

## SWIB Board Meeting Materials for March 12-13, 2019

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## ***Regular Meeting of the Board of Trustees***

**Tuesday, March 12, 2019 – Wednesday, March 13, 2019**

**STATE OF WISCONSIN INVESTMENT BOARD**

**Offices of the Wisconsin Investment Board**

**121 East Wilson Street**

**Madison, Wisconsin**

**Board Room – 2<sup>nd</sup> Floor**

**(After the Compensation Committee meeting, approximately 3:45 p.m.)**

### **OPEN SESSION**

1. **Motion to go into Closed Session**

### **CLOSED SESSION\*\***

### **RECONVENE IN OPEN SESSION**

2. **Announcements of Board Actions Relating to Items Taken up in Closed Session**

### **RECESS UNTIL WEDNESDAY, MARCH 13, 2019**

### **RECONVENE**

3. **Open Session Minutes of December 12, 2018**
4. **Election of Secretary and Assistant Secretary**
5. **Annual Committee Assignments by Board Chair**
6. **Proposed 2020 Board Meeting Dates**
7. **Investment Performance and Market Updates**
  - A. Board Investment Performance Report, Q4 2018
  - B. Callan Quarterly Peer Report, Q4 2018
8. **Review of 2018 Performance and 2019 Outlook**

**\*\* The motion to go into closed session at this meeting is made pursuant to Sections 19.36(5) and 19.85(1)(e) of the Wisconsin Statutes to (i) consider confidential and proprietary strategies for the investment of public funds relating to specific proprietary investment strategies of internal WRS portfolios, and (ii) approve prior closed session minutes that discuss specific confidential and proprietary strategies related to asset allocation; pursuant to Section 19.85(1)(c) of the Wisconsin Statutes to (iii) discuss the performance evaluation data and compensation of SWIB's executive director/chief investment officer, deputy executive director/chief administrative officer, agency business director, senior staff, portfolio managers and internal audit director related to SWIB's incentive compensation program and 2018 performance, (v) to review performance evaluation data for SWIB's board of trustees, and (vi) approve executive closed session minutes related to the performance review of SWIB's internal audit director and employment applicants for SWIB's chief technology & operations officer position. 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.**

**CLOSED SESSION\*\***

**RECONVENE IN OPEN SESSION**

9. **Announcements of Board Actions Relating to Items Taken up in Closed Session**
10. **Investment Committee Open Session Business**
  - A. Approved Open Session Minutes of November 27, 2018, December 20, 2018 and January 29, 2019
  - B. Final Open Session Agenda for February 28, 2019 and Draft Open Session Agendas for March 26, 2019 and April 23, 2019
  - C. Amendments to SWIB Investment Committee WRS Investment Guidelines
11. **Committee Reports and Recommended Actions from Committee Agendas - Open Session Items**
  - A. Compensation Committee
    - (1) Compensation Committee Charter
    - (2) SWIB Compensation Plan for Unclassified Employees
    - (3) 2019 Strategic Results Scorecard
    - (4) 2019 Investment Services Staff Incentive Compensation Targets
    - (5) Investment Management Staff 2019 RPMs
    - (6) 2018 Incentive Compensation Awards
    - (7) Incentive Compensation Deferral Policy
  - B. Strategic Planning and Corporate Governance Committee
    - (1) Recruitment Philosophy
  - C. Audit and Finance Committee
    - (1) Position Request
    - (2) Audit and Finance Committee Charter
    - (3) Follow Up on Legislative Audit Bureau Management Audit Recommendations
  - D. Benchmark and Performance Committee
    - (1) State Investment Fund Benchmark
12. **In the Absence of Questions, the Following Reports will be Filed Without Comment:**
  - A. Enterprise Risk Management Quarterly Report, Q4 2018
  - B. New Contracts, Q4 2018
  - C. Quarterly Report of Direct Charges to Funds, Q4 2018
  - D. Private Markets and Funds Alpha Commitments, Q4 2018
13. **Future Items for Discussion**
14. **Motion to Adjourn**

*NOTES: Items may be taken in order other than listed.  
The meeting site is physically accessible. Upon prior request,  
reasonable accommodations will be provided.*

Board Meeting

Tab 3 – Open Session Minutes of December 12, 2018

**Review and Action**

**Proposed Motion: Move to approve the Open Session Minutes of December 12, 2018, as presented.**

**STATE OF WISCONSIN INVESTMENT BOARD**

*Board Meeting-Open Session*

**Wednesday, December 12, 2018**

**Offices of the Investment Board**

**121 East Wilson Street, Madison, Wisconsin**

**Board Members Present:** Dave Stein, Chair  
Norm Cummings, Vice-Chair  
Bob Conlin, Secretary  
Sandra Claflin-Chalton, Trustee  
Mark Doll, Trustee  
Barb Nick, Trustee  
Ellen Nowak, Trustee  
Tim Sheehy, Trustee  
Paul Stewart, Trustee

**Staff and Others Present:** David Villa, Executive Director/Chief Investment Officer  
Rochelle Klaskin, Deputy Executive Director/Chief Administrative Officer  
Sara Chandler, Chief Legal Counsel  
Chuck Carpenter, Managing Director-Private Mkts & Funds Alpha  
Todd Ludgate, Managing Director-Public Fixed Income  
Brian Hellmer, Managing Director-Public Equities  
Edwin Denson, Managing Director-Asset & Risk Allocation  
Nick Stanton, Head of Multi-Asset Strategy  
Brandon Brickner, Internal Audit Director  
Mike Jacobs, Agency Business Director  
Mike Bress, Chief Financial Officer  
Shirley Eckes, Head of Operations  
Phil Richards, Performance Director  
Samir Datta, Financial Planning & Analysis Director  
Brian Heimsoth, Quantitative Manager  
Pu Shen, Managing Analyst-Asset & Risk Allocation  
Brad Gentert, Performance Analyst  
Amanda Murkley, Internal Auditor  
Ithipol Yang, Help Desk Specialist  
Janet Klosterman, Legal Assistant  
Eileen Neill, Verus Advisory, Inc.  
Chris Levell, NEPC  
Sandy Halim, CEM Benchmarking  
Ivan "Butch" Cliff, Callan Associates  
Sam Rebenstorf, Legislative Audit Bureau  
Bob Schaefer, State Engineering Association  
George Mickelson, State Engineering Association  
Michael McGuire, Northwest Passage Capital Advisors  
Sean Callahan, BlackRock  
(Some attendees may have attended only portions of the meeting.)

## **Open Session**

### **1. Approval of Open Session Minutes**

**Motion:** A motion was made by Trustee Stein and seconded by Trustee Nick to approve the open session minutes of August 29, 2018, October 1, 2018 and October 9-10, 2018, as presented. The motion passed unanimously.

### **2. Investment Performance and Market Updates**

#### **A. Investment Performance Report, Q3 2018**

Phil Richards, Performance Director, presented the *Investment Performance Report as of September 30, 2018*, which was included on pages 24-40 in the meeting materials. Mr. Richards reported that: **(1)** the Core Trust Fund (CTF) returned +2.91% gross of fees in Q3 2018, bringing year-to-date returns to +3.49%, and resulting in a year-to-date gross excess return of 55 basis points (bps); **(2)** Q3 returns were driven by strong absolute and relative performance by the private equity and venture capital portfolios; **(3)** the CTF five-year gross-of-fee return of 7.51% outperformed the policy benchmark by 37 bps on an annualized basis; **(4)** the CTF outperformed the 60/40 reference portfolio by 32% (cumulative) over a 20-year period, with \$12.4 billion of excess value added due to active management.

Mr. Richards then reviewed total assets under management for the CTF and the Variable Trust Fund (VTF) as well as the split between internal/external management and active/passive management. He noted that all asset class exposures are within target ranges, and CTF leverage remains at 10%. He discussed the return attribution of the CTF and VTF and the performance of the Separately Managed Funds, and answered questions.

#### **B. Callan Quarterly Peer Report, Q3 2018**

Mr. Richards introduced Ivan “Butch” Cliff, Executive Vice President and Director of Research, Callan Associates, to provide an update on SWIB’s performance relative to its peer group. Mr. Cliff explained that Callan compared the CTF’s performance against a peer group selected for their similarity to SWIB. The peer group is made up of 42 public funds, each with greater than \$10 billion in assets under management. His presentation was included on pages 41-55 in the meeting materials. Mr. Cliff highlighted several differentiating factors to consider when evaluating SWIB’s performance versus its peers, including: **(1)** fully-funded status; **(2)** ability to utilize a more risk-averse, more diversified strategic investment policy with less reliance on equity-like risks; and **(3)** mix of internal and external investment management that generates cost savings.

Mr. Cliff stated that as of September 30, 2018, over the last five years, SWIB generated absolute returns of 7.51% annualized, exceeding its actuarially-required return of 7.2% to maintain fully-funded status, and has added value above its target policy return with annualized excess returns of +37 bps. He commented that these results have been generated with high levels of diversification and very low tracking error due to robust risk management. In reviewing SWIB’s 5- and 10-year return consistency, he highlighted smooth, consistent performance with less volatility than peers. In reviewing SWIB’s asset allocation, he noted that SWIB is more globally oriented (less home country bias) than its peers with lower exposure to illiquid alternative investments and more fixed income exposure that is less risky.

In comparing SWIB's performance to its peers, Mr. Cliff noted that adjusting for asset allocation results in considerable improvement in SWIB's ranking for all periods. Asset allocation adjusted peer rankings were well above median for all periods, illustrating the effective implementation of SWIB's investment program. Mr. Cliff also postulated that the result would look even better if they took costs into account, as SWIB spends less than its peers. In considering comparisons of risk, SWIB is taking far less risk than its peers, which decreases the chance of materially underperforming the policy target. Notwithstanding its low levels of risk, SWIB's excess returns compare favorably to peers.

In comparing SWIB's total asset class performance versus targets and peers (page 54), Mr. Cliff highlighted that: (1) four of SWIB's five asset classes outperformed their targets over the last five years, with US equity slightly trailing its target but doing well versus peers; (2) three of SWIB's five asset classes ranked above median versus peers, with the international equity return lagging behind peers even while beating its target; and (3) US fixed income ranks lower than peers due to SWIB's low risk portfolio.

### **3. Annual Presentation on Cost Benchmarking**

Mike Bress, Chief Financial Officer, stated that *SWIB's Total Cost of Management Plan Policy* requires an annual report to the Board on cost benchmarking. This annual report generally includes a staff analysis/evaluation and a report by CEM Benchmarking, Inc. on their analysis of SWIB's costs relative to its peer group. Mr. Bress introduced Sandy Halim, Principal, CEM Benchmarking, Inc., and Samir Datta, Financial Planning & Analysis Director, who each presented their findings.

#### **A. 2017 CEM Benchmarking Report**

Ms. Halim presented her report, *State of Wisconsin Investment Board CY 2017 CEM Investment Benchmarking Report*, included in the meeting materials on pages 58-74. Ms. Halim noted that CEM compares SWIB's costs to a custom peer group of similarly-sized U.S. public pension funds.

Ms. Halim identified key takeaways from CEM's report, including: (1) SWIB's 2017 total cost was \$436.8 million, or 45.9 bps, which was lower than its custom benchmark cost of 48.6 bps, for a cost savings of \$26 million, and lower than its peers, for a cost savings of \$90 million, primarily due to SWIB's lesser use of external active management and asset allocation; (2) SWIB's 5-year net value added was 0.2%, which was equal to the U.S. public and peer median; and (3) SWIB's 5-year performance was in the positive-valued-added, low-cost quadrant of the cost effectiveness chart.

Ms. Halim noted an increase in SWIB's costs, resulting from an increase in higher cost assets and an increase in infrastructure/technology spending. She explained that differences in total costs relative to peers can often reflect asset mix differences.

Ms. Halim facilitated the Board's discussion and answered questions about the funds in CEM's database and CEM's findings.

#### **B. Staff Presentation on SWIB's Cost Effectiveness Annual Evaluation**

Mr. Datta commented briefly on the information shared in CEM's presentation and then presented *SWIB's Cost Effectively Annual Evaluation*, included on pages 75-80 in the meeting materials.

Mr. Datta explained that SWIB's costs are 9.5 bps lower than its peers, resulting in a savings of \$90 million. One driver of this savings is internal management, where SWIB's costs for managing assets internally are multiples lower than the costs for external management. A second driver is asset allocation, where SWIB invests in fewer high-cost assets. Despite overall costs savings, SWIB's governance costs exceed its peers, largely due to infrastructure/technology spending. Finally, Mr. Datta noted that SWIB's total costs have increased since 2013, but have nonetheless remained materially lower than its peers during that period.

#### **4. Asset Allocation Update and Recommendations for 2019**

Edwin Denson, Managing Director-Asset and Risk Allocation, introduced Chris Levell, NEPC, the Board's asset allocation consultant, who presented NEPC's asset allocation review, including their current capital market assumptions. A copy of NEPC's report was included on pages 82-103 in the meeting materials.

Mr. Levell started by outlining his asset allocation recommendations, which were unchanged since the October Board Workshop, to: **(1)** increase Private Equity/Debt exposure by 1% (from 8% to 9%) from Public Equity; **(2)** increase Small Cap from 2% to 3%; **(3)** decrease Emerging Markets from 5% to 3%; **(4)** move Global Bonds to U.S. investment grade and high yield bonds; and **(5)** shift Emerging Market Debt from majority external to a 50/50 blend of external and local currency. NEPC also recommended that SWIB increase the ability of the CTF to be dynamic by effectively expanding the ranges for public asset classes from +/- 3% relative to policy to +/- 6% relative to policy at the CTF level. The purpose of this expansion is to allow exposure management to have a larger role within the existing active risk budget for the CTF.

Mr. Levell then reviewed NEPC's 2018 asset class assumptions and long-term performance forecasts. Finally, he noted no changes to the proposed asset allocation targets, ranges and active risk for the VTF.

Mr. Denson then reviewed the *Asset Allocation Overview and Recommendations for 2019*, included on pages 104-111 in the meeting materials, and answered questions.

**Motion:** A motion was made by Trustee Stein and seconded by Trustee Stewart to adopt and approve the asset allocation and active risk targets for the Core Trust Fund and the Variable Trust Fund as set forth and further described in the Asset Allocation Overview and Recommendations for 2019 included in the Board materials, as recommended by the Investment Committee and the Board's asset allocation consultant, NEPC. The motion passed unanimously.

#### **5. Quarterly Investment Update, Q3 2018**

David Villa, Executive Director/Chief Investment Officer, kicked off the *Quarterly Investment Update*, included on pages 113-150 in the meeting materials. Mr. Villa started by walking the Board through illustrations of pension funding and underfunding and the impact of leverage. In particular, he described how the funding levels of SWIB's peers are critical to understanding comparisons of SWIB's performance to its peers.

Mr. Denson then provided a market review. He then described the key trends and drivers in global

equities, global bonds, currencies, private equity, private real estate and co-investments. In his economic outlook, he reviewed forecasts for GDP growth, global inflation, U.S. growth and other measures, and answered questions.

## **6. Motion to Convene in Closed Session**

**Motion:** A motion was made by Trustee Stein and seconded by Trustee Doll to convene in closed session (a) pursuant to sections 19.36(5) and 19.85(1)(e) of the Wisconsin Statutes to (1) consider confidential and proprietary strategies for the investment of public funds relating to the active risk and specific proprietary investment strategies of internal WRS portfolios; (2) discuss and consider any specific strategies related to asset allocation; and (3) approve and discuss prior closed session minutes that discuss the same, the investment of public funds related to SWIB’s facility and the negotiation of contracts with consultants for the investment of public funds; and (b) pursuant to sections 19.85(1)(c), (f) and 19.36(7) of the Wisconsin Statutes to (1) discuss the performance evaluation and compensation data of SWIB’s Internal Audit Director; (2) consider and discuss employment applicants for SWIB’s Chief Technology & Operations Officer position and discuss specific search considerations for such applicants; and (3) approve and discuss prior closed session minutes that discuss the financial data of specific persons and the preliminary consideration of possible personnel problems and the employment, promotion, compensation and performance evaluation data of specific public employees, including with respect to SWIB’s Executive Director search.

The Chair called for a roll call vote:

Clafin-Chalton-Aye	Conlin-Aye	Cummings-Aye
Doll-Aye	Nick-Aye	Nowak-Aye
Sheehy-Aye	Stein-Aye	Stewart-Aye

There being nine ayes and no nays, the Chair declared the motion passed. The Board convened in closed session at 11:28 a.m. and reconvened in open session at 12:16 p.m.

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

Trustee Stein reported that during its regular closed session the Board (a) approved prior closed session minutes; and (b) discussed implementation of the 2019 asset allocation. Mr. Stein further reported that during executive closed session the Board (a) approved prior executive closed session minutes; (b) approved the Audit and Finance Committee’s salary recommendation for the Internal Audit Director; and (c) received an update on the Chief Technology & Operations Officer recruitment.

## **8. Committee Reports and Recommended Actions from Committee Agendas-Open Session**

### **A. Audit and Finance Committee**

Trustee Cummings, Chair of the Audit and Finance Committee, reported that in open session the Committee (1) approved prior meeting minutes; (2) approved the Fiscal Year 2018 Audited Financial Statements for the State Investment Fund (SIF) and discussed LAB’s Independent Auditor’s Report on Internal Controls and its End of Audit Letter, noting that the SIF once again received an unmodified (clean) opinion and that no issues were noted in the internal control report; (3) discussed the Quarterly Cost of Management Report, (4) discussed the open audit issues report;

(5) approved the draft audit reports on Hedge Funds and Rebalancing; (6) reviewed the 2018 Audit Plan Status Report; (g) discussed Internal Audit's Strategic Plan; (7) approved the 2019 Audit Plan; (8) reviewed the 2019 Audit and Finance Committee's Annual Agenda; and (9) received some routine staff reports. Mr. Cummings noted that the Committee took no actions that require Board approval.

## **B. Strategic Planning and Corporate Governance Committee**

Trustee Nick, Chair of the Strategic Planning and Corporate Governance Committee, reported that in open session, the Committee (1) approved prior meeting minutes; (2) heard a preliminary view of SWIB's five-year staffing forecast, the first in a series of presentations about the next five years; (3) heard a recruiting update; and (4) was updated about the progress on the Comprehensive Solution and the functioning of the SWIB Work Alignment Team (SWAT). Ms. Nick also reported on two additional agenda items, both requiring Board approval.

### **(1) Strategic Planning and Corporate Governance Committee Charter**

**Motion:** A motion was made by Trustee Nick and seconded by Trustee Stewart to approve the revisions to the *Strategic Planning and Corporate Governance Committee Charter*, as reflected in the Committee materials and as recommended by the Strategic Planning and Corporate Governance Committee. The motion passed unanimously.

### **(2) Executive Director/Chief Investment Officer Position Description**

**Motion:** A motion was made by Trustee Nick and seconded by Trustee Stewart to approve the new position description for the Executive Director/Chief Investment Officer, as reflected in the Committee materials and as recommended by the Strategic Planning and Corporate Governance Committee. The motion passed unanimously.

## **C. Benchmark and Performance Committee**

Trustee Claflin-Chalton, Chair of the Benchmark and Performance Committee, reported that in open session the Committee considered revisions to its charter and policies and heard the 2019 annual benchmark review presentation and recommendations from the Board's benchmark consultant

### **(1) Benchmark and Performance Committee Charter and Policies**

**Motion:** A motion was made by Trustee Claflin-Chalton and seconded by Trustee Stewart to approve the revisions to the *Benchmark and Performance Committee Charter and Policies*, as reflected in the Committee meeting materials and as recommended by the Benchmark and Performance Committee. The motion passed unanimously.

## **(2) Approval of 2019 Benchmarks**

**Motion:** A motion was made by Trustee Claflin-Chalton and seconded by Trustee Stewart to approve (a) the benchmark changes, effective January 1, 2019, for: (1) Alpha Pool Leverage, (2) Global Developed Fixed Income, (3) Current Return Co-Investment Portfolio, (4) SWIB Treasuries, (5) U.S. Investment Grade, and (6) Emerging Markets Debt; (b) the change to the calculation methodology of the benchmark for the Private Equity Portfolio, effective January 1, 2019; (c) the benchmark changes for the UW System Trust Fund, effective April 1, 2018; (d) the benchmark changes for the select Global Equities Sector Portfolios, effective October 1, 2018 to November 30, 2018 and additional changes effective December 3, 2018; and (e) that all other existing benchmarks remain unchanged; all as reflected in the Committee materials and as recommended by SWIB's benchmark consultant and the Benchmark and Performance Committee, with the exception of the recommended change to the State Investment Fund benchmark that will be reconsidered at the March 2019 meeting. The motion passed unanimously.

### **D. Compensation Committee**

Dave Stein, Chair of the Compensation Committee, reported that in open session, the Committee (1) approved prior meeting minutes; (2) heard an overview from SWIB's compensation consultant on the current compensation landscape and competitive market pay trends; (3) reviewed various projected incentive compensation totals for Calendar Year 2018; and (4) reviewed data on current SWIB staff's qualifications. The Committee also reviewed, and recommended for Board approval, a variety of compensation-related documents.

**Motion:** A motion was made by Trustee Stein and seconded by Trustee Stewart to approve the scoring of the *2018 Strategic Results Scorecard*, as reflected in the Committee meeting materials and as recommended by the Compensation Committee, subject to final confirmation by the Chair of the Compensation Committee following the end of the calendar year of no material events; provided that if material events have occurred, as determined in his discretion, he will call a Special Meeting of the Board to consider revisions to the Scorecard. The motion passed unanimously.

**Motion:** A motion was made by Trustee Stein and seconded by Trustee Stewart to approve SWIB's new *Incentive Compensation Plan-Unclassified Executive Staff*, and to approve proposed amendments to SWIB's: (1) *Compensation Philosophy*; (2) *Compensation Plan for Unclassified Employees*; (3) *Incentive Compensation Plan-Unclassified Investment Services Staff*, including the *Incentive Compensation Deferral Policy* and *Retroactive Incentive Compensation Errors Policy* attached as appendices thereto; (4) *Incentive Compensation Plan-Unclassified Investment Management Staff*; (5) incentive compensation maximums for Investment Management Staff for calendar years 2019 to 2021, subject to future adjustment in accordance with the procedures established by the Board in December 2013; and (6) salary bands for SWIB staff; all as reflected in the Committee's meeting materials and as recommended by the Compensation Committee. The motion passed unanimously.

## **9. Investment Committee Open Session Business**

### **A. Approved Open Session Committee Minutes**

Mr. Villa noted that the approved open session minutes of the July 24, 2018, September 6, 2018, September 25, 2018 and October 23, 2018 Investment Committee meetings were included on

pages 202-222 in the meeting materials for the Board's review. Mr. Villa noted that he previously reviewed the agenda for each meeting with the Board.

## **B. Changes to Trustee WRS Investment Policy**

Sara Chandler, Chief Legal Counsel, walked the Trustees through the proposed changes to the *Board of Trustees Wisconsin Retirement System Investment Policy*, included on pages 223-243 in the meeting materials. Ms. Chandler commented that the revisions reflected the recent organizational changes as well as changes to the ranges that trigger mandatory rebalancing to be based on the asset allocation approved by the Board, and clarified the roles of Board and Staff consultants, and answered questions.

**Motion:** A motion was made by Trustee Stein and seconded by Trustee Sheehy to approve the changes to the *Board of Trustees WRS Investment Policy*, as reflected in the Board's meeting materials. The motion passed unanimously.

## **C. Changes to Board of Trustees SIF & Separately Managed Funds Investment Policy and Guidelines**

Ms. Chandler walked the Trustees through the proposed changes to the *Board of Trustees SIF & Separately Managed Funds Investment Policy and Guidelines*, included on pages 244-272 in the meeting materials, noting that the revisions reflected the recent organizational changes as well as benchmark changes approved by the Board, and answered questions.

**Motion:** A motion was made by Trustee Stein and seconded by Trustee Stewart to approve the changes to the *Board of Trustees SIF & Separately Managed Funds Investment Policy and Guidelines*, as reflected in the Board's meeting materials. The motion passed unanimously.

## **D. Agendas for Upcoming Meetings**

Mr. Villa noted that the final open session agenda for the November 27, 2018 Investment Committee meeting (pages 273-274) and the draft open session agendas for the December 20, 2018 and January 29, 2019 Investment Committee meetings (pages 275-278) were included in the meeting materials for the Board's review.

## **10. Reports Filed Without Comment**

Hearing no questions on the (a) Q3 2018 Enterprise Risk Management Quarterly Report (pages 280-284) and draft ERCC Open Session Committee Minutes of October 3, 2018 (pages 285-287); (b) Chief Financial Officer's Report-New and Amended Contracts Approved, Q3 2018 (pages 288-289); (c) Quarterly Report of Charges to Funds, Q3 2018 (pages 290-299); and (d) Private Markets and Funds Alpha Commitments, Q3 2018 (pages 300-303), the Chair stated the reports would be filed without comment.

## **11. Future Items for Discussion**

Trustee Stein called for future items for Board discussion. There were none noted.

## **12. Adjournment**

**Motion:** A motion to adjourn was made by Trustee Stein and seconded by Trustee Stewart. The motion passed unanimously, and the meeting adjourned at 12:34 p.m.

Date of Board Approval: \_\_\_\_\_

Signed: \_\_\_\_\_  
Robert J. Conlin, Board Secretary

Pursuant to the Board Procedures, a Secretary and an Assistant Secretary are elected each year.

**Bob Conlin, Secretary**

**Sara Chandler, Assistant Secretary**

The Governor appoints the Board Chair and Vice Chair. The Board Chair has recommended **Barb Nick** for Vice Chair.

Pursuant to each Committee Charter, the Board Chair shall appoint members of each Committee and appoint members to serve as Committee chair, vice chair and secretary for terms not to exceed one year. These appointments shall be in effect until February 28, 2020.

**Audit and Finance Committee**

<b>Current</b>	<b>Proposed For June Meeting</b>	<b>Proposed Following June Meeting*</b>
Norm Cummings, Chair Bob Conlin, Vice Chair & Secretary Tim Sheehy Paul Stewart	Norm Cummings, Chair Bob Conlin, Vice Chair & Secretary Tim Sheehy Mark Doll	Bob Conlin, Chair Tim Sheehy, Vice Chair & Secretary Mark Doll Local Government Member
Jeff Anderson, State Controller, ex-officio Joe Chrisman, State Auditor, ex-officio	Jeff Anderson, State Controller, ex-officio Joe Chrisman, State Auditor, ex-officio	Jeff Anderson, State Controller, ex-officio Joe Chrisman, State Auditor, ex-officio

**Benchmark and Performance Committee**

<b>Current</b>	<b>Proposed Following March Meeting*</b>
Sandra Claffin-Chalton, Chair Paul Stewart, Vice Chair & Secretary Mark Doll David Stein	Mark Doll, Chair David Stein, Vice Chair & Secretary Teacher Retirement Board Member Public Member

**Compensation Committee**

<b>Current</b>	<b>Proposed Following March Meeting*</b>
David Stein, Chair Mark Doll, Vice Chair & Secretary Tim Sheehy Barb Nick	David Stein, Chair Tim Sheehy, Vice Chair & Secretary Barb Nick Teacher Retirement Board Member

**Strategic Planning and Corporate Governance Committee**

<b>Current</b>	<b>Proposed For June Meeting*</b>	<b>Proposed Following June Meeting*</b>
Barb Nick, Chair Norm Cummings, Vice Chair & Secretary Sandra Claffin-Chalton Bob Conlin Secretary Nowak	Barb Nick, Chair Norm Cummings, Vice Chair & Secretary Bob Conlin Secretary Brennan Public Member	Barb Nick, Chair Bob Conlin, Vice Chair & Secretary Secretary Brennan Local Government Member Public Member

\*If a member has not been appointed, the Board Chair reserves the right to appoint additional Committee members on a temporary or permanent basis.

**PROPOSED 2020 MEETING AGENDA PLAN\***  
**REGULAR BUSINESS ITEMS**

<b>MONTH</b>	<b>Committees Scheduled</b>
<b>March 17-18</b>	<b>Audit &amp; Finance SPCG Compensation</b>
<b>June 9 Board Meeting June 10 Investment Forum</b>	<b>Audit &amp; Finance SPCG</b>
<b>September 8-9 (Speaker TBD)</b>	<b>Audit &amp; Finance SPCG</b>
<b>October 20-21</b>	<b>WORKSHOP, No committees</b>
<b>December 15-16</b>	<b>Audit &amp; Finance SPCG Compensation Benchmark</b>

**\*Subject to surveying Trustee availability**

# Investment Performance Report

As of

December 31, 2018

# Executive Summary

*December 31, 2018*

- Core Trust Fund returned (-6.51%) gross of fees in Q4, which brings the YTD return to (-3.25%) resulting in an excess return of +20 bps.
- Equity markets had a negative quarter with the US Equity markets (S&P 500) returning (-13.52%) and Non US Equity markets (MSCI World ex US) returning (-12.78%).
- Core Trust Fund five year gross of fee return of 5.17% outperforms the Policy Benchmark by +25 bps on an annualized basis.
- Core Trust Fund Return outperforms the 60/40 Reference Portfolio Return by 38% (cumulative) over a 20 year time period.

# Economic and Market Indicators

December 31, 2018

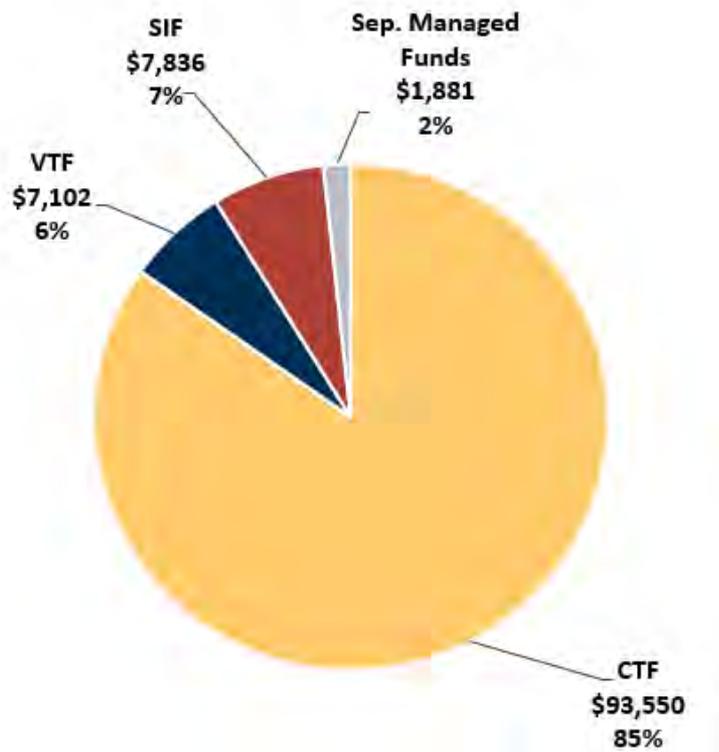
	YTD	1 Year	5 Year	10 Year
<b><u>Economic Indicators</u></b>				
GDP	5.53	5.53	4.14	3.70
GDP Deflator	2.28	2.28	1.66	1.60
CPI	1.91	1.91	1.51	1.80
National Wage Rate Growth	2.30	2.30	2.60	2.13
<b><u>Market Indicators</u></b>				
US Equity	-5.24	-5.24	7.91	13.18
Global Equity	-8.93	-8.93	4.82	10.05
International Developed Equity	-14.09	-14.09	0.34	6.24
US Government Credit	-0.42	-0.42	2.53	3.46
Global Sovereign Debt	-0.84	-0.84	0.77	1.52
Real Estate	8.68	8.68	10.72	7.38

**Sources:** US Equity, Russell 3000; Global Equity, MSCI ACWI Gross; International Developed Equity, MSCI World ex US Equities; US Government Credit, Barclays Capital Govt/Credit; Global Sovereign Debt, Citigroup World Govt Bonds; Real Estate, ODCE

All returns are represented in percent

# Total Assets Under Management (AUM)

December 31, 2018 (in millions)



Fund	12/31/17 AUM <sup>1</sup>	12/31/18 AUM <sup>1</sup>	1 Year AUM Change
Total WRS	\$108,508	\$100,652	(\$7,857)
CTF	\$100,329	\$93,550	(\$6,779)
VTF	\$8,179	\$7,102	(\$1,077)
SIF <sup>2</sup>	\$6,991	\$7,836	\$845
Sep. Managed Funds	\$1,512	\$1,881	\$369
<b>Total AUM</b>	<b>\$117,011</b>	<b>\$110,369</b>	<b>(\$6,642)</b>

- CTF investment earnings of (-\$3.3b) and \$3.5b of outflows for a one year change of (-\$6.8b).
- VTF investment earnings of (-\$0.6b) and \$0.4b of outflows for a one year change of (-\$1.0b).

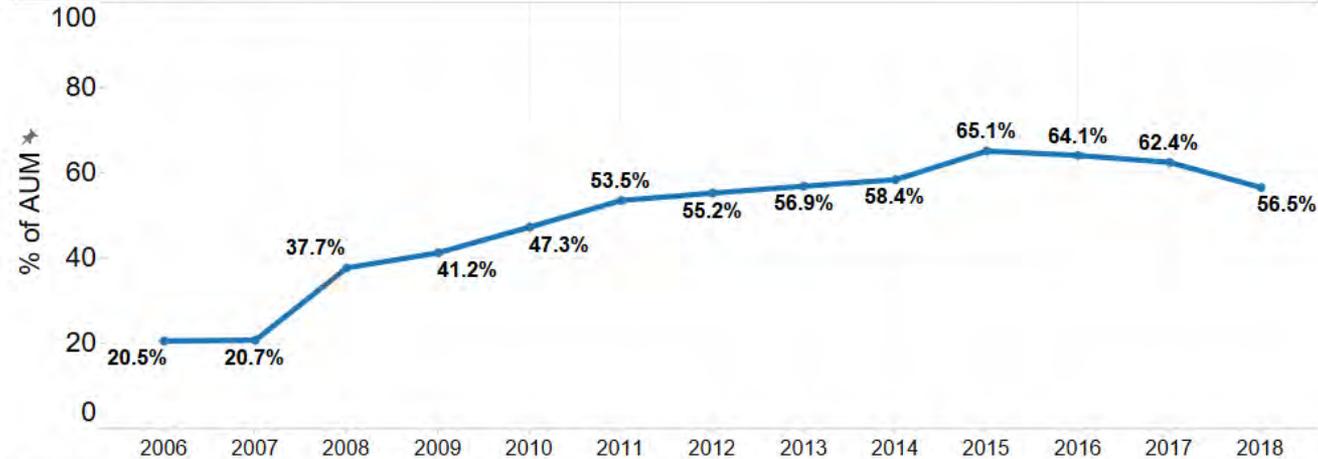
<sup>1</sup>AUM is the total market value of assets that an investment company or financial institution manages on behalf of investors.

<sup>2</sup>Excluding cash held in CTF, VTF, and Separately Managed Funds.

# WRS Assets as of December 31, 2018

## *Breakdown of Internal vs. External and Active vs. Passive*

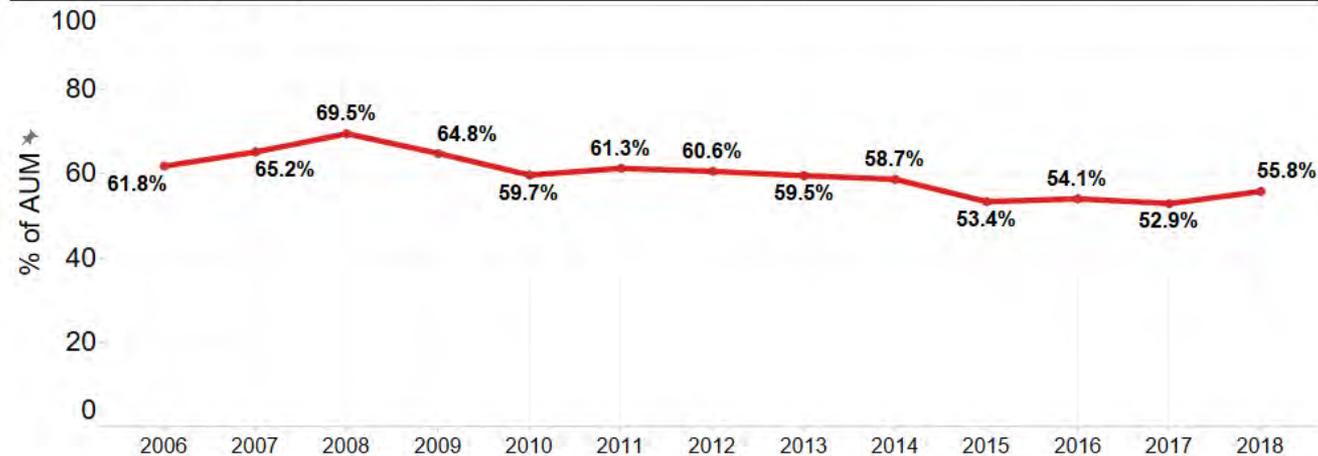
**Internally Managed Assets**



### **Change from 2017 to 2018**

Due to TIPS/Treasuries leverage repositioning in Q2, and re-allocating funds from internal global equity sectors to external global managers.

**Actively Managed Assets**

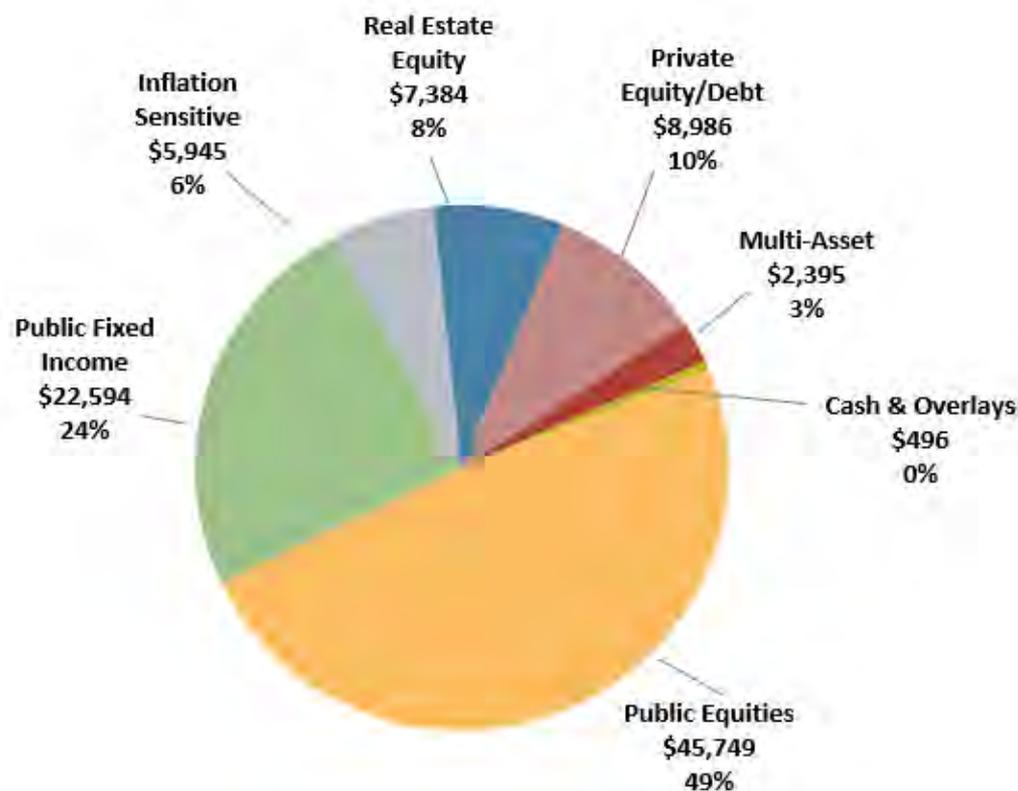


### **Change from 2017 to 2018**

Increased AUM in Hedge Funds, Multi-Asset and Private Markets compared to 2017.

