

MONTANA

BOARD OF INVESTMENTS

REGULAR MEETING OF THE
MONTANA BOARD OF INVESTMENTS
Zoom Meeting
April 20, 2021

COMMITTEE MEETINGS

- A. Audit Committee – Maggie Peterson, Chair** **9:30 AM**
1. Public Comment – *Public Comment on issues with Committee Jurisdiction*
 2. Approval of February 23, 2021, Committee Minutes
 3. Executive Director Comments
 4. Audit Committee Checklist
 5. Continuation of Operations Update – **Decision**
 6. Internal Control Policy Update – **Decision**
- B. Loan Committee – Jack Prothero, Chair** **10:00 AM**
1. Public Comment – *Public Comment on issues with Committee Jurisdiction*
 2. Approval of February 23, 2021, Committee Meeting Minutes
 3. Executive Director Comments
 4. In State Loan Requests – **Decision**
- C. Human Resource Committee – Terry Cohea, Chair** **10:30 AM**
1. Public Comment – *Public Comment on issues with Committee Jurisdiction*
 2. Executive Director Comments

BREAK **11:00 AM**

- Tab 1 CALL TO ORDER – Karl Englund, Chairman** **11:15 AM**
- A. Notice of Video Recording of Meeting
 - B. Roll Call
 - C. Public Comment – *Public Comment on issues with Board Jurisdiction*
 - D. Approval of the February 23-24, 2021, Meeting, and March 23, 2021, Special Meeting Minutes
 - E. Administrative Business
 1. Audit Committee Report - **Decisions**
 2. Loan Committee Report
 3. Human Resource Committee Report
 - F. Comments from TRS and PERS Board Members
 - G. Comments from Board Legislative Liaisons

- Tab 2 EXECUTIVE DIRECTOR REPORTS – Dan Villa** **11:30 AM**
- A. Member Requests from Prior Meeting
 - B. Monthly Snapshot
 - C. Monthly Website Traffic
 - D. Legislative Update
 - E. Administrative Rule Review - **Decision**

LUNCH **12:00 PM**

- Tab 5 INVESTMENT POLICY STATEMENTS – John Romasko, CFA** **1:00 PM**
- A. Trust Funds Investment Policy
 - B. Clark Fork River Reserve Investment Policy

Tab 6	WORK PLAN – Rande Muffick, CFA & Jason Brent, CFA, CAIA & Steve Strong	1:30 PM
	A. International Asset Class Review	
BREAK		2:45 PM
Tab 7	CAPITAL MARKET/ASSET ALLOCATION - RVK, Inc.	3:00 PM
RECAP OF STAFF TO DO LIST AND ADJOURNMENT – Karl Englund, Chairman		4:15 PM

MONTANA

BOARD OF INVESTMENTS

REGULAR BOARD MEETING MINUTES February 23-24, 2021

Call to Order

The Board of Investment's meeting was called to order by Chairman Karl Englund at 11:19 a.m., on Tuesday, February 23, 2021.

Attendance

Board Members Present: Chairman Karl Englund, Jack Prothero, Jeff Greenfield, Terry Cohea, Bruce Nelson, Diane Fladmo, Maggie Peterson, Mark Barry, Jeff Meredith

Legislative Liaisons Present: None

Board Staff Present: Dan Villa, Doug Hill, Sheli Jacoby, Lindsay Ford, Peggy MacEwen, April Madden, Jon Putnam, Kirsten Haswell, Julie Feldman, Rande Muffick, John Romasko, Savannah Morgan, Louise Welsh, Polly Boutin, Sam Holman, Thomas Winkler, Kelsey Gauthier, Michael Nguyen, Jason Brent, Ethan Hurley, John Carpenter, Dan Zarling, Emily Kovarik, Sue Tinsley, Tim House, Dan Whyte, Steve Strong, Eron Krpan, Teri Kolnik, Roberta Diaz, Tammy Lindgren, Mark Lodman

Interested Parties Present: Adam Rees – Fund Map; Mark Higgins, Becky Gratsinger, Jim Voytko – RVK; Jessica Blumberg – Department of Commerce, Joseph Schulman, Darren Smith, Lara Clarke – JP Morgan

February 23, 2021

Tab 1 CALL TO ORDER (08:00:00)

A. Notice of Video Recording (08:00:20)

Chairman Englund advised of audio and video recording of the meeting.

B. Introduction of new Board members (08:01:05)

C. Roll Call (08:00:31)

Roll was taken: nine Board members were present, forming a quorum.

D. Public Comment (08:06:50)

Chairman Englund asked for public comment. None was given.

E. Approval of Minutes (08:07:03)

November 19, 2020 Regular Board Meeting

Member Nelson moved to approve. Member Peterson seconded the motion which passed unanimously.

F. Administrative Business

1. Audit Committee Report (08:07:46)

Chair Peterson briefed the Board.

- Chair Peterson moved to accept the FY 2020 Financial Audit as presented. Member Greenfield seconded the motion which passed unanimously.

2. Loan Committee Report (08:11:01)

Chair Prothero briefed the Board.

3. HR Committee Report (08:12:52)

Chair Cohea briefed the Board.

G. Comments from TRS and PERS Board Members (08:14:00)

Member Greenfield and Member Peterson briefed the Board.

H. Comments from Board Legislative Liaisons (08:17:32)

None

I. Introduction of New Staff (08:18:11)

Executive Director Villa introduced new staff members Dan Whyte, Jeremy Ragar, and Peggy Saarela.

Tab 2 EXECUTIVE DIRECTOR REPORTS (08:25:24)

A. Member Requests or Follow up from Prior Meeting

Executive Director Villa briefed the Board.

B. Monthly Snapshot

Executive Director Villa briefed the Board.

C. Monthly Web Traffic

Executive Director Villa briefed the Board.

D. Disaster Recovery and Emergency Preparedness

Executive Director Villa briefed the Board.

E. Legislative Update

Executive Director Villa briefed the Board.

F. Administrative Rule Review

Executive Director Villa briefed the Board.

G. Custodial Bank RFP

Executive Director Villa briefed the Board.

Tab 3 MONTANA LOAN PROGRAM (08:58:53)

A. Commercial and Residential Portfolios Report

Doug Hill briefed the Board and answered questions.

Tab 4 BOND PROGRAM (09:09:55)

A. INTERCAP

Louise Welsh briefed the Board and answered questions.

1. Activity Report

2. Staff Approved Loans Report

B. 2021 INTERCAP Remarketing Update

Louise Welsh briefed the Board and answered questions.

Tab 5 INVESTMENTS – NEW COMMITMENTS

A. Public Asset Classes (09:13:53)

Rande Muffick and Jason Brent briefed the Board and answered questions.

B. Real Estate (09:28:00)

Ethan Hurley briefed the Board and answered questions.

Tab 6 WORK PLAN (9:45:37)

Kirsten Haswell and John Romasko briefed the Board and answered questions.

Tab 7 RVK, Inc. (10:47:30)

Mark Higgins, Becky Gratsinger, and Jim Voytko briefed the Board and answered questions.

February 24, 2021

RECONVENE AND CALL TO ORDER (08:00:00)

A. Notice of Video and Audio Recording of the Meeting (08:00:03)

Chairman Englund advised of audio and video recording of the meeting.

B. Roll Call (08:00:20)

Roll was taken: nine Board members were present, forming a quorum.

C. Public Comment (08:00:56)

Chairman Englund asked for public comment. None was given.

Tab 8 INVESTMENT UPDATE

A. CIO Update – Jon Putnam, CFA, FRM, CAIA (08:02:15)

Jon Putnam briefed the Board and answered questions.

B. Macro Attribution – Eron Krpan, CFA, CIPM (08:38:04)

Eron Krpan briefed the Board and answered questions.

C. Private Equity – Michael Nguyen (09:01:31)

Michael Nguyen briefed the Board.

D. Real Estate – Ethan Hurley, CAIA (09:12:11)

Ethan Hurley briefed the Board and answered questions.

E. Real Assets – Ethan Hurley, CAIA (09:26:01)

Ethan Hurley briefed the Board and answered questions.

F. Core Fixed Income – John Romasko, CFA (09:40:06)

John Romasko briefed the Board.

G. Non-Core Fixed Income – Rande Muffick, CFA (09:47:32)

Rande Muffick briefed the Board and answered questions.

H. Domestic Equity – Rande Muffick, CFA (09:52:58)

Rande Muffick briefed the Board and answered questions.

I. International Equity – Rande Muffick, CFA (10:05:33)

Rande Muffick briefed the Board and answered questions.

- J. STIP** – Kirsten Haswell (10:15:34)
Kirsten Haswell briefed the Board.
- K. State Fund** – John Romasko, CFA (10:17:12)
John Romasko briefed the Board and answered questions.
- L. Trust Funds Investment Pool** – John Romasko, CFA (10:21:42)
John Romasko briefed the Board and answered questions.

Tab 9 INVESTMENT POLICY STATEMENTS

- A. Greenway Trail Maintenance Fund** (10:25:41)
John Romasko briefed the Board and answered questions.
- Member Cohea moved to approve. Member Prothero seconded the motion which passed unanimously.
- B. Yellowstone Pipeline Cleanup Fund** (10:28:09)
John Romasko briefed the Board and answered questions.
- Member Barry moved to approve. Member Fladmo seconded the motion which passed unanimously.

Tab 10 FIDUCIARY DUTY OF BOARD AND STAFF

Deferred until the March 23, 2021 special Board meeting.

RECAP OF STAFF TO DO LIST AND ADJOURNMENT

Chairman Englund and Executive Director Villa listed items to recap.
Chairman Englund adjourned the meeting at 11:39 am.

MONTANA BOARD OF INVESTMENTS

APPROVE: _____
Karl J. Englund, Chairman

ATTEST: _____
Dan Villa, Executive Director

DATE: April 20, 2021

MONTANA

BOARD OF INVESTMENTS

SPECIAL BOARD MEETING MINUTES March 23, 2021

Call to Order

The Board of Investment's meeting was called to order by Chairman Karl Englund at 10:00 a.m., on Tuesday, March 23, 2021.

Attendance

Board Members Present: Chairman Karl Englund, Jack Prothero, Bruce Nelson, Jeff Greenfield, Diane Fladmo, Mark Barry, Jeff Meredith

Legislative Liaisons Present: None

Board Staff Present: Dan Villa, Doug Hill, Lindsay Ford, Peggy MacEwen, Jon Putnam, Kirsten Haswell, Julie Feldman, Savannah Morgan, Louise Welsh, Kelsey Gauthier, Jason Brent, Dan Whyte, Steve Strong, Eron Krpan, Teri Kolnik

Interested Parties Present: Lindsey Longwell, Jonathan Kowolik – RVK; Don Triveline – Palisade Capital Management

March 23, 2021

1. Notice of Video/Audio Recording (08:00:05)

Chairman Englund advised of audio and video recording of the meeting.

2. Roll Call (08:00:17)

Roll was taken: seven Board members were present.

3. Public Comment – *Public Comment on issues with Board Jurisdiction* (08:00:54)

Chairman Englund asked for public comment. There was none.

4. Administrative Rule Hearing RE: MAR Notice 8-97-100 (08:01:13)

Chairman Englund opened the hearing as the presiding officer and read the Notice of Function of the Administrative Rule Review committee as required.

Dan Whyte testified on behalf of the Board with respect to the proposed administrative rules. On behalf of Executive Director Villa and Board staff, Mr. Whyte recommended three items: require amendment of three rules; 18 rules to be repealed; and five rules to be transferred.

Chairman Englund opened the hearing for testimony. None was offered and the hearing was closed.

5. Request for Proposals – Custodial Bank – Decision

Executive Director Villa, Lindsey Longwell, and Jonathan Kowolik briefed the Board and answered questions.

Mark Barry moved to approve the Custodial Bank RFP as presented. Diane Fladmo seconded the motion which passed unanimously.

6. Fiduciary Duty Training – Dan Whyte, Esq

Dan Whyte presented his fiduciary training to the Board and answered questions.

7. Adjournment

Chairman Englund adjourned the meeting at 11:50 p.m.

MONTANA BOARD OF INVESTMENTS

APPROVE: _____
Karl J. Englund, Chairman

ATTEST: _____
Dan Villa, Executive Director

DATE: April 20, 2021

MONTANA

BOARD OF INVESTMENTS

TO: Members of the Board of Directors
FROM: Dan Villa, Executive Director
DATE: April 9, 2021
RE: April Executive Director's Report

A. Member Requests or Follow Up from Prior Meeting - none

B. Monthly Snapshot – attachment

C. Monthly Website Traffic:

The screenshot shows a 'Profile Snapshot' for AGF with the following summary metrics:

- 3,946 Visits
- 7,062 Pageviews
- 74.10% Bounce Rate
- 1:56:23 Engagement

Below the summary is a table of page performance data:

	Pages	Pageview	Unique Views	Landings	Exits	Time on Page
1	/	1,531	1,377	1,338	825	1:24:49
2	/2020meetings	641	620	572	595	01:33
3	/loanprograms	424	364	205	200	01:29
4	/meetings	398	298	130	214	02:44
5	/unifiedinvestments/quarterlyperformancereports	361	300	204	236	02:00
6	/investments	347	251	72	75	01:29
7	/stip	336	292	171	166	1:40:47
8	/annualreportsaudits	311	262	178	205	2:43:35
9	/intercap	242	209	136	143	43:08
10	/stip/dailyfactoryield	235	185	109	168	01:43

D. Legislative Update – attachment

The updated bill tracking sheet is attached to this memorandum as is our FY22-23 budget as currently approved.

E. Administrative Rule Review – **Decision**

No additional public comment was received following the Board's March 23 hearing. Staff recommends approval of the administrative rule revisions at this time.

Several members requested staff review and recommend any process changes to our administrative rule review process. Staff suggests that the Chief Legal Counsel be designated as the hearings officer and the Executive Director represent the BOI for the purposes of conducting the public hearings regarding amendments to Board

administrative rules. Staff would then present any public comment and response to public comment to the full Board under "Tab 2 - Executive Director Report". The Board would have full discretion on next steps which could include but are not limited to directing staff to revise the rules based on public comment, cancel any rule change, or votie to adopt the rules as proposed. Staff recommends that final adoption of any rule change should remain with the Board.

If this is acceptable to the Board, staff will prepare the necessary revisions to policy for your consideration at the June meeting.

F. Asset/Liability Study

Below is the timeline for the asset/liability studies of the Public Employee Retirement System and Teachers Retirement System.

