
INVESTMENT ADVISORY COUNCIL

OF THE MINNESOTA STATE BOARD OF INVESTMENT

**INVESTMENT ADVISORY COUNCIL
MEETING
February 21, 2023**



The Minnesota Legislature has established a seventeen member Investment Advisory Council (IAC) to advise the Board and its staff on investment-related matters. All proposed investment policies are reviewed by the IAC before they are presented to the State Board of Investment (SBI) for action.

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**INVESTMENT ADVISORY COUNCIL
MEETING**

AGENDA

February 21, 2023

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AGENDA
INVESTMENT ADVISORY COUNCIL MEETING

Tuesday, February 21, 2023
12:00 p.m.
Retirement Systems Building
Room 106 – Main Floor
60 Empire Drive, St. Paul, MN

	TAB
1. Call to Order	
2. Approval of Minutes of November 14, 2022	Motion Needed
3. Performance Summary	A
4. Executive Director’s Administrative Report	B
5. Private Markets Investment Program Report	C Motion Needed
6. Other Items	

REPORTS

- ❖ **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
November 14, 2022
IAC Meeting Minutes

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Minutes Investment Advisory Council Meeting November 14, 2022

The Investment Advisory Council (IAC) met at 12:00 p.m. on Monday, November 14, 2022 in Room 106 of the Retirement Systems Building, 60 Empire Drive, St. Paul, MN 55103.

IAC Members Present: Doug Anderson, Dennis Duerst, Kim Faust, Susanna Gibbons, Gary Martin, Erin Leonard, Dan McConnell, Nancy Orr, Jim Schowalter, Martha Severson Rush, Jay Stoffel, and Shawn Wischmeier.

IAC Members Absent: Denise Anderson, Peggy Ingison, and Carol Peterfeso.

SBI Staff Present: Jill Schurtz, Patricia Ammann, Paul Anderson, Shirley Baribeau, Nate Blumenshine, Tammy Brusehaver, Andy Christensen, Mike Clancey, Dan Covich, Aaron Griga, Ben Harris, Cathy Hua, Keletso Kgari, Andrew Krech, Steve Kuettel, Todd Lauf, Melissa Mader, John Mulé, Charlene Olson, Iryna Shafir, Erol Sonderegger, Jonathan Stacy, Reece Tolkinen, David Velasquez, Jeff Weber, and Samir Zahar.

Others Present: Katie Comstock, Aon Investments; Sarah Bernstein and Gordon Latter, Meketa Investment Group; J. Adam Sorenson, Attorney General's Office; Karl Procaccini and Jake Smith, Governor's Office; Bibi Black, Secretary of State's Office; and Ramona Advani, State Auditor's Office.

Call to Order

Gary Martin, Chair, called the meeting to order.

Approval of IAC Minutes

The minutes of the August 15, 2022 meeting were approved with the correction that Dennis Duerst was in attendance at the meeting.

Performance Summary

Executive Director Jill Schurtz referred members to the Quarterly Performance Summary in Tab A of the meeting materials. Ms. Schurtz outlined the following items from the report as of September 30, 2022:

AUM: The SBI was responsible for \$117.9 billion in assets, of which the Combined Funds represented \$77.1 billion.

Performance: The Combined Funds exceeded its long-term objectives by outperforming its Composite Index for the ten-year period and provided a real rate of return above inflation over a 20-year period.

Asset Allocation and TUCS Ranking: The Combined Funds asset mix is in-line with the asset allocation targets. The Combined Funds ranked in the 75th and 70th percentile for the quarter and year, respectively, compared to other public pension plans with assets greater than \$20 billion in the Trust Universe Comparison Services (TUCS).

Executive Director's Administrative Report

Ms. Schurtz referred members to Tab B of the meeting materials for the Executive Director's Administrative Report. The following items were reviewed:

Executive Directors' First Thirty Days Overview: Ms. Schurtz presented an overview of the focus of her first thirty days at the SBI.

Budget and Travel: The SBI Administrative Budget for period ending September 30, 2022 was listed as Attachment A and the summary of staff's travel was included as Attachment B.

FY22 Audit Report: The legislative auditors continue to work on the SBI's annual audit and will provide a report when completed.

IAC Meeting Dates 2023: Meeting dates for the 2023 calendar year were listed in the report.

Unauthorized Holdings Updates: The Russia/Belarus, Iran, Sudan, and Thermal Coal updates were provided. Staff is working with one manager on newly identified holdings that will be added to the next thermal coal list.

Litigation Update: There is no litigation involving the SBI.

Private Markets Investment Program Report

Ms. Schurtz referred members to Tab C of the meeting materials for the Private Markets Investment Program Report. Ms. Schurtz introduced Andrew Krech and Erol Sonderegger who highlighted various private market projects: the capital commitment process (pacing), the use of policy limit ranges, and managing total portfolio liquidity levels. Katie Comstock re-affirmed Staff's approach.

Adjournment of Meeting

The motion to adjourn the meeting was approved. The meeting adjourned at 12:46 p.m.

Informational Reports included in Quarterly Meeting Material:

Public Markets Investment Report

Participant Directed Investment Program and Non-Retirement Investment Program Report

SBI Environmental Social and Governance (ESG) Report

Aon Market Environmental Report

Meketa Capital Markets Outlook & Risk Metrics Report

SBI Comprehensive Performance Report

Respectfully submitted,



Jill E. Schurtz

Executive Director and Chief Investment Officer

TAB A

Quarterly Performance Summary

December 31, 2022

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Quarterly Report

Performance Summary

December 31, 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.

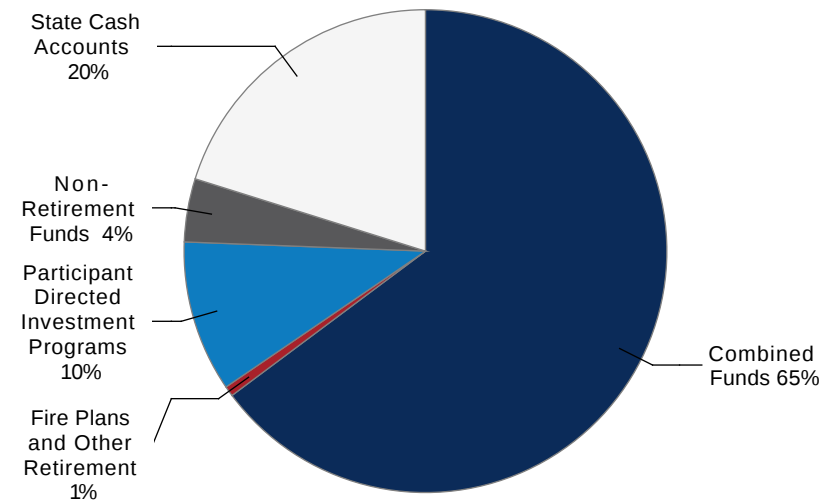
State Cash

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

	<u>\$ Millions</u>
COMBINED FUNDS	\$80,120
Fire Plans + Other Retirement Plans	847
Participant Directed Investment Program	12,520
State Deferred Compensation Plan	8,588
Health Care Savings Plan	1,642
Unclassified Employees Retirement Plan	329
Hennepin County Supplemental Retirement Plan	153
PERA Defined Contribution Plan	84
Minnesota College Savings Plan	1,693
Minnesota Achieving a Better Life Experience Plan	31
Non-Retirement Funds	5,235
Assigned Risk Plan	254
Permanent School Fund	1,736
Environmental Trust Fund	1,448
Closed Landfill Investment Fund	115
Miscellaneous Trust Funds	915
Other Postemployment Benefits Accounts	767
State Cash	24,924
Invested Treasurer's Cash	24,764
Other State Cash Accounts	159
TOTAL SBI AUM	123,646



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	8.7%
Combined Funds Composite Index	8.4
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	8.6%
CPI-U	2.5
Excess	6.1

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	\$77,122
Net Contributions	-669
Investment Return	3,667
Ending Market Value	80,120

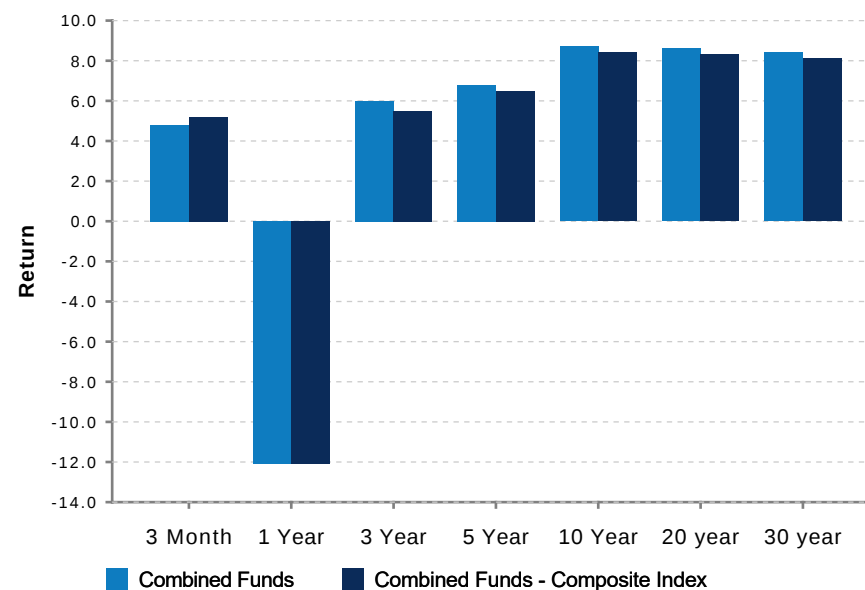
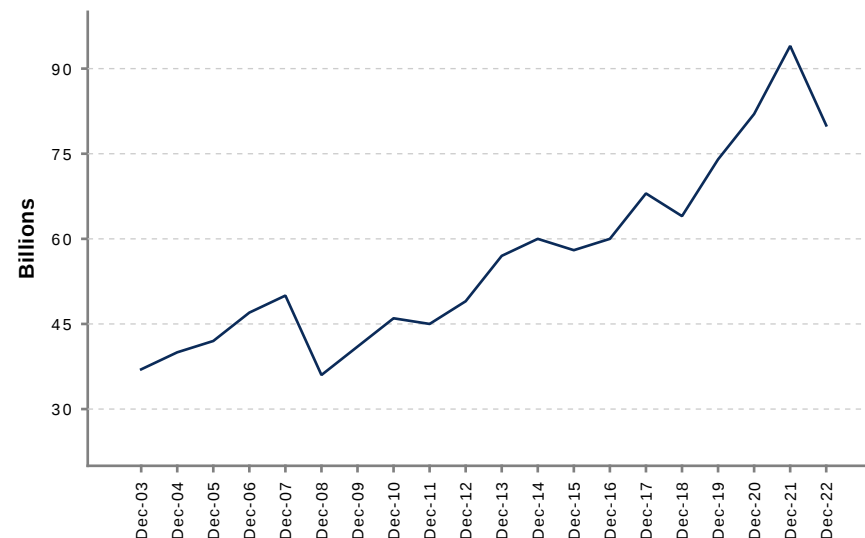
The change in market value of the Combined Funds since the end of last quarter is due to net contributions and investment returns.

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	4.8%	0.2%	-12.1%	6.0%	6.8%	8.7%	8.6%	8.4%
Combined Funds - Composite Index	5.2%	0.1%	-12.1%	5.5%	6.5%	8.4%	8.3%	8.1%
Excess	-0.4%	0.1%	-0.0%	0.5%	0.3%	0.3%	0.2%	0.2%

Asset Growth

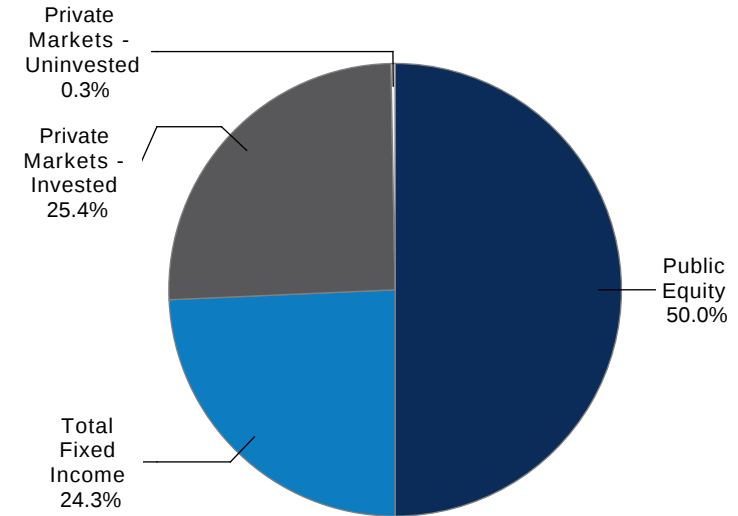


Combined Funds Summary

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.

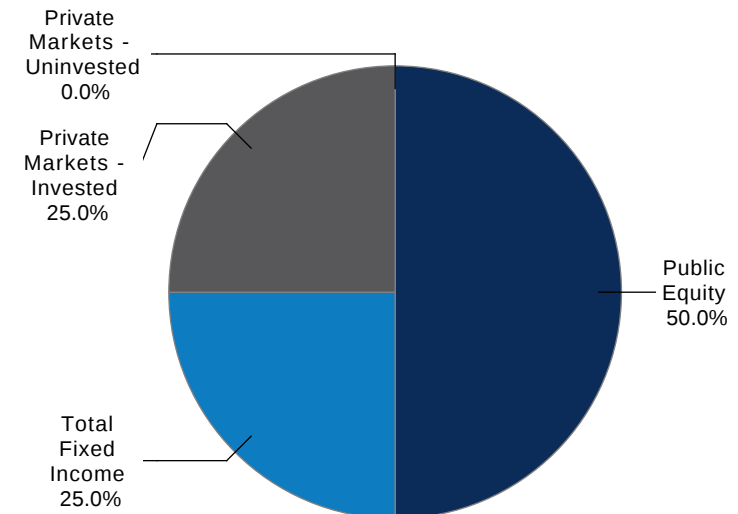
	<u>(Millions)</u>	<u>Actual Mix</u>	<u>Policy Target</u>
Public Equity	\$40,037	50.0%	50.0%
Total Fixed Income	19,464	24.3	25.0
Private Markets - Total	20,619	25.7	25.0
Private Markets - Invested	20,363	25.4	
Private Markets - Uninvested	256	0.3	
TOTAL	80,120	100.0	



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.

	<u>Policy Weight</u>	<u>Market Index</u>
Public Equity	50.0%	Public Equity Benchmark
Total Fixed Income	25.0	Total Fixed Income Benchmark
Private Markets - Invested	25.0	Private Markets
Private Markets - Uninvested	0.0	





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).

	<u>Market Value</u>	<u>Actual Weight</u>	<u>Policy Weight</u>	<u>Last Qtr</u>	<u>FYTD</u>	<u>1 Year</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>	<u>20 Year</u>	<u>30 Year</u>
Public Equity	\$40.0	50.0%	50.0%	8.8%	2.9%	-17.8%	5.3%	6.5%	10.0%	9.0%	8.5%
Public Equity Benchmark				9.6	2.7	-18.0	4.8	6.2			
Excess				-0.8	0.2	0.2	0.5	0.3			
Domestic Equity	26.7	33.3	33.5	7.3	2.6	-19.4	7.3	8.9	12.1	9.8	9.3
Domestic Equity Benchmark				7.2	2.4	-19.2	7.0	8.7	12.1	9.9	9.4
Excess				0.1	0.2	-0.2	0.3	0.1	0.0	-0.1	-0.1
International Equity	12.5	15.6	16.5	12.0	3.9	-13.7	1.5	1.8	4.7	7.1	6.4
International Equity Benchmark				14.3	3.0	-16.0	0.0	0.9	3.8	6.7	5.7
Excess				-2.3	1.0	2.3	1.5	1.0	0.9	0.4	0.7
Global Equity	0.8	1.0	0.0	8.6	-1.1	-27.7					
MSCI AC World Index Net				9.8	2.3	-18.4					
Excess				-1.2	-3.4	-9.4					

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.

	<u>Market Value</u>	<u>Actual Weight</u>	<u>Policy Weight</u>	<u>Last Qtr</u>	<u>FYTD</u>	<u>1 Year</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>	<u>20 Year</u>	<u>30 Year</u>
Total Fixed Income	\$19.5	24.3%	25.0%	1.4%	-3.0%	-13.6%	-1.9%	0.9%	1.7%	3.7%	5.0%
Total Fixed Income Benchmark				1.1%	-3.5%	-13.3%	-2.2%				
Excess				0.3%	0.5%	-0.3%	0.3%				
Core/Core Plus	\$4.3	5.4%	5.0	2.1%	-2.6%	-14.1%	-2.3%	0.5%	1.5%	3.6%	4.9%
Core Bonds Benchmark				1.9%	-3.0%	-13.0%	-2.7%	0.0%	1.1%	3.1%	4.6%
Excess				0.3%	0.3%	-1.1%	0.4%	0.4%	0.5%	0.5%	0.4%
Return Seeking Fixed Income	\$4.0	5.0%	5.0	3.8%	1.1%	-11.4%					
Bloomberg U.S. Aggregate				1.9%	-3.0%	-13.0%					
Excess				1.9%	4.0%	1.6%					
Treasury Protection	\$7.4	9.2%	10.0	-0.1%	-7.1%	-20.6%	-4.9%	-0.8%			
Bloomberg Treasury 5+ Year				0.4%	-6.5%	-20.3%	-4.7%	-0.9%			
Excess				-0.6%	-0.5%	-0.3%	-0.1%	0.1%			
Laddered Bond + Cash	\$3.7	4.7%	5.0	0.9%	1.3%	1.1%	0.6%	1.2%	0.8%	1.5%	3.1%
ICE BofA US 3-Month Treasury Bill				0.8%	1.3%	1.5%	0.7%	1.3%	0.8%	1.3%	2.4%
Excess				0.1%	0.0%	-0.4%	-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

	<u>Last Qtr</u>	<u>FYTD</u>	<u>1 Year</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>	<u>20 Year</u>	<u>25 Year</u>	<u>30 Year</u>
Private Markets - Invested	0.3%	-2.1%	4.9%	16.3%	14.2%	13.1%	14.1%	12.7%	13.4%
Private Markets - Uninvested (1)	7.4%	2.6%	-17.6%						
Private Equity	0.1%	-4.0%	0.3%	18.9%	17.5%	16.5%	16.2%	14.5%	15.8%
Private Credit	4.3%	5.5%	12.8%	13.2%	12.3%	13.5%	13.0%	12.9%	
Resources	0.2%	3.4%	21.8%	9.2%	5.0%	3.3%	13.8%	10.6%	13.0%
Real Estate	-0.9%	0.5%	19.7%	17.4%	14.6%	13.6%	10.3%	9.8%	9.7%

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 Private Markets Uninvested is currently cash. Prior to 11/02/2022. The Uninvested portion of the Private Markets allocation was 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



SBI Combined Funds Strategic Allocation Category Framework

	<u>12/31/2022</u> (\$ millions)	<u>12/31/2022</u> Weights	<u>Category Range</u>	
<u>Growth - Appreciation</u>				
Public Equity	\$ 40,036.8	50.0%		
Private Equity	\$ 14,500.6	18.1%		
Non-Core Real Assets	\$ 3,599.3	4.5%		
	\$ 58,136.8	72.6%	50%	75%
<u>Growth - Income-oriented</u>				
Core Fixed Income	\$ 4,327.0	5.4%		
Private Credit	\$ 1,693.1	2.1%		
Return-Seeking Fixed Income	\$ 4,011.9	5.0%		
	\$ 10,032.1	12.5%	15%	30%
<u>Real Assets</u>				
Core Real Estate		0.0%		
Real Assets	\$ 537.9	0.7%		
	\$ 537.9	0.7%	0%	10%
<u>Inflation Protection</u>				
TIPS		0.0%		
Commodities		0.0%		
		0.0%	0%	10%
<u>Protection</u>				
U.S. Treasuries	\$ 7,387.7	9.2%		
	\$ 7,387.7	9.2%	5%	20%
<u>Liquidity</u>				
Cash	\$ 4,025.3	5.0%		
	\$ 4,025.3	5.0%	0%	5%
<u>Opportunity</u>				
Opportunity		0.0%		
		0.0%	0%	10%
Total	\$ 80,120.0	100%		
Illiquid Asset Exposure	\$ 20,331.0	25.4%	0%	30%



Volatility Equivalent Benchmark Comparison

	As of December 31, 2022							
	<i>1-year</i>	<i>3-year</i>	<i>5-year</i>	<i>10-year</i>	<i>15-year</i>	<i>20-year</i>	<i>25-year</i>	<i>30-year</i>
SBI Combined Funds Return	-12.1%	6.0%	6.8%	8.7%	6.9%	8.6%	7.2%	8.4%
Volatility Equivalent Benchmark Return			3.3%	6.3%	4.4%	6.7%	5.6%	6.5%
Value Added			3.5%	2.4%	2.5%	1.8%	1.6%	1.8%
Standard Deviation: Benchmark = Combined Funds			10.9%	11.0%	11.0%	11.0%	11.0%	11.0%
Benchmark Stock Weight			57%	74%	62%	69%	68%	71%
Benchmark Bond Weight			43%	26%	38%	31%	32%	29%

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

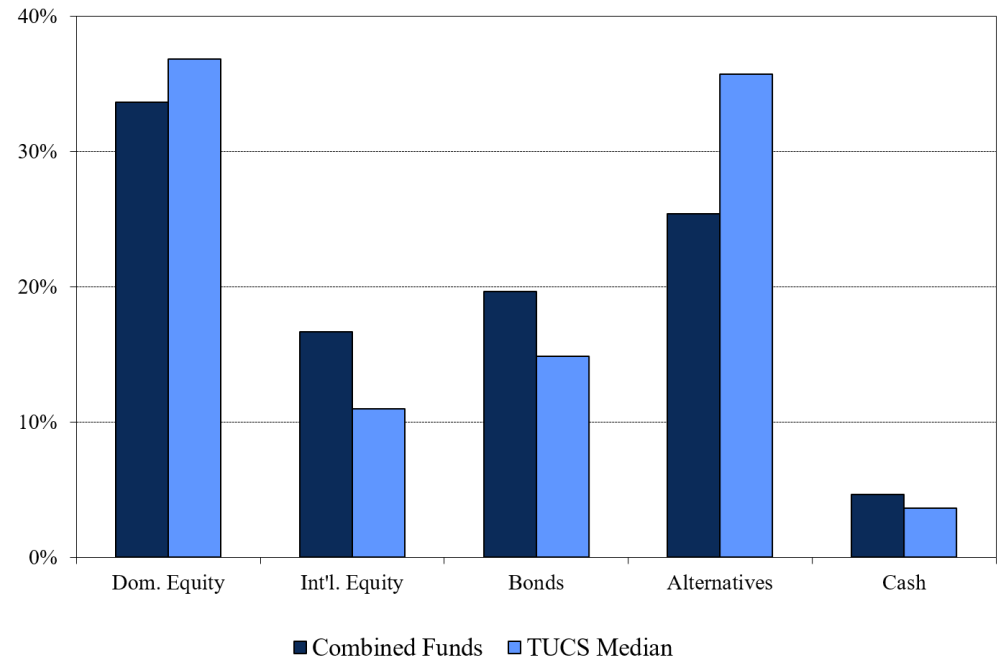
Asset Mix Compared to Other Pension Funds

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

	<u>(\$Millions)</u>	<u>Actual Mix</u>
Public Equity	40,037	50.0
Total Fixed Income	19,464	24.3
Private Markets - Invested	20,363	25.4
Private Markets - Uninvested	256	0.3
TOTAL	80,120	100.0



	<u>Domestic Equity</u>	<u>International Equity</u>	<u>Bonds</u>	<u>Alternatives</u>	<u>Cash</u>
Combined Funds	33.6%	16.7%	19.6%	25.4%	4.7%
Median in TUCS	36.8%	11.0%	14.9%	35.7%	3.6%



Combined Funds Summary

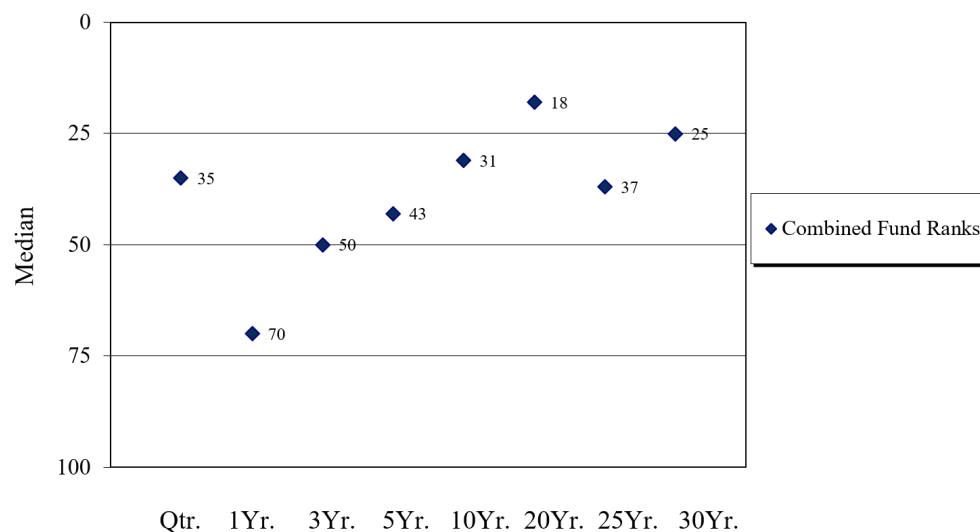
Performance Compared to Other Pension Funds

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.



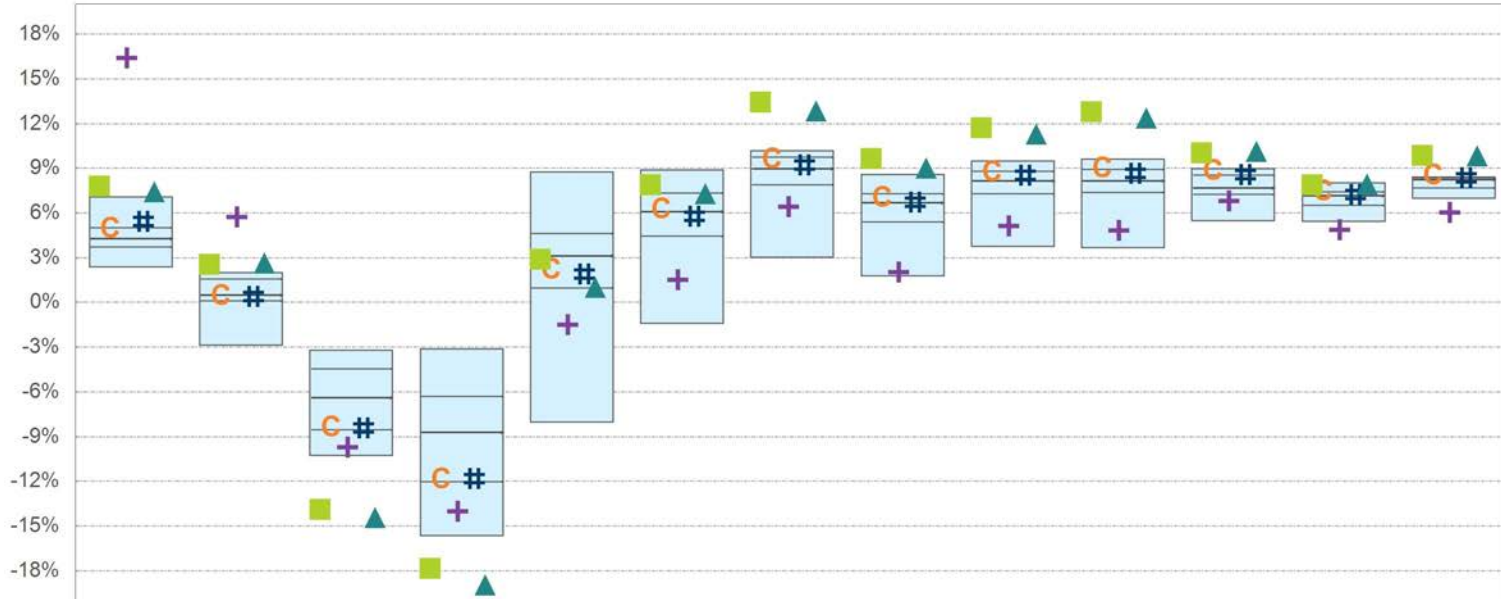
Periods Ended 12/31/2022

	Qtr	1 Yr	3 Yrs	5 Yrs	10 Yrs	20 Yrs	25 Yrs	30 Yrs
Combined Funds	35th	70th	50th	43rd	31st	18th	37th	25th
Percentile Rank in TUCS								

Minnesota State Board of Investments Performance Comparison

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

Cumulative Periods Ending : December 31, 2022

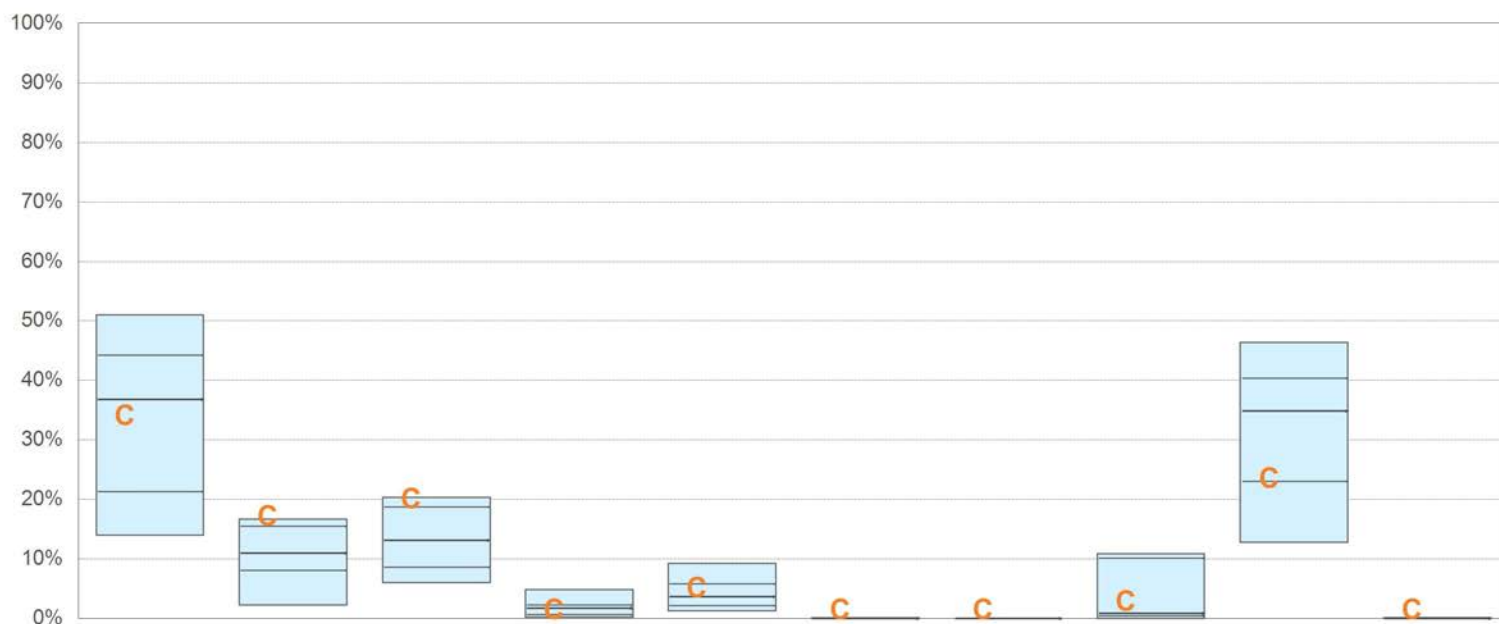


Percentile Rankings	1 Qtr	2 Qtrs	3 Qtrs	1 Year	2 Years	3 Years	4 Years	5 Years	7 Years	10 Years	20 Years	25 Years	30 Years
5th	7.07	2.00	-3.19	-3.13	8.76	8.89	10.17	8.59	9.51	9.64	8.96	8.02	8.42
25th	5.02	1.56	-4.45	-6.32	4.63	7.34	9.74	7.31	8.80	8.93	8.55	7.42	8.38
50th	4.27	0.50	-6.40	-8.74	3.14	6.11	8.99	6.71	8.17	8.15	7.68	7.15	8.26
75th	3.73	0.12	-8.56	-12.05	0.97	4.47	7.88	5.39	7.28	7.40	7.25	6.52	7.68
95th	2.38	-2.86	-10.29	-15.66	-8.01	-1.42	3.05	1.79	3.77	3.69	5.47	5.45	6.98
No. Of Obs	20	20	20	20	20	20	18	18	18	18	17	16	14
C Combined Funds	4.79 (35)	0.26 (65)	-8.56 (75)	-12.04 (70)	2.03 (65)	6.11 (50)	9.46 (37)	6.88 (43)	8.59 (31)	8.84 (31)	8.69 (18)	7.28 (37)	8.38 (25)
# SBI Combined Funds Ind	5.20 (18)	0.13 (70)	-8.68 (75)	-12.06 (75)	1.66 (65)	5.53 (55)	8.97 (50)	6.46 (50)	8.28 (43)	8.43 (37)	8.32 (31)	7.00 (50)	8.13 (50)
S S&P 500	7.56 (1)	2.31 (1)	-14.16 (99)	-18.11 (99)	2.66 (50)	7.66 (12)	13.18 (1)	9.42 (1)	11.48 (1)	12.56 (1)	9.80 (1)	7.64 (5)	9.64 (1)
T Russell 3000	7.18 (1)	2.40 (1)	-14.70 (99)	-19.21 (99)	0.75 (75)	7.06 (35)	12.60 (1)	8.78 (1)	11.03 (1)	12.13 (1)	9.88 (1)	7.68 (5)	9.57 (1)
+ MSCI Wld Ex US (Net)	16.18 (1)	5.50 (1)	-9.96 (93)	-14.29 (87)	-1.75 (93)	1.27 (93)	6.20 (93)	1.79 (99)	4.87 (93)	4.59 (93)	6.57 (83)	4.64 (99)	5.77 (100)

Minnesota State Board of Investments

Asset Allocation of Master Trusts - Public : Plans > \$20 Billion

Quarter Ending December 31, 2022



Percentile Rankings	US Equity	Non-US Equity	US Fixed	Non-US Fixed	Cash	Convertible	GIC GAC	Real Estate	Alternative Investments	Other
5th	50.99	16.67	20.36	4.85	9.27	0.06	-	10.82	46.37	0.11
25th	44.24	15.53	18.72	2.29	5.83	0.00	-	10.17	40.36	0.07
50th	36.84	10.99	13.15	1.71	3.62	0.00	-	0.86	34.87	0.00
75th	21.36	8.08	8.66	0.67	2.15	0.00	-	0.43	23.00	0.00
95th	13.96	2.27	5.98	0.25	1.27	0.00	-	0.00	12.84	0.00
 Combined Funds	33.63 (58)	16.67 (5)	19.63 (15)	0.00 (100)	4.66 (37)	0.00 (100)	0.00 (1)	2.41 (41)	23.00 (75)	0.00 (100)

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TAB B

Executive Director's Administrative Report

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EXECUTIVE DIRECTOR'S ADMINISTRATIVE REPORT

DATE: February 14, 2023

TO: Members, State Board of Investment

FROM: **Jill E. Schurtz**
Executive Director & Chief Investment Officer

1. Reports on Budget and Travel

A report on the SBI's administrative budget for the fiscal year to date through December 31, 2022, is included as **Attachment A**.

A report on travel for the period from October 1, 2022 – December 31, 2022 is included as **Attachment B**.

2. Legislative Update

A summary of relevant legislation pending before the MN Legislature is included in **Attachment C**.

3. FY22 Audit Report

The Legislative Auditor letter to the SBI regarding its Fiscal Year 2022 audit is included as **Attachment D**. The SBI earned the highest level of opinion with no written findings or recommendations.

4. FY22 Annual Report

The Fiscal Year 2022 Annual Report will be distributed in the first quarter of 2023.

5. Russia/Belarus Update

Each quarter, staff provides a report to the Board on steps taken to implement *Minnesota Statutes*, section 11A.245 that requires SBI actions concerning companies with operations in Russia and Belarus.

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 15 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 the fourth quarter, the liquidation manager sold four equity holdings. As of December 31, 2022, 27 holdings remained on the divestment list, with an estimated market value of \$1.1 million. The SBI has divested nearly 70% of the market value of affected Russian and Belarusian securities it held as of the effective date of Minnesota Statutes Section 11A.245.

The liquidation manager indicated that, except for sporadic trading in foreign-listed depository receipts, 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.

On December 22, 2022, staff sent a letter to each applicable external manager containing the most recent restricted list.

6. Sudan

In October 2022, the State of Minnesota Office of the Revisor of Statutes removed the Sudan restriction in *Minnesota Statutes*, section 11A.243 and SBI staff removed the restriction from its quarterly screening process.

On December 22, 2022, staff sent a letter to each applicable external manager informing them of the removal of the restriction, effective immediately.

7. 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.

At the end of the fourth quarter, there was one company on the SBI's Iran restricted list held in the Combined Funds portfolio, Russian company Gazprom PJSC. This security was

scheduled for 50% divestment by 12/31/22; however, no market currently exists because Russian securities are restricted from trading due to sanctions imposed by the United States, Russia, or other governments. Despite continued efforts, the liquidation manager was unable to find a market to sell this security during the quarter. As a result, no shares of restricted companies held in the portfolio were sold during the fourth quarter.

On December 22, 2022, staff sent a letter to each applicable external manager containing the most recent restricted list.

8. Thermal Coal Update

The Minnesota State Board of Investment approved a resolution at its May 2020 meeting requiring the removal of any publicly traded company deriving more than 25% of its revenue from thermal coal production (exploration/mining). The SBI has contracted with Moody's ESG and Institutional Shareholder Services, Inc. (ISS) to identify companies that meet the criteria set forth in the resolution.

The resolution required removal of companies initially identified in a prudent and expeditious manner by December 31, 2020. Beginning with the Board's regularly scheduled third quarter 2020 meeting and continuing each quarter thereafter, staff reports to the Board on updates and the status of any action authorized by this resolution.

In the fourth quarter, during a review of the restricted list, the SBI discovered that some thermal coal securities were inadvertently omitted from the data feed by the SBI's data vendor. The updated data feed resulted in the addition of 33 companies to the MSBI restricted list, of which 11 companies were held in the Combined Funds portfolio. Additionally, the SBI added the ISS database for screening.

The additional companies are scheduled to be fully liquidated by March 31, 2023. Of the 11 companies held in the SBI's portfolio, managers sold 1,759,957 shares across 3 companies during the fourth quarter. At the end of the quarter, there were 8 companies on the MSBI restricted list held in the Combined Funds portfolio and are scheduled for 100% divestment by 3/31/23.

On December 22, 2022, staff sent a letter to each applicable external manager containing the most recent restricted list.

9. 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 2023 ADMINISTRATIVE BUDGET REPORT
FISCAL YEAR TO DATE THROUGH DECEMBER 31, 2022**

ITEM	FISCAL YEAR 2023 BUDGET	FISCAL YEAR 2023 12/31/2022
PERSONNEL SERVICES		
FULL TIME EMPLOYEES	\$ 7,721,000	\$ 3,504,892
PART TIME EMPLOYEES	\$ 12,000	11,988
	0	0
MISCELLANEOUS PAYROLL	300,000	134,651
SUBTOTAL	\$ 8,033,000	\$ 3,651,531
STATE OPERATIONS		
RENTS & LEASES	390,000	163,942
REPAIRS/ALTERATIONS/MAINTENANCE	21,000	16,233
PRINTING & BINDING	12,000	1,286
PROFESSIONAL/TECHNICAL SERVICES/IT PROF	550,000	109,613
COMPUTER SYSTEMS SERVICES	191,000	144,200
COMMUNICATIONS	25,000	6,821
TRAVEL, IN-STATE	3,000	30
TRAVEL, OUT-STATE	300,000	74,532
SUPPLIES	50,000	29,431
EQUIPMENT	93,985	6,008
EMPLOYEE DEVELOPMENT	219,000	47,578
OTHER OPERATING COSTS	125,000	70,285
INDIRECT COSTS	300,000	109,715
SUBTOTAL	\$ 2,279,985	\$ 779,672
TOTAL ADMINISTRATIVE BUDGET	\$ 10,312,985	\$ 4,431,203

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ATTACHMENT B

STATE BOARD OF INVESTMENT

Travel Summary by Date October 1, 2022 - December 31, 2022

Purpose	Name	Destination / Date	Total Cost
Conference: AAAIM National Conference 2022	C. Hua	New York, NY Sept. 27-Oct. 1, 2022	\$ 2,442.78
Private Markets Manager Manager Monitoring: Court Square	M. Clancey	New York, NY Oct. 6-7, 2022	1,322.68
Conference: National Council on Teacher Retirement (NCTR)	M. Perry	Tucson, AZ Oct. 9-11, 2022	768.40
Conference: ILPA Private Equity Legal Conference sponsored by ILPA	J. Weber	Washington D.C. Oct. 12-13, 2022	1,447.99
Public Markets Manager Conference: Sands Client Conference	T. Brusehaver	Washington D.C. Oct. 12-16, 2022	1,125.39
Public Markets Manager Manager Monitoring: Hood River Conference: 28th Annual ABS East Conference sponsored by Information Management Network	A. Griga	Miami, FL Oct. 16-19, 2022	1,819.93
Private Markets Manager Manager Monitoring: IK Partners	M. Clancey	New York, NY Oct. 17-18, 2022	1,262.39
Private Markets Managers Manager Monitoring: TPG Annual Investor Meeting	M. Ndungu	Scottsdale, AZ Oct. 17-19, 2022	1,569.21

STATE BOARD OF INVESTMENT

Travel Summary by Date October 1, 2022 - December 31, 2022 (Continued)

Purpose	Name	Destination / Date	Total Cost
Conference: Alborne Partners 2022 Investor Conference	A. Christensen A. Krech S. Zahar	Toronto, Canada Oct. 17-19, 2022	\$ 3,683.50
Conference: P2F2 Conference 2022	P. Anderson S. Baribeau N. Ramaswami K. Anderson I. Shafir	Philadelphia, PA Oct. 22-26, 2022	10,568.10
Private Markets Managers Manager Monitoring: Arsenal Capital Partners; Vestar Capital Partners; Blackstone Capital Partners	M. Ndungu	New York, NY Oct. 25-27, 2022	1,686.04
Conference: Whitehorse AGM sponsored by Whitehorse Private Equity	M. Clancey	Toronto, Canada Oct. 26-27, 2022	946.36
Private Markets Managers Manager Monitoring: Carlyle Group; Oak Hill Capital Partners Manager Search: FTV Capital	J. Stacy	New York, NY Nov. 1-3, 2022	1,504.12
Private Markets Managers Manager Monitoring: EnCap; Energy & Minerals Group; EnerVest	M. Clancey	Houston, TX Nov. 7-10, 2022	2,076.63
Private Markets Manager Manager Monitoring: Lexington Partners Conference: ILPA Summit 2022	M. Ndungu S. Zahar	New York, NY Nov. 8-10, 2022	2,708.12

STATE BOARD OF INVESTMENT

Travel Summary by Date October 1, 2022 - December 31, 2022 (Continued)

Purpose	Name	Destination / Date	Total Cost
Private Markets Managers Manager Monitoring: Lexington Partners; Permira; Hellman & Friedman Manager Search: WindRose	J. Stacy	New York, NY Nov. 8-10, 2022	\$ 1,440.46
Conferences: Academic Forum sponsored by Defined Contribution Institutional Investment Association; Retirement Research Center Summit	P. Ammann	New York, NY Nov. 14-16, 2022	1,217.01
Public Markets Managers Manager Monitoring: PIMCO; BlackRock; Goldman Sachs; PGIM; KKR Manager Search: One William Street Capital Management; Waterfall Asset Management; Guggenheim; GoldenTree	D. Covich A. Griga	New York, NY Nov. 14-17, 2022	3,300.47
Conference: Corporare Governance Bootcamp sponsored by Council of Institutional Investors	N. Blumenshine	New York, NY Nov. 15-18, 2022	3,799.79
Private Markets Managers Manager Monitoring: Thomas H. Lee; TA Associates Manager Search: Wheelock Street; Great Hill Partners	J. Stacy	Boston, MA Nov. 15-17, 2022	1,597.63

STATE BOARD OF INVESTMENT

Travel Summary by Date October 1, 2022 - December 31, 2022 (Continued)

Purpose	Name	Destination / Date	Total Cost
Private Markets Managers Manager Monitoring: Energy Capital Partners; Welsh Carson Anderson & Stowe	M. Clancey	New York, NY Nov. 15-17, 2022	\$ 1,544.45
Public Markets Manager Manager Monitoring: NISA	C. Hua E. Pechacek	St. Louis, MO Nov. 16, 2022	816.01
Public Markets Manager Manager Monitoring: NISA Conference: State Street Bank Client Advisory Board	E. Sonderegger	St. Louis, MO Miami, FL Nov. 16-18, 2022	1,384.68
Conference: Private Credit for the Limited Partner sponsored by ILPA Institute	M. Ndungu	New York, NY Nov. 30-Dec. 1, 2022	1,980.10
Custodian: State Street Bank; NRS	P. Anderson C. Hua D. Velasquez	Boston, MA Dec. 7-9, 2022	1,494.44

ATTACHMENT C

BILLS OF INTEREST TO THE MINNESOTA STATE BOARD OF INVESTMENT

Bill No.	Author	Name of Bill	Current Status	Notes
HF0782	Becker-Finn, et al.	Minnesota Secure Choice Program	01/25: HF0782 was referred to the State and Local Government Finance and Policy Committee	The bill creates IRA and Roth IRA retirement programs for employees of private companies. The bill provides for auto-enrollment of employees. The SBI would be responsible for choosing the investment options for the plans. The SBI executive director (or designee) would serve on the Secure Choice board responsible for administering the plan. The board would appoint an executive director to oversee the plan's activities, and would also have authority to contract with third party administrators to provide administrative and custodial services to the plan.
SF0413	Pappas, et al.		01/19: SF0413 was referred to the State and Local Government and Veterans Committee	
HF0159	Freiberg	Additional Investment Authority for Qualifying Units of Local Government	01/09: HF0159 was referred to the State and Local Government Finance and Policy Committee	The bill broadens the definition of local governments that may invest in the SBI's non-retirement equity pool. The bill changes the definition of qualifying governments to those with a bond rating of AA or better. The bill also expands the investment authority of self-insurance pools to include any securities that are allowable investments under Minn. Stat. §11A.24, and removes the requirement that self-insurance pools invest through indexed mutual funds or the SBI's asset pools.
SF0323	Westlin, et al.		01/17: SF0323 was referred to the State and Local Government and Veterans Committee	
SF0940	Lucero, et al	The Stop Environmental Social Governance (ESG) and Social Credit Score Discrimination Act	01/30: SF0940 was referred to the State and Local Government and Veterans Committee	The bill would require the SBI to liquidate direct combined pension fund holdings in any company determined to boycott mining, energy production, production agriculture, or commercial lumber production. The SBI would also be prohibited from purchasing any new investments in such companies and must complete liquidation by July 1, 2028.
HF0707	Koznick, et al.	State Board of Investment Prohibited from Investment in Companies that Exclude Minnesota Based Energy, Natural Resources, Agricultural, or Livestock Companies	01/23: HF0707 was referred to the State and Local Government Finance and Policy Committee	The bill would prohibit the SBI from investing in assets which exclude Minnesota based energy, natural resources, and certain agricultural companies based on ESG factors. The SBI would be required to liquidate its existing holdings within 15 months of the effective date of the law. The bill also makes it illegal for financial institutions to discriminate against a person based on that person's political affiliation or upon other ESG criteria.
SF1225	Lucero		02/06: SF1225 was referred to the State and Local Government and Veterans Committee	

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OFFICE OF THE LEGISLATIVE AUDITOR
STATE OF MINNESOTA • Judy Randall, Legislative Auditor

December 22, 2022

Jill Schurtz, Executive Director and Chief Investment Officer
Minnesota State Board of Investment
60 Empire Drive, Suite 355
Saint Paul, MN 55103

Dear Executive Director Schurtz:

The Office of the Legislative Auditor has completed its audit of certain financial activities at the Minnesota State Board of Investment (SBI). This work supports our audit of the State of Minnesota's financial statements for the fiscal year ended June 30, 2022. The primary objective of the audit is to render an opinion on the State of Minnesota's financial statements, which will be included in the *Annual Comprehensive Financial Report*, prepared by the Department of Management and Budget. The work in your department also supports our audit opinions on the financial statements of the three state retirement systems: Minnesota State Retirement System, Public Employees Retirement Association, and Teachers Retirement Association. This is not a comprehensive audit of the Minnesota State Board of Investment.

In planning and performing this audit, we considered SBI's internal control system to determine the appropriate audit procedures. We gained an understanding of, but did not test, SBI's internal controls. As part of this audit, we also reviewed certain investment-related financial activity presented in the financial statements and notes to the financial statements for the State of Minnesota and the three state retirement systems. This activity included, but was not limited to, investment balances, investment fees, and securities lending.

On December 16, 2022, we issued an unqualified (clean) opinion on the State of Minnesota's *Annual Comprehensive Financial Report* for the fiscal year ended June 30, 2022. In addition, we issued an unqualified (clean) opinion on the financial statements of each of the three state retirement systems. We also provided the state and the three state retirement systems with a report on the internal control over financial reporting. For the fiscal year ending June 30, 2022, we had no written findings or recommendations directed toward the Minnesota State Board of Investment.

We appreciate the cooperation and assistance provided by the staff and administration of the Minnesota State Board of Investment throughout our audit process.

Sincerely,

A handwritten signature in black ink, appearing to read 'V. Stone'.

Valentina Stone, CPA
Audit Director

Cc: Members, Minnesota State Board of Investment
Paul Anderson, Director, Financial Services and Operations

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TAB C

Private Markets Program Report

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DATE: February 14, 2023

TO: Members, Investment Advisory Council

FROM: SBI Staff

SUBJECT: Private Markets Commitments for Consideration

Staff has reviewed the following action agenda item:

- A. Status of SBI Current Private Markets Commitments
- B. Consideration of New Investment commitments

Existing Managers:

Private Equity	Goldner Hawn	Goldner Hawn VIII	up to \$100 Million
Private Equity	Hellman & Friedman	HFCP XI	up to \$200 Million
Private Equity	Paine Schwartz	Paine Schwartz Food Chain VI	up to \$150 Million
Private Equity	Windjammer	Windjammer Capital VI	up to \$200 Million
Private Credit	Marathon	MDCF II	up to \$250 Million
Real Assets	ECP	ECP V	up to \$200 Million
Real Estate	Angelo, Gordon & Co.	AG Asia Realty Fund V	up to \$100 Million
Real Estate	TA Realty	Realty Associates XIII	up to \$200 Million

SBI action is required on item B.

A. Status of SBI Current Private Markets Commitments

Minnesota State Board of Investment Combined Funds December 31, 2022

Combined Funds Market Value \$80,120,052,361

	% of Combined Funds	Current Level	Target Level ¹	Difference
Market Value (MV)	25.4%	\$20,362,986,293	\$20,030,013,090	(\$332,973,203)
Policy Target	25%			
Statutory Limit	35%			
MV + Unfunded	39.7%	\$31,786,970,057	\$36,054,023,562	\$4,267,053,506
Policy Limit	45.0%			

Asset Class	% of Combined Funds	Market Value	Unfunded Commitment	Total
Private Equity	18.1%	\$14,500,597,097	\$7,702,932,575	\$22,203,529,673
Private Credit	2.1%	\$1,693,120,337	\$1,512,993,136	\$3,206,113,473
Real Assets	2.8%	\$2,203,516,896	\$526,857,210	\$2,730,374,106
Real Estate	2.4%	\$1,933,815,139	\$1,681,200,842	\$3,615,015,981
Other ²		\$31,936,824		\$31,936,824
Total		\$20,362,986,293	\$11,423,983,764	\$31,786,970,057

Cash Flows December 31, 2022

Calendar Year	Capital Calls	Distributions	Net Invested
2022	\$3,945,092,895	(\$3,140,446,870)	\$804,646,025
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.

B. Consideration of New Investment Commitments

ACTION ITEMS:

1) Investment with an existing private equity manager, Goldner Hawn, in Goldner Hawn Fund VIII (“Fund VIII”).

Goldner Hawn Fund VIII will seek to make equity investments in lower middle market businesses with a strong regional focus on the Midwest. Investments will typically total \$20-40 million per transaction with overall company enterprise values generally ranging from \$50-250 million. Goldner Hawn expects Fund VIII to continue the firm’s value-oriented approach to investing with an emphasis on sourcing investments by partnering with business owners and management and creating portfolio company value through a variety of operational initiatives post-acquisition. Fund VIII investments will be diversified across industrials, specialty manufacturing, value-added distribution, and business services.

In addition to reviewing the attractiveness of the Goldner Hawn Fund VIII investment opportunity, staff conducted appropriate due diligence including but not limited to, reference checks, database searches, and, to the extent available, a review of the Fund’s potential investor base. Staff’s diligence process will continue as additional data and documentation become available.

More information on Goldner Hawn Fund VIII is included as **Attachment A beginning on page 11.**

RECOMMENDATION:

Staff is recommending a commitment of up to \$100 million to Goldner Hawn Fund VIII and requests the IAC’s endorsement of this recommendation for the Board’s approval. It is understood that 1) such a commitment will not exceed 20% of Goldner Hawn Fund VIII and 2) an additional amount not to exceed one percent of the total commitment for the payment of required charges at closing may be required and is approved. 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 Goldner Hawn 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 Goldner Hawn or a reduction or termination of the commitment.

2) Investment with an existing private equity manager, Hellman & Friedman LLC (“H&F”), in Hellman & Friedman Capital Partners XI (“Fund XI”).

Hellman & Friedman Capital Partners XI will seek to make equity-related investments mainly in the \$400 million to \$4 billion, primarily in the U.S. and Western Europe. The Firm

targets investments in mid to large-cap companies, depending on where it believes it can find the most compelling opportunities. H&F specifically targets high quality growth businesses where it believes deep sector expertise and bespoke value creation plans can make a significant difference to the trajectory of the company. Once H&F acquires a business, the Firm works to add value as a knowledgeable working business partner actively assisting portfolio company management with major strategic and financial initiatives. The firm operates in technology, healthcare, consumer services & retail, financial services, and information, content, and business services sectors.

In addition to reviewing the attractiveness of the Hellman & Friedman Capital Partners XI investment opportunity, staff conducted appropriate due diligence including but not limited to, reference checks, database searches, and, to the extent available, a review of the Fund's potential investor base. Staff's diligence process will continue as additional data and documentation become available.

More information on Hellman & Friedman Capital Partners XI is included as **Attachment B beginning on page 15.**

RECOMMENDATION:

Staff is recommending a commitment of up to \$200 million to Hellman & Friedman Capital Partners Fund XI and requests the IAC's endorsement of this recommendation for the Board's approval. It is understood that 1) such a commitment will not exceed 20% of Hellman & Friedman Capital Partners Fund XI and 2) an additional amount not to exceed one percent of the total commitment for the payment of required charges at closing may be required and is approved. 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 Hellman & Friedman 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 Hellman & Friedman or a reduction or termination of the commitment.

3) Investment with an existing private equity manager, Paine Schwartz Partners, LLC ("Paine Schwartz"), in Paine Schwartz Food Chain VI, L.P. ("Fund VI").

Paine Schwartz Food Chain Fund VI will continue to make investments in the global food and agribusiness sectors which, despite attractive industry fundamentals, are currently underserved by private equity firms. Consistent with the Fund V strategy, Fund VI will focus on sustainable food chain investing, adopting a proactive, thesis-driven approach to identify value-added and differentiated companies primarily in the upstream segments of the value chain. Fund VI will target businesses headquartered in Organisation for Economic Cooperation and Development (OECD) countries, while seeking to limit overall exposure to

developing markets. Once the Fund makes an investment, the Firm will seek to leverage its extensive domain expertise to create value and position each investment for exit by recruiting experienced senior talent, expanding into new geographic markets, broadening customer bases, and executing on M&A opportunities.

In addition to reviewing the attractiveness of the Paine Schwartz Food Chain VI Fund investment opportunity, staff conducted appropriate due diligence including but not limited to, reference checks, database searches, and, to the extent available, a review of the Fund's potential investor base. Staff's diligence process will continue as additional data and documentation become available.

More information on Paine Schwartz Food Chain VI Fund is included as **Attachment C beginning on page 19.**

RECOMMENDATION:

Staff is recommending a commitment of up to \$150 million to Paine Schwartz Food Chain Fund VI and requests the IAC's endorsement of this recommendation for the Board's approval. It is understood that 1) such a commitment will not exceed 20% of Paine Schwartz Food Chain Fund VI and 2) an additional amount not to exceed one percent of the total commitment for the payment of required charges at closing may be required and is approved. 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 Paine Schwartz Partners 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 Paine Schwartz Partners or a reduction or termination of the commitment.

4) Investment with an existing private equity manager, Windjammer Capital Investors ("Windjammer") in Windjammer Capital Fund VI, L.P. ("Fund VI").

Windjammer Capital Fund VI will to continue to execute the Firm's tested investment strategy and remain a disciplined investor focusing on high quality, leading middle-market businesses and creating value during its ownership by serving as an engaged, transformative partner in close cooperation with management. The Fund intends to invest in advanced manufacturing, specialty distribution, and business service companies that operate in a diverse set of niche industries and generate \$10 million to \$50 million in operating profit. Fund VI is expected to seek opportunities that satisfy the Firm's rigorous capital preservation standards and also offer attractive levers for growth and value-creation, which can be realized through targeted strategic and tactical initiatives led by the Firm's deal teams.

In addition to reviewing the attractiveness of the Windjammer Capital Fund VI investment opportunity, staff conducted appropriate due diligence including but not limited to, reference checks, database searches, and, to the extent available, a review of the Fund's potential investor base. Staff's diligence process will continue as additional data and documentation become available.

More information on Windjammer Capital Fund VI is included as **Attachment D beginning on page 23.**

RECOMMENDATION:

Staff is recommending a commitment of up to \$200 million to Windjammer Capital Fund VI and requests the IAC's endorsement of this recommendation for the Board's approval. It is understood that 1) such a commitment will not exceed 20% of Windjammer Capital Fund VI and 2) an additional amount not to exceed one percent of the total commitment for the payment of required charges at closing may be required and is approved. 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 Windjammer Capital Investors 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 Windjammer Capital Investors or a reduction or termination of the commitment.

5) Investment with an existing private credit manager, Marathon Asset Management ("Marathon"), in Marathon Distressed Credit Fund II, L.P. ("MDCF II").

Marathon Distressed Credit Fund II will seek to construct a portfolio of distressed, dislocated, and restructuring corporate credit opportunities in complex situations with attractive risk-adjusted return characteristics. Core holdings of the Fund will include bankruptcy reorganizations, liquidations, rescue lending, distressed exchanges, debtor-in-possession financings, and dislocated credit. In addition, MDCF II includes investor favorable terms that protect against undue capital allocation in the absence of sufficient opportunities.

In addition to reviewing the attractiveness of the MDCF II investment opportunity, staff conducted appropriate due diligence including but not limited to, reference checks, database searches, and, to the extent available, a review of the Fund's potential investor base. Staff's diligence process will continue as additional data and documentation become available.

More information on MDCF II is included as **Attachment E beginning on page 27.**

RECOMMENDATION:

Staff is recommending a commitment of up to \$250 million to Marathon Distressed Credit Fund II VI and requests the IAC's endorsement of this recommendation for the Board's approval. It is understood that 1) such a commitment will not exceed 20% of Marathon Distressed Credit Fund II and 2) an additional amount not to exceed one percent of the total commitment for the payment of required charges at closing may be required and is approved. 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 Marathon Asset Management 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 Marathon Asset Management or a reduction or termination of the commitment.

6) Investment with an existing Real Asset manager, ECP, in ECP V ("Fund V").

ECP Fund V will continue the Firm's investment strategy of making value-added, primarily control investments in existing and new-build energy infrastructure projects, mainly in North America. Specifically, ECP intends to primarily focus on power and renewable generation, energy-related environmental infrastructure assets and related energy services with the notable exclusion of oil and gas exploration and production. Fund V will make between 10 and 15 investments, with an average equity commitment per transaction of \$250 million to \$750 million.

In addition to reviewing the attractiveness of the ECP V investment opportunity, staff conducted appropriate due diligence including but not limited to, reference checks, database searches, and, to the extent available, a review of the Fund's potential investor base. Staff's diligence process will continue as additional data and documentation become available.

More information on ECP V is included as **Attachment F beginning on page 31.**

RECOMMENDATION:

Staff is recommending a commitment of up to \$200 million to ECP V and requests the IAC's endorsement of this recommendation for the Board's approval. It is understood that 1) such a commitment will not exceed 20% of ECP V and 2) an additional amount not to exceed one percent of the total commitment for the payment of required charges at closing may be required and is approved. 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 ECP 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 ECP or a reduction or termination of the commitment.

7) Investment with an existing Real Estate manager, Angelo, Gordon & Co. (“Angelo Gordon”), in AG Asia Realty Fund V (“Fund V”).

AG Asia Realty Fund V will seek to make opportunistic investments in real estate in Asia. The Fund will continue Angelo Gordon’s approach of investing across a broad range of geographical markets and product types. Fund V will emphasize the purchase of underperforming and troubled real estate assets from owners who lack the capital, patience, or expertise to improve cash flow and value. The assets are often attractively priced due to an inefficiency of the sale process, unique attributes of the asset or the seller’s need for near-term liquidity. The Fund will also target high margin development opportunities that meet the growing needs of the region’s large population.

In addition to reviewing the attractiveness of the AG Asia Realty Fund V investment opportunity, staff conducted appropriate due diligence including but not limited to, reference checks, database searches, and, to the extent available, a review of the Fund’s potential investor base. Staff’s diligence process will continue as additional data and documentation become available.