# Core Trust Fund Assets Under Management (AUM)

Breakdown by Asset Class as of December 31, 2018 (in millions)



Asset Class	12/31/17 AUM <sup>1</sup>	12/31/18 AUM <sup>1</sup>	1 Yr. AUM Change
Public Equities	\$50,964	\$45,749	(\$5,215)
Public Fixed Income	\$24,504	\$22,594	(\$1,910)
Inflation Sensitive	\$7,125	\$5,945	(\$1,180)
Real Estate Equity	\$6,401	\$7,384	\$983
Private Equity/Debt	\$8,163	\$8,986	\$823
Multi-Asset	\$2,635	\$2,395	(\$240)
Cash & Overlays	\$537	\$496	(\$41)
<b>Total AUM</b>	<b>\$100,329</b>	<b>\$93,550</b>	<b>(\$6,779)</b>

- Total AUM change of (-\$6.8b) due to both negative investment returns and withdrawals.
- Public Equity change of (-\$5.2b) driven by negative investment returns, primarily from Q4.

<sup>1</sup>AUM is the total market value of assets that an investment company or financial institution manages on behalf of investors.

# Core Trust Fund Allocation

All Values as of December 31, 2018

	Total Exposure (\$ Mil.)	Total Exposure (%)	Adjusted Policy Target <sup>4</sup>	Target Range
<b>Public Equities<sup>1</sup></b>	<b>\$45,958</b>	<b>49.1%</b>	<b>49.2%</b>	<b>46.2 - 52.1%</b>
<i>Global Developed</i>	39,533	42.3%	42.3%	
<i>Emerging Market</i>	4,585	4.9%	4.9%	
<i>US Small Cap</i>	1,841	2.0%	2.0%	
<b>Public Fixed Income<sup>1</sup></b>	<b>\$23,232</b>	<b>24.8%</b>	<b>25.3%</b>	<b>22.3 - 28.3%</b>
<i>Investment Grade<sup>2</sup></i>	17,564	18.8%	19.6%	
<i>High Yield</i>	1,240	1.3%	1.3%	
<i>Global Developed</i>	2,533	2.7%	2.5%	
<i>Emerging Debt</i>	1,379	1.5%	1.4%	
<i>Emerging Debt (local)</i>	516	0.6%	0.5%	
<b>Inflation Sensitive<sup>1</sup></b>	<b>\$14,354</b>	<b>15.3%</b>	<b>15.5%</b>	<b>10.5 - 20.5%</b>
<b>Real Estate Equity<sup>1</sup></b>	<b>\$7,384</b>	<b>7.9%</b>	<b>7.9%</b>	<b>5.0 - 11.0%</b>
<b>Private Equity/Debt<sup>1</sup></b>	<b>\$8,986</b>	<b>9.6%</b>	<b>9.6%</b>	<b>5.0 - 11.0%</b>
<b>Multi-Asset<sup>1</sup></b>	<b>\$2,395</b>	<b>2.6%</b>	<b>2.6%</b>	<b>1.0 - 7.0%</b>
<b>Cash &amp; Overlays<sup>3</sup></b>	<b>\$496</b>	<b>0.5%</b>	<b>0.0%</b>	
<b>Total Fund</b>	<b>\$102,805</b>	<b>109.9%</b>		

- Asset class exposures are within the Target Range.
- Core Trust Fund financial leverage remains at ~10% for Q4.

<sup>1</sup> Public and private market asset values include cash.

<sup>2</sup> Contains government/credit investment grade bonds, excess treasuries, and long treasuries.

<sup>3</sup> Cash is liquidity, global equity income, overlay related cash and amount of cash needed to fund synthetic beta related to Alpha Pool as physical investment inclusive of adjustment for interest.

<sup>4</sup> Adjusted Policy Target is the fund policy target weights dynamically adjusted for actual weights and other asset allocation and rebalancing.

# Core Trust Fund Relative Return Attribution

Gross of Fees as of December 31, 2018

SWIB Total Fund Returns	YTD	One Year	Five Years	Ten Years
<b>Core Trust Fund</b>	<b>-3.25%</b>	<b>-3.25%</b>	<b>5.17%</b>	<b>8.77%</b>
<b>Core Trust Fund Benchmark</b>	<b>-3.46%</b>	<b>-3.46%</b>	<b>4.92%</b>	<b>8.19%</b>
Portfolio Implementation	-0.04%	-0.04%	-0.06%	0.04%
Public Equity Management	-0.05%	-0.05%	-0.05%	0.14%
Public Fixed Management	0.01%	0.01%	0.05%	0.17%
Inflation Protection Management	0.06%	0.06%	0.01%	0.02%
Real Estate Management	0.01%	0.01%	0.07%	-0.01%
Private Equity/Debt Mgmt	0.35%	0.35%	0.18%	0.16%
Multi-Asset Management	-0.04%	-0.04%	0.00%	0.05%
Cash/Leverage & Overlays (Alpha Pool)	-0.09%	-0.09%	0.03%	0.02%
<b>Total Excess Return</b>	<b>0.20%</b>	<b>0.20%</b>	<b>0.25%</b>	<b>0.59%</b>

- 25 bps of annualized excess return over five years due to selection effect.

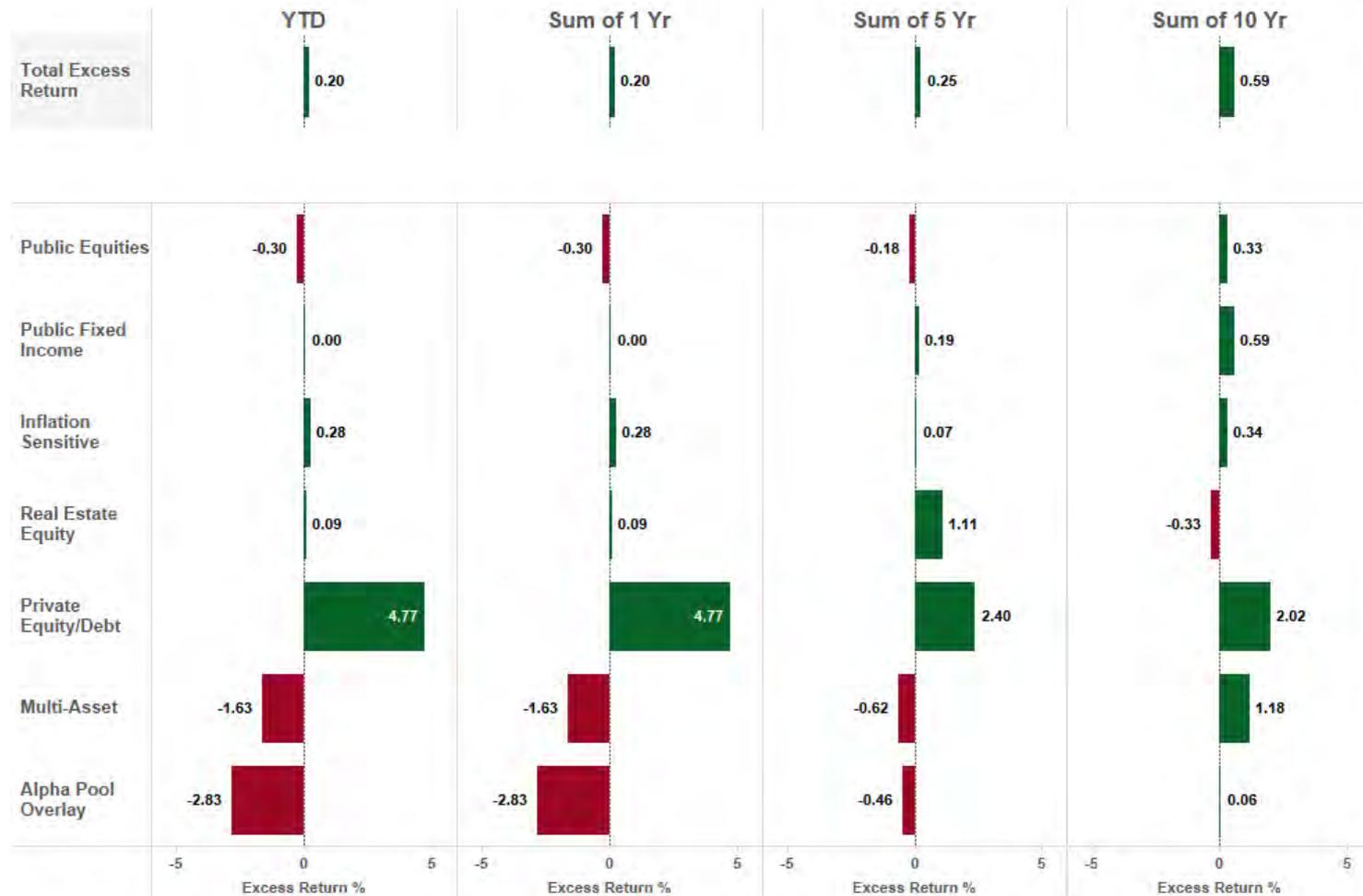
*Portfolio Implementation: a combination of intentional style drift, allocation drift, and timing effects.*

## NOTES

- Performance attribution is not an exact science - small differences between attributes are not meaningful.
- CTF returns reflect a one-time performance only adjustment to correct a timing issue related to the booking of ETF cash flows. The adjustment covers the time period from July 1, 2017 to March 31, 2018, which results in a 3.1 basis point increase to the CTF return.

# Core Trust Fund Asset Class Excess Return

*Gross of Fees Performance Above Benchmark as of December 31, 2018*



- Five year asset class relative returns remain strong with Private Markets (Real Estate and Private Equity) as the main drivers of excess return.

# Core Trust Fund Performance

Gross of Fees as of December 31, 2018

	Inception Date	Market Value (Millions)	Calendar YTD	1 Year	5 Years	10 Years / ITD <sup>3</sup>
<b>Core Trust Fund</b>	<b>6/30/77</b>	<b>\$93,550</b>	<b>-3.25</b>	<b>-3.25</b>	<b>5.17</b>	<b>8.77</b>
Core Trust Fund Benchmark			-3.46	-3.46	4.92	8.19
			0.20	0.20	0.25	0.59
<b>Public Equities<sup>1</sup></b>	<b>12/31/92</b>	<b>\$45,958</b>	<b>-9.23</b>	<b>-9.23</b>	<b>4.45</b>	<b>10.44</b>
Public Equity Benchmark			-8.93	-8.93	4.63	10.11
			-0.30	-0.30	-0.18	0.33
Global Developed Equity	2/28/17	\$39,533	-8.41	-8.41	N/A	-3.97
MSCI World Custom Net			-8.23	-8.23	N/A	-3.86
			-0.18	-0.18	N/A	-0.11
Emerging Market Equity	2/28/17	\$4,585	-15.54	-15.54	N/A	-6.86
MSCI Emerging Market Custom Net			-14.52	-14.52	N/A	-6.41
			-1.02	-1.02	N/A	-0.45
US Small Cap	2/28/17	\$1,841	-10.99	-10.99	N/A	-6.30
Russell 2000			-11.01	-11.01	N/A	-6.37
			0.03	0.03	N/A	0.07
<b>Public Fixed Income<sup>1</sup></b>	<b>12/31/92</b>	<b>\$23,232</b>	<b>-0.76</b>	<b>-0.76</b>	<b>2.49</b>	<b>4.26</b>
Fixed Income Benchmark			-0.76	-0.76	2.30	3.68
			0.00	0.00	0.19	0.59
Investment Grade Fixed Income <sup>2</sup>	5/31/05	\$17,564	-0.14	-0.14	2.76	3.93
Barclays Capital Govt/Credit			-0.42	-0.42	2.53	3.46
			0.28	0.28	0.23	0.47
High Yield Fixed Income	1/31/01	\$1,240	-2.47	-2.47	4.45	10.79
BofA Merrill Lynch Corporate High Yield Ba/B Index since 1/1/18			-2.03	-2.03	3.85	9.90
			-0.44	-0.44	0.60	0.90
Global Developed Fixed Income	9/30/89	\$2,533	-1.00	-1.00	1.03	2.47
Citigroup WGBI Unhedged (Net Tax)			-0.84	-0.84	0.77	1.52
			-0.16	-0.16	0.26	0.95
Emerging Market Debt	5/31/05	\$1,379	-4.72	-4.72	4.98	10.01
JPM EMBI Global Diversified			-4.26	-4.26	4.80	8.20
			-0.46	-0.46	0.19	1.81
Emerging Market Debt - Local	7/31/17	\$516	-8.00	N/A	N/A	-3.71
JPM GBI-EM Global Diversified			-6.21	N/A	N/A	-2.90
			-1.79	N/A	N/A	-0.81

<sup>1</sup> Market value includes the Notional Exposure for Synthetic and/or Policy Overlay Accounts

<sup>2</sup> Contains government/credit investment grade bonds, excess treasuries, and long treasuries

<sup>3</sup> 10 years annualized or since inception annualized

All returns are represented in percent

# Core Trust Fund Performance Cont.

*Gross of Fees as of December 31, 2018*

	Inception Date	Market Value (Millions)	Calendar YTD	1 Year	5 Years	10 Years / ITD <sup>4</sup>
<b>Inflation Sensitive<sup>1</sup></b>	<b>12/31/03</b>	<b>\$14,354</b>	<b>-0.54</b>	<b>-0.54</b>	<b>0.81</b>	<b>3.50</b>
Inflation Sensitive Benchmark			<u>-0.82</u>	<u>-0.82</u>	<u>0.74</u>	<u>3.15</u>
			<b>0.28</b>	<b>0.28</b>	<b>0.07</b>	<b>0.34</b>
TIPS	12/31/03	\$14,354	-0.98	-0.98	1.80	4.01
Bloomberg Barclays Capital TIPS Index			<u>-1.26</u>	<u>-1.26</u>	<u>1.69</u>	<u>3.64</u>
			<b>0.28</b>	<b>0.28</b>	<b>0.11</b>	<b>0.36</b>
<b>Real Estate Equity</b>	<b>3/31/04</b>	<b>\$7,384</b>	<b>8.77</b>	<b>8.77</b>	<b>11.83</b>	<b>7.05</b>
Real Estate Benchmark			<u>8.68</u>	<u>8.68</u>	<u>10.72</u>	<u>7.38</u>
			<b>0.09</b>	<b>0.09</b>	<b>1.11</b>	<b>-0.33</b>
<b>Private Equity/Debt<sup>2</sup></b>	<b>12/31/02</b>	<b>\$8,986</b>	<b>15.93</b>	<b>15.93</b>	<b>13.09</b>	<b>11.73</b>
Private Equity Benchmark			<u>11.16</u>	<u>11.16</u>	<u>10.69</u>	<u>9.71</u>
			<b>4.77</b>	<b>4.77</b>	<b>2.40</b>	<b>2.02</b>
<b>Multi-Asset</b>	<b>3/31/03</b>	<b>\$2,395</b>	<b>-6.57</b>	<b>-6.57</b>	<b>3.67</b>	<b>8.68</b>
Multi-Asset Benchmark			<u>-4.94</u>	<u>-4.94</u>	<u>4.29</u>	<u>7.50</u>
			<b>-1.63</b>	<b>-1.63</b>	<b>-0.62</b>	<b>1.18</b>
<b>Alpha Pool Overlay<sup>2,3</sup></b>	<b>1/31/11</b>	<b>\$6,774</b>	<b>-0.22</b>	<b>-0.22</b>	<b>1.10</b>	<b>1.88</b>
Alpha Pool Overlay Benchmark			<u>2.61</u>	<u>2.61</u>	<u>1.56</u>	<u>1.83</u>
			<b>-2.83</b>	<b>-2.83</b>	<b>-0.46</b>	<b>0.06</b>

<sup>1</sup> Market value includes the Notional Exposure for Synthetic and/or Policy Overlay Accounts

<sup>2</sup> Net of external manager fees

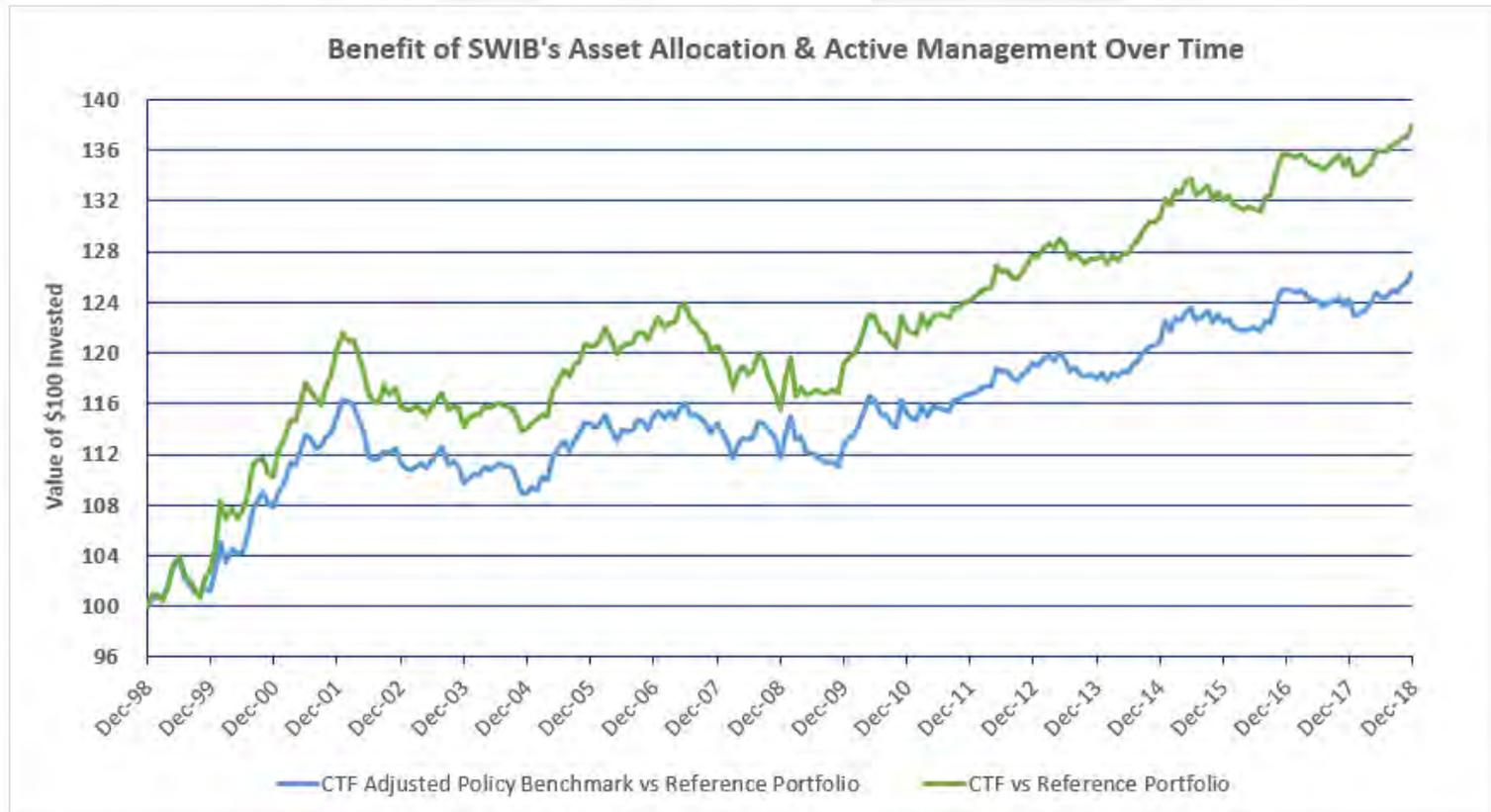
<sup>3</sup> Includes Hedge Fund Portfolio

<sup>4</sup> 10 years annualized or since inception annualized

All returns are represented in percent

# CTF Performance vs. 60/40 Reference Portfolio

December 1998 to December 2018



- CTF Adjusted Policy Benchmark outperforms Reference Portfolio by 26% over 20 years, equivalent to approximately +\$30.4b of excess value added.
- CTF outperforms Reference Portfolio by 38% over 20 years, equivalent to approximately +\$43.8b of excess value added with \$13.4b of excess value added due to active management.

*(Based on CTF market value as of December 1998 assuming no contributions or withdrawals)*

# Variable Trust Fund Allocation vs. Policy Target

All Values as of December 31, 2018

	<b>Market Value (\$ Mil.)</b>	<b>Total Exposure (%)</b>	<b>Target</b>	<b>Target Range</b>
<b>Public Equities</b>	<b>\$7,083</b>	<b>99.7%</b>	<b>100.0%</b>	
<i>Domestic</i>	4,952	69.7%	70.0%	65.0 - 75.0%
<i>International</i>	2,130	30.0%	30.0%	25.0 - 35.0%
<b>Cash</b>	<b>\$19</b>	<b>0.3%</b>	<b>0.0%</b>	
<b>TOTAL FUND</b>	<b>\$7,102</b>	<b>100%</b>	<b>100%</b>	

- Ended the quarter slightly underweight domestic equities but within Target Range.

# Variable Trust Fund Relative Return Attribution

*Gross of Fees as of December 31, 2018*

SWIB Total Fund Returns	YTD	One Year	Five Years	Ten Years
<b>Variable Trust Fund</b>	<b>-7.90%</b>	<b>-7.90%</b>	<b>5.89%</b>	<b>11.65%</b>
<b>Variable Trust Fund Benchmark</b>	<b>-7.83%</b>	<b>-7.83%</b>	<b>5.86%</b>	<b>11.29%</b>
Portfolio Implementation	-0.01%	-0.01%	0.00%	0.04%
Public Equity Management	-0.06%	-0.06%	0.04%	0.31%
<b>Total Excess Return</b>	<b>-0.07%</b>	<b>-0.07%</b>	<b>0.03%</b>	<b>0.36%</b>

- 3 bps of annualized excess return over five years primarily due to selection effect.

*Portfolio Implementation: a combination of intentional style drift, allocation drift, and timing effects.*

## NOTES

- Performance attribution is not an exact science - small differences between attributes are not meaningful.
- VTF returns reflect a one-time performance only adjustment to correct a timing issue related to the booking of ETF cash flows. The adjustment covers the time period from July 1, 2017 to March 31, 2018, which results in a 2.3 basis point increase to the VTF return.

# Separately Managed Funds Performance

*Gross of Fees as of December 31, 2018*

	Market Value (Millions)	Calendar YTD	1 Year	5 Years	10 Years / ITD <sup>2</sup>
<b>State Investment Fund (SIF)</b>	\$9,571.2	1.90	1.90	0.68	0.45
SIF Benchmark		<u>1.94</u>	<u>1.94</u>	<u>0.67</u>	<u>0.40</u>
		<b>-0.03</b>	<b>-0.03</b>	<b>0.01</b>	<b>0.05</b>
<b>State Life Insurance Fund</b>	\$111.7	-2.35	-2.35	4.36	5.43
State Life Insurance Benchmark		<u>-2.30</u>	<u>-2.30</u>	<u>3.98</u>	<u>4.81</u>
		<b>-0.05</b>	<b>-0.05</b>	<b>0.38</b>	<b>0.62</b>
<b>Historical Society Endowment Fund</b>	\$15.6	-4.00	-4.00	6.71	10.91
Historical Society Endowment Benchmark		<u>-3.78</u>	<u>-3.78</u>	<u>6.64</u>	<u>10.83</u>
		<b>-0.23</b>	<b>-0.23</b>	<b>0.06</b>	<b>0.08</b>
<b>Injured Patients &amp; Families Compensation Fund</b>	\$1,330.4	-1.47	-1.47	3.67	5.65
Injured Patients & Families Compensation Benchmark		<u>-1.17</u>	<u>-1.17</u>	<u>3.21</u>	<u>4.79</u>
		<b>-0.30</b>	<b>-0.30</b>	<b>0.46</b>	<b>0.85</b>
<b>UW System Long Term Fund<sup>1</sup></b>	\$418.8	-2.69	N/A	N/A	-2.69
UW System Benchmark		<u>-2.98</u>	<u>N/A</u>	<u>N/A</u>	<u>-2.98</u>
		<b>0.29</b>	<b>N/A</b>	<b>N/A</b>	<b>0.29</b>

<sup>1</sup> Performance start date of April 1, 2018

<sup>2</sup> Ten years annualized or since inception annualized

\*Local Gov't Property Insurance Fund and Edvest Fund not shown. Funds are invested 100% in SIF

All returns are represented in percent

# Glossary

Term	Definitions
Active Management	A process for managing a portfolio in which investment staff makes the day-to-day decisions on what to buy and sell with the goal of generating a return on investment that is greater than the market would otherwise provide.
Alpha Pool Overlay	ACTIVE MANAGEMENT strategies that focus on alpha (Hedge Funds, Tactical Alpha) with very little beta exposure.
AUM	(Assets Under Management) - The total market value of assets that an investment company or financial institution manages on behalf of investors.
Benchmark	A standard or reference point – often an index fund – used to measure or judge the performance of investments.
BPS	(Basis Point) - A unit of measure used in the investment industry. One basis point equals 1/100th of 1% (0.01%) or 1 cent for each \$100.
CPI	(Consumer Price Index) – A measure that examines the weighted average of prices of a basket of consumer goods and services, such as transportation, food and medical care. It is calculated by taking price changes for each item in the predetermined basket of goods and averaging them. Changes in the CPI are used to assess price changes associated with the cost of living.
CTF	(Core Trust Fund) - The trust fund which holds the largest part of the WRS assets. It is a fully diversified, balanced fund that includes a mixture of holdings such as stocks, bonds and real estate.
Excess Return	Investment returns from a security or a portfolio that exceeds a BENCHMARK or index 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 beat the market.
Exposure	Exposure is the dollar value of physical assets plus the NOTIONAL VALUE of derivatives.

# Glossary

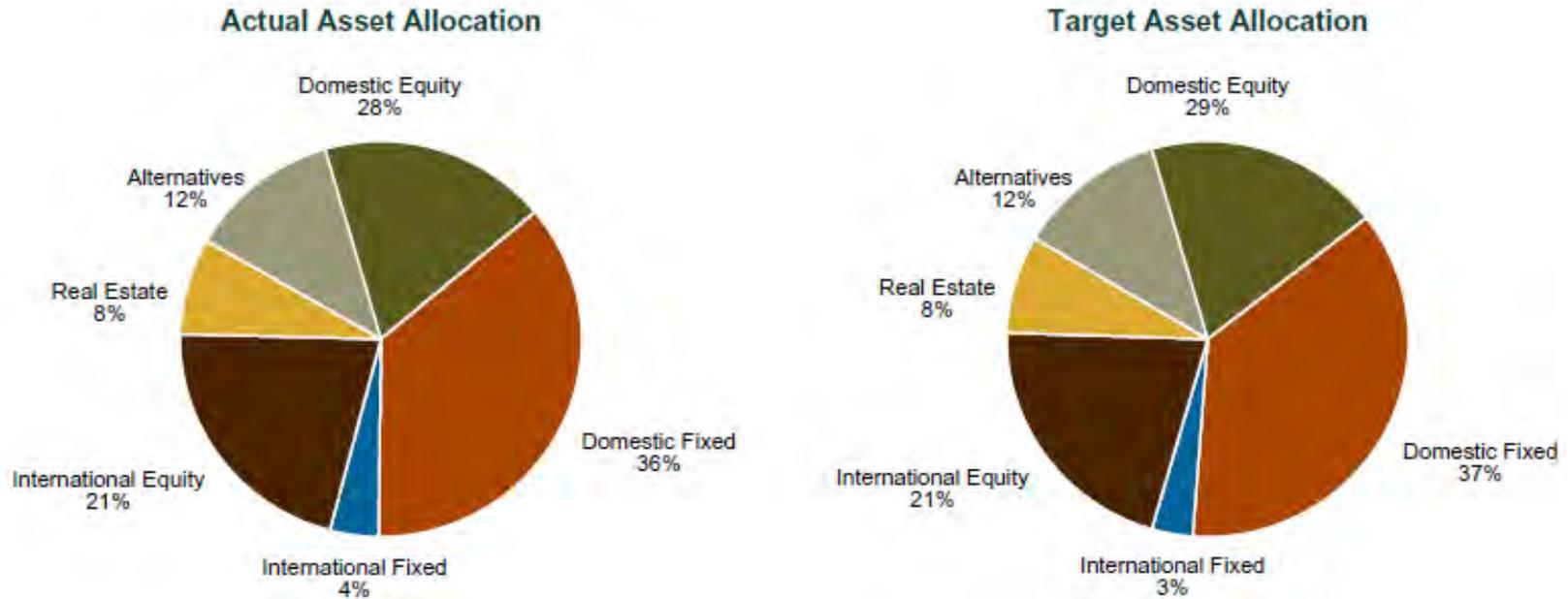
Term	Definitions
GDP	(Gross Domestic Product) - As an aggregate measure of total economic production for a country, GDP represents the market value of all goods and services produced by the economy during the period measured, including personal consumption, government purchases, private inventories, paid-in construction costs and foreign trade balances (exports are added, imports are subtracted).
Interaction	Attribution effect resulting from the combination of (or interaction between) allocation and selection effects.
Market Value	The price an asset would fetch in the marketplace.
Notional Value	The total value of a leverage position's assets. This term is commonly used in the options, futures and currency markets which employ the use of leverage, wherein a small amount of invested money can control a large portion of the market.
Passive Management	Investing in a fund that replicates a market index, such as the S&P 500, that will allow an investment performance that is no worse, or better, than the market as a whole.
Policy Benchmark	Fund level BENCHMARK approved by the Benchmark Committee. (Also referred to as "Policy Target" or "SWIB's Asset Allocation).
Policy Target	Fund level BENCHMARK approved by the Benchmark Committee. (Also referred to as "Policy Benchmark").
Portfolio Implementation	A combination of intentional style drift, allocation drift and timing effects.
Reference Portfolio	Hypothetical global portfolio comprised of 60% MSCI World Net (custom starting 2010) and 40% Citi WGBI after tax. Assumes no contributions or withdrawals.
Relative Return Attribution	A measure of the return of an investment portfolio relative to a theoretical passive REFERENCE PORTFOLIO or BENCHMARK.
SIF	(State Investment Fund) - A pool of cash balances of the WRS various state and local government units.
Total Exposure	The dollar value of MARKET VALUE plus the NOTIONAL VALUE of the Policy Overlays.
VTF	(Variable Trust Fund) - The smaller of the two WRS funds. It is primarily a stock fund that has a relatively greater degree of risk than the Core Trust Fund due to the volatility of the stock market.
WRS	(Wisconsin Retirement System) – The total aggregate of the Core and Variable Trust Funds.

# Callan Quarterly Report Summary— Q4 2018

Board Meeting  
March 13, 2019

# Actual vs Target Asset Allocation

*Gross of Fees as of December 31, 2018*



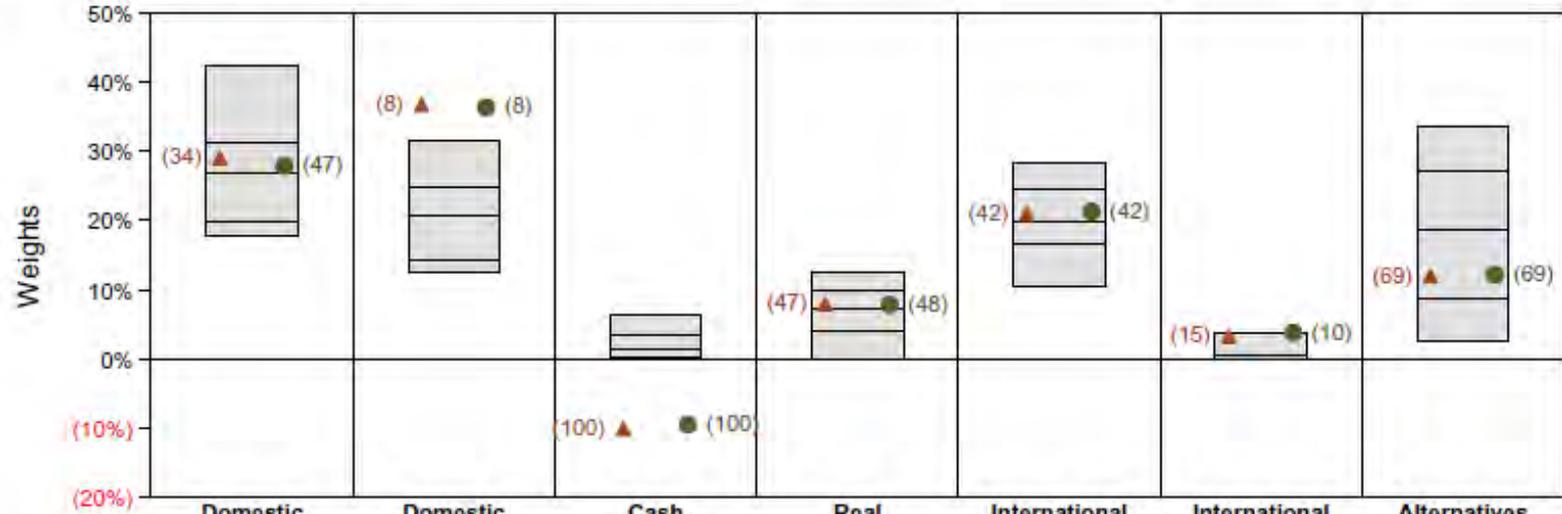
**Target Asset Allocation weights are aggregated to fit the Callan peer allocation definitions.**

- Global equities are carved out into domestic and international equity.
- TIPS are included in Domestic Fixed Income.
- Global Fixed income sub-asset class is carved out into domestic and international fixed income.
- Alternatives includes Private Equity, Hedge Funds, and Multi-Asset.

# Actual vs Target Asset Allocation

Gross of Fees as of December 31, 2018

Asset Class Weights vs Very Large Public Funds (>10B)



	Domestic Equity	Domestic Fixed	Cash Equivalent	Real Estate	International Equity	International Fixed	Alternatives
10th Percentile	42.30	31.67	6.42	12.55	28.29	3.83	33.50
25th Percentile	31.30	24.68	3.55	9.89	24.38	0.66	27.21
Median	26.89	20.85	1.59	7.38	19.70	0.00	18.65
75th Percentile	19.92	14.38	0.40	4.09	16.73	0.00	8.85
90th Percentile	17.91	12.43	0.00	0.00	10.42	0.00	2.76
<b>Fund</b> ●	27.88	36.31	(9.41)	7.89	21.29	3.86	12.17
<b>Target</b> ▲	29.00	36.69	(10.00)	8.00	21.00	3.31	12.00
% Group Invested	96.55%	96.55%	82.76%	86.21%	93.10%	37.93%	58.62%

- Domestic Fixed Income is top decile, Cash & Cash Equivalent is bottom percentile (leverage).
- Peers are invested more heavily in the Private Markets asset class (Real Estate, Private Equity).

# Total Fund Ranking – Unadjusted Ranking

*Gross of Fees as of December 31, 2018*

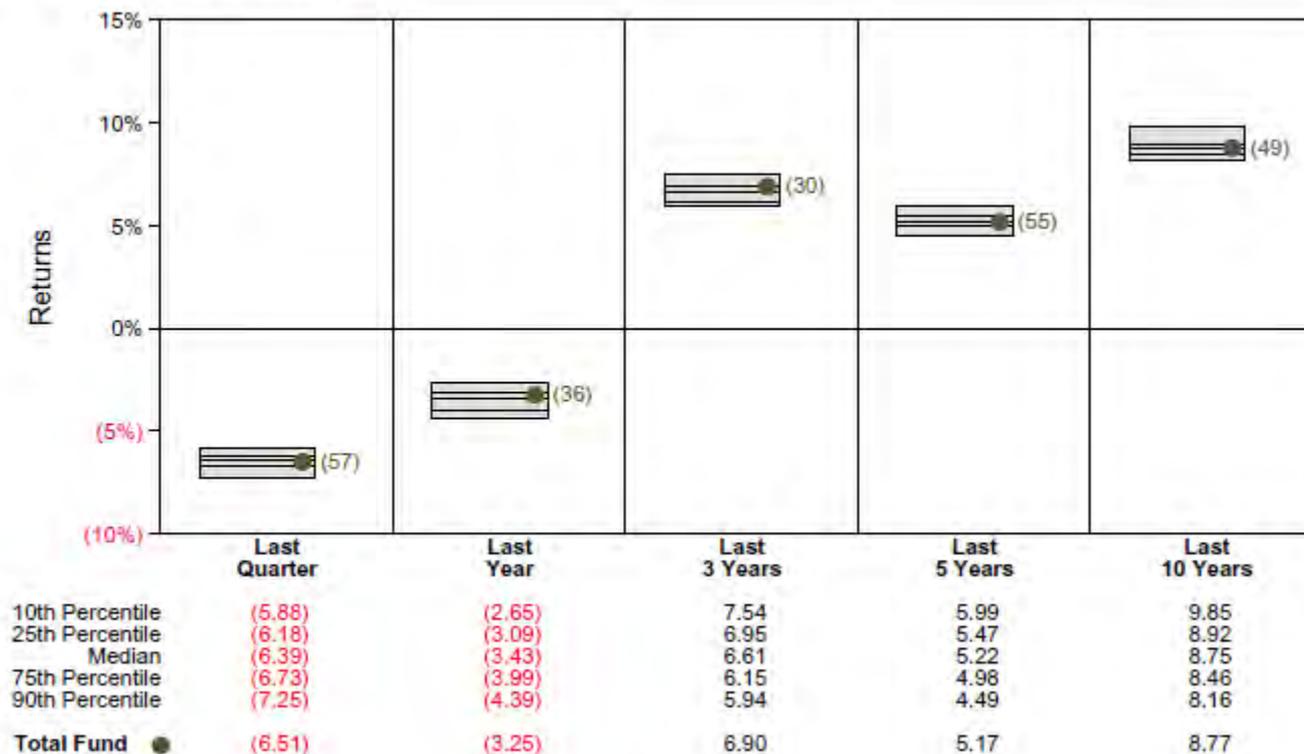
## Very Large Public Funds (>10B)



# Total Fund Ranking – Asset Allocation Adjusted

Gross of Fees as of December 31, 2018

## Asset Allocation Adjusted Ranking



- Asset allocation adjusted only, not total risk adjusted.
- 10 year ranking improves from 58<sup>th</sup> percentile to 49<sup>th</sup> percentile.