RVK Asset/Liability Timeline

	Responsible Party	Proposed MBOI Timeline			
		Time to Complete	Cumulative Duration	Start	Finish
Receive Data	MBOI / MBOI Actuary			April 9	
ProVal Liability Programming	RVK Actuary	5 Weeks	5 Weeks	April 12	May 14
Review Liabilities	RVK / RVK Actuary	1 Week	6 Weeks	May 17	May 21
Review With RVK Actuary Compare To Valuation Resolve Discrepancies					
ProVal Modeling	RVK	2 Weeks	8 Weeks	May 24	June 4
Capital Market Deterministic Stochastic Logic Check Results					
Report Generation	RVK	3 Weeks	11 Weeks	June 7	June 25
Export Raw Data to Excel Excel Data Customization Deliverable Generation Generate and Assemble Data Template Outputs Draft Report Text Draft Conclusions/Executive Summary					
Asset Liability Team Review	RVK / RVK Actuary	1 Week	12 Weeks	June 28	July 2
RVK A/L Team RVK Consulting Actuary					
Client Service Team Review	RVK	1 Week	13 Weeks	July 5	July 9
Staff/Client Actuary Review	MBOI / MBOI Actuary	1 Week	14 Weeks	July 12	July 16
Deliver Final Study	RVK			July 22	
Present Study	RVK			August 10	



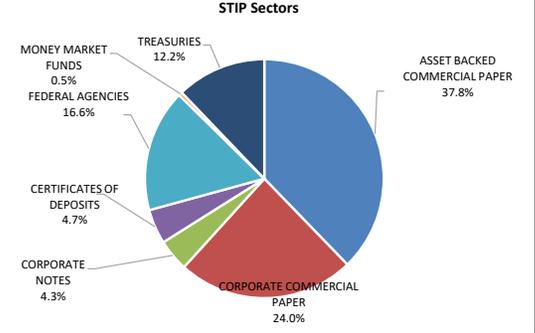
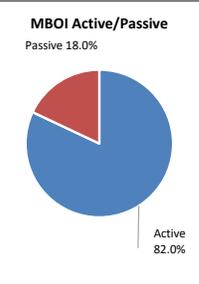
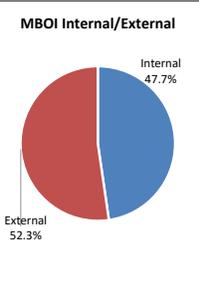
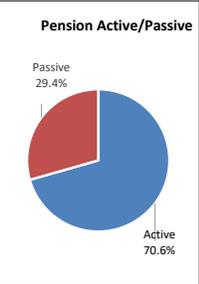
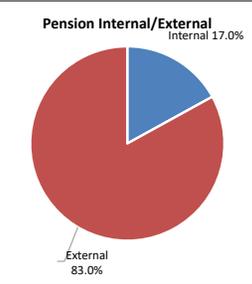
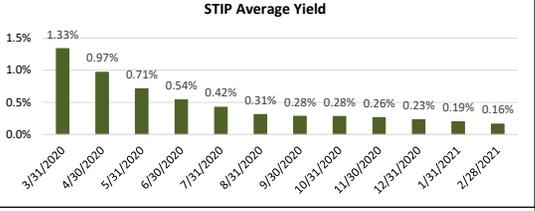
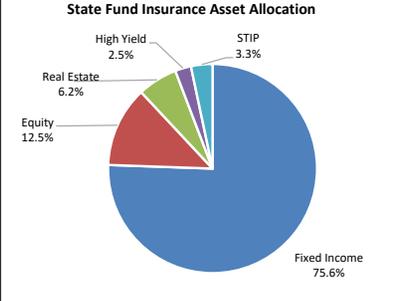
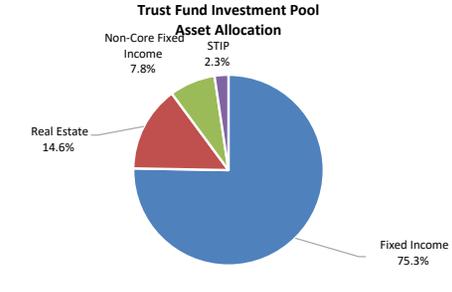
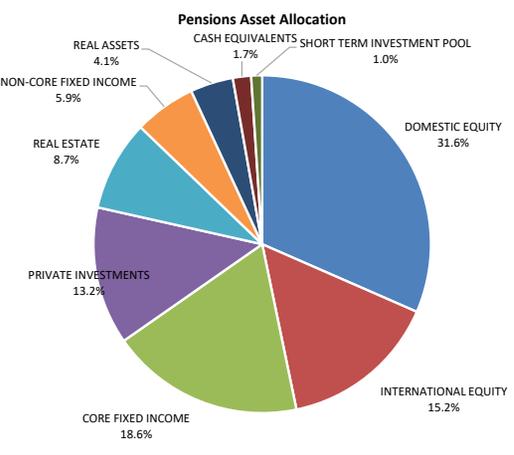
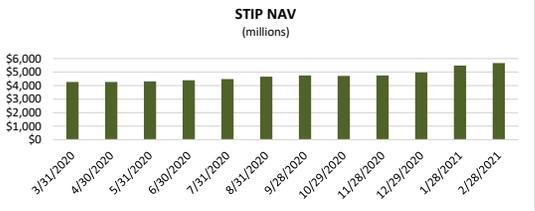
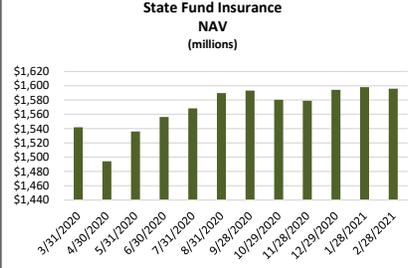
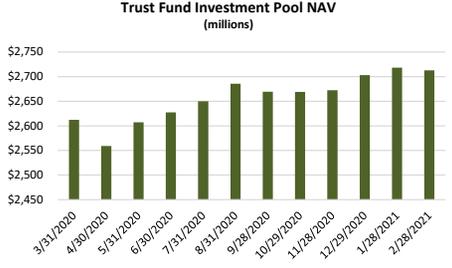
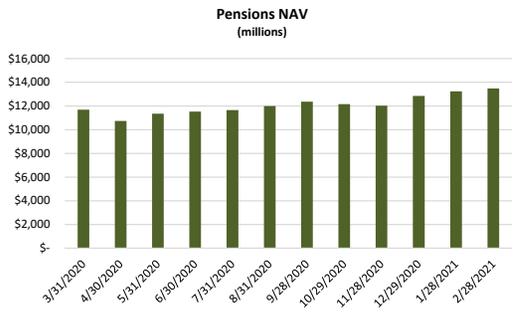
MBOI Snapshot

Asset Management View

2/28/2021 Unaudited

Assets Under Management \$23,042,654,156

Pensions	NAV	%	TFIP	NAV	%	State Fund	NAV	%	Other Fixed Income & Pending	\$	(361,590,179)
DOMESTIC EQUITY	\$ 4,253,100,111	31.6%	Fixed Income	\$ 2,015,322,305	75.29%	Fixed Income	\$ 1,200,008,444	75.56%			
INTERNATIONAL EQUITY	\$ 2,502,174,017	18.6%	Real Estate	\$ 389,966,865	14.57%	Equity	\$ 198,179,168	12.48%	STIP*	NAV	%
CORE FIXED INCOME	\$ 2,047,057,725	15.2%	Non-Core Fixed Income	\$ 208,769,352	7.80%	Real Estate	\$ 97,974,691	6.17%	ASSET BACKED COMMERCIAL PAPER	\$2,146,814,026	37.92%
PRIVATE INVESTMENTS	\$ 1,779,117,598	13.2%	STIP	\$ 62,802,023	2.35%	STIP	\$ 52,802,399	3.32%	CORPORATE COMMERCIAL PAPER	\$1,221,708,503	21.58%
REAL ESTATE	\$ 1,169,761,872	8.7%	Total	\$ 2,676,860,545	100.00%	High Yield	\$ 39,238,498	2.47%	FEDERAL AGENCIES	\$948,940,641	16.76%
NON-CORE FIXED INCOME	\$ 796,136,095	5.9%				State Fund Total	\$ 1,588,203,199	100.00%	TREASURIES	\$713,747,233	12.61%
REAL ASSETS	\$ 554,209,546	4.1%						CERTIFICATES OF DEPOSITS	\$328,369,740	5.80%	
CASH EQUIVALENTS	\$ 235,615,879	1.7%						CORPORATE NOTES	\$245,058,391	4.33%	
SHORT TERM INVESTMENT POOL	\$ 141,290,912	1.0%						MONEY MARKET FUNDS	\$56,078,302	0.99%	
Pensions Total	\$ 13,478,463,755	100.0%						STIP Total	\$5,660,716,836	100.00%	



Definition of NAV: Net Asset Value is the total value of the account including assets held, adjusted for payables, receivables and liabilities

(1) Other Holdings column on page two represents the value of securities, receivables, payables and liabilities that comprise the Net Asset Value for the asset owner.

*Difference of \$239,543,331 is attributable the portion of STIP held within CAPP (\$191,956,889) and TFIP (\$47,112,552) as a cash investment. Such value is represented in the NAV for the CAPP and STIP columns.

MONTANA

BOARD OF INVESTMENTS

TO: Members of the Board
FROM: John Romasko, Director of Fixed Income
DATE: April 20, 2021
RE: Proposed Changes for the Trust Funds Investment Pool

We are asking for two material changes to the TFIP Investment Policy Statement.

The first is to change the performance benchmark from the **Bloomberg Barclays US Aggregate Bond Index** to a blended index. The blended index is the weighted average of the index for each Asset Class. We have significantly increased the real estate and high yield asset class holdings in TFIP and will continue to increase real estate investments. A blended benchmark is a better comparison for the increasingly diverse holdings.

The second change is to clarify the policy statement for real estate investments. The changes make clear the allowance of Core Plus Real Estate and Real Estate Debt investments and the allowable leverage for each. Staff's intention is to build a stable portfolio of Real Estate assets that provide distributable income to participants. This is more effectively done with a diversified set of assets including Core Plus Real Estate and Real Estate Debt investments, that when aggregated, produce core like returns and distributions.

TRUST FUNDS INVESTMENT POOL INVESTMENT POLICY

Approved April 3, 2018

Last Revised ~~June 9, 2020~~ April 20, 2021

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1. Introduction:

The Trust Funds Investment Pool (TFIP) was created by the Board on October 1, 1995. The pool is designed to provide participants exposure to a portfolio of income-producing assets. The use of a commingled pool allows for simplified investing and accounting, broader diversification and thus less risk than would otherwise be available for individual participants. The TFIP invests directly in the underlying Asset Classes. Each Asset Class has an underlying set of investment objectives and investment guidelines. Each account participating in the TFIP is separately identified for accounting and record keeping purposes.

This policy is effective upon adoption and supersedes all previous Investment Policy Statement (IPS) related to the investment management of the TFIP.

2. Purpose:

The purpose of this policy statement is to provide a broad strategic framework for the TFIP investments under the guidance of the Montana Board of Investments.

3. Legal and Constitutional Authority:

Article VIII, Section 13, of the Montana Constitution requires that the Legislature provide for a Unified Investment Program for public funds. Section 17-6-201, Montana Code Annotated (MCA), established the Unified Investment Program, created the Montana Board of Investments (the "Board") and gave the Board sole authority to invest state funds, in accordance with state law and the state constitution.

Section 17-6-201(1), MCA requires the Board to operate under the "prudent expert principle," defined as:

- 1) "discharging its duties with the care, skill, prudence, and diligence, under the circumstances then prevailing, that a prudent person acting in a like capacity with the same resources and familiar with like matters exercises in the conduct of an enterprise of like character with like aims;
- 2) diversifying the holdings of each fund to minimize the risk of loss and maximize the rate of return, unless under the circumstances it is clearly prudent not to do so; and
- 3) discharging its duties solely in the interest of and for the beneficiaries of the funds managed."

The Board, as the investment fiduciary, is responsible for establishing the investment parameters for the TFIP.

4. Strategic Investment Objectives

The Board's primary objective is to provide investment income to participants. The Board's secondary objective is to achieve the highest level of investment performance. Both objectives must be compatible with the Board's risk tolerance and prudent investment practices. The Board seeks to maintain a long-term perspective in formulating and implementing investment policies and evaluating investment performance.

5. Time Horizon

The Board expects to meet or exceed these objectives over a long-term investment horizon. Over shorter periods, the anticipated market volatility, and specific actions, including risk mitigation efforts of the Board, may lead to unfavorable, but expected, deviation from the objectives.

6. Performance Measurement

Success in achieving these objectives will be measured by comparing the risk and return of the account to the **Bloomberg/Barclays U.S. Aggregate Bond Index (IG fixed income), the NCREIF ODCE Index (real estate) and the Bloomberg Barclays US High Yield – 2% Issuer Cap Index (Non-Core fixed income) Each weighted proportionately to the portfolio's holdings.**~~(the “Benchmark”).~~ Performance results will be monitored and evaluated quarterly. However, success in achieving the objective will be measured on a three-year, five-year, and ten-year annualized basis.

7. Roles and Responsibilities

- a) **Board of Investments** – The Board is responsible for approving the IPS for the TFIP and has the authority to manage the TFIP as it considers prudent, and subject to such limitations as contained in law and the Constitution. The Board reviews this document periodically and, as needed, approves any changes to the policy.
As described in the Board of Investments Governance Manual, the Board delegates authority to the Executive Director, Chief Investment Officer (CIO), and other Staff to execute the day to day duties required to carry out the Board’s mission.
- b) **Executive Director** – The Executive Director is empowered by the Board to sign any and all documents required to conduct Board business, unless there are specific written policies or instructions from the Board to the contrary. The Executive Director is responsible for the oversight of the TFIP and the establishment of the financial reporting procedures and the collection and reporting of all income.
- c) **Chief Investment Officer** – The CIO is empowered by the Board to serve as the principal staff person responsible for overseeing the investment activities under the Board’s jurisdiction in compliance with the Board’s policies. The CIO, with the support of other staff, is responsible for recommending investment policy changes for Board approval.
- d) **Staff** – The staff is responsible for:
 - I. Managing day-to-day operations and delegating work to external resources as appropriate;
 - II. Monitoring allocations and overseeing all investment manager due diligence activities and recommending changes to the CIO;
 - III. Monitoring and reporting to the Board the performance of each asset class and the individual managers’ performance;
 - IV. Informing the Board of any new managers or terminations; and
 - V. Reporting any deviations from the IPS to the Board.

- e) **Investment Consultant** – The investment consultant assists the CIO and Staff with policy recommendations and provides advice to the Board. The investment consultant shall provide assistance to Staff as requested in conjunction with the management of all separate accounts.
- f) **External Managers** – Managers are responsible for all aspects of portfolio management as set forth in the contract specific to each manager. Managers must communicate with staff as needed, regarding investment strategies and results. Managers must also cooperate fully with staff regarding administrative, accounting, and reconciliation issues as well as any requests from the investment consultant and the master custodian.

8. Strategic Asset Allocation

The current asset allocation ranges for the TFIP are in **Appendix I**. The asset allocation ranges are subject to change as modifications are adopted by the Board, at which time **Appendix I** will be revised to reflect these changes.

9. Rebalancing

The actual asset allocation mix may deviate from time to time from the approved asset allocation ranges due to financial market performance, cash flows, and manager performance. Material deviations from the asset allocation ranges can alter the expected return and risk of the separate accounts. Rebalancing to remain within the Board-approved allocation ranges is delegated to staff in consultation with the CIO and the Executive Director. Any necessary rebalancing will be made in a timely manner and will take into consideration associated costs and current market conditions.

10. Risk Management

a) Evaluation of Investment Managers

The Investment Manager Evaluation Policy is a distinct policy that is regularly reviewed and updated separate from the IPS because staff utilizes the Investment Manager Evaluation Policy to oversee and manage other assets in addition to the TFIP assets.

b) Liquidity

Many participants in the TFIP spend the income generated from their holdings. However, the total liquidity needs for the TFIP are generally low and participant capital is not expected to change dramatically on short notice. However, illiquidity risk still needs to be monitored and managed by staff on a regular basis to ensure that assets are not required to be sold too quickly, or at an unfavorable time, and potentially at a discount to fair value to meet the cash needs of pool participants.

A significant percentage of the investment in Core Real Estate is considered illiquid. Due to the limited liquidity of these assets, it will typically be impractical to fund participant cash needs or correct deviations from policy ranges through the purchase or sale of these assets.

The investments held in Investment Grade and High Yield Fixed Income are categorized as publicly traded securities. In “normal market” conditions many of the underlying assets can be liquidated in a relatively short period to accommodate both expected and unexpected withdrawals as well as any repositioning of the asset allocation to stay within approved ranges.

c) **Monitoring/Reporting – Transparency**

Managers shall submit periodic reports to facilitate Staff’s monitoring of the Managers’ conformance to investment restrictions and performance objectives.

Staff shall provide regular reporting to the Board regarding the asset allocation and performance of the TFIP to confirm these items are known and adhere to all IPS requirements and expectations.

d) **Leverage**

Leverage is a significant risk factor. Investment managers may utilize leverage only when permitted in the manager’s investment guidelines approved by Staff. Staff shall monitor the use of leverage and its impact on risk and return.

The use of derivative securities can generate additional leverage even if the derivative is being used to reduce the risk in other investments. Investment managers may only use derivatives when permitted in the manager’s investment guidelines approved by Staff.

e) **Cash Investments**

Cash investments held within the TFIP entail an element of credit risk. Thus, only approved cash investment vehicles are permitted. These include: any cash vehicle at the Custodial Bank; STIP; or any SEC-registered money market fund which specifically address credit risk in their respective investment guidelines.

11. Securities Lending

Section 17-1-113, MCA, authorizes the Board to lend securities held by the state. The Board may lend its publicly traded securities through an agent, to other market participants in return for compensation. Currently, through an explicit contract, the state's Custodial Bank, manages the state's securities lending program. The Board seeks to assess counterparty and reinvestment risk, associated with each aspect of its securities lending program. The Board requires borrowers to maintain collateral at 102 percent for domestic securities and 105 percent for international securities. To ensure that the collateral ratio is maintained, securities on loan are marked to market daily and the borrower must provide additional collateral if the value of the collateral falls below the agreed-upon ratio of over-collateralization. In addition to the strict collateral requirements imposed by the Board, the credit quality of approved borrowers is monitored continuously by the contractor. From time to time, Staff or the investment manager may restrict a security from the loan program upon notification to the Custodial Bank. Staff will monitor the securities lending program and will periodically report to the Board on the status of the program. The Board’s participation in securities lending may change over time given account activity, market conditions and the agent agreement.

