MINNESOTA STATE BOARD OF INVESTMENT

STATE BOARD OF INVESTMENT
MEETING
August 24, 2022

Governor Tim Walz

State Auditor Julie Blaha

Secretary of State Steve Simon

Attorney General Keith Ellison

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STATE BOARD OF INVESTMENT MEETING

AGENDA

August 24, 2022

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AGENDA
STATE BOARD OF INVESTMENT MEETING
Wednesday, August 24, 2022
10:00 a.m.

G23 Senate Committee Room
State Capitol
75 Rev. Dr. Martin Luther King Jr. Boulevard
St. Paul, MN

		TAB	
1.	**Call to Order**		
2.	**Approval of Minutes of May 25, 2022**		**Motion Needed**
3.	**Performance Summary**	**A**	
4.	**Executive Director's Administrative Report** (Mansco Perry)	**B**	
5.	**Update on Meketa Climate Risk Project** (Allan Emkin)	**C**	
6.	**Recommendation for Climate Risk Investment Belief** (Mansco Perry)	**D**	**Motion Needed**
7.	**Master Custodian Services** (Mansco Perry)	**E**	**Motion Needed**
8.	**Contact and Document Management Database** (Mansco Perry)	**F**	**Motion Needed**
9.	**Foreign Tax Advisory Services** (Mansco Perry)	**G**	**Motion Needed**
10.	**Custodian Services for State's Cash Accounts** (Mansco Perry)	**H**	**Motion Needed**
11.	**Update from Executive Director Search Committee** (Gary Martin)	**I**	
12.	**Other Items**		

REPORTS

- **Private Markets Investment Program Report**
- **Public Markets Investment Program Report**
- **Participant Directed Investment Program and Non-Retirement Investment Program Report**
- **SBI Environmental, Social, and Governance (ESG) Report**
- **Aon Market Environment Report**
- **Meketa Capital Markets Outlook & Risk Metrics Report**
- **SBI Comprehensive Performance Report**

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Approval of
May 25, 2022
SBI Meeting Minutes

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Minutes
State Board of Investment Meeting
May 25, 2022

Notice of Meeting
The State Board of Investment (SBI) met at 10:15 a.m. Wednesday, May 25, 2022 in G23 Senate Committee Room, State Capitol, St. Paul Minnesota and over the phone. Attendance and all votes were conducted with a roll call.

Call to Order
Governor Tim Walz, Chairperson of the SBI, called the meeting to order. Governor Tim Walz, State Auditor Julie Blaha, Secretary of State Steve Simon, and Attorney General Keith Ellison were present.

Approval of Minutes
The minutes of the February 24, 2022 SBI meeting were approved by roll call vote.

Performance Summary
Executive Director Mansco Perry referred members to the March 31, 2022 Performance Summary provided in Tab A of the meeting materials. Mr. Perry informed the Board that as of March 31, 2022 the SBI was responsible for $131 billion in assets, of which the Combined Funds represent $90 billion of those assets.

Mr. Perry reported that the Combined Funds continue to meet its long-term objectives by outperforming its Composite Index over the ten-year period ending March 31, 2022 (Combined Funds 10.2% vs. Combined Funds Composite Index 9.9%) and providing a real rate of return above inflation over a 20 year time-period (Combined Funds 8.3% vs. CPI-U 2.4%). The Combined Funds underperformed the Composite Index for the quarter (Combined Funds -3.8% vs. Composite Index -3.7%) primarily from relative underperformance in public equities. For the year, the Combined Funds matched the Composite Index with a 9.5% return. Mr. Perry noted that the asset mix is in-line with the target allocation. He then referred members to the Volatility Equivalent Benchmark Comparison report, which shows that the Combined Funds earned a higher return versus a portfolio with an equity and bond allocation equivalent to the same risk. Lastly, Mr. Perry referred members to the Trust Universe Comparison Service (TUCS) report that compares the performance of the Combined Funds to other public funds with over $20 billion in assets. He stated that the Combined Funds performed in the 70th percentile for the quarter and the 42nd percentile for the year and in the first quartile for all other time-periods listed.

Executive Director's Administrative Report
Mr. Perry referred members to Tab B of the meeting materials for the Executive Director's Administrative Report. Mr. Perry highlighted the fact that the Administrative Budget included as Attachment A in the meeting material provides the total expenses for nine months ending March 31, 2022 and noted that Staff has started to travel again after taking a pause for a few years. Mr. Perry then introduced Mr. Mulé, Director of Legal and Policy Services to present the Legislative Update. Mr. Mulé referred Members to the legislative tracker included as Attachment C in the meeting material and noted that Staff has already implemented the Russia and

Belarus divestment requirements into its unauthorized holdings listing due to the legislation being signed into law. Mr. Mulé noted that the Omnibus Pension Policy and Technical Bill was signed into law and includes language to allow the SBI to fully implement the salary plan approved in 2019 with regard to classification of the investment analyst position. Mr. Perry continued with the Administrative Report by providing an update on the unauthorized holdings restrictions for Russia/Belarus, Sudan and Iran. Lastly, Mr. Perry noted that there is no litigation against the SBI.

Report from the SBI Administrative Committee

Mr. Perry referred members to Tab C of the meeting materials for the SBI Administrative Committee Report. He stated that the Administrative Committee met in May and reviewed the Executive Director's Work Plan for the 2023 fiscal year, the Administrative Budget for the 2023 and 2024 fiscal years, and the Continuing Fiduciary Education Plan. Mr. Perry noted that the Administrative Committee would reconvene a few months after his successor has been in the role to reassess the work plan and other items. Work plan items that Mr. Perry highlighted include the completion of the Meketa Climate Risk Analysis, the Diversity, Equity and Inclusion (DEI) Policy, and a number of Request for Proposals (RFPs) issued as various contracts are scheduled to expire. In response to Auditor Blaha's question, Mr. Perry noted that the Combined Funds strategic allocation focuses on a long-term time-period and Staff does not react to short-term turbulence in the market.

State Auditor Blaha moved approval of the following recommendations, which reads: "**The Committee recommends that the SBI approve the FY23 Executive Director's Work Plan. Further, the Committee recommends that the Work Plan serve as the basis for the Executive Director's performance evaluation for FY23.**

The Committee recommends that the SBI approve the FY23, and FY24 Administrative Budget Plan, as presented to the Committee, and that the Executive Director have the flexibility to reallocate funds between budget categories if the Executive Director deems necessary.

The Committee recommends that the SBI adopt the attached Continuing Fiduciary Education Plan." The motion passed by roll call vote.

Meketa Climate Change Investment Analysis: Phase II

Governor Walz referred members to Tab D of the meeting materials for an update on the Climate Change Investment Analysis and introduced Mr. Emkin from Meketa Investment Group who discussed Phase II of the analysis. Mr. Emkin reminded the Board that there are three phases to this analysis: Phase I was presented at the March Board meeting and provided a high-level review of global trends in climate change and related developments in financial markets across asset classes, policy and regulatory frameworks. Phase II, provided in the meeting material, highlights the survey responses from 20 public pension plans that are leaders in their efforts to manage climate-related investment risks and opportunities. Meketa found there is a broad range of policies with no best practice recognized from its peers on how to address this issue. Phase III of the analysis will be presented at the August Board meeting and will focus on the SBI's current exposure to climate risks and opportunities throughout the Combined Funds and provide options for the SBI to implement a successful climate transition strategy.

Members recognized the intentional and thoughtful approach Meketa has taken with this analysis and Staff for managing the process to bring the SBI closer towards net zero as fiduciaries of the retirement assets.

Recommendation to add Diversity, Equity and Inclusion (DEI) Statement to the SBI's Investment Beliefs

Mr. Perry referred members to Tab E of the meeting materials with a recommendation from the DEI Committee to amend the SBI Investments Beliefs to include a statement that reflects the belief that diversity adds value and should be valued by the investment industry. Mr. Perry stated that Meketa assisted in developing the following statement:

> ***"Best practices are developed by the best teams.***
> *There is no merit-based explanation for the lack of racial and gender diversity in the investment industry. In fact, research indicates that such diversity adds value. The SBI must ensure that non-financial biases do not prevent it from working with the best teams. In this diverse and changing world, organizations that demonstrate a commitment to diversity are more likely to succeed."*

State Auditor Blaha moved approval of the recommendation which reads: "**The Investment Advisory Council endorsed the Executive Director's recommendation to the SBI Board that the aforementioned language be added to the SBI's Investment Beliefs at the May 25, 2022 SBI Meeting."** The motion passed by roll call vote.

Recommendation for the Water Quality and Sustainability Account from the 3M Settlement

Mr. Perry referred members to Tab F of the meeting materials that provides information for the creation of the Water Quality and Sustainability sub-accounts for Minnesota Pollution Control Agency (MPCA) and Department of Natural Resources (DNR), as co-trustees. Each sub-account has a specific asset allocation to address the risk tolerance and return objectives based on required cash flow needs and time horizon. Mr. Perry stated that if approved by the Board, he would sign the Letter of Understanding that MPCA and DNR Commissioners have already executed in order to proceed with the working of this account. Secretary of State Simon moved approval of the recommendation that reads: "**The Investment Advisory Council endorsed the SBI Staff's recommendation that the Board approve the establishment of the Water Quality and Sustainability Account and required sub-accounts. Once approved, it is the intent of all parties to implement the new separate account structure by July 1, 2022 or later if determined appropriate by the Co-Trustees."** The motion passed by roll call vote.

Investment Accounting System Review

Mr. Perry referred members to Tab G of the meeting materials that provided information on the review of investment accounting system for the internally managed portfolios. Mr. Perry stated that Staff initiated the Request for Proposal (RFP) process in February of 2022 since the contract for the current provider expires in December of 2022. After a review of the responses from ten firms, Staff recommends to continue with Broadridge Financial Solutions as the investment accounting system provider for the internally managed portfolios. State Auditor Blaha moved approval of the recommendation that reads: "**The Executive Director concurs with Staff's recommendation and requests the Board authorize the Executive Director, with assistance**

from SBI's legal counsel, to negotiate and execute a contract with Broadridge Financial Solutions, Inc. for the Investment Accounting System services for a five year period ending no later than December 31, 2027." The motion passed by roll call vote.

Private Markets Commitment for Consideration
Mr. Martin, Chairperson of the Investment Advisory Council (IAC), delivered the report on the Private Market commitment for consideration listed in Tab H of the meeting materials. Mr. Martin stated that Blackstone is a long-time general partner with the SBI. He highlighted some of the IAC discussion for this investment included the opportunistic value add type of properties in this strategy and Blackstone's Environmental, Social and Governance (ESG) efforts as a firm and in the management of its properties.

State Auditor Blaha moved approval of the recommendation that reads: **"The Investment Advisory Council concurs with Staff's recommendation that the SBI authorize the Executive Director, with assistance from the SBI's legal counsel, to negotiate and execute a commitment of up to $200 million, or 20% of Blackstone Real Estate Partners X, whichever is less, plus an additional amount not to exceed one percent of the total commitment for the payment of required charges at closing. Approval of this potential commitment is not intended to be, and does not constitute in any way, a binding or legal agreement or impose any legal obligations on the State Board of Investment and neither the State of Minnesota, the Investment Advisory Council, the State Board of Investment nor its Executive Director have any liability for reliance by Blackstone Inc. upon this approval. Until the Executive Director on behalf of the SBI executes a formal agreement, further due diligence and negotiations may result in the imposition of additional terms and conditions on Blackstone Inc. or reduction or termination of the commitment."** The motion passed by roll call vote.

Update from Executive Director Search Committee
Mr. Martin provided members with an update from the Executive Director Search Committee. He stated that the committee selected Korn/Ferry to assist in the executive director search process and outlined the anticipated timeline for candidate interviews and a recommendation to the Board.

Security and Exchange Commission (SEC) Climate Disclosure Rule Report
Mr. Blumenshine, SBI Investment Officer, Stewardship and ESG stated that the SBI would submit a public comment in support of the SEC's proposed rules for the enhancement and standardization of climate related disclosure for investors. Mr. Blumenshine noted that these proposed rules will not necessarily be easy to implement for corporations but are needed in order to create the framework for maintaining the long-term health of the financial markets in which the SBI invests. Mr. Blumenshine informed the Board that they have been given a copy of a resolution to this matter.

State Auditor Blaha moved approval to adopt the Resolution on Climate Change Risk-Related Information Transparency to the SEC (see **Attachment A**). The motion passed by roll call vote.

Other Items and Reports
Mr. Perry stated that the remainder of the reports in the meeting materials include the following: Presentation of Non-Defined Benefit Investment Programs; Public Markets Investment Report;

Participant Directed Investment Program and Non-Retirement Investment Program Report; SBI ESG Report; Aon Market Environmental Report; Meketa Capital Markets Outlook & Risk Report; and the SBI Comprehensive Performance Report. Mr. Perry referenced one report in particular, the Presentation of Non-Defined Benefit Investment Program, which covered all the non-pension asset investment programs that the SBI is responsible for and how these assets account for a third of the assets under the SBI's responsibility.

Public Testimony
Governor Walz recognized Bonnie Beckel, representative of the Minnesota Divestment Coalition; Jessica Garraway, a Minneapolis educator; Dr. Barry Cohen, Member of Jewish Voice for Peace and representing the Minnesota BDS Community; and Ilan Sharon, representing the Jewish Community Relations Council (JCRC). Governor Walz thanked the public speakers for their testimony.

Adjournment of Meeting
Secretary of State Simon moved approval to adjourn the meeting. The motion passed by roll call vote. The meeting adjourned at 11:17 a.m.

Respectfully submitted,

Mansco Perry III

Mansco Perry III
Executive Director and
Chief Investment Officer

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Minnesota State Board of Investment
60 Empire Drive, Suite 355
St. Paul, MN 55103
Phone: (651) 296-3328
Fax: (651) 296-9572
Email: minn.sbi@state.mn.us
Website: https://mn.gov/sbi/
An Equal Opportunity Employer

RESOLUTION ON CLIMATE CHANGE RISK-RELATED INFORMATION TRANSPARENCY

WHEREAS, the primary mission of Minnesota State Board of Investment (MSBI) is to maintain the long-term viability of various retirement and other state funds for the State of Minnesota;

WHEREAS, the MSBI is a large, diversified, and long-term investor and broad market returns are the primary driver of our long-term returns;

WHEREAS, market returns depend on the long-term health of the economy, which in turn depends on the productivity of social and environmental systems;

WHEREAS, effects from climate change on social and environmental systems represent a material risk to the MSBI maintaining the long-term viability of its funds;

WHEREAS, investors need consistent, reliable and comparable information to manage all market risk, especially material systematic risk such as climate change;

WHEREAS, the Security and Exchange Commission (SEC) has the authority to promulgate disclosure requirements for the protection of investors and has proposed rules for consistent disclosure of material climate-related risks.

NOW, THEREFORE, BE IT RESOLVED that the MSBI supports the Proposed Rules for The Enhancement and Standardization of Climate-Related Disclosures for Investors, File No. S7-10-22:

1. The MSBI believes that implementation of the proposed rules will result in better transparency and enhanced due diligence for investors.

2. The MSBI will submit a comment letter addressing the proposed rule in more detail prior to the comment submission deadline.

Adopted this 25th day
of May, 2022

Governor Tim Walz
Chair, Minnesota
State Board of Investment

State Auditor Julie Blaha
Minnesota
State Board of Investment

Secretary of State Steve Simon
Minnesota
State Board of Investment

Attorney General Keith Ellison
Minnesota
State Board of Investment

TAB A

Quarterly
Performance Summary

June 30, 2022

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Performance Summary

June 30, 2022

Description of SBI Investment Programs

The Minnesota State Board of Investment is responsible for the investment management of various retirement funds, trust funds and cash accounts.

Combined Funds

The Combined Funds represent the assets for both the active and retired public employees in the statewide retirement systems, the biggest of which are the Public Employees Retirement Association (PERA), the Teachers Retirement Association (TRA), and the Minnesota State Retirement System (MSRS). The SBI commingles the assets of these plans into the Combined Funds to capture investment efficiencies. All assets in the Combined Funds are managed externally by investment management firms retained by contract.

Fire Plans + Other Retirement Plans

Fire Plans and Other Retirement Plans include assets from volunteer fire relief plans and other public retirement plans with authority to invest with the SBI, if they so choose. Fire Plans that are not eligible to be consolidated with Public Employees Retirement Association (PERA) or elect not to be administered by PERA may invest their assets with the SBI using the same asset pools as the Combined Funds. The Statewide Volunteer Firefighter Retirement Plan is administered by PERA and has its own investment vehicle called the Volunteer Firefighter Account.

Participant Directed Investment Program

The Participant Directed Investment Program (PDIP) provides investment vehicles for a variety of retirement or other tax-advantaged savings plans. Investment goals among the PDIP's many participants are varied. In order to meet the variety of goals, participants may allocate their investments among one or more accounts that are appropriate for their needs within statutory requirements and rules established by the participating organizations.

Non-Retirement Funds

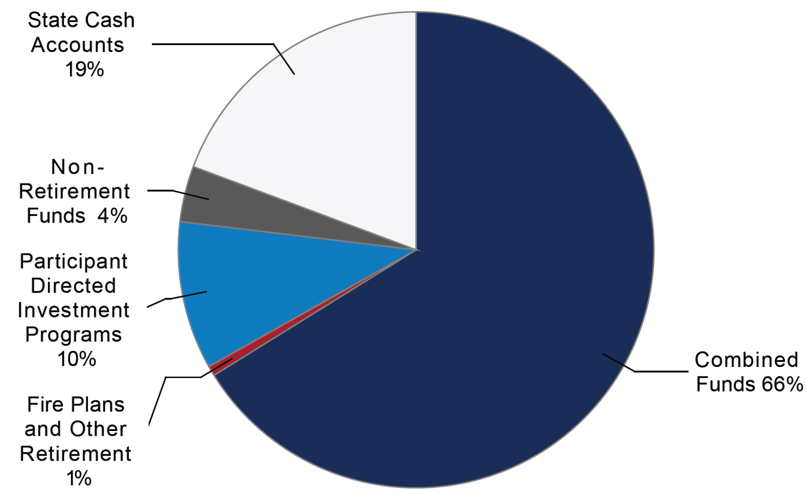
The Non-Retirement Funds are funds established by the State of Minnesota and other government entities for various purposes which include the benefit of public schools, the environment, other post-employment benefits, workers compensation insurance, and other purposes.

State Cash

The State Cash accounts are cash balances of state government funds including the State General Fund. Most accounts are invested by SBI staff through a short-term pooled fund referred to as the Treasurer's Cash Pool. It contains the cash balances of special or dedicated accounts necessary for the operation of certain State agencies and non-dedicated cash in the State Treasury. Because of special legal restrictions, a small number of cash accounts cannot be commingled.

Funds Under Management

	$ Millions
COMBINED FUNDS	**$81,320**
Fire Plans + Other Retirement Plans	**831**
Participant Directed Investment Program	**12,368**
State Deferred Compensation Plan	8,481
Health Care Savings Plan	1,578
Unclassified Employees Retirement Plan	335
Hennepin County Supplemental Retirement Plan	156
PERA Defined Contribution Plan	83
Minnesota College Savings Plan	1,709
Minnesota Achieving a Better Life Experience Plan	27
Non-Retirement Funds	**4,652**
Assigned Risk Plan	255
Permanent School Fund	1,743
Environmental Trust Fund	1,448
Closed Landfill Investment Fund	116
Miscellaneous Trust Funds	317
Other Postemployment Benefits Accounts	773
State Cash	**25,585**
Invested Treasurer's Cash	25,494
Other State Cash Accounts	91
Total SBI AUM	**124,756**



Note: Differentials within column amounts may occur due to rounding

Quarterly Report

Comparison to Objective

Match or Exceed Composite Index (10 yr.)

Outperform a composite market index weighted in a manner that reflects the long-term asset allocation of the Combined Funds over the latest 10 year period.

	10 Year
Combined Funds	**9.4%**
Combined Funds - Composite Index	9.0
Excess	0.3

Provide Real Return (20 yr.)

Provide returns that are 3-5 percentage points greater than inflation over the latest 20 year period.

	20 Year
Combined Funds	**8.2%**
CPI-U	2.5
Excess	5.7

Note:

Throughout this report performance is calculated net of investment management fees, differentials within column amounts may occur due to rounding, and returns for all periods greater than one year are annualized.

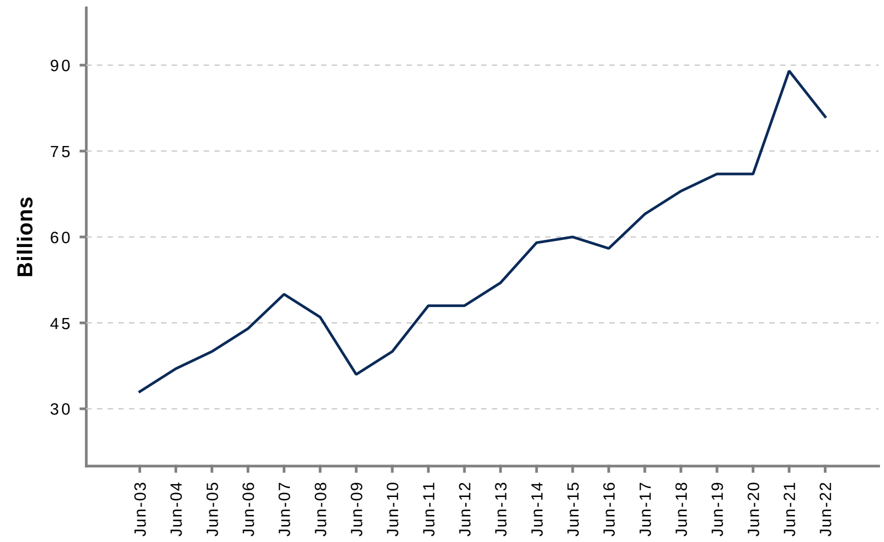
Combined Funds Summary

Combined Funds Change in Market Value ($Millions)

	One Quarter
Combined Funds	
Beginning Market Value	$89,861
Net Contributions	-665
Investment Return	-7,877
Ending Market Value	81,320

The change in market value of the Combined Funds since the end of last quarter is due to net contributions and investment returns.

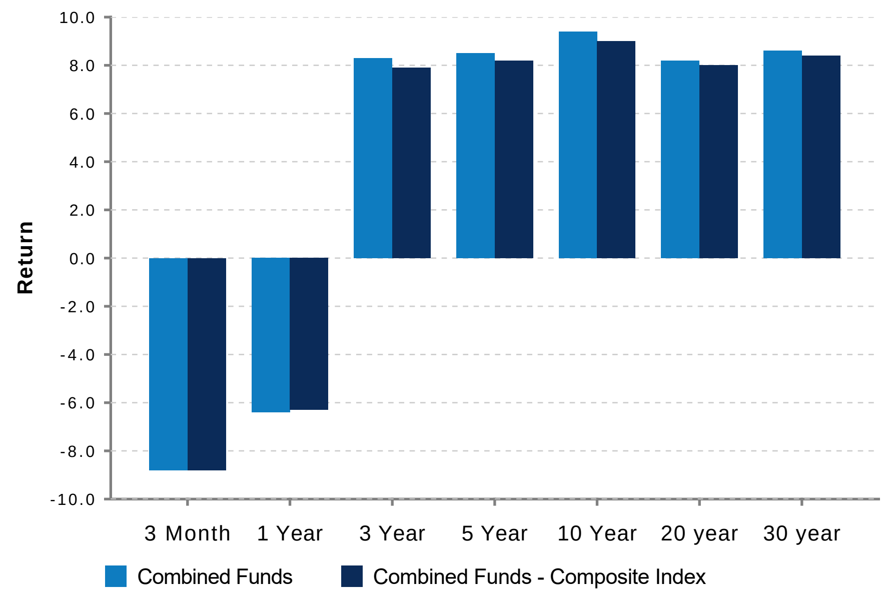
Asset Growth



Performance (Net of Fees)

The Combined Funds' performance is evaluated relative to a composite of public market index and private market investment returns. The Composite performance is calculated by multiplying the beginning of month Composite weights and the monthly returns of the asset class benchmarks.

	Qtr	FYTD	1 Yr	3 Yr	5 Yr	10 Yr	20 Yr	30 Yr
Combined Funds	-8.8%	-6.4%	-6.4%	8.3%	8.5%	9.4%	8.2%	8.6%
Combined Funds - Composite Index	-8.8%	-6.3%	-6.3%	7.9%	8.2%	9.0%	8.0%	8.4%
Excess	-0.0%	-0.1%	-0.1%	0.5%	0.3%	0.3%	0.2%	0.2%

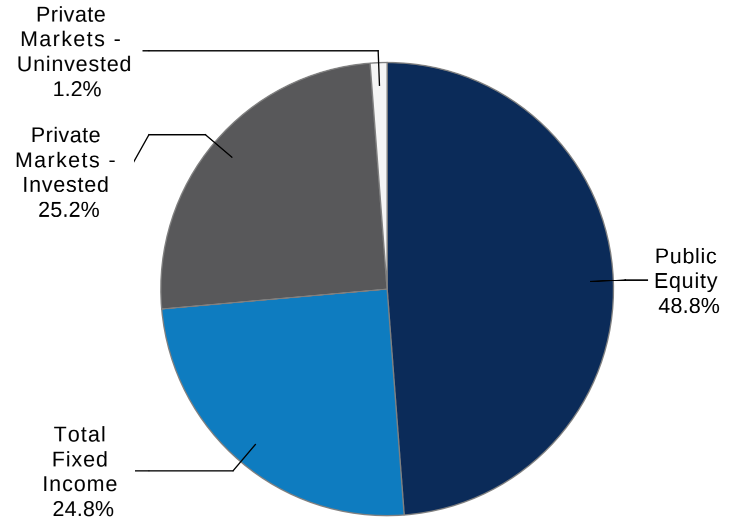


Combined Funds Summary

Asset Mix

The Combined Funds actual asset mix relative to the Strategic Asset Allocation Policy Target is shown below. Any uninvested portion of the Private Markets allocation is held in Public Equity.

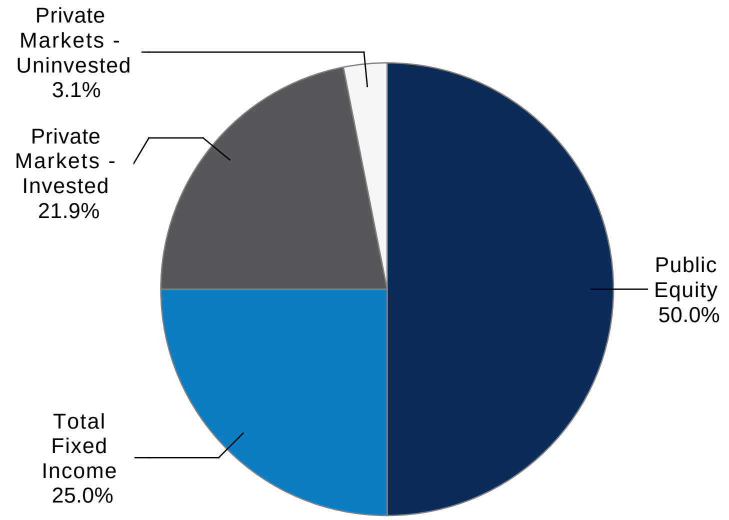
	(Millions)	Actual Mix	Policy Target
Public Equity	$39,693	48.8%	50.0%
Total Fixed Income	20,183	24.8	25.0
Private Markets - Total	21,444	26.4	25.0
Private Markets - Invested	20,455	25.2	
Private Markets - Uninvested	989	1.2	
TOTAL	81,320	100.0	



Composite Index Comparison

The Combined Funds Composite is set as the Strategic Asset Allocation Policy Target. Asset class weights for Private Markets - Invested and Private Markets - Uninvested are reset at the start of each month. The Combined Funds Composite weighting shown below is as of the first day of the quarter.

	Policy Weight	Market Index
Public Equity	50.0%	Public Equity Benchmark
Total Fixed Income	25.0	Total Fixed Income Benchmark
Private Markets - Invested	21.9	Private Markets
Private Markets - Uninvested	3.1	S&P 500



Combined Funds Asset Class Performance Summary

Public Equity

The Combined Funds Public Equity includes Domestic Equity, International Equity and Global Equity.

The Public Equity benchmark is 67% Russell 3000 and 33% MSCI ACWI ex US (net).

	Market Value	Actual Weight	Policy Weight	Last Qtr	FYTD	1 Year	3 Year	5 Year	10 Year	20 Year	30 Year
Public Equity	$39.7	48.8%	50.0%	-15.4%	-15.5%	-15.5%	7.3%	8.1%	10.5%	8.2%	8.8%
Public Equity Benchmark				-15.7	-15.7	-15.7	6.9	7.9			
Excess				0.4	0.1	0.1	0.4	0.2			
Domestic Equity	26.8	33.0	33.5	-16.8	-14.2	-14.2	9.8	10.6	12.6	9.0	9.5
Domestic Equity Benchmark				-16.7	-13.9	-13.9	9.7	10.5	12.5	9.1	9.7
Excess				-0.1	-0.3	-0.3	0.1	0.1	0.0	-0.1	-0.1
International Equity	12.0	14.8	16.5	-11.9	-17.4	-17.4	2.6	3.3	5.6	6.1	
International Equity Benchmark				-13.7	-19.4	-19.4	1.3	2.5	4.8	5.8	
Excess				1.8	2.0	2.0	1.3	0.8	0.8	0.3	
Global Equity	0.8	1.0	0.0	-17.1	-27.9	-27.9					
MSCI AC WORLD INDEX NET				-15.7	-15.8	-15.8					
Excess				-1.5	-12.1	-12.1					

Note:

Prior to 6/30/16 the returns of Domestic and International Equity were not reported as a Total Public Equity return. For additional information regarding historical asset class performance and benchmarks, please refer to the Combined Funds Performance Report.

Combined Funds Asset Class Performance Summary

Total Fixed Income

The Combined Funds Fixed Income program includes Core/Core Plus, Return Seeking Fixed Income, Treasuries and Laddered Bond + Cash.

The Total Fixed Income benchmark is 40% Bloomberg U.S. Aggregate Index/ 40% Bloomberg Treasury 5+ Years Index/ 20% ICE BofA US 3-Month Treasury Bill.

	Market Value	Actual Weight	Policy Weight	Last Qtr	FYTD	1 Year	3 Year	5 Year	10 Year	20 Year	30 Year
Total Fixed Income	$20.2	24.8%	25.0%	-5.7%	-10.5%	-10.5%	-0.1%	1.8%	2.4%	4.1%	5.3%
Total Fixed Income Benchmark				-4.8%	-9.6%	-9.6%	-0.2%				
Excess				-0.9%	-1.0%	-1.0%	0.2%				
Core/Core Plus	$4.3	5.3%	5.0	-5.7%	-11.7%	-11.7%	-0.5%	1.3%	2.1%	4.0%	5.2%
Core Bonds Benchmark				-4.7%	-10.3%	-10.3%	-0.9%	0.9%	1.5%	3.6%	4.8%
Excess				-1.0%	-1.4%	-1.4%	0.4%	0.4%	0.6%	0.4%	0.4%
Return Seeking Fixed Income	$3.9	4.8%	5.0	-7.6%	-12.3%	-12.3%					
Bloomberg U.S. Aggregate				-4.7%	-10.3%	-10.3%					
Excess				-2.9%	-2.1%	-2.1%					
Treasury Protection	$7.7	9.5%	10.0	-7.3%	-13.5%	-13.5%	-1.8%				
Bloomberg Treasury 5+ Year				-7.2%	-13.5%	-13.5%	-1.8%				
Excess				-0.1%	-0.0%	-0.0%	0.0%				
Laddered Bond + Cash	$4.3	5.3%	5.0	-0.0%	-0.3%	-0.3%	0.5%	1.0%	0.7%	1.5%	3.1%
ICE BofA US 3-Month Treasury Bill				0.1%	0.2%	0.2%	0.6%	1.1%	0.6%	1.3%	2.4%
Excess				-0.1%	-0.5%	-0.5%	-0.2%	-0.1%	0.1%	0.2%	0.7%

Note:

Since 12/1/2020 the Total Fixed Income includes allocations to Core/Core Plus Bonds, Return Seeking Bonds, Treasuries and Laddered Bond + Cash. From 7/1/2020 to 11/30/2020 Total Fixed Income was Core Bonds, Treasuries and Cash. From 2/1/2018-6/30/20 Total Fixed Income was Core Bonds and Treasuries. Prior to 2/1/2018, Total Fixed Income was Core Bonds. For additional information regarding historical asset class performance and benchmarks, please refer to the Combined Funds Performance Report.

Combined Funds Asset Class Performance Summary

Private Markets

	Last Qtr	FYTD	1 Year	3 Year	5 Year	10 Year	20 Year	25 Year	30 Year
Private Markets - Invested	4.0%	24.8%	24.8%	18.7%	16.3%	13.8%	14.0%	13.9%	13.3%
Private Markets -Uninvested (1)	-16.0%	-10.2%	-10.2%						
Private Equity	1.2%	22.1%	22.1%	23.6%	20.9%	17.5%	15.9%	15.3%	15.5%
Private Credit	6.7%	21.3%	21.3%	13.0%	12.3%	13.4%	12.6%	13.1%	
Resources	14.5%	33.8%	33.8%	5.3%	4.2%	2.9%	13.3%	12.8%	13.0%
Real Estate	13.7%	43.7%	43.7%	19.4%	15.8%	14.0%	10.3%	11.1%	9.6%

Private Markets

The time-weighted rates of return for the Private Markets portfolio are shown here. Private Markets included Private Equity, Private Credit, Resources, and Real Estate. Some of the existing investments are relatively immature and returns may not be indicative of future results.

Private Equity Investments - The objectives of the Private Equity portfolio, which may include leveraged buyouts, growth equity, venture capital and special situations, are to achieve attractive returns and to provide overall portfolio diversification to the total plan.

Private Credit Investments - The objectives of the Private Credit portfolio, which may include mezzanine debt, direct lending, and other forms of non-investment grade fixed income instruments, are to achieve a high total return over a full market cycle and to provide some degree of downside protection and typically provide current income in the form of a coupon. In certain situations, investments in the Private Credit portfolio also provide an equity component of return in the form of warrants or re-organized equity.

Resource Investments - The objectives of the Resources portfolio, which may include energy, infrastructure, and other hard assets, are to provide protection against the risks associated with inflation and to provide overall portfolio diversification to the total plan.

Real Estate Investments - The objectives of the Real Estate portfolio, which may include core and non-core real estate investments, are to achieve attractive returns, preserve capital, provide protection against risks associated with inflation, and provide overall portfolio diversification to the total plan.

The SBI also monitors Private Markets performance using money-weighted return metrics such as Internal Rate of Return and Multiple of Invested Capital. For money-weighted return metrics please refer to the Combined Funds Performance Report.

(1) The Uninvested portion of the Private Markets allocation is invested in a combination of a passively managed S&P 500 Index strategy and a cash overlay strategy invested in equity derivatives and cash.
Source: State Street Bank

STATE STREET.

SBI Combined Funds Strategic Allocation Category Framework

	6/30/2022 ($ millions)	6/30/2022 Weights	Category Range	
Growth - Appreciation				
Public Equity	$ 40,682.8	50.0%		
Private Equity	$ 14,756.3	18.1%		
Non-Core Real Assets	$ 3,493.2	4.3%		
	$ 58,932.4	**72.5%**	*50%*	*75%*
Growth - Income-oriented				
Core Fixed Income	$ 4,297.1	5.3%		
Private Credit	$ 1,590.2	2.0%		
Return-Seeking Fixed Income	$ 3,920.4	4.8%		
	$ 9,807.8	**12.1%**	*15%*	*30%*
Real Assets				
Core Real Estate		0.0%		
Real Assets	$ 575.6	0.7%		
	$ 575.6	**0.7%**	*0%*	*10%*
Inflation Protection				
TIPS		0.0%		
Commodities		0.0%		
		0.0%	*0%*	*10%*
Protection				
U.S. Treasuries	$ 7,685.6	9.5%		
	$ 7,685.6	**9.5%**	*5%*	*20%*
Liquidity				
Cash	$ 4,318.2	5.3%		
	$ 4,318.2	**5.3%**	*0%*	*5%*
Opportunity				
Opportunity		**0.0%**		
		0.0%	*0%*	*10%*
Total	**$ 81,319.8**	**100%**		
Illiquid Asset Exposure	**$ 20,415.4**	**25.1%**	*0%*	*30%*

Volatility Equivalent Benchmark Comparison

	As of June 30, 2022							
	1-year	*3-year*	*5-year*	*10-year*	*15-year*	*20-year*	*25-year*	*30-year*
SBI Combined Funds Return	**-6.4%**	**8.3%**	**8.5%**	**9.4%**	**7.0%**	**8.2%**	**7.5%**	**8.6%**
Volatility Equivalent Benchmark Return			**4.8%**	**6.0%**	**4.5%**	**6.0%**	**5.6%**	**6.6%**
Value Added			**3.7%**	**3.3%**	**2.5%**	**2.1%**	**1.9%**	**2.0%**

Standard Deviation: Benchmark = Combined Funds			**10.1%**	**8.4%**	**10.0%**	**9.4%**	**10.0%**	**9.4%**
Benchmark Stock Weight			**60%**	**60%**	**58%**	**59%**	**62%**	**62%**
Benchmark Bond Weight			**40%**	**40%**	**42%**	**41%**	**38%**	**38%**

The Volatility Equivalent Benchmark stock and bond weights are adjusted to equal the standard deviation of the SBI Combined Funds portfolio. Then a return is calculated. The bond return used is the Bloomberg U.S. Aggregate. The stock return used is the MSCI AC World Net Return Index. Prior to 12/31/98 it was the MSCI ACWI Total Return Index and pre-11/1/1993 it was the Wilshire 5000 adjusted for various SBI divestment mandates

Combined Funds Summary

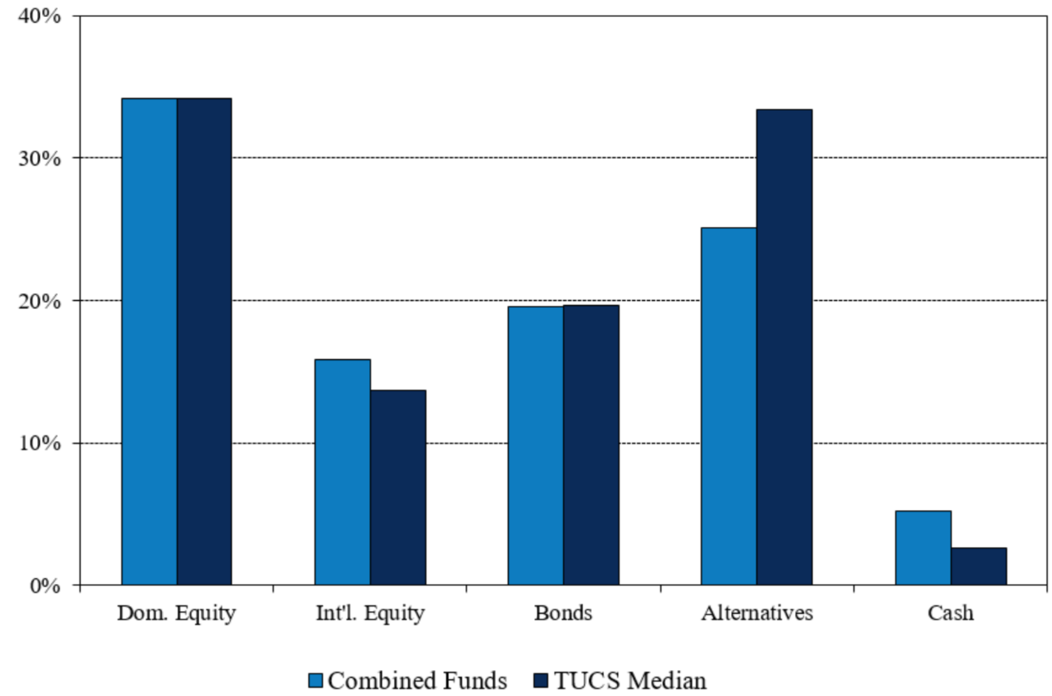
Asset Mix Compared to Other Pension Funds

The comparison universe used by the SBI is the Trust Universe Comparison Service (TUCS). Only funds with assets over $20 billion are included in the comparisons shown in this section.

Comparisons of the Combined Funds' asset mix to the median allocation to stocks, bonds and other assets of the public funds in TUCS over $20 billion are shown below:

Combined Funds Asset Mix

	($Millions)	Actual Mix
Public Equity	39,693	48.8
Total Fixed Income	20,183	24.8
Private Markets - Invested	20,455	25.2
Private Markets - Uninvested	989	1.2
TOTAL	81,320	100.0



	Domestic Equity	International Equity	Bonds	Alternatives	Cash
Combined Funds	34.2%	15.8%	19.6%	25.2%	5.3%
Median in TUCS	34.2%	13.7%	19.7%	33.4%	2.7%

Combined Funds Summary

Performance Compared to Other Pension Funds

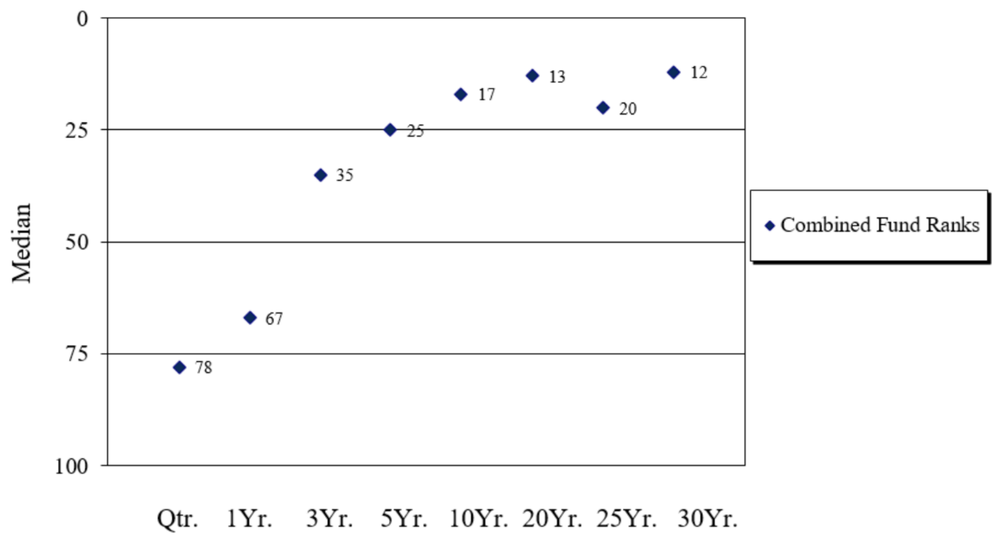
While the SBI is concerned with how its returns compare to other pension investors, universe comparisons should be used with great care. There are several reasons why such comparisons will provide an "apples to oranges" look at performance:

- Differing Allocations. Asset allocation will have a dominant effect on return. The allocation to stocks among the funds in TUCS typically ranges from 20-90%, a very wide range for meaningful comparison. This further distorts comparisons among funds.

- Differing Goals/Liabilities. Each pension fund structures its portfolio to meet its own liabilities and risk tolerance. This will result in different asset mix choices. Since asset mix will largely determine investment results, a universe ranking is not relevant to a discussion of how well a plan sponsor is meeting its long-term liabilities.

With these considerations in mind, the performance of the Combined Funds compared to other public pension funds in Trust Universe Comparison Service (TUCS) are shown below.

The SBI's returns are ranked against public plans with over $20 billion in assets. All funds in TUCS report their returns gross of fees.



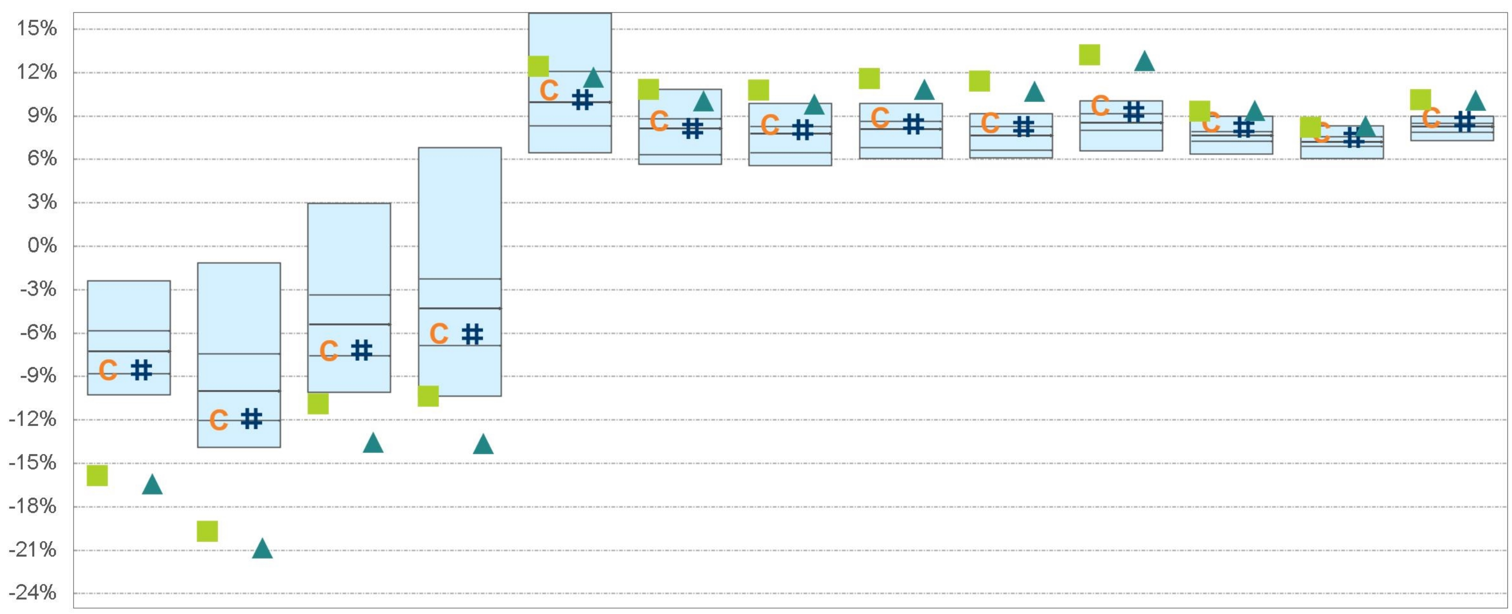
Periods Ended 06/30/2022

	Qtr	1 Yr	3 Yrs	5 Yrs	10 Yrs	20 Yrs	25 Yrs	30 Yrs
Combined Funds Percentile Rank in TUCS	78th	67th	35th	25th	17th	13th	20th	12th

Minnesota State Board of Investments
Performance Comparison

Total Returns of Master Trusts - Public : Plans > $20 Billion

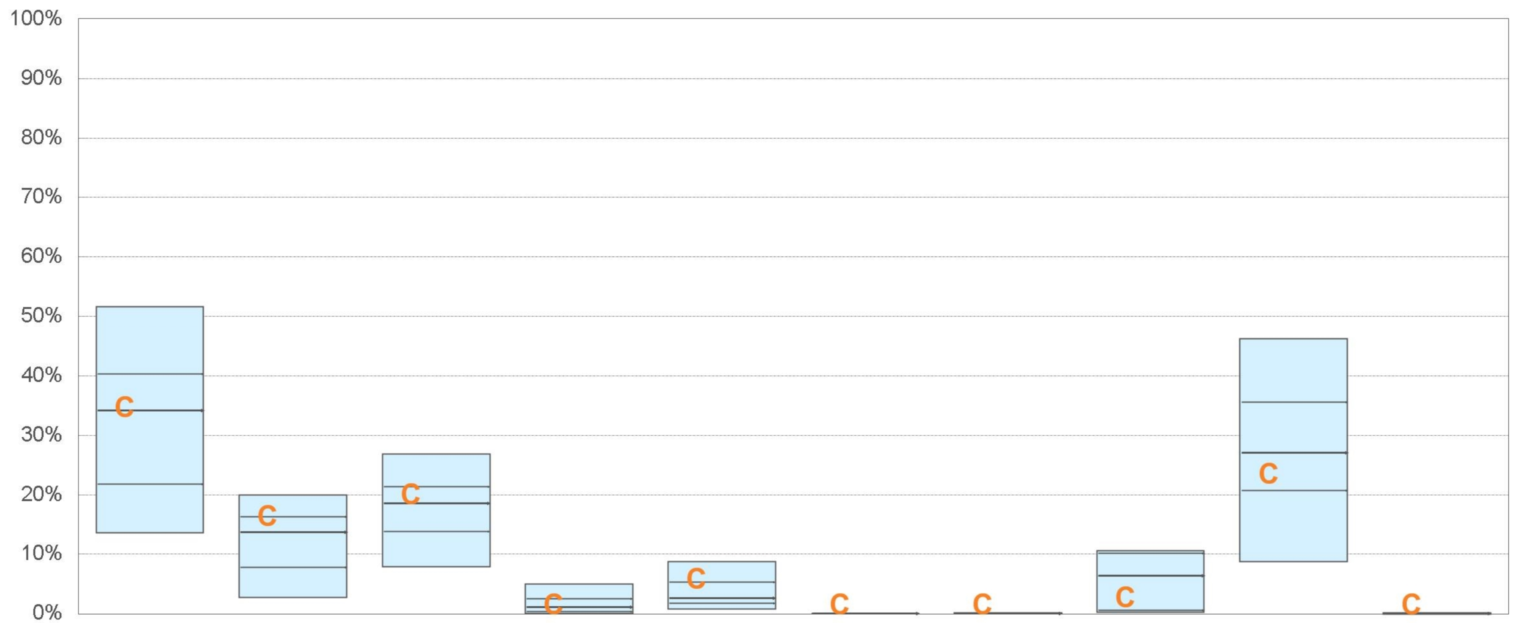
Cumulative Periods Ending : June 30, 2022



Percentile Rankings	1 Qtr	2 Qtrs	3 Qtrs	1 Year	2 Years	3 Years	4 Years	5 Years	7 Years	10 Years	20 Years	25 Years	30 Years
5th	-2.40	-1.14	2.97	6.83	16.11	10.84	9.87	9.87	9.16	10.06	8.99	8.33	8.98
25th	-5.82	-7.42	-3.38	-2.25	12.07	8.81	8.27	8.61	8.26	9.17	7.93	7.56	8.52
50th	-7.26	-10.02	-5.39	-4.30	9.96	8.14	7.77	8.08	7.66	8.54	7.68	7.23	8.27
75th	-8.81	-12.03	-7.58	-6.87	8.33	6.32	6.45	6.82	6.66	8.02	7.26	6.91	7.89
95th	-10.27	-13.88	-10.07	-10.36	6.48	5.65	5.58	6.07	6.13	6.61	6.38	6.05	7.29
No. Of Obs	32	30	30	30	30	29	28	28	28	28	26	23	20

	1 Qtr	2 Qtrs	3 Qtrs	1 Year	2 Years	3 Years	4 Years	5 Years	7 Years	10 Years	20 Years	25 Years	30 Years
C Combined Funds	-8.81 (78)	-12.27 (81)	-7.48 (71)	-6.30 (67)	10.52 (46)	8.40 (35)	8.16 (32)	8.61 (25)	8.26 (25)	9.48 (17)	8.32 (13)	7.61 (20)	8.61 (12)
# SBI Combined Funds Ind	-8.80 (71)	-12.18 (78)	-7.43 (67)	-6.31 (67)	9.85 (53)	7.86 (50)	7.80 (46)	8.17 (35)	8.00 (35)	9.04 (28)	7.98 (21)	7.28 (41)	8.35 (40)
■ S&P 500	-16.10 (99)	-19.96 (99)	-11.14 (95)	-10.62 (95)	12.18 (18)	10.60 (9)	10.55 (1)	11.31 (1)	11.14 (1)	12.96 (1)	9.08 (1)	7.98 (10)	9.85 (1)
▲ Russell 3000	-16.70 (99)	-21.10 (99)	-13.79 (99)	-13.88 (99)	11.42 (32)	9.77 (9)	9.57 (9)	10.59 (1)	10.43 (1)	12.57 (1)	9.14 (1)	8.06 (10)	9.84 (1)

Minnesota State Board of Investments
Asset Allocation of Master Trusts - Public : Plans > $20 Billion
Quarter Ending June 30, 2022



Percentile Rankings	US Equity	Non-US Equity	US Fixed	Non-US Fixed	Cash	Convertible	GIC GAC	Real Estate	Alternative Investments	Other
5th	51.58	20.01	26.83	4.93	8.74	0.07	0.15	10.57	46.19	0.18
25th	40.35	16.28	21.31	2.49	5.35	0.06	0.00	10.20	35.58	0.00
50th	34.18	13.69	18.60	1.08	2.62	0.00	0.00	6.36	27.06	0.00
75th	21.78	7.81	13.81	0.32	1.79	0.00	0.00	0.55	20.75	0.00
95th	13.56	2.72	7.84	0.00	0.75	0.00	0.00	0.27	8.70	-0.08
C Combined Funds	34.18 (50)	15.84 (37)	19.56 (37)	0.00 (100)	5.26 (31)	0.00 (100)	0.00 (100)	2.19 (62)	22.96 (56)	0.00 (87)

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TAB B

Executive Director's Administrative Report

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EXECUTIVE DIRECTOR'S ADMINISTRATIVE REPORT

DATE: August 17, 2022

TO: Members, State Board of Investment

FROM: Mansco Perry III
Executive Director and Chief Investment Officer

1. Reports on Budget and Travel

A report on the SBI's administrative budget for the fiscal year to date through June 30, 2022, is included as **Attachment A**.

A report on travel for the period from April 1, 2022 – June 30, 2022 is included as **Attachment B**.

2. Russia/Belarus Update

During the 2022 legislative session, the Minnesota Legislature passed a bill requiring the SBI to liquidate its holdings in companies with their principal place of business in Russia or Belarus. The bill was signed into law and became effective on April 2, 2022. The statute prohibits any new investment in target companies and requires the SBI to identify and liquidate, to the extent practicable, 50% of its direct holdings in target companies within nine months of the effective date; and 100% of its holdings within 18 months of the effective date.

SBI utilizes information from data service providers, including MSCI, Factset and Bloomberg, to develop a list of target companies with their principal place of business in Russia or Belarus. Staff receives monthly reports from the SBI's custodian bank concerning SBI holdings of companies on the restricted list.

In April 2022, SBI staff completed the transfer of all securities subject to liquidation to a single manager who will be responsible for the orderly and prudent liquidation of the securities within the required timeframe, subject to market and regulatory constraints.

In the second quarter, managers liquidated two bond holdings and closed all outstanding Russian ruble forward currency contracts. The liquidation manager indicated that the market for equity trading remained effectively closed to foreign investors during the quarter due to sanctions imposed by the United States and its allies as well as retaliatory actions taken by the Russian government to restrict foreign capital flows. Trading in fixed income securities, however, was less restricted, and therefore additional liquidations from the bond holdings are likely over the coming quarter.

On June 23, 2022, staff sent a letter to each applicable external manager (international equity, domestic equity, global equity and fixed income) containing the most recent restricted list. This list will be updated at least annually in June.

3. Sudan Update

Each quarter, staff provides a report to the Board on steps taken to implement *Minnesota Statutes*, section 11A.243 that requires SBI actions concerning companies with operations in Sudan. Staff receives periodic reports from the Eiris Conflict Risk Network (CRN) about the status of companies with operations in Sudan.

The SBI is restricted from purchasing stock in the companies designated as highest offenders by the CRN. Accordingly, staff updates the list of restricted stocks and notifies investment managers that they may not purchase shares in companies on the restricted list. Staff receives monthly reports from the SBI's custodian bank concerning SBI holdings of companies on the CRN list and writes letters as required by law.

According to the law, if after 90 days following the SBI's communication, a company continues to have active business operations in Sudan, the SBI must divest holdings of the company according to the following schedule:

- at least 50% shall be sold within nine months after the company appeared on the scrutinized list; and

- 100% shall be sold within fifteen months after the company appeared on the list.

In the second quarter, there were two restricted companies on the SBI divestment list, and 101,000 shares sold.

On June 23, 2022, staff sent a letter to each applicable external manager (international equity, domestic equity and global equity) containing the most recent restricted list and the list of stocks to be divested in compliance with Minnesota law.

4. Iran Update

Each quarter, staff provides a report to the Board on steps taken to implement *Minnesota Statutes*, section 11A.244 that requires SBI actions concerning companies with operations in Iran.

SBI receives information on companies with Iran operations from Institutional Shareholder Services, Inc. (ISS). Staff receives monthly reports from the SBI's custodian bank concerning SBI holdings of companies on the restricted list and writes letters as required by the law.

According to the law, if after 90 days following the SBI's communication a company continues to have scrutinized business operations, the SBI must divest all publicly traded securities of the company according to the following schedule:

- at least 50% shall be sold within nine months after the company appeared on the scrutinized list; and

- 100% within fifteen months after the company appeared on the scrutinized list.

In the second quarter, there were no restricted companies on the SBI divestment list, therefore no restricted shares to sell.

On June 23, 2022, staff sent a letter to each applicable external manager (international equity, domestic equity, global equity and fixed income) containing the most recent restricted list and the list of companies to be divested in compliance with Minnesota law.

5. Litigation Update

SBI legal counsel will give a verbal update on the status of any litigation at the meeting.

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ATTACHMENT A

STATE BOARD OF INVESTMENT
FISCAL YEAR 2022 ADMINISTRATIVE BUDGET REPORT
FISCAL YEAR TO DATE THROUGH JUNE 30, 2022

ITEM	FISCAL YEAR 2022 BUDGET	FISCAL YEAR 2022 6/30/2022
PERSONNEL SERVICES		
FULL TIME EMPLOYEES	$ 6,433,500	$ 5,621,669
PART TIME EMPLOYEES	2,300	2,274
OVERTIME AND PREMIUM PAY	100	87
MISCELLANEOUS PAYROLL	349,900	76,946
SUBTOTAL	**$ 6,785,800**	**$ 5,700,975**
STATE OPERATIONS		
RENTS & LEASES	285,000	281,121
REPAIRS/ALTERATIONS/MAINTENANCE	21,000	15,113
PRINTING & BINDING	12,000	7,227
PROFESSIONAL/TECHNICAL SERVICES	450,000	234,574
COMPUTER SYSTEMS SERVICES	269,000	152,207
COMMUNICATIONS	25,000	14,250
TRAVEL, IN-STATE	3,000	381
TRAVEL, OUT-STATE**	230,000	39,087
SUPPLIES	50,000	24,097
EQUIPMENT	43,685	39,279
EMPLOYEE DEVELOPMENT	150,000	116,104
OTHER OPERATING COSTS	130,000	129,114
INDIRECT COSTS	300,000	205,883
SUBTOTAL	**$ 1,968,685**	**$ 1,258,437**
TOTAL ADMINISTRATIVE BUDGET	**$ 8,754,485**	**$ 6,959,412**

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ATTACHMENT B

STATE BOARD OF INVESTMENT

Travel Summary by Date
April 1, 2022 - June 30, 2022

Purpose	Name	Destination / Date	Total Cost
Conference: Pension Bridge Annual 2022 sponsored by with.Intelligence	C. Hua	San Francisco, CA 4/18/2022 - 4/21/2022	$ 967.30
Consultant: Aon Investments USA **Manager Monitoring** **Private Markets Managers:** Warburg Pincus; Angelo Gordon; Rockpoint; Vista	A. Christensen	Chicago, IL New York, NY 4/23/2022 - 4/28/2022	1,636.53
Consultant: Aon Investments USA **Manager Monitoring** **Public Markets Managers:** Neuberger Berman; LSV	E. Sonderegger	Chicago, IL 4/23/2022 - 4/26/2022	752.79
Manager Monitorting **Public Markets Managers:** LSV; McKinley Capital	D. Covich	Chicago, IL 4/25/2022 - 4/26/2022	412.21
Manager Monitoring **Private Markets Managers:** Warburg Pincus; Vista; Siris	A. Krech	New York, NY 4/26/2022 - 4/29/2022	1,604.62
Manager Monitoring **Public Markets Manager:** Barrow Hanley **Conference:** Elkind Economics Emerging Markets Forum	E. Sonderegger	Dallas, TX 5/9/2022 - 5/11/2022	869.97
In-State Travel **Fire Relief Presentation:** Bayport Volunteer Fire Relief Association	P. Ammann	Bayport, MN 5/11/2022	23.87

STATE BOARD OF INVESTMENT

Travel Summary by Date
April 1, 2022 - June 30, 2022
(Continued)

Purpose	Name	Destination / Date	Total Cost
Manager Monitoring **Public Markets Managers:** Payden & Rygel; TCW; PIMCO Western Asset; Oaktree **Conference:** Oaktree Conference 2022	A. Griga	Los Angeles, CA 5/16/2022 - 5/19/2022	$ 1,309.86
Manager Monitoring **Private Markets Managers:** Oaktree; Canyon Partners **Manager Search** **Private Markets Manager:** Vance Street Capital	J. Stacy	Los Angeles, CA 5/17/2022 - 5/20/2022	1,739.71
Manager Monitoring **Private Markets Manager:** Oaktree **Conference:** Oaktree Conference 2022	A. Krech	Los Angeles, CA 5/18/2022 - 5/20/2022	1,087.73
Conference: Oaktree Conference 2022	M. Perry	Los Angeles, CA 5/18/2022 - 5/20/2022	626.79
In-State Travel **Fire Relief Presentation:** Kasson Volunteer Fire Relief Association	P. Ammann	Kasson, MN 5/24/2022	81.90
Manager Monitoring **Private Markets Manager:** Wind Point Partners **Manager Search** **Private Markets Managers:** Valor Equity Partners; CIVC Partners	J. Stacy	Chicago, IL 5/31/2022 - 6/2/2022	1,190.14

STATE BOARD OF INVESTMENT

Travel Summary by Date
April 1, 2022 - June 30, 2022
(Continued)

Purpose	Name	Destination / Date	Total Cost
Conference: Government Finance Officers Association (GFAO) Conference	E. Hattling	Austin, TX 6/2/2022 - 6/8/2022	$ 3,028.96
Conference: Public Policy Forum sponsored by Defined Contribution Institutional Investor Association	P. Ammann	Washington, D.C. 6/7/2022 - 6/10/2022	1,836.83
Manager Monitoring Private Markets Manager: Adams Street Partners **Conference:** Institutional Limited Partners Association (ILPA) Members Conference	A. Krech	Chicago, IL 6/7/2022 - 6/9/2022	1,492.90
Conference: Institutional Limited Partners Association (ILPA) Members Conference	S. Zahar	Chicago, IL 6/7/2022 - 6/9/2022	1,634.86
Conference: Institutional Limited Partners Association (ILPA) Members Conference	A. Christensen	Chicago, IL 6/7/2022 - 6/9/2022	1,673.00
Manager Monitoring Public Markets Managers: Goldmans Sachs; BlackRock; Pzena; Rock Creek; Sands	D. Covich	Washington, D.C. New York, NY 6/20/2022 - 6/23/2022	2,060.13
Manager Monitoring Public Markets Managers: Goldmans Sachs; BlackRock; Pzena; Rock Creek; Sands; Morgan Stanley	E. Sonderegger	Washington, D.C. New York, NY 6/20/2022 - 6/24/2022	2,599.21

STATE BOARD OF INVESTMENT

Travel Summary by Date
April 1, 2022 - June 30, 2022
(Continued)

Purpose	Name	Destination / Date	Total Cost
Conference: Crane's Money Fund Symposium	S. Kuettel	Minneapolis, MN 6/20/2022-6/22/2022	$ 416.00
Conference: National Association of Public Pension Attorneys (NAPPA)	J. Mulé	Louisville, KY 6/21/2022 - 6/24/2022	2,672.00
Conference: National Association of Public Pension Attorneys (NAPPA)	J. Weber	Louisville, KY 6/21/2022 - 6/24/2022	2,601.10
Board Designee Conference: National Association of Public Pension Attorneys (NAPPA)	A. Sorenson	Louisville, KY 6/21/2022 - 6/24/2022	2,517.62
Manager Monitoring **Public Markets Managers:** Goldman Sachs; Pzena; Ariel; Rock Creek; Neuberger Berman; Morgan Stanley	E. Pechacek	New York, NY 6/21/2022-6/24/2022	2,072.75
Conference: Instituional Limited Partners Association (ILPA) Limited Partners/General Partners Roundtable	A. Krech	New York, NY 6/22/2022 - 6/23/2022	1,567.31
Manager Monitoring **Private Markets Manager:** KKR **Conference:** KKR Global Investors Conference	A. Krech	Los Angeles, CA 6/26/2022 - 6/29/2022	1,665.43

TAB C

Update on Meketa Climate Risk Project

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DATE: August 17, 2022

TO: Members, State Board of Investment

FROM: Members, Investment Advisory Council and SBI Staff

SUBJECT: Update on Meketa Climate Risk Project

Meketa Investment Group will give an update on the final report of the Climate Risk Project being conducted on behalf of the SBI.

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MEKETA INVESTMENT GROUP

Minnesota State Board of Investments (SBI)

August 15, 2022

Climate Change Investment Analysis

Phase III: SBI Climate Investment Exposures and Policy Options

Meketa Project Team

Project Director: Sarah Bernstein, Managing Principal, Head of Sustainability
Project Strategic Advisor: Allan Emkin, Managing Principal, Consultant
Stephen MacLellan, Managing Principal, Consultant
Zach Stevens, Sr. Quantitative Research Analyst
Sabina Panthi, Sr. Investment Analyst - ESG
Casey Satterlee, Sr. Investment Analyst
Nick Buckley, Investment Analyst
Fabiola Bustamante, Performance Analyst
Ryan Murray, Investment Associate, Private Markets
Harrison Page, Investment Associate, Private Markets
Diego Valdez Colin, Summer Intern, ESG
Matthew Parla, Client Service Assistant

Table of Contents

Preface

This report is the third in a series designed to assist the Minnesota State Board of Investments ("SBI"), in its oversight of the SBI investment portfolio. This and previous reports address the potential investment risks and opportunities associated with climate change. Meketa's Climate Change Investment Analysis project for the SBI provides data, analysis, and options for consideration as the SBI further develops its strategy to address long-term climate investment risks and opportunities. During year one of the project, Meketa addressed these issues in three reports:

→ In this Phase III report, we analyze the SBI portfolio's current exposure to climate risks and opportunities throughout the total portfolio – public and private market investments – and provide options for the SBI to implement a successful climate transition strategy consistent with the SBI's fiduciary duty and the terms of the Paris Agreement.

→ The Phase II report provided results and analysis of a survey of 20 public pension plan climate leaders. The report focused on the manner in which public pension plan thought leaders manage climate-related investment risks and opportunities. The survey results provide the SBI a range of investment strategy perspectives to consider as it determines the best course of action for the SBI.

→ The Phase I report reviewed high level global trends that address climate change and related developments in financial markets across asset classes, policy and regulatory frameworks, institutional collaboration, and trends for investment-related climate risk data, metrics, and climate scenario analyses. Those trends are gaining momentum on an almost daily basis.

→ The Phase I and II reports found that rapid change in the management of investment risks and opportunities is well underway. Academia, institutional investment firms and providers of analytical tools, databases, and econometric models have and will continue to create resources for institutional investors to assess their investment exposure to climate risks and provide insight in how best to manage that risk and attendant opportunities.

→ The Phase II report found trends among public pension plan climate leaders to: 1) improve their climate risk and opportunity monitoring across their entire portfolio, 2) increase investments in climate solutions, and 3) focus enhanced effort on stewardship, including proxy voting and engagement with managers, investee companies, and government regulatory and policy making bodies. A recent trend indicates an increase in public pension funds addressing Net Zero greenhouse gas emissions by 2050. With the attention to Net Zero awareness the need has grown to address climate risks and opportunities in the real economy where the long-term risks to investment portfolios are manifest.

→ Although this is the final phase of the year one study, it is just the beginning of an ongoing effort to best manage risk and return in a complex and challenging environment.

→ We thank the SBI for engaging Meketa to work on these critical issues and thank the SBI Staff and the SBI's investment managers for their insights and information.

Overview

The Meketa Phase III climate report to the SBI concentrates on:

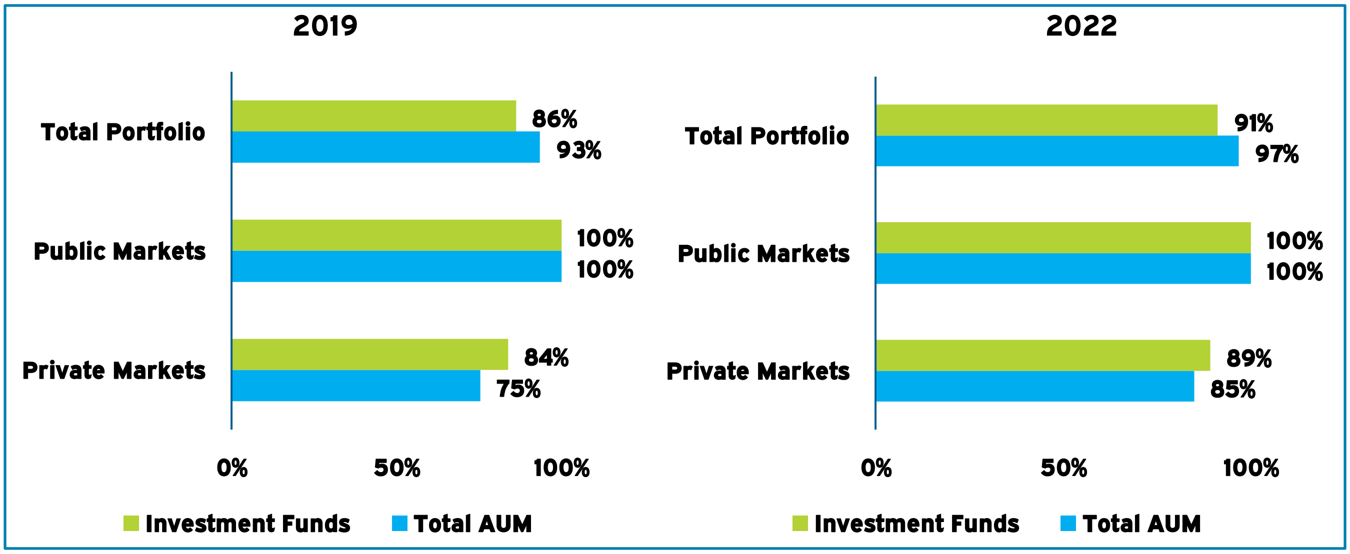
1) **Analyzing the SBI portfolio's** current investment manager approaches to managing climate risk through survey responses from public and private markets funds, and quantitative climate analysis of the SBI's public market portfolio companies.
2) **Economic modeling of various approaches to managing climate risk and opportunity**. A what if exercise. We use a top-down, statistical approach to give clients a "big picture" estimation of potential impacts to returns and risk that could confront them in a fundamentally uncertain situation.
3) **Three distinct approaches to managing climate risk and opportunity.** There is no consensus in the investment community on best practice, and there are many variations within each of these three broad approaches. Seeking to reduce the greenhouse gas (GHG) emissions of the SBI's portfolio is not equivalent to seeking to reduce the real economy systemic climate risks throughout the portfolio. For example, neither broad exclusion of fossil fuel producers, nor hedging the portfolio to become 'carbon neutral', directly address reducing the energy transition risks in the real economy, nor the mounting physical climate risks.
4) **Climate Aware Approach (Current)**. Continue the SBI's proxy voting on climate issues, exposure to climate transition opportunities in private markets, exclusion of thermal coal producers, manager engagement around climate issues through periodic climate surveys, engagement with regulators, and participation in institutional investor organizations focused on climate.
5) **Energy Supply Focused Approach: (exclude all Fossil Fuels).** Exclude all companies with fossil fuel revenues; continue other climate aware available elements of current approach (proxy voting and engagement limited to non-fossil fuels companies).
6) **Portfolio-Wide Strategic Net Zero Goal Approach.** Develop an overarching portfolio-wide strategy that seeks to reduce climate risks in the real economy by coordinating and strengthening the use of tools available to address climate issues, including: increased attention to proxy voting; engagement with managers, portfolio companies and governments; increased investments in climate solutions appropriate to each asset class; select exclusions if they the support engagement and investment strategy; and appropriate participation in institutional investor organizations addressing climate.
7) **Pros and Cons of the three alternative approaches,** including real economy potential impacts, costs, and complexity of implementation.
8) **A recommendation for the SBI's consideration –** Consider a comprehensive strategy across all asset classes that benefits from all three approaches listed above, with the emphasis on A and C, and using elements under B (exclusion of fossil fuels) under certain limited circumstances.

As science and markets continue to provide more and better information which policymakers can rely upon there will be a need to reflect those developments in whatever policy the SBI adopts. This continual evolution is consistent with existing SBI practices of regular and timely review of all aspects of the investment portfolio and is, in our opinion, a best practice.

I. Asset Manager Approaches to Climate Risks and Opportunities

This section presents the results of the 2022 survey of the SBI's asset managers on their approaches to managing climate risks and opportunities. The survey asks about general climate risks and opportunities and focuses on energy transition. In subsequent work on each asset class, we intend to analyze more closely both energy transition and physical climate risks and how they are managed.

Figure 1: Climate Risk Survey of SBI Active Investment Funds that Responded[1]



- → The great majority of SBI fund managers responded to the 2022 and 2019 survey, including 100% of public markets funds and 89% of private markets funds in 2022, compared to 84% in 2019.
- → Managers of 89% of the SBI's active private market funds responded in 2022 (231 of 259). The 231 responding private markets funds were managed by 65 different managers.
- → The 2022 survey enhanced the 2019 survey by requesting that managers supply portfolio level climate metrics on their portfolio companies, such as Scope 1, Scope 2, and Scope 3 emissions.
- → Private market responses from managers included some that stated that this was the first time they were attempting to measure such metrics, and that are completing and sending their results. Though some responses were too late to include in this report, the results will be used going forward.

Managers responsible for investing 97% of the SBI's Assets Under Management (AUM) responded to the climate survey in 2022, higher than the 93% from the 2019 survey.

[1] The 2022 survey request went to the 259 SBI active funds of the total 286 private markets funds. The 27 funds that were not sent the survey were funds that had been nearly completely wound down by December 2021. The 2019 numbers have been corrected and updated to provide consistency with the 2022 survey such as excluding Treasury funds in public markets and excluding all inactive funds in private markets.

Climate change material risks and opportunities encompass energy transition and physical climate exposures.

→ Attention to stranded assets from the energy transition has often concentrated on larger fossil fuel energy supply companies. Today, the fossil fuel energy supply sector accounts for approximately 4% of the MSCI ACWI index. As the transition proceeds, investment research on a broader range of companies is emerging. For example, a leading fixed income credit rating provider, Fitch, finds that: "Majors, due to their size, asset mix and business diversification, are generally in a stronger position to successfully manage the energy transition. However, mid-caps and juniors will face difficulties as they generally do not have the cash and/or scale and in-house expertise and capacity to develop robust climate strategies, finance decarbonization effects and shift their business model while ensuring ongoing profitability"[1]

→ Potentially stranded assets, financial stress, and investment opportunities that arise from the energy transition can be seen in most sectors, including, for example, the transportation and food sectors, as consumer preferences and regulatory regimes shift to support lower carbon alternatives.

→ Energy transition risks may also occur in low carbon industries, as new technologies come to commercial fruition. For example, hydrogen is emerging as a key potential opportunity to help shift toward global Net Zero targets. It is being pursued in many industries that are heavy energy users, from transportation to technology. In technology, large companies such as Microsoft are working to move off diesel to support their highly energy intensive data centers with hydrogen. Most hydrogen fuel is very carbon intensive to produce. In July 2022, Australian company, Hysata announced a breakthrough to make green hydrogen cost competitive. This is just one example that may change trends in the types of renewable energies that are produced and used, and potentially raise long-term risks to more established renewable energy technologies and products.

Energy transition risks and opportunities:

→ **Are occurring in all sectors**

→ **Within the energy sector, oil and gas majors are generally in a stronger position to manage the transition than mid-caps and juniors**

→ **Transition risks can be material even in renewable energy sectors, due to potentially swift technology changes.**

[1] Sustainable Fitch, Sustainable Insight │ 19 July 2022

The Intergovernmental Panel on Climate Change (IPCC) found in its sixth report, released in February 2022, that human-induced climate change is causing dangerous and widespread disruption in nature and affecting the lives of billions of people around the world, despite efforts to reduce the risks. The report finds that the world faces unavoidable climate hazards over the next two decades with global warming of 1.5° C. The report states that to avoid mounting loss of life, biodiversity and infrastructure, ambitions, accelerated action is required to adapt to climate change, at the same time as making rapid, deep cuts in greenhouse gas emissions.

→ For 2021, a total of $343 billion in economic losses from catastrophic events world-wide were reported by large insurance provider, Aon, $329 billion of which resulted from weather and climate -related events, making 2021 the third costliest year on record, after adjusting for inflation. Of the 2021 losses, only 38% were covered by insurance.[1]

→ Physical climate risks already take a financial toll and create stranded assets in agriculture, which, after energy, is the second largest sector responsible for GHG emissions. For example, a recent study in *Environmental Research Letters* by Stanford University climate scientists examined the global warming impact on the U.S. crop insurance program, which Congress established in the 1930s to revive domestic agriculture in the wake of the Dust Bowl. Recent research shows a new dust bowl is twice as likely today due to climate change. Between 1991 and 2017, climate-fueled temperature increases generated an estimated $27 billion in insurance payments to U.S. farmers, the study found. Those losses accounted for nearly 20% of the program's total payouts over that period.

→ Financial losses from physical climate risks in traditional agriculture are expected to rise as climate change intensifies and be geographically more severe in different geographies. The agricultural sector represented approximately 0.16% of the MSCI ACWI IMI index, with total food products industry representing approximately 1.9% of the index as of March 2022. Food production financial stress can have repercussions throughout the economy, including for example through inflation.

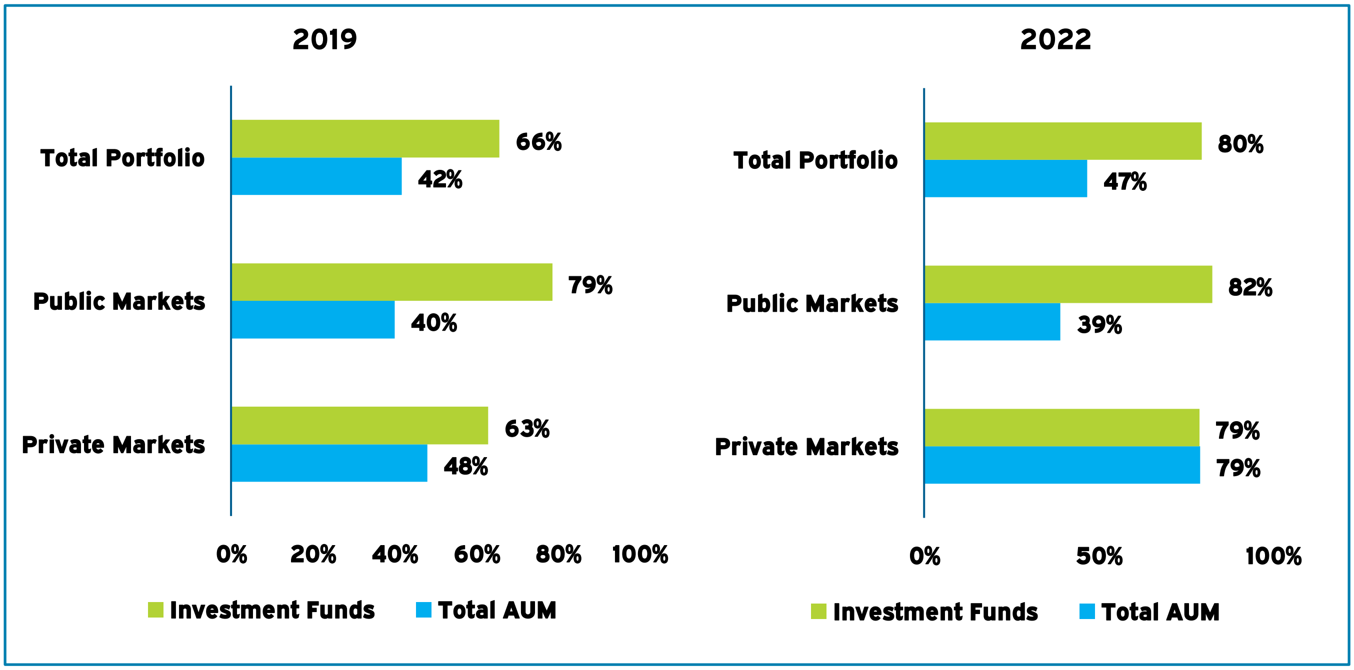
→ Warming may bring physical climate opportunities. For example, in Canada global warming may open new agricultural opportunities because warming starts from a relatively colder base.

The modeled physical climate impacts that have been assumed to be decades away are already happening today in some cases.

[1] January, 2022, 2021 Weather, Climate and Catastrophe Insight report

A large majority (80%) of SBI funds that responded to the survey account for material climate change risks in their management of the SBI funds.

Figure 2: SBI Funds that Account for Climate Change Material Risk



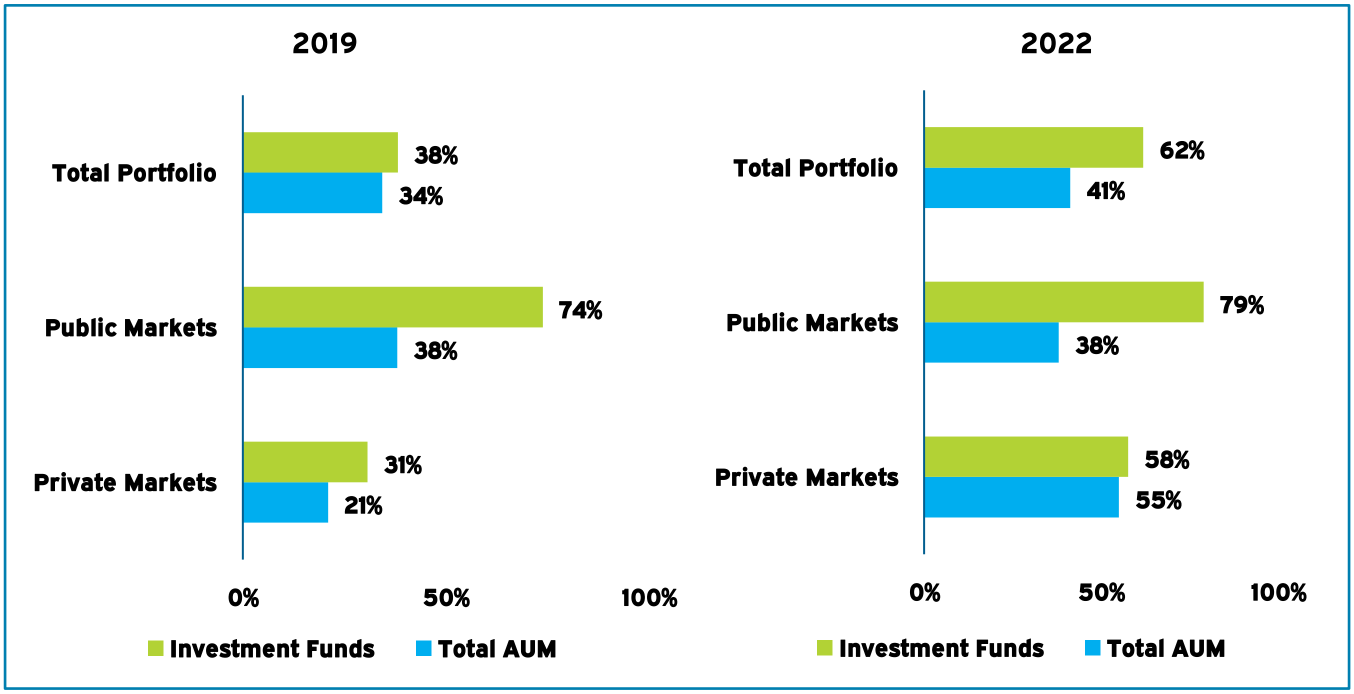
→ In 2022, 80% of SBI's public and private markets investment funds that responded to the survey indicated that they account for climate change material risks, compared to 66% in 2019.

→ Public market equities include a few funds that passively manage a large portion of the SBI's assets. By design these passively managed equity funds invest based on market cap weights only.

The SBI's large passive equity investments reduce the percent of the total portfolio AUM where the SBI's managers account for climate change risk in investments.

In 2022, 62% of the SBI funds that responded to the survey indicated that they account for low carbon economy opportunities compared to 38% in 2019.

Figure 3: SBI Funds that Account for Low Carbon Economy Opportunities



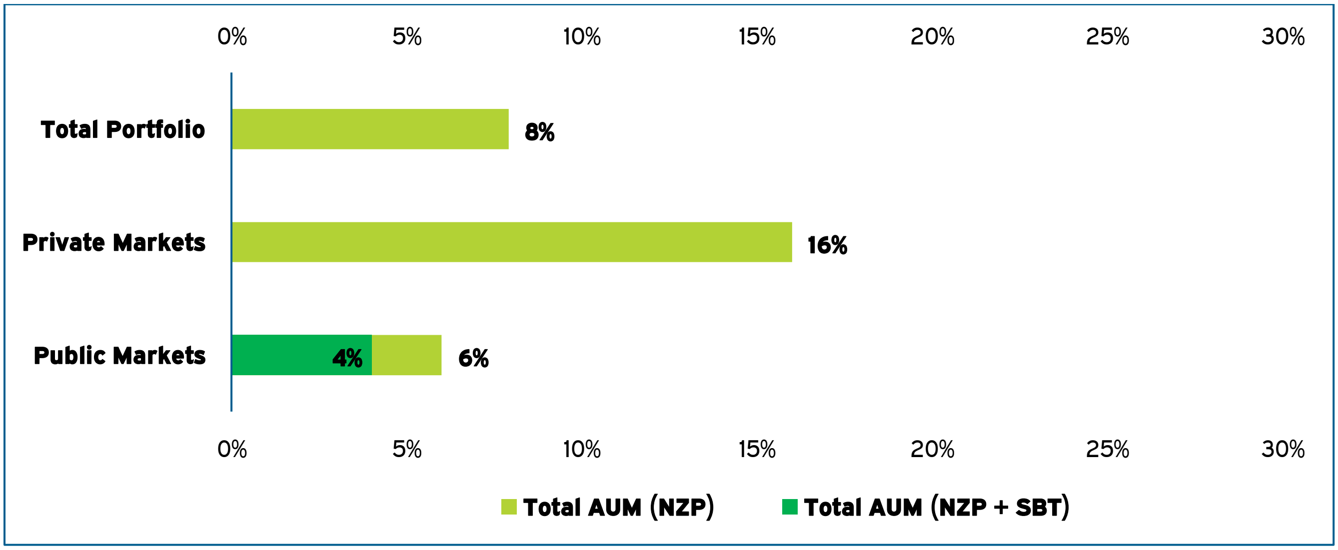
→ In 2022, 62% percent of SBI funds responded that they account for low carbon economy opportunities, compared to the 80% that account for material climate risks.

→ The percent of the SBI's private markets funds that is managed to account for low carbon economy opportunities nearly doubled in 2022 from 2019 (58% up from 31%) and more than doubled the percent of SBI's private markets AUM (55% up from 21%).

The SBI's public and private markets active managers are increasingly accounting for low carbon economy opportunities in their investment strategy, along with material climate risks.

SBI public and private markets are adopting Net Zero pledges. To achieve Net Zero goals, asset managers are often encouraging, supporting, and setting criteria for portfolio companies to transition their businesses to meet Net Zero targets, rather than implementing broad exclusions for higher risk industries, and/or types of companies.