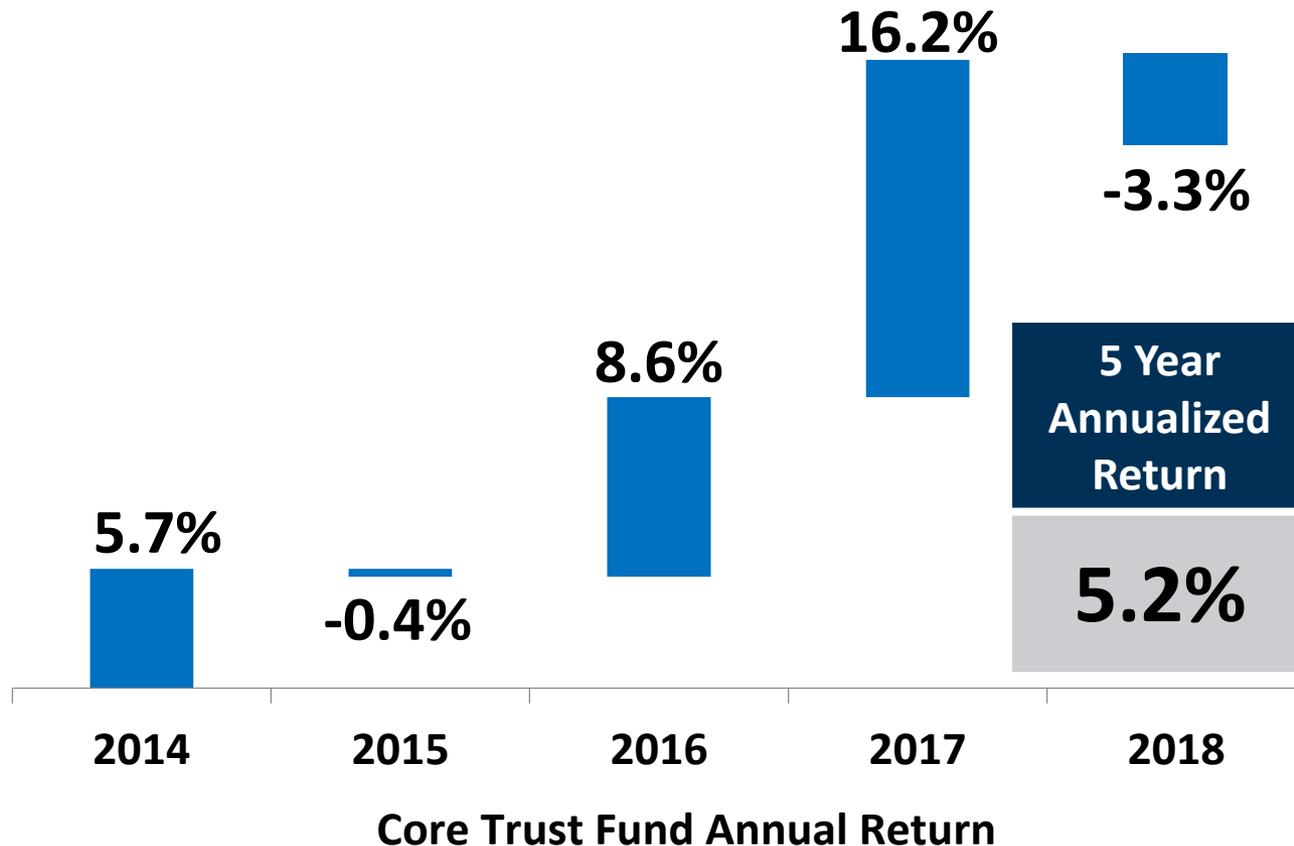
# Quarterly Investment Update

*Board Meeting*

*March 13, 2019*

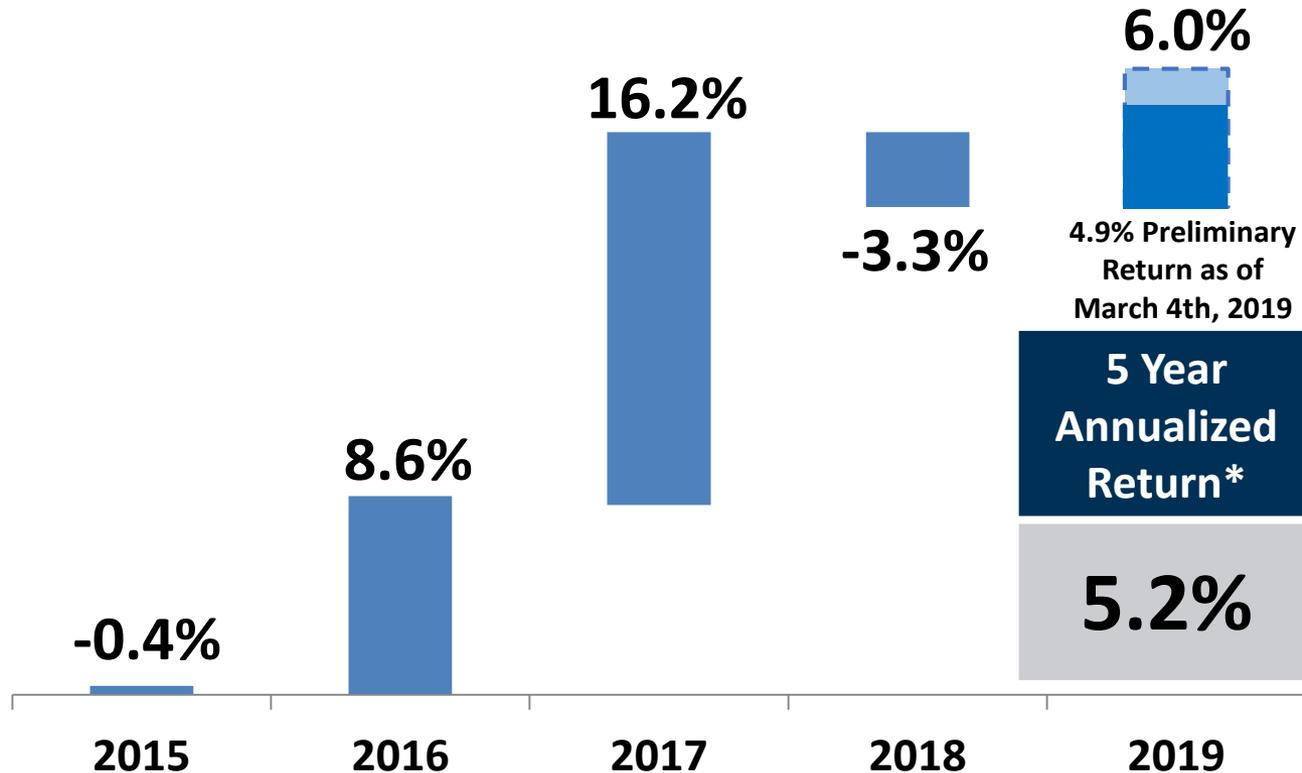
# Performance Outlook

# 2018 CTF 5-Year Return Decomposed



Source: SWIB; 5.2% is the geometric average realized return, 2014 to 2018.

# 2019 CTF 5-Year Return - ?



**Core Trust Fund Annual Return**

Source: SWIB; \*5-year Annualized Return is forecast using NEPC assumptions for 2019.

# Benchmark Index Performance

*2018 saw declines across all asset classes.*

<b>Summary of Returns</b>					
December 31, 2018					
<b>Benchmark Indices (% change, annualized)</b>	<b>YTD</b>	<b>1 Yr</b>	<b>5 Yr</b>	<b>10 Yr</b>	<b>10 Yr Volatility</b>
CTF Policy Benchmark (Gross of Fee)	-3.46%	-3.46%	4.92%	8.19%	8.37%
S&P 500	-4.4%	-4.4%	8.5%	13.1%	13.6%
Russell 2000	-11.0%	-11.0%	4.4%	12.0%	18.4%
MSCI ACWI Gross	-8.9%	-8.9%	4.8%	10.0%	14.6%
MSCI ACWI Gross (Local)	-7.2%	-7.2%	6.5%	10.6%	12.3%
MSCI World ex US Equities	-14.1%	-14.1%	0.3%	6.2%	16.1%
MSCI World ex US Equities (Local)	-10.9%	-10.9%	3.8%	7.4%	12.2%
MSCI Emerging Markets	-14.6%	-14.6%	1.6%	8.0%	19.3%
Barclays Capital Govt/Credit	-0.4%	-0.4%	2.5%	3.5%	3.3%
BOFA ML High Yield	-2.3%	-2.3%	3.8%	11.0%	7.6%
Citigroup World Govt Bonds	-0.8%	-0.8%	0.8%	1.5%	5.9%
Citigroup World Govt Bonds (Hedged)	2.6%	2.6%	3.6%	3.2%	2.8%

Source: FactSet, SWIB

# Benchmark Index Performance

*Year to date, equities and credit have pared the losses.*

<b>Summary of Returns</b>					
January 31, 2019					
<b>Benchmark Indices (% change, annualized)</b>	<b>YTD</b>	<b>1 Yr</b>	<b>5 Yr</b>	<b>10 Yr</b>	<b>10 Yr Volatility</b>
CTF Policy Benchmark (Gross of Fee)	4.77%	-1.55%	6.20%	9.29%	8.25%
S&P 500	8.0%	-2.3%	11.0%	15.0%	13.4%
Russell 2000	11.2%	-3.5%	7.3%	14.5%	18.3%
MSCI ACWI Gross	7.9%	-7.0%	7.3%	11.9%	14.5%
MSCI ACWI Gross (Local)	7.3%	-4.4%	8.8%	12.1%	12.3%
MSCI World ex US Equities	7.1%	-12.1%	2.6%	8.0%	15.9%
MSCI World ex US Equities (Local)	5.7%	-6.7%	5.6%	8.7%	12.2%
MSCI Emerging Markets	8.8%	-14.2%	4.8%	9.7%	19.3%
Barclays Capital Govt/Credit	1.2%	1.9%	2.5%	3.7%	3.2%
BOFA ML High Yield	4.6%	1.6%	4.6%	10.9%	7.6%
Citigroup World Govt Bonds	1.4%	-1.1%	0.8%	2.1%	5.8%
Citigroup World Govt Bonds (Hedged)	0.9%	4.2%	3.5%	3.5%	2.7%

Source: FactSet, SWIB Preliminary Performance as of March 4th, 2019

# Market Review

# All Eyes on the Cycle Ahead

*Are we through the rapids yet?*

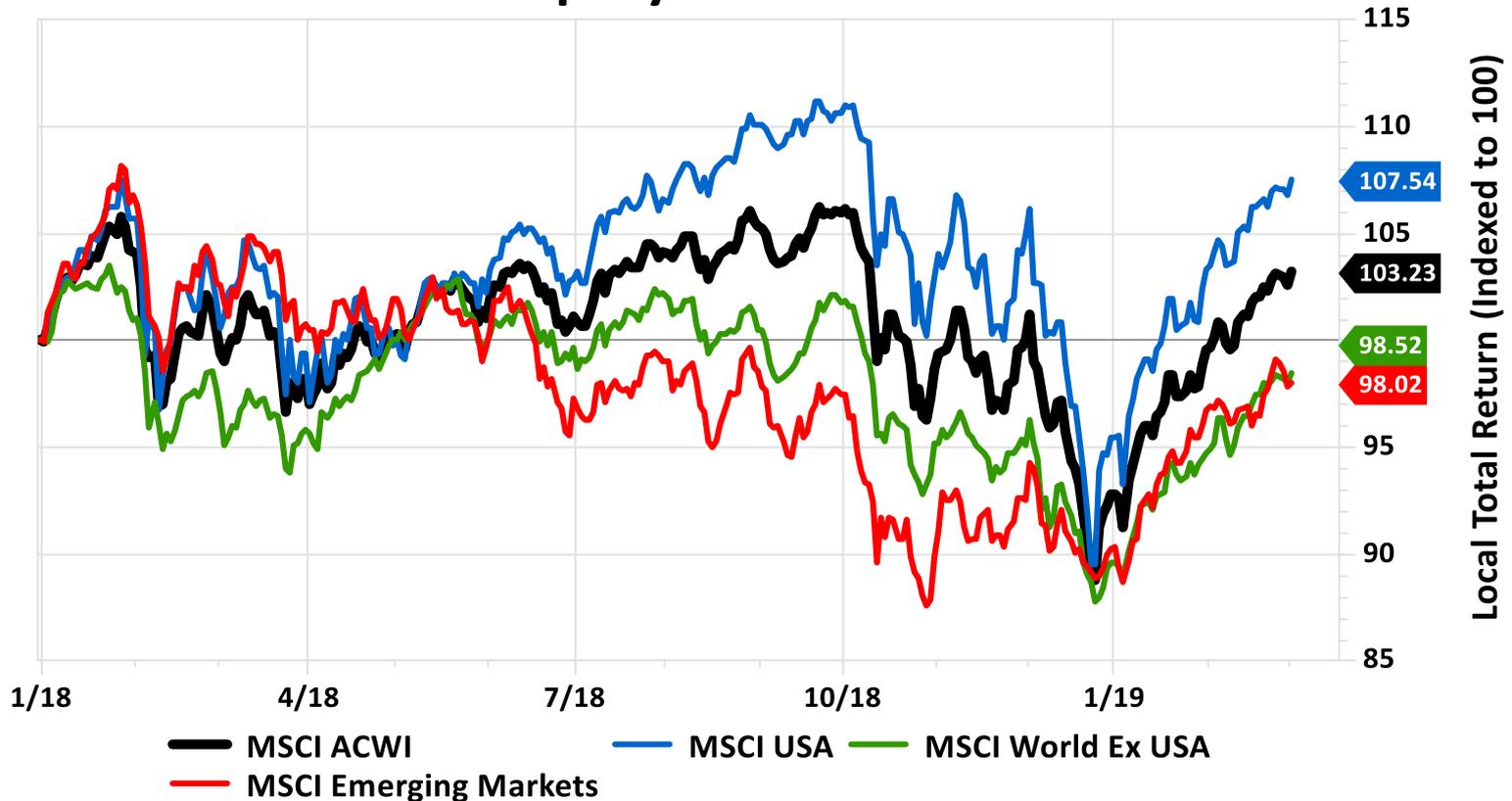


# Global Equities - Performance

*2019 is thus far repairing the losses delivered in Q4.*

03/04/2019

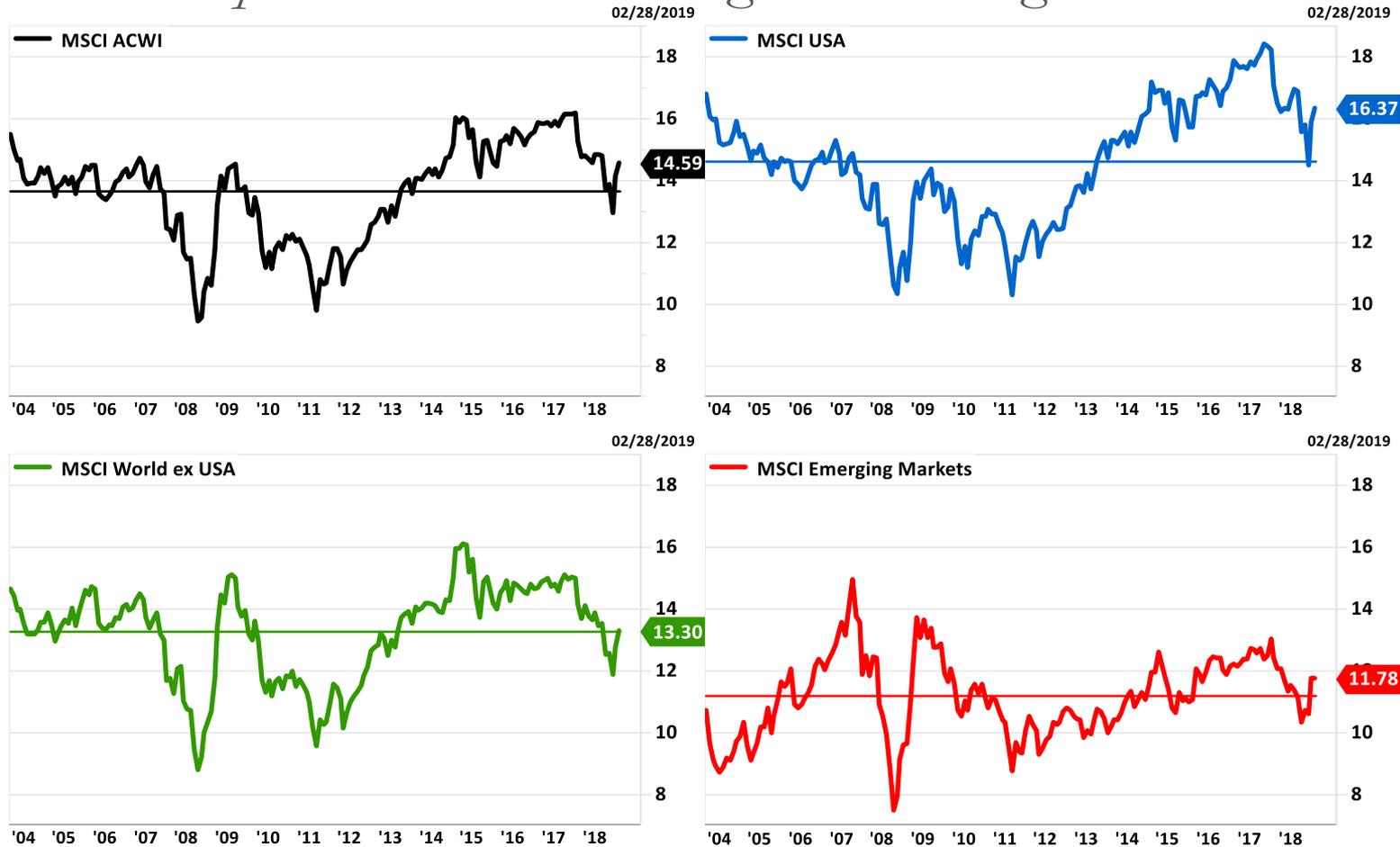
## Local Equity Performance



Source: FactSet

# Global Equities - Valuation

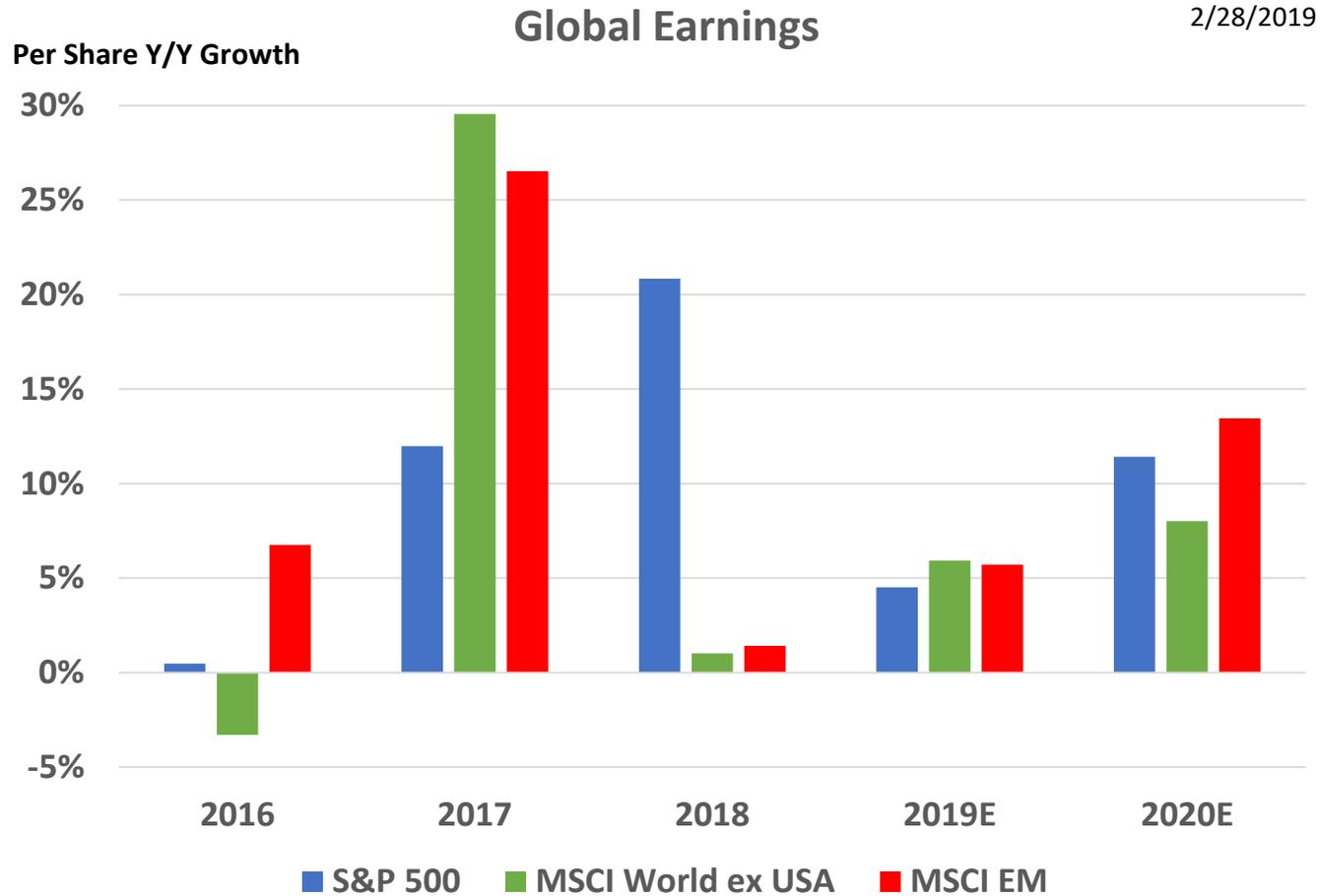
*Price multiples have reverted to longer term averages.*



Source: FactSet Market Aggregates - Next Twelve Month P/E Ratios

# Earnings Growth

*Near term expectations are positive.*



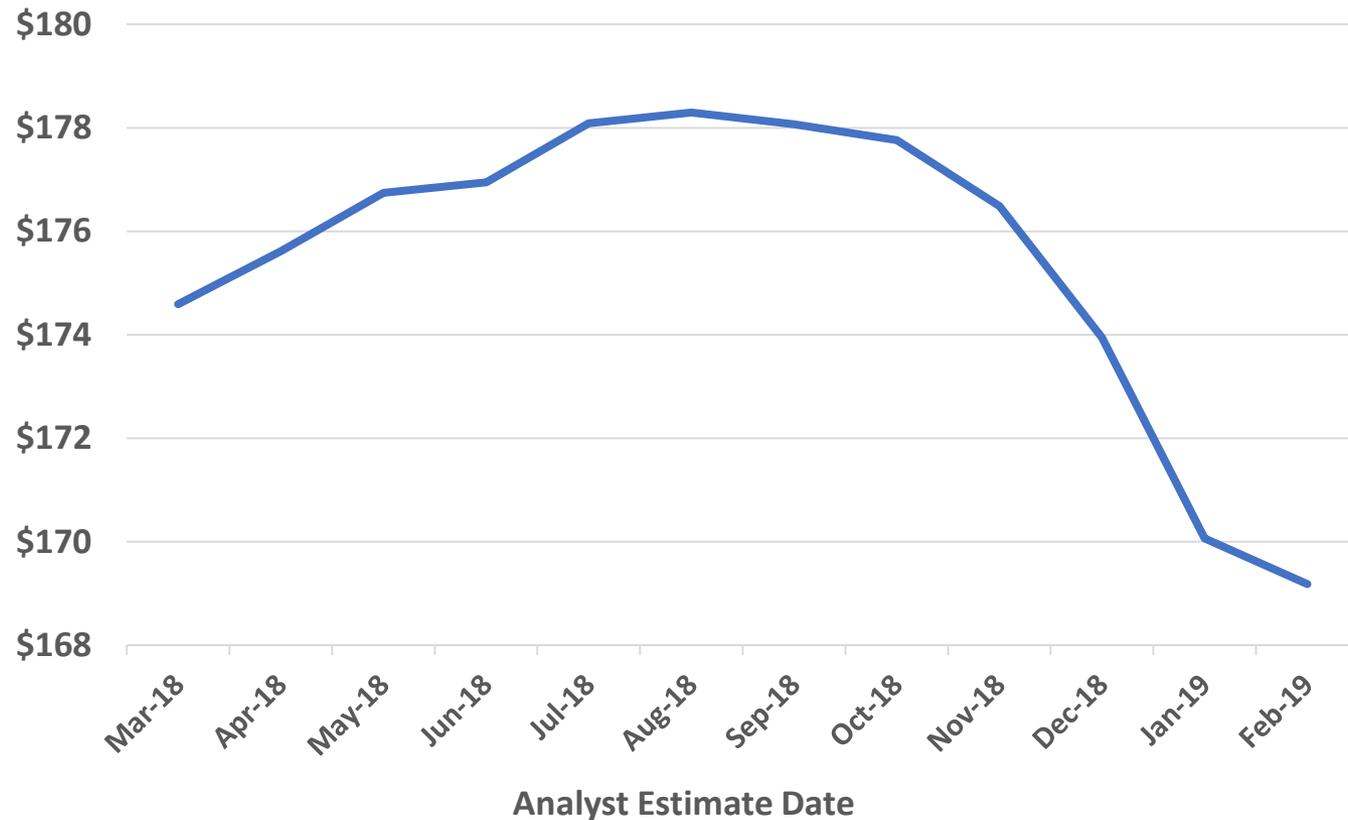
Source: FactSet

# Revised Expectations

*Consensus forecasts for 2019 have been trimmed in recent months.*

## S&P 500 Earnings Expectations

### 2019 Earnings per Share

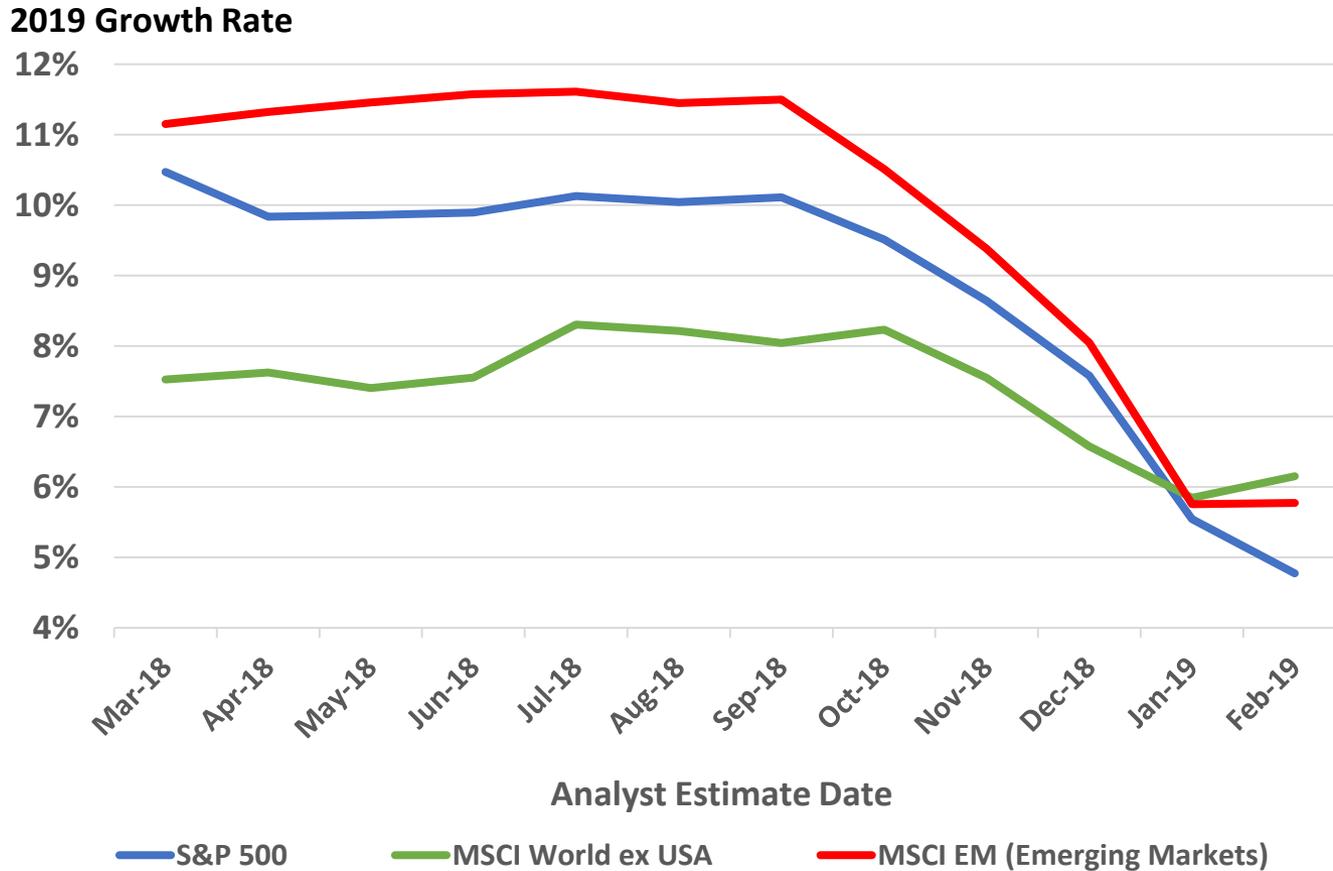


Source: FactSet

# Revised Expectations

*Forecasts are lower and less divergent globally.*

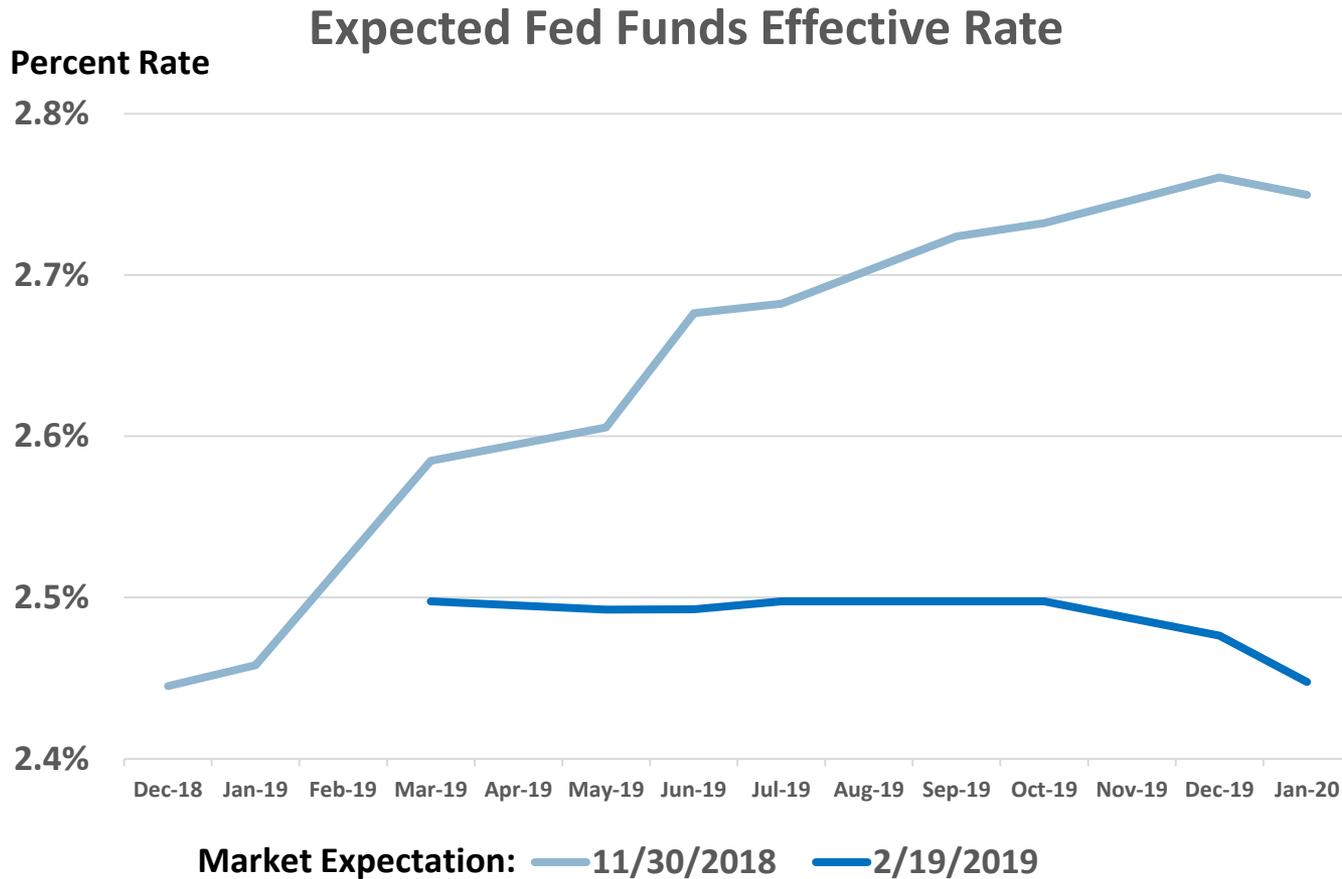
## Evolution of 2019 EPS Growth Expectations