12. Exercise of Shareholder Rights

a) Proxy Voting

Article VIII, Section 13 of the Montana Constitution requires that “no public funds shall be invested in private corporate capital stock” with the exception of public retirement system and state compensation insurance fund assets. Therefore, the TFIP does not participate in proxy voting.

b) Class Action Litigation

Claims under state and federal securities laws arising out of losses on securities under the Board’s management are assets subject to the Board’s fiduciary duty of prudent management. The Board shall take reasonable, cost effective steps to identify, pursue and collect upon claims under securities laws for losses suffered by the Board on its investment. Accordingly, the Board maintains a detailed litigation policy, including process steps, outlined in the Board’s Governance Manual, Appendix F.

13. Investment Policy Statement Review

Per Board’s Governance Policy, “the Board shall create, maintain, and revise as necessary Investment Policy Statements (IPS) for each separate account it manages. The IPS shall cite the law establishing the account if such law exists, the permissible investments authorized by law, and establish an investment range for each of the permissible investments. The Board shall review such policies at least annually or more frequently at the request of Board staff. IPS may only be revised in a public meeting. All IPS shall be posted on the Board’s web site for review by the public.”

Appendix I: Trust Funds Investment Pool Allocation Ranges

Permitted Ranges:

Approved February 11, 2020

Trust Funds Investment Pool Asset Class		
Asset Class	Range Low	Range High
Real Estate	0	30
Non-Core Fixed Income	0	10
Investment Grade Fixed Income & Cash	60	100

Schedule II-A: Investment Objectives and Guidelines Real Estate Asset Class

Effective Date of Schedule: June 9, 2020

This Schedule is effective upon adoption by the Board and supersedes all previous Investment Objectives and Guidelines for Real Estate.

Statement of Purpose:

The purpose of these objectives and guidelines is to:

1. Establish the investment objectives and performance standards of the Real Estate Asset Class; and
2. Provide diversified exposure to Real Estate in a prudent and cost-effective manner.

Investment Objective:

Strategic:

The objective of the Real Estate Asset Class is to attain the highest possible return within the parameters of the Investment Guidelines set forth below.

Performance:

Success in achieving this objective will be measured by comparing the risk and after-fee return of the Real Estate Asset Class to the **NCREIF ODCE Index** (the “Benchmark”). Performance results will be monitored and evaluated quarterly. However, the success in achieving the objective will be measured on a five-year, and ten-year annualized basis.

Investment Guidelines:

Staff will have full discretion to manage the Real Estate Asset Class consistent with the investment guidelines stated below. Compliance with the following guidelines for permitted investments and other restrictions is the sole responsibility of the Staff. Any exceptions or compliance violations are to be reported to the Board at the next scheduled quarterly Board meeting.

Most of the Real Estate Asset Class investments will be managed by external investment managers.

Permitted Investments:

The Real Estate Asset Class may invest only in the following:

1. Separate Accounts, Open-Ended Funds, Closed-Ended Funds, Exchange-Traded Funds (ETFs), Real Estate Investment Trusts (REITs), or Master Limited Partnerships (MLPs) managing publicly traded Real Estate, where the investments are approved by the CIO and purchased and monitored by Staff;

2. Private Investment partnership interests. These private partnerships may be direct limited partnerships, limited liability companies, or vehicles that primarily invest in partnerships, including Fund-of-Funds and Secondary Funds.
3. The Real Estate Asset Class may co-invest with private investment managers in transactions that are suitable for inclusion into a private Real Estate investment partnership;
4. Individual public or private securities received as distributions from funds are also permitted to be held in the Real Estate Asset Class; and
5. Cash – either an investment in the Short-Term Investment Pool (STIP), a vehicle available through the Custodian, or an SEC registered money market fund that is considered a “US Treasury” or “US Government” money market fund per the SEC regulations.

Other Restrictions

1. No less than 75% of the aggregate of the Real Estate Asset Class net asset value plus uncalled committed capital shall be invested in “Core and Core-Plus”-Real Estate. ~~Real Estate is classified as “Core” if it is an investment in operating, substantially leased, and positively cash flowing institutional quality real estate across property types, geographies and markets;~~
2. No more than 35% of the aggregate of the Real Estate Asset Class net asset value plus uncalled committed capital should be in a single Fund, Partnership, or Separate Account;
3. Individual public securities received as distributions will be liquidated over a reasonable time period dependent on market conditions;

The following table provides a guideline range with respect to the Real Estate Asset Class strategy diversification. It is important to note that these ranges reference the sum of the Real Estate Asset Class Net Asset Value and uncalled commitments.

<u>Strategy</u>	<u>Policy Range</u>
<u>Core Real Estate</u>	<u>50% - 100%</u>
<u>Core-plus</u>	<u>0% - 25%</u>
<u>Real Estate Debt</u>	<u>0% - 25%</u>

For funds with exposure across these categories, the fund will be classified in the category that is most reflective of the underlying investments in the funds.

Leverage

Leverage is a significant risk factor. On an individual fund basis, the leverage level can range up to 50.0 percent. Leverage for Core and Core-plus Funds consists of the combined borrowing at the property level and the fund level. Leverage for Real Estate Debt is only measured at the fund level. On a select basis, the leverage may exceed ~~75~~65.0 percent for a given investment, if it is determined to be reasonable to do so. Leverage shall be monitored on an individual fund level and new investments shall be made with the intention that the total Real Estate Asset Class leverage shall not exceed 50%.

<u>Strategy</u>	<u>Leverage Policy Range</u>
Core Real Estate Investments	0% - 50%
<u>Core-plus</u>	<u>0% - 65%</u>
<u>Real Estate Debt</u>	<u>0% - 50%</u>

If at any time, due to market fluctuations or any other circumstances, any of the guidelines are not maintained, Staff will use its best efforts to conform to these limits in a timely manner, while considering current market conditions and the associated costs of rebalancing. At the Board's next regularly scheduled quarterly meeting, the CIO shall inform the Board of any cases that the Real Estate Asset Class allocations were outside of the limits and either inform the Board of the actions that were taken to return the Real Estate Asset Class back within guidelines or a plan to do so.

While no formal diversification ranges are set forth for property type diversification or regional diversification within the United States, it is expected that the Real Estate Asset Class shall remain diversified across these factors. These and other factors shall be monitored and reported to the Board at least annually.

**Schedule II-B:
Investment Objectives and Guidelines
Non-Core Fixed Income Asset Class**

Effective Date of Schedule: June 9, 2020

This Schedule is effective upon adoption by the Board and supersedes all previous Investment Objectives and Guidelines for Non-Core Fixed Income.

Statement of Purpose:

The purpose of these objectives and guidelines is to:

1. Establish the investment objectives and performance standards of the Non-Core Fixed Income Asset Class; and
2. Provide diversified exposure to the Non-Core Fixed Income markets in a prudent and cost-effective manner.

Investment Objective:

Strategic:

The objective of the Non-Core Fixed Income Asset Class is to attain the highest possible total return within the parameters of the Investment Guidelines set forth below.

Performance:

Success in achieving this objective will be measured by comparing the risk and after-fee return of the Non-Core Fixed Income Asset Class to the **Bloomberg Barclays US High Yield - 2% Issuer Cap Index** (the “Benchmark”). Performance results will be monitored and evaluated quarterly. However, the success in achieving the objective will be measured on a three-year, five-year, and ten-year annualized basis.

Investment Guidelines:

Staff will have full discretion to manage the Non-Core Fixed Income Asset Class consistent with the investment guidelines stated below. Non-Core Fixed Income is defined as strategies primarily invested in High Yield Corporate Debt, Emerging Market Debt, Convertible Debt and Preferred Securities. Compliance with the following guidelines for permitted investments and other restrictions is the sole responsibility of the Staff. Any exceptions or compliance violations are to be reported to the Board at the next scheduled quarterly Board meeting.

Permitted Investments:

The Non-Core Fixed Income Asset Class may invest only in the following:

1. Securities and derivatives held in separate accounts, commingled funds, limited partnerships, or limited liability companies managed by external investment managers and governed by their respective investment management contracts and investment guidelines;

Other Restrictions

1. A maximum of 10% of the market value of the Non-Core Fixed Income Asset Class may be held in Non-U.S. securities if they are denominated in a foreign currency;
2. The average duration of the Non-Core Fixed Income Asset Class will be maintained in a range of + or – 25% of the index duration;
3. A maximum of 25% of the market value of the Non-Core Fixed Income Asset Class may be invested in dedicated Emerging Market Debt mandates;
4. The Non-Core Fixed Income Asset Class market value invested in any single mandate/portfolio using an active investment strategy, other than internally managed mandates, may be no greater than 5% of the Trust Fund Investment Pool Assets

If at any time, due to market fluctuations or any other circumstances, any of the guidelines are not maintained, Staff will use its best efforts to conform to these limits in a timely manner, while considering current market conditions and the associated costs of rebalancing. At the Board's next regularly scheduled quarterly meeting, the CIO may inform the Board of any cases that the Non-Core Fixed Income Asset Class allocations were outside of the limits and either inform the Board of the actions that were taken to return the Non-Core Fixed Income Asset Class back within guidelines or a plan to do so.

**Schedule II-C:
Investment Objectives and Guidelines
Investment Grade Fixed Income Asset
Class**

Effective Date of Schedule: June 9, 2020

This Schedule is effective upon adoption by the Board and supersedes all previous Investment Objectives and Guidelines for Investment Grade Fixed Income Asset Class.

Statement of Purpose:

The purpose of these objectives and guidelines is to:

1. Establish the investment objectives and performance standards of the Investment Grade Fixed Income Asset Class; and
2. Provide diversified exposure to the Investment Grade Fixed Income markets in a prudent and cost-effective manner.

Investment Objective:

Strategic:

The objective of the Investment Grade Fixed Income Asset Class is to attain the highest possible total return within the parameters of the Investment Guidelines set forth below.

Performance:

Success in achieving this objective will be measured by comparing the risk and after-fee return of Investment Grade Fixed Income Asset Class to the **Bloomberg Barclays US Aggregate Bond Index** (the “Benchmark”). Performance results will be monitored and evaluated quarterly. However, the success in achieving the objective will be measured on a three-year, five-year, and ten-year annualized basis.

Investment Guidelines:

Staff will have full discretion to manage the Investment Grade Fixed Income Asset Class consistent with the investment guidelines stated below. Compliance with the following guidelines for permitted investments and other restrictions is the sole responsibility of the Staff. Any exceptions or compliance violations are to be reported to the Board at the next scheduled quarterly Board meeting.

Permitted Investments:

The Investment Grade Fixed Income Asset Class may invest only in the following:

1. Dollar denominated debt obligations of the U.S. Government, including its agencies and instrumentalities
2. Dollar denominated debt obligations of Quasi and Foreign Government entities
3. Dollar denominated debt obligations of domestic and foreign corporations

4. Dollar denominated securitized assets, including U.S. Agency mortgage backed securities (MBS), U.S. Agency collateralized mortgage obligations (CMOs) and asset backed securities (ABS).
5. Dollar denominated non-agency mortgage backed securities (RMBS) and non-agency commercial mortgage backed securities (CMBS).
6. Cash – either an investment in the Short-Term Investment Pool (STIP), a vehicle available through the Custodian, or an SEC registered money market fund that is considered a “US Treasury” or “US Government” money market fund per the SEC regulations.

Other Restrictions

1. The average duration of the Investment Grade Fixed Income Asset Class will be maintained in a range of + or – 20% of the index duration;
2. A minimum of 20% of the Net Asset Value of the Investment Grade Fixed Income Asset Class will be held in U.S. Government securities, including U.S. Treasuries, TIPS and Agency securities;
3. Securities must be rated investment grade by at least two nationally recognized statistical rating organizations (NRSRO), with the exception of securities issued or guaranteed by agencies or instrumentalities of the U.S. Government. In the case of split-rated securities, the lower rating is used;
4. Securities that drop below investment grade as defined above may be held to maturity, however the Investment Grade Fixed Income Asset Class may not hold more than 10% of its Net Asset Value in securities rated below investment grade;
5. Securitized assets must be rated a minimum of the 4th highest rating by any nationally recognized statistical rating organization (NRSRO) at the time of purchase;
 - a. Securitized assets that drop below the 4th highest rating of any NRSRO may be held to maturity, however the Investment Grade Fixed Income Asset Class may not hold more than 5% of its Net Asset Value in these securities;
6. A maximum of 10% of the market value of the Investment Grade Fixed Income Asset Class may be held in dollar denominated quasi and foreign government securities.
7. A maximum of two times the Benchmark weight may be held in Corporate securities in the Investment Grade Fixed Income Asset Class;
8. A maximum of two times the Benchmark weight in U.S. Agency MBS may be held in U.S. Agency MBS and CMO securities in the Investment Grade Fixed Income Asset Class;
 - a. A maximum of 20% of the Net Asset Value of the Investment Grade Fixed Income Asset Class may be held in U.S. Agency CMOs;
9. A maximum of 10% of the Net Asset Value of the Investment Grade Fixed Income Asset Class may be held in dollar denominated non-agency MBS (RMBS).
10. A maximum of 5% of the Net Asset Value of the Investment Grade Fixed Income Asset Class may be held in asset backed securities (ABS).
11. A maximum of 10% of the Net Asset Value of the Investment Grade Fixed Income Asset Class may be held in commercial mortgage backed securities (CMBS).

12. A maximum of 3% of the Net Asset Value of the Investment Grade Fixed Income Asset Class may be held in a single corporate parent issuer, foreign/quasi government issuer or securitized specific pool at the time of purchase;
 - a. A maximum of 4% of the Net Asset Value of the Investment Grade Fixed Income Asset Class may be held in a single corporate parent issuer, foreign/quasi government issuer or securitized specific pool at any time;
13. A maximum of 5% of the Net Asset Value of the Investment Grade Fixed Income Asset Class may be invested in Cash;
14. The use of leverage is prohibited.

If at any time, due to market fluctuations or any other circumstances, any of the guidelines are not maintained, Staff will use its best efforts to conform to these limits in a timely manner, while considering current market conditions and the associated costs of rebalancing. At the Board's next regularly scheduled quarterly meeting, the CIO may inform the Board of any cases that the Investment Grade Fixed Income Asset Class allocations were outside of the limits and either inform the Board of the actions that were taken to return the Investment Grade Fixed Income Asset Class back within guidelines or a plan to do so.

MONTANA

BOARD OF INVESTMENTS

TO: Members of the Board
FROM: John Romasko, Director of Fixed Income
DATE: April 20, 2021
RE: Department of Justice - Upper Clark Fork River Basin Reserve Fund

We are asking to increase the maximum allocation to Trust Funds Investment Pool (TFIP) from 97% to 99%. The client does not expect to expend any significant funds for the foreseeable future and has a strong preference for increased yields in the TFIP.

Schedule I-U

Investment Objectives and Guidelines

Upper Clark Fork River Basin Reserve Fund

Effective Date of Schedule: ~~May 23, 2018~~ April 20, 2021

This schedule is effective upon adoption by the Board and supersedes all previous Investment Objectives and Guidelines for this specific portfolio.

Introduction

The purpose of this policy statement is to provide a framework for the Upper Clark Fork River Basin Reserve Fund (MU22) investments under the guidance of the Board.

The Upper Clark Fork River Basin Reserve Fund originated in 1999, a Consent Decree was entered between the State of Montana, the United States, and Atlantic Richfield Company (ARCO), to settle certain litigation and to provide for the funding of restoration action on and around the Clark Fork River and tributaries generally above the confluence of the Little Blackfoot River. Funds are used by the Natural Resource Damage Program of the Montana Department of Justice (NRDP) to cover potential cost over-runs of the Streamside Tailings Operable Unit, if any, and then to the Upper Clark Fork River Basin Restoration Fund.

Statement of Purpose

The purpose of these objectives and guidelines is to:

1. Establish the investment objectives and performance standards of the Upper Clark Fork River Basin Reserve Fund account; and
2. Provide diversified investment exposure within the guidelines in a prudent and cost-effective manner.

Investment Objective

Strategic:

The objective of the Upper Clark Fork River Basin Reserve Fund portfolio is to attain above benchmark total return within the parameters of the Investment Guidelines set forth below with an emphasis on investment income and preservation of principal.