Figure 4: SBI Funds with a Net Zero Pledge (NZP) and Funds that Follow a Science Based Target (SBT)



→ In public markets, 6% of the SBI's public markets AUM (nine funds) are investing with a Net Zero pledge, of which five funds, representing 4% of public markets assets are managed in line with a GHG target approved by the Science Based Target Initiative (SBTi).

→ In SBI's private markets, 16% of the private markets AUM of the managers that responded is managed against a Net Zero pledge, including 24 funds managed by eight different asset managers.

→ Among private markets funds managed to Net Zero, the range of commentary varied from, for example, a manager noting that they are just starting to put together their program to achieve a Net Zero goal by 2050, to a manager stating that their target is to have all portfolio companies achieve Net Zero status by 2040.

Across the SBI portfolio, 8% of the SBI's AUM is currently managed against a Net Zero pledge among the managers that responded.

The SBI's passive equity assets account for a large percentage of assets where climate risks and opportunities and Net Zero pledges are not considered, by design.

Figure 5: 2022 Climate Survey Results from all SBI Funds by Asset Category

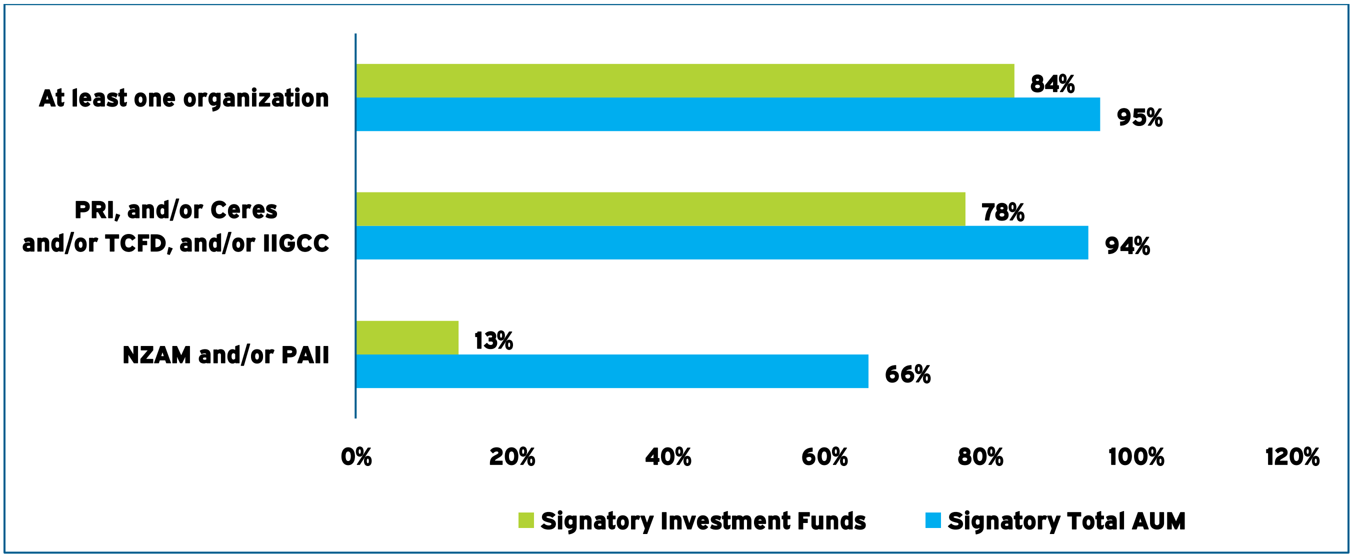
All Funds that Responded											
				Funds that responded YES to:							
				Account for climate change material risks?		Account for low carbon economy opportunities?		Net Zero Pledge		Net Zero Pledge + Science Based Target	
Asset Class	Total # of SBI Funds	# of Funds	Total SBI AUM of responses ($M)	# of funds	Percent of AUM (%)	# of funds	Percent of AUM (%)	# of funds	Percent of AUM (%)	# of funds	Percent of AUM (%)
Total Portfolio	316	288	82,468	229	47	178	41	33	8	5	3
Total Public Markets	57	57	66,676	47	31	45	31	9	5	5	3
Total Private Markets	259	231	15,792	182	15	133	11	24	3	N/A	N/A
Total Public Markets	57	57	66,676	47	39	45	38	9	6	5	4
Domestic Equity	18	18	32,303	14	10	13	10	1	0.3	0	0
Active	13	13	3,658	12	5	11	5	1	0.3	0	0
Semi-Passive	2	2	3,376	2	5	2	5	0	0	0	0
Passive	3	3	25,269	0	0	0	0	0	0	0	0
International Equity	18	18	14,123	14	8	14	8	3	2	1	0.7
Active	15	15	6,002	14	8	14	8	3	2	1	1
Passive	3	3	8,121	0	0	0	0	0	0	0	0
Global Equity	3	3	1,155	3	2	3	2	2	1	1	0.7
Fixed Income	16	16	12,662	16	19	15	19	3	3	3	3
Private Markets-Uninvested	2	2	6,432	0	0	0	0	0	0	0	0
Total Private Markets	259	231	15,792	182	79	133	55	24	16	N/A	N/A
Private Equity	158	138	11,265	105	55	81	39	12	12	N/A	N/A
Private Other	101	93	4,527	77	24	52	16	12	4	N/A	N/A

→ The SBI's 24 private markets funds that implement a Net Zero pledge encompass private equity (12 funds), real estate (8), private credit (2), and real assets funds (2).

Public Markets Net Zero pledges are currently being implemented in SBI active international equity (3 funds) and fixed income (3 funds) more than in active domestic U.S. equity (1 fund).

Additional insight into manager attention to climate issues can be seen in their participation in institutional investor organizations that focus on investor climate risks and opportunities.

Figure 6: SBI Total Portfolio Funds that are Signatories to Climate-Related Investment Organizations



→ Ninety-five percent of the SBI's assets were managed by firms that are signatories to at least one institutional investor organization that addresses climate change investment issues.

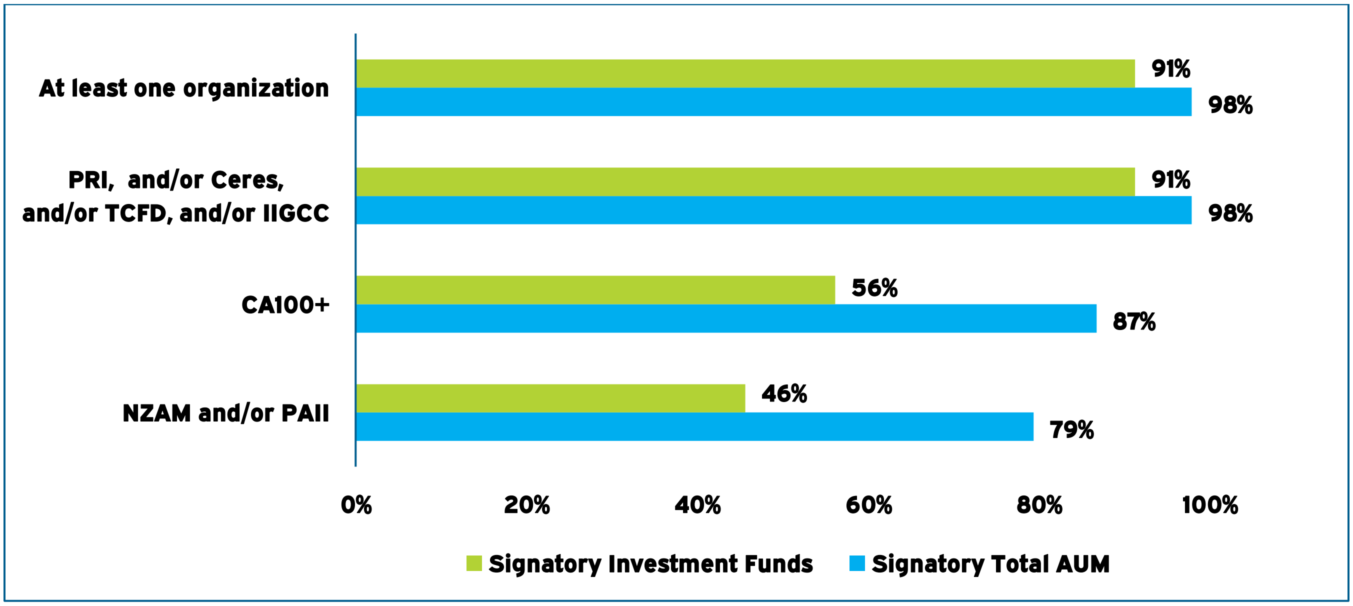
→ These include the PRI, Ceres, TCFD, and IIGCC, where 78% of SBI funds, representing 94% of the SBI AUM, are signatories to at least one of these organizations.

→ A significantly smaller number of funds (13%) are managed by signatories to either the Net Zero Asset Management initiative (NZAM) or to the Paris Aligned Investment Initiative (PAII).

Sixty-six percent of the SBI's assets are managed by firms that are signatories to NZAM or PAII. This represents 13% of the SBI's funds that responded to the survey and includes managers of passive equity assets, where the specific funds in which the SBI invests with a given manager are managed based on market cap weighted indexes that by design do not include Net Zero criteria.

Firms that manage publicly listed assets for the SBI are taking advantage of collaborative efforts as they seek best practices and education to mitigate investment climate change risks and increase climate opportunities that can affect their long-term investment performance.

Figure 7: SBI Public Markets Funds that are Signatories to Climate-Related Investment Organizations



→ In the SBI's Public Markets investments, 91% of the funds reported their firm being a signatory to at least one climate-related institutional investor organization, accounting for 98% of the SBI's public markets AUM.

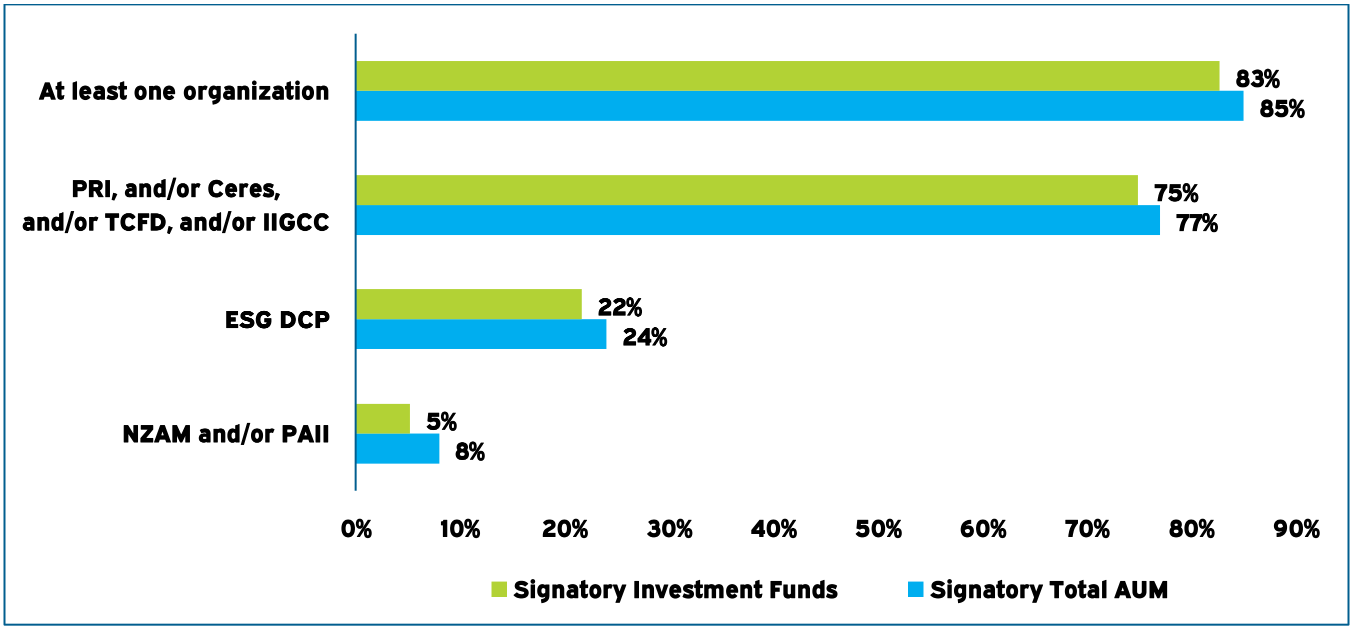
→ Slightly less than half (46%) of the SBI's public markets funds report that their firm is a member of NZAM and/or PAII, representing 79% of the SBI's public markets AUM of the survey respondents, which includes managers of the SBI's passively managed funds.

→ Managers of the SBI's passive equities, that, by design those specific funds do not account for climate change in their investment mandate, are more frequently making important contributions to long-term stable energy transitions through their proxy voting and engagement. The largest managers, such as BlackRock, SSGA, and Vanguard, are the largest global investors in many publicly listed companies.

Managers of 56% of the SBI's of public markets funds, representing 87% of SBI public markets AUM, are members of Climate Action 100+, an organization that focuses on climate proxy voting and engagement with the largest corporate emitters of greenhouse gases.

Some widely supported institutional investor organizations such as Climate Action 100+ focus primarily on publicly listed companies. For investors, reliable comparable data is a critical component to managing risks and opportunities. For private markets managers, recent developments directly address private markets managers and companies, such as the ESG Data Convergence Project (EDCP). The EDCP was launched in 2021 to provide a vehicle for common sustainability reporting among private equity GPs and LPs, in the absence of regulated disclosures.

Figure 8: SBI Active Private Markets Funds that are Signatories to Climate-Related Investment Organizations



→ In the SBI Private Markets, 83%, 191 of the 231 active private markets funds that responded to the survey. These funds were managed by 50 of the 65 responding managers, are signatories to at least one climate-related investment organization, and accounted for 85% of the SBI's private markets AUM from survey respondents.

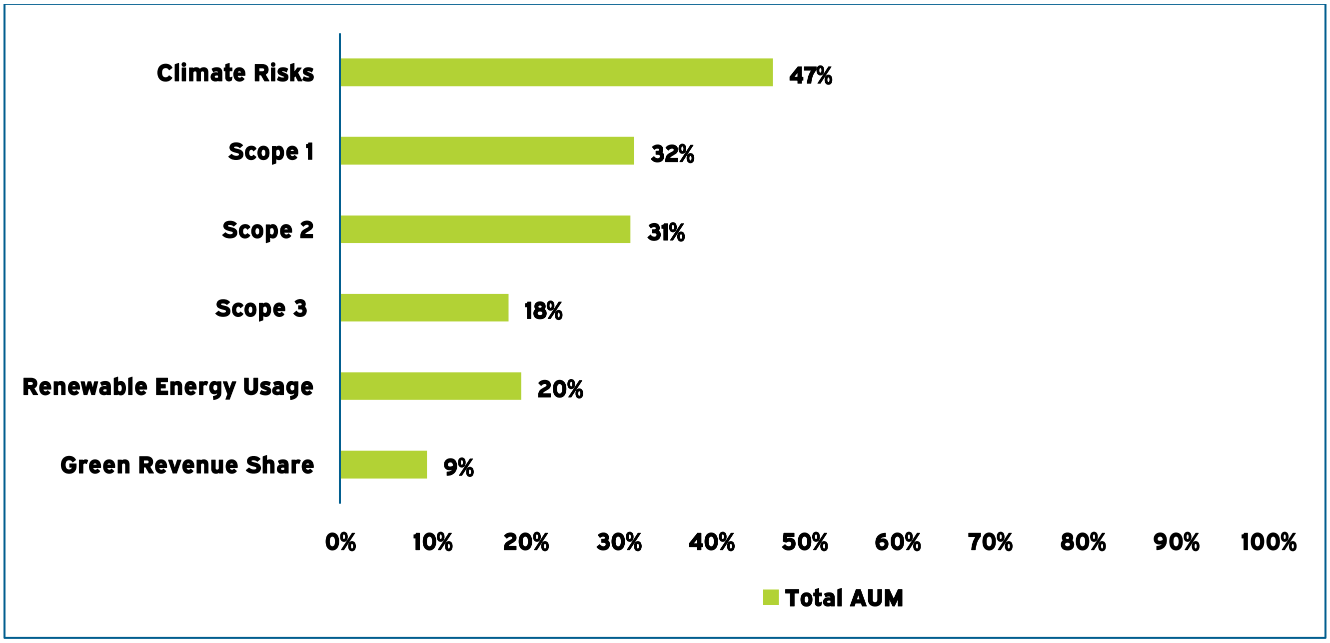
→ Seven SBI private markets funds, from four different managers (representing 5% of private markets AUM of survey respondents), reported that their firms are a member of the NZAM, compared to the total 24 SBI private markets funds reported that they manage to a Net Zero pledge. This difference indicates that Net Zero asset manager implementations are occurring in addition to those that are official members of NZAM or PAII.

The ESG Data Convergence Project (EDCP), launched in October 2021 to aggregate ESG metrics using comparable data across private equity funds, already has 17 different firms as signatories that manage 50 SBI funds. The 50 funds represented 24% of SBI's private markets assets from the survey.

II. Asset Manager Approaches to Climate Monitoring

Investment manager monitoring of climate is growing, as institutional investors such as the SBI request better disclosure and information on how managers are addressing climate risks and opportunities.

Figure 9: SBI Total Portfolio Monitoring Results



→ A total of 229 of the 288 SBI public and private markets funds reported that they account for climate risks. These funds account for 47% of the total portfolio AUM of the reporting companies.

→ The approaches vary widely. For example, one respondent disclosed that the company-level climate analysis explicitly incorporates a climate change section that breaks down transition and physical risks, as well as target setting.

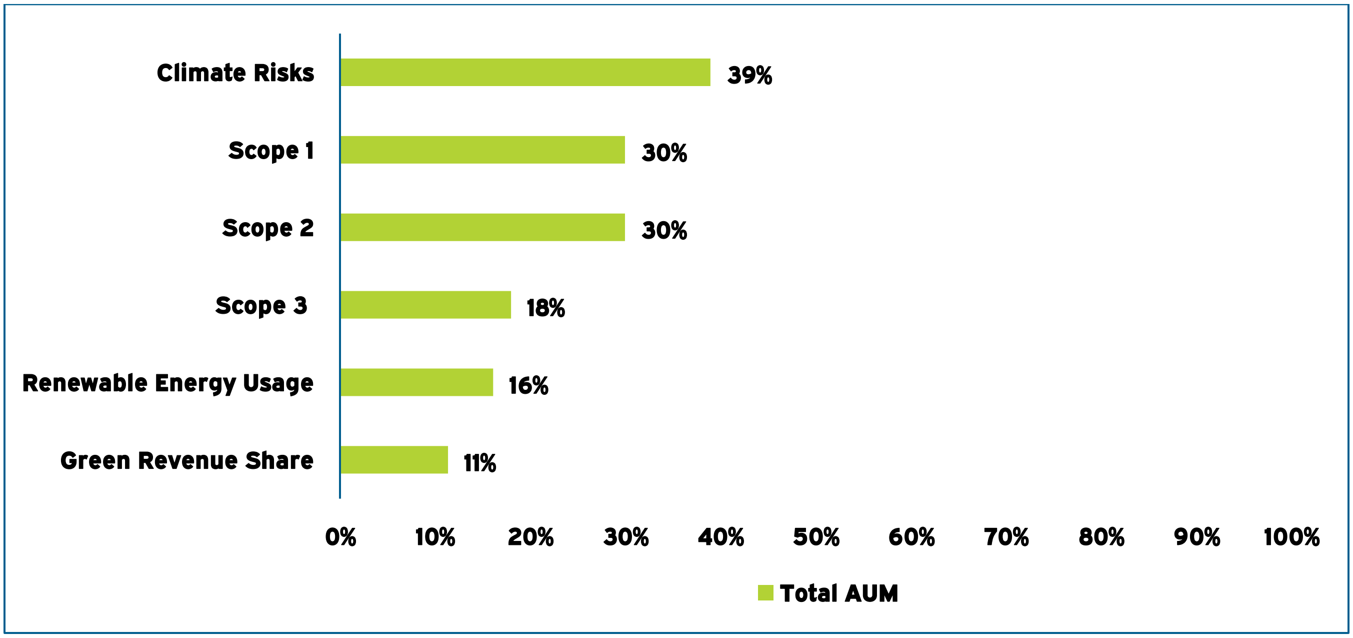
→ Funds managing 18% of the SBI's total portfolio AUM of the responding firms measure Scope 3 emissions. The lack of reliable data was often cited as a hurdle to measuring Scope 3 emissions of portfolio companies.

→ SBI funds that measure the renewable energy use of their portfolio companies, account for 20% of the total portfolio AUM among those managers that responded to the survey, while 9% of the Total portfolio AUM is managed by funds that track green revenue shares.

Managers that track climate risk data, such as Scope 1 and 2 emissions, had reached 39% of the SBI's total portfolio. Attention to climate opportunities was lower, such as green revenue share (9%) and renewable energy use (18%). Scope 3 emissions, which are the most difficult to measure, were also tracked by a relatively small percent of the SBI's AUM (18%).

The SBI's total public markets portfolio reflects the high percentage of public markets funds in passive, market cap weighted equity index funds that are by design managed without regard to climate or other metrics.

Figure 10: SBI Total Public Market Funds Monitoring Results



→ Funds managing 30% of the SBI's public markets AUM measure Scope 1 and 2 emissions. Eighteen percent measure Scope 3 emissions. The lack of reliable data was often cited as a hurdle to measuring Scope 3 emissions of portfolio companies.

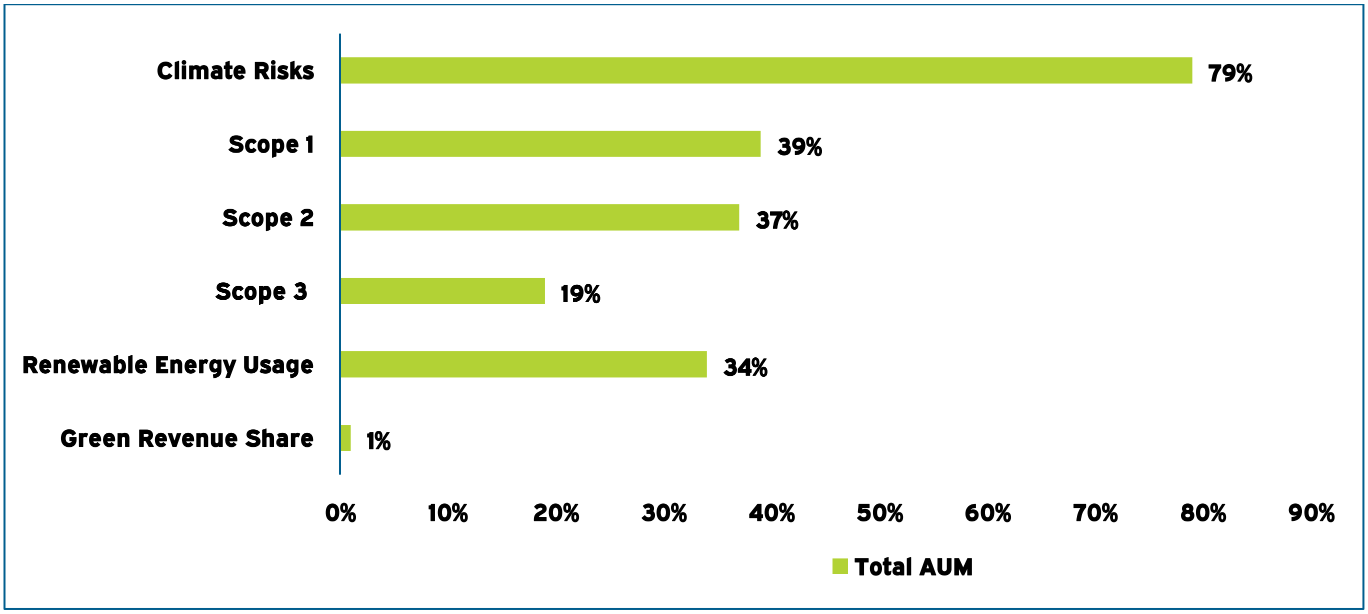
→ Nineteen SBI public markets funds measure renewable energy use of their portfolio companies, accounting for 16% of the total public markets AUM among those managers that responded to the survey.

→ Twelve SBI public markets funds (11% of public markets AUM) keep track of green revenue share of portfolio companies, reflecting the lack of standardized measurement of green revenues.

Within the SBI's public markets investments, 30% of the public markets AUM (36 of 57 funds) measure Scope 1 and 2 emissions of portfolio companies, while less than 20% measure renewable energy use, green revenue share, or Scope 3 emissions.

Private market investments represent a smaller share of the SBI's total investment portfolio than public markets. Figure 11 reports the shares of private markets AUM from respondents that measure emissions and climate opportunity metrics.

Figure 11: SBI Private Market Funds Monitoring Results



→ Private markets funds that measure Scope 1 emissions (39%) or Scope 2 emissions (37%) represent a similar percent of the SBI's private markets AUM, as that of the SBI's public markets AUM that measure Scope 1 and 2 emissions (39%).

→ SBI private markets funds that manage one percent of private markets AUM monitor the green revenue share of portfolio companies. The much lower tracking of green revenue share compared to renewable energy usage reflects the lack of readily available, comparable data regarding green revenue share.

A significantly greater percent of private markets AUM (34%), compared to that of public markets AUM (16%) is managed by funds that track the renewable energy use of portfolio companies.

Figure 12: 2022 Climate Survey Results from all SBI Funds by Asset Category

All Funds that Responded											
				Funds that responded YES to:							
				Account for climate change material risks		Measure Scope 1, and/or Scope 2, and/or Scope 3 gas emissions		Measure Renewable Energy Consumption		Measure the Share of Green Revenues Generated	
Asset Class	Total # of SBI Funds	# of Funds	Total SBI AUM of responses ($M)	# of funds	Percent of AUM (%)	# of funds	Percent of AUM (%)	# of funds	Percent of AUM (%)	# of funds	Percent of AUM (%)
Total Portfolio	316	288	82,468	229	47	105	32	87	20	16	9
Total Public Markets	57	57	66,676	47	31	36	24	19	13	12	9
Total Private Markets	259	231	15,792	182	15	69	7	68	7	4	0.3
Total Public Markets	57	57	66,676	47	39	36	30	19	16	12	11
Domestic Equity	18	18	32,303	14	10	10	6	4	2	1	1
Active	13	13	3,658	12	5	9	4	4	2	1	1
Semi-Passive	2	2	3,376	2	5	1	3	0	0	0	0
Passive	3	3	25,269	0	0	0	0	0	0	0	0
Int'l Equity	18	18	14,123	14	8	11	6	7	5	6	4
Active	15	15	6,002	14	8	11	6	7	5	6	4
Passive	3	3	8,121	0	0	0	0	0	0	0	0
Global Equity	3	3	1,155	3	2	3	2	2	1	1	1
Fixed Income	16	16	12,662	16	19	12	15	6	9	4	6
Private Markets-Uninvested	2	2	6,432	0	0	0	0	0	0	0	0
Total Private Markets	259	231	$15,792	182	79	69	39	68	34	4	1.5
Private Equity	158	138	11,265	105	55	44	28	47	27	0	0
Private Other	101	93	4,527	77	24	25	10	21	7	4	1.5

→ Most of the SBI's fixed income funds track GHG emissions (12 of 16 funds).

→ Within public markets, domestic equity had the fewest actively managed funds and the lowest percent of public markets AUM measuring renewable energy and green revenue share.

→ Within private markets, the four funds (1 manager) that measure the green revenue share of their portfolio companies were in real assets and private credit.

Survey results indicate that some managers in each sub-asset class track climate metrics despite the newness and current constraints on climate data availability.

Manager engagement with portfolio companies on climate risks and opportunities can be an essential element to managing transition risks and enhancing transition opportunities.

Figure 13: 2022 Climate Survey Results from all SBI Funds by Asset Category

All Funds that Responded									
				Funds that Responded YES to:					
				Engage on Scope 1, and/or Scope 2, and/or, Scope 3 gas emissions		Engage on Renewable Energy Consumption		Engage on the Share of Green Revenues Generated	
Asset Class	Total # of SBI Funds	# of Funds	Total SBI AUM of responses ($M)	# of funds	Total AUM (%)	# of funds	Total AUM (%)	# of funds	Total AUM (%)
Total Portfolio	316	288	82,468	84	28	52	15	12	7
Total Public Markets	57	57	66,676	33	23	16	12	8	7
Total Private Markets	259	231	15,792	51	5.3	36	4	4	0.3
Total Public Markets	57	57	66,676	33	28	16	14	8	9
Domestic Equity	18	18	32,303	9	6	3	1	0	0
Active	13	13	3,658	8	4	3	1	0	0
Semi-Passive	2	2	3,376	1	3	0	0	0	0
Passive	3	3	25,269	0	0	0	0	0	0
Int'l Equity	18	18	14,123	10	6	6	4	4	2
Active	15	15	6,002	10	6	6	4	4	2
Passive	3	3	8,121	0	0	0	0	0	0
Global Equity	3	3	1,155	3	2	2	1	0	0
Fixed Income	16	16	12,662	11	15	5	8	4	6
Private Markets-Uninvested	2	2	6,432	0	0	0	0	0	0
Total Private Markets	259	231	15,792	51	28	36	19	4	1.5
Private Equity	158	138	11,265	35	22	28	17	0	0
Private Other	101	93	4,527	16	6	8	2	4	1.5

→ Fewer SBI funds engage portfolio companies on climate, than monitor climate metrics.

More SBI funds (84 funds) engage portfolio companies on carbon emissions, than on climate opportunity metrics such as renewable energy use (52 funds) or green revenue share (12 funds).

III. Portfolio Climate Exposures – Introduction

In sections I and II we reported survey findings on how the SBI's asset managers are addressing climate risks and opportunities. Sections III-V assess the SBI's exposure to climate risks and opportunities based on metrics for portfolio companies, and top-down total portfolio climate scenario analysis.

The metrics and analytic tools available for investors to analyze climate risks and opportunities is rapidly evolving. Today, for public markets, a growing number of companies provide reported data such as Scope 1, 2 and 3 greenhouse gas emissions, green revenue share and renewable energy use. For public markets companies, ESG data providers gather company level metrics that are reported and provide modeled estimates for companies that do not report. Private market company climate data is not widely available today.

We expect continued growth in reported data, particularly in geographies where policy regulators require such data, and continued evolution and refinement of climate key performance metrics, and in climate scenario analysis.

For this report, Meketa relied on a leading ESG data provider – ISS – to look at some key performance metrics for the SBI's Public Markets portfolio companies, including Scope 1 + 2 emissions intensity (emissions generated directly from a company's business and emissions generated from purchased energy), and Scope 3 emissions intensity (emissions generated by a company's suppliers, and by its customers' use of its products and services). Emissions intensity measures the carbon emissions of a company compared to its revenues, and is a measure supported by the TCFD. The SBI's exposure is the emissions intensity weighted by the SBI's investment exposure to a given company.

Emissions intensity provides an indication of the emissions efficiency of a company. Another useful metric is the carbon footprint, which weights the absolute emissions by investment exposure. Measuring the carbon footprint is important because of the need to reduce overall emissions. However, a carbon footprint does not distinguish the efficiency of an entity's use of resources, and whether total emissions are due to positive or negative economic growth. For future climate implementation reports, we anticipate looking within each asset class at both carbon emissions intensity and carbon footprints.

We also include metrics that can indicate a company's exposure to climate opportunities, and ability to succeed during the energy transition away from fossil fuels. These include information such as Board oversight of Climate Risks, >5% green revenue share, GHG target approved by the Science Based Target initiative (SBTi), renewable energy used by the company, and renewable energy generation as a share of revenues.

For the SBI's private markets climate exposures, we relied on the information provided through the survey, because currently no comprehensive private markets climate database is available. Through our survey of the SBI's private markets managers, we found only a handful that supplied the resulting data, even though a somewhat larger percent responded that they track such data. With this limitation, for this report we focus on the percentage of each private markets asset class that indicated that they track climate data, and which supplied data. Over time, we expect private markets data to become more widely reported on comparable metrics.

To complement the bottom-up understanding of the SBI's exposure to climate risks and opportunities through such metrics, Meketa employed a top down, macro assessment of the potential performance of the SBI's portfolio, with its current asset allocation, under different climate scenarios – consistent with a 3.0 degree warming globally, and consistent with the current scientific conclusion that to avoid warming that has irreversible catastrophic effects globally, warming must be kept to 1.5 degrees above industrial levels.

Meketa analyzed the SBI's portfolio with public markets company-level climate metrics and complemented the bottom-up findings with a top-down assessment of the SBI's portfolio over the next twenty years under different climate scenarios.

IV. Public Markets Climate Exposures

Figure 14 shows how much Scope 1, 2 and 3 emissions data is reported by publicly listed companies in the SBI portfolio, as collected by ISS. Emissions data is modeled by ISS for companies that don't report.

Figure 14: SBI Public Markets: Reported Scope 1, 2 and 3 Emissions

					Reported Scope 1+2 Emissions			Reported Scope 3 Emissions		
	# Of Companies	AUM ($M)[1]	% Of Asset Class	% Of Total Public Market	# Of companies	% Of Asset Class	% Of Total Public Market	# Of companies	% Of Asset Class	% Of Total Public Market
Public Markets	**6,623**	**56,958**	**100%**	**100%**	**2,725**	**73%**	**73%**	**996**	**44%**	**44%**
Benchmark[2]	*5,884*	-	*100%*	-	*2,718*	*74%*	-	*1,042*	*44%*	-
Public Markets Asset Classes										
Domestic Equity	**3,096**	**32,123**	**100%**	**56%**	**917**	**81%**	**46%**	**305**	**52%**	**30%**
Passive	3,016	25,173	78%	44%	900	85%	38%	294	56%	25%
Active	1,492	6,951	22%	12%	603	66%	8%	228	39%	5%
Benchmark	*3,038*	-	*100%*	-	*904*	*82%*	-	*295*	*53%*	-
Int'l Equity	**2,568**	**13,792**	**100%**	**24%**	**1,695**	**91%**	**21%**	**632**	**49%**	**11%**
Passive	2,159	7,933	58%	14%	1,408	91%	13%	548	51%	7%
Active	1,204	5,859	42%	10%	878	77%	8%	369	39%	4%
Benchmark	*2,254*	-	*100%*	-	*1,502*	*90%*	-	*573*	*47%*	-
Global Equity	**222**	**1,125**	**100%**	**2%**	**89**	**84%**	**2%**	**49**	**52%**	**1%**
Benchmark	*2,873*	-	*100%*	-	*1,960*	*89%*	-	*796*	*55%*	-
Fixed Income	**1,586**	**9,921**	**100%**	**17%**	**874**	**29%**	**5%**	**377**	**13%**	**2%**
Benchmark	*2,216*	-	*100*	-	*728*	*23%*	-	*362*	*11%*	-

→ A large minority of companies 41% (2,725 of 6,623 companies) of the SBI's public markets investee companies, reported Scope 1+2 emissions as of December 31, 2021.

→ Fewer companies (996 of 6,623) reported Scope 3 emissions, as of December 31, 2021.

Companies that report carbon emissions today tend to be larger market capitalization companies. Thus, the 41% of companies that reported Scope 1+2 emissions comprised 73% of the SBI Total Public Markets portfolio.

[1] Public Market Data as of 12/31/2021, excluding Cash and Treasury Protection. 5.8% (or $3.3 billion) of the remaining market value was missing securities unique identifiers, 4% of which belonged to the Fixed Income portfolio. These securities were included in the AUM calculation but not included in the count of # of companies.

[2] Consists of asset class benchmarks by their respective weight: 56% Russell 3000, 24% MSCI ACWI ex. US, 2% MSCI ACWI and 17% SSGA US Agg.

Emissions intensity measures the carbon emissions of each issuer per million USD of revenues. This metric offers a proxy for the carbon efficiency per unit output, a measure endorsed by the TCFD.

Figure 15: Scope 1, 2 and 3 Emissions Intensity by asset class

					Scope 1+2 Emissions Intensity[1]		Scope 1, 2 + 3 Emissions Intensity[1]	
	# Of Companies	AUM ($M)	% Of Sector	% Of Total Public Market	Average	Weighted Average	Average	Weighted Average
Public Markets	**6,623**	**56,958**	**100%**	**100%**	**228**	**129**	**1,604**	**1,007**
Benchmark	*5,884*	-	-	-	**252**	**134**	**1691**	**993**
Public Market Asset Classes								
Domestic Equity	**3,096**	**32,123**	**100%**	**56%**	**175**	**121**	**1,667**	**1,005**
Passive	3,016	25,173	78%	44%	178	122	1,652	1,005
Active	1,492	6,951	22%	12%	169	118	1,705	1,235
Benchmark	*3,038*	-	-	-	181	123	1,740	1,049
Int'l Equity	**2,568**	**13,792**	**100%**	**24%**	**272**	**168**	**1,635**	**1,247**
Passive	2,159	7,933	58%	14%	337	159	1,540	1,191
Active	1,204	5,859	42%	10%	189	157	1,757	1,148
Benchmark	*2,254*	-	-	-	376	208	1,728	1,298
Global Equity	**222**	**1,125**	**100%**	**2%**	**82**	**70**	**577**	**548**
Benchmark	*2,873*	-	-	-	340	154	1,659	1,011
Fixed Income	**1,586**	**9,921**	**100%**	**17%**	**268**	**124**	**1,528**	**676**
Benchmark	*2,216*	-	-	-	304	66	1,488	396

→ The SBI's total public markets weighted average emissions intensity was roughly in line with the total public markets benchmark (129 and 134 weighted average emissions intensity).

→ Among actively managed domestic, international, and global equities, global equities exhibited the lowest weighted average emissions intensity compared to its benchmark (70 vs 154).

→ The SBI's fixed income assets indicated a higher-weighted average emissions than the benchmark, however, these numbers may be skewed by a lower exposure to corporates in the benchmark, and by lower availability of CUSIP identifiers in the benchmark due to ETFs, compared to the actual holdings by the SBI.

The SBI's public markets investments and benchmark are skewed somewhat to lower carbon emissions intensity companies, compared to the simple average emissions intensity of companies in the economy: The SBI's public markets portfolio and its benchmark show an investment weighted average emissions intensity that is lower than the unweighted average emissions intensity of the portfolio companies.

[1] Carbon intensity is expressed as the issuer's total carbon emissions per million USD of revenue as a proxy of the carbon efficiency per unit of output.

Forward-looking energy transition metrics can help assess how/if companies might successfully transition to a low-carbon economy. There are multiple and growing approaches to climate transition metrics. For this report we include three:

1) Board oversight of climate risks,

2) the percentage of green revenues, and

3) Greenhouse Gas (GHG) targets approved by the Science-Based Target initiative (SBTi).

Board oversight of climate risks reflects company responses to the question: does the company's Board of Directors exercise oversight of climate-related risks and opportunities?

We used the ISS measure of green revenue share that includes products and services throughout the economy that have a (significant or limited) contributing impact on the achievement of mitigating climate change. Examples range widely and include renewable energy production, power utilities using renewables, vehicles that increase use of renewable energy, concrete made with less or zero fossil fuel energy, products that reduce the use of energy, which can range from laundry detergent that works well in cold water (avoids energy used to heat water), energy efficiency in buildings, to food products with reduced emissions.

Large corporate users of energy are beginning to generate clean energy solutions. For example, large technology companies such as Microsoft and Google are transitioning to use clean energy to support the data storage needs of their businesses. A large consumer retail company, Walmart, has added jobs in U.S. Midwest through its support for offsite wind energy generation to support the clean energy needs of its facilities.

SBTi approved GHG targets are clearly defined pathways for companies and financial institutions to reduce greenhouse gas (GHG) emissions which have been validated by the SBTi. Targets include near-term targets, next five to ten years targets, and long-term (2050, and 2040 for the power sector) targets needed to achieve Net Zero GHG emissions.

Forward-looking transition metrics can help assess how/if companies might successfully transition to a low-carbon economy.

Figure 16: Board Oversight of Climate Risk, Green Revenue Share and Approved Science Based Targets

	Board Oversight of Climate Risks			>5% Green Revenue Share[1]			GHG target approved by Science-Based Target Initiative (SBTi)		
	# Of companies	% Of Asset Class	% Of Total Public Market[4]	# Of companies	% Of Asset Class	% Of Total Public Market	# Of companies	% Of Asset Class	% Of Total Public Market
Public Markets	**1,637**	**62%**	**62%**	**594**	**24%**	**24%**	**312**	**23%**	**23%**
Benchmark[5]	*1,508*	*63%*	-	*572*	*24%*	-	*301*	*23%*	-
Public Markets Asset Classes									
Domestic Equity	**920**	**79%**	**45%**	**322**	**34%**	**19%**	**136**	**29%**	**17%**
Passive	910	83%	37%	318	40%	16%	131	31%	14%
Active	618	65%	8%	186	27%	3%	109	21%	3%
Benchmark	*919*	*80%*	-	*318*	*34%*	-	*131*	*30%*	-
Int'l Equity	**711**	**60%**	**14%**	**248**	**15%**	**4%**	**179**	**21%**	**5%**
Passive	573	65%	9%	220	15%	2%	164	25%	3%
Active	478	44%	5%	117	13%	1%	116	13%	1%
Benchmark	*583*	*57%*	-	*236*	*16%*	-	*159*	*21%*	-
Global Equity	**55**	**58%**	**1%**	**25**	**29%**	**1%**	**30**	**34%**	**1%**
Benchmark	*1,030*	*74%*	-	*352*	*29%*	-	*274*	*28%*	-
Fixed Income	**403**	**18%**	**3%**	**108**	**3%**	**0%**	**76**	**4%**	**1%**
Benchmark	*405*	*16%*	-	*91*	*4%*	-	*89*	*4%*	-

→ >5% Green Revenue Share: The SBI's Total public markets actively managed funds that held portfolio companies with greater than 5% green revenue share (594 companies), was slightly more than those held in the SBI total public markets benchmark (572 companies).

→ GHG Target Approved by the SBTi: The SBI's total public markets investments includes 312 companies with an approved GHG target, slightly more than the benchmark (301).

Sixty-two percent of the SBI's public markets portfolio AUM (1,637 companies) indicate there is Board oversight of climate risks at portfolio companies; 24% of AUM (594 companies) show a green revenue share >5% and 23% (312 companies) were identified as having GHG emissions targets approved by the SBTi.

[1] MSB assets data, SBI; climate metrics, ISS.

Energy transitions are occurring throughout economy, both within the traditional energy sector, and in sectors that require large amounts of energy. Within the energy sector, integrated oil and gas majors Total Energy and BP are among the top 100 producers of renewable energy globally. Peabody Energy, a large U.S. coal mining company announced in 2022 that it was converting two old coal mines in Missouri and Illinois to solar power and noted that because the sites were already connected to the energy grid, getting the solar energy to the grid was much less costly and less time consuming than solar energy sites not already connected.

Figure 17: Energy Supply: Fossil Fuel and Renewable Energy Generation Exposure

	Renewable Energy Generation Revenue >5%[1]			Fossil Fuel Revenue >20%[2]			Fossil Fuel Revenue >20% and Renewable Energy Generation Revenue >5%		
	# Of companies	% Of Asset Class	% Of Total Public Market	# Of companies	% Of Asset Class	% Of Total Public Market	# Of companies	% Of Asset Class	% Of Total Public Market
Public Markets	**99**	**1.11%**	**1.10%**	**557**	**6.03%**	**6.03%**	**75**	**1.04%**	**1.04%**
Benchmark	*100*	*1.21%*	-	*502*	*5.87%*	-	*77*	*1.09%*	-
Public Markets Asset Classes									
Domestic Equity	**22**	**1.02%**	**0.57%**	**205**	**5.40%**	**3.07%**	**19**	**1.01%**	**0.57%**
Passive	21	1.07%	0.47%	200	5.31%	2.35%	18	1.06%	0.47%
Active	13	0.83%	0.10%	113	5.89%	0.72%	13	0.83%	0.10%
Benchmark	*21*	*1.14%*	-	*206*	*5.48%*	-	*18*	*1.05%*	-
Int'l Equity	**53**	**1.52%**	**0.34%**	**194**	**8.03%**	**1.83%**	**34**	**1.23%**	**0.28%**
Passive	52	1.75%	0.24%	155	8.01%	1.12%	34	1.55%	0.22%
Active	14	0.99%	0.10%	92	6.93%	0.71%	9	0.63%	0.06%
Benchmark	*57*	*1.71%*	-	*192*	*8.36%*	-	*37*	*1.46%*	-
Global Equity	**2**	**1.45%**	**0.03%**	**3**	**2.20%**	**0.04%**	**2**	**1.45%**	**0.03%**
Benchmark	*66*	*1.33%*	-	*243*	*6.43%*	-	*46*	*1.23%*	-
Fixed Income	**33**	**0.94%**	**0.16%**	**234**	**6.28%**	**1.09%**	**29**	**0.92%**	**0.16%**
Benchmark	*33*	*0.71%*	-	*165*	*3.58%*	-	*32*	*0.71%*	-

→ Today, in the SBI's total public markets portfolio, there are many more companies that generate fossil fuel revenues >20% of total revenues (557 companies) than there are companies that generate renewable energy revenues >5% of total revenues (99 companies). One indicator that the global economy and companies are in transition is the number of companies that have over 5% renewable energy revenues and >20% fossil fuel revenue share.

Seventy-five of the SBI portfolio companies with >20% fossil fuel revenues also generate >5% renewable energy revenues, with 77 such companies in the total public markets benchmark.

[1] Average recent-year revenues (>5%) for the issuer's involvement in the generation of electric power using renewables.

[2] Average recent-year revenues (>20%) for the issuer's total involvement in fossil fuel, including any exposure in Production, Exploration, Distribution, and Services.

There is evidence of the energy transition among large coal, and oil and gas reserves owners in SBI benchmarks and in its portfolio holdings. Large fossil fuel companies may exhibit a small percent of renewable energy generation, or of green revenue share, but, because they are large global companies, they may represent a large share of today's global renewable energy generation.

Figure 18: Top 200 Fossil Fuel Reserves Companies and Energy Transition Indicators

	ISS Top 100 Coal and Top 100 Oil& Gas Reserves			ISS Top 100 Coal or Top 100 Oil& Gas Reserves and Top 200 Renewable Energy Generators			Top 100 Coal and Top 100 Oil & Gas Reserves and GHG targets Approved by Science Based Target Initiative		
	# of companies	% of Sector	% Of Total Public Market	# of companies	% of Sector	% Of Total Public Market	# of companies	% of Sector	% Of Total Public Market
Public Markets	**109**	**2.81%**	**2.81%**	**16**	**0.45%**	**0.45%**	**1**	**0.020%**	**0.020%**
Benchmark	114	2.70%	-	20	0.49%	-	1	0.024%	-
Public Markets Asset Classes									
Domestic Equity	**23**	**1.74%**	**0.98%**	**1**	**0.01%**	**0.0047%**	**0**	**0%**	**0%**
Passive	23	1.79%	0.79%	1	0.001%	0.0003%	0	0%	0%
Active	19	1.54%	0.19%	1	0.036%	0.0044%	0	0%	0%
Benchmakr-R3000	26	1.79%	-	1	0.01%	-	0	0%	-
Int'l Equity	**60**	**6.24%**	**1.42%**	**13**	**1.89%**	**0.427%**	**1**	**0.100%**	**0.020%**
Passive	55	5.70%	0.80%	13	1.63%	0.226%	1	0.120%	0.015%
Active	35	6.01%	0.62%	8	1.97%	0.201%	1	0.054%	0.005%
Benchmark-ACWI-ex-US	65	6.06%	-	18	1.79%	-	1	0.096%	-
Global Equity	**1**	**0.32%**	**0.01%**	**1**	**0.32%**	**0.006%**	**0**	**0.0%**	**0%**
Benchmark-ACWI	75	3.46%	-	18	0.70%	-	1	0.037%	-
Fixed Income	**54**	**2.30%**	**0.40%**	**4**	**0.07%**	**0.012%**	**0**	**0%**	**0%**
Benchmark-US Agg	24	0.90%	-	4	0.21%	-	0	0%	-

→ Compared to the SBI's domestic equity benchmark, the international equity, global equity, and fixed income benchmarks each held more companies that were both top 200 fossil fuel reserves companies and Top 200 renewable energy generators globally.

Twenty companies in the SBI total public markets benchmark (16 in the portfolio) are both top 100 Oil and Gas reserves companies and among the Top 200 global renewable energy generation companies. This includes integrated oil and gas majors such as Total Energies (82nd largest global renewables producer), BP (95th) Repsol SA (140th), Eni (141st) Shell (144th), and Equinor (180th).

V. SBI Private Markets Climate Exposure

Among the SBI's private markets funds, some reported that they track climate metrics of their portfolio companies. We first review by sub-asset class the overall number of managers and percent of SBI private markets funds being monitored using climate metrics, and then present information on the number of funds that provided results of their measurements for funds in which the SBI invests.

Figure 19: SBI Private markets sub-asset class measure climate exposures

	Number of Funds that Responded		Monitor Climate Risks		Measure Scope 1, 2, and/or 3		Measure Renewable Energy usage		Measure Green Revenue Share	
	# of Funds	% AUM	# of Funds	% AUM	# of Funds	% AUM	# of Funds	% AUM	# of Funds	% AUM
Total Private Markets	231	100%	182	79%	69	39%	68	34%	4	1%
Private Equity	138	71%	105	55%	44	28%	47	27%	0	0%
Real Estate	30	10%	22	7%	3	1%	10	3%	0	0%
Real Assets	27	9%	25	9%	19	8%	7	3%	3	1%
Private Credit	36	10%	30	8%	3	1%	4	1%	1	0%

→ Among the SBI's 231 private markets funds that responded to the climate survey, by sub-asset class, more Private Equity and Real Estate funds reported that they measure Scope 1, 2 and/or Scope 3 emissions, than measure renewable energy use. No SBI Private Equity or Real Estate funds measured green revenue share, largely due to lack of clear definition of metrics.

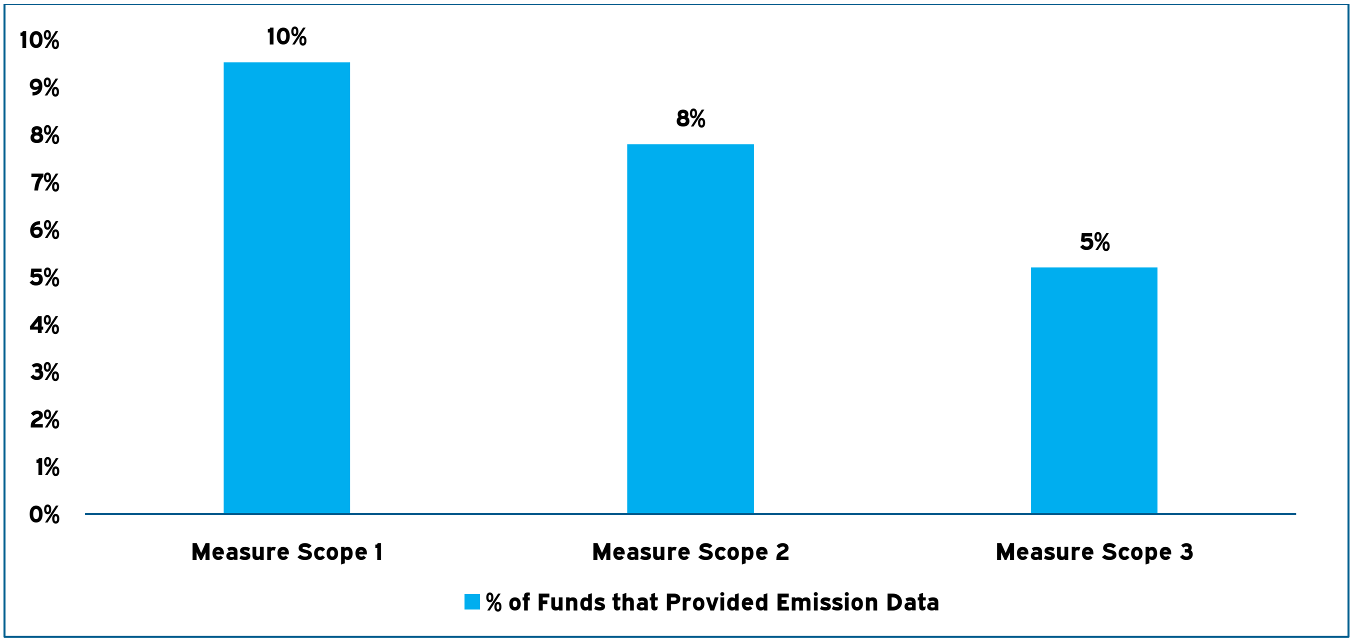
→ Private Credit fund managers that measure Scope 1,2, and/or 3 emissions also measure renewable energy use.

→ The four SBI private markets funds (one manager) that track the green revenue share of portfolio companies include three Real Assets funds and one Private Credit fund.

Slightly more than one third of the SBI's private markets assets are managed by funds that measure Scope 1,2 and/or 3 emissions (39% of private markets AUM) and/or measure renewable energy usage (34% of private markets AUM).

Private markets investment funds are in the early stages of collecting GHG emissions data on portfolio companies.

Figure 20: SBI Private Markets Carbon Emissions Scope 1, 2 and 3 Measurements Provided



→ Among the 231 private markets respondents, 22 funds (10% of respondents), representing nine distinct managers, provided data for Scope 1 metrics tons of CO_2 emitted by the 502 portfolio companies.

→ Eighteen funds (8% of respondents), representing seven distinct managers, provided data for Scope 2 metric tons of CO2 emitted by 469 portfolio companies.

→ Twelve funds (5% of respondents), representing four distinct managers, provided data for Scope 3 metric tons of CO2 emitted by 436 portfolio companies.

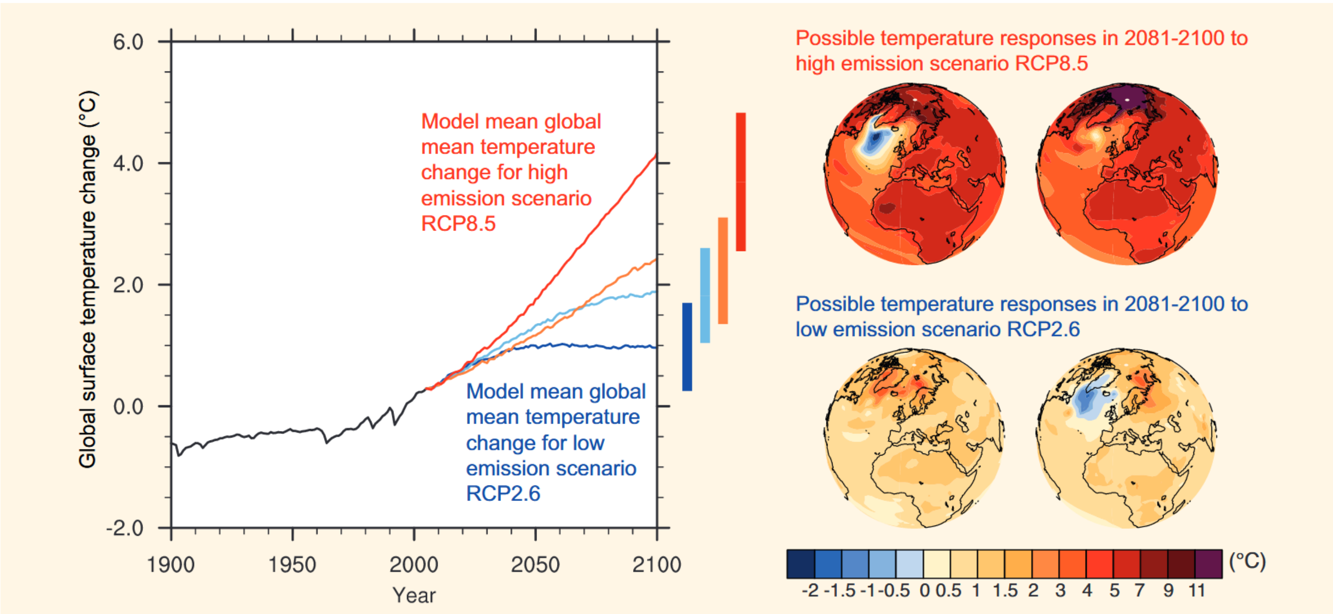
The small number of SBI private markets funds that reported emissions of their portfolio companies reflects the fact that market wide, private markets managers are in the very early stages of collecting and reporting emissions data of their portfolio companies in the absence of regulatory disclosure requirements.

We anticipate that the availability of reported climate metrics by private markets funds will increase in coming years.

VI. Climate Scenario Analysis

Global temperatures have been rising along with various industrial greenhouse gas emissions, most notably (but not limited to) carbon dioxide (CO_2) and creating significant increases in material physical climate risks.

Figure 21: What Are We Dealing With?[1]



→ Currently average world temperatures are slightly less than +1.5°C above the pre-industrial baseline.

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Increases of the average temperature from 2.0° C to 4.0° C above industrial levels by the end of the 21st century, are not only possible, but arguably likely without broad changes in human behavior.

[1] Source: IPCC Fifth Assessment Report, FAQ 12.1, Figure 1, https://www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5_Chapter12_FINAL.pdf.

Meketa's Climate Scenario Approach

Our clients are often seeking to mitigate risks across their entire investment portfolio over 20 to 30-year periods. As a result, we use a top-down, statistical approach to give asset allocators a "big picture" estimation of potential impacts to returns and risk that could confront them in a fundamentally uncertain situation. However, such an approach should not be viewed in isolation and has unique benefits and drawbacks.

A top-down model illustrates broader relationships at the expense of specificity; bottom-up models can make more specific assumptions.

Our statistical approach relies on demonstrated historical relationships to explain causality.

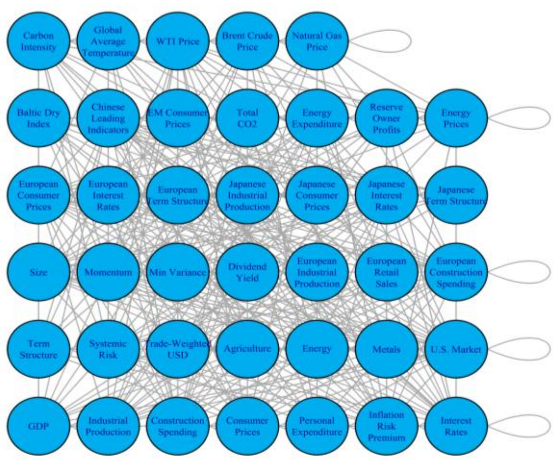
As a financial model, our results show observable monetary impacts from transition risks better than from physical climate risks, and its results are affected by capital market conditions.

→ We start by using information from our fundamentally driven asset study and our quantitatively driven modelling of economic and financial factors.

- This information provides us with a foundation of what we know but leaves an honest assessment of our uncertainty.

This uncertainty leads us to define future scenarios in terms of their probability of occurrence and presents a range of possible outcomes.

Figure 22: The Meketa Climate Scenario Analysis Model



We take historical factor definitions and their past behaviors to generate direct and indirect relationships among factors. We then use these relationships to generate "simulations" that forecast these factors into the future.

→ Each simulation can be thought of as a way the world *could* look in the future.

→ We then review the simulations with characteristics that are of interest.

The SBI Current Portfolio Climate Scenarios

For the SBI's current portfolio target asset allocation (based on December 31, 2021), Meketa analyzed two climate change scenarios compare to the base case where climate change is not taken into account. We selected simulations where:

→ Global warming was constrained consistent with 3.0°C warming by 2100.

→ Global warming was constrained consistent with 1.5°C warming by 2100.

Figure 23: SBI Current Target Portfolio: Climate Scenario Analysis Model

SBI 20-Year Climate Scenario Analysis: Average Target Portfolio (As of December 31, 2021)	Base: No temperature effect included (%)	1.5 Degree (%)	3 Degree (%)
Long-Term Expected Return (annualized)			
Current	6.9	6.0	6.7
Standard Deviation			
Current	14.7	15.5	15.1
Sharpe Ratio			
Current	0.35	0.28	0.33

→ The lower long-term return expectations for scenarios with climate included, relative to the base case where climate is not accounted for, presumably reflect the greater societal efforts to curtail carbon emissions and incentivize climate-friendly economic initiatives, and/or the impacts of ignoring climate change.

→ The 1.5° C long-term expected return is nearly a full one percentage point lower than the expected return that does not include any anticipation of climate change.

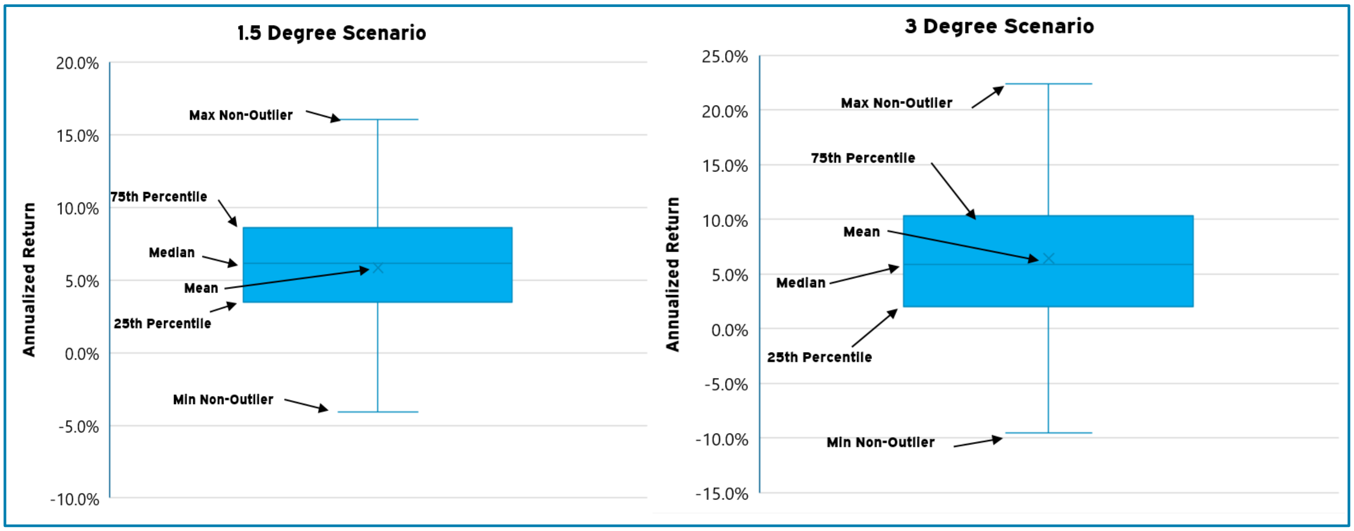
→ For the SBI's current portfolio, the lower relative return of the 1.5° C scenario versus the 3.0° C scenario likely stems in part from the SBI's relatively somewhat high allocation to alternative asset classes, including private equity, and reflects the start date of December 31, 2021, when private equity was relatively highly valued. Alternative assets historically display a positive relationship with temperature, and more sensitivity to changes in climate forecasts, thus increasing the asset class variability while decreasing average returns.

Under either a 1.5° C or 3.0° C climate change scenario, the SBI's portfolio would be expected to reduce future returns and increase portfolio volatility, to become less risk efficient compared to estimates that do not include climate.

→ Our analysis begins in December 2021, a period characterized by low interest rates, a dramatic recent increase in equity prices including private equity, and somewhat higher prices for energy relative to historic lows in 2020. Our modeling incorporates 1) extrapolation of recent market trends and 2) reversion to mean expected long-term returns when generating simulations for analysis. If the starting point of the analysis were shifted, particularly in volatile markets as we have experienced in recent years, we expect the relation between the mean expected return of the base and climate scenario portfolios would differ.

→ Modeling a 4.0° C or higher scenarios could result in potentially even lower performance as the global economy grapples the possible enormous destruction of capital and greater volatility from unmitigated physical climate risks.

Figure 24: Point versus range Estimates = 1.5 and 3.0 (December 31, 2021)



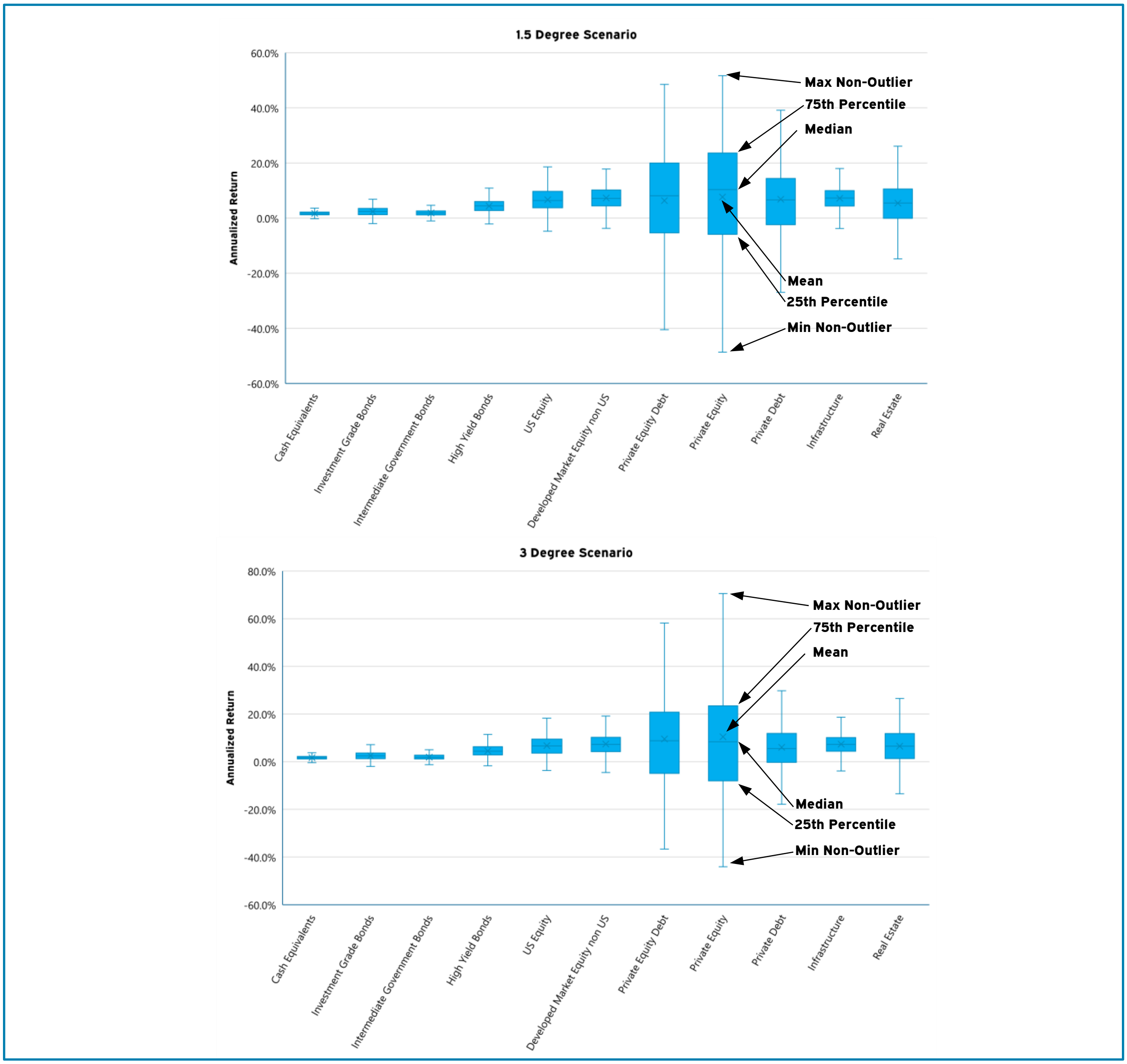
→ Across simulations, the SBI's target portfolio has an average expected return approximately 0.7% higher in a 3.0-degree scenario than 1.5° scenario.

→ The range of likely outcomes (i.e., the middle 50% of simulations) substantially overlap, though the 3.0-degree scenario has greater variation in outcomes.

→ Given current capital market conditions and the current target asset allocation, the portfolio is more likely to moderately outperform in a 3.0° scenario than in a 1.5°. That outcome is uncertain and subject to change as markets and climate conditions change.

For the 20-year time frame beginning December 31, 2021, the SBI climate scenarios indicate that the 3.0° scenarios produce a higher variation in results, with a somewhat higher mean return than the 1.5° scenarios.

Figure 25: SBI Current Target Portfolio: 20-year Climate Scenario Analysis Distribution of Asset Class Returns (December 31, 2021)



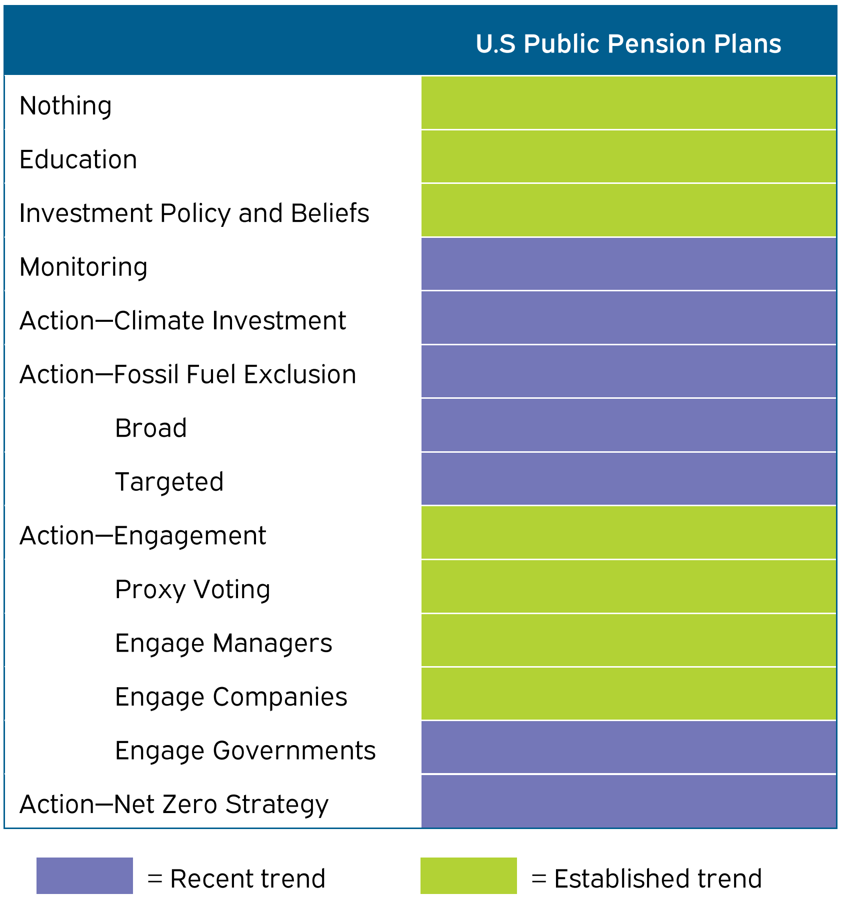
→ Although alternative asset class returns are currently expected to be higher on average in a 3.0° scenario than a 1.5° scenario, the highest reasonably expected return (the 25th percentile return) is higher in a 1.5° scenario.

For the 20-year time frame beginning December 31, 2021, in both the 1.5° and 3.0° scenarios, fixed income returns display less variability in outcomes than equities and real assets. Private equity, private debt, infrastructure, and real estate have substantial variability in outcomes relative to other asset classes.

VII. Policy Options Discussion

The growing attention being devoted to climate change physical and transition risks includes consideration of multiple different investment tools and implementation efforts. Each investment tool can be used in multiple ways.

Figure 26: Public Pension Plans and Climate Investment Risk and Opportunity Tools



→ **Climate Change Investment Issues are Complex**

- Decarbonizing an investment portfolio and helping move the market beta toward Net Zero are not equal.

→ **No Best Practices**

- There is a wide range of approaches by plans to address climate risks and opportunities.
- Plans of all sizes, and widely varying experience in addressing climate, continue to evolve their approaches and use of different investment tools.

→ **Growing Trend to Adopt Net Zero by 2050 or Before**

- Net Zero strategies focus on transition in the real economy and vary widely.

The range of investment tools can each be implemented in different ways, and can have differing impacts on the real economy, and costs and complexity of implementation.

Figure 27: Climate Investment Tools – Impact on Real Economy, Costs and Complexity

Approaches to addressing Climate Risks and Opportunities	Impact on Real Economy	Cost	Complexity
Support Investor Organizations	Can improve collaborative results	Low	Low
Portfolio Measurement and Monitoring	Can improve portfolio impact	Medium	Low to Medium
Stewardship- Proxy Voting and Engagement	Medium	Low to High	Low to Medium
Investing in Climate Solutions	Medium to High	Low	Low
Exclusion	None	Low to Medium	Low to Medium
Net Zero Goal	Medium to High	Medium to High	High

= None to Low   = Low to Medium   = Medium   = Medium to High   = High

→ **Investor Organizations** – The SBI is a signatory to investor organizations focused on climate, including CII, PRI, Ceres, Climate Action 100+, TCFD and CDP. Such organizations provide mechanisms for the SBI to enhance its proxy voting and engagement, and climate strategy efforts through education and work with other institutional investors.

→ **Portfolio monitoring of climate metrics** can vary in complexity from low, measuring a few metrics, to high, monitoring more metrics and using scenario analysis. The SBI has begun to implement more complex climate assessments.

→ **Stewardship** - The SBI votes all its proxies in-house, supported by an operational structure of separately managed accounts in public markets equities. The SBI has sponsored a climate related shareholder proposal in conjunction with CA100+.

→ **Investing** - The SBI has invested in some private market funds devoted to climate solutions. Increasing the SBI's exposure to investments more geared toward mitigating climate risks may have a medium to high effect on the real economy, while incurring low additional costs.

→ **Exclusion** – The SBI excludes thermal coal companies, and its separate account structure can support targeted, case by case exclusions in public markets. The most expensive approach excludes fossil fuel companies from existing private market funds.

There is a wide range of options for the SBI to consider while evolving their climate change approach. Adopting a portfolio-wide Net Zero Goal strategy would likely be both the most complex approach and offer the greatest potential impact on the real economy.

Addressing climate risks and opportunities is still an art, not a science, and one for which asset owners are continually evolving their approach. Investment climate risks and opportunities represent rapidly moving targets, as policies, technologies, and consumer preferences change with heightened physical climate risks, and with the ability to address these issues change with improved data and analysis. Investment policies may seek to enhance a dynamic global process. For discussion, we offer three broad policy options: Climate Aware (Current), Energy Supply Exclusion (Broad Exclusion of Fossil Fuel Suppliers, and a Portfolio-wide Strategic Net Zero Goal.

Figure 28: Climate Policy Approaches

Approach	Implementation	Pros	Cons
Climate Aware (Current)	Maintain Existing approach to investment climate risk and opportunities	No additional time and resources required	Low to medium expected long-term contribution to lowering real economy climate risks and increasing risk-adjusted return of investment portfolio
Energy Supply Exclusion (Broad FF Exclusion)	Expand coal exclusion to all fossil fuel suppliers, and maintain rest of existing approach to climate risks and opportunities	Minimal to medium implementation costs and resources, depending on approach to private markets	Low expected long-term contribution to lowering real economy climate risks and expected low contribution to improving risk-adjusted return of investment portfolio
Portfolio-wide Strategic Net Zero Goal	Take greater advantage of opportunities and attention to material risks by increasing investment in climate solutions and engagement; and evolving to targeted exclusions using forward-looking metrics if, and when, they enhance engagement and investment strategies.	Expected greatest long-term contribution to lowering real economy climate risks and to potentially improving risk-adjusted return of the investment portfolio.	Most time and resource intensive. Implementation will evolve as conditions change.

→ These three broad approaches each carry their own pros and cons and are not necessarily mutually exclusive. For example, among four large U.S. public pension funds with Net Zero commitments, CalPERS and CalSTRS avoid exclusions; the NYSCRF embraced a Net Zero Goal focused on engagement and climate solution investing, with case-by case exclusions; and three NY City plans enacted broad fossil fuel exclusion then subsequently made a Net Zero Pledge.

A portfolio-wide strategic Net Zero goal may best address the dynamic changes underway in the global economy; likely require the greatest increase in resources; and can be implemented to enhance elements of the SBI's current approach and use exclusions where they support the SBI's stewardship and investment strategy.

To provide some indication of the potential financial return and risk of each investment policy approach, we modeled the three policy options across two different climate scenarios (temperatures constrained to 1.5 degrees of temperature rise and a scenario with warming up to 3.0 degrees) and across a 'base case' scenario that does not factor climate impacts into the forecasts. Each policy option begins with the SBI's current target asset allocation[1]. The policy scenarios are proxied by a:

1) **Climate-Aware Policy (current approach):** SBI portfolio invested at current asset class targets,

2) **Energy Supply Focused policy**: SBI portfolio exposure to fossil fuel suppliers removed, and

3) **Net Zero goal portfolio-wide strategy:** a scenario geared toward solutions across all asset classes that are more likely to succeed in a transition to a 1.5° global economy.

Figure 29: Climate Policy Approaches – Climate Scenario Analyses

SBI 20-Year Climate Scenario Analysis: Target Portfolios (As of December 31, 2021)	Base (%)	1.5 Degree (%)	3 Degree (%)
Long-Term Expected Return (annualized)			
Climate Aware (Current)	6.9	6.0	6.7
Energy Supply Focus (ex-FF suppliers)	6.9	5.9	6.7
Portfolio-Wide Strategic Net Zero Goal	6.9	8.0	9.1
Standard Deviation			
Climate Aware (Current)	14.7	15.5	15.1
Energy Supply Focus (ex-FF Suppliers)	14.7	15.4	15.3
Portfolio-wide Strategic Net Zero Goal	14.7	15.5	15.1
Sharpe Ratio			
Climate Aware (Current)	0.35	0.28	0.33
Energy Supply Focus (ex-FF Suppliers)	0.35	0.27	0.32
Portfolio-wide Strategic Net Zero Goal	0.35	0.41	0.49

Compared to the SBI's long-term investment target return of 7.5%, the current 20-year forward base case, with no climate factors, would be expected to underperform 7.5%, The current target allocation, and the ex-fossil fuel suppliers' portfolio underperformance, compared to the SBI's target return, is expected to be even worse with climate factored in under 3.0 and 1.5 degree scenarios.

The portfolio-wide strategic Net Zero Goal portfolio would be expected to have the greatest likelihood of achieving or exceeding the SBI's 7.5% long-term target return. We emphasize that all long-term forecasts have a high degree of uncertainty, even before consideration of the high level of dynamic change and uncertainty due to climate change that we face this century.

[1] See Appendix I for discussion of modeling method and assumptions.

→ Climate change, whether mitigated or not, is likely to increase portfolio volatility and decrease expected returns relative to traditional forecasts.

→ Currently, a 1.5° scenario is forecast to have a more negative impact on the SBI portfolio risk and return than a 3° scenario.

- This dynamic is due in part to the financial focus of the model, which accounts for changing capital market conditions and risks reflected in market pricing. Presently, this approach will tend to better reflect transition risks than physical risks. We expect the 1.5° scenarios to have a greater degree of transition risk while the 3° scenarios to have greater exposure to physical risks.
- This dynamic is also due in part to a relatively strong degree of exposure to alternative asset classes, which are forecast to be more highly sensitive to climate change impacts. This exposure is amplified by the start date of the period of analysis, which begins with asset classes such as private equity being at relatively high historic values and would be expected to revert to a long-term mean overtime.
- The difference between the scenarios could decline or potentially reverse as capital market conditions change (e.g., fossil fuel supplier valuations change), the policy landscape forces markets to better reflect climate risks (e.g., carbon taxes, improved company climate reporting), or the portfolio changes (i.e., while alternative assets are most sensitive to climate impacts, they also provide the greatest upside for correctly navigating climate change risk and opportunities).

→ Excluding fossil fuel suppliers has a minor impact on portfolio risk and return.

- The allocation to fossil fuel providers is relatively small compared to the entire portfolio (less than 5%), and the risks of climate change are diffused throughout the economy (i.e., they are not isolated to fossil fuel providers).

→ A Portfolio-wide Net Zero Goal approach can outperform levels of return consistent with current forecasts, albeit with an increased level of risk, to achieve improved Sharpe Ratios.

- There are sufficient potential "upside" scenarios across asset classes (particularly in alternative assets) that climate risks could be feasibly managed.

Excluding all fossil fuel suppliers has a minor impact on portfolio risk and return (it represents less than 5% of the entire portfolio) and has limited impact on reducing real economy climate risks that are diffused throughout the economy.

A portfolio-wide strategy geared toward a Net Zero goal has the best likelihood of maintaining or exceeding current forecasts, as this includes sufficient potential 'upside' scenarios across asset classes that can feasibly manage climate risks.

VIII. Conclusions

A growing number of public pension plans have adopted Net Zero or Paris-aligned investment strategies. The relatively recent growth in Net Zero pledges is indicative of the rapid increase in attention to climate investment issues. With this attention, plans of all sizes, and widely varying experience in addressing climate risks and opportunities, continue to evolve their approach.

As the SBI considers how best to evolve its approach to investment climate risks and opportunities, Meketa offers three distinct, broad approaches. There is no consensus in the investment community on best practice. The three broad approaches are not mutually exclusive, and there are many variations within each of these three broad approaches. Seeking to reduce the carbon emissions of the SBI's portfolio is not equivalent to seeking to reduce the real economy systemic climate risks throughout the portfolio. For example, neither broad exclusion of fossil fuel producers, nor hedging the portfolio to become 'carbon neutral', directly address reducing the climate risks in real economy. The three approaches, summarized below, each carry pros and cons, and each can be implemented in a variety of ways.

1) **Climate Aware Approach (Current)**. Continue the SBI's proxy voting on climate issues; exposure to climate transition opportunities in private markets; exclusion of thermal coal producers: manager engagement around climate issues through periodic climate surveys, engagement with regulators, and participation in institutional investor organizations focused on climate.
2) **Energy Supply Focused Approach: (exclude all Fossil Fuels).** Exclude all companies with fossil fuel revenues and continue other climate aware available elements of current approach (i.e., proxy-voting and engagement limited to non-fossil fuels companies).
3) **Portfolio-Wide Strategic Net Zero Goal Approach.** Develop an overarching portfolio-wide strategy that seeks to help reduce climate risks in the real economy facing the plan, by coordinating and strengthening the use of tools available to address climate issues, including increased attention to proxy voting, engagement with managers, portfolio companies and governments, increased investments in climate solutions appropriate to each asset class, using exclusions selectively if and when they enhance an engagement and investment strategy (which may include situations where a company misrepresents climate risks and significantly lags peers in enacting a meaningful transition plan), and appropriate participation in institutional investor organizations addressing climate.

A recommendation for the SBI's consideration –

Adopt a two-step process to first establish a Net Zero Goal, followed by a second step to develop a thoughtful implementation plan using elements of all three approaches, with an emphasis on Climate Aware and Net Zero approaches, using exclusions selectively if, and when, such actions may enhance a portfolio-wide engagement and investment strategy.

In our opinion, while a Net Zero approach will likely require the greatest effort, it may also yield the strongest results for the long-term benefit of the plan. We believe the SBI's current operations have a flexible structure that can accommodate change and are well-structured to support a portfolio-wide approach. The recommendation would be in concert with taking the first step in an ongoing four-stage Net Zero process to pledge, plan, proceed and publish.

As science and markets continue to provide more and better information from which policymakers can rely upon there will be a need to reflect those developments in whatever investment policy the SBI adopts. We anticipate both new metrics and analytic tools, and use of metrics at the regional and industry level to assess the most impactful implementation of investment tools to address climate risks and opportunities, and the integration of physical climate risk and physical climate risk management into portfolio analysis. This continual evolution is consistent with existing SBI practices of regular and timely review of all aspects of the investment portfolio and is, in our opinion, a best practice.

Appendix I

Climate Scenario Analyses of the SBI Portfolio

Historically, climate change modeling within asset owner portfolios focused on "bottom-up" methods. These approaches generally take detailed information about individual companies and industries and aggregate them across an entire portfolio. These approaches are very granular, providing insights about current practices and exposures and potential impacts from highly specific policy, technical, and behavioral interventions. However, precise analysis over short time periods does not necessarily yield results that translate to long term, strategic decision making. Fiduciaries typically consider investment decisions across longer, multi-decade timespans. Bottom-up analysis provides a snapshot of a portfolio at a given time but can encounter difficulty forecasting into the future. Companies change, business practices change, consumers' tastes change. Though analysts can make assumptions about trends going forward, any long-term analysis will be dependent on the accuracy of those assumptions.

To avoid becoming overly dependent on current conditions and future assumptions, Meketa uses a top-down, multifactor framework to assess long-term trends and scenarios. We specify broad, economically linked quantitative factors and project their future behaviors based on underlying historical relationships. Not specifically a climate model, our macroeconomic model can contextualize past environmental changes (e.g., mean global temperature rise over the pre-industrial baseline) alongside economic and financial factors and project various climate scenarios going forward over a long timeframe. Our approach is somewhat more dependent on the continuation of historical trends than bottom-up models and lacks their granularity, but it offers a broader range of potential situations for consideration. As time horizons lengthen, it becomes increasingly difficult for any climate change model to estimate the impact of climate on companies, reflecting increasing uncertainty with longer-timespans.

Given its focus on broad economic/financial measures and lack determinative mechanisms, the model's strength is financial impacts that are easily quantifiable and behave relatively consistently over time. In a climate context, we expect the model will tend to better represent transition risks better than physical risks. Additionally, the model is less suited to evaluating distinct, well-defined policy scenarios where the potential outcomes are known with some certainty than a determinative model. Meketa's model is better suited to assessing potential impacts of broad portfolio change whose occurrence is uncertain.

By default, Meketa's model uses 34 factors to generate expected returns for 97 asset classes. To assess the impacts of climate change, we added a global land and ocean mean temperature factor. With the available history for each factor, we used a VAR (vector auto-regression) model to estimate the relationship among factors through time, with a greater weight on more recent trends than those in the past. For each simulation, we begin with the most recent data point for each factor and adjust them in a randomized fashion, based on a normal distribution with mean matching the most recent data point and distribution based on historically observed variability. The new value is then adjusted based on the VAR-estimated factor interaction effects to yield a forecast return for each factor in that month. This process then repeats to generate monthly factor returns over a 20-year time period in approximately 10,000 simulations. We generate asset class returns from these factors based on historical relationships which are recentered on Meketa's traditional capital market expectations. Once generated, by analyzing a subset of simulations with select characteristics (e.g., all scenarios with temperatures consistent with +3.0°C of temperature rise above the pre-industrial average by 2100), we analyze a range of possible outcomes consistent with the desired characteristics.

Standard Factors Forecasted

Industrial Production	Energy	European Consumer Prices
Retail Sales	Metals	European Interest Rates
Construction Spending	U.S. Market	European Term Structure
Consumer Prices	Size	Japanese Industrial Production
Personal Expenditure	Value	Japanese Retail Sales
Inflation Risk Premium	Momentum	Japanese Consumer Prices
Interest Rates	Min Variance	Japanese Interest Rates
Term Structure	Dividend Yield	Japanese Term Structure
Systemic Risk	European Industrial Production	Baltic Dry Index
Trade-Weighted USD	European Retail Sales	Chinese Leading Indicators
Agriculture	European Construction Spending	EM Consumer Prices

For SBI, we assume the portfolio is invested at its asset class targets:

→ 33.5% US Equity,

→ 16.5% Non-US Equity,

→ 10% Government Bonds,

→ 5% Core/Core-Plus Bonds,

→ 5% Return-Seeking Bonds,

→ 5% Cash/Laddered Bonds, and

→ 25% Private Markets (allocated among private equity, debt, infrastructure and real estate based on current investment allocations).

