Wisconsin Retirement System Financial Report

Calendar Year 2021

Wisconsin Retirement System

Financial Report

Calendar Year 2021

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Independent Auditor's Report on the Financial Statements and Other Reporting Required by *Government Auditing Standards*

Senator Robert Cowles, Co-chairperson
Joint Legislative Audit Committee

Members of the Employee Trust Funds Board and
Mr. A. John Voelker, Secretary
Department of Employee Trust Funds

Report on the Audit of the Financial Statements

Opinion

We have audited the Statement of Fiduciary Net Position, Statement of Changes in Fiduciary Net Position, and the related notes for the Wisconsin Retirement System, administered by the State of Wisconsin Department of Employee Trust Funds (ETF), as of and for the year ended December 31, 2021.

In our opinion, the accompanying financial statements referred to above present fairly, in all material respects, the financial position of the Wisconsin Retirement System, as of December 31, 2021, and the changes in financial position for the year then ended in accordance with accounting principles generally accepted in the United States of America.

Basis for Opinion

We conducted our audit in accordance with auditing standards generally accepted in the United States of America and the standards applicable to financial audits contained in *Government Auditing Standards,* issued by the Comptroller General of the United States. Our responsibilities under those standards are further described in the Auditor's Responsibility for the Audit of the Financial Statements section of our report. We are required to be independent of ETF and to meet our other ethical responsibilities in accordance with the relevant ethical requirements relating to our audit. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Emphases of Matter

As discussed in Note 1 to the financial statements, the financial statements referred to in the first paragraph present only the Wisconsin Retirement System and do not purport to, and do not, present fairly the financial position of the State of Wisconsin as of December 31, 2021, or the changes in financial position for the year then ended, in accordance with accounting principles generally accepted in the United State of America.

As discussed in Note 2 to the financial statements, the accounting and financial reporting for certain external investment management fees for externally managed assets changed beginning in 2021. These external investment management fees are reported in the Net Increase (Decrease) in the Fair Value of

Investments account on the Statement of Changes in Fiduciary Net Position. In addition, as discussed in Note 2, the prior Real Estate account and Limited Partnerships account were combined into the Private Fund Investments account on the Statement of Fiduciary Net Position.

As discussed in Note 3 to the financial statements, the financial statements include investments that do not have readily ascertainable market prices. Some of these investments are valued based on a variety of third-party pricing methods and others, such as private fund investments, are reported based on net asset value. Because of the inherent uncertainty of valuation, these estimated values may differ from the values that could be realized in a secondary market transaction or the amount ultimately realized.

Our opinion is not modified with respect to these matters.

Responsibilities of Management for the Financial Statements

Management is responsible for the preparation and fair presentation of the financial statements in accordance with accounting principles generally accepted in the United States of America, and for the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditor's Responsibility for the Audit of the Financial Statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance but is not absolute assurance. Therefore, reasonable assurance is not a guarantee that an audit conducted in accordance with auditing standards generally accepted in the United States of America and *Government Auditing Standards* will always detect a material misstatement when it exists. The risk of not detecting a material misstatement resulting from fraud is higher than one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control. Misstatements are considered material if there is a substantial likelihood that, individually or in the aggregate, they would influence the judgement made by a reasonable user based on the financial statements.

In performing an audit in accordance with auditing standards generally accepted in the United States of America and *Government Auditing Standards*, we exercised professional judgement and maintained professional skepticism throughout the audit. We also identified and assessed the risks of material misstatement of the financial statements, whether due to fraud or error, and designed and performed audit procedures responsive to those risks. Such procedures include examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements.

In addition, we obtained an understanding of internal control relevant to the audit in order to design audit procedures that were appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of ETF's internal control. Accordingly, no such opinion is expressed.

We also evaluated the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, and evaluated the overall presentation of the financial statements.

We are required to communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit, significant audit findings, and certain internal control-related matters that we identified during the audit.

Required Supplementary Information

Accounting principles generally accepted in the United States of America require that the management's discussion and analysis on pages 7 through 16, and the following information found on pages 63 through 68 be presented to supplement the financial statements: the Wisconsin Retirement System Schedules of Changes in Net Pension Liability (Asset) and Related Ratios, the Wisconsin Retirement System Schedule of Required Employer Contributions, and the Wisconsin Retirement System Schedule of Investment Returns, which include the related notes. Such information is the responsibility of management and, although not a part of the financial statements, is required by the Governmental Accounting Standards Board (GASB) that considers it to be an essential part of financial reporting for placing the financial statements in an appropriate operational, economic, or historical context. We have applied certain limited procedures to the required supplementary information in accordance with auditing standards generally accepted in the United States of America, which consisted of inquiries of management about the methods of preparing the information and comparing the information for consistency with management's responses to our inquiries, the financial statements, and other knowledge we obtained during our audit of the financial statements. We do not express an opinion or provide any assurance on the information because the limited procedures do not provide us with sufficient evidence to express an opinion or provide any assurance.

Other Reporting Required by *Government Auditing Standards*

In accordance with *Government Auditing Standards*, we have also issued our report dated September 26, 2022, and published in report 22-13, on our consideration of ETF's internal control over financial reporting; our testing of its compliance with certain provisions of laws, regulations, and contracts; and other matters. The purpose of that report is solely to describe the scope of our testing of internal control over financial reporting and compliance and the result of that testing, and not to provide an opinion on the effectiveness of ETF's internal control over financial reporting or on compliance. That report is an integral part of an audit performed in accordance with *Government Auditing Standards* and should be used in considering ETF's internal control over financial reporting and compliance.

LEGISLATIVE AUDIT BUREAU

Legislative Audit Bureau

September 26, 2022

Management's Discussion and Analysis

Management of the Wisconsin Department of Employee Trust Funds (ETF) presents this discussion and analysis of the financial activities for the year ended December 31, 2021. This narrative is intended to supplement the financial statements which follow and should be read in conjunction with the note disclosures, which are an integral part of the financial statements.

ETF administers a defined benefit pension trust and other employee benefit plans for approximately 663,000 members, retirees, and beneficiaries. The following discussion and analysis is intended to serve as an introduction to Wisconsin Retirement System's (WRS) financial statements.

» *Financial Statements*

The WRS is reported as a Fiduciary Fund. Fiduciary funds are used to account for resources held for the benefit of parties outside the government whose funds are restricted for purposes of the trust. The financial statements include:

- Statement of Fiduciary Net Position
- Statement of Changes in Fiduciary Net Position
- Notes to Financial Statements

The Statement of Fiduciary Net Position provides a snapshot of account balances at a point in time. It reports the assets available for future payments to benefit recipients, along with any liabilities that are owed as of the statement date. The full accrual basis of accounting is used.

The difference between assets and liabilities represents the net value of assets held in trust for future benefit payments. This amount is called "Net Position - Restricted for Pensions".

The Statement of Changes in Fiduciary Net Position displays the effect of financial transactions that occurred during the calendar year. Additions less deductions equals the net increase (decrease) in net position. This net increase (decrease) reflects the change in the value of net position that occurred during the year.

Notes to the Financial Statements are an integral part of the financial statements and provide additional information that is essential for a comprehensive understanding of the data reported in the financial statements. The notes describe the accounting and administrative policies under which ETF operates, significant account balances and activities, material risks, obligations, contingencies and subsequent events, if any.

The Required Supplementary Information (RSI) includes:

- Schedule of Changes in Net Pension Liability (Asset) and Related Ratios
- Schedule of Required Employer Contributions
- Schedule of Investment Returns

The financial statements and related notes are prepared in accordance with Generally Accepted Accounting Principles (GAAP) established by the Governmental Accounting Standards Board (GASB).

» Financial Highlights

Net Position of the WRS increased by $16.8 billion or 13.5% from $125.0 billion in 2020 to $141.8 billion in 2021. This was primarily a result of returns on investments due to favorable market conditions.

The WRS funding ratio under the funding methodology used to establish required contributions continues to be 100% as of December 31, 2021. Under the GASB financial reporting method, the WRS is 106% funded as of December 31, 2021. As of December 31, 2021, the WRS had a Net Pension Asset of $8.1 billion compared to a Net Pension Asset of $6.2 billion as of December 31, 2020. The increase of approximately $1.9 billion is primarily attributable to gains on investments due to more favorable market conditions in 2021. The Total Pension Liability increased from $118.7 billion in 2020 to $133.8 billion in 2021.

» Analysis of WRS Financial Activity

The WRS is a cost-sharing, multiple-employer public employee retirement system established by the State of Wisconsin to provide pension benefits for state and local government employees. The system is administered in accordance with Wis. Stat. § 40. ETF, under the direction of the ETF Board, is responsible for administration of the WRS, including collecting contributions from employers and paying retirement benefits to WRS participants. The State of Wisconsin Investment Board (SWIB) is responsible for managing WRS investments.

The system's funding objective is to meet its long-term benefit obligations through contributions and investment income. Contributions and the income from investments provide the reserves needed to finance the benefits provided under the programs.

The following tables show comparative summaries of the WRS net position and the changes in the WRS net position for 2021 and 2020.

Summary of WRS Net Position
As of December 31
(In Millions)

	2021	2020	$ Change	% Change
Assets				
Cash and Cash Equivalents	$ 6,817	$ 6,401	$ 416	6.5 %
Receivables	11,564	11,850	(286)	(2.4)
Investments at Fair Value	168,509	139,039	29,470	21.2
Securities Lending Collateral	396	811	(415)	(51.2)
Other Assets	25	17	8	47.1
Total Assets	**$ 187,311**	**$ 158,118**	**$ 29,193**	**18.5 %**
Liabilities				
Core Investment Due To Other Benefit Programs	$ 4,957	$ 4,408	$ 549	12.5 %
Variable Investment Due To Other Benefit Programs	20	22	(2)	(9.1)
Obligation Under Reverse Repurchase Agreements	17,012	10,659	6,353	59.6
Investment Payables	13,533	10,012	3,521	35.2
Securities Lending Collateral Liability	1,157	811	346	42.7
Other Payables	8,784	7,240	1,544	21.3
Total Liabilities	**$ 45,463**	**$ 33,152**	**$ 12,311**	**37.1 %**
Net Position Restricted for Pensions	**$ 141,848**	**$ 124,966**	**$ 16,882**	**13.5 %**

Summary of Changes in WRS Net Position
For the Years Ended December 31
(In Millions)

	2021	2020	$ Change	% Change
Contributions	$ 2,252	$ 2,186	$ 66	3.0 %
Net Investment Income	21,056	16,698	4,358	26.1
Total Additions	**$ 23,308**	**$ 18,884**	**$ 4,424**	**23.4 %**
Benefits/Benefit Expenses	$ 6,395	$ 5,978	$ 417	7.0 %
Administrative Expenses	31	33	(2)	(6.1)
Total Deductions	**$ 6,426**	**$ 6,011**	**$ 415**	**6.9 %**
Net Increase (Decrease) in Net Position	**$ 16,882**	**$ 12,873**	**$ 4,009**	**31.1 %**
Net Position - Beginning of Year	**$ 124,966**	**$ 112,093**	**$ 12,873**	**11.5 %**
Net Position - End of Year	**$ 141,848**	**$ 124,966**	**$ 16,882**	**13.5 %**

Cash and Cash Equivalents

Cash and Cash Equivalents increased by $416 million, or 6.5%, when comparing calendar year-end 2021 to 2020. The majority of the increase is attributed to an increase in cash held in a short-term investment pool at year-end 2021 due to rebalancing. Routine rebalancing activities fluctuate throughout the year and can impact cash balances at a point in time.

Receivables

Receivables decreased by $286 million, or 2.4%, when comparing calendar year-end 2021 to 2020. Most of this decrease is due to a decrease in the balance for Investment Sales Receivable, which is dependent upon the timing and settlement of securities transactions. Approximately 86% of the Investment Sales Receivable balance relates to the use of To Be Announced (TBA) securities. TBA securities are derivative contracts that consist of mortgage-backed securities (MBS) issued by the Government National Mortgage Association, a government entity, and by government-sponsored enterprises, such as the Federal National Mortgage Association or the Federal Home Loan Mortgage Corp. The term TBA is derived from the fact that the actual MBS that will be delivered to fulfill a TBA trade is not designated at the time the trade is made. Instead, the specific pool of mortgages making up the MBS is announced 48 hours prior to the established trade settlement date. Eligibility rules and standards for MBS pools deliverable into TBA contracts ensure that delivered MBS pools are fungible. TBA securities sold create a receivable on the Statement of Fiduciary Net Position because payment for TBA securities is not made until the settlement date.

Other routine rebalancing activities, where investment positions were sold but pending settlement, also contributed to the change in receivables at December 31, 2021.

Securities Lending Collateral

Securities Lending Collateral decreased by $415 million as of 2021, compared to 2020. The balance consists of cash received as collateral for securities lending transactions. As of December 31, 2021, SWIB's securities lending agent released $761 million in cash from the Securities Lending Collateral pool to SWIB. This cash , included in Cash and Cash Equivalents, plus Securities Lending Collateral equals the Securities Lending Collateral Liability at December 31, 2021. The cash released provides liquidity for other investment strategies.

Securities Lending Collateral Liability

Securities Lending Collateral Liability increased by $346 million from 2020 to 2021 due to an increase in lending activities primarily used to support Core Fund liquidity needs. Investment policies permit the use of both cash and treasury securities as collateral to support short positions.

Obligation Under Reverse Repurchase Agreements

Obligation Under Reverse Repurchase Agreements increased by $6.4 billion, or 59.6% , when comparing calendar year-end 2021 to 2020. Reverse repurchase agreements involve the sale of assets with the simultaneous agreement to repurchase those assets for a pre-determined price, plus interest, at a future date.

The proceeds from these agreements are invested in Treasury Inflation-Protected Securities (TIPS). During 2021, SWIB increased its capacity to participate in reverse repurchase agreements, providing access to low-cost financing needed to maintain SWIB's strategic allocation targets. The increase in reverse repurchase agreements corresponds with the overall increase in the Core Fund's assets under management.

Investment Payables

Investment Payables increased by $3.5 billion, or 35.2%, when comparing calendar year-end 2021 to 2020. The majority of this increase is due to investment purchases payable, which is dependent upon the timing and settlement of pending purchase transactions. Investment purchases payable primarily relate to the use of To Be Announced (TBA) securities, which accounts for about 91% of the investment purchases payable balance at December 31, 2021. Purchased TBA securities create a payable on the Statement of Fiduciary Net Position because payment for TBA securities is not made until the settlement date. Other routine rebalancing activities, where investment positions were purchased but pending settlement, also contributed to the change in Investment Payables at December 31, 2021.

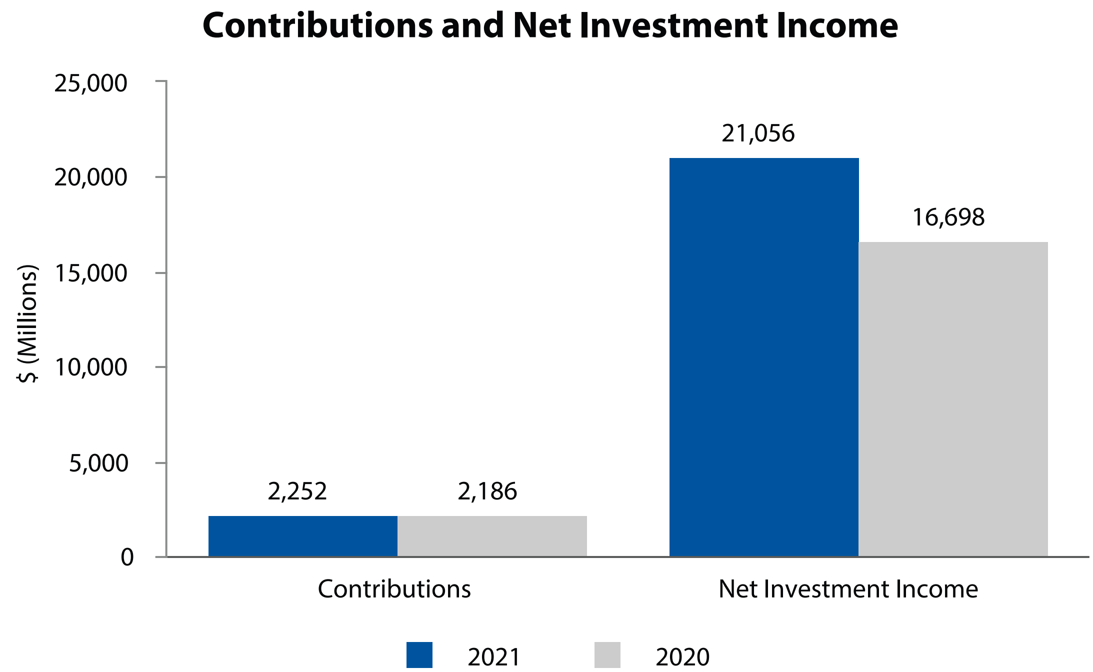
Other Payables

Other Payables increased by $1.5 billion, or 21.3%, when comparing calendar year-end 2021 to 2020 primarily relating to Short Sell Obligations. Short sale transactions are created when a security not owned by the portfolio is sold in anticipation of purchasing the security at a lower price in the future. The increase in short sales is largely due to internal equity and fixed income strategies designed to increase active risk.

