding companies.

- Any other guidelines notwithstanding, all portfolio commitments are subject to the following approvals:

	Head of PMFA	ED/CIO
• Funds or Strategic Partnerships	\$250 million or less	Over \$250 million
• Co-Investments	\$75 million or less	Over \$75 million
SWIB ownership equal to or greater than 50% of an individual fund (excluding funds of one and a fund/vehicle through which a co-investment is made)	ED/CIO, provided that notice shall be given to the ED/CIO if ownership of an individual fund (excluding funds of one and a fund/vehicle through which a co-investment is made) is equal to or greater than 33 1/3%	

- The Private Equity Portfolio shall not include investments in venture capital funds.
- Investments may be made through funds, strategic partnerships, or co-investments. Co-investments must be made in one of the following ways:
 - alongside a fund with the same sponsor or manager as a fund in which SWIB is or has been an investor,
 - alongside a fund with the same sponsor or manager as a fund on which SWIB is conducting due diligence and is actively evaluating for a prospective commitment, or
 - as approved by the ED/CIO.
- Neither the aggregate exposure (including co-investments) to any fund manager or sponsor, nor the aggregate amount of investments in any company, may exceed 10% of the total Private Equity Portfolio’s exposure without approval of the ED/CIO.
- No more than 45% of the Private Equity Portfolio’s exposure may be invested outside of the U.S., without the approval of the ED/CIO. No more than 20% of the Private Equity Portfolio may be invested in emerging markets.

6. The Private Equity Portfolio may make co-investments in public company securities through private placements, including PIPEs, or other offerings. Co-investments in public company securities shall not exceed 2% of the Private Equity Portfolio's exposure. For purposes of this guideline, public company securities received via a distribution are not counted and are expected to be sold as soon as reasonably practicable.
7. Other guideline limitations notwithstanding, the head of Private Equity or other staff authorized by the head of PMFA may modify or waive terms of investments in the portfolio and generally take any and all other actions that are necessary and reasonable to protect, maintain or enhance the value of SWIB's position in the investments.

R. Real Estate Equity Portfolio Guidelines

The Real Estate Equity Portfolio contains investments in a broad range of real estate and real estate-related assets, including equity and debt investments, either solely, or through investment vehicles and structures such as public or private Real Estate Investment Trusts (REITs), public or private real estate company securities, limited liability corporations, limited partnerships, joint ventures, separate accounts or co-investment vehicles. Investment guidelines and soft parameters for Real Estate shall be applied, on an invested basis, to the aggregate composition of the Real Estate Equity Portfolio (except that all REIT portfolios shall be included in the aggregate as Core holdings).

All portfolio commitments are subject to the following approvals:

	Head of PMFA	ED/CIO
Commingled Fund	\$250 million or less	Over \$250 million
Core - Separate Account*	\$300 million or less	Over \$300 million
Non-Core – Separate Account*	\$200 million or less	Over \$200 million

*With respect to a separate account tranche, approval is required for the tranche, and not for individual investments within the tranche.

1. Aggregate exposure (including co-investments) to any commingled fund manager or sponsor may not exceed 20% of the Real Estate Equity Portfolio's exposure without approval of the ED/CIO. This limit does not apply to real estate investments for which SWIB has sole discretion to select, retain, and terminate manager(s) and/or advisor(s) without cause.
2. Aggregate direct public REIT and real estate company stock holdings (excluding underlying commingled fund holdings and externally managed REIT Portfolios) may not exceed 15% of the Real Estate Equity Portfolio's exposure and portfolio investments in any one public REIT or company may not exceed 3% of the Real Estate Equity Portfolio's exposure. SWIB's direct ownership position in any public REIT or company may not exceed 20% of

outstanding voting equity, without ED/CIO approval. Any externally managed REIT portfolio(s) will be managed under separate authority, with guidelines set out in the management agreement(s) between SWIB and the selected manager(s).

3. No more than 45% of the Real Estate Equity Portfolio’s exposure may be invested outside the U.S., without the approval of the ED/CIO. No more than 20% of the Real Estate Equity Portfolio’s exposure may be invested in emerging markets, and no more than 10% of the Real Estate Equity Portfolio’s exposure may be invested in separate accounts invested in emerging markets.
4. Other guideline limitations notwithstanding, the head of Real Estate or other staff authorized by the head of PMFA may: modify or waive terms of investments in the portfolio, including without limitation mortgages and leases on real estate in the portfolio; enter into new mortgages and leases; execute deeds and bills of sale; make expenditures for maintenance and improvements; grant easements; hire consultants, service providers, real estate advisors and property managers; and generally take any and all other actions that are necessary and reasonable to protect, maintain or enhance investment value of SWIB’s position in the investments.
5. Prior to funding a direct investment (including a property within a separate account tranche) where real property is a material component, the property shall be evaluated for the presence of environmental and code compliance issues. If environmental issues that require action by governmental authorities exist, then funding shall not occur until an adequate remediation program is in place. If code compliance issues exist, then an adequate plan to bring the property into compliance shall be in place.
6. SWIB may not initiate improvement or development of real property owned or controlled by SWIB without making provisions for compliance with applicable Federal, state and local codes and ordinances.

S. Current Return Portfolio

The Current Return Portfolio consists of current return or certain equity-related investments, made on a global basis, in limited partnership or other fund vehicles, strategic partnerships, and co-investments in operating or holding companies. Investments may be made in debt instruments and in instruments with both current pay and equity features.

1. Any other guidelines notwithstanding, all portfolio commitments are subject to the following approvals:

	Head of PMFA	ED/CIO
• Funds or Strategic Partnerships	\$250 million or less	Over \$250 million
• Co-Investments	\$75 million or less	Over \$75 million

SWIB ownership equal to or greater than 50% of an individual fund (excluding funds of one and a fund/vehicle through which a co-investment is made)	ED/CIO, provided that notice shall be given to the ED/CIO if ownership of an individual fund (excluding funds of one and a fund/vehicle through which a co-investment is made) is equal to or greater than 33 1/3%
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2. Investments may be made through funds, strategic partnerships, or co-investments. Co-investments must be made in one of the following ways:
 - (1) alongside a fund with the same sponsor or manager as a fund in which SWIB is or has been an investor;
 - (2) alongside a fund with the same sponsor or manager as a fund on which SWIB is conducting due diligence and is actively evaluating for a prospective commitment; or
 - (3) as approved by the ED/CIO.
3. Neither the aggregate exposure (including co-investments) to any fund manager or sponsor, nor the aggregate amount of investments in any company, may exceed 25% of the Current Return Portfolio’s exposure without approval of the ED/CIO.
4. No more than 45% of the Current Return Portfolio’s exposure may be invested outside of the U.S., without the approval of the ED/CIO. No more than 20% of the Current Return Portfolio may be invested in emerging markets.
5. The Current Return Portfolio may make co-investments in public company securities through private placements or other offerings. Co-investments in public company securities shall not exceed 2% of the Current Return Portfolio’s exposure. For purposes of this guideline, public company securities received via a distribution are not counted and are expected to be sold as soon as reasonably practicable.
6. Other guideline limitations notwithstanding, the head of Private Equity or other staff authorized by the head of PMFA may modify or waive terms of investments in the portfolio and generally take any and all other actions that are necessary and reasonable to protect, maintain or enhance the value of SWIB’s position in the investments.

T. Hedge Fund Portfolio

The Hedge Fund Portfolio (“HF Portfolio”) will be comprised primarily of direct investments in hedge funds and is intended to generate a low-beta, alpha-oriented return stream.

1. The HF Portfolio will be comprised of the following investment vehicles:
 - a. *Direct Investments or Fund-of-Funds*: SWIB intends for its portfolio to be comprised primarily of direct investments in hedge funds rather than fund-of-funds vehicles that use an intermediary investment advisor(s) to select and allocate to hedge funds through a commingled fund. SWIB may make

investments in fund-of-fund vehicles, as may be deemed appropriate by Funds Alpha staff and otherwise approved hereunder.

- b. *Hedge Funds or Separately Managed Accounts (“SMAs”)*: Investments can be made in limited liability partnerships with other investors or, in some cases depending upon the manager and size of investment, in separately managed accounts. SWIB expects most investments will be in limited liability vehicles. SWIB may invest via SMAs if it is in the best interest of SWIB to do so.

2. Hedge Fund Investment Strategies:

- a. *Relative Value* – strategies that seek to take advantage of price differentials by buying and selling different yet related securities. Relative value strategies include, but are not limited to, fixed income arbitrage, insurance linked, quantitative strategies, merger arbitrage, convertible arbitrage, and volatility-related investments.
- b. *Credit* - long/short and event driven investment strategies to various fixed-income instruments including bank loans, corporate, government bonds, distressed debt, and securitized credit.
- c. *Equity Long/Short* – long and short investments in publicly traded stocks and related securities either on a discretionary or systematic basis.
- d. *Tactical Trading* – global investments in indexes, commodities, interest rates, and currencies and, in each case, their derivatives as a result of relative value or directional forecasts from a systematic or discretionary approach.
- e. *Multi-Strategy* – funds seek to maximize risk-adjusted returns by investing in a variety of underlying investment strategies. They often employ flexibility in terms of capital, aiming to allocate dynamically to the best opportunities and shifting resources to where they are most needed.
- f. *Specialty Finance* - broad collection of lending strategies which typically have private, customized structures with a front ended cash flow profile at the portfolio level, short duration, and asset backed collateral.
- g. *Special Opportunity Investments & Coinvests*– SWIB may invest a portion of its portfolio in special opportunity investments, which may include: interests in the equity or revenues of hedge fund managers, co-investments, or external manager “best ideas” opportunities.

The HF Portfolio has the following target weightings and ranges to the individual hedge fund strategies:

	<u>Target Allocation</u>	<u>Target Maximum</u>

Relative Value	20%	40%
Credit	10%	30%
Equity Long/Short	20%	30%
Tactical Trading	10%	30%
Multi-strategy	25%	50%
Specialty Finance	10%	15%
Special Opportunity Investments	<u>5%</u>	15%
	100%	

3. Approvals: HF Portfolio allocations are subject to the following approvals:

	Head of PMFA	ED/CIO
• Core	Up to \$300 million aggregated	More than \$300 million
• Special Opp/ Co-invest	Up to \$75 million aggregated	More than \$75 million
SWIB ownership equal to or greater than 50% of an individual fund, calculated at the master fund level (excluding funds of one and a fund/vehicle through which a co-investment is made)	ED/CIO, provided that notice shall be given to the ED/CIO if ownership of an individual fund (excluding funds of one and a fund/vehicle through which a co-investment is made) is equal to or greater than 33 1/3%	

4. The aggregate exposure to any hedge fund manager or sponsor (including co-investments) may not exceed 15% of the total HF Portfolio's exposure without approval of the ED/CIO.
5. Other guideline limitations notwithstanding, the head of Funds Alpha or other staff authorized by the head of PMFA may modify or waive terms of investments in the portfolio and generally take any and all other actions that are necessary and reasonable to protect, maintain, or enhance the value of SWIB's position in the investments.
6. All redemptions, terminations or reductions of capital will be at the discretion of the Funds Alpha Manager and the head of PMFA.

U. Beta One Portfolio

The Beta One Portfolio is comprised primarily of direct investments in strategies of external managers that are intended to generate both (1) the total return (or beta of one) of a SWIB policy benchmark and (2) an excess return (or alpha) over the benchmark through active security

selection. Tracking error measures divergence around the given benchmark. In comparison, SWIB’s external hedge fund portfolio is designed to deliver only an excess return or alpha. This section does not govern passive external managers which the Asset and Risk Allocation Division oversees and monitors.

1. Investments in Beta One External Managers will be comprised of the following investment vehicles:
 - a. *Separately Managed Accounts (“SMAs”)*: in which external managers direct positioning but the assets reside at SWIB’s custodial bank.
 - b. *Commingled Investments or Fund Investments*: in which SWIB has a percentage ownership in limited liability partnerships or other structures alongside other investors or in a fund-of-one structure where SWIB is the sole investor. Assets reside at the manager’s custodial bank.

2. Investment Strategies and Broad Guidelines for Beta One External Managers:
 - a. *Equities* – strategies will be comprised of various fundamental, quantitative and other approaches intended to produce an active return above the respective benchmarks. Strategies will be invested in traditional long only portfolios, active extension formats (i.e. 130/30, 150/50) and other public equity securities approaches across various styles, geographies and market cap weights. A limited use of shorting (up to 80%) may be used in the active extension format in non-SMAs.
 - b. *Fixed Income* – strategies will be comprised of various fundamental, quantitative, and other approaches intended to produce an active return above the respective benchmarks. Strategies will primarily be invested in portfolios across the credit quality spectrum, across geographies, including emerging and frontier market debt, across structures (e.g., asset-backed securities, corporate debentures, etc.) Individual manager guidelines may allow shorting of cash bonds. Derivatives may be used (long or short) for both hedging and investment purposes and will be set forth in the individual manager guidelines.
 - c. Notwithstanding any shorting permitted in (a) above, pursuant to SWIB’s policies, the investment guidelines for SMAs will prohibit the Beta One External Managers from shorting any equity securities and from purchasing equity securities in secondary offerings.

3. Any use of derivatives, leverage, and shorting allowed will be incorporated into the ex-ante risk assessments and active risk contributions.

4. Approvals: Beta One External Manager allocations are subject to the following approvals:

Investment	Head of PMFA	ED/CIO
Beta One Fixed Income	Up to \$1.8 billion	More than \$1.8 billion
Beta One Equity	Up to \$1 billion	More than \$1 billion

Includes all Funds Alpha investments aggregated with the Manager, regardless of vehicle, strategy or portfolio.		

5. Other guideline limitations notwithstanding, the head of Funds Alpha or other staff authorized by the head of PMFA may modify, amend or waive terms of Beta One Manager investment management agreements and generally take any and all other actions that are necessary and reasonable to protect, maintain, or enhance the value of SWIB's position in the investments.
6. All redemptions, terminations or reductions of capital will be at the discretion of the head of Funds Alpha and the head of PMFA in consultation with the head of ARA for policy benchmark exposure consideration.
7. Notwithstanding the above discretion regarding redemptions, terminations or reductions, if the Risk Management Division determines that certain risk attributes in the context of the total Core Fund or the aggregate Beta One Portfolio are undesirable for the Core Fund, Variable Fund or the aggregate portfolio, then the head of Risk Management may recommend redemptions, terminations or reductions to portfolio exposures. With the ED/CIO's concurrence, the head of Funds Alpha will make the changes as recommended by the head of Risk Management.

V. Private Markets and Funds Alpha Overage Portfolios

Portfolios may be established at the asset class level for private equity, co-investment, real estate, venture capital, hedge fund, and private debt asset classes to provide for (i) excess exposure to certain investment ideas where the sizing of the investment requires it to be held, in part, outside of an individual internal portfolio or (ii) hedging transactions using public or private securities. In each case, a primary investment must be made by the relevant private markets or hedge fund portfolio with the excess exposure or hedging transaction being allocated to an overage portfolio. The relevant PMFA strategy head will be responsible for portfolio oversight and monitoring of the investment, including the securities in the overage portfolio.

These portfolios may also be used to express investment strategies and ideas that do not fit clearly in any of the private markets or Funds Alpha portfolios but are attractive from a risk/return perspective. In such cases, no primary investment will be made in the existing private markets portfolios, and the ED/CIO will designate a portfolio manager that will be responsible for portfolio oversight and monitoring.

These portfolios may invest in (1) any instrument approved for the relevant private markets asset class portfolios described elsewhere in these guidelines, and (2) any other public or private securities or derivatives approved for trading by SWIB solely for hedging purposes. Each investment idea expressed in the portfolios shall be approved by the ED/CIO with the

recommendation of the head of PMFA. The ARA Division is responsible for reporting on any approved investment to the Investment Committee on a monthly basis. Other governance, monitoring, compliance or reporting for the investment may also be specified in the approval. Portfolios will not have a separate benchmark or risk target, but will be included within the benchmark and soft risk parameters for the applicable aggregated asset class, portfolio, or Core Fund, as applicable and as approved at the time of the investment. If the investment will use active risk assigned to exposure management, it will be noted in the investment approval.

VII. EXTERNAL MANAGEMENT

Portfolios may be managed internally by SWIB investment professionals or externally by money management firms. In making the decision on how the portfolios will be managed, SWIB compares the resources, expertise, diversification benefits, and cost of internal management versus external management. If the decision is made to manage the portfolios externally, SWIB will determine whether a separate account or commingled fund best suits SWIB's needs.

External active and passive managers operate under contractual investment guidelines approved by SWIB's investment management staff.

APPENDIX 1 - APPROVED EXCHANGES

Approved Exchanges for Derivatives Trading as of March 29, 2022*

Australian Securities Exchange
BOX Options Exchange
CBOE Exchanges
Chicago Board of Trade
Chicago Mercantile Exchange
London Stock Exchange
Eurex Exchange
Euronext Exchanges
ICE Futures Exchanges
International Securities Exchange
Montreal Exchange
Nasdaq Exchanges
New York Mercantile Exchange
NYSE Exchanges
Osaka Exchange
TMX (Toronto Stock Exchange)
Tokyo Stock Exchange

*Approved exchanges shall include any and all exchanges that may be acquired by, merged with or otherwise reorganized with or into, or any subset of, any of the above-listed exchanges subsequent to the date above provided that such exchange continues to clear through a Qualifying Central Counterparty (QCCP). This list may be updated for such organizational or name changes from time to time by Legal & Compliance without any additional action of the Investment Committee, and all additions or changes shall be deemed Approved Exchanges for purposes of the WRS Investment Committee Investment Guidelines effective as of the date of such acquisition, merger or reorganization. On a quarterly basis, Compliance shall provide notice to the Investment Committee if there have been any such changes to the list.

The Multi-~~Asset~~[Strat](#) and Exposure Management Portfolios are approved to trade on any of the above exchanges and any other exchange whose clearing house is a Qualifying Central Counterparty (QCCP) as defined by the Bank for International Settlement (BIS).