The following scenarios were examined:

→ **Current Portfolio with Temperature Changes**: Examine simulations where global mean temperature rises consistent with changes of +1.5°C and +3.0°C above the pre-industrial baseline by the year 2100 versus a traditional set of baseline capital market expectations. These scenarios represent decreased and increased levels of carbon emission mitigation relative to current climate-naïve financial projections respectively.

→ **Fossil Fuel Exclusions with Temperature Changes**: Examine simulations where the current portfolio exposure to companies with greater than 25% revenue exposure from fossil fuels (approximately 4% of the overall portfolio) is removed from the portfolio in environments where global mean temperature rises consistent with changes of +1.5°C and +3.0°C above the pre-industrial baseline by the year 2100 as well as in the baseline forecast and redistributed pro-rata to the rest of the portfolio.

→ **Portfolio-wide Net Zero Goal with Temperature Changes**: Examines simulations where the portfolio is assumed to be invested with manager or in strategies which have better-than-median performance in simulations where global mean temperature rises consistent with changes of +1.5°C and +3.0°C above the pre-industrial baseline by the year 2100.

It is important to note that, given the non-deterministic nature of the model, we do not explicitly make additional assumptions in our scenarios. We do not predetermine the path of public policy, consumer behavior, government intervention, etc. Instead, we use our simulations to represent a broad variety of different environments that represent varying behaviors economic actors may implement over different time periods that are consistent with the specified changes to be examined. By contrast with other climate forecast models, we do not require a strong view on the implementation details (or lack thereof) of climate change mitigation efforts. Instead of assuming specific technological and policy changes with each scenario, we allow for any combination of policy and technology changes that are consistent with the scenario under investigation, in this case various temperature changes. Provided that a suitable number of simulations are generated, most relatively common configurations of circumstances are represented in the model output.

Temperature Change Scenarios

Our initial analysis concerns the portfolio's current target asset allocation and portfolio construction's reaction to varying amounts of temperature change by the end of the current century. We selected simulations with:

1) temperatures that stayed beneath 1.5°C over the pre-industrial baseline through the end of the 20-year period, and

2) temperatures within 0.25°C of temperatures consistent with a 3.0°C temperature rise by 2100.

These projections are compared to a baseline scenario for traditional capital markets forecast based primarily on financial measures with no special consideration for climate change impacts.

Climate Scenario Analysis: Average Target Portfolios (As of December 31, 2021)	Base (%)	1.5 Degree (%)	3 Degree (%)
Long-Term Expected Return (annualized)			
SBI (Current)	6.9	6.0	6.7
Standard Deviation			
SBI (Current)	14.7	15.5	15.1
Sharpe Ratio			
SBI (Current)	0.35	0.28	0.33

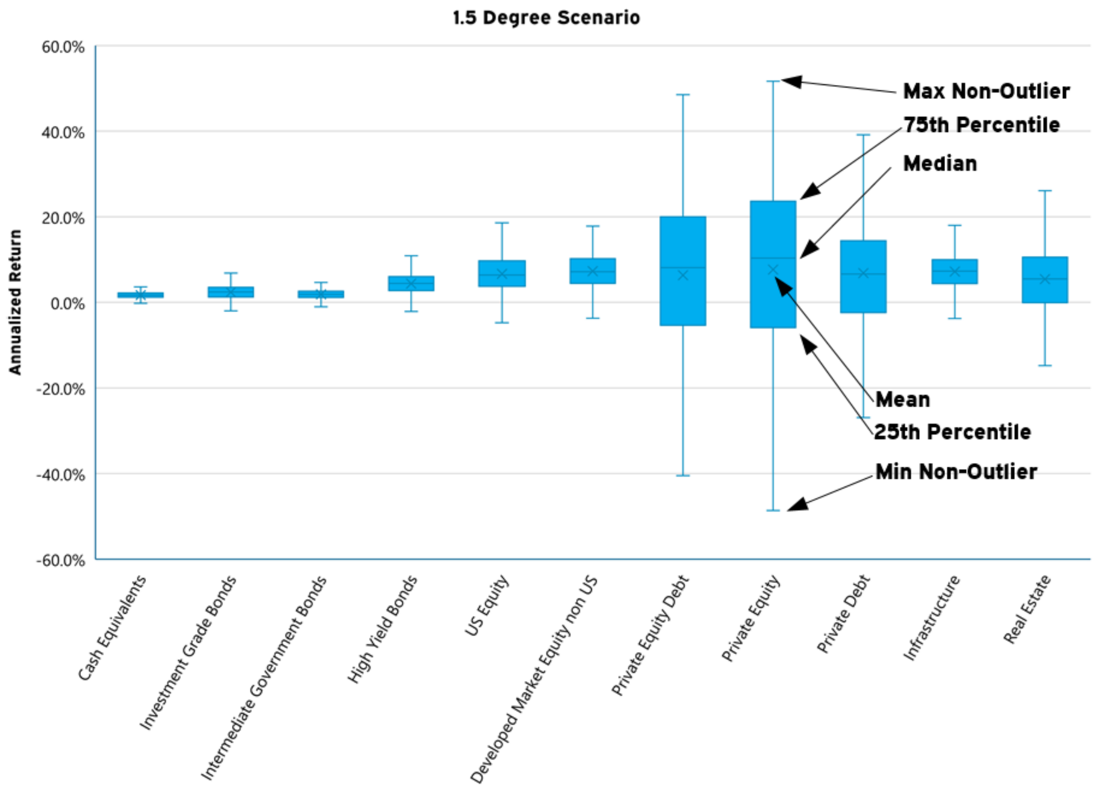
In terms of average expected long-term risk and return, the various degrees of climate change had similar directional impacts across portfolios. Whether limiting global temperature rise to only 1.5°C or 3°C, expected return is lower than expected return absent climate change assumptions. Both alternative temperature scenarios will entail social and economic changes consistent with either mitigating causes of climate change or grappling with the consequences of not doing so. The decline in expected return is greater in the 1.5°C temperature rise scenario than the 3.0° C(approximately 0.9% versus 0.2%).

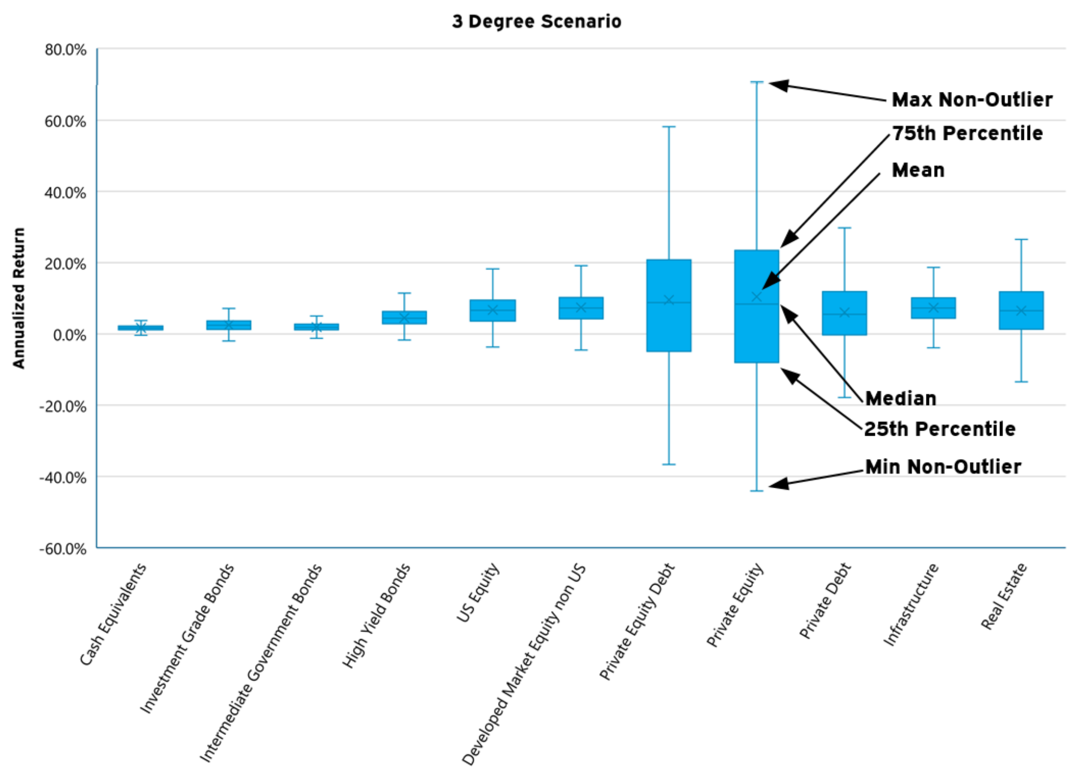
Regarding risk, in both temperature-rise scenarios, portfolio risk, as measured by standard deviation increases, rising more in the 1.5°C scenario than the 3°C scenario. The degree to which risk increases in each scenario varies is roughly similar to the difference displayed among returns, with the change risk of the 1.5°C scenario higher than that of the 3°C scenario.

The simultaneous increase in risk and decrease in expected return versus an idealized baseline is not necessarily surprising. Both temperature scenarios reflect transition and physical risks that are not accounted for in the baseline forecast and will contribute to poorer risk-adjusted performance on a relative basis. The results indicate that the risks to performance are potentially higher in a situation where temperatures are kept lower, presumably through greater societal efforts to curtail carbon emissions and incentivize climate-friendly economic initiatives though they are still present in a less aggressive climate change mitigation environment.

Regarding the lower relative return of the 1.5°C scenario versus the 3°C scenario, the result likely stems in part from SBI's somewhat relatively high allocation to alternative vehicles. Alternative asset classes have historically displayed a positive relationship with temperature and more sensitivity to changes in the climate forecast, increasing the asset class's variability while decreasing average returns. It is important to also note that the scenarios are subject to current capital market conditions. As these market condition change, particularly with regard to valuation levels and realized performance, expected returns for different scenarios can shift and potentially reverse position. Additionally, these results only reflect financial performance; they do not directly include non-financial impacts on living conditions or general wellbeing. To the extent non-financial impacts become reflected financially (i.e., market externalities become internalized and integrated in markets), their influence may vary between scenarios.

In addition to examining mean risk and return, examining the distribution of outcomes supports the same general conclusions.





The return distributions share several characteristics in common: equity asset class returns are generally wider than those of fixed income asset classes while private market asset classes have wider distributions than comparable public asset classes, returns for the +3.0°C scenario are in general higher than those of the +1.5°C scenario. However, the shape of the distribution varies. Distributions are in almost all cases positively skewed in the +3.0°C scenario with relatively symmetrically sized 2nd and 3rd quartile outcomes. By contrast, the skew of returns for the +1.5°C scenario is more mixed. Public equity, government debt, and floating rate private debt exhibit positive skew while nominal corporate credit, private equity, infrastructure, and real estate asset classes have negative skew. In addition, the middle 50% of outcome is less symmetrical, with much more scope for downside outcomes particularly among private debt and private equity investments.

The practical conclusion to draw from an examination of the scenarios' return distribution is similar to that of the average results – a world with more climate change mitigation measures presents more challenges with generating high returns and broadens the scope for downside financial outcomes. By contrast, a "milder" mitigation scenario leaves greater possibilities for positive outcomes across virtually all asset classes. However, for a number of asset classes, including those with significant leftward skews like private equity, potential outcomes are sufficiently variable client returns may be able to significantly outperform the average forecast result for the given asset class.

Fossil Fuel Exclusion

When considering ways to mitigate the risks of climate change, whether due to transition or physical risk, a much-discussed approach is excluding fossil fuel exposure. Theoretically, excluding fossil fuel exposure could help hedge out certain transition risks (e.g., stranded asset risk).

Climate Scenario Analysis: Average Target Portfolios (As of December 31, 2021)

	Base (%)	1.5 Degree (%)	3 Degree (%)
Long-Term Expected Return (annualized)			
SBI (Current)	6.9	6.0	6.7
SBI (ex-FF)	6.9	5.9	6.7
Standard Deviation			
SBI (Current)	14.7	15.5	15.1
SBI (ex-FF)	14.7	15.4	15.3
Sharpe Ratio			
SBI (Current)	0.35	0.28	0.33
SBI (ex-FF)	0.35	0.27	0.32

However, the impact of excluding companies with greater than 25% revenue exposure from fossil fuels (approximately 4% of the overall portfolio) has a minor impact on the forecasts for both temperature scenarios. Assuming the same distribution of returns in each individual asset class, in a +1.5°C scenario which reflects a high level of climate change mitigation efforts, exclusion reduces portfolio risk by less than 0.1% while simultaneously reducing expected return by less than 0.1%. In a +3.0°C scenario, where continued fossil fuel use could be expected for a greater proportion of the period and/or have a greater intensity of use relative to the +1.5°C scenario, expected return is also expected less than 0.1% while portfolio risk actually increases by approximately 0.1%.

The small magnitude of the impact of fossil fuel exclusion is likely due in part to the relatively modest amount of assets being excluded, which are subsequently reinvested in the same broad asset classes that still have indirect economic exposure to fossil fuels. Additionally, the direction of impact is likely negative due to the status of energy markets at the end of 2021. While not as low relative to historical averages as at the end of 2020 due to public health measures enacted in response to the global COVID-19 epidemic, energy prices were still low enough that a model which incorporates a degree of mean reversion in prices. The impact of this mean reversion will be lower in scenarios with greater climate change mitigation but still present. The greater potential impact of energy price reversion in the +3.0°C scenario likely accounts for the decrease in expected return as well as greater standard deviation.

Portfolio-Wide Net Zero Goal

An alternative approach to fossil fuel exclusion to mitigate climate-related portfolio risks in to adopt a Portfolio-wide Net Zero Goal investment framework, selecting portfolio approaches or investment strategies that take into account the impacts of climate change and attempt to avoid negative impacts from transition and physical risk while simultaneously capitalizing on new opportunities. Estimating the potential gains from such an approach are necessarily uncertain; Net Zero Goal investing represents a deviation from the broadly diversified portfolios often assumed in asset allocation. To aid our analysis, we adapt an approach to estimate the potential impact of successfully selecting strong active investment managers for portfolios, assuming that the Net Zero Goal portfolios could potentially outperform our forecast median returns at the asset class level in line with the degree of intra-quartile spread exhibited in the forecasts.

Climate Scenario Analysis: Target Portfolios (As of December 31, 2021)	Base (%)	1.5 Degree (%)	3 Degree (%)
Long-Term Expected Return (annualized)			
SBI (Current)	6.9	6.0	6.7
SBI (Portfolio-Wide Net Zero Goal)	6.9	8.0	9.1
Standard Deviation			
SBI (Current)	14.7	15.5	15.1
SBI (Portfolio-Wide Net Zero Goal)	14.7	15.5	15.1
Sharpe Ratio			
SBI (Current)	0.35	0.28	0.33
SBI (Portfolio-Wide Net Zero Goal)	0.35	0.41	0.49

In both climate change scenarios, a Portfolio-Wide Net Zero investment framework has the potential to meaningfully impact expected returns, increasing forecast returns beyond those of the Base case (6.9%) long-term return as well as improving on the scenarios returns by over 2% in both cases. While this level of return is subject to uncertainty and cannot be taken as given, it indicates exploring such an approach is a worthwhile exercise.

Conclusions

Climate Change Will Likely Increase Investing Challenges: Compared to a traditional baseline, we can expect lower returns and higher volatility in the future. The magnitude of the change may vary with different degrees of climate change mitigation, and the mix of costs will shift (i.e., transition versus physical impacts) but the general trend is clear.

Fossil Fuel Exclusion May Have a Limited Impact: Though there may be other rationales for divesting from fossil fuel companies and the direction of impact of divestment may vary with the economic environment, the scale of impact on portfolio risk and return from divestment is expected to be relatively modest.

A Portfolio-wide Net Zero Goal: For investors seeking to keep a stable level of nominal return or maintain a set level of risk, the potential impact of a Portfolio-wide Net Zero Goal investment approach appears to be sufficient to help meet existing objectives. However, implementation may be challenging, particularly in a +1.5°C climate mitigation scenario where substantial downside risk exists in several asset classes.

Appendix II

Summary Descriptions of Institutional Investor Organizations with a Climate Focus

Year Founded	Organization Name	Abbreviation	About
1985	Council of Institutional Investors	CII	CII is a nonprofit association of US public, corporate and union employee benefit funds, other employee benefit plans, state and local entities charged with investing public assets and foundations and endowments with combined assets under management of approximately $4 trillion.
1989	Ceres	Ceres	Ceres is a nonprofit organization transforming the economy to build a just and sustainable future for people and the planet. Through powerful networks and global collaborations of investors, companies and nonprofits, Ceres drives action and inspires equitable market-based and policy solutions throughout the economy.
2000	Carbon Disclosure Project	CDP	CDP is a not-for-profit charity that runs the global disclosure system for investors, companies, cities, states, and regions to manage their environmental impacts. The world's economy looks to CDP as the gold standard of environmental reporting with the richest and most comprehensive dataset on corporate and city action.
2005	Principles for Responsible Investing	PRI	The PRI is the world's leading proponent of responsible investment. It works to understand the investment implications of environment, social and governance ("ESG") factors and to support its international network of investor signatories in incorporating these factors into their investment and ownership decisions
2009	Global Real Estate Sustainability Benchmark	GRESB	GRESB is the global ESG benchmark for financial markets, composed of an independent foundation and a benefit corporation. Working together as one, the GRESB Foundation focuses on the development, approval, and management of the GRESB Standards while GRESB BV performs ESG assessments and provides related services to GRESB Members.
2011	Sustainability Accounting Standards Board	SASB	SASB Standards guide the disclosure of financially material sustainability information by companies to their investors. Available for 77 industries, the Standards identify the subset of ESG issues most relevant to financial performance in each industry.

Year Founded	Organization Name	Abbreviation	About
2015	The Task Force on Climate-related Financial Disclosures	TCFD	Created by the Financial Stability Board, the TCFD has set out its series of recommendations to establish a framework for businesses to manage climate risks; both transition and physical, and benefit from the related opportunities
2017	Climate Action 100+	CA100+	Climate Action 100+ is an investor-led initiative to ensure the world's largest corporate greenhouse gas emitters take necessary action on climate change.
2017	Transition Pathway Initiative	TPI	The Transition Pathway Initiative ("TPI") is a global, asset-owner led initiative which assesses companies' preparedness for the transition to a low carbon economy.
2017	The Institutional Investors Group on Climate Change	IIGCC	IIGCC is the European membership body for investor collaboration on climate change.
2019	Net Zero Asset Owner Alliance	NZAOA	Institutional investors transitioning their portfolio to Net Zero GHG emissions by 2050.
2019	Paris Aligned Investment Initiative	PAII	The Paris Aligned Investment Initiative is a collaborative investor-led global forum enabling investors to align their portfolios and activities to the goals of the Paris Agreement. The Paris Aligned Investment Initiative ("PAII") was established in May 2019 by the Institutional Investors Group on Climate Change ("IIGCC"). As of March 2021, the initiative has grown into a global collaboration supported by four regional investor networks – AIGCC (Asia), Ceres (North America), IIGCC (Europe) and IGCC (Australasia).
2021	ESG Data Convergence Project	ESG DCP	The Project's objective is to streamline the private investment industry's historically fragmented approach to collecting and reporting ESG data in order to create a critical mass of meaningful, performance-based, comparable ESG data from private companies. This allows GPs and portfolio companies to benchmark their current position and generate progress toward ESG improvements while enabling greater transparency and more comparable portfolio information for LPs.

WE HAVE PREPARED THIS REPORT (THIS "REPORT") FOR THE SOLE BENEFIT OF THE INTENDED RECIPIENT (THE "RECIPIENT").

SIGNIFICANT EVENTS MAY OCCUR (OR HAVE OCCURRED) AFTER THE DATE OF THIS REPORT AND THAT IT IS NOT OUR FUNCTION OR RESPONSIBILITY TO UPDATE THIS REPORT. ANY OPINIONS OR RECOMMENDATIONS PRESENTED HEREIN REPRESENT OUR GOOD FAITH VIEWS AS OF THE DATE OF THIS REPORT AND ARE SUBJECT TO CHANGE AT ANY TIME. ALL INVESTMENTS INVOLVE RISK. THERE CAN BE NO GUARANTEE THAT THE STRATEGIES, TACTICS, AND METHODS DISCUSSED HERE WILL BE SUCCESSFUL.

INFORMATION USED TO PREPARE THIS REPORT WAS OBTAINED FROM INVESTMENT MANAGERS, CUSTODIANS, AND OTHER EXTERNAL SOURCES. WHILE WE HAVE EXERCISED REASONABLE CARE IN PREPARING THIS REPORT, WE CANNOT GUARANTEE THE ACCURACY OF ALL SOURCE INFORMATION CONTAINED HEREIN.

CERTAIN INFORMATION CONTAINED IN THIS REPORT MAY CONSTITUTE "FORWARD - LOOKING STATEMENTS," WHICH CAN BE IDENTIFIED BY THE USE OF TERMINOLOGY SUCH AS "MAY," "WILL," "SHOULD," "EXPECT," "AIM", "ANTICIPATE," "TARGET," "PROJECT," "ESTIMATE," "INTEND," "CONTINUE" OR "BELIEVE," OR THE NEGATIVES THEREOF OR OTHER VARIATIONS THEREON OR COMPARABLE TERMINOLOGY. ANY FORWARD-LOOKING STATEMENTS, FORECASTS, PROJECTIONS, VALUATIONS, OR RESULTS IN THIS PRESENTATION ARE BASED UPON CURRENT ASSUMPTIONS. CHANGES TO ANY ASSUMPTIONS MAY HAVE A MATERIAL IMPACT ON FORWARD - LOOKING STATEMENTS, FORECASTS, PROJECTIONS, VALUATIONS, OR RESULTS. ACTUAL RESULTS MAY THEREFORE BE MATERIALLY DIFFERENT FROM ANY FORECASTS, PROJECTIONS, VALUATIONS, OR RESULTS IN THIS PRESENTATION.

PERFORMANCE DATA CONTAINED HEREIN REPRESENT PAST PERFORMANCE. PAST PERFORMANCE IS NO GUARANTEE OF FUTURE RESULTS.

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TAB D

Recommendation for Climate Risk Investment Belief

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DATE: August 17, 2022

TO: Members, State Board of Investment

FROM: Mansco Perry III
Executive Director and Chief Investment Officer

SUBJECT: Recommendation for Climate Risk Investment Belief

As mentioned to the members of the Board at the May 25, 2022 State Board of Investment (SBI) meeting, I encouraged the Board that an investment belief statement focusing on climate risk be considered by the SBI after the Meketa Report has been completed and accepted.

While I am prepared to make a recommendation at this time, I believe it is more appropriate for the Board to ask the Staff and our investment consultants to analyze the issue and prepare a recommendation for consideration at the next SBI Board meeting.

This is not a formal recommendation, but given that I will no longer be involved, I bring it to you as a suggestion. I believe that such an approach would be consistent with our work over the past few years.

Thank you.

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TAB E

Master Custodian Services

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DATE: August 17, 2022

TO: Members, State Board of Investment

FROM: Members, Investment Advisory Council and SBI Staff

SUBJECT: Master Custodian Services

The SBI's current contract with State Street Bank for master custodian services expires on April 30, 2023. The SBI's relationship with its master custodian is central to its responsibility to effectively and efficiently manage the retirement, trust fund and certain non-retirement assets under its control. The primary responsibilities of the master custodian are to provide settlement and custody services, income collection, reporting, and performance measurement for assets owned by the various funds under SBI management and serve as the book of record. In addition, non-basic services such as analytics and securities lending are provided.

It is the SBI's practice to solicit a contract through a Request for Proposal (RFP) process. The following is a summary of SBI Staff's review process and the recommendation resulting from the Master Custodian Services RFP.

Summary

The SBI Staff formed a team to complete a thorough review of master custodian services needed and developed an RFP. On April 18, 2022, the SBI issued an RFP for custodian services. The RFP was announced in the State Register and on the SBI website which made it available to any interested firm. Additionally, the RFP was provided to the following firms:

Bank of New York Mellon
Citigroup
J.P. Morgan Chase
Northern Trust Corporation
State Street Corporation
U.S. Bank

One firm submitted a response to the RFP: State Street Corporation

While just one response was received, a thorough review was carried out. SBI Staff reviewed the RFP response for mandatory requirements, selection criteria, and fees. Three SBI Staff members conducted independent evaluations and scoring of the response in its entirety and utilized eleven SBI Staff members across various functions of the SBI to provide feedback on components of the RFP response. State Street's response describes an organization and system functionalities capable of meeting the requirements of the SBI and as the incumbent, they have provided satisfactory services.

Conclusion
Based on SBI Staff's review and evaluation of the State Street RFP response, SBI Staff is recommending that State Street Corporation be selected as the SBI's master custodian bank.

RECOMMENDATION:

The Investment Advisory Council endorsed the Executive Director and SBI Staff's recommendation to the SBI Board to authorize the Executive Director, with assistance from SBI's legal counsel, to negotiate and execute a contract with State Street Corporation, Boston, MA, for Master Custodian Services for a period of up to five years.

Approval by the SBI of this potential commitment is not intended to be, and does not constitute in any way, a binding or legal agreement or impose any legal obligation on the State Board of Investment and neither the State of Minnesota, the State Board of Investment or its Executive Director have any liability for reliance by State Street Corporation upon this approval. Until a formal agreement is executed by the Executive Director on behalf of the SBI, further due diligence and negotiations may result in the imposition of additional terms and conditions on State Street Corporation or reduction or termination of the commitment.

TAB F

Contact and Document Management Database

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DATE: August 17, 2022

TO: Members, State Board of Investment

FROM: Members, Investment Advisory Council and SBI Staff

SUBJECT: Contact and Document Management Database

The SBI's current contract with Dynamo Software Inc. (Dynamo) for its contact and document management database expires on June 14, 2023. An organization of the size and complexity of the SBI requires a system to properly store and manage contacts, documents, team work flow, as well as have the ability to integrate with Microsoft Outlook and other cloud-based document-sharing platforms.

It is the SBI's practice to solicit a contract through a Request for Proposal (RFP) process. The following is a summary of SBI Staff's review process and the recommendation resulting from the Contact and Document Management Database RFP.

Summary

On May 2, 2022, the SBI issued an RFP for a contact and document management database. The RFP was also announced in the State Register and on the SBI website which made it available to any interested firm. Additionally, the RFP was provided to the following firms:

Backstop
BlackRock (eFront)
Dynamo
Factset

The following three firms submitted responses to the RFP before the stated deadline:

BlackRock (eFront)
Dynamo
Factset

SBI Staff reviewed the RFP responses for mandatory requirements, selection criteria, fees, and accessibility standards. SBI Staff reviewers conducted independent evaluations and scoring. Dynamo was the top scoring respondent for meeting the RFP requirements, the quality and completeness of the response to contact and data storage functionality questions, knowledge and experience in data storage and research, user interface and implementation, and technology and support capabilities.

Dynamo responded thoroughly to the RFP and demonstrated their experience in contact and document management work for large public pension and institutional client investment portfolios. While the other respondent organizations had quality staffs and product offerings, SBI Staff felt that Dynamo offered a smooth interface, demonstrated its ability to integrate with Microsoft Outlook and other document-sharing platforms, and offered workflow capabilities that is commensurate with SBI needs.

Conclusion
Based on SBI Staff's review and evaluation of the RFP responses, SBI Staff is recommending that Dynamo be selected as the contact and document management database provider for the SBI.

RECOMMENDATION:

The Investment Advisory Council endorsed the Executive Director and SBI Staff's recommendation to the SBI Board to authorize the Executive Director, with assistance from SBI's legal counsel, to negotiate and execute a contract with Dynamo Software Inc. (Dynamo) to provide contact and document management database services to the SBI for a period of up to five years.

Approval by the SBI of this potential commitment is not intended to be, and does not constitute in any way, a binding or legal agreement or impose any legal obligation on the State Board of Investment and neither the State of Minnesota, the State Board of Investment or its Executive Director have any liability for reliance by Dynamo upon this approval. Until a formal agreement is executed by the Executive Director on behalf of the SBI, further due diligence and negotiations may result in the imposition of additional terms and conditions on Dynamo or reduction or termination of the commitment.

TAB G

Foreign Tax Advisory Services

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DATE: August 17, 2022

TO: Members, State Board of Investment

FROM: Members, Investment Advisory Council and SBI Staff

SUBJECT: Foreign Tax Advisory Services

The SBI's current contract with KPMG for foreign tax advisory services expires on March 31, 2023. As an investor in public and private equity and debt in emerging market countries, the SBI is often required to appoint a local (i.e. foreign market) tax agent to calculate capital gains tax liability, prepare annual tax returns, and more generally interact with local tax authorities.

It is the SBI's practice to solicit a contract through a Request for Proposal (RFP) process. The following is a summary of SBI Staff's review process and the recommendation resulting from the Foreign Tax Advisory Services RFP.

Summary

On May 31, 2022, the SBI issued an RFP to seek an advisor that could not only provide foreign tax advisory services in any emerging market country in which the SBI may invest going forward, but also act as the sole point of contact to the SBI for its local tax offices. The RFP was announced in the State Register and on the SBI website which made it available to any interested firm. Additionally, the RFP was provided to the following firms:

BDO
CBIZ MHM, LLC
CliftonLarsonAllen
Crowe LLP
Deloitte LLP
Ernst and Young LLP (EY)
Grant Thornton
KPMG LLP (KPMG)
PwC US
RSM

The following two firms submitted responses to the RFP:

EY
KPMG

SBI Staff reviewed the RFP responses for mandatory requirements, selection criteria, and cost detail and method of payment. All reviewers conducted independent evaluations and scoring. SBI Staff reviewed the RFP responses and scored EY highest for thoroughness in RFP response, ability to meet the current and future foreign tax advisory needs of the SBI, and overall costs of the proposed services. Additionally, SBI Staff conducted reference checks on EY. The references communicated positive feedback on EY services, staff knowledge, and overall value.

While the other respondent demonstrated their experience in foreign tax advisory work and the proficiency of their staffs, the response of EY better demonstrated its ability to add value to the SBI and improve overall portfolio tax efficiency.

Conclusion
Based on SBI Staff's review and evaluation of the RFP responses, Staff is recommending that EY be selected as the SBI's foreign tax advisor.

RECOMMENDATION:

The Investment Advisory Council endorsed the Executive Director and SBI Staff's recommendation to the SBI Board to authorize the Executive Director, with assistance from SBI's legal counsel, to negotiate and execute a contract with Ernst and Young LLP (EY) for the SBI's Foreign Tax Advisory Services for a period of up to five years.

Approval by the SBI of this potential commitment is not intended to be, and does not constitute in any way, a binding or legal agreement or impose any legal obligation on the State Board of Investment and neither the State of Minnesota, the State Board of Investment or its Executive Director have any liability for reliance by EY upon this approval. Until a formal agreement is executed by the Executive Director on behalf of the SBI, further due diligence and negotiations may result in the imposition of additional terms and conditions on EY or reduction or termination of the commitment.

TAB H

Custodian Services for State’s Cash Accounts

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DATE: August 17, 2022

TO: Members, State Board of Investment

FROM: Members, Investment Advisory Council and SBI Staff

SUBJECT: Custodian Services for State's Cash Accounts

The current banking custodial services contract with Principal Bank for the State's cash accounts expires on December 31, 2022. The primary responsibilities are to provide settlement, income collection, and custody services. The following is a summary of SBI Staff's review process and the recommendation resulting from the Custodial Services Request for Proposal (RFP) conducted in partnership with Minnesota Management and Budget (MMB).

Summary

The RFP process was conducted as part of the State's master banking RFP. SBI Staff formed a team to review requirements and prepare the RFP. On May 31, 2022, MMB announced the RFP in the State Register which made it available to any interested firm. Additionally, the RFP was provided to the following firms:

Bank of America
Deltek Public Records
e.republic
First American by Deluxe
Fiserv
Grant Street Group
JP Morgan
Mastercard
Northern Trust
PNC Bank
Principal Bank
State Street Corporation
U.S. Bank
Wells Fargo Bank

The following three firms submitted responses to the RFP:

Principal Bank
State Street Corporation
U.S. Bank

SBI Staff reviewed the RFP responses for mandatory requirements, selection criteria, and cost proposal. SBI Staff conducted independent evaluations and scoring. SBI Staff reviewed the RFP responses and scored Principal Bank highest for thoroughness in RFP response, ability to meet the needs of the SBI, and overall costs of the proposed services. While the other respondents demonstrated their experience in custodial banking and the proficiency of their staffs, Principal Bank better demonstrated its ability in working on local custody needs with the SBI.

Conclusion
Based on SBI Staff's review and evaluation of the RFP responses, SBI Staff is recommending that Principal Bank be selected to provide the SBI with banking custodial services for the State's cash accounts.

RECOMMENDATION:

The Investment Advisory Council endorsed the Executive Director and SBI Staff's recommendation to the SBI Board to authorize the Executive Director, with assistance from SBI's legal counsel, to negotiate and execute a contract with Principal Bank, Des Moines, IA, to provide the SBI with banking custodial services for the State's cash accounts for up to five years.

Approval by the SBI of this potential commitment is not intended to be, and does not constitute in any way, a binding or legal agreement or impose any legal obligation on the State Board of Investment and neither the State of Minnesota, the State Board of Investment or its Executive Director have any liability for reliance by Principal Bank upon this approval. Until a formal agreement is executed by the Executive Director on behalf of the SBI, further due diligence and negotiations may result in the imposition of additional terms and conditions on Principal Bank or reduction or termination of the commitment.

TAB I

Update from Executive Director Search Committee

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DATE: August 17, 2022

TO: Members, State Board of Investment

FROM: Members, Executive Director Search Committee

SUBJECT: Report from Executive Director Search Committee

The Executive Director Search Committee will give a verbal update on the status and progress of the Executive Director search process.

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REPORTS

- Private Markets Investment Program Report
- Public Markets Investment Program Report
- Participant Directed Investment Program and Non-Retirement Investment Program Report
- SBI Environmental, Social, and Governance (ESG) Report
- Aon Market Environment Report
- Meketa Capital Markets Outlook & Risk Metrics Report
- SBI Comprehensive Performance Report

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REPORT

Private Markets Investment Program Report

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DATE: August 17, 2022

TO: Members, State Board of Investment

FROM: Members, Investment Advisory Council and SBI Staff

SUBJECT: SBI Private Markets Program Report

This report provides the current status of the SBI private markets commitments.

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Minnesota State Board of Investment

Combined Funds

June 30, 2022

Combined Funds Market Value	$81,319,865,988
Amount Available for Investment	**($124,847,603)**

	% of Combined Funds	Current Level	Target Level [1]	Difference
Market Value (MV)	25.2%	$20,454,814,100	$20,329,966,497	($124,847,603)
Policy Target	*25%*			
Statutory Limit	*35%*			
MV +Unfunded	40.2%	$32,675,669,995	$36,593,939,695	$3,918,269,700
Policy Limit	*45.0%*			

Asset Class	% of Combined Funds	Market Value	Unfunded Commitment	Total
Private Equity	18.1%	$14,756,296,696	$8,068,484,547	$22,824,781,243
Private Credit	2.0%	$1,590,234,043	$1,598,612,939	$3,188,846,982
Real Assets	2.8%	$2,284,606,570	$636,200,551	$2,920,807,121
Real Estate	2.2%	$1,784,338,236	$1,917,557,858	$3,701,896,094
Other[2]		$39,338,555		$39,338,555
Total		$20,454,814,100	$12,220,855,895	$32,675,669,995

Cash Flows

June 30, 2022

Calendar Year	Capital Calls	Distributions	Net Invested
2022	$2,105,211,853	($1,625,706,073)	$479,505,780
2021	$4,556,450,698	($3,672,823,834)	$883,626,864
2020	$2,786,134,001	($2,318,825,278)	$467,308,723
2019	$2,543,614,503	($2,080,037,860)	$463,576,642
2018	$1,992,000,341	($2,049,733,815)	($57,733,474)
2017	$2,021,595,780	($2,383,863,711)	($362,267,931)

[1] There is no target level for MV + Unfunded. This amount represents the maximum allowed by policy

[2] Represents in-kind stock distributions from the liquidating portfolio managed by T.Rowe Price and cash accruals.

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REPORT

Public Markets Investment Program

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DATE: August 17, 2022

TO: Members, State Board of Investment

FROM: Members, Investment Advisory Council and SBI Staff

SUBJECT: SBI Public Markets Program Report

This report provides a brief performance review of the SBI Public Markets portfolio through the second quarter of 2022. Included in this section are a short market commentary, manager performance summaries and a report of any organizational updates for the public equity and fixed income managers in the SBI portfolio.

The report includes the following sections:

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Review of SBI Public Markets Program
Second Quarter 2022

Market Summary

Global capital markets fell sharply in the second quarter as rampant inflation, dramatically tighter financial conditions and continued shockwaves from the pandemic and the war in Ukraine all weighed on the outlook for global growth. The MSCI All Country World (ACWI) Index (net) lost -15.7% in U.S. dollar terms. Global fixed income markets also posted sharp losses as interest rates rose in response to central bank rate hikes to combat inflation and credit-sensitive sectors priced a higher probability of recession. Within the U.S., the broad Russell 3000 Index fell -16.7%, led lower by underperformance of growth companies. Amid the severe risk-off sentiment, defensive sectors such as Consumer Staples (-2.4%) and Utilities (-5.4%) held up best, while growth-oriented and economically sensitive sectors flagged (Consumer Discretionary -25.6%, Technology -22.1%, Basic Materials -20.2%).

Faster-than-expected inflation readings during the quarter drove the U.S. Federal Reserve (Fed) to accelerate its policy hikes in an all-out effort to prevent inflation expectations from getting out of control. The Fed raised rates a total of 125 basis points during the quarter and signaled its expectation for significant additional tightening. Echoing the Fed, central banks across the globe tightened policy rates aggressively to combat inflation, despite signs of decelerating growth. As the Fed's strongly hawkish tone and global economic and geopolitical uncertainty drove a continued flight to safety, the U.S. dollar gained against all developed currencies, rising nearly +6.5% on a trade-weighted basis during the quarter.

Overall Combined Funds Portfolio - Quarter and One-Year Performance

The overall Combined Funds portfolio returned -8.8% during the second quarter, matching the composite benchmark's return over the period. Within public equities, the portfolio's active equity managers lagged their benchmarks on balance; global equity, U.S. growth equity and emerging markets managers contributed most to underperformance. The portfolio's fixed income allocation was a drag as widening credit spreads impacted the portfolio's core plus and return-seeking bond managers during the quarter. On the positive side, the portfolio's currency hedging program benefitted returns as the U.S. dollar rose sharply during the quarter and the hedging program helped offset currency depreciation in the portfolio's non-U.S. equity holdings.

The private markets invested portfolio returned +4.0%, led by strong performance from the resources and real estate portfolios. The private markets uninvested portfolio, which is invested in S&P 500 Index strategies, fell -16.0% for the quarter.

For the year ending June 30, 2022, the Combined Funds portfolio returned -6.4%, modestly underperforming the composite benchmark return of -6.3%. Despite headwinds from the portfolio's global equity and emerging markets equity managers, the overall public equity portfolio modestly outperformed its benchmark for the full year. The total fixed income portfolio underperformed its policy benchmark for the full year (-10.5% Portfolio vs. -9.6% Benchmark) as weak performance from the portfolio's core plus and return-seeking managers weighed on returns.

The invested private markets portfolio returned +24.8% for the year, led by the real estate portfolio which gained +43.7% for the period. The private markets uninvested portfolio, which is invested in S&P 500 Index strategies, fell -10.2% for the year.

Domestic Equity

The threatening skies that soured domestic equity markets in the first quarter darkened in Q2, and a further deterioration in investor sentiment drove domestic equity valuations down sharply. The specter of a monetary-policy-induced recession came to the fore following the Fed's aggressive rate hikes and tough talk in the face of persistent inflationary pressures—continued supply chain issues have been fueled by the war in Ukraine, pandemic-induced backlogs, and city-wide Covid lockdowns in China. With higher borrowing costs for companies and consumers alike and softening domestic economic and confidence data, markets turned more bearish on long-term growth and profitability prospects. The Russell 3000 Index finished the quarter down -16.7%.

Recession fears and concerns over inflation continued to drive a shift in investor preference to the relative safety of companies with durable revenues and pricing power. Value stocks significantly outperformed growth stocks during the quarter (R3000V -12.4% vs. R3000G -20.8%). Within the growth stock segment, the bid-to-safety rotation away from high-growth companies into quality-growth companies that began last December continued through the first half of the year. By sector, defensive sectors performed the best: Consumer Staples (-2.4%), Utilities (-5.4%), and Health Care (-7.4%) sectors performed better than the benchmark. Energy stocks (-6.5%) also performed better than most sectors, while other inflation-sensitive sectors such as Real Estate (-15.3%) and Basic Materials (-20.2%) fared worse. Industrials (-16.0%) and Financials (-16.8%) posted losses generally in-line with the overall index. Cyclical sectors such as Technology (-22.1%) and Consumer Discretionary (-25.8%) posted the largest losses.

The Combined Funds' domestic equity portfolio fell -16.8% during the quarter, slightly underperforming the Russell 3000 Index, which returned -16.7%. An overweight to small cap stocks in the portfolio modestly detracted from relative performance. Active management was a negative contributor during the quarter, with underperformance concentrated within the large cap growth active managers, as was the case last quarter. Accordingly, large cap managers underperformed in aggregate (-17.7% Portfolio vs. -16.7% Benchmark). The remaining managers generally outperformed, and active small cap managers nicely outpaced their benchmarks (-16.5% vs. -17.2%). In aggregate, passive managers tracked their benchmarks during the quarter.

Active large and all-cap growth managers were the largest underperformers for the third consecutive quarter. Again, this was in large part due to the severe underperformance of higher-priced, lower-profitability companies. Active large cap growth managers underperformed (Sands -34.1% and Winslow -22.0% vs. -20.9% Benchmark), as did active all-cap manager Zevenbergen (-41.4% Portfolio vs. -21.8% Benchmark). Sands and Zevenbergen both underperformed materially due to their concentrated nature and focus on higher-growth stocks during a quarter that saw a continued downward rerating in high-multiple stocks (e.g., Block -54.7%, Shopify -53.8%, Netflix -53.3%, Twilio -49.2%, Airbnb -48.1%, Sea Ltd. -44.2%). Winslow fared better given its focus on higher-quality growth stocks, broader diversification, and tilt towards select names such as Microsoft (-16.5%) and UnitedHealth Group (+1.1%) that outperformed the index.

Active large cap value managers outperformed during the quarter (Barrow Hanley -9.9% and LSV -11.0% vs. Benchmark -12.2%). Barrow Hanley's fundamental bottom-up stock selection was the key driver of its relative performance this quarter, while an underweight to the Real Estate sector also helped. LSV's quantitative, deep-value approach was in favor during the quarter, and its selection of lower-priced stocks that are more sensitive to value factor upswings led to significant gains in stock selection.

Semi-passive large cap managers were slightly above their benchmark in aggregate (BlackRock and J.P. Morgan both -16.2% vs. Benchmark -16.7%). Quantitative manager BlackRock generated gains from traditional value metrics and measures evaluating earnings yield, equity ownership structures, sales, and other financial statement metrics that were rewarded by the market during the quarter. J.P. Morgan's sector-neutral, fundamental strategy outperformed the benchmark this quarter due in large part to being diversified and selecting relatively defensive stocks that tilt toward quality.

Overall, the active small cap managers outperformed their benchmarks. Among small cap growth managers, Rice Hall James was the only outperformer, but by a large margin (-13.1% Portfolio vs. -19.3% Benchmark). This was due in large part to the manager's preference for higher quality, lower-volatility companies that are highly profitable and have strong free cash flows—all of which were in favor over the quarter. In addition, the active small cap growth managers tend to eschew early-stage, highly volatile biotech names, which underperformed in the quarter. Small cap value managers outperformed due to strong stock selection, especially in consumer cyclicals, where a preference for higher-quality, larger cap names was a strong boost to the portfolio. Overall, the active small cap value managers focus on stocks that are higher quality and more value-oriented than the benchmark, which was a strong benefit in Q2. Quantitative-focused manager Martingale (-11.8% Portfolio vs -15.3% Benchmark) was the strongest small cap value outperformer due mainly to its value and quality signals.

Global Equity and ACWI ex USA Equity
As the world reckoned with the twin specters of recession and inflation, global markets fell sharply across all industry sectors during the quarter. Equities declined across nearly every developed and emerging market; among major markets only China eked out a gain. The MSCI All-Country World Index (ACWI) (net) returned -15.5% for the quarter, led down by U.S. Technology and Consumer Discretionary names.

The global equity portfolio's active managers struggled in the U.S. with poor selection in the Technology and Healthcare. Consequently, the global equity portfolio ended behind the benchmark (-17.1% Portfolio vs. -15.5% Benchmark). Long-term growth manager Baillie Gifford's portfolio declined by -29.2% as many of their high-growth, high-valuation stocks saw rerating based on higher interest rates and a weaker near-term growth outlook. Seven of their holdings ended the quarter down more than 50% including Carvana, Peloton, Cloudflare, Affirm, Shopify, Netflix, and Beyond Meat. Losses for quality growth manager Martin Currie (-20.6%) were more concentrated in a handful of cyclical names, with graphics semiconductor specialist NVIDIA (-44.4%), genomic industry leader Illumina (-47.2%), and Irish insulation panel maker Kingspan (-39.4%) accounting for most of the underperformance. However, value manager Ariel was able to strongly outperform the benchmark (-5.9% Portfolio vs. -15.5% Benchmark). Ariel scored gains with rebounding Chinese tech giant Baidu (+12.4%) and developed market health care names like Gilead Sciences (+4.9%). Ariel also benefited from a relatively large defensive cash position and tactical currency hedging.

The portfolio's ACWI ex USA manager, Earnest Partners, modestly outperformed the benchmark during the quarter (-13.4% Portfolio vs. -13.7% Benchmark). Chinese winners including the A-shares portfolio and two ADRs (battery maker BYD +39.7% and Baidu +12.4%) led the way.

Developed International Equity and Currency Overlay
International developed markets equities, as measured by the MSCI World ex USA Index (net), fell -14.7% during the second quarter in U.S. dollar terms, slightly outperforming the broad U.S. market for the second consecutive quarter. As the Fed set a hawkish tone and global economic and geopolitical uncertainty drove a continued flight to safety, the U.S. dollar gained against all developed currencies. Every country in the index saw their equity market decline during the quarter, and all market sectors finished in negative territory as well. As in the U.S. market, Information Technology names were the biggest decliners on the quarter.

The portfolio's active developed markets managers modestly beat the MSCI World ex USA Index (net), returning -14.5% versus the benchmark's -14.7% return. Since most stocks within the index were down, the portfolio's modest cash position (2.6% of active AUM) was the biggest single positive contributor to performance. Quantitative value manager AQR outperformed, benefitting most from the value component of its quantitative stock selection, especially its Japanese value names.

The passive developed markets portfolio tracked the MSCI World ex USA Index (net) within guideline tolerance for the quarter (-14.4% Portfolio vs. -14.7% Benchmark).

While the developed markets equity program struggled, the currency hedging program provided over $200 million in gains, highlighting its diversification potential. (The portfolio's currency hedging program seeks to protect the developed markets portfolio from a decline in value of foreign currencies relative to the U.S. dollar; the U.S. dollar often benefits from equity market turmoil as investors seek safety.) Overall, the performance of the developed markets portfolio was lifted +2.8% by the currency hedge program as the dollar rallied against all hedged currencies. The biggest gains came against the Japanese Yen (Japan's central bank has staked out a contrarian position, maintaining its zero-interest rate policy while most central banks have commenced policy tightening) and against the Euro (where the Russia-Ukraine conflict continues to generate geopolitical uncertainty and fears of a full-blown energy crisis). The program's overall hedge ratio ranged between 40.9% and 80.2%, markedly higher than previous quarters.

Emerging Markets Equity
Emerging market equities, as measured by MSCI Emerging Markets Index (net), posted a loss of -11.4% in U.S. dollar terms during the second quarter. The index was boosted by China's +2.3% quarterly return, which was easily the best single country return across all developed and emerging markets during the quarter. Unhampered by Western sanctions on Russian oil and large enough to generate their own momentum, Chinese markets were buoyed by the prospect of ebbing Covid restrictions. Investors also cheered signs of China easing its regulatory crackdown on Technology names and moving to provide much needed support to the beleaguered real estate development sector.

The portfolio's active emerging markets managers underperformed the MSCI Emerging Markets Index (net) (-12.9% Portfolio vs. -11.4% Benchmark). Most of the underperformance is attributable to the managers maintaining a significant underweight to China. Neuberger Berman outperformed the benchmark, lifted by their overweight to and positive issue selection within Consumer Staples and by a large cash position (5.5% of AUM). Martin Currie underperformed during the quarter, hindered by a significant overweight to semiconductor manufacturers. Morgan Stanley was hurt by an overweight to semiconductors, and a large underweight to China (15.7% Portfolio weight vs. 30.9% Benchmark weight) and ended the quarter well behind the benchmark.

Earnest Partners' dedicated China A-share strategy outperformed the MSCI China A Index during the quarter (+3.5% Portfolio vs. +1.7% Benchmark). After struggling for several quarters, Earnest's brewery holdings bounced back (Jiangsu King's Luck +16.3% and Jiangsu Yanghe +30.2%), as did names in the Materials sector, including Tiangqi Lithium (+45.3%). And although their lack of holdings in the Real Estate sector cost them last quarter, that positioning was rewarded in the current quarter as Real Estate and Financials ended the quarter as the A-share market's weakest performing sectors.

The passive emerging markets portfolio experienced slight positive tracking error relative to the MSCI Emerging Markets Index (net) within guideline tolerance for the quarter (-11.3% Portfolio vs. -11.4% Benchmark).

Core/Core Plus and Return Seeking Bonds

The Bloomberg Aggregate Bond Index returned -4.7% during the second quarter, leading to a first-half return of -10.3%, the worst six-month drawdown since the Index's inception in 1973. Interest rates rose sharply as inflation accelerated and the Fed communicated its intention to aggressively raise its policy rate to re-establish price stability. The U.S. Federal Reserve (Fed) raised rates at both of its policy meetings during the quarter. After hiking rates by a sizable 50bps at its May FOMC meeting, the Fed followed up with a 75bps hike in June after the June CPI report showed inflation had accelerated to +9.1% year-on-year. The June hike was the largest hike since 1994.

Credit spreads widened in sympathy with the decline in equity valuations and growing investor concern that aggressive Fed hikes would push an already-slowing economy into recession. Credit-sensitive assets, including both investment grade and high yield corporate bonds, underperformed, as did structured assets tied to commercial real estate and consumer receivables. Agency mortgage-backed securities (MBS) suffered from continued interest rate volatility and the prospect that slower voluntary prepayments by mortgage borrowers would require the Fed to sell a larger portion of its MBS portfolio in the secondary market to meet its balance sheet reduction targets. Emerging markets debt continued to suffer headwinds from both direct and knock-on effects of the war in Ukraine as well as a dramatic pickup in inflation within developing economies and concerns over the outlook for global growth.

The portfolio's core/core plus bond managers underperformed the Bloomberg Aggregate Index during the quarter (-5.6% Portfolio vs. -4.7% Benchmark). Overall, managers' overweight to investment grade credit (and an underweight to U.S. Treasuries) hurt relative performance, did their exposures to out-of-benchmark high yield credit and emerging market debt.

The portfolio's return seeking bond managers returned -7.7% during the second quarter, underperforming both the Bloomberg Aggregate Index policy benchmark's return of -4.7% as well as a weighted composite of the managers' underlying benchmarks (-6.4%). While a lower overall duration helped the portfolio's return relative to the Bloomberg Aggregate Index as interest rates rose, this positive impact was more than offset by the return seeking managers' emphasis on credit sectors with higher return potential such as high yield bonds, bank loans, securitized credit and emerging markets debt.

Treasury Protection Portfolio
For the three months ending in June, the Treasury Protection portfolio slightly underperformed the Bloomberg Treasury 5+ Year Index (-7.3% Portfolio vs. -7.2% Benchmark). Managers' modest positioning in U.S. Agencies was a drag as credit and liquidity spreads widened. An allocation to Treasury Inflation Protection Securities (TIPS) was also a detractor as market expectations for future inflation declined as the Fed stepped up its efforts to regain price stability. On the positive side, managers were positioned slightly short duration versus the benchmark, which helped as interest rates rose during the period.

Laddered Bonds + Cash Portfolio
The combined Laddered Bonds + Cash portfolio returned -0.01% during the quarter, underperforming the portfolio's benchmark (ICE BofA U.S. 3-Month Treasury Bill) which returned +0.10%. The portfolio's underperformance was concentrated in the Laddered Bonds portfolio which, on a standalone basis returned -0.05% for the quarter. Despite being invested in high quality securities including U.S. Treasuries, U.S. agencies and high quality corporate bonds, the Ladder portfolio's longer duration positioning (approximately 0.5 years) resulted in modest mark-to-market losses on the portfolio's investments as short-term interest rates climbed rapidly during the quarter. However, the Ladder portfolio's yield advantage (2.5% as of 6/30 vs. 1.7% for the 3-Mth T-Bill) ultimately will translate into positive relative performance once the Fed slows the pace of rate hikes and interest volatility begins to normalize. The portfolio's cash strategy returned +0.20%, exceeding the benchmark return of +0.10%.

Public Markets Managers' Organizational Update
Second Quarter 2022

Acadian (Developed Markets Equity)
Acadian's co-CEO John Chisholm retired at the end of June 2022 as an anticipated part of Acadian's long-term succession plan, and former co-CEO Ross Dowd became sole CEO.

AQR (Developed Markets Equity)
AQR lost two principals in the second quarter, Ian Roche (Principal, Research and Portfolio Management) and Jeremy Getson (Principal, Business Development – Client Service). In total, AQR saw 8 of 39 principals depart over the last 12 months.

Ariel (Global Equity)
Todor Petrov, Vice President, Research, Global Equities, left Ariel in May 2022 to pursue a new opportunity in the asset management industry. He was the second analyst to leave Ariel in 2022. Gregory DeTrolio joined the global investment team as Vice President, Portfolio Analyst and Global Equities Trader at the end of the second quarter.

Baillie Gifford (Global Equity)
In May 2022, eight employees joined the Baillie Gifford partnership including Linda Lin, an LTGG analyst. At the same time, four partners retired. The number of partners is now 51.

BlackRock (Domestic Equity, Fixed Income)
Doug McNeely, Managing Director and Head of Strategic Client Coverage, will be leaving the firm at the end of September 2022. Laura Champion, Samantha Trabucco and Natalie Vnukovica will continue serving as client coverage on SBI's accounts.

Columbia Threadneedle (Fixed Income)
Senior Portfolio Manager Mark Van Holland, who has been with Columbia for 24 years and managed high yield credit strategies for 12 years, is retiring effective Q1 2023. Brian Lavin will continue as lead of the high yield team, with Brett Kaufman co-managing institutional portfolios. In addition, Kris Keller, currently serving as Head of High Yield Research, has been promoted to portfolio manager for institutional clients and will work alongside Mr. Kaufman and Mr. Lavin.

Goldman Sachs Asset Management (Developed Markets Equity, Fixed Income)
Dave Fishman, a partner in Fixed Income and Liquidity Solutions, is retiring after 25 years with GSAM. John Olivo, managing director and global head of short duration strategies, will continue as lead PM on the SBI's Laddered Bond portfolio.

Hood River (Domestic Equity)
Jackson Allen joined Hood River in June of 2022 as an equity research associate. Prior to joining Hood River, Jackson was an intern equity research analyst for the firm. He began his career as a summer investment analyst at UVIMCO.

J.P. Morgan (Domestic Equity)
Three analysts either departed or announced plans to retire in the quarter, and two analysts were hired as replacements with one search outstanding. Leslie Rich, utilities analyst, plans to retire

later this summer. Replacing her coverage is Teresa Kim, who was hired from Jennison and was the co-manager of the Jennison Utility Fund and Jennison Carbon Solutions Fund. Nitin Bhambhani, software and services analyst, intends to retire in early 2023 and replacing his coverage is Eric Cheung, who was hired from Bessemer and was previously at Neuberger Berman. Laurence McGrath, health services and medical technology analyst, departed the firm in Q2, and J.P. Morgan is currently performing a search for his replacement.

McKinley (Developed Markets Equity)
Elias (Eli) Krauklis will be joining McKinley in the role of Director of Quantitative Research/Portfolio Manager. He replaces Anureet Saxena, who resigned in February due to personal circumstances. Miranda Chang, Quantitative Research Analyst, resigned in May 2022 and Michelle D'Souza, Portfolio Assistant, resigned in June 2022. Both are pursuing new opportunities. McKinley is currently interviewing candidates for an Investment Analyst position which will provide both qualitative and quantitative support to the investment team.

Morgan Stanley (Emerging Markets Equity)
Four analysts joined the Morgan Stanley Emerging Markets team in Q2 after two analyst departures in Q1. The new analysts are Saumya Jain and Uday Tharar (macroeconomic research), Harrison Jamin (sustainability research), and Ravi Jain (Latin America, EMEA).

NISA (Cash Overlay)
Matt Byron was promoted to Chief Operating Officer and joined NISA's Management Committee effective May 2022. Joe Murphy, Director, Portfolio Management, announced his retirement at the end of this year and stepped down from NISA's Management Committee effective May 2022. NISA will be updating the membership of the Investment Committee later this year because of Mr. Murphy's departure; the appointment(s) will be from existing members of the investment team. Danna Gilbert, Director, Enterprise Data, departed in May 2022. Ms. Gilbert's responsibilities were assumed by other members of NISA's Senior Team.

Peregrine (Domestic Equity)
CFO and COO Hema Nealon announced during the quarter that she will resign effective year-end. A search for her replacement will commence shortly. Barbara McFadden, Co-Head of Trading, elected to retire from the firm, and Jeff Nordstrom rejoined Peregrine on March 28th as Senior Equity Trader after a 13-year hiatus from the firm.

PIMCO (Fixed Income)
In May, the US Securities and Exchange Commission charged Allianz Global Investors US (the U.S. division of PIMCO's parent company), with securities fraud relating to its Structured Alpha options trading strategy. AGI US subsequently plead guilty and is disqualified from providing advisory services to U.S. registered investment funds for the next 10 years. The only relevance to PIMCO is both PIMCO and AGI US share common ownership, Allianz Global Investors.

PGIM (Fixed Income)
Daleep Singh has joined PGIM Fixed Income as Chief Global Economist and Head of Global Macroeconomic Research effective June 2022, replacing Nathan Sheets, who departed PGIM in September. Mr. Singh previously served as U.S. Deputy National Security Advisor and Deputy

Director of the National Economic Council for the Biden Administration, and was Head of the Markets Group at the Federal Reserve Bank of New York.

Zevenbergen (Domestic Equity)

On May 12, 2022, Zevenbergen announced the retirements of Lisa Foley (Client Service) as of June 30, 2022, and Leslie Tubbs (Portfolio Manager and COO) as of December 31, 2022. There are no plans to add to staff, and existing investment and client service teams will absorb their responsibilities.

2022 Manager Meetings

After two years in which travel was restricted due to the COVID-19 pandemic, MSBI staff began traveling to and accepting visits from managers in April. Staff will continue to utilize teleconference and videoconference technologies to remain in communication with managers between in-person visits.

During the quarter, staff traveled to Chicago, Dallas, Los Angeles, Washington, D.C., and New York City for 15 manager meetings. Staff received 11 visits from managers at our office in St. Paul; staff also attended 4 manager seminars in the Twin Cities hosted by SBI managers. 47 manager strategy review calls were held via teleconference or videoconference.

Investment Manager	**Asset Class**
Acadian Asset Management LLC	Developed Markets Equity
Ariel Investments, LLC	Global Equity
ArrowMark Colorado Holdings, LLC	Domestic Equity
Ashmore Investment Management Limited	Fixed Income
Ashmore Investment Management Limited	Russia/Belarus Liquidation
Baillie Gifford Overseas Limited	Global Equity
Barrow, Hanley, Mewhinney & Strauss, LLC	Domestic Equity
BlackRock Financial Management, Inc.	Fixed Income
Columbia Threadneedle Investments	Developed Markets Equity
Columbia Threadneedle Investments	Fixed Income
Dodge & Cox	Fixed Income
Earnest Partners LLC	International Equity
Fidelity Institutional Asset Management LLC	Developed Markets Equity
Goldman Sachs Asset Management, L.P.	Domestic Equity
Goldman Sachs Asset Management, L.P.	Fixed Income
Hotchkis and Wiley Capital Management, LLC	Domestic Equity
J.P. Morgan Investment Management Inc.	Developed Markets Equity
KKR (Kohlberg, Kravis and Roberts)	Fixed Income
LSV Asset Management	Domestic Equity
Macquarie Investment Management Advisers	Emerging Markets Equity
Marathon Asset Management LLP	Developed Markets Equity
Martin Currie Inc.	Emerging Markets Equity

2022 Manager Meetings (cont.)

Martin Currie Inc.	Global Equity
Morgan Stanley Investment Management Inc.	Emerging Markets Equity
Neuberger Berman Investment Advisers LLC	Fixed Income
Neuberger Berman Investment Advisers LLC	Emerging Markets Equity
Oaktree Asset Management	Fixed Income
Payden & Rygel	Fixed Income
Prudential Global Investment Management (PGIM)	Fixed Income
Pacific Investment Management Company LLC (PIMCO)	Fixed Income
Pzena Investment Management, LLC	Emerging Markets Equity
Record Currency LLC	Currency Overlay
Rice Hall James & Associates, LLC	Domestic Equity
The Rock Creek Group, LLC	Emerging Markets Equity
Sands Capital Management, LLC	Domestic Equity
State Street Global Advisors	Developed Markets Equity
State Street Global Advisors	Emerging Markets Equity
State Street Global Advisors	Fixed Income
TCW	Fixed Income
Wellington Management Company, LLP	Domestic Equity
Western Asset Management Company, LLC	Fixed Income
Zevenbergen Capital Investments LLC	Domestic Equity

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REPORT

Participant Directed Investment Program and Non-Retirement Investment Program

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DATE: August 17, 2022

TO: Members, State Board of Investment

FROM: Members, Investment Advisory Council and SBI Staff

SUBJECT: Participant Directed Investment Program and Non-Retirement Program

This section of the report provides commentary on the Participant Directed Investment Program (PDIP) investment options and Non-Retirement Program managers along with the list of due diligence meetings staff conducted during the second quarter.

The report includes the following sections:

Page

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Participant Directed Investment Program Fund Commentaries
Second Quarter 2022

Domestic Equities

Vanguard Total Stock Market Index Institutional Plus

The Fund employs an indexing approach designed to track the performance of the CRSP U.S. Total Market Index, which represents approximately 100% of the investable U.S. stock market and includes large-, mid-, small-, and micro-cap stocks. The Fund matched its benchmark return for the quarter and for the year with a -16.8% and -14.2% return, respectively.

Vanguard Institutional Index Plus

The Fund attempts to employ a full replication indexing approach designed to track the S&P 500 Index. Performance for the Fund matched the S&P 500 Index return for the quarter with a -16.1% return and for the year with a -10.6% return. *This option is only available to the Minnesota Deferred Compensation Plan (MNDCP).*

Vanguard Dividend Growth Fund

The Fund is actively managed by Wellington Management and invests in large- and mid- cap equity holdings with an emphasis on high-quality companies with a history of paying stable or increasing dividends. Performance for the Fund returned -9.2% for the quarter and 0.0% for the year. The Fund does not consider its benchmark sector positioning when constructing the portfolio; weightings result from stock selection.

Vanguard Mid-Cap Index

The Fund attempts to employ a full replication indexing approach designed to track the performance of a broadly diversified pool of medium-size U.S. stocks. The Fund matched the CRSP US Mid Cap Index return for the quarter and for the year with a -17% return and a -16% return, respectively.

T. Rowe Price Institutional Small-Cap Stock Fund

The Fund's investment process emphasizes fundamental research and active, bottom-up stock selection. The Fund seeks to provide long-term capital growth by investing primarily in stocks of small companies in both growth and value-oriented securities. The Fund outperformed the Russell 2000 for the quarter with a -15.2% return compared to the benchmark return of -17.2% and outperformed for the year with a –23.2% return compared to the benchmark return of -25.2%.

International Equities

Fidelity Diversified International Equity Fund

The Fund's approach actively selects international companies primarily in foreign developed markets based on fundamental analysis, management quality, and attractive valuations over a long time horizon. The Fund returned -17.0% for the quarter, underperforming the MSCI EAFE benchmark return of -14.5%. For the year, the Fund returned –22.6%, underperforming the benchmark return of -17.8%.

Vanguard Total International Stock Index
The Fund attempts to employ an indexing approach designed to track the FTSE Global All Cap ex US Index, a market-cap weighted pool designed to measure performance of developed and emerging market companies. The Fund outperformed the benchmark return for the quarter with a -12.9% versus the benchmark return of -14.1% and outperformed for the year with a -18.9% return compared to -19.4% for the benchmark, respectively.

Fixed Income and Capital Preservation Options

Dodge & Cox Income Fund
The Fund invests in a diversified portfolio that consists primarily of investment-grade debt securities with a larger allocation to corporate and securitized debt relative to the benchmark. The fixed income fund matched the performance the Bloomberg U.S. Aggregate Index for the quarter with a -4.7% return. For the year, the Fund outperformed with a -10.0% return compared to the benchmark return of -10.3%.

Vanguard Total Bond Market Index
The Fund employs a sampling process to its index investment approach to track the performance of the Bloomberg U.S. Aggregate Index. The Fund returned -4.7% for the quarter, matching the benchmark return. The Fund underperformed for the year with return of -10.5% compared to the benchmark return of -10.3%.

Stable Value Fund
Galliard Asset Management manages the stable value portfolio in a separate account and invests in investment contracts issued by high quality financial institutions and in a diversified, high quality fixed income portfolio. The portfolio returned +0.5% for the quarter compared to a +0.8% return for its benchmark, the 3-Year Constant Maturity Treasury +45 basis points. For the year, the portfolio returned +1.8% compared to the benchmark return of +1.9%.

Money Market Fund
State Street Global Advisors manages the money market fund in a commingled pool vs. ICE BofA U.S. 3 Month T-Bill benchmark. In a low yield environment within short duration fixed income, the Fund earned +0.2% for the quarter and +0.3% for the year.

Model Portfolio Option

Vanguard Balanced
The Balanced Fund seeks capital appreciation, current income, and long-term growth of income. The Fund allocation tracks the investment performance of an index with 60% CRSP US Total Stock Market Index and 40% Bloomberg Barclays U.S. Aggregate Float Adjusted Index. The Balanced Fund matched the composite benchmark for the quarter and for the year with a -12.1% return and a -12.5% return, respectively.

Non-Retirement Fund Commentaries
Second Quarter 2022

Assigned Risk Plan Fixed Income Manager
RBC Global Asset Management actively manages the fixed income portfolio for the Assigned Risk Plan to the Bloomberg U.S. Governmental Intermediate benchmark with a focus on security selection and secondarily on sector allocation. The portfolio returned -1.6% for the quarter, slightly outperforming the benchmark return of -1.7%. For the year, the portfolio returned -6.3%, matching the benchmark return.

Non-Retirement Program Fixed Income Manager
Prudential Global Investment Management (PGIM) actively manages the Non-Retirement Fixed Income portfolio to the Bloomberg U.S. Aggregate in a separately managed portfolio. The fixed income portfolio underperformed for the quarter with a -5.2% return compared to the benchmark return of -4.7%. For the year, the portfolio underperformed the benchmark with a -11.1% return, compared to -10.3% for the benchmark.

Non-Retirement Program Domestic Equity Manager
Mellon Investments Corporation passively manages the Non-Retirement Domestic Equity portfolio to the S&P 500 Index in a separately managed portfolio. The portfolio matched the benchmark return for the quarter with a -16.1% return, and underperformed the benchmark slightly for the year with a -10.7% return compared to -10.6% for the benchmark.

Non-Retirement Program Money Market Manager
State Street Global Advisors manages the Non-Retirement Money Market Fund against the iMoneyNet All Taxable Money Fund Average. The fund slightly outperformed the benchmark for the quarter with a +0.2% return, and for the year with a +0.3% return. The benchmark returned +0.1% and +0.2% over the respective time-periods.

2022 Manager Meetings

After two years in which travel was restricted due to the COVID-19 pandemic, MSBI staff began traveling to and accepting visits from managers during the quarter. Staff will continue to utilize teleconference and videoconference technologies to remain in communication with managers between visits.

During the quarter, staff traveled to Washington D.C. for a conference and had one on-site manager strategy review and 10 strategy review calls held via videoconference.

Investment Manager	Management Style/Asset Class	Investment Program
• Ascensus	Multi-Asset Class Platform	PDIP (MN ABLE Plan)
• Dodge & Cox	Active, Fixed Income Option	PDIP
• Fidelity	Active, International Equity Option	PDIP
• Galliard	Stable Value Fund	PDIP
• Mellon Capital	Passive, S&P 500 Index Fund	Non-Retirement Program
• PGIM	Active, Fixed Income	Non-Retirement Program
• RBC	Active, Intermediate Fixed Income	Non-Retirement Program
• State Street Global Advisors	Target Date Fund Money Market Fund	PDIP PDIP
• TIAA-CREF	Multi-Asset Class Platform	PDIP (MN 529 Plan)
• T. Rowe Price	Active, Small Cap Equities Stable Value Prospective Mgr.	PDIP Bench List
• Vanguard	Passive, Total Stock Market Fund Passive, Institutional S&P 500 Index Passive, Mid Cap Index Fund Passive, Total International Equity Passive, Bond Fund Passive, Balanced Fund Active, Dividend Growth Fund	PDIP PDIP PDIP PDIP PDIP PDIP PDIP

REPORT

SBI Environmental, Social, and Governance (ESG) Report

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MINNESOTA STATE BOARD OF INVESTMENT

ENVIRONMENTAL, SOCIAL, GOVERNANCE REPORT

2022 Proxy Season Highlights

Over the course of Fiscal Year (FY) 2022, the Minnesota State Board of Investment (SBI) voted ballots for 2,273 different company meetings on over 20,000 items. The majority of these votes were on director elections. There were also 5,988 management proposals and a record-breaking 512 shareholder proposals. It is important to note that these numbers do not include the many proposals withdrawn by shareholders after successful engagements with companies.

Of the Environmental, Social, and Governance (ESG) related shareholder proposals that the SBI had voting rights for, 28 received majority votes, this is slightly lower than the 31 that passed in 2021 but still well above the 18 that passed in 2020.

The SBI, along with many other U.S. public pensions and institutional investors, plays an important role in encouraging improved environmental, social and governance practices that are material to the long-term sustainability of the world's largest corporations.

For the SBI's complete proxy voting records from FY 2022, please visit the Proxy Committee page on the SBI website.

BELOW IS A SUMMARY OF THE SBI'S PROXY VOTING ACTIVITY FROM 2022

GOVERNANCE

- **Executive Compensation:** The SBI voted against approximately 70% of advisory votes on executive compensation due to lack of sufficient alignment or transparency with shareholders.
- **Other Corporate Governance Proposals:** The SBI voted for the vast majority of shareholder proposals related to corporate governance practices such as proxy access, independent chairman, declassification of boards, written consent, reports on political spending, and majority voting.

Nine proposals related to governance issues that increase shareholder rights and information received majority shareholder support.

ENVIRONMENTAL

- **Climate Change Risk:** Nine climate change risk related proposals received majority support in 2022. The SBI voted in favor of all nine. These proposals were at Chevron, Caterpillar, Boeing, Dominion Energy, Chubb, Costco, Home Depot, Travelers and Exxon Mobil.
- **Climate Change and Other Environmental Proposals:** In total, the SBI voted for 62 environmental and climate related proposals in 2022. These included many that were close to receiving majority support such as the proposals at Phillips 66 (49.8%), Amazon (48.6%), and Valero (42.4%).

SOCIAL

- **Diversity:** In 2022, the SBI voted for four Gender/Racial Equality and Employment Rights related proposals that received more than 50% of the vote. These were for IBM, Walt Disney, Lowe's, and Apple.
- **Racial Justice:** The murder of George Floyd in 2020 and subsequent events that have highlighted racial inequalities in America have caused many customers, employees, and investors to increase their focus on racism and racial equity. The SBI voted for six proposals related to Racial Justice that received majority support in 2022. Proposals at Home Depot, Johnson & Johnson, Altria, McDonalds, Waste Management, and Apple all received majority support. This is significant because when similar proposals were submitted for the first time in 2021, none received majority support.

In total, the SBI voted for 181 shareholder proposals on social issues including 25 related to Human Capital Management.

Other ESG Highlights

Investor Coalition for Equal Votes

In the second quarter of 2022, the SBI participated in the launch of the Investor Coalition for Equal Votes (ICEV). The ICEV is a new collective investor initiative to push back against unequal voting rights at portfolio companies.

Many investors are concerned that dual-class share structures dampen the ability of investors to act as effective stewards. There recently has been an increase in companies going public with dual-class share structures that do not include sunset provisions. The goal of this global initiative is to engage market participants and encourage one-share, one-vote structures for public companies either at IPO or at some reasonable sunset period.

For more information about ICEV and the SBI's role, please refer to the ICEV Press Release announcing the launch of this initiative on June 13, 2022.

Midwest Investors Diversity Initiative

The SBI is proud to participate in the Midwest Investors Diversity Initiative, an investor coalition working to increase racial and gender diversity on corporate boards. The coalition has now worked with 70 Midwest-based companies, and the SBI is pleased to announce the following results among those companies. This represents real progress, and we're excited for more ahead.

- 95 women and persons of color have received board appointments (75 women and 38 persons of color, including 18 women of color)
- 51 companies have adopted a policy to include diverse candidates in the search process for new board members
- 46 companies now publicly disclose the composition of their board members

A recent MIDI press release highlights the success of the group since its formation in 2016.

Changing the Face of CIOs

Earlier this spring, SBI Executive Director and CIO Mansco Perry was interviewed for an article that was published in the July 2022 issue of Emerging Manager Monthly. The article weaves together many insightful comments from a variety of public pension leaders about how to increase diversity in the investment industry. In particular, Director Perry emphasized the key role that education can play to reduce inequality and increase diversity in the industry, *"If we want this to be successful, there needs to be greater focus in general on educating people. I'm convinced this country has the talent and resources to bring the rest of the population along with it. The so-called 1% may no longer be 1%."*

See full text of the article in the following pages.

Ownership Works

On August 2, 2022, KKR announced an agreement to sell Minnesota Rubber and Plastics (MRP). As part of the sale, all of MRP's more than 1,450 continuing employees will receive cash payouts from their equity interest. This sale is the latest example of KKR's value creation strategy that promotes employee engagement through a broad-based employee ownership.

KKR's co-head of private equity, Pete Stavros, founded the non-profit Ownership Works in 2021 to support employee ownership efforts across the private equity industry. In addition to KKR, the following SBI managers are also part of Ownership Works and working to increase prosperity through shared ownership: Goldman Sachs, Leonard Green, Oak Hill, Silver Lake, TPG and Warburg Pincus.

MINNESOTA STATE BOARD OF INVESTMENT

Contact

John Mulé, Director, Legal and Policy Services
Minnesota State Board of Investment
60 Empire Drive, Suite 355
St. Paul, MN 55103

Phone: (651) 296-3328
Fax: (651) 296-9572
Email: minn.sbi@state.mn.us
Website: http://mn.gov/sbi/

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Emerging Manager Monthly

NEWS 07.06.22 JULY 2022 ISSUE

Changing The Face Of CIOs: Identifying Diverse Talent Sees Incremental Progress

By DANIELLE CORREA

When a pension plan or nonprofit is looking to fill a cio role, making the right hire is critical to the future success of those organizations and having a diverse pool of candidates is necessary to accomplish that goal.

“I think the objective is always to get the right fit, the right candidate into a seat. On top of that, if you can have a diverse candidate, a female candidate, a minority candidate, then I think that adds additional values. You want to have a wider universe and what you want to do is then whittle it down to the shortlist,” said Shoaib Khan, director and cio of the $95 billion New Jersey Division of Investment, who took on his role in May.“Somebody who’s a female goes through challenges and the minority has other challenges,” he continued. “I think all of those different experiences is what adds value and to the extent we can add that into the mix, I think it results in better investment decision making. When you add those different perspectives and experiences, that enhances an organization’s ability to either reduce risk or enhance returns. That’s why it’s important to cast a wider net.”

Casting a wider net and identifying diverse talent is growing in importance among the top public defined benefit pension plans and foundations and endowments in the U.S., with incremental progress seen in the hiring of women and minority cios.

However, among the 100 largest U.S. public pension plans and 100 largest U.S. nonprofit institutions, roughly half of new cio roles filled this year at defined benefit plans and more than half at endowments and foundations were white males, Emerging Manager Monthly found.

What more can these institutions and search firms do to further attempts to fill the available roles with qualified diverse candidates?

"I think we're moving in the right direction, definitely, but I feel like there are starts and stops along the way," said CIO Angela Miller-May of the $50 billion Illinois Municipal Retirement Fund. "The last two years, there has been a big push. Companies have committed to hiring more women and making sure that minorities and women are part of their candidate pool. Diversity is a positive for their bottom line and it's really good business to have that diversity of thought, diversity of age, and ethnicity, backgrounds and education."

The State of The Industry

Women and/or minority executives hold the top investment position at 21 of the 100 largest U.S. defined benefit plans, up from 19 in 2021 and down from 25 in 2020 and 23 from 2019, when EMM began tracking the data. Although there were some changes in senior investment leadership among the top 100 U.S. nonprofits, the number of women and/or minority executives leading these institutions is now 39, up from 38 the past two years and 36 in 2019.

Some new women and minority hires from the past year have come through internal promotion — the $44 billion Iowa Public Employees Retirement System's CIO Sriram Lakshminarayanan had served as the plan's chief risk officer since 2014 until his promotion in January. Others came from an outside organization such as new ceo and cio of the $35 billion San Francisco Employees' Retirement System Alison Romano, who previously served as deputy cio of the $253 billion Florida State Board of Administration before beginning in her new role at SFERS on June 13.

On the nonprofit side, Anca Ion, deputy cio and cio for internal investment of the $5 billion Texas Treasury Safekeeping Trust Company, was promoted to cio in November while Anne Dinneen, cio of the $1.4 billion Hamilton College endowment, was named as the new senior v.p. and cio of the $13 billion NewYork-Presbyterian Hospital on May 2.

The past year has brought on both additions and departures at a number of the top pension plans and nonprofits, including the exit of various women and minority individuals.

The pension space saw the departures of Alex Doñé, who left his post as cio of the $263 billion New York City Retirement Systems; Ray Joseph, who resigned after serving as cio for the $29 billion Los Angeles Fire & Police Pension System for less than a year; and Elizabeth Burton, who resigned as cio of the $22.5 billion Employees' Retirement System of the State of Hawaii.

Doñé departed for a managing director role at private equity firm Platinum Equity and has been succeeded by Deputy/Interim CIO Michael Haddad, a white male.

Joseph and Burton reportedly left their respective plans for personal reasons and plans to fill Joseph's position are in development, while no news has been released on the search for Burton's replacement.

Elsewhere, Director of Investments Fernando Vinzons departed the $14 billion Cook County (Il.) Pension Fund for the cio role at the $13 billion Chicago Teachers' Pension Fund, where he will begin on July 11.

"I look forward to joining the Chicago Teachers' Pension Fund. They have a terrific team and an impassioned Board of Trustees who are all laser-focused on delivering for their members," Vinzons said.

Further, the public pension space will see a few retirements from women and minority cios, as Liza Crisafi of the $10 billion San Diego City Employees' Retirement System is set to retire on July 31 after serving in the role since 2008 and Executive Director and CIO Mansco Perry is set to retire on Aug. 16 after nearly 10 years leading the $89 billion Minnesota State Board of Investment.

"It's been an interesting job, but not without a lot of challenges, as most cio jobs are," Perry said.

Executive search firms EFL Associates and Korn Ferry are assisting with finding successors for Crisafi and Perry, respectively.

In the nonprofit space, CIO Ruchit Shah departed the Texas Treasury Safekeeping Trust Company in November 2021 for a senior managing director role at M-Cor Holdings, the Milken Family Office. Shah was succeeded by Ion.

William “Bill” Lee stepped down as senior v.p. and cio at the NewYork-Presbyterian Hospital in September 2021 after more than five years in the role and was succeeded by Hamilton College CIO Dinneen.

Yatin Patel, co-cio of the $7 billion Conrad N. Hilton Foundation, left the organization in June 2021 in pursuit of other career opportunities with Co-CIO Michael Buchman, a white male, taking over as cio after the two had worked alongside one another since 2016.

Meanwhile, the $9 billion Hershey Trust Company is looking to hire a new ceo and cio as Janice Bratton, who has served in the cio role since 2019 and as ceo since 2020, is set to retire at the end of 2022.

The company began a national search for Bratton’s successor in February.

Charles Skorina, founder and managing partner of Tucson, Ariz.- based executive search firm Charles Skorina & Company, indicated that a majority of the cio biographies on its website are for the nonprofit sector and over half of those cios came from other nonprofits.

“When I’m talking to folks who want to be a cio, I tell them that about 60% of all cio openings, [although] it varies, in nonprofits come from other nonprofits,” Skorina said.

While not in the top 100 nonprofits by assets, the $900 million endowment of the University of St. Thomas’ (Minn.) Chief Treasury and Investment Officer Carol Peterfeso stepped down from her role on Nov. 24, which she had held since 2010.

Peterfeso is succeeded by Pennsylvania State University Deputy CIO Sonali Dalal who will begin her new role as v.p. and cio in August.

Meanwhile, the $1.4 billion National Geographic Society named Kristi Craig, director of private investments at Georgetown University, as its first cio in February.

In January, the $1.1 billion Pepperdine University named minority Jeffrey Rohde as its permanent cio after serving as acting cio following Charles “Jeff” Pippin’s October retirement. That same month, Deputy CIO Leena Bhutta of the $2.4 billion Doris Duke Charitable Foundation was named cio following the retirement of Jeffrey Heil, a white male

In December, CEO and CIO Carla Hunter of the $628 million Weizmann Global Endowment Management Trust retired and was succeeded by Monica Spencer.

Kit Ali, senior partner of executive search for diversity recruitment firm Mogul, finds that generally more women and minorities are being hired among nonprofit institutions rather than in the public pension space.

“Diverse candidates generally have an affinity for philanthropy and good work. Foundations and endowments, generally speaking, [are] out there trying to change the world in a good way. I think that naturally appeals to diverse individuals,” Ali said.

Of the 16 new hires in the top 100 pension plans this year, seven were women or minorities. Among the nine hires in the top 100 nonprofits, three were either a woman or minority.

Casting A Wider Net

For many institutions, executive search firms can be helpful in the process of casting that wider net in order to attract talented diverse individuals to fill senior investment roles, with some finding it to be a big undertaking.

Miller-May thinks that if an institution is seeking diversity or diverse candidates, it is a small pipeline or universe, therefore search firms “have their work cut out for them.”

“When we’re recruiting college grads, that’s our responsibility as cios to make sure that we implement a pipeline internally for someone to advance to the role of cio. You don’t have to go outside, but that means developing people and allowing people to be exposed to different things and different ways of looking at a portfolio,” Miller-May said.

Miller-May, who spent the early part of her career in banking, joined IMRF in August 2021 following 11 years at the Chicago Teachers’ Pension Fund, where she started in an entry-level investment position and eventually climbed the ladder and landed the role of cio.

Back in 2010, the hiring process at Chicago Teachers included an interview with the executive director and manager, while the process for Miller-May to acquire her role at IMRF consisted of research, “YouTube-ing,” studying and figuring out situational questions, she noted.

“This was all new to me, but I had to do the speaking and advocating for myself,” Miller-May said.

“I appreciated Chicago Teachers. It is where I gathered most of my knowledge about how to construct a portfolio, how to select managers, how to adhere to the Illinois pension code and a strategic asset allocation. But the culture changed with COVID and this position at IMRF became available,” she continued.

EFL Associates led the search that began in March 2021 for the cio role Miller-May eventually filled in August 2021.

In its search for a cio to succeed Miller-May, Chicago Teachers partnered with Korn Ferry, according to Executive Director and Interim CIO Carlton Lenoir Sr.

“We are pleased with the comprehensive and collaborative process that we undertook. Korn Ferry presented a diverse and well-qualified group of candidates. We appreciated the quality of the candidates and the energy they put into this search,” said Lenoir, who will hand over the cio responsibilities to Vinzons when he joins.

“My experience with CTPF and Korn Ferry was positive and the process for vetting candidates was quite thorough,” Vinzons said.

“It is my hope that search firms prioritize presenting a fresh, qualified and diverse pool of candidates for employers. As a minority, I understand first-hand how daunting the search process can be. Anything a search firm can do to improve outreach, educate people about the process and add to their pool of diverse candidates would be progressive, timely and welcome,” he continued.

Vinzons is joining Chicago Teachers after serving four years as director of investments and 10 years as a senior member of the investment team for the Cook County (Ill.) Pension Fund.

“I was responsible for the growth of an under-funded pension portfolio [from $5.2 billion to $14 billion] and improved peer ranking [from 65th to 28th percentile],” Vinzons said, noting that he has over 18 years of investment and financial market expertise and is well-versed in all investable asset classes, including private equity, real estate and hedge funds.

In his experience, Michael Kennedy, senior client partner of Korn Ferry's asset management practice, indicated that when funds try to screen diverse candidates for roles themselves, they are not able to cast as broad a net as search firms.

"They are a lot more limited in their outreach efforts to reach targeted women and people of color," he said. "They don't have the relationships. They're reaching out to candidates cold and candidates may not be responsive or may not return their call. Utilizing a search firm provides greater access to talent because people will be more inclined to return my calls because they're familiar with Korn Ferry."

In the search process that Kennedy follows, he allocates a "significant" amount of time to gain knowledge about the organization.

"I have one-on-one discussions or interviews with board members and senior staff and any other relevant stakeholders that I think I need to speak to in order to develop an understanding of the structure of the organization, the culture of the organization. That's important because as I'm speaking with candidates, [they] will want to know about the board and the senior team. What's the culture like, and has there been turnover? Is there stability? All of those kinds of things," he said.

Organizations' job postings and e-mails cannot specifically state that they are looking for a woman or diverse candidate, according to Skorina, who finds that hiring authorities like his firm is still valuable.

When on the phone or writing an e-mail, "Can you say, 'Hello, I'm looking for a director of investments and it must be a woman and it must be a Latino? I don't think so,'" Skorina said. "If you're looking for minority candidates, you have to brand the search because there are more second-level minority candidates."

Skorina began his career in banking and eventually moved to the West Coast, where he started his firm, which recruits board members and executive officers, cios and senior asset managers for institutional investment funds and firms.

“[Over 10 years ago] I got to thinking, I don’t do any business with women. All of my contacts are men. So, I started tracking women in finance, in particular on the asset management side. Four or five years ago, I wondered how they were doing, how they compare with the guys. So, we did a study and you know what, they do just as good if not better,” Skorina said.

Skorina’s 2021 study Women in Finance: The Long Hard Road, published in The Skorina Letter, discovered there are plenty of talented women waiting for a cio opportunity and the research shows that they perform the best.

Skorina’s clients include the $3.9 billion Michigan State University endowment, $2 billion University of Nebraska Foundation and $1 billion University System of Maryland Foundation.

One of the current searches Skorina is working on is for a cio with experience at a U.S. endowment, foundation or pension fund for the Monterrey Institution of Technology and Higher Education at the university’s flagship campus in Monterrey, Mexico. He believes it would be useful to recruit a Spanish-speaking candidate, although it is not a requirement of the university.