Contributions and Investment Earnings

The retirement benefits provided by the WRS are funded from pension trust fund revenue. The primary sources of revenue are investment income generated from the investment of plan assets and contributions for active members made by members and their employers.

Total contributions and investment earnings for the year ended December 31, 2021, was $23.3 billion compared to $18.9 billion in December 31, 2020. As the chart below shows, contributions increased by $66 million, while investment income increased by $4.4 billion. The increase in contributions was primarily driven by an increase in covered payroll for the year. The increase in investment income during 2021 is primarily attributable to improved market performance, with a total Core Fund net investment return of 16.9% compared to 15.2% in 2020, and a total Variable Retirement Investment Trust (Variable Fund) net investment return of 20.0%, compared to 17.5% in 2020.



The assets of the WRS are valued at fair market value and are invested in the Core Fund and the Variable Fund, which are collectively the Retirement Funds. All WRS members have at least half, if not all, of their pension contributions invested in the Core Fund. The Core Fund is a diversified, balanced fund invested for the long-term needs of the WRS. Diversification helps to stabilize the effects of market changes. The investment objective of this trust fund is to meet or exceed an average of 6.8% annual nominal return over the long-term. This objective is based on market rate of return and actuarial assumptions needed to meet the obligations of the WRS. The Variable Fund allows active employees participating in the WRS to put up to half of their pension fund contributions into this global stock fund. Approximately 14% of WRS members participate in the Variable Fund. By statute, the Variable Fund invests in stocks and provides participants the potential for higher returns in exchange for higher risk. The investment objective of the Variable Fund is to meet or exceed broad equity market indices over a full market cycle.

SWIB is responsible for managing the assets of the WRS. See Note 3 for additional information on Investments and Securities Lending Transactions.

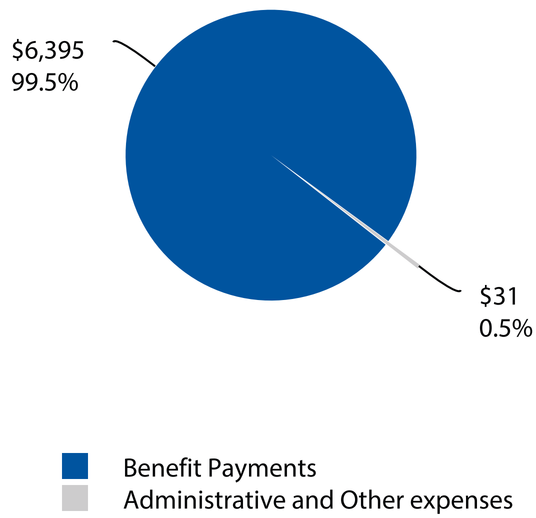
Expenses - Deductions from Plan Net Position

The primary expenses of the WRS include annuity benefits for retirees and beneficiaries, refunds of contributions to former members, and expenses associated with the administration of the retirement plans. Benefit payments for 2021 totaled $6.4 billion, an increase of $417 million or 7.0% over the 2020 amount of $6.0 billion. This was due to the number of retired participants increasing from 221,019 as of December 31, 2020, to 226,605 as of December 31, 2021, as well as increases in annuities starting with the May 1, 2021 annuity payment. Administrative expenses of approximately $31 million accounted for less than 0.5% of the deductions to net position in 2021 and remained relatively consistent from 2020.

Investment expenses are deducted from investment income and were $435 million in 2021, a decrease of 41.3% from $742 million in 2020. The decrease was primarily related to an accounting change implemented in 2021 for assets managed by third-party investment managers within external portfolios. See Note 2 for more information on this accounting change.

Expenses as of December 31, 2021

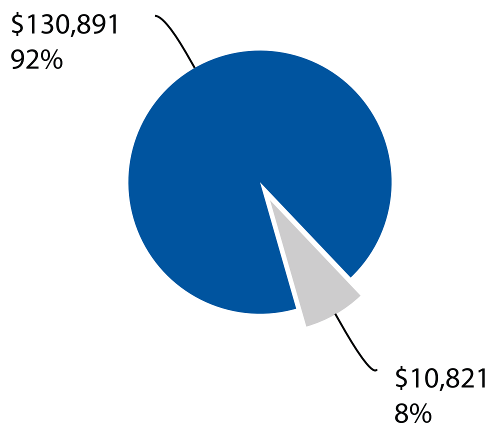
(In Millions)



Retirement Reserves

The funds accumulated by the WRS to meet current and future obligations to retirees and beneficiaries are derived from the excess of revenue over expenses. Reserves have been established to reflect legal restrictions established by Wisconsin Statutes on the use of funds. The higher level of funding a plan achieves, the larger the accumulation of assets and the greater the investment income potential. In 2021 revenues exceeded expenses, leading to an increase of $16.8 billion in the retirement reserves. The increase was primarily related to the increase in investment earnings in 2021. The reserves are invested in either the Core Fund or the Variable Fund. Approximately 92% of the reserves are invested in the Core Fund and 8% are invested in the Variable Fund.

Total Reserves Core vs. Variable
as of December 31, 2021
(In Millions)



Summary of Pension Plan Reserve Balances
For the Years Ended December 31
(In Millions)

Total Reserves	**2021**	**Increase (Decrease)**	**2020**
Annuity	$ 75,530	$ 6,770	$ 68,760
Employee	22,469	1,817	20,652
Employee Additional	268	34	234
Employer	26,406	1,783	24,623
Market Recognition Account (WRS Only)	17,039	6,356	10,683
Total Reserves	**$ 141,712**	**$ 16,760**	**$ 124,952**

Members, Retirees, Beneficiaries and Employers

Approximately 260,000 active members were employed with 1,555 WRS-participating employers as of December 31, 2021. The number of inactive, retirees and other annuitants totaled 404,676 at year-end. Total members served by the WRS in 2021 was approximately 663,000 as shown in the following tables.

Distribution of Active Members
As of December 31

Active Member Category	2021 Number	2021 Percent of Total	2020 Number	2020 Percent of Total
General	132,650	51.3 %	132,985	51.3 %
Teachers	102,753	39.7	102,465	39.5
Elected/Executive/Judges	1,264	0.5	1,292	0.5
Protective with Social Security	19,220	7.4	19,749	7.6
Protective without Social Security	2,760	1.1	2,758	1.1
Total Active Members	**258,647**	**100.0 %**	**259,249**	**100.0 %**

Additional information about members is presented in Note 4, Description of the Wisconsin Retirement System.

Distribution of Inactive, Retirees, and Beneficiaries
As of December 31

Inactive, Retirees, Beneficiaries	2021 Number	2021 Percent of Total	2020 Number	2020 Percent of Total
Inactive Members:				
Terminated Participants	174,573	43.1 %	168,944	42.9 %
Alternate Payees	3,498	0.9	3,468	0.9
Retirees and Beneficiaries:				
Retirement Annuitants	218,846	54.0	213,268	54.2
Disability Annuitants	6,305	1.6	6,303	1.6
Death Beneficiary Annuitants	1,454	0.4	1,448	0.4
Total Inactive, Retiree and Beneficiaries	**404,676**	**100.0 %**	**393,431**	**100.0 %**

Additional information about inactive, retirees and beneficiaries is presented in Note, 4, Description of the Wisconsin Retirement System.

The number of participating employers by category as of 2021 and 2020, was:

Distribution of Employers
As of December 31

Employer	2021	2020
State Agencies, UW & Public Authorities	56	56
Cities	189	188
Counties	71	71
Villages	291	283
Towns	287	279
School Districts	421	421
Cooperative Educational Service Agencies	12	12
WI Technical College System Districts	16	16
Special Districts	212	211
Total Employers	**1,555**	**1,537**

Actuarial Valuations and Funding Progress - Pension Plan

ETF's actuarial consultant performs an actuarial valuation of the WRS each year to determine funding requirements and establish contribution rates. The funding policy provides for periodic employer contributions at actuarially determined rates that will remain relatively level over time as a percentage of payroll and will accumulate sufficient assets to meet the costs of all benefits when due. The latest valuation of the pension plan was performed by Gabriel Roeder Smith & Company (GRS). Under the funding methodology, the WRS is 100% funded as of December 31, 2021. For financial reporting purposes, a funding ratio is calculated in accordance with GASB pension accounting standards. Under these standards, the WRS was 106% funded as of December 31, 2021.

» *Financial Contact*

This financial report is designed to provide a general overview of the program's finances. Questions concerning any of the information provided in this report should be addressed to ETF at P.O. Box 7931, Madison, Wisconsin, 53707-7931.

Wisconsin Retirement System
Statement of Fiduciary Net Position
December 31, 2021
(In Thousands)

	Pension Trust Fund
Assets:	
Equity In Pooled Cash & Cash Equivalents	$ 6,816,816
Securities Lending Collateral	396,434
Prepaid Expenses	19,752
Receivables:	
Contributions Receivable	230,826
Prior Service Contributions Receivable	5,789
Benefit Overpayments Receivable	2,095
Due From Other Benefit Programs	1,608
Miscellaneous Receivables	102
Securities Lending Income Receivable	3,344
Interest and Dividends Receivable	450,913
Investment Sales Receivable	10,869,737
Total Receivables	11,564,414
Investments at Fair Value:	
Equities	83,778,808
Fixed Income Investments	48,219,267
Private Fund Investments	26,573,553
Multi Asset Investments	6,227,923
Preferred Securities	703,312
Convertible Securities	2,153
Foreign Currency Contracts	3,794
Options Contracts	(1,946)
Financial Futures Contracts	76,789
Swaps	25,690
To Be Announced Securities	2,899,255
Total Investments	168,508,598
Capital Assets - Net of Accum. Depreciation	4,865
Total Assets	187,310,879
Liabilities:	
Core Investment Due To Other Benefit Programs	4,957,156
Variable Investment Due To Other Benefit Programs	19,611
Obligation Under Reverse Repurchase Agreements	17,012,077
Short Sell Obligations	8,050,666
Securities Lending Collateral Liability	1,157,434
Collateral Due to Counterparty	125,917
Benefits Payable	455,787
Unearned Revenue	11
Due To Other Benefit Programs	5,639
Miscellaneous Payables	145,928
Investment Payables	13,532,952
Total Liabilities	45,463,178
Net Position - Restricted for Pensions	$ 141,847,701

The accompanying notes are an integral part of the financial statements.

Wisconsin Retirement System
Statement of Changes in Fiduciary Net Position
For the Year Ended December 31, 2021
(In Thousands)

		Pension Trust Fund
Additions:		
Contributions:		
Employer Contributions	$	1,164,586
Member Contributions		1,086,782
Total Contributions		2,251,368
Investment Income:		
Net Increase (Decrease) in Fair Value of Investments		19,625,644
Interest, Dividend, and Other Investment Income		2,564,885
Securities Lending Income		47,080
Less:		
Investment Income Distributed to Other Benefit Programs		(742,669)
Investment Expense		(435,466)
Securities Lending Fees		(3,282)
Net Investment Income		21,056,192
Interest on Prior Service Receivable		366
Total Additions		23,307,926
Deductions:		
Benefits and Refunds:		
Retirement, Disability, and Beneficiary		6,352,709
Separation Benefits		42,042
Other Benefit Expense		3
Administrative Expenses		31,625
Other Expenses		240
Total Deductions		6,426,619
Net Increase (Decrease)		16,881,307
Net Position - Beginning of Year		124,966,394
Net Position - End of Year	$	141,847,701

The accompanying notes are an integral part of the financial statements.

NOTES TO FINANCIAL STATEMENTS

1 SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

The Wisconsin Retirement System (WRS) is a cost-sharing, multiple-employer public employee retirement system established and administered by the State of Wisconsin to provide pension benefits for state and local government employees. The system is administered in accordance with Wis. Stat. § 40. The Department of Employee Trust Funds (ETF) is responsible for administration of the WRS, including collecting contributions from employers and paying retirement benefits to WRS participants, and the State of Wisconsin Investment Board (SWIB) is responsible for managing WRS investments.

» *Presentation Basis*

The financial statements have been prepared in conformity with Generally Accepted Accounting Principles (GAAP) for government units as prescribed by the Governmental Accounting Standards Boards (GASB).

The assets and operations of the WRS are accounted for as a Fiduciary Fund. The WRS fund is used to account for the collection of member and employer contributions; investment of assets; and payment of retirement, disability, and death benefits to former employees, and their beneficiaries, of the State of Wisconsin and participating local governments in Wisconsin.

ETF is not a general-purpose government and does not present government-wide statements. The WRS is included in the State of Wisconsin financial reporting entity and is presented in the State's Annual Comprehensive Financial Report as a "Pension and Other Employee Benefit Trust Fund." The WRS is reported as a separate fund in ETF's separately issued Annual Comprehensive Financial Report.

Department-wide administrative expenses, capital assets, and general fund activities are most closely associated with the WRS fund and have been blended with the WRS for presentation. All material intrafund transactions have been eliminated from fund financial statements.

» *Measurement Focus and Basis of Accounting*

The financial statements have been prepared in accordance with GAAP. The WRS fund is accounted for using the flow of economic resources measurement focus and the accrual basis of accounting. Under the accrual basis of accounting, contributions are recognized in the accounting period in which the underlying earnings on which the contributions are based are paid and the employer has made a formal commitment to provide the contributions. Benefits and refunds are recognized when due and payable in accordance with the terms of the WRS. Security transactions and the related gains and losses are recorded on a trade date basis. Dividend income is recorded on the ex-dividend date, and interest income is accrued as earned.

» *Investments*

The assets of the WRS are valued at fair value and are invested in the Core Retirement Investment Trust (Core Fund) and the Variable Retirement Investment Trust (Variable Fund), which are collectively the Retirement Funds. Earnings are allocated between the WRS and other benefit programs invested in the Retirement Funds based on the average balance invested for each program. Earnings allocated to other benefit programs are classified as "Investment Income Distributed to Other Benefit Programs" on the Statement of Changes in Fiduciary Net Position. The total amount invested by the other benefit programs included in the Retirement Funds is presented as "Core Investment Due To Other Benefit Programs" and "Variable Investment Due To Other Benefit Programs" on the Statement of Fiduciary Net Position.

The State of Wisconsin Investment Board (SWIB) manages the Retirement Funds with oversight by the SWIB Board of Trustees, as authorized in Wis. Stat. § 25.17. SWIB is not registered with the Securities and Exchange Commission as an investment company.

» *Funding Value of Assets*

While investments are valued at fair value for financial statement presentation, a funding value of assets is used in evaluating the funded status of the WRS and in determining future contribution requirements. Funding value does not include deferred market gains and losses that have not yet been distributed from the Market Recognition Account (MRA) to the program reserves. See Note 7 for further explanation of the MRA. As of December 31, 2021, the funding value of reserves was $124.8 billion.

» *Administrative Expenses*

ETF administrative costs are financed by a separate appropriation and are allocated to each benefit plan administered by ETF in accordance with Wis. Stat. § 40.04. The sources of funds for this appropriation are investment earnings and third-party reimbursements received from the various programs administered by ETF. Administrative expenses allocated to the WRS for the year were approximately $31.6 million.

SWIB incurs expenses related to investing the trust funds. As authorized by Wis. Stat. § 25.187 (2), these costs are charged directly to the investment income of each trust fund.

» *Capital Assets*

Capital assets consist of office furniture, equipment, computer software (purchased or externally acquired and internally generated software), and certain capitalizable costs related to leased office space. ETF capitalizes purchased assets in excess of $5,000 at cost and capitalizes internally-generated software and other intangible assets in excess of $1 million. Costs incurred related to leased office space are valued at purchase price or construction cost plus any costs necessary to place the asset into use. Assets are depreciated over an estimated useful life, ranging from 3 to 20 years, using the straight-line method of depreciation.

As of December 31, 2021, the total value of capital assets was $15.6 million. The accumulated depreciation is $10.7 million for a net capital asset value of $4.9 million. The net capital asset value primarily relates to internally-generated software. Approximately $1.1 million of the balance are the costs related to the future occupancy of office space leased by SWIB.

» *Amounts Due To/From Other Benefit Programs*

In addition to the WRS, ETF administers other employee benefit programs for public employees. Amounts due from or to the WRS and other benefit programs administered by ETF, as of December 31, 2021, consist of the following:

Due To/From Other Benefit Programs
As of December 31, 2021
(In Thousands)

Wisconsin Retirement System	Due To Other Benefit Programs	Due From Other Benefit Programs
Employee Reimbursement Accounts & Commuter Benefits	33	9
Health Insurance	713	814
State Retiree Health Insurance	0	300
Local Retiree Health Insurance	3	38
Life Insurance	174	0
State Retiree Life Insurance	10	0
Local Retiree Life Insurance	13	0
Duty Disability Insurance	297	172
Income Continuation Insurance	0	81
Accumulated Sick Leave Conversion Credit Program	3,198	60
Supplemental Health Insurance Conversion Credit Program	1,199	126
Deferred Compensation	0	9
Total	5,640	1,609

Totals may vary from the financial statements due to rounding.