More information on AG Asia Realty Fund V is included as **Attachment G beginning on page 35.**

RECOMMENDATION:

Staff is recommending a commitment of up to \$100 million to AG Asia Realty Fund V and requests the IAC’s endorsement of this recommendation for the Board’s approval. It is understood that 1) such a commitment will not exceed 20% of AG Asia Realty Fund V and 2) an additional amount not to exceed one percent of the total commitment for the payment of required charges at closing may be required and is approved. 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 Angelo, Gordon & Co. 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 Angelo, Gordon & Co. or a reduction or termination of the commitment.

8) Investment with an existing real estate manager, TA Realty, in The Realty Associates Fund XIII (“Fund XIII”).

Realty Associates Fund XIII will continue the strategy of making real estate investments in the U.S. diversified by property type, geography, industry exposure, and tenancy. The Firm's three decades of experience in acquiring, managing, and selling real estate across the U.S. provides the firm with a unique perspective and ability to identify opportunities and execute an investment strategy focused on adding value at the property level. TA Realty seeks middle market real estate investments with characteristics that allow them to add value over time, maximizing both income and property value while also protecting cash flow and moderating overall portfolio risk.

In addition to reviewing the attractiveness of The Realty Associates Fund XIII investment opportunity, staff conducted appropriate due diligence including but not limited to, reference checks, database searches, and, to the extent available, a review of the Fund's potential investor base. Staff's diligence process will continue as additional data and documentation become available.

More information on The Realty Associates Fund XIII is included as **Attachment H beginning on page 39.**

RECOMMENDATION:

Staff is recommending a commitment of up to \$200 million to Realty Associates Fund XIII and requests the IAC's endorsement of this recommendation for the Board's approval. It is understood that 1) such a commitment will not exceed 20% of Realty Associates Fund XIII and 2) an additional amount not to exceed one percent of the total commitment for the payment of required charges at closing may be required and is approved. 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 TA Realty 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 TA Realty or a reduction or termination of the commitment.

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ATTACHMENT A

PRIVATE EQUITY MANAGER SUMMARY PROFILE

I. Background Data

<i>Name of Fund:</i>	Goldner Hawn Fund VIII, L.P.
<i>Type of Fund:</i>	Limited Partnership
<i>Target Fund Size:</i>	\$350 Million
<i>Fund Manager:</i>	Goldner Hawn
<i>Manager Contact:</i>	Joseph Heinen Goldner Hawn 90 South Seventh Street, Suite 3700 Minneapolis, MN 55402

II. Organization and Staff

Goldner Hawn (the "Firm") has formed Goldner Hawn Fund VIII, L.P. ("Fund VIII" or the "Fund") to continue its strategy of making equity investments in lower middle market businesses with a strong regional focus on the Upper Midwest. Fund VIII will be managed by Jason Brass, Chadwick Cornell, Joseph Heinen, Peter Settle, and Andrew Tomashek.

Goldner Hawn (formerly Goldner Hawn Johnson and Morrison) was founded in 1989 and currently has offices in Cincinnati, Ohio, and its headquarters in Minneapolis, Minnesota. The Firm has approximately 13 employees, including 4 Partners who have an average of 15 years with the Firm. The team has experience outside of private equity investing in such areas as C-suite operating roles, transaction diligence advisory, corporate development, senior lending, legal counsel, and investment banking. Goldner Hawn is currently employee-owned and is committed to improving their ESG and DEI efforts at Goldner Hawn and across their portfolio companies.

III. Investment Strategy

Fund VIII intends to maintain a consistent approach and investment strategy the firm has employed in generating returns for investors for the past three decades. The firm intends to invest the Fund in approximately 8 to 10 platform investments. The Fund intends to lead change of control transactions and recapitalizations. Goldner Hawn expects to focus on primarily making equity investments, typically totaling \$20 million to \$40 million per transaction, with overall company enterprise values generally ranging from \$50 million to \$250 million. However, any particular investment may fall outside of these ranges. Similar to the Firm's prior funds, Fund VIII intends to continue to have a strong regional focus in the Midwest. Goldner Hawn believes that the Midwest has many attractive lower-middle-market companies and is underpenetrated by private equity firms. Goldner Hawn expects the Fund's

investments to be diversified across several industries, such as industrial and specialty manufacturing, value-added distribution, and business services. Goldner Hawn believes that a diversified investment approach is optimal considering the investment period for the Fund and the likelihood that the risk-reward characteristics of various industry sectors may vary over this period. Although the Fund will ultimately aim to have a portfolio diversified across industry sectors, it may be concentrated in any one sector at times.

Goldner Hawn has consistently organized its investment efforts around several core investment disciplines and believes that Fund VIII will benefit from the Firm's continued adherence to these tenets:

- An emphasis on sourcing investments in which the firm partners with business owners and management on an "advantaged" or proprietary basis, thereby facilitating positive transaction dynamics.
- A value-oriented approach to investing, which the firm believes is increasingly essential to maximizing risk-adjusted investment returns. Goldner Hawn believes they have successfully invested in companies at attractive market valuation multiples. A rigorous vetting of the firm's investment thesis and careful risk management enables them to access opportunities with favorable risk and reward profiles.
- Maintaining the Firm's internal investment processes that effectively deploy the diverse financing and operating capabilities and extensive experience of the investment team. Investment decisions made by the Firm require unanimous approval from the Fund's Investment Committee members.
- A demonstrated approach to creating portfolio company value through a variety of means, including improving or augmenting management teams when needed; identifying and executing add-on acquisitions; facilitating new strategic initiatives; solving internal company issues that previously detracted from company value; and timing and managing the exits of the Fund's portfolio company investments.

IV. Investment Performance

Previous fund performance as of September 30, 2022 for Goldner Hawn is shown below:

Fund	Vintage Year	Total Commitment	SBI Investment	Net IRR	Net MOIC	Net DPI
GHJM Marathon Fund IV*	1999	\$200,000,000	\$40,000,000	8.4%	1.4	1.4x
GHJM Marathon Fund V*	2005	\$254,250,000	\$50,000,000	12.2%	1.9	1.9x
GHJM Trailhead Fund**(***)	2012	\$100,000,000	\$20,000,000	20.4%	3.4	3.1x
Goldner Hawn Fund VII***	2019	\$288,775,688	\$57,755,138	31.3%	1.5	0.6x

Previous fund investments are not indicative of future results. Goldner Hawn provided net IRR and Net MOIC.

* Funds IV and V are fully liquidated and are not part of the offering materials of Goldner Hawn Fund VIII.

** Represents private capital in an SBIC fund. Total commitments, including debentures, totaled \$250,000,000.

*** As of September 30, 2022. Fund VII's return is based on the standard management fee.

V. Investment Period and Term

The investment period of the fund will commence on the initial closing date and end on the fifth anniversary of the final closing date, and a ten-year term, with the possibility of up to three one-year extensions.

This document is a summary of more detailed information provided in the Fund's Confidential Private Placement Memorandum (the "PPM"). It is qualified in its entirety by the more detailed information provided in the PPM and the Limited Partnership Fund Agreement.

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ATTACHMENT B

PRIVATE EQUITY MANAGER SUMMARY PROFILE

I. Background Data

<i>Name of Fund:</i>	Hellman & Friedman Capital Partners XI, L.P.
<i>Type of Fund:</i>	Private Equity – Buyout
<i>Target Fund Size:</i>	\$23 billion
<i>Fund Manager:</i>	Hellman & Friedman LP
<i>Manager Contact:</i>	Suzanne Kim 415 Mission Street, Suite 5700 San Francisco, CA 94105

II. Organization and Staff

Hellman & Friedman LLC, a subadvisor to Hellman & Friedman LP (collectively with Hellman & Friedman LP, the “Firm” or “H&F”) is raising Hellman & Friedman Capital Partners XI, L.P. (collectively with any of its parallel funds, “HFCP XI” or the “Fund”) to continue H&F’s history of making large-scale private equity investments in high quality, growing businesses in the developed markets. Since inception, H&F has invested over \$60 billion in more than 110 companies.

Hellman & Friedman was founded in 1984 by Warren Hellman and Tully Friedman. Since the firm’s inception, H&F has been exclusively focused on private equity through a single private equity strategy. The firm has over 70 investment professionals and approximately 150 employees in total across three offices – San Francisco, New York, and London.¹

H&F is committed to a diverse and inclusive working environment both at the Firm itself and at its portfolio companies. The Firm is a founding member and signatory of the ILPA Diversity in Action Initiative, which aims to advance diversity, equality and inclusion, and is actively involved with a range of other initiatives including Junior Women in Private Equity, Private Equity Women Investor Network (“PeWin”), the Women’s Private Equity Summit, and PE HR Network. At portfolio companies, H&F is actively involved in holding management teams accountable for culture and DEI through measuring KPIs and communicating outcomes to ensure continuous improvement and promoting transparency.

¹ As of July 1, 2022.

III. Investment Strategy

H&F's strategy is to focus its resources on the private equity market. The firm concentrates its people in small teams on what it believes are the best companies and industries that meet the Firm's investment criteria. The Firm believes its disciplined investment philosophy and process give it a competitive advantage. H&F's well-articulated and analytical investment philosophy is applied rigorously and embraced by its investment professionals.

In Fund XI, H&F is focused on making equity-related investments mainly in the \$400 million - \$4 billion equity check range, and primarily in the U.S. and developed countries outside the U.S. The Firm targets investments in mid to large-cap companies, depending on where it believes it can find the most compelling opportunities. The Firm operates in the following sectors: Technology, Healthcare, Consumer Services & Retail, Financial Services, and Information, Content, & Business Services. H&F generally prefers to make fewer, larger investments to concentrate resources on the Firm's best ideas.

H&F specifically targets high quality growth businesses where it believes deep sector expertise and bespoke value creation plans can make a significant difference to the trajectory of the company. These businesses typically have leading and defensible competitive market positions resulting typically from one or more of the following attributes: strong brand names; long-standing customer relationships; high market share; structural low-cost position; barriers to entry; and/or superior distribution systems. Further, H&F typically seeks to identify businesses with strong economic profiles, which may include predictable recurring or re-occurring revenues and the ability to generate high levels of free cash flow or attractive returns on invested capital.

Once H&F acquires a business, the Firm works to add value as a knowledgeable working business partner actively assisting portfolio company management with major strategic and financial initiatives. The Firm has developed expertise in sponsoring and leading growth initiatives at its portfolio companies across a range of areas, including marketing and customer acquisition, customer retention, new product development, expansion in go-to-market resources, digital transformation, and strategic acquisitions. The H&F investment team also leverages the in-house Operating Group, which are people with deep industry, private equity, and value creation expertise, and the in-house Specialists, which have expertise in the areas of legal, tax, and capital markets.

H&F believes ESG considerations are ingrained in H&F's culture. Importantly, H&F does not view ESG considerations as being separate or additional to its core analysis - the Firm believes that ESG factors are a fundamental component of any company's long-term sustainability. Topics like climate change, energy efficiency, board alignment, DEI (Diversity, Equity & Inclusion), cybersecurity and data privacy, and corporate accountability are interwoven into its evaluation of potential investments. H&F adopted its own internal Responsible Investment Policy in 2011 to formally integrate ESG into its investment process and has adopted the American Investment Council's Guidelines for Responsible Investment. Overall responsibility for overseeing, monitoring and periodically reviewing H&F's ESG Policy rests with H&F's ESG Committee, which is currently comprised of H&F's CEO, Head of Sustainability & ESG, and ESG Executive Sponsor.

IV. Investment Performance

Previous fund performance as of September 30, 2022 for the prior H&F Capital Partners (HFCP) funds is shown below:

Fund	Vintage Year	Total Commitments	SBI Investment	Net IRR*	Net MOIC*	Net DPI*
HFCP	1987	\$327 million	--	12%	2.1x	2.1x
HFCP II	1991	\$877 million	--	22%	2.7x	2.7x
HFCP III	1995	\$1.5 billion	\$40 million	34%	2.3x	2.3x
HFCP IV	2000	\$2.2 billion	\$150 million	34%	2.8x	2.8x
HFCP V	2004	\$3.5 billion	\$160 million	28%	2.7x	2.7x
HFCP VI	2006	\$8.4 billion	\$175 million	13%	1.9x	1.9x
HFCP VII	2011	\$8.9 billion	\$50 million	25%	3.3x	3.1x
HFCP VIII	2016	\$11.1 billion	--	16%	1.7x	0.5x
HFCP IX	2019	\$16.5 billion	\$175 million	11%	1.2x	0.1x
HFCP X	2021	\$24.4 billion	\$250 million	NM	0.9x	0.1x

* Previous Fund investments may be relatively immature and returns may not be indicative of future results.

V. Investment Period and Term

Fund XI will have a six-year investment period and a ten-year term, subject to a two-year extension with the approval of a majority in interest of the Limited Partners or the advisory board of HFCP XI. Any additional extensions of the term will require the approval of a majority in interest of the Limited Partners.

This document is a summary of certain more detailed information provided in the Confidential Private Placement Memorandum and other materials on the Hellman & Friedman Capital Partners XI data site (the “Materials”). It is qualified in its entirety by the more detailed information and disclosures provided in the Materials.

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ATTACHMENT C

PRIVATE EQUITY MANAGER SUMMARY PROFILE

I. Background Data

<i>Name of Fund:</i>	Paine Schwartz Food Chain Fund VI, L.P.
<i>Type of Fund:</i>	Private Equity Limited Partnership
<i>Target Fund Size:</i>	\$1.5 billion
<i>Fund Manager:</i>	Paine Schwartz Partners, LLC
<i>Manager Contact:</i>	Natalya Michaels 475 Fifth Ave 17 th Floor New York, NY 10017

II. Organization and Staff

Paine Schwartz Food Chain Fund VI, L.P. (“Fund VI”) is being established by Paine Schwartz Partners, LLC (“the Firm”) to make control buy-out and growth investments in the global food and agribusiness sectors, which, despite attractive industry fundamentals, are currently underserved by private equity firms. Fund VI will follow an investment strategy consistent with that of Paine Schwartz Food Chain Fund V, which uses a thesis-driven approach to invest in proprietary and complex transactions, and leverages the investing and operating backgrounds of the Firm’s professionals to drive value creation. To date, Paine Schwartz Partners, together with the Predecessor Firm, has made 28 platform investments in the food and agribusiness sectors along with 52 add-on transactions.

The Fund will be led by managing partners Kevin Schwartz, CEO and Angelos Dassios, CIO. Messrs. Schwartz and Dassios are joined at the senior level by Partners Alex Corbacho, Dr. Lutz Goedde and supported by the Firm’s Chairman, Dexter Paine. The Executive Team has collaborated on investments for over 20 years. Paine Schwartz Partners was co-founded in 2006 by Messrs. Paine and Schwartz. The Predecessor Firm¹ was co-founded by Mr. Paine in 1997. The Paine Schwartz Partners team includes approximately 50 investment, operations, and finance professionals, who in conjunction with the Firm’s Operating Directors and Food Chain Advisory Board (FCAB) members, represent over 500 combined years of experience in the food and agribusiness industries.

The Firm has partnered with a leading consulting firm to augment its industry trends research. The Firm believes that this research will enable Fund VI to identify attractive investments and create value for its portfolio companies. Fund VI will also utilize the

¹ In 1997 W. Dexter Paine, III co-founded a private equity firm known as Fox Paine & Company (the “Predecessor Firm”). Kevin Schwartz was a Managing Director at the Predecessor Firm before co-founding Paine Schwartz Partners with Dexter Paine.

Firm's Food Chain Advisory Board (FCAB) as an additional resource. The FCAB is made up of six independent executives with extensive experience in the food and agribusiness industries.

The Firm is committed to increasing awareness of Diversity, Equity and Inclusion ("DE&I") both within the Firm and its portfolio companies and believes it has made substantial progress over the past several years. The Firm believes diversity, equity and inclusion improve collaboration and decision making, nurtures a sense of shared environment and ultimately results in better investment outcomes.

III. *Investment Strategy*

Fund VI will focus on investment opportunities in the global food and agribusiness sectors. Consistent with the Fund V strategy, Fund VI will focus on sustainable food chain investing, adopting a proactive, thesis-driven approach to identify value-added and differentiated companies primarily in the upstream segments of the value chain. Fund VI will target businesses headquartered in Organisation for Economic Cooperation and Development (OECD) countries, seeking to limit overall exposure to developing markets. Once the Fund makes an investment, the Firm will leverage its extensive domain expertise to create value and position each investment for exit by recruiting experienced senior talent, expanding into new geographic markets, broadening customer bases, and executing on M&A opportunities.

There are several key aspects to the Paine Schwartz Partners investment strategy:

Focus on Attractive, Underserved Food and Agribusiness Sectors

The Firm believes these sectors provide attractive investment opportunities as global demand for food is rising due to population growth, rising wealth, and changing diets, while at the same time supply is increasingly challenged. Limitations to productivity, climate change, degradation of land and stressed water supplies are all factors that contribute to a supply-demand imbalance that is expected to widen in the future. Furthermore, the food and agriculture sectors have relatively low private equity participation and analyst coverage relative to their size in the overall economy.

Proactive, Thesis-Driven Approach to Idea Generation and Sourcing

Paine Schwartz Partners seeks to identify attractive investment opportunities in the food and agribusiness sectors through several different avenues, including: extensive primary research in identifying macro trends and conducting "deep dives" on specific industry segments; hosting industry conferences as well as staff off-sites; building upon the experience of the Firm's existing operating director network and Food Chain Advisory Board; capitalizing on the Firm's unique partnership with a leading consulting firm; and leveraging a deep network of industry companies and CEOs.

Hands-On and Active Ownership Approach

The Investment Team expects to take a hands-on approach with each investment, seeking to add value through active board seat participation and leadership on critical decision-making. The Investment Team, along with the Food Chain Advisory Board, believes that it has the integrated experience and networks to effectuate this strategy, possessing significant, combined expertise in areas such as R&D, intellectual property, regulatory, product commercialization, strategic planning and business development, among others. Further, the Fund will employ its Portfolio Excellence Platform (“PEP”) to strategically seek to add value at the portfolio company level. PEP is an in-house team that provides a broad range of operational services to portfolio companies, from management team to IT systems enhancements.

Paine Schwartz Partners believes that day-to-day management of ESG issues will help protect its portfolio from risk while enhancing the value of its investments. The Firm accomplishes this by taking a proactive ESG approach with its underlying portfolio companies, as well as reporting on ESG annually and highlighting the Firm’s approach to responsible investment and ESG performance across the portfolio. The Firm is a signatory of the United Nations Principles for Responsible Investment (“UN PRI”) and a supporter of the Task Force on Climate-related Financial Disclosures (“TCFD”). The Firm’s investment thesis aligns with the UN Sustainable Development Goals (“SDG”)

IV. Investment Performance

Performance for prior funds is presented as of 09/30/22 below:

Fund	Vintage Year	Total Commitments	SBI Investment	Net IRR*	Net MOIC*	Net DPI*
Fund I **	1998	\$509 million	\$40 million	7%	1.4x	1.4x
Fund II **	2000	\$1.0 billion	\$50 million	33%***	2.1x***	1.2x***
Fund III	2006	\$1.2 billion	N/A	2%	1.1x	1.0x
Fund IV	2015	\$893 million	\$75 million	9%	1.4x	0.5x
Fund V	2019	\$1.4 billion	\$150 million	31%	1.4x	0.2x

* Net IRR, Multiple of Invested Capital (MOIC) and Distributed to Paid In (DPI) were provided by the General Partner as of the aforementioned dates. All information excludes co-investments.

** Funds I and II were managed by the Predecessor Firm.

*** Paine & Partners professionals ceased management of Fund II as of 12/31/2007. Performance is presented through 12/31/2017 based on valuations provided by the General Partner.

Performance for food and agribusiness investments, aggregated across Funds II-IV is presented below:

Fund	Number of Investments	Total Invested Capital	Net IRR*	Net MOIC*
Funds II-IV	28 platforms w/ 52 add-ons	\$4.1 billion	21%	1.5x

* Net IRR and Multiple of Invested Capital (MOIC) were estimated per SEC guidelines and were provided by the General Partner.

V. *Investment Period and Term*

The investment period of the Fund will end five years from the final closing. The term of the Fund will terminate on the tenth anniversary of the date of the final closing but may be extended for up to a maximum of two consecutive one year periods with the approval of the Advisory Board.

This document is a summary of more detailed information provided in the Confidential Private Placement Memorandum (the “PPM”). It is qualified in its entirety by the more detailed information provided in the PPM.

ATTACHMENT D

PRIVATE EQUITY MANAGER SUMMARY PROFILE

I. Background Data

<i>Name of Fund:</i>	Windjammer Capital Fund VI, L.P.
<i>Type of Fund:</i>	Private Equity – Buyout
<i>Target Fund Size:</i>	\$1.0 billion
<i>Fund Manager:</i>	Windjammer Capital Investors
<i>Manager Contact:</i>	Greg Bondick Windjammer Capital Investors 890 Winter Street Waltham, MA 02451

II. Organization and Staff

Windjammer Capital Investors (the “Firm” or “Windjammer”) is forming Windjammer Capital Fund VI, L.P. (the “Partnership” or “Fund V”) to continue Windjammer’s history of investing in middle-market businesses. It marks the Firm’s sixth institutional fund since its founding in 1990 and its fourth fund since the realignment of its investment focus to emphasize control equity in 2006. Windjammer intends to continue to execute its tested investment strategy and remain a disciplined investor focusing on high quality, leading middle-market businesses and creating value during its ownership by serving as an engaged, transformative partner in close cooperation with management.

The firm is led by Gregory Bondick and Jeffrey Miehle (the “Managing Principals”), who have been partners together at Windjammer for the past 15 years and collectively have an average of 30 years of investment, management, and advisory experience in the private equity and corporate finance industries. The Managing Principals are supported by 15 investment and operations professionals. Windjammer has offices in Newport Beach, California and Waltham, Massachusetts. Windjammer is committed to improving DEI internally and actively looks to add diversity to its Firm.

III. Investment Strategy

Windjammer is forming Fund VI to create a unique portfolio of control equity investments in leading middle-market companies that are expected to share a core set of high performance attributes. The Fund intends to invest in advanced manufacturing, specialty distribution and business service companies that operate in a diverse set of niche industries and generate \$10 million to \$50 million in operating profit. Fund VI is expected to seek opportunities that satisfy the Firm’s rigorous capital preservation standards and also offer attractive levers for growth and value-creation, which can be realized through targeted strategic and tactical initiatives led by the Firm’s deal teams.

The foundation of the Firm's investment strategy is its emphasis on asset selection with a focus on capital preservation, which is consistently reinforced in its sourcing, diligence, and approval protocols. The Firm's investment selection process focuses on a set of embedded characteristics that have been effective indicators for sustainable differentiation among high quality, resilient businesses based on the Firm's past experience. Windjammer uses its diligence protocols to further identify those high quality middle-market business models that also offer discernable and actionable unexploited value creation opportunities that are consistent with its own resource capabilities and achievable within the envisioned holding period. Windjammer expects that Fund VI's platform will meet a majority of the following characteristics:

- *Significant, Defensible Market Position*: the target company is a significant and embedded participant in a niche market with strong barriers to entry.
- *Favorable Industry Growth and Profitability Characteristics*: the target company operates in a mature and growing industry, typically growing faster than GDP due to the underlying demand drivers.
- *Mission Critical Products*: the target company provides customers with a mission critical, proprietary product or service that offers high value-to-cost benefits for customers.
- *Strong Core Management / Organizational Teams*: most management teams have a demonstrated track record of success, but Windjammer has been successful in developing and complementing management teams through the addition of new leadership in line with the go-forward growth strategy or enhancement of key functional areas with either internal reorganization or outside recruitments.
- *Predictable Cash Flow*: the target company has predictable cash flows based upon the underlying demand drivers of its products.
- *Value Creation Opportunities*: typical platforms have established strong and resilient market positions that historically translated into sufficient cash flows and distributions to prior ownership.
- *RONA Benchmark*: the target company has historically generated a minimum return on net assets (RONA) in excess of 25%

The second key pillar to the Firm's investment strategy and success is its dedication of considerable time, resources and prior experience in driving value creation programs at each platform investment. These customized core initiatives are developed and executed by its deal teams that consist of both investment staff and Operating Directors in alignment with company management with an emphasis on focused and urgent execution. The initiatives are customized and incorporate all aspects of the business including, but not limited to: (i) revenue enhancement programs; (ii) operational improvement initiatives; and (iii) management team and board upgrades.

ESG factors play an important role at the Firm. Windjammer adopted an ESG policy that is intended to reflect the Firm's general framework for managing ESG issues through the lifecycle of an investment. When conducting diligence on a prospective company, Windjammer has a 13-point ESG checklist that it reviews with company management. The Firm has recently created a Chief ESG position and is committed to annual training for the members of the team. Additionally, the plans to work with outside resources at the inception of Fund VI to enhance its ESG related due diligence. The Firm also supports the responsible investing guidelines outlined by the American Investment Council.

IV. Investment Performance

Previous fund performance as of September 30, 2022 is shown below:

Fund	Vintage Year	Total Commitments	SBI Investment	Net IRR*	Net MOIC*	Net DPI*
PMI Mezzanine Fund	1995	\$262 million	-	10.2%	1.6x	1.6x
Windjammer Mezzanine & Equity Fund II	2000	\$334 million	\$66.7 million	9.3%	1.5x	1.5x
Windjammer Senior Equity Fund III***	2006	\$574 million	\$75 million	19.7%	2.4x	2.4x
Windjammer Senior Equity Fund IV***	2012	\$726 million	\$100 million	18.5%	2.5x	1.8x
Windjammer Senior Equity Fund V**, ***	2018	\$870 million	\$100 million	22.3%	1.4x	0.0x

* Previous Fund investments may be relatively immature and, therefore, returns may not be indicative of future results. Net IRR and Net MOIC provided by the manager.

** Fund V net DPI will increase to 0.5x based on the cash distribution from the sale of a portfolio company in November 2022.

*** Funds III, IV and V represent the investment strategy that will be continued in Fund VI.

V. Investment Period and Term

The investment period is six years and the term is ten years from the final close, with one additional one-year period at the discretion of the General Partner and up to two further one-year periods at the discretion of the General Partner with the approval of a majority in interest of the Limited Partners.

This document is a summary of more detailed information provided in the Confidential Private Placement Memorandum (the "PPM"). It is qualified in its entirety by the more detailed information provided in the PPM.

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ATTACHMENT E

PRIVATE CREDIT MANAGER SUMMARY PROFILE

I. Background Data

<i>Name of Fund:</i>	MDCF II, L.P.
<i>Type of Fund:</i>	Dislocated & Distressed Corporate Credit
<i>Total Fund Size:</i>	\$2.5 billion
<i>Fund Manager:</i>	Marathon Asset Management, L.P.
<i>Manager Contact:</i>	James Atwater One Bryant Park, 38th Floor New York, New York 10036

II. Organization and Staff

Marathon Asset Management was formed in 1998 by Bruce Richards (Chairman and Chief Executive Officer) and Louis Hanover (Chief Investment Officer), to seek attractive absolute returns through investments in the global credit markets, with long-term goal of building a world-class asset management platform. Marathon's core competency is opportunistic investing in the global corporate, emerging market and structured credit markets based on fundamental, bottom-up research across distinct investment funds, managed vehicles and separate accounts. Marathon Asset Management is a global credit manager with approximately \$20 billion of capital under management as of September 30, 2022. Marathon employs approximately 168 employees globally, approximately 86 of whom are investment professionals. Marathon is headquartered in New York with investment offices in Miami, Los Angeles, London, Luxembourg and Tokyo.

Marathon is owned by the Partners of the Firm, which consist of Bruce Richards (Chairman and Chief Executive Officer), Louis Hanover (Chief Investment Officer), Jamie Raboy (Chief Operating and Chief Risk Officer), Andrew Springer (Head of Structured Credit), Gabriel "Gaby" Szpigiel (Head of Emerging Markets), Andrew Brady (Head of Underwriting & Asset Management for Corporate Credit), Jeff Jacob (Opportunistic Credit Portfolio Manager), Jason Friedman (Global Head of Business Development), Christine Chartouni (Chief Legal Officer) and Blackstone Alternative Asset Management (15% - 20% minority interest). The Principals continue to maintain autonomy over the Investment Manager's business management, operations and investment processes following this transaction.

Marathon believes its clients benefit from differentiated perspectives and experiences available only through the development and commitment to its diverse workforce that collectively promotes an inclusive culture defined by intellectual honesty, strong ethic and teamwork. Marathon's diversity and inclusion approach focuses on career advancement, professional development, and mentoring.

III. Investment Strategy

Marathon will look to construct a portfolio of distressed, dislocated, and restructuring corporate credit opportunities in complex situations with attractive risk-adjusted return characteristics. Core holdings of the Fund will include bankruptcy reorganizations, liquidations, rescue lending, distressed exchanges, debtor-in-possession financings, and dislocated credit. Marathon intends to target investments in stressed and deeply distressed companies that are often going through or preparing for some form of a restructuring process. Marathon's investment team seeks to identify the portion of the capital structure with the greatest asymmetry of potential reward relative to their fundamental view of the risk of the investment and in the context of the most likely outcome of the restructuring process. Marathon often takes an active role in a restructuring process, such as leading creditor's committees, when appropriate to advocate an outcome consistent with their investment view.

Additionally, Marathon will look to invest in dislocated or mispriced capital structures where there is no pending or ongoing credit event, but the price of a particular capital instrument does not reflect Marathon's view of the underlying risk of the investment. These investments may involve outright long-positions in individual loans or securities or investments in multiple parts of a single capital structure that we believe will diverge or converge from their current trading levels.

Marathon seeks to identify corporate credit-related events, such as corporate liability management activities or deleveraging and improving corporate credit profiles that are not reflected in a security or loans trading levels. These types of events could include activities such as new equity capital raises, discounted debt retirements, maturity extension risks or companies experiencing fundamental earnings improvements.

Marathon has been investing in distressed securities since its inception in 1998, over which time the investment team has been responsible for committing over \$30 billion to dislocated investments. Marathon's corporate credit investment team has an average of 20 years of experience investing in bankruptcy reorganizations, dislocated credit, distressed exchanges, rescue loans, debtor-in-possession loans, liquidations and sovereign restructurings.

Since 2008, Marathon has raised over \$10 billion in capital for closed-end draw down vehicles to take advantage of private market opportunities. It has been over 2 years since Marathon raised a dedicated distressed corporate investment vehicle in the U.S. – in December 2020, firm closed Marathon Distressed Credit Fund ("MDCF I"), a drawdown vehicle with approximately \$2.5 billion in commitments. The firm believes the timing is once again ripe for opportunity for strong risk-adjusted returns in distressed corporate credit and is seeking to raise capital at this time for investment in dislocated corporate credit.

Marathon adopted an ESG policy whose core objectives include investing responsibly by adhering to best practices, integrating ESG factors into the investment process when possible and leading by example through their business and culture. Marathon is a signatory to the UN Principles for Responsible Investment (PRI) and are committed to upholding the six principles that govern responsible investment across the world.

Investment Triggers

Marathon may invest up to 50% of its aggregate capital commitments prior to the occurrence of an Investment Trigger (as defined below) but may not invest in excess of 50% of capital commitments, in each case measured at the time of investment, until an Investment Trigger has occurred. Once an Investment Trigger has occurred, the Partnership may continue to make investments in excess of 50% of capital commitments, regardless of whether the criterion of any Investment Trigger continues to be satisfied.

“Investment Trigger” means:

- High Yield spreads for (A) bonds reach a level of +675bps or more based on the Bank of America Merrill Lynch High Yield Index (H0A0 Index, sourced from Bloomberg) or (B) loans reach a level of +675bps or more based on the Morningstar S&P LSTA;
- 33% of bonds in the Bank of America ML High Yield index (H0A0 Index, sourced from Bloomberg) trade at a price of 80% or less of par; or
- The trailing 12 month High Yield (A) bond default rate reaches 4% or higher as reported by Bank of America Merrill Lynch High Yield Index (H0A0 Index, sourced from Bloomberg) or (B) loan default rate reaches 4% or higher as reported by the Morningstar S&P LSTA.

IV. Investment Performance

Previous fund performance as of September 30, 2022 is shown below:

Fund	Vintage Year	Total Commitments	SBI Investment	Net IRR*	Net MOIC*	Net DPI*
Corporate Debt Opportunities Fund	2009	\$400 Million	-	16.7	2.0x	1.9x
Public Private Investment Partnership	2009	\$949 Million	-	24.6%	1.8x	1.7x
European Credit Opportunity I	2011	\$974 Million	-	9.1%	1.3x	1.2x
European Credit Opportunity Fund II	2014	\$1.1 Billion	-	7.9%	1.4x	1.4x
European Credit Opportunity Fund III	2015	\$692 Million	-	9.5%	1.5x	0.47x
Distressed Credit Fund I	2019	\$2.5 Billion	\$200 million	11.4%	1.1x	Still in Investment period

* Previous fund investments are not indicative of future results. Net IRR, Net MOIC and DPI were provided by Marathon Asset Management.

V. Investment Period and Term

The Fund's investment horizon is based on its 30-month Investment Period and 36-month Harvest Period. The conclusion of the Investment Period and/or the Harvest Period may be extended for a one-year period in the sole discretion of the General Partner and for an additional one-year period with the consent of the Advisory Committee.

This document is a summary of more detailed information provided in the Fund's Confidential Private Placement Memorandum (the "PPM"). It is qualified in its entirety by the more detailed information provided in the PPM and the Fund's Agreement of Limited Partnership.

ATTACHMENT F

REAL ASSETS MANAGER SUMMARY PROFILE

I. Background Data

<i>Name of Fund:</i>	ECP V, L.P.
<i>Type of Fund:</i>	Energy Infrastructure
<i>Target Fund Size:</i>	\$4 billion
<i>Fund Manager:</i>	Energy Capital Partners Management, LP
<i>Manager Contact:</i>	Fred Storz 40 Beechwood Road Summit, New Jersey 07901

II. Organization and Staff

Energy Capital Partners (“ECP” or “the Firm”) is forming ECP V, LP (“Fund V” or “the Fund”) to continue the Firm’s investment strategy of making value-added, primarily control investments in existing and new-build energy infrastructure projects, primarily in North America.

ECP was established in 2005 and is led by a team of experienced investment professionals, many of whom have been investing together over the last 20 years or more. ECP’s senior professionals collectively average approximately 20 years of energy industry experience, possess deep industry relationships and have a successful track record of investing in energy infrastructure assets. The Firm has raised more than \$27 billion of committed capital across five private equity funds, two credit funds, two continuation funds and several bespoke co-investment and other investment vehicles.

The Firm is led by founder Douglas Kimmelman, together with Partners, Schuyler Coppedge, Rahman D’Argenio, Murray Karp, Peter Labbat, Tyler Reeder, Andrew Gilbert, Matt DeNichilo, Drew Brown, Matt Delaney and Mahmud Riffat. Since 2005, ECP has grown to a team of 37 investment professionals, 31 additional professionals across compliance, accounting, investor relations and administrative functions, and five senior advisors. ECP is headquartered in Summit, New Jersey, and has offices in San Diego, Houston, New York and Seoul, Korea.

III. Investment Strategy

ECP intends to utilize a disciplined investment approach focused on acquiring and developing primarily controlling interests in high quality assets, contracts and businesses in power generation, renewables, energy storage, environmental infrastructure, and sustainability, efficiency & reliability. Specifically, ECP intends to primarily focus on the following sub-sectors linked to the current mega trends and disruptive themes of energy transition, clean

energy, electrification, decarbonization and sustainability with the notable exclusion of oil and gas exploration, production and midstream:

- Power generation (natural gas as the transition solution)
- Renewables (wind, solar, geothermal, hydro)
- Storage (energy and battery storage and solutions)
- Environmental infrastructure (environmental clean-up, recycling, waste management & beneficial re-use, waste disposal & processing, waste-to-energy); and
- Sustainability, efficiency and reliability (energy efficiency, renewable natural gas, carbon capture, energy-use & supply management, digital infrastructure, hydrogen, and downstream infrastructure).

Energy Capital Partners presently anticipates that Fund V will make between 10 and 15 investments, with an average equity commitment per transaction of \$250 million to \$750 million. This approach is consistent with ECP III and ECP IV.

The Firm expects to focus Fund V's investment efforts predominantly on control opportunities in North America, though the Fund may opportunistically evaluate investments in Europe. ECP believes that focusing primarily on investments where Fund V will acquire control positions in assets and/or the company managing assets will enable it to optimize financing and risk management structures, operations and contracts, capacity arrangements, fuel purchasing or switching capabilities, expansion opportunities, exit strategies, recapitalizations and other value creation strategies. Also, such control is expected to allow the Firm to take advantage of its expertise in ensuring that qualified and properly motivated management is in place at the portfolio companies to operate such assets. A key component of ECP's strategy is evaluating environmental impacts and seeking to generate low carbon energy in a variety of renewable resource or low carbon emissions related investments.

ECP expects Fund V to pursue both the purchase of existing assets, contracts and businesses, and the development and construction of new ones. The Firm intends to remain opportunistic in selecting between late-stage development and operating investments, with a focus on capturing attractive risk-adjusted returns, while utilizing a disciplined investment approach. ECP anticipates seeking higher investment returns for directly negotiated acquisition opportunities where Fund V's \$4 billion size and the Firm's extensive industry relationships enables opportunities that others may not see. The Firm believes acquisition opportunities may present more attractive opportunities when and if available for purchase at a discount to replacement cost and with an attractive underlying thesis for ownership during Fund V's projected life. The Firm has also successfully executed development and construction projects and managed associated risks. The Firm believes that as a result of the broad array of skill sets necessary to engage in development activities as well as the incremental development and construction risks, less competition exists with respect to development investment opportunities. Generally, the Firm believes the risks of development and construction are less on execution and more related to the potential long-time of development and potential illiquidity to sell an uncompleted project in an attractive M&A cycle.

The Firm also intends to opportunistically pursue take-private transactions or strategic partnerships with public companies, based on previous experience and track record with those

types of transactions. Examples of take-private or strategic partnership investments include ECP II's investments in EnergySolutions Inc., ECP III's investments in Dynegy and Calpine, and ECP V's investment in Biffa. ECP expects that such opportunities will only be pursued should a compelling value proposition be identified and actionable, and if ECP believes that the transaction can help advance any future strategic opportunities.

IV. Investment Performance

Previous fund performance as of September 30, 2022 is shown below:

Fund	Vintage Year	Total Commitments	SBI Investment	Net IRR*	Net MOIC*	Net DPI**
ECP I	2006	\$2.3 billion	N/A	-3%	0.6x	62%
ECP II	2009	\$4.3 billion	\$100 million	9%	1.4x	138%
ECP III	2013	\$5.1 billion	\$200 million	11%	1.5x	112%
ECP IV	2018	\$3.3 billion	\$150 million	21%	1.4x	28%

Past performance is not necessarily indicative of future results. Investment strategy does not guarantee the return of principal. Net returns exclude investment from the GP.

* Previous Fund investments (mainly Fund IV) may be relatively immature and, therefore, returns may not be indicative of future results. Net IRR and Net MOIC provided by the manager. The negative IRR for Fund I is represented as a 3% loss per annum (a compounded annual loss rate).

** Net DPI for ECP III and ECP IV would be 128% and 30% respectively if we take into account distributions through year-end as well those estimated to be distributed through Q1 2023 (including those from the sale of Transit Energy Group (ECP III), which is pending and subject to regulatory approval and customary closing conditions).

V. Investment Period and Term

The commitment period will last six years, and the term of the fund will be 11 years, subject to a one year extension at the General Partner's discretion and two additional two-year extensions with the approval of either the LP Advisory Committee or a majority of the LPs by capital commitments.

This document is a summary of more detailed information provided in the Confidential Private Placement Memorandum (the "PPM"). It is qualified in its entirety by the more detailed information provided in the PPM.

All terms summarized in this document are subject to negotiation between the Minnesota State Board of Investment and the General Partner.

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ATTACHMENT G

REAL ESTATE MANAGER SUMMARY PROFILE

I. Background Data

<i>Name of Fund:</i>	AG Asia Realty Fund V, L.P.
<i>Type of Fund:</i>	Real Estate Limited Partnership
<i>Target Fund Size:</i>	\$1.8 billion
<i>Fund Manager:</i>	Angelo Gordon & Co., L.P.
<i>Manager Contact:</i>	Aliana Spungen 245 Park Avenue New York, NY, 10167

II. Organization and Staff

Angelo, Gordon & Co., L.P. (“Angelo Gordon” or the “Firm”) is forming Asia Realty Fund V (“Fund V” or “Fund”) to make opportunistic investments in real estate in Asia. Angelo Gordon has been actively investing in Asia since 2005 and currently has offices and staff in Hong Kong, Seoul, Singapore, and Tokyo. The Fund will continue Angelo Gordon’s approach of investing across a broad range of geographical markets and product types, including, but not limited to office, industrial, residential, hotel, and retail.

Angelo Gordon was founded in 1988 by the late John Angelo and Michael Gordon. The Firm is 100% founder and employee owned and has over 650 employees globally and approximately 240 investment professionals working across its core disciplines of credit and real estate. As of September 30, 2022, the firm had approximately \$52 billion in assets under management.

Angelo Gordon is committed to fostering, cultivating and preserving a culture of diversity and inclusion. The Firm has partnered with several organizations that promote the attraction and retention of ethnically diverse and female candidates, including the Robert Toigo Foundation (TOIGO), Sponsors for Educational Opportunity (SEO), and Expanding Equity. Internally, the Firm created the AG Diversity Council and AG Women’s Network to drive networking, awareness, and engagement activities.

III. Investment Strategy

Similar to its predecessor Funds, the strategy for Fund V will emphasize the purchase of underperforming and troubled real estate assets from owners who lack the capital, patience, or expertise to improve cash flow and value. The assets are often attractively priced due to an inefficiency of the sale process, unique attributes of the asset or the seller’s need for near-term liquidity. The Fund will also target high margin development opportunities that meet the growing needs of the region’s large population. The Fund intends to focus on the largest markets in Asia, specifically Japan, South Korea, China, Hong Kong, and Singapore. Angelo

Gordon believes that the Fund will benefit from a value-add strategy in a region that exhibits strong growth, insufficient capital, a limited number of experienced real estate investors, market volatility and other important inefficiencies.

Angelo Gordon generally will work in tandem with a local operating partner to correct an asset's underperformance, increase cash flow, and add significant value. In many cases, Angelo Gordon's local operating partners are able to source opportunities which are off-market and proprietary, which the Firm believes has created an attractive stream of deal flow. For the past 18 years, Angelo Gordon has been building an operating partner network in Asia and is currently working with more than 55 firms to pursue joint venture opportunities. Operating partners are also able to "work the assets" daily improving execution of the value creation plan.

The Fund will seek to invest in a portfolio of assets that, after stabilization, will be highly sought after by traditional institutional real estate investors and will continue to appreciate even after underperformance has been corrected. Angelo Gordon will, therefore, seek opportunities to purchase assets with all or some of the following fundamental strengths:

- Clearly identifiable reasons for underperformance and a well-defined and achievable plan for turnaround,
- Purchase price and forecasted stabilized value that are at discounts to replacement costs,
- Favorable long-term demand growth in the local market, and
- Barriers to new supply in the local market due to restrictions on land availability, zoning, or entitlement.

The Funds will be managed by a team of experienced real estate investment professionals with a long and successful history of working together. The strategy is led by Wilson Leung, Head of Asia Real Estate, and Steven Cha, co-Portfolio Manager and Head of Korea Real Estate. The seven senior members of the team average 19 years of experience and 14 years working for Angelo Gordon. They are supported by 13 investment professionals dedicated to Asia real estate, as well as shared resources such as accounting, legal, compliance, risk, data science, and investor relations.

ESG is an important element of the Asia real estate strategy and Angelo Gordon more broadly. Allison Binns joined Angelo Gordon in 2021 as the Head of ESG & Sustainable Investing for the firm. She focuses on ESG integration and sustainable investing approaches across investment verticals, and is responsible for sustainable reporting. Angelo Gordon is an affiliate member of the IFRS Sustainability Alliance, a signatory to the UN-supported Principles of Responsible Investing, and is a signatory of the Standards Board for Alternative Investments. Specifically for the real estate process, Angelo Gordon integrates its ESG initiatives into its real estate investments by utilizing an ESG due diligence checklist. The checklist covers a wide range of topics within each ESG category. Past examples of how the Firm improved the ESG value of a property include achieving LEED Gold Green Building Certification on an office property, installing solar panels and other measures to qualify for "Intelligent Building" and obtaining "Green Building" certifications on a residential property and installing an environmentally-friendly generator using geothermal heat as a source of power to utilize renewable energy at an office property.

IV. Performance

Previous fund performance as of September 30, 2023 is shown below:

Fund	Vintage Year	Total Commitments	SBI Investment	Net IRR*	Net MOIC*	Net DPI*
AG Asia Realty Fund	2006	\$526 million	--	3%	1.2x	1.2x
AG Asia Realty Fund II	2010	\$616 million	--	17%	1.6x	1.6x
AG Asia Realty Fund III	2015	\$847 million	\$50 million	12%	1.4x	1.0x
AG Asia Realty Fund IV	2018	\$1.3 billion	\$100 million	17%	1.3x	0.3x

* Certain previous Fund investments may be relatively immature and, therefore, returns may not be indicative of future results. Net IRR and net MOIC are based on liquidation of each Fund at 9/30/22 NAV. Performance data was provided by the General Partner.

V. Investment Period and Term

Fund V will have a four-year investment period and an eight-year term, with the option to extend for one year at the General Partner's discretion and a second one-year extension unless a majority of the LPAC object within 25 days of the General Partner giving notice.

This document is a summary of more detailed information provided in the Confidential Private Placement Memorandum (the "PPM"). It is qualified in its entirety by the more detailed information provided in the PPM.

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ATTACHMENT H

REAL ESTATE MANAGER SUMMARY PROFILE

I. Background Data

<i>Name of Fund:</i>	TA Realty Value-Add Fund XIII, L.P.
<i>Type of Fund:</i>	Real Estate Limited Partnership
<i>Target Fund Size:</i>	\$1.5 billion
<i>Fund Manager:</i>	TA Realty LLC
<i>Manager Contact:</i>	Tom Landry TA Realty LLC One Federal Street, 17 th Floor Boston, MA 02110

II. Organization and Staff

TA Realty LLC ("TA Realty" or the "Firm") has formed TA Realty Value-Add Fund XIII ("Fund XIII" or the "Fund") to continue its strategy of making real estate investments in the U.S. diversified by property type, geography, industry exposure, and tenancy. The Firm's four decades of experience in acquiring, managing, and selling real estate across the U.S. provides the Firm with a unique perspective and ability to identify opportunities and execute an investment strategy focused on adding value.

TA Realty was founded in 1982 and currently has offices in Newport Beach, California; San Francisco, California; Dallas, Texas; and its headquarters in Boston, Massachusetts. The Firm has approximately 119 employees, including 24 Partners who have an average of 18 years with the Firm. TA Realty is majority owned by Mitsubishi Estate Co., Ltd (MEC), a global property owner, developer and investment manager. MEC's interests are held by its subsidiary MEC Global Partners America Inc. As of December 31, 2021, approximately 10.5% of the firm's equity that was formerly owned by the Founder, was recycled, increasing the total number of TA Realty Partners owning equity to 22. The final tranche of the Founder's equity (approximately 10.5%) was repurchased in November 2022 and is currently in the process of being "recycled" to existing TA Realty Partners such that 30% of the firm's ownership will continue to remain with TA Realty Partners. TA Realty has developed and Diversity Equity & Inclusion policy to create and preserve a culture of Diversity Equity & Inclusion across the firm.

III. Investment Strategy

The Fund's value-add strategy is focused on pursuing the steady growth of income and appreciation produced by real estate investments while minimizing downside risk. Since inception, the Firm has maintained a consistent investment philosophy during multiple real estate and economic cycles. The Firm is focused on creating diversified real estate portfolios that generate strong cash flow, benefit from an active asset management approach, and result in the long-term creation of value over the life of the Fund. TA Realty seeks real estate investments with characteristics that allow them to dynamically add value over time, maximizing both income and property value while also protecting cash flow and moderating overall portfolio risk.

The Firm constructs its portfolios to diversity across four main property types (Industrial, Multifamily and to a lesser extent, Office and Grocery Anchored Retail) and several specific markets experiencing strong secular tailwinds. While the Firm does not set specific targets for property type allocations, their recent funds have historically been more heavily weighted towards industrial and multifamily properties. Similarly, the Firm does not establish geographic targets in constructing its funds; however, the funds typically have coastal concentrations with approximately 70-75% of the funds invested on the coasts.

TA Realty believes that creating, growing, and distributing income is a critical component to achieving its return objectives. As the Firm constructs portfolios, the focus is on establishing a balance of assets that provide current income along with other assets that deliver a value-add component, but are also expected to substantially increase income as the strategies are implemented and executed. The value-add component is generated via active, hands-on asset management and execution of the business plan developed at acquisition. ESG considerations have been incorporated into the investment process, as TA Realty has observed energy efficient buildings trade at a slight premium in the marketplace.

TA Realty abides by a prudent approach to leverage where leverage is applied at the portfolio level, maintaining flexibility and not encumbering individual properties. The Firm's experience over multiple economic cycles has informed its view that leverage can be either advantageous or detrimental, so it targets a loan-to-value of approximately 45%. The debt program is designed and implemented to be compatible with the evolving life cycle of the Fund, considering pricing, terms, and risk to the portfolio.

TA Realty uses the disposition process as another way to add value. The Firm's dispositions team, in conjunction with asset level and portfolio level analysis, identifies strategies to maximize value upon an asset's disposition. Some examples are property-level decision-making that attractively positions the asset for prospective buyers (i.e., staggered lease expirations, tenant diversification, contractual rent increases, etc.) and maximizing exit pricing by exploiting a wide range of exit strategies (portfolio sales, tenant/user sales, accommodating 1031 exchanges, etc.).

IV. Investment Performance

Previous fund performance as of September 30, 2022, TA Realty is shown below:

Fund	Vintage Year	Total Commitment	SBI Investment	Net IRR*	Net MOIC*	Net DPI*
Advent Realty L.P.	1987	\$164 million	\$0	2.3%	1.2	1.2
Advent Realty II L.P.	1990	\$333 million	\$0	12.0%	2.1	2.1
Realty Associates Fund III	1994	\$488 million	\$40 million	11.4%	2.1	2.1
Realty Associates Fund IV	1996	\$450 million	\$50 million	13.4%	2.2	2.2
Realty Associates Fund V	1999	\$563 million	\$50 million	10.3%	1.8	1.8
Realty Associates Fund VI	2002	\$739 million	\$50 million	8.6%	1.5	1.5
Realty Associates Fund VII	2004	\$917 million	\$75 million	0.3%	1.0	1
Realty Associates Fund VIII	2006	\$1,743 million	\$100 million	-0.1%	1.0	1
Realty Associates Fund IX	2008	\$1,493 million	\$100 million	10.4%	1.6	1.6
Realty Associates Fund X	2012	\$1,562 million	\$100 million	12.6%	1.6	1.6
Realty Associates Fund XI	2015	\$879 million	\$100 million	13.6%	1.7	.8
Realty Associates Fund XII	2018	\$1,178 million	\$100 million	32.8%	1.6	.08

* Previous fund investments are not indicative of future results. Net IRR and Net MOIC were provided by TA Realty.

V. Investment Period and Term

The fund will have a two-year investment period from the date of the final closing, and a seven-year term, with the possibility of up to three one-year extensions.

This document is a summary of more detailed information provided in the Fund's Confidential Private Placement Memorandum (the "PPM"). It is qualified in its entirety by the more detailed information provided in the PPM and the Limited Partnership Fund Agreement.

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REPORTS

- ❖ 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

Public Markets Investment Program

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DATE: February 14, 2023

TO: Members, Investment Advisory Council

FROM: SBI Staff

SUBJECT: SBI Public Markets Program Report

This report provides a brief performance review of the SBI Public Markets portfolio through the calendar fourth 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's Public Markets Program	3
• Public Markets Managers' Organizational Update	10
• Manager Meetings	12

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Review of SBI Public Markets Program Fourth Quarter 2022

Market Summary

Global equity markets rebounded strongly during the final quarter of calendar year 2022, snapping back following a sharp decline over the prior three calendar quarters. The MSCI All Country World (ACWI) Index of global stocks gained +9.8% in U.S. dollar terms for the quarter. Returns on non-U.S. investments were buoyed by a sharp reversal in the U.S. dollar versus other currencies following strong gains over the last year. Global bond markets stabilized during the quarter, and the Bloomberg Global Aggregate Bond Index rebounded +4.6% over the quarter. Despite the quarter's strong gains, however, global capital markets finished the calendar year deeply in negative territory; the MSCI ACWI Index ended the year down -18.4% and the Bloomberg Global Aggregate Bond Index finished down -16.3%.

The rally in global financial markets during the quarter was fueled by evidence of a welcome softening in inflation in the U.S. and signals by the Federal Reserve that a slowdown in the pace of policy tightening (and eventual pause) was on the horizon. China's unexpected U-turn on its Zero-Covid policy and rapid reopening of its economy also boosted investor sentiment on the outlook for global growth. Finally, milder temperatures across Europe blunted the impact of curtailed natural gas supplies from Russia, leading to welcome declines in energy prices which reduced fears of energy rationing and a deeper recession across the region. Against this backdrop, the U.S. dollar declined nearly 7% on a trade-weighted basis, giving up about a third of its gains from the recent rally which began in May 2021. With the Fed signaling it may be nearly done with rate hikes and an easing of risk-off sentiment globally, investor demand for the dollar as a safe haven waned. Global commodities rose overall, boosted by gains in copper, aluminum and crude oil as hopes for China's re-opening fueled a rally in industrial inputs.

Overall Combined Funds Portfolio - Quarter and One-Year Performance

The overall Combined Funds portfolio returned +4.8% during the calendar fourth quarter, underperforming the composite benchmark's return of +5.2%. Negative relative return for the quarter was driven primarily by a drag from the portfolio's currency hedging program and an underweight to international equities within the public equity program. A timing-related issue with year-end index pricing within the Treasury protection portfolio, which reversed in January 2023, also contributed to reported underperformance for the quarter. On the positive side, the program's public equity, core/core plus and return-seeking fixed income managers all posted positive returns relative to their policy benchmark. The private markets invested portfolio returned +0.3% during the quarter.

For the one-year period ended December 31, 2022, the Combined Funds portfolio posted a return of -12.1%, matching the composite benchmark return for the period. While the portfolio's modest over-allocation to equities was a drag, this effect was offset by an underweight to international equities and gains from portfolio's currency hedging program, which blunted the impact of currency losses in the portfolio's developed international equity portfolio. An under-allocation to the Treasury protection portfolio also helped relative performance as longer-maturity Treasuries were one of the worst performing sectors during calendar year 2022.

Underlying active manager performance across the public equity portfolio was mixed and overall detracted modestly from relative performance. The total fixed income portfolio slightly underperformed its policy benchmark for the calendar year (-13.6% Portfolio vs. -13.3% Benchmark) as underperformance from the portfolio's core plus, Treasury protection and laddered bonds portfolios were a drag on relative performance. The invested private markets portfolio returned +4.9% for the calendar year 2022, while the private markets uninvested portfolio, which was invested in S&P 500 Index strategies for most of the year, declined -17.6% over the same period.

Domestic Equity

The Russell 3000 Index rallied +7.2% in the fourth calendar quarter of 2022, although the path to those gains was uneven. In the first two months of the fourth calendar quarter of 2022, U.S. equity markets experienced a strong relief rally as investors welcomed signs of falling inflation and a potential end to the Fed's aggressive tightening cycle. Corporate profits also remained strong during the period despite fears of an impending recession. However, markets fell back in December as the Fed and other global central banks signaled that more progress on inflation was required and that policy rates would need to remain restrictive for some time. Despite the strong quarterly performance result, U.S. stocks still finished out the calendar year deeply in negative territory, with the Russell 3000 Index down -19.2% for the year, marking the worst annual decline since 2008. During the quarter, value, defensive, and commodity-focused stocks significantly outperformed domestic growth and cyclical stocks, reflecting the market's long-term concern on the outlook for global growth amid tightening financial conditions.

Large cap stocks outperformed small cap stocks (R1000 +7.2% vs R2000 +6.2%) over the fourth quarter as the market gave preference to more resilient, stable companies in the face of economic headwinds and rising costs of capital. This effect was also acutely illustrated by the divide between growth stocks and value stocks. Value outperformed growth, particularly within the large cap space (R1000 Value +12.4% vs. R1000 Growth +2.2%) as investors sought the perceived safety offered by stable value names (lower P/E multiples, nearer-term cashflows) versus the relative uncertainty associated with growth names which still depend on future compounding growth and net margin expansion to justify their current valuations.

Within large cap value, financial names JPMorgan (+29.5%) and Berkshire Hathaway (+15.7%) were top contributors, as were energy names Exxon Mobil (+27.4%) and Chevron (+25.9%). Within large cap growth, the mega-cap technology names were the biggest detractors, as shares of Tesla (-53.6%), Amazon (-25.7%) and Apple (-5.8%) drove index performance. Across the market, commodity-oriented and defensive sectors performed the best during the quarter, with energy (+19.4%), materials (+15.8%), industrials (+15.4%), and consumer staples (+13.4%) each gaining more than double-digits, while the poorest performing sectors were within cyclicals such as consumer discretionary (-5.0%) and technology (+0.8%).

The Combined Funds' domestic equity portfolio gained +7.3% during the quarter, outperforming the Russell 3000 Index, which returned +7.2%. An overweight to small cap stocks in the portfolio modestly detracted from relative performance, while active management within domestic equities was a positive contributor during the quarter. Active domestic equity managers gained +7.6%, while the aggregate active domestic equity benchmark returned +7.1%.

The portfolio's large cap and all cap growth managers had widely varied performance versus their benchmarks during the quarter. This was in part due to the concentrated nature of the portfolios and the strong dispersion of growth stock performance. Concentrated all cap growth manager Zevenbergen had the poorest performance (-13.0% Portfolio vs. +2.3% Benchmark) given its concentrated approach and exposures to high-growth names such as Tesla (-53.6%), Trade Desk (-25.0%), and Silvergate (-75.1%). Sands sidestepped these exposures and instead held on to stronger-performing names such as DexCom (+40.6%) and Visa (+17.2%). Winslow had the strongest relative performance through its more defensive thematic positioning (Winslow +7.5% vs. +2.2% Benchmark).

Active large cap value managers both outperformed during the quarter (Barrow Hanley +15.2% and LSV +14.4% vs. Benchmark +12.4%). Barrow Hanley's fundamental bottom-up stock selection was the key driver of its relative outperformance this quarter, while an overweight to quality energy and technology names also helped. LSV's quantitative, deep-value approach rebounded during the quarter, and its selection of lower-priced stocks in the healthcare and technology sectors were key drivers of relative performance.

Semi-passive large cap managers both outperformed their benchmark during the quarter (BlackRock +7.6% and J.P. Morgan +7.4% vs. Benchmark +7.2%). Quantitative manager BlackRock had strong performance early in the quarter as it was able to profit from trades on market sentiment—those that position the portfolio to predict investor flows from news data, broker text, and bond market insights—as well as defensive quality measures of stock fundamentals. J.P. Morgan's outperformance was attributed entirely to good stock selection during the quarter given that the strategy doesn't take sector bets. Stock selection was strongest in the consumer cyclical and technology sectors.

Small cap growth managers underperformed in aggregate during the quarter (+3.6% Managers vs. +4.1% Benchmark), in part due to an underweight to the energy sector as well as selection within industrials. That said, the managers' overall bias towards quality-growth and larger cap names offset losses somewhat. Hood River and Rice Hall James both lagged the benchmark (Hood River -0.3% and Rice Hall James +3.1% vs Benchmark +4.1%) while ArrowMark and Wellington outperformed (ArrowMark +8.0% and Wellington +4.6% vs. +4.1% Benchmark).

Small cap value managers outperformed the index in aggregate (+10.8% Managers vs. +8.4% Benchmark). All small cap value managers outperformed the index. Peregrine and Hotchkis & Wiley outperformed due in part to their deep value style being in favor during the quarter, and Goldman's higher quality bias was also helpful. Quantitative manager Martingale's quality, value, and momentum signals all contributed to positive relative performance.

Passive managers largely tracked their benchmarks overall during the quarter, posting a combined return of +7.2% which was in-line with the overall passive benchmark's return of +7.2%. The passive Russell 2000 portfolio experienced some negative tracking error due to timing of a rebalancing trade executed during the quarter.

Global Equity and ACWI ex USA Equity

International markets mirrored the U.S. recovery in the fourth quarter with the MSCI All-Country World Index (ACWI) (net) returning +9.8% in U.S. dollar terms. In a reversal of recent

performance trends, foreign markets broadly outperformed the U.S. over the quarter (35 of the 47 countries in the ACWI Index outperformed the return on U.S. stocks). The largest positive contributions to performance came from Japan (+13.2%), the United Kingdom (+17.3%), France (+22.2%), Germany (+24.6%), China (+14.2%) and Australia (+15.7%). A decline in the U.S. dollar on the quarter (-6.8%) provided a strong tailwind for foreign stocks. For the quarter, all sectors of the ACWI Index ended in positive territory except for consumer discretionary, which was weighed down by outsized losses from mega-cap names Tesla (-53.6%) and Amazon (-25.7%).

The Combined Funds' global equity portfolio trailed the benchmark for the fourth quarter (+8.6% Portfolio vs. +9.8% Benchmark). Concentrated growth manager Baillie Gifford finished the quarter down more than 8% relative to the benchmark (+1.4% Portfolio vs. +9.8% Benchmark), driven in large part by its large stake in Tesla. Overweights to Atlassian (-38.9%), Amazon, and Trade Desk (-25.0%) were also a drag. Quality growth manager Martin Currie outperformed (+12.0% Portfolio vs. +9.8% Benchmark) due to strong issue selection and avoiding Tesla and Amazon; a large overweight to rebounding semiconductor equipment maker ASML (+26.9%) added value. Value manager Ariel slightly underperformed the benchmark, hurt by a large defensive cash position as well as the manager's decision to hedge a portion of the currency exposures from its non-U.S. holdings.

The portfolio's ACWI ex USA manager, Earnest Partners, modestly underperformed the benchmark during the quarter (+14.2% Portfolio vs. +14.3% Benchmark).