Source: FactSet

# Fed Expectations

*Expected pace of future rate hikes has diminished.*



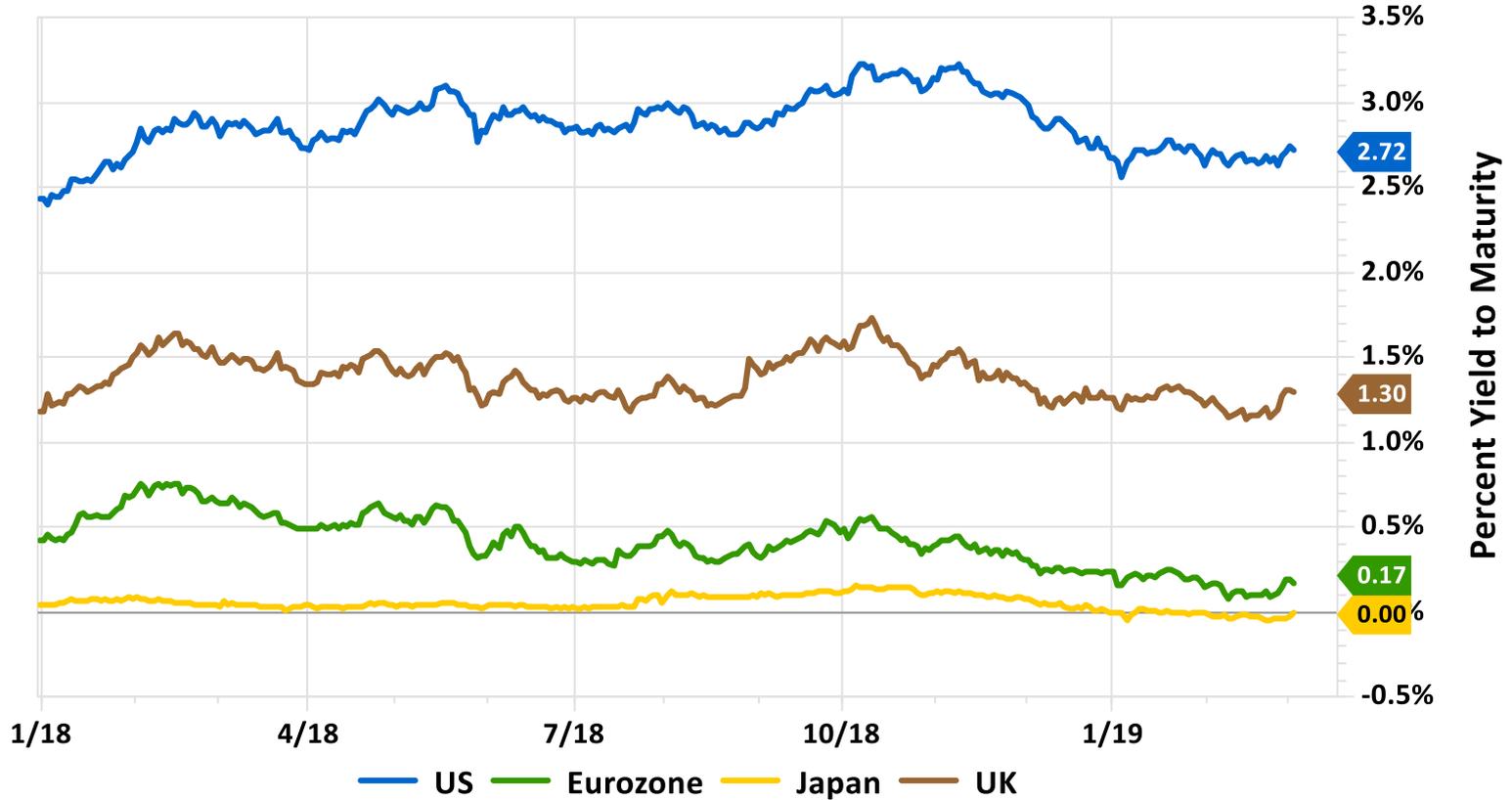
Source: Bloomberg

# Global Bonds

## *Sovereign Yield History*

03/04/2019

### 10-Year Government Bond Yields



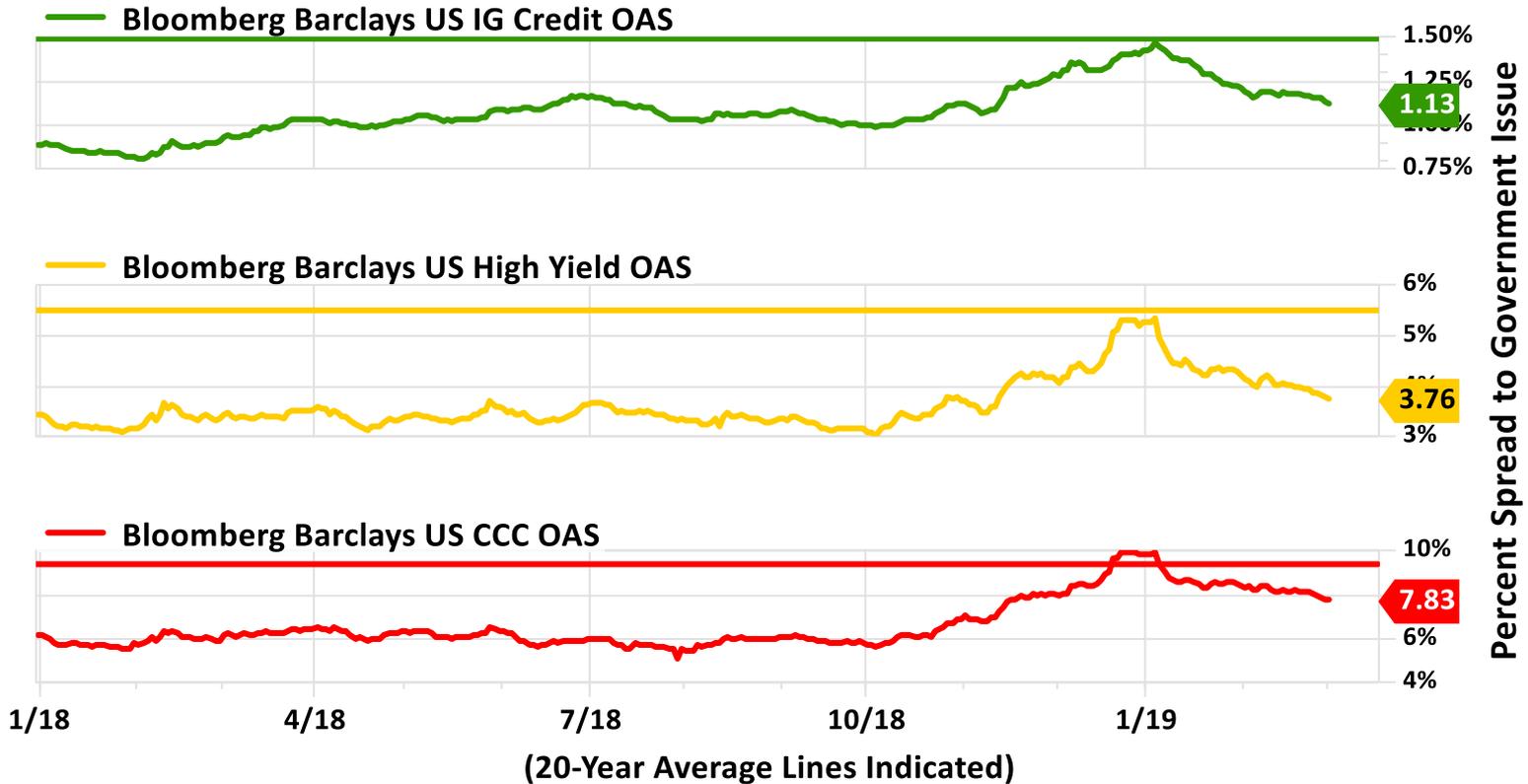
Source: FactSet

# Credit Sectors

*Spreads have narrowed year to date.*

03/04/2019

## Credit Spreads



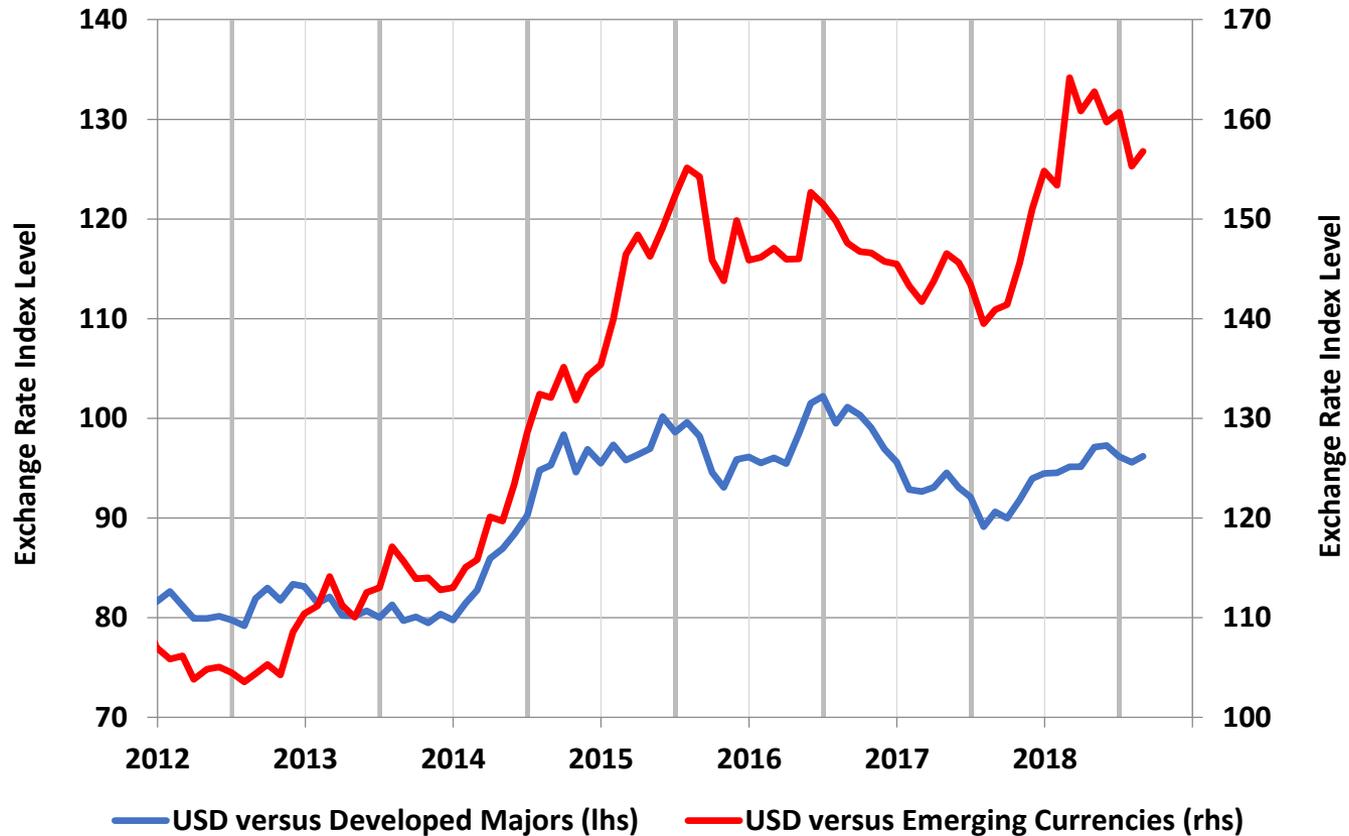
Source: FactSet

# Currency Performance

*The dollar has recently reacted to lower U.S. rate expectations.*

Updated: 02/28/2019

## Foreign Exchange Rates



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

# U.S. Breakevens

*Inflation expectations fell sharply in 2018*

### US 5 Year Breakeven Inflation Expectation

Updated: 02/28/2019



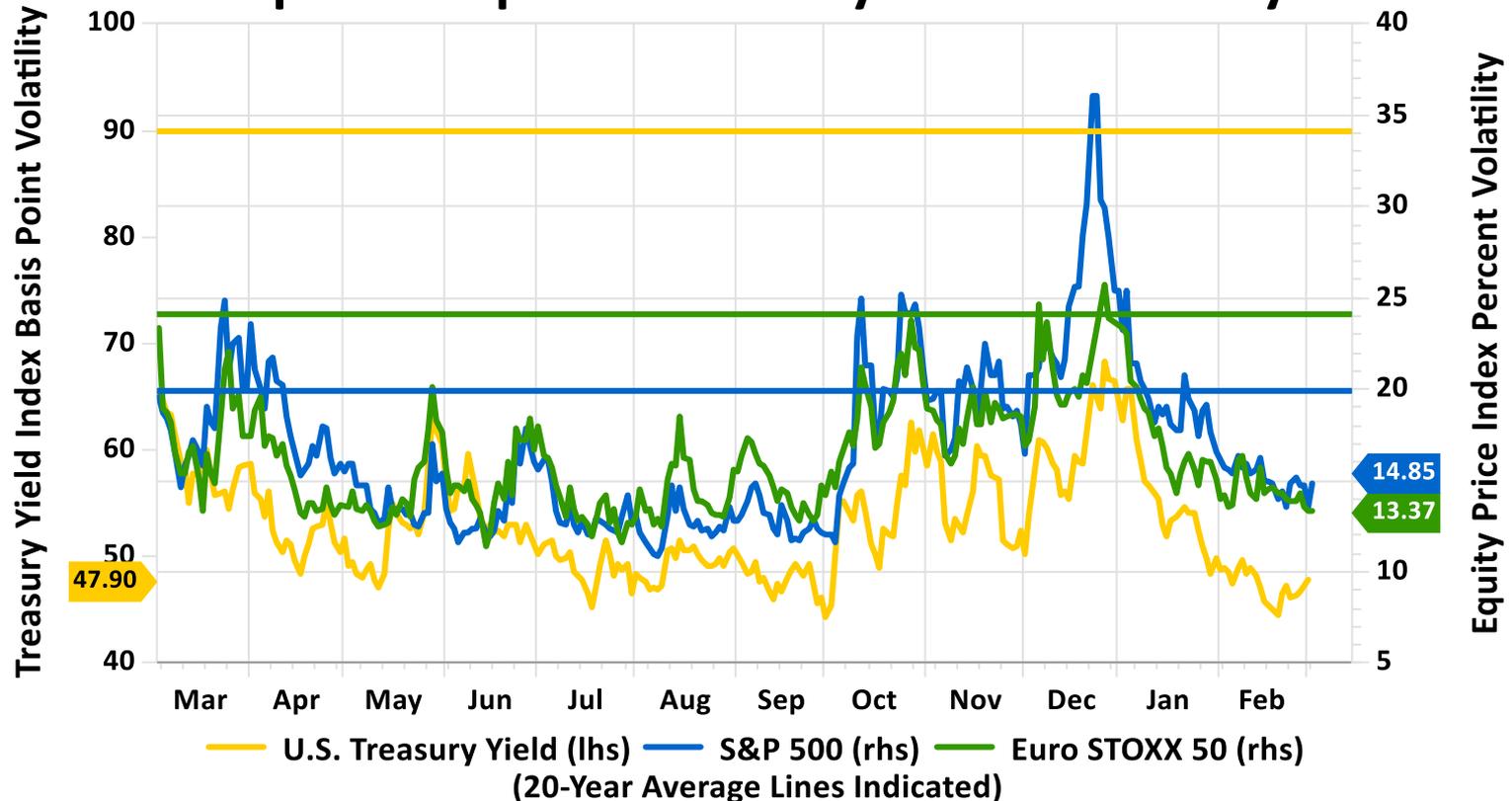
Source: Bloomberg

# Volatility

*Has normalized following spike in Q4.*

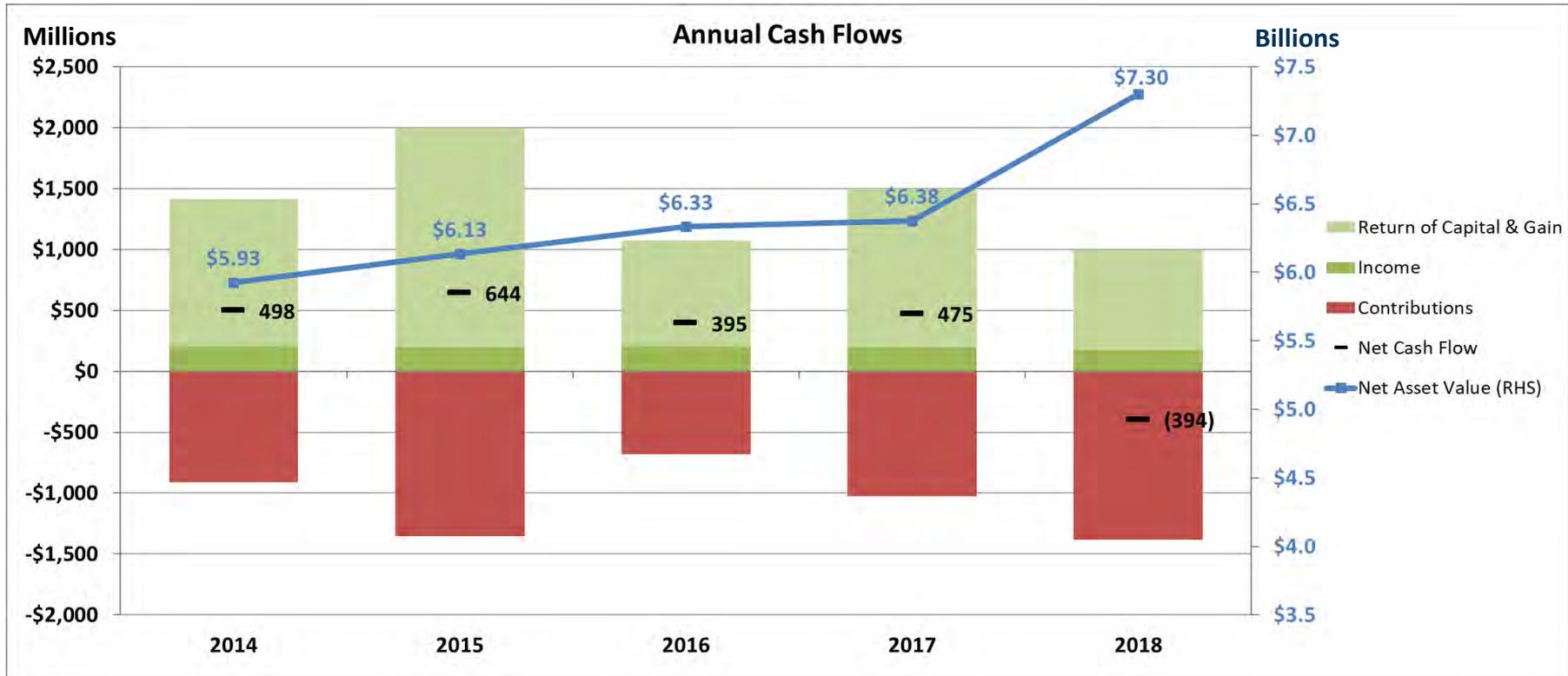
03/04/2019

## Option Implied Volatility - 1 Year History



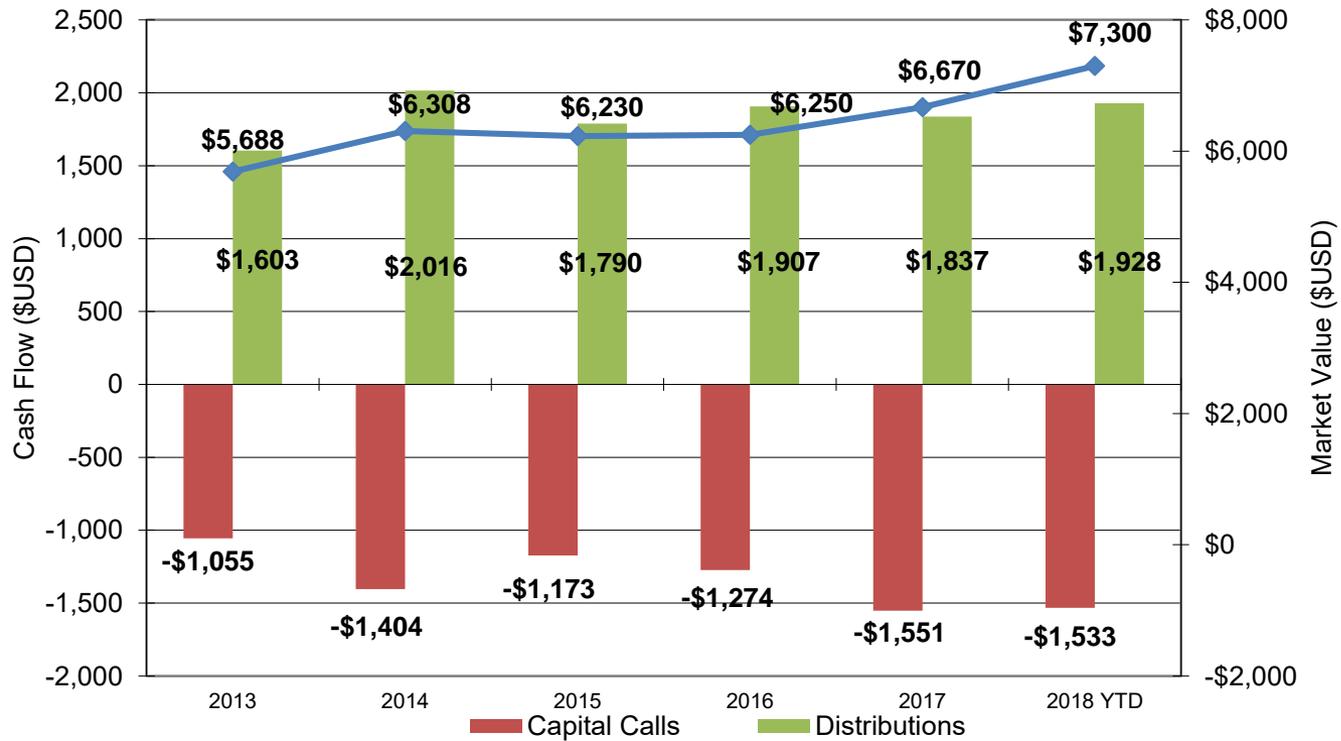
Source: FactSet, Merrill Lynch MOVE, CBOE VIX, Euro Stoxx 50 VSTOXX

# Real Estate Portfolio Investment Activity



Note: Net Asset Value does not include the Portfolio level cash holdings.

# Private Equity Portfolio



Includes 304, 321, 345 and 503 Portfolios

# PE CoInvest Performance Summary

- \$423 million invested in 28 companies
- \$212 million of Realized Value
- \$491 million of remaining Market Value
- \$702 million of Total Value
- TVPI: 1.66x
- DPI: 0.50x



Above cost: TVPI ≥ 1.20x; At or near cost: 0.9x ≤ TVPI < 1.20x; Below cost: TVPI < 0.9x

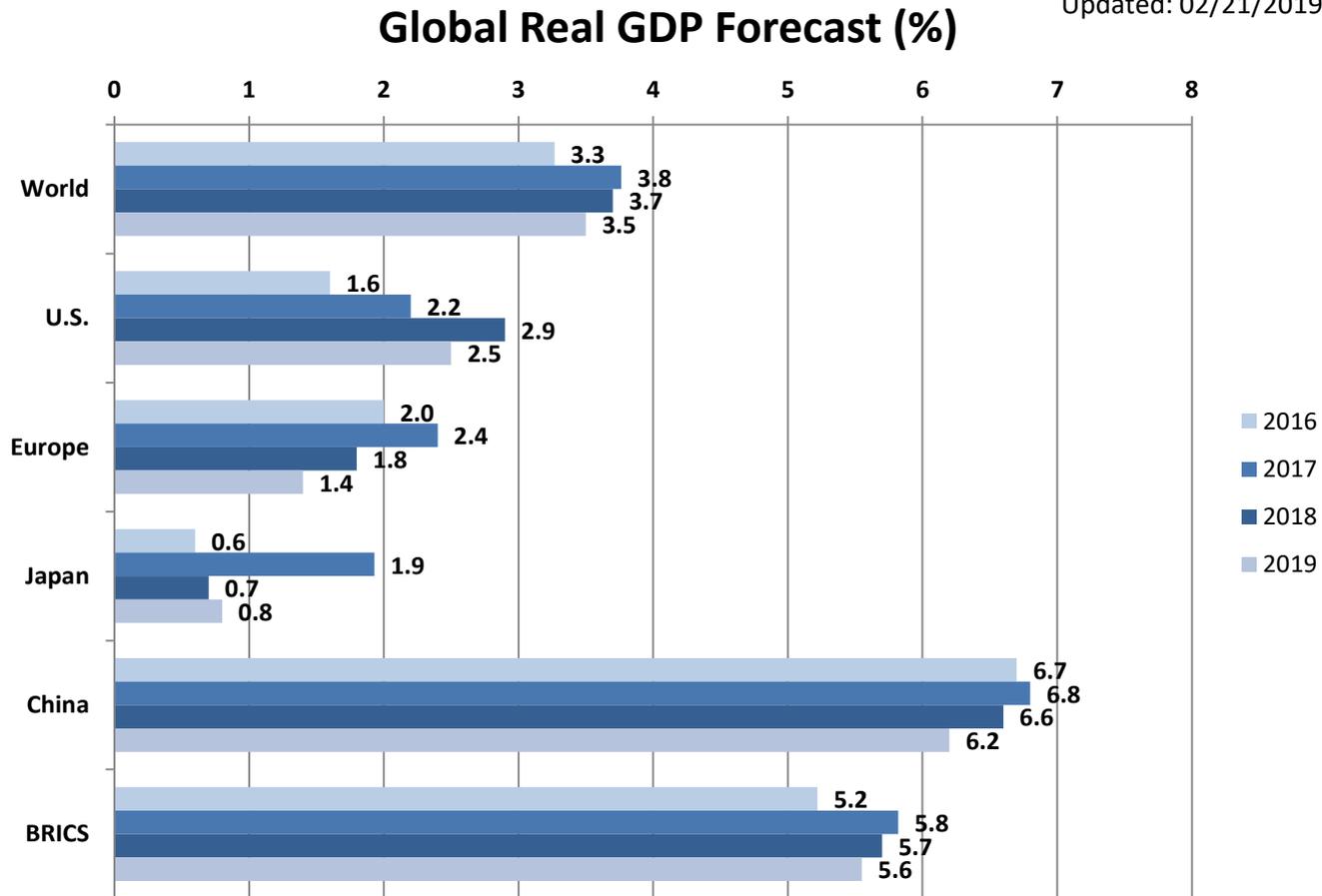
Notes: Data as of 12/31/18 based on internal figures; Amounts in thousands USD; Data is gross of any expenses; Figures in parenthesis represent number of investments; Realized Value and Total Value include cash proceeds for partially realized investments  
 TVPI = (Market Value + Distributions)/Invested Capital  
 DPI = Distributions/Invested Capital

# Economic Outlook

# Global Growth

*Broad moderation expected in 2019.*

Updated: 02/21/2019

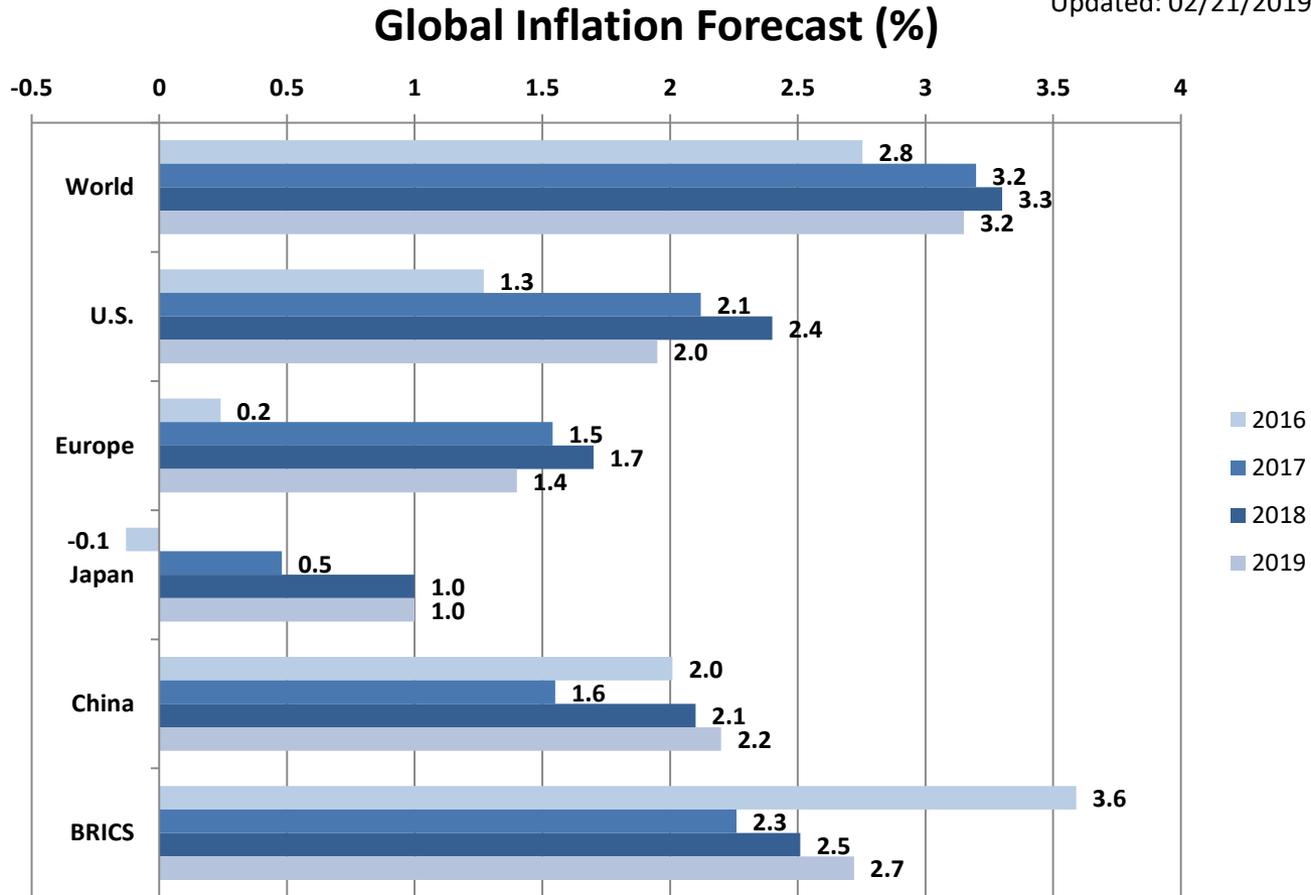


Source: Bloomberg Consensus

# Global Inflation

*Emerging World inflation to rise as real growth falls in 2019.*

Updated: 02/21/2019

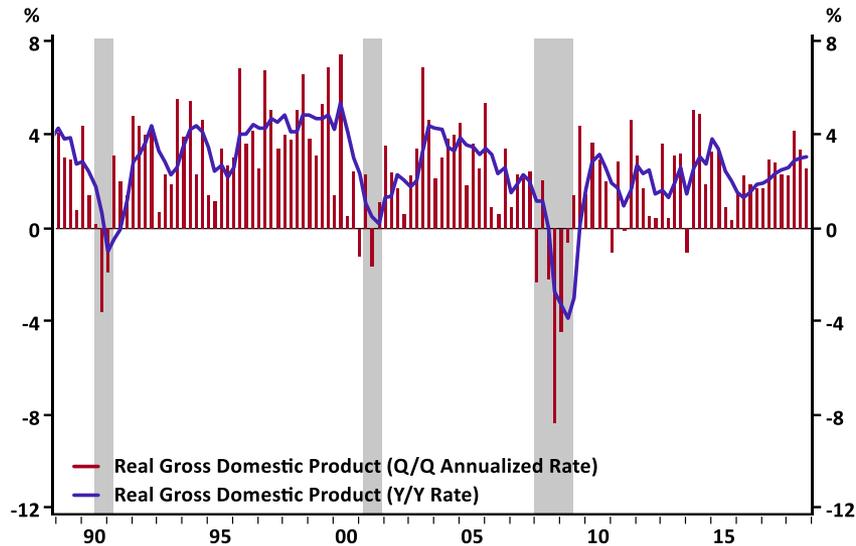


Source: Bloomberg Consensus

# U.S. Growth

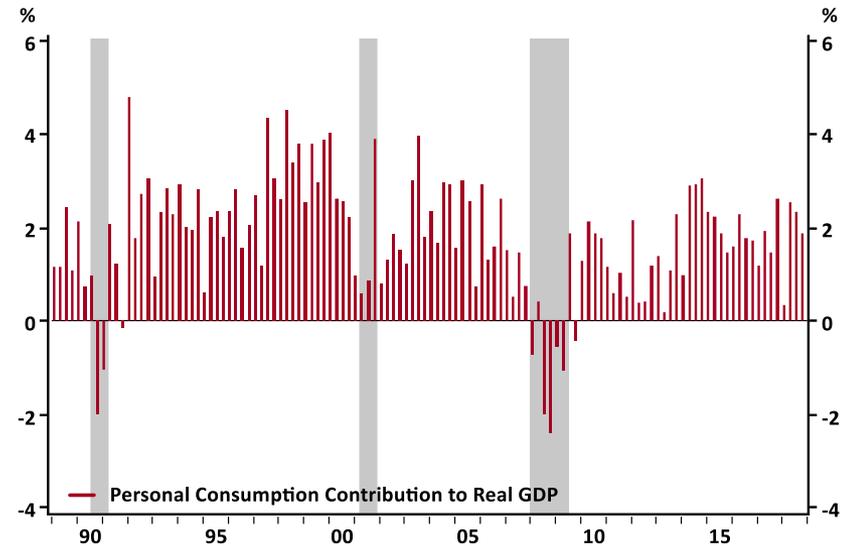
*Remains robust, thanks mostly to consumers.*