Performance:

Success in achieving this objective will be measured by comparing the risk and return of the account to the **Trust Funds Investment Pool benchmark, the Short-Term Investment Pool benchmark, and the Bloomberg/Barclays 1-5 Year Treasury Index**. Each weighted proportionately to the portfolio's holdings, over a five-year moving average.

Time Horizon:

The Upper Clark Fork River Basin Reserve Fund is an expendable fund. Expenditures are expected in future years, as projected, and periodically updated by the NRDP. The Board expects to meet or exceed all objectives over a long-term investment horizon. Over shorter periods, the

anticipated market volatility, and specific actions, including risk mitigation efforts of the Board may lead to unfavorable, but expected, deviation from these objectives.

Investment Guidelines

The Board will have full discretion to manage the Upper Clark Fork River Basin Reserve Fund portfolio consistent with the investment guidelines stated below. Compliance with the following guidelines for permitted investments and other restrictions is the sole responsibility of the Staff. Any exceptions or compliance violations are to be reported to the Board at the next scheduled Board meeting.

Permitted Investments:

The Upper Clark Fork River Basin Reserve Fund may only invest in the following:

1. U.S. Treasury Bonds
2. U.S. Agency Bonds
3. Trust Funds Investment Pool (TFIP)
4. Short-Term Investment Pool (STIP) or any cash vehicle at the Custodial Bank

Other Restrictions:

1. A maximum of 97.9% of the market value of the portfolio will be invested in the TFIP.
2. A maximum of 60% of the market value of the portfolio will be invested in U.S. Treasury and Agency bonds.
3. The maximum maturity of U.S. Treasury and Agency bonds will be 6 years.

If at any time, due to market fluctuations or any other circumstances, any of the guidelines are not maintained, Staff will use its best efforts to conform to these limits in a timely manner while considering current market conditions and the associated costs of rebalancing. At the Board's next regularly scheduled meeting, the CIO shall inform the Board of any cases that the allocations were outside the limits and either inform the Board of the actions that were taken to return the portfolio back within guidelines or a plan to do so.

Montana International Equities

Asset Class Review

Presented by:

Rande R. Muffick, CFA, Director of Public Market Investments

Jason C. Brent, CFA, CAIA, Investment Officer

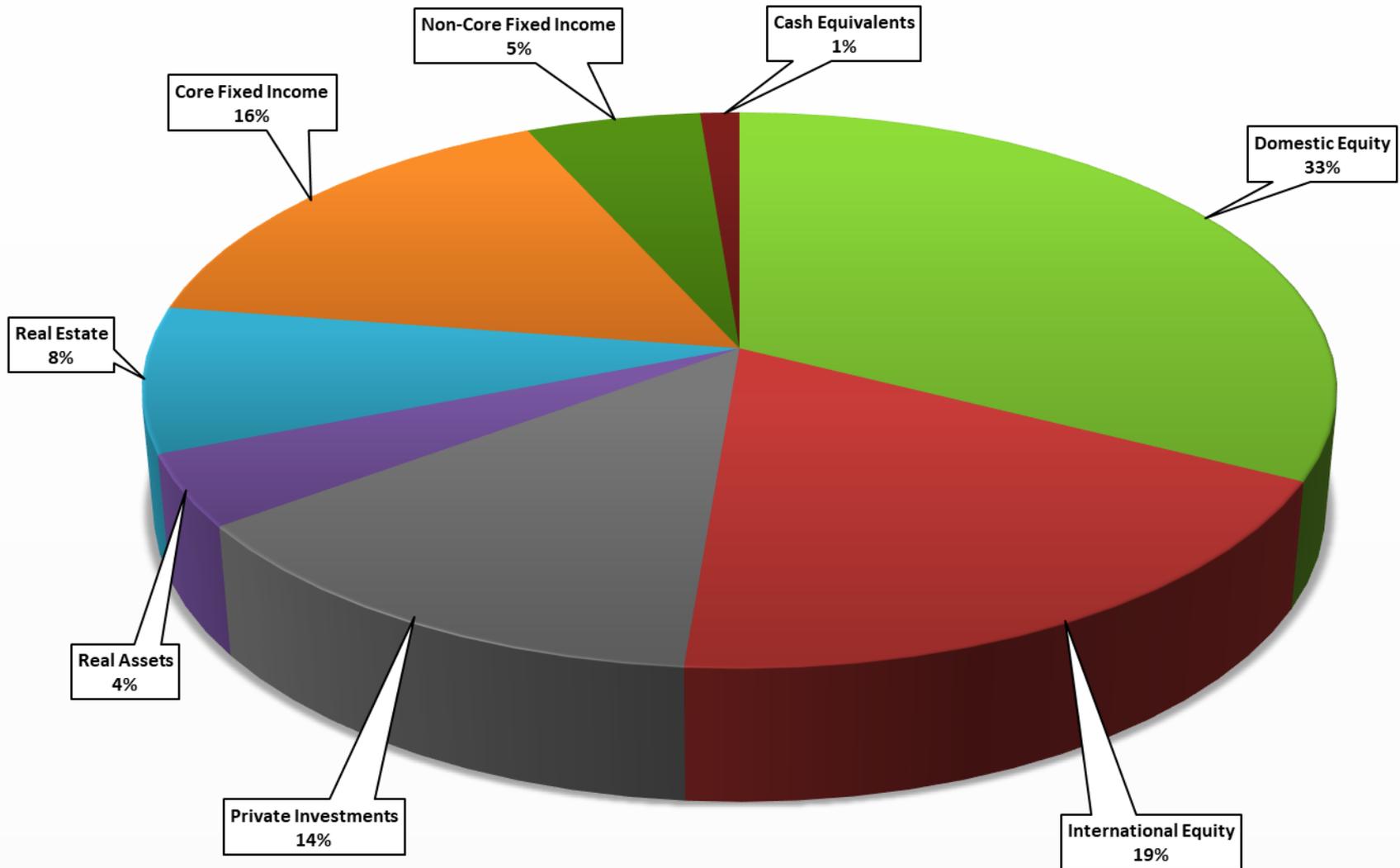
Steven M. Strong, Senior Investment Analyst

April 2021

International Equities Asset Class

- Objective: Attain the highest possible total return within the parameters of the International Equities Investment Guidelines per the Public Retirement Plans IPS
- Second-largest Asset Class
 - Allocation range: 12% – 22%
- Managed by external asset managers that invest in the equities of companies based outside the United States
- Includes indexed and actively-managed portfolios
- Highly liquid assets
- High relative volatility in returns

CAPP as of 12/31/20



Comparing International Equities to Domestic Equities

- Sector exposures differ
 - More financials in international but less technology
- Currency market movements affect the returns of the Asset Class
- Lower average market capitalization
- Less concentration in a small number of stocks
- Local shares (ordinaries) and American Depositary Receipts (ADRs)
- Cash is largely foreign currency

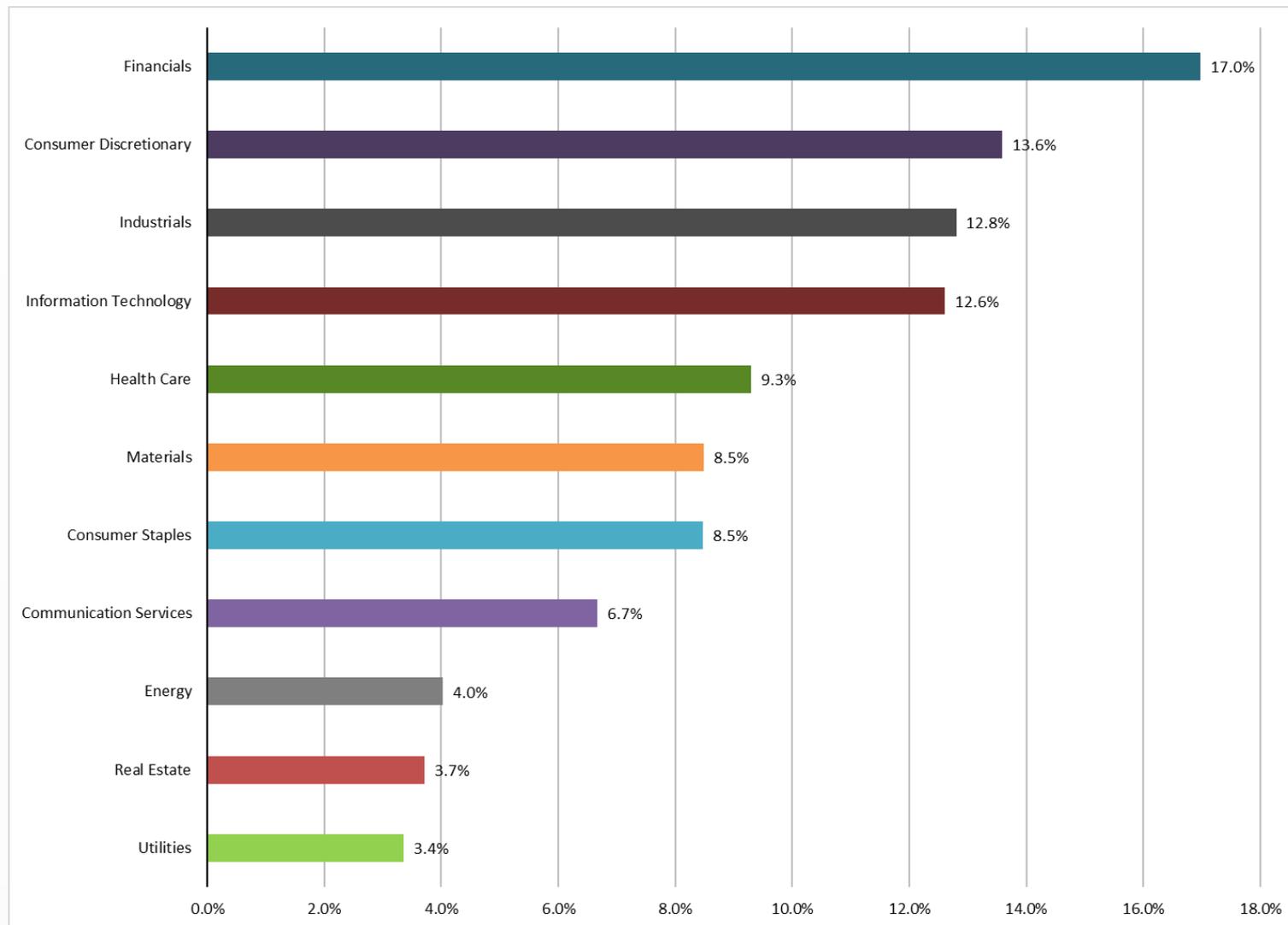
Currency Effects on International Returns

- Currency movements can be volatile in the short term and can impact the returns realized by investors
 - For a US-based investor, a strengthening US dollar means lower returns when investments made in foreign currencies are translated back to US dollars
 - Conversely, a falling US dollar means higher returns when foreign investments are translated, as has been the case over the past year

MSCI ACWI ex-US IMI - Characteristics

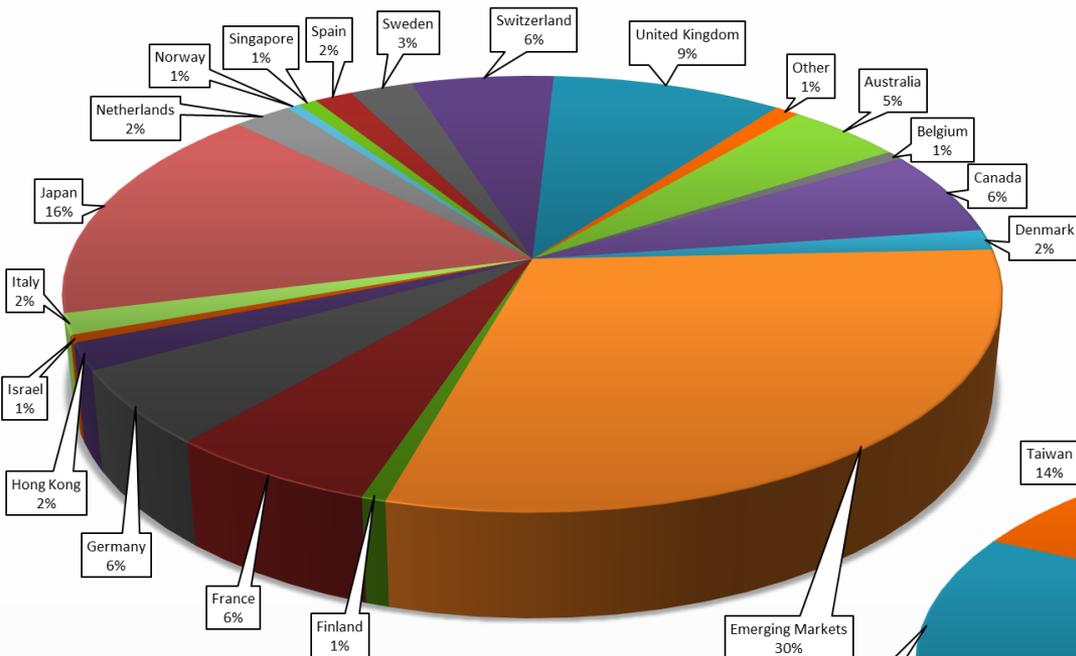
	Current (12/31/20)	Historical Range (Trailing 7 Years)	
		Minimum	Maximum
Dividend Yield	2.32	2.32	3.74
Est 3-5 Yr EPS Growth	12.46	8.76	14.54
Price/Book	1.77	1.30	1.78
Price/Cash Flow	9.39	0.75	9.53
P/E using FY1 Est	18.95	12.27	18.95
Price/Sales	1.34	0.92	1.34
ROE	11.87	8.65	14.76
Market Cap (Weighted Average, \$ Billions)	87	38	88
Number of Holdings	6,603	5,987	6,628

