
INVESTMENT ADVISORY COUNCIL

OF THE MINNESOTA STATE BOARD OF INVESTMENT

**INVESTMENT ADVISORY COUNCIL
MEETING
February 14, 2022**



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 14, 2022

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AGENDA
INVESTMENT ADVISORY COUNCIL MEETING

Virtual Meeting
Monday, February 14, 2022
12:00 p.m.

1. Call to Order	TAB
2. Approval of Minutes of November 15, 2021	
3. Performance Summary	A
4. Executive Director’s Administrative Report	B
5. Report from Record Currency Management	C
6. Treasury Protection Portfolio Duration	D
7. Report from DEI Task Force	E
8. Update on Meketa Climate Risk Project	F
9. Report on SBI Portfolio by Albourne Partners	G
10. Report on SBI Portfolio by Aon Investments	H
11. Report on SBI Portfolio by Meketa Investment Group	I
12. Private Markets Commitments	J
13. Report from Executive Director Search Committee	K
14. 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 15, 2021
IAC Meeting Minutes**

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**Minutes
Investment Advisory Council
November 15, 2021**

Call to Order

The Investment Advisory Council (IAC) met at 12:00 p.m. on Monday, November 15, 2021. The Chair of the IAC determined that an in person meeting was not practical or prudent because of the current COVID-19 health pandemic. As is permitted under the Open Meeting Law in these conditions, this IAC meeting was conducted via Zoom for Government video conferencing software and over the phone. Attendance and all votes were conducted by roll call.

MEMBERS PRESENT: Denise Anderson, Doug Anderson, Dennis Duerst, Kim Faust, Susanna Gibbons, Morris Goodwin Jr., Jennifer Hassemer (for Jim Schowalter), Peggy Ingison, Erin Leonard, Gary Martin, Dan McConnell, Carol Peterfeso, Jim Schowalter, Martha Severson Rush, Jay Stoffel and Shawn Wischmeier and Public Member Emeritus Malcolm McDonald.

MEMBERS ABSENT: Nancy Orr.

SBI STAFF: Mansco Perry, Patricia Ammann, Paul Anderson, Shirley Baribeau, Nate Blumenshine, Cassie Boll, Tammy Brusehaver, Andy Christensen, Dan Covich, Stephanie Gleeson, Aaron Griga, Andrew Krech, Steve Kuettel, Melissa Mader; John Mulé, Charlene Olson, S. Emily Pechacek, Narmada Ramaswami, Iryna Shafir, Erol Sonderegger, Jonathan Stacy, and Jeff Weber.

OTHERS ATTENDING: Kristen Doyle and Katie Comstock, Aon Investments; Allan Emkin, Neil Rue, Gordon Latter, and Ghiane Jones, Meketa Investment Group; Sean Crawford, Albourne America; J. Adam Sorenson, Attorney General's Office; Karl Procaccini, Governor's Office; Bibi Black, Secretary of State's Office; Ramona Advani, State Auditor's Office.

Members of the public attended the meeting; however due to the meeting being held via virtual teleconference the SBI was unable to track the information.

Approval of Minutes

The minutes of the August 16, 2021 IAC meeting were approved unanimously by roll call vote. Shawn Wischmeier was not present for the vote.

Performance Summary

Mr. Perry, Executive Director, referred members to the September 30, 2021 Performance Summary provided in Tab A of the meeting materials. Mr. Perry stated that as of September 30, 2021, the SBI was responsible for over \$128 billion of assets and that the Combined Funds represent approximately \$90 billion, which currently is nearing \$94 billion as of November 14, 2021. Mr. Perry reported that the Combined Funds continue to exceed its long-term objectives by outperforming its Composite Index over the ten-year period ending September 30, 2021 (Combined Funds 11.6% vs. Combined Fund Composite Index 11.2%) and providing a real rate of return above inflation over the latest 20 year time-period (Combined Funds 8.7% vs CPI-U 2.2%). The Combined Funds also exceeded the composite index for all time-periods reported as of September 30, 2021.

Mr. Perry noted that the Combined Funds actual asset mix is in-line with the asset allocation targets. He referred members to the Combined Funds Asset Class Performance Summary ending September 30, 2021. Mr. Perry stated the performance for the Public Equity Program was negative for the quarter primarily due to the International Equity Program return, but reported a positive relative return to the composite benchmark. He noted the Total Fixed Income Program earned the same return as its benchmark and the Private Markets invested allocation returned 9.4% for the quarter. Next, Mr. Perry stated the Volatility Benchmark Comparison shows the Combined Fund portfolio added value for all time-periods listed on a risk adjusted basis. Lastly, Mr. Perry stated the Combined Funds ranked in the second quartile for the quarter and in the first quartile for all other time-periods ending September 30, 2021 in the Trust Universe Comparison Service (TUCS) for all public plans over \$20 billion.

Executive Director's Administrative Report

Mr. Perry referred members to Tab B of the meeting materials for the Executive Director's Administrative Report, which includes the SBI's Administrative Budget for three months ending September 30, 2021. Mr. Perry stated that the legislative auditors continue to work on the SBI's audit and he will report back when finished. He stated that the FY2021 Annual Report will be available shortly after the audit is completed. Meeting dates for the 2022 calendar year were also included in the Administrative Report. Mr. Perry noted the remainder of the Administrative Report has the Iran and Sudan updates and that there was no litigation against the SBI. Lastly, Mr. Perry stated that the SBI may need to seek approval from the Legislature to correct some technical difficulties encountered with a section of the SBI's Investment Salary Plan.

Private Markets Investment Program Report

Mr. Perry referred members to Tab C of the meeting materials for the Private Markets Investment Program Report and asked Mr. Krech to provide a brief summary of the funds recommended for an investment. Mr. Krech stated that staff is recommending investments in the following four funds with existing private market firms: Arsenal Capital Partners VI, Permira VIII, Warburg Pincus Global Growth 14, and Marathon Secured Private Strategies Fund III.

Mr. Goodwin asked how commitment amounts are determined given the dollars available in the unfunded allocation. Mr. Krech answered that staff's objective is to be consistent with the pacing schedule by being disciplined over a period of several years. To fund the private market strategic target of 25% the goal is to avoid concentration in any particular vintage year, make sure there are cash reserves available to take advantage of fundraising opportunities when they arise, and be strategic with recommendations to ensure the program is diversified. Mr. Krech answered

Mr. Stoffel's question regarding the fluctuation with the number of recommended investments each quarter. Staff will identify the fundraising opportunities over the course of the year and beyond. Once Staff has the IAC endorsement and the Board's approval, Staff has more control over the pacing schedule and when to fund the investment.

Mr. Duerst asked how Staff measures the Diversity, Equity and Inclusion (DEI) and Environmental, Social and Governance (ESG) efforts of a private markets firm when considering whether to make an investment with the fund. Mr. Krech and Mr. Blumenshine answered that Staff is still in the early stages of developing the measurement tools when evaluating firms based on ESG and DEI criteria. The time may come when Staff will not bring a recommendation for an investment once metrics have been determined in evaluating a firm's DEI data. Mr. Perry commented that the DEI Task Force he created is focusing on questions like these and others. This will be discussed further later in the meeting.

In response to questions from Ms. Gibbons, Mr. Stacy and Mr. Krech addressed how Staff became comfortable with Arsenal Fund VI given DEI concerns and addressed the timeline between Fund V and Fund VI fundraisings. They commented that Staff met with Arsenal and discussed the lack of diversity within their investment team compared to their peers; and at this time, Staff does not have DEI standards in place by which to disqualify a manager. Regarding Arsenal's two-year deployment turnaround, Staff noted the SBI was a late investor in Fund V and that Fund VI is early in its fundraising efforts. Arsenal will not be able to make an investment on behalf of Fund VI until terms of Fund V have been met.

The Council further discussed the use of the credit facility and potential impact on a Fund's unfunded commitment amount; how total commitment amounts are determined and thoughts on limits in addition to Staff's conviction with a firm given their large asset base; how to create more capacity to more thoroughly evaluate managers on their ESG strategies and DEI approaches; discussion on any impact the disruption in the supply chain has had on private market funds; and other items.

A motion was made that the IAC endorse a commitment with Arsenal Capital Partners VI. The motion was seconded and approved by roll call vote with fourteen Yes votes and one No vote.

A motion was made that the IAC endorse a commitment with Permira Fund VIII. The motion was seconded and approved unanimously by roll call vote.

A motion was made that the IAC endorse a commitment with Warburg Pincus Global Growth 14. The motion was seconded and approved unanimously by roll call vote.

A motion was made that the IAC endorse a commitment with Marathon Secured Private Strategies Fund III. The motion was seconded and approved unanimously by roll call vote.

Public Markets Investment Program Report

Mr. Perry referred members to Tab D of the meeting materials for the Public Markets Investment Program Report. Mr. Perry stated that Mr. Sonderegger would provide an update on the SBI's Small Cap Equity Managers.

Mr. Sonderegger addressed questions the IAC members had from the previous meeting about the active small cap value manager relative underperformance for all time-periods ending June 30, 2021. Mr. Sonderegger noted that Staff is constantly monitoring the program and after thorough review of the managers does not recommend any changes at this time. Mr. Sonderegger noted that the small cap segment shows a tilt to value with a beta of 1.07 or an expected 7% decrease relative to the benchmark when value underperforms. Other factors Mr. Sonderegger noted about the small cap value managers was the diversified pool of assets in the portfolio as the result of having contrarian and deep value managers with quantitative and fundamental investment approaches. Performance did turn around with the small cap value segment reporting positive relative returns for the quarter, one, and ten years ending September 30, 2021.

In response to a question from Mr. Martin, Mr. Sonderegger commented that the small cap allocation went from a 10% allocation to less than 6% as the result of bringing the domestic equity program in-line with the market cap weight of the policy benchmark.

Other Items:

SBI Staff Remote Working Update

In response to a question from Mr. Martin, Mr. Perry informed the IAC that Staff continues to use Zoom and other forms of on-line communication to conduct ongoing due diligence meetings and attend advisory committee meetings. Mr. Sonderegger and Mr. Krech commented on the importance of in-person meetings, but also noted that with the new COVID-19 strains, Staff will continue the policy of not taking in-person meetings or scheduling any business travel until further notice.

Climate Risk Report Update

Mr. Perry asked Mr. Emkin of Meketa to give a brief update on the Climate Risk Project. Mr. Emkin stated that the first draft addresses topics of climate change in the financial markets, regulatory environment, institutional activism, and availability of data and analytical tools. The first draft of the report will be distributed to IAC and Board members before their next meeting.

Diversity, Equity and Inclusion (DEI) Task Force Update

Mr. Perry asked Ms. Gibbons and Mr. Morris to give an update on the DEI Task Force work. Ms. Gibbons and Mr. Morris provided a summary of the goals from the first meeting. The first is to collect the data needed in order to evaluate the amount of DEI in the SBI portfolio. Second, is to understand the DEI work that has been done by staff, IAC members, investment consultants and investment managers. For the next meeting, the goal is to define and understand the SBI's fiduciary obligation and state law when developing policies to help address disparities and inequity in a portfolio the SBI's size. The task force anticipates the investment consultants will help with these tasks in addition to updating language in the SBI's Investment Beliefs. Ms. Gibbons also thanked staff for the excellent work on the ESG Report.

Ms. Comstock, from Aon, commented on guidance recently released by the Department of Labor (DOL) that may help the SBI in updating its Investment Beliefs. She also noted the different questionnaires used in the industry to collect data and how these are evolving to help plan sponsors and investors gather relevant data from their managers.

Consultant Update at Next IAC Meeting

Mr. Perry stated that for the next IAC meeting, he will be asking the SBI consultants to each provide their perspective on the portfolio by highlighting the items the SBI has done well and offer suggestions for improvement.

Acknowledgement/Recognition

Mr. Stoffel congratulated Mr. Perry for the recognition he received as one of the seven finalists of public fund CIO's with assets over \$100 billion for Innovator of Year Award by Chief Investment Officer Magazine. Mr. Stoffel reminded the Council that this magazine awarded Mr. Perry the Lifetime Achievement Award in 2018 and as the result of that award, the Governor Dayton declared the day of the award presentation as Mansco Perry Day.

Mr. Perry offered that Chief Investment Officer Magazine named Meketa's Mr. Emkin, as one of the five finalists for its 2021 Consultant of the Year Award.

Lastly, Mr. Martin congratulated Meketa's Mr. Rue who will retire at the end of December 2021 after nearly 40 years in the industry and thanked him for his service and dedication to the SBI.

Adjournment of Meeting

The motion to adjourn the meeting was seconded and approved by roll call vote. The meeting adjourned at 1:48 p.m.

Respectfully submitted,



Mansco Perry III
Executive Director and
Chief Investment Officer

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TAB A

Quarterly Performance Summary

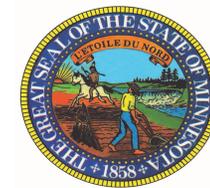
December 31, 2021

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Performance Summary

December 31, 2021



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

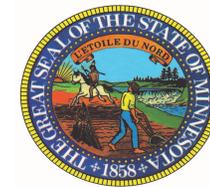
The Participant Directed Investment Program (PDIP) provides investment vehicles for a variety of retirement or other tax-advantaged savings plans. Investment goals among the PDIP's many participants are varied. In order to meet the variety of goals, participants may allocate their investments among one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

Non-Retirement

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.

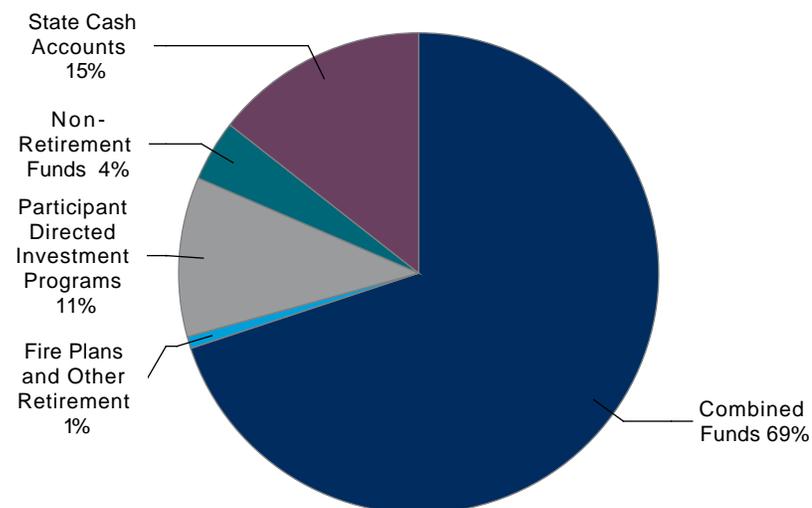
State Cash

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	\$94,134
FIRE PLANS + OTHER RETIREMENT	1,074
PARTICIPANT DIRECTED INVESTMENT PROGRAMS	14,470
State Deferred Compensation Plan	10,069
Health Care Savings Plan	1,747
Unclassified Employees Retirement Plan	409
Hennepin County Supplemental Retirement Plan	196
PERA Defined Contribution Plan	103
Minnesota College Savings Plan	1,920
Minnesota Achieving a Better Life Experience Plan	26
NON-RETIREMENT FUNDS	5,540
Assigned Risk Plan	282
Permanent School Fund	2,057
Environmental Trust Fund	1,759
Closed Landfill Investment Fund	140
Miscellaneous Trust Funds	375
Other Postemployment Benefits Accounts	927
STATE CASH ACCOUNTS	20,515
Invested Treasurer's Cash	20,446
Other State Cash Accounts	69
TOTAL SBI AUM	135,733



Note: Differentials within column amounts may occur due to rounding



Combined Funds Long Term Objectives

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.

	<u>10 Year</u>
COMBINED FUNDS	11.6%
COMBINED FUNDS - COMPOSITE INDEX	11.2
Excess	0.4

Provide Real Return (20 yr.)

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

	<u>20 Year</u>
COMBINED FUNDS	8.6%
CPI-U	2.3
Excess	6.3

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)

	<u>One Quarter</u>
COMBINED FUNDS	
Beginning Market Value	\$89,948
Net Contributions	-675
Investment Return	4,860
Ending Market Value	94,134

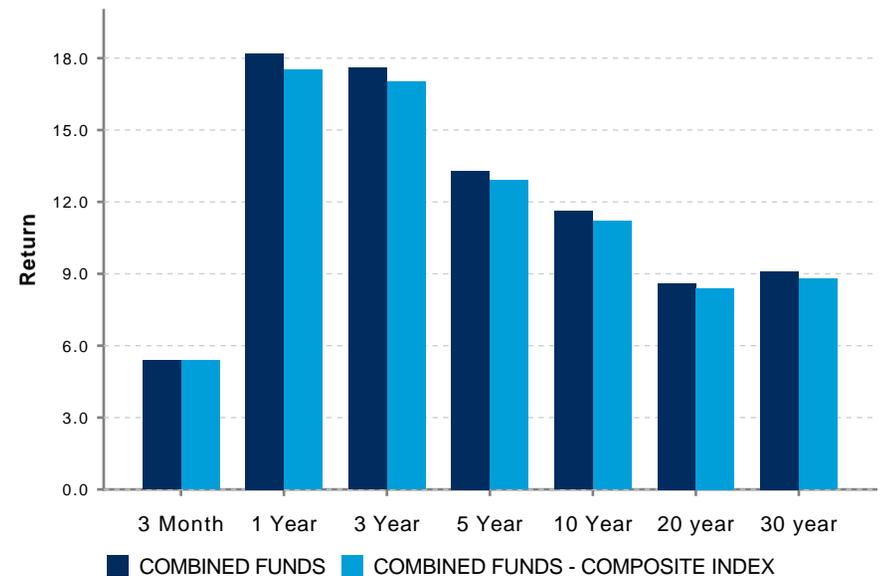
The change in market value of the Combined Funds since the end of last quarter is due to net contributions and investment returns.

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.

	<u>Qtr</u>	<u>FYTD</u>	<u>1 Yr</u>	<u>3 Yr</u>	<u>5 Yr</u>	<u>10 Yr</u>	<u>20 Yr</u>	<u>30 Yr</u>
COMBINED FUNDS	5.4%	6.8%	18.2%	17.6%	13.3%	11.6%	8.6%	9.1%
COMBINED FUNDS - COMPOSITE INDEX	5.4	6.7	17.5	17.0	12.9	11.2	8.4	8.8
Excess	0.0	0.1	0.7	0.6	0.5	0.4	0.2	0.2

Asset Growth



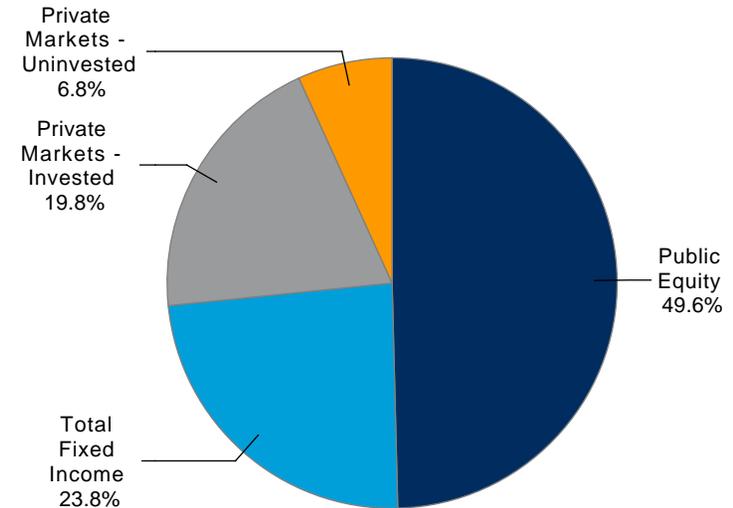


Combined Funds Summary

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.

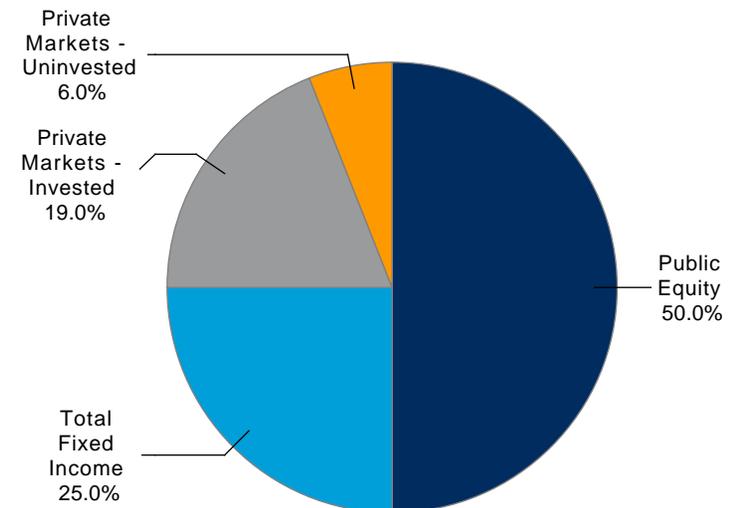
	<u>(Millions)</u>	<u>Actual Mix</u>	<u>Policy Target</u>
Public Equity	\$46,689	49.6%	50.0%
Total Fixed Income	22,391	23.8	25.0
Private Markets - Total	25,053	26.6	25.0
Private Markets - Invested	18,621	19.8	
Private Markets - Uninvested	6,432	6.8	
TOTAL	94,134	100.0	



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	19.0	Private Markets
Private Markets - Uninvested	6.0	S&P 500





Combined Funds Asset Class Performance Summary

Public Equity

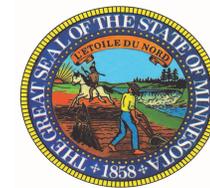
The Combined Funds Public Equity includes Domestic Equity, International Equity and Global Equity.

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

	<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	\$46.7	49.6%	50.0%	6.8%	5.8%	19.9%	22.0%	15.5%	13.9%	8.9%	9.6%
Public Equity Benchmark				6.8	5.7	19.6	21.5	15.1			
Excess				-0.0	0.1	0.4	0.5	0.3			
Domestic Equity	31.6	33.5	33.5	9.1	9.1	25.8	26.0	18.1	16.4	9.6	10.4
Domestic Equity Benchmark				9.3	9.2	25.7	25.7	17.9	16.3	9.7	10.5
Excess				-0.2	-0.1	0.1	0.3	0.2	0.1	-0.1	-0.1
International Equity	14.0	14.8	16.5	2.1	-0.6	9.0	14.1	10.1	7.9	7.1	
International Equity Benchmark				1.8	-1.2	7.8	13.1	9.6	7.3	6.8	
Excess				0.3	0.6	1.2	1.0	0.6	0.7	0.3	
Global Equity	1.2	1.2	0.0	3.3	-1.3	9.6					
MSCI AC WORLD INDEX NET				6.7	5.6	18.5					
Excess				-3.3	-6.8	-8.9					

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	\$22.4	23.8%	25.0%	0.4%	0.5%	-1.6%	6.4%	4.7%	3.9%	4.9%	5.8%
Total Fixed Income Benchmark				0.5	0.6	-2.1	5.8				
Excess				-0.1	-0.1	0.5	0.6				
Core/Core Plus	4.8	5.1	5.0	-0.1	0.1	-1.1	6.0	4.4	3.7	4.8	5.7
Core Bonds Benchmark				0.0	0.1	-1.5	4.8	3.6	2.9	4.3	5.3
Excess				-0.1	0.0	0.5	1.2	0.8	0.9	0.5	0.4
Return Seeking Fixed Income	4.0	4.3	5.0	0.1	-0.0	0.8					
Bloomberg U.S. Aggregate				0.0	0.1	-1.5					
Excess				0.1	-0.1	2.4					
Treasury Protection	9.0	9.6	10.0	1.0	1.2	-3.7	6.2				
Bloomberg Treasury 5+ Year				1.3	1.4	-3.8	6.2				
Excess				-0.2	-0.2	0.1	-0.0				
Laddered Bond + Cash	4.6	4.8	5.0	-0.1	-0.0	0.0	1.0	1.2	0.8	1.6	3.2
ICE BofA US 3-Month Treasury Bill				0.0	0.0	0.0	1.0	1.1	0.6	1.3	2.5
Excess				-0.1	-0.1	-0.0	-0.0	0.0	0.1	0.3	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	6.4%	16.4%	39.1%	16.9%	17.0%	13.9%	13.8%	13.8%	13.1%
Private Markets -Uninvested(1)	11.1	11.7	28.5						
Private Equity	5.9%	16.9%	44.5%	23.8%	22.3%	18.1%	15.7%	15.4%	15.7%
Private Credit	7.3%	13.4%	26.9%	11.8%	13.3%	13.2%	12.6%	12.7%	
Resources	6.5%	13.6%	27.8%	-2.4%	3.2%	2.4%	13.3%	12.6%	12.6%
Real Estate	9.4%	20.6%	29.6%	14.0%	12.7%	12.4%	9.4%	10.5%	8.6%

Private Markets

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

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

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

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

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

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

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

SBI Combined Funds Strategic Allocation Category Framework

	<u>12/31/21</u> <u>(\$ millions)</u>	<u>12/31/21 Weights</u>	<u>Category Ranges</u>	
<u>Growth - Appreciation</u>				
Public Equity	\$ 53,126.77	56.4%		
Private Equity	\$ 13,430.49	14.3%		
Non-Core Real Assets	\$ 3,073.41	3.3%		
	\$ 69,630.67	74.0%	50%	75%
<u>Growth - Income-oriented</u>				
Core Fixed Income	\$ 4,807.48	5.1%		
Private Credit	\$ 1,564.87	1.7%		
Return-Seeking Fixed Income	\$ 4,030.23	4.3%		
	\$ 10,402.58	11.1%	15%	30%
<u>Real Assets</u>				
Core Real Estate		0.0%		
Real Assets	\$ 500.80	0.5%		
	\$ 500.80	0.5%	0%	10%
<u>Inflation Protection</u>				
TIPS		0.0%		
Commodities		0.0%		
		0.0%	0%	10%
<u>Protection</u>				
U.S. Treasuries	\$ 8,994.61	9.6%		
	\$ 8,994.61	9.6%	5%	20%
<u>Liquidity</u>				
Cash	\$ 4,605.03	4.9%		
	\$ 4,605.03	4.9%	0%	5%
<u>Opportunity</u>				
Opportunity		0.0%	0%	10%
Total	\$ 94,133.70	100.0%		
Illiquid Asset Exposure	\$ 18,569.58	19.7%	0%	30%

Volatility Equivalent Benchmark Comparison

Periods Ending 12/31/2021

		As of December 31, 2021							
		<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		18.2%	17.6%	13.3%	11.6%	8.4%	8.6%	8.6%	9.1%
Volatility Equivalent Benchmark Return				10.5%	8.5%	6.2%	6.8%	6.8%	7.3%
Value Added				2.9%	3.1%	2.3%	1.8%	1.8%	1.8%
Standard Deviation: Benchmark = Combined Funds				9.3%	8.1%	9.8%	9.3%	9.8%	9.3%
Benchmark Stock Weight				62%	61%	59%	60%	62%	62%
Benchmark Bond Weight				38%	39%	41%	40%	38%	38%

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



Combined Funds Summary

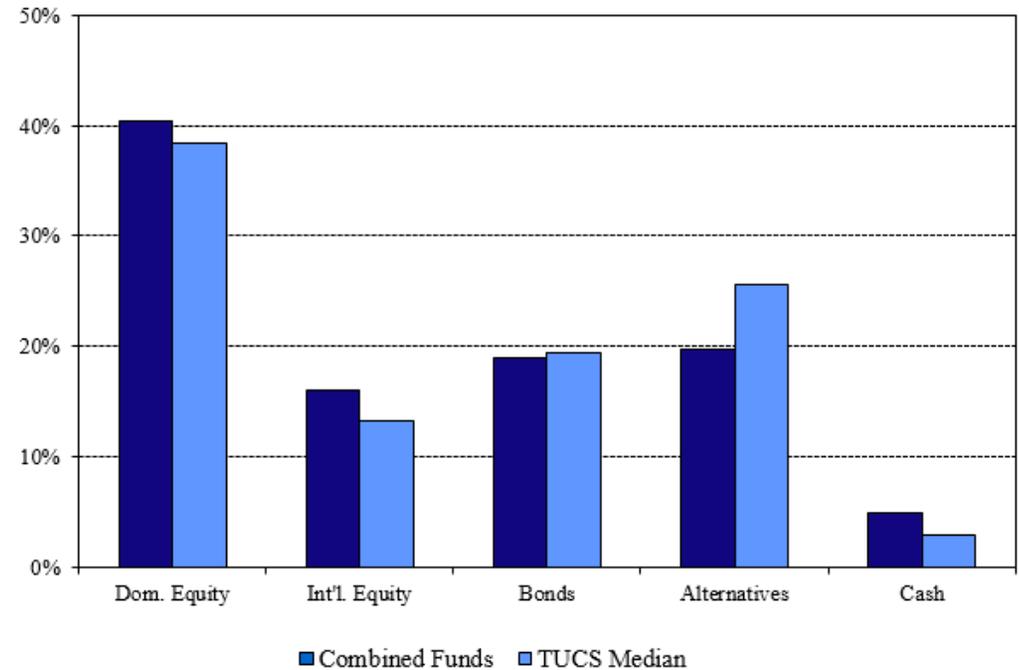
Asset Mix Compared to Other Pension Funds

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

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

Combined Funds Asset Mix

	<u>(\$Millions)</u>	<u>Actual Mix</u>
Public Equity	46,689	49.6
Total Fixed Income	22,391	23.8
Private Markets - Invested	18,621	19.8
Private Markets - Uninvested	6,432	6.8
TOTAL	94,134	100.0



	<u>Domestic Equity</u>	<u>International Equity</u>	<u>Bonds</u>	<u>Alternatives</u>	<u>Cash</u>
Combined Funds	40.4%	16.1%	18.9%	19.8%	4.8%
Median in TUCS	38.4%	13.2%	19.4%	25.1%	2.9%



Combined Funds Summary

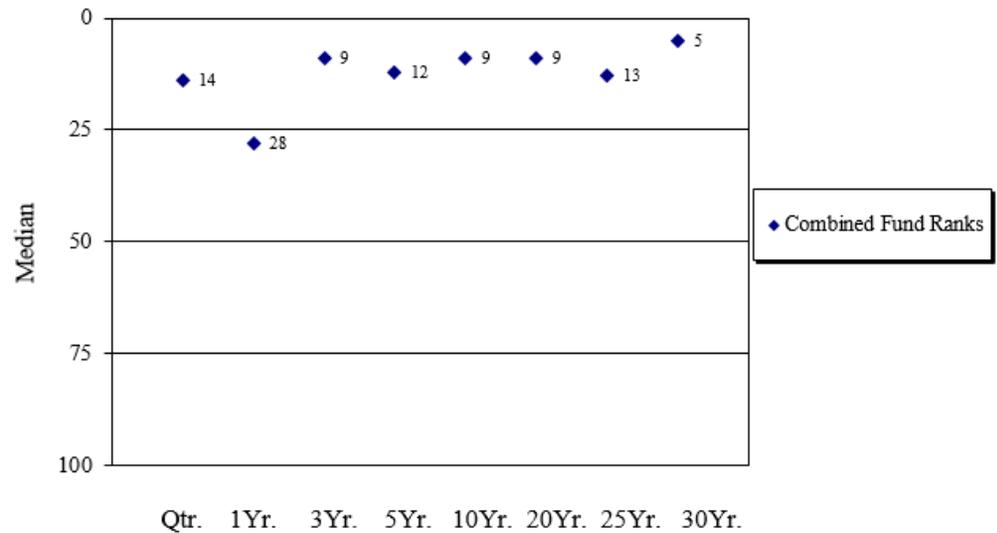
Performance Compared to Other Pension Funds

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.

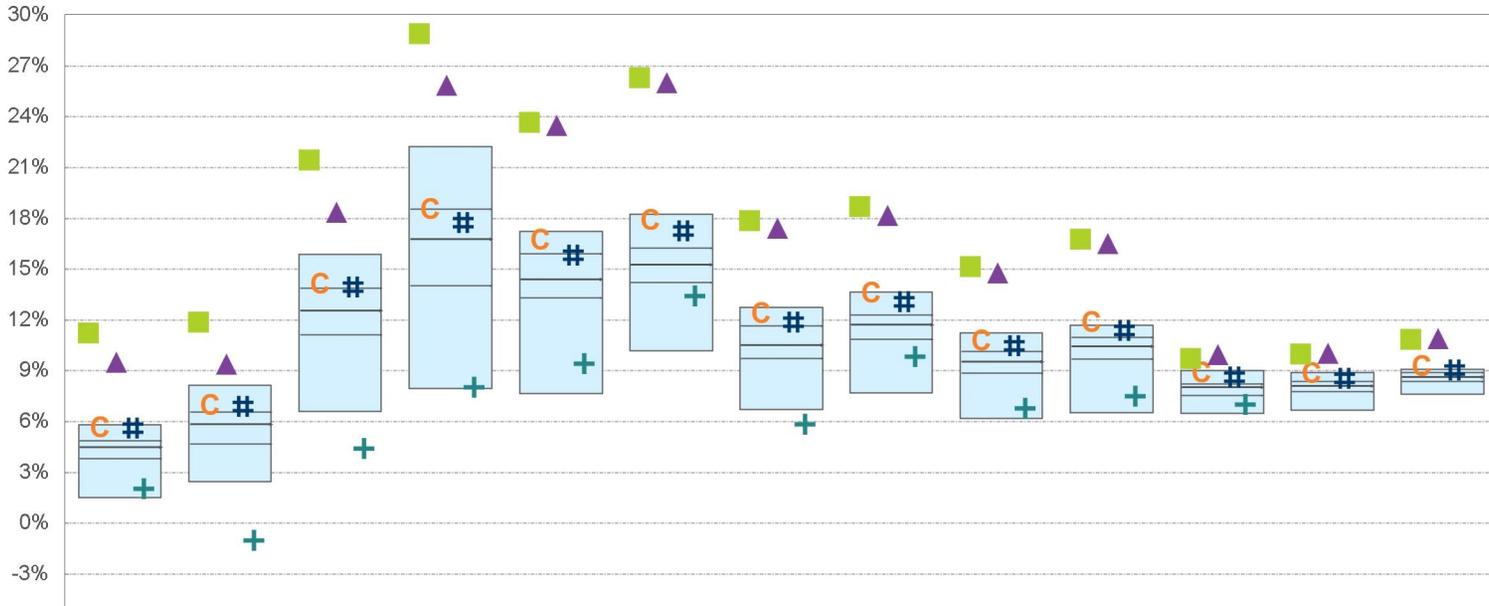


Periods Ended 12/31/2021

	Qtr	1 Yr	3 Yrs	5 Yrs	10 Yrs	20 Yrs	25 Yrs	30 Yrs
Combined Funds	14th	28th	9th	12th	9th	9th	13th	5th
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, 2021*



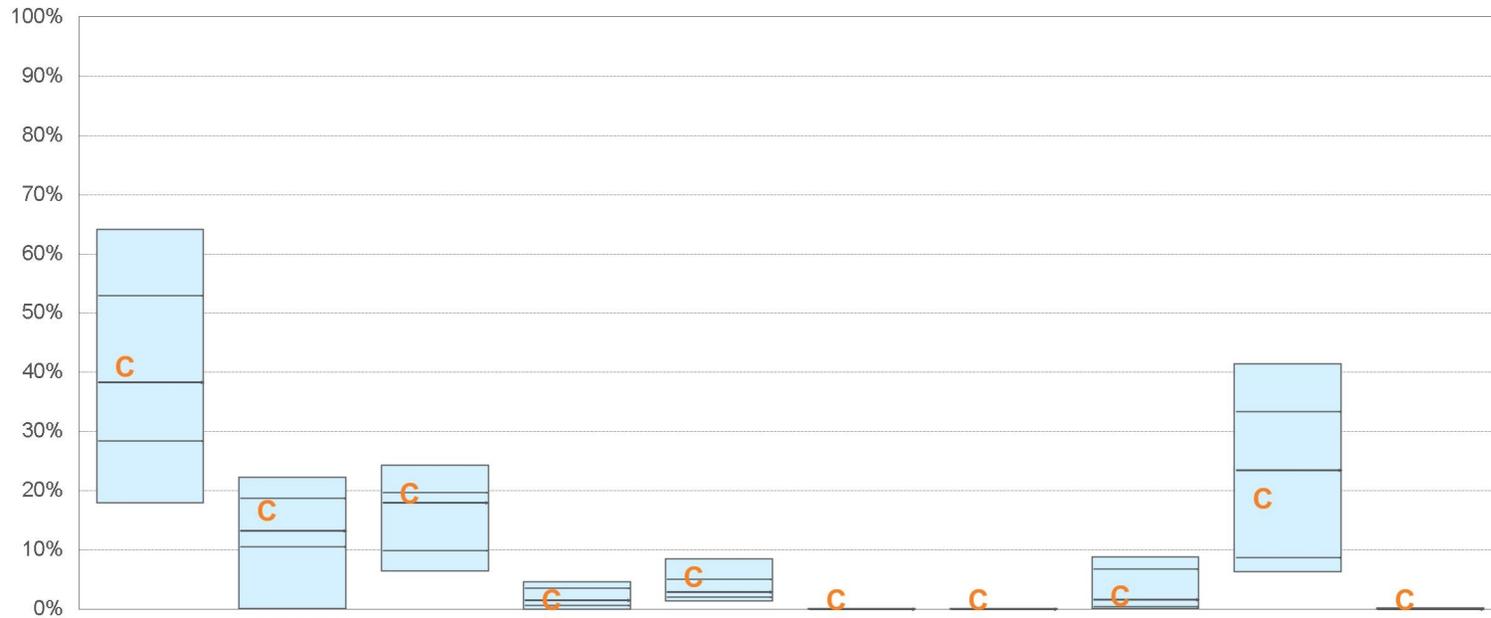
Percentile Rankings	1 Qtr	2 Qtrs	3 Qtrs	1 Year	2 Years	3 Years	4 Years	5 Years	7 Years	10 Years	20 Years	25 Years	30 Years
5th	5.83	8.15	15.88	22.24	17.21	18.24	12.74	13.64	11.24	11.70	9.01	8.92	9.08
25th	4.87	6.58	13.88	18.54	15.90	16.25	11.64	12.28	10.15	10.97	8.24	8.39	8.92
50th	4.48	5.85	12.54	16.79	14.40	15.27	10.54	11.72	9.55	10.45	8.05	8.10	8.64
75th	3.81	4.69	11.14	14.02	13.32	14.20	9.74	10.85	8.88	9.68	7.53	7.78	8.36
95th	1.53	2.46	6.61	7.97	7.67	10.19	6.71	7.70	6.20	6.54	6.49	6.69	7.63

No. Of Obs	34	34	34	34	34	32	32	32	32	32	29	25	19
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C Combined Funds	5.46 (14)	6.81 (22)	13.96 (22)	18.34 (28)	16.54 (14)	17.73 (9)	12.22 (15)	13.44 (12)	10.61 (15)	11.69 (9)	8.72 (9)	8.67 (13)	9.08 (5)
# SBI Combined Funds Ind	5.41 (14)	6.68 (22)	13.71 (31)	17.54 (34)	15.60 (25)	17.04 (9)	11.67 (18)	12.87 (18)	10.27 (21)	11.18 (18)	8.41 (18)	8.32 (25)	8.83 (25)
■ S&P 500	11.02 (1)	11.67 (1)	21.21 (1)	28.70 (1)	23.44 (1)	26.07 (1)	17.65 (1)	18.47 (1)	14.93 (1)	16.55 (1)	9.52 (1)	9.76 (1)	10.65 (1)
+ MSCI World Ex US (N)	1.81 (93)	-1.23 (99)	4.18 (99)	7.82 (96)	9.22 (93)	13.18 (78)	5.61 (99)	9.61 (81)	6.55 (92)	7.28 (92)	6.80 (87)		
▲ Russell 3000	9.26 (1)	9.15 (1)	18.14 (1)	25.64 (1)	23.24 (1)	25.78 (1)	17.18 (1)	17.96 (1)	14.55 (1)	16.30 (1)	9.72 (1)	9.80 (1)	10.69 (1)

Minnesota State Board of Investments Asset Allocation of Master Trusts - Public : Plans > \$20 Billion

Quarter Ending December 31, 2021



Percentile Rankings	US Equity	Non-US Equity	US Fixed	Non-US Fixed	Cash	Convertible	GIC GAC	Real Estate	Alternative Investments	Other
5th	64.15	22.31	24.30	4.60	8.45	0.08	0.14	8.84	41.40	0.20
25th	52.92	18.68	19.72	3.52	5.03	0.00	0.00	6.77	33.41	0.08
50th	38.37	13.20	17.95	1.48	2.86	0.00	0.00	1.65	23.44	0.00
75th	28.37	10.59	9.90	0.64	2.01	0.00	0.00	0.41	8.76	0.00
95th	18.00	0.16	6.42	0.00	1.35	0.00	0.00	0.12	6.38	0.00
C Combined Funds	40.37 (45)	16.06 (40)	18.94 (30)	0.00 (100)	4.84 (30)	0.00 (100)	0.00 (100)	1.65 (50)	18.13 (55)	0.00 (99)

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TAB B

Executive Director's Administrative Report

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EXECUTIVE DIRECTOR'S ADMINISTRATIVE REPORT

DATE: February 7, 2022

TO: Members, State Board of Investment

FROM: Mansco Perry III
Executive Director and Chief Investment Officer

1. Reports on Budget and Travel

A report on the SBI's administrative budget for the fiscal year to date through December 31, 2021, is included as **Attachment A**.

2. FY21 Audit Report

The Legislative Auditor letter to the financial audit of the State Board of Investment financial operations for Fiscal Year 2021 is included as **Attachment B**. The Office of the Legislative Auditor (OLA) had no written findings or recommendations for the SBI.

3. Draft of the FY21 Annual Report

The Fiscal Year 2021 Annual Report was distributed January 2022.

4. Sudan Update

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

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

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

- at least 50% shall be sold within nine months after the company appeared on the scrutinized list; and
- 100% shall be sold within fifteen months after the company appeared on the list. In the fourth quarter, there was nine eight restricted companies on the SBI divestment list, and 720,790 shares were sold due to the restriction.

On December 17, 2021, staff sent a letter to each applicable external manager (international equity, domestic equity and global equity) containing the most recent restricted list and the list of stocks to be divested in compliance with Minnesota law.

6. Iran Update

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

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

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

- at least 50% shall be sold within nine months after the company appeared on the scrutinized list; and
- 100% within fifteen months after the company appeared on the scrutinized list.

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

On December 17, 2021, staff sent a letter to each applicable external manager (international equity, domestic equity, global equity and fixed income) containing the most recent restricted list and the list of companies to be divested in compliance with Minnesota law.

7. Litigation Update

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

ATTACHMENT A

**STATE BOARD OF INVESTMENT
FISCAL YEAR 2022 ADMINISTRATIVE BUDGET REPORT
FISCAL YEAR TO DATE THROUGH DECEMBER 31, 2021**

ITEM	FISCAL YEAR 2022 BUDGET	FISCAL YEAR 2022 12/31/2021
PERSONNEL SERVICES		
FULL TIME EMPLOYEES	\$ 6,735,800	\$ 2,759,884
PART TIME EMPLOYEES	0	0
MISCELLANEOUS PAYROLL	350,000	13,344
SUBTOTAL	\$ 7,085,800	\$ 2,773,228
STATE OPERATIONS		
RENTS & LEASES	285,000	163,562
REPAIRS/ALTERATIONS/MAINTENANCE	21,000	9,003
PRINTING & BINDING	12,000	971
PROFESSIONAL/TECHNICAL SERVICES	250,000	14,482
COMPUTER SYSTEMS SERVICES	169,000	104,223
COMMUNICATIONS	25,000	7,721
TRAVEL, IN-STATE	3,000	14
TRAVEL, OUT-STATE	235,000	0
SUPPLIES	50,000	8,150
EQUIPMENT	25,000	12,677
EMPLOYEE DEVELOPMENT	150,000	93,060
OTHER OPERATING COSTS	125,000	67,201
INDIRECT COSTS	300,000	50,287
SUBTOTAL	\$ 1,650,000	\$ 531,352
TOTAL ADMINISTRATIVE BUDGET	\$ 8,735,800	\$ 3,304,580

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ATTACHMENT B



OFFICE OF THE LEGISLATIVE AUDITOR

STATE OF MINNESOTA • Judy Randall, Legislative Auditor

December 22, 2021

Mr. Mansco Perry III, Executive Director and Chief Investment Officer
Minnesota State Board of Investment
60 Empire Drive, Suite 355
Saint Paul, MN 55103

Dear Mr. Perry:

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, 2021. 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 17, 2021, we issued an unqualified (clean) opinion on the State of Minnesota's *Annual Comprehensive Financial Report* for the fiscal year ended June 30, 2021. 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, 2021, 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 State Board of Investment throughout our audit process.

Sincerely,

A handwritten signature in cursive script that reads "Tracy Gebhard".

Tracy Gebhard, CPA
Audit Director

cc: Paul Anderson, Director, Financial Services and Operations

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TAB C

Report from Record Currency Management

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DATE: February 7, 2022

TO: Members, Investment Advisory Council

FROM: SBI Staff

SUBJECT: Manager Presentation from Record Currency Management

At the upcoming IAC meeting on February 14, 2022, Leslie Hill, CEO of Record Currency Management, will present a brief update on the Currency Overlay strategy the firm manages for the Combined Funds. Ms. Hill will review the program strategy, performance and current scope of the hedging program. In addition, Ms. Hill will outline potential next steps to extend the program to the remainder of the SBI's non-dollar equity exposures. A copy of Ms. Hill's presentation appears after **page 14** of this tab.

Background

The Board authorized the implementation of a currency overlay program for the Combined Funds as part of its May 2020 Resolution Concerning the Management of the Combined Funds Asset Allocation and Liquidity. The scope of the authorization called for the currency overlay program to be used primarily as a risk management tool for purposes of hedging the SBI's non-dollar equity exposure. Staff's recommendation to hire Record Currency Management ("Record") was approved by Board at its August 2020 meeting and Record commenced managing the strategy in October 2020.

Implementation Phases

Staff outlined a phased implementation approach in its initial recommendation. A copy of the initial recommendation appears in **Attachment A on Page 3**.

Phase One, which called for a focus on applying a currency overlay to the Combined Fund's passive developed markets portfolio, is fully implemented.

Phase Two called for the extension of the currency overlay program beyond the developed markets passive manager to include the portfolio's remaining non-dollar equity exposures. Staff is currently working with Record to develop an implementation plan for Phase Two with expected rollout later in FY2022.

Phase Three would expand the currency overlay program to introduce the potential for cross-currency hedging strategies and would enable Record to express active total return views. Staff has not yet begun evaluation of Phase Three.

Staff is satisfied with the currency overlay program's results since inception with respect to Phase One and plans to proceed with a measured adoption of Phase Two over the remainder of FY2022.

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ATTACHMENT A

DATE: August 10, 2020

TO: Members, Investment Advisory Council

FROM: SBI Staff

SUBJECT: Currency Overlay Program and Manager Recommendation

Staff believes that the currency exposure embedded in the Combined Funds international investments is a material source of short- to intermediate-term risk which can and should be actively managed. Staff believes that a dynamic, tactical approach to currency management can result in a reduction in equity portfolio volatility and has the potential to add value to the portfolio relative to an unhedged benchmark.

To support the goal of implementing an effective currency management strategy, Staff has spent considerable time evaluating currency overlay strategies. After initial discussions with several prospective investment managers, Staff issued a Request for Information (RFI) and performed additional diligence on an industry-leading manager specializing in the design and implementation of currency overlay programs for institutional clients; a manager with whom the SBI had a successful experience managing a currency overlay program from 1995-1999. Staff has included in the **Appendix on page 6** a recommendation to hire a currency manager to implement and manage a currency overlay strategy for the SBI portfolio.

Background

The Combined Funds portfolio has material exposure to foreign currency risk, primarily via the portfolio's international equities allocation. As seen in Figure 1 below, as of June 30, 2020 the portfolio's exposure to international equities totaled nearly \$13.9 billion, or 19.5% of the Total Combined Funds portfolio.

Figure 1. Combined Fund International Equity Exposure as of 6/30/20

Strategy	Market Value (\$MM)	% of Combined Funds
Domestic Equity	\$28,486	40.1%
International Equity	\$13,865	19.5%
Private Markets	\$11,105	15.6%
Fixed Income and Cash	\$17,598	24.8%
Total Portfolio	\$71,053	100.0%

The asset class target for the international equity program is currently a blend of 75% MSCI World ex USA Net Index and 25% MSCI Emerging Markets Net Index. Importantly, both indexes are

unhedged and reported in U.S. dollar terms. An unhedged benchmark reflects the full impact of changes in the foreign exchange value of the dollar vis-à-vis the foreign currencies in which the index's foreign equity holdings are denominated. In contrast, a fully- or partially-hedged benchmark seeks to neutralize all or a portion of the impact of currency translation on returns, with the remaining return reflecting only the performance of the underlying equities.

Figure 2 below shows the results of a historical risk decomposition of the Combined Funds portfolio allocation using the portfolio's strategic asset allocation targets as of March 31, 2020. Over the period from June 1999 to March 2020, currency was the third largest contributor to portfolio risk after domestic equity and foreign underlying (local market) equity, contributing over 70 basis points of annual return volatility, or 7.2% of total portfolio risk.

Figure 2. Historical Risk Decomposition of the Combined Funds Asset Allocation*

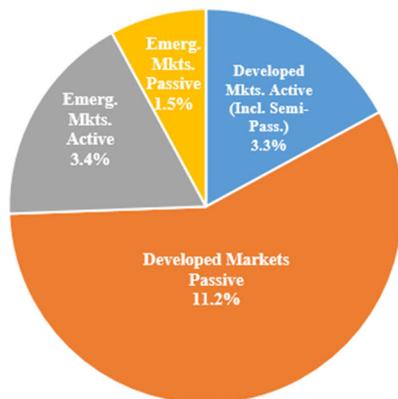
Portfolio Volatility Attribution (June 1999 - March 2020)			
Asset class	Strategic allocation	Contrib. to portfolio volatility	
		Absolute terms per annum	% of total
Domestic Equity	42.1%		63.8%
Foreign Equity	20.7%	2.7%	27.6%
Local Equity			
Currency Exposure		0.7%	7.2%
Private Markets, Fixed Income and Cash	37.2%	0.1%	1.4%
Total	100.0%	9.7%	100.0%

**Assumes static policy weights as of 3/31/20. Volatility based on asset class benchmarks and/or proxy return series. Source: Record Currency Management*

SBI began investing internationally in 1992 and at the outset established that the SBI's international equity portfolio be judged against an unhedged benchmark. This decision was based on analysis of the expected diversification benefits from an allocation to unhedged international equities on a total fund basis. This decision has been reaffirmed periodically over time by Staff and the IAC/Board. After the most recent review, Staff notes that an unhedged policy benchmark remains most appropriate for the SBI's asset class target for international equities.

The SBI's current active international equity managers have the authority to hedge currencies opportunistically/tactically when they believe it will add value or protect from loss relative to their benchmark. The developed markets (DM) international passive portfolio and emerging markets (EM) passive portfolios, however, remain unhedged at all times. Over time, as the result of a purposeful shift away from active management in favor of passive management, the passive component of the international equity program has grown and now represents 65.3% of the overall international portfolio. As a result, nearly two-thirds of the SBI's currency exposure is currently unmanaged.

Combined Funds International Equity Exposure by Strategy as of 6/30/20



Strategy	Market Value (SMM)	% of Int'l Equities	% of Combined Funds
Developed Markets Active (Incl. Semi-Pass.)	\$2,369	17.1%	3.3%
Developed Markets Passive	\$7,949	57.3%	11.2%
Emerging Markets Active	\$2,448	17.7%	3.4%
Emerging Markets Passive	\$1,098	7.9%	1.5%
Total International Equity	\$13,865	100.0%	19.5%

Staff believes it is important to acknowledge that:

- 1) Currencies are volatile and can have significant impacts on the returns of international assets when viewed from the perspective a U.S.-based investor such as the SBI;
- 2) Currently, nearly two-thirds of the SBI's total currency exposure is unmanaged, and;
- 3) Currency risk represents a significant component of the Combined Funds overall risk profile and should be taken into consideration as part of the overall management of the Combined Funds portfolio.

Objectives of a Currency Overlay Program

The primary objective of a currency overlay program is to explicitly manage the currency risk in the SBI's portfolio. In practice, currency overlay services are provided by an investment manager who analyzes the currency risks present in the client's underlying portfolio and determines whether the currency should be hedged and by what percentage. This percentage, ranging from 0% (fully unhedged) to 100% (fully hedged), is referred to as a hedge ratio. Managers determine the desired hedge ratio for each currency in the portfolio subject to the overlay based on either 1) a fundamental valuation approach to determining a currency's "fair value" or "expected value", 2) a systematic approach using observed market price data and a series of rules which define when to initiate/close hedges, or 3) a combination of both.

In terms of implementation, most currency overlay managers utilize a combination of currency spot and forward transactions to construct and manage a portfolio of currency hedges. Managers may also supplement their strategy with currency swaps, futures, and options depending on market conditions. The currency market is the deepest, most liquid and most cost-effective trading market in the world. The world's major currencies trade on an over-the-counter, interbank market that operates on a 24-hour basis. According to the Bank for International Settlements' triennial FX market survey published in April 2019, average daily FX volumes were \$6.6 trillion per day, including nearly \$1 trillion in daily volume in FX forwards.

Staff believes the track record of fundamental approaches to currency valuation and currency management is not compelling. There is no consensus on what drives short-term currency movements and attempts to forecast currency fluctuations over even a medium-term investment horizon relevant for hedging (e.g. 1-2 years) have produced mixed results at best. Meanwhile, systematic approaches that do not rely on forecasting but rather seek to take advantage of certain structural features inherent in the currency markets (ultra-low cost trading, non-collateralized trading, fully customizable sizes and tenors) seem to offer the best opportunity to capture hedging benefit while minimizing opportunity cost of hedging unnecessarily during periods of dollar weakness.

With the currency overlay program, Staff is currently focused on two objectives: 1) introducing currency management in order to actively manage currency risk that is currently unmanaged, and 2) expanding the program to seek to maximize the potential value added from currency management. Staff anticipates implementing the currency overlay in a phased approach to minimize operational risk.

Phase One:

Phase One implementation will focus on applying a currency overlay to the Combined Fund’s passive developed markets portfolio. This portfolio is benchmarked to the MSCI World ex USA Net Index and represents approximately 50% of the total portfolio’s currency risk. As shown in Figure 3 below, approximately 95% of the passive portfolio’s currency exposure can be efficiently hedged using a currency overlay approach.

Figure 1. Benchmark Currency Risk and Hedgeability, MSCI World ex USA Index

MSCI World ex USA Index Currency Risk		
Currency	Weight	Hedgeable ?
Euro	29.2%	Yes
Japanese yen	23.1%	Yes
Pound sterling	12.8%	Yes
Swiss franc	9.4%	Yes
Canadian dollar	9.1%	Yes
Australian dollar	6.1%	Yes
Hong Kong dollar	3.1%	No - USD peg
Swedish krona	2.8%	Yes
Danish krone	2.1%	Yes
Singapore dollar	1.0%	<i>No - below materiality threshold</i>
Israeli shekel	0.6%	
Norwegian krone	0.5%	
New Zealand dollar	0.3%	
Total Hedgeable		94.6%

Source: Record Currency Management, MSCI. Data as of 6/30/20.

The benchmark for Phase One will be the portfolio’s unhedged return from currency. Additionally, the effectiveness of the hedging program will be judged on its contribution to the total protected return (underlying equity + hedge return) of the international equity portfolio. The objectives of the currency overlay in Phase One are to achieve positive value added net of fees

relative to an unhedged benchmark, and to reduce the realized volatility of the international equity program. Staff anticipates establishing a risk budget for the overlay including position/exposure limits, target volatility and maximum drawdown.

Phase Two:

Phase Two will expand the currency overlay program beyond the developed markets passive manager to include the emerging markets passive equity portfolio. While it is anticipated that the opportunities for hedging EM currencies will be less frequent than those for DM currencies, Staff plans to more fully evaluate this option with the assistance of the currency overlay manager, should one be retained. Also as part of Phase Two, Staff is expecting to expand the overlay program to include all or a portion of the active developed markets managers' portfolios. As a precursor to this aspect of Phase Two implementation, Staff plans to review each active DM equity manager's currency management process to determine whether currency management is integral to, or merely a byproduct of, the stock selection process. Staff will then make a judgement as to whether a manager's portfolio should be included or excluded from the overlay program.

Phase Three:

Phase Three would expand the currency overlay program to introduce the potential for cross-currency hedging strategies and would enable the manager to express active total return views on a currency outside of the restrictions of a 0% to 100% hedge ratio (net longs or net shorts would not be limited to exposures present in an underlying equity portfolio). Cross-currency hedging involves expressing a view in the portfolio on a cross-currency pair where the U.S. dollar is not one of the currencies being bought or sold, e.g. EURJPY or EURCHF. Staff will initiate discussions to review the expanded strategies contemplated under Phase Three prior to implementation.

Considerations and Limitations:

A systematic currency overlay tends to perform best in trending markets. Performance may be challenged in sideways, trendless markets. In a period of sustained dollar weakness, the manager may not find sufficient opportunities to justify the costs of the program. In addition, while a systematic approach is designed to effectively vary hedge ratio to capture hedging gains during periods of dollar strength and to minimize hedging during periods of dollar weakness, there is risk that this objective won't be achieved.

There is an explicit cost to run an overlay program based on the notional size of the actively hedged portfolio. In addition, while trading costs are very low for the types of financial instruments used to construct the hedges, there is a cost to transact and this can vary over time. Finally, there are operational and administrative costs involved in managing the program. Overall, Staff believes that the expected benefit from the program outweighs the expected costs.

Appendix: Review of Currency Overlay Manager: Record Currency Management

Organization

Record Currency Management Limited is an industry leading independent currency manager, founded in 1983 in London by Neil Record. Record's parent company, Record plc, is publicly listed on the London Stock Exchange. The firm provides currency management services, including passive hedging, currency overlay and active total return currency management and advisory services to clients worldwide.

Based in Windsor, UK, the firm employs 87 employees, and maintains offices in Windsor, Zurich and New York. As of June 30, 2020, 53% of the share capital in the firm (Record plc) was held by employees of the firm, including 45% held by Board Directors and 8% held by other employees of the firm. The firm's shares have been listed on the main market of the London Stock exchange since its IPO in 2007.

Assets

As of June 30, 2020, Record's total assets under management were US\$63.3 billion, representing over 70 client relationships, including pension funds, foundations and institutions. The firm's pension fund relationships include 11 public plan clients. While Record's client base is global, the majority of the firm's clients are based in three regions: Europe ex-UK, North America, and the United Kingdom.

Team

At the overall firm level, Record Currency Management is led by an Executive Committee consisting of CEO Leslie Hill, CFO Steve Cullen, CIO Bob Noyen, Head of Portfolio Management Dmitri Tikhonov, Ph.D., COO Joel Sleight, Head of Client Team Sally Francis-Cole and Head of Human Resources Kevin Ayles. Founder Neil Record provides strategic leadership to the firm as Chairman of the firm's Board of Directors.

The firm's investment process is overseen by a five-member Investment Committee (IC) chaired by CIO Bob Noyen. The senior members of the IC have worked together for over 20 years, and the committee members average over 30 years of industry experience.

Additionally, the three-person Investment Management Group (IMG), chaired by CIO Bob Noyen, is responsible for day-to-day portfolio management of all portfolios in the Currency Overlay Strategy. This team is supported by one of the largest independent currency specialist research teams in the world. A team of 15 research analysts conducts extensive fundamental and technical analysis across macroeconomic research, quantitative research and investment strategy. An additional 33 professionals provide direct support to the investment process, including trading, risk management, portfolio implementation, legal and operations, reporting and technology support.

Record Currency Management Senior Leadership Team

Name	Responsibility	Years of Investment Experience	Years with Firm	Education
Neil Record	Chairman Member, Investment Committee	43	37	MSc in Economics
Leslie Hill	CEO Member, Investment Committee	41	28	MBA
Bob Noyen*	Chief Investment Officer Chair, Investment Committee	36	21	MBA
Dmitri Tikhonov*	Head of Portfolio Management Member, Investment Committee	18	18	PhD in Mathematical Modelling
Andrey Rumyantsev‡	Head of Investment Strategy Member, Investment Committee	19	14	MBA
Joel Sleight†	Chief Operating Officer	24	24	MSc in Statistics
Shaesta Wahedally†	Deputy Chief Operating Officer	23	23	BSc in Applied Statistics
James Mills†	Head of Portfolio Implementation	21	18	BSc in Mathematics
James Rockall†	Head of Trading	19	16	BSc in Economics
Matt Bushell†	Head of Operations	7	7	MMath in Mathematics
Sandeep Prashar†	Head of Front Office Risk Management	20	13	MSc in Accounting and Finance
Susan Varkey†	Head of Reporting	16	16	BSc in Physics

* Investment Management Group (IMG) member

† Portfolio Management Group (PMG) member

‡ Dual membership - IMG and PMG

Investment Process

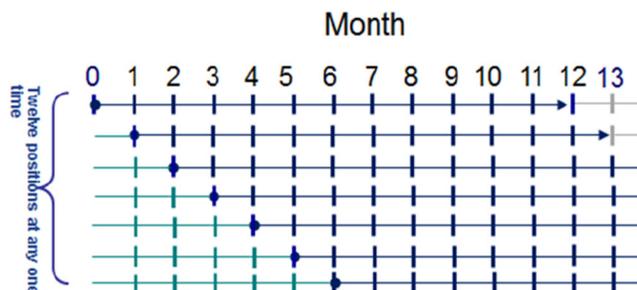
Record's Currency Overlay investment philosophy is underpinned by a belief in a robust, systematically driven investment process. Record's systematic process for Currency Overlay leverages the deep, liquid and ultra-low trading cost market for spot and forward currency transactions to build a matrix of option-like hedges that dynamically respond to changes in prevailing FX spot rates. The process seeks to create a fully dynamic hedge ratio that builds incrementally from 0% to 100% when the dollar is strong (underlying foreign investments are losing value from currency effect), and reduces hedging down to 0% during periods of dollar weakness (foreign investments gaining value from currency effect).

The Currency Overlay strategy is implemented through a number of equally-sized, independently-managed positions for each foreign currency exposure managed. For large exposures, such as the Euro or Japanese yen, there are typically twelve 12-month positions, each initiated and maturing at one-month intervals, as shown in Figure 1.

Each position represents a set of instructions controlling the sale or purchase of forward contracts of a fixed amount and maturity date, and each position is established with a reference protection level which corresponds to a specific protection level relative to the prevailing spot rate. The systematic process opens and closes positions at frequent intervals based on whether or not they

are in the money. A position can either be open (hedge is on) or closed (hedge is off), depending on the prevailing spot rate relative to the protection level.

Figure 1. Position Matrix by Month

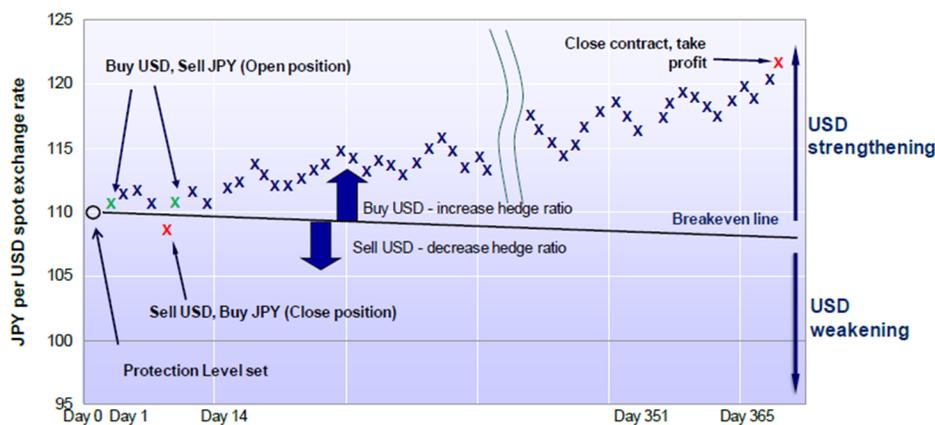


Source: Record Currency

Each established position, therefore is only opened as a forward contract if the dollar strengthens above the protection level. If the dollar subsequently weakens and falls below the protection level, the position is closed and remains closed until the dollar appreciates above the protection level once again. At the end of 12 months, the position is closed out and any net gain/loss realized.

In the case of a strengthening dollar, therefore, in-the-money positions are left on and as the dollar appreciates above additional protection levels, new long dollar hedges are established. In this way, the hedge ratio builds incrementally from 0% to 100%. In the reverse case, a weakening dollar causes positions to be closed out as the dollar weakens (and the foreign currency strengthens) through a series of protection levels, resulting in the hedge ratio falling to zero and thereby avoiding a potential hedging loss. As an example, Figure 2 illustrates a single dollar-yen position in isolation.

Figure 2. Life cycle of a single USDJPY position



Source: Record Currency

Record believes that it is equally important to deliver active risk management and value-generating discretionary intervention alongside the systematic processes. The Firm's Currency Overlay

strategies are closely monitored by Investment Management Group (IMG), who have the discretion to intervene in the systematic process in accordance with client objectives and guidelines. The key role of the IMG is to provide this tactical oversight and conduct portfolio interventions, to determine the appropriate currencies to be managed, to crystallize unrealized gains and to control hedging costs in-line with client's risk budget and hedging goals.

Record takes a thorough, holistic approach to risk management that includes detailed processes across exposure risk management, compliance/operational risk management and counterparty risk management. Portfolio risk management and exposure management is overseen by the Investment Management Group (IMG) and the Portfolio Management Group (PMG) using a series of portfolio monitoring and scenario risk management tools. All portfolio trading is subject to dual-processing workflows which require approval by a secondary, independent portfolio team member. Compliance is monitored on both a pre- and post-trade basis. In terms of counterparty risk management, the firm maintains a rigorous Credit Risk Policy which establishes credit limits for each counterparty and governs management of mark-to-market exposure with each counterparty. All counterparties must be on the firm's Approved Counterparty List, which is governed by the firm's Risk Management Committee (RMC). In order to be included on the firm's approved list, counterparties must generally be highly rated and be party to a netting agreement. Record's RMC also considers a range of risk metrics including credit default swap spreads, regulatory regime, size, standing in a region and government support.

ESG

Record has an established ESG policy and has launched a number of initiatives related to integrating ESG factors into its business and investment process. The firm has been a signatory of the UN PRI since June 2018, and is a member of the group Swiss Sustainable Finance. In May 2018, Record signed-on to the FX Global Code, a set of global principles of good practice in the foreign exchange market, developed to provide a common set of guidelines to promote the integrity and effective functioning of the wholesale foreign exchange market.

With respect to climate, Record promotes Task Force on Climate-related Financial Disclosures (TCFD) principles and has begun some of its core reporting. The firm is committed to developing its strategy, governance and reporting efforts around investment and corporate climate risks. Additionally, the firm is part of a carbon offsetting program and has been certified as carbon neutral since July 2007.

Record has a Board Diversity Policy in addition to an anti-discrimination policy. Record's board is committed to diversity and will endeavor to ensure that minority gender on the board represents at least one-third of the total. The firm is also considering sign-on to the Women in Finance Charter (WIFC), a program committed to creating a more balanced and fair financial services industry by encouraging signatory firms to increase the number of women employed in senior management roles.

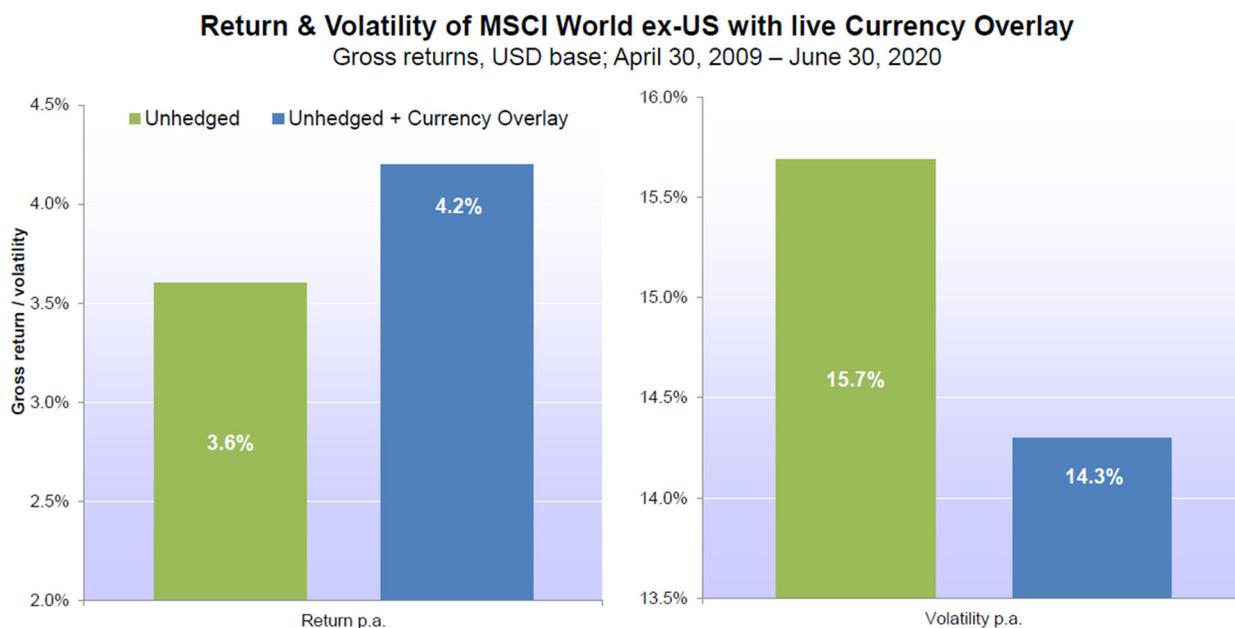
In 2020, the firm launched its FX counterparty active ESG engagement strategy. With this strategy, Record subjects all counterparty banks to a rigorous ESG screening. All institutions are rated for ESG standards using a series of quantitative and qualitative metrics. If a bank fails to

meet the set benchmark, traders will prioritize other banks. The firm then actively engages with institutions to incentivize ESG progress and disclosure.

Performance

Currency overlay is a highly customized and client-specific strategy. Client-specific factors include the amount and distribution of underlying currency exposure in the client’s portfolio, the desired maximum hedge ratio, and the client’s risk budget for cash flows (realized gains and losses) and overall program value-at-risk. Currency overlay programs tend to perform best in trending markets, when trading costs are lowest. In a full implementation scenario, Record’s Currency Overlay strategy seeks to generate 80-100 basis points of annual outperformance relative to the portfolio’s unhedged return over a market cycle including periods of dollar strength, dollar weakness and periods of sideways movement.

Staff reviewed detailed performance results of a large U.S. state pension plan for the 2009-2020 period, as well as the summary performance data from the firm’s GIPS-compliant composite performance data. For the sample U.S. plan Staff reviewed, Record’s Currency Overlay strategy generated \$283 million in cumulative hedging gains (gross of fees) over the life of the account (May 2009 to June 2020) on an average hedgeable asset base over that time of approximately \$4.7 billion (calculated using year-end asset balance).



Source: Record Currency Management. Currency overlay and currency returns calculated based on live performance of a U.S.-based client hedging currency exposure in their international equity portfolio.

Recommendation

Staff recommends hiring Record Currency to help design, implement and manage a Currency Overlay Program within the SBI portfolio. Record is an industry-leading independent currency

manager with strong and stable organization and one of the most highly experienced investment teams focused on currency management in the world. Record's systematic process coupled with disciplined interventions to crystallize gains and control costs has a demonstrated history of adding value relative to an unhedged currency benchmark, including as a component of the SBI's portfolio from 1995-2000. If this recommendation is accepted, Staff would begin the process of negotiating an agreement with Record Currency with the expectation that program design would commence immediately with the goal of implementing the overlay program by the end of 2020.

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Currency Overlay

Adding Value and Reducing Risk Through Managing Currency

Minnesota State Board of Investment
February 2022

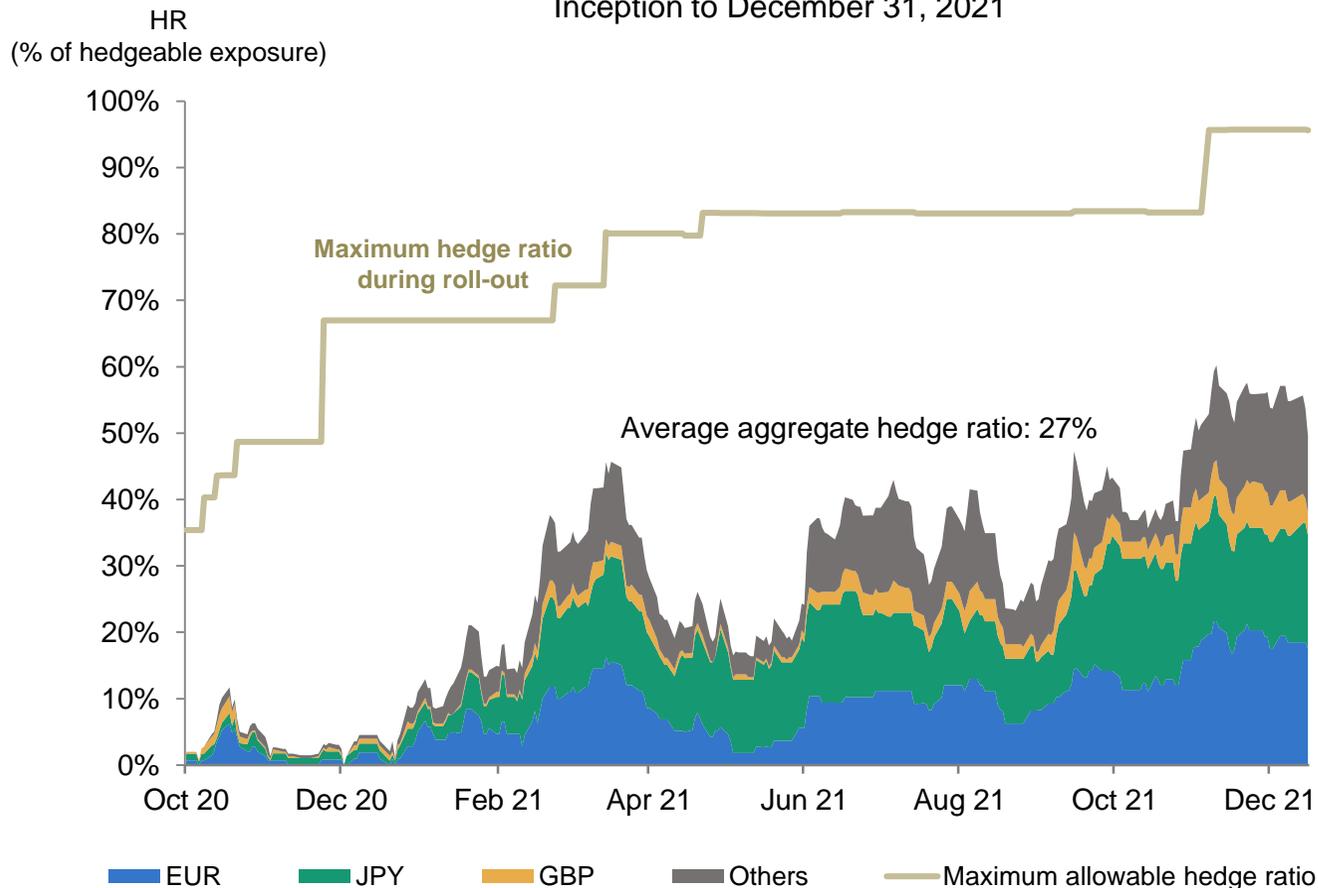
Why Currency Overlay?

- Process has delivered asymmetric returns for decades
- Reliably exploits trends
- Responds to changing market conditions

Note: There is no guarantee that any strategy or technique will lead to superior performance. The nature of hedging with derivatives means that there will be intermittent cash flows, which can be large monetary amounts both positive and negative. The use of derivatives means there is credit risk associated.

Hedge ratio development by currency

Daily portfolio hedge ratios (HR) by currency, weighted
Inception to December 31, 2021



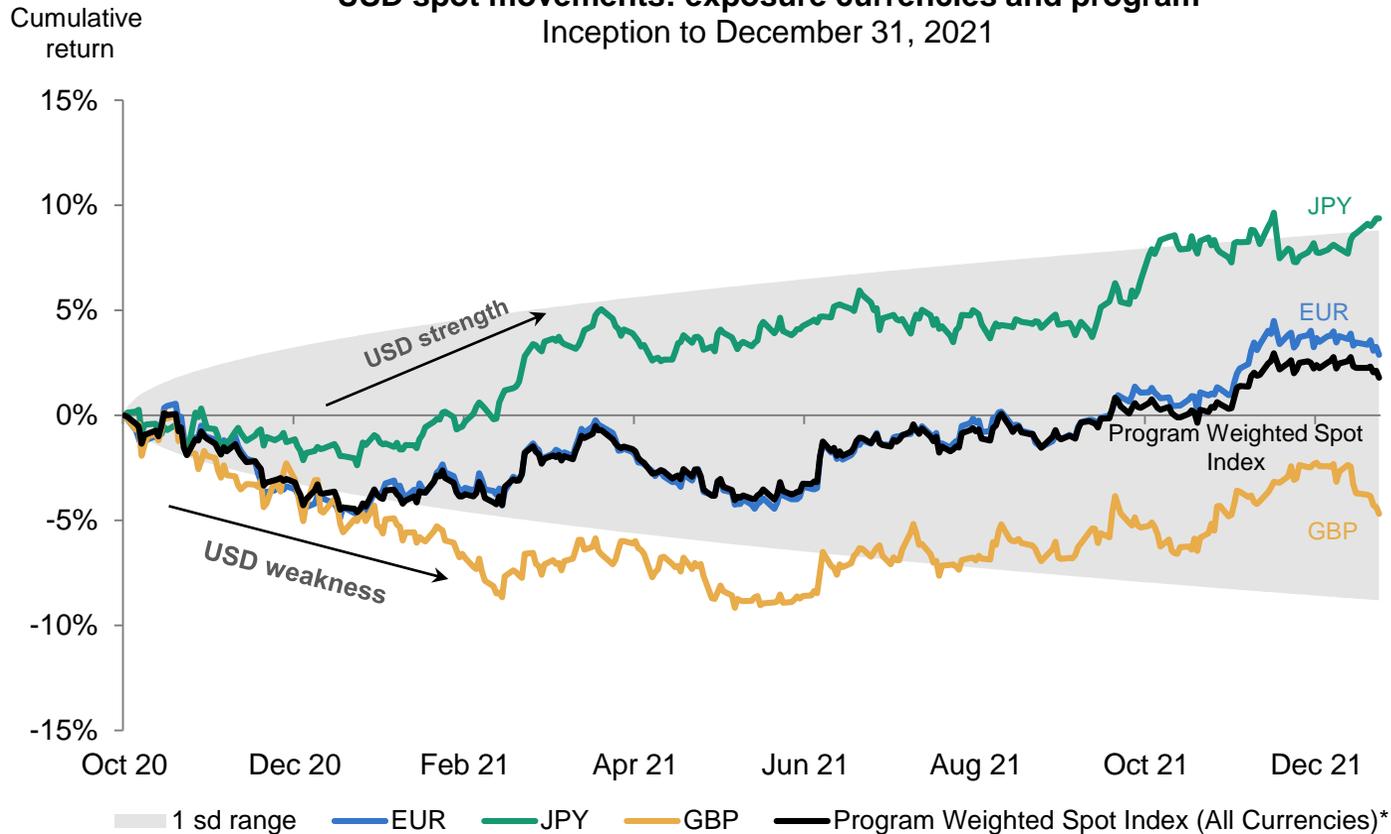
- Gradual roll-out of currencies and maximum HR
- Increasing familiarity for investment & operational teams
- Reflecting US dollar spot path

'Others' include: Canadian dollar, CAD; Swiss franc, CHF; Australian dollar, AUD; Swedish krona, SEK, and Danish krone, DKK as proxied to EUR.

Source: Record. Data as at December 31, 2021. The maximum allowable hedge ratio and the actual hedge ratios presented are weighted by the total currency exposure of the hedgeable currencies. EUR, JPY and GBP hedges were initiated with a max hedge ratio of 50% on October 16, 2020. CAD hedge was initiated with a max hedge ratio of 50% on October 23, 2020. AUD hedge was initiated with a max hedge ratio of 50% on October 28, 2020. CHF hedge was initiated with a max hedge ratio of 50% on November 5, 2020. Max hedge ratio was increased to 67% for all currencies and SEK hedge was initiated with a max hedge ratio of 67% on December 9, 2020 bringing weighted max hedge ratio to 67%. AUD, CHF max hedge ratios were increased to 100% on March 10, 2021 bringing weighted max hedge ratio to 72%. JPY max hedge ratio was increased to 100% on March 30, 2021 bringing weighted max hedge ratio to 80%. CAD max hedge ratio was increased from 67% to 100% on May 7, 2021 bringing weighted max hedge ratio to 83%. EUR, SEK max hedge ratios were increased to 100% on November 22, 2021 bringing weighted max hedge ratio to 96%.

US dollar movements

USD spot movements: exposure currencies and program
Inception to December 31, 2021



Since inception:

- **Muted US dollar** movements
- Program **weighted US dollar spot index stronger by 1.8%*** with USD:
 - **stronger vs Japanese yen and euro**
 - **weaker vs pound sterling and other currencies**

Source: Record, WM/Reuters. As at December 31, 2021. 1 standard deviation range based on assumed FX volatility of 8% p.a.

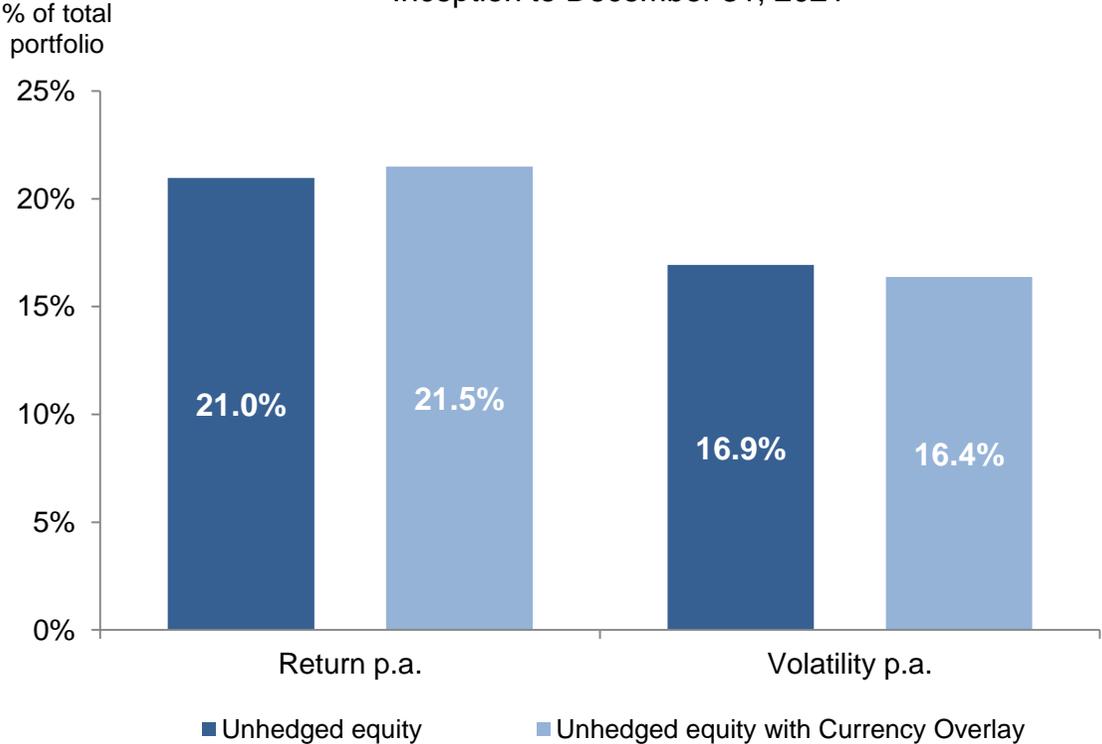
*Program weighted index reflects actual program's currency weights to euro, EUR; Japan, JPY and pound sterling, GBP, Canadian dollar, CAD; Swiss franc, CHF; Australian dollar, AUD; Swedish krona, SEK; and Danish krone, DKK (as proxied with EUR). Currency weights are calculated with reference to the portfolio's hedgeable exposure. The hedgeable exposure represents the currency exposure of the hedgeable currencies as they were included in the hedging program.

Currency Overlay's impact

Currency Overlay:

- Net value added since inception \$31 million*
- Reduced portfolio volatility
- Avoided negative cash flows

Passive International Equity Portfolio
 MSCI World ex US as proxy; Net of fees
 Inception to December 31, 2021



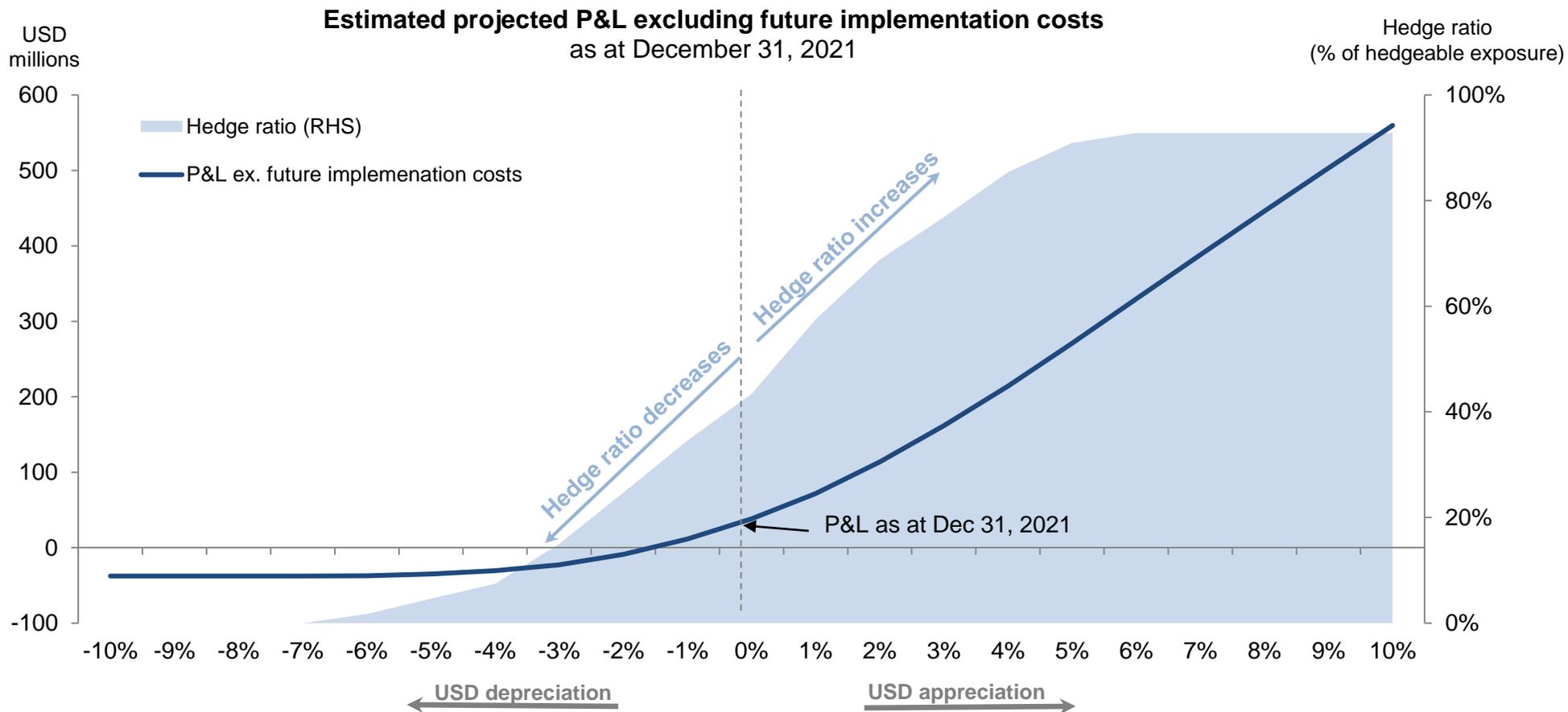
*Inception to December 31, 2021

Source: Record, MSCI. Currency overlay returns are calculated based on the live monthly net performance of the MSBI program scaled based on the total proportion of the MSCI World ex US index included in the hedgeable. Unhedged and passively hedged returns are calculated based on the MSCI World ex US price return indices. Avoidance of negative cash flows relative to a passive hedge with a comparable or higher hedge ratio over the given period.

Note: Past performance is not a guide to the future. The use of derivatives means there is credit risk associated.

Currency Overlay's optionality

Asymmetric P&L projections due to USD movements



Source: Record. Data as at December 31, 2021. This slide is for illustrative purposes only. P&L projections assume all exposure currencies move against the US dollar in the same direction, with the same magnitude, and assume a program structure as of December 31, 2021, with the provision to set additional positions up to the maximum hedge ratio if USD strengthens.

Note: Past performance is not a guide to the future. The use of derivatives means there is credit risk associated. Performance results are presented on a gross basis and do not reflect the deduction of fees and expenses, which will reduce the returns. Performance results showing the effect of agreed fees is available on request.

Potential next steps

Phase 2: Expand Currency Overlay

- DM active / semi-active
- Selectively risk manage EM exposure

Phase 3: Cross-hedging

- Net zero US dollar exposure
- Long vs short foreign currencies
- Value add / tracking error targets

Combined Funds International Equity Exposure*
as at December 31, 2021

Strategy	Market Value (USD, billions)	% of Int'l Equities	Status
DM Passive	7.1	50%	Phase 1 - Implemented
DM active & semi-active **	3.1	22%	Phase 2
EM (inc. China)	3.9	28%	Phase 2
Total Int'l Equity	14.1	100%	

*Record's analysis of actual asset mix and related benchmarks as indicated in Comprehensive Performance report (December 31, 2021)

**DM active + ACWI ex-US + Global

Appendix

About Record Currency Management

1983

Founded 39 years ago

2007

Publicly listed on main market of LSE

79

Employees in Windsor, London, New York & Zurich

89

Clients including pension funds, foundations & institutions*

\$85.3bn AuME*

\$20.9bn AuME for North American clients*

Clients include



Minnesota State Board of Investment



Maryland State Retirement Agency



State Board of Administration of Florida



Sunsuper Pty Ltd.
(Australian Superannuation Fund)



Pensionskasse des Bundes PUBLICA
(Swiss Government Pension Fund)

*AuME data and client numbers are as at December 31, 2021. AuME expresses the total notional exposure of Passive Hedging and Currency for Return products, and the maximum hedgeable exposure of Dynamic Hedging products.

Presenter profile



Leslie Hill – Chief Executive Officer

BA in French, University of London, UK

MBA, University of California at Berkeley, USA

Leslie has responsibility for the overall leadership and direction of the company, as well as engaging directly with clients, consultants and investors.

Leslie sits on Record's Board and Investment Committees. She has 43 years of industry experience having previously worked for Lloyds Bank and Merrill Lynch International. Leslie joined Record in 1992.

Program roll-out

- Inception: October 15, 2020
- Eight hedgeable currencies
- Gradual rollout reflecting currency price movement
- Systematic investment process achieving asymmetric results
- Tactical oversight and portfolio interventions to manage risk and capture market opportunities

Hedgeable currency exposures

% of DM passive portfolio

(as at December 31, 2021)

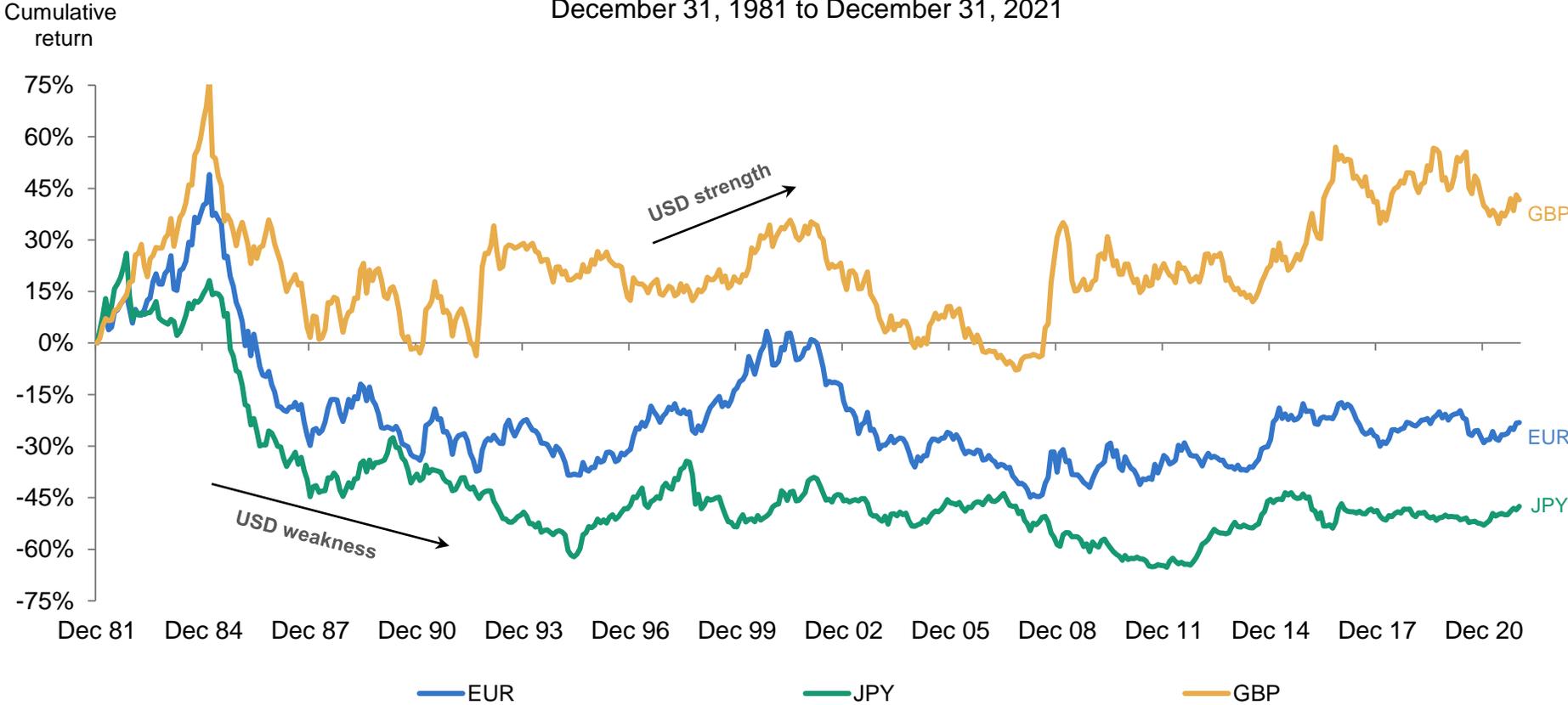
Currency	Weight	USD, billion
Euro (EUR)	29.8%	2.1
Japanese yen (JPY)	20.1%	1.4
Pound sterling (GBP)	12.4%	0.9
Other*	31.7%	2.2
Total hedgeable	94.1%	6.7

Source: MSCI.

*'Other' currencies include: Canadian dollar, CAD (10.4%); Swiss franc, CHF (9.6%); Australian dollar, AUD (6.2%); Swedish krona, SEK (3.1%); and Danish krone, DKK (2.4%) which is proxied with EUR. Currencies not hedged include Hong Kong dollar, HKD, Singapore dollar, SGD; Norwegian krona, NOK; Israeli shekel, ILS— totalling 5.9%.

Longer term perspective: US dollar trends

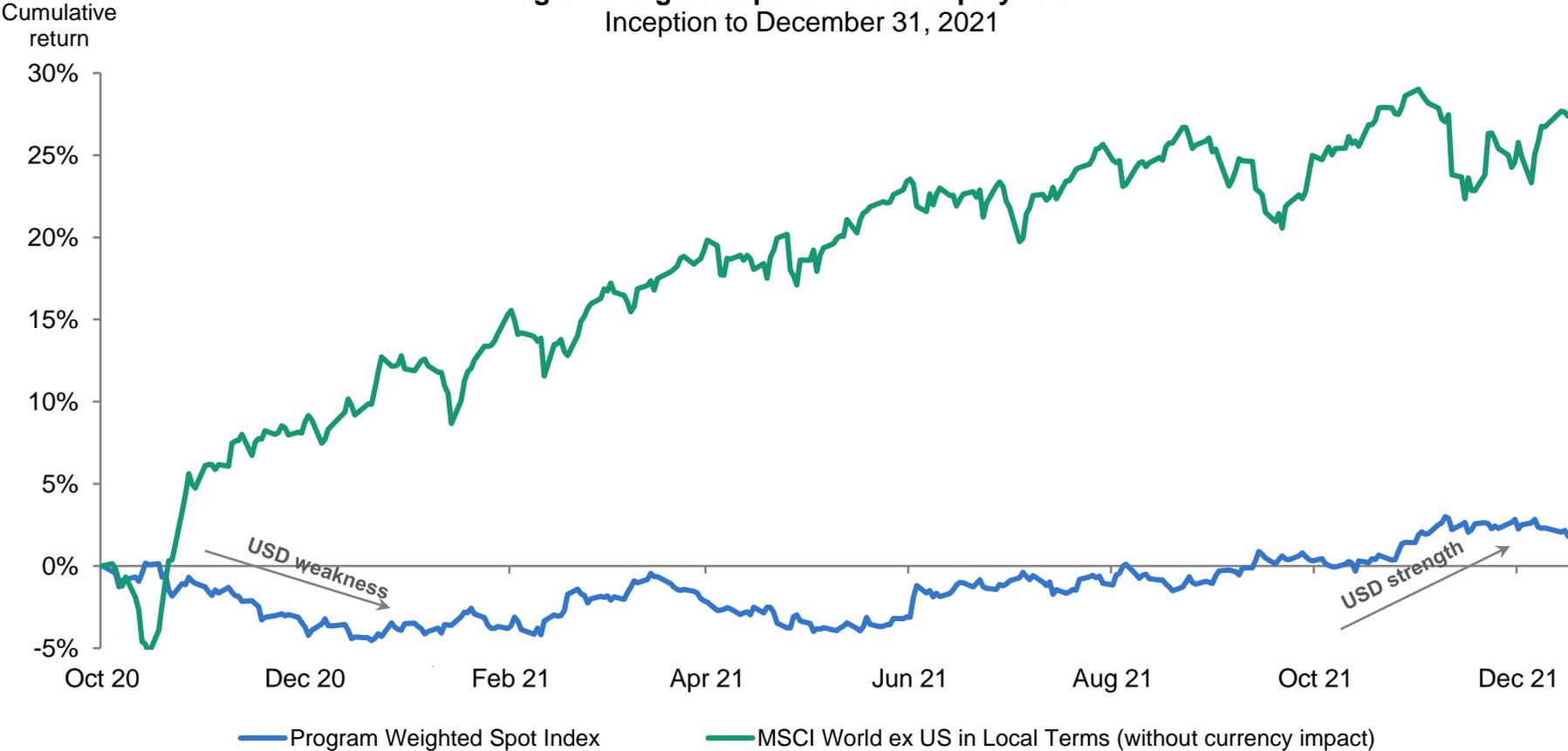
USD spot moves versus exposure currencies
December 31, 1981 to December 31, 2021



Source: Record, WM/Reuters. As at December 31, 2021.

US dollar vs equity movements

Program weighted spot and local equity return
Inception to December 31, 2021

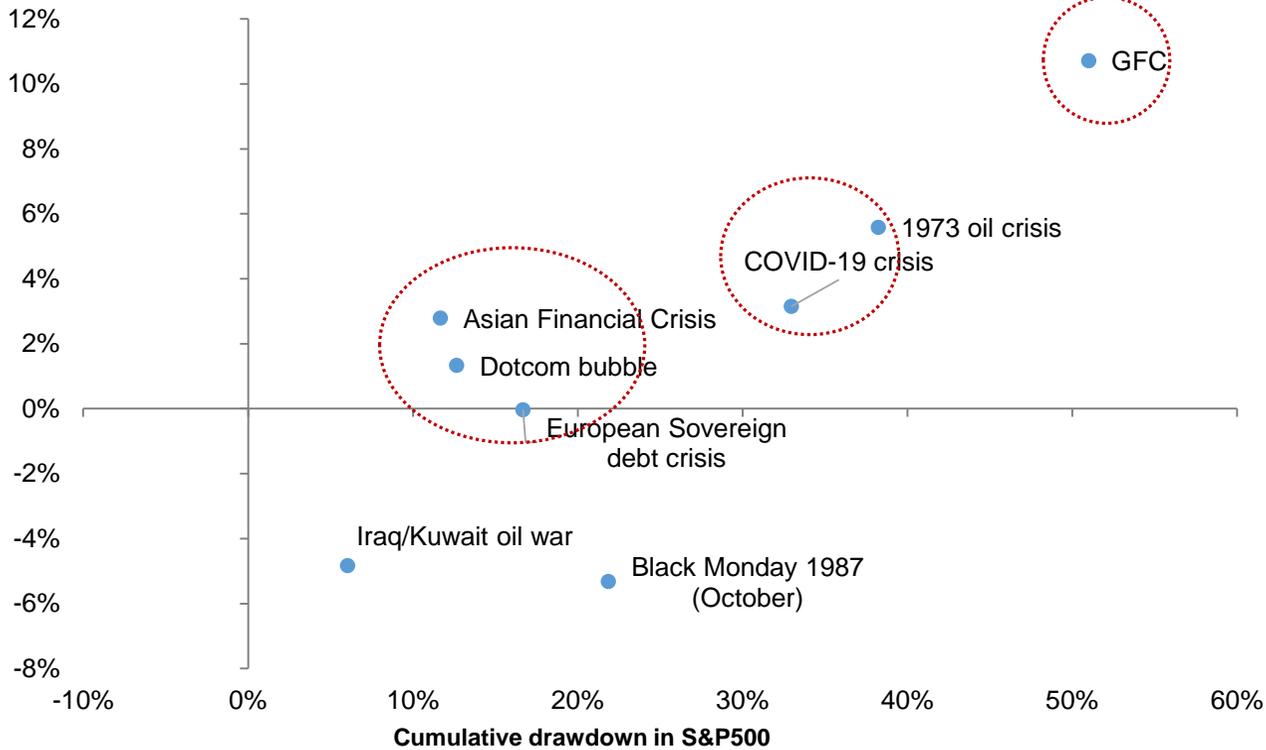


Source: MSCI, WM/Reuters, Record. Data as at December 31, 2021.

USD dollar risk-off properties

Cumulative USD vs
EUR, JPY & GBP

US dollar performance vs EUR, JPY and GBP
During major equity drawdown episodes



US dollar has tended to appreciate during equity drawdown episodes

- More so post-GFC
- Due to dollar's role as funding currency of riskier investments (e.g. EM)

Currency Overlay's impact

Attribution by currency

Cumulative Net Performance (USD, millions)

Inception to December 31, 2021

	Currency (unhedged)	Currency Overlay
EUR	-58.8	15.2
GBP	41.6	-12.3
JPY	-127.9	47.4
Other*	26.9	-19.3
Total	-118.2	31.0

- Currency Overlay provided **protection vs overall currency losses**
- Performance reflective of **average aggregate hedge ratio of 27%** driven by
 - gradual roll out of program
 - US dollar path and volatility
- **Asymmetric results:**
 - **protecting against currency losses** from weakness in Japanese yen and euro
 - **preserving currency gains** from strength in pound sterling and “Other” currencies*

Source: Record. Data as at December 31, 2021.

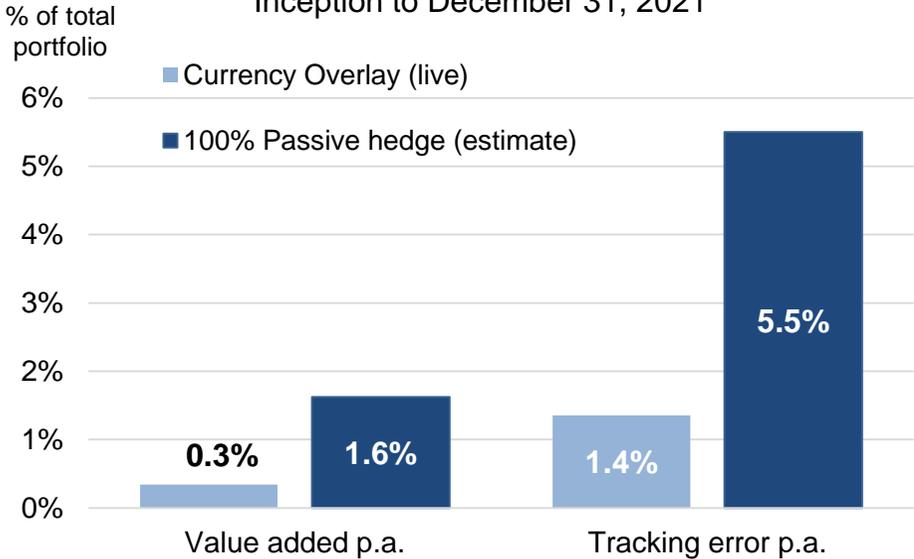
**Other' currencies include: Canadian dollar, CAD; Swiss franc, CHF; Australian dollar, AUD; Swedish krona, SEK, and Danish krone (DKK) as proxied to EUR.