## U.S. GDP Growth



Source: Bureau of Economic Analysis /Haver Analytics

## Consumption Contribution to GDP

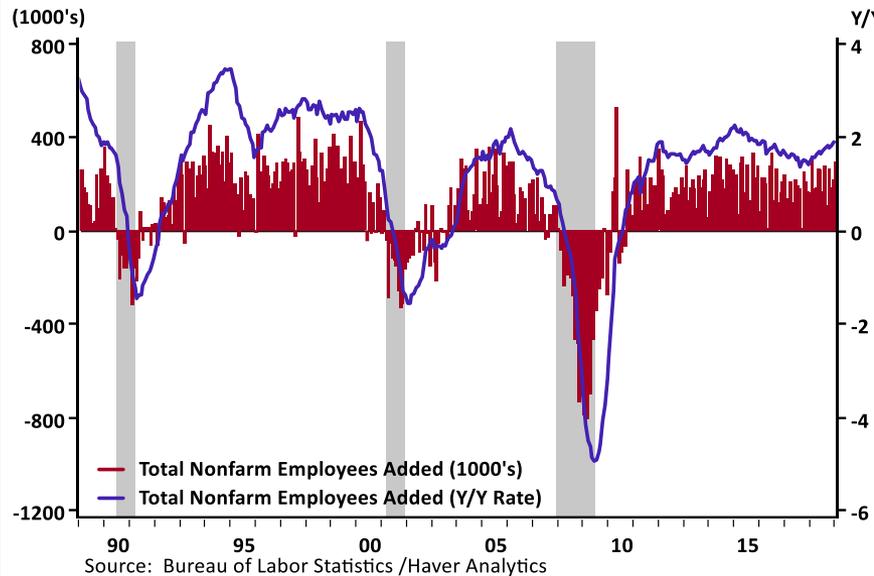


Source: Bureau of Economic Analysis /Haver Analytics

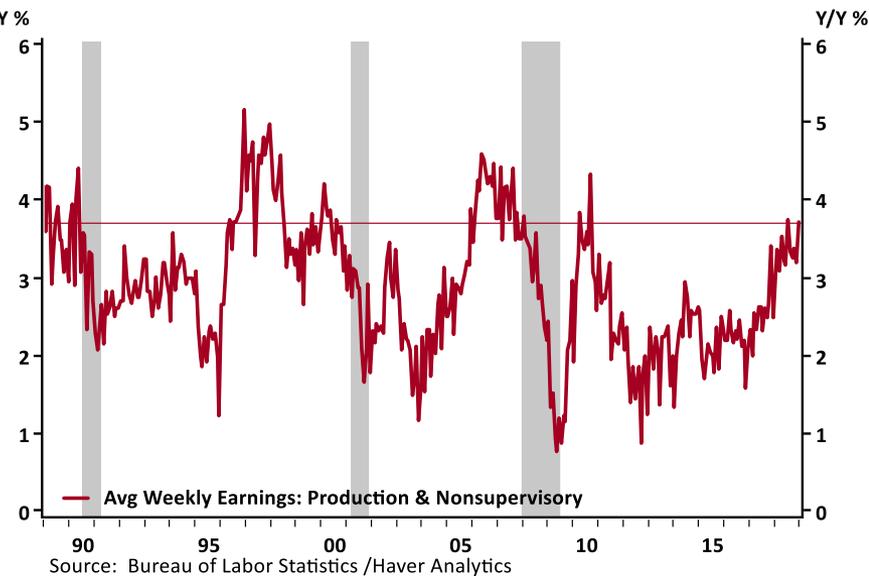
# Labor Market

*Very tight with improving employment and wage growth.*

## U.S. Total Nonfarm Employees



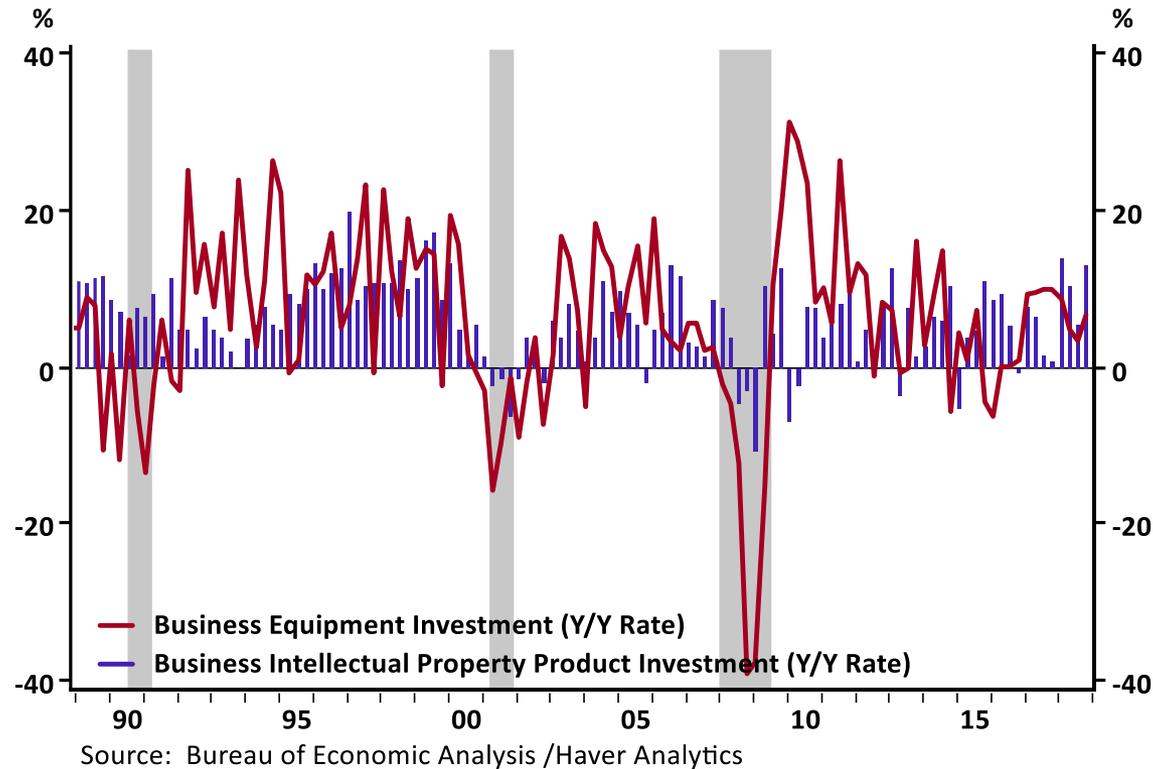
## U.S. Wage Growth



# Business Investment

*Recovered a bit in Q4.*

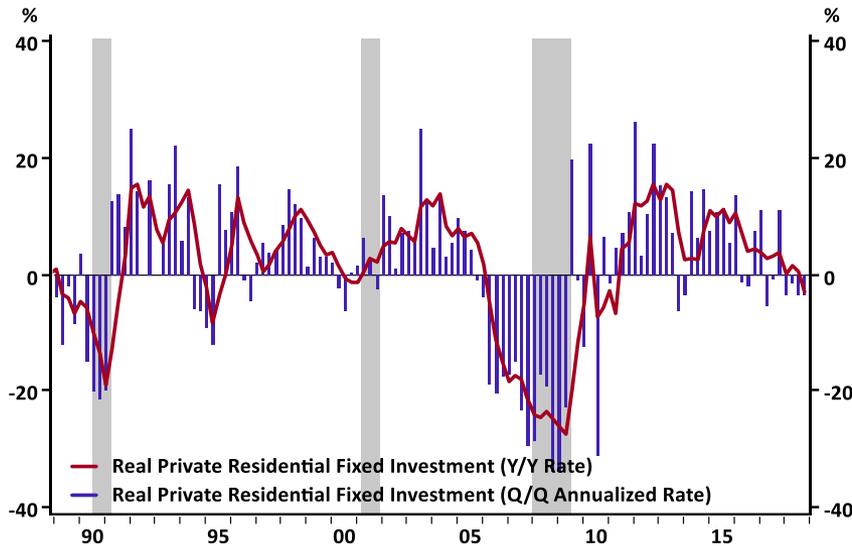
## U.S. Business Investment Growth



# Residential Investment

*Remained weak.*

## U.S. Residential Investment Growth



Source: Bureau of Economic Analysis /Haver Analytics

## U.S. Housing Inventory - Months Supply

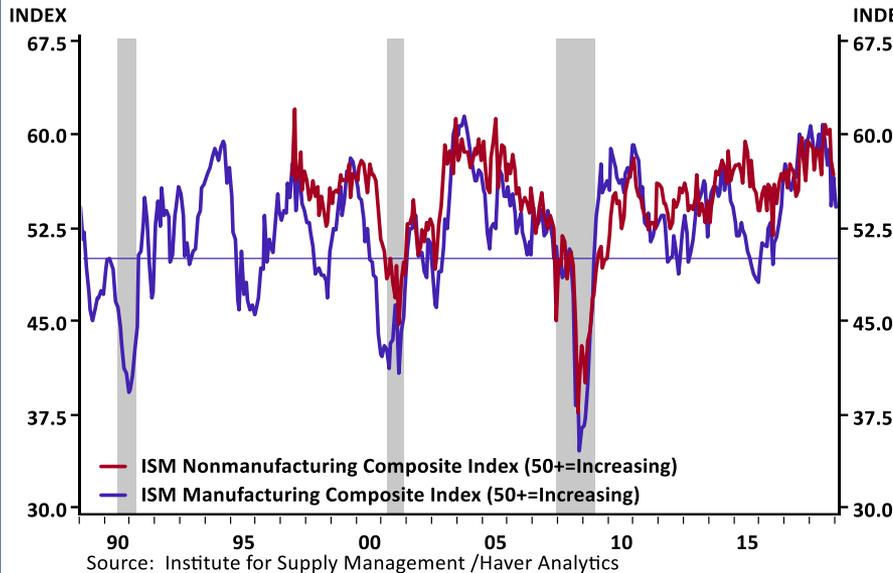


Source: Census Bureau /Haver Analytics

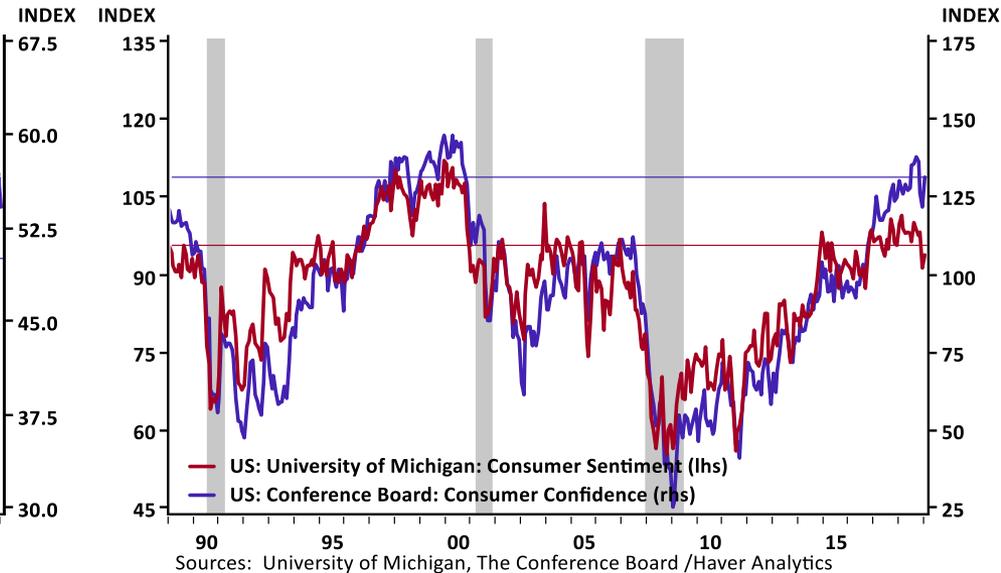
# Survey Data

*Managers and Consumers remained optimistic.*

## U.S. Purchasing Managers Outlook



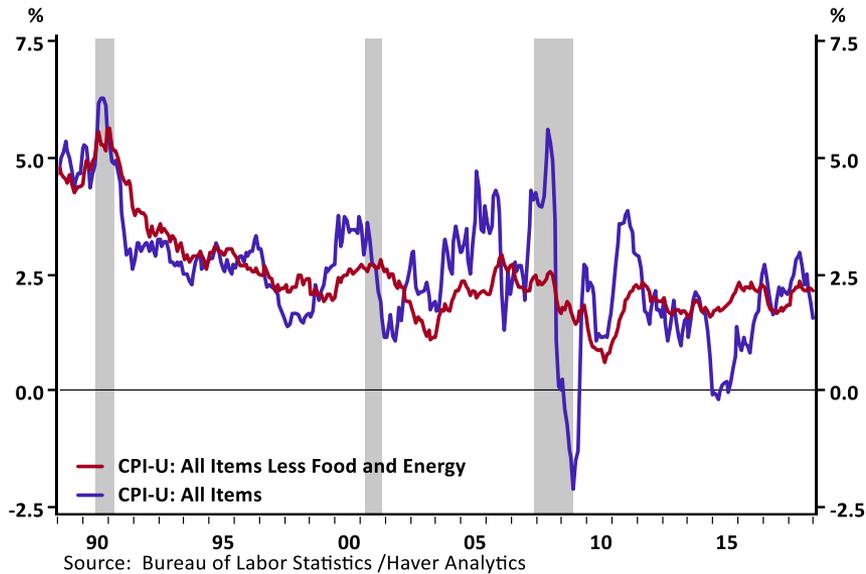
## U.S. Consumer Confidence



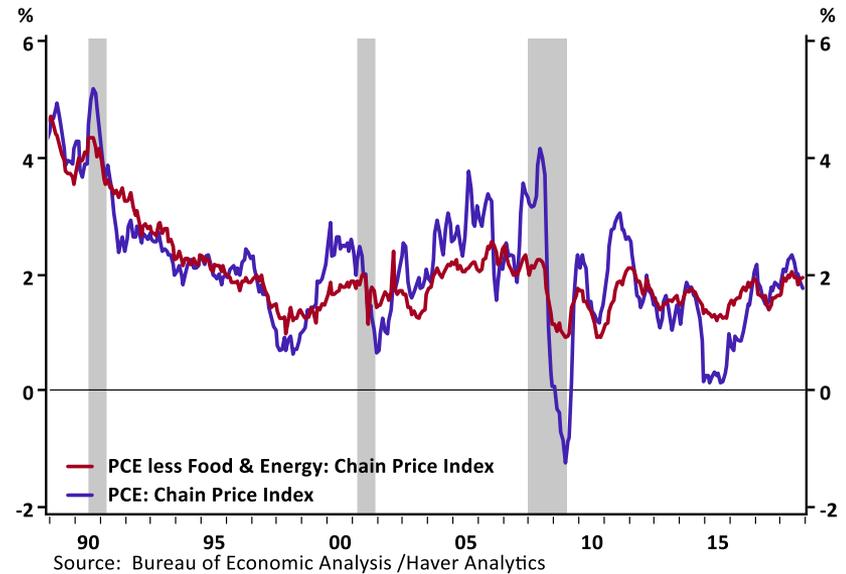
# Inflation

*In the vicinity of FOMC target.*

### U.S. Consumer Price Inflation



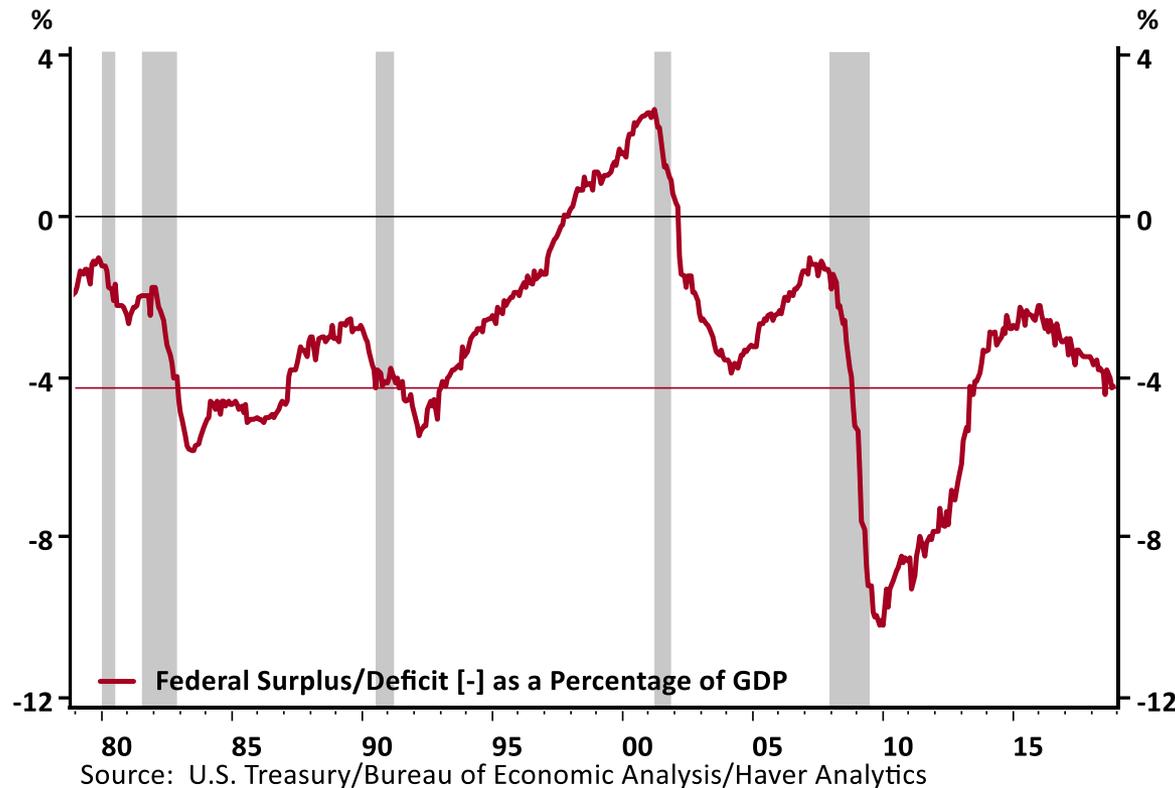
### U.S. PCE Inflation



# U.S. Government Deficit

*Bigger, giving the economy additional push.*

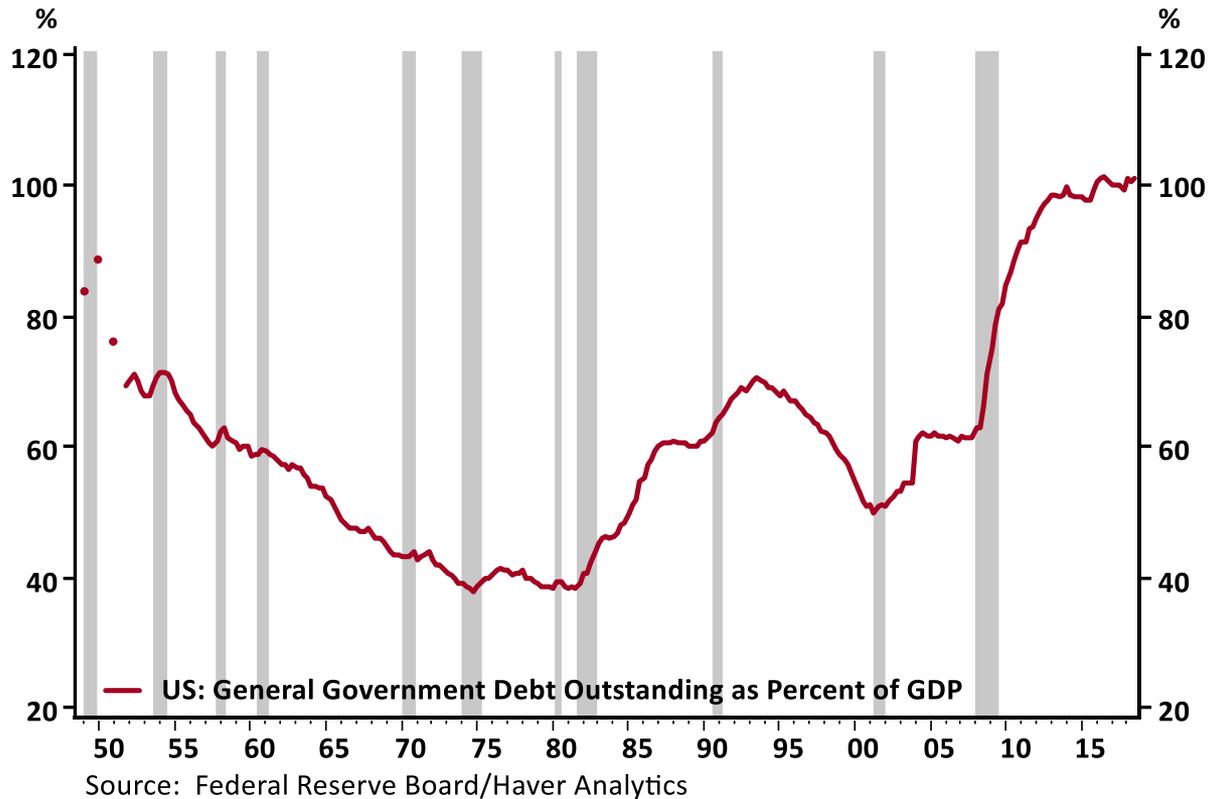
## U.S. Govt. Surplus/Deficit (Percent of GDP)



# U.S. Government Debt

*At 70-year high.*

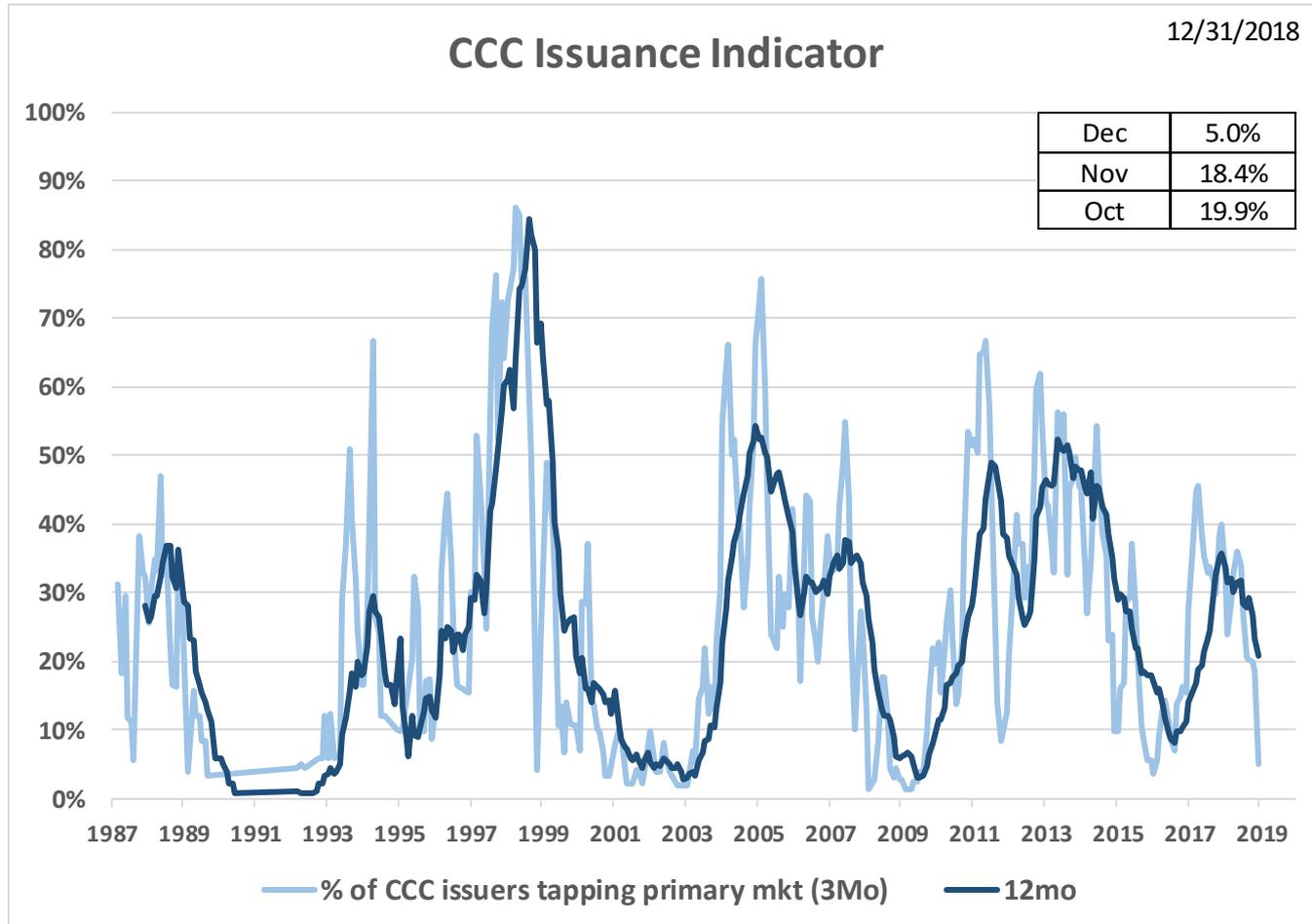
## U.S. Govt. Debt (Percent of GDP)



# *Appendix*

# Credit Issuance

*Aggressive issuance declined in 2018.*



Source: Bank of America Merrill Lynch New Issue Roundup

# Valuation Indicators

*Credit spreads and public equity multiples are now closer to long term averages.*

Valuation Metric	Valuation Date	Current	1 Yr	5Yr	10 Yr	All Data	Earliest Data
10 Year Treasury Yield (%)	Feb-19	2.7	2.9	2.3	2.5	6.2	Jan-62
S&P 500 Forward P/E (NTM)	Feb-19	16.6	16.5	16.9	15.3	16.0	Jan-90
MSCI xUS Forward P/E (NTM)	Feb-19	13.4	13.7	14.9	13.9	13.7	Feb-05
Private Equity Multiple (EBITDA, Large)	Dec-18	10.9	10.9	10.6	9.7	8.7	Jan-94
Barclays Corp Investment Grade OAS (bps)	Feb-19	125	120	126	155	132	Jun-89
Barclays Corp High Yield OAS (bps)	Feb-19	398	379	440	527	508	Jan-94
US Inflation (%)	Feb-19	1.6	2.4	1.5	1.6	3.8	Jan-62
US Real GDP Growth (%)	Feb-19	3.0	2.8	2.4	1.6	3.1	Dec-61
US Volatility	Feb-19	13.9	17.2	15.0	18.5	19.3	Jan-90
Europe Volatility	Feb-19	14.0	17.0	19.4	22.9	24.0	Jan-99
UK Volatility	Feb-19	12.4	14.5	14.5	17.5	19.2	Jan-00
Japan Volatility	Feb-19	19.2	20.3	21.3	23.6	24.9	Jan-98

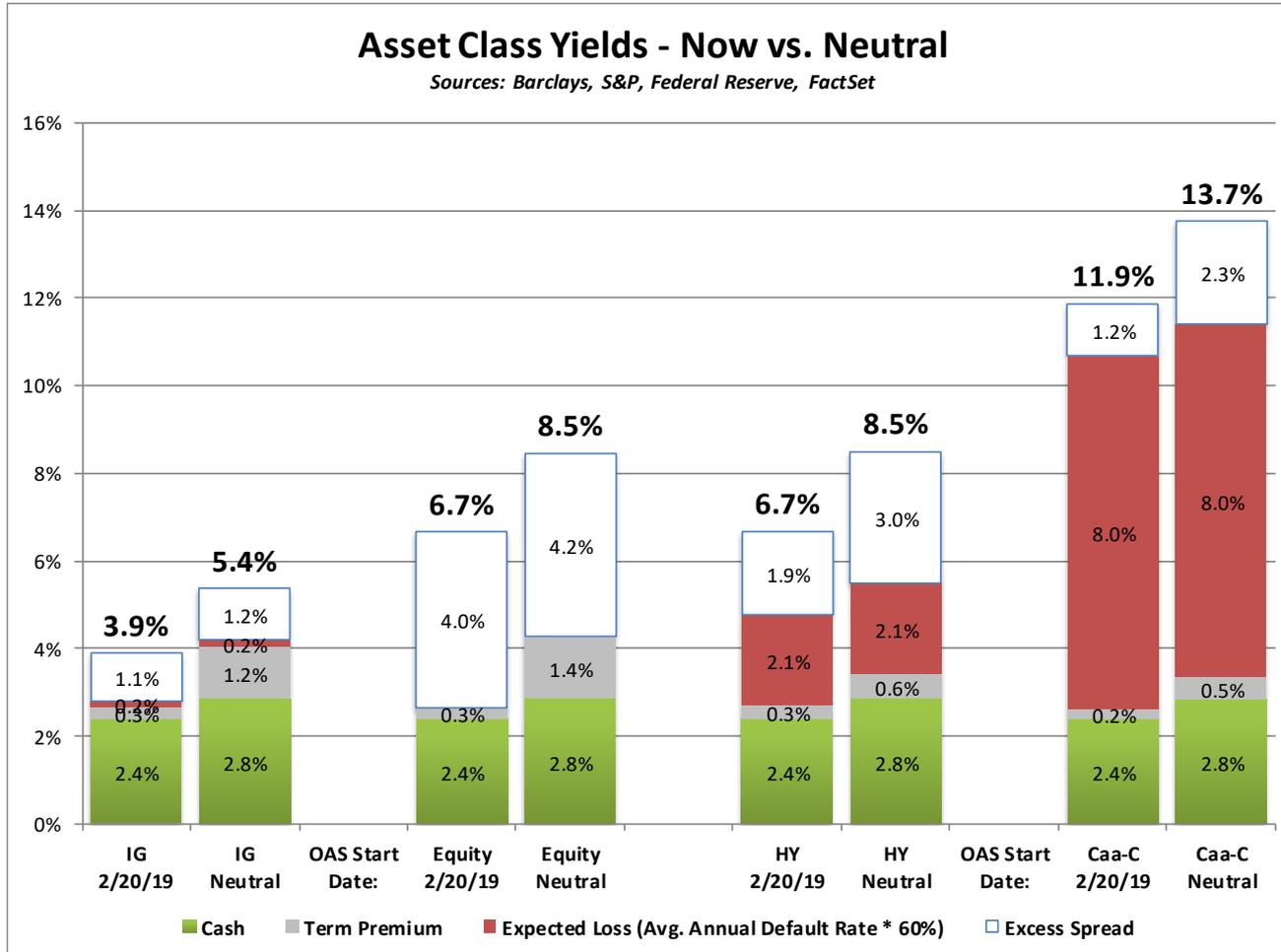
US 2019 GDP Growth Forecast: 2.5%

US 2019 CPI Forecast: 2.0%

Source: FactSet, Bloomberg

# Risk Premiums

*Premia for equities and high grade bonds are closer to long-term expectations.*



**STATE OF WISCONSIN INVESTMENT BOARD**

*Investment Committee Meeting-Open Session*

**Tuesday, November 27, 2018**

Offices of the Investment Board  
121 East Wilson Street, Madison, Wisconsin

**Committee Members Present:** David Villa, Executive Director/Chief Investment Officer (Chair)  
Chuck Carpenter, Managing Director-Private Markets & Funds  
Alpha (Vice-Chair)  
Edwin Denson, Managing Director-Asset & Risk Allocation (Secretary)  
Brian Hellmer, Managing Director-Public Equities  
Todd Ludgate, Managing Director-Public Fixed Income  
Nick Stanton, Head of Multi-Asset Strategy  
Chirag Gandhi, Portfolio Manager-Global Bonds  
Chris Prestigiacomio, Portfolio Manager-Private Debt & Venture Capital  
Brian Heimsoth, Quantitative Manager  
Derek Drummond, Funds Alpha Manager

**Also in Attendance:** Rochelle Klaskin, Deputy Executive Director/Chief Administrative Officer  
Sara Chandler, Chief Legal Counsel  
Shirley Eckes, Head of Operations  
Mike Jacobs, Agency Business Director  
Brandon Brickner, Internal Audit Director  
Steve Johnson, Technology Director  
Russell Snow, Investment Operations Director  
Phil Richards, Performance Director  
Bob Dehnke, Data Management Director  
Lisa Lange, Compliance Counsel  
Kate Burkart-Paulson, Assistant Legal Counsel  
Bill Luetzow, Assistant Compliance Counsel  
Brad Gentert, Performance Analyst  
Amanda Murkley, Internal Auditor  
Chris Preisler, Communications Specialist  
Janet Klosterman, Legal Assistant  
Chris Levell, NEPC  
Eileen Neill, Verus Advisory, Inc. (by telephone)  
Ali Kazemi, Wilshire Associates, Inc. (by telephone)  
Jennifer Wildman, Aksia (by telephone)  
(Some individuals may have attended only portions of the meeting.)

**OPEN SESSION**

With a quorum present, David Villa, Executive Director/Chief Investment Officer and Committee Chair, called the meeting to order at 1:00 p.m.

### **1. Approval of the Minutes**

Mr. Villa asked if there were any comments on either the open or closed session minutes of the October 23, 2018 Investment Committee (IC) meeting. Hearing no comments, Mr. Villa stated that the Committee could approve both the open and closed session minutes in open session.

**Motion:** A motion was made by Mr. Carpenter and seconded by Mr. Prestigiacomio to approve both the open session and the closed session minutes of the October 23, 2018 IC meeting, as presented. The motion passed unanimously.

### **2. Quarterly Performance Review (Q3 2018)**

Mr. Villa noted that a copy of the *Performance and Attribution Update-Q3 2018* was included in the meeting materials on pages 9-19 for the Committee's information. As there were no specific questions or comments, no presentation was required.

### **3. Asset Allocation Recommendation**

Chris Levell, NEPC, walked the Committee through the *Asset Allocation Review*, included on pages 20-49 in the meeting materials. Mr. Levell noted that the materials did not include any substantive changes from the draft recommendations presented to the Board of Trustees at the October Workshop. He highlighted NEPC's asset allocation recommendations, as outlined on page 21 of the meeting materials, to **(a)** increase Private Equity/Debt by 1% (from 8% to 9%) from Public Equity; **(b)** increase Small Cap from 2% to 3%; **(c)** decrease Emerging Markets from 5% to 3%; **(d)** move Global Bonds to U.S. investment grade and high yield bonds; **(e)** shift Emerging Market Debt from majority external to a 50/50 blend of external and local currency; and **(f)** increase the ability of the Core Trust Fund to be dynamic by expanding the ranges for public asset classes to allow exposure management to have a larger role within the existing active risk budget.

Mr. Levell also noted that the recommended 2019 policy targets and ranges and target active risk for the Variable Trust Fund (VTF) are unchanged from 2018.

**Motion:** A motion was made by Mr. Ludgate and seconded by Mr. Hellmer to approve and to recommend to the Board of Trustees the Asset Allocation Overview and Recommendations for 2019, in substantially the form included in the Committee's materials. The motion passed unanimously.

### **4. Recommended Amendments to WRS Investment Policy and SIF & Separately Managed Funds Investment Policy and Guidelines**

Sara Chandler, Chief Legal Counsel, walked the Committee through the proposed amendments to the *Board of Trustees Wisconsin Retirement System Investment Policy* and the *Board of Trustees State Investment Fund & Separately Managed Funds Investment Policy and Guidelines* included on pages 50-98 in the meeting materials. Ms. Chandler commented that the revisions reflected the recent organizational changes as well as changes to the ranges that trigger mandatory rebalancing to be based on the asset allocation approved by the Board, and clarified the roles of Board and Staff consultants, and answered questions. The Committee requested one additional title change (page 60) and clarifications to the names of the revised benchmarks for the UW System Trust Funds (page 96).

**Motion:** A motion was made by Mr. Hellmer and seconded by Mr. Prestigiacomio to approve and to recommend to the Board of Trustees that they approve the amendments to (a) the Board of Trustees Wisconsin Retirement System Investment Policy and (b) the Board of Trustees State Investment Fund & Separately Managed Funds Investment Policy and Guidelines, as presented in the Committee materials, with the additional amendments to pages 60 and 96. The motion passed unanimously.

## **5. Multi-Asset Q3 2018 Update**

Nick Stanton, Head of Multi-Asset Strategy, presented the *Multi-Asset Internal Management Quarterly Update*, included in the meeting materials on pages 99-104.

Mr. Stanton walked the Committee through his presentation, discussing the quarterly, annual and historical performance for the Global Securities and Alpha portfolios, and the historical P&L for the options overlay program, and answered questions. Mr. Stanton reported that each portfolio was in compliance with its guidelines.

## **6. Funds Alpha Q3 2018 Update**

Derek Drummond, Funds Alpha Manager, presented the *Funds Alpha Q3 2018 Update*, included in the meeting materials on pages 105-118.

Mr. Drummond reviewed the current Excess Value Added (EVA) and Q3 performance for each business line (Hedge Funds, Beta One Equities and Beta One Fixed Income), noting that the three lines of business totaled approximately \$21 billion in assets. He then reviewed the active management market environment for hedge funds and active equities and each portfolio's correlation to key indices, and answered questions. He also noted that both the Hedge Fund and Beta One portfolios are in compliance with their investment guidelines.

## **7. Private Debt Q3 2018 Update**

Chris Prestigiacomio, Portfolio Manager-Private Debt & Venture Capital, presented the *Private Debt Portfolio Investment Committee Quarterly Report*, included in the meeting materials on pages 119-125.

Mr. Prestigiacomio reported that, at September 30, 2018, the Private Debt portfolio market value was just over \$500 million. He then described the portfolio characteristics, noting that the average rating remained BBB. He reviewed portfolio returns and the loan pipeline and answered questions. Mr. Prestigiacomio also reported that there were no active watchlist or workout loans and that the Private Debt portfolio is in compliance with all portfolio guidelines.

## **8. Annual Benchmark Presentation**

Phil Richards, Performance Director, introduced Eileen Neill, Verus Advisory, who presented the results of the *Annual Benchmark Review*, as outlined in her memo on pages 126-128 in the meeting materials. Ms. Neill walked the Committee through the recommendations for new or updated benchmarks for (a) Alpha Pool Leverage, (b) Global Developed Fixed Income, (c) the State Investment Fund ("SIF"), (d) the Current Return Co-Investment Portfolio, (e) SWIB Treasuries, (f) U.S. Investment Grade, and (g) Emerging Markets Debt, all effective January 1, 2019. The Committee discussed implementation of the new combined Emerging Markets Debt benchmark,

including the monitoring and rebalancing of capital allocated to underlying managers. The Committee requested that Ms. Neill clarify for the Board of Trustees that Emerging Markets Debt is not a completely new benchmark, but a new aggregate of two existing benchmarks.

Ms. Neill then discussed a proposed change to the calculation methodology used for the Private Equity portfolio benchmark to switch the classification methodology from “geographic location” to “currency denomination” to control for currency differences.

Lastly, she reviewed the provisional benchmarks already approved by the IC that will require approval by the Board of Trustees for (a) select Global Equity Sector Portfolios (Telecommunication Services, Information Technology and Consumer Discretionary), and (b) the University of Wisconsin System Trust Funds (private equity and non-US equities), detailed on pages 129-133 in the meeting materials.

**Motion:** A motion was made by Mr. Carpenter and seconded by Mr. Stanton to:

- Approve and to recommend to the Board of Trustees’ Benchmark and Performance Committee the changes to the benchmarks as presented and recommended by SWIB’s benchmark consultant, Verus Advisory, in its memo dated November 27, 2018 included in the Committee’s materials, which includes the benchmark and calculation methodology changes listed below; and
  - Further, that all separately managed fund benchmarks that incorporate the SIF benchmark be correspondingly updated to reflect the revised SIF benchmark.
- Recommend to the Board of Trustees’ Benchmark and Performance Committee the provisional benchmarks recommended by Verus Advisory and adopted by the Investment Committee on September 6, 2018, with respect to (a) the UW System Trust Fund, and (b) select Global Equities Sector Portfolios.

<b><u>Proposed Benchmark Changes for 2019 (effective Jan. 1, 2019)</u></b>	
<b>A. Alpha Pool Leverage Benchmark</b>	
Current Benchmark:	LIBOR plus 30 bps
<b>Recommended Benchmark:</b>	No leverage benchmark
<b>B. Global Developed Fixed Income</b>	
Current Benchmark:	Citigroup WGBI Unhedged (Net Tax)
<b>Recommended Benchmark:</b>	N/A
<b>C. State Investment Fund (“SIF”)</b>	
Current Benchmark:	80% T-Bill (90-day) + 20% CD (30-day)
<b>Recommended Benchmark:</b>	80% T-Bill (60-day) + 20% CD (30-day)
<b>D. Current Return Co-Investment Portfolio (New)</b>	
Current Benchmark:	N/A
<b>Recommended Benchmark:</b>	Credit Suisse Leveraged Loan Index + 1%
<b>E. SWIB Treasuries</b>	
Current Benchmark:	81% BloombergBarclays U.S. Treasury Index + 19% BloombergBarclays Long U.S. Treasury Index

<b>Proposed Benchmark Changes for 2019 (effective Jan. 1, 2019)</b>	
<b>Recommended Benchmark:</b>	89% BloombergBarclays U.S. Treasury Index + 11% BloombergBarclays Long U.S. Treasury Index
<b>F. U.S. Investment Grade (New)</b>	
Current Benchmark:	No existing benchmark
<b>Recommended Benchmark:</b>	79% BloombergBarclays Government/Credit Index + 21% SWIB Treasuries Benchmark
<b>G. Emerging Markets Debt (New)</b>	
Current Benchmark:	No existing combined strategy benchmark
<b>Recommended Benchmark:</b>	50% JP Morgan Emerging Markets Bond Index Global Diversified + 50% JP Morgan Global Bond Index - Emerging Diversified

<b>Proposed Changes for Calculation Methodology for 2019 (effective Jan. 1, 2019)</b>	
<b>Private Equity Portfolio</b>	
Current Methodology:	Geographic location classification
<b>Recommended Methodology:</b>	Currency denomination classification

The motion passed unanimously.

### **9. Convene in Closed Session**

**Motion:** A motion to go into closed session 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 (1) the review of active risk profiles of portfolio investments and the Core Trust Fund, (2) the review of specific proprietary investment strategies related to venture capital, funds alpha, private debt, multi-asset strategy and exposure management, (3) the review of credit counterparty information, and (4) the approval of the Core Trust Fund’s active risk budget and (b) to discuss and approve prior closed session minutes that discuss the same, was made by Mr. Hellmer and seconded by Mr. Ludgate.

The Chair called for a roll call vote.

Carpenter-Aye	Denson-Aye	Drummond-Aye	Gandhi-Aye
Heimsoth-Aye	Hellmer-Aye	Ludgate-Aye	Prestigiacomo-Aye
Stanton-Aye	Villa-Aye		

There being ten ayes and no nays, the Chair declared the motion passed. The Committee then convened in closed session at 1:52 p.m. and reconvened in open session at 4:30 p.m.

### **10. Announcement of Committee Actions Relating to Items Taken up in Closed Session**

Mr. Villa announced that, while in closed session, the Committee (a) reviewed proprietary investment information regarding the multi-asset, funds alpha, private debt, and venture capital strategies and approved the 2019 strategies for funds alpha, private debt and venture capital, (b) reviewed the total and active risk for the Core and Variable Trust Funds, (c) approved the active risk budget for calendar year 2019, and (d) received a report from SWIB’s Credit Task Force on counterparty credit risk.

## **11. Currency Task Force Report**

Chirag Gandhi, Portfolio Manager-Global Bonds, reported that the task force met on November 19, 2018. Referring to the agenda on page 274 in the meeting materials, Mr. Gandhi noted that the Task Force discussed SWIB's models of the Euro, Yen and U.S. Dollar.

## **12. Credit Task Force Report**

Todd Ludgate, Managing Director-Public Fixed Income, noted that a copy of the agenda for the November 16, 2018 Staff Credit Task Force Meeting was included on page 275 in the meeting materials for the Committee's information.

## **13. Research Task Force Report**

Mr. Ludgate referred to the *Research Task Force Report to Investment Committee*, on page 276 in the meeting materials, as he discussed projects completed over the last twelve months and highlighted the projects in progress and ideas under consideration. He noted that SWIB has begun an initiative on artificial intelligence as well.

## **14. Soft Risk Parameters**

Mr. Villa stated that the report, *Soft Risk Parameters-Asset Class and Portfolio*, as of October 31, 2018, was included on pages 277-278 in the meeting materials for the Committee's review. Mr. Heimsoth commented that there were no new discussion triggers.

## **15. Future Meeting Topics**

Mr. Villa noted that a summary of standard IC agenda items and draft agendas for the December 20, 2018 and January 29, 2019 IC meetings were included on pages 279-284 of the meeting materials for the Committee's review.

## **16. Adjournment**

**Motion:** A motion to adjourn the meeting was made by Mr. Carpenter and seconded by Mr. Gandhi. The motion passed unanimously, and the meeting adjourned at 4:35 p.m.

Date of Committee Approval: 12/20/2018

Signed: /s/ Edwin Denson

Edwin Denson  
Investment Committee Secretary

**STATE OF WISCONSIN INVESTMENT BOARD**

*Investment Committee Meeting-Open Session*

**Thursday, December 20, 2018**

Offices of the Investment Board  
121 East Wilson Street, Madison, Wisconsin

**Committee Members Present:** David Villa, Executive Director/Chief Investment Officer (Chair)  
Chuck Carpenter, Managing Director-Private Markets & Funds  
Alpha (Vice-Chair)  
Edwin Denson, Managing Director-Asset & Risk Allocation (Secretary)  
Brian Hellmer, Managing Director-Public Equities  
Todd Ludgate, Managing Director-Public Fixed Income  
Nick Stanton, Head of Multi-Asset Strategy  
Chris Prestigiacomio, Portfolio Manager-Private Debt & Venture Capital  
Brian Heimsoth, Quantitative Manager  
Derek Drummond, Funds Alpha Manager

**Also in Attendance:** Bob Conlin, Trustee  
Sara Chandler, Chief Legal Counsel  
Shirley Eckes, Head of Operations  
Mike Jacobs, Agency Business Director  
Brandon Brickner, Internal Audit Director  
Steve Johnson, Technology Director  
Russell Snow, Investment Operations Director  
Phil Richards, Performance Director  
Bob Dehnke, Data Management Director  
Scott Parrish, Portfolio Manager-Private Equity  
Steve Spiekerman, Portfolio Manager-Real Estate  
Chris Eckerman, Managing Analyst-Private Equity  
Jeff Lucas, Managing Analyst-Public Fixed Income  
Shan Lo, Managing Analyst-Public Fixed Income  
Alex Wilson, Managing Analyst-Public Equities  
Mike Shearer, Managing Analyst-Multi-Asset Strategy  
Lisa Lange, Compliance Counsel  
Kate Burkart-Paulson, Assistant Legal Counsel  
Bill Luetzow, Assistant Compliance Counsel  
Chris Preisler, Communications Specialist  
Janet Klosterman, Legal Assistant  
Rose Dean, Wilshire Associates, Inc. (by telephone)  
(Some individuals may have attended only portions of the meeting.)

**OPEN SESSION**

With a quorum present, David Villa, Executive Director/Chief Investment Officer and Committee Chair, called the meeting to order at 1:02 p.m.

## **1. Approval of the Minutes**

Mr. Villa asked if there were any comments on either the open or closed session minutes of the November 27, 2018 Investment Committee (IC) meeting. Hearing no comments, Mr. Villa stated that the Committee could approve both the open and closed session minutes in open session.

**Motion:** A motion was made by Mr. Carpenter and seconded by Mr. Ludgate to approve both the open session and the closed session minutes of the November 27, 2018 IC meeting, as presented. The motion passed unanimously.

## **2. June Investment Forum Preview**

Alex Wilson, Managing Analyst-Public Equities, previewed the Investment Forum scheduled for June 12, 2019, noting that there are five confirmed speakers and the team is working to secure a sixth. Tentative topics include (a) the U.S. equities macro market, (b) artificial intelligence, (c) the real estate market and Amazon's impact on certain sectors, (d) credit markets and structured products, (e) value investing in 2019, and (f) China.

## **3. Private Equity Q3 2018 Update**

Scott Parrish, Portfolio Manager-Private Equity, presented the *Private Equity Quarterly Activity Report*, included in the meeting materials on pages 10-25. Mr. Parrish reported that, as of November 30, 2018, the Private Equity portfolio had a market value of approximately \$7.2 billion (7.4% of the Core Trust Fund (CTF)) and total exposure of approximately \$12.2 billion. He commented that the portfolio was again cash flow positive in 2018, with \$1.3 billion in contributions and \$1.7 billion in distributions.

Mr. Parrish reviewed the portfolio's diversification by sub-asset class and as compared to the benchmark. In discussing sub-asset class diversification (page 18), he noted the increased allocation to the Buyout-Small sub-asset class and the decreased allocations to the Buyout-Large and Buyout-Mega sub-asset classes in 2018 relative to 2013. Finally, Mr. Parrish reviewed the annual commitment pacing on page 24 in the materials, noting the elevated total commitment amount for 2018 and the expectation that some of the 2018 commitments will be 2019 vintage year funds, and answered questions.

## **4. Real Estate Q3 2018 Update**

Steve Spiekerman, Portfolio Manager-Real Estate, presented the *Real Estate Quarterly Activity Report*, included in the meeting materials on pages 26-40. He walked the Committee through the current market illustrations (pages 27-31) and highlighted that (a) the amount of capital available to invest as "dry powder" is at historically high levels, (b) vacancies are at historically low levels across all property types, (c) capital expenditures and leverage costs are increasing, (d) cash flow returns are towards the bottom of their usual ranges, and (e) the rate of rent growth is tapering off.

In reviewing the pipeline of potential new investments (page 38), Mr. Spiekerman noted the robust pipeline but cautioned that not all of the potential investments were likely to close in the current market environment. Lastly, Mr. Spiekerman highlighted the additional commitment made in Q4 2018 (page 39), and noted that the portfolio was in compliance with its investment guidelines.

## **5. Amendments to WRS Investment Guidelines**

Sara Chandler, Chief Legal Counsel, walked the Committee through the proposed amendments to the *SWIB Investment Committee Wisconsin Retirement System Investment Guidelines*, included on pages 41-81 in the meeting materials. Ms. Chandler noted that the revisions reflect (a) structural changes relating to the October reorganization, including the combination of the Executive Director and Chief Investment Officer roles, (b) the recently approved 2019 asset allocation, (c) the consolidation of the Government/Credit and Global Bond portfolios, (d) measurement of the Global Equity portfolio guidelines at the global sector aggregate portfolio level and a reduced short sale limitation (now tested on the aggregate portfolio), (e) updated approval requirements for investments in both the Exposure Management and Private Markets and Funds Alpha Overage portfolios, (f) revisions to the Venture Capital, Current Return and Private Equity portfolios' guidelines relating to individual fund ownership approval thresholds and strategic partner co-investments, (g) a new requirement for consultant recommendations for certain additional Hedge Fund subscriptions, and (h) other clarifying and conforming changes. Ms. Chandler facilitated the Committee's discussion of the changes and answered questions.

**Motion:** A motion was made by Mr. Stanton and seconded by Mr. Hellmer to approve the amendments to the *SWIB Investment Committee Wisconsin Retirement System Investment Guidelines*, as presented in the Committee materials. The motion passed unanimously.

## **6. Convene in Closed Session**

**Motion:** A motion to go into closed session 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 (1) the review of active risk profiles of portfolio investments and the CTF, (2) the review of specific proprietary investment strategies related to private equity, real estate, fixed income, public equities, multi-asset and exposure management, and (3) the review of credit counterparty information, was made by Mr. Prestigiaco and seconded by Mr. Heimsoth

The Chair called for a roll call vote.

Carpenter-Aye	Denson-Aye	Drummond-Aye
Heimsoth-Aye	Hellmer-Aye	Ludgate-Aye
Prestigiaco-Aye	Stanton-Aye	Villa-Aye

There being nine ayes and no nays, the Chair declared the motion passed. The Committee then convened in closed session at 1:47 p.m. and reconvened in open session at 3:52 p.m.

## **7. Announcement of Committee Actions Relating to Items Taken up in Closed Session**

Mr. Villa announced that, while in closed session, the Committee (a) reviewed proprietary investment information regarding the private equity, public fixed income, public equities and multi-asset strategies and approved 2019 strategies for public fixed income, public equities and multi-asset strategy, (b) reviewed the total and active risk for the Core and Variable Trust Funds, and (c) received a report from SWIB's Credit Task Force on counterparty credit risk.

## **8. Soft Risk Parameters**

Mr. Villa stated that the report, *Soft Risk Parameters-Asset Class and Portfolio*, as of November 30, 2018, was included on pages 216-217 in the meeting materials for the Committee's review. Mr. Heimsoth commented on one new discussion trigger for the Private Markets and Funds Alpha Group based on ex ante volatility for Hedge Funds falling below the bottom of range.

## **9. Future Meeting Topics**

Mr. Villa noted that a summary of standard IC agenda items and draft agendas for the January 29, 2019 and February 28, 2019 IC meetings were included on pages 218-223 of the meeting materials for the Committee's review.

## **10. Adjournment**

**Motion:** A motion to adjourn the meeting was made by Mr. Carpenter and seconded by Mr. Stanton. The motion passed unanimously, and the meeting adjourned at 4:00 p.m.