The outstanding balances between benefit programs primarily result from the time lag between when actual receipts and disbursements are made and when those amounts are allocated between benefit programs. All liabilities are expected to be paid within one year of the balance sheet date of December 31, 2021.

» *Use of Estimates*

The preparation of financial statements in accordance with GAAP requires management to make estimates that affect amounts reported herein. Due to the inherent uncertainty involved, actual results could differ from those estimates.

2 ACCOUNTING CHANGES

Beginning in 2021, treatment of fees paid to some external investment managers in exchange for their management of investments in external portfolios was changed. This change impacted holdings in private equity, real estate, hedge funds, and select public markets portfolios. The investment management fees for these investments, in the amount of $522 million for CY 2021, are no longer included in "Investment Expense" on the Statement of Changes in Fiduciary Net Position. Rather, they are now included in the "Net Increase (Decrease) in Fair Value of Investments" on the Statement of Changes in Fiduciary Net Position. This change has no net impact on the Net Position - Restricted for Pensions on the Statement of Fiduciary Net Position or on Net Increase (Decrease) on the Statement of Changes in Fiduciary Net Position. In addition, the reporting of fees paid to external investment managers in exchange for their management of investments within SWIB portfolios remains unchanged from prior years. These fees are included in "Investment Expense" on the Statement of Changes in Fiduciary Net Position. Real estate fund investments previously classified as Real Estate on the Statement of Fiduciary Net Position were combined with private equity and real estate limited partnerships. The category for these investments on the Statement of Fiduciary Net Position was renamed Private Fund Investments.

3 DEPOSITS, INVESTMENTS AND SECURITIES LENDING TRANSACTIONS

» *Valuation of Securities*

The investments of the Retirement Funds are reported in the Statement of Fiduciary Net Position at fair value as prescribed by GASB and in accordance with Wis. Stat. § 25.17 (14). Unrealized gains and losses are reflected in the Statement of Changes in Fiduciary Net Position as “Net Increase (Decrease) in Fair Value of Investments.”

The fair value of the Retirement Funds’ assets is obtained or estimated in accordance with a pricing hierarchy established with SWIB’s custodian, Bank of New York Mellon (BNY Mellon). As prescribed by the hierarchy, a variety of independent pricing sources are used to price assets based on type, class, or issue.

When a portfolio includes securities or instruments for which the custodial bank does not receive fair value information from its vendor pricing sources, a variety of third-party pricing methods are used, including appraisals, pricing models, and other methods deemed acceptable by industry standards.

The “Equity in Pooled Cash and Cash Equivalents” account reported on the Statement of Fiduciary Net Position consists of short-term investments which are used to meet the liquidity requirements of the Retirement Funds. Equity in Pooled Cash and Cash Equivalents held by the Retirement Funds can include cash on deposit, foreign currencies, cash posted as collateral to counterparties, repurchase agreements, certificates of deposit, U.S. Treasury Bills, short-term investment funds, and other U.S. or foreign liquid financial instruments with maturities that are generally less than three months. Equity in Pooled Cash and Cash Equivalents are reported at fair value or cost, which approximates fair value.

Privately-held debt, which is included in "Fixed Income Investments" on the Statement of Fiduciary Net Position, is priced using approaches that value each holding based on the best available information using the following hierarchy of pricing sources:

1. Custodian-supplied prices for assets that can be priced in accordance with the pricing hierarchy established with SWIB's custodian
2. Prices provided by a third party with expertise in the debt markets

For private market investments where no readily ascertainable market value exists, including limited partnerships and real estate pooled funds, fair value is estimated based on the net asset values (NAV) provided by the general partner. Due to the reporting timing of private markets investment managers, reported fair values as of December 31, 2021 are based on actual September 30, 2021 reporting, which has been adjusted to reflect cash flows occurring from October 1, 2021 through December 31, 2021. The reported fair value is considered an estimate that may significantly differ from the value that could be realized in a secondary market transaction or the amount ultimately realized. The financial statements of the limited partnerships and real estate pooled funds are audited by independent auditors annually.

Certain portfolios invest in privately-held companies alongside a strategic partner, such as a limited partnership fund manager. These co-investments are valued by SWIB's strategic partners, who often employ independent valuation agents and use a variety of methodologies including reviews of subsequent financing rounds, discounted cash flow analyses, cash flow multiples analyses, reviews of market comparable sales or metrics, and reviews of third-party appraisals.

Real estate investments owned by SWIB in limited liability companies are valued by independent appraisers every three years. In years when appraisals are not performed, properties are informally appraised by the asset advisor. Each year audited financial statements are prepared for each property.

SWIB employs portfolio strategies which involve investments across multiple asset classes. The "Multi Asset Investments" account on the Statement of Fiduciary Net Position consists primarily of hedge funds. SWIB values hedge funds based on monthly statements or estimated returns received from each of the hedge fund's administrators. A third-party administrator's responsibility is to independently account for the hedge fund's activity and calculate the NAV of the fund. Generally, hedge fund administrators price financial instruments traded in active markets based on quoted market prices or binding dealer quotations. For certain over-the-counter (OTC) instruments, fair value is determined based on valuation models used by the administrator or independent valuation agent. Annually, the financial statements prepared by the administrator are audited by independent auditors.

Derivative financial instruments are marked to market daily, with valuation changes recognized in income during the period the instruments are held and when the instrument is sold or expires. The nature and use of derivative instruments are discussed later in this note.

A limited number of securities are carried at cost. Certain non-public or closely-held investments are not reported at fair value, but are carried at cost as no independent price quotes are available to estimate fair value for these securities.

» *Credit Risk*

Credit risk is the risk that an issuer or other counterparty to an investment will not fulfill its obligations to SWIB. Fixed income credit risk investment guidelines outline the minimum ratings required at the time of purchase by individual portfolios, or groups of portfolios, based on the portfolios' investment objectives. In addition, some fixed income portfolios are required to always carry a minimum weighted average rating. Information regarding SWIB's credit risk related to derivative instruments is discussed later in this note.

The table entitled Credit Quality Distribution displays the lowest credit rating assigned by nationally recognized statistical rating organizations on debt securities held by the Retirement Funds as of December 31, 2021. Included in this table are fixed income securities, including certain short-term securities, classified as "Equity in Pooled Cash and Cash Equivalents" on the Statement of Fiduciary Net Position. Also included are interest rate sensitive investments held in the Retirement Funds' securities lending collateral reinvestment pools, which are managed by SWIB's custodian. Additional information regarding the securities lending program is discussed later in this note.

The table also includes SWIB's investment in commingled fixed income funds, which are not rated. Although the funds themselves are not assigned ratings, external management investment guidelines govern minimum credit quality standards for the investments within each portfolio. These standards are determined based on the investment objectives and risk parameters of each fund.

Retirement Funds
Credit Quality Distribution
As of December 31, 2021
(In Thousands)

Rating	Fair Value	% of Total
AAA/Aaa	$ 529,669	1.0 %
AA/Aa	29,717,181	54.3
A	3,082,226	5.6
A-1/P-1	54,709	0.1
A-2/P-2	201,642	0.4
A-3/P-3	17,978	0.0
BBB/Baa	7,603,105	13.9
BB/Ba	2,384,348	4.4
B	1,968,407	3.6
CCC/Caa or below	814,370	1.5
Not Rated	1,467,599	2.7
Commingled Fixed Income Funds	6,843,327	12.5
Total	$ 54,684,561	100.0 %

SWIB held $17.0 billion in reverse repurchase agreements at December 31, 2021. Investment guidelines permit certain portfolios to enter into reverse repurchase agreements, which are a sale of securities with a simultaneous agreement to repurchase the securities in the future at the same price plus a stated rate of interest. The market value of the securities underlying reverse repurchase agreements exceeds the cash received, providing the counterparty a margin against a decline in market value of the securities. If the counterparty defaults on their obligation to sell these securities back to SWIB or provide cash of equal value, SWIB could suffer an economic loss equal to the difference between the market value of the underlying securities plus accrued interest and the agreement obligation, including accrued interest.

SWIB enters into reverse repurchase agreements with various counterparties and such transactions are governed by Master Repurchase Agreements. Master Repurchase Agreements are negotiated contracts and contain terms in which SWIB seeks to minimize counterparty credit risk. SWIB also controls credit exposures by limiting trades with any one counterparty to stipulated amounts. The counterparty credit exposure is managed through the transfer of margin, in the form of cash or securities, between SWIB and the counterparty. The Retirement Funds' counterparty credit exposure for reverse repurchase agreements at December 31, 2021 is summarized in the table entitled Reverse Repurchase Agreements, Counterparty Credit Exposure.

Retirement Funds
Reverse Repurchase Agreements Counterparty Credit Exposure
As of December 31, 2021
(In Thousands)

Fair Value of Collateral Held by Counterparty		$ 17,327,331
Less:		
Cash due to Counterparty	17,012,077	
Collateral and Interest due to Counterparty	184,732	
Total due to Counterparty		17,196,809
Net Counterparty Credit Exposure		$ 130,522

The cash proceeds from reverse repurchase agreements are reinvested by the Retirement Funds. The maturities of the purchases made with the proceeds of reverse repurchase agreements are not necessarily matched to the maturities of the agreements. The agreed-upon yields earned by the counterparty for the reverse repurchase agreements held were between 0.07% and 0.22% at December 31, 2021. Portfolio guidelines require agreements to mature between one and 90 days.

The cash due to counterparties resulting from reverse repurchase agreements is reported as "Obligation Under Reverse Repurchase Agreements" and the interest due to counterparties is included in "Investment Payables" on the Statement of Fiduciary Net Position.

» Custodial Credit Risk

SWIB's custodial credit risk policy addresses the primary risks associated with safekeeping and custody. It requires that SWIB's custodial institution be selected through a competitive bid process and that the institution be designated a Systemically Important Financial Institution (SIFI) by the U.S. Federal Reserve. The policy also requires that SWIB be reflected as beneficial owner on all securities entrusted to the custodian and that SWIB have access to safekeeping and custody accounts. The custodian is also required to carry insurance covering errors and omissions and they must provide SWIB with an annual report on internal controls, prepared in accordance with the Statement on Standards for Attestation Engagements. In addition, SWIB management has established a system of controls for the oversight of services and related processes performed by the custodian. SWIB's current custodial bank was selected in accordance with these guidelines and meets all the requirements stipulated in the custodial credit risk policy.

Deposits - Custodial credit risk related to deposits is the risk that, in the event of the failure of a depository financial institution, SWIB will not be able to recover deposits that are in possession of an outside party. Cash deposits totaled $620.7 million as of December 31, 2021. Of the total, $123.4 million was collateralized by securities borrowed. Depository insurance covered another $36.2 million of the total. The remaining deposits, totaling $461.1 million, were uninsured and uncollateralized. These uninsured deposits represent the U.S. dollar equivalent of balances held in foreign currencies in SWIB's custodian's nominee name, cash posted as collateral for derivative transactions, and cash collateral posted in excess of the market value of securities borrowed by SWIB for short sales. In addition to cash deposits, the Retirement Funds held $24.0 million in certificates of deposit, as of December 31, 2021.

Investments - Custodial credit risk for investments is the risk that, in the event of failure of the counterparty to a transaction, SWIB will not be able to recover the value of investments that are in the possession of an outside party. The Retirement Funds held repurchase agreements totaling $268.8 million as of December 31, 2021. These repurchase agreements were tri-party agreements held in a short-term cash management portfolio managed by SWIB's custodian. The underlying securities for these agreements were held by the tri-party agent, not in SWIB's name.

The Core Trust Fund holds committed repos with a major equity derivative clearing organization (counterparty) for an agreed upon commitment amount, from which the counterparty can fully or partially draw upon at their discretion during the commitment period. A separate account is established at the asset custodian in SWIB's name to hold the available cash and the collateral from the counterparty if any of the commitment amount is drawn. For the undrawn commitment amount, the counterparty pays SWIB a commitment fee. Any cash amounts drawn are structured as repo transactions where SWIB receives a fee and U.S. Treasuries as collateral with a margin percentage greater than 100%. Draws are limited to a maximum of 30 days, so the term of each repo transaction is also limited to 30 days. The counterparty is rated AA+ and is a Systematically Important Financial Market Utility. Collateral is marked to market daily. A separate financial services company acts as SWIB's agent and provides indemnification in the event of the counterparty's default.

The Retirements Funds, under a Master Repurchase Agreement, hold mortgage series trust certificates issued by a loan originator. The loan originator, acting as trust sponsor, places Government National Mortgage Association (Ginnie-Mae) eligible loans in a trust and issues trust certificates. The trust sponsor sells trust certificates to SWIB's counterparty in a repo transaction under a separate Master Repurchase Agreement between the trust sponsor and the counterparty. The sponsor and owner trustee utilize a custodian for the loan documents. SWIB purchases the trust certificates and provides funding to the counterparty which provides funding to the loan originator/trust sponsor. The trust certificates have been pledged by the counterparty to SWIB under the Master Repurchase Agreement between SWIB and the counterparty. The trust certificates are collateralized by the pool of mortgage loans custodied at the custodian. The counterparty is required to make margin adjustments when the value of the collateral pool, based on To Be Announced (TBA) pricing, falls below the required margin threshold. The collateral held is greater than 100%, and the repurchase transactions have one-month terms.

During 2021, SWIB entered into Institutional Client Account Agreements with prime brokers. These agreements include, but are not limited to the execution, settlement, and clearance of securities, commodities, and other financial products and transactions, including borrowings related to the transactions, commodities, other financial assets, and the extension of credit to SWIB. The Account Agreement is treated as a master netting agreement, a securities contract within the meaning of the United States Bankruptcy Code, or a netting contract within the meaning of the Federal Deposit Insurance Corporation Improvement Act of 1991.

SWIB manages relationships with prime brokers, including instructing asset transfers and margin movements regarding collateral. Collateral is held by the prime brokers and any affiliated entity and are commingled in their accounts along with the right of rehypothecation in accordance with applicable law. Collateral consists of cash, treasuries, and securities subject to prime broker rules and standard terms. Separate agreements govern lock-up rates and fees for borrows, as well as lending and other fees, as applicable. Margin calculation is included in the lock-up terms and rates charged may vary by portfolio. Certain changes can only be made with advance notice based on a lock-up term of 29 days. The prime brokers are designated a SIFI. Although SWIB monitors these counterparties, there is no guarantee the counterparty will not become insolvent and there is no certainty that SWIB would not incur losses due to its assets being unavailable for a period of time, ultimately receiving less than a full recovery of its assets, or both.

» *Concentration of Credit Risk*

Concentration of credit risk is the risk of loss attributed to the magnitude of an organization's investment in a single issuer. SWIB limits concentrations of credit risk by establishing investment guidelines for individual portfolios or groups of portfolios that generally restrict issuer concentrations in any one company or Rule 144A securities to less than 5% of the portfolio's market value. The Retirement Funds did not hold any investments with a single issuer, exclusive of investments issued or explicitly guaranteed by the U.S. government, representing 5% or more of the Retirement Funds' value at December 31, 2021.

» *Interest Rate Risk*

Interest rate risk is the risk that changes in interest rates will adversely affect the fair value of an investment. SWIB uses several methods to manage interest rate risk. Fixed income instruments held by the Retirement Funds include investments with variable rate securities, stepped rate securities, securities with no coupon, such as discount notes, and coupons that range between 0.0% and 17.0% at December 31, 2021.

SWIB analyzes long and intermediate term portfolios' interest rate risk using various duration calculations. Modified duration, which is stated in years, is the measure of price sensitivity of a fixed income security to an interest rate change of 100 basis points. The calculation is based on the weighted average of the present values for all cash flows. Some investments are analyzed using an option-adjusted duration calculation which is similar to the modified duration method. Option-adjusted duration incorporates the duration-shortening effect of any embedded call provisions in the securities. Duration statistics are weighted by the dollar value of the position to compute an average duration for each investment type.

Short-term portfolios' interest rate risk is analyzed using the weighted average maturity to next reset. Weighted average maturity is the maturity of each position in a portfolio weighted by the dollar value of the position to compute an average maturity for the portfolio as a whole. This measure indicates a portfolio's sensitivity to interest rate changes: a longer weighted average maturity implies greater volatility in response to interest rate changes.

SWIB's investment guidelines related to interest rate risk vary by portfolio. Some fixed income portfolios require management within a range of a targeted duration, while others require a weighted average maturity at or below a specified number of days or years.

The Interest Rate Sensitivity by Investment Type table below presents the aggregated interest rate exposure for the Retirement Funds' assets at December 31, 2021. Weighted average maturity, where reset dates are assumed to be the effective maturity date for the security, is presented for repurchase agreements and short-term pooled investments. Longer-term instruments held by the Retirement Funds are presented using modified duration, as this measure more accurately states the interest rate sensitivity of these investments. This duration measure is calculated using reset dates for some floating rate instruments, such as term loans. Information about the interest rate sensitivity of derivative contracts is discussed later in this note.