Developed International Equity and Currency Overlay

International developed markets equities, as measured by the MSCI World ex USA Index (net), rose +16.2% during the fourth quarter in U.S. dollar terms. In local currency terms, which excludes the impact of the weakening dollar over the period, the index gained a robust +8.4%. With the strong currency tailwind, every country and sector in the index ended the quarter in positive territory for the quarter when measured in U.S. dollar terms.

The portfolio's active developed markets managers modestly beat the MSCI World ex USA Index (net), returning +16.3% versus the benchmark's +16.2% return. Core growth manager Columbia Threadneedle outperformed as the result of especially strong issue selection within financial sector, which was a top-performing sector on the quarter within the index. In particular, overweights to two Japanese banks benefitted from a loosening of yield curve control by the Bank of Japan (BoJ) and the prospect of an end to the BoJ's zero interest rate policy. Quantitative manager Acadian underperformed the benchmark (+15.2% Portfolio vs. +16.2 Benchmark), as five of Acadian's six alpha factors each modestly detracted.

The passive developed markets portfolio tracked the MSCI World ex USA Index (net) return for the quarter (+16.3% Portfolio vs. +16.2% Benchmark).

After a dramatic sixteen-month run during which the U.S. dollar appreciated over +21% against a trade-weighted basket of foreign currencies, the dollar fell -6.8% during the fourth calendar quarter of 2022. The change in sentiment was precipitated by a reversal of many of the trends that dominated the macro picture for most of the year: global inflation worries lessened after November's softer inflation print in the U.S., leading markets to forecast a sooner-than-expected end to Fed rate hikes; China scrapped its Zero-Covid policy, promoting more optimistic views on global growth; and exceedingly mild weather in Europe eased fears of an energy crisis. Together,

these and other developments ended the flight-to-quality and made the rest of the world a more attractive place to invest, precipitating the dollar's fall.

Accordingly, the portfolio's currency hedging program detracted -3.6% versus a fully unhedged portfolio during the quarter, largely tracing the hedging gains experienced in the prior quarter. The Euro hedge was the largest detractor, followed by the Pound and the Yen. The Euro and Yen were each buoyed by hawkish central bank actions, while the Pound was supported by the perceived fiscal conservatism of the Sunak government. As the U.S. dollar fell, the program's currency hedge ratios also retreated from 72.1% at the start of the quarter to just 14.6% by the end of December.

Emerging Markets Equity

Emerging markets equities, as measured by the MSCI Emerging Markets Index (net), gained +9.7% in U.S. dollar terms during the fourth quarter of calendar year 2022. As in the developed markets, a depreciating U.S. dollar provided a significant performance tailwind to returns across emerging markets: in local terms, which excludes currency impact, the Index returned just +6.6%. While most countries within EM posted positive returns, notable exceptions included oil-producing nations Qatar (-15.3%), Saudi Arabia (-7.4%), Indonesia (-3.6%), and U.A.E. (-1.5%) whose exports fell in value as it became clear that initial forecasts of an energy crisis in Europe would not materialize. All sectors of the market posted gains over the quarter, with rebounding semiconductor names like Samsung (+18.4%) and TSMC (+10.3%) leading the charge.

The portfolio's active emerging markets managers modestly outperformed the MSCI Emerging Markets Index (net), returning +10.0% versus the benchmark's +9.7% return. Overall, the portfolio's underweight positioning in Saudi Arabia and India helped relative performance. MSBI is not currently registered to hold local securities in either market; consequently, the portfolio's active managers tend to be underweight those countries or invested in depository receipts, which generally outperformed locally-listed names over the quarter.

Value manager Pzena (+11.9% Portfolio vs. +9.7% Benchmark) generated strong outperformance from security selection in the financial sector, where their holdings outperformed the index by more than +10%. In general, performance within the financial services sector was varied across countries as divergent central bank policy moves and other country-specific idiosyncratic events combined to produce both strong upside and downside moves across different markets. Quality growth managers Martin Currie and Morgan Stanley also outperformed during the quarter and benefitted from strong performance within financials. Growth fund-of-funds manager Rock Creek lagged the benchmark by -1.3% primarily due to its underweight to the information technology and communications sectors as well as weak issue selection within both sectors. Core manager Macquarie also lagged the benchmark (+8.3% Portfolio vs. +9.7% Benchmark) primarily due to poor issue selection within China and Brazil.

Earnest Partners' dedicated China A-share strategy significantly outperformed the MSCI China A Index during the quarter (+11.3% Portfolio vs. +4.3% Benchmark). Issue selection was strong across four of the seven sectors represented in the portfolio, particularly within information technology. Winners included such diverse names as software provider Yonyou (+40.1%), consumer products manufacturer C&S Paper (+37.7%), pharmaceutical company Shenzhen Salubris (+37.2%), and energy company Jiangsu Linyang (+30.6%).

The passive emerging markets portfolio tracked the MSCI Emerging Markets Index (net) within tolerance for the quarter (+9.5% Portfolio vs. +9.7% Benchmark).

Core/Core Plus and Return Seeking Bonds

The U.S. fixed income market, as measured by the Bloomberg U.S. Aggregate Index, posted a gain of +1.9% during the fourth calendar quarter of 2022. Despite ending the year on a positive note, the Index finished down -13.0%, marking one of the worst years on record. During the quarter, longer-term interest rates were little changed while short-term rates rose in sympathy with the Fed's continued policy tightening. The Fed delivered a total of 125 basis points of hikes over the quarter (75bps in November and 50 basis point hikes in December) and indicated that it expected more hikes would be needed to combat inflation. Investors, however, eager for any sign of progress on inflation, reacted favorably to inflation reports over the quarter which showed headline inflation declining from +8.3% year-on-year in August to +7.1% in November, well below the June peak of +9.1%. Spread sectors rallied on the positive inflation news, and longer-term interest rates, which had risen at the start of the quarter over concerns that inflation might not come down quickly enough, fell back to levels where they started the quarter.

Within the spread sectors of the bond market, Agency mortgages returned +2.4% over the quarter and outperformed duration-matched Treasuries, as investors were attracted to wider spreads and expectations for lower interest rate volatility, which would provide a continued tailwind for MBS returns. Investment grade credit spreads tightened during the quarter, with the spread on the Bloomberg U.S. Credit Index declining to +130 bps over comparable-maturity Treasuries from +159bps at the start of the quarter. Within credit, lower quality and longer-maturity bonds outperformed higher quality and shorter-maturity bonds. High yield credit spreads generally tightened, with single B-rated bonds outperforming both higher quality BB-rated bonds and more credit sensitive, lower-quality CCC-rated bonds. Market conditions improved for emerging markets debt during the quarter, as signs of easing inflation in the U.S. and China's rapid re-opening created positive sentiment for both improved liquidity and global growth. Sovereign EM spreads tightened and local currency yields across many markets declined. Returns on local currency bonds were additionally boosted by a weaker U.S. dollar.

The portfolio's core/core plus bond managers slightly outperformed the Bloomberg Aggregate Index during the quarter (+2.1% Portfolio vs. +1.9% Benchmark). The managers' overweight to spread sectors and underweight to U.S. Treasuries proved beneficial during fourth quarter's broad-based rally, as spreads tightened across most sectors, including asset backed securities, investment grade credit and out-of-benchmark high yield credit sectors. Additionally, the managers' tactical overweight to agency mortgage-backed securities was well timed, as spread tightening and lower interest rate volatility translated into strong relative performance vs. Treasuries. Lastly, strong security selection within investment grade credit contributed to positive relative returns.

The portfolio's return-seeking bond managers returned +3.8% during the fourth quarter, outperforming the policy benchmark (Bloomberg U.S. Aggregate Bond Index) return of +1.9%, and outperforming the weighted composite of the managers' individual benchmarks, which returned +3.6%. Key sectors owned within return-seeking mandates such as high yield bonds, floating rate bank loans and emerging market debt all experienced strong absolute returns during the quarter. Higher beta emerging markets debt manager Ashmore rebounded from weakness earlier in the year and outperformed its benchmark for the quarter (+8.8% Portfolio vs +8.3%

Benchmark). Multi-asset credit managers Payden & Rygel and PGIM and opportunistic multi-sector manager Blackrock each outperformed their benchmarks, boosted by an emphasis on corporate credit sectors and high-quality securitized bonds. Securitized credit manager TCW experienced modest underperformance during the quarter as lower-quality and less-liquid securitized bonds failed to participate in the rally within corporate-related credit over the quarter.

Treasury Protection Portfolio

The Treasury protection portfolio underperformed the Bloomberg Treasury 5+ Year Index for the fourth quarter (-0.1% Portfolio vs. +0.4% Benchmark) largely due to pricing differences caused by the index provider and portfolio's custodian observing closing prices at different times on the last trading day of the quarter. The performance variance, approximately -0.50%, was observed to reverse itself on the first trading day in January 2023.

Laddered Bonds + Cash Portfolio

The combined Laddered Bonds + Cash portfolio returned +0.92% for the fourth quarter, modestly outperforming the portfolio's benchmark (ICE BofA US 3-Month Treasury Bill) which returned +0.84% over the same period. The laddered bond portfolio's spread sector exposure versus its Treasury benchmark drove outperformance, as high quality corporate and ABS credit spreads tightened during the quarter. The cash portfolio also exceeded the benchmark, returning +0.90% over the quarter. On a yield basis, the laddered portfolio continues to provide a yield advantage over cash (the ladder portfolio yielded 4.6% at the end of December versus cash portfolio yield of 4.2%). Over time, this persistent yield advantage is expected to drive relative outperformance for the ladder portfolio vs. cash.

**Public Markets Managers' Organizational Update
Fourth Quarter 2022**

AQR (Developed Markets Equity)

Two principals departed the firm during the quarter; Scott Metchick, Research and Portfolio Management, and Jeff Dunn, Business Development.

Blackrock (Fixed Income)

Rick Rieder, Chief Investment Officer of Global Fixed Income, was among a group of six executives added to the BlackRock Global Executive Committee, effective in the first quarter of 2023. Mr. Rieder is currently the lead portfolio manager for the Opportunistic Fixed Income portfolio managed by Blackrock within the SBI's Return Seeking Bond portfolio. Mr. Rieder intends to maintain his day-to-day portfolio management duties.

Dodge & Cox (Fixed Income)

Tom Dugan, Director of Fixed Income, announced his retirement effective at the end of 2023. Mr. Dugan became Director in 2017 after being promoted from associate Director of Fixed Income. Mr. Dugan will be succeeded by Lucy John, VP and Associate Director of Fixed Income. Ms. John is currently a member of the firm's U.S. Fixed Income Investment Committee.

Earnest Partners (International Equity)

In January, Earnest Partners announced that Chief Operating Officer Malin Eriksson will transition to an Advisor to the CEO role. Former General Counsel Carsten Fiege will become COO. Earnest is seeking a new General Counsel.

JP Morgan (Developed Markets Equity)

Zenah Shuhaiber was added as a portfolio manager for the EAFE Plus product. Ms. Shuhaiber has been with JP Morgan's international equity team for 17 years.

Morgan Stanley (Emerging Markets Equity)

Eduardo Wisbrun, an analyst covering Latin America and EMEA, departed during the quarter.

Neuberger Berman (Emerging Markets Equity)

Analyst Michael Cortina departed in Q4. His sector coverage was transferred to new hire Erbor Kulla.

PGIM (Fixed Income)

Michael Collins, Senior Portfolio Manager for multi-sector fixed income strategies and co-PM for SBI's portfolios, announced his plan to retire in April 2024. In preparation for Mr. Collins' departure, Associate PM Lindsey Rosner will take on additional responsibilities alongside current co-PMs Rich Piccirillo and Gregory Peters. Additionally, Michael Lillard, CEO of PGIM Fixed Income also announced his intention to retire in April 2024. Mr. Lillard will be succeeded by John Vibert, who is now serving as President.

Pzena (Emerging Markets Equity)

On October 31, 2022, Pzena completed its previously announced go-private transaction and is now a private company. As part of its long-term succession plan, effective January 1, 2023, Pzena co-founders Rich Pzena and Bill Lipsey stepped down from their roles as Chief Executive Officer and President. Mr. Pzena continues in all his investment responsibilities including Co-CIO and Portfolio Manager. The Chief Executive Officer role transitioned to Caroline Cai, and the President role transitioned to Allison Fisch, both of whom will also continue as Emerging Markets Equity portfolio managers. Akhil Subramanian was promoted to portfolio manager on the Emerging Markets strategy.

Sands (Domestic Equity)

Effective December 31, 2022, Michael Sramek has retired from the firm after an extended medical leave. The Select Growth strategy will continue to be managed by the three incumbent co-managers, Wes Johnston, Tom Trentman, and Frank Sands. In addition, Karin Riechenberg was promoted from Senior ESG Analyst to Director of Stewardship.

Zevenbergen (Domestic Equity)

Effective January 1, 2023, a total of 15% of the economic interest in the firm was transferred from founder and majority owner Nancy Zevenbergen to existing minority owner Virtus Investment Partners (10%) and three employees (5%): Joe Dennison (PM), Anthony Zachery (PM), and Alexa Parker Kopicky (CCO/CFO). Virtus does not have a seat on the ZCI Board and has no involvement or control over ZCI's operations. In addition, as previously announced, Leslie Tubbs, Portfolio manager and COO, retired from the firm effective December 31, 2022. Ms. Tubbs' shared portfolio management and operations responsibilities have been absorbed by the rest of the investment and operations staff.

Fourth Quarter 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 2022. Staff will also continue to utilize teleconference and videoconference technologies to remain in communication with managers between in-person visits.

During the quarter, Staff traveled to conduct onsite visits with eight managers. Staff met with five managers at our offices in St. Paul. In addition, 46 manager strategy review calls were held via teleconference or videoconference during the quarter. Note that while staff met with some managers multiple times during the quarter, each manager/strategy is listed just once in the following list.

Investment Manager

Asset Class

Acadian Asset Management LLC	Developed Markets Equity
AQR Capital Management, LLC	Developed Markets Equity
Ariel Investments, LLC	Global Equity
Ashmore Investment Management Limited	Fixed Income
Ashmore Investment Management Limited	Emerging Markets Equity
Baillie Gifford Overseas Limited	Global Equity
Barrow, Hanley, Mewhinney & Strauss, LLC	Domestic Equity
BlackRock Financial Management, Inc.	Fixed Income
BlackRock Institutional Trust Company, N.A.	Domestic Equity
Columbia Threadneedle Investments	Developed Markets Equity
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, LP	Fixed Income
Hood River Capital Management, LLC	Domestic Equity
Hotchkis and Wiley Capital Management, LLC	Domestic Equity
J.P. Morgan Investment Management Inc.	Domestic Equity
J.P. Morgan Investment Management Inc.	Developed Markets Equity
KKR (Kohlberg, Kravis and Roberts)	Fixed Income
Macquarie Investment Management Advisers	Emerging Markets Equity

2022 Manager Meetings (cont.)

Martin Currie Inc.	Global Equity
McKinley Capital Management, LLC	Developed Markets Equity
Morgan Stanley Investment Management Inc.	Emerging Markets Equity
Neuberger Berman Investment Advisers LLC	Fixed Income
Neuberger Berman Investment Advisers LLC	Emerging Markets Equity
NISA Investment Advisors, LLC	Cash Overlay
Oaktree Asset Management	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
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
Winslow Capital Management, LLC	Domestic Equity
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: February 14, 2023

TO: Members, Investment Advisory Council

FROM: 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 third quarter.

The report includes the following sections:

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• Participant Directed Investment Program Fund Commentaries	3
• Non-Retirement Fund Commentaries	5
• Manager Meetings	6

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Participant Directed Investment Program Fund Commentaries

Fourth 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 slightly outperformed its benchmark return for the quarter with a return of 7.2% compared to the benchmark return of +7.1% and matched the benchmark performance for the year with a return of -19.5%.

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 +7.6% return and for the year with a -18.1% 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. The Fund matched the S&P U.S. Dividend Growers Index for the quarter with a +13.1% return. For the year, the Fund outperformed with a -4.9% return compared to a -9.7% for the benchmark. 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 +9.0% return and a -18.7% 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 underperformed the Russell 2000 for the quarter with a +4.2% return compared to the benchmark +6.2% and underperformed for the year with a -23.3% return compared to the benchmark return of -20.4%.

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 +14.8% for the quarter, underperforming the MSCI EAFE benchmark return of +17.3%. For the year, the Fund returned -23.4%, underperforming the benchmark return of -14.5%.

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 for the quarter with a +14.7% return versus the benchmark return of +14.1% and outperformed for the year with a -16.0% return compared to -16.2% 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 outperformed the Bloomberg U.S. Aggregate Index for the quarter with a +2.8% return, compared to the benchmark of +1.9%. For the year, the Fund outperformed with a -10.9% return compared to the benchmark return of -13.0%.

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 +1.7% for the quarter, underperforming the benchmark return of +1.9% and modestly underperformed the benchmark for the year with a -13.1% return vs the benchmark return of -13.0%.

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 is benchmarked against the 3-year Constant Maturity Treasury + 45bps. For the quarter, the portfolio returned +0.6% compared to the benchmark return of +1.2%. For the year, the portfolio returned +2.1% compared to the benchmark return of +3.5%.

Money Market Fund

State Street Global Advisors manages the cash option in a commingled pool called the short-term investment strategy. The Fund outperformed the ICE BofA 3 Month U.S. T-Bill Index for the quarter and for the year with a +1.0% and a +1.9% return, respectively. The benchmark returned +0.8% and +1.5% over the respective time-periods.

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 underperformed the composite benchmark for the quarter and for the year with a +4.9% return and a -16.9% return, respectively compared to the benchmark return of +5.1% and -16.7%.

Non-Retirement Fund Commentaries

Fourth 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 +0.9% for the quarter, slightly underperforming the benchmark return of +1.0%. For the year, the portfolio returned -7.6%, outperforming the benchmark return of -7.7%.

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 performance matched for the quarter with a +1.9% return. For the year, the portfolio underperformed the benchmark with a -13.6% return, compared to -13.0% 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 slightly outperformed the benchmark for the year, returning +7.5% vs the benchmark of +7.6%. For the year, the fund matched the benchmark return of -18.1%.

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 +0.9% return, and for the year with a +1.7% return. The benchmark returned +0.8% and +1.5% over the respective time-periods.

2022 Manager Meetings

MSBI Staff has incorporated a hybrid process to its manager due diligence process. As of April of 2022 Staff begun to travel to and accept visits from managers after a two-year pause in travel due to the pandemic. MSBI Staff will continue to use teleconference and videoconference technology to remain in communication with managers between visits.

During the quarter, Staff visited with two managers at the St. Paul office and the remaining strategy review calls were 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
• 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	PDIP
• Vanguard	Passive, Total Stock Market Fund	PDIP
	Passive, Institutional S&P 500 Index	PDIP
	Passive, Mid Cap Index Fund	PDIP
	Passive, Total International Equity	PDIP
	Passive, Bond Fund	PDIP
	Passive, Balanced Fund	PDIP
	Active, Dividend Growth Fund	PDIP

REPORT

SBI Environmental, Social, and Governance (ESG) Report

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MINNESOTA STATE BOARD OF INVESTMENT

ENVIRONMENTAL, SOCIAL, GOVERNANCE REPORT

Energy Transition Investment Highlights

The SBI is a long-term investor whose primary mission is to maintain the viability of the retirement systems it supports. As part of this mission, it is important for the SBI to be pragmatic about the risks and opportunities facing the portfolio. In response to scientific evidence regarding climate change, governments, businesses, and individuals are seeking ways to transition to less carbon intensive forms of energy. Changes to climate and the associated long-term energy transition present a unique set of risks and opportunities for existing and prospective SBI investments; especially companies focused on the production of hydrocarbons. As hydrocarbons are expected to be a necessary and significant part of the energy mix for the foreseeable future, reducing emissions from the oil and gas industry is increasingly recognized as critical. Companies that can successfully execute on mitigation strategies and those able to deliver on energy transition approaches present potentially compelling opportunities.

This ESG report highlights several energy companies in the SBI's portfolio that are taking steps to reduce emissions intensity as well as several private companies that illustrate how SBI managers are making investments to capitalize on the macroeconomic themes of sustainability and the energy transition.

Private Companies

AVOLTA

Avolta specializes in renewable natural projects that provide sustainable solutions for decarbonizing the agricultural industry. Avolta's pipeline contains projects at dairy farms throughout the U.S. designed to capture livestock's methane emissions. The captured methane will be upgraded into high quality gas for use in nearby pipelines, maintaining the reliability of existing infrastructure, and ensuring the transition to "greener" fuels does not disrupt current operations. The SBI invested in Avolta through ECP.



Please visit the [Avolta website](#) and read the [ECP ESG Report 2021](#) to learn more.

ERM

ERM is the world's largest pure-play sustainability consultancy. Over the last 50 years, ERM has built deep and broad technical expertise in environmental health, safety, risk and social matters with a first-class team of more than 5,500 purpose-driven consultants, including 580 partners, across 150 offices in over 40 countries. The Company supports its clients in every part of their organizations with a focus on operationalizing sustainability and implementing ESG best practices. The SBI invested in ERM through KKR.



Please visit the [ERM website](#) and read the [KKR ESG Report](#) to learn more.

RESOURCE ENVIRONMENTAL SOLUTIONS (RES)

RES is the nation's largest ecological restoration company. RES' mission is to restore a resilient earth for a modern world, project by project. The company supports the public and private sectors with solutions for environmental mitigation, storm water, water quality, and climate and flooding resilience. RES delivers durable ecological uplift on its sites, based on science-led design, full delivery, long-term stewardship, and guaranteed performance. Access to additional investment capital helps RES to continue with product line expansion in coastal resiliency, large scale water quality projects, new mitigation banks, and carbon solutions. The SBI invested in RES through KKR.



Please visit the [RES website](#) to learn more.

RESTAURANT TECHNOLOGIES, INC. (RTI)

RTI is a provider of cooking oil management systems to restaurants, hotels, convenience stores, universities, and hospitals. RTI recently partnered with Renewable Energy Group (REG) to convert RTI's used cooking oil into biodiesel at REG's network of commercial-scale manufacturing facilities. This closed-loop system produces a sustainable alternative to fossil fuels, thereby supporting both the circular economy and decarbonization. The SBI invested in RTI through ECP.



To learn more read the [RTI ESG Report 2022](#) and the [ECP ESG Report 2021](#).

Public Companies

PIONEER NATURAL RESOURCES

Pioneer is a large independent U.S. oil and gas exploration and production company. The company recently joined the Oil and Gas Methane Partnership, becoming one of the first U.S. operators to participate in this private-public coalition for methane emissions measurement best practices. With a 22% reduction in greenhouse gas emissions intensity and 50% reduction in methane emissions intensity from 2019 to 2022, Pioneer is making progress towards its long-term ambition to achieve net zero Scope 1 and Scope 2 emissions. It has also begun to form partnerships to participate in developing wind and solar projects on its large ownership position of surface acreage in the Permian Basin. The SBI invested in Pioneer through multiple domestic equity accounts.



Please read the [2022 Pioneer Sustainability Report](#) to learn more.

VALERO

Valero is the largest petroleum refiner in the world and the world's second largest renewable fuels producer. It is leveraging its liquid-fuels platform to diversify into high-growth, high-return, low-carbon projects that further strengthen its long-term competitive advantage as a leading producer of transportation fuels. It more than doubled its production capacity of renewable diesel at its Louisiana facility in 2021 and is opening a brand new renewable diesel plant in Texas. The SBI invested in Valero through multiple domestic equity accounts.



Please read the [Valero 2022 ESG Report](#) to learn more.

TOTALENERGIES

TotalEnergies is a multi-energy company that produces and markets fuels, natural gas and electricity. The company is profoundly transforming its production and sales while continuing to meet the energy needs of a growing population. They have committed to the Paris-aligned goal of net-zero emissions by 2050. In 2021, renewables and electricity accounted for 25% of total investments. Their objective is to channel half of future investments to growing renewable energies, gas and new decarbonized molecules. The SBI invested in TotalEnergies through multiple international equity accounts.



Please read the [TotalEnergies Sustainability & Climate 2022 Progress Report](#) to learn more.

EQUINOR

Equinor is an international energy company committed to long-term value creation in a low-carbon future. Their ambition is to reduce net operated emissions by 50% by 2030. They have already brought their CO₂ emissions in oil and gas production down to industry leading levels and are shaping the low carbon industry. They are using their experience with North Sea drilling to build offshore wind farms around the world and developing hydrogen value chains to enable other industries to decarbonize their activities. The SBI is invested in Equinor through multiple international equity accounts.



Please read the [Equinor 2022 Energy transition plan](#) to learn more.

MINNESOTA STATE BOARD OF INVESTMENT

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REPORT

AON Market Environment Report

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Market Environment

Fourth Quarter 2022

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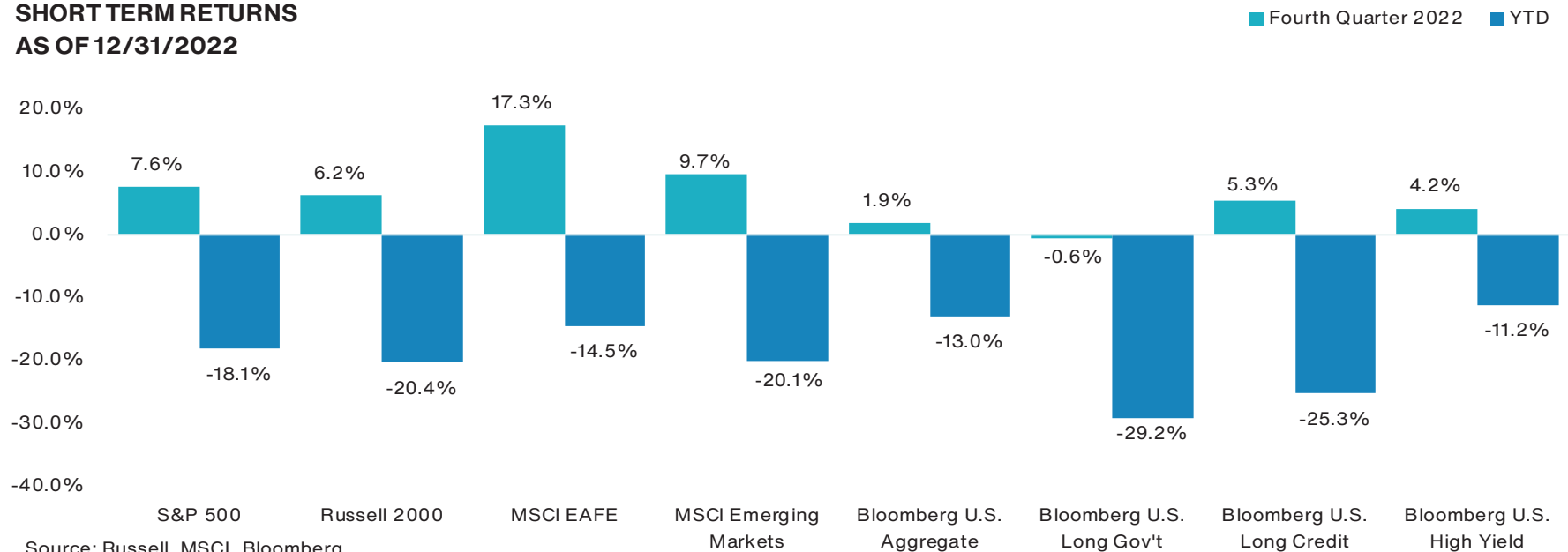
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Market Highlights

SHORT TERM RETURNS AS OF 12/31/2022



Source: Russell, MSCI, Bloomberg

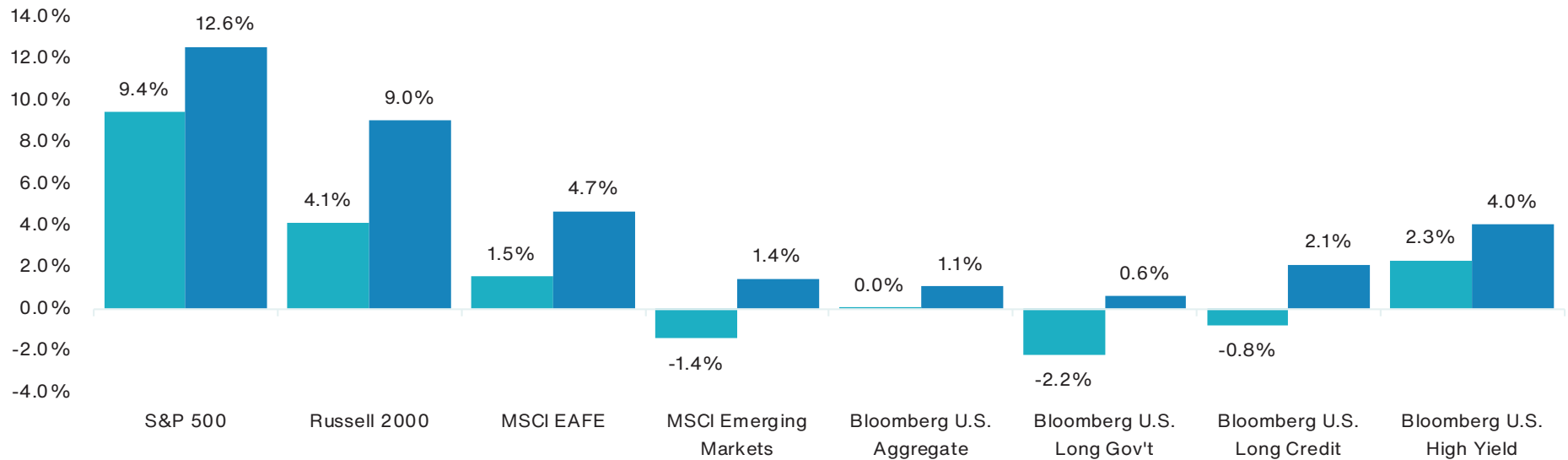
MSCI Indices show net total returns throughout this report. All other indices show gross total returns.

Past performance is no guarantee of future results. Indices cannot be invested in directly. Unmanaged index returns assume reinvestment of any and all distributions and do not reflect fees and expenses. Please see appendix for index definitions and other general disclosures.

Market Highlights

LONG TERM ANNUALIZED RETURNS AS OF 12/31/2022

■ Five-Year ■ Ten-Year



Source: Russell, MSCI, Bloomberg

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Market Highlights

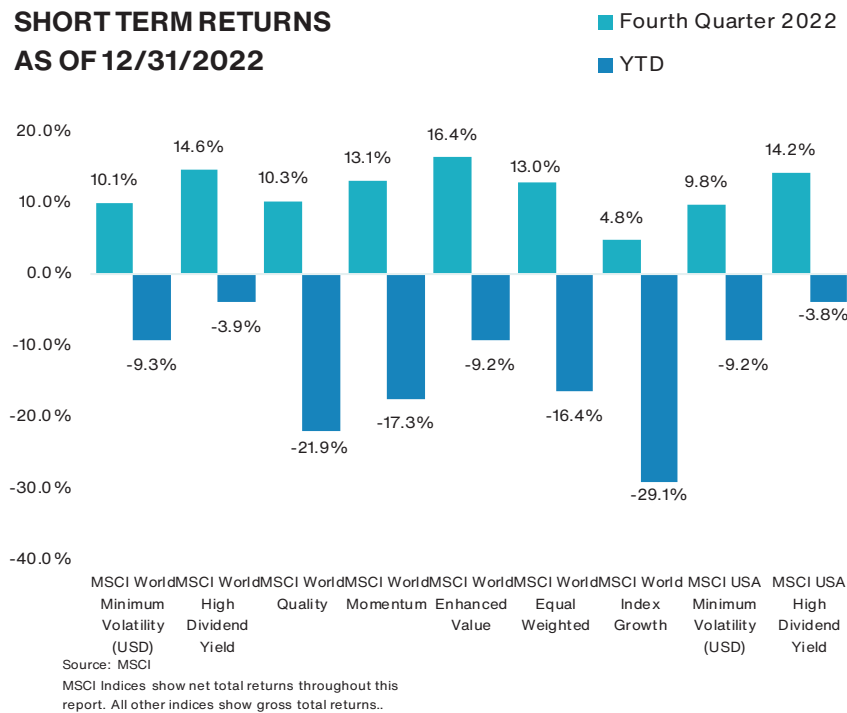
Returns of the Major Capital Markets						
	Period Ending 12/31/2022					
	Fourth Quarter	YTD	1-Year	3-Year ¹	5-Year ¹	10-Year ¹
Equity						
MSCI All Country World IMI	9.84%	-18.40%	-18.40%	3.89%	4.96%	7.94%
MSCI All Country World	9.76%	-18.36%	-18.36%	4.00%	5.23%	7.98%
Dow Jones U.S. Total Stock Market	7.18%	-19.53%	-19.53%	6.89%	8.65%	12.03%
Russell 3000	7.18%	-19.21%	-19.21%	7.07%	8.79%	12.13%
S&P 500	7.56%	-18.11%	-18.11%	7.66%	9.42%	12.56%
Russell 2000	6.23%	-20.44%	-20.44%	3.10%	4.13%	9.01%
MSCI All Country World ex-U.S. IMI	14.15%	-16.58%	-16.58%	0.20%	0.85%	3.98%
MSCI All Country World ex-U.S.	14.28%	-16.00%	-16.00%	0.07%	0.88%	3.80%
MSCI EAFE	17.34%	-14.45%	-14.45%	0.87%	1.54%	4.67%
MSCI EAFE (Local Currency)	8.72%	-7.00%	-7.00%	3.64%	3.81%	7.56%
MSCI Emerging Markets	9.70%	-20.09%	-20.09%	-2.69%	-1.40%	1.44%
Equity Factors						
MSCI World Minimum Volatility (USD)	10.09%	-9.28%	-9.28%	2.46%	5.62%	9.05%
MSCI World High Dividend Yield	14.60%	-3.93%	-3.93%	4.25%	5.62%	7.91%
MSCI World Quality	10.26%	-21.90%	-21.90%	6.52%	9.42%	11.73%
MSCI World Momentum	13.14%	-17.34%	-17.34%	6.94%	8.89%	11.98%
MSCI World Enhanced Value	16.36%	-9.21%	-9.21%	1.95%	1.92%	7.10%
MSCI World Equal Weighted	12.95%	-16.38%	-16.38%	2.05%	3.14%	7.43%
MSCI World Index Growth	4.77%	-29.05%	-29.05%	4.94%	7.73%	10.44%
MSCI USA Minimum Volatility (USD)	9.80%	-9.19%	-9.19%	5.14%	8.59%	11.88%
MSCI USA High Dividend Yield	14.19%	-3.75%	-3.75%	6.07%	7.38%	11.46%
MSCI USA Quality	9.28%	-22.67%	-22.67%	6.65%	10.44%	13.57%
MSCI USA Momentum	12.16%	-17.39%	-17.39%	6.52%	8.78%	14.07%
MSCI USA Enhanced Value	12.40%	-13.99%	-13.99%	3.50%	4.71%	10.90%
MSCI USA Equal Weighted	9.71%	-16.99%	-16.99%	6.35%	7.54%	11.41%
MSCI USA Growth	0.59%	-31.97%	-31.97%	7.10%	10.63%	13.69%

Returns of the Major Capital Markets						
	Period Ending 12/31/2022					
	Fourth Quarter	YTD	1-Year	3-Year ¹	5-Year ¹	10-Year ¹
Fixed Income						
Bloomberg Global Aggregate	4.55%	-16.25%	-16.25%	-4.48%	-1.66%	-0.44%
Bloomberg U.S. Aggregate	1.87%	-13.01%	-13.01%	-2.71%	0.02%	1.06%
Bloomberg U.S. Long Gov't	-0.59%	-29.19%	-29.19%	-7.39%	-2.19%	0.61%
Bloomberg U.S. Long Credit	5.30%	-25.29%	-25.29%	-5.78%	-0.77%	2.13%
Bloomberg U.S. Long Gov't/Credit	2.61%	-27.09%	-27.09%	-6.20%	-1.21%	1.57%
Bloomberg U.S. TIPS	2.04%	-11.85%	-11.85%	1.21%	2.11%	1.12%
Bloomberg U.S. High Yield	4.17%	-11.19%	-11.19%	0.05%	2.31%	4.03%
Bloomberg Global Treasury ex U.S.	6.85%	-19.55%	-19.55%	-6.81%	-3.37%	-1.90%
JP Morgan EMBI Global (Emerging Market	7.44%	-16.45%	-16.45%	-4.49%	-1.00%	1.35%
Commodities						
Bloomberg Commodity Index	2.22%	16.09%	16.09%	12.65%	6.44%	-1.28%
Goldman Sachs Commodity Index	3.44%	25.99%	25.99%	10.49%	6.46%	-3.30%
Hedge Funds						
HFRI Fund-Weighted Composite ²	2.26%	-4.20%	-4.20%	5.68%	4.42%	4.68%
HFRI Fund of Funds ²	1.79%	-5.25%	-5.25%	3.71%	3.02%	3.51%
Real Estate						
NAREIT U.S. Equity REITS	5.24%	-24.37%	-24.37%	-0.11%	3.68%	6.53%
NCREIF NFI - ODCE	-4.96%	7.47%	7.47%	9.93%	8.68%	10.10%
FTSE Global Core Infrastructure Index	8.66%	-5.79%	-5.79%	3.32%	6.65%	8.54%
Private Equity						
Burgiss Private iQ Global Private Equity ³			6.18%	21.00%	18.52%	15.82%
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 June 30, 2022						

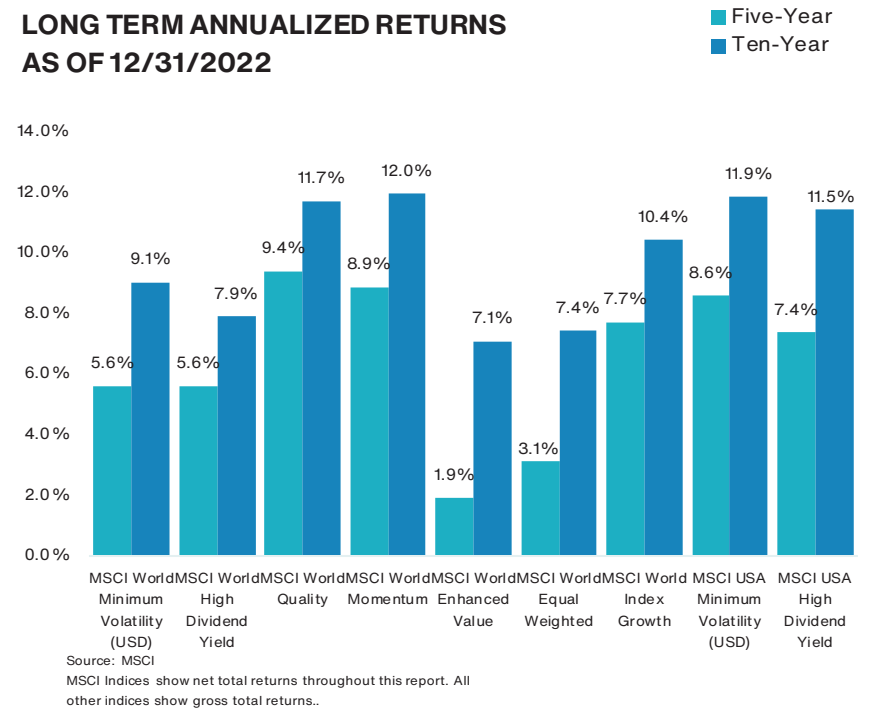
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Factor Indices

SHORT TERM RETURNS AS OF 12/31/2022



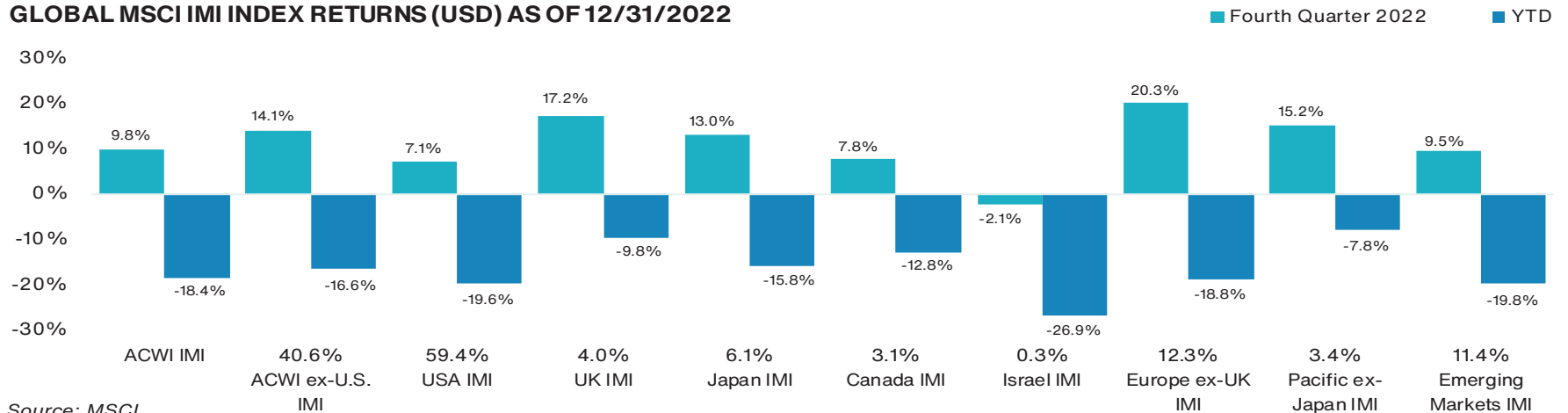
LONG TERM ANNUALIZED RETURNS AS OF 12/31/2022



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Global Equity Markets

GLOBAL MSCI IMI INDEX RETURNS (USD) AS OF 12/31/2022



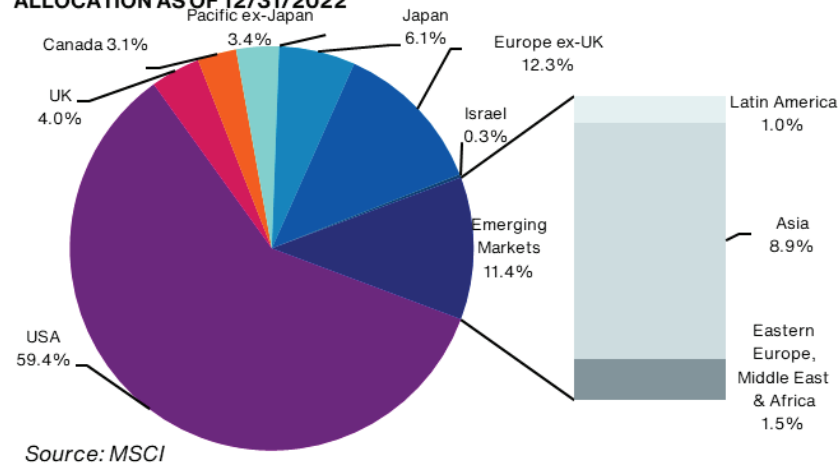
- In Q4 2022, equity markets rebounded as high-interest rate concerns abated. Volatility fell throughout the quarter as the CBOE Volatility Index (VIX) fell to 21.7 in December from 31.6 in the previous quarter, staying well above its 20-year average of 19.4. Yields trended higher with major central banks indicating continued support for aggressive monetary policy to control rising inflation. The MSCI All Country World Investable Market Index (ACWI IMI) returned 9.8% for the quarter but was down 18.4% on a year-to-date basis.
- Across international markets, generally all the regions were strong over the quarter. All regions apart from Israel posted a positive return.
- Europe ex-UK equities were the best regional performer with a return of 20.3% in US dollar terms due to sharp euro appreciation against the dollar. Economically sensitive sectors including energy, financials, industrials, and consumer discretionary outperformed.

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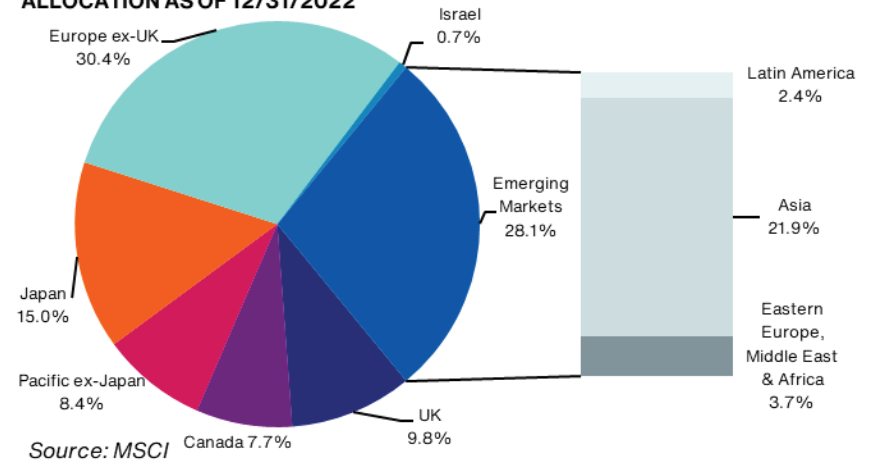
Global Equity Markets

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 12/31/2022



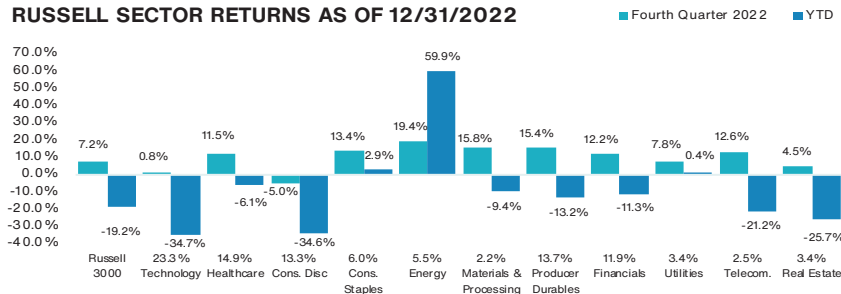
MSCI ALL COUNTRY WORLD EX-U.S. IMI INDEX GEOGRAPHIC ALLOCATION AS OF 12/31/2022



U.S. Equity Markets

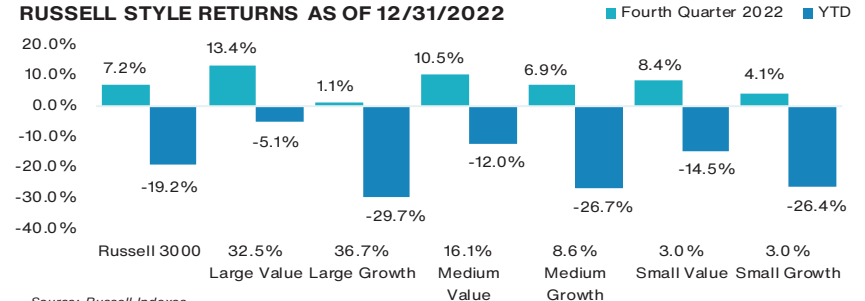
- U.S. equities had a strong quarter with the S&P 500 index rising by 7.6%.
- In the US mid-term elections, the Democrats retained control over the Senate with a 51-seat majority whilst the Republicans won back control of the House of Representatives. The US Congress passed a \$1.7tn annual spending bill to fund the US government until September 2023 and avoid a government shutdown. The bill includes \$45bn in new military and economic aid to Ukraine, nearly \$773bn in domestic funding, and more than \$850bn for the US military
- The U.S. economy rebounded in the third quarter after it contracted in the first half of 2022. Annualized gross domestic product rose by 2.9% over Q3 2022, following the 0.6% contraction rate in the previous quarter. A narrowing trade deficit contributed to the U.S. economy's expansion in the third quarter, as softening consumer demand lowered imports while exports rose, particularly in the oil sector.
- The Russell 3000 Index rose 7.2% during the fourth quarter but was down 19.2% on a year-to-date basis. Except for Consumer Discretionary (-5.0%), all the sectors generated positive returns. Energy (19.4%) and Materials & Processing (15.8%) were the best performers.
- Large-cap stocks outperformed in value and Medium-cap stocks outperformed in growth.
- On a style basis, value outperformed growth across market capitalizations over the quarter and on a year-to-date basis.

RUSSELL SECTOR RETURNS AS OF 12/31/2022



Source: Russell Indexes

RUSSELL STYLE RETURNS AS OF 12/31/2022

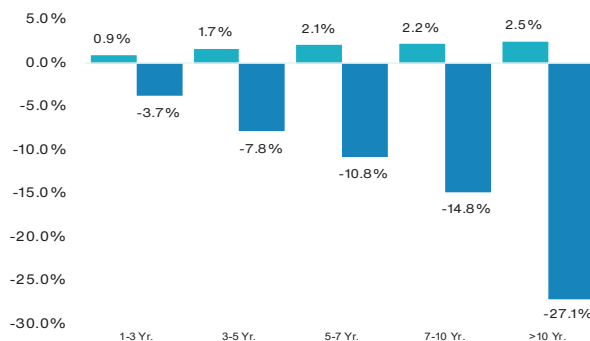


Source: Russell Indexes

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U.S. Fixed Income Markets

BLOOMBERG AGGREGATE RETURNS BY MATURITY AS OF 12/31/2022



Source: FactSet

Fourth Quarter 2022 YTD

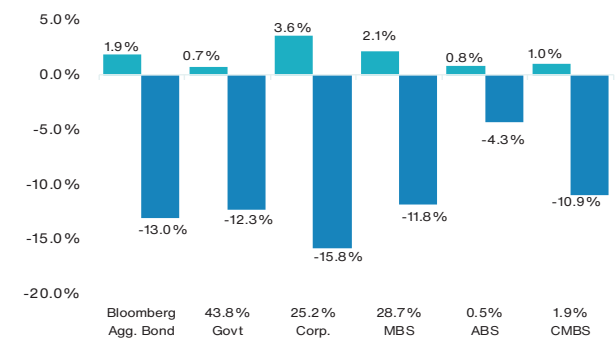
BLOOMBERG AGGREGATE RETURNS BY QUALITY AND HIGH YIELD RETURNS AS OF 12/31/2022



Source: FactSet

Fourth Quarter 2022 YTD

BLOOMBERG AGGREGATE RETURNS BY SECTOR AS OF 12/31/2022



Source: FactSet

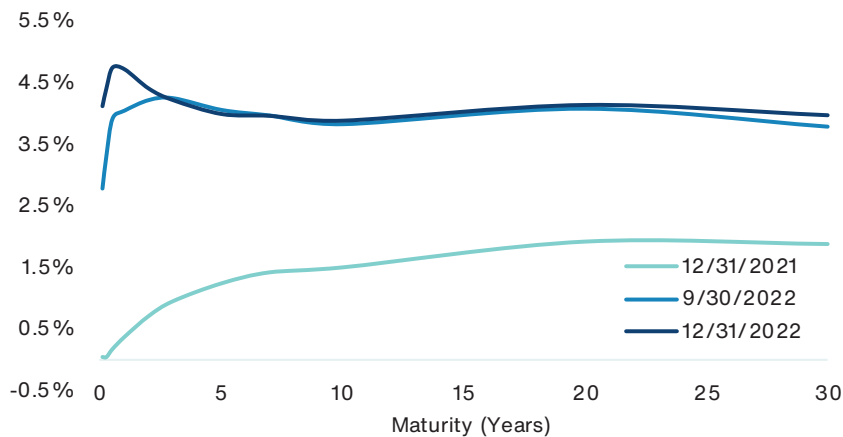
Fourth Quarter 2022 YTD

- The U.S. Federal Reserve (Fed) increased its benchmark interest rate by 125bps to a range of 4.25%-4.5% over the quarter. Fed chair Jerome Powell reiterated that monetary policy needs to be restrictive enough to bring inflation under control. According to the median estimate on the Fed dot plot, officials expect the policy rate to reach 5.1% by the end of 2023, up from the 4.6% forecasted in September.
- The Bloomberg U.S. Aggregate Bond Index was up 1.9% over the quarter but was down 13.0% on a year-to-date basis.
- Across durations, all maturities finished the quarter in positive territory.
- Within investment-grade bonds, lower-credit quality generally outperformed higher-quality issues, with Baa bonds rising by 4.2%. High-yield bonds also rose by 4.2%.

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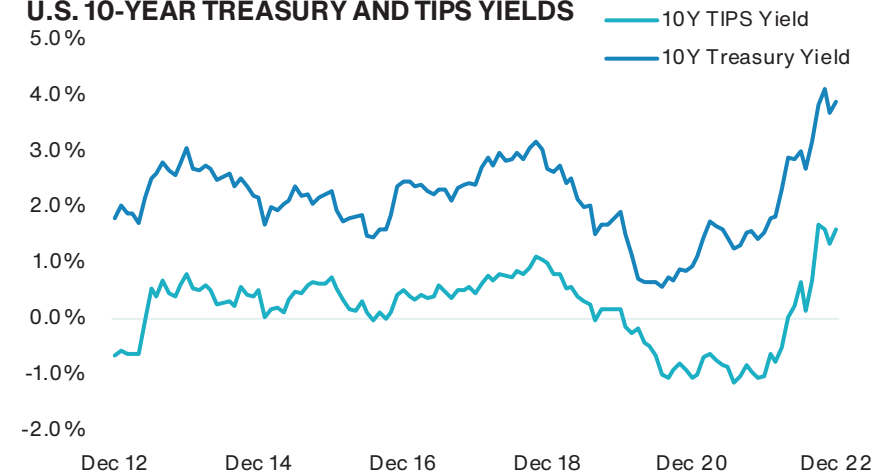
U.S. Fixed Income Markets

U.S. TREASURY YIELD CURVE



Source: U.S. Department of Treasury

U.S. 10-YEAR TREASURY AND TIPS YIELDS

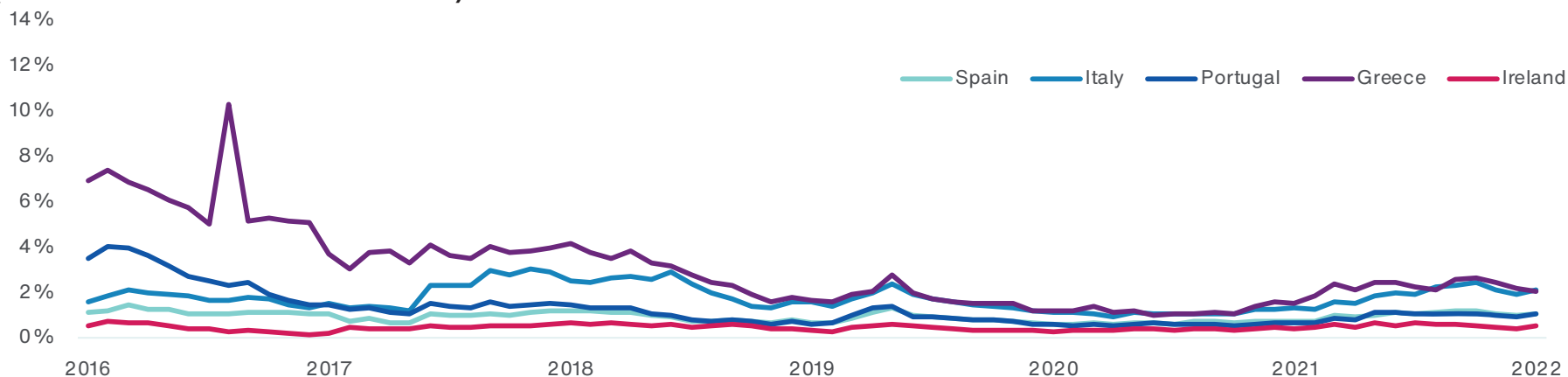


Source: U.S. Department of Treasury

- U.S. Treasury yields saw notable increases at shorter maturities, fell marginally at medium maturities but rose slightly at the longer end of the curve. The 10-year Treasury yield was up 5bps to 3.88%, and the 30-year Treasury yield was up 18bps to 3.97% over the quarter.
- Inflation slowed down, driven by a fall in energy prices. The U.S. annual consumer price index (CPI) rose 7.1% year-on-year in November, down from the 7.7% recorded in October and less than economists' expectations of 7.3%.
- The 10-year TIPS yield fell by 10bps over the quarter to 1.58%.

European Fixed Income Markets

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



- European government bond spreads over 10-year German bunds generally narrowed across the Euro Area. The European Central Bank (ECB) raised its benchmark interest rates by 125bps to 2% over the quarter, the highest level in 14 years. The ECB president, Christine Lagarde, indicated further 0.5% rate increases in the next two meetings as the ECB announced plans to start shrinking the €5tn of bonds it purchased over the last eight years from March 2023.
- German and Portuguese government bond yields rose sharply, up 41bps and 40bps to 2.53% and 3.57% respectively over the quarter.
- Greek government bond yields fell by 20bps to 4.59% over the quarter.
- Eurozone annual inflation eased more than expected to 10.0% in November.

Credit Spreads

Spread (bps)	12/31/2022	9/30/2022	6/30/2022	Quarterly Change (bps)	YTD Change (bps)
U.S. Aggregate	51	62	36	-11	15
Long Gov't	2	1	0	1	2
Long Credit	157	196	130	-39	27
Long Gov't/Credit	87	107	74	-20	13
MBS	51	69	31	-18	20
CMBS	120	105	68	15	52
ABS	76	53	38	23	38
Corporate	130	159	92	-29	38
High Yield	469	552	283	-83	186
Global Emerging Markets	332	403	285	-71	47

Source: FactSet, Bloomberg

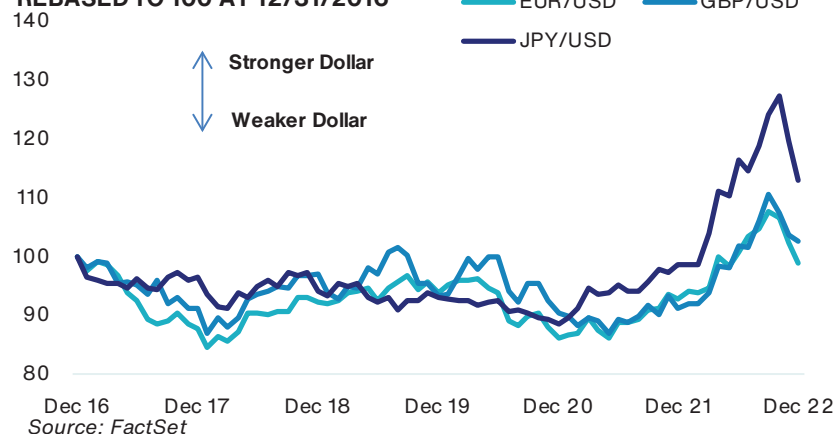
- Credit markets rose amid risk-taking sentiment during the quarter, with spreads generally narrowing.
- High Yield and Global Emerging Markets spreads narrowed by 83bps and 71bps respectively while ABS and CMBS spreads widened by 23bps and 15bps, respectively.

Currency

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



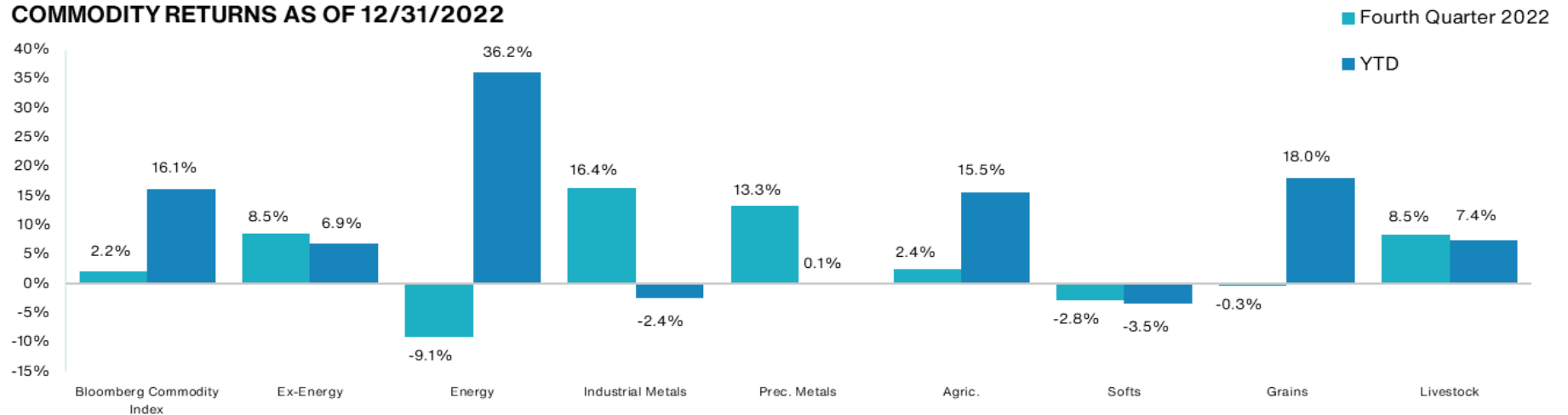
**U.S. DOLLAR RELATIVE TO EUR, GBP AND JPY
REBASED TO 100 AT 12/31/2016**



- The U.S. Dollar weakened against all major currencies over the quarter as the combination of weakening US growth and falling inflation led to expectations that the Fed would cut policy rates this year faster than previously anticipated. On a trade-weighted basis, the U.S. dollar depreciated by 4.8%.
- Sterling appreciated by 7.2% against the U.S. dollar. The Bank of England (BoE) raised its benchmark interest rate by 125bps to 3.5% over the quarter, its highest level since 2008. The central bank expects inflation could touch 10.9% in Q4 2022. The BoE became the first major central bank to actively start to unwind quantitative easing as it sold £750mn of government bonds. The BoE plans to trim its balance sheet by £80bn over the year.
- The U.S. dollar depreciated by 8.2% against the Euro and by 8.8% against the yen. The Bank of Japan (BoJ) unexpectedly changed its yield curve control policy by increasing the acceptable band of its 10-year government bond yields from plus or minus 0.25% to 0.5% around its target rate of zero. The BoJ made a series of government bond purchases to maintain the target band as yields rose across the curve following the announcement.