Date of Committee Approval: 1/29/2018

Signed: /s/ Edwin Denson

Edwin Denson  
Investment Committee Secretary

**STATE OF WISCONSIN INVESTMENT BOARD**

*Investment Committee Meeting-Open Session*

**Tuesday, January 29, 2019**

Offices of the Investment Board  
121 East Wilson Street, Madison, Wisconsin

**Committee Members Present:** Chuck Carpenter, Managing Director-Private Markets & Funds  
Alpha (Vice-Chair)  
Edwin Denson, Managing Director-Asset & Risk Allocation (Secretary)  
Brian Hellmer, Managing Director-Public Equities  
Todd Ludgate, Managing Director-Public Fixed Income  
Nick Stanton, Head of Multi-Asset Strategy  
Chris Prestigiacomio, Portfolio Manager-Private Debt & Venture Capital  
Chirag Gandhi, Portfolio Manager-Public Fixed Income  
Brian Heimsoth, Quantitative Manager  
Derek Drummond, Funds Alpha Manager (by telephone)

**Also in Attendance:** Bob Conlin, Trustee  
Kate Burkart-Paulson, Senior Legal Counsel  
Sara Chandler, Chief Legal Counsel  
Bob Dehnke, Data Management Director  
Chris Eckerman, Managing Analyst-Private Equity  
Shirley Eckes, Head of Operations  
Steve Johnson, Technology Director  
Rochelle Klaskin, Deputy Executive Director/Chief Administrative Officer  
Janet Klosterman, Legal Assistant  
Matt Kuznacic, Operations Strategy, Planning & Coordination Director  
Lisa Lange, Compliance Counsel  
Bill Luetzow, Assistant Compliance Counsel  
Scott Parrish, Portfolio Manager-Private Equity  
Kurt Petrie, Internal Auditor  
Chris Preisler, Communications Specialist  
Trish Reopelle, Managing Analyst-Investment Business  
Phil Richards, Performance Director  
Jay Risch, Government Relations Liaison  
Russell Snow, Investment Operations Director  
Steve Spiekerman, Portfolio Manager-Real Estate  
Phil Tomajko, Private Markets & Hedge Fund Investment Operations Director  
Chris Levell, NEPC (by telephone)  
(Some individuals may have attended only portions of the meeting.)

**OPEN SESSION**

With a quorum present, Nick Stanton, Head of Multi-Asset Strategy, at the request of David Villa, Executive Director/Chief Investment Officer and Committee Chair, who was not able to attend, called the meeting to order at 1:30 p.m.

## **1. Approval of the Minutes**

Mr. Stanton asked if there were any comments on either the open or closed session minutes of the December 20, 2018 Investment Committee (IC) meeting. Hearing no comments, Mr. Stanton stated that the Committee could approve both the open and closed session minutes in open session.

**Motion:** A motion was made by Mr. Prestigiaco and seconded by Mr. Carpenter to approve both the open session and the closed session minutes of the December 20, 2018 IC meeting, as presented. The motion passed unanimously.

## **2. Transition Update (Q3 & Q4 2018)**

Trish Reopelle, Managing Analyst-Investment Business, walked the Committee through the August 2018 Wellington transition, which she noted was the only transition in Q3 and Q4 2018, detailed on page 8 in the meeting materials. The transition of \$2 billion from internal passive equities to Wellington Global Equity was requested by the Asset & Risk Allocation (ARA) division. Approximately 90% of the trading was completed by SWIB's internal trading team, with Wellington completing the remaining trading in emerging market and illiquid securities. Ms. Reopelle noted that the transition implementation resulted in a cost of 46 bps, which was outside the one standard deviation range of the expected cost. She explained that approximately one-third of the cost was due to unexpected trading undertaken by Wellington during the transition window. The IC discussed and confirmed that the manager's trading should be tracked and allocated separately from the transition costs in the future. She then facilitated the Committee's discussion about SWIB's transition process, including how the expected costs are calculated and how the timing for trading activity is determined.

## **3. Amendments to WRS Investment Guidelines**

Sara Chandler, Chief Legal Counsel, walked the Committee through the proposed amendments to the *SWIB Investment Committee WRS Investment Guidelines*, described in her memo on pages 9-10 in the meeting materials. SWIB staff proposed revising the shorting constraint in the Global Equity Portfolio guidelines applicable to the global sector aggregate portfolio from 30% to 50% of the portfolio's market value. This percentage would be consistent with the limit that was applicable to the individual sector portfolios prior to the December 2018 guideline amendments. In connection with this increase, staff is also proposing a new soft risk parameter discussion trigger at 40% of the portfolio's market value. Staff believes this approach is more consistent with encouraging active risk in the global sector aggregate portfolio.

Brian Hellmer, Managing Director-Public Equities, added that, earlier in January 2019, he requested and was granted a waiver from the Executive Director/Chief Investment Officer of the shorting constraint for the global sector aggregate portfolio. The waiver allowed the global sector aggregate portfolio to increase its short position limitation from 30% to 40% of the portfolio's market value until the January meeting of the IC. Mr. Hellmer then answered questions regarding the current and maximum expected short exposure for individual sector portfolios.

**Motion:** A motion was made by Mr. Hellmer and seconded by Mr. Ludgate to approve the amendments to the Global Equity Portfolios guidelines and soft risk parameters in the *SWIB Investment Committee WRS Investment Guidelines* as shown in the Committee materials. The motion passed unanimously.

#### **4. Fixed Income Q4 2018 Update**

Todd Ludgate, Managing Director-Public Fixed Income, presented the *Investment Strategies: Public Fixed Income* quarterly update for Q4 2018, included on pages 11-28 in the meeting materials. Mr. Ludgate reported that each fixed income portfolio was in compliance with its guidelines during Q4 2018. He highlighted the illustrations on pages 16-17, which showed (a) the US dollar had appreciated broadly against both domestic market and emerging market currencies in 2018, and (b) credit spreads widened substantially during Q4 2018. Mr. Ludgate commented that a market review, performance information and several other illustrations were included in the Appendix for the Committee's review.

#### **5. Public Equities Q4 2018 Update**

Mr. Hellmer presented the *Public Equities Internal Management Quarterly Update, Q4 2018*, included on pages 29-45 in the meeting materials. Mr. Hellmer stated that the total public equities assets under management for the Global Sector and the Small Cap Diversified portfolios as of year-end 2018 was \$8.6 billion. He discussed the underperformance of both portfolios in Q4, noted positive performance year-to-date in 2019, and analyzed the long-term performance of both portfolios, included on pages 33-34 in the meeting materials. He also noted that tracking error for both portfolios was below the soft risk parameter discussion triggers.

In discussing the equity markets outlook, Mr. Hellmer noted that 2019 earnings expectations have fallen roughly 3% over the last three months. Finally, as a result of negative Q4 2018 equity market performance, valuation levels are now modestly attractive, and there is increasing uncertainty about the expectations for the Federal Reserve.

#### **6. Multi-Asset Q4 2018 Update**

Mr. Stanton presented the *Multi-Asset Internal Management Quarterly Update* for Q4 2018, which was included on pages 46-51 in the meeting materials. Mr. Stanton (a) discussed the underperformance of the Global Securities Portfolio (GSP) and the Alpha Portfolio during Q4 2018 and (b) discussed the performance of the Options Overlay program since inception, presented on page 50 in the meeting materials, noting that its profits for 2018 were just over \$8 million. He also reported that each portfolio was in compliance with its guidelines.

#### **7. Convene in Closed Session**

**Motion:** A motion to go into closed session 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 (1) the review of active risk profiles of portfolio investments and the Core Trust Fund, (2) the review of specific proprietary investment strategies related to fixed income, public equities, multi-asset, private equity, real estate, and exposure management, and (3) the review of credit counterparty information was made by Mr. Ludgate and seconded by Mr. Gandhi.

Mr. Stanton called for a roll call vote.

Carpenter-Aye  
Heimsoth-Aye  
Stanton-Aye

Denson-Aye  
Hellmer-Aye

Drummond-Aye  
Ludgate-Aye

Gandhi-Aye  
Prestigiacomo-Aye

There being nine ayes and no nays, Mr. Stanton declared the motion passed. The Committee then convened in closed session at 2:00 p.m. and reconvened in open session at 3:46 p.m.

#### **8. Announcement of Committee Actions Relating to Items Taken up in Closed Session**

Mr. Stanton announced that, while in closed session, the Committee (a) reviewed proprietary investment information regarding the fixed income, public equities, multi-asset, private equity, real estate and exposure management asset classes and approved 2019 strategies for the private equity and real estate strategies, (b) reviewed the total and active risk for the Core and Variable Trust Funds, and (c) received a report from SWIB's Credit Task Force on counterparty credit risk.

#### **9. Soft Risk Parameters**

Mr. Stanton stated that the report, *Soft Risk Parameters-Asset Class and Portfolio*, as of December 31, 2018, was included on pages 211-212 in the meeting materials for the Committee's review.

#### **10. Future Meeting Topics**

Mr. Stanton noted that a summary of standard IC agenda items and draft agendas for the February 28, 2019 and March 26, 2019 IC meetings were included on pages 213-218 of the meeting materials for the Committee's review.

#### **11. Adjournment**

**Motion:** A motion to adjourn the meeting was made by Mr. Carpenter and seconded by Mr. Ludgate. The motion passed unanimously, and the meeting adjourned at 3:48 p.m.

Date of Committee Approval: 2/28/2019

Signed: /s/ Edwin Denson

Edwin Denson  
Investment Committee Secretary

*Staff Investment Committee Meeting*

**Thursday, February 28, 2019**  
**STATE OF WISCONSIN INVESTMENT BOARD**  
**121 East Wilson Street**  
**Madison, Wisconsin**  
**Presentation Room**  
**1:30 p.m.**

**Est. Time  
(minutes)**

**OPEN SESSION**

- |    |   |   |
|----|---|---|
|    |    | 1. <b>Approval of the Minutes - Open Session</b><br>A. January 29, 2019             |
| 5  |   | 2. <b>June Investment Forum Preview</b> – Sarah Noronha                             |
| 5  |   | 3. <b>Quarterly Performance Review (Q4 2018)</b> – Phil Richards and Brad Gentert   |
| 5  |   | 4. <b>Currency Task Force Report</b> – Chirag Gandhi                                |
| 5  |   | 5. <b>Credit Task Force Report</b> – Jon Simon                                      |
| 5  |   | 6. <b>Research Task Force Report</b> – Todd Ludgate, Nick Stanton and Brian Hellmer |
| 5  |  | 7. <b>Amendments to WRS Investment Committee Guidelines</b> – Sara Chandler         |
| 15 |   | 8. <b>Funds Alpha Q4 2018 Update</b> – Derek Drummond                               |
| 15 |   | 9. <b>Private Debt Q4 2018 Update</b> – Chris Prestigiacommo                        |
|    |  | <b>CLOSED SESSION*</b>  |
|    |  | <b>RECONVENE IN OPEN SESSION</b>  |

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\* 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 Trust Fund, (ii) the review of specific proprietary investment strategies related to funds alpha, private debt, venture capital, currency exposure and exposure management, and (iii) the review of credit counterparty 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.

10. **Announcement of Committee Actions Relating to Items Taken up in Closed Session**
11. **QIR Annual Certification Report** (No presentation unless requested)
12. **Soft Risk Parameters** (No presentation unless requested)
13. **Future Meeting Topics**
-  14. **Motion to Adjourn**

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

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

**FUTURE MEETINGS**

3/26/19 – March Committee Mtg.  
 4/23/19 – April Committee Mtg.  
 5/30/19 – May Committee Mtg.  
 6/25/19 – June Committee Mtg.  
 7/23/19 – July Committee Mtg.  
 8/27/19 – August Committee Mtg.  
 9/24/19 – September Committee Mtg.  
 10/29/19 – October Committee Mtg.  
 11/26/19 – November Committee Mtg.  
 12/19/19 – December Committee Mtg.

Investment Committee Members:

Executive Director/Chief Inv. Officer: David Villa (Chair)  
 Managing Director-Private Markets & Funds Alpha:  
     Chuck Carpenter (Vice-Chair)  
 Managing Director-Asset & Risk Allocation:  
     Edwin Denson (Secretary)  
 Managing Director-Public Equities: Brian Hellmer  
 Managing Director-Public Fixed Income: Todd Ludgate  
 Head of Multi-Asset Strategy: Nick Stanton  
 Portfolio Manager: Chris Prestigiacomio  
 Portfolio Manager: Chirag Gandhi  
 Quantitative Manager: Brian Heimsoth  
 Funds Alpha Manager: Derek Drummond

*Staff Investment Committee Meeting*

Tuesday, March 26, 2019

**STATE OF WISCONSIN INVESTMENT BOARD**

**121 East Wilson Street**

**Madison, Wisconsin**

**Presentation Room**

**1:30 p.m.**

**Est. Time  
(minutes)**

**OPEN SESSION**



**1. Approval of the Minutes – Open Session**

A. February 28, 2019

**5**

**2. June Investment Forum Preview – Sarah Noronha**

**5**

**3. Open Internal Audit Recommendations – Brandon Brickner**

**10**

**4. Private Equity Q4 2018 Update – Scott Parrish and Chris Eckerman**

**10**

**5. Real Estate Q4 2018 Update – Steve Spiekerman**



**CLOSED SESSION\***



**RECONVENE IN OPEN SESSION**

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

**7. Soft Risk Parameters (No presentation unless requested)**

**8. Future Meeting Topics**



**9. Motion to Adjourn**

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

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

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\*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 Trust Fund, (ii) the review of specific proprietary investment strategies related to private equity, real estate, fixed income, public equities, multi-asset and exposure management, and (iii) the review of credit counterparty 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**

4/23/19 – April Committee Mtg.  
5/30/19 – May Committee Mtg.  
6/25/19 – June Committee Mtg.  
7/23/19 – July Committee Mtg.  
8/27/19 – August Committee Mtg.  
9/24/19 – September Committee Mtg.  
10/29/19 – October Committee Mtg.  
11/26/19 – November Committee Mtg.  
12/19/19 – December Committee Mtg.

Investment Committee Members:

Executive Director/Chief Inv. Officer: David Villa (Chair)  
Managing Director-Private Markets & Funds Alpha:  
    Chuck Carpenter (Vice-Chair)  
Managing Director-Asset & Risk Allocation:  
    Edwin Denson (Secretary)  
Managing Director-Public Equities: Brian Hellmer  
Managing Director-Public Fixed Income: Todd Ludgate  
Head of Multi-Asset Strategy: Nick Stanton  
Portfolio Manager: Chris Prestigiacomo  
Portfolio Manager: Chirag Gandhi  
Quantitative Manager: Brian Heimsoth  
Funds Alpha Manager: Derek Drummond

*Staff Investment Committee Meeting*

**Tuesday, April 23, 2019**  
**STATE OF WISCONSIN INVESTMENT BOARD**  
**121 East Wilson Street**  
**Madison, Wisconsin**  
**Presentation Room**  
**1:30 p.m.**

**Est. Time  
(minutes)**

**OPEN SESSION**

- |   |   |   |
|---|---|---|
|   |  | 1. <b>Approval of the Minutes – Open Session</b><br>A. March 26, 2019 |
| 5 |   | 2. <b>June Investment Forum – Sarah Noronha</b>                       |
| 5 |   | 3. <b>Corporate Governance Update – Rochelle Klaskin</b>              |
| 5 |   | 4. <b>Fixed Income Q1 2019 Update – Todd Ludgate</b>                  |
| 5 |   | 5. <b>Public Equities Q1 2019 Update – Brian Hellmer</b>              |
| 5 |   | 6. <b>Multi-Asset Q1 2019 Update – Nick Stanton</b>                   |

 **CLOSED SESSION\***

 **RECONVENE IN OPEN SESSION**

- |  |   |  |
|--|---|--|
|  |   | 7. <b>Announcement of Committee Actions Relating to Items Taken up in Closed Session</b> |
|  |   | 8. <b>Soft Risk Parameters</b> (No presentation unless requested)                        |
|  |   | 9. <b>Future Meeting Topics</b>  |
|  |  | 10. <b>Motion to Adjourn</b>   |

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\*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 Trust Fund, (ii) the review of specific proprietary investment strategies related to fixed income, public equities, multi-asset, private equity, real estate and exposure management, and (iii) the review of credit counterparty 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.

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

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

**FUTURE MEETINGS**

5/30/19 – May Committee Mtg.  
6/25/19 – June Committee Mtg.  
7/23/19 – July Committee Mtg.  
8/27/19 – August Committee Mtg.  
9/24/19 – September Committee Mtg.  
10/29/19 – October Committee Mtg.  
11/26/19 – November Committee Mtg.  
12/19/19 – December Committee Mtg.

**Investment Committee Members:**

Executive Director/Chief Inv. Officer: David Villa (Chair)  
Managing Director-Private Markets & Funds Alpha:  
    Chuck Carpenter (Vice-Chair)  
Managing Director-Asset & Risk Allocation:  
    Edwin Denson (Secretary)  
Managing Director-Public Equities: Brian Hellmer  
Managing Director-Public Fixed Income: Todd Ludgate  
Head of Multi-Asset Strategy: Nick Stanton  
Portfolio Manager: Chris Prestigiacomio  
Portfolio Manager: Chirag Gandhi  
Quantitative Manager: Brian Heimsoth  
Funds Alpha Manager: Derek Drummond

SWIB Investment Committee  
**WISCONSIN RETIREMENT SYSTEM**  
**INVESTMENT GUIDELINES**

Revised as of  
February 28, 2019

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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 WRS<sup>1</sup> 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 Compliance Division or legal requirements or review operational readiness with the Operations Division prior to the trading of the instruments and securities authorized herein.

## II. LEVERAGE USE POLICY

### Introduction

The funds managed by SWIB can have exposure to leverage through different structures and vehicles. Leverage is an exposure to an asset class that is not fully collateralized by cash assets or an exposure to an asset acquired that has not been fully funded. There are two types of leverage, financial leverage and economic leverage:

- Financial leverage is an exposure to an asset class that is not fully collateralized by cash, with the remaining unfunded exposure not collateralized by another

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<sup>1</sup> 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.

asset. An example of financial leverage is buying a future on an equity index that is only partially collateralized with cash assets.

- Economic leverage is an exposure that is partially collateralized by cash and partially collateralized by an alternative asset to cash but fully collateralized. An example of economic leverage is buying a future on an equity index and partially collateralizing the exposure with cash and collateralizing the remaining exposure with assets such as bonds so that the exposure is fully collateralized.

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.

Both financial and economic leverage, however, require liquid assets to pay down the levered obligation. This type of risk is called liquidity risk. Liquidity risk is managed by monitoring the level of liquidity required in various market scenarios and ensuring that an adequate quantity of liquid assets is available to meet commitments in times of market stress.

The total amount of financial leverage is approved by the Board through the WRS asset allocation process. The Board-approved asset allocation targets for each asset class together with the approved financial leverage is called the “Policy Portfolio.” The total amount of economic leverage is limited by the Board-approved active risk target and range.

### **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 Managing Director of Asset and Risk Allocation (ARA), and the [Executive Director](#)/Chief Investment Officer ([ED](#)/CIO). Leverage use exposure risk metrics are reported at least quarterly to the Investment Committee. Leverage will be reviewed by the Investment Committee with an eye to diversifying counterparties, maturities and sources. Leverage will also be periodically reported by the [ED](#)/CIO to the Board. The balancing of these dimensions can vary through time as market conditions vary, especially with respect to liquidity.

## **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 exchanged 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 ARA 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. For clarity, exchange-traded funds

(ETFs), exchange-traded notes (ETNs), or exchange-traded vehicles (ETVs) shall not be deemed exchange-traded derivatives.

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 "AAAm" 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.

For clarity, this Item 2 does not apply to ETFs, ETNs, and ETVs, 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.

3. 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. For internal public equities portfolios, the aggregate notional value of put options sold and not covered by portfolio cash is limited to 10% of the market value of the portfolio. For internal public equity portfolios, the aggregate notional value of call options sold and not covered by the underlying security positions is limited to 10% of the market value of the portfolio. These limits do not apply to the multi-asset portfolios or any option overlay investment strategies.

4. 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.
5. Guideline limits and soft parameters for each portfolio will be applied to the aggregate exposures which include both physical and synthetic securities.
6. New derivatives strategies will be reviewed and approved by the Investment Committee before their implementation or use.
7. SWIB shall not enter into new derivatives agreements with new counterparties until the [ED/CIO](#) has approved the agreement. Each managing director, head or portfolio manager in the relevant division 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 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 managing director, head or portfolio manager in the relevant division ("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 ~~Executive Director (only for mandatory rebalancing)~~, [ED/CIO](#), Managing Director, ARA and each

- managing director or head of each major asset class. 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 ~~Transition Management~~[plan \(a “Rebalancing Plan”\)](#) to affect the rebalancing. The ~~plan~~[Rebalancing Plan](#) will include the total amount of each asset class to be bought and sold, the intended ~~net~~-market ~~exposure~~, the ~~specific vehicles~~[exposures](#), and the time frame of purchases and sales. The ~~plan~~[Rebalancing Plan](#) is based on best estimates of market~~close~~ 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 ~~Transition Management~~[Rebalancing](#) Plan may be subsequently adjusted for additional purchases and/or sales to true up the~~net~~ market ~~exposure~~[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 Managing Director, 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. ~~5.~~ 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. ~~6.~~ 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. ~~7.~~ 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. 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.
  - c. 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. WRS General and Portfolio Guidelines – Internal Management

Each internal portfolio is assigned compulsory investment guidelines. ~~Managers~~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 ~~Officer~~division, ED/CIO, and the Managing Director or Head of the asset class in which the deviation occurred. Upon receiving notice of a deviation or potential deviation, the ED/CIO and relevant Managing Director will either take action to correct the deviation or obtain a waiver approved by the ED/CIO ~~and Executive Director~~. If the ED/CIO ~~or Executive Director~~ are is not available, then the waiver may be granted by the Managing Director of any asset class (other than the asset class to which the portfolio is requesting the waiver) and the ~~Assistant~~Deputy

[Executive](#) Director. 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. ~~Managers~~[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).
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 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 MSCI World Index or the MSCI Emerging Market Index, respectively. Public fixed income investments in markets designated as ~~"developed" or "emerging"~~ are investments in the debt of countries (or of companies incorporated or organized in countries) included in ~~the Citigroup World Government Bond Index or~~ the JP Morgan Emerging Markets Diversified Index, ~~respectively.~~ 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. ~~All portfolios are measured against benchmarks approved by the Board.~~ ~~Current~~The Board approves the benchmarks for the Core Trust Fund and Variable Trust 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 ARA Division will monitor the risk exposures of all WRS portfolios. The Managing Director, ARA will have the authority to 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 Managing Director, ARA. In addition to such recommendations, drawdown control procedures for all active internal WRS portfolios will be implemented and monitored by the ARA 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 strategies 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.

**A. ~~U.S. Equity~~Small Cap Portfolios**

The ~~U.S. Equity~~Small Cap Portfolios are invested primarily in publicly traded equity securities that are registered with the Securities and Exchange Commission, including common stocks, preferred stocks, ETFs, American Depositary Receipts (ADRs), American Depositary Shares (ADSs), convertible bonds, securities issued in initial public offerings, and when-issued securities. The ~~U.S. Equity~~Small Cap Portfolios may also be invested in equity securities that are publicly traded on stock exchanges in other developed countries.

1. When aggregated with other SWIB portfolios, no more than 20% of outstanding shares of any single issuer, excluding shares held in commingled funds and ETFs, may be owned.
2. When aggregated with other SWIB portfolios, no single issuer's equity securities may represent more than 3%, excluding shares held in commingled funds and ETFs, of the total market value of all SWIB equity portfolios.
3. When aggregated with other SWIB portfolios, securities subject to restrictions on trading pursuant to Rule 144 under the Securities Act of 1933 shall not constitute more than 1% of the market value of all SWIB equity portfolios.

4. Up to 10% of each portfolio's market value may be invested in international and emerging markets companies through common stocks, ADRs, ADSs, or country-specific ETFs. All international and emerging markets stock transactions must be ~~done on an~~ in equity securities that are publicly traded on a stock exchange ~~located~~ in a developed country.
5. Portfolios may use exchange-traded futures contracts or ETF's to equitize cash and receivables.
6. Portfolios 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 a portfolio may not exceed 50% of a portfolio's market value.
7. Except as provided in 4 above, securities must be issued by an entity that is incorporated in the United States; provided that investment is also permitted if the issuer is incorporated in a tax haven outside the United States if 1) the company's headquarters are located in the U.S. or 2) the headquarters are located in Belize, Bahamas, Bermuda, British Virgin Islands, Cayman Islands, Channel Islands, Cook Islands, Isle of Man, Marshall Islands, Panama, Liberia or Netherland Antilles and the primary exchange for the issuer's securities is located in the U.S.

## B. Global Equity Portfolios

The ~~Global Equity Portfolios~~ global sector portfolios are invested primarily in publicly traded equity securities, including common stocks, preferred stocks, ADRs, ADSs, ETFs, convertible bonds, 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 markets. Collectively, the global sector portfolios are referred to herein as the "global sector aggregate portfolio."

1. Investments in companies whose headquarters and/or primary exchange are located in emerging market countries shall not exceed 5% of ~~at~~ the global sector aggregate portfolio's market value.
2. ~~When aggregated with other SWIB portfolios,~~ The global sector aggregate portfolio may own no more than 10% of outstanding shares of a single issuer, excluding shares held in commingled funds and ETFs, ~~may be owned.~~
3. ~~When aggregated with other SWIB portfolios, no~~ No single issuer's equity securities may represent more than 3%, excluding shares held in commingled funds and ETFs, of the total market value of ~~all SWIB equity portfolios~~ the global sector aggregate portfolio.
4. ~~When aggregated with other SWIB portfolios, securities~~ Securities subject to restrictions on trading pursuant to Rule 144 of the Securities Act of 1933

shall not constitute more than 1% of the market value of ~~all SWIB equity portfolios~~the global sector aggregate portfolio.

5. 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.
6. ~~Portfolios~~Sector portfolios may use exchange-traded futures contracts or ETF's to equitize cash and receivables.
7. ~~Portfolios~~Sector portfolios 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 global sector aggregate portfolio may not exceed 50% of the portfolio's market value.

### C. Passive Portfolios

The objective of the passive portfolios is to closely track the returns and risk of their respective benchmarks.

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. Activity or retention of 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.
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 aggregated levels of policy fund financial leverage do not exceed any Trustee-approved limits.

#### D. Government/Credit Portfolio

The Government/Credit Portfolio is primarily invested in publicly traded and Rule 144A, ~~U.S. dollar denominated~~ fixed income instruments, primarily of investment grade, including ~~government, agency, corporate, and Yankee securities~~ governments, government-related entities, and corporations around the world, primarily in developed markets, including the United States.

1. The portfolio shall maintain an average quality rating of A or better.
2. Effective duration of the portfolio shall remain within ~~15~~18% of the assigned benchmark's duration.
3. Non-investment grade securities shall not exceed 15% of the portfolio's market value.
4. With the exception of ~~U.S. government and agency~~developed market sovereign securities, issuer concentrations are restricted to 5% (investment grade) and 3% (non-investment grade) of the market value of the portfolio.
5. Securities sold to SWIB under Rule 144A under the Securities Act of 1933 may not exceed 20% of the portfolio's market value.
- ~~6. Financial futures, options, and swaps are permitted for the purposes of adjusting durations, taking or modifying credit positions, or investing anticipated cash flows, subject to the following guidelines:~~
  - ~~(a) Derivatives may be used to replicate a position that would be taken through the purchase or sale of a permitted bond.~~
  - ~~(b) Eligible contracts are:~~
    - ~~(1) 2-Year U.S. Treasury Futures~~
    - ~~(2) 5-Year U.S. Treasury Futures~~
    - ~~(3) 10-Year U.S. Treasury Futures~~
    - ~~(4) 30-Year U.S. Treasury Bond Futures~~
  - ~~(c) Each contract must be specific to an explicitly documented transaction. Contracts must be closed when any hedged positions are closed.~~

#### ~~F. Global Bond Portfolio~~

~~The Global Bond Portfolio is primarily invested in publicly traded and Rule 144A fixed income obligations of governments, government-related entities, and corporations around the world, primarily in developed markets, including the United States.~~

- ~~1. Overall portfolio quality must be maintained at an average rating of "A" or better.~~

- ~~2. Effective duration of the portfolio shall remain within 20% of the assigned benchmark's duration.~~
- ~~3. Subject to Guideline #4, corporate securities may not exceed 20% of the portfolio's market value (i.e. either long or short and as calculated on a net basis) and must be rated at least "B-" and above.~~
- ~~4. Corporate securities rated "BB+" or lower but no lower than "B-" may not exceed 5% of the portfolio's market value.~~
- ~~5. No single corporate issuer shall represent more than 5% of the portfolio's market value.~~
6. Emerging market sovereign debt is limited to (a) securities that are rated "B-" or above and (b) debt of countries in the JP Morgan Emerging Market Bond Index Global Diversified ("JP Morgan EM Bond Index"). Emerging market corporate debt is limited to (a) securities that are rated "B-" or above and (b) issuers in the Bloomberg Barclays US Credit Index.
7. Gross emerging market ("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 will not be counted against the EM debt exposure threshold.
8. Subject to Guideline #~~11~~10, gross EM currency shall not exceed ~~15~~10% of the portfolio's market value on a long or short basis (i.e., long % + short %), except that EM FX forwards intended to hedge the currency risk of an EM debt of same country may be netted (measured using the notional value of the currency forwards) and only the netted amount shall count against the ~~15~~10% threshold. To calculate the threshold under this Guideline #8, EM unhedged local currency debt shall be included, and any FX exposure described in Guideline #~~10~~9, that is not used to hedge EM debt shall be counted toward the EM currency limit.
- ~~9. Securities sold to SWIB under Rule 144A shall not exceed 20% of a portfolio's market value.~~
9. ~~10.~~ Currency, interest rate, credit or return ~~exposure management is permitted but not required.~~ ~~Exposure management is permitted only~~derivatives use is permitted for the purposes of adjusting durations, taking or modifying credit or currency positions, investing anticipated cash flows or to replicate a position taken through the purchase or sale of a permitted bond. Derivatives use is permitted through the use of (a) exchange-traded interest rate, credit and currency instruments, including futures and options, (b) spot and forward contracts in foreign currencies, (c) Over-the-counter and exchanged traded currency ("FX") options limited to delta-adjusted notional value of +/- ~~5% versus the currency weight in the benchmark~~3% of the market value of the portfolio, (d) interest rate, credit default and total return swaps on securities approved herein in

accordance with the General Guidelines above and (e) volatility derivatives limited to 3% gross notional exposure and 1% net notional exposure of the portfolio market value. Notwithstanding Guideline #6, underlying securities in traded credit default swap indices (“CDXCDSI”) may include (i) EM sovereign and EM corporate debt securities rated “B-” or below, (ii) EM debt of countries that are not included in the JP Morgan EM Bond Index , or (iii) EM corporate issuers that are not included in the Bloomberg Barclays US Credit Index; provided however, that at least 75% of the EM sovereign debt securities or EM corporate debt securities that underlie any such traded CDXCDSI are included in the indices listed in Guideline #6, as applicable, and are rated at least “B-” and above. Also, ~~notwithstanding Guidelines #3-4,~~ underlying securities in traded CDXCDSI may include corporate securities rated lower than “B-” or below; provided however, that at least 75% of the corporate securities underlying the traded CDXCDSI are rated at least “B-” and above. ~~Net CDX exposure shall be included in the threshold under Guideline #3 and net high yield CDX exposure shall be included under Guideline #4.~~

10. ~~11.~~ Subject to the limitation in Guideline #8, the portfolio may take a position in a single market currency of benchmark developed (non-U.S.) countries ~~(excluding EM benchmark countries)~~ of up to +/- ~~10% versus the currency weight in the benchmark~~ 6% of the market value of the portfolio. Currencies of developed (non-~~benchmark~~ ~~countries~~ ~~and~~ ~~EM benchmark~~ U.S.) and emerging markets countries may be held through the use of forward contracts (including FX Swaps) provided that the notional value of any single ~~non-benchmark or~~ EM currency shall not exceed +/- ~~5~~ 3% of the market value of the portfolio.
11. ~~12.~~ Maximum cash in the portfolio shall not exceed 20% of the market value of the portfolio.

#### 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 portfolios option adjusted duration should be +/- 15% of the benchmark duration.

## **F.~~G.~~ Currency Overlay**

To separate the management of currency risk from the risk of asset allocation and security selection, a currency overlay may be established at the fund level for the Core Fund and/or the Variable Fund. The ED/CIO, the Managing Director, ARA, and the internal Global Bond Portfolio Manager shall set the currency overlay strategy.

1. The amount of the overlay will be expressed in relation to the size of the aggregate non-U.S. market value of the internally managed Global Sector Portfolios and the internally managed MSCI World ex U.S. Index Portfolio. This amount is referred to as the “portfolio reference value.” For example, if the Global Sector Portfolios have a non-U.S. market value of \$1 billion and the MSCI World ex U.S. Index Portfolio has a market value of \$1 billion, then the portfolio reference value is \$2 billion.
2. Only the currencies in the MSCI All Country World Index (ACWI) may be used to implement the currency overlay.
3. Currencies may be bought or sold.
4. Positions in any individual non-U.S. currency may be taken equal to +/- 10% of the portfolio reference value for major currencies (Euro, UK Sterling and Japanese Yen) and +/- 5% for all other ACWI currencies. For example, if the portfolio reference value is \$2 billion, individual currency positions in major currencies could be taken of +/- \$200 million.
5. Up to 25% of the portfolio reference value may be hedged into U.S. dollars.
6. The risk of the currency overlay strategy in aggregate will be limited to 25% of the active risk ~~objective~~target for the total trust fund, which is set by the Board.
7. Limits shall be calculated using the notional value of the currency instruments (*i.e.*, forwards and futures) and the portfolio reference value at the time of purchase.

## **G. ~~H.~~ 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.

Each strategy and/or investment idea expressed in the portfolios shall be approved by ~~a majority~~any three of the ED/CIO, the Managing Directors of ARA, Public Fixed

Income, [Private Markets & Funds Alpha](#) and Public Equities, and the Head of Multi-Asset Strategy. Portfolio oversight will be the responsibility of the ARA Division, and the Investment Committee will monitor each investment in the portfolios. The Investment Committee shall establish procedures to monitor these portfolios. 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. ~~H.~~ Multi-Asset Strategies Portfolios

The Multi-Asset Strategies portfolios are authorized to invest in or short any instrument and derivative, subject to the general and derivative guidelines contained in these IC Guidelines and the following restrictions:

1. The maximum amount to be allocated to Multi-Asset Strategies, expressed as a percentage of the total Core Fund, shall be approved by the Board.
2. The maximum active risk ~~objective~~[target](#) of an individual Multi-Asset Portfolio at time of implementation will be targeted at no more than 6% of the active risk ~~objective~~[target](#) for the total Core Fund, which is set by the Board.
3. The strategies within a Multi-Asset Portfolio may be managed either by internal investment staff or by an external manager. The SWIB individual(s) proposing a strategy will manage and monitor the strategy and ensure that all reporting requirements are satisfied.
4. Leverage and derivatives may be used to implement individual strategies and to adjust the market exposure of a Multi-Asset Portfolio, subject to the active risk target limit stated in guideline 2 above.
5. To-be-announced mortgage-backed securities (TBA MBS) may be traded only with a counterparty with which SWIB has a current Master Securities Forward Transaction Agreement (MSFTA).
  - 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.
6. The settlement of any forward TBA contract shall not be more than 90 days from the date of the trade.

Global Securities Portfolio:

1. Any physical and derivative instrument is permitted subject to the Multi-Asset Strategies Portfolios Guidelines contained in these IC Guidelines. Shorting is permitted. Up to 50% of the portfolio market exposure can be created synthetically to fund long/short ideas.
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 contributions.
3. The Global Securities Portfolio (GSP's) ex-ante tracking error limit will not exceed 6% as measured by SWIB's standard model used at any given time by SWIB's ARA Division. If market conditions (compared to active management actions) cause the portfolio's ex-ante tracking error to exceed this limit, then the GSP 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 GSP's ex-ante tracking error exceeds 6% then the portfolio may not trade or take any other action which is predicted to increase the ex-ante tracking error of the portfolio.

Alpha Portfolio:

1. Any physical and derivative instrument is permitted subject to the Multi-Asset Strategies Portfolios Guidelines contained in these IC Guidelines. Shorting is permitted.
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 contributions.
3. The Alpha Portfolio's ex-ante tracking error limit will not exceed 10% as measured by SWIB's standard model used at any given time by SWIB's ARA Division. If market conditions (compared to active management actions) cause the portfolio's ex-ante tracking error to exceed this limit, then the Alpha 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 Alpha Portfolio's ex-ante tracking error exceeds 10% then the portfolio may not trade or take any other action which is predicted to increase the ex-ante tracking error of the portfolio.

## 1. Short Term Credit Portfolio

The Short-Term Credit Portfolio is an investment vehicle of cash and short-term investments of the WRS designed to achieve a return equal to USD Three Month LIBOR. Its investment objectives are: 1) Safety of principal; 2) Return Objective of 3-Month LIBOR; and 3) Liquidity.

### Portfolio Allocation

(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
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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 minimum	No
Repurchase Agreements	BBB
Commercial Paper	A-2/P-2
Unrated Wisconsin Company Commercial Paper (maximum Unrated maturity of 90 days and percentage of the portfolio in unrated CP cannot exceed 15%)	
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/	BBB

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%).

}

Wisconsin CD Program – individual bank  
Unrated

#### J. K. General Guidelines specific for Private Market and Hedge Fund Portfolios

1. The portfolio manager shall be responsible for notifying the ~~Executive Director~~ ED/CIO and including in the portfolio strategy reports to the Trustees disclosure of any referrals or significant contacts (other than status requests) 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. Funds or commingled investment pools authorized to invest more than 50% of their capital outside the U.S. shall be considered non-U.S. investments.
4. 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.
5. Each portfolio manager shall submit to the Managing Director – PMFA a written summary of any proposed investment. The Managing Director 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 Managing Director – PMFA, ~~CIO and/or Executive Director~~ 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.
6. 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 amount to more than 10% of the base commitment.

7. Private equity investments in markets designated as “developed” or “emerging” are investments in entities that are incorporated or organized 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.

8. Beginning April 8, 2019, and notwithstanding anything permitted by the guidelines below, all PMFA investments shall require the approval of the ED/CIO.

#### K. ~~L.~~ 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 market rate fixed income 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. 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 Illinois, Iowa, Minnesota, Michigan, Indiana, Ohio or Pennsylvania.

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 Portfolio Manager 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 Managing Director – 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 Managing Director – PMFA.
3. The Private Debt Portfolio’s aggregate portfolio 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):

<b>Rating</b>	<b>Maximum Position</b>
U.S. Gov’t/Agency	No Limit
“AA” or higher	\$100 MILLION
“A”	\$75 MILLION
“BBB”	\$50 MILLION
“BB” or less	\$25 MILLION

4. 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.
5. Other guideline limitations notwithstanding, portfolio managers or other staff authorized by the Managing Director – 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.

### **L.M.-Venture Capital Portfolio**

The SWIB Venture Capital Portfolio (the “Venture Capital Portfolio” includes both the Wisconsin Venture Capital Portfolio (formerly known as the Wisconsin Private Equity 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, through strategic partnerships, or as co-investments in venture-backed companies.

- 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 located in Wisconsin.