APPENDIX 2 - SOFT RISK PARAMETERS

SOFT RISK PARAMETERS – ASSET CLASS AND PORTFOLIO

PORTFOLIO ASSET CLASS CHARACTERISTIC	ASSET CLASS	DISCUSSION TRIGGER
Asset Class Exposure*	Core Fund	
	Global Equities	Target ± 4.6%
	EM Equities	Target ± 2.8%
	Small Cap	Target ± 4.9%
	EAFE Small Cap	Target ± 4.3%
	U.S. Inv Grade	Target ± 4.8%
	High Yield and Levered Loans	Target ± 5.1%
	EM Debt	Target ± 5.6%
	Variable Fund	
	U.S. Equity	Target ± 5.0%
	Int'l Equity	Target ± 5.0%
*Post-Corridor Treatment		
Maximum Small Cap Exposure	CTF Domestic Public Equities	2.75x Benchmark
	VTF Domestic Public Equities	2.75x Benchmark
Ex Ante Tracking Error	Public Equities	0.75% - 2.25%
	Public Fixed	0.4% - 1.2%
	Core Fund	0.6% - 1.8%
	Variable Fund	0.3% - 0.9%
Counterparty Exposure (internal and external separate account portfolios)	WRS (Core and Variable Funds)	5 bp exposure (net of collateral, if any) to a single counterparty
Duration	Public Fixed	+/- 1 year of Benchmark

ACTIVE/INDEXED EQUITIES

Minimum Number of Holdings

	Small Cap	100 Long
	Global Equity Portfolio	15 Long/short equity ideas
Ex Ante Tracking Error	Passives (Core Fund and Variable Fund Consolidation):	
	MSCI US	10 bp annualized
	MSCI ex US	20 bp annualized
	MSCI US Small Cap	30 bp annualized
	Small Cap	1.75% - 5.25%
	Global Equity Portfolio	4% - 12%
Maximum EM Active Risk Exposure	Global Equity Portfolio	Emerging Markets Tracking Error Contribution of 20%
	Small Cap	Emerging Markets Tracking Error Contribution of 20%
Maximum Convertible Bond Issues	Global Equity Portfolio	0
	Small Cap	0
Maximum Private Placements	Small Cap	0
Ex Ante Equity Beta	Global Equity Portfolio	Range of -0.3 to +0.3 with a target of zero over a market cycle. This is measured ex ante with a trailing two-year risk sampling period
Single Name Concentration	Small Cap	Benchmark weight \pm 2%
Maximum ETF Exposure	Small Cap	+/- 15% of portfolio value
Maximum Company Ownership (Excluding ETFs) (L/S)	Small Cap	3% of outstanding
Top Ten Holdings (L/S)	Small Cap	20% of portfolio
P/E Ratio	Small Cap	50%-150% of Benchmark
Maximum Sector Exposure	Small Cap	Benchmark weight \pm 10%
Maximum Cash	Passives	1% in unequitized cash
	Small Cap	5%

FIXED INCOME

	IG Credit	+/- 1 year of assigned Benchmark
Duration	MBS	+/- 1 year of assigned Benchmark
	Long Treasury	+/- 2 years of assigned Benchmark
	High Yield	+/- 2 years of assigned Benchmark
	IG Credit	Greater of 10% or 3 x Benchmark
Maximum Corporate Industry Sector Exposure	IG Credit	Greater of 10% or 3 x Benchmark
Ex Ante Tracking Error	IG Credit	1.5%
	MBS	3.0%
	High Yield	3.0%
	Lev Loans	3.0%
	Long Treasury	1.5%
Maximum Equity Exposure	TBA Strategy	15%
	High Yield	5% of portfolio value
	Lev Loans	5% of portfolio value
Ex-Ante Beta to MBS Benchmark	TBA Strategy	+/-0.3⁴

MULTI-~~ASSET~~STRAT

Ex ante volatility (tracking error) range	Multi-Strat	3% to 8%, measured with a trailing two-year risk sampling period
Ex-Ante Equity Beta		
Ex-Ante Spread Beta	Multi-Strat	Range of -0.3 to +0.3 with a target of zero over a market cycle. This is measured ex ante with a trailing two-year risk sampling period
Ex-Ante Rates Beta		
Ex-Ante FX Carry Beta		

PRIVATE MARKETS & FUNDS ALPHA

Maximum Co-Investments	Private Equity	30% of core Private Equity Portfolio for Private Equity Co-Investments 30% of Current Return Portfolio for Current Return Co-Investments
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⁴ [The Risk Management Division adjusts FactSet ex-ante beta soft risk parameter by a rolling 12-month average.](#)

Maximum Co-Investments alongside funds with the same sponsor or manager as a fund on which SWIB was conducting due diligence and actively evaluating for a prospective commitment at the time of co-investment ⁵	Private Equity	5% of core Private Equity Portfolio for Private Equity Co-Investments
	Venture Capital	5% of Current Return Portfolio for Current Return Co-Investments 5% of Venture Capital Portfolio for Venture Capital Co-Investments
Maximum Venture Capital Exposure	Venture Capital	25% of sum of Private Equity, Current Return, Private Debt and Venture Capital
Maximum Development Risk (Direct Holdings Only)	Real Estate	10%
Maximum Single Property Type Exposure - Quarterly	Real Estate	50%
Minimum Core Holdings (Including REIT portfolios)	Real Estate	50%
Maximum Value Holdings	Real Estate	30%
Maximum Opportunistic Holdings	Real Estate	30%
Maximum Core Portfolio Leverage	Real Estate	50%
Maximum Core Fund/Deal Leverage (Must be non-recourse to SWIB)	Real Estate	65%
Maximum Real Estate Equity Portfolio Leverage	Real Estate	60%
Maximum Holdings with Leverage > 80%	Real Estate	10%
Maximum Debt Holdings	Real Estate	25%
Ex ante volatility (tracking error) Range	Hedge Fund	2.5% to 6.5%, measured with a trailing two-year risk sampling period
	Beta One Equity	0.8% to 2.0%
	Beta One Fixed Income	0.8% to 2.0%
Equity Delta to the S&P 500 Range	Hedge Fund	-0.3 to +0.3 (target of zero) over a market cycle measured ex ante with a trailing two-year risk sampling period

⁵ If SWIB subsequently commits to a limited partnership or other fund vehicle of the sponsor or manager, then such co-investment shall no longer be included for purposes of calculating this soft parameter.

Target Beta Range	Beta One Equity	0.8 to 1.2 (target of 1.0) (CTF + VTF)
	Beta One Fixed Income	0.8 to 1.2 (target of 1.0)
Maximum one-year annual Conditional Value at Risk (CVaR)	Hedge Fund	7% based on trailing two-year risk sampling period
Maximum Hedge Fund Active Risk Contribution	Hedge Fund	6.0 bps of Core Fund active risk
Maximum General Partner/Investment Manager Portfolio Concentration	Hedge Fund	12%
	Beta One	25% (CTF+VTF)

APPENDIX 3 – CTF AND VTF BENCHMARKS
State of Wisconsin Investment Board
Target State Benchmarks 2024¹

Core Trust Fund Benchmark²		
	Current Benchmark	
Public Equity	40% MSCI ACWI Investable Market Index (IMI) with a 50% weight to the China large cap	- Current and previous benchmark asset classes are weighted by asset class strategic target weights - Current Benchmark updated 4/30/2012 to include Cash, which reflects leverage
Public Fixed Income	27% Fixed Blend of Eight Components ³	
Inflation Sensitive	19% Bloomberg U.S. Treasury Inflation-Linked Bond Index	
Private Equity/Debt	18% Roll-Up of Five Components ⁴	
Real Estate	8% NCREIF Open End Diversified Core Equity (ODCE)	
Cash	(-12%) Bloomberg Short Term Bank Yield Index (BSBY) + 30bps	
Total	100%	

Variable Trust Fund Benchmark			
	Current Benchmark		
Domestic Equities	70% MSCI USA Investable Market Index		
International Equities	30% MSCI All Country World Index (ACWI) ex US Custom Net Index		
Total	100%		

Note: Roll-Up refers to the market-weighted aggregation of benchmark components or indices, based on SWIB’s actual market exposures.

¹ Reflects target weights under the 2024 Asset Allocation implementation plan forecasted for 12/31/2024.

² The major asset class weights are established through the annual asset allocation exercise. Private Equity/Debt weights float between 10% and 26% and Real Estate weights float between 4% and 12%. The Private Equity/Debt excess weights are taken from Public Equities and the Real Estate excess weights are taken 50% from Public Equities and 50% from Public Fixed Income.

³ Public Fixed Income Benchmark: Fixed Blend of Eight Components
 24.00% Bloomberg U.S. Treasury Index
 24.00% Bloomberg U.S. Credit Index
 20.00% ICE BofA BB-B US High Yield Index
 10.00% Morningstar LSTA U.S. Leveraged Loan 100 Index
 8.00% Bloomberg Mortgage-Backed Securities Index
 5.00% JPM EMBI Global Diversified
 5.00% JPM GBI-EM Diversified
 4.00% Bloomberg U.S. Treasury Long Index

⁴ Private Equity/Debt Benchmark: Roll-Up of Five Components
 Component One: State Street Private Equity Index (SSPEI) – All Regions
 Component Two: SSPEI Venture Capital – U.S. Region
 Component Three: Private Equity Legacy (SW050300) Actual Portfolio Returns
 Component Four: Bloomberg Duration-Adjusted Baa Corporate plus 20 basis points
 Component Five: SSPEI Private Debt – All Regions

Effective 1/1/2010, the tax treatment of the MSCI benchmark updated to a custom net-of-tax benchmark based on SWIB-specific tax treatment.

STATE OF WISCONSIN INVESTMENT BOARD
Investment Committee Meeting–Open Session

Tuesday, August 27, 2024

Offices of the Investment Board
4703 Madison Yards Way, Madison, Wisconsin

Committee Members Present: Edwin Denson, Executive Director/Chief Investment Officer (Chair)
Anne-Marie Fink, Private Markets & Funds Alpha–Chief Investment Officer
Todd Mattina, Head Economist & Asset and Risk Allocation Chief Investment Officer
Stefano Cavaglia, Senior Portfolio Manager–Asset & Risk Allocation
Derek Drummond, Head of Funds Alpha
Diane Linn, Senior Portfolio Manager–Multi-Asset Strategies
Lin Maung, Senior Portfolio Manager–Private Equity
Chase Nicholson, Senior Portfolio Manager–Multi-Asset Strategies
Jason Rector, Portfolio Manager–Funds Alpha
Mike Shearer, Head of Fixed Income Strategies
Nick Stanton, Head of Multi-Asset Strategies

Eric Barber, Chief Legal Counsel (non-voting)
Hassan Chehime, Head of Risk Management (non-voting)
Rochelle Klaskin, Deputy Executive Director/Chief Operating Officer (non-voting)

Also in Attendance:

Clyde Tinnen, Trustee
John Voelker, Trustee
Joe Amoyal, Senior Trader–Non-Investment Grade Fixed Income
Nathan Ballard, Senior Legal Counsel
Brandon Brickner, Head of Internal Audit
Kate Burkart-Paulson, Senior Legal Counsel
Sara Chandler, Chief of Staff & Strategy
Bridget Chen, Senior Analyst–Investment Grade Fixed Income
Christian Comito, Senior Portfolio Manager–Investment Grade Fixed Income
Kliton Duri, Senior Portfolio Manager–Non-Investment Grade Fixed Income
Trey Edgerle, Compliance Analyst
Tom Freeman, Director of Quantamental Research
Scott Freundlich, Portfolio Manager–Non-Investment Grade Fixed Income
Megan Gall, Investment Operations Analyst
Shannon Gannon, Communications Director
Max Garcia, Analyst–Funds Alpha
Chase Gendron, Investment Operations Analyst
Jameson Greenfield, Chief Financial Officer
Thomas Gregg, Investment Operations Analyst
Dan Gyorog, Internal Auditor

Vince Janecky, Internal Auditor Data Analyst
Phil Johnson, Senior Portfolio Manager–Non-Investment Grade
Fixed Income
Ryan Johnston, Senior Analyst–Funds Alpha
Salah Khalaf, Portfolio Manager–Private Markets & Funds Alpha
Jason Kowalke, Investment Operations Analyst
Jason Krueger, Compliance Analyst
Alex Kubiak, Investment Operations Analyst
Lisa Lange, Director of Compliance & Senior Legal Counsel
Alex Li, Analyst–Asset & Risk Allocation
Shan Lo, Senior Portfolio Manager–Multi-Asset Strategies
Jeff Lucas, Senior Portfolio Manager–Investment Grade Fixed Income
Bill Luetzow, Legal Counsel
Michael Mandarino, Senior Analyst–Non-Investment Grade Fixed Income
Damian Maroun, Head of Trading and Execution
Ed Martinez, PMFA Business Director
Frank Mazzucco, Senior Legal Counsel
Joy Mukherjee, Senior Portfolio Manager–U.S. Small Cap Strategy
Chad Neumann, Senior Portfolio Manager–Global Equity Strategy
Scott Nichols, Head of Trading
Sarah Noronha, Senior Portfolio Manager–U.S. Small Cap Strategy
Hunter Olson, Analyst–Non-Investment Grade Fixed Income
Cefe Quesada, Chief Technology Officer
Anand Rakesh, Director of Risk Analytics & Financial Engineering
Systems
Robby Richlen, Analyst–Funds Alpha
Jay Risch, Government Relations Liaison
Tom Robinson, Head of Corporate Governance
Susan Schmidt, Head of Equities
Gabriel Souza, Investment Operations Analyst
Mark Taylor, Senior Portfolio Manager–Fixed Income Strategies
Matt Terpstra, Internal Auditor
Rob Thornton, ARA Business Director
Leif Thybony, Senior Portfolio Manager–Non-Investment Grade Fixed
Income
Dawn Tuescher, Executive Administrative Assistant
Ping Wong, Portfolio Manager–Liquidity, Inflation & Rates
Mgmt.
Sarah Zhao, Investment Operations Analyst
Kasey Bernard, Legislative Audit Bureau
(Some individuals may have attended only portions of the meeting.)

OPEN SESSION

With a quorum present, Edwin Denson, Chair of the Investment Committee, called the meeting to order at 1:00 p.m.

1. Approval of the Minutes

Mr. Denson asked if there were any comments on either the open or closed session minutes of the July 23, 2024 Investment Committee (IC) meeting. Hearing no comments, Mr. Denson stated that the Committee could approve both the open and closed session minutes in open session.

Motion: A motion was made by Mr. Shearer and seconded by Mr. Maung to approve both the open session and the closed session minutes of July 23, 2024, as presented. The motion passed unanimously.

2. Global Public Markets Strategies Division Update

Nick Stanton, Head of Multi-Asset Strategies, reported on performance from the Global Public Markets Strategies division in the *Global Public Markets Strategies Quarterly Update, Q2 2024*, included on pages 11-13 in the meeting materials. He highlighted that all eight division strategies generated positive relative returns for the year through June 30, 2024, and reviewed performance of division strategies over the year-to-date, three-, and five-year periods, as applicable.

3. Q2 2024 Quarterly Updates

A. LIRM

Ping Wong, Portfolio Manager–Liquidity, Inflation & Rates Mgmt., presented the *Investment Strategies: Liquidity, Inflation and Rates Management (LIRM)* quarterly update, included on pages 14-21 in the meeting materials. With respect to the market, he noted that **(a)** money market fund net assets continued to increase through July, **(b)** after peaking at the end of the first quarter, U.S. Treasury bill supply declined in April due to tax receipts and increased U.S. Treasury coupon issuance, and **(c)** market participants are anticipating that the Federal Reserve will lower interest rates by approximately 100 basis points (bps) by the end of the year. Mr. Wong then reviewed performance for **(i)** the State Investment Fund (SIF), noting that the SIF returned positive absolute and relative performance year-to-date, and **(ii)** the short-term credit portfolio, which generated positive absolute performance year-to-date before being de-allocated in mid-June. Lastly, he confirmed that the portfolios remained in compliance with their guidelines and answered questions regarding the SIF's benchmark.

B. Multi-Asset Strategies

Chase Nicholson, Senior Portfolio Manager–Multi-Asset Strategies, presented the *Multi-Strat Portfolio Review*, included on pages 22-26 in the meeting materials. He reported that the multi-asset portfolio outperformed its benchmark by 92 bps in Q2 2024, driven primarily by systematic strategies. Mr. Nicholson then **(a)** provided market commentary, describing the factors that contributed to the spike in the CBOE Volatility Index (VIX) in early August, and **(b)** confirmed that the portfolio remained in compliance with its guidelines.

C. Fixed Income Strategies

Mike Shearer, Head of Fixed Income Strategies, presented the *Fixed Income Strategies Review*, included on pages 27-41 in the meeting materials. He reviewed Q2 2024 performance for the fixed income portfolios, highlighting that all five portfolios generated positive relative performance year-to-date. Mr. Shearer then provided a fixed income market review, commenting that (a) inflation and employment data, as well as Federal Reserve commentary, led market participants to expect interest rate cuts in the coming months, (b) U.S. Treasury yields rose during the quarter, with the U.S. yield curve steepening modestly, (c) spreads across investment grade credit and high yield widened during the quarter, while U.S. mortgage-backed securities (MBS) spreads generally remained stable, and (d) consumer credit delinquent percentages have returned to pre-pandemic levels. Lastly, he confirmed that the portfolios were in compliance with their guidelines in Q2 2024.

D. Global Equities

Susan Schmidt, Head of Equities, presented the *Global Equity Strategy Review*, included on pages 42-49 in the meeting materials. She reported that the global equity strategy outperformed its benchmark by 21 bps in Q2 2024, as the team navigated the challenging investment backdrop created by inconsistent macroeconomic signals and evidence of decelerating earnings growth. Ms. Schmidt then presented a market overview, noting that (a) a small set of names continued to lead strong overall equity market performance, (b) management teams remain cautious due to elevated geopolitical risk and uncertainty regarding the timing of interest rate cuts, and (c) while a majority of companies exceeded earnings expectations during the second quarter, both upside and downside earnings-day movements are increasing in size. Lastly, she confirmed that the portfolio remained in compliance with its guidelines.

E. Small Cap Strategy

Joy Mukherjee, Senior Portfolio Manager–U.S. Small Cap Strategy, referred to the *U.S. Small Cap Strategy Review*, included on pages 50-55 in the meeting materials. He noted that the portfolio outperformed its benchmark by 308 bps year-to-date and that absolute and relative performance over the three- and five-year periods were positive. Mr. Mukherjee then (a) discussed trends related to small cap market performance in the second quarter, noting that small cap names continued to underperform large cap names, (b) provided sector commentary, stating that industrials and financials were the top-performing sectors in the quarter, while the communication services and consumer staples sectors detracted, and (c) confirmed that the portfolio remained in compliance with its guidelines.

4. Convene in Closed Session

Motion: A motion to go into closed session as authorized pursuant to sections 19.85(1)(e) and 19.36(5) of the Wisconsin Statutes to consider confidential strategies for the investment of public funds, including (a) the review of active risk profiles of portfolio investments and the Core and Variable Trust Funds, and (b) the review of specific proprietary investment strategies and investment instruments related to global equities, small cap equities, fixed income strategies, multi-asset, short-term credit, and exposure management, was made by Mr. Cavaglia and seconded by Mr. Drummond.

Mr. Denson called for a roll call vote.

Denson-Aye	Fink-Aye	Mattina-Aye	Cavaglia-Aye
Drummond-Aye	Linn-Aye	Maung-Aye	Nicholson-Aye
Rector-Aye	Shearer-Aye	Stanton-Aye	

There being eleven ayes and no nays, Mr. Denson declared the motion passed. The Committee convened in closed session at 1:26 p.m. and reconvened in open session at 2:30 p.m.

5. Announcement of Committee Actions Relating to Items Taken Up in Closed Session

Mr. Denson announced that, while in closed session, the Committee (i) reviewed active risk profiles of portfolio investments and the Core and Variable Trust Funds, and (ii) reviewed specific proprietary investment strategies and investment instruments related to global equities, small cap equities, fixed income strategies, multi-asset, short-term credit, and exposure management.

6. Soft Risk Parameters

Hassan Chehime, Head of Risk Management, noted that the report *Soft Risk Parameters—Asset Class and Portfolio*, as of July 31, 2024, was included on pages 188-189 in the meeting materials for the Committee’s review. Mr. Chehime noted that there was one new discussion trigger this month relating to the Variable Trust Fund’s (VTF) ex ante tracking error and that two discussion triggers had been dropped relating to the maximum unequitized cash within the passive index portfolios and the hedge fund portfolio’s one-year annual conditional value at risk (CVaR).

7. Future Meeting Topics

Mr. Denson noted that draft agendas for the September 24, 2024 and October 22, 2024 Committee meetings were included on pages 190-193 in the meeting materials for the Committee’s review.

8. Adjournment

Motion: A motion to adjourn the meeting was made by Mr. Shearer and seconded by Mr. Maung. The motion passed unanimously, and the meeting adjourned at 2:32 p.m.