MSCI ACWI ex-US IMI - Sectors as of 12/31/20

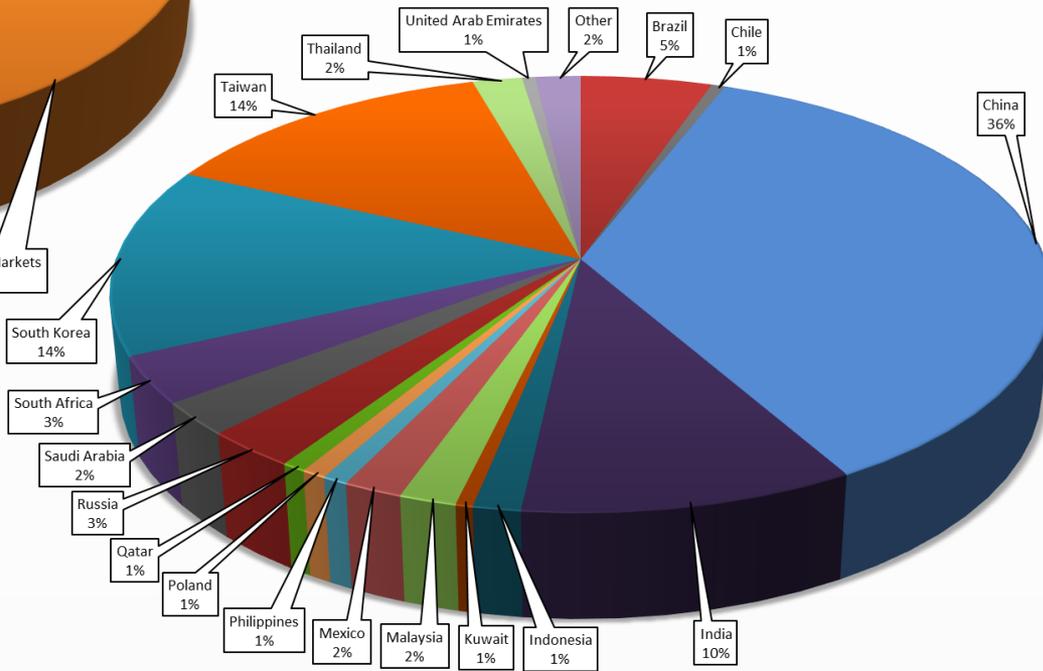


MSCI ACWI ex-US IMI - Countries as of 12/31/20

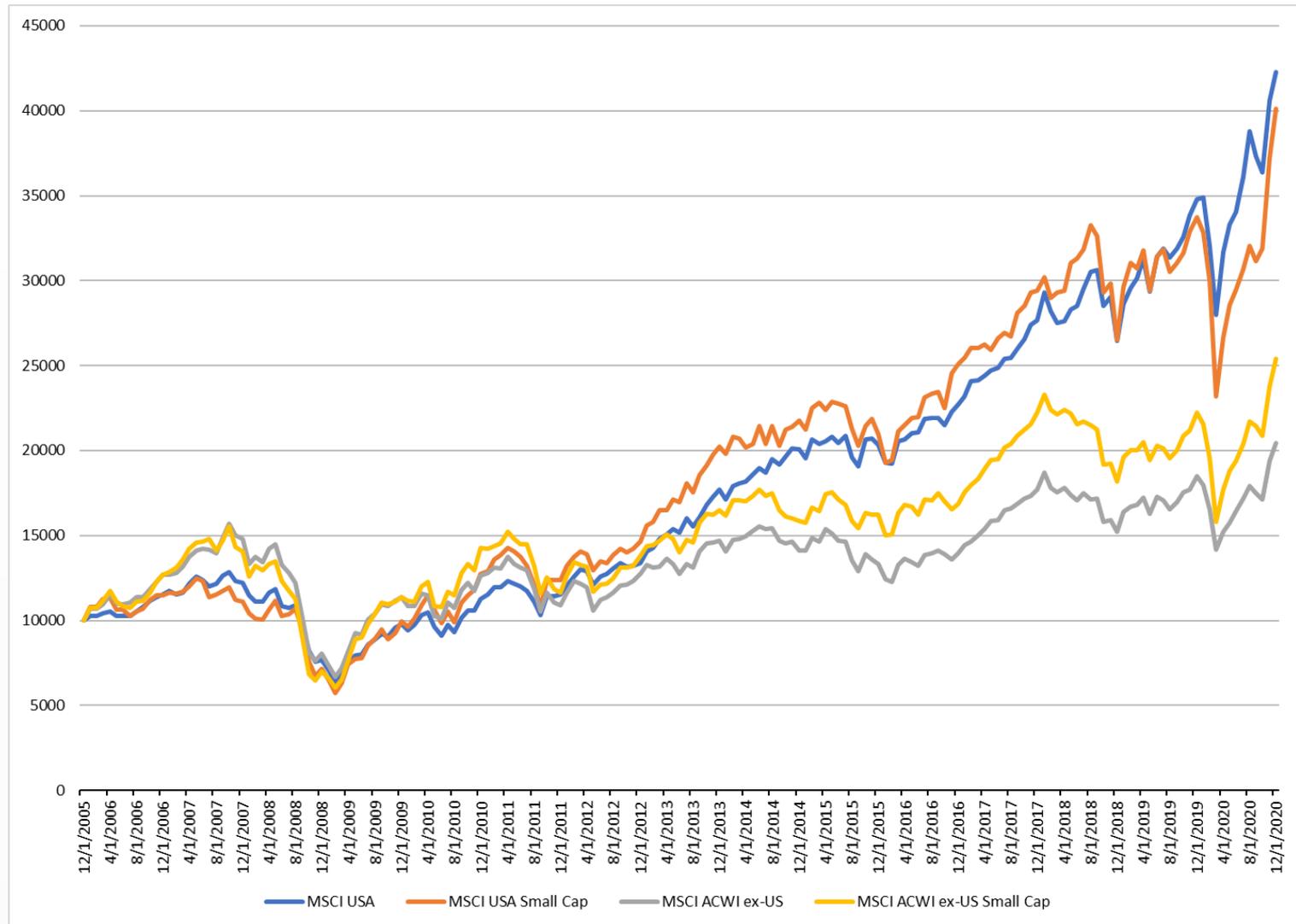
MSCI ACWI ex-US IMI



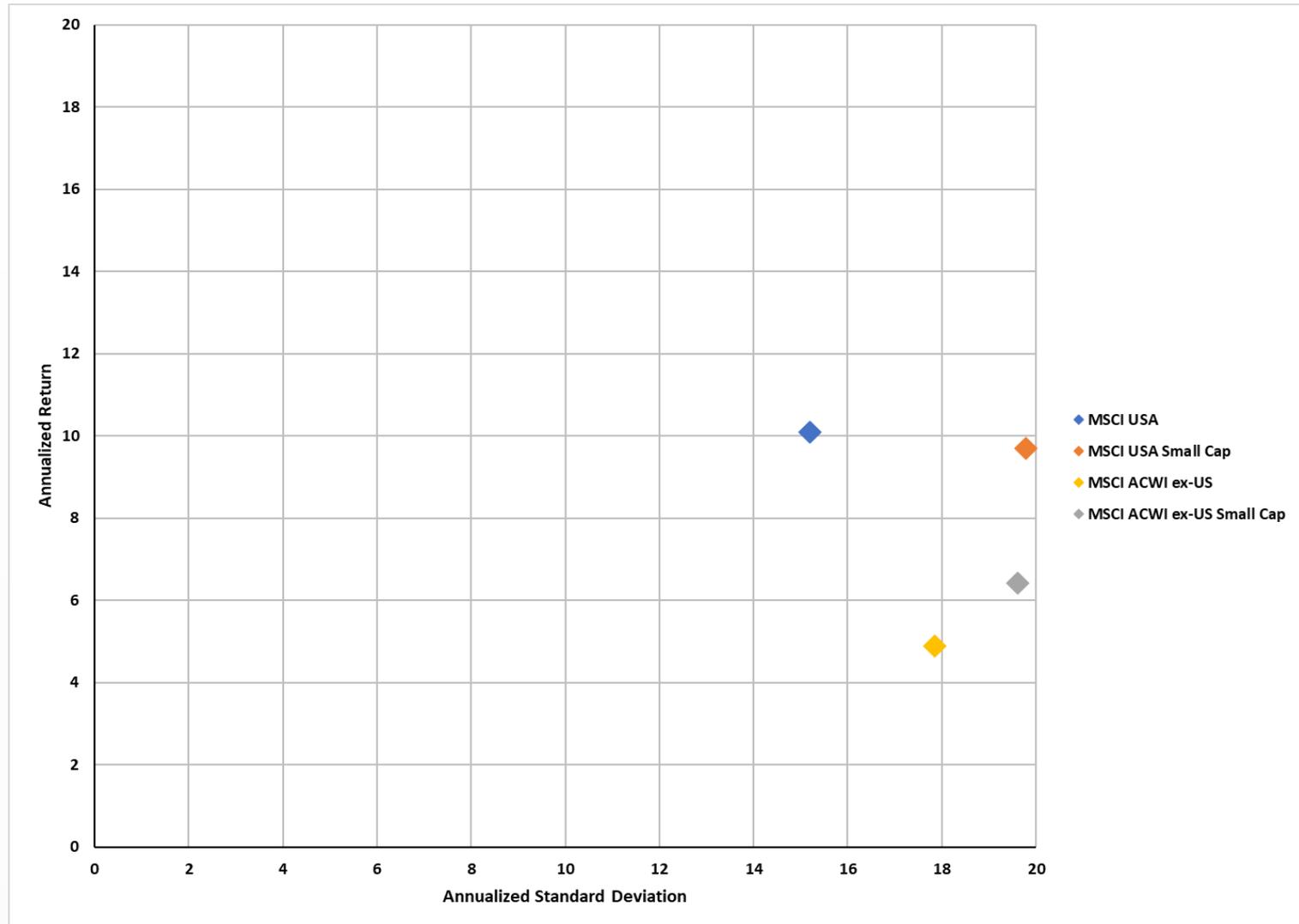
Emerging Markets Only



Cumulative Returns



Risk & Return (Trailing 15 Years)



International Benchmark

- MBOI uses the MSCI All-Country World ex-US Investable Market Index (“ACWI ex-US IMI”) as the benchmark for the Asset Class
 - MSCI is the index provider
 - “All-Country” means that the benchmark includes both developed and emerging market countries
 - “IMI” means that the benchmark includes stocks across the market cap range from small to large
- Subsets of the broader benchmark (e.g., small cap only) are used with individual portfolios

International Benchmark

- MSCI conducts Semi-Annual Index Reviews (SAIR)
 - Adds and removes companies from its indices
 - Assigns country classifications for new constituents
 - Recalculates the reference points used to define the various market cap segments
- Implementation of any previously-announced country reclassifications (e.g., from emerging to developed) typically occurs in conjunction with the SAIR
- Less comprehensive Quarterly Index Reviews (QIR) are conducted in the off-quarters

International Benchmark

- MSCI reserves the right to conduct index changes outside of the regular review schedule
- One recent example was the decision to exclude companies identified by the US government as having ties to the Chinese military
- MBOI's index fund managers, which replicate the benchmark holdings, followed suit
- Active managers that held any of those names did so as well

International Equities Asset Class Structure

- Well-diversified by sector, region, and investment strategy
- Cost-effective implementation
- Indexed and actively-managed portfolios
- Large Caps
 - Significant exposure to indexed portfolios
- Small Caps
 - Allocation can be managed independently of Large Caps
 - Heavier exposure to actively-managed portfolios
- Emerging Markets exposure
- Cash levels are minimized per policy

Types of Portfolios

- Indexed Portfolios
 - Commingled Funds
- Actively-Managed Portfolios
 - Separate Accounts and Commingled Funds
 - Fundamental and Quantitative Methodologies
- Exchange Traded Funds (ETFs)

Types of Portfolios

Indexed Portfolios

BlackRock ACWI ex-US Index Fund
BlackRock ACWI ex-US Small Cap Index Fund
BlackRock Emerging Markets Index Fund
ETFs

Actively-Managed Portfolios

Quantitative

Acadian
DFA

Fundamental

Invesco
Lazard
Baillie Gifford
Franklin Templeton
American Century

Types of Portfolios

Value

Lazard

Acadian (Quant)

Franklin Templeton

Core

BlackRock ACWI ex-US Index Fund

DFA (Quant)

BlackRock ACWI ex-US Small Cap Index Fund

BlackRock Emerging Markets Index Fund

ETFs

Growth

Invesco

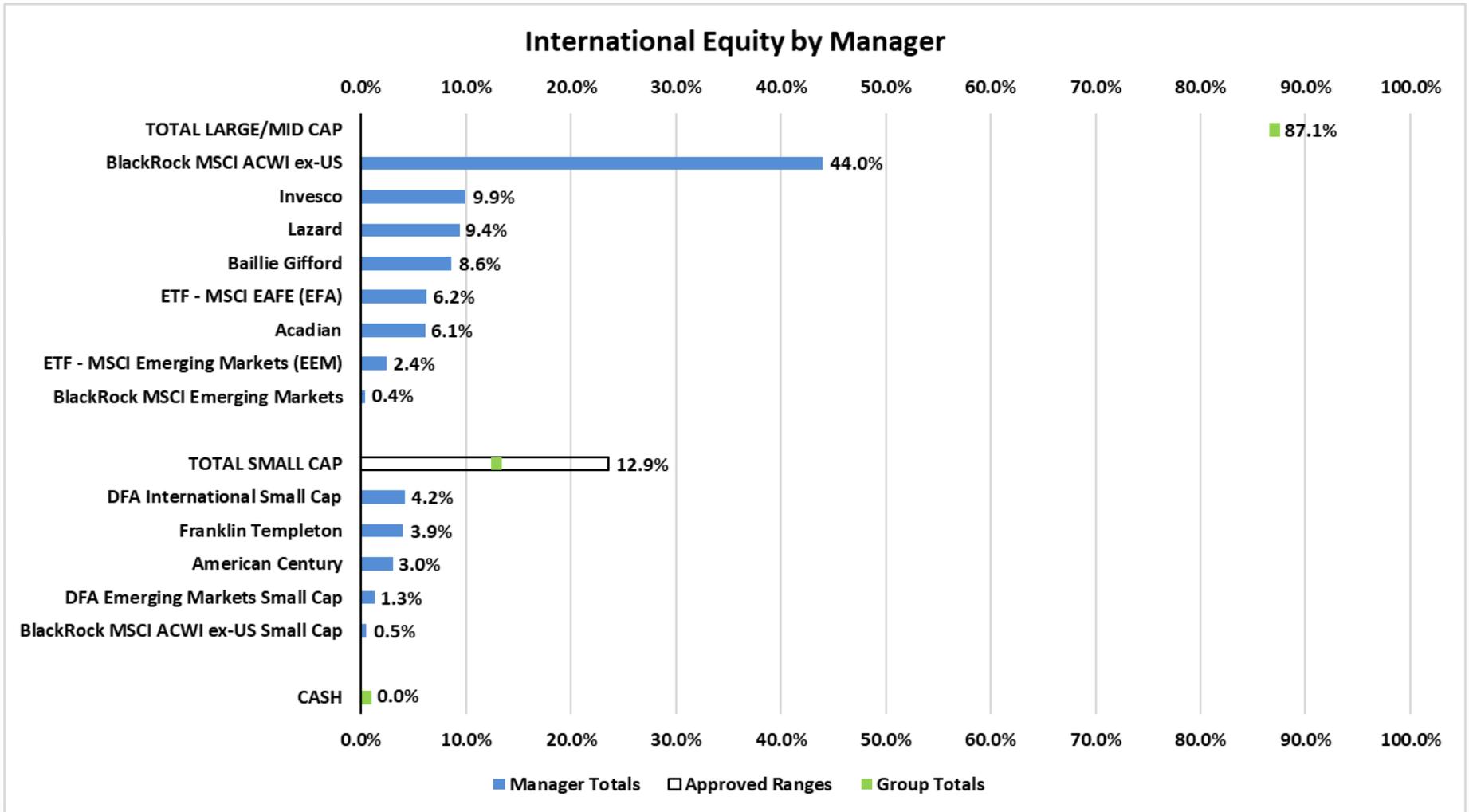
Baillie Gifford

American Century

International Equities Asset Class Structure

- Complementary Active Portfolios
 - Styles
 - Methodologies
 - Market capture profiles
 - Low correlation of returns among portfolios
- Small Caps are typically overweight
- Emerging Markets allocation can be adjusted with ETFs
- Limited cash per policy

International Equities by Manager at 12/31/20



Due Diligence and Monitoring

- External Manager Evaluation Policy
- Staff performs due diligence and monitoring:
 - Quarterly review process
 - Manager Scorecard
 - Analytic tools (FactSet and Bloomberg)
 - Research database tools (eVestment)
 - On-site visits
- Continual development of a “bench” of managers of interest
- RVK involvement

Due Diligence and Monitoring

When to terminate a manager

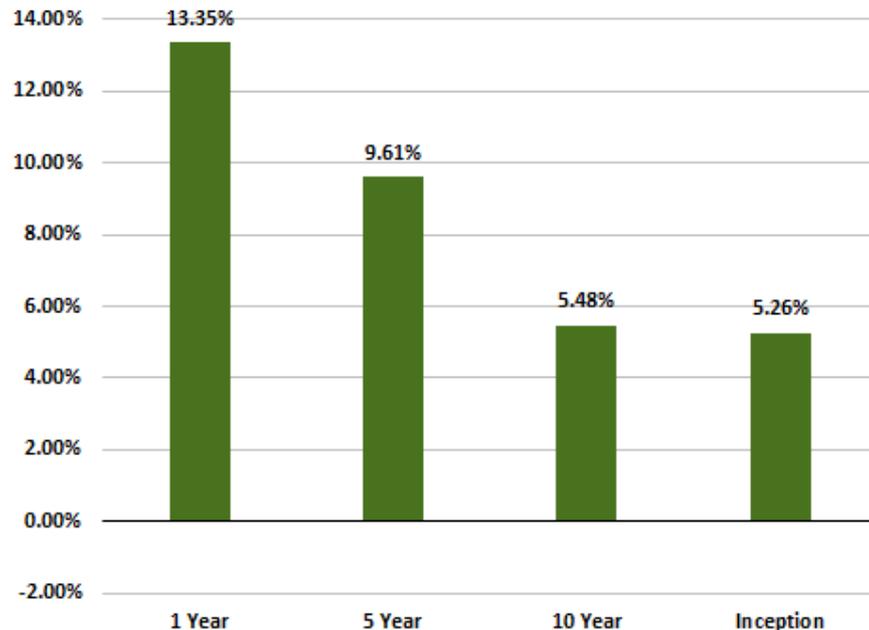
- Qualitative and quantitative factors used to aid in decision-making process
- Decision relies on professional judgment—there's no magical formula
- Performance is rarely the only reason for termination
 - Must understand the market context when assessing performance
 - Short-term performance is rarely a good indication of a manager's skill