SWIB invests in securities with contractual cash flows, such as asset-backed securities and U.S. government agencies. These types of structured product investments may be highly sensitive to interest rate changes as they may be subject to early payment in a period of declining interest rates. The resulting changes in timing, or possible reduction in expected total cash flows, affect the fair value of these securities.

Retirement Funds
Interest Rate Sensitivity by Investment Type*
As of December 31, 2021
(In Thousands)

Investment Type	Fair Value	Weighted Average Duration (years)	Weighted Average Maturity (days)
U.S. Treasury Inflation Protected Securities	$ 21,183,185	7.6	
Corporate Bonds & Private Placements	14,676,074	6.9	
U.S. Treasury Securities	5,576,699	8.5	
U.S Government Agencies	2,312,676	4.8	
Foreign Government/Agency Bonds	2,268,939	7.2	
Asset Backed Securities	832,864	3.3	
Commercial Paper	284,302		69
Repurchase Agreements	268,766		3
Municipal Bonds	188,657	11.5	
Commingled Funds			
Short Term Cash Management	5,404,746		57
Emerging Market Fixed Income	1,221,762	4.9	
Exchange Traded	465,891	7.6	
Total	$ 54,684,561		

*Excludes derivatives

» Foreign Currency Risk

Foreign currency risk is the risk that changes in exchange rates will adversely impact the fair value of an investment. It includes the risk that currencies in which a portfolio's investments are denominated, and currencies in which a portfolio has taken on a long or short active position, will decline or appreciate in value relative to the U.S. dollar.

Foreign currency exchange rates may fluctuate significantly for a number of reasons, including the forces of supply and demand in the foreign exchange markets, actual or perceived changes in interest rates, intervention by U.S. or foreign governments or central banks, currency controls, or political developments in the U.S. or abroad.

SWIB's policies include foreign currency risk management objectives relating to each individual portfolio. These guidelines address the foreign currency management activities permitted for each portfolio based on the portfolio mandates, risk tolerances, and objectives. SWIB also employs discretionary currency overlay strategies at the total fund level when currency market conditions suggest such strategies are warranted. Additional information related to the management of foreign currencies through the use of derivative instruments is discussed later in this note.

The table entitled Currency Exposures by Investment Type presents the Retirement Fund investments which were exposed to foreign currency risk at December 31, 2021.

Retirement Funds
Currency Exposure by Investment Type [1,3]
December 31, 2021
Stated in U.S. Dollars
(In Thousands)

Currency	Cash & Cash Equivalents	Equities	Fixed Income	Limited Partnerships	Preferred Securities	Financial Futures Contracts	Options	Short Sell Obligations[2]	Swaps	Total[4]
Australian Dollar	$ 11,677	$ 966,643	$ 31,718	$ 0	$ 0	$ 268	$ 0	$ (220,666)	$ 0	$ 789,640
Brazilian Real	1,004	60,621	14,844	0	64,833	0	0	0	0	141,302
Canadian Dollar	85,883	1,869,006	23,033	0	0	2,184	0	(309,765)	0	1,670,341
Chilean Peso	73	9,379	0	0	0	0	0	0	0	9,452
Chinese Yuan Renminbi (Onshore)	(33)	0	0	0	0	0	0	0	(130)	(163)
Colombian Peso	4	117	0	0	0	0	0	0	0	121
Czech Republic Koruna	1	1,372	2,299	0	0	0	0	0	0	3,672
Denmark Krone	706	562,801	0	0	0	0	0	(188,052)	0	375,455
Euro Member Countries	21,749	6,978,639	334,061	1,741,436	175,624	5,645	(140)	(1,176,868)	2,949	8,083,095
Hong Kong Dollar	6,401	985,886	0	0	0	(302)	0	(41,310)	0	950,675
Hungarian Forint	804	30,165	1,681	0	0	0	0	0	0	32,650
Indian Rupee	0	168,292	0	0	0	0	0	0	0	168,292
Indonesian Rupiah	18	20,404	0	0	0	0	0	0	0	20,422
Israeli Shekel	573	53,239	0	0	0	0	0	(14,779)	0	39,033
Japanese Yen	908	4,389,940	0	0	0	953	0	(761,888)	0	3,629,913
Korean (South) Won	0	324,509	0	0	379	0	0	0	0	324,888
Malaysian Ringgit	415	8,457	32,473	0	0	0	0	0	0	41,345
Mexican Peso	(410)	2,014	45,042	0	0	0	0	0	(1,114)	45,532
New Zealand Dollar	630	71,953	16,393	0	0	0	0	(26,627)	0	62,349
Norwegian Krone	901	254,611	0	0	0	0	0	(50,961)	0	204,551
Peruvian Sol	5	82	0	0	0	0	0	0	0	87
Philippine Peso	54	824	0	0	0	0	0	0	0	878
Poland Zloty	30	47,663	18,491	0	0	0	0	0	0	66,184
Russian Ruble	126	0	3,632	0	0	0	0	0	0	3,758
Singapore Dollar	2,846	135,809	0	0	0	0	0	(49,799)	0	88,856
South African Rand	1,402	48,273	38,114	0	39	0	0	0	0	87,828
Sweden Krona	621	1,041,597	4,329	1,890	0	0	0	(324,837)	0	723,600
Swiss Franc	424	1,394,924	0	0	0	0	0	(342,307)	0	1,053,041
Taiwan New Dollar	275	514,142	0	0	6	0	0	0	0	514,423
Thailand Baht	0	36,586	0	0	0	0	0	0	0	36,586
Turkish Lira	0	3,663	0	0	0	0	0	0	0	3,663
United Kingdom Pound	31,909	2,972,486	34,389	428,991	0	857	0	(510,441)	0	2,958,191
Total[4]	**$ 168,996**	**$22,954,097**	**$ 600,499**	**$ 2,172,317**	**$ 240,881**	**$ 9,605**	**$ (140)**	**$ (4,018,300)**	**$ 1,705**	**$ 22,129,660**

1) Commingled funds (including limited partnerships and other pooled vehicles) represent investments where the Retirement Funds own only a portion of the overall fund. While the overall fund may be denominated in U.S. dollars, the underlying investments may be exposed to foreign currency risk in various currencies. Commingled funds are shown in the denomination used by the fund for financial reporting.

2) Short Sell Obligations are reported as liabilities on the Statement of Fiduciary Net Position. They are included in the above table because they have exposure to foreign currency risk.

3) Investment types holding instruments denominated only in U.S. Dollars are not included in the above table. At calendar year-end, these include: Convertible Securities, Multi Asset Investments, TBAs, Option Contracts, Swaps, and Obligation Under Reverse Repurchase Agreements.

4) Totals may not add due to rounding.

» *Fair Value of Investments*

Fair value measurements of the investments held by the WRS are categorized by the hierarchy established by generally-accepted accounting principles. The hierarchy, which has three levels, is based on the valuation inputs used to measure the fair value of the investment.

Level 1 - Investments reflect unadjusted quoted prices in active markets for identical assets.

Level 2 - Investments reflect prices that are based on inputs that are either directly or indirectly observable for an asset (including quoted prices for similar assets), which may include inputs in markets that are not considered to be active.

Level 3 - Investments reflect prices based upon valuation techniques in which significant inputs or significant value drivers are unobservable.

The fair value hierarchy gives the highest priority to Level 1 inputs and the lowest priority to Level 3. When the inputs used to measure fair value fall within different levels of the hierarchy, the level within which the fair value measurement is categorized is based on the lowest level input that is significant to fair value. The categorization of investments within the hierarchy is based upon the pricing transparency of the instrument and does not represent the investment's overall risk.

Commingled investments are not categorized under the fair value hierarchy but are disclosed within this note as investments measured at NAV.

The fair value measurements of investments as of December 31, 2021, are found in the table entitled Investments by Fair Value Level.

Retirement Funds
Investments by Fair Value Level
As of December 31, 2021
(In Thousands)

	Fair Value			
Asset Type	**Level 1**	**Level 2**	**Level 3**	**TOTAL**
Cash Equivalents				
Certificates of Deposit	$ 0	$ 9,008	$ 15,005	$ 24,013
Commercial Paper	0	0	180,510	180,510
Money Market Funds	250,005	0	0	250,005
Total Cash Equivalents	250,005	9,008	195,515	454,528
Equities				
Domestic	50,086,973	57	93,048	50,180,078
International	22,942,766	165	11,166	22,954,097
Total Equities	73,029,739	222	104,214	73,134,175
Fixed Income				
Asset Backed Securities	0	811,356	21,508	832,864
Corporate Bonds & Private Placements	0	14,405,143	65,277	14,470,420
Exchange Traded Funds	465,891	0	0	465,891
Foreign Government/Agency Bonds	0	2,268,939	0	2,268,939
Municipal Bonds	0	188,657	0	188,657
U.S. Government Agencies	0	2,312,676	0	2,312,676
U.S. Treasury Inflation Protected Securities	0	21,183,186	0	21,183,186
U.S. Treasury Securities	38,476	5,538,222	0	5,576,698
Total Fixed Income	504,367	46,708,179	86,785	47,299,331
Preferred Securities				
Domestic	1	229,440	232,989	462,430
International	240,882	0	0	240,882
Total Preferred Securities	240,883	229,440	232,989	703,312
Convertibles	0	63	2,090	2,153
Derivatives				
Foreign Exchange Contracts	0	3,793	0	3,793
Futures	76,789	0	0	76,789
Options	(1,946)	0	0	(1,946)
Swaps	0	25,689	0	25,689
To Be Announced Securities	0	2,899,255	0	2,899,255
Total Derivatives	74,843	2,928,737	0	3,003,580
Short Sales	(8,047,473)	0	(3,193)	(8,050,666)
Total	**$ 66,052,364**	**$ 49,875,649**	**$ 618,400**	**$ 116,546,413**

Securities classified as Level 1 are generally valued at the official closing price (usually the last trade price). Such investments generally include exchange-traded securities such as equities, preferred stock, certain derivative instruments, and exchange-traded funds. U.S. Treasury Bills and only the most recently-issued U.S. Treasury Notes and Bonds are classified as Level 1 as available pricing for these securities is similarly reliable to exchange-traded securities.

Securities classified as Level 2 are valued using observable inputs provided by third-party pricing services generally using either a bid evaluation or a matrix-pricing technique. Bid evaluations may include market quotations that are based on yields, maturities, call features, and ratings. Matrix-pricing is used to value securities based on their relationship to benchmark market prices for securities with similar interest rates, maturities, and credit ratings. Pricing in this level may also include market approaches that incorporate benchmark interest rates. Debt securities comprise the majority of the Level 2 investments as they are generally traded using a dealer market, with lower trading volumes than Level 1 securities. OTC derivative instruments, such as swaps, TBAs, and foreign exchange contracts, are also included in Level 2 because they are priced using a market approach that considers benchmark interest rates and foreign exchange rates.

Level 3 investments are generally valued using significant inputs that are unobservable to the marketplace. This may occur if an investment is illiquid or its value is based on estimates. For the WRS, such investments primarily include private fund investments, which are valued using appraisals that include significant unobservable inputs. Asset Backed Securities included in Level 3 represent private placements that are valued at purchase price when third-party valuations are unavailable. Equities, convertibles, and preferred securities included in the Level 3 hierarchy are generally privately-held securities valued using valuation models such as price multiples incorporating comparable public companies, discounted cash flows and milestone valuation models. In some instances of privately-held preferred securities, fair value is determined based on recent financing rounds. Bank loans, which are included in corporate bonds and private placements within the Level 3 category, are priced by vendors using proprietary models which may incorporate unobservable inputs. Cash and Cash Equivalents included in Level 3 represent securities priced at cost. Typically, due to their short-term nature, cost approximates fair value for these investments. Other factors such as infrequent trading, an inactive market, or adjusted quoted prices may also result in Level 3 measurements.

» *Investments Measured at NAV*

The fair value of investments in certain fixed income funds, equities, private equity limited partnerships, stock funds, real estate limited partnerships, equity limited partnerships, and hedge funds are based on the investments' NAV per share (or its equivalent), provided by the investee. The December 31, 2021 investments valued using NAV are shown in the table entitled Investments Measured at NAV.

Retirement Funds
Investments Measured at NAV
As of December 31, 2021
(In Thousands)

Investments Measured at NAV	Fair Value	Unfunded Commitments	Redemption Frequency	Redemption Notice Period [7]
Cash and Cash Equivalents [1]	$ 5,404,746	$ 0	Daily	Same Day
Fixed Income [2]	1,221,762	0	Daily	5 days
Private Fund Investments [3]	26,573,553	14,112,896	N/A	N/A
Equities [4]	9,710,717	0	Daily, Monthly	2-30 days
Equity Limited Partnerships [5]	933,917	0	Monthly	15 days
Hedge Funds [6]	6,227,923	746,672	Various	Various
Total	$ 50,072,618	$ 14,859,568		

[1]This category consists of short-term cash funds with the investment objective of safety of principal and liquidity while earning a competitive money market rate of return. The short-term cash funds have daily liquidity with same day notice.

[2] This category includes a long-only fixed income manager which can invest across the credit quality spectrum, in varying geographies, and can include derivatives, high yield, and structured securities. The long-only manager requires a redemption notice period of 5 days and has daily liquidity.

[3] Private Fund Investments include direct, co-investments, LLCs with existing SWIB general partners, direct secondary investments, and fund of funds. These investments are illiquid and are generally not resold or redeemed. Distributions from each fund are received as the underlying investments are liquidated or over the life of the investment. The table entitled Limited Partnerships - Estimated Remaining Life provides an estimate of the period over which the underlying assets are expected to be liquidated. As of December 31, 2021, there is one partial sale planned in 2022 on the secondary market. The anticipated sale price of this fund is not expected to be materially different than the NAV as of December 31, 2021.

[4] This category includes long-only equity managers (71%) with various fundamental, quantitative, and other approaches spanning various styles, geographies, and market cap weights. These long-only manager investments can be redeemed either daily or monthly with between 10 and 30 business days' notice. The remaining 29% of this category represents emerging markets equity index funds with an investment strategy designed to track the return of the given segment of the emerging equity markets. These investments can be redeemed daily with 2 business days' notice.

[5] Equity Limited Partnership fund invests in global equity. The long-only manager requires a redemption notice period of 15 days and can be redeemed monthly. The table entitled Limited Partnerships-Estimated Remaining Life indicates that the investments represent open-ended funds that are readily redeemable.

[6] Hedge Fund investments are private investment funds that seek to produce absolute returns using a broad range of strategies. In certain instances, Hedge Fund investments are structured as limited partnerships, whereby participants receive distributions over the life of the fund. Estimated remaining life for four funds structured as limited partnerships is >10 years, and three funds between 5-10 years. Additional information relating to Hedge Funds can be found later in this note.

[7] Redemption terms described for NAV investments reflect contractual agreements and assume withdrawals are made without adverse market impact and under normal market conditions.

» *Private Fund Investments*

Private Fund Investments include private equity, and real estate.

Private Equity Limited Partnerships participated in the following investment strategies at December 31, 2021:

Leveraged Buyout - This strategy acquires the controlling interest of a private company using a significant amount of borrowed capital (leverage).
Distressed Debt - This strategy can invest in public and private companies undergoing financial distress, a turnaround in business operations, or which are believed to be undervalued because of a discrete extraordinary event.
Growth Equity - This strategy is an investment opportunity in relatively mature companies that are going through a transformational event in their lifecycle with potential for significant growth.
Venture Capital - This strategy invests in companies with potential for significant growth (generally small to early stage emerging firms).

Private Debt - This strategy includes any debt held by or extended to privately held companies. The debt securities can be senior debt, mezzanine debt, and structured capital but commonly involve non-bank institutions making loans to private companies or buying those loans on the secondary market.
Secondaries - This strategy provides a market for investors to sell or purchase positions in private markets funds.

Real Estate limited partnerships generally consisted of the following investment strategies at December 31, 2021:

Core - Core investments are expected to deliver a significant percentage of their return from income and should experience lower volatility than Opportunistic and Value investments due to lower leverage, higher occupancy, and asset location.
Value - Value investments typically have significant near-term leasing, repositioning, and/or renovation risk. This strategy is expected to have modest initial operating revenues with potential for substantial income growth and will likely encounter greater volatility than Core strategies, but lower volatility than Opportunistic strategies.
Opportunistic - Opportunistic investments usually have significant development, lease-up, financial restructuring, and/or liquidity risk with little or no initial operating income. This strategy typically uses the highest leverage, is expected to achieve most of its return from future capital gains, and is likely to encounter greater volatility than Core and Value strategies.

Private equity and real estate limited partnerships are generally structured to provide distributions to participants of the fund as the holdings of the partnership are liquidated over time. The table entitled Limited Partnerships - Estimated Remaining Life illustrates the distribution of estimated remaining liquidation periods for the limited partnership holdings as of December 31, 2021.