Date of Committee Approval: 09/24/24

Signed: /s/ Eric Barber
Eric Barber, Secretary
Investment Committee

STATE OF WISCONSIN INVESTMENT BOARD
Investment Committee Meeting–Open Session

Tuesday, September 24, 2024

Offices of the Investment Board
4703 Madison Yards Way, Madison, Wisconsin

Committee Members Present: Edwin Denson, Executive Director/Chief Investment Officer (Chair)
Anne-Marie Fink, Private Markets & Funds Alpha–Chief Investment Officer
Todd Mattina, Head Economist & Asset and Risk Allocation Chief Investment Officer
Stefano Cavaglia, Senior Portfolio Manager–Asset & Risk Allocation
Derek Drummond, Head of Funds Alpha
Diane Linn, Senior Portfolio Manager–Multi-Asset Strategies
Lin Maung, Senior Portfolio Manager–Private Equity
Chase Nicholson, Senior Portfolio Manager–Multi-Asset Strategies
Mike Shearer, Head of Fixed Income Strategies
Nick Stanton, Head of Multi-Asset Strategies
Ivy Zhang, Senior Portfolio Manager–Asset & Risk Allocation

Eric Barber, Chief Legal Counsel (non-voting)
Hassan Chehime, Head of Risk Management (non-voting)
Rochelle Klaskin, Deputy Executive Director/Chief Operating Officer (non-voting)

Also in Attendance: John Voelker, Trustee
Nathan Ballard, Senior Legal Counsel
Zach Berghouse, Internal Auditor
Kevin Blank, Analyst–Funds Alpha
Brandon Brickner, Head of Internal Audit
Eric Buchholtz, Fund Accounting Manager
Kate Burkart-Paulson, Senior Legal Counsel
Sara Chandler, Chief of Staff & Strategy
Bridget Chen, Portfolio Manager–Investment Grade Fixed Income
Christian Comito, Senior Portfolio Manager–Investment Grade Fixed Income
Trey Edgerle, Compliance Analyst
Greg Fletcher, Performance Director
Shannon Gannon, Communications Director
Max Garcia, Analyst–Funds Alpha
Chase Gendron, Investment Operations Analyst
Jameson Greenfield, Chief Financial Officer
Thomas Gregg, Investment Operations Analyst
Dan Gyrog, Internal Auditor
Brian Heimsoth, Senior Portfolio Manager–Asset & Risk Allocation
Vince Janecky, Internal Auditor Data Analyst
Salah Khalaf, Portfolio Manager–Private Markets & Funds Alpha
Jason Kowalke, Investment Operations Analyst

Dylan Krivoshein, Investment Operations Analyst
Jason Krueger, Compliance Analyst
Alex Kubiak, Investment Operations Analyst
Katie Kuryla, Senior Paralegal/Records Specialist
Lisa Lange, Director of Compliance & Senior Legal Counsel
Shan Lo, Senior Portfolio Manager–Multi-Asset Strategies
Matt Marek, Senior Analyst–Asset & Risk Allocation
Damian Maroun, Head of Trading and Execution
Ed Martinez, PMFA Business Director
Frank Mazzucco, Senior Legal Counsel
Jason Mirr, Senior Portfolio Manager–U.S. Small Cap Strategy
Sunil Nair, Operational, Financing & Counterparty Risk Director
Scott Nichols, Head of Trading
Hunter Olson, Analyst–Non-Investment Grade Fixed Income
Cefe Quesada, Chief Technology Officer
Anand Rakesh, Director of Risk Analytics & Financial Engineering
Systems
Tom Robinson, Head of Corporate Governance
Joe Roth, Transition Management and Portfolio Support Manager
Gabriel Souza, Investment Operations Analyst
Mark Taylor, Senior Portfolio Manager–Fixed Income Strategies
Matt Terpstra, Internal Auditor
Rob Thornton, ARA Business Director
Dawn Tuescher, Executive Administrative Assistant
Sarah Zhao, Investment Operations Analyst
Joe Nankof, NEPC
Samuel Rebenstorf, Legislative Audit Bureau
(Some individuals may have attended only portions of the meeting.)

OPEN SESSION

With a quorum present, Edwin Denson, Chair of the Investment Committee, called the meeting to order at 1:02 p.m.

1. Approval of the Minutes

Mr. Denson asked if there were any comments on either the open or closed session minutes of the August 27, 2024 Investment Committee (IC) meeting. Hearing no comments, Mr. Denson stated that the Committee could approve both the open and closed session minutes in open session.

Motion: A motion was made by Mr. Shearer and seconded by Mr. Nicholson to approve both the open session and the closed session minutes of August 27, 2024, as presented. The motion passed unanimously.

2. October Board Workshop Preview

Todd Mattina, Head Economist & Asset and Risk Allocation Chief Investment Officer, provided a summary of the upcoming October Board Workshop, which will include (a) a

review of innovative projects undertaken across the agency, including a technology strategy update and an overview of a funds alpha managed account platform that launched in June 2023, **(b)** thought leadership and investment insight discussions with external speakers, including regarding the potential impact of the U.S. presidential election on economic policymaking and the macroeconomic environment, and **(c)** a preview of the asset allocation analysis and NEPC’s recommendations, made in consultation with the Asset and Risk Allocation (ARA) division, to be presented to the Board for approval in December 2024.

3. Transition Update (Q2 2024)

Joe Roth, Transition Management and Portfolio Support Manager, presented the *Transition Management Summary, Q2 2024*, included on page 10 in the meeting materials, and reviewed the four transition events during the quarter. Mr. Roth noted that the first transition liquidated small cap portfolio assets to effectuate a reduction in overall Core Trust Fund (CTF) policy leverage. This transition was managed by State Street and performance exceeded the shortfall tolerance range to the positive. The second transition, which was managed internally and fell within the established shortfall tolerance range, implemented the approved asset allocation policy change to reduce global equities and increase exposure to the certain internal fixed income portfolios. The third and fourth transitions, which were also managed internally, liquidated \$1.5 billion from externally managed beta one equity portfolio assets in two tranches to decouple international and domestic equities. Mr. Roth noted that the third transition was completed with positive performance while the fourth cost more than expected due to the impact of one idiosyncratic event.

4. Convene in Closed Session

Motion: A motion to go into closed session as authorized pursuant to sections 19.85(1)(e) and 19.36(5) of the Wisconsin Statutes to consider confidential strategies for the investment of public funds, including **(a)** the review of active risk profiles of portfolio investments and the Core and Variable Trust Funds, **(b)** the review of specific proprietary investment strategies and investment instruments related to asset and risk allocation and exposure management, and **(c)** the review of broker information, was made by Mr. Stanton and seconded by Mr. Mattina.

Mr. Denson called for a roll call vote.

Denson-Aye	Fink-Aye	Mattina-Aye	Cavaglia-Aye
Drummond-Aye	Linn-Aye	Maung-Aye	Nicholson-Aye
Shearer-Aye	Stanton-Aye	Zhang-Aye	

There being eleven ayes and no nays, Mr. Denson declared the motion passed. The Committee convened in closed session at 1:08 p.m. and reconvened in open session at 3:07 p.m.

5. Announcement of Committee Actions Relating to Items Taken Up in Closed Session

Mr. Denson announced that, while in closed session, the Committee **(i)** reviewed active risk profiles of portfolio investments and the Core and Variable Trust Funds, **(ii)** reviewed specific proprietary investment strategies and investment instruments related to asset and risk allocation and exposure management, and **(iii)** reviewed broker information.

6. Separately Managed Funds Update

Rob Thornton, ARA Business Director, and Bridget Chen, Portfolio Manager–Investment Grade Fixed Income, presented the annual *Separately Managed Funds Update*, included on pages 148-162 in the meeting materials. Mr. Thornton noted that **(i)** the ARA division is responsible for oversight of the Separately Managed Funds (SMFs), with all quarterly rebalancing performed in accordance with the corresponding SMF’s guidelines, and **(ii)** SWIB fixed income staff continue to perform active portfolio management for a portion of the State Life Insurance Fund (SLIF).

Mr. Thornton then reviewed the investment objectives, asset allocations and performance for each SMF, noting that **(a)** the Injured Patients & Families Compensation Fund includes a portion actively managed by an external manager as well as passive investments, **(b)** the UW System Long Term Fund’s public markets investments are held in BlackRock passive index funds and existing private markets investments will gradually roll off, **(c)** the UW System Cash Management Fund is also largely invested in BlackRock passive index funds with smaller allocations to high yield bonds and a floating rate income fund, and **(d)** the State Historical Society Trust Fund is invested in BlackRock passive index funds. Ms. Chen then reviewed the investment objectives and asset allocation for the SLIF, which is made up of investment-grade fixed income assets and is primarily managed internally by the fixed income team.

Mr. Thornton commented that each SMF had positive absolute performance over the one-year period and that relative performance was positive for the three-, five-, and ten-year periods, as applicable. Finally, Mr. Thornton and Ms. Chen answered questions regarding the relative performance of various index funds, the process for SMF rebalancings, and the SLIF’s portfolio holdings and position sizes.

7. Research Task Force Report

Stefano Cavaglia, Senior Portfolio Manager–Asset & Risk Allocation, presented the *Research Task Force Update*, included on pages 163-171 in the meeting materials. He discussed recent Research Task Force (RTF) initiatives, including **(a)** sponsoring seminars relating to current events, including alternative views on the prospects for the world economy, Federal Reserve policy and investor sentiment, and distressed debt, **(b)** hosting speakers on broad trends such as artificial intelligence and machine learning, **(c)** promoting knowledge-sharing and educational programs, including participation in sessions related to SWIB’s membership in the International Centre for Pension Management and a forum for quantitative research in finance, and **(d)** collaborating with SWIB’s Chief Technology Officer on artificial intelligence initiatives. Lastly, Mr. Cavaglia welcomed the new members of the RTF and the investment forum task force.

8. Corporate Governance Update

Tom Robinson, Head of Corporate Governance, presented the *Corporate Governance Update*, included on pages 172-179 in the meeting materials. He reported that, for the second consecutive year, SWIB’s proxy voting support levels through Q2 2024 increased to their highest levels since new voting guidelines were adopted in 2019. He highlighted that **(a)** directors and executive compensation proposals continue to receive strong market

support and fewer failures, (b) Japanese board independence may be reaching its near-term ceiling, (c) non-binding U.S. shareholder proposal volume has leveled off after three consecutive years of increases, although support levels remain historically low, and (d) court decisions and regulatory developments may result in further corporate governance changes in 2025.

Mr. Robinson then reviewed SWIB's voting trends, including an observation that Japanese companies represent SWIB's second-largest voting market, accounting for approximately 17% of meetings voted. He shared additional proxy voting observations regarding non-binding U.S. "say-on-pay" votes, highlighting that executive compensation support levels vary by sector, as well as improved board independence in Japan following recent reforms.

With respect to broader U.S. market trends, Mr. Robinson (a) noted that, after issuing guidance in 2021 making it more difficult for companies to exclude shareholder proposals from proxies, the SEC appeared to reverse course in 2023 and exclusions have risen, (b) stated that boards are paying closer attention to succession planning as median CEO tenure declines to all-time lows and average board age increases to ten-year highs, and (c) discussed the SEC's rulemaking regarding proxy advisors and the emissions disclosure rules from the SEC and California. Lastly, Mr. Robinson answered questions regarding the non-binding nature of shareholder proposals in the U.S. market.

9. Quarterly Performance Review (Q2 2024)

Mr. Denson noted that the *Investment Performance Report*, as of June 30, 2024, was included on pages 180-212 in the meeting materials for the Committee's information.

10. Soft Risk Parameters

Hassan Chehime, Head of Risk Management, noted that the report *Soft Risk Parameters—Asset Class and Portfolio*, as of August 30, 2024, was included on pages 213-214 in the meeting materials for the Committee's review. Mr. Chehime noted that there were no new discussion triggers and that two discussion triggers had been dropped relating to the ex ante tracking error for each of the public fixed income asset class and the Variable Trust Fund (VTF).

11. Fair Value Measurement Review of WRS Investments

Mr. Denson noted that a report entitled *Fair Value Measurement Review of WRS Investments*, with an overview of the nature and liquidity of SWIB's assets, was included on pages 215-225 in the meeting materials for the Committee's review.

12. Future Meeting Topics

Mr. Denson noted that draft agendas for the October 22, 2024 and November 26, 2024 Committee meetings were included on pages 226-229 in the meeting materials for the Committee's review.

13. Adjournment

Motion: A motion to adjourn the meeting was made by Mr. Mattina and seconded by Mr. Cavaglia. The motion passed unanimously, and the meeting adjourned at 3:45 p.m.

Date of Committee Approval: 10/22/24

Signed: /s/ Eric Barber
Eric Barber, Secretary
Investment Committee

STATE OF WISCONSIN INVESTMENT BOARD
Investment Committee Meeting–Open Session

Tuesday, October 22, 2024

Offices of the Investment Board
4703 Madison Yards Way, Madison, Wisconsin

Committee Members Present: Edwin Denson, Executive Director/Chief Investment Officer (Chair)
Anne-Marie Fink, Private Markets & Funds Alpha–Chief Investment Officer
Todd Mattina, Head Economist & Asset and Risk Allocation
Chief Investment Officer
Stefano Cavaglia, Senior Portfolio Manager–Asset & Risk Allocation
Derek Drummond, Head of Funds Alpha
Diane Linn, Senior Portfolio Manager–Multi-Asset Strategies
Lin Maung, Senior Portfolio Manager–Private Equity
Chase Nicholson, Senior Portfolio Manager–Multi-Asset Strategies
Jason Rector, Portfolio Manager–Funds Alpha
Mike Shearer, Head of Fixed Income Strategies
Nick Stanton, Head of Multi-Asset Strategies
Ivy Zhang, Senior Portfolio Manager–Asset & Risk Allocation

Eric Barber, Chief Legal Counsel (non-voting)
Hassan Chehime, Head of Risk Management (non-voting)
Rochelle Klaskin, Deputy Executive Director/Chief Operating Officer (non-voting)

Also in Attendance: Clyde Tinnen, Trustee
John Voelker, Trustee
Nathan Ballard, Senior Legal Counsel
Zach Berghouse, Internal Auditor
Kevin Blank, Analyst–Funds Alpha
Brandon Brickner, Head of Internal Audit
Kate Burkart-Paulson, Senior Legal Counsel
Sara Chandler, Chief of Staff & Strategy
Christian Comito, Senior Portfolio Manager–Investment Grade Fixed Income
Tunc Dayioglu, Senior Portfolio Manager–Funds Alpha
Kliton Duri, Senior Portfolio Manager–Non-Investment Grade Fixed Income
Chris Eckerman, Senior Portfolio Manager–Private Equity
Trey Edgerle, Compliance Analyst
Greg Fletcher, Performance Director
Scott Freundlich, Portfolio Manager–Non-Investment Grade Fixed Income
Megan Gall, Investment Operations Analyst
Max Garcia, Analyst–Funds Alpha
Chase Gendron, Investment Operations Analyst
Jameson Greenfield, Chief Financial Officer

Dan Gyorog, Internal Auditor
Alex Hansen, Investment Operations Analyst
Brian Heimsoth, Senior Portfolio Manager–Asset & Risk Allocation
Phil Johnson, Senior Portfolio Manager–Non-Investment Grade
Fixed Income
Salah Khalaf, Portfolio Manager–Private Markets & Funds Alpha
Jason Kowalke, Investment Operations Analyst
Dylan Krivoshein, Investment Operations Analyst
Jason Krueger, Compliance Analyst
Alex Kubiak, Investment Operations Analyst
Katie Kuryla, Senior Paralegal/Records Specialist
Lisa Lange, Director of Compliance & Senior Legal Counsel
Alex Li, Analyst–Asset & Risk Allocation
Shan Lo, Senior Portfolio Manager–Multi-Asset Strategies
Jon Loboda, Performance Measurement Operations Manager
Tony Lubarsky, Investment Operations Analyst
Jeff Lucas, Senior Portfolio Manager–Investment Grade Fixed Income
Bill Luetzow, Legal Counsel
Michael Mandarino, Senior Analyst–Non-Investment Grade Fixed Income
Matt Marek, Senior Analyst–Asset & Risk Allocation
Ed Martinez, PMFA Business Director
Frank Mazzucco, Senior Legal Counsel
Sunil Nair, Operational, Financing & Counterparty Risk Director
Scott Nichols, Head of Trading
Hunter Olson, Analyst–Non-Investment Grade Fixed Income
Scott Parrish, Head of Private Equity
Chris Prestigiacommo, Head of Private Debt & Venture Capital
Anand Rakesh, Director of Risk Analytics & Financial Engineering
Systems
Jason Rothenberg, Head of Real Estate
Andrea Ruiz, Senior Portfolio Manager–Liquidity, Inflation & Rates
Mgmt.
Dan Schally, Analyst–Real Estate
Gabriel Souza, Investment Operations Analyst
Matt Terpstra, Internal Auditor
Rob Thornton, ARA Business Director
Leif Thybony, Senior Portfolio Manager–Non-Investment Grade Fixed
Income
Dawn Tuescher, Executive Administrative Assistant
Sarah Zhao, Investment Operations Analyst
Kasey Bernard, Legislative Audit Bureau
Joe Nankof, NEPC
Eileen Neill, Verus Advisory
(Some individuals may have attended only portions of the meeting.)

OPEN SESSION

With a quorum present, Edwin Denson, Chair of the Investment Committee, called the

meeting to order at 1:01 p.m.

1. Approval of the Minutes

Mr. Denson asked if there were any comments on either the open or closed session minutes of the September 24, 2024 Investment Committee (IC) meeting. Hearing no comments, Mr. Denson stated that the Committee could approve both the open and closed session minutes in open session.

Motion: A motion was made by Mr. Mattina and seconded by Ms. Linn to approve both the open session and the closed session minutes of September 24, 2024, as presented. The motion passed unanimously.

2. Annual Benchmark Presentation

Joe Nankof, NEPC, the Board of Trustees' benchmark consultant, presented the first of two parts of the 2024 annual benchmark review, included on pages 10-27 in the meeting materials. Mr. Nankof noted that NEPC's benchmark recommendations for the public equity, public fixed income, and private markets asset classes were being presented at this IC meeting, with the remainder presented at the November IC meeting, in each case for the Committee's consideration prior to the December Board meeting. He then discussed NEPC's methodology and selection criteria in connection with the 2024 benchmark review, including coordinating with the Asset & Risk Allocation division (ARA), the performance team, and specific investment management staff where warranted.

With respect to the public equity asset class, Mr. Nankof summarized NEPC's recommendation to change the China equity strategy benchmark to the MSCI China All Shares and MSCI ACWI Investable Market Index (IMI) with a 50% weight to rescaled China All Shares, effective on January 1, 2025. Mr. Nankof and Greg Fletcher, Performance Director, led the Committee's discussion regarding the recommendation, including the advantages of using MSCI as the index provider across public equity strategies and the work undertaken by NEPC and the ARA division to prepare for a potential benchmark transition. Mr. Nankof stated that NEPC was not recommending any other public equity benchmark changes.

With respect to the public fixed income and private markets asset classes, Mr. Nankof (a) discussed NEPC's review of existing and potential alternative benchmarks for the relevant mandates, including its deeper dive of the leveraged loan portfolio, (b) reviewed NEPC's recommendation to maintain the current approach to currency adjustments for the private equity and current return portfolio benchmarks, and (c) confirmed that NEPC was not recommending any benchmark changes for the portfolios within the public fixed income and private markets asset classes.

Motion: A motion was made by Mr. Drummond and seconded by Mr. Cavaglia to approve, and to recommend to the Board of Trustees' Benchmark and Performance Committee, (i) the change to the China equity strategy benchmark to the MSCI China All Shares and MSCI ACWI Investable Market Index (IMI) with a 50% weight to rescaled China All Shares, effective January 1, 2025, and (ii) no changes to the current benchmarks for all other portfolios within the public equity, public fixed income, and private markets asset classes, in each case as presented and recommended by SWIB's benchmark consultant,

NEPC, in part one of its Annual Benchmark Review, included in the Committee's materials. The motion passed unanimously.

3. Private Markets & Funds Alpha Division Update

Anne-Marie Fink, Private Markets & Funds Alpha–Chief Investment Officer, presented the *Private Markets & Funds Alpha Division Update*. She highlighted strong overall Private Markets & Funds Alpha (PMFA) division performance during the third quarter, while noting the variability of returns and diversification benefits across the different PMFA portfolios. She also thanked staff for their work in compiling and presenting performance data.

4. Q3 2024 Quarterly Updates

A. Private Equity

Scott Parrish, Head of Private Equity, presented the *Quarterly Activity Report – Private Equity*, included on pages 28-50 in the meeting materials. He provided a private equity market update for Q3 2024, noting that **(a)** U.S. private equity fundraising dollars and the number of funds both decreased year-over-year in a challenging fundraising environment, **(b)** sponsor dry powder declined relative to the 2022 peak, **(c)** funds larger than \$1 billion accounted for more than 80% of the capital committed year-to-date, **(d)** U.S. enterprise value-to-EBITDA entry multiples and leverage multiples increased slightly year-over-year for transactions funded by broadly syndicated loans, **(e)** U.S. private equity deal volume declined year-over-year while deal value increased, indicating a trend of larger transactions thus far in 2024, and **(f)** while the number of portfolio company exits was split evenly between corporate acquisitions and sponsor-to-sponsor transactions, the IPO market was the most active since 2021 in terms of exit value.

Mr. Parrish then reported that, as of September 30, 2024, the market value of the aggregate private equity asset class, excluding the venture capital and private debt portfolios, was approximately \$22.3 billion and made up 17% of the Core Trust Fund (CTF). He commented that capital calls continued to exceed distributions year-to-date, but that the portfolios' net cash outflow position had improved materially, with distributions received thus far in 2024 exceeding all distributions received in 2023. Mr. Parrish and Chris Eckerman, Senior Portfolio Manager–Private Equity, then led the Committee's discussion regarding the current health of the private equity market overall and the possibility of deal and exit activity accelerating for the remainder of 2024 and into 2025.

With respect to performance, Mr. Parrish highlighted that **(a)** as of June 30, 2024, the combined private equity and current return portfolios, inclusive of co-investments, achieved second quartile performance for vintage years 2014-2022, with the exception of third quartile performance for 2016, and first quartile performance for 2023, and **(b)** the private equity and current return portfolios outperformed their benchmarks for the one-, three-, and five-year time periods. He also commented on the equity multiples and internal rates of return (IRRs) for the portfolios' sub-strategies, highlighting strong performance across nearly all sub-strategies, and reviewed new sub-strategy definitions within the current return portfolio.