But, “I’ve been looking for six months for a Latino or Latina. I haven’t filled the job yet. I’ve had to focus on Texas, because there are more [there],” Skorina said.

Khan of the New Jersey Division of Investment views executive search firms as helpful since they are looking for diverse candidates day in and day out and are focused on recruiting as opposed to other organizations that may key in on different functions.

“They have a pretty good idea of who’s sitting where. When I was at Florida State Board of Administration, I was not aware that there was an opening at New Jersey until the recruitment firm that New Jersey had engaged with reached out to me because they had known me over the years. Recruitment firms tend to know what the landscape of candidates are and I think that’s some of the value that they bring,” Khan said.

The search for Khan’s role began in October 2021, when the plan retained EFL Associates for assistance. Having joined the division as deputy director in January 2021 from the Florida plan and taking over the director and cio position on an acting basis in

June 2021 following Corey Amon's departure, Khan was appointed to the role permanently in May 2022.

"I did not know that I would be asked to step into the acting director or an acting cio role as quickly as I was, but of course it was because Corey decided to move to the next step in his career and so I was asked to step in," he said.

Khan began his career in the pension arena for both the finance and investment teams of the $1 billion City of Miami (Fla.) General Employees' & Sanitation Employees' Retirement Trust. From there, he moved on to focus on a number of strategies in alternative and traditional investments and a bank in Switzerland before returning to the pension space in 2017.

"I always look for that meeting of minds," Khan said of his transitions to new organizations. "Are we looking to achieve the same things? Are the objectives that they are looking to achieve in line and do they make sense to me? Is this something that I would be interested in and that I could add value to?"

Mogul's Ali thinks that candidates have to come from within the industry when looking for candidates at the cio level.

"I think if you go lower down the spectrum when you're talking about manager level and director level hires, that's when the search firms can get a bit more creative with diversity. That's when you can look at the private wealth managers, you can look at the pension funds, you can look at the sales side. Chief investment officer has most likely already held that title somewhere else or is about to be promoted into it. And that only happens within your industry. So, that kind of comes back to how industries as a whole have to start making themselves a place where diverse candidates like to start and build their careers. Because if not, then you'll be dealing with a situation where the talent pool just doesn't exist," he said.

When it comes to casting a wider net in searches, Ali finds it is more about what the industry has already done to incorporate diversity.

"Hiring at the junior level is a whole different beast than hiring at this [cio] level. Companies and industries really have to take a deep look within and see why there is not enough diversity at this level," Ali said.

Ali began his career in the asset management industry in executive search and has stayed within the sector for 20+ years. Having moved from the U.K. a couple of years ago, he helped launch Mogul's U.S. asset management practice.

"Executive search has been an industry that's been very good to me, but diversity was something that's never a priority at the senior level in most of the industries that I've worked around. When I had the opportunity to join Mogul and really have an impact and help industries really transform, it was a no brainer for me," he said.

Miller-May finds that some search firms could do a better job in their networking and outreach.

"I think the search firms could do a better job. I had a really good experience with Illinois Municipal, but before this role, I was never really introduced to a search firm. I think that's something that they could do better … expand their networks or have conversations and talk to people that may not be looking for roles, just to have a pipeline of diverse candidates. Why wait to connect and develop relationships when the role comes up? Why not have that pipeline of people ready that are at one level and ready for the next level that you have developed a relationship with?" Miller-May said.

"I think if they just work to expand their networks by aligning themselves with organizations, colleges and universities that promote and encourage diversity, they'll find more diverse candidates," she continued.

On the flipside, Miller-May compares search firms to investment consultants in that search firms can be thought of as the "gatekeepers for the senior roles, for leadership roles."

"They have the influence to really affect change and increase diversity for many organizations. When serving on boards and we've had to hire, we've been advised by search firms of what the levels of compensation should be, who's out there looking for the role, and what percentage, or what's the likelihood of us being able to attract candidates. They act as advisors and I think that if they could be committed to diversity and be intentional like we try to hold our investment consultants to, that will work to improve diversity from a different aspect," she said.

Meanwhile, Lenoir thinks executive search firms help to broaden the applicant pool to source diverse talent and help ensure that each search gets the full attention it deserves.

“They are experts in creating a match between the organization and the employee, they help to eliminate any inherent bias, they elevate the importance of the position they have been engaged to fill, and supplement internal hiring talent with their reliability, efficiency and efficacy,” Lenoir said.

Minnesota’s Perry, who spent his career in government offices, as a private equity analyst, in administration and as a cio, is retiring this year and indicated the search for his successor will be a national one made up of people with some experience, but not exclusively from public funds, as well as some internal candidates.

“They’re hoping to have a diverse pool of candidates, but that’s unfortunately easier said than done,” Perry said.

“There’s just a small universe of talent, irrespective of ethnic background or gender, who are getting out of school and looking to come and work for a pension plan or endowment or foundation, but once they get exposed to it, there are quite a few who get excited about it,” he continued.

While the $4 billion Chicago Community Trust does not use executive search firms in its hiring process, Senior Director of Investments Laura Kernaghan does think they can provide value as she believes there is a tendency in the industry to seek candidates with very specific backgrounds that ultimately limits the pool of prospects.

“We have tried to cast our net a little bit wider and then that way, we think it’s very helpful for firms to be able to do so as well from an executive search standpoint because I think it really comes down to making sure that strong foundation is in place and that the individual you hire can ultimately achieve what you need within the role. Having the flexibility really allows for a wider net and allows for us to really get those diverse candidates,” Kernaghan said.

Kernaghan has been with the trust since October 2018 after her former supervisor at the Ann and Robert H. Lurie Children’s Hospital of Chicago was hired as cfo at the trust. Before shifting to the nonprofit side, she began her career in traditional finance spending “well over a decade” as an equity analyst.

“I really enjoyed that work, it was very fast paced and intellectually challenging and then I transitioned into an asset allocator’s role.” But then, “I wanted to shift to a slightly different pace of work, but one that also was very much still focused on achieving positive outcomes not only from a profit perspective but also from a mission perspective,” she said.

Miller-May serves on several boards that have asked their search firms to look for and bring in diverse candidates. When they did not do so, the board sent them back out to identify diverse candidates.

“We told them, ‘No, we want to see women in this pool, we want to see minorities in this pool, we want to be able to ensure that we’re selecting the right person for this job from a wide and diverse pool of candidates,’” she said.

Access To Open CIO Positions And Seeking Talent

Recruiting, educating, networking and opening the doors to talented women and minorities that can fill cio and senior investment roles is the way for these candidates to gain access to available positions and not be overlooked, according to the industry representatives who find the access is not there.

Tiffany Pham, ceo and founder of Mogul, points out that 85% of all jobs are filled by networking, according to a LinkedIn survey. Meanwhile, she indicated that the current network of executives is 85% non-diverse, according to the Harvard Business Review.

“When you take that 85% non-diverse candidates and the fact that 85% of all positions are coming from networking, the diverse candidates are not going to hear about it. Even the ones in the industry and especially not the ones who are working in adjacent industries that might be a fit. Unfortunately, senior-level hiring is very much a closed, traditional, exclusive, upscale network,” Mogul’s Ali said.

“We can’t expect a different outcome if we keep searching for talent in the same ways and within the same networks,” Pham added, noting that Mogul’s network of executives is diverse in gender, ethnicity and other characteristics that allow the firm to reach a deeper level of talent in searches.

Lenoir finds there is always more work to do in granting access to information on open cio positions for women and minorities.

"CTPF has become an industry leader when it comes to MWDBE investing, with nearly 50% of our assets invested with diverse fund managers. That commitment makes it clear to future leaders in our investment department that MWDBE investing is a core value – and I think that was one of our strongest recruiting tools during our most recent search. We have woven diversity into every aspect of our organization, and it's clear to applicants that differences are our strength," he said.

Perry thinks that with regard to education, a better job of exposing the general populace to the industry at earlier ages needs to be done.

"More importantly to me is that I think we need to see that diverse groups get better educations, generally. If we can resolve that then I think we've resolved a lot of other problems [people] seem to be facing. Starting at the classroom and with internships," Perry said.

Miller-May contends that women and minorities do not have enough access to information on open cio roles within the public pension plan space despite an interest in increasing diverse hires and an uptick in opportunities for diverse candidates.

"I think it's just not enough information out there in general for diverse candidates to know where the roles are. It seems to be word of mouth or who you know. We've had to establish our own networks and connections. Diverse people know where to find diverse candidates. There's a lot more reaching out of peers and colleagues who say, 'I think you would be perfect for a role and can I put you in touch with someone or can I introduce you to someone?' We need more sponsors and advocates," she continued.

Chicago Community Trust's Kernaghan believes it is an issue of awareness.

"I do think that it's possible that we're missing out on talent that might not be looking specifically within this corner of the industry where that might not be connected necessarily to the right individuals. I think it comes back to that idea that relationships and networking are important for job seekers," she said.

Kennedy finds that women and people of color do not get enough information about open opportunities, but a lot of the times it has to do with people not thinking about the position as the next stop in their career.

“You may have a senior person of color or a female in an investment consulting firm and they’re doing great work. They’re very successful, well paid and they’re not thinking about putting their name in to be a cio at a pension plan. I would reach out to that person and submit the opportunity to them and give them the positives even though they’re content where they are,” Kennedy said.

Similarly, New Jersey’s Khan thinks people reaching out from recruitment and search firms to somebody for a position is “very common” even though they may not be looking to make a career move.

“A lot of the candidates are not looking to move necessarily until they are presented with a compelling opportunity which fits what they might be looking to do as a next step,” he said.

Searches for C-suite roles tend to be confidential, according to Pham, who indicated that qualified, diverse talent will not be aware that searches are happening and conversely, will not appear in traditional recruiter searches.

“Mainstream sourcing platforms have algorithms that tend to favor non-diverse candidates. So, both groups, through no fault of their own, aren’t necessarily interacting and seeing the opportunities with each other. Using firms that specialize in diversity hiring can be a great start for institutions wanting to connect with new networks of diverse candidates who are ready for the next level,” Pham said.

“Diverse people are also not getting into the pipelines because they operate outside of the traditional ‘insider’ networks. Studies have shown that women have smaller networks than men, particularly in male-dominated industries, and they approach job searches differently. So, understanding that female talent and diverse talent approach job searches differently can help us in accessing that talent in a different way,” she continued.

Kernaghan pointed out that the overall structure of the industry can still be challenging for diverse candidates.

“[They] might not necessarily feel like they’re part of the club, so to speak, and I think that remains a challenge broadly across the investment industry,” she said.

“It’s almost like you’ve got to be in the industry to know where the roles are,” Miller-May said. “You have to develop those relationships. The information comes through the building and developing of relationships and networking with peers and networking with mentors or sponsors. You have to be open to meeting, collaborating, and knowing different people in different settings.”

“There are so many talented and smart people out here, but if you don’t know that person or can’t identify them, they’ve got to raise their hands and make themselves known and you have to be open and eliminate the challenges in connecting with them,” she continued.

While Khan thinks candidates should network and connect with recruiters for more access, he also thinks there is great access to open cio positions today because they are advertised in various places in addition to the technology that is available.

“We’re living in a world where technology is obviously at the forefront that I think allows access to be wider than if you had asked 10 or 15 years ago or even five years ago. Technology changes so fast. I think today we’re all in a better place where there is greater information flow,” he said.

Khan further pointed out that like everything else, organizations need constant improvement and recognition that there is a lot of value that comes from expanding and bringing in diverse and women candidates, networking, being active and keeping an open mind.

Kennedy discussed the importance of education and getting the word out as well as mentoring and developing and grooming individuals along the way.

“I’ve identified talented women and people of color who started in some of these organizations in the junior levels and I’ve tracked their careers and every now and then I will call just a handful up and check on how things are going. And sometimes they’ll call me and they’ll say, ‘Michael, this is what I’m doing now. What do you think should be the next step in my career? I want to be a cio.’ I think we need to have more of those kinds of conversations so that people actually have some sense as to what they need to do to broaden their experience that will make them very strong candidates to become a successful cio," Kennedy said.

Perry agrees in the value of education and thinks the industry will not be successful without that focus.

"If we want this to be successful, there needs to be greater focus in general on educating people. I'm convinced this country has the talent and resources to bring the rest of the population along with it. The so-called 1% may no longer be 1%," Perry said.

Having interviewed cio candidates, Skorina thinks the job is a great one that more people should know about.

"Whenever I do my cio interviews I ask, 'How did you get into this business?' You get interesting answers with the men. They're kind of guided [as] men are supposed to go into business. At the high school level and then in college there's not as much of a social, cultural push to guide women into business," Skorina said. "Most of the women I've talked to who have gotten into the cio role was just a fluke through a friend or their parents. One of the parents was in finance and that's how they learned about it."

Kennedy implied that it comes down to mentoring and developing and making sure people get the right opportunities as they work through their careers.

"I think that really is going to be incumbent upon senior people with these various types of asset management organizations to take a real interest in making sure that they're reaching back and attentive to building a diverse slate of talented employees as they manage their careers," Kennedy said.

"Companies now are a lot more attuned to that over the last year or two, there certainly is a lot more conversation around that, but I think that's going to be the next step to make sure that these individuals get the right type of mentorship, get the right types of experience and exposure that will allow them to develop the skillsets and experience they need for the next promotion," he continued.

Lenoir views recruitment and retention as vital as the industry can be "insular."

“When we conducted our search, we considered candidates with varied backgrounds. One of our three finalists for the cio position came from private industry, and that says a lot about our recruiting process – we were willing to look beyond the traditional requirements to find candidates with a diversity of thought and experience to fill the position. As competition for candidates grows, we will continue to benefit from this kind of out-of-the-box thinking,” he said.

Compensation is another contributing factor when comparing the pension space to asset management and keeping talented diverse individuals on the payroll.

“To retain these leaders, it’s important to make sure that candidates are aligned with an institution’s mission and values – because we know they can go elsewhere and earn more money in many cases. Public funds are limited and have a tough time competing on compensation alone – so we need to work hard to find people who connect with our mission and values and are willing to invest in that mission – as well as their career. When those elements align, we find candidates who are well suited for success as cios,” Lenoir said.

Miller-May agreed on the disparity of compensation when comparing institutions to asset management.

“It is a robust job market and talented diverse people are being hired in the asset management space and private space. If we have to compete with this space from a compensation aspect, it could be challenging. What makes a public pension plan like IMRF attractive is the inclusive culture, the positive work environment, the values, and the mission. Candidates find these things to be as valuable and coveted as compensation,” Miller-May said.

Skorina finds that compensation is an issue with finding interested talent.

“You don’t have that many chief investment officers making a million dollars, but in private equity that’s small change for somebody really good. If I have a compensation cap, I go to where they’re paid the least, and that’s public pensions,” Skorina said.

While recruitment, mentoring and retaining talent is important for many institutions, others think it also has to do with considering biases and new hiring approaches.

Kernaghan believes that institutions need to carefully consider potential biases when securing more women and minorities for cio and senior investment roles.

“When we’re looking to hire investment managers, we think about whether we are insisting on a threshold of assets under management or a minimum track record. Those are things that ultimately perpetuate bias against up-and-coming diverse talent and I think this same concept applies for hiring as well and making sure that we don’t have our job requirements being too rigid or if we are really thinking about making sure that we’re not focused on only recruiting from select schools and ultimately structuring our job search in a way that leads us to miss out on candidates that could be fantastic for these types of roles,” she said.

Pham thinks one way the industry can seek women and minority talent is to embrace new approaches to hiring.

“We can’t keep doing the same thing and expect different results. Instead, we can start by ensuring that each open role, from entry level to C-suite, has a fully diversified pipeline. Carefully examine the requirements for each role. Bring in diversity hiring specialists to help you find diverse talent, because amazing candidates are out there and they are ready for the opportunity. Also, understand that embracing diversity doesn’t end with a new hire — it’s important to consciously develop an inclusive culture where diverse talent is welcomed and can thrive,” she said.

Ali is pleased with what he has seen among the institutional asset management industry and thinks it is more a case of keeping up the good work.

“Build up those mid-level and lower level of ranks with diversity, eventually you’re going to see the power upwards. A lot of changes have already been made. In certain parts of the investment industry there’s a lot of very senior successful women and people of color,” he said. “Don’t take your foot off the pedal and understand there’s still a lot of work that needs to be done because there is that data at the senior level.”

For Perry, he believes the talent is out there, it is just a matter of finding the right match.

“People have the right approach to do this job. You’ve got to think of it a lot more broadly than, ‘Well, gee, I want to be responsible for a hundred plus billion dollars.’ That’s the easy part. There are a variety of stakeholder groups that you have to develop the relationships with. There are big and little politics that you have to be cognizant of,” Perry said.

“The fact that you’ve got a global discipline board both that invites people with an interest that you never expected to show up at your board meetings is part of your responsibility to be able to understand and navigate,” he continued.

Executive search firms find that in order to find the diverse talent, institutions need to seek out inclusivity, make diversity a priority and target various investment organizations.

Pham indicated there are currently 11 million open jobs and only nine million candidates. She insists that top diverse talent has options and they want to work for an employer that is inclusive and celebrates diversity.

Commitment to diversity was non-existent for the folks who got into the financial industry prior to the 2008 crash and are now getting into the top positions, however, other industries like the strategy consulting space have been committed to diversity from the beginning, according to Ali.

Kennedy is encouraged as he believes there are a lot of talented women and people of color available, but a lot of times executive search consultants do not know where to find them.

“The types of organizations that I would target would be pension funds, consulting firms, asset management firms and funds-of-funds. Just a variety of different asset management-type organizations. And then I really focus on the experiences and the skillsets of the individual candidates to see if they could make that transition to [let’s say] a public pension plan,” Kennedy said.

Kennedy also finds that in an environment coming out of COVID, people are used to working remotely, which opens up opportunities for women and people of color.

“As an example, Boston has always been a difficult place to recruit talented people of color and specifically African Americans, but now many of the firms are able to recruit because those individuals may not necessarily have to relocate to Boston. Therefore, they have access to the firms that Boston may have access to that they haven’t had in the past,” he said.

Bringing Awareness to Future Generations

Through efforts in recruiting, educating and mentoring diverse candidates, the interviewees unanimously agreed that targeting younger generations of women and people of color at the middle school, high school and college levels will make them more aware of these positions and should help raise the number of talented diverse cios in the future.

The Chicago Teachers’ Pension Fund stresses the importance of internships, mentorships and exposure to the industry with fund managers and within leadership, according to Lenoir.

“These opportunities help guide and develop future talent. We are currently working on a partnership with an organization that provides mentoring to high school students and are looking at ways to expand those relationships so we can continue to build the pipeline and drive long-term opportunities. We are long-term investors, and we know that talent development takes time and resources. We’re willing to provide both,” Lenoir said.

The Minnesota State Board of Investment is starting a few internship programs in the Twin Cities area and trying to recruit more nationally, having “a little bit of success” to date, according to Perry.

Raising talented women and minorities’ awareness about these open positions is something that the Chicago Community Trust has been excited about for some time, according to Kernaghan.

“I think that awareness of finance career path broadly and in particular these kinds of roles that are a little bit more off the beaten path can be low for women and minorities. I think that many potential diverse candidates just might not even know much about these types of roles or the fact that they exist and, in all honesty, I did not know at the outset of my career that this type of role was even a possibility," she said.

"If we can set even a few future candidates on the right path with the knowledge of these potential opportunities, I think that will contribute to progress and we should not underestimate the influence that seeing someone who looks like you and is serving in these roles has on candidates that can ultimately allow them to see themselves serving in the same capacity over time. I think people often need to see it to believe it," Kernaghan continued.

Similarly, being able to see that there are a number of diverse and women leaders sitting in seats across the country and in various organizations will bring the talented individuals the confidence that they need to be able to believe that they have the objective to "reach their right," according to Khan.

"I think that goes toward encouraging and giving them the confidence. When you look across the student pools and across colleges and high schools, it's very diverse and I think we are going to see those come across but I think we need to continue to instill the confidence and instill that objective. We want to make sure that much like everything, there is this outreach as well. Even at middle schools because that's where people start to develop their minds and start to think about their future and their careers," Khan said.

"We need to be inclusive from a very early stage so that as they progress there is less of a need to continue to target and it just becomes natural," he continued.

Miller-May thinks it is really just about being inclusive, open-minded and looking at who would be a good fit, when she discussed IMRF's process around her hiring last year.

"It was the track record of work that I had accomplished, and the qualifications that I had and the probability that I could continue to be successful and accomplish great things at IMRF. I didn't feel like I couldn't be myself or that they were looking for the typical, conventional cio. I feel like they were very open minded, and they were open to the idea of a diverse cio. I think that's all you can do is to be intentional in providing opportunities, setting any biases aside, and really getting to know the person and value that they could bring," she said.

Pham identified raising awareness of open cio positions to younger generations of women and minorities as "highly impactful."

"When a diverse person is hired for a cio role or another C-suite role, it changes the entire organization, not just the C-suite. It's not just a diverse voice on the table who thinks differently. It impacts thousands of diverse individuals in that industry or at that company who are now inspired to grow similarly up that ladder. That cio may not even realize it, but he or she is inspiring analysts for the next 15 years, who now know that it's possible for them to also rise to the top. Each hire has a ripple effect and can make a difference for so many," Pham said.

Ali "absolutely" agrees in raising awareness on open cio positions to younger people and indicated that he starts in high school and middle school.

"The financial industry is a defining [and] rewarding place as well. If you believe that somebody who looks and sounds like you doesn't have a place there, you're not going to look at it," Ali said. "It's all about the skills and education and what you're bringing to the table. Who you are [and] where you come from have no play in this environment."

Kennedy noted that many endowments and foundations are actively starting internship programs for younger generations in the wake of George Floyd's murder.

"They're trying to identify primarily college students and give them internships so that they actually gain some insights into the investment management industry as a possible career. And I think that's one of the important trends that I am seeing. So, more and more people are now hearing about investment management and what it's about and what the career opportunities may be. And then there are longstanding organizations who continue to develop top level and diverse talent. And these individuals are ready to jump into a variety of asset managers," Kennedy said.

Skorina mentioned a discussion he had with University System of Maryland Foundation CIO Sam Gallo in April, where Gallo noted the most important attributes that recruiters and institutional boards should look for in a successful cio candidate, including "experience; a deep respect for strategic asset allocation and risk management; a profound and intense level of intellectual curiosity; love working with, educating and communicating with the board, staff and outside groups; and a strong ability to collaborate."

Skorina placed Gallo in his current cio position nearly eleven years ago when the foundation was seeking a cio.

A Slow Pace Toward Progress

While recent years show that the industry may be moving in the right direction, most investors and executive search firms find the pipeline of diverse talent to fill these senior investment roles is still not moving forward at the appropriate pace.

"I think there does appear to be a little bit more energy and focus now. It's something that is a bit more perpetual. I'm optimistic because I've seen a lot more cios and investment arms engage in dialogue and I also recognize it's not going to be something that happens overnight, but it does appear as though there is more of a dedication," Perry said.

Miller-May, who claims the pace of increasing diversity stops and starts, finds that the responsibility of hiring diverse candidates is not a job for one person alone.

"I think we have to keep the communication going, keep talking about it, keep pushing for it. Institutions that are doing the right things, are building a pipeline of interns, trying to expose different people — minorities and women to this industry — and then investing in those people and supporting those people and hiring those people and continuing to offer support. I think hiring directors of diversity for organizations is a plus, but it's not just their job. I think we all have to work together in the end. It's not a minority or women issue, it's everybody's issue and so until everybody comes together and moves the needle together, I think we'll just be having these stops and starts," she said.

Kennedy views the pace as still slow despite sincere efforts being made.

"Many of these organizations are coming up with programs and internships and things of that nature and they're talking about doing a better job recruiting and going to HBCUs, but I still think it's a slow process. I don't see the needle being moved significantly much at all," Kennedy said.

Khan indicated that he sees a “constant effort” from the public pension space in taking constructive steps to attract diverse candidates.

“I tend to think that there is now a recognition and there is an effort by organizations to attract a wider pool of talent, and that includes diverse and women candidates. I’m hopeful that it’s going to continue in that direction even further,” he said.

Skorina believes institutions should make sure to focus on ensuring the pipeline is not being rushed and more junior team members are gaining the experience they need to be successful later on in their career.

“There’s a legal duty to manage the money well for your clients [and] there are implications for that because you can get sued for doing things wrong. Suppose you bring up people so fast that they’re not experienced and they make a mistake. There’s always the danger that you can push and there are implications if you push too fast because mistakes cost a lot of money,” he said.

As senior roles tend to not turn over very quickly, Kernaghan thinks there is a “real push and a real desire for change, but it may not always happen at the pace that one might expect or hope for otherwise,” she said.

Mogul’s Pham finds that the pace is slow, but indicated the importance of celebrating the progress.

“It’s important to celebrate the progress we’ve made and increase the momentum. I do believe it will happen. We will get there,” Pham said.

Progress In the Value Of Diverse Talent

Even if change does not happen as quickly as one hopes, industry folks who come from various diverse backgrounds and organizations see progress in the industry’s recognition that committing to diversity is a value-add for any institution or firm.

Institutional investors and the investment industry at large have only just begun to embrace gender and ethnic diversity, according to Pham, although some segments are farther along than others.

“However, we are seeing an industry-wide recognition that change needs to happen, and that in itself is progress. There are so many opportunities to learn from what’s working in other industries and apply best practices to the investment industry as a whole. At Mogul, we work across all industries and we see what’s working in each one,” Pham said.

Korn Ferry’s Kennedy finds that just the fact that conversations have been held over the last few years has been significant when viewed in the context of the evolvement of diversity in the industry.

“There used to be a time where I would go into investment management firms and I would actually bring the topic up and in many cases, it would just be glossed over. And that’s not the case today. So today when I go in, before I can bring it up, they’re usually bringing it up to me or they lead off the discussion saying, ‘We really want to talk about that. What are you seeing in the industry? What are the trends? What can we do better?’” he said.

Miller-May points out that when you get more diversity in leadership roles, it does trickle down across the organization.

“I think those organizations that understand this will be successful. There are those that believe if you’re increasing diversity, it’s not part of your fiduciary responsibility, similar to thoughts about ESG. They think it’s a social issue and it’s not. Being a fiduciary means that I am bringing the best talented managers and the best talented staff to the organization and, for me, that means having people that can bring better solutions and having more diversity and more inclusion,” she said.

Kernaghan thinks that institutions are increasingly aware of DEI in the way that teams are run, portfolios are managed and how external partners are selected, but as mentioned previously, it should be recognized that change is not immediate.

“Awareness is really only a first step. We then need to be able to adjust our processes to allow for expansion of the candidate pool over time and then also have an honest assessment about whether our approaches will allow qualified candidates to be fairly considered for employment, ultimately hired and then furthermore, well integrated into our team. We see a lot of progress but it does take time,” she said.

Progress has been made with regard to DEI in the industry, but needs to accelerate in order to reach a point where Perry can say that it has been a “successful endeavor.”

“We are making a concerted effort with diversity, equity and inclusion that my board is very excited about, but I’ve been around long enough to know that it’s easier said than done,” Perry said.

Employee diversity is an integral part of the business practices of the Chicago Teachers’ Pension Fund, according to Lenoir.

“CTPF is committed to pursuing diversity and recognizes that the need for and benefits of diversity are amongst the cornerstones of a successful workplace. When hiring, the Fund strives to recruit individuals with diverse backgrounds, qualities, experiences and working styles which bring a richer set of ideas, perspectives and approaches to the workplace,” Lenoir said.

“We continue to encourage diversity and equality among our employees, vendors and investment professionals through policy and action,” he continued.

At the end of the day, we all look through a lens, according to Khan.

“The more lenses that you bring into an organization, I think the greater the chances of enhancing that organization, of having a more cohesive organization and ultimately, an organization that grows,” he said.

REPORT

AON Market Environment Report

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Market Environment

Second Quarter 2022

Aon

Investment advice and consulting services provided by Aon Investments USA Inc., an Aon Company.

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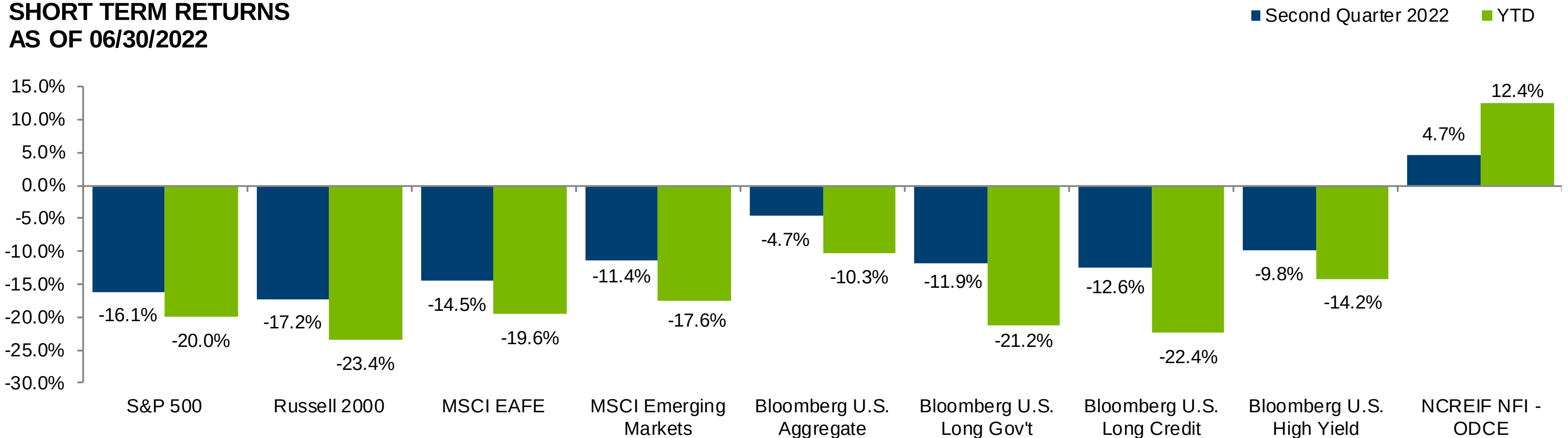
Market Highlights

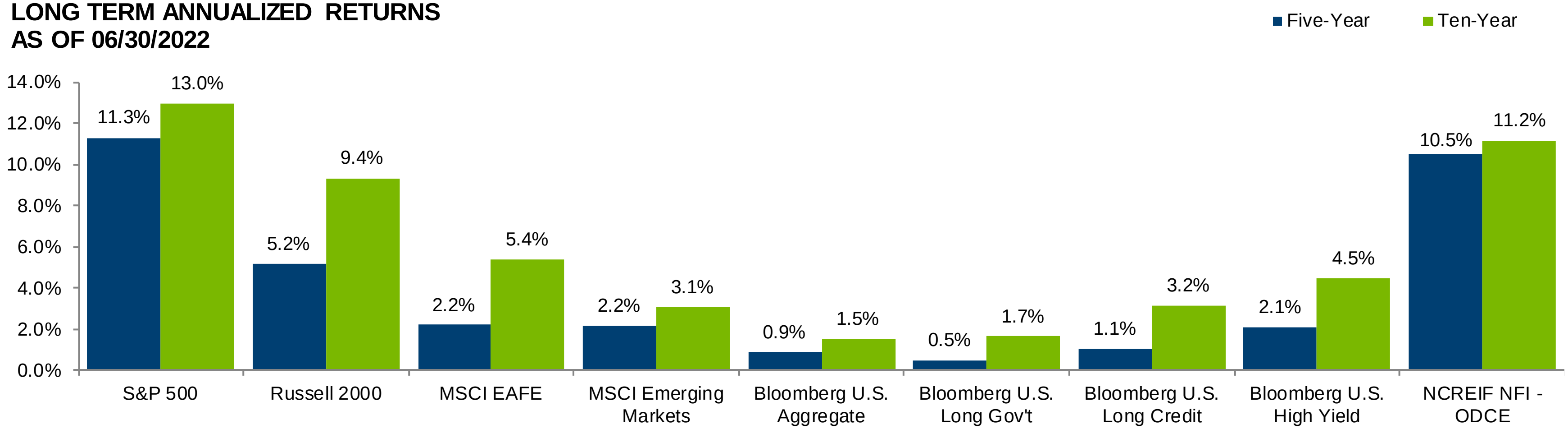
SHORT TERM RETURNS
AS OF 06/30/2022



Source: Russell, MSCI, Bloomberg

MSCI Indices show net total returns throughout this report. All other indices show gross total returns.

LONG TERM ANNUALIZED RETURNS
AS OF 06/30/2022



Source: Russell, MSCI, Bloomberg

Note: MSCI Indices show net total returns throughout this report. All other indices show gross total returns.

Market Highlights

Returns of the Major Capital Markets

Period Ending 06/30/2022

	Second Quarter	YTD	1-Year	3-Year[1]	5-Year[1]	10-Year[1]
Equity						
MSCI All Country World IMI	-15.83%	-20.44%	-16.52%	5.98%	6.70%	8.71%
MSCI All Country World	-15.66%	-20.18%	-15.75%	6.21%	7.00%	8.76%
Dow Jones U.S. Total Stock Market	-16.84%	-21.33%	-14.24%	9.61%	10.48%	12.47%
Russell 3000	-16.70%	-21.10%	-13.87%	9.77%	10.60%	12.57%
S&P 500	-16.10%	-19.96%	-10.62%	10.60%	11.31%	12.96%
Russell 2000	-17.20%	-23.43%	-25.20%	4.21%	5.17%	9.35%
MSCI All Country World ex-U.S. IMI	-14.28%	-19.08%	-19.86%	1.55%	2.50%	5.01%
MSCI All Country World ex-U.S.	-13.73%	-18.42%	-19.42%	1.35%	2.50%	4.83%
MSCI EAFE	-14.51%	-19.57%	-17.77%	1.07%	2.20%	5.40%
MSCI EAFE (Local Currency)	-7.83%	-11.27%	-6.59%	4.37%	4.27%	8.33%
MSCI Emerging Markets	-11.45%	-17.63%	-25.28%	0.57%	2.18%	3.06%
Equity Factors						
MSCI World Minimum Volatility (USD)	-9.54%	-6.01%	-6.01%	3.58%	6.55%	9.01%
MSCI World High Dividend Yield	-8.48%	-8.06%	-3.32%	5.61%	6.40%	8.36%
MSCI World Quality	-16.80%	-23.79%	-15.83%	10.16%	11.43%	12.01%
MSCI World Momentum	-17.98%	-22.60%	-17.21%	6.97%	10.48%	11.72%
MSCI World Enhanced Value	-11.97%	-12.92%	-10.00%	3.69%	3.72%	7.91%
MSCI World Equal Weighted	-15.62%	-19.93%	-17.78%	3.23%	4.29%	8.11%
MSCI World Index Growth	-21.14%	-28.71%	-22.22%	8.67%	10.32%	11.42%
MSCI USA Minimum Volatility (USD)	-9.15%	-12.56%	-3.21%	6.34%	9.64%	11.65%
MSCI USA High Dividend Yield	-7.45%	-8.84%	-0.84%	7.16%	8.44%	11.19%
MSCI USA Quality	-16.19%	-23.60%	-15.21%	11.05%	13.11%	13.86%
MSCI USA Momentum	-18.02%	-24.04%	-20.02%	5.88%	10.32%	13.44%
MSCI USA Enhanced Value	-12.85%	-16.12%	-11.31%	6.67%	7.14%	11.66%
MSCI USA Equal Weighted	-16.45%	-20.57%	-15.25%	7.72%	8.62%	11.84%
MSCI USA Growth	-22.94%	-29.88%	-21.80%	12.43%	14.09%	14.69%
Fixed Income						
Bloomberg Global Aggregate	-8.26%	-13.91%	-15.25%	-3.22%	-0.55%	0.11%
Bloomberg U.S. Aggregate	-4.69%	-10.35%	-10.29%	-0.93%	0.88%	1.54%
Bloomberg U.S. Long Gov't	-11.89%	-21.20%	-18.42%	-2.94%	0.50%	1.65%
Bloomberg U.S. Long Credit	-12.59%	-22.40%	-21.36%	-2.44%	1.05%	3.17%
Bloomberg U.S. Long Gov't/Credit	-12.27%	-21.88%	-20.14%	-2.32%	1.03%	2.63%
Bloomberg U.S. TIPS	-6.08%	-8.92%	-5.14%	3.04%	3.21%	1.73%
Bloomberg U.S. High Yield	-9.83%	-14.19%	-12.81%	0.21%	2.10%	4.47%
Bloomberg Global Treasury ex U.S.	-11.44%	-17.19%	-19.67%	-5.89%	-2.12%	-1.46%
JP Morgan EMBI Global (Emerging Markets)	-10.55%	-18.83%	-19.25%	-4.33%	-1.00%	2.05%
Commodities						
Bloomberg Commodity Index	-5.66%	18.44%	24.27%	14.34%	8.39%	-0.82%
Goldman Sachs Commodity Index	2.01%	35.80%	45.05%	14.69%	11.67%	-1.83%
Hedge Funds						
HFRI Fund-Weighted Composite[2]	-4.94%	-5.86%	-5.82%	6.10%	5.05%	4.96%
HFRI Fund of Funds[2]	-3.61%	-6.28%	-5.19%	4.05%	3.69%	3.78%
Real Estate						
NAREIT U.S. Equity REITS	-17.00%	-20.20%	-6.27%	4.00%	5.30%	7.39%
NCREIF NFI - ODCE	4.70%	12.42%	29.50%	12.66%	10.54%	11.16%
FTSE Global Core Infrastructure Index	-8.64%	-5.37%	2.88%	5.73%	7.78%	9.06%
Private Equity						
Burgiss Private iQ Global Private Equity[3]			35.76%	25.94%	21.26%	16.77%

MSCI Indices show net total returns throughout this report. All other indices show gross total returns.

[1] Periods are annualized.

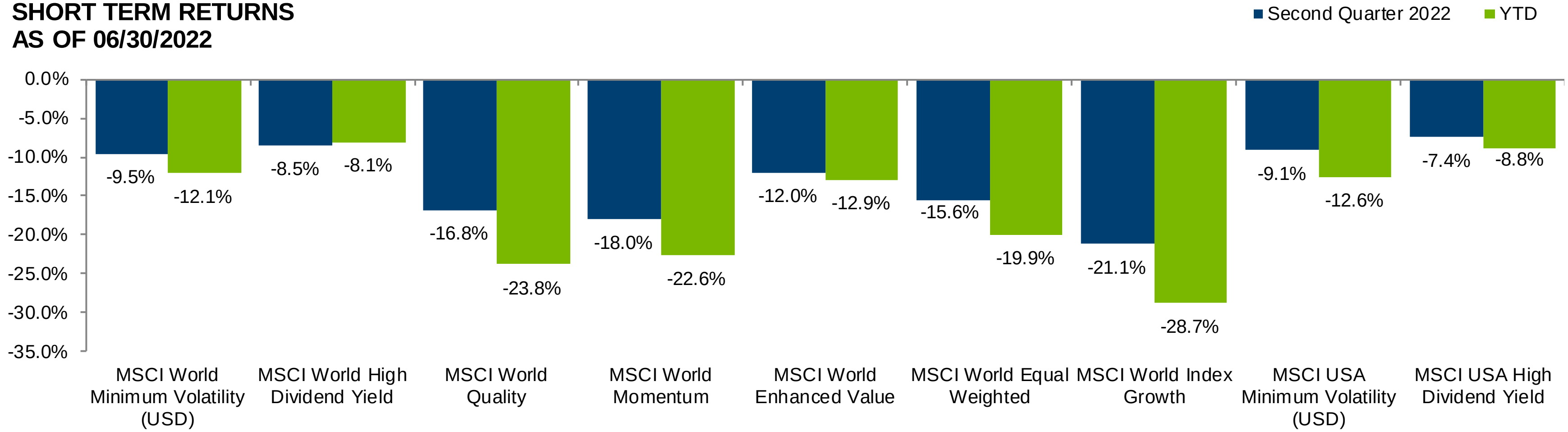
[2] Latest 5 months of HFR data are estimated by HFR and may change in the future.

[3] Burgiss Private iQ Global Private Equity data is as at December 31, 2021

MSCI Indices show net total returns throughout this report. All other indices show gross total returns.
[1] Periods are annualized.
[2] Latest 5 months of HFR data are estimated by HFR and may change in the future.
[3] Burgiss Private iQ Global Private Equity data is as at September 30, 2021

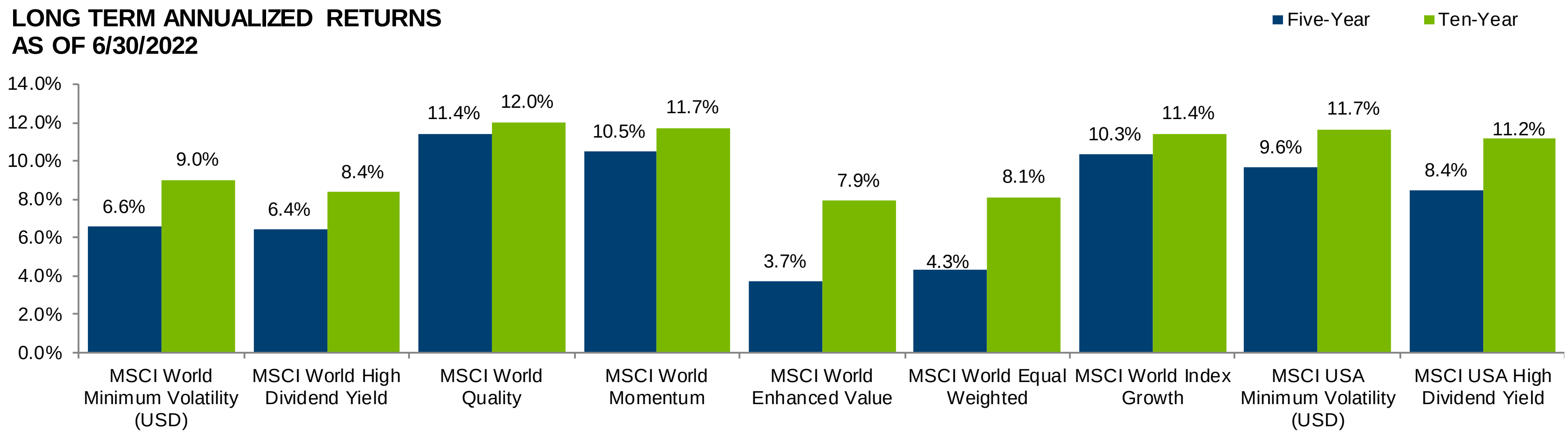
Factor Indices

SHORT TERM RETURNS AS OF 06/30/2022



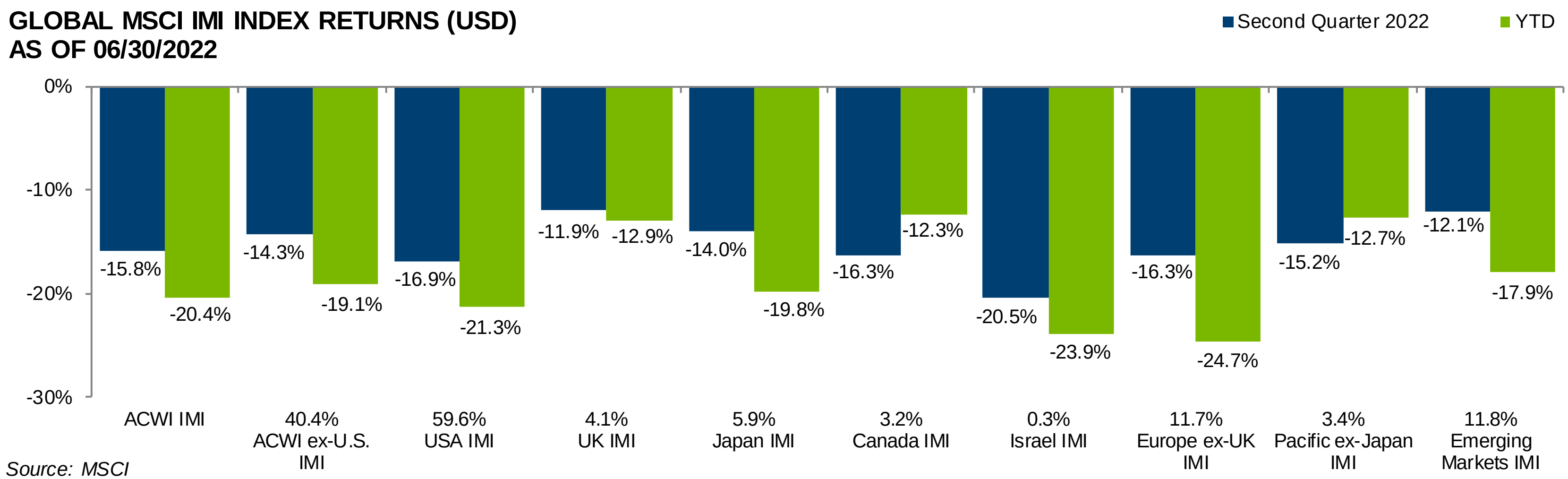
Source: MSCI

LONG TERM ANNUALIZED RETURNS AS OF 6/30/2022



Source: MSCI

Global Equity Markets



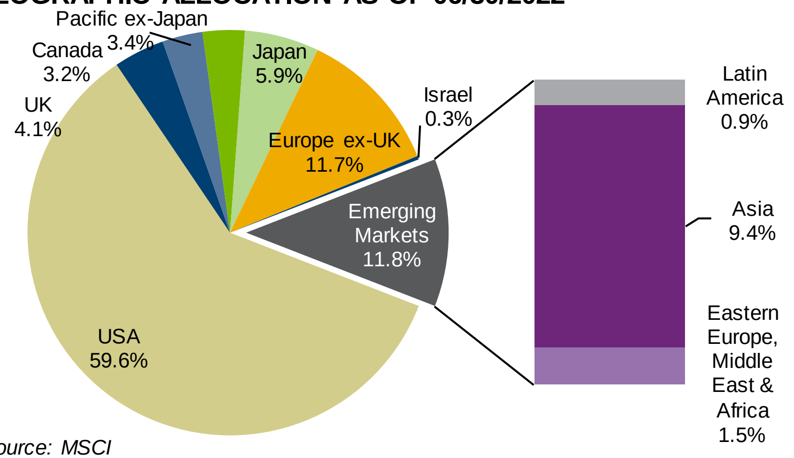
Source: MSCI

- In Q2 2022 capital markets were dominated by geopolitical uncertainty and higher interest rates amidst soaring inflation. Volatility remained elevated throughout the quarter. U.S. equities were sharply down over the quarter with major equity indices entering correction territory. The MSCI All Country World Investable Market Index (ACWI IMI) returned -15.8% for the quarter and was down 20.4% on a year-to-date basis.
- Across international markets, all the regions were weak over the quarter, with almost all major equity regions posting double-digit losses.
- Europe ex-UK equities were the second worst regional performer with a return of -16.3% due to Europe's proximity and exposure to the fallout from the Russia-Ukraine conflict.
- Emerging Markets returned -12.1% for the second quarter with Brazilian and Korean equities weighing on the region. The Biden administration has put five Chinese companies on an export blacklist for supporting Russian military and defence companies. Meanwhile, the US cabinet has not reached a consensus on the issue of removing Trump-era tariffs on Chinese imports.

Global Equity Markets

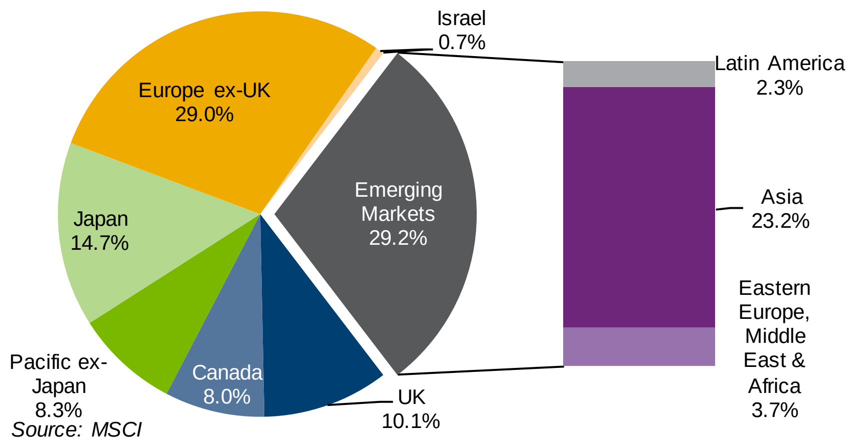
Below is the country/region breakdown of the global and international equity markets as measured by the MSCI All Country World IMI Index and the MSCI All Country World ex-U.S. IMI Index, respectively.

MSCI ALL COUNTRY WORLD IMI INDEX GEOGRAPHIC ALLOCATION AS OF 06/30/2022



Source: MSCI

MSCI ALL COUNTRY WORLD EX-U.S. IMI INDEX GEOGRAPHIC ALLOCATION AS OF 06/30/2022

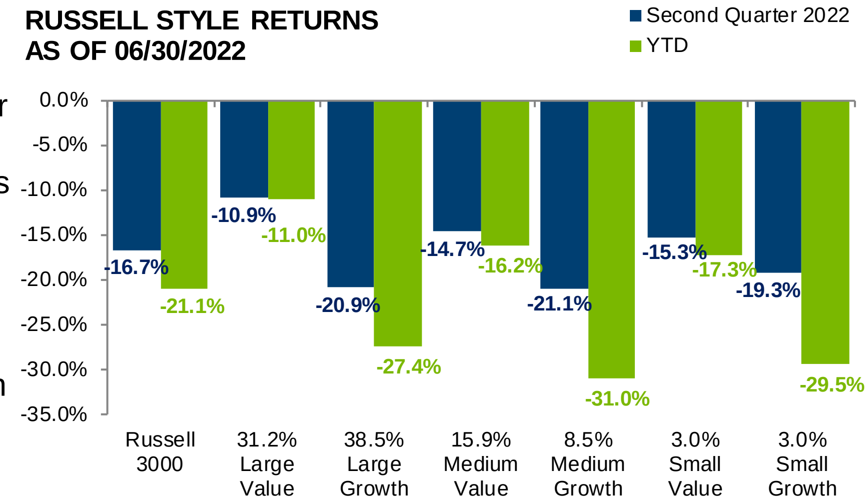


Source: MSCI

U.S. Equity Markets

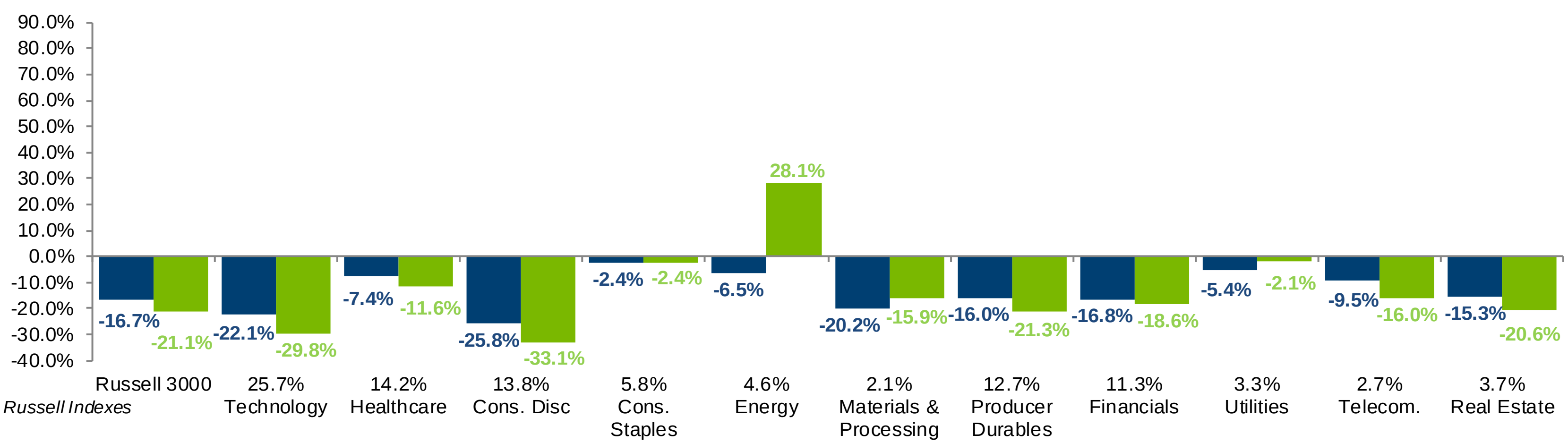
- U.S. equities had a weak quarter with the S&P 500 index falling by 16.1%.
- The Russell 3000 Index fell 16.7% during the second quarter and was down 21.1% on a year-to-date basis. Performance among sectors was negative. Consumer Staples and Utilities were the best performers while the Consumer Discretionary and Technology sectors were the worst performers.
- Large cap stocks have outperformed medium cap stocks over the quarter. On a style basis, value outperformed growth across market capitalizations over the quarter and on a year-to-date basis.

RUSSELL STYLE RETURNS AS OF 06/30/2022



Source: Russell Indexes

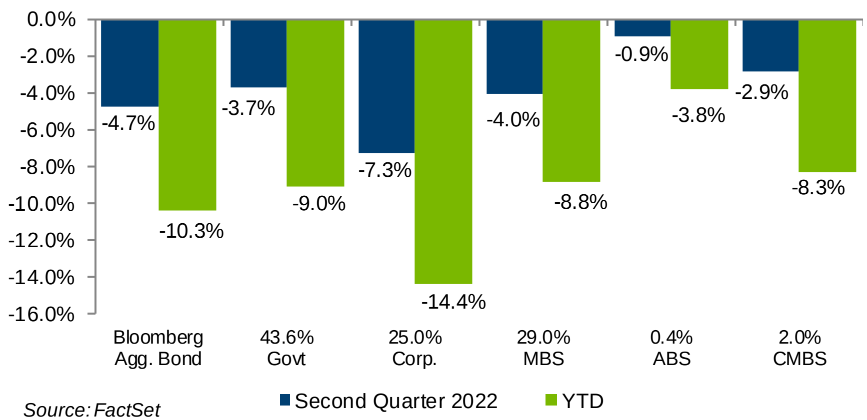
RUSSELL SECTOR RETURNS AS OF 06/30/2022



Source: Russell Indexes

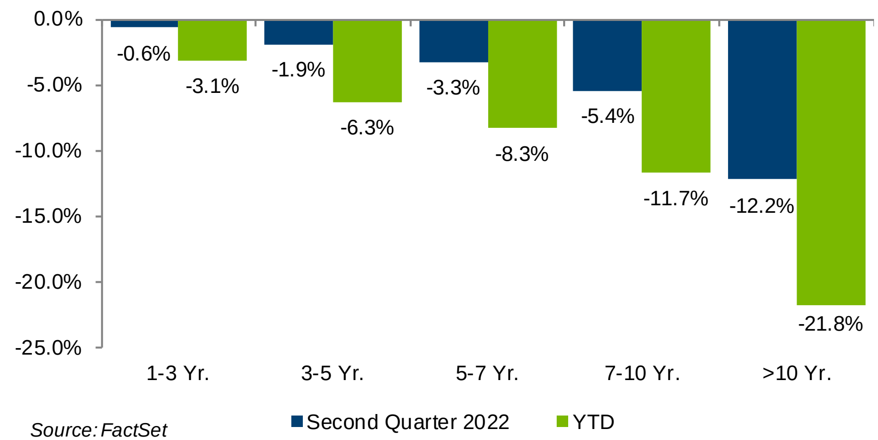
U.S. Fixed Income Markets

BLOOMBERG AGGREGATE RETURNS BY SECTOR AS OF 06/30/2022



Source: FactSet

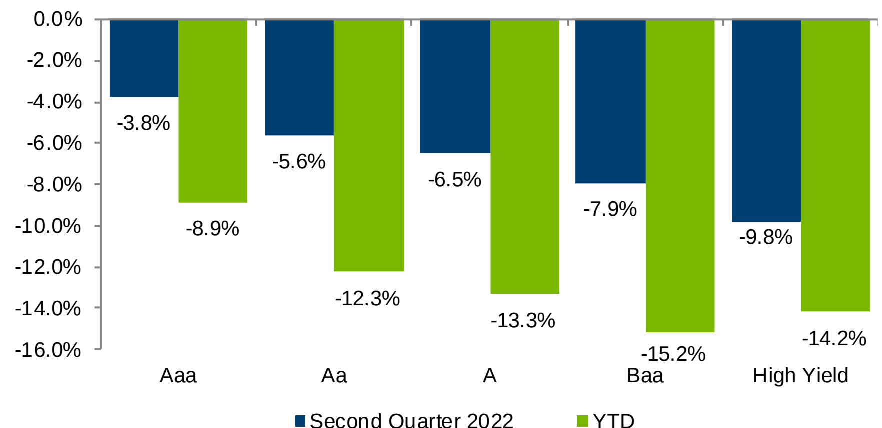
BLOOMBERG AGGREGATE RETURNS BY MATURITY AS OF 06/30/2022



Source: FactSet

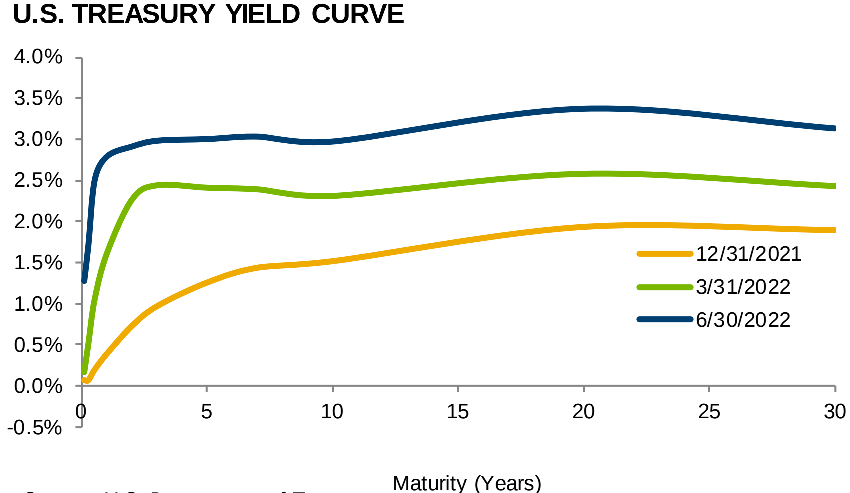
- The Bloomberg U.S. Aggregate Bond Index was down 4.7% over the quarter and 10.3% on a year-to-date basis.
- Across durations, all maturities finished the quarter in negative territory.
- Within investment-grade bonds, lower-credit quality underperformed higher-quality issues, with Baa bonds falling by 7.9%. High-yield bonds fell by 9.8%.

BLOOMBERG AGGREGATE RETURNS BY QUALITY AND HIGH YIELD RETURNS AS OF 06/30/2022

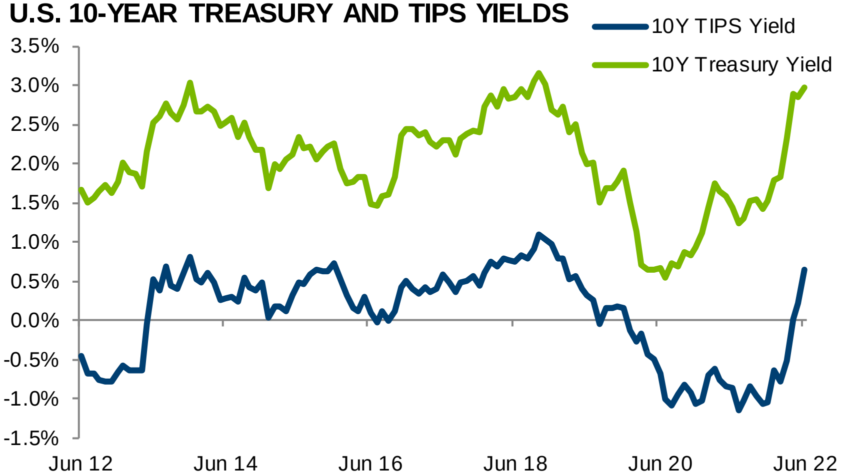


Source: FactSet

U.S. Fixed Income Markets



Source: U.S. Department of Treasury

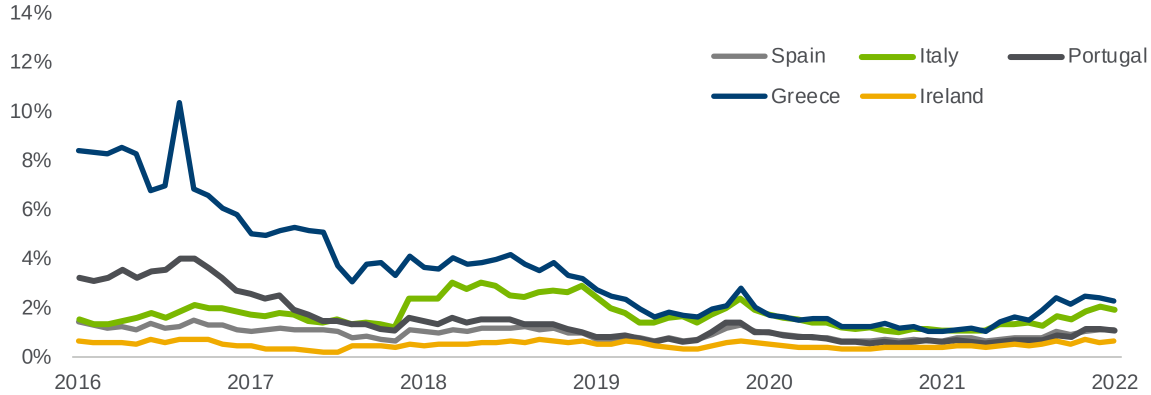


Source: U.S. Department of Treasury

- U.S. Treasury yields saw notable increases across the maturities which moved the yield curve upwards over the quarter. The 10-year Treasury yield was up 66bps to 2.98%, and the 30-year Treasury yield was up 70bps to 3.14% over the quarter.
- As expected, the U.S. Federal Reserve (Fed) increased its benchmark interest rate by 75bps to a range of 1.50-1.75%, the largest rate increase since 1994. Fed chair Jay Powell indicated that a rate hike of 50bps or 75bps is also imminent at the July meeting. According to the median estimate on the Fed dot plot, officials expect the interest rate to reach 3.4% by the end of the year. The Fed announced its plans to shrink its $9 trillion balance sheet in a phased manner by stopping the reinvestment of proceeds from maturing securities from June. The Fed will allow $30 billion of Treasuries and $17.5 billion of mortgage-backed securities (MBS) to mature every month from June. After three months, this pace will increase to $60 billion in Treasuries and $35 billion in MBS.
- Inflation remained elevated as energy and food prices accelerated sharply due to supply-chain disruptions, which have been exacerbated by Russia’s invasion of Ukraine. The U.S. annual consumer price index (CPI) remained at a 40-year high as it rose 8.6% year on year in May.
- The 10-year TIPS yield rose by 117bps over the quarter to 0.65%.

European Fixed Income Markets

EUROZONE PERIPHERAL BOND SPREADS (10-YEAR SPREADS OVER GERMAN BUNDS)



Source: FactSet

- European government bond spreads over 10-year German bunds widened across the Euro Area. The European Central Bank (ECB) president Christine Lagarde signaled that the central bank might raise rates by 50bps in September "if the inflation outlook persists or deteriorates", in addition to a planned 25bps hike in July. However, later in the quarter, the ECB held an emergency meeting to tackle the issue of widening spreads between the bond yields of core and peripheral Eurozone countries after the yields of countries like Italy and Spain touched their highest level in eight years. The ECB indicated that it would flexibly invest the proceeds from its €1.7tn asset purchase program to support peripheral countries with wider spreads.
- German government bund yields rose sharply, up 83bps to 1.38% over the quarter.
- Eurozone inflation hit an all-time high of 8.6% over the year to June.

Credit Spreads

Spread (bps)	06/30/2022	03/31/2022	12/31/2021	Quarterly Change (bps)	YTD Change (bps)
U.S. Aggregate	55	41	36	14	19
Long Gov't	-1	3	0	-4	-1
Long Credit	184	155	130	29	54
Long Gov't/Credit	101	88	74	13	27
MBS	46	24	31	22	15
CMBS	101	85	68	16	33
ABS	75	57	38	18	37
Corporate	155	116	92	39	63
High Yield	569	325	283	244	286
Global Emerging Markets	404	313	285	91	119

Source: FactSet, Bloomberg

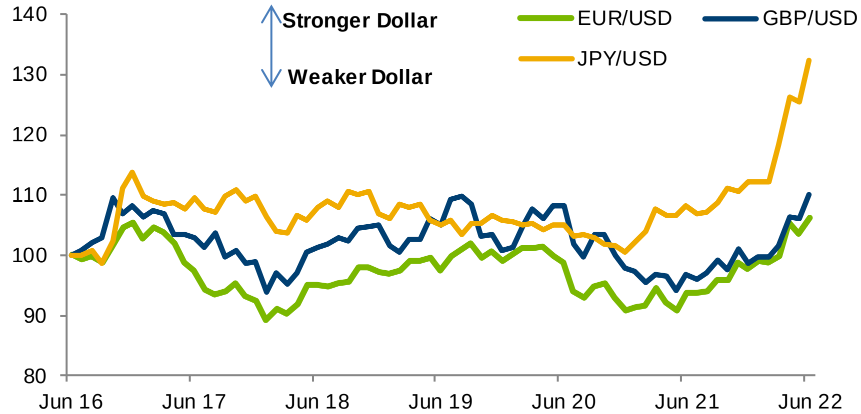
- Credit markets declined from risk-averse sentiment during the quarter, with spreads widening.
- High Yield and Global Emerging Markets spreads increased by 244bps and 91bps, respectively.

Currency

TRADE WEIGHTED U.S. DOLLAR INDEX (2006 = 100)

Source: Federal Reserve

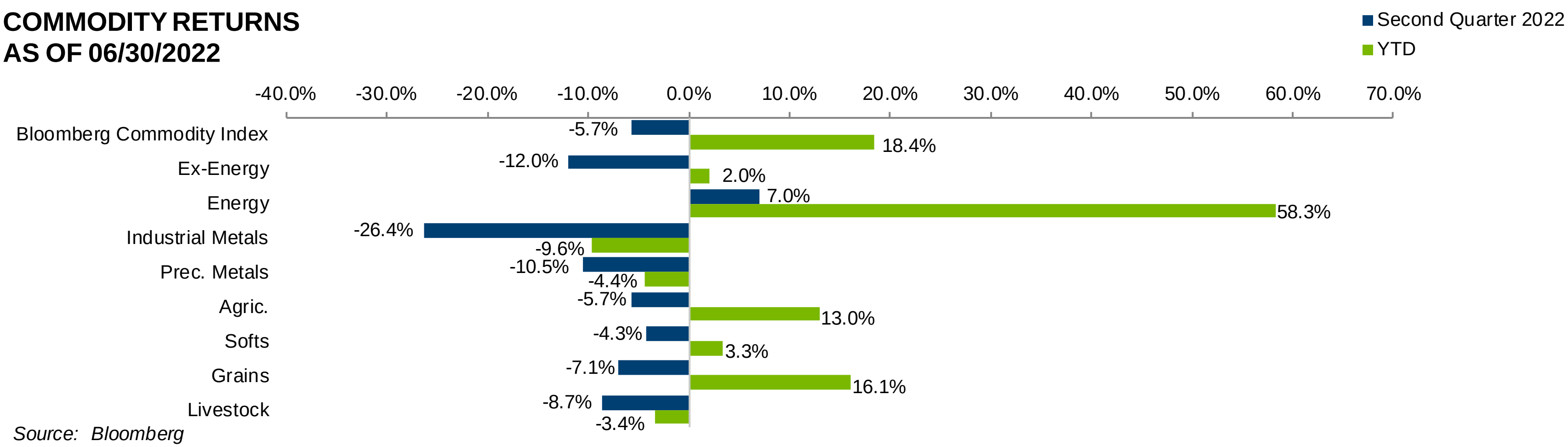
U.S. DOLLAR RELATIVE TO EUR, GBP AND JPY REBASED TO 100 AT 06/30/2016



Source: FactSet

- The U.S. Dollar strengthened against all major currencies over the quarter. On a trade-weighted basis, the U.S. dollar appreciated by 4.9%.
- The Sterling depreciated by 8.4% against the U.S. dollar. The Bank of England increased its benchmark interest rate for the second time this quarter, with the policy rate sitting at 1.25%, its highest level in 13 years.
- The U.S. dollar appreciated by 6.4% against the Euro.
- The US dollar appreciated by 11.9% against the yen as the Bank of Japan is still maintaining its ultra-loose monetary policy stance as compared to the current monetary tightening stance of other major central banks.

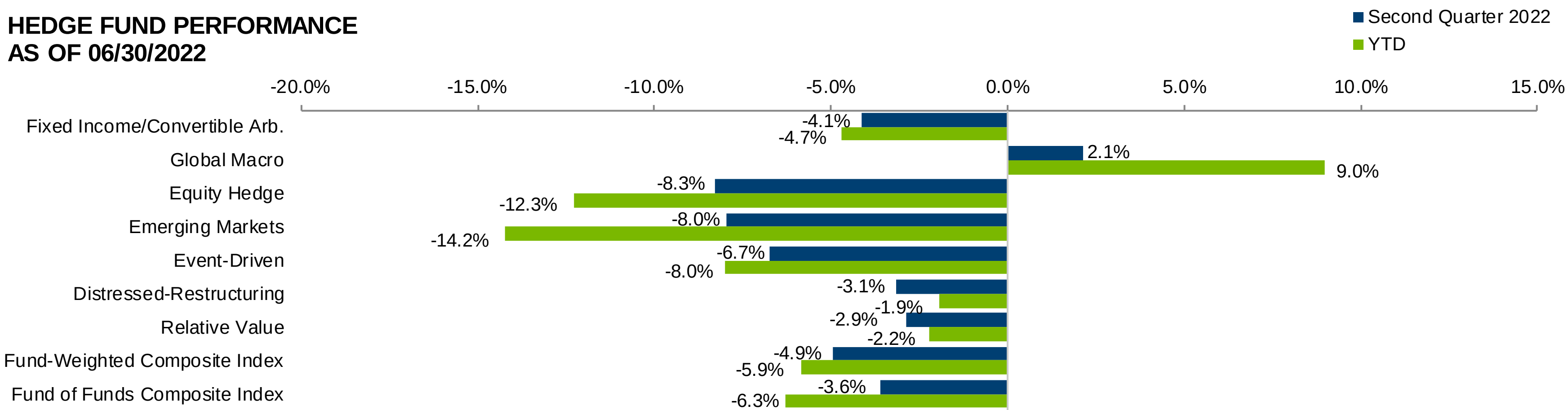
Commodities



Source: Bloomberg
Note: Softs and Grains are part of the wider Agriculture sector

- Commodity prices were pegged back later in the quarter, after rising for two consecutive months, with the Bloomberg Commodity Index falling by 5.7% for the quarter.
- Energy continued to have outsized gains, with the sector up 7.0% over the quarter and 58.3% on a year-to-date basis. The price of Brent crude oil rose by 6.4% to $115/bbl while WTI crude oil spot prices rose by 5.5% to $106/bbl over the quarter.
- Industrial Metals fell the most over the quarter at -26.4%.
- Meanwhile, OPEC+ agreed to a larger than expected oil production increase due to surging energy prices. The group decided to increase production by 648,000 barrels per day for July and August.

Hedge Fund Markets Overview

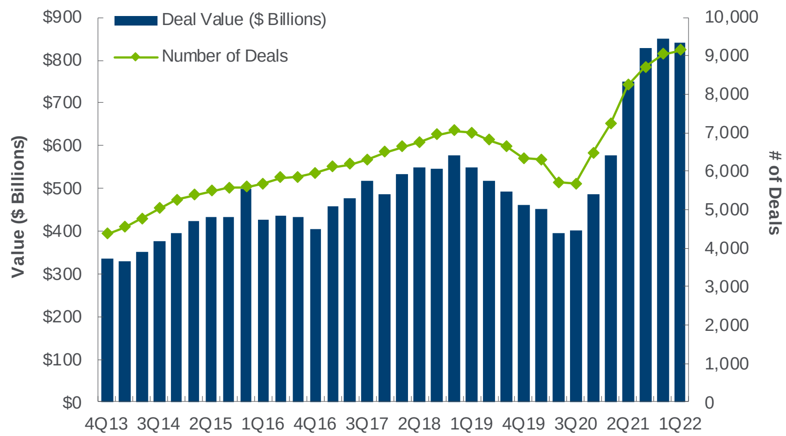


Note: Latest 5 months of HFR data are estimated by HFR and may change in the future.
Source: HFR

- Hedge fund performance was generally negative over the quarter, with only the Global Macro strategy outperforming.
- The HFRI Fund-Weighted Composite and HFRI Fund of Funds Composite Index produced returns of -4.9% and -3.6% over the quarter, respectively.
- Over the quarter, Global Macro was the only one to generate positive returns with returns of 2.1%.
- Equity Hedge and Emerging Markets strategies were the worst performers with returns of -8.3% and -8.0% respectively.
- On a year-to-date basis, all strategies, except for Global Macro, were negative.

Private Equity Market Overview – 1Q 2022

LTM Global Private Equity-Backed Buyout Deal Volume

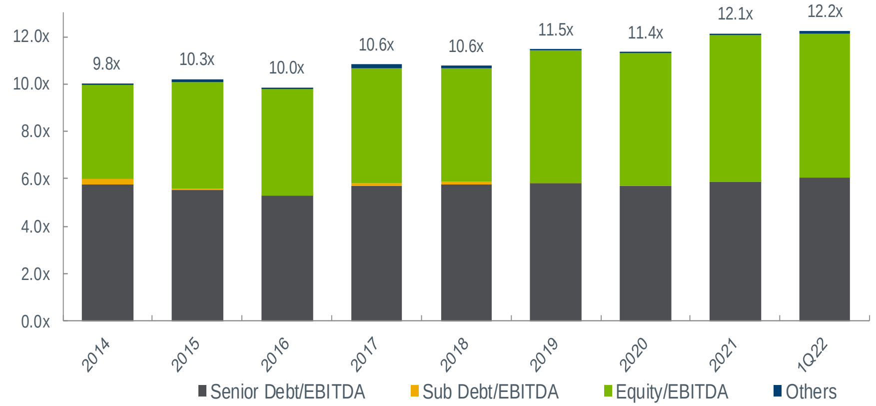


Source: Preqin

- **Fundraising:** During Q1 2022, $270.1 billion was raised by 482 funds, which was roughly equal to capital raised in Q4 2021 but 8.8% lower than capital raised in Q1 2021. Dry powder stood at $2.8 trillion at the end of the quarter, an increase of 0.9% and 28.5% compared to year-end 2021 and the five-year average, respectively.
- **Buyout:** Global private equity-backed buyout deals totaled $191.6 billion in Q1 2022, which was a decrease on a capital basis of 11.3% compared to Q4 2021, but an increase of 33.9% compared to the five-year quarterly average. At the end of Q1 2022, the average purchase price multiple for all U.S. LBOs was 12.2x EBITDA, up from year-end 2021's average of 11.4x and up from the five-year average (11.1x). Large cap purchase price multiples stood at 12.2x, up compared to Q4 2021 level's of 11.2x. The average purchase price multiple across European transactions greater than €1B averaged 11.6x EBITDA at the end of Q1 2022, equal to the multiple seen at year-end 2021. Purchase prices for transactions of €500M million or more remained stable at 11.5x EBITDA, equal to that seen at the end of 2021. Globally, exit value totaled $110.4 billion on 570 deals during the quarter, significantly lower than the $254.3 billion across 839 deals during Q4 2021.
- **Venture:** During the quarter, an estimated 3,723 venture-backed transactions totaling $70.7 billion were completed, which was a decrease on a capital and deal count basis over the prior quarter's total of $95.4 billion across 4,098 deals. This was an increase of 59.6% compared to the five-year quarterly average of $44.3 billion. Total U.S. venture-backed exit value totaled approximately $33.6 billion across an estimated 430 completed transactions in Q1 2022, down substantially from $192.5 billion across 537 exits in Q4 2021.
- **Mezzanine:** 6 funds closed on $10.7 billion during the quarter. This was a significant increase from the prior quarter's total of $1.6 billion raised by 7 funds and represented 80.6% of capital raised in full year 2021. Estimated dry powder was $50.0 billion at the end of Q1 2022, up from $48.3 billion at the end of 2021.

Private Equity Market Overview – 1Q 2022

U.S. LBO Purchase Price Multiples – All Transactions Sizes



Source: S&P

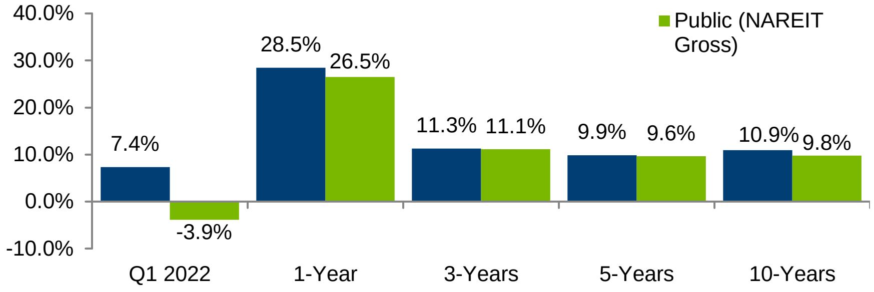
- **Distressed Debt:** The LTM U.S. high-yield default rate was 0.5% as of March 2022, which was in line with December 2021's LTM rate of 0.5%.4 The high-yield default rate is projected to trend higher through 2022. During the quarter, $3.9 billion was raised by 7 funds, down significantly from the $13.2 billion raised by 30 funds during Q4 2021. Dry powder was estimated at $145.3 billion at the end of Q1 2022, which was down 8.3% from year-end 2021. This remained above the five-year annual average level of $130.5 billion.
- **Secondaries:** 14 funds raised $5.3 billion during the quarter, down slightly from the $5.8 billion raised by 14 funds in Q4 2021. This was 50.1% lower than the five-year quarterly average of 10.6 billion.
- **Infrastructure:** $69.7 billion of capital was raised by 20 funds in Q1 2022 compared to $36.7 billion of capital raised by 24 partnerships in Q4 2021. At the end of the quarter, dry powder stood at $330.9 billion, up from last year's record of $313.0 billion. Infrastructure managers completed 566 deals for an aggregate deal value of $72.5 billion in Q1 2022 compared to 733 deals totaling $181.0 billion in Q4 2021.
- **Natural Resources:** During Q1 2022, an estimated 5 funds closed on $0.4 billion compared to 28 funds totaling $14.4 billion in 2021. Energy and utilities industry managers completed 55 deals totaling $33.0 billion in Q1 2022, compared to $34.7 billion across 223 deals in 2021.

Sources: [1] Preqin [2] Standard & Poor's [3] PwC/CB Insights MoneyTree Report [4] PitchBook/NVCA Venture Monitor [5] Fitch Ratings [6] Thomson Reuters [7] UBS

Notes: FY=Fiscal year ended 12/31; YTD=Year to date; LTM=Last 12 months (aka trailing 12 months); PPM=Purchase Price Multiples: Total Purchase Price ÷ EBITDA.

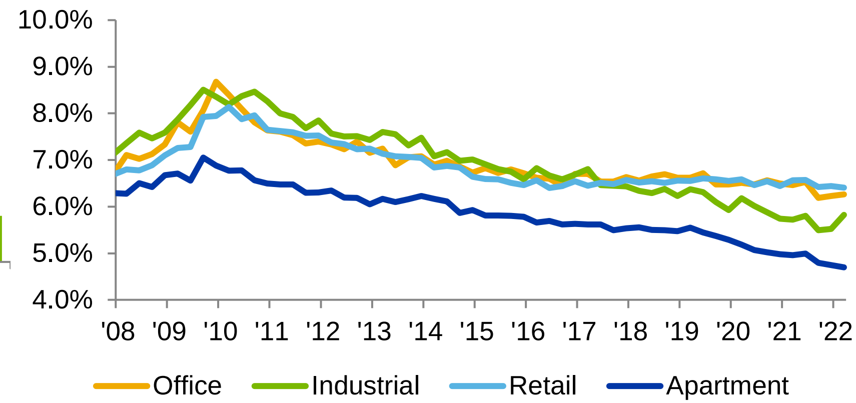
U.S. Commercial Real Estate Markets (TO BE UPDATED)

PRIVATE VS. PUBLIC REAL ESTATE RETURNS AS OF 03/31/2022



**First quarter returns are preliminary*
Sources: NCREIF, FactSet

CAP RATES BY SECTOR



Sources: RCA, AON 3/31/2022

- U.S. Core Real Estate returned 7.4%* in first quarter 2022, equating to a 28.5% total gross return year-over-year. Townsend witnessed a robust recovery across the US economy and US real estate markets in 2021, with a continuation through the first quarter of 2022. Real estate capital markets are highly liquid and competitive for in vogue sectors but have also been surprisingly strong for less favored sectors. Capital raising has exceeded pre-pandemic levels and even exceeded historical highs, resulting in a continued build up of dry powder in the market.
- Global property markets, as measured by the FTSE EPRA/NAREIT Developed Real Estate Index, returned -3.8% (USD) in aggregate during the first quarter and experienced a cumulative increase of 15.4% over the trailing 1-year period. REIT market performance was driven by Asia Pacific (-0.8% USD), North America (-3.9% USD), and Europe (-7.1% USD). The U.S. REIT markets (FTSE NAREIT Equity REITs Index) returned -3.9% in the first quarter. The U.S. 10-year treasury bond yields steepened to 2.3% during the quarter, an increase of 80 basis points over year-end 2021.
- In first quarter 2022, deal volumes across all sectors moderated from a historic high in fourth quarter 2021. The demand for modern logistics networks has outpaced development and now low-single-digit vacancy rates are common across major markets in the US. A mismatch of supply and demand is driving strong rent growth in the industrial sector, as e-commerce still only accounts for approximately 15% of retail sales and is forecasted to grow at close to 10% per annum between 2022-2025. Significant demand combined with an undersupply of modern assets continues to support the development modern logistics properties and refurbishment of well-located older product.
- The strong global economic rebound has stoked inflation beyond economists' expectations and persistent supply chain disruption has been slow to resolve. Commercial real estate construction has been particularly impacted by supply chain disruption and witnessed material prices increases well beyond CPI. Key materials inputs for commercial and residential construction have seen substantial price increases, including Lumber, Copper, and Steel. Real estate provides an inflationary hedge, and the trend is already prevalent in industrial, apartment, and life sciences in terms of rising rent growth. However, not all sectors will benefit from hedge. Office fundamentals likely to remain weak in the near-term
- Townsend has identified high conviction investment themes that are predicated on secular growth trends and strong underlying real estate market fundamentals. These investment themes have commonalities such as anticipated tenant demand growth, natural barriers to supply, and operating complexity that are anticipated to persist medium to long-term.

*Indicates preliminary NFI-ODCE data gross of fees

Notes

1. Preqin
2. Standard & Poors
3. PitchBook/National Venture Capital Association Venture Monitor
4. Fitch Ratings

Notes:

FY: Fiscal year ended 12/31

YTD: Year to date

YE: Year end

LTM: Last twelve months (aka trailing twelve months or TTM)

PPM: Purchase Price Multiples: Total Purchase Price / EBITDA

/bbl: Price per barrel

MMBtu: Price per million British thermal units

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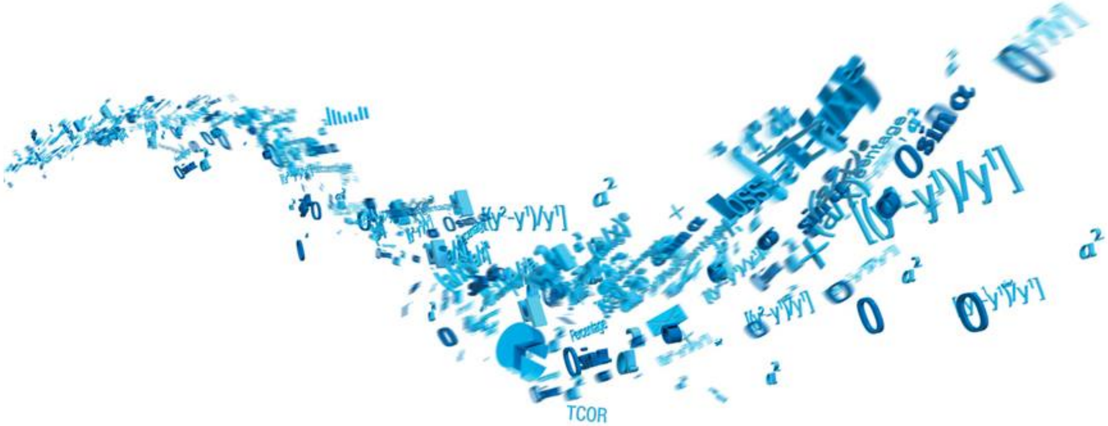
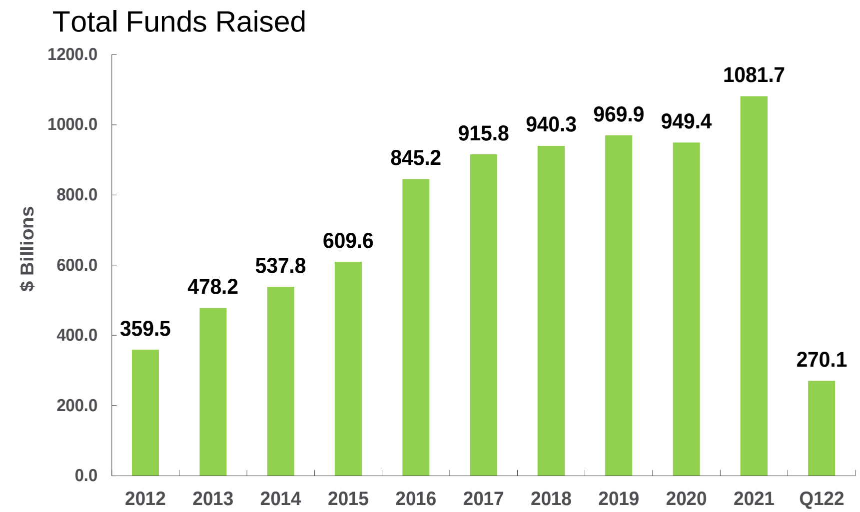


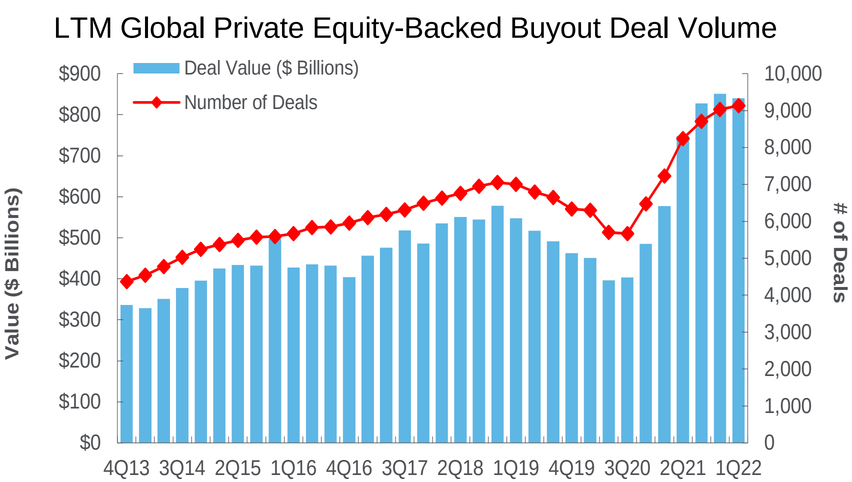
Appendix A:

Global Private Equity Market Overview
1Q 2022

Private Equity Overview



Source: Preqin



Source: Preqin

Fundraising

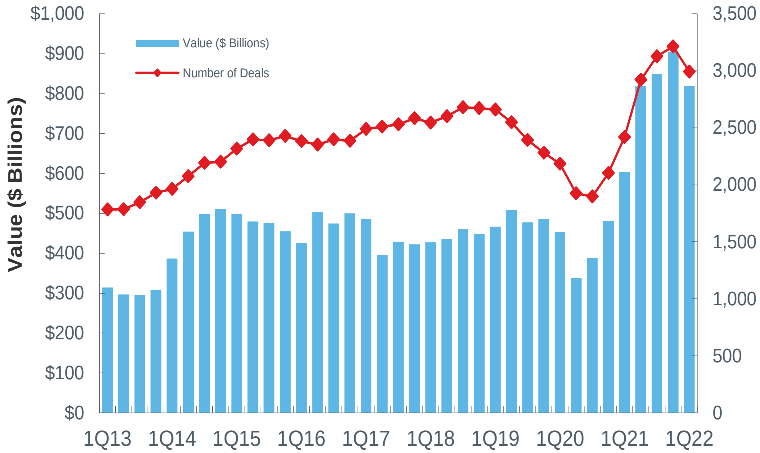
- During Q1 2022, $270.1 billion was raised by 482 funds, which was roughly equal to capital raised in Q4 2021 but 8.8% lower than capital raised in Q1 2021. Capital raised through 1Q 2022 represented 25.0% of capital raised during calendar year 2021.[1]
  - 1Q 2022 fundraising was 8.8% lower, on a capital basis, than capital raised in 1Q 2021 and 41.7% lower by number of funds raised.
  - The majority of capital was raised by funds with target geographies in North America, comprising 72.8% of the quarter's total. This was up from 52.7% in 4Q 2021. Capital targeted for Europe made up 17.6% of the total funds raised during the quarter, a decrease from 28.7% in 4Q 2021. The remainder was attributable to managers targeting Asia and other parts of the world.
- Dry powder stood at nearly $2.8 trillion at the end of the quarter, roughly flat with that seen at year-end 2021.[1]

Activity

- Global private equity-backed buyout deals totaled $191.6 billion in 1Q 2022, which was down 11.3% on a capital basis and down 8.0% by number of deals from 4Q 2021.[1]
  - This was 33.9% higher than the five-year quarterly average deal value of $143.1 billion.
  - Average deal size was $501.6 million in 1Q 2022. This was down 0.5% compared to 4Q 2021 and up 11.3% relative to the five-year quarterly average.
- European sponsored loan issuance decreased to €15.1 during Q1 2022 compared to €32.6 during Q1 2021. This was 16.3% lower than the five-year quarterly average level of €18.0 billion.[3]
- Through 1Q 2022, the average purchase price multiple for all U.S. LBOs was 12.2x EBITDA, an increase of 0.8x over 2021's average.[2] Large cap purchase price multiples stood at 12.2x through 1Q 2022, up compared to 2021's level of 11.2x.[2]
  - Average purchase price multiples for all U.S. LBOs were 1.0x and 1.8x turns (multiple of EBITDA) above the five- and ten-year average levels, respectively.
- In Europe, the average purchase price multiple across European transactions of greater than €500M averaged 11.5x EBITDA as of 1Q 2022, equal to that seen at the end of 4Q 2021. Purchase prices for transactions of greater than €1.0 billion averaged 11.6x EBITDA, also equal to the value seen at the end of Q4 2021.[3]
- Debt remained broadly available in the U.S.
  - The average leverage for U.S. deals through 1Q 2022 was 6.0x compared to the five and ten-year averages of 5.8x and 5.6x, respectively.[3]
  - The amount of debt issued supporting new transactions increased compared to the prior quarter, moving from 61.9% to 78.2%, and was higher than the five-year average of 65.0%.[3]
- In Europe, the average senior debt/EBITDA on an LTM basis ended 1Q 2022 at 5.9x, up from the 5.8x observed at 4Q 2021.