A private equity consultant hired by SWIB will review prospective investments in limited partnerships or other fund vehicles and confirm that such investments meet a prudent investor standard prior to SWIB’s investment. From time to time, SWIB may also consider formation of fund investments where it may participate both as a general partner and as limited partner. In such cases, subject to the approval limits below, SWIB will retain a consultant to advise it on the strategy and opportunity. A “follow-on fund” is an investment or an investment vehicle that has the same sponsor or manager and is either parallel to, or has a substantially similar investment strategy as, a fund in which SWIB is or has been an investor. Any other guidelines notwithstanding, the Venture Capital Portfolio commitments are subject to the following approvals:

Approval By:	Managing Director- PMFA	<del>Chief Investment Officer</del> <u>ED/CIO</u>	<del>Executive Director</del>
<b>New Manager</b>			
• Venture Capital Funds	Up to \$30 million or less	More than \$30 million <del>up to \$60 million</del>	<del>More than \$60 million</del>
• Venture Capital • Co-Investments	Up to \$10 million or less	More than \$10 million <del>up to \$20 million</del>	<del>More than \$20 million</del>
<b>Follow on Commitments</b>			
• Venture Capital Funds	Up to \$50 million but manager exposure not to exceed 20% of the aggregate Venture Capital Portfolio value	More than \$50 million <del>up to \$75 million</del>	<del>More than \$75 million</del>

<ul style="list-style-type: none"> <li>• Venture Capital</li> <li>• Co-Investments (excluding funds of one)</li> </ul>	Up to \$10 million with exposure not to exceed 10% of the aggregate Venture Capital Portfolio value	More than \$10 million <del>up to \$20 million</del> with exposure not to exceed 10% of portfolio value	<del>More than \$20 million with exposure not to exceed 10% of portfolio value</del>
SWIB ownership <u>equal to or greater than 33 1/3%</u> of an individual fund, <del>(excluding co-investments and</del> funds of one <u>and any fund/vehicle through which a co-investment is made)</u>	<del>Either CIO/ED/CIO, provided that notice shall be given to the ED/CIO if ownership of an individual fund (excluding a fund/vehicle through which a co-investment is made) is equal to or Executive Director</del> <u>greater than 33 1/3%</u>		

Notwithstanding any of the approval thresholds above, the following additional restrictions shall apply to the Venture Capital Portfolio:

1. SWIB may not own more than 50% of a portfolio company's outstanding equity (through both fund ownership and co-investment).
2. Venture capital investments may be made only through limited partnerships or other fund vehicles that invest the majority of their capital in the U.S. or other developed markets. Venture co-investments are restricted to U.S. companies only. No more than 2% of the Core Fund may be invested in venture capital.
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 or
  - (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.
4. Venture capital co-investments made within the Wisconsin Venture Capital Portfolio are limited to companies with their headquarters or primary operations in Wisconsin. No more than 5% of the Venture Capital Portfolio shall be in co-investments from the Non-Wisconsin Venture Capital Portfolio.

5. Neither the aggregate exposure (including co-investments) to any fund manager or sponsor, nor the aggregate amount of investments in any company, may exceed 20% of the aggregate Venture Capital Portfolio aggregate value without approval of the ~~ED/CIO and Executive Director~~. For purposes of the chart above and this paragraph, aggregate Venture Capital Portfolio value is defined as the net asset value plus unfunded commitments.
6. Subject to the approval thresholds and the restrictions above, the Venture Capital Portfolio Manager or other staff authorized by the Managing Director – 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.

**M. ~~N.~~ 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, ~~through~~ strategic partnerships, and ~~as~~ co-investments in operating or holding companies. Investment guidelines and soft parameters shall be applied to the aggregate composition of the Private Equity Portfolio (including the Legacy, Private Equity Co-Investment ~~and~~ Current Return portfolios ~~and~~ Current Return Co-Investment Portfolios), unless otherwise stated. A private equity consultant hired by SWIB will review prospective investments in limited partnerships or other fund vehicles with new managers and confirm that such new investments meet a prudent investor standard. Follow-on funds, co-investments and secondary fund purchases do not require consultant review. A “follow-on fund” is an investment or an investment vehicle that has the same sponsor or manager and is either parallel to, or has a substantially similar investment strategy as, a fund in which SWIB is or has been an investor. Co-investments where SWIB is the lead investor may not be made.

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

	Managing Director – PMFA	<del>Chief Investment Officer</del> <u>ED/CIO</u>	<del>Executive Director</del>
New Manager			
<ul style="list-style-type: none"> <li>• <del>Buy-outs</del> <u>Funds or Strategic Partnerships</u></li> </ul>	\$100 million or less	Over \$100 million up to \$300 million	<del>Over \$300 million</del>
<ul style="list-style-type: none"> <li>• <del>Strategic Partnerships</del></li> </ul>	<del>\$30 million or less</del>	<del>Over \$30 million up to \$60 million</del>	<del>Over \$60 million</del>

• Co-Investments	\$30 million or less	Over \$30 million up to \$60 million	<del>Over \$60 million</del>
Follow-on Commitments			
• <del>Buy-outs</del> <u>Funds or Strategic Partnerships</u>	\$150 million or less	Over \$150 million up to \$300 million	<del>Over \$300 million</del>
• <del>Strategic Partnerships</del>	<del>\$50 million or less</del>	<del>Over \$50 million up to \$75 million</del>	<del>Over \$75 million</del>
• Co-Investments	\$50 million or less	Over \$50 million up to \$75 million	<del>Over \$75 million</del>
SWIB ownership <u>equal to or greater than 33 1/3%</u> of an individual fund; <u>(excluding a fund/vehicle through which a co-investment investment is made)</u>	<del>Either CIO/ED/CIO, provided that notice shall be given to the ED/CIO if ownership of an individual fund (excluding a fund/vehicle through which a co-investment is made) is equal to or Executive Director;</del> <u>greater than 33 1/3%</u>		

2. SWIB may not own more than 50% of a company's outstanding equity (through both fund ownership and co-investment).
3. The Private Equity Portfolio shall not include investments in venture capital funds.
4. Investments may be made through funds, strategic partnerships, or co-investments. Co-investments may be made only in the U.S. or other developed markets. Co-investments must be made in one of the following ways and may only be made in the U.S. or other developed markets:
  - (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) ~~alongside or with a strategic partner that has entered into a written agreement to co-invest with SWIB and to be responsible for due diligence, or~~
  - (4) as approved by the ED/CIO ~~or the Executive Director~~.

5. 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 exposure without approval of the ~~ED/CIO and Executive Director~~. (Exposure is defined as net asset value plus unfunded commitments.)
6. No more than 45% of the Private Equity Portfolio may be invested (including commitments to investments) outside of the U.S., without the approval of the ~~ED/CIO and Executive Director~~.
7. No more than 33 1/3% of the Private Equity Co-~~investments~~Investment Portfolio's exposure may be invested outside of the U.S. in other developed markets, without the approval of the ~~ED/CIO and Executive Director~~. (Exposure is defined as net asset value plus unfunded commitments.)
8. Other guideline limitations notwithstanding, portfolio managers or other staff authorized by the Managing Director – 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.

#### N. ~~Q.~~ 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). Certain investments with relatively higher expected returns, and higher risk, may be used on a more tactical basis. A real estate consultant hired by SWIB will review prospective commingled fund investments with new managers and/or new strategies and confirm such new investments meet a prudent investor standard. Follow-on funds and secondary fund purchases will not require consultant review. A "follow-on fund" is either (a) a direct investment that is parallel to a fund in which SWIB is or has been an investor or (b) an investment or an investment vehicle that has the same sponsor or manager and is either parallel to, or has a substantially similar investment strategy as, a fund in which SWIB is or has been an investor.

Each real estate investment (including the individual investments in a separate account tranche) must be processed and closed in accordance with applicable provisions of the Real Estate Procedures Manual.

All portfolio commitments are subject to the following approvals:

	Managing Director – PMFA	<del>Chief Investment Officer</del> <u>ED/CIO</u>	<del>Executive Director</del>
Commingled Fund			
• New Fund	\$100 million or less	Over \$100 million <del>up to \$300 million</del>	<del>Over \$300 million</del>
• Follow-on Fund	\$150 million or less	Over \$150 million <del>up to \$300 million</del>	<del>Over \$300 million</del>
Core - Separate Account*	\$150 million or less	Over \$150 million <del>up to \$300 million</del>	<del>Over \$300 million</del>
Non-Core – Separate Account*	\$100 million or less	Over \$100 million <del>up to \$300 million</del>	<del>Over \$300 million</del>

\*With respect to a separate account tranche, approval is required for the tranche, but 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 total Real Estate Equity Portfolio exposure without approval of the ED/CIO ~~and Executive Director~~. (Exposure is defined as net asset value plus unfunded commitments.) This does not apply to real estate investments for which SWIB has sole discretion to select, retain, and terminate manager(s) and/or advisors 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 market value of the Real Estate Equity Portfolio and portfolio investments in any one public REIT or company may not exceed 3% of the market value of the Real Estate Equity Portfolio. SWIB's direct ownership position in any public REIT or company may not exceed 20% of outstanding voting equity, without Board approval. Any externally managed REIT portfolio(s) will be managed under separate authority, with guidelines set

- out in the management agreements between SWIB and the selected manager(s).
3. No more than 40% of the aggregate portfolios may be invested (including commitments to investments) outside the U.S. Commingled funds that are authorized to invest more than 50% of their capital in emerging markets require prior approval of the [ED/CIO](#) ~~and Executive Director~~.
  4. Other guideline limitations notwithstanding, the portfolio manager or other staff authorized by the Managing Director – 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.
  7. Staff may hire up to five real estate advisors at any time with delegated investment discretion. These advisors shall have investment discretion of up to \$100 million of capital for each discretionary investment, with guidelines set out in the management agreements between SWIB and the selected manager(s). Staff has authority to terminate selected managers and/or advisors and hire replacement managers and/or advisors.

#### O. ~~P.~~ **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 fixed income instruments and in instruments with both current pay and equity features. Investment guidelines and soft parameters shall be applied to the aggregate composition of the Private Equity Portfolio (including the Legacy ~~and~~, [Private Equity Co-Investment, Current Return and](#)

Current Return Co-Investment Portfolios), unless otherwise stated. A private equity consultant hired by SWIB will review prospective investments in limited partnerships or other fund vehicles with new managers and confirm that such new investments meet a prudent investor standard. Follow-on funds, co-investments and secondary fund purchases ~~will do~~ not require consultant review. A “follow-on fund” is an investment or an investment vehicle that has the same sponsor or manager and is either parallel to, or has a substantially similar investment strategy as, a fund in which SWIB is or has been an investor. Co-investments where SWIB is the lead investor may not be made.

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

	Managing Director – PMFA	<del>Chief Investment Officer</del> ED/CIO	<del>Executive Director</del>
New Manager			
• Funds or Strategic Partnerships	\$100 million or less	Over \$100 million <del>up to \$300 million</del>	<del>Over \$300 million</del>
• Co-Investments	\$30 million or less	Over \$30 million <del>up to \$60 million</del>	<del>Over \$60 million</del>
Follow-on Commitments			
• Funds or Strategic Partnerships	\$150 million or less	Over \$150 million <del>up to \$300 million</del>	<del>Over \$300 million</del>
• Co-Investments	\$50 million or less	Over \$50 million <del>up to \$75 million</del>	<del>Over \$75 million</del>
<del>Investments in excess of 33% SWIB ownership equal to or greater than 50% of an individual fund (excluding co-investments a fund/vehicle through which a co-investment is made)</del>		<del>Either CIO ED/CIO, provided that notice shall be given to the ED/CIO if ownership of an individual fund (excluding a fund/vehicle through which a co-investment is made) is equal to or Executive Director greater than 33 1/3%</del>	

2. SWIB may not own more than 50% of a company’s outstanding equity (through both fund ownership and co-investment).
3. Investments may be made through funds, strategic partnerships, or co-investments. Co-investments may be made only in the U.S. or other developed markets. Co- investments must be made in one of the following ways:

- (1) alongside a fund with the same sponsor or manager as a fund ~~that~~in which SWIB is in, or has been ~~in, the Current Return Portfolio~~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 ~~for the Current Return Portfolio~~; or
  - (3) ~~alongside or with a strategic partner that has entered into a written agreement to co-invest with SWIB and to be responsible for due diligence; or~~ ~~(4)~~ as approved by the ED/CIO ~~or the Executive Director~~.
4. Neither the aggregate exposure (including co-investments) to any fund manager or sponsor, nor the aggregate amount of investments in any company, may exceed ~~20~~10% of the total Private Equity Portfolio exposure without approval of the ED/CIO ~~and Executive Director~~. (Exposure is defined as net asset value plus unfunded commitments.)
  5. No more than ~~40~~45% of the Current Return Portfolio may be invested (including commitments to investments) outside of the U.S., without the approval of the ED/CIO.
  6. No more than ~~25% of any fund or strategic partnership shall be invested (including~~33 1/3% of the Current Return Co-Investment Portfolio's exposure may be invested outside of the U.S. in other developed markets, without the approval of the ED/CIO. (Exposure is defined as net asset value plus unfunded commitments ~~to investments) in emerging markets.~~)
  7. Other guideline limitations notwithstanding, portfolio managers or other staff authorized by the Managing Director – 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. ~~Q.~~ 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, but 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 its investments will be in limited liability vehicles rather than SMAs, but may make use of SMAs if it is in the best interest of SWIB to do so.
- c. *Special Opportunity Investments*: 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-invest, or external manager “best ideas” opportunities. Special Opportunity Investments will be capped at 20% of the market value of the total HF Portfolio.

## 2. Hedge Fund Investment Strategies:

- a. *Event-Driven* – investments up (debt or credit) and down (equity) the corporate capital structure where an expectation exists for realized profits over a short to medium time frame as a result of a known catalyst such as a merger, spinoff, or restructuring.
- b. *Long-Short Equity* – long and short investments in publicly traded stocks.
- c. *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.
- d. *Relative Value* – consists of strategies that seek to take advantage of price differentials by buying and selling different yet related securities. Relative value strategies include fixed income arbitrage, insurance linked, long/short credit, quantitative strategies, structured credit, and volatility-related investments.
- e. *Multistrategy* – investment managers that invest across multiple asset classes, typically (but not always) with multiple portfolio managers. Most multistrategy funds diversify across three or more underlying strategies.

In the event a sub-strategy could fall under more than one Investment Strategy, the categorization designated by the Consultant will be utilized.

The HF Portfolio has the following target weightings and ranges to the individual hedge fund strategies, based on the Consultant’s “Lower Beta” model portfolio recommendations:

	<u>Target Allocation</u>	<u>Target Maximum</u>
Relative Value	20%	40%
Event-Driven	15%	30%
Long-Short Equity	20%	30%
Tactical Trading	20%	40%
Multistrategy	20%	40%
Special Opportunity Investments	5%	20%
	100%	

3. Categories within Investment Strategies: Each strategy above will be divided into three categories: Core, Satellite, and Niche investments. Core investments generally include funds that invest across a broad array of sub-strategies and securities within the strategy. Satellite investments generally include funds that focus on a narrower or particular segment of the strategy or market. Niche investments generally include funds that focus on a very narrow segment of the strategy or market or on a market dislocation, which may be small and more illiquid. Niche investments may include investments in fund of funds and emerging managers. SWIB staff will work with the HF Portfolio Consultant (“Consultant”) to designate each investment to a strategy and then categorize it as Core, Satellite or Niche within such strategy.
4. Roles of SWIB staff and Consultant: SWIB Funds Alpha staff and the Consultant will be responsible for conducting initial and ongoing hedge fund due diligence, selecting individual hedge funds, and determining the allocations to individual hedge funds. The Consultant will conduct primary investment and operational due diligence and make individual hedge fund written recommendations to SWIB staff. SWIB staff will conduct its review of the universe of recommended managers from the Consultant and recommend hedge funds according to the approval process. SWIB shall only invest in new Hedge Funds that are affirmatively recommended by the Consultant, and SWIB shall obtain an additional recommendation from the Consultant for additional subscriptions to existing funds of \$50 million or 30% of the current investment (whichever is less). SWIB staff and the

Consultant will be responsible for ongoing monitoring of SWIB's hedge fund investments.

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

Investment	Managing Director-PMFA	Chief Investment Officer <del>ED/CIO</del>	Executive Director
<b>New Funds*</b>			
Core/Satellite	Up to \$250 million or up to 5% of capital, whichever is less	More than 5% (or \$250 million, whichever is less) <del>and up to 8% of capital</del>	<del>More than 8% of capital</del>
Niche	Up to \$150 million or up to 3% of capital, whichever is less	More than 3% (or \$150 million, whichever is less) <del>and up to 5% of capital</del>	<del>More than 5% of capital</del>
<b>Additional Subscriptions to Existing Funds**</b>			
Core/Satellite	Up to \$350 million or Up to 7% of capital, whichever is less	More than 7% (or \$350 million, whichever is less) <del>and up to 10% of capital</del>	<del>More than 10% of capital</del>
Niche	Up to \$250 million or up to 5% of capital, whichever is less	More than 5% (or \$250 million, whichever is less) <del>and up to 7% of capital</del>	<del>More than 7% of capital</del>
<b>Special Opportunity Investments</b>	Up to \$100 million	More than \$100 million <del>and up to \$200 million</del>	<del>More than \$200 million</del>
* Approval threshold is calculated based on the investment amount being allocated to the new fund			
** Approval threshold is calculated based on SWIB's aggregate hedge fund investments with the Manager			

Definitions: For purposes of the approvals above, capital is defined as the total market value of the HF Portfolio. All measurements for approvals are subject to the latest month-end data and results at the time the portfolio manager requests approval pursuant to the above requirements, and investments shall be made by SWIB within 45 days of such approval. If the investment cannot be closed within such 45-period, the measurement of percentage of capital shall be made again and additional approvals, if any are required pursuant to the above table, shall be sought and received before the investment is made.

6. The market value of the HF Portfolio allocated to one hedge fund manager as a percentage of the total market value of the total HF Portfolio may not exceed 15% without approval of the [ED/CIO](#) ~~and Executive Director~~.
7. Other guideline limitations notwithstanding, portfolio managers or other staff authorized by the Managing Director - 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. Private Markets and Funds Alpha Overage Portfolios**

Portfolios may be established at the asset class level for private equity, co-invest, 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 private markets or funds alpha portfolio manager 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 Executive Director, the CIO,~~ the Managing Director-PMFA, ~~and~~ the relevant portfolio manager, ~~in consultation with the Managing Director, ARA~~ and a majority of the ED/CIO, the Managing Directors of ARA, Public Fixed Income and Public Equities and the Head of Multi-Asset Strategy. Any approved investment shall be reported 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 risk parameters for the applicable aggregated asset class, portfolio, or Core Trust 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.

## **VI. 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, 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 Committee or by SWIB's investment management staff, as designated in the Investment Committee Charter. Further, the Investment Committee has adopted separate governance and guidelines with respect to Beta One External Managers.

## **APPENDIX 1 - APPROVED EXCHANGES**

### **Approved Exchanges for Derivatives Trading as of February 28, 2019\***

[Australian Securities Exchange](#)  
[BOX Options Exchange](#)  
[CBOE Futures Exchange](#)  
[CBOE Options Exchange](#)  
[CBOE C2 Options Exchange](#)  
[CBOE BZX Options Exchange](#)  
[CBOE EDGX Options Exchange](#)  
[Chicago Board of Trade](#)  
[Chicago Mercantile Exchange](#)  
[Eurex Exchange](#)  
[Euronext Amsterdam](#)  
[Euronext Brussels](#)  
[Euronext Lisbon](#)  
[Euronext Paris MATIF](#)  
[Euronext Paris MONEP](#)  
[ICE Futures Europe](#)  
[ICE Futures US](#)  
[ICE Futures Singapore](#)  
[International Securities Exchange](#)  
[ISE Gemini](#)  
[ISE Mercury](#)  
[London Stock Exchange - Derivatives](#)  
[TMX \(Toronto Montreal Exchange\)](#)  
[Montreal Exchange](#)  
[NASDAQ OMX BX](#)  
[NASDAQ OMX PHLX](#)  
[NASDAQ OMX Futures Exchange](#)  
[NASDAQ Options Market](#)  
[New York Mercantile Exchange](#)  
[NYSE Arca Options](#)  
[NYSE Liffe](#)  
[NYSE MKT LLC](#)  
[Osaka 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 Global Securities Portfolio ~~and the~~ Alpha Portfolio 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) (subject to ~~quarterly~~annual reporting to the Investment Committee).

### **Approved Exchanges for Derivative Trading**

<b>Acronym</b>	<b>Exchange*</b>	<b>Approval Date</b>
<del>BOX</del>	<del>Boston Options Exchange</del>	<del>2/22/2010</del>
<del>CBT</del>	<del>Chicago Board of Trade</del>	<del>7/28/2009</del>
<del>CBOE</del>	<del>Chicago Board Options Exchange, Incorporated</del>	<del>2/22/2010</del>
<del>CME</del>	<del>Chicago Mercantile Exchange</del>	<del>7/28/2009</del>
<del>EUREX</del>		<del>7/28/2009</del>
<del>EURONEXT</del>		<del>7/28/2009</del>
<del>ICE</del>	<del>Intercontinental Exchange</del>	<del>4/21/2010</del>
<del>ISE</del>	<del>International Securities Exchange, LLC</del>	<del>2/22/2010</del>
<del>LSE</del>	<del>London Stock Exchange</del>	<del>7/28/2009</del>
<del>MSE</del>	<del>Montreal Exchange</del>	<del>7/28/2009</del>
<del>PHLX</del>	<del>NASDAQ OMX PHLX</del>	<del>2/22/2010</del>
<del>NSDQ</del>	<del>NASDAQ Options Market</del>	<del>2/22/2010</del>
<del>AMEX</del>	<del>NYSE Amex LLC</del>	<del>2/22/2010</del>
<del>NYSE</del>	<del>NYSE Arca, Inc.</del>	<del>2/22/2010</del>
<del>NYSE LIFFE</del>		<del>7/28/2009</del>
<del>OSE</del>	<del>Osaka Securities Exchange</del>	<del>7/28/2009</del>
<del>SFE</del>	<del>Sydney Futures Exchange</del>	<del>7/28/2009</del>
<del>TSE</del>	<del>Tokyo Stock Exchange</del>	<del>7/28/2009</del>

## APPENDIX 2 - SOFT RISK PARAMETERS

### SOFT RISK PARAMETERS – ASSET CLASS AND PORTFOLIO

PORTFOLIO ASSET CLASS CHARACTERISTIC	ASSET CLASS <sup>2</sup>	DISCUSSION TRIGGER
Asset Class Exposure	Core Fund	
	Global <u>Equities</u>	<u>39.8% - 47.8%*</u> <del>Strategic Target +/- 15% of the Strategic Target</del>
	<u>EM Equities</u> <del>Int'l Equity</del>	<u>0.0% - 7.5%*</u> <del>Strategic Target +/- 15% of the Strategic Target</del>
	<u>Small Cap</u> <del>U.S. Equity</del>	<u>0.0% - 6.0%*</u> <del>Strategic Target +/- 15% of the Strategic Target</del>
	<u>U.S.</u> <del>Inv Grade</del>	<u>16.6 - 26.6%*</u> <del>Strategic Target +/- 15% of the Strategic Target</del>
	High Yield	<u>0.0% - 5.6%*</u> <del>Strategic Target +/- 100 bps</del>
	EM Debt	<u>0.0% - 6.6%*</u> <del>Strategic Target +/- 100 bps</del>
	Variable Fund	
	U.S. Equity	65% to 75%
	Int'l Equity	25% to 35%
<u>*Post-Corridor Treatment</u>		
Maximum Small Cap Exposure	U.S. Equities	2.75x Benchmark
Ex Ante Tracking Error	Public Equities	.75% - 2.25%
	Public Fixed	.4% - 1.2%
	Core Fund	.6% - 1.8%
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	<del>U.S.</del> Public Fixed	+/- 15% of Benchmark
	<del>Global Fixed</del>	<del>+/- 15% of Benchmark</del>

<sup>2</sup> "Passives," as used in these Soft Risk Parameters, means portfolios 0797, 0799, 0812 and 0813.

PORTFOLIO ASSET CLASS CHARACTERISTIC	ASSET CLASS <sup>2</sup>	DISCUSSION TRIGGER
<a href="#">Base Portfolio</a>	<a href="#">Global Equities</a>	<a href="#">8-12% of Aggregate Sector Portfolio</a>
<a href="#">Scaled Portfolio</a>	<a href="#">Global Equities</a>	<a href="#">88-92% of Aggregate Sector Portfolio</a>

#### ACTIVE/INDEXED EQUITIES

Minimum Number of Holdings		
	Small Cap Diversified	100
	<del>Shareholder Opportunity</del>	<del>-10</del>
	Global Sector <del>Portfolios</del> <a href="#">Aggregate Portfolio</a>	Lesser of <del>25</del> <a href="#">100</a> names or 25% of <del>sector</del> index names
	<del>Global Equity Concentrated</del>	<del>100</del>
	<del>Merger Arb</del>	<del>10</del>
	<del>Low Volatility Global Equity</del>	<del>25% of index names</del>
Ex Ante Tracking Error		
	Passives ( <a href="#">Variable Fund</a> ):	
	R1000 Index	6 bp annualized
	MSCI ex US	20 bp annualized
	<a href="#">Passives (Core Fund):</a>	
	<a href="#">MSCI US</a>	<a href="#">10 bp annualized</a>
	<a href="#">MSCI ex US</a>	<a href="#">20 bp annualized</a>
	Small Cap Diversified	3% - 9%
	<del>Shareholder Opportunity</del>	<del>3% - 9%</del>
	Global Sector <del>Portfolios</del> <a href="#">Aggregate Portfolio</a>	<del>2</del> <a href="#">1</a> % - <del>6</del> <a href="#">4</a> %
	<del>Global Equity Concentrated</del>	<del>2% - 6%</del>
	<del>Low Volatility Global Equity</del>	<del>2% - 6%</del>

PORTFOLIO ASSET CLASS CHARACTERISTIC	ASSET CLASS <sup>2</sup>	DISCUSSION TRIGGER	
Maximum Position Size	Passives	5% notional value of futures	
	Small Cap Diversified	5%	
	<del>Shareholder Opportunity</del>	<del>15%</del>	
	Global Sector <del>Portfolios</del> <u>Aggregate Portfolio</u>	Benchmark weight $\pm$ 5%	
	<del>Global Equity Concentrated</del>	<del>Benchmark weight <math>\pm</math> 5%</del>	
	<del>Merger Arb</del>	<del>15%</del>	
	<del>Low Volatility Global Equity</del>	<del>Benchmark weight <math>\pm</math> 5%</del>	
	<u>Maximum Total Value of Short Sales</u>	<u>Global Sector Aggregate Portfolio</u>	<u>40% of portfolio value</u>
	Maximum ETF Exposure	Passives	5% of portfolio value
		Small Cap Diversified	+/- 15% of portfolio value
<del>Shareholder Opportunity</del>		<del>+/- 15% of portfolio value</del>	
Global Sector <u>Aggregate</u> Portfolios		+/- 15% of portfolio value	
<del>Global Equity Concentrated</del>		<del>+/- 15% of portfolio value</del>	
Maximum Company Ownership		Passives	10% of outstanding
		Small Cap Diversified	10% of outstanding
	<del>Shareholder Opportunity</del>	<del>19% of outstanding</del>	
	Global Sector <del>Portfolios</del> <u>Aggregate Portfolio</u>	10% of outstanding	

PORTFOLIO ASSET CLASS CHARACTERISTIC	ASSET CLASS <sup>2</sup>	DISCUSSION TRIGGER
	<del>Global Equity Concentrated</del>	<del>10% of outstanding</del>
	<del>Merger Arb</del>	<del>10% of outstanding</del>
	<del>Low Volatility Global Equity</del>	<del>5% of outstanding</del>
Top Ten Holdings	Small Cap Diversified	25% of portfolio
P/E Ratio	Small Cap Diversified	50%-150% of Benchmark
	Global Sector <del>Portfolios</del> <a href="#">Aggregate Portfolio</a>	50%-150% of Benchmark
	<del>Global Equity Concentrated</del>	<del>50%-150% of Benchmark</del>
	<del>Low Volatility Global Equity</del>	<del>50%-150% of Benchmark</del>
Maximum Sector Exposure	Small Cap Diversified	Benchmark weight $\pm 10\%$
	<del>Shareholder Opportunity</del>	<del>Benchmark weight <math>\pm 20\%</math></del>
	<del>Merger Arb</del>	<del>25% of portfolio value</del>
	Global <del>Equity</del> <a href="#">Sector Concentrated</a> <a href="#">Aggregate Portfolio</a>	Benchmark weight $\pm 5\%$
	<del>Low Volatility Global Equity</del>	<del>Benchmark weight <math>\pm 10\%</math></del>
Maximum Notional Uncovered Sold Calls	Passives	5% of portfolio value
	Small Cap Diversified	5% of portfolio value
	<del>Shareholder Opportunity</del>	<del>5% of portfolio value</del>

PORTFOLIO ASSET CLASS CHARACTERISTIC	ASSET CLASS <sup>2</sup>	DISCUSSION TRIGGER
	<del>Global Sector Portfolios</del>	<del>5% of portfolio value</del>
	<del>Global Equity Concentrated</del>	<del>5% of portfolio value</del>
	<del>Merger Arb</del>	<del>—5% of portfolio value</del>
	<del>Low Volatility Global Equity Sector Aggregate Portfolios</del>	<del>5% of portfolio value</del>
Maximum Notional Uncovered Sold Puts	Passives	5% of portfolio value
	Small Cap Diversified	5% of portfolio value
	<del>Shareholder Opportunity</del>	<del>5% of portfolio value</del>
	<del>Global Sector Portfolios</del>	<del>5% of portfolio value</del>
	<del>Global Equity Concentrated</del>	<del>5% of portfolio value</del>
	<del>Merger Arb</del>	<del>5% of portfolio value</del>
	<del>Low Volatility Global Equity Sector Aggregate Portfolio</del>	<del>5% of portfolio value</del>
Maximum Cash	Passives	1% in unequitized cash
	Small Cap Diversified	5%
	<del>Shareholder Opportunity</del>	<del>10%</del>
	<del>Global Sector Portfolios</del>	<del>5%</del>
	<del>Global Equity Concentrated</del>	<del>5%</del>

PORTFOLIO ASSET CLASS CHARACTERISTIC	ASSET CLASS <sup>2</sup>	DISCUSSION TRIGGER
	<del>Low Volatility</del> Global Equity Sector Aggregate Portfolio	5%
<b>GOVERNMENT/CREDIT</b>		
<del>Minimum</del> Number of Issuers	Gov't/Credit	<del>20-200</del> 50
<del>Interest Rate Futures/Interest Rate Swaps Absolute Duration Contribution</del>	Gov't/Credit	<del>25% of Benchmark</del>
Maximum <del>Corporate</del> Industry Sector Exposure	Gov't/Credit	Greater of 10% or 3 x Benchmark
Ex Ante Tracking Error	Gov't/Credit	.34% - 1.01%
<del>Maximum Cash</del>	Gov't/Credit	<del>20%</del>
<b>GLOBAL BOND</b>		
<del>Interest Rate Futures/Interest Rate Swaps Absolute Duration Contribution</del>	Global Bond	<del>25% of Benchmark</del>
<del>Maximum Exposure to Individual Sovereign Issuer</del>	Global Bond	<del>40%</del>
<del>Ex Ante Tracking Error</del>	Global Bond	<del>.5% - 1.5%</del>
<del>Credit</del>	Global Bond	<del>Exposure to corporate credit securities (net CDX and cash bonds combined) exceeds 15% of the portfolio's market value (on a long or short basis)</del>
<b>PRIVATE MARKETS &amp; FUNDS ALPHA</b>		
Maximum Outside Developed Markets	Private Equity	15% of <del>Buyouts (Current and Legacy Portfolios)</del> <a href="#">score Private Equity Portfolio (excluding co-investments)</a>
		15% of Current Return Portfolio <a href="#">(excluding co-investments)</a>
<del>Maximum Venture Capital</del>	Private Equity	<del>15%</del>
<del>Minimum Buyouts (corporate</del>	Private Equity	<del>85%</del>

PORTFOLIO ASSET CLASS CHARACTERISTIC	ASSET CLASS <sup>2</sup>	DISCUSSION TRIGGER
<i>finance, special situation, mezzanine</i>		
Maximum Co-Investments	Private Equity	20% of <a href="#">Buyoutscore Private Equity Portfolio for Private Equity Co-Investments</a> <a href="#">20% of Current Return Portfolio for Current Return Co-Investments</a>
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 <sup>23</sup>	Private Equity	5% of <a href="#">Buyoutscore Private Equity Portfolio for Private Equity Co-Investments</a> <a href="#">5% of Current Return Portfolio for Current Return Co-Investments</a>
Minimum Funds	Private Equity	80% <a href="#">of aggregate Private Equity Portfolio</a>
Maximum Venture Capital Exposure	Venture Capital	Aggregate portfolio value not to exceed 25% of Private Equity and Private Debt Portfolio
Maximum Co-Investments in Venture Capital Portfolio	Venture Capital	8% of Venture Capital Portfolio (not including separate accounts) (guideline is 10%)
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%

<sup>3</sup> 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.

PORTFOLIO ASSET CLASS CHARACTERISTIC	ASSET CLASS <sup>2</sup>	DISCUSSION TRIGGER
Ex ante volatility range	Hedge Fund/Alpha	2.5% to 6.5%, measured with a trailing two <u>  </u> -year risk sampling period
Equity Delta to the S&P 500	Hedge Fund/Alpha	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 <u>  </u> -year risk sampling period
One <u>  </u> -year annual Conditional Value at Risk (CVaR)	Hedge Fund/Alpha	A targeted 95% one <u>  </u> -year annual CVaR of greater than 7% based on trailing two <u>  </u> -year risk sampling period

**APPENDIX 3 – ~~WRS INTERNAL~~ CTF and VTF BENCHMARKS <sup>1</sup>**

(as of ~~May~~February 1, ~~2017~~<sup>2019</sup>)

Core Trust Fund Benchmark <sup>2</sup>		
	Current Benchmark	
Global Equities	<del>50.04</del> 9% - <del>86</del> 87.8% MSCI World/ <del>46.1</del> Russell 2000/ <del>40.6.1</del> MSCI EM	- 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
Fixed Income	24.5% See Public Fixed Income benchmark <sup>4</sup>	
Inflation Protection	<del>14.5</del> 15.5% See Inflation Sensitive benchmark <sup>5</sup>	
Real Estate	8% NFI-ODCE <sup>6</sup>	
Private Equity/Debt	<del>89</del> % “Roll-up” of six component benchmarks <sup>7</sup>	
Multi Asset	4% See Multi Asset benchmark <sup>8</sup>	
Cash	( <del>9.10</del> %) 3-Month LIBOR + <del>40</del> 30bps	
Total	100%	

Variable Trust Fund Benchmark			
	Current Benchmark	As-of	Prior Benchmark
Domestic Equities	70% Russell 3000	07/01/2012	69% Russell 3000
International Equities	30% MSCI All Country World Index (ACWI) ex US <sup>3</sup>		30% MSCI All Country World Index (ACWI) ex US <sup>3</sup>
<del>Multi Asset</del>			<del>1%</del>
<b>Total</b>	<b>100%</b>		

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

<sup>1</sup> Refer to the Historical Benchmark Adjustments for additional background.

<sup>2</sup> The major asset class weights are established through the annual asset allocation exercise; Private Equity and Real Estate weights float between 5% and 11%. The Private Equity excess weights are taken from Public Equities, Real Estate excess weights are taken 50% from Public Equities and 50% from Fixed Income. Multi-Asset weights float between 1% and 7% with excess weights taken 50% from Public Equities and 50% from Fixed Income.

<sup>3</sup> MSCI effective 7/1/2009. Beginning 1/1/2010, the tax treatment of the MSCI benchmark updated to a custom net-of-tax benchmark based on SWIB-specific tax treatment.

<sup>4</sup> Public Fixed Income Benchmark (effective 1/1/2010, excludes TIPS): Fixed Blend of ~~six~~seven components

- ~~67.66~~9% Bloomberg Barclays Capital Govt/Credit
- ~~12%~~ Citigroup WGBI Unhedged (Net Tax)
- ~~5.5%~~ BofA Merrill Lynch US HY Index
- ~~5.5%~~ JPM EMBI Global Diversified
- ~~8.16~~1% Bloomberg Barclays US Treasuries
- ~~2.0~~0% Bloomberg Barclays US Treasuries Long
- ~~7.5%~~ BofA Merrill Lynch Corporate HY Ba/B Index
- ~~3.75%~~ JPM EMBI Global Diversified
- ~~3.75%~~ JPM GBI-EM Diversified

<sup>5</sup> Inflation Sensitive Benchmark: ~~(Effective 10/1/14): “Rollup” of Bloomberg Barclays Capital TIPS Index and S&P Dow Jones Commodity Index~~

<sup>6</sup> Real Estate Benchmark:

(Effective 1/1/13): 100% NFI-ODCE (NCREIF Fund Index – Open End Diversified Core Equity)

<sup>7</sup> Private Equity/Debt Benchmark:

Component one: Burgiss Global All Private Equity  
Component two: [“Rollup” of Burgiss US Buyout \(weighted vintage year\) and Western Europe Buyout with Equal Vintage Year Allocation](#)  
Component three: Burgiss Venture Cap (weighted vintage year)  
Component four: Burgiss Index (weighted vintage year)  
Component five: Credit Suisse Leveraged Loan Index + 1%  
Component six: Bloomberg Barclays Capital Duration-Adjusted Baa Corporate plus 20 basis points

<sup>8</sup> Multi Asset Benchmark:

~~65~~60% MSCI World [Custom Net](#)  
~~25~~40% Bloomberg Barclays Capital Govt/Credit  
~~10% Citigroup WGBI Unhedged (Net Tax)~~

<sup>9</sup> Beginning 1/1/2010, the tax treatment of the MSCI benchmark updated to a custom net-of-tax benchmark based on SWIB-specific tax treatment.



# Enterprise Risk Management: ERM Update

*Enterprise Risk*

*March 12, 2019*

# ERM Summary – March 12, 2019

## ➤ Key takeaways from the ERCC of 10/03/2018:

- **Compliance update** – Slight increase Q2 of personal trade requests, in general requests are lower than prior quarters due to changes made to SWIB's Personal Trade Approvals policy. Despite general decrease in personal trade requests from prior years, SWIB did have a rise in personal trade violations in 2017 and five employees with violations in the first and second quarters of 2018.
- **Risk Framework discussion** – Discussion on two key enhancements to the ERM risk framework – velocity and risk appetite. Also discussion around key enterprise risks at SWIB.
- **Annual Report on Internal Controls (AROIC)** – ERM prepared the 2017 AROIC as requested by the Department of Administration (DOA). This comes after a 3 year suspension from the requirement due to Peoplesoft implementation. For 2017, SWIB reported no material weaknesses in internal controls.
- Two key tasks assigned by the ERCC March 3, 2018: (i) Compliance to compile an inventory of SWIB policies and their respective owners, and (ii) ERM to poll senior managers on current top SWIB risks from their perspective.

## ➤ Update on key ERM activities for 2019:

### 1. Identification and capture of Risk Categories and Risk Areas across the Organization.

- Continue to update existing dashboard to incorporate the categories and risk areas.
- Development of a risk and controls database to capture risks, mitigations, controls and analytics.  
*Key takeaway - 92 risk areas identified across 20 risk categories throughout organization. 60% refresh of risk areas completed in 2018. Q1-Q2 2019 will target Operations and Technology group to establish robust controls and further identify risks to the group.*

### 2. Enhancements to the existing framework.

- Introduction of the concept of risk appetite, and incorporation of risk velocity in the overall ratings calculation.  
*Key takeaway - Initial classification of risk categories and their corresponding risk appetite on a 1-5 scale. Proposed change of weights in overall risk score from 60/40/0 to 50/40/10 (impact/likelihood/velocity)*

### 3. Join Business Process Management in Efforts to Identify Operations key Risks and Controls

- Work with Business Process team to identify risks and controls associated with Public Markets, Private Markets, Performance and Data Management  
*The Finlay Group wrapped up a deep dive into risk and control identification of processes within Operations group, Public Markets was completed using the PARC model end of 2018. Initial work in Performance, Private Equity and Data Management is underway. ERM is assisting in risk identification and mitigation of risks through the use of sound controls.*

### 4. Annual Report on Internal Controls (ARIOC)

- ERM is working to complete the 2018 ARIOC as requested by the Department of Administration (DOA). SWIB will report no material weaknesses in internal controls for 2018.