Mr. Parrish then discussed the private equity portfolios' sub-asset class diversification, highlighting the increased percentages from small- and mid-buyout managers as well as current return co-investments, and noted that public company exposure continued to

decrease. Lastly, Mr. Parrish reviewed the commitments made in Q3 2024, discussed the portfolio pipeline for Q4 2024, and confirmed that the portfolio remained in compliance with all investment guidelines.

B. Real Estate

Jason Rothenberg, Head of Real Estate, presented the *Quarterly Activity Report – Real Estate*, included on pages 51-63 in the meeting materials. He provided a real estate market overview, noting that **(a)** the capital markets repricing that has characterized the real estate market recently may be nearing its end, with transaction activity and sentiment appearing to improve after the Federal Reserve’s interest rate cut in September, **(b)** leasing demand for the multi-family and industrial property types rose beginning in 2021, which led to more product development and increased vacancy rates, while the office sector has experienced negative absorption since 2020, **(c)** elevated vacancy rates in the multi-family sector are concentrated in the Sun Belt markets as projects financed in 2021 are completed, and **(d)** construction starts in the multi-family and industrial sectors have declined since 2022. He also answered questions regarding the different overall and stabilized vacancy rates across geographies and the team’s views on adjusting the portfolio’s investment strategy in light of current trends.

Mr. Rothenberg then reviewed the real estate portfolio, noting that the portfolio’s market value held steady at approximately \$11.8 billion as of the end of Q3 2024, representing 9% of the CTF. He discussed the portfolio’s **(i)** risk profile, which has not materially changed, **(ii)** diversification by property type, highlighting the portfolio’s underweight to office, and **(iii)** multi-family investments relative to the benchmark.

Mr. Rothenberg also reviewed the portfolio’s performance, highlighting **(a)** outperformance relative to the benchmark over all time periods despite negative absolute returns for the one-year period, and **(b)** contributors for the one-year period, including the portfolio’s underweight to office and exposure to credit strategies and alternative sectors. He then **(i)** answered questions regarding relative performance of the portfolio’s industrial, multi-family and credit holdings, **(ii)** reviewed the commitments made in the third quarter and the pipeline under review, and **(iii)** confirmed that the portfolio remained in compliance with its investment guidelines.

C. Private Debt

Chris Prestigiaco, Head of Private Debt & Venture Capital, presented the *Private Debt Portfolio Investment Committee Quarterly Report*, included on pages 64-75 in the meeting materials. Mr. Prestigiaco provided a private debt market update for the third quarter, noting that **(a)** fundraising is anticipated to reach approximately \$200 billion by the end of the year, driven by strong investor interest in private debt strategies, **(b)** investors continue to prefer more established managers, which received the significant majority of fund commitments during the quarter, **(c)** direct lending remains the preferred sub-strategy within private debt, accounting for over 50% of funds closed, **(d)** dry powder available to invest has leveled off at approximately \$520 billion, which could decline further if lower interest rates spark increased transaction activity, and **(e)** overall leverage increased slightly year-

over-year but remains below long-term historical averages, while default rates remain low, due in part to an uptick in loan modifications.

Mr. Prestigiaco noted that one loan paid off and several new loans were added during the quarter. He then reviewed the portfolio's **(i)** characteristics, with the overall market value and average coupon increasing from the prior quarter while average life and duration decreased modestly, **(ii)** current below investment grade (BIG) holdings, which decreased to 6% due in part to amortization of existing loans, **(iii)** sector mix, which remained slightly underweight industrial relative to the benchmark, and **(iv)** originations within and outside Wisconsin, noting the higher average coupon for non-Wisconsin loans.

With respect to the portfolio's performance, Mr. Prestigiaco highlighted that the portfolio outperformed its benchmark over the three- and five-year time periods but underperformed for the one-year period, with one-year relative performance declining by approximately 50 basis points (bps) from the prior quarter due to the negative performance of one loan. He then **(a)** reported that there were no problem credits or workouts in the portfolio, **(b)** confirmed that the portfolio remained in compliance with its guidelines, and **(c)** discussed the pipeline under review.

D. Funds Alpha

Derek Drummond, Head of Funds Alpha, presented the *Funds Alpha Q3 2024 Update*, included on pages 76-82 in the meeting materials. He discussed performance for the third quarter, highlighting that the hedge fund and beta one portfolios all had positive excess value added (EVA) year-to-date and that the beta one equity portfolio now generated positive EVA for the three-year period. With respect to performance for the third quarter, he commented that **(a)** the beta one equity portfolio's performance was down slightly, with volatile alpha driven by a positive earnings period and then undercut by specific macroeconomic events, **(b)** the beta one fixed income portfolio's strong returns for the quarter were driven by risk-on spread compression in U.S. and emerging markets, and **(c)** the hedge funds portfolio's positive performance was primarily due to equity long/short and multi-strategy strategies.

Mr. Drummond then provided an update on the market environment, noting that **(i)** hedge fund managers are approaching the U.S. election with slightly lower levels of net-to-gross risk, **(ii)** U.S. fixed income managers have taken risk down as credit spreads rallied, while idiosyncratic risk among emerging market debt managers remains elevated, **(iii)** the team is seeking to increase tracking error for the beta one equity portfolio, **(iv)** an unanticipated stimulus announcement in China led to increased international capital flows and factor rotations in equities, **(v)** while large platforms continue to increase assets under management, they are not adding staff at the same rate and are increasingly outsourcing mandates to external managers, and **(vi)** discrepancies between index and single-name volatilities have created relative value opportunities while highlighting increased earnings risk for security selection. Lastly, he reviewed manager positioning and factor exposures in the beta one portfolios, commenting that the beta one equity portfolio is recently overweight beta, and confirmed that all portfolios were in compliance with their guidelines for Q3 2024.

5. Convene in Closed Session

Motion: A motion to go into closed session as authorized pursuant to sections 19.85(1)(e) and 19.36(5) of the Wisconsin Statutes to consider confidential strategies for the investment

of public funds, including (a) the review of active risk profiles of portfolio investments and the Core and Variable Trust Funds, and (b) the review of specific proprietary investment strategies and investment instruments related to private equity, real estate, private debt, venture capital, funds alpha, and exposure management, was made by Mr. Stanton and seconded by Mr. Nicholson.

Mr. Denson called for a roll call vote.

Denson-Aye	Fink-Aye	Mattina-Aye	Cavaglia-Aye
Drummond-Aye	Linn-Aye	Maung-Aye	Nicholson-Aye
Rector-Aye	Shearer-Aye	Stanton-Aye	Zhang-Aye

There being twelve ayes and no nays, Mr. Denson declared the motion passed. The Committee convened in closed session at 2:02 p.m. and reconvened in open session at 3:05 p.m.

6. Announcement of Committee Actions Relating to Items Taken Up in Closed Session

Mr. Denson announced that, while in closed session, the Committee (i) reviewed active risk profiles of portfolio investments and the Core and Variable Trust Funds, and (ii) reviewed specific proprietary investment strategies and investment instruments related to private equity, real estate, private debt, venture capital, funds alpha, and exposure management.

7. October Board Workshop Debrief

Todd Mattina, Head Economist & Asset and Risk Allocation Chief Investment Officer, provided a summary of the October Board Workshop. He noted that sessions included (a) a preview of NEPC’s asset allocation recommendations, made in consultation with the ARA division, to be presented to the Board for approval in December, (b) discussions regarding innovative projects undertaken across the agency, including a technology and data management strategy update, a fireside chat regarding a funds alpha managed account platform that enhances capital efficiency and transparency, and new leverage diversification initiatives, (c) an external speaker session with Frank Kelly, founder of a political risk advisory firm, who reviewed the potential impacts of the U.S. presidential election on the macroeconomic environment, and (d) a fireside chat with Chris Ailman, former CIO of CalSTRS, who discussed the opportunity costs of divestment as well as energy transition investment opportunities.

8. Soft Risk Parameters

Hassan Chehime, Head of Risk Management, noted that the report *Soft Risk Parameters—Asset Class and Portfolio*, as of September 30, 2024, was included on pages 181-182 in the meeting materials for the Committee’s review. Mr. Chehime indicated that there was one new discussion trigger this month relating to the ex ante tracking error for the long Treasury portfolio. He also noted that the soft risk parameters (SRPs) had been updated to remove the SRPs related to the active internal global equity strategy due to its recent closure.

9. Future Meeting Topics

Mr. Denson noted that draft agendas for the November 26, 2024 and December 19, 2024 Committee meetings were included on pages 183-186 in the meeting materials for the Committee's review.

10. Adjournment

Motion: A motion to adjourn the meeting was made by Mr. Shearer and seconded by Mr. Cavaglia. The motion passed unanimously, and the meeting adjourned at 3:10 p.m.

Date of Committee Approval: _____

Signed: /s/ Eric Barber
Eric Barber, Secretary
Investment Committee

Name of Meeting: Staff Investment Committee Meeting
Date/Time: Tuesday, November 26, 2024 1:00 pm
Room: 7th Floor Conference Room - 7022
Address: 4703 Madison Yards Way, Madison, WI 53705

Est. Time Minutes	Action Item	Topic	Presenter
		OPEN SESSION	
	Motion	1. Approval of the Minutes – Open Session A. October 22, 2024	
25	Motion	2. 2025 Asset Allocation Recommendations	Joe Nankof, NEPC
10	Motion	3. Annual Benchmark Presentation	Joe Nankof, NEPC
10	Motion	4. Amendments to Investment Committee WRS Investment Guidelines	Lisa Lange
5		5. Global Public Market Strategies Division Update	Mike Shearer Nick Stanton
20		6. Q3 2024 Quarterly Updates A. LIRM B. Multi-Asset C. Fixed Income Strategies D. Global Equities E. Small Cap	Andrea Ruiz Chase Nicholson Mike Shearer Nick Stanton Joy Mukherjee
	Motion	CLOSED SESSION*	
	Motion	RECONVENE IN OPEN SESSION	
		7. Announcement of Committee Actions Relating to Items Taken Up in Closed Session	
		8. Soft Risk Parameters (No presentation unless requested)	

* A motion to go into closed session at this meeting is authorized pursuant to sections 19.85(1)(e) and 19.36(5) of the Wisconsin Statutes (a) to consider confidential strategies for the investment of public funds, including (i) the review of active risk profiles of portfolio investments and the Core and Variable Trust Funds, and (ii) the review of specific proprietary investment strategies and investment instruments related to global equities, small cap equities, fixed income strategies, multi-asset, short-term credit, and exposure management, and (b) to discuss and approve prior closed session minutes that discuss the same. The Committee may convene in additional closed sessions or announce additional closed session items at the meeting in accordance with the procedure outlined in the Attorney General’s Opinion reported at 66 OAG 106 (1977). Whenever a closed session is held, the committee will subsequently reconvene in open session to cover remaining agenda items.

		9. Future Meeting Topics	
	Motion	10. Motion to Adjourn	
		<p><i>NOTES: Items may be taken in order other than listed.</i></p> <p><i>The meeting site is physically accessible. Upon prior request, reasonable accommodations will be provided.</i></p>	

<p><u>Future Meetings</u></p> <p>12/19/24 – Dec Committee Mtg. 1/28/25 – Jan Committee Mtg. 2/25/25 – Feb Committee Mtg. 4/1/25 – March Committee Mtg. 4/22/25 – April Committee Mtg. 5/27/25 – May Committee Mtg. 6/24/25 – June Committee Mtg. 7/29/25 – July Committee Mtg.</p>	<p><u>Voting Committee Members:</u></p> <p>Edwin Denson (Chair), Executive Director/Chief Investment Officer Anne-Marie Fink, Private Markets & Funds Alpha–CIO Todd Mattina, Head Economist, Asset & Risk Allocation–CIO Stefano Cavaglia, Senior Portfolio Manager–Asset & Risk Allocation Derek Drummond, Head of Funds Alpha Diane Linn, Senior Portfolio Manager–Multi-Asset Strategies Lin Maung, Senior Portfolio Manager–Private Equity Chase Nicholson, Senior Portfolio Manager–Multi-Asset Strategies Jason Rector, Portfolio Manager–Funds Alpha Mike Shearer, Head of Fixed Income Strategies Nick Stanton, Head of Multi-Asset Strategies Ivy Zhang, Senior Portfolio Manager–Asset & Risk Allocation</p> <p><u>Non-voting Committee Members</u></p> <p>Rochelle Klaskin, Deputy Executive Director/Chief Operating Officer Eric Barber (Secretary), Chief Legal Counsel Hassan Chehime, Head of Risk Management</p>
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AGENDA / NOTICE

Name of Meeting: Staff Investment Committee Meeting
Date/Time: Thursday, December 19, 2024 1:00 pm
Room: 7th Floor Conference Room - 7022
Address: 4703 Madison Yards Way, Madison, WI 53705

Est. Time Minutes	Action Item	Topic	Presenter
		OPEN SESSION	
	Motion	1. Approval of the Minutes – Open Session A. November 26, 2024	
5		2. Transition Update (Q3 2024)	Joe Roth
	Motion	CLOSED SESSION*	
	Motion	RECONVENE IN OPEN SESSION	
		3. Announcement of Committee Actions Relating to Items Taken Up in Closed Session	
5		4. Research Task Force Report	Stefano Cavaglia
		5. Quarterly Performance Review (Q3 2024) (No presentation unless requested)	
		6. Soft Risk Parameters (No presentation unless requested)	
		7. Future Meeting Topics	
	Motion	8. Motion to Adjourn	
		<i>NOTES: Items may be taken in order other than listed.</i> <i>The meeting site is physically accessible. Upon prior request, reasonable accommodations will be provided.</i>	

* A motion to go into closed session at this meeting is authorized pursuant to sections 19.85(1)(e) and 19.36(5) of the Wisconsin Statutes (a) to consider confidential strategies for the investment of public funds, including (i) the review of active risk profiles of portfolio investments and the Core and Variable Trust Funds, (ii) the review of specific proprietary investment strategies and investment instruments related to asset and risk allocation and exposure management, and (iii) the review of broker information, and (b) to discuss and approve prior closed session minutes that discuss the same. The Committee may convene in additional closed sessions or announce additional closed session items at the meeting in accordance with the procedure outlined in the Attorney General’s Opinion reported at 66 OAG 106 (1977). Whenever a closed session is held, the committee will subsequently reconvene in open session to cover remaining agenda items.

Future Meetings

1/28/25 – Jan Committee Mtg.
 2/25/25 – Feb Committee Mtg.
 4/1/25 – March Committee Mtg.
 4/22/25 – April Committee Mtg.
 5/27/25 – May Committee Mtg.
 6/24/25 – June Committee Mtg.
 7/29/25 – July Committee Mtg.

Voting Committee Members:

Edwin Denson (Chair), Executive Director/Chief Investment Officer
Anne-Marie Fink, Private Markets & Funds Alpha–CIO
Todd Mattina, Head Economist, Asset & Risk Allocation–CIO
Stefano Cavaglia, Senior Portfolio Manager–Asset & Risk Allocation
Derek Drummond, Head of Funds Alpha
Diane Linn, Senior Portfolio Manager–Multi-Asset Strategies
Lin Maung, Senior Portfolio Manager–Private Equity
Chase Nicholson, Senior Portfolio Manager–Multi-Asset Strategies
Jason Rector, Portfolio Manager–Funds Alpha
Mike Shearer, Head of Fixed Income Strategies
Nick Stanton, Head of Multi-Asset Strategies
Ivy Zhang, Senior Portfolio Manager–Asset & Risk Allocation

Non-voting Committee Members

Rochelle Klaskin, Deputy Executive Director/Chief Operating Officer
Eric Barber (Secretary), Chief Legal Counsel
Hassan Chehime, Head of Risk Management

AGENDA / NOTICE

Name of Meeting: Staff Investment Committee Meeting
Date/Time: Tuesday, January 28, 2025 1:00 pm
Room: 7th Floor Conference Room - 7022
Address: 4703 Madison Yards Way, Madison, WI 53705

Est. Time Minutes	Action Item	Topic	Presenter
		OPEN SESSION	
	Motion	1. Approval of the Minutes – Open Session A. December 19, 2024	
5	Motion	2. Amendments to SWIB Investment Committee Charter	Eric Barber
5		3. Private Markets & Funds Alpha Division Update	Anne-Marie Fink
45		4. Q4 2024 Quarterly Updates A. Private Equity B. Real Estate C. Private Debt D. Funds Alpha	Scott Parrish Jason Rothenberg Chris Prestigiacomo Derek Drummond
	Motion	CLOSED SESSION*	
	Motion	RECONVENE IN OPEN SESSION	
		5. Announcement of Committee Actions Relating to Items Taken Up in Closed Session	
		6. Soft Risk Parameters (No presentation unless requested)	
		7. Future Meeting Topics	
	Motion	8. Motion to Adjourn	
		<i>NOTES: Items may be taken in order other than listed.</i> <i>The meeting site is physically accessible. Upon prior request, reasonable accommodations will be provided.</i>	

* A motion to go into closed session at this meeting is authorized pursuant to sections 19.85(1)(e) and 19.36(5) of the Wisconsin Statutes (a) to consider confidential strategies for the investment of public funds, including (i) the review of active risk profiles of portfolio investments and the Core and Variable Trust Funds, and (ii) the review of specific proprietary investment strategies and investment instruments related to global public market strategies, private equity, real estate, private debt, venture capital, funds alpha, and exposure management, and (b) to discuss and approve prior closed session minutes that discuss the same. The Committee may convene in additional closed sessions or announce additional closed session items at the meeting in accordance with the procedure outlined in the Attorney General’s Opinion reported at 66 OAG 106 (1977). Whenever a closed session is held, the committee will subsequently reconvene in open session to cover remaining agenda items.

Future Meetings

2/25/25 – Feb Committee Mtg.
 4/1/25 – March Committee Mtg.
 4/22/25 – April Committee Mtg.
 5/27/25 – May Committee Mtg.
 6/24/25 – June Committee Mtg.
 7/29/25 – July Committee Mtg.
 8/26/25 – August Committee Mtg.
 9/23/25 – September Committee Mtg.
 10/28/25 – October Committee Mtg.
 11/25/25 – November Committee Mtg.
 12/18/25 – December Committee Mtg.