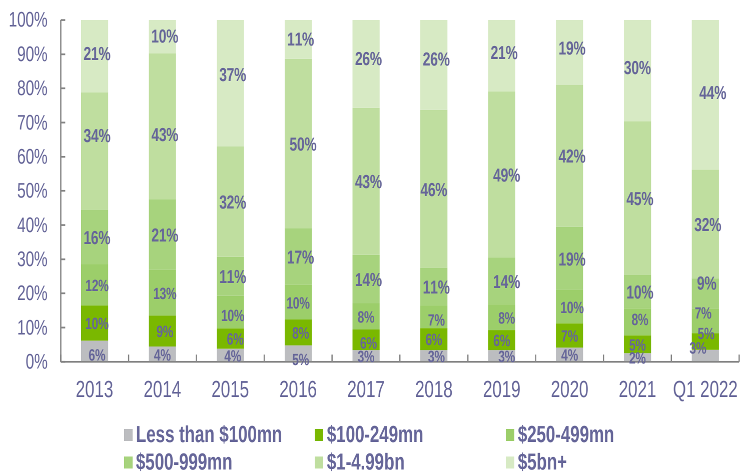
Buyouts / Corporate Finance

LTM PE Exit Volume and Value



Source: Preqin

M&A Deal Value by Deal Size



Source: Preqin

Fundraising

- $105.8 billion was closed on by 121 buyout and growth funds in 1Q 2022, compared to $105.8 billion raised by 197 funds in 4Q 2021, equal in value to the prior quarter. This was lower than the $132.3 billion raised by 204 funds in 1Q 2021.[1]
  - This was also lower than the five-year quarterly average of $112.3 billon and 183 funds.
  - Insight Partners XII was the largest fund raised during the quarter, closing on $17.0 billion of commitments.[1]
- Buyout and growth equity dry powder was estimated at $1.1 trillion, slightly lower than 4Q 2021.[1]
- Small, medium, and large cap buyout funds increased in dry powder compared to 4Q 2021 by 1.0%, 1.0% and 4.0%, respectively. Mega cap buyout funds had amassed $398.4 billion in dry powder at the end of the quarter, down 9.4% compared to 4Q 2021.[1]
  - An estimated 54.4% of buyout dry powder was targeted for North America, while European dry powder comprised 22.4% and Asia/Rest of World accounted for the remainder.[1]

Activity

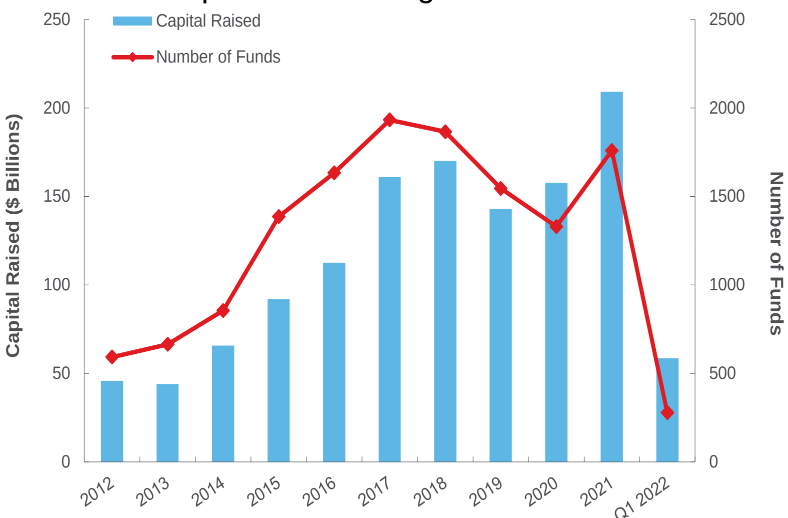
- Global private equity-backed buyout deals totaled $191.6 billion in 1Q 2022, which was a decrease on a capital basis of 11.3% compared to 4Q 2021, but an increase of 33.9% compared to the five-year quarterly average.[1]
- Through 1Q 2022, deal value accounted for 22.5% of 2021's total buyout activity and represented 94.4% of deal value during the same period in 2021.[1]
  - Through 1Q 2022, deals valued at $5.0 billion or greater accounted for an estimated 43.7% of total deal value compared to 18.9% through 1Q 2021 and 29.6% in 2021.[1] Deals valued between $1.0 billion to $4.99 billion represented 31.8% of total deal value through the first quarter.[1]
  - By geography, North American deals accounted for the largest percentage of total deal value at an estimated 68.3% through 1Q 2022, while Information Technology deals accounted for the largest percentage by industry at 23.4% of total deal value. [1]
- At the end of 1Q 2022, the average purchase price multiple for all U.S. LBOs was 12.2x EBITDA, up from year-end 2021's average of 11.4x and up from the five-year average (11.1x). [3]
  - Large cap purchase price multiples stood at 12.2x, up compared to the full-year 2021 level of 11.2x.[3]
  - The average purchase price multiple across European transactions greater than €1B averaged 11.6x EBITDA at the end of 1Q 2022, equal to the multiple seen at year-end 2021. Purchase prices for transactions of €500M million or more remained stable at 11.5x EBITDA, equal to that seen at the end of 2021.[3]
  - The portion of average purchase prices financed by equity for all deals was 50.0% through 1Q 2022, down slightly from 50.8% through 4Q 2021. This remained above the five- and ten-year average levels of 47.9% and 45.1%, respectively.[3]
- Globally, exit value totaled $110.4 billion on 572 deals during the quarter, significantly lower than the $254.3 billion across 839 deals during 4Q 2021. 1Q 2022's totals were also lower than 1Q 2021's totals of $195.5 billion in value across 793 deals.[1]

Opportunity [4]

- Managers targeting the middle and large markets with expertise across business cycles.

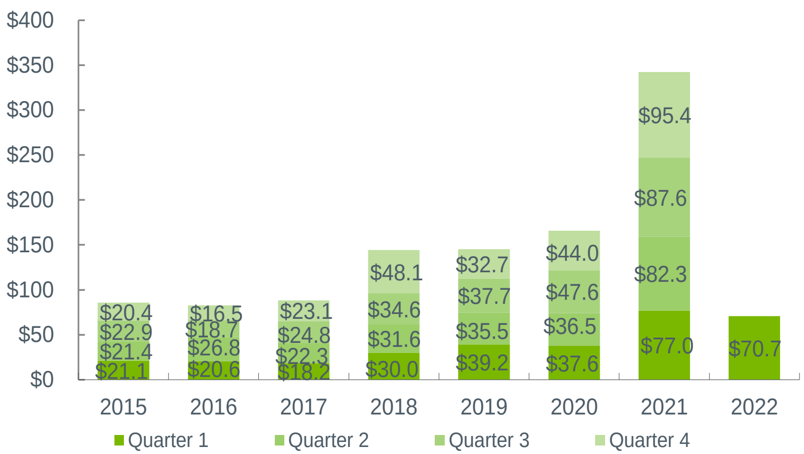
Venture Capital

Venture Capital Fundraising



Source: Preqin

U.S. Venture Capital Investments by Quarter ($B)



Source: Pitchbook / NVCA Venture Monitor

Fundraising

- $58.5 billion of capital was raised by 278 funds in 1Q 2022, up from the prior quarter's total of $52.3 billion raised by 471 managers. However, this was down from 1Q 2021's amount of $64.5 billion raised by 419 funds. 1Q 2022's capital raised represented 28.0% of 2021's total.[1]
  - 1Q 2022 fundraising was 39.3% higher, on a capital basis, compared to the five-year quarterly average of $42.0 billion.
  - Tiger Global Private Investment Partners XV was the largest fund raised during the quarter, closing on $12.7 billion.
- At the end of 1Q 2022, there were an estimated 4,109 funds in market targeting $315.3 billion.[1]
  - Alpha Wave Ventures II was the largest venture fund in market, targeting an estimated $10.0 billion.
  - The majority of funds in market are seeking commitments of $200.0 million or less.
- Dry powder was estimated at $483.2 billion at the end of 1Q 2022, up from 4Q 2021's total of $439.5 billion.[1]

Activity

- During the quarter, an estimated 3,723 venture-backed transactions totaling $70.7 billion were completed, which was a decrease on a capital and deal count basis over the prior quarter's total of $95.4 billion across 4,098 deals. This was an increase of 59.6% compared to the five-year quarterly average of $44.3 billion.[7]
  - In 1Q 2022, there were 134 U.S.-based deals involving unicorn companies, representing roughly $27.3 billion in deal value. This was down by value and by number compared to 4Q 2021, which saw 166 unicorn-related deals close at a deal value of $40.4 billion. 1Q 2022 represented the lowest quarter by value and number since 4Q 2020.[7]
- At the end of 1Q 2021, median pre-money valuations increased across Seed, Series A, and Series B. Compared to 4Q 2021, Seed transactions increased to a median pre-money valuation of $21.0 million from $18.7 million, Series A increased from $51.8 million to $78.0 million, and Series B increased from $171.5 million to $285.2 million. Series C and Series D+ median pre-money valuations decreased during the quarter, with Series C dropping from $567.0 million to $528.7 million and Series D+ dropping from $1.9 billion to $1.3 billion.[8]
- Total U.S. venture-backed exit value totaled approximately $33.6 billion across an estimated 430 completed transactions in 1Q 2022, down substantially from $192.5 billion across 537 exits in 4Q 2021. Through 1Q 2022, U.S. exit activity represented only 4.3% of 2021's total.[7]
  - The number of U.S. venture-backed initial public offerings decreased over 4Q 2021, with only 28 IPOs completed in 1Q 2022. 224 exits occurred by acquisition, marking a decrease over the prior quarter's 288, and accounted for only $9.5 billion in exit value. IPOs accounted for $23.8 billion in value compared to $167.8 billion in the prior quarter.[7]

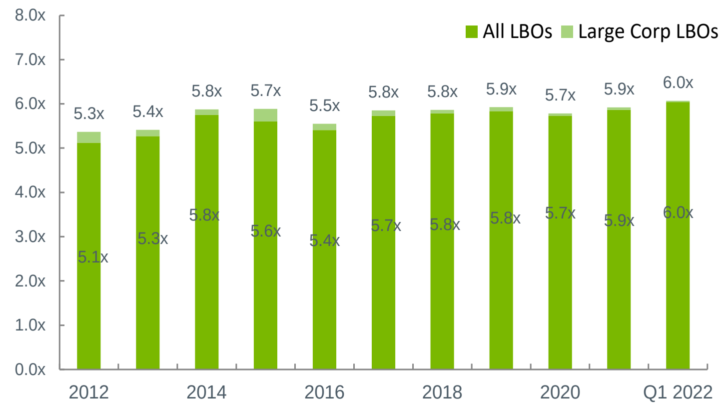
Opportunity[4]

- Early stage continues to be attractive, although we continue to monitor valuations
- Smaller end of growth equity
- Technology sector

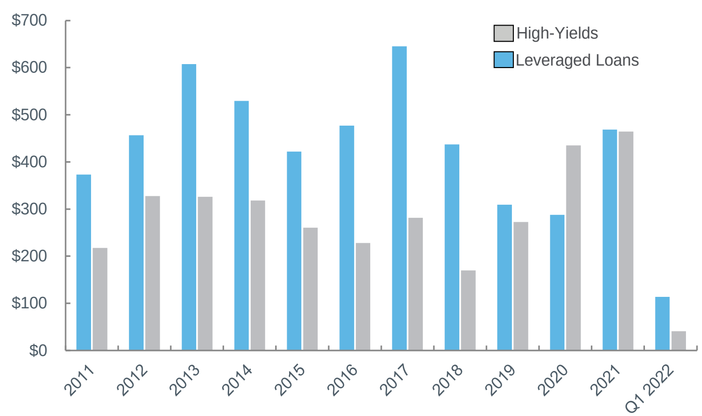
Empower Results®

Leveraged Loans & Mezzanine

Average Leverage by Deal Size



Debt Issuance ($ Billions)



Sources from top to bottom: S&P, UBS

Leveraged Loans

Fundraising

- New CLO issuance totaled $30.0 billion through 1Q 2022, an increase from the $28.1 billion seen through 1Q 2021.[2]
- High-yield debt issuance totaled $41.1 billion through 1Q 2022. 2022's YTD total is 73.8% less than the same period's total of $156.6 billion in 2021.[2]
- Through 1Q 2022, leveraged loan mutual fund net flows ended at a net inflow of $15.5 billion.[2]

Activity

- Leverage for all U.S. LBO transactions through 1Q was 6.0x, up from 2021's leverage of 5.9x. Leverage continues to be comprised almost entirely of senior debt. The average leverage level for large cap LBOs was 6.0x through the quarter, up from the 5.9x witnessed at year-end 2021.[3]
- Through 1Q 2022, institutional leveraged loan issuances totaled $113.5 billion, 59.2% less than the $228.0 billion issued in the same period during 2021.[2]
- 78.2% of new leveraged loans were used to support M&A and growth activity through 1Q 2022, up from 61.9% in Q4 2021. This was above the five-year average of 65.0%.[3]
- European sponsored loan issuance decreased slightly to €15.1 during the first quarter compared to €20.7 during 4Q 2021. This was 16.3% lower than the five-year quarterly average level of €18.0 billion.[3]

Opportunity [4]

- Funds with the ability to source deals directly and the capacity to scale for large transactions (both sponsored and non-sponsored)
- Funds with an extensive track record, experience through prior credit cycles, and staff with workout experience

Mezzanine

Fundraising

- 6 funds closed on $10.7 billion during the quarter. This was a significant increase from the prior quarter's total of $1.6 billion raised by 7 funds and represented 80.6% of capital raised in full year 2021.[1]
- Estimated dry powder was $50.0 billion at the end of Q1 2022, up from $48.3 billion at the end of 2021.[1]
- An estimated 101 funds are in market targeting $56.0 billion of commitments. GS Mezzanine Partners VIII is the largest fund in market targeting commitments of $12.0 billion.[1]

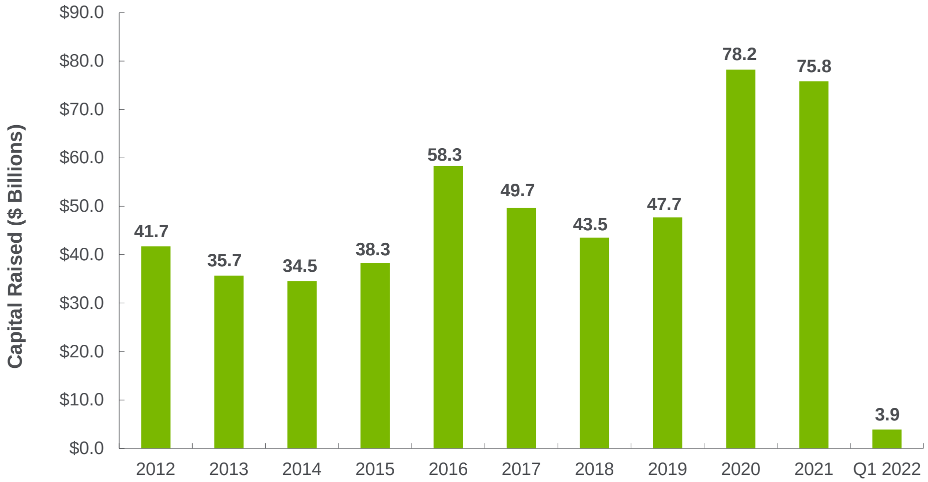
Opportunity [4]

- Funds with the capacity to scale for large sponsored deals

Empower Results®

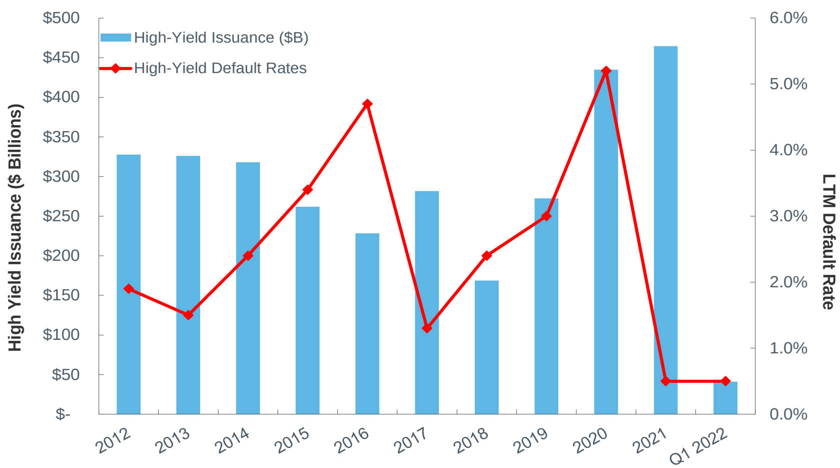
Distressed Private Markets

Distressed Debt, Turnaround, & Special Situations Fundraising



Source: Preqin

High-Yield Bond Volume vs Default Rates



Source: UBS & Fitch Ratings

Fundraising

- During the quarter, $3.9 billion was raised by 7 funds, down significantly from the $13.2 billion raised by 30 funds during 4Q 2021. Distressed funds have raised 5.1% of 2021's total through 1Q 2022.[1]
  - 1Q 2022's fundraising was 73.6% lower than the five-year quarterly average.
  - Capital raised in 1Q 2022 represented a decrease compared to the $19.2 billion raised in 1Q 2021.
  - Crestline Opportunity Fund IV was the largest fund closed during the quarter, closing on $1.6 billion.
- Dry powder was estimated at $145.3 billion at the end of 1Q 2022, which was down 8.3% from year-end 2021. This remained above the five-year annual average level of $130.5 billion.[1]
- Roughly 186 funds were in the market at the end of 1Q 2022 seeking $87.3 billion in capital commitments.[1]
  - Special situations managers were targeting the most capital, seeking an aggregate $56.9 billion, followed by distressed debt managers at $25.8 billion.
  - Clearlake Capital Partners VII was the largest fund in market with a target fund size of $10.0 billion.

Activity

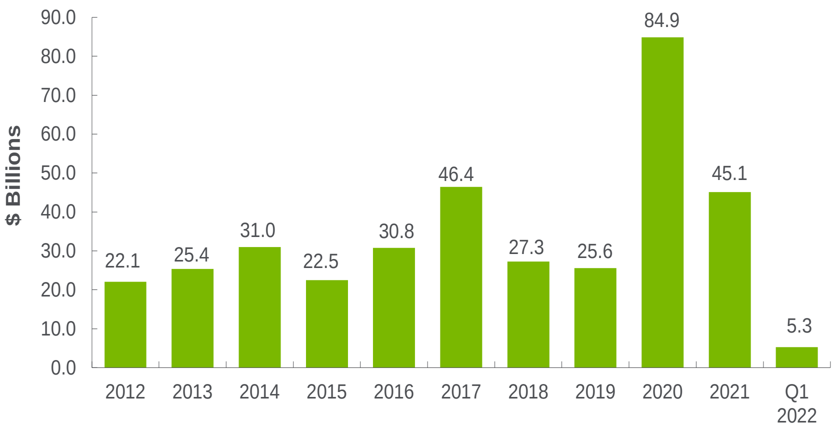
- The LTM U.S. high-yield default rate was 0.5% as of March 2022, which was in line with December 2021's LTM rate of 0.5%. The high-yield default rate is projected to trend higher through 2022.[6]
- The market dislocation caused by COVID-19 is expected to supply additional distressed opportunities in the next several months.

Opportunity [4]

- Funds capable of performing operational turnarounds
- Funds with the flexibility to invest globally

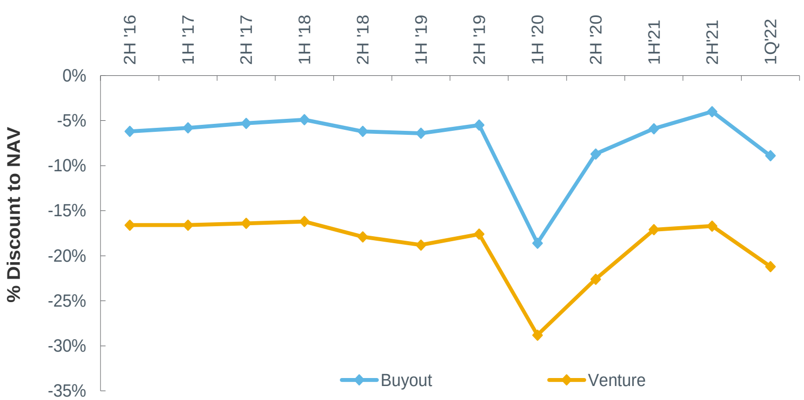
Secondaries

Secondary Fundraising



Source: Preqin

Secondary Pricing



Source: UBS

Fundraising

- 14 funds raised $5.3 billion during the quarter, down slightly from the $5.8 billion raised by 14 funds in 4Q 2021. This was 50.1% lower than the five-year quarterly average of 10.6 billion.[1]
  - Newbury Equity Partners V was the largest fund raised during the quarter, closing on $2.0 billion.
- At the end of 1Q 2022, there were an estimated 111 secondary and direct secondary funds in market targeting roughly $84.8 billion. The majority of secondary funds are targeting North American investments.[1]
  - Lexington Capital Partners X and ASF IX are the largest funds being raised, each seeking $15.0 billion in commitments.[1]

Activity

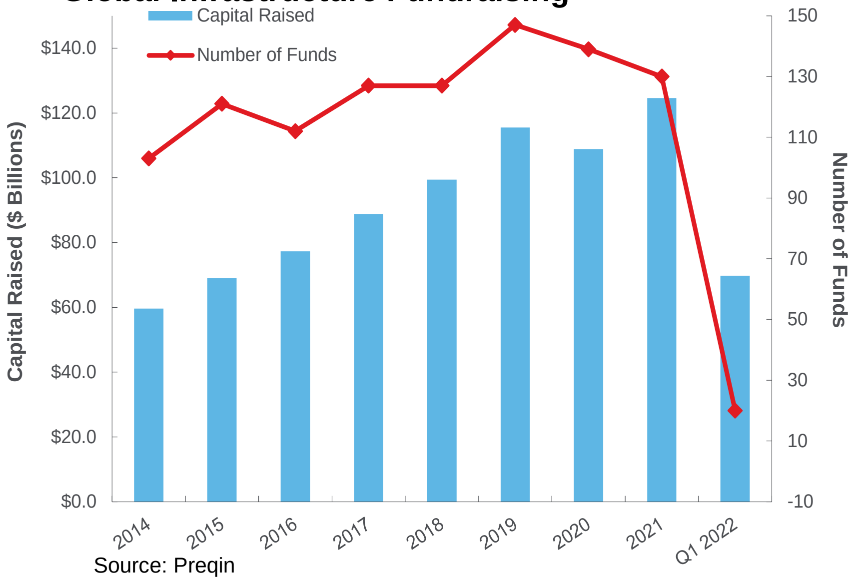
- The market continues to have participation from a broad base of buyers and sellers with opportunistic selling activity from public and private pensions, financial institutions and insurance companies.
- Transaction fund leverage and deferred payment structures continue to be prevalent and are used as a means to improve pricing and deal returns in an increasingly competitive environment.[2]
- According to UBS, The number of GP-led situations brought to market continued to increase in varying quality and strategies, along with more household GP names utilizing the secondary market. This is expected to continue throughout 2022.[2]
  - GP-led transactions continue to take a greater share of transaction volume and activity.
- Cambell Lutyens expect LP-led secondary sales to grow even stronger as more investors recognize the benefit of using these transactions to crystalize gains, trim their GP rosters, and manage balance sheet risk. [15]
- Recent market volatility may create a widening gap over the course of the year between bid and ask prices for secondary transactions.[15]
- The average discount rate for all private equity sectors finished the quarter at 11.4%, a larger discount compared to the 6.7% discount seen at the end of 2021. The average buyout pricing discount ended the quarter at 8.9%, while the average venture discount increased to 21.2%.[2]

Opportunity [4]

- Funds that are able to execute complex and structured transactions
- Niche strategies

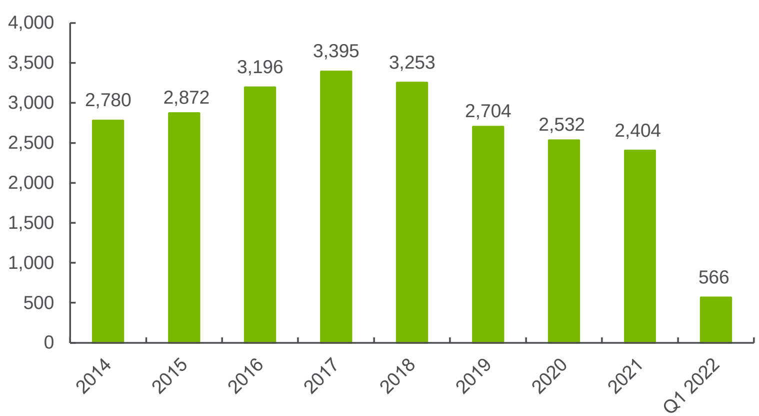
Infrastructure

Global Infrastructure Fundraising



Source: Preqin

Number of Deals Completed



Source: Preqin

Fundraising

- $69.7 billion of capital was raised by 20 funds in 1Q 2022 compared to $36.7 billion of capital raised by 24 partnerships in Q4 2021. Through 1Q 2022, infrastructure funds have raised 56.0% of 2021's total. [1]
  - KKR's Global Infrastructure Investors IV was the largest fund raised during the quarter, closing on $17.0 billion.[1]
- As of the end of 1Q 2022, there were an estimated 357 funds in the market seeking roughly $198.5 billion.[1]
  - Brookfield Global Transition Fund was the largest fund in market and was seeking commitments of $12.5 billion.
- At the end of the quarter, dry powder stood at $330.9 billion, up from last year's record of $313.0 billion.[1]
- Concerns surrounding the relative availability and pricing of assets remain. Fundraising continues to be very competitive given the number of funds and aggregate target level of funds in market. Investor appetite for the asset class persists despite the record levels of dry powder and increased investment activity from strategic and corporate buyers as well as institutional investors.

Activity

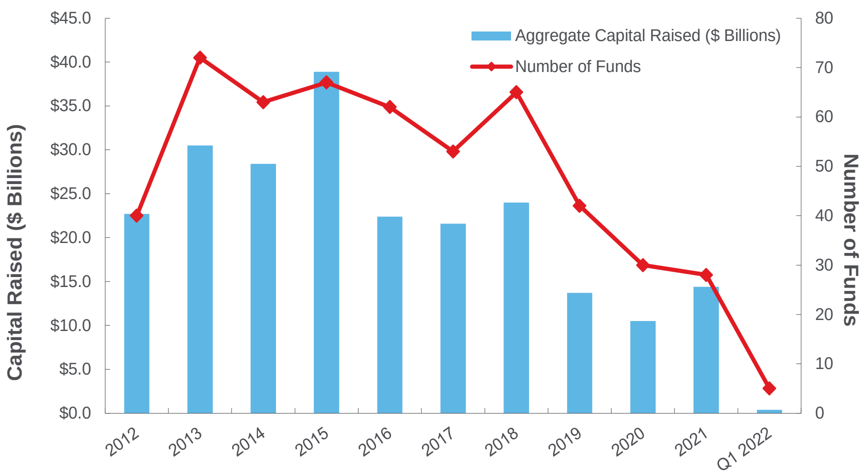
- Infrastructure managers completed 566 deals for an aggregate deal value of $72.5 billion in 1Q 2022 compared to 733 deals totaling $181.0 billion in 4Q 2021.[1]
  - By region, Europe saw the largest number of deals completed, with 44.2% of deals being invested in the region, followed by North America at 26.4%. Asia amassed 9.6% of activity during the quarter.
  - Renewable energy was the dominant industry during the quarter making up 59.5% of transactions, followed by the conventional energy sector which accounted for 11.5% of deals. The telecom sector accounted for 10.4% of deals during the first quarter.[1]

Opportunity [4]

- Mid-market core+ and value-add infrastructure as well as a platform investing approach continue to offer the best relative value
- Assess funds with pre-specified assets with caution due to possible lag in and uncertainty around valuation impact
- Blind-pool funds may be better positioned to take advantage of the market dislocation in certain sub-sectors, however careful review of such strategies is required
- Build-to-core greenfield strategies particularly in the social / PPP infrastructure space offer a premium for investors willing to take on construction / development risk

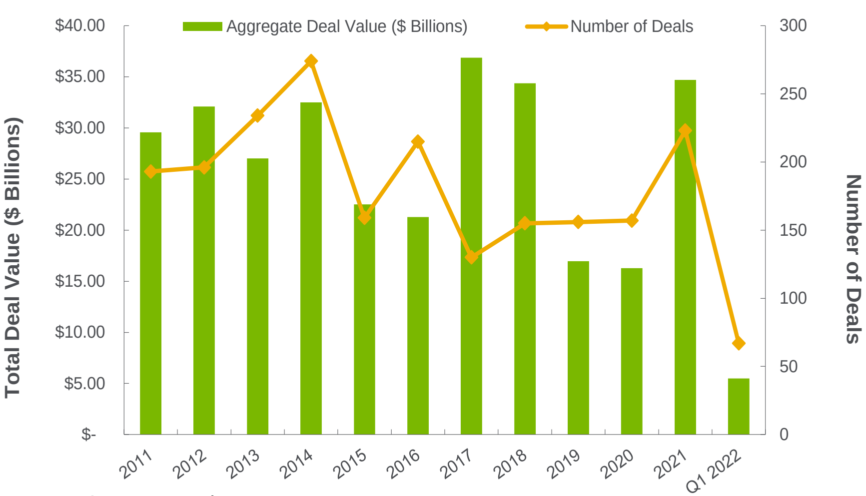
Natural Resources

Natural Resources Fundraising



Source: Preqin

Energy & Utilities Deal Activity



Source: Preqin

Fundraising

- During 1Q 2022, an estimated 5 funds closed on $0.4 billion compared to 28 funds totaling $14.4 billion in 2021.[1]
- Dry powder stood at roughly $38.0 billion at the end of 1Q 2022, which was 4.5% lower than 4Q 2021's level of $39.8 billion and down from the five-year average level by 22.9%.[1]

Activity

- Energy and utilities industry managers completed 67 deals totaling $5.5 billion in Q1 2022, compared to $34.7 billion across 223 deals in 2021.
- Crude oil prices increased during the quarter.
  - WTI crude oil prices increased 51.3% during the quarter to $108.50 per bbl. This was also an increase of 74.1% compared to 1Q 2021.[10]
  - Brent crude oil prices ended the quarter at $117.25/bbl, up 58.1% compared to the prior quarter, and up 79.3% from 1Q 2021.[10]
- Natural gas prices (Henry Hub) finished 1Q 2022 at $4.90 per MMBtu, which was up 30.3% from 4Q 2021 and up 87.0% from 1Q 2022.[10]
- A total of 671 crude oil and natural gas rotary rigs were in operation in the U.S. at the end of the quarter. This was up by 14.5% from the prior quarter and up 56.0% over 1Q 2021.[13]
  - Crude oil rigs represented 79.4% of the total rigs in operation. 60.4% of the 533 active oil rigs were in the Permian basin.
  - 45.6% and 26.8% of natural gas rigs at the end of 1Q 2022 were operating in the Haynesville and Marcellus basins, respectively.
- The price of iron ore (Tianjin Port) ended the quarter at $152.07 per dry metric ton, up from $116.96 at the end of 4Q 2021.[10]

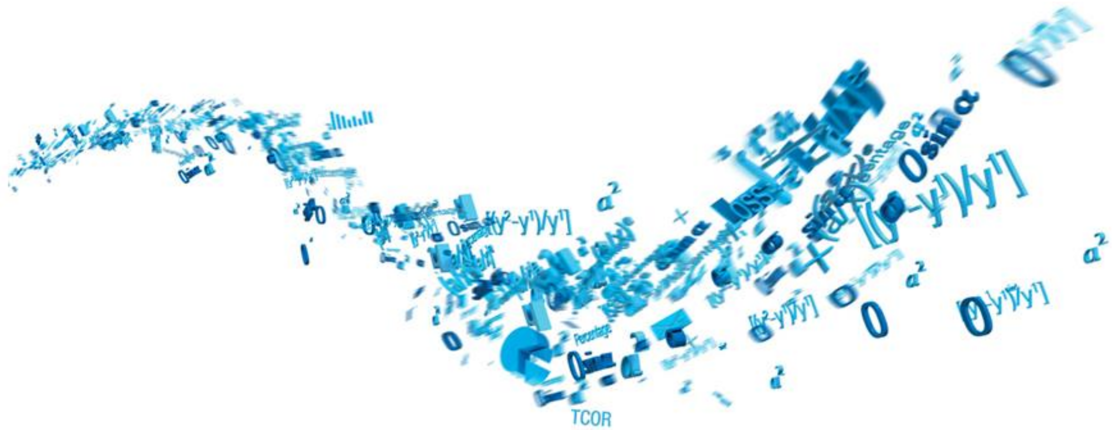
Opportunity [4]

- Acquire and exploit existing oil and gas strategies over early-stage exploration in core U.S. and Canadian basins
- Select midstream opportunities

Notes

1. Preqin
2. UBS
3. Standard & Poor's
4. Aon Investments USA Inc.
5. Moody's
6. Fitch Ratings
7. PitchBook/National Venture Capital Association Venture Monitor
8. Cooley Venture Financing Report
9. U.S. Energy Information Administration
10. Bloomberg
11. Setter Capital Volume Report: Secondary Market
12. KPMG and CB Insights
13. Baker Hughes
14. Evercore
15. Campbell Lyutens

Notes:
FY: Fiscal year ended 12/31
YTD: Year to date
YE: Year end
LTM: Last twelve months (aka trailing twelve months or TTM)
PPM: Purchase Price Multiples: Total Purchase Price / EBITDA
/bbl: Price per barrel
MMBtu: Price per million British thermal units



Appendix B:

Real Estate Market Update

1Q 2022

United States Real Estate Market Update (1Q22)

General

- Townsend witnessed a robust recovery across the U.S. economy and U.S. real estate markets in 2021, with a continuation through the first quarter of 2022. The post-pandemic economic recovery has remained generally on track; however, an array of headwinds have emerged including rising interest rates, persistent inflation, various geopolitical events, and widespread global supply chain struggles. Equity markets retraced from December 2021's all-time highs, as a result of tightening federal reserve policy and market volatility. In 1Q22, The S&P 500 produced a gross total return of -4.6%. The MSCI US REIT index also cooled off following a strong 2021, posting a gross return of -4.1%.

- After multiple quarters of GDP growth, U.S. GDP decreased at an annualized rate of 1.5% in first quarter 2022, attributable to decreased federal, state and local government spending, and decreased exports. As a result of the atrocities of the Russian-Ukraine war, prolonged lockdowns in Shanghai, and a rise in protectionist measures, commodity pricing has skyrocketed, in lockstep with inflation. The Federal Reserve continues to view the overall economy as strong, despite, noting an anticipated slowing of growth in early 2022.

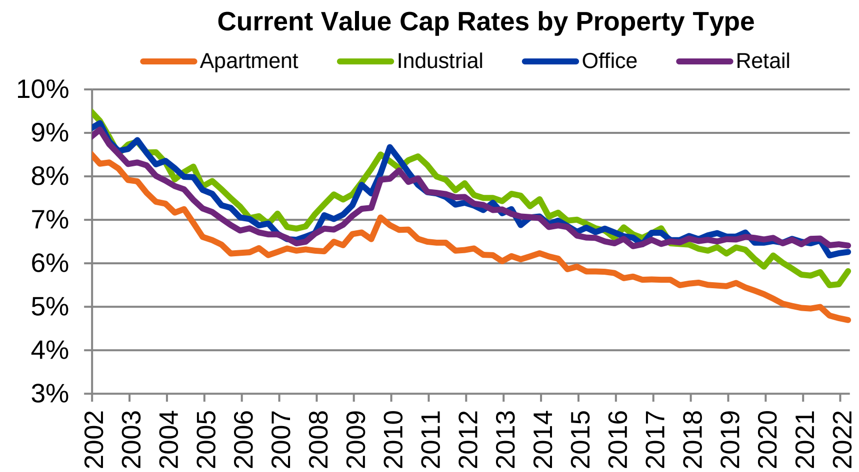
Commercial Real Estate

- Through the first quarter of 2022, total CRE transaction activity for the quarter was up 56% YoY, with annual transaction activity up 125% YoY. In 1Q22, deal volumes across all sectors moderated from a historic high in fourth quarter 2021. Transaction volume has been the strongest in the apartment and industrial sectors.

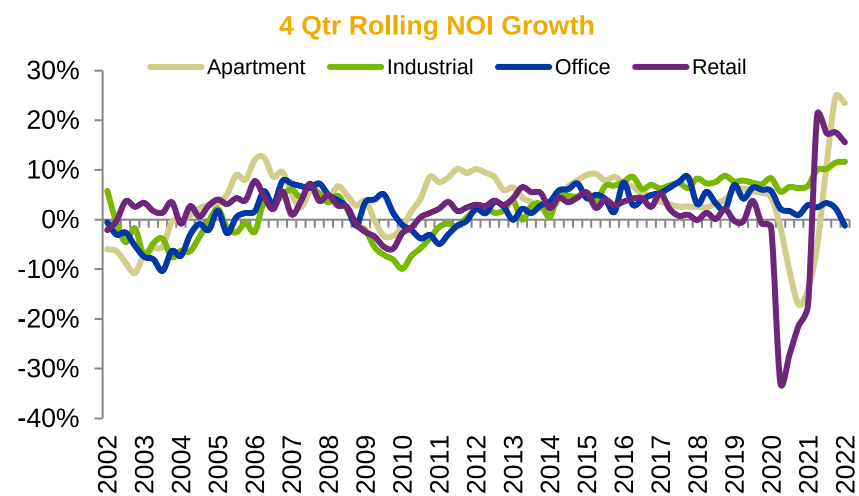
- Transaction cap rates (5.0%) expanded significantly during the quarter, to the tune of 76 bps. This increase comes after a -81 bps quarter-over-quarter decrease in 4Q21. Current valuation cap rates increased for industrial (+30 bps) and office (+3 bps). While both the apartment (-10 bps) and retail (-3 bps) property sectors experienced slight cap rate compression.

- NOI growth has substantially diverged between property sectors due to the impacts of COVID-19. Retail NOI has expanded substantially (+16%) YoY as the sector continues to recover from decreased rent collections and retailer shutdowns. Apartment sector fundamentals remain strong, as many millennials seek out a more opportune time to purchase their first home. Apartment NOI expanded (+23%) YoY.

- 10-year treasury bond yields steepened to 2.3% during the quarter, an increase of 80 basis points over year-end 2021. Economists expect rates to move modestly higher throughout 2022.



Source: NCREIF



Source: NCREIF

Sources: Bureau of Economic Analysis, U.S. Census Bureau, St. Louis Fed, NCREIF, Real Capital Analytics, Bloomberg LP., Preqin.

United States Property Matrix (1Q22)

TOWNSEND® GROUP
an Aon company

INDUSTRIAL

- In 1Q22, industrial properties were the highest returning sector at 11.0% and outperformed the NPI by 563 bps.
- Transaction volumes decreased to $34 billion in the first quarter of the year, resulting in a 50% increase year-over-year. Individual asset sales increased 18% year-over-year, while portfolio purchases turned in a year-over-year volume increase of 33%. At $34 billion, the industrial sector decreased by $44 billion quarter-over-quarter.
- The industrial sector turned in NOI growth of 11.7% over the past year. NOI continues to reach all time highs for the sector.
- Vacancy decreased by 173 bps year-over-year to 1.8%. Vacancy in the sector decreased 30 bps from last quarter, reaching all-time historic lows. E-commerce continues to drive demand across the sector.
- Industrial cap rates compressed approximately 100 bps from a year ago, to 3.4%. Industrial overall fundamentals still top all property sectors.

MULTIFAMILY

- The apartment sector delivered a 5.3% return during the quarter, underperforming the NPI by 8 bps.
- Transaction volume in the first quarter of 2022 decreased to $63 billion, resulting in an increase of 56% year-over-year. Transaction volume for the sector is near historical levels. This volume continues to make multifamily the most actively traded sector for the eighteenth straight quarter.
- Cap rates remained steady at 3.6% quarter-over-quarter, decreasing 15 bps year-over-year. Multifamily cap rates remain at the lowest level observed in years, driven by continued increases in valuation.
- The multifamily sector saw increasing vacancy rates throughout the entirety of 2020 due to the global pandemic. Through 2021, the sector appears to have shaken that trend although vacancy rates remained steady during the last 3 quarters. Vacancy rates slightly decreased by 7 bps quarter-over-quarter and are back to near pre-pandemic levels. The aging millennials have begun shifting their desires to suburban living, but continued home price appreciation has deterred the full effect of this migratory trend.

OFFICE

- The office sector returned 1.6% in 1Q22, 373 bps below the NPI return over the period.
- Transaction volumes decreased by 59% year-over-year in the first quarter. Transaction volume equated to $35 billion for the quarter, a decrease of $20 billion quarter-over-quarter. Office transaction levels have officially regressed to levels only seen prior to the COVID-19 pandemic.
- Office sector vacancy rates have expanded since the beginning of the pandemic due to work from home orders and uncertainty revolving around the future of office space. Office continues to be the highest vacancy property type at close to 12.9%, increasing 20 bps from last quarter.
- NOI growth in the office sector compressed quarter-over-quarter by 295 bps and appears to be in the midst of its recovery to pre-pandemic levels.
- Office cap rates compressed from a year ago, sitting at approximately 4.5%. Office-using job growth was stunted significantly through out 2020 due to work from home orders. Though we are observing a slow but steady flow back to in-office work, there is still uncertainty in the sector as many companies remain hesitant.

RETAIL

- As of 1Q22, the retail sector delivered a quarterly return of 2.3%, underperforming 307 bps below the NPI.
- Transaction volumes totaled $19 billion in the first quarter, increasing 102% year-over-year. Single asset transactions accounted for just over 79% of all sales volume for the quarter.
- Cap rates have expanded approximately 10 bps within the sector over the last year, to 5.1%. Current valuation cap rates compressed quarter-over-quarter by 20 bps due to valuation adjustments made across the sector in general.
- NOI growth slightly decreased, 2.0% over the last year. Retail has begun its slow recovery as vaccine rollouts have allowed a large portion of store nationally to open and operate safely.
- Retail vacancy rates increased over the quarter by 10 bps, and down 90 bps over the past year to 9.0%. Many big box stores have closed as the need for retail space shrinks, translating to a negative outlook for rent growth. Paired with the global economic crisis, which has had a significant negative impact on this sector.

Sources: Real Capital Analytics, Green Street, NCREIF

Global Real Estate Market Update (1Q22)

TOWNSEND® GROUP
an Aon company

- Diminishing operational uncertainty, robust demand and abundant liquidity led global investment activity to a strong start to 2022. More capital being put into the market than any other first quarter ($280B, 33% increase from 1Q21). Unfortunately, this surge was quelled in relation the geopolitical consequences of war between Russia and Ukraine. The conflict has contributed to rising commodity prices in conjunction with inflation, and lower expectations of economic growth overall.

- That withstanding, the U.S. was at the forefront of this growth in deal volume improving 76% YOY. This was led by its multifamily sector, being the world's largest single property market. The Asia Pacific market had inverse results with deal pipelines dissipating. China's zero-Covid policy, which put some of the country's largest cities into complete lockdown, has played a part.

Global Total Commercial Real Estate Volume - 2021 - 2022

$ US Billions	Q1 2022	Q1 2021	% Change Q1 22 - Q1 21	Full Year Ending Q1 2022	Full Year Ending Q1 2021	% Change Full Year
Americas	169	96	75%	855	356	140%
EMEA	81	78	4%	444	308	44%
Asia Pacific	126	144	-13%	865	824	5%
Total	375	318	18%	2164	1488	45%

Source: Real Capital Analytics, Inc., Q1' 22 `

- Following a serious downturn during the peak of the pandemic, the hotel industry is trending towards a recovery. The lowering of travel restrictions has seen global air traffic up 116% YOY as of February 2022. This has reflected in transaction activity with purchases totaling $18B 1Q22 and in the last 12 months doubled its volume from the previous year.

- Given the low interest rate environment, the weight of capital targeting real estate will likely continue to increase as investors search for yield. While the industrial, residential and healthcare sectors are taking the lion's share of allocated capital, core offices and niche sectors like student/senior living are beginning to garner more investor interest despite facing occupancy challenges in 2021.

- Buoyant buyer demand boosted by strong investment fundamentals has continued to drive investment activity across the Multifamily asset class globally, continuing its momentum into Q122. Despite a modest decline in quarterly volumes year-over-year in EMEA, activity remained well above historic first quarter norms. While inflationary pressures and rising construction costs suggest some headwinds, the sector remains one of the most favored across the regions.

- Inflation points have reached record levels in the U.S. and Europe prompting a shift in Fed policy. While inflation is forecast to stay high through most of 2022, it is expected to moderate thereafter. In the U.S., the price effects of supply chain disruptions are expected to subside over the coming quarters, with continued higher rents and wages countering these deflationary factors, which is expected to keep overall inflation at higher levels than pre-COVID through 2023.

- The industrial sector continues to exhibit the strongest performance globally, spurred by tenant demand driven by an acceleration in e-commerce and supply chain reconfiguration. Inventory shortages resulting in supply chain reorientation is expected to continue to shift demand to emerging markets(e.g., Vietnam, India, Mexico). Additionally, supply chain bottlenecks have led to shipping and port delays and shifted incremental demand to inland port and more rail- dependent locations.

Global Outlook - GDP (Real) Growth % pa, 2022-2024

	2022	2023	2024
Global	**5.9**	**4.3**	**3.6**
Asia Pacific	**4.4**	**4.6**	**4.4**
Australia	4.1	2.8	2.5
China	4.5	5.2	5.1
India	8.7	7.3	6.5
Japan	1.8	1.8	1.1
North America	**2.7**	**2.0**	**1.9**
US	2.6	2.0	1.9
Middle East	**4.1**	**4.4**	**4.5**
European Union	**3.0**	**2.1**	**2.0**
France	2.7	1.8	1.7
Germany	1.8	2.3	2.0
UK	3.7	1.2	1.7

Source: Bloomberg

Sources: Jones Lang LaSalle Research, Cushman & Wakefield, Real Capital Analytics, Inc., CBRE

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Aon Investments USA Inc.

200 E. Randolph Street

Suite 700

Chicago, IL 60601

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REPORT

Meketa Capital Markets Outlook & Risk Metrics

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Capital Markets Outlook & Risk Metrics

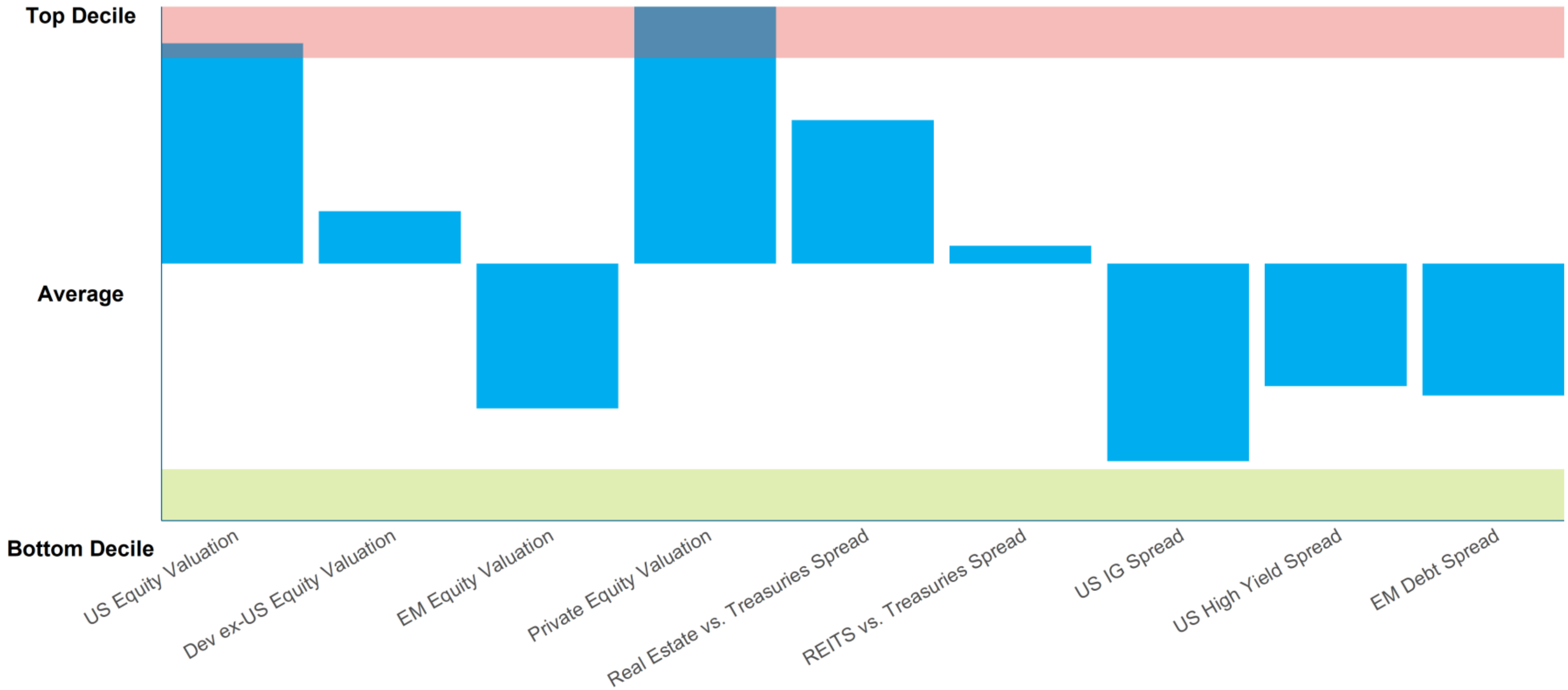
As of June 30, 2022

Capital Markets Outlook

Markets

- → June capped off the worst first half performance for US equity markets since the 1970s, as markets reassessed future growth expectations in response to the Fed's 75 bp rate hike in June.
- → In the US, small and mid-cap companies lagged large and mega cap stocks in the month of June and value lagged growth stocks.
- → While all major equity indices suffered negative returns, emerging markets and China proved to be slightly more resilient than US and non-US developed markets.
- → After a strong performance in early 2022, commodities, infrastructure, and public natural resources also suffered negative returns in June.
- → Inflation re-accelerated in the US and Europe to new highs in June, reigniting concerns that policy officials may prioritize inflation fighting at the expense of economic growth. Markets repriced inflation expectations higher, and bonds suffered losses across all categories.
- → While China continues to ease COVID lockdowns and engage in fiscal and monetary stimulus, concerns persist that China's 2022 GDP will be substantially lower than 2021.

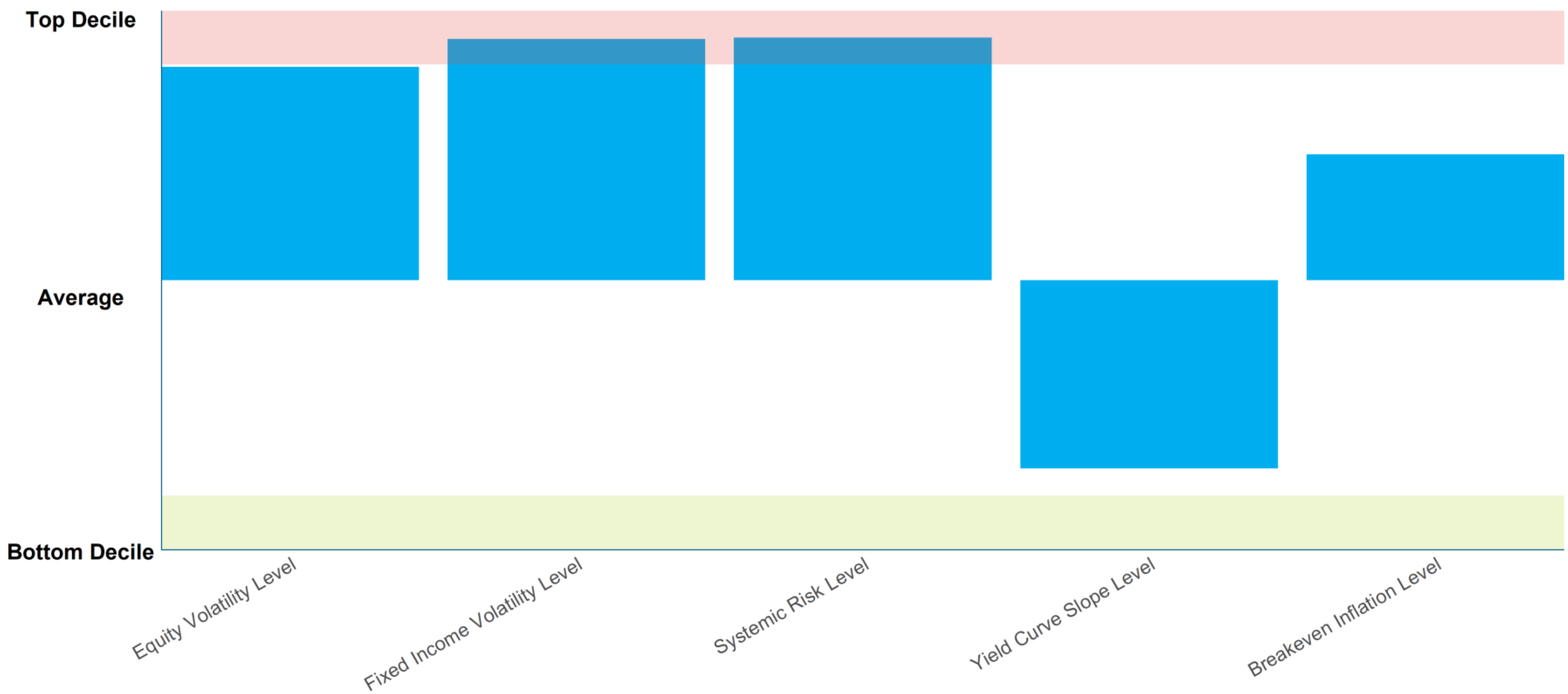
Risk Overview/Dashboard (1)
(As of June 30, 2022)[1]



→ Dashboard (1) summarizes the current state of the different valuation metrics per asset class relative to their own history.

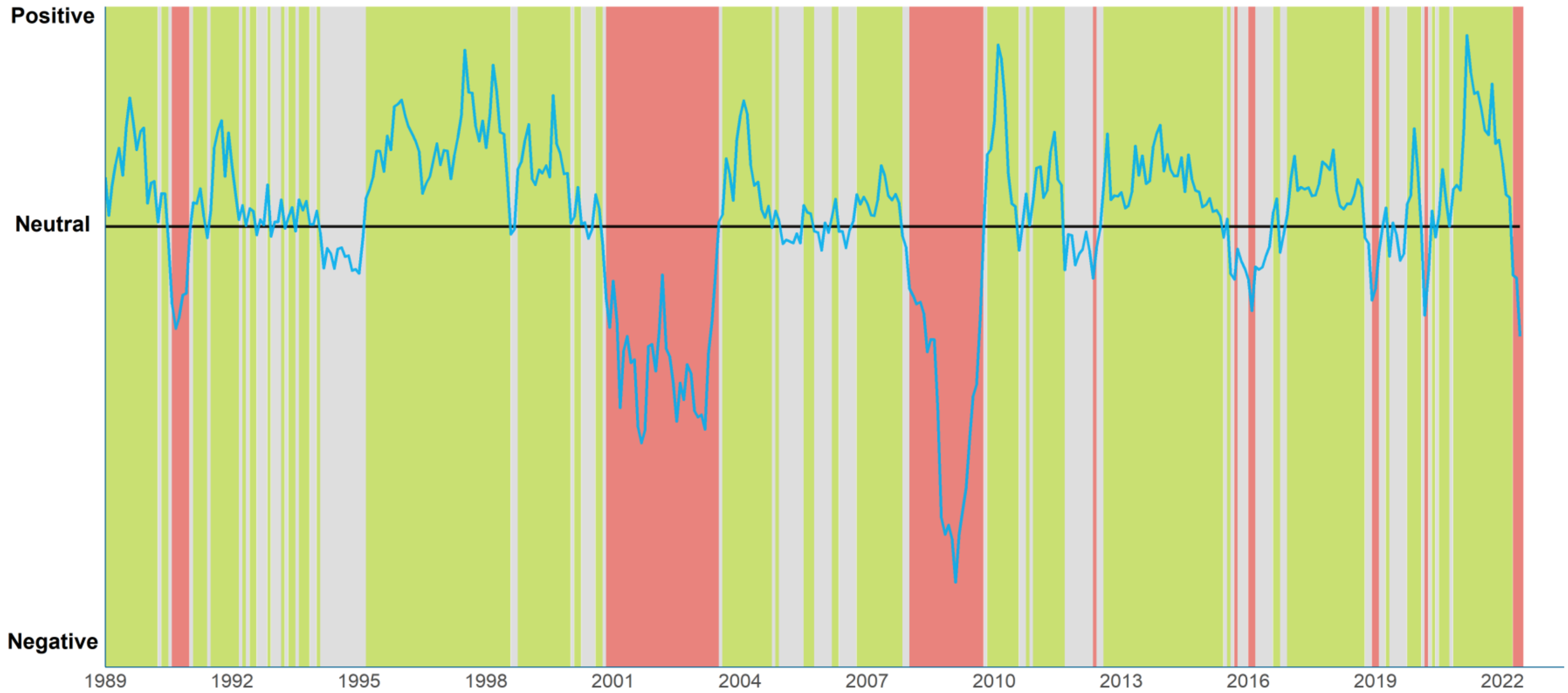
[1] With the exception of Private Equity Valuation, that is YTD as of December 31, 2021.

Risk Overview/Dashboard (2)
(As of June 30, 2022)



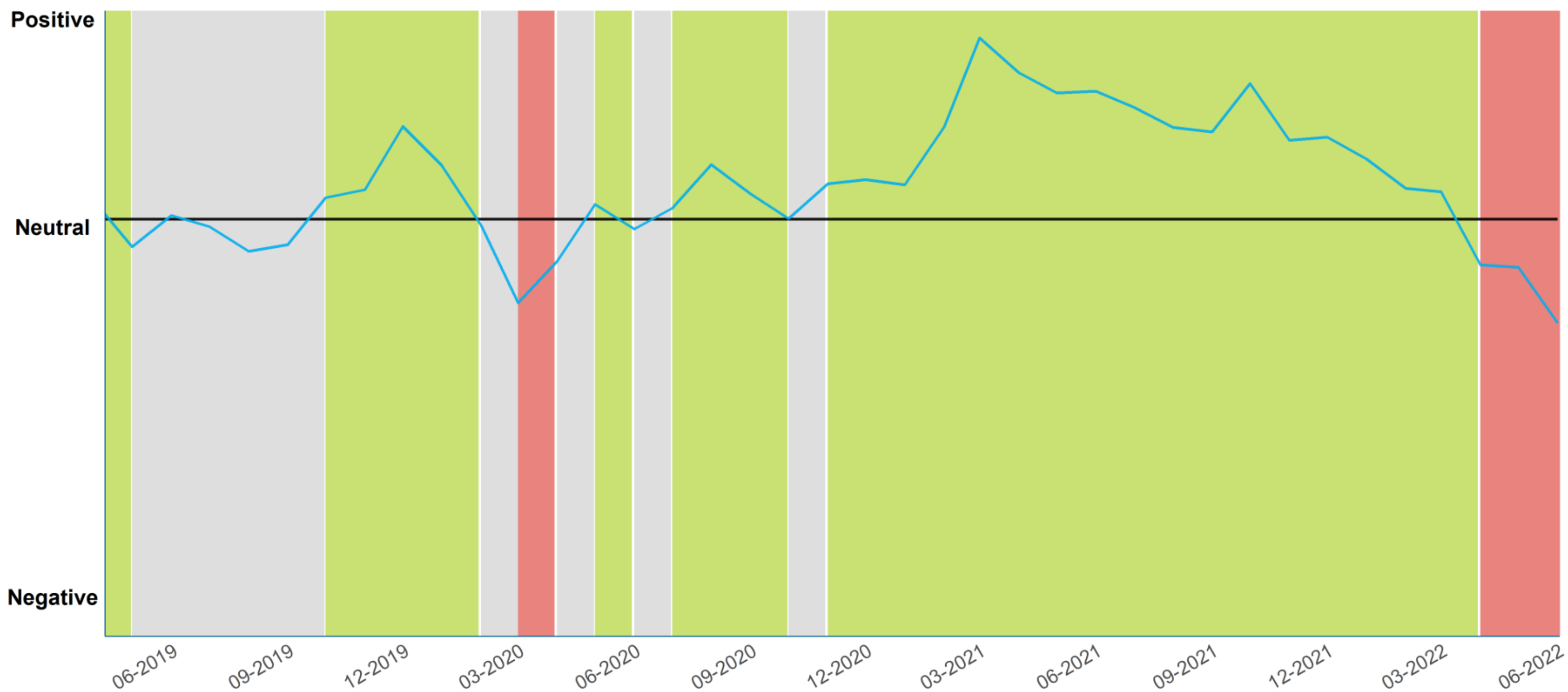
→ Dashboard (2) shows how the current level of each indicator compares to its respective history.

Market Sentiment Indicator (All History)
(As of June 30, 2022)

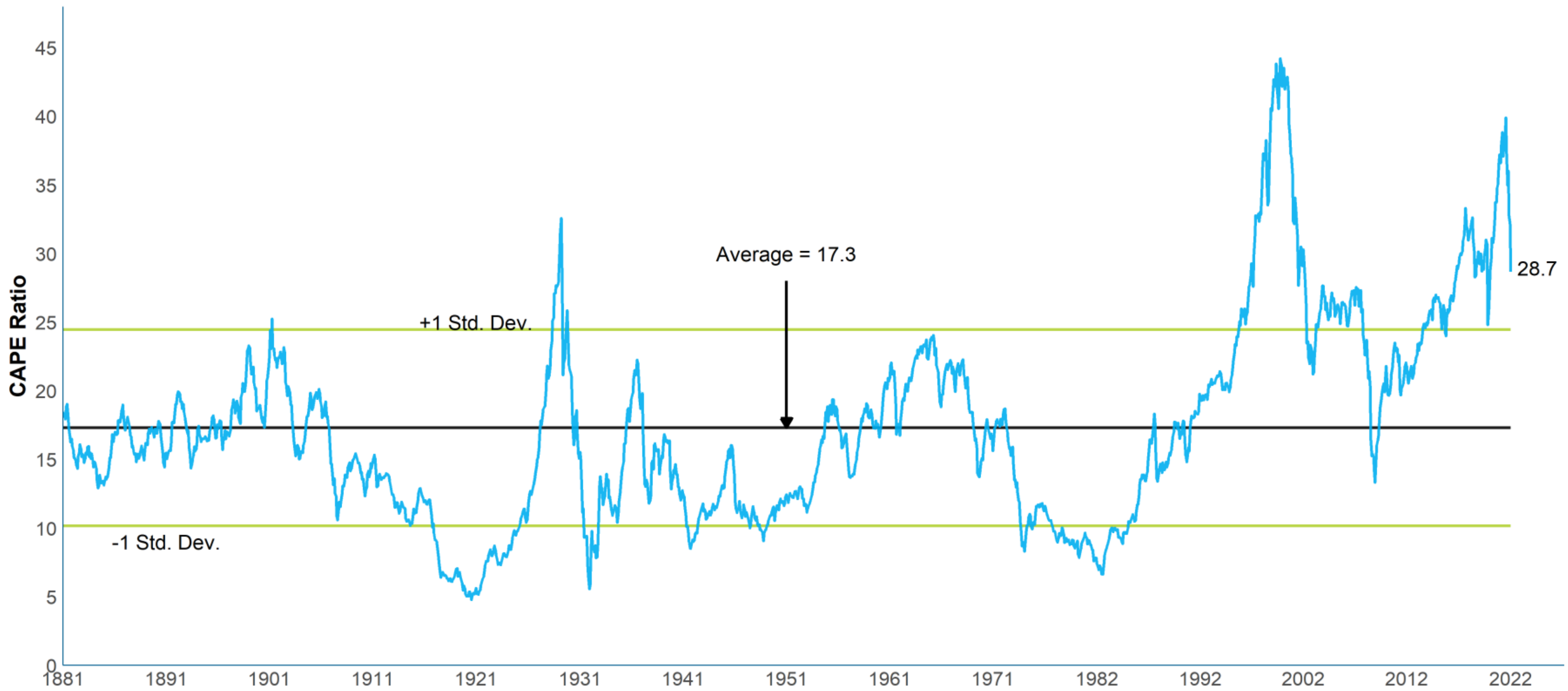


Market Sentiment Indicator (Last Three Years)

(As of June 30, 2022)



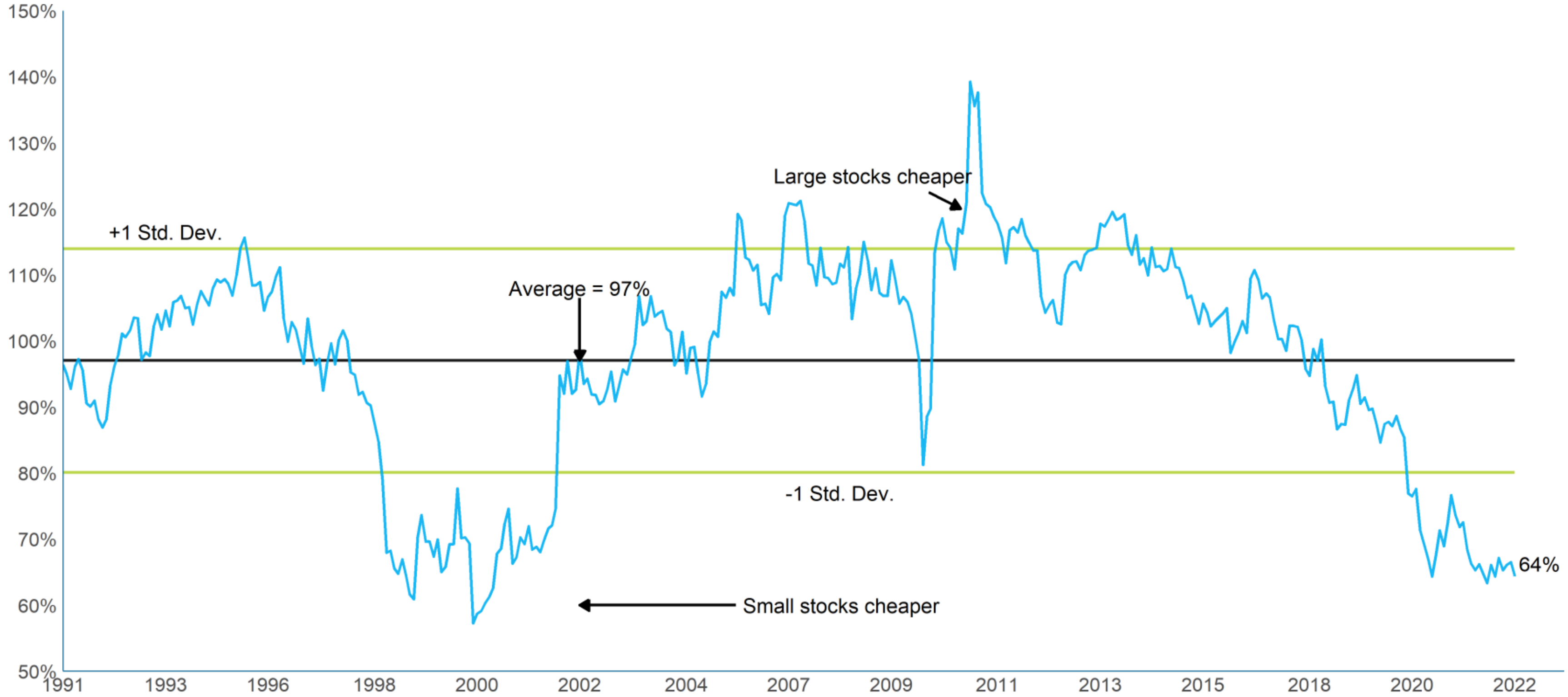
US Equity Cyclically Adjusted P/E[1]
(As of June 30, 2022)



→ This chart details one valuation metric for US equities. A higher (lower) figure indicates more expensive (cheaper) valuation relative to history.

[1] US Equity Cyclically Adjusted P/E on S&P 500 Index. Source: Robert Shiller, Yale University, and Meketa Investment Group.

Small Cap P/E vs. Large Cap P/E[1]
(As of June 30, 2022)



→ This chart compares the relative attractiveness of small cap US equities vs. large cap US equities on a valuation basis. A higher (lower) figure indicates that large cap (small cap) is more attractive.

[1] Small Cap P/E (Russell 2000 Index) vs. Large Cap P/E (Russell 1000 Index) - Source: Russell Investments. Earnings figures represent 12-month "as reported" earnings.

Growth P/E vs. Value P/E[1]
(As of June 30, 2022)

→ This chart compares the relative attractiveness of US growth equities vs. US value equities on a valuation basis. A higher (lower) figure indicates that value (growth) is more attractive.

[1] Growth P/E (Russell 3000 Growth Index) vs. Value (Russell 3000 Value Index) P/E - Source: Bloomberg, MSCI, and Meketa Investment Group. Earnings figures represent 12-month "as reported" earnings.

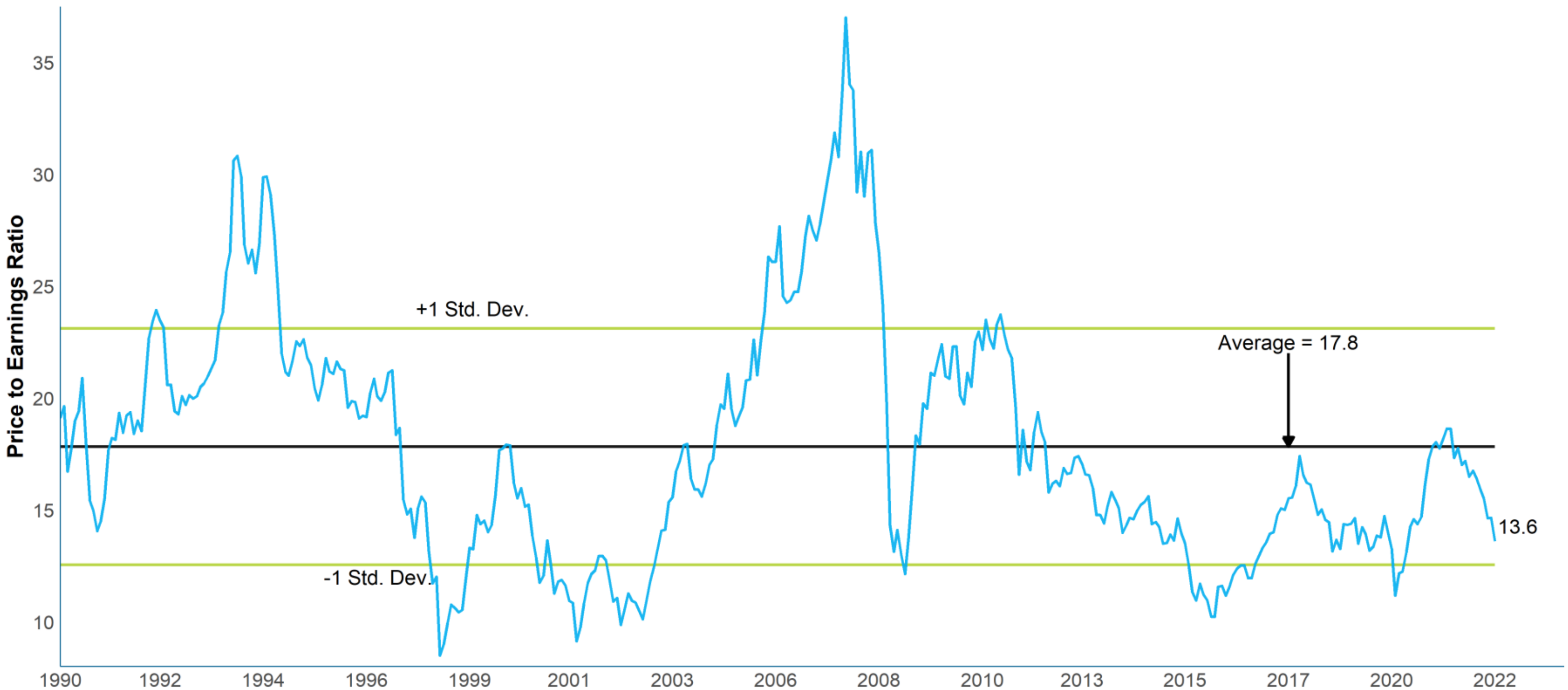
Developed International Equity Cyclically Adjusted P/E[1]
(As of June 30, 2022)

→ This chart details one valuation metric for developed international equities. A higher (lower) figure indicates more expensive (cheaper) valuation relative to history.

[1] Developed International Equity (MSCI EAFE Index) Cyclically Adjusted P/E – Source: MSCI and Bloomberg. Earnings figures represent the average of monthly "as reported" earnings over the previous ten years.

Emerging Market Equity Cyclically Adjusted P/E[1]

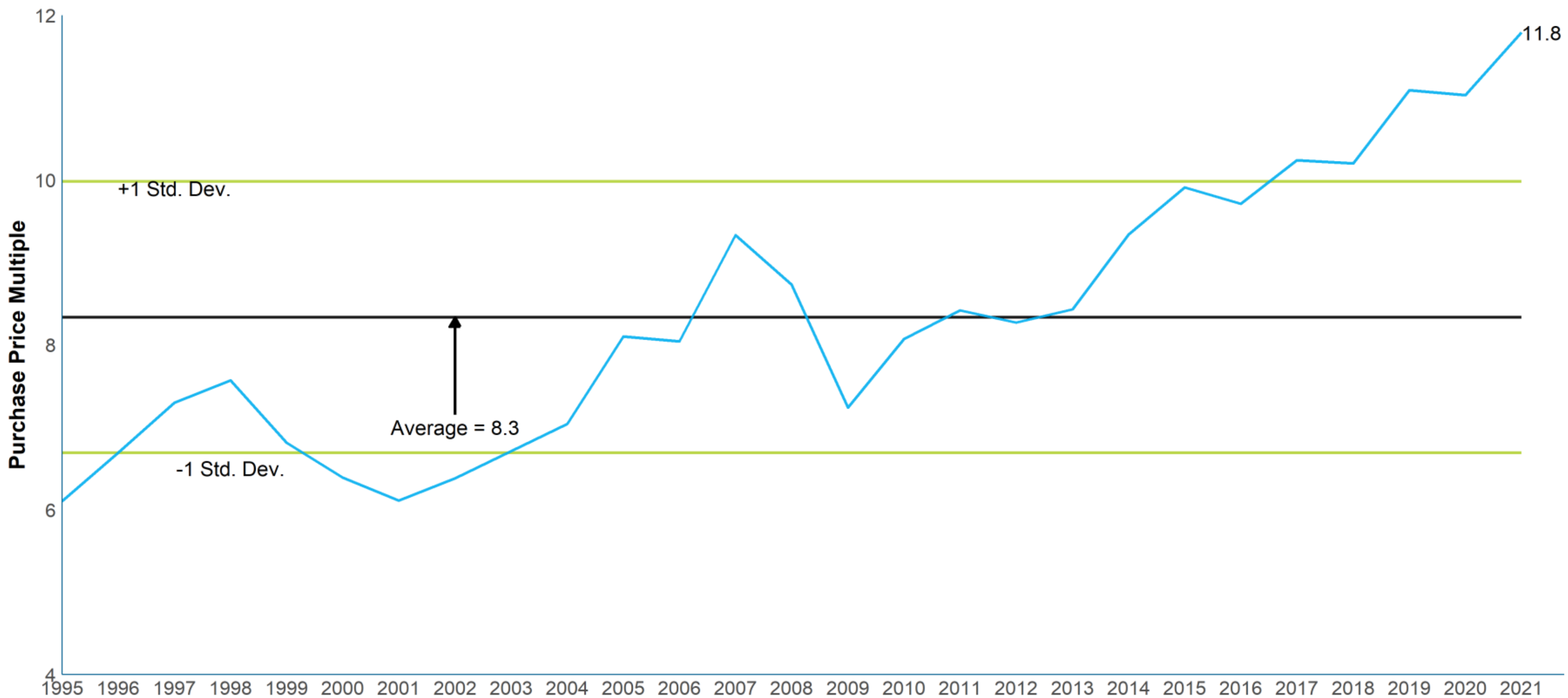
(As of June 30, 2022)



→ This chart details one valuation metric for emerging markets equities. A higher (lower) figure indicates more expensive (cheaper) valuation relative to history.

[1] Emerging Market Equity (MSCI Emerging Markets Index) Cyclically Adjusted P/E – Source: MSCI and Bloomberg. Earnings figures represent the average of monthly "as reported" earnings over the previous ten years.

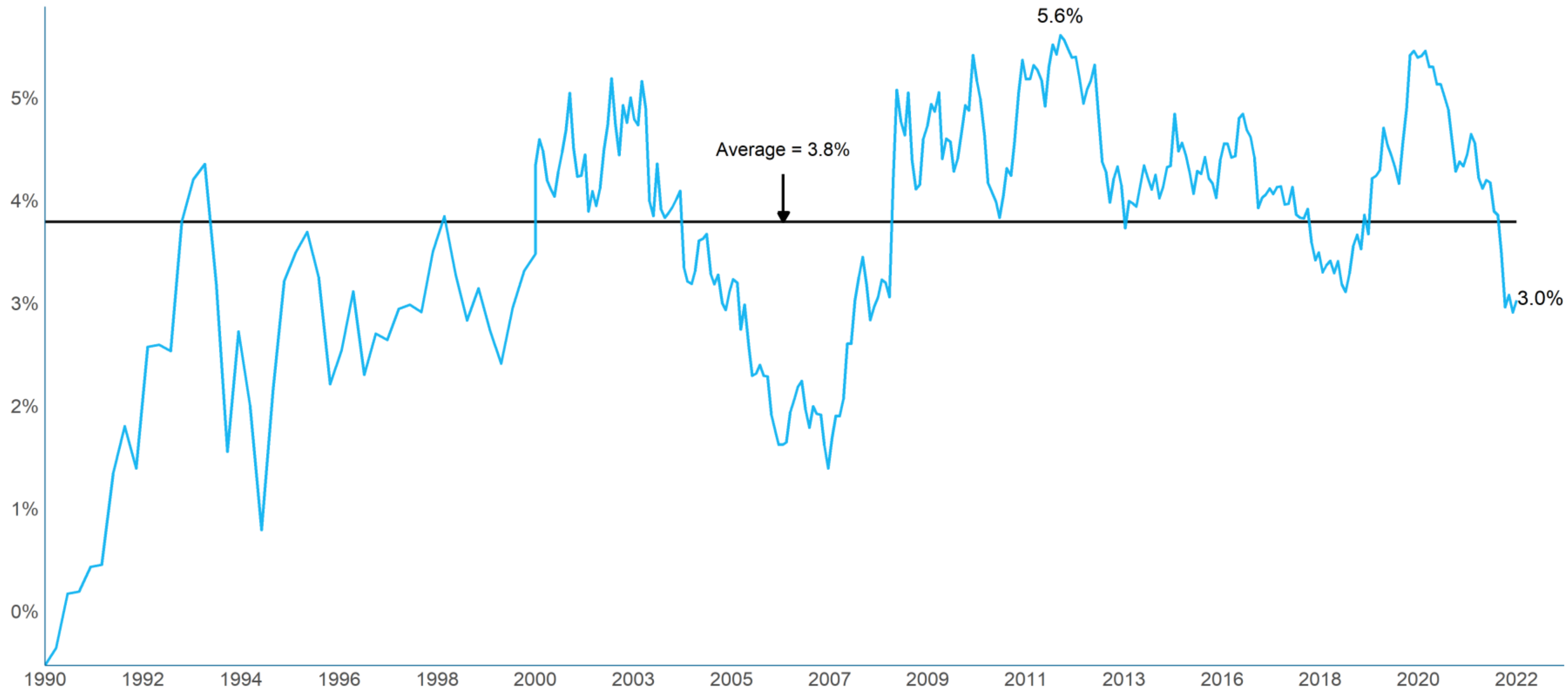
Private Equity Multiples[1]
(As of June 30, 2022)[2]



→ This chart details one valuation metric for the private equity market. A higher (lower) figure indicates more expensive (cheaper) valuation relative to history.

[1] Private Equity Multiples – Source: S&P LCD Average EBITDA Multiples Paid in All LBOs.
[2] Annual Data, as of December 31, 2021

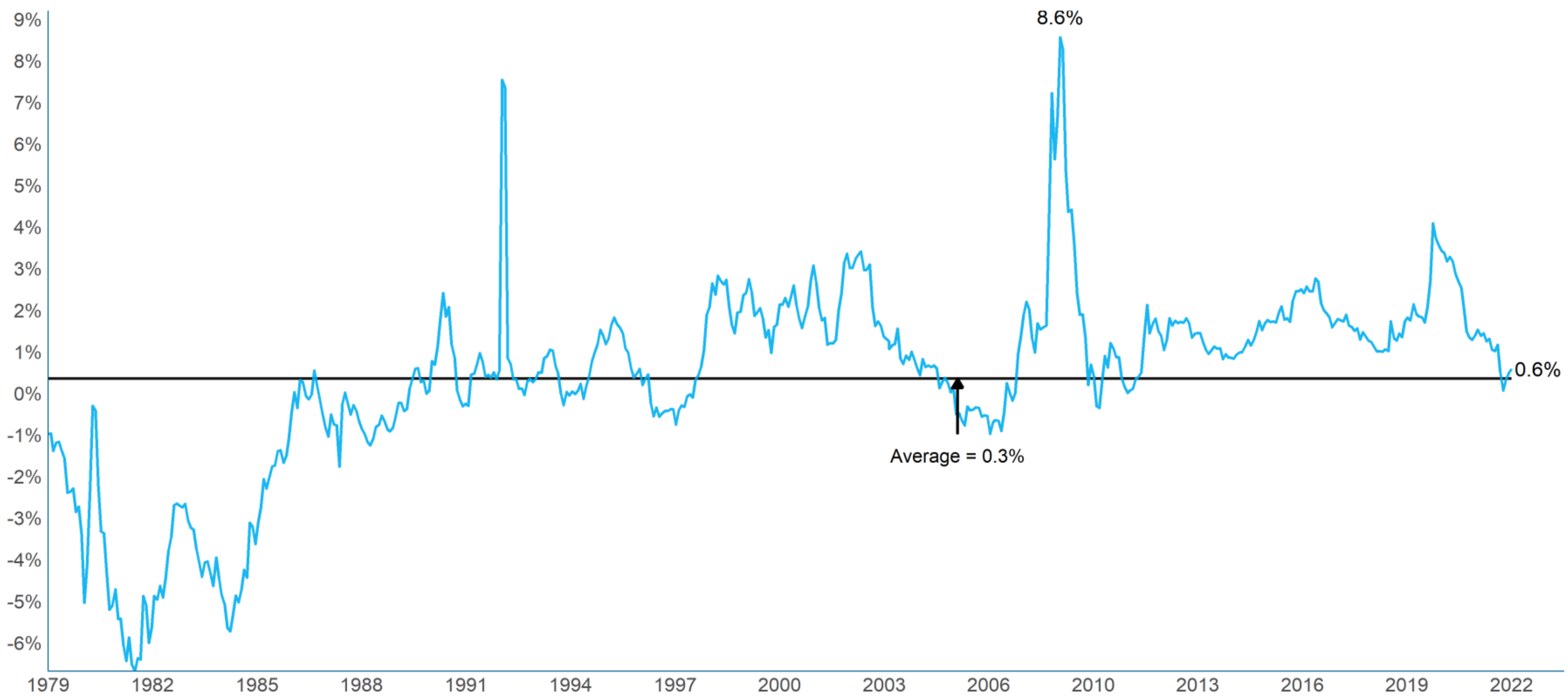
Core Real Estate Spread vs. Ten-Year Treasury[1]
(As of June 30, 2022)



→ This chart details one valuation metric for the private core real estate market. A higher (lower) figure indicates cheaper (more expensive) valuation.