Retirement Funds
Limited Partnerships - Estimated Remaining Life
As of December 31, 2021
(In Thousands)

	Estimated Remaining Life				
Limited Partnership Type	**< 5 Years**	**5 - 10 Years**	**> 10 Years**	**N/A[2]**	**Total**
Private Fund Investments[1]	$ 6,222,836	$ 14,799,090	$ 1,709,477	$ 3,842,150	$ 26,573,553
Equity Limited Partnerships	0	0	0	933,917	933,917
Total	$ 6,222,836	$ 14,799,090	$ 1,709,477	$ 4,776,067	$ 27,507,470

[1] Estimated remaining life represents subjective estimates, assuming normal market conditions.

[2] N/A investments represent open-ended funds that are readily redeemable.

» Hedge Funds

Hedge Fund investments are private investment funds that seek to produce absolute returns using a broad range of strategies. The Retirement Funds participated in the following Hedge Fund strategies at December 31, 2021:

Long/Short Equity - This strategy invests both long and short in publicly-traded stocks. These managers vary in their use of short selling and leverage.
Event-Driven - This strategy seeks to gain an advantage from pricing inefficiencies that may occur before or after a corporate action or related event, such as a merger, spinoff, earnings call, bankruptcy, or restructuring.
Tactical Trading - This strategy invests in indices, commodities, interest rate instruments, and currencies as a result of relative value or directional forecasts from a systematic or discretionary approach.
Relative Value - This strategy uses a range of fixed income arbitrage, insurance linked, long-short credit, and/or quantitative strategies that seek to take advantage of price differentials.
Multistrategy - This strategy employs a wide range of strategies and instruments in managing assets.

When redeeming Hedge Fund investments, the agreements governing the investment often require advanced notice and may restrict the timing of withdrawals. The table entitled Hedge Fund Redemption Timing depicts redemption terms, independent of other contractual restrictions like lock-up periods as discussed below, for SWIB's Hedge Fund investments at December 31, 2021.

Retirement Funds
Hedge Fund Redemption Timing
As of December 31, 2021
(In Thousands)

Redemption Frequency	Redemption Notice Period (days)	Fair Value
Monthly	3 - 90	$ 1,745,198
Quarterly [1, 3]	30 - 180	3,522,547
Semi - Annual	60	277,559
Other [1, 2]	0 - 90, N/A	682,619
Total		$ 6,227,923

[1] These categories include funds that are in the process of being fully redeemed, with final distribution expected in 2022.

[2] This category also includes funds that are structured as limited partnerships, whereby withdrawals are not permitted, but the participants receive distributions over the life of the fund..

[3] This category includes funds that are subject to rolling locks, whereby the fund automatically re-locks unless a withdrawal request is submitted.

Hedge Fund agreements can also include lock-up periods, which restrict investors from redeeming their investment during a specified time frame. Lock-up periods help portfolio managers mitigate liquidity risks. Lock-ups can be hard, where redemptions are not permitted for a specified time period, or soft, where redemptions are permitted provided the investor pays a penalty. In certain instances, a fund may have both hard and soft lock-up restrictions. In addition, in certain investments, Hedge Fund managers may be allowed to institute a rolling lock-up. A fund with a rolling lock-up period requires investors to commit to an initial lock-up period, and, if the investor does not submit a redemption notice within a set time prior to expiration of the lock-up, the lock-up is reset.

The table entitled Hedge Fund Lock-ups reflects the lock-up terms for the Hedge Fund investments held at December 31, 2021.

Retirement Funds
Hedge Fund Lock-ups
As of December 31, 2021
(In Thousands)

Hedge Fund Lock Type	Initial Duration of Lock (Years)	Year of Lock Expiration	Fair Value
Hard Lock	1 - 3	2024	$ 660,205
Rolling Lock	2	2022 - 2023	357,527
None [1]	N/A	N/A	4,756,338
Other [2]	N/A	N/A	453,853
Total			$ 6,227,923

[1] This category includes funds that are in the process of being fully redeemed, with final distribution expected in 2022.

[2] This category includes funds that are structured as limited partnerships, whereby withdrawals are not permitted but the participants receive distributions over the life of the fund.

Similar to lock-ups, Hedge Fund agreements also commonly incorporate gating restrictions. An investor-level gate limits redemption on a particular redemption date to a specified percentage of the investor's account value, while a fund-level gate may limit total investor withdrawals on a particular redemption date to a percentage of aggregated fund-level (or master fund-level) NAV. In certain instances, funds can have both investor and fund-level gates in place. Such funds are reflected in the Investor Level category. The table entitled Hedge Fund Gates summarizes the Hedge Fund gates in place at December 31, 2021.

Retirement Funds
Hedge Fund Gates
As of December 31, 2021
(In Thousands)

Hedge Fund Gate Type	Gate Range	Fair Value
Investor Level	12.5% - 50.0%	$ 2,057,613
Fund Level	8.3% - 25.0%	1,009,162
None	N/A	2,481,499
Other [1, 2]	N/A	679,649
Total		$ 6,227,923

[1] This category includes funds that are in the process of being fully redeemed, with final distribution expected in 2022.

[2] This category includes funds that are structured as limited partnerships, whereby withdrawals are not permitted but the participants receive distributions over the life of the fund.

» Derivatives Instruments

A derivative instrument, as defined by GASB Statement No. 53 "Accounting and Financial Reporting for Derivative Instruments," is a financial instrument or other contract that has the following characteristics:

- **Settlement factors** - It has (1) one or more reference rates and (2) one or more notional amounts or payment provisions or both. Those terms determine the amount of the settlement or settlements and, in some cases, whether or not a settlement is required.
- **Leverage** - It requires no initial net investment or an initial net investment that is smaller than would be required for other types of contracts that would be expected to have a similar response to changes in market factors.
- **Net settlement** - Its terms require or permit net settlement, it can readily be settled net by a means outside the contract, or it provides for delivery of an asset that puts the recipient in a position not substantially different from net settlement.

Derivative instruments may be used to implement investment strategies for the Retirement Funds. All derivative instruments are subjected to risk analysis and monitoring processes at the portfolio, asset class, and fund levels. Investment guidelines define allowable derivative activity for each portfolio and are based on the investment objectives which have been approved by the Board. Where derivative instruments are permitted, guidelines stipulate allowable types and the manner and degree to which they are to be used.

Gains and losses for all derivative instruments are reported in the Statement of Changes in Fiduciary Net Position as “Net Increase (Decrease) in Fair Value of Investments.” SWIB invests in derivative instruments directly and indirectly through commingled or pooled investment vehicles. Information relating to investments held in commingled funds has not been separately disclosed in the financial statements or the accompanying footnotes, consistent with GASB reporting requirements.

A derivative instrument can take the form of an individually negotiated contract between the Retirement Funds and a specific counterparty. These types of negotiated positions are known as OTC contracts. OTC contracts can be structured as either uncleared or cleared.

Uncleared OTC contracts are non-standardized bilateral contracts that do not include the use of a centralized intermediary, such as a clearinghouse. Uncleared OTC transactions are subject to regulatory requirements with respect to data reporting and recordkeeping, trading relationship documentation, business conduct standards, portfolio reconciliation, and margin collection and posting. For these transactions, master netting agreements and credit support annexes governing the credit relationship and collateral exchange between two parties are put in place to mitigate counterparty credit risk.

Cleared OTC contracts offer additional protections to trade participants. These types of transactions employ the use of an intermediary between counterparties. The intermediary, known as a clearinghouse, serves to facilitate trading and mitigate risks. While not completely standardized, these contracts involve a high degree of standardization. Once cleared, the clearinghouse steps in as the counterparty to all trades. Regulatory bodies govern the tools and procedures for risk mitigation such as margin requirements and daily mark-to-market.

In addition to trading OTC, derivative contracts can also be transacted on established exchanges. These contracts are called exchange-traded and are completely standardized. Like cleared OTC contracts, the clearinghouse is an intermediary to the trade, reducing risks and standardizing the exchange of margin.

The table entitled Derivative Contract Types summarizes the differences between OTC and exchange-traded contracts.

Retirement Funds
Derivative Contract Types

Uncleared (OTC)	Cleared (OTC)	Exchange-Traded
Trades negotiated over-the-counter	Trades negotiated over-the-counter	Trades executed on organized exchanges
Customized trade terms are agreed upon by counterparties	Trades limited to standardized terms	Trades limited to standardized terms
Traded bilaterally between counterparties	Trades are submitted through a clearinghouse, which is counterparty	Trades are booked with exchange's clearinghouse, which is counterparty
Margin (collateral) often exchanged but subject to negotiation between counterparties.	Mandatory margin requirements	Mandatory margin requirements
Common example: Forward Contracts	Common example: Credit Default Swaps	Common example: Futures Contracts

Collateral postings are commonplace for derivative contracts and vary based on the type of contract traded. SWIB posted $423.5 million in cash and $370.9 million in securities as collateral for derivative positions as of December 31, 2021. More information regarding collateral requirements is included below.

Uncleared OTC Derivative Instruments

Inherent in the use of uncleared OTC derivative instruments, the Retirement Funds may be exposed to counterparty credit risk. Counterparty credit risk is the risk that a derivative instrument counterparty may fail to meet its payment obligations under the terms of the derivative contract. SWIB seeks to mitigate this risk through counterparty credit evaluations and approvals, counterparty credit limits, and exposure monitoring procedures. Additionally, policies have been established which seek to implement master netting arrangements with counterparties that permit the closeout and netting of transactions with the same counterparty upon the occurrence of certain events, such as payment default, rating downgrade, bankruptcy, illegality, or force majeure. Agreements may also require daily collateral postings to further mitigate credit risk.

The table entitled OTC Derivative Instruments Subject to Counterparty Credit Risk, summarizes, by credit rating, the Retirement Funds' exposure to counterparty credit risk relating to uncleared OTC contracts as of December 31, 2021, without respect to any collateral or netting agreement.

Retirement Funds
OTC Derivative Instruments Subject to Counterparty Credit Risk
As of December 31, 2021
(In Thousands)

Counterparty Credit Rating	FX Receivables	Swap Receivables	To Be Announced Receivables[1]	Warrant Receivables[1,2]	Total [3]
AA	$ 772,619	$ 0	$ 0	$ 0	$ 772,619
A	3,444,485	3,497,233	1,174	0	6,942,892
Not Rated	0	0	0	1,527	1,527
Total	$ 4,217,104	$ 3,497,233	$ 1,174	$ 1,527	$ 7,717,038

[1]Exposure to counterparty credit risk for To Be Announced Securities and Warrants is limited to unrealized gains on open positions.

[2] Warrants issued by privately held company that is not rated by statistical credit rating organization.

[3] Aggregate amount of liabilities included in master netting arrangements was $7.6 billion at December 31, 2021.

The aggregate fair value of receivables relating to uncleared OTC derivative contracts was $7.7 billion at December 31, 2021. This amount represents the maximum loss that would be recognized at the reporting date if all counterparties failed to perform as contracted. This maximum exposure is reduced to $7.7 million at December 31, 2021 when counterparty collateral and master netting arrangements are considered. SWIB had credit exposure to 21 uncleared OTC counterparties as of December 31, 2021.

Cleared OTC and Exchange-Traded Derivative Instruments

Counterparty credit risk is mitigated by an intermediary for cleared OTC and exchange-traded derivative contracts. For these types of derivative investments, a clearinghouse interposes itself as counterparty to all trades and extends a guarantee that trades will be settled as originally intended and to ensure performance and margin requirements are imposed. The requirements are established with the intent to cover nearly all expected price changes based on market risk. Margin payments are settled daily based upon the price movements of the contracts, thereby significantly reducing counterparty credit risk.

» Foreign Currency Spot and Forward Contracts

Foreign Currency Spot and Forward contracts are uncleared OTC agreements between two parties to exchange designated currencies at a specific time in the future. No cash is exchanged when a foreign exchange spot or forward contract is initiated. Depending upon market movements, forward contracts may require collateral postings either to SWIB or to counterparties. Spot contracts are exempt from collateralization. For deliverable contracts, amounts due are paid or received on the contracted settlement date. In other instances (most often in emerging markets), contracts are established as non-deliverable forwards (NDFs). Unlike deliverable contracts, NDFs are only settled in U.S. dollars.

Currency exposure management is permitted through the use of currency derivative instruments. Direct hedging of currency exposure back to the U.S. dollar is permitted when consistent with the strategy of the portfolio. Cross-currency exposure management seeking to transfer out of an exposed currency and into a benchmark currency is also permitted. SWIB may employ discretionary currency overlay strategies when currency market conditions suggest such strategies are warranted.

Losses may arise from future changes in the value of the underlying currency, or if the counterparties do not perform under the terms of the contract. Spot and forward contracts are valued daily with the changes in fair value included in “Net Increase (Decrease) in Fair Value of Investments” on the Statement of Changes in Fiduciary Net Position. The net receivable or payable for spot and forward contracts is reflected as “Foreign Currency Contracts” on the Statement of Fiduciary Net Position. The tables entitled Foreign Currency Spot and Forward Contracts present the fair value of foreign currency spot and forward contract assets and liabilities held by the Retirement Funds as of December 31, 2021.

Retirement Funds
Foreign Currency Spot and Forward Contracts
December 31, 2021
(In Thousands)

Currency	Notional (local currency)	Fair Value ($U.S.)	Unrealized Gain(Loss) ($U.S.)
Foreign Currency Contract Receivables			
Australian Dollar	285,883	$ 207,852	$ 3,250
Brazilian Real	332,710	58,989	996
Canadian Dollar	216,105	171,084	1,954
Chilean Peso	31,725,130	37,081	(1,126)
Chinese Yuan Renminbi	21,982	3,447	24
Colombian Peso	6,749,977	1,645	(39)
Czech Republic Koruna	1,314,912	59,837	1,393
Danish Krone	111,173	16,999	77
Euro Member Countries	49,708	56,534	135
Hong Kong Dollar	132,781	17,031	(1)
Hungarian Forint	25,913,046	79,625	(798)
Indian Rupee	6,722,639	89,743	736
Indonesian Rupiah	752,892,727	52,721	659
Israeli Shekel	53,671	17,244	149
Japanese Yen	42,612,540	370,070	(6,940)
Mexican Peso	347,464	16,754	548
New Zealand Dollar	37,250	25,503	65
Norwegian Krone	1,745,355	197,745	2,442
Philippine Peso	147,326	2,849	(60)
Poland Zloty	239,503	59,305	363
Russian Ruble	4,076,488	53,895	(928)
Singapore Dollar	106,330	78,863	744
South African Rand	235,006	14,580	54
Sweden Krona	2,152,372	237,819	(495)
Switzerland Franc	344,039	377,613	1,922
Thailand Baht	337,726	10,107	(4)
Turkish Lira	217,840	15,830	(3,803)
United Kingdom Pound	137,749	186,574	2,763
United States Dollar	1,699,764	1,699,765	0
Total Receivables		$ 4,217,104	$ 4,080

Retirement Funds
Foreign Currency Spot and Forward Contracts
December 31, 2021
(In Thousands)

Currency	Notional (local currency)	Fair Value ($U.S.)	Unrealized Gain(Loss) ($U.S.)
Foreign Currency Contract Payables			
Australian Dollar	(137,497)	$ (99,971)	$ 465
Brazilian Real	(12,183)	(2,178)	(12)
Canadian Dollar	(142,127)	(112,518)	(294)
Chilean Peso	(590,743)	(686)	8
Chinese Yuan Renminbi	(132,907)	(20,838)	(105)
Colombian Peso	(25,636,532)	(6,249)	179
Czech Republic Koruna	(275,830)	(12,605)	(296)
Danish Krone	(269,330)	(41,182)	16
Euro Members Countries	(1,085,567)	(1,235,355)	3,372
Hong Kong Dollar	(37,074)	(4,755)	(2)
Hungarian Forint	(5,598,136)	(17,248)	594
Indian Rupee	(913,581)	(12,162)	(190)
Israeli Shekel	(24,207)	(7,782)	(95)
Japanese Yen	(6,629,934)	(57,576)	409
Korean (South) Won	(15,550,600)	(13,038)	59
Mexican Peso	(129,100)	(6,269)	(13)
New Zealand Dollar	(90,658)	(62,021)	911
Norwegian Krone	(467,605)	(53,025)	(1,357)
Philippine Peso	(914,284)	(17,679)	335
Poland Zioty	(21,678)	(5,374)	(2)
Russian Ruble	(400,161)	(5,267)	13
Singapore Dollar	(49,683)	(36,840)	(495)
South African Rand	(443,031)	(27,543)	277
Sweden Krona	(1,048,484)	(115,809)	396
Switzerland Franc	(75,830)	(83,339)	(832)
Taiwan New Dollar	(1,848,535)	(66,892)	81
Thailand Baht	(843,472)	(25,243)	(402)
Turkish Lira	(217,840)	(15,830)	(3,180)
United Kingdom Pound	(32,751)	(44,358)	(126)
United States Dollar	(2,003,679)	(2,003,678)	0
Total Payables		(4,213,310)	(286)
Net		$ 3,794	$ 3,794

» *Futures Contracts*

A futures contract is an exchange-traded agreement to buy or sell a financial instrument, index, or commodity at an agreed upon price and specified date in the future.