Voting Committee Members:

Edwin Denson (Chair), Executive Director/Chief Investment Officer
Anne-Marie Fink, Private Markets & Funds Alpha–CIO
Todd Mattina, Head Economist, Asset & Risk Allocation–CIO
Stefano Cavaglia, Senior Portfolio Manager–Asset & Risk Allocation
Derek Drummond, Head of Funds Alpha
Diane Linn, Senior Portfolio Manager–Multi-Asset Strategies
Lin Maung, Senior Portfolio Manager–Private Equity
Chase Nicholson, Senior Portfolio Manager–Multi-Asset Strategies
Jason Rector, Portfolio Manager–Funds Alpha
Mike Shearer, Head of Fixed Income Strategies
Nick Stanton, Head of Multi-Asset Strategies
Ivy Zhang, Senior Portfolio Manager–Asset & Risk Allocation

Non-voting Committee Members

Rochelle Klaskin, Deputy Executive Director/Chief Operating Officer
Eric Barber (Secretary), Chief Legal Counsel
Hassan Chehime, Head of Risk Management

Board Meeting

Tab 7 – Quarterly Investment Update, Q3 2024



Quarterly Investment Update

Board Meeting

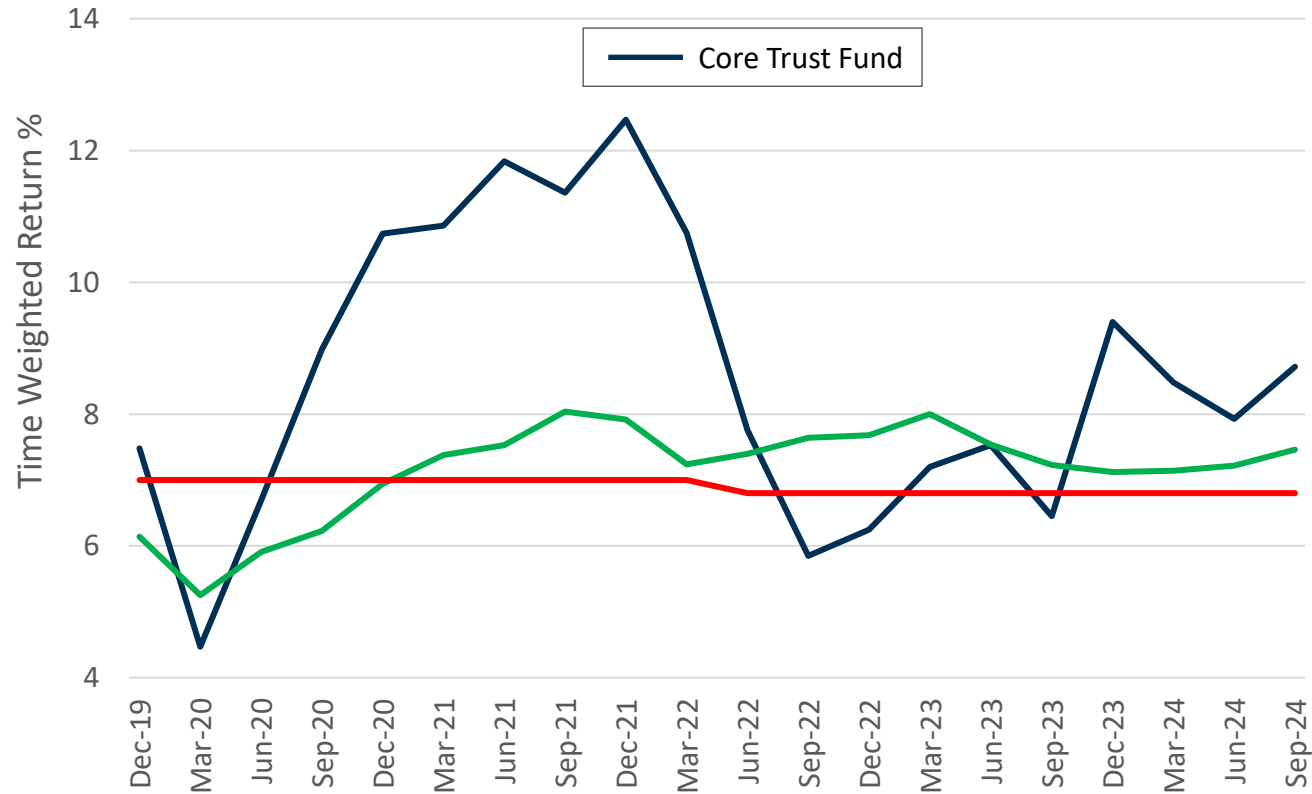
December 11, 2024

Performance Trends & Outlook

CTF 5-Year Rolling NoF Return Trend

Quarter-end Results Through September 30, 2024

**CTF 5-Year Rolling Annualized
Net of External Manager Fee Return % ("NoF" Return)**



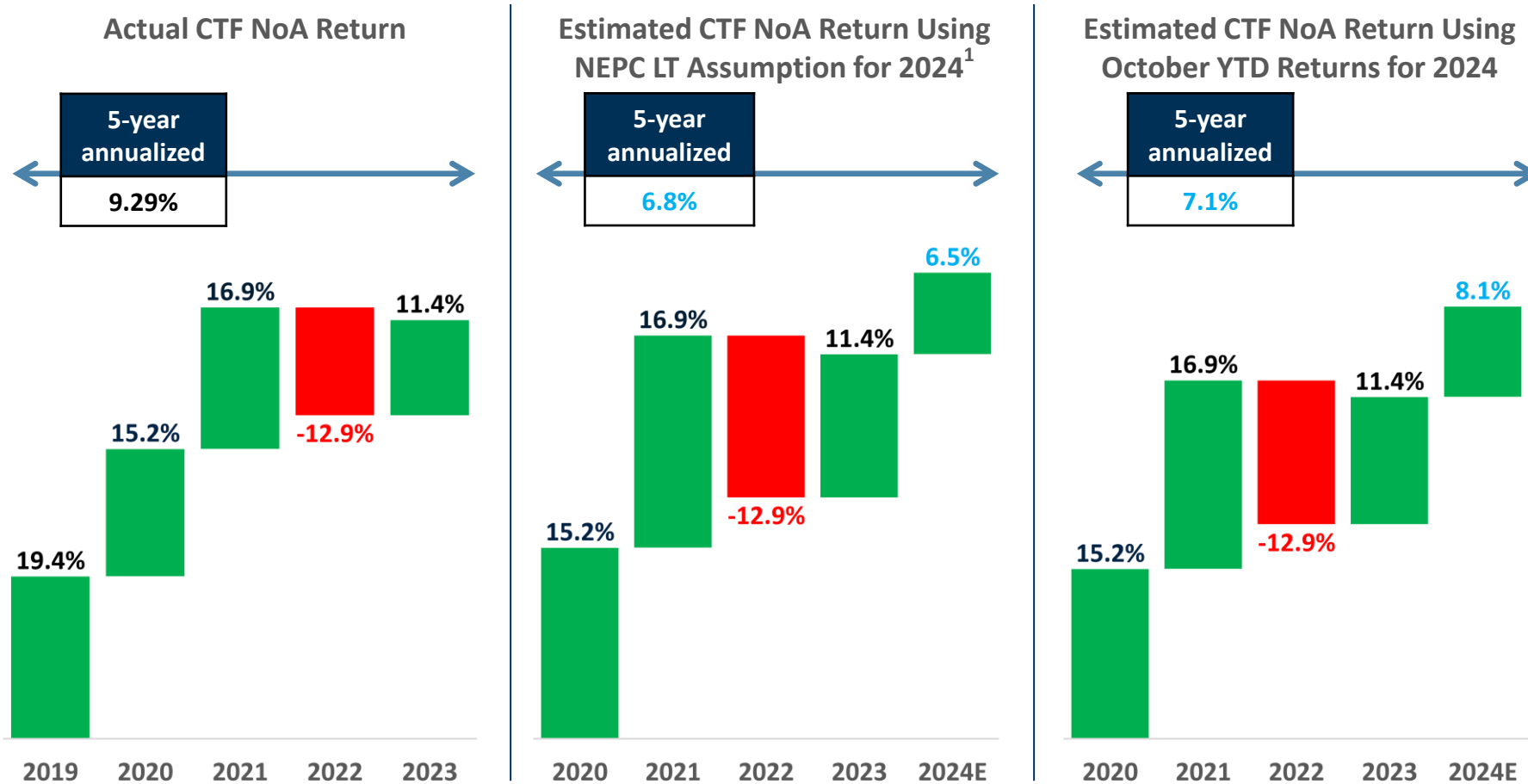
5-Year Annualized NoF Return (as of September 30, 2024)	
8.72%	Core Trust Fund
7.88%	CTF Policy Benchmark

7.46%
CTF 20-Year NoF Return

6.8%
Actuarial Target Rate of Return

CTF 5-Year NoA Return Estimate

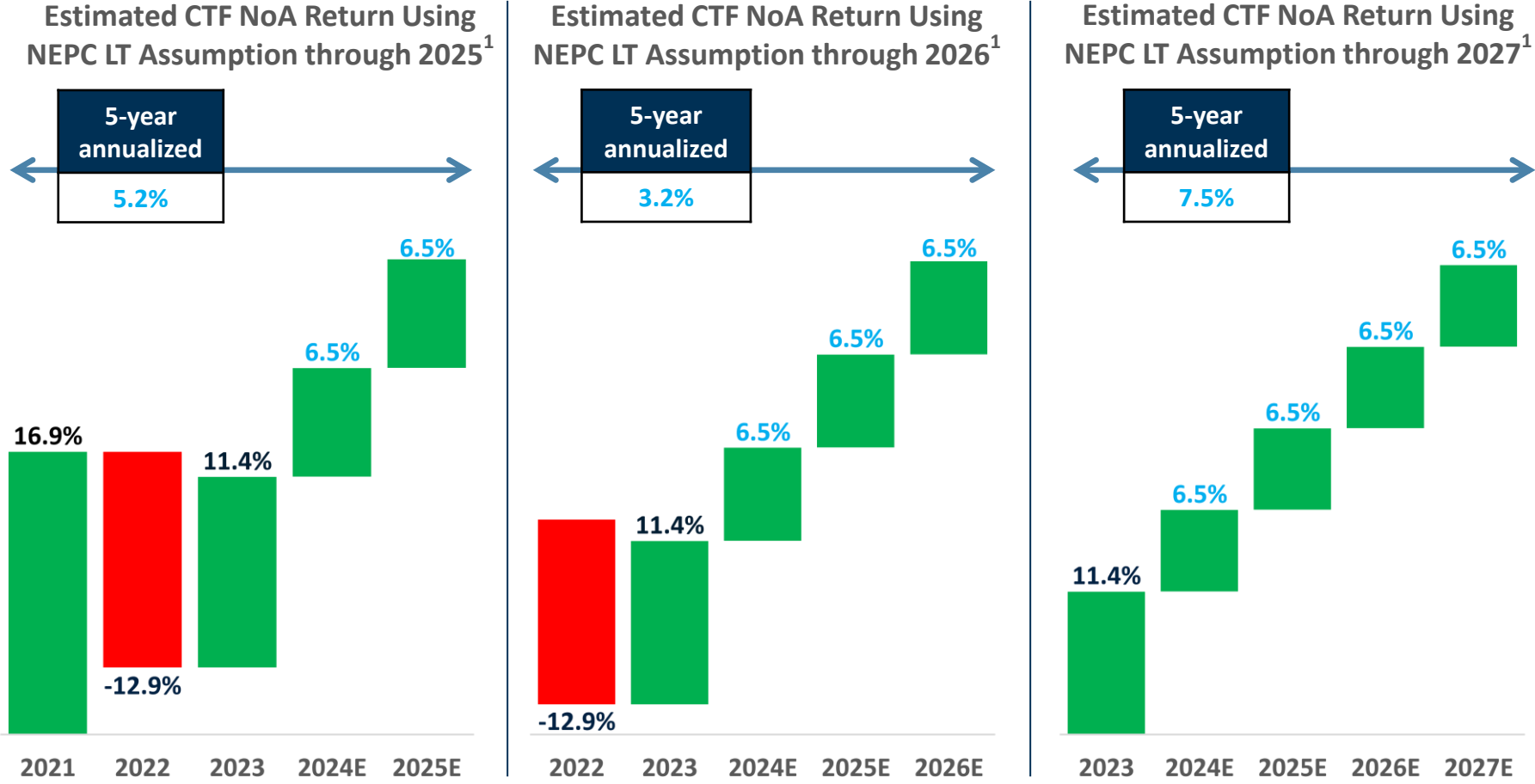
Calendar year and 5-year annualized returns



¹ 6.5% is NEPC's 10-year expected return for SWIB's 2024 policy portfolio and is used to estimate future year performance through 2027. SWIB's asset allocation process balances risk and expected return to set its asset allocation. The 10-year expected return does not always equal or exceed the WRS assumed rate of return, currently 6.8%. SWIB's actual results may be more or less than the NEPC 10-year expected return. 4

CTF 5-Year NoA Return Forward Estimate

Calendar year and 5-year annualized returns

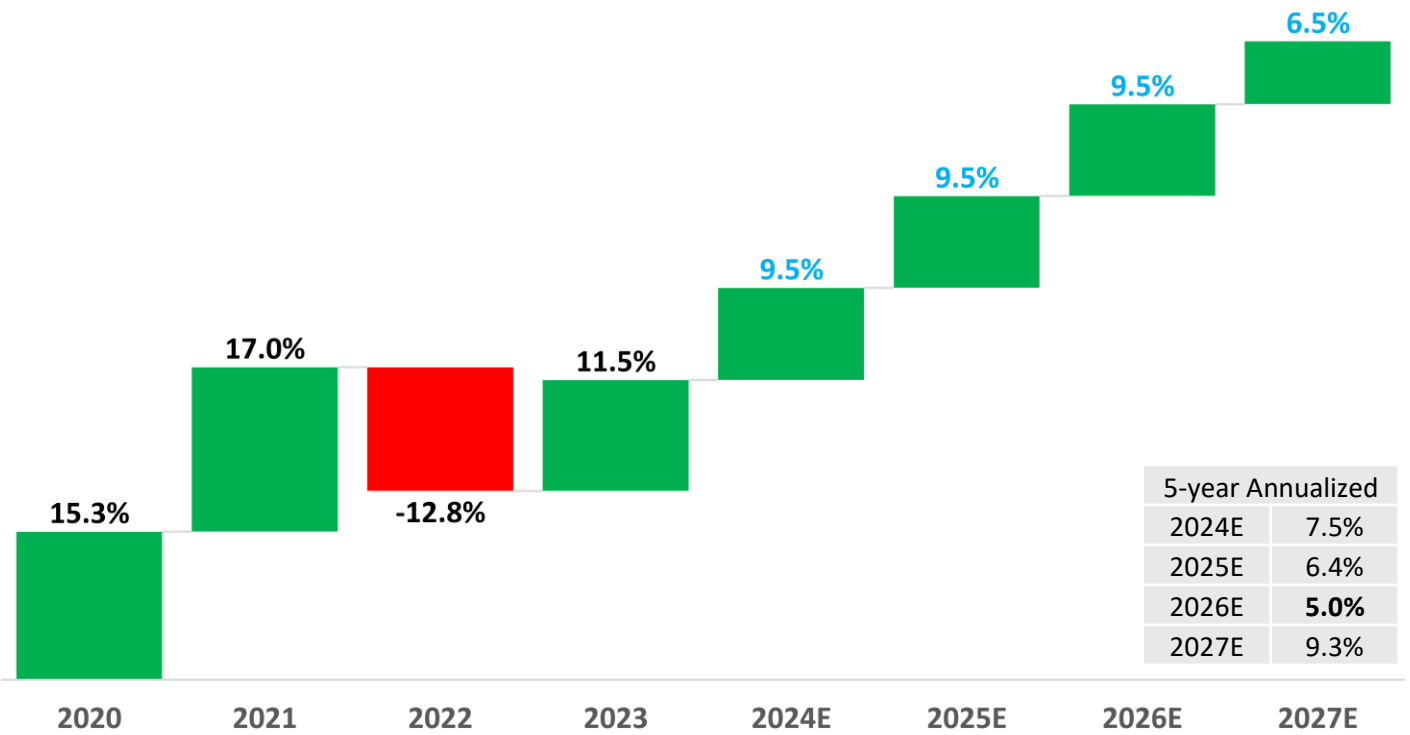


¹ 6.5% is NEPC's 10-year expected return for SWIB's 2024 policy portfolio and is used to estimate future year performance through 2027. SWIB's asset allocation process balances risk and expected return to set its asset allocation. The 10-year expected return does not always equal or exceed the WRS assumed rate of return, currently 6.8%. SWIB's actual results may be more or less than the NEPC 10-year expected return. 5

Average Return Required for No Dividend Cut

Calendar year and 5-year annualized returns

A 9.5% average return for 2024-2026 avoids a negative CTF dividend adjustment¹



¹ Based on SWIB calculations, calendar year returns of 9.5% in 2024E to 2026E would maintain the 5-year annualized return at 5% or higher to avoid a negative dividend adjustment. The ETF Effective Rate is assumed to be the same as the 5-year annualized CTF NOF Return. NEPC 10-year expected return assumption is used to estimate 2027.

CTF Policy Benchmark & Other Indices

October 31, 2024: Total Rate of Return %, Annualized					
Index Name (Gross Return Basis, unless noted)	YTD	1yr	5yr	10yr	10yr volatility
CTF Policy Benchmark (Net)	7.1	17.0	7.2	6.9	8.7
MSCI USA	20.8	38.4	15.3	12.9	15.5
MSCI USA Small Cap	10.2	33.9	10.4	9.3	19.5
MSCI World ex US Equities (Net)	7.3	23.8	6.6	5.3	15.3
MSCI World ex US Equities (Net) (Local)	11.0	20.9	8.3	7.3	12.4
MSCI EAFE Small Cap	4.6	23.6	4.5	6.2	16.7
MSCI Emerging Markets ex China	8.9	28.0	7.2		
MSCI China	21.9	22.0	(1.0)	2.5	24.8
MSCI ACWI	16.4	33.4	11.6	9.6	14.8
MSCI ACWI (Local)	17.8	32.6	12.4	10.6	13.6
Bloomberg US Gov't / Credit	1.9	10.2	(0.1)	1.7	5.2
ICE BOFA High Yield BB/B	6.3	14.9	4.0	20.8	7.3
Bloomberg U.S. TIPs	3.0	8.6	2.2	2.3	5.0