Commodities

COMMODITY RETURNS AS OF 12/31/2022



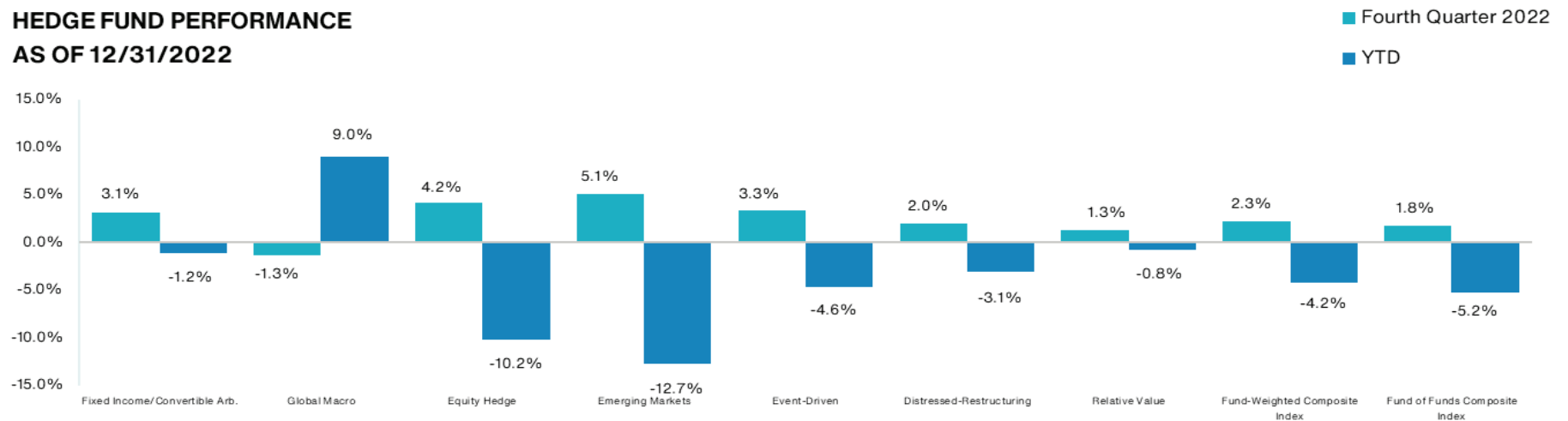
Source: Bloomberg Note: Softs and Grains are part of the wider Agriculture sector

- Commodity prices rose over the quarter with the Bloomberg Commodity Index rising by 2.2% for quarter.
- The energy sector fell 9.1% over the quarter but has risen by 36.2% on a year-to-date basis. The price of WTI crude oil was up by 1.0% to U.S.\$80/BBL.
- Industrial Metals rose the most over the quarter at 16.4%.
- Meanwhile, OPEC+ agreed to cut 2m barrels a day in oil production in an attempt to keep oil prices from falling due to weaker global demand. This cut is equivalent to 2% of global supply and threatens to further increase inflationary pressures across the globe.

Past performance is no guarantee of future results. Indices cannot be invested in directly. Unmanaged index returns assume reinvestment of any and all distributions and do not reflect fees and expenses. Please see appendix for index definitions and other general disclosures.

Hedge Funds Market Overview

HEDGE FUND PERFORMANCE AS OF 12/31/2022



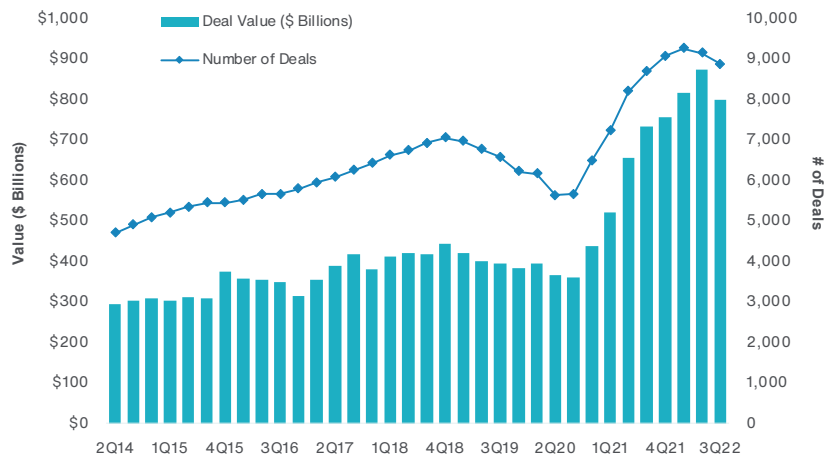
Source: HFRI Note: Latest 5 months of HFRI data are estimated by HFRI and may change in the future.

- Hedge fund performance was generally positive over the quarter.
- The HFRI Fund-Weighted Composite and HFRI Fund of Funds Composite Index produced returns of 2.3% and 1.8% over the quarter, respectively.
- Over the quarter, Emerging Markets was the best performer with a return of 5.1%.
- Global Macro was the worst performer and the only strategy with a negative return (-1.3%) over the quarter.
- On a year-to-date basis, Global Macro has outperformed all other strategies whilst Emerging Markets have performed the worst.

Past performance is no guarantee of future results. Indices cannot be invested in directly. Unmanaged index returns assume reinvestment of any and all distributions and do not reflect fees and expenses. Please see appendix for index definitions and other general disclosures.

Private Equity Market Overview — Third Quarter 2022

LTM Global Private Equity-Backed Buyout Deal Volume



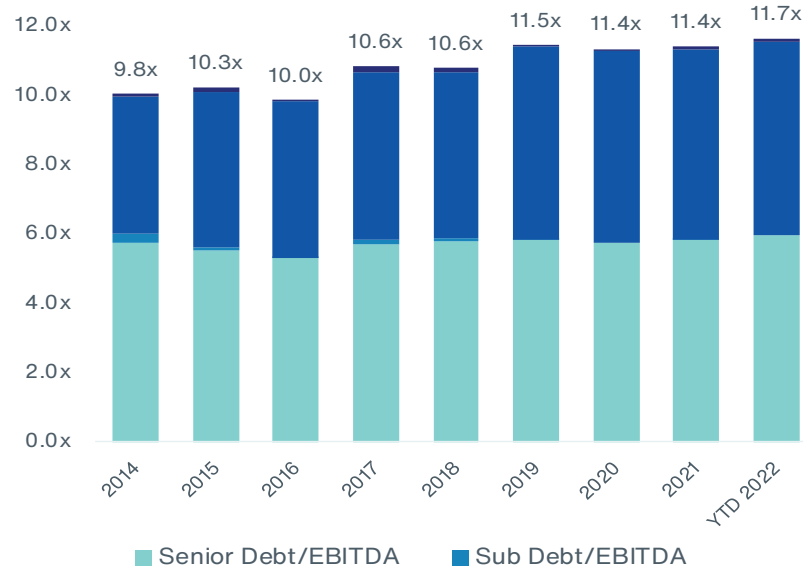
Source: Preqin

Sources: 1 Preqin 2 Standard & Poor's 3 PitchBook/NVCA Venture Monitor 4 Fitch Ratings
 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.

- **Fundraising:** During 3Q 2022, \$231.6 billion was raised by 485 funds, which was down 22.3% by number of funds raised and down by 18.7% by capital raised compared to 2Q 2022. This represented an increase of 6.8% on a capital basis compared to 3Q 2021. Dry powder stood at \$3.0 trillion at the end of the quarter, an increase of 1.3% and 43.3% compared to 2Q 2022 and the five-year average, respectively.¹
- **Buyout:** Global private equity-backed buyout deals totaled \$93.6 billion in 3Q 2022, which was a decrease on a capital basis of 64.8% compared to 2Q 2022 and a decrease of 31.2% compared to the five-year quarterly average.¹ During the quarter, the average purchase price multiple for all U.S. LBOs was 11.7x EBITDA, up slightly from 2Q 2022's average of 11.5x and up from the five-year average (11.1x). Large-cap purchase price multiples stood at 11.7x during the quarter, up compared to full-year 2021's level of 11.2x. The LTM average purchase price multiple across European transactions greater than €1B averaged 10.5x EBITDA at the end of 3Q 2022, down from 11.3x at the end of 2Q 2022. Purchase prices for transactions of €500M million or more averaged 10.2x EBITDA on an LTM basis, lower than the 11.2x seen at the end of 2Q 2022.² Globally, exit value totaled \$67.8 billion on 298 deals during the quarter, lower than the \$125.2 billion across 348 deals during 2Q 2022.¹
- **Venture:** During the quarter, an estimated 3,076 U.S. venture-backed transactions totaling \$43.0 billion were completed, which was a decrease on a capital value and deal count basis over the prior quarter's total of \$71.9 billion across 4,055 deals. This was also a decrease of 14.2% compared to the five-year quarterly average of \$50.2 billion. Total U.S. venture-backed exit value totaled approximately \$14.0 billion across an estimated 302 completed transactions in 3Q 2022, down substantially from \$192.6 billion across 475 exits in 3Q 2021.³
- **Mezzanine:** 12 funds closed on \$28.7 billion during the quarter. This was a significant increase from the prior quarter's total of \$3.8 billion raised by 7 funds and also a significant increase from the \$3.8 billion raised by 15 funds in 3Q 2021. Estimated dry powder was \$70.5 billion at the end of 3Q 2022, up from \$50.6 billion at the end of 2Q 2022.¹

Private Equity Market Overview – Third 2022

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



Sources: 1 Preqin 2 Standard & Poor's 3 PitchBook/NVCA Venture Monitor 4 Fitch Ratings

- **Distressed Debt:** The YTD U.S. high-yield default rate was 1.2% as of October 2022. Fitch predicted the TTM default rate may rise to 1.5%-1.75% by year-end 2022. The high-yield default rate is projected to trend higher through 2023.⁴ During the quarter, \$16.6 billion was raised by 15 funds, down significantly from the \$29.4 billion raised by 17 funds during 2Q 2022. Dry powder was estimated at \$153.3 billion at the end of 3Q 2022, which was down 4.4% from 2Q 2022. This remained above the five-year annual average level of \$129.4 billion.¹
- **Secondaries:** 5 funds raised \$5.5 billion during the quarter, down from the \$13.8 billion raised by 17 funds in 2Q 2022. This was 50.6% lower than the five-year quarterly average of \$11.2 billion. Secondary dry powder was estimated at \$127.8 billion at the end of the quarter.¹
- **Infrastructure:** \$33.8 billion of capital was raised by 34 funds in 3Q 2022 compared to \$40.1 billion of capital raised by 59 partnerships in 2Q 2022. At the end of the quarter, dry powder stood at \$298.8 billion, down from 2Q 2022's total of \$319.5 billion. Infrastructure managers completed 1999 deals for an aggregate deal value of \$304.4 billion through 3Q 2022 compared to 2,489 deals totaling \$530.6 billion in 2021.¹
- **Natural Resources:** Through 3Q 2022, an estimated 19 funds closed on \$3.8 billion compared to 29 funds totaling \$13.0 billion in 2021. Energy and utilities industry managers completed 59 deals totaling \$12.3 billion in 3Q 2022, compared to \$11.6 billion across 53 deals in 2Q 2022.¹

Appendix: Index Definitions

MSCI AC World Index - The MSCI ACWI Index, MSCI's flagship global equity index, is designed to represent performance of the full opportunity set of large- and mid-cap stocks across 23 developed and 24 emerging markets. As of May 2022, it covers more than 2,933 constituents across 11 sectors and approximately 85% of the free float-adjusted market capitalization in each market.

S&P 500 - The S&P 500® is widely regarded as the best single gauge of large-cap U.S. equities and serves as the foundation for a wide range of investment products. The index includes 500 leading companies and captures approximately 80% coverage of available market capitalization.

HFRI Fund Weighted Composite - The HFRI Fund Weighted Composite Index is a global, equal-weighted index of single-manager funds that report to HFR Database. Constituent funds report monthly net of all fees performance in US Dollar and have a minimum of \$50 Million under management or \$10 Million under management and a twelve (12) month track record of active performance. The HFRI Fund Weighted Composite Index does not include Funds of Hedge Funds.

Russell 3000 Index - The Russell 3000 Index is a market-capitalization-weighted equity index that seeks to track 3000 of the largest U.S.-traded stocks.

Russell 2000 Index - The Russell 2000 Index measures the performance of the small-cap segment of the U.S. equity universe. The Russell 2000 Index is a subset of the Russell 3000® Index representing approximately 10% of the total market capitalization of that index. It includes approximately 2000 of the smallest securities based on a combination of their market cap and current index membership.

MSCI All Country World Investable Market Index - A capitalization-weighted index of stocks representing approximately 49 developed and emerging countries, including the U.S. and Canadian markets and covering all investable large-, mid- and small-cap securities.

MSCI Emerging Markets Investable Market Index - A capitalization-weighted index of stocks representing approximately 26 emerging countries, and covering all investable large-, mid- and small-cap securities.

Dow Jones U.S. Total Stock Market Index - A capitalization-weighted index of stocks representing all U.S. equity eligible securities.

MSCI World Index - A free float-adjusted market capitalization weighted index that is designed to measure the equity market performance of developed markets, representing 24 developed market country indices.

MSCI USA Value/Growth - The MSCI USA Value/Growth Index captures U.S. large and mid cap securities exhibiting overall value/growth style characteristics. The value investment style characteristics for index construction are defined using three variables: book value to price, 12-month forward earnings to price and dividend yield. The growth investment style characteristics for index construction are defined using five variables: long-term forward EPS growth rate, short-term forward EPS growth rate, current internal growth rate and long-term historical EPS growth trend and long-term historical sales per share growth trend.

Bank of America Merrill Lynch U.S. Corporate Index - An unmanaged index considered representative of fixed-income obligations issued by U.S. corporates.

Bank of America Merrill Lynch U.S. High Yield Index - An unmanaged index considered representative of sub-investment grade fixed-income obligations issued by U.S. corporates.

Bloomberg U.S. Government Index - An unmanaged index considered representative of fixed-income obligations issued by the U.S. government.

Bloomberg Long Credit Index - An unmanaged index considered representative of long duration fixed-income obligations issued by U.S. corporates.

S&P GSCI - A world-production weighted index that is based on the average quantity of production of each commodity in the index.

MSCI factor indexes - are rules-based indexes that capture the returns of systematic factors that have historically earned a persistent premium over long periods of time—such as Value, Low Size, Low Volatility, High Yield, Quality and Momentum and Growth.

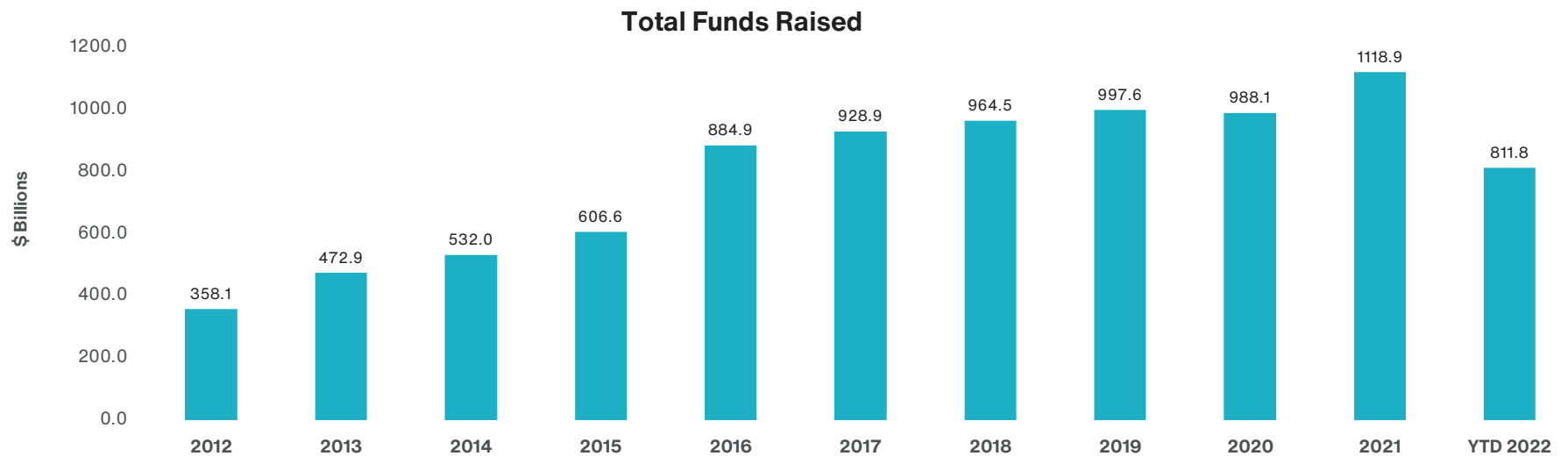
AON

3Q 2022 Global Private Equity Market Overview

January 2023



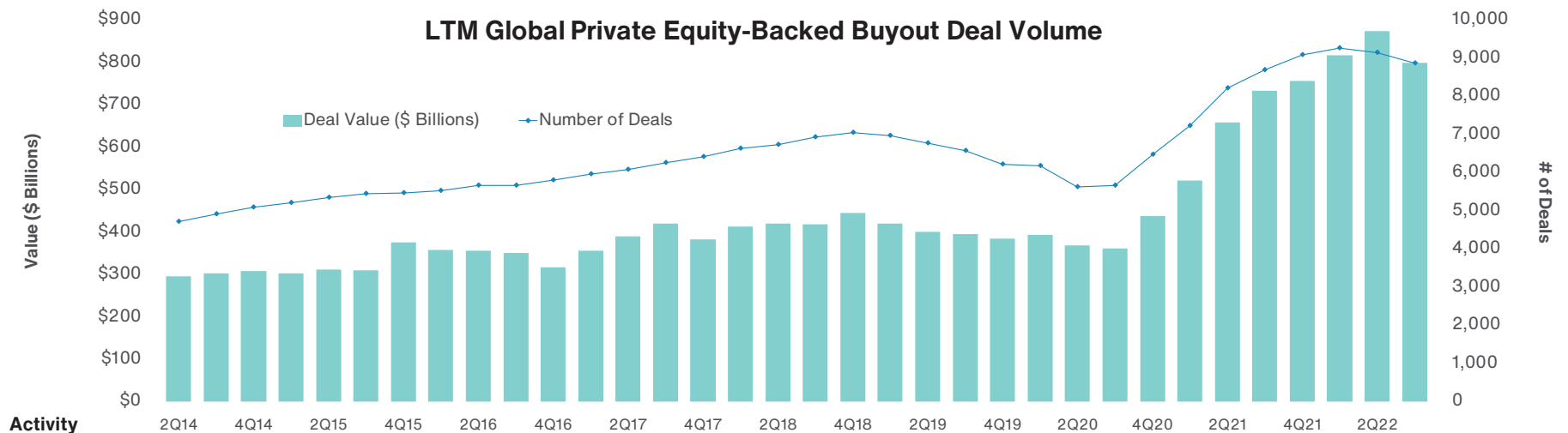
Private Equity Overview



Fundraising

- During 3Q 2022, \$231.6 billion was raised by 485 funds, which was down 22.3% by number of funds raised and down 18.7% by capital raised compared to 2Q 2022. Capital raised through 3Q 2022 represented 72.6% of capital raised during calendar year 2021.¹
 - 3Q 2022 fundraising was 6.8% higher, on a capital basis, than capital raised in 3Q 2021 but 40.7% lower by number of funds raised.
 - The majority of capital was raised by funds with target geographies in North America, comprising 66.6% of the quarter's total. This was down from 72.1% in 2Q 2022. Capital targeted for Europe made up 20.4% of the total funds raised during the quarter, an increase from 11.7% in 2Q 2022. The remainder was attributable to managers targeting Asia and other parts of the world.
- Dry powder stood at \$3.0 trillion at the end of the quarter, an increase of 1.3% and 43.3% compared to 2Q 2022 and the five-year average, respectively.¹

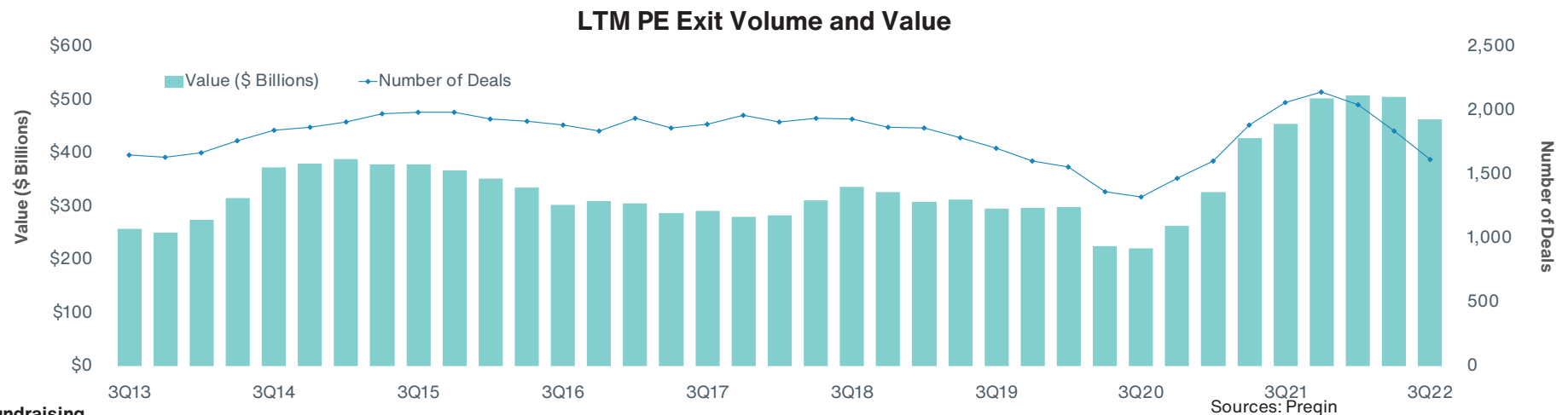
Private Equity Overview (cont.)



Activity

- Global private equity-backed buyout deals totaled \$93.6 billion in 3Q 2022, which was a decrease on a capital basis of 64.8% compared to 2Q 2022.¹
 - This was a decrease of 31.2% compared to the five-year quarterly average.
 - Average deal size was \$336.9 million in 3Q 2022. This was down 56.0% compared to 2Q 2022 and down 17.3% relative to the five-year quarterly average.
- During the quarter, the average purchase price multiple for all U.S. LBOs was 11.7x EBITDA, up from 2Q 2022's average of 11.5x and up from the five-year average (11.1x). Large cap purchase price multiples stood at 11.7x during the quarter, up compared to full-year 2021's level of 11.2x.²
 - Average purchase price multiples for all U.S. LBOs were 0.6x and 1.4x turns (multiple of EBITDA) above the five- and ten-year average levels, respectively.
- In Europe, the average purchase price multiple across transactions of greater than €500M averaged 10.2x EBITDA on an LTM basis, down from 11.3x at the end of 2Q 2022.³
- Availability of debt has contracted, but GPs were still able to obtain debt financing for the best deals.
 - The average leverage for U.S. deals through 3Q 2022 was 6.0x compared to the five and ten-year averages of 5.8x and 5.6x, respectively.³
 - In Europe, the average senior debt/EBITDA on an LTM basis ended 3Q 2022 at 5.7x, lower than that observed at 2Q 2022 (5.9x).

Buyouts / Corporate Finance



Fundraising

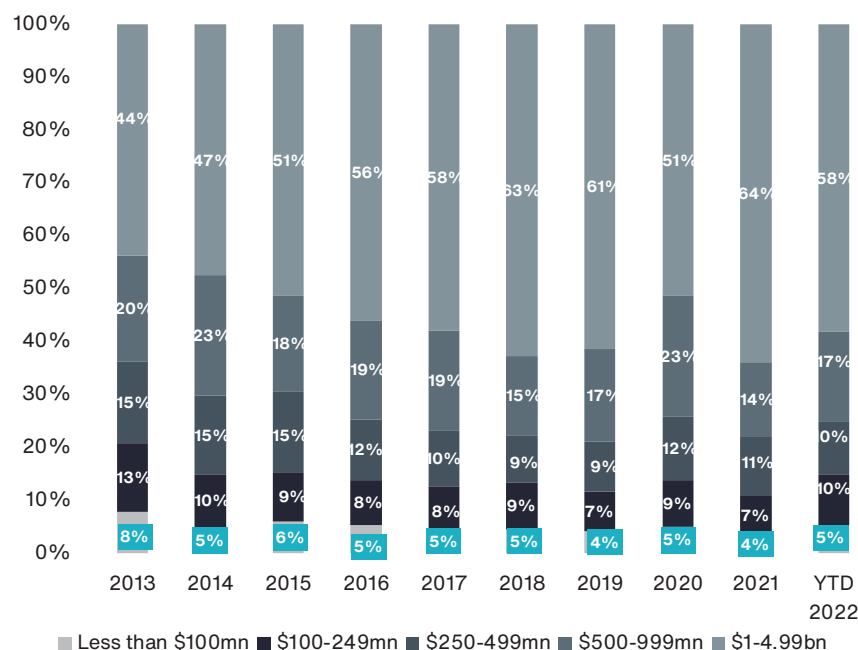
- \$101.8 billion was closed on by 108 buyout and growth funds in 3Q 2022, compared to \$117.7 billion raised by 153 funds in 2Q 2022. This was higher than the \$100.5 billion raised by 190 funds in 3Q 2021.¹
 - This was lower, on a capital basis, than the five-year quarterly average of \$113.0 billion and lower by number of funds (193).
 - Francisco Partners VII was the largest fund raised during the quarter, closing on \$13.5 billion of commitments.
- Buyout and growth equity dry powder was estimated at \$1.3 trillion, up from 4Q 2021.¹
 - An estimated 56.7% of buyout dry powder was targeted for North America, while European dry powder comprised 23.7% and Asia/Rest of World accounted for the remainder.

Activity

- Globally, exit value totaled \$67.8 billion on 298 deals during the quarter, lower than the \$125.2 billion across 348 deals during 2Q 2022. 3Q 2022's totals were significantly lower than 3Q 2021's totals of \$110.2 billion in value across 522 deals.¹

Buyouts / Corporate Finance

M&A Deal Value by Deal Size



Sources: Preqin

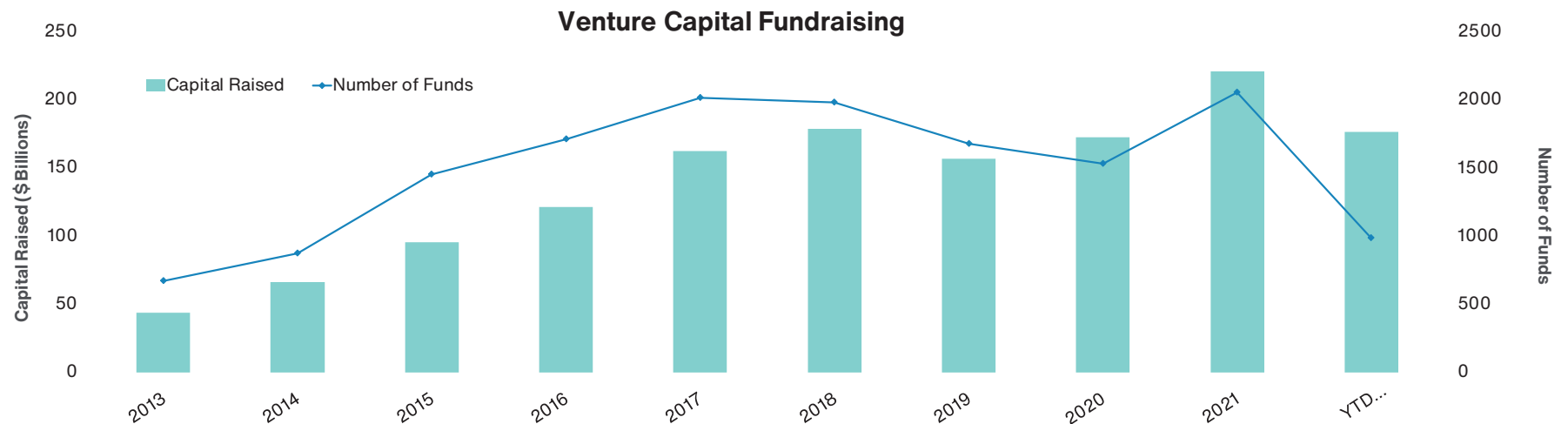
Activity

- Global private equity-backed buyout deals totaled \$93.6 billion in 3Q 2022, which was a decrease on a capital basis of 64.8% compared to 2Q 2022 and a decrease of 44.5% compared to 2Q 2021.¹
- Through 3Q 2022, deal value accounted for 79.4% of 2021's total and represented 107.8% of deal value during the same period in 2021.¹
 - Through 3Q 2022, deals valued between \$1.0 billion - \$4.9 billion accounted for an estimated 58.0% of total deal value compared to 64.0% in 2021. Deals valued between \$500.0 million to \$1.0 billion represented 17.0% of total deal value through the third quarter.
 - By geography, North American deals accounted for the largest percentage of total deal value at an estimated 60.3% in 3Q 2022, while Healthcare deals accounted for the largest percentage by industry at 25.9% of total deal value.
- Through 3Q 2022, the average purchase price multiple for all U.S. LBOs was 11.7x EBITDA, down from 2Q 2022's average of 12.1x but up from the five-year average (11.1x).³
 - Large cap purchase price multiples stood at 11.7x, up compared to the full-year 2021 level of 11.2x.
- In Europe, the average purchase price multiple across transactions of greater than €500M averaged 10.2x EBITDA on an LTM basis, down from 11.2x at the end of 2Q 2022 and down from the multiple seen at the end of Q4 2021 (11.5x).³
- The portion of average purchase prices financed by equity for all deals was 47.5% through 3Q 2022, down slightly from 49.2% through 2Q 2022. This remained above the five- and ten-year average levels of 47.4% and 44.8%, respectively.³

Opportunity⁴

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

Venture Capital



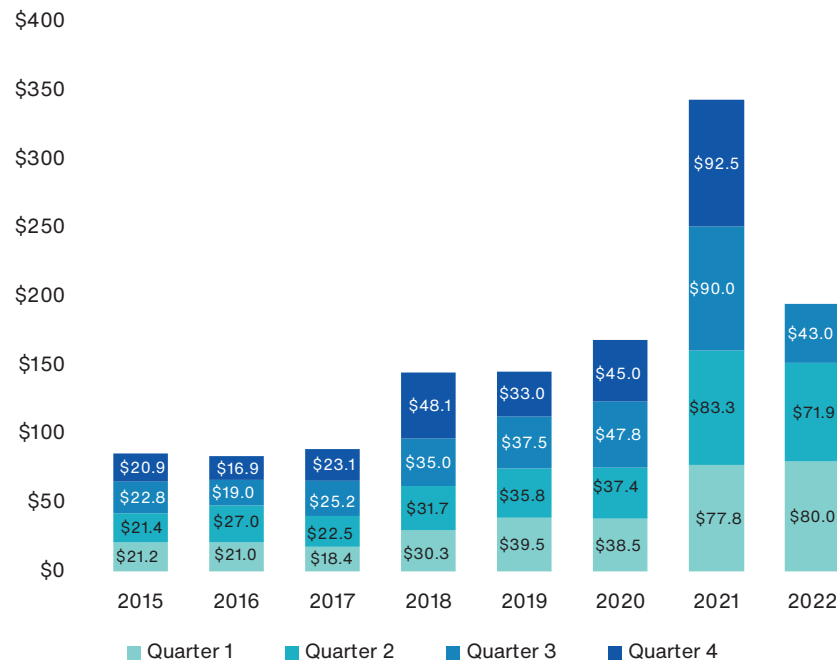
Sources: Preqin

Fundraising

- \$48.3 billion of capital was raised by 273 funds in 3Q 2022, down from the prior quarter's total of \$56.4 billion raised by 335 managers. This was up from 3Q 2021's amount of \$37.3 billion raised by 449 funds. Through 3Q 2022, capital raised represented 79.8% of 2021's total.¹
 - 3Q 2022 fundraising was 2.8% higher, on a capital basis, compared to the five-year quarterly average of \$46.9 billion.
 - Bessemer Venture Partners XII was the largest fund raised during the quarter, closing on \$3.9 billion.
- At the end of 3Q 2022, there were an estimated 4,953 funds in market targeting \$386.2 billion.¹
 - Tiger Private Investment Partners XVI was the largest venture fund in market, targeting an estimated \$11.0 billion.
 - The majority of funds in market are seeking commitments of \$2A00.0 million or less.
- Dry powder was estimated at \$556.7 billion at the end of 3Q 2022, up from 2Q 2022's total of \$523.0 billion.¹

Venture Capital

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



Source: Pitchbook / NVCA

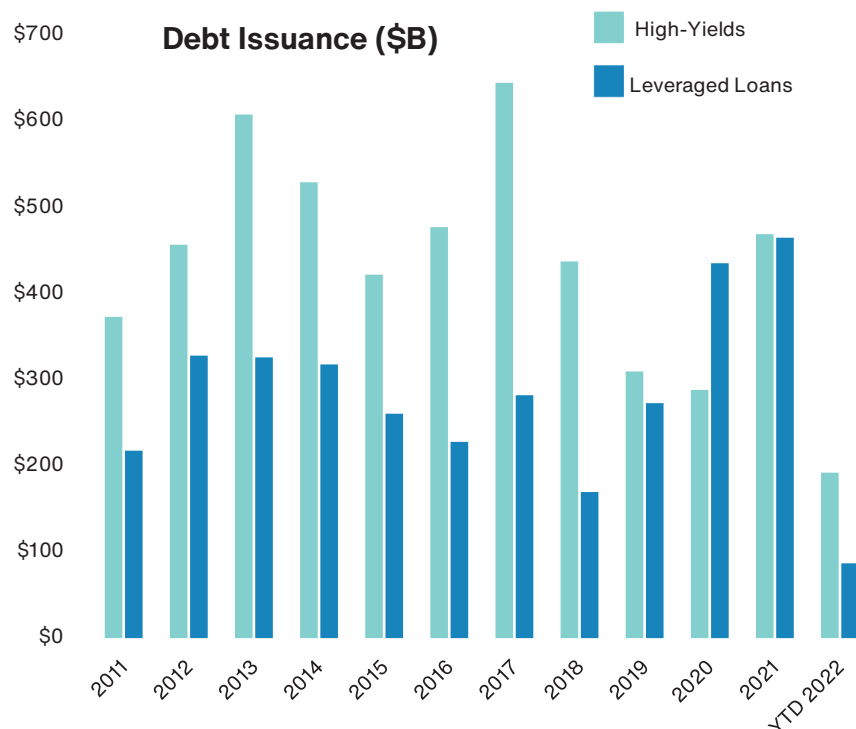
Activity

- During the quarter, an estimated 3,076 U.S. venture-backed transactions totaling \$43.0 billion were completed, which was a decrease on a capital value and deal count basis over the prior quarter's total of \$71.9 billion across 4,055 deals. This was also a decrease of 14.2% compared to the five-year quarterly average of \$50.2 billion.⁷
 - In 3Q 2022, there were 59 U.S.-based deals involving unicorn companies, representing roughly \$7.6 billion in deal value. This was down by value and by number compared to 2Q 2022, which saw 114 unicorn-related deals close at a deal value of \$25.5 billion. 3Q 2022 represented the lowest quarter by value and number since 4Q 2019.⁷
- At the end of 2Q 2022, median pre-money valuations decreased across all series. Compared to 2Q 2022, Seed transactions decreased from a median pre-money valuation of \$18.6 million to \$17.6 million, Series A decreased from \$57.5 million to \$45.0 million, Series B decreased from \$164.4 million to \$90.0 million, Series C decreased from \$502.1 million to \$130.2 million, and Series D+ median pre-money valuations decreased from \$1.5 billion to \$526.5 million.⁸
- Total U.S. venture-backed exit value totaled approximately \$14.0 billion across an estimated 302 completed transactions in 3Q 2022, down substantially from \$192.6 billion across 475 exits in 3Q 2021. This was the lowest quarterly total since 1Q 2013. Through 3Q 2022, U.S. exit activity represented only 8.1% of 2021's total.⁷
 - The number of U.S. venture-backed initial public offerings decreased over 2Q 2022, with only 13 IPOs completed in 3Q 2022 at a value of \$2.5 billion. 151 exits occurred by acquisition, marking a decrease over the prior quarter's 232, and accounted for \$10.2 billion in exit value.⁷

Opportunity⁴

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

Leveraged Loans & Mezzanine



Sources: UBS

Leveraged Loans Fundraising

- New CLO issuance totaled \$104.5 billion through 3Q 2022.²
- High-yield debt issuance totaled \$18.9 billion in 3Q 2022, the second lowest quarterly volume since the Financial Crisis. 2022's YTD total represented only 18.7% of 2021's total.²
- Through 3Q 2022, leveraged loan mutual fund net flows ended at a net inflow of \$1.4 billion.²

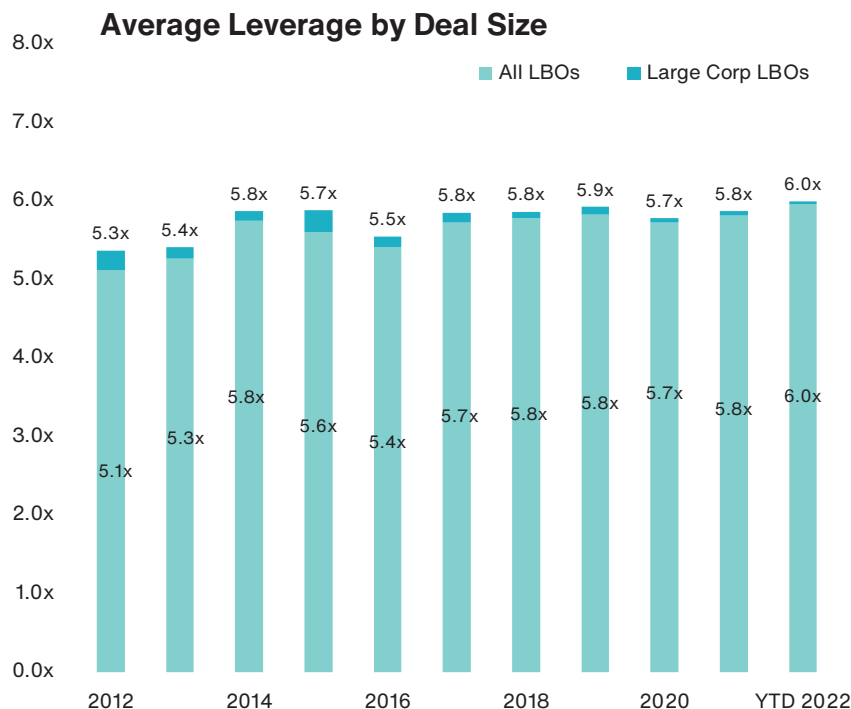
Activity

- In 3Q 2022, institutional leveraged loan issuances totaled only \$23.4 billion, the lowest quarterly total since 4Q 2009. 2022's YTD total represented only 40.1% of 2021's total.²
- European sponsored loan issuance increased to €8.9 during 3Q 2022 compared to €6.4 during 2Q 2022. This was 48.3% lower than the five-year quarterly average level of €17.2 billion.³

Opportunity⁴

- 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

Leveraged Loans & Mezzanine



Sources: S&P

Activity

- Leverage for all U.S. LBO transactions through 3Q was 6.0x, up slightly from 2Q's leverage level 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, higher than that seen at year-end 2021 (5.8x).³
- The amount of debt issued supporting new transactions increased compared to the prior quarter, moving from 80.4% to 82.1%, and was higher than the five-year average of 65.0%.³

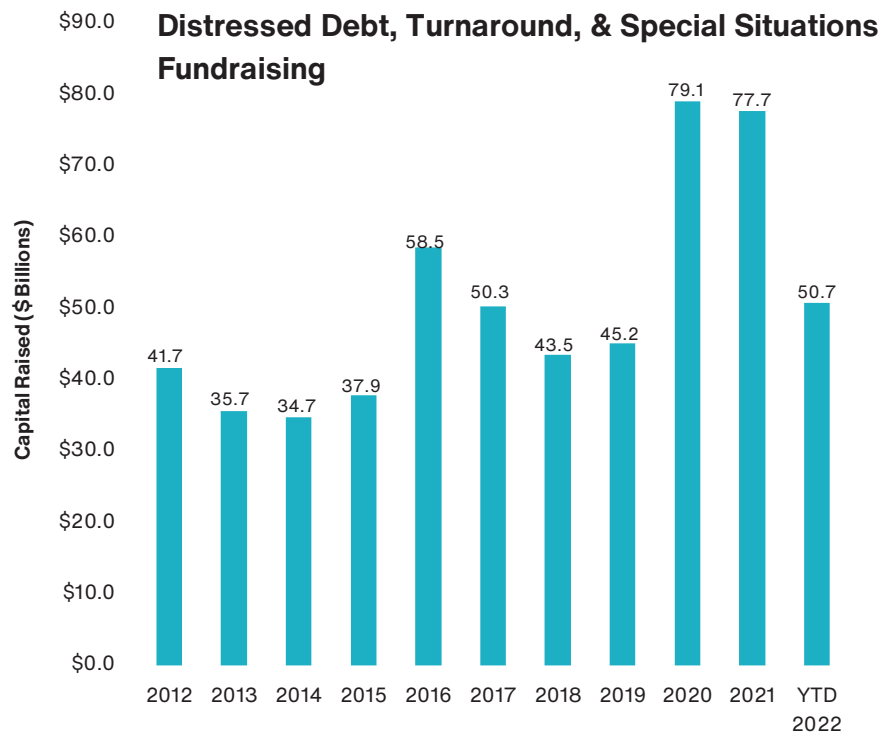
Mezzanine Fundraising

- 12 funds closed on \$28.7 billion during the quarter. This was a significant increase from the prior quarter's total of \$3.8 billion raised by 7 funds and also a significant increase from the \$3.8 billion raised by 15 funds in 3Q 2021.¹
- Estimated dry powder was \$70.5 billion at the end of 3Q 2022, up from \$50.6 billion at the end of 2Q 2022.¹
- An estimated 106 funds were in market targeting \$32.5 billion of commitments. HPS Strategic Investment Partners V is the largest fund in market targeting commitments of \$9.5 billion.¹

Opportunity⁴

- Funds with the capacity to scale for large sponsored deals

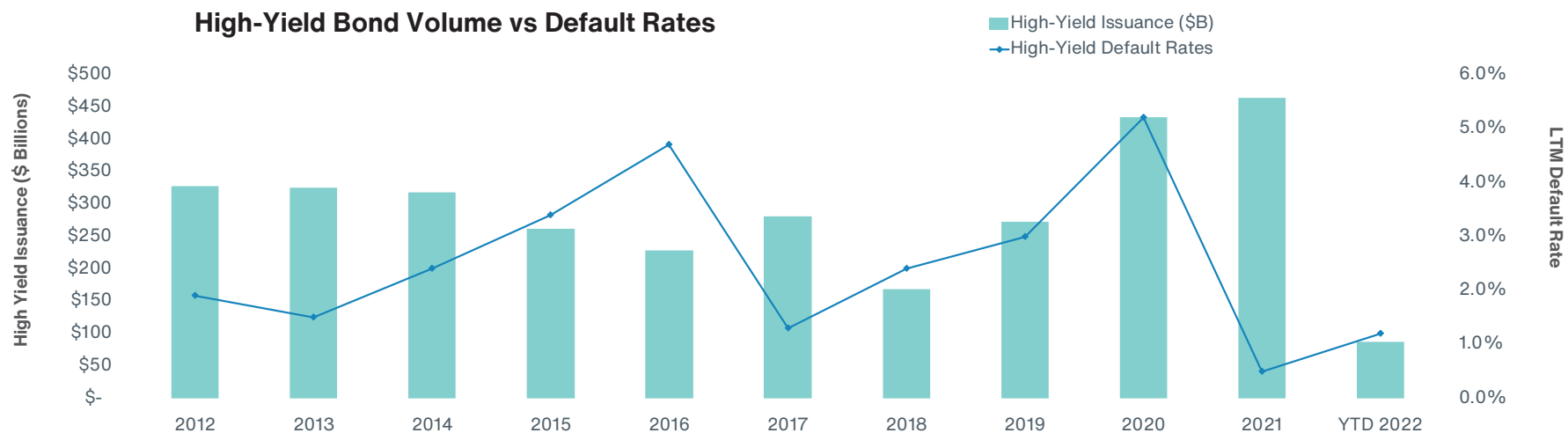
Distressed Private Markets



Fundraising

- During the quarter, \$16.6 billion was raised by 15 funds, down significantly from the \$29.4 billion raised by 17 funds during 2Q 2022. Distressed funds have raised 65.3% of 2021's total through 3Q 2022.¹
 - 3Q 2022's fundraising was 8.4% higher than the five-year quarterly average.
 - Capital raised in 3Q 2022 represented a decrease compared to the \$27.6 billion raised in 3Q 2021.
 - Sixth Street Opportunities V was the largest fund closed during the quarter, closing on \$4.1 billion.
- Dry powder was estimated at \$153.3 billion at the end of 3Q 2022, which was down 4.4% from 2Q 2022. This remained above the five-year annual average level of \$129.4 billion.¹
- Roughly 197 funds were in the market at the end of 3Q 2022 seeking \$87.6 billion in capital commitments.¹
 - Special situations managers were targeting the most capital, seeking an aggregate \$53.8 billion, followed by distressed debt managers at \$31.4 billion.
 - KKR Opportunities Fund II was the largest fund in market with a target fund size of \$5.0 billion.

Distressed Private Markets



Sources: UBS / Fitch Ratings

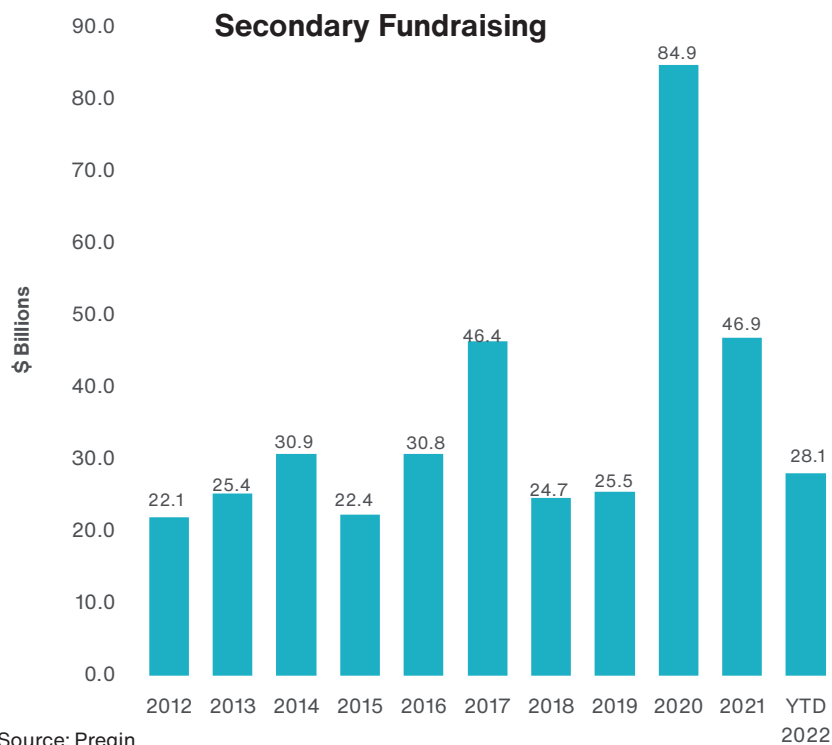
Activity

- The YTD U.S. high-yield default rate was 1.2% as of October 2022. Fitch predicted the TTM default rate may rise to 1.5%-1.75% by year-end 2022. The high-yield default rate is projected to trend higher through 2023.⁶
- The market dislocation caused by current macroeconomic factors may supply additional distressed opportunities in the next several months.

Opportunity⁴

- Funds capable of performing operational turnarounds
- Funds with the flexibility to invest globally

Secondaries



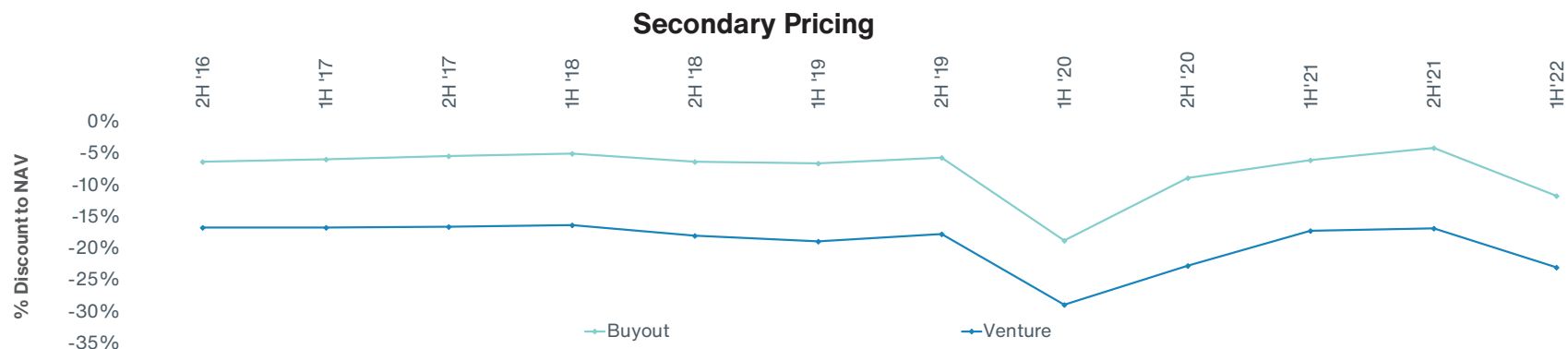
Fundraising

- 5 funds raised \$5.5 billion during the quarter, down from the \$13.8 billion raised by 17 funds in 2Q 2022. This was 50.6% lower than the five-year quarterly average of \$11.2 billion.¹
 - NB Secondary Opportunities Fund V was the largest fund raised during the quarter, closing on \$4.9 billion.
- At the end of 3Q 2022, there were an estimated 118 secondary and direct secondary funds in market targeting roughly \$79.4 billion. The majority of secondary funds are targeting North American investments.¹
 - Strategic Partners GP Solutions is the largest fund being raised, seeking \$20.0 billion in commitments.

Activity

- The market continues to have participation from a broad base of buyers and sellers with opportunistic selling activity being seen from public and private pensions, financial institutions and insurance companies.²
- PJT Partners noted several \$1.0+ billion Limited Partner transactions closed during 3Q 2022, despite the macro environment. Investors are now focusing their demand on a select group of managers.¹⁶
- According to UBS, the number of GP-led situations brought to market continued to increase with varying quality and strategies, along with more household GP names utilizing the secondary market. This is expected to continue throughout 2022.²

Secondaries



Source: UBS

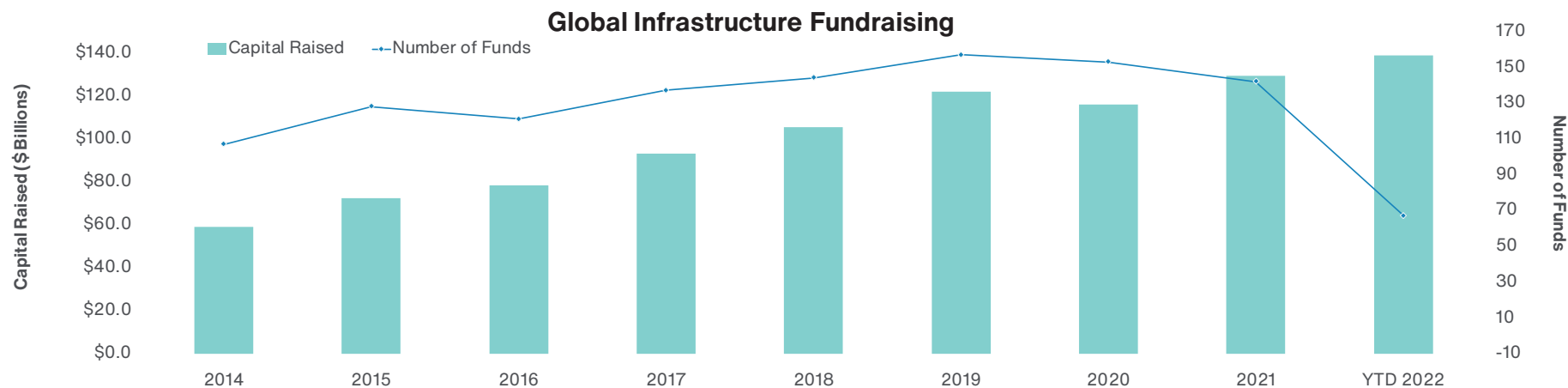
Activity

- Campbell Lutyens expects LP-led secondary sales to grow even stronger as more investors use these transactions to crystalize gains, trim their GP rosters, and manage balance sheet risk.¹⁵ According to Evercore, secondary deals involving LP positions increased to 51% of total deal volume as GP-related deals saw a meaningful contraction.¹⁴
- Payment deferrals and structured equity solutions continue to be prevalent in the LP portfolio market and are used as a means to improve pricing and deal returns in an increasingly competitive environment.¹⁶
- Recent market volatility may create a widening gap over the course of the year between bid and ask prices for secondary transactions.¹⁵
- Given the current public market conditions, buyers are wanting to purchase assets based off NAVs that reflect the volatility.²
- The average discount rate for all private equity sectors finished 1H 2022 at a larger discount compared to the 11.4% discount seen at the end of Q1 22. The average buyout pricing discount ended the 1H at 11.6%, while the average venture discount increased to 22.9%.²

Opportunity⁴

- Funds that are able to execute complex and structured transactions
- Niche strategies

Infrastructure

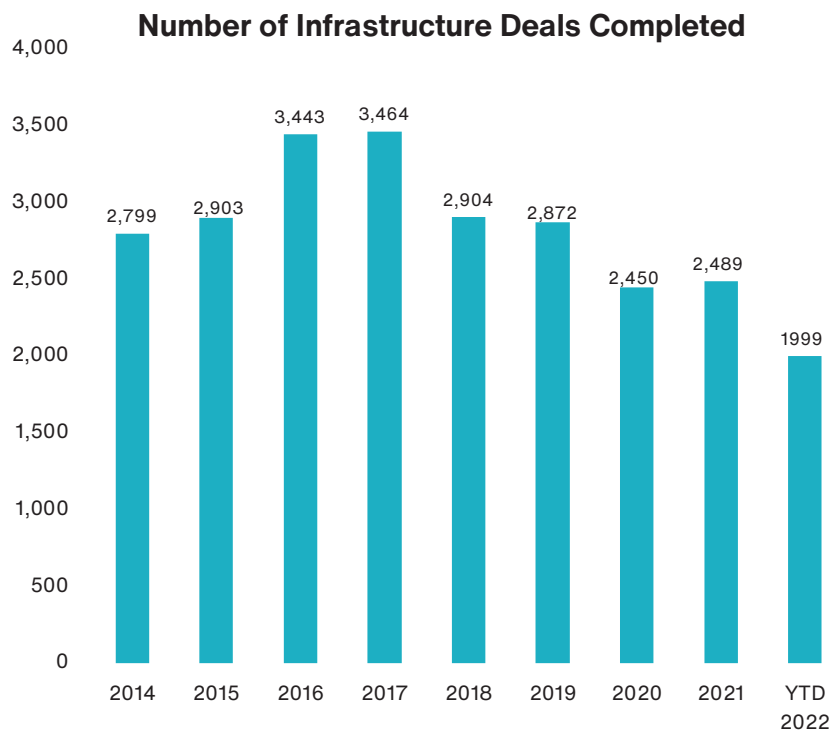


Fundraising

Source: Preqin

- \$138.8 billion of capital was raised by 67 funds through 3Q 2022 compared to \$129.2 billion of capital raised by 142 partnerships in 2021. This is 22.7% higher than the five-year average of \$113.1 billion.¹
 - Copenhagen Infrastructure Energy Transition Fund I was the largest fund raised during the quarter, closing on €3.0 billion.
- As of the end of 3Q 2022, there were an estimated 411 funds in the market seeking roughly \$276.0 billion.¹
 - By number, the core-plus strategy had the most funds in market with 114 funds seeking capital.
- At the end of the quarter, dry powder stood at \$298.8 billion, down from 2Q 2022's total of \$319.5 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 strong levels of dry powder and increased investment activity from strategic and corporate buyers as well as institutional investors.

Infrastructure



Source: Preqin

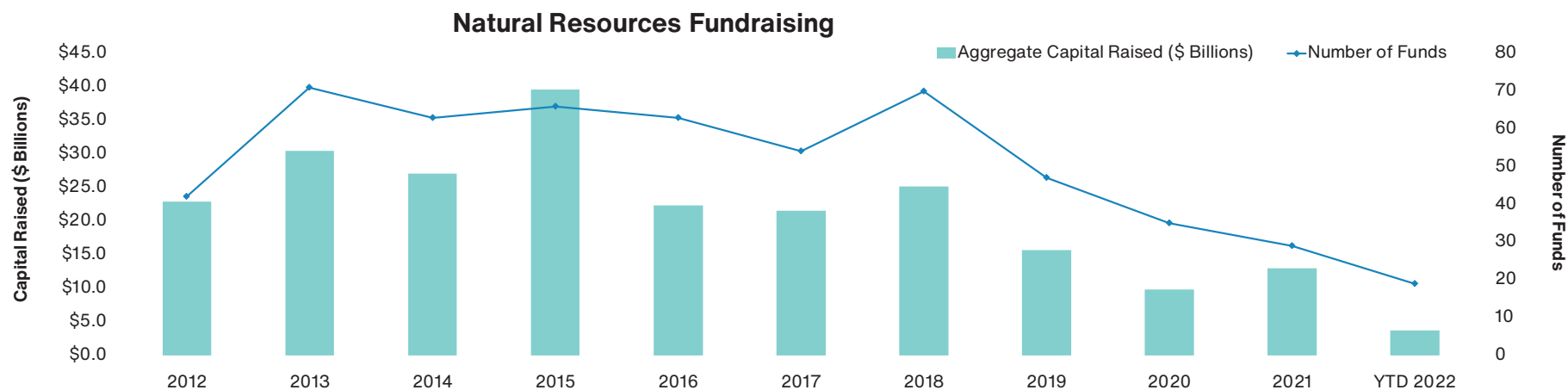
Activity

- Infrastructure managers completed 1,999 deals for an aggregate deal value of \$304.4 billion through 3Q 2022 compared to 2,489 deals totaling \$530.6 billion in 2021.¹
 - By region, Europe saw the largest number of deals, with 39.4% of deals being completed in the region, followed by North America at 27.8%. Asia amassed 12.9% of activity through the end of 3Q 2022.
 - Renewable energy was the dominant industry year-to-date, making up 51.4% of transactions, followed by the transportation sector which accounted for 12.4% of deals. The conventional energy sector accounted for 9.9% of deals through the third quarter.

Opportunity⁴

- 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



Source: Preqin

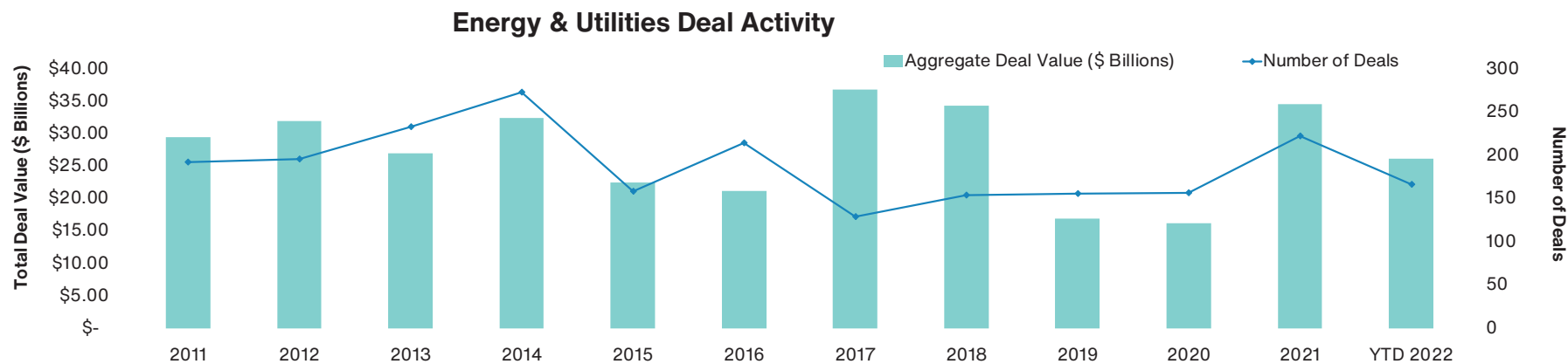
Fundraising

- Through 3Q 2022, an estimated 19 funds closed on \$3.8 billion compared to 29 funds totaling \$13.0 billion in 2021.¹
- Dry powder stood at roughly \$31.2 billion at the end of 3Q 2022, which was 9.3% lower than 4Q 2021's level of \$34.4 billion and down from the five-year average level by 32.8%.¹

Activity

- Crude oil prices decreased during the quarter.
 - WTI crude oil prices decreased 26.6% during the quarter to \$84.26 per bbl. However, this was an increase of 17.6% compared to 3Q 2021.¹⁰
 - Brent crude oil prices ended the quarter at \$89.76/bbl, down 26.9% compared to the prior quarter. However, this was an increase of 20.5% from 3Q 2021.¹⁰
 - Natural gas prices (Henry Hub) finished 3Q 2022 at \$7.88 per MMBtu, which was up 2.3% from the prior quarter and up 52.7% from 3Q 2021.¹⁰

Natural Resources



Source: Preqin

Activity

- Energy and utilities industry managers completed 59 deals totaling \$12.3 billion in 3Q 2022, compared to \$11.6 billion across 53 deals in 2Q 2022.¹
- A total of 765 crude oil and natural gas rotary rigs were in operation in the U.S. at the end of the quarter. This was up by 2.0% from the prior quarter and up 44.9% over 3Q 2021.¹³
 - Crude oil rigs represented 79.0% of the total rigs in operation. 56.1% of the 604 active oil rigs were in the Permian basin.
 - At the end of 3Q 2022, 44.7% and 24.5% of natural gas rigs were operating in the Haynesville and Marcellus basins, respectively.
- The price of iron ore (Tianjin Port) ended the quarter at \$99.80 per dry metric ton, down from \$130.74 at the end of 2Q 2022.¹⁰

Opportunity⁴

- 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
16. PJT Partners

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

AON

3Q 2022 Real Estate Market Overview

January 2023



United States Real Estate Market Update (3Q22)

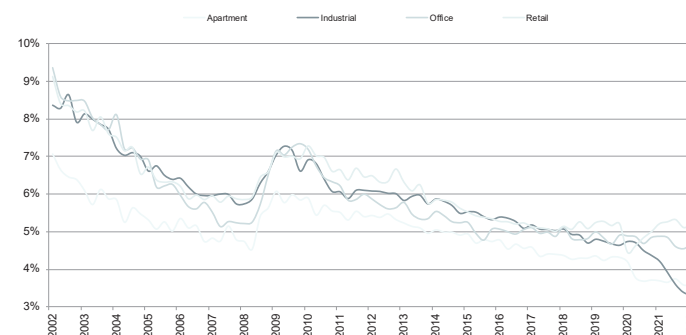
General

- Townsend witnessed a robust recovery across the U.S. economy and U.S. real estate markets in 2021 but has begun to moderate so far in 2022. An array of headwinds have emerged including rising interest rates, persistent inflation, various geopolitical events, and widespread global supply chain struggles. The S&P 500 locked in its 3rd worst performance since the 1950s, producing a gross total return of -25.0% during the first three quarters of the year. The MSCI US REIT index also continued its cool off following a strong 2021, posting a gross third quarter return of -10.0%.
- During the third quarter, GDP reversed course, increasing at an annualized rate of 2.6% due to a narrowing trade deficit. This positive growth is expected to be a one-off for the near-term following two quarters of negative GDP growth, which has historically signaled a recession. As a result of the atrocities of the Russian-Ukraine war, Saudi-Iranian oil concerns, and a rise in protectionist measures, commodity pricing has skyrocketed in lockstep with persistent inflation, which is anticipated to carry over well into 2023. Federal reserve officials remain committed to taming inflation and reducing the central bank's balance sheet for the foreseeable future, approving five interest rate hikes through third quarter 2022, with an additional 75 bps hike in November 2022.