Currency Overlay's impact

Comparison vs 100% Passive hedge

Currency Overlay and 100% Passive Hedging vs unhedged equity

Inception to December 31, 2021



- **Reduced tracking error** vs 100% Passive hedge

Realised (settled) monthly cash flows (CFs)
USD millions; Inception to December 31, 2021

	Currency Overlay (live)	100% Passive hedge (estimate)
Largest positive	14.0	186.2
Largest negative	-3.6	-180.7
Average absolute	1.6	96.4

- **Reduced CF impact** due to Overlay's portfolio structure
- **Asymmetric CFs:** largest negative < 1/3rd of largest positive

Source: Record, MSCI. Currency overlay returns are calculated based on the live monthly net performance of the MSBI program scaled based on the total proportion of the MSCI World ex US index included in the hedgeable. Unhedged and passively hedged returns are calculated based on the MSCI World ex US price return indices.

Short- mid-term market outlook

Country-specific risks

In the next 3-6 months, the COVID-19 pandemic, geopolitical situation, economic policies, commodity prices and inflation are likely the key drivers in currency movements

	US dollar upside considerations	US dollar downside risks
USD	<ul style="list-style-type: none"> Escalating geopolitical situation regarding Russia and Ukraine would be dollar supportive (shorter-term risk) Omicron uncertainty benefiting USD through risk channels ('USD smile') Fed has shifted market attention to quantitative tightening, another proactive step towards normalization, relative to other CBs 	<ul style="list-style-type: none"> Rapid spread of Omicron + high immunity levels from boosters and prior infection has short-lived impact on risk and mobility Fed hiking cycle adequately priced with increasingly limited room for upside surprises as supply chain issues resolve through 2022 US valuations stretched on traditional metrics (i.e. Purchasing Power Parity)
EUR	<ul style="list-style-type: none"> Commonplace vaccine hesitancy could extend euro area's economic recovery trajectory, delaying timeline for monetary policy normalisation Global rate reflation does not translate into higher euro rates due to high ECB ownership of sovereign debt and continued APP accommodation Political uncertainty in Italy could undermine the currency 	<ul style="list-style-type: none"> Scholz's pro-EU stance and expansionist fiscal spending plan could be euro-positive as general bloc political risks tempered Euro undervalued versus USD and market positioning is short, reflecting ECB as a laggard, even after hawkish meeting
JPY	<ul style="list-style-type: none"> Easing concerns over Omicron driving yen to resume weakening trend as risk-sensitive inflows unwind and global yields rise Rising global commodity prices pressure the current account, while Chinese growth slowdown could impact Japanese exports 	<ul style="list-style-type: none"> Lack of inflation & subsequent high relative real yields position yen for strong appreciation should risk appetite sour PM Kishida's caution over COVID-19 combined with sizeable stimulus package could bolster Japanese growth, and strengthen yen
GBP	<ul style="list-style-type: none"> BoE tightens too quickly in response to inflation and pressures growth, inverting yield curve and reducing attractiveness of yields Brexit woes escalate, tarnishing EU-UK relations and bringing heightened currency volatility 	<ul style="list-style-type: none"> UK still ahead in vaccine race (boosters), could see less disruption from Omicron Government's thus far hands-off approach to Omicron and BoE's newfound preference to challenge inflation supports rates

Additional information

This material has been prepared for professional investors.

Accordingly, certain assumptions around your knowledge of market practices, derivative instruments, and associated risks are assumed as understood. When providing advice or making discretionary investment decisions, based on information provided by you, we shall be responsible for assessing the suitability of investments as required by FCA, SEC and CFTC rules as applicable. You shall be responsible for ensuring that information provided to us is kept accurate, complete and up to date so as to enable us to assess the on-going suitability for you.

The views about the methodology, investment strategy and its benefits are those held by Record Currency Management Limited.

All data, unless otherwise stated in the footnote of the relevant page is as at February 2, 2022 and may have changed since. This information has been provided for the information of the recipient only and is not for onward distribution.

Regulated status

Record Currency Management Limited is authorized and regulated by the Financial Conduct Authority in the UK, registered as an Investment Adviser with the Securities and Exchange Commission, registered as a Commodity Trading Adviser with the US Commodity Futures Trading Commission, an Exempt International Adviser with the Ontario and Alberta Securities Commissions in Canada, and registered as exempt with the Australian Securities and Investments Commission.

TAB D

Treasury Protection
Portfolio Duration

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DATE: February 7, 2022

TO: Members, Investment Advisory Council

FROM: SBI Staff

SUBJECT: Recommendation to Reduce Target Duration of Treasury Protection Portfolio and Establish Trigger Levels for Further Adjustments Based on Market Conditions

In light of the rapid rise in inflation and its potential impact on interest rates, Staff believes that a reduction in the target duration of the Treasury Protection Portfolio is warranted in order to reduce the risk of negative returns from a sustained rise in interest rates and the potential for a lower bond-equity correlation benefit.

Further, consistent with the implementation plan outlined in Staff’s August 2020 Response to Resolution Concerning Management of Combined Funds Asset Allocation and Liquidity, Staff is proposing the adoption of an evaluation framework for future changes in the target duration and policy benchmark based on prevailing interest rates in order to maintain the optimal balance between the portfolio’s objectives of principal protection and risk-off hedging benefit during periods of equity drawdown.

To support these proposals, Staff has undertaken an extensive review of the Treasury Protection Portfolio strategy and reviewed a range of policy benchmark options. A draft position paper presenting details of Staff’s analysis appears in **Attachment A on Page 3**.

RECOMMENDATION:

Staff recommends that the IAC endorse adoption of the February 2022 Staff Position Paper which outlines the recommendation to: 1) reduce the target duration of the Treasury Protection Portfolio to 9 years from the current 12 years by adjusting the policy benchmark for the Treasury Protection Portfolio to a blend of 80% Bloomberg U.S. Treasury 5-10 Year Index and 20% Bloomberg U.S. Treasury 10+ Year Index from 100% Bloomberg U.S. Treasury 5+ Year currently; and 2) establish the following trigger levels and recommended subsequent changes to the target duration and policy benchmark based on the prevailing level of interest rates as represented by the yield on the 10-year U.S. Treasury Note:

If 10-Year U.S. Treasury Note Yield Level is:	Adjust Policy Target Duration to:	Change Policy Benchmark to:
3% or Higher	12 years	100% Treasury 5+ Year
Between 1% and 3%	9 years	80% Treasury 5-10 Year 20% Treasury 10+ Year
1% or Lower	7 years	100% Treasury 5-10 Index

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ATTACHMENT A

TREASURY PROTECTION PORTFOLIO

**TARGET DURATION AND
POLICY BENCHMARK FRAMEWORK**

Staff Paper

February 2022

Executive Summary

In light of the recent rapid rise in inflation and its potential impact on interest rates, Staff conducted a review of the appropriate target duration and benchmark for the Treasury Protection Portfolio. Staff reviewed the current policy benchmark and considered several options for reducing the duration of the policy benchmark in order to limit the negative performance impact from a sustained rise in interest rates. Staff used both historical risk and return analysis, historical correlation with equities (risk-off benefit) and a scenario analysis approach to evaluate different target durations and benchmark options.

Staff recommends that the target duration of the Treasury Protection Portfolio be reduced to 9 years from the current level of approximately 12 years. This would be accomplished by shifting the policy benchmark to a blend of 80% Treasury 5-10 Year Index and 20% Treasury 10+ Year Index from the current Treasury 5+ Year Index. Further, Staff recommends the adoption of an evaluation framework for future changes in the target duration and policy benchmark based on prevailing interest rates in order to maintain the optimal balance between the portfolio's objectives of principal protection and risk-off hedging benefit during periods of equity drawdown.

History and Background

The Treasury Protection Portfolio was added to the Combined Funds fixed income allocation in 2017. With a target allocation of 10% of the total Combined Funds portfolio, the Treasury Protection portfolio represented 50% of the portfolio's total allocation to fixed income at that time. Consistent with the goals of liquidity, principal preservation, and capturing the risk-off hedge benefit from longer-maturity Treasuries, Staff had selected the U.S. Treasury 5+ Year Index as the policy benchmark for the Treasury Protection Portfolio. At that time, Staff considered a range of longer- and shorter-duration benchmarks (see **Figure 1**), but ultimately settled on the 5+ Year Index as offering the best balance of hedge benefit, capital efficiency, liquidity and principal preservation.

Figure 1. Policy Benchmarks Considered at Program Inception (2018)

	U.S. Treasury Intermed.	U.S. Treasury	U.S. Gov't	U.S. Treasury 5+ Year	Treasury 10+ Year
Maturity Range	1-10 Years	1-30 Years	1-30 Years	5-30 Years	10-30 Years
Market Sectors	Tsy Only	Tsy Only	Tsy/Agency	Tsy Only	Tsy Only
Duration	3.9	6.2	6.1	10.8	17.3
Yield	1.9%	2.1%	2.1%	2.4%	2.8%
Volatility (1-yr Ann.)	1.9%	3.0%	3.0%	5.6%	7.5%
Index Inception	1/1/1973	1/1/1973	1/1/1973	11/1/1995	1/1/1973
Market Value	\$6.2T	\$7.3T	\$7.7T	\$3.2T	\$1.3T
Issues	213	259	540	103	49
Avg. Ann. Return (1/30/98-10/31/17)	4.1%	4.6%	4.6%	6.0%	7.1%

Source: Bloomberg, Staff calculations

The current policy benchmark (Treasury 5+ Year Index) represents an issuance-weighted combination of all coupon-bearing U.S. Treasury securities with maturities between 5- and 30-years. Because it excludes the 1-5 year maturity segment, the Treasury 5+ Year Index has a longer duration, or interest rate risk, than the broad fixed income market as a whole. In addition, the

current benchmark's emphasis on longer maturities means that its performance is more linked to changes in longer-term interest rates than yield changes at the short-to-intermediate maturity spectrum.

Since the inception of the Treasury Protection Portfolio in February 2018, the strategy has performed in-line with expectations. The overall total return of the strategy has been strong, and the portfolio has produced solid risk-off hedging benefit, both overall in terms of negative co-movement with equities (beta) and strong positive returns during the equity corrections of 4Q2018 and 1Q2020. **Figure 2** shows the performance results of the Treasury Protection Portfolio since inception through 12/31/21 relative to its benchmark as well as the other benchmarks considered at the program's inception.

Figure 2. Program Performance as of 12/31/21

	--- Since Inception 2/1/2018 ---				Beta to S&P 500
	1 Yr	3 Yr	Return	Std Dev	
Treasury Protection Portfolio	-3.7%	6.2%	5.3%	7.6%	-0.13
U.S. Treasury 5+ Year Index (5-30 yr)	-3.8%	6.2%	5.4%	7.7%	-0.13
<i>Comparative Benchmarks</i>					
U.S. Treasury Intermediate (1-10 yr)	-1.7%	3.0%	2.9%	2.4%	-0.06
U.S. Treasury (1-30 yr)	-2.3%	4.1%	3.7%	4.1%	-0.08
U.S. Gov't (1-30 yr)	-2.3%	4.1%	3.7%	4.1%	-0.08
U.S. Treasury 10+ Year (10-30 yr)	-4.6%	8.8%	7.1%	12.2%	-0.19
U.S. Aggregate (1-30 yr)	-1.5%	4.8%	4.0%	3.3%	0.01

Source: State Street, Bloomberg, Staff calculations

While returns have exceeded expectations, the strategy's longer duration profile (currently ~12 years) makes it highly sensitive to changes in interest rates (see **Figure 3**). Therefore, the strategy's observed performance volatility since inception is materially higher than broad market benchmarks like the U.S. Aggregate Bond Index or the broad U.S. Treasury Index, both of which have a significant allocation to shorter securities with maturities from one- to five years. However, Staff believes that one of the key benefits of longer duration indexes such as the Treasury 5+ Year Index is the greater expected risk-off correlation benefit vis-à-vis equities during periods of equity drawdown. On balance, the longer duration profile provides a greater price sensitivity to changes in interest rates, as declining interest rates typically coincide with a risk-off event such as a recession or other negative economic shock. Of course, the sensitivity works both ways: a sharp, sustained rise in interest rates would generate greater losses for a longer-duration strategy relative to a strategy with a shorter duration profile.

Figure 3. Selected Benchmark Characteristics as of 12/31/21

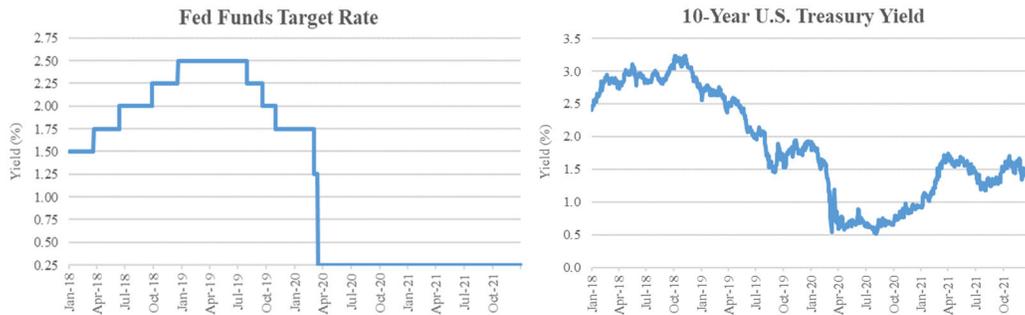
	Eff Dur	Yield	Cnvx	Market Value Distribution				Duration Distribution				Beta to S&P 500
				2Y	5Y	10Y	30Y	2Y	5Y	10Y	30Y	
Treasury Protection Portfolio	11.8	1.7%	2.13	0.0%	28.4%	43.4%	28.2%	0.1	2.1	4.5	5.1	-
U.S. Treasury 5+ Year Index (5-30 yr)	12.0	1.6%	2.16	0.0%	33.5%	38.0%	28.4%	0.1	2.1	4.5	5.2	-0.16
<i>Comparative Benchmarks</i>												
U.S. Treasury Intermediate (1-10 yr)	4.0	1.1%	0.23	47.0%	41.0%	12.0%	0.0%	1.1	2.0	1.0	0.0	-0.06
U.S. Treasury (1-30 yr)	7.0	1.2%	1.05	35.0%	32.0%	21.0%	12.0%	0.9	1.7	2.1	2.4	-0.09
U.S. Gov't (1-30 yr)	6.9	1.2%	1.02	36.0%	31.0%	20.5%	12.5%	0.9	1.6	2.1	2.3	-0.09
U.S. Treasury 10+ Year (10-30 yr)	18.1	1.9%	4.07	0.0%	0.0%	37.5%	62.5%	0.1	0.5	6.3	11.2	-0.25
U.S. Aggregate (1-30 yr)	6.6	1.7%	0.35	25.6%	17.9%	15.7%	40.9%	0.8	1.5	2.4	2.0	0.00

Beta to S&P 500 calculated using monthly returns for 10 years ended 12/31/21. Source: State Street, Bloomberg, Staff calculations

Current Environment

Since the inception of the Treasury Protection strategy in early 2018 through the end of 2020, interest rates declined significantly. The drop in interest rates was precipitated first by fears of a global economic slowdown in early 2019 and was accelerated by the COVID-19 pandemic in early 2020. By March 2020, interest rates had fallen to record lows, driven lower by the pandemic shutdown and expectations for a deep and protracted global recession. Aggressive easing by the Fed, including cutting its policy rate to zero and re-initiating bond purchases (quantitative easing), helped to keep rates low throughout 2020. **Figure 4** shows the path of the Fed’s overnight policy rate and the yield on the 10-year U.S. Treasury since 2018.

Figure 4. Fed Funds and 10-Yr Treasury Yields 2018-2021



Source: Federal Reserve, Bloomberg

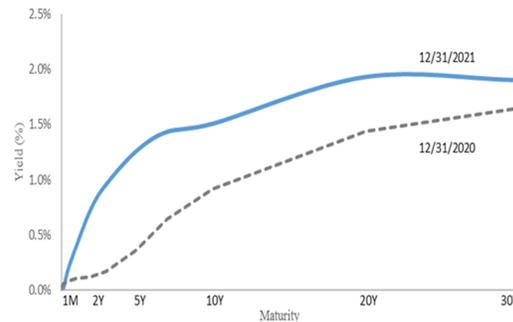
While the economic recession induced by the pandemic was indeed deep (real GDP declined by over -31% annualized in Q2 2020), it was also short-lived. Adjustment to a work-from-home economy, massive monetary and fiscal policy stimulus, and the development and eventual rollout of vaccines all helped speed the recovery in the U.S. economy. By early 2021, the economy was growing at a 6% annualized pace and unemployment had fallen to 6% from a pandemic high of nearly 15%.

More recently, the dramatic and unexpected rebound in consumer demand and economic activity has strained fragile supply chains and produced a spike in inflation (see **Figure 5**). Faster growth and inflation, coupled with significant improvement in the labor market (both hiring and wage growth) throughout 2021, have pushed the Fed to pivot to a more hawkish policy stance and consider rapidly unwinding its support for the economy to avoid overheating.

Figure 5. U.S. Consumer Price Index (CPI)



Figure 6. U.S. Treasury Yield Curve 2020-2021



Source: U.S. Bureau of Labor Statistics, Bloomberg

As a result of the Fed’s policy shift, and in anticipation of a sustained tightening cycle, interest rates have risen sharply across the yield curve (see **Figure 6**). The market currently expects a “Fed liftoff” in March 2022, with Fed Funds reaching 0.875% by end-2022, 1.5% by end-2023 with a terminal Fed Funds rate for this cycle of around 2% (see **Figure 7**). Despite these moves, inflation remains highly elevated and real interest rates (nominal interest rates less inflation) remain substantially negative. Accordingly, the expected real return on bonds going forward remains low/negative. Although most market participants – and the Fed – expect inflation to decline quickly from current levels, there is a risk that higher inflation may prove more permanent. Despite this risk, current prices imply that longer-term inflation expectations, while having risen to be in-line with long-run averages, currently reflect confidence that the Fed will be able to bring inflation down to its target level over time (see **Figure 8**).

Figure 7. Market-Implied Fed Funds Path

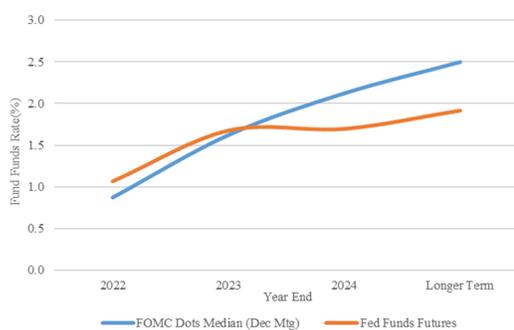


Figure 8. Market-Implied Inflation Expectations



Source: Federal Reserve, Bloomberg

In addition to the risk of a sustained rise in interest rates beyond what is implied by current market pricing, there is also the risk that such a rise in interest rates would put downward pressure on valuations for risk assets, including equities. Some market participants believe that record-low interest rates and waves of policy stimulus have been a significant driver of equity valuations and that, as policy stimulus is removed and interest rates rise, bonds and equities could move lower in tandem. The potential for this scenario could seriously undermine the expected risk-off correlation benefit of the Treasury Protection Portfolio. **With these emerging risks posing some downside potential to the return-to-risk profile for Treasuries over the intermediate term, the current environment argues for reducing the duration profile of the Treasury Protection Portfolio.**

Benchmark Index Review

To determine the appropriate new target duration profile and policy benchmark for the Treasury Protection Portfolio, Staff reviewed a range of possible benchmarks with the following objectives:

1. Reduce duration to lessen tail risk of significant principal loss vs. current policy benchmark
2. Maintain risk-off hedge benefit (negative beta to equities)
3. Minimize reduction in long-term return expectations

With these objectives in mind, Staff evaluated a range of possible benchmarks including standard published benchmarks as well as customized blended benchmarks. In terms of blended benchmarks, Staff focused on blends of the 5-10 Year and 10-30 Year (also called 10+ Year)

segments in order to more specifically calibrate overall benchmark duration and to focus exposures on the intermediate and long-end of the maturity spectrum for maximum risk-off hedge benefit and capital efficiency. Staff assessed statistics including duration, yield, and maturity and duration distribution. Staff also reviewed the historical risk-return profile of each benchmark, including each benchmark’s equity beta and performance during 28 equity drawdown periods between January 1990 and October 2021. Finally, to augment the historical return analysis, Staff also constructed a scenario analysis framework to assess the potential performance of the policy benchmarks under consideration across several interest rate environments.

Historical Risk-Return Analysis

A summary of the key statistics for the current policy benchmark and a broad range of comparative benchmarks is shown in **Figure 9**. The benchmarks highlighted with a bold box reflect the benchmarks which staff actively considered for the updated policy benchmark.

Figure 9. Selected Treasury Benchmarks - Characteristics as of 12/31/21

	Eff Dur	Yield	Cnvx	Market Value Distribution				Duration Distribution			
				2Y	5Y	10Y	30Y	2Y	5Y	10Y	30Y
Treasury 5+ Year	12.0	1.6%	2.2	0.0%	33.5%	38.0%	28.4%	0.1	2.1	4.5	5.2
<i>Benchmark Segments</i>											
Tsy 1-5 Year	2.8	0.9%	0.10	72.0%	28.0%	0.0%	0.0%	1.5	1.2	0.0	0.0
Tsy 5-10 Year	6.7	1.4%	0.52	0.0%	61.5%	38.5%	0.0%	0.1	3.6	3.1	0.0
Tsy 10+ Year	18.1	1.9%	4.07	0.0%	0.0%	37.5%	62.5%	0.1	0.5	6.3	11.2
<i>Blended Benchmarks</i>											
90% Tsy 5-10 Yr / 10% Tsy 10+ Yr	7.9	1.4%	0.88	0.0%	55.4%	38.4%	6.3%	0.1	3.2	3.4	1.1
80% Tsy 5-10 Yr / 20% Tsy 10+ Yr	9.0	1.5%	1.23	0.0%	49.2%	38.3%	12.5%	0.1	2.9	3.7	2.2
55% Tsy 5-10 Yr / 45% Tsy 10+ Yr	11.8	1.6%	2.12	0.0%	33.8%	38.1%	28.1%	0.1	2.2	4.5	5.1
30% Tsy 5-10 Yr / 70% Tsy 10+ Yr	14.7	1.7%	3.01	0.0%	18.5%	37.8%	43.8%	0.1	1.4	5.3	7.9
<i>Standard Benchmarks</i>											
U.S. Treasury Intermediate	4.0	1.1%	0.23	47.0%	41.0%	12.0%	0.0%	1.1	2.0	1.0	0.0
U.S. Treasury	7.0	1.2%	1.05	35.0%	32.0%	21.0%	12.0%	0.9	1.7	2.1	2.4

Source: Factset, Bloomberg, Staff calculations

Figure 10 highlights the historical return and risk profile of the Treasury 5+ Year Index and other comparative benchmarks. Again, the four benchmark options which Staff actively considered for the updated policy benchmark are highlighted with a bold box. As seen in **Figure 10**, the blended benchmark of 80% Tsy 5-10 Year and 20% Tsy 10+ Year (“80-20 Index”) exhibited the strongest negative beta to the S&P 500 over the last 10 years (-0.13) of the options considered.

In addition, over the 28 S&P 500 drawdown periods analyzed between 1989 and 2021, the median gain of the 80/20 Index was nearly +2.6% versus the median S&P 500 decline of -10.4%. While the 80/20 Index also posted the highest total return (+2.9% annualized), it did so with the highest volatility (+5.5% annualized), stemming from the index’s longer duration profile (~9.0 years) and emphasis on longer maturities. In contrast, the U.S. Treasury Index provided less negative co-movement with the S&P 500 over the last 10 years (beta -0.09), a lower median gain of +2.1% during the equity drawdown periods analyzed and also generated the lowest total return (+2.1%).

Figure 10. Selected Benchmarks – Historical Performance as of 12/31/21

	10-yr Annualized Ending 12/31/21		Beta to S&P 500	Perf. During S&P 500 Drawdowns 1990-2021	
	Return	Std Dev		Median Return	Median Capture
Treasury 5+ Year	3.2%	6.8%	-0.16	3.2%	-0.30x
<i>Benchmark Segments</i>					
Tsy 1-5 Year	1.3%	1.4%	-0.04	1.0%	-0.10x
Tsy 5-10 Year	2.5%	4.3%	-0.10	2.5%	-0.24x
Tsy 10+ Year	4.5%	11.0%	-0.25	4.6%	-0.44x
<i>Blended Benchmarks</i>					
90% Tsy 5-10 Yr / 10% Tsy 10+ Yr	2.7%	4.9%	-0.12	2.4%	-0.23x
80% Tsy 5-10 Yr / 20% Tsy 10+ Yr	2.9%	5.5%	-0.13	2.6%	-0.25x
55% Tsy 5-10 Yr / 45% Tsy 10+ Yr	3.5%	7.2%	-0.17	3.4%	-0.33x
30% Tsy 5-10 Yr / 70% Tsy 10+ Yr	4.0%	8.9%	-0.21	3.9%	-0.38x
<i>Standard Benchmarks</i>					
U.S. Treasury Intermediate	1.7%	2.2%	-0.06	1.7%	-0.16x
U.S. Treasury	2.1%	3.6%	-0.09	2.1%	-0.20x

Source: Bloomberg, Staff calculations

Scenario Analysis

To augment the historical return analysis, Staff constructed a scenario analysis framework to assess the potential performance of the policy benchmarks under consideration across several interest rate environments. Staff solicited input from several external investment managers to assist with the construction and validation of scenarios for the evolution of the economy and interest rates over the next 12-24 months (see Appendix for a summary of the scenario inputs). Staff applied these scenarios – labeled Bull, Base, and Bear – across a range of indexes to identify differences in the potential return outcomes. **Figure 11** shows scenario analysis results that highlight the cumulative return profile over a 24-month horizon for the current policy benchmark and other comparative benchmarks.

Figure 11. Scenario Analysis Results

	Eff Dur	Yield	Cnvx	Scenario Return (2-Yr Cum)		
				Bull	Base	Bear
Treasury 5+ Year	12.0	1.6%	2.2	17.2%	-3.0%	-19.2%
<i>Benchmark Segments</i>						
Tsy 1-5 Year	2.8	0.9%	0.10	3.6%	0.8%	-1.1%
Tsy 5-10 Year	6.7	1.4%	0.52	9.8%	-0.7%	-8.3%
Tsy 10+ Year	18.1	1.9%	4.07	26.2%	-5.8%	-32.2%
<i>Blended Benchmarks</i>						
90% Tsy 5-10 Yr / 10% Tsy 10+ Yr	7.9	1.4%	0.88	11.4%	-1.2%	-10.7%
80% Tsy 5-10 Yr / 20% Tsy 10+ Yr	9.0	1.5%	1.23	13.1%	-1.7%	-13.1%
55% Tsy 5-10 Yr / 45% Tsy 10+ Yr	11.8	1.6%	2.12	17.1%	-3.0%	-19.1%
30% Tsy 5-10 Yr / 70% Tsy 10+ Yr	14.7	1.7%	3.01	21.2%	-4.2%	-25.0%
<i>Standard Benchmarks</i>						
U.S. Treasury Intermediate	4.0	1.1%	0.23	5.7%	0.4%	-3.5%
U.S. Treasury	7.0	1.2%	1.05	10.0%	-0.9%	-9.6%

Index characteristics as of 12/31/21. Source: Factset, Bloomberg, Staff calculations

As seen in **Figure 11**, the Base case calls for muted returns across all benchmarks, consistent with a steady but measured rise in interest rates over the analysis period. The Bull case reflects a recession-type scenario, with longer duration benchmarks like the current policy benchmark and the even longer duration 10+ Year Index producing the strongest outperformance as rates decline across the curve in that scenario. The Bear case highlights the risk of a material rise in interest rates caused by faster than expected growth and inflation. Notably, the longest-duration

benchmarks produce significantly negative returns in the Bear case: the current policy benchmark shows a decline of over -19%, while the 10+ Year Index shows a cumulative decline of over -32%. Truncating this tail risk scenario is a key objective of reducing the policy benchmark duration. Staff noted that each of the four highlighted benchmarks satisfy the objective of limiting downside risk while providing a balanced return profile across the Bull-Base-Bear scenarios.

Overall, Staff believes that while several of the benchmarks considered meet the objectives outlined, the blended benchmark of a blend of 80% Treasury 5-10 Year Index and 20% Treasury 10+ Year Index (representing a target duration of ~9.0 years) presents the optimal balance between reducing downside performance in a rising interest rate environment while also maintaining an effective expected risk-off hedge benefit in equity drawdowns.

Establishing Trigger Levels for Further Adjustments

Staff believes that the target duration of the policy benchmark for the Treasury Protection Portfolio should be periodically assessed relative to the level of interest rates and expected real returns over an intermediate-term (3-5 year) horizon. In general, a material decline in interest rates from prevailing levels should precipitate a review and potential further shortening of the target duration of the policy benchmark to reflect the lower expected forward-looking return potential and a lower expected risk-off hedging benefit as interest rates approach a lower bound. On the other hand, a material increase in interest rates from current levels would, on balance, improve the forward-looking expected return profile for bonds and re-establish the potential for strong performance from a decline in rates in a recession or other risk-off scenario.

Using the yield of the 10-year U.S. Treasury Note as a proxy for interest rates, Staff believes that lower bound, or trigger level, of 1% on the 10-year Treasury reflects an appropriate level below which a further step-wise reduction in target duration of the policy benchmark should be considered. In terms of an upper bound, or trigger level, Staff believes a level of 3% on the 10-year Treasury marks an appropriate level at which an extension in duration should be considered. **Figure 12** highlights the proposed ranges relative to the historical yield on the 10-year Treasury since 2008.

Figure 12. 10-Year US Treasury Yield and Proposed Trigger Levels



Source: Bloomberg, SBI Staff

Figure 13 shows the proposed benchmark adjustments and target duration changes that would be considered should prevailing interest rates fall below or rise above the established band. If the yield on the 10-year T-Note were to fall below 1%, Staff will consider a further stepwise reduction in the portfolio’s target duration, to ~7.0 years. If the yield on the T-Note should rise above 3%, Staff will consider a stepwise increase in the portfolio’s target duration, to ~12 years. Staff shall have discretion as to whether to implement a change in the portfolio’s target duration and the timing of such change, based prevailing market conditions.

In addition, Staff shall periodically review and re-assess the appropriate trigger levels and resulting duration target and policy benchmark adjustments vis-à-vis the prevailing interest rate environment and provide updated recommendations, as necessary.

Figure 13. Summary of Policy Benchmarks at Triggers

If 10-Year U.S. Treasury Note Yield Level is:	Adjust Policy Target Duration to:	Change Policy Benchmark to:
3% or Higher	12 years	100% Treasury 5+ Year
Between 1% and 3%	9 years	80% Treasury 5-10 Year 20% Treasury 10+ Year
1% or Lower	7 years	100% Treasury 5-10 Index

Source: SBI Staff

Appendix

Scenario Analysis Input Summary

Base Case: Expansion + Fed Liftoff

Economy broadly follows Fed Summary of Economic Projections (SEP)
Growth moderates to 2-2.5% real
Inflation settles into 2-2.25% range
Fed taper complete and begins hiking cycle in March '22
Gradual pace (~every other meeting) to terminal Fed Funds 1.75% by end-23

	Cash	2y	5y	10y	30y
Begin Yield	0.05	0.70	1.25	1.49	1.90
End Yield	1.75	1.85	2.10	2.25	2.50
Change	1.70	1.15	0.85	0.76	0.60
2yr Cum Ret	1.9%	1.0%	0.3%	-2.2%	-7.9%

Bull Case: Global Recession

Global growth slowdown/recession
Inflation falls back below 2%
Slack emerges in labor market
Housing prices fall, stock market bear market feeds negative wealth effect
Fed stuck at zero, re-institutes asset purchases
Rates retrace to pandemic lows; 5s & 10s push near zero on safe haven demand

	Cash	2y	5y	10y	30y
Begin Yield	0.05	0.70	1.25	1.49	1.90
End Yield	0.01	0.01	0.05	0.25	0.60
Change	-0.04	-0.69	-1.20	-1.24	-1.30
2yr Cum Ret	0.0%	2.1%	7.4%	13.6%	33.7%

Bear Case: Faster Growth + Sticky Inflation

Global growth re-accelerates
Inflation remains elevated above Fed's comfort zone; modest wage-price loop and demand-side inflation
Dollar sideways to weaker as U.S. vs RoW growth differential narrows
Fed taper complete and begins hikes in March '22
Faster pace of hikes (~every meeting) gets policy rate to 2.5% by end-23

	Cash	2y	5y	10y	30y
Begin Yield	0.05	0.70	1.25	1.49	1.90
End Yield	2.38	3.13	3.50	3.88	4.25
Change	2.33	2.43	2.25	2.39	2.35
2yr Cum Ret	2.5%	0.0%	-4.1%	-15.1%	-42.5%

Scenario Analysis Methodology Summary

- Staff developed economic and interest rate scenarios based on internal discussions and in consultation with several of the program's existing fixed income managers. Staff developed an interest rate path for each of five yield curve points (Cash, 2-year, 5-year, 10-year and 30-year) over an 8-quarter (24 month) horizon for each of the three scenarios.
- Using the interest rate paths as inputs, Staff calculated quarterly total returns for an investment representing each yield curve point. Return calculation for each period included estimations of yield/carry, roll-down return and price return from changes in interest rates. Estimates for the price impact from both duration and convexity were included in price return.
- Quarterly returns were linked to create a cumulative 8-quarter (24-month) horizon total return for each curve point.
- Index performance was approximated based on each index's weighted market value exposure to each curve point as of 12/31/21 and held constant over the investment horizon.

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TAB E

Report from DEI Task Force

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DATE: February 7, 2022

TO: Members, Investment Advisory Council

FROM: Diversity, Equity and Inclusion (DEI) Task Force

SUBJECT: Report from the DEI Task Force

The following documents were prepared by the DEI Task Force for the Executive Director of the Minnesota State Board of Investment (MSBI). The documents are being shared with the Investment Advisory Council (IAC) in order to gather additional comments from other IAC members on the two initial recommendations presented:

1. Updated MSBI Investment Beliefs
2. Enhanced DEI data collection

DEI Task Force Members: Susanna Gibbons, Morris Goodwin, Gary Martin, Peggy Ingison, Carol Peterfeso, and Bibi Black

DEI Task Force Staff support: Katie Comstock (Aon) and Nate Blumenshine

The Diversity, Equity and Inclusion (DEI) Task Force for the Minnesota State Board of Investment (MSBI) held its initial meeting on October 11, 2021, and has made significant progress in developing its understanding of the current DEI landscape through its discussions, use of outside speakers, consultant expertise, and external research. While the work of the Task Force continues, we are prepared to make some initial recommendations.

1. We recommend modifications to the current statement of beliefs to incorporate our evolving understanding of the benefits of diversity, and our obligation as plan fiduciaries. Current research suggests that greater diversity in our decision makers (including staff, asset managers, and consultants) will lead to improved investment results and improved economic outcomes, to the benefit of the Plans, the State of Minnesota, and its taxpayers.

Background and relevant research

In reviewing the obligation of the MSBI and the Investment Advisory Council (IAC), we sought expertise from Reinhart Institutional Investor Services, a law firm with expertise in advising public plans on their fiduciary duties. We did not retain Reinhart as counsel or on an advisory basis, but they provided us with a summary of the current DEI landscape for fiduciaries, based on their expertise in this topic. Key findings from their presentation:

- Minnesota Statutes (sections 356A.04 and 356A.05) are unique (in Reinhart’s experience) in that they establish a three-pronged fiduciary duty. We are required to serve the interests of plan beneficiaries, the taxpayers who help finance the plan, and the State of Minnesota, which established the plan. At times, this may introduce the need to balance the interests of these parties.
- Prudence imposes a duty of inquiry: we need to inform ourselves about a range of developments impacting the plan, including the importance of DEI; that duty is process-oriented rather than prescriptive since circumstances change.
- The economic and by implication possible benefits of diversity that need to be considered in making investment decisions have become increasingly clear.
 - “Gompers has found that diversity significantly improves financial performance...”at Venture Capital Firms. Ethnic diversity improved the performance of IPOs and acquisitions by 26.4% to 32.2%.¹
 - “Closing...racial wealth gaps would boost...the US economy by an additional \$2-3 trillion. That’s equivalent to 8% to 12% of US GDP”²
 - Companies in “...the top quartile for ethnic and racial diversity in management were 35% more likely to have financial returns above their industry mean”³
 - Diversity can reduce bias: “diverse teams are more likely to constantly reexamine facts and remain objective.”⁴

¹ Harvard Business Review, 2018-07, *The Other Diversity Dividend*

² McKinsey & Company Online, America 2021 – The Opportunity to Advance Racial Equity

³ McKinsey & Company, *Why Diversity Matters*, January 2015

⁴ Harvard Business Review, *Why Diverse Teams are Smarter*, November 2016

- The standard of prudent care references peer practices. Investment practices are evolving, and growing number of public plans have concluded that DEI issues are financially material.⁵

We have also reviewed additional independent research, which confirms the information presented by Reinhart.

- Section 342 of The Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 established the Office of Minority and Women Inclusion. In its annual report to Congress, the Board of Governors of the Federal Reserve System affirms “that diverse perspectives inspire the best ideas, decisionmaking, and – ultimately – service to the public.”
- “...banks with more female directors faced lower and less-frequent fines for misconduct, savings those institutions \$7.84 million a year, on average. The conclusion: Banks with more women on their boards commit less fraud.”⁶
- Finally, for those concerned that we might lose our focus on performance by including more diverse-owned firms, a recent study by the Knight Foundation concludes that there is no evidence to suggest that the Plans would be harmed by adding minority- and women-owned firms.⁷

The support for updating our belief statement to incorporate the importance of Diversity, Equity and Inclusion as an organizing principle is grounded in our fiduciary duty, fact-based, and supported by a significant and growing body of research. **Based on this research, we recommend the Executive Director develop language that reflects the importance of DEI policies and strategies as important tools for increasing a broader more diverse perspective of our teams and incorporating the benefits of DEI on the returns of our portfolios.** We considered a broad range of ideas, and suggest the following.

- It is important to update policy within our existing frameworks, which we believe work well.
- We should incorporate language acknowledging the three-pronged Fiduciary obligation in the State of Minnesota, and the need to balance what may seem to be competing interests.
- We should recognize the enhanced performance benefits from working with diverse teams.
- We should develop an understanding of the economic impact that our investments have on the residents and taxpayers of the State of Minnesota.

⁵ We have reviewed updated policy and belief statements provided by our Consultant, Aon; we have reviewed additional information from LACERA, The Office of the Illinois State Treasurer, CalSTRS, CalPERS, and the State of Connecticut. This information is available in BoardEffect.

⁶ Banks with More Women on Their Boards Commit Less Fraud, by Scott Berinato, Harvard Business Review, May-June 2021.

⁷ *Diversifying Investments: A Study of Ownership Diversity and Performance in the Asset Management Industry*, Knight Foundation Executive Report, January 2019; Professor Josh Lerner, Harvard University, and Bella Research Group.

We have included sample language as **Attachment A** to this recommendation.

- 2. There is a clear need for measurement and metrics with respect to Diversity, Equity, and Inclusion. In order to evaluate the extent to which we achieve the economic benefits of improvements in Diversity, we need to establish our starting point, and monitor progress over time.**

Background and relevant research

The landscape for DEI due diligence efforts has shifted dramatically in the past 12 months. The widespread adoption of DEI policies and procedures has brought increased scrutiny to the asset management business, and with it, the need for additional information about investment manager practices and outcomes. The MSBI DEI task force has reviewed its own due diligence practices, along with updated practices from eVestment, ILPA, and other industry sources, and discussed a range of possibilities around appropriate due diligence procedures⁸. The purpose of adopting such procedures would be threefold. First, we need to establish our starting point for evaluating the success of our efforts as we move forward. Second, we need to compare our starting point with the industry broadly speaking so that we can also measure and monitor our progress relative to the industry. Third, we need to develop a process for monitoring manager investment practices so we can evaluate the economic impact of specific investment decisions.

SBI staff has updated its procedures on gathering DEI data, and had some information to report to the Task Force. The SBI invests in 90 different public markets funds, managed by 72 different firms and has not yet attempted to gather DEI data from these managers. The SBI invests in 283 private markets investment funds, managed by 84 different firms⁹. Of those, 35 managers covering 171 funds, have provided some diversity data. Twenty-Seven managers provided detailed gender diversity information, and 22 managers reported additional information about the racial makeup of staff. The task force discussed the need to balance the depth of information desired with the likelihood of receiving that information. We did not want the length of the questionnaire to be an impediment to receiving any information at all, but we would like to create opportunities to expand the data collected as best practices for due diligence continue to evolve.

We recommend the Executive Director consider the following range of possibilities for the ongoing DEI data collection efforts.

Initial focus:

- Continue with current effort to collect basic demographic information. The standard EEO-1 template provides a useful starting point, and is consistent with the Albourne data request and the Harmony questionnaire. We acknowledge that some of the racial information may not be available for international companies.

⁸ Due diligence procedures from ILPA, eVestment, Albourne, Harmony Analytics, Office of the Illinois Treasurer, and Aon are available in BoardEffect

⁹ Public and Private Markets manager and funds data as of 12/31/2021

- Organize demographic data by:
 - Firm ownership
 - Decision-making level
 - Compensation
- Develop report on data at the aggregate level so that we can begin to monitor progress on both outcomes and participation level.

Enhanced due diligence:

- Evaluate information on pay equity policies
- Evaluate qualitative information specific policies and practices
- Evaluate quantitative information on investment manager employee pipelines: to what extent does diverse talent rise in terms of responsibility or compensation? (See questions B.6 and B.7 of Albourne questionnaire; this should be modified to solicit information on race as well as gender).
- Develop reporting to highlight the extent to which individual managers show improvement, so that we can determine whether broader trends in the SBI are driven by changes in reporting or changes in practice.

Best Practice due diligence requires continued research and vetting by the task force

- Request quantitative information on investment-level board diversity¹⁰
- Request information on proxy voting policies
- Request qualitative information on the community implications of investment manager underwriting practices. To what extent does their process consider the disproportionate economic impacts of their investments on various socioeconomic communities?¹¹
- Request information on Investment manager business partners, including broker/dealers¹²

We believe it is important for the Executive Director to decide the appropriate starting point for our due diligence procedures based on current resource constraints, as well as the longer-term vision for this process. We have attempted to outline what we believe is the current state of play. However, this is a rapidly evolving area, and we think that longer-term vision will be critical in creating and maintaining a robust due diligence process.

¹⁰ See *The Missing Element of Private Equity*, in Harvard Law School Forum on Corporate Governance, posted by FCLTGlobal, Sunday August 8, 2021.

¹¹ See “Measure and Management” section, *The Racial Justice in investment cohort, preliminary report*; Initiative for Responsible Investment at the Hauser Institute, Kennedy School of Government, Harvard University.

¹² See Illinois State Treasurer supplemental diversity questions

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SBI Investment Beliefs

Please note: sample additions to the belief statement are highlighted in the document below.

In September 2017, and updated in xxx 2022, the State Board of Investment (SBI) adopted a set of Investment Beliefs for managing the assets of the Combined Funds (those funds utilized to support the defined benefit plans of the State's employees). The primary purpose of these Beliefs is to guide the SBI toward sound investing principles related to investing on behalf of the Combined Funds. In this respect, the Beliefs help provide context for SBI's actions, reflect SBI's investment values, and acknowledge SBI's role in supporting the State's broader retirement systems. When relevant, the SBI also uses these Beliefs as a guide when investing the assets of the other investment programs that it manages, as deemed appropriate.

Under Minnesota law¹, the SBI, Staff, and IAC owe a fiduciary duty to plan beneficiaries; the taxpayers who help to finance the plan; and the state of Minnesota, which established the plan. As fiduciaries, we consider both the return potential and the risk of all of our decisions.

For large, diversified, long-term investors such as the SBI, broad market returns are the primary driver of the returns experienced by the investor. Market returns depend on the long-term health of the economy, which in turn depends on the productivity of social and environmental systems. Given our three-pronged fiduciary obligation, we must consider the impact that our investment decisions have on the health of these systems. We must be active in assessing and balancing any trade-offs that arise.

The SBI is a long-term investor whose primary mission is to maintain the viability of the retirement systems it supports.

When determining an appropriate level of risk that the systems' assets should bear the SBI must reflect the nature of those systems' liabilities and funding policy.

The SBI's strategic allocation policy is the primary determinant of (i) the asset portfolio's long-term investment return and (ii) asset portfolio's risk.

While the SBI can sacrifice some short-term liquidity to pursue a greater long-term return, the investment portfolio's net cash flows and ability to pay benefits on a year-by-year basis are key risk considerations.

Diversification improves the risk-adjusted return profile of the SBI investment portfolio.

Diversification of the SBI investment portfolio takes place across several critical dimensions, such as allocation across global regions and country markets (e.g., U.S. versus Europe, Asia, emerging markets, etc.), allocation among different types of assets (equities, bonds, real estate, etc.), spreading assets across various sectors and industries (e.g., technology, financials, consumer-oriented, etc.), and weighting of different risk factor premiums (e.g., value vs. growth, small companies vs. big companies, carry, illiquidity, etc.). If the correlation (i.e., relationship) among the returns generated by these factors is less than perfect (i.e., less than 1.0), then diversification is beneficial.

There are long-term benefits to SBI managing investment costs.

The equity risk premium is significantly positive over a long-term investment horizon although it can vary over time.

The equity risk premium is also pervasive across several asset classes and its overall exposure should be managed accordingly.

¹ Minnesota Statute 356A01

SBI Investment Beliefs

Private market investments have an illiquidity premium that the SBI can capture.

This risk premium can increase the portfolio’s long-term compound return and help diversify the portfolio’s risk.

It is extremely challenging for a large institutional investor to add significant value over market-representative benchmarks, particularly in the highly competitive public global equity markets.

Passive management should be utilized when there is low confidence that active management can add value. Active management can have potential to add value where information processing is difficult and challenging, allowing for market inefficiencies that are potentially exploitable.

The SBI benefits significantly when roles and levels of authority are clearly defined and followed.

The role of the members of the State Board of Investment (Board) is to establish investment policies that are in compliance with state statute and guide the ongoing management of the funds. The Board delegates implementation of that policy to the Executive Director/CIO, and exercises oversight with respect to the Executive Director/CIO’s implementation activities and the portfolio’s active risk level in the context of the portfolio’s strategic allocation policy. The Board also ensures adequate resources are available to the SBI staff to perform their work;

The Investment Advisory Council (IAC) key role is advising the Board and Executive Director/CIO on general policy matters and methods to enhance the management of the investment portfolio;

The Executive Director’s/CIO’s key role is implementing SBI investment policies and setting the portfolio’s active risk level in a prudent manner to achieve value-added over policy benchmarks.

Utilizing engagement initiatives to address environmental, social, and governance-related (ESG) issues can lead to positive portfolio and governance outcomes.

In addition to specific engagement strategies the SBI might apply, proxy rights attached to shareholder interests in public companies are also “plan assets” of the SBI and represent a key mechanism for expressing SBI’s positions relating to specific ESG issues. By taking a leadership role in promoting responsible corporate governance through the proxy voting process, SBI can contribute significantly to implementing ESG best practices which should, in turn, add long-term value to SBI’s investments.

Economic risks introduced by issues of environmental degradation and social inequities need to be assessed.

In order to integrate prudent financial management practices with principles of environmental stewardship, inclusive economic prosperity, and corporate accountability to shareholders and stakeholders alike, appropriate decision-making tools and frameworks are needed. The standard of practice can be expected to evolve over time, and must be actively engaged with monitoring and evaluating the long-term ESG risks embedded in our investment decisions.

Best practices can only be developed by the best people.

Ensuring the opportunity for economic prosperity for all requires supporting fairness in hiring, promotion and retention practices among all SBI service providers, SBI portfolio investment companies, and SBI staff and IAC members. This will require a continual effort to broaden the understanding of the systems within which the SBI operates.

TAB F

Update on Meketa Climate Risk Project

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DATE: February 7, 2022

TO: Members, Investment Advisory Council

FROM: SBI Staff

SUBJECT: Update on Meketa Climate Risk Project

Meketa Investment Group will give a verbal update on the status and progress of the Climate Risk Project being conducted on behalf of the SBI.

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MEKETA

INVESTMENT GROUP

Minnesota State Board of Investments (SBI)

February 14, 2022

Climate Change Investment Analysis

Phase 1: Global Trends

Meketa Project Team

Project Director: Sarah Bernstein, Managing Principal, Consultant
Project Strategic Advisor: Allan Emkin, Managing Principal, Consultant
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Table of Contents

Table of Contents.....	2
Preface.....	3
Overview.....	4
I. Climate Change Global Outlook.....	5
II. Energy Transition.....	7
III. Climate Change and Financial Markets.....	13
IV. Policies, Regulations, and Institutional Collaboration.....	26
V. Climate Data, Metrics, and Ratings.....	31
VI. Climate Scenario Analysis.....	38
VII. Conclusions.....	43

Preface

The Minnesota State Board of Investments (“SBI”), as part of its oversight of the investment portfolio, continues to address the potential risks and opportunities of climate change on its portfolio. Meketa’s Climate Change Investment Analysis project for the SBI seeks to provide data, analysis, and options for the SBI to further develop its investment strategy to address long-term climate investment risks and opportunities.

During year one of this project, Meketa intends to address these issues in three reports:

- In this first report, we review high-level global trends in climate change and related developments in financial markets across asset classes, policy and regulatory frameworks, institutional collaboration, and trends in climate risk data, metrics, and climate scenario analyses.
- Meketa plans to present Report Two at the May 2022 Investment Advisory Committee (“IAC”) meeting. Report Two is designed to explore how public pension plan climate leaders address climate-related investment risks and returns. The report will include results of a survey of global public pension plan leaders in managing climate risks and opportunities and their approaches to investment strategies in line with the Paris Agreement. The survey results will provide the SBI a range of perspectives to consider on climate investment strategy as they determine the best course of action to pursue for the SBI Investment Portfolio.
- Report Three will analyze the SBI portfolio’s current exposure to climate risks and opportunities throughout the total portfolio – public and private market investments - and discuss and provide options for the SBI to implement a successful climate transition strategy consistent with the terms of the Paris Agreement.

We thank the SBI for engaging Meketa to work on these critical issues and the SBI Staff for their insights and information.

Overview

As more governments, businesses, and investors seek to align their efforts with the Paris Agreement to reach a goal of net-zero emissions by 2050, there is increasing recognition that the climate crisis and evolving energy transition from fossil fuels to renewable sources carry ever growing material investment risks and opportunities.

Physical climate risk and the energy transition affect all parts of the economy. Long-term declines have begun in traditional fossil fuel energy markets. For companies that lag industry peers in the transition, the shift away from fossil fuels may pose material long-term business risks. However, this long-term decline is not occurring without cycles and shocks. The huge drop in fossil fuels with the economic collapse during the first year of COVID-19, followed by the rebound during which the market values of fossil fuel related companies surged, provides a recent example amidst growing recognition of the long-term decline. For companies aligning with a low-carbon economy, even with the benefit of very large long-term growth prospects, such companies also face traditional business risks, heightened technological change risks, and risks of supply shortages in key inputs.

Greenhouse gas emissions vary widely across industries and between companies within each industry. The complex nature of the transition and the difficulty of energy supply and demand transitioning in lockstep to meet net-zero goals in the timeframe identified by experts is already producing economic disruptions. The magnitude of the changes underway carry significant government policy and regulatory risks for both traditional companies and low carbon-focused companies. A growing number of companies that are in transition offer both traditional fossil fuel-driven and new low-carbon energy products and services. The current uncertainty of many government paths heightens the risks throughout the economy. It is important to underscore that traditional sources of energy will continue to be in demand to meet the diverse needs of business, the consumer, and government for the foreseeable future.

Within the institutional investor community, growing attention is devoted to identifying and managing the investment risks and opportunities that arise with physical climate risk and with the transition toward a low-carbon economy. The issues are complex, with no easy answers. In the US today, Meketa finds that most public pension plans do not address climate-related risk and opportunities explicitly in their investment strategy. Among asset owners that actively seek to address investment climate risks and opportunities, there is no established best practice on how best to tackle these issues.

Institutional investor strategies are evolving and will likely change significantly within the coming decade. Trends indicate that the early attention to climate focused on the publicly traded equity asset class and, at varying rates, has spread to all major asset classes. Climate data, metrics, and analytic tools are developing to assess climate risks and opportunities and align with net-zero ambitions. Attention is shifting to encompass the Scope 3 emissions of companies – emissions based a company's inputs and the emissions generated in the use of products after sale. Biodiversity impacts of climate change are commanding growing attention. The importance of economic and social stability of a just transition that supports those workers and communities most negatively affected, is gaining recognition. The realization that decarbonizing an investment portfolio, if disconnected from decarbonization in the real economy, does not address long-term climate risks. Strengthening collaborations among institutional investors is raising the importance of shareowner proxy voting and engagement with companies, asset managers, and governments in managing long-term investment climate risks.

I. Climate Change Global Outlook

Broadly defined, climate change is the variation in average weather conditions or patterns stretched out over an extended time, ranging from a few decades to millions of years. In today's context, the primary concern is the increasing temperature of the earth's atmosphere brought on by gases that trap heat, known as greenhouse gases ("GHG"). There are many GHG sources of global warming in nature, including natural forest fires, water vapor, and volcanos, which make up the overwhelming majority of GHG emissions. Bloomberg analyzed the impact of forest fires and their CO₂ impact in 2019 and determined that globally, forest fires were responsible for 7.8 billion (21%) of the 36.8 billion tons of carbon released from burning fossil fuels.¹ The current consensus within the scientific community is that human activity drives a critical portion of GHG emissions and is a primary cause of climate change today. The human component is a small percent overall but is large as an incremental factor and is the element that humans can strive to reduce. Leading climate scientists, such as Johan Rockstrom, Director of the Potsdam Institute for Climate Impact Research, find restricting warming of the earth to no more than 1.5 degrees Celsius above pre-industrial levels by 2050, at the latest, is an essential physical threshold to avert the risk of irreversible, devastating environmental upheaval. Meeting these goals requires GHG emissions, much of which are carbon emissions, to drop by half by 2030 and reach net-zero emissions (removing as much CO₂ from the atmosphere as is being generated) by 2050 or sooner.

Based on 2019 data, the US Environmental Protection Agency estimates that carbon dioxide ("CO₂") accounts for 80.0% of all GHG emissions and primarily makes its way into the atmosphere from the burning of fossil fuels (coal, natural gas, and oil), solid waste, biological material, and through certain chemical reactions.² Additionally, CO₂ remains in the atmosphere the longest, with about three-quarters of it dissolving into the ocean over a few decades and the remainder taking hundreds to even thousands of years to eliminate.³ The GHG methane accounts for approximately 17% of annual GHG emissions. However, methane has about 28 times the warming power of CO₂ per one ton over a 100-year period. Although methane has much stronger warming potential than CO₂, it remains in the atmosphere for less time – about 12 years.

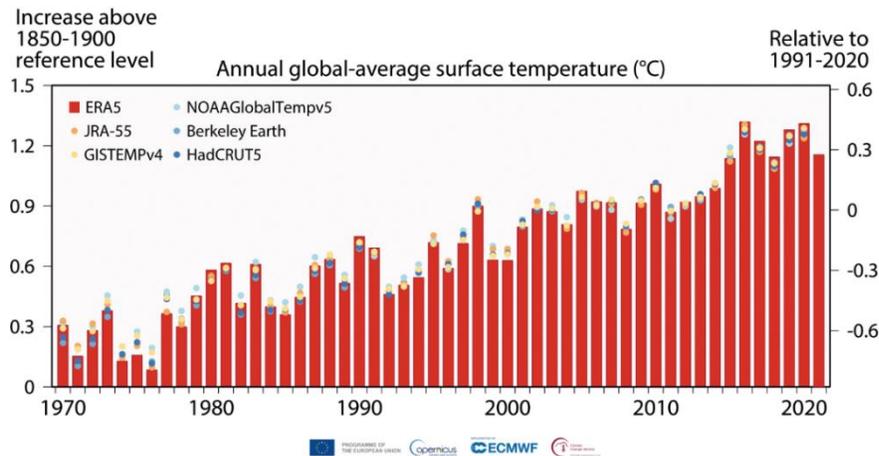
One consequence of these emissions is global warming. Since 1880, the 10 warmest years measured all occurred after 2005. The last seven years rank as the top seven hottest, as shown below.

¹ <https://www.bloomberg.com/graphics/2020-fire-emissions/>

² Source: <https://www.epa.gov/ghgemissions/overview-greenhouse-gases>

³ https://blogs.edf.org/climate411/2008/02/26/ghg_lifetimes/

Figure I.1¹



Global warming is not an isolated risk factor that affects a subset of people, countries, or companies. It has, and will continue to, change how economies and industries operate. Rising temperatures already affect many lives. Many believe that the time seems to be rapidly approaching when the damage becomes so severe that future generations may not have the opportunity to course correct.

Attribution studies link climate change to rising trends in extreme weather. Carbon Brief analyzed several hundred of these studies and found that in a majority of cases, human-related climate change either increased the likelihood of or exacerbated the effects of extreme weather events.²

In August 2021, the United Nation’s (“UN”) Intergovernmental Panel on Climate Change (“IPCC”) released their Sixth Assessment, a special report³ that reviewed the most up-to-date data and physical science understanding of climate change and outlines how humans have contributed to global warming. The report finds: “it is unequivocal that human influence has warmed the atmosphere, oceans and land.” The study warns that, without rapid and large-scale reductions in GHG emission, global temperatures will reach or exceed 1.5°C of warming above pre-industrial levels in the next two decades. This level of warming would lead to catastrophic natural disasters like more extreme heatwaves, droughts, and flooding around the world. This report is the first major review of the science of climate change since 2013.

The uptick in extreme weather events has a spillover effect on biodiversity. As an example, forests across the globe have been devastated as wildfires increase. Forests play a crucial role in CO₂ absorption across the globe. The UN IPCC forecasts a temperature increase of 2.6-4.8°Celsius by 2100.⁴ A study found that if emissions continue rising at their record-breaking rate, one in six of all the world’s species face the risk of extinction.⁵

¹ Source: <https://climate.copernicus.eu/copernicus-globally-seven-hottest-years-record-were-last-seven>

² Source: <https://www.carbonbrief.org/mapped-how-climate-change-affects-extreme-weather-around-the-world>

³ Source: Climate Change 2021: The Physical Science Basis

⁴ Source: <https://eciu.net/analysis/briefings/climate-science-the-basics/climate-change-and-nature>

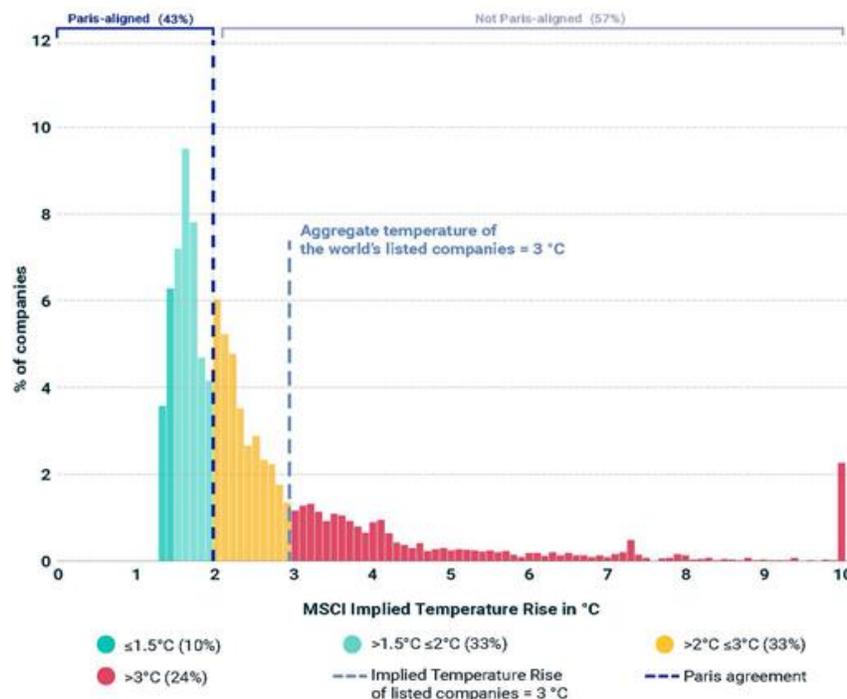
⁵ Source: <https://www.theguardian.com/environment/2015/apr/30/one-in-six-of-worlds-species-faces-extinction-due-to-climate-change-study>

II. Energy Transition

Long-term secular trends indicate an acceleration in the transition away from carbon-based energy to renewables. In the net-zero emissions pathway presented in the International Energy Agency (IEA) 2021 report, in 2030 the world economy will be 40% larger than today but use 7% less total energy, accomplished in large part by major advancements in energy efficiency. The report estimates a significant decline in the use of fossil fuels with these shifts. The IEA 2021 report predicts that a push towards net-zero will result in energy supply generated from fossil fuel decreasing from 80% of total energy supply today to just over 20% of total energy supply by 2050.

The Paris Agreement aims to limit global temperature rise to well below 2°C, and preferably to no more than 1.5°C. Evidence on whether companies have credible plans to reduce their emissions in line with the Paris Agreement goals or ‘net-zero’ emissions by 2050, shows that most companies globally are not aligned with 1.5°C. For example, MSCI analyzed the 9,226 constituents (as of September 20, 2021) of the MSCI ACWI Investable Market Index (“IMI”). The MSCI ACWI IMI covers approximately 99% of the global public equity investment opportunity set. In the MSCI Net-Zero Tracker of October 2021, they report that listed companies are on track to cause average temperatures to rise by nearly 3°C above pre-industrial levels. Less than half (43%) of listed companies align with a 2°C temperature rise and less than 10% of listed companies align with a 1.5°C temperature rise, as shown in Figure II.1.

Figure II.1¹



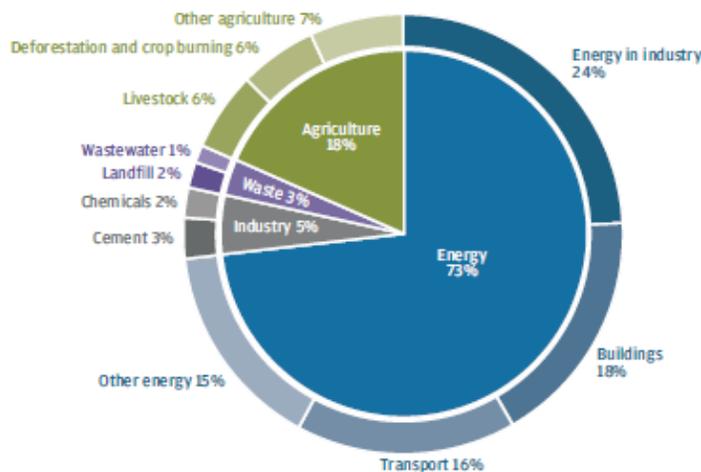
¹ Source: <https://am.jpmorgan.com/content/dam/jpm-am-aem/emea/regional/en/insights/market-insights/otmoi/mi-otmoi-the-path-to-net-zero-emissions.pdf>

GHG emissions have increased about 50% since 1990. With GHG emissions and temperatures continuing to rise at unprecedented levels, we face a shorter timeframe to address climate issues than previously anticipated.

High Emitting Sectors

Carbon emissions vary widely by economic sector and geography. From a sector perspective, the energy and industrial sectors have contributed most to the rise of global emissions since 1990, with GHG emissions up 56% and 180%, respectively. The increase in the agriculture sector has been more muted (16.5%), although the types of agriculture emissions are often more environmentally damaging. As shown in Figure II.2, power generation, transport, and buildings are the sectors that emit the most CO₂ and, accordingly, are where the most innovation and new regulation are expected.

Figure II.2– Global Greenhouse Gas Emissions by Sector¹



Greenhouse gas emissions include CO₂, methane, nitrous oxide, and fluorinated greenhouse gases. CO₂ equivalent tons standardize emissions to allow for comparison between gases. One equivalent ton has the same warming effect as one ton of CO₂ over 100 years. Past performance is not a reliable indicator of current and future results. Data as of 31 March 2021.

There are high-emitting companies in every sector. To measure emissions in a standard framework, the GHG Protocol defined three scopes of emissions. In addition to variation among industries in their absolute level of emissions, industries differ markedly in the proportion of Scope 1, 2, and 3 emissions. The scopes correlate to who ‘owns’ those emissions and the level of control applicable to changing those emission levels at each stage. Today, Scope 1 and 2 emissions are a mandatory part of reporting for many organizations across the world and relate to systems that are within reasonable control of an entity, such as onsite and purchased energy.

Scope 1 emissions are defined as direct emissions. Scope 1 emissions include emissions generated directly from operations owned or controlled by the reporting entity. Scope 2 is defined as indirect GHG emissions from the generation of purchased or acquired electricity, steam, heating, or cooling consumed by the reporting entity.

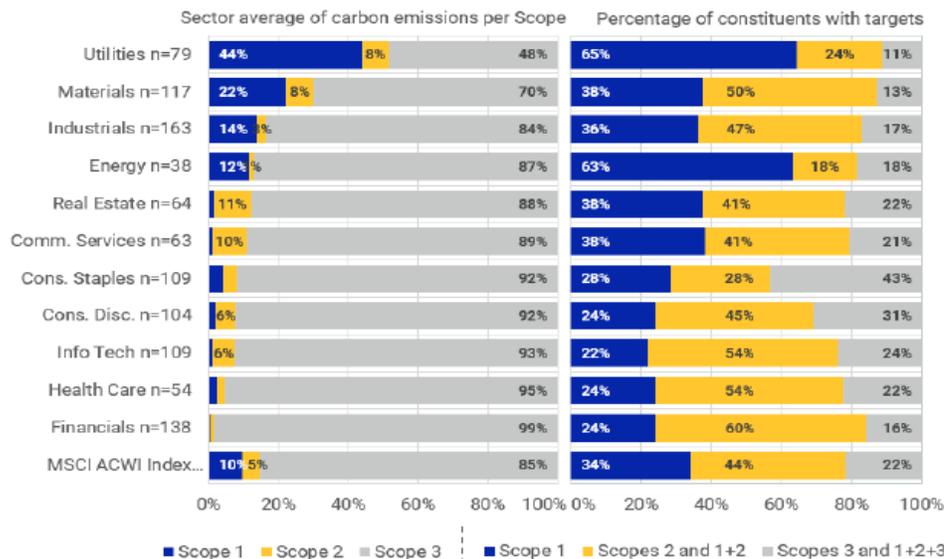
¹ Source: Climate Watch, Our World in Data, World Resource Institute, J.P. Morgan Asset Management.

Scope 3 emissions include all other indirect emissions that occur in a company's value chain of creating end products, beginning with sourcing the raw materials, and continuing through manufacturing, transporting, and use of the product. Scope 3 emissions remain mostly voluntary to report. In many industries, the reduction of Scope 3 has the potential to have the largest impact on overall emissions reduction. As illustrated in Figure II.3, Scope 3 emissions account for the great majority of total emissions in most sectors, including high emitting sectors such as energy, technology, and consumer discretionary, which includes transportation.

Figure II.3 illustrates the sector differences in proportions of Scope 1, 2, and 3 emissions. The left-hand column graphs by sector average carbon emissions per scope. For example, the airline industry generates predominately Scope 1 emissions. The emissions from using jet fuel in the operation of providing travel services result in Scope 1 emissions that often account for two-thirds or more of an airline's total emissions. Energy utilities, by the nature of the service they provide, include a high percent of Scope 1 emissions. Scope 1 emissions currently account for an estimated average 44% of total emissions for the utilities sector. Real estate exhibits very little Scope 1 emissions. Scope 2 emissions account for 11% of total real estate emissions on average, and Scope 3 emissions accounted for nearly 90% of total emissions. For the energy sector, Scope 3 emissions account for 87% of total emissions. Energy sector Scope 3 emissions include those emissions released when sold products are used, such as combustion of aviation fuel in aircrafts, gasoline in car engines, or sold to energy utilities.

Measuring carbon emissions provides a starting point for understanding where the greatest risks in addressing climate change lie. Tracking the carbon targets of companies provides an indication of potential for improvements, as shown in the right-hand column in Figure II.3.

Figure II.3 – Scopes of Carbon Emissions (left) and Targets (right) by GICS Sector¹



This research used two-digit codes to define each GICS sector peer set. Total carbon emissions of each sector comprise Scope 1, 2, and 3 emissions. Scope 1 and 2 emissions were reported by the companies or estimated by the MSCI Climate Change Metrics Methodology. Scope 3 emissions were estimated by the MSCI Scope 3 Carbon Emissions Estimation Methodology, which is aligned with the GHG protocol. Scope 2 targets included energy consumption reduction targets. When multiple targets existed, the scope of final target year was represented in the chart. Source: CDP. MSCI ESG Research. as of January 5, 2021

¹ Source: MSCI.

Among MSCI ACWI Index constituents, emissions targets align fairly well with the dominant Scope type of emissions in sectors dominated by Scope 1 emissions. For example, 65% of the targets set by companies in the utilities sector focused on Scope 1 emissions, which was the dominant scope (44%). In contrast, in sectors dominated by Scope 3 emissions, targets are often misaligned. For financials, where 99% of emissions came from Scope 3, only 16% of targets covered Scope 3 emissions. The energy sector’s emissions were 87% Scope 3, while only 18% of the energy sector constituent’s targets addressed Scope 3 emissions. Addressing Scope 3 emissions for an energy company requires reducing the fossil fuel-based energy products the company sells.

The number of companies setting decarbonization targets has increased recently, growing to 939 of the MSCI ACWI constituents in 2020 from 589 in 2019, as shown in Figure II.4. The number of constituents with self-declared net-zero targets reached 15% of the total number of companies with decarbonization targets.

Figure II.4 – Number of Companies that Set or Added Decarbonization Targets¹



The changes in climate already underway are systemic and affect all economic sectors. **Reducing both the supply and demand for fossil fuels is essential to creating a low carbon economy.** Energy sector dynamics indicate interconnected and critical nature of changes required throughout the economy. Reductions in the supply of fossil fuels, without reductions in demand, can be counterproductive to the long-term energy transition and contribute to shortfalls and record energy prices, as currently occurring in Europe. Countries wrestle with balancing economic health with the speed of the energy transition, in some situations leading to near-term increases in fossil fuel energy, including coal, which is often relatively inexpensive in some regions compared to renewables, even if the country’s long-term goals are a net-zero emissions by 2050 or thereabouts.

¹ Source: MSCI.



Demand for fossil fuel energy includes industries that are very difficult to decarbonize and currently generally rely on high levels of burning fossil fuels. Seven difficult-to-decarbonize industries currently account for 30% of GHG emissions – concrete, steel, aluminum, chemicals, and the transport that supports the global economy – ships, planes, and trucks. Industry, academia, the financial industry, and government are all committing significant resources to seek ways to make those industries more efficient and less energy intense.

Increased regulations and demand from consumers are spurring change. Fossil fuel reserve owners and the traditional energy sector increasingly face headwinds in the form of government and corporate climate policies, and global demand shifting to renewable sources of energy. Transition efforts are growing even in high-emitting sectors, including for industries with emissions that are very hard to abate. New energy transition industries are rapidly growing, even as new technologies create changes in products. The pace of growth is bringing potential bottlenecks in supplies, such as in key minerals used in battery storage.

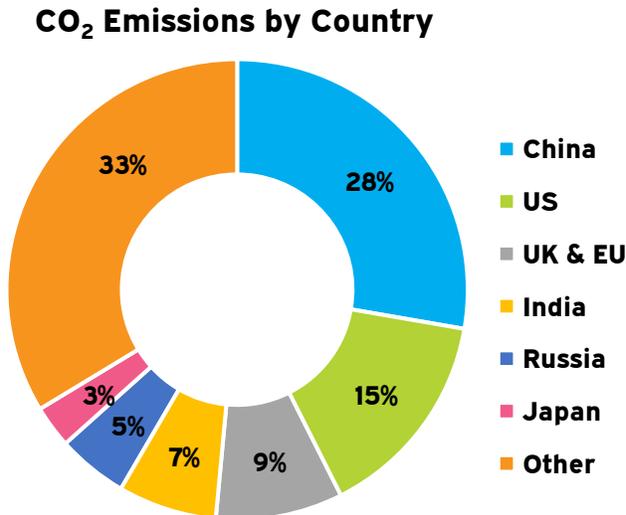
Scope 1 and 2 emissions can dramatically change at the company level by outsourcing production and thereby transferring the associated emissions to another owner. One example is Apple, which has transformed its data centers to run on renewable energy. Apple outsources the production of its phones and therefore has minimal Scope 1 and 2 emissions. Apple exemplifies a successful, large global company that cannot reduce its significant Scope 3 emissions without setting and achieving emissions targets for the company's suppliers.

Companies in sectors with lower total emissions are also beginning to transition. For example, McDonalds and eBay co-signed a deal pledging to produce 345 megawatt ("MW") of solar power in Louisiana, the state's largest solar project to date. Microsoft recently committed to providing 250MW of solar power to underserved minority and rural communities, while Walmart pledged as the "anchor tenant" supporting 129MW of community solar projects. Plug Power signed a power purchase agreement for 345MW of wind turbine power to use to create liquid hydrogen, the first and largest wind-powered hydrogen plant in the US.

High Emitting Geographies

Geographically, the sources of emissions continue to shift. In 1900, Europe and the US produced over 90% of CO₂ emissions. The latter half of the 20th Century witnessed a significant rise in emissions from Asia, in conjunction with economic growth, particularly in China. As shown in Figure II.5, for 2019, China, India, and Japan accounted for nearly 40% of the world's CO₂ emissions. Together, China, the US, the United Kingdom ("UK"), and the European Union ("EU"), India, Russia, and Japan accounted for two-thirds of worldwide emissions, with the rest of the world accounting for the remaining third.

Figure II.5 – Share of Global CO₂ Emissions by Country, 2019¹



As nations grapple with setting net-zero targets, a central issue concerns the abilities of developed and emerging countries to transition. From a historical perspective, carbon emissions declined in developed markets in part because multinationals relocated production (and their carbon emissions) to emerging markets. These dynamics allowed high-income economies to start their energy transition earlier. As emerging markets were later to industrialize, most emerging markets are not responsible for the bulk of global emissions to date. As of 2019, the US had emitted more CO₂ emissions than any single country on earth and contributed 25% of historical emissions since the Industrial Revolution. The second largest contributor to historical CO₂ emissions is China. The lowest geographical contribution region is Africa, both historically and currently.² Going forward, the drive to decarbonize in developed markets could spur more emissions in emerging markets, partly from the expected increase in demand for a range of raw materials that are critical to low-carbon technologies (e.g., lithium, nickel, cobalt, manganese, and graphite) most of which are today mined in emerging markets. From a policy perspective, this illuminates the need for internationally interconnected approaches to climate policy development across regions, to avoid enacting GHG emissions reduction policies in one country or region that inadvertently raise overall global emissions.

¹ Source: Gapminder, Global Carbon Project, Our World in Data, United Nations, J.P. Morgan Asset Management.

² Source: <https://ourworldindata.org/co2-emissions>

III. Climate Change and Financial Markets

The accelerating transition to renewable energy and the escalation of physical climate risks is contributing to significant change in global financial markets. Sustainable investment assets grew to \$35.3 trillion globally in 2020 according to Bloomberg, 14% of total global investable assets which totaled \$250 trillion in 2020.¹ This figure accounts for all investment funds that integrate environmental, social, and governance (“ESG”) factors into their investment process, not just funds explicitly designed for a quantifiable environmental impact. The same report estimates that approximately \$25 trillion of these assets are invested in funds that integrate ESG into their financial modeling, so managers may be taking ESG into consideration in their investment process, but not necessarily changing investments on these considerations.

Figure III.1: Growth in Sustainable Investing Assets

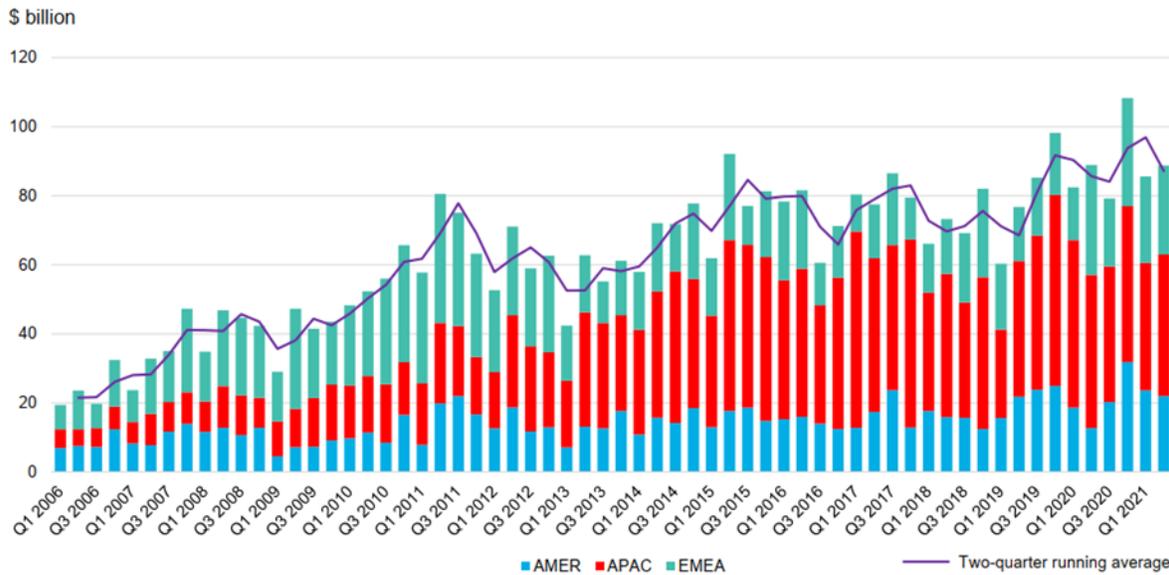


Over the past decade, investors increased investments in renewable energy projects. (See Figure III.2). Renewable energy cost reductions, technological innovations, and government subsidies helped support attractive value propositions.² As the energy transition progresses, the nature and extent of government subsidies is likely to change. Governments may introduce new, increase and/or roll back renewable incentive programs that in some cases began when renewable energy was a nascent industry. As of 2021, 27 countries, and 11 states in the US have adopted some form of carbon pricing mechanism. Carbon pricing may further accelerate the transition to a low-carbon economy.

¹ <https://www.institutionalinvestor.com/article/b1s6dsvw696kqd/Global-Investable-Assets-Reach-Record-250-Trillion>

² https://data.bloomberglp.com/promo/sites/12/678001-BNEF_2020-04-22-ExecutiveFactbook.pdf?link=cta-text

Figure III.2 – New Financial Investment in Clean Energy by Region (\$ billions)¹



The cost of de-carbonization is expected to continue to decline long-term, driven by technological and financial innovations, growth in market adoption, and supportive government policies. For example, Goldman Sachs finds that consistent application of low-cost, de-carbonization technology improvements at scale, breakthrough clean hydrogen technologies, financial innovations, and a lower cost of capital for low carbon activities can, in aggregate, reduce the annual costs of the path to net-zero by roughly \$1.0 trillion. This cost reduction is approximately a 20.0% improvement over their 2019 Carbonomics cost curve estimate. Goldman Sachs finds financial conditions tightening for hydrocarbon developments, leading to hurdle rates 20.0+% for long-cycle oil developments, while low carbon projects, such as renewable power investment financing, have hurdle rates in the range of 3.0%–5.0%.²

These developments are accelerating as large investors, banks, and market participants, including large commodities traders, are increasing their low carbon financial exposures. Recently, the world’s four largest oil traders reportedly began efforts to invest billions of dollars in renewable energy projects over the next five years.

Investor demand has led to a growing number of investment funds that seek to meet or exceed market financial returns and achieve a quantifiable climate impact. This includes thematic funds in public and private markets, such as those with investment strategies focused on water to climate technology, to broader energy transition mandates.

In addition to specific “green” or ESG-focused fund options, a growing number of investment funds incorporate ESG factors without labeling their investment product green, sustainable, or ESG-focused. As underlying companies begin to shift their focus to be more climate friendly, the broad investable universe for managers inevitably becomes “cleaner.” Climate-specific developments continue to escalate. December 2020 saw the launch of the Net-Zero Asset Managers Initiative, a collection of currently 128 asset managers that oversee \$43 trillion in AUM who pledged to support investing aligned with net-zero carbon emissions by 2050 or sooner.

¹ Source: BloombergNEF.

² Source: “Carbonomics Innovation, Deflation and Affordable De-carbonization”, Goldman Sachs, October 13, 2020.

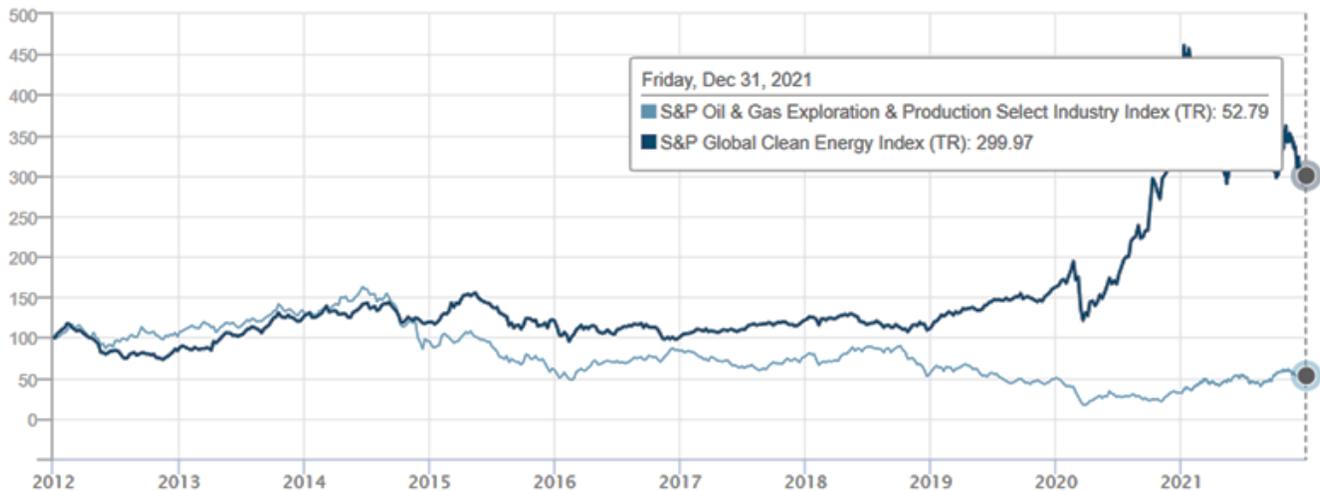
Public Equity Market Trends

Trends in equity indexes indicate that long-term declines in fossil fuel energy and long-term growth in clean energy valuations also include near-term volatility embedded in energy prices and economic activity, as occurred in 2021 with the very strong run up in oil, gas, and coal.

The S&P Global Clean Energy Index compared to its Oil and Gas Exploration and Production index illustrates the volatility and long-term shifts. As shown in Figure III.3 below, the S&P Clean Energy Index value outpaced that of the S&P Oil and Gas Exploration and Production Index since early 2018, with clean energy more than doubling in value in 2020, while Oil and Gas Exploration and Production lost approximately 35%. However, the pickup in the global economy coming out of the pandemic in 2021 reversed the clean energy trend direction. Oil, gas, and coal rebounded throughout 2021 with the economic recovery and, with insufficient renewable energy to meet demand, even in countries actively transitioning to renewables.

Figure III.3: Clean Energy vs. O&G Exploration and Development Market Values¹

SPDR S&P Oil & Gas Exploration & Production ETF (XOP) vs. iShares Global Clean Energy ETF (ICLN), as of January 2022



Recent changes in the composition of the Clean Energy Index illustrate the lack of maturity of the sector, investor demand, and rapid developments within clean energy. For example, the largest exchange-traded funds (“ETF”) in the space, BlackRock’s iShares Global Clean Energy, brought in more than \$2.8 billion since the start of 2021. The iShares fund tracks the S&P Global Clean Energy Index, which held just 30 names as of April 2021. The large inflows in ETFs led to an overhaul of the benchmark, as too much money chased too few stocks. There are now 81 names instead of 30 in the index, and the number of names continues to grow. Adding names increased liquidity and diversity. It also included companies with a wider range of clean energy and brought the “clean energy exposure” score of the index down. S&P believes the clean energy score will return to its prior level as they add more names, especially from emerging markets.

¹ Source: S&P Dow Jones Indices.



The long-term energy sector’s shift in its share of market capitalization in major indices mirrors trends in energy sector index returns. As shown in Figure III.4, both the Russell 1000 and the Russell 3000 indexes drops in market share occurred in the energy sector, the oil and gas industry and the coal sub-industry. These drops reflect the extraordinary growth in valuations of a few huge global technology companies, including Facebook, Amazon, Netflix, Google, and Apple, which have dwarfed growth in every part of the public equity markets. The energy rally in 2021 brought an increase in market share for fossil fuel companies compared to 2020.

Figure III.4 – Russell 1000 and Russell 3000 Energy Sector Market Share¹

% of Russell	R1000			R3000		
	Sector Energy (%)	Industry Oil&Gas Con Fuel (%)	Sub-Ind Coal and Con Fuels (%)	Sector Energy (%)	Industry Oil&Gas Con Fuel (%)	Sub-Ind Coal and Con Fuels (%)
30-Sep-10	10.65	10.33	0.33	10.21	9.87	0.32
30-Sep-15	6.66	6.62	0.01	6.34	6.28	0.02
30-Sep-20	2.01	1.92	0.00	2.02	1.90	0.01
30-Sep-21	2.74	2.62	0.00	2.87	2.71	0.01

The long-term trend of declining market share of fossil fuel companies in indexes incorporates both the decline in market capitalization of fossil fuel companies and a reduction in the number of fossil fuel companies included in the index. The reduction in the number of fossil fuel companies in broad indexes can reflect mergers, companies going out of business or going private, and the removal of some energy sector companies from an index. For example, since 2011, the US alone retired 60% of all US-based, coal-fired power plants.² The S&P Dow Jones Industrial Average announced on August 25, 2020, that it would remove its longest tenured constituent, ExxonMobil, due to its poor performance and negative investor sentiment. Exxon was the most valuable publicly traded company in the world as recently as 2013. The May 2021 ExxonMobil shareholder vote led by small climate transition activist hedge fund Engine No. 1 saw three of its four nominees join the Exxon Board. The vote was unprecedented and a sign that institutional investors are increasingly willing to force corporations to actively participate in that transition.

Public equity fossil fuel free and climate transition indexes outperformed market-cap weighted parent indexes, as illustrated in Figure III.5 for both MSCI World and S&P 500 indexes in recent years. For the periods ending December 31, 2021, fossil fuel free indexes performed marginally better than the parent indexes over the 3-year and 5-year trailing periods. The risk profiles of climate transition indexes and ex-fossil fuel indexes were very similar to their parent benchmarks, often with slightly lower risk. Climate transition indexes assign higher weights to companies across the economy that align better with the Paris Accord. These indexes outperformed their parent indexes and the ex-fossil fuel indexes. Low-carbon indexes such as the MSCI World Low Carbon Target and the S&P500 Carbon Efficient indexes, exhibited slightly higher returns, and higher risk, than the parent indexes for these periods, reflecting in part the impact of a small group of huge global technology companies.

¹ Source: Russell.

² Source: <https://www.sierraclub.org/press-releases/2020/09/bloomberg-philanthropies-and-sierra-clubs-beyond-coal-campaign-reaches>



Figure III.5: Climate Index Annualized Returns Compared to Core Parent Market Cap Indexes

Annualized Risk Return Statistics
(Periods Ending December 31, 2021)¹

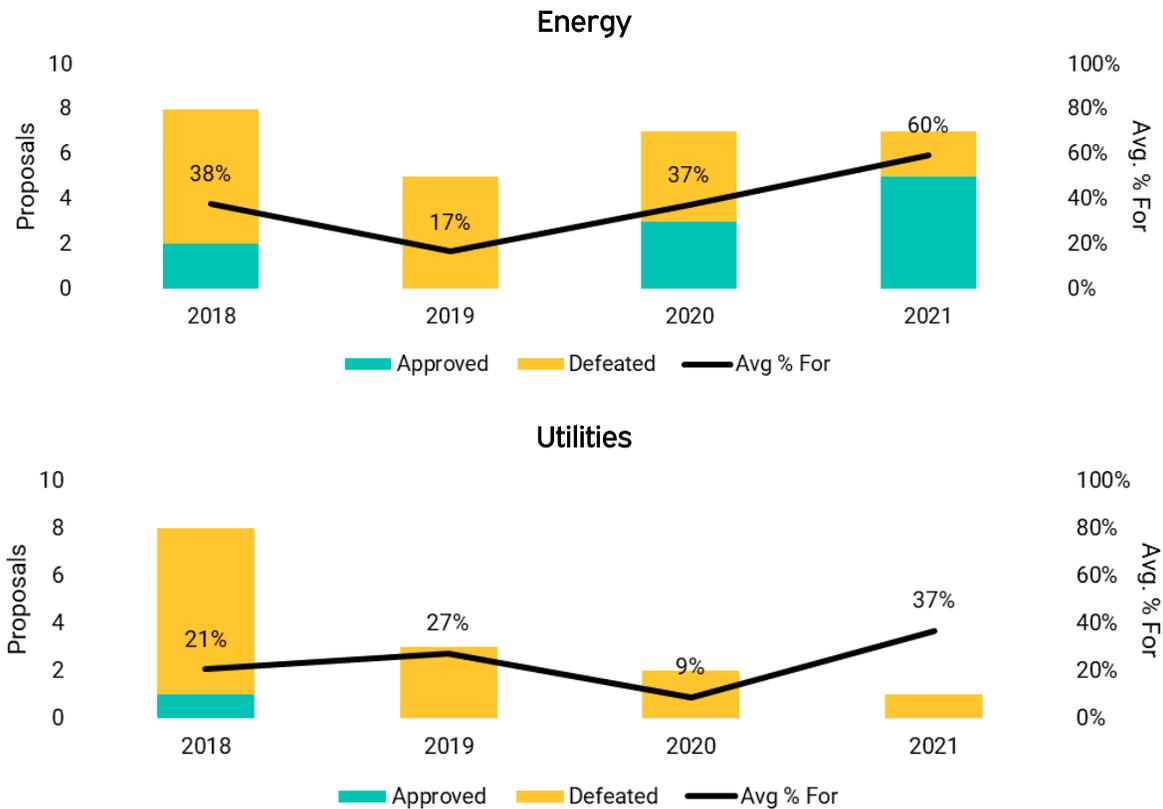
Name of Index	No. of Firms	Weighted Avg Mkt Cap (\$B)	Return		Risk (Std Deviation)		Sharpe Ratio		Tracking Error
			3-Yr (%)	5-Yr (%)	3-Yr (%)	5-Yr (%)	3-Yr	5-Yr	5-Yr (%)
MSCI WORLD	1,546	418.8	22.3	15.6	17.3	15.0	1.20	0.96	-
Ex-Fossil Fuels	1,469	433.5	23.3	16.4	17.0	15.8	1.26	1.02	0.7
Low Carbon Target	1,267	393.3	22.7	15.8	17.4	15.1	1.21	0.97	0.3
Climate Paris Aligned	655	364.9	23.7	17.0	17.1	14.8	1.28	1.05	1.2
S&P 500	505	597.8	26.1	18.5	17.4	15.4	1.50	1.20	-
Fossil Fuel Free	489	607.8	26.8	19.2	17.2	15.3	1.56	1.26	0.7
Carbon Efficient	490	653.4	26.2	18.5	17.6	15.5	1.49	1.19	10.6
Net Zero Climate Transition	371	668.9	28.6	20.1	17.3	15.4	1.65	1.31	1.1

While sustainability has become mainstream in financial markets, there are a wide variety of approaches, little standardization in disclosure, and regulatory guidance is generally just emerging. There are some equity climate opportunity funds that outperformed where the bulk of outperformance was driven by a residual missing factor, a systemic, as opposed to stock specific ‘climate beta’ factor that is not accounted for by traditional fundamentals such as size, momentum, growth, quality, sectors, and country-related factors. For example, LA Capital finds that climate has evolved to be a driver of return and can be additive to an existing set of traditional fundamental factors and to a broad ESG factor.

A key trend in public equity markets is the growing attention to proxy voting and engagement, particularly regarding disclosure and management of climate risks and Paris Alignment. The percentage of proxies voted in favor of stronger climate risk disclosure and management rose from 2018 to 2021 in both the energy and utilities sectors, as shown in Figure III.6.

¹ Sources: MSCI and S&P Dow Jones Indices.

Figure III.6 – Proxy Voting Trends on Climate in Energy and Utilities Sectors¹



The chart shows the number of defeated and approved climate-related shareholder proposals in the US energy and materials sectors (left scale) and the average percentage of votes in favor (right scale).

The growing attention to the need to achieve net-zero carbon real economy emissions as quickly as possible and no later than 2050 is shifting investor attention to creating a better “market beta” through decarbonization, with the aim of minimizing the overall negative costs to the global economy and to investors, thus better aligning their interests.

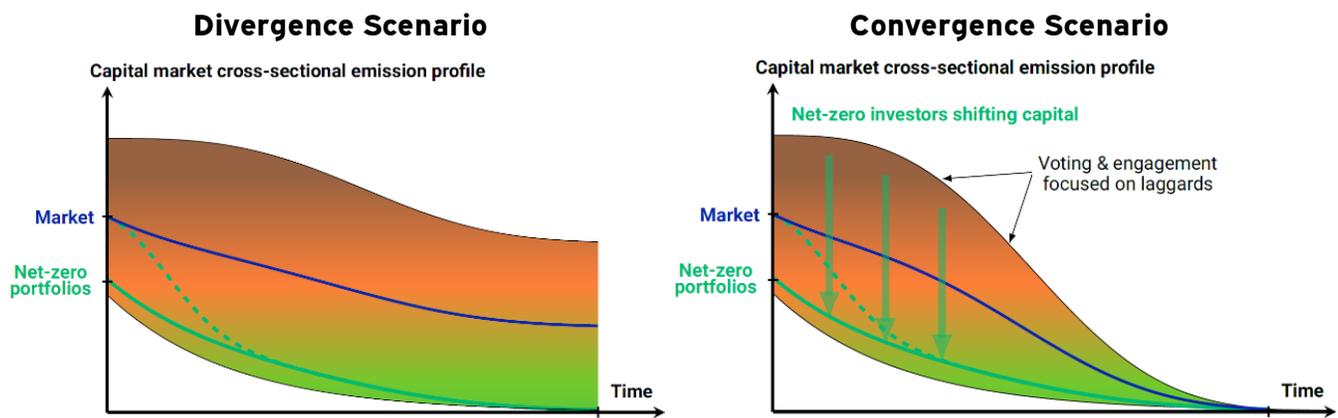
Trends indicate that the early focus on divestment of fossil fuel companies has evolved. With the focus on net-zero real economy solutions, many market participants have evolved beyond simplistic blanket fossil fuel exclusions. More investors use divestment strategically – shifting their exclusion criteria to focus, not on historic measures of emissions exposure, but on forward-looking transition strategies, thereby supporting companies that are actively transitioning. Investing in climate solutions across the economy is becoming a larger aspect of climate strategies as investment opportunities increase. More effort and attention are being devoted to proxy voting and engagement.

Central issues for net-zero-designed portfolios include the potential ‘divergence’ between investor net-zero results and real economy net-zero results across all sectors if investors focus only on finding climate alpha opportunities. For example, as illustrated in Figure III.8, MSCI finds that a focus only on pure climate opportunities can result in a global economy in which only some companies become

¹ Source: MSCI ESG Research.

net-zero, and only concentrated investment portfolios that focus on net-zero leaders would be able to reach net zero. Diverging from these concentrated portfolios, the broad market and the economy at large would incur the high costs of no widespread, timely transition (monetary, human, and environmental). In contrast, a net-zero focus on both investing in leaders and creating a better market beta, could drive a 'convergence' scenario in which net-zero investors lead the broad market and the overall market follows hopefully bringing the global economy to net-zero before 2050.

Figure III.7 – Net-Zero Investment Portfolios that Diverge or Converge with Net-Zero Real Economy¹



The complex nature of the global energy transition across industries and geographies raises the potential for conflicts and for net-zero strategies by governments and private market participants that can inadvertently work against a global transition to net-zero. These concerns suggest that forward-looking, transition metrics, rather than static carbon emissions may be a central element to developing net-zero investment strategies.

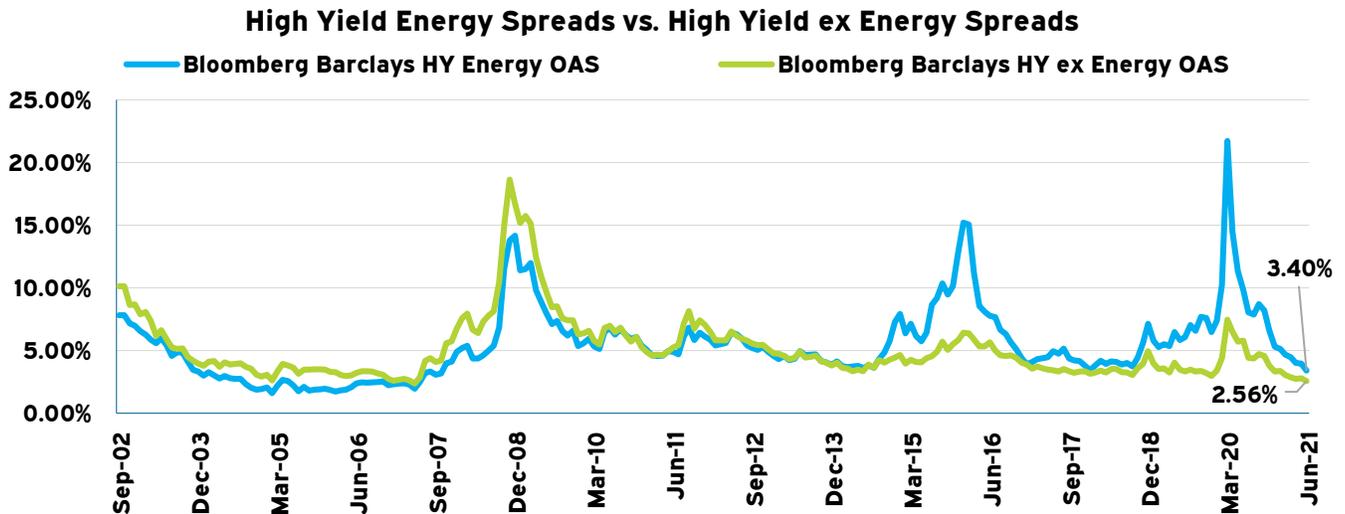
Fixed Income Trends

Climate transition trends, and volatility, are evident in fixed income markets in credit spreads between traditional energy and the overall high yield market, and the rapid growth in climate and sustainability related bonds.

As shown in Figure III.8 below, credit spreads for energy sector constituents within the Bloomberg Barclays High Yield Index traded wider to the broader market since 2014, widened to higher peaks following the onset of COVID-19 in early 2020 but then dropped sharply since the end of June 2021 with the rebound in oil, gas, and coal.

¹ Source: MSCI ESG Research.

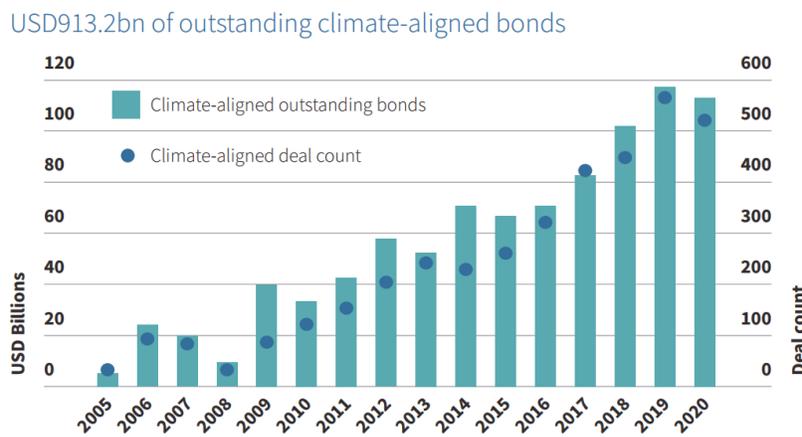
Figure III.8 - High Yield Energy Spreads compared to Market High Yield ex-Energy Spreads¹



The bond market includes climate related bonds that are labelled (“Green Bonds”) and bonds that are climate aligned but unlabeled. The Climate Bonds Initiative (“CBI”) tracks bond issuers financing of labelled and unlabeled climate-aligned assets. At the end of Q3 2021, green bond issuance for the calendar year stood at \$354 billion, surpassing the 2020 record. The total volume of labeled green bonds comprises one part of an overall total universe that CBI reports at \$1.7 trillion, encompassing bonds labeled green, transition, pandemic, social, SDGs, and sustainability.

The 2020 CBI report on unlabeled climate aligned bonds identified 420 climate-aligned issuers (issuers that derive at least 75% of their revenues from climate-aligned business activities) with 311 of those being fully aligned issuers (issuers that derive 95% or more of their revenue from climate-aligned activities). CBI calculates there is currently \$913.2 billion in outstanding unlabeled climate-aligned bonds (Figure III.9), with an emphasis on corporate issuers.

Figure III.9 – Climate Aligned Unlabeled Bonds²



¹ Source: Bloomberg Inc.

² Climate Bonds Initiative.



Transport companies held the lion's share of the market, accounting for over 50% of climate-aligned bond issuance globally. Geographically, China was by far the largest issuer, representing 36% of the global total. France, the US, South Korea, and the UK round out the top five, with China and France together accounting for more than half of the total climate-aligned universe.

The increase in green bond issuance has yet to be directly associated with a reduction in carbon intensities. For example, the Bank of International Settlements released a report in September 2020 that found "no strong evidence that green bond issuance is associated with any reduction in carbon intensities over time at the firm level." The report clarifies that these results do not indicate that green bonds failed to meet their intended environmental goals, but, rather, that the firms that issued these bonds did not exhibit a meaningful difference in their carbon intensity. The report suggests that like credit rating buckets or classifications, firm-level ratings could better deliver on climate change goals than the current project-based system.¹

To date, there is little to no standardization for reporting and disclosures of climate related bonds. The definition of "green" assets and activities varies across countries and companies, allowing issuers to label a bond as "green" without having to report where the funds are being used, a version of greenwashing in the bond market. The issuers for about half of the municipal green bonds sold in 2021 self-designated the bonds as green bonds, rather than certifying the bonds through an outside party, leaving the onus on investors to determine if the bond and the issuer align with the investor's standards.

On the other side of the fixed income markets, the banks that underwrite bond sales are benefiting from green bonds. For the first time, J.P. Morgan is making more in fees for underwriting ESG, including green bond sales, than for underwriting fossil fuel related bonds.

Beyond green bonds, in fixed income, managers are now explicitly integrating ESG into their credit analysis process to varying degrees and several have been doing it for many years in various forms. In an asset class with an asymmetric return profile and significant focus on left tail risk, evaluating ESG risk is another layer in the due diligence process and a reasonably natural progression for most fixed income managers. The most common approach is a proprietary or internally generated ESG scorecard or ranking. The scorecard commonly has 20-40 ESG factors that are analyzed and given a score. Those scores typically contribute to a cumulative or average overall score for the bond issuer. The ESG score may be ranked or simply considered in the overall due diligence in the same way that the investment team evaluates management experience, market position, protective covenants in the bond indenture, or other factors along with valuation, fundamental financial metrics, and market technicals. Other managers may draw a harder line in their ESG approach by eliminating a certain amount of the lowest ranking issuers regardless of the strength of their non-ESG factors. A further and more stringent step may be to screen out whole industries such as tobacco, cluster munitions, thermal coal, or companies that are involved in controversial practices such as child labor.

Most fixed income managers now have access to one or more scores from external ESG data providers such as Sustainalytics, MSCI, Bloomberg, ISS, CDP, RepRisk, and RobecoSAM. Meketa has observed that most managers seek to use these third-party scoring providers with their own internal scoring to arrive at a final cumulative score. One approach may be to average them all. Another approach is to determine if the vendors have it wrong such that the manager's internal ESG score is better or worse than what the vendor has ranked the issuer. Finally, the most ESG-advanced managers pursue engagement with corporate issuers which have low ESG scores or are deemed to be ESG laggards. The

¹ Source: https://www.bis.org/publ/qtrpdf/r_qt2009c.htm



engagement process may result in a company making progress and potentially improving a forward-looking ESG score. We note that engagement is more challenging and less commonly practiced by bond managers who are not equity holders with voting rights. Most fixed income managers today utilize the above steps to different degrees. Almost all managers are evolving and improving their ESG approach within the investment process.

We note that some managers have dedicated ESG, Sustainability, or Climate analysts that operate separate from the investment team to arrive at their own conclusions. At some firms with dedicated strategies to ESG, Sustainability, or Climate, the investment team integrates the analysis in a deliberate way. Many firms have these teams but have no dedicated ESG strategy. Another approach is to have dedicated ESG analysts embedded in the investment team to help the fundamental analyst arrive at a holistic view that incorporates ESG factors in the evaluation. Another approach puts the task of ESG analysis on the plate of the same credit analysts doing the fundamental credit work. It is important to understand the approaches to ESG at a manager, the process, the depth of the due diligence, and who is doing the analysis.