Source: Factset, SWIB

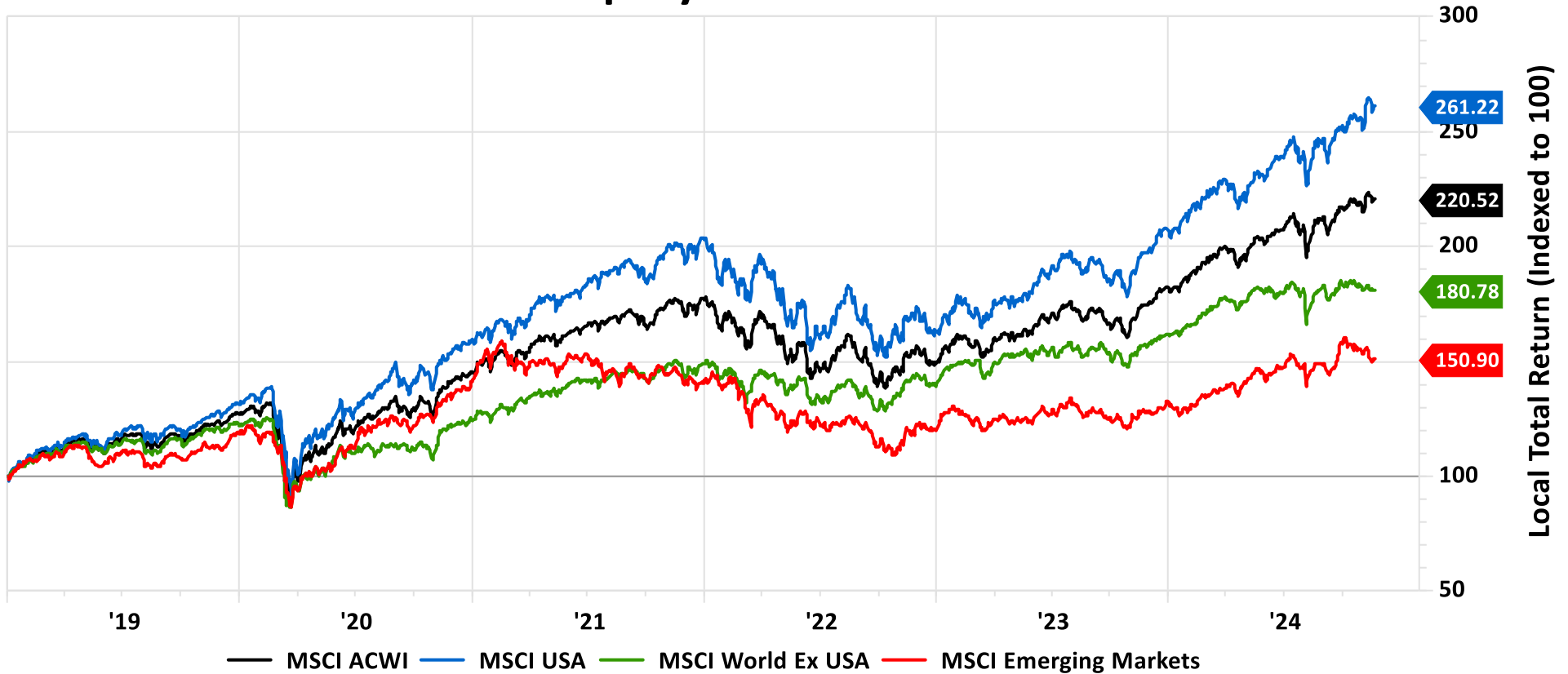
Asset Class Review

Global Equities - Performance

Both DM and EM equities were volatile in the last few weeks

11/21/2024

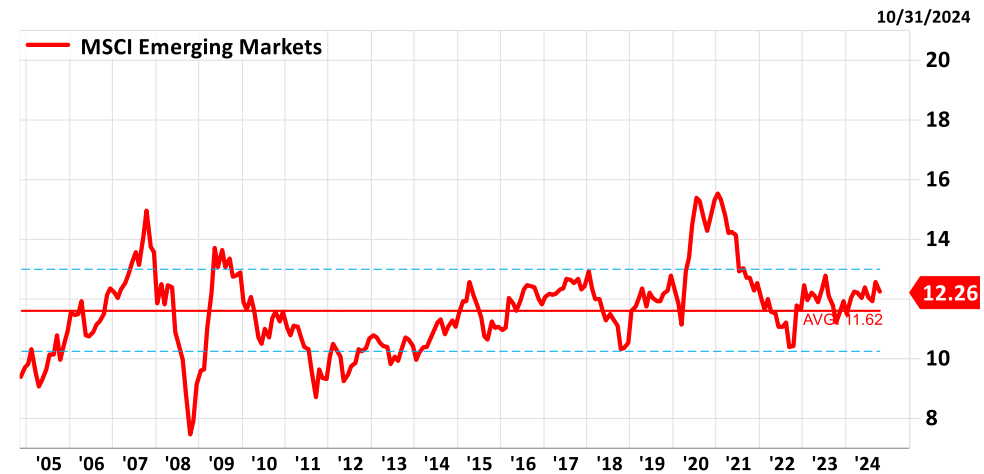
Local Equity Performance



Source: FactSet

Global Equities - Valuation

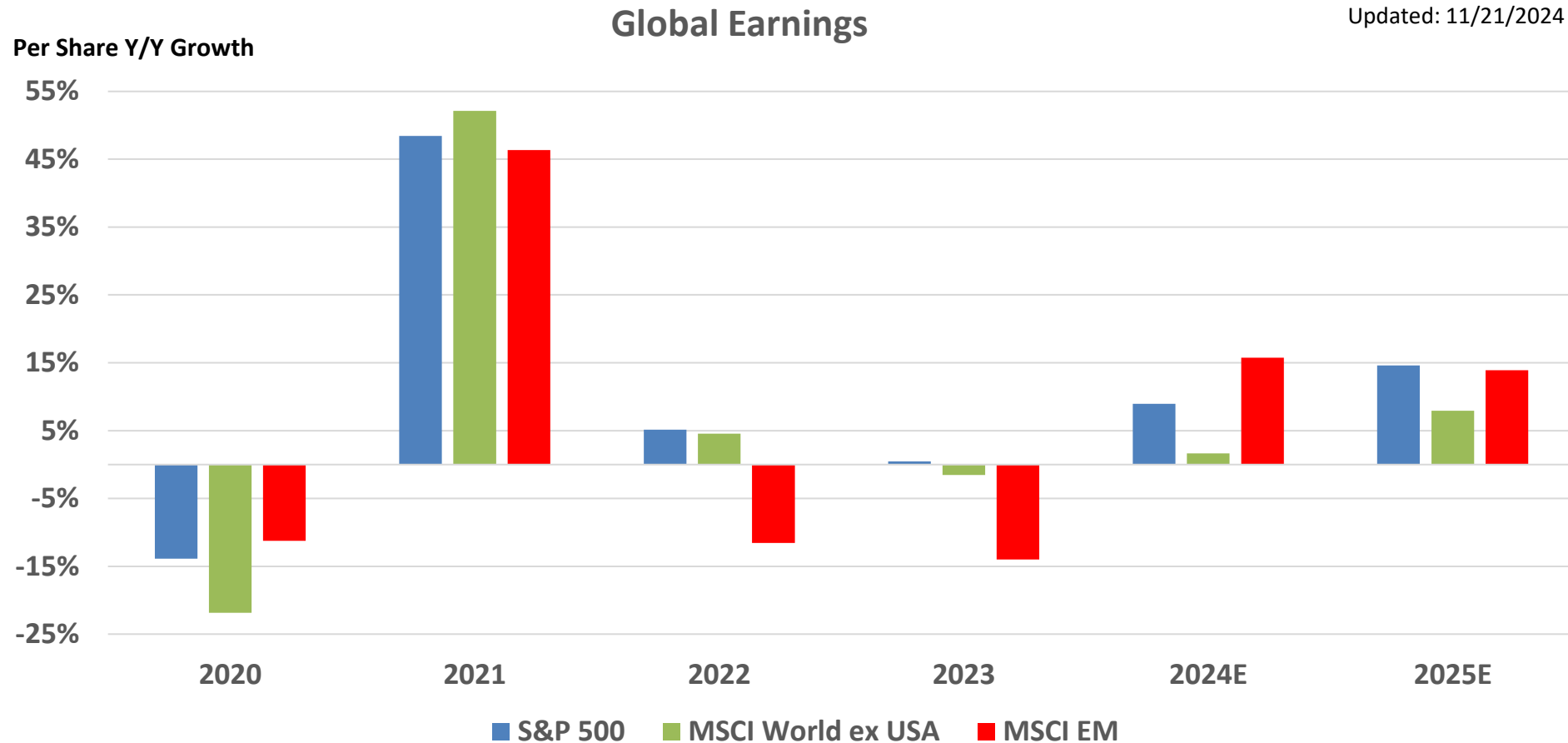
US P/E ratio is above one standard deviation of its 20-year average



Source: FactSet Market Aggregates - Next Twelve Month P/E Ratio, monthly, 20-year Average with 1 Std. Dev. Bands

Earnings Growth

Developed ex US earnings growth forecast has dimmed for 2024



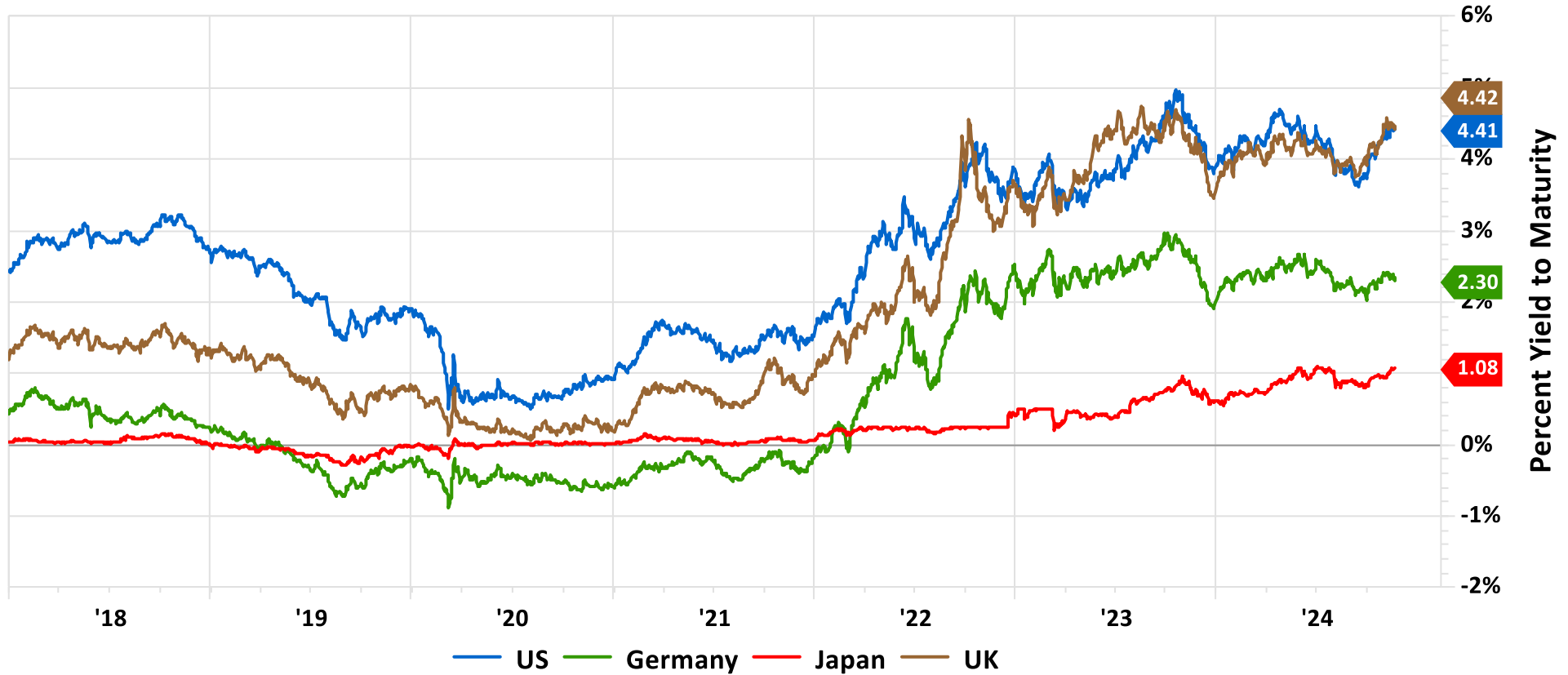
Source: Analyst Consensus; FactSet

Global Bonds

DM yields have increased in recent weeks

11/21/2024

10-Year Government Bond Yields

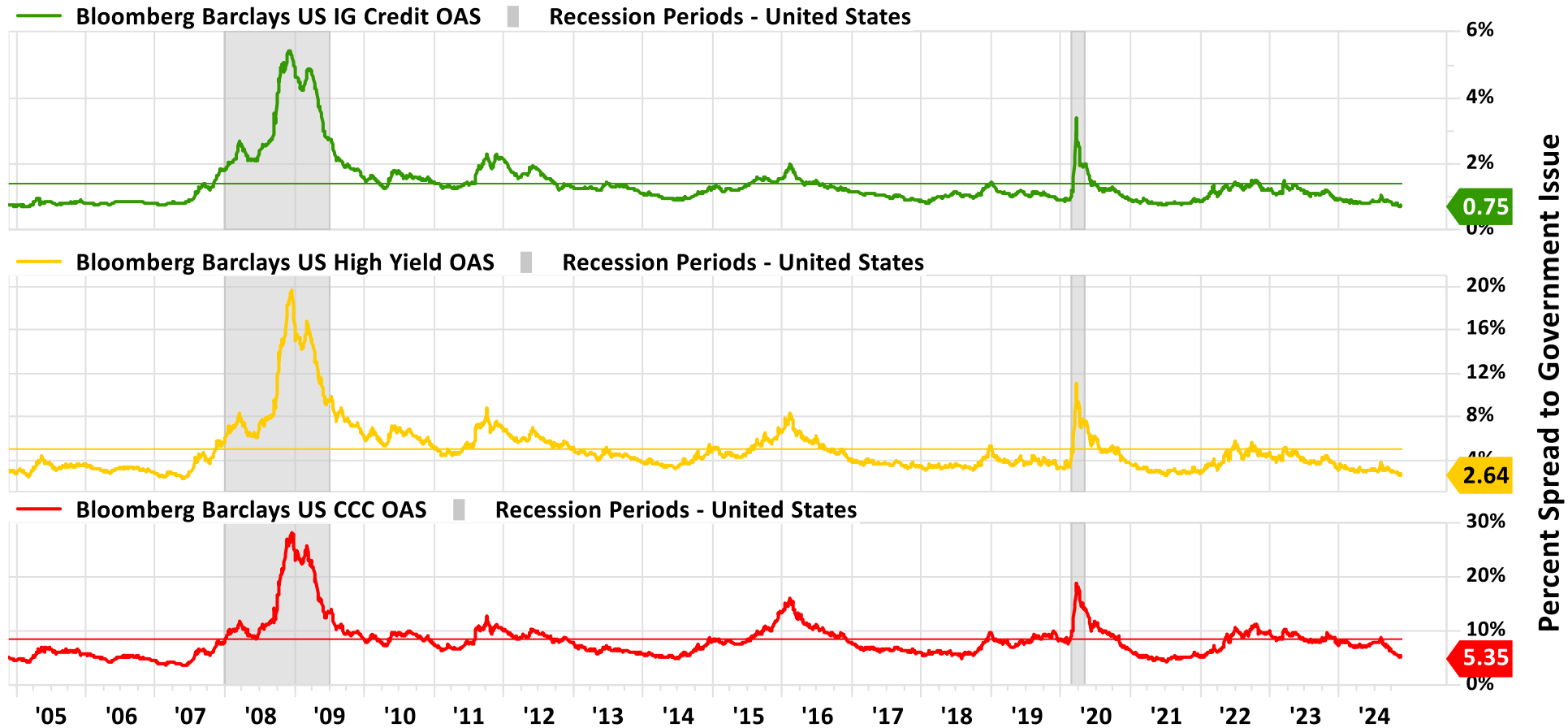


Source: FactSet

Credit Sectors

Spread levels are below the long run averages

11/21/2024

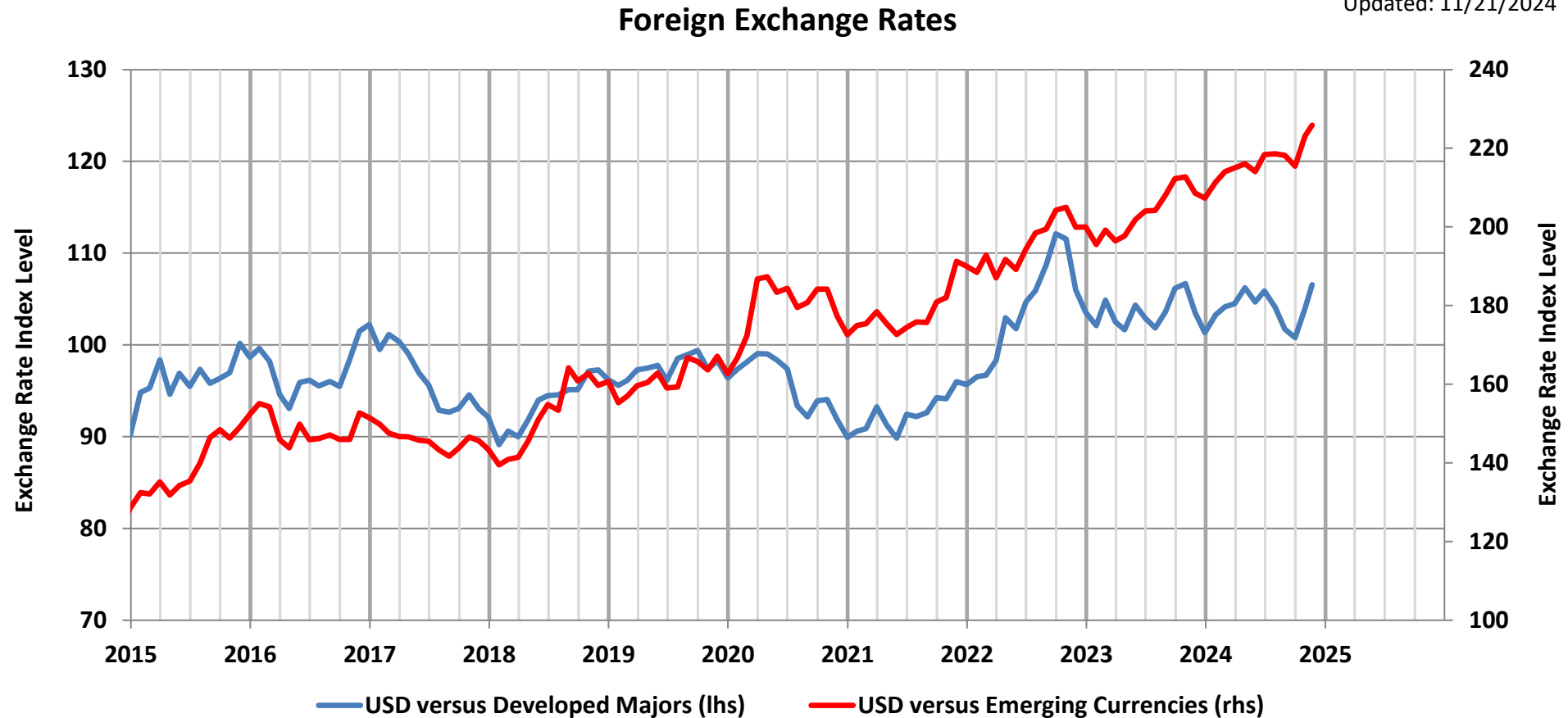


Source: FactSet

Currency Performance

USD versus DM remains in range; strength versus EM currencies continues

Updated: 11/21/2024



Source: Bloomberg, DXY Index, JPM Emerging Markets Currency Index (Inverted)

U.S. Inflation

Inflation expectations have moved sharply higher in the past 2 months

As of: 11/21/2024

US 5 Year Breakeven Inflation



Source: Bloomberg

Global Public Market Strategies Division

Mike Shearer – Head of Fixed Income

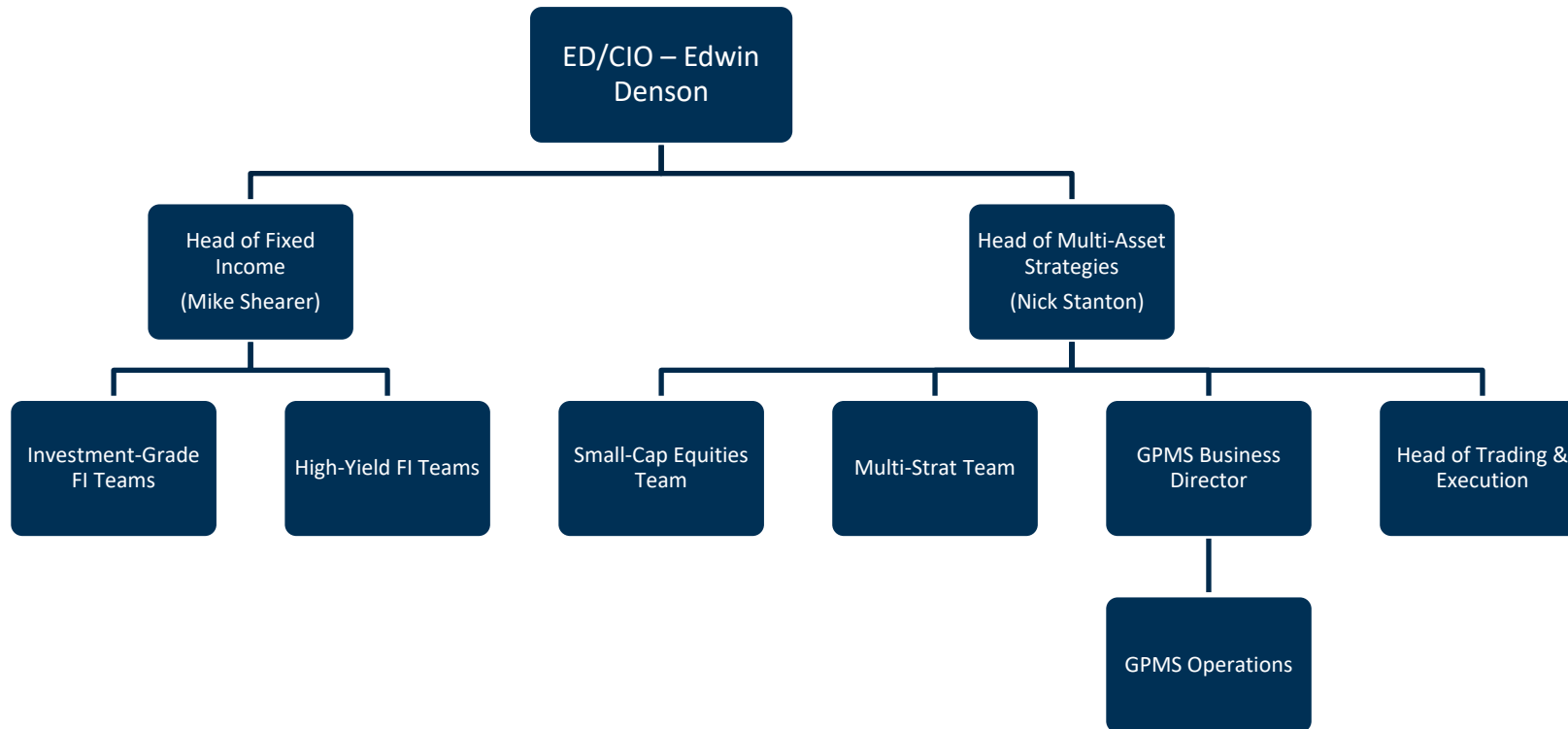
Nick Stanton – Head of Multi-Asset Strategies

December 11, 2024 Board Meeting

Divisional Role & Structure

- The Global Public Market Strategies (GPMS) Division was created in January 2020 by consolidating the internally-managed public market strategies under a single structure. The division also includes key service areas to this effort including trading and public markets operations.
- SWIB makes use of internal asset management in areas where we can attract skilled talent and have a reasonable chance of meaningful long-run alpha creation.
- The division's goal is to maximize long-run EVA while staying within the assigned active risk budget expectations.