Red Flags

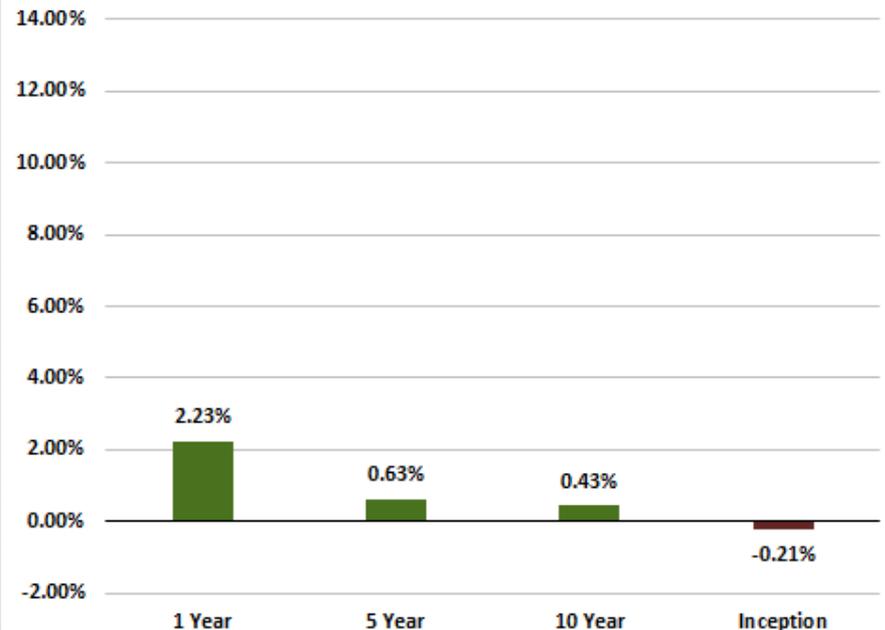
- Firm instability
 - Change of ownership
 - Excessive staff turnover/change of leadership
 - Legal or regulatory problems
- Ethical breach/loss of trust
- Style drift
- Inadequate risk controls
- Client service issues

International Equities Performance History

**International Equity
Total Returns**



**International Equity
Relative Return to Benchmark**



Benchmark: International Equity – PAC Custom Blend

- From inception to 10/31/2006: MSCI EAFE, Net
- 11/1/2006 to 6/30/2007: MSCI ACWI ex-US, Net
- 7/1/2007 to 2/28/2014: 92.5% ACWI ex-US + 7.5% ACWI ex-US Small Cap
- 3/1/2014 to present: MSCI ACWI ex-US IMI, Net
- Inception Date: 4/1/1997

History of International Equities Management Fees

	Average Balance	% of Total	Manager Expenses	Expense Ratio
2018	2,014,170,510	100.0%	6,809,209	0.34%
Active	929,546,556	46.2%	5,467,855	0.59%
Large/Mid	660,163,881	32.8%	3,543,364	0.54%
Small	269,382,674	13.4%	1,924,491	0.71%
Passive	1,084,623,954	53.8%	1,341,354	0.12%
Large/Mid	1,013,392,261	50.3%	1,253,050	0.12%
Small	71,231,694	3.5%	88,304	0.12%
2019	1,937,567,725	100.0%	6,412,121	0.33%
Active	897,342,218	46.3%	5,158,994	0.57%
Large/Mid	652,251,462	33.7%	3,422,288	0.52%
Small	245,090,757	12.6%	1,736,706	0.71%
Passive	1,040,225,507	53.7%	1,253,127	0.12%
Large/Mid	990,011,512	51.1%	1,188,212	0.12%
Small	50,213,995	2.6%	64,915	0.13%
2020	2,030,749,924	100.0%	6,795,019	0.33%
Active	929,666,704	45.8%	5,336,426	0.57%
Large/Mid	681,500,893	33.6%	3,569,839	0.52%
Small	248,165,811	12.2%	1,766,587	0.71%
Passive	1,101,083,220	54.2%	1,458,593	0.13%
Large/Mid	1,092,059,105	53.8%	1,447,764	0.13%
Small	9,024,116	0.4%	10,829	0.12%

International Equities - Summary

- Second-largest Asset Class
- Invests in equities of companies based outside the US
- Managed by external investment managers
- Includes indexed and actively-managed portfolios
- Liquid assets with high relative volatility in returns
- US dollar returns impacted by foreign currency movements
- Diversified across sectors, regions, market caps, styles, and methodologies
- Extensive due diligence and monitoring process

April 20, 2021

Capital Market Assumption and Asset Allocation Education

Montana Board of Investments



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Capital Markets Assumptions Education



Capital Markets Assumptions

Philosophy

- Each year, RVK's general consulting and research teams collaborate to review the capital markets environment and update long-term, forward-looking capital markets assumptions (CMAs) for each asset class utilized by our clients.
- The forecast horizon is for long-term periods – greater than 10 years.
- The components we estimate include:
 - Return
 - Risk (volatility of returns)
 - Correlation (relationship of asset class returns with all other asset classes)
- Return assumptions are generally index-based and assume no investment manager alpha.
- Annual updates are typically gradual and incorporate historical performance, current valuations, as well as the overall economic environment.

What does it mean to get CM Assumptions “*right*”?

Relative accuracy is most important.

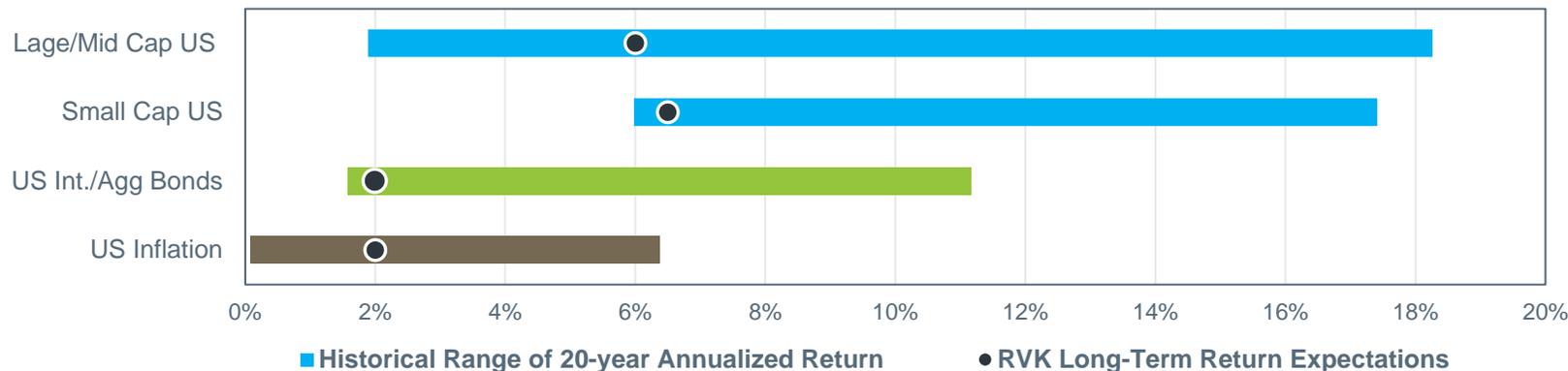
- **Relative Accuracy:** Assumptions capture the relative relationships between asset classes, which are key to making trade-off decisions when modeling.
 - Having some assumptions that are spot on, and others that are far off, will produce unbalanced and poorly diversified portfolios.

Absolute accuracy matters too – just not as much.

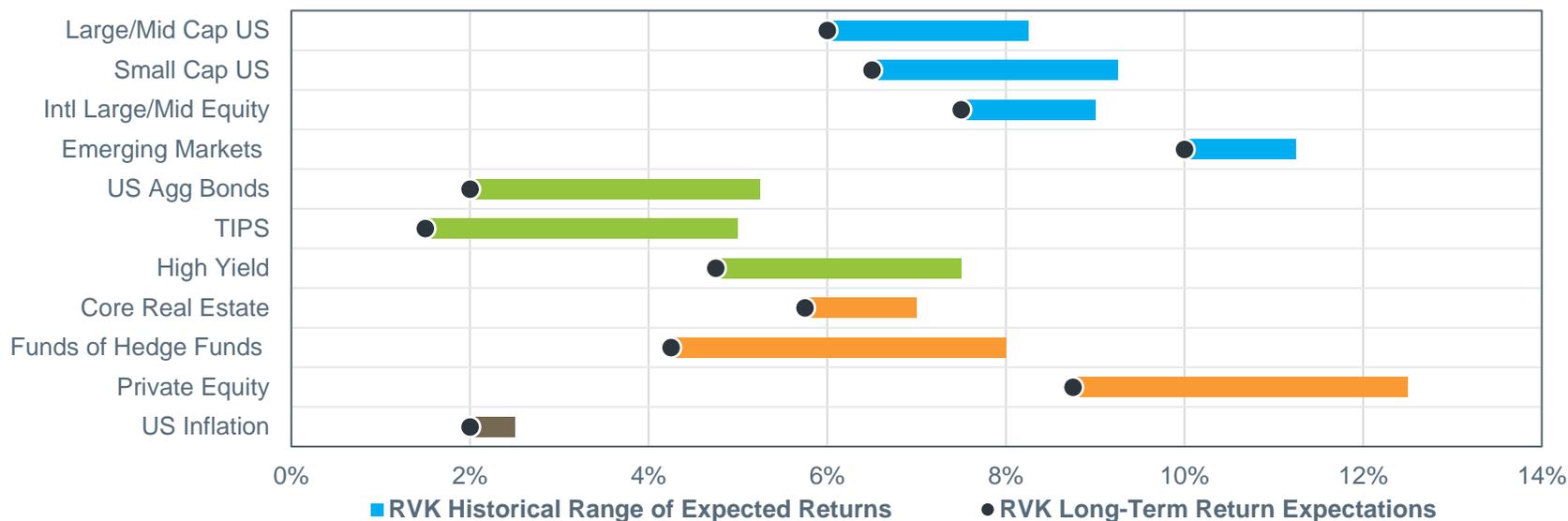
- **Absolute Accuracy:** Assumptions reflect the absolute values actually experienced in future long-term market environments.
 - Having assumptions that are too high or too low across the board can cause a Fund to believe it can distribute more than it can afford or restrict spending more than necessary.

Historical Perspective of Expected Returns

RVK Long-Term Expected Returns vs. Historical Range of Returns¹



2021 Expected Returns vs. RVK Historical Range of Expected Returns²



¹ Historical range shows the minimum and maximum 20-year annualized return for a given asset class based on monthly rolling 20-year annualized return series starting from Jan 1926. Large/Mid Cap US is represented by S&P 500 US Large Stock; Small Cap US by S&P 500 US Small Stock; US Int./Agg Bonds by S&P 500 US Intermediate Government December 1992 – December 1999 and Barclays US Aggregate Bond Index thereafter; and US Inflation by S&P 500 US Inflation.

² Data shown includes 2007 through 2021 Capital Market Assumptions for selected asset classes.

Key Themes for 2021 Capital Markets Assumptions

Inflation

Past and future inflation levels are studied and considered given market conditions, break-even indications, sovereign intervention, and inflation component pricing behavior. *The 2021 inflation assumption remained the same at 2.0%, given ongoing debt and demographic issues – though new potentially inflationary policy considerations are being monitored closely.*

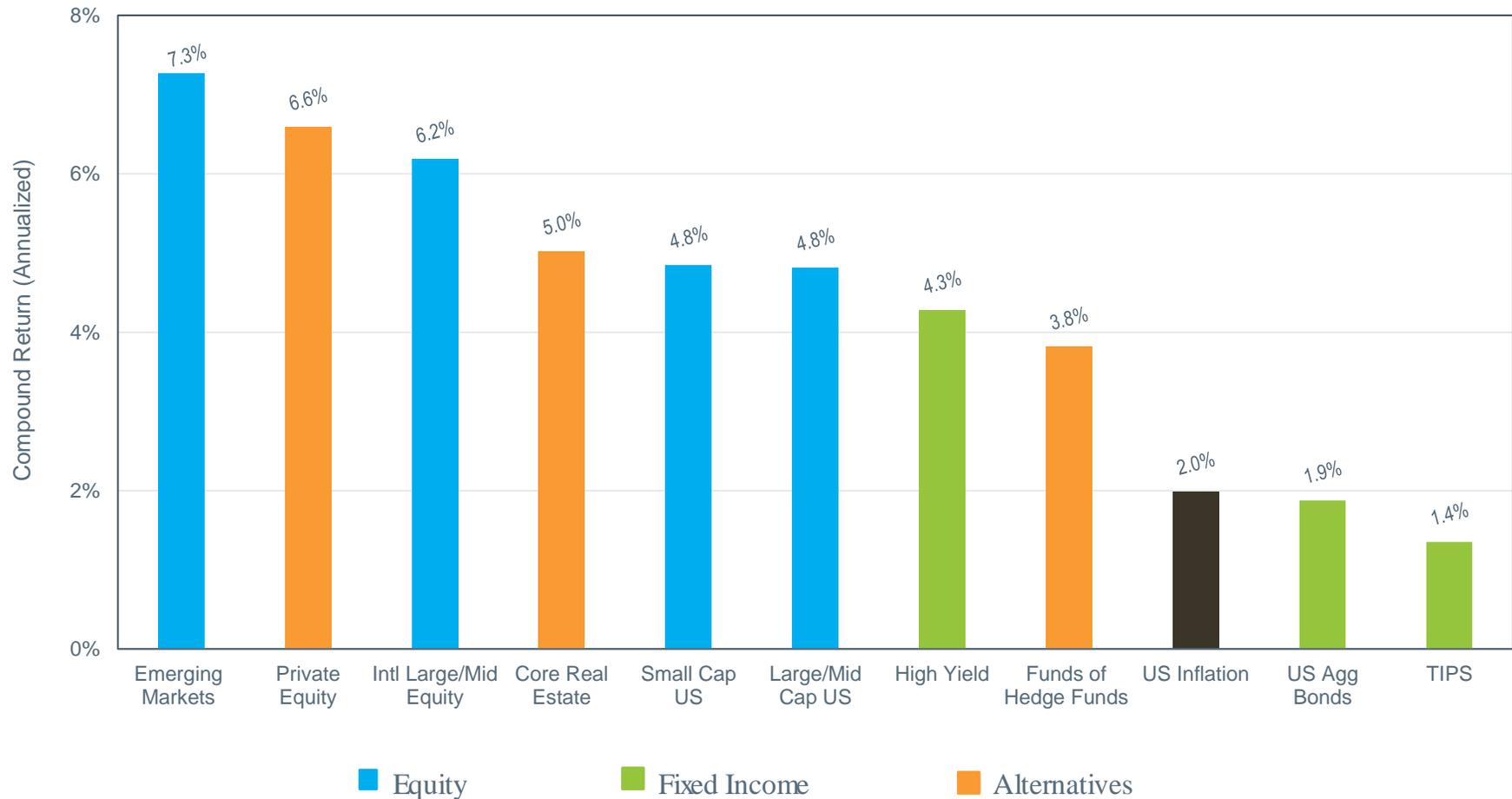
Mean-reversion

Mean reversion is considered for asset classes that demonstrated strong performance over the last year (or longer). *All equity return assumptions were decreased, given the historically elevated valuation levels and reduced dividend yields.*

Low yields

Yield history, current environment, and prospective environments are considered. *The majority of the fixed income return assumptions were decreased, given historically low starting yields and reduced spreads.*