In emerging markets debt, a similar process is applied to sovereign issuers where managers score the countries according to another set of ESG factors on a scorecard and arrive at an overall score. They typically then rank the issuers on a relative basis and incorporate this in the overall investment score. Similar to the corporate bond ESG approaches discussed above, there are many degrees of how deeply the manager incorporates the ESG score in the process. Some managers consider the score as one of many factors in the credit analysis while others use it to eliminate countries. Many managers use the score as another factor to consider in deciding how much to underweight or overweight a position vs. the benchmark. Like screening out whole industries, some managers will screen out certain countries based on ESG factors like on low human rights metrics or countries that are subject to sanctions by UN Security Council, for example. A very limited number of EMD managers are involved in ESG engagement. The process for ESG engagement for Corporate and Quasi-sovereign bonds is like the process used in developed market fixed income as described above. Sovereign bond ESG engagement is less common, but a few managers are actively involved. This may come in the form of engaging with countries about key issues like the Sustainable Development Goals (“SDG”) or the UN Guiding Principles of Business and Human Rights. These managers may engage with Ministries of Finance, politicians, nonprofit organizations, or other members of their network in a given emerging market country. We note that, ultimately, much of the capital needed to achieve Paris Agreement targets will need to go to emerging markets rather than developed markets. As a result, we believe ESG investing in emerging markets debt will be an increasing area of interest.

Within the context of net-zero investment strategies, differences between emerging markets and developed markets illustrate potential tensions between climate and economic growth issues with net-zero fixed income strategies based on emissions that do not incorporate energy transition metrics. The investment firm, Ninety One provides the example that if an investor halved their allocation to emerging market debt relative to the Barclays Global Aggregate Bond Index, they would decrease portfolio emissions by 11%, using the EU’s SFDR measure of emissions relative to GDP for sovereign bonds, with a material reduction in exposure to growth in emerging markets.

Engagement efforts by institutional investors, previously centered on equities, are growing in fixed income, where the regular issuance of debt provides distinct points to discuss with companies their strategies for addressing climate issues.

Hedge Fund Trends

Hedge Funds have generally lagged other asset classes in efforts to integrate sustainable investing into their investment processes, owing primarily to the nature of the underlying investments in hedge funds. Most hedge funds, so-called “macro assets” – index futures, forwards, ETFs, and options – are difficult to analyze from a climate perspective. Hedge funds that focus on “micro-assets” – equity and credit names – can more easily integrate climate themes into their investment strategy.

In terms of hedge fund trends, hedge fund managers are increasingly seeking to integrate climate risk and opportunity in their evaluation of securities. These considerations are not applicable typically to hedge fund managers who invest exclusively through derivative instruments.

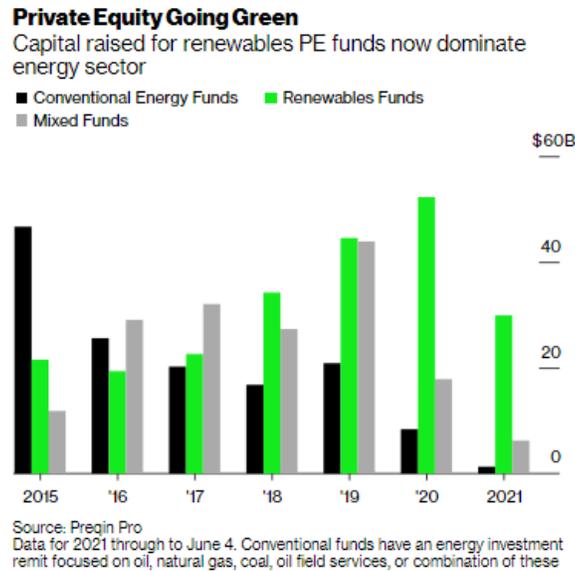
Some climate-related developments are creating opportunities for hedge funds. For example, carbon emissions trading is a form of carbon pricing. It is an approach to limit climate change by creating a market with limited allowances for emissions. Carbon emissions trading started in 1997 when some 180 countries signed the Kyoto Protocol. Carbon emissions trading exists in some fashion in many countries today, including China, the EU, India, and the UK, as well as in states in the US, such as California. As carbon emissions credit trading expands, several firms that offer managed futures funds are trading carbon emissions, most prevalently in Europe. In addition to carbon emissions trading, hedge fund managers are finding investment opportunities in structured products that offer niche exposures, such as reforestation and biodiversity. Managers may take advantage of overlay structures, such as emission-reduction or fossil fuel free, to mitigate carbon exposure in existing portfolios.

Because hedge funds are often designed to take advantage of shorter-term market movements, even hedge funds designed to support investment portfolio decarbonization may potentially conflict with long-term decarbonization of the real economy.

Private Markets

Traditionally, private equity funds (“PE funds”) were strong proponents of the fossil-fuel industry. Today, PE funds more often pursue the integration of climate-focused solutions and asset managers are finding strong investment opportunities tied to the climate transition. In 2021, much of the capital raised by private equity energy and infrastructure funds went to PE funds with a renewable focus or component rather than a focus on conventional energy sources, as shown in Figure III.10 below.

Figure III.10 – Private Equity Capital Raised for renewables funds Compared Conventional Energy



Some challenges facing private equity funds in climate-related investments include limited access to data, lack of universally adopted framework (including universal net-zero framework), challenges stemming from internal buy-in, and inconsistent regulatory requirements.¹ Fewer than 10% of all 8,810 private equity firms are currently signatories to the United Nations’ Principles for Responsible Investment (“UN PRI”). It can be difficult to determine the exact scope of climate related investments and their performance in private equity.

Private infrastructure, as an investable asset class, appeared around 2005. At that time, common infrastructure investments were gas-fired power plants, midstream pipelines, and transportation. By 2021, 80% of the infrastructure energy funds (not assets) that closed invested in renewable energy, in contrast to 6% in non-renewable energy funds and 14% in mixed.²

Real estate is susceptible to climate change risks as a physical long-term asset. Rising seas, extreme weather, and water availability will all have economic impacts. Regarding emissions, real estate development represents 30% of GHG emissions worldwide.³

In real estate private markets, trends relating to climate change investing appear mixed. The underlying real estate assets – the buildings – are where many energy efficiencies are incorporated. It is becoming common for new builds to include motion sensors, low flow water, green roofs, and water harvesting, among the many other wide and various energy efficient options. For existing properties, real estate managers analyze the amount of investment needed to add or gain more energy efficiency.

¹ James, K., & Lubber, M. (2021). (rep.). The Changing Climate for Private Equity. Retrieved October 2021, from <https://www.ceres.org/resources/reports/changing-climate-private-equity>.

² Jacobius, A. (2021, September 20). Changing Energy Landscape Fuels Infrastructure Investing. Pensions & Investments. Retrieved October 18, 2021, from <https://www.pionline.com/alternatives/changing-energy-landscape-fuels-infrastructure-investing>

³ International Energy Agency: <https://www.iea.org/topics/buildings>



Minnesota State Board of Investments

Phase III: Climate Change and Financial Markets

Meketa currently is aware of one real estate manager that markets real estate funds that are aware of physical climate risks. Otherwise, there are a handful of managers that have strong ESG programs within the broader company that spill into better green/climate aware management at the real estate fund level. Industry data shows that investment managers have created relatively few green real estate funds. However, data is not readily available to show market-wide inflows or demand for green real estate products or to clearly demonstrate climate change trends within private market real estate investment.

IV. Policies, Regulations, and Institutional Collaboration

Policy and Regulatory trends show accelerating shifts in climate regulations and policies. The sheer volume of change affects investment markets. Institutional collaboration around climate continues to expand to encompass engagement with companies (through both equities and fixed income investments) and engagement with governments. **By far, the policy decisions of legislative and regulatory bodies will dwarf the direct impact of institutional investors.**

Over the last several decades, world leaders have debated how to combat climate change. These discussions produced several important pacts, including the Kyoto Protocol and, most recently, the Paris Agreement. Through these treaties, countries agree to reduce GHG emissions to address climate change. Although governments generally agree on the science behind climate change, they have differing views on who is most responsible and how to set emissions-reduction goals. A central issue is that developed countries historically produced the most emissions as they developed their economies, while emerging markets bear much of the brunt of the climate risks from these historic emissions and will require a different time path to reduce emissions than for countries that are already developed.

Although negotiations largely began with world leaders at the national level, climate change policies are being enacted at state and local levels as well. Three notable examples in the US are New York, Minnesota, and California. New York's Climate Act is among the most ambitious laws in the world. This Act requires New York to reduce GHG emissions 40% by 2030 and 85% by 2050 from 1990 levels, along with a list of other requirements intended to place New York on a path toward carbon neutrality.¹

In Minnesota, the state rolled out a multi-agency initiative called Minnesota Climate, which focuses on reducing Minnesota's GHG emissions by 80% by 2050.² The set of policy proposals will lead Minnesota to 100% clean energy in the state's electricity sector by 2050. The policies build on Minnesota's past reductions of fossil fuels and aim to increase the use of clean energy resources while ensuring reliable, affordable electricity. Xcel Energy, Minnesota's largest utility, has publicly committed to generating 100% of its electricity from clean energy by 2050. The proposal focuses on three key areas: 100% clean energy by 2050, clean energy first, and energy optimization. In 2016, the transportation sector surpassed electricity as the sector generating the largest CO₂ emissions in Minnesota. Among many other statewide initiatives, Governor Walz asked the Minnesota Pollution Control Agency ("MPCA") to start the rulemaking process by adopting two emissions standards that will reduce GHG emissions from passenger vehicles: the Low-Emission Vehicle ("LEV") standard and the Zero-Emission Vehicle ("ZEV") standard. Other initiatives include support for development of a statewide electric vehicle charging network, support for climate transition in agriculture and biofuels, and support for homes to reduce energy use.

California has long been a leader of climate change policies and initiatives in the US. As such, in 2006 the state passed aggressive legislation (the California Global Warming Solutions Act of 2006) to reduce its overall GHG emissions to 1990 levels by 2020 and 40% below 1990 levels by 2030, and it appointed the California Air Resources Board ("CARB") to develop the necessary policies to achieve this goal.³ This

¹ Source: Climate Act. Retrieved from <https://climate.ny.gov/>

² Source: Our Minnesota Climate. Retrieved from <https://climate.state.mn.us/>.

³ Source: California Air Resources Board AB 32 Global Warming Solutions Act of 2006. Retrieved from <https://ww2.arb.ca.gov/resources/factsheets/ab-32-global-warming-solutions-act-2006>.



legislation was the first of its kind in the country to take a comprehensive, long-term approach to addressing climate change. The goal was to place California on a path to a low-carbon future.

This section highlights trends in climate change policies globally, first by documenting the current climate change agreement in place, the Paris Agreement. The charts indicate how nations have implemented climate policies and outlines the goals and pledges during discussions at the 26th UN Climate Change Conference of the Parties (“COP26”) in November 2021.

The Paris Agreement, often referred to as the Paris Accords or the Paris Climate Accords is a legally binding international treaty on climate change that was signed by 195 nations at the COP21 in Paris in December 2015. This agreement mandated climate change policy at the international level and covers climate change mitigation, adaptation, and finance. It was groundbreaking at its inception because for the first time developed and emerging countries committed to work together to tackle the climate change crisis. The goal of the Paris climate accord was to create a climate-neutral world by 2050. Although most nations signed the Paris Agreement, experts say the pledges are not ambitious enough to prevent global temperatures from warming more than 1.5°C above pre-industrial times. It is expected to be extremely challenging for nations to shift their economies sufficiently to meet their pledges.

Becoming "climate neutral" means reducing GHG emissions as much as possible but also compensating for any remaining emissions by removing carbon dioxide and other GHGs from the atmosphere, using natural or artificial processes. To achieve this goal, each signatory pledged to reduce their respective GHG emissions to keep global temperatures "well below" 2.0°C above pre-industrial times and attempt to limit them even further to 1.5°C. The long-term temperature goal of 1.5°C is important as climate scientists explain that a rise in global temperatures above 1.5°C can lead to more frequent and severe natural disasters, resulting in catastrophic damage. The average global temperature has already risen by about 1°C. Therefore, scientists say that world leaders must take more aggressive action to effectively mitigate climate change. World leaders gathered at COP26 to try to agree upon next steps.

Climate change policies vary amongst countries largely because developing countries are much more dependent on fossil fuels as a core component of their economic growth. In April 2021, President Biden hosted a virtual summit with 40 world leaders called the Leaders Summit on Climate, with the goal to rally the world in tackling the climate crisis. At the summit, the US and several other countries announced ambitious new climate targets aimed at cutting GHG emissions to limit global warming to 1.5°C above pre-industrial levels. In addition, world leaders reiterated the need to use nature-based solutions to fight climate change and discussed how achieving net-zero by 2050 is not possible without natural climate solutions, such as preventing illegal deforestation and the loss of wetlands and restoring marine and terrestrial ecosystems.

During the summit, the US pledged to cut carbon emissions by 50-52% below 2005 levels by the year 2030, which essentially doubles the previous promise. In addition, the US announced its support of a proposal to protect the Southern Ocean through the three marine protected area proposals under the Convention for the Conservation of Antarctic Marine Living Resources (“CCAMLR”). All participants highlighted their support for protecting and conserving land and marine areas to eliminate carbon and build climate resilience.

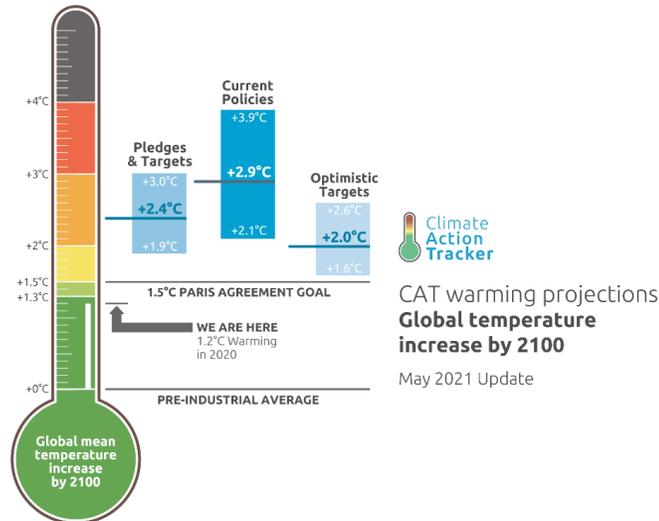
Canada, the EU, the UK, and Japan pledged to cut GHG emissions more aggressively. Canada promised to limit emissions by 40-45% by 2030, which was an increase from its prior commitment to a 30% reduction. Canada is also allocating \$4 billion of its new federal budget to land and ocean protection

efforts. The EU announced its plans to cut emissions by at least 55% by 2030, compared with 1990 levels. This goal is a substantial step up from the EU's previous 2030 target of cutting emissions by 40%. The UK government said it wanted to cut carbon emissions by 78% by 2035, which is 15 years earlier than its current target. Japan pledged to reduce emissions by 46% in 2030 compared to 2013 levels. Previously, the country had pledged only a 26% cut in emissions. China made no new pledges at the virtual summit. The Chinese government noted that they would tackle coal in the next few years as the President of China plans to regulate coal projects and coal consumption more severely. Brazil committed to achieve net-zero by 2050, end illegal deforestation by 2030, and double funding for deforestation enforcement. Although these commitments are positive, scientists are urging more aggressive and immediate action from world leaders, especially after COP26.

COP26 in Glasgow was the biggest climate change conference since the Paris Agreement. More than 100 world leaders and thousands of diplomats from nearly 200 countries gathered to negotiate ways to cut GHG emissions by 2030. By the end of COP26, 151 countries had submitted new climate plans (known as nationally determined contributions, or NDCs) to slash their emissions by 2030. To keep the goal of 1.5°C within reach, it is estimated that we need to cut global emissions in half by the end of this decade. In contrast, the UN calculates that these plans, as they stand, put the world on track for 2.5°C of warming by the end of the century. The Glasgow decision calls on countries to "revisit and strengthen" their 2030 targets by the end of 2022 to align them with the Paris Agreement's temperature goals. It also asks all countries that have not yet done so to submit long-term strategies to 2050, aiming for a transition to net-zero emissions around mid-century. In addition, the pact asks nations to consider further actions to curb potent non-CO₂ gases, such as methane, and includes language emphasizing the need to "phase down unabated coal" and "phase-out fossil fuel subsidies." This marked the first time that negotiators have explicitly referenced shifting away from coal and phasing out fossil fuel subsidies in COP decision text. COP26 recognized the importance of nature for both reducing emissions and building resilience to the impacts of climate change, both in the formal text and also through multiple initiatives announced on the sidelines.

Figure IV.1 illustrates an estimate of the current climate pledges and targets in relation to their estimated ability to address global warming. As shown, current pledges and targets, policies, and even optimistic targets, together fall short limiting the global temperature rise to 1.5°C.

Figure IV.1 – Climate Pledges, Targets, and Current Policies¹



Carbon reduction targets by countries continue to climb. To date, 49 countries plus the EU pledged a net-zero target. This includes 12 G20 countries. The pledges cover over half of global domestic GHG emissions, over half of GDP and a third of the global population. Eleven targets are enshrined in law, covering 12% of global emissions. If made robust and implemented fully, net-zero targets could help bring the predicted temperature rise down to 2.2°C. However, many of the national climate plans delay action until after 2030, raising doubts over whether governments can deliver net-zero pledges.

For financial markets, the rapid growth in climate and more broadly ESG investing with a lack of regulation and standards, has generated risks of greenwashing and makes it more difficult for investors and companies to analyze and make strategic decisions to address climate transition issues.

Regulation and standardization are starting to develop globally. To date, there is a lack of global baseline standards on climate reporting. The lack of standardization increases the range of reporting required by companies and asset managers and reduces the clarity for asset owners into investment products and underlying data on investee companies.

Europe has led the way in regulations surrounding so-called “green” investments. The EU’s Non-Financial Reporting Directive (“NFRD”) allowed investors to review such disclosures since 2018. The EU’s Sustainable Finance Disclosure Regulations (“SFDR”) and EU Taxonomy regulation provides a framework to overcome some of the shortcomings in consistency and reporting. The EU Taxonomy Delegated Act sets out a list of environmentally sustainable economic activities that make a significant contribution to climate change mitigation and adaptation, providing investors and issuers a common language as it pertains to climate friendly investing. The Taxonomy Regulation will roll out additional legal disclosure obligations for issuers claiming the “green” label in 2022.

In the US, both the SEC and the Department of Labor (“DOL”) proposed regulatory changes that address ESG including climate issues in 2021. In March 2021, the SEC created a new Climate and ESG Task Force to identify misconduct related to climate and ESG issues in investing. They requested

¹ Source: Climate Action Tracker.



comment specifically on how the SEC should regulate climate change disclosures and broader ESG disclosure. In September 2021, the SEC proposed new disclosure rules to enhance the information mutual funds, ETFs, and certain other funds report annually about their proxy votes and make that information easier to analyze. In October 2021, the DOL proposed new rules that would explicitly direct ERISA pension plan fiduciaries to consider that ESG issues could present material business risks or opportunities to companies and create a new presumption that a prudent fiduciary should consider ESG issues when evaluating the risk and return profiles of investment opportunities. This new language clarifies and confirms explicitly that climate change and other ESG factors are no different from other “traditional” material risk-return factors, and that plans should regard these factors on an equal footing in the investment decision-making process.

A landmark announcement on November 3, 2021, accelerates efforts to create international standards, convergence among regional standards, and convergence among the multiple existing voluntary standards. The newly launched International Sustainability Standards Board (“ISSB”), by the International Financial Reporting Standards Foundation (“IFRS”) will absorb corporate reporting bodies Climate Disclosure Standards Board (“CDSB”) and the Value Reporting Framework (“VRF”). The ISSB will sit alongside and work in close cooperation with the International Accounting Standards Board (“IASB”). The lack of consistent standards has created uncertainty and raises investment risk and reduces the clarity for asset owners into investment products and underlying investee companies. Such convergence, as is evident in the IFRS announcement, can help fulfill the demand for streamlining and formalizing corporate sustainability disclosures and improving transparency for investors. The IASB recently took nearer-term governmental accounting steps to clarify existing reporting standards which make explicit that IFRS financial reporting must incorporate material climate risks.

Collaborative efforts to address climate change continue to expand throughout financial and economic markets. Many organizations have coalesced under the Race to Zero umbrella. Each of the Race to Zero members are committed to the same overarching goal: reducing emissions across all scopes, swiftly and fairly in line with the Paris Agreement, with transparent action plans and robust near-term targets. Together they form the largest, growing alliance of non-state actors committed to taking rigorous and immediate action to halve global emissions by 2030 and deliver a healthier, fairer zero carbon world in time.

Collaborative efforts are providing tools that asset owners and managers can utilize to set interim milestones and targets to apply to both investment and engagement processes. These include the Net Zero Asset Owners Association, the Net Zero Asset Managers Initiative, the UN convened Net Zero Asset Owner Alliance and the Target Setting Protocol, the Science Based Targets initiative for financial institutions, the Paris Aligned Investment Initiative, and the Net Zero Investment Framework 1.0.

V. Climate Data, Metrics, and Ratings

Data availability is an essential element of investment analysis. Trends in the evolution of climate data indicate that over time we can expect:

- Improvements in the quality and quantity of climate data.
- Coverage of more companies, including privately held companies, and more asset classes.
- Refinements to existing measures, and development of new metrics, including more forward-looking transition metrics that potentially enhance our ability to analyze the climate risks that investors face, and greater development and attention to all scopes of emissions, including Scope 3.
- Data and metric standardization can benefit from evolving regulatory standards and over time better harmonization of standards across jurisdictions.
- Greater transparency on environmental and ESG ratings, and potential increased correlations among rating providers as standards develop.

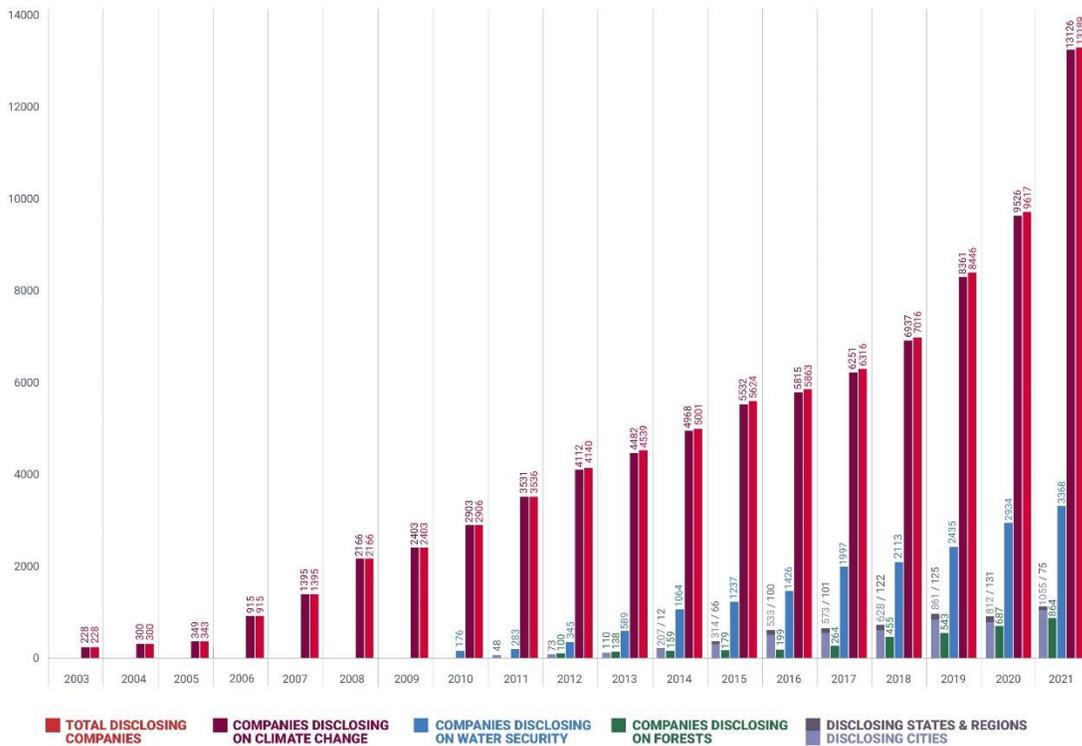
Lack of Data

Climate data is unavailable for many key climate risk metrics and is thus modeled or estimated by data providers. Increasingly, company data, particularly for larger companies, is being made available consistent with voluntary standards developed by private and non-profit organizations. For example, the number of companies disclosing on climate change data to the CDP grew from 228 companies in 2003, to nearly 4,500 a decade later, reaching over 9,500 by 2020 and ramping to more than 13,000 in 2021. The 13,126 CDP reporting companies in 2021 represent more than 64% of global market capitalization. CDP reporting today includes more than 14,000 entities when the count includes the hundreds of cities, states and regions that disclosed to the CDP in 2021.¹

¹ CDP, "Accelerating the Rate of Change: CDP Strategy 2021-2025, October 2021.

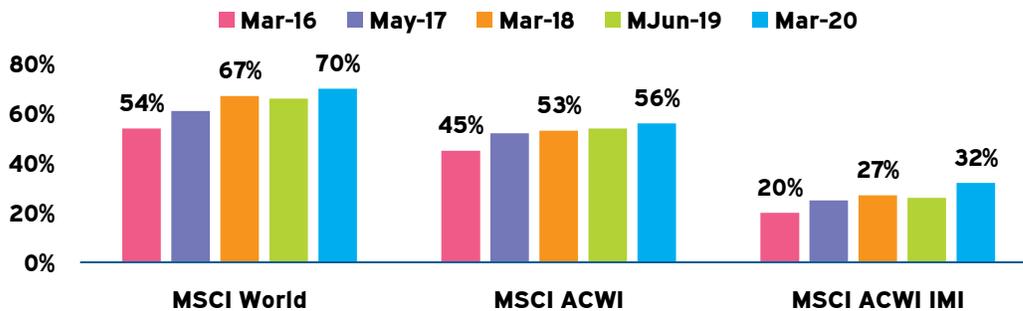


Figure V.1 – CDP Reporting Growth¹



The percent of publicly listed companies that disclose Scope 1 and 2 carbon emissions data has grown globally and across all markets, with the greatest coverage among larger companies, and developed markets, as illustrated in Figure V.2 in the increase in disclosures for the MSCI World, MSCI ACWI, and MSCI ACWI IMI indexes.

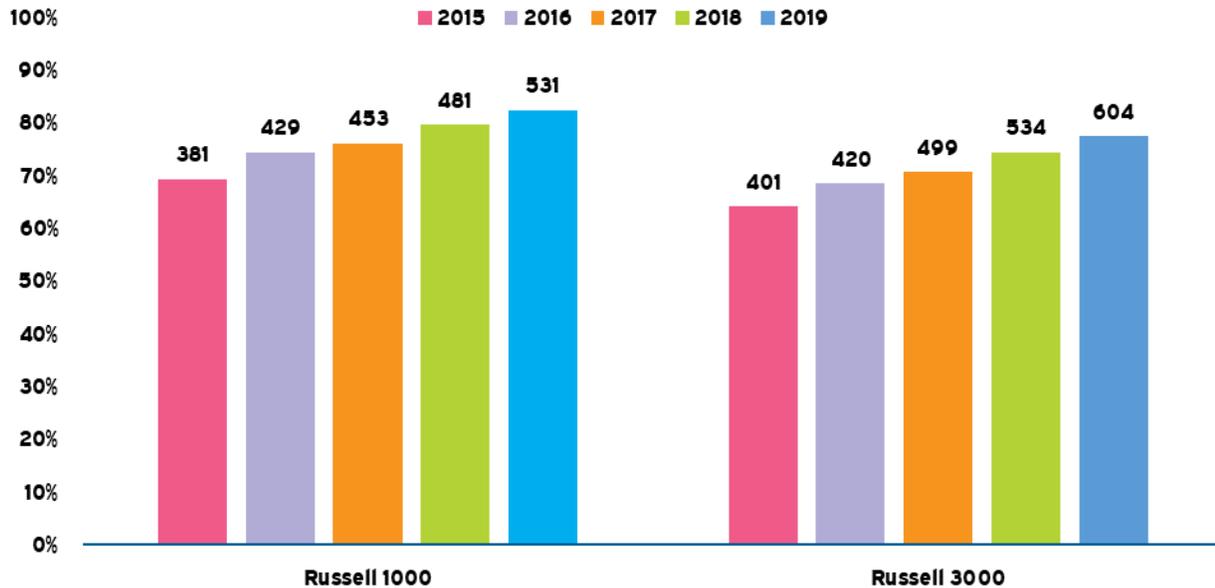
Figure V.2: Percentage of MSCI Index Companies with Disclosed Scope 1 + 2 Carbon Data by Universe²



¹ Source: CDP.

² Source: MSCI.

Figure V.3: Russell 1000 and 3000 Scope 1 and 2 carbon emissions disclosure data (Percent of index), number of companies that report



As shown in Figure V.3, in the US, the same patterns hold, where larger companies tend to report emissions data more than smaller cap companies. For example, in 2019, the latest data for which FTSE/Russell had carbon reporting data available, 531 of the Russell 1000 companies reported Scope 1 and 2 emissions which accounted for 82% of the index. For the Russell 3000 index, 604 of the total 2,992 companies reported emissions in 2019 which accounted for 77% of the index.

With 59% of the US domiciled companies that are constituents of the MSCI ACWI disclosing Scope 1 and 2 Carbon emissions data, the US lags its European counterparts, Japan, and some developing countries in the percent of companies disclosing carbon emissions data, as show in Figure V.4. China lags much further, at 21% of MSCI ACWI China domiciled companies reporting on carbon emissions.

Figure V.4: Percentage of MSCI ACWI Companies with Disclosed Scope 1 + 2 Carbon Data, by Country of Domicile¹



¹ Source: MSCI.



Along with raw data, the number of entities with published climate metrics continues to grow. For example, in October 2021, the Transition Pathway Initiative (“TPI”), an asset owner led initiative, which assesses companies' preparedness for the transition to a low carbon economy, announced the 2022 opening of the Global Climate Transition Centre. The Centre has the backing of asset owners and managers with combined assets under management or advisement of \$40 trillion. Through the Centre, the TPI plans to assess 10,000 issuers, up from 400-plus today, on their alignment with a net-zero pathway, and expand coverage from equities to encompass bonds. TPI divides company assessments into two parts: The TPI “Management Quality” covers companies’ management/governance of GHG emissions and the risks and opportunities arising from the low-carbon transition. The TPI “Carbon Performance Assessment” involves quantitative benchmarking of companies’ emissions pathways against the international targets and national pledges made as part of the 2015 Paris Agreement, for example limiting global warming to below 2°C. TPI bases both assessments on company disclosures.

Asset Class Coverage Primarily of Public Equities

ESG and climate data and ratings first emerged for public equities. Fixed income and private markets ESG and climate-specific data are now coming to market. For example, the CDP plans to expand its climate disclosures to debt, sovereign, and private markets, and has launched pilots for private equity and venture capital.¹

In September 2021, global credit rating provider, Fitch, announced the creation of a comprehensive range of ESG ratings products with transparency to underlying rationales, at both an entity level and instrument level for the investable fixed income market. Fitch implemented its ESG Relevance Scores in 2019. These scores quantify the effect that ESG factors have on current credit ratings of entities and debt instruments. For these scores, the forecast is rarely out further than a standard assessment period of three to five years.

The Fitch ESG Vulnerability Scores measure the relative vulnerability of sectors and entities to long-term ESG-related changes under a scenario that incorporates a global transition to a 2°C warmer climate by 2050. The analysis extends to 2050 and provides milestone assessments from 2025. Fitch’s ESG Vulnerability Scores’ core stress scenario is the UN PRI Inevitable Policy Response (“IPR”) Forecasted Policy Scenario (“FPS”). As Fitch summarized: “The scores are a ranking of the relative risks to sectors and entities based on what we believe could (rather than will) threaten them. Our view is based on credible downside risks drawn from current scientific understanding, policy discussion and commitments, and technological achievements.”²

The GRESB Real Estate Assessment is the investor driven global ESG benchmark and reporting framework for listed property companies, private property funds, developers and investors that invest directly in real estate. The GRESB Real Estate Assessment requires that funds report on their energy, waste, and water data as well as their Scope 1, 2, and 3 GHG emissions within the Performance Indicators Aspect, which is worth a quarter of the overall GRESB score. The GRESB Assessment introduced mandatory reporting of Scope 3 emissions in 2018 following pressure from investors to capture a more comprehensive view of emissions portfolios.

Physical climate risk is central to real estate risks. Start-ups are creating technologies that measures the risks posed to real estate. One such company is Four Twenty Seven Inc. (majority owned by

¹ CDP, “Accelerating the Rate of Change: CDP Strategy 2021-2025, October 2021.

² Fitch Ratings, Special Report, 15 January 2021, p.4.



Moody's), which maps climate data of real estate properties against climate risks and gives each property a score.

Private market databases on climate metrics are developing. They are likely to be generally constrained by the private nature of the issuers. In September 2021, CalPERS and Carlyle Group led a group of global private equity firms and pensions funds managing over \$4 trillion in assets that have agreed to standardize reporting on (ESG) performance of portfolio companies, tracking data on GHG emissions, renewable energy, board diversity and other metrics. Additional efforts to address the lack of private market climate data are emerging. For example, on October 7, 2021, the Ford Foundation, S&P Global (NYSE: SPGI), Hamilton Lane (NASDAQ: HLNE) and Omidyar Network, launched Novata as an independent, unbiased and flexible open architecture platform for private markets to more consistently report on relevant ESG data. ESG data providers are expanding to private market climate data. For example, in October 2021, MSCI and The Burgiss Group announced a new carbon footprint toolkit that includes measuring and monitoring GHG emissions of private equity and debt portfolios, based on estimates for over 15,000 companies in more than 4,000 active private equity and debt funds, and measure progress towards net-zero commitments.

Improvements to climate metrics and development of new metrics

Metrics to capture physical climate risk and energy transition risk are rapidly evolving. Many data providers and organizations are contributing. Early on, climate risk metrics investors often centered on a company's carbon footprint, or the Scope 1 and Scope 2 carbon emissions embedded in the asset owner's investment. Concerns over potential stranded assets, particularly of fossil fuel reserve owners, prompted the development of metrics to measure potential stranded assets for fossil fuel reserve owners.

With the adoption of Task Force on Climate Related Financial Disclosure ("TCFD") framework for climate reporting, carbon intensity, measured as Scope 1 and 2 emissions per \$1 million revenues became a leading economy-wide metric. In parallel, efforts to better understand company's management of climate risks led to the development of forward-looking and corporate strategy metrics, such as alignment with a net-zero long-term trajectory, use of science-based emissions reductions targets, and whether companies establish interim targets to supplement long-term targets.

Recognition of the critical differences in which sustainability issues are financially material for different industries spurred integration of industry-based distinctions, such as those based on the Sustainable Accounting Standards Board ("SASB"). Recently, data and metrics improvements have included measurement and coverage of Scope 3 emissions. Scope 3 emissions vary widely across industries and sub-industries, and for some industries Scope 3 emissions are a large percent of total emissions. For example, using ISS emissions data, adding Scope 3 emissions increased total emissions for energy sector companies by an estimated 887%; 269% for the industrials sector companies; 137% for the materials sector; and 135% for the utilities sector.

The TPI brings a clear focus on transition that is industry specific, including metrics on how the transition is managed, along with trends in emissions relative to transition goals such as alignment with the Paris Accord.

New climate metrics are emerging. For example, Ninety One proposes new transition metrics for sovereign debt to provide better measures of the how countries are transitioning to net-zero. They raise the question of measuring emissions based on where a product is consumed, rather than

production based, which would significantly change the accounting for many products that are produced in emerging markets but consumed in developed markets, from phones to solar panels.

As another example of a forward-looking metric, Carbon Tracker Advisor, Greg Rogers, created a new, simple open-source metric entitled Carbon Quotient (“CQ”) to measure forward exposure to emissions using data such as property plant and equipment – and across the economy, not just the fossil fuel supply sector. The data required is basic financial data, so public and private companies will have the data. The metrics build on audited financials to adjust the income statement and balance sheet to reflect a particular ‘what if’ scenario – ‘what if’ this company or this portfolio had to be carbon neutral today as a matter of law? Would it be profitable? Would it be solvent? Climate-related financial risk and opportunity both arise from the need to retire and replace carbon-intensive assets with low or zero carbon alternatives on an expedited schedule. By treating everyone the same, assuming net-zero applies to everyone *today* by law, CQ analytics allow investors and corporate managers to compare different investment options on an apples-to-apples basis in a way that reflects financial risk.

The CQ ratio differs from carbon intensity in two ways: First, by accounting for future unrealized emissions embedded in existing long-lived assets, the CQ ratio is forward-looking. Second, by correlating unrealized emissions with the assets that produce them, which assets risk becoming stranded, the CQ ratio serves as a measure of financial risk.

Lack of Regulatory Standards

The rapid private sector development of financial ESG products and data has occurred without clear regulatory standards. Market-led voluntary framework leaders are actively working to bring more consistency across frameworks, as can be seen in the merger between SASB and the IRRG into the Value Reporting Foundation, and incorporation of various efforts such as TPI and SASB into alignment with the TCFD framework. Where government standards are developing, they are inconsistent across geographic regions. Trends indicate that regulations that seek to standardize the taxonomy for data presentation and for marketing investment products as ESG or Climate/Sustainable will continue to grow, likely led by the EU and the UK, with standards in the US and other jurisdictions also emerging. In 2021, the SEC took steps to review current climate disclosure regulations to potentially require additional disclosures. The SEC also announced in 2021 that its examination priorities would shift to include a greater focus on climate-related risks. The November 2021 announcement by the IFCR on the launch of the ISSB, and absorption of the VRF noted above, marks a significant step forward in convergence of international standards for climate and other sustainability reporting.

Opaque Ratings and Low Correlation on Ratings Among Key Raters

With the rise of climate data and metrics, data providers are providing overall ESG ratings and ratings for each pillar – Environmental, Social, and Governance. The intent of the ratings is to provide greater understanding of the differences between companies on ESG issues, including climate issues. The opaque nature of the ratings and the divergence of ratings across different providers makes such ratings more difficult for investors to use.

Multiple studies have found relatively low levels of correlation on ESG scores among different providers. They also find low correlations between ratings on the Environmental dimension. For example, findings of Berg, Koebel and Rigobon, MIT Sloan and University of Zurich in “Aggregate Confusion: The Divergence of ESG Ratings”, December 29, 2020, found Correlations between ESG ratings of six providers were on average 0.54, and range from 0.38 to 0.71. The correlations of the environmental



dimension were slightly lower than the overall correlations, with an average of 0.53, and a range from 0.23-0.73. These results were largely consistent with prior findings by Chatterji et al. (2016), and with findings from Christensen, Serafeim and Sikochi (2020).

While disclosure of ESG data is increasing, Christensen, et al (2021) finds that greater disclosure currently leads to greater disagreement among ratings, driven primarily by environmental and social disclosures. Berg et al (2020) investigate reasons for the divergence among ESG ratings and find that the main driver of the divergence is measurement (ratings are based on different measurements of the same attribute), while scope (the types of attributes included) and weights (ratings are based on different views of the relative importance of attributes) are less important.

Low correlations among ESG ratings likely reflect at least in part the early stages of institutional innovation around ESG disclosure and metrics, and their development prior to regulators stipulating any standard taxonomy with which to organize and provide data. Over time, as consistent standards for environmental and broader ESG disclosure emerge, and as data and measurement approaches become more transparent, ratings divergence may slowly be reduced. Measurement divergence may be reduced through clearer taxonomy and disclosure.

VI. Climate Scenario Analysis

Climate data, metrics, and ratings focus on assessing individual companies on their climate risk profiles and progress. Portfolio-wide analysis is also emerging. Climate scenario analysis related to climate modeling is an actively evolving area of both discussion and practice among different types of economic actors – asset owners, investment managers, and corporate leadership, among others. In some respects, climate modeling resembles other forecasting tools routinely used by institutional investors (e.g., mean-variance forecasting, portfolio stress tests, and historical scenario analysis) that require significant judgment regarding assumptions and invariably err to some degree versus reality but are nonetheless useful when planning portfolio positioning. Scenario frameworks can help provide a means of evaluating the impact of various climate-related proposals and potentially aid comparability of impacts across different groups of stakeholders. Forward-looking scenario analysis, when combined with assessment of the current climate positioning of a portfolio, makes it possible to understand the costs of various climate objectives more fully for a portfolio and determine a plan to attain those goals and preexisting financial goals. We review the current state of some modeling frameworks, discuss different types of scenario models, and their benefits and drawbacks.

Modeling Frameworks

Although initially mentioned in many codifications of climate frameworks in the middle of the 2010s, in the last several years there has been greater attention paid to financial climate modeling, including objectives and approaches. These features tend to vary based on the sponsoring entity and their position within the financial system.

Task Force of Climate Related Financial Disclosures (“TCFD”) The TCFD, a task force established by the Financial Stability Board, develops recommendations for more effective climate-related disclosures to enable better investment, credit, and insurance underwriting decisions while simultaneously aiding transparency of carbon-related assets in the financial system. TCFD’s recommendations are not targeted directly at asset owners, instead encouraging other organizations to use scenario analysis to identify and assess the potential implications of a range of plausible future states under conditions of uncertainty and to make that information available to inform the decision making of investors and stakeholders. The TCFD approach to climate scenario analysis is flexible, acknowledging that quantitative, as well as written qualitative assessments, can be helpful for assessing risks across a number of areas including transition risk, physical risk, policy & legal risk, and reputational risk. They emphasize that to be most useful, organizations should consider multiple scenarios that cover a reasonable variety of future outcomes, at least one of which is aligned with a 2°C scenario. Other helpful scenarios may include scenarios informed or mandated by national actors or physical and transition risks that are particularly suited to the organization’s operations. More recent communications have provided clarifying details about TCFD’s 2017 positions on scenario analysis, provided case studies for use, and solicited additional commentary integrating climate into risk management processes and determining useful financial sector metrics.

Although TCFD’s framework is targeted at organizations and may more naturally function as input into asset owners’ analyses of climate issues, their considerations for assessing design decisions in scenario analysis are also applicable in a portfolio context:



- Consideration of which parameters to use, the degree of certainty associated with those parameters, and sensitivity of output to changes in parameters.
- Assumptions made regarding policy changes, technology development/deployment, energy mix, price of key commodities or inputs, geographical tailoring of transitional and physical impacts.
- Evaluation of analytical choices including selection of scenarios, time horizons evaluated, and selection of supporting data and models.

In addition to its work on scenario analysis, the TCFD also advocates for increased financial transparency regarding climate exposures, information which can be integrated into multiple types of scenario frameworks.

Network of Central Banks and Supervisors for Greening the Financial System (“NGFS”) NGFS is a group of central banks and financial regulatory supervisors collaborating to contribute to the development of environmental and climate risk in the financial sector and sharing of best practices among the group. Given the economy-spanning responsibilities of its member institutions, the NGFS scenario framework focuses on macroeconomic impacts across a number of scenarios and their impact on the global financial system and the wider global economy. Recognizing the difficulty of determining detailed, plausible scenarios given the inherent uncertainty of climate modeling, NGFS has focused its efforts on developing and providing background data on six scenarios spanning a number of emissions/temperature scenarios and a spectrum of policy responses ranging from organized to disorganized. These scenarios are periodically updated to reflect shifts in climate policy, changes in IMF growth projections, and impacts from disruptive events (e.g., COVID-19). These particular scenarios not only cover a broad range of possible scenarios, but also demonstrate varying levels of exposure to physical and transition risks, exposures which tend to be inversely correlated (i.e., transition steps taken will tend to increase transition risks for economic actors but simultaneously decrease physical warming and its attendant risks) though they do interact to some degree in portions of the model ensemble.

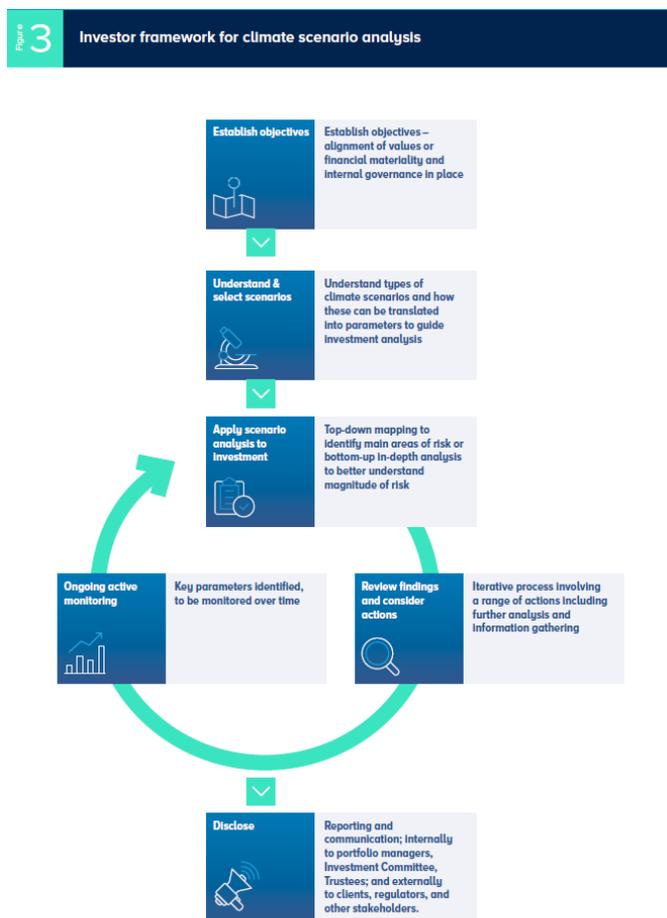
LT Climate Policy	ST Climate Policy	Policy Coordination	Sequestration Availability
Below 2.0°	Immediate	High	Medium
Net Zero	Delayed	Medium	Low
Natl. Determ. Contributions		Low	
Current			

While the NGFS approach lacks some flexibility due to its use of pre-determined scenarios, the scenarios are based on an ensemble of models and provide well specified data, both in terms of outputs as well as documented linkages throughout. Its assessments of aspects of physical and transmission risk are broadly defined and provides high-level data suitable for reviewing portfolio risk exposures in a top-down manner.

Institutional Investors Group on Climate Change (“IIGCC”) The IIGCC is a group formed to foster investor collaboration on climate change and is primarily composed of European asset owners and investment managers. They seek to support and help define the public policies, investment practices, and corporate behaviors that will result in progress towards a net-zero climate goal by 2030. While generally aligned with the TCFD, the IIGCC recognizes that climate scenario analysis presents unique challenges to

financial and investment practitioners: climate impacts have both great breadth and magnitude, highly uncertain and long-time horizons, foreseeable wide scale outcomes but little detailed certainties, and long-term consequences that are impacted by short-term actions. The framework also recognizes that asset owners may seek to use scenarios to assess both financial (e.g., liability/solvency impacts, investment selection) and climate outcomes (e.g., net-zero alignment, stakeholder engagement) simultaneously. Given the different starting point and different needs of various investors, the IIGCC discusses a variety of approaches to formulating and using scenario analysis, noting that simplified scenario approaches can be appropriate to have a better initial understanding of the impact of certain policies but also provides perspective on the use and selection of more sophisticated integrated modelling techniques. The IIGCC also specifically addresses the issue of translating the output of climate models into relevant financial metrics. Their approach allows for both top-down analyses that focus on macroeconomic implications of climate change and their impacts on strategic asset allocation and liabilities, and bottom-up analyses that model impacts at the asset, sector, and portfolio levels which can be aggregated in a holistic analysis of the whole portfolio.

Figure VI.1 – Spectrum of Approaches: Top-Down versus Bottom-Up¹



¹ Source: IIGCC.



As shown in Figure VI.1, there are a spectrum of approaches to climate scenario analysis. Climate scenario methods generally fall into “top-down” or “bottom-up” categories. Multitudes of options exist within those categories and there is considerable scope for combined or aggregated models.

Bottom-up models generally take detailed information about individual companies and industries, then analysts apply and aggregate the information across an entire portfolio. Starting with the outputs of climate models, investors determine what linkages between climate variables and traditional financial valuation and risk variables seem plausible. These linkages can integrate climate considerations into traditional investment processes to provide climate-aware insights. The ability to integrate into existing approaches is a key benefit of a bottom-up approach. As transparency and disclosure requirements like those advocated by the TCFD become more mainstream, the ability to adjust individual asset and sector models to account for climate variable should improve.

While these methods are very granular, they provide insight into current practices and exposures and can yield results that do not necessarily translate to long-term strategic decision making. While climate models can provide long-term forecasts of environmental and associated variables, the linkages between this data and financial variable, as well as asset-level and sector-specific models, are not necessarily built to forecast future values over long time-periods. Additionally, aggregation can reduce the usefulness of the analysis (e.g., a bottom-up analysis that forecast shifts within asset classes but little change in returns among asset classes would have limited usefulness for strategic asset allocation). Fiduciaries typically consider investment decisions, particularly regarding strategic asset allocation and liability management, across longer, multi-decade timespans. Companies change, business practices change, and consumers’ tastes change. Though analysts can make assumptions about trends going forward, any long-term analysis will be dependent on the accuracy of those assumptions.

Top-down models generally begin with climate model outputs and climate scenario considerations and attempt to link these outputs with forecast changes in macroeconomic and broad financial trends over an extended period. While less useful for forecasting performance for portions of an investor’s portfolio, these broader variables typically integrate well with whole-portfolio measures of risk exposure, asset class risk and return forecasting. Scenarios like those of the NGFS can use econometric methods to estimate the impact to GDP from physical climate risk, the socioeconomic impact of climate change on GDP, future behavior of interest rates from climate shocks, among others. However, such models are only as strong as their linkages. To the extent that climate models are incorrect versus reality or the estimated linkages between climate data and targeted variables vary, the top-down estimate will necessarily suffer. Though broader macroeconomic variables can have more stable relationships over time than company-specific measures of valuation, they can also vary over time and would potentially become less stable in more extreme climate scenarios.

Given the tradeoffs associated with both bottom-up and top-down approaches, combining the two can offer the strengths of both while mitigating their weaknesses. One way to combine the methods is to use them sequentially, using a top-down approach to identify riskier areas of portfolios (whether they be asset classes, sectors, or companies) and then engage in detailed bottom-up analyses for those areas to better understand and manage specific climate risks. An investor could also conduct both simultaneously, using the output of each analysis to inform insights about the other. Additionally, both types could be used simultaneously but prioritize different areas of inquiry. For example, bottom-up analysis could be used for judging alignment with an investor’s climate goals throughout the portfolio while the top-down approach would focus on long-term financial impacts.



A key area of concern for any scenario modeling exercise, whether bottom-up or top-down, is assessing scenario output sensitivity to different scenario inputs. Particularly for longer-duration (i.e., multi-decade) analysis associated with asset allocation and liability management, changes in starting dates and assumptions about the timing of various policy responses will meaningfully impact results over the periods of analysis. Input sensitivity does not invalidate a model, but sensitivities should be understood and mitigated where possible by using a variety of different scenarios with varying inputs to help derive a meaningful set of results.

In summary, ascertaining the impacts of climate change, particularly over a longer time horizon, is a challenging endeavor. Differences in the character, magnitude, or timing of various climate risk factors can radically affect the outcome of the analysis. Climate change impacts are not obvious nor simple to estimate or counteract. Trends indicate that as multiple stakeholders continue to work on providing guidance and resources to support scenario analysis efforts among asset owners and other investors, climate scenario analysis will continue to advance. The varying strengths and weaknesses of different analytical approaches, whether bottom-up, top-down, or hybrid approaches should be acknowledged and accounted.

VII. Conclusions

In this first report, we reviewed high-level global trends in climate change and related developments in financial markets across asset classes, policy and regulatory frameworks, institutional collaboration, and trends in climate risk data, metrics, and climate scenario analyses.

The challenges brought about by physical climate risks and the global energy transition to reduce GHG emissions affect every economic sector and geography. GHG emissions vary widely across industries and between companies within each industry. The complex nature of the transition and the difficulty of energy supply and demand transitioning in lockstep to meet net-zero goals in the timeframe identified by experts, is already producing economic disruptions. The magnitude of the changes underway carry significant government policy and regulatory risks for both traditional companies and low carbon-focused companies. A growing number of companies that are in transition offer both traditional fossil fuel driven and new low-carbon energy products and services. The current uncertainty of many government paths heightens the risks throughout the economy. It is important to underscore that traditional sources of energy will continue to be in demand to meet the diverse needs of businesses, the consumer, and governments for the foreseeable future.

Efforts to address climate change are undergoing rapid change across financial markets, government policies and regulations, institutional collaborations, and in climate investment data, metrics, ratings, and scenario analysis. Developing investment strategies that can best seek to manage climate risks and align with net-zero global ambitions will likely continue to evolve as the world seeks to transition to a low-carbon economy, and as physical climate risks mount. These issues are complex, with no easy answers. In the US today, Meketa finds that most public pension plans do not address climate-related risk and opportunities explicitly in their investment strategy. Among asset owners that actively seek to address investment climate risks and opportunities, there are no established best practices on how best to tackle these issues.

Institutional investor climate strategies are evolving and will likely change significantly within the coming decade. Trends indicate that the early attention to climate focused on the publicly traded equity asset class and, at varying rates, has spread to all major asset classes. Attention is shifting to encompass the Scope 3 emissions of companies – emissions based on a company's inputs, and the emissions generated in the use of products after sale. Biodiversity impacts of climate change are commanding growing attention. The importance to economic and social stability of a just transition that supports those workers and communities most negatively affected is gaining recognition. In addition, there is the realization that decarbonizing an investment portfolio, if disconnected from decarbonization in the real economy, does not address long-term climate risks. Strengthening collaborations among institutional investors is raising the importance of shareowner proxy voting, and engagement with companies, asset managers and governments in managing long-term investment climate risks. Meketa will continue to monitor these trends as they evolve.

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TAB G

Report on SBI Portfolio
by Albourne Partners

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DATE: February 7, 2022

TO: Members, Investment Advisory Council

FROM: SBI Staff

SUBJECT: Report on SBI Portfolio by Albourne Partners

SBI private markets consultant Albourne Partners will provide an overview of their capabilities and resources available to SBI staff.

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Overview Albourne

Presentation to Minnesota SBI Investment Advisory Council

February 14, 2022

Contents

PART	1	Relationship Overview
PART	2	About Albourne
PART	3	ESG Capabilities
PART	4	DEI Resources
PART	5	Appendix

Relationship Overview

Relationship began in May 2021

Albourne service model acts as an extension of the SBI investment office

Full working partnership with access to significant Albourne resources

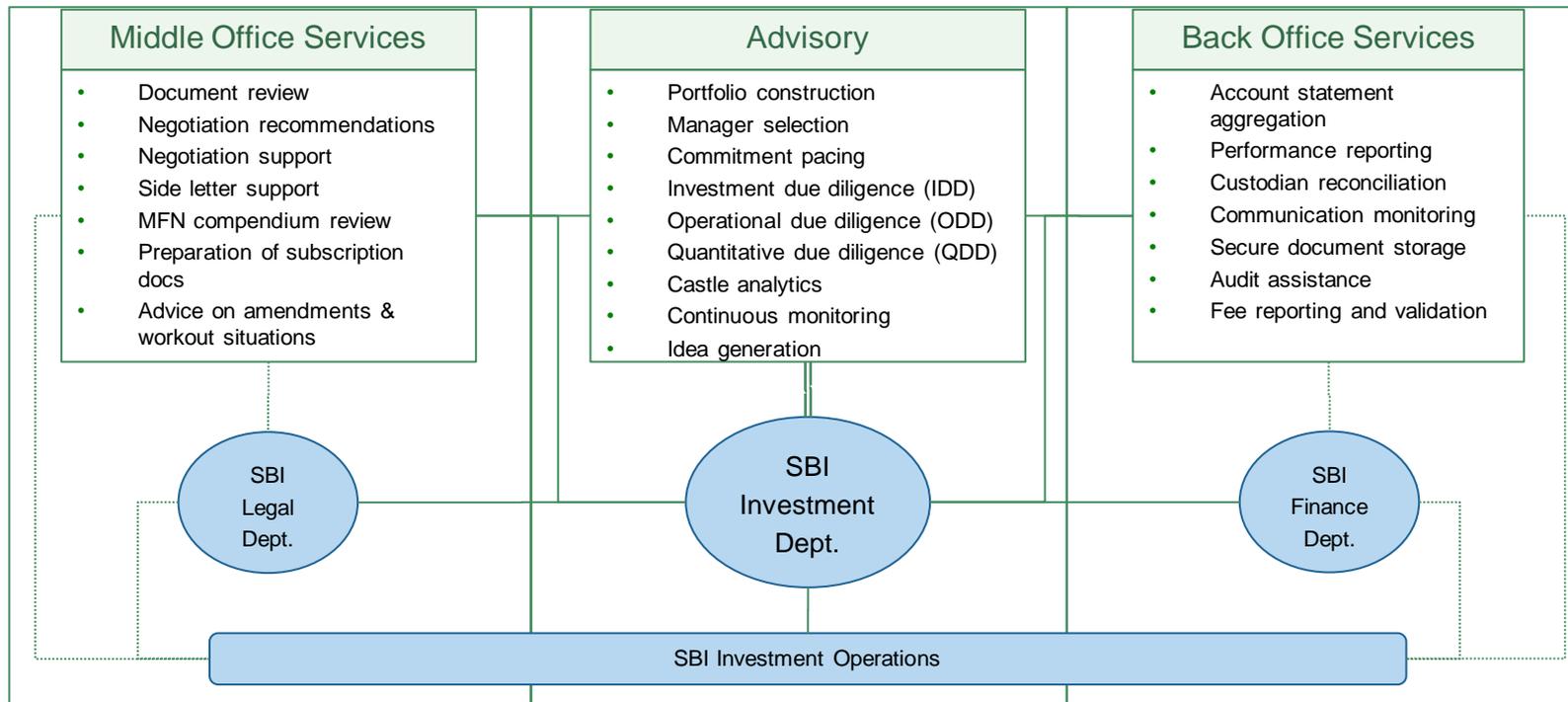
Broad scope of services that cover:

- **Advisory** – Asset allocation, governance, and portfolio construction
- **Due Diligence** – investment, operational, and quantitative analysis to assist in sourcing, selecting, and monitoring investments
- **Implementation** – significant resources providing assistance, guidance, and recommendations on legal documents, terms, fees, and policies
- **Reporting and Monitoring** – collecting and storing manager, fund, and portfolio data and verifying custodian and fee records

Our service model can help build on the long-term success of SBI's investment program and seeks to maintain its high level of quality and commitment to the participants and beneficiaries of the various investment pools

Extension of Staff – Across SBI Departments

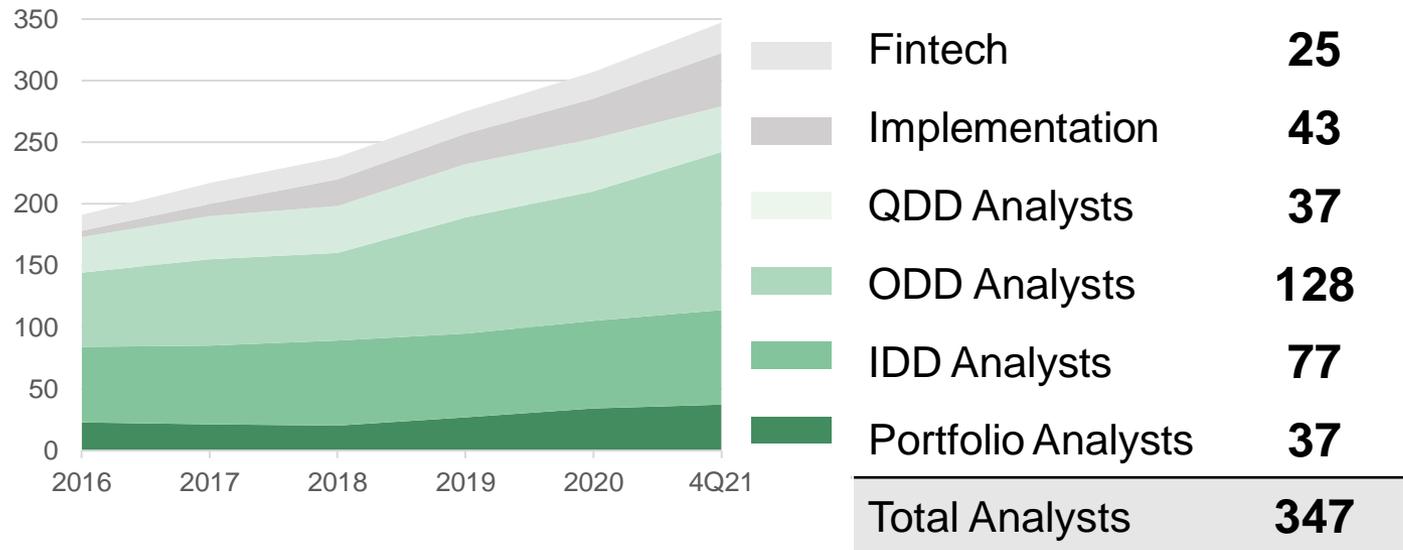
Albourne Advisory with Middle and Back Office Services (B2Y) provides seamless support across SBI departments to provide continuity across related functions.



*Albourne does not provide legal or tax advice

About Albourne – Our Colleagues

519 Total Headcount ¹	347 Analysts	<7% Analyst Turnover ³	48%52% Female / Male
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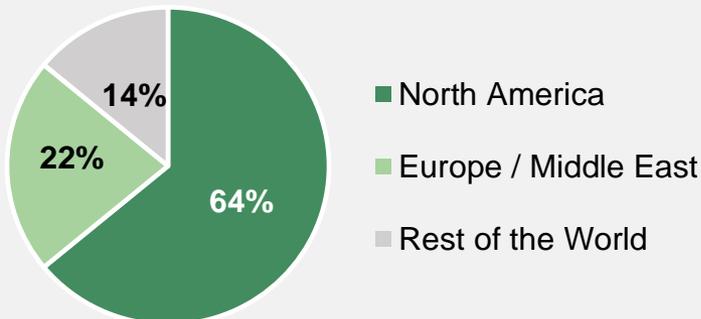
100% Owned by Employees ²	>60 Employee Share & Option Holders	116 Partners	>12 Partners' Average Tenure (Years)
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1. Headcount numbers are aggregated across all Albourne Group entities worldwide
 2. Including the Albourne Employee Benefit Trust and two retired employees
 3. All Analysts, average in three years 2018-2020
 4. All figures as of 1 October 2021

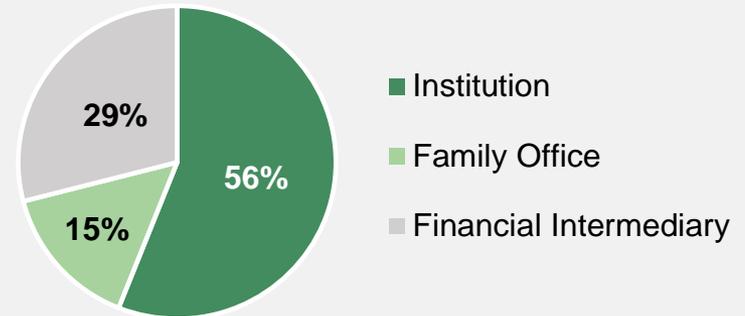
About Albourne – Our Clients

- >300¹ clients globally
- >45 Public Pension Plan clients globally
- >\$600bn² in alternatives
- One of the largest groups of investors in alternative investments

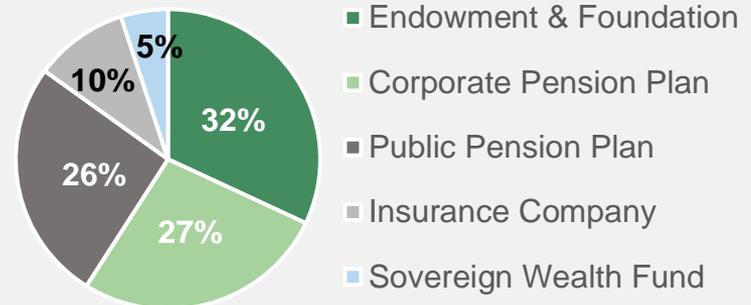
Clients by Region



Clients by Type



Institutions by Type



1. The aggregate number of client entities for the Albourne Group worldwide. Clients may be subscribed to multiple services.

2. A conservative aggregation of the estimated investments in alternatives (where known) of Albourne Group clients worldwide, using public sources where possible

IDD - Investment Due Diligence



Three Reasons: Albourne IDD

- Breadth and Depth of global coverage across alternatives
- Clients can access experienced specialist analysts & their fund ratings
- Client scale can provide access to some of the best managers

Global Team

- 48 Private Markets IDD Analysts*
- 41 Hedge Fund IDD Analysts*
- Analysts in 10 locations

Online Library

- >2,160 Private Markets IDD Reports
- >2,170 Hedge Fund IDD Reports
- >280 Dynamic Beta IDD Reports

Average		High (Auto-decayed)
C IDD Analyst Assessment	4 Conviction	
Latest ¹		Previous ²
C	C	IDD Analyst Assessment
4	5	Conviction ³
M	M	Expected Alpha
L	L	Expected Beta
L	L	Expected Risk
C	C	Strategy & Investment Process
B	B	Management & Team
B	C	Risk Process

Ratings are relative to strategy. ¹Rating date 25 Mar 2018 ²Rating date 6 Jul 2017 ³Latest Conviction auto-decayed

Clear rating scheme based on qualitative and quantitative input

Focus for 2022

- **ESG & DEI**
- **Emerging Managers (NEMO)**
- **Expanded Quantitative Tools**

ODD - Operational Due Diligence



Three Reasons: Albourne ODD

- Large global team based in Europe, Asia, North America
- Flexible Offering - different report types depending on depth of ODD required
- Feedback to manager ensures research is “actionable”

Global Team

- 128 ODD Analysts
- On the ground in 7 locations
- 17 Partners in ODD

Online Library

- >900 Private Markets ODD Reports
- >1,560 Hedge Fund ODD Reports
- >1,590 managers ongoing desk based monitoring

C Manager ODD
Acceptable practices with areas for improvement.

Latest ¹	Peers ²	
C	C	Manager ODD
B	B	Disclosure
C	B	Manager Organization
C	B	Background Checks
D	C	Compliance Resources & Policy
B	B	Investment Operations
B	C	Infrastructure & Business Continuity

Ratings are relative to industry best practices. ¹Rating date 19 Feb 2021 ²Average rating of 17 managers in the Asset Class Specialist - Private Equity peer group.

C Fund ODD
Acceptable practices with areas for improvement.

Latest ⁵	Previous ⁶	Peers ⁷	
C	C	B	Fund ODD
C	C	C	Fund Terms & Governance
B	B	B	Custody & Counterparties
C	C	B	Valuation
C	C	B	Review of Financial Statements

Ratings are relative to industry best practices. ⁵Rating date 19 Feb 2021 ⁶Rating date 15 Jan 2015 ⁷Average rating of 15 fund series with North American Multi-Strategy LBO/Growth strategy.

Focus for 2022

- **Data Analytics & Digitization**
- **Desk Based Monitoring**
- **Adapting to virtual ODD**

Responsible Investing: ESG

What we're seeing

← Majority of Albourne's Clients →

Objectives	Values-Based Abstemiousness	ESG Risk Management	ESG-Themed Investing	Non-Concessionary Impact	Concessionary Impact	Pure Giving
Scope	SRI* Funds	All Funds	ESG-Themed Funds	Impact Funds	SRI* Funds and Foundations	
Motives	Do No Harm			Do Good		
Approaches		Risk Mitigation	Opportunity Seeking		Philanthropy	

How we're helping

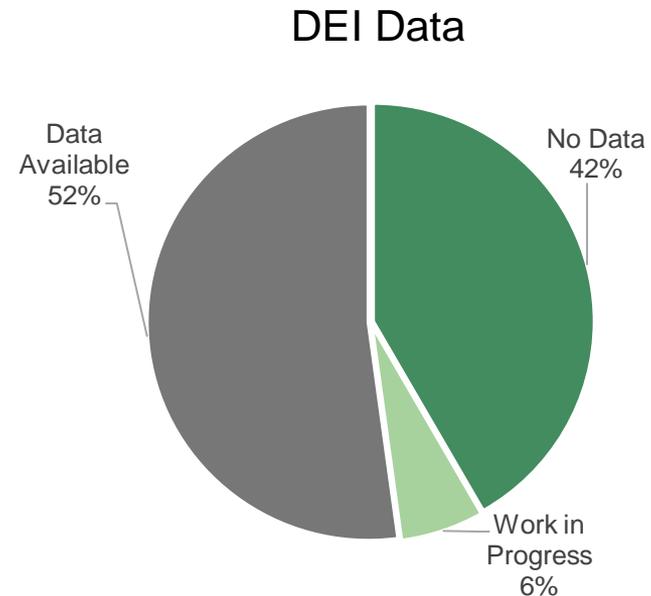
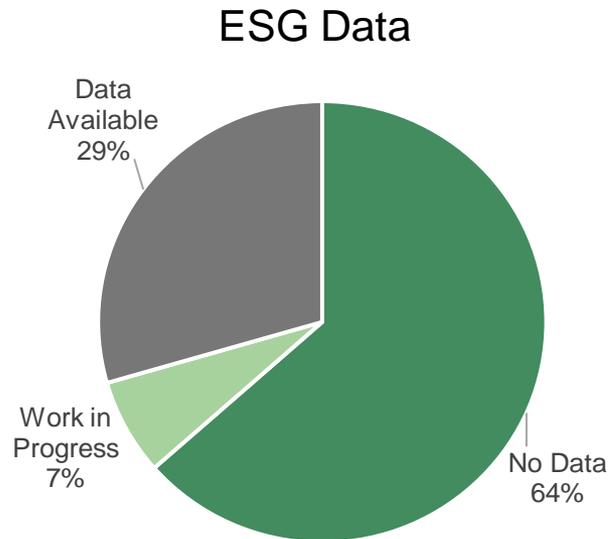
- Helping assess ESG risks in underlying investments through IDD, ESG Scores and OP
- Helping evaluate the quality of ESG-related & Impact opportunities though IDD and Impact DD
- Helping benchmark managers' corporate sustainability practices through ODD
- Helping clients develop their ESG Policies and assisting with their implementation

Engaging with ESG issues globally

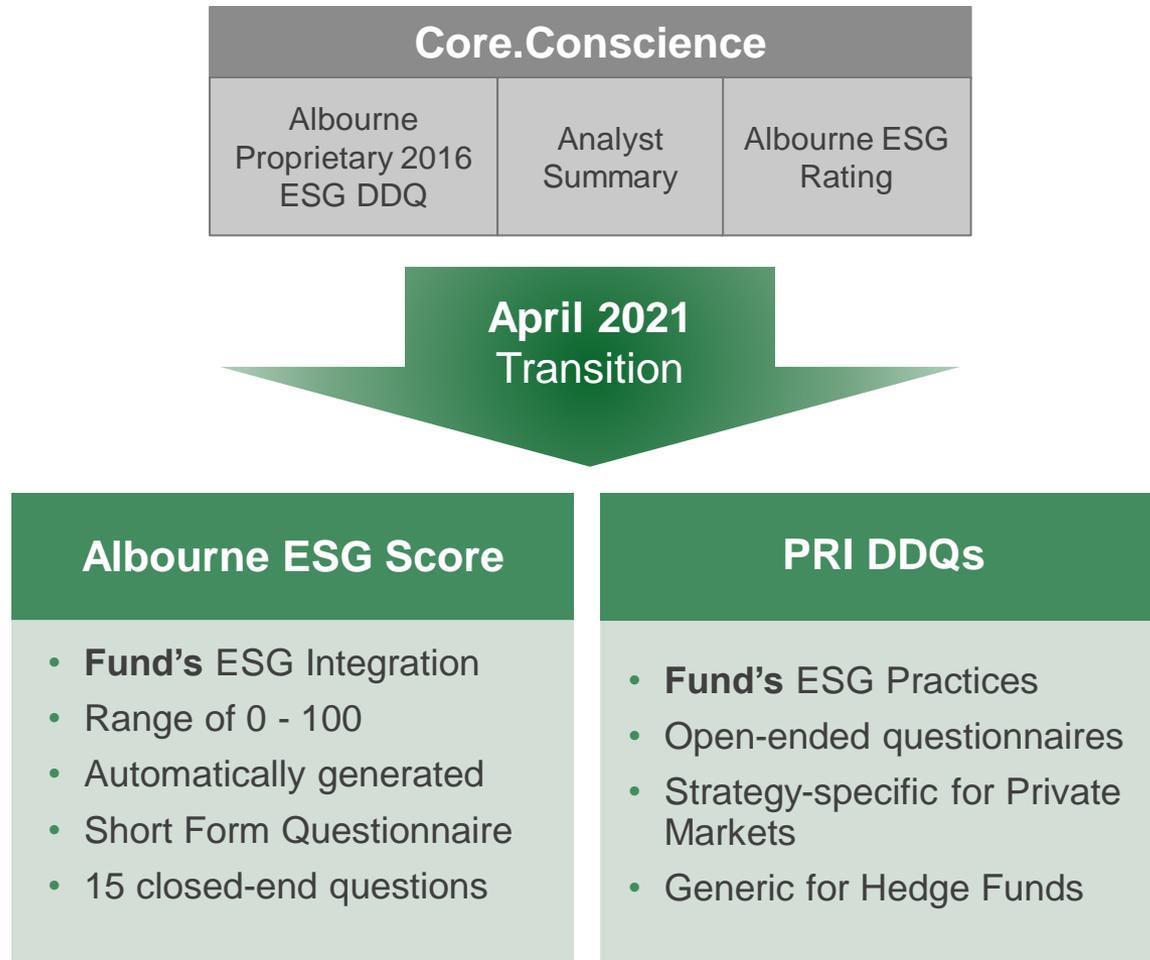


SBI Fund Level Status – ESG and DEI Data Project

- Currently canvassing SBI private markets portfolio under SBI staff direction
- ESG and DEI data collection project coincides with fund raising cycle



New Albourne ESG Score & PRI DDQs



Albourne D&I Initiatives

- **2012 MWBE Coverage Initiative**
 - Albourne MoatSpace manager portal - Hedge Funds self classify
 - Quarterly prime broker survey and manager outreach
- **2018 D&I/ESG Commandment**
 - Investor Manifesto II - Responsible investing: D&I & ESG Proposals
 - Initiated ILPA, AIMA and SBAI Discussions
- **2019 ODD ESG Section (Including D&I)**
 - Employment practices & diversity: Anti-harassment / Equal Pay / D&I Policy
 - Launched 2Q 2019
- **2020 AIMA D&I Questionnaire**
 - ILPA inspired with addition of ownership, veterans, persons w/disabilities and LGBTQ+ community plus additional policy questions
 - Launched 17 August 2020
- **2021 Initiatives**
 - ILPA Diversity in Action initiative signatory
 - WK Kellogg Foundation Expanding Equity Program participant
 - Ongoing collaboration with AIMA, ILPA, SBAI and CFA Institute on D&I best practices and transparency
 - Further integration of the D&I Questionnaire into the ODD process
 - Engagement with industry organizations to support diverse manager sourcing

Diverse Manager Coverage as of 4Q 2021

IDD
410 funds

ODD
256 funds

QDD
356 funds

HF
308
funds

- 53 published in 2020
- 178 published in 2021

HF
140
Funds

- 34 published in 2020
- 105 published in 2021

HF
329
funds

- 329 funds with up-to-date monthly returns (Oct 2021 onward)

PM
102
fund
series

- 38 published in 2020
- 36 published in 2021

PM
116
fund
series

- 37 published in 2020
- 77 published in 2021

PM
27
fund
series

- 27 fund series with quarterly performance (3Q 2020 onward)

AIMA D&I Questionnaire – Summary as of 4Q 2021

Policies	(1) D&I	(2) Equal Pay	(3) Track Workforce Composition	(4) Family /Parental Leave
Yes	61%	74%	80%	87%
No	28%	18%	16%	7%
Due to be implemented within the next 12 months	5%	3%	1%	2%
No response	6%	5%	3%	3%

Policies	(5) Code of Conduct	(6) Reporting and Investigation	(7) Mandatory Training	(8) Claims in Last 5 Years
Yes	91%	81%	72%	9%
No	5%	14%	18%	87%
Due to be implemented within the next 12 months	2%	2%	0%	N/A
No response	2%	4%	11%	4%

% Equity Ownership	(9) Women	(10) Racial/Ethnic Minorities	(11) Other Minority Groups
0%	44%	33%	56%
>0% to <25%	24%	19%	7%
25% to 33%	3%	2%	0%
>33 to ≤50%	3%	3%	1%
>50%	5%	16%	2%
N/A – The firm is a publicly listed company	17%	18%	19%
No response	4%	11%	16%

Total D&I submissions: 503

Disclaimer

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You should carefully review the relevant offering documents before investing in any funds mentioned in the Information. You are responsible for reviewing any fund, the qualifications of its manager, its offering documents and any statements made by a fund or its manager and for performing such additional due diligence as you may deem appropriate, including consulting with your own legal, tax, and other advisers.

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TAB H

Report on SBI Portfolio
by Aon Investments

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DATE: February 7, 2022

TO: Members, Investment Advisory Council

FROM: SBI Staff

SUBJECT: Report on SBI Portfolio by Aon Investments

SBI consultant Aon Investments will provide an assessment and overview of the SBI's total portfolio.

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TAB I

Report on SBI Portfolio by Meketa Investment Group

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DATE: February 7, 2022

TO: Members, Investment Advisory Council

FROM: SBI Staff

SUBJECT: Report on SBI Portfolio by Meketa Investment Group

SBI consultant Meketa Investment Group will provide an assessment and overview of the SBI's total portfolio.

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TAB J

Private Markets Commitments

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DATE: February 7, 2022

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

New Managers:

Private Equity	Clearlake	Clearlake Capital Partners VII	\$100 Million
Private Equity	Siris	Siris Partners V	\$100 Million
Private Equity	TSG	TSG9	\$100 Million

Existing Managers:

Private Equity	Advent	Advent International GPE X	\$150 Million
Private Equity	Apax	Apax XI	\$100 Million
Private Equity	Blackstone	Blackstone Capital Partners IX	\$150 Million
Private Equity	Blackstone	Blackstone Growth II	\$150 Million
Private Equity	Bridgepoint	Bridgepoint Europe VII	€90 Million
Private Equity	Brookfield	Brookfield Capital Partners VI	\$150 Million
Private Equity	IK	IK X Fund	€90 Million
Private Equity	KKR	KKR Core Investments Fund II	\$100 Million
Private Equity	KKR	KKR Europe VI	\$100 Million
Private Equity	Asia Alternatives	MN Asia Investors, LP	\$250 Million
Private Equity	Nordic Capital	Nordic Capital XI	€90 Million
Private Equity	Thoma Bravo	Thoma Bravo XV	\$100 Million
Private Equity	TPG Capital	TPG Partners IX	\$100 Million
Private Equity	Welsh, Carson, Anderson & Stowe	WCAS XIV	\$150 Million
Private Equity	Wind Point Partners	Wind Point Partners X	\$100 Million
Private Credit	HPS	HPS Strategic Investment Partners Fund V	\$100 Million
Private Credit	Oaktree	Oaktree Special Situations Fund III	\$200 Million
Private Credit	Värde	Värde Fund XIV	\$100 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, 2021

Combined Funds Market Value \$94,133,698,205

Amount Available for Investment **\$4,912,562,746**

	% of Combined Funds	Current Level	Target Level ¹	Difference
Market Value (MV)	19.8%	\$18,620,861,805	\$23,533,424,551	\$4,912,562,746
<i>Policy Target</i>	25%			
<i>Statutory Limit</i>	35%			
MV +Unfunded	31.8%	\$29,949,804,307	\$42,360,164,192	\$12,410,359,886
<i>Policy Limit</i>	45.0%			

Asset Class	% of Combined Funds	Market Value	Unfunded Commitment	Total
Private Equity	14.3%	\$13,430,493,676	\$7,148,221,367	\$20,578,715,043
Private Credit	1.7%	\$1,564,872,515	\$1,598,971,388	\$3,163,843,903
Real Assets	2.2%	\$2,023,897,008	\$725,497,826	\$2,749,394,834
Real Estate	1.6%	\$1,550,312,366	\$1,856,251,920	\$3,406,564,286
Other ²		\$51,286,241		\$51,286,241
Total		\$18,620,861,805	\$11,328,942,501	\$29,949,804,307

Cash Flows December 31, 2021

Calendar Year	Capital Calls	Distributions	Net Invested
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 a new private equity manager, Clearlake Capital Group (“Clearlake”), in Clearlake Capital Partners VII (“CCP VII”).

Clearlake is establishing CCP VII to invest in private equity, special situations, and credit/distressed investments in mid-market companies. Utilizing an all-weather, control-focused investment approach, CCP VII will seek to invest in companies undergoing complex financial, operational, and/or structural change that can benefit from Clearlake’s O.P.S. framework (Operations, People, Strategy). CCP VII will primarily target control-oriented investments with an average equity check of \$500 to \$750 million in mid-market companies with average enterprise value of \$1 to \$2 billion and greater in the technology, industrials, and consumer sectors.

In addition to reviewing the attractiveness of the Clearlake Capital Partners VII investment opportunity, staff conducted due diligence, reference checks, a literature database search, and reviewed the potential investor base for the fund, subject to availability of such information and data. Staff’s diligence process will continue as additional data and documentation become available.

More information on Clearlake Capital Partners VII is included as **Attachment A beginning on page 21**.

RECOMMENDATION:

Staff is requesting that the Investment Advisory Council concur with Staff’s recommendation to commit up to \$100 million, or 20% of Clearlake Capital Partners VII, whichever is less, plus an additional amount not to exceed one percent of the total commitment for the payment of required charges at closing. Approval of this potential commitment is not intended to be, and does not constitute in any way, a binding or legal agreement or impose any legal obligations on the State Board of Investment and neither the State of Minnesota, the Investment Advisory Council, the State Board of Investment nor its Executive Director have any liability for reliance by Clearlake 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 Clearlake or reduction or termination of the commitment.

2) Investment with a new private equity manager, Siris Capital Group (“Siris”), in Siris Partners V (“Fund V”).

Siris is forming Siris Partners V to make primarily control-oriented, private equity, equity-related and similar investments in mature, middle-market technology companies, primarily in North America, that are facing transition. The Firm primarily targets companies with

approximately \$75 to \$250 million of EBITDA. Siris' operations-intensive strategy integrates a group of senior operating executives, consultants, advisors and other professionals in similar roles, who work closely with the Siris investment team and portfolio value creation team in sourcing, diligencing and implementing post-acquisition operating improvements at target companies.

In addition to reviewing the attractiveness of the Siris Partners V investment opportunity, staff conducted due diligence, reference checks, a literature database search, and reviewed the potential investor base for the fund, subject to availability of such information and data. Staff's diligence process will continue as additional data and documentation become available.

More information on Siris Partners V is included as **Attachment B beginning on page 25**.

RECOMMENDATION:

Staff is requesting that the Investment Advisory Council concur with Staff's recommendation to commit up to \$100 million, or 20% of Siris Partners V, whichever is less, plus an additional amount not to exceed one percent of the total commitment for the payment of required charges at closing. Approval of this potential commitment is not intended to be, and does not constitute in any way, a binding or legal agreement or impose any legal obligations on the State Board of Investment and neither the State of Minnesota, the Investment Advisory Council, the State Board of Investment nor its Executive Director have any liability for reliance by Siris 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 Siris or reduction or termination of the commitment.

3) Investment with a new private equity manager, TSG Consumer Partners ("TSG"), in TSG9.

TSG is seeking investors for TSG9 to make private equity investments in the U.S. focused primarily on consumer companies. TSG intends to invest in select companies in consumer industries which generally compete in less-cyclical, well-established and stable markets. TSG seeks to create value through active participation. TSG is managed by an experienced investment team with significant operating capability and a considerable network of contacts in consumer industries and the financial community. TSG often works closely with management to improve sales, marketing, operations, digital and/or financial functions and is typically able to expand revenues through distribution expansions, new market entry, strategic product line extensions and/or acquisitions.

In addition to reviewing the attractiveness of the TSG9 investment opportunity, staff conducted due diligence, reference checks, a literature database search, and reviewed the potential investor base for the fund, subject to availability of such information and data. Staff's diligence process will continue as additional data and documentation become available.

More information on TSG9 is included as **Attachment C beginning on page 29.**

RECOMMENDATION:

Staff is requesting that the Investment Advisory Council concur with Staff's recommendation to commit up to \$100 million, or 20% of TSG9, whichever is less, plus an additional amount not to exceed one percent of the total commitment for the payment of required charges at closing. Approval of this potential commitment is not intended to be, and does not constitute in any way, a binding or legal agreement or impose any legal obligations on the State Board of Investment and neither the State of Minnesota, the Investment Advisory Council, the State Board of Investment nor its Executive Director have any liability for reliance by TSG 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 TSG or reduction or termination of the commitment.

4) Investment with an existing private equity manager, Advent International Corporation (“Advent”), in Advent International GPE X (“GPE X”).

Advent is forming GPE X to make private equity investments primarily in companies across the markets of Europe and North America, and increasingly in Asia. Advent has developed a highly professionalized and systematic process which primarily focuses on companies in five core sectors in which Advent has substantial experience and deep local and international knowledge: business and financial services; healthcare; industrial; retail, consumer and leisure; and technology. The Fund will invest where it has the opportunity to create value and seek opportunities for true break-out potential for the companies in which it invests.

In addition to reviewing the attractiveness of the Advent International GPE X investment opportunity, staff conducted due diligence, reference checks, a literature database search, and reviewed the potential investor base for the fund, subject to availability of such information and data. Staff's diligence process will continue as additional data and documentation become available.

More information on Advent International GPE X is included as **Attachment D beginning on page 33.**

RECOMMENDATION:

Staff is requesting that the Investment Advisory Council concur with Staff's recommendation to commit up to \$150 million, or 20% to Advent International GPE X, plus an additional amount not to exceed one percent of the total commitment for the payment of required charges at closing. Approval of this potential commitment is not intended to be, and does not constitute in any way, a binding or legal agreement or impose any legal obligations on the State Board of Investment and neither the State of Minnesota, the Investment Advisory Council, the State Board of Investment nor its Executive Director have any liability for reliance by Advent 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 Advent or reduction or termination of the commitment.

5) Investment with an existing private equity manager, Apax Partners (“Apax”), in Apax XI.

Apax is seeking investors for Apax XI to continue the Apax Buyout Funds’ established strategy of investing in buyouts globally across its four sectors, tech, services, healthcare and consumer/internet, with its digital capability as a horizontal specialization spanning across sectors. The investment strategy of Apax XI will leverage Apax’s long-standing sector focus and sub-sector knowledge, their global platform, which provides opportunities for Apax XI to invest flexibly across geographies, and Apax’s strong operational capabilities, which allow for transformational improvements in portfolio companies, including digital acceleration.

In addition to reviewing the attractiveness of the Apax XI investment opportunity, staff conducted due diligence, reference checks, a literature database search, and reviewed the potential investor base for the fund, subject to availability of such information and data. Staff’s diligence process will continue as additional data and documentation become available.

More information on Apax XI is included as **Attachment E beginning on page 37.**

RECOMMENDATION:

Staff is requesting that the Investment Advisory Council concur with Staff’s recommendation to commit up to \$100 million, or 20% of Apax XI, whichever is less, plus an additional amount not to exceed one percent of the total commitment for the payment of required charges at closing. Approval of this potential commitment is not intended to be, and does not constitute in any way, a binding or legal agreement or impose any legal obligations on the State Board of Investment and neither the State of Minnesota, the Investment Advisory Council, the State Board of Investment nor its Executive Director have any liability for reliance by Apax 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 Apax or reduction or termination of the commitment.

6) Investment with an existing private equity manager, The Blackstone Group (“Blackstone”), in Blackstone Capital Partners IX (“BCP IX”).

Blackstone is expected to establish BCP IX to make control and control oriented private equity investments on a global basis. BCP IX is expected to focus on large scale and complex transactions, primarily in the United States and Western Europe, and on a more limited basis in other regions such as Asia. Past funds have successfully executed on the following transaction types globally: large buyouts, public-to-privates, corporate carve-outs, and buy-and-build platforms. The Blackstone investment team is supported by a Portfolio Operations

Group that is comprised of functional experts focused on procurement, lean process, healthcare cost containment, data science, IT enablement, talent management, and sustainability.

In addition to reviewing the attractiveness of the Blackstone Capital Partners IX investment opportunity, staff conducted due diligence, reference checks, a literature database search, and reviewed the potential investor base for the fund, subject to availability of such information and data. Staff's diligence process will continue as additional data and documentation become available.

More information on Blackstone Capital Partners IX is included as **Attachment F beginning on page 41**.

RECOMMENDATION:

Staff is requesting that the Investment Advisory Council concur with Staff's recommendation to commit up to \$150 million, or 20% of Blackstone Capital Partners IX, whichever is less, plus an additional amount not to exceed one percent of the total commitment for the payment of required charges at closing. Approval of this potential commitment is not intended to be, and does not constitute in any way, a binding or legal agreement or impose any legal obligations on the State Board of Investment and neither the State of Minnesota, the Investment Advisory Council, the State Board of Investment nor its Executive Director have any liability for reliance by Blackstone upon this approval. Until the Executive Director on behalf of the SBI executes a formal agreement, further due diligence and negotiations may result in the imposition of additional terms and conditions on Blackstone or reduction or termination of the commitment.

7) Investment with an existing private equity manager, The Blackstone Group ("Blackstone"), in Blackstone Growth II ("BXG II").

Blackstone is expected to form BXG II to deliver attractive risk-adjusted returns by investing in dynamic, growth-stage business in five core sectors globally: consumer, consumer technology, enterprise software, financial services, and healthcare. It is expected that BXG II will focus on providing capital to growth-state companies that have the potential for category leadership and breakout performance. Targeted companies are expected to have sustainable barriers to entry supported by differentiated intellectual property, proven business models, large addressable markets, accomplished management teams, capital efficient business models that offer significant operating leverage, and strong historical and forecasted revenue growth.

In addition to reviewing the attractiveness of the Blackstone Growth Equity II investment opportunity, staff conducted due diligence, reference checks, a literature database search, and reviewed the potential investor base for the fund, subject to availability of such information and data. Staff's diligence process will continue as additional data and documentation become available.

More information on Blackstone Growth Equity II is included as **Attachment G beginning on page 45.**

RECOMMENDATION:

Staff is requesting that the Investment Advisory Council concur with Staff's recommendation to commit up to \$150 million, or 20% of Blackstone Growth II, whichever is less, plus an additional amount not to exceed one percent of the total commitment for the payment of required charges at closing. Approval of this potential commitment is not intended to be, and does not constitute in any way, a binding or legal agreement or impose any legal obligations on the State Board of Investment and neither the State of Minnesota, the Investment Advisory Council, the State Board of Investment nor its Executive Director have any liability for reliance by Blackstone upon this approval. Until the Executive Director on behalf of the SBI executes a formal agreement, further due diligence and negotiations may result in the imposition of additional terms and conditions on Blackstone or reduction or termination of the commitment.

8) Investment with an existing private equity manager, Bridgepoint, in Bridgepoint Europe VII ("BE VII").

Bridgepoint is seeking investors for BE VII continue its history of investing in middle-market, growth-oriented European businesses. Bridgepoint has invested across Europe since the early 1990s and has delivered strong and consistent investment performance over an extended period. BE VII will focus on six sectors: business services, consumer, financial services, healthcare, advanced industrials, and media and sports rights, with technology acts as a transversal across the six sectors. Within these sectors, Bridgepoint focuses on companies with sustainable end market growth and high quality of earnings. Generating 'internal growth' through operational improvement will be an important driver of value creation for BE VII.

In addition to reviewing the attractiveness of the Bridgepoint Europe VII investment opportunity, staff conducted due diligence, reference checks, a literature database search, and reviewed the potential investor base for the fund, subject to availability of such information and data. Staff's diligence process will continue as additional data and documentation become available.

More information on Bridgepoint Europe VII is included as **Attachment H beginning on page 49.**

RECOMMENDATION:

Staff is requesting that the Investment Advisory Council concur with Staff's recommendation to commit up to €90 million, or 20% of Bridgepoint Europe VII, whichever is less, plus an additional amount not to exceed one percent of the total commitment for the payment of required charges at closing. Approval of this potential commitment is not intended to be, and does not constitute in any way, a binding or legal

agreement or impose any legal obligations on the State Board of Investment and neither the State of Minnesota, the Investment Advisory Council, the State Board of Investment nor its Executive Director have any liability for reliance by Bridgepoint 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 Bridgepoint or reduction or termination of the commitment.

9) Investment with an existing private equity manager, Brookfield Asset Management (“Brookfield”), in Brookfield Capital Partners VI (“BCP VI”).

Brookfield is establishing BCP VI to pursue target value investments in high-quality businesses where it expects to utilize an operationally focused approach to enhance performance and cash flows. Brookfield expects the Fund’s investments to be diversified geographically, with a focus on markets where it has a significant presence or where it has extensive experience and knowledge. BCP VI seeks to invest principally in industrials, business services, and infrastructure services, and in the key markets where Brookfield has deep investment expertise and local operational capabilities, including North America, Europe, Asia Pacific and Brazil.

In addition to reviewing the attractiveness of the Brookfield Capital Partners VI investment opportunity, staff conducted due diligence, reference checks, a literature database search, and reviewed the potential investor base for the fund, subject to availability of such information and data. Staff’s diligence process will continue as additional data and documentation become available.

More information on Brookfield Capital Partners VI is included as **Attachment I beginning on page 53.**

RECOMMENDATION:

Staff is requesting that the Investment Advisory Council concur with Staff’s recommendation to commit up to \$150 million, or 20% of Brookfield Capital Partners VI, whichever is less, plus an additional amount not to exceed one percent of the total commitment for the payment of required charges at closing. Approval of this potential commitment is not intended to be, and does not constitute in any way, a binding or legal agreement or impose any legal obligations on the State Board of Investment and neither the State of Minnesota, the Investment Advisory Council, the State Board of Investment nor its Executive Director have any liability for reliance by Brookfield 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 Brookfield or reduction or termination of the commitment.

10) Investment with an existing private equity manager, IK Investment Partners (“IK”), in IK X Fund.

IK is expected to form IK X Fund to invest in regional middle market companies in Northern Europe with strong potential for growth and attempt to double the earnings of each company through add-on acquisitions and international expansion, and operational improvements. IK X is expected to be a continuation of the mid-cap strategy that has IK has developed over the course of nine prior funds. It is expected that IK X will invest in companies in the industrials, consumer, business services, and healthcare sectors. A centerpiece of IK’s investment strategy is to seek to double the earnings of its portfolio companies by transforming strong local businesses into international leaders through add-on acquisitions and operational improvement.

In addition to reviewing the attractiveness of the IK X Fund investment opportunity, staff conducted due diligence, reference checks, a literature database search, and reviewed the potential investor base for the fund, subject to availability of such information and data. Staff’s diligence process will continue as additional data and documentation become available.

More information on IK X Fund is included as **Attachment J beginning on page 57.**

RECOMMENDATION:

Staff is requesting that the Investment Advisory Council concur with Staff’s recommendation to commit up to €90 million, or 20% of IK X Fund, whichever is less, plus an additional amount not to exceed one percent of the total commitment for the payment of required charges at closing. Approval of this potential commitment is not intended to be, and does not constitute in any way, a binding or legal agreement or impose any legal obligations on the State Board of Investment and neither the State of Minnesota, the Investment Advisory Council, the State Board of Investment nor its Executive Director have any liability for reliance by IK 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 IK or reduction or termination of the commitment.

11) Investment with an existing private equity manager, KKR, in KKR Core Investments Fund II (“Fund II”).

KKR is seeking investors to pursue high-quality investments with the potential to generate attractive risk-adjusted returns and significant net asset value appreciation over a long period of time. The strategy will target investment opportunities that KKR believes are more stable, less cyclical and more cash-generative, with limited uncontrollable exposures and disrupters, as well as lower average leverage over the hold period, than those targeted by traditional private equity funds. The opportunities assessed to-date have generally been in developed markets (e.g. North America, Western Europe, and select countries in Asia) given the target risk/return profile of the strategy.

In addition to reviewing the attractiveness of the KKR Core Investments Fund II investment opportunity, staff conducted due diligence, reference checks, a literature database search, and reviewed the potential investor base for the fund, subject to availability of such information and data. Staff's diligence process will continue as additional data and documentation become available.

More information on KKR Core Investments Fund II is included as **Attachment K beginning on page 61.**

RECOMMENDATION:

Staff is requesting that the Investment Advisory Council concur with Staff's recommendation to commit up to \$100 million, or 20% of KKR Core Investments Fund II, whichever is less, plus an additional amount not to exceed one percent of the total commitment for the payment of required charges at closing. Approval of this potential commitment is not intended to be, and does not constitute in any way, a binding or legal agreement or impose any legal obligations on the State Board of Investment and neither the State of Minnesota, the Investment Advisory Council, the State Board of Investment nor its Executive Director have any liability for reliance by KKR 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 KKR or reduction or termination of the commitment.

12) Investment with an existing private equity manager, KKR, in KKR Europe VI ("Fund VI").

KKR is establishing KKR Europe VI to continue its history of making investments into companies primarily in the developed economies of Western Europe. The Fund's investments are generally expected to be made in the form of management buyouts, build-ups, partnership deals, corporate carve-outs or other investments with a view to acquire a controlling interest or other significant influence. The focus of the investment strategy is expected to be predominantly on the European upper mid-market, or deals with an enterprise value range of €500 million to €2 billion, although Fund VI will also have the flexibility to invest in larger or smaller transactions opportunistically.

In addition to reviewing the attractiveness of the KKR Europe VI investment opportunity, staff conducted due diligence, reference checks, a literature database search, and reviewed the potential investor base for the fund, subject to availability of such information and data. Staff's diligence process will continue as additional data and documentation become available.

More information on KKR Europe VI is included as **Attachment L beginning on page 65.**

RECOMMENDATION:

Staff is requesting that the Investment Advisory Council concur with Staff's recommendation to commit up to \$100 million, or 20% of KKR Europe VI, whichever is less, plus an additional amount not to exceed one percent of the total commitment for

the payment of required charges at closing. Approval of this potential commitment is not intended to be, and does not constitute in any way, a binding or legal agreement or impose any legal obligations on the State Board of Investment and neither the State of Minnesota, the Investment Advisory Council, the State Board of Investment nor its Executive Director have any liability for reliance by KKR 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 KKR or reduction or termination of the commitment.

13) Investment with an existing private equity manager, Asia Alternatives Management (“Asia Alternatives”), in a separately managed account established for the benefit of the SBI (“MN Asia Investors, LP”).

In the third quarter of 2020, the Investment Advisory Council and the State Board of Investment approved a commitment with Asia Alternatives Management to invest \$200 million in a Separately Managed Account (“SMA”) across two pools of capital: a “Balanced Pool” which will be invested in parallel with Asia Alternatives Capital Partners VI, and a “Co-Investment Pool,” which was established to pursue substantially similar investments as the Fund, subject to investment guidelines or restrictions agreed to by both the Limited Partner and Asia Alternatives. An additional commitment of \$100 million to the Co-Investment pool was approved by the Council and the Board in August, 2021. In order to ensure that the SBI will be able to participate in attractive investment opportunities sourced by Asia Alternatives for the remainder of 2022 and into 2023, staff is recommending that the Council approve an additional commitment of \$250 million to MN Asia Investor, to be split between the Co-Investment Pool and the Balanced pool in a manner agreed upon by Staff and Asia Alternatives. Funds allocated to the Balanced Pool would likely be committed at the time Asia Alternatives raises its next flagship fund, which is currently expected in the second half of 2022. This would bring the total amount committed to the MN Asia Investors SMA to \$550 million.

In addition to reviewing the attractiveness of the Asia Alternatives Capital Partners investment opportunity, staff conducted due diligence, reference checks, a literature database search, and reviewed the potential investor base for the fund, subject to availability of such information and data. Staff’s diligence process will continue as additional data and documentation become available.

More information on MN Asia Investors is included as **Attachment M beginning on page 69 and 71.**

RECOMMENDATION:

Staff is requesting that the Investment Advisory Council concur with Staff’s recommendation to commit up to an additional \$250 million to MN Asia Investors, plus an additional amount not to exceed one percent of the total commitment for the payment of required charges at closing. Approval of this potential commitment is not intended to be, and does not constitute in any way, a binding or legal agreement or

impose any legal obligations on the State Board of Investment and neither the State of Minnesota, the Investment Advisory Council, the State Board of Investment nor its Executive Director have any liability for reliance by Asia Alternatives 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 Asia Alternatives or reduction or termination of the commitment.

14) Investment with an existing private equity manager, Nordic Capital, in Nordic Capital XI (“Fund XI”).

Nordic Capital is forming Nordic Capital XI as a continuation of Nordic Capital’s strategy of focusing on upper middle-market companies (enterprise value of €250-€1,500 million) in Northern Europe, as well as across Europe and North America for Healthcare investments. Fund XI will target robust, difficult to replicate businesses operating within non-cyclical and resilient sectors benefitting from long term secular drivers and strong downside protections throughout market cycles. Investments will be made primarily in three core sectors: healthcare, technology & payments (“T&P”), and financial services.

In addition to reviewing the attractiveness of the Nordic Capital XI investment opportunity, staff conducted due diligence, reference checks, a literature database search, and reviewed the potential investor base for the fund, subject to availability of such information and data. Staff’s diligence process will continue as additional data and documentation become available.

More information on Nordic Capital XI is included as **Attachment N beginning on page 75.**

RECOMMENDATION:

Staff is requesting that the Investment Advisory Council concur with Staff’s recommendation to commit up to €90 million, or 20% of Nordic Capital XI, whichever is less, plus an additional amount not to exceed one percent of the total commitment for the payment of required charges at closing. Approval of this potential commitment is not intended to be, and does not constitute in any way, a binding or legal agreement or impose any legal obligations on the State Board of Investment and neither the State of Minnesota, the Investment Advisory Council, the State Board of Investment nor its Executive Director have any liability for reliance by Nordic Capital 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 Nordic Capital or reduction or termination of the commitment.

15) Investment with an existing private equity manager, Thoma Bravo, in Thoma Bravo XV.

Thoma Bravo is seeking investors for Thoma Bravo XV to make investments (generally expected to consist of control buyouts) in software and technology-enabled services companies in North America. Thoma Bravo's strategy seeks to create value by transforming businesses in fragmented, consolidating industry sectors into larger, more profitable and more valuable businesses through rapid operational improvements, growth initiatives, and strategic and accretive add-on acquisitions. The application and infrastructure software and technology enabled services industry sectors on which Thoma Bravo focuses today are fragmented and consolidating, which lend themselves particularly well to this strategy.

In addition to reviewing the attractiveness of the Thoma Bravo XV investment opportunity, staff conducted due diligence, reference checks, a literature database search, and reviewed the potential investor base for the fund, subject to availability of such information and data. Staff's diligence process will continue as additional data and documentation become available.

More information on Thoma Bravo XV is included as **Attachment O beginning on page 79.**

RECOMMENDATION:

Staff is requesting that the Investment Advisory Council concur with Staff's recommendation to commit up to \$100 million, or 20% of Thoma Bravo XV, whichever is less, plus an additional amount not to exceed one percent of the total commitment for the payment of required charges at closing. Approval of this potential commitment is not intended to be, and does not constitute in any way, a binding or legal agreement or impose any legal obligations on the State Board of Investment and neither the State of Minnesota, the Investment Advisory Council, the State Board of Investment nor its Executive Director have any liability for reliance by Thoma Bravo 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 Thoma Bravo or reduction or termination of the commitment.

16) Investment with an existing private equity manager, TPG Capital ("TPG"), in TPG Partners IX ("TPG IX").

TPG is establishing TPG IX to make investments in the healthcare, software & enterprise technology ("SET"), internet, digital media & communications ("IDMC"), consumer and business services & industrials ("BSI") sectors. In each of these sectors, the Firm takes a long-dated, deeply thematic go-to-market approach that results in strategic, often proprietary sourcing and differentiated deal flow. TPG believes that its focus on proactive theme development, coupled with its operationally intensive investment style, results in an attractive and differentiated balance of deal types relative to its peers. The Firm has increased

its focus over time on transformational investments, which allows it to leverage its growth orientation and full suite of operational capabilities to drive improvement programs.

In addition to reviewing the attractiveness of the TPG IX investment opportunity, staff conducted due diligence, reference checks, a literature database search, and reviewed the potential investor base for the fund, subject to availability of such information and data. Staff's diligence process will continue as additional data and documentation become available.

More information on TPG IX is included as **Attachment P beginning on page 83**.

RECOMMENDATION:

Staff is requesting that the Investment Advisory Council concur with Staff's recommendation to commit up to \$100 million, or 20% of TPG IX, whichever is less, plus an additional amount not to exceed one percent of the total commitment for the payment of required charges at closing. Approval of this potential commitment is not intended to be, and does not constitute in any way, a binding or legal agreement or impose any legal obligations on the State Board of Investment and neither the State of Minnesota, the Investment Advisory Council, the State Board of Investment nor its Executive Director have any liability for reliance by TPG 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 TPG or reduction or termination of the commitment.

17) Investment with an existing private equity manager, Welsh, Carson, Anderson & Stowe ("WCAS"), in WCAS XIV.