GPMS Structure



GPMS Portfolios

As of 9/30/24

Portfolio	AUM (bil.)	Target \$ Volatility (mil.)	Expected IR
Multi-Strat	\$2.5	\$138	.47
High Yield	\$6.0	\$116	.19
U.S. Small Cap*	\$3.1	\$106	.16
MBS	\$2.8	\$32	.58
Leveraged Loans	\$2.7	\$29	.24
US IG Credit	\$3.9	\$24	.59
Long Treasuries	\$1.2	\$15	.21

*Combination of CTF and VTF accounts

GPMS Portfolios – Fixed Income

- The Fixed Income portfolios invest in different securities and sectors but follow a common disciplined, repeatable investment process with foundational risk management
 - Each potential investment is evaluated for return expectation against tracking error and tail-risk contribution
 - Seek uncorrelated idiosyncratic risk, while maintaining diversification at the sub-strategy and individual security levels
- Sector and Security Selection
 - Each sector team is staffed with experienced, proven investors
 - Utilize deep credit analysis and familiarity with management teams to seek individual companies and securities we believe are misvalued (rich or cheap) by the market and so will have differentiated performance versus the benchmark
- Take advantage of market inefficiencies and catalysts
 - The investment process is built on SWIB's ability to be a long-term investor that is nimble when opportunities arise
- Oversight of all portfolios – individual and combined – at the management level ensures appropriate risk allocation and adherence to the investment process

Fixed Income: Overview

Staffing

- 14 investment professionals

Experience

- 18 years avg. experience
- 2 PhDs, 9 Master's Degree, 5 CFAs

2024 Active Risk Budget Assumptions

	AUM (\$ Bil)	% of CTF EVA	% of CTF Risk
High Yield	5.3	2.1%	3.3%
MBS	2.3	1.7%	0.8%
IG Credit	3.2	1.4%	0.8%
Lev. Loans	2.4	0.6%	0.8%
Long Treas.	0.9	0.3%	0.0%

	Excess Returns				EVA (\$ mil.)			
	YTD	1-year	3-year	5-year	YTD	1-year	3-year	5-year
High Yield	0.78%	0.76%	-1.97%		39.5	35.9	-262.9	
MBS	2.31%	2.77%	0.43%		55.0	60.5	26.8	
IG Credit	0.38%	0.74%	-0.46%	0.42%	17.0	25.9	-72.9	
Lev. Loans	0.28%	0.48%			6.2	9.1		
Long Treas.	0.34%	0.49%			3.5	4.2		

GPMS Portfolios – Fixed Income

Integrated approach to portfolio management

- All portfolios utilize Blackrock Aladdin analytics for portfolio and risk management
 - Team management has consistently calibrated oversight of risks and exposures
- Information sharing between portfolio teams
 - Daily markets meeting
 - Cross-market analysis and insight
 - Macro analysis
 - Sector relative value
 - Individual companies

GPMS Portfolios – US Small-Cap

- Find stocks that can outperform the benchmark by conducting deep, fundamental, bottom-up research
 - Use our pool of experienced analysts to identify quality businesses with sustainable growth opportunities and strong balance sheets.
 - Build sound financial models to determine how changes in revenue, margins, etc. affect companies' long-run valuations.
- Maintain a long-term investment discipline
 - The team has historically found success investing in companies with strong competitive moats and sound fundamentals coupled with reasonable valuations.
 - SWIB's long-run focus allows the portfolio to be patient and stick with companies through short-term fluctuations. The team gets to know the portfolio companies well and forms direct lines of communication to company management.
- Run a diversified portfolio
 - The Small-Cap portfolio constantly evaluates risk exposures, making sure to adjust positioning if particular risk factor appear to be driving portfolio risk.

US Small Cap: Overview

Staffing

- 6 investment professionals

Experience

- 18 years avg. experience
- 5 MBAs, 5 CFAs

2024 Active Risk Budget Assumptions

	AUM (\$ Bil)	% of CTF EVA	% of CTF Risk
US Small-Cap	2.8	1.3%	2.4%

	Excess Returns				EVA* (\$ mil.)			
	YTD	1-year	3-year	5-year	YTD	1-year	3-year	5-year
US Small-Cap	3.82%	2.65%	1.08%	0.64%	85.8	51.6	97.2	68.5

*Small-Cap EVA numbers include CTF and VTF accounts

GPMS Portfolios – Multi-Strat

- The Multi-Strat Portfolio focuses on three areas of alpha creation in addition to one-off/opportunistic opportunities:
 - Fundamental Security Selection: These strategies focus on building portfolios of securities based on existing internal and external fundamental signals.
 - Fundamental Arbitrage: These strategies build security pairs or long/short baskets based on similar securities which are mispriced relative to each other. These strategies require fundamental insight regarding the meaningful difference between the securities, the likelihood and likely timing of reversion to parity, and the likely loss associated with a break between the securities.
 - Systematic: These are rules-based strategies which generally attempt to take advantage of small but persistent mispricing of securities due to investor biases. Although the development of the strategies uses fundamental insight, that insight is used to construct the rules associated with running the strategy as opposed to selecting stocks in real-time.

Multi-Strat: Overview

Staffing

- 9 investment professionals
- 1 Consultant

Experience

- 18 years avg. experience
- 2 PhDs, 9 Master's Degrees, 7 CFAs, 3 FRMs, 2 CAIAs, 1 CIPM

2024 Active Risk Budget Assumptions

	AUM (\$ Bil)	% of CTF EVA	% of CTF Risk
Multi-Strat	2.5	7.2%	3.3%

	Excess Returns				EVA (\$ mil.)			
	YTD	1-year	3-year	5-year	YTD	1-year	3-year	5-year
Multi-Strat	2.04%	0.28%	1.72%	1.72%	51.8	9.1	135.5	274.3

Board Meeting

Tab 8 – Announcement of Matters Taken Up in Closed Session

Board Meeting

Tab 9 – In the Absence of Questions, the Following Reports will be filed without comment (for informational purposes):

- A. Quarterly Charges to Funds Reports, Q3 2024
- B. Private Markets and Funds Alpha Commitments, Q3 2024
- C. Board Contact Log

November 14, 2024

Senator Howard Marklein, Co-Chair
 Joint Committee on Finance
 P.O. Box 7882
 Madison, WI 53707

Representative Mark Born, Co-Chair
 Joint Committee on Finance
 P.O. Box 8952
 Madison, WI 53708

Senator Eric Wimberger, Co-Chair
 Joint Legislative Audit Committee
 P.O. Box 7882
 Madison, WI 53707

Representative Robert Wittke, Co-Chair
 Joint Legislative Audit Committee
 P.O. Box 8953
 Madison, WI 53708

Secretary Kathy Blumenfeld
 Department of Administration
 101 East Wilson Street
 P.O. Box 7864
 Madison, WI 53707

Dear Senator Marklein, Senator Wimberger, Representative Born, Representative Wittke and Secretary Blumenfeld:

State statutes require the State of Wisconsin Investment Board (SWIB) to report all expenses charged to the trust funds under management and the number of full-time equivalent positions created or abolished during the quarter¹. The information contained in this report is for the quarter ended September 30, 2024.

Total Cost of Management Summary	4Q 2023	1Q 2024	2Q 2024	3Q 2024	Trailing 4 Qtr Total	% of Total
Internal Operating Expenses						
Operating Budget Expenses	\$ 30,466,430	\$ 16,684,634	\$ 53,105,483	\$ 20,205,307	\$ 120,461,854	71.7%
Custodial, Investment Operations & Banking	2,213,596	2,085,638	2,351,406	2,153,795	8,804,435	5.2%
Legal	254,543	470,162	82,559	251,976	1,059,240	0.6%
Investment Research & Consulting	7,637,651	9,086,537	8,818,009	8,176,891	33,719,088	20.1%
Total Internal Operating Expenses	\$ 40,572,220	\$ 28,326,971	\$ 64,357,457	\$ 30,787,969	\$ 164,044,617	97.6%
Total Securities Lending Agent Expenses	\$ 1,086,188	\$ 1,104,239	\$ 942,792	\$ 848,703	\$ 3,981,922	2.4%
Total SWIB Operating Costs	\$ 41,658,408	\$ 29,431,210	\$ 65,300,249	\$ 31,636,672	\$ 168,026,539	100.0%
Supplemental Information - External Investment Management Fees						
Real Estate	\$ 21,208,015	\$ 21,563,935	\$ 21,501,161	\$ 21,408,439	\$ 85,681,550	11.2%
Private Equity ¹	50,314,765	41,850,708	58,799,138	49,781,071	200,745,681	26.2%
Venture Capital ¹	8,349,306	7,253,041	9,827,891	8,997,014	34,427,252	4.5%
Current Return ¹	7,186,895	6,409,082	7,725,862	7,815,311	29,137,149	3.8%
Hedge Funds	70,745,475	108,182,074	72,599,021	58,200,199	309,726,769	40.5%
Beta One & Other - External Funds ²	(1,286,826)	73,848,455	35,822,481	(2,602,707)	105,781,403	13.8%
Total External Investment Management Fees	\$ 156,517,629	\$ 259,107,295	\$ 206,275,554	\$ 143,599,327	\$ 765,499,804	100.0%
Grand Total Cost of Management	\$ 198,176,037	\$ 288,538,505	\$ 271,575,803	\$ 175,235,999	\$ 933,526,343	

¹Beginning 3Q 2024, Private Equity & Venture Capital external fund fees are broken out in greater detail and reflected retroactively for the prior quarters presented.

²Beginning 3Q 2024, Beta One & Other separately managed fund fees and commingled fees have been combined to align with other SWIB external reporting.

¹Wisconsin Statutes Section 25.17 (13m): Investment-related costs and expenses charged to the WRS Trust Funds, State Investment Fund, State Life Insurance Fund, Historical Society Endowment Fund, Injured Patients and Families Compensation Fund and UW Trust Fund. Investment transaction expenses, such as trading commissions and interest expense, are included in investment returns, and therefore not included in this report.

SWIB operating costs are charged to the trust funds under management. Externally managed fund fees for commingled assets are netted against investment returns generated by SWIB’s external fund holdings. It is important to consider costs in the context of value-added investment returns. For example, during the five years ended December 31, 2023, after consideration of all expenses, costs, and fees, SWIB generated more than \$3.1 billion in additional profits beyond what would have been generated by the benchmark portfolio SWIB is measured against. These profits all go directly into the Wisconsin Retirement System for the benefit of its beneficiaries.

Attachment A provides a breakdown of the amount and percentage of assets managed under each type of dedicated and commingled account or partnership, and the change in the amount and percentage from the prior calendar quarter. As of September 30, 2024, SWIB’s total authorized full-time equivalent positions are 298 as shown in the table below.

Assets Under Management & Positions		
	6/30/2024	9/30/2024
Internal Management	44.8%	46.3%
External Management	55.2%	53.7%
Total SWIB Positions	298	298

In addition, Attachment B provides details of the services provided to SWIB and their associated quarterly costs. For definitions of the expense categories presented in the Total Cost of Management Summary table, please refer to Attachment C.

As new investment strategies are implemented and markets continue to evolve, SWIB will continue evaluating the most efficient means to manage the trust fund assets. Please contact us if you have any questions or comments about this report.

Sincerely,



Edwin Denson
Executive Director/Chief Investment Officer

Attachments

cc: Members, Joint Committee on Finance
Members, Joint Committee on Audit
Robert Lang, Legislative Fiscal Bureau
Joe Chrisman, Legislative Audit Bureau

Total Assets Under Management	12/31/2023		3/31/2024		6/30/2024		9/30/2024	
	Amount		Amount		Amount		Amount	
Wisconsin Retirement System (WRS)	(in millions)	%	(in millions)	%	(in millions)	%	(in millions)	%
Internally Managed Assets	\$50,381	38.0%	\$51,697	37.8%	\$51,414	37.4%	\$56,273	39.3%
Externally Managed Dedicated Assets	32,166	24.3%	36,294	26.6%	35,951	26.2%	36,150	25.3%
Externally Managed Commingled Assets	49,854	37.7%	48,357	35.5%	49,644	36.2%	50,245	35.2%
1. Passive Index	788	0.6%	741	0.5%	761	0.6%	699	0.5%
2. Limited Partnerships	34,302	25.9%	34,657	25.4%	35,214	25.7%	36,048	25.3%
3. Active Managed Commingled	14,764	11.2%	12,959	9.5%	13,669	10.0%	13,498	9.5%
Total WRS Assets	\$132,401	100.0%	\$136,348	100.0%	\$137,009	100.0%	\$142,669	100.0%
Other Funds								
State Investment Fund - Internally Managed	\$19,853		\$20,430		\$20,327		\$20,735	
Separately Managed Funds - Internally Managed	\$97		\$94		\$93		\$98	
Separately Managed Funds - Externally Managed	\$2,710		\$2,751		\$2,770		\$2,908	
Total Other Funds	\$22,660		\$23,276		\$23,190		\$23,742	
Total Assets Under Management	\$155,062		\$159,624		\$160,199		\$166,410	
Supplemental AUM Breakout								
Total Internal Assets Under Management	\$70,332	45.4%	\$72,222	45.2%	\$71,834	44.8%	\$77,107	46.3%
Total External Asset Under Management	\$84,730	54.6%	\$87,402	54.8%	\$88,365	55.2%	\$89,304	53.7%

STATE OF WISCONSIN INVESTMENT BOARD
Expenses for All Funds Under Management
Quarter Ending September 30, 2024

EXPENSE CATEGORY	SERVICE PROVIDED	EXPENSES
<u>Internal Expenses</u>		
Staff Compensation	Staff Compensation	15,014,956
Fringe Benefits	Fringe Benefits	2,725,371
Staff Travel	Staff Travel	295,152
<u>Supplies, Services and Facilities</u>		
2N TELEKOMUNIKACE a.s.	Supplies, Services and Facilities	73
Advanced Systems Concepts	Supplies, Services and Facilities	7,257
Amazon.com	Supplies, Services and Facilities	2,263
AT&T Landline	Supplies, Services and Facilities	3,330
Atlassian.com	Supplies, Services and Facilities	4,446
AVI Systems, Inc.	Supplies, Services and Facilities	15,329
BiZZdesign United States Inc.	Supplies, Services and Facilities	5,000
Bloomberg BusinessWeek	Supplies, Services and Facilities	1,537
Capital Newspapers	Supplies, Services and Facilities	238
Carahsoft Technology Corp	Supplies, Services and Facilities	42,729
CDS MY Block 1 Office, LLC	Supplies, Services and Facilities	1,214,780
CDW-G	Supplies, Services and Facilities	2,044
Center City Film & Video	Supplies, Services and Facilities	21,000
Centurylink	Supplies, Services and Facilities	172
CFA Society of Madison	Supplies, Services and Facilities	5,830
Charter Communications (Spectrum Business)	Supplies, Services and Facilities	6,904
Ciphereus LLC	Supplies, Services and Facilities	1,488
ClickStudios	Supplies, Services and Facilities	1,452
Coffee Werks Machine Service and Sales	Supplies, Services and Facilities	454
Column Software PBC	Supplies, Services and Facilities	182
Concur Technologies, Inc.	Supplies, Services and Facilities	20,700
Creative Business Interiors	Supplies, Services and Facilities	296
DbSchema Database Designer	Supplies, Services and Facilities	75
Deft	Supplies, Services and Facilities	9,331
Dell Marketing LP	Supplies, Services and Facilities	2,495
Department of Administration	Supplies, Services and Facilities	95,663
Depreciation Expense	Supplies, Services and Facilities	300,223
Department of Workforce Development	Supplies, Services and Facilities	2,301
Employee Trust Funds Dept of (ETF)	Supplies, Services and Facilities	56,203
Fed Ex	Supplies, Services and Facilities	679
Gartner Inc	Supplies, Services and Facilities	35,579
Gordon Flesch	Supplies, Services and Facilities	14,252
Harvard Business Review	Supplies, Services and Facilities	319
hireEZ	Supplies, Services and Facilities	17,800
IKM Building Solutions, Inc.	Supplies, Services and Facilities	8,181
Indeed	Supplies, Services and Facilities	15,000
Institutional Investor	Supplies, Services and Facilities	899
Keystone Peer Review Organization Inc	Supplies, Services and Facilities	922
Legislative Audit Bureau	Supplies, Services and Facilities	(202,400)
LinkedIn	Supplies, Services and Facilities	17,205
Macabacus.com	Supplies, Services and Facilities	300
Madison Gas and Electric Company	Supplies, Services and Facilities	31,004
Mathworks	Supplies, Services and Facilities	37,049
Milwaukee Journal Sentinel	Supplies, Services and Facilities	525
mxttoolbox.com	Supplies, Services and Facilities	297
New York Times	Supplies, Services and Facilities	1,151
Newton Software	Supplies, Services and Facilities	3,870
Packerland Rent-A-Mat, Inc.	Supplies, Services and Facilities	377
Pension Fund Data Exchange Ltd	Supplies, Services and Facilities	1,500
Phox Locks	Supplies, Services and Facilities	68
Presidio	Supplies, Services and Facilities	9,326
Saba Software (Canada) Inc.	Supplies, Services and Facilities	42,318
Shred-it	Supplies, Services and Facilities	861
Slack.com	Supplies, Services and Facilities	634
Software House Intl	Supplies, Services and Facilities	286,222
Staples Advantage	Supplies, Services and Facilities	1,152
Target	Supplies, Services and Facilities	72
The Economist	Supplies, Services and Facilities	160

EXPENSE CATEGORY	SERVICE PROVIDED	EXPENSES
The Washington Post	Supplies, Services and Facilities	29
Thomson Reuters	Supplies, Services and Facilities	2,917
Validity Screening Solutions	Supplies, Services and Facilities	775
Verizon Wireless	Supplies, Services and Facilities	3,538
Wheeler Reports Inc	Supplies, Services and Facilities	2,120
WiscNet	Supplies, Services and Facilities	9,920
Wisconsin Independent Network	Supplies, Services and Facilities	1,350
Wisconsin State Journal	Supplies, Services and Facilities	62
Total Supplies, Services & Facilities		\$ 2,169,828
Total Internal Expenses *		\$ 20,205,307
<u>Custodial, Investment Operations and Banking Fees</u>		
BNY Asset Servicing - Custody	Master Custody Services	428,948
BNY Asset Servicing - Investment Operations	Investment Operating Services	1,541,293
Markit Group Limited	Investment Consulting Services	178,342
Markit NA	Investment Data Management Software	5,212
Total Custodial, Investment Operations and Banking Fees		\$ 2,153,795
<u>Legal Fees</u>		
Chapman & Cutler LLP	Legal Work for Investment Strategies	42,824
DLA Piper LLP (US)	Legal Work for Investment Strategies	179,692
Godfrey & Kahn SC	Legal Work for Investment Strategies	8,598
Legal Services Expense Accrual	Legal Work for Investment Strategies	(192,301)
Morgan, Lewis & Bockius LLP	Legal Work for Investment Strategies	1,047
Purrington Moody Weill LLP	Legal Work for Investment Strategies	3,633
Quarles & Brady	Legal Work for Investment Strategies	137,037
Reinhart Boerner Van Deuren SC	Legal Work for Investment Strategies	350
Sidley Austin LLP (International)	Legal Work for Investment Strategies	8,394
Vedder Price PC	Legal Work for Investment Strategies	62,703
Total Legal Fees		\$ 251,976
<u>Investment Counsel</u>		
12358433 Canada Inc.	Investment Consulting	5,460
3x108 Fintech Consulting Limited	Investment Consulting	145,072
AE Business Solutions	Investment Consulting Services	48,620
Aksia LLC	Hedge Fund Investment Consulting	344,917
Alex Solutions	Research and Data Services	43,000
Ampcus Inc.	Information Security Consulting Services	7,000
Arb Journal	Regulatory Research & Analysis	23,500
Arthur Selender	Investment Consulting Services	4,000
Backstop Solutions Group	Investment Software	18,503
Barclays	US Constituent Data	30,000
Barra LLC	Research & Data Services	62,946
Barrons	Investment Research	158
BCA Research Inc	Global & Domestic Fixed Income Strategy Research	29,500
BITA Risk Limited	Risk Oversight Services	53,054
BiZZdesign United States Inc.	Enterprise Architecture Software	11,500
Blackrock Financial Management Inc	Risk Services	81,903
Bloomberg Finance LP	Market, Company, Industry & Benchmark Information	1,479,353
BNY Asset Servicing - Eagle/Pace	Investment Consulting Services	115,000
Bridge Consulting Partners Ltd	Investment Consulting Services	83,224
Callan Associates Inc	Investment Consulting & Performance Benchmarking	6,250
Canoe Software Inc.	Investment Software	16,450
Capital Economics LTD	Market Research	15,417
CappThesis, LLC	Research and Data Services	2,500
Carahsoft Technology Corp	Investment Consulting Services	74,345
CBJL Incorporated	Investment Consulting Services	104,345
CBOE Global Markets, Inc.	Research and Data Services	1,770
CCG Data Solutions	Investment Consulting Services and Software	78,400
CFRA Research	Investment Research Services	24,507
Charles River System Inc	Portfolio Management Trading Software & Services	421,863
CLO Research Group	Investment Research	1,875
CoStar Portfolio Strategy	Real Estate Consulting & Research Services	23,042
Crane Data LLC	Research and Data Services	3,000
Dacheng Xiu	Investment Research	62,475
DiatomC LLC	Investment Consulting	93,600
Dow Jones News Service	Company and Industry News Services	9
DTCC - EPN	Trade Settlement Service	2,400
DTCC ITP LLC	Trade Settlement Service	2,411
Efront Financial Solutions Inc	Private Markets Portfolio Management Services	224,254