Commercial Real Estate

- Through the third quarter of 2022, total CRE transaction activity for the quarter decreased by -21% YoY, with annual transaction activity up 43% YoY. The office sector transaction volumes in the U.S. have notably not recovered to pre-pandemic levels. While office sector fundamentals signaled mild improvement, the sector faces significant headwinds in the capital markets, driven by a dramatic increase in the cost of debt.
- Transaction cap rates (4.9%) expanded during the quarter, to the tune of 27 bps. This increase comes after a -35 bps quarter-over-quarter decrease in 2Q22. Current valuation cap rates decreased for retail (-16 bps) and office (-4 bps), while the industrial (+4 bps) and apartment (+1 bp) property sectors experienced slight cap rate expansion.
- NOI growth has substantially diverged between property sectors. Apartment sector fundamentals remain strong, as many would-be buyers continue to be priced out of the housing market. Apartment NOI expanded (+18%) YoY.
- 10-year treasury bond yields surged 82 bps to end the quarter at 3.8%. As economists expected rates have moved significantly higher throughout 2022.

Current Value Cap Rates by Property Type



Source: NCREIF

4 Qtr Rolling NOI Growth



Source: NCREIF

United States Property Matrix (3Q22)

INDUSTRIAL	MULTIFAMILY
- In 3Q22, industrial properties were the second highest returning sector at 1.11% and outperformed the NPI by 54 bps. - Transaction volumes decreased to \$35 billion in the third quarter of the year, resulting in an 18% decrease year-over-year. Individual asset sales decreased 21% year-over-year, while portfolio purchases turned in a year-over-year volume decrease of 44%. At \$35 billion, the industrial sector decreased by \$4 billion quarter-over-quarter. - The industrial sector turned in NOI growth of 13.6% over the past year. NOI continues to reach all time highs for the sector. - Vacancy decreased by 97 bps year-over-year to 1.5%. Vacancy in the sector decreased 14 bps from last quarter, reaching all-time historic lows. E-commerce continues to drive demand across the sector. - Industrial cap rates compressed approximately 55 bps from a year ago, to 3.4%. Industrial overall fundamentals still top all property sectors.	- The apartment sector delivered a 1.2% return during the quarter, outperforming the NPI by 63 bps. - Transaction volume in the third quarter of 2022 decreased to \$74 billion, resulting in a decrease of 17% year-over-year. Transaction volume for the sector decreased from the second quarter but it still high relative to historical levels. This volume continues to make multifamily the most actively traded sector for the nineteenth straight quarter. - Cap rates remained steady at 3.6% quarter-over-quarter, decreasing 6 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 appeared to have shaken that trend although vacancy rates remained steady during the last 3 quarters. Vacancy rates increased by 69 bps quarter-over-quarter. 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	RETAIL
- The office sector returned -0.66% in 3Q22, 123 bps below the NPI return over the period. - Transaction volumes decreased by 33% year-over-year in the third quarter. Transaction volume equated to \$26 billion for the quarter, a decrease of \$2 billion quarter-over-quarter. Office transaction levels have regressed from 2Q22 but not quite to levels seen during 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 12.97%, increasing 3 bps from last quarter. - NOI growth in the office sector compressed quarter-over-quarter by 742 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 4.6%. 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.	- As of 3Q22, the retail sector delivered a quarterly return of 0.39%, underperforming 18 bps below the NPI. - Transaction volumes totaled \$18 billion in the third quarter, decreasing 9% year-over-year. Single asset transactions accounted for just over 84% of all sales volume for the quarter. - Cap rates have compressed approximately 27 bps within the sector over the last year, to 5.0%. Current valuation cap rates compressed quarter-over-quarter by 16 bps due to valuation adjustments made across the sector in general. - NOI growth decreased, 9.5% over the last year. Retail has begun its slow recovery as a large portion of stores nationally have opened and operate safely. - Retail vacancy rates decreased over the quarter by 69 bps, and down 111 bps over the past year to 8.0%. 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 (3Q22)

- Inflationary issues have crystalized into higher financing costs linked with rising interest rates and growing concerns of economic growth overall. Global acquisitions of income producing properties slumped 30% in the third quarter when compared to the same period one year ago. With a usual lag between macro events and its effect to direct property markets, expectations are that this negative pressure is just on the onset with a looming recession.

- Tangible effects of these challenges can be witnessed in the EMEA region, with deal volume falling 13% YOY. Transaction activity in the U.K. was down 41%, in Germany by 45% and in France by 32%. The European economy is especially vulnerable in these times of energy driven price inflation due to its dependence on global energy markets. European Commission data shows consumer confidence is at its lowest ever level and Oxford Economics expects the European economy to contract in 2023.

- The U.S. experienced a shallow decline in transaction activity relative to the top European and Asia Pacific markets. Investors spent \$149 billion on U.S. income-producing properties priced at \$10 million or greater between July and September, which is down 19% on the same period a year ago.

- The Asia Pacific market appears to be in the midst of a correction with transaction activity declining 6% YOY. This was due to a combination of fewer trades in major markets, rapid currency depreciation against the US dollar and the rising cost of debt sparked by an aggressive tightening of interest rates in the US. A depreciating yen pushed volumes down in Japan to US\$4.6 billion, as weak activity across most sectors led to a 61% year-on-year decline. Volumes in China (US\$3.3 billion) continued to decrease, down 55% year-on-year in the third quarter due to the lingering impact of Covid policies.

- Global retail sales growth softened in the third quarter as the squeeze on real incomes impacts consumer activity, and this is likely to filter through to more constrained retailer activity. With consumers becoming more selective in their discretionary retail spending, be it online or offline, the focus for retailers has shifted to improving profitability.

- In the third quarter, demand for logistics and industrial remained resilient with strong fundamentals. Nevertheless, occupiers are adopting a more cautious approach amid economic headwinds. The U.S. remains most resilient with leasing activity holding up in Q3, while limited supply in primary markets and softening demand in China were drags on performance in Europe and Asia Pacific respectively.

- Dealmaking has become increasing difficult in the multifamily sector, with wide bid-ask spreads on transactions, higher financing costs and general caution in the market. The number of active buyers and sellers in Europe has fallen to a 10-year low, as some investors have chosen the "wait and see" approach during this period of dislocation. The general anticipation of defined signals on the economic outlook will give way to advantageous opportunities in distressed properties or mispricing.

Global Total Commercial Real Estate Volume - 2021 - 2022

Global Total Commercial Real Estate Volume - 2021 - 2022						% Change	
\$ US Billions	Q3 2022	Q3 2021	% Change		YTD 2022	YTD 2022/Q1-	
			Q3 22 - Q3 21	Q1-Q3 2022		Q3 22	
Americas	159	201	-21%		533	440	21%
EMEA	53	99	-46%		232	266	-13%
Asia Pacific	207	225	-8%		568	604	-6%
Total	419	524	-20%		1332	1311	2%

Source: Real Capital Analytics, Inc., Q3' 22

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

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REPORT

Meketa Capital Markets Outlook & Risk Metrics

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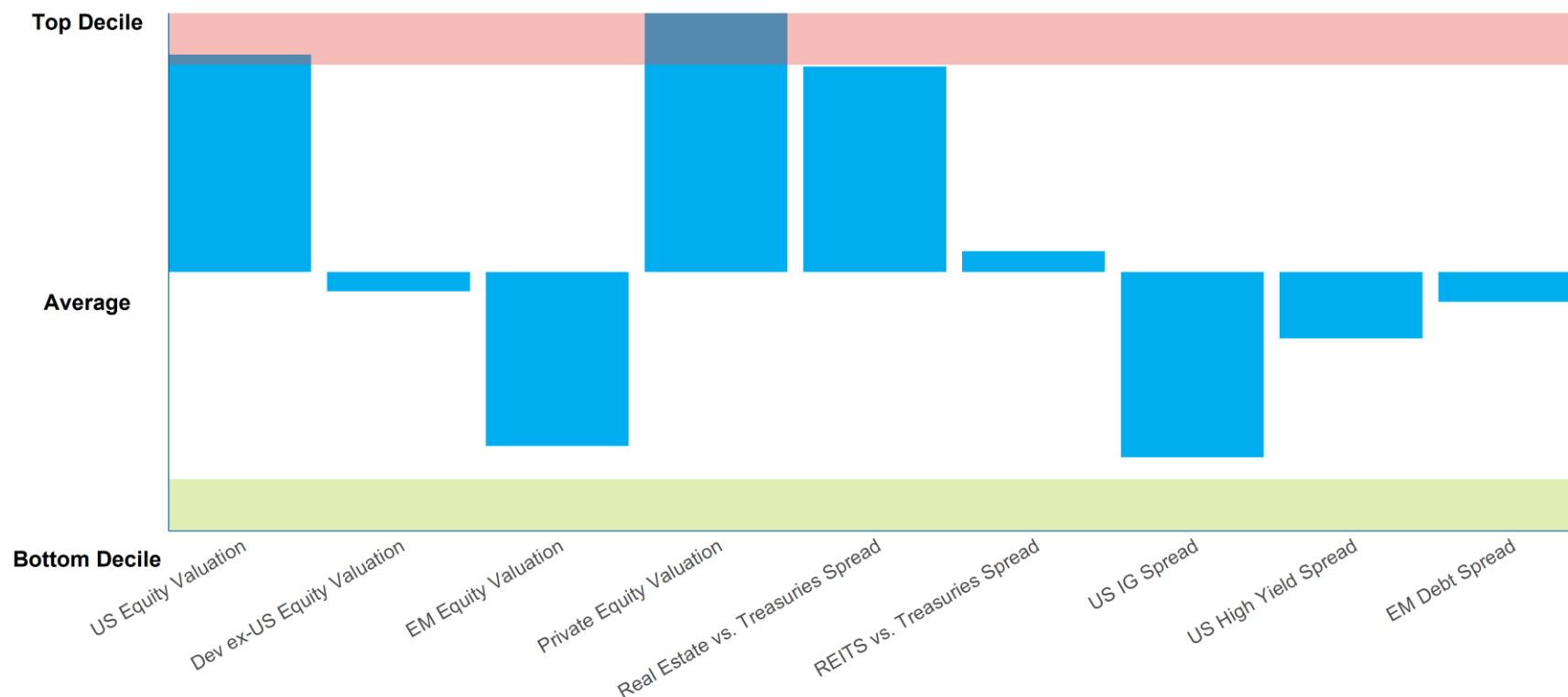
Capital Markets Outlook & Risk Metrics

As of December 31, 2022

Capital Markets Outlook

- Major equity and bond markets finished 2022 in negative territory, marking one of the worst years for investors since the early 1980s. However, many markets showed some resiliency with positive performance in the second half of the year.
- China's relaxation of its Zero COVID policy helped support equity market rallies on the hopes of a re-opening boom after a long period of underperformance.
- US equity markets lagged Non-US equity markets in December as the ECB's gradualist approach to interest rate hikes helped support better than expected economic growth.
- With the notable support from China's equity rally and a weaker US dollar, emerging markets outperformed US stocks.
- Value stocks took the lead in December, proving more resilient than growth stocks both in and outside of the US.
- In spite of slowing inflation, major fixed income markets sold off in December and finished the year in double digit negative territory.
- Short-term rates continued to climb due to the Fed's 50 bp rate hike in December, leading to a steep inversion of the yield curve.
- Natural resource stocks and commodities sold off in December but retained solid positive returns for the full year.

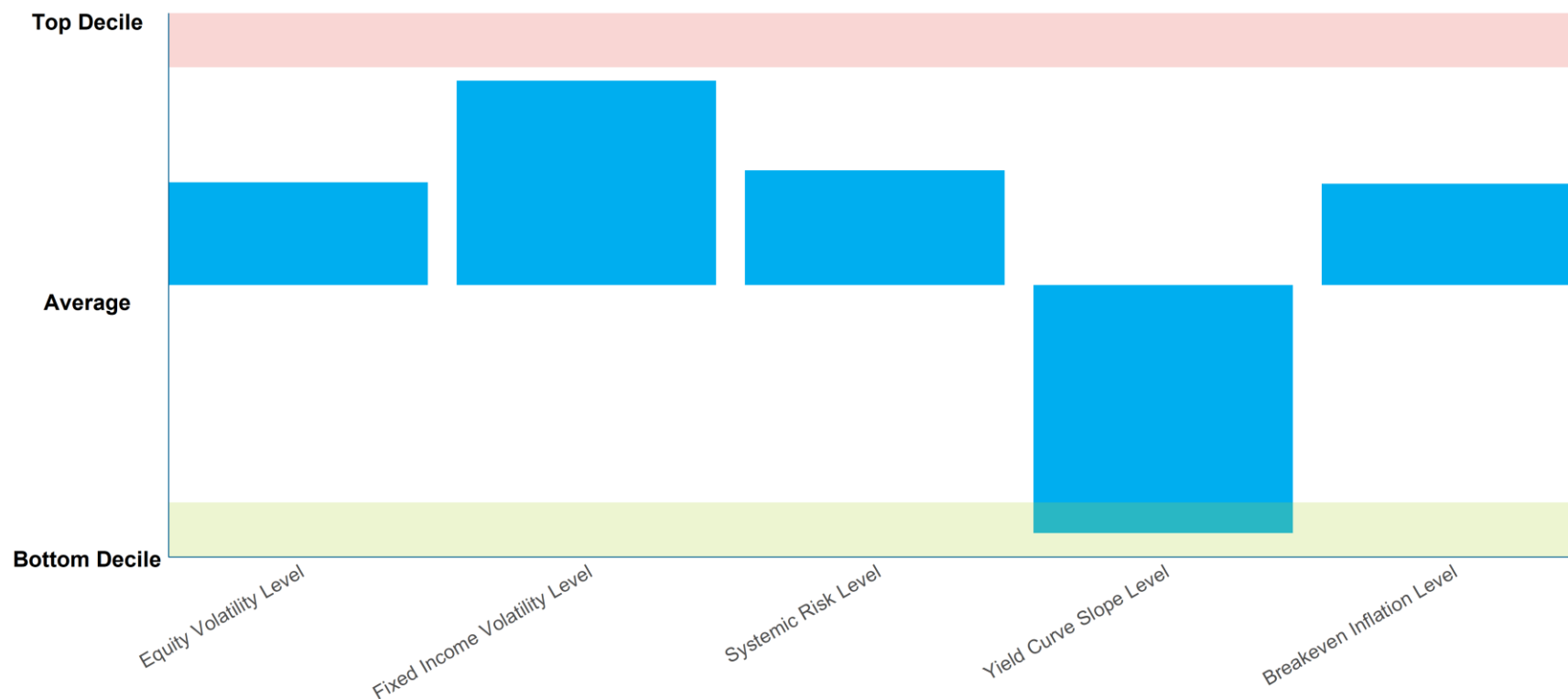
Risk Overview/Dashboard (1) (As of December 31, 2022)¹



→ Dashboard (1) summarizes the current state of the different valuation metrics per asset class relative to their own history.

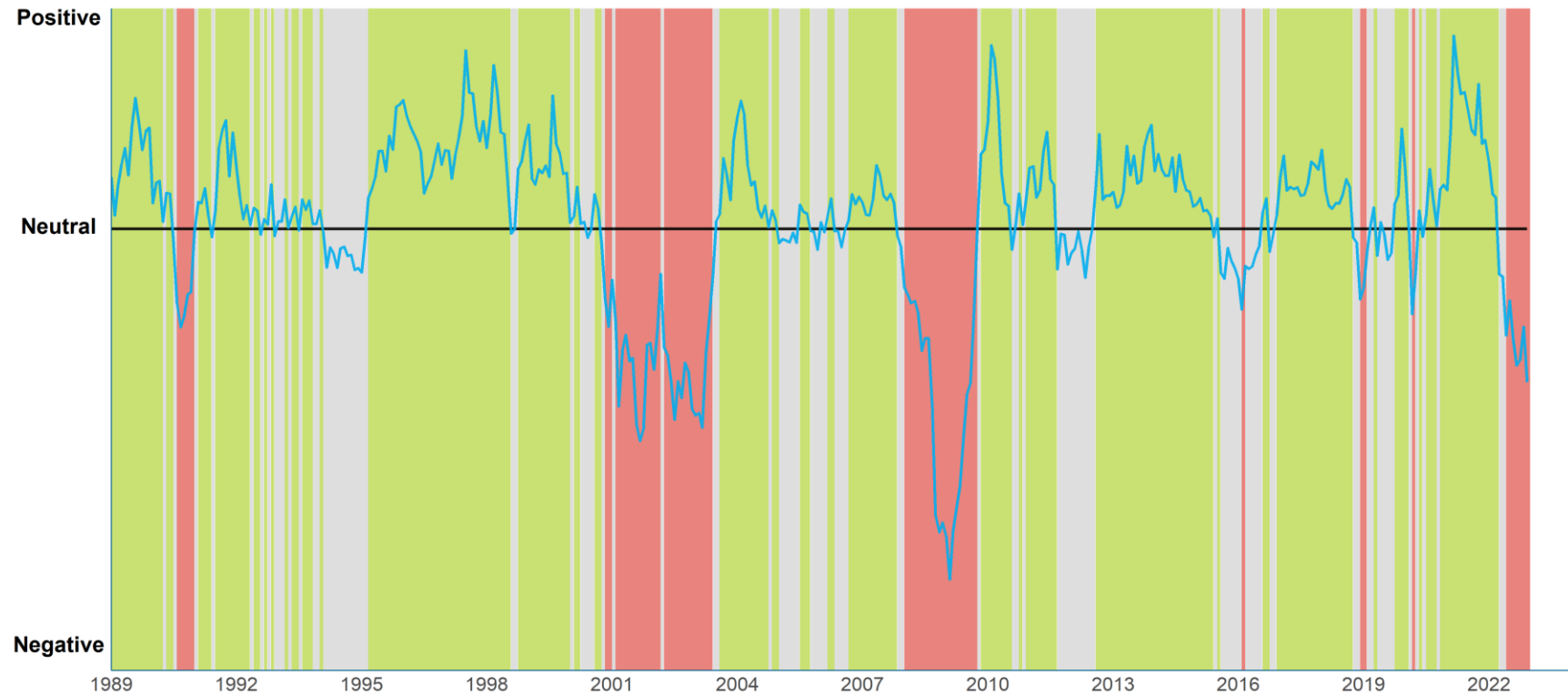
¹ With the exception of Private Equity Valuation, that is YTD as of December 31, 2021.

Risk Overview/Dashboard (2) (As of December 31, 2022)

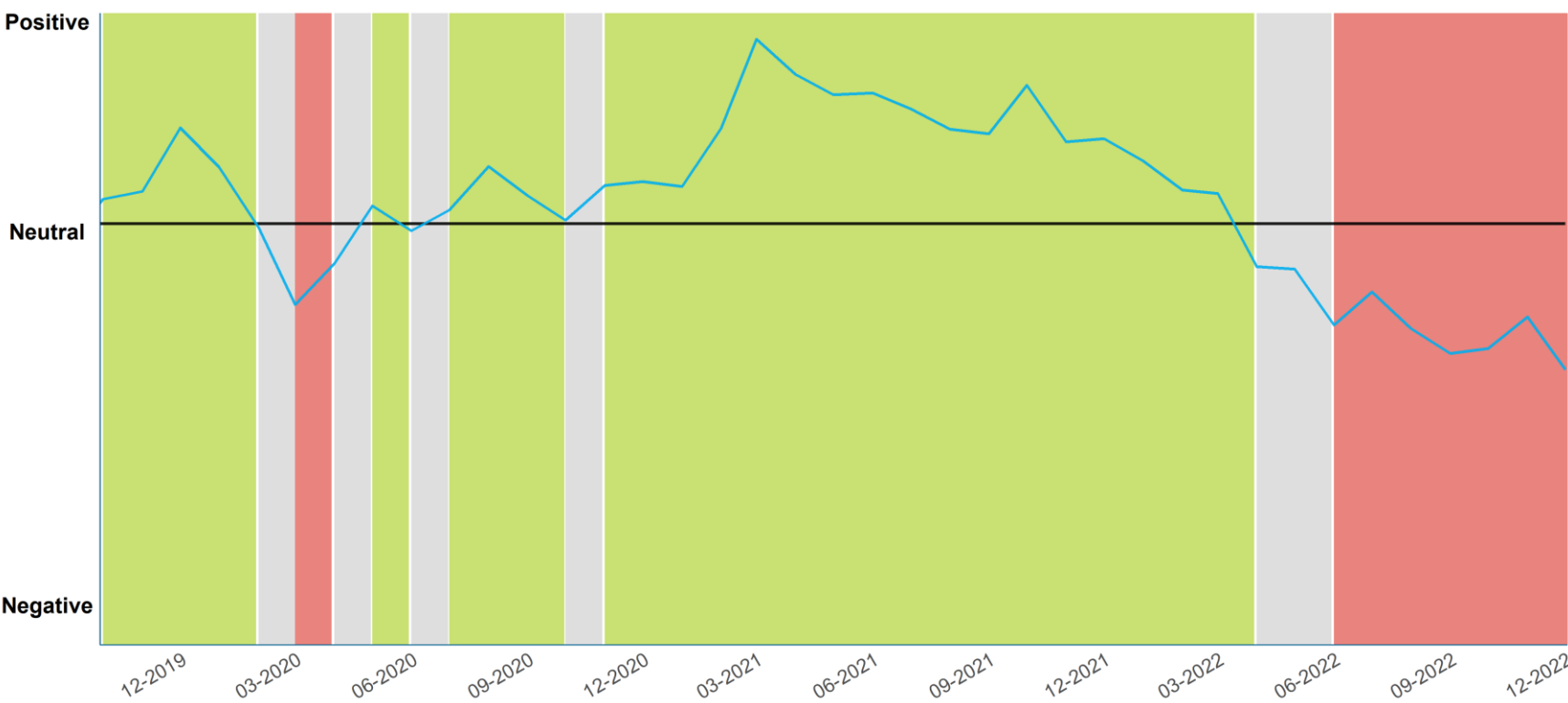


→ Dashboard (2) shows how the current level of each indicator compares to its respective history.

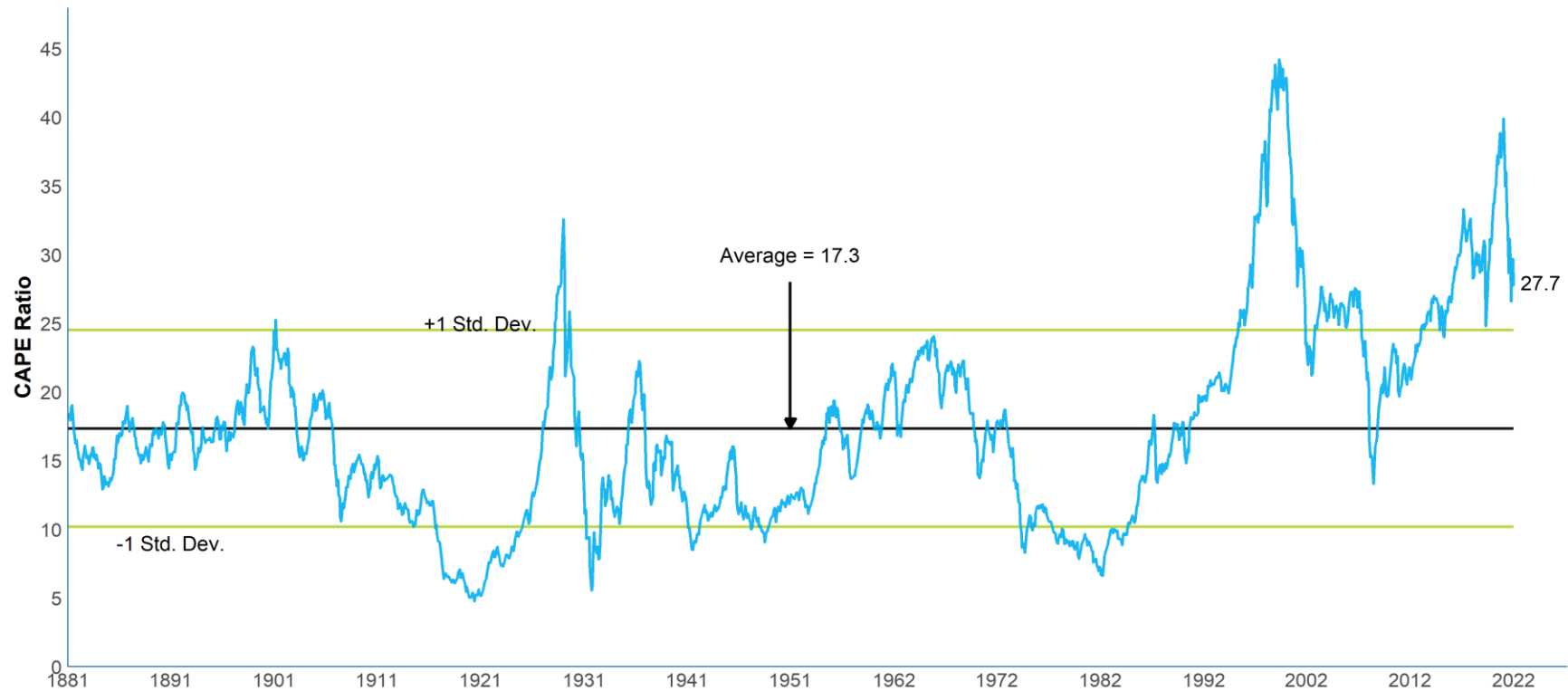
Market Sentiment Indicator (All History) (As of December 31, 2022)



Market Sentiment Indicator (Last Three Years)
(As of December 31, 2022)



US Equity Cyclically Adjusted P/E¹ (As of December 31, 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.

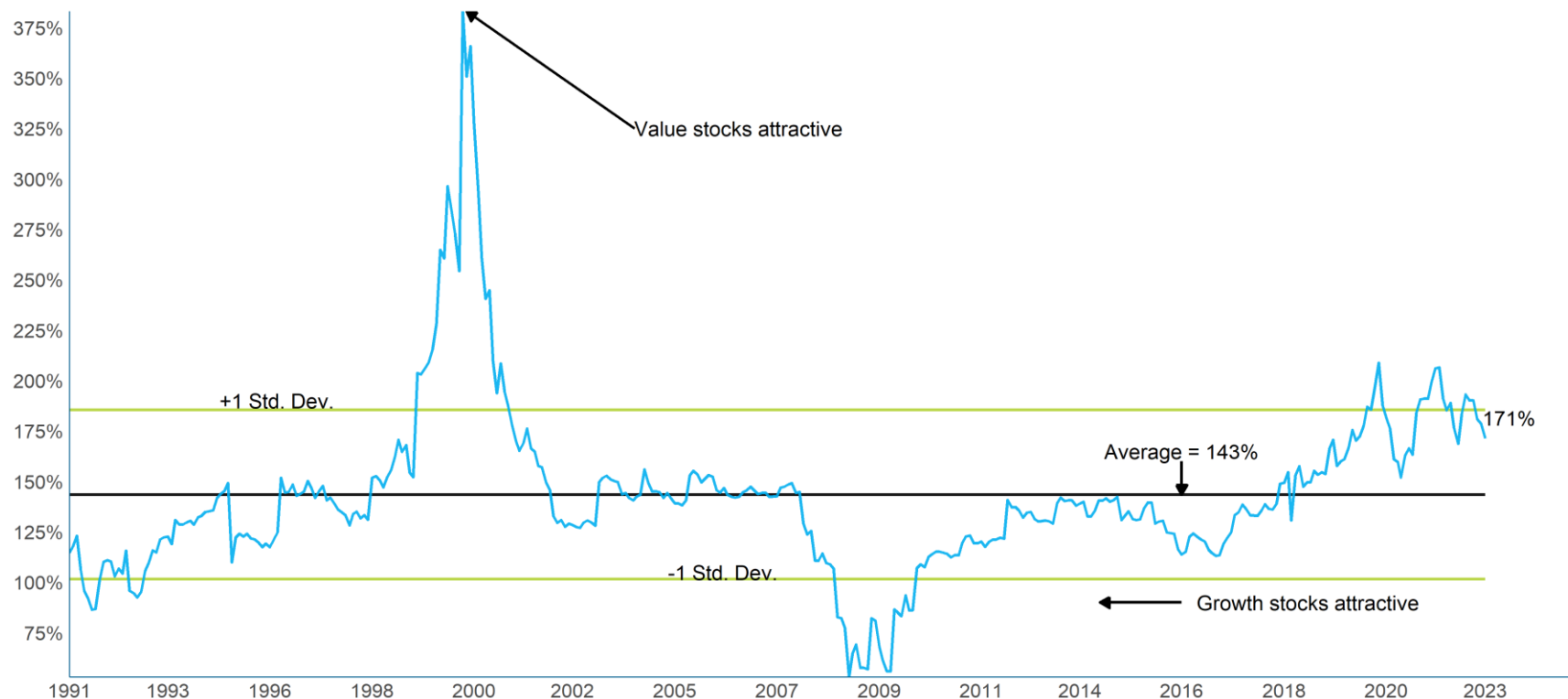
Small Cap P/E vs. Large Cap P/E¹ (As of December 31, 2022)



→ 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/E¹ (As of December 31, 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/E¹ (As of December 31, 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.

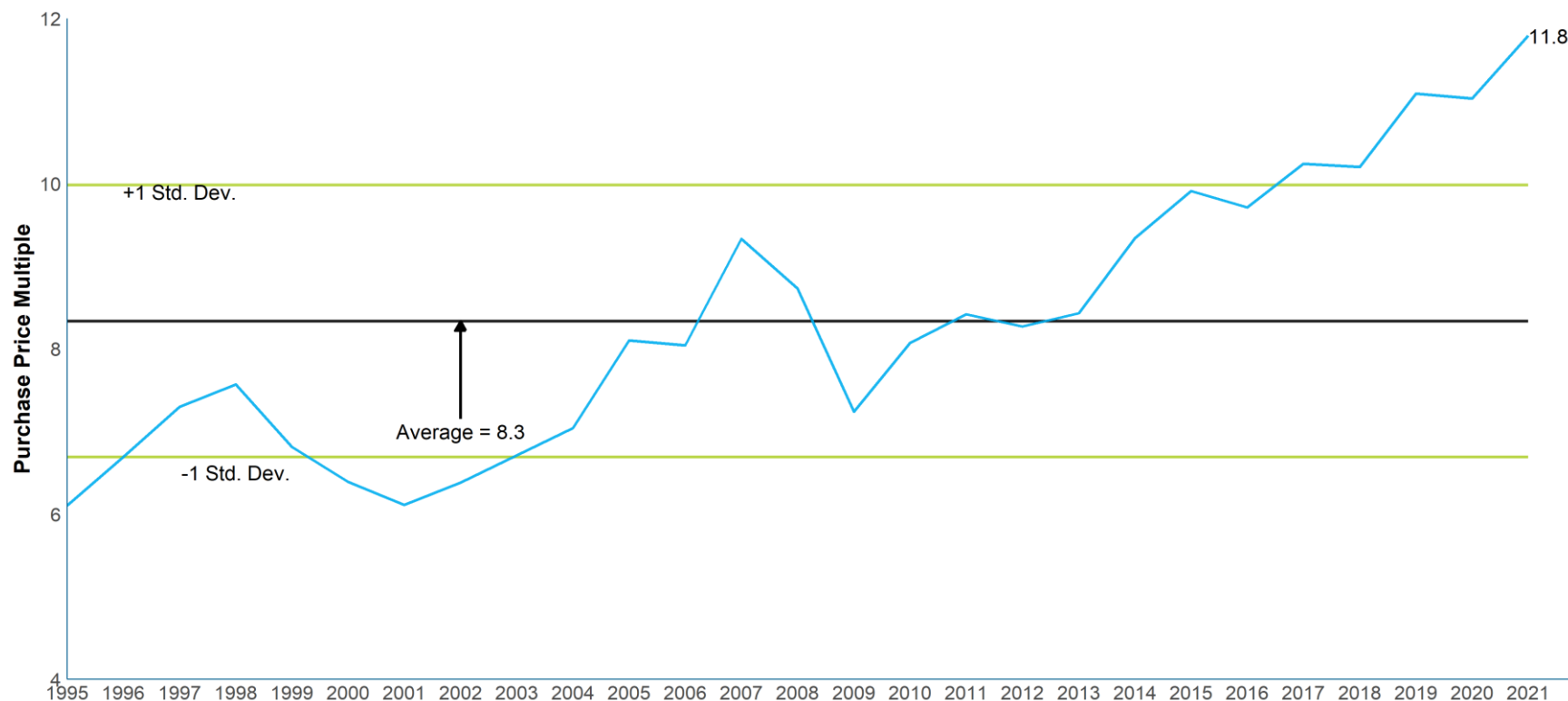
Emerging Market Equity Cyclically Adjusted P/E¹ (As of December 31, 2022)



→ 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 Multiples¹ (As of December 31, 2022)²

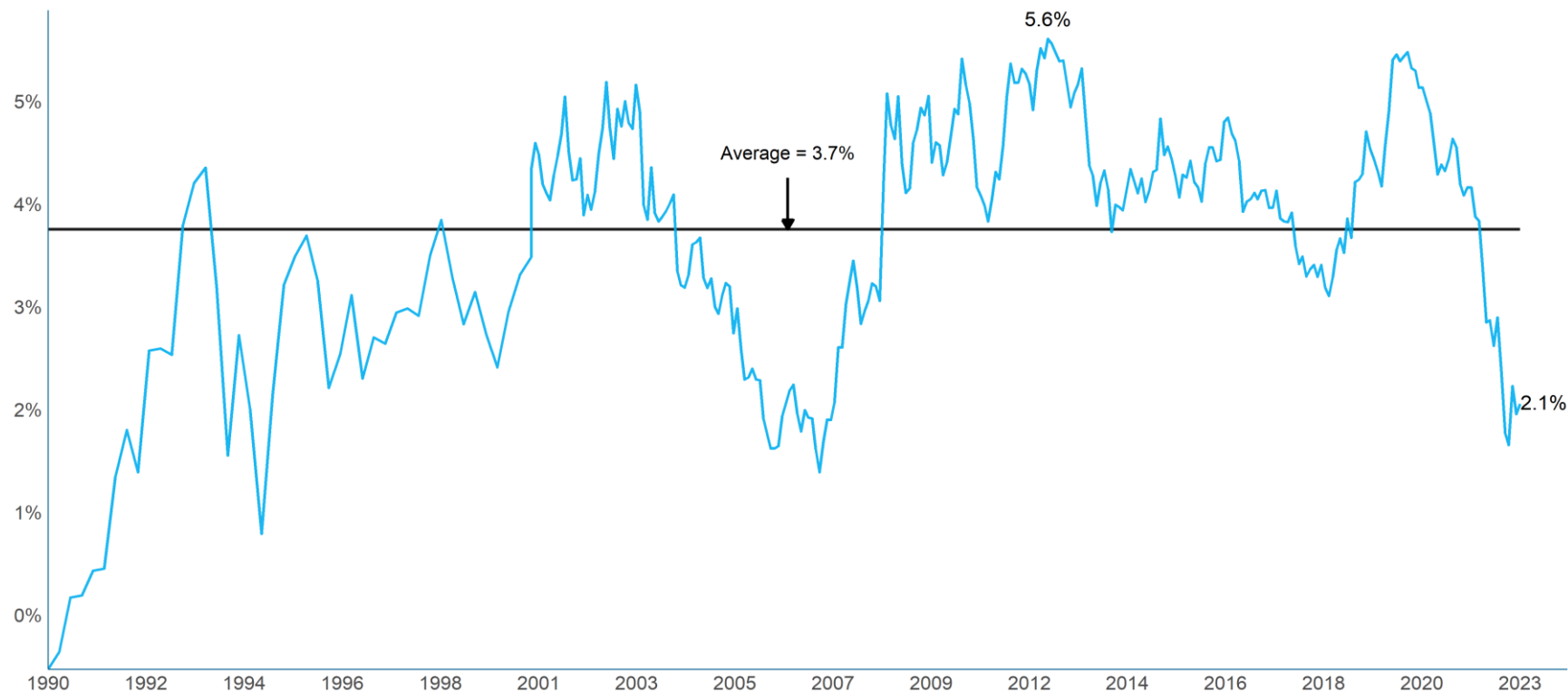


→ This chart details one valuation metric for the private equity market. A higher (lower) figure indicates more expensive (cheaper) valuation relative to history.

¹ Private Equity Multiples – Source: S&P LCD Average EBITDA Multiples Paid in All LBOs.

² Annual Data, as of December 31, 2021

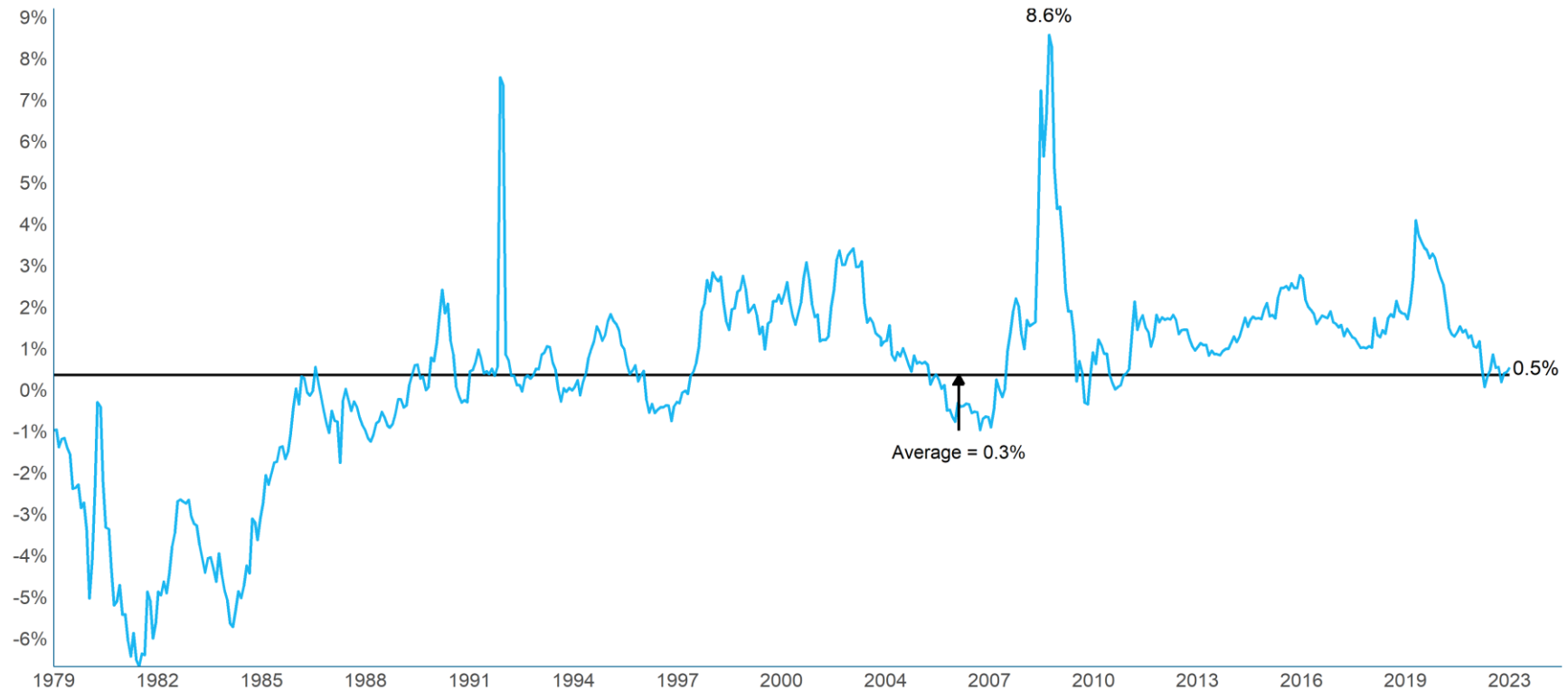
Core Real Estate Spread vs. Ten-Year Treasury¹ (As of December 31, 2022)



→ 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.

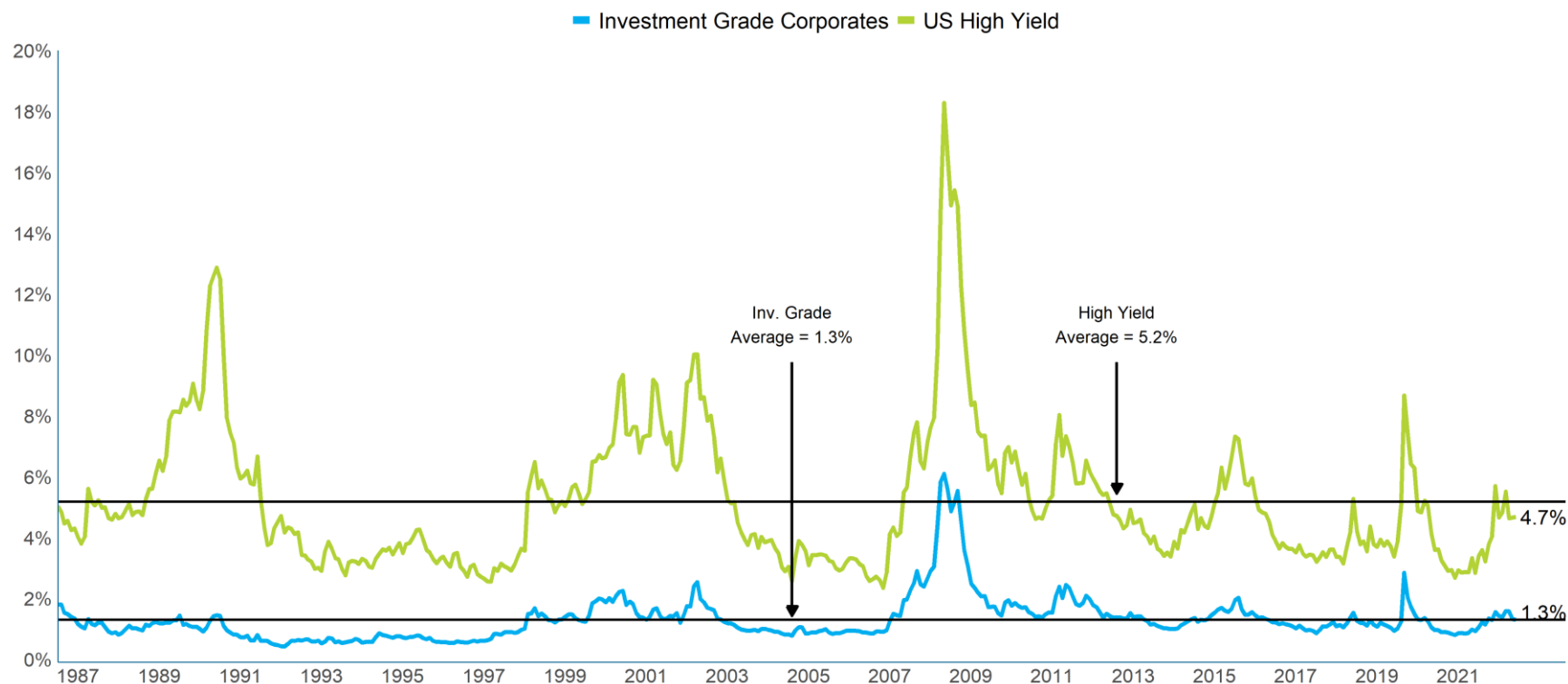
REITs Dividend Yield Spread vs. Ten-Year Treasury¹ (As of December 31, 2022)



→ 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.

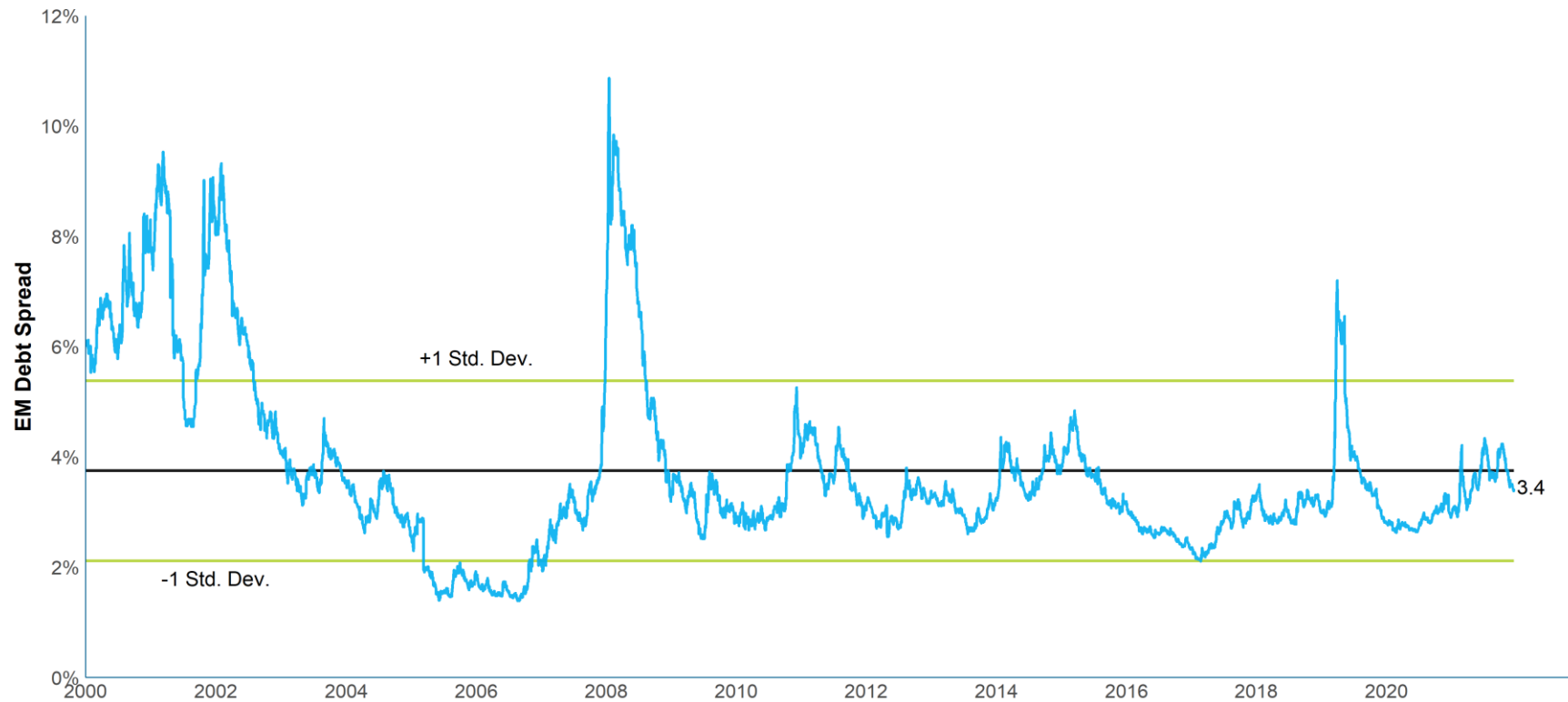
Credit Spreads¹ (As of December 31, 2022)



→ 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.

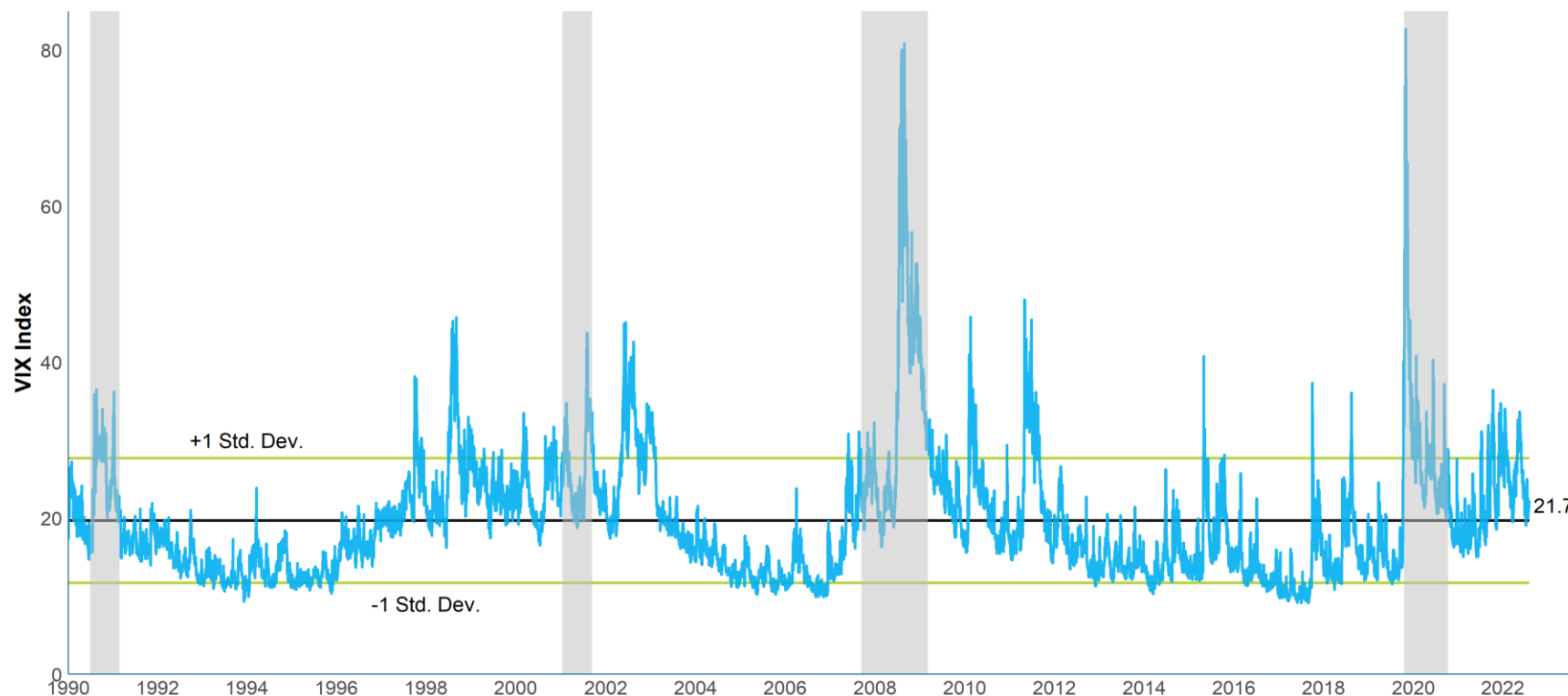
Emerging Market Debt Spreads¹ (As of December 31, 2022)



→ 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.

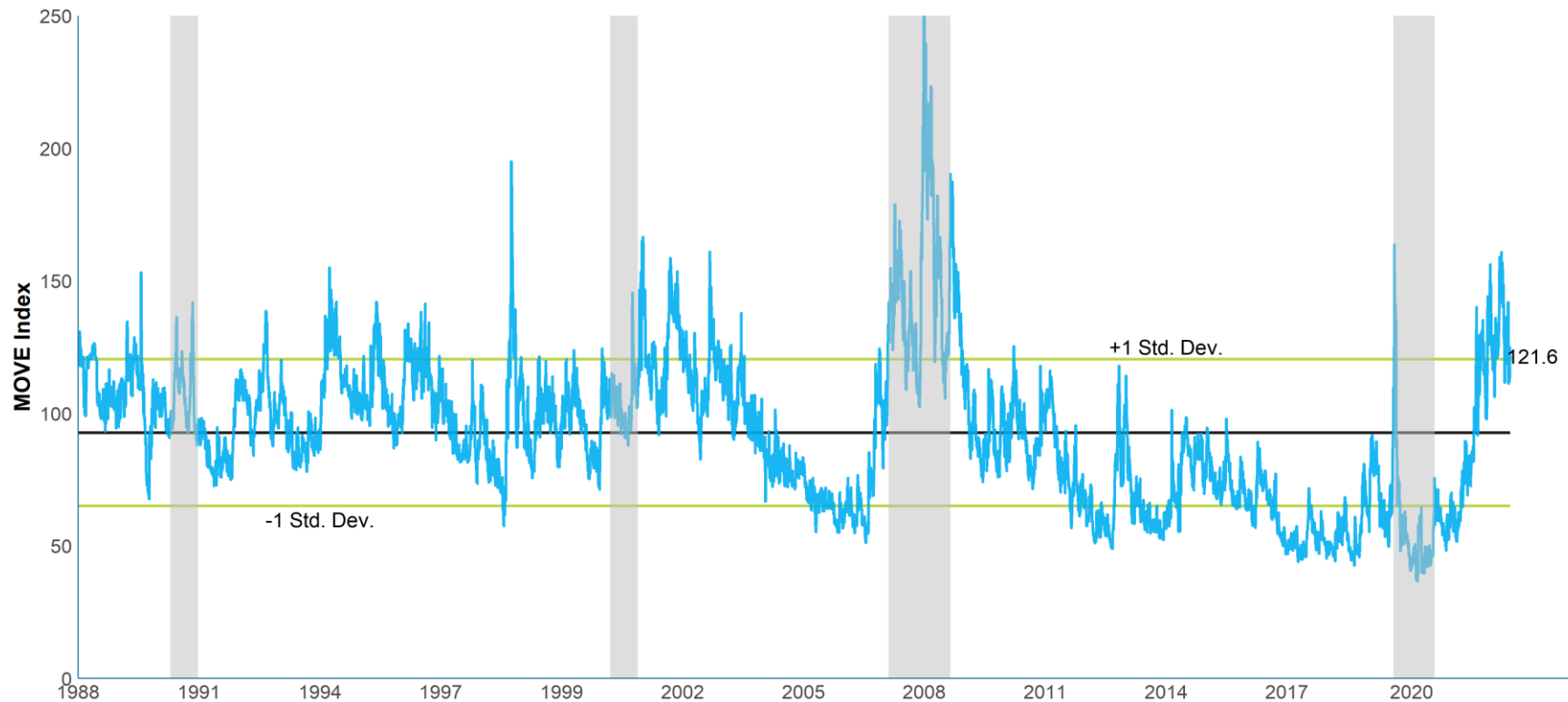
Equity Volatility¹ (As of December 31, 2022)



→ 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.

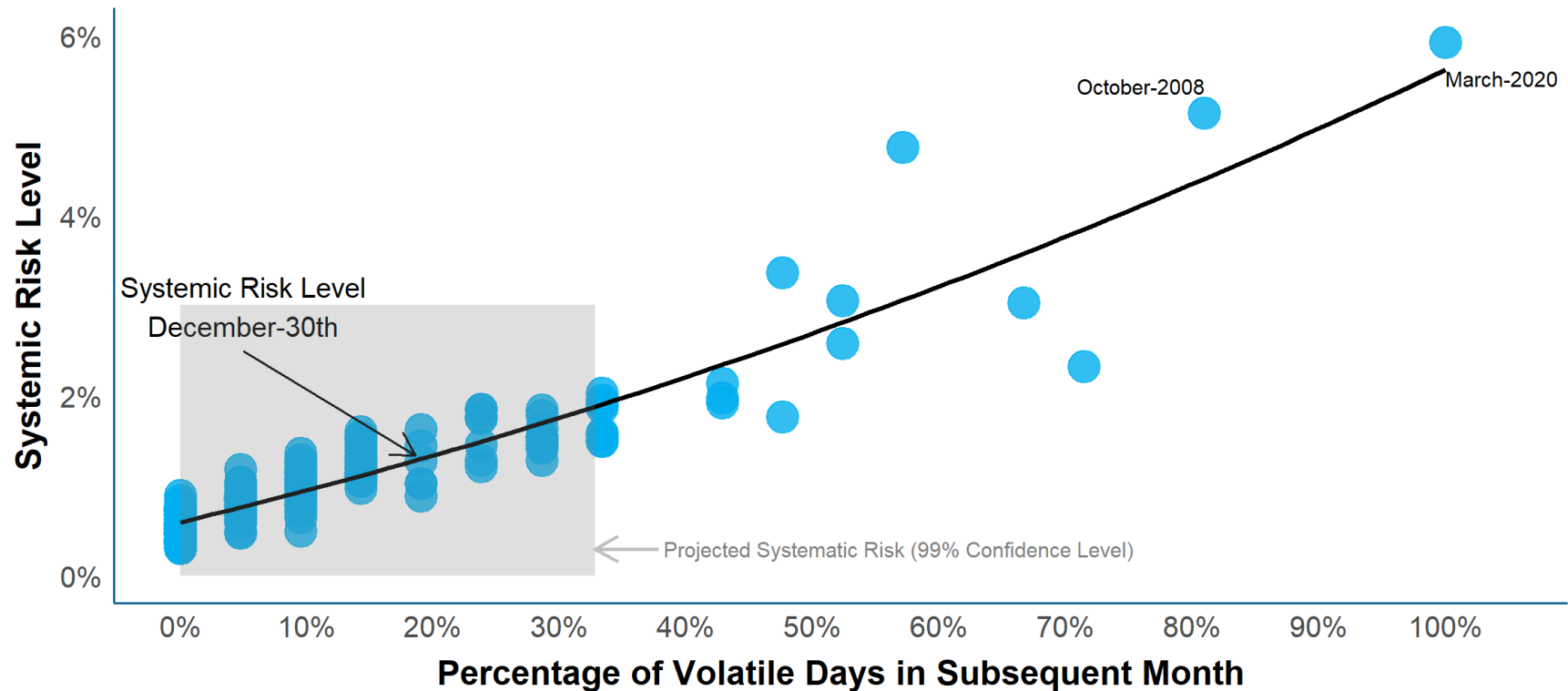
Fixed Income Volatility¹ (As of December 31, 2022)



→ 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.

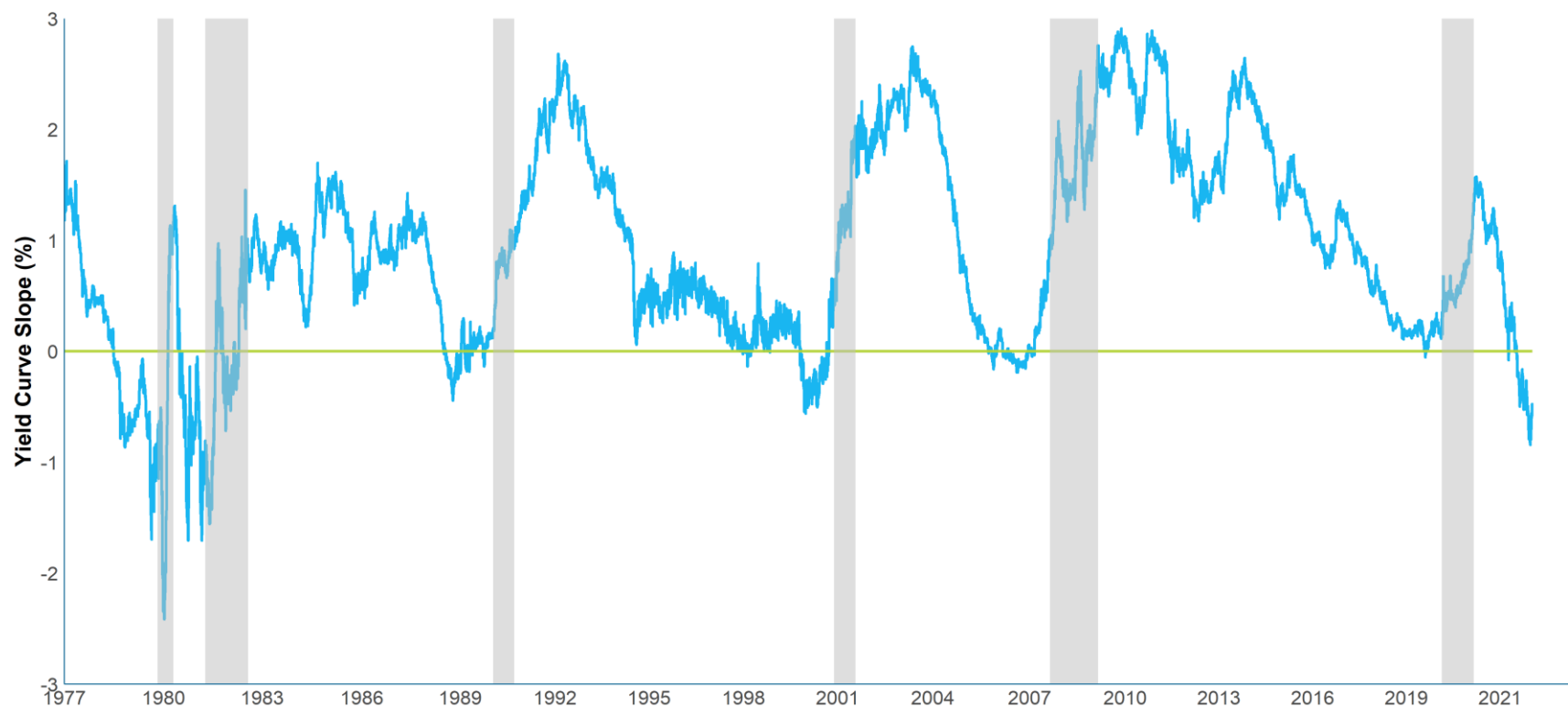
Systemic Risk and Volatile Market Days¹ (As of December 31, 2022)



→ 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.