WCAS is forming WCAS XIV to invest in buyout and control growth equity investments primarily in U.S.-based, middle-market technology and healthcare companies. WCAS XIV's investment strategy is to build market-leading companies by (i) buying growth businesses in healthcare and technology industries, (ii) partnering with strong management teams and (iii) building value through a combination of operational improvements, internal growth initiatives and strategic operations. WCAS' focuses on operational growth rather than financial engineering, routinely uses proven management teams with prior WCAS experience, and maintains a consistent and disciplined investment approach.

In addition to reviewing the attractiveness of the WCAS XIV investment opportunity, staff conducted due diligence, reference checks, a literature database search, and reviewed the potential investor base for the fund, subject to availability of such information and data. Staff's diligence process will continue as additional data and documentation become available.

More information on WCAS XIV is included as **Attachment Q beginning on page 87.**

RECOMMENDATION:

Staff is requesting that the Investment Advisory Council concur with Staff's recommendation to commit up to \$150 million, or 20% of WCAS XIV, whichever is less, plus an additional amount not to exceed one percent of the total commitment for the payment of required charges at closing. Approval of this potential commitment is not intended to be, and does not constitute in any way, a binding or legal agreement or impose any legal obligations on the State Board of Investment and neither the State of Minnesota, the Investment Advisory Council, the State Board of Investment nor its Executive Director have any liability for reliance by WCAS 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 WCAS or reduction or termination of the commitment.

18) Investment with an existing private equity manager, Wind Point Partners (“Wind Point”), in Wind Point Partners X (“WPP X”).

Wind Point is seeking investors for WPP X to continue the Firm's successful history of making private equity investments in North American middle-market companies. Wind Point focuses on companies in the consumer products, industrial products, and business services sectors typically with \$100 million - \$1 billion of total enterprise value at the time of acquisition. To execute their strategy, they seek to bring together three key elements in each transaction: a top-caliber CEO, a well-positioned middle-market company, and a value creation plan.

In addition to reviewing the attractiveness of the Wind Point Partners X investment opportunity, staff conducted due diligence, reference checks, a literature database search, and reviewed the potential investor base for the fund, subject to availability of such information and data. Staff's diligence process will continue as additional data and documentation become available.

More information on Wind Point Partners X is included as **Attachment R beginning on page 91.**

RECOMMENDATION:

Staff is requesting that the Investment Advisory Council concur with Staff's recommendation to commit up to \$100 million, or 20% of Wind Point Partners X, whichever is less, plus an additional amount not to exceed one percent of the total commitment for the payment of required charges at closing. Approval of this potential commitment is not intended to be, and does not constitute in any way, a binding or legal agreement or impose any legal obligations on the State Board of Investment and neither the State of Minnesota, the Investment Advisory Council, the State Board of Investment nor its Executive Director have any liability for reliance by Wind Point 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 Wind Point or reduction or termination of the commitment.

19) Investment with an existing private credit manager, HPS Investment Partners (“HPS”), in HPS Strategic Investment Partners Fund V (“HPS SIP V”).

HPS is establishing HPS SIP V to generate current income as well as long-term capital appreciation through high-yielding fixed and floating rate debt and debt-like investments. The junior capital solutions provided by HPS may include subordinated debt (such as second lien and unsecured debt), mezzanine securities, preferred equity and convertible securities and may be accompanied by equity-related securities (such as options or warrants) and/or select common equity investments. SIP V will have global investments capabilities but will focus on large-cap companies in North America and Europe, with 60% to 80% of the portfolio anticipated to be in North America.

In addition to reviewing the attractiveness of the HPS SIP V investment opportunity, staff conducted due diligence, reference checks, a literature database search, and reviewed the potential investor base for the fund, subject to availability of such information and data. Staff’s diligence process will continue as additional data and documentation become available.

More information on HPS SIP V is included as **Attachment S beginning on page 95.**

RECOMMENDATION:

Staff is requesting that the Investment Advisory Council concur with Staff’s recommendation to commit up to \$100 million, or 20% of HPS Strategic Investment Partners Fund V, whichever is less, plus an additional amount not to exceed one percent of the total commitment for the payment of required charges at closing. Approval of this potential commitment is not intended to be, and does not constitute in any way, a binding or legal agreement or impose any legal obligations on the State Board of Investment and neither the State of Minnesota, the Investment Advisory Council, the State Board of Investment nor its Executive Director have any liability for reliance by HPS 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 HPS or reduction or termination of the commitment.

20) Investment with an existing private credit manager, Oaktree Capital Management (“Oaktree”), in Oaktree Special Situations Fund III (“Fund”).

Oaktree is expected to form Special Situations Fund III to make control investments in middle-market companies through three types of investments: (a) the purchase of distressed debt, (b) structured equity investments (e.g., debt or preferred equity with a conversion

feature or warrants) and (c) direct equity investments. The Fund's expected objective is to make investments that result in control of, or significant influence over, a company. The Fund is expected to make investments that primarily fall into one of the three categories: distress for control, structured equity, and direct equity investments.

In addition to reviewing the attractiveness of the Oaktree Special Situations Fund III investment opportunity, staff conducted due diligence, reference checks, a literature database search, and reviewed the potential investor base for the fund, subject to availability of such information and data. Staff's diligence process will continue as additional data and documentation become available.

More information on Oaktree Special Situations Fund III is included as **Attachment T beginning on page 99**.

RECOMMENDATION:

Staff is requesting that the Investment Advisory Council concur with Staff's recommendation to commit up to \$200 million, or 20% of Oaktree Special Situations Fund III, whichever is less, plus an additional amount not to exceed one percent of the total commitment for the payment of required charges at closing. Approval of this potential commitment is not intended to be, and does not constitute in any way, a binding or legal agreement or impose any legal obligations on the State Board of Investment and neither the State of Minnesota, the Investment Advisory Council, the State Board of Investment nor its Executive Director have any liability for reliance by Oaktree 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 Oaktree or reduction or termination of the commitment.

21) Investment with an existing private credit manager, Värde Partners ("Värde"), in Värde Fund XIV ("Fund").

Värde is expected to seek investors for Värde Fund XIV to invest in a broad range of credit and value-oriented opportunities, including credit origination, acquiring credit and credit-related assets, and restructuring. Värde's approach to investing is based on four core principles: search opportunistically for complex situations in less efficient markets; seek to invest at a price that allows Värde to unlock or create value; focus on value drivers, the path to unlock value and potential exit strategies; and manage risk through diversified investment programs and trading strategies. Värde will apply this investing approach to construct a portfolio pursued by four global investment teams: Corporate and Traded Credit, Specialty Finance, Real Estate, and Real Assets and Infrastructure.

In addition to reviewing the attractiveness of the Värde Fund XIV investment opportunity, staff conducted due diligence, reference checks, a literature database search, and reviewed the potential investor base for the fund, subject to availability of such information and data.

Staff's diligence process will continue as additional data and documentation become available.

More information on Värde XIV is included as **Attachment U beginning on page 105.**

RECOMMENDATION:

Staff is requesting that the Investment Advisory Council concur with Staff's recommendation to commit up to \$100 million, or 20% of Värde XIV, whichever is less, plus an additional amount not to exceed one percent of the total commitment for the payment of required charges at closing. Approval of this potential commitment is not intended to be, and does not constitute in any way, a binding or legal agreement or impose any legal obligations on the State Board of Investment and neither the State of Minnesota, the Investment Advisory Council, the State Board of Investment nor its Executive Director have any liability for reliance by Värde 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 Värde or reduction or termination of the commitment.

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ATTACHMENT A

PRIVATE EQUITY MANAGER SUMMARY PROFILE

I. Background Data

Name of Fund:	Clearlake Capital Partners VII, L.P.
Type of Fund:	Private Equity
Target Fund Size:	\$10 billion
Fund Manager:	Clearlake Capital Group
Manager Contact:	Marcelia Freeman mfreeman@clearlake.com 233 Wilshire Blvd. Santa Monica, CA 90401

II. Organization and Staff

Clearlake Capital Group (“Clearlake” or “Firm”) was founded in 2006 by José Feliciano and Behdad Eghbali, who have together built a team that has successfully invested nine funds focused on control and non-control investing strategies. Based in Santa Monica, California, Clearlake is forming Clearlake Capital Partners VII (“CCP VII” or “Fund”) to continue Clearlake’s successful strategy of investing in private equity, special situations, and credit/distressed investments in mid-market companies. The Firm is managed by the Co-Founders in collaboration with the other Clearlake investment professionals. The Clearlake team is comprised of approximately 75 investment and operational professionals and is complemented by over 30 operating executives and over 20 employees dedicated to senior credit and structured products.

In 2018, Dyal Capital Partners, a division of Blue Owl Capital and Goldman Sachs Asset Management’s Petershill program, completed a minority investment in Clearlake. This passive, non-voting, minority stake provides permanent capital to increase the Firm’s investments in the Clearlake Funds, to make strategic acquisitions, and to support the development of initiatives that capitalize on the Firm’s investment approach coupled with its synergistic integration of private equity, credit, special situations, and distressed capabilities.

Clearlake 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 Association of Asian American Investment Managers (AAAIM), Hispanic Heritage Foundation, National Association of Investment Companies (NAIC), Robert Toigo Foundation (TOIGO), Sponsors for Educational Opportunity (SEO), and Women's Association of Venture and Equity (WAVE). In total, over 80% of the Firm’s employees are female or ethnic minority, including the Firm’s co-founders, who are ethnic minority. The investment team is 19%

female and 58% ethnic minority.¹ Clearlake is minority owned and managed and is certified by the Southern California National Minority Supplier Development Council (NMSDC).

III. Investment Strategy

Utilizing an all-weather, control-focused investment approach, Fund VII will seek to invest in companies undergoing complex financial, operational, and/or structural change that can benefit from the *O.P.S.*[®] framework (Operations, People, Strategy). These investment opportunities may involve major corporate transitions, including transformational acquisitions, carve-outs, or divestitures; companies experiencing legal, regulatory, or operational challenges; and restructurings, turnarounds, or bankruptcies. Fund VII will target investments which the Firm believes can fully utilize Clearlake's deep sector network and industry expertise underpinned by Clearlake's operational improvement approach *O.P.S.*[®], to effect operational improvements and create value at each respective portfolio company. Fund VII will primarily target control-oriented investments with an average equity check of \$500 to \$750 million in mid-market companies with average enterprise value of \$1 to \$2 billion and greater in the technology, industrials, and consumer sectors.

One of the core tenets of Clearlake's strategy is a flexible and creative approach to investment structure. The Firm believes its entry point agnostic approach to investing across the capital structure provides a more flexible, creative approach to structuring investments. The Firm believes this approach provides downside protection and preservation of investment principal in a variety of market environments, while creating significant upside potential. Another core tenet is a value focus. Clearlake often invests in companies that it believes are performing below their potential in niche or misunderstood sectors. As a result, Clearlake's investments have so far frequently been at attractive multiples and/or at significant discounts to asset or intrinsic values. A third key tenet is active value enhancement and OPS approach. Examples of *O.P.S.*[®] initiatives include:

- *Operations*: 100-day plan development and execution; liquidity management; KPI development and monitoring
- *People*: back the right management team; improve governance; align incentives
- *Strategy*: active and ongoing strategic planning; pursue bolt-on acquisitions; plan and execute strategic transformations.

¹ Clearlake defines minorities and/or diverse individuals as those that self-identify in one or more of the following categories: Female, Black or African American, Hispanic or Latino, Asian, Hawaiian or Pacific Islander, American Indian or Alaskan Native, Two or More Races, Middle Eastern and/or Other Ethnic Group (person of any ethnic group not categorized by the foregoing). Clearlake includes other ethnicities (such as those of Middle Eastern descent) for diversity tracking purposes. Statistics provided herein are as of December 31, 2021 and reflect full time employees only. Investment Team includes Clearlake's *O.P.S.*[®] professionals. Percentages not inclusive of WhiteStar Asset Management and Trinitas Capital Management (together, "WhiteStar") professionals (over 20 employees) or Clearlake professional(s) who would rather not specify race/ethnicity.

As part of the ongoing monitoring and enhancement of its controlled portfolio companies, Clearlake works with company management to integrate ESG factors into board deliberations and day-to-day compliance programs. ESG factor integration varies from company to company based upon issues such as the portfolio company’s industry, region of operations, applicable legal standards, and the size and nature of operations. The Firm has committed to the United Nations’ six Principles for Responsible Investment and in 2019 the Firm engaged Malk Partners, a leading ESG consulting firm, to advance its ESG program and approach to ESG management and portfolio performance monitoring. Through this engagement, Malk performs ESG due diligence reviews, identifies ESG risks and opportunities, and recommends mitigation solutions for key ESG issue areas for portfolio company acquisition opportunities. Post-close, Malk evaluates portfolio companies ongoing progress in ESG issue areas, reports their ESG progress, and provides updated risk assessments and recommendations on a forward-looking basis. The respective deal team members are then responsible for identifying and establishing specific key performance indicators specific to each portfolio company.

When making an investment, Clearlake considers potential realization alternatives that are continually monitored from the time the investment is made through exit. The range of exits and realization events is dictated by the enterprise’s financial performance, the type of investment and current market conditions. Clearlake believes its broad experience exiting a variety of private equity and distressed investments provides it with a full spectrum of monetization opportunities. These exit strategies can include selling part or all of the company to a strategic or financial acquirer; merging into a larger entity with more liquid securities that can then be sold in the secondary markets; undertaking public offerings; merging with a special purpose acquisition company (SPAC); and selling post reorganization securities into the secondary markets.

IV. Investment Performance

Previous fund performance as of September 30, 2021 for Clearlake Flagship Funds and the SBI’s investments with previous funds, where applicable, is shown below:

Fund	Vintage Year	Total Commitments	SBI Investment	Net IRR*	Net MOIC*	Net DPI*
Fund I	2006	\$160 million	--	8.5%	1.3x	1.3x
Fund II	2009	\$415 million	--	15.6%	1.8x	1.6x
Fund III	2012	\$789 million	--	40.9%	3.7x	2.6x
Fund IV	2015	\$1.4 billion	--	34.3%	2.7x	1.4x
Fund V	2017	\$3.6 billion	--	58.0%	2.9x	0.9x
Fund VI	2020	\$7.1 billion	--	73.0%	1.4x	-

* Previous Fund investments may be relatively immature and, therefore, returns may not be indicative of future results. Net IRR, Multiple of Invested Capital (MOIC), and DPI provided by Clearlake.

V. Investment Period and Term

The term of the fund is ten years, with the option of two consecutive one-year extensions, first, in the General Partner's sole discretion, and second, with the consent of the Advisory Board. The Investment Period will last for a period of six years from the commencement date of the Fund.

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 and any supplemental thereto.

ATTACHMENT B

PRIVATE EQUITY MANAGER SUMMARY PROFILE

I. Background Data

<i>Name of Fund:</i>	Siris Partners V, L.P.
<i>Type of Fund:</i>	Private Equity
<i>Target Fund Size:</i>	\$4 billion
<i>Fund Manager:</i>	Siris Capital Group
<i>Manager Contact:</i>	Tracy Harris 601 Lexington Ave New York, NY 10022

II. Organization and Staff

Siris Capital Group (“Siris” or “Firm”) was founded by Frank Baker, Peter Berger and Jeffrey Hendren in 2011 to make private equity investments in mature, middle-market technology companies in North America. The three founders have worked together for more than 20 years and each has substantial private equity and transaction experience. The Siris team is anchored by a core group of its Founders, Partners and Managing Directors, along with Operating Professionals who have significant operational and sector expertise, which Siris believes is a competitive advantage. The Founders and Operating Professionals¹ are supported by talented investment professionals and a senior operations team, some of whom have worked with the Founders for over 10 years. The organization has evolved significantly since Siris was founded, with an emphasis on growing talent and the next generation of leadership from within, while also selectively adding senior team members to enhance specific functions. Currently, the Firm includes 57 employees, 35 of whom are members of the investment team (including 5 in the Value Creation team and 2 in Business Development), along with 10 Executive Partners, who are full time with Siris and deeply integrated into the investment process, and 6 Executive Advisors.

Since inception, DEI has been a critical component of Siris’ culture and core values. The Firm is committed to a workplace culture that values and promotes diversity, inclusion, equal employment opportunities and a work environment free of harassment and hostility. Siris promotes diverse perspectives across the Firm and supports similar DEI efforts across its portfolio. To date, the team has formalized this commitment by establishing a DEI Council, publishing a DEI policy, and conducting baseline metrics collection to assist in creating a more inclusive work environment. To develop more diversity in the industry, Siris supports SEO, WAVE, All Star Code, NAIC and the RFK Compass Initiative. The

Firm is also a founding signatory to ILPA’s Diversity in Action in Initiative. Currently, the

¹ Includes both Executive Partners and Executive Advisors

investment team is 15% female and 44% ethnic minority, while the Partner group is 11% female and 44% ethnic minority. In addition, the Siris V GP is majority ethnic minority-owned.

III. Investment Strategy

Siris is forming Siris Partners V (“Fund V” or “Fund”) to make primarily control-oriented, private equity, equity-related and similar investments in mature, middle-market technology companies, primarily in North America, that are facing transition. Siris’ strategy is differentiated in its value-orientation whereas the majority of other technology-focused PE firms focus primarily on growth. As such, their existing LPs tend to view them as a “hedge” to their more growth-oriented tech fund exposure. Additionally, given potential macroeconomic headwinds, Siris believes their cycle-resilient approach is particularly well-positioned.

The Firm primarily targets companies with approximately \$75 to \$250 million of EBITDA. Siris employs a thematic, research-driven approach to sourcing its target companies, developing theses around specific subsectors in technology that the Firm believes are undergoing fundamental market and/or technology transitions. Siris’ operations-intensive strategy integrates a group of senior operating executives, consultants, advisors and other professionals in similar roles (“Operating Professionals”), who work closely with the Siris investment team and portfolio value creation team (the “Value Creation” team) in sourcing, diligencing and implementing post-acquisition operating improvements at target companies. Siris’ Operating Professionals are generally former senior corporate executives with a long tenure, typically averaging over 20 years of technology industry experience.

Siris’ investment strategy involves detailed research, theme development and preparation of internal sector reports in an effort to identify companies in specific technology subsectors faced with technology or market transitions. Siris believes its systematic and disciplined understanding of key subsectors is a valuable asset to the Firm as it seeks to identify and validate potential investment opportunities. Siris recognizes that technology lifecycles will continue to evolve, and that specific themes and focus areas will evolve along with them, but the Firm believes its consistent approach to developing detailed sector knowledge and insight remains critical to sourcing efforts.

Siris seeks to invest responsibly and to incorporate ESG factors systematically into the firm’s investment and portfolio company oversight processes. Deal team members utilize ESG factors identified in the due diligence process to inform the development of appropriate ESG metrics that Siris will endeavor to monitor during ownership. The Firm has also been expanding its industry engagement and knowledge base. Siris is a member of the Business for Social Responsibility, an organization that provides guidance and best practices around ESG, and became a UNPRI signatory in October 2021.

Siris focuses on driving value creation across the portfolio, particularly revenue growth and operational efficiencies, in an effort to drive EBITDA growth. Specific examples include go-to-market refinement, R&D transformation, M&A, non-core divestitures, and C-suite

transition. Siris' Value Creation team helps formulate the post-investment execution strategy, including critical "100-Day Plan" objectives, and seeks to ensure operational best practices are incorporated across the portfolio. This includes matters such as company leadership and board governance, procurement, ESG and D&I, and cybersecurity, amongst others. Siris believes that the integrated model of the in-house Value Creation team working alongside the Operating Professionals and Investment team is highly effective in driving improvement in operationally complex transactions.

Siris would typically expect a hold period of three to six years on its platform portfolio companies. However, as noted above, given Siris' ability to potentially generate cash flow from its mature assets, Siris has often had the ability to provide interim distributions within the first 24 months of ownership. Siris also works to identify in the pre-diligence and diligence processes any non-core business divisions that would make sense for the target to exit and often seeks to execute on such decisions expeditiously post-closing of the acquisition.

IV. Investment Performance

Previous fund performance as of September 30, 2021 for Siris and the SBI's investments with previous funds, where applicable, is shown below:

Fund	Vintage Year	Total Commitments	SBI Commitment	Net IRR*	Net MOIC*	Net DPI*
Siris II**	2011	\$641 million	--	7.7%	1.3x	0.9x
Siris III	2015	\$1.8 billion	--	14.0%	1.5x	0.8x
Siris IV	2018	\$3.4 billion	--	22.1%	1.4x	0.2x

* Previous Fund investments may be relatively immature and, therefore, returns may not be indicative of future results. Net IRR, Multiple of Invested Capital (MOIC), and DPI were provided by Siris.

** Siris II is the Firm's first institutional and fully independent fund.

V. Investment Period and Term

The term of the fund is ten years, subject to two consecutive one-year extensions with Advisory Committee approval. The Investment Period will last for a period of five years from the commencement date of the Fund.

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 and any supplemental thereto.

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ATTACHMENT C

PRIVATE EQUITY MANAGER SUMMARY PROFILE

I. Background Data

<i>Name of Fund:</i>	TSG9 LP
<i>Type of Fund:</i>	Private Equity
<i>Target Fund Size:</i>	\$5 billion
<i>Fund Manager:</i>	TSG Consumer Partners, LP
<i>Manager Contact:</i>	Hadley Mullin 1100 Larkspur Landing Circle, Suite 360 Larkspur, CA 94939

II. Organization and Staff

Founded in 1986, TSG Consumer Partners, LP (together with its affiliates, “TSG” or the “Firm”) was among the first private equity firms in the U.S. focused primarily on investing in consumer companies. TSG has assembled an experienced team of consumer industry specialists and has offices in the San Francisco Bay Area, New York, and London. TSG has achieved particular success through its hands-on management approach and in-depth understanding of, and extensive experience within, the consumer industry. TSG anticipates that the Partnership will generally make individual investments of varied size and target companies with annual revenues ranging between \$100 million and \$1 billion.

TSG is currently managed by three Senior Managing Directors and twelve Managing Directors (together with the Senior Managing Directors, the “Managing Principals”). The Managing Principals collectively bring considerable private equity, investment banking, management consulting, operational and tax experience to the Partnership. The Managing Principals are supported by a team of additional investment, operational, business development, accounting and compliance professionals.

The investment team is comprised of veteran consumer industry investors, operators and specialists and is gender diverse, which is particularly important in the consumer sector, given that women drive the majority of household spending decisions in the U.S. for many of the goods and services sold by TSG’s current and prior portfolio companies. TSG has long focused on gender balance and continues to enhance its diversity, equity, and inclusion (DEI) programs to foster a leading gender and racially diverse and inclusive workplace. TSG has 44% female representation among the Managing Principals and 22% representation of underrepresented minorities among the Managing Principals and Investment Team, collectively. TSG has also partnered with organizations such as The Opportunity Network, which provides underrepresented students with opportunities to improve their professional mobility. Further, 25% of TSG’s portfolio companies, as of 12/31/2021, are female- or minority-led businesses.

III. Investment Strategy

As with its predecessor funds, TSG9 intends to implement a highly focused investment approach that leverages more than thirty years of key strategies and learnings from its prior funds. The strategy TSG employs is based on its competitive strengths and expertise and is characterized by the following components:

Investing in Consumer Companies: TSG intends to invest in select companies in consumer industries which generally compete in less-cyclical, well-established and stable markets. TSG believes that these markets are usually characterized by relatively predictable cash flows, lower volatility in weak economic environments and relatively low capital requirements with limited risk of technological obsolescence. TSG believes that the consumer industry is becoming increasingly global due to digitalization, offering meaningful growth opportunities to certain consumer businesses. The strong brands in which TSG generally seeks to invest often provide attractive margins and defensible competitive positions built upon entrenched, loyal consumer franchises.

Investment Sourcing Capabilities: TSG has developed an extensive network of relationships with consumer companies, industry managers, consultants, investment bankers, lawyers, accountants and other intermediaries. These relationships, many of which are decades long, have historically enabled TSG to deploy capital at an attractive pace and have provided proprietary investment opportunities. Certain of TSG's investments have been negotiated outside of a broad auction process.

Creating Value through Active Participation: TSG is managed by an experienced investment team with significant operating capability and a considerable network of contacts in consumer industries and the financial community. The Managing Principals can furnish operating management assistance to portfolio companies, thereby creating the opportunity for even greater returns on investment. TSG often works closely with management to improve sales, marketing, operations, digital and/or financial functions and is typically able to expand revenues through distribution expansions, new market entry, strategic product line extensions and/or acquisitions.

Prudent Financial Leverage: TSG has generally employed a prudent amount of financial leverage to provide the operating flexibility to support rapid and substantial investments in new product introductions, channel or geographic expansion, operations and/or increased sales and marketing activities. There has generally been meaningful sales and profitability growth for TSG's portfolio companies enabling TSG to derive a substantial portion of its returns from underlying growth and multiple accretion.

Well-Defined Exit Strategies: TSG has broad experience in managing portfolio company exits via a variety of channels, including trade sales to strategic buyers, sales to other financial sponsors and initial public offerings. TSG will, in each case, determine the exit mechanism that is most appropriate, while considering a variety of factors including, but not limited to: interest from strategic buyers for corporate development, capital market conditions, interest from financial sponsors, relative valuations across public or private markets and other factors, as appropriate.

Investment Criteria

TSG will seek investments of varied size that it believes generally meet the following criteria:

- Companies in consumer industries with strong and defensible market positions.
- Annual revenues between \$100 million and \$1 billion.
- Companies not subject to rapid technological changes or significant research and development requirements.
- Companies that have significant growth potential.
- Companies in which TSG believes operating inefficiencies exist.
- Companies where strong management exists or can be recruited. TSG believes that it can add the greatest value when it supports capable, motivated managers.
- Companies with strong and differentiated brand positioning.

ESG

TSG seeks to grow and improve the companies in which TSG invests for long-term sustainability, which can benefit multiple stakeholders and mitigate adverse impacts. In furtherance of these goals, where possible and deemed prudent, TSG works through appropriate governance structures (e.g., boards of directors) of its portfolio companies to address relevant ESG considerations – including environmental, public health, safety and social issues – and encourages its portfolio companies to advance these same goals in a way that is consistent with the fiduciary duties of TSG and its portfolio companies.

IV. Investment Performance

Previous fund performance as of September 30, 2021 for TSG and the SBI's investments with previous funds, where applicable, is shown below:

Fund**	Vintage Year	Total Commitments	SBI Investment	Net IRR*	Net MOIC*	Net DPI*
TSG4	2002	\$509 million	--	36.2%	2.8x	2.8x
TSG5	2007	\$897 million	--	16.8%	2.1x	2.1x
TSG6	2012	\$1.3 billion	--	29.9%	2.7x	2.2x
TSG7A	2016	\$2.0 billion	--	31.1%	2.8x	0.3x
TSG7B	2016	\$510 million	--	28.1%	1.8x	0.4x
TSG8	2019	\$4.1 billion	--	(5.3)%	0.95x	0.0x

* Previous Fund investments may be relatively immature and, therefore, returns may not be indicative of future results. Net IRR and Multiple of Invested Capital (MOIC) provided by TSG.

** TSG's first three funds are excluded from the table above due to changes in the composition of the team and in the case of TSG1 limited access to historical records. The performance of TSG2 and TSG3 along with relevant information on changes in the investment team composition have been made available in the TSG9 private placement memorandum.

V. Investment Period and Term

The term of the fund is twelve years, subject to extensions with Advisory Committee approval. The Investment Period will last for a period of six years from the commencement date of the Fund.

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 and any supplemental thereto.

ATTACHMENT D

PRIVATE EQUITY MANAGER SUMMARY PROFILE

I. Background Data

<i>Name of Fund:</i>	Advent International GPE X, L.P.
<i>Type of Fund:</i>	Private Equity
<i>Target Fund Size:</i>	\$23 billion
<i>Fund Manager:</i>	Advent International Corporation
<i>Manager Contact:</i>	Robert Weaver 12 East 49th Street, 45th Floor New York, NY 10017

II. Organization and Staff

Advent International Corporation (“Advent”) is one of the world’s largest and most experienced global private equity firms, operating from 14 offices in 12 countries and employing 256 investment professionals. To date, the Firm has raised more than \$70 billion for its buyout funds from over 450 institutional investors worldwide. From inception in 1989 through September 30, 2021, Advent’s Global Private Equity Program (“GPE”) has invested \$46.3 billion in 281 companies, representing an aggregate enterprise value at entry of more than \$212 billion. In addition to the GPE program, Advent makes control-oriented investments in Latin America through their Latin American Private Equity Program (“LAPEF”) funds, has a technology-focused program (“Advent Global Technology Program”), and makes non-control investments via their subsidiary Sunley House Capital Management.

The GPE team comprises 220 investment professionals with a mix of operating, strategic consulting and financial backgrounds. Its 31 Investment Partners have an average of 19 years of experience in private equity and have worked with Advent for an average of 14 years. The Advent Portfolio Support Group is an in-house team of 35 professionals with operating and consulting experience who bring tools, expertise and resources to support the transformational initiatives that comprise the specific value creation plans at Advent’s portfolio companies. Advent has also developed a global network of external Operating Partners, senior industry executives who work with the Firm on an independent consulting basis in specific subsectors.

DEI is an important pillar of firm management for Advent. The Firm’s DEI mission statement focuses on development, recruitment, retention, and culture. By partnering with organizations like SEO (Seizing Every Opportunity), Level 20, TOIGO, UNITE and others, Advent seeks to improve the diversity of its candidate pool during the hiring process. As of December 2021, Advent’s employee base is 47% female and the investment

deal team is 27% female. The North American investment team is 42% ethnic minority. The stats for the European team will be released in 2022.

III. Investment Strategy

As with its predecessor funds, GPE X will pursue Advent's long-established strategy, which is based around five key components:

Sector specialization – Advent has developed a highly professionalized and systematic process which primarily focuses on companies in five core sectors in which Advent has substantial experience and deep local and international knowledge: (1) Business & Financial Services; (2) Healthcare; (3) Industrial; (4) Retail, Consumer & Leisure; and (5) Technology. Within these sectors, the GPE Team will use its deep expertise, combined with a resource-intensive approach, to proactively generate investment opportunities in sub-sectors that are undergoing substantial change, have outstanding growth potential or display other attractive characteristics. With a focus on specific sub-sectors, Advent will seek to utilize existing organizational knowledge and experience to identify investments in areas where it has had previous success and develop new opportunities based on a clear understanding of industry trends and competitive landscape.

Global presence and dynamic allocation of capital – GPE X intends to invest primarily in companies across the private equity markets of Europe and North America, and increasingly in Asia, where Advent has established local professionals and investment experience. Advent dynamically allocates capital as a result of a comprehensive “top-down” and “bottom-up” approach which results in finding and selecting the most compelling opportunities across sectors and geographies. Portfolio composition therefore varies from fund to fund depending on both secular and cyclical factors which impact the Firm's view of risk and return, and therefore the investment decisions.

Firm wide collaboration – Advent believes the Firm's culture of collaboration will lead to attractive cross-sector and cross-geography deals. As sectors continue to intersect, especially with the increasing permeation of technology, and companies look for partners with differentiated insights, Advent's coverage across key markets and sectors positions the Team well as a partner of choice.

Control-oriented investments in well-positioned companies – GPE X will seek to invest in companies where Advent can add significant value, usually through a controlling stake or a structure allowing it to influence the business in a meaningful way. Advent's experience has shown that it can implement value creation plans more effectively and improve downside protection if it has control and is an active owner. GPE X will also have the flexibility to deploy capital across deal types and sizes, with equity investments ranging from \$100 million to \$2 billion or more.

Investing behind value creation – The Fund will invest where it has the opportunity to create value and seek opportunities for true break-out potential for the companies in which it invests. The Fund will invest in both complex, transformational opportunities on one

hand and high-growth acceleration opportunities on the other. In both cases, Advent will focus on operational improvements, rather than financial engineering, to drive earnings growth and create value. Advent believes that this investment framework, rather than a focus on cost reduction, will position the Team to execute compelling investment opportunities and value creation plans in various market conditions.

Advent integrates ESG throughout the investment process. ESG pre-diligence screens, which map against the sector-specific Sustainable Accounting Standards Board (SASB) materiality index and provide recommended actions, are performed by third-party advisors and applied to all investments globally. Targeted ESG-related diligences are performed by external experts for specifically identified ESG issues, as applicable. Once an investment has been made, deal team members and internal consulting teams work with portfolio company senior management to embed material findings into value creation plans. In an effort to align on key metrics and increase transparency, Advent is the first private equity firm to collaborate with S&P Global Sustainable¹ for sector-specific ESG assessment, benchmarking and scoring of its portfolio companies.

For Advent, exit discipline starts during the diligence process. Before an initial investment in a new company is made, the deal team has already prepared an exit plan, which identifies potential buyers and other options for achieving liquidity via the capital markets. Post-investment, the team monitors and develops relationships with possible acquirers and evaluates the feasibility/attractiveness of a public offering, while implementing the value creation plan. Exits are pursued as soon as value creation targets are achieved, which in certain cases can be well before the end of the planned four-to-five-year hold period.

IV. Investment Performance

Previous fund performance as of September 30, 2021 for Advent and the SBI's investments with previous funds, where applicable, is shown below:

Fund	Vintage Year	Total Commitments	SBI Commitment	Net IRR*	Net MOIC*	Net DPI*
ESSF	1989	\$231 million	--	16.9%	2.2x	2.2x
GPE II	1993	\$314 million	--	22.0%	2.0x	2.0x
GPE III	1997	\$1.0 billion	--	10.6%	1.7x	1.7x
GPE IV	2001	\$1.5 billion	--	43.9%	3.0x	3.0x
GPE V	2005	\$3.3 billion	--	48.1%	2.4x	2.4x
GPE VI	2008	\$10.4 billion	\$50 million	16.5%	2.1x	2.0x
GPE VII	2012	\$10.8 billion	\$90 million	15.1%	2.0x	1.4x
GPE VIII	2016	\$13.0 billion	\$100 million	26.9%**	2.3x	0.7x
GPE IX	2019	\$17.5 billion	\$115 million	129.4%* *	3.0x	0.2x

* Previous Fund investments may be relatively immature and, therefore, returns may not be indicative of future results. Net IRR, Multiple of Invested Capital (MOIC), and Net DPI were provided by Advent.

** GPE IX and GPE VIII use a credit facility to bridge capital calls for investments. If amounts funded with the credit facility had been funded instead with capital contributions the Net IRR would have been approximately 26% for GPE VIII and 102% for GPE IX.

V. Investment Period and Term

The term of the fund is ten years, subject to extensions with Advisory Committee approval. The Investment Period will last for a period of six years from the commencement date of the Fund.

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 and any supplemental thereto.

ATTACHMENT E

PRIVATE EQUITY MANAGER SUMMARY PROFILE

I. Background Data

Name of Fund:	Apax XI USD L.P.
Type of Fund:	Private Equity – Buyout
Target Fund Size:	US\$ 13.0 billion
Fund Manager:	Apax XI GP Co. Limited
Manager Contact:	David Kim 601 Lexington Avenue New York, NY 10022

II. Organization and Staff

Apax Partners LLP (“**Apax**” or the “**Firm**”) is a global private equity advisory firm. For nearly 50 years, Apax has sought to go beyond a traditional private equity approach in building and growing businesses. Results are driven by a collaborative culture within which the Firm can expand mutual success through mutual vision. Apax’s conviction is that a blend of hands-on operating experience, specialist sector and sub-sector knowledge, and incisive global perspective deliver the best results.

Today, Apax is led by co-CEOs Andrew Sillitoe and Mitch Truwit, who have held these positions since 2014. Together, they lead a team of over 160 investment professionals including the Operational Excellence Practice (“**OEP**”), which is a team of 27 operators organized along functional lines designed to complement the deal teams by bringing different skills and expertise. Apax investment and OEP professionals are based in seven offices: London, New York, Munich, Mumbai, Tel Aviv, Shanghai, and Hong Kong.

Over the past few years, Apax has committed itself to a long-term vision for a more diverse partnership at the Firm. Apax’s mission is to build a firm of the most talented professionals, which represents the diversity of society as a whole in the geographies where the Firm operates and invests, creating opportunities for high potential individuals in underserved or disadvantaged communities. In addition to partnering with organizations such as #10,000 Black Interns, Level 20, Out Investors, SEO London, Synergist Network, Thirty Percent Coalition and ILPA’s Diversity in Action Initiative, Apax has focused on increasing diversity at the Firm at the point of entry, within junior ranks, with the aim to grow and promote from within. The Firm has looked to shift the lens of hiring so that more candidates partake in the initial stages of the hiring process with the additional aim of interviewing and hiring candidates based on their merits with as little unconscious bias as possible. For example, by focusing on interviewing and hiring a larger proportion of female candidates, Apax’s investment team has changed its composition at the point of entry. Apax is proud that since 2018, 40% of all investment team hires have been women. As of September 2021, 28% of all Investment

Professionals are women, up from 9% four years ago, and 39% of Investment Professionals in the U.S. are members of ethnic minority groups or identify as two or more races.

III. Investment Strategy

The private equity funds advised by Apax (the “**Apax Funds**”) aim to achieve superior returns by finding ‘hidden gems’ (businesses in which the investment team can visualise potential, allowing Apax Funds to purchase at discounted entry valuations which could be materially higher upon exit if improvements are made to the business) in ‘coveted categories’ (high quality sub-sectors within the economy in respect of which the investment team has significant experience and expertise, and where successful businesses – or ‘polished’ assets – often trade for very high multiples).

Following acquisition, Apax focuses on ‘value mining’ to improve these businesses, combining sub-sector know-how and best practice with operational and digital expertise, including through input from the Operational Excellence Practice. Finally, Apax Funds seek to reap the rewards of the strategy to achieve superior returns by selling improved, or ‘polished’, businesses which are intrinsically more valuable than they were at the time of acquisition, and which operate in the right sections of the economy to command high multiples. As with prior funds, Apax XI intends to invest the majority of its capital in Europe and North America with c.10-15% of total commitments invested in other geographies, primarily India and China where Apax has local presence.

Apax became a signatory to the UN Principles for Responsible Investment (“**PRI**”) in April 2011. Apax was a member of the PRI Private Equity Advisory Committee for a 3-year cycle from January 2016 to December 2018. In this capacity Apax has participated in the development of a number of responsible investment standards and guidelines such as the PRI led LP DDQ working group (which developed the PRI due diligence questionnaire) and also the working group developing the guidance document for portfolio monitoring.

The Principles of Responsible Investment have provided the framework which has guided the Firm in the development of its responsible investment activities. Apax has consistently achieved a score of A+ in the Strategy and Governance and in the Direct Private Equity Module in the PRI assessment reporting cycle for the past 3 years, providing a strong validation of the Firm’s commitment to adopting and implementing the Principles.

Apax joined the UNPRI hosted initiative Climate International (“**iCI**”) in June 2021, in order to participate with industry peers in a collaborative initiative to assess and mitigate private equity’s exposure to climate change risk. As a signatory to the iCI, Apax has made commitments to:

- 1) Recognize that climate change will have adverse effects on the global economy, which presents both risks and opportunities for investments.
- 2) Join forces to contribute to the objective of the Paris Agreement to limit global warming to well-below two degrees Celsius.

- 3) Actively engage with portfolio companies to reduce their greenhouse gas emissions, contributing to an overall improvement in sustainability performance.

Apax completed a project to measure and offset the emissions of the Firm’s own operations in the course of 2021 and Climate Care has confirmed Apax as Carbon Neutral for 2019 and 2020 through the purchase of offsetting credits in two carbon removal projects, which it will also support for its emissions for 2021 and 2022.

IV. Investment Performance

Previous Apax Fund performance as of September 30, 2021 is shown below:

Fund	Vintage Year	Total Commitments	SBI Investment	Net IRR*	Net MOIC*	Net DPI*
AEV	2001	€4.4 billion	--	28.5%	1.9	1.9
AEVI	2005	€4.3 billion	--	12.9%	2.1	2.0
USVII	2006	\$856 million	--	13.1%	2.0	1.9
AEVII	2007	€11.2 billion	--	7.4%	1.5	1.9
AVIII USD	2012	\$3.8 billion	\$200 million	16.5%	2.0	1.5
AVIII EUR	2012	€2.8 billion	--	16.9%	2.0	1.5
AIX USD	2016	\$7 billion	\$150 million	37.9%	2.5	0.9
AIX EUR	2016	€2.2 billion	--	37.1%	2.5	0.9
AX USD	2020	\$8.7 billion	\$150 million	56.2%	1.2	0.0
AX EUR	2020	€2.2 billion	--	58.7%	1.2	0.0

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

V. Investment Period and Term

Apax XI will have a five-year investment period and a ten-year term, each from the final closing date, with the possibility for up to three one-year extensions of the term with investor / LPAC consent.

This document is a summary of more detailed information provided in Apax XI’s Confidential Private Placement Memorandum (the “PPM”). It is qualified in its entirety by reference to the PPM and the Fund’s limited partnership agreements.

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ATTACHMENT F

PRIVATE EQUITY MANAGER SUMMARY PROFILE

I. Background Data

<i>Name of Fund:</i>	Blackstone Capital Partners IX, L.P.
<i>Type of Fund:</i>	Private Equity
<i>Target Fund Size:</i>	Not yet determined
<i>Fund Manager:</i>	The Blackstone Group L.P.
<i>Manager Contact:</i>	Sarah Foster 345 Park Avenue New York, NY 10154

II. Organization and Staff

Blackstone Inc. (together with its affiliates “Blackstone” or the “Firm”) is sponsoring Blackstone Capital Partners IX L.P. (“BCP IX” or the “Fund”), a private investment fund that will make control and control oriented private equity investments on a global basis. The Fund’s focus is expected be on large scale and complex transactions, primarily in the United States and Western Europe, and on a more limited basis in other regions such as Asia.

Blackstone was founded in 1985 by Stephen A. Schwarzman and Peter G. Peterson and is headquartered in New York, NY. Blackstone’s alternative asset management businesses include investment vehicles focused on private equity, real estate, hedge fund solutions, credit, secondary funds, tactical opportunities, infrastructure, insurance solutions and life sciences. As of December 31, 2021, Blackstone had 185 Senior Managing Directors, and approximately 3,800 total employees across 27 offices globally. The Firm’s total assets under management is approximately \$880 billion.

All investment and disposition decisions of BCP IX are expected be made by a global Investment Committee comprised of Joe Baratta, Prakash Melwani, Stephen A. Schwartzman, Jon Gray, and select Senior Managing Directors.

Blackstone is highly focused on its efforts and commitments to ESG and DEI. Blackstone takes a comprehensive approach to ESG by integrating it in the management of their portfolios and assets. Each business vertical at the Firm has a dedicated Head of ESG and the teams utilize data during the diligence and ownership phases to provide transparency and accountability. One specific example is a 15% target for carbon emissions reduction in aggregate across investments globally where Blackstone controls energy usage.

Blackstone's commitment to DEI is reflected at all levels of the organization. Blackstone partners with and provides direct support to multiple diversity focused organizations such as Sponsors for Educational Opportunity ("SEO"), Toigo Foundation, Year Up, Girls Who Invest, Ladders for Leaders, Cristo Rey Brooklyn, 30 Percent Coalition, Declare, and Level 20. Approximately one-third of its leadership team is diverse. The Firm achieved 41% female representation globally and 49% ethnic minority representation in the U.S. among the 2021 incoming analyst class. Globally, of the employees who have self-identified, Blackstone is approximately 40% female and 35% ethnic minority. Blackstone has committed to a target of at least one-third diverse representation on new controlled portfolio company boards in the US and Europe. Furthermore, Blackstone has committed to hiring veterans, spouses and caregivers across the firm and its portfolio companies and has hired nearly 100,000 as of July 2021.

III. Investment Strategy

BCP IX will continue Blackstone Private Equity's proven approach to making control and control-oriented private equity investments on a global basis. The fund will continue to pursue a thematic, sector-based approach to private equity investing with a focus on large and complex transactions where Blackstone's scale, brand, and business transformation capabilities lend a competitive advantage. BCP IX intends to remain disciplined with an unrelenting focus on valuation, cash flow and business quality.

The following key differentiators have allowed Blackstone to deploy capital at scale and deliver strong risk-adjusted returns:

- **Power of Blackstone Platform:** The breadth and scope of Blackstone's global platform provides access to unique insights across businesses lines. Blackstone's private equity business benefits from its cooperation with its real estate business, which is the largest owner of commercial real estate in the world. Additionally, Blackstone is one of the largest credit managers in the world and a large counterparty for many investment banks and deal intermediaries. This helps facilitate deal execution and allows Blackstone to optimize the capital structure of portfolio companies throughout the investment period. In 2021, Blackstone issued and raised \$230 billion of debt and equity for portfolio companies.
- **Thematic Investing:** BCP IX focuses on deploying capital across a set of core themes which reflect industries experiencing high secular growth that are positioned to benefit from ongoing or anticipated changes in the macroeconomic environment, industry trends, or consumer behavior where Blackstone can add significant value through operating intervention capabilities. Examples of key themes include Digital Consumer, Healthcare, Tech-Enabled Suppliers, Single Family Home-Related, ESG/Energy Transition and Travel & Leisure/COVID Recovery.
- **Partner of Choice:** Blackstone seeks to be the partner of choice for families, entrepreneurs and management teams and help them grow and transform their

businesses using the firm's operating resources and the power of the broader Blackstone platform. Target companies, boards of directors, financial intermediaries and others view Blackstone as a partner of choice that is credible and able to create substantial value through key differentiated operating capabilities.

- **Large Scale, Control Buyouts:** Blackstone's scale affords significant competitive advantages in sourcing, diligencing, operating and exiting investments. BCP VIII has an average TEV of \$6.2 billion in U.S. investments, representing more than 3x the average TEV since BCP VI. Blackstone's control-oriented strategy facilitates discretion over capital allocation decisions, talent selection in management teams and boards, and value creation initiatives. Control also allows the Fund significant exit optionality, enabling alignment of liquidity events with favorable market conditions.
- **Business Transformation:** Blackstone has a deep track record of transforming portfolio companies and helping improve their growth and profitability potential to drive exit multiple expansion. This capability is enabled by the Portfolio Operations team led by former Co-Chief Executive Officer at SAP Jennifer Morgan. The team includes 84 operating professionals focused on Data Science, Procurement, Lean Process, Branding, IT Enablement, Talent Management, Sustainability, ESG and Healthcare Cost Containment, among other areas.

In the current investment environment, Blackstone expects to focus its sourcing efforts on several key transaction types. The firm is often able to engage bilaterally on large, complex transactions because of the ability to deliver multi-billion-dollar equity commitments (and the related third-party debt commitments) efficiently, confidentially and credibly. Blackstone is well suited to navigate the execution and operating complexity associated with large public-to-private, corporate carve-out and family/founder transactions. The type of transactions below have comprised the majority of capital deployed from BCP VII and BCP VIII:

- **High Growth/Buy and Build Platforms:** Blackstone's capital, operating resources and M&A expertise can serve as a catalyst for growth in platforms with differentiated business models and attractive long-term industry dynamics. The Firm is able to help professionalize these growing businesses by augmenting finance, IT, HR and other functions, as well as improve capital allocation discipline.
- **High Quality/Attractive Free-Cash-Flow Yield:** Blackstone's valuation framework is grounded in the free cash flow generation potential of investments during the ownership period. The firm seeks to acquire businesses with strong market positions, sustainable competitive advantages, and secular industry growth tailwinds. Additionally, a focus on control deals allows Blackstone to operationalize a specific business transformation plan and maintain exit optionality.

IV. Investment Performance

Previous fund performance as of December 31, 2021 for Blackstone Capital Partners and the SBI's investments with previous funds, where applicable, is shown below:

Fund	Vintage Year	Total Commitments	SBI Investment	Net IRR*	Net MOIC*	Net DPI*
BCP I	1987	\$810 million	--	19%	1.9x	1.9x
BCP II	1993	\$1.3 billion	\$50 million	32%	2.1x	2.1x
BCP III	1997	\$3.8 billion	--	14%	1.9x	1.9x
BCP IV	2002	\$6.5 billion	\$70 million	36.1%	2.5x	2.4x
BCP V	2006	\$21.4 billion	\$140 million	8.2%	1.7x	1.6x
BCP VI	2011	\$15.1 billion	\$100 million	12.7%	1.8x	1.3x
BCP VII	2016	\$18.0 billion	\$130 million	20.5%	1.7x	0.4x
BCP VIII	2020	\$24.5 billion	\$150 million	54%	1.3x	0.0x

* Previous Fund investments may be relatively immature and, therefore, returns may not be indicative of future results. Net Internal Rate of Return (IRR) and Multiple of Invested Capital (MOIC) provided by Blackstone.

V. Investment Period and Term

The term of the fund is expected to be eleven years, subject to extensions unless the Advisory Committee objects. The Investment Period is expected to last for a period of six years from the commencement date of the Fund.

This document has been prepared by the Minnesota State Board of Investment (MSBI) and any views or opinions expressed herein are solely the views of MSBI and not Blackstone. Blackstone shall not be responsible for the contents of this document produced by MSBI. 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 and any supplemental thereto.

ATTACHMENT G

PRIVATE EQUITY MANAGER SUMMARY PROFILE

I. Background Data

<i>Name of Fund:</i>	Blackstone Growth II L.P.
<i>Type of Fund:</i>	Growth Equity
<i>Target Fund Size:</i>	~ \$7- \$8 billion
<i>Fund Manager:</i>	Blackstone Inc.
<i>Manager Contact:</i>	Sarah Foster 345 Park Avenue New York, NY 10154

II. Organization and Staff

Blackstone Inc. (together with its affiliates “Blackstone” or the “Firm”) is sponsoring Blackstone Growth II L.P. (“BXG II” or the “Fund”), a private investment fund that seeks to deliver attractive risk-adjusted returns by investing in dynamic, growth-stage business in five core sectors globally: consumer, consumer technology, enterprise software, financial services, and healthcare.

Blackstone was founded in 1985 by Stephen A. Schwarzman and Peter G. Peterson and is headquartered in New York, NY. Blackstone’s alternative asset management businesses include investment vehicles focused on private equity, real estate, hedge fund solutions, noninvestment grade credit, secondary funds, and multi-asset class exposures falling outside of other funds’ mandates. As of December 31, 2021, Blackstone had 185 Senior Managing Directors, and approximately 3,800 total employees across 27 offices globally. The Firm’s total assets under management is approximately \$880 billion.

The BXG team is led by Jon Korngold, who has previously held a variety of leadership roles at General Atlantic and Goldman Sachs. In addition to Mr. Korngold the BXG investment team will include Senior Managing Directors, Christopher James, Ram Jagannath, Vini Letteri, Yifat Oron, Brian Sauvigne and Paul Morrissey. In total, the Blackstone Growth team comprises 38 professionals across four offices in New York, San Francisco, London and Tel Aviv.

Blackstone is highly focused on its efforts and commitments to ESG and DEI. Blackstone takes a comprehensive approach to ESG by integrating it in the management of their portfolios and assets. Each business vertical at the Firm has a dedicated Head of ESG and the teams utilize data during the diligence and ownership phases to provide transparency and accountability. One specific example is a 15% target for carbon emissions reduction in aggregate across investments globally where Blackstone controls energy usage.

Blackstone's commitment to DEI is reflected at all levels of the organization. Blackstone partners with and provides direct support to multiple diversity focused organizations such as Sponsors for Educational Opportunity ("SEO"), Toigo Foundation, Year Up, Girls Who Invest, Ladders for Leaders, Cristo Rey Brooklyn, 30 Percent Coalition, Declare, and Level 20. Approximately one-third of its leadership team is diverse. The Firm achieved 41% female representation globally and 49% ethnic minority representation in the U.S. among the 2021 incoming analyst class. Globally, of the employees who have self-identified, Blackstone is approximately 40% female and 35% ethnic minority. Blackstone has committed to a target of at least one-third diverse representation on new controlled portfolio company boards in the US and Europe. Furthermore, Blackstone has committed to hiring veterans, spouses and caregivers across the firm and its portfolio companies and has hired nearly 100,000 as of July 2021.

III. Investment Strategy

BXG II, in continuing with the successful launch of BXG I, will focus on providing capital to growth-state companies that have the potential for category leadership and breakout performance. Targeted companies are expected to have sustainable barriers to entry supported by differentiated intellectual property, proven business models, large addressable markets, accomplished management teams, capital efficient business models that offer significant operating leverage, and strong historical and forecasted revenue growth. The Firm expects to focus on businesses that have matured past many of the binary risks that often characterize growth equity investments, and instead to focus on minimizing execution risks associated with fast-growing environments, which Blackstone believes it is uniquely positioned to address.

The following characteristics are key to the BXG investment strategy:

- **Concentrated Portfolio.** The Fund will likely have a relatively concentrated portfolio, and expects to be actively involved in the company's strategic, operational and financial initiatives. BXG II will only pursue the most attractive opportunities that are uncovered out of a large set of opportunities generated by the deep and broad Blackstone sourcing platform. The Firm believes this selectivity will allow BXG II to deploy large amounts of capital into investments with highly attractive risk-adjusted return profiles. Finally, unlike the typical growth equity model characterized by having significantly more portfolio companies relative to operational professionals, the Firm believes that this approach allows BXG II to commit substantial operational resources to each investment and ensure that Blackstone's value-add capabilities are fully utilized.
- **No Binary Risks.** BXG II intends to pursue investments in companies that have eclipsed many of the hurdles that plague early stage opportunities. These include technology risk, evolving business model risk, and total addressable market size. Further, the Fund will seek to invest in businesses with proven unit economics. In other words, the strategy will focus on companies whose primary challenge is minimizing the execution risks and operational strains that are associated with fast-growth environments.

- **Sector Concentration.** Blackstone has extensive growth investing experience across multiple industry verticals. BXG II will seek to invest in sectors in which Blackstone has extensive experiences and that the Firm believes hold the greatest growth prospects with highly attractive underlying business characteristics. The team believes that five core sectors – consumer, consumer technology, enterprise software, financial services, and healthcare – have produced many of the most innovative and transformative companies today, and will continue to generate a very high number of attractive investment opportunities.
- **High Growth.** Blackstone believes that market forces are driving attractive growth opportunities in sectors at growth rates that significantly outpace GDP. This rising tide creates opportunities for all market participants and particularly strong opportunities for the best companies.

BXG II will seek to make equity investments in the range of \$200 - \$500 million, with the opportunity for additional follow-on funding for organic and inorganic growth opportunities after the initial investment. The Firm believes its ability to fund leading companies at scale will be highly attractive to entrepreneurs and management teams looking for a long-term partner (versus a syndicate of multiple investment firms) and that few other firms can match Blackstone’s substantial capital resources and value-add capabilities.

IV. Investment Performance

Previous fund performance as of December 31, 2021 for Blackstone Growth and the SBI's investments with previous funds, where applicable, is shown below:

Fund	Vintage Year	Total Commitments	SBI Investment	Net IRR*	Net MOIC*	Net DPI*
BXG I	2020	\$4.5 billion	\$250 million	43%	1.2	0.1

* Previous Fund investments may be relatively immature and, therefore, returns may not be indicative of future results. Net IRR and Multiple of Invested Capital (MOIC) provided by Blackstone.

V. Investment Period and Term

The term of the fund is eleven years, subject to one-year extensions with the approval of a majority of Limited Partners. The Investment Period will last for a period of five years from the commencement date of the Fund.

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ATTACHMENT H

PRIVATE EQUITY MANAGER SUMMARY PROFILE

I. **Background Data**

<i>Name of Fund:</i>	Bridgepoint Europe VII
<i>Type of Fund:</i>	Private Equity
<i>Target Fund Size:</i>	€7 billion
<i>Fund Manager:</i>	Bridgepoint Advisers Limited
<i>Manager Contact:</i>	John Barber 95 Wigmore Street London, England, W1U 1FB

II. **Organization and Staff**

Bridgepoint (the “Firm”) is raising its seventh flagship equity fund, Bridgepoint Europe VII (“BE VII” or the “Fund”), which will continue Bridgepoint’s established strategy of investing in middle-market, growth-oriented European businesses. Bridgepoint has invested across Europe since the early 1990s and has delivered strong and consistent investment performance over an extended period.

From its establishment in 1984 to 2000, Bridgepoint operated as a subsidiary of the European banking group, NatWest. During the 1990s, it gradually increased the proportion of external funds under management and in 1998 it raised Bridgepoint Europe I (“BE I”), its first external fund, with commitments of £1bn. In June 2000, the Bridgepoint Partners and employees completed the acquisition of the management company of the business from NatWest and the secondary sale of NatWest’s interests in the underlying portfolio. The business was fully owned by Bridgepoint Partners and employees until 2018 when a passive minority stake was sold to Dyal Capital Partners in order to support the organization’s long-term growth. Dyal’s investment facilitated the expansion of the platform with the EQT Credit acquisition as well as the opening of new offices in Amsterdam and San Francisco, a number of new hires, and investment in the operating platform, data analysis capabilities, and cyber security. In July 2021, Bridgepoint listed on the London Stock Exchange. Proceeds from the listing will be used to continue investing in the Firm’s platform to strengthen and enhance it to drive investment returns. Importantly, the Firm continues to be majority owned by its employees and former employees (all permanent employees are shareholders in the listed company).

Currently, Bridgepoint has over 180 investment professionals, 92 of whom are focused solely on the Bridgepoint Europe (“BE”) fund series. The Bridgepoint Europe Investment Team is led by 30 Investment Partners with an average of 19 years of private equity experience, of which 15 years have been with the Firm. Bridgepoint Europe also benefits from a dedicated Portfolio Support Group of more than 30 professionals which provides an operations-focused

resource for adding value across the portfolio. The group comprises: the Operational Support Group; Shanghai, New York and San Francisco Offices; Procurement Team; and Capital Markets Team. Bridgepoint has offices globally with investment offices in Europe (London, Amsterdam, Frankfurt, Madrid, Paris, and Stockholm), portfolio offices in Shanghai, New York, and San Francisco, and a funds management office in Luxembourg. In addition to the flagship Bridgepoint Europe funds, Bridgepoint also manages two additional private equity fund series, Bridgepoint Development Capital (companies with enterprise values of typically up to £150 million) and Bridgepoint Growth (early stage growth companies with enterprise values of up to £30 million), as well as three Credit strategies – Credit Opportunities, Direct Lending and Syndicated Debt.

Bridgepoint is committed to a diverse and inclusive working environment both at the Firm itself and at its portfolio companies. The Firm is a signatory to ILPA’s ‘Diversity in Action’ initiative which aims to advance diversity, equality and inclusion, and is actively involved with a range of other initiatives including ‘Level 20’, which aims to promote gender diversity in the European private equity industry. Bridgepoint also partners with organizations such as the 10,000 Black Interns and the Out Investors initiative. Bridgepoint has employees of more than 30 different nationalities. It has a gender-balanced recruitment policy, and more than 50% of its associate (entry-level) hires are female. More broadly, 46% of staff are female, and women currently account for 25% of Investment Professionals.

III. *Investment Strategy*

Bridgepoint is raising BE VII which will seek to acquire a well-diversified portfolio of predominantly European middle market businesses. The Fund will continue Bridgepoint Europe’s strategy of investing in European middle market buyouts, focusing on established businesses with enterprise values typically between €250m and €1bn. As with Bridgepoint’s existing funds, there will be no prescriptive country allocations, thus providing the Fund flexibility in its deployment of capital within Europe to exploit regional variances and capture optimum value and relative return opportunities.

BE VII will focus on six sectors: Business Services, Consumer, Financial Services, Healthcare, Advanced Industrials, and Media & Sports Rights, with Technology acting as a transversal across the six sectors. Within these sectors, Bridgepoint focuses on companies with sustainable end market growth and high quality of earnings. Bridgepoint looks for assets in growth niches which have the potential to deliver premium returns irrespective of macroeconomic conditions. Bridgepoint targets market leaders with leading intellectual property and service provision, companies accessing growing global markets, and businesses with high levels of recurring revenues. In addition, BE VII will target market leading businesses operating in fragmented markets to use as platforms for consolidation at accretive valuations. Generating ‘internal growth’ through operational improvement will also be an important driver of value creation for the Fund.

Bridgepoint’s strong sector expertise drives its investment activity. All Bridgepoint Partners and Directors in the Investment Team are aligned with a sector team working globally to

identify the most promising market segments. Each sector team produces two deep-dives into key thematics every year, which leads to either proprietary deal sourcing or at least puts Bridgepoint in a strong position should companies be auctioned. More than 75% of BE V and BE VI transactions were the product of the Firm's sector mapping and long-term origination program. To complement the sector focus, Bridgepoint Europe applies a sector and geographic matrix to the deployment of its investment resources. Transaction teams typically combine local team members with colleagues with relevant sector and functional expertise from other offices. This provides a compelling mix of skills and experience to execute transactions and drive subsequent value creation initiatives.

Bridgepoint Europe draws on a substantial operational toolkit to build better, bigger, more efficient and more sustainable growth businesses. While each investment is unique, there are nevertheless certain key elements common to a typical Bridgepoint investment case which are incorporated into value creation plans for each asset. These include: organic revenue development initiatives, add-on acquisitions, selective appointments (for example, to enhance management teams, digital impact strategies, and ESG upgrade plans), and operational improvements. Since 2000, earnings growth has accounted for almost 75% of value creation in Bridgepoint Europe portfolio companies up to the point of exit, driven by operational improvement and M&A.

Bridgepoint considers its ability to exit investments in both favorable and more challenging market conditions to be a great strength and among its key attributes. All investments are considered regularly as possible realizations, both in the context of asset-specific and fund as-a-whole dynamics. The Fund will carefully balance its priorities of returning material capital to investors regularly and maximizing overall returns, basing the selection of potential exit candidates on their performance to date and an assessment of their capacity to maintain growth in capital appreciation.

Bridgepoint's ESG principles are a critical part of the Firm's investment strategy and are integrated into every layer of the investment process, as well as informing the manner in which Bridgepoint is managed. Bridgepoint's dedicated Head of ESG, who leads the ESG Team, reports to an ESG Committee which meets on a quarterly basis and comprises eight individuals from across Bridgepoint's investment teams and support functions. Bridgepoint's ESG Committee reviews ESG performance across the portfolio, against the Firm's ESG framework which is set out in detailed guidance provided to all companies. This will include checking on the implementation status of ESG programs at each portfolio company and identifying which companies need further support and guidance. Bridgepoint has been a signatory to the UN PRI since 2013 and was again awarded an 'A+' for strategy and governance and an 'A' for its private equity (responsible investment practices) by the UN PRI in July 2020. In support of the Firm's broader values and ESG framework, Bridgepoint is classifying BE VII as Article 8 under the Sustainable Finance Disclosure Regulation ("SFDR"). This demonstrates Bridgepoint's commitment to embedding ESG considerations into every stage of the investment process, whilst reporting transparently on progress with ESG initiatives to investors, to a degree which surpasses industry-standard commitments and reporting requirements.

IV. Investment Performance

Previous fund performance as of September 30, 2021 for Bridgepoint and the SBI's investments with previous funds, where applicable, is shown below:

Fund	Vintage Year	Total Commitments	SBI Investment	Net IRR*	Net MOIC*	Net DPI*
Bridgepoint Europe I	1998	£1.0 billion	--	10%	1.6x	1.6x
Bridgepoint Europe II	2001	€2.0 billion	--	23.5%	1.7x	1.7x
Bridgepoint Europe III	2005	€2.5 billion	--	3.7%	1.4x	1.1x
Bridgepoint Europe IV	2008	€4.8 billion	--	12.6%	1.8x	1.6x
Bridgepoint Europe V	2015	€4.0 billion	--	19.5%	1.9x	0.9x
Bridgepoint Europe VI	2019	€5.8 billion	€150 million	20.3%	1.2x	0.1x

* Previous Fund investments may be relatively immature and, therefore, returns may not be indicative of future results. Performance data was provided by Bridgepoint.

V. Investment Period and Term

The investment period will be up to five years from the final closing (targeted four years). The term will be ten years from the final close, and may be extended by one additional year at the discretion of the Manager (after prior consultation with the LPAC) and may be extended by up to two further one-year periods with the consent of investors representing more than 50% of total 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 Manager.

ATTACHMENT I

PRIVATE EQUITY MANAGER SUMMARY PROFILE

I. **Background Data**

Name of Fund:	Brookfield Capital Partners VI, L.P.
Type of Fund:	Private Equity
Target Fund Size:	\$12.5 Billion
Fund Manager:	Brookfield Asset Management
Manager Contact:	Jeff Clarke 250 Vesey Street New York, NY 1281

II. **Organization and Staff**

Brookfield Asset Management Inc. (together with its affiliates, “Brookfield” or “Firm”) is a premier global alternative asset manager with over \$650 billion of AUM across private equity, real estate, infrastructure, renewable energy and credit¹. Building on a history as an owner and operator that dates back more than 100 years, Brookfield invests in long-life assets and businesses that help support the backbone of today’s global economy, as well as in the debt securities of these assets and businesses.

Brookfield is a leading global private equity investor, with approximately \$78 billion of AUM in the private equity sector and approximately 76,000 operating employees. Brookfield Private Equity Group’s (“BPEG”) investment professionals are located in 11 offices worldwide. BPEG has grown its investment business and expanded geographically, being mindful to develop a local presence in the regions where we operate. We have teams in North and South America, Europe, India, Australia and more recently we have opened offices in China and Japan. Today, the Private Equity Group is comprised of 130 investment professionals that includes finance investment professionals and business operations professionals who work as an integrated team throughout all stages of the investment life cycle.

The Private Equity Group is led by Cyrus Madon, Managing Partner and CEO of Private Equity, and is supported by an executive management team and seven regional investment heads, each of whom manage the investment teams of a specific global region. The BPEG Leadership Team is supported by senior investment and operating professionals and is supplemented by a group of senior Brookfield executives who make up the Investment Committee and provide oversight to the Private Equity Group. Collectively, the Leadership Team has an average of approximately 25 years of investment experience and has worked together at Brookfield for an average of 14 years. In total, the Private Equity Group is composed of 130 investment professionals worldwide.

¹ As of September 30, 2021

Brookfield’s approach to diversity and inclusion has been deliberate and is integrated into its Human Capital Development processes and initiatives. Brookfield supports a number of Employee Resource Groups, which are networks organized by employees around shared interests, characteristics, or experiences. A few examples are Brookfield Women, Brookfield Pride, Brookfield Black Professionals, and Brookfield Next Generation. A concerted effort to increase gender diversity has yielded positive results as currently 46% of Brookfield employees are female and 26% of managing partners, managing directors and senior vice presidents are female. Out of all Brookfield investment professionals, 21% are female and 24% are ethnic minorities. Overall, 35% of Brookfield’s employee base are ethnic minorities².

III. Investment Strategy

Brookfield is forming Brookfield Capital Partners VI (“BCP VI” or “Fund”) to pursue target value investments in high-quality businesses where it expects to utilize an operationally focused approach to enhance performance and cash flows. Brookfield expects the Fund’s investments to be diversified geographically, with a focus on markets where it has a significant presence or where it has extensive experience and knowledge. The Fund’s flexible investment mandate allows Brookfield to execute on a variety of transaction types, allowing it to maintain a value orientation and act decisively in various situations including restructurings, public to privates, corporate carve-outs, or capital market dislocations. The Firm believes that BCP VI is well-positioned to take advantage of a compelling and sizable private equity opportunity set by leveraging Brookfield’s global footprint and deep operating experience to drive transaction sourcing, enhance execution and add value post-acquisition.

BCP VI will leverage the Private Equity Group’s extensive 20-plus year investment and operating experience in identifying, sourcing, and executing on attractive investment opportunities globally. The Fund stands to benefit from BPEG’s robust sourcing capabilities, which is enhanced by the Investment Team’s ability to leverage knowledge and expertise resident across Brookfield’s operating businesses to identify investment opportunities. Further, where Brookfield’s reputation and pedigree allow, the Investment Team utilizes such attributes to position us as a partner of choice. Target opportunities include investments in providers of essential products and services that have market-leading positions, benefit from high barriers to entry, and demonstrate stable cash flow characteristics. Brookfield’s strategy targets complex, often contrarian, transactions that can result in less competition for us and the ability for us to acquire for value.

Post-acquisition, the Firm seeks to deploy an active management approach focused on strategic and/or operational improvements and cash-generative growth opportunities. By exercising influence or control over our portfolio companies, it seeks to add value by focusing on profitability, sustainable operating and product margins and cash flow. The value created by this active management approach is manifested in Brookfield’s strong private equity investment track record.

BCP VI will target approximately 15–18 investments, comprised principally of initial and follow-on investments that range from approximately \$500–\$800 million and will seek to

² As of March 2021; 55% are white, 10% did not respond or declined to self-identify

include three to four larger-scale transactions to be pursued opportunistically. The Fund seeks to invest principally in industrials, business services, and infrastructure services where it believes it possesses a competitive or informational advantage. Brookfield has also developed small but dedicated teams to identify and evaluate investments in healthcare and technology services, two of the largest sectors for capital investment in private equity. The Fund will primarily target investments in the key markets where Brookfield has deep investment expertise and local operational capabilities, including North America, Europe, Asia Pacific and Brazil.

ESG management has always been fundamental to how Brookfield conducts its business. Brookfield established organization-wide principles that govern its overall approach to ESG, and the implementation of these principles is tailored to each investment, based on, among other things, the business activity, location and industry of operations, and investment type. These principles are: mitigate the impact of its operations on the environment, ensure the well-being and safety of employees, uphold strong governance practices, and be good corporate citizens. In addition, Brookfield partners with various organizations to improve ESG in the marketplace as well as at the Firm. A few examples are: the Net Zero Asset Managers (NZAM) initiative, the Sustainability Accounting Standards Board, becoming a signatory to Principles for Responsible Investment (PRI), and supporting the Task Force on Climate-related Financial Disclosures (TCFD).

IV. Investment Performance

Previous fund performance as of September 30, 2021 for Brookfield and the SBI's investments with previous funds, where applicable, is shown below:

Fund	Vintage Year	Total Commitments	SBI Investment	Net IRR*	Net MOIC*	Net DPI*
Brookfield Capital Partners I	2001	C\$416 million	--	24.5%	1.9x	1.9x
Brookfield Capital Partners II	2006	C\$1 billion	--	14.5%	2.3x	2.2x
Credit Crisis Consortium Investments (CCC) **	2009	\$7 billion	--	22.9%	2.0x	1.5x
Brookfield Capital Partners III	2011	\$1 billion	--	7.0%	1.4x	1.1x
Brookfield Capital Partners IV	2015	\$4 billion	\$100 million	50.0%	2.7x	1.6x
Brookfield Capital Partners V	2019	\$8.5 billion	\$250 million	26.4%	1.3x	0.0x

* Previous Fund investments may be relatively immature and, therefore, returns may not be indicative of future results. Performance data was provided by Brookfield.

** Credit Crisis Consortium Investments includes all investments made between 2009 and 2011 where members of the Brookfield private equity team were significantly involved in sourcing, evaluating or executing such investments.

V. Investment Period and Term

The Commitment Period for the Fund will terminate four years from the final closing date. The Fund will terminate ten years from the initial closing date, subject to up to two additional one-year extensions by the General Partner with the consent of the LP Advisory Committee.

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 J

PRIVATE EQUITY MANAGER SUMMARY PROFILE

I. Background Data

Name of Fund:	IK X Fund
Type of Fund:	Private Equity
Target Fund Size:	Not yet determined
Fund Manager:	IK Investment Partners
Manager Contact:	Alice Langley The Adelphi 1-11 John Adam Street London, England, WC2N 6HT

II. Organization and Staff

IK Investment Partners (“IK” or “Firm”) was founded in 1989 by Bjorn Saven, who now serves as non-executive Chairman. The Firm makes private equity investments in four separate Fund series that vary in target company enterprise value (“EV”) size and ownership control: Mid Cap Funds (majority control; EVs > €150 million), Partnership Funds (minority control; EVs > €200 million), Small Cap Funds (primarily majority control; EV > €50 million), and Development Capital (primarily majority control; EV < €50 million).

The IK investment team is comprised of approximately 85 investment professionals, of which 40 are dedicated to the Firm’s Mid Cap strategy. The IK Mid Cap investment team is led by Dan Soudry and supported by IK’s CEO Christopher Masek, who is the Chairman of the Mid Cap Investment Committee. In addition to Mr. Soudry and Mr. Masek, the Mid Cap senior investment staff is made up of Alireza Etemad and Maria Brunow in the Nordic region; Norman Bremer, and Remko Hilhorst in Benelux; Remi Buttiaux, Vincent Elriz, and Diki Korniloff in France; Pete Wilson in London; and Mirko Jablonsky and Anders Petersson in Germany, Austria and Central Europe (“DACH”). Johan Van de Steen leads the Firm’s Operations team and Thierry Aoun leads the Firm’s Capital Markets team. IK’s investment teams operate out of local offices in Amsterdam, Copenhagen, Hamburg, London, Paris and Stockholm, while investor relations, administrative, and back office functions are based in some of those locations and Luxembourg and New York.

IK strives to create an environment that embraces and fosters diversity and inclusion (“D&I”). IK believes that its commitment to D&I aligns with its “People-First” value objective. D&I is an important part of its practices and policies on recruitment, compensation and benefits, professional development and training as well as promotions and the ongoing development of a work environment built on the premise of fairness. As part of its D&I efforts, IK is a member of Level 20 in an effort to improve gender diversity in European private equity. Currently, the investment team is 21% female.

III. Investment Strategy

IK is expected to sponsor IK Fund X (“IK X” or “Fund”) to invest in regional middle market companies in Northern Europe with strong potential for growth and attempt to double the earnings of each company through add-on acquisitions and international expansion, and operational improvements. Fund X is expected to be a continuation of the mid-cap strategy that IK has developed over the course of nine prior funds. IK believes that its strategy is differentiated across several dimensions:

Middle Market Focus: The Fund is expected to focus primarily on companies with enterprise value of between €200-€1,000+ million, investing equity of between €100 million and €300 million in approximately 20 companies. The average enterprise value of investments made over the last three mid-cap funds was approximately €320 million. IK believes that, by focusing on this segment of the lower middle-market, they are able to exploit inefficiencies that are not present at the larger end of the market, as well as avoid competition from larger pan-European or Global funds.

Geographic Focus: IK X is expected to focus on Northern Continental Europe, primarily Benelux (Belgium, the Netherlands and Luxembourg), DACH (Germany, Austria and Switzerland), France and the Nordic region. These are collectively known as IK’s “Core Markets,” and the firm has been active in each for nearly 20 years, additionally the IK X Fund will have a dedicated team to address the UK market. The Firm’s investment professionals are organized into five regional teams (Benelux, DACH, France, Nordic and the UK) to better serve this unique geographic footprint.

Sector Focus: Over its 30-year history, IK has transitioned from a generalist approach to become a firm broadly focused on the industrials, consumer, business services, and healthcare sectors. In particular, IK has developed a strong track record and deep industry network within the industrials, consumer, business services, and healthcare subsectors. The Firm’s networks and industry knowledge often provide early access to owners and management, allowing IK to limit the level of competition around target companies and helping the Firm position itself as a knowledgeable and supportive partner to management.

ESG: IK believes that strong ESG practices correlate positively with enhanced financial performance within portfolio companies as well as enrich society more broadly. By working with management teams, it helps portfolio companies recognize and manage the opportunities and risks associated with ESG factors. During the sourcing and diligence phase, deal teams perform ESG due diligence, typically alongside external ESG specialists, and include a summary of their findings in their IC memo. Depending on the materiality of the ESG risks identified, IK may choose to pursue an investment opportunity and embed risk management or ESG enhancement actions in the post-acquisition Full Potential Plan. During the ownership phase, each portfolio company forms an Audit & ESG Committee, which reports to the Board of Directors. This committee is charged with ensuring that the company has a robust ESG plan and is responsible for monitoring the implementation of that plan on an annual basis as well as part of the exit process.

Sourcing: IK sources investment opportunities by combining a strategic screening process with proactive outreach. All new potential investments are evaluated against a consistent set of investment criteria: the aforementioned size, geography, and sector, as well as performance, positioning, and potential. In terms of company performance, IK seeks to invest in high EBITDA margin businesses with strong EBITDA-to-cash conversion rates. In the 40 mid cap investments made by IK from the last 3 mid-cap funds, the EBITDA margin was 25%, and the cash conversion rate was 78%. The ideal acquisition target is positioned as a leader in its local market, has a sustainable competitive advantage, and has a defensible market share. Finally, a prospective IK investment should have potential to realize significant strategic and operational improvement as the result of an international buy-and-build strategy. The IK team spends significant time and energy to create the opportunities to invest in these types of companies at an attractive basis by actively marketing the Firm’s capabilities to business owners, industrial advisors, M&A houses, management teams, financing sources, and other industry participants. Over the last three mid-cap funds, these sourcing efforts resulted in IK pre-empting an auction or participating in a limited auction with respect to 48% of its investments.

Ownership: A centerpiece of IK’s investment strategy is to seek to double the earnings of its portfolio companies by transforming strong local businesses into international leaders through add-on acquisitions and operational improvement. In the 40 investments made from the last three mid-cap funds, 80% have executed on buy-and-build via 120 add-on acquisitions so far. IK believes that its international footprint has given the Firm the ability to identify investment opportunities outside a company’s local market that enhance growth by providing the company access to new markets, products, technology, and services. To add value to its portfolio companies, IK also engages in a systematic program of operational improvement that include both a 100 Day Plan as well as Mid-term Plans. This value creation program is called the “Full Potential Plan” (FPP) and is implemented by the IK deal team with support from the Operations team. The FPP includes initiatives to improve top-line growth and cost efficiencies as well as balance sheet optimization and management augmentation. In addition, IK encourages its portfolio companies to implement responsible environmental, social, and governance policies in order to manage business risks, increase brand value, and pre-empt regulatory changes.

Exit: As with sourcing and value creation, IK has a common structure and process for realizing a successful exit. Exit planning is an important part of the due diligence process, and likely exit options are a part of every investment proposal. Once an investment is completed, regular reviews take place that include a “Hold/Sell” analysis, consider multiple exit paths and evaluate incremental return prospects. These reviews help ensure objectivity from the deal team and challenge the team to justify why an investment should continue to be held. Given IK’s typical investment size, most historical exits have been to a strategic or financial buyer.

IV. Investment Performance

Previous fund performance as of September 30, 2021 for IK and the SBI's investments with previous funds, where applicable, is shown below:

Fund	Vintage Year	Total Commitments	SBI Investment	Net IRR*	Net MOIC*	Net DPI*
IK 1989 Fund	1989	€108 million	--	26%	5.3x	5.3x
IK 1994 Fund	1994	€250 million	--	40%	3.8x	3.8x
IK 1997 Fund	1997	€750 million	--	8%	1.7x	1.7x
IK 2000 Fund	2000	€2,100 million	--	9%	1.6x	1.6x
IK 2004 Fund	2004	€825 million	--	33%	2.2x	2.2x
IK 2007 Fund	2007	€1.7 billion	--	8%	1.5x	1.5x
IK VII	2013	€1.4 billion	€150 million	16%	2.1x	1.7x
IK VIII	2016	€1.9 billion	€150 million	19%	1.6x	0.7x
IK IX	2020	€2.9 billion	€135 million	6%	1.0x	0.0x

* Previous Fund investments may be relatively immature and, therefore, returns may not be indicative of future results. Net IRR and Net MOIC were provided by IK. The IK VII Fund and previous do not have any credit facility, the IK VII Fund has a 90 day facility and the IK IX Fund has a 180 day facility.

V. Investment Period and Term

The Investment Period is expected to last for a period of five years. The Fund is expected to have a term of ten years, with the possibility of three one-year extensions.

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. Please note the IK X PPM isn't yet available.

ATTACHMENT K

PRIVATE EQUITY MANAGER SUMMARY PROFILE

I. Background Data

<i>Name of Fund:</i>	KKR Core Investments Fund II SCSp
<i>Type of Fund:</i>	Private Equity
<i>Target Fund Size:</i>	\$4 Billion
<i>Fund Manager:</i>	KKR
<i>Manager Contact:</i>	Ari Barkan 30 Hudson Yards, Suite 7500 New York, NY, 10001

II. Organization and Staff

Kohlberg Kravis Roberts & Co. (“KKR” or the “General Partner”), one of the world’s oldest and most experienced private equity firms, is headquartered in New York, NY and has over twenty office locations globally. Founded in 1976 by Jerome Kohlberg, Henry R. Kravis and George R. Roberts, KKR seeks to provide its investors with long-term capital appreciation through multiple business platforms, including private equity, credit, infrastructure and real estate.

The KKR Core Investments team consists of Partners Webster Chua, Tim Franks, and Kate Richdale, and Principal Kevin Murphy. The team is further supported by KKR’s investment teams across the Americas, Europe and Asia, which includes over 440 private markets investment professionals as well as over 85 operations executives at KKR Capstone.

At KKR diversity has become an ever greater focus over the years, as the Firm competes to attract talent. Since the Firm established KKR’s Inclusion & Diversity Council in 2014, it has worked closely with its human capital teams to recruit team members from a far wider variety of backgrounds, including greater variety of educational and work experience backgrounds, as well as more diversity in terms of gender and ethnicity. This has included partnering with organizations such as SEO, Out on the Street, Toigo, PE WIN, and 100 women in finance. As of year-end 2021, KKR’s global investment team was 28% female, and, in the U.S., 31% were ethnic minorities.

III. Investment Strategy

KKR (“The Firm”) is establishing KKR Core Investments Fund II SCSp (“The Fund”) to pursue high-quality investments with the potential to generate attractive risk-adjusted returns and significant net asset value appreciation over a long period of time. The strategy will target investment opportunities that KKR believes are more stable, less cyclical and more

cash-generative, with limited uncontrollable exposures and disrupters, as well as lower average leverage over the hold period, than those targeted by traditional private equity funds. Due to the longer hold period and relatively lower risk profile of Core Investments relative to traditional private equity, KKR believes pursuing this opportunity requires capital that is long-term, patient and with target returns consistent with the associated risk of such investments.

As of September 30, 2021, the Core Investments platform has raised over \$24 billion, of which KKR itself represents \$7.5 billion, including \$4 billion raised for Core Platform II. This commitment represents over 30% of total Core Investments capital raised to date, and is currently KKR's largest strategy commitment from its balance sheet.

Core Investments opportunities targeted by the Fund are expected to exhibit some or all of the following attributes:

- Strong businesses with limited operational turnaround required
- Not highly cyclical
- Lower leverage, on average, over the investment holding period
- More limited exposure to single risk factors (e.g. commodity prices, customer concentrations)
- More limited potential for disruption than a typical private equity investment (for example by technological disruption)
- Control or significant influence
- High cash flow generation
- High quality management team

In the Firm's experience to-date, the profile of the "typical" Core Investment opportunity has skewed towards stable industries with visible growth paths that are, they believe, less susceptible to disruption (for example, veterinary care, dental services, oncology treatment, mission-critical subscription-based software, infrastructure, and others). While there may be some exceptions, KKR believes businesses that are in transition, are part of cyclical industries, or that require a turnaround thesis are generally less appropriate, given the target of a lower risk/return profile, for the Core Investment strategy.

The opportunities assessed to-date have generally been in developed markets (e.g. North America, Western Europe, and select countries in Asia) given the target risk/return profile of the strategy. For investment opportunities in emerging markets, KKR generally targets a risk/return profile that is higher than the target Core Investments opportunity set, in order to receive returns commensurate with sovereign and/or currency risk.

Given the longer target hold period of Core Investments, KKR will generally seek to make investments involving control or significant influence. With a longer investment tenor, the Firm is more likely to face different economic cycles, technological change and industry repositionings. For these reasons KKR believes it is important to be able to control the strategic direction of the companies.

While over the course of ownership it is expected that certain strategic adjustments and business enhancements will be made, the Core Investments strategy will generally target companies which have a principal business strategy that the Firm believes is well-positioned to succeed over a ten to fifteen year time horizon. KKR will generally seek to back strong management teams who share a long-term vision for the company in question.

As a general matter at the beginning of the hold period for Core Investments KKR expects to employ leverage with respect to portfolio companies that is similar to the Firm's typical practice with respect to traditional private equity. However, over time as an investment matures, the Firm will generally seek to reduce leverage to a more moderate level, with a goal to ultimately begin distributions of available cash to investors.

KKR believes that the addressable market for Core Investments is strong and growing, with both the volume and transaction size of investment opportunities exceeding the Firm's original expectations. In KKR's view, the Core Investments target universe currently represents a less crowded market with more favorable supply and demand dynamics than traditional private equity. By competing in a segment with fewer sponsors managing less capital, KKR believes buyers are able to differentiate themselves through competitive advantages and/or greater compatibility, as opposed to pricing.

All potential investments at KKR go through a rigorous due diligence process. As part of this process, in conversations with the respective KKR industry teams, cross-functional internal subject matter experts review prospective investments to identify material Environmental, Social or Governance ("ESG") factors, gather the appropriate information from the company in question, and make informed recommendations about potential risks and opportunities as potential investments move through the Investment Committee process.

ESG considerations discovered in the diligence phase can affect investment decisions; however, a decision to invest or not is rarely due exclusively to ESG issues. ESG-related concerns are often intertwined with other business issues that make the business more, or less, attractive for investment. In rare cases, KKR may find an ESG issue poses such a risk to an investment that the investment does not occur. However, in most instances the Firm looks to determine that a company has significant opportunities because of the way it addresses ESG issues or could have such opportunities if it were to address them in a proactive manner. Understanding ESG challenges and opportunities of individual investments helps KKR determine whether to invest in a company and, more importantly, the best strategy for working with a company in the future.

KKR has been publicly committed to responsible investing since the Firm became a signatory of the UN-supported Principles for Responsible Investment ("PRI") in 2009. In 2013, KKR codified its processes and procedures related to responsible investment by developing a global Private Equity ESG Policy, which was published publicly in 2014.

IV. Investment Performance

Performance of the current Core Partnership Investments as of September 30, 2021 is shown below:

Fund	Vintage Year	Total Commitments	SBI Investment	Net IRR*	Net MOIC*	Net DPI*
KKR Core SMA	2017	\$1bn	--	15.7%	1.8x	0.00x
KKR Core Platform I**	2017	\$8.5bn	--	28.4%	1.6X	0.00x
KKR Core Investments Partnership SCSp	2020	\$646mm	\$97mm	19.6%	1.1x	0.01x

* The Core Partnership investments may be relatively immature and, therefore, returns may not be indicative of future results. Net IRR and Net MOIC are USD based and provided by the manager.

** KKR Core Platform I includes two SMAs investing together from 2017 through September 30, 2021, together with the KKR Balance Sheet. KKR GP and Balance Sheet vehicles are excluded from the net IRR and net MOIC information since KKR's Balance Sheet does not pay management fee or carried interest.

V. Investment Period and Term

The investment period for the Fund is 5 years from the first investment and expected to run through 2027. The term of the Fund at the latest will be twenty-five years from the date of the first portfolio investment where each deal is underwritten to a 10-15 year hold, with three possible one-year extensions by the GP.

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 L

PRIVATE EQUITY MANAGER SUMMARY PROFILE

I. **Background Data**

Name of Fund:	KKR European Fund VI, L.P.
Type of Fund:	Private Equity
Target Fund Size:	€9 Billion
Fund Manager:	KKR European Fund VI SCSp
Manager Contact:	Ari Barkan 30 Hudson Yards, Suite 7500 New York, NY, 10001

II. **Organization and Staff**

Kohlberg Kravis Roberts & Co. (“KKR” or “Firm”), one of the world’s oldest and most experienced private equity firms, is headquartered in New York, NY and has over twenty office locations globally. Founded in 1976 by Jerome Kohlberg, Henry R. Kravis and George R. Roberts, KKR seeks to provide its investors with long-term capital appreciation through multiple business platforms. During the first two decades, KKR focused on building a leading private equity business.

KKR has been investing in Europe since 1996 and opened its first European office in London in 1998. The European private equity team has grown to over 40 investment professionals today, supported by 21 Europe-based operational professionals in KKR Capstone, 9 capital markets specialists in KKR Capital Markets, two Europe-focused specialists in our Global Macro team, as well as the deep resources of the Firm globally. The Members, Managing Directors, and Directors of the European private equity team have an average tenure of 9 years at KKR and an average of 17 years of industry experience.

As with the broader Firm, diversity of the European private equity team has become an ever greater focus over the years, as the Firm competes to attract talent. Since the Firm established KKR’s Inclusion & Diversity Council in 2014, it has worked closely with its human capital teams to recruit team members from a far wider variety of backgrounds, including greater variety of educational and work experience backgrounds, as well as more diversity in terms of gender and ethnicity. This has included partnering with organizations such as SEO, Out on the Street, Toigo, PE WIN, and 100 women in finance. KKR believes meaningful progress has been made as evidenced by the ~50% of the European Private Equity Team hires over the last three years were female, and the gender composition of the overall team today is over one third female. At year-end 2021, 28% of KKR global investment professionals were female.

III. Investment Strategy

KKR is establishing KKR European Fund VI (“Fund” or “Fund VI”) to continue its history of making investments into companies primarily in the developed economies of Western Europe. The Fund’s investments are generally expected to be made in the form of management buyouts, build-ups, partnership deals, corporate carve-outs or other investments with a view to acquire a controlling interest or other significant influence. The focus of the investment strategy is expected to be predominantly on the European upper mid-market, or deals with an enterprise value range of €500 million to €2 billion, although Fund VI will also have the flexibility to invest in larger or smaller transactions opportunistically.

The KKR European private equity team is organized into a matrix of regional and sector specialists. The seven regional coverage areas are the UK, the DACH region (Germany, Austria and Switzerland), the Nordics, France, Italy, Spain, Portugal, and the Benelux region (The Netherlands, Belgium and Luxembourg). The sector specialist teams cover Business Services, Consumer, Financial Services, Health Care, Industrials, and TMT. All regional and sector teams are supported by a generalist pool of associates and analysts. Leading the group is a 19-person senior team, who collectively have an average of 17 years of industry experience and an average tenure at KKR of 9 years.

In addition to having a strong local team, KKR believes that one of its key differentiators as an investor in European private equity is their ability to combine local knowledge and expertise with the global resources of one of the world’s pre-eminent private equity businesses. The KKR Europe team works together with KKR Capstone, a team of approximately 80 global operational professionals that has been an integral part of portfolio operations in the Firm since the early 2000s. Furthermore, the KKR Europe team also utilizes the following KKR resources: KKR Capital Markets, Public Affairs, KKR Global Institute, Global Macro and Asset Allocation, KKR Technology & Innovation Team, Senior Advisors, and the Client and Partner Group.

Complementing KKR’s deep resources is its partnership approach to sourcing in Europe. A defining characteristic of the opportunities that the European private equity team has sourced over the last decade has been the significant proportion of partnership deals. Partnership deals to the KKR Europe team means transactions where the family/founder(s), corporate or prior investor has retained a meaningful stake in their business post KKR investment. The partnership philosophy is built on KKR’s fundamental belief that it can be a provider of more than just capital, and that there are compelling reasons and benefits for a company to consider a partnership with the Firm.

As with all KKR teams, the European private equity team incorporates ESG throughout their process beginning with the diligence phase and continuing until exit. Understanding ESG challenges and opportunities of individual investments helps KKR determine whether to invest in a company and, more importantly, the best strategy for working with a company in the future. Engagement on ESG issues with portfolio companies is overseen by KKR’s industry and country teams with support from KKR Senior Advisors, internal experts, and external advisors, as necessary. KKR has been publicly committed to responsible investing since the Firm became a signatory of the UN-supported Principles for Responsible Investment (“PRI”) in 2009. In 2013, KKR codified its processes and procedures related to

responsible investment by developing a global Private Equity ESG Policy, which was published publicly in 2014.

Once KKR makes an investment, KKR and the portfolio company management team begin carrying out the plans laid out in the detailed 100-Day Plan. The 100-Day Plan assigns responsibilities to various managers and KKR professionals, as well as to KKR Capstone operational executives (when engaged), and delineates a clear set of action steps to achieve operational excellence and a company’s strategic objectives. Specific areas of focus for deal teams, KKR Capstone, and other dedicated external partners include: long-term revenue growth; upgrading and strengthening of business processes and operating metrics; portfolio management through M&A; support carve-out transactions; cost and efficiency improvements; including turnarounds; technology improvements; and cross portfolio programs. By focusing on these components and others, KKR has been able to translate operational improvement into value creation for their portfolio companies and ultimately for their investors.

KKR’s goal upon exit is to achieve the optimum combination of an attractive risk-adjusted rate of return and multiple of capital. KKR evaluates recapitalization opportunities in the context of what it views as appropriately leveraged capital structures and long-term value creation. While the team is proactive on the exit front, they will assess exit strategies in terms of what is beneficial for each company’s long-term value and returns. In Europe, KKR has held investments for four to seven years on average since inception in 1996, which it believes gives deal teams sufficient time to implement improvement plans that build long-term value for portfolio companies.

IV. Investment Performance

Previous fund performance as of September 30, 2021 for KKR Europe and the SBI's investments with previous funds, where applicable, is shown below:

Fund	Vintage Year	Total Commitments	SBI Investment	Net IRR*	Net MOIC*	Net DPI
KKR European Fund I	1999	€2.8 billion	--	20.2%	2.3x	2.3x
KKR European Fund II	2005	€4.4 billion	--	4.5%	1.3x	1.3x
KKR European Fund III	2008	€4.6 billion	--	11.5%	1.7x	1.6x
KKR European Fund IV	2015	€3.4 billion	--	20.9%	1.8x	0.8x
KKR European Fund V	2019	€5.8 billion	\$100 million**	32.7%	1.3x	0.1x

* Previous Fund investments may be relatively immature and, therefore, returns may not be indicative of future results. Net IRR and Net MOIC are USD based and provided by KKR.

** KKR offers LPs a euro-denominated sleeve or a dollar-denominated sleeve.

V. Investment Period and Term

The investment period for the Fund will be six years with a term of eleven years from the initial investment, subject to up to two additional one-year extensions with limited partner consent.

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 M

DATE: February 7, 2022

TO: Members, Investment Advisory Council

FROM: SBI Staff

SUBJECT: MN Asia Investors, LP – Additional Commitment

In the third quarter of 2020, the Investment Advisory Council and the State Board of Investment approved a commitment with Asia Alternatives Management to invest \$200 million in a Separately Managed Account (“SMA”) across two pools of capital: a “Balanced Pool” which will be invested in parallel with Asia Alternatives Capital Partners VI, and a “Co-Investment Pool,” which was established to pursue substantially similar investments as the Fund, subject to investment guidelines or restrictions agreed to by both the Limited Partner and Asia Alternatives. An additional commitment of \$100 million to the Co-Investment pool was approved by the Council and the Board in August, 2021. Please see the attached appendix for a summary of MN Asia Investors.

In the approximately 15 months since closing on the initial commitment, the SBI has been able to participate in a number of attractive co-investment opportunities through the co-investment pool, as well as the investments made through the Balanced Pool. In order to ensure that the SBI will be able to participate in attractive investment opportunities sourced by Asia Alternatives for the remainder of 2022 and into 2023, staff is recommending that the Council approve an additional commitment of \$250 million to MN Asia Investor, to be split between the Co-Investment Pool and the Balanced pool in a manner agreed upon by Staff and Asia Alternatives. Funds allocated to the Balanced Pool would likely be committed at the time Asia Alternatives raises its next flagship fund, which is currently expected in the Q4 2022/Q1 2023. This would bring the total amount committed to the MN Asia Investors SMA to \$550 million.

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ATTACHMENT M

PRIVATE EQUITY MANAGER SUMMARY PROFILE

I. Background Data

<i>Name of Fund:</i>	MN Asia Investors
<i>Type of Fund:</i>	Private Equity Separately Managed Account
<i>Target Fund Size:</i>	N/A
<i>Fund Manager:</i>	Asia Alternatives Management, LLC
<i>Administrative Contact:</i>	Melissa Ma One Embarcadero Center, 16 th Floor San Francisco, CA 94111

II. Organization and Staff

Asia Alternatives Management LLC (“Asia Alternatives” or the “Firm”) was founded in 2006 by Melissa Ma, Laure Wang and Rebecca Xu. Today, Firm leadership is comprised of Ms. Ma and Ms. Xu, along with Principals William LaFayette and Akihiko Yasuda and Praneeet Garg, and Principals Valerie Leung and Dan Dashiell, who collectively have over 130 years of on-the-ground experience in Asia and over 110 years collective experience investing in Asia private equity.

Currently¹, the Asia Alternatives Investment team is made up of 18 investment professionals with significant experience evaluating and investing in private equity funds and direct deals in Asia, including investment sourcing, due diligence, negotiation, research and monitoring, accounting and reporting, client service and risk management. The Investment Team is supported by an investment administration team of 38 people performing finance and accounting, investor relations and fund administration duties. The Firm’s investment staff are largely based in offices in Hong Kong, Beijing and Shanghai, while the San Francisco office is focused primarily on client service, marketing and corporate financial reporting and governance.

MN Asia Investors, LP (the “SMA”) made its first investment December 2020 and invests in whole or in part alongside Asia Alternatives flagship funds, and pursues substantially similar investments as the flagship funds, potentially subject to investment guidelines or restrictions agreed to by both the Limited Partner and Asia Alternatives. In addition to investments made alongside the Asia Alternatives flagship funds, the SMA may also participate in co-investment opportunities such as direct fund investments, secondary investments, and direct equity investments, subject to investment guidelines or restrictions agreed to by both the Limited Partner and Asia Alternatives

¹ As of December 31, 2021

ESG and DEI are engrained in the culture and operations of Asia Alternatives. The Firm became a signatory to UNPRI in May 2019 and, as a UNPRI member, has committed to six Principles. These Principles center on incorporating ESG topics into investment analysis and decision-making processes, integrating ESG elements into internal ownership policies and practices, and proper reporting and disclosures. Regarding portfolio construction for the Fund, potential ESG risks and opportunities are appropriately considered as part of Asia Alternatives' overall investment process, including inquiries relating to the status of ESG policies at portfolio funds and reporting processes related to the same. DEI is a key part of the Asia Alternatives culture and seeks to recruit from various nontraditional sources for their investment professionals. The Asia Alternatives global investment team is 56% female, and 73% of the US-based team (mostly back and middle office) is ethnic minority.

III. Investment Strategy

As with the flagship funds, the SMA pursues investment opportunities with top-performing private equity managers and holds a diversified portfolio of Asian private equity funds. Like AACP Funds I-VI, the SMA invests primarily in Greater China, Japan, South Korea, India, Southeast Asia and Australia. The SMA intends to be diversified across buyout, growth and expansion, venture capital and special situations (defined as distressed debt, real estate, corporate restructuring and/or structured transactions). Asia Alternatives seeks to invest the SMA across approximately 20-25 fund managers, who will form the core fund manager relationships for the Firm. Because the depth of proven private equity managers across Asia is relatively small, Asia Alternatives believes that concentrating the SMA's investments with proven, top-performing managers is necessary to help ensure overall attractive returns.

The Asia Alternatives Investment Team is organized by "buckets" of a combination of geography and sub-sector – for example China small-mid growth or Japan mid-large buyouts. The team produces "Bucket Reports" which are the basis for making a recommendation of risk premium for the bucket. The Bucket Reports are analyses that look at a series of macroeconomic updates (e.g. GDP, regulatory changes, currency, stock market, etc.) and private equity market specific factors (e.g., exits, leverage multiples, valuation levels, number of players, amount of money raised, etc.) as a basis for making risk premium recommendations. Every quarter the Investment Team re-underwrites its views and risk premiums based on recent developments.

The Investment team sets hurdles for (i) geographic risk, (ii) illiquidity risk and (iii) manager risk. The portfolio is constructed based on which buckets the Investment team analyzes and deems have the highest probability to deliver the risk premium hurdles set. Once the Investment team has picked which buckets to concentrate capital in, it screens managers "bottom up" and ranks managers for each bucket. The goal is to invest in the top 2-5 managers, as appropriate, for each of the most attractive buckets.

This investment process is expected to result in a portfolio that has been thoughtfully constructed across three dimensions:

Strategy Type:

The Firm expects that approximately 90+% of the capital of the SMA will be invested independent, Asia-based firms, with the remainder allocated to fund managers affiliated with U.S. or European private equity firms. These investments will generally be of the following types:

- 50-60% of the capital is expected to be invested with “core managers,” who as a team have invested two or more prior iterations together.
- 5-15% of the capital is expected to be invested with first time or emerging managers who have strong potential to generate the top-performing funds among their peer group. A number of these managers are expected to be structured primaries.
- Finally, the SMA expects to invest approximately 20-30% in structured primaries. These are primary commitments in new firms where Asia Alternatives plays an anchor sponsor role and receives economic benefits for this sponsorship. The teams, however, are often experienced groups that have worked together for a prior employer.
- To further enhance returns, the SMA will also allocate approximately 20-30% to pursue direct co-investments and secondary purchases of fund investments. These direct co-investments and secondaries will primarily be with the SMA’s existing managers or those fund managers who have strong potential to provide future fund investments.

Geography:

Asia Alternative’s allocations for the SMA are based on a rigorous and systematic top-down bucket analysis of the key private equity markets in Asia coupled with a bottom-up screening of the current Asia fund manager universe to identify the most suitable opportunities. The process is centered around assessing the various levels of risk in each market and selecting managers who have historically and/or the Firm believes have the future potential to generate sufficient return to more than justify the risk associated with their chosen investment market and strategy.

Each quarter Asia Alternatives evaluates the attractiveness of each geographical region in Asia and each sub-asset class as a starting point of how to allocate capital within the SMA. The Investment Team evaluates (i) the economic and business fundamentals of the country’s economy, using criteria such as size and growth of GDP, policy and regulatory environment, business fundamentals, public market depth, and corporate governance; and (ii) attractiveness of the private equity environment, considering factors such as the level of buyout, growth and expansion, venture and special situation opportunities, overall quality and depth of fund managers, ability to exit and fundraising momentum.

The portfolio’s projected geographic allocation is 45-55% Greater China, 20-40% Japan and South Korea, 15-25% India, and 10-15% Southeast Asia and Australia. Given the growing and dynamic nature of the Asia private equity landscape, these allocations may fluctuate as much as +/-10% during the life of the Fund.

Sub-Asset Class:

To overlay the geographic assessment, the Investment Team performs a separate analysis on the private equity sub-asset classes in Asia, which are buyout, expansion and growth, venture and special situations. The criteria used to evaluate each sub-asset class include investment themes, source of deals, drivers of return, skills required, exit options and country focus. Systematically reviewing sub-asset class in Asia along this framework results in a portfolio that is expected to consist of 40-50% buyout opportunities, 25-35% in expansion and growth, 20-25% venture investments, and 5-15% in special situations funds which could include distressed debt, real estate, corporate restructuring and/or structured transactions.

IV. Investment Performance

Previous fund performance as of September 30, 2021 for Asia Alternatives funds are shown below:

Fund	Vintage Year	Total Commitments	SBI Investment	Net IRR*	Net MOIC*	Net DPI*
AACP I	2007	\$515 million	--	11.3%	1.8x	1.8x
AACP II	2008	\$950 million	--	18.2%	2.7x	2.0x
AACP III	2012	\$908 million	--	14.7%	1.9x	1.2x
AACP IV	2015	\$948 million	--	16.7%	1.8x	0.3x
AACP V	2017	\$1.52 billion	\$100 million	17.3%	1.3x	0.1x
AACP VI	2021	\$1.1 billion	--	(59.6)%	0.8x	0.0x
MN Asia Investors**	2020	\$300 million	\$300 million	(40.9)%	0.8x	0.0x

* Previous Fund investments may be relatively immature and, therefore, returns may not be indicative of future results. Performance provided by Asia Alternatives Management. Net DPI is as of December 31, 2021.

** This fund is a separately managed account. The Minnesota State Board of Investment is the sole limited partner.

V. Investment Period and Term

MN Asia Investors has only one LP and thus The Minnesota State Board of Investments can amend the investment period and/or term to accommodate additional capital. The terms of the account will be negotiated between Asia Alternatives and the Minnesota State Board of Investment.

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 and any supplemental thereto.

ATTACHMENT N

PRIVATE EQUITY MANAGER SUMMARY PROFILE

I. Background Data

Name of Fund:	Nordic Capital XI, L.P.
Type of Fund:	Private Equity
Target Fund Size:	€8 billion
Fund Manager:	Nordic Capital
Manager Contact:	Pär Norberg Head of Investor Relations Mäster Samuelsgatan 21, SE-11144 Stockholm, Sweden

II. Organization and Staff

Nordic Capital (or “Firm”) is establishing Nordic Capital XI to make growth buyouts primarily in Northern Europe, and selectively North America for Healthcare. The Firm is one of the oldest Nordic region mid-market private equity investors and is supported by strong local presence and long-standing industry relationships in Northern Europe. Nordic Capital Fund I was established in 1989 and, since then, the predecessor Nordic Capital Funds up to Nordic Capital Fund X have invested over €18.3 billion in 121 portfolio companies as of 30 September 2021. The Firm has ten offices including seven investment advisory offices in Stockholm, Copenhagen, Oslo, Helsinki, Frankfurt, London and New York. On 30 June 2021, Nordic Capital announced the closing of its first Evolution Fund at EUR 1.2bn, building on its investment experience in the mid-market. The Evolution Fund will focus on the same sectors but on smaller mid-market deals.

Nordic Capital Fund XI will leverage the Firm’s 167-person team with 70 investment professionals and dedicated professionals supporting Ownership Excellence, Capital Markets, ESG, Investor Relations, Legal, Controlling & Valuation and Fund Operations. The investment team at Nordic Capital is split into sector teams where each senior investment professional typically drives a subsector or segment. In addition, Nordic Capital has a deep network of operating partners and long-term industrial advisors. Nordic Capital is led by Managing Partner Kristoffer Melinder, who has been with Nordic Capital since 1998. Kristoffer became co-Managing Partner in 2010 and sole Managing Partner in 2016. Under his leadership, Nordic Capital has made significant refinements to its operating model including sharpening its sector-based focus and developing dedicated Ownership Excellence resources. In November 2019, Nordic Capital sold a passive, minority stake of the Firm to a U.S.-based family office.