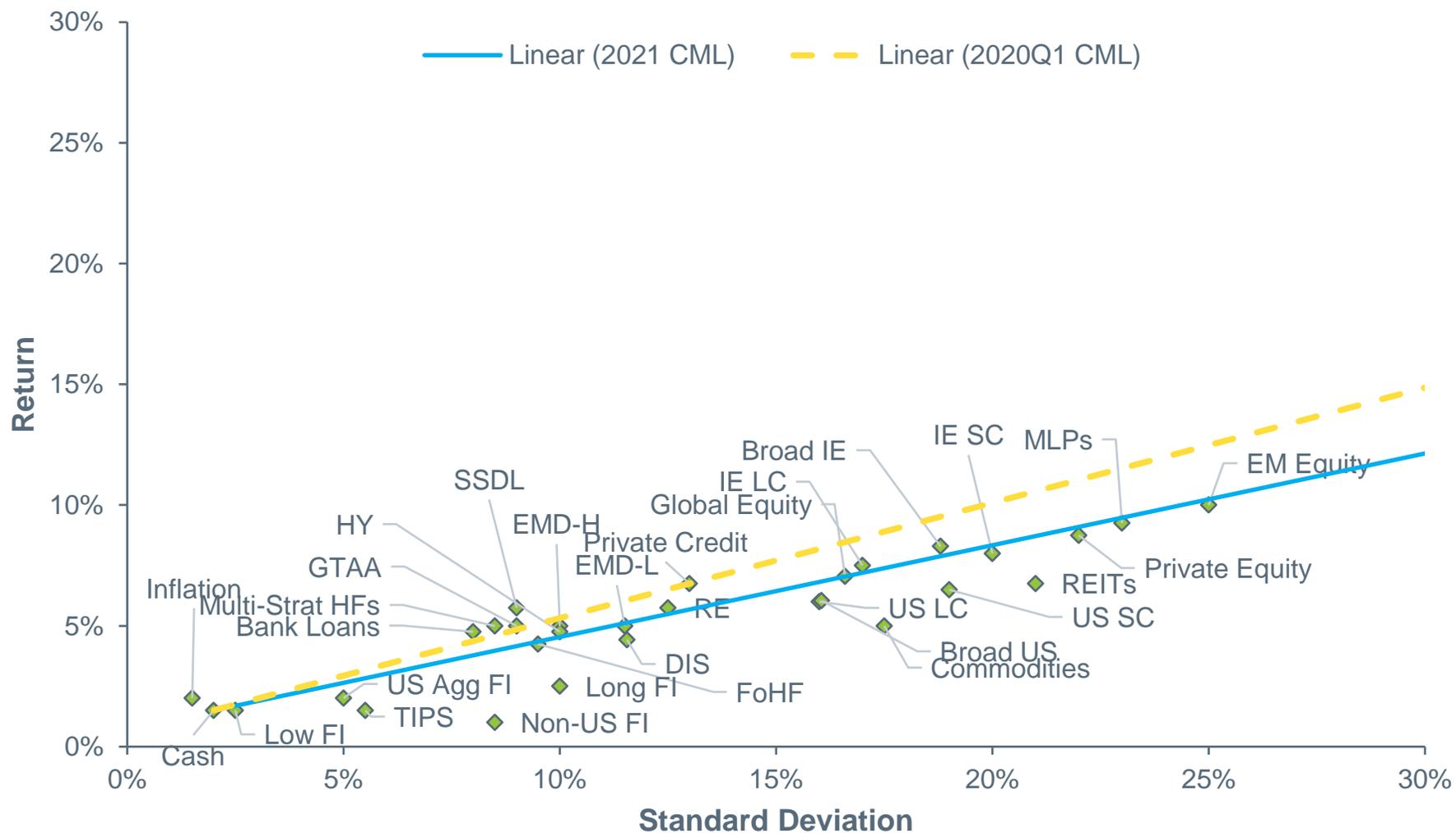
RVK 2021 Compound Return Assumptions



RVK 2021 Assumptions vs. 2020 Q1

Asset Class	2020 Q1			2021			Change (2020 Q1 - 2021)		
	Nominal Return (Arith.)	Risk (St. Dev.)	Nominal Return (Geo.)	Nominal Return (Arith.)	Risk (St. Dev.)	Nominal Return (Geo.)	Nominal Return (Arith.)	Risk (St. Dev.)	Nominal Return (Geo.)
Large/Mid Cap US Equity	7.25%	16.00%	6.08%	6.00%	16.00%	4.81%	-1.25%	0.00%	-1.26%
Small Cap US Equity	8.50%	19.00%	6.87%	6.50%	19.00%	4.84%	-2.00%	0.00%	-2.03%
Broad US Equity	7.30%	16.00%	6.13%	6.05%	16.05%	4.86%	-1.25%	0.05%	-1.27%
Dev'd Large/Mid Cap Int'l Equity	9.00%	17.00%	7.70%	7.50%	17.00%	6.18%	-1.50%	0.00%	-1.52%
Dev'd Small Cap Int'l Equity	10.00%	20.00%	8.23%	8.00%	20.00%	6.19%	-2.00%	0.00%	-2.03%
Emerging Markets Equity	11.25%	25.00%	8.54%	10.00%	25.00%	7.26%	-1.25%	0.00%	-1.28%
Broad International Equity	9.70%	18.30%	8.20%	8.30%	18.80%	6.70%	-1.40%	0.50%	-1.50%
Global Equity	8.35%	16.35%	7.14%	7.05%	16.60%	5.79%	-1.30%	0.25%	-1.35%
US Aggregate Fixed Income	2.50%	5.00%	2.38%	2.00%	5.00%	1.88%	-0.50%	0.00%	-0.50%
Non-US Dev'd Sovereign Fixed Income UH	1.25%	8.50%	0.90%	1.00%	8.50%	0.64%	-0.25%	0.00%	-0.25%
Emerging Markets Debt Hard Currency	7.00%	10.00%	6.54%	5.00%	10.00%	4.53%	-2.00%	0.00%	-2.01%
Emerging Markets Debt Local Currency	5.75%	11.50%	5.13%	5.00%	11.50%	4.38%	-0.75%	0.00%	-0.75%
TIPS	2.50%	5.50%	2.35%	1.50%	5.50%	1.35%	-1.00%	0.00%	-1.00%
Low Duration Fixed Income	2.00%	2.50%	1.97%	1.50%	2.50%	1.47%	-0.50%	0.00%	-0.50%
Long Duration Fixed Income	3.00%	10.00%	2.52%	2.50%	10.00%	2.02%	-0.50%	0.00%	-0.50%
High Yield	7.50%	10.00%	7.04%	4.75%	10.00%	4.28%	-2.75%	0.00%	-2.76%
Bank Loans	7.00%	8.00%	6.70%	4.75%	8.00%	4.45%	-2.25%	0.00%	-2.26%
Core Real Estate	5.75%	12.50%	5.02%	5.75%	12.50%	5.02%	0.00%	0.00%	0.00%
Global REITs	7.50%	21.00%	5.51%	6.75%	21.00%	4.74%	-0.75%	0.00%	-0.76%
MLPs	11.75%	23.00%	9.46%	9.25%	23.00%	6.91%	-2.50%	0.00%	-2.55%
Funds of Hedge Funds	4.75%	9.50%	4.32%	4.25%	9.50%	3.82%	-0.50%	0.00%	-0.50%
Multi-Strategy Hedge Funds	5.50%	8.50%	5.16%	5.00%	8.50%	4.66%	-0.50%	0.00%	-0.50%
GTAA	5.50%	9.00%	5.12%	5.00%	9.00%	4.62%	-0.50%	0.00%	-0.50%
Private Credit	9.00%	13.00%	8.23%	6.75%	13.00%	5.97%	-2.25%	0.00%	-2.27%
Senior Secured Direct Lending	8.00%	9.00%	7.63%	5.75%	9.00%	5.37%	-2.25%	0.00%	-2.26%
Private Equity	10.00%	22.00%	7.86%	8.75%	22.00%	6.59%	-1.25%	0.00%	-1.27%
Commodities	5.00%	17.50%	3.57%	5.00%	17.50%	3.57%	0.00%	0.00%	0.00%
Diversified Inflation Strategies	5.00%	11.50%	4.38%	4.45%	11.55%	3.82%	-0.55%	0.05%	-0.56%
US Inflation	2.00%	1.50%	1.99%	2.00%	1.50%	1.99%	0.00%	0.00%	0.00%
Cash Equivalents	1.50%	2.00%	1.48%	1.50%	2.00%	1.48%	0.00%	0.00%	0.00%

Capital Markets Line



Asset Allocation – Review of Investment Objectives, Constraints, and Asset Class Roles



What is “Strategic Asset Allocation” and Why is it Important?

Strategic Asset Allocation

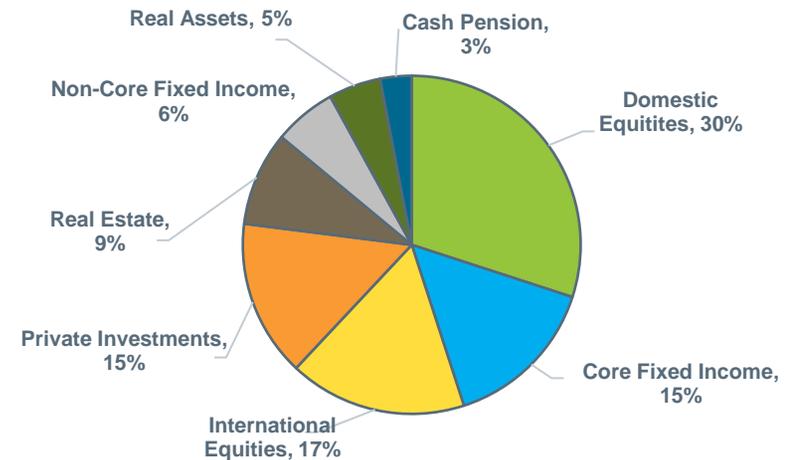
Definition

Asset allocation refers to a portfolio construction framework whereby investors diversify a portfolio of investments across various asset groups that share distinct and relatively homogenous return and risk drivers. When executed successfully, asset allocation reduces portfolio risk and enhances long term expected returns.

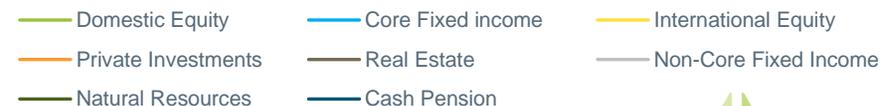
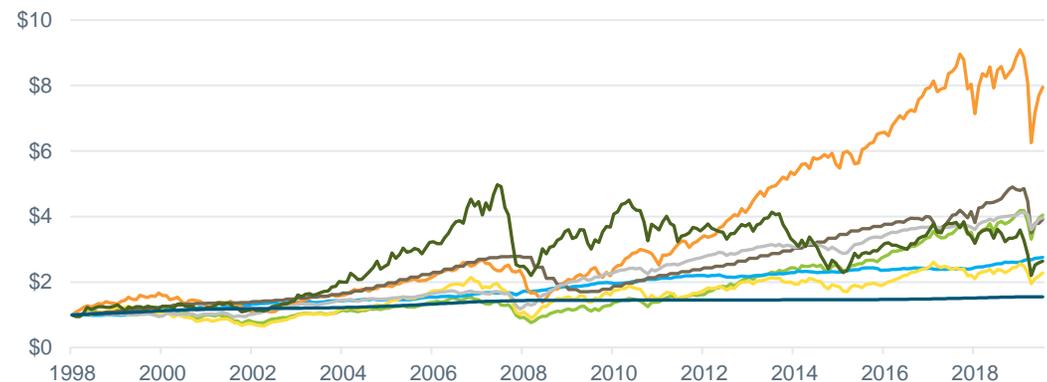
Benefits

- ❑ **Enhancement of Risk-Adjusted Return** – Asset classes that have unique or differing return drivers (e.g., equity, fixed income, real estate, etc.) have historically exhibited low return correlations. As a result, portfolios that are diversified across these asset classes tend to exhibit lower portfolio volatility and improved risk-adjusted returns.
- ❑ **Leveraging Comparative Advantages** – Investors who maintain a comparative advantage in specific market segments can amplify returns by increasing allocations to these segments.

Montana Board of Investments
Midpoint Asset Allocation¹



Index Performance (Growth of \$1)²



¹ Midpoint Asset Allocation is typically reviewed every 1-3 years to affirm positioning.

² Index performance shown for each asset class is represented by the primary benchmark for each of MBOI's asset classes.

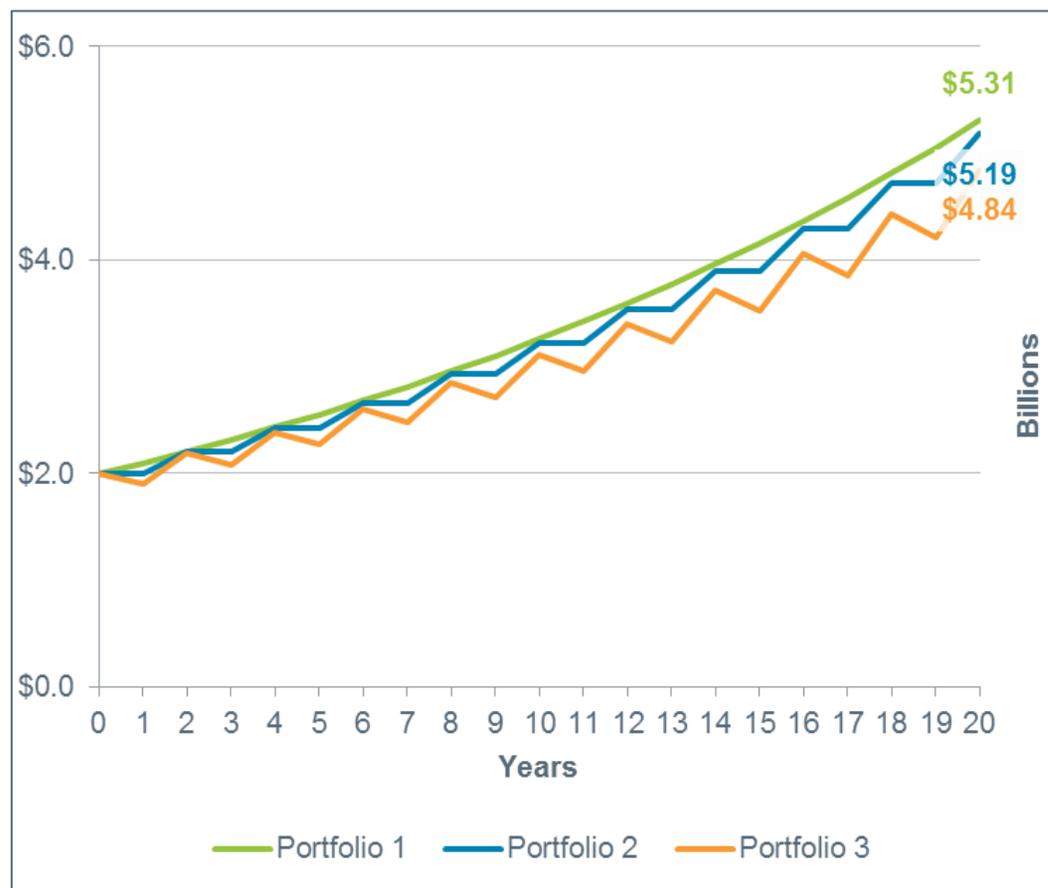
Volatility Erodes Portfolio Wealth

All things equal, portfolios with greater volatility will underperform less volatile portfolio mixes over time.

All portfolios start with \$2 billion and have the same average return over 20 years.

Years	Portfolio 1	Portfolio 2	Portfolio 3
1	5.0%	0.0%	-5.0%
2	5.0%	10.0%	15.0%
3	5.0%	0.0%	-5.0%
4	5.0%	10.0%	15.0%
5	5.0%	0.0%	-5.0%
6	5.0%	10.0%	15.0%
7	5.0%	0.0%	-5.0%
8	5.0%	10.0%	15.0%
9	5.0%	0.0%	-5.0%
10	5.0%	10.0%	15.0%
11	5.0%	0.0%	-5.0%
12	5.0%	10.0%	15.0%
13	5.0%	0.0%	-5.0%
14	5.0%	10.0%	15.0%
15	5.0%	0.0%	-5.0%
16	5.0%	10.0%	15.0%
17	5.0%	0.0%	-5.0%
18	5.0%	10.0%	15.0%
19	5.0%	0.0%	-5.0%
20	5.0%	10.0%	15.0%

Average	5.0%	5.0%	5.0%
Std. Deviation	0.0%	5.1%	10.3%
Compound Return	5.0%	4.9%	4.5%



Correlation and Diversification Matter

Portfolios comprised of less correlated investments will provide better protection in down market environments (as indicated by a lower portfolio standard deviation).

Portfolio I (Higher Correlation)

Investments	A	B
Allocation (%)	56.0%	44.0%
Return	10.0%	7.0%
St Dev.	12.0%	8.0%
Correlation	0.90	
Portfolio Expected Return	8.7%	
Portfolio St Dev.	10.0%	

Portfolio II (Lower Correlation)

Investments	A	B
Allocation (%)	56.0%	44.0%
Return	10.0%	7.0%
St Dev.	13.2%	8.8%
Correlation	0.10	
Portfolio Expected Return	8.7%	
Portfolio St Dev.	8.7%	

MBOI Retirement Plan Investment Objectives & Constraints

Financial Objectives

Provide sufficient funds to cover expected benefit payments over the life of the plan.