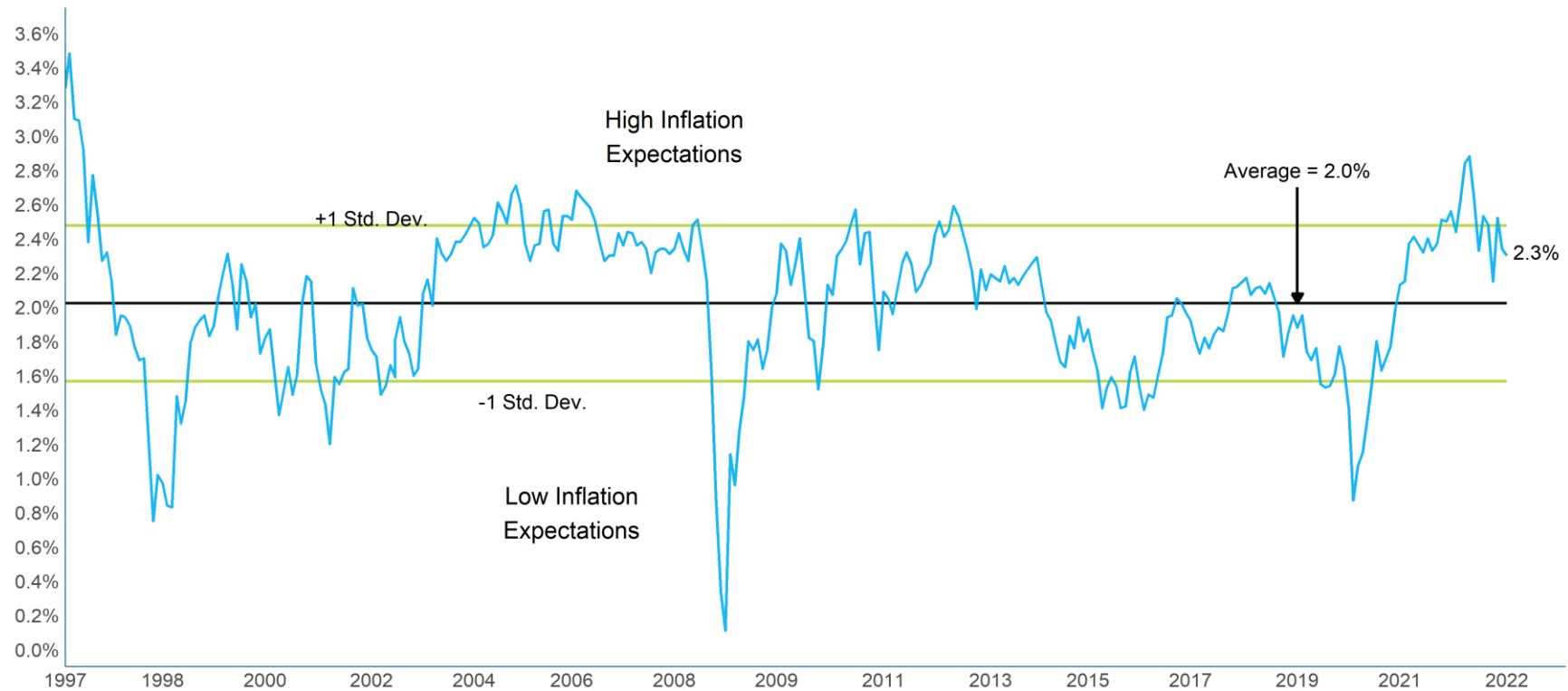
Yield Curve Slope (Ten Minus Two)¹
(As of December 31, 2022)



→ 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.

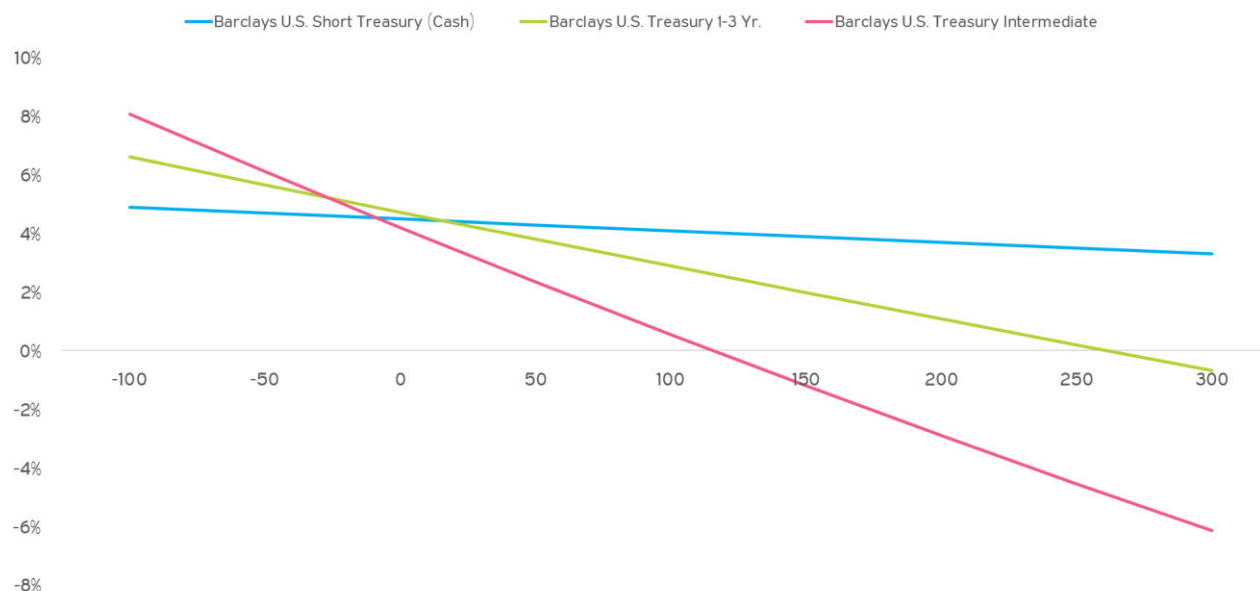
Ten-Year Breakeven Inflation¹ (As of December 31, 2022)



→ 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).

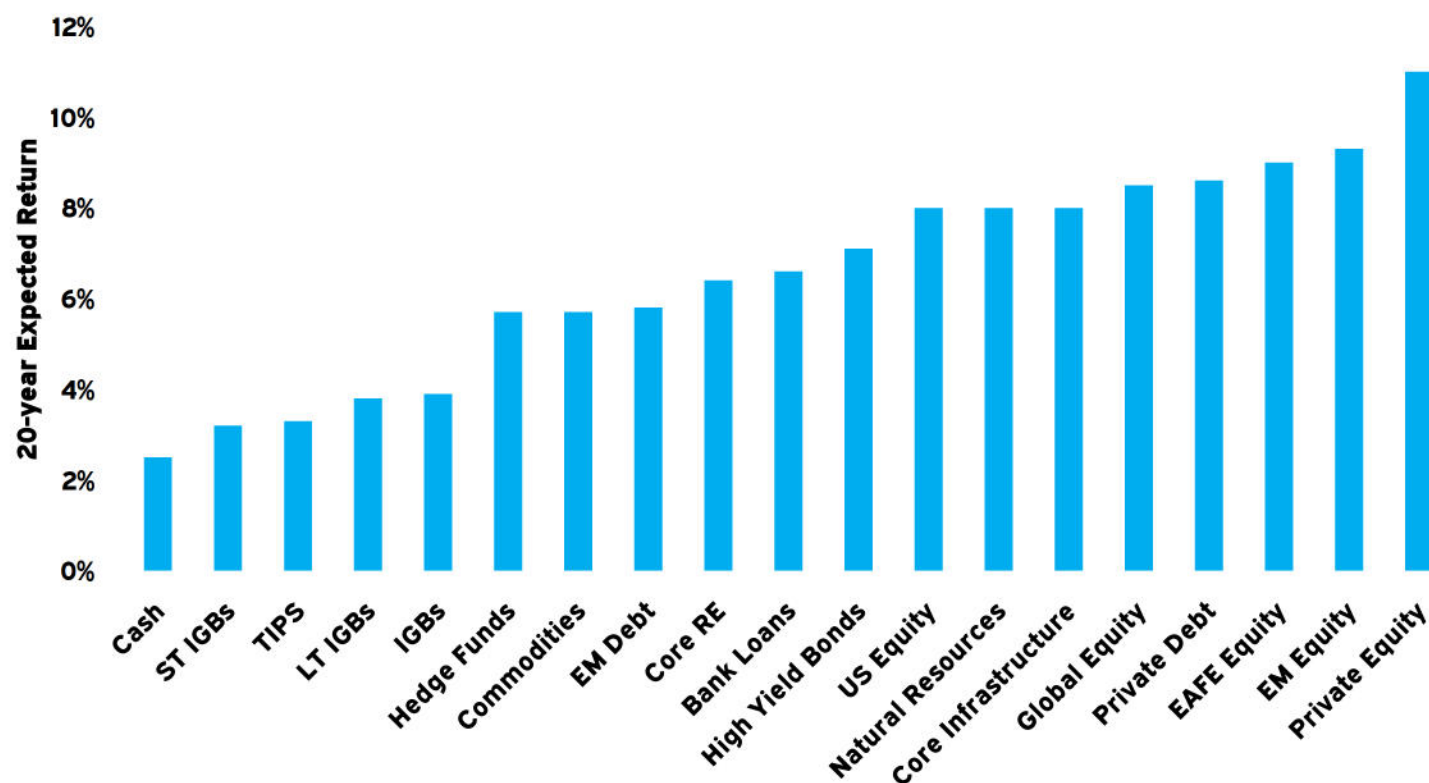
Total Return Given Changes in Interest Rates (bps)¹ (As of December 31, 2022)



	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)	4.9%	4.7%	4.5%	4.3%	4.1%	3.9%	3.7%	3.5%	3.3%	0.40	4.50%
Barclays US Treasury 1-3 Yr.	6.6%	5.7%	4.7%	3.8%	2.9%	2.0%	1.1%	0.2%	-0.7%	1.86	4.72%
Barclays US Treasury Intermediate	8.1%	6.1%	4.2%	2.3%	0.5%	-1.2%	-2.9%	-4.5%	-6.1%	3.76	4.20%
Barclays US Treasury Long	22.0%	12.6%	4.1%	-3.6%	-10.4%	-16.4%	-21.5%	-25.7%	-29.1%	16.19	4.08%

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 Returns¹



→ This chart details Meketa's long-term forward-looking expectations for total returns across asset classes.

¹ Source: Meketa Investment Group's 2022 Intra-year Asset Study.

Appendix

Data Sources and Explanations¹

- 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 December 31, 2022, unless otherwise noted.

Appendix

Data Sources and Explanations¹

- 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 December 31, 2022, unless otherwise noted.

Appendix

Data Sources and Explanations¹

- 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 December 31, 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.

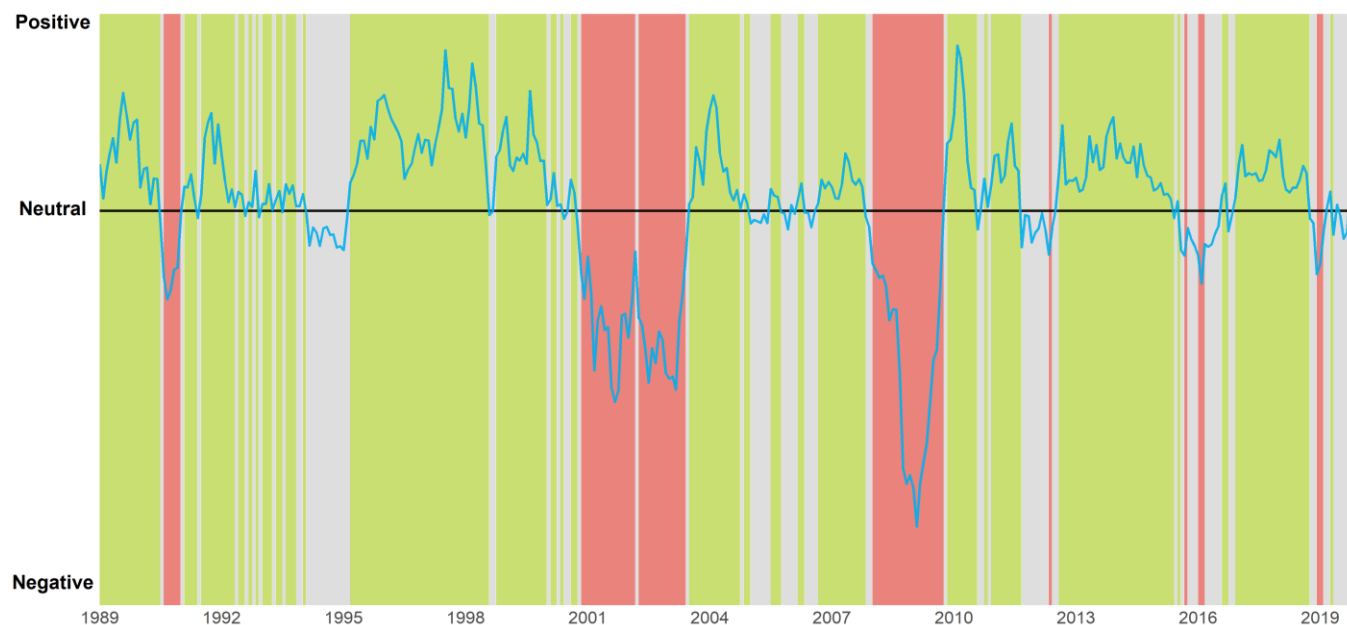
→ Meketa's Risk Metrics, which rely significantly on standard market measures of relative valuation, often provide valid early signals of increasing long-term risk levels in the global investment markets. However, as is the case with numerous valuation measures, the Risk Metrics may convey such risk 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 measure¹. 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.

Disclaimer Information

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REPORT

SBI Comprehensive Performance Report

December 31, 2022

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Quarterly Report

Comprehensive Performance Report

December 31, 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.

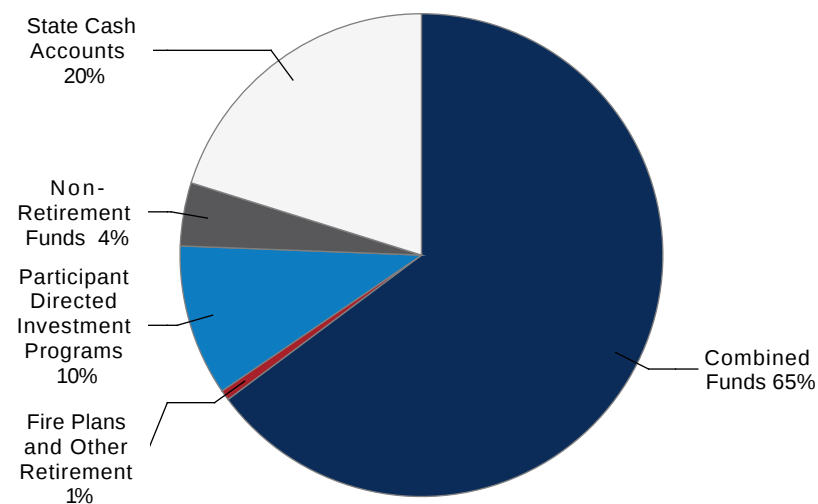
State Cash

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

	<u>\$ Millions</u>
COMBINED FUNDS	\$80,120
Fire Plans + Other Retirement Plans	847
Participant Directed Investment Program	12,520
State Deferred Compensation Plan	8,588
Health Care Savings Plan	1,642
Unclassified Employees Retirement Plan	329
Hennepin County Supplemental Retirement Plan	153
PERA Defined Contribution Plan	84
Minnesota College Savings Plan	1,693
Minnesota Achieving a Better Life Experience Plan	31
Non-Retirement Funds	5,235
Assigned Risk Plan	254
Permanent School Fund	1,736
Environmental Trust Fund	1,448
Closed Landfill Investment Fund	115
Miscellaneous Trust Funds	915
Other Postemployment Benefits Accounts	767
State Cash	24,924
Invested Treasurer's Cash	24,764
Other State Cash Accounts	159
TOTAL SBI AUM	123,646



Note: Differentials within column amounts may occur due to rounding



Quarterly Report

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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.



Quarterly Report

Combined Funds

December 31, 2022



Combined Funds Summary

Combined Funds Change in Market Value (\$Millions)

	One Quarter
Combined Funds	
Beginning Market Value	\$77,122
Net Contributions	-669
Investment Return	3,667
Ending Market Value	80,120

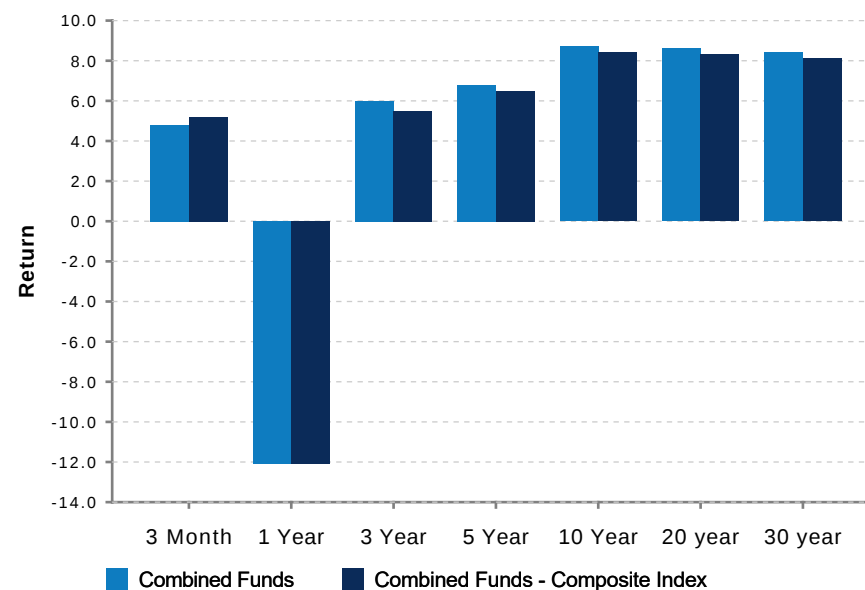
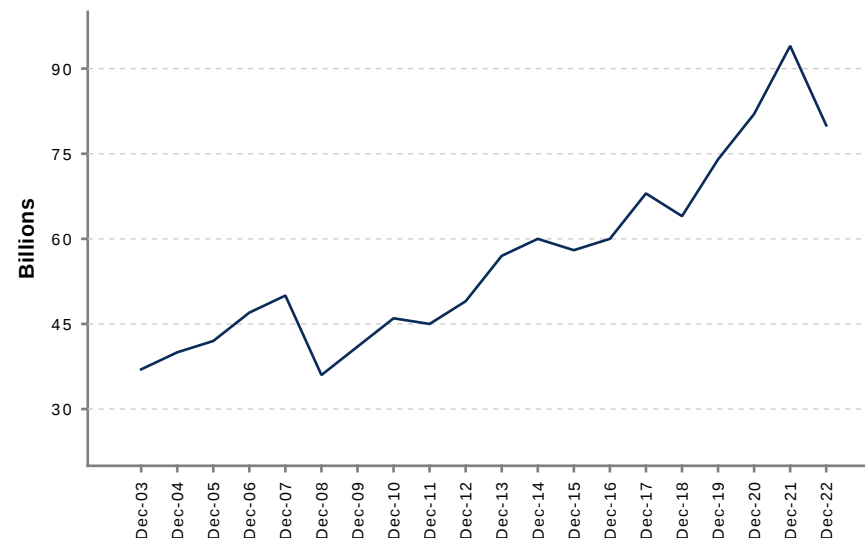
The change in market value of the Combined Funds since the end of last quarter is due to net contributions and investment returns.

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	4.8%	0.2%	-12.1%	6.0%	6.8%	8.7%	8.6%	8.4%
Combined Funds - Composite Index	5.2%	0.1%	-12.1%	5.5%	6.5%	8.4%	8.3%	8.1%
Excess	-0.4%	0.1%	-0.0%	0.5%	0.3%	0.3%	0.2%	0.2%

Asset Growth

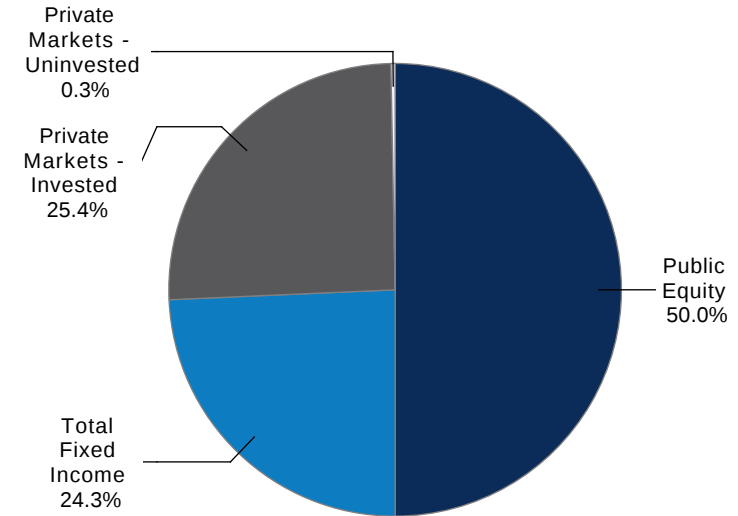


Combined Funds Summary

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.

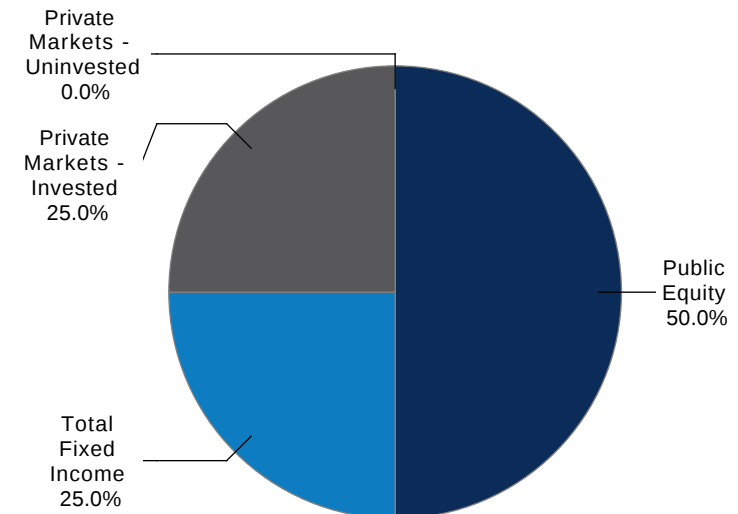
	<u>(Millions)</u>	<u>Actual Mix</u>	<u>Policy Target</u>
Public Equity	\$40,037	50.0%	50.0%
Total Fixed Income	19,464	24.3	25.0
Private Markets - Total	20,619	25.7	25.0
Private Markets - Invested	20,363	25.4	
Private Markets - Uninvested	256	0.3	
TOTAL	80,120	100.0	



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.

	<u>Policy Weight</u>	<u>Market Index</u>
Public Equity	50.0%	Public Equity Benchmark
Total Fixed Income	25.0	Total Fixed Income Benchmark
Private Markets - Invested	25.0	Private Markets
Private Markets - Uninvested	0.0	





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).

	<u>Market Value</u>	<u>Actual Weight</u>	<u>Policy Weight</u>	<u>Last Qtr</u>	<u>FYTD</u>	<u>1 Year</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>	<u>20 Year</u>	<u>30 Year</u>
Public Equity	\$40.0	50.0%	50.0%	8.8%	2.9%	-17.8%	5.3%	6.5%	10.0%	9.0%	8.5%
Public Equity Benchmark				9.6	2.7	-18.0	4.8	6.2			
Excess				-0.8	0.2	0.2	0.5	0.3			
Domestic Equity	26.7	33.3	33.5	7.3	2.6	-19.4	7.3	8.9	12.1	9.8	9.3
Domestic Equity Benchmark				7.2	2.4	-19.2	7.0	8.7	12.1	9.9	9.4
Excess				0.1	0.2	-0.2	0.3	0.1	0.0	-0.1	-0.1
International Equity	12.5	15.6	16.5	12.0	3.9	-13.7	1.5	1.8	4.7	7.1	6.4
International Equity Benchmark				14.3	3.0	-16.0	0.0	0.9	3.8	6.7	5.7
Excess				-2.3	1.0	2.3	1.5	1.0	0.9	0.4	0.7
Global Equity	0.8	1.0	0.0	8.6	-1.1	-27.7					
MSCI AC World Index Net				9.8	2.3	-18.4					
Excess				-1.2	-3.4	-9.4					

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.

	<u>Market Value</u>	<u>Actual Weight</u>	<u>Policy Weight</u>	<u>Last Qtr</u>	<u>FYTD</u>	<u>1 Year</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>	<u>20 Year</u>	<u>30 Year</u>
Total Fixed Income	\$19.5	24.3%	25.0%	1.4%	-3.0%	-13.6%	-1.9%	0.9%	1.7%	3.7%	5.0%
Total Fixed Income Benchmark				1.1%	-3.5%	-13.3%	-2.2%				
Excess				0.3%	0.5%	-0.3%	0.3%				
Core/Core Plus	\$4.3	5.4%	5.0	2.1%	-2.6%	-14.1%	-2.3%	0.5%	1.5%	3.6%	4.9%
Core Bonds Benchmark				1.9%	-3.0%	-13.0%	-2.7%	0.0%	1.1%	3.1%	4.6%
Excess				0.3%	0.3%	-1.1%	0.4%	0.4%	0.5%	0.5%	0.4%
Return Seeking Fixed Income	\$4.0	5.0%	5.0	3.8%	1.1%	-11.4%					
Bloomberg U.S. Aggregate				1.9%	-3.0%	-13.0%					
Excess				1.9%	4.0%	1.6%					
Treasury Protection	\$7.4	9.2%	10.0	-0.1%	-7.1%	-20.6%	-4.9%	-0.8%			
Bloomberg Treasury 5+ Year				0.4%	-6.5%	-20.3%	-4.7%	-0.9%			
Excess				-0.6%	-0.5%	-0.3%	-0.1%	0.1%			
Laddered Bond + Cash	\$3.7	4.7%	5.0	0.9%	1.3%	1.1%	0.6%	1.2%	0.8%	1.5%	3.1%
ICE BofA US 3-Month Treasury Bill				0.8%	1.3%	1.5%	0.7%	1.3%	0.8%	1.3%	2.4%
Excess				0.1%	0.0%	-0.4%	-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

	<u>Last Qtr</u>	<u>FYTD</u>	<u>1 Year</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>	<u>20 Year</u>	<u>25 Year</u>	<u>30 Year</u>
Private Markets - Invested	0.3%	-2.1%	4.9%	16.3%	14.2%	13.1%	14.1%	12.7%	13.4%
Private Markets - Uninvested (1)	7.4%	2.6%	-17.6%						
Private Equity	0.1%	-4.0%	0.3%	18.9%	17.5%	16.5%	16.2%	14.5%	15.8%
Private Credit	4.3%	5.5%	12.8%	13.2%	12.3%	13.5%	13.0%	12.9%	
Resources	0.2%	3.4%	21.8%	9.2%	5.0%	3.3%	13.8%	10.6%	13.0%
Real Estate	-0.9%	0.5%	19.7%	17.4%	14.6%	13.6%	10.3%	9.8%	9.7%

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 Private Markets Uninvested is currently cash. Prior to 11/02/2022. The Uninvested portion of the Private Markets allocation was 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



Quarterly Report

Asset Class & Manager Performance

December 31, 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

December 31, 2022



	<u>Ending Market Value</u>	<u>Portfolio Weight</u>	<u>Last Qtr</u>	<u>Fiscal YTD</u>	<u>1 Year</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>	<u>Since Inception</u>	<u>Inception Date</u>
Total Domestic Equity										
ACTIVE DOMESTIC EQUITY AGGREGATE (1)	\$2,778,766,255	10.2%	7.6%	4.4%	-21.3%	5.9%	7.2%	11.2%	7.9%	06/1996
Active Domestic Equity Benchmark			7.1	3.5	-19.4	5.1	6.5	10.8	8.5	06/1996
Excess			0.4	0.8	-1.9	0.8	0.7	0.4	-0.6	
SEMI PASSIVE DOMESTIC EQUITY AGGREGATE (2)	2,745,141,950	10.1	7.5	2.6	-18.7	8.2	9.5	12.6	8.6	06/1996
Semi Passive Domestic Equity Benchmark			7.2	2.3	-19.1	7.3	9.1	12.4	8.5	06/1996
Excess			0.3	0.3	0.4	0.8	0.4	0.2	0.1	
PASSIVE DOMESTIC EQUITY AGGREGATE (3)	21,705,173,493	79.7	7.2	2.3	-19.2	7.3	9.0	12.3	8.7	06/1996
Passive Domestic Equity Benchmark			7.2	2.3	-19.1	7.3	9.0	12.3	8.8	06/1996
Excess			0.0	0.0	-0.0	0.0	0.0	-0.0	-0.1	
TRANSITION AGGREGATE DOMESTIC EQUITY (4)	60	0.0								
TOTAL DOMESTIC EQUITY (5)	27,229,081,758	100.0	7.3	2.6	-19.4	7.3	8.9	12.2	10.3	01/1984
Domestic Equity Benchmark			7.2	2.4	-19.2	7.0	8.7	12.1	10.5	01/1984
Excess			0.1	0.2	-0.2	0.3	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.



	<u>2022 Calendar Return</u>	<u>2021 Calendar Return</u>	<u>2020 Calendar Return</u>	<u>2019 Calendar Return</u>	<u>2018 Calendar Return</u>
Total Domestic Equity					
ACTIVE DOMESTIC EQUITY AGGREGATE (1)	-21.3%	18.5%	27.3%	27.6%	-6.5%
Active Domestic Equity Benchmark	-19.4	20.3	19.8	28.2	-8.0
Excess	-1.9	-1.7	7.5	-0.6	1.4
SEMI PASSIVE DOMESTIC EQUITY AGGREGATE (2)	-18.7	28.8	21.0	30.9	-4.9
Semi Passive Domestic Equity Benchmark	-19.1	26.5	21.0	31.4	-4.8
Excess	0.4	2.3	0.0	-0.5	-0.1
PASSIVE DOMESTIC EQUITY AGGREGATE (3)	-19.2	26.5	20.8	31.3	-5.0
Passive Domestic Equity Benchmark	-19.1	26.4	20.8	31.3	-5.0
Excess	-0.0	0.1	0.0	0.0	-0.0
TRANSITION AGGREGATE DOMESTIC EQUITY (4)					
TOTAL DOMESTIC EQUITY (5)	-19.4	25.8	21.7	30.7	-5.3
Domestic Equity Benchmark	-19.2	25.7	20.8	30.8	-5.2
Excess	-0.2	0.1	0.9	-0.1	-0.0

(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.



	<u>Ending Market Value</u>	<u>Portfolio Weight</u>	<u>Last Qtr</u>	<u>Fiscal YTD</u>	<u>1 Year</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>	<u>Since Inception</u>	<u>Inception Date</u>
Active Large Cap Growth										
SANDS	\$139,753,961	0.5%	1.7%	-1.9%	-49.3%	-3.0%	5.4%	10.1%	9.0%	01/2005
Russell 1000 Growth			2.2	-1.5	-29.1	7.8	11.0	14.1	10.0	01/2005
Excess			-0.5	-0.4	-20.2	-10.8	-5.5	-4.0	-1.1	
WINSLOW	148,507,890	0.5	7.5	1.5	-31.0	5.8	10.6	13.4	10.3	01/2005
Russell 1000 Growth			2.2	-1.5	-29.1	7.8	11.0	14.1	10.0	01/2005
Excess			5.3	3.0	-1.8	-1.9	-0.3	-0.7	0.2	
RUSSELL 1000 GROWTH AGGREGATE (1)	288,261,851	1.1	4.6	-0.2	-41.3	6.3	11.5	14.2	9.7	11/2003
Russell 1000 Growth			2.2	-1.5	-29.1	7.8	11.0	14.1	10.0	11/2003
Excess			2.4	1.3	-12.1	-1.5	0.6	0.1	-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.



	<u>2022 Calendar Return</u>	<u>2021 Calendar Return</u>	<u>2020 Calendar Return</u>	<u>2019 Calendar Return</u>	<u>2018 Calendar Return</u>
Active Large Cap Growth					
SANDS	-49.3%	5.2%	71.0%	33.5%	7.0%
Russell 1000 Growth	-29.1	27.6	38.5	36.4	-1.5
Excess	-20.2	-22.4	32.5	-2.8	8.6
WINSLOW	-31.0	24.8	37.6	34.2	4.2
Russell 1000 Growth	-29.1	27.6	38.5	36.4	-1.5
Excess	-1.8	-2.8	-0.9	-2.2	5.7
RUSSELL 1000 GROWTH AGGREGATE (1)	-41.3	12.8	81.3	37.3	4.7
Russell 1000 Growth	-29.1	27.6	38.5	36.4	-1.5
Excess	-12.1	-14.8	42.8	0.9	6.2

(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.



	<u>Ending Market Value</u>	<u>Portfolio Weight</u>	<u>Last Qtr</u>	<u>Fiscal YTD</u>	<u>1 Year</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>	<u>Since Inception</u>	<u>Inception Date</u>
Semi-Passive Large Cap										
BLACKROCK	\$1,371,123,756	5.0%	7.6%	2.2%	-19.2%	7.7%	9.4%	12.9%	9.9%	01/1995
Semi Passive Domestic Equity Benchmark			7.2	2.3	-19.1	7.3	9.1	12.4	9.5	01/1995
Excess			0.4	-0.0	-0.1	0.4	0.2	0.5	0.4	
J.P. MORGAN	1,374,018,194	5.0	7.4	2.9	-18.1	8.7	9.8	13.0	9.9	01/1995
Semi Passive Domestic Equity Benchmark			7.2	2.3	-19.1	7.3	9.1	12.4	9.5	01/1995
Excess			0.1	0.6	1.0	1.3	0.6	0.6	0.4	
SEMI-PASSIVE DOMESTIC EQUITY AGGREGATE	2,745,141,950	10.1	7.5	2.6	-18.7	8.2	9.5	12.6	8.6	06/1996
Semi Passive Domestic Equity Benchmark			7.2	2.3	-19.1	7.3	9.1	12.4	8.5	06/1996
Excess			0.3	0.3	0.4	0.8	0.4	0.2	0.1	



	<u>2022 Calendar Return</u>	<u>2021 Calendar Return</u>	<u>2020 Calendar Return</u>	<u>2019 Calendar Return</u>	<u>2018 Calendar Return</u>
Semi-Passive Large Cap					
BLACKROCK	-19.2%	28.3%	20.7%	30.4%	-4.1%
Semi Passive Domestic Equity Benchmark	-19.1	26.5	21.0	31.4	-4.8
Excess	-0.1	1.8	-0.3	-1.0	0.7
J.P. MORGAN					
J.P. MORGAN	-18.1	29.3	21.2	31.3	-5.4
Semi Passive Domestic Equity Benchmark	-19.1	26.5	21.0	31.4	-4.8
Excess	1.0	2.8	0.3	-0.1	-0.6
SEMI-PASSIVE DOMESTIC EQUITY AGGREGATE					
SEMI-PASSIVE DOMESTIC EQUITY AGGREGATE	-18.7	28.8	21.0	30.9	-4.9
Semi Passive Domestic Equity Benchmark	-19.1	26.5	21.0	31.4	-4.8
Excess	0.4	2.3	0.0	-0.5	-0.1



	<u>Ending Market Value</u>	<u>Portfolio Weight</u>	<u>Last Qtr</u>	<u>Fiscal YTD</u>	<u>1 Year</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>	<u>Since Inception</u>	<u>Inception Date</u>
Active Large Cap Value										
BARROW HANLEY	\$366,821,838	1.3%	15.2%	9.7%	1.1%	9.7%	9.5%	11.8%	8.6%	04/2004
Russell 1000 Value			12.4	6.1	-7.5	6.0	6.7	10.3	7.7	04/2004
Excess			2.8	3.6	8.6	3.8	2.9	1.5	0.9	
LSV	344,553,649	1.3	14.4	6.7	-6.3	6.2	6.1	11.4	8.7	04/2004
Russell 1000 Value			12.4	6.1	-7.5	6.0	6.7	10.3	7.7	04/2004
Excess			2.0	0.6	1.3	0.3	-0.6	1.1	0.9	
RUSSELL 1000 VALUE AGGREGATE	711,375,487	2.6	14.8	8.3	-2.6	8.4	8.2	11.6	8.8	10/2003
Russell 1000 Value			12.4	6.1	-7.5	6.0	6.7	10.3	8.4	10/2003
Excess			2.4	2.1	4.9	2.5	1.5	1.3	0.3	



	<u>2022 Calendar Return</u>	<u>2021 Calendar Return</u>	<u>2020 Calendar Return</u>	<u>2019 Calendar Return</u>	<u>2018 Calendar Return</u>
Active Large Cap Value					
BARROW HANLEY	1.1%	27.7%	2.4%	26.9%	-5.9%
Russell 1000 Value	-7.5	25.2	2.8	26.5	-8.3
Excess	8.6	2.5	-0.4	0.4	2.4
LSV	-6.3	29.7	-1.3	26.9	-11.8
Russell 1000 Value	-7.5	25.2	2.8	26.5	-8.3
Excess	1.3	4.5	-4.1	0.4	-3.6
RUSSELL 1000 VALUE AGGREGATE	-2.6	28.8	1.6	27.4	-8.7
Russell 1000 Value	-7.5	25.2	2.8	26.5	-8.3
Excess	4.9	3.7	-1.2	0.9	-0.4



	<u>Ending Market Value</u>	<u>Portfolio Weight</u>	<u>Last Qtr</u>	<u>Fiscal YTD</u>	<u>1 Year</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>	<u>Since Inception</u>	<u>Inception Date</u>
Active Small Cap Growth										
ARROWMARK	\$160,333,381	0.6%	8.0%	4.7%	-23.3%	-0.3%	3.8%		8.5%	11/2016
Russell 2000 Growth			4.1	4.4	-26.4	0.6	3.5		8.0	11/2016
Excess			3.9	0.3	3.1	-0.9	0.2		0.6	
HOOD RIVER	207,466,566	0.8	-0.3	3.9	-27.7	13.2	10.9		13.7	11/2016
Russell 2000 Growth			4.1	4.4	-26.4	0.6	3.5		8.0	11/2016
Excess			-4.4	-0.5	-1.4	12.6	7.4		5.8	
RICE HALL JAMES	174,745,131	0.6	3.1	-1.5	-24.4	2.7	3.5		9.0	11/2016
Russell 2000 Growth			4.1	4.4	-26.4	0.6	3.5		8.0	11/2016
Excess			-1.0	-5.8	2.0	2.0	0.0		1.1	
WELLINGTON	220,822,279	0.8	4.6	3.2	-28.5	-0.3	3.5		8.0	11/2016
Russell 2000 Growth			4.1	4.4	-26.4	0.6	3.5		8.0	11/2016
Excess			0.4	-1.2	-2.1	-0.9	0.0		0.1	
RUSSELL 2000 GROWTH AGGREGATE	763,367,357	2.8	3.6	2.6	-26.3	3.9	5.6	9.2%	7.1	11/2003
Russell 2000 Growth			4.1	4.4	-26.4	0.6	3.5	9.2	7.9	11/2003
Excess			-0.6	-1.8	0.0	3.3	2.1	-0.0	-0.8	



	<u>2022 Calendar Return</u>	<u>2021 Calendar Return</u>	<u>2020 Calendar Return</u>	<u>2019 Calendar Return</u>	<u>2018 Calendar Return</u>
Active Small Cap Growth					
ARROWMARK	-23.3%	6.1%	21.9%	20.1%	0.9%
Russell 2000 Growth	-26.4	2.8	34.6	28.5	-9.3
Excess	3.1	3.2	-12.8	-8.4	10.3
HOOD RIVER	-27.7	24.2	61.7	24.3	-7.0
Russell 2000 Growth	-26.4	2.8	34.6	28.5	-9.3
Excess	-1.4	21.4	27.0	-4.2	2.3
RICE HALL JAMES	-24.4	15.6	23.8	18.0	-6.9
Russell 2000 Growth	-26.4	2.8	34.6	28.5	-9.3
Excess	2.0	12.8	-10.8	-10.5	2.4
WELLINGTON	-28.5	4.3	33.1	35.6	-11.6
Russell 2000 Growth	-26.4	2.8	34.6	28.5	-9.3
Excess	-2.1	1.4	-1.5	7.1	-2.3
RUSSELL 2000 GROWTH AGGREGATE	-26.3	12.4	35.4	24.6	-6.2
Russell 2000 Growth	-26.4	2.8	34.6	28.5	-9.3
Excess	0.0	9.5	0.8	-3.9	3.2



	<u>Ending Market Value</u>	<u>Portfolio Weight</u>	<u>Last Qtr</u>	<u>Fiscal YTD</u>	<u>1 Year</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>	<u>Since Inception</u>	<u>Inception Date</u>
Active Small Cap Value										
GOLDMAN SACHS	\$269,316,292	1.0%	9.8%	4.1%	-14.4%	3.6%	3.5%	9.0%	8.4%	01/2004
Russell 2000 Value			8.4	3.4	-14.5	4.7	4.1	8.5	7.3	01/2004
Excess			1.4	0.7	0.1	-1.1	-0.6	0.5	1.1	
HOTCHKIS AND WILEY	187,602,300	0.7	13.9	13.1	3.1	12.0	7.6	10.9	8.6	01/2004
Russell 2000 Value			8.4	3.4	-14.5	4.7	4.1	8.5	7.3	01/2004
Excess			5.5	9.7	17.6	7.3	3.4	2.4	1.2	
MARTINGALE	164,644,449	0.6	11.3	7.1	-8.0	7.4	5.0	10.3	7.6	01/2004
Russell 2000 Value			8.4	3.4	-14.5	4.7	4.1	8.5	7.3	01/2004
Excess			2.8	3.7	6.4	2.7	0.9	1.8	0.3	
PEREGRINE	254,472,702	0.9	9.5	3.4	-12.5	6.5	4.2	8.9	9.3	07/2000
Russell 2000 Value			8.4	3.4	-14.5	4.7	4.1	8.5	8.7	07/2000
Excess			1.0	0.0	2.0	1.8	0.0	0.4	0.6	
RUSSELL 2000 VALUE AGGREGATE	876,035,742	3.2	10.8	6.3	-9.4	6.6	4.7	9.5	8.6	10/2003
Russell 2000 Value			8.4	3.4	-14.5	4.7	4.1	8.5	8.1	10/2003
Excess			2.4	2.9	5.1	1.9	0.5	1.0	0.5	



	<u>2022 Calendar Return</u>	<u>2021 Calendar Return</u>	<u>2020 Calendar Return</u>	<u>2019 Calendar Return</u>	<u>2018 Calendar Return</u>
Active Small Cap Value					
GOLDMAN SACHS	-14.4%	27.0%	2.4%	23.2%	-13.3%
Russell 2000 Value	-14.5	28.3	4.6	22.4	-12.9
Excess	0.1	-1.3	-2.3	0.8	-0.5
HOTCHKIS AND WILEY	3.1	36.5	-0.2	19.7	-14.4
Russell 2000 Value	-14.5	28.3	4.6	22.4	-12.9
Excess	17.6	8.2	-4.8	-2.7	-1.5
MARTINGALE	-8.0	41.3	-4.6	21.1	-15.0
Russell 2000 Value	-14.5	28.3	4.6	22.4	-12.9
Excess	6.4	13.0	-9.2	-1.3	-2.1
PEREGRINE	-12.5	28.6	7.3	21.1	-16.1
Russell 2000 Value	-14.5	28.3	4.6	22.4	-12.9
Excess	2.0	0.3	2.7	-1.3	-3.3
RUSSELL 2000 VALUE AGGREGATE	-9.4	31.8	1.5	21.3	-14.7
Russell 2000 Value	-14.5	28.3	4.6	22.4	-12.9
Excess	5.1	3.5	-3.1	-1.1	-1.8



	<u>Ending Market Value</u>	<u>Portfolio Weight</u>	<u>Last Qtr</u>	<u>Fiscal YTD</u>	<u>1 Year</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>	<u>Since Inception</u>	<u>Inception Date</u>
Active All Cap										
ZEVENBERGEN (1)	\$139,725,818	0.5%	-13.0%	-6.0%	-55.7%	-3.3%	5.8%	11.9%	9.6%	04/1994
Zevenbergen Custom Benchmark			2.3	-1.1	-29.0	9.2	11.8	14.5		04/1994
Excess			-15.3	-4.9	-26.8	-12.5	-6.1	-2.7		
ACTIVE RUSSELL 3000 GROWTH (2)	139,725,818	0.5	-13.0	-6.0	-55.7				-36.8	01/2021
Russell 3000 Growth TR			2.3	-1.1	-29.0				-5.5	01/2021
Excess			-15.3	-4.9	-26.8				-31.3	

(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.



	<u>2022 Calendar Return</u>	<u>2021 Calendar Return</u>	<u>2020 Calendar Return</u>	<u>2019 Calendar Return</u>	<u>2018 Calendar Return</u>
Active All Cap					
ZEVENBERGEN (1)	-55.7%	-9.7%	126.2%	43.0%	2.3%
Zevenbergen Custom Benchmark	-29.0	32.3	38.5	36.4	-1.5
Excess	-26.8	-42.0	87.7	6.7	3.8
ACTIVE RUSSELL 3000 GROWTH (2)					
ACTIVE RUSSELL 3000 GROWTH (2)	-55.7	-9.7			
Russell 3000 Growth TR	-29.0	25.8			
Excess	-26.8	-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.



	<u>Ending Market Value</u>	<u>Portfolio Weight</u>	<u>Last Qtr</u>	<u>Fiscal YTD</u>	<u>1 Year</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>	<u>Since Inception</u>	<u>Inception Date</u>
Total Passive Domestic Equity										
BLACKROCK RUSSELL 1000	\$20,646,951,584	75.8%	7.3%	2.3%	-19.2%	7.3%	9.1%		11.8%	11/2016
RUSSELL 1000 (DAILY)			7.2	2.3	-19.1	7.3	9.1		11.8	11/2016
Excess			0.0	0.0	-0.0	-0.0	-0.0		-0.0	
BLACKROCK RUSSELL 2000	122,084,248	0.4	5.9	3.6	-19.9	3.9			5.7	11/2018
RUSSELL 2000 (DAILY)			6.2	3.9	-20.4	3.1			5.1	11/2018
Excess			-0.3	-0.3	0.6	0.8			0.6	
BLACKROCK RUSSELL 3000 (1)	936,137,661	3.4	7.2	2.4	-19.2	7.3	9.0	12.2%	9.3	07/1995
Passive Manager Benchmark			7.2	2.4	-19.2	7.1	8.8	12.1	9.2	07/1995
Excess			0.0	0.0	0.0	0.3	0.2	0.1	0.1	
PASSIVE DOMESTIC EQUITY AGGREGATE (2)	21,705,173,493	79.7	7.2	2.3	-19.2	7.3	9.0	12.3	8.7	06/1996
Passive Domestic Equity Benchmark			7.2	2.3	-19.1	7.3	9.0	12.3	8.8	06/1996
Excess			0.0	0.0	-0.0	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.



	<u>2022 Calendar Return</u>	<u>2021 Calendar Return</u>	<u>2020 Calendar Return</u>	<u>2019 Calendar Return</u>	<u>2018 Calendar Return</u>
Total Passive Domestic Equity					
BLACKROCK RUSSELL 1000	-19.2%	26.5%	20.9%	31.4%	-4.8%
RUSSELL 1000 (DAILY)	-19.1	26.5	21.0	31.4	-4.8
Excess	-0.0	0.1	-0.0	0.0	-0.0
BLACKROCK RUSSELL 2000	-19.9	16.0	20.8	25.2	
RUSSELL 2000 (DAILY)	-20.4	14.8	20.0	25.5	
Excess	0.6	1.2	0.8	-0.3	
BLACKROCK RUSSELL 3000 (1)	-19.2	26.2	21.2	31.1	-5.2
Passive Manager Benchmark	-19.2	25.7	20.9	31.0	-5.2
Excess	0.0	0.5	0.3	0.0	-0.0
PASSIVE DOMESTIC EQUITY AGGREGATE (2)	-19.2	26.5	20.8	31.3	-5.0
Passive Domestic Equity Benchmark	-19.1	26.4	20.8	31.3	-5.0
Excess	-0.0	0.1	0.0	0.0	-0.0

(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

December 31, 2022



	<u>Ending Market Value</u>	<u>Portfolio Weight</u>	<u>Last Qtr</u>	<u>Fiscal YTD</u>	<u>1 Year</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>	<u>Since Inception</u>	<u>Inception Date</u>
Total International Equity										
DEVELOPED MARKETS (1)	\$9,074,663,677	71.6%	12.7%	6.2%	-10.7%	3.3%	3.2%	5.7%	5.7%	01/1997
BENCHMARK DM			16.2%	5.5%	-14.3%	1.3%	1.8%	4.6%	4.5%	01/1997
Excess			-3.5%	0.7%	3.6%	2.0%	1.4%	1.1%	1.2%	
EMERGING MARKETS (2)	3,081,497,594	24.3%	9.8	-1.6	-21.1	-2.8%	-1.4%	1.5%	5.0	11/1996
BENCHMARK EM			9.7	-3.0	-20.1	-2.7	-1.4	1.4	5.2	11/1996
Excess			0.1	1.4	-1.0	-0.2	0.0	0.0	-0.3	
ACWI EX-US AGGREGATE	351,173,133	2.8	14.2	3.6	-12.6				-0.7	01/2021
MSCI AC WORLD ex US (NET) - DAILY			14.3	3.0	-16.0				-4.8	01/2021
Excess			-0.1	0.6	3.4				4.1	
CHINA ONLY AGGREGATE	154,077,114	1.2	11.3	-10.2	-24.5				-14.3	01/2021
MSCI China A			4.3	-14.7	-25.9				-12.6	01/2021
Excess			7.0	4.6	1.4				-1.8	
TRANSITION AGGREGATE INTERNATIONAL EQUITY (3)	4,084,462	0.0								
TOTAL INTERNATIONAL EQUITY (4)	12,665,495,979	100.0	12.0	4.0	-13.7	1.5	1.8	4.6	6.1	10/1992
International Equity Benchmark			14.3	3.0	-16.0	0.0	0.9	3.8	5.5	10/1992
Excess			-2.3	1.0	2.3	1.5	1.0	0.9	0.6	

(1) The current benchmark for Developed Markets, Benchmark DM, is the Standard (large + mid) MSCI World ex USA (net).

(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.



	<u>2022 Calendar Return</u>	<u>2021 Calendar Return</u>	<u>2020 Calendar Return</u>	<u>2019 Calendar Return</u>	<u>2018 Calendar Return</u>
Total International Equity					
DEVELOPED MARKETS (1)	-10.7%	13.5%	8.9%	23.3%	-14.2%
BENCHMARK DM	-14.3%	12.6%	7.6%	22.5%	-14.1%
Excess	3.6%	0.9%	1.3%	0.8%	-0.1%
EMERGING MARKETS (2)					
EMERGING MARKETS (2)	-21.1	-1.5	17.9	20.3	-15.4
BENCHMARK EM	-20.1	-2.5	18.3	18.4	-14.6
Excess	-1.0	1.1	-0.4	1.9	-0.8
ACWI EX-US AGGREGATE					
ACWI EX-US AGGREGATE	-12.6	12.8			
MSCI AC WORLD ex US (NET) - DAILY	-16.0	7.8			
Excess	3.4	4.9			
CHINA ONLY AGGREGATE					
CHINA ONLY AGGREGATE	-24.5	-2.9			
MSCI China A	-25.9	3.2			
Excess	1.4	-6.1			
TRANSITION AGGREGATE INTERNATIONAL EQUITY (3)					
TOTAL INTERNATIONAL EQUITY (4)					
TOTAL INTERNATIONAL EQUITY (4)	-13.7	8.9	11.4	22.4	-14.5
International Equity Benchmark	-16.0	7.8	10.5	21.5	-14.2
Excess	2.3	1.1	0.8	0.9	-0.3

(1) The current benchmark for Developed Markets, Benchmark DM, is the Standard (large + mid) MSCI World ex USA (net).

(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.



	<u>Ending Market Value</u>	<u>Portfolio Weight</u>	<u>Last Qtr</u>	<u>Fiscal YTD</u>	<u>1 Year</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>	<u>Since Inception</u>	<u>Inception Date</u>
Active Developed Markets										
ACADIAN	\$350,031,956	2.8%	15.2%	6.1%	-12.5%	3.5%	2.7%	7.9%	6.1%	07/2005
BENCHMARK DM			16.2	5.5	-14.3	1.3	1.8	4.6	4.5	07/2005
Excess			-1.0	0.6	1.8	2.3	0.9	3.4	1.6	
COLUMBIA	365,297,486	2.9	17.8	8.4	-15.0	3.7	4.1	6.7	3.4	03/2000
BENCHMARK DM			16.2	5.5	-14.3	1.3	1.8	4.6	3.3	03/2000
Excess			1.6	2.9	-0.7	2.5	2.3	2.1	0.1	
FIDELITY	350,279,126	2.8	16.2	4.3	-17.4	2.5	3.2	6.0	6.0	07/2005
BENCHMARK DM			16.2	5.5	-14.3	1.3	1.8	4.6	4.5	07/2005
Excess			0.0	-1.2	-3.2	1.2	1.4	1.4	1.5	
JP MORGAN	306,248,118	2.4	15.4	5.8	-19.0	1.5	2.2	4.8	4.7	07/2005
BENCHMARK DM			16.2	5.5	-14.3	1.3	1.8	4.6	4.5	07/2005
Excess			-0.7	0.3	-4.7	0.3	0.4	0.3	0.3	
MARATHON	345,642,440	2.7	16.9	6.6	-12.1	2.2	2.7	6.2	7.5	11/1993
BENCHMARK DM			16.2	5.5	-14.3	1.3	1.8	4.6	4.8	11/1993
Excess			0.7	1.1	2.2	0.9	0.9	1.6	2.7	
MCKINLEY	252,839,973	2.0	15.7	4.4	-18.0	2.1	2.4	5.6	4.5	07/2005
BENCHMARK DM			16.2	5.5	-14.3	1.3	1.8	4.6	4.5	07/2005
Excess			-0.5	-1.1	-3.7	0.9	0.6	1.0	-0.0	
AQR CAPITAL MANAGEMENT	326,974,293	2.6	16.9	4.8	-12.7	0.2	-0.1	4.1	4.4	07/2005
BENCHMARK DM			16.2	5.5	-14.3	1.3	1.8	4.6	4.5	07/2005
Excess			0.7	-0.7	1.6	-1.1	-1.9	-0.5	-0.1	



	<u>2022 Calendar Return</u>	<u>2021 Calendar Return</u>	<u>2020 Calendar Return</u>	<u>2019 Calendar Return</u>	<u>2018 Calendar Return</u>
Active Developed Markets					
ACADIAN	-12.5%	13.6%	11.7%	19.1%	-13.5%
BENCHMARK DM	-14.3	12.6	7.6	22.5	-14.1
Excess	1.8	0.9	4.2	-3.4	0.6
COLUMBIA	-15.0	14.2	15.0	28.9	-14.9
BENCHMARK DM	-14.3	12.6	7.6	22.5	-14.1
Excess	-0.7	1.6	7.4	6.4	-0.8
FIDELITY	-17.4	13.0	15.4	27.1	-14.6
BENCHMARK DM	-14.3	12.6	7.6	22.5	-14.1
Excess	-3.2	0.4	7.8	4.6	-0.5
JP MORGAN	-19.0	13.3	14.2	28.5	-17.3
BENCHMARK DM	-14.3	12.6	7.6	22.5	-14.1
Excess	-4.7	0.7	6.6	6.0	-3.3
MARATHON	-12.1	12.8	7.6	23.5	-13.4
BENCHMARK DM	-14.3	12.6	7.6	22.5	-14.1
Excess	2.2	0.2	0.1	1.0	0.7
MCKINLEY	-18.0	11.6	16.4	25.6	-15.9
BENCHMARK DM	-14.3	12.6	7.6	22.5	-14.1
Excess	-3.7	-1.0	8.8	3.1	-1.9
AQR CAPITAL MANAGEMENT	-12.7	8.1	6.5	20.8	-18.2
BENCHMARK DM	-14.3	12.6	7.6	22.5	-14.1
Excess	1.6	-4.5	-1.1	-1.7	-4.1



	<u>Ending Market Value</u>	<u>Portfolio Weight</u>	<u>1 Qtr</u>	<u>Fiscal YTD</u>	<u>1 Year</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>	<u>Since Inception</u>	<u>Inception Date</u>
Total Developed Markets										
Active Developed Markets Aggregate (1)	\$2,297,313,392	18.1%	16.3%	5.8%	-15.2%	2.3%	2.5%	5.7%	5.2%	06/1996
BENCHMARK DM			16.2%	5.5%	-14.3%	1.3%	1.8%	4.6%	2.0%	06/1996
Excess			0.1%	0.3%	-0.9%	1.0%	0.7%	1.1%	3.2%	
SSgA DEVELOPED MARKETS PASSIVE	\$6,719,090,479	53.1%	16.3%	5.6%	-13.8%	1.8%	2.2%	5.0%		
BENCHMARK DM			16.2%	5.5%	-14.3%	1.3%	1.8%	4.6%		
Excess			0.1%	0.1%	0.5%	0.5%	0.4%	0.4%		
RECORD CURRENCY (2)	\$58,259,806	0.5%	-3.6%	0.6%	3.5%					10/2020
DEVELOPED MARKETS	\$9,074,663,677		12.7%	6.2%	-10.7%	3.3%	3.2%	5.7%	5.7%	01/1997
BENCHMARK DM			16.2%	5.5%	-14.3%	1.3%	1.8%	4.6%	4.5%	01/1997
Excess			-3.5%	0.7%	3.6%	2.0%	1.4%	1.1%	1.2%	

(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.