Sound ESG principles have been of strong importance for a long time for Nordic Capital, but has become more formalized in recent years. In 2014, the Firm developed a Responsible Investment Policy and in 2019 it became a signatory of the UNPRI (United Nations Principles for Responsible Investment). Diversity and inclusion is also an important objective for Nordic

Capital with a continued focus on gender diversity in investment professional recruitment. Nordic Capital sponsors Level 20 and has launched the Woman Accelerate Program to promote women to board positions. In 2021, 50% of investment professionals hired were female. Currently, Nordic Capital has c.42% female professionals and 16% female investment professionals.

III. Investment Strategy

Fund XI intends to focus primarily on control or co-control buyouts of attractive European middle-market businesses, and selective Healthcare investments in North America. The Fund intends to make equity investments of between €200 million and €1 billion in business with an enterprise value of €300 million to €2 billion.

Nordic Capital focusses on primarily on growth buy-outs and seeks to accelerate earnings growth and drive genuine business transformation. The Firm will target what it believes are robust, difficult to replicate businesses operating within non-cyclical and resilient sectors benefitting from long term secular drivers and strong downside protections. In particular, the Firm will seek to pursue investments in selected subsectors where specific structural growth trends, transformational dynamics or disruptive market developments have been identified.

The Firm seeks to implement its strategy through a sector-based approach which is core to its investment philosophy and informs the way companies are targeted, deals are sourced, and value is created. The Investment Advisory Team is organized into sector teams that are specialists in their segments, and continually seek to deepen market coverage, develop innovative investment themes and broaden their relationship network. Nordic Capital believes this approach provides key competitive advantages, supporting conviction-based sourcing, conversion and value creation. Nordic Capital is predominantly an investor that employs control or co-control and has extensive experience supporting the rapid expansion of portfolio companies. Its typical key objective is to accelerate the growth profile of its investments to seek to deliver attractive assets at exit. This is often achieved through a mix of organic growth, industry consolidation and/or strategic positioning implemented through the Firm's structured playbooks. Assistance to the general partner of the Nordic Capital Products in relation to the planning and execution of these concrete improvement agendas is led by the sector teams and supported by Nordic Capital's well-developed Ownership Excellence framework and resources.

Over time the Firm has refined its specialist investment model to focus on sectors it believes are characterized by:

- (i) lack of cyclical, strong downside protections and controllable risks well-positioned to benefit from macro and market trends;
- (ii) Nordic Capital having developed knowledge and experience, extensive industrial networks and an established track record from prior investments;
- (iii) specialists having historically performed more strongly than generalists; and

- (iv) an abundance of attractive and robust platforms well positioned for strong performance through the application of the Firm's investment strategy.

As a result, Nordic Capital today implements a deeply specialized investment approach investing predominantly in the Focus Sectors. Nordic Capital will also seek to invest opportunistically in the Industrial & Business Services sector in the Nordic Region given its strong investment heritage in this sector following decades of investing experience and established networks and relationships.

Sustainability factors are fully integrated into all stages of the investment and ownership process from evaluation through to exit. In the diligence and pre-closing phase, responsible checklists are completed and sector-specific guidelines are established for ESG analysis. During the ownership period, Nordic Capital sets clear sustainability expectations on portfolio companies and each company needs to have a sustainability strategy approved and reviewed annually by the Board of Directors.

In order to seek to identify priority assets for investments, each sector team conducts extensive sector mapping and analyses specific subsectors for attractive segments and companies. Once identified, Nordic Capital will often track businesses for many years as a prospect and in its Shadow Portfolio, during which time it will seek to develop strong conviction around the equity story for an asset. Notably within Fund X, 100% of companies acquired were tracked by Nordic Capital in its Shadow Portfolio for an average of c.2 years.

93% of invested capital deployed by Fund X¹ is invested across Nordic Capital's Focus Sectors. An overview of Nordic Capital's investment history across its Focus Sectors is shown below:

- Healthcare: €8.6B deployed; 32 deals completed; 3.3x realized gross MOIC
- Tech & Payments: €5.3B deployed; 23 deals completed; 4.4x realized gross MOIC
- Financial Services: €2.9B deployed; 11 deals completed; 3.1 realized gross MOIC

¹ As at 30 September 2021.

IV. Investment Performance

Previous fund performance as of September 30, 2021 for Nordic and the SBI's investments with previous funds, where applicable, is shown below:

Fund	Vintage Year	Total Commitments	SBI Investment	Net IRR*	Net MOIC*	Net DPI*
Fund I	1990	€55 million	-	69.3%	4.0x	4.0x
Fund II	1993	€110 million	-	85.1%	4.6x	4.6x
Fund III	1998	€350 million	-	30.5%	3.3x	3.3x
Fund IV	2000	€760 million	-	24.1%	2.2x	2.2x
Fund V	2003	€1.5 billion	-	20.0%	2.7x	2.7x
Fund VI	2006	€1.9 billion	-	8.6%	1.7x	1.7x
Fund VII	2008	€4.3 billion	-	8.2%	1.6x	1.6x
Fund VIII	2013	€3.6 billion	€150 million	18.8%	1.9x	1.2x
Fund IX	2018	€4.3 billion	€150 million	59.5%	2.0x	0.1x
Fund X	2020	€6.1 billion	€135 million	166.3% ¹	2.4x	0.0x

* Past performance is not necessarily indicative, or a guarantee, of future results. Returns information provided by Nordic Capital.

¹ Unlevered net IRR as of 30 September 2021.

V. Investment Period and Term

The investment period will end six years from the date that Nordic Capital Fund XI makes its first portfolio investment or, if earlier, the date that Nordic Capital Fund X's commitment period terminates. The term is ten years from the later of the final closing and the start date, subject to extension or early termination in certain circumstances.

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. Any capitalized terms used herein and not otherwise defined shall have the meaning attributed to them in the PPM.

ATTACHMENT O

PRIVATE EQUITY MANAGER SUMMARY PROFILE

I. Background Data

Name of Fund:	Thoma Bravo Fund XV, L.P.
Type of Fund:	Private Equity
Target Fund Size:	\$22 billion
Fund Manager:	Thoma Bravo, L.P.
Manager Contact:	Jennifer James 600 Montgomery Street, 20 th Floor San Francisco, CA 94111

II. Organization and Staff

Thoma Bravo, L.P. (“Thoma Bravo” or the “Firm”) is sponsoring Thoma Bravo Fund XV, L.P. (the “Fund” or “Fund XV”) to make investments (generally expected to consist of control buyouts) in software and technology-enabled services companies in North America.

Thoma Bravo is a successor to Golder Thoma & Co., which was founded in 1980 by Stanley Golder and Carl Thoma, who had worked together within what was then First Chicago Corporation’s venture capital group. It was there that the partners began to develop the consolidation or “buy and build” investment strategy of seeking to create value by building companies in fragmented industries through add-on acquisitions. The original firm subsequently became Golder, Thoma, Cressey, Rauner, Inc. (often referred to as GTCR), which in 1998 split into two firms, one of which was Thoma Cressey Equity Partners Inc. (“TCEP”). From 1998 through 2007, TCEP (renamed Thoma Cressey Bravo, Inc. in 2007) raised and invested three private equity funds: Fund VI, Fund VII and Fund VIII, which invested principally in companies in the services, software and healthcare sectors.

With offices in San Francisco, Chicago, and Miami, the Firm employs approximately 57 investment professionals, including 30 senior investment professionals. The Firm also utilizes the services of 24 operating partners and operating advisors¹ who are not employees of the Firm. All six Managing Partners have been with Thoma Bravo for over fifteen years.

Thoma Bravo is committed to improving DEI internally and within the industry. The Firm is a signatory for the ILPA Diversity in Action initiative which commits the Firm to specific actions that advance diversity and inclusion, both within Thoma Bravo and the industry more broadly. The Firm continues to expand its reach into external diversity and inclusion-focused organizations, including partnering with organizations such as: Declare, Sponsors for Educational Opportunity (“SEO”), Women’s Association of Venture Equity (“WAVE”), The

¹ Personnel figures are as of September 16, 2021

Synergist Network, Private Equity Women Investor Network (“PEWIN”), and Women’s Private Equity Summit. As of October 2021, approximately 62% of the Firm’s employees are women or under-represented minority groups and approximately 45% for the Firm’s investment team are women or under-represented minority groups.

III. Investment Strategy

Fund XV is expected to build upon the investment strategy and process originally created by Carl Thoma and his partners more than 35 years ago, and more recently refined by Orlando Bravo and the other current Thoma Bravo partners. This strategy seeks to create value by transforming businesses in fragmented, consolidating industry sectors into larger, more profitable and more valuable businesses through rapid operational improvements, growth initiatives, and strategic and accretive add-on acquisitions. The application and infrastructure software and technology enabled services industry sectors on which Thoma Bravo focuses today are fragmented and consolidating, which lend themselves particularly well to this strategy. Fund XV is expected to target roughly 12-15 platform investments and typically commit in excess of \$900 million over the life of each investment.

The investment process starts with proactive deal sourcing, where investment professionals seek out companies that appear to fit with Thoma Bravo’s buy and build strategy. Thoma Bravo professionals are active in the software and technology enabled services sectors by contacting industry professionals and intermediaries, through face-to-face meetings, email correspondence, phone conversations, and attendance at industry conferences. Once formal due diligence is initiated on a company, the Thoma Bravo investment staff and sometimes one or more operating partners embark on a rigorous, hands-on and time-intensive process. In addition to thoroughly evaluating the prospective portfolio company, the process also allows Thoma Bravo time to work with the target company’s management team to develop an operational improvement program. Upon the closing of an investment, the company’s management is expected to implement the operational improvement plan agreed upon during due diligence with the guidance of Thoma Bravo and often one or more operating partners or operating advisors.

Once the operating improvements are achieved and management is functioning as planned, a consolidation strategy typically will be pursued to generate continued growth. Like operating plans, Thoma Bravo’s consolidation plans typically are formulated pre-investment and are central to the investment thesis on which any investment is pursued. However, the investment return to which the investment is underwritten generally does not include the impact of acquisitions, so a successful consolidation program may produce a return that is incremental to the original plan. Together, these consolidation initiatives and operational improvements are intended to quickly transform a company into a more profitable, larger and more valuable business that is attractive to strategic or financial acquirers or public investors. Throughout the process of managing an investment, Thoma Bravo intends to proactively manage liquidity options by developing and cultivating relationships with potential strategic and financial purchasers, the investment community and lending sources. Thoma Bravo expects to use the following methods of exiting investments in portfolio companies: (i) sales to strategic

purchasers or financial purchasers; (ii) initial public offerings; and (iii) recapitalizations (for interim liquidity).

Thoma Bravo considers a diverse range of ESG factors when making investments and monitoring its portfolio companies. The basis of the Firm's ESG policy is an ESG matrix tailored to the Software sector. It focuses on analyzing the portfolio company's annual energy spend, electronic waste disposal policies, family leave policy, non-discrimination and anti-harassment policy, employee wellness programs, data and cyber security, customer privacy policies, business continuity risks, and the code of conduct, among many other elements.

In the pre-investment and ownership phases, if deal team members identify material ESG risks or opportunities, they are included in discussions with the Investment Committee and Thoma Bravo may engage external advisors to carry out additional ESG-related due diligence as needed. Deal team members will formulate a plan with the prospective portfolio company's management team to develop an action plan to address the risk or opportunity. ESG risks and opportunities are continually monitored in conjunction with portfolio company management. Given Thoma Bravo values transparency, portfolio company ESG considerations are reported to LPs annually.

IV. Investment Performance

Previous fund performance as of September 30, 2021 for Thoma Bravo is shown below:

Fund	Vintage Year	Total Commitments	SBI Investment	Net IRR*	Net MOIC*	Net DPI*
Fund VII**	2000	\$554 million	\$50 million	24.8%	2.1x	2.1x
Fund VIII**	2005	\$765 million	\$70 million	18.3%	2.9x	2.9x
Fund IX	2008	\$823 million	--	44.7%	3.8x	3.7x
Fund X	2011	\$1.3 billion	--	39.5%	3.2x	2.6x
SOFI	2013	\$418 million	--	36.3%	3.3x	2.5x
Fund XI	2014	\$3.7 billion	--	32.5%	3.8x	1.9x
SOFII	2015	\$1.1 billion	--	20.1%	2.3x	1.0x
Discover I	2015	\$1.1 billion	--	40.8%	3.1x	1.0x
Fund XII	2016	\$7.6 billion	\$75 million	19.1%	1.8x	0.2x
Discover II	2017	\$2.4 billion	--	56.0%	2.0x	0.2x
Fund XIII	2018	\$12.6 billion	\$150 million	61.5%	1.8x	0.5x
Explore Fund	2020	\$1.1 billion	--	86.3%	1.2x	0.0x
Discover Fund III	2020	\$3.9 billion	--	NM	1.0x	0.0x
Fund XIV	2020	\$17.9 billion	\$150 million	4.4%	1.0x	0.0x

* Previous fund investments are not indicative of future results.

** Funds VII and VIII include investments in sectors other than software and technology enabled services. Net IRR, Net MOIC and Net DPI were provided by Thoma Bravo.

V. Investment Period and Term

The Fund will have a six-year investment period and a ten-year term. The Fund may be extended for an additional one-year period at the discretion of the General Partner and, thereafter, for two additional one-year periods at the discretion of the General Partner with the consent of the Fund's advisory committee.

This document for informational purposes only and is not intended, and should not be relied on in any manner, as legal, tax, investment, accounting or other advice or as an offer to sell or a solicitation of an offer to buy limited partner or other interests in any fund, any investment vehicle or any other security. Any offer or solicitation regarding a fund will be made only pursuant to the confidential private placement memorandum of the Fund (as may be amended or supplemented, a "PPM") and Fund's subscription documents and Agreement of Limited Partnership (an "LPA"), which will be furnished to qualified investors on a confidential basis at their request for their consideration in connection with such offering. This document is not a part of a PPM or subscription documents. The information contained in this document will be superseded by, and is qualified in its entirety by reference to, a PPM, which contains important information about the investment objectives, terms and conditions of an investment in the Fund, tax information and risk disclosures that should be read carefully prior to any investment in the Fund, and the applicable LPA.

ATTACHMENT P

PRIVATE EQUITY MANAGER SUMMARY PROFILE

I. Background Data

Name of Fund:	TPG Partners IX, L.P.
Type of Fund:	Private Equity Limited Partnership
Total Fund Size:	\$14-15 Billion (target)
Fund Manager:	TPG Capital / TPG GenPar IX, L.P.
Manager Contact:	Joe Buss 888 7 th Avenue New York, NY 10106

II. Organization and Staff

Formed in 1993 by David Bonderman and James Coulter, TPG (“Firm”) is a global alternative investment firm with approximately \$109 billion in AUM¹. TPG Capital is the North American & European focused middle- and large- market private equity business of TPG. Since inception, TPG Capital has invested approximately \$65 billion in 271 investments, creating over \$47 billion of realized gains. In January 2022, TPG completed an IPO on the NASDAQ stock exchange. Proceeds from the offering were used to purchase partnership interests in the TPG operating entity from other existing investors and for general corporate purposes.

The TPG Capital team is led by Managing Partners Todd Sisitsky, Nehal Raj and Jeff Rhodes and consists of 118 professionals, including 77 dedicated investment professionals (21 of whom are Partners and Principals leading the sourcing, investment management and execution of TPG IX), 36 operational professionals and 5 dedicated non-investment personnel. The majority of the team is based in San Francisco, with additional professionals in the New York and London offices.

Promoting diversity, equity and inclusion is a core value at TPG, embedded into the highest levels of our firm and guided by our Diversity, Equity & Inclusion Council. Created in 2015, the DE&I Council is a 16-member partner steering committee led by TPG’s CEO and Chief Human Resources Officer and supported by three advisory groups focused on recruiting and engagement with our external ecosystem and internal teams. TPG works with a number of leading diversity focused organizations as collaborators, speakers and often as sponsors, including the Thirty Percent Coalition, Women Corporate Directors, Him for Her, Ascend-Pinnacle, the Latino Corporate Directors Association and Stanford Women on Boards. Currently, the TPG investment team is 22%¹ female globally and 41%¹ ethnic minority in the U.S. only.

¹ As of September 30, 2021.

III. Investment Strategy

TPG Partners IX, L.P. (“TPG IX” or “Fund”) is being formed to seek attractive returns by making significant investments in operating companies through acquisitions and financings. TPG Capital’s investing strategy for the Fund centers on six core principles:

1. **Market attractiveness:** Markets that are supportive of long-term growth, that TPG knows well and have studied deeply, and where it believes it has ability to generate differentiated risk/reward.
2. **Company positioning:** Companies that are leaders in their respective markets with durable competitive advantages and strong unit economics, or, where this is not the case, companies for which TPG has a clear, time-bound plan to transform the company into a market leader.
3. **Management excellence:** Strong existing management teams or a clear, time-bound plan to upgrade, often with new executives identified ahead of deal close.
4. **Control dynamics:** Control or co-control situations; by exception, non-control situations where we can reasonably expect to exert significant influence on the company to effect change when and as needed and sell at what we believe to be the optimal time.
5. **Preservation of capital:** Focus on the preservation of capital in downside scenarios and the avoidance of markets or companies with significant tail risks or other potential discontinuities that are inherently unknowable at the time of investment.
6. **Concentrated exposure:** Reasonably concentrated portfolio with fewer high-conviction investments versus a portfolio approach with wide dispersion among positive and negative outcomes.

These core principles underpin the Firm’s investment strategy and are embodied by its three-pronged model of competitive advantage: sector focus, Ops approach, and pursuit of differentiated deal types.

TPG Capital’s core sectors include: Healthcare, Software & Enterprise Technology (“SET”), Internet, Digital Media & Communications (“IDMC”), Consumer and Business Services & Industrials (“BSI”). In each of these sectors, the Firm takes a long-dated, deeply thematic go-to-market approach that results in strategic, often proprietary sourcing and differentiated deal flow. Through TPG’s deep industry knowledge, it has also built vast ecosystems to support its sourcing, investing and operating activity. The combination of TPG’s expertise, capabilities and network enables it to pursue attractive, differentiated investments in all market cycles.

TPG has had a long-standing commitment to fostering strong ESG performance in its portfolio. Seeking positive ESG outcomes aligns with the core tenets of why—and how—TPG invests. TPG is a Signatory to, and a Sponsor of, the United Nations’ Principles for Responsible Investment (PRI). TPG received an A+/A+ Rating from PRI in 2020. TPG’s focus on material ESG factors generates actionable insights and seeks to enhance long-term financial returns, improving its assessments of risk and value-creation across the portfolio. TPG’s Global ESG Performance Policy commitment is to incorporate consideration of material ESG factors across our diligence and investment processes, advise and support portfolio companies in managing

ESG performance risks and pursuing value- creation opportunities, and foster greater transparency related to the material ESG performance factors across the portfolio.

TPG was one of the first private equity firms to establish an in-house operations group (“TPG Ops” or “Ops Team”) in 1996. TPG believes that its TPG Capital Ops Team continues to be a core differentiator in its ability to drive strong growth in portfolio companies and the resulting strong performance in its funds. As of September 30, 2021, TPG Capital’s Ops Team consists of 36 operations professionals who have substantial specialized sector knowledge and functional experience. TPG Capital Ops Team professionals, most of whom are full-time employees of TPG, are fully integrated into the deal teams and incentivized through portfolio company performance. TPG Capital Ops Team professionals identify and underwrite operational improvement opportunities, build and partner with strong management teams, and execute on tailored value creation plans through functional line-level engagement.

TPG believes that its focus on proactive theme development, coupled with its operationally intensive investment style, results in an attractive and differentiated balance of deal types relative to its peers. The Firm has increased its focus over time on transformational investments, which allows it to leverage its growth orientation and full suite of operational capabilities to drive improvement programs. TPG has a bias towards pursuing investments with structural and sizing characteristics, as well as management relationships and dynamics that allows deal teams to effect meaningful change and hold significant influence as a provider of solutions capital.

IV. Investment Performance

Previous fund performance as of September 30, 2021 for TPG Capital and the SBI's investments with previous funds, where applicable, is shown below:

Fund	Vintage Year	Total Commitments	SBI Investment	Net IRR* ²	Net MOIC* ³	Net DPI*
Air Partners	1993	\$64 million	N/A	73%	8.9x	8.9x
TPG I	1994	\$721 million	N/A	36%	3.7x	3.5x
TPG II	1997	\$2.5 billion	N/A	10%	1.8x	1.7x
TPG III	1999	\$4.5 billion	N/A	26%	2.8x	2.6x
TPG IV	2003	\$5.8 billion	N/A	15%	2.1x	1.9x
TPG V	2006	\$15.4 billion	N/A	5%	1.4x	1.4x
TPG VI	2008	\$18.9 billion	N/A	10%	1.5x	1.4x
TPG VII	2015	\$10.5 billion	\$100 million	21%	2.0x	1.0x
TPG VIII	2019	\$11.5 billion	\$150 million	55%	1.4x	0.1x
TPG Healthcare	2019	\$2.7 billion	--	84%	1.8x	0.2x

* Past performance is not indicative of future results. Please see *Section IX. Investment Performance* of the PPM for additional information. Net IRR, Net MOIC, and Net DPI were provided by TPG.

² Capital invested amounts shown reflect totals for the LP, GP and affiliated entities. Performance metrics shown are exclusively for LPs, excluding amounts related to the GP and its affiliated entities.

³ Recycle Adjusted. Unadjusted Net MoM for TPG I is 3.5x; TPG II is 1.7x; TPG III is 2.6x; TPG IV is 1.9x; TPG VI is 1.5x; TPG VII is 1.9x; TPG VIII is 1.4x; and THP is 1.7x.

V. Investment Period and Term

The commitment period for the Fund is six years from the effective date. The fund term is ten years, which may be extended for up to two additional one-year periods with the consent of the advisory committee.

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 Q

PRIVATE EQUITY MANAGER SUMMARY PROFILE

I. Background Data

Name of Fund:	WCAS XIV, L.P.
Type of Fund:	Private Equity
Total Fund Size:	\$5.0 billion
Fund Manager:	Welsh, Carson, Anderson & Stowe
Manager Contact:	Jonathan M. Rather 320 Park Avenue Suite 2500 New York, NY 10022-6815

II. Organization and Staff

Welsh, Carson, Anderson & Stowe (“WCAS” or “Firm”) has formed WCAS XIV, (the “Partnership”) to invest in buyout and control growth equity investments primarily in U.S.-based, middle-market technology and healthcare companies. WCAS XIV is the 18th limited partnership formed by WCAS. Established in 1979 and based in New York, WCAS has organized 17 limited partnerships with total capital of over \$26 billion. The limited partnerships consist of thirteen equity partnerships and four subordinated debt funds.

WCAS has 16 General Partners and approximately 45 investment professionals, located in New York and San Francisco. The General Partners have strategic, operational, and financial experience combined with extensive relationships and expertise in healthcare and technology. The General Partners average 19 years of experience in private equity and 16 years working together at WCAS. The six senior General Partners on the Management Committee have all worked at WCAS for over 20 years. WCAS Resource Group identifies and implements operating enhancements across the portfolio. The Resource Group is composed of approximately 35 Operating Partners, including generalist operating professionals, functional specialists, and senior industry professionals with deep subsector experience. Typically, each portfolio company investment is staffed with a minimum of two General Partners, a group of Investment Professionals and WCAS Resource Group professionals to provide the proper balance of experience and expertise.

To enhance its DEI efforts, the Firm appointed Eric Lee as the Firm’s Head of Diversity and Inclusion to help reinforce best practices in DEI both at WCAS and at portfolio companies. Moreover, WCAS became one of the founding signatories to the Institutional Limited Partners Association (“ILPA”) Diversity in Action Initiative. The Firm and its employees are also active participants and Board members in several organizations whose mission is to increase diversity and inclusion in the private equity industry, such as the Robert Toigo Foundation, SEO Alternative Investments, and Girls Who Invest. Finally, WCAS recently

became a signatory of UNPRI. These commitments are exhibited internally as the diversity metrics of the investment team have improved to 23% female and 32% ethnic minority as of December 2021.

III. Investment Strategy

The Partnership will invest primarily in equity and equity-related securities of companies selected by the General Partner. The Partnership's investment strategy is to build market-leading companies by (i) buying growth businesses in healthcare and technology industries, (ii) partnering with strong management teams and (iii) building value through a combination of operational improvements, internal growth initiatives and strategic operations. The eight building blocks of WCAS's investment strategy are listed below:

- Focus on Operational Growth – WCAS relies on organic and acquisition-driven growth rather than financial engineering to drive returns. Through this approach, the Firm seeks to create sustainable business models and industry leaders. WCAS believes that the most proven method for increasing equity value is to grow the operating profits of its companies and maintains an operational intensive resource strategy. For example in WCAS XII, the portfolio company investments generated an annual CAGR of 24% in revenue and 28% in EBITDA over the life of the fund. Approximately 60% of the equity value creation in WCAS XII has been generated by operational growth as opposed to leverage and multiple expansion.
- Disciplined Portfolio Construction – WCAS seeks to maintain a consistent and disciplined investment approach. The Firm diversifies its portfolios by time, industry, theme, stage of investment and economic sensitivity. Over the last five years the Firm has invested approximately \$800million to \$1 billion annually and targets approximately 15 portfolio company investments per Partnership.
- Strong Alignment of Interests – WCAS believes strongly in a high alignment of interests with its Limited Partners, which will be achieved through a significant financial commitment to WCAS XIV by the General Partners and other WCAS professionals, as well as proper alignment with the executives leading WCAS portfolio companies. In WCAS XIV, WCAS will be investing \$320 million as one of the largest investors in the fund.
- Industry Specialization – WCAS's two target industries, technology and healthcare, offer attractive opportunities for private equity given their (i) size, (ii) growth and (iii) fragmented nature. Combined, the two industries represent approximately 38% of the U.S. GDP and are growing much faster than the overall economy.
- Control Investor Strategy – WCAS believes that its value-added investment strategy is best executed when it acquires operational and strategic control of companies. Since 1995, approximately 90% of WCAS's equity capital has been invested as a control investor.

- Deal Size Agnostic – WCAS’s strategy is to invest in companies of various sizes and stages and seeks to build a portfolio with exposure to (i) buyouts, (ii) control growth equity investments, and (iii) buy-and-build investments.
- Repeat Management Teams – The Firm routinely uses proven management teams with prior WCAS portfolio company experience. Approximately 60% of the WCAS XII and WCAS XIII portfolio companies have included an executive team from a prior portfolio company.
- Capital markets review – WCAS’s Director of Capital Markets works closely with the Firm’s portfolio companies to design appropriate capital structures. The Firm has significant experience financing its portfolio companies during various market environments. WCAS focuses on capitalizing its portfolio companies with relatively modest leverage levels for financial flexibility.

ESG principles are institutionalized as part of WCAS’s investment and company building process. When WCAS prepares for Investment Review Committee (“IRC”) of a new investment, the Firm retains a third-party ESG consulting firm to identify ESG risks and opportunities for inclusion in the IRC materials. Post-transaction, WCAS’s investment and Resources Group professionals work with each portfolio company to execute ESG initiatives and retain specialized consultants, where appropriate. WCAS’s commitment to sustainability is driven by the Firm’s leadership team and the early adoption of a formal ESG policy in 2013. In addition, the Firm conducts annual ESG training for investment and Operating Partners so they are well-versed in ESG best practices.

The General Partners evaluate exit opportunities throughout the life of a portfolio company investment, and each investment undergoes a re-underwriting analysis at its two-year anniversary. Exit decisions are discussed and approved by all General Partners as part of WCAS’s Quarterly Portfolio Review. In determining the ultimate timing of a full or partial exit, WCAS considers the progress of a portfolio company’s operational and financial performance; capital market and overall economic conditions; and individual WCAS Partnership portfolio considerations.

IV. Investment Performance

Previous fund performance as of September 30, 2021 for investments in WCAS's Equity Partnerships is shown below. Performance for Funds I through IV is not provided, as those Partnerships were not focused exclusively on buyouts.

Fund	Vintage Year	Total Commitments	SBI Investment	Net IRR*	Net MOIC*	Net DPI*
WCAS V	1989	\$371 million	N/A	33%	3.5x	3.5x
WCAS VI	1993	\$604 million	N/A	14%	2.1x	2.1x
WCAS VII	1995	\$1.4 billion	N/A	18%	2.2x	2.2x
WCAS VIII	1998	\$3.0 billion	\$100 million	3%	1.3x	1.3x
WCAS IX	2000	\$3.8 billion	\$125 million	11%	1.7x	1.7x
WCAS X	2005	\$3.4 billion	\$100 million	8%	1.7	1.7x
WCAS XI	2008	\$3.8 billion	\$100 million	12%	1.7x	1.4x
WCAS XII	2015	\$3.3 billion	\$150 million	32%	2.5x	1.1x
WCAS XIII	2019	\$4.3 billion	\$250 million	41%	1.3x	0.0x

* Previous Fund investments may be relatively immature and, therefore, returns may not be indicative of future results. Net IRR and Multiple of Invested Capital (MOIC) were provided by WCAS.

V. Investment Period and Term

The investment period will be six years from the initial closing. The Partnership will terminate ten years from the initial closing, subject to extensions of up to three additional one-year periods with the consent of a majority 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.

ATTACHMENT R

PRIVATE EQUITY MANAGER SUMMARY PROFILE

I. Background Data

Name of Fund:	Wind Point Partners X-A, L.P.
Type of Fund:	Private Equity – Buyout
Target Fund Size:	\$1.7 billion
Fund Manager:	Wind Point Advisors LLC
Manager Contact:	Ron Liberman 676 N. Michigan Avenue Suite 3700 Chicago, IL 60611

II. Organization and Staff

Wind Point Partners (“Wind Point” or the “Firm”) is forming Wind Point Partners X (the “Fund” or “WPP X”) to continue the Firm’s successful history of making private equity investments in North American middle-market companies. Wind Point focuses on companies in the Consumer Products, Industrial Products, and Business Services sectors typically with \$100 million - \$1 billion of total enterprise value at the time of acquisition. Since its inception in 1984, Wind Point has invested approximately \$4.9 billion in 111 portfolio companies generating strong performance across multiple economic cycles.

Wind Point has been an active investor in the Consumer Products, Industrial Products, and Business Services sectors since the 1980s. These three sectors are referred to by Wind Point as their “Core Sectors” and comprise 100% of the Firm’s investment activity since 2007. In the early 2000s, Wind Point began a shift away from other “non-Core” sectors such as Healthcare, Telecommunications and Media, and other areas. Wind Point’s Managing Directors have spent the entirety of their careers investing exclusively in the Firm’s “Core Sectors.”

The Firm is led by Managing Directors Nathan Brown, Paul Peterson, Alex Washington, Konrad Salaber, David Stott, and Joe Lawler who have an average tenure at Wind Point of 18 years. They are joined by 17 additional investment professionals and 15 operations professionals all working from a single office in Chicago.

As a commitment to DEI at the Firm, Wind Point became a signatory to the ILPA Diversity in Action initiative. GPs and LPs who join the Diversity in Action initiative commit to specific actions that advance diversity and inclusion, both within their organization and the industry more broadly. Some key initiatives for Wind Point include partnering with various organizations to promote DEI in the private equity industry (WAVE, PEWIN, NAIC, and others), launching a diversity hiring initiative focusing on identifying and recruiting ethnically diverse and female candidates, and launching a diversity initiative in 2019 to increase diversity among portfolio company boards. Currently, the Wind Point Associate cohort is 50% female

and 25% ethnic minority. Overall, Wind Point is 48% female and 12% ethnic minority with the investment team being 22% female and 17% ethnic minority. Furthermore, 47% of new Executive Advisor Partners (“EAPs”) added by Wind Point with Fund IX are of diverse backgrounds, 60% of investment team hires over the last two years are of diverse backgrounds, and women serve on boards of half of the portfolio companies in Fund IX.

III. Investment Strategy

Wind Point intends to continue their strategy of identifying well-positioned middle-market businesses they believe are in need of leadership transitions whereby they can leverage their extensive executive networks to conduct thorough diligence and establish a clear path to value creation and drive fundamental business transformation. To execute their strategy, they seek to bring together three key elements in each transaction:

- 1) A top-caliber CEO: The core of Wind Point’s investment strategy is focused on identifying and partnering with a top-caliber CEO. Wind Point senior investment professionals and Wind Point’s Chief Talent Officer (“CTO”) dedicate significant time to developing an extensive network of potential CEO candidates. Once an investment opportunity is identified, the diligence process typically involves a potential CEO candidate and one or more members of Wind Point’s Executive Advisor Partner (“EAP”) network. EAP members are senior executives with deep ties to Wind Point who are typically retired, but looking to play an active advisory role in Wind Point’s process. Wind Point believes the enthusiasm, experience base, and knowledge represented by our EAPs contribute very significant benefits in CEO identification and recruiting, deal sourcing, and enhancing Wind Point’s competitive edge. The Wind Point IX EAP group includes more than 30 former CEOs (including 14 former Wind Point portfolio company CEOs). In addition, the group has held over 60 public company board seats, as well as more than 35 current board seats for Wind Point’s portfolio companies (over 80 board seats when including Realized portfolio companies).
- 2) A well-positioned middle-market company: The Wind Point team has extensive experience sourcing unique opportunities in the middle market by leveraging their reputation as an attractive partner to companies Wind Point believes are in need of upgraded executive talent or a full leadership transition. These opportunities may include family or entrepreneur-held businesses with no succession plan, corporate divestitures without an experienced leader, or simply businesses with weak leadership. Additional characteristics of opportunities they pursue are businesses with solid fundamentals, multiple organic growth opportunities, and attractive add-on acquisition opportunities. Considerable time is spent developing relationships with business owners, executives, investment bankers, and others to source investment opportunities potentially well-suited for Wind Point’s approach. Deal team members spend time building relationships with businesses nearing a leadership transition, proactively network with corporate development staff and key executives at larger organizations, attend trade shows and conferences, and regularly meet with investment bankers to update them on our current CEO candidates and industry niches of interest.

- 3) A value creation plan (“VCP”): The goal of Wind Point’s VCP is to build a fundamentally better business by improving the company’s team, growth rate, operations, effectiveness, and strategic position. During the diligence process, Wind Point works side-by-side with their CEO candidate and executive partners to develop and quantify specific initiatives to drive sales, improve operations, and pursue add-on acquisitions that they compile into a tactical VCP to execute during their ownership period. Participating throughout the diligence process allows the CEO to begin implementing the value creation plan immediately following close of the transaction. The VCP provides an ownership “game plan”, which they use as a collaborative and dynamic tool for measuring progress throughout the investment. Wind Point remains very active throughout the ownership period, with the key areas of focus being pursuing add-on acquisitions, top-grading the management team, creating a value-add board of directors, and evolving the VCP if needed.

Wind Point’s collaborative culture provides the opportunity for potential and existing deals to be discussed weekly during their “all hands” meeting. All members of the investment team and any EAPs in attendance are encouraged to ask questions and participate in the conversation. Thus, while Wind Point does have an Investment Committee comprised of the Managing Directors who formally approve each investment, in practice, the Firm seeks to develop consensus support across the organization.

IV. Investment Performance

Previous fund performance as of September 30, 2021, is shown below. Historical Wind Point performance is provided here:

Fund	Vintage Year	Total Commitments	SBI Investment	Net IRR*	Net MOIC*	Net DPI*
WPP II	1987	\$90 million	-	19%	3.2x	3.2x
WPP III	1997	\$215 million	-	23%	2.3x	2.3x
WPP IV	1999	\$405 million	-	10%	1.8x	1.8x
WPP V	2002	\$476 million	-	5%	1.1x	1.1x
WPP VI	2006	\$715 million	-	4%	1.2x	1.2x
WPP VII	2009	\$915 million	-	19%	2.0x	1.9x
WPP VIII	2016	\$985 million	-	31%	1.9x	0.8x
WPP IX	2019	\$1.5 billion	\$100 million	2%	1.0x	0.1x

* Previous fund investments are not indicative of future results. Net IRR, Net MOIC, and Net DPI were provided by Wind Point Partners.

** WPP I is not included as the Fund primarily made venture investments and the majority of the Fund was not comprised of third-party institutional capital.

*** Net IRR and Net MOIC for “Core Sector” investments across Wind Point III – VI are as follows (all Wind Point VII, VIII and IX investments are in “Core Sectors”):

- Wind Point III (1997; 8 of 15 investments): 26% and 2.6x
- Wind Point IV (1999; 6 of 12 investments): 17% and 3.4x
- Wind Point V (2002; 7 of 11 investments): 29% and 2.0x
- Wind Point VI (2006; 9 of 10 investments): 5% and 1.3x

V. Investment Period and Term

The fund will have a six-year investment period and a ten-year term, with the potential of one additional two-year extension with the consent of the Advisory Board and additional one-year extensions with the consent of a majority interest of Limited Partners.

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 S

PRIVATE CREDIT MANAGER SUMMARY PROFILE

I. Background Data

Name of Fund:	HPS Strategic Investment Partners V, L.P.
Type of Fund:	Private Credit
Total Fund Size:	\$9.5 billion (Target) ¹
Fund Manager:	HPS Investment Partners, LLC
Manager Contact:	Adam Jordan 1320 Main Street, Suite 300 Columbia, SC 29201

II. Organization and Staff

HPS Investment Partners, LLC (“HPS” or the “Firm”) has established HPS Strategic Investment Partners V (“SIP V” or the “Fund”), to invest in high-yielding fixed and floating rate debt and debt-like investments. HPS is a leading global investment firm with a focus on non-investment grade credit. Established in 2007 as a unit of Highbridge Capital Management, a subsidiary of J.P. Morgan Asset Management, HPS has over 170 investment professionals and over 440 total employees as of November 2021. The Firm is headquartered in New York with 13 additional offices globally. In June 2018, affiliates of Dyal Capital Partners (now Blue Owl Capital Inc) made a passive minority investment in HPS. As of December 2021, HPS had approximately \$77 billion of assets under management.

HPS is committed to fostering, cultivating and maintaining a diverse, equitable and inclusive workplace. HPS partners with several organizations that support this shared vision as they believe diversity makes communities stronger and it helps internally with providing HPS with a more diverse set of potential employees. Currently, HPS partners with Seizing Every Opportunity (“SEO”), The Opportunity Network, Out For Undergrad (“O4U”), and Harlem Lacrosse. HPS is also a founding signatory to the Institutional Limited Partners Association’s (“ILPA”) Diversity in Action Initiative, joined other investors and investment firms in founding the Equity Alliance, and, in collaboration with The Kapnick Foundation, established the HPS Center for Financial Excellence at Howard University. Currently, the investment team is 15% female and 30% ethnic minority* as of September 30, 2021.

* Minority includes the following categories: Asian, Black/African American, Hispanic, two or more races. Statistics above exclude jurisdictions that do not report race/ethnicity information.

¹ There can be no assurance that targeted fund size will be achieved.

III. Investment Strategy

SIP V will seek to generate current income as well as long-term capital appreciation through high-yielding fixed and floating rate debt and debt-like investments. The junior capital solutions provided by HPS may include subordinated debt (such as second lien and unsecured debt), mezzanine securities, preferred equity and convertible securities and may be accompanied by equity-related securities (such as options or warrants) and/or select common equity investments. Such instruments typically represent the portion of the issuer's capital structure between senior secured debt and common equity. They generally rank senior to common equity but are subordinated to any senior secured indebtedness and are typically used by companies as growth capital to fund acquisitions, refinance existing indebtedness or recapitalize their balance sheets. HPS believes its junior capital solutions offer investors the combination of a high contractual coupon and current income, with significant downside protection through highly negotiated credit documentation with customized covenants.

HPS believes there is an attractive opportunity to provide privately placed junior capital solutions to large companies that require this type of funding as an alternative to traditional financing sources (e.g., banks and other participants in the publicly traded syndicated credit markets). Global regulatory actions stemming from the 2008 financial crisis have significantly increased capital requirements and costs for banks to underwrite and syndicate non-investment grade credit commitments. Banks' unwillingness to take underwriting risk for subordinated debt has led them to focus on very large, existing issuers and increase the "flex" provisions in their commitment papers, allowing them to significantly change pricing and terms of a new issue to help it clear the market. These actions have narrowed the group of issuers that are able to or want to access the publicly syndicated credit markets and, in combination with ongoing market volatility, have led many corporate issuers to seek dedicated private credit platforms (such as HPS) that invest and hold the issuers' securities for the long term. HPS's junior capital solutions allow issuers to: (a) avoid the uncertainty and increasing costs of obtaining syndicated financing commitments, (b) negotiate customized structures and terms, (c) work collaboratively with a single long-term financing provider, (d) act quickly if an opportunity requires financing in a short period of time, (e) limit burdensome public reporting/maintain confidentiality of financial information and (f) minimize management team distraction and time associated with a syndicated financing.

HPS believes that the diversified sourcing, scale, flexibility of capital and experience of the investment team allow it to offer creative capital solutions to companies while seeking to provide investors with attractive returns and significant downside protection. The diversity and breadth of its sourcing platform combined with a favorable demand environment for non-investment grade capital has allowed HPS to remain highly selective on investment opportunities and have limited dependence on any single industry or deal source. The Fund intends to leverage HPS's global credit platform and relationships to continue to source attractive investments directly from private and public companies as well as private equity-backed businesses.

HPS generally intends to pursue investments where the members of the investment team possess a deep knowledge of the sector and the company, generally focusing on companies that demonstrate, or are expected to develop: (i) sustainable advantages and meaningful barriers to entry, (ii) strong market share, (iii) substantial EBITDA margins and free cash flow

and (iv) proven, experienced management teams. HPS expects to be the sole or lead investor in each investment and will consider a variety of transactions including recapitalizations, refinancing, restructurings, acquisitions and leveraged buyouts.

HPS has established an ESG framework that guides their process as a credit investor. During the pre-investment review and evaluation phase, HPS will assess ESG risks and opportunities associated with prospective investments, often leveraging outside resources, including equity owners (including private equity sponsors), consultants, subscription-based databases, public filings and news services, and/or external counsel engaged to assist in due diligence. In certain limited circumstances where HPS has control or similar influence over the company, HPS endeavors to capitalize on the increased access to information and ability to affect change, reflect a deeper-dive ESG review in the due diligence and Investment Committee deliberation processes, and, where appropriate, incorporate ESG initiatives into the value creation plan.

The Fund will have global investments capabilities but will focus on large-cap companies in North America and Europe, with 60% to 80% of the portfolio anticipated to be in North America. Consistent with prior Strategic Investment Partners funds, the Fund will seek to mitigate any currency exposure through hedging or currency swaps. A large portion of the return is anticipated to be generated by the mezzanine securities, including ongoing interest income as well as original issue discount and prepayments and related penalties, with additional potential return from common equity investments and equity kickers.

IV. Investment Performance

Previous fund performance as of September 30, 2021 for HPS Strategic Investment Partners funds is shown below:

Fund	Vintage Year	Total Commitments	SBI Investment	Net IRR*	Net MOIC*	Net DPI**,**
Mezzanine Partners I	2008	\$2.1 billion	-	6.5%**	1.3x**	1.1x**
Mezzanine Partners II	2012	\$4.4 billion	-	14.3%	1.6x	1.2x
Mezzanine Partners III	2016	\$6.6 billion	-	11.4%	1.4x	0.4x
Mezzanine Partners 2019	2019	\$8.4 billion	\$100 million	19.9%	1.2x	0.1x

* Past Performance is not necessarily indicative of future results. Net IRR, MOIC and DPI were provided by HPS. Represents the estimated and unaudited inception-to-date returns for a full fee paying model investor in the offshore fund, assuming the portfolio is ultimately recovered at net asset value as of 9/30/2021.

** Please note that Mezzanine Partners I ("Fund I") has a fee structure with meaningfully different characteristics, primarily with the management fee being payable based on committed, not invested, capital and carried interest payable on GAAP-accrued but unrealized debt income such as OIDs or PIKs. Pro forma Net Fund I return is pro forma for Fund II, III, & 2019 fee structure, in each case for a full fee-paying offshore fund investor. Actual net Fund I returns under committed fee structure are 5.5% / 1.3x as of 9/30/2021.

*** As of 9/30/2021. Calculated as total fund distributions (net of carried interest) / total called capital (including management fees and fund expenses).

V. Investment Period and Term

The investment period will be four years from the first closing date. The term of the Fund will be ten years from the first closing date, which may be extended for one year at the discretion of the General Partner and for two additional one-year periods with LPAC approval.

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

ATTACHMENT T

PRIVATE CREDIT MANAGER SUMMARY PROFILE

I. Background Data

<i>Name of Fund:</i>	Oaktree Special Situations Fund III, L.P.
<i>Type of Fund:</i>	Private Credit
<i>Target Fund Size:</i>	\$2.5-\$3.0 billion
<i>Fund Manager:</i>	Oaktree Capital Management, L.P.
<i>Manager Contact:</i>	Michael Trefz 1301 Avenue of the Americas New York, NY 10019

II. Organization and Staff

Oaktree Capital Management, L.P. (“Oaktree” or “Firm”), is expected to establish Oaktree Special Situations Fund III, L.P. (“Fund”). The Fund is expected to make control investments in middle-market companies through three types of investments: (a) structured equity investments (e.g., debt or preferred equity with a conversion feature or warrants), (b) direct equity investments and (c) the purchase of distressed debt.

Oaktree was formed in April 1995 and is a leading global investment management firm headquartered in Los Angeles, California, with more than 1,000 employees throughout offices in 19 cities worldwide. As of September 30, 2021, Oaktree had approximately \$158 billion in assets under management¹. Oaktree is expected to manage the Fund through its special situations group (“Special Situations Group,” or “SSG”). The Fund is the seventh closed-end fund or account Oaktree has organized since 2014 for the purpose of making special situation private equity investments primarily in the U.S. The six prior funds and accounts have combined committed capital of nearly \$5 billion. The Fund is the seventh special situations fund or account managed by Jordon Kruse and Matt Wilson, who were named co-portfolio managers in July 2014 and took over sole responsibility for the SSG in January 2016.

In March 2019, Brookfield Asset Management Inc. (“Brookfield”) and Oaktree Capital Group, LLC (“OCG”) announced that they had entered into an agreement to which Brookfield would acquire a majority interest in Oaktree’s business. The transaction closed in September 2019. Upon the closing of the transaction, Brookfield acquired an economic stake of approximately 61.2% of the Oaktree business and OCG’s Class A common shares ceased to be publicly traded. Both Brookfield and Oaktree continue to operate their

¹ Includes Oaktree's proportionate amount of DoubleLine Capital AUM resulting from its 20% minority interest therein. Important information regarding Oaktree's calculation methodology for assets under management can be found in the legal disclosures section of the PPM

respective businesses independently, partnering to leverage their strengths, with each remaining under its prior brand and led by its prior management and investment teams. Howard Marks and Bruce Karsh will continue to have operating control of Oaktree as an independent entity for the foreseeable future.

In order to deepen its longstanding commitment to ESG integration in investment, Oaktree became a signatory to the United-Nations-supported Principles for Responsible Investment (PRI) in 2019. In 2020 Oaktree became a supporter of the Task Force on Climate-Related Financial Disclosures (TCFD), a member of BSR, and in 2021 became a member of the Sustainability Accounting Standards Board (SASB) Standards.

Oaktree is proud of its diversity. Globally, 43% of all employees and 14% of investment professionals are female. In the U.S., 47% of all employees and 35% of investment professionals are ethnic minorities². Oaktree is committed to increasing representation in our female and underrepresented groups, with a focus on investment teams and officer level roles, and the Firm has put in place targets to hold itself accountable to these goals. Oaktree aims to do this through (1) enhanced recruitment, (2) retention & development, (3) awareness & education and (4) accountability. In early 2017, the Firm launched a Diversity & Inclusion (“D&I”) Council to drive Oaktree’s global D&I strategy and in 2021, Oaktree named its first full-time Head of D&I, Jerilyn Castillo McAniff. In addition to several internal teams focused on D&I, Oaktree is a strategic partner to numerous organizations that champion causes of diversity, such as [AltFinance: Investing in Black Futures](#), Girls Who Invest, SEO, Level 20, Out For Undergrad, and #10000 Black Interns.

III. Investment Strategy

The Fund’s expected objective is to make investments that result in control of, or significant influence over, a company. The Fund is expected to make investments that primarily fall into one of the aforementioned categories:

Structured Equity – Oaktree pursues tailored structured equity investments in situations that involve (a) stress or dislocation or (b) a degree of complexity or something else that makes them incompatible with more mainstream capital solutions. In stressed situations, the Fund’s structured equity investments fill a void, as lenders of last resort often do not have the operational or strategic capabilities to add value beyond providing financial capital, and many traditional private equity firms lack the needed structuring creativity and flexibility. For healthy companies that want or need a partner and are unable – or choose not – to access the mainstream capital markets for a variety of reasons, SSG offers professionalization, strategic and operational-improvement resources that are critical to a company’s success. Importantly, SSG’s structured equity investments typically “attach” and “detach” at senior levels in a company’s capital structure and have meaningful debt or equity value that sits junior to them. The forms of structured equity investments include,

² Defined as Asian, Black/African American, Latino/Hispanic, Native American or Native Hawaiian and 2 or more races.

but are not limited to, debt or preferred stock with common equity, warrants or an equity conversion feature. The structured equity investment is expected to provide the Fund with control or significant influence over the company, including board representation and/or contractual control provisions/covenants.

Structured equity investments are typically exited in two stages. Stage one is usually the sale of the fixed-income component typically through a refinancing that replaces the Fund's fixed-income investment with a lower cost of capital debt following a turnaround. Stage two is the eventual sale of the equity-linked component either through the sale of public equity or full sale of the company.

Direct Equity Investments – Oaktree expects to make direct equity investments in companies where there is an opportunity to acquire assets at bargain purchase prices because of fragmentation, distress or dislocation. SSG focuses on Special Situations where a company, industry or asset class may be misunderstood or where there is company- or industry-specific dislocation, which can lead to capital flight, forced/motivated sellers, or underpriced assets. Direct equity investments often involve establishing a platform to purchase assets in partnership with an experienced management team.

Direct equity investments are typically exited through the full sale of the company; however, the Fund looks to make interim monetization via financings, divestitures or dividend recapitalizations where appropriate. The choice as to the method of final exit will depend upon, among other things, the capital structure of the company, the likelihood of attracting a strategic buyer and the state of the market for public equity offerings.

Distress for Control – Oaktree is expected to make secondary purchases of large blocks of relatively illiquid debt at prices substantially below par. SSG targets (a) companies that are likely to default or have unsustainable capital structures requiring financial restructuring and (b) the debt class that SSG believes will receive equity in a restructuring. SSG expects these companies will have fundamentally sound business models and sustainable competitive positions, notwithstanding their situational distress. Oaktree believes that acquiring the distressed securities of such companies and skillfully restructuring their debt can create relatively low-cost, limited-risk equity ownership positions. Ultimately, the Fund will seek control of the company through the restructuring, which may include the injection of new capital.

Distressed debt investments have two primary paths for the exit: open market sale of debt or sale of the company after a full restructuring. In the case of an open market sale, this usually takes place because SSG believes the security no longer trades at an inherent discount to its intrinsic value and/or because the business prospects of the company have improved and they no longer believe the company will need to restructure. In the case of a full restructuring, the fund typically receives equity in the recapitalization and has full or partial control of the company through voting rights and board representation. As such, SSG can control the timing and path of exit similar to a direct equity investment (see discussion below for Direct Equity exit).

As long-term investors, Oaktree believes that a concerted and consistent focus on ESG throughout the investment lifecycle allows it to avoid undue risk and better identify valuable opportunities. Diligence on ESG-related matters is incorporated into investment decisions; the team utilizes a proprietary ESG tracker that identifies 30 governance, 17 environmental and 22 social items to create a quantitative picture of a potential investment's baseline ESG practices. In addition, SSG uses SASB industry-specific materiality maps to guide targeted ESG investment due diligence relevant to the specific industry or company. In 2021, SSG further enhanced ESG integration at portfolio companies developing a private investment "playbook" to serve as a framework for instituting basic practices in key ESG areas and a roadmap for implementing better and best practices. As part of this "playbook," the team provides portfolio companies a suite of tools, such as a greenhouse gas self-assessment tool, a sustainability policy template, a supplier code of conduct, an employee handbook guideline and an ESG communications handbook.

Historically, the SSG team generally makes friendly investments in cooperation with a target company's existing management. In certain instances, however, such as the restructuring of an existing debt investment, the Fund may proceed with actions that may be adverse to a board of directors, members of management, stockholders or members of a creditors' committee if Oaktree determines that such a strategy would better serve the Partnership's interests.

It's expected that once strategic initiatives have been implemented, and the team makes the decision that it is the optimum time to realize the investment, the SSG will explore all possible avenues including sale to strategic buyers, sale to financial buyers, asset divestitures, refinancing, dividend recapitalizations and sales of securities in both registered offerings and open-market transactions in obtaining the maximum value of the investment. The choice as to the method of disposition will depend upon, among other factors, the capital structure of the company, the likelihood of attracting a strategic buyer and the state of the market for public equity offerings.

IV. Investment Performance

Previous fund performance as of September 30, 2021 for Oaktree and the SBI's investments with previous funds, where applicable, is shown below:

Fund	Vintage Year	Total Commitments	SBI Investment	Net IRR*	Net MOIC*	Net DPI*
The Principal Fund	1994	\$540 million	--	14.6%	1.7x	1.7x
Principal Opps. Fund	1996	\$845 million	--	5.4%	1.5x	1.5x
Principal Opps. Fund II	2000	\$1.6 billion	--	17.8%	1.8x	1.8x
Principal Opps Fund III	2004	\$1.6 billion	--	9.5%	1.5x	1.5x
Principal Opps. Fund IV	2006	\$4.0 billion	--	8.8%	1.7x	1.7x
Principal Fund V ¹	2009	\$3.3 billion	--	2.0%	1.1x	1.1x
Special Situations Fund ²	2014	\$1.2 billion	\$100 million	6.1%	1.2x	0.2x
Special Situations Fund II ²	2018	\$1.4 billion	\$100 million	142.8%	2.0x	0.2x
Principal V Continuation Fund ¹	2009	\$0.9 billion	--	27.5%	1.5x	0.9x

As of September 30, 2021

¹ Oaktree Principal Fund V was part of a GP-led secondary transaction (the "Transaction"), whereby limited partners were given the option to receive accelerated liquidity for several of the Fund's remaining assets. In conjunction with the Transaction, which closed on September 30, 2019, Oaktree Principal V Continuation Fund ("PVCF") was established to purchase the transacting portion of Oaktree Principal Fund V's assets at a discount to Oaktree's then-current valuation of such assets. Accordingly, the performance of PVCF reflects the terms of such liquidity transaction, including the negotiated selection of assets by the purchasers participating in the transaction and the initial value of such assets upon PVCF's commencement.

² This fund employs subscription line financing.

V. Investment Period and Term

The Investment Period is expected to terminate four years after the date of initial investment. The Fund's term is expected to be ten years from the initial investment date, subject to five one-year extensions at the discretion of the General Partner and an additional one-year extensions with the consent of a majority in interest of 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 and any supplemental thereto.

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ATTACHMENT U

DISTRESSED/OPPORTUNISTIC MANAGER SUMMARY PROFILE

I. Background Data

<i>Name of Fund:</i>	The Värde Fund XIV, L.P.
<i>Type of Fund:</i>	Private Equity
<i>Target Fund Size:</i>	\$2 billion
<i>Fund Manager:</i>	Värde Management, L.P
<i>Manager Contact:</i>	Kim Steinberg 901 Marquette Avenue South Minneapolis, MN 55402

II. Organization and Staff

Värde Partners, Inc. is forming The Värde Fund XIV, L.P. (the “Fund”) and certain parallel funds (collectively, the Fund) to invest in a broad range of credit and value-oriented opportunities, including credit origination, acquiring credit and credit-related assets, and restructuring/distressed.

Värde Partners is a global alternative investment firm with assets under management of over \$13.5 billion. Värde was founded in 1993 and is headquartered in Minneapolis, Minnesota with additional major offices in London, Singapore, and New York. Värde also maintains additional offices in Asia Pacific and Europe.

Värde is managed by a group of senior professionals, including nineteen partners: Ilfryn C. Carstairs, Bradley P. Bauer, Giuseppe Naglieri, Jonathan A. Fox, Andrew P. Lenk, George G. Hicks, Marcia L. Page, Brendan D. Albee, James E. Dunbar, Carlos Sanz Esteve, Scott T. Hartman, Elena Lieskovska, Haseeb K. Malik, Aneek Mamik, David A. Marple, Francisco Milone, Timothy J. Mooney, Rick J. Noel, and Brian C. Schmidt.

Värde has increased its focus on diversity efforts over the past several years. The firm has established multi-year diversity targets for its employees and related to the gender diversity of its portfolio company boards, including for portfolio companies where Värde has significant control or influence to have at least two female portfolio company board members (or 30% of total). In 2020, Värde was selected by the W.K. Kellogg Foundation to participate in a 12-month program, Expanding Equity, to help investment management firms improve the racial diversity at their organizations. Currently, the investment team is 24% female and 22% ethnic minority (ethnicity information relates to U.S. employees only).

III. Investment Strategy

The Värde Fund XIV is Värde's flagship and seeks to bring together the Firm's global capabilities and competitive advantages in credit investing and origination into a comprehensive, flexible investment program that targets opportunistic credit returns throughout the various ebbs and flows of market cycles. The Firm leverages the depth of its global platform to consistently generate a pipeline of differentiated deal flow at these return levels that is not dependent on a general credit cycle.

The Firm has been deliberate in developing over many years global investing capabilities spanning private and public markets, in both originated and secondary opportunities, and across the credit quality spectrum. Värde believes its ability to source differentiated deal flow and create proprietary assets throughout the cycle will provide the Fund with valuable opportunities to generate strong returns even when the prevailing market environment appears limiting.

The flagship is Värde's broadest opportunistic investing strategy, and accordingly is afforded the fullest flexibility to invest across Värde's platform. Värde maintains a closely coordinated, integrated global platform, allowing it to see across global markets and identify opportunities that the Firm believes offer strong absolute and relative value at all points in time. The Firm believes there are always cycles somewhere, including dislocations or mismatches in supply and demand for credit in markets of meaningful size and importance. Therefore this global lens is a key feature of the Fund's strategy, while Värde's local presence is critical to accessing opportunity and unlocking value.

Considering Värde's strong capability to access the broad opportunity on offer across geographies and the Fund's flexibility of mandate to capitalize on it, Värde believes the Fund presents a compelling value proposition for investors seeking differentiated global opportunistic credit exposures, strong risk-adjusted returns and efficient capital management.

The Firm will seek to unlock value for the Fund through three core focus areas and approaches:

- Origination
- Acquisition of undervalued credit and credit-related assets
- Traditional distress and restructuring

Collectively, the Firm's three global investing teams have breadth across global markets and expertise in specific asset classes and credit-led investing themes:

Corporate & Traded Credit: This team focuses on opportunistic and dislocated traded credit, restructurings and liquidations in corporate, structured product, sovereign and other fixed-income credit instruments and related assets. The team has the capability to manage structured credit investments related to real estate, including commercial mortgage-backed securities (CMBS) and residential mortgage-backed securities (RMBS).

Real Estate & Mortgages: This team focuses on private and public debt and equity investments related to real estate (both residential and commercial) as well as private credit and asset-level investments in the transportation and infrastructure sectors, among other real assets categories.

Financial Services & Specialty Finance: This team pursues private credit and private equity investments in financial services businesses, including consumer and commercial finance, insurance, trust and corporate services, payments and asset management. The team is also responsible for investments in asset-backed securities, collateralized by small balance consumer and commercial asset types.

Värde's ESG Policy defines the Firm's approach to integrating the consideration of ESG principles into its investment activities across all funds under management as well as its general business practices. Alongside the ESG policy each investing segment has bespoke guidelines that outline the requirements for ESG analysis. Additionally, Värde became a signatory to PRI in December 2021.

ESG considerations are having an impact across multiple sectors, geographies and industries, influencing risk/return characteristics. Värde's approach to ESG in investing is one of integration. That is, the Firm is not an impact investor, nor are the Funds impact funds, but rather undertakes thoughtful analysis to incorporate ESG risks and opportunities into its decision-making processes.

The intention is that ESG analysis should be viewed in line with other material elements of investment analysis. As such, the areas of focus, the depth of analysis and the implications will be bespoke to each situation.

There is an organization-wide objective that the analysis of each new investment should cover a consistent set of steps for the analysis and ongoing monitoring of ESG risks and opportunities. This includes both actions during the due diligence/underwriting stage as well as ongoing monitoring and potential value creation opportunities.

IV. Investment Performance

Previous fund performance and the SBI's investment in those funds, where applicable, is listed in the table below. Performance is reported as of September 30, 2021.

Fund	Vintage Year	Total Commitments	SBI Investment	Net IRR*	Net MOIC*	Net DPI*
Fund V	2000	\$83 million		20.8%	2.8x	2.8x
Fund VI	2001	\$47 million		17.8%	2.3x	2.3x
Fund VII, VII-A	2003	\$147 million		2.7%	1.2x	1.2x
Fund V-B	2005	\$89 million		5.3%	1.4x	1.4x
Fund VII-B, VIII	2006	\$997 million		5.4%	1.4x	1.4x
Fund IX, IX-A	2008	\$2.3 billion	\$100 million	15.3%	2.2x	2.2x
Fund X	2010	\$2.0 billion	\$150 million	10.3%	1.8x	1.6x
Fund XI	2013	\$2.0 billion	\$200 million	4.6%	1.3x	0.9x
Fund XII	2016	\$1.7 billion		5.1%	1.2x	0.5x
Fund XIII	2018	\$2.5 billion	\$150 million	15.3%	1.3x	0.0x

* Previous Fund investments may be relatively immature and, therefore, returns may not be indicative of future results. Net IRR and Multiple of Invested Capital (MOIC) were provided by Värde.

V. Investment Period and Term

The Fund will have a term of nine years. The Investment Period will last for a period of three years from the final close, plus a five-year harvest from the final close, subject to possible extensions.

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 and any supplements thereto.

TAB K

Report from
Executive Director
Search Committee

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DATE: February 7, 2022

TO: Members, Investment Advisory Council

FROM: SBI Staff

SUBJECT: Report from Executive Director Search Committee

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

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REPORT

Public Markets Investment Program

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DATE: February 7, 2022

TO: Members, Investment Advisory Council

FROM: SBI Staff

SUBJECT: SBI Public Markets Program Report

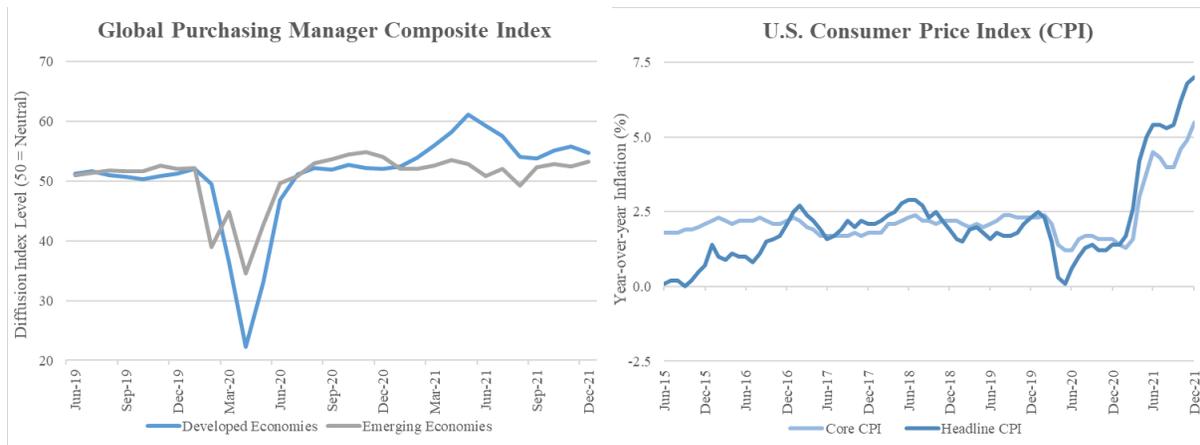
This report provides a brief performance review of the SBI Public Markets portfolio through the fourth quarter of 2021. Included in this section are a short market commentary, manager performance summaries and a report of any organizational updates for the public equity and fixed income managers in the SBI portfolio.

The report includes the following sections:

	Page
• Review of SBI's Public Markets Program	3
• Public Markets Managers' Organizational Update	11
• Manager Meetings	12

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Review of SBI Public Markets Program Fourth Quarter 2021



Source: Bloomberg, Markit, U.S. Bureau of Labor Statistics

Market Summary

Global capital markets rallied in the final quarter of 2021, with the MSCI All Country World (ACWI) Index (net) gaining +6.7% in U.S. dollars for the quarter. Within the U.S., the broad Russell 3000 Index rose +9.3%, led by gains in large cap growth names (+11.6%). Small caps lagged; the Russell 2000 Growth Index of small cap growth companies was unchanged on the quarter. By sector across the Russell 3000 Index, technology, real estate, materials and consumer discretionary names outperformed, while energy, financials and healthcare lagged.

During the quarter, economic activity recovered from a dip earlier in the year caused by a spike in COVID-19 cases due to the Delta variant of the virus. While a new, even faster-spreading variant (Omicron) emerged during the quarter and dampened the prospects for a full “return to normal”, the market largely took Omicron in stride owing to its generally milder symptoms, especially among the vaccinated population. The robust consumer demand-led recovery continued to pressure supply chains and drove gains in consumer prices to a 40-year high level in December, up +7.0% year-on-year. Even excluding the volatile food and energy components, so-called core prices rose +5.5% during 2021. Labor market conditions continued to improve, albeit at a slower pace than earlier in the year. Employers added an average of 365,000 workers per month over the fourth quarter, and the jobless rate declined to 3.9%, inching nearer to the pre-pandemic low of 3.5%. Average hourly earnings rose +4.7% year on year in November, and the Atlanta Fed’s wage growth tracker showed a +4.3% rise over the same period, representing a 20-year high for that measure.

Asian markets (both developed and emerging) posted weak results, led lower by China, Singapore, Hong Kong and Japan. Concerns over an economic slowdown in China (especially in the real estate sector) continued to cast a shadow over that market. Latin America was also a source of weakness, with Brazil down nearly 9% in U.S. dollar terms and Chile down nearly 12%. Political instability and faster-than-expected inflation contributed to the decline in investor sentiment in these markets. On the positive side, developed European markets fared well, led by France, Switzerland and Italy, as investors gravitated to mega cap industrial, consumer and financial names

which dominate these markets. The U.S. dollar rose 1.5% during the quarter on a trade-weighted basis, led by strength against the Japanese yen, the euro and most EM currencies.

The U.S. Federal Reserve (Fed) pivoted towards a more hawkish (less accommodative) monetary policy stance during the quarter. After announcing its much-anticipated plan to begin tapering its asset purchases at its November meeting, the Fed accelerated the pace of tapering at its December meeting in response to persistently high inflation readings. In response to the Fed's hawkish turn, short- and intermediate-term U.S. interest rates rose modestly during the quarter as market participants began to price-in the possibility of the Fed hiking rates as soon as March 2022.

Overall Combined Funds Portfolio - Quarter and One-Year Performance

The overall Combined Funds portfolio returned +5.4% during the fourth quarter of 2021, matching the composite benchmark which returned +5.4% over the same period. Portfolio relative performance during the quarter was mixed, as asset allocation gains from an overweight to U.S. equities and a corresponding underweight to fixed income were offset by negative relative performance from active public equity and fixed income managers. Positive performance from active managers within the international equity portfolio helped relative performance. The private markets invested portfolio returned +6.4%, led by strong performance from the private equity and real estate portfolios. The private markets uninvested portfolio, which is invested in an S&P 500 Index strategy, gained +11.1% for the quarter and helped boost overall fund performance.

Within public equity, global equity managers, U.S. large- and all-cap growth managers and fixed income managers all detracted from relative performance. In particular, growth-oriented active equity managers suffered from a significant rotation away from speculative growth names towards quality growth as well as value stocks. On the positive side, public equity performance benefitted from strong relative outperformance from the portfolio's U.S. semi-passive large-cap and active small-cap managers, as well as the portfolio's emerging markets equity managers.

For the year ending December 31, 2021, the Combined Funds portfolio outperformed the composite benchmark return by +0.7%, or 70 basis points (+18.2% Combined Funds vs. +17.5% Composite Benchmark). Performance was aided by both strong underlying performance at the asset class level as well as an overweight to equities – and corresponding underweight to fixed income – maintained for most of the period.

Overall, the public equity portfolio posted strong results (+19.9% Portfolio vs. +19.6% Benchmark), helped by active manager outperformance within both the domestic equity and international equity portfolios, while the global managers lagged. The total fixed income portfolio also outperformed its benchmark for the full year (-1.6% Portfolio vs. -2.1% Benchmark), boosted by solid relative performance across all segments of the portfolio. The invested private markets portfolio returned +39.1% for the year, led by the private equity portfolio which gained +44.5% for the period. The private markets uninvested portfolio, which is invested in an S&P 500 Index strategy, gained +28.5% for the year.

Domestic Equity

Domestic markets benefitted from a continued strong post-lockdown economic recovery, fueling growth in corporate earnings and strong returns across U.S. equities during the quarter. Domestic markets gained in October on this optimism, dipped slightly in November, and then posted strong returns in December. The Russell 3000 Index finished the quarter higher by +9.3%, ending 2021 with a +25.7% return.

Fears of the global impact of the Omicron variant on global growth prospects, as well as concerns over inflation and tighter monetary policy, drove a downward rerating of high-multiple, high-growth companies in December. The shift in investor preference to the relative safety of companies with strong revenues and pricing power (particularly defensive-growth mega-cap names) drove much of the positive performance of broad market indices, and fueled outperformance of growth versus value indices (R3000G +10.9% vs. R3000V +7.4%). Large caps outperformed small caps (R1000 +9.8% vs. R2000 +2.1%), and within small caps, the selloff in high-growth names drove underperformance of small cap growth versus small cap value (R2000G +0.0% vs. R2000V +4.4%).

Real estate (+14.3%), technology (+13.9%), and utilities (+12.7%) sectors were the strongest performers during the quarter, while telecommunications (-0.5%), financials (+5.4%), and industrials (+5.7%) sectors lagged overall benchmark performance. Noncyclical sectors and those with better prospects of pricing power in the face of higher inflation generally fared best; the consumer staples (+12.2%) sector performed better than consumer discretionary (+8.2%). Within small caps, healthcare stocks fared poorly (-10.5%), driven by large losses in biotechnology stocks. Due in part to higher cost structures and growth concerns, small cap energy (-3.9%) and consumer discretionary (+1.1%) sectors also notably underperformed the overall market.

The Combined Funds' domestic equity portfolio gained +9.1% during the quarter, slightly underperforming the Russell 3000 Index, which returned +9.3%. An overweight to small cap stocks in the portfolio modestly detracted from relative performance. Active management was a negative contributor during the quarter, with underperformance concentrated in a few large cap growth active managers. Accordingly, large cap managers underperformed in aggregate (+8.0% Portfolio vs. +9.8% Benchmark). All other managers generally outperformed, and active small cap managers nicely outpaced their benchmarks (+4.0% vs. +2.1%). In aggregate, passive managers tracked their benchmarks during the quarter.

Active large and all-cap growth managers were the largest underperformers during the quarter. Active large cap growth managers underperformed (Sands Capital -6.6% and Winslow +7.9% vs. +11.6% Benchmark), as did active all-cap manager Zevenbergen (-5.8% Portfolio vs. +10.9% Benchmark). An underweight to the largest companies by market cap was a significant detractor during the quarter, as these names fared well during the December rotation into quality growth stocks. The top five companies by market cap (Apple, Microsoft, Alphabet, Amazon, and Tesla) represent 38% and 36% of the Russell 1000 Growth and Russell 3000 Growth indices, respectively, and the portfolio's active managers tend to diversify away from these names. Sands and Zevenbergen both underperformed significantly due to their concentrated nature and focus on higher-growth stocks during a quarter that saw a significant downward re-rating in high-multiple stocks with low/no earnings (i.e. Sea Ltd. -29.8%, Block -32.7%, Snap -36.3%, Peloton -60.3%).

Winslow fared better given its focus on higher-quality growth stocks and lower levels of concentration. While disappointing, this level of underperformance is not out of line with expectations for the strategies given the higher-volatility nature of Sands and Zevenbergen coupled with the speed and magnitude of the high-growth selloff in December.

Active large cap value managers were mixed during the quarter (Barrow Hanley +9.2% and LSV +6.9% vs. Benchmark +7.8%). LSV's quantitative, deep value approach was out of favor in yet another quarter that rewarded growth and sentiment. In addition, the portfolio is overweight smaller-cap names, which held back relative performance. Barrow Hanley was buoyed by strong stock-specific attribution, particularly in technology (i.e. Broadcom, Qualcomm) and consumer discretionary sectors. This was offset somewhat by its pro-cyclical stance, including an over-allocation to consumer discretionary and an under-allocation to utilities, real estate, and healthcare.

Semi-passive large cap managers both outperformed their benchmarks this quarter (Blackrock +10.8%, J.P. Morgan +11.3% vs. Benchmark +9.8%). Quantitative manager Blackrock benefited most from trend-based stock sentiment models as well as fast-moving alternative data that helped the manager pivot around the changing market dynamics in December. J.P. Morgan's sector-neutral, fundamental strategy gained largely from a recent quality bias, an overall overweight to the largest names in the index, and good security selection across industrials, technology, and consumer discretionary sectors.

Active small cap growth managers performed well versus their benchmarks, and only one manager, Arrowmark, underperformed the benchmark (-4.9% Portfolio vs. +0.0% Benchmark). Hood River fared best (+4.8% Portfolio vs. +0.0% Benchmark), followed by Rice Hall James (+4.5% Portfolio vs. +0.0% Benchmark). In aggregate, active small cap growth managers were underweight early-stage biotech companies that sold-off dramatically during the quarter; hence strong selection of healthcare stocks was the largest driver of returns.

Active small cap value managers had some the strongest performance over the quarter versus their benchmarks across domestic equities, and only one manager, Hotchkis & Wiley, modestly underperformed (+3.6% Portfolio vs. +4.4% Benchmark). Martingale fared best (+8.5% Portfolio vs. +4.4% Benchmark), followed by Goldman Sachs (+6.9% Portfolio vs. +4.4% Benchmark). Small cap value managers were generally underweight high-priced biotechnology names, high-multiple stocks driven upward by sentiment, and meme stocks—all of which boosted manager relative performance. In conjunction with the managers' bottom-up stock picking, this translated into strong security selection across healthcare, consumer discretionary, industrials, and technology sectors.

Global Equity and ACWI ex USA Equity

The portfolio's global equity managers returned +3.3% in the third quarter, underperforming the MSCI ACWI Index (net), which returned +6.7%. All three global managers utilize a bottom-up, fundamental investment approach, with concentrated portfolios and a high degree of active share, or differentiation from the benchmark. The global equity managers in aggregate also have a growth style bias, which suffered headwinds during the quarter as investors rotated away from high-growth names into more durable growth and cyclical value names. During the fourth quarter, several companies commonly held across the global equity portfolio experienced weakness.

Technology companies in China, including Alibaba and Pinduoduo, remained under pressure due to continued uncertainty surrounding the regulatory environment. Healthcare technology leader Moderna, which had benefited from the successful development and deployment of its COVID-19 vaccine, struggled as investors reassessed its future prospects for new blockbuster treatments as well as increasing competition within the COVID-19 vaccine space. Within the U.S., managers' holdings of Peloton and Zoom were a drag on performance as investors began to question the durability of revenue growth for these classic stay-at-home stocks once the pandemic eases.

The portfolio's ACWI ex USA manager (Earnest Partners) was matched the benchmark during the quarter (+1.8% Portfolio vs. +1.8% Benchmark). The strategy holds no utilities and an underweight to consumer staples. Both industries were strong performers, detracting from performance. The portfolio is also tilted toward emerging markets, which underperformed relative to the developed markets. Good issue selection within healthcare, energy, and real estate and across the emerging markets made up for the index and industry headwinds.

Developed International Equity and Currency Overlay

International developed markets equities, as measured by the MSCI World ex USA Index (net), rose +3.1% during the fourth quarter, significantly lagging the U.S. market. The index gained more on local currency basis (+4.2%), but a broad-based appreciation in the U.S. dollar versus other currencies dragged down international equity returns when measured in U.S. dollars.

Despite Omicron and lingering supply chain and inflation worries, European equities bounced back from their third quarter slump. Such renewed investor confidence was not felt in Japan, however, where concerns about an aging population continue to subdue investor sentiment. Index performance by country among major markets was led by strong performance from Switzerland (+12.8%), Canada (+7.8%), and France (+7.1%). Returns across most European markets were positive in U.S. dollar terms with a couple of exceptions (Spain -1.4% and Norway -0.3%). The remainder of index losers by country were concentrated in the Pacific region, with New Zealand (-4.0%), Japan (-4.0%), Hong Kong (-3.6%), and Singapore (-3.4%) all detracting.

The portfolio's active developed markets managers matched the MSCI World ex USA Index (net), returning +3.1% versus the benchmark's +3.1% return. Good issue selection across markets such as Japan, Australia, and American-listed ADRs and within sectors and industries including pharmaceuticals, industrials, and REITs were the primary drivers of relative performance for the period. Country selection generally detracted with underweights to top performers Switzerland and Canada hurting the most. Sector allocation effects were also modestly negative, with an overweight to energy and underweights to food products and utilities losing most.

Quality growth manager J.P. Morgan outperformed the benchmark by +2.3% on the quarter, led by strong issue selection in information technology, industrial, and consumer staple names, particularly in Japan. Meanwhile, diversified core manager Marathon and quantitative factor-driven manager AQR both detracted from relative performance the portfolio (lagging the benchmark by -1.9% and -1.2%, respectively). Marathon's portfolio was primarily hurt by poor stock selection in the European portfolio. AQR's strategy, which emphasizes value, momentum and quality factors, suffered most from losses to their currency strategy and poor stock selection in Japan.

The passive developed markets portfolio tracked the MSCI World ex USA Index (net) within guideline tolerance for the quarter (+3.2% Portfolio vs. +3.1 % Benchmark).

The portfolio's currency hedging program, which seeks to protect the passive developed markets portfolio from a decline in value of foreign currencies relative to the U.S. dollar, had a net positive impact during the period (+0.2%), as the dollar experienced a broad-based rally. Hedges on the euro, Japanese yen, and Swedish krona contributed positively, while other developed currencies detracted. The program's overall hedge ratio ended the quarter at 52.3% and ranged between 36.7% and 60.2% over the period.

Emerging Markets Equity

Emerging market equities, as measured by MSCI Emerging Markets Index (net), posted a loss of -1.3% in the fourth quarter of 2021. Among major markets, China's -6.4% return contributed most to the index's poor results owing to its dominant size within the index, while Russia (-7.4%) and Brazil (-6.5%) were also negative. Egypt (+18.3%), the Czech Republic (+12.3%), Peru (+10.4%), and the United Arab Emirates (+10.3%) all recorded excellent quarters, but because of their small size did not do much to improve index performance. The only major positive contribution to index return came from Taiwan (+8.4%).

Equity markets in China, Brazil, and Russia, were each impacted by distinct themes that weighed on sentiment at the end of 2021. In China, investors continued their re-assessment after targeted regulations shook the market over the summer. The market also remained concerned about China's continued insistence on a zero-tolerance approach to the COVID-19 pandemic and the cost this may have for the economy. In Brazil and across many smaller emerging markets, rising inflation put pressure on economies and governments as central banks raised rates. Finally, escalating tension between Russia and the West over the standoff in Ukraine led investors to tilt away from the geopolitical risk.

The portfolio's active emerging markets managers outperformed the MSCI Emerging Markets index (net) (-0.9% Portfolio vs. -1.3% Benchmark). An underweight to China (especially tech names like Alibaba, down -16.5% in Q4) continued to lift the portfolio while an underweight to the healthcare sector also contributed. Stock selection was generally positive, especially in China.

After a difficult third quarter, Macquarie bounced back, outperforming the benchmark by +3.2%. The portfolio was lifted by a large bet on semiconductors and by strong stock selection in China. Morgan Stanley also performed particularly well, outperforming the benchmark by +1.8%. Strong selection in and underweights to Chinese internet and healthcare names were the biggest contributors to Morgan Stanley's outperformance. RockCreek's performance lagged the index by -1.9% during the quarter. Positive impacts from country allocations (underweight China and overweight to Mexico) were more than offset by poor issue selection in key industries including industrials and consumer staples.

Earnest Partners' dedicated China A-share strategy outperformed the MSCI China A Index during the quarter (+5.0% Portfolio vs. +3.2% Benchmark). Earnest was able to ride a rebound in onshore Chinese technology and consumer staples names, which the portfolio is overweight. Issue selection within the technology, materials, and financials industries also added to index outperformance.

The passive emerging markets portfolio experienced slight negative tracking error relative to the MSCI Emerging Markets Index (net) within guideline tolerance for the quarter (-1.4% Portfolio vs. -1.3% Benchmark).

Core/Core Plus and Return Seeking Bonds

The Bloomberg Aggregate Bond Index was unchanged during the final quarter of 2021. Interest rates across the intermediate segment of the yield curve rose (maturities between 2-7 years) in response to a shift in the Federal Reserve's policy outlook amid faster-than-expected inflation and a continued broad-based rebound in economic activity. Yields on longer maturities, however, were well contained during the quarter, and the yield on the 30-year Treasury bond actually fell over the period as investors judged earlier action by the Fed to contain inflation now as having positive implications for growth and moderating inflation over the long-term.

Across the various sectors of the bond market, most non-Treasury sectors, or "spread sectors," performed relatively well over the quarter, supported by positive economic fundamentals, including strong corporate earnings and continued improvement in the labor market. Treasury Inflation-Protected Securities (TIPS) outperformed nominal Treasuries during the quarter as realized inflation remained elevated and expectations for future inflation also increased. The Agency mortgage-backed security (MBS) sector lagged other spread sectors on the quarter. MBS spreads widened modestly, impacted by rising interest rate volatility as well as investor speculation that the Fed might further increase the pace of its tapering of asset purchases, or indeed, begin outright asset sales, as it pivots to policy tightening to combat higher-than-expected inflation. Emerging market debt remained under pressure, including both local currency and hard currency sub-sectors, as key markets including China, Russia, and Brazil all experienced weakness.

The portfolio's core/core plus bond managers slightly underperformed the Bloomberg Aggregate Index during the quarter (-0.1% Portfolio vs. +0.0% Benchmark). Managers' overweights to out-of-benchmark sectors such as high yield credit and bank loans contributed positively to performance, but this was slightly outweighed by negative security selection in Agency MBS and interest rate positioning which favored the intermediate segment of the yield curve where rates rose most.

The portfolio's return seeking bond managers slightly outperformed the Bloomberg Aggregate Index over the fourth quarter (+0.1% Portfolio vs. +0.0% Benchmark). The return seeking managers' emphasis on corporate credit, including both investment grade and high yield corporate bonds, high yield bank loans and securitized credit all boosted relative performance as these sectors outperformed equivalent-duration U.S. Treasuries during the quarter. On the negative side, the portfolio's modest allocation to emerging markets debt was a drag on relative performance as emerging markets debt lagged.

Treasury Protection Portfolio

While yields on most U.S. Treasury securities rose modestly in the fourth quarter, the move was concentrated in the 2- to 7-year segment of the yield curve. Yields on longer maturities, such as the 10- to 30-year segment, were flat to modestly lower on the quarter. Price action during the quarter was driven by a shift in the Federal Reserve's policy outlook to a more hawkish stance following faster-than-expected inflation, a continued broad-based rebound in economic activity

and strong labor market. For the three months ending in December, the Treasury Protection portfolio slightly underperformed the Bloomberg Treasury 5+ Year Index (+1.0% Portfolio vs. +1.3% Benchmark). Overall, the portfolio was positioned slightly short duration versus the benchmark, resulting in modestly negative relative performance, as longer maturities outperformed shorter-dated bonds. Meanwhile, the portfolio's modest yield advantage resulting from positions in U.S. agencies was insufficient to overcome the short duration headwind.

Laddered Bonds + Cash Portfolio

The market environment for short-term money markets during the fourth quarter of 2021 was characterized by a significant repricing of the market's expectations for the timing and pace of Fed policy rate hikes. At the end of the third quarter, the market expected the Fed to remain on hold for most of 2022 and set the odds of a March 2022 hike at just 1%. By the end of December, in response to a shift in the Fed's forward guidance in response to faster inflation and continued strong economic growth, the market had moved the odds of a March hike to nearly 60% with fully three 25-bp hikes expected in 2022. As a result, while the Fed kept its policy rate near zero and investor demand for front-end paper remained strong, the yield on the one-year U.S. Treasury bill climbed 30 basis points over the quarter and the yield on the 2-year U.S. Note more than doubled over the period, rising some 45 basis points, to end at 0.73%.

For the quarter ending December 31, 2021, the combined Laddered Bonds + Cash portfolio returned -0.06%, underperforming its benchmark, the ICE BofA US 3-Month Treasury Bill, by seven basis points, or -0.07%. The maturity-constrained cash portfolio returned +0.02% over the quarter, while performance within the Laddered Bonds portfolio was negatively impacted by a sharp rise in yields at the front end of the yield curve in response to the market's rapid shift upwards in the timetable for the Fed to begin raising its policy rate in response to strong economic conditions and higher-than-desired inflation.

Public Markets Managers' Organizational Update
Fourth Quarter 2021

AQR (Developed Markets Equity)

In the fourth quarter, AQR announced a significant shakeup in its senior ranks. The changes were intended to reduce costs and create opportunities for midcareer professionals. In addition to the previously announced departure Ronen Israel (co-Head of Portfolio Management, Research, Risk and Trading), five additional principals departed: Scott Richardson, Ari Levine, Michael Katz, Michael Patchen, and Chris Palazzolo. Staff views the continued turnover at AQR as a concern.

Baillie Gifford (Global Equity)

The firm has added several portfolio managers to the Long Term Global Growth strategy, including John MacDougall (returning from Shanghai office), Michael Pye, Robert Wilson and Gemma Barkhuizen. All were promotions from within the firm. Mark Urquhart remains a PM on the strategy but Tom Slater, who had been co-PM, has stepped down as decision maker but will remain an analyst on the team.

Earnest Partners (International Equity)

Jessie Magee departed Earnest Partners. His coverage of Industrials was picked up by Pavel Sokolov. Lauren Puglisi joined Earnest and will be co-covering Financials.

Morgan Stanley (Emerging Markets Equity)

Ruchir Sharma stepped down from his portfolio responsibilities as of December 31, 2021 and will be leaving the firm in the first quarter of 2022. Paul Psaila, Amay Hattangadi and Eric Carlson will continue in their investment leadership roles. Amy Oldenburg was promoted to Head of Emerging Markets Equity to lead the strategy from a business perspective.

Pzena (Emerging Markets Equity)

John Goetz has transitioned off of the portfolio management team for Pzena's Emerging Markets strategies effective 1/1/22. John will continue to serve as Pzena's co-Chief Investment Officer.

Record Currency (Currency Overlay)

James Rockall, Head of Trading, has retired from the firm and Nathan Vurgest, Deputy Head of Trading, has been appointed into this role as department head, effective October 1, 2021.

2021 Manager Meetings

As a result of the ongoing COVID-19 pandemic and continued restrictions on business travel on the part of managers' and MSBI Staff policies, there were no in-person meetings conducted with Public Markets managers during the fourth quarter of 2021. Throughout the quarter, however, Staff utilized teleconference and videoconference technologies to remain in communication with managers as needed. During the quarter, Staff held 31 manager strategy review calls via teleconference or videoconference.

Investment Manager

Asset Class

AQR Capital Management, LLC	Developed Markets Equity
Ariel Investments, LLC	Global Equity
Ashmore Investment Management Limited	Fixed Income
Baillie Gifford Overseas Limited	Global Equity
BlackRock Financial Management, Inc.	Fixed Income
BlackRock Institutional Trust Company, N.A.	Domestic Equity
Columbia Threadneedle Investments	Fixed Income
Dodge & Cox	Fixed Income
Earnest Partners LLC	International Equity
Fidelity Institutional Asset Management LLC	Developed Markets Equity
Goldman Sachs Asset Management, L.P.	Domestic Equity
Goldman Sachs Asset Management, LP	Fixed Income
J.P. Morgan Investment Management Inc.	Developed Markets Equity
KKR (Kohlberg, Kravis and Roberts)	Fixed Income
LSV Asset Management	Domestic Equity
Macquarie Investment Management Advisers	Emerging Markets Equity
Martin Currie Inc.	Emerging Markets Equity
Martin Currie Inc.	Global Equity
Martingale Asset Management, L.P.	Domestic Equity
Morgan Stanley Investment Management Inc.	Emerging Markets Equity
Neuberger Berman Investment Advisers LLC	Fixed Income
NISA Investment Advisors, LLC	Cash Overlay
Prudential Global Investment Management (PGIM)	Fixed Income

2021 Manager Meetings (cont.)

Peregrine Capital Management	Domestic Equity
Record Currency LLC	Currency Overlay
Sands Capital Management, LLC	Domestic Equity
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 7, 2022

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 fourth quarter.

The report includes the following sections:

	Page
• Participant Directed Investment Program Fund Commentaries	2
• Non-Retirement Fund Commentaries	4
• Manager Meetings	5

**Participant Directed Investment Program Fund Commentaries
Fourth Quarter 2021**

Domestic Equities

Vanguard Total Stock Market Index Institutional Plus

The Fund employs an indexing approach designed to track the performance of the CRSP U.S. Total Market Index, which represents approximately 100% of the investable U.S. stock market and includes large-, mid-, small-, and micro-cap stocks. The Fund matched its benchmark return for the quarter and for the year with a +9.2% and +25.7% return, respectively.

Vanguard Institutional Index Plus

The Fund attempts to employ a full replication indexing approach designed to track the S&P 500 Index. Performance for the Fund matched the S&P 500 Index return for the quarter with a +11.0% return and for the year with a +28.7% return. *This option is only available to the Minnesota Deferred Compensation Plan (MNDCP).*

Vanguard Dividend Growth Fund

The Fund is actively managed by Wellington Management and invests in large- and mid- cap equity holdings with an emphasis on high-quality companies with a history of paying stable or increasing dividends. Performance for the Fund returned +11.6% for the quarter and +24.8% for the year. The Fund does not consider its benchmark sector positioning when constructing the portfolio; weightings result from stock selection.

Vanguard Mid-Cap Index

The Fund attempts to employ a full replication indexing approach designed to track the performance of a broadly diversified pool of medium-size U.S. stocks. The Fund matched the CRSP US Mid Cap Index return for the quarter and for the year with a +8.0% return and a +24.5% 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 outperformed the Russell 2000 for the quarter with a +3.4% return compared to the benchmark return of +2.1% and for the year with a +16.8% return compared to the benchmark return of +14.8%.

International Equities

Fidelity Diversified International Equity Fund

The Fund's approach actively selects companies based on fundamental analysis, management quality, and attractive valuations over a long time horizon. The Fund returned +4.0% for the quarter, outperforming the MSCI EAFE benchmark return of +2.7%. For the year, the Fund returned +13.1%, outperforming the benchmark return of +11.3%.

Vanguard Total International Stock Index

The Fund attempts to employ an indexing approach designed to track the FTSE Global All Cap ex US Index, a market-cap weighted pool designed to measure performance of developed and emerging market companies. The Fund outperformed the benchmark return for the quarter with a +2.1% return versus the benchmark return of 1.7% and matched the return for the year with a +8.7% return.

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 slightly underperformed the Bloomberg U.S. Aggregate Index for the quarter with a -0.4% return compared to a 0.0% return for the benchmark. For the year, the Fund outperformed with a -0.9% return compared to the benchmark return of -1.5%.

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 -0.2% for the quarter, slightly underperforming the benchmark return of 0.0%. For the year, the Fund reported a -1.7% return compared to the benchmark return of -1.5%.

Stable Value Fund

Galliard Asset Management manages the stable value portfolio in a separate account and invests in investment contracts issued by high quality financial institutions and in a diversified, high quality fixed income portfolio. The portfolio returned +0.5% for the quarter compared to a +0.3% return for its benchmark, the 3-Year Constant Maturity Treasury +45 basis points. For the year, the portfolio returned +1.9% compared to the benchmark return of +0.9%.

Money Market Fund

State Street Global Advisors manages the money market fund in a commingled pool vs. ICE BofA U.S. 3 Month T-Bill benchmark. In a very low yield environment within short duration fixed income, the Fund earned 0.0% for the quarter and for the year returned +0.1% compared to a +0.0% return for the benchmark.

Model Portfolio Option

Vanguard Balanced

The Balanced Fund seeks capital appreciation, current income, and long-term growth of income. The Fund allocation tracks the investment performance of an index with 60% CRSP US Total Stock Market Index and 40% Bloomberg Barclays U.S. Aggregate Float Adjusted Index. The Balanced Fund matched the composite benchmark for the quarter and for the year with a +5.5% return and a +14.2% return, respectively.

Non-Retirement Fund Commentaries Fourth Quarter 2021

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 -0.7% for the quarter compared to the benchmark return of -0.6%. For the year, the portfolio returned -1.6% compared to the benchmark return of -1.7%.

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 underperformed for the quarter with a -0.2% return compared to the benchmark return of +0.0%. For the year, the portfolio matched the benchmark with a -1.5% return.

Non-Retirement Program Domestic Equity Manager

Mellon Investments Corporation passively manages the Non-Retirement Domestic Equity portfolio to the S&P 500 Index in a separately managed portfolio. The portfolio matched the benchmark return for the quarter and the year with a +11.0% return and a +28.7% return, respectively.

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 matched the benchmark for the quarter with a +0.0% return and slightly outperformed for the year with a return of +0.1%.

2021 Manager Meetings

As a result of the ongoing COVID-19 pandemic and continued restrictions on business travel on the part of managers' and MSBI Staff policies, there were no in-person meetings conducted during the fourth quarter of 2021.

Throughout the quarter, however, Staff utilized teleconference and videoconference technologies to remain in communication with managers as needed. During the quarter staff met with the investment funds noted below.

Investment Manager	Management Style/Asset Class	Investment Program
• Ascensus	Multi-Asset Class Platform	PDIP (MN ABLE Plan)
• Dodge & Cox	Active, Fixed Income	PDIP
• Galliard	Stable Value Fund	PDIP
• Prudential Global Investment Mgmt. (PGIM)	Active, Fixed Income	Non-Retirement Program
• RBC Global Asset Mgmt.	Active, Fixed Income	Assigned Risk Plan Non-Retirement
• 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

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REPORT

SBI Environmental, Social, and Governance (ESG) Report

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ESG Initiatives Resolution Update

On February 26, 2020, the Minnesota State Board of Investment (MSBI) passed a resolution concerning Environmental, Social, and Governance (ESG) initiatives. Over the last two years, the SBI has made progress implementing the following four measures that are part of the resolved clause in that resolution.

Measure #1

The MSBI Proxy Committee continue to actively vote proxies in accordance with MSBI proxy guidelines, policies, and precedents as approved from time to time by the Board.

Update:

In FY 2021, the MSBI voted proxies for 2,429 company meetings. From a shareholder stewardship perspective, 2021 was very successful in terms of passing shareholder proposals. Thirty-one ESG related shareholder proposals received majority votes.

In FY 2020, the MSBI voted proxies for 2,425 company meetings. Eighteen ESG related shareholder proposals received majority votes.

Measure #3

The MSBI prepare and periodically update a Stewardship Report and other ESG informational materials provided to stakeholders and posted on the MSBI website.

Update:

The MSBI updated its website in 2021 and expanded the section of the website dedicated to ESG. Recently, the MSBI's inaugural Stewardship Report, PRI Transparency report and FY 2021 proxy voting records have been published to the website.

Measure #2

The MSBI continue to participate in ESG coalitions and engage with corporations on ESG related issues, including but not limited to participation in the Council of Institutional Investors; the United Nations Principles for Responsible Investment; the Ceres Investor Network; the Institutional Limited Partners Association; the Thirty Percent Coalition; the Midwest Investors Diversity Initiative; the Robert F. Kennedy Compass initiative; and other ESG related organizations the MSBI may join from time to time.

Update:

The MSBI has been actively involved with its coalition partners the last two years.

Some highlights include:

- The MSBI Executive Director and CIO, Mansco Perry III, serving as Treasurer for the Council of Institutional Investors;
- Using the resources from the United Nations Principles for Responsible Investment (PRI) as a framework for reporting on the SBI's Stewardship and ESG Incorporation activities;
- Partnering with Ceres to engage with several energy companies on more responsible gas flaring and methane venting practices;
- Using the ESG and Diversity, Equity and Inclusion (DEI) due diligence questionnaires developed by Institutional Limited Partners Association as part of manager evaluations; and
- Coordinating with other members of the Thirty Percent Coalition and the Midwest Investors Diversity Initiative to take the lead on engaging with several companies on board diversity.

ESG Initiatives Resolution Update

Measure #4

The MSBI Executive Director develop and implement plans for reporting on and addressing ESG investment risks; to evaluate options for reducing the MSBI's investments to long-term carbon risk exposure; and to promote efforts for greater diversity and inclusion on corporate boards and within the investment industry.

Update:

- ❖ **Addressing ESG Risks:** MSBI Staff have been meeting with investment managers to evaluate the extent of ESG integration within each manager's investment process.
- ❖ **Evaluating Options for Reducing Long-Term Carbon Risk Exposure:** The MSBI has engaged Meketa Investment Group to produce a comprehensive Climate Risk Assessment tailored for the SBI. A portion of the Climate Risk Assessment Report will be published in the SBI's first and second quarter of 2022 Investment Advisory Council and State Board of Investment meeting materials.
- ❖ **Promoting Greater Diversity and Inclusion:** The MSBI Executive Director formed a DEI Task Force to make recommendations regarding different approaches the MSBI could take. The DEI Task Force has had three meetings and is beginning to make recommendations to the Executive Director.

Shareholder Engagement

The MSBI is actively engaging with several companies on climate change and diversity issues, and has filed several shareholder proposals related to those topics.

In January 2022, due at least in part to the MSBI's engagement effort, including submitting a shareholder proposal, Marathon Oil made several significant commitments:



- 99% gas capture rate by 2022 and Zero Routine Flaring by 2030 in alignment with the World Bank initiative.
- Methane intensity reductions of 60% by 2025 and 80% by 2030.
- Greenhouse gas intensity reduction targets of 40% by 2022 and 70% by 2030.



The MSBI partnered with the Ceres Investor Network on this engagement and plans to continue to meet with the company to evaluate its progress toward achieving these goals.

MINNESOTA STATE BOARD OF INVESTMENT

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REPORT

AON Market Environment Report

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Market Environment

Fourth Quarter 2021

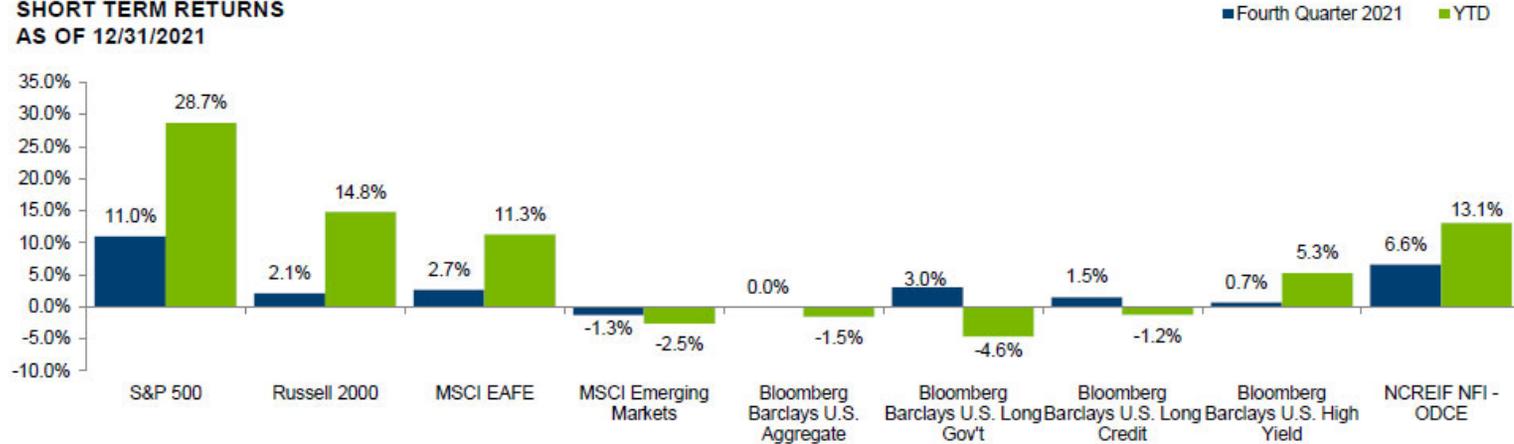
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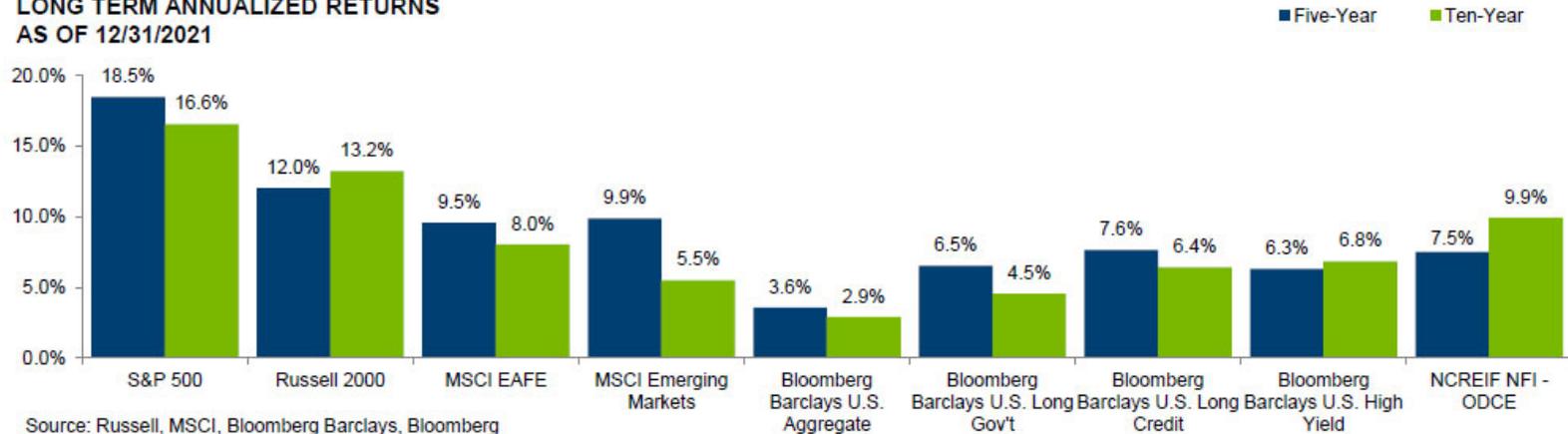
Market Highlights

SHORT TERM RETURNS AS OF 12/31/2021



Source: Russell, MSCI, Bloomberg Barclays, Bloomberg

LONG TERM ANNUALIZED RETURNS AS OF 12/31/2021



Source: Russell, MSCI, Bloomberg Barclays, Bloomberg

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

Market Highlights

Returns of the Major Capital Markets							
Period Ending 12/31/2021	Fourth Quarter	YTD	1-Year	3-Year ¹	5-Year ¹	10-Year ¹	
Equity							
MSCI All Country World IMI	6.10%	18.22%	18.22%	20.20%	14.12%	11.84%	
MSCI All Country World	6.68%	18.54%	18.54%	20.38%	14.40%	11.85%	
Dow Jones U.S. Total Stock Market	9.14%	25.66%	25.66%	25.72%	17.92%	16.24%	
Russell 3000	9.28%	25.66%	25.66%	25.79%	17.97%	16.30%	
S&P 500	11.03%	28.71%	28.71%	26.07%	18.47%	16.55%	
Russell 2000	2.14%	14.82%	14.82%	20.02%	12.02%	13.23%	
MSCI All Country World ex-U.S. IMI	1.64%	8.53%	8.53%	13.62%	9.83%	7.57%	
MSCI All Country World ex-U.S.	1.82%	7.82%	7.82%	13.18%	9.61%	7.28%	
MSCI EAFE	2.69%	11.26%	11.26%	13.54%	9.55%	8.03%	
MSCI EAFE (Local Currency)	3.91%	18.70%	18.70%	13.35%	8.36%	10.09%	
MSCI Emerging Markets	-1.31%	-2.54%	-2.54%	10.94%	9.87%	5.49%	
Equity Factors							
MSCI World Minimum Volatility (USD)	7.00%	14.84%	14.84%	13.70%	11.34%	11.02%	
MSCI World High Dividend Yield	7.17%	16.81%	16.81%	13.61%	10.27%	9.70%	
MSCI World Quality	10.32%	26.10%	26.10%	28.37%	20.53%	16.00%	
MSCI World Momentum	5.84%	14.95%	14.95%	23.80%	19.69%	15.72%	
MSCI World Enhanced Value	4.19%	20.77%	20.77%	11.84%	8.28%	9.66%	
MSCI World Equal Weighted	3.10%	15.40%	15.40%	16.53%	11.58%	11.07%	
MSCI World Index Growth	8.19%	21.40%	21.40%	29.76%	21.31%	16.06%	
Fixed Income							
Bloomberg Barclays Global Aggregate	-0.67%	-4.71%	-4.71%	3.59%	3.36%	1.77%	
Bloomberg Barclays U.S. Aggregate	0.01%	-1.54%	-1.54%	4.79%	3.57%	2.90%	
Bloomberg Barclays U.S. Long Gov't	3.05%	-4.57%	-4.57%	8.78%	6.53%	4.53%	
Bloomberg Barclays U.S. Long Credit	1.52%	-1.18%	-1.18%	11.37%	7.64%	6.42%	
Bloomberg Barclays U.S. Long Gov't/Credit	2.15%	-2.52%	-2.52%	10.62%	7.39%	5.72%	
Bloomberg Barclays U.S. TIPS	2.36%	5.96%	5.96%	8.44%	5.34%	3.09%	
Bloomberg Barclays U.S. High Yield	0.71%	5.28%	5.28%	8.83%	6.30%	6.83%	
Bloomberg Barclays Global Treasury ex U.S.	-1.45%	-8.17%	-8.17%	1.86%	2.74%	0.44%	
JP Morgan EMBI Global (Emerging Markets)	0.02%	-1.51%	-1.51%	6.06%	4.47%	4.95%	
Commodities							
Bloomberg Commodity Index	-1.56%	27.11%	27.11%	9.86%	3.66%	-2.85%	
Goldman Sachs Commodity Index	1.51%	40.35%	40.35%	7.99%	2.80%	-5.50%	
Hedge Funds							
HFRI Fund-Weighted Composite ²	0.56%	10.30%	10.30%	10.86%	7.10%	5.79%	
HFRI Fund of Funds ²	0.77%	6.53%	6.53%	8.59%	5.78%	4.59%	
Real Estate							
NAREIT U.S. Equity REITS	16.31%	43.24%	43.24%	18.41%	10.75%	11.38%	
NCREIF NFI - ODCE	6.59%	13.09%	14.59%	7.05%	7.50%	9.92%	
FTSE Global Core Infrastructure Index	10.03%	17.84%	17.84%	13.91%	11.35%	10.23%	
Private Equity							
Burgiss Private iQ Global Private Equity ³			54.98%	22.55%	20.17%	15.22%	

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 of June 30, 2021

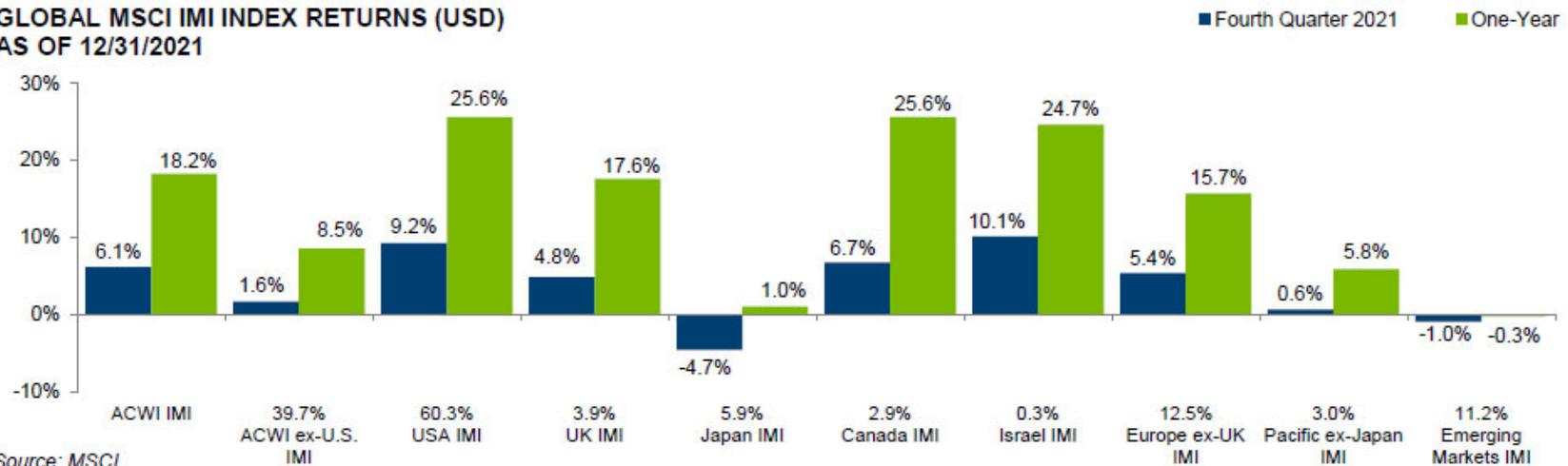
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Global Equity Markets

**GLOBAL MSCI IMI INDEX RETURNS (USD)
AS OF 12/31/2021**



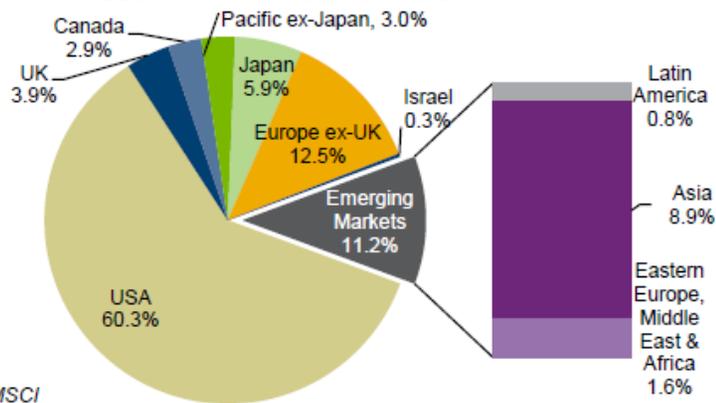
Source: MSCI

- In the fourth quarter, renewed fears as to whether the economy would be strained by the latest Covid variant, Omicron, surfaced. Global inflation pressures intensified, beckoning many central banks to pivot toward tighter monetary policy. However, equity markets shrugged off these risks, posting positive gains in Q4 2021. The MSCI All Country World Investable Market Index (ACWI IMI) returned 6.1% for the quarter and was up 18.2% on the year.
- Across international markets, most regions were strong with only Japanese and Emerging Markets equities down on the quarter. Japanese equities were the worst performer with a return of -4.7%.
- Emerging Markets returned -1.0% for the fourth quarter. Brazil and China weighed on the region. Chinese GDP slowed to an annualized 4.9% in the third quarter, missing economists' expectations of 5.2%, and down from 7.9% GDP in the second quarter.