EXPENSE CATEGORY	SERVICE PROVIDED	EXPENSES
Elevation LLC	Research and Data Services	12,500
Eliassen Group	Information Technology Consulting Services	49,920
EquiLend Holdings LLC	Investment Data	74,083
Ernst & Young LLP	Tax Compliance Services & Investment Consulting	25,497
FactSet Research Systems Inc	Financial & Economic Database	362,932
FBN Securities, Inc.	Investment Research	18,500
FIS Data Systems Inc.	Research and Data Services	45,956
Fitch Solutions Inc	Credit Rating Services	19,688
FocusEconomics S.L.U	Investment Consulting	105
Funston Advisory Services LLC	Consulting Services	14,500
Gallagher	Insurance and Risk Management Services	15,875
Green Street Advisor	Real Estate Analytics	31,025
Haver Analytics	Global Macroeconomic Research	24,593
Ice Data LP	Fixed Income Indices	178,271
iFathom Corporation	Investment Consulting	96,015
In Focus Information LLC	Private Placement Investment Research	1,600
InsiderScore LLC	Investment Research & Analytics	22,050
Institutional Shareholder Services Inc	Proxy Voting Analysis	44,412
Intex Solutions, Inc.	Research and Data Services	30,600
IPC Systems Inc	Trading Telecommunication System	14,000
JP Morgan	Public Market Management Fee	18,750
JPSB Consulting Limited	Investment Consulting	90,720
Keystone Consulting Inc	Investment Information Technology Consulting Services	82,480
Knowledge Services	Recruitment and Staffing Services	28,896
Kreischer Miller LLP	Investment Consulting	13,500
LRB Group, LLC	Investment Consulting	34,200
Manalo Advisors Limited	Research and Data Services	3,750
Markit Group Limited	Investment Consulting Services	10,569
Markit NA	Investment Data Management Software	14,810
Markit-EDM Limited	Investment Consulting	204,233
McLagan Partners Inc	Investment Compensation Data and Analysis	50,000
Meketa Investment Group	Public Markets External Manager Consultant	71,301
MNI Market News	Research and Data Services	5,171
Money-Media Inc	Research and Data Services	5,440
Moody's Analytics	Economic, Currency & Bond Analysis	90,817
MSCI - Barra	Research and Data Services	(24,926)
MSCI Inc - Risk Metrics Solutions	Research and Data Services	335,968
MSCI, Inc	Research and Data Services	126,031
My Data Outlet International, LLC	Research and Data Services	52,000
NEPC LLC	Investment Consulting Services	80,000
Newsfile	Investment Research	1,125
Nuware Technology Corp	Investment Information Technology Consulting Services	66,560
NYSE Market Inc	New York Stock Exchange Data	6,309
Options Price Reporting Authority	Quote System for Options Market	2,237
Oxford Economics USA INC	Research and Data Service	17,588
Pac-invest	Research and Data Services	14,343
PEI Media Inc	Private Equity Real Estate News	11,875
Phil Erlanger Research Co Inc	Investment Research	4,000
Pitchbook Data Inc	Research and Data Services	20,500
PremiaLab	Investment Research	27,500
Preyer	Investment Consulting Services	84,840
Q4 Psychological Associates	Consulting Services	11,550
Quantum Research Consulting LLC	Investment Consulting	30,780
Refinitiv	Investment Research	292,566
Reorg Research Limited	Research and Data Services	45,000
RIMES Technologies Corporation	Research and Data Service	48,563
Russell Investment Group	Index Data	8,932
S&P Dow Jones Indices	Research and Data Services	59,124
S&P Global Market Intelligence	Industry & Corporate Research	199,034
SAHM Consulting	Investment Research	4,000
SailPoint Technologies, Inc.	Information Security Software	24,556
Seaport Global Securities LLC	Research and Data Services	2,930
SEI Investments	Research and Data Services	22,736
Sharp Decisions Inc	Investment Information Technology Consulting Services	69,000
SimCorp Data & Performance Capitalized Expenses	Investment System	(278,760)
SimCorp Implementation Capitalized Expenses	Investment System	(1,254,048)
Simcorp USA, Inc.	Investment System	1,846,499
Simmons & Simmons	Global Regulatory Services	6,854
Snowflake Inc	Research and Data Services	83,636
Software House Intl	Investment Software	9,853
Solve Advisors Inc	Investment Research	10,299

EXPENSE CATEGORY	SERVICE PROVIDED	EXPENSES
State Street	Investment Consulting	33,333
StepStone Group	Private Equity Consulting Services	2,743
StepStone Group Real Estate	Real Estate Consulting Services	59,330
Susquehanna Financial Group LLP	Investment Research	12,000
SWIFT SC	Research and Data Services	10,566
SystemsAccountants	Investment Information Technology Consulting Services	78,080
The Financial Times Limited	Investment Research	363
The Nasdaq Stock Market, LLC	Research & Data Services	6,300
Toronto Stock Exchange	Market Data	14,452
TradeWeb	On-Line Fixed Income Trading Services	11,184
UFP Research SA	Investment Research	12,500
Unit4 Business Software Inc	Financial & Administration Services System	81,409
Urban Land Institute	Investment Consulting Services	2,370
Variyas Global Solutions, Inc.	Information Technology Consulting Services	277,577
Verity LLC	Research Management System	49,876
Verus Advisory Inc	Benchmarking Consulting Services	2,500
Virtu ITG Analytics LLC	Trading Transaction Cost Analysis	26,333
Wolverine Execution Services LLC	Options Trading Platform	1,512
Workday Implementation Capitalized Expenses	Financial & Administration Services System	(244,133)
Workday, Inc.	Financial & Administration Services System	50,607
WorldBridge Partners Inc	Recruitment Consulting	66,560
Total Investment Counsel		\$ 8,176,891
<u>Securities Lending Agent Fees</u>		
BNY Asset Servicing & eSecLending	Securities Lending Agent Fees	848,703
Total Securities Lending Agent Fees		\$ 848,703
Total Quarterly Charges to Funds		\$ 31,636,672

* All costs reported are on an accrual basis except for internal operating costs which are on a cash basis of accounting. Negative expense amounts are due to accrual adjustments and/or other miscellaneous adjustments.

Explanation of Expenses

Internal Operating Expenses

Internal operating expenses consist primarily of staff compensation and fringe benefits. SWIB employs a staff of professional investment and support staff to manage trust fund assets. Other internal operating expenses consist of office equipment, supplies, business travel, information technology equipment and services, and general services.

Custodial & Banking Fees

Wisconsin Certificate of Deposit Program: Under a contract with SWIB, Bankers' Bank administers the program under which the State Investment Fund (SIF) purchases certificates of deposit from Wisconsin-based banks and thrifts. Most administrative costs are paid by the participating banks. SWIB's expenses help underwrite other administrative costs, such as insurance that SWIB requires to be purchased. There are currently no investments in Bankers' Bank certificates of deposit and no fees were incurred.

BNY: Provides master custodial and administrative services (safekeeping of assets, income collection, valuations and accounting) for public and private domestic and foreign securities in the Wisconsin Retirement System (WRS), the SIF, and the other separately managed trust funds. In addition, SWIB receives performance measurement and analytical services through its contract with BNY, which serves as the official book of record for SWIB's accounting and performance measurement functions. BNY provides data and analytical tools used by SWIB for compliance and risk management. These include global collateral management, data management, and hosting services. Fees for these services are established by contract.

US Bank: The State of Wisconsin contracted with US Bank to be the state's working bank. The fees paid to US Bank by the SIF reflect bank service charges that are not directly applicable to the fund participants.

Legal Fees, Services, and Expenses

Under authority delegated by the Attorney General, pursuant to s. 25.18 (1) (a) Statutes, SWIB may employ legal counsel for any matters arising out of the scope of its investment authority. This includes legal services relating to bankruptcies, class actions, private markets transactions, fiduciary advice, securities law, investment litigation, and other similar matters.

Investment Counsel

Current law gives SWIB the authority to employ investment counsel in any matters arising out of the scope of its investment authority. Investment research and services provided include global market, industry, economic and company information, financial and performance analytics, news information, pricing and exchange data, credit ratings, financial modeling, economic forecasting, trading services, and a variety of Board consultations. These services enable SWIB to perform due diligence on current and future holdings and assist in monitoring investments.

Securities Lending Agent Fees

Securities lending programs generally earn income through the reinvestment of cash collateral posted by borrowers and through the collection of fees for loans where non-cash collateral is posted. SWIB's securities lending income is shared with the agent to pay the costs associated with the administration of the program. Securities lending agent fees are reported as expenses.

External Investment Management Fees

Some external asset managers have been granted delegated authority to determine investment strategy and purchase securities in SWIB's name in accordance with approved investment guidelines. These investment vehicles are known as separately managed accounts (SMAs). Fees for managing SMAs are typically assessed as a percentage of the market value of assets under management and in some cases, fees are based on investment performance. These costs are actual expenses to SWIB that are, in accordance with accounting guidelines generally accepted in the U.S., recognized as expenses on the WRS Statement of Changes in Net Investment Position.

SWIB also invests in separate legal entities managed by external investment managers to gain exposure to select strategies including Public Markets, Private Markets¹, and Hedge Funds. These investment vehicles are known as "commingled" accounts. In exchange for their investment management services, the external managers charge a fee within the entity they manage. These fees generally do not require SWIB to remit payment. Fees are typically assessed as a percentage of the market value of assets under management, commitments, and in some cases are based on investment performance. While the fees charged to these external vehicles do not meet the statutory definition of a cost or expense to SWIB, they are included in SWIB's total cost of management reporting as a supplemental reporting item that falls outside the statutory requirements of this report.

¹ Beginning in 2023, External Investment Management Fees for private markets, encompassing Private Equity, Venture Capital, Current Return and Real Estate asset classes, are reported on a net of fee basis rather than gross. Net fees reflect fee offsets, waivers, and deferrals.

Private Equity Commitments*

July 2024 – September 2024

<i>Investment</i>	<i>Commitment (millions)</i>
Ashgrove Specialty Lending Fund II	€60.0
Blackstone Capital Opportunities Fund V	\$75.0
Brandon Lane Partners	\$70.0
Hughes Growth Equity Fund II	\$50.0
North Haven Capital Partners VIII	\$75.0
Peninsula Capital Partners VIII	\$75.0
Sixth Street Specialty Lending Europe III	\$100.0
SPC Wilson Point	\$50.0
Sterling Group Credit Fund III	\$100.0
StoneTree Investment Partners Fund I	\$25.0
VMG Consumer VI	\$50.0

**Includes Current Return Portfolio and Co-Investments.*

Private Equity Commitments*

July 2024 – September 2024

<i>Investment</i>	<i>Commitment (millions)</i>
Energy Co-Investment	\$25.0
Industrials Co-Investment	\$20.0
Industrials Co-Investment	\$30.0
Consumer Co-Investment	\$27.8
Industrials Co-Investment	\$10.0
Information Technology Co-Investment	\$2.0

*Includes Current Return Portfolio and Co-Investments.

Private Debt Investments/Commitments

July 1, 2024 to September 30, 2024 (Third Quarter)

<i>Investment</i>	<i>Investment/Commitment</i>
Asset Manager	\$30,000,000
Asset Manager	\$25,000,000
Entertainment	\$15,000,000
Marine Transportation/Distribution	13,000,000
Total	\$83,000,000

Real Estate Commitments

July 2024 – September 2024

<i>Investment</i>	<i>Commitment (millions)</i>
Lone Star Real Estate Fund VII, LP	\$150
FPA Core Plus Fund VI, LP	50
RLIF Co-investment Fund II, LP	50
Heitman Real Estate Debt Partners III, LP	50
Realterm Airport Logistics Properties, LP	21
Total	\$321

Funds Alpha Commitments*

July 1st – September 30th, 2024

Manager	Commitment (Millions)
Badgerstone Masri	\$ 25
Badgerstone SRT 1970	\$ 25
Marshall Wace TOPS CTF	\$ 300
Marshall Wace TOPS VTF	\$ 100
Altriarch	\$ 70
Taula	\$ 15
Blackrock EM VTF	\$ 300
TOTAL	\$ 835

**Includes Hedge Funds and Beta One*

Board Contact Log

DATE OF INBOUND COMMUNICATION	DATE OF BOARD COMMUNICATION	COMMUNICATION SOURCE	TOPIC
September 2, 2024	November 27, 2024	Susan Freiss	Fossil fuel divestment and systemic climate risks
October 14, 2024	November 27, 2024	Judith Stadler	Systematic Climate Risks
October 17, 2024	November 27, 2024	Peter Knotek	Fossil fuel divestment and systemic climate risks
November 7, 2024	November 27, 2024	Anne Steinberg	Follow-up on Conversation during October 15 SWIB Meeting

Board Meeting

Tab 10 – Future Items for Discussion

2025 Board Meeting and Agenda Plan

March 2025	
Audit & Finance	<p>Open Session</p> <ul style="list-style-type: none"> • Open Audit Issues Report(s) • Approval of Draft Audit Report(s) • 2025 Internal Audit Plan Status • 2025 Internal Audit Goals • Compliance Overview • Financial Reporting • Administrative Reports <p>Executive Closed Session</p> <ul style="list-style-type: none"> • Evaluation of Head of Internal Audit • Head of Internal Audit Compensation Recommendation
Compensation & Workforce Development	<p>Open Session</p> <ul style="list-style-type: none"> • Annual Committee Charter Review • Comprehensive RPM Review Planning • Strategic Results Scorecard Approval • Incentive Compensation Program Review • Review Strategic Results Scorecard and Division Scorecards • Incentive Compensation Award Recommendations • Talent Acquisition Update <p>Executive Closed Session</p> <ul style="list-style-type: none"> • Incentive Compensation Award Recommendations for Specific Individuals • Long Term Incentive Plan Awards • Deputy Executive Director/Chief Operating Officer Incentive Compensation Award Recommendation • ED/CIO Evaluation and Compensation
SPCG	<p>Open Session</p> <ul style="list-style-type: none"> • Real Estate Strategy Report and Market Outlook • Corporate Governance Program Update • June Investment Forum Preview • Operational Update <p>Executive Closed Session</p> <ul style="list-style-type: none"> • ED/CIO Goals Review
Board Meeting	<p>Open Session</p> <ul style="list-style-type: none"> • Committee Reports • Election of Secretary and Assistant Secretary • Annual Committee Assignments • Proposed Meeting Dates for Next Year • Investment Performance and Market Updates; Callan Annual Report • Committee Open Session Business • Quarterly Investment Update • Q4 Direct Charges to Funds / PMFA Commitments / Board Contact Log <p>Closed Session</p> <ul style="list-style-type: none"> • Risk Management Update • Committee Closed Session Business <p>Executive Closed Session</p> <ul style="list-style-type: none"> • Incentive Compensation Award Recommendations for Specific Individuals

2025 Board Meeting and Agenda Plan

June 2025	
Audit & Finance	<p>Open Session</p> <ul style="list-style-type: none"> • Annual Charters Review • WRS Audited Financial Statements • Open Audit Issues Report(s) • Approval of Draft Audit Report(s) • Annual Affirmations and Disclosures • 2025 Internal Audit Plan Status • Internal Audit Strategic Plan • Five-Year Audit Summary • Financial Reporting • Administrative Reports <p>Executive Closed Session</p> <ul style="list-style-type: none"> • LAB Review of Statements of Economic Interest
SPCG	<p>Open Session</p> <ul style="list-style-type: none"> • Hedge Fund Strategy Report and Market Outlook • Annual Corporate Governance Policy Review <p>Executive Closed Session</p> <ul style="list-style-type: none"> • ED/CIO Goals Review
INVESTMENT FORUM	
Board Meeting	<p>Open Session</p> <ul style="list-style-type: none"> • Committee Reports • Investment Performance and Market Updates; Callan Quarterly Report • Committee Open Session Business • Quarterly Investment Update • Q1 Direct Charges to Funds / PMFA Commitments / Board Contact Log <p>Closed Session</p> <ul style="list-style-type: none"> • Risk Management Update • Committee Closed Session Business
INVESTMENT FORUM	

2025 Board Meeting and Agenda Plan

September 2025	
Audit & Finance	<p>Open Session</p> <ul style="list-style-type: none"> • Open Audit Issues Report(s) • Approval of Draft Audit Report(s) • 2025 Internal Audit Plan Status • 2026 Internal Audit Plan Preview • Financial Reporting • Administrative Reports
Compensation & Workforce Development	<p>Open Session</p> <ul style="list-style-type: none"> • Comprehensive RPM Review Preview • Talent Acquisition and Employee Engagement Update
SPCG	<p>Open Session</p> <ul style="list-style-type: none"> • Private Equity Strategy Report and Market Outlook • Corporate Governance 2025 Proxy Voting Review • Trustee Manual Review/Policies Update • October Workshop Preview • Operational Update <p>Closed Session</p> <ul style="list-style-type: none"> • Co-Investment and Venture Capital Strategy Report and Market Outlook • Board/Staff Consultant Annual Reporting • ED/CIO Goals Review
Board Meeting	<p>Open Session</p> <ul style="list-style-type: none"> • Committee Reports • Investment Forum Recap • Fiduciary & Public Records Training • Investment Performance and Market Updates; Callan Quarterly Report • Committee Open Session Business • Quarterly Investment Update • Q2 Direct Charges to Funds / PMFA Commitments / Board Contact Log <p>Closed Session</p> <ul style="list-style-type: none"> • Risk Management Update • Committee Closed Session Business • Board Self-Evaluation with Governance Consultant

OCTOBER BOARD WORKSHOP	
<ul style="list-style-type: none"> • Outside Speakers • Asset Allocation review 	

2025 Board Meeting and Agenda Plan

December 2025	
Audit & Finance	<p>Open Session</p> <ul style="list-style-type: none"> • SIF Audited Financial Statements • Open Audit Issues Report(s) • Approval of Draft Audit Report(s) • 2025 Internal Audit Plan Status • Proposed 2026 Internal Audit Plan • Financial Reporting, including Budget and Position Request • Administrative Reports <p>Executive Closed Session</p> <ul style="list-style-type: none"> • LAB Review of Statements of Economic Interests
Benchmark & Performance	<p>Open Session</p> <ul style="list-style-type: none"> • Annual Committee Charter, Policies, and Benchmarking Philosophy Review
Compensation & Workforce Development	<p>Open Session</p> <ul style="list-style-type: none"> • Compensation Philosophy Review • Compensation Consultant Report • Incentive Compensation Plan Changes for Next Performance Year (if any) • Incentive Compensation Projections • Comprehensive RPM Review • Talent Acquisition Update and People Metrics <p>Executive Closed Session</p> <ul style="list-style-type: none"> • Succession Planning
SPCG	<p>Open Session</p> <ul style="list-style-type: none"> • Annual Committee Charter Review • Beta One Strategy Report and Market Outlook <p>Executive Closed Session</p> <ul style="list-style-type: none"> • ED/CIO Goals Review
Board Meeting	<p>Open Session</p> <ul style="list-style-type: none"> • Committee Reports • Investment Performance and Market Updates; Callan Quarterly Report • Annual Presentation on Cost Benchmarking • Asset Allocation Recommendation • Quarterly Investment Update • Committee Open Session Business • Q3 Direct Charges to Funds / PMFA Commitments / Board Contact Log <p>Closed Session</p> <ul style="list-style-type: none"> • Asset Allocation Implementation Discussion • Risk Management Update • Committee Closed Session Business • Annual Review of Expected Tail Loss Analysis