The fair value of futures contracts represents the unrealized gain (loss) on the contracts, since trade inception, and is reflected as "Financial Futures Contracts" on the Statement of Fiduciary Net Position. Futures contracts are marked to market daily, based upon the closing market price of the contract at the board of trade or exchange on which they are traded. Gains and losses resulting from investments in futures contracts are included in the "Net Increase (Decrease) in Fair Value of Investments" on the Statement of Changes in Fiduciary Net Position.

Futures contracts involve, to varying degrees, risk of loss in excess of the margin deposited with the clearinghouse. Losses may arise from future changes in the value of the underlying instrument. Futures contracts may be entered into for purposes such as the following:

- To efficiently gain or adjust market exposures for rebalancing,
- To adjust sector, interest rate, or duration exposures, and
- To securitize cash or act as a substitute for cash market transactions.

The table entitled Futures Contracts presents the Retirement Funds investments in futures contracts as of December 31, 2021.

Retirement Funds
Futures Contracts
As of December 31, 2021
(In Thousands)

Futures Contract Description	Position	Expiration	Notional Amount	Fair Value*
Commodity	Long	Jan 22 - Dec 22	$ 481,066	$ 9,540
	Short	Feb 22 - Sep 22	(301,319)	(2,073)
Currency	Long	Mar 22	(187,712)	(932)
Equity Index	Long	Jan 22 - Mar 22	3,288,773	44,774
	Short	Jan 22 - Apr 22	(247,991)	(745)
Fixed Income	Long	Mar 22	11,160,685	28,893
	Short	Mar 22	(4,985,764)	(2,668)
Total			$ 9,207,738	$ 76,789

* Fair Value includes foreign currency gains (losses).

The table entitled Futures Contracts with Interest Rate Sensitivity presents the interest rate sensitivity of fixed income futures contracts as of December 31, 2021. Duration, which is stated in years, is the measure of price sensitivity of a fixed income security to an interest rate change of 100 basis points. Duration statistics presented in this table are weighted by the notional value of each position to compute an average duration for the contract types held.

Retirement Funds
Futures Contracts with Interest Rate Sensitivity
As of December 31, 2021
(In Thousands)

Contract Type	Position	Notional Amount	Fair Value	Weighted Average Duration (Years)
U.S. Treasury Notes	Long	$ 8,726,225	$ 6,070	4.0
U.S. Treasury Notes	Short	(4,527,766)	(6,820)	6.2
U.S. Treasury Bonds	Long	2,434,460	22,823	17.5
U.S. Treasury Bonds	Short	(109,194)	477	15.4
Foreign Government Bonds	Short	(348,804)	3,675	8.4
Total		$ 6,174,921	$ 26,225	

» *Options*

An options contract gives the purchaser of the contract the right, but not the obligation, to buy (call) or sell (put) the security or index underlying the contract at an agreed upon price on or before the expiration date of the contract. The seller of the contract is subject to market risk, while the purchaser is subject to credit risk and market risk, to the extent of the premium paid to enter into the contract.

Trust fund rebalancing policies and certain portfolio investment guidelines permit the use of exchange-traded and OTC options. Investment guidelines allow options to be used to improve market exposure efficiency, enhance expected returns, or provide market exposure hedges. Exchange rules require that the seller of short exchange-traded option contracts cover these positions either by collateral deposits in the form of cash or by pledging, in escrow, the actual securities that would be transferred to the contract purchaser in the event the options contract was exercised. In the case of OTC options, investment guidelines mitigate counterparty credit risk by establishing minimum credit ratings and requiring master netting agreements with provisions for collateral exchanges.

The fair value of option contracts is based upon the closing market price of the contract and is reflected as "Options Contracts" on the Statement of Fiduciary Net Position. Gains and losses as a result of investments in option contracts are included in the "Net Increase (Decrease) in Fair Value of Investments" on the Statement of Changes in Fiduciary Net Position. The table entitled Options Contracts presents the fair value of option contracts as of December 31, 2021.

Retirement Funds
Options Contracts
As of December 31, 2021
(In Thousands)

Description	Contract Type	Position	Exchange-Traded (EXCH) vs. OTC	Expiration	Notional	Fair Value	Unrealized Gain (Loss)
Equity	CALL	Long	EXCH	Jan 22 - Mar 22	$ 14,437	$ 252	$ (2,872)
Equity	CALL	Short	EXCH	Jan 22 - Mar 22	(48,872)	(456)	502
Equity	PUT	Long	EXCH	Jan 22	9,429	63	(446)
Equity	PUT	Short	EXCH	Jan 22	(24,579)	(1,665)	43
Equity Index	PUT	Short	EXCH	Jan 22	(28)	0	1
OTC Index	PUT	Short	OTC	Jan 22 - Feb 22	(416,946)	(140)	895
Total					$ (466,559)	$ (1,946)	$ (1,877)

» *Swaps*

Swaps are negotiated contractual agreements between two parties which can be either cleared or uncleared OTC investments. As is specified in SWIB's investment guidelines, swaps may be used as an alternative to physical securities when it is deemed advantageous for portfolio construction. In addition, swaps may be used to adjust asset class exposures for the Retirement Funds. Guideline limits and soft risk parameters for each portfolio are applied to the aggregate exposures which includes both physical and synthetic securities. A synthetic security is a security or combination of securities that mirrors the properties of another reference security.

Throughout the calendar year, the Retirement Funds held positions in Total Return Swaps (TRS), Interest Rate Swaps (IRS), and Credit Default Swaps (CDS). The table entitled Open Swap Positions lists the open swap contracts held at December 31, 2021.

Retirement Funds
Open Swap Positions
As of December 31, 2021
(In Thousands)

Type	Maturity Date	Reference Rate	Notional Amount	Fair Value	Unrealized Gain (Loss)
Credit Default	Dec-25	N/A[1]	$ 12,000	$ 13	$ 1,210
Credit Default	Jun-26	N/A[1]	20,000	(825)	2,100
Credit Default	Dec-26	N/A[1]	204,720	5,423	120
Credit Default	Dec-26	N/A[2]	(400,000)	(36,561)	337
Interest Rate[3]	May-25	Pay CNY-7D Fixing Repo Rates, Receive Fixed 2.02	20,397	(187)	50
Interest Rate[3]	Jul-25	Pay CNY-7D Fixing Repo Rates, Receive Fixed 2.53	4,754	34	34
Interest Rate[3]	Jul-26	Pay CNY-7D Fixing Repo Rates, Receive Fixed 2.57	2,510	23	23
Interest Rate[3]	Jun-27	Pay MNX-TIIE-Banxico 28D, Receive Fixed 5.42	12,178	(1,114)	(1,114)
Total Return	Jan-22	Pay 1-Day FED FUNDS plus spread, Receive Equity Index Return	(97,758)	2,840	2,840
Total Return	Feb-22	Pay 1-Day FED FUNDS plus spread, Receive Equity Index Return	(687,525)	22,953	22,952
Total Return	Mar-22	Pay 1-Day FED FUNDS plus spread, Receive Equity Index Return	(171,370)	6,773	6,773
Total Return	Apr-22	Pay 1-Day FED FUNDS plus spread, Receive Equity Index Return	(83,227)	605	605
Total Return	May-22	Pay 1-Day FED FUNDS plus spread, Receive Equity Index Return	(153,428)	2,709	2,709
Total Return	Jun-22	Pay 1-Day FED FUNDS plus spread, Receive Equity Index Return	(99,414)	1,185	1,185
Total Return	Jul-22	Pay 1-Day FED FUNDS plus spread, Receive Equity Index Return	(140,527)	4,083	4,083
Total Return	Aug-22	Pay 1-Day FED FUNDS plus spread, Receive Equity Index Return	(90,725)	3,586	3,586
Total Return	Sep-22	Pay 1-Day FED FUNDS plus spread, Receive Equity Index Return	(524,845)	15,071	15,071
Total Return	Sep-22	Pay 1-Day FED FUNDS plus spread, Receive Equity Index Return	(220,717)	(658)	(658)
Total Return	Sep-22	Receive 1-Day FED FUNDS plus spread, Pay Equity Index Return	532,639	(11,636)	(11,636)
Total Return	Oct-22	Pay 1-Day FED FUNDS plus spread, Receive Equity Index Return	(50,000)	124	124
Total Return	Oct-22	Pay 3-Month LIBOR plus spread, Receive Equity Index Return	(89,714)	2,607	2,607
Total Return	Nov-22	Pay 1-Day FED FUNDS plus spread, Receive Equity Index Return	(155,942)	5,412	5,412
Total Return	Nov-22	Pay 1-Day FED FUNDS plus spread, Receive Equity Index Return	(175,302)	6,928	6,928
Total Return	Nov-22	Receive 1-Day FED FUNDS plus spread, Pay Equity Index Return	147,101	(3,698)	(3,698)
Total			$ (2,184,195)	$ 25,690	$ 61,643

[1] SWIB sold credit protection in exchange for periodic payments

[2] SWIB bought credit protection in exchange for periodic payments

[3] Denotes instrument is highly sensitive to interest rate changes

Open CDS contracts represent cleared OTC positions where SWIB gains exposure to credit protection. Under the terms of the contract, SWIB receives or pays periodic payments and, in exchange, agrees to pay or receive a formula-driven amount to counterparties for losses incurred if stipulated credit events occur. CDS spreads are sensitive to credit spread and interest rate changes. The fair value of a CDS is determined using the closing price as reported by the applicable clearinghouse.

IRS positions represent cleared OTC contracts where fair value is determined using the closing price as reported by the applicable clearinghouse. IRS positions are sensitive to changes in interest rates. One stream of future interest payments is exchanged for another between counterparties. In most cases, interest rate swaps include the exchange of a fixed interest rate for a floating rate.

The open TRS contracts represent uncleared OTC positions where SWIB gains exposure to the return of the underlying equity index and, in exchange, agrees to pay or receive the stipulated rate benchmark, plus or minus a spread. The rate benchmark is based on the 3-month London Interbank Offering Rate (LIBOR) rate or the 1-day Fed Funds Rate set by the Federal Open Market Committee (FOMC) and is sensitive to interest rate changes. The fair value of a TRS is based on the change in quoted market price of the underlying equity index and represents the unrealized gain (loss) on the contracts since trade inception.

The fair value of CDS, IRS, and TRS is reflected as “Swaps” on the Statement of Fiduciary Net Position. Gains and losses resulting from investments in swap contracts are included in the “Net Increase (Decrease) in Fair Value of Investments” on the Statement of Changes in Fiduciary Net Position. Any interest owed but not yet paid relating to swap contracts is reported within "Investment Payables" on the Statement of Fiduciary Net Position. Interest expense relating to swap contracts is reported as "Investment Expense" on the Statement of Changes in Fiduciary Net Position.

» *To Be Announced Securities*

TBA mortgage-backed securities are uncleared OTC forward contracts consisting of mortgage-backed securities (MBS) issued by Government National Mortgage Association, a government entity, and by government-sponsored enterprises such as the Federal National Mortgage Association or the Federal Home Loan Mortgage Corp. The term TBA is derived from the fact that the actual MBS that will be delivered to fulfill a TBA trade is not designated at the time the trade is made. Instead, the specific pool of mortgages comprising the MBS is announced 48 hours prior to the established trade settlement date. Eligibility rules and standards for MBS pools deliverable into TBA contracts ensure that delivered MBS pools are fungible. Payment for TBA securities is not made until the settlement date.

Certain portfolio investment guidelines allow for both long and short TBA positions. To mitigate counterparty credit risk, guidelines establish minimum credit ratings and require master netting agreements which include provisions for collateral exchanges.

TBAs, much like their underlying MBS securities, may be highly sensitive to interest rate changes. This is because the MBS pool on which these forward contracts are based can be subject to early payment in a period of declining interest rates. The price of TBAs can fluctuate as the marketplace predicts changes in timing, or possible reductions in expected cash flows, associated with a change in interest rates. The table entitled TBA Contracts includes the interest rate sensitivity of TBA contracts as of December 31, 2021. Duration, which is stated in years, is the measure of price sensitivity of a fixed income security to an interest rate change of 100 basis points. Duration statistics presented in this table are weighted by the fair value of each position to compute an average duration for the contracts held.

Retirement Funds
TBA Contracts
As of December 31, 2021
(In Thousands)

Position	Contract Maturity	Fair Value	Unrealized Gain (Loss)	Weighted Average Duration (Years)
Long	Feb - Mar 22	$ 4,646,235	$ 175	4.7
Short	Feb 22	(1,746,980)	(2,475)	6.7
Total		$ 2,899,255	$ (2,300)	

The fair value of TBAs is reflected in “To Be Announced Securities” on the Statement of Fiduciary Net Position. The unrealized gain (loss) associated with these contracts is included within the “Net Increase (Decrease) in Fair Value of Investments” on the Statement of Changes in Fiduciary Net Position.

» *Warrants*

A warrant is a contract that entitles the holder to buy the underlying stock of the issuing company at a specified price. Warrants and options are similar in that the two instruments allow the holder special rights to buy securities. However, warrants differ from options in that they provide additional financing to the issuing company when exercised. As of December 31, 2021, SWIB held warrant contracts valued at $2.3 million. Warrants are included in the “Equities” section on the Statement of Fiduciary Net Position. The associated unrealized gain of $1.2 million is included in the "Net Increase (Decrease) in Fair Value of Investments" on the Statement of Changes in Fiduciary Net Position.

» *Securities Lending Transactions*

State statutes and Board policies permit SWIB to use investments of the Retirement Funds to enter into securities lending transactions. These transactions involve the lending of securities to broker-dealers and other entities in exchange for collateral, in the form of cash or securities, with the simultaneous agreement to return the collateral for identical securities in the future. SWIB’s custodian acts as an agent in lending the Retirement Funds’ directly-held domestic and international securities. When the Retirement Funds’ securities are delivered to a borrower as part of a securities lending agreement, the borrower is required to place collateral with the lending agent equal to at least 102% of the loaned securities’ fair value, including interest accrued, as of the delivery date, as long as the securities and the collateral are denominated in the same currency. In the event that securities are loaned against collateral denominated in a different currency, the borrower is required to place collateral with the lending agent totaling at least 105% of the loaned securities’ fair value, including interest accrued, as of the delivery date. Collateral is marked to market daily and adjusted as needed to maintain the required minimum level. Pledging or selling non-cash collateral securities cannot be done without a borrower default. On December 31, 2021, the fair value of the securities on loan to counterparties was approximately $11.4 billion.

Cash collateral is reinvested by the lending agent in two separate pools, a U.S. dollar cash collateral pool and a pool denominated in Euros. These pools are administered in accordance with contractual investment guidelines which are designed to minimize the risk of principal loss and provide a modest rate of return. Investment guidelines limit credit and liquidity risk by restricting new investments to overnight repurchase agreements collateralized with high quality U.S. government, U.S. government agencies, and sovereign debt securities. To further reduce credit risk, SWIB’s custodian provides indemnification to SWIB against counterparty default. The earnings generated from the collateral investments, plus or minus the rebates received from or paid to the dealers and less fees paid to agents, results in the net earnings from lending activities, which are then split on a percentage basis with the lending agent. Cash from the U.S. dollar pool may be posted as collateral relating to short sale transactions and it earns the Overnight Bank Funding rate plus 10 basis points. Additional information relating to short sales is discussed later in this note. As of December 31, 2021, SWIB's securities lending agent released $761 million in cash from the Securities Lending Collateral pool to SWIB. The cash released is included in Cash and Cash Equivalents on the Statement of Fiduciary Net Position and is used to provide liquidity for other investment strategies. The Securities Lending Collateral Liability is fully collaterized when the cash released is combined with the Securities Lending Collateral.

At December 31, 2021, the Retirement Funds had minimal credit risk exposure to borrowers as loans are collateralized in excess of 100%. In addition to the cash collateral reinvestment indemnification, the contract with the lending agent requires it to indemnify the Retirement Funds if the borrowers fail to return the loaned securities and the collateral is inadequate to replace the securities lent. The Retirement Funds are also indemnified against losses resulting from violations of investment guidelines.

The majority of security loans are open-ended and can be terminated on demand by the Retirement Funds or the borrower. Maturities of investments made with cash collateral are not necessarily matched to the maturities of the securities loaned because most loans do not have a fixed maturity date. The risk that SWIB would be unable to return collateral to securities borrowers upon termination of the loan is mitigated by the highly liquid nature of investments held in the collateral reinvestment pools and cash held by SWIB. The average maturities of the loans and the average maturities of the assets held in the collateral reinvestment pools were similar at December 31, 2021.

Securities lending is allowed in certain commingled fund investments. As an investor in such funds, SWIB does not own the underlying securities and does not separately report on securities lending activity. All earnings of these funds are reported in the Statement of Changes in Fiduciary Net Position as “Net Increase (Decrease) in Fair Value of Investments.”