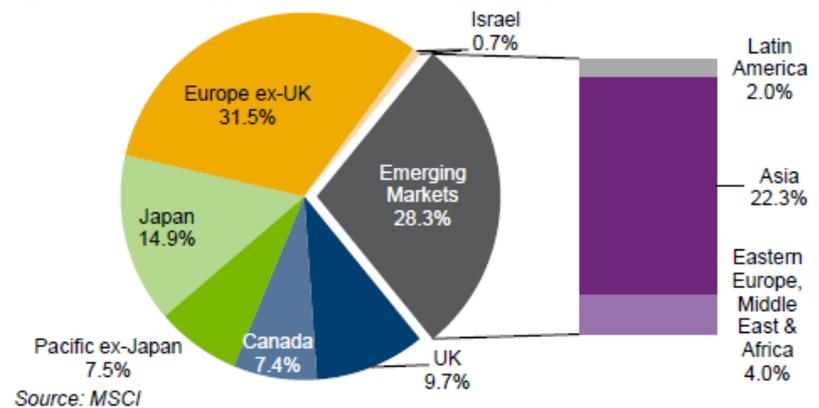
Global Equity Markets

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 12/31/2021**



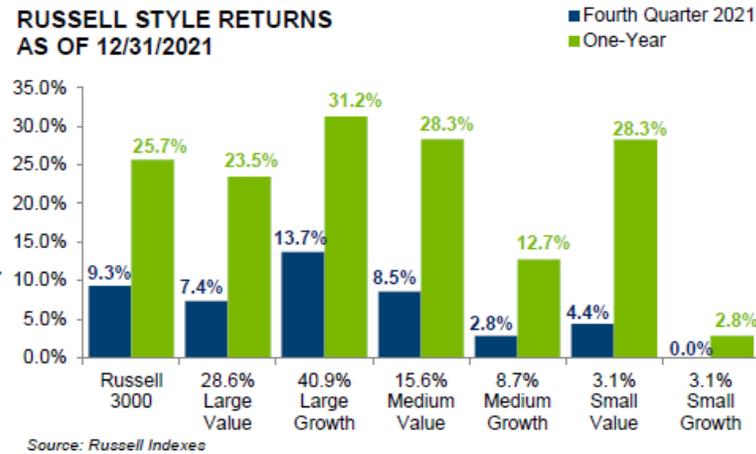
**MSCI ALL COUNTRY WORLD EX-U.S. IMI INDEX
GEOGRAPHIC ALLOCATION AS OF 12/31/2021**



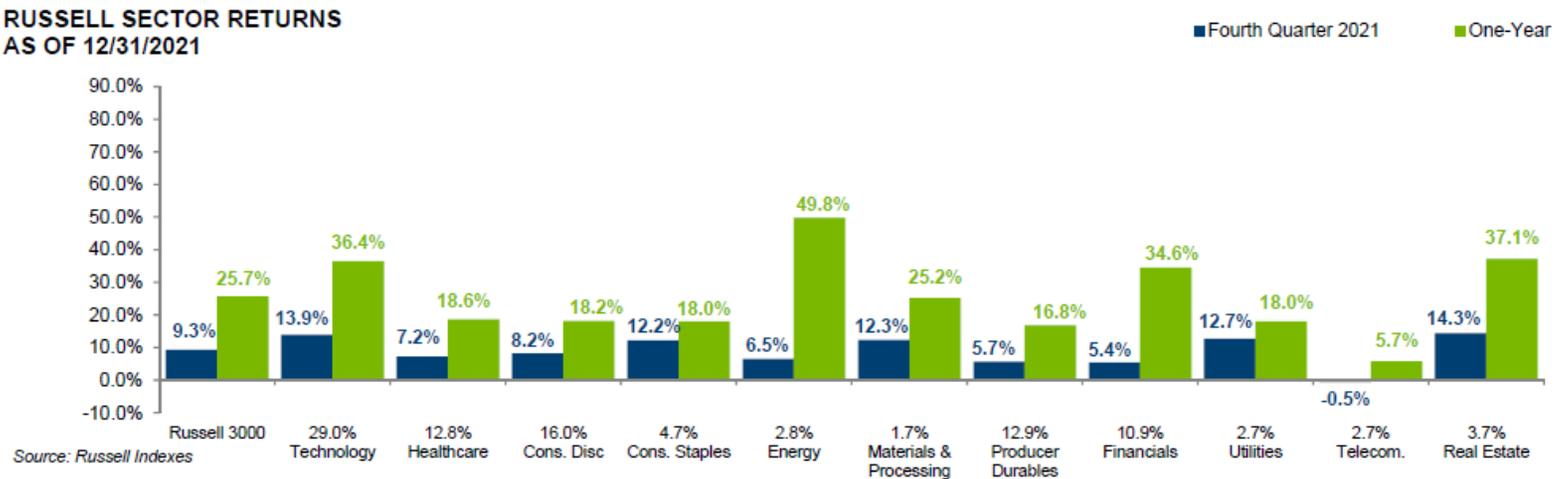
U.S. Equity Markets

- U.S. equities had a strong quarter with the S&P 500 index returning 11.0%.
- The Russell 3000 Index rose 9.3% during the fourth quarter and was up 25.7% over the trailing one-year period. Performance among sectors was generally positive. Real Estate and Technology were the best performers while the Telecommunication sector was the worst performer at -0.5%.
- Large and medium cap stocks outperformed small caps over the quarter. On a style basis, value outperformed growth within medium and small-cap stocks over the quarter and trailing one-year period. However, large cap growth equities led value for the quarter and trailing one-year period.

RUSSELL STYLE RETURNS AS OF 12/31/2021

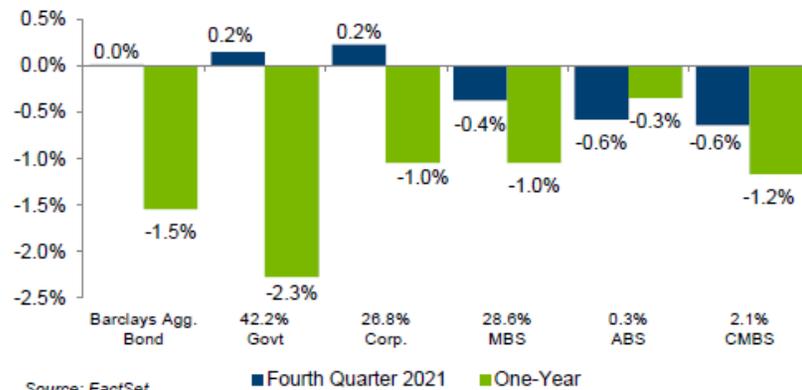


RUSSELL SECTOR RETURNS AS OF 12/31/2021



U.S. Fixed Income Markets

BLOOMBERG BARCLAYS AGGREGATE RETURNS BY SECTOR AS OF 12/31/2021

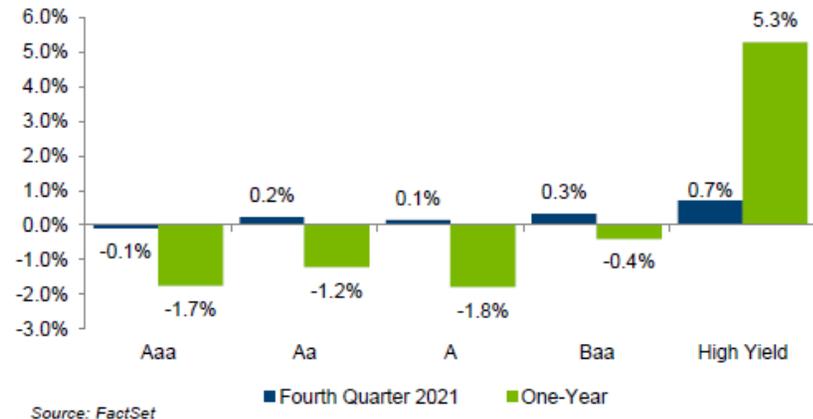


BLOOMBERG BARCLAYS AGGREGATE RETURNS BY MATURITY AS OF 12/31/2021



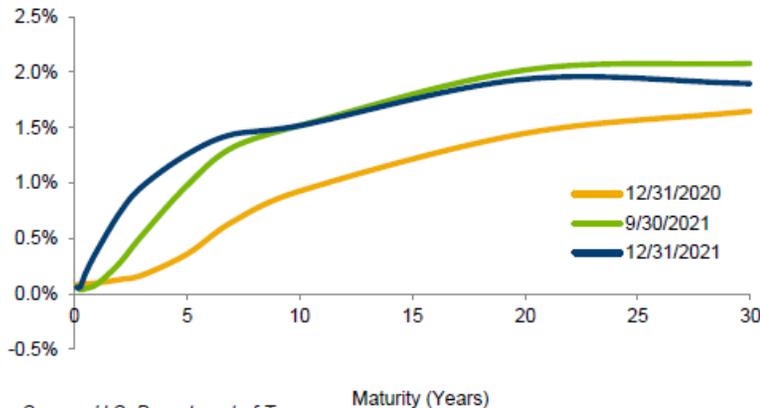
- The Bloomberg Barclays U.S. Aggregate Bond Index was flat over the quarter and down -1.5% over the past year.
- Across durations, only 10+ years maturity bonds finished the quarter in positive territory while all other maturities were negative.
- Within investment-grade bonds, lower-credit quality outperformed higher-quality issues on the margin, with Baa bonds rising by 0.3%. High yield bonds rose by 0.7%.

BLOOMBERG BARCLAYS AGGREGATE RETURNS BY QUALITY AND HIGH YIELD RETURNS AS OF 12/31/2021

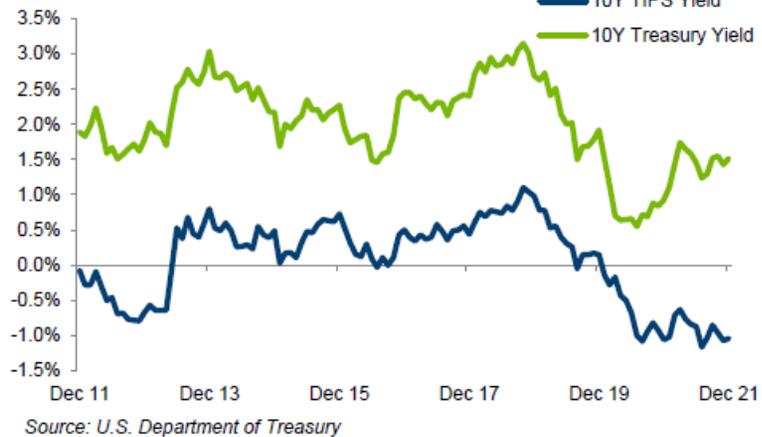


U.S. Fixed Income Markets

U.S. TREASURY YIELD CURVE



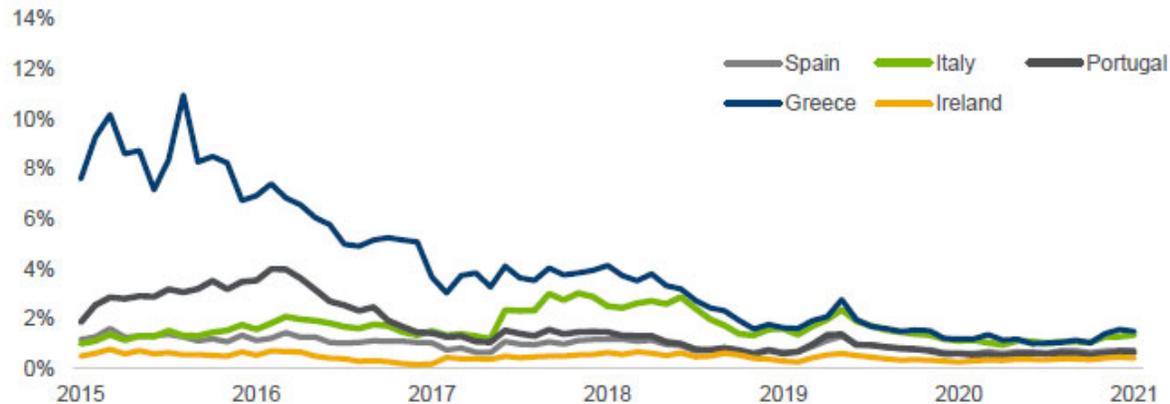
U.S. 10-YEAR TREASURY AND TIPS YIELDS



- The U.S. Treasury yield curve flattened with the short-end of the curve rising and longer duration yields falling. Shorter tenors (i.e., the 2-year and 5-year) began to factor in potential monetary policy changes and saw notable increases. However, the 10-year U.S. Treasury yield ended the quarter flat at 1.52% while the 30-year yield fell by 18bps to 1.90% due to uncertainty surrounding the risks of lower growth and tighter monetary policy.
- The Federal Reserve indicated that it would accelerate the withdrawal of its monthly asset purchase program, reducing bond purchases by \$30bn a month after initially starting with a monthly rate of \$15bn. Additionally, consensus interest rate expectations from Fed officials signaled three interest rate hikes in 2022, followed by another three in 2023 and two in 2024.
- U.S. annual headline inflation rose at its fastest pace since 1982 due to increasing gasoline, shelter, food, and vehicle prices. The consumer price index (CPI) rose by 6.8% in the year to November and core CPI, which excludes food and energy costs, rose by 4.9%.
- Despite inflationary pressures, the 10-year TIPS yield fell by 19bps over the quarter to -1.04%.

European Fixed Income Markets

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



Source: FactSet

- European government bond spreads over 10-year German bunds widened slightly across the Euro Area. The European Central Bank announced the end of its Pandemic Emergency Purchase Program in March 2022 as expected.
- German government bund yields rose modestly, up 1bp to -0.18% over the quarter.
- The Eurozone posted quarter-on-quarter growth of 2.2% in Q3, up marginally from 2.1% growth in Q2.

Credit Spreads

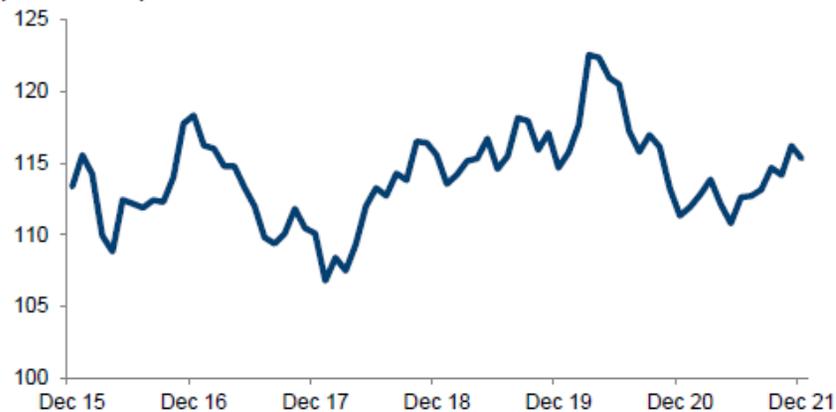
Spread (bps)	12/31/2021	09/30/2021	12/31/2020	Quarterly Change (bps)	One-Year Change (bps)
U.S. Aggregate	36	33	42	3	-6
Long Gov't	0	0	1	0	-1
Long Credit	130	123	141	7	-11
Long Gov't/Credit	74	72	85	2	-11
MBS	31	27	39	4	-8
CMBS	68	61	81	7	-13
ABS	38	29	33	9	5
Corporate	92	84	96	8	-4
High Yield	283	289	360	-6	-77
Global Emerging Markets	285	287	268	-2	17

Source: FactSet, Bloomberg Barclays

- Credit markets declined from risk-averse sentiment during the quarter.
- While spreads are still narrow relative to historical averages, ABS and Corporate bonds spreads widened modestly in the fourth quarter, increasing by 9bps and 8bps, respectively.

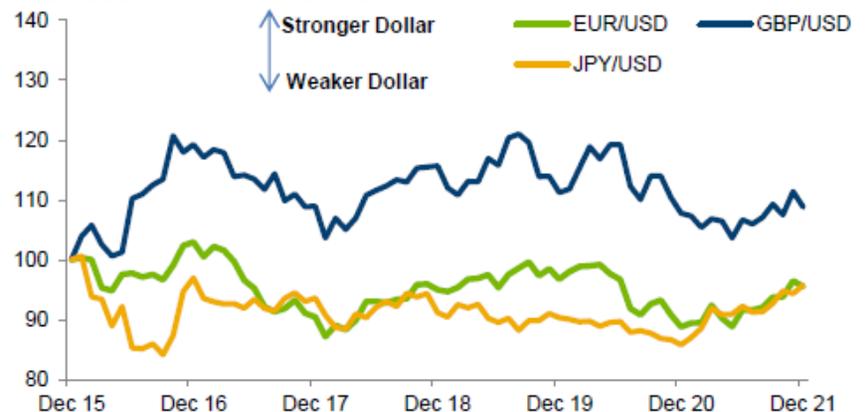
Currency

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



Source: Federal Reserve

**U.S. DOLLAR RELATIVE TO EUR, GBP AND JPY
REBASED TO 100 AT 12/31/2015**

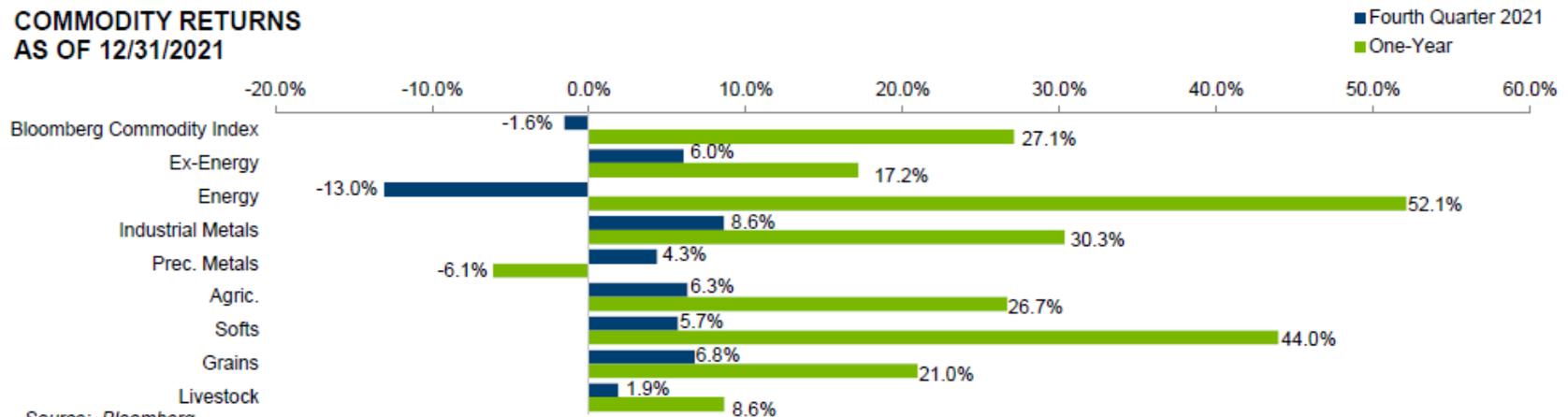


Source: FactSet

- The U.S. Dollar appreciated against major currencies over the quarter but depreciated relative to the sterling. On a trade-weighted basis, the U.S. dollar rose 0.6%.
- The Sterling appreciated by 0.5% against the U.S. dollar, as the Bank of England raised its benchmark interest rate by 15bps to 0.25% in an attempt to address higher inflation.
- The U.S. dollar appreciated by 1.9% against the Euro and by 3.2% against the Yen.

Commodities

COMMODITY RETURNS AS OF 12/31/2021



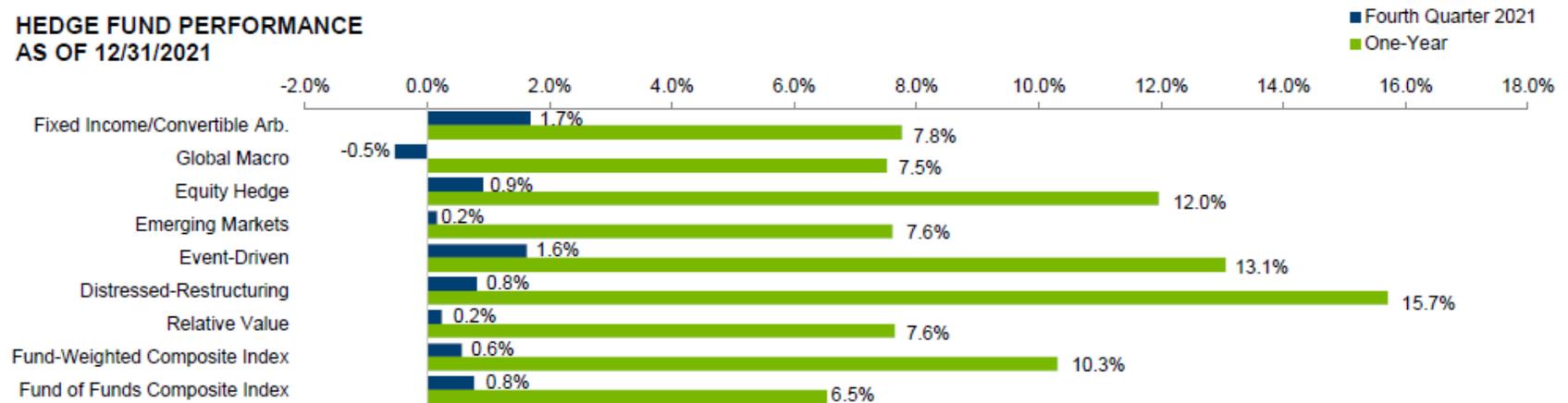
Source: Bloomberg

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

- Momentum in the commodities market slowed, with the Bloomberg Commodity Index returning -1.6% for the quarter.
- Energy was the largest detractor, with the sector down 13.0% over the quarter. However, energy closed the year up 52.1%. The price of Brent crude oil fell by 0.9% to \$78/bbl. while WTI crude oil spot prices rose by 0.2% to \$75/bbl over the quarter.
- Industrial Metals was the best performing commodity sub-component with a return of 8.6%, while agriculture and other soft commodity prices also rose over the quarter.

Hedge Fund Markets Overview

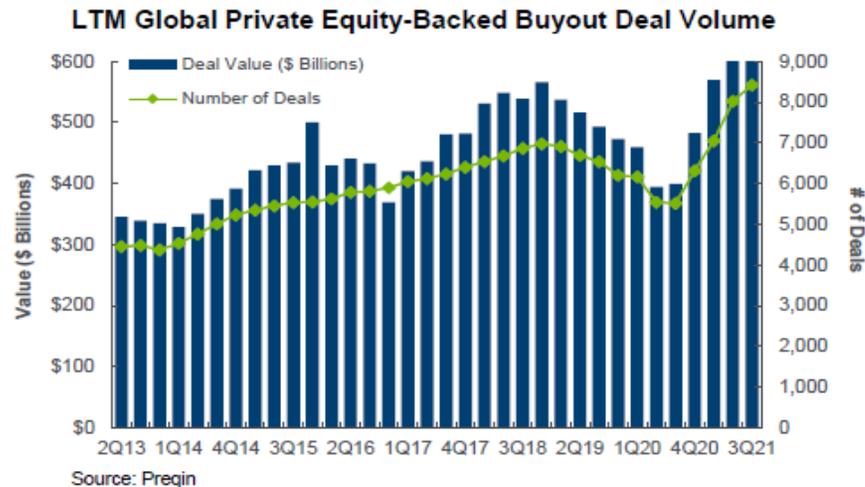
HEDGE FUND PERFORMANCE AS OF 12/31/2021



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

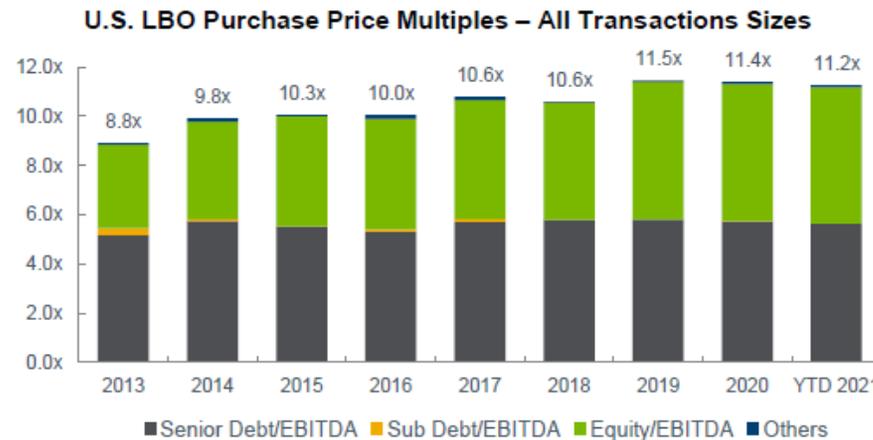
- Hedge fund performance was generally positive across strategies in the fourth quarter.
- The HFRI Fund-Weighted Composite and HFRI Fund of Funds Composite Index produced returns of 0.6% and 0.8% over the quarter, respectively.
- Over the quarter, Fixed Income/Convertible Arbitrage and Event-Driven strategies were the best performers with returns of 1.7% and 1.6% respectively.
- Global Macro, the only strategy in negative territory for the quarter, was the laggard, down 0.5%.
- Over the trailing one-year period, all strategies were positive, led by Distressed and Event-Driven funds.

Private Equity Market Overview – 3Q 2021



- Fundraising:** In 3Q 2021, \$175.2 billion was raised by 574 funds, which was a decrease of 43.7% on a capital basis and 28.8% by number of funds over the prior quarter. Dry powder stood at nearly \$2.2 trillion at the end of the quarter, an increase compared to year-end 2020's total of \$2.1 trillion.¹
- Buyout:** Global private equity-backed buyout deals totaled \$191.9 billion in 3Q 2021, which was down 16.5% on a capital basis and down 8.0% by number of deals from 2Q 2021.¹ Through 3Q 2021, the average purchase price multiple for all U.S. LBOs was 11.2x EBITDA, a decrease of 0.2x over 2020's average but higher than the five-year average (10.8x).² Large cap purchase price multiples stood at 11.1x through 3Q 2021, down compared to 2020's level of 11.3x.² In Europe, the average purchase price multiple across European transactions of greater than €500M averaged 13.1x EBITDA on an LTM basis as of 3Q 2021, greater than the 12.6x multiple seen at the end of 4Q 2020. Purchase prices for transactions of greater than €1.0 billion increased to 13.2x EBITDA on an LTM basis compared to the 13.1x seen at the end of 2020. Globally, exit value totaled \$195.0 billion from 701 deals during the third quarter, down from the \$247.6 billion in value from 818 deals during 2Q 2021. 3Q 2021's totals were also lower than 3Q 2020's total of \$197.7 billion in value across 510 deals.¹
- Venture:** During the third quarter, an estimated 3,518 venture-backed transactions totaling \$82.8 billion were completed in the U.S., which was higher than the prior quarter on a capital basis but a decrease compared to the 3,787 completed deals. Q3's transaction value was 126.3% higher than the five-year quarterly average of \$36.6 billion and marked the strongest quarter on record.³ Total U.S. venture-backed exit activity totaled approximately \$187.2 billion across an estimated 504 completed transactions in 3Q 2021, down from the \$259.7 billion across 457 exits in 2Q 2021. Through 3Q 2021, U.S. exit activity represented 201.6% of 2020's total.³
- Mezzanine:** Seven funds closed on \$3.3 billion during the third quarter. This was down significantly from the prior quarter's total of \$7.0 billion raised by 11 funds, but up from 3Q 2020's total of \$1.2 billion raised by 8 funds. Estimated dry powder was \$50.9 billion at the end of 3Q 2021, down slightly from the \$51.9 billion seen at the end of 2Q 2021.¹

Private Equity Market Overview – 3Q 2021

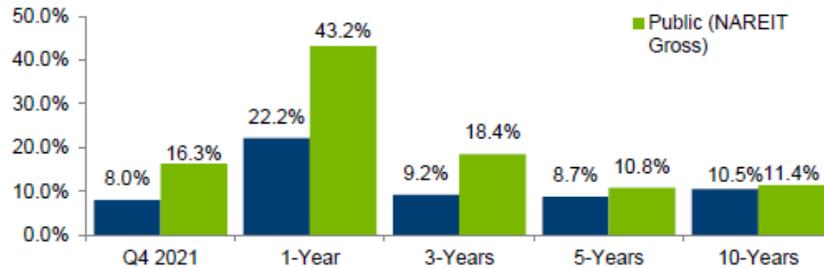


- Distressed Debt:** The TTM U.S. high-yield default rate fell to 1.0% at the end of the third quarter, which was a decrease from the 4.5% seen at year-end 2020.⁴ During the quarter, \$25.4 billion was raised by 12 funds, an increase from the \$15.3 billion raised by 18 funds in 2Q 2021. Distressed funds have raised 78.5% of 2020's total through 3Q 2021.¹ Dry powder was estimated at \$140.8 billion at the end of 3Q 2021, which was down from the \$153.4 billion seen at the end of 2Q 2021. However, this was 16.5% higher than the five-year annual average level of \$120.9 billion.¹
- Secondaries:** 14 funds raised \$5.5 billion during the quarter, down significantly from the \$12.3 billion raised by 18 funds in 2Q 2021. However, this was up 22.3% from 3Q 2020.¹ At the end of 3Q 2021, there were an estimated 112 secondary and direct secondary funds in market targeting roughly \$43.2 billion.¹
- Infrastructure:** \$18.3 billion of capital was raised by 17 funds in 3Q 2021 compared to \$38.0 billion of capital raised by 39 partnerships in 2Q 2021. Through 3Q 2021, infrastructure funds have raised 73.0% of 2020's total. At the end of the quarter, dry powder stood at an estimated \$284.7 billion, up from 2Q 2021's total of \$270.6 billion. Infrastructure managers completed 462 deals with an estimated aggregate deal value of \$68.3 billion in 3Q 2021 compared to 482 deals totaling \$112.9 billion a quarter ago.¹
- Natural Resources:** During 3Q 2021, three funds closed on \$3.6 billion compared to eight funds totaling \$2.7 billion in 2Q 2021. Energy and utilities industry managers completed approximately 123 deals totaling an estimated \$21.8 billion through 3Q 2021, which represented 133.9% of energy and utilities deal value during all of 2020.¹

Sources: ¹ Preqin ² Standard & Poor's ³ PwC/CB Insights MoneyTree Report ⁴ PitchBook/NVCA Venture Monitor ⁵ Fitch Ratings ⁶ Thomson Reuters ⁷ UBS
 Notes: FY=Fiscal year ended 12/31; YTD=Year to date; LTM=Last 12 months (aka trailing 12 months); PPM=Purchase Price Multiples: Total Purchase Price ÷ EBITDA.

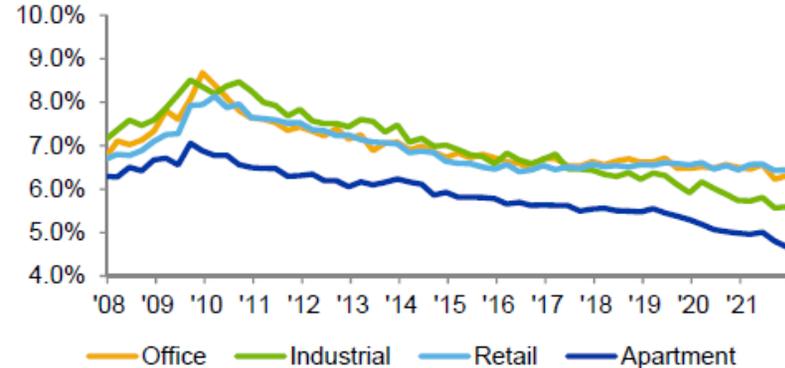
U.S. Commercial Real Estate Markets

PRIVATE VS. PUBLIC REAL ESTATE RETURNS AS OF 12/31/2021



*Fourth quarter returns are preliminary
Sources: NCREIF, FactSet

CAP RATES BY SECTOR



Sources: RCA, AON 12/31/2021

- U.S. Core Real Estate returned 8.0%* in the fourth quarter, equating to an 22.2% total gross return year-over-year. Townsend has witnessed a robust recovery across the US economy and US real estate markets through the entirety of 2021. Despite lingering uncertainty, real estate capital markets are highly liquid and competitive for in vogue sectors but have also been surprisingly strong for less favored sectors. Capital raising has exceeded pre-pandemic levels and smashed through historical highs, resulting in a surplus of dry powder in the market.
- Global property markets, as measured by the FTSE EPRA/NAREIT Developed Real Estate Index, returned 10.4% (USD) in aggregate during the fourth quarter and experienced a cumulative increase of 27.2% over the trailing 1-year period. REIT market performance was driven by Asia Pacific (0.6% USD), North America (16.0% USD), and Europe (8.5% USD). The U.S. REIT markets (FTSE NAREIT Equity REITs Index) returned 16.3% in the fourth quarter. The U.S. 10-year treasury bond yields ended the quarter flat at 1.2%.
- In 2021, industrial deal volumes realigned with the growth trend we observed pre-pandemic. The demand for modern logistics networks has outpaced development and now low-single-digit vacancy rates are common across major markets in the US. A mismatch of supply and demand is driving strong rent growth in the sector, as e-commerce still only accounts for 13% of retail sales and is forecasted to grow at close to 10% per annum between 2022-2025. Significant demand combined with an undersupply of modern assets continues to support the development modern logistics properties and the retrofit or refurbishment of well-located older product.
- The residential sector was the largest, most liquid portion of the US market in 2021; transaction activity in the smaller US markets continues to increase as remote work seems to have a grasp on our future to some extent. Property prices are appreciating across almost every major economy. Labor costs and supply chain issues continue to drag on the sector. Greater return-to-office, the continued recovery of jobs, and easing of regulatory pressures should drive healthy market rent growth creating attractive investment opportunities across the residential market, including multifamily and single family-for-rent.
- Townsend has identified high conviction investment themes that are predicated on secular growth trends and strong underlying real estate market fundamentals. These investment themes have commonalities such as anticipated tenant demand growth, natural barriers to supply, and operating complexity that are anticipated to persist medium to long-term.

*Indicates preliminary NFI-ODCE data gross of fees

Notes

1. Preqin
2. Standard & Poors
3. PriceWaterhouseCoopers/CB Insights MoneyTree Report
4. PitchBook/National Venture Capital Association Venture Monitor
5. Fitch Ratings
6. UBS

Notes:

FY: Fiscal year ended 12/31

YTD: Year to date

YE: Year end

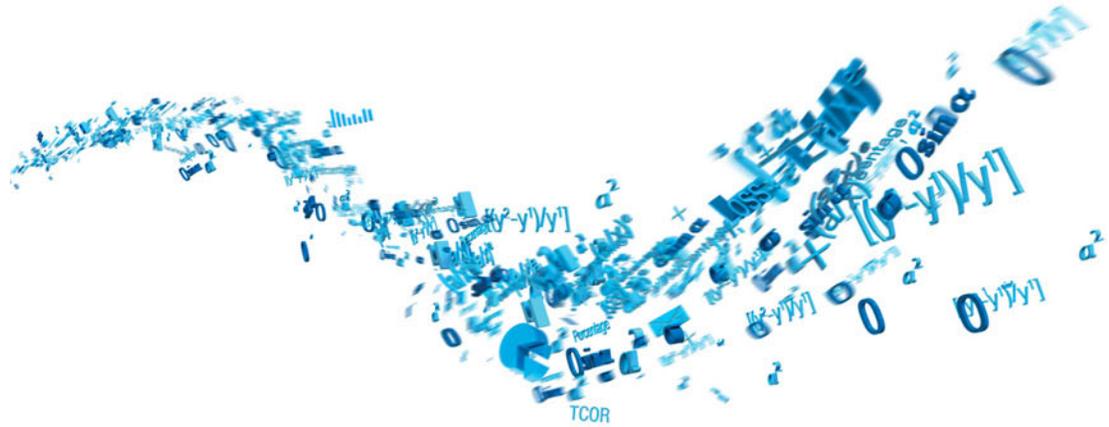
LTM: Last twelve months (aka trailing twelve months or TTM)

PPM: Purchase Price Multiples: Total Purchase Price / EBITDA

/bbl: Price per barrel

MMBtu: Price per million British thermal units

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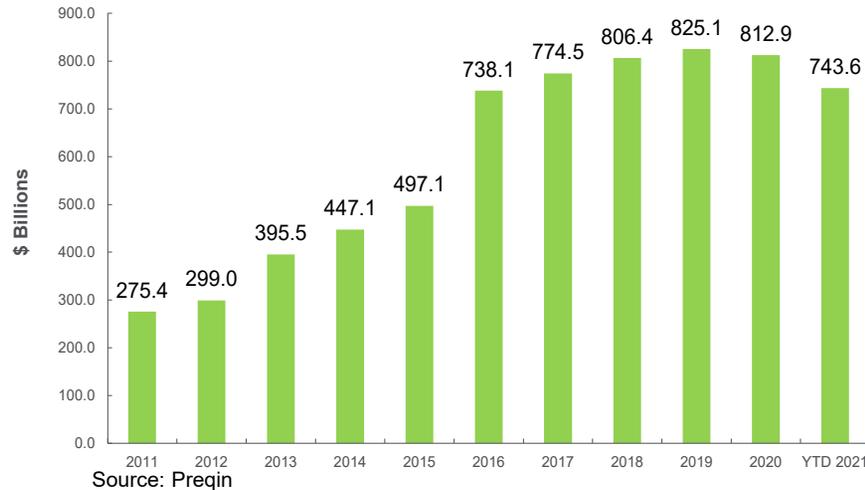
Appendix A:

Global Private Equity Market Overview

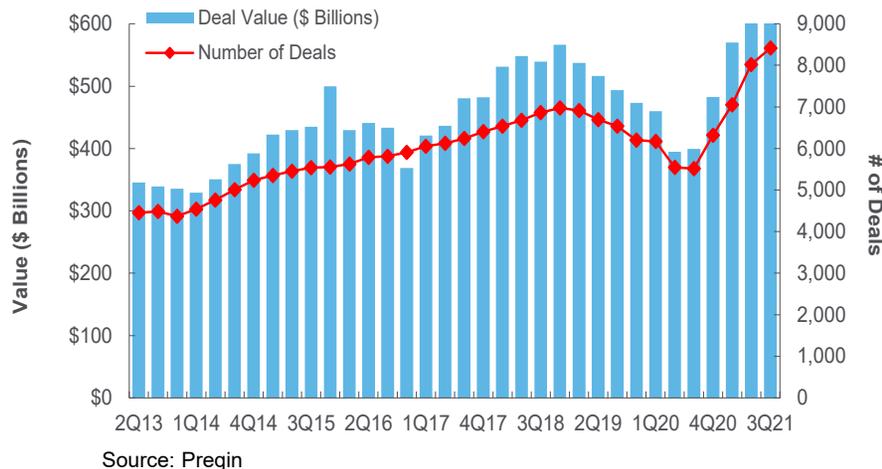
3Q 2021

Private Equity Overview

Total Funds Raised



LTM Global Private Equity-Backed Buyout Deal Volume



Fundraising

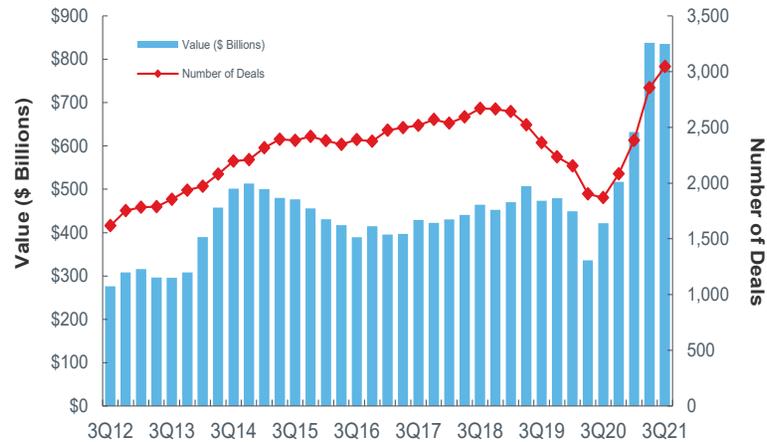
- In 3Q 2021, \$175.2 billion was raised by 574 funds, which was a decrease of 43.7% on a capital basis and 28.8% by number of funds over the prior quarter. Capital raised through 3Q 2021 represented 91.5% of capital raised during calendar year 2020.¹
 - 3Q 2021 fundraising was 16.3% lower, on a capital basis, than the five-year quarterly average, and 18.2% lower by number of funds raised.
 - The majority of capital was raised by funds with target geographies in North America, comprising 56.4% of the quarter's total. This was down from 58.5% in 2Q 2021. Capital targeted for Europe made up 27.2% of the total funds raised during the quarter, an increase from 19.8% in 2Q 2021. The remainder was attributable to managers targeting Asia and other parts of the world.
- Dry powder stood at nearly \$2.2 trillion at the end of the quarter, an increase compared to year-end 2020's total of \$2.1 trillion.¹

Activity

- Global private equity-backed buyout deals totaled \$191.9 billion in 3Q 2021, which was down 16.5% on a capital basis and down 8.0% by number of deals from 2Q 2021.¹
 - This was 45.9% higher than the five-year quarterly average deal volume of \$131.6 billion.
 - Average deal size was \$101.0 million in 3Q 2021. This was up 31.7% compared to 3Q 2020 and up 28.8% relative to the five-year quarterly average.
- European sponsored loan issuance decreased to €23.9 during the third quarter compared to €32.5 during 2Q 2021. This was 39.9% higher than the five-year quarterly average level of €17.1 billion.³
- Through 3Q 2021, the average purchase price multiple for all U.S. LBOs was 11.2x EBITDA, a decrease of 0.2x over 2020's average.² Large cap purchase price multiples stood at 11.1x through 3Q 2021, down compared to 2020's level of 11.3x.²
 - Average purchase price multiples for all U.S. LBOs were 0.4x and 1.2x turns (multiple of EBITDA) above the five- and ten-year average levels, respectively.
- In Europe, the average purchase price multiple across European transactions of greater than €500M averaged 13.1x EBITDA on an LTM basis as of 3Q 2021, greater than the 12.6x multiple seen at the end of 4Q 2020. Purchase prices for transactions of greater than €1.0 billion increased to 13.2x EBITDA on an LTM basis compared to the 13.1x seen at the end of 2020.³
- Debt remained broadly available in the U.S.
 - The average leverage for U.S. deals through 3Q 2021 was 5.6x compared to the five and ten-year averages of 5.7x and 5.5x, respectively.³
 - The amount of debt issued supporting new transactions increased compared to the prior quarter, moving from 58.8% to 61.9%, but was lower than the five-year average of 64.3%.³
- In Europe, the average senior debt/EBITDA on an LTM basis ended 3Q 2021 at 5.3x, down from the 5.8x observed at 2Q 2021.

Buyouts / Corporate Finance

LTM PE Exit Volume and Value



Source: Preqin

M&A Deal Value by Deal Size



Source: Preqin

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Fundraising

- \$92.5 billion was closed on by 144 buyout and growth funds in 3Q 2021, compared to \$164.2 billion raised by 215 funds in 2Q 2021. This was higher than the \$87.6 billion raised by 129 funds in 3Q 2020.¹
 - This was lower than the five-year quarterly average of \$108.5 billion and 185 funds.
 - Partner Group Direct Equity 2019 was the largest fund raised during the quarter, closing on \$15.0 billion of commitments.¹
- Buyout and growth equity dry powder was estimated at \$1.2 trillion, slightly higher than 4Q 2020.¹
- Mega, large, and small cap buyout funds decreased in dry powder compared to 4Q 2020 by 4.9%, 3.0% and 7.9%, respectively. Mega cap buyout funds had amassed \$432.5 billion in dry powder at the end of the quarter. Mid cap dry powder exhibited the only increase compared to 4Q 2020, increasing to \$149.4 billion or an increase of 4.0% over the period.¹
 - An estimated 61.6% of buyout dry powder was targeted for North America, while European dry powder comprised 26.4% and Asia/Rest of World accounted for the remainder.¹

Activity

- Global private equity-backed buyout deals totaled \$191.9 billion in 3Q 2021, which was down 16.5% on a capital basis and down 8.0% by number of deals from 2Q 2021.¹ This was 45.9% higher than the five-year quarterly average deal volume of \$131.6 billion.¹
- Through 3Q 2021, deal value accounted for 128.2% of 2020's total buyout activity and represented 213.7% of deal volume during the same period in 2020.¹
 - Through 3Q 2021, deals valued at \$5.0 billion or greater accounted for an estimated 30.8% of total deal value compared to 27.7% through 2Q 2021 and 18.9% in 2020.¹ Deals valued between \$1.0 billion to \$4.99 billion represented 45.5% of total deal value through the third quarter.¹
 - By geography, North American deals accounted for the largest percentage of total deal value at an estimated 59.1% through 3Q 2021, while Information Technology deals accounted for the largest percentage by industry at 22.5% of total deal value.¹
- U.S. entry multiples for all transaction sizes in 3Q 2021 stood at 12.3x EBITDA, up from 2Q 2021's level (11.5x).¹ Through 3Q 2021, the average purchase price multiple for all U.S. LBOs was 11.2x EBITDA, a decrease of 0.2x over 2020's average but higher than the five-year average (10.8x).³
 - Large cap purchase price multiples stood at 11.1x through 3Q 2021, down compared to 2020's level of 11.3x.³
 - In Europe, the average purchase price multiple across European transactions of greater than €500M averaged 13.1x EBITDA on an LTM basis as of 3Q 2021, greater than the 12.6x multiple seen at the end of 4Q 2020. Purchase prices for transactions of greater than €1.0 billion increased to 13.2x EBITDA on an LTM basis compared to the 13.1x seen at the end of 2020.³
 - The portion of average purchase prices financed by equity for all deals was 47.2% through 2Q 2021, up slightly from 47.0% through 2Q 2021. This remained above the five- and ten-year average levels of 42.5% and 40.1%, respectively.³
- Globally, exit value totaled \$195.0 billion from 701 deals during the third quarter, down from the \$247.6 billion in value from 818 deals during 2Q 2021. 3Q 2021's totals were also lower than 3Q 2020's total of \$197.7 billion in value across 510 deals.¹

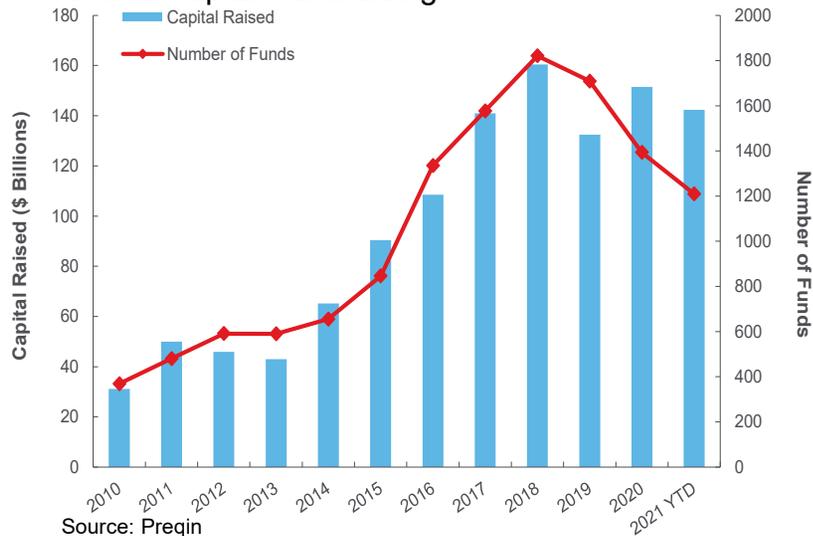
Opportunity⁴

- Managers targeting the middle market with expertise across business cycles.



Venture Capital

Venture Capital Fundraising



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



Source: Pitchbook / NVCA Venture Monitor

Fundraising

- \$31.1 billion of capital was raised by 317 funds in 3Q 2021, down from the prior quarter's total of \$54.8 billion raised by 450 managers. The average fund size decreased during the quarter to \$106.0 million from \$129.0 million.¹
 - 3Q 2021 fundraising was 16.6% lower on a capital basis compared to the five-year quarterly average of \$37.3 billion.
 - Liberty 77 Fund was the largest fund raised during the quarter, closing on \$2.5 billion.
- At the end of 3Q 2021, there were an estimated 3,448 funds in market targeting \$280.0 billion.¹
 - Tiger Global Private Investment Partners XV was the largest venture fund in market, targeting an estimated \$10.0 billion.
 - The majority of funds in market are seeking commitments of \$200.0 million or less.
- Dry powder was estimated at \$410.5 billion at the end of 3Q 2021, up from 2Q 2021's total of \$383.3 billion and 77.3% higher than the five-year average.¹

Activity

- During the third quarter, an estimated 3,518 venture-backed transactions totaling \$82.8 billion were completed in the U.S., which was higher than the prior quarter on a capital basis but a decrease compared to the 3,787 completed deals. 3Q's transaction value was 126.3% higher than the five-year quarterly average of \$36.6 billion and marked the strongest quarter on record.⁷
 - In 3Q 2021, there were 131 U.S.-based deals involving unicorn companies, representing roughly \$35.1 billion in deal value. This was up by value but down by number compared to 2Q 2021, which saw 148 unicorn-related deals close at a deal value of \$34.1 billion. 3Q 2021 marked a new record for unicorn-related activity by deal value.⁷
- At the end of 3Q 2021, median pre-money valuations increased across Series A and Series D+. Compared to 2Q 2021, Series A transactions increased to a median pre-money valuation of \$75.0 million from \$47.1 million, and Series D+ transactions increased from \$1.3 billion to \$1.8 billion. Seed valuations decreased from \$15.0 million to \$13.3 million, Series B decreased from \$253.3 million to \$244.2 million, and Series C decreased from \$500.0 million to \$445.0 million.⁸
- Total U.S. venture-backed exit activity totaled approximately \$187.2 billion across an estimated 504 completed transactions in 3Q 2021, down from the \$259.7 billion across 457 exits in 2Q 2021. Through 3Q 2021, U.S. exit activity represented 201.6% of 2020's total.⁷
 - The number of U.S. venture-backed initial public offerings increased over 2Q 2021, with 93 IPOs completed in 3Q 2021. 225 exits occurred by acquisition, marking a decrease over the prior quarter, but accounted for only \$23.6 billion in exit value. IPOs accounted for \$162.2 billion in value compared to \$232.5 billion in the prior quarter.⁷

Opportunity⁴

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

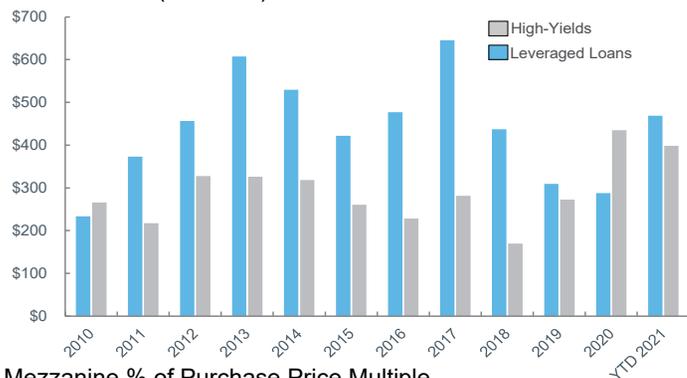


Leveraged Loans & Mezzanine

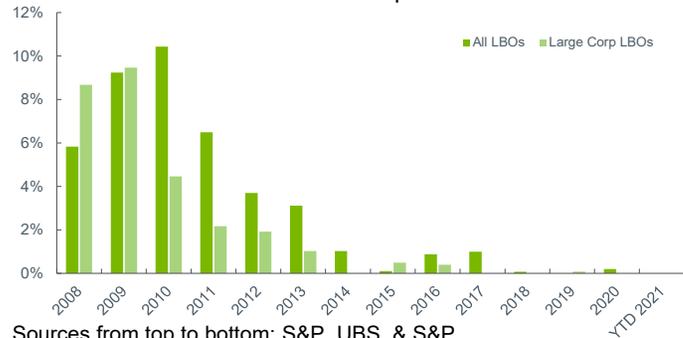
Average Leverage by Deal Size



Debt Issuance (\$ Billions)



Mezzanine % of Purchase Price Multiple



Sources from top to bottom: S&P, UBS, & S&P

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Leveraged Loans

Fundraising

- New CLO issuance totaled \$114.4 billion through 3Q 2021, increasing from \$63.1 billion through 2Q 2021.²
- High-yield debt issuance totaled \$398.3 billion through 3Q 2021. 2021's YTD total is 7.3% greater than the same period's total of \$371.2 billion in 2020.²
- Through 3Q 2021, leveraged loan mutual fund net flows ended at a net inflow of \$25.9 billion.²

Activity

- Leverage for all U.S. LBO transactions through 3Q was 5.6x, down from 2020's leverage of 5.7x. Leverage continues to be comprised almost entirely of senior debt. The average leverage level for large cap LBOs was 5.6x through the quarter, up from the 5.7x witnessed at year-end 2020.³
- Through 3Q 2021, institutional leveraged loan issuances totaled \$468.8 billion, 133.2% greater than the \$208.7 billion issued in the same period during 2020.²
- 61.9% of new leveraged loans were used to support M&A and growth activity through 3Q 2021, up from 58.8% in Q2 2021. This was below the five-year average of 64.3%.³
- European sponsored loan issuance decreased slightly to €23.9 during the second quarter compared to €32.5 during 2Q 2021. This was 39.9% higher than the five-year quarterly average level of €17.1 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

Mezzanine

Fundraising

- Seven funds closed on \$3.3 billion during the third quarter. This was down significantly from the prior quarter's total of \$7.0 billion raised by 11 funds, but up from 3Q 2020's total of \$1.2 billion raised by 8 funds. Through 3Q, mezzanine funds have raised only 36.6% of 2020's total of \$28.8 billion.¹
- Estimated dry powder was \$50.9 billion at the end of 3Q 2021, down slightly from the \$51.9 billion seen at the end of 2Q 2021.¹
- An estimated 93 funds are in market targeting \$41.0 billion of commitments. ICG Europe Fund VIII is the largest fund in market targeting commitments of €7.0 billion.¹

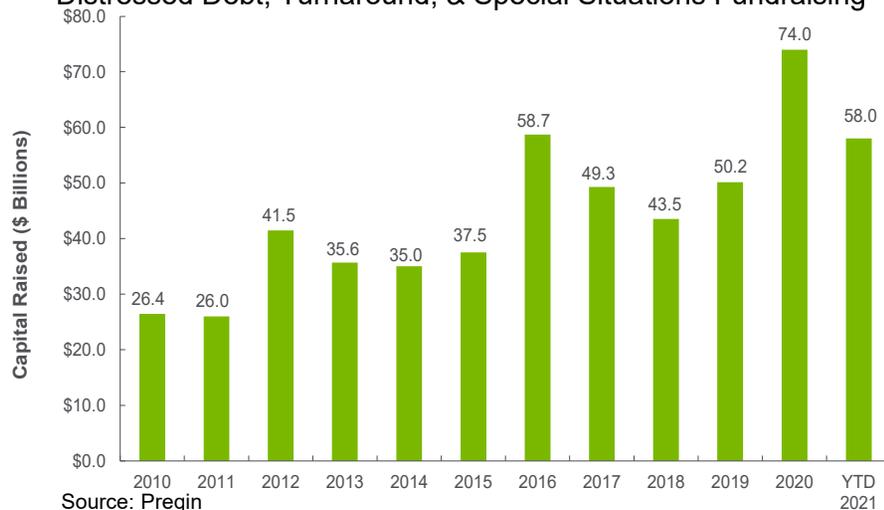
Opportunity⁴

- Funds with the capacity to scale for large sponsored deals



Distressed Private Markets

Distressed Debt, Turnaround, & Special Situations Fundraising



High-Yield Bond Volume vs Default Rates



Fundraising

- During the quarter, \$25.4 billion was raised by 12 funds, an increase from the \$15.3 billion raised by 18 funds in 2Q 2021. Distressed funds have raised 78.5% of 2020's total through 3Q 2021.¹
 - 3Q 2021's fundraising was 74.4% higher than the five-year quarterly average.
 - Capital raised in 3Q 2021 represented an increase of 771.5% compared to the \$2.9 billion raised in 3Q 2020.
 - Oaktree Opportunities Fund XI was the largest fund closed during the quarter, closing on \$15.9 billion.
- Dry powder was estimated at \$140.8 billion at the end of 3Q 2021, which was down from the \$153.4 billion seen at the end of 2Q 2021. However, this was 16.5% higher than the five-year annual average level of \$120.9 billion.¹
- Roughly 172 funds were in the market at the end of 3Q 2021 seeking \$84.9 billion in capital commitments.¹
 - Special situations managers were targeting the most capital, seeking an aggregate \$50.6 billion, followed by distressed debt managers at \$29.9 billion.
 - Clearlake Capital Partners VII was the largest fund in market with a target fund size of \$10.0 billion.

Activity

- The TTM U.S. high-yield default rate fell to 1.0% at the end of the third quarter, which was a decrease from the 4.5% seen at year-end 2020.⁶
- The market dislocation caused by COVID-19 is expected to supply additional distressed opportunities in the next several months.

Opportunity⁴

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

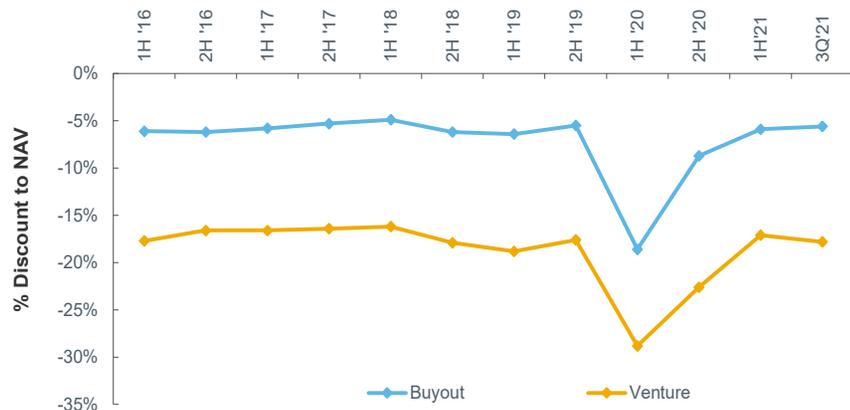
Secondaries

Secondary Fundraising



Source: Preqin

Secondary Pricing



Source: UBS

Fundraising

- 14 funds raised \$5.5 billion during the quarter, down significantly from the \$12.3 billion raised by 18 funds in 2Q 2021. However, this was up 22.3% from 3Q 2020.¹
 - 17Capital Fund 5 was the largest fund raised during the quarter, closing on \$3.0 billion.
- At the end of 3Q 2021, there were an estimated 112 secondary and direct secondary funds in market targeting roughly \$43.2 billion. The majority of secondary funds are targeting North American investments.¹
 - Six funds are currently in market targeting \$3.0 billion or greater in capital commitments. Together, these six funds account for \$24.5 billion of the \$43.2 billion of capital being raised.
 - Landmark Equity Partners XVII is the largest fund being raised, seeking \$6.0 billion in commitments.¹

Activity

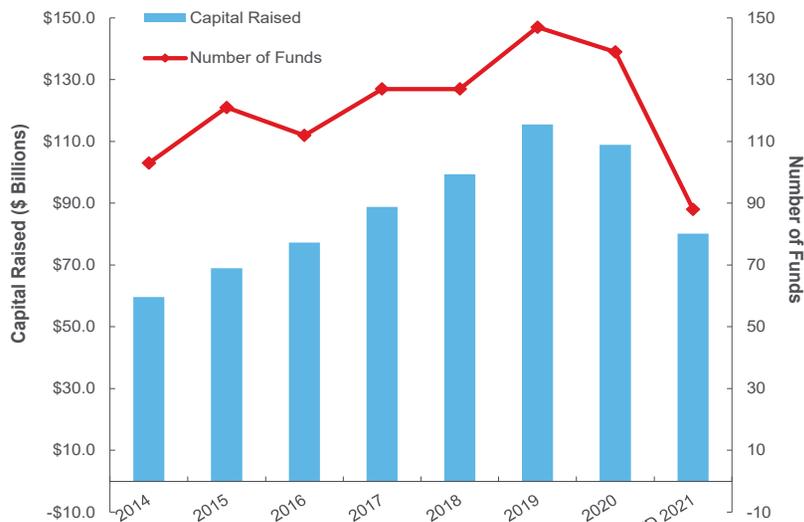
- The market continues to have participation from a broad base of buyers and sellers with opportunistic selling activity from public and private pensions, financial institutions and insurance companies.
- After slower volume of LP transactions in 1H 2021, Evercore expects a strong rebound given many LPs are overweight to PE due to strong performance, valuation considerations, and the ability to take advantage of attractive market conditions.¹⁴
- The average discount rate for all private equity sectors finished 3Q 2021 at 8.0%, up slightly from 1H 2021 at 8.2% and continuing the rebound from the 11.8% discount at the end of 2H 2020. The average buyout pricing discount rebounded to 5.6% in 3Q from 5.9% in 1H 2021, while venture ended slightly higher at a discount of 17.8% from 17.1% in 1H 2021.²
- Pricing improvements may continue given the strong fundraising in recent quarters and the pressure to deploy capital.²
- Pricing is also expected to strengthen as buyers become more comfortable with the stability of the NAVs used in secondary transactions. Steep discounts may continue for assets of less experienced GPs or for assets in sectors that were more severely impacted by Covid-19.²
- Pricing for younger, higher quality assets is high and there has been a full rebound in pricing for mature, mixed quality portfolios, according to Evercore.¹⁴

Opportunity⁴

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

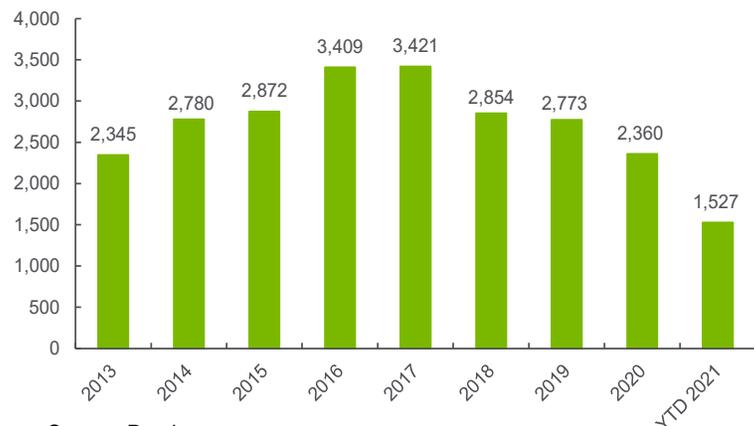
Infrastructure

Global Infrastructure Fundraising



Source: Preqin

Number of Deals Completed



Source: Preqin

Fundraising

- \$18.3 billion of capital was raised by 17 funds in 3Q 2021 compared to \$38.0 billion of capital raised by 39 partnerships in 2Q 2021. Through 3Q 2021, infrastructure funds have raised 73.0% of 2020's total.¹
 - Macquarie Infrastructure Partners V was the largest fund raised during the quarter, closing on \$6.9 billion.¹
- As of the end of 3Q 2021, there were an estimated 337 funds in the market seeking roughly \$235.0 billion.¹
 - EQT Infrastructure V was the largest fund in market and was seeking commitments of €12.5 billion.
- At the end of the quarter, dry powder stood at an estimated \$284.7 billion, up from 2Q 2021's total of \$270.6 billion.¹
- Concerns surrounding the relative availability and pricing of assets remain. Fundraising continues to be very competitive given the number of funds and aggregate target level of funds in market. Investor appetite for the asset class persists despite the record levels of dry powder and increased investment activity from strategic and corporate buyers as well as institutional investors.

Activity

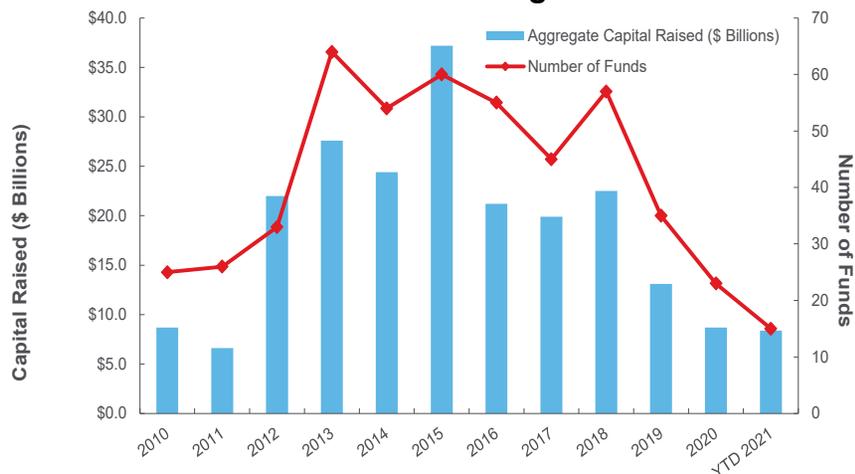
- Infrastructure managers completed 462 deals with an estimated aggregate deal value of \$68.3 billion in 3Q 2021 compared to 482 deals totaling \$112.9 billion a quarter ago.¹
 - By region, Europe saw the largest number of deals completed, with 39.0% of deals being invested in the region, followed by North America at 30.1%. Asia amassed 13.1% of activity during the quarter.
 - Renewable energy was the dominant industry during the quarter making up 54.5% of transactions, followed by the conventional energy sector which accounted for 12.8% of deals. The transport sector and telecoms sector each accounted for 10.6% of deals during the third quarter.¹

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

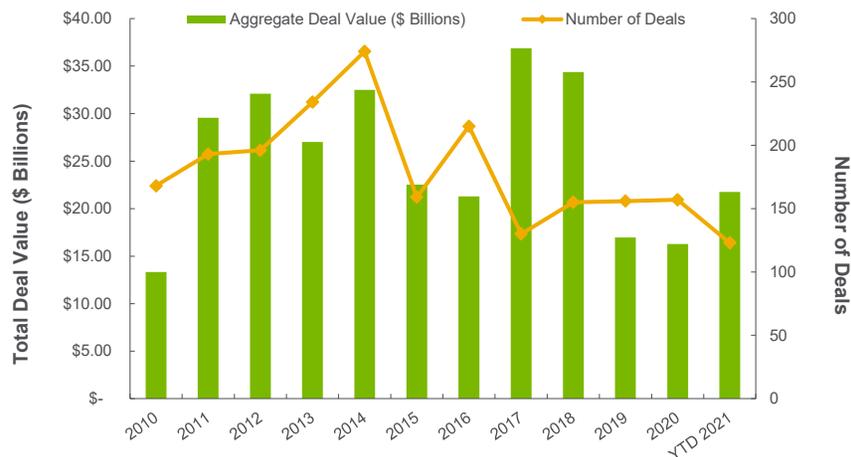
Natural Resources

Natural Resources Fundraising



Source: Preqin

Energy & Utilities Deal Activity



Source: Preqin

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Fundraising

- During 3Q 2021, three funds closed on \$3.6 billion compared to eight funds totaling \$2.7 billion in 2Q 2021.¹ Through 3Q 2021, 96.6% of 2020's total had been raised.
 - Carlyle International Energy Partners II was the largest fund raised during the quarter, securing commitments of \$2.3 billion.
- At the end of the third quarter, there were roughly 102 funds in the market targeting an estimated \$30.7 billion in capital.¹
 - Quantum Energy Partners VIII was the largest fund raising capital with a target fund size of \$4.5 billion.
- Dry powder stood at roughly \$38.8 billion at the end of 3Q 2021, which was 3.0% lower than 2Q 2021's level of \$40.0 billion and down from the five-year average level by 25.9%.¹

Activity

- Energy and utilities industry managers completed approximately 123 deals totaling an estimated \$21.8 billion through 3Q 2021, which represented 133.9% of energy and utilities deal value during all of 2020.¹
- Crude oil prices increased during the quarter.
 - WTI crude oil prices increased 0.4% during the quarter to \$71.65 per bbl. This was an increase of 80.8% compared to 3Q 2020.¹⁰
 - Brent crude oil prices ended the quarter at \$74.49/bbl, up 1.8% compared to the prior quarter, and up 82.1% from 3Q 2020.¹⁰
- Natural gas prices (Henry Hub) finished 3Q 2021 at \$5.16 per MMBtu, which was up 58.3% from 2Q 2021 and up 168.8% from 3Q 2020.¹⁰
- A total of 528 crude oil and natural gas rotary rigs were in operation in the U.S. at the end of the quarter. This was up by 11.2% from the prior quarter and up 98.5% over 3Q 2020.¹³
 - Crude oil rigs represented 81.1% of the total rigs in operation. 61.2% of the 428 active oil rigs were in the Permian basin.
 - 46.5% and 26.3% of natural gas rigs at the end of 3Q 2021 were operating in the Haynesville and Marcellus basins, respectively.
- The price of iron ore (Tianjin Port) ended the quarter at \$124.52 per dry metric ton, down from \$214.43 at the end of 2Q 2021.¹⁰

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

Notes:

FY: Fiscal year ended 12/31

YTD: Year to date

YE: Year end

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

PPM: Purchase Price Multiples: Total Purchase Price / EBITDA

/bbl: Price per barrel

MMBtu: Price per million British thermal units

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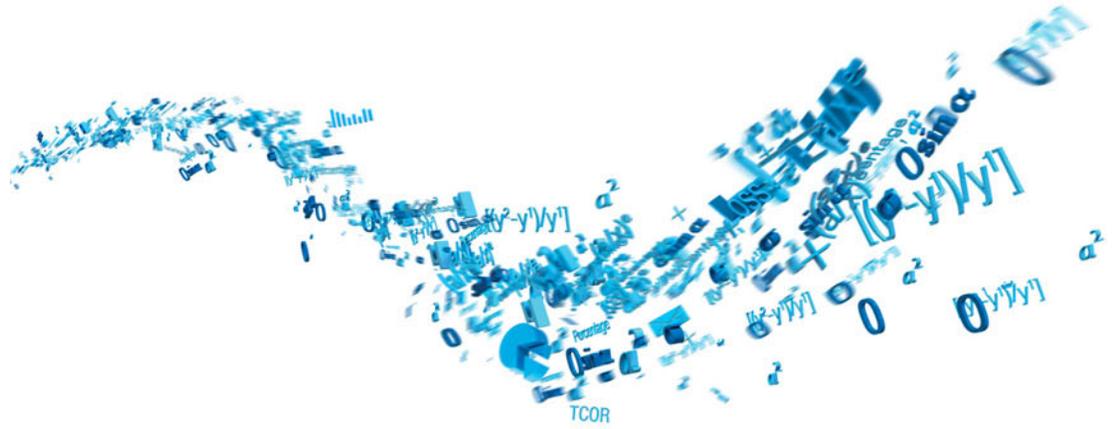
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Appendix B:

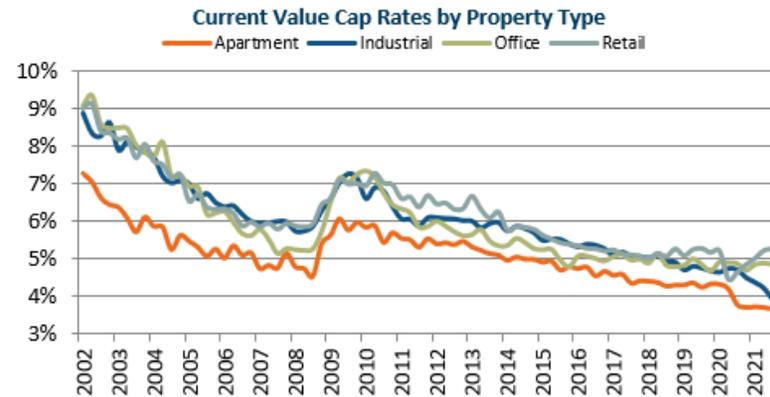
Real Estate Market Update

3Q 2021

United States Real Estate Market Update (3Q21)

General

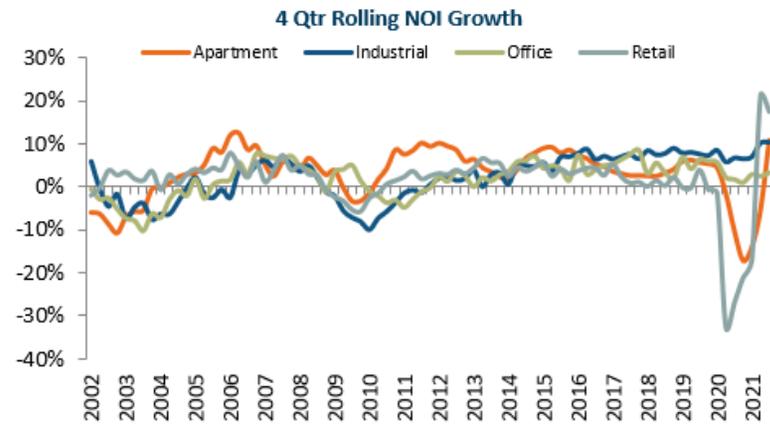
- As a result of the COVID-19 pandemic, national, state and local governments across the world implemented stay-at-home orders, which caused a near complete halt of the world economy in the 1st half 2020. Governments dramatically expanded expenditures in order to protect people and businesses from large-scale disruption. In 3Q21, equity markets continued to bounce back from the March 2020 rout and continued to exceed prior highs, the S&P 500 produced a gross total return of 0.6%, bringing the year-to-date total return to 15.9%. The MSCI US REIT index continued to rebound and produced a return of 12.0% and exceed pre-COVID levels.
- The U.S. entered a recession in February 2020, but the economy has since rebounded with the accelerated development and continued rollout of vaccines. In the 3rd quarter, U.S. GDP grew at an annualized rate of 2.0%. The unemployment rate peaked in April at 14.8% and has since declined to 4.8% at quarter end 3Q21, falling an additional 110 bps from the end of 2Q21. The Federal Reserve continues to act aggressively, thus far financial markets have stabilized. The world economy shrunk by -3.5% in 2020 but is forecasted to grow 5.9% in 2021.



Source: NCREIF

Commercial Real Estate

- Through the third quarter of 2021, total CRE transaction activity for the quarter was up 151% YoY, after seeing a significant transaction freeze in the first half of 2020, the market continues to rebound and has now exceeded activity levels observed prior to the COVID-19 induced slowdown. Transaction volume has been the strongest in the apartment and industrial sectors.
- Transaction cap rates (5.0%) compressed -16 bps during the quarter. Current valuation cap rates declined for industrial (-30 bps), apartment (-4 bps), and office (-3 bps). The retail (+5 bps) property sector continued to experience cap rate expansion.
- NOI growth has substantially diverged between property sectors due to the impacts of COVID-19. Retail NOI has expanded substantially (+17%) YoY as the sector recovers from decreased rent collections and retailer shutdowns early last year. Apartment NOI expanded (+11%) YoY, as broad-based effective market rents are deep in their recovery.
- In the third quarter of 2021, \$49 bn of aggregate capital was raised by real estate funds. There continues to be substantial dry powder, ~\$384 billion, seeking exposure to private real estate.
- 10-year treasury bond yields expanded 7 bps to 1.52% during the quarter, signaling inflation which many experts expected to observe, though varying significance levels.



Source: NCREIF

Sources: Bureau of Economic Analysis, U.S. Census Bureau, St. Louis Fed, NCREIF, Real Capital Analytics, Bloomberg LP., Preqin.

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United States Property Matrix (3Q21)



INDUSTRIAL

- In 3Q21, industrial properties were the highest returning sector at 10.9% and outperformed the NPI by 570 bps.
- Transaction volumes rose to \$39.5 billion in the third quarter of the year, resulting in a 130% increase year-over-year. Individual asset sales increased 79% year-over-year, while portfolio purchases turned in a year-over-year volume increase of 258%. At slightly over \$39.5 billion, the industrial sector increased a significant \$7.0 billion quarter-over-quarter.
- The industrial sector turned in NOI growth of 10.2% over the past year. NOI continues to reach all time highs for the sector.
- Vacancy decreased by 100 bps year-over-year to 2.5%. Vacancy in the sector decreased 60 bps from last quarter, reaching all-time historic lows. E-commerce continues to drive demand across the sector.
- Industrial cap rates compressed approximately 80 bps from a year ago, to 3.9%. Industrial overall fundamentals still top all property sectors.

MULTIFAMILY

- The apartment sector delivered a 6.5% return during the quarter, outperforming the NPI by 130 bps.
- Transaction volume in the third quarter of 2021 rose to \$78.7 billion, resulting in an increase of 192% year-over-year. Transaction volume for the sector is now exceeding all historic highs. This volume continues to make multifamily the most actively traded sector for the seventeenth straight quarter.
- Cap rates remained steady at 3.7% quarter-over-quarter, compressing 10 bps year-over-year. Multifamily cap rates remain at the lowest level observed in years, driven by continued increases in valuation.
- The multifamily sector saw increasing vacancy rates throughout the entirety of 2020 due to the global pandemic. Through 2021, the sector appears to have shaken that trend as vacancy rates decreased 60 bps quarter-over-quarter, now 280 bps lower than a year ago and back to pre-pandemic levels. The aging millennials have begun shifting their desires to suburban living, but continued home price appreciation has deterred the full effect of this migratory trend.

OFFICE

- The office sector returned 1.9% in 3Q21, 340 bps below the NPI return over the period.
- Transaction volumes increased by 137% year-over-year in the third quarter. Transaction volume equated to \$34.8 billion for the quarter, an increase of \$6.7 billion quarter-over-quarter. Office transaction levels have officially regressed to levels only seen prior to the COVID-19 pandemic.
- Office sector vacancy rates have expanded since the beginning of the pandemic due to work from home orders and uncertainty revolving around the future of office space. Office continues to be the highest vacancy property type at close to 13.1%, expanding 40 bps from last quarter.
- NOI growth in the office sector expanded quarter-over-quarter by 80 bps and appears to be in the midst of its recovery to pre-pandemic levels as it has increased 160 bps since the same period last year.
- Office cap rates remained flat from a year ago, sitting at approximately 4.9%. Office-using job growth was stunted significantly through out 2020 due to work from home orders. Though we are observing a slow but steady flow back to in-office work, there is still uncertainty in the sector as many companies remain hesitant.

RETAIL

- As of 3Q21, the retail sector delivered a quarterly return of 1.6%, performing 370 bps below the NPI.
- Transaction volumes totaled \$17.4 billion in the third quarter, increasing 127% year-over-year. Single asset transactions accounted for just over 73.5% of all sales volume for the quarter.
- Cap rates have expanded approximately 60 bps within the sector over the last year, to 5.3%. Current valuation cap rates did expand quarter-over-quarter by 10 bps due to slight downward valuation adjustments made across the sector in general.
- NOI growth significantly increased, +17.4% over the last year. Retail has begun its slow recovery as vaccine rollouts have allowed a large portion of store nationally to open and operate safely.
- Retail vacancy rates compressed over the quarter by 60 bps, though still up 80 bps over the past year to 9.1%. 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.

Global Real Estate Market Update (3Q21)

- The real estate investment market has continued its recovery from the COVID-19 crisis with investments in income producing real estate doubling the level of that last year. In 3Q21 US Volume was \$187.4 billion, a 193% growth year over year. The US was at the forefront of this recovery and transaction volume as a result of strong demand in industrial and apartment properties.
- Renewed COVID restrictions stemming from the spread of the Delta variant impeded the recovery in some parts of the world during the third quarter, but in most countries the economy continued to rebound. Uncertainty remains an ongoing theme.
- Investment activity in the Americas witnessed an extreme surge to \$187.4 billion by 193% year-over-year. Transaction volume in the US decreased 28% relative to 2Q21.
- In the Asia Pacific region, volumes grew only 1% year-over-year. Mainland China (+20%) remains the top market in the region with Australia (+106%), and South Korea (+54%) seeing the most improvements in deal activity year over year in 3Q21.
- In the office sector, global leasing activity improved by 39% year-over-year; however, they remain 25% lower than Q3 2019, showing that the recovery, although underway, is far from over. Office re-entry rates still vary significantly by country but are now starting to rise around the globe. This is important, as before new space requirements are cemented, corporates need more evidence of how hybrid office and remote work impacts their demand profile. Vacancy continued its upward trajectory in Q3, adding 30bps over the quarter to 14.6%; that said, this is the slowest rate of increase since the onset of the pandemic.
- Supported by rising vaccination rates and easing restrictions, trading conditions for a large number of retailers have improved over the third quarter in markets such as the U.S. as well as most of Europe. Leasing activity continues to pick up in many major retail destinations globally, with prime space highly sought-after in countries with high vaccination rates and eased containment measures. In markets where containment measures have been tightened recently, notably across the Southeast Asia region, many retailers remain concentrated on servicing domestic consumers and opening stores in suburban shopping centers.
- Multifamily maintained its status as the most liquid asset type in the U.S. in the third quarter, while complementary segments such as single-family residential attracted increased attention. In Europe, investor interest in multifamily, along with single-family and affordable housing, continues unabated. In Asia Pacific, Japan remained the most active market for multifamily in Q3, while the build-to-rent (BTR) market in Australia is gaining momentum. There are still very few projects operational in Australia, but the number planned and under construction continues to grow.
- Ongoing supply chain disruptions and pressure on critical supply hubs are posing a challenge to the global economic recovery. Demand for logistics space remained extremely robust across all three regions in the third quarter, to the extent that new supply is struggling to keep up with the weight of demand in some markets. With supply tight, aggregate vacancy rates are sub-5% in both the U.S. and Europe. These supply and demand dynamics are supporting solid rental growth, which is evident across all three regions.

Global Total Commercial Real Estate Volume - 2020 - 2021

\$ US Billions	Q3 2021	Q3 2020	Q3 21 - Q3 20		YTD 2021	Q1-Q3 2021	% Change
				% Change			YTD 2021/Q1 - Q3 21
Americas	187	64		193%	424	230	84%
EMEA	76	61		24%	239	206	16%
Asia Pacific	205	203		1%	569	558	2%
Total	468	328		43%	1232	994	24%

Source: Real Capital Analytics, Inc., Q3' 21

Global Outlook - GDP (Real) Growth % pa, 2021-2023

	2021	2022	2023
Global	5.8	4.4	3.4
Asia Pacific	6.0	5.0	4.6
Australia	3.8	3.7	3.0
China	8.0	5.4	5.4
India	9.2	7.5	
Japan	2.4	2.6	1.3
North America	5.5	3.9	2.5
US	5.5	3.9	2.5
Middle East	3.0	4.7	3.6
European Union	5.4	4.4	2.3
France	6.7	4.1	2.1
Germany	2.8	4.8	2.0
UK	7.0	5.0	2.1

Source: Bloomberg

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REPORT

Meketa Capital Markets Outlook & Risk Metrics Report

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Capital Markets Outlook & Risk Metrics
As of December 31, 2021

Capital Markets Outlook

Markets

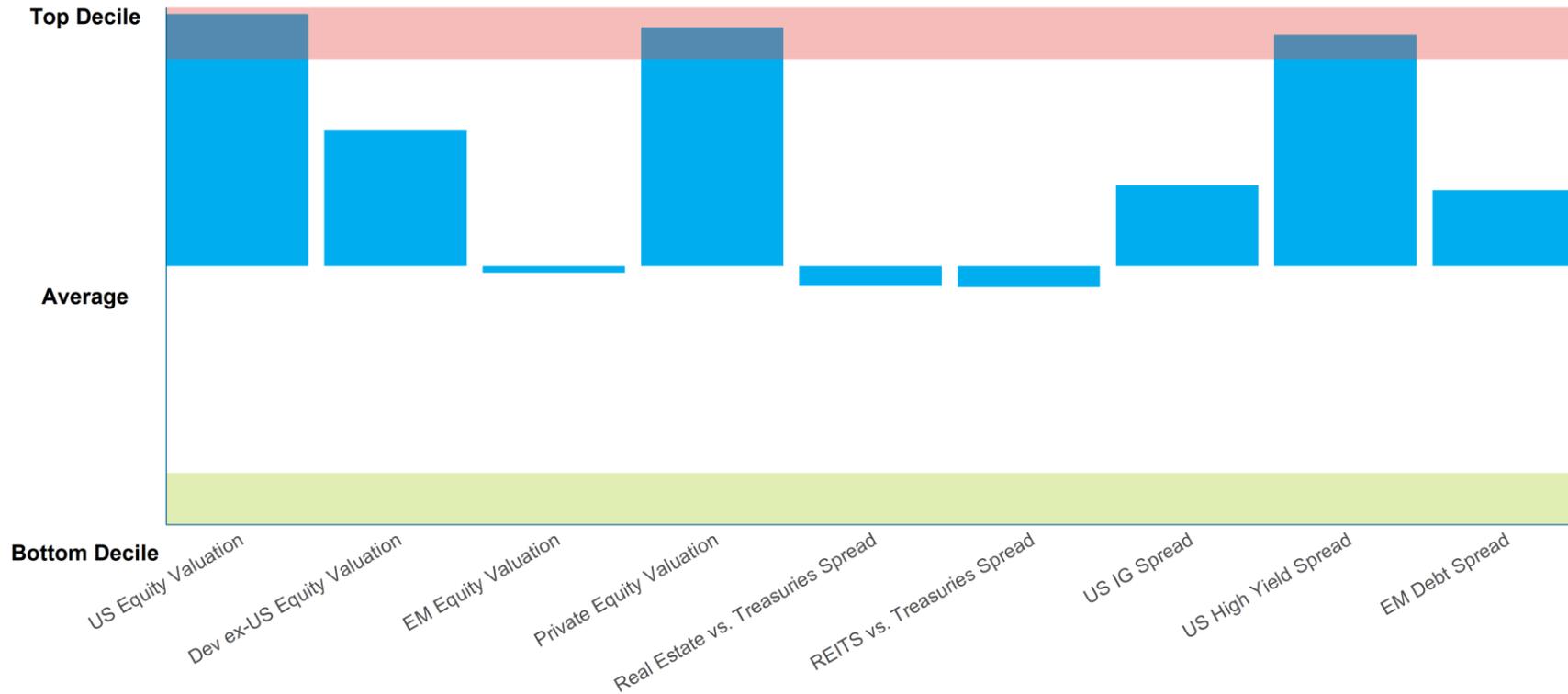
- Global markets generally posted positive returns in December, shaking-off Omicron variant and inflation concerns. In the US, the Fed indicated that tightening of policy may be brought forward with a more rapid reduction in asset purchases in 2022.
- China's equity market bucked the trend, posting negative returns due primarily to concerns about an economic slowdown linked to the real estate sector.
- In the US, large cap stocks outperformed midcap and small cap stocks, and value stocks beat growth stocks. While large cap value and growth stocks performed similarly in 2021, smaller cap value substantially outperformed small growth stocks for the year.
- Non-US developed markets rallied in December, with the EAFE modestly outperforming the S&P 500.
- In spite of negative returns in China, the broad emerging markets index posted gains. EM value stocks outperformed growth stocks in December and for the calendar year.
- The investment grade bond market produced negative returns in December, as inflation continued to weigh on nominal bond returns. However, TIPS and high yield bonds delivered positive returns.
- REITs and infrastructure stocks delivered very strong returns in December.
- After a difficult November, commodities returned to positive territory, offering support for natural resource stocks which posted strong returns.

Capital Markets Outlook

Markets

- US headline inflation climbed to a near 40-year high in November, as consumer prices rose 6.8% year-on-year, largely driven by higher energy costs, which rose 33%. Still, core inflation (ex-food and energy) rose 4.9% year-on-year.
- In China, Evergrande officially defaulted on \$300 billion in debt and its shares were suspended from trading in Hong Kong. Policy makers cut borrowing costs and urged local governments and state-owned companies to finish real estate projects started by Evergrande. Concerns regarding other real estate developers continue to mount as the government steps in to support growth.
- While COVID continues to spread in developed and emerging markets, the Omicron variant has thus far proved to be less severe than the Delta variant, giving investors hope that recent travel bans and lockdowns might soon be rolled back.

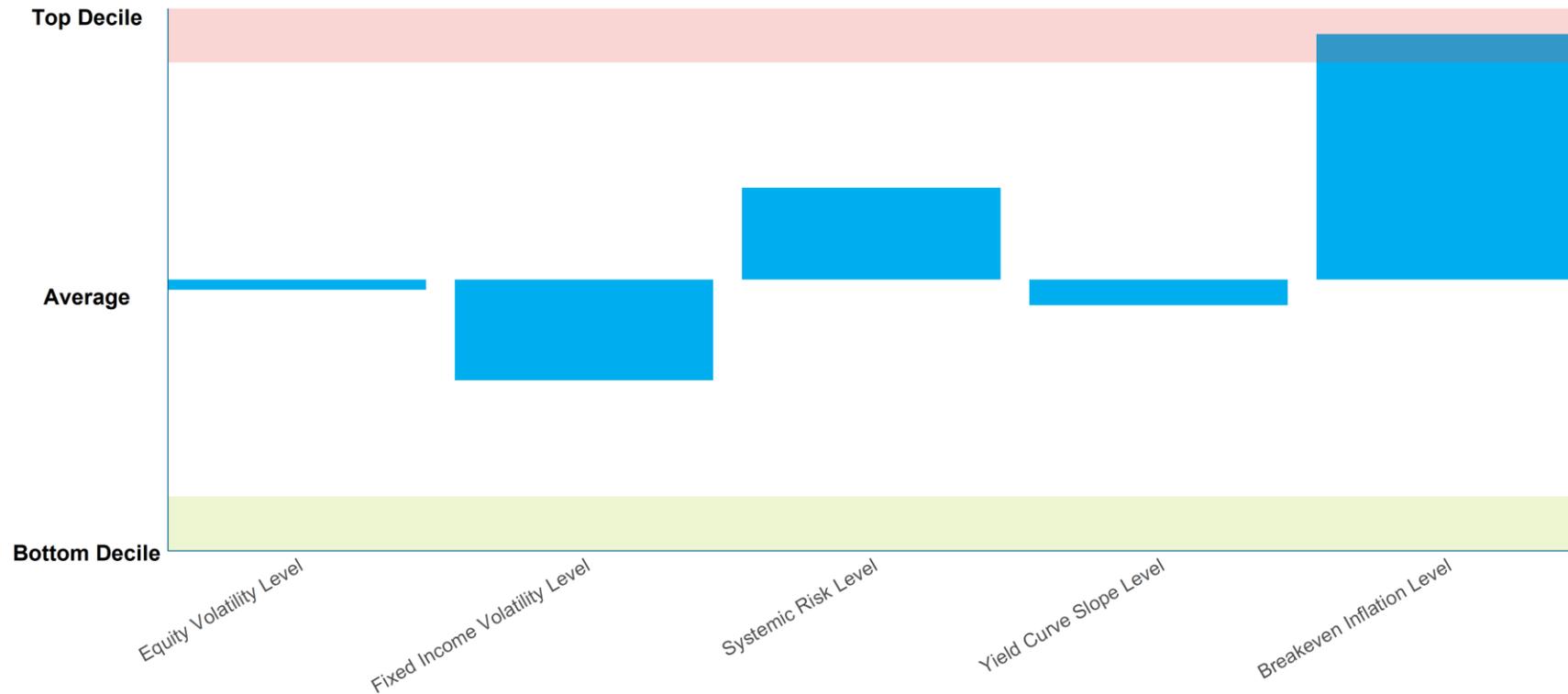
Risk Overview/Dashboard (1) (As of December 31, 2021)¹



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

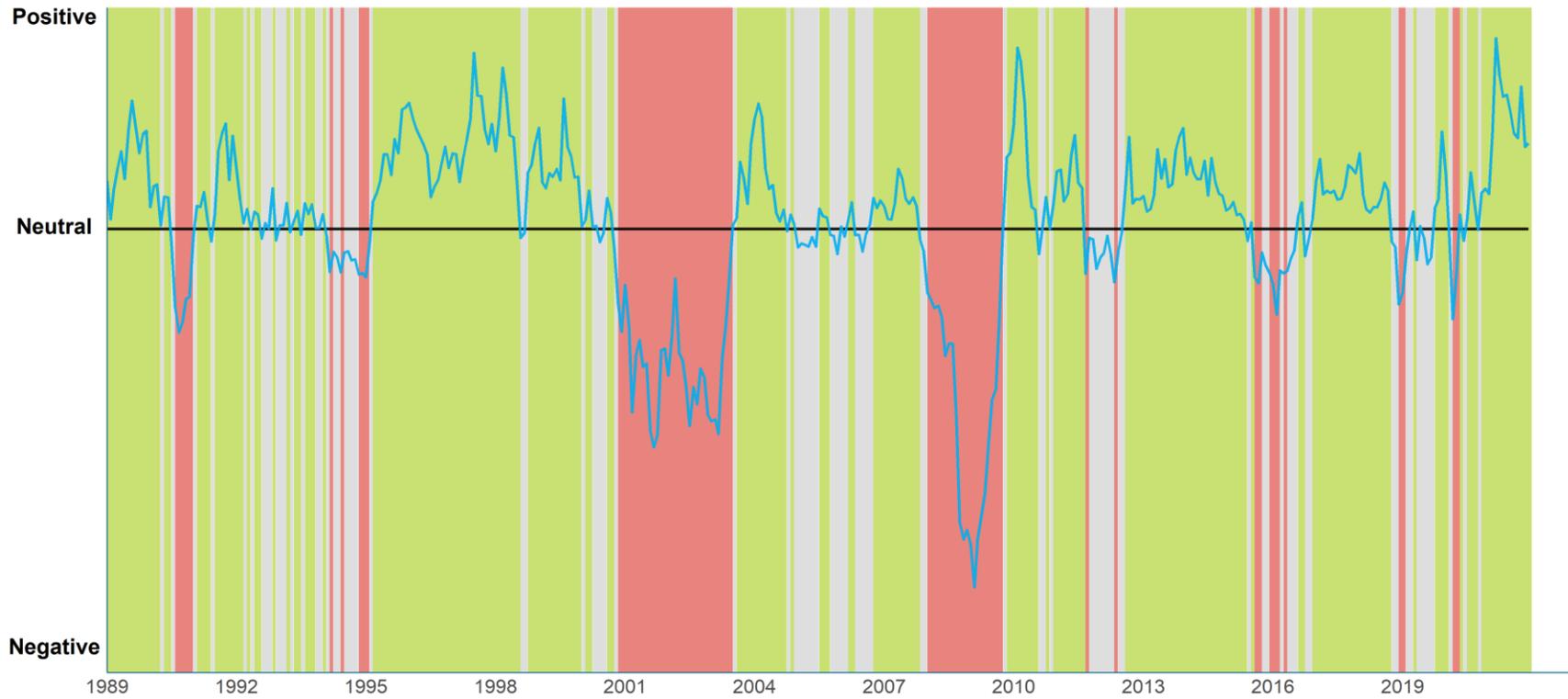
¹ With the exception of Private Equity Valuation, that is YTD as of December 31, 2020.

Risk Overview/Dashboard (2) (As of December 31, 2021)

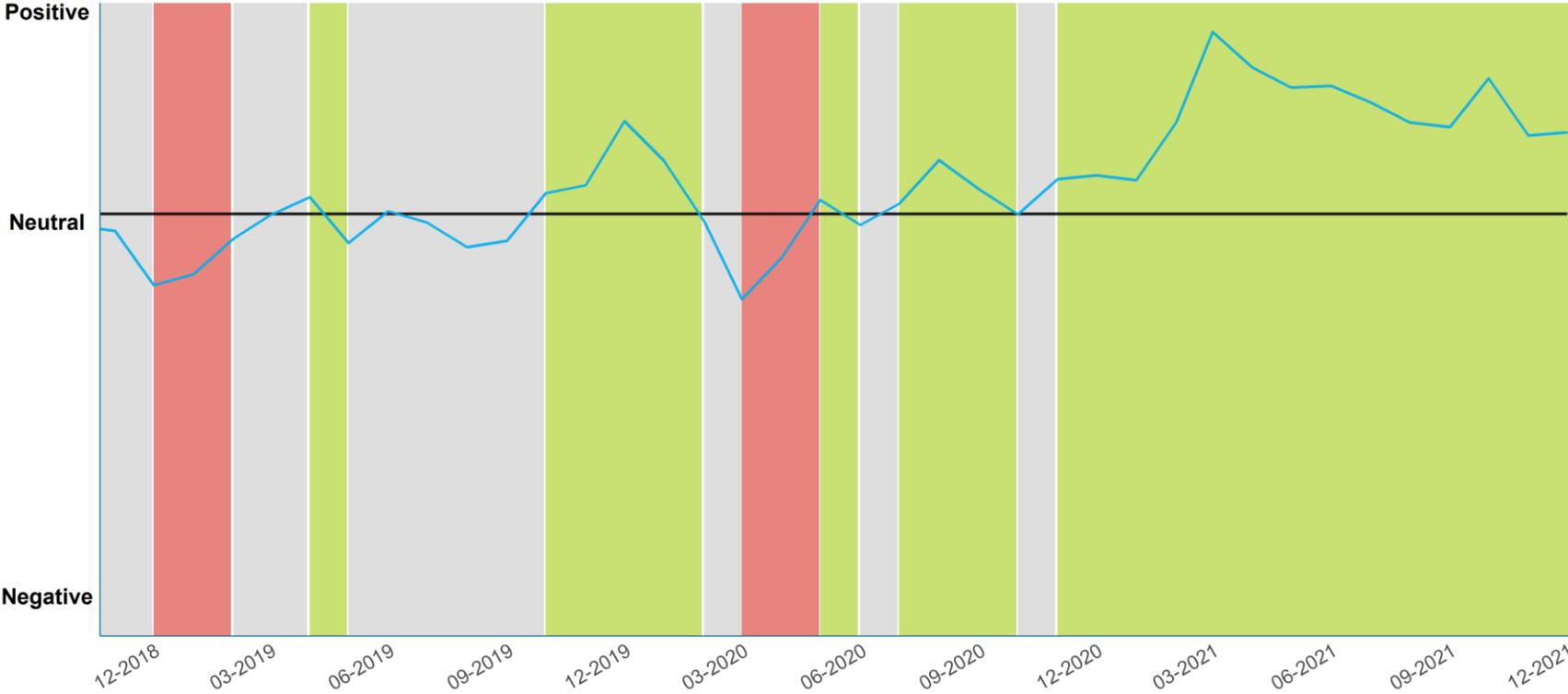


- Dashboard (2) shows how the current level of each indicator compares to its respective history.