	<u>2022 Calendar Return</u>	<u>2021 Calendar Return</u>	<u>2020 Calendar Return</u>	<u>2019 Calendar Return</u>	<u>2018 Calendar Return</u>
Total Developed Markets					
Active Developed Markets Aggregate (1)	-15.2%	12.5%	12.2%	24.4%	-15.1%
BENCHMARK DM	-14.3%	12.6%	7.6%	22.5%	-14.1%
Excess	-0.9%	-0.1%	4.6%	1.9%	-1.0%
SSgA DEVELOPED MARKETS PASSIVE	-13.8%	13.0%	8.2%	23.0%	-13.9%
BENCHMARK DM	-14.3%	12.6%	7.6%	22.5%	-14.1%
Excess	0.5%	0.4%	0.6%	0.5%	0.2%
DEVELOPED MARKETS	-10.7%	13.5%	8.9%	23.3%	-14.2%
BENCHMARK DM	-14.3%	12.6%	7.6%	22.5%	-14.1%
Excess	3.6%	0.9%	1.3%	0.8%	-0.1%

(1) Includes the historical returns of AQR and terminated managers previously classified as "Semi-Passive Developed Markets"



	<u>Ending Market Value</u>	<u>Portfolio Weight</u>	<u>Last Qtr</u>	<u>Fiscal YTD</u>	<u>1 Year</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>	<u>Since Inception</u>	<u>Inception Date</u>
Active Emerging Markets										
MARTIN CURRIE	\$356,083,603	2.8%	10.9%	-1.7%	-25.7%	-3.2%	-0.7%		4.1%	04/2017
BENCHMARK EM			9.7	-3.0	-20.1	-2.7	-1.4		2.4	04/2017
Excess			1.2	1.3	-5.6	-0.5	0.6		1.7	
MACQUARIE	327,273,885	2.6	8.3	-5.6	-26.5	-3.7	-1.0		2.8	04/2017
BENCHMARK EM			9.7	-3.0	-20.1	-2.7	-1.4		2.4	04/2017
Excess			-1.4	-2.6	-6.4	-1.0	0.4		0.4	
MORGAN STANLEY	429,420,220	3.4	10.7	3.1	-23.8	-3.0	-1.8	1.7%	7.7	01/2001
BENCHMARK EM			9.7	-3.0	-20.1	-2.7	-1.4	1.4	7.5	01/2001
Excess			1.0	6.1	-3.7	-0.3	-0.4	0.3	0.2	
NEUBERGER BERMAN	314,020,199	2.5	9.6	-2.1	-22.1	-5.6	-3.6		0.9	04/2017
BENCHMARK EM			9.7	-3.0	-20.1	-2.7	-1.4		2.4	04/2017
Excess			-0.1	0.9	-2.0	-3.0	-2.2		-1.5	
PZENA	342,372,902	2.7	11.9	3.4	-7.4	2.9	2.0		4.3	04/2017
BENCHMARK EM			9.7	-3.0	-20.1	-2.7	-1.4		2.4	04/2017
Excess			2.2	6.4	12.7	5.6	3.4		1.9	
ROCK CREEK	345,788,241	2.7	8.4	-2.1	-19.4	-2.3	-1.3		2.0	04/2017
BENCHMARK EM			9.7	-3.0	-20.1	-2.7	-1.4		2.4	04/2017
Excess			-1.3	0.9	0.7	0.4	0.1		-0.5	



	<u>2022 Calendar Return</u>	<u>2021 Calendar Return</u>	<u>2020 Calendar Return</u>	<u>2019 Calendar Return</u>	<u>2018 Calendar Return</u>
Active Emerging Markets					
MARTIN CURRIE	-25.7%	-3.5%	26.5%	27.3%	-16.6%
BENCHMARK EM	-20.1	-2.5	18.3	18.4	-14.6
Excess	-5.6	-1.0	8.2	8.8	-2.0
MACQUARIE	-26.5	-2.2	24.2	23.2	-13.3
BENCHMARK EM	-20.1	-2.5	18.3	18.4	-14.6
Excess	-6.4	0.3	5.9	4.7	1.3
MORGAN STANLEY	-23.8	3.5	15.7	20.4	-16.7
BENCHMARK EM	-20.1	-2.5	18.3	18.4	-14.6
Excess	-3.7	6.0	-2.6	1.9	-2.2
NEUBERGER BERMAN	-22.1	-5.6	14.2	19.7	-17.1
BENCHMARK EM	-20.1	-2.5	18.3	18.4	-14.6
Excess	-2.0	-3.1	-4.1	1.3	-2.6
PZENA	-7.4	9.3	7.7	13.4	-10.8
BENCHMARK EM	-20.1	-2.5	18.3	18.4	-14.6
Excess	12.7	11.8	-10.6	-5.1	3.8
ROCK CREEK	-19.4	-5.2	22.0	22.3	-17.6
BENCHMARK EM	-20.1	-2.5	18.3	18.4	-14.6
Excess	0.7	-2.7	3.7	3.9	-3.1



	<u>Ending Market Value</u>	<u>Portfolio Weight</u>	<u>Last Qtr</u>	<u>Fiscal YTD</u>	<u>1 Year</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>	<u>Since Inception</u>	<u>Inception Date</u>
Total Emerging Markets										
ACTIVE EMERGING MARKETS AGGREGATE	\$2,114,959,051	16.7%	10.0%	-0.7%	-21.4%	-2.9%	-1.2%	1.3%	2.7%	01/2012
BENCHMARK EM			9.7	-3.0	-20.1	-2.7	-1.4	1.4	2.9	01/2012
Excess			0.3	2.2	-1.3	-0.2	0.2	-0.1	-0.2	
SSGA EMERGING MARKETS PASSIVE	966,538,543	7.6	9.5	-3.3	-20.4	-2.9	-1.6	1.4	2.8	01/2012
BENCHMARK EM			9.7	-3.0	-20.1	-2.7	-1.4	1.4	2.9	01/2012
Excess			-0.2	-0.3	-0.3	-0.2	-0.2	-0.1	-0.0	
EMERGING MARKETS TOTAL	3,081,497,594	24.3	9.8	-1.6	-21.1	-2.8	-1.4	1.5	5.0	11/1996
BENCHMARK EM			9.7	-3.0	-20.1	-2.7	-1.4	1.4	5.2	11/1996
Excess			0.1	1.4	-1.0	-0.2	0.0	0.0	-0.3	



	<u>2022 Calendar Return</u>	<u>2021 Calendar Return</u>	<u>2020 Calendar Return</u>	<u>2019 Calendar Return</u>	<u>2018 Calendar Return</u>
Total Emerging Markets					
ACTIVE EMERGING MARKETS AGGREGATE	-21.4%	-0.9%	17.6%	21.4%	-15.6%
BENCHMARK EM	-20.1	-2.5	18.3	18.4	-14.6
Excess	-1.3	1.6	-0.7	3.0	-1.0
SSGA EMERGING MARKETS PASSIVE	-20.4	-2.9	18.3	18.1	-14.7
BENCHMARK EM	-20.1	-2.5	18.3	18.4	-14.6
Excess	-0.3	-0.3	0.0	-0.3	-0.1
EMERGING MARKETS TOTAL	-21.1	-1.5	17.9	20.3	-15.4
BENCHMARK EM	-20.1	-2.5	18.3	18.4	-14.6
Excess	-1.0	1.1	-0.4	1.9	-0.8



	<u>Ending Market Value</u>	<u>Portfolio Weight</u>	<u>Last Qtr</u>	<u>Fiscal YTD</u>	<u>1 Year</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>	<u>Since Inception</u>	<u>Inception Date</u>
Active ACWI ex-US										
EARNEST PARTNERS ACWI EX US	\$351,173,133	2.8%	14.2%	3.6%	-12.6%				-0.7%	01/2021
MSCI AC WORLD ex US (NET) - DAILY			14.3%	3.0%	-16.0%				-4.8%	01/2021
Excess			-0.1%	0.6%	3.4%				4.1%	
TOTAL ACWI EX-US AGGREGATE										
TOTAL ACWI EX-US AGGREGATE	\$351,173,133	2.8%	14.2%	3.6%	-12.6%				-0.7%	01/2021
MSCI AC WORLD ex US (NET) - DAILY			14.3%	3.0%	-16.0%				-4.8%	01/2021
Excess			-0.1%	0.6%	3.4%				4.1%	



	<u>2022 Calendar Return</u>	<u>2021 Calendar Return</u>	<u>2020 Calendar Return</u>	<u>2019 Calendar Return</u>	<u>2018 Calendar Return</u>
Active ACWI ex-US					
EARNEST PARTNERS ACWI EX US	-12.6%	12.8%			
MSCI AC WORLD ex US (NET) - DAILY	-16.0	7.8			
Excess	3.4	4.9			
TOTAL ACWI EX-US AGGREGATE					
MSCI AC WORLD ex US (NET) - DAILY	-16.0	7.8			
Excess	3.4	4.9			



	<u>Ending Market Value</u>	<u>Portfolio Weight</u>	<u>Last Qtr</u>	<u>Fiscal YTD</u>	<u>1 Year</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>	<u>Since Inception</u>	<u>Inception Date</u>
China Only Managers										
EARNEST PARTNERS CHINA	\$154,077,114	1.2%	11.3%	-10.2%	-24.5%				-14.3%	01/2021
MSCI China A			4.3	-14.7	-25.9				-12.6	01/2021
Excess			7.0	4.6	1.4				-1.8	
CHINA ONLY AGGREGATE	154,077,114	1.2	11.3	-10.2	-24.5				-14.3	01/2021
MSCI China A			4.3	-14.7	-25.9				-12.6	01/2021
Excess			7.0	4.6	1.4				-1.8	



	<u>2022 Calendar Return</u>	<u>2021 Calendar Return</u>	<u>2020 Calendar Return</u>	<u>2019 Calendar Return</u>	<u>2018 Calendar Return</u>
China Only Managers					
EARNEST PARTNERS CHINA	-24.5%	-2.9%			
MSCI China A	-25.9	3.2			
Excess	1.4	-6.1			
CHINA ONLY AGGREGATE					
MSCI China A	-25.9	3.2			
Excess	1.4	-6.1			

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Global Equity

December 31, 2022



	<u>Ending Market Value</u>	<u>Portfolio Weight</u>	<u>Last Qtr</u>	<u>Fiscal YTD</u>	<u>1 Year</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>	<u>Since Inception</u>	<u>Inception Date</u>
Global Equity Managers										
ARIEL INVESTMENTS	\$364,395,952	43.6%	9.5%	-0.8%	-5.6%				2.9%	01/2021
MSCI AC WORLD NET USD DAILY			9.8	2.3	-18.4				-1.6	01/2021
Excess			-0.2	-3.1	12.8				4.5	
BAILLIE GIFFORD	172,967,535	20.7	1.4	-3.7	-46.9				-26.0	01/2021
MSCI AC WORLD NET USD DAILY			9.8	2.3	-18.4				-1.6	01/2021
Excess			-8.3	-6.0	-28.5				-24.4	
MARTIN CURRIE INVESTMENTS - GLOBAL EQ	297,536,322	35.6	12.0	0.1	-32.9				-13.0	01/2021
MSCI AC WORLD NET USD DAILY			9.8	2.3	-18.4				-1.6	01/2021
Excess			2.2	-2.2	-14.5				-11.4	
GLOBAL EQUITY	834,899,810	100.0	8.6	-1.1	-27.7				-11.0	01/2021
MSCI AC WORLD NET USD DAILY			9.8	2.3	-18.4				-1.6	01/2021
Excess			-1.2	-3.4	-9.4				-9.4	



	<u>2022 Calendar Return</u>	<u>2021 Calendar Return</u>	<u>2020 Calendar Return</u>	<u>2019 Calendar Return</u>	<u>2018 Calendar Return</u>
Global Equity Managers					
ARIEL INVESTMENTS	-5.6%	12.1%			
MSCI AC WORLD NET USD DAILY	-18.4	18.5			
Excess	12.8	-6.5			
BAILLIE GIFFORD	-46.9	3.1			
MSCI AC WORLD NET USD DAILY	-18.4	18.5			
Excess	-28.5	-15.5			
MARTIN CURRIE INVESTMENTS - GLOBAL EQ	-32.9	12.8			
MSCI AC WORLD NET USD DAILY	-18.4	18.5			
Excess	-14.5	-5.8			
GLOBAL EQUITY	-27.7	9.6			
MSCI AC WORLD NET USD DAILY	-18.4	18.5			
Excess	-9.4	-8.9			

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Core/Core Plus Bonds

December 31, 2022



	<u>Ending Market Value</u>	<u>Portfolio Weight</u>	<u>Last Qtr</u>	<u>Fiscal YTD</u>	<u>1 Year</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>	<u>Since Inception</u>	<u>Inception Date</u>
Bonds										
CORE (1)	\$1,862,671,253	41.2%	2.2%	-2.1%	-12.3%				-5.5%	11/2020
Bloomberg U.S. Aggregate			1.9	-3.0	-13.0				-6.4	11/2020
Excess			0.3	0.8	0.7				0.9	
CORE PLUS (1)	2,662,040,309	58.8	2.1	-3.0	-15.2				-6.8	11/2020
Bloomberg U.S. Aggregate			1.9	-3.0	-13.0				-6.4	11/2020
Excess			0.2	-0.0	-2.2				-0.4	
TRANSITION AGGREGATE CORE BONDS (2)	19,207	0.0								
TOTAL CORE/CORE PLUS BONDS (3)	4,524,730,769	100.0	2.1	-2.6	-14.1	-2.3%	0.4%	1.5%	6.7	07/1984
Bloomberg U.S. Aggregate			1.9	-3.0	-13.0	-2.7	0.0	1.1	6.4	07/1984
Excess			0.3	0.3	-1.1	0.4	0.4	0.5	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.



	<u>2022 Calendar Return</u>	<u>2021 Calendar Return</u>	<u>2020 Calendar Return</u>	<u>2019 Calendar Return</u>	<u>2018 Calendar Return</u>
Bonds					
CORE (1)	-12.3%	-1.0%			
Bloomberg U.S. Aggregate	-13.0	-1.5			
Excess	0.7	0.5			
CORE PLUS (1)	-15.2	-1.1			
Bloomberg U.S. Aggregate	-13.0	-1.5			
Excess	-2.2	0.4			
TRANSITION AGGREGATE CORE BONDS (2)					
TOTAL CORE/CORE PLUS BONDS (3)	-14.1	-1.1	9.7%	9.7%	-0.0%
Bloomberg U.S. Aggregate	-13.0	-1.5	7.5	8.7	0.0
Excess	-1.1	0.5	2.2	1.0	-0.1

(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.



	<u>Ending Market Value</u>	<u>Portfolio Weight</u>	<u>Last Qtr</u>	<u>Fiscal YTD</u>	<u>1 Year</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>	<u>Since Inception</u>	<u>Inception Date</u>
Active Core										
DODGE & COX	\$993,659,661	22.0%	2.4%	-1.5%	-11.3%	-1.3%	1.1%	2.1%	5.0%	02/2000
Bloomberg U.S. Aggregate			1.9	-3.0	-13.0	-2.7	0.0	1.1	4.0	02/2000
Excess			0.6	1.5	1.7	1.4	1.1	1.1	1.0	
BLACKROCK	869,011,592	19.2	1.9	-2.9	-13.4	-2.5	0.2	1.2	4.4	04/1996
Bloomberg U.S. Aggregate			1.9	-3.0	-13.0	-2.7	0.0	1.1	4.3	04/1996
Excess			0.0	0.1	-0.4	0.2	0.2	0.2	0.1	
CORE	1,862,671,253	41.2	2.2	-2.1	-12.3				-5.5	11/2020
Bloomberg U.S. Aggregate			1.9	-3.0	-13.0				-6.4	11/2020
Excess			0.3	0.8	0.7				0.9	

(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.



	<u>2022 Calendar Return</u>	<u>2021 Calendar Return</u>	<u>2020 Calendar Return</u>	<u>2019 Calendar Return</u>	<u>2018 Calendar Return</u>
Active Core					
DODGE & COX	-11.3%	-0.7%	9.4%	9.6%	-0.0%
Bloomberg U.S. Aggregate	-13.0	-1.5	7.5	8.7	0.0
Excess	1.7	0.8	1.8	0.9	-0.1
BLACKROCK					
BLACKROCK	-13.4	-1.3	8.3	9.3	-0.1
Bloomberg U.S. Aggregate	-13.0	-1.5	7.5	8.7	0.0
Excess	-0.4	0.2	0.8	0.6	-0.2
CORE					
CORE	-12.3	-1.0			
Bloomberg U.S. Aggregate	-13.0	-1.5			
Excess	0.7	0.5			



	<u>Ending Market Value</u>	<u>Portfolio Weight</u>	<u>Last Qtr</u>	<u>Fiscal YTD</u>	<u>1 Year</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>	<u>Since Inception</u>	<u>Inception Date</u>
Core Plus Bonds										
GOLDMAN SACHS	\$871,117,351	19.3%	2.0%	-3.1%	-13.9%	-2.6%	0.3%	1.3%	4.7%	07/1993
Bloomberg U.S. Aggregate			1.9	-3.0	-13.0	-2.7	0.0	1.1	4.4	07/1993
Excess			0.1	-0.1	-0.9	0.1	0.2	0.3	0.3	
NEUBERGER	854,474,948	18.9	2.0	-2.5	-13.8	-2.0	0.5	1.4	5.6	07/1988
Bloomberg U.S. Aggregate			1.9	-3.0	-13.0	-2.7	0.0	1.1	5.4	07/1988
Excess			0.1	0.5	-0.8	0.7	0.5	0.3	0.3	
WESTERN	936,448,010	20.7	2.3	-3.3	-17.6	-3.4	-0.0	1.6	7.4	07/1984
Bloomberg U.S. Aggregate			1.9	-3.0	-13.0	-2.7	0.0	1.1	6.4	07/1984
Excess			0.5	-0.4	-4.6	-0.7	-0.0	0.6	1.0	
CORE PLUS	2,662,040,309	58.8	2.1	-3.0	-15.2				-6.8	11/2020
Bloomberg U.S. Aggregate			1.9	-3.0	-13.0				-6.4	11/2020
Excess			0.2	-0.0	-2.2				-0.4	

(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.



	<u>2022 Calendar Return</u>	<u>2021 Calendar Return</u>	<u>2020 Calendar Return</u>	<u>2019 Calendar Return</u>	<u>2018 Calendar Return</u>
Core Plus Bonds					
GOLDMAN SACHS	-13.9%	-1.5%	9.0%	9.6%	-0.0%
Bloomberg U.S. Aggregate	-13.0	-1.5	7.5	8.7	0.0
Excess	-0.9	0.0	1.5	0.9	-0.0
NEUBERGER	-13.8	-0.6	9.9	9.0	-0.1
Bloomberg U.S. Aggregate	-13.0	-1.5	7.5	8.7	0.0
Excess	-0.8	1.0	2.4	0.3	-0.1
WESTERN	-17.6	-1.3	10.9	11.1	-0.2
Bloomberg U.S. Aggregate	-13.0	-1.5	7.5	8.7	0.0
Excess	-4.6	0.3	3.4	2.4	-0.3
CORE PLUS	-15.2	-1.1			
Bloomberg U.S. Aggregate	-13.0	-1.5			
Excess	-2.2	0.4			

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Return Seeking Bonds

December 31, 2022



	<u>Ending Market Value</u>	<u>Portfolio Weight</u>	<u>Last Qtr</u>	<u>Fiscal YTD</u>	<u>1 Year</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>	<u>Since Inception</u>	<u>Inception Date</u>
Return Seeking Bonds Managers										
COLUMBIA CREDIT PLUS	\$837,964,823	20.9%	3.4%	-1.3%	-15.3%				-6.7%	12/2020
Credit Plus Benchmark			3.8	-0.6	-13.7				-6.8	12/2020
Excess			-0.4	-0.7	-1.6				0.1	
PIMCO CREDIT PLUS	798,212,549	19.9	3.5	-0.5	-13.6				-6.0	12/2020
Credit Plus Benchmark			3.8	-0.6	-13.7				-6.8	12/2020
Excess			-0.3	0.1	0.1				0.7	
CREDIT PLUS	1,636,177,373	40.8	3.4	-0.9	-14.5				-6.4	12/2020
Credit Plus Benchmark			3.8	-0.6	-13.7				-6.8	12/2020
Excess			-0.3	-0.3	-0.7				0.4	
BLACKROCK OPPORTUNISTIC	526,810,755	13.1	2.7	1.3	-5.4				-2.2	12/2020
ICE BofA US 3-Month Treasury Bill			0.8	1.3	1.5				0.7	12/2020
Excess			1.8	-0.1	-6.8				-2.9	
ASHMORE EMERGING MARKET	278,244,352	6.9	8.8	2.3	-17.2				-13.7	01/2021
JPM JEMB Sovereign-only 50-50			8.3	3.3	-14.8				-10.2	01/2021
Excess			0.5	-1.0	-2.4				-3.5	
TCW SECURITIZED CREDIT	386,053,534	9.6	-0.6	-1.7	-4.6				-2.5	07/2021
ICE BofA US 3-Month Treasury Bill			0.8	1.3	1.5				1.0	07/2021
Excess			-1.5	-3.0	-6.1				-3.5	



	<u>2022 Calendar Return</u>	<u>2021 Calendar Return</u>	<u>2020 Calendar Return</u>	<u>2019 Calendar Return</u>	<u>2018 Calendar Return</u>
Return Seeking Bonds Managers					
COLUMBIA CREDIT PLUS	-15.3%	1.1%			
Credit Plus Benchmark	-13.7	0.0			
Excess	-1.6	1.1			
PIMCO CREDIT PLUS	-13.6	0.8			
Credit Plus Benchmark	-13.7	0.0			
Excess	0.1	0.7			
CREDIT PLUS	-14.5	0.9			
Credit Plus Benchmark	-13.7	0.0			
Excess	-0.7	0.9			
BLACKROCK OPPORTUNISTIC	-5.4	0.3			
ICE BofA US 3-Month Treasury Bill	1.5	0.0			
Excess	-6.8	0.2			
ASHMORE EMERGING MARKET	-17.2	-10.1			
JPM JEMB Sovereign-only 50-50	-14.8	-5.3			
Excess	-2.4	-4.8			
TCW SECURITIZED CREDIT	-4.6				
ICE BofA US 3-Month Treasury Bill	1.5				
Excess	-6.1				



	<u>Ending Market Value</u>	<u>Portfolio Weight</u>	<u>Last Qtr</u>	<u>Fiscal YTD</u>	<u>1 Year</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>	<u>Since Inception</u>	<u>Inception Date</u>
Return Seeking Bonds Managers										
PAYDEN RYCEL	\$278,546,545	6.9%	6.1%	4.0%	-9.6%				-3.7%	01/2021
Multi-Asset Credit Benchmark			4.9	3.5	-10.0				-3.9	01/2021
Excess			1.1	0.5	0.4				0.1	
PGIM	321,787,387	8.0	5.5	4.0	-11.5				-4.4	01/2021
Multi-Asset Credit Benchmark			4.9	3.5	-10.0				-3.9	01/2021
Excess			0.6	0.5	-1.5				-0.6	
MULTI-ASSET CREDIT	600,333,932	15.0	5.8	4.0	-10.6				-4.1	01/2021
Multi-Asset Credit Benchmark			4.9	3.5	-10.0				-3.9	01/2021
Excess			0.9	0.5	-0.6				-0.2	
KKR	290,653,743	7.2	3.6	3.5	-11.0				-3.5	01/2021
ICE BofA US Cash Pay HY Constrained			4.1	3.4	-11.1				-3.3	01/2021
Excess			-0.4	0.2	0.1				-0.3	
OAKTREE	291,820,583	7.3	4.8	4.2	-9.5				-2.7	01/2021
ICE BofA US Cash Pay HY Constrained			4.1	3.4	-11.1				-3.3	01/2021
Excess			0.7	0.8	1.6				0.5	
HIGH YIELD	582,474,326	14.5	4.2	3.8	-10.3				-3.1	01/2021
ICE BofA US Cash Pay HY Constrained			4.1	3.4	-11.1				-3.3	01/2021
Excess			0.2	0.5	0.8				0.1	



	<u>2022 Calendar Return</u>	<u>2021 Calendar Return</u>	<u>2020 Calendar Return</u>	<u>2019 Calendar Return</u>	<u>2018 Calendar Return</u>
Return Seeking Bonds Managers					
PAYDEN RYSEL	-9.6%	2.6%			
Multi-Asset Credit Benchmark	-10.0	2.7			
Excess	0.4	-0.1			
PGIM	-11.5	3.2			
Multi-Asset Credit Benchmark	-10.0	2.7			
Excess	-1.5	0.5			
MULTI-ASSET CREDIT	-10.6	2.9			
Multi-Asset Credit Benchmark	-10.0	2.7			
Excess	-0.6	0.2			
KKR	-11.0	4.7			
ICE BofA US Cash Pay HY Constrained	-11.1	5.3			
Excess	0.1	-0.6			
OAKTREE	-9.5	4.5			
ICE BofA US Cash Pay HY Constrained	-11.1	5.3			
Excess	1.6	-0.8			
HIGH YIELD	-10.3	4.6			
ICE BofA US Cash Pay HY Constrained	-11.1	5.3			
Excess	0.8	-0.7			



	<u>Ending Market Value</u>	<u>Portfolio Weight</u>	<u>Last Qtr</u>	<u>Fiscal YTD</u>	<u>1 Year</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>	<u>Since Inception</u>	<u>Inception Date</u>
Return Seeking Bonds										
CREDIT PLUS	\$1,636,177,373	40.8%	3.4%	-0.9%	-14.5%				-6.4%	12/2020
Credit Plus Benchmark			3.8	-0.6	-13.7				-6.8	12/2020
Excess			-0.3	-0.3	-0.7				0.4	
OPPORTUNISTIC FI	526,810,755	13.1	2.7	1.3	-5.4				-2.2	12/2020
ICE BofA US 3-Month Treasury Bill			0.8	1.3	1.5				0.7	12/2020
Excess			1.8	-0.1	-6.8				-2.9	
EMERGING MARKET DEBT	278,244,352	6.9	8.8	2.3	-17.2				-13.7	01/2021
JPM JEMB Sovereign-only 50-50			8.3	3.3	-14.8				-10.2	01/2021
Excess			0.5	-1.0	-2.4				-3.5	
SECURITIZED CREDIT	386,053,534	9.6	-0.6	-1.7	-4.6				-2.4	06/2021
ICE BofA US 3-Month Treasury Bill			0.8	1.3	1.5				0.9	06/2021
Excess			-1.5	-3.0	-6.1				-3.4	
MULTI-ASSET CREDIT	600,333,932	15.0	5.8	4.0	-10.6				-4.1	01/2021
Multi-Asset Credit Benchmark			4.9	3.5	-10.0				-3.9	01/2021
Excess			0.9	0.5	-0.6				-0.2	
HIGH YIELD	582,474,326	14.5	4.2	3.8	-10.3				-3.1	01/2021
ICE BofA US Cash Pay HY Constrained			4.1	3.4	-11.1				-3.3	01/2021
Excess			0.2	0.5	0.8				0.1	
RETURN SEEKING BONDS (1)	4,011,979,318	100.0	3.8	1.1	-11.3				-4.8	12/2020
Return Seeking Fixed Income Benchmark			3.6	1.3	-9.8				-4.2	12/2020
Excess			0.2	-0.2	-1.6				-0.6	

(1) Includes Return Seeking Bonds transition account.



	<u>2022 Calendar Return</u>	<u>2021 Calendar Return</u>	<u>2020 Calendar Return</u>	<u>2019 Calendar Return</u>	<u>2018 Calendar Return</u>
Return Seeking Bonds					
CREDIT PLUS	-14.5%	0.9%			
Credit Plus Benchmark	-13.7	0.0			
Excess	-0.7	0.9			
OPPORTUNISTIC FI					
ICE BofA US 3-Month Treasury Bill	1.5	0.0			
Excess	-6.8	0.2			
EMERGING MARKET DEBT					
JPM JEMB Sovereign-only 50-50	-14.8	-5.3			
Excess	-2.4	-4.8			
SECURITIZED CREDIT					
ICE BofA US 3-Month Treasury Bill	1.5				
Excess	-6.1				
MULTI-ASSET CREDIT					
Multi-Asset Credit Benchmark	-10.0	2.7			
Excess	-0.6	0.2			
HIGH YIELD					
ICE BofA US Cash Pay HY Constrained	-11.1	5.3			
Excess	0.8	-0.7			
RETURN SEEKING BONDS (1)					
Return Seeking Fixed Income Benchmark	-9.8	0.8			
Excess	-1.6	0.1			

(1) Includes Return Seeking Bonds transition account.

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Treasuries

December 31, 2022



	<u>Ending Market Value</u>	<u>Portfolio Weight</u>	<u>Last Qtr</u>	<u>Fiscal YTD</u>	<u>1 Year</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>	<u>Since Inception</u>	<u>Inception Date</u>
Treasuries Managers										
BLACKROCK	\$2,217,742,738	30.0%	0.1%	-7.0%	-20.6%	-5.0%			-0.7%	02/2018
Bloomberg Treasury 5+ Year			0.4	-6.5	-20.3	-4.7			-0.4	02/2018
Excess			-0.4	-0.5	-0.3	-0.3			-0.2	
GOLDMAN SACHS	2,471,087,165	33.4	-0.2	-7.0	-20.6	-4.9			-0.5	02/2018
Bloomberg Treasury 5+ Year			0.4	-6.5	-20.3	-4.7			-0.4	02/2018
Excess			-0.6	-0.4	-0.3	-0.2			-0.1	
NEUBERGER	2,698,930,834	36.5	-0.2	-7.2	-20.5	-4.7			-0.5	02/2018
Bloomberg Treasury 5+ Year			0.4	-6.5	-20.3	-4.7			-0.4	02/2018
Excess			-0.7	-0.7	-0.2	0.0			-0.0	
TOTAL TREASURIES	7,387,760,736	100.0	-0.1	-7.1	-20.6	-4.9			-0.5	02/2018
Bloomberg Treasury 5+ Year			0.4	-6.5	-20.3	-4.7			-0.4	02/2018
Excess			-0.6	-0.5	-0.3	-0.1			-0.1	



	<u>2022 Calendar Return</u>	<u>2021 Calendar Return</u>	<u>2020 Calendar Return</u>	<u>2019 Calendar Return</u>	<u>2018 Calendar Return</u>
Treasuries Managers					
BLACKROCK	-20.6%	-4.0%	12.5%	10.4%	
Bloomberg Treasury 5+ Year	-20.3	-3.8	12.8	10.4	
Excess	-0.3	-0.2	-0.3	-0.1	
GOLDMAN SACHS	-20.6	-3.9	12.7	10.6	
Bloomberg Treasury 5+ Year	-20.3	-3.8	12.8	10.4	
Excess	-0.3	-0.1	-0.1	0.1	
NEUBERGER	-20.5	-3.4	12.8	10.4	
Bloomberg Treasury 5+ Year	-20.3	-3.8	12.8	10.4	
Excess	-0.2	0.4	-0.1	-0.0	
TOTAL TREASURIES	-20.6	-3.7	12.7	10.4	
Bloomberg Treasury 5+ Year	-20.3	-3.8	12.8	10.4	
Excess	-0.3	0.0	-0.2	0.0	

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Laddered Bonds + Cash

December 31, 2022



	<u>Ending Market Value</u>	<u>Portfolio Weight</u>	<u>Last Qtr</u>	<u>1 Year</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>	<u>Since Inception</u>	<u>Inception Date</u>
Laddered Bond and Cash Managers									
Neuberger Berman Ladder Bond	\$1,107,234,700	29.6%	0.9%	0.8%				0.4%	11/2020
ICE BofA US 3-Month Treasury Bill			0.8	1.5				0.7	11/2020
Excess			0.1	-0.6				-0.3	
Goldman Sachs Ladder Bond	1,108,677,597	29.7	0.9	0.9				0.5	11/2020
ICE BofA US 3-Month Treasury Bill			0.8	1.5				0.7	11/2020
Excess			0.1	-0.5				-0.2	
Treasury Ladder Aggregate	2,215,912,297	59.3	0.9	0.9				0.4	11/2020
ICE BofA US 3-Month Treasury Bill			0.8	1.5				0.7	11/2020
Excess			0.1	-0.6				-0.3	
Combined Funds STIF	1,477,241,072	39.5	0.9	1.7	0.8%	1.3%	0.8%	1.5	01/2004
iMoneyNet Money Fund Average-All Taxable			0.8	1.4	0.6	1.0	0.6	1.1	01/2004
Excess			0.1	0.4	0.2	0.3	0.3	0.4	
TEACHERS RETIREMENT CD REPO	43,920,338	1.2	0.8	1.5	0.9	1.4	1.0	0.9	02/2012
ICE BofA US 3-Month Treasury Bill			0.8	1.5	0.7	1.3	0.8	0.7	02/2012
Excess			-0.0	0.1	0.2	0.1	0.2	0.2	
Laddered Bond + Cash	3,737,204,933	100.0	0.9	1.1	0.6	1.2	0.8	4.2	12/1977
ICE BofA US 3-Month Treasury Bill			0.8	1.5	0.7	1.3	0.8	4.4	12/1977
Excess			0.1	-0.4	-0.2	-0.1	0.1	-0.2	



	<u>2022 Calendar Return</u>	<u>2021 Calendar Return</u>	<u>2020 Calendar Return</u>	<u>2019 Calendar Return</u>	<u>2018 Calendar Return</u>
Laddered Bond and Cash Managers					
Neuberger Berman Ladder Bond	0.8%	0.0%			
ICE BofA US 3-Month Treasury Bill	1.5	0.0			
Excess	-0.6	-0.0			
Goldman Sachs Ladder Bond	0.9	0.1			
ICE BofA US 3-Month Treasury Bill	1.5	0.0			
Excess	-0.5	0.0			
Treasury Ladder Aggregate	0.9	0.0			
ICE BofA US 3-Month Treasury Bill	1.5	0.0			
Excess	-0.6	-0.0			
Combined Funds STIF	1.7	0.1	0.5%	2.3%	2.0%
iMoneyNet Money Fund Average-All Taxable	1.4	0.0	0.3	1.9	1.5
Excess	0.4	0.1	0.2	0.5	0.5
TEACHERS RETIREMENT CD REPO	1.5	0.1	1.0	2.5	1.8
ICE BofA US 3-Month Treasury Bill	1.5	0.0	0.7	2.3	1.9
Excess	0.1	0.0	0.4	0.2	-0.0
Laddered Bond + Cash	1.1	0.0	0.6	2.3	1.9
ICE BofA US 3-Month Treasury Bill	1.5	0.0	0.7	2.3	1.9
Excess	-0.4	-0.0	-0.1	0.1	0.0



Uninvested Private Markets

December 31, 2022



	<u>Ending Market Value</u>	<u>Portfolio Weight</u>	<u>Last Qtr</u>	<u>Fiscal YTD</u>	<u>1 Year</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>	<u>Since Inception</u>	<u>Inception Date</u>
Uninvested Private Markets Managers										
NISA PRIVATE MKT UNINV OVERLAY (1)	\$255,790,050	99.9%	8.7%	5.2%	-15.4%				4.1%	01/2021
S&P 500 INDEX (DAILY)			8.4	3.1	-17.5				3.1	01/2021
Excess			0.3	2.1	2.1				1.0	
BLACKROCK SP INDEX (2)	342,116	0.1	2.3	-2.6	-21.9				0.3	01/2021
S&P 500 INDEX (DAILY)			3.4	-1.6	-21.2				0.7	01/2021
Excess			-1.1	-1.0	-0.6				-0.4	
UNINVESTED PRIVATE MARKETS (3)	256,132,165	100.0	7.4	2.6	-17.6				3.0	01/2021
S&P 500 INDEX (DAILY)			8.4	3.1	-17.5				3.1	01/2021
Excess			-1.0	-0.5	-0.1				-0.1	

(1) NISA Private Market Uninv Overlay is currently cash. Prior to 11/02/2022. NISA Private Market Uninv Overlay was invested in a combination of a passively managed S&P 500 Index strategy and a cash overlay strategy invested in equity derivatives and cash.

(2) Blackrock SP Index is currently cash. Prior to 10/17/2022. Blackrock SP Index was invested a passively managed S&P 500 Index strategy .

(3) The Uninvested Private Markets is currently cash. Prior to 11/02/2022. The Uninvested portion of the Private Markets allocation was invested in a combination of a passively managed S&P 500 Index strategy and a cash overlay strategy invested in equity derivatives and cash.



	<u>2022 Calendar Return</u>	<u>2021 Calendar Return</u>	<u>2020 Calendar Return</u>	<u>2019 Calendar Return</u>	<u>2018 Calendar Return</u>
Uninvested Private Markets Managers					
NISA PRIVATE MKT UNINV OVERLAY	-15.4%	28.1%			
S&P 500 INDEX (DAILY)	-17.5	28.7			
Excess	2.1	-0.6			
BLACKROCK SP INDEX					
BLACKROCK SP INDEX	-21.9	28.9			
S&P 500 INDEX (DAILY)	-21.2	28.7			
Excess	-0.6	0.2			
UNINVESTED PRIVATE MARKETS					
UNINVESTED PRIVATE MARKETS	-17.6	28.6			
S&P 500 INDEX (DAILY)	-17.5	28.7			
Excess	-0.1	-0.1			



Private Markets

December 31, 2022



Combined Funds Asset Class Performance Summary

Private Markets

	<u>Last Qtr</u>	<u>FYTD</u>	<u>1 Year</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>	<u>20 Year</u>	<u>25 Year</u>	<u>30 Year</u>
Private Markets - Invested	0.3%	-2.1%	4.9%	16.3%	14.2%	13.1%	14.1%	12.7%	13.4%
Private Markets - Uninvested (1)	7.4%	2.6%	-17.6%						
Private Equity	0.1%	-4.0%	0.3%	18.9%	17.5%	16.5%	16.2%	14.5%	15.8%
Private Credit	4.3%	5.5%	12.8%	13.2%	12.3%	13.5%	13.0%	12.9%	
Resources	0.2%	3.4%	21.8%	9.2%	5.0%	3.3%	13.8%	10.6%	13.0%
Real Estate	-0.9%	0.5%	19.7%	17.4%	14.6%	13.6%	10.3%	9.8%	9.7%

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 Private Markets Uninvested is currently cash. Prior to 11/02/2022. The Uninvested portion of the Private Markets allocation was 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
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Private Markets Investments



Investments	Commitments	Contributions	Distributions	Remaining Commitment	Market Value	Investment Multiple	IRR	Vintage Year
Private Equity	24,459,107,173	18,638,203,537	14,659,740,266	7,702,932,575	14,500,597,097	1.56	13.81	
Adams Street Partners, LLC	398,191,000	184,935,511	117,846,307	213,351,400	146,638,477	1.43	11.62	
Adams Street Global Secondary Fund 5 LP	100,000,000	77,114,692	75,128,710	22,885,308	28,191,298	1.34	6.31	2012
Adams Street Global Secondary Fund 6	100,000,000	80,400,008	42,717,597	19,599,992	81,808,886	1.55	25.98	2017
Adams Street Global Secondary Fund 7	198,191,000	27,420,811	0	170,866,100	36,638,293	1.34	49.93	2021
Advent International Group	505,000,000	344,792,247	324,631,020	163,291,707	289,953,676	1.78	16.54	
Advent International GPE VI-A, L.P.	50,000,000	52,993,313	103,400,194	0	4,273,767	2.03	16.47	2008
Advent International GPE VII, L.P.	90,000,000	86,490,641	138,972,935	3,600,000	18,536,033	1.82	13.62	2012
Advent International GPE VIII-B	100,000,000	100,000,000	73,062,483	0	117,493,043	1.91	17.79	2016
Advent International GPE IX	115,000,000	100,058,293	9,195,408	14,941,707	145,293,397	1.54	29.29	2019
Advent International GPE X	150,000,000	5,250,000	0	144,750,000	4,357,437	0.83	-17.00	2022
Affinity Ventures	9,000,000	9,000,000	3,590,011	0	826,375	0.49	-11.57	
Affinity Ventures IV, L.P.	4,000,000	4,000,000	1,541,970	0	3,279	0.39	-36.39	2004
Affinity Ventures V, L.P.	5,000,000	5,000,000	2,048,042	0	823,096	0.57	-8.33	2008
Apax Partners	600,000,000	523,062,755	538,261,900	161,066,025	320,260,210	1.64	16.55	
APAX VIII - USD	200,000,000	240,451,261	348,098,981	7,966,190	47,610,862	1.65	13.78	2013
Apax IX USD L.P.	150,000,000	162,024,715	180,896,534	14,420,230	146,642,292	2.02	23.93	2016
Apax X USD L.P.	150,000,000	120,586,779	9,266,385	38,679,605	126,007,057	1.12	13.08	2019
Apax XI	100,000,000	0	0	100,000,000	0	0.00		2022
Arsenal Capital Partners	175,000,000	90,583,003	3,024,099	87,134,668	97,048,924	1.10	5.38	
Arsenal Capital Partners V, L.P.	75,000,000	71,375,568	2,739,855	6,076,596	81,153,215	1.18	7.38	2019
Arsenal Capital Partners VI LP	100,000,000	19,207,435	284,244	81,058,072	15,895,709	0.84	-18.57	2021
Asia Alternatives	399,000,000	137,015,949	16,651,370	274,550,616	136,516,485	1.12	6.35	
Asia Alternatives Capital Partners V	99,000,000	94,446,647	15,521,948	17,119,918	102,365,882	1.25	10.38	2017
MN Asia Investors	300,000,000	42,569,302	1,129,422	257,430,698	34,150,603	0.83	-19.89	2020
Banc Fund	178,551,387	187,460,477	42,688,009	0	205,190,757	1.32	6.32	
Banc Fund IX, L.P.	107,205,932	107,205,932	35,362,612	0	119,383,239	1.44	6.58	2014
Banc Fund X, L.P.	71,345,455	80,254,545	7,325,397	0	85,807,518	1.16	5.43	2018

Minnesota State Board of Investment
Quarter Ending December 31, 2022
Private Markets Investments



Investments	Commitments	Contributions	Distributions	Remaining Commitment	Market Value	Investment Multiple	IRR	Vintage Year
BlackRock	951,774,870	956,392,392	4,487,465	0	1,271,402,561	1.33	22.51	
BlackRock Long Term Capital, SCSP	950,000,000	954,617,522	2,660,745	0	1,271,269,100	1.33	22.62	2019
BlackRock Tempus Fund	1,774,870	1,774,870	1,826,720	0	133,461	1.10	5.17	2015
Blackstone Group L.P.	1,535,000,000	841,927,722	695,255,307	788,708,659	513,202,512	1.44	14.86	
Blackstone Capital Partners Asia II	270,000,000	19,941,951	0	250,058,049	14,411,211	0.72	-27.73	2021
Blackstone Capital Partners IV, L.P.	70,000,000	84,459,884	201,361,236	1,832,302	197,857	2.39	37.02	2002
Blackstone Capital Partners V L.P.	140,000,000	152,406,707	245,675,051	7,027,560	904,611	1.62	8.02	2006
Blackstone Capital Partners VI, L.P.	100,000,000	106,536,526	151,074,729	11,175,309	38,441,195	1.78	12.37	2008
Blackstone Capital Partners VII	130,000,000	138,887,230	75,041,379	9,306,402	130,769,584	1.48	12.95	2015
Blackstone Capital Partners VIII LP	150,000,000	75,297,980	5,014,030	83,707,016	82,128,424	1.16	13.67	2019
Blackstone Capital Partners IX	150,000,000	0	0	150,000,000	0	0.00		2022
Blackstone Growth	250,000,000	201,139,854	17,088,881	63,702,019	185,251,858	1.01	0.54	2020
Blackstone Growth Equity II	150,000,000	0	0	150,000,000	0	0.00		2022
Blackstone Supplemental Account - M	125,000,000	63,257,591	0	61,900,000	61,097,774	0.97	-3.77	2021
Blackstone Strategic Partners	915,500,000	684,135,302	827,902,683	320,728,847	252,892,057	1.58	11.75	
Strategic Partners III VC, L.P.	25,000,000	25,059,678	33,874,990	115,168	264,285	1.36	5.97	2004
Strategic Partners III-B, L.P.	100,000,000	79,629,077	118,509,586	12,304,709	219,560	1.49	6.35	2004
Strategic Partners IV VC, L.P.	40,500,000	42,158,499	62,465,109	2,264,243	2,418,539	1.54	9.21	2008
Strategic Partners IV-B	100,000,000	99,369,278	152,721,770	11,657,975	3,221,654	1.57	12.17	2008
Strategic Partners V, LP	100,000,000	87,150,574	134,911,866	15,878,130	8,572,103	1.65	18.55	2011
Strategic Partners VI, L.P.	150,000,000	103,771,940	127,309,200	52,910,384	30,695,660	1.52	14.49	2014
Strategic Partners VII, L.P.	150,000,000	117,906,196	118,494,072	49,157,172	81,931,478	1.70	19.30	2016
Strategic Partners VIII	150,000,000	113,227,658	77,271,177	92,124,399	108,559,153	1.64	39.81	2018
Strategic Partners IX	100,000,000	15,862,402	2,344,913	84,316,667	17,009,625	1.22	23.63	2022
Bridgepoint	264,258,068	135,728,894	14,615,268	128,529,173	187,576,767	1.49	22.66	
Bridgepoint Europe VI L.P.	168,205,609	135,728,894	14,615,268	32,476,714	187,576,767	1.49	22.66	2018
Bridgepoint Europe VII	96,052,459	0	0	96,052,459	0	0.00		2022
Brookfield Asset Management Inc.	500,000,000	363,589,282	191,575,931	177,006,264	381,871,866	1.58	32.52	
Brookfield Capital Partners Fund IV	100,000,000	108,101,181	169,896,934	12,570,118	95,032,148	2.45	44.88	2015
Brookfield Capital Partners V L.P.	250,000,000	227,854,632	21,678,997	42,069,615	260,665,987	1.24	12.98	2018
Brookfield Capital Partners Fund VI	150,000,000	27,633,469	0	122,366,531	26,173,731	0.95	-6.14	2022
CVC Capital Partners	390,404,026	437,744,877	596,568,841	23,041,525	268,259,744	1.98	16.98	
CVC Capital Partners VI	256,563,477	283,860,779	301,154,716	21,517,238	263,923,604	1.99	17.26	2013
CVC European Equity Partners V, L.P.	133,840,549	153,884,098	295,414,125	1,524,287	4,336,140	1.95	16.75	2008

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Private Markets Investments



Investments	Commitments	Contributions	Distributions	Remaining Commitment	Market Value	Investment Multiple	IRR	Vintage Year
Canyon Partners	125,000,000	128,095,847	21,475,843	18,379,996	124,509,271	1.14	10.59	
Canyon Distressed Opportunity Fund III	125,000,000	128,095,847	21,475,843	18,379,996	124,509,271	1.14	10.59	2020
CarVal Investors	600,000,000	517,703,333	391,548,297	121,520,050	276,375,591	1.29	7.83	
CVI Credit Value Fund A II	150,000,000	142,500,000	199,242,174	7,500,000	3,569,788	1.42	8.25	2012
CVI Credit Value Fund A III	150,000,000	142,500,000	153,131,448	7,500,000	39,218,535	1.35	8.37	2015
CVI Credit Value Fund IV	150,000,000	135,203,333	39,020,110	54,020,050	135,357,480	1.29	7.36	2017
CVI Credit Value Fund V	150,000,000	97,500,000	154,566	52,500,000	98,229,788	1.01	0.96	2020
Cardinal Partners	10,000,000	10,000,000	39,196,082	0	30,303	3.92	10.61	
DSV Partners IV	10,000,000	10,000,000	39,196,082	0	30,303	3.92	10.61	1985
Carlyle Group	400,000,000	296,512,068	64,895,154	167,087,780	269,831,489	1.13	7.07	
Carlyle Strategic Partners IV, L.P.	100,000,000	119,848,374	53,429,269	32,306,465	81,058,809	1.12	7.32	2016
Carlyle Partners VII, L.P.	150,000,000	154,442,314	11,445,009	7,002,695	168,620,556	1.17	7.68	2017
Carlyle Partners VIII	150,000,000	22,221,380	20,876	127,778,620	20,152,125	0.91	-16.87	2021
Chicago Growth Partners	60,000,000	58,347,626	123,930,240	1,652,374	64,095	2.13	19.54	
Chicago Growth Partners II, L.P.	60,000,000	58,347,626	123,930,240	1,652,374	64,095	2.13	19.54	2008
Clearlake Capital	100,000,000	41,028,943	2,434	58,971,057	40,450,311	0.99	-1.88	
Clearlake Capital Partners VII	100,000,000	41,028,943	2,434	58,971,057	40,450,311	0.99	-1.88	2022
Court Square	489,419,132	479,871,704	613,283,355	64,524,555	250,963,995	1.80	14.83	
Court Square Capital Partners II, L.P.	164,419,132	170,029,204	295,744,454	6,176,873	3,198,779	1.76	12.33	2006
Court Square Capital Partners III, L.P.	175,000,000	188,471,515	276,934,903	7,718,622	129,029,428	2.15	20.28	2012
Court Square Capital Partners IV, L.P.	150,000,000	121,370,985	40,603,998	50,629,060	118,735,788	1.31	19.88	2018
GTCR	210,000,000	211,677,127	424,264,809	16,665,460	165,965,744	2.79	26.42	
GTCR Fund X	100,000,000	105,821,208	214,751,215	6,751,396	629,696	2.04	21.36	2010
GTCR XI	110,000,000	105,855,919	209,513,594	9,914,064	165,336,048	3.54	35.23	2013
Goldman, Sachs & Co.	449,800,000	374,323,424	333,811,784	165,185,992	231,792,285	1.51	11.76	
GS Capital Partners VI, L.P.	100,000,000	110,285,035	142,499,747	2,551,356	2,468,952	1.31	7.11	2007
GS China-US Cooperation Fund	99,800,000	35,438,412	523,330	64,536,033	49,202,015	1.40	16.66	2018
GS Vintage VII	100,000,000	86,360,775	65,391,877	59,320,828	72,173,840	1.59	16.05	2016
West Street Capital Partners VII, L.P.	150,000,000	142,239,202	125,396,830	38,777,775	107,947,478	1.64	19.90	2016

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Private Markets Investments



Investments	Commitments	Contributions	Distributions	Remaining Commitment	Market Value	Investment Multiple	IRR	Vintage Year
Goldner Hawn Johnson & Morrison	77,755,138	55,556,950	71,964,283	22,370,155	50,293,486	2.20	22.08	
GHJM TrailHead Fund	20,000,000	16,652,130	51,364,283	3,354,486	6,532,145	3.48	20.29	2012
Goldner Hawn Fund VII, L.P.	57,755,138	38,904,820	20,600,000	19,015,669	43,761,341	1.65	32.73	2018
Green Equity Investors	325,000,000	333,548,416	237,861,791	29,139,575	318,701,449	1.67	13.48	
Green Equity Investors VI, L.P.	200,000,000	224,611,333	236,849,045	12,063,912	202,703,352	1.96	13.95	2012
Green Equity Investors VIII	125,000,000	108,937,083	1,012,746	17,075,663	115,998,097	1.07	5.50	2020
HarbourVest	21,630,989	20,940,752	26,321,096	785,945	5,515,834	1.52	12.21	
Dover Street VII Cayman Fund L.P.	2,198,112	2,074,235	1,839,926	132,416	24,915	0.90	-4.44	2014
HarbourVest Intl PE Partners V-Cayman US	3,511,365	3,346,199	4,467,690	170,760	84,175	1.36	13.66	2014
Harbourvest Intl PE Partners VI-Cayman	4,223,903	4,039,458	5,441,043	186,769	2,491,803	1.96	15.62	2014
HarbourVest Partners VIII Cayman Buyout	4,506,711	4,390,673	5,812,711	156,000	478,129	1.43	13.48	2014
HarbourVest Partners VIII-Cayman Venture	7,190,898	7,090,187	8,759,726	140,000	2,436,811	1.58	11.54	2014
Hellman & Friedman	475,000,000	365,615,011	165,276,173	122,106,136	332,305,414	1.36	18.28	
Hellman & Friedman Capital Partners VII, L.P.	50,000,000	49,896,546	153,705,841	2,202,044	9,635,420	3.27	24.87	2009
Hellman & Friedman Investors IX, L.P.	175,000,000	172,969,812	4,158,129	5,240,542	200,960,300	1.19	9.15	2018
Hellman & Friedman Capital Partners X	250,000,000	142,748,653	7,412,203	114,663,550	121,709,694	0.90	-10.35	2021
IK Limited	597,683,702	462,416,562	478,134,553	157,870,468	272,561,422	1.62	14.95	
IK Fund VII	179,802,806	179,315,195	295,129,855	8,094,311	43,576,311	1.89	14.43	2013
IK Fund VIII	170,252,491	177,056,244	183,004,699	8,193,251	123,539,776	1.73	18.19	2016
IK Fund IX	151,575,947	106,045,123	0	45,530,447	105,445,335	0.99	-0.47	2019
IK Fund X	96,052,459	0	0	96,052,459	0	0.00		2022
Kohlberg, Kravis, Roberts & Co.	1,647,000,000	1,053,336,914	943,685,336	656,994,780	692,309,102	1.55	13.16	
KKR 2006 Fund L.P.	200,000,000	218,137,965	391,703,450	3,300,979	1,305,125	1.80	9.11	2006
KKR Americas Fund XII L.P.	150,000,000	146,124,719	56,711,545	16,909,238	184,487,392	1.65	19.88	2016
KKR Asian Fund III	100,000,000	93,205,498	48,897,408	16,868,175	111,890,108	1.73	23.90	2017
KKR Asian Fund IV	150,000,000	55,326,357	415,503	98,610,591	57,036,276	1.04	4.26	2020
KKR Core Investments Partnership	97,000,000	92,524,782	4,092,567	9,689,508	99,780,399	1.12	10.97	2021
KKR Core Investments Fund II	100,000,000	0	0	100,000,000	0	0.00		2022
KKR Europe V	100,000,000	87,822,313	16,882,045	16,643,999	86,046,863	1.17	10.06	2018
KKR European Fund VI (USD) SCSp	100,000,000	0	0	100,000,000	0	0.00		2022
KKR Millennium Fund	200,000,000	205,167,570	424,946,028	0	161,924	2.07	16.36	2002
KKR MN Partnership L.P.	150,000,000	70,488,217	36,790	79,511,783	71,052,546	1.01	1.08	2021
KKR North America Fund XIII	300,000,000	84,539,493	0	215,460,507	80,548,468	0.95	-6.65	2021

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Lexington Partners	1,345,000,000	1,037,980,368	727,413,109	374,364,188	823,826,480	1.49	13.66	
Lexington Capital Partners VI-B, L.P.	100,000,000	98,374,022	145,572,539	1,634,703	937,945	1.49	7.91	2005
Lexington Capital Partners VII, L.P.	200,000,000	173,199,401	263,397,102	30,768,965	27,272,619	1.68	14.56	2009
Lexington Capital Partners VIII, L.P.	150,000,000	136,386,669	132,529,400	32,663,555	94,641,480	1.67	17.08	2014
Lexington Capital Partners IX, L.P.	150,000,000	119,415,468	29,436,142	43,256,225	149,352,928	1.50	37.08	2018
Lexington Capital Partners X	100,000,000	0	0	100,000,000	0	0.00		2021
Lexington Co-Investment Partners IV	200,000,000	213,618,715	119,813,557	7,156,369	228,759,860	1.63	17.10	2017
Lexington Co-Investment Partners V	300,000,000	185,467,198	10,031,374	124,564,176	199,831,111	1.13	16.44	2020
Lexington Co-Investment Partners V Overage	45,000,000	27,621,000	839,090	18,218,090	28,065,754	1.05	5.24	2021
Lexington Middle Market Investors IV	100,000,000	83,897,895	25,793,905	16,102,105	94,964,783	1.44	25.29	2016
MHR Institutional Partners	75,000,000	80,059,392	21,512,850	14,698,636	91,437,822	1.41	10.49	
MHR Institutional Partners IV LP	75,000,000	80,059,392	21,512,850	14,698,636	91,437,822	1.41	10.49	2014
Madison Dearborn Capital Partners LLC	200,000,000	155,829,638	67,829,581	67,852,936	159,922,945	1.46	13.76	
Madison Dearborn Capital Partners VII, L.P.	100,000,000	98,383,478	59,938,858	17,549,186	102,371,221	1.65	13.87	2015
Madison Dearborn Capital Partners VIII-A, L.P.	100,000,000	57,446,160	7,890,723	50,303,750	57,551,725	1.14	12.77	2019
Marathon	200,000,000	149,906,171	6,185,200	56,000,000	162,297,216	1.12	9.56	
Marathon Distressed Credit Fund	200,000,000	149,906,171	6,185,200	56,000,000	162,297,216	1.12	9.56	2020
Merced Capital	278,737,500	288,144,755	283,963,672	0	66,649,114	1.22	4.21	
Merced Partners III	100,000,000	103,878,468	133,823,596	0	1,061,332	1.30	5.50	2010
Merced Partners IV	125,000,000	124,968,390	120,597,539	0	20,974,774	1.13	2.61	2013
Merced Partners V	53,737,500	59,297,897	29,542,537	0	44,613,008	1.25	4.92	2017
Neuberger Berman LLC	625,000,000	421,129,806	302,570,458	440,178,206	422,806,852	1.72	32.55	
Dyal Capital Partners III	175,000,000	206,392,267	200,464,173	108,505,538	153,915,301	1.72	26.62	2015
Dyal Capital Partners IV	250,000,000	173,737,540	94,769,114	166,050,224	218,143,145	1.80	51.73	2018
Dyal Capital Partners V	200,000,000	41,000,000	7,337,170	165,622,444	50,748,406	1.42	29.17	2020
Nordic Capital	586,242,093	473,217,443	332,164,135	189,574,137	393,068,591	1.53	15.64	
Nordic Capital Fund VIII	175,818,953	224,335,867	294,008,523	12,967,395	74,805,392	1.64	13.90	2013
Nordic Capital IX Beta, L.P.	168,916,405	171,098,140	38,155,612	12,883,442	223,636,056	1.53	20.53	2017
Nordic Capital Fund X	145,454,277	77,783,435	0	67,670,841	94,627,143	1.22	27.98	2020
Nordic Capital Fund XI	96,052,459	0	0	96,052,459	0	0.00		2022
Oak Hill Capital Management, Inc.	250,000,000	246,395,110	219,208,755	11,155,972	182,994,973	1.63	31.45	
Oak Hill Capital Partners IV Onshore LP	150,000,000	153,245,546	219,173,712	4,305,536	65,509,900	1.86	33.52	2016
Oak Hill Capital Partners V	100,000,000	93,149,564	35,043	6,850,436	117,485,074	1.26	20.27	2018

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Oaktree Capital Management, LLC	387,000,000	193,606,596	56,914,692	241,268,839	204,364,293	1.35	11.59	
Oaktree Special Situations Fund, L.P.	100,000,000	103,995,409	20,335,451	7,741,294	98,324,565	1.14	3.40	2014
Oaktree Special Situations Fund II, L.P.	100,000,000	89,611,187	36,579,241	46,527,545	106,039,728	1.59	60.53	2018
Oaktree Special Situations Fund III	187,000,000	0	0	187,000,000	0	0.00		2022
Paine & Partners, LLC	225,000,000	190,603,098	52,218,491	57,682,420	212,995,623	1.39	13.71	
Paine Schwartz Food Chain Fund IV	75,000,000	66,115,658	35,397,971	17,742,963	60,407,268	1.45	9.00	2014
Paine Schwartz Food Chain Fund V, L.P.	150,000,000	124,487,440	16,820,520	39,939,457	152,588,354	1.36	26.06	2018
Permal PE	5,337,098	4,391,745	4,407,251	1,090,000	670,475	1.16	4.85	
Glouston Private Equity Opportunities IV	5,337,098	4,391,745	4,407,251	1,090,000	670,475	1.16	4.85	2014
Permira	624,951,601	446,484,892	456,660,047	220,606,913	412,814,055	1.95	19.55	
Permira V, L.P.	177,363,078	183,885,787	371,872,643	4,492,891	134,229,476	2.75	21.72	2013
Permira VI, L.P.	135,286,543	127,758,268	73,561,733	27,427,208	155,916,690	1.80	17.53	2016
Permira VII L.P.1	152,214,549	134,840,837	11,225,671	28,599,383	122,667,890	0.99	-0.43	2019
Permira VIII	160,087,431	0	0	160,087,431	0	0.00		2022
Public Pension Capital Management	240,000,000	148,405,288	86,272,572	109,557,219	194,689,902	1.89	24.23	
Public Pension Capital, LLC	240,000,000	148,405,288	86,272,572	109,557,219	194,689,902	1.89	24.23	2014
Silver Lake Partners	335,000,000	343,977,838	362,209,346	31,457,894	312,600,282	1.96	18.62	
Silver Lake Partners III, L.P.	100,000,000	93,833,966	192,153,178	9,528,468	21,439,325	2.28	18.26	2007
Silver Lake Partners IV	100,000,000	115,774,574	125,122,815	2,881,307	144,143,006	2.33	21.68	2012
Silver Lake Partners V, L.P.	135,000,000	134,369,298	44,933,353	19,048,119	147,017,951	1.43	13.55	2017
Siris Capital Group	67,875,000	0	0	67,875,000	0	0.00		
Siris V	67,875,000	0	0	67,875,000	0	0.00		2022
Split Rock	110,000,000	107,055,906	125,392,564	2,944,094	28,423,171	1.44	5.08	
Split Rock Partners LP	50,000,000	47,890,906	58,794,192	2,109,094	1,882,459	1.27	2.91	2005
Split Rock Partners II, LP	60,000,000	59,165,000	66,598,372	835,000	26,540,712	1.57	7.68	2008
Summit Partners	600,000,000	413,247,801	407,561,235	401,079,890	378,242,746	1.90	27.87	
Summit Partners Growth Equity Fund VIII	100,000,000	116,727,192	233,090,056	23,129,320	64,307,313	2.55	27.09	2011
Summit Partners Growth Equity Fund IX	100,000,000	132,014,916	141,424,991	109,410,075	150,727,597	2.21	34.04	2015
Summit Partners Growth Equity Fund X-A	150,000,000	136,186,520	33,046,188	46,859,668	136,147,451	1.24	16.82	2019
Summit Partners Growth Equity Fund XI	250,000,000	28,319,173	0	221,680,827	27,060,386	0.96	-5.56	2021

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TPG Capital	650,000,000	377,803,107	193,953,829	316,280,792	353,814,474	1.45	22.01	
TPG Growth V	150,000,000	89,439,959	8,437,171	68,561,194	106,586,458	1.29	26.40	2021
TPG Partners VII, L.P.	100,000,000	100,744,944	155,978,885	17,143,909	44,815,655	1.99	20.62	2015
TPG Partners VIII	150,000,000	126,581,475	29,532,864	41,612,418	143,377,820	1.37	29.78	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	61,036,729	4,909	88,963,271	59,034,541	0.97	-7.45	2021
Thoma Bravo LLC	525,000,000	517,799,418	284,137,643	79,925,772	468,090,063	1.45	22.08	
Thoma Bravo Fund XII, L.P.	75,000,000	81,949,004	84,992,456	18,452,144	74,308,212	1.94	16.33	2016
Thoma Bravo Fund XIII, L.P.	150,000,000	184,783,234	92,067,654	12,475,387	209,900,921	1.63	29.30	2018
Thoma Bravo Fund XIV	150,000,000	147,332,137	37	2,667,863	130,189,159	0.88	-9.08	2020
Thoma Bravo Fund XV LP	100,000,000	53,735,043	19,556	46,330,378	53,275,311	0.99	-1.13	2021
Thoma Cressey Fund VII, L.P.	50,000,000	50,000,000	107,057,940	0	416,460	2.15	23.58	2000
Thomas H. Lee Partners	400,000,000	279,184,218	255,827,915	150,348,063	210,324,469	1.67	26.39	
Thomas H. Lee Equity Fund VII, LP.	100,000,000	99,558,385	137,442,415	10,603,772	48,738,007	1.87	22.12	2015
Thomas H. Lee Equity Fund VIII, L.P.	150,000,000	146,552,354	118,385,500	22,817,770	130,883,623	1.70	38.33	2018
Thomas H. Lee Equity Fund IX	150,000,000	33,073,479	0	116,926,521	30,702,838	0.93	-16.20	2021
Varde Fund	631,286,710	598,625,551	691,417,756	32,661,159	232,573,520	1.54	9.80	
Varde Fund IX, L.P.	100,000,000	100,000,000	216,448,853	0	0	2.16	15.01	2008
Varde Fund X, LP	150,000,000	150,000,000	253,177,296	0	8,593,915	1.75	10.08	2010
Varde Fund XI, LP	200,000,000	200,000,000	221,771,569	0	54,662,694	1.38	5.24	2013
Varde Fund XIII, L.P.	150,000,000	144,000,000	20,038	6,000,000	164,691,360	1.14	7.33	2018
Varde Fund XIV	31,286,710	4,625,551	0	26,661,159	4,625,551	1.00	0.00	2022
Vestar Capital Partners	380,000,000	346,288,859	389,389,862	43,751,237	158,707,572	1.58	11.40	
Vestar Capital Partners IV, L.P.	55,000,000	55,668,688	102,656,956	57,313	32,650	1.84	14.62	1999
Vestar Capital Partners V, L.P.	75,000,000	76,797,458	100,961,586	0	105,895	1.32	3.88	2005
Vestar Capital Partners VI, LP	100,000,000	107,516,638	152,527,578	0	60,316,152	1.98	23.64	2011
Vestar Capital Partners VII, L.P.	150,000,000	106,306,076	33,243,742	43,693,924	98,252,875	1.24	10.71	2017
Vista Equity Partners	200,000,000	147,667,435	77,223	53,545,468	160,912,377	1.09	4.36	
Vista Equity Partners Perennial	200,000,000	147,667,435	77,223	53,545,468	160,912,377	1.09	4.36	2020