» *Short Sell Obligations*

The Retirement Funds may sell a security it does not own in anticipation of purchasing the security later at a lower price. This is known as a short sale transaction. For the duration of the short sale transaction, a liability is recorded under “Short Sell Obligations” on the Statement of Fiduciary Net Position. The liability presented on the Statement of Fiduciary Net Position represents the fair value of the shorted securities necessary for delivery to the purchaser and is marked-to-market daily. Realized and unrealized gains and losses associated with short sales are recorded on the Statement of Changes in Fiduciary Net Position, in the “Net Increase (Decrease) in Fair Value of Investments” account. Prior to executing a short sale, SWIB borrows the security from a party currently holding it. While the transaction is open, the Retirement Funds incur expenses for securities borrowing costs. In addition, as a security borrower, the Retirement Funds may incur dividend and interest expense as such payments must be remitted to the security lender during the course of the loan. During the duration of the borrow, there may be corporate action elections requiring the borrower to deliver items such as cash or securities to the lender. Expenses resulting from short sales are included in “Investment Expense” on the Statement of Changes in Fiduciary Net Position.

Risks arise from short sales due to the possible illiquidity of the securities markets and from potential adverse movements in security values. The cost to acquire the securities sold short may exceed the amount of proceeds initially received, as well as the amount of the liability recorded as “Short Sell Obligations” in the Statement of Fiduciary Net Position. Short sales expose the short seller to potentially unlimited liability as there is no upward limit on the price a shorted security can reach. Certain portfolio guidelines permit short sales and mitigate risks in various ways, including: limiting the total value of short sales as a percentage of portfolio value, establishing portfolio versus benchmark tracking error limits, and monitoring other statistical and economic risk measures of the portfolio. Investment performance and risk associated with each portfolio is measured against benchmarks and monitored by management.

When a short sale occurs, the shorting portfolio must borrow the security and deliver it to the buyer. If the shorted security is owned by another Retirement Fund portfolio, investment policies allow the borrowing of the shorted securities from other Retirement Fund portfolios, including inter-fund borrowings. In addition to borrowing securities from existing Retirement Fund portfolios, SWIB may borrow securities from external sources. These borrowings are facilitated by SWIB’s custodian.

Except in the case of borrowings within the same trust fund, the Retirement Funds are required to post collateral to the lender, at the required rate of 102% for in-currency loans and 105% for cross-currency loans. The Retirement Funds posted $127.2 million in cash and $5.2 billion in securities as collateral to security lenders representing $46.1 million in excess of the fair market value of the securities borrowed as of December 31, 2021. If the security lender recalled the security and SWIB was not able to supply the lender with the security, the lender would be permitted to use SWIB's collateral to fund the purchase of the security.

» *Investment Policy and Asset Allocation*

As part of its fiduciary responsibilities, SWIB is required by Wis. Stat. § 25.15 (2)(b) "to diversify investments in order to minimize the risk of large losses, unless under the circumstances it is clearly prudent not to do so, considering each trust's or fund's portfolio as a whole at any point in time." SWIB exercises this duty in part by establishing its investment policy and by setting the asset allocation.

SWIB's Board of Trustees has established the asset allocation pursuant to a comprehensive and ongoing evaluation of the appropriate risk and return standards for each fund under management. The Board of Trustees consists of nine members meeting specific requirements as follows:

- Six Governor-appointed and State Senate-approved members, including:
  - Four with at least ten years investment experience
  - One with at least ten years financial experience and who works for a local government participant in the Local Government Investment Pool; and
  - One additional member
- Educator participant in the WRS appointed by the Teachers Retirement Board
- Non-educator participant in the WRS appointed by the Wisconsin Retirement Board
- Secretary of the Department of Administration or designee

The Board-approved investment policy for the WRS is intended to assist in development of a diversified portfolio of investments within acceptable risk parameters. The policy represents a delegation of standing authority to the SWIB's Executive Director/Chief Investment Officer and investment managers within the organization to make prudent investments within the investment guidelines, pursuant to Wis. Stat. § 15.02 (4) and Wis. Stat. § 25.15 (2) and Wisconsin Administrative Code IB 2.02.

Additionally, the Investment Committee (IC) was created to provide oversight of SWIB investments within the parameters established by the Board of Trustees. Oversight includes analysis of risk and investment returns of the portfolios, asset classes, and Core and Variable Funds. The IC is responsible for proposing to the Board of Trustees changes to the WRS investment policy, approving investment guidelines or strategies for internally-managed portfolios, approving the general strategies for each asset class, and for approving new investment and derivative instruments. The Board of Trustees reserves all rights to modify and amend IC guidelines at any time at its discretion.

The IC approved WRS Investment Guidelines include several policies, including a derivatives use policy, rebalancing procedures, and a leverage use policy. The derivatives use policy sets forth the objectives, monitoring, and reporting guidelines relating to derivative investments. The rebalancing procedures used in both mandatory and discretionary asset class rebalancing are described in the Investment Guidelines, and the leverage use policy describes SWIB's leverage philosophy. The total amount of policy leverage is approved by the Board of Trustees through the WRS asset allocation process.

The Board adopts the Retirement Funds' asset allocation policy, based on recommendations by the IC, the Board's asset allocation consultant, Executive Director/Chief Investment Officer, and Head of Asset and Risk Allocation. SWIB undertakes a comprehensive review of its strategic asset allocation plan every other year, including asset/liability modeling, to determine a suitable target allocation for each asset class included in the Core and Variable Funds, and an annual review to assess whether any interim adjustments should be made. The strategic nature of these reviews contemplates a long-term time horizon over which potential results are evaluated. This exercise is not an attempt to predict short-term market movements, but an effort to understand the long-term impacts of poor, normal, and above average market results.

In addition to potential future market impact, SWIB also contemplates the objectives of the funds, the impact of actuarial analysis, and the soundness of investment return and risk expectations. SWIB's asset allocation policies reflect the Board's program of risk allocation that involves reducing equity exposure by leveraging lower-volatility assets, such as fixed income securities. This investment strategy results in Core Fund strategic targets which exceed 100% of invested assets. Currently, the Board has approved an asset allocation target of 15% policy leverage for the Core Fund subject to an allowable range of up to 20%.

SWIB's asset allocation review process also includes assumptions regarding expected rates of return. Long-term (e.g. 30-year) expected real rates of return on pension plan investments are determined using a building block method in which best-estimate ranges of expected future real rates of return (expected returns, net of pension plan investment expense and inflation) are developed for each major asset class. These ranges are combined to produce the long-term expected real rate of return by weighting the expected future real rates of return by the target asset allocation percentage and by adding expected inflation.

The table entitled Asset Allocation Targets and Expected Returns presents the policy asset allocation targets and the best estimates of expected geometric rates of return for each major asset class as of December 31, 2021. In determining asset allocation targets, investments may be categorized differently than they are within the financial statements. For example, SWIB management considers inflation-sensitive assets separately from other fixed income investments for asset allocation purposes.

Retirement Funds
Asset Allocation Targets and Expected Returns[2]
As of December 31, 2021

Core Fund Asset Class	Asset Allocation %	Long-Term Expected Nominal Rate of Return %	Long-Term Expected Real Rate of Return %[1]
Global Equities	52 %	6.8 %	4.2 %
Fixed Income	25	4.3	1.8
Inflation Sensitive Assets	19	2.7	0.2
Real Estate	7	5.6	3.0
Private Equity/Debt	12	9.7	7.0
Total Core Fund	115 %	6.6 %	4.0 %
Variable Fund Asset Class			
U.S. Equities	70 %	6.3 %	3.7 %
International Equities	30	7.2	4.6
Total Variable Fund	100 %	6.8 %	4.2 %

[1] New England Pension Consultants Long Term US CPI (Inflation) Forecast: 2.5%

[2] Asset Allocations are managed within established ranges, target percentages may differ from actual monthly allocations

» *Annual Money-Weighted Rate of Return*

Money-weighted rate of return expresses investment performance, net of pension plan investment expense, adjusted for the changing amounts actually invested. For the year ended December 31, 2021, the money-weighted rate of return for the Core Fund was 17.03% and 19.98% for the Variable Fund.

4 DESCRIPTION OF THE WISCONSIN RETIREMENT SYSTEM

The WRS is a cost-sharing, multiple-employer public employee retirement system established and administered by the State of Wisconsin to provide pension benefits for state and local government employees. WRS benefits and other plan provisions are established by Wis. Stat. § 40. Benefit terms may only be modified by legislation. ETF, under the direction of the ETF Board, is responsible for the administration of the WRS.

» *Employee Trust Funds Board*

The ETF Board has general oversight of ETF, appoints the ETF Secretary and oversees administration of the benefit programs, other than group insurance and deferred compensation. The ETF Board is comprised of 13 members, including:

- the Governor or the Governor's designee on the Group Insurance Board;
- the Administrator of the Department of Administration's Division of Personnel Management or the Administrator's designee;
- 4 members appointed by the Teachers Retirement Board (an advisory board to the ETF Board);
- 4 members appointed by the Wisconsin Retirement Board (an advisory board to the ETF Board);
- a public member who is not a participant in or beneficiary of the WRS, with at least 5 years of experience in actuarial analysis, administration of an employee benefit plan or significant administrative responsibility in a major insurer;
- a WRS annuitant; and
- a participant in the WRS who is a technical college or public school district educational support personnel employee.

» *WRS Employers*

The WRS is open to all public employers in Wisconsin. Participation is optional, except that participation is mandatory for school districts with respect to teachers, some municipalities with respect to police and firefighters, and all counties except Milwaukee County. As of December 31, 2021, the number of participating employers was:

State Agencies, UW & Public Authorities	56
Cities	189
Counties	71
Villages	291
Towns	287
School Districts	421
Cooperative Educational Service Agencies	12
Wisconsin Technical College System Districts	16
Special Districts	212
Total Employers	1,555

» *WRS Membership*

All eligible employees of a participating employer who are expected to work at least 1,200 hours per year (880 hours per year for teachers and school district educational support employees) must be covered by the WRS. As of December 31, 2021, the WRS membership consisted of:

Current Employees:	
General	132,650
Teachers	102,753
Elected / Executive / Judges	1,264
Protective with Social Security	19,220
Protective without Social Security	2,760
Total Current Employees	258,647
Inactive Participants:	
Terminated Participants	174,573
Alternate Payees	3,498
Total Inactive Participants	178,071
Retirees and Beneficiaries Currently Receiving Benefits:	
Retirement Annuitants	218,846
Disability Annuitants	6,305
Death Beneficiary Annuitants	1,454
Total Annuitants	226,605
Total Participants	663,323

Approximately 1,535 inactive participants are receiving Long-Term Disability Insurance benefits.

» *WRS Benefits*

The WRS provides retirement benefits as well as death and disability benefits. Vesting requirements have changed over time, as follows:

- Participants in the system prior to January 1, 1990 were fully vested at the time they met participation requirements;

- For participants entering the system from January 1, 1990, to April 23, 1998, creditable service in each of five years was required for vesting;
- All active participants in the system at any time from April 24, 1998 to June 30, 2011 are fully vested; and
- 2011 Wisconsin Act 32 generally required participants hired on or after July 1, 2011 to have five years of creditable service to be vested.

Employees who retire at or after age 65 (54 for protective occupations and 62 for elected officials and executive service retirement plan participants, if hired on or before 12/31/2016) are entitled to a retirement benefit based on a formula factor, their final average earnings, and creditable service. Formula factors are shown in the table below:

Employment Category	Service Before 1/1/2000	Service Between 2000 and 2011	Service After 2011
General and Teachers	1.765%	1.6%	1.6%
Executive and Elected	2.165	2.0*	1.6*
Protective with Social Security	2.165	2.0	2.0
Protective without Social Security	2.665	2.5	2.5

*2011 Wisconsin Act 10 changed the Executive and Elected formula factor from 2.0% to 1.6%. The effective date of the change varies among different employee categories, and generally applies to the service earned after Act 10 effective date (i.e. June 29, 2011).

Final average earnings is the average of the participant's three highest annual earnings periods. Creditable service includes current service and prior service for which a participant received earnings and made contributions as required. Creditable service also includes creditable military service. The retirement benefit will be calculated as a money purchase benefit based on the member's contributions plus matching employer's contributions, with interest, if that benefit is higher than the formula benefit.

Vested participants may retire at or after age 55 (50 for protective occupations) and receive an actuarially-reduced benefit. Participants terminating covered employment prior to eligibility for an annuity may either receive member-required contributions plus interest as a separation benefit or leave contributions on deposit and defer application until eligible to receive a retirement benefit.

» *Post-Retirement Adjustments*

The Employee Trust Funds Board may periodically adjust annuity payments from the retirement system based on annual investment performance in accordance with s. 40.27, Wis. Stat. An increase (or decrease) in annuity payments may result when investment gains (losses), together with other actuarial experience factors, create a surplus (shortfall) in the reserves, as determined by the system's consulting actuary. Annuity increases are not based on cost of living or other similar factors. For Core annuities, decreases may be applied only to previously granted increases. By law, Core annuities cannot be reduced to an amount below the original, guaranteed amount (the "floor") set at retirement.

The Core and Variable Fund annuity adjustments granted during the past 10 years are as follows:

Year	Core Adjustment	Variable Adjustment
2012	(7.0)%	(7.0)%
2013	(9.6)	9.0
2014	4.7	25.0
2015	2.9	2.0
2016	0.5	(5.0)
2017	2.0	4.0
2018	2.4	17.0
2019	0.0	(10.0)
2020	1.7	21.0
2021	5.1	13.0

The negative Core annuity adjustments from 2012 to 2013 were primarily due to the Fund's $21.0 billion investment decline in 2008, caused by the global economic crisis. Core Fund gains and losses are recognized over a five-year period.

» *Long-Term Receivables*

The "Prior Service Contributions Receivable" on the Statement of Fiduciary Net Position represents the WRS unfunded actuarial accrued liability (UAAL), determined under the plan's Frozen Initial Liability funding methodology. This liability is being amortized as a level percentage of payroll over a 40-year period beginning January 1, 1990, for employers in the WRS prior to 2009. The remaining balance is expected to be fully amortized by December 31, 2029. Liabilities for employers joining the WRS beginning in 2009 are amortized over 30 years. Interest is assessed on the outstanding liability at year-end at the assumed earnings rate. The level-percentage-of-payroll amortization method results in a relatively lower dollar contribution in earlier years than in later years, when payrolls have increased. During the early years of the amortization period, payments made are less than annual interest assessments, resulting in an increase in the liability. As payrolls increase annually, prior service payments increase proportionally until they exceed annual interest and ultimately fully liquidate the liability at the end of the amortization period. State law requires the accrued retirement cost to be funded. As of December 31, 2021, the receivable balance was $5.8 million.

» *Variable Retirement Option*

Prior to 1980, WRS participants could opt to have one-half of their required contributions and matching employer contributions invested in the Variable Fund. Retirement benefits were adjusted for the difference between the investment experience of the Core Fund and the Variable Fund. Provisions for allowing members to withdraw from the Variable Fund were added with the passage of Chapter 221, Laws of 1979. The Variable Fund was closed to new membership after April 30, 1980. 1999 Wisconsin Act 11 reopened the Variable Fund for existing and future participants, effective January 1, 2001. As of December 31, 2021, there were 50,205 active and inactive members and 42,251 annuitants participating in the Variable Fund.

» *Municipal Police and Firefighters Pension Group*

As of March 31, 1978, administration of certain local funds for police officers and firefighters was assumed by the Wisconsin Retirement Fund. This included approximately 2,000 members. As of December 31, 2021, approximately 19 annuitants or their beneficiaries remained in the system. This group was closed to new members after January 1, 1948.

The liability for retirement benefits for these annuitants is funded by the employers, as benefit payments are made. Annuity reserves for these police and firefighter annuities are established by a transfer from the employer accumulation reserve at the time the annuity is approved. Earnings on these reserves are used to fund annuity adjustments on the same basis as for WRS annuitants. The unfunded liability for these annuitants as of December 31, 2021, was approximately $400,000.

» *Annuity Supplement - General Fund*

As authorized under 1985 Wis. Stats. § 40.27 (1), the State's General Fund provides certain supplemental annuity benefits to annuitants receiving a continuing annuity on or before September 1974. The benefit is subject to continuation of the appropriation by the Legislature. ETF serves as a clearing agent for its payment. Total supplemental annuity benefits paid were approximately $45,000 in December 31, 2021.

5 CONTRIBUTIONS REQUIRED AND MADE

» *Required Contributions*

Contribution rates are determined by the "entry age normal with a frozen initial liability" actuarial method. This is a "level contribution" actuarial method intended to keep employer and member contribution rates at a level percentage of payroll over the years. This method determines the amount of contributions necessary to fund: 1) the current service cost, which represents the estimated amount necessary to pay for benefits earned by the members during the current service year plus actuarial gains or losses arising from the difference between actual and assumed experience; and 2) the prior service cost, which represents the estimated amount necessary to pay for unfunded benefits earned prior to the employer becoming a participating employer in the WRS and the past service cost of benefit improvements.

The 2021 contribution requirements were determined by the December 31, 2019, actuarial valuation.

Member contributions are deducted from the member's salary and remitted to ETF by the participating employer. Employers generally may not pay the member required contribution. The member required contribution is one-half of the actuarially-determined contribution rate for General category members, which includes teachers and members in the Executive and Elected Official category. By statute, member required contributions for Protective occupation category members are the same rate as General category members. Employers are required to contribute the remainder of the actuarially-determined contribution rate.