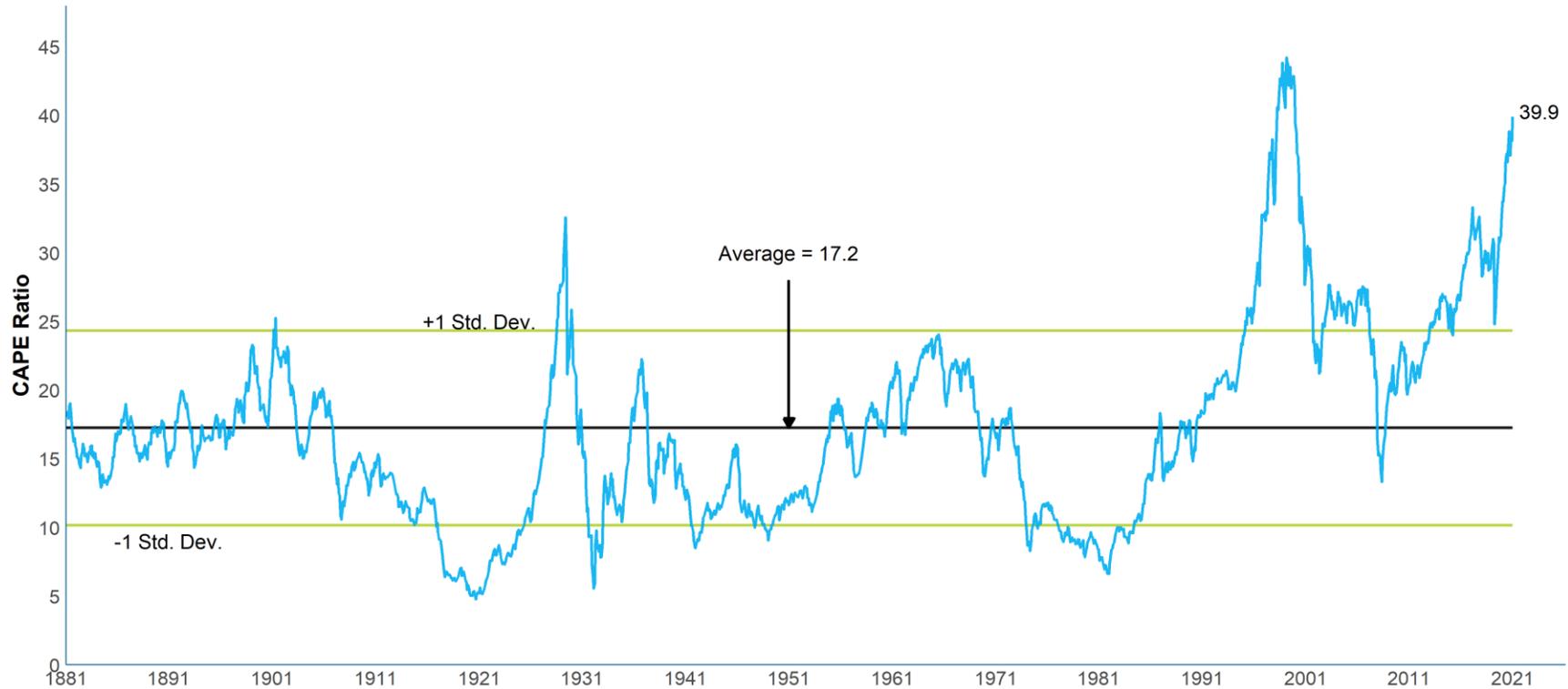
Market Sentiment Indicator (All History) (As of December 31, 2021)



Market Sentiment Indicator (Last Three Years)
(As of December 31, 2021)



US Equity Cyclically Adjusted P/E¹
(As of December 31, 2021)



- 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, 2021)



- 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, 2021)



- 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.

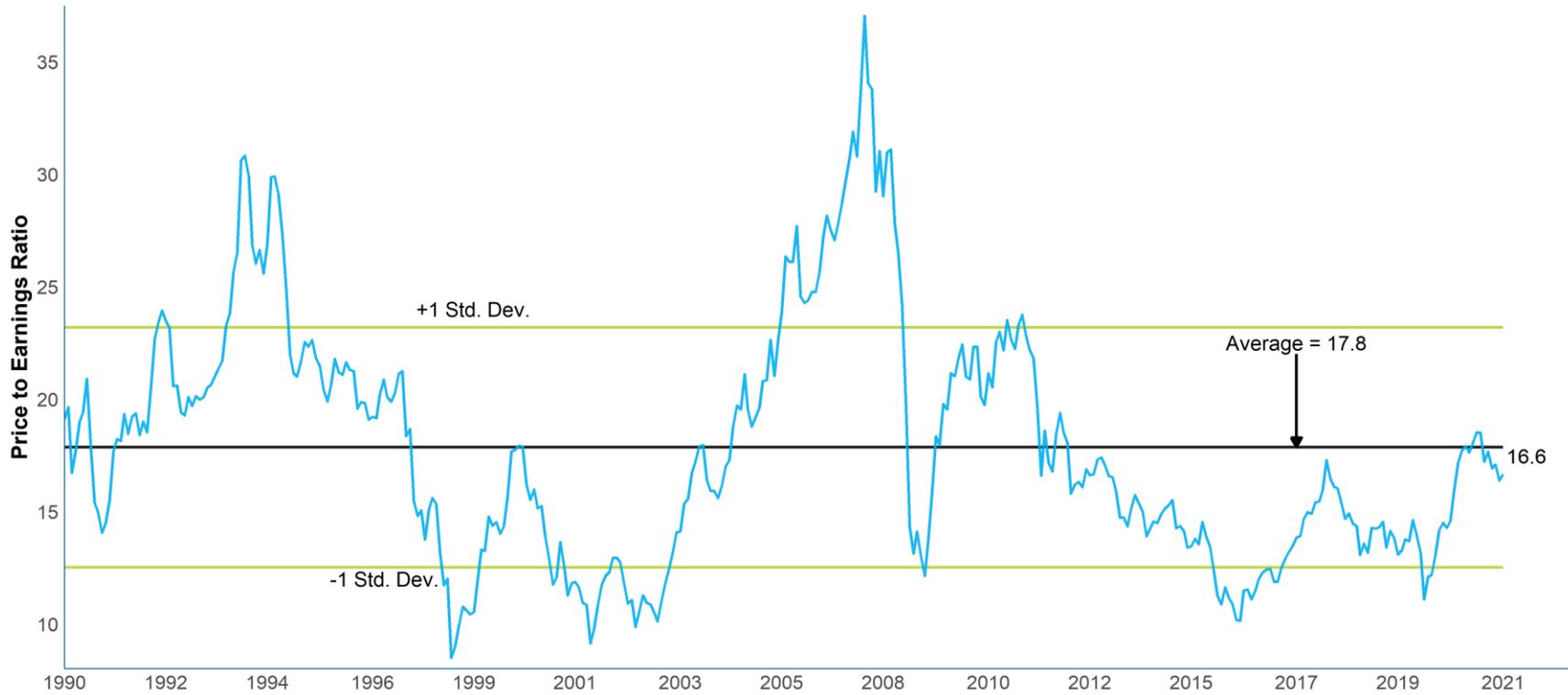
Developed International Equity Cyclically Adjusted P/E¹ (As of December 31, 2021)



- 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.

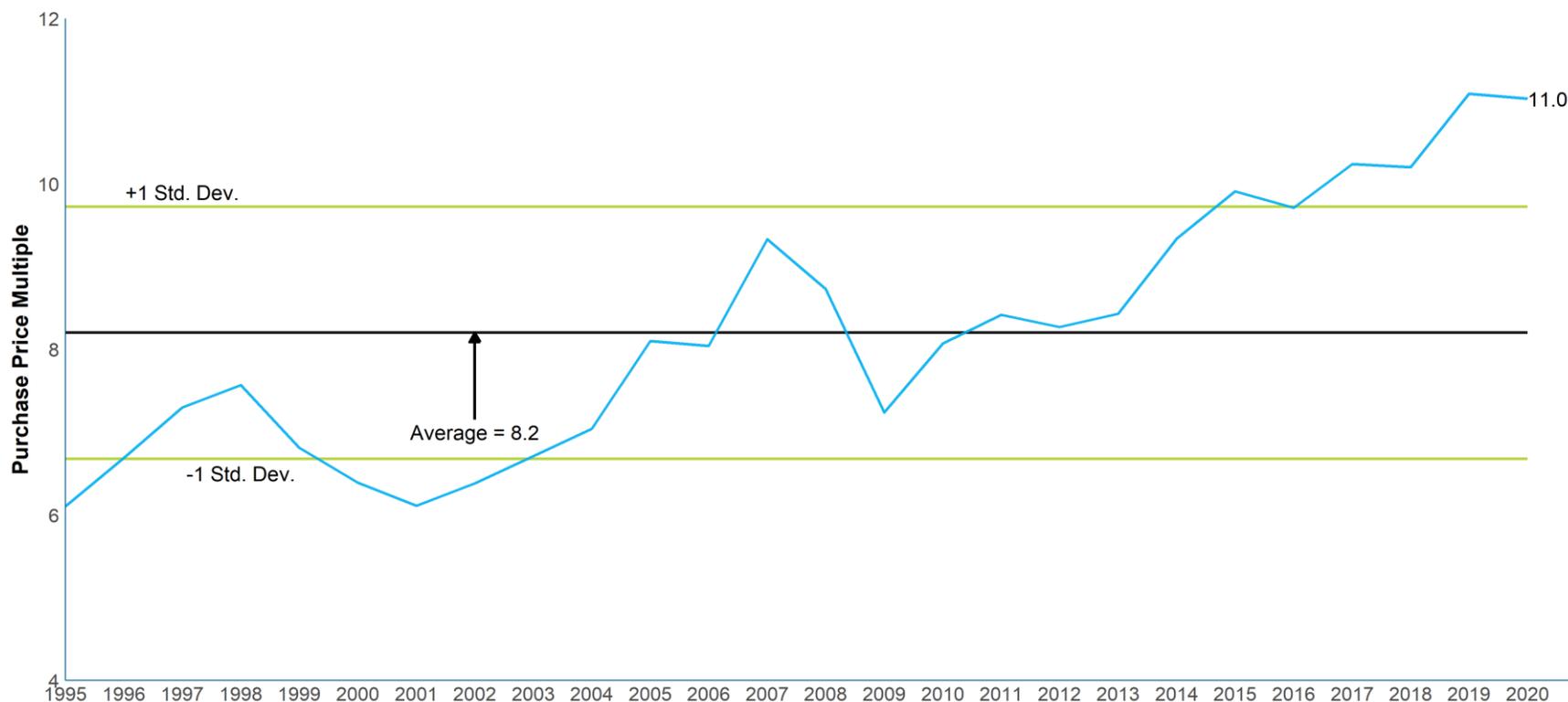
Emerging Market Equity Cyclically Adjusted P/E¹
 (As of December 31, 2021)



- 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 February 28, 2021)²

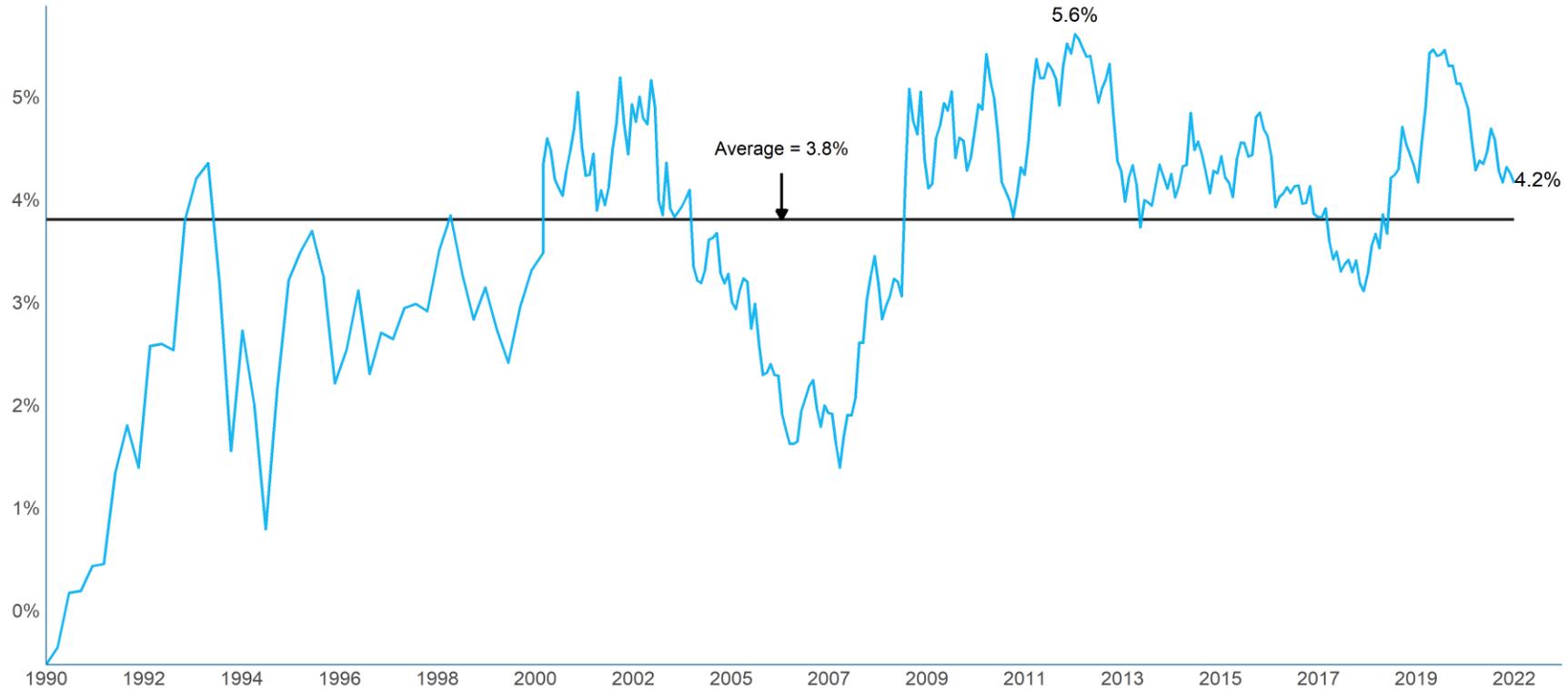


- This chart details one valuation metric for the private equity market. A higher (lower) figure indicates more expensive (cheaper) valuation relative to history.

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

² Annual Data, as of December 31, 2020

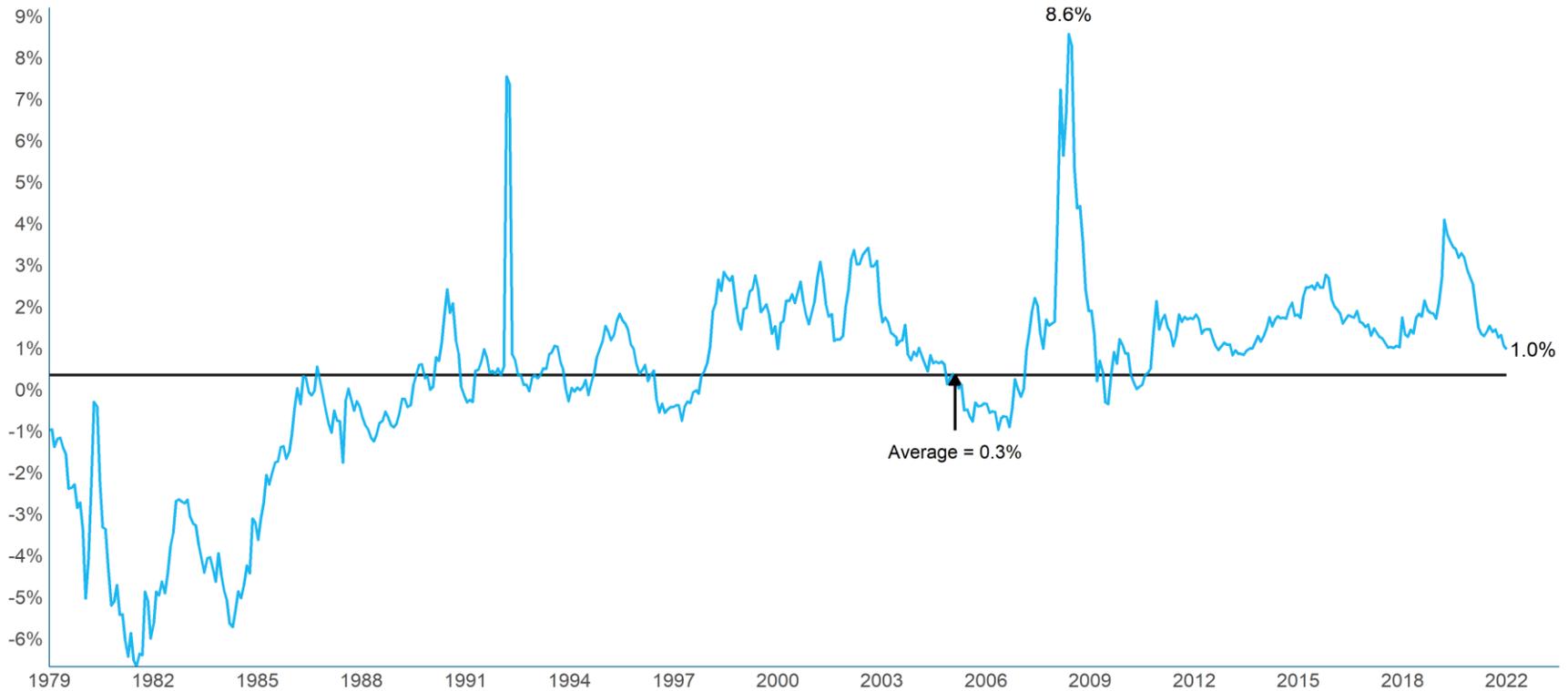
Core Real Estate Spread vs. Ten-Year Treasury¹ (As of December 31, 2021)



- 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.

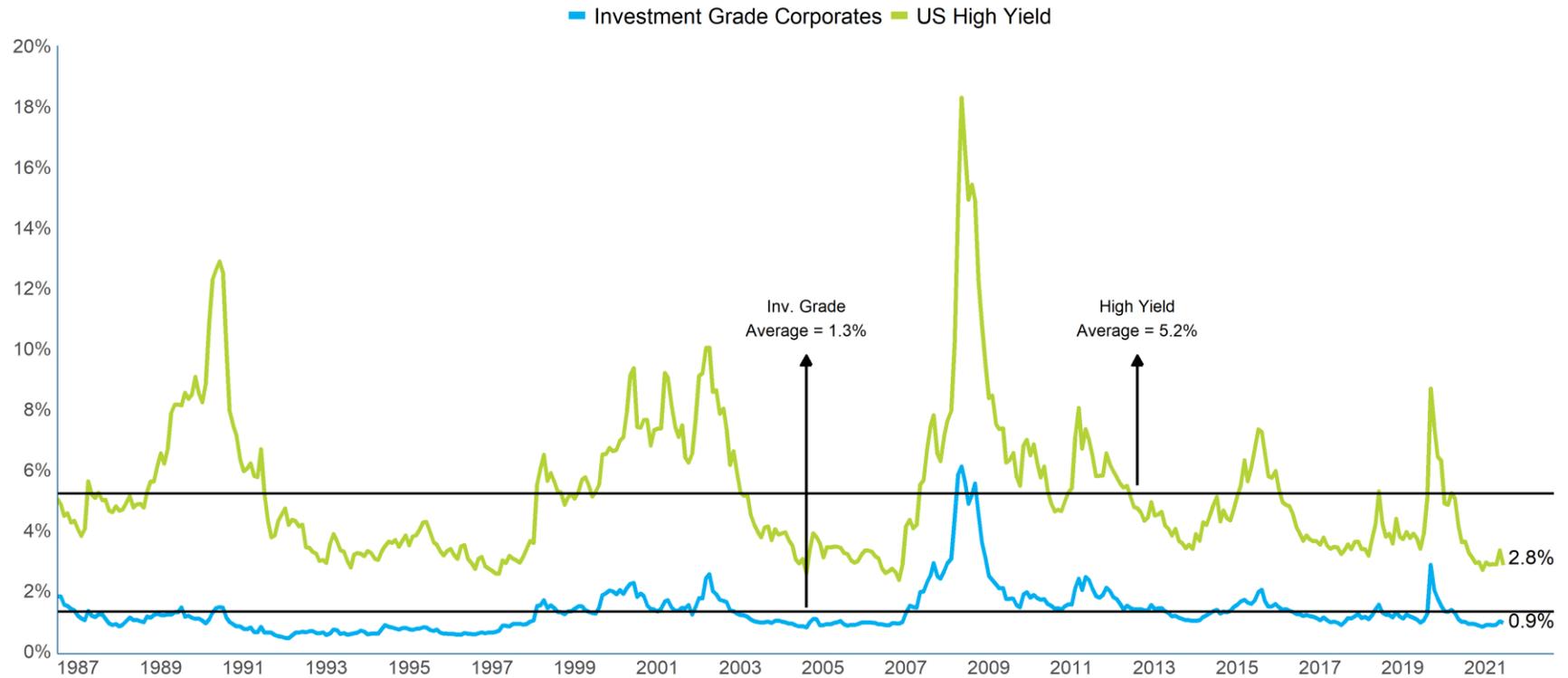
REITs Dividend Yield Spread vs. Ten-Year Treasury¹
 (As of December 31, 2021)



- 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, 2021)



- 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.

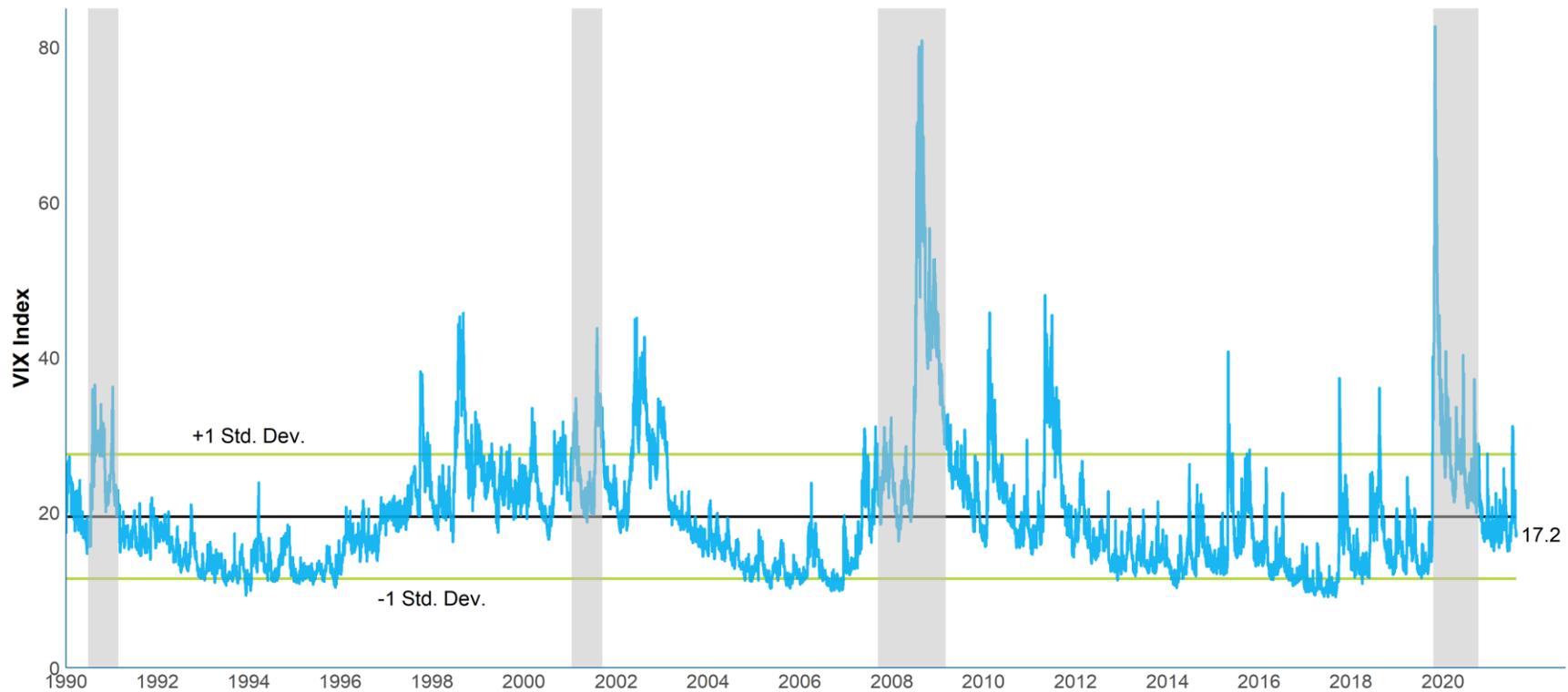
Emerging Market Debt Spreads¹
(As of December 31, 2021)



- 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.

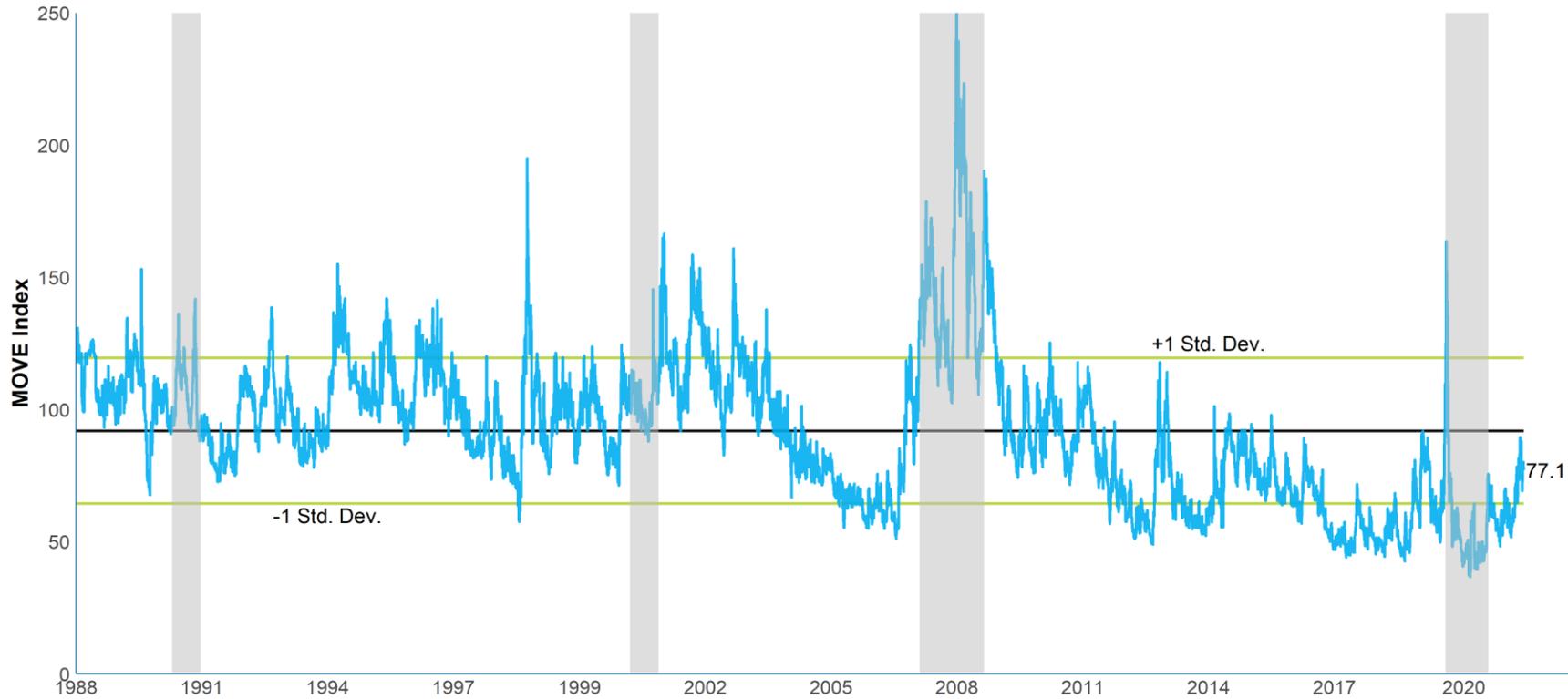
Equity Volatility¹
(As of December 31, 2021)



- 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.

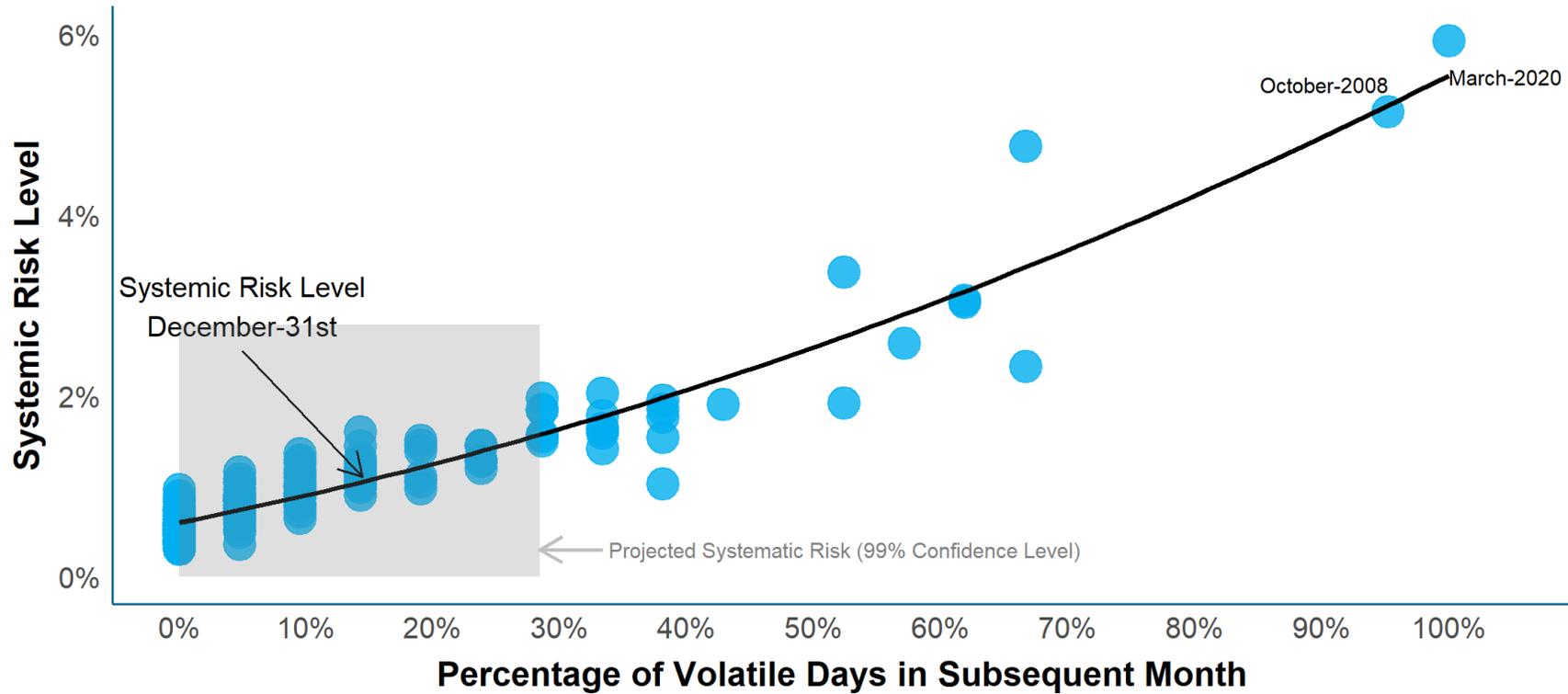
Fixed Income Volatility¹
(As of December 31, 2021)



- 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.

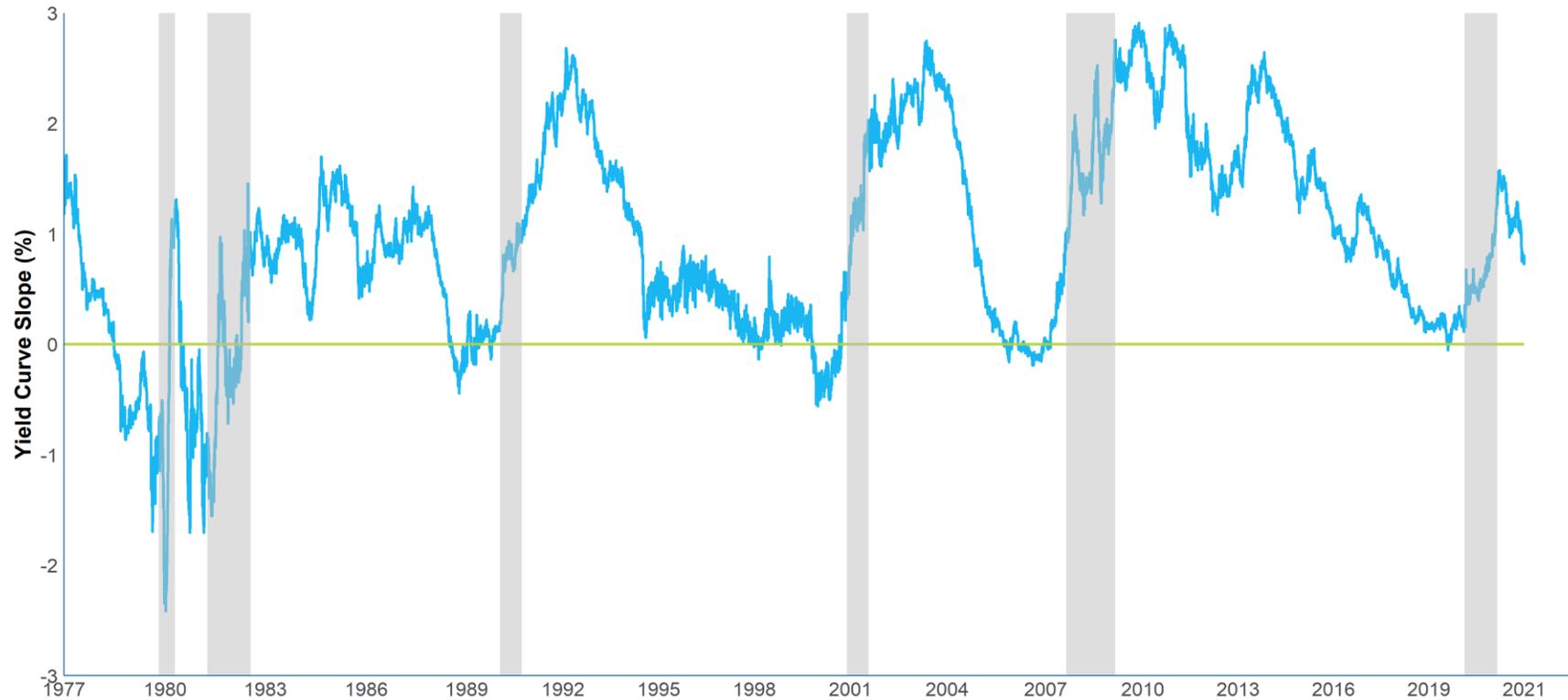
Systemic Risk and Volatile Market Days¹
(As of December 31, 2021)



- 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.

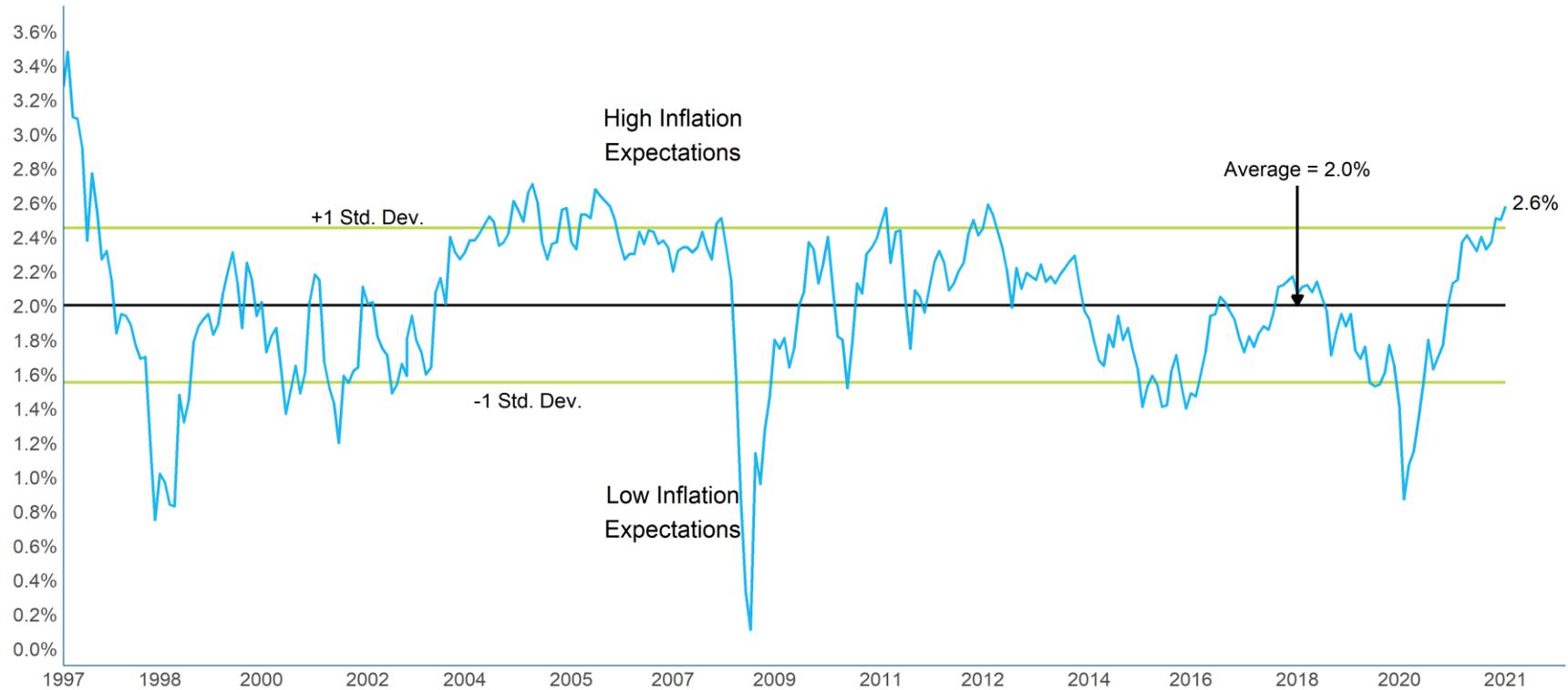
Yield Curve Slope (Ten Minus Two)¹
(As of December 31, 2021)



- 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.

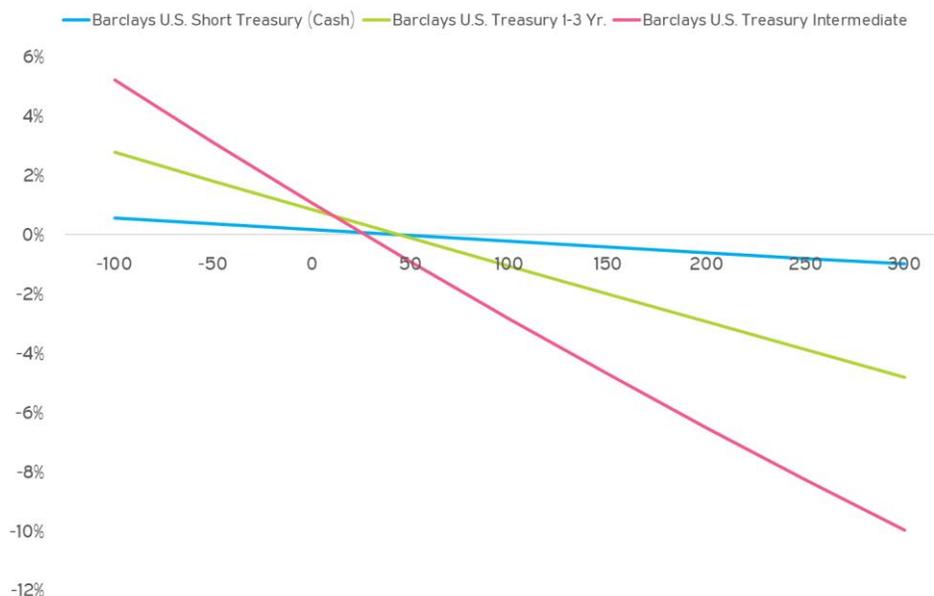
Ten-Year Breakeven Inflation¹
(As of December 31, 2021)



- 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).

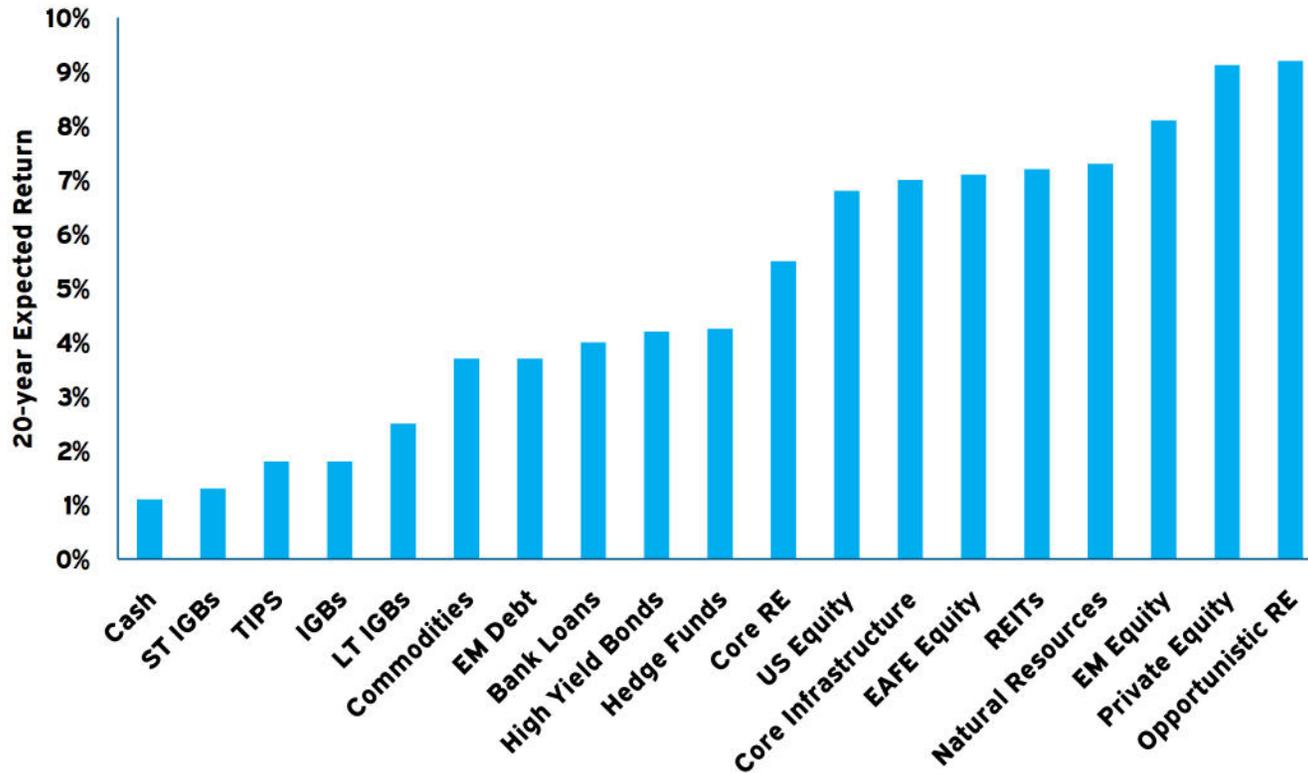
Total Return Given Changes in Interest Rates (bps)¹ (As of December 31, 2021)



	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)	0.5%	0.3%	0.1%	0.0%	-0.2%	-0.4%	-0.6%	-0.8%	-1.0%	0.39	0.15%
Barclays US Treasury 1-3 Yr.	2.8%	1.8%	0.8%	-0.1%	-1.1%	-2.0%	-3.0%	-3.9%	-4.8%	1.92	0.83%
Barclays US Treasury Intermediate	5.2%	3.1%	1.1%	-0.9%	-2.9%	-4.7%	-6.5%	-8.3%	-10.0%	4.03	1.05%
Barclays US Treasury Long	22.6%	11.7%	1.9%	-6.9%	-14.6%	-21.2%	-26.8%	-31.3%	-34.8%	18.61	1.89%

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 2021 Annual 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 October 31, 2021 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 October 31, 2021 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 October 31, 2021 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.

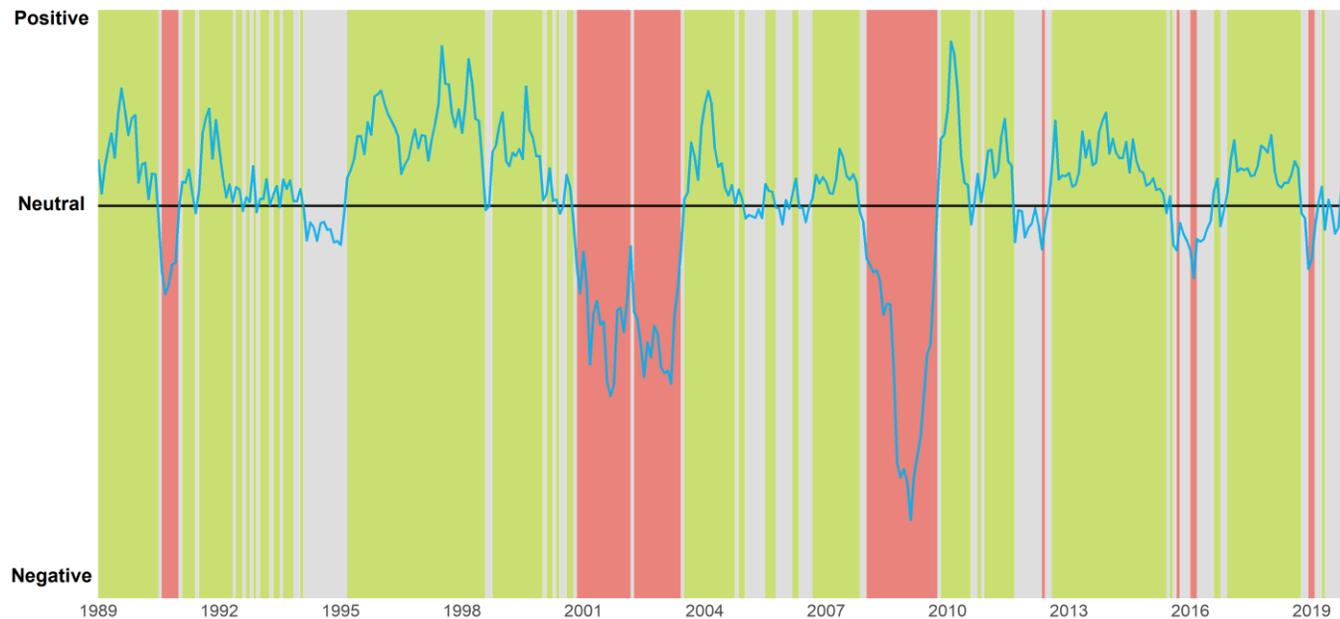
- Meketa's Risk Metrics, which rely significantly on standard market measures of relative valuation, often provide valid early signals of increasing long-term risk levels in the global investment markets. However, as is the case with numerous valuation measures, the Risk Metrics may convey such risk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

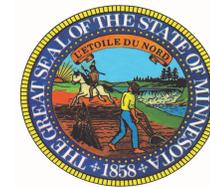
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REPORT

SBI Comprehensive Performance Report

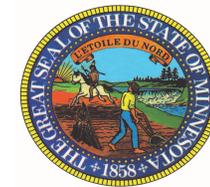
December 31, 2021

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Comprehensive Performance Report

December 31, 2021



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

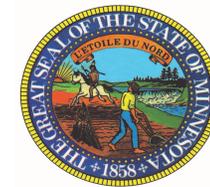
The Participant Directed Investment Program (PDIP) provides investment vehicles for a variety of retirement or other tax-advantaged savings plans. Investment goals among the PDIP's many participants are varied. In order to meet the variety of goals, participants may allocate their investments among one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

Non-Retirement

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.

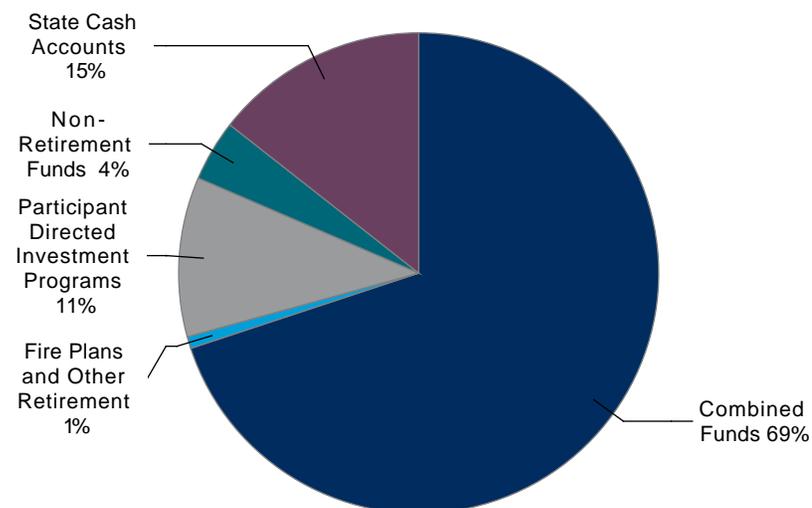
State Cash

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	\$94,134
FIRE PLANS + OTHER RETIREMENT	1,074
PARTICIPANT DIRECTED INVESTMENT PROGRAMS	14,470
State Deferred Compensation Plan	10,069
Health Care Savings Plan	1,747
Unclassified Employees Retirement Plan	409
Hennepin County Supplemental Retirement Plan	196
PERA Defined Contribution Plan	103
Minnesota College Savings Plan	1,920
Minnesota Achieving a Better Life Experience Plan	26
NON-RETIREMENT FUNDS	5,540
Assigned Risk Plan	282
Permanent School Fund	2,057
Environmental Trust Fund	1,759
Closed Landfill Investment Fund	140
Miscellaneous Trust Funds	375
Other Postemployment Benefits Accounts	927
STATE CASH ACCOUNTS	20,515
Invested Treasurer's Cash	20,446
Other State Cash Accounts	69
TOTAL SBI AUM	135,733



Note: Differentials within column amounts may occur due to rounding



Quarterly Report

Table of Contents

Combined Funds	5
Domestic Equity	
International Equity	
Fixed Income	
Private Markets	
Treasuries	
Participant Directed Investment Program	87
Supplemental Investment Fund	
Deferred Compensation Program	
Minnesota College Savings Plan	
Achieve a Better Life Experience	
Non-Retirement Funds	103
Assigned Risk Plan	
Permanent School Fund	
Environmental Trust Fund	
Closed Landfill Investment Fund	
Non-Retirement Managers	
State Cash Accounts	111
Invested Treasurer's Cash	
Other State Cash Accounts	
Addendum	113

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, 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. Inception to date return information is included for manager accounts and total asset class but not other aggregates because of portfolio management decisions to group managers in different aggregates over time.



Combined Funds

December 31, 2021



Combined Funds Summary

Combined Funds Change in Market Value (\$Millions)

	<u>One Quarter</u>
COMBINED FUNDS	
Beginning Market Value	\$89,948
Net Contributions	-675
Investment Return	4,860
Ending Market Value	94,134

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

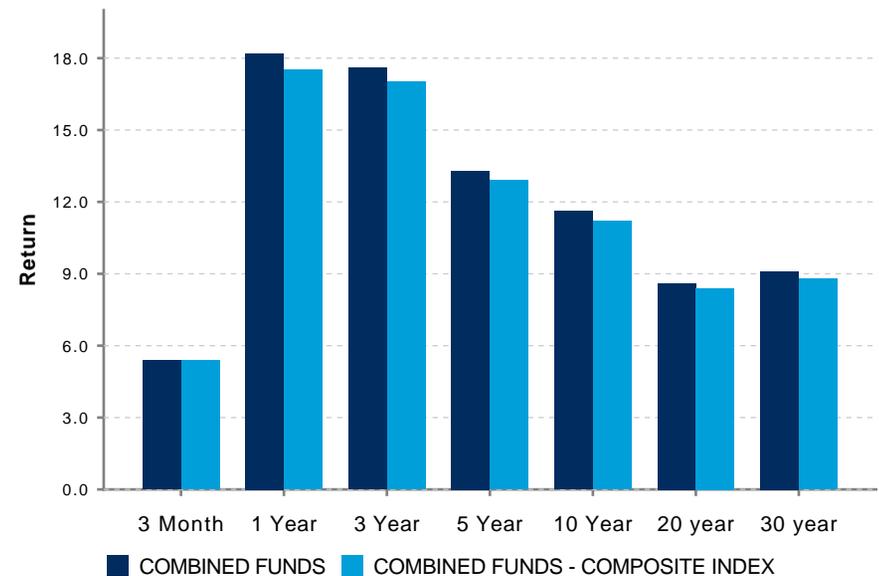
Asset Growth



Performance (Net of Fees)

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

	<u>Qtr</u>	<u>FYTD</u>	<u>1 Yr</u>	<u>3 Yr</u>	<u>5 Yr</u>	<u>10 Yr</u>	<u>20 Yr</u>	<u>30 Yr</u>
COMBINED FUNDS	5.4%	6.8%	18.2%	17.6%	13.3%	11.6%	8.6%	9.1%
COMBINED FUNDS - COMPOSITE INDEX	5.4	6.7	17.5	17.0	12.9	11.2	8.4	8.8
Excess	0.0	0.1	0.7	0.6	0.5	0.4	0.2	0.2



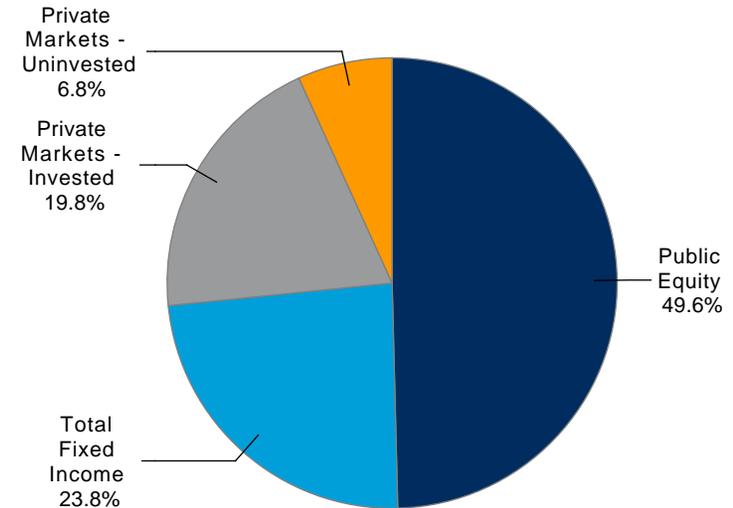


Combined Funds Summary

Asset Mix

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

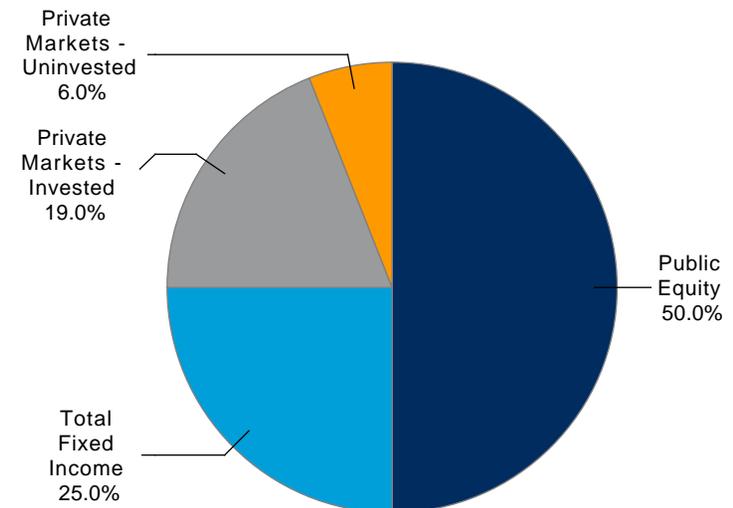
	<u>(Millions)</u>	<u>Actual Mix</u>	<u>Policy Target</u>
Public Equity	\$46,689	49.6%	50.0%
Total Fixed Income	22,391	23.8	25.0
Private Markets - Total	25,053	26.6	25.0
Private Markets - Invested	18,621	19.8	
Private Markets - Uninvested	6,432	6.8	
TOTAL	94,134	100.0	



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	19.0	Private Markets
Private Markets - Uninvested	6.0	S&P 500





Combined Funds Asset Class Performance Summary

Public Equity

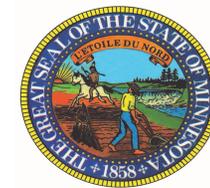
The Combined Funds Public Equity includes Domestic Equity, International Equity and Global Equity.

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

	<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	\$46.7	49.6%	50.0%	6.8%	5.8%	19.9%	22.0%	15.5%	13.9%	8.9%	9.6%
Public Equity Benchmark				6.8	5.7	19.6	21.5	15.1			
Excess				-0.0	0.1	0.4	0.5	0.3			
Domestic Equity	31.6	33.5	33.5	9.1	9.1	25.8	26.0	18.1	16.4	9.6	10.4
Domestic Equity Benchmark				9.3	9.2	25.7	25.7	17.9	16.3	9.7	10.5
Excess				-0.2	-0.1	0.1	0.3	0.2	0.1	-0.1	-0.1
International Equity	14.0	14.8	16.5	2.1	-0.6	9.0	14.1	10.1	7.9	7.1	
International Equity Benchmark				1.8	-1.2	7.8	13.1	9.6	7.3	6.8	
Excess				0.3	0.6	1.2	1.0	0.6	0.7	0.3	
Global Equity	1.2	1.2	0.0	3.3	-1.3	9.6					
MSCI AC WORLD INDEX NET				6.7	5.6	18.5					
Excess				-3.3	-6.8	-8.9					

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	\$22.4	23.8%	25.0%	0.4%	0.5%	-1.6%	6.4%	4.7%	3.9%	4.9%	5.8%
Total Fixed Income Benchmark				0.5	0.6	-2.1	5.8				
Excess				-0.1	-0.1	0.5	0.6				
Core/Core Plus	4.8	5.1	5.0	-0.1	0.1	-1.1	6.0	4.4	3.7	4.8	5.7
Core Bonds Benchmark				0.0	0.1	-1.5	4.8	3.6	2.9	4.3	5.3
Excess				-0.1	0.0	0.5	1.2	0.8	0.9	0.5	0.4
Return Seeking Fixed Income	4.0	4.3	5.0	0.1	-0.0	0.8					
Bloomberg U.S. Aggregate				0.0	0.1	-1.5					
Excess				0.1	-0.1	2.4					
Treasury Protection	9.0	9.6	10.0	1.0	1.2	-3.7	6.2				
Bloomberg Treasury 5+ Year				1.3	1.4	-3.8	6.2				
Excess				-0.2	-0.2	0.1	-0.0				
Laddered Bond + Cash	4.6	4.8	5.0	-0.1	-0.0	0.0	1.0	1.2	0.8	1.6	3.2
ICE BofA US 3-Month Treasury Bill				0.0	0.0	0.0	1.0	1.1	0.6	1.3	2.5
Excess				-0.1	-0.1	-0.0	-0.0	0.0	0.1	0.3	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	6.4%	16.4%	39.1%	16.9%	17.0%	13.9%	13.8%	13.8%	13.1%
Private Markets -Uninvested(1)	11.1	11.7	28.5						
Private Equity	5.9%	16.9%	44.5%	23.8%	22.3%	18.1%	15.7%	15.4%	15.7%
Private Credit	7.3%	13.4%	26.9%	11.8%	13.3%	13.2%	12.6%	12.7%	
Resources	6.5%	13.6%	27.8%	-2.4%	3.2%	2.4%	13.3%	12.6%	12.6%
Real Estate	9.4%	20.6%	29.6%	14.0%	12.7%	12.4%	9.4%	10.5%	8.6%

Private Markets

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

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

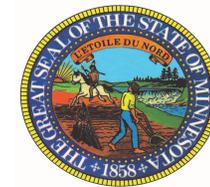
Private Credit Investments - The objectives of the Private Credit portfolio, which may include mezzanine debt, direct lending, and other forms of non-investment grade fixed income instruments, are to achieve a high total return over a full market cycle and to provide some degree of downside protection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

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

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

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

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



Quarterly Report

Asset Class & Manager Performance

December 31, 2021

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, 2021



	<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)	\$3,658,221,094	11.3%	3.1%	2.3%	18.5%	24.4%	16.8%	15.5%		
Active Domestic Equity Benchmark			5.7	3.4	20.3	22.7	15.0	14.9		
Excess			-2.5	-1.1	-1.7	1.7	1.7	0.6		
SEMI PASSIVE DOMESTIC EQUITY AGGREGATE (2)	3,376,194,650	10.5	11.0	11.1	28.8	26.8	18.9	16.9		
Semi Passive Domestic Equity Benchmark			9.8	10.0	26.5	26.2	18.4	16.5		
Excess			1.2	1.1	2.3	0.6	0.5	0.3		
PASSIVE DOMESTIC EQUITY AGGREGATE (3)	25,268,638,610	78.2	9.7	9.9	26.5	26.1	18.2	16.4		
Passive Domestic Equity Benchmark			9.7	9.9	26.4	26.1	18.3	16.4		
Excess			-0.0	0.0	0.1	0.0	-0.0	0.0		
TRANSITION AGGREGATE DOMESTIC EQUITY (4)	39	0.0								
TOTAL DOMESTIC EQUITY (5)	32,303,054,393	100.0	9.1	9.1	25.8	26.0	18.1	16.4	11.2	01/1984
Domestic Equity Benchmark			9.3	9.2	25.7	25.7	17.9	16.3	11.4	01/1984
Excess			-0.2	-0.1	0.1	0.3	0.2	0.1	-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>2020 Calendar Return</u>	<u>2019 Calendar Return</u>	<u>2018 Calendar Return</u>	<u>2017 Calendar Return</u>	<u>2016 Calendar Return</u>
Total Domestic Equity					
ACTIVE DOMESTIC EQUITY AGGREGATE (1)	27.3%	27.6%	-6.5%	20.6%	10.9%
Active Domestic Equity Benchmark	19.8	28.2	-8.0	18.3	15.7
Excess	7.5	-0.6	1.4	2.3	-4.8
SEMI PASSIVE DOMESTIC EQUITY AGGREGATE (2)	21.0	30.9	-4.9	22.5	11.1
Semi Passive Domestic Equity Benchmark	21.0	31.4	-4.8	21.7	12.1
Excess	0.0	-0.5	-0.1	0.8	-1.0
PASSIVE DOMESTIC EQUITY AGGREGATE (3)	20.8	31.3	-5.0	21.3	12.6
Passive Domestic Equity Benchmark	20.8	31.3	-5.0	21.5	12.5
Excess	0.0	0.0	-0.0	-0.2	0.1
TRANSITION AGGREGATE DOMESTIC EQUITY (4)					
TOTAL DOMESTIC EQUITY (5)	21.7%	30.7%	-5.3%	21.4%	11.5
Domestic Equity Benchmark	20.8%	30.8%	-5.2%	21.1%	12.7
Excess	0.9%	-0.1%	-0.0%	0.2%	-1.3

(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.

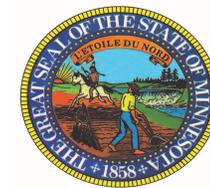
(5) The current Domestic Equity Benchmark is the Russell 3000.

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	\$275,654,189	0.9%	-6.6%	-2.8%	5.2%	33.9%	28.3%	20.5%	14.0%	01/2005
Russell 1000 Growth			11.6	12.9	27.6	34.1	25.3	19.8	12.9	01/2005
Excess			-18.2	-15.7	-22.4	-0.2	3.0	0.7	1.0	
WINSLOW	215,151,938	0.7	7.9	10.6	24.8	32.1	26.2	19.2	13.4	01/2005
Russell 1000 Growth			11.6	12.9	27.6	34.1	25.3	19.8	12.9	01/2005
Excess			-3.8	-2.3	-2.8	-2.0	0.9	-0.6	0.4	
RUSSELL 1000 GROWTH AGGREGATE (1)	490,806,127	1.5	-0.9	2.6	12.8	41.1	31.4	22.2		
Russell 1000 Growth			11.6	12.9	27.6	34.1	25.3	19.8		
Excess			-12.5	-10.3	-14.8	7.0	6.1	2.5		

(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>2020 Calendar Return</u>	<u>2019 Calendar Return</u>	<u>2018 Calendar Return</u>	<u>2017 Calendar Return</u>	<u>2016 Calendar Return</u>
Active Large Cap Growth					
SANDS	71.0%	33.5%	7.0%	35.3%	-6.9%
Russell 1000 Growth	38.5	36.4	-1.5	30.2	7.1
Excess	32.5	-2.8	8.6	5.1	-13.9
WINSLOW	37.6	34.2	4.2	33.2	-1.9
Russell 1000 Growth	38.5	36.4	-1.5	30.2	7.1
Excess	-0.9	-2.2	5.7	3.0	-9.0
RUSSELL 1000 GROWTH AGGREGATE (1)	81.3%	37.3%	4.7%	33.4%	1.0
Russell 1000 Growth	38.5%	36.4%	-1.5%	30.2%	7.1
Excess	42.8%	0.9%	6.2%	3.2%	-6.1

(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	\$1,697,838,501	5.3%	10.8%	10.7%	28.3%	26.4%	19.3%	17.4%	11.2%	01/1995
Semi Passive Domestic Equity Benchmark			9.8	10.0	26.5	26.2	18.4	16.5	10.8	01/1995
Excess			1.0	0.7	1.8	0.2	0.8	0.8	0.4	
J.P. MORGAN	1,678,356,149	5.2	11.3	11.5	29.3	27.2	18.9	17.1	11.1	01/1995
Semi Passive Domestic Equity Benchmark			9.8	10.0	26.5	26.2	18.4	16.5	10.8	01/1995
Excess			1.5	1.5	2.8	1.0	0.4	0.6	0.3	
SEMI-PASSIVE DOMESTIC EQUITY AGGREGATE	3,376,194,650	10.5	11.0	11.1	28.8	26.8	18.9	16.9		
Semi Passive Domestic Equity Benchmark			9.8	10.0	26.5	26.2	18.4	16.5		
Excess			1.2	1.1	2.3	0.6	0.5	0.3		



	<u>2020 Calendar Return</u>	<u>2019 Calendar Return</u>	<u>2018 Calendar Return</u>	<u>2017 Calendar Return</u>	<u>2016 Calendar Return</u>
Semi-Passive Large Cap					
BLACKROCK	20.7%	30.4%	-4.1%	24.6%	12.5%
Semi Passive Domestic Equity Benchmark	21.0	31.4	-4.8	21.7	12.1
Excess	-0.3	-1.0	0.7	2.9	0.5
J.P. MORGAN					
J.P. MORGAN	21.2	31.3	-5.4	21.8	12.3
Semi Passive Domestic Equity Benchmark	21.0	31.4	-4.8	21.7	12.1
Excess	0.3	-0.1	-0.6	0.1	0.2
SEMI-PASSIVE DOMESTIC EQUITY AGGREGATE					
SEMI-PASSIVE DOMESTIC EQUITY AGGREGATE	21.0%	30.9%	-4.9%	22.5%	11.1
Semi Passive Domestic Equity Benchmark	21.0%	31.4%	-4.8%	21.7%	12.1
Excess	0.0%	-0.5%	-0.1%	0.8%	-1.0



	<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	\$382,116,838	1.2%	9.2%	7.9%	27.7%	18.4%	12.3%	13.3%	9.1%	04/2004
Russell 1000 Value			7.8	6.9	25.2	17.6	11.2	13.0	8.7	04/2004
Excess			1.4	1.0	2.5	0.7	1.2	0.4	0.4	
LSV	387,457,748	1.2	6.9	4.5	29.7	17.5	11.2	14.2	9.6	04/2004
Russell 1000 Value			7.8	6.9	25.2	17.6	11.2	13.0	8.7	04/2004
Excess			-0.9	-2.4	4.5	-0.1	0.0	1.2	0.9	
RUSSELL 1000 VALUE AGGREGATE	769,574,587	2.4	8.0	6.2	28.8	18.6	12.3	13.7		
Russell 1000 Value			7.8	6.9	25.2	17.6	11.2	13.0		
Excess			0.3	-0.8	3.7	0.9	1.1	0.7		



	<u>2020 Calendar Return</u>	<u>2019 Calendar Return</u>	<u>2018 Calendar Return</u>	<u>2017 Calendar Return</u>	<u>2016 Calendar Return</u>
Active Large Cap Value					
BARROW HANLEY	2.4%	26.9%	-5.9%	14.6%	12.8%
Russell 1000 Value	2.8	26.5	-8.3	13.7	17.3
Excess	-0.4	0.4	2.4	0.9	-4.5
LSV					
LSV	-1.3	26.9	-11.8	18.6	17.0
Russell 1000 Value	2.8	26.5	-8.3	13.7	17.3
Excess	-4.1	0.4	-3.6	4.9	-0.4
RUSSELL 1000 VALUE AGGREGATE					
RUSSELL 1000 VALUE AGGREGATE	1.6%	27.4%	-8.7%	17.3%	15.3
Russell 1000 Value	2.8%	26.5%	-8.3%	13.7%	17.3
Excess	-1.2%	0.9%	-0.4%	3.7%	-2.1



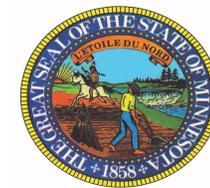
	<u>Ending Market Value</u>	<u>Portfolio Weight</u>	<u>Last Qtr</u>	<u>Fiscal YTD</u>	<u>1 Year</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>	<u>Since Inception</u>	<u>Inception Date</u>
Active Small Cap Growth										
ARROWMARK	\$208,976,684	0.6%	-4.9%	-5.9%	6.1%	15.8%	14.6%		16.0%	11/2016
Russell 2000 Growth			0.0	-5.6	2.8	21.2	14.5		16.2	11/2016
Excess			-4.9	-0.2	3.2	-5.4	0.1		-0.2	
HOOD RIVER	287,085,207	0.9	4.8	2.9	24.2	35.6	23.0		24.1	11/2016
Russell 2000 Growth			0.0	-5.6	2.8	21.2	14.5		16.2	11/2016
Excess			4.7	8.6	21.4	14.5	8.5		7.9	
RICE HALL JAMES	231,074,888	0.7	4.5	1.8	15.6	19.1	15.0		17.0	11/2016
Russell 2000 Growth			0.0	-5.6	2.8	21.2	14.5		16.2	11/2016
Excess			4.4	7.4	12.8	-2.1	0.5		0.8	
WELLINGTON	308,784,968	1.0	0.5	-0.8	4.3	23.4	15.3		17.0	11/2016
Russell 2000 Growth			0.0	-5.6	2.8	21.2	14.5		16.2	11/2016
Excess			0.4	4.8	1.4	2.3	0.8		0.8	
RUSSELL 2000 GROWTH AGGREGATE	1,035,921,748	3.2	1.3	-0.3	12.4	23.8	16.8	13.8		
Russell 2000 Growth			0.0	-5.6	2.8	21.2	14.5	14.1		
Excess			1.3	5.3	9.5	2.6	2.2	-0.3		



	<u>2020 Calendar Return</u>	<u>2019 Calendar Return</u>	<u>2018 Calendar Return</u>	<u>2017 Calendar Return</u>	<u>2016 Calendar Return</u>
Active Small Cap Growth					
ARROWMARK	21.9%	20.1%	0.9%	26.2%	
Russell 2000 Growth	34.6	28.5	-9.3	22.2	
Excess	-12.8	-8.4	10.3	4.1	
HOOD RIVER	61.7	24.3	-7.0	21.3	
Russell 2000 Growth	34.6	28.5	-9.3	22.2	
Excess	27.0	-4.2	2.3	-0.9	
RICE HALL JAMES	23.8	18.0	-6.9	27.9	
Russell 2000 Growth	34.6	28.5	-9.3	22.2	
Excess	-10.8	-10.5	2.4	5.8	
WELLINGTON	33.1	35.6	-11.6	22.6	
Russell 2000 Growth	34.6	28.5	-9.3	22.2	
Excess	-1.5	7.1	-2.3	0.4	
RUSSELL 2000 GROWTH AGGREGATE	35.4%	24.6%	-6.2%	22.0%	4.7
Russell 2000 Growth	34.6%	28.5%	-9.3%	22.2%	11.3
Excess	0.8%	-3.9%	3.2%	-0.1%	-6.6



	<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	\$340,151,466	1.1%	6.9%	5.7%	27.0%	17.0%	9.3%	12.4%	9.8%	01/2004
Russell 2000 Value			4.4	1.2	28.3	18.0	9.1	12.0	8.7	01/2004
Excess			2.6	4.4	-1.3	-1.0	0.3	0.4	1.1	
HOTCHKIS AND WILEY	195,634,393	0.6	3.6	5.9	36.5	17.7	8.5	13.0	8.9	01/2004
Russell 2000 Value			4.4	1.2	28.3	18.0	9.1	12.0	8.7	01/2004
Excess			-0.7	4.7	8.2	-0.3	-0.5	0.9	0.2	
MARTINGALE	194,548,367	0.6	8.5	8.7	41.3	17.7	8.2	13.3	8.6	01/2004
Russell 2000 Value			4.4	1.2	28.3	18.0	9.1	12.0	8.7	01/2004
Excess			4.1	7.5	13.0	-0.3	-0.9	1.3	-0.1	
PEREGRINE	315,957,218	1.0	6.7	4.6	28.6	18.7	9.5	12.3	10.5	07/2000
Russell 2000 Value			4.4	1.2	28.3	18.0	9.1	12.0	9.9	07/2000
Excess			2.4	3.4	0.3	0.7	0.5	0.3	0.5	
RUSSELL 2000 VALUE AGGREGATE	1,046,291,443	3.2	6.5	6.0	31.8	17.5	8.8	12.6		
Russell 2000 Value			4.4	1.2	28.3	18.0	9.1	12.0		
Excess			2.2	4.8	3.5	-0.5	-0.3	0.5		



	<u>2020 Calendar Return</u>	<u>2019 Calendar Return</u>	<u>2018 Calendar Return</u>	<u>2017 Calendar Return</u>	<u>2016 Calendar Return</u>
Active Small Cap Value					
GOLDMAN SACHS	2.4%	23.2%	-13.3%	12.6%	24.6%
Russell 2000 Value	4.6	22.4	-12.9	7.8	31.7
Excess	-2.3	0.8	-0.5	4.7	-7.1
HOTCHKIS AND WILEY	-0.2	19.7	-14.4	7.9	19.9
Russell 2000 Value	4.6	22.4	-12.9	7.8	31.7
Excess	-4.8	-2.7	-1.5	0.0	-11.8
MARTINGALE	-4.6	21.1	-15.0	6.9	34.3
Russell 2000 Value	4.6	22.4	-12.9	7.8	31.7
Excess	-9.2	-1.3	-2.1	-0.9	2.5
PEREGRINE	7.3	21.1	-16.1	12.5	27.8
Russell 2000 Value	4.6	22.4	-12.9	7.8	31.7
Excess	2.7	-1.3	-3.3	4.7	-3.9
RUSSELL 2000 VALUE AGGREGATE	1.5%	21.3%	-14.7%	10.2%	26.5
Russell 2000 Value	4.6%	22.4%	-12.9%	7.8%	31.7
Excess	-3.1%	-1.1%	-1.8%	2.3%	-5.2



	<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 All Cap										
ZEVENBERGEN (1)	\$315,627,190	1.0%	-5.8%	-9.8%	-9.7%	43.0%	32.2%	22.3%	13.3%	04/1994
Zevenbergen Custom Benchmark			10.9	11.7	32.3	35.7	26.2	20.2		04/1994
Excess			-16.7	-21.5	-42.0	7.3	6.0	2.1		
ACTIVE RUSSELL 3000 GROWTH (2)	315,627,190	1.0	-5.8	-9.8	-9.7					
Russell 3000 Growth TR			10.9	11.7	25.8					
Excess			-16.7	-21.5	-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>2020 Calendar Return</u>	<u>2019 Calendar Return</u>	<u>2018 Calendar Return</u>	<u>2017 Calendar Return</u>	<u>2016 Calendar Return</u>
Active All Cap					
ZEVENBERGEN (1)	126.2%	43.0%	2.3%	35.1%	-2.8%
Zevenbergen Custom Benchmark	38.5	36.4	-1.5	30.2	7.1
Excess	87.7	6.7	3.8	4.9	-9.9

**ACTIVE RUSSELL 3000
 GROWTH (2)**

Russell 3000 Growth TR
 Excess

(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	\$24,010,475,647	74.3%	9.8%	10.0%	26.5%	26.2%	18.4%		19.1%	11/2016
RUSSELL 1000 (DAILY)			9.8	10.0	26.5	26.2	18.4		19.1	11/2016
Excess			-0.0	0.0	0.1	0.0	-0.0		-0.0	
BLACKROCK RUSSELL 2000	100,149,002	0.3	2.1	-2.3	16.0	20.6			15.4	11/2018
RUSSELL 2000 (DAILY)			2.1	-2.3	14.8	20.0			14.8	11/2018
Excess			0.0	-0.0	1.2	0.6			0.6	
BLACKROCK RUSSELL 3000 (1)	1,158,013,961	3.6	9.3	9.3	26.2	26.1	18.1	16.4%	10.6	07/1995
Passive Manager Benchmark			9.3	9.2	25.7	25.8	18.0	16.3	10.5	07/1995
Excess			-0.0	0.1	0.5	0.3	0.2	0.1	0.1	
PASSIVE DOMESTIC EQUITY AGGREGATE (2)	25,268,638,610	78.2	9.7	9.9	26.5	26.1	18.2	16.4		
Passive Domestic Equity Benchmark			9.7	9.9	26.4	26.1	18.3	16.4		
Excess			-0.0	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.



	<u>2020 Calendar Return</u>	<u>2019 Calendar Return</u>	<u>2018 Calendar Return</u>	<u>2017 Calendar Return</u>	<u>2016 Calendar Return</u>
Total Passive Domestic Equity					
BLACKROCK RUSSELL 1000	20.9%	31.4%	-4.8%	21.7%	
RUSSELL 1000 (DAILY)	21.0	31.4	-4.8	21.7	
Excess	-0.0	0.0	-0.0	-0.0	
BLACKROCK RUSSELL 2000	20.8	25.2			
RUSSELL 2000 (DAILY)	20.0	25.5			
Excess	0.8	-0.3			
BLACKROCK RUSSELL 3000 (1)	21.2	31.1	-5.2	21.1	12.7%
Passive Manager Benchmark	20.9	31.0	-5.2	21.1	12.7
Excess	0.3	0.0	-0.0	0.0	0.0
PASSIVE DOMESTIC EQUITY AGGREGATE (2)	20.8%	31.3%	-5.0%	21.3%	12.6
Passive Domestic Equity Benchmark	20.8%	31.3%	-5.0%	21.5%	12.5
Excess	0.0%	0.0%	-0.0%	-0.2%	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.

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International Equity

December 31, 2021



	<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)	\$9,794,110,103	69.2%	3.2%	2.6%	12.9%	14.9%	10.2%	8.6%		
BENCHMARK DM			3.1	2.5	12.6	14.1	9.6	7.8		
Excess			0.0	0.1	0.3	0.9	0.6	0.8		
EMERGING MARKETS (2)	3,723,030,419	26.3	-1.0	-8.8	-1.5	11.8	10.3	5.6		
BENCHMARK EM			-1.3	-9.3	-2.5	10.9	9.9	5.5		
Excess			0.3	0.5	1.1	0.9	0.4	0.1		
ACWI EX-US AGGREGATE	401,712,273	2.8	1.8	0.6	12.8					
MSCI AC WORLD ex US (NET) - DAILY			1.8	-1.2	7.8					
Excess			-0.1	1.9	4.9					
CHINA ONLY AGGREGATE	203,955,847	1.4	5.0	-1.6	-2.9					
MSCI China A			3.2	-1.4	3.2					
Excess			1.9	-0.2	-6.1					
TRANSITION AGGREGATE INTERNATIONAL EQUITY (3)	782,461	0.0								
TOTAL INTERNATIONAL EQUITY (4)	14,149,250,807	100.0	2.1	-0.6	8.9	14.1	10.1	7.9	6.8	10/1992
International Equity Benchmark			1.8	-1.2	7.8	13.1	9.6	7.3	6.3	10/1992
Excess			0.3	0.6	1.1	1.0	0.5	0.7	0.5	

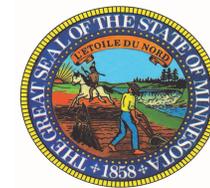
(1) The current benchmark for Developed Markets, Benchmark DM, is the Standard (large + mid) MSCI World ex USA (net).

(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 include impact of currency overlay on the passive EAFE portfolio from 12/1/95-10/31/00. This impact is included in the return for the Combined Funds portion of the International Equity portfolio.

Note: All aggregates include the performance of terminated managers. For historical benchmark details please refer to the addendum of this report.



	<u>2020 Calendar Return</u>	<u>2019 Calendar Return</u>	<u>2018 Calendar Return</u>	<u>2017 Calendar Return</u>	<u>2016 Calendar Return</u>
Total International Equity					
DEVELOPED MARKETS (1)	9.1%	23.3%	-14.2%	24.9%	1.3%
BENCHMARK DM	7.6	22.5	-14.1	24.2	2.7
Excess	1.5	0.8	-0.1	0.7	-1.5
EMERGING MARKETS (2)					
EMERGING MARKETS (2)	17.9	20.3	-15.4	37.7	7.5
BENCHMARK EM	18.3	18.4	-14.6	37.3	11.2
Excess	-0.4	1.9	-0.8	0.4	-3.7
ACWI EX-US AGGREGATE					
MSCI AC WORLD ex US (NET) - DAILY					
Excess					
CHINA ONLY AGGREGATE					
MSCI China A					
Excess					
TRANSITION AGGREGATE INTERNATIONAL EQUITY (3)					
TOTAL INTERNATIONAL EQUITY (4)					
TOTAL INTERNATIONAL EQUITY (4)	11.4%	22.4%	-14.5%	27.6%	2.6
International Equity Benchmark	10.5%	21.5%	-14.2%	27.2%	4.5
Excess	0.8%	0.9%	-0.3%	0.4%	-1.8

(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.

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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 Developed Markets										
ACADIAN	\$400,215,354	2.8%	4.2%	0.9%	13.6%	14.7%	12.4%	11.2%	7.3%	07/2005
BENCHMARK DM			3.1	2.5	12.6	14.1	9.6	7.8	5.7	07/2005
Excess			1.1	-1.6	0.9	0.7	2.7	3.4	1.6	
COLUMBIA	429,803,043	3.0	3.3	4.4	14.2	19.2	13.8	10.3	4.4	03/2000
BENCHMARK DM			3.1	2.5	12.6	14.1	9.6	7.8	4.2	03/2000
Excess			0.2	1.9	1.6	5.1	4.2	2.5	0.2	
FIDELITY	424,299,362	3.0	3.1	3.4	13.0	18.4	12.3	10.0	7.6	07/2005
BENCHMARK DM			3.1	2.5	12.6	14.1	9.6	7.8	5.7	07/2005
Excess			-0.0	0.9	0.4	4.3	2.6	2.2	1.8	
JP MORGAN	378,253,742	2.7	5.4	5.0	13.3	18.5	12.0	8.9	6.4	07/2005
BENCHMARK DM			3.1	2.5	12.6	14.1	9.6	7.8	5.7	07/2005
Excess			2.3	2.5	0.7	4.4	2.4	1.1	0.7	
MARATHON	393,222,114	2.8	1.3	1.2	12.8	14.5	9.8	9.4	8.3	11/1993
BENCHMARK DM			3.1	2.5	12.6	14.1	9.6	7.8	5.5	11/1993
Excess			-1.9	-1.3	0.2	0.4	0.2	1.6	2.7	
MCKINLEY	307,476,126	2.2	2.8	5.5	11.6	17.7	12.0	9.4	6.0	07/2005
BENCHMARK DM			3.1	2.5	12.6	14.1	9.6	7.8	5.7	07/2005
Excess			-0.4	3.0	-1.0	3.6	2.4	1.5	0.3	
AQR CAPITAL MANAGEMENT	374,601,660	2.6	1.9	-1.2	8.1	11.6	7.3	7.6	5.5	07/2005
BENCHMARK DM			3.1	2.5	12.6	14.1	9.6	7.8	5.7	07/2005
Excess			-1.2	-3.7	-4.5	-2.4	-2.3	-0.3	-0.2	



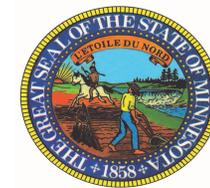
	<u>2020 Calendar Return</u>	<u>2019 Calendar Return</u>	<u>2018 Calendar Return</u>	<u>2017 Calendar Return</u>	<u>2016 Calendar Return</u>
Active Developed Markets					
ACADIAN	11.7%	19.1%	-13.5%	37.0%	8.1%
BENCHMARK DM	7.6	22.5	-14.1	24.2	2.7
Excess	4.2	-3.4	0.6	12.8	5.4
COLUMBIA	15.0	28.9	-14.9	32.7	-5.6
BENCHMARK DM	7.6	22.5	-14.1	24.2	2.7
Excess	7.4	6.4	-0.8	8.5	-8.3
FIDELITY	15.4	27.1	-14.6	25.9	1.2
BENCHMARK DM	7.6	22.5	-14.1	24.2	2.7
Excess	7.8	4.6	-0.5	1.7	-1.5
JP MORGAN	14.2	28.5	-17.3	28.3	4.0
BENCHMARK DM	7.6	22.5	-14.1	24.2	2.7
Excess	6.6	6.0	-3.3	4.1	1.2
MARATHON	7.6	23.5	-13.4	23.1	-1.1
BENCHMARK DM	7.6	22.5	-14.1	24.2	2.7
Excess	0.1	1.0	0.7	-1.1	-3.8
MCKINLEY	16.4	25.6	-15.9	28.5	-7.5
BENCHMARK DM	7.6	22.5	-14.1	24.2	2.7
Excess	8.8	3.1	-1.9	4.3	-10.2
AQR CAPITAL MANAGEMENT	6.5	20.8	-18.2	25.1	0.8
BENCHMARK DM	7.6	22.5	-14.1	24.2	2.7
Excess	-1.1	-1.7	-4.1	0.9	-2.0



	<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 Developed Markets										
Active Developed Markets Aggregate (1)	\$2,707,871,402	19.1%	3.1%	2.6%	12.5%	16.2%	11.1%	9.3%		
BENCHMARK DM			3.1	2.5	12.6	14.1	9.6	7.8		
Excess			0.0	0.2	-0.1	2.2	1.4	1.5		
SSgA DEVELOPED MARKETS PASSIVE										
SSgA DEVELOPED MARKETS PASSIVE	\$7,086,238,702	50.1%	3.2%	2.6%	13.0%	14.6%	10.1%	8.2%	6.6%	10/1992
BENCHMARK DM			3.1%	2.5%	12.6%	14.1%	9.6%	7.8%	6.3%	10/1992
Excess			0.0%	0.1%	0.4%	0.5%	0.4%	0.4%	0.3%	
RECORD CURRENCY (2)										
RECORD CURRENCY (2)	\$25,659,704	0.2%	0.2%	0.4%	0.9%					
DM PASSIVE EQUITY WITH CURRENCY MGMT										
DM PASSIVE EQUITY WITH CURRENCY MGMT	\$7,111,898,406	50.3%	3.4%	3.0%	13.9%	14.8%	10.0%	8.2%		
BENCHMARK DM			3.1%	2.5%	12.6%	14.1%	9.6%	7.8%		
Excess			0.2%	0.5%	1.3%	0.7%	0.4%	0.4%		
DEVELOPED MARKETS TOTAL										
DEVELOPED MARKETS TOTAL	9,794,110,103	69.2	3.2	2.6	12.9	14.9	10.2	8.6		
BENCHMARK DM			3.1	2.5	12.6	14.1	9.6	7.8		
Excess			0.0	0.1	0.3	0.9	0.6	0.8		

(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 Passive Account with Currency Management and without.

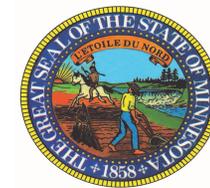


	<u>2020 Calendar Return</u>	<u>2019 Calendar Return</u>	<u>2018 Calendar Return</u>	<u>2017 Calendar Return</u>	<u>2016 Calendar Return</u>
Total Developed Markets					
Active Developed Markets Aggregate (1)	12.2%	24.4%	-15.1%	26.8%	-0.3%
BENCHMARK DM	7.6	22.5	-14.1	24.2	2.7
Excess	4.6	1.9	-1.0	2.6	-3.0
SSgA DEVELOPED MARKETS PASSIVE	8.2%	23.0%	-13.9%	24.7%	3.2
BENCHMARK DM	7.6%	22.5%	-14.1%	24.2%	2.7
Excess	0.6%	0.5%	0.2%	0.5%	0.4
DM PASSIVE EQUITY WITH CURRENCY MGMT	8.0%	23.0%	-13.9%	23.8%	3.3
BENCHMARK DM	7.6%	22.5%	-14.1%	24.2%	2.7
Excess	0.4%	0.5%	0.2%	-0.4%	0.5
DEVELOPED MARKETS TOTAL	9.1%	23.3%	-14.2%	24.9%	1.3
BENCHMARK DM	7.6%	22.5%	-14.1%	24.2%	2.7
Excess	1.5%	0.8%	-0.1%	0.7%	-1.5

(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	\$478,993,871	3.4%	-1.6%	-10.3%	-3.5%	15.8%			11.8%	04/2017
BENCHMARK EM			-1.3	-9.3	-2.5	10.9			7.9	04/2017
Excess			-0.3	-1.0	-1.0	4.9			3.9	
MACQUARIE	445,110,970	3.1	1.9	-8.7	-2.2	14.4			10.3	04/2017
BENCHMARK EM			-1.3	-9.3	-2.5	10.9			7.9	04/2017
Excess			3.2	0.6	0.3	3.4			2.4	
MORGAN STANLEY	563,392,394	4.0	0.5	-4.5	3.5	13.0	10.6%	6.6%	9.5	01/2001
BENCHMARK EM			-1.3	-9.3	-2.5	10.9	9.9	5.5	9.0	01/2001
Excess			1.8	4.8	6.0	2.0	0.7	1.1	0.5	
NEUBERGER BERMAN	403,048,387	2.8	-1.1	-10.2	-5.6	8.9			6.5	04/2017
BENCHMARK EM			-1.3	-9.3	-2.5	10.9			7.9	04/2017
Excess			0.2	-0.9	-3.1	-2.1			-1.4	
PZENA	369,735,725	2.6	-2.3	-5.6	9.3	10.1			7.0	04/2017
BENCHMARK EM			-1.3	-9.3	-2.5	10.9			7.9	04/2017
Excess			-1.0	3.7	11.8	-0.9			-1.0	
ROCK CREEK	427,884,306	3.0	-3.2	-11.5	-5.2	12.2			7.2	04/2017
BENCHMARK EM			-1.3	-9.3	-2.5	10.9			7.9	04/2017
Excess			-1.9	-2.2	-2.7	1.3			-0.8	



	<u>2020 Calendar Return</u>	<u>2019 Calendar Return</u>	<u>2018 Calendar Return</u>	<u>2017 Calendar Return</u>	<u>2016 Calendar Return</u>
Active Emerging Markets					
MARTIN CURRIE	26.5%	27.3%	-16.6%		
BENCHMARK EM	18.3	18.4	-14.6		
Excess	8.2	8.8	-2.0		
MACQUARIE	24.2	23.2	-13.3		
BENCHMARK EM	18.3	18.4	-14.6		
Excess	5.9	4.7	1.3		
MORGAN STANLEY	15.7	20.4	-16.7	37.9%	6.1%
BENCHMARK EM	18.3	18.4	-14.6	37.3	11.2
Excess	-2.6	1.9	-2.2	0.6	-5.1
NEUBERGER BERMAN	14.2	19.7	-17.1		
BENCHMARK EM	18.3	18.4	-14.6		
Excess	-4.1	1.3	-2.6		
PZENA	7.7	13.4	-10.8		
BENCHMARK EM	18.3	18.4	-14.6		
Excess	-10.6	-5.1	3.8		
ROCK CREEK	22.0	22.3	-17.6		
BENCHMARK EM	18.3	18.4	-14.6		
Excess	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	\$2,688,165,653	19.0%	-0.9%	-8.4%	-0.9%	12.3%	10.4%	5.5%		
BENCHMARK EM			-1.3	-9.3	-2.5	10.9	9.9	5.5		
Excess			0.4	0.9	1.6	1.3	0.5	-0.0		
SSGA EMERGING MARKETS PASSIVE	1,034,864,765	7.3	-1.4	-9.5	-2.9	10.7	9.7	5.5	5.5	01/2012
BENCHMARK EM			-1.3	-9.3	-2.5	10.9	9.9	5.5	5.5	01/2012
Excess			-0.0	-0.3	-0.3	-0.2	-0.1	0.0	0.0	
EMERGING MARKETS TOTAL	3,723,030,419	26.3	-1.0	-8.8	-1.5	11.8	10.3	5.6		
BENCHMARK EM			-1.3	-9.3	-2.5	10.9	9.9	5.5		
Excess			0.3	0.5	1.1	0.9	0.4	0.1		



	<u>2020 Calendar Return</u>	<u>2019 Calendar Return</u>	<u>2018 Calendar Return</u>	<u>2017 Calendar Return</u>	<u>2016 Calendar Return</u>
Total Emerging Markets					
ACTIVE EMERGING MARKETS AGGREGATE	17.6%	21.4%	-15.6%	37.2%	5.3%
BENCHMARK EM	18.3	18.4	-14.6	37.3	11.2
Excess	-0.7	3.0	-1.0	-0.1	-5.9
SSGA EMERGING MARKETS PASSIVE					
SSGA EMERGING MARKETS PASSIVE	18.3%	18.1%	-14.7%	37.4%	11.1
BENCHMARK EM	18.3%	18.4%	-14.6%	37.3%	11.2
Excess	0.0%	-0.3%	-0.1%	0.1%	-0.1
EMERGING MARKETS TOTAL					
EMERGING MARKETS TOTAL	17.9%	20.3%	-15.4%	37.7%	7.5
BENCHMARK EM	18.3%	18.4%	-14.6%	37.3%	11.2
Excess	-0.4%	1.9%	-0.8%	0.4%	-3.7



	<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>
Active ACWI ex-US										
EARNEST PARTNERS ACWI EX US	\$401,712,273	2.8%	1.8%	0.6%	12.8%				12.8%	01/2021
MSCI AC WORLD ex US (NET) - DAILY			1.8%	-1.2%	7.8%				7.8%	01/2021
Excess			-0.1%	1.9%	4.9%				4.9%	
TOTAL ACWI EX-US AGGREGATE										
TOTAL ACWI EX-US AGGREGATE	\$401,712,273	2.8%	1.8%	0.6%	12.8%					
MSCI AC WORLD ex US (NET) - DAILY			1.8%	-1.2%	7.8%					
Excess			-0.1%	1.9%	4.9%					



2020 Calendar Return

2019 Calendar Return

2018 Calendar Return

2017 Calendar Return

2016 Calendar Return

Active ACWI ex-US

EARNEST PARTNERS ACWI EX
US

MSCI AC WORLD ex US (NET) -
DAILY

Excess

**TOTAL ACWI EX-US
AGGREGATE**

MSCI AC WORLD ex US (NET) -
DAILY

Excess



	<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	\$203,955,847	1.4%	5.0%	-1.6%	-2.9%				-2.9%	01/2021
MSCI China A			3.2	-1.4	3.2				3.2	01/2021
Excess			1.9	-0.2	-6.1				-6.1	
CHINA ONLY AGGREGATE										
CHINA ONLY AGGREGATE	\$203,955,847	1.4%	5.0%	-1.6%	-2.9%					
MSCI China A			3.2%	-1.4%	3.2%					
Excess			1.9%	-0.2%	-6.1%					



2020 Calendar Return

2019 Calendar Return

2018 Calendar Return

2017 Calendar Return

2016 Calendar Return

China Only Managers

EARNEST PARTNERS CHINA

MSCI China A

Excess

CHINA ONLY AGGREGATE

MSCI China A

Excess

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Global Equity

December 31, 2021



	<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	\$385,890,261	33.4%	5.8%	2.3%	12.1%				12.1%	01/2021
MSCI AC WORLD NET USD DAILY			6.7	5.6	18.5				18.5	01/2021
Excess			-0.9	-3.3	-6.5				-6.5	
BAILLIE GIFFORD	325,699,683	28.2	-2.7	-7.9	3.1				3.1	01/2021
MSCI AC WORLD NET USD DAILY			6.7	5.6	18.5				18.5	01/2021
Excess			-9.4	-13.4	-15.5				-15.5	
MARTIN CURRIE INVESTMENTS - GLOBAL EQ	443,506,471	38.4	6.0	1.0	12.8				12.8	01/2021
MSCI AC WORLD NET USD DAILY			6.7	5.6	18.5				18.5	01/2021
Excess			-0.6	-4.6	-5.8				-5.8	
GLOBAL EQUITY	1,155,096,415	100.0	3.3	-1.3	9.6				9.6	01/2021
MSCI AC WORLD NET USD DAILY			6.7	5.6	18.5				18.5	01/2021
Excess			-3.3	-6.8	-8.9				-8.9	



2020 Calendar Return

2019 Calendar Return

2018 Calendar Return

2017 Calendar Return

2016 Calendar Return

Global Equity Managers

ARIEL INVESTMENTS

MSCI AC WORLD NET USD
DAILY

Excess

BAILLIE GIFFORD

MSCI AC WORLD NET USD
DAILY

Excess

**MARTIN CURRIE INVESTMENTS
- GLOBAL EQ**

MSCI AC WORLD NET USD
DAILY

Excess

GLOBAL EQUITY

MSCI AC WORLD NET USD
DAILY

Excess

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Core/Core Plus Bonds

December 31, 2021



	<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)	\$2,009,485,585	39.9%	-0.2%	0.0%	-1.0%					
Bloomberg U.S. Aggregate			0.0	0.1	-1.5					
Excess			-0.2	-0.0	0.5					
CORE PLUS (1)	3,030,297,501	60.1	-0.1	0.1	-1.1					
Bloomberg U.S. Aggregate			0.0	0.1	-1.5					
Excess			-0.1	0.0	0.4					
TRANSITION AGGREGATE CORE BONDS (2)	19,117	0.0								
TOTAL CORE/CORE PLUS BONDS (3)	5,039,802,203	100.0	-0.1	0.1	-1.1	6.0	4.4	3.7	7.3	07/1984
Bloomberg U.S. Aggregate			0.0	0.1	-1.5	4.8	3.6	2.9	6.9	07/1984
Excess			-0.1	0.0	0.5	1.2	0.8	0.9	0.4	

(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>2020 Calendar Return</u>	<u>2019 Calendar Return</u>	<u>2018 Calendar Return</u>	<u>2017 Calendar Return</u>	<u>2016 Calendar Return</u>
Bonds					
CORE (1)					
Bloomberg U.S. Aggregate					
Excess					
CORE PLUS (1)					
Bloomberg U.S. Aggregate					
Excess					
TRANSITION AGGREGATE CORE BONDS (2)					
TOTAL CORE/CORE PLUS BONDS (3)	9.7%	9.7%	-0.0%	4.2%	3.6
Bloomberg U.S. Aggregate	7.5%	8.7%	0.0%	3.5%	2.6
Excess	2.2%	1.0%	-0.1%	0.7%	0.9

(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.