[1] Core Real Estate Spread vs. Ten-Year Treasury – Source: Real Capital Analytics, US Treasury, Bloomberg, and Meketa Investment Group. Core Real Estate is proxied by weighted sector transaction-based indices from Real Capital Analytics and Meketa Investment Group.

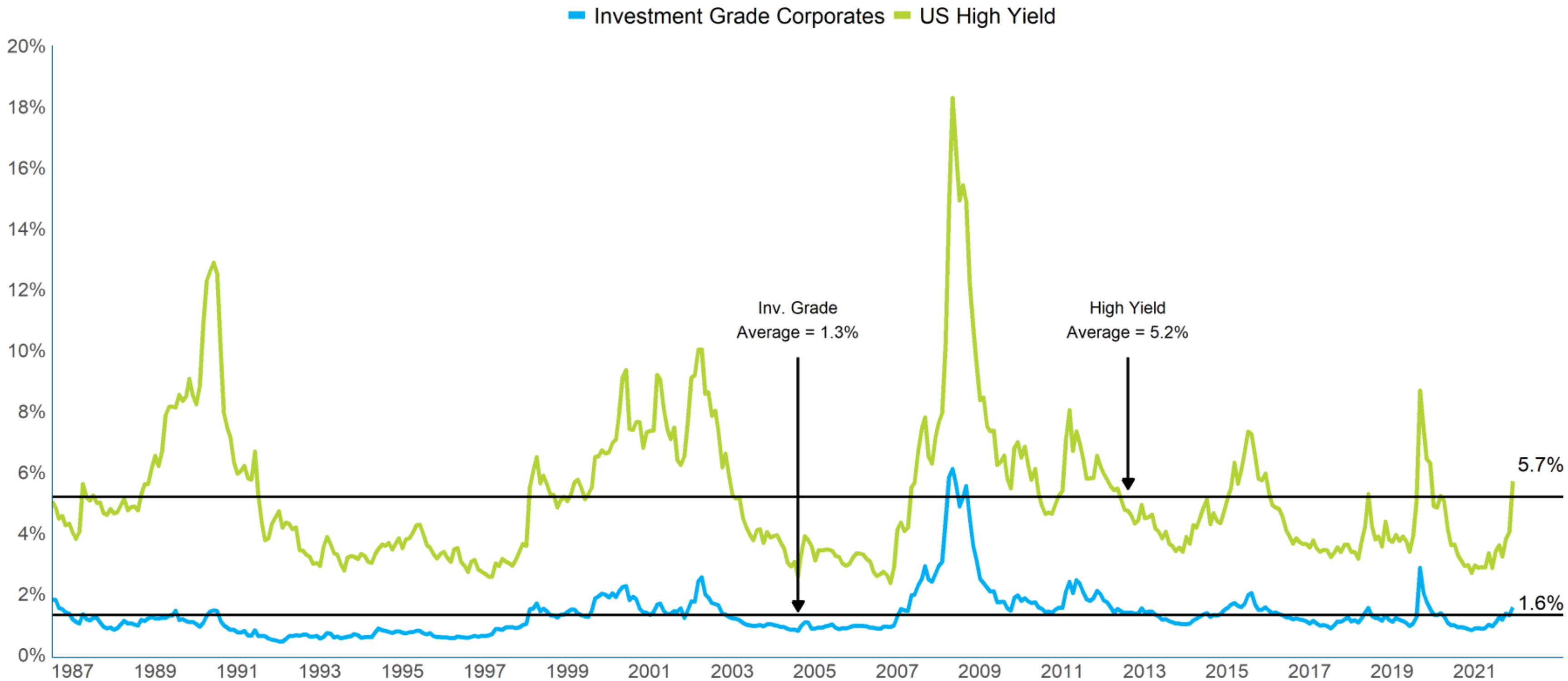
REITs Dividend Yield Spread vs. Ten-Year Treasury[1]
(As of June 30, 2022)



→ This chart details one valuation metric for the public REITs market. A higher (lower) figure indicates cheaper (more expensive) valuation.

[1] REITs Dividend Yield Spread vs. Ten-Year Treasury – Source: NAREIT, US Treasury. REITs are proxied by the yield for the NAREIT Equity Index.

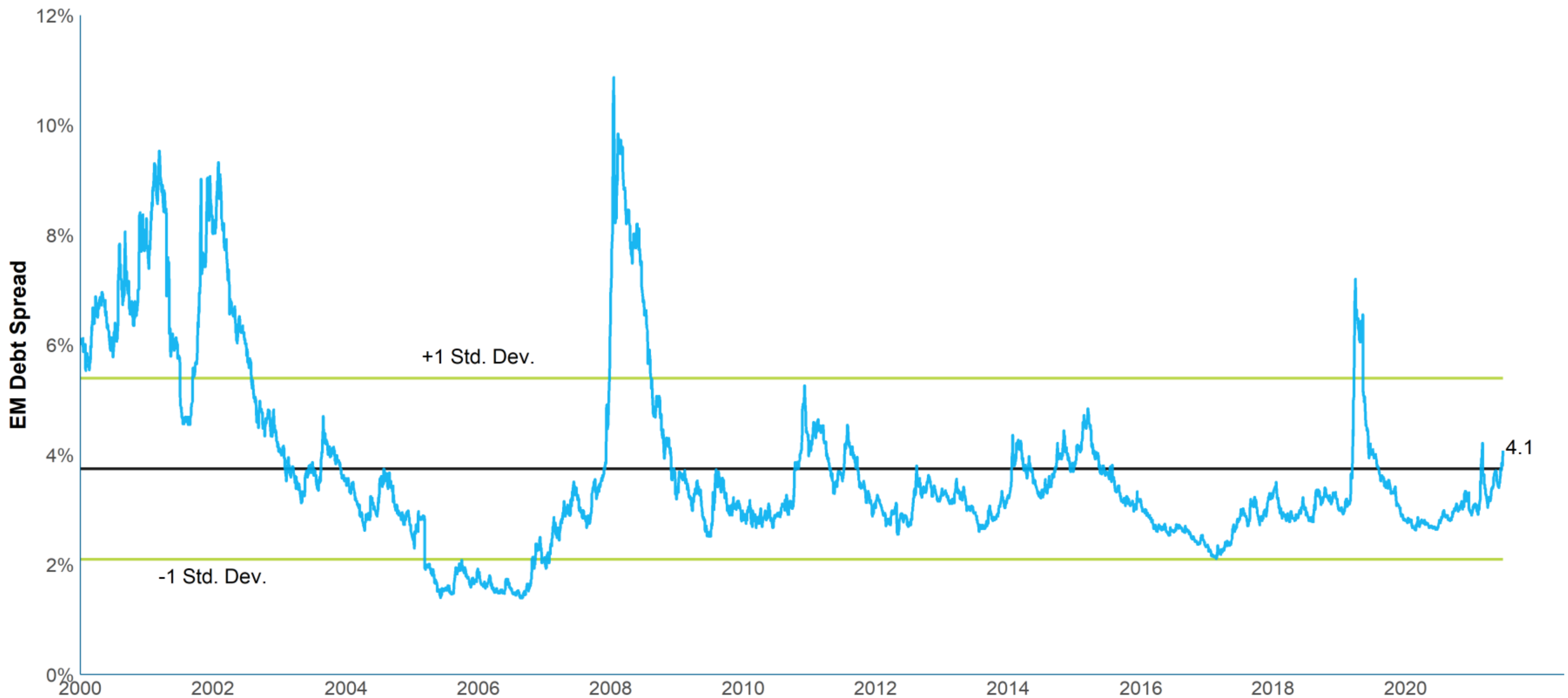
Credit Spreads[1]
(As of June 30, 2022)



→ This chart details one valuation metric for the US credit markets. A higher (lower) figure indicates cheaper (more expensive) valuation relative to history.

[1] Credit Spreads – Source: Bloomberg. High Yield is proxied by the Bloomberg High Yield Index and Investment Grade Corporates are proxied by the Bloomberg US Corporate Investment Grade Index. Spread is calculated as the difference between the Yield to Worst of the respective index and the 10-Year US Treasury yield.

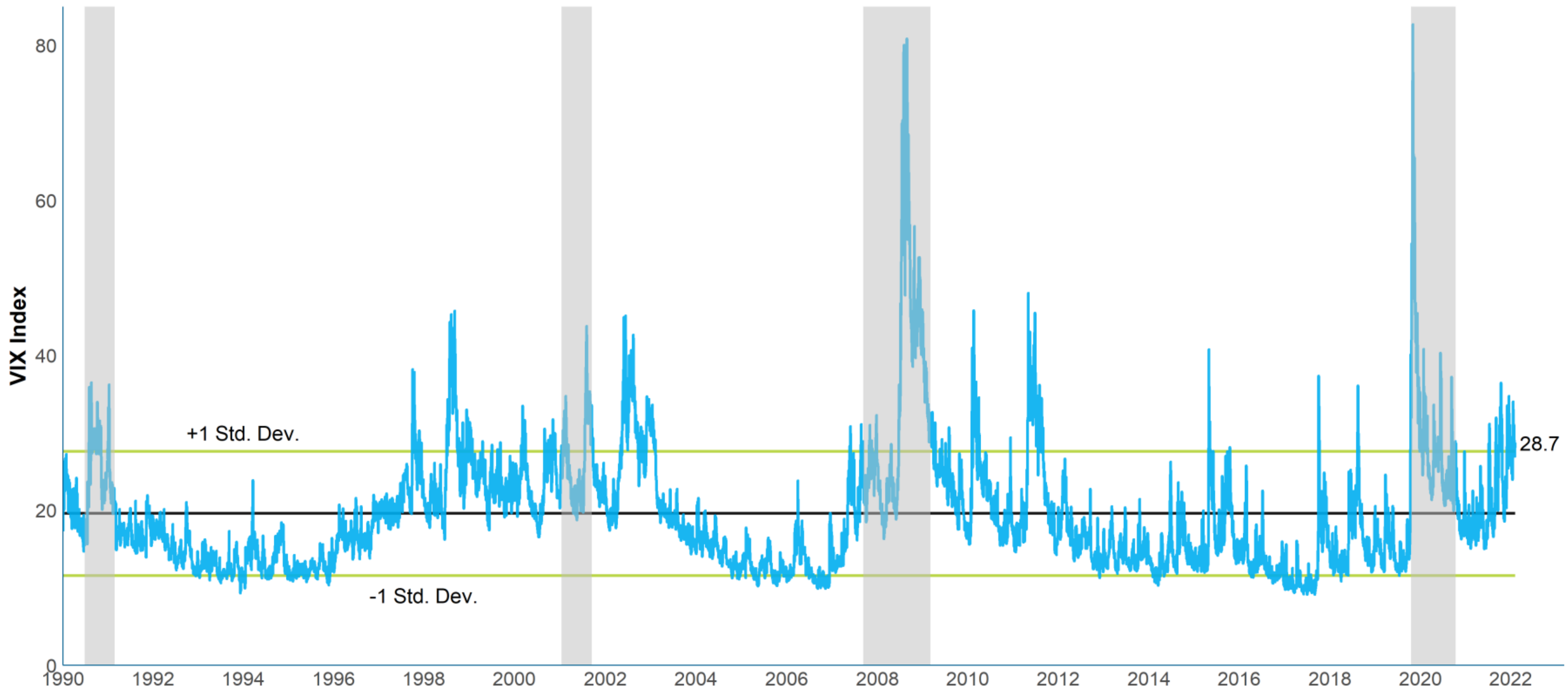
Emerging Market Debt Spreads[1]
(As of June 30, 2022)



→ This chart details one valuation metric for the EM debt markets. A higher (lower) figure indicates cheaper (more expensive) valuation relative to history.

[1] EM Spreads – Source: Bloomberg. Option Adjusted Spread (OAS) for the Bloomberg EM USD Aggregate Index.

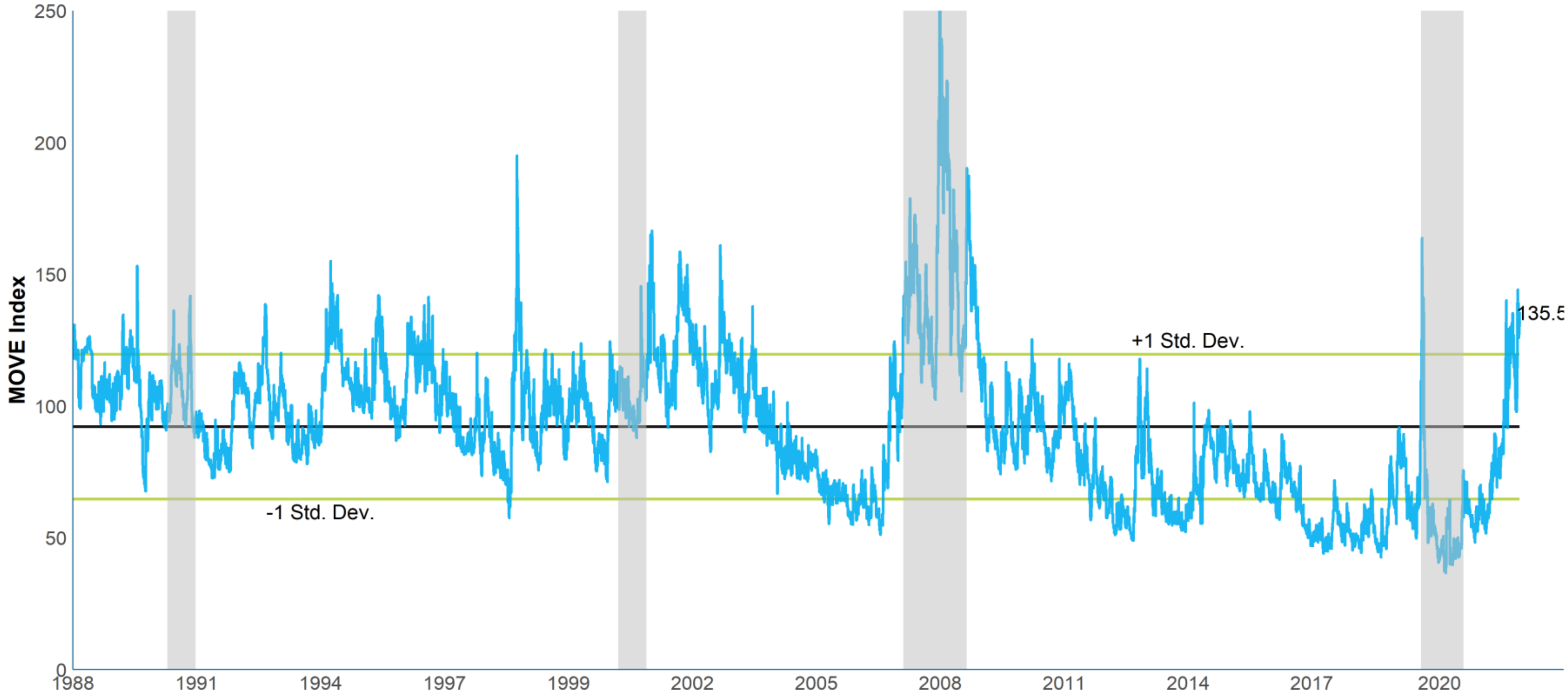
Equity Volatility[1]
(As of June 30, 2022)



→ This chart details historical implied equity market volatility. This metric tends to increase during times of stress/fear and while declining during more benign periods.

[1] Equity Volatility – Source: Bloomberg, and Meketa Investment Group. Equity Volatility proxied by VIX Index, a Measure of implied option volatility for US equity markets.

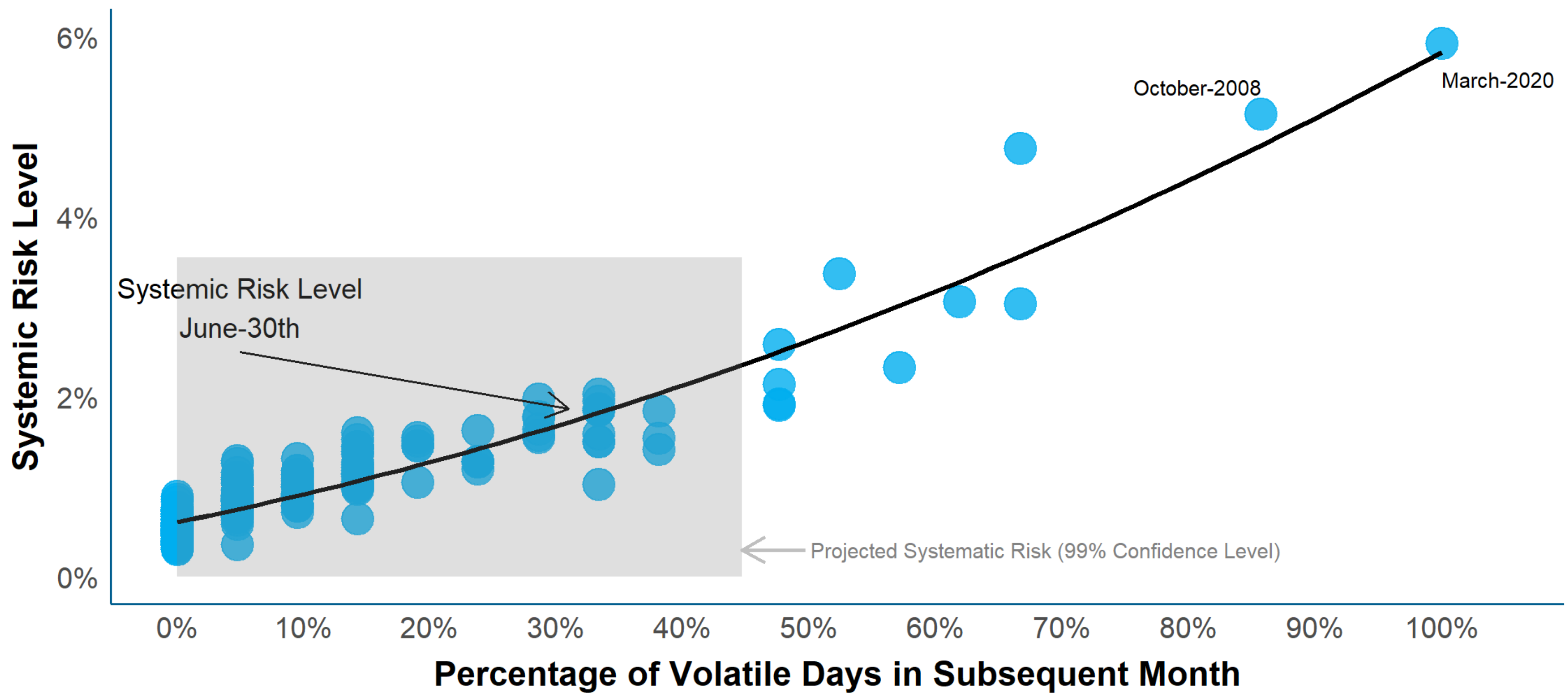
Fixed Income Volatility[1]
(As of June 30, 2022)



→ This chart details historical implied fixed income market volatility. This metric tends to increase during times of stress/fear and while declining during more benign periods.

[1] Fixed Income Volatility – Source: Bloomberg, and Meketa Investment Group. Fixed Income Volatility proxied by MOVE Index, a Measure of implied option volatility for US Treasury markets.

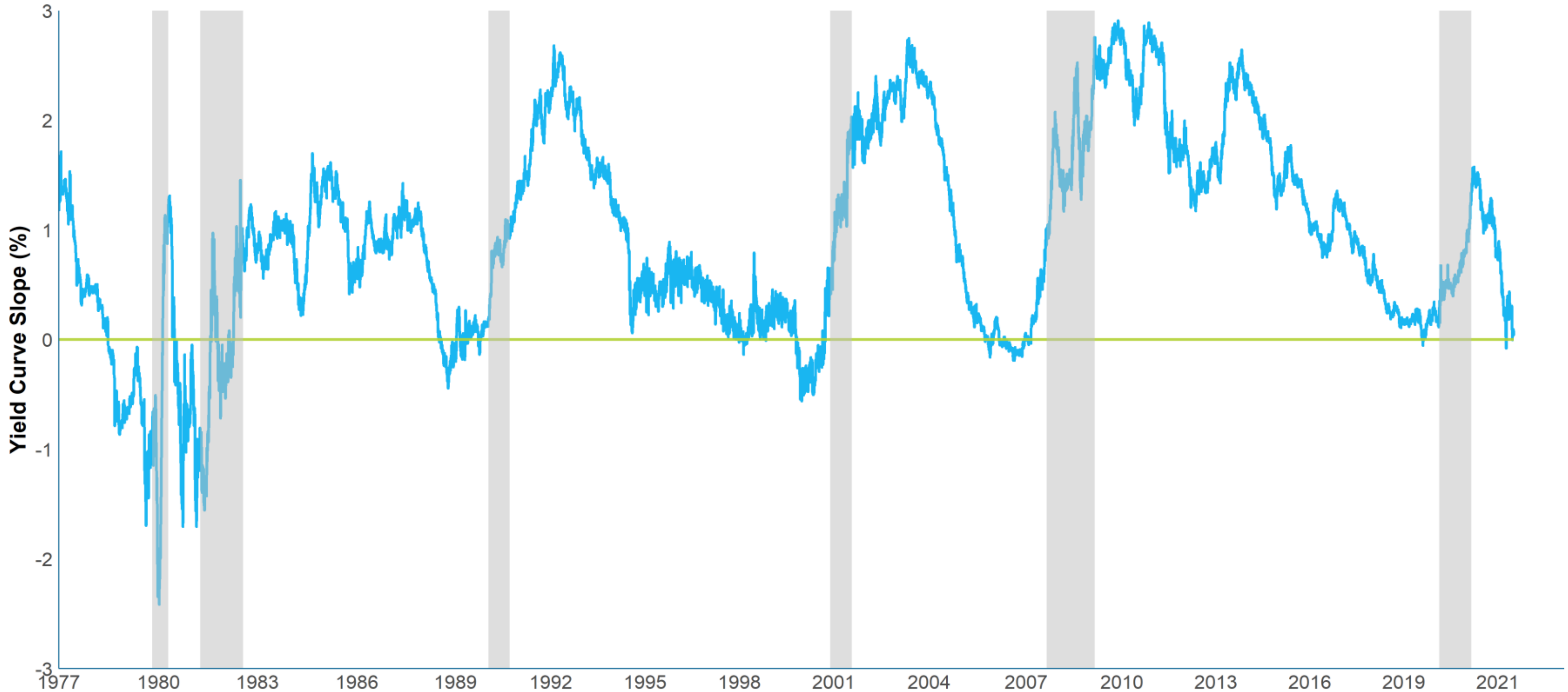
Systemic Risk and Volatile Market Days[1]
(As of June 30, 2022)



→ Systemic Risk is a measure of 'System-wide' risk, which indicates herding type behavior.

[1] Source: Meketa Investment Group. Volatile days are defined as the top 10 percent of realized turbulence, which is a multivariate distance between asset returns.

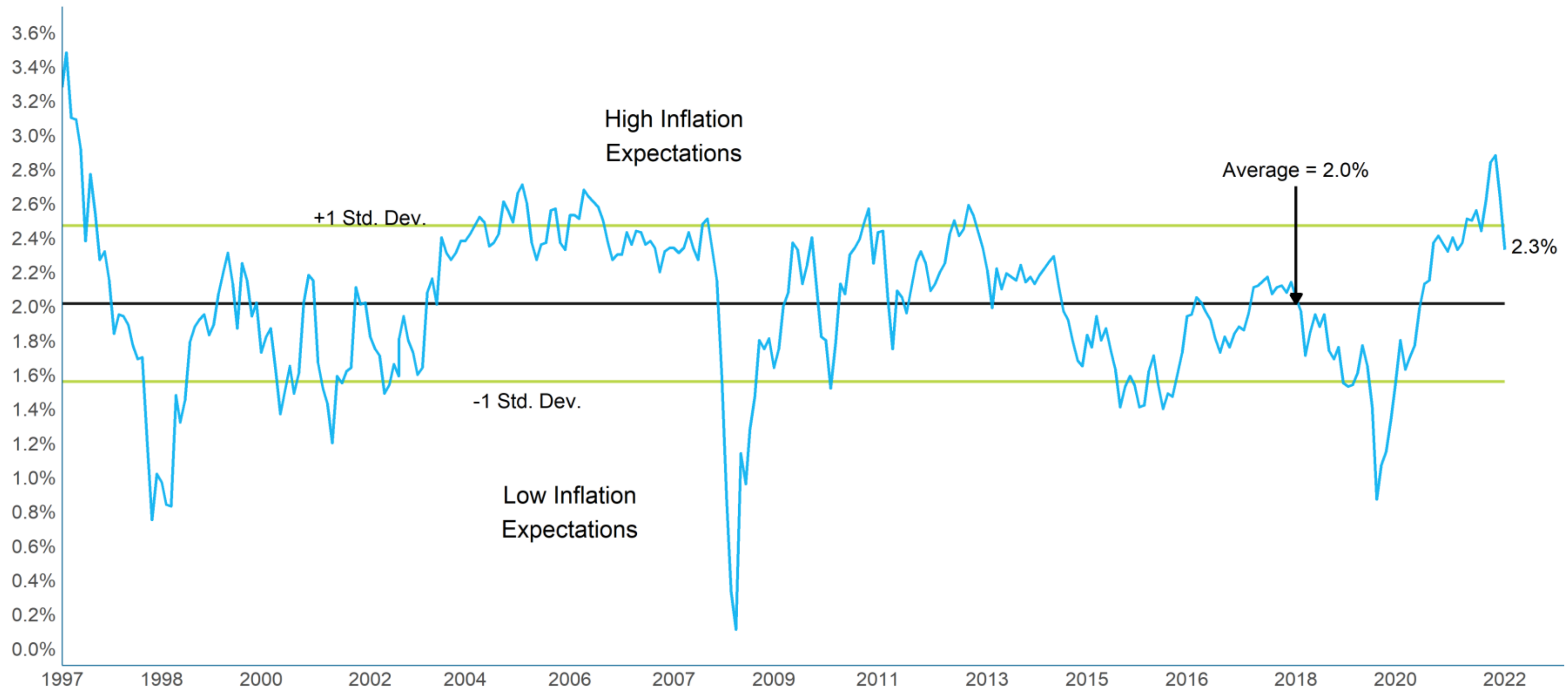
Yield Curve Slope (Ten Minus Two)[1]
(As of June 30, 2022)



→ This chart details the historical difference in yields between ten-year and two-year US Treasury bonds/notes. A higher (lower) figure indicates a steeper (flatter) yield curve slope.

[1] Yield Curve Slope (Ten Minus Two) – Source: Bloomberg, and Meketa Investment Group. Yield curve slope is calculated as the difference between the 10-Year US Treasury Yield and 2-Year US Treasury Yield.

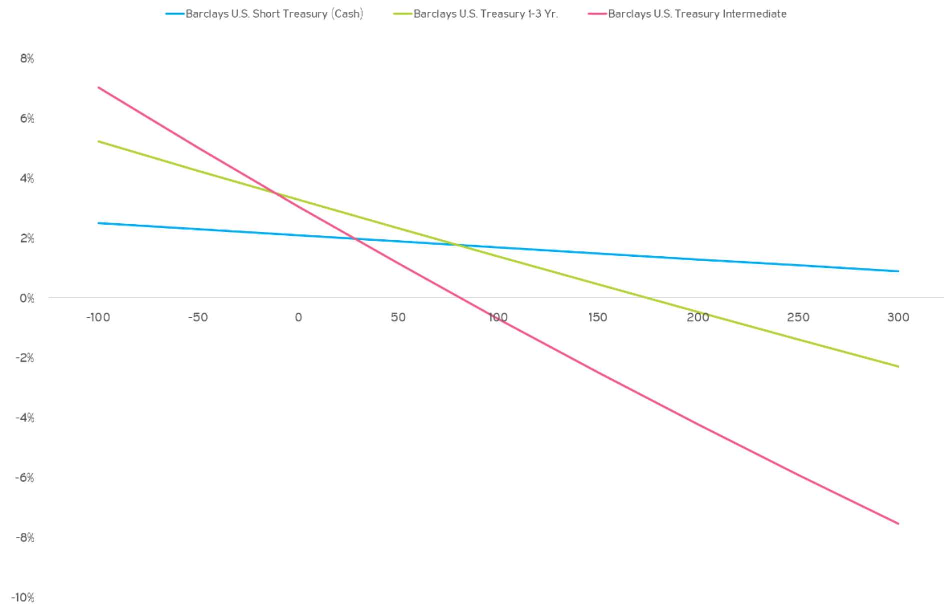
Ten-Year Breakeven Inflation[1]
(As of June 30, 2022)



→ This chart details the difference between nominal and inflation-adjusted US Treasury bonds. A higher (lower) figure indicates higher (lower) inflation expectations.

[1] Ten-Year Breakeven Inflation – Source: US Treasury and Federal Reserve. Inflation is measured by the Consumer Price Index (CPI-U NSA).

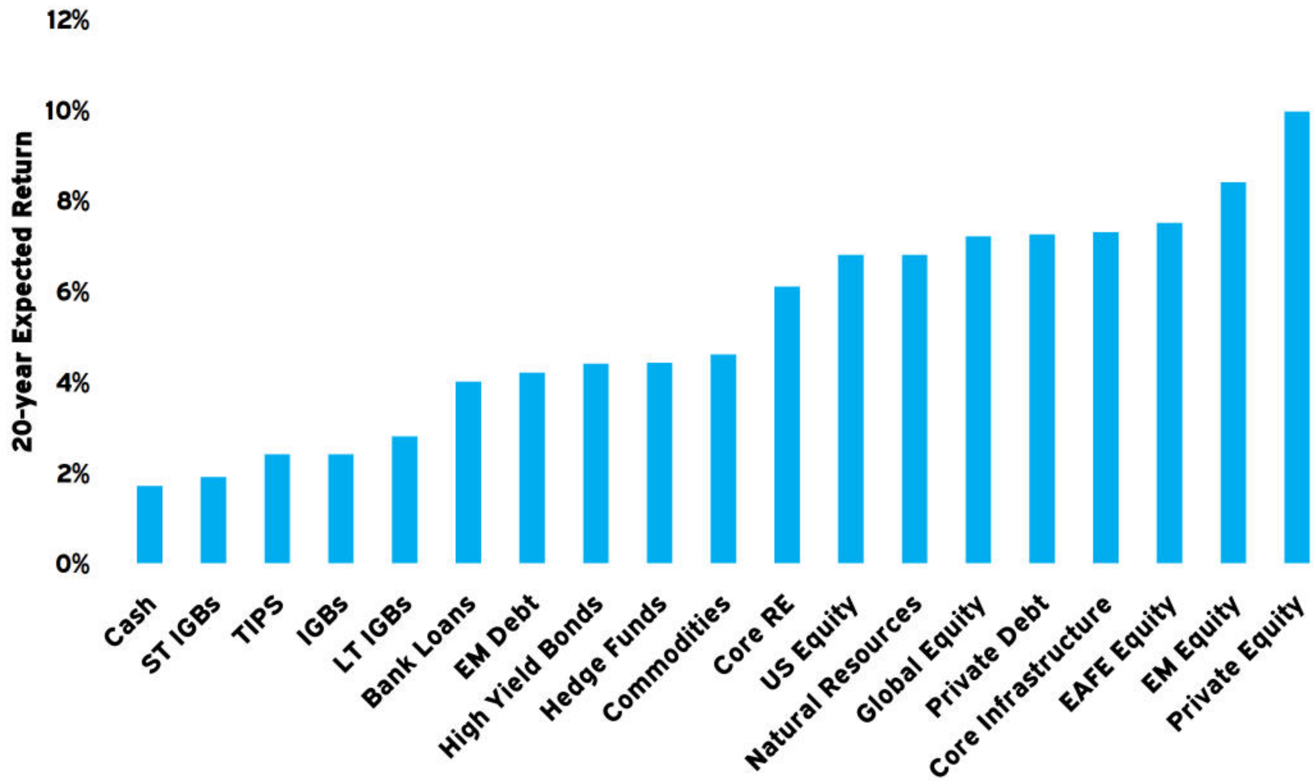
Total Return Given Changes in Interest Rates (bps)[1]
(As of June 30, 2022)



	Total Return for Given Changes in Interest Rates (bps)									Statistics	
	-100	-50	0	50	100	150	200	250	300	Duration	YTW
Barclays US Short Treasury (Cash)	2.5%	2.3%	2.1%	1.9%	1.7%	1.5%	1.3%	1.1%	0.9%	0.41	2.08%
Barclays US Treasury 1-3 Yr.	5.2%	4.2%	3.3%	2.3%	1.4%	0.4%	-0.5%	-1.4%	-2.3%	1.92	3.27%
Barclays US Treasury Intermediate	7.0%	5.0%	3.0%	1.1%	-0.7%	-2.5%	-4.2%	-5.9%	-7.6%	3.86	3.04%
Barclays US Treasury Long	22.4%	12.4%	3.3%	-4.8%	-12.0%	-18.2%	-23.5%	-27.9%	-31.3%	17.17	3.33%

[1] Data represents the expected total return from a given change in interest rates (shown in basis points) over a 12-month period assuming a parallel shift in rates. Source: Bloomberg, and Meketa Investment Group.

Long-Term Outlook – 20-Year Annualized Expected Returns[1]



→ This chart details Meketa's long-term forward-looking expectations for total returns across asset classes.

[1] Source: Meketa Investment Group's 2022 Annual Asset Study.

Appendix

Data Sources and Explanations[1]

→ US Equity Cyclically Adjusted P/E on S&P 500 Index – Source: Robert Shiller and Yale University.

→ Small Cap P/E (Russell 2000 Index) vs. Large Cap P/E (Russell 1000 Index) - Source: Russell Investments. Earnings figures represent 12-month "as reported" earnings.

→ Growth P/E (Russell 3000 Growth Index) vs. Value (Russell 3000 Value Index) P/E - Source: Bloomberg, MSCI, and Meketa Investment Group. Earnings figures represent 12-month "as reported" earnings.

→ Developed International Equity (MSCI EAFE) Cyclically Adjusted P/E – Source: MSCI and Bloomberg. Earnings figures represent the average of monthly "as reported" earnings over the previous ten years.

→ Emerging Market Equity (MSCI Emerging Markets Index) Cyclically Adjusted P/E – Source: MSCI and Bloomberg. Earnings figures represent the average of monthly "as reported" earnings over the previous ten years.

→ Private Equity Multiples – Source: S&P LCD Average EBITDA Multiples Paid in All LBOs.

→ Core Real Estate Spread vs. Ten-Year Treasury – Source: Real Capital Analytics, US Treasury, Bloomberg, and Meketa Investment Group. Core Real Estate is proxied by weighted sector transaction-based indices from Real Capital Analytics and Meketa Investment Group.

[1] All Data as of June 30, 2022, unless otherwise noted.

Appendix

Data Sources and Explanations[1]

→ REITs Dividend Yield Spread vs. Ten-Year Treasury – Source: NAREIT, US Treasury. REITs are proxied by the yield for the NAREIT Equity Index.

→ Credit Spreads – Source: Bloomberg High Yield is proxied by the Bloomberg High Yield Index and Investment Grade Corporates are proxied by the Bloomberg US Corporate Investment Grade Index.

- Spread is calculated as the difference between the Yield to Worst of the respective index and the 10-Year Treasury Yield.

→ EM Debt Spreads – Source: Bloomberg, and Meketa Investment Group. Option Adjusted Spread (OAS) for the Bloomberg EM USD Aggregate Index.

→ Equity Volatility – Source: Bloomberg, and Meketa Investment Group. Equity Volatility proxied by VIX Index, a Measure of implied option volatility for US equity markets.

→ Fixed Income Volatility – Source: Bloomberg, and Meketa Investment Group. Equity Volatility proxied by MOVE Index, a Measure of implied option volatility for US Treasury markets.

→ Systemic Risk and Volatile Market Days – Source: Meketa Investment Group. Volatile days are defined as the top 10 percent of realized turbulence, which is a multivariate distance between asset returns.

→ Systemic Risk, which measures risk across markets, is important because the more contagion of risk that exists between assets, the more likely it is that markets will experience volatile periods.

[1] All Data as of June 30, 2022, unless otherwise noted.

Appendix

Data Sources and Explanations[1]

→ Yield Curve Slope (Ten Minus Two) – Source: Bloomberg, and Meketa Investment Group. Yield curve slope is calculated as the difference between the 10-Year US Treasury Yield and 2-Year US Treasury Yield.

→ Ten-Year Breakeven Inflation – Source: US Treasury and Federal Reserve. Inflation is measured by the Consumer Price Index (CPI-U NSA).

[1] All Data as of June 30, 2022, unless otherwise noted.

Meketa Market Sentiment Indicator

Explanation, Construction and Q&A

Meketa has created the MIG Market Sentiment Indicator (MIG-MSI) to complement our valuation-focused Risk Metrics. This measure of sentiment is meant to capture significant and persistent shifts in long-lived market trends of economic growth risk, either towards a risk-seeking trend or a risk-aversion trend.

This appendix explores:

→ What is the Meketa Market Sentiment Indicator?

→ How do I read the indicator graph?

→ How is the Meketa Market Sentiment Indicator constructed?

→ What do changes in the indicator mean?

Meketa has created a market sentiment indicator for monthly publication (the MIG-MSI – see below) to complement Meketa's Risk Metrics.

→ Meketa's Risk Metrics, which rely significantly on standard market measures of relative valuation, often provide valid early signals of increasing long-term risk levels in the global investment markets. However, as is the case with numerous valuation measures, the Risk Metrics may convey such risk concerns long before a market correction take place. The MIG-MSI helps to address this early-warning bias by measuring whether the markets are beginning to acknowledge key Risk Metrics trends, and / or indicating non-valuation-based concerns. Once the MIG-MSI indicates that the market sentiment has shifted, it is our belief that investors should consider significant action, particularly if confirmed by the Risk Metrics. Importantly, Meketa believes the Risk Metrics and MIG-MSI should always be used in conjunction with one another and never in isolation. The questions and answers below highlight and discuss the basic underpinnings of the Meketa MIG-MSI:

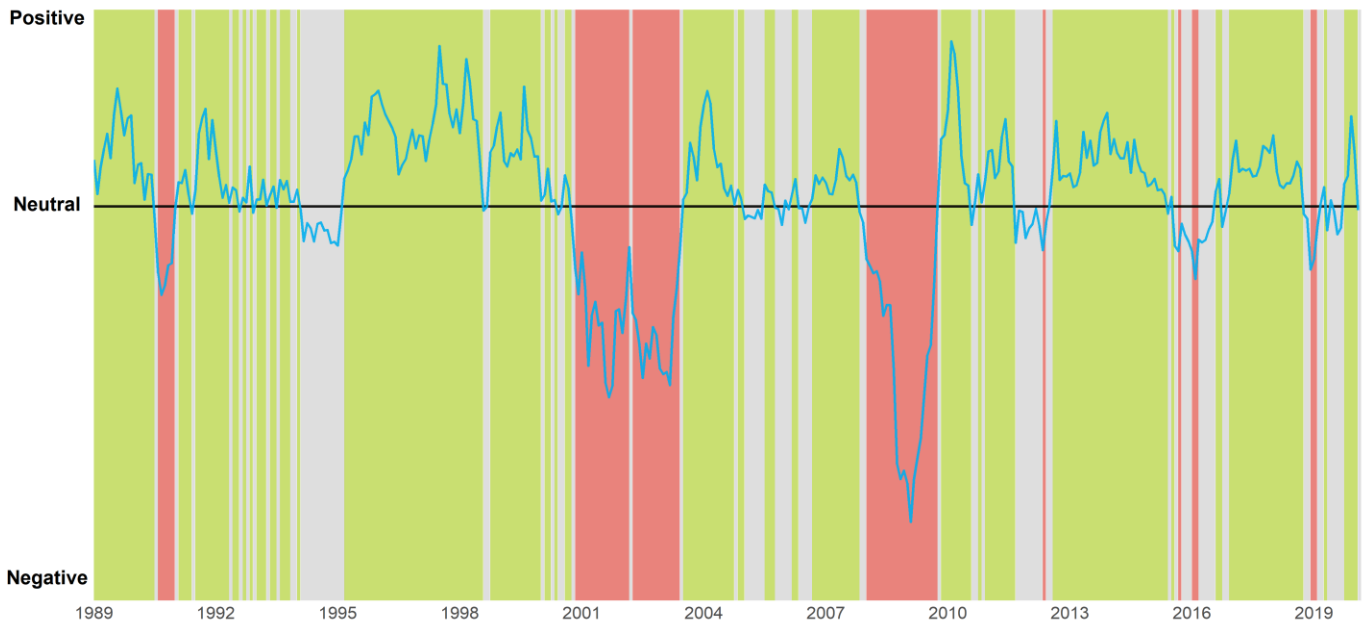
What is the Meketa Market Sentiment Indicator (MIG-MSI)?

→ The MIG-MSI is a measure meant to gauge the market's sentiment regarding economic growth risk. Growth risk cuts across most financial assets and is the largest risk exposure that most portfolios bear. The MIG-MSI takes into account the momentum (trend over time, positive or negative) of the economic growth risk exposure of publicly traded stocks and bonds, as a signal of the future direction of growth risk returns; either positive (risk seeking market sentiment), or negative (risk averse market sentiment).

How do I read the Meketa Market Sentiment Indicator graph?

→ Simply put, the MIG-MSI is a color-coded indicator that signals the market's sentiment regarding economic growth risk. It is read left to right chronologically. A green indicator on the MIG-MSI indicates that the market's sentiment towards growth risk is positive. A gray indicator indicates that the market's sentiment towards growth risk is neutral or inconclusive. A red indicator indicates that the market's sentiment towards growth risk is negative. The black line on the graph is the level of the MIG-MSI. The degree of the signal above or below the neutral reading is an indication the signal's current strength.

→ Momentum as we are defining it is the use of the past behavior of a series as a predictor of its future behavior.



How is the Meketa Market Sentiment Indicator (MIG-MSI) Constructed?

→ The MIG-MSI is constructed from two sub-elements representing investor sentiment in stocks and bonds:

- Stock return momentum: Return momentum for the S&P 500 Equity Index (trailing 12-months).
- Bond yield spread momentum: Momentum of bond yield spreads (excess of the measured bond yield over the identical duration US Treasury bond yield) for corporate bonds (trailing 12-months) for both investment grade bonds (75% weight) and high yield bonds (25% weight).
- Both measures are converted to Z-scores and then combined to get an "apples to apples" comparison without the need of re-scaling.

→ The black line reading on the graph is calculated as the average of the stock return momentum measure and the bonds spread momentum measure[1]. The color reading on the graph is determined as follows:

- If both stock return momentum and bond spread momentum are positive = GREEN (positive).
- If one of the momentum indicators is positive, and the other negative = GRAY (inconclusive).
- If both stock return momentum and bond spread momentum are negative = RED (negative).

[1] Momentum as we are defining it is the use of the past behavior of a series as a predictor of its future behavior.
"Time Series Momentum" Moskowitz, Ooi, Pedersen, August 2010. *http://pages.stern.nyu.edu/~lpederse/papers/TimeSeriesMomentum.pdf*

What does the Meketa Market Sentiment Indicator (MIG-MSI) mean? Why might it be useful?

→ There is strong evidence that time series momentum is significant and persistent. Across an extensive array of asset classes, the sign of the trailing 12-month return (positive or negative) is indicative of future returns (positive or negative) over the next 12-month period. The MIG-MSI is constructed to measure this momentum in stocks and corporate bond spreads. A reading of green or red is agreement of both the equity and bond measures, indicating that it is likely that this trend (positive or negative) will continue over the next 12 months. When the measures disagree, the indicator turns gray. A gray reading does not necessarily mean a new trend is occurring, as the indicator may move back to green, or into the red from there. The level of the reading (black line) and the number of months at the red or green reading, gives the user additional information on which to form an opinion, and potentially take action.

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REPORT

SBI Comprehensive Performance Report

June 30, 2022

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Comprehensive Performance Report

June 30, 2022

Description of SBI Investment Programs

The Minnesota State Board of Investment is responsible for the investment management of various retirement funds, trust funds and cash accounts.

Combined Funds

The Combined Funds represent the assets for both the active and retired public employees in the statewide retirement systems, the biggest of which are the Public Employees Retirement Association (PERA), the Teachers Retirement Association (TRA), and the Minnesota State Retirement System (MSRS). The SBI commingles the assets of these plans into the Combined Funds to capture investment efficiencies. All assets in the Combined Funds are managed externally by investment management firms retained by contract.

Fire Plans + Other Retirement Plans

Fire Plans and Other Retirement Plans include assets from volunteer fire relief plans and other public retirement plans with authority to invest with the SBI, if they so choose. Fire Plans that are not eligible to be consolidated with Public Employees Retirement Association (PERA) or elect not to be administered by PERA may invest their assets with the SBI using the same asset pools as the Combined Funds. The Statewide Volunteer Firefighter Retirement Plan is administered by PERA and has its own investment vehicle called the Volunteer Firefighter Account.

Participant Directed Investment Program

The Participant Directed Investment Program (PDIP) provides investment vehicles for a variety of retirement or other tax-advantaged savings plans. Investment goals among the PDIP’s many participants are varied. In order to meet the variety of goals, participants may allocate their investments among one or more accounts that are appropriate for their needs within statutory requirements and rules established by the participating organizations.

Non-Retirement Funds

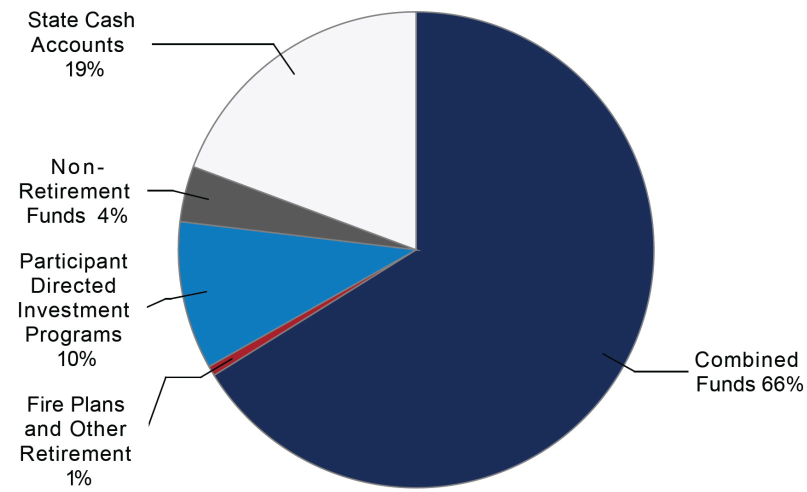
The Non-Retirement Funds are funds established by the State of Minnesota and other government entities for various purposes which include the benefit of public schools, the environment, other post-employment benefits, workers compensation insurance, and other purposes.

State Cash

The State Cash accounts are cash balances of state government funds including the State General Fund. Most accounts are invested by SBI staff through a short-term pooled fund referred to as the Treasurer's Cash Pool. It contains the cash balances of special or dedicated accounts necessary for the operation of certain State agencies and non-dedicated cash in the State Treasury. Because of special legal restrictions, a small number of cash accounts cannot be commingled.

Funds Under Management

	$ Millions
Combined Funds	**$81,320**
Fire Plans + Other Retirement Plans	**831**
Participant Directed Investment Program	**12,368**
State Deferred Compensation Plan	8,481
Health Care Savings Plan	1,578
Unclassified Employees Retirement Plan	335
Hennepin County Supplemental Retirement Plan	156
PERA Defined Contribution Plan	83
Minnesota College Savings Plan	1,709
Minnesota Achieving a Better Life Experience Plan	27
Non-Retirement Funds	**4,652**
Assigned Risk Plan	255
Permanent School Fund	1,743
Environmental Trust Fund	1,448
Closed Landfill Investment Fund	116
Miscellaneous Trust Funds	317
Other Postemployment Benefits Accounts	773
State Cash	**25,585**
Invested Treasurer's Cash	25,494
Other State Cash Accounts	91
Total SBI AUM	**124,756**



Note: Differentials within column amounts may occur due to rounding

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Performance Reporting Legend

Manager Level Data
Aggregate Level Data
Sub-Asset Class Level Data
Asset Class Level Data

Note:

Throughout this report performance is calculated net of investment management fees, gross of administrative fees. Aggregates include terminated managers, and returns for all periods greater than one year are annualized. Inception Date and Since Inception Returns refer to the date of retention by the SBI. FYTD refers to the return generated by an account since July 1 of the most recent year. For historical benchmark details, please refer to the addendum of this report. Some aggregate inception to date return are based portfolio management decisions to re-group manager accounts in different or newly created aggregates.

Combined Funds

June 30, 2022

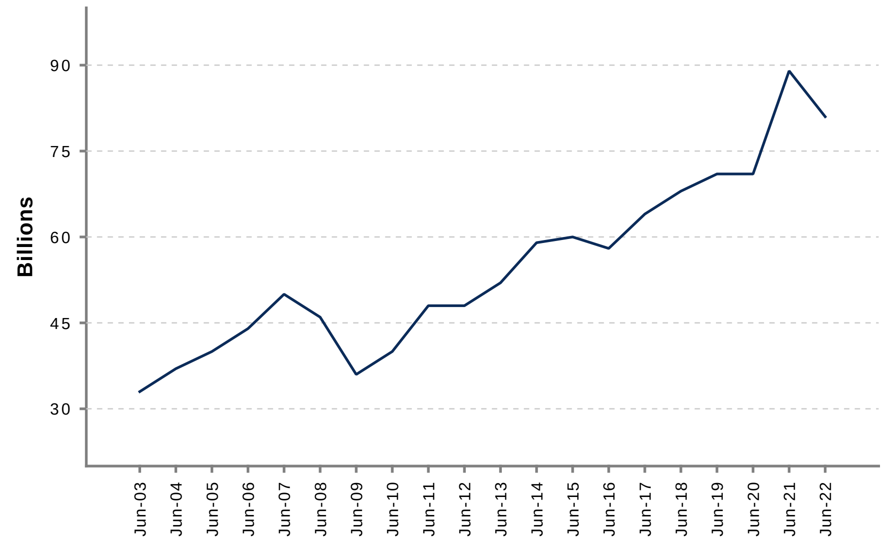
Combined Funds Summary

Combined Funds Change in Market Value ($Millions)

	One Quarter
Combined Funds	
Beginning Market Value	$89,861
Net Contributions	-665
Investment Return	-7,877
Ending Market Value	81,320

The change in market value of the Combined Funds since the end of last quarter is due to net contributions and investment returns.

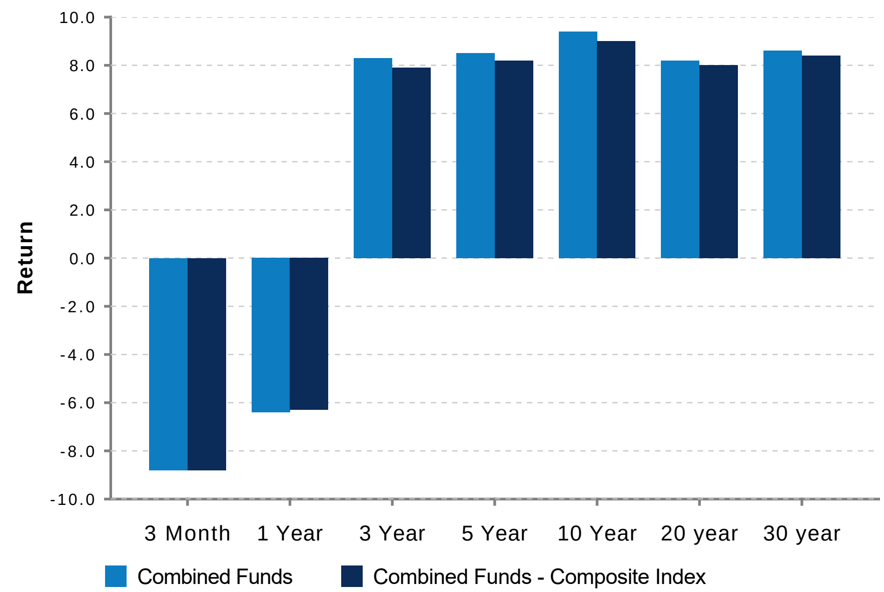
Asset Growth



Performance (Net of Fees)

The Combined Funds' performance is evaluated relative to a composite of public market index and private market investment returns. The Composite performance is calculated by multiplying the beginning of month Composite weights and the monthly returns of the asset class benchmarks.

	Qtr	FYTD	1 Yr	3 Yr	5 Yr	10 Yr	20 Yr	30 Yr
Combined Funds	-8.8%	-6.4%	-6.4%	8.3%	8.5%	9.4%	8.2%	8.6%
Combined Funds - Composite Index	-8.8%	-6.3%	-6.3%	7.9%	8.2%	9.0%	8.0%	8.4%
Excess	0.0%	-0.1%	-0.1%	0.5%	0.3%	0.3%	0.2%	0.2%

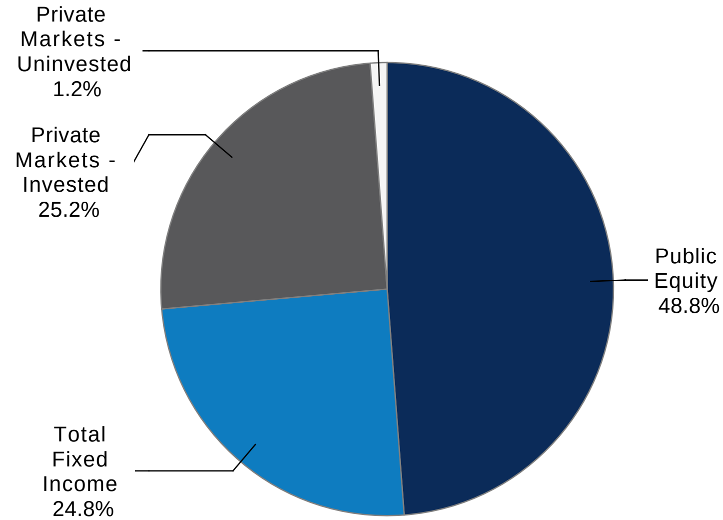


Combined Funds Summary

Asset Mix

The Combined Funds actual asset mix relative to the Strategic Asset Allocation Policy Target is shown below. Any uninvested portion of the Private Markets allocation is held in Public Equity.

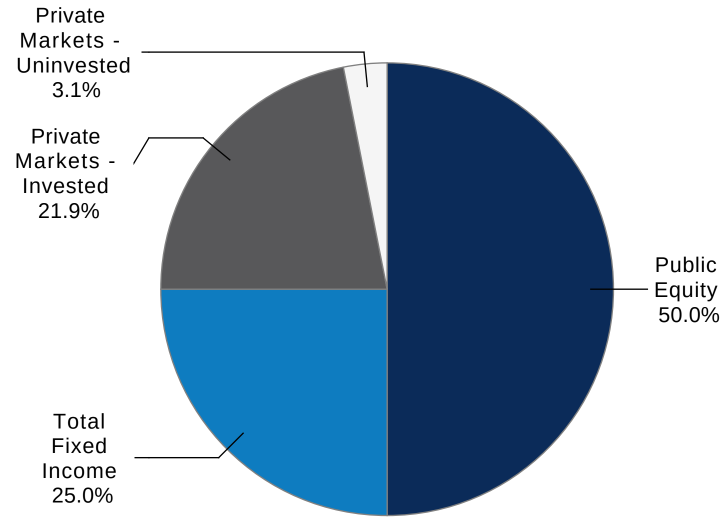
	(Millions)	Actual Mix	Policy Target
Public Equity	$39,693	48.8%	50.0%
Total Fixed Income	20,183	24.8	25.0
Private Markets - Total	21,444	26.4	25.0
Private Markets - Invested	20,455	25.2	
Private Markets - Uninvested	989	1.2	
TOTAL	**81,320**	**100.0**	



Composite Index Comparison

The Combined Funds Composite is set as the Strategic Asset Allocation Policy Target. Asset class weights for Private Markets - Invested and Private Markets - Uninvested are reset at the start of each month. The Combined Funds Composite weighting shown below is as of the first day of the quarter.

	Policy Weight	Market Index
Public Equity	50.0%	Public Equity Benchmark
Total Fixed Income	25.0	Total Fixed Income Benchmark
Private Markets - Invested	21.9	Private Markets
Private Markets - Uninvested	3.1	S&P 500



Combined Funds Asset Class Performance Summary

Public Equity

The Combined Funds Public Equity includes Domestic Equity, International Equity and Global Equity.

The Public Equity benchmark is 67% Russell 3000 and 33% MSCI ACWI ex US (net).

	Market Value	Actual Weight	Policy Weight	Last Qtr	FYTD	1 Year	3 Year	5 Year	10 Year	20 Year	30 Year
Public Equity	$39.7	48.8%	50.0%	-15.4%	-15.5%	-15.5%	7.3%	8.1%	10.5%	8.2%	8.8%
Public Equity Benchmark				-15.7	-15.7	-15.7	6.9	7.9			
Excess				0.4	0.1	0.1	0.4	0.2			
Domestic Equity	26.8	33.0	33.5	-16.8	-14.2	-14.2	9.8	10.6	12.6	9.0	9.5
Domestic Equity Benchmark				-16.7	-13.9	-13.9	9.7	10.5	12.5	9.1	9.7
Excess				-0.1	-0.3	-0.3	0.1	0.1	0.0	-0.1	-0.1
International Equity	12.0	14.8	16.5	-11.9	-17.4	-17.4	2.6	3.3	5.6	6.1	
International Equity Benchmark				-13.7	-19.4	-19.4	1.3	2.5	4.8	5.8	
Excess				1.8	2.0	2.0	1.3	0.8	0.8	0.3	
Global Equity	0.8	1.0	0.0	-17.1	-27.9	-27.9					
MSCI AC World Index Net				-15.7	-15.8	-15.8					
Excess				-1.5	-12.1	-12.1					

Note:

Prior to 6/30/16 the returns of Domestic and International Equity were not reported as a Total Public Equity return. For additional information regarding historical asset class performance and benchmarks, please refer to the Combined Funds Performance Report.

Combined Funds Asset Class Performance Summary

Total Fixed Income

The Combined Funds Fixed Income program includes Core/Core Plus, Return Seeking Fixed Income, Treasuries and Laddered Bond + Cash.

The Total Fixed Income benchmark is 40% Bloomberg U.S. Aggregate Index/ 40% Bloomberg Treasury 5+ Years Index/ 20% ICE BofA US 3-Month Treasury Bill.

	Market Value	Actual Weight	Policy Weight	Last Qtr	FYTD	1 Year	3 Year	5 Year	10 Year	20 Year	30 Year
Total Fixed Income	$20.2	24.8%	25.0%	-5.7%	-10.5%	-10.5%	-0.1%	1.8%	2.4%	4.1%	5.3%
Total Fixed Income Benchmark				-4.8%	-9.6%	-9.6%	-0.2%				
Excess				-0.9%	-1.0%	-1.0%	0.2%				
Core/Core Plus	$4.3	5.3%	5.0	-5.7%	-11.7%	-11.7%	-0.5%	1.3%	2.1%	4.0%	5.2%
Core Bonds Benchmark				-4.7%	-10.3%	-10.3%	-0.9%	0.9%	1.5%	3.6%	4.8%
Excess				-1.0%	-1.4%	-1.4%	0.4%	0.4%	0.6%	0.4%	0.4%
Return Seeking Fixed Income	$3.9	4.8%	5.0	-7.6%	-12.3%	-12.3%					
Bloomberg U.S. Aggregate				-4.7%	-10.3%	-10.3%					
Excess				-2.9%	-2.1%	-2.1%					
Treasury Protection	$7.7	9.5%	10.0	-7.3%	-13.5%	-13.5%	-1.8%				
Bloomberg Treasury 5+ Year				-7.2%	-13.5%	-13.5%	-1.8%				
Excess				-0.1%	-0.0%	-0.0%	0.0%				
Laddered Bond + Cash	$4.3	5.3%	5.0	-0.0%	-0.3%	-0.3%	0.5%	1.0%	0.7%	1.5%	3.1%
ICE BofA US 3-Month Treasury Bill				0.1%	0.2%	0.2%	0.6%	1.1%	0.6%	1.3%	2.4%
Excess				-0.1%	-0.5%	-0.5%	-0.2%	-0.1%	0.1%	0.2%	0.7%

Note:

Since 12/1/2020 the Total Fixed Income includes allocations to Core/Core Plus Bonds, Return Seeking Bonds, Treasuries and Laddered Bond + Cash. From 7/1/2020 to 11/30/2020 Total Fixed Income was Core Bonds, Treasuries and Cash. From 2/1/2018-6/30/20 Total Fixed Income was Core Bonds and Treasuries. Prior to 2/1/2018, Total Fixed Income was Core Bonds. For additional information regarding historical asset class performance and benchmarks, please refer to the Combined Funds Performance Report.

Combined Funds Asset Class Performance Summary

Private Markets

	Last Qtr	FYTD	1 Year	3 Year	5 Year	10 Year	20 Year	25 Year	30 Year
Private Markets - Invested	4.0%	24.8%	24.8%	18.7%	16.3%	13.8%	14.0%	13.9%	13.3%
Private Markets -Uninvested (1)	-16.0%	-10.2%	-10.2%						
Private Equity	1.2%	22.1%	22.1%	23.6%	20.9%	17.5%	15.9%	15.3%	15.5%
Private Credit	6.7%	21.3%	21.3%	13.0%	12.3%	13.4%	12.6%	13.1%	
Resources	14.5%	33.8%	33.8%	5.3%	4.2%	2.9%	13.3%	12.8%	13.0%
Real Estate	13.7%	43.7%	43.7%	19.4%	15.8%	14.0%	10.3%	11.1%	9.6%

Private Markets

The time-weighted rates of return for the Private Markets portfolio are shown here. Private Markets included Private Equity, Private Credit, Resources, and Real Estate. Some of the existing investments are relatively immature and returns may not be indicative of future results.

Private Equity Investments - The objectives of the Private Equity portfolio, which may include leveraged buyouts, growth equity, venture capital and special situations, are to achieve attractive returns and to provide overall portfolio diversification to the total plan.

Private Credit Investments - The objectives of the Private Credit portfolio, which may include mezzanine debt, direct lending, and other forms of non-investment grade fixed income instruments, are to achieve a high total return over a full market cycle and to provide some degree of downside protection and typically provide current income in the form of a coupon. In certain situations, investments in the Private Credit portfolio also provide an equity component of return in the form of warrants or re-organized equity.

Resource Investments - The objectives of the Resources portfolio, which may include energy, infrastructure, and other hard assets, are to provide protection against the risks associated with inflation and to provide overall portfolio diversification to the total plan.

Real Estate Investments - The objectives of the Real Estate portfolio, which may include core and non-core real estate investments, are to achieve attractive returns, preserve capital, provide protection against risks associated with inflation, and provide overall portfolio diversification to the total plan.

The SBI also monitors Private Markets performance using money-weighted return metrics such as Internal Rate of Return and Multiple of Invested Capital. For money-weighted return metrics please refer to the Combined Funds Performance Report.

(1) The Uninvested portion of the Private Markets allocation is invested in a combination of a passively managed S&P 500 Index strategy and a cash overlay strategy invested in equity derivatives and cash.
Source: State Street Bank

Asset Class & Manager Performance
June 30, 2022

The assets of the Combined Funds are allocated to public equity, fixed income, private markets, and cash. Each asset class may be further differentiated by geography, management style, and/or strategy. Managers are hired to manage the assets accordingly. This diversification is intended to reduce wide fluctuations in investment returns on a year-to-year basis and enhances the Funds' ability to meet or exceed the actuarial return target over the long-term.

The Combined Funds consist of the assets of active employees and retired members of the statewide retirement plans. The SBI commingles the assets of these plans into the Combined Funds to capture investment efficiencies. This sharing is accomplished by grouping managers by asset class, geography, and management style, into several Investment Pools. The individual funds participate in the Investment Pools by purchasing units which function much like the shares of a mutual fund.

While the vast majority of the units of these pools are owned by the Combined Funds, the Supplemental Investment Fund also owns units of these pools. The Supplemental Investment Funds are mutual fund-like investment vehicles which are used by investors in the Participant Directed Investment Program. Please refer to the Participant Directed Investment Program report for more information.

The performance information presented on the following pages for Public Equity and Fixed Income includes both the Combined Funds and Supplemental Investment Fund. The Private Markets is Combined Funds only. All assets in the Combined Funds are managed externally by investment management firms retained by contract.

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Domestic Equity

June 30, 2022

	Ending Market Value	Portfolio Weight	Last Qtr	Fiscal YTD	1 Year	3 Year	5 Year	10 Year	Since Inception	Inception Date
Total Domestic Equity										
ACTIVE DOMESTIC EQUITY AGGREGATE (1)	**$2,663,159,206**	**9.7%**	**-18.6%**	**-22.8%**	**-22.8%**	**6.7%**	**8.3%**	**11.4%**	**7.8%**	**06/1996**
Active Domestic Equity Benchmark			-16.8	-19.5	-19.5	7.0	7.9	11.1	8.5	06/1996
Excess			-1.8	-3.4	-3.4	-0.3	0.5	0.3	-0.6	
SEMI PASSIVE DOMESTIC EQUITY AGGREGATE (2)	**2,676,013,773**	**9.8**	**-16.2**	**-11.9**	**-11.9**	**10.8**	**11.5**	**13.1**	**8.6**	**06/1996**
Semi Passive Domestic Equity Benchmark			-16.7	-13.0	-13.0	10.2	11.0	12.8	8.5	06/1996
Excess			0.5	1.1	1.1	0.6	0.5	0.2	0.1	
PASSIVE DOMESTIC EQUITY AGGREGATE (3)	**21,999,326,173**	**80.5**	**-16.7**	**-13.2**	**-13.2**	**10.1**	**10.9**	**12.7**	**8.8**	**06/1996**
Passive Domestic Equity Benchmark			-16.7	-13.1	-13.1	10.1	10.9	12.7	8.9	06/1996
Excess			0.0	-0.1	-0.1	0.0	-0.0	-0.0	-0.1	
TRANSITION AGGREGATE DOMESTIC EQUITY (4)	28	0.0								
TOTAL DOMESTIC EQUITY (5)	**27,338,499,179**	**100.0**	**-16.8**	**-14.2**	**-14.2**	**9.8**	**10.6**	**12.6**	**10.4**	**01/1984**
Domestic Equity Benchmark			-16.7	-13.9	-13.9	9.7	10.5	12.5	10.6	01/1984
Excess			-0.1	-0.3	-0.3	0.1	0.1	0.0	-0.2	

(1) The Active Domestic Equity Benchmark is a weighted composite each of the individual active domestic equity manager's benchmarks.

(2) The current Semi-Passive Domestic Equity Benchmark is the Russell 1000 index.

(3) The current Passive Domestic Equity Benchmark is a weighted average of the Russell 1000, Russell 2000 and Russell 3000.

(4) The Transition Domestic Equity Aggregate will periodically contain residual Domestic Equity securities from transitions.

(5) The current Domestic Equity Benchmark is the Russell 3000.

Note: All aggregates include the performance of terminated managers. For historical benchmark details please refer to the addendum of this report.

	2021 Calendar Return	2020 Calendar Return	2019 Calendar Return	2018 Calendar Return	2017 Calendar Return
Total Domestic Equity					
ACTIVE DOMESTIC EQUITY AGGREGATE (1)	**18.5%**	**27.3%**	**27.6%**	**-6.5%**	**20.6%**
Active Domestic Equity Benchmark	20.3	19.8	28.2	-8.0	18.3
Excess	-1.7	7.5	-0.6	1.4	2.3
SEMI PASSIVE DOMESTIC EQUITY AGGREGATE (2)	**28.8**	**21.0**	**30.9**	**-4.9**	**22.5**
Semi Passive Domestic Equity Benchmark	26.5	21.0	31.4	-4.8	21.7
Excess	2.3	0.0	-0.5	-0.1	0.8
PASSIVE DOMESTIC EQUITY AGGREGATE (3)	**26.5**	**20.8**	**31.3**	**-5.0**	**21.3**
Passive Domestic Equity Benchmark	26.4	20.8	31.3	-5.0	21.5
Excess	0.1	0.0	0.0	-0.0	-0.2
TRANSITION AGGREGATE DOMESTIC EQUITY (4)					
TOTAL DOMESTIC EQUITY (5)	**25.8**	**21.7**	**30.7**	**-5.3**	**21.4**
Domestic Equity Benchmark	25.7	20.8	30.8	-5.2	21.1
Excess	0.1	0.9	-0.1	-0.0	0.2

(1) The Active Domestic Equity Benchmark is a weighted composite each of the individual active domestic equity manager’s benchmarks.
(2) The current Semi-Passive Domestic Equity Benchmark is the Russell 1000 index.
(3) The current Passive Domestic Equity Benchmark is a weighted average of the Russell 1000, Russell 2000 and Russell 3000.
(4) The Transition Domestic Equity Aggregate will periodically contain residual Domestic Equity securities from transitions.
(5) The current Domestic Equity Benchmark is the Russell 3000.
Note: All aggregates include the performance of terminated managers. For historical benchmark details please refer to the addendum of this report.

	Ending Market Value	Portfolio Weight	Last Qtr	Fiscal YTD	1 Year	3 Year	5 Year	10 Year	Since Inception	Inception Date
Active Large Cap Growth										
SANDS	**$142,405,713**	**0.5%**	**-34.1%**	**-49.8%**	**-49.8%**	**-0.8%**	**8.1%**	**11.1%**	**9.3%**	**01/2005**
Russell 1000 Growth			-20.9	-18.8	-18.8	12.6	14.3	14.8	10.4	01/2005
Excess			-13.2	-31.0	-31.0	-13.4	-6.2	-3.7	-1.1	
WINSLOW	**146,310,546**	**0.5**	**-22.0**	**-24.8**	**-24.8**	**8.4**	**12.9**	**13.8**	**10.5**	**01/2005**
Russell 1000 Growth			-20.9	-18.8	-18.8	12.6	14.3	14.8	10.4	01/2005
Excess			-1.1	-6.0	-6.0	-4.2	-1.4	-1.0	0.1	
RUSSELL 1000 GROWTH AGGREGATE (1)	**288,716,259**	**1.1**	**-28.5**	**-39.7**	**-39.7**	**8.0**	**13.7**	**14.8**	**10.0**	**11/2003**
Russell 1000 Growth			-20.9	-18.8	-18.8	12.6	14.3	14.8	10.4	11/2003
Excess			-7.6	-20.9	-20.9	-4.6	-0.6	-0.0	-0.3	

(1) Prior to 1/1/2021 the Russell 1000 Growth Aggregate included returns from Zevenbergen, which moved to the Russell 3000 Growth benchmark and is now reported separately.

	2021 Calendar Return	2020 Calendar Return	2019 Calendar Return	2018 Calendar Return	2017 Calendar Return
Active Large Cap Growth					
SANDS	**5.2%**	**71.0%**	**33.5%**	**7.0%**	**35.3%**
Russell 1000 Growth	27.6	38.5	36.4	-1.5	30.2
Excess	-22.4	32.5	-2.8	8.6	5.1
WINSLOW	**24.8**	**37.6**	**34.2**	**4.2**	**33.2**
Russell 1000 Growth	27.6	38.5	36.4	-1.5	30.2
Excess	-2.8	-0.9	-2.2	5.7	3.0
RUSSELL 1000 GROWTH AGGREGATE (1)	**12.8**	**81.3**	**37.3**	**4.7**	**33.4**
Russell 1000 Growth	27.6	38.5	36.4	-1.5	30.2
Excess	-14.8	42.8	0.9	6.2	3.2

(1) Prior to 1/1/2021 the Russell 1000 Growth Aggregate included returns from Zevenbergen, which moved to the Russell 3000 Growth benchmark and is now reported separately.

Semi-Passive Large Cap

	Ending Market Value	Portfolio Weight	Last Qtr	Fiscal YTD	1 Year	3 Year	5 Year	10 Year	Since Inception	Inception Date
BLACKROCK	**$1,340,953,756**	**4.9%**	**-16.2%**	**-12.5%**	**-12.5%**	**10.2%**	**11.6%**	**13.4%**	**10.0%**	**01/1995**
Semi Passive Domestic Equity Benchmark			-16.7	-13.0	-13.0	10.2	11.0	12.8	9.6	01/1995
Excess			0.5	0.5	0.5	0.0	0.6	0.6	0.4	
J.P. MORGAN	**1,335,060,017**	**4.9**	**-16.2**	**-11.3**	**-11.3**	**11.4**	**11.6**	**13.4**	**10.0**	**01/1995**
Semi Passive Domestic Equity Benchmark			-16.7	-13.0	-13.0	10.2	11.0	12.8	9.6	01/1995
Excess			0.5	1.7	1.7	1.2	0.6	0.6	0.4	
SEMI-PASSIVE DOMESTIC EQUITY AGGREGATE	**2,676,013,773**	**9.8**	**-16.2**	**-11.9**	**-11.9**	**10.8**	**11.5**	**13.1**	**8.6**	**06/1996**
Semi Passive Domestic Equity Benchmark			-16.7	-13.0	-13.0	10.2	11.0	12.8	8.5	06/1996
Excess			0.5	1.1	1.1	0.6	0.5	0.2	0.1	

	2021 Calendar Return	2020 Calendar Return	2019 Calendar Return	2018 Calendar Return	2017 Calendar Return
Semi-Passive Large Cap					
BLACKROCK	**28.3%**	**20.7%**	**30.4%**	**-4.1%**	**24.6%**
Semi Passive Domestic Equity Benchmark	26.5	21.0	31.4	-4.8	21.7
Excess	1.8	-0.3	-1.0	0.7	2.9
J.P. MORGAN	**29.3**	**21.2**	**31.3**	**-5.4**	**21.8**
Semi Passive Domestic Equity Benchmark	26.5	21.0	31.4	-4.8	21.7
Excess	2.8	0.3	-0.1	-0.6	0.1
SEMI-PASSIVE DOMESTIC EQUITY AGGREGATE	**28.8**	**21.0**	**30.9**	**-4.9**	**22.5**
Semi Passive Domestic Equity Benchmark	26.5	21.0	31.4	-4.8	21.7
Excess	2.3	0.0	-0.5	-0.1	0.8

	Ending Market Value	Portfolio Weight	Last Qtr	Fiscal YTD	1 Year	3 Year	5 Year	10 Year	Since Inception	Inception Date
Active Large Cap Value										
BARROW HANLEY	**$334,237,835**	**1.2%**	**-9.9%**	**-0.6%**	**-0.6%**	**9.7%**	**9.2%**	**11.6%**	**8.3%**	**04/2004**
Russell 1000 Value			-12.2	-6.8	-6.8	6.9	7.2	10.5	7.6	04/2004
Excess			2.3	6.2	6.2	2.8	2.1	1.1	0.7	
LSV	**322,894,526**	**1.2**	**-11.0**	**-8.2**	**-8.2**	**7.7**	**7.4**	**11.9**	**8.6**	**04/2004**
Russell 1000 Value			-12.2	-6.8	-6.8	6.9	7.2	10.5	7.6	04/2004
Excess			1.2	-1.3	-1.3	0.8	0.2	1.4	0.9	
RUSSELL 1000 VALUE AGGREGATE	**657,132,361**	**2.4**	**-10.5**	**-4.5**	**-4.5**	**9.0**	**8.8**	**11.6**	**8.6**	**10/2003**
Russell 1000 Value			-12.2	-6.8	-6.8	6.9	7.2	10.5	8.3	10/2003
Excess			1.7	2.3	2.3	2.2	1.7	1.1	0.2	

	2021 Calendar Return	2020 Calendar Return	2019 Calendar Return	2018 Calendar Return	2017 Calendar Return
Active Large Cap Value					
BARROW HANLEY	**27.7%**	**2.4%**	**26.9%**	**-5.9%**	**14.6%**
Russell 1000 Value	25.2	2.8	26.5	-8.3	13.7
Excess	2.5	-0.4	0.4	2.4	0.9
LSV	**29.7**	**-1.3**	**26.9**	**-11.8**	**18.6**
Russell 1000 Value	25.2	2.8	26.5	-8.3	13.7
Excess	4.5	-4.1	0.4	-3.6	4.9
RUSSELL 1000 VALUE AGGREGATE	**28.8**	**1.6**	**27.4**	**-8.7**	**17.3**
Russell 1000 Value	25.2	2.8	26.5	-8.3	13.7
Excess	3.7	-1.2	0.9	-0.4	3.7

	Ending Market Value	Portfolio Weight	Last Qtr	Fiscal YTD	1 Year	3 Year	5 Year	10 Year	Since Inception	Inception Date
Active Small Cap Growth										
ARROWMARK	**$153,096,450**	**0.6%**	**-20.0%**	**-31.1%**	**-31.1%**	**0.7%**	**5.1%**		**8.4%**	**11/2016**
Russell 2000 Growth			-19.3	-33.4	-33.4	1.4	4.8		7.9	11/2016
Excess			-0.8	2.4	2.4	-0.7	0.3		0.5	
HOOD RIVER	**199,707,710**	**0.7**	**-21.6**	**-28.4**	**-28.4**	**11.9**	**11.3**		**14.2**	**11/2016**
Russell 2000 Growth			-19.3	-33.4	-33.4	1.4	4.8		7.9	11/2016
Excess			-2.4	5.0	5.0	10.5	6.5		6.4	
RICE HALL JAMES	**177,325,306**	**0.6**	**-13.1**	**-21.9**	**-21.9**	**4.7**	**6.3**		**10.2**	**11/2016**
Russell 2000 Growth			-19.3	-33.4	-33.4	1.4	4.8		7.9	11/2016
Excess			6.2	11.5	11.5	3.3	1.5		2.3	
WELLINGTON	**213,914,046**	**0.8**	**-19.5**	**-31.3**	**-31.3**	**1.8**	**4.7**		**8.2**	**11/2016**
Russell 2000 Growth			-19.3	-33.4	-33.4	1.4	4.8		7.9	11/2016
Excess			-0.2	2.1	2.1	0.4	-0.1		0.3	
RUSSELL 2000 GROWTH AGGREGATE	**744,043,512**	**2.7**	**-18.8**	**-28.4**	**-28.4**	**4.9**	**6.9**	**9.2%**	**7.1**	**11/2003**
Russell 2000 Growth			-19.3	-33.4	-33.4	1.4	4.8	9.3	7.9	11/2003
Excess			0.5	5.0	5.0	3.5	2.1	-0.1	-0.7	

STATE STREET.

Active Small Cap Growth

	2021 Calendar Return	2020 Calendar Return	2019 Calendar Return	2018 Calendar Return	2017 Calendar Return
ARROWMARK	**6.1%**	**21.9%**	**20.1%**	**0.9%**	**26.2%**
Russell 2000 Growth	2.8	34.6	28.5	-9.3	22.2
Excess	3.2	-12.8	-8.4	10.3	4.1
HOOD RIVER	**24.2**	**61.7**	**24.3**	**-7.0**	**21.3**
Russell 2000 Growth	2.8	34.6	28.5	-9.3	22.2
Excess	21.4	27.0	-4.2	2.3	-0.9
RICE HALL JAMES	**15.6**	**23.8**	**18.0**	**-6.9**	**27.9**
Russell 2000 Growth	2.8	34.6	28.5	-9.3	22.2
Excess	12.8	-10.8	-10.5	2.4	5.8
WELLINGTON	**4.3**	**33.1**	**35.6**	**-11.6**	**22.6**
Russell 2000 Growth	2.8	34.6	28.5	-9.3	22.2
Excess	1.4	-1.5	7.1	-2.3	0.4
RUSSELL 2000 GROWTH AGGREGATE	**12.4**	**35.4**	**24.6**	**-6.2**	**22.0**
Russell 2000 Growth	2.8	34.6	28.5	-9.3	22.2
Excess	9.5	0.8	-3.9	3.2	-0.1

	Ending Market Value	Portfolio Weight	Last Qtr	Fiscal YTD	1 Year	3 Year	5 Year	10 Year	Since Inception	Inception Date
Active Small Cap Value										
GOLDMAN SACHS	**$258,767,673**	**0.9%**	**-15.0%**	**-13.1%**	**-13.1%**	**4.3%**	**4.7%**	**9.5%**	**8.4%**	**01/2004**
Russell 2000 Value			-15.3	-16.3	-16.3	6.2	4.9	9.1	7.3	01/2004
Excess			0.2	3.2	3.2	-1.9	-0.2	0.4	1.1	
HOTCHKIS AND WILEY	**165,838,118**	**0.6**	**-16.5**	**-3.5**	**-3.5**	**9.7**	**6.4**	**10.6**	**8.1**	**01/2004**
Russell 2000 Value			-15.3	-16.3	-16.3	6.2	4.9	9.1	7.3	01/2004
Excess			-1.2	12.8	12.8	3.5	1.5	1.5	0.7	
MARTINGALE	**153,976,148**	**0.6**	**-11.8**	**-6.6**	**-6.6**	**7.7**	**5.2**	**10.7**	**7.5**	**01/2004**
Russell 2000 Value			-15.3	-16.3	-16.3	6.2	4.9	9.1	7.3	01/2004
Excess			3.5	9.6	9.6	1.5	0.3	1.7	0.1	
PEREGRINE	**246,011,463**	**0.9**	**-14.0**	**-11.5**	**-11.5**	**7.5**	**5.6**	**9.4**	**9.4**	**07/2000**
Russell 2000 Value			-15.3	-16.3	-16.3	6.2	4.9	9.1	8.8	07/2000
Excess			1.2	4.8	4.8	1.3	0.7	0.4	0.6	
RUSSELL 2000 VALUE AGGREGATE	**824,593,402**	**3.0**	**-14.4**	**-9.6**	**-9.6**	**6.8**	**5.2**	**9.8**	**8.5**	**10/2003**
Russell 2000 Value			-15.3	-16.3	-16.3	6.2	4.9	9.1	8.1	10/2003
Excess			0.8	6.7	6.7	0.6	0.3	0.8	0.4	

	2021 Calendar Return	2020 Calendar Return	2019 Calendar Return	2018 Calendar Return	2017 Calendar Return
Active Small Cap Value					
GOLDMAN SACHS	**27.0%**	**2.4%**	**23.2%**	**-13.3%**	**12.6%**
Russell 2000 Value	28.3	4.6	22.4	-12.9	7.8
Excess	-1.3	-2.3	0.8	-0.5	4.7
HOTCHKIS AND WILEY	**36.5**	**-0.2**	**19.7**	**-14.4**	**7.9**
Russell 2000 Value	28.3	4.6	22.4	-12.9	7.8
Excess	8.2	-4.8	-2.7	-1.5	0.0
MARTINGALE	**41.3**	**-4.6**	**21.1**	**-15.0**	**6.9**
Russell 2000 Value	28.3	4.6	22.4	-12.9	7.8
Excess	13.0	-9.2	-1.3	-2.1	-0.9
PEREGRINE	**28.6**	**7.3**	**21.1**	**-16.1**	**12.5**
Russell 2000 Value	28.3	4.6	22.4	-12.9	7.8
Excess	0.3	2.7	-1.3	-3.3	4.7
RUSSELL 2000 VALUE AGGREGATE	**31.8**	**1.5**	**21.3**	**-14.7**	**10.2**
Russell 2000 Value	28.3	4.6	22.4	-12.9	7.8
Excess	3.5	-3.1	-1.1	-1.8	2.3

	Ending Market Value	Portfolio Weight	Last Qtr	Fiscal YTD	1 Year	3 Year	5 Year	10 Year	Since Inception	Inception Date
Active All Cap										
ZEVENBERGEN (1)	**$148,673,671**	**0.5%**	**-41.4%**	**-57.5%**	**-57.5%**	**-0.6%**	**8.7%**	**12.9%**	**10.0%**	**04/1994**
Zevenbergen Custom Benchmark			-20.8	-19.8	-19.8	13.9	15.1	15.2		04/1994
Excess			-20.6	-37.7	-37.7	-14.4	-6.4	-2.3		
ACTIVE RUSSELL 3000 GROWTH (2)	**148,673,671**	**0.5**	**-41.4**	**-57.5**	**-57.5**				**-43.5**	**01/2021**
Russell 3000 Growth TR			-20.8	-19.8	-19.8				-6.5	01/2021
Excess			-20.6	-37.7	-37.7				-37.0	

(1) Effective 1/1/2021, the SBI changed the Zevenbergen Benchmark to the Russell 3000 Growth. Prior to this date it was the Russell 1000 Growth.

(2) Prior to 1/1/2021, Zevenbergen returns were reported as part of the Russell 1000 Growth Aggregate.

	2021 Calendar Return	2020 Calendar Return	2019 Calendar Return	2018 Calendar Return	2017 Calendar Return
Active All Cap					
ZEVENBERGEN (1)	**-9.7%**	**126.2%**	**43.0%**	**2.3%**	**35.1%**
Zevenbergen Custom Benchmark	32.3	38.5	36.4	-1.5	30.2
Excess	-42.0	87.7	6.7	3.8	4.9
ACTIVE RUSSELL 3000 GROWTH (2)	**-9.7**				
Russell 3000 Growth TR	25.8				
Excess	-35.6				

(1) Effective 1/1/2021, the SBI changed the Zevenbergen Benchmark to the Russell 3000 Growth. Prior to this date it was the Russell 1000 Growth.

(2) Prior to 1/1/2021, Zevenbergen returns were reported as part of the Russell 1000 Growth Aggregate.

	Ending Market Value	Portfolio Weight	Last Qtr	Fiscal YTD	1 Year	3 Year	5 Year	10 Year	Since Inception	Inception Date
Total Passive Domestic Equity										
BLACKROCK RUSSELL 1000	**$20,922,341,857**	**76.5%**	**-16.7%**	**-13.1%**	**-13.1%**	**10.1%**	**11.0%**		**12.5%**	**11/2016**
RUSSELL 1000 (DAILY)			-16.7	-13.0	-13.0	10.2	11.0		12.5	11/2016
Excess			0.0	-0.1	-0.1	-0.0	-0.0		-0.0	
BLACKROCK RUSSELL 2000	**162,991,281**	**0.6**	**-17.2**	**-24.5**	**-24.5**	**5.1**			**5.5**	**11/2018**
RUSSELL 2000 (DAILY)			-17.2	-25.2	-25.2	4.2			4.7	11/2018
Excess			0.0	0.7	0.7	0.9			0.8	
BLACKROCK RUSSELL 3000 (1)	**913,993,034**	**3.3**	**-16.7**	**-13.7**	**-13.7**	**10.0**	**10.8**	**12.7%**	**9.4**	**07/1995**
Passive Manager Benchmark			-16.7	-13.9	-13.9	9.8	10.6	12.6	9.3	07/1995
Excess			0.0	0.1	0.1	0.3	0.2	0.1	0.1	
PASSIVE DOMESTIC EQUITY AGGREGATE (2)	**21,999,326,173**	**80.5**	**-16.7**	**-13.2**	**-13.2**	**10.1**	**10.9**	**12.7**	**8.8**	**06/1996**
Passive Domestic Equity Benchmark			-16.7	-13.1	-13.1	10.1	10.9	12.7	8.9	06/1996
Excess			0.0	-0.1	-0.1	0.0	-0.0	-0.0	-0.1	

(1) The current Passive Manager Benchmark is the Russell 3000. For historical benchmark details please refer to the addendum of this report.