Return Objective

The primary long-term risk to the retirement plans is the failure to generate the actuarially assumed return that is necessary to fund the payment of future benefits. In order to mitigate this risk, the MBOI seeks to maximize long term return, while managing risks. Specific return objectives that derive from this overarching goal include:

- ✓ Exceed the actuarial annual target rate of return, as determined by governing boards of the public retirement systems, net of all investment and administrative expenses and at a risk level appropriate for the MBOI plans which also may be broadly consistent with other similar public fund peers.
- ✓ Exceed the investment policy benchmark for the retirement plans, which represents the return the plan would have achieved if the plan implemented a passively managed portfolio.
- ✓ Rank in the top half of comparable public pension plans.

Risk Tolerance

The fund has a moderate to high tolerance for risk. The primary driver of risk tolerance is the liquidity requirement to fund monthly distributions to beneficiaries and capital calls for illiquid investments.

Investment Constraints

In addition to cash flow and liquidity considerations to meet benefit payments, capital calls, and other requirements, investment staff and system resources are a consideration in supporting the investment program.

Purpose for MBOI's Current Investments

<u>Asset Class</u>	<u>Objectives</u>	<u>Primary Role in MBOI Portfolio</u>
Domestic Equity	<ul style="list-style-type: none">• Capital Appreciation• Inflation Protection	Capitalize on equity risk premium (relative to the risk-free rate of treasury bonds) in domestic markets in order to generate higher portfolio returns.
International Equity	<ul style="list-style-type: none">• Capital Appreciation• Inflation Protection	Capitalize on equity risk premium (relative to the risk-free rate of treasury bonds) in international markets in order to generate higher portfolio returns.
Private Investments	<ul style="list-style-type: none">• Capital Appreciation	Capitalize on illiquidity risk premium (relative to public equity) to generate returns in excess of public equity markets.
Real Assets	<ul style="list-style-type: none">• Inflation Protection	Protection against unexpected inflation, as well as potential return enhancement and equity risk diversification.
Real Estate	<ul style="list-style-type: none">• Inflation Protection• Capital Appreciation	Diversification, income generation, return enhancement, and inflation correlation.
Core Fixed Income	<ul style="list-style-type: none">• Capital Preservation	Preservation of capital and provision of liquidity via investment in high quality debt securities that provide stable income.
Non-Core Fixed Income	<ul style="list-style-type: none">• Capital Preservation• Capital Appreciation	Enhanced return potential relative to Core Fixed Income by investing in securities with greater income and return potential.

Asset Allocation Study



Mean Variance Optimization

- ❑ Mean Variance Optimization (MVO) is a modeling tool based on linear programming. The model was created by Nobel Laureate, Harry Markowitz in 1952. MVO is used by investment professionals to identify portfolio allocations that maximize return for a given level of risk (expressed only as portfolio volatility).
- ❑ Inputs into the model are forecasts of asset class return, risk (volatility), and correlation to suggest *optimal* allocations or “*efficient portfolios*.”
- ❑ While MVO is a powerful tool, subjective judgment is equally important when determining a prudent asset allocation. Below is a high level summary of the benefits and shortcomings of the MVO model:

Pros

Valuable framework to illustrate the risk and return tradeoff

Cons

Notable margin of error and assumption that volatility is the primary definition of risk

Benefits:

- ✓ Research Shows that Asset Allocation is the #1 Driver of Portfolio Risk and Return
- ✓ Provides a Powerful Framework to Visualize the Trade-Off Between Return and Volatility

Shortcomings:

- ✗ Fails to Fully Capture Non-Normal Return Patterns
- ✗ Fails to Capture Non-Risk Related Decision Factors
- ✗ Assumes Static Asset Class Correlations
- ✗ Highly Sensitive to Slight Changes to Input Values, which Themselves Have a High Margin of Error
- ✗ Fails to Capture the Potential Value Added from Active Management

Asset Allocation Study – Results

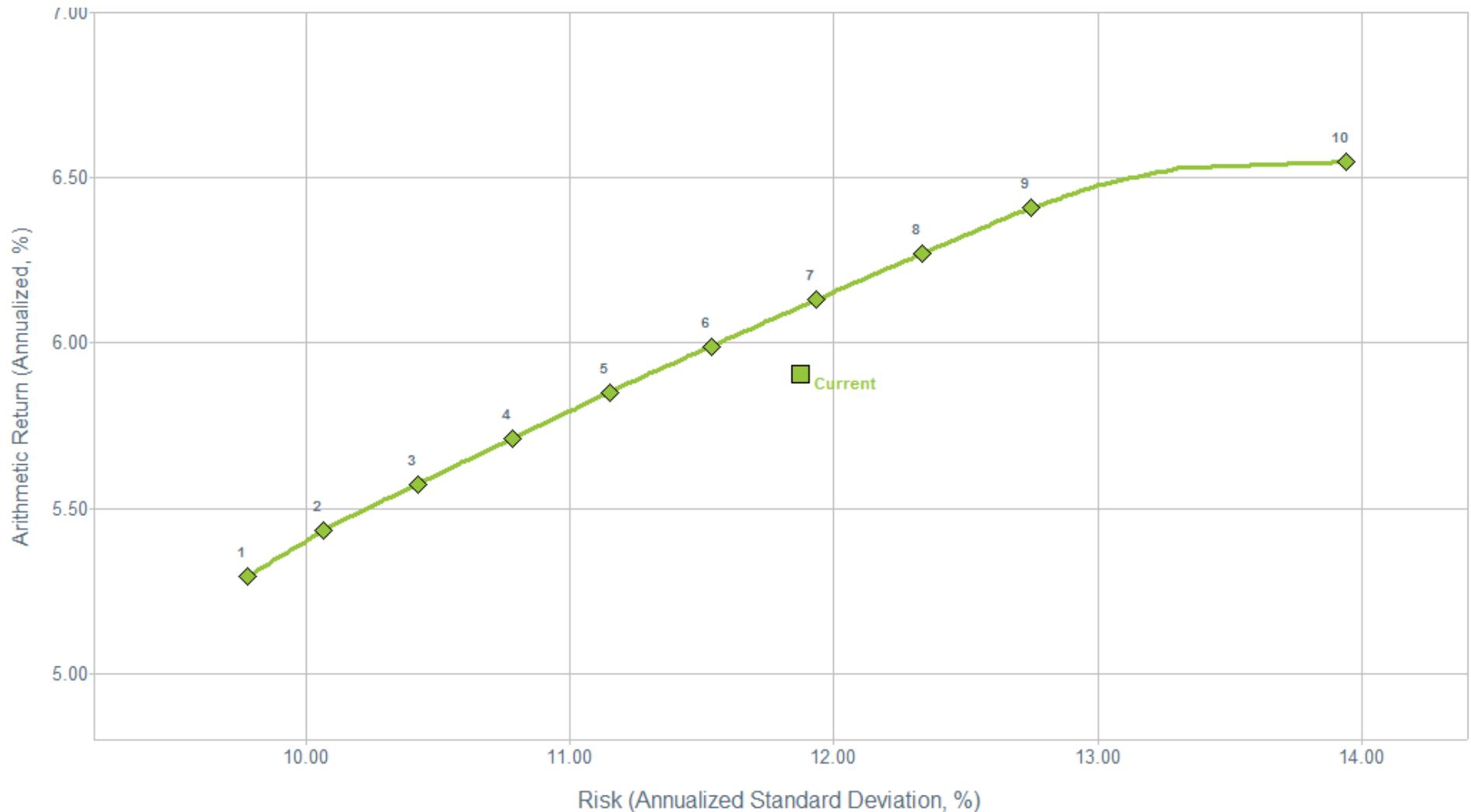
Efficient Portfolios

	Min	Max	1	2	3	4	5	6	7	8	9	10	Current
Domestic Equities	24	36	24	24	24	24	24	24	24	24	24	36	30
International Equities	11	21	11	14	17	18	20	21	21	21	21	21	17
Private Investments	11	19	11	11	11	11	11	12	14	16	18	19	15
Real Assets	1	7	5	2	1	1	1	1	1	1	1	1	5
Real Estate	5	13	13	13	13	13	13	13	13	13	13	5	9
Core Fixed Income	15	25	25	25	25	25	24	22	20	18	16	15	15
Non-Core Fixed Income	3	7	7	7	7	7	7	7	7	7	7	3	6
Cash Equivalents	0	4	4	4	2	1	0	0	0	0	0	0	3
Total			100	100	100	100	100	100	100	100	100	100	100
Capital Appreciation			53	56	59	60	62	64	66	68	70	79	68
Capital Preservation			29	29	27	26	24	22	20	18	16	15	18
Alpha			0	0	0	0	0	0	0	0	0	0	0
Inflation			18	15	14	14	14	14	14	14	14	6	14
Expected Arithmetic Return			5.19	5.32	5.45	5.58	5.71	5.84	5.97	6.10	6.23	6.36	5.91
Expected Risk (Standard Deviation)			9.48	9.74	10.06	10.40	10.75	11.10	11.46	11.83	12.21	13.53	11.87
Expected Compound Return			4.77	4.87	4.97	5.07	5.17	5.26	5.36	5.45	5.54	5.51	5.25
Expected Return (Arithmetic)/Risk Ratio			0.55	0.55	0.54	0.54	0.53	0.53	0.52	0.52	0.51	0.47	0.50
RVK Expected Eq Beta (LCUS Eq = 1)			0.55	0.57	0.59	0.61	0.63	0.65	0.67	0.69	0.70	0.80	0.70
RVK Liquidity Metric (T-Bills = 100)			70	70	70	69	69	68	67	65	64	70	70

Asset Allocation Study – Results

- ❑ The current midpoints plot close to the efficient frontier and as such, represent an efficiently diversified portfolio.

Efficient Frontier



Asset Allocation Study – Results

Monte Carlo Analysis

1 Year	1	2	3	4	5	6	7	8	9	10	Current
1st Percentile	-20.44	-22.06	-22.94	-23.82	-24.51	-25.50	-26.15	-27.07	-28.04	-32.53	-26.57
5th Percentile	-9.42	-10.39	-10.91	-11.36	-11.84	-12.23	-12.67	-13.11	-13.61	-16.24	-12.80
25th Percentile	-0.25	-0.53	-0.62	-0.75	-0.85	-0.93	-1.02	-1.07	-1.14	-2.19	-1.17
50th Percentile	5.42	5.56	5.72	5.84	5.98	6.16	6.25	6.42	6.58	6.69	6.07
75th Percentile	11.15	11.71	12.12	12.48	12.88	13.20	13.57	13.92	14.26	15.57	13.41
95th Percentile	20.04	21.13	21.88	22.64	23.40	24.06	24.74	25.42	26.19	29.28	24.63
99th Percentile	26.54	28.37	29.40	30.39	31.43	32.38	33.22	34.15	35.26	39.71	33.02
3 Years											
1st Percentile	-11.03	-12.03	-12.69	-13.34	-14.18	-14.80	-15.48	-16.13	-16.78	-20.67	-15.64
5th Percentile	-4.37	-4.90	-5.21	-5.50	-5.78	-6.02	-6.28	-6.52	-6.83	-8.60	-6.39
25th Percentile	1.67	1.52	1.50	1.48	1.47	1.47	1.47	1.45	1.42	0.76	1.24
50th Percentile	5.11	5.23	5.36	5.47	5.59	5.72	5.85	5.97	6.10	6.08	5.60
75th Percentile	8.56	8.90	9.17	9.43	9.69	9.92	10.19	10.43	10.68	11.41	9.95
95th Percentile	13.63	14.33	14.83	15.30	15.75	16.21	16.65	17.05	17.51	19.12	16.37
99th Percentile	17.27	18.25	18.80	19.37	20.00	20.56	21.11	21.69	22.28	24.67	20.93
5 Years											
1st Percentile	-6.79	-7.59	-8.07	-8.49	-8.92	-9.26	-9.66	-10.09	-10.55	-13.69	-9.91
5th Percentile	-2.36	-2.80	-3.01	-3.20	-3.43	-3.58	-3.78	-3.95	-4.15	-5.55	-3.91
25th Percentile	2.29	2.22	2.22	2.23	2.23	2.23	2.23	2.24	2.25	1.66	2.04
50th Percentile	5.11	5.21	5.33	5.44	5.55	5.67	5.79	5.89	6.01	5.96	5.55
75th Percentile	7.78	8.06	8.28	8.52	8.73	8.95	9.18	9.42	9.64	10.14	8.96
95th Percentile	11.62	12.16	12.57	12.95	13.33	13.70	14.07	14.43	14.83	16.13	13.82
99th Percentile	14.62	15.32	15.81	16.26	16.79	17.30	17.77	18.20	18.70	20.60	17.49
10 Years											
1st Percentile	-3.39	-3.86	-4.19	-4.47	-4.82	-5.01	-5.35	-5.68	-6.07	-8.07	-5.47
5th Percentile	-0.26	-0.57	-0.72	-0.82	-0.93	-1.05	-1.18	-1.31	-1.47	-2.61	-1.36
25th Percentile	3.03	2.98	3.00	3.02	3.04	3.08	3.11	3.13	3.15	2.71	2.91
50th Percentile	5.01	5.09	5.21	5.31	5.41	5.53	5.62	5.73	5.84	5.80	5.41
75th Percentile	6.89	7.12	7.31	7.50	7.67	7.86	8.03	8.21	8.40	8.74	7.83
95th Percentile	9.70	10.11	10.41	10.69	10.98	11.28	11.58	11.82	12.13	12.97	11.34
99th Percentile	11.62	12.09	12.53	12.89	13.30	13.63	13.96	14.39	14.76	16.01	13.86

Appendix



Asset Allocation Assumptions

Asset Class	Arithmetic Return Assumption	Standard Deviation Assumption
Domestic Equities	6.05	16.05
International Equities	8.30	18.80
Private Investments	8.75	22.00
Real Assets	4.45	11.55
Real Estate	5.75	12.50
Core Fixed Income	2.00	5.00
Non-Core Fixed Income	4.75	10.00
Cash Equivalents	1.50	2.00

	Domestic Equities	International Equities	Private Investments	Real Assets	Real Estate	Core Fixed Income	Non-Core Fixed Income	Cash Equivalents
Domestic Equities	1.00	0.85	0.79	0.66	0.22	0.15	0.65	-0.02
International Equities	0.85	1.00	0.79	0.78	0.28	0.01	0.71	-0.11
Private Investments	0.79	0.79	1.00	0.68	0.33	-0.27	0.65	-0.14
Real Assets	0.66	0.78	0.68	1.00	0.37	0.25	0.67	-0.05
Real Estate	0.22	0.28	0.33	0.37	1.00	-0.05	0.12	0.05
Core Fixed Income	0.15	0.01	-0.27	0.25	-0.05	1.00	0.24	0.28
Non-Core Fixed Income	0.65	0.71	0.65	0.67	0.12	0.24	1.00	-0.10
Cash Equivalents	-0.02	-0.11	-0.14	-0.05	0.05	0.28	-0.10	1.00

Summary of Expected Return Methodology

Building Block Methodology	Income	+	Inflation	+	Real Growth	+ -	Valuation Change
Cash Equivalents	Income						
Fixed Income	Income + OAS change + Expected interest rate changes (and duration impact)						
TIPS	Real Income + Inflation						
Public Equity	Income + Inflation + Real GDP/earnings growth + / - Valuation						
Core Real Estate	Income + Inflation + / - Valuation – Investment fees						
Hedge Funds	Income (collateral return, cash) + Beta return + Alpha return						
Commodities	Collateral return (cash assumption) + Spot return (inflation assumption) + Roll return						
Spread Methodology	Beta assumption	+	Illiquidity premium				
Private Credit	Bank loan assumption + Return premium						
Private Equity	US large/mid cap equity assumption + Return premium						
Asset Blend Methodology							
GTAA	30% global equity + 25% US Agg fixed income + 5% int'l developed fixed income + 10% EMD (local) + 10% TIPS + 10% high yield + 10% commodities						
Diversified Inflation Strategies	1/3 TIPS + 1/3 commodities + 1/3 global REITs						

While the above factors generally inform the direction and magnitude of the capital market assumptions, RVK also considers qualitative, triangulation, and other factors as needed, when arriving at final assumption values.



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