# Appendix

## *Enterprise Risk Management Update*

# ERM Dashboard

February 2019

Managing the External Environment				Managing the Assets				Managing the Organization				Managing the Strategy				
Risk Category	Prior*	Current*	Trend**	Risk Category	Prior*	Current*	Trend**	Risk Category	Prior*	Current*	Trend**	Risk Category	Prior*	Current*	Trend**	
<b>COMMUNICATIONS &amp; EXTERNAL RELATIONS</b> <b>Risk Areas</b> - Corporate Governance - Industry / External Surveys - Internal Communication - Media Relations - Public Relations - Reputational			➔	<b>INVESTMENT STRATEGY &amp; POLICY DESIGN</b> <b>Risk Areas</b> - Benchmarking - Investment Assumptions - Investment Strategy & Guidelines - New Strategy Design - Risk Budgeting			➔	<b>BUSINESS CONTINUITY</b> <b>Risk Areas</b> - Planning & Testing - Disaster Recovery			➔	<b>DATA MANAGEMENT</b> <b>Risk Areas</b> - Data Governance - Data Infrastructure - Data Quality				➔
<b>PHYSICAL SECURITY &amp; INFRASTRUCTURE</b> <b>Risk Areas</b> - Facilities Management - Health & Safety - Datacenter			➔	<b>INVESTMENT RISK MANAGEMENT</b> <b>Risk Areas</b> - Exposure Management - Portfolio Management - Investment Governance - Investment Monitoring - Investment Reporting - Liquidity Management - Transitioning & Rebalancing			➔	<b>INVESTMENT OPERATIONS &amp; CONTROLS</b> <b>Risk Areas</b> - Cash Management - Collateral Management - Investment Accounting (ABOR / IBOR) - Reconciliation Oversight - Trade Support			➔	<b>FINANCIAL SYSTEMS &amp; CONTROLS</b> <b>Risk Areas</b> - Accounts Payable - Budgeting & Forecasting - Cost Allocation & Analysis - Financial Accounting & Reporting - Performance Reporting - Procurement - Travel				➔
<b>MACRO / EMERGING / GEOPOLITICAL</b> <b>Risk Areas</b> - Cybersecurity - Senior Management Tenure - Spreadsheet / Model Management			➔	<b>INVESTMENT IMPLEMENTATION</b> <b>Risk Areas</b> - Asset Allocation - Investment Due Diligence - Research & Idea Generation - Transaction Execution - New Instrument Onboarding & Support			➔	<b>WORKFORCE</b> <b>Risk Areas</b> - Benefits - Compensation & Incentive Compensation - Employee Conduct - Hiring / Onboarding - Talent & Succession Planning - Termination / Separation			➔	<b>COMPLIANCE</b> <b>Risk Areas</b> - Ethics Policy - Investment Guidelines - Operating Guidelines - Regulatory Reporting				➔
<b>LEGISLATIVE / REGULATORY</b> <b>Risk Areas</b> - Delegated Authority - External Counsel - Legislative Relations - Records Retention			➔	<b>MARKET RISKS</b> NR NR <b>Risk Areas</b> - Counterparty - Credit - Currency - Inflation - Interest Rate			➔	<b>TECHNOLOGY &amp; SYSTEMS MANAGEMENT</b> <b>Risk Areas</b> - Business Systems Management - Design, Development, & Testing - Information Security - Infrastructure Management			➔	<b>THIRD-PARTY STAKEHOLDER</b> <b>Risk Areas</b> - Business Management - Critical Vendor - Relationship Management - Vendor Performance				➔
			➔				➔				➔	<b>FRAUD DETECTION &amp; PREVENTION / FIDUCIARY</b> <b>Risk Areas</b> - Contract Management - External Audit - Fiduciary Duty - Insurance / Indemnification - Internal Audit - Internal Control Framework - Legal Malpractice				➔

\* Prior and current risk ratings result from one or a combination of evaluation approaches and are based on residual scores (i.e., after mitigations and controls are considered).  
 \*\* Trend indicates ERM's projection of category rating based on expected changes to processes, material and relevant information, and/or events that impact enterprise risks.

RISK RATINGS	
Critical	Low
High	Negligible
Moderate	Not Rated

Trends	
Increasing	↗
No Change	➔
Decreasing	↘

# Risk Register

ERM RISK REGISTER			Top 5 risk categories by average residual scores		As of 02/15/2019	
ID	Risk Category	Risk Description	Related Risk Areas	Res. Rati	Tre nd	Comments
1	Communications	<b>Communication Risks</b> are risks that impact SWIB's reputation, and public relations.	-Corporate Governance -Industry/External Surveys -Internal Communications -Media Relations -Public Relations -Reputational	3.06	↓	<ul style="list-style-type: none"> <li>*Trustees are not aware of major SWIB news announcement before staff releases it to the media (e.g. performance returns, incentive compensation, etc.)</li> <li>*Executive Director is not aware of public inquiry about a sensitive topic or is not consulted before SWIB responds.</li> <li>*Sensitive information is publicly disclosed without appropriate approval or by unauthorized staff.</li> <li>*Open records requests are not handled appropriately by authorized staff in a timely manner.</li> <li>*SWIB fails to respond to misleading, inaccurate or adverse media exposure.</li> <li>*Staff presentation materials contain incorrect, inconsistent and/or inappropriate information.</li> <li>*Sensitive or confidential information is publicly released as part of a survey response.</li> <li>*SWIB casts proxy votes in a manner not consistent with both Board-approved voting guidelines and with IB 2.03 (Wisconsin Administrative Code.)</li> </ul>
2	Investment Implementation	<b>Investment Implementation Risks</b> include risks that impact valuation of SWIB assets, cash flows in or out of SWIB, incorrect tracking on returns, and inadequate separation of responsibilities.	-Asset Allocation -Investment Governance -Investment Monitoring -Investment Reporting -Liquidity Management -Transitioning & Rebalancing -Portfolio Management	2.86	→	<ul style="list-style-type: none"> <li>*Investments are incorrectly valued on SWIB books</li> <li>*Inadequate or ineffective segregation of duties between operations responsibilities (i.e., wire instructions, reconciliation, monitoring, etc.)</li> <li>*Portfolio's return does not track the index's return.</li> <li>*Large cash flows into or out of the portfolio.</li> </ul>
3	Investment Operations & Controls	<b>Investment Operations &amp; Controls Risks</b> are risks that may impact SWIB's investment control framework to effectively manage and oversee performance measurement and investment operations processes.	-Cash Management -Collateral Management -Investment Accounting (ABOR/IBOR) -Reconciliation Oversight -Trade Support	2.8	→	<ul style="list-style-type: none"> <li>*Custodian beginning of day security and currency positions are incorrect and loaded into OMS.</li> <li>*OTC Option trade is sent to BNYM with incorrect trade details.</li> <li>*NDF FX trade released in matching system to market with full settlement instructions.</li> <li>*BNY Mellon Asset Servicing inputs payables/receivables incorrectly.</li> <li>*Time weighted return calculations provided by BNYM are inaccurate (e.g., not adjusted for significant cash flows, incorrectly adjusted, etc.)</li> <li>*Time weighted return calculations provided by BNYM are incorrectly adjusted by custodian for significant cash flows.</li> <li>*Calculation of current month NAVs incorrect (i.e.: transactions improperly included or excluded from real estate database valuation report). Timing risk - this would be detected/corrected at QE via a recon between Courtland, audited statements, and the GP's statements.</li> </ul>
4	Compliance	<b>Compliance Risks</b> are risk that include Investment and operating guidelines, policy and procedure stewardship and regulatory reporting.	-Ethics Policy -Investment Guidelines -Operating Guidelines -Regulatory Reporting	2.79	↓	<ul style="list-style-type: none"> <li>*Ethics training is not sufficient</li> <li>*Staff use material nonpublic information for trading activities in personal portfolios (i.e., insider trading, front running, etc.)</li> <li>*Culture &amp; polices fail to promote integrity &amp; reporting.</li> <li>*Failure to monitor &amp; test Investment Guidelines accurately, effectively &amp; timely.</li> <li>*Appropriate agreements (e.g., ISDA, CSA, etc.) with the counterparty not in place.</li> <li>*Collateral reinvested or for assets loaned fails to meet SWIB's investment guidelines requirements.</li> </ul>
5	Technology & Systems Management	<b>Technology &amp; Systems Management Risks</b> include system management, security both internal and external, management of SWIB's information infrastructure, and the development/design of systems at SWIB.	-Business System Management -Design, Development & Testing -Information Security -Infrastructure Management	2.3	↓	<ul style="list-style-type: none"> <li>*Risks that the combination of project work, post deployment work and production support will have an effect on staff morale, health and stress levels, as well as position vacancies over time.</li> <li>*Staff is not fully prepared to take over the more technical/admin tasks required to support the system independently.</li> <li>*Portfolio monitoring capabilities are interrupted or lost due to Barclays POINT no longer available (2018). Failure to develop and implement an alternative plan.</li> </ul>

## **New and Amended Contracts Approved October-December 2018**

### **New Contracts**

#### **Adeptyx Consulting**

An Adeptyx Consulting investment-related resource was retained to provide reporting business analyst services. The resource will be on-site for 6 months, at a cost of \$204,800.

#### **Gartner Inc.**

Gartner Inc.'s subscription, which provides proprietary investment research specializing in technology industry analysis and forecasts, was purchased at an annual cost of \$55,200.

#### **Levr Technology Inc.**

A Levr Technology Inc. investment-related resource was retained to provide business intelligence Tableau consulting services. The resource will be on-site for 3 months, at a cost of \$81,000.

#### **LionPoint Group**

Three LionPoint Group investment-related resources were retained to facilitate the implementation of the eFront platform. The project will last 26 weeks, at a cost of \$411,600 for the three resources.

#### **TapFin Process Solutions**

A TapFin Process Solutions Systems Engineer was retained to provide infrastructure support for the information technology division. The resource will be on-site for 4 months, at a cost of \$40,960.

### **Amended Contracts/Extensions**

#### **C&A Consulting**

- One consultant extended through 12/31/2018 at a cost of \$189,210.

#### **Levr Technology Inc.**

- One consultant extended through 12/31/2018 at a cost of \$62,000.

#### **Systems Accountants**

- One consultant extended through 06/30/2019 at a cost of \$52,000.

#### **The Bachrach Group**

- Two consultants extended through 12/31/2018 at a cost of \$139,920.

#### **The Finlay Group**

- One consultant extended through 02/15/2019 at a cost of \$119,600.

#### **V-Soft Consulting Group Inc.**

- One consultant extended through 01/31/2019 at a cost of \$52,500.

Note: the dollar amounts listed above for consultants represent the estimated total contract costs and may not reflect actual costs incurred. For example, estimated and actual costs may differ due to variances in actual hours worked by consultant, travel expenses, etc.



February 13, 2019

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

Representative John Nygren, Co-Chair  
Joint Committee on Finance  
P.O. Box 8953  
Madison, WI 53708-8953

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

Representative Samantha Kerkman, Co-Chair  
Joint Legislative Audit Committee  
P.O. Box 8952  
Madison, WI 53708-8952

Secretary Joel Brennan  
Department of Administration  
P.O. Box 7864  
Madison, WI 53707-7864

Dear Senator Darling, Senator Cowles, Representative Nygren, Representative Kerkman, and Secretary Brennan:

State statutes require the State of Wisconsin Investment Board (SWIB) to submit a report on all expenses charged to the trust funds under management during the prior calendar quarter and on the number of full-time equivalent positions created or abolished during the quarter<sup>1</sup>. The information contained in this report is for the quarter ending December 31, 2018.

**Total Cost of Management – 4th Quarter 2018**

SWIB Cost of Management Summary	1st Quarter 2018 Cost	2nd Quarter 2018 Cost	3rd Quarter 2018 Cost	4th Quarter 2018 Cost	One-year Ending 12/31/2018	% of Costs
<b>Internal Operating Costs:</b>						
Agency Operating Expenses	\$ 9,049,543	\$ 22,633,641	\$ 7,526,336	\$ 7,774,386	\$ 46,983,906	10.4%
Custodial, Investment Operations & Banking Fees	\$ 1,415,605	\$ 1,633,565	\$ 1,669,753	\$ 1,283,191	\$ 6,002,114	1.3%
Legal Fees	\$ 121,492	\$ 277,413	\$ 563,292	\$ 672,980	\$ 1,635,177	0.4%
Investment Research & Consulting Fees	\$ 6,970,437	\$ 8,061,514	\$ 6,495,458	\$ 8,533,239	\$ 30,060,648	6.7%
<b>Total Internal Operating Costs</b>	<b>\$ 17,557,077</b>	<b>\$ 32,606,133</b>	<b>\$ 16,254,839</b>	<b>\$ 18,263,796</b>	<b>\$ 84,681,845</b>	<b>18.8%</b>
<b>External Management Fees:</b>						
Real Estate Advisory/Asset Management	\$ 12,372,631	\$ 12,247,263	\$ 12,598,570	\$ 13,033,794	\$ 50,252,258	11.1%
Private Equity Management	\$ 34,267,390	\$ 35,991,714	\$ 33,854,190	\$ 37,166,487	\$ 141,279,781	31.3%
Public Market Separate Accounts	\$ 10,530,180	\$ 4,286,717	\$ 7,911,602	\$ 10,076,829	\$ 32,805,328	7.3%
Public Market Commingled Accounts	\$ 47,645,208	\$ 30,741,083	\$ 40,189,302	\$ 23,138,702	\$ 141,714,295	31.4%
<b>Total External Management Fees</b>	<b>\$ 104,815,409</b>	<b>\$ 83,266,777</b>	<b>\$ 94,553,664</b>	<b>\$ 83,415,812</b>	<b>\$ 366,051,662</b>	<b>81.2%</b>
<b>Total Cost of Management</b>	<b>\$ 122,372,486</b>	<b>\$ 115,872,910</b>	<b>\$ 110,808,503</b>	<b>\$ 101,679,608</b>	<b>\$ 450,733,507</b>	
Average Assets Under Management (in billions)	\$ 116.6	\$ 116.1	\$ 118.4	\$ 109.7	\$ 115.2	
<b>Cost in Basis Points (all trust funds)</b>						<b>39.1</b>

<sup>1</sup>Wisconsin Statutes Section 25.17 (13m): All investment-related expenses for the WRS Trust Funds, State Investment Fund, State Life Insurance Fund, Historical Society Endowment Fund, Injured Patients and Families Compensation Fund, UW Trust Fund and EdVest Fund.

SWIB's total costs, including both internal operating and external management costs, are charged to the trust funds under management. Over a one-year period ending December 31, 2018, SWIB's total cost of management was 39.1 basis points (0.39%) or 39 cents for every \$100 managed.

To reduce external asset management costs and increase net investment returns, SWIB continues to build internal resources to be able to manage assets internally where it makes sense to do so. For example, as you can see in the table below, managing public market asset classes internally is more cost effective than using external asset management.

### Internal vs External Investment Management

Portfolio	SWIB Internal Cost (Basis Points)	CEM* Peer Median External Management Costs (Basis Points)	Multiple
<b>Active Management</b>			
Global Large Cap Equity	10.7	42.4	4.0X
US Small Cap Equity	17.0	65.5	3.8X
US Fixed Income	7.5	13.9	1.9X
Global Fixed Income	8.6	39.9	4.6X
<b>Passive Management</b>			
US Large Cap Equity	0.7	0.9	1.3X
International (EAFE) Equity	0.8	2.2	2.8X
Fixed Income - Inflation Indexed	0.5	1.4	2.8X

External Management costs are 1.3 – 4.6 times the cost to manage these portfolios internally  
 CEM\* Benchmarking, Inc. benchmarks investment costs for pension funds (2017)  
 Basis Point = 1 basis point equals 0.01%; For example, 100 basis points = 1.0%

For the year ending December 31, 2018, external investment management fees represented 81.2% of SWIB's total costs of management and 41.5% of assets under management, while SWIB's internal operating expenses represented 18.8% of costs and 58.5% of assets (see Attachment A).

Assets Under Management & FTE		
	9/30/2018	12/31/2018
Internal Management	59.0%	58.5%
External Management	41.0%	41.5%
SWIB Positions – FTE	203.00	203.00
Total SWIB Positions	203.00	203.00

Attachment B and C provides details of services and related quarterly costs.

Internal operating costs include salary and fringe benefits for internal staff, technology, research and market data services, asset custody fees, legal services, and investment consulting. External management fees make up the largest component of the trust funds' costs. This category includes fees paid to asset managers for public market, private market, and real estate asset management.

As new investment strategies are implemented and as markets change, SWIB will continue to evaluate the most efficient means to manage the trust fund assets. We hope this report provides a comprehensive representation of the costs SWIB incurs to manage the assets of the trust funds including the Wisconsin Retirement System. Please contact me if you have any questions or comments about the report.

Sincerely,



David Villa  
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

Wisconsin Retirement System (WRS)	3/31/2018		6/30/2018		9/30/2018		12/31/2018	
	Amount (in millions)	Percent						
Internally Managed	\$63,541	59.3%	\$63,067	58.9%	\$62,528	57.2%	\$56,876	56.5%
Externally Managed Dedicated Accounts	16,733	15.6%	17,268	16.1%	19,563	17.9%	18,004	17.9%
Externally Managed Commingled Accounts	26,848	25.1%	26,699	24.9%	27,238	24.9%	25,711	25.6%
1. Passive Index Funds	8,239	7.7%	7,744	7.2%	7,777	7.1%	6,600	6.6%
2. Enhanced Index Commingled Funds	0	0.0%	0	0.0%	0	0.0%	0	0.0%
3. Limited Partnerships	12,582	11.7%	12,974	12.1%	13,333	12.2%	13,591	13.5%
4. Actively Managed Commingled Accounts	6,027	5.6%	5,982	5.6%	6,128	5.6%	5,520	5.5%
<b>TOTAL WRS Assets</b>	<b>\$107,121</b>	<b>100.0%</b>	<b>\$107,034</b>	<b>100.0%</b>	<b>\$109,329</b>	<b>100.0%</b>	<b>\$100,591</b>	<b>100.0%</b>

State Investment Fund - Internally Managed	\$7,544		\$7,185		\$7,191		\$7,191	
Various Funds Internally Managed	\$133		\$117		\$115		\$116	
Separately Managed Funds Externally Managed*	\$1,765		\$1,783		\$1,810		\$1,764	

<b>Total Assets Under Management</b>	<b>\$116,563</b>		<b>\$116,119</b>		<b>\$118,446</b>		<b>\$109,663</b>	
<b>Total Internal Management</b>	<b>\$71,218</b>	<b>61.1%</b>	<b>\$70,369</b>	<b>60.6%</b>	<b>\$69,834</b>	<b>59.0%</b>	<b>\$64,183</b>	<b>58.5%</b>
<b>Total External Management</b>	<b>\$45,345</b>	<b>38.9%</b>	<b>\$45,750</b>	<b>39.4%</b>	<b>\$48,611</b>	<b>41.0%</b>	<b>\$45,480</b>	<b>41.5%</b>

\*The UW System Long Term Fund was not previously included in the Separately Managed Funds total. It was funded in March 2018, and the previous quarter numbers have been amended back to the 1st quarter of 2018. Quarter end market value ranged between \$404 and \$441 million. Including this fund decreased total internal management by approximately 0.2% each quarter.

STATE OF WISCONSIN INVESTMENT BOARD  
Expenses for All Funds Under Management  
Quarter Ending December 31, 2018

<u>EXPENSE CATEGORY</u>	<u>SERVICE PROVIDED</u>	<u>EXPENSES</u>
<b><u>Internal Operating Expenses</u></b>		
Staff Compensation	Staff Compensation	5,483,248
Fringe Benefits	Fringe Benefits	1,299,602
Equipment, Supplies & Services	General Supplies & Services	991,536
<b>Total Internal Operating Expenses ***</b>		<b>\$ 7,774,386</b>
<b><u>Custodial, Investment Operations and Banking Fees</u></b>		
Bankers Bank	Custodial and Banking Fees	5,000
BNY Mellon Asset Servicing - Custody	Master Custody Services	362,753
BNY Mellon Asset Servicing - Investment Operations	Investment Operating Services	915,392
US Bank	Banking Fees	46
<b>Total Custodial, Investment Operations and Banking Fees</b>		<b>\$ 1,283,191</b>
<b><u>Legal Fees</u></b>		
Chapman & Cutler LLP	Legal Work for Investment Strategies	225,428
Cox Castle & Nicholson LLP	Legal Work for Investment Strategies	59,323
DLA Piper LLP (US)	Legal Work for Investment Strategies	92,660
Eversheds Sutherland (US) LLP	Legal Work for Investment Strategies	4,425
Faegre Baker Daniels LLP	Legal Work for Investment Strategies	3,026
Godfrey & Kahn SC	Legal Work for Investment Strategies	8,687
Proskauer Rose LLP	Legal Work for Investment Strategies	18,361
Purrington Moody Weill LLP	Legal Work for Investment Strategies	25,996
Quarles & Brady	Legal Work for Investment Strategies	83,754
Reinhart Boerner Van Deuren SC	Legal Work for Investment Strategies	81,389
Robins Kaplan LLP	Legal Work for Investment Strategies	375
Rutherford & Bechtold LLC	Legal Work for Investment Strategies	4,400
Shearman & Sterling LLP	Legal Work for Investment Strategies	60,760
Sidley Austin (Domestic)	Legal Work for Investment Strategies	3,240
von Briesen & Roper SC	Legal Work for Investment Strategies	1,156
<b>Total Legal Fees</b>		<b>\$ 672,980</b>
<b><u>Investment Counsel</u></b>		
Activist Insight	Research and Data Services	8,950
Adeptyx Consulting	Investment Consulting	82,576
Advent Software Inc	Research Management System	57,996
Aksia LLC	Hedge Fund Investment Consulting	175,000
Ananth Seshadri	Economic Consulting Services	30,000
B Riley FBR Inc	Investment Research	13,143
Barrington Research Associates Inc	Investment Research	2,000
BCA Research Inc	Global & Domestic Fixed Income Strategy Research	25,500
Berenberg	Investment Research	45,702
Bloomberg Finance LP	Market, Company, Industry & Benchmark Information	624,400
BNY Mellon Asset Servicing - Eagle/Pace	Investment Consulting Services	85,750
Board of Trustees of the Leland Stanford Junior University	Research and Data Services	35,000
Boenning & Scattergood Inc	Investment Research	5,035
Bruce Hansen	Economic Consulting Services	2,500
C&A Consulting	Investment Consulting	120,304
Callan Associates Inc	Investment Consulting & Performance Benchmarking	6,250
Canaccord Genuity	Investment Research	12,000
Carnegie Inc	Investment Research	1,000
CEM Benchmarking Inc	Investment Cost Analysis	70,000
CFRA Research	Investment Research	20,000
Charles River System Inc	Portfolio Management Trading Software & Services	437,968
CIBC World Markets Inc	Investment Research	5,886
Citisoft Inc	Enterprise Investment Management System Consulting	1,058,018
CL King & Associates	Investment Research	5,000
Cornerstone Macro LLC	Macro Economic Research	59,007
CoStar Portfolio Strategy	Real Estate Consulting & Research Services	27,500
Council of Institutional Investors	Corporate Governance	30,600
Cowen and Company LLC	Investment Research	9,488
Craig-Hallum Capital Group	Investment Research	15,547
Crane Data LLC	Research and Data Services	3,000
Cutter Associates	Investment Organization and Systems Consulting	17,500
DA Davidson & Co	Investment Research	12,549
Delta Strategy Group	Investment Research	5,250
Depository Trust and Clearing Corp	Research and Data Services	3,000
Dow Jones News Service	Company and Industry News Services	42,857
eFront Financial Solutions Inc	Real Estate Portfolio Management Services	317,141
Empirical Research Partners LLC	Investment Research	83,210
Energy Aspects LTD	Investment Research	12,500
Euromonitor International	Research and Data Services	24,868

EXPENSE CATEGORYSERVICE PROVIDEDEXPENSES

Evercore Group LLC	Investment Research	93,118
Exane Inc	Investment Research	57,499
FactSet Research Systems Inc	Financial & Economic Database	765,329
Fitch Solutions Inc	Credit Rating Services	43,225
FTSE Fixed Income LLC	Real Time Index Data	35,370
Furey Research Partners LLC	Small Cap Research	16,000
Fusion Trading	Research and Data Services	201
Goodbody	Investment Research	4,292
Green Street Advisor	Real Estate Analytics	16,250
Guggenheim Securities LLC	Investment Research	32,832
Haver Analytics	Global Macroeconomic Research	18,200
Infogix	Investment Data Glossary	10,417
Institutional Limited Partners Association	Private Equity Research	5,000
Institutional Shareholder Services Inc	Proxy Voting Analysis	144,197
International Swaps and Derivatives Assn	Derivative Industry Research	12,300
ITG Solutions Network Inc	Trading Transaction Cost Analysis	15,000
Jefferies Research Services LLC	Investment Research	39,765
Keefe Bruyette & Woods (KBW)	Investment Research	15,651
KeyBanc Capital Markets Inc	Investment Research	29,955
Keystone Consulting Inc	Investment Information Technology Consulting Services	204,802
Leerink Partners LLC	Investment Research	15,118
Levr Technology Inc	Investment Information Technology Consulting Services	79,096
Liberum Capital Inc	Investment Research	17,879
LionPoint Group	Investment Consulting	45,272
Longbow Securities LLC	Investment Research	9,465
Macquarie Capital (USA) Inc	Investment Research	46,683
Mainfirst Securities US Inc	Investment Research	23,526
Markit NA	MarkitEDM Software & Implementation Services	159,931
Markit-EDM Limited	Investment Consulting	15,000
McLagan Partners Inc	Investment Compensation Data and Analysis	35,000
Mediobanca Securities USA LLC	Investment Research	3,000
Merrill Lynch (Bank of America)	Investment Research	46,635
Moodys Analytics	Economic, Currency & Bond Analysis	28,554
Morningstar Inc	Industrial Sector Market Research & Analysis	7,900
MSCI Inc - Risk Metrics Solutions	Research and Data Services	355,925
MUFG Securities America	Investment Research	36,371
National Conference on Public Employee Retirement Systems	Investment Research	4,000
Ned Davis Research Inc	Investment Research	9,900
Needham & Company LLC	Investment Research	15,082
NEPC LLC	Investment Consulting	100,000
Noble Capital Markets Inc	Investment Research	5,808
Novus Partners Inc	Profit & Loss Analytics System	47,025
Nuware Technology Corp	Investment Information Technology Consulting Services	308,488
NYSE Market Inc	New York Stock Exchange Data	6,872
Omgeo LLC	Post Trade Settlement Information	485
Oppenheimer & Co Inc	Investment Research	2,743
Options Price Reporting Authority	Quote System for Options Market	2,142
Pac-Invest	Research and Data Services	10,500
Pension Real Estate Association	Real Estate Investment Research	330
Piper Jaffray & Co	Investment Research	15,911
Redburn Europe Limited	Investment Research	50,332
Renaissance Macro Research	Macro Economic Research	18,195
Responsible Investor	Research and Data Services	457
Robert W. Baird & Co.	Investment Research	71,586
Russell Investment Group	Index Data	8,151
Seaport Global Securities LLC	Research and Data Services	2,340
SEB Securities Inc	Investment Research	13,000
Sharp Decisions Inc	Investment Information Technology Consulting Services	179,786
Sidoti & Company LLC	Investment Research	6,319
SMBC Nikko Securities America, Inc.	Investment Research	5,000
SOP Advisors LP	Investment Research	5,000
Standard & Poors	Industry & Corporate Research	15,425
Stephens Inc	Investment Research	26,470
StepStone Group	Private Equity Consulting	555,445
Stifel Nicolaus & Company Incorporated	Investment Research	47,817
Strategic Economic Decisions Inc	Investment Research Reports	12,500
SunTrust Robinson Humphrey Inc	Investment Research	12,399
SystemsAccountants	Investment Consulting	41,214
TD Securities (USA) LLC	Investment Research	9,705
Telsey Advisory Group	Consumer Sector Research	37,500
The Bachrach Group	Investment Consulting	211,250
The Benchmark Company LLC	Investment Research	6,000
The Finlay Group	Investment Consulting	244,600
The Leuthold Group LLC	Broad Based Market Research	8,107
Thomson Reuters (Markets) LLC	Research Pricing (Autex, Baseline, FirstCall)	12,615
Toronto Stock Exchange	Market Data	8,189
Trade Alert LLC	Market Data	1,545
TradeWeb	On-Line Fixed Income Trading Services	9,000



EXPENSE CATEGORYSERVICE PROVIDEDEXPENSES

Clessidra SGR SPA	Private Equity Management Fees	8,396
Coller Capital	Private Equity Management Fees	210,178
Cortec Group	Private Equity Management Fees	417,260
Cressey & Company	Private Equity Management Fees	666,667
CVC Capital Partners	Private Equity Management Fees	721,358
ECM Equity Capital Management Gmbh	Private Equity Management Fees	131,676
EnCap Investments	Private Equity Management Fees	560,852
EQT Partners	Private Equity Management Fees	472,031
Excellere Capital Management	Private Equity Management Fees	420,388
Flexpoint Ford	Private Equity Management Fees	136,620
Fortissimo Capital	Private Equity Management Fees	176,899
Fortress Investment Group	Private Equity Management Fees	2,868
FountainVest Partners	Private Equity Management Fees	379,558
German Equity Partners	Private Equity Management Fees	226,974
Gilde	Private Equity Management Fees	300,243
Glendon Capital Management	Private Equity Management Fees	258,330
Gores Group	Private Equity Management Fees	90,542
Graphite Capital Management	Private Equity Management Fees	32,968
GSO Capital Partners	Private Equity Management Fees	406,953
GTCR	Private Equity Management Fees	1,018,737
Harvest Partners	Private Equity Management Fees	483,022
Hellman & Friedman Investors	Private Equity Management Fees	565,427
HgCapital	Private Equity Management Fees	323,904
Hudson Advisors	Private Equity Management Fees	36,619
Inflexion Private Equity Partners LLP	Private Equity Management Fees	1,225,585
Insight Equity	Private Equity Management Fees	99,064
JMI Equity	Private Equity Management Fees	359,350
Kohlberg Kravis Roberts & Co	Private Equity Management Fees	300,057
KPS Capital Partners	Private Equity Management Fees	125,000
Lake Pacific Partners	Private Equity Management Fees	81,698
Leonard Green & Partners	Private Equity Management Fees	576,405
Lightbay Capital	Private Equity Management Fees	250,000
Lindsay, Goldberg & Bessemer	Private Equity Management Fees	301,860
Merit Capital Partners	Private Equity Management Fees	290,497
Montefiore Investment	Private Equity Management Fees	161,516
Morgan Stanley	Private Equity Management Fees	(72,642)
New Capital Partners	Private Equity Management Fees	125,000
Oaktree Capital Management	Private Equity Management Fees	195,129
Old Lane	Private Equity Management Fees	19,944
Patria Investimentos	Private Equity Management Fees	252,054
Peninsula Capital Partners LLC	Private Equity Management Fees	389,228
Platte River Equity	Private Equity Management Fees	182,500
Pomona Capital	Private Equity Management Fees	(9,637)
Providence Equity Partners, Inc.	Private Equity Management Fees	1,008,253
Quantum Energy Partners	Private Equity Management Fees	218,748
Resource Capital Funds	Private Equity Management Fees	115,455
Ridgemont Partners	Private Equity Management Fees	365,427
Riverstone Holdings	Private Equity Management Fees	474,715
SAIF Partners	Private Equity Management Fees	135,699
Segulah	Private Equity Management Fees	(39,913)
Sentinel Real Estate Corporation	Private Equity Management Fees	125,000
Shamrock Capital Advisors	Private Equity Management Fees	500,000
Sheridan Production Partners	Private Equity Management Fees	354,000
StepStone Group	Private Equity Management Fees	54,337
Sterling Group	Private Equity Management Fees	552,118
Stone Point Capital LLC	Private Equity Management Fees	742,158
The Jordan Company LP	Private Equity Management Fees	525,807
TowerBrook Investors	Private Equity Management Fees	332,291
TPG Capital	Private Equity Management Fees	1,311,828
Triton	Private Equity Management Fees	143,188
TSG Capital Partners	Private Equity Management Fees	369,863
TSG Consumer Partners LLC	Private Equity Management Fees	970,260
Update Partners	Private Equity Management Fees	140,625
Venture Capital****	Private Equity Management Fees	3,424,193
Vista Equity Partners	Private Equity Management Fees	1,172,714
Warburg Pincus	Private Equity Management Fees	970,080
Waterland Private Equity	Private Equity Management Fees	1,737,599
Wayzata Investment Partners	Private Equity Management Fees	77,431
Wind Point Partners	Private Equity Management Fees	310,684
WP Global Partners Inc	Private Equity Management Fees	47,827
<b>Total Private Equity Management**</b>		<b>\$ 37,166,487</b>

Commingled Account Public Market Management Fees

AQR Capital	Public Market Management Fees	336,015
Arrowgrass Capital	Public Market Management Fees	(115,007)
Benefit Street Partners	Public Market Management Fees	(2,583,360)
BFAM Asian Opportunities Fund	Public Market Management Fees	969,773

<u>EXPENSE CATEGORY</u>	<u>SERVICE PROVIDED</u>	<u>EXPENSES</u>
Blackrock	Public Market Management Fees	560,227
Blue Mountain Capital Management	Public Market Management Fees	(933,686)
Bridgewater Associates	Public Market Management Fees	1,240,969
Capula Investment Management	Public Market Management Fees	1,493,358
Davidson Kempner Capital Management	Public Market Management Fees	(58,022)
DE Shaw & Co	Public Market Management Fees	3,779,166
Dorsal Capital Partners	Public Market Management Fees	(292,646)
Dyal Capital Partners	Public Market Management Fees	513,400
Efficient	Public Market Management Fees	146,312
Exoduspoint Capital Management	Public Market Management Fees	144,602
Graham Capital Management	Public Market Management Fees	889,941
Graticule Asset Management Asia	Public Market Management Fees	891,465
Highbridge Capital Management	Public Market Management Fees	(1,824,199)
Holocene Advisors Fund LP	Public Market Management Fees	1,139,871
King Street Capital Management	Public Market Management Fees	439,676
Los Angeles Capital	Public Market Management Fees	876,220
Marshall Wace	Public Market Management Fees	2,695,655
Nephilia Capital Ltd	Public Market Management Fees	82,533
Pharo	Public Market Management Fees	1,734,963
PIMCO	Public Market Management Fees	2,851,570
PSquared Asset Management	Public Market Management Fees	789,397
Scopia PX LLC	Public Market Management Fees	477,283
Senator Global Opportunity	Public Market Management Fees	455,268
Standish Mellon	Cash Management	51,432
Stone Milliner Asset Management	Public Market Management Fees	1,127,585
TCW	Public Market Management Fees	255,032
Tourbillion Global Equities LLC	Public Market Management Fees	213,609
Two Sigma	Public Market Management Fees	4,052,916
Wellington Trust Company	Public Market Management Fees	737,384
<b>Total Commingled Account Public Market Management Fees</b>		<b>\$ 23,138,702</b>
<b><u>Separate Account Public Market Management Fees</u></b>		
Acadian Asset Management	Public Market Management Fees	1,068,305
Alliance Bernstein	Public Market Management Fees	4,202,387
Blackrock	Public Market Management Fees	1,006,062
Dodge and Cox	Public Market Management Fees	480,997
Fidelity Investments	Public Market Management Fees	716,056
Loomis Sayles & Co	Public Market Management Fees	1,055,709
Parametric	Public Market Management Fees	347,870
Prudential Global Investment Management (PGIM)	Public Market Management Fees	8,437
Wellington Trust Company	Public Market Management Fees	1,191,006
<b>Total Separate Account Public Market Management Fees</b>		<b>\$ 10,076,829</b>
<b>Total Quarterly Charges to Funds</b>		<b>\$ 101,679,608</b>

\*Fees paid to fund managers are established as percentage of the capital committed. As assets in a fund are sold, the management fees paid are typically reimbursed from the profits of the fund.

\*\*Expenses for private equity management fees are estimated and adjusted annually based upon committed capital or assets under management, determined by management contract terms. Total committed capital includes management fees. All capital contributions to the limited partnership must first be returned to the limited partners before any incentive fees are paid to the general partner.

\*\*\*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.

\*\*\*\*Pursuant to Wisconsin Statute Section 25.184 Venture Capital investments are recorded in aggregate.

## Explanations 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 the 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.

*BNY Mellon:* Provides master custody 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 custodial contract with BNY Mellon, which serves as the official book of record for SWIB's accounting and performance measurement functions. BNY Mellon 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 has 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. These fees are distributed to the fund participants through the monthly SIF earnings process.

### **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. The Attorney General annually reviews and approves a list of law firms to provide investment legal services for SWIB.

### **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.

### **Private Equity & Real Estate Investment Management Services**

SWIB hires private equity and real estate advisors to assist with sourcing analysis, due diligence, and management of investments. SWIB also invests in funds, typically limited partnerships. Each fund either has a general partner or, for real estate, engages a fund manager with delegated authority to make real estate investments for the fund. Fees paid to fund managers are typically established as a percentage of the capital committed or assets under management. As assets in a fund are sold, the management fees paid typically are reimbursed from the profits of the fund.

### **Separate Account Public Market Management Fees**

External asset managers have been delegated authority within guidelines established by SWIB to determine investment strategy and purchase securities in SWIB's name under a separate and distinct account. Fees are typically assessed as a percentage of the market value of assets under management and in some cases fees are based on investment performance. Standish Mellon invests cash in international and global portfolios that has yet to be invested in stocks or bonds. Due to settlement times around the globe, these funds cannot be effectively managed in the State Investment Fund. The fees are negotiated as part of the custodial contract.

### **Commingled Account Public Market Management Fees**

SWIB has investments in a number of externally-managed funds which seek to replicate the returns of a particular public market index or seek to enhance the return from a particular public market index through the use of quantitative models or other strategies. SWIB's investments are commingled with other investors' and the underlying securities are owned in the name of the fund manager. Fees are typically based on a percentage of assets under management and may include other factors, such as performance. Hedge funds are included in this category as the invested assets are also commingled. Costs incurred from hedge fund investments consist of base fees and performance fees.

# Private Equity Commitments\*

*October 2018 – December 2018*

<i>Investment</i>	<i>Commitment (millions)</i>
Harvest VIII	\$75.0
Lindsay Goldberg V	\$100.0
ParkerGale	\$31.5
Triton V	€45.0
TSG 8	\$100.0
Udata Partners VI	\$75.0
Warburg Pincus Global Growth	\$100.0
Consumer Co-Investment	€20.0
Consumer Co-Investment	\$7.0

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

# Private Debt Investments/Commitments

*October 2018– December 2018*

<i>Investment</i>	<i>Commitment</i>
Hardwood Funding	\$5,000,000
Project Arrow Oak Creek CTL	\$11,000,000
QuadGraphics	\$1,500,000
Dairy Farmers of America	\$5,000,000
Fonterra Cooperative	\$5,000,000
<b>Total</b>	<b>\$27,500,000</b>

# Real Estate Commitments

*October 2018 – December 2018*

<i>Investment</i>	<i>Commitment (millions)</i>
Blackstone Real Estate Partners IX, LP	\$300.0
Wilson Blue Moon I, LLC	\$50.0
<b>Total</b>	<b>\$350.0</b>

# Funds Alpha Commitments\*

*October 1 2018 – December 31 2018*

<i>Investment</i>	<i>Commitment (millions)</i>
Pharo Trading	\$60M
Davidson Kempner	\$10M
Dyal Lion	\$18M
<b>Total</b>	<b>\$88M</b>

*\*Includes Hedge Funds and Beta One*