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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	\$1,064,153,022	21.1%	-0.2%	-0.1%	-0.7%	6.0%	4.4%	4.2%	5.9%	02/2000
Bloomberg U.S. Aggregate			0.0	0.1	-1.5	4.8	3.6	2.9	4.9	02/2000
Excess			-0.2	-0.1	0.8	1.2	0.8	1.3	1.0	
BLACKROCK	945,332,564	18.8	-0.1	0.1	-1.3	5.3	3.9	3.2	5.1	04/1996
Bloomberg U.S. Aggregate			0.0	0.1	-1.5	4.8	3.6	2.9	5.0	04/1996
Excess			-0.1	0.0	0.2	0.5	0.3	0.3	0.1	
CORE	2,009,485,585	39.9	-0.2	0.0	-1.0					
Bloomberg U.S. Aggregate			0.0	0.1	-1.5					
Excess			-0.2	-0.0	0.5					



	<u>2020 Calendar Return</u>	<u>2019 Calendar Return</u>	<u>2018 Calendar Return</u>	<u>2017 Calendar Return</u>	<u>2016 Calendar Return</u>
Active Core					
DODGE & COX	9.4%	9.6%	-0.0%	4.2%	4.8%
Bloomberg U.S. Aggregate	7.5	8.7	0.0	3.5	2.6
Excess	1.8	0.9	-0.1	0.7	2.2
BLACKROCK					
BLACKROCK	8.3	9.3	-0.1	3.7	2.8
Bloomberg U.S. Aggregate	7.5	8.7	0.0	3.5	2.6
Excess	0.8	0.6	-0.2	0.1	0.1

CORE					
Bloomberg U.S. Aggregate					
Excess					



	<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	\$901,449,039	17.9%	0.1%	0.4%	-1.5%	5.6%	4.1%	3.4%	5.4%	07/1993
Bloomberg U.S. Aggregate			0.0	0.1	-1.5	4.8	3.6	2.9	5.1	07/1993
Excess			0.0	0.3	0.0	0.8	0.5	0.5	0.4	
NEUBERGER	991,261,956	19.7	-0.0	0.2	-0.6	6.0	4.3	3.4	6.3	07/1988
Bloomberg U.S. Aggregate			0.0	0.1	-1.5	4.8	3.6	2.9	6.0	07/1988
Excess			-0.0	0.1	1.0	1.2	0.7	0.5	0.3	
WESTERN	1,137,586,507	22.6	-0.3	-0.2	-1.3	6.8	5.1	4.4	8.1	07/1984
Bloomberg U.S. Aggregate			0.0	0.1	-1.5	4.8	3.6	2.9	6.9	07/1984
Excess			-0.3	-0.3	0.3	2.0	1.5	1.5	1.2	
CORE PLUS	3,030,297,501	60.1	-0.1	0.1	-1.1					
Bloomberg U.S. Aggregate			0.0	0.1	-1.5					
Excess			-0.1	0.0	0.4					



	<u>2020 Calendar Return</u>	<u>2019 Calendar Return</u>	<u>2018 Calendar Return</u>	<u>2017 Calendar Return</u>	<u>2016 Calendar Return</u>
Core Plus Bonds					
GOLDMAN SACHS	9.0%	9.6%	-0.0%	3.9%	3.0%
Bloomberg U.S. Aggregate	7.5	8.7	0.0	3.5	2.6
Excess	1.5	0.9	-0.0	0.4	0.3
NEUBERGER	9.9	9.0	-0.1	3.6	2.7
Bloomberg U.S. Aggregate	7.5	8.7	0.0	3.5	2.6
Excess	2.4	0.3	-0.1	0.0	0.1
WESTERN	10.9	11.1	-0.2	5.6	4.9
Bloomberg U.S. Aggregate	7.5	8.7	0.0	3.5	2.6
Excess	3.4	2.4	-0.3	2.1	2.2

CORE PLUS

Bloomberg U.S. Aggregate

Excess

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Return Seeking Bonds

December 31, 2021

Minnesota State Board of Investment
Quarter Ending December 31, 2021
Return Seeking Bonds Managers



	<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	\$936,073,433	23.2%	0.1%	-0.0%	1.1%				2.0%	12/2020
Credit Plus Benchmark			0.1	0.2	0.0				0.1	12/2020
Excess			-0.0	-0.3	1.1				1.9	
PIMCO CREDIT PLUS	816,971,904	20.3	0.2	0.5	0.8				1.5	12/2020
Credit Plus Benchmark			0.1	0.2	0.0				0.1	12/2020
Excess			0.1	0.2	0.7				1.4	
CREDIT PLUS	1,753,045,337	43.5	0.1	0.2	0.9				1.8	12/2020
Credit Plus Benchmark			0.1	0.2	0.0				0.1	12/2020
Excess			0.0	-0.0	0.9				1.7	
BLACKROCK OPPORTUNISTIC	505,299,008	12.5	-0.0	0.0	0.3				0.9	12/2020
ICE BofA US 3-Month Treasury Bill			0.0	0.0	0.0				0.1	12/2020
Excess			-0.1	-0.0	0.2				0.8	
ASHMORE EMERGING MARKET	271,996,943	6.7	-3.6	-8.3	-10.1				-10.1	01/2021
JPM JEMB Sovereign-only 50-50			-1.5	-3.4	-5.3				-5.3	01/2021
Excess			-2.1	-5.0	-4.8				-4.8	
TCW SECURITIZED CREDIT	302,433,528	7.5	0.6	0.9					0.9	07/2021
ICE BofA US 3-Month Treasury Bill			0.0	0.0					0.0	07/2021
Excess			0.6	0.8					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>
Return Seeking Bonds Managers										
PAYDEN RYGEL	\$308,367,771	7.7%	0.1%	0.4%	2.6%				2.6%	01/2021
Multi-Asset Credit Benchmark			0.3	0.8	2.7				2.7	01/2021
Excess			-0.3	-0.4	-0.1				-0.1	
PGIM	310,739,408	7.7	1.5	2.1	3.2				3.2	01/2021
Multi-Asset Credit Benchmark			0.3	0.8	2.7				2.7	01/2021
Excess			1.2	1.3	0.5				0.5	
MULTI-ASSET CREDIT	619,107,179	15.4	0.8	1.2	2.9				2.9	01/2021
Multi-Asset Credit Benchmark			0.3	0.8	2.7				2.7	01/2021
Excess			0.5	0.4	0.2				0.2	
KKR	315,246,552	7.8	0.9	1.9	4.7				4.7	01/2021
ICE BofA US Cash Pay HY Constrained			0.7	1.6	5.3				5.3	01/2021
Excess			0.2	0.3	-0.6				-0.6	
OAKTREE	263,101,289	6.5	0.8	1.7	4.5				4.5	01/2021
ICE BofA US Cash Pay HY Constrained			0.7	1.6	5.3				5.3	01/2021
Excess			0.2	0.0	-0.8				-0.8	
HIGH YIELD	578,347,841	14.4	0.9	1.8	4.6				4.6	01/2021
ICE BofA US Cash Pay HY Constrained			0.7	1.6	5.3				5.3	01/2021
Excess			0.2	0.2	-0.7				-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	\$1,753,045,337	43.5%	0.1%	0.2%	0.9%				1.8%	12/2020
Credit Plus Benchmark			0.1	0.2	0.0				0.1	12/2020
Excess			0.0	-0.0	0.9				1.7	
OPPORTUNISTIC FI	505,299,008	12.5	-0.0	0.0	0.3				0.9	12/2020
ICE BofA US 3-Month Treasury Bill			0.0	0.0	0.0				0.1	12/2020
Excess			-0.1	-0.0	0.2				0.8	
EMERGING MARKET DEBT	271,996,943	6.7	-3.6	-8.3	-10.1				-10.1	01/2021
JPM JEMB Sovereign-only 50-50			-1.5	-3.4	-5.3				-5.3	01/2021
Excess			-2.1	-5.0	-4.8				-4.8	
SECURITIZED CREDIT	302,433,528	7.5	0.6	0.9					0.8	06/2021
ICE BofA US 3-Month Treasury Bill			0.0	0.0					0.0	06/2021
Excess			0.6	0.8					0.8	
MULTI-ASSET CREDIT	619,107,179	15.4	0.8	1.2	2.9				2.9	01/2021
Multi-Asset Credit Benchmark			0.3	0.8	2.7				2.7	01/2021
Excess			0.5	0.4	0.2				0.2	
HIGH YIELD	578,347,841	14.4	0.9	1.8	4.6				4.6	01/2021
ICE BofA US Cash Pay HY Constrained			0.7	1.6	5.3				5.3	01/2021
Excess			0.2	0.2	-0.7				-0.7	
RETURN SEEKING BONDS	4,030,229,837	100.0	0.1	-0.0	0.9				1.6	12/2020
Return Seeking Fixed Income Benchmark			0.1	0.2	0.8				1.3	12/2020
Excess			-0.0	-0.2	0.1				0.4	



Treasuries

December 31, 2021



	<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	\$2,794,530,888	31.1%	1.1%	1.2%	-4.0%	6.0%			5.2%	02/2018
Bloomberg Treasury 5+ Year			1.3	1.4	-3.8	6.2			5.4	02/2018
Excess			-0.2	-0.2	-0.2	-0.2			-0.2	
GOLDMAN SACHS	2,986,771,158	33.2	1.0	1.2	-3.9	6.2			5.3	02/2018
Bloomberg Treasury 5+ Year			1.3	1.4	-3.8	6.2			5.4	02/2018
Excess			-0.3	-0.3	-0.1	-0.0			-0.1	
NEUBERGER	3,213,311,415	35.7	1.1	1.3	-3.4	6.3			5.4	02/2018
Bloomberg Treasury 5+ Year			1.3	1.4	-3.8	6.2			5.4	02/2018
Excess			-0.2	-0.1	0.4	0.1			0.0	
TOTAL TREASURIES	8,994,613,462	100.0	1.0	1.2	-3.7	6.2			5.3%	02/2018
Bloomberg Treasury 5+ Year			1.3	1.4	-3.8	6.2			5.4%	02/2018
Excess			-0.2	-0.2	0.0	-0.0			-0.1%	



	<u>2020 Calendar Return</u>	<u>2019 Calendar Return</u>	<u>2018 Calendar Return</u>	<u>2017 Calendar Return</u>	<u>2016 Calendar Return</u>
Treasuries Managers					
BLACKROCK	12.5%	10.4%			
Bloomberg Treasury 5+ Year	12.8	10.4			
Excess	-0.3	-0.1			
GOLDMAN SACHS	12.7	10.6			
Bloomberg Treasury 5+ Year	12.8	10.4			
Excess	-0.1	0.1			
NEUBERGER	12.8	10.4			
Bloomberg Treasury 5+ Year	12.8	10.4			
Excess	-0.1	-0.0			
TOTAL TREASURIES	12.7%	10.4%			
Bloomberg Treasury 5+ Year	12.8%	10.4%			
Excess	-0.2%	0.0%			

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Laddered Bonds + Cash

December 31, 2021

Minnesota State Board of Investment
Quarter Ending December 31, 2021
Laddered Bond + Cash Managers



	<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	\$1,796,191,840	39.4%	-0.1%	0.0%				0.1%	11/2020
ICE BofA US 3-Month Treasury Bill			0.0	0.0				0.1	11/2020
Excess			-0.1	-0.0				0.0	
Goldman Sachs Ladder Bond	1,796,195,852	39.4	-0.1	0.1				0.1	11/2020
ICE BofA US 3-Month Treasury Bill			0.0	0.0				0.1	11/2020
Excess			-0.1	0.0				0.0	
Treasury Ladder Aggregate	3,592,387,692	78.8	-0.1	0.0				0.1	11/2020
ICE BofA US 3-Month Treasury Bill			0.0	0.0				0.1	11/2020
Excess			-0.1	-0.0				0.0	
Combined Funds STIF	943,371,504	20.7	0.0	0.1	1.0%	1.2%	0.7%		
iMoneyNet Money Fund Average-All Taxable			0.0	0.0	0.7	0.8	0.4		
Excess			0.0	0.1	0.2	0.3	0.3		
TEACHERS RETIREMENT CD REPO	23,060,292	0.5	0.0	0.1	1.2	1.3			
ICE BofA US 3-Month Treasury Bill			0.0	0.0	1.0	1.1			
Excess			0.0	0.0	0.2	0.2			
Laddered Bond + Cash	4,558,820,479	100.0	-0.1	0.0	1.0	1.2	0.8		
ICE BofA US 3-Month Treasury Bill			0.0	0.0	1.0	1.1	0.6		
Excess			-0.1	-0.0	-0.0	0.0	0.1		



Uninvested Private Markets

December 31, 2021



	<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	\$899,199,201	14.0%	11.2%	11.8%	28.1%				28.1%	01/2021
S&P 500 INDEX (DAILY)			11.0	11.7	28.7				28.7	01/2021
Excess			0.1	0.1	-0.6				-0.6	
BLACKROCK SP INDEX	5,532,994,914	86.0	11.1	11.7	28.9				28.9	01/2021
S&P 500 INDEX (DAILY)			11.0	11.7	28.7				28.7	01/2021
Excess			0.1	0.1	0.2				0.2	
UNINVESTED PRIVATE PMARKETS	6,432,194,116	100.0	11.1	11.7	28.6				28.6	01/2021
S&P 500 INDEX (DAILY)			11.0	11.7	28.7				28.7	01/2021
Excess			0.1	0.0	-0.1				-0.1	



Private Markets

December 31, 2021



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	6.4%	16.4%	39.1%	16.9%	17.0%	13.9%	13.8%	13.8%	13.1%
Private Markets -Uninvested(1)	11.1	11.7	28.5						
Private Equity	5.9%	16.9%	44.5%	23.8%	22.3%	18.1%	15.7%	15.4%	15.7%
Private Credit	7.3%	13.4%	26.9%	11.8%	13.3%	13.2%	12.6%	12.7%	
Resources	6.5%	13.6%	27.8%	-2.4%	3.2%	2.4%	13.3%	12.6%	12.6%
Real Estate	9.4%	20.6%	29.6%	14.0%	12.7%	12.4%	9.4%	10.5%	8.6%

Private Markets

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

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

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

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

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

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

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

Minnesota State Board of Investment
Private Markets Investments as of December 31, 2021

Investments	Commitments	Contributions	Distributions	Remaining Commitment	Market Value	Investment Multiple	IRR	Vintage Year
Private Equity	22,381,478,315	16,810,290,272	14,716,613,205	7,148,221,367	13,430,493,676	1.67	13.95	
Adams Street Partners, LLC	285,440,000	147,314,692	88,411,532	138,125,308	139,179,212	1.54	13.45	
Adams Street Global Secondary Fund 5	100,000,000	77,114,692	65,670,831	22,885,308	39,760,044	1.37	7.14	2012
Adams Street Global Secondary Fund 6	100,000,000	70,200,000	22,740,701	29,800,000	94,628,500	1.67	42.12	2017
Adams Street Global Secondary Fund 7	85,440,000	0	0	85,440,000	4,790,668	0.00		2021
Advent International Group	355,000,000	297,283,913	307,053,636	64,475,449	360,690,340	2.25	20.75	
Advent International GPE VI-A, L.P.	50,000,000	52,993,313	103,400,194	0	5,713,664	2.06	16.66	2008
Advent International GPE VII, L.P.	90,000,000	84,690,641	121,395,551	5,400,000	44,853,065	1.96	15.03	2012
Advent International GPE VIII-B	100,000,000	94,900,002	73,062,483	5,099,998	140,736,483	2.25	25.59	2016
Advent International GPE IX	115,000,000	64,699,957	9,195,408	53,975,451	169,387,127	2.76	103.65	2019
Affinity Ventures	9,000,000	9,000,000	3,590,011	0	1,092,682	0.52	-10.68	
Affinity Ventures IV, L.P.	4,000,000	4,000,000	1,541,970	0	3,279	0.39	-38.56	2004
Affinity Ventures V, L.P.	5,000,000	5,000,000	2,048,042	0	1,089,403	0.63	-7.12	2008
Apax Partners	500,000,000	457,429,439	438,692,620	110,413,546	442,652,513	1.93	20.90	
APAX VIII - USD	200,000,000	233,892,465	335,200,854	11,285,376	91,032,096	1.82	16.07	2013
Apax IX USD L.P.	150,000,000	151,432,129	103,661,099	21,402,349	271,343,783	2.48	35.35	2016
Apax X USD L.P.	150,000,000	72,104,846	(169,333)	77,725,821	80,276,633	1.11	27.05	2019
Arsenal Capital Partners	175,000,000	59,579,360	2,572,916	117,872,804	75,118,508	1.30	17.49	
Arsenal Capital Partners V, L.P.	75,000,000	59,579,360	2,572,916	17,872,804	75,118,508	1.30	17.49	2019
Arsenal Capital Partners VI LP	100,000,000	0	0	100,000,000	0	0.00		2021
Asia Alternatives	399,000,000	96,205,529	10,585,653	310,428,730	103,996,168	1.19	12.80	
Asia Alternatives Capital Partners V	99,000,000	86,063,243	10,585,653	20,571,016	95,983,925	1.24	14.83	2017
MN Asia Investors	300,000,000	10,142,286	0	289,857,714	8,012,244	0.79	-27.04	2020
Banc Fund	276,801,387	285,710,477	236,753,119	0	233,468,801	1.65	11.32	
Banc Fund VIII, L.P.	98,250,000	98,250,000	205,046,223	0	6,080,304	2.15	12.74	2008
Banc Fund IX, L.P.	107,205,932	107,205,932	28,394,227	0	132,298,016	1.50	8.41	2014
Banc Fund X, L.P.	71,345,455	80,254,545	3,312,670	0	95,090,481	1.23	11.39	2018
BlackRock	501,774,870	506,392,392	4,457,327	34,324,007	683,321,802	1.36	35.71	
BlackRock Tempus Fund*	1,774,870	1,774,870	1,796,583	0	186,302	1.12	5.87	2015
BlackRock Long Term Capital, SCSP	500,000,000	504,617,522	2,660,745	34,324,007	683,135,500	1.36	36.39	2019

**Minnesota State Board of Investment
Private Markets Investments as of December 31, 2021**

Investments	Commitments	Contributions	Distributions	Remaining Commitment	Market Value	Investment Multiple	IRR	Vintage Year
Blackstone Group L.P.	1,235,000,000	718,142,379	655,267,901	604,954,797	476,021,334	1.58	16.37	
Blackstone Capital Partners Asia II	270,000,000	0	0	270,000,000	0	0.00		2021
Blackstone Capital Partners IV, L.P.	70,000,000	84,459,884	200,562,452	1,832,302	1,039,731	2.39	37.02	2002
Blackstone Capital Partners V L.P.	140,000,000	152,406,707	243,424,491	7,027,560	3,205,729	1.62	8.03	2006
Blackstone Capital Partners VI, L.P.	100,000,000	106,447,971	139,191,740	11,175,309	46,446,134	1.74	12.48	2008
Blackstone Capital Partners VII	130,000,000	136,105,549	54,670,664	10,977,430	164,191,592	1.61	19.39	2015
Blackstone Capital Partners VIII LP	150,000,000	48,549,459	1,647,045	105,491,598	57,160,416	1.21	37.54	2019
Blackstone Growth	250,000,000	148,422,810	15,771,509	115,200,598	162,338,412	1.20	51.71	2020
Blackstone Supplemental Account - M	125,000,000	41,750,000	0	83,250,000	41,639,321	1.00	-0.62	2021
Blackstone Strategic Partners	815,500,000	641,533,016	747,548,822	251,665,221	293,455,911	1.62	12.20	
Strategic Partners III VC, L.P.	25,000,000	25,059,678	33,874,990	1,008,025	284,606	1.36	5.98	2004
Strategic Partners III-B, L.P.	100,000,000	79,629,077	118,509,586	12,304,709	210,560	1.49	6.35	2004
Strategic Partners IV VC, L.P.	40,500,000	42,141,930	61,740,454	2,280,812	2,950,538	1.54	9.22	2008
Strategic Partners IV-B	100,000,000	99,328,593	151,709,708	11,695,838	4,587,301	1.57	12.23	2008
Strategic Partners V, LP	100,000,000	86,990,760	132,472,411	21,261,697	10,991,070	1.65	18.75	2011
Strategic Partners VI, L.P.	150,000,000	102,248,069	120,356,510	54,093,766	40,539,181	1.57	15.95	2014
Strategic Partners VII, L.P.	150,000,000	109,444,381	89,135,151	56,312,272	107,256,333	1.79	23.14	2016
Strategic Partners VIII	150,000,000	96,690,527	39,750,012	92,708,103	126,636,322	1.72	64.83	2018
Bridgepoint	171,517,322	104,779,696	13,311,036	66,737,626	112,479,740	1.20	14.98	
Bridgepoint Europe VI L.P.	171,517,322	104,779,696	13,311,036	66,737,626	112,479,740	1.20	14.98	2018
Brookfield Asset Management Inc.	350,000,000	276,328,328	163,785,962	105,511,499	311,895,269	1.72	41.52	
Brookfield Capital Partners Fund IV	100,000,000	99,945,063	152,347,702	20,456,504	100,047,680	2.53	48.03	2015
Brookfield Capital Partners V L.P.	250,000,000	176,383,265	11,438,260	85,054,995	211,847,590	1.27	21.52	2018
CVC Capital Partners	392,123,020	435,638,955	540,973,576	26,866,441	279,638,780	1.88	17.04	
CVC European Equity Partners V, L.P.	133,940,455	153,884,098	294,886,647	1,624,193	5,275,725	1.95	16.79	2008
CVC Capital Partners VI	258,182,565	281,754,857	246,086,929	25,242,248	274,363,055	1.85	17.38	2013
Canyon Partners	125,000,000	85,000,000	8,750,000	48,750,000	94,881,463	1.22	22.58	
Canyon Distressed Opportunity Fund III	125,000,000	85,000,000	8,750,000	48,750,000	94,881,463	1.22	22.58	2020

Minnesota State Board of Investment
Private Markets Investments as of December 31, 2021

Investments	Commitments	Contributions	Distributions	Remaining Commitment	Market Value	Investment Multiple	IRR	Vintage Year
CarVal Investors	900,000,000	712,703,333	876,459,499	187,500,000	228,636,439	1.55	10.74	
CarVal Credit Value Fund I	100,000,000	95,000,000	213,343,831	5,000,000	492,573	2.25	18.71	2010
CVI Credit Value Fund A II	150,000,000	142,500,000	199,242,174	7,500,000	3,939,841	1.43	8.31	2012
CVI Credit Value Fund A III	150,000,000	142,500,000	142,972,726	7,500,000	47,697,343	1.34	8.61	2015
CVI Credit Value Fund IV	150,000,000	112,703,333	60	37,500,000	143,495,213	1.27	7.91	2017
CVI Credit Value Fund V	150,000,000	30,000,000	154,566	120,000,000	32,913,000	1.10	10.75	2020
CVI Global Value Fund, L.P.	200,000,000	190,000,000	320,746,143	10,000,000	98,469	1.69	9.53	2007
Cardinal Partners	10,000,000	10,000,000	39,196,082	0	30,447	3.92	10.61	
DSV Partners IV	10,000,000	10,000,000	39,196,082	0	30,447	3.92	10.61	1985
Carlyle Group	400,000,000	243,895,589	56,816,362	205,382,274	213,098,725	1.11	8.45	
Carlyle Partners VII, L.P.	150,000,000	145,344,820	4,603,692	9,258,872	155,256,062	1.10	8.14	2017
Carlyle Partners VIII	150,000,000	0	0	150,000,000	0	0.00		2021
Carlyle Strategic Partners IV, L.P.	100,000,000	98,550,769	52,212,670	46,123,402	57,842,663	1.12	8.84	2016
Chicago Growth Partners	60,000,000	58,347,626	123,371,040	1,652,374	479,452	2.12	19.54	
Chicago Growth Partners II, L.P.	60,000,000	58,347,626	123,371,040	1,652,374	479,452	2.12	19.54	2008
Court Square	500,000,000	436,299,153	476,198,027	104,074,563	290,884,456	1.76	14.52	
Court Square Capital Partners II, L.P.	175,000,000	170,029,204	295,744,454	16,757,741	9,237,662	1.79	12.54	2006
Court Square Capital Partners III, L.P.	175,000,000	187,335,558	172,980,330	8,846,824	188,944,387	1.93	19.39	2012
Court Square Capital Partners IV, L.P.	150,000,000	78,934,391	7,473,243	78,469,998	92,702,406	1.27	20.60	2018
Crescendo	101,500,000	103,101,226	57,982,654	0	308,589	0.57	-4.60	
Crescendo Ventures IV	101,500,000	103,101,226	57,982,654	0	308,589	0.57	-4.60	2000
GTCR	210,000,000	211,174,635	421,341,248	14,989,866	260,056,453	3.23	29.37	
GTCR Fund X	100,000,000	105,821,208	214,751,215	6,751,396	0	2.03	21.33	2010
GTCR XI	110,000,000	105,353,427	206,590,033	8,238,470	260,056,453	4.43	42.98	2013
Goldman, Sachs & Co.	549,800,000	430,287,415	420,794,586	163,847,156	291,206,752	1.65	15.12	
GS Capital Partners V, L.P.	100,000,000	74,319,006	191,435,136	1,041,099	588,782	2.58	18.23	2005
GS Capital Partners VI, L.P.	100,000,000	110,260,752	140,595,269	2,551,356	5,228,548	1.32	7.24	2007
GS China-US Cooperation Fund	99,800,000	30,114,445	0	69,860,000	35,357,523	1.17	11.54	2018
GS Vintage VII	100,000,000	82,623,489	42,288,697	56,376,033	93,952,871	1.65	20.38	2016
West Street Capital Partners VII, L.P.	150,000,000	132,969,723	46,475,484	34,018,668	156,079,027	1.52	20.08	2016
Goldner Hawn Johnson & Morrison	77,755,138	48,525,185	51,364,283	29,401,920	37,311,647	1.83	18.75	
GHJM TrailHead Fund	20,000,000	16,652,130	51,364,283	3,354,486	6,344,667	3.47	20.52	2012
Goldner Hawn Fund VII, L.P.	57,755,138	31,873,055	0	26,047,434	30,966,980	0.97	-3.15	2018

Minnesota State Board of Investment
Private Markets Investments as of December 31, 2021

Investments	Commitments	Contributions	Distributions	Remaining Commitment	Market Value	Investment Multiple	IRR	Vintage Year
Green Equity Investors	325,000,000	320,802,154	232,611,638	40,985,265	359,186,444	1.84	17.09	
Green Equity Investors VI, L.P.	200,000,000	224,085,897	232,474,764	12,564,648	258,788,761	2.19	17.22	2012
Green Equity Investors VIII	125,000,000	96,716,257	136,874	28,420,617	100,397,683	1.04	8.88	2020
HarbourVest*	21,654,422	20,931,698	24,762,578	809,378	8,167,837	1.57	13.57	
Dover Street VII Cayman Fund L.P.	2,198,112	2,074,080	1,773,483	132,416	126,974	0.92	-3.62	2014
HarbourVest Intl PE Partners V-Cayman	3,522,557	3,345,452	4,313,009	181,952	321,986	1.39	14.30	2014
Harbourvest Intl PE Partners VI-Cayman	4,236,144	4,039,458	4,808,849	199,010	3,428,789	2.04	17.48	2014
HarbourVest Partners VIII Cayman Buyout	4,506,711	4,387,189	5,574,478	156,000	643,816	1.42	13.51	2014
HarbourVest Partners VIII-Cayman Venture	7,190,898	7,085,519	8,292,759	140,000	3,646,273	1.68	13.52	2014
Hellman & Friedman	650,000,000	412,745,049	471,839,939	240,952,958	248,178,660	1.74	15.16	
Hellman & Friedman Capital Partners VI, L.P.	175,000,000	171,037,755	315,233,005	5,062,369	3,216,013	1.86	12.91	2007
Hellman & Friedman Capital Partners VII, L.P.	50,000,000	49,883,520	153,358,750	2,218,442	10,467,521	3.28	25.06	2009
Hellman & Friedman Investors IX, L.P.	175,000,000	162,041,946	3,248,184	13,453,975	205,142,485	1.29	26.39	2018
Hellman & Friedman Capital Partners X	250,000,000	29,781,828	0	220,218,172	29,352,642	0.99	-1.44	2021
IK Limited	507,875,675	416,321,584	429,343,125	103,906,531	258,924,653	1.65	15.78	
IK Fund VII	180,333,327	179,315,195	294,196,910	8,624,832	48,960,428	1.91	14.99	2013
IK Fund VIII	170,789,497	175,535,613	135,146,215	0	150,507,958	1.63	18.88	2016
IK Fund IX	156,752,851	61,470,776	0	95,281,698	59,456,267	0.97	-5.35	2019
Kohlberg, Kravis, Roberts & Co.	1,447,000,000	820,681,906	875,427,290	679,067,018	583,686,943	1.78	14.13	
KKR Millennium Fund	200,000,000	205,167,570	424,946,028	0	161,924	2.07	16.37	2002
KKR 2006 Fund L.P.	200,000,000	218,137,965	364,445,342	3,300,979	32,361,281	1.82	9.24	2006
KKR Americas Fund XII L.P.	150,000,000	140,374,688	43,868,169	21,076,513	227,141,640	1.93	35.12	2016
KKR Asian Fund III	100,000,000	85,255,519	34,665,449	23,925,794	135,085,830	1.99	39.25	2017
KKR Asian Fund IV	150,000,000	27,282,329	0	122,717,671	27,704,714	1.02	2.29	2020
KKR Europe V	100,000,000	62,058,946	5,620,274	40,868,303	74,904,899	1.30	23.85	2018
KKR Core Investments Partnership	97,000,000	58,481,119	1,882,028	41,101,528	62,402,885	1.10	14.43	2021
KKR MN Partnership L.P.	150,000,000	23,923,770	0	126,076,230	23,923,770	1.00		2021
KKR North America Fund XIII	300,000,000	0	0	300,000,000	0	0.00		2021
Lexington Partners	1,345,000,000	882,359,899	642,617,395	522,753,537	727,642,926	1.55	14.66	
Lexington Capital Partners VI-B, L.P.	100,000,000	98,374,022	142,607,132	1,634,703	4,775,369	1.50	7.98	2005
Lexington Capital Partners VII, L.P.	200,000,000	172,617,467	254,286,612	37,909,237	36,296,054	1.68	14.81	2009
Lexington Capital Partners VIII, L.P.	150,000,000	136,386,669	117,970,594	32,663,555	108,780,177	1.66	19.29	2014

**Minnesota State Board of Investment
Private Markets Investments as of December 31, 2021**

Investments	Commitments	Contributions	Distributions	Remaining Commitment	Market Value	Investment Multiple	IRR	Vintage Year
Lexington Capital Partners IX, L.P.	150,000,000	93,876,748	17,979,736	66,694,769	124,885,934	1.52	74.21	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	208,484,372	90,381,786	10,727,639	262,561,844	1.69	23.17	2017
Lexington Co-Investment Partners V	300,000,000	90,788,493	0	209,955,762	100,473,342	1.11	23.65	2020
Lexington Co-Investment Partners V Overage	45,000,000	12,870,000	0	32,130,000	13,112,908	1.02	3.23	2021
Lexington Middle Market Investors IV	100,000,000	68,962,128	19,391,535	31,037,872	76,757,298	1.39	33.51	2016
MHR Institutional Partners	75,000,000	72,746,892	19,816,608	22,011,136	73,617,641	1.28	9.13	
MHR Institutional Partners IV LP	75,000,000	72,746,892	19,816,608	22,011,136	73,617,641	1.28	9.13	2014
Madison Dearborn Capital Partners LLC	200,000,000	126,680,632	44,254,411	94,338,777	146,323,170	1.50	16.25	
Madison Dearborn Capital Partners VII, L.P.	100,000,000	94,966,742	36,628,967	20,200,000	111,341,465	1.56	14.67	2015
Madison Dearborn Capital Partners VIII-A, L.P	100,000,000	31,713,890	7,625,444	74,138,777	34,981,705	1.34	49.32	2019
Marathon	200,000,000	97,906,171	6,185,200	108,000,000	118,198,840	1.27	39.56	
Marathon Distressed Credit Fund	200,000,000	97,906,171	6,185,200	108,000,000	118,198,840	1.27	39.56	2020
Merced Capital	278,737,500	288,144,755	260,544,521	0	75,928,187	1.17	3.55	
Merced Partners III	100,000,000	103,878,468	132,676,445	0	2,004,903	1.30	5.48	2010
Merced Partners IV	125,000,000	124,968,390	111,222,539	0	25,931,593	1.10	2.05	2013
Merced Partners V	53,737,500	59,297,897	16,645,537	0	47,991,691	1.09	2.21	2017
Neuberger Berman LLC	625,000,000	369,293,061	242,961,608	451,051,180	378,427,550	1.68	37.42	
Dyal Capital Partners III	175,000,000	196,839,631	173,362,071	109,247,334	145,228,703	1.62	27.70	2015
Dyal Capital Partners IV	250,000,000	137,453,431	69,238,627	176,803,846	164,013,402	1.70	65.34	2018
Dyal Capital Partners V	200,000,000	35,000,000	360,909	165,000,000	69,185,445	1.99	197.44	2020
Nordic Capital	501,061,322	400,098,484	264,506,025	177,725,354	468,968,449	1.83	21.62	
Nordic Capital Fund VIII	176,215,066	220,988,400	255,365,276	27,622,444	144,560,567	1.81	16.76	2013
Nordic Capital Fund X	153,962,277	28,392,180	0	125,570,097	32,400,299	1.14	33.84	2020
Nordic Capital IX Beta, L.P.	170,883,980	150,717,903	9,140,749	24,532,813	292,007,583	2.00	50.67	2017
North Sky Capital*	2,454,339	1,998,089	2,451,201	456,250	473,171	1.46	13.67	
North Sky Capital LBO Fund III, LP	1,070,259	720,259	986,393	350,000	112,971	1.53	14.57	2014
North Sky Capital Venture Fund III, LP	1,384,080	1,277,830	1,464,808	106,250	360,200	1.43	13.10	2014
Oak Hill Capital Management, Inc.	250,000,000	217,314,478	179,712,221	57,114,226	132,784,146	1.44	27.73	
Oak Hill Capital Partners IV Onshore LP	150,000,000	146,337,056	179,677,178	28,091,648	53,596,056	1.59	27.47	2016
Oak Hill Capital Partners V	100,000,000	70,977,422	35,043	29,022,578	79,188,090	1.12	32.18	2018

Minnesota State Board of Investment
Private Markets Investments as of December 31, 2021

Investments	Commitments	Contributions	Distributions	Remaining Commitment	Market Value	Investment Multiple	IRR	Vintage Year
Oaktree Capital Management, LLC	200,000,000	151,510,632	42,135,451	81,989,598	173,884,890	1.43	14.64	
Oaktree Special Situations Fund, L.P.	100,000,000	101,739,445	20,335,451	10,241,294	102,596,877	1.21	5.99	2014
Oaktree Special Situations Fund II, L.P.	100,000,000	49,771,187	21,800,000	71,748,304	71,288,013	1.87	113.01	2018
Paine & Partners, LLC	225,000,000	141,900,926	40,330,296	88,483,799	135,747,409	1.24	9.85	
Paine Schwartz Food Chain Fund IV	75,000,000	64,832,786	35,397,971	11,240,368	55,401,715	1.40	9.36	2014
Paine Schwartz Food Chain Fund V, L.P.	150,000,000	77,068,140	4,932,325	77,243,431	80,345,694	1.11	12.37	2018
Permal PE*	5,337,098	4,382,196	4,150,751	1,090,000	871,981	1.15	4.79	
Glouston Private Equity Opportunities IV	5,337,098	4,382,196	4,150,751	1,090,000	871,981	1.15	4.79	2014
Permira	459,437,361	419,540,501	358,680,136	79,992,861	581,934,358	2.24	24.64	
Permira V, L.P.	177,798,218	181,954,007	287,672,383	16,693,133	275,808,420	3.10	24.93	2013
Permira VI, L.P.	137,212,841	125,857,463	71,007,752	30,602,456	179,734,890	1.99	25.14	2016
Permira VII L.P.1	144,426,302	111,729,031	0	32,697,271	126,391,048	1.13	13.79	2019
Public Pension Capital Management	175,000,000	104,803,140	82,335,049	85,397,202	128,583,023	2.01	25.28	
Public Pension Capital, LLC	175,000,000	104,803,140	82,335,049	85,397,202	128,583,023	2.01	25.28	2014
Silver Lake Partners	435,000,000	428,646,514	517,828,074	31,465,901	412,148,171	2.17	16.27	
Silver Lake Partners II, L.P.	100,000,000	90,200,747	171,719,560	11,771,953	3,222	1.90	11.02	2004
Silver Lake Partners III, L.P.	100,000,000	93,757,540	191,856,230	9,528,468	27,039,743	2.33	18.62	2007
Silver Lake Partners IV	100,000,000	114,916,580	118,381,791	3,048,367	190,596,574	2.69	27.41	2012
Silver Lake Partners V, L.P.	135,000,000	129,771,647	35,870,492	7,117,113	194,508,632	1.78	29.97	2017
Split Rock	110,000,000	107,055,906	125,392,564	2,944,094	26,468,610	1.42	5.04	
Split Rock Partners LP	50,000,000	47,890,906	58,794,192	2,109,094	3,808,069	1.31	3.25	2005
Split Rock Partners II, LP	60,000,000	59,165,000	66,598,372	835,000	22,660,541	1.51	7.35	2008
Summit Partners	600,000,000	356,402,679	388,658,227	442,669,510	349,927,999	2.07	31.24	
Summit Partners Growth Equity Fund VIII	100,000,000	116,727,192	229,442,550	23,129,320	69,543,912	2.56	27.99	2011
Summit Partners Growth Equity Fund IX	100,000,000	130,700,488	139,311,534	108,611,046	159,447,936	2.29	42.31	2015
Summit Partners Growth Equity Fund X-A	150,000,000	108,974,999	19,904,143	60,929,144	120,936,151	1.29	39.72	2019
Summit Partners Growth Equity Fund XI	250,000,000	0	0	250,000,000	0	0.00		2021
TPG Capital	550,000,000	240,115,179	132,206,097	335,570,437	226,400,031	1.48	22.57	
TPG Growth V, L.P.	150,000,000	57,953,251	526,470	93,174,085	67,506,630	1.17	17.95	2021
TPG Partners VII, L.P.	100,000,000	99,851,997	113,041,264	8,011,667	70,468,231	1.84	19.91	2015
TPG Partners VIII	150,000,000	82,309,931	18,638,363	84,384,685	88,425,170	1.30	40.50	2018
TPG Tech Adjacencies II, L.P.	150,000,000	0	0	150,000,000	0	0.00		2021

**Minnesota State Board of Investment
Private Markets Investments as of December 31, 2021**

Investments	Commitments	Contributions	Distributions	Remaining Commitment	Market Value	Investment Multiple	IRR	Vintage Year
Thoma Bravo LLC	425,000,000	425,577,045	208,638,702	69,054,632	472,940,438	1.60	24.10	
Thoma Bravo Fund XII, L.P.	75,000,000	81,455,833	22,548,786	16,164,188	128,028,309	1.85	17.75	2016
Thoma Bravo Fund XIII, L.P.	150,000,000	166,084,959	79,031,939	30,926,697	215,519,141	1.77	47.05	2018
Thoma Bravo Fund XIV	150,000,000	128,036,253	37	21,963,747	128,956,962	1.01	1.27	2020
Thoma Cressey Fund VII, L.P.	50,000,000	50,000,000	107,057,940	0	436,026	2.15	23.58	2000
Thomas H. Lee Partners	400,000,000	226,694,658	178,567,472	198,887,065	269,141,633	1.97	35.38	
Thomas H. Lee Equity Fund VII, LP.	100,000,000	99,263,449	132,589,381	10,898,708	52,576,986	1.87	23.65	2015
Thomas H. Lee Equity Fund VIII, L.P.	150,000,000	127,431,209	45,978,091	37,988,357	216,564,647	2.06	78.30	2018
Thomas H. Lee Equity Fund IX	150,000,000	0	0	150,000,000	0	0.00		2021
Thomas, McNerney & Partners	80,000,000	78,125,000	123,481,847	1,875,000	4,403,460	1.64	8.30	
Thomas, McNerney & Partners I, L.P.	30,000,000	30,000,000	15,087,143	0	1,882,379	0.57	-8.90	2002
Thomas, McNerney & Partners II, L.P.	50,000,000	48,125,000	108,394,704	1,875,000	2,521,081	2.30	16.47	2006
Varde Fund	600,000,000	534,750,000	676,476,918	65,250,000	180,938,971	1.60	10.09	
Varde Fund IX, L.P.	100,000,000	100,000,000	216,221,047	0	0	2.16	15.01	2008
Varde Fund X, LP	150,000,000	150,000,000	251,421,642	0	10,202,793	1.74	10.12	2010
Varde Fund XI, LP	200,000,000	200,000,000	208,814,191	0	67,948,496	1.38	5.44	2013
Varde Fund XIII, L.P.	150,000,000	84,750,000	20,038	65,250,000	102,787,682	1.21	12.02	2018
Vestar Capital Partners	380,000,000	333,277,631	351,457,475	56,184,822	176,843,927	1.59	11.65	
Vestar Capital Partners IV, L.P.	55,000,000	55,652,024	102,293,320	57,313	374,894	1.84	14.63	1999
Vestar Capital Partners V, L.P.	75,000,000	76,797,458	98,533,182	0	3,421,462	1.33	3.98	2005
Vestar Capital Partners VI, LP	100,000,000	106,955,659	150,510,164	0	55,459,639	1.93	24.22	2011
Vestar Capital Partners VII, L.P.	150,000,000	93,872,491	120,808	56,127,509	117,587,933	1.25	16.45	2017
Vista Equity Partners	200,000,000	147,617,149	77,223	53,595,754	151,303,664	1.03	2.50	
Vista Equity Partners Perennial	200,000,000	147,617,149	77,223	53,595,754	151,303,664	1.03	2.50	2020

**Minnesota State Board of Investment
Private Markets Investments as of December 31, 2021**

Investments	Commitments	Contributions	Distributions	Remaining Commitment	Market Value	Investment Multiple	IRR	Vintage Year
Warburg Pincus	1,116,000,000	1,033,859,733	943,872,728	88,748,500	757,305,926	1.65	11.43	
Warburg Pincus China, L.P.	45,000,000	45,585,000	13,952,700	1,350,000	61,277,352	1.65	17.42	2016
Warburg Pincus China-Southeast Asia II	50,000,000	14,825,000	1,715,000	35,175,000	18,314,298	1.35	33.65	2019
Warburg Pincus Financial Sector	90,000,000	80,776,212	8,930,700	13,455,000	122,982,330	1.63	24.59	2017
Warburg Pincus Global Growth, L.P.	250,000,000	213,099,568	2,625,000	37,000,000	258,018,117	1.22	19.57	2018
Warburg Pincus Private Equity IX, L.P.	100,000,000	100,000,000	170,824,150	0	1,140,828	1.72	9.60	2005
Warburg Pincus Private Equity X, LP	150,000,000	150,000,000	265,629,491	0	3,739,961	1.80	9.52	2007
Warburg Pincus Private Equity XI, LP	200,000,000	200,342,452	246,872,748	0	108,688,847	1.77	13.10	2012
Warburg Pincus Private Equity XII, LP	131,000,000	129,231,500	69,780,687	1,768,500	182,751,770	1.95	20.62	2015
Warburg, Pincus Equity Partners, L.P.	100,000,000	100,000,000	163,542,253	0	392,423	1.64	10.02	1998
Wayzata Investment Partners	300,000,000	243,165,000	375,257,779	15,750,000	20,306,983	1.63	14.34	
Wayzata Opportunities Fund II, LLC	150,000,000	174,750,000	332,726,945	750,000	0	1.90	16.54	2007
Wayzata Opportunities Fund III	150,000,000	68,415,000	42,530,834	15,000,000	20,306,983	0.92	-2.07	2012
Wellspring Capital Partners	125,000,000	149,192,072	52,966,771	12,849,764	139,916,653	1.29	23.61	
Wellspring Capital Partners VI, L.P.	125,000,000	149,192,072	52,966,771	12,849,764	139,916,653	1.29	23.61	2016
Welsh, Carson, Anderson & Stowe	500,000,000	397,339,428	354,266,662	102,660,572	360,778,477	1.80	18.94	
Welsh, Carson, Anderson & Stowe XI, L.P.	100,000,000	100,000,000	150,512,105	0	16,267,410	1.67	11.65	2008
Welsh, Carson, Anderson & Stowe XII, L.P.	150,000,000	145,877,897	177,480,040	4,122,103	180,419,688	2.45	30.14	2014
Welsh, Carson, Anderson & Stowe XIII, L.P.	250,000,000	151,461,531	26,274,517	98,538,469	164,091,379	1.26	34.86	2018
Whitehorse Capital	300,000,000	195,868,793	86,018,142	144,488,512	161,332,854	1.26	31.12	
Whitehorse Liquidity Partners III	100,000,000	95,979,279	58,169,653	21,915,409	69,179,431	1.33	25.60	2019
Whitehorse Liquidity Partners IV	100,000,000	74,112,569	27,848,489	48,350,048	66,376,478	1.27	51.34	2020
Whitehorse Liquidity Partners V	100,000,000	25,776,945	0	74,223,055	25,776,945	1.00		2021
Wind Point Partners	100,000,000	59,086,107	1,912,585	42,831,081	57,796,577	1.01	1.35	
Wind Point Partners IX	100,000,000	59,086,107	1,912,585	42,831,081	57,796,577	1.01	1.35	2019
Windjammer Capital Investors	266,708,861	208,682,790	229,590,601	60,297,074	131,103,539	1.73	11.66	
Windjammer Mezzanine & Equity Fund II	66,708,861	55,215,684	85,036,800	1,013,936	65,319	1.54	8.95	2000
Windjammer Senior Equity Fund IV, L.P.	100,000,000	94,740,728	143,346,904	16,802,619	64,590,106	2.19	16.54	2012
Windjammer Senior Equity Fund V, L.P.	100,000,000	58,726,378	1,206,897	42,480,519	66,448,115	1.15	11.36	2017

**Minnesota State Board of Investment
Private Markets Investments as of December 31, 2021**

Investments	Commitments	Contributions	Distributions	Remaining Commitment	Market Value	Investment Multiple	IRR	Vintage Year
Private Credit	4,014,874,281	2,887,800,232	2,213,806,291	1,598,971,388	1,564,872,515	1.31	10.09	
Audax Group	350,000,000	185,329,327	180,637,770	182,205,508	49,746,218	1.24	9.51	
Audax Mezzanine Fund III, L.P.	100,000,000	104,871,591	130,353,666	782	3,849,034	1.28	9.04	2010
Audax Mezzanine Fund IV-A, L.P.	100,000,000	80,457,736	50,284,104	32,204,727	45,897,184	1.20	11.07	2015
Audax Mezzanine Fund V	150,000,000	0	0	150,000,000	0	0.00		2020
Avenue Capital Partners	200,000,000	200,977,328	72,265,702	0	201,309,688	1.36	6.94	
Avenue Energy Opportunities Fund, L.P.	100,000,000	100,977,328	48,424,215	0	75,726,230	1.23	3.85	2014
Avenue Energy Opportunities Fund II	100,000,000	100,000,000	23,841,487	0	125,583,458	1.49	11.93	2017
BlackRock	97,500,000	87,570,291	11,145,751	9,929,709	93,521,305	1.20	9.85	
BlackRock Middle Market Senior Fund	97,500,000	87,570,291	11,145,751	9,929,709	93,521,305	1.20	9.85	2018
Brookfield Asset Management Inc.	200,000,000	17,346,078	0	182,653,922	17,619,886	1.02		
Brookfield Real Estate Finance Fund VI	200,000,000	17,346,078	0	182,653,922	17,619,886	1.02		2021
Energy Capital Partners	28,087,500	21,414,484	9,451,244	16,124,260	11,879,922	1.00	-0.54	
Energy Capital Credit Solutions II-A	28,087,500	21,414,484	9,451,244	16,124,260	11,879,922	1.00	-0.54	2018
Gold Hill	65,852,584	65,852,584	113,654,899	0	3,615,262	1.78	11.87	
Gold Hill 2008	25,852,584	25,852,584	48,393,297	0	3,198,224	2.00	14.63	2008
Gold Hill Venture Lending	40,000,000	40,000,000	65,261,602	0	417,038	1.64	10.71	2004
Goldman, Sachs & Co.	250,000,000	261,176,828	315,988,287	47,422,591	1,226,215	1.21	6.80	
GS Mezzanine Partners 2006 Institutional	100,000,000	113,458,168	135,137,487	9,858,563	567,940	1.20	5.00	2006
GS Mezzanine Partners V, L.P.	150,000,000	147,718,660	180,850,800	37,564,028	658,275	1.23	9.08	2007
HPS Investment Partners	100,000,000	89,666,025	11,615,902	18,518,567	91,992,049	1.16	17.15	
HPS Mezzanine Partners 2019, L.P.	100,000,000	89,666,025	11,615,902	18,518,567	91,992,049	1.16	17.15	2019
Kohlberg, Kravis, Roberts & Co.	274,000,000	349,064,594	283,731,195	109,388,462	116,794,359	1.15	9.81	
KKR Lending Partner II L.P.	75,000,000	86,884,685	82,467,685	8,802,924	9,694,427	1.06	2.97	2015
KKR Lending Partners III L.P.	199,000,000	262,179,909	201,263,510	100,585,538	107,099,932	1.18	14.74	2017
LBC Credit Partners	200,000,000	170,748,496	109,829,893	81,914,878	109,663,144	1.29	16.93	
LBC Credit Partners IV, L.P.	100,000,000	111,000,028	99,354,374	36,445,534	53,213,554	1.37	16.31	2016
LBC Credit Partners V, L.P.	100,000,000	59,748,468	10,475,519	45,469,344	56,449,590	1.12	23.89	2019
Marathon	100,000,000	96,022,008	858,534	5,000,000	116,900,635	1.23	18.42	
Marathon Secured Private Strategies Fund II	100,000,000	96,022,008	858,534	5,000,000	116,900,635	1.23	18.42	2019

**Minnesota State Board of Investment
Private Markets Investments as of December 31, 2021**

Investments	Commitments	Contributions	Distributions	Remaining Commitment	Market Value	Investment Multiple	IRR	Vintage Year
Merit Capital Partners	320,232,500	233,068,983	269,245,537	87,096,717	112,643,906	1.64	11.41	
Merit Mezzanine Fund IV, L.P.	75,000,000	70,178,571	139,120,463	4,821,429	763,800	1.99	11.58	2004
Merit Mezzanine Fund V, LP	75,000,000	71,044,898	79,266,865	3,955,102	32,549,883	1.57	9.49	2009
Merit Mezzanine Fund VI	100,000,000	91,845,514	50,858,209	8,087,687	79,330,223	1.42	15.32	2016
Merit Mezzanine Fund VII	70,232,500	0	0	70,232,500	0	0.00		2020
Oaktree Capital Management, LLC	650,000,000	230,500,021	30,385,564	424,500,000	265,918,474	1.29	14.57	
Oaktree Opportunities Fund X, L.P.	50,000,000	46,500,021	26,169,660	8,500,000	38,210,768	1.38	9.35	2015
Oaktree Opportunities Fund Xb, L.P.	100,000,000	60,000,000	0	40,000,000	81,429,060	1.36	16.24	2015
Oaktree Opportunities Fund XI	300,000,000	90,000,000	438,597	210,000,000	105,214,229	1.17	30.26	2020
Oaktree Real Estate Debt III	200,000,000	34,000,000	3,777,307	166,000,000	41,064,417	1.32	19.03	2020
PIMCO BRAVO*	9,201,697	8,660,948	8,897,965	7,735,883	1,227,302	1.17	4.93	
PIMCO BRAVO Fund Onshore Feeder I	3,958,027	3,958,027	4,016,443	2,385,880	6,534	1.02	1.60	2014
PIMCO Bravo Fund OnShore Feeder II	5,243,670	4,702,921	4,881,522	5,350,003	1,220,768	1.30	5.50	2014
Prudential Global Investment Mgmt	600,000,000	468,774,854	508,311,565	175,514,408	150,872,485	1.41	10.44	
Prudential Capital Partners II, L.P.	100,000,000	97,930,132	145,671,152	11,049,052	3,907,329	1.53	9.26	2005
Prudential Capital Partners III, L.P.	100,000,000	102,778,757	174,115,441	13,731,310	2,171,871	1.72	14.07	2009
Prudential Capital Partners IV	100,000,000	112,326,556	113,850,945	2,136,397	33,695,075	1.31	8.35	2012
Prudential Capital Partners V, L.P.	150,000,000	147,909,672	74,674,027	6,427,387	103,298,672	1.20	8.38	2016
PGIM Capital Partners VI, L.P.	150,000,000	7,829,738	0	142,170,262	7,799,538	1.00	-0.45	2020
Summit Partners	95,000,000	100,002,497	133,679,035	22,177,023	7,059,836	1.41	9.27	
Summit Subordinated Debt Fund III, L.P.	45,000,000	44,088,494	60,443,093	2,250,000	3,857,092	1.46	8.81	2004
Summit Subordinated Debt Fund IV, L.P.	50,000,000	55,914,003	73,235,942	19,927,023	3,202,744	1.37	10.00	2008
TCW	200,000,000	174,519,135	127,021,901	56,449,308	84,475,756	1.21	8.64	
TCW Direct Lending LLC	100,000,000	83,599,652	86,302,217	25,329,409	18,980,637	1.26	8.12	2014
TCW Direct Lending VII	100,000,000	90,919,484	40,719,684	31,119,899	65,495,119	1.17	9.72	2018
TSSP	275,000,000	127,105,751	27,085,547	172,340,152	128,406,073	1.22	15.56	
Sixth Street Oppotunities Partners V	75,000,000	0	0	75,000,000	0	0.00		2021
Sixth Street TAO Partners (B), L.P.	50,000,000	42,105,468	13,697,256	21,591,788	39,935,472	1.27	12.83	2018
Sixth Street TAO Partners (D), L.P.	100,000,000	46,844,122	9,658,776	60,184,839	46,722,604	1.20	22.36	2018
TSSP Opportunities Partners IV (A), L.P.	50,000,000	38,156,161	3,729,515	15,563,525	41,747,998	1.19	15.20	2018

Minnesota State Board of Investment
Private Markets Investments as of December 31, 2021

Investments	Commitments	Contributions	Distributions	Remaining Commitment	Market Value	Investment Multiple	IRR	Vintage Year
Real Assets	4,247,571,518	3,807,602,989	2,427,415,913	725,497,826	2,023,897,008	1.17	4.12	
BlackRock	198,500,000	114,525,120	35,956,634	93,889,926	86,500,308	1.07	2.77	
BlackRock Global Renewable Power Fund II	98,500,000	97,789,849	35,775,666	10,625,197	70,663,302	1.09	3.17	2017
BlackRock Global Renewable Power Infrastructure II	100,000,000	16,735,271	180,968	83,264,729	15,837,005	0.96	-4.90	2019
EIG Global Energy Partners	450,000,000	469,824,098	357,552,577	77,704,481	151,545,522	1.08	2.09	
EIG Energy Fund XIV	100,000,000	113,459,470	95,309,310	2,761,129	4,578,083	0.88	-4.65	2007
EIG Energy Fund XV	150,000,000	161,870,879	150,201,781	22,871,323	26,974,930	1.09	2.21	2010
EIG Energy Fund XVI	200,000,000	194,493,749	112,041,487	52,072,029	119,992,508	1.19	4.93	2013
Encap Energy	400,000,000	423,893,117	343,249,404	11,165,163	165,963,689	1.20	6.24	
EnCap Energy Capital Fund VII, L.P.	100,000,000	105,406,230	137,949,713	0	3,236,851	1.34	14.47	2007
EnCap Energy Capital Fund VIII, L.P.	100,000,000	103,335,766	56,609,079	470,044	31,973,320	0.86	-3.61	2010
Encap Energy Fund IX	100,000,000	113,296,505	98,126,751	4,318,795	46,294,066	1.27	7.89	2012
EnCap Energy Capital Fund X, L.P.	100,000,000	101,854,615	50,563,861	6,376,323	84,459,452	1.33	8.59	2015
Energy & Minerals Group	680,000,000	664,096,296	367,088,248	57,575,279	531,200,944	1.35	7.38	
NGP Midstream & Resources, L.P.	100,000,000	103,565,615	179,560,149	17,857	7,256,874	1.80	13.41	2007
The Energy & Minerals Group Fund II, L.P.	100,000,000	106,674,084	104,295,500	170,365	106,206,612	1.97	13.20	2011
The Energy & Minerals Group Fund III, L.P.	200,000,000	201,327,783	22,410,545	1,284,543	104,430,794	0.63	-7.59	2014
The Energy & Minerals Group Fund IV, LP	150,000,000	160,664,225	56,342,489	14,023,899	167,361,031	1.39	9.56	2015
The Energy & Minerals Group Fund V	112,500,000	77,017,651	3,658,916	38,514,704	122,334,568	1.64	23.45	2019
The Energy & Minerals Group Fund V Accordion, LP	17,500,000	14,846,938	820,649	3,563,911	23,611,066	1.65	25.30	2019
Energy Capital Partners	450,000,000	402,323,741	344,296,573	139,311,970	225,581,229	1.42	11.01	
Energy Capital Partners II-A	100,000,000	85,722,480	112,434,332	29,749,110	5,790,984	1.38	9.05	2010
Energy Capital Partners III, L.P.	200,000,000	232,678,193	205,208,676	30,058,269	124,906,952	1.42	10.66	2013
Energy Capital Partners IV-A, LP	150,000,000	83,923,068	26,653,565	79,504,591	94,883,293	1.45	19.99	2017
Enervest Management Partners	100,000,000	98,460,385	64,090,705	9,633,313	71,313,447	1.38	8.17	
EnerVest Energy Institutional Fund XIV-A, L.P.	100,000,000	98,460,385	64,090,705	9,633,313	71,313,447	1.38	8.17	2015
First Reserve	500,000,000	542,153,951	266,236,300	8,684,211	130,608,661	0.73	-8.02	
First Reserve Fund XI, L.P.	150,000,000	150,292,121	100,059,903	0	186,939	0.67	-8.72	2006
First Reserve Fund XII, L.P.	150,000,000	165,617,044	83,728,049	0	6,849,122	0.55	-14.46	2008
First Reserve Fund XIII, L.P.	200,000,000	226,244,786	82,448,348	8,684,211	123,572,599	0.91	-3.75	2013

**Minnesota State Board of Investment
Private Markets Investments as of December 31, 2021**

Investments	Commitments	Contributions	Distributions	Remaining Commitment	Market Value	Investment Multiple	IRR	Vintage Year
Kohlberg, Kravis, Roberts & Co.	249,850,000	98,831,929	20,860,052	161,251,711	86,969,132	1.09	5.84	
KKR Global Infrastructure Investors III	149,850,000	98,831,929	20,860,052	61,251,711	86,969,132	1.09	5.84	2018
KKR Global Infrastructure Investors IV	100,000,000	0	0	100,000,000	0	0.00		2021
Merit Energy Partners	519,721,518	384,644,480	145,585,650	94,599,899	314,109,920	1.20	3.37	
Merit Energy Partners F-II, L.P.	100,000,000	59,522,861	32,328,014	0	6,351,293	0.65	-6.50	2006
Merit Energy Partners H	100,000,000	100,000,000	29,668,582	0	54,438,878	0.84	-2.73	2011
Merit Energy Partners I, L.P.	169,721,518	169,721,518	74,639,059	0	176,268,499	1.48	9.16	2014
Merit Energy Partners K, L.P.	150,000,000	55,400,101	8,949,995	94,599,899	77,051,250	1.55	32.86	2019
NGP	599,500,000	574,496,867	457,824,770	58,181,874	231,227,157	1.20	6.34	
Natural Gas Partners IX, LP	150,000,000	173,962,921	249,243,688	605,481	657,713	1.44	12.07	2007
NGP Natural Resources X, L.P.	150,000,000	148,720,924	125,225,975	1,279,076	18,008,046	0.96	-1.09	2011
NGP Natural Resources XI, L.P.	150,000,000	152,660,321	70,181,267	6,290,493	110,905,870	1.19	4.90	2014
NGP Natural Resources XII, L.P.	149,500,000	99,152,701	13,173,840	50,006,824	101,655,529	1.16	6.17	2017
Sheridan	100,000,000	34,353,005	24,675,000	13,500,000	28,876,999	1.56	12.44	
Sheridan Production Partners III-B, L.P.	100,000,000	34,353,005	24,675,000	13,500,000	28,876,999	1.56	12.44	2014

Minnesota State Board of Investment
Private Markets Investments as of December 31, 2021

Investments	Commitments	Contributions	Distributions	Remaining Commitment	Market Value	Investment Multiple	IRR	Vintage Year
Real Estate	3,973,147,868	2,297,172,340	1,610,911,325	1,856,251,920	1,550,312,366	1.38	9.42	
Angelo, Gordon & Co.	550,000,000	403,635,735	149,915,815	166,820,000	367,860,691	1.28	11.41	
AG Asia Realty Fund III, L.P.	50,000,000	47,587,261	44,875,000	6,196,250	21,004,011	1.38	12.79	2016
AG Asia Realty Fund IV, L.P.	100,000,000	59,786,100	7,250,000	41,937,500	63,821,371	1.19	12.73	2018
AG Europe Realty Fund II, L.P.	75,000,000	68,859,240	12,028,384	12,768,750	80,070,958	1.34	11.55	2018
AG Europe Realty Fund III	75,000,000	23,321,631	0	50,437,500	25,158,607	1.08	7.71	2020
AG Realty Fund IX	100,000,000	92,141,126	61,750,000	11,650,000	68,426,862	1.41	9.28	2014
AG Realty Fund X, L.P.	150,000,000	111,940,377	24,012,431	43,830,000	109,378,882	1.19	17.40	2018
Blackstone	924,500,000	756,183,656	767,259,655	300,400,168	465,566,571	1.63	13.22	
Blackstone Real Estate Partners Asia II	74,500,000	58,695,612	5,846,550	23,520,334	62,309,763	1.16	9.79	2017
Blackstone Real Estate Partners Asia III	100,000,000	0	0	100,000,000	0	0.00		2021
Blackstone Real Estate Partners V	100,000,000	104,213,007	205,535,477	4,174,052	3,380,342	2.00	10.83	2006
Blackstone Real Estate Partners VI, L.P.	100,000,000	109,477,567	217,421,377	4,907,906	2,817,848	2.01	13.08	2007
Blackstone Real Estate Partners VII, LP	100,000,000	111,820,752	150,549,044	11,131,179	49,834,005	1.79	15.44	2011
Blackstone Real Estate Partners IX, L.P.	300,000,000	201,738,475	44,258,441	133,773,366	224,661,680	1.33	29.53	2018
Blackstone Real Estate VIII.TE.1 L.P.	150,000,000	170,238,243	143,648,767	22,893,331	122,562,933	1.56	15.90	2015
Blackstone Strategic Partners	75,000,000	77,552,384	65,205,458	1,002,319	1,997,988	0.87	-2.09	
Strategic Partners III RE, L.P.	25,000,000	25,987,864	15,252,523	9,006	92,349	0.59	-6.46	2005
Strategic Partners IV RE, L.P.	50,000,000	51,564,520	49,952,935	993,313	1,905,640	1.01	0.09	2008
Brookfield Asset Management Inc.	300,000,000	0	0	300,000,000	0	0.00		
Brookfield Strategic Real Estate Partners IV	300,000,000	0	0	300,000,000	0	0.00		2021
Carlyle Group	450,000,000	95,296,372	71,739,971	408,163,883	55,145,157	1.33	24.10	
Carlyle Realty Partners VIII, L.P.	150,000,000	95,296,372	71,739,971	108,163,883	55,145,157	1.33	24.10	2017
Carlyle Realty Partners IX	300,000,000	0	0	300,000,000	0	0.00		2021
Kohlberg, Kravis, Roberts & Co.	125,000,000	31,908,294	0	93,091,706	31,908,294	1.00		
KKR Real Estate Partners Americas III	125,000,000	31,908,294	0	93,091,706	31,908,294	1.00		2021
Landmark Partners	249,500,000	79,444,165	38,201,701	175,882,096	64,276,227	1.29	15.97	
Landmark Real Estate Partners VIII	149,500,000	79,444,165	38,201,701	75,882,096	64,276,227	1.29	15.97	2016
Landmark Real Estate Partners IX	100,000,000	0	0	100,000,000	0	0.00		2021
Lubert Adler	174,147,868	83,117,934	62,415,347	92,414,787	50,300,947	1.36	14.75	
Lubert-Adler Real Estate Fund VII-B	74,147,868	67,585,213	62,415,347	7,414,787	35,368,792	1.45	15.36	2017
Lubert-Adler Recovery and Enhancement Capital Fund	100,000,000	15,532,721	0	85,000,000	14,932,155	0.96	-6.88	2021

**Minnesota State Board of Investment
Private Markets Investments as of December 31, 2021**

Investments	Commitments	Contributions	Distributions	Remaining Commitment	Market Value	Investment Multiple	IRR	Vintage Year
Oaktree Capital Management, LLC	200,000,000	29,475,519	19,370,464	190,000,000	20,406,770	1.35	140.43	
Oaktree Real Estate Opportunities Fund VIII	200,000,000	29,475,519	19,370,464	190,000,000	20,406,770	1.35	140.43	2020
Rockpoint	200,000,000	155,995,868	42,520,337	60,014,581	145,619,392	1.21	8.69	
Rockpoint Real Estate Fund V, L.P.	100,000,000	98,683,417	42,509,110	17,327,032	80,199,236	1.24	7.35	2014
Rockpoint Real Estate Fund VI, L.P.	100,000,000	57,312,451	11,227	42,687,549	65,420,157	1.14	22.80	2019
Rockwood	200,000,000	140,704,192	52,114,821	60,960,204	119,467,619	1.22	8.98	
Rockwood Capital RE Partners X, L.P.	100,000,000	94,027,411	52,020,270	7,657,118	66,406,663	1.26	8.17	2015
Rockwood Capital RE Partners XI	100,000,000	46,676,781	94,552	53,303,086	53,060,956	1.14	15.79	2019
Silverpeak Real Estate Partners	225,000,000	143,858,221	106,300,929	7,502,176	8,106,491	0.80	-3.61	
Silverpeak Legacy Pension Partners II	75,000,000	73,062,894	92,027,822	7,502,176	482,839	1.27	4.18	2005
Silverpeak Legacy Pension Partners III	150,000,000	70,795,327	14,273,108	0	7,623,652	0.31	-11.64	2008
TA Associates Realty	300,000,000	300,000,000	235,866,827	0	219,656,218	1.52	13.99	
Realty Associates Fund X	100,000,000	100,000,000	160,292,466	0	1,000,181	1.61	12.58	2012
Realty Associates Fund XI	100,000,000	100,000,000	72,569,658	0	94,548,637	1.67	13.74	2015
Realty Associates Fund XII	100,000,000	100,000,000	3,004,703	0	124,107,400	1.27	30.79	2018
Total	34,617,071,982	25,802,865,834	20,968,746,733	11,328,942,501	18,569,575,564	1.53	12.18	2018
<i>Difference**</i>					51,286,241			
Private Markets Total with Difference					18,620,861,805			

<i>Private Markets Portfolio Status</i>	Managers	Funds
PRIVATE EQUITY	59	179
PRIVATE CREDIT	18	41
REAL ASSETS	11	33
REAL ESTATE	13	33
Total	101	286

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. Ultimately, the actual performance and value of any investment is not known until final liquidation. Because there is no industry-standardized method for valuation or reporting comparisons of performance and valuation data among different investments is difficult.

Data presented in this report is made public pursuant to Minn. Stat. Chs. 13 and 13D, and Minn. Stat. § 11A.24, subd. 6(c). Additional information on private markets investments may be classified as non-public and not subject to disclosure.

*Partnership interests transferred to the MSBI during 1Q2015. All data presented as of the transfer date.

** Difference is from an in-kind stock distribution liquidating account, cash transactions posted to next day and distributions received in foreign currency during the month.



Participant Directed Investment Program

December 31, 2021



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 Fund 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. Stock Actively Managed Fund - an actively managed, U.S. common stock portfolio.
- U.S. Stock Index Fund - a passively managed, common stock portfolio designed to broadly track the performance of the U.S. stock market.
- Broad International Stock 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	\$120,431,414	5.6%	15.1%	18.0%	12.7%	11.4%	01/1980
U.S. ACTIVELY MANAGED FUND	100,873,647	7.7	23.4	27.4	19.4	16.9	07/1986
U.S. STOCK INDEX FUND	497,072,504	9.3	26.2	26.1	18.1	16.4	07/1986
BROAD INTERNATIONAL STOCK FUND	162,714,305	2.1	9.0	14.1	10.1	7.9	09/1994
BOND FUND	123,928,832	-0.1	-1.1	6.0	4.4	3.7	07/1986
MONEY MARKET FUND	599,667,632	0.0	0.1	1.1	1.3	0.8	07/1986
STABLE VALUE FUND	1,684,667,943	0.5	1.9	2.4	2.3	2.2	11/1994
VOLUNTEER FIREFIGHTER ACCOUNT	158,323,573	3.5	9.7	14.1	10.1	8.8	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	\$120,431,414	5.6%	15.1%	18.0%	12.7%	11.4%
SIF BALANCED FUND BENCHMARK		5.6%	14.3%	17.2%	12.2%	10.9%
Excess		0.0%	0.9%	0.8%	0.5%	0.5%

U.S. Actively Managed Fund

The U.S. Stock 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. ACTIVELY MANAGED FUND	100,873,647	7.7	23.4	27.4	19.4	16.9
Russell 3000		9.3	25.7	25.8	18.0	16.3
Excess		-1.6	-2.2	1.6	1.4	0.6



Supplemental Investment Fund Performance

U.S. Stock Index Fund

The investment objective of the U.S. Stock 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. STOCK INDEX FUND	\$497,072,504	9.3%	26.2%	26.1%	18.1%	16.4%
Russell 3000		9.3%	25.7%	25.8%	18.0%	16.3%
Excess		-0.0%	0.5%	0.3%	0.2%	0.1%

Broad International Stock Fund

The investment objective of the Broad International Stock 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 STOCK FUND	162,714,305	2.1	9.0	14.1	10.1	7.9
International Equity Benchmark		1.8	7.8	13.1	9.6	7.3
Excess		0.3	1.2	1.0	0.6	0.7



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	\$123,928,832	-0.1%	-1.1%	6.0%	4.4%	3.7%
Bloomberg U.S. Aggregate		0.0%	-1.5%	4.8%	3.6%	2.9%
Excess		-0.1%	0.5%	1.2%	0.8%	0.9%

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	599,667,632	0.0	0.1	1.1	1.3	0.8
ICE BofA US 3-Month Treasury Bill		0.0	0.0	1.0	1.1	0.6
Excess		0.0	0.1	0.1	0.1	0.1



Supplemental Investment Fund Performance

Stable Value Fund

The investment objectives of the Stable Value Fund are to protect investors from loss of their original investment and to provide competitive interest rates using somewhat longer-term investments than typically found in a money market fund. The Fund is invested in a well-diversified portfolio of high-quality fixed income securities with strong credit ratings. The Fund also invests in contracts issued by highly rated insurance companies and banks which are structured to provide principal protection for the Fund's diversified bond portfolios, regardless of daily market changes. The Stable Value Fund Benchmark is the 3-year Constant Maturity Treasury Bill +45 basis points. Please note that the Market Value for the Stable Value Fund reflects assets held through the Deferred Compensation Plan as well.

	<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	\$1,684,667,943	0.5%	1.9%	2.4%	2.3%	2.2%
Fixed Interest Blended Benchmark		0.3%	0.9%	1.4%	1.8%	1.5%
Excess		0.2%	1.0%	1.0%	0.5%	0.7%

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	158,323,573	3.5	9.7	14.1	10.1	8.8
SIF Volunteer Firefighter Account BM		3.5	9.0	13.3	9.6	8.3
Excess		-0.1	0.7	0.9	0.6	0.6



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	\$768,954,143	9.2%	25.7%				07/2019
VANGUARD INSTITUTIONAL INDEX PLUS	1,961,877,557	11.0	28.7	26.1%	18.5%	16.5%	07/1999
VANGUARD DIVIDEND GROWTH	1,007,262,260	11.6	24.8	22.4	17.0		10/2016
VANGUARD MID CAP INDEX	828,658,173	8.0	24.5	24.5	15.9	15.1	01/2004
T. ROWE PRICE SMALL-CAP STOCK	1,098,600,663	3.4	16.8	25.0	17.0	16.2	04/2000
FIDELITY DIVERSIFIED INTERNATIONAL	395,662,215	4.0	13.1	20.7	13.6	10.6	07/1999
VANGUARD TOTAL INTERNATIONAL STOCK INDEX	377,275,052	2.1	8.7	13.7	9.9	7.7	07/2011
VANGUARD BALANCED INDEX	1,563,292,465	5.5	14.2	17.4	12.4	11.0	12/2003
DODGE & COX INCOME	338,050,726	-0.4	-0.9	6.0	4.4	4.1	07/1999
VANGUARD TOTAL BOND MARKET INDEX	371,146,681	-0.2	-1.7	4.8	3.6	2.9	12/2003
2025 FUND	251,230,080	3.0	9.7	12.5	9.0	8.3	07/2011
2030 FUND	212,405,875	3.9	10.9	15.2	10.8	9.6	07/2011
2035 FUND	167,569,455	4.4	11.5	16.8	11.9	10.4	07/2011
2040 FUND	131,032,481	4.6	12.3	17.8	12.6	11.0	07/2011
2045 FUND	120,455,924	4.9	13.3	18.6	13.1	11.4	07/2011
2050 FUND	99,232,623	5.1	14.1	19.4	13.5	11.7	07/2011
2055 FUND	63,817,055	5.2	14.6	19.7	13.7	11.7	07/2011
2060 FUND	51,683,721	5.2	14.6	19.7	13.7	11.7	07/2011
2065 FUND	4,168,457	5.2	14.6				04/2020
INCOME FUND	252,691,911	2.4	8.0	10.3	7.2	5.8	07/2011
TD Ameritrade SDB	94,351,662						
TD Ameritrade SDB Roth	2,991,411						



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	\$768,954,143	9.2%	25.7%			07/2019
CRSP US Total Market Index		9.2	25.7			07/2019
Excess		0.0	0.0			
VANGUARD INSTITUTIONAL INDEX PLUS	1,961,877,557	11.0	28.7	26.1%	18.5%	07/1999
S&P 500		11.0	28.7	26.1	18.5	07/1999
Excess		-0.0	-0.0	-0.0	-0.0	
VANGUARD DIVIDEND GROWTH	1,007,262,260	11.6	24.8	22.4	17.0	10/2016
DIVIDEND GROWTH SPLICED INDEX		12.3	23.7	22.9	17.3	10/2016
Excess		-0.8	1.1	-0.5	-0.4	
Mid Cap US Equity						
VANGUARD MID CAP INDEX	828,658,173	8.0	24.5	24.5	15.9	01/2004
CRSP US Mid Cap Index		8.0	24.5	24.5	15.9	01/2004
Excess		-0.0	0.0	-0.0	0.0	
Small Cap US Equity						
T. ROWE PRICE SMALL-CAP STOCK	1,098,600,663	3.4	16.8	25.0	17.0	04/2000
Russell 2000		2.1	14.8	20.0	12.0	04/2000
Excess		1.2	2.0	5.0	4.9	
International Equity						
FIDELITY DIVERSIFIED INTERNATIONAL	395,662,215	4.0	13.1	20.7	13.6	07/1999
MSCI EAFE FREE (NET)		2.7	11.3	13.5	9.5	07/1999
Excess		1.3	1.8	7.1	4.0	
VANGUARD TOTAL INTERNATIONAL STOCK INDEX	377,275,052	2.1	8.7	13.7	9.9	07/2011
FTSE Global All Cap ex US Index Net		1.7	8.7	13.6	9.7	07/2011
Excess		0.4	-0.0	0.1	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

	Ending Market Value	Last Qtr	1 Year	3 Year	5 Year	Option Since
VANGUARD BALANCED INDEX	\$1,563,292,465	5.5%	14.2%	17.4%	12.4%	12/2003
Vanguard Balanced Fund Benchmark		5.5	14.2	17.5	12.4	12/2003
Excess		-0.0	-0.0	-0.1	-0.0	

Fixed Income

DODGE & COX INCOME	338,050,726	-0.4	-0.9	6.0	4.4	07/1999
Bloomberg U.S. Aggregate		0.0	-1.5	4.8	3.6	07/1999
Excess		-0.4	0.6	1.2	0.8	

VANGUARD TOTAL BOND MARKET INDEX	371,146,681	-0.2	-1.7	4.8	3.6	12/2003
Bloomberg U.S. Aggregate		0.0	-1.5	4.8	3.6	12/2003
Excess		-0.3	-0.1	0.0	0.0	

MONEY MARKET FUND	599,667,632	0.0	0.1	1.1	1.3	07/1986
ICE BofA US 3-Month Treasury Bill		0.0	0.0	1.0	1.1	07/1986
Excess		0.0	0.1	0.1	0.1	

Stable Value

STABLE VALUE FUND	1,684,667,943	0.5	1.9	2.4	2.3	11/1994
Fixed Interest Blended Benchmark		0.3	0.9	1.4	1.8	11/1994
Excess		0.2	1.0	1.0	0.5	

(1) Prior to 09/20/2021 the benchmark was NASDAQ US Dividend Achievers Select.

(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

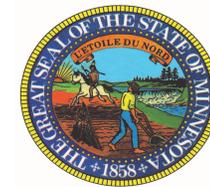
MN TARGET RETIREMENT ACCOUNTS

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	\$251,230,080	3.0%	9.7%	12.5%	9.0%	07/2011	2050 FUND	\$99,232,623	5.1%	14.1%	19.4%	13.5%	07/2011
2025 FUND BENCHMARK		3.0	9.8	12.5	9.0	07/2011	2050 FUND BENCHMARK		4.9	14.1	19.4	13.5	07/2011
Excess		0.0	-0.0	0.0	0.0		Excess		0.2	-0.0	-0.0	-0.0	
2030 FUND	212,405,875	3.9	10.9	15.2	10.8	07/2011	2055 FUND	63,817,055	5.2	14.6	19.7	13.7	07/2011
2030 FUND BENCHMARK		3.8	11.0	15.2	10.8	07/2011	2055 FUND BENCHMARK		5.0	14.6	19.8	13.7	07/2011
Excess		0.1	-0.0	0.0	0.0		Excess		0.2	-0.0	-0.0	-0.0	
2035 FUND	167,569,455	4.4	11.5	16.8	11.9	07/2011	2060 FUND	51,683,721	5.2	14.6	19.7	13.7	07/2011
2035 FUND BENCHMARK		4.3	11.5	16.8	11.9	07/2011	2060 FUND BENCHMARK		5.0	14.6	19.8	13.7	07/2011
Excess		0.1	-0.0	0.0	-0.0		Excess		0.2	-0.0	-0.0	-0.0	
2040 FUND	131,032,481	4.6	12.3	17.8	12.6	07/2011	2065 FUND	4,168,457	5.2	14.6			04/2020
2040 FUND BENCHMARK		4.5	12.4	17.8	12.6	07/2011	2065 FUND BENCHMARK		5.0	14.6			04/2020
Excess		0.1	-0.0	0.0	0.0		Excess		0.2	-0.0			
2045 FUND	120,455,924	4.9	13.3	18.6	13.1	07/2011	INCOME FUND	252,691,911	2.4	8.0	10.3	7.2	07/2011
2045 FUND BENCHMARK		4.8	13.3	18.6	13.1	07/2011	INCOME FUND BENCHMARK		2.4	8.1	10.3	7.2	07/2011
Excess		0.2	-0.0	-0.0	-0.0		Excess		0.0	-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, 2021

Total = \$1,920 Million

Fund Name	Ending Market	3 Months	1 Year	Annualized				Inception Date
				3 Years	5 Years	10 Years	Since Inception	
2038/2039 Enrollment Option	\$4,936,571	6.34%					5.70%	6/11/2021
2038-2039 Custom Benchmark		5.86%					5.73%	
2036/2037 Enrollment Option	\$55,870,195	6.07%	16.90%				16.55%	10/28/2019
2036-2037 Custom Benchmark		5.70%	16.18%				15.80%	
2034/2035 Enrollment Option	\$48,218,480	5.76%	16.09%				15.82%	10/28/2019
2034-2035 Custom Benchmark		5.42%	15.40%				15.15%	
2032/2033 Enrollment Option	\$55,865,321	5.41%	15.12%				15.24%	10/28/2019
2032-2033 Custom Benchmark		5.11%	14.52%				14.57%	
2030/2031 Enrollment Option	\$68,088,676	4.80%	13.55%				14.04%	10/28/2019
2030-2031 Custom Benchmark		4.58%	13.10%				13.43%	
2028/2029 Enrollment Option	\$86,573,019	4.04%	11.43%				12.25%	10/28/2019
2028-2029 Custom Benchmark		3.81%	10.91%				11.58%	
2026/2027 Enrollment Option	\$119,486,337	3.23%	9.21%				10.56%	10/28/2019
2026-2027 Custom Benchmark		3.10%	8.83%				9.98%	
2024/2025 Enrollment Option	\$165,176,766	2.47%	7.21%				8.88%	10/28/2019
2024-2025 Custom Benchmark		2.35%	6.74%				8.19%	
2022/2023 Enrollment Option	\$192,173,297	1.68%	5.04%				6.48%	10/28/2019
2022-2023 Custom Benchmark		1.51%	4.32%				5.67%	
In School Option	\$311,603,690	1.36%	3.80%				5.33%	10/28/2019
In School Custom Benchmark		1.19%	3.13%				4.30%	

MINNESOTA COLLEGE SAVINGS PLAN

Performance Statistics for the Period Ending: December 31, 2021

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 BB: U.S. and International Equity Option	\$344,055,996	7.83% 7.86%	21.97% 22.45%	21.40% 21.20%	15.01% 14.80%	13.24% 13.28%	8.39% 9.11%	10/ 1/2001
Moderate Allocation Option BB: Moderate Allocation Option	\$100,384,948	4.73% 4.85%	12.99% 13.29%	15.18% 15.05%	10.71% 10.61%	9.12% 9.26%	6.63% 7.16%	8/ 2/2007
100% Fixed-Income Option BB: 100% Fixed-Income Option	\$21,069,387	0.24% 0.34%	0.18% 0.46%	5.18% 5.50%	3.62% 3.94%	2.57% 2.98%	3.67% 4.26%	8/16/2007
International Equity Index Option BB: International Equity Index Option	\$9,223,830	2.40% 1.89%	9.12% 8.45%	13.08% 13.12%	9.74% 9.69%		6.14% 6.29%	6/18/2013
Money Market Option BB: Money Market Option	\$13,421,555	0.00% 0.00%	0.00% 0.01%	0.79% 0.69%	0.92% 0.79%	0.47% 0.41%	0.51% 0.46%	11/ 1/2007
Principal Plus Interest Option Citigroup 3-Month U.S. Treasury Bill	\$125,547,521	0.31% 0.01%	1.38% 0.05%	1.75% 0.96%	1.71% 1.11%	1.55% 0.60%	2.40% 1.24%	10/10/2001
Aggressive Allocation Option BB: Aggressive Allocation Option	\$74,197,640	6.26% 6.36%	17.37% 17.81%	18.17% 18.15%	12.88% 12.73%		9.99% 9.93%	8/12/2014
Conservative Allocation Option BB: Conservative Allocation Option	\$18,260,021	2.47% 2.51%	6.68% 6.63%	9.19% 9.13%	6.67% 6.60%		5.20% 5.23%	8/18/2014
Equity and Interest Accumulation Option BB: Equity and Interest Accumulation Option	\$7,370,130	4.65% 4.62%	12.94% 12.33%	13.24% 13.20%	9.70% 9.59%		7.92% 7.82%	8/18/2014
U.S. Large Cap Equity Option BB: U.S. Large Cap Equity Option	\$95,852,538	10.96% 11.03%	10.96% 11.03%	10.96% 11.03%	10.96% 11.03%	10.96% 11.03%	10.96% 11.03%	8/12/2014
Social Choice Equity Option BB: Social Choice Equity Option	\$566,223	9.42% 9.28%					10.30% 10.40%	6/11/2021
Matching Grant Citigroup 3-Month U.S. Treasury Bill	\$1,812,792	0.31% 0.01%	1.38% 0.05%	1.75% 0.96%	1.71% 1.11%	1.55% 0.60%	2.40% 1.24%	3/22/2002

MINNESOTABLE *plan*

A member of The National ABLE Alliance

Performance as of
12/31/21

Total Market Value: \$ 26,378,921

<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>Inception Date</u>
Aggressive Option	\$ 2,288,157	8.67%	3.09	5.28	17.24	17.24	19.06	12.94		12.80	12/15/16
ABLE Aggressive Custom Benchmark			3.33	5.38	17.61	17.61	19.52	13.38		13.31	
Variance			(0.24)	(0.10)	(0.37)	(0.37)	(0.46)	(0.44)		(0.51)	
Moderately Aggressive Option	\$ 2,551,456	9.67%	2.57	4.45	14.34	14.34	16.68	11.38		11.28	12/15/16
ABLE Moderately Aggressive Custom Benchmark			2.77	4.53	14.74	14.74	17.10	11.78		11.75	
Variance			(0.20)	(0.08)	(0.40)	(0.40)	(0.42)	(0.40)		(0.47)	
Growth Option	\$ 3,594,391	13.63%	2.05	3.57	11.55	11.55	14.24	9.73		9.69	12/15/16
ABLE Growth Custom Benchmark			2.21	3.69	11.91	11.91	14.63	10.14		10.14	
Variance			(0.16)	(0.12)	(0.36)	(0.36)	(0.39)	(0.41)		(0.45)	
Moderate Option	\$ 3,044,386	11.54%	1.51	2.71	8.74	8.74	11.73	8.09		8.08	12/15/16
ABLE Moderate Custom Benchmark			1.65	2.83	9.12	9.12	12.13	8.46		8.49	
Variance			(0.14)	(0.12)	(0.38)	(0.38)	(0.40)	(0.37)		(0.41)	
Moderately Conservative Option	\$ 3,056,717	11.59%	0.98	1.83	5.95	5.95	8.40	5.90		5.91	12/15/16
ABLE Moderately Conservative Custom Benchmark			1.10	1.92	6.12	6.12	8.68	6.20		6.23	
Variance			(0.12)	(0.09)	(0.17)	(0.17)	(0.28)	(0.30)		(0.32)	
Conservative Option	\$ 4,570,527	17.33%	0.26	0.61	2.12	2.12	3.88	2.94		2.95	12/15/16
ABLE Conservative Custom Benchmark			0.36	0.68	2.19	2.19	4.03	3.12		3.14	
Variance			(0.10)	(0.07)	(0.07)	(0.07)	(0.15)	(0.18)		(0.19)	
Checking Option	\$ 7,273,287	27.57%									03/30/17

MINNESOTA ACHIEVE A BETTER LIFE EXPERIENCE

The Minnesota Achieve a Better Life Experience Plan (ABI)
The plan is administered by the Department of Human Services (DHS).

The SBI and DHS have jointly contracted with Ascensus to provide recordkeeping, administrative, and investment management services for the plan.

RISK BASED ALLOCATIONS

The plan offers seven different allocation investment options: Aggressive, Moderately Aggressive, Growth, Moderate, Moderately Conservative, Conservative, and Checking.
Each allocation is based on a fixed risk level.

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Quarterly Report

Non-Retirement

December 31, 2021



Quarterly Report

Non-Retirement Funds

The SBI manages funds for trusts and programs created by the Minnesota State Constitution and Legislature.

- 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 Minnesota Workers Compensation Assigned Risk Plan provides worker compensation insurance for companies unable to obtain coverage through private carriers.
- 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

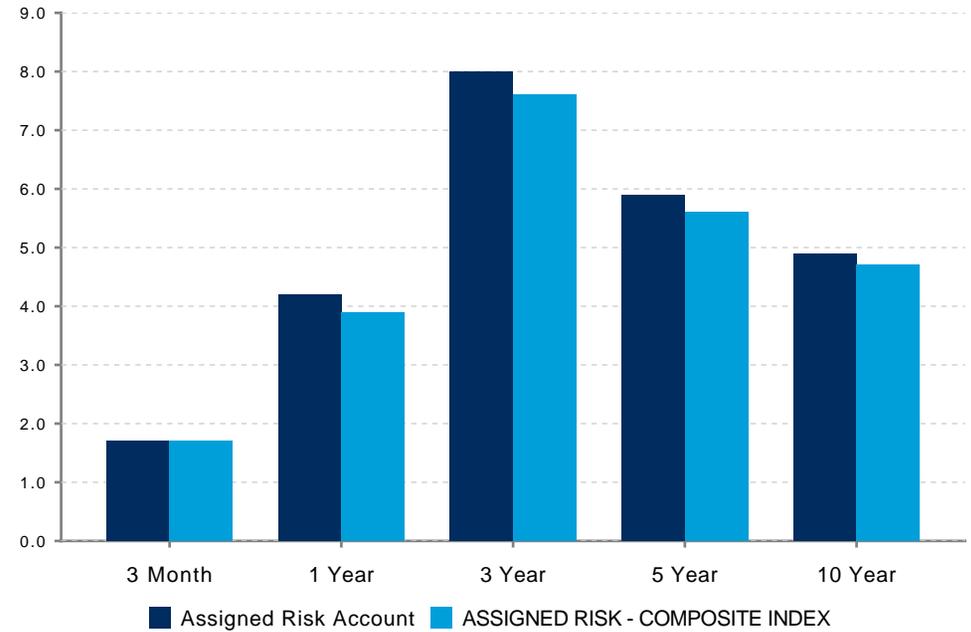
Assigned Risk Plan

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.

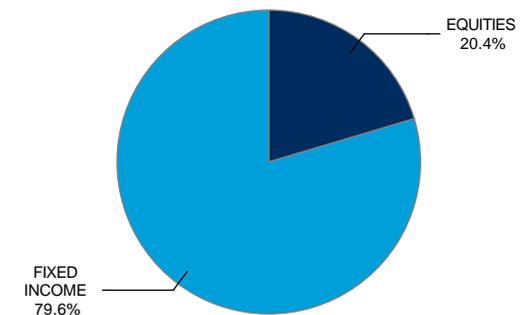
The Assigned Risk Plan is invested in a portfolio of common stocks and bonds

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.



	<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>
Assigned Risk Account	\$281,624,513	1.7%	4.2%	8.0%	5.9%	4.9%
EQUITIES	57,557,829	11.0	28.7	26.1	18.6	16.3
FIXED INCOME	224,066,684	-0.7	-1.6	3.1	2.4	1.7
ASSIGNED RISK - COMPOSITE INDEX		1.7	3.9	7.6	5.6	4.7
Excess		0.0	0.3	0.4	0.3	0.2
S&P 500		11.0	28.7	26.1	18.5	16.6
Bloomberg U.S. Government: Intermediate		-0.6	-1.7	3.0	2.3	1.7



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.



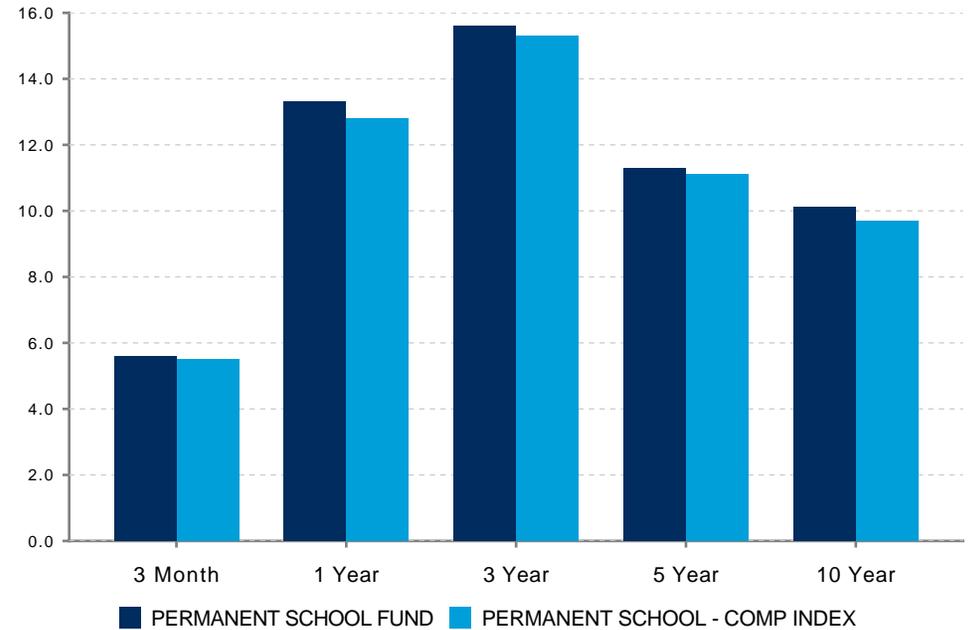
Non-Retirement

Permanent School Fund

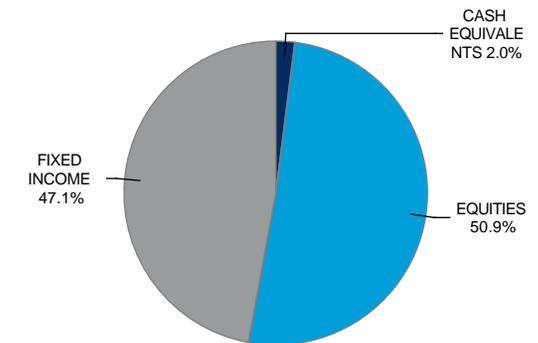
The investment objective of the Permanent School Fund is to produce a growing level of spendable income, within the constraints of maintaining adequate portfolio quality and liquidity. The income from the portfolio is transferred to the school endowment fund and distributed to Minnesota's public schools.

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.

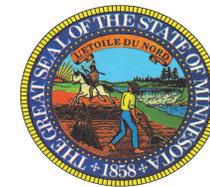
The stock segment is passively managed to track the performance of the S&P 500. The bond segment is actively managed to add incremental value through sector, security and yield curve decisions. The fixed income benchmark is the Bloomberg U.S. Aggregate. The total fund benchmark is a combination of the 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.



	<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>
PERMANENT SCHOOL FUND	\$2,056,618,329	5.6%	13.3%	15.6%	11.3%	10.1%
CASH EQUIVALENTS	40,281,360	0.0	0.1	1.0	1.2	0.7
EQUITIES	1,046,792,787	11.0	28.7	26.1	18.5	16.5
FIXED INCOME	969,544,181	-0.2	-1.5	5.3	4.0	3.6
PERMANENT SCHOOL - COMP INDEX		5.5	12.8	15.3	11.1	9.7
Excess		0.1	0.5	0.3	0.3	0.4
S&P 500		11.0	28.7	26.1	18.5	16.6
Bloomberg U.S. Aggregate		0.0	-1.5	4.8	3.6	2.9



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.



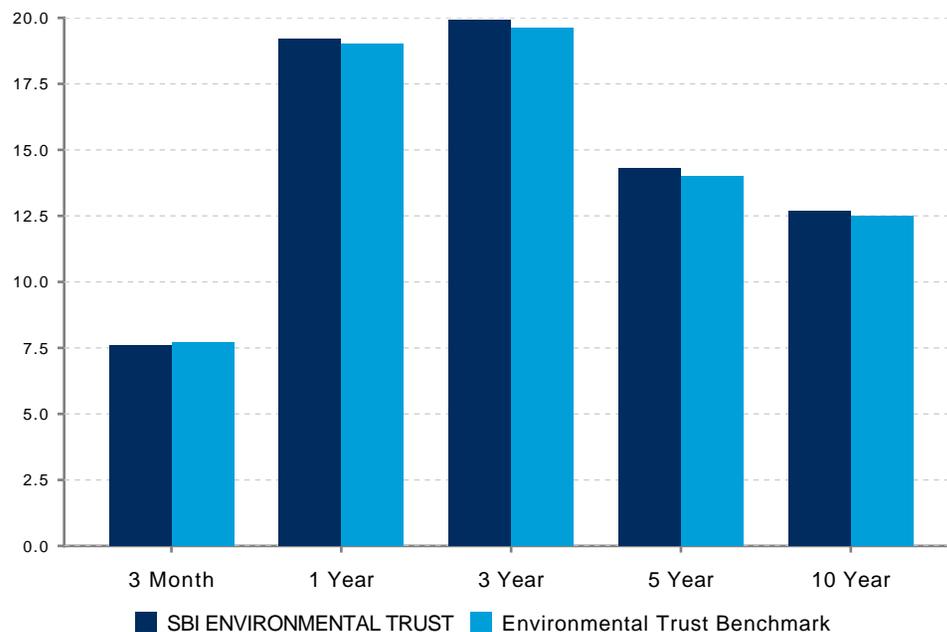
Non-Retirement

Environmental Trust Fund

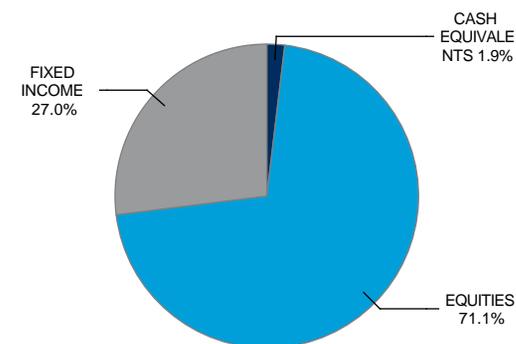
The objective of the Environmental Trust Fund is to increase the market value of the Fund over time in order to increase the annual amount made available for spending within the constraints of maintaining adequate portfolio quality and liquidity.

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.



	<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>
SBI ENVIRONMENTAL TRUST	\$1,759,271,518	7.6%	19.2%	19.9%	14.3%	12.7%
CASH EQUIVALENTS	32,656,849	0.0	0.1	1.0	1.2	0.7
EQUITIES	1,252,015,396	11.0	28.7	26.1	18.5	16.5
FIXED INCOME	474,599,273	-0.2	-1.5	5.3	4.0	3.6
Environmental Trust Benchmark		7.7	19.0	19.6	14.0	12.5
Excess		-0.1	0.2	0.3	0.2	0.2
S&P 500		11.0	28.7	26.1	18.5	16.6
Bloomberg U.S. Aggregate		0.0	-1.5	4.8	3.6	2.9



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.

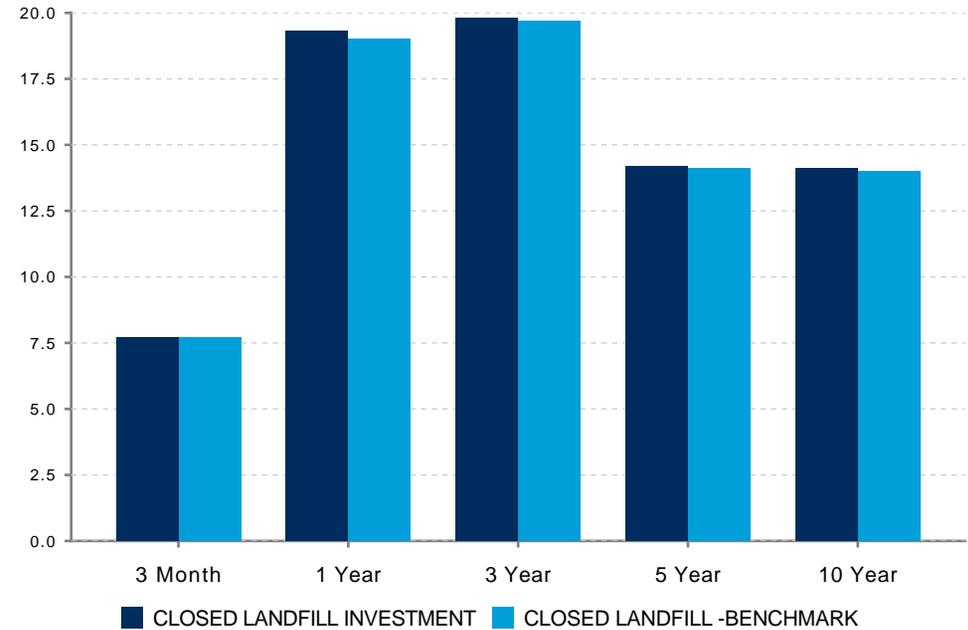


Non-Retirement

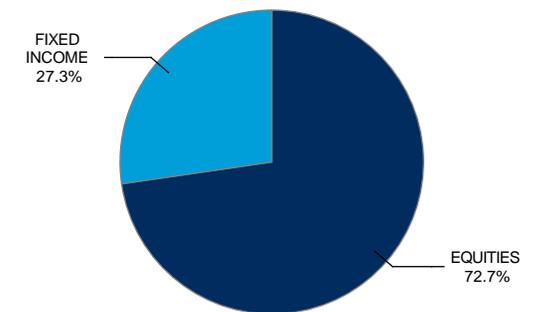
Closed Landfill Investment Fund

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 are 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.



	<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>
CLOSED LANDFILL INVESTMENT	\$140,233,911	7.7%	19.3%	19.8%	14.2%	14.1%
EQUITIES	101,896,107	11.0	28.7	26.1	18.5	16.5
FIXED INCOME	38,337,804	-0.2	-1.5	5.3	4.0	
CLOSED LANDFILL -BENCHMARK		7.7	19.0	19.7	14.1	14.0
Excess		0.0	0.4	0.1	0.1	0.0
S&P 500		11.0	28.7	26.1	18.5	16.6
Bloomberg U.S. Aggregate		0.0	-1.5	4.8	3.6	2.9



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.

Minnesota State Board of Investment
Quarter Ending December 31, 2021
Non-Retirement Managers



	<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	3,426,797,377	11.0	11.7	28.7	26.1	18.5	16.5	10.8	07/1993
S&P 500 INDEX (DAILY)		11.0	11.7	28.7	26.1	18.5	16.6	10.8	07/1993
Excess		-0.0	-0.0	-0.0	0.0	0.0	-0.0	0.1	
NON RETIREMENT FIXED INCOME - PRUDENTIAL	1,677,983,382	-0.2	-0.0	-1.5	5.3	4.0	3.6	5.8	07/1994
Bloomberg U.S. Aggregate		0.0	0.1	-1.5	4.8	3.6	2.9	5.3	07/1994
Excess		-0.2	-0.1	0.0	0.5	0.4	0.7	0.5	
RBC	224,066,687	-0.7	-0.7	-1.6	3.1	2.4	1.7	4.7	07/1991
RBC Custom Benchmark		-0.6	-0.6	-1.7	3.0	2.3	1.7	4.7	07/1991
Excess		-0.1	-0.1	0.1	0.1	0.1	0.1	-0.1	
MET COUNCIL OPEB BOND POOL	101,318,759	-0.6	-0.6	-0.4	2.3				
NON RETIREMENT CASH ACCOUNT	104,968,986	0.0	0.0	0.1	1.0				
ICE BofA US 3-Month Treasury Bill		0.0	0.0	0.0	1.0				
Excess		0.0	0.0	0.0	-0.0				

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, 2021



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.

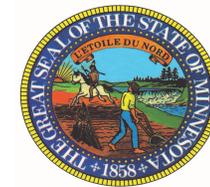
Beginning in January 2003, the Treasurer's Cash Pool is measured against the iMoneyNet, All Taxable Money Fund Report Average.

	<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	20,446,361,995	-0.2	-0.0	1.2	1.3	0.7
iMoneyNet Money Fund Average-All Taxable		0.0	0.0	0.7	0.8	0.4

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	69,575,362	0.5	0.4	3.5	3.2	



Addendum

Benchmark Definitions

Active Domestic Equity Benchmark:

A weighted composite each of the individual active domestic equity managers' benchmarks. Effective 3/1/2017 the calculation uses the average weight of the manager relative to the total group of active managers during the month. Prior to 3/1/2017 the beginning of the month weight relative to the total group was used.

Benchmark DM:

Since 6/1/08 the developed markets managers' benchmark, "Benchmark DM," is the Standard (large + mid) MSCI World ex USA (net). From 10/1/07 through 5/31/08 the benchmark was the Provisional Standard MSCI World ex USA (net). From 10/1/03 to 9/30/07 the benchmark was the MSCI World ex USA (net). Prior to that date, it was the MSCI EAFE Free (net), including from 10/1/01 to 5/31/02 when it was the Provisional MSCI EAFE Free (net).

Benchmark EM:

Since 6/1/08 the emerging markets managers' benchmark, "Benchmark EM," is the Standard (large + mid) MSCI Emerging Markets Free (net). From 10/1/07 through 5/31/08 the benchmark was the Provisional Standard MSCI Emerging Markets Free (net). From 1/1/01 to 9/30/07 the benchmark was the MSCI Emerging Markets Free (net), including from 10/1/01 to 5/31/02 when it was the Provisional MSCI Emerging Markets Free (net). Prior to 1/1/01, it was the MSCI Emerging Markets Free (gross).

Combined Funds Composite Index:

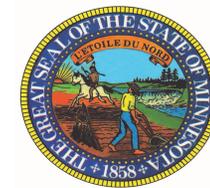
The Composite Index performance is calculated by multiplying the beginning of month Composite weights by the monthly returns of the asset class benchmarks. Asset class weights for Private Markets - Invested and Private Markets - Uninvested are reset at the start of each month. From 1/1/2018-2/28/2019 the Transitional Policy Target was used to reflect the addition of Treasuries to the Fixed Income portfolio. From 7/1/2016-12/31/2016 the composite weights were set to match actual allocation as the portfolio was brought into line with the new Strategic Asset Allocation Policy Target. 7/1/2016 to 12/1/2020 the uninvested portion of Private Markets allocated to Public Equity. Prior to 7/1/2016 the uninvested portion of the Private Markets was invested in Fixed Income and the Composite Index was adjusted accordingly. When the Strategic Asset Allocation Policy Target changes, so does the Composite Index.

Core Bonds Benchmark:

The Core Bonds Benchmark is the Bloomberg U.S. Aggregate. Prior to 2016 this index was called the Barclays Agg. Prior to 9/18/2008 this index was called the Lehman Brothers Aggregate Bond Index. From 7/1/84-6/30/94 the asset class benchmark was the Salomon Brothers Broad Investment Grade Index. The SBI name for this benchmark changed from Fixed Income to Core Bonds on March 31, 2020.

Credit Plus Benchmark:

40% Bloomberg US Corporate Bond Index, 30% Bloomberg US Mortgage Backed Index, 20% BofA ML US High Yield BB-B Cash Pay Constrained Index, and 10% JPM EMBI Global Diversified Index.



Addendum

Domestic Equity Benchmark:

Since 12/1/2020 the benchmark is the Russell 3000. From 1/1/2019-11/30/2020 the benchmark was 90% Russell 1000 and 10% Russell 2000. From 10/1/2003 to 12/31/2018 it was the Russell 3000. From 7/1/1999 to 9/30/2003, it was the Wilshire 5000 Investable Index. From 11/1/1993 to 6/30/1999, the target was the Wilshire 5000 as reported with no adjustments. Prior to 11/1/1993, the Wilshire 5000 was adjusted to reflect SBI mandated restrictions, which included liquor and tobacco, American Home Products and South Africa.

Fixed Interest Blended Benchmark: Since 6/1/2002, equals 3 Year Constant Maturity Treasury Yield + 45 bps. Prior to this change it was the 3 Year Constant Maturity Treasury Yield + 30 bps.

International Equity Benchmark:

Since 12/1/2020 equals the MSCI ACWI ex-US(Net). From 1/1/2018 to 1/1/2019 it was 75% MSCI World ex USA Index (net) and 25% MSCI Emerging Markets Index (net). From 6/1/08 to 12/31/2018 the International Equity asset class target was the Standard (large + mid) MSCI ACWI ex U.S. (net). From 10/1/07 through 5/31/08 the benchmark was the Provisional Standard MSCI ACWI ex U.S. (net). From 10/1/03 to 9/30/07 the target was MSCI ACWI ex U.S. (net). From 1/1/01 to 9/30/03, the target was MSCI EAFE Free (net) plus Emerging Markets Free (net), and from 7/1/99 to 12/31/00 the target was MSCI EAFE Free (net) plus Emerging Markets Free (gross). From 7/1/99 to 9/30/03, the weighting of each index fluctuated with market capitalization. From 10/1/01 to 5/31/02 all international benchmarks being reported were the MSCI Provisional indices. From 12/31/96 to 6/30/99 the benchmark was fixed at 87% EAFE Free (net)/13% Emerging Markets Free (gross). On 5/1/96, the portfolio began transitioning from 100% EAFE Free (net) to the 12/31/96 fixed weights. Prior to 5/1/96 it was 100% the EAFE Free (net).

Multi-Asset Credit Benchmark:

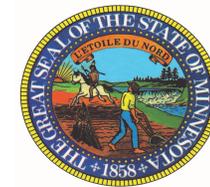
33.33% ICE BofA High Yield, 33.33% S&P LSTA Leveraged Loan, and 33.33% JPM EMBI Global Diversified Index.

Passive Domestic Equity Benchmark:

A weighted average of the Russell 1000, Russell 2000 and Russell 3000 effective 11/1/2018. From 10/1/2016 to 11/1/2018 it was a weighted average of the Russell 1000 and Russell 3000. From 10/1/2003 to 10/1/2016 it was equal to the Russell 3000. From 7/1/2000 to 9/30/2003, it was the Wilshire 5000 Investable Index. From 11/1/1993 to 6/30/2000, the target was the Wilshire 5000 as reported with no adjustments. Prior to 11/1/1993, the Wilshire 5000 was adjusted to reflect SBI mandated restrictions, which included liquor and tobacco, American Home Products and South Africa.

Passive Manager Benchmark:

Russell 3000 effective 10/1/2003. From 7/1/2000 to 9/30/2003, it was the Wilshire 5000 Investable Index. From 11/1/1993 to 6/30/2000, the target was the Wilshire 5000 as reported with no adjustments. Prior to 11/1/1993, the Wilshire 5000 was adjusted to reflect SBI mandated restrictions, which included liquor and tobacco, American Home Products and South Africa.



Addendum

Public Equity Benchmark:

Since 12/1/2020 it is 67% Russell 3000 and 33% MSCI ACWI ex-US(net). From 1/1/2019 to 12/1/2020 it was 60.3% Russell 1000, 6.7% Russell 2000, 24.75% MSCI World Ex US (net), and 8.25% MSCI EM (net). From 7/1/2017 thru 12/31/2018 it was 67% Russell 3000 and 33% MSCI ACWI ex USA. Prior to 6/30/16 the returns of Domestic and International Equity were not reported as a total Public Equity return. From 6/30/16-6/30/17 the Public Equity benchmark adjusted by 2% each quarter from 75% Russell 3000 and 25% MSCI ACWI ex USA until it reached 67% and 33%.

Return Seeking BM:

A weighted composite of each individual return seeking fixed income managers' benchmarks. The calculation uses the average weight of the manager relative to the total group of active managers during the month.

Semi-Passive Domestic Equity Benchmark: Russell 1000 index effective 1/1/2004. Prior to 1/1/2004 it was the Completeness Fund benchmark.

Total Fixed Income Benchmark:

Since 7/1/2020 the Total Fixed Income benchmark is 40% Bloomberg U.S. Aggregate Index/ 40% Bloomberg Treasury 5+ Years Index/ 20% ICE BofA US 3-Month Treasury Bill. From 4/1/2019-6/30/2020 it was 50% Bloomberg Aggregate and 50% Bloomberg Treasury 5+ Years Index. From 2/1/2018-3/31/19 the weighting of this benchmark reflected the relative weights of the Core Bonds and Treasuries allocations in the Combined Funds Composite.

Zevenbergen Benchmark: Russell 3000 Growth index effective 1/1/2021. Prior to 1/1/2021 it was the Russell 1000 Growth Index.

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