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Warburg Pincus	1,416,000,000	1,119,561,182	1,030,212,257	302,448,500	797,077,610	1.63	11.16	
Warburg Pincus China-Southeast Asia II	50,000,000	23,000,000	4,097,500	27,000,000	21,281,930	1.10	7.46	2019
Warburg Pincus China, L.P.	45,000,000	46,935,000	17,602,200	0	54,962,643	1.55	12.40	2016
Warburg Pincus Financial Sector	90,000,000	90,599,482	34,617,600	3,555,000	128,103,579	1.80	22.77	2017
Warburg Pincus Global Growth, L.P.	250,000,000	219,726,241	2,625,000	30,125,000	292,085,996	1.34	15.24	2018
Warburg Pincus Global Growth 14, L.P.	300,000,000	59,726,507	0	240,000,000	57,973,140	0.97	-6.27	2022
Warburg, Pincus Equity Partners, L.P.	100,000,000	100,000,000	163,542,253	0	394,169	1.64	10.02	1998
Warburg Pincus Private Equity IX, L.P.	100,000,000	100,000,000	172,072,950	0	38,050	1.72	9.60	2005
Warburg Pincus Private Equity X, LP	150,000,000	150,000,000	266,203,541	0	3,321,978	1.80	9.52	2007
Warburg Pincus Private Equity XI, LP	200,000,000	200,342,452	262,255,748	0	73,532,725	1.68	11.58	2012
Warburg Pincus Private Equity XII, LP	131,000,000	129,231,500	107,195,466	1,768,500	165,383,400	2.11	19.43	2015
Wayzata Investment Partners	150,000,000	68,415,000	49,197,752	15,000,000	19,136,411	1.00	-0.03	
Wayzata Opportunities Fund III	150,000,000	68,415,000	49,197,752	15,000,000	19,136,411	1.00	-0.03	2012
Wellspring Capital Partners	125,000,000	150,553,509	55,485,810	13,363,287	162,424,603	1.45	21.32	
Wellspring Capital Partners VI, L.P.	125,000,000	150,553,509	55,485,810	13,363,287	162,424,603	1.45	21.32	2016
Welsh, Carson, Anderson & Stowe	650,000,000	464,481,208	450,125,847	185,518,792	373,223,633	1.77	18.28	
Welsh, Carson, Anderson & Stowe XI, L.P.	100,000,000	100,000,000	161,464,441	0	7,136,609	1.69	11.72	2008
Welsh, Carson, Anderson & Stowe XII, L.P.	150,000,000	145,877,897	208,326,095	4,122,103	144,934,370	2.42	26.74	2014
Welsh, Carson, Anderson & Stowe XIII, L.P.	250,000,000	213,945,620	80,335,311	36,054,380	216,494,963	1.39	28.34	2018
Welsh, Carson, Anderson & Stowe XIV	150,000,000	4,657,691	0	145,342,309	4,657,691	1.00		2022
Whitehorse Capital	300,000,000	238,256,423	141,337,733	120,685,964	152,516,675	1.23	19.88	
Whitehorse Liquidity Partners III	100,000,000	100,411,175	73,575,406	17,533,513	57,796,381	1.31	18.09	2019
Whitehorse Liquidity Partners IV	100,000,000	90,985,009	50,741,765	33,461,421	59,955,117	1.22	21.91	2020
Whitehorse Liquidity Partners V	100,000,000	46,860,240	17,020,562	69,691,030	34,765,177	1.11	30.96	2021
Wind Point Partners	200,000,000	101,102,677	2,667,492	101,569,418	126,330,747	1.28	21.16	
Wind Point Partners IX	100,000,000	89,435,693	2,667,492	13,236,402	112,234,440	1.28	19.64	2019
Wind Point Partners X	100,000,000	11,666,984	0	88,333,016	14,096,307	1.21	20.82	2022
Windjammer Capital Investors	266,708,861	222,686,013	290,675,748	59,784,573	134,350,202	1.91	12.57	
Windjammer Mezzanine & Equity Fund II	66,708,861	55,215,684	85,449,570	10,139,363	410,640	1.55	9.01	2000
Windjammer Senior Equity Fund IV, L.P.	100,000,000	94,740,728	165,677,026	21,167,914	69,240,831	2.48	17.93	2012
Windjammer Senior Equity Fund V, L.P.	100,000,000	72,729,601	39,549,152	28,477,296	64,698,731	1.43	20.22	2017

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Private Credit	4,218,183,754	3,237,878,317	2,603,759,485	1,512,993,136	1,693,120,337	1.33	10.16	
Audax Group	350,000,000	214,463,928	212,205,499	157,495,661	60,027,546	1.27	10.56	
Audax Mezzanine Fund III, L.P.	100,000,000	105,207,316	133,977,984	0	5,663,391	1.33	9.87	2010
Audax Mezzanine Fund IV-A, L.P.	100,000,000	86,002,489	76,348,548	30,475,584	29,479,058	1.23	11.39	2015
Audax Mezzanine Fund V	150,000,000	23,254,123	1,878,967	127,020,077	24,885,097	1.15	36.67	2020
Avenue Capital Partners	200,000,000	200,977,328	166,846,046	0	170,177,657	1.68	10.27	
Avenue Energy Opportunities Fund, L.P.	100,000,000	100,977,328	79,573,855	0	73,703,244	1.52	7.06	2014
Avenue Energy Opportunities Fund II	100,000,000	100,000,000	87,272,191	0	96,474,413	1.84	15.34	2017
BlackRock	97,500,000	93,275,368	17,419,531	4,224,632	100,862,200	1.27	9.29	
BlackRock Middle Market Senior Fund	97,500,000	93,275,368	17,419,531	4,224,632	100,862,200	1.27	9.29	2018
Brookfield Asset Management Inc.	200,000,000	50,903,859	18,935,605	149,096,141	40,877,287	1.18	29.21	
Brookfield Real Estate Finance Fund VI	200,000,000	50,903,859	18,935,605	149,096,141	40,877,287	1.18	29.21	2021
Energy Capital Partners	28,087,500	29,002,111	9,769,268	8,854,657	20,241,878	1.03	3.10	
Energy Capital Credit Solutions II-A	28,087,500	29,002,111	9,769,268	8,854,657	20,241,878	1.03	3.10	2018
Gold Hill	65,852,584	65,852,584	113,654,899	0	3,056,927	1.77	11.80	
Gold Hill Venture Lending	40,000,000	40,000,000	65,261,602	0	325,647	1.64	10.69	2004
Gold Hill 2008	25,852,584	25,852,584	48,393,297	0	2,731,280	1.98	14.45	2008
Goldman, Sachs & Co.	227,500,000	261,181,928	316,656,514	24,922,591	527,063	1.21	6.79	
GS Mezzanine Partners 2006 Institutional	100,000,000	113,458,168	135,467,496	9,858,563	271,628	1.20	5.00	2006
GS Mezzanine Partners V, L.P.	127,500,000	147,723,760	181,189,018	15,064,028	255,435	1.23	9.07	2007
HPS Investment Partners	200,000,000	120,321,201	26,826,065	100,230,900	111,760,873	1.15	10.66	
HPS Mezzanine Partners 2019, L.P.	100,000,000	94,383,315	22,434,937	21,777,658	90,088,045	1.19	10.91	2019
HPS Strategic Investment Partners V	100,000,000	25,937,886	4,391,128	78,453,242	21,672,828	1.00	0.69	2022
Kohlberg, Kravis, Roberts & Co.	274,000,000	359,504,477	310,834,996	100,892,678	108,293,157	1.17	9.47	
KKR Lending Partner II L.P.	75,000,000	87,050,313	84,077,542	8,802,924	5,548,754	1.03	1.47	2015
KKR Lending Partners III L.P.	199,000,000	272,454,164	226,757,454	92,089,754	102,744,403	1.21	13.95	2017
LBC Credit Partners	200,000,000	200,303,239	146,142,733	70,791,967	86,415,322	1.16	9.64	
LBC Credit Partners IV, L.P.	100,000,000	110,929,258	108,591,417	36,220,071	21,967,266	1.18	8.09	2016
LBC Credit Partners V, L.P.	100,000,000	89,373,981	37,551,317	34,571,896	64,448,056	1.14	15.20	2019
Marathon	200,000,000	101,022,008	858,534	100,000,000	130,550,920	1.30	13.33	
Marathon Secured Private Strategies Fund II	100,000,000	96,022,008	858,534	5,000,000	125,606,340	1.32	13.45	2019
Marathon Secured Private Strategies Fund III	100,000,000	5,000,000	0	95,000,000	4,944,580	0.99	-1.11	2022

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Investments	Commitments	Contributions	Distributions	Remaining Commitment	Market Value	Investment Multiple	IRR	Vintage Year
Merit Capital Partners	350,000,000	248,748,298	324,705,942	101,184,902	90,510,991	1.67	11.61	
Merit Mezzanine Fund IV, L.P.	75,000,000	70,178,571	139,120,463	4,821,429	787,300	1.99	11.58	2004
Merit Mezzanine Fund V, LP	75,000,000	72,122,449	108,565,889	2,877,551	12,247,352	1.68	10.14	2009
Merit Mezzanine Fund VI	100,000,000	92,629,096	77,019,590	7,304,104	65,695,053	1.54	15.75	2016
Merit Mezzanine Fund VII	100,000,000	13,818,182	0	86,181,818	11,781,285	0.85	-27.57	2020
Oaktree Capital Management, LLC	650,000,000	339,040,920	53,839,957	317,500,000	380,617,464	1.28	12.82	
Oaktree Opportunities Fund X, L.P.	50,000,000	46,500,021	35,544,660	8,500,000	32,075,205	1.45	9.41	2015
Oaktree Opportunities Fund Xb, L.P.	100,000,000	65,000,000	0	35,000,000	96,667,675	1.49	14.89	2015
Oaktree Opportunities Fund XI	300,000,000	150,000,000	1,682,144	150,000,000	177,020,327	1.19	15.01	2020
Oaktree Real Estate Debt III	200,000,000	77,540,899	16,613,153	124,000,000	74,854,257	1.18	13.95	2020
PIMCO BRAVO	5,243,670	4,729,123	5,606,388	5,350,003	367,178	1.26	4.90	
PIMCO Bravo Fund OnShore Feeder II	5,243,670	4,729,123	5,606,388	5,350,003	367,178	1.26	4.90	2014
Prudential Global Investment Mgmt	600,000,000	512,024,865	560,391,077	139,345,222	152,623,094	1.39	10.35	
Prudential Capital Partners II, L.P.	100,000,000	97,930,132	145,671,152	11,049,052	492,778	1.49	9.01	2005
Prudential Capital Partners III, L.P.	100,000,000	102,848,928	174,817,309	13,609,083	3,022,104	1.73	14.14	2009
Prudential Capital Partners IV	100,000,000	113,041,199	133,319,569	1,948,707	18,448,600	1.34	8.56	2012
Prudential Capital Partners V, L.P.	150,000,000	152,171,004	100,817,656	8,771,398	84,535,348	1.22	7.54	2016
PGIM Capital Partners VI, L.P.	150,000,000	46,033,602	5,765,390	103,966,983	46,124,264	1.13	28.97	2020
Summit Partners	95,000,000	100,002,497	136,746,526	22,177,023	1,986,037	1.39	9.03	
Summit Subordinated Debt Fund III, L.P.	45,000,000	44,088,494	62,804,226	2,250,000	295,847	1.43	8.57	2004
Summit Subordinated Debt Fund IV, L.P.	50,000,000	55,914,003	73,942,300	19,927,023	1,690,190	1.35	9.74	2008
TCW	200,000,000	174,519,135	145,912,466	67,578,060	74,292,233	1.26	8.97	
TCW Direct Lending LLC	100,000,000	83,599,652	88,264,004	25,329,409	19,210,680	1.29	8.31	2014
TCW Direct Lending VII	100,000,000	90,919,484	57,648,462	42,248,651	55,081,554	1.24	10.04	2018
TSSP	275,000,000	162,005,447	36,407,440	143,348,699	159,932,510	1.21	11.13	
Sixth Street TAO Partners (B), L.P.	50,000,000	45,066,204	19,138,671	24,088,278	39,645,821	1.30	10.99	2018
Sixth Street TAO Partners (D), L.P.	100,000,000	60,296,419	11,437,732	47,183,559	60,595,773	1.19	13.26	2018
TSSP Opportunities Partners IV (A), L.P.	50,000,000	40,355,923	5,821,838	13,363,763	44,507,095	1.25	11.39	2018
Sixth Street Opportunities Partners V	75,000,000	16,286,901	9,199	58,713,099	15,183,822	0.93	-6.95	2021

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Investments	Commitments	Contributions	Distributions	Remaining Commitment	Market Value	Investment Multiple	IRR	Vintage Year
Real Assets	4,047,571,518	3,816,550,901	2,615,672,172	526,857,210	2,203,516,896	1.26	5.39	
BlackRock	198,500,000	141,833,911	71,583,086	68,953,998	95,233,963	1.18	6.46	
BlackRock Global Renewable Power Fund II	98,500,000	101,030,503	68,717,826	7,963,383	56,851,347	1.24	7.01	2017
BlackRock Global Renewable Power Infrastructure III	100,000,000	40,803,408	2,865,259	60,990,616	38,382,616	1.01	1.11	2019
ElG Global Energy Partners	450,000,000	470,987,133	381,719,877	77,704,481	155,253,600	1.14	3.08	
ElG Energy Fund XIV	100,000,000	113,459,470	95,309,310	2,761,129	3,667,823	0.87	-5.04	2007
ElG Energy Fund XV	150,000,000	161,871,503	156,199,601	22,871,323	22,882,914	1.11	2.38	2010
ElG Energy Fund XVI	200,000,000	195,656,159	130,210,966	52,072,029	128,702,864	1.32	6.79	2013
Encap Energy	300,000,000	320,795,851	274,201,152	9,223,353	184,234,403	1.43	8.23	
EnCap Energy Capital Fund VIII, L.P.	100,000,000	103,335,766	64,549,894	470,044	44,027,775	1.05	0.96	2010
Encap Energy Fund IX	100,000,000	113,725,245	119,060,570	3,890,055	41,332,854	1.41	9.90	2012
EnCap Energy Capital Fund X, L.P.	100,000,000	103,734,839	90,590,688	4,863,253	98,873,773	1.83	15.74	2015
Energy & Minerals Group	680,000,000	689,824,966	400,586,767	40,962,715	554,547,139	1.38	7.23	
NGP Midstream & Resources, L.P.	100,000,000	103,565,615	179,560,149	17,857	5,084,486	1.78	13.26	2007
The Energy & Minerals Group Fund II, L.P.	100,000,000	108,534,480	108,598,045	170,365	107,726,494	1.99	12.57	2011
The Energy & Minerals Group Fund III, L.P.	200,000,000	206,781,398	34,146,626	1,219,725	111,468,094	0.70	-5.21	2014
The Energy & Minerals Group Fund IV, LP	150,000,000	162,424,343	73,420,064	14,023,899	162,560,798	1.45	9.08	2015
The Energy & Minerals Group Fund V	112,500,000	91,343,320	3,658,916	24,189,035	141,263,641	1.59	17.27	2019
The Energy & Minerals Group Fund V Accordion, LP	17,500,000	17,175,810	1,202,967	1,341,834	26,443,626	1.61	18.34	2019
Energy Capital Partners	350,000,000	350,697,256	319,929,715	77,132,284	195,190,172	1.47	12.27	
Energy Capital Partners III, L.P.	200,000,000	234,313,247	281,260,752	30,058,269	62,764,620	1.47	10.78	2013
Energy Capital Partners IV-A, LP	150,000,000	116,384,009	38,668,963	47,074,015	132,425,553	1.47	18.64	2017
Enervest Management Partners	100,000,000	99,031,763	99,964,623	9,061,935	48,138,821	1.50	9.33	
EnerVest Energy Institutional Fund XIV-A, L.P.	100,000,000	99,031,763	99,964,623	9,061,935	48,138,821	1.50	9.33	2015
First Reserve	500,000,000	564,086,967	278,557,281	0	139,588,789	0.74	-7.18	
First Reserve Fund XI, L.P.	150,000,000	150,292,121	100,059,903	0	71,821	0.67	-8.77	2006
First Reserve Fund XII, L.P.	150,000,000	165,617,044	85,669,271	0	245,885	0.52	-17.85	2008
First Reserve Fund XIII, L.P.	200,000,000	248,177,802	92,828,107	0	139,271,084	0.94	-2.33	2013
Kohlberg, Kravis, Roberts & Co.	249,850,000	175,155,777	34,521,445	85,920,201	158,683,404	1.10	6.53	
KKR Global Infrastructure Investors III	149,850,000	133,173,722	33,991,484	27,372,295	118,923,207	1.15	7.47	2018
KKR Global Infrastructure Investors IV	100,000,000	41,982,055	529,961	58,547,906	39,760,197	0.96	-7.62	2021

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Investments	Commitments	Contributions	Distributions	Remaining Commitment	Market Value	Investment Multiple	IRR	Vintage Year
Merit Energy Partners	519,721,518	384,644,480	183,288,900	94,599,899	357,632,082	1.41	5.56	
Merit Energy Partners F-II, L.P.	100,000,000	59,522,861	33,692,416	0	6,704,961	0.68	-5.44	2006
Merit Energy Partners H	100,000,000	100,000,000	29,668,582	0	51,733,953	0.81	-2.95	2011
Merit Energy Partners I, L.P.	169,721,518	169,721,518	99,039,059	0	191,659,884	1.71	10.92	2014
Merit Energy Partners K, L.P.	150,000,000	55,400,101	20,888,843	94,599,899	107,533,284	2.32	41.08	2019
NGP	599,500,000	585,139,792	540,519,326	49,798,344	278,044,521	1.40	9.46	
Natural Gas Partners IX, LP	150,000,000	173,962,921	249,243,688	605,481	518,173	1.44	12.05	2007
NGP Natural Resources X, L.P.	150,000,000	149,242,325	129,772,139	757,675	22,820,806	1.02	0.59	2011
NGP Natural Resources XI, L.P.	150,000,000	153,765,092	115,178,751	6,290,493	129,239,158	1.59	11.24	2014
NGP Natural Resources XII, L.P.	149,500,000	108,169,454	46,324,748	42,144,695	125,466,385	1.59	15.71	2017
Sheridan	100,000,000	34,353,005	30,800,000	13,500,000	36,970,001	1.97	16.19	
Sheridan Production Partners III-B, L.P.	100,000,000	34,353,005	30,800,000	13,500,000	36,970,001	1.97	16.19	2014

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Investments	Commitments	Contributions	Distributions	Remaining Commitment	Market Value	Investment Multiple	IRR	Vintage Year
Real Estate	4,173,147,868	2,784,594,290	2,016,869,018	1,681,200,842	1,933,815,139	1.42	10.23	
Angelo, Gordon & Co.	550,000,000	454,740,052	253,032,407	145,060,000	375,978,349	1.38	12.55	
AG Asia Realty Fund III, L.P.	50,000,000	47,587,261	47,125,000	6,196,250	18,875,353	1.39	11.74	2016
AG Asia Realty Fund IV, L.P.	100,000,000	74,409,775	25,750,000	37,952,500	74,783,556	1.35	16.27	2018
AG Europe Realty Fund II, L.P.	75,000,000	68,779,896	30,019,976	12,768,750	70,212,416	1.46	11.64	2018
AG Europe Realty Fund III	75,000,000	40,686,731	3,000,000	34,687,500	44,359,391	1.16	11.13	2020
AG Realty Fund IX	100,000,000	92,141,126	83,000,000	11,650,000	48,435,222	1.43	8.59	2014
AG Realty Fund X, L.P.	150,000,000	131,135,263	64,137,431	41,805,000	119,312,411	1.40	21.69	2018
Blackstone	1,124,500,000	882,295,369	892,879,767	406,027,044	569,524,075	1.66	13.65	
Blackstone Real Estate Partners Asia II	74,500,000	67,867,196	9,322,917	16,202,923	70,586,572	1.18	7.58	2017
Blackstone Real Estate Partners Asia III	100,000,000	11,017,468	2,368	89,345,032	9,364,460	0.85	-15.58	2021
Blackstone Real Estate Partners V	100,000,000	104,217,981	209,112,174	4,174,052	0	2.01	10.84	2006
Blackstone Real Estate Partners VI, L.P.	100,000,000	109,500,200	218,432,792	4,907,906	1,880,386	2.01	13.07	2007
Blackstone Real Estate Partners VII, LP	100,000,000	112,093,301	180,597,195	11,131,179	22,031,003	1.81	15.20	2011
Blackstone Real Estate VIII.TE.1 L.P.	150,000,000	173,325,809	176,915,939	21,403,114	121,580,009	1.72	17.04	2015
Blackstone Real Estate Partners IX, L.P.	300,000,000	304,273,413	98,496,381	58,862,838	344,081,645	1.45	29.85	2018
Blackstone Real Estate Partners X	200,000,000	0	0	200,000,000	0	0.00		2022
Blackstone Strategic Partners	75,000,000	77,559,576	66,169,437	990,056	1,088,373	0.87	-2.08	
Strategic Partners III RE, L.P.	25,000,000	25,981,820	15,252,523	9,006	99,036	0.59	-6.45	2005
Strategic Partners IV RE, L.P.	50,000,000	51,577,756	50,916,914	981,050	989,337	1.01	0.10	2008
Brookfield Asset Management Inc.	300,000,000	59,546,546	0	240,453,454	65,508,703	1.10	10.96	
Brookfield Strategic Real Estate Partners IV	300,000,000	59,546,546	0	240,453,454	65,508,703	1.10	10.96	2021
Carlyle Group	450,000,000	132,768,744	97,778,799	382,109,098	96,254,221	1.46	29.76	
Carlyle Realty Partners VIII, L.P.	150,000,000	123,342,815	97,778,799	91,535,027	88,950,634	1.51	30.69	2017
Carlyle Realty Partners IX	300,000,000	9,425,929	0	290,574,071	7,303,587	0.77	-22.52	2021
Kohlberg, Kravis, Roberts & Co.	125,000,000	73,471,551	4,906,451	53,150,647	76,320,035	1.11	13.36	
KKR Real Estate Partners Americas III	125,000,000	73,471,551	4,906,451	53,150,647	76,320,035	1.11	13.36	2021
Landmark Partners	249,500,000	99,205,389	60,282,221	173,008,010	79,806,760	1.41	19.09	
Landmark Real Estate Partners VIII, L.P.	149,500,000	99,205,389	60,282,221	73,008,010	79,806,760	1.41	19.09	2016
Landmark Real Estate Partners IX	100,000,000	0	0	100,000,000	0	0.00		2021
Lubert Adler	174,147,868	112,795,244	86,217,291	62,414,787	69,856,159	1.38	16.51	
Lubert-Adler Real Estate Fund VII-B, L.P.	74,147,868	67,585,213	82,515,205	7,414,787	19,021,551	1.50	15.43	2017
Lubert-Adler Recovery and Enhancement Capital Fund	100,000,000	45,210,030	3,702,087	55,000,000	50,834,608	1.21	25.33	2021

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Investments	Commitments	Contributions	Distributions	Remaining Commitment	Market Value	Investment Multiple	IRR	Vintage Year
Oaktree Capital Management, LLC	200,000,000	104,475,519	36,295,052	130,000,000	79,383,985	1.11	32.21	
Oaktree Real Estate Opportunities Fund VIII	200,000,000	104,475,519	36,295,052	130,000,000	79,383,985	1.11	32.21	2020
Rockpoint	200,000,000	178,865,629	69,882,159	41,172,282	154,026,381	1.25	8.74	
Rockpoint Real Estate Fund V, L.P.	100,000,000	99,528,281	58,755,434	17,327,032	67,292,604	1.27	6.74	2014
Rockpoint Real Estate Fund VI, L.P.	100,000,000	79,337,348	11,126,725	23,845,250	86,733,778	1.23	17.54	2019
Rockwood	200,000,000	164,861,297	61,784,022	39,319,406	144,479,815	1.25	8.94	
Rockwood Capital RE Partners X, L.P.	100,000,000	94,027,411	57,507,174	7,657,118	65,583,428	1.31	8.05	2015
Rockwood Capital RE Partners XI	100,000,000	70,833,887	4,276,848	31,662,288	78,896,387	1.17	12.87	2019
Silverpeak Real Estate Partners	225,000,000	144,009,375	109,295,624	7,496,058	3,728,425	0.78	-3.83	
Silverpeak Legacy Pension Partners II, L.P.	75,000,000	73,069,012	92,033,940	7,496,058	414,065	1.27	4.17	2005
Silverpeak Legacy Pension Partners III, L.P.	150,000,000	70,940,363	17,261,685	0	3,314,360	0.29	-12.03	2008
TA Associates Realty	300,000,000	300,000,000	278,345,788	0	217,859,857	1.65	14.53	
Realty Associates Fund X	100,000,000	100,000,000	161,064,353	0	116,633	1.61	12.56	2012
Realty Associates Fund XI	100,000,000	100,000,000	108,893,200	0	67,401,021	1.76	13.45	2015
Realty Associates Fund XII	100,000,000	100,000,000	8,388,235	0	150,342,203	1.59	28.38	2018
Total	36,898,010,313	28,477,227,045	21,896,040,941	11,423,983,764	20,331,049,469	1.48	11.92	
<i>Difference**</i>					31,936,824			
Private Markets Total with Difference					20,362,986,293			

<i>Private Markets Portfolio Status</i>	Managers	Funds
PRIVATE EQUITY	58	188
PRIVATE CREDIT	18	42
REAL ASSETS	11	31
REAL ESTATE	13	34
Total	100	295

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.



Quarterly Report

Participant Directed Investment Program

December 31, 2022



Quarterly Report

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.

	<u>Ending Market Value</u>	<u>Last Qtr</u>	<u>1 Year</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>	<u>Option Since</u>
BALANCED FUND	\$101,390,931	5.2%	-16.5%	4.1%	5.9%	8.2%	01/1980
U.S. EQUITY ACTIVELY MANAGED FUND	73,312,485	7.6	-20.7	7.7	9.4	12.5	07/1986
U.S. EQUITY INDEX FUND	359,382,668	7.2	-19.2	7.3	9.0	12.2	07/1986
BROAD INTERNATIONAL EQUITY FUND	126,533,512	12.0	-13.7	1.5	1.8	4.7	09/1994
BOND FUND	98,292,620	2.1	-14.1	-2.3	0.5	1.5	07/1986
MONEY MARKET FUND	666,504,678	1.0	1.9	0.9	1.4	0.9	07/1986
STABLE VALUE FUND	1,731,918,804	0.6	2.1	2.2	2.3	2.2	11/1994
VOLUNTEER FIREFIGHTER ACCOUNT	143,516,721	5.2	-15.2	2.2	4.0	5.9	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.

	<u>Ending Market Value</u>	<u>Last Qtr</u>	<u>1 Year</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>
BALANCED FUND	\$101,390,931	5.2%	-16.5%	4.1%	5.9%	8.2%
SIF BALANCED FUND BENCHMARK		5.1%	-15.8%	3.7%	5.7%	7.8%
Excess		0.1%	-0.7%	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.

	<u>Ending Market Value</u>	<u>Last Qtr</u>	<u>1 Year</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>
U.S. EQUITY ACTIVELY MANAGED FUND	73,312,485	7.6	-20.7	7.7	9.4	12.5
Russell 3000		7.2	-19.2	7.1	8.8	12.1
Excess		0.4	-1.5	0.6	0.6	0.4



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.

	<u>Ending Market Value</u>	<u>Last Qtr</u>	<u>1 Year</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>
U.S. EQUITY INDEX FUND	\$359,382,668	7.2%	-19.2%	7.3%	9.0%	12.2%
Russell 3000		7.2%	-19.2%	7.1%	8.8%	12.1%
Excess		0.0%	0.0%	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).

	<u>Ending Market Value</u>	<u>Last Qtr</u>	<u>1 Year</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>
BROAD INTERNATIONAL EQUITY FUND	126,533,512	12.0	-13.7	1.5	1.8	4.7
International Equity Benchmark		14.3	-16.0	0.0	0.9	3.8
Excess		-2.3	2.3	1.5	1.0	0.9



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.

	<u>Ending Market Value</u>	<u>Last Qtr</u>	<u>1 Year</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>
BOND FUND	\$98,292,620	2.1%	-14.1%	-2.3%	0.5%	1.5%
Bloomberg U.S. Aggregate		1.9%	-13.0%	-2.7%	0.0%	1.1%
Excess		0.3%	-1.1%	0.4%	0.4%	0.5%

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.

	<u>Ending Market Value</u>	<u>Last Qtr</u>	<u>1 Year</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>
MONEY MARKET FUND	666,504,678	1.0	1.9	0.9	1.4	0.9
ICE BofA US 3-Month Treasury Bill		0.8	1.5	0.7	1.3	0.8
Excess		0.1	0.4	0.2	0.2	0.2



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.

	<u>Ending Market Value</u>	<u>Last Qtr</u>	<u>1 Year</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>
STABLE VALUE FUND	\$1,731,918,804	0.6%	2.1%	2.2%	2.3%	2.2%
Fixed Interest Blended Benchmark		1.2%	3.5%	1.8%	2.2%	1.8%
Excess		-0.6%	-1.4%	0.4%	0.2%	0.4%

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.

	<u>Ending Market Value</u>	<u>Last Qtr</u>	<u>1 Year</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>
VOLUNTEER FIREFIGHTER ACCOUNT	143,516,721	5.2	-15.2	2.2	4.0	5.9
SIF Volunteer Firefighter Account BM		5.6	-14.7	1.7	3.6	5.5
Excess		-0.5	-0.5	0.5	0.3	0.4



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.

	<u>Ending Market Value</u>	<u>Last Qtr</u>	<u>1 Year</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>	<u>Option Since</u>
VANGUARD TOTAL STOCK MARKET INSTITUTIONAL INDEX PLUS	\$624,403,023	7.2%	-19.5%	7.0%			07/2019
VANGUARD INSTITUTIONAL INDEX PLUS	1,548,446,629	7.6	-18.1	7.6	9.4%	12.6%	07/1999
VANGUARD DIVIDEND GROWTH	957,101,082	13.1	-4.9	10.0	11.8		10/2016
VANGUARD MID CAP INDEX	671,954,433	9.0	-18.7	6.2	7.3	11.1	01/2004
T. ROWE PRICE SMALL-CAP STOCK	802,728,979	4.2	-23.3	3.8	7.8	11.2	04/2000
FIDELITY DIVERSIFIED INTERNATIONAL	297,058,822	14.8	-23.4	1.3	2.7	5.8	07/1999
VANGUARD TOTAL INTERNATIONAL STOCK INDEX	324,939,578	14.7	-16.0	0.5	1.1	4.1	07/2011
VANGUARD BALANCED INDEX	1,232,807,564	4.9	-16.9	3.4	5.5	7.8	12/2003
DODGE & COX INCOME	278,116,216	2.8	-10.9	-1.1	1.1	2.1	07/1999
VANGUARD TOTAL BOND MARKET INDEX	313,105,195	1.7	-13.1	-2.7	-0.0	1.0	12/2003
2025 FUND	211,429,134	4.7	-12.2	2.3	3.6	5.5	07/2011
2030 FUND	191,978,045	5.9	-14.9	2.8	4.1	6.4	07/2011
2035 FUND	151,480,381	7.2	-17.0	2.8	4.3	6.9	07/2011
2040 FUND	122,209,719	7.8	-17.9	3.0	4.5	7.2	07/2011
2045 FUND	115,385,227	8.3	-18.4	3.2	4.6	7.6	07/2011
2050 FUND	98,079,144	8.7	-18.8	3.4	4.8	7.7	07/2011
2055 FUND	64,518,697	9.0	-19.1	3.6	4.9	7.8	07/2011
2060 FUND	49,828,395	9.0	-19.1	3.6	4.9	7.8	07/2011
2065 FUND	6,590,959	9.0	-19.1				04/2020
INCOME FUND	207,751,247	4.1	-11.0	1.8	3.0	3.6	07/2011
TD Ameritrade SDB	76,844,484						
TD Ameritrade SDB Roth	2,650,513						



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	\$624,403,023	7.2%	-19.5%	7.0%		07/2019
CRSP US Total Market Index		7.1	-19.5	7.0		07/2019
Excess		0.0	-0.0	0.1		
VANGUARD INSTITUTIONAL INDEX PLUS	1,548,446,629	7.6	-18.1	7.6	9.4%	07/1999
S&P 500		7.6	-18.1	7.7	9.4	07/1999
Excess		-0.0	-0.0	-0.0	-0.0	
VANGUARD DIVIDEND GROWTH	957,101,082	13.1	-4.9	10.0	11.8	10/2016
VANGUARD DIVIDEND GROWERS INDEX		13.1	-9.7	8.9	10.4	10/2016
Excess		0.0	4.8	1.1	1.4	
Mid Cap US Equity						
VANGUARD MID CAP INDEX	671,954,433	9.0	-18.7	6.2	7.3	01/2004
CRSP US Mid Cap Index		9.0	-18.7	6.2	7.3	01/2004
Excess		-0.0	-0.0	0.0	0.0	
Small Cap US Equity						
T. ROWE PRICE SMALL-CAP STOCK	802,728,979	4.2	-23.3	3.8	7.8	04/2000
Russell 2000		6.2	-20.4	3.1	4.1	04/2000
Excess		-2.0	-2.9	0.7	3.6	
International Equity						
FIDELITY DIVERSIFIED INTERNATIONAL	297,058,822	14.8	-23.4	1.3	2.7	07/1999
MSCI EAFE FREE (NET)		17.3	-14.5	0.9	1.5	07/1999
Excess		-2.5	-8.9	0.4	1.2	
VANGUARD TOTAL INTERNATIONAL STOCK INDEX	324,939,578	14.7	-16.0	0.5	1.1	07/2011
FTSE Global All Cap ex US Index Net		14.1	-16.2	0.4	0.9	07/2011
Excess		0.6	0.3	0.2	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	\$1,232,807,564	4.9%	-16.9%	3.4%	5.5%	12/2003
Vanguard Balanced Fund Benchmark		5.1	-16.7	3.5	5.6	12/2003
Excess		-0.2	-0.2	-0.1	-0.1	

Fixed Income

DODGE & COX INCOME	278,116,216	2.8	-10.9	-1.1	1.1	07/1999
Bloomberg U.S. Aggregate		1.9	-13.0	-2.7	0.0	07/1999
Excess		0.9	2.1	1.6	1.1	

VANGUARD TOTAL BOND MARKET INDEX	313,105,195	1.7	-13.1	-2.7	-0.0	12/2003
Bloomberg U.S. Aggregate		1.9	-13.0	-2.7	0.0	12/2003
Excess		-0.2	-0.1	-0.0	-0.0	

MONEY MARKET FUND	666,504,678	1.0	1.9	0.9	1.4	07/1986
ICE BofA US 3-Month Treasury Bill		0.8	1.5	0.7	1.3	07/1986
Excess		0.1	0.4	0.2	0.2	

Stable Value

STABLE VALUE FUND	1,731,918,804	0.6	2.1	2.2	2.3	11/1994
Fixed Interest Blended Benchmark		1.2	3.5	1.8	2.2	11/1994
Excess		-0.6	-1.4	0.4	0.2	

(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 decision by investing their assets in the fund that is closest to their anticipated retirement date.

Target Date Retirement Funds

	<u>Ending Market Value</u>	<u>Last Qtr</u>	<u>1 Year</u>	<u>3 Year</u>	<u>5 Year</u>	<u>Option Since</u>		<u>Ending Market Value</u>	<u>Last Qtr</u>	<u>1 Year</u>	<u>3 Year</u>	<u>5 Year</u>	<u>Option Since</u>	
SSgA														
2025 FUND	\$211,429,134	4.7%	-12.2%	2.3%	3.6%	07/2011		2050 FUND	\$98,079,144	8.7%	-18.8%	3.4%	4.8%	07/2011
2025 FUND BENCHMARK		4.7%	-12.2%	2.3%	3.6%	07/2011		2050 FUND BENCHMARK		8.5%	-18.8%	3.5%	4.8%	07/2011
Excess		-0.0%	-0.0%	-0.0%	-0.0%			Excess		0.1%	-0.0%	-0.0%	-0.0%	
2030 FUND	\$191,978,045	5.9%	-14.9%	2.8%	4.1%	07/2011		2055 FUND	\$64,518,697	9.0%	-19.1%	3.6%	4.9%	07/2011
2030 FUND BENCHMARK		5.9%	-14.8%	2.8%	4.1%	07/2011		2055 FUND BENCHMARK		8.9%	-19.1%	3.6%	4.9%	07/2011
Excess		-0.0%	-0.0%	-0.0%	-0.0%			Excess		0.1%	-0.0%	-0.0%	-0.0%	
2035 FUND	\$151,480,381	7.2%	-17.0%	2.8%	4.3%	07/2011		2060 FUND	\$49,828,395	9.0%	-19.1%	3.6%	4.9%	07/2011
2035 FUND BENCHMARK		7.1%	-17.0%	2.8%	4.3%	07/2011		2060 FUND BENCHMARK		8.9%	-19.1%	3.6%	4.9%	07/2011
Excess		0.0%	-0.0%	-0.0%	-0.0%			Excess		0.1%	-0.0%	-0.0%	-0.0%	
2040 FUND	\$122,209,719	7.8%	-17.9%	3.0%	4.5%	07/2011		2065 FUND	\$6,590,959	9.0%	-19.1%			04/2020
2040 FUND BENCHMARK		7.7%	-17.9%	3.0%	4.5%	07/2011		2065 FUND BENCHMARK		8.9%	-19.1%			04/2020
Excess		0.1%	-0.0%	-0.0%	-0.0%			Excess		0.1%	-0.0%			
2045 FUND	\$115,385,227	8.3%	-18.4%	3.2%	4.6%	07/2011		INCOME FUND	\$207,751,247	4.1%	-11.0%	1.8%	3.0%	07/2011
2045 FUND BENCHMARK		8.2%	-18.4%	3.2%	4.7%	07/2011		INCOME FUND BENCHMARK		4.2%	-11.0%	1.8%	3.0%	07/2011
Excess		0.1%	-0.0%	-0.0%	-0.0%			Excess		-0.1%	-0.1%	-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: December 31, 2022

Total = \$1,693 Million

Fund Name	Ending Market	3 Months	1 Year	Annualized				Inception Date
				3 Years	5 Years	10 Years	Since Inception	
2038/2039 Enrollment Option	\$15,878,837	7.83%	-16.65%				-7.84%	6/11/2021
2038-2039 Custom Benchmark		6.29%	-18.27%				-8.87%	
2036/2037 Enrollment Option	\$60,116,508	7.66%	-16.54%	3.62%			4.94%	10/28/2019
2036-2037 Custom Benchmark		6.12%	-18.01%	2.87%			4.22%	
2034/2035 Enrollment Option	\$49,699,242	7.34%	-16.18%	3.33%			4.63%	10/28/2019
2034-2035 Custom Benchmark		5.91%	-17.63%	2.63%			3.96%	
2032/2033 Enrollment Option	\$55,930,176	6.90%	-15.85%	3.15%			4.40%	10/28/2019
2032-2033 Custom Benchmark		5.60%	-17.15%	2.49%			3.77%	
2030/2031 Enrollment Option	\$66,065,873	6.09%	-15.02%	2.77%			3.97%	10/28/2019
2030-2031 Custom Benchmark		5.06%	-16.15%	2.20%			3.42%	
2028/2029 Enrollment Option	\$83,024,457	5.21%	-13.68%	2.26%			3.36%	10/28/2019
2028-2029 Custom Benchmark		4.45%	-14.57%	1.69%			2.83%	
2026/2027 Enrollment Option	\$114,851,628	4.29%	-12.13%	1.93%			2.86%	10/28/2019
2026-2027 Custom Benchmark		3.82%	-12.83%	1.45%			2.42%	
2024/2025 Enrollment Option	\$157,509,820	3.22%	-9.55%	1.94%			2.71%	10/28/2019
2024-2025 Custom Benchmark		3.00%	-9.98%	1.45%			2.25%	
2022/2023 Enrollment Option	\$168,533,244	2.39%	-6.45%	1.64%			2.24%	10/28/2019
2022-2023 Custom Benchmark		2.39%	-6.70%	1.05%			1.71%	
In School Option	\$220,996,434	2.22%	-5.36%	1.52%			1.85%	10/28/2019
In School Custom Benchmark		2.23%	-5.60%	0.77%			1.15%	

MINNESOTA COLLEGE SAVINGS PLAN

Performance Statistics for the Period Ending: December 31, 2022

Fund Name	Ending Market	3 Months	1 Year	Annualized				Inception Date
				3 Years	5 Years	10 Years	Since Inception	
U.S. and International Equity Option	\$264,041,108	9.47%	-18.50%	4.45%	6.15%	9.19%	6.94%	10/ 1/2001
BB: U.S. and International Equity Option		9.47%	-18.51%	4.37%	6.02%	9.25%	7.62%	
Moderate Allocation Option	\$85,949,441	6.32%	-15.34%	2.51%	4.25%	6.11%	5.05%	8/ 2/2007
BB: Moderate Allocation Option		6.51%	-15.28%	2.43%	4.25%	6.23%	5.54%	
100% Fixed-Income Option	\$16,410,926	1.84%	-10.85%	-1.51%	0.63%	0.98%	2.65%	8/16/2007
BB: 100% Fixed-Income Option		1.99%	-10.85%	-1.34%	0.87%	1.31%	3.20%	
International Equity Index Option	\$9,059,037	16.16%	-14.85%	0.57%	1.23%		3.72%	6/18/2013
BB: International Equity Index Option		15.85%	-15.50%	0.27%	1.04%		3.76%	
Money Market Option	\$13,661,686	0.83%	1.40%	0.59%	1.08%	0.61%	0.57%	11/ 1/2007
BB: Money Market Option		0.80%	1.33%	0.54%	0.96%	0.54%	0.51%	
Principal Plus Interest Option	\$120,600,755	0.49%	1.30%	1.51%	1.67%	1.51%	2.35%	10/10/2001
Citigroup 3-Month U.S. Treasury Bill		0.87%	1.50%	0.71%	1.25%	0.74%	1.26%	
Aggressive Allocation Option	\$73,127,461	7.90%	-16.83%	3.51%	5.20%		6.38%	8/12/2014
BB: Aggressive Allocation Option		8.00%	-16.87%	3.46%	5.18%		6.33%	
Conservative Allocation Option	\$16,239,242	3.81%	-10.05%	1.36%	2.77%		3.25%	8/18/2014
BB: Conservative Allocation Option		3.99%	-10.02%	1.25%	2.80%		3.28%	
Equity and Interest Accumulation Option	\$7,719,268	3.64%	-9.18%	4.60%	5.38%		5.72%	8/18/2014
BB: Equity and Interest Accumulation Option		4.14%	-8.84%	4.45%	5.44%		5.68%	
U.S. Large Cap Equity Option	\$91,176,995	7.50%	-18.22%	7.50%	9.24%		10.40%	8/12/2014
BB: U.S. Large Cap Equity Option		7.56%	-18.11%	7.66%	9.42%		10.52%	
Social Choice Equity Option	\$914,495	9.69%	-17.86%				-6.16%	6/11/2021
BB: Social Choice Equity Option		7.18%	-19.21%				-7.09%	
Matching Grant	\$1,370,536	0.49%	1.30%	1.51%	1.67%	1.51%	2.35%	3/22/2002
Citigroup 3-Month U.S. Treasury Bill		0.87%	1.50%	0.71%	1.25%	0.74%	1.26%	

MINNESOTABLE^{plan}

A member of The National ABLE Alliance

Performance as of
12/31/2022

Total Market Value: **\$31,101,187**

<u>Fund Name</u>	<u>Market Value</u>	<u>% of Plan</u>	<u>1 Month</u>	<u>3 Months</u>	<u>YTD</u>	<u>1 Year</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>	<u>Inception</u>	<u>Date</u>
Aggressive Option	\$2,237,927	7.20%	(4.52)	7.48	(19.39)	(19.39)	2.99	4.72		6.70	12/15/16
ABLE Aggressive Custom Benchmark			(4.09)	7.64	(19.36)	(19.36)	3.23	5.01		7.11	
Variance			(0.43)	(0.16)	(0.03)	(0.03)	(0.24)	(0.29)		(0.41)	
Moderately Aggressive Option	\$2,487,498	8.00%	(3.80)	6.47	(17.39)	(17.39)	2.65	4.27		5.92	12/15/16
ABLE Moderately Aggressive Custom Benchmark			(3.48)	6.62	(17.39)	(17.39)	2.84	4.54		6.30	
Variance			(0.32)	(0.15)	0.00	0.00	(0.19)	(0.27)		(0.38)	
Growth Option	\$3,855,652	12.40%	(3.16)	5.39	(15.43)	(15.43)	2.17	3.74		5.07	12/15/16
ABLE Growth Custom Benchmark			(2.87)	5.58	(15.43)	(15.43)	2.36	4.00		5.43	
Variance			(0.29)	(0.19)	0.00	0.00	(0.19)	(0.26)		(0.36)	
Moderate Option	\$3,407,061	10.95%	(2.51)	4.32	(13.45)	(13.45)	1.64	3.13		4.18	12/15/16
ABLE Moderate Custom Benchmark			(2.26)	4.54	(13.49)	(13.49)	1.78	3.39		4.50	
Variance			(0.25)	(0.22)	0.04	0.04	(0.14)	(0.26)		(0.32)	
Moderately Conservative Option	\$3,332,132	10.71%	(1.70)	3.24	(9.36)	(9.36)	1.36	2.55		3.22	12/15/16
ABLE Moderately Conservative Custom Benchmark			(1.45)	3.37	(9.34)	(9.34)	1.46	2.76		3.48	
Variance			(0.25)	(0.13)	(0.02)	(0.02)	(0.10)	(0.21)		(0.26)	
Conservative Option	\$5,857,579	18.83%	(0.54)	1.55	(3.71)	(3.71)	0.79	1.60		1.82	12/15/16
ABLE Conservative Custom Benchmark			(0.35)	1.79	(3.55)	(3.55)	0.85	1.77		2.00	
Variance			(0.19)	(0.24)	(0.16)	(0.16)	(0.06)	(0.17)		(0.18)	
Checking Account Option	\$9,923,337	31.91%									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

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Quarterly Report

Non-Retirement

December 31, 2022



Quarterly Report

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 trusted 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

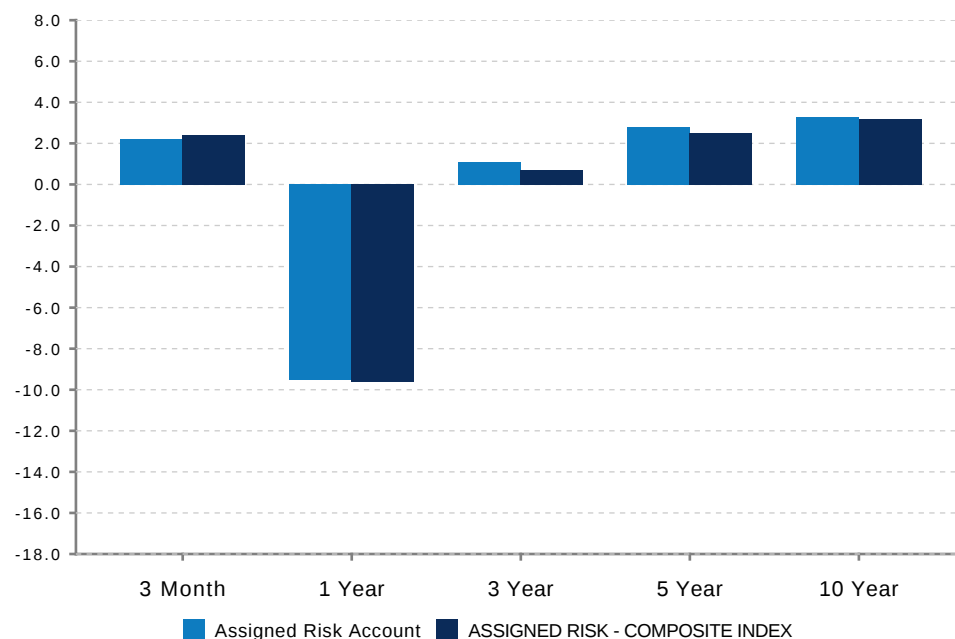
Assigned Risk Plan

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.

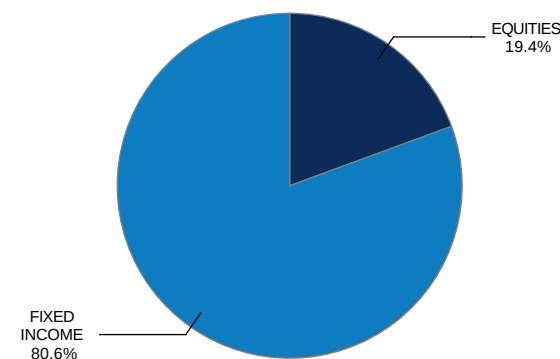
The Assigned Risk Plan is invested in a portfolio of common stocks and bonds

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 PLAN	\$253,985,527	2.2%	-9.5%	1.1%	2.8%	3.3%
EQUITIES	\$49,171,473	7.6%	-18.1%	7.7%	9.4%	12.3%
FIXED INCOME	\$204,814,055	0.9%	-7.6%	-1.2%	0.5%	0.8%
ASSIGNED RISK - COMPOSITE INDEX		2.4%	-9.6%	0.7%	2.5%	3.2%
Excess		-0.2%	0.2%	0.4%	0.3%	0.2%
S&P 500		7.6%	-18.1%	7.7%	9.4%	12.6%
Bloomberg U.S. Government: Intermediate		1.0%	-7.7%	-1.4%	0.5%	0.7%



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.



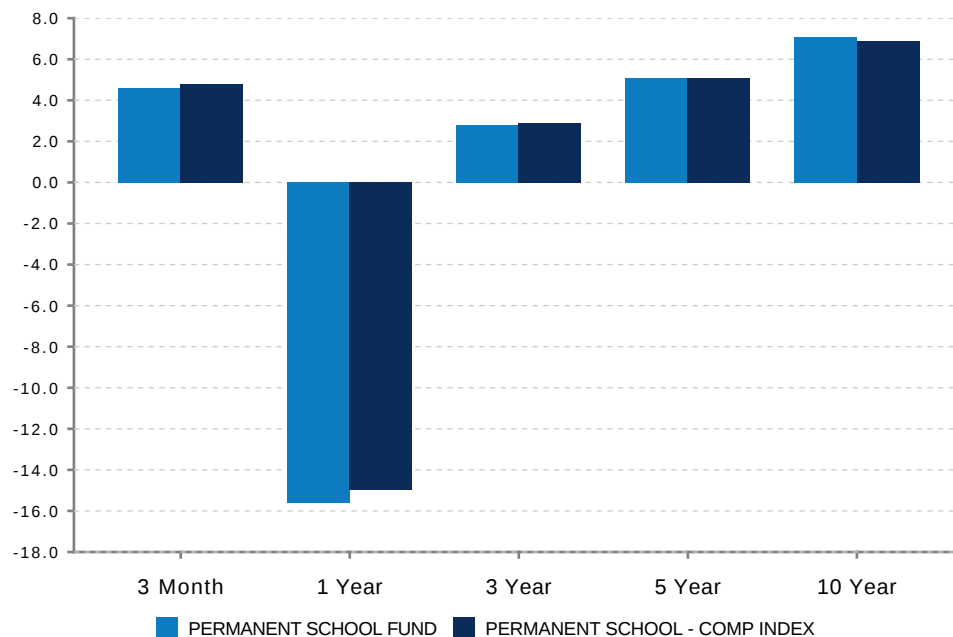
Non-Retirement

Permanent School Fund

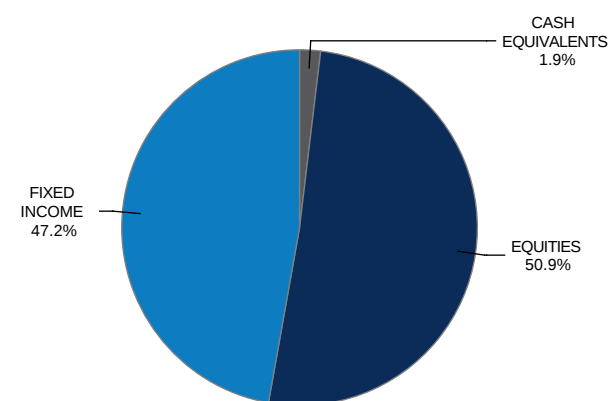
The investment objective of the Permanent School Fund is to produce a growing level of spendable income, within the constraints of maintaining adequate portfolio quality and liquidity. The income from the portfolio is transferred to the school endowment fund and distributed to Minnesota's public schools.

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	\$1,735,782,134	4.6%	-15.6%	2.8%	5.1%	7.1%
CASH EQUIVALENTS	33,292,907	0.9	1.7	0.8	1.3	0.8
EQUITIES	882,892,472	7.6	-18.1	7.7	9.4	12.6
FIXED INCOME	819,596,755	1.9	-13.6	-2.7	0.2	1.5
PERMANENT SCHOOL - COMP INDEX		4.8	-15.0	2.9	5.1	6.9
Excess		-0.2	-0.6	-0.1	0.0	0.2
S&P 500		7.6	-18.1	7.7	9.4	12.6
Bloomberg U.S. Aggregate		1.9	-13.0	-2.7	0.0	1.1



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.



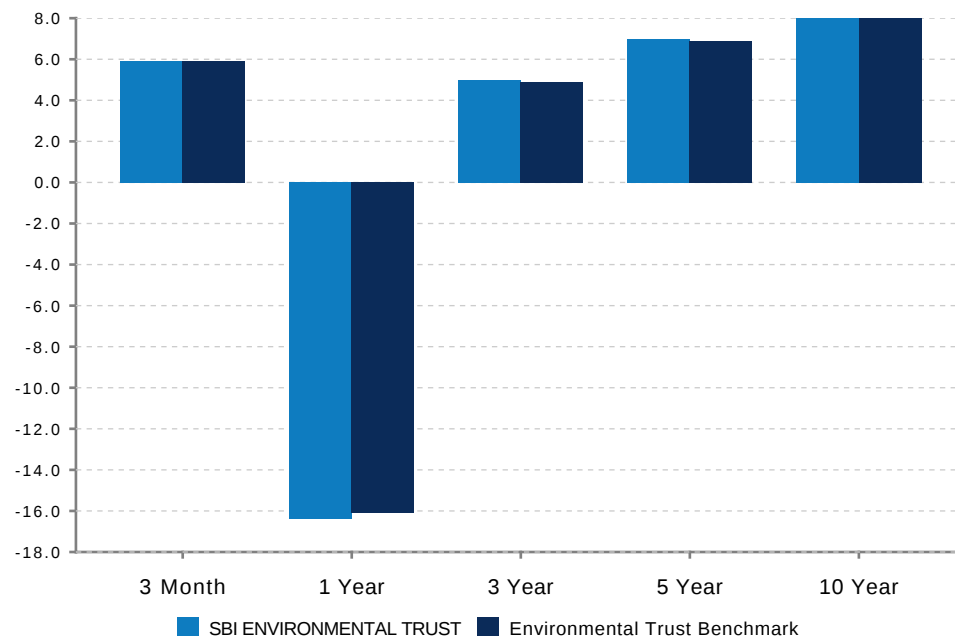
Non-Retirement

Environmental Trust Fund

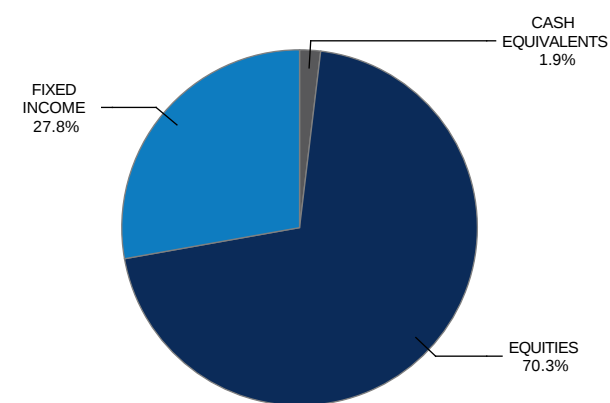
The objective of the Environmental Trust Fund is to increase the market value of the Fund over time in order to increase the annual amount made available for spending within the constraints of maintaining adequate portfolio quality and liquidity.

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	\$1,447,742,197	5.9%	-16.4%	5.0%	7.0%	9.4%
CASH EQUIVALENTS	27,628,104	0.9	1.7	0.8	1.3	0.8
EQUITIES	1,018,324,339	7.6	-18.1	7.7	9.4	12.6
FIXED INCOME	401,789,754	1.9	-13.6	-2.7	0.2	1.5
Environmental Trust Benchmark		5.9	-16.1	4.9	6.9	9.2
Excess		-0.1	-0.3	0.1	0.1	0.1
S&P 500		7.6	-18.1	7.7	9.4	12.6
Bloomberg U.S. Aggregate		1.9	-13.0	-2.7	0.0	1.1



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.

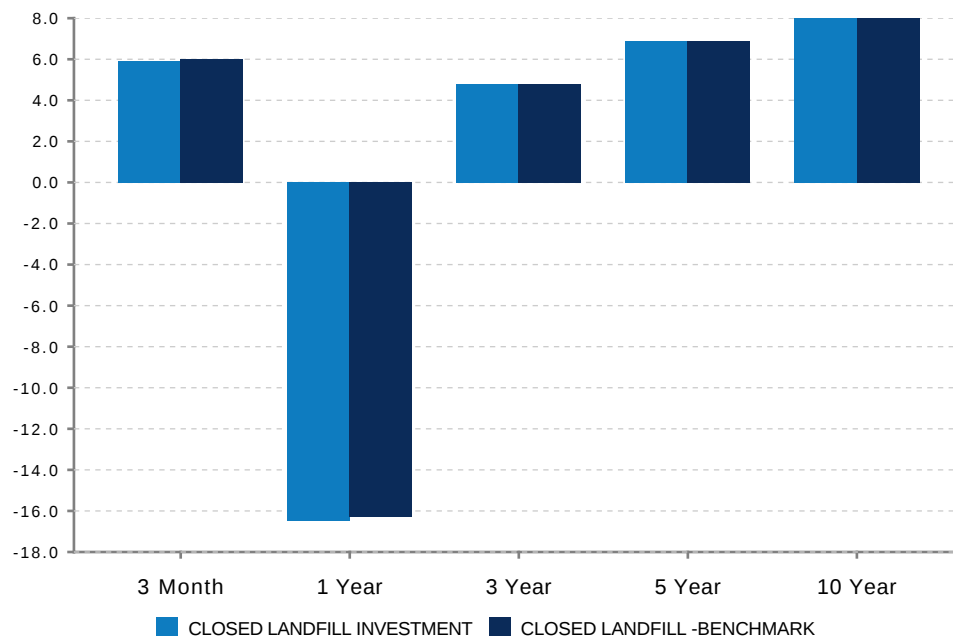


Non-Retirement

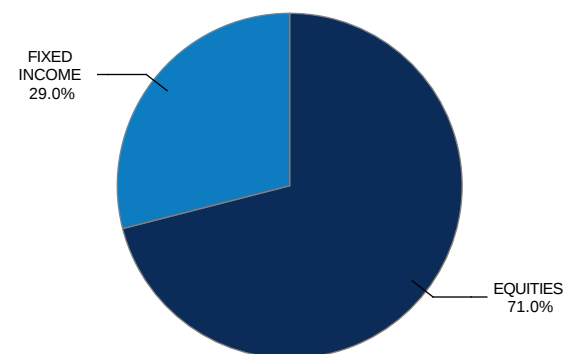
Closed Landfill Investment Fund

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	\$115,205,505	5.9%	-16.5%	4.8%	6.9%	10.4%
EQUITIES	81,771,819	7.6	-18.1	7.7	9.4	12.6
FIXED INCOME	33,433,686	1.9	-13.6	-2.7	0.2	
CLOSED LANDFILL -BENCHMARK		6.0	-16.3	4.8	6.9	10.3
Excess		-0.1	-0.2	-0.1	-0.0	0.0
S&P 500		7.6	-18.1	7.7	9.4	12.6
Bloomberg U.S. Aggregate		1.9	-13.0	-2.7	0.0	1.1



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.



	<u>Ending Market Value</u>	<u>Last Qtr</u>	<u>Fiscal YTD</u>	<u>1 Year</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>	<u>Since Inception</u>	<u>Inception Date</u>
NON RETIREMENT EQUITY INDEX - MELLON	2,779,378,685	7.5	2.3	-18.1	7.7	9.4	12.6	9.7	07/1993
S&P 500 INDEX (DAILY)		7.6	2.3	-18.1	7.7	9.4	12.6	9.6	07/1993
Excess		-0.0	0.0	-0.0	-0.0	-0.0	-0.0	0.1	
NON RETIREMENT FIXED INCOME - PRUDENTIAL	1,442,921,095	1.9	-2.9	-13.6	-2.7	0.2	1.5	5.0	07/1994
Bloomberg U.S. Aggregate		1.9	-3.0	-13.0	-2.7	0.0	1.1	4.6	07/1994
Excess		-0.0	0.1	-0.6	0.0	0.2	0.4	0.4	
RBC	204,814,040	0.9	-2.1	-7.6	-1.2	0.5	0.8	4.2	07/1991
RBC Custom Benchmark		1.0	-2.1	-7.7	-1.4	0.5	0.7	4.3	07/1991
Excess		-0.1	-0.1	0.1	0.2	0.1	0.1	-0.1	
MET COUNCIL OPEB BOND POOL	95,611,357	1.0	-1.5	-5.6	-1.1			0.7	02/2018
NON RETIREMENT CASH ACCOUNT	704,362,759	0.9	1.4	1.7	0.8	1.3		1.3	12/2017
ICE BofA US 3-Month Treasury Bill		0.8	1.3	1.5	0.7	1.3		1.3	12/2017
Excess		0.0	0.1	0.2	0.0	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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Quarterly Report

State Cash

December 31, 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.

	<u>Ending Market Value</u>	<u>Last Qtr</u>	<u>1 Year</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>
Treasurer's Cash	24,764,443,720	0.9	0.2	0.4	1.1	0.7
iMoneyNet Money Fund Average-All Taxable		0.8	1.4	0.6	1.0	0.6

Other State Cash Accounts

Due to differing investment objectives, strategies, and time horizons, some State agencies' accounts are invested separately. 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.

	<u>Ending Market Value</u>	<u>Last Qtr</u>	<u>1 Year</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>
Debt Service	83,464,708	3.8	-3.8	0.4	1.6	
Housing Finance (1)	75,748,594	1.0				



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

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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