(2) The current Passive Domestic Equity Benchmark is a weighted average of the Russell 1000, Russell 2000 and Russell 3000.

	2021 Calendar Return	2020 Calendar Return	2019 Calendar Return	2018 Calendar Return	2017 Calendar Return
Total Passive Domestic Equity					
BLACKROCK RUSSELL 1000	**26.5%**	**20.9%**	**31.4%**	**-4.8%**	**21.7%**
RUSSELL 1000 (DAILY)	26.5	21.0	31.4	-4.8	21.7
Excess	0.1	-0.0	0.0	-0.0	-0.0
BLACKROCK RUSSELL 2000	**16.0**	**20.8**	**25.2**		
RUSSELL 2000 (DAILY)	14.8	20.0	25.5		
Excess	1.2	0.8	-0.3		
BLACKROCK RUSSELL 3000 (1)	**26.2**	**21.2**	**31.1**	**-5.2**	**21.1**
Passive Manager Benchmark	25.7	20.9	31.0	-5.2	21.1
Excess	0.5	0.3	0.0	-0.0	0.0
PASSIVE DOMESTIC EQUITY AGGREGATE (2)	**26.5**	**20.8**	**31.3**	**-5.0**	**21.3**
Passive Domestic Equity Benchmark	26.4	20.8	31.3	-5.0	21.5
Excess	0.1	0.0	0.0	-0.0	-0.2

(1) The current Passive Manager Benchmark is the Russell 3000. For historical benchmark details please refer to the addendum of this report.

(2) The current Passive Domestic Equity Benchmark is a weighted average of the Russell 1000, Russell 2000 and Russell 3000.

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International Equity
June 30, 2022

	Ending Market Value	Portfolio Weight	Last Qtr	Fiscal YTD	1 Year	3 Year	5 Year	10 Year	Since Inception	Inception Date
Total International Equity										
DEVELOPED MARKETS (1)	**$8,298,147,179**	**68.1%**	**-14.5%**	**-16.7%**	**-16.7%**	**2.3%**	**3.1%**	**6.1%**	**4.8%**	**01/1997**
BENCHMARK DM			-14.7	-16.8	-16.8	1.7	2.7	5.4	1.9	01/1997
Excess			0.2	0.1	0.1	0.6	0.5	0.7	2.9	
EMERGING MARKETS (2)	**3,129,118,020**	**25.7**	**-12.6**	**-26.9**	**-26.9**	**0.3**	**1.8**	**3.0**	**5.1**	**11/1996**
BENCHMARK EM			-11.4	-25.3	-25.3	0.6	2.2	3.1	5.5	11/1996
Excess			-1.1	-1.6	-1.6	-0.2	-0.4	-0.1	-0.3	
ACWI EX-US AGGREGATE	**339,116,156**	**2.8**	**-13.4**	**-15.0**	**-15.0**				**-3.2**	**01/2021**
MSCI AC WORLD ex US (NET) - DAILY			-13.7	-19.4	-19.4				-8.2	01/2021
Excess			0.4	4.4	4.4				5.0	
CHINA ONLY AGGREGATE	**171,492,926**	**1.4**	**3.5**	**-17.3**	**-17.3**				**-12.7**	**01/2021**
MSCI China A			1.7	-14.3	-14.3				-7.0	01/2021
Excess			1.8	-3.0	-3.0				-5.6	
TRANSITION AGGREGATE INTERNATIONAL EQUITY (3)	474,459	0.0								
TOTAL INTERNATIONAL EQUITY (4)	**12,182,252,484**	**100.0**	**-12.0**	**-17.5**	**-17.5**	**2.6**	**3.3**	**5.6**	**6.0**	**10/1992**
International Equity Benchmark			-13.7	-19.4	-19.4	1.3	2.5	4.8	5.5	10/1992
Excess			1.8	2.0	2.0	1.3	0.8	0.8	0.5	

(1) The current benchmark for Developed Markets, Benchmark DM, is the Standard (large + mid) MSCI World ex USA (net). Excludes impact of Record Currency. Impact of Record Currency will be shown beginning of 9/30/2022.

(2) The current benchmark for Emerging Markets, Benchmark EM, is the Standard (large + mid) MSCI Emerging Markets Free (net).

(3) The Transition Aggregate International Equity contains International Equity securities that are being transitioned to a different manager.

(4) The current International Equity Benchmark is the MSCI ACWI ex USA (net). Does not includes impact of currency overlay on the passive EAFE portfolio from 12/1/95-10/31/00. This impact is included in the return for the Combined Funds portion of the International Equity portfolio.

Note: All aggregates include the performance of terminated managers. For historical benchmark details please refer to the addendum of this report.

	2021 Calendar Return	2020 Calendar Return	2019 Calendar Return	2018 Calendar Return	2017 Calendar Return
Total International Equity					
DEVELOPED MARKETS (1)	**12.9%**	**9.1%**	**23.3%**	**-14.2%**	**24.9%**
BENCHMARK DM	12.6	7.6	22.5	-14.1	24.2
Excess	0.3	1.5	0.8	-0.1	0.7
EMERGING MARKETS (2)	**-1.5**	**17.9**	**20.3**	**-15.4**	**37.7**
BENCHMARK EM	-2.5	18.3	18.4	-14.6	37.3
Excess	1.1	-0.4	1.9	-0.8	0.4
ACWI EX-US AGGREGATE	**12.8**				
MSCI AC WORLD ex US (NET) - DAILY	7.8				
Excess	4.9				
CHINA ONLY AGGREGATE	**-2.9**				
MSCI China A	3.2				
Excess	-6.1				
TRANSITION AGGREGATE INTERNATIONAL EQUITY (3)					
TOTAL INTERNATIONAL EQUITY (4)	**8.9**	**11.4**	**22.4**	**-14.5**	**27.6**
International Equity Benchmark	7.8	10.5	21.5	-14.2	27.2
Excess	1.1	0.8	0.9	-0.3	0.4

(1) The current benchmark for Developed Markets, Benchmark DM, is the Standard (large + mid) MSCI World ex USA (net). Excludes impact of Record Currency. Impact of Record Currency will be shown beginning of 9/30/2022.

(2) The current benchmark for Emerging Markets, Benchmark EM, is the Standard (large + mid) MSCI Emerging Markets Free (net).

(3) The Transition Aggregate International Equity contains International Equity securities that are being transitioned to a different manager.

(4) The current International Equity Benchmark is the MSCI ACWI ex USA (net). Does not includes impact of currency overlay on the passive EAFE portfolio from 12/1/95-10/31/00. This impact is included in the return for the Combined Funds portion of the International Equity portfolio.

Note: All aggregates include the performance of terminated managers. For historical benchmark details please refer to the addendum of this report.

	Ending Market Value	Portfolio Weight	Last Qtr	Fiscal YTD	1 Year	3 Year	5 Year	10 Year	Since Inception	Inception Date
Active Developed Markets										
ACADIAN	**$329,917,349**	**2.7%**	**-14.6%**	**-16.8%**	**-16.8%**	**3.4%**	**4.0%**	**8.7%**	**5.9%**	**07/2005**
BENCHMARK DM			-14.7	-16.8	-16.8	1.7	2.7	5.4	4.3	07/2005
Excess			0.0	-0.1	-0.1	1.7	1.3	3.4	1.6	
COLUMBIA	**336,891,543**	**2.8**	**-14.7**	**-18.2**	**-18.2**	**3.5**	**5.2**	**7.1**	**3.1**	**03/2000**
BENCHMARK DM			-14.7	-16.8	-16.8	1.7	2.7	5.4	3.1	03/2000
Excess			-0.0	-1.4	-1.4	1.8	2.6	1.7	-0.0	
FIDELITY	**335,859,949**	**2.8**	**-15.0**	**-18.1**	**-18.1**	**3.5**	**4.4**	**7.0**	**5.9**	**07/2005**
BENCHMARK DM			-14.7	-16.8	-16.8	1.7	2.7	5.4	4.3	07/2005
Excess			-0.3	-1.4	-1.4	1.8	1.8	1.6	1.6	
JP MORGAN	**289,419,044**	**2.4**	**-15.4**	**-19.7**	**-19.7**	**1.8**	**3.4**	**5.7**	**4.5**	**07/2005**
BENCHMARK DM			-14.7	-16.8	-16.8	1.7	2.7	5.4	4.3	07/2005
Excess			-0.7	-2.9	-2.9	0.1	0.8	0.3	0.3	
MARATHON	**324,202,484**	**2.7**	**-14.1**	**-16.6**	**-16.6**	**2.8**	**3.0**	**6.8**	**7.4**	**11/1993**
BENCHMARK DM			-14.7	-16.8	-16.8	1.7	2.7	5.4	4.7	11/1993
Excess			0.5	0.2	0.2	1.1	0.3	1.4	2.7	
MCKINLEY	**241,645,715**	**2.0**	**-14.9**	**-17.1**	**-17.1**	**2.7**	**4.0**	**6.2**	**4.3**	**07/2005**
BENCHMARK DM			-14.7	-16.8	-16.8	1.7	2.7	5.4	4.3	07/2005
Excess			-0.3	-0.4	-0.4	1.0	1.4	0.9	0.1	
AQR CAPITAL MANAGEMENT	**312,094,562**	**2.6**	**-13.0**	**-17.7**	**-17.7**	**0.5**	**0.8**	**5.4**	**4.2**	**07/2005**
BENCHMARK DM			-14.7	-16.8	-16.8	1.7	2.7	5.4	4.3	07/2005
Excess			1.7	-0.9	-0.9	-1.2	-1.8	0.0	-0.1	

	2021 Calendar Return	2020 Calendar Return	2019 Calendar Return	2018 Calendar Return	2017 Calendar Return
Active Developed Markets					
ACADIAN	**13.6%**	**11.7%**	**19.1%**	**-13.5%**	**37.0%**
BENCHMARK DM	12.6	7.6	22.5	-14.1	24.2
Excess	0.9	4.2	-3.4	0.6	12.8
COLUMBIA	**14.2**	**15.0**	**28.9**	**-14.9**	**32.7**
BENCHMARK DM	12.6	7.6	22.5	-14.1	24.2
Excess	1.6	7.4	6.4	-0.8	8.5
FIDELITY	**13.0**	**15.4**	**27.1**	**-14.6**	**25.9**
BENCHMARK DM	12.6	7.6	22.5	-14.1	24.2
Excess	0.4	7.8	4.6	-0.5	1.7
JP MORGAN	**13.3**	**14.2**	**28.5**	**-17.3**	**28.3**
BENCHMARK DM	12.6	7.6	22.5	-14.1	24.2
Excess	0.7	6.6	6.0	-3.3	4.1
MARATHON	**12.8**	**7.6**	**23.5**	**-13.4**	**23.1**
BENCHMARK DM	12.6	7.6	22.5	-14.1	24.2
Excess	0.2	0.1	1.0	0.7	-1.1
MCKINLEY	**11.6**	**16.4**	**25.6**	**-15.9**	**28.5**
BENCHMARK DM	12.6	7.6	22.5	-14.1	24.2
Excess	-1.0	8.8	3.1	-1.9	4.3
AQR CAPITAL MANAGEMENT	**8.1**	**6.5**	**20.8**	**-18.2**	**25.1**
BENCHMARK DM	12.6	7.6	22.5	-14.1	24.2
Excess	-4.5	-1.1	-1.7	-4.1	0.9

	Ending Market Value	Portfolio Weight	1 Qtr	Fiscal YTD	1 Year	3 Year	5 Year	10 Year	Since Inception	Inception Date
Total Developed Markets										
Active Developed Markets Aggregate (1)	**$2,170,030,647**	**17.8%**	**-14.5%**	**-17.8%**	**-17.8%**	**2.7%**	**3.4%**	**6.5%**	**5.1%**	**06/1996**
BENCHMARK DM			-14.7%	-16.8%	-16.8%	1.7%	2.7%	5.4%	1.9%	06/1996
Excess			0.1%	-1.0%	-1.0%	1.0%	0.7%	1.2%	3.2%	
SSgA DEVELOPED MARKETS PASSIVE	**$6,128,116,532**	**50.3%**	**-14.4%**	**-16.3%**	**-16.3%**	**2.2%**	**3.1%**	**5.8%**		
BENCHMARK DM			-14.7%	-16.8%	-16.8%	1.7%	2.7%	5.4%		
Excess			0.2%	0.5%	0.5%	0.5%	0.4%	0.4%		
RECORD CURRENCY (2)	**$243,903,744**	**2.0%**	**2.8%**	**3.7%**	**3.7%**					**10/2020**
DEVELOPED MARKETS TOTAL (3)	**$8,298,147,179**	**68.1%**	**-14.5%**	**-16.7%**	**-16.7%**	**2.3%**	**3.1%**	**6.1%**	**4.8%**	**01/1997**
BENCHMARK DM			-14.7%	-16.8%	-16.8%	1.7%	2.7%	5.4%	1.9%	01/1997
Excess			0.2%	0.1%	0.1%	0.6%	0.5%	0.7%	2.9%	

(1) Includes the historical returns of AQR and terminated managers previously classified as "Semi-Passive Developed Markets."

(2) Return for Record Currency is the difference between the DM Equity with Currency Management and without.

(3) Excludes impact of Record Currency. Impact of Record Currency will be shown beginning of 9/30/2022.

	2021 Calendar Return	2020 Calendar Return	2019 Calendar Return	2018 Calendar Return	2017 Calendar Return
Total Developed Markets					
Active Developed Markets Aggregate (1)	**12.5%**	**12.2%**	**24.4%**	**-15.1%**	**26.8%**
BENCHMARK DM	12.6%	7.6%	22.5%	-14.1%	24.2%
Excess	-0.1%	4.6%	1.9%	-1.0%	2.6%
SSgA DEVELOPED MARKETS PASSIVE	**13.0%**	**8.2%**	**23.0%**	**-13.9%**	**24.7%**
BENCHMARK DM	12.6%	7.6%	22.5%	-14.1%	24.2%
Excess	0.4%	0.6%	0.5%	0.2%	0.5%
DEVELOPED MARKETS TOTAL (2)	**12.9%**	**9.1%**	**23.3%**	**-14.2%**	**24.9%**
BENCHMARK DM	12.6%	7.6%	22.5%	-14.1%	24.2%
Excess	0.3%	1.5%	0.8%	-0.1%	0.7%

(1) Includes the historical returns of AQR and terminated managers previously classified as "Semi-Passive Developed Markets"
(2) Excludes impact of Record Currency. Impact of Record Currency will be shown beginning of 9/30/2022.

	Ending Market Value	Portfolio Weight	Last Qtr	Fiscal YTD	1 Year	3 Year	5 Year	10 Year	Since Inception	Inception Date
Active Emerging Markets										
MARTIN CURRIE	**$362,322,704**	**3.0%**	**-14.3%**	**-32.2%**	**-32.2%**	**1.1%**	**3.4%**		**4.9%**	**04/2017**
BENCHMARK EM			-11.4	-25.3	-25.3	0.6	2.2		3.3	04/2017
Excess			-2.8	-6.9	-6.9	0.5	1.2		1.6	
MACQUARIE	**346,681,748**	**2.8**	**-12.4**	**-28.9**	**-28.9**	**2.1**	**3.0**		**4.2**	**04/2017**
BENCHMARK EM			-11.4	-25.3	-25.3	0.6	2.2		3.3	04/2017
Excess			-0.9	-3.6	-3.6	1.5	0.8		1.0	
MORGAN STANLEY	**416,616,818**	**3.4**	**-16.5**	**-29.4**	**-29.4**	**-1.3**	**0.2**	**2.8%**	**7.7**	**01/2001**
BENCHMARK EM			-11.4	-25.3	-25.3	0.6	2.2	3.1	7.8	01/2001
Excess			-5.1	-4.1	-4.1	-1.8	-2.0	-0.3	-0.1	
NEUBERGER BERMAN	**320,818,238**	**2.6**	**-10.7**	**-28.5**	**-28.5**	**-2.9**	**0.1**		**1.4**	**04/2017**
BENCHMARK EM			-11.4	-25.3	-25.3	0.6	2.2		3.3	04/2017
Excess			0.7	-3.2	-3.2	-3.5	-2.1		-1.9	
PZENA	**331,171,766**	**2.7**	**-11.7**	**-15.4**	**-15.4**	**3.8**	**3.2**		**4.1**	**04/2017**
BENCHMARK EM			-11.4	-25.3	-25.3	0.6	2.2		3.3	04/2017
Excess			-0.2	9.8	9.8	3.2	1.0		0.8	
ROCK CREEK	**352,188,526**	**2.9**	**-12.2**	**-27.2**	**-27.2**	**1.4**	**1.7**		**2.6**	**04/2017**
BENCHMARK EM			-11.4	-25.3	-25.3	0.6	2.2		3.3	04/2017
Excess			-0.7	-1.9	-1.9	0.9	-0.5		-0.7	

	2021 Calendar Return	2020 Calendar Return	2019 Calendar Return	2018 Calendar Return	2017 Calendar Return
Active Emerging Markets					
MARTIN CURRIE	**-3.5%**	**26.5%**	**27.3%**	**-16.6%**	
BENCHMARK EM	-2.5	18.3	18.4	-14.6	
Excess	-1.0	8.2	8.8	-2.0	
MACQUARIE	**-2.2**	**24.2**	**23.2**	**-13.3**	
BENCHMARK EM	-2.5	18.3	18.4	-14.6	
Excess	0.3	5.9	4.7	1.3	
MORGAN STANLEY	**3.5**	**15.7**	**20.4**	**-16.7**	**37.9%**
BENCHMARK EM	-2.5	18.3	18.4	-14.6	37.3
Excess	6.0	-2.6	1.9	-2.2	0.6
NEUBERGER BERMAN	**-5.6**	**14.2**	**19.7**	**-17.1**	
BENCHMARK EM	-2.5	18.3	18.4	-14.6	
Excess	-3.1	-4.1	1.3	-2.6	
PZENA	**9.3**	**7.7**	**13.4**	**-10.8**	
BENCHMARK EM	-2.5	18.3	18.4	-14.6	
Excess	11.8	-10.6	-5.1	3.8	
ROCK CREEK	**-5.2**	**22.0**	**22.3**	**-17.6**	
BENCHMARK EM	-2.5	18.3	18.4	-14.6	
Excess	-2.7	3.7	3.9	-3.1	

Total Emerging Markets

	Ending Market Value	Portfolio Weight	Last Qtr	Fiscal YTD	1 Year	3 Year	5 Year	10 Year	Since Inception	Inception Date
ACTIVE EMERGING MARKETS AGGREGATE	**$2,129,799,799**	**17.5%**	**-13.2%**	**-27.5%**	**-27.5%**	**0.3%**	**1.7%**	**2.8%**	**2.9%**	**01/2012**
BENCHMARK EM			-11.4	-25.3	-25.3	0.6	2.2	3.1	3.3	01/2012
Excess			-1.7	-2.2	-2.2	-0.3	-0.5	-0.3	-0.4	
SSGA EMERGING MARKETS PASSIVE	**999,318,221**	**8.2**	**-11.3**	**-25.6**	**-25.6**	**0.4**	**2.0**	**3.1**	**3.3**	**01/2012**
BENCHMARK EM			-11.4	-25.3	-25.3	0.6	2.2	3.1	3.3	01/2012
Excess			0.1	-0.3	-0.3	-0.2	-0.1	0.0	0.0	
EMERGING MARKETS TOTAL	**3,129,118,020**	**25.7**	**-12.6**	**-26.9**	**-26.9**	**0.3**	**1.8**	**3.0**	**5.1**	**11/1996**
BENCHMARK EM			-11.4	-25.3	-25.3	0.6	2.2	3.1	5.5	11/1996
Excess			-1.1	-1.6	-1.6	-0.2	-0.4	-0.1	-0.3	

Total Emerging Markets

	2021 Calendar Return	2020 Calendar Return	2019 Calendar Return	2018 Calendar Return	2017 Calendar Return
ACTIVE EMERGING MARKETS AGGREGATE	**-0.9%**	**17.6%**	**21.4%**	**-15.6%**	**37.2%**
BENCHMARK EM	-2.5	18.3	18.4	-14.6	37.3
Excess	1.6	-0.7	3.0	-1.0	-0.1
SSGA EMERGING MARKETS PASSIVE	**-2.9**	**18.3**	**18.1**	**-14.7**	**37.4**
BENCHMARK EM	-2.5	18.3	18.4	-14.6	37.3
Excess	-0.3	0.0	-0.3	-0.1	0.1
EMERGING MARKETS TOTAL	**-1.5**	**17.9**	**20.3**	**-15.4**	**37.7**
BENCHMARK EM	-2.5	18.3	18.4	-14.6	37.3
Excess	1.1	-0.4	1.9	-0.8	0.4

	Ending Market Value	Portfolio Weight	Last Qtr	Fiscal YTD	1 Year	3 Year	5 Year	10 Year	Since Inception	Inception Date
Active ACWI ex-US										
EARNEST PARTNERS ACWI EX US	**$339,116,156**	**2.8%**	**-13.4%**	**-15.0%**	**-15.0%**				**-3.2%**	**01/2021**
MSCI AC WORLD ex US (NET) - DAILY			-13.7%	-19.4%	-19.4%				-8.2%	01/2021
Excess			0.4%	4.4%	4.4%				5.0%	
TOTAL ACWI EX-US AGGREGATE	**$339,116,156**	**2.8%**	**-13.4%**	**-15.0%**	**-15.0%**				**-3.2%**	**01/2021**
MSCI AC WORLD ex US (NET) - DAILY			-13.7%	-19.4%	-19.4%				-8.2%	01/2021
Excess			0.4%	4.4%	4.4%				5.0%	

	2021 Calendar Return	2020 Calendar Return	2019 Calendar Return	2018 Calendar Return	2017 Calendar Return
Active ACWI ex-US					
EARNEST PARTNERS ACWI EX US	**12.8%**				
MSCI AC WORLD ex US (NET) - DAILY	7.8				
Excess	4.9				
TOTAL ACWI EX-US AGGREGATE	**12.8**				
MSCI AC WORLD ex US (NET) - DAILY	7.8				
Excess	4.9				

	Ending Market Value	Portfolio Weight	Last Qtr	Fiscal YTD	1 Year	3 Year	5 Year	10 Year	Since Inception	Inception Date
China Only Managers										
EARNEST PARTNERS CHINA	**$171,492,926**	**1.4%**	**3.5%**	**-17.3%**	**-17.3%**				**-12.7%**	**01/2021**
MSCI China A			1.7	-14.3	-14.3				-7.0	01/2021
Excess			1.8	-3.0	-3.0				-5.6	
CHINA ONLY AGGREGATE	**171,492,926**	**1.4**	**3.5**	**-17.3**	**-17.3**				**-12.7**	**01/2021**
MSCI China A			1.7	-14.3	-14.3				-7.0	01/2021
Excess			1.8	-3.0	-3.0				-5.6	

	2021 Calendar Return	2020 Calendar Return	2019 Calendar Return	2018 Calendar Return	2017 Calendar Return
China Only Managers					
EARNEST PARTNERS CHINA	**-2.9%**				
MSCI China A	3.2				
Excess	-6.1				
CHINA ONLY AGGREGATE	**-2.9**				
MSCI China A	3.2				
Excess	-6.1				

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Global Equity

June 30, 2022

	Ending Market Value	Portfolio Weight	Last Qtr	Fiscal YTD	1 Year	3 Year	5 Year	10 Year	Since Inception	Inception Date
Global Equity Managers										
ARIEL INVESTMENTS	**$367,295,376**	**43.5%**	**-5.9%**	**-2.7%**	**-2.7%**				**4.4%**	**01/2021**
MSCI AC WORLD NET USD DAILY			-15.7	-15.8	-15.8				-3.6	01/2021
Excess			9.8	13.1	13.1				8.0	
BAILLIE GIFFORD	**179,657,576**	**21.3**	**-29.2**	**-49.2**	**-49.2**				**-31.4**	**01/2021**
MSCI AC WORLD NET USD DAILY			-15.7	-15.8	-15.8				-3.6	01/2021
Excess			-13.6	-33.4	-33.4				-27.8	
MARTIN CURRIE INVESTMENTS - GLOBAL EQ	**297,270,411**	**35.2**	**-20.6**	**-32.3**	**-32.3**				**-17.1**	**01/2021**
MSCI AC WORLD NET USD DAILY			-15.7	-15.8	-15.8				-3.6	01/2021
Excess			-4.9	-16.6	-16.6				-13.4	
GLOBAL EQUITY	**844,223,363**	**100.0**	**-17.1**	**-27.9**	**-27.9**				**-13.8**	**01/2021**
MSCI AC WORLD NET USD DAILY			-15.7	-15.8	-15.8				-3.6	01/2021
Excess			-1.5	-12.1	-12.1				-10.1	

Global Equity Managers

	2021 Calendar Return	2020 Calendar Return	2019 Calendar Return	2018 Calendar Return	2017 Calendar Return
ARIEL INVESTMENTS	**12.1%**				
MSCI AC WORLD NET USD DAILY	18.5				
Excess	-6.5				
BAILLIE GIFFORD	**3.1**				
MSCI AC WORLD NET USD DAILY	18.5				
Excess	-15.5				
MARTIN CURRIE INVESTMENTS - GLOBAL EQ	**12.8**				
MSCI AC WORLD NET USD DAILY	18.5				
Excess	-5.8				
GLOBAL EQUITY	**9.6**				
MSCI AC WORLD NET USD DAILY	18.5				
Excess	-8.9				

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Core/Core Plus Bonds
June 30, 2022

	Ending Market Value	Portfolio Weight	Last Qtr	Fiscal YTD	1 Year	3 Year	5 Year	10 Year	Since Inception	Inception Date
Bonds										
CORE (1)	**$1,800,935,252**	**40.1%**	**-5.0%**	**-10.4%**	**-10.4%**				**-5.9%**	**11/2020**
Bloomberg U.S. Aggregate			-4.7	-10.3	-10.3				-6.6	11/2020
Excess			-0.3	-0.1	-0.1				0.7	
CORE PLUS (1)	**2,692,897,748**	**59.9**	**-6.1**	**-12.6**	**-12.6**				**-7.1**	**11/2020**
Bloomberg U.S. Aggregate			-4.7	-10.3	-10.3				-6.6	11/2020
Excess			-1.4	-2.3	-2.3				-0.5	
TRANSITION AGGREGATE CORE BONDS (2)	18,984	0.0								
TOTAL CORE/CORE PLUS BONDS (3)	**4,493,851,985**	**100.0**	**-5.7**	**-11.7**	**-11.7**	**-0.5%**	**1.3%**	**2.1%**	**6.9**	**07/1984**
Bloomberg U.S. Aggregate			-4.7	-10.3	-10.3	-0.9	0.9	1.5	6.5	07/1984
Excess			-1.0	-1.4	-1.4	0.4	0.4	0.6	0.3	

(1) Prior to 12/1/2020 the Core and Core Plus managers were categorized as Active or Semi-Passive. For historical performance of each manager, see the following pages in this report. For information on the historical performance of the previous groupings refer to the 9/30/2020 Comprehensive Performance Report.

(2) The Transition Aggregate Core Bonds includes core bonds securities that are being transition to a different manager.

(3) The current Core Bonds Benchmark is the Bloomberg U.S. Aggregate calculated daily. For historical benchmark details please refer to the addendum of this report.

Note: All aggregates include the performance of terminated managers. Inception refers to the date of retention by the SBI.

	2021 Calendar Return	2020 Calendar Return	2019 Calendar Return	2018 Calendar Return	2017 Calendar Return
Bonds					
CORE (1)	**-1.0%**				
Bloomberg U.S. Aggregate	-1.5				
Excess	0.5				
CORE PLUS (1)	**-1.1**				
Bloomberg U.S. Aggregate	-1.5				
Excess	0.4				
TRANSITION AGGREGATE CORE BONDS (2)					
TOTAL CORE/CORE PLUS BONDS (3)	**-1.1**	**9.7%**	**9.7%**	**-0.0%**	**4.2%**
Bloomberg U.S. Aggregate	-1.5	7.5	8.7	0.0	3.5
Excess	0.5	2.2	1.0	-0.1	0.7

(1) Prior to 12/1/2020 the Core and Core Plus managers were categorized as Active or Semi-Passive. For historical performance of each manager, see the following pages in this report. For information on the historical performance of the previous groupings refer to the 9/30/2020 Comprehensive Performance Report.

(2) The Transition Aggregate Core Bonds includes core bonds securities that are being transition to a different manager.

(3) The current Core Bonds Benchmark is the Bloomberg U.S. Aggregate calculated daily. For historical benchmark details please refer to the addendum of this report.

Note: All aggregates include the performance of terminated managers. Inception refers to the date of retention by the SBI.

	Ending Market Value	Portfolio Weight	Last Qtr	Fiscal YTD	1 Year	3 Year	5 Year	10 Year	Since Inception	Inception Date
Active Core										
DODGE & COX	**$957,584,084**	**21.3%**	**-4.8%**	**-10.1%**	**-10.1%**	**0.2%**	**1.7%**	**2.7%**	**5.2%**	**02/2000**
Bloomberg U.S. Aggregate			-4.7	-10.3	-10.3	-0.9	0.9	1.5	4.2	02/2000
Excess			-0.1	0.2	0.2	1.1	0.8	1.1	1.0	
BLACKROCK	**843,351,169**	**18.8**	**-5.2**	**-10.7**	**-10.7**	**-0.8**	**1.0**	**1.7**	**4.6**	**04/1996**
Bloomberg U.S. Aggregate			-4.7	-10.3	-10.3	-0.9	0.9	1.5	4.5	04/1996
Excess			-0.5	-0.4	-0.4	0.2	0.2	0.2	0.1	
CORE	**1,800,935,252**	**40.1**	**-5.0**	**-10.4**	**-10.4**				**-5.9**	**11/2020**
Bloomberg U.S. Aggregate			-4.7	-10.3	-10.3				-6.6	11/2020
Excess			-0.3	-0.1	-0.1				0.7	

(1) Prior to 12/1/2020 the Core managers were categorized as Active or Semi-Passive. For information on the historical performance of the previous groupings refer to the 9/30/2020 Comprehensive Performance Report.

	2021 Calendar Return	2020 Calendar Return	2019 Calendar Return	2018 Calendar Return	2017 Calendar Return
Active Core					
DODGE & COX	**-0.7%**	**9.4%**	**9.6%**	**-0.0%**	**4.2%**
Bloomberg U.S. Aggregate	-1.5	7.5	8.7	0.0	3.5
Excess	0.8	1.8	0.9	-0.1	0.7
BLACKROCK	**-1.3**	**8.3**	**9.3**	**-0.1**	**3.7**
Bloomberg U.S. Aggregate	-1.5	7.5	8.7	0.0	3.5
Excess	0.2	0.8	0.6	-0.2	0.1
CORE	**-1.0**				
Bloomberg U.S. Aggregate	-1.5				
Excess	0.5				

	Ending Market Value	Portfolio Weight	Last Qtr	Fiscal YTD	1 Year	3 Year	5 Year	10 Year	Since Inception	Inception Date
Core Plus Bonds										
GOLDMAN SACHS	**$847,734,347**	**18.9%**	**-5.4%**	**-10.8%**	**-10.8%**	**-0.6%**	**1.2%**	**1.9%**	**4.9%**	**07/1993**
Bloomberg U.S. Aggregate			-4.7	-10.3	-10.3	-0.9	0.9	1.5	4.6	07/1993
Excess			-0.7	-0.5	-0.5	0.3	0.3	0.3	0.3	
NEUBERGER	**876,507,889**	**19.5**	**-6.1**	**-11.4**	**-11.4**	**-0.3**	**1.3**	**1.9**	**5.8**	**07/1988**
Bloomberg U.S. Aggregate			-4.7	-10.3	-10.3	-0.9	0.9	1.5	5.5	07/1988
Excess			-1.5	-1.1	-1.1	0.6	0.4	0.3	0.2	
WESTERN	**968,655,513**	**21.6**	**-6.6**	**-15.0**	**-15.0**	**-1.1**	**1.1**	**2.4**	**7.6**	**07/1984**
Bloomberg U.S. Aggregate			-4.7	-10.3	-10.3	-0.9	0.9	1.5	6.5	07/1984
Excess			-1.9	-4.7	-4.7	-0.2	0.2	0.8	1.0	
CORE PLUS (1)	**2,692,897,748**	**59.9**	**-6.1**	**-12.6**	**-12.6**				**-7.1**	**11/2020**
Bloomberg U.S. Aggregate			-4.7	-10.3	-10.3				-6.6	11/2020
Excess			-1.4	-2.3	-2.3				-0.5	

(1) Prior to 12/1/2020 the Core Plus managers were categorized as Active or Semi-Passive. For information on the historical performance of the previous groupings refer to the 9/30/2020 Comprehensive Performance Report.

	2021 Calendar Return	2020 Calendar Return	2019 Calendar Return	2018 Calendar Return	2017 Calendar Return
Core Plus Bonds					
GOLDMAN SACHS	**-1.5%**	**9.0%**	**9.6%**	**-0.0%**	**3.9%**
Bloomberg U.S. Aggregate	-1.5	7.5	8.7	0.0	3.5
Excess	0.0	1.5	0.9	-0.0	0.4
NEUBERGER	**-0.6**	**9.9**	**9.0**	**-0.1**	**3.6**
Bloomberg U.S. Aggregate	-1.5	7.5	8.7	0.0	3.5
Excess	1.0	2.4	0.3	-0.1	0.0
WESTERN	**-1.3**	**10.9**	**11.1**	**-0.2**	**5.6**
Bloomberg U.S. Aggregate	-1.5	7.5	8.7	0.0	3.5
Excess	0.3	3.4	2.4	-0.3	2.1
CORE PLUS	**-1.1**				
Bloomberg U.S. Aggregate	-1.5				
Excess	0.4				

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Return Seeking Bonds
June 30, 2022

	Ending Market Value	Portfolio Weight	Last Qtr	Fiscal YTD	1 Year	3 Year	5 Year	10 Year	Since Inception	Inception Date
Return Seeking Bonds Managers										
COLUMBIA CREDIT PLUS	**$849,190,492**	**21.7%**	**-8.4%**	**-14.2%**	**-14.2%**				**-8.0%**	**12/2020**
Credit Plus Benchmark			-7.2	-13.0	-13.0				-8.5	12/2020
Excess			-1.3	-1.2	-1.2				0.5	
PIMCO CREDIT PLUS	**802,002,795**	**20.5**	**-7.3**	**-12.7**	**-12.7**				**-7.6**	**12/2020**
Credit Plus Benchmark			-7.2	-13.0	-13.0				-8.5	12/2020
Excess			-0.2	0.2	0.2				0.9	
CREDIT PLUS	**1,651,193,286**	**42.2**	**-7.9**	**-13.5**	**-13.5**				**-7.8**	**12/2020**
Credit Plus Benchmark			-7.2	-13.0	-13.0				-8.5	12/2020
Excess			-0.7	-0.5	-0.5				0.7	
BLACKROCK OPPORTUNISTIC	**520,289,923**	**13.3**	**-3.7**	**-6.5**	**-6.5**				**-3.6**	**12/2020**
ICE BofA US 3-Month Treasury Bill			0.1	0.2	0.2				0.1	12/2020
Excess			-3.8	-6.7	-6.7				-3.7	
ASHMORE EMERGING MARKET	**264,015,730**	**6.7**	**-11.8**	**-25.8**	**-25.8**				**-19.1**	**01/2021**
JPM JEMB Sovereign-only 50-50			-10.0	-20.2	-20.2				-15.2	01/2021
Excess			-1.7	-5.6	-5.6				-3.9	
TCW SECURITIZED CREDIT	**342,352,869**	**8.7**	**-2.3**	**-2.1**	**-2.1**				**-2.1**	**07/2021**
ICE BofA US 3-Month Treasury Bill			0.1	0.2	0.2				0.2	07/2021
Excess			-2.4	-2.3	-2.3				-2.3	

Return Seeking Bonds Managers	2021 Calendar Return	2020 Calendar Return	2019 Calendar Return	2018 Calendar Return	2017 Calendar Return
COLUMBIA CREDIT PLUS	**1.1%**				
Credit Plus Benchmark	0.0				
Excess	1.1				
PIMCO CREDIT PLUS	**0.8**				
Credit Plus Benchmark	0.0				
Excess	0.7				
CREDIT PLUS	**0.9**				
Credit Plus Benchmark	0.0				
Excess	0.9				
BLACKROCK OPPORTUNISTIC	**0.3**				
ICE BofA US 3-Month Treasury Bill	0.0				
Excess	0.2				
ASHMORE EMERGING MARKET	**-10.1**				
JPM JEMB Sovereign-only 50-50	-5.3				
Excess	-4.8				
TCW SECURITIZED CREDIT					
ICE BofA US 3-Month Treasury Bill					
Excess					

	Ending Market Value	Portfolio Weight	Last Qtr	Fiscal YTD	1 Year	3 Year	5 Year	10 Year	Since Inception	Inception Date
Return Seeking Bonds Managers										
PAYDEN RYGEL	**$267,829,470**	**6.8%**	**-8.9%**	**-12.7%**	**-12.7%**				**-7.4%**	**01/2021**
Multi-Asset Credit Benchmark			-8.5	-12.3	-12.3				-7.3	01/2021
Excess			-0.5	-0.4	-0.4				-0.2	
PGIM	**309,422,222**	**7.9**	**-9.5**	**-13.1**	**-13.1**				**-8.3**	**01/2021**
Multi-Asset Credit Benchmark			-8.5	-12.3	-12.3				-7.3	01/2021
Excess			-1.1	-0.8	-0.8				-1.1	
MULTI-ASSET CREDIT	**577,251,692**	**14.7**	**-9.3**	**-12.9**	**-12.9**				**-7.9**	**01/2021**
Multi-Asset Credit Benchmark			-8.5	-12.3	-12.3				-7.3	01/2021
Excess			-0.8	-0.6	-0.6				-0.6	
KKR	**280,757,327**	**7.2**	**-10.4**	**-12.5**	**-12.5**				**-6.8**	**01/2021**
ICE BofA US Cash Pay HY Constrained			-9.9	-12.6	-12.6				-6.4	01/2021
Excess			-0.5	0.1	0.1				-0.4	
OAKTREE	**280,159,163**	**7.2**	**-9.5**	**-11.6**	**-11.6**				**-6.2**	**01/2021**
ICE BofA US Cash Pay HY Constrained			-9.9	-12.6	-12.6				-6.4	01/2021
Excess			0.4	0.9	0.9				0.2	
HIGH YIELD	**560,916,490**	**14.3**	**-10.0**	**-12.1**	**-12.1**				**-6.6**	**01/2021**
ICE BofA US Cash Pay HY Constrained			-9.9	-12.6	-12.6				-6.4	01/2021
Excess			-0.1	0.5	0.5				-0.1	

Return Seeking Bonds Managers	2021 Calendar Return	2020 Calendar Return	2019 Calendar Return	2018 Calendar Return	2017 Calendar Return
PAYDEN RYGEL	**2.6%**				
Multi-Asset Credit Benchmark	2.7				
Excess	-0.1				
PGIM	**3.2**				
Multi-Asset Credit Benchmark	2.7				
Excess	0.5				
MULTI-ASSET CREDIT	**2.9**				
Multi-Asset Credit Benchmark	2.7				
Excess	0.2				
KKR	**4.7**				
ICE BofA US Cash Pay HY Constrained	5.3				
Excess	-0.6				
OAKTREE	**4.5**				
ICE BofA US Cash Pay HY Constrained	5.3				
Excess	-0.8				
HIGH YIELD	**4.6**				
ICE BofA US Cash Pay HY Constrained	5.3				
Excess	-0.7				

	Ending Market Value	Portfolio Weight	Last Qtr	Fiscal YTD	1 Year	3 Year	5 Year	10 Year	Since Inception	Inception Date
Return Seeking Bonds										
CREDIT PLUS	**$1,651,193,286**	**42.2%**	**-7.9%**	**-13.5%**	**-13.5%**				**-7.8%**	**12/2020**
Credit Plus Benchmark			-7.2	-13.0	-13.0				-8.5	12/2020
Excess			-0.7	-0.5	-0.5				0.7	
OPPORTUNISTIC FI	**520,289,923**	**13.3**	**-3.7**	**-6.5**	**-6.5**				**-3.6**	**12/2020**
ICE BofA US 3-Month Treasury Bill			0.1	0.2	0.2				0.1	12/2020
Excess			-3.8	-6.7	-6.7				-3.7	
EMERGING MARKET DEBT	**264,015,730**	**6.7**	**-11.8**	**-25.8**	**-25.8**				**-19.1**	**01/2021**
JPM JEMB Sovereign-only 50-50			-10.0	-20.2	-20.2				-15.2	01/2021
Excess			-1.7	-5.6	-5.6				-3.9	
SECURITIZED CREDIT	**342,352,869**	**8.7**	**-2.3**	**-2.1**	**-2.1**				**-2.0**	**06/2021**
ICE BofA US 3-Month Treasury Bill			0.1	0.2	0.2				0.2	06/2021
Excess			-2.4	-2.3	-2.3				-2.2	
MULTI-ASSET CREDIT	**577,251,692**	**14.7**	**-9.3**	**-12.9**	**-12.9**				**-7.9**	**01/2021**
Multi-Asset Credit Benchmark			-8.5	-12.3	-12.3				-7.3	01/2021
Excess			-0.8	-0.6	-0.6				-0.6	
HIGH YIELD	**560,916,490**	**14.3**	**-10.0**	**-12.1**	**-12.1**				**-6.6**	**01/2021**
ICE BofA US Cash Pay HY Constrained			-9.9	-12.6	-12.6				-6.4	01/2021
Excess			-0.1	0.5	0.5				-0.1	
RETURN SEEKING BONDS (1)	**3,920,443,138**	**100.0**	**-7.7**	**-12.4**	**-12.4**				**-7.0**	**12/2020**
Return Seeking Fixed Income Benchmark			-6.4	-10.7	-10.7				-6.2	12/2020
Excess			-1.3	-1.7	-1.7				-0.8	

(1) Includes return seeking bonds transition account.

	2021 Calendar Return	2020 Calendar Return	2019 Calendar Return	2018 Calendar Return	2017 Calendar Return
Return Seeking Bonds					
CREDIT PLUS	**0.9%**				
Credit Plus Benchmark	0.0				
Excess	0.9				
OPPORTUNISTIC FI	**0.3**				
ICE BofA US 3-Month Treasury Bill	0.0				
Excess	0.2				
EMERGING MARKET DEBT	**-10.1**				
JPM JEMB Sovereign-only 50-50	-5.3				
Excess	-4.8				
SECURITIZED CREDIT					
ICE BofA US 3-Month Treasury Bill					
Excess					
MULTI-ASSET CREDIT	**2.9**				
Multi-Asset Credit Benchmark	2.7				
Excess	0.2				
HIGH YIELD	**4.6**				
ICE BofA US Cash Pay HY Constrained	5.3				
Excess	-0.7				
RETURN SEEKING BONDS (1)	**0.9**				
Return Seeking Fixed Income Benchmark	0.8				
Excess	0.1				

(1) Includes return seeking bonds transition account.

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Treasuries

June 30, 2022

	Ending Market Value	Portfolio Weight	Last Qtr	Fiscal YTD	1 Year	3 Year	5 Year	10 Year	Since Inception	Inception Date
Treasuries Managers										
BLACKROCK	**$2,385,087,167**	**31.0%**	**-7.3%**	**-13.6%**	**-13.6%**	**-2.0%**			**0.9%**	**02/2018**
Bloomberg Treasury 5+ Year			-7.2	-13.5	-13.5	-1.8			1.0	02/2018
Excess			-0.1	-0.1	-0.1	-0.1			-0.1	
GOLDMAN SACHS	**2,549,568,530**	**33.2**	**-7.3**	**-13.6**	**-13.6**	**-1.8**			**1.0**	**02/2018**
Bloomberg Treasury 5+ Year			-7.2	-13.5	-13.5	-1.8			1.0	02/2018
Excess			-0.1	-0.1	-0.1	-0.0			-0.0	
NEUBERGER	**2,751,034,205**	**35.8**	**-7.3**	**-13.3**	**-13.3**	**-1.6**			**1.2**	**02/2018**
Bloomberg Treasury 5+ Year			-7.2	-13.5	-13.5	-1.8			1.0	02/2018
Excess			-0.1	0.2	0.2	0.2			0.1	
TOTAL TREASURIES	**7,685,689,902**	**100.0**	**-7.3**	**-13.5**	**-13.5**	**-1.8**			**1.1**	**02/2018**
Bloomberg Treasury 5+ Year			-7.2	-13.5	-13.5	-1.8			1.0	02/2018
Excess			-0.1	-0.0	-0.0	0.0			0.0	

	2021 Calendar Return	2020 Calendar Return	2019 Calendar Return	2018 Calendar Return	2017 Calendar Return
Treasuries Managers					
BLACKROCK	**-4.0%**	**12.5%**	**10.4%**		
Bloomberg Treasury 5+ Year	-3.8	12.8	10.4		
Excess	-0.2	-0.3	-0.1		
GOLDMAN SACHS	**-3.9**	**12.7**	**10.6**		
Bloomberg Treasury 5+ Year	-3.8	12.8	10.4		
Excess	-0.1	-0.1	0.1		
NEUBERGER	**-3.4**	**12.8**	**10.4**		
Bloomberg Treasury 5+ Year	-3.8	12.8	10.4		
Excess	0.4	-0.1	-0.0		
TOTAL TREASURIES	**-3.7**	**12.7**	**10.4**		
Bloomberg Treasury 5+ Year	-3.8	12.8	10.4		
Excess	0.0	-0.2	0.0		

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Laddered Bonds + Cash

June 30, 2022

	Ending Market Value	Portfolio Weight	Last Qtr	1 Year	3 Year	5 Year	10 Year	Since Inception	Inception Date
Laddered Bond and Cash Managers									
Neuberger Berman Ladder Bond	**$1,374,878,304**	**32.1%**	**-0.1%**	**-0.5%**				**-0.2%**	**11/2020**
ICE BofA US 3-Month Treasury Bill			0.1	0.2				0.1	11/2020
Excess			-0.2	-0.6				-0.3	
Goldman Sachs Ladder Bond	**1,375,912,818**	**32.1**	**-0.0**	**-0.4**				**-0.1**	**11/2020**
ICE BofA US 3-Month Treasury Bill			0.1	0.2				0.1	11/2020
Excess			-0.1	-0.5				-0.3	
Treasury Ladder Aggregate	**2,750,791,122**	**64.3**	**-0.1**	**-0.4**				**-0.2**	**11/2020**
ICE BofA US 3-Month Treasury Bill			0.1	0.2				0.1	11/2020
Excess			-0.2	-0.6				-0.3	
Combined Funds STIF	**1,506,896,559**	**35.2**	**0.2**	**0.3**	**0.6%**	**1.1%**	**0.7%**	**1.4**	**01/2004**
iMoneyNet Money Fund Average-All Taxable			0.1	0.1	0.4	0.8	0.4	1.0	01/2004
Excess			0.1	0.2	0.2	0.3	0.3	0.4	
TEACHERS RETIREMENT CD REPO	**22,327,868**	**0.5**	**0.1**	**0.2**	**0.8**	**1.2**	**0.8**	**0.8**	**02/2012**
ICE BofA US 3-Month Treasury Bill			0.1	0.2	0.6	1.1	0.6	0.6	02/2012
Excess			0.0	0.0	0.2	0.1	0.2	0.2	
Laddered Bond + Cash	**4,280,026,156**	**100.0**	**-0.0**	**-0.3**	**0.5**	**1.0**	**0.7**	**4.2**	**12/1977**
ICE BofA US 3-Month Treasury Bill			0.1	0.2	0.6	1.1	0.6	4.4	12/1977
Excess			-0.1	-0.5	-0.2	-0.1	0.1	-0.2	

	2021 Calendar Return	2020 Calendar Return	2019 Calendar Return	2018 Calendar Return	2017 Calendar Return
Laddered Bond and Cash Managers					
Neuberger Berman Ladder Bond	**0.0%**				
ICE BofA US 3-Month Treasury Bill	0.0				
Excess	-0.0				
Goldman Sachs Ladder Bond	**0.1**				
ICE BofA US 3-Month Treasury Bill	0.0				
Excess	0.0				
Treasury Ladder Aggregate	**0.0**				
ICE BofA US 3-Month Treasury Bill	0.0				
Excess	-0.0				
Combined Funds STIF	**0.1**	**0.5%**	**2.3%**	**2.0%**	**0.9%**
iMoneyNet Money Fund Average-All Taxable	0.0	0.3	1.9	1.5	0.5
Excess	0.1	0.2	0.5	0.5	0.4
TEACHERS RETIREMENT CD REPO	**0.1**	**1.0**	**2.5**	**1.8**	**1.3**
ICE BofA US 3-Month Treasury Bill	0.0	0.7	2.3	1.9	0.9
Excess	0.0	0.4	0.2	-0.0	0.5
Laddered Bond + Cash	**0.0**	**0.6**	**2.3**	**1.9**	**1.1**
ICE BofA US 3-Month Treasury Bill	0.0	0.7	2.3	1.9	0.9
Excess	-0.0	-0.1	0.1	0.0	0.2

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Uninvested Private Markets

June 30, 2022

	Ending Market Value	Portfolio Weight	Last Qtr	Fiscal YTD	1 Year	3 Year	5 Year	10 Year	Since Inception	Inception Date
Uninvested Private Markets Managers										
NISA PRIVATE MKT UNINV OVERLAY	**$417,311,048**	**42.2%**	**-15.8%**	**-10.1%**	**-10.1%**				**2.0%**	**01/2021**
S&P 500 INDEX (DAILY)			-16.1	-10.6	-10.6				2.0	01/2021
Excess			0.3	0.5	0.5				0.0	
BLACKROCK SP INDEX	**571,743,537**	**57.8**	**-16.1**	**-10.3**	**-10.3**				**2.3**	**01/2021**
S&P 500 INDEX (DAILY)			-16.1	-10.6	-10.6				2.0	01/2021
Excess			-0.0	0.3	0.3				0.3	
UNINVESTED PRIVATE MARKETS	**989,054,584**	**100.0**	**-16.0**	**-10.2**	**-10.2**				**2.2**	**01/2021**
S&P 500 INDEX (DAILY)			-16.1	-10.6	-10.6				2.0	01/2021
Excess			0.1	0.4	0.4				0.2	

Uninvested Private Markets Managers	2021 Calendar Return	2020 Calendar Return	2019 Calendar Return	2018 Calendar Return	2017 Calendar Return
NISA PRIVATE MKT UNINV OVERLAY	**28.1%**				
S&P 500 INDEX (DAILY)	28.7				
Excess	-0.6				
BLACKROCK SP INDEX	**28.9**				
S&P 500 INDEX (DAILY)	28.7				
Excess	0.2				
UNINVESTED PRIVATE MARKETS	**28.6**				
S&P 500 INDEX (DAILY)	28.7				
Excess	-0.1				

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Private Markets
June 30, 2022

Private Markets

	Last Qtr	FYTD	1 Year	3 Year	5 Year	10 Year	20 Year	25 Year	30 Year
Private Markets - Invested	4.0%	24.8%	24.8%	18.7%	16.3%	13.8%	14.0%	13.9%	13.3%
Private Markets -Uninvested (1)	-16.0%	-10.2%	-10.2%						
Private Equity	1.2%	22.1%	22.1%	23.6%	20.9%	17.5%	15.9%	15.3%	15.5%
Private Credit	6.7%	21.3%	21.3%	13.0%	12.3%	13.4%	12.6%	13.1%	
Resources	14.5%	33.8%	33.8%	5.3%	4.2%	2.9%	13.3%	12.8%	13.0%
Real Estate	13.7%	43.7%	43.7%	19.4%	15.8%	14.0%	10.3%	11.1%	9.6%

Private Markets

The time-weighted rates of return for the Private Markets portfolio are shown here. Private Markets included Private Equity, Private Credit, Resources, and Real Estate. Some of the existing investments are relatively immature and returns may not be indicative of future results.

Private Equity Investments - The objectives of the Private Equity portfolio, which may include leveraged buyouts, growth equity, venture capital and special situations, are to achieve attractive returns and to provide overall portfolio diversification to the total plan.

Private Credit Investments - The objectives of the Private Credit portfolio, which may include mezzanine debt, direct lending, and other forms of non-investment grade fixed income instruments, are to achieve a high total return over a full market cycle and to provide some degree of downside protection and typically provide current income in the form of a coupon. In certain situations, investments in the Private Credit portfolio also provide an equity component of return in the form of warrants or re-organized equity.

Resource Investments - The objectives of the Resources portfolio, which may include energy, infrastructure, and other hard assets, are to provide protection against the risks associated with inflation and to provide overall portfolio diversification to the total plan.

Real Estate Investments - The objectives of the Real Estate portfolio, which may include core and non-core real estate investments, are to achieve attractive returns, preserve capital, provide protection against risks associated with inflation, and provide overall portfolio diversification to the total plan.

The SBI also monitors Private Markets performance using money-weighted return metrics such as Internal Rate of Return and Multiple of Invested Capital. For money-weighted return metrics please refer to the Combined Funds Performance Report.

(1) The Uninvested portion of the Private Markets allocation is invested in a combination of a passively managed S&P 500 Index strategy and a cash overlay strategy invested in equity derivatives and cash

Minnesota State Board of Investment
Private Markets Investments as of June 30, 2022

Investments	Commitments	Contributions	Distributions	Remaining Commitment	Market Value	Investment Multiple	IRR	Vintage Year
Private Equity	**24,615,873,195**	**18,283,427,823**	**15,295,386,547**	**8,068,484,547**	**14,756,296,696**	**1.64**	**13.85**	
Adams Street Partners, LLC	285,445,000	167,226,742	109,349,746	118,218,258	150,627,408	1.55	13.84	
Adams Street Global Secondary Fund 5 LP	100,000,000	77,114,692	72,719,159	22,885,308	32,878,006	1.37	6.92	2012
Adams Street Global Secondary Fund 6	100,000,000	75,200,000	36,630,587	24,800,000	91,937,940	1.71	36.39	2017
Adams Street Global Secondary Fund 7	85,445,000	14,912,050	0	70,532,950	25,811,463	1.73		2021
Advent International Group	505,000,000	318,230,921	324,631,020	189,853,033	311,680,664	2.00	18.60	
Advent International GPE VI-A, L.P.	50,000,000	52,993,313	103,400,194	0	5,538,801	2.06	16.61	2008
Advent International GPE VII, L.P.	90,000,000	85,590,641	138,972,935	4,500,000	21,530,638	1.88	14.16	2012
Advent International GPE VIII-B	100,000,000	100,000,000	73,062,483	0	129,810,536	2.03	21.10	2016
Advent International GPE IX	115,000,000	79,646,967	9,195,408	35,353,033	154,800,689	2.06	57.21	2019
Advent International GPE X	150,000,000	0	0	150,000,000	0	0.00		2022
Affinity Ventures	9,000,000	9,000,000	3,590,011	0	857,493	0.49	-11.71	
Affinity Ventures IV, L.P.	4,000,000	4,000,000	1,541,970	0	3,279	0.39	-37.45	2004
Affinity Ventures V, L.P.	5,000,000	5,000,000	2,048,042	0	854,215	0.58	-8.37	2008
Apax Partners	600,000,000	465,906,422	489,606,104	209,397,504	361,123,939	1.83	18.77	
APAX VIII - USD	200,000,000	233,892,465	335,200,854	11,285,376	69,473,217	1.73	14.74	2013
Apax IX USD L.P.	150,000,000	155,305,183	147,113,643	17,529,295	204,601,152	2.26	29.14	2016
Apax X USD L.P.	150,000,000	76,708,774	7,291,608	80,582,833	87,049,569	1.23	26.32	2019
Apax XI	100,000,000	0	0	100,000,000	0	0.00		2022
Arsenal Capital Partners	175,000,000	82,514,407	2,579,409	94,937,757	97,283,685	1.21	12.59	
Arsenal Capital Partners V, L.P.	75,000,000	67,788,176	2,579,409	9,663,988	82,557,454	1.26	12.71	2019
Arsenal Capital Partners VI LP	100,000,000	14,726,231	0	85,273,769	14,726,231	1.00	0.00	2021
Asia Alternatives	399,000,000	117,977,506	13,108,459	291,176,134	126,591,779	1.18	11.04	
Asia Alternatives Capital Partners V	99,000,000	90,995,539	13,100,628	18,158,101	101,528,337	1.26	12.99	2017
MN Asia Investors	300,000,000	26,981,967	7,831	273,018,033	25,063,441	0.93	-10.80	2020
Banc Fund	276,801,387	285,710,477	246,820,430	0	223,401,491	1.65	10.87	
Banc Fund VIII, L.P.	98,250,000	98,250,000	211,093,311	0	33,216	2.15	12.73	2008
Banc Fund IX, L.P.	107,205,932	107,205,932	32,414,449	0	128,277,794	1.50	7.78	2014
Banc Fund X, L.P.	71,345,455	80,254,545	3,312,670	0	95,090,481	1.23	9.02	2018
BlackRock	951,774,870	956,392,392	4,457,327	0	1,210,109,142	1.27	28.88	
BlackRock Tempus Fund	1,774,870	1,774,870	1,796,583	0	180,592	1.11	5.63	2015
BlackRock Long Term Capital, SCSP	950,000,000	954,617,522	2,660,745	0	1,209,928,550	1.27	29.16	2019

Minnesota State Board of Investment
Private Markets Investments as of June 30, 2022

Investments	Commitments	Contributions	Distributions	Remaining Commitment	Market Value	Investment Multiple	IRR	Vintage Year
Blackstone Group L.P.	1,535,000,000	765,490,371	675,486,738	860,655,284	505,966,302	1.54	15.95	
Blackstone Capital Partners Asia II	270,000,000	0	0	270,000,000	0	0.00		2021
Blackstone Capital Partners IV, L.P.	70,000,000	84,459,884	200,562,452	1,832,302	1,028,076	2.39	37.02	2002
Blackstone Capital Partners V L.P.	140,000,000	152,406,707	245,675,051	7,027,560	870,191	1.62	8.02	2006
Blackstone Capital Partners VI, L.P.	100,000,000	106,536,126	144,395,601	11,175,309	44,408,772	1.77	12.52	2008
Blackstone Capital Partners VII	130,000,000	136,647,177	65,753,267	10,977,430	158,490,728	1.64	17.87	2015
Blackstone Capital Partners VIII, L.P.	150,000,000	60,649,186	2,658,588	95,195,845	73,102,750	1.25	29.40	2019
Blackstone Capital Partners IX, L.P.	150,000,000	0	0	150,000,000	0	0.00		2022
Blackstone Growth	250,000,000	183,041,291	16,441,778	81,196,838	184,618,689	1.10	13.59	2020
Blackstone Growth Equity II	150,000,000	0	0	150,000,000	0	0.00		2022
Blackstone Supplemental Account - M	125,000,000	41,750,000	0	83,250,000	43,447,096	1.04	5.73	2021
Blackstone Strategic Partners	915,500,000	671,888,725	797,591,164	330,837,616	293,396,262	1.62	12.24	
Strategic Partners III VC, L.P.	25,000,000	25,059,678	33,874,990	115,168	272,077	1.36	5.98	2004
Strategic Partners III-B, L.P.	100,000,000	79,629,077	118,509,586	12,304,709	205,488	1.49	6.35	2004
Strategic Partners IV VC, L.P.	40,500,000	42,142,465	61,953,059	2,280,277	3,133,887	1.54	9.28	2008
Strategic Partners IV-B	100,000,000	99,356,038	152,338,242	11,669,115	3,905,141	1.57	12.21	2008
Strategic Partners V, LP	100,000,000	87,076,150	133,611,131	15,952,561	10,198,223	1.65	18.68	2011
Strategic Partners VI, L.P.	150,000,000	103,206,952	125,203,876	53,465,124	36,105,859	1.56	15.43	2014
Strategic Partners VII, L.P.	150,000,000	113,380,474	108,026,963	52,709,596	97,077,735	1.81	22.16	2016
Strategic Partners VIII	150,000,000	106,675,490	63,771,177	97,524,399	127,616,658	1.79	55.65	2018
Strategic Partners IX	100,000,000	15,362,402	302,140	84,816,667	14,881,193	0.99	-1.24	2022
Bridgepoint	167,542,238	135,728,894	13,311,036	31,813,344	156,389,122	1.25	16.60	
Bridgepoint Europe VI L.P.	167,542,238	135,728,894	13,311,036	31,813,344	156,389,122	1.25	16.60	2018
Brookfield Asset Management Inc.	500,000,000	318,431,297	188,146,050	219,665,575	357,713,360	1.71	38.99	
Brookfield Capital Partners Fund IV	100,000,000	107,053,430	168,651,562	13,303,704	110,315,643	2.61	47.89	2015
Brookfield Capital Partners V L.P.	250,000,000	211,377,867	19,494,488	56,361,871	247,397,718	1.26	17.85	2018
Brookfield Capital Partners Fund VI	150,000,000	0	0	150,000,000	0	0.00		2022
CVC Capital Partners	389,955,421	435,638,955	540,973,576	24,698,842	315,021,684	1.96	17.28	
CVC Capital Partners VI	256,146,007	281,754,857	246,086,929	23,205,690	309,391,552	1.97	17.91	2013
CVC European Equity Partners V, L.P.	133,809,414	153,884,098	294,886,647	1,493,152	5,630,132	1.95	16.79	2008
Canyon Partners	125,000,000	97,826,145	21,475,843	48,649,698	97,534,190	1.22	17.48	
Canyon Distressed Opportunity Fund III	125,000,000	97,826,145	21,475,843	48,649,698	97,534,190	1.22	17.48	2020

Minnesota State Board of Investment
Private Markets Investments as of June 30, 2022

Investments	Commitments	Contributions	Distributions	Remaining Commitment	Market Value	Investment Multiple	IRR	Vintage Year
CarVal Investors	900,000,000	772,741,005	893,403,426	137,558,380	276,467,722	1.51	10.63	
CarVal Credit Value Fund I	100,000,000	95,025,281	213,808,779	5,000,000	0	2.25	18.71	2010
CVI Credit Value Fund A II	150,000,000	142,500,000	199,242,174	7,500,000	3,971,331	1.43	8.30	2012
CVI Credit Value Fund A III	150,000,000	142,500,000	149,290,605	7,500,000	42,727,808	1.35	8.55	2015
CVI Credit Value Fund IV	150,000,000	135,203,333	10,058,440	25,058,380	159,033,915	1.25	7.33	2017
CVI Credit Value Fund V	150,000,000	67,500,000	154,566	82,500,000	70,734,668	1.05	6.15	2020
CVI Global Value Fund, L.P.	200,000,000	190,012,391	320,848,863	10,000,000	0	1.69	9.53	2007
Cardinal Partners	10,000,000	10,000,000	39,196,082	0	30,380	3.92	10.61	
DSV Partners IV	10,000,000	10,000,000	39,196,082	0	30,380	3.92	10.61	1985
Carlyle Group	400,000,000	264,275,015	57,102,334	192,769,488	245,381,111	1.14	9.05	
Carlyle Partners VII, L.P.	150,000,000	146,080,022	4,889,664	8,809,642	168,301,293	1.19	10.51	2017
Carlyle Partners VIII, L.P.	150,000,000	4,860,867	0	145,139,133	4,196,173	0.86	-13.67	2021
Carlyle Strategic Partners IV, L.P.	100,000,000	113,334,126	52,212,670	38,820,713	72,883,645	1.10	7.29	2016
Chicago Growth Partners	60,000,000	58,347,626	123,371,040	1,652,374	624,099	2.13	19.54	
Chicago Growth Partners II, L.P.	60,000,000	58,347,626	123,371,040	1,652,374	624,099	2.13	19.54	2008
Clearlake Capital	100,000,000	31,282,144	2,434	68,717,856	30,248,707	0.97	-5.11	
Clearlake Capital Partners VII, L.P.	100,000,000	31,282,144	2,434	68,717,856	30,248,707	0.97	-5.11	2022
Court Square	489,419,132	462,662,121	561,831,134	79,246,408	272,577,835	1.80	14.92	
Court Square Capital Partners II, L.P.	164,419,132	170,029,204	295,744,454	6,176,873	6,253,288	1.78	12.43	2006
Court Square Capital Partners III, L.P.	175,000,000	187,850,200	225,585,707	8,334,834	163,609,361	2.07	20.15	2012
Court Square Capital Partners IV, L.P.	150,000,000	104,782,717	40,500,973	64,734,701	102,715,186	1.37	25.95	2018
Crescendo	101,500,000	103,101,226	57,982,654	0	290,742	0.57	-4.60	
Crescendo Ventures IV	101,500,000	103,101,226	57,982,654	0	290,742	0.57	-4.60	2000
GTCR	210,000,000	211,677,127	424,264,809	16,665,460	223,217,875	3.06	28.05	
GTCR Fund X	100,000,000	105,821,208	214,751,215	6,751,396	559,932	2.03	21.36	2010
GTCR XI	110,000,000	105,855,919	209,513,594	9,914,064	222,657,944	4.08	39.37	2013
Goldman, Sachs & Co.	549,800,000	436,529,223	492,011,762	175,138,330	263,157,783	1.73	15.40	
GS Capital Partners V, L.P.	100,000,000	74,319,006	191,435,136	1,041,099	436,736	2.58	18.23	2005
GS Capital Partners VI, L.P.	100,000,000	110,260,752	141,234,290	2,551,356	4,162,371	1.32	7.17	2007
GS China-US Cooperation Fund	99,800,000	30,613,445	0	69,361,000	43,091,123	1.41	18.75	2018
GS Vintage VII	100,000,000	83,536,746	52,317,848	61,310,863	92,600,201	1.73	20.15	2016
West Street Capital Partners VII, L.P.	150,000,000	137,799,274	107,024,488	40,874,012	122,867,353	1.67	21.90	2016

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Goldner Hawn Johnson & Morrison	77,755,138	57,009,055	51,364,283	20,918,050	58,498,274	1.93	20.67	
GHJM TrailHead Fund	20,000,000	16,652,130	51,364,283	3,354,486	6,623,935	3.48	20.44	2012
Goldner Hawn Fund VII, L.P.	57,755,138	40,356,924	0	17,563,564	51,874,339	1.29	22.46	2018
Green Equity Investors	325,000,000	320,957,978	234,641,442	40,854,141	352,900,234	1.83	15.93	
Green Equity Investors VI, L.P.	200,000,000	224,241,721	234,504,568	12,433,524	249,259,240	2.16	16.21	2012
Green Equity Investors VIII	125,000,000	96,716,257	136,874	28,420,617	103,640,994	1.07	7.70	2020
HarbourVest	21,623,686	20,932,251	25,369,551	778,642	7,294,542	1.56	13.04	
Dover Street VII Cayman Fund L.P.	2,198,112	2,074,080	1,787,970	132,416	83,989	0.90	-4.28	2014
HarbourVest Intl PE Partners V-Cayman US	3,507,877	3,346,005	4,413,905	167,272	154,221	1.37	13.81	2014
HarbourVest Intl PE Partners VI-Cayman	4,220,088	4,039,458	5,122,622	182,954	2,879,169	1.98	16.27	2014
HarbourVest Partners VIII Cayman Buyout	4,506,711	4,387,189	5,574,478	156,000	707,754	1.43	13.60	2014
HarbourVest Partners VIII-Cayman Venture	7,190,898	7,085,519	8,470,577	140,000	3,469,409	1.69	13.13	2014
Hellman & Friedman	650,000,000	534,604,235	480,509,178	129,164,463	368,635,707	1.59	14.89	
Hellman & Friedman Capital Partners VI, L.P.	175,000,000	171,037,755	315,233,005	5,009,796	3,174,994	1.86	12.90	2007
Hellman & Friedman Capital Partners VII, L.P.	50,000,000	49,892,204	153,705,841	2,206,386	10,471,748	3.29	25.00	2009
Hellman & Friedman Investors IX, L.P.	175,000,000	170,925,623	4,158,129	7,284,731	216,698,798	1.29	18.80	2018
Hellman & Friedman Capital Partners X. L.P.	250,000,000	142,748,653	7,412,203	114,663,550	138,290,168	1.02	2.80	2021
IK Limited	500,335,253	450,439,447	430,276,069	70,978,503	306,438,737	1.64	15.56	
IK Fund VII	179,637,471	179,315,195	295,129,855	7,928,976	45,298,555	1.90	14.67	2013
IK Fund VIII	170,085,135	175,535,613	135,146,215	8,025,896	166,734,107	1.72	19.18	2016
IK Fund IX	150,612,647	95,588,640	0	55,023,631	94,406,075	0.99	-1.52	2019
Kohlberg, Kravis, Roberts & Co.	1,647,000,000	934,817,158	905,763,634	769,418,084	676,517,750	1.69	13.91	
KKR Millennium Fund	200,000,000	205,167,570	424,946,028	0	161,924	2.07	16.37	2002
KKR 2006 Fund L.P.	200,000,000	218,137,965	372,893,706	3,300,979	20,029,959	1.80	9.12	2006
KKR Americas Fund XII L.P.	150,000,000	144,039,881	50,557,068	18,331,120	227,625,000	1.93	29.98	2016
KKR Asian Fund III	100,000,000	87,203,475	40,314,000	22,203,436	129,582,200	1.95	32.24	2017
KKR Asian Fund IV	150,000,000	35,267,786	415,503	115,147,717	35,520,480	1.02	2.62	2020
KKR Core Investments Fund II	100,000,000	0	0	100,000,000	0	0.00		2022
KKR Core Investments Partnership	97,000,000	67,729,650	3,014,541	33,742,631	74,630,004	1.15	15.99	2021
KKR Europe V	100,000,000	78,176,644	13,622,788	25,786,388	90,226,775	1.33	22.18	2018
KKR European Fund VI (USD) SCSp	100,000,000	0	0	100,000,000	0	0.00		2022
KKR MN Partnership L.P.	150,000,000	48,923,770	0	101,076,230	49,911,394	1.02	3.41	2021
KKR North America Fund XIII	300,000,000	50,170,417	0	249,829,583	48,830,014	0.97	-2.67	2021

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Lexington Partners	1,345,000,000	922,760,327	697,595,619	486,383,061	780,115,592	1.60	14.88	
Lexington Capital Partners VI-B, L.P.	100,000,000	98,374,022	145,572,539	1,634,703	1,006,329	1.49	7.91	2005
Lexington Capital Partners VII, L.P.	200,000,000	172,835,427	259,262,085	31,132,939	33,341,371	1.69	14.78	2009
Lexington Capital Partners VIII, L.P.	150,000,000	136,386,669	126,618,706	32,663,555	111,177,569	1.74	19.47	2014
Lexington Capital Partners IX, L.P.	150,000,000	93,876,748	27,468,456	68,036,267	134,684,381	1.73	60.47	2018
Lexington Capital Partners X, L.P.	100,000,000	0	0	100,000,000	0	0.00		2021
Lexington Co-Investment Partners IV	200,000,000	212,079,081	105,958,564	8,696,003	258,374,593	1.72	21.06	2017
Lexington Co-Investment Partners V	300,000,000	120,743,252	7,588,884	186,845,632	136,538,058	1.19	33.67	2020
Lexington Co-Investment Partners V Overage	45,000,000	19,503,000	839,090	26,336,090	20,904,755	1.11	17.60	2021
Lexington Middle Market Investors IV	100,000,000	68,962,128	24,287,295	31,037,872	84,088,535	1.57	34.12	2016
MHR Institutional Partners	75,000,000	75,934,392	20,350,497	18,823,636	80,732,330	1.33	9.48	
MHR Institutional Partners IV, L.P.	75,000,000	75,934,392	20,350,497	18,823,636	80,732,330	1.33	9.48	2014
Madison Dearborn Capital Partners LLC	200,000,000	138,423,539	49,451,476	84,078,910	167,815,200	1.57	16.81	
Madison Dearborn Capital Partners VII, L.P.	100,000,000	99,037,562	41,826,032	16,470,133	125,031,144	1.68	15.96	2015
Madison Dearborn Capital Partners VIII-A, L.P	100,000,000	39,385,977	7,625,444	67,608,777	42,784,055	1.28	29.05	2019
Marathon	200,000,000	133,906,171	6,185,200	72,000,000	157,371,776	1.22	23.89	
Marathon Distressed Credit Fund	200,000,000	133,906,171	6,185,200	72,000,000	157,371,776	1.22	23.89	2020
Merced Capital	278,737,500	288,144,755	272,339,922	0	75,279,818	1.21	4.13	
Merced Partners III	100,000,000	103,878,468	133,823,596	0	1,065,950	1.30	5.50	2010
Merced Partners IV	125,000,000	124,968,390	114,347,539	0	24,765,811	1.11	2.30	2013
Merced Partners V	53,737,500	59,297,897	24,168,787	0	49,448,058	1.24	5.13	2017
Neuberger Berman LLC	625,000,000	383,519,176	268,466,382	450,185,746	420,934,492	1.80	36.83	
Dyal Capital Partners III	175,000,000	197,750,746	186,355,275	109,247,334	144,903,070	1.68	27.02	2015
Dyal Capital Partners IV	250,000,000	150,768,430	81,688,193	175,938,412	210,580,932	1.94	65.48	2018
Dyal Capital Partners V	200,000,000	35,000,000	422,914	165,000,000	65,450,490	1.88	78.53	2020
Nordic Capital	583,391,804	439,169,382	321,629,558	220,771,910	434,097,989	1.72	19.41	
Nordic Capital Fund VIII, L.P.	175,605,270	222,197,616	283,473,946	14,891,964	111,491,328	1.78	15.87	2013
Nordic Capital Fund X, L.P.	144,805,949	56,603,841	0	88,202,108	67,893,248	1.20	44.96	2020
Nordic Capital IX Beta, L.P.	168,890,098	160,367,925	38,155,612	23,587,351	254,713,413	1.83	34.74	2017
Nordic Capital Fund XI, L.P.	94,090,487	0	0	94,090,487	0	0.00		2022
North Sky Capital	2,454,339	1,998,089	2,491,492	456,250	223,916	1.36	11.56	
North Sky Capital LBO Fund III, L.P.	1,070,259	720,259	1,026,684	350,000	78,527	1.53	14.57	2014
North Sky Capital Venture Fund III, L.P.	1,384,080	1,277,830	1,464,808	106,250	145,389	1.26	9.39	2014

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Oak Hill Capital Management, Inc.	250,000,000	243,654,808	217,994,544	13,896,274	179,548,990	1.63	34.75	
Oak Hill Capital Partners IV Onshore, L.P.	150,000,000	153,245,546	217,959,501	4,305,536	70,764,587	1.88	35.67	2016
Oak Hill Capital Partners V, L.P.	100,000,000	90,409,262	35,043	9,590,738	108,784,402	1.20	26.57	2018
Oaktree Capital Management, LLC	400,000,000	161,308,614	50,714,692	280,568,839	171,329,101	1.38	12.14	
Oaktree Special Situations Fund, L.P.	100,000,000	101,617,427	20,335,451	10,241,294	93,292,028	1.12	3.15	2014
Oaktree Special Situations Fund II, L.P.	100,000,000	59,691,187	30,379,241	70,327,545	78,037,073	1.82	82.00	2018
Oaktree Special Situations Fund III, L.P.	200,000,000	0	0	200,000,000	0	0.00		2022
Paine & Partners, LLC	225,000,000	171,009,748	44,671,969	70,079,438	188,493,687	1.36	13.72	
Paine Schwartz Food Chain Fund IV, L.P.	75,000,000	65,619,119	35,397,971	18,239,502	58,548,789	1.43	9.32	2014
Paine Schwartz Food Chain Fund V, L.P.	150,000,000	105,390,629	9,273,998	51,839,936	129,944,898	1.32	29.50	2018
Permal PE	5,337,098	4,387,326	4,339,751	1,090,000	703,292	1.15	4.77	
Glouston Private Equity Opportunities IV	5,337,098	4,387,326	4,339,751	1,090,000	703,292	1.15	4.77	2014
Permira	620,791,469	428,099,891	433,777,494	233,597,849	442,889,303	2.05	21.28	
Permira V, L.P.	177,271,306	183,303,708	350,218,136	4,401,119	163,758,054	2.80	22.45	2013
Permira VI, L.P.	134,743,818	125,857,463	72,333,687	28,133,433	168,178,927	1.91	21.13	2016
Permira VII L.P.1	151,958,868	118,938,719	11,225,671	44,245,820	110,952,322	1.03	2.04	2019
Permira VIII	156,817,478	0	0	156,817,478	0	0.00		2022
Public Pension Capital Management	240,000,000	123,880,036	85,241,161	132,726,741	166,125,873	2.03	25.83	
Public Pension Capital, LLC	240,000,000	123,880,036	85,241,161	132,726,741	166,125,873	2.03	25.83	2014
Silver Lake Partners	335,000,000	339,395,609	350,566,768	33,733,506	392,781,259	2.19	20.76	
Silver Lake Partners III, L.P.	100,000,000	93,804,936	192,001,680	9,528,468	25,617,750	2.32	18.48	2007
Silver Lake Partners IV, L.P.	100,000,000	115,466,047	121,537,519	2,881,307	188,065,734	2.68	25.83	2012
Silver Lake Partners V, L.P.	135,000,000	130,124,626	37,027,569	21,323,731	179,097,774	1.66	22.02	2017
Split Rock	110,000,000	107,055,906	125,392,564	2,944,094	29,351,677	1.45	5.21	
Split Rock Partners II, L.P.	60,000,000	59,165,000	66,598,372	835,000	27,193,825	1.59	7.92	2008
Split Rock Partners, L.P.	50,000,000	47,890,906	58,794,192	2,109,094	2,157,852	1.27	2.96	2005
Summit Partners	600,000,000	380,158,626	393,824,982	423,239,289	370,427,003	2.01	29.73	
Summit Partners Growth Equity Fund VIII	100,000,000	116,727,192	230,283,579	23,129,320	68,806,167	2.56	27.55	2011
Summit Partners Growth Equity Fund IX	100,000,000	131,564,916	141,424,991	109,860,075	160,172,667	2.29	38.55	2015
Summit Partners Growth Equity Fund X-A	150,000,000	131,866,518	22,116,412	40,249,894	141,448,169	1.24	23.69	2019
Summit Partners Growth Equity Fund XI	250,000,000	0	0	250,000,000	0	0.00		2021

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TPG Capital	650,000,000	287,401,201	162,560,368	399,648,520	284,601,821	1.56	24.34	
TPG Growth V, L.P.	150,000,000	68,959,038	526,470	82,168,298	84,485,267	1.23	27.02	2021
TPG Partners VII, L.P.	100,000,000	100,557,107	135,130,268	17,331,746	69,204,324	2.03	21.98	2015
TPG Partners VIII, L.P.	150,000,000	98,053,550	26,903,303	69,979,982	112,324,002	1.42	39.43	2018
TPG Partners IX, L.P.	100,000,000	0	0	100,000,000	0	0.00		2022
TPG Tech Adjacencies II, L.P.	150,000,000	19,831,506	327	130,168,494	18,588,229	0.94	-12.41	2021
Thoma Bravo LLC	425,000,000	448,523,134	242,710,395	49,136,635	470,503,053	1.59	23.44	
Thoma Bravo Fund XII, L.P.	75,000,000	81,455,833	47,157,550	18,945,315	109,860,883	1.93	17.18	2016
Thoma Bravo Fund XIII, L.P.	150,000,000	175,850,937	88,494,868	21,407,684	217,426,714	1.74	38.21	2018
Thoma Bravo Fund XIV, L.P.	150,000,000	141,216,364	37	8,783,636	142,788,667	1.01	1.30	2020
Thoma Cressey Fund VII, L.P.	50,000,000	50,000,000	107,057,940	0	426,789	2.15	23.58	2000
Thomas H. Lee Partners	400,000,000	258,480,851	226,553,389	171,051,430	287,010,443	1.99	34.58	
Thomas H. Lee Equity Fund VII, L.P.	100,000,000	99,416,381	137,123,365	10,745,776	53,598,781	1.92	23.59	2015
Thomas H. Lee Equity Fund VIII, L.P.	150,000,000	144,123,246	89,430,024	25,246,878	217,452,971	2.13	66.07	2018
Thomas H. Lee Equity Fund IX, L.P.	150,000,000	14,941,224	0	135,058,776	15,958,691	1.07	11.45	2021
Thomas, McNerney & Partners	80,000,000	78,125,000	125,613,281	1,875,000	93,746	1.61	8.13	
Thomas, McNerney & Partners I, L.P.	30,000,000	30,000,000	15,945,755	0	0	0.53	-10.86	2002
Thomas, McNerney & Partners II, L.P.	50,000,000	48,125,000	109,667,526	1,875,000	93,746	2.28	16.39	2006
Varde Fund	500,000,000	486,500,000	464,600,624	13,500,000	220,867,678	1.41	7.53	
Varde Fund X, L.P.	150,000,000	150,000,000	252,548,040	0	9,084,824	1.74	10.10	2010
Varde Fund XI, L.P.	200,000,000	200,000,000	212,032,546	0	56,928,654	1.34	4.91	2013
Varde Fund XIII, L.P.	150,000,000	136,500,000	20,038	13,500,000	154,854,200	1.13	8.85	2018
Vestar Capital Partners	380,000,000	333,277,631	352,742,923	56,542,081	188,638,580	1.62	11.72	
Vestar Capital Partners IV, L.P.	55,000,000	55,652,024	102,293,320	57,313	377,736	1.84	14.62	1999
Vestar Capital Partners V, L.P.	75,000,000	76,797,458	99,818,631	0	1,356,514	1.32	3.89	2005
Vestar Capital Partners VI, LP	100,000,000	106,955,659	150,510,164	357,259	58,535,394	1.95	23.92	2011
Vestar Capital Partners VII, L.P.	150,000,000	93,872,491	120,808	56,127,509	128,368,937	1.37	17.13	2017
Vista Equity Partners	200,000,000	147,617,149	77,223	53,595,754	157,216,492	1.07	4.26	
Vista Equity Partners Perennial	200,000,000	147,617,149	77,223	53,595,754	157,216,492	1.07	4.26	2020

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Warburg Pincus	1,416,000,000	1,072,824,491	995,165,574	349,498,500	808,287,690	1.68	11.57	
Warburg Pincus China-Southeast Asia II	50,000,000	17,200,000	3,300,000	32,800,000	18,304,908	1.26	18.88	2019
Warburg Pincus China, L.P.	45,000,000	45,585,000	16,711,200	1,350,000	58,182,947	1.64	15.33	2016
Warburg Pincus Financial Sector	90,000,000	80,736,630	15,357,600	13,455,000	130,902,252	1.81	24.79	2017
Warburg Pincus Global Growth 14, L.P.	300,000,000	29,876,507	0	270,000,000	30,789,930	1.03	4.87	2022
Warburg Pincus Global Growth, L.P.	250,000,000	219,852,402	2,625,000	30,125,000	293,395,462	1.35	20.68	2018
Warburg Pincus Equity Partners, L.P.	100,000,000	100,000,000	163,542,253	0	392,275	1.64	10.02	1998
Warburg Pincus Private Equity IX, L.P.	100,000,000	100,000,000	171,872,950	0	1,107,532	1.73	9.64	2005
Warburg Pincus Private Equity X, LP	150,000,000	150,000,000	266,203,541	0	3,264,714	1.80	9.52	2007
Warburg Pincus Private Equity XI, LP	200,000,000	200,342,452	262,255,748	0	94,471,254	1.78	12.86	2012
Warburg Pincus Private Equity XII, LP	131,000,000	129,231,500	93,297,283	1,768,500	177,476,416	2.10	20.77	2015
Wayzata Investment Partners	300,000,000	243,165,000	379,022,482	15,750,000	18,832,610	1.64	14.37	
Wayzata Opportunities Fund II, LLC	150,000,000	174,750,000	333,882,672	750,000	303,707	1.91	16.57	2007
Wayzata Opportunities Fund III	150,000,000	68,415,000	45,139,810	15,000,000	18,528,903	0.93	-1.67	2012
Wellspring Capital Partners	125,000,000	149,192,072	55,485,810	14,724,724	151,222,622	1.39	23.09	
Wellspring Capital Partners VI, L.P.	125,000,000	149,192,072	55,485,810	14,724,724	151,222,622	1.39	23.09	2016
Welsh, Carson, Anderson & Stowe	500,000,000	440,768,724	365,218,998	59,231,276	429,857,388	1.80	19.04	
Welsh, Carson, Anderson & Stowe XI, L.P.	100,000,000	100,000,000	161,464,441	0	7,179,043	1.69	11.75	2008
Welsh, Carson, Anderson & Stowe XII, L.P.	150,000,000	145,877,897	177,480,040	4,122,103	196,002,149	2.56	29.51	2014
Welsh, Carson, Anderson & Stowe XIII, L.P.	250,000,000	194,890,827	26,274,517	55,109,173	226,676,195	1.30	30.73	2018
Whitehorse Capital	300,000,000	200,324,098	118,551,353	148,287,298	145,009,515	1.32	27.77	
Whitehorse Liquidity Partners III	100,000,000	99,311,782	68,865,298	18,582,906	64,653,688	1.34	22.80	2019
Whitehorse Liquidity Partners IV	100,000,000	87,205,482	42,229,770	36,313,731	69,220,816	1.28	37.34	2020
Whitehorse Liquidity Partners V	100,000,000	13,806,834	7,456,285	93,390,661	11,135,011	1.35	28.30	2021
Wind Point Partners	100,000,000	76,531,864	1,912,585	25,385,324	90,114,606	1.20	19.02	
Wind Point Partners IX	100,000,000	76,531,864	1,912,585	25,385,324	90,114,606	1.20	19.02	2019
Windjammer Capital Investors	266,708,861	220,551,345	251,920,723	61,919,241	155,841,137	1.85	12.43	
Windjammer Mezzanine & Equity Fund II, L.P.	66,708,861	55,215,684	85,036,800	10,139,363	225,454	1.54	8.96	2000
Windjammer Senior Equity Fund IV, L.P.	100,000,000	94,740,728	165,677,026	21,167,914	61,480,126	2.40	17.76	2012
Windjammer Senior Equity Fund V, L.P.	100,000,000	70,594,933	1,206,897	30,611,964	94,135,557	1.35	21.23	2017

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Private Credit	**4,122,141,781**	**3,030,409,622**	**2,422,760,369**	**1,598,612,939**	**1,590,234,043**	**1.32**	**10.18**	
Audax Group	350,000,000	194,883,140	206,818,431	176,802,249	41,793,755	1.28	10.37	
Audax Mezzanine Fund III, L.P.	100,000,000	105,207,316	133,977,984	0	5,019,606	1.32	9.80	2010
Audax Mezzanine Fund IV-A, L.P.	100,000,000	84,788,842	72,840,448	31,689,231	30,239,177	1.22	11.41	2015
Audax Mezzanine Fund V, L.P.	150,000,000	4,886,982	0	145,113,018	6,534,971	1.34	33.72	2020
Avenue Capital Partners	200,000,000	200,977,328	142,601,103	0	167,099,847	1.54	9.06	
Avenue Energy Opportunities Fund, L.P.	100,000,000	100,977,328	76,484,671	0	64,838,757	1.40	5.94	2014
Avenue Energy Opportunities Fund II, L.P.	100,000,000	100,000,000	66,116,432	0	102,261,090	1.68	14.03	2017
BlackRock	97,500,000	92,646,829	11,145,751	4,853,171	98,570,389	1.18	7.86	
BlackRock Middle Market Senior Fund	97,500,000	92,646,829	11,145,751	4,853,171	98,570,389	1.18	7.86	2018
Brookfield Asset Management Inc.	200,000,000	34,157,840	0	165,842,160	35,392,816	1.04	4.43	
Brookfield Real Estate Finance Fund VI	200,000,000	34,157,840	0	165,842,160	35,392,816	1.04	4.43	2021
Energy Capital Partners	28,087,500	24,139,611	9,769,268	13,717,157	15,189,235	1.03	3.60	
Energy Capital Credit Solutions II-A	28,087,500	24,139,611	9,769,268	13,717,157	15,189,235	1.03	3.60	2018
Gold Hill	65,852,584	65,852,584	113,654,899	0	3,463,533	1.78	11.84	
Gold Hill 2008	25,852,584	25,852,584	48,393,297	0	3,112,627	1.99	14.57	2008
Gold Hill Venture Lending	40,000,000	40,000,000	65,261,602	0	350,906	1.64	10.70	2004
Goldman, Sachs & Co.	227,500,000	261,176,828	315,988,287	24,922,591	1,195,785	1.21	6.79	
GS Mezzanine Partners 2006 Institutional	100,000,000	113,458,168	135,137,487	9,858,563	584,683	1.20	5.00	2006
GS Mezzanine Partners V, L.P.	127,500,000	147,718,660	180,850,800	15,064,028	611,102	1.23	9.08	2007
HPS Investment Partners	100,000,000	93,355,090	13,757,452	15,817,865	96,441,495	1.18	13.64	
HPS Mezzanine Partners 2019, L.P.	100,000,000	93,355,090	13,757,452	15,817,865	96,441,495	1.18	13.64	2019
Kohlberg, Kravis, Roberts & Co.	274,000,000	349,821,572	291,014,366	109,388,462	116,018,947	1.16	9.85	
KKR Lending Partner II, L.P.	75,000,000	86,884,685	82,467,685	8,802,924	7,530,584	1.04	1.79	2015
KKR Lending Partners III, L.P.	199,000,000	262,936,887	208,546,681	100,585,538	108,488,363	1.21	14.85	2017
LBC Credit Partners	200,000,000	185,535,000	130,941,951	78,481,711	84,838,741	1.16	10.16	
LBC Credit Partners IV, L.P.	100,000,000	110,960,534	104,845,762	36,220,071	25,495,082	1.17	8.32	2016
LBC Credit Partners V, L.P.	100,000,000	74,574,466	26,096,189	42,261,640	59,343,659	1.15	19.53	2019
Marathon	200,000,000	96,022,008	858,534	105,000,000	123,146,125	1.29	16.31	
Marathon Secured Private Strategies Fund II	100,000,000	96,022,008	858,534	5,000,000	123,146,125	1.29	16.31	2019
Marathon Secured Private Strategies Fund III	100,000,000	0	0	100,000,000	0	0.00		2022

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Merit Capital Partners	350,000,000	233,926,126	296,017,759	116,007,074	97,094,200	1.68	11.55	
Merit Mezzanine Fund IV, L.P.	75,000,000	70,178,571	139,120,463	4,821,429	787,345	1.99	11.58	2004
Merit Mezzanine Fund V, LP	75,000,000	71,902,041	79,877,706	3,097,959	33,522,199	1.58	9.39	2009
Merit Mezzanine Fund VI, L.P.	100,000,000	91,845,514	77,019,590	8,087,687	62,784,656	1.52	16.42	2016
Merit Mezzanine Fund VII, L.P.	100,000,000	0	0	100,000,000	0	0.00		2020
Oaktree Capital Management, LLC	650,000,000	284,040,920	45,746,760	372,500,000	325,377,259	1.31	14.74	
Oaktree Opportunities Fund X, L.P.	50,000,000	46,500,021	32,044,660	8,500,000	34,297,931	1.43	9.50	2015
Oaktree Opportunities Fund Xb, L.P.	100,000,000	60,000,000	0	40,000,000	88,994,160	1.48	16.89	2015
Oaktree Opportunities Fund XI, L.P.	300,000,000	135,000,000	1,222,794	165,000,000	159,178,286	1.19	22.76	2020
Oaktree Real Estate Debt III, L.P.	200,000,000	42,540,899	12,479,306	159,000,000	42,906,881	1.30	17.06	2020
PIMCO BRAVO	9,201,697	8,673,551	9,384,185	7,735,883	787,745	1.17	4.96	
PIMCO BRAVO Fund Onshore Feeder I	3,958,027	3,958,027	4,016,443	2,385,880	6,495	1.02	1.60	2014
PIMCO BRAVO Fund OnShore Feeder II	5,243,670	4,715,524	5,367,742	5,350,003	781,250	1.30	5.53	2014
Prudential Global Investment Mgmt	600,000,000	482,578,112	531,214,884	168,071,852	147,146,851	1.41	10.40	
Prudential Capital Partners II, L.P.	100,000,000	97,930,132	145,671,152	11,049,052	492,778	1.49	9.02	2005
Prudential Capital Partners III, L.P.	100,000,000	102,823,075	174,159,760	13,634,935	3,233,482	1.73	14.13	2009
Prudential Capital Partners IV, L.P.	100,000,000	112,819,414	119,011,951	1,948,707	31,051,292	1.33	8.47	2012
Prudential Capital Partners V, L.P.	150,000,000	149,798,262	91,962,979	10,646,386	90,880,328	1.22	8.20	2016
PGIM Capital Partners VI, L.P.	150,000,000	19,207,228	409,042	130,792,772	21,488,970	1.14	26.97	2020
Summit Partners	95,000,000	100,002,497	133,679,035	22,177,023	4,941,586	1.39	9.03	
Summit Subordinated Debt Fund III, L.P.	45,000,000	44,088,494	60,443,093	2,250,000	2,665,969	1.43	8.58	2004
Summit Subordinated Debt Fund IV, L.P.	50,000,000	55,914,003	73,235,942	19,927,023	2,275,617	1.35	9.74	2008
TCW	200,000,000	174,519,135	135,645,751	61,935,134	81,098,443	1.24	8.95	
TCW Direct Lending LLC	100,000,000	83,599,652	87,717,684	25,329,409	19,000,467	1.28	8.32	2014
TCW Direct Lending VII	100,000,000	90,919,484	47,928,067	36,605,725	62,097,976	1.21	10.10	2018
TSSP	275,000,000	148,101,451	34,521,953	155,360,606	150,637,291	1.25	15.24	
Sixth Street Opportunities Partners V	75,000,000	12,818,018	0	62,181,982	12,818,018	1.00		2021
Sixth Street TAO Partners (B), L.P.	50,000,000	42,787,998	17,262,393	24,474,395	39,841,420	1.33	13.17	2018
Sixth Street TAO Partners (D), L.P.	100,000,000	52,449,486	11,437,722	55,030,492	53,582,728	1.24	19.70	2018
TSSP Opportunities Partners IV (A), L.P.	50,000,000	40,045,949	5,821,838	13,673,737	44,395,125	1.25	14.86	2018

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Real Assets	**4,247,571,518**	**3,908,367,836**	**2,619,478,562**	**636,200,551**	**2,284,606,570**	**1.25**	**5.57**	
BlackRock	198,500,000	123,002,996	56,955,086	86,695,319	80,013,796	1.11	4.21	
BlackRock Global Renewable Power Fund II	98,500,000	97,789,849	55,490,848	10,625,197	55,465,418	1.13	4.29	2017
BlackRock Global Renewable Power Infrastructure III	100,000,000	25,213,148	1,464,238	76,070,122	24,548,379	1.03	3.14	2019
EIG Global Energy Partners	450,000,000	469,824,847	377,207,705	77,704,481	145,469,056	1.11	2.63	
EIG Energy Fund XIV	100,000,000	113,459,470	95,309,310	2,761,129	3,840,512	0.87	-4.99	2007
EIG Energy Fund XV	150,000,000	161,871,503	154,367,874	22,871,323	24,375,000	1.10	2.37	2010
EIG Energy Fund XVI	200,000,000	194,493,874	127,530,520	52,072,029	117,253,544	1.26	5.95	2013
Encap Energy	400,000,000	425,447,503	388,645,322	9,625,251	196,827,118	1.38	9.37	
EnCap Energy Capital Fund VII, L.P.	100,000,000	105,420,704	141,245,195	0	452,145	1.34	14.51	2007
EnCap Energy Capital Fund VIII, L.P.	100,000,000	103,335,766	60,931,531	470,044	44,953,093	1.02	0.50	2010
Encap Energy Fund IX	100,000,000	113,593,325	111,036,911	4,021,975	45,739,984	1.38	9.67	2012
EnCap Energy Capital Fund X, L.P.	100,000,000	103,097,708	75,431,685	5,133,231	105,681,896	1.76	15.69	2015
Energy & Minerals Group	680,000,000	671,442,857	385,493,399	57,517,566	560,993,701	1.41	7.84	
NGP Midstream & Resources, L.P.	100,000,000	103,565,615	179,560,149	17,857	5,769,259	1.79	13.31	2007
The Energy & Minerals Group Fund II, L.P.	100,000,000	108,534,480	107,280,051	170,365	108,701,955	1.99	12.99	2011
The Energy & Minerals Group Fund III, L.P.	200,000,000	205,909,034	29,560,105	1,226,830	115,886,961	0.71	-5.47	2014
The Energy & Minerals Group Fund IV, LP	150,000,000	161,569,139	64,613,529	14,023,899	178,313,832	1.50	10.69	2015
The Energy & Minerals Group Fund V, L.P.	112,500,000	77,017,651	3,658,916	38,514,704	127,927,910	1.71	20.93	2019
The Energy & Minerals Group Fund V Accordion	17,500,000	14,846,938	820,649	3,563,911	24,393,784	1.70	21.81	2019
Energy Capital Partners	450,000,000	430,008,136	353,299,267	111,761,226	246,739,015	1.40	10.60	
Energy Capital Partners II-A, L.P.	100,000,000	85,856,131	117,653,952	29,749,110	151,918	1.37	8.94	2010
Energy Capital Partners III, L.P.	200,000,000	232,678,193	208,991,750	30,058,269	121,907,471	1.42	10.23	2013
Energy Capital Partners IV-A, LP	150,000,000	111,473,812	26,653,565	51,953,847	124,679,626	1.36	17.25	2017
Enervest Management Partners	100,000,000	98,748,934	89,138,179	9,344,764	60,540,026	1.52	9.99	
EnerVest Energy Institutional Fund XIV-A, L.P.	100,000,000	98,748,934	89,138,179	9,344,764	60,540,026	1.52	9.99	2015
First Reserve	500,000,000	549,147,616	271,884,084	3,692,077	149,391,750	0.77	-6.22	
First Reserve Fund XI, L.P.	150,000,000	150,292,121	100,059,903	0	152,670	0.67	-8.73	2006
First Reserve Fund XII, L.P.	150,000,000	165,617,044	84,745,180	0	5,387,555	0.54	-14.46	2008
First Reserve Fund XIII, L.P.	200,000,000	233,238,451	87,079,001	3,692,077	143,851,524	0.99	-0.36	2013

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Kohlberg, Kravis, Roberts & Co.	249,850,000	141,935,167	26,509,443	118,148,473	132,609,880	1.12	8.12	
KKR Global Infrastructure Investors III	149,850,000	124,810,350	26,509,443	35,273,290	115,608,430	1.14	8.28	2018
KKR Global Infrastructure Investors IV	100,000,000	17,124,817	0	82,875,183	17,001,450	0.99	-0.72	2021
Merit Energy Partners	519,721,518	384,644,480	166,171,321	94,599,899	396,342,667	1.46	6.47	
Merit Energy Partners F-II, L.P.	100,000,000	59,522,861	32,929,385	0	9,209,656	0.71	-4.78	2006
Merit Energy Partners H, L.P.	100,000,000	100,000,000	29,668,582	0	61,902,048	0.92	-1.30	2011
Merit Energy Partners I, L.P.	169,721,518	169,721,518	89,039,059	0	230,036,683	1.88	13.67	2014
Merit Energy Partners K, L.P.	150,000,000	55,400,101	14,534,295	94,599,899	95,194,280	1.98	40.58	2019
NGP	599,500,000	579,812,294	477,724,756	53,611,496	276,885,557	1.30	8.16	
Natural Gas Partners IX, L.P.	150,000,000	173,962,921	249,243,688	605,481	774,555	1.44	12.07	2007
NGP Natural Resources X, L.P.	150,000,000	148,935,849	126,358,808	1,064,151	20,243,732	0.98	-0.44	2011
NGP Natural Resources XI, L.P.	150,000,000	153,405,370	84,127,723	6,290,493	131,093,523	1.40	8.86	2014
NGP Natural Resources XII, L.P.	149,500,000	103,508,154	17,994,537	45,651,371	124,773,747	1.38	11.99	2017
Sheridan	100,000,000	34,353,005	26,450,000	13,500,000	38,794,002	1.90	16.30	
Sheridan Production Partners III-B, L.P.	100,000,000	34,353,005	26,450,000	13,500,000	38,794,002	1.90	16.30	2014

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Real Estate	**4,173,147,868**	**2,495,671,659**	**1,868,886,721**	**1,917,557,858**	**1,784,338,236**	**1.46**	**10.67**	
Angelo, Gordon & Co.	550,000,000	440,098,769	195,782,407	140,905,000	395,097,021	1.34	12.53	
AG Asia Realty Fund III, L.P.	50,000,000	47,587,261	47,125,000	6,196,250	18,755,721	1.38	12.20	2016
AG Asia Realty Fund IV, L.P.	100,000,000	73,298,760	17,500,000	35,522,500	71,820,649	1.22	13.14	2018
AG Europe Realty Fund II, L.P.	75,000,000	68,779,896	26,644,976	12,768,750	72,642,988	1.44	12.69	2018
AG Europe Realty Fund III, L.P.	75,000,000	36,687,885	0	36,937,500	40,455,527	1.10	9.53	2020
AG Realty Fund IX, L.P.	100,000,000	92,141,126	73,000,000	11,650,000	60,724,792	1.45	9.40	2014
AG Realty Fund X, L.P.	150,000,000	121,603,841	31,512,431	37,830,000	130,697,343	1.33	22.28	2018
Blackstone	1,124,500,000	786,041,368	875,196,061	494,718,957	504,727,652	1.76	14.14	
Blackstone Real Estate Partners Asia II	74,500,000	62,432,965	7,342,747	21,066,561	69,918,786	1.24	11.46	2017
Blackstone Real Estate Partners Asia III	100,000,000	0	0	100,000,000	0	0.00		2021
Blackstone Real Estate Partners V, L.P.	100,000,000	104,213,007	208,932,593	4,174,052	122,149	2.01	10.83	2006
Blackstone Real Estate Partners VI, L.P.	100,000,000	109,477,567	217,880,533	4,907,906	2,828,566	2.02	13.10	2007
Blackstone Real Estate Partners VII, LP	100,000,000	112,064,035	177,634,974	11,131,179	25,368,829	1.81	15.36	2011
Blackstone Real Estate VIII.TE.1, L.P.	150,000,000	172,057,391	173,157,085	21,961,064	127,227,354	1.75	18.26	2015
Blackstone Real Estate Partners IX, L.P.	300,000,000	225,796,404	90,248,128	131,478,195	279,261,967	1.64	41.41	2018
Blackstone Real Estate Partners X, L.P.	200,000,000	0	0	200,000,000	0	0.00		2022
Blackstone Strategic Partners	75,000,000	77,560,049	66,018,792	994,740	1,245,716	0.87	-2.08	
Strategic Partners III RE, L.P.	25,000,000	25,987,864	15,252,523	9,006	93,065	0.59	-6.46	2005
Strategic Partners IV RE, L.P.	50,000,000	51,572,185	50,766,269	985,734	1,152,651	1.01	0.11	2008
Brookfield Asset Management Inc.	300,000,000	0	0	300,000,000	0	0.00		
Brookfield Strategic Real Estate Partners IV	300,000,000	0	0	300,000,000	0	0.00		2021
Carlyle Group	450,000,000	109,319,068	83,493,461	397,442,484	82,766,259	1.52	32.90	
Carlyle Realty Partners VIII, L.P.	150,000,000	109,319,068	83,493,461	97,442,484	82,766,259	1.52	32.90	2017
Carlyle Realty Partners IX, L.P.	300,000,000	0	0	300,000,000	0	0.00		2021
Kohlberg, Kravis, Roberts & Co.	125,000,000	65,080,194	2,694,165	60,682,336	69,465,586	1.11	16.73	
KKR Real Estate Partners Americas III	125,000,000	65,080,194	2,694,165	60,682,336	69,465,586	1.11	16.73	2021
Landmark Partners	249,500,000	90,305,635	54,693,746	165,020,626	71,453,366	1.40	19.76	
Landmark Real Estate Partners VIII, L.P.	149,500,000	90,305,635	54,693,746	65,020,626	71,453,366	1.40	19.76	2016
Landmark Real Estate Partners IX, L.P.	100,000,000	0	0	100,000,000	0	0.00		2021
Lubert Adler	174,147,868	102,920,244	77,321,940	72,414,787	58,194,299	1.32	14.58	
Lubert-Adler Real Estate Fund VII-B, L.P.	74,147,868	67,585,213	77,321,940	7,414,787	23,283,024	1.49	15.67	2017
Lubert-Adler Recovery and Enhancement Capital Fund	100,000,000	35,335,030	0	65,000,000	34,911,275	0.99	-2.47	2021

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Oaktree Capital Management, LLC	200,000,000	64,475,519	34,370,464	170,000,000	42,236,372	1.19	80.96	
Oaktree Real Estate Opportunities Fund VIII	200,000,000	64,475,519	34,370,464	170,000,000	42,236,372	1.19	80.96	2020
Rockpoint	200,000,000	170,762,131	63,382,835	48,873,885	161,507,150	1.32	11.58	
Rockpoint Real Estate Fund V, L.P.	100,000,000	99,126,386	53,707,916	17,327,032	80,266,752	1.35	9.17	2014
Rockpoint Real Estate Fund VI, L.P.	100,000,000	71,635,745	9,674,919	31,546,853	81,240,398	1.27	27.62	2019
Rockwood	200,000,000	145,171,718	60,396,117	59,008,985	125,989,436	1.28	10.09	
Rockwood Capital RE Partners X, L.P.	100,000,000	94,027,411	56,119,269	7,657,118	68,616,639	1.33	9.13	2015
Rockwood Capital RE Partners XI, L.P.	100,000,000	51,144,308	4,276,848	51,351,866	57,372,797	1.21	15.82	2019
Silverpeak Real Estate Partners	225,000,000	143,936,964	106,379,672	7,496,058	6,877,761	0.79	-3.80	
Silverpeak Legacy Pension Partners II, L.P.	75,000,000	73,069,012	92,033,940	7,496,058	441,078	1.27	4.18	2005
Silverpeak Legacy Pension Partners III, L.P.	150,000,000	70,867,952	14,345,733	0	6,436,683	0.29	-12.12	2008
TA Associates Realty	300,000,000	300,000,000	249,157,062	0	264,777,622	1.71	16.10	
Realty Associates Fund X	100,000,000	100,000,000	161,064,353	0	95,612	1.61	12.56	2012
Realty Associates Fund XI	100,000,000	100,000,000	80,550,731	0	112,206,954	1.93	16.38	2015
Realty Associates Fund XII	100,000,000	100,000,000	7,541,978	0	152,475,056	1.60	40.40	2018
Total	**37,158,734,362**	**27,717,876,939**	**22,206,512,199**	**12,220,855,896**	**20,415,475,546**	**1.54**	**12.27**	
Difference**					39,338,554			
Private Markets Total with Difference					**20,454,814,100**			

Private Markets Portfolio Status	Managers	Funds
PRIVATE EQUITY	60	191
PRIVATE CREDIT	18	42
REAL ASSETS	11	33
REAL ESTATE	13	34
Total	**102**	**300**

Notes

None of the data presented herein has been reviewed or approved by either the general partner or investment manager. The performance and valuation data presented herein is not a guarantee or prediction of future results and may slightly differ from final fiscal year end report. Ultimately, the actual performance and value of any investment is not known until final liquidation. Because there is no industry-standardized method for valuation or reporting comparisons of performance and valuation data among different investments is difficult. Data presented in this report is made public pursuant to Minn. Stat. Chs. 13 and 13D, and Minn. Stat. § 11A.24, subd. 6(c). Additional information on private markets investments may be classified as non-public and not subject to disclosure.

*Partnership interests transferred to the MSBI during 1Q2015. All data presented as of the transfer date.

** Difference is from an in-kind stock distribution liquidating account, cash transactions posted to next day and distributions received in foreign currency during the month.

Participant Directed Investment Program

June 30, 2022

Participant Directed Investment Program

The Participant Directed Investment Program (PDIP) provides investment vehicles for a variety of retirement or other tax-advantaged savings plans. The objective of the Plan is to be competitive in the marketplace by providing quality investment options with low fees to its participants. Investment goals among the PDIP's many participants are varied.

- The Supplemental Investment Fund (SIF) is an investment platform that provides participants with the option to invest in many of the same pools as the Combined Funds in addition to a Stable Value Fund and a Money Market Fund. The Volunteer Firefighter Account is an option in the SIF for local firefighter entities that join the Statewide Voluntary Firefighter Plan administered by PERA. The investment vehicles are structured much like a family of mutual funds where participating entities buy or sell units in each fund. Participants may allocate their investments among one or more funds that are appropriate for their needs and are within statutory requirements and rules established by the participating organizations.
- The Mutual Fund Line-up is an investment platform that offers participants three sets of investment options. The first is a set of actively and passively managed mutual funds, a Stable Value Fund and a Money Market Fund. The second is a set of target date funds called Minnesota Target Retirement Funds. The third is a self-directed brokerage account window which offers thousands of mutual funds. The SBI has no direct management responsibilities for funds within the self-directed brokerage account window. Participants may allocate their investments among one or more accounts that are appropriate for their needs within the statutory requirements and rules established by the participating organizations.
- The SBI is responsible for the investment options provided in the two State Sponsored Savings Plans established under provisions of the Internal Revenue Code 529, the Minnesota College Savings Plan and Minnesota Achieving a Better Life Experience Plan (ABLE). The Minnesota College Savings Plan is an educational savings plan designed to help families save for qualified nationwide college costs. The SBI is responsible for the investments and the Minnesota Office of Higher Education (OHE) is responsible for the overall administration of the Plan. The SBI and OHE have contracted jointly with TIAA-CREF Tuition Financing, Inc. to provide administrative, marketing, communication, recordkeeping and investment management services. The ABLE Plan is a savings plan designed to help individuals save for qualified disability expenses without losing eligibility for certain assistance programs. The plan is administered by the Department of Human Services (DHS). The SBI and DHS have jointly contracted with Ascensus to provide recordkeeping, administrative, and investment management services for the plan.

The investment returns shown in this report are calculated using a time-weighted rate of return formula. These returns are net of investment management fees and transaction costs. They do not, however, reflect administrative expenses that may be deducted by the retirement systems or other agencies to defray administrative costs.

Supplemental Investment Fund Summary

The Minnesota Supplemental Investment Fund (SIF) is a multi-purpose investment platform that offers a range of investment options to state and local public employees. This investment platform provides some or all of the investment options to the Public Employees Retirement Association (PERA) Defined Contribution Plan, local pension plans and the Statewide Volunteer Firefighter plan.

A wide diversity of investment goals exists among the Fund's participants. In order to meet those needs, the Fund has been structured much like a "family of mutual funds." Participants may allocate their investments among one or more accounts that are appropriate for their needs, within the statutory requirements and rules established by the participating organizations. Participation in the Fund is accomplished through the purchase or sale of shares in each account. All returns are net of investment management fees.

Investment Option Descriptions

- Balanced Fund - a balanced portfolio utilizing both common stocks and bonds
- U.S. Equity Actively Managed Fund - an actively managed, U.S. common stock portfolio.
- U.S. Equity Index Fund - a passively managed, common stock portfolio designed to broadly track the performance of the U.S. stock market.
- Broad International Equity Fund - a portfolio of non-U.S. stocks that incorporates both active and passive management.
- Bond Fund - an actively managed, bond portfolio.
- Money Market Fund - a portfolio utilizing short-term, liquid debt securities.
- Stable Value Fund - a portfolio of stable value instruments, including security backed contracts and insurance company and bank investment contracts.
- Volunteer Firefighter Account - a balanced portfolio only used by the Statewide Volunteer Firefighter Plan.

	Ending Market Value	Last Qtr	1 Year	3 Year	5 Year	10 Year	Option Since
BALANCED FUND	$97,575,089	-12.3%	-12.4%	6.3%	7.3%	8.6%	01/1980
U.S. EQUITY ACTIVELY MANAGED FUND	75,900,118	-17.7	-17.3	9.6	11.1	12.8	07/1986
U.S. EQUITY INDEX FUND	351,754,996	-16.7	-13.7	10.0	10.8	12.7	07/1986
BROAD INTERNATIONAL EQUITY FUND	127,002,860	-11.9	-17.4	2.6	3.3	5.6	09/1994
BOND FUND	101,045,109	-5.7	-11.7	-0.5	1.3	2.1	07/1986
MONEY MARKET FUND	635,290,160	0.2	0.3	0.7	1.2	0.8	07/1986
STABLE VALUE FUND	1,745,008,223	0.5	1.8	2.2	2.3	2.2	11/1994
VOLUNTEER FIREFIGHTER ACCOUNT	132,255,201	-10.3	-12.7	4.1	5.2	6.5	01/2010

Note:
The Market Values for the Money Market Fund, the Stable Value Fund, and the Total Supplemental Investment Fund also include assets held through other plans.

Supplemental Investment Fund Performance

Balanced Fund

The primary investment objective of the Balanced Fund is to gain exposure to publicly traded U.S. equities, bond and cash in a diversified investment portfolio. The Fund seeks to maximize long-term real rates of return, while limiting short-run portfolio return volatility. The Balanced Fund is invested in a balanced portfolio of common stocks and bonds. Common stocks provide the potential for significant capital appreciation, while bonds act as a deflation hedge and provide portfolio diversification. The benchmark is a blend of 60% Russell 3000/35% Bloomberg U.S. Aggregate/5% 3 Month T-Bills.

	Ending Market Value	Last Qtr	1 Year	3 Year	5 Year	10 Year
BALANCED FUND	**$97,575,089**	**-12.3%**	**-12.4%**	**6.3%**	**7.3%**	**8.6%**
SIF BALANCED FUND BENCHMARK		-11.8%	-11.7%	5.9%	7.0%	8.2%
Excess		-0.5%	-0.6%	0.4%	0.3%	0.3%

U.S. Equity Actively Managed Fund

The U.S. Equity Actively Managed Fund's investment objective is to generate above-average returns from capital appreciation on common stocks. The U.S. Stock Actively Managed Fund is invested primarily in the common stocks of U.S. companies. The managers in the account also hold varying levels of cash.

	Ending Market Value	Last Qtr	1 Year	3 Year	5 Year	10 Year
U.S. EQUITY ACTIVELY MANAGED FUND	**75,900,118**	**-17.7**	**-17.3**	**9.6**	**11.1**	**12.8**
Russell 3000		-16.7	-13.9	9.8	10.6	12.6
Excess		-1.0	-3.4	-0.2	0.5	0.3

Supplemental Investment Fund Performance

U.S. Equity Index Fund

The investment objective of the U.S. Equity Index Fund is to generate returns that track those of the U.S. stock market as a whole. The Fund is designed to track the performance of the Russell 3000 Index, a broad-based equity market indicator. The Fund is invested 100% in common stock.

	Ending Market Value	Last Qtr	1 Year	3 Year	5 Year	10 Year
U.S. EQUITY INDEX FUND	**$351,754,996**	**-16.7%**	**-13.7%**	**10.0%**	**10.8%**	**12.7%**
Russell 3000		-16.7%	-13.9%	9.8%	10.6%	12.6%
Excess		0.0%	0.1%	0.3%	0.2%	0.1%

Broad International Equity Fund

The investment objective of the Broad International Equity Fund is to earn a high rate of return by investing in the stock of companies outside the U.S. Portions of the Fund are passively managed and semi-passively managed. These portions of the Fund are designed to track and modestly outperform, respectively, the return of developed markets included in the MSCI World ex USA Index. A portion of the Fund is "actively managed" by several international managers and emerging markets specialists who buy and sell stocks in an attempt to maximize market value. The International Equity Benchmark is currently the MSCI ACWI ex USA (net).

	Ending Market Value	Last Qtr	1 Year	3 Year	5 Year	10 Year
BROAD INTERNATIONAL EQUITY FUND	**127,002,860**	**-11.9**	**-17.4**	**2.6**	**3.3**	**5.6**
International Equity Benchmark		-13.7	-19.4	1.3	2.5	4.8
Excess		1.8	2.0	1.3	0.8	0.8

Supplemental Investment Fund Performance

Bond Fund

The investment objective of the Bond Fund is to exceed the return of the broad domestic bond market by investing in fixed income securities. The Bond Fund invests primarily in high-quality, government and corporate bonds that have intermediate to long-term maturities, usually 3 to 20 years. The Bond Fund benchmark is the Bloomberg U.S. Aggregate.

	Ending Market Value	Last Qtr	1 Year	3 Year	5 Year	10 Year
BOND FUND	**$101,045,109**	**-5.7%**	**-11.7%**	**-0.5%**	**1.3%**	**2.1%**
Bloomberg U.S. Aggregate		-4.7%	-10.3%	-0.9%	0.9%	1.5%
Excess		-1.0%	-1.4%	0.4%	0.4%	0.6%

Money Market Fund

The investment objective of the Money Market Fund is to protect principal by investing in short-term, liquid U.S. Government securities. The Fund is invested entirely in high-quality, short-term U.S. Treasury and Agency securities. The average maturity of the portfolios is less than 90 days. Please note that the Market Value for the Money Market Fund reflects assets held through the Deferred Compensation Plan as well.

	Ending Market Value	Last Qtr	1 Year	3 Year	5 Year	10 Year
MONEY MARKET FUND	**635,290,160**	**0.2**	**0.3**	**0.7**	**1.2**	**0.8**
ICE BofA US 3-Month Treasury Bill		0.1	0.2	0.6	1.1	0.6
Excess		0.1	0.2	0.1	0.1	0.1

Supplemental Investment Fund Performance

Stable Value Fund

The investment objectives of the Stable Value Fund are to protect investors from loss of their original investment and to provide competitive interest rates using somewhat longer-term investments than typically found in a money market fund. The Fund is invested in a well-diversified portfolio of high-quality fixed income securities with strong credit ratings. The Fund also invests in contracts issued by highly rated insurance companies and banks which are structured to provide principal protection for the Fund's diversified bond portfolios, regardless of daily market changes. The Stable Value Fund Benchmark is the 3-year Constant Maturity Treasury Bill +45 basis points. Please note that the Market Value for the Stable Value Fund reflects assets held through the Deferred Compensation Plan as well.

	Ending Market Value	Last Qtr	1 Year	3 Year	5 Year	10 Year
STABLE VALUE FUND	**$1,745,008,223**	**0.5%**	**1.8%**	**2.2%**	**2.3%**	**2.2%**
Fixed Interest Blended Benchmark		0.8%	1.9%	1.4%	1.9%	1.6%
Excess		-0.4%	-0.1%	0.9%	0.4%	0.6%

Volunteer Firefighter Account

The Volunteer Firefighter Account is different than other SIF program options. It is available only to the local entities that participate in the Statewide Volunteer Firefighter Plan (administered by PERA) and have all of their assets invested in the Volunteer Firefighter Account. There are other volunteer firefighter plans that are not eligible to be consolidated that may invest their assets through other SIF program options. The investment objective of the Volunteer Firefighter Account is to maximize long-term returns while limiting short-term portfolio return volatility. The account is invested in a balanced portfolio of domestic equity, international equity, fixed income and cash. The benchmark for this account is 35% Russell 3000, 15% MSCI ACWI ex USA (net), 45% Bloomberg U.S. Aggregate, 5% 3 Month T-Bills.

	Ending Market Value	Last Qtr	1 Year	3 Year	5 Year	10 Year
VOLUNTEER FIREFIGHTER ACCOUNT	**132,255,201**	**-10.3**	**-12.7**	**4.1**	**5.2**	**6.5**
SIF Volunteer Firefighter Account BM		-10.1	-12.2	3.6	4.8	6.0
Excess		-0.2	-0.4	0.6	0.4	0.5

Mutual Funds

The mutual fund investment line-up provides investment options to the Minnesota Deferred Compensation Plan (MNDCP), Unclassified Retirement Plan, Health Care Savings Plan, and the Hennepin County Retirement Plan. The MNDCP is a tax-sheltered retirement savings plan that is supplemental to public employees primary retirement plan. (In most cases, the primary plan is a defined benefit plan administered by TRA, PERA, or MSRS.) Participants can choose from active and passively managed stock and bond funds, a Stable Value Fund, a Money Market Fund, a set of 10 target date retirement fund options, and a brokerage window where participants can choose from hundreds of mutual funds.

	Ending Market Value	Last Qtr	1 Year	3 Year	5 Year	10 Year	Option Since
VANGUARD TOTAL STOCK MARKET INSTITUTIONAL INDEX PLUS	$608,335,463	-16.8%	-14.2%	9.7%			07/2019
VANGUARD INSTITUTIONAL INDEX PLUS	1,532,803,355	-16.1	-10.6	10.6	11.3%	12.9%	07/1999
VANGUARD DIVIDEND GROWTH	897,507,934	-9.2	-0.0	10.4	12.1		10/2016
VANGUARD MID CAP INDEX	638,822,124	-17.0	-16.0	7.2	8.3	11.5	01/2004
T. ROWE PRICE SMALL-CAP STOCK	804,050,061	-15.2	-23.2	5.7	9.2	11.8	04/2000
FIDELITY DIVERSIFIED INTERNATIONAL	288,680,380	-17.0	-22.6	3.0	3.5	6.6	07/1999
VANGUARD TOTAL INTERNATIONAL STOCK INDEX	308,995,114	-12.9	-18.9	2.0	2.8	5.2	07/2011
VANGUARD BALANCED INDEX	1,266,548,685	-12.1	-12.5	5.7	6.9	8.2	12/2003
DODGE & COX INCOME	287,691,122	-4.7	-10.0	0.3	1.7	2.6	07/1999
VANGUARD TOTAL BOND MARKET INDEX	322,254,514	-4.7	-10.5	-0.9	0.8	1.5	12/2003
2025 FUND	215,091,492	-8.7	-9.1	4.2	5.0	6.2	07/2011
2030 FUND	186,904,594	-10.7	-12.0	4.9	5.7	7.1	07/2011
2035 FUND	143,662,270	-12.5	-14.6	5.0	5.9	7.5	07/2011
2040 FUND	112,706,991	-13.3	-15.7	5.2	6.2	7.9	07/2011
2045 FUND	104,615,002	-13.9	-16.3	5.4	6.4	8.3	07/2011
2050 FUND	87,417,823	-14.5	-16.9	5.7	6.6	8.4	07/2011
2055 FUND	56,482,644	-15.0	-17.5	5.7	6.6	8.4	07/2011
2060 FUND	44,502,804	-15.0	-17.5	5.7	6.6	8.4	07/2011
2065 FUND	4,508,114	-15.0	-17.5				04/2020
INCOME FUND	217,065,195	-7.6	-8.1	3.4	4.0	4.1	07/2011
TD Ameritrade SDB	75,827,462						
TD Ameritrade SDB Roth	2,368,197						

Mutual Funds

LARGE CAP EQUITY

Vanguard Total Stock Market Institutional Index Plus (passive)

A passive domestic stock portfolio of large and small companies that tracks the CRSP US Total Market Index.

Vanguard Index Institutional Plus (passive)

A passive domestic stock portfolio that tracks the S&P 500.

Vanguard Dividend Growth (active) (1)

A fund of large cap stocks which is expected to outperform the S&P U.S. Dividend Growers Index, over time.

MID CAP EQUITY

Vanguard Mid Cap Index (passive) (2)

A fund that passively invests in companies with medium market capitalizations that tracks the CRSP US Mid-Cap Index.

SMALL CAP EQUITY

T Rowe Price Small Cap (active)

A fund that invests primarily in companies with small market capitalizations and is expected to outperform the Russell 2000 Index.

INTERNATIONAL EQUITY

Fidelity Diversified International (active)

A fund that invests primarily in stocks of companies located outside of the United States and is expected to outperform the MSCI index of Europe, Australasia and the Far East (EAFE), over time.

Vanguard Total International Stock Index (passive) (3)

A fund that seeks to track the investment performance of the FTSE Global All Cap ex US Index, an index designed to measure equity market performance in developed and emerging markets, excluding the United States.

	Ending Market Value	Last Qtr	1 Year	3 Year	5 Year	Option Since
Large Cap US Equity						
VANGUARD TOTAL STOCK MARKET INSTITUTIONAL INDEX PLUS	**$608,335,463**	**-16.8%**	**-14.2%**	**9.7%**		**07/2019**
CRSP US Total Market Index		-16.8	-14.2	9.6		07/2019
Excess		0.0	-0.0	0.1		
VANGUARD INSTITUTIONAL INDEX PLUS	**1,532,803,355**	**-16.1**	**-10.6**	**10.6**	**11.3%**	**07/1999**
S&P 500		-16.1	-10.6	10.6	11.3	07/1999
Excess		-0.0	-0.0	-0.0	-0.0	
VANGUARD DIVIDEND GROWTH	**897,507,934**	**-9.2**	**-0.0**	**10.4**	**12.1**	**10/2016**
DIVIDEND GROWTH SPLICED INDEX		-11.1	-5.6	9.6	11.3	10/2016
Excess		1.9	5.5	0.8	0.9	
Mid Cap US Equity						
VANGUARD MID CAP INDEX	**638,822,124**	**-17.0**	**-16.0**	**7.2**	**8.3**	**01/2004**
CRSP US Mid Cap Index		-17.0	-16.0	7.2	8.3	01/2004
Excess		-0.0	-0.0	0.0	0.0	
Small Cap US Equity						
T. ROWE PRICE SMALL-CAP STOCK	**804,050,061**	**-15.2**	**-23.2**	**5.7**	**9.2**	**04/2000**
Russell 2000		-17.2	-25.2	4.2	5.2	04/2000
Excess		2.0	2.0	1.5	4.0	
International Equity						
FIDELITY DIVERSIFIED INTERNATIONAL	**288,680,380**	**-17.0**	**-22.6**	**3.0**	**3.5**	**07/1999**
MSCI EAFE FREE (NET)		-14.5	-17.8	1.1	2.2	07/1999
Excess		-2.5	-4.9	1.9	1.3	
VANGUARD TOTAL INTERNATIONAL STOCK INDEX	**308,995,114**	**-12.9**	**-18.9**	**2.0**	**2.8**	**07/2011**
FTSE Global All Cap ex US Index Net		-14.1	-19.4	1.8	2.6	07/2011
Excess		1.3	0.5	0.3	0.2	

Mutual Funds

BALANCED

Vanguard Balanced Index (passive) (4)

A fund that passively invests in a mix of domestic stocks and bonds. The fund is expected to track a weighted benchmark of 60% CRSP US Total Market Index/40% Bloomberg U.S. Aggregate.

FIXED INCOME

Dodge & Cox Income Fund (active)

A fund that invests primarily in investment grade securities in the U.S. bond market which is expected to outperform the Bloomberg U.S. Aggregate, over time.

Vanguard Total Bond Market Index (passive)

A fund that passively invests in a broad, market weighted bond index that is expected to track the Bloomberg U.S. Aggregate.

Money Market Fund (5)

A fund that invests in short-term debt instruments which is expected to outperform the return on 3 Month T-Bills.

STABLE VALUE

Stable Value Fund (5)

A portfolio composed of stable value instruments which are primarily investment contracts and security backed contracts. The fund is expected to outperform the return of the 3 year Constant Maturity Treasury +45 basis points, over time.

	Ending Market Value	Last Qtr	1 Year	3 Year	5 Year	Option Since
Balanced Funds						
VANGUARD BALANCED INDEX	**$1,266,548,685**	**-12.1%**	**-12.5%**	**5.7%**	**6.9%**	**12/2003**
Vanguard Balanced Fund Benchmark		-12.1	-12.5	5.7	7.0	12/2003
Excess		-0.0	-0.1	-0.0	-0.0	
Fixed Income						
DODGE & COX INCOME	**287,691,122**	**-4.7**	**-10.0**	**0.3**	**1.7**	**07/1999**
Bloomberg U.S. Aggregate		-4.7	-10.3	-0.9	0.9	07/1999
Excess		-0.0	0.3	1.2	0.8	
VANGUARD TOTAL BOND MARKET INDEX	**322,254,514**	**-4.7**	**-10.5**	**-0.9**	**0.8**	**12/2003**
Bloomberg U.S. Aggregate		-4.7	-10.3	-0.9	0.9	12/2003
Excess		-0.0	-0.2	-0.0	-0.0	
MONEY MARKET FUND	**635,290,160**	**0.2**	**0.3**	**0.7**	**1.2**	**07/1986**
ICE BofA US 3-Month Treasury Bill		0.1	0.2	0.6	1.1	07/1986
Excess		0.1	0.2	0.1	0.1	
Stable Value						
STABLE VALUE FUND	**1,745,008,223**	**0.5**	**1.8**	**2.2**	**2.3**	**11/1994**
Fixed Interest Blended Benchmark		0.8	1.9	1.4	1.9	11/1994
Excess		-0.4	-0.1	0.9	0.4	

(1) Prior to 09/20/2021 the benchmark was the NASDAQ US Dividend Achievers Select Index.

(2) Prior to 02/01/2013 the benchmark was the MSCI US Mid-Cap 450 Index.

(3) Prior to 06/01/2013 the benchmark was MSCI ACWI ex USA IMI.

(4) Prior to 01/01/2013 the benchmark was 60% MSCI US Broad Market Index and 40% Bloomberg U.S. Aggregate.

(5) Money Market and Stable Value are Supplemental Investment Fund options which are also offered to eligible plans that invest through other plans.

Mutual Funds

MN TARGET RETIREMENT ACCOUNTS

Target retirement funds offer a mix of investments that are adjusted over time to reduce risk and become more conservative as the target retirement date approaches. A participant only needs to make one investment decison by investing their assets in the fund that is closest to their anticipated retirement date.

Target Date Retirement Funds

	Ending Market Value	Last Qtr	1 Year	3 Year	5 Year	Option Since
SSgA						
2025 FUND	**$215,091,492**	**-8.7%**	**-9.1%**	**4.2%**	**5.0%**	**07/2011**
2025 FUND BENCHMARK		-8.8%	-9.1%	4.2%	5.0%	07/2011
Excess		0.1%	-0.0%	0.0%	0.0%	
2030 FUND	**$186,904,594**	**-10.7%**	**-12.0%**	**4.9%**	**5.7%**	**07/2011**
2030 FUND BENCHMARK		-10.8%	-12.0%	4.9%	5.7%	07/2011
Excess		0.1%	0.0%	0.0%	0.0%	
2035 FUND	**$143,662,270**	**-12.5%**	**-14.6%**	**5.0%**	**5.9%**	**07/2011**
2035 FUND BENCHMARK		-12.6%	-14.7%	4.9%	5.9%	07/2011
Excess		0.2%	0.0%	0.0%	0.0%	
2040 FUND	**$112,706,991**	**-13.3%**	**-15.7%**	**5.2%**	**6.2%**	**07/2011**
2040 FUND BENCHMARK		-13.5%	-15.7%	5.2%	6.2%	07/2011
Excess		0.2%	0.0%	0.0%	0.0%	
2045 FUND	**$104,615,002**	**-13.9%**	**-16.3%**	**5.4%**	**6.4%**	**07/2011**
2045 FUND BENCHMARK		-14.1%	-16.3%	5.4%	6.4%	07/2011
Excess		0.2%	0.0%	0.0%	0.0%	

	Ending Market Value	Last Qtr	1 Year	3 Year	5 Year	Option Since
2050 FUND	**$87,417,823**	**-14.5%**	**-16.9%**	**5.7%**	**6.6%**	**07/2011**
2050 FUND BENCHMARK		-14.8%	-17.0%	5.6%	6.6%	07/2011
Excess		0.2%	0.0%	0.0%	0.0%	
2055 FUND	**$56,482,644**	**-15.0%**	**-17.5%**	**5.7%**	**6.6%**	**07/2011**
2055 FUND BENCHMARK		-15.3%	-17.5%	5.7%	6.6%	07/2011
Excess		0.3%	0.0%	-0.0%	-0.0%	
2060 FUND	**$44,502,804**	**-15.0%**	**-17.5%**	**5.7%**	**6.6%**	**07/2011**
2060 FUND BENCHMARK		-15.3%	-17.5%	5.7%	6.6%	07/2011
Excess		0.2%	0.0%	-0.0%	-0.0%	
2065 FUND	**$4,508,114**	**-15.0%**	**-17.5%**			**04/2020**
2065 FUND BENCHMARK		-15.3%	-17.5%			04/2020
Excess		0.3%	0.0%			
INCOME FUND	**$217,065,195**	**-7.6%**	**-8.1%**	**3.4%**	**4.0%**	**07/2011**
INCOME FUND BENCHMARK		-7.7%	-8.1%	3.3%	4.0%	07/2011
Excess		0.1%	-0.0%	0.0%	0.0%	

Note: Each SSgA Fund benchmark is the aggregate of the returns of the Fund's underlying index funds weighted by the Fund's asset allocation

MN College Savings Plan Options

The Minnesota College Savings Plan is an education savings plan designed to help families set aside funds for future college costs. The SBI is responsible for the investments and the Minnesota Office of Higher Education (OHE) is responsible for the overall administration of the Plan.

The SBI and OHE contract jointly with TIAA to provide administrative, marketing, communication, recordkeeping and investment management services. Please see the next page for the performance as reported by TIAA.

ENROLLMENT-BASED MANAGED ALLOCATIONS - The Enrollment Year Investment Option is a set of single fund options representing the date your future student needs their college savings. The asset allocation adjusts automatically to a more conservative investment objective and level of risk as the enrollment year approaches. The managed allocation changed from Age-Based to Enrollment-Based on October 28, 2019.

RISK BASED ALLOCATIONS - The Risk Based Allocation Option offers three separate allocation investment options - Aggressive, Moderate and Conservative, each of which has a fixed risk level that does not change as the Beneficiary ages.

ASSET CLASS BASED ALLOCATIONS

U.S. LARGE CAP EQUITY INDEX - A passive domestic stock portfolio that tracks the S&P 500.

INTERNATIONAL EQUITY INDEX - A fund that passively invests in a mix of developed and emerging market equities. The fund is expected to track a weighted benchmark of 80% MSCI ACWI World ex USA and 20% MSCI Emerging Markets Free Index.

U.S. AND INTERNATIONAL EQUITY INDEX - A fund that invests in a mix of equities, both U.S. and international, across all capitalization ranges and real estate-related securities. The fund is expected to track a weighted benchmark of 60% Russell 3000, 24% International, 6% Emerging Markets, and 10% Real Estate Securities Fund.

PRINCIPAL PLUS INTEREST OPTION - A passive fund where contributions are invested in a Funding Agreement issued by TIAA-CREF Life. The funding agreement provides for a return of principal plus a guaranteed rate of interest which is made by the insurance company to the policyholder, not the account owners. The account is expected to outperform the return of the 3-month T-Bill.

EQUITY AND INTEREST ACCUMULATION - A fund that passively invests half of the portfolio in U.S. equities across all capitalization ranges and the other half in the same Funding Agreement issued by TIAA-CREF Life as described above. The fund is expected to track a weighted benchmark of 50% Russell 3000 and 50% 3-month T-Bill.

100% FIXED INCOME - A fund that passively invests in fixed income holdings that tracks the Bloomberg U.S. Aggregate and two active funds that invest in inflation-linked bonds and high yield securities. The fund is expected to track a weighted benchmark of 70% Bloomberg U.S. Aggregate, 20% inflation-linked bond, and 10% high yield.

MONEY MARKET - An active fund that invests in high-quality, short-term money market instruments of both domestic and foreign issuers that tracks the iMoneyNet Average All Taxable benchmark.

SOCIAL CHOICE EQUITY ALLOCATION – An actively managed fund that seeks to provide a favorable long-term total return that reflects the investment performance of the overall U.S. equity market while giving special consideration to companies whose activities are consistent with certain environmental, social and governance criteria.

MINNESOTA COLLEGE SAVINGS PLAN
Performance Statistics for the Period Ending: June 30, 2022

Total = $1,709 Million

Fund Name	Ending Market	3 Months	1 Year	Annualized 3 Years	5 Years	10 Years	Since Inception	Inception Date
2038/2039 Enrollment Option	$8,541,408	-12.90%	-12.81%				-12.29%	6/11/2021
2038-2039 Custom Benchmark		-13.88%	-13.16%				-12.70%	
2036/2037 Enrollment Option	$52,724,960	-12.71%	-12.71%				5.48%	10/28/2019
2036-2037 Custom Benchmark		-13.56%	-12.96%				5.13%	
2034/2035 Enrollment Option	$44,640,728	-12.26%	-12.46%				5.18%	10/28/2019
2034-2035 Custom Benchmark		-13.10%	-12.71%				4.84%	
2032/2033 Enrollment Option	$50,897,368	-11.77%	-12.18%				4.97%	10/28/2019
2032-2033 Custom Benchmark		-12.51%	-12.35%				4.66%	
2030/2031 Enrollment Option	$61,871,843	-10.76%	-11.46%				4.59%	10/28/2019
2030-2031 Custom Benchmark		-11.45%	-11.64%				4.28%	
2028/2029 Enrollment Option	$78,685,892	-9.39%	-10.41%				3.97%	10/28/2019
2028-2029 Custom Benchmark		-9.98%	-10.58%				3.58%	
2026/2027 Enrollment Option	$110,018,445	-7.90%	-9.12%				3.48%	10/28/2019
2026-2027 Custom Benchmark		-8.49%	-9.42%				3.08%	
2024/2025 Enrollment Option	$153,887,435	-6.03%	-7.16%				3.26%	10/28/2019
2024-2025 Custom Benchmark		-6.51%	-7.49%				2.74%	
2022/2023 Enrollment Option	$181,291,909	-4.11%	-4.80%				2.63%	10/28/2019
2022-2023 Custom Benchmark		-4.47%	-5.31%				1.95%	
In School Option	$266,329,039	-3.47%	-4.08%				2.12%	10/28/2019
In School Custom Benchmark		-3.79%	-4.61%				1.25%	

MINNESOTA COLLEGE SAVINGS PLAN

Performance Statistics for the Period Ending: June 30, 2022

Fund Name	Ending Market	3 Months	1 Year	Annualized 3 Years	5 Years	10 Years	Since Inception	Inception Date
U.S. and International Equity Option	$268,372,125	-15.23%	-14.36%	6.85%	7.82%	9.84%	7.02%	10/ 1/2001
BB: U.S. and International Equity Option		-15.93%	-14.44%	6.60%	7.62%	9.88%	7.69%	
Moderate Allocation Option	$85,801,515	-10.96%	-11.84%	4.55%	5.54%	6.65%	5.20%	8/ 2/2007
BB: Moderate Allocation Option		-11.46%	-11.89%	4.31%	5.44%	6.75%	5.67%	
100% Fixed-Income Option	$17,717,703	-4.44%	-8.34%	-0.11%	1.28%	1.37%	2.89%	8/16/2007
BB: 100% Fixed-Income Option		-4.52%	-8.41%	0.13%	1.54%	1.72%	3.45%	
International Equity Index Option	$8,129,940	-12.31%	-18.06%	1.46%	2.41%		3.47%	6/18/2013
BB: International Equity Index Option		-13.90%	-19.27%	1.06%	2.27%		3.47%	
Money Market Option	$14,197,292	0.09%	0.09%	0.47%	0.90%	0.48%	0.50%	11/ 1/2007
BB: Money Market Option		0.09%	0.11%	0.39%	0.78%	0.42%	0.45%	
Principal Plus Interest Option	$128,400,523	0.31%	1.18%	1.61%	1.68%	1.52%	2.37%	10/10/2001
Citigroup 3-Month U.S. Treasury Bill		0.14%	0.19%	0.61%	1.09%	0.62%	1.22%	
Aggressive Allocation Option	$67,187,117	-13.04%	-13.04%	5.71%	6.72%		6.65%	8/12/2014
BB: Aggressive Allocation Option		-13.71%	-13.14%	5.51%	6.57%		6.54%	
Conservative Allocation Option	$16,255,164	-6.58%	-7.70%	2.69%	3.57%		3.46%	8/18/2014
BB: Conservative Allocation Option		-6.89%	-8.01%	2.48%	3.49%		3.45%	
Equity and Interest Accumulation Option	$7,509,281	-8.36%	-6.33%	5.96%	6.25%		5.88%	8/18/2014
BB: Equity and Interest Accumulation Option		-8.48%	-6.74%	5.59%	6.15%		5.76%	
U.S. Large Cap Equity Option	$84,084,151	-16.12%	-10.74%	10.44%	11.12%		10.79%	8/12/2014
BB: U.S. Large Cap Equity Option		-16.10%	-10.62%	10.60%	11.31%		10.90%	
Social Choice Equity Option	$675,840	-16.02%	-14.53%				-12.87%	6/11/2021
BB: Social Choice Equity Option		-16.70%	-13.87%				-12.31%	
Matching Grant	$1,457,645	0.31%	1.18%	1.61%	1.68%	1.52%	2.37%	3/22/2002
Citigroup 3-Month U.S. Treasury Bill		0.14%	0.19%	0.61%	1.09%	0.62%	1.22%	

MINNESOTABLE plan
A member of The National ABLE Alliance

Performance as of
06/30/22

Total Market Value: $ **27,378,469**

Fund Name		Market Value	% of Plan	1 Month	3 Months	YTD	1 Year	3 Year	5 Year	10 Year	Inception	Inception Date
Aggressive Option	$	1,996,331	7.29%	(7.45)	(14.92)	(20.21)	(17.04)	5.18	6.31		7.13	12/15/16
ABLE Aggressive Custom Benchmark				(7.77)	(15.40)	(20.54)	(17.16)	5.32	6.56		7.49	
Variance				**0.32**	**0.48**	**0.33**	**0.12**	**(0.14)**	**(0.25)**		**(0.36)**	
Moderately Aggressive Option	$	2,297,154	8.39%	(6.45)	(12.99)	(17.91)	(15.14)	4.64	5.65		6.35	12/15/16
ABLE Moderately Aggressive Custom Benchmark				(6.71)	(13.35)	(18.20)	(15.17)	4.77	5.91		6.70	
Variance				**0.26**	**0.36**	**0.29**	**0.03**	**(0.13)**	**(0.26)**		**(0.35)**	
Growth Option	$	3,441,612	12.57%	(5.41)	(10.92)	(15.56)	(13.16)	3.99	4.95		5.51	12/15/16
ABLE Growth Custom Benchmark				(5.66)	(11.27)	(15.82)	(13.18)	4.13	5.20		5.85	
Variance				**0.25**	**0.35**	**0.26**	**0.02**	**(0.14)**	**(0.25)**		**(0.34)**	
Moderate Option	$	3,080,821	11.25%	(4.39)	(8.86)	(13.11)	(11.13)	3.32	4.18		4.64	12/15/16
ABLE Moderate Custom Benchmark				(4.61)	(9.16)	(13.41)	(11.19)	3.41	4.42		4.94	
Variance				**0.22**	**0.30**	**0.30**	**0.06**	**(0.09)**	**(0.24)**		**(0.30)**	
Moderately Conservative Option	$	3,101,058	11.33%	(3.04)	(6.12)	(9.28)	(7.83)	2.54	3.23		3.53	12/15/16
ABLE Moderately Conservative Custom Benchmark				(3.18)	(6.35)	(9.53)	(7.90)	2.58	3.42		3.76	
Variance				**0.14**	**0.23**	**0.25**	**0.07**	**(0.04)**	**(0.19)**		**(0.23)**	
Conservative Option	$	4,986,381	18.21%	(1.15)	(2.37)	(3.89)	(3.30)	1.35	1.84		1.95	12/15/16
ABLE Conservative Custom Benchmark				(1.25)	(2.47)	(4.06)	(3.35)	1.32	1.98		2.09	
Variance				**0.10**	**0.10**	**0.17**	**0.05**	**0.03**	**(0.14)**		**(0.14)**	
Checking Option	$	8,475,113	30.96%									03/30/17

MINNESOTA ACHIEVE A BETTER LIFE EXPERIENCE
The Minnesota Achieve a Better Life Experience Plan (ABLE)
The plan is administered by the Department of Human Services (DHS).

The SBI and DHS have jointly contracted with Ascensus to provide recordkeeping, administrative, and investment management services for the plan.

RISK BASED ALLOCATIONS

The plan offers seven different allocation investment options: Aggressive, Moderately Aggressive, Growth, Moderate, Moderately Conservative, Conservative, and Checking. Each allocation is based on a fixed risk level.

ascensus™ | college savings

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Non-Retirement

June 30, 2022

Non-Retirement Funds

The SBI manages funds for trusts and programs created by the Minnesota State Constitution and Legislature.

- The Minnesota Workers Compensation Assigned Risk Plan provides worker compensation insurance for companies unable to obtain coverage through private carriers.

- The Permanent School Fund is a trust established for the benefit of Minnesota public schools.

- The Environmental Trust Fund is a trust established for the protection and enhancement of Minnesota's environment. It is funded with a portion of the proceeds from the state's lottery.

- The Closed Landfill Investment Fund is a trust created by the Legislature to invest money to pay for the long-term costs of maintaining the integrity of landfills in Minnesota once they are closed.

- Other Post-Employment Benefits Accounts (OPEB) are the assets set aside by local units of government for the payment of retiree benefits trusteed by the Public Employees Retirement Association.

- Miscellaneous Trust Accounts are other small funds managed by the SBI for a variety of purposes.

All equity, fixed income, and cash assets for these accounts are managed externally by investment management firms retained by the SBI.

Non-Retirement

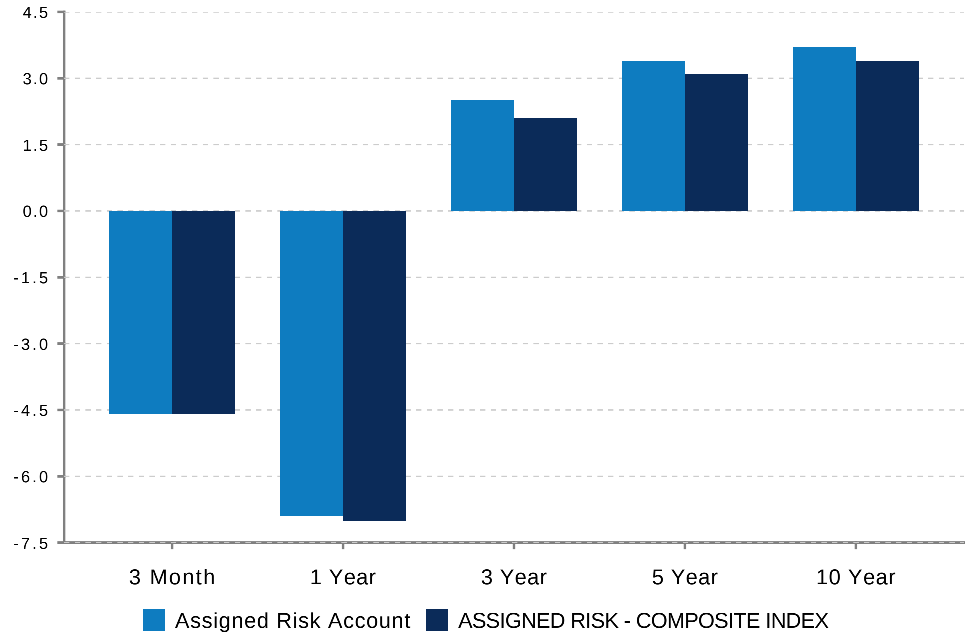
Assigned Risk Plan

The Assigned Risk Plan has two investment objectives: to minimize the mismatch between assets and liabilities and to provide sufficient liquidity for the payment of ongoing claims and operating expenses.

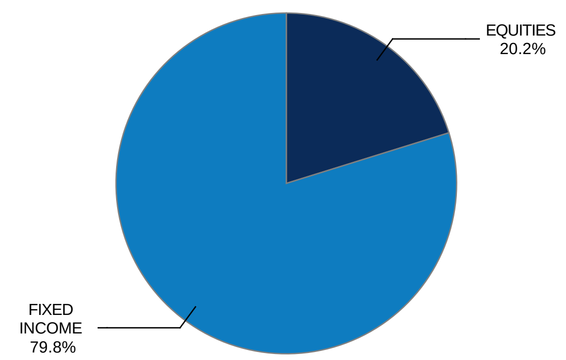
The Assigned Risk Plan is invested in a portfolio of common stocks and bonds

The equity segment is passively managed to track the performance of the S&P 500.

The fixed income benchmark is the Bloomberg U.S. Government Intermediate Index. The total fund benchmark is a combination of the fixed income and equity benchmarks, weighted according to the total fund asset allocation targets of 80% fixed income and 20% equities. The actual asset mix will fluctuate and is shown in the graph below.



	Ending Market Value	Last Qtr	1 Year	3 Year	5 Year	10 Year
Assigned Risk Account	$255,123,153	-4.6%	-6.9%	2.5%	3.4%	3.7%
EQUITIES	51,653,000	-16.1	-10.6	10.6	11.3	12.8
FIXED INCOME	203,470,152	-1.6	-6.3	-0.1	1.0	1.1
ASSIGNED RISK - COMPOSITE INDEX		-4.6	-7.0	2.1	3.1	3.4
Excess		0.1	0.1	0.4	0.3	0.2
S&P 500		-16.1	-10.6	10.6	11.3	13.0
Bloomberg U.S. Government: Intermediate		-1.7	-6.3	-0.3	0.9	1.0



Note: Since 12/1/2017 the Assigned Risk equity segment has been managed by Mellon. From 1/17/2017-11/30/2017 it was managed internally by SBI staff. Prior to 1/17/2017 the equity segment was managed by SSgA (formerly GE Investment Mgmt.). RBC manages the fixed income segment of the Fund.

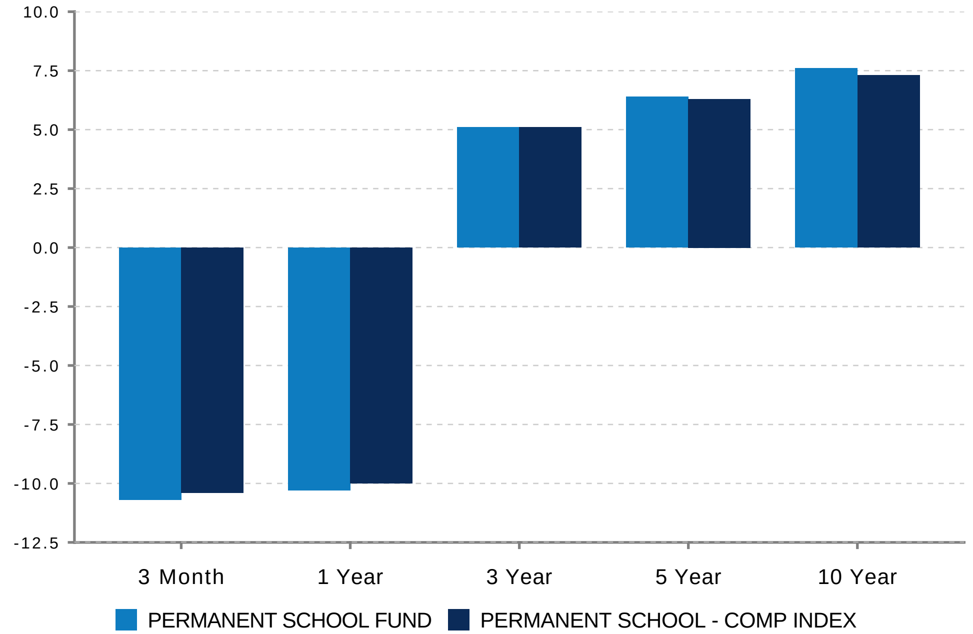
Non-Retirement

Permanent School Fund

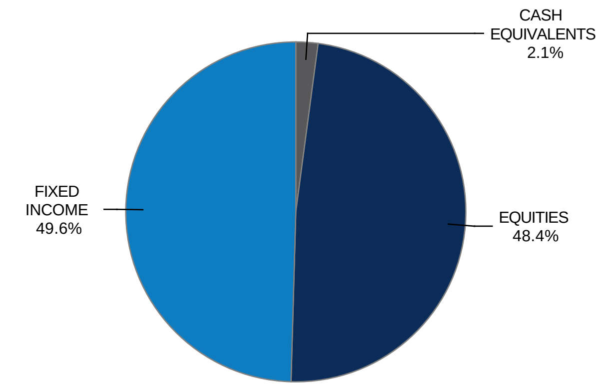
The investment objective of the Permanent School Fund is to produce a growing level of spendable income, within the constraints of maintaining adequate portfolio quality and liquidity. The income from the portfolio is transferred to the school endowment fund and distributed to Minnesota's public schools.

The Permanent School Fund is invested in a balanced portfolio of common stocks and bonds. Common stocks provide the potential for significant capital appreciation, while bonds provide portfolio diversification and a more stable stream of current income.

The stock segment is passively managed to track the performance of the S&P 500. The bond segment is actively managed to add incremental value through sector, security and yield curve decisions. The fixed income benchmark is the Bloomberg U.S. Aggregate. The total fund benchmark is a combination of the fixed income and equity benchmarks, weighted according to the total fund asset allocation targets of 2% cash, 50% equity, and 48% fixed income. The actual asset mix will fluctuate and is shown in the graph below.



	Ending Market Value	Last Qtr	1 Year	3 Year	5 Year	10 Year
PERMANENT SCHOOL FUND	$1,743,213,504	-10.7%	-10.3%	5.1%	6.4%	7.6%
CASH EQUIVALENTS	36,442,202	0.1	0.2	0.6	1.1	0.7
EQUITIES	842,966,690	-16.1	-10.6	10.6	11.3	12.9
FIXED INCOME	863,804,612	-5.2	-11.1	-0.9	1.0	2.0
PERMANENT SCHOOL - COMP INDEX		-10.4	-10.0	5.1	6.3	7.3
Excess		-0.3	-0.3	0.0	0.1	0.3
S&P 500		-16.1	-10.6	10.6	11.3	13.0
Bloomberg U.S. Aggregate		-4.7	-10.3	-0.9	0.9	1.5



Note: Since 12/1/2017 the equity segment has been managed by Mellon and the fixed income segment by Prudential. Prior to 12/1/2017 both segments were managed internally by SBI staff. Prior to 7/1/97 the Fund allocation was 100% fixed income.

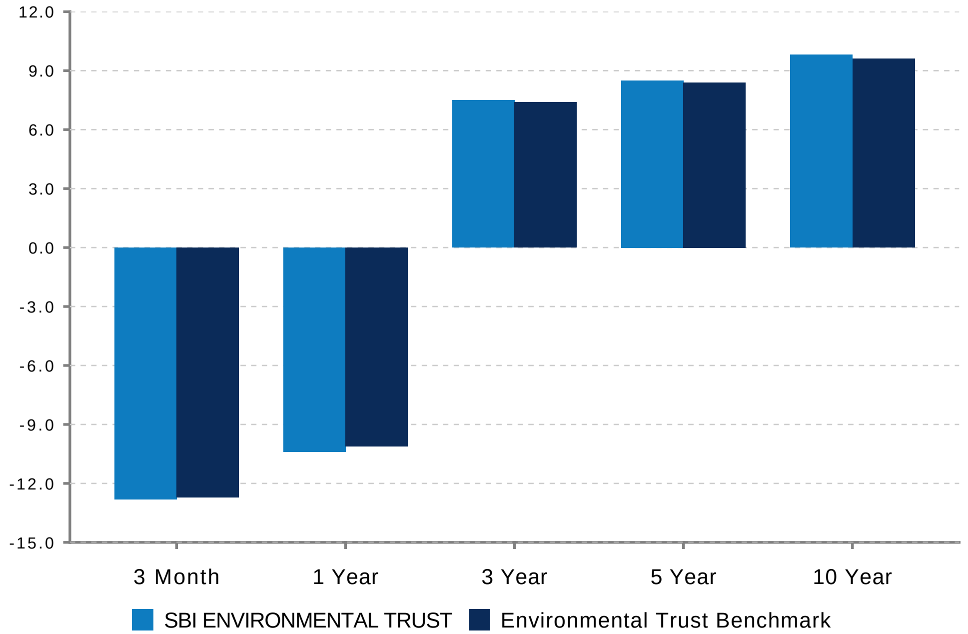
Non-Retirement

Environmental Trust Fund

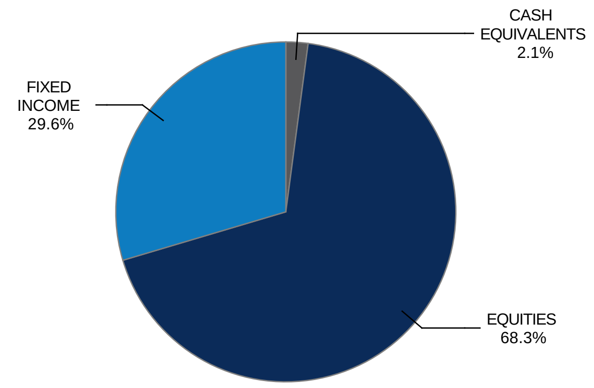
The objective of the Environmental Trust Fund is to increase the market value of the Fund over time in order to increase the annual amount made available for spending within the constraints of maintaining adequate portfolio quality and liquidity.

The Environmental Trust Fund is invested in a balanced portfolio of common stocks and bonds. Common stocks provide the potential for significant capital appreciation, while bonds act as a deflation hedge and provide portfolio diversification.

The bond segment is actively managed to add incremental value through sector, security and yield curve decisions. The stock segment is passively managed to track the performance of the S&P 500. The fixed income benchmark is the Bloomberg U.S. Aggregate. The total fund benchmark is a combination of the fixed income and equity benchmarks, weighted according to the total fund asset allocation targets of 2% cash, 70% equities, and 28% fixed income. The actual asset mix will fluctuate and is shown in the graph below.



	Ending Market Value	Last Qtr	1 Year	3 Year	5 Year	10 Year
SBI ENVIRONMENTAL TRUST	$1,448,074,771	-12.8%	-10.4%	7.5%	8.5%	9.8%
CASH EQUIVALENTS	30,570,937	0.1	0.2	0.6	1.1	0.7
EQUITIES	989,496,427	-16.1	-10.6	10.6	11.3	12.9
FIXED INCOME	428,007,407	-5.2	-11.1	-0.9	1.0	2.0
Environmental Trust Benchmark		-12.7	-10.1	7.4	8.4	9.6
Excess		-0.1	-0.3	0.1	0.1	0.2
S&P 500		-16.1	-10.6	10.6	11.3	13.0
Bloomberg U.S. Aggregate		-4.7	-10.3	-0.9	0.9	1.5



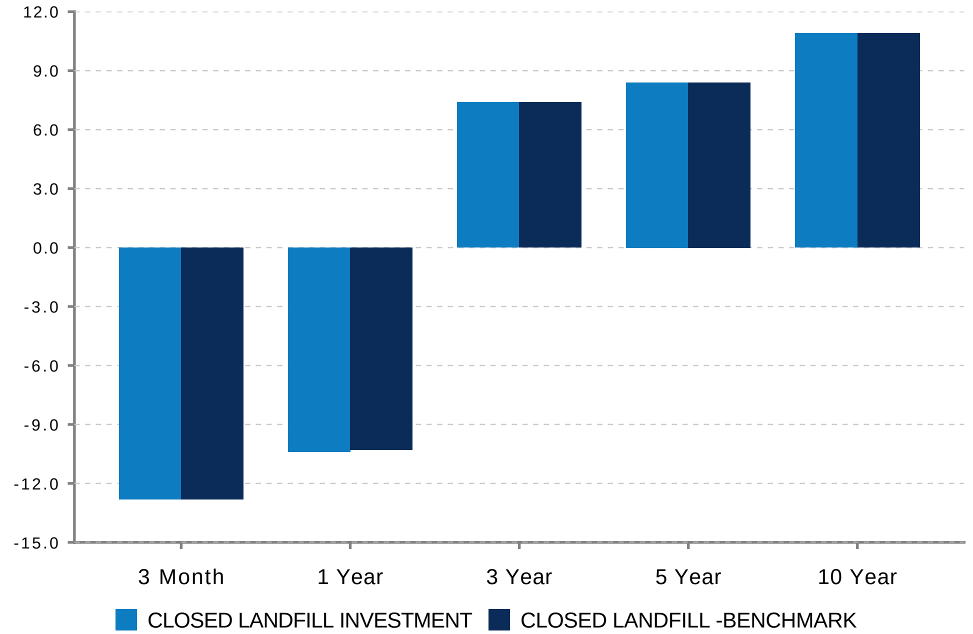
Note: Since 12/1/2017 the equity segment has been managed by Mellon and the fixed income segment by Prudential. Prior to 12/1/2017 both segments were managed internally by SBI staff. From 7/1/94 to 7/1/99, the Fund's target allocation and benchmark was 50% fixed income and 50% stock. Prior to 7/1/94 the Fund was invested entirely in short-term instruments as part of the Invested Treasurer's Cash pool.

Non-Retirement

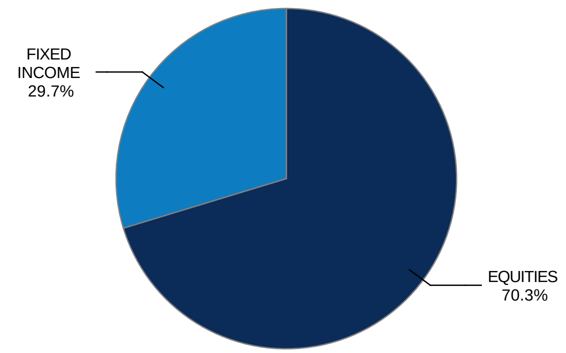
Closed Landfill Investment Fund

The investment objective of the Closed Landfill Investment Fund is to increase the market value of the Fund and to reduce volatility to meet future expenditures. By statute, the assets of the Fund were unavailable for expenditure until after the fiscal year 2020 to pay for long-term costs of maintaining the integrity of landfills in Minnesota once they are closed. In FY 2011, $48 million was transferred out of the general fund leaving a balance of $1 million in the account. Legislation was enacted in 2013 to replenish the principal and earnings back into the fund and in FY 2014 a repayment was made in the amount of $64.2 million. In 2015, legislation was passed which repealed any further repayments.

The bond segment is actively managed to add incremental value through sector, security and yield curve decisions. The stock segment is managed to passively track the performance of the S&P 500. The fixed income benchmark is the Bloomberg U.S. Aggregate. The total fund benchmark is a combination of the fixed income and equity benchmarks, weighted according to the total fund asset allocation targets of 70% equities and 30% fixed income. The actual asset mix will fluctuate and is shown in the graph below.



	Ending Market Value	Last Qtr	1 Year	3 Year	5 Year	10 Year
CLOSED LANDFILL INVESTMENT	$116,113,735	-12.8%	-10.4%	7.4%	8.4%	10.9%
EQUITIES	81,683,167	-16.1	-10.6	10.6	11.3	12.9
FIXED INCOME	34,430,568	-5.2	-11.1	-0.9	1.0	
CLOSED LANDFILL -BENCHMARK		-12.8	-10.3	7.4	8.4	10.9
Excess		-0.1	-0.1	0.0	0.0	0.0
S&P 500		-16.1	-10.6	10.6	11.3	13.0
Bloomberg U.S. Aggregate		-4.7	-10.3	-0.9	0.9	1.5



Note: Since 12/1/2017 the equity segment has been managed by Mellon and the fixed income segment by Prudential. Prior to 12/1/2017 both segments were managed internally by SBI staff. Prior to 9/10/14 the Fund's target allocation and benchmark was 100% domestic equity.

	Ending Market Value	Last Qtr	Fiscal YTD	1 Year	3 Year	5 Year	10 Year	Since Inception	Inception Date
NON RETIREMENT EQUITY INDEX - MELLON	**2,721,896,425**	**-16.1**	**-10.7**	**-10.7**	**10.6**	**11.3**	**12.9**	**9.8**	**07/1993**
S&P 500 INDEX (DAILY)		-16.1	-10.6	-10.6	10.6	11.3	13.0	9.7	07/1993
Excess		-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	0.1	
NON RETIREMENT FIXED INCOME - PRUDENTIAL	**1,526,936,023**	**-5.2**	**-11.1**	**-11.1**	**-0.9**	**1.0**	**2.0**	**5.2**	**07/1994**
Bloomberg U.S. Aggregate		-4.7	-10.3	-10.3	-0.9	0.9	1.5	4.8	07/1994
Excess		-0.5	-0.8	-0.8	0.1	0.1	0.5	0.4	
RBC	**203,470,068**	**-1.6**	**-6.3**	**-6.3**	**-0.1**	**1.0**	**1.1**	**4.4**	**07/1991**
RBC Custom Benchmark		-1.7	-6.3	-6.3	-0.3	0.9	1.0	4.5	07/1991
Excess		0.1	0.1	0.1	0.2	0.1	0.1	-0.1	
MET COUNCIL OPEB BOND POOL	97,060,180	-1.0	-4.8	-4.8	-0.2			1.1	02/2018
NON RETIREMENT CASH ACCOUNT	**99,598,038**	**0.2**	**0.3**	**0.3**	**0.6**			**1.2**	**12/2017**
ICE BofA US 3-Month Treasury Bill		0.1	0.2	0.2	0.6			1.1	12/2017
Excess		0.1	0.1	0.1	0.0			0.1	

Note:

RBC is the manager for the fixed income portion of the Assigned Risk Account. RBC changed its name from Voyageur Asset Management on 1/1/2010. The current benchmark is the Bloomberg U.S. Government Intermediate Index. Prior to 7/1/11 the Voyageur Custom Index was 10% 90 day T-Bill, 25% Merrill 1-3 Government, 15% Merrill 3-5 Government, 25% Merrill 5-10 Government, 25% Merrill Mortgage Master.

Prior to 12/1/17 the Non Retirement Equity Index and Non Retirement Fixed Income accounts were managed internally by SBI staff.

In addition to the Non-Retirement Funds listed on the previous pages, the Non Retirement Equity Index and the Non Retirement Fixed Income accounts also include the assets of various smaller Miscellaneous Trust Accounts and Other Post Employment Benefits.

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State Cash

June 30, 2022

State Cash Accounts

Invested Treasurer's Cash

The Invested Treasurer's Cash Pool (ITC) represents the balances in more than 400 separate accounts that flow through the Minnesota State Treasury. These accounts vary greatly in size. The ITC contains the cash balances of certain State agencies and non-dedicated cash in the State Treasury.

The investment objectives of the ITC, in order of priority, are as follows:

- Safety of Principal. To preserve capital.
- Liquidity. To meet cash needs without the forced sale of securities at a loss.
- Competitive Rate of Return. To provide a level of current income consistent with the goal of preserving capital.

The SBI seeks to provide safety of principal by investing all cash accounts in high quality, liquid, short term investments. These include U.S. Treasury and Agency issues, repurchase agreements, bankers acceptances, commercial paper, and certificates of deposit.

Beginning in January 2003, the Treasurer's Cash Pool is measured against the iMoneyNet, All Taxable Money Fund Report Average.

	Ending Market Value	Last Qtr	1 Year	3 Year	5 Year	10 Year
Treasurer's Cash	25,494,237,378	0.0	-1.1	0.4	0.9	0.6
iMoneyNet Money Fund Average-All Taxable		0.1	0.1	0.4	0.8	0.4

Other State Cash Accounts

Due to differing investment objectives, strategies, and time horizons, some State agencies' accounts are invested seperately. These agencies direct the investments or provide the SBI with investment guidelines and the SBI executes on their behalf. Consequently, returns are shown for informational purposes only and there are no benchmarks for these accounts.

	Ending Market Value	Last Qtr	1 Year	3 Year	5 Year	10 Year
Debt Service	89,537,554	-1.6	-4.2	0.7	1.6	

Addendum

Benchmark Definitions

Active Domestic Equity Benchmark:

A weighted composite each of the individual active domestic equity managers' benchmarks. Effective 3/1/2017 the calculation uses the average weight of the manager relative to the total group of active managers during the month. Prior to 3/1/2017 the beginning of the month weight relative to the total group was used.

Benchmark DM:

Since 6/1/08 the developed markets managers' benchmark, "Benchmark DM," is the Standard (large + mid) MSCI World ex USA (net). From 10/1/07 through 5/31/08 the benchmark was the Provisional Standard MSCI World ex USA (net). From 10/1/03 to 9/30/07 the benchmark was the MSCI World ex USA (net). Prior to that date, it was the MSCI EAFE Free (net), including from 10/1/01 to 5/31/02 when it was the Provisional MSCI EAFE Free (net).

Benchmark EM:

Since 6/1/08 the emerging markets managers' benchmark, "Benchmark EM,"is the Standard (large + mid) MSCI Emerging Markets Free (net). From 10/1/07 through 5/31/08 the benchmark was the Provisional Standard MSCI Emerging Markets Free (net). From 1/1/01 to 9/30/07 the benchmark was the MSCI Emerging Markets Free (net), including from 10/1/01 to 5/31/02 when it was the Provisional MSCI Emerging Markets Free (net). Prior to 1/1/01, it was the MSCI Emerging Markets Free (gross).

Combined Funds Composite Index:

The Composite Index performance is calculated by multiplying the beginning of month Composite weights by the monthly returns of the asset class benchmarks. Asset class weights for Private Markets - Invested and Private Markets - Uninvested are reset at the start of each month. From 1/1/2018-2/28/2019 the Transitional Policy Target was used to reflect the addition of Treasuries to the Fixed Income portfolio. From 7/1/2016-12/31/2016 the composite weights were set to match actual allocation as the portfolio was brought into line with the new Strategic Asset Allocation Policy Target. 7/1/2016 to 12/1/2020 the uninvested portion of Private Markets allocated to Public Equity. Prior to 7/1/2016 the uninvested portion of the Private Markets was invested in Fixed Income and the Composite Index was adjusted accordingly. When the Strategic Asset Allocation Policy Target changes, so does the Composite Index.

Core Bonds Benchmark:

The Core Bonds Benchmark is the Bloomberg U.S. Aggregate. Prior to 2016 this index was called the Barclays Agg. Prior to 9/18/2008 this index was called the Lehman Brothers Aggregate Bond Index. From 7/1/84-6/30/94 the asset class benchmark was the Salomon Brothers Broad Investment Grade Index. The SBI name for this benchmark changed from Fixed Income to Core Bonds on March 31, 2020.

Credit Plus Benchmark:

40% Bloomberg US Corporate Bond Index, 30% Bloomberg US Mortgage Backed Index, 20% BofA ML US High Yield BB-B Cash Pay Constrained Index, and 10% JPM EMBI Global Diversified Index.

Addendum

Domestic Equity Benchmark:

Since 12/1/2020 the benchmark is the Russell 3000. From 1/1/2019-11/30/2020 the benchmark was 90% Russell 1000 and 10% Russell 2000. From 10/1/2003 to 12/31/2018 it was the Russell 3000. From 7/1/1999 to 9/30/2003, it was the Wilshire 5000 Investable Index. From 11/1/1993 to 6/30/1999, the target was the Wilshire 5000 as reported with no adjustments. Prior to 11/1/1993, the Wilshire 5000 was adjusted to reflect SBI mandated restrictions, which included liquor and tobacco, American Home Products and South Africa.

Fixed Interest Blended Benchmark: Since 6/1/2002, equals 3 Year Constant Maturity Treasury Yield + 45 bps. Prior to this change it was the 3 Year Constant Maturity Treasury Yield + 30 bps.

International Equity Benchmark:

Since 12/1/2020 equals the MSCI ACWI ex-US(Net). From 1/1/2018 to 1/1/2019 it was 75% MSCI World ex USA Index (net) and 25% MSCI Emerging Markets Index (net). From 6/1/08 to 12/31/2018 the International Equity asset class target was the Standard (large + mid) MSCI ACWI ex U.S. (net). From 10/1/07 through 5/31/08 the benchmark was the Provisional Standard MSCI ACWI ex U.S. (net). From 10/1/03 to 9/30/07 the target was MSCI ACWI ex U.S. (net). From 1/1/01 to 9/30/03, the target was MSCI EAFE Free (net) plus Emerging Markets Free (net), and from 7/1/99 to 12/31/00 the target was MSCI EAFE Free (net) plus Emerging Markets Free (gross). From 7/1/99 to 9/30/03, the weighting of each index fluctuated with market capitalization. From 10/1/01 to 5/31/02 all international benchmarks being reported were the MSCI Provisional indices. From 12/31/96 to 6/30/99 the benchmark was fixed at 87% EAFE Free (net)/13% Emerging Markets Free (gross). On 5/1/96, the portfolio began transitioning from 100% EAFE Free (net) to the 12/31/96 fixed weights. Prior to 5/1/96 it was 100% the EAFE Free (net).

Multi-Asset Credit Benchmark:

33.33% ICE BofA High Yield, 33.33% S&P LSTA Leveraged Loan, and 33.33% JPM EMBI Global Diversified Index.

Passive Domestic Equity Benchmark:

A weighted average of the Russell 1000, Russell 2000 and Russell 3000 effective 11/1/2018. From 10/1/2016 to 11/1/2018 it was a weighted average of the Russell 1000 and Russell 3000. From 10/1/2003 to 10/1/2016 it was equal to the Russell 3000. From 7/1/2000 to 9/30/2003, it was the Wilshire 5000 Investable Index. From 11/1/1993 to 6/30/2000, the target was the Wilshire 5000 as reported with no adjustments. Prior to 11/1/1993, the Wilshire 5000 was adjusted to reflect SBI mandated restrictions, which included liquor and tobacco, American Home Products and South Africa.

Passive Manager Benchmark:

Russell 3000 effective 10/1/2003. From 7/1/2000 to 9/30/2003, it was the Wilshire 5000 Investable Index. From 11/1/1993 to 6/30/2000, the target was the Wilshire 5000 as reported with no adjustments. Prior to 11/1/1993, the Wilshire 5000 was adjusted to reflect SBI mandated restrictions, which included liquor and tobacco, American Home Products and South Africa.

Addendum

Public Equity Benchmark:

Since 12/1/2020 it is 67% Russell 3000 and 33% MSCI ACWI ex-US(net). From 1/1/2019 to 12/1/2020 it was 60.3% Russell 1000, 6.7% Russell 2000, 24.75% MSCI World Ex US (net), and 8.25% MSCI EM (net). From 7/1/2017 thru 12/31/2018 it was 67% Russell 3000 and 33% MSCI ACWI ex USA. Prior to 6/30/16 the returns of Domestic and International Equity were not reported as a total Public Equity return. From 6/30/16-6/30/17 the Public Equity benchmark adjusted by 2% each quarter from 75% Russell 3000 and 25% MSCI ACWI ex USA until it reached 67% and 33%.

Return Seeking BM:

A weighted composite of each individual return seeking fixed income managers' benchmarks. The calculation uses the average weight of the manager relative to the total group of active managers during the month.

Semi-Passive Domestic Equity Benchmark: Russell 1000 index effective 1/1/2004. Prior to 1/1/2004 it was the Completeness Fund benchmark.

Total Fixed Income Benchmark:

Since 7/1/2020 the Total Fixed Income benchmark is 40% Bloomberg U.S. Aggregate Index/ 40% Bloomberg Treasury 5+ Years Index/ 20% ICE BofA US 3-Month Treasury Bill. From 4/1/2019-6/30/2020 it was 50% Bloomberg Aggregate and 50% Bloomberg Treasury 5+ Years Index. From 2/1/2018-3/31/19 the weighting of this benchmark reflected the relative weights of the Core Bonds and Treasuries allocations in the Combined Funds Composite.

Zevenbergen Benchmark: Russell 3000 Growth index effective 1/1/2021. Prior to 1/1/2021 it was the Russell 1000 Growth Index.

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