Contribution rates in effect during 2021 by employment category were:

Employment Category	Employer Current	Employer Prior *	Member	Total
General, Teachers, Executive & Elected Officials	6.75%	0.03%	6.75%	13.53%
Protective Occupation with Social Security	11.75	0.01	6.75	18.51
Protective Occupation without Social Security	16.35	0.01	6.75	23.11

*The employer prior service contribution rate is a weighted average of individual employer rates.

Contributions required and made during 2021 were:

	Contributions (In Millions)	Percentage of Payroll
Employer Current Service	$ 1,162.8	7.37%
Employer Prior Service*	0.4	0.00
Member Required	1,065.9	6.75

*Employer prior service contributions are recorded on the Statement of Fiduciary Net Position as a reduction in the Prior Service Contribution Receivable. Contributions include both mandatory and voluntary payments received from participating employers. Some prior service contributions received after year end are included in Contributions, but are not in the determination of Prior Service Contributions Receivable. This is due to a difference in how these payments are treated for actuarial and financial reporting purposes.

Employers also contributed approximately $139,000 in reimbursement for benefits paid under the s. 62.13, Wis. Stat, Police and Firefighters Pension Program.

» *Member and Employer Additional Contributions*

Contributions in addition to those required contributions by members and/or employers may be made to the retirement system. These contributions are held in separate reserve accounts and are subject to certain restrictions as to amount, form of benefit payments, tax status, etc.

6 NET PENSION LIABILITY (ASSET) OF PARTICIPATING EMPLOYERS - WRS

The components of the Net Pension Liability (Asset) of the participating employers at December 31, 2021, were as follows (In Millions):

Total Pension Liability*	$ 133,787.52
Plan Fiduciary Net Position**	141,847.70
Participating Employer's Net Pension Liability (Asset)	$ (8,060.18)
Plan Fiduciary Net Position as a Percentage of the Total Pension Liability	106.02%

*Includes the impact of known Market Recognition account deferred gains/losses on the liability for dividend payments.

** Immaterial differences may exist between the Plan Fiduciary Net Position used in the actuarial valuation and that reported in the Statement of Fiduciary Net Position, due to the timing of the actuarial valuation.

Additional information as of the latest actuarial valuations follows:

Actuarial Valuation Date:	December 31, 2020
Measurement Date of Net Pension Liability (Asset):	December 31, 2021
Experience Study:	January 1, 2018 - December 31, 2020 Published November 19, 2021
Actuarial Cost Method:	Entry Age Normal
Asset Valuation Method:	Fair Value
Long-Term Expected Rate of Return:	6.8%
Discount Rate:	6.8%
Salary Increases:	
Wage Inflation	3.0%
Senior/Merit	0.1% - 5.6%
Mortality:	2020 WRS Experience Mortality Table
Post-retirement Adjustments:*	1.7%

*No post-retirement adjustments is guaranteed. Actual adjustments are based on recognized investment return, actuarial experience and other factors. 1.7% is assumed annual adjustments based on the investment return assumption and the post-retirement discount rate. Includes the impact of known Market Recognition Account deferred gains/losses on the liability for dividend payments.

Actuarial assumptions are based upon an experience study conducted in 2021 that covered a three-year period from January 1, 2018 to December 31, 2020. Based on this experience study, actuarial assumptions used to measure the Total Pension Liability changed from prior year, including the discount rate, long-term expected rate of return, post-retirement adjustment, price inflation, mortality and separation rates. The Total Pension Liability for December 31, 2021, is based upon a roll-forward of the liability calculated from the December 31, 2020 actuarial valuation.

A single discount rate of 6.8% was used to measure the Total Pension Liability, as opposed to a discount rate of 7.0% for the prior year. The discount rate is based on the expected rate of return on pension plan investments. Because of the unique structure of the WRS, the 6.8% expected rate of return implies that a dividend of approximately 1.7% will always be paid after reflecting known changes in the Market Recognition Account. For purposes of the single discount rate, it was assumed that the dividend would always be paid.

The projection of cash flows used to determine the single discount rate assumed that plan member contributions will be made at the current contribution rate and that employer contributions will be made at rates equal to the difference between actuarially determined contribution rates and the member rate. Based on these assumptions, the pension plan's fiduciary net position was projected to be available to make all projected future benefit payments (including expected dividends) of current plan members. Therefore, the long-term expected rate of return on pension plan investments was applied to all periods of projected benefit payments to determine the Total Pension Liability.

» *Sensitivity of the Net Pension Liability (Asset) to Changes in the Discount Rate*

The following presents the plan's Net Pension Liability (Asset), calculated using a single discount rate of 6.8, as well as what the plan's Net Pension Liability (Asset) would be if it were calculated using a single discount rate that is one percentage point lower or one percentage point higher (In Millions):

	Discount Rate		
	1% Decrease 5.8%	**Current Discount Rate 6.8%**	**1% Increase 7.8%**
Total Pension Liability	$ 147,566.97	$ 133,787.52	$ 123,868.87
Plan Fiduciary Net Position	141,847.70	141,847.70	141,847.70
Net Pension Liability (Asset)	$ 5,719.27	$ (8,060.18)	$ (17,978.83)

Amounts may not foot due to rounding.

For the WRS, the determination of liabilities also depends on the assumed dividend that is linked to the interest rate used in the liability calculation. Therefore, the following table shows an alternative set of Sensitivity Analysis, which varies the assumed dividend in conjunction with the change in the discount rate. For the liabilities shown below, the assumed dividend was 0.8% for the 5.8% discount rate, 1.7% for the 6.8% discount rate, and 2.7% for the 7.8% discount rate (In Millions):

	Discount Rate		
	1% Decrease 5.8%	**Current Discount Rate 6.8%**	**1% Increase 7.8%**
Total Pension Liability	$ 139,249.23	$ 133,787.52	$ 129,828.54
Plan Fiduciary Net Position	141,847.70	141,847.70	141,847.70
Net Pension Liability (Asset)	$ (2,598.47)	$ (8,060.18)	$ (12,019.16)

Amounts may not foot due to rounding.

7 STATUTORY RESERVES

The following reserves have been established to reflect legal restrictions on the use of pension trust funds.

» Employee Accumulation Reserve

As authorized by Wis. Stats. § 40.04 (4), this reserve includes all required and voluntary member contributions, including contributions made by the employer on behalf of the employee. This reserve may only be used to pay lump sum benefits or transfers to the Annuity Reserve to fund annuities. All legal restrictions on use of this reserve were met during the year. The Employee Accumulation Reserve is fully funded.

Employee Accumulation Reserve balances (In Millions) as of December 31, 2021, were:

	Core	Variable	Total
Employee Required	$ 19,875.9	$ 2,593.4	$ 22,469.3
Employee Additional	248.8	19.3	268.1
Total	$ 20,124.7	$ 2,612.7	$ 22,737.4

Amounts may not foot due to rounding.

» Employer Accumulation Reserve

As authorized by Wis. Stat. § 40.04 (5), this reserve includes all required employer contributions, including contributions for amortization of the unfunded accrued actuarial liability. This reserve may only be used to pay lump sum benefits or transfers to the Annuity Reserve to fund annuities. All legal restrictions on use of this reserve were met during the year. The Employer Accumulation Reserve is 100.00% funded.

Employer Accumulation Reserve balances (In Millions) as of December 31, 2021, were:

	Core	Variable	Police & Firefighters	Total
Employer Accumulation	$ 23,812.4	$ 2,593.4	$ 0.0	$ 26,405.8
Less: Unfunded Actuarial Accrued Liability	0.0	0.0	(0.4)	(0.4)
Net Employer Accumulation	$ 23,812.4	$ 2,593.4	$ (0.4)	$ 26,405.4

Amounts may not foot due to rounding.

» Annuity Reserve

As authorized by Wis. Stat. § 40.04 (6), this reserve includes the present value of all annuities. The present value of new annuities is transferred from the Employee Accumulation Reserve and the Employer Accumulation Reserve to the Annuity Reserve. This reserve may only be used for the payment of annuities and death benefits to annuitants. All legal restrictions on use of this reserve were met during the year. The Annuity Reserve is fully funded.

Annuity Reserve balances (In Millions) as of December 31, 2021, were:

	Core	Variable	Police & Firefighters	Total
Annuity Reserve	$ 69,913.8	$ 5,615.1	$ 1.4	$ 75,530.3

» Market Recognition Account

As authorized by Wis. Stat. § 40.04 (3), this reserve is used to smooth the flow of investment income into the Employee, Employer, and Annuity Reserves and other benefit plans invested in the Core Fund. Under the Market Recognition Account (MRA), all investment income, including realized and unrealized market gains and losses, is deposited into the MRA. At year-end, income equal to the assumed earnings rate is recognized. Any surplus or shortfall in earnings is recognized equally over five years.

Year-end balances in the MRA (In Millions) for the last five years after annual distributions were as follows:

As of:	MRA
December 31, 2017	$ 3,273
December 31, 2018	$ (4,916)
December 31, 2019	$ 5,712
December 31, 2020	$ 11,070
December 31, 2021	$ 17,659

8 CONTINGENCIES, RELATED PARTIES, & LITIGATION

» Loss Contingencies

No loss contingencies occurred during CY 2021.

» Related Party Transactions

During 2021, the Core Fund entered into reverse repurchase agreements with the State Investment Fund (SIF), for which the investment assets are managed by SWIB, as a counterparty. The transactions were governed by a Master Repurchase Agreement and credit exposure is also managed through the transfer of margin between the Core Fund and SIF. As of December 31, 2021, the Core Fund held $3.1 billion in a bilateral reverse repurchase agreement with the SIF. The repurchase agreement was an overnight agreement collateralized with U.S. Treasury securities in the amount of 102%. The Core Fund enters into similar reverse repurchase agreements with other counterparties. The Core and Variable Funds are also participants in the SIF, with investments totaling $3.7 billion and $499 million, respectively, at December 31, 2021. The SIF is a short-term, commingled fund with the investment objective of safety of principal and liquidity while earning a competitive money market rate of return.

» *Litigation*

On March 8, 2019, ETF filed a complaint in Dane County Circuit Court against Vitech. The complaint intends to remedy damages suffered when Vitech breached its contract with ETF by failing to fulfill its promises according to the provisions of the contract. In response to the complaint, Vitech filed a counterclaim against ETF. The case is scheduled for a status conference on November 11, 2022. Any resolution of this dispute is not anticipated to have a material effect on the WRS' financial position.

REQUIRED SUPPLEMENTARY INFORMATION

Wisconsin Retirement System
Schedules of Changes in Net Pension Liability (Asset) and Related Ratios
(In Millions)

Calendar Year Ended, December 31	2021	2020	2019	2018
Total Pension Liability				
Service Cost	$ 2,019.3	$ 1,975.8	$ 1,902.5	$ 1,860.9
Interest on the Total Pension Liability	8,157.5	7,480.7	6,888.1	7,169.7
Difference between Expected and Actual Experience[1]	9,453.1	6,376.7	5,473.3	(4,968.3)
Assumption Changes	1,829.1	0.0	0.0	361.5
Benefit Payments	(6,352.7)	(5,939.4)	(5,646.3)	(5,516.2)
Refunds of Member Contributions	(42.0)	(38.9)	(44.1)	(40.2)
Net Change in Total Pension Liability	15,064.3	9,855.0	8,573.5	(1,132.6)
Total Pension Liability - Beginning	118,723.3	108,868.3	100,294.8	101,427.3
Total Pension Liability - Ending (a)	$ 133,787.5	$ 118,723.3	$ 108,868.3	$ 100,294.8
Plan Fiduciary Net Position				
Employer Contributions [2]	$ 1,164.6	$ 1,133.3	$ 1,046.9	$ 1,030.5
Member Contributions	1,086.8	1,053.2	987.7	973.0
Pension Plan Net Investment Income	21,056.7	16,698.6	19,049.5	(4,049.4)
Benefit Payments	(6,352.7)	(5,939.4)	(5,646.3)	(5,516.2)
Refunds of Member Contributions	(42.0)	(38.9)	(44.1)	(40.2)
Pension Plan Administrative Expense	(31.9)	(33.3)	(34.2)	(31.6)
Other [3]	0.0	0.0	(3.9)	(25.4)
Net Change in Plan Fiduciary Net Position	16,881.4	12,873.6	15,355.7	(7,659.4)
Plan Fiduciary Net Position - Beginning	124,966.4	112,092.8	96,737.1	104,396.5
Plan Fiduciary Net Position - Ending (b)	$ 141,847.8	$ 124,966.4	$ 112,092.8	$ 96,737.1
Net Pension Liability(Asset) - Ending (a) - (b)	$ (8,060.3)	$ (6,243.1)	$ (3,224.5)	$ 3,557.7
Plan Fiduciary Net Position as a Percentage of Total Pension	106.02 %	105.26 %	102.96 %	96.45 %
Covered Employee Payroll	$ 15,780.8	$ 15,359.9	$ 14,832.5	$ 14,301.4
Net Pension Liability(Asset) as a Percentage of Covered Employee Payroll	(51.08)%	(40.65)%	(21.74)%	24.88 %

Immaterial differences may exist between the amounts in this schedule and those reported in the Statement of Changes in Fiduciary Net Position.

Amounts may not foot due to rounding.

[1] Starting with 2015, this item includes the impact of known Market Recognition Account deferred gains/losses on the liability for dividend payments.

[2] Employer contributions shown in the above tables includes Employer Required Contributions in addition to Early Retirement Contributions and Additional Contributions paid by employer on behalf of employee.

[3] Other for 2018 relates to an impairment loss on a capital asset.

Wisconsin Retirement System
Schedules of Changes in Net Pension Liability (Asset) and Related Ratios
(In Millions)

Calendar Year Ended, December 31	2017	2016	2015	2014	2013
Total Pension Liability					
Service Cost	$ 1,842.9	$ 1,814.1	$ 1,787.9	$ 1,757.0	$ 1,745.0
Interest on the Total Pension Liability	6,627.2	6,372.4	6,347.1	6,089.3	5,680.7
Difference between Expected and Actual Experience[1]	4,459.5	150.3	(4,247.3)	437.3	2,659.9
Assumption Changes	0.0	0.0	1,412.0	0.0	0.0
Benefit Payments	(5,211.3)	(5,022.9)	(4,823.6)	(4,540.2)	(4,224.7)
Refunds of Member Contributions	(38.4)	(39.3)	(37.6)	(34.4)	(33.3)
Net Change in Total Pension Liability	7,679.9	3,274.6	438.5	3,708.9	5,827.7
Total Pension Liability - Beginning[2]	93,747.4	90,129.7	89,691.2	85,982.2	80,154.6
Total Pension Liability - Ending (a)	$ 101,427.3	$ 93,404.3	$ 90,129.7	$ 89,691.2	$85,982.2
Plan Fiduciary Net Position					
Employer Contributions[3]	$ 1,017.6	$ 963.1	$ 977.7	$ 987.8	$ 914.7
Member Contributions	965.5	921.9	937.2	941.9	871.3
Pension Plan Net Investment Income	14,875.4	7,273.1	(673.1)	4,891.0	11,347.3
Benefit Payments	(5,211.3)	(5,022.9)	(4,823.6)	(4,540.2)	(4,224.7)
Refunds of Member Contributions	(38.4)	(39.3)	(37.6)	(34.4)	(33.3)
Pension Plan Administrative Expense	(26.1)	(20.4)	(22.7)	(24.0)	(22.9)
Other	0.0	0.0	0.0	0.0	0.0
Net Change in Plan Fiduciary Net Position	11,582.7	4,075.4	(3,642.1)	2,222.0	8,852.4
Plan Fiduciary Net Position - Beginning[4]	92,813.8	88,504.7	92,146.8	89,924.7	81,072.3
Plan Fiduciary Net Position - Ending (b)	$ 104,396.5	$ 92,580.1	$ 88,504.7	$ 92,146.8	$89,924.7
Net Pension Liability(Asset) - Ending (a) - (b)	$ (2,969.1)	$ 824.2	$ 1,625.0	$ (2,455.6)	$(3,942.5)
Plan Fiduciary Net Position as a Percentage of Total Pension	102.93 %	99.12 %	98.20 %	102.74 %	104.59 %
Covered Employee Payroll	$ 13,943.1	$ 13,706.0	$ 13,530.5	$ 13,219.5	$12,884.8
Net Pension Liability(Asset) as a Percentage of Covered Employee Payroll	(21.29)%	6.01 %	12.01 %	(18.58)%	(30.60)%

Immaterial differences may exist between the amounts in this schedule and those reported in the Statement of Changes in Fiduciary Net Position.

Amounts may not foot due to rounding.

1 Starting with 2015, this item includes the impact of known Market Recognition Account deferred gains/losses on the liability for dividend payments.

2 As of calendar year 2017, the Long-Term Disability Insurance (LTDI) program is reported within the Wisconsin Retirement System (WRS). Beginning of year liabilities for 2017 were adjusted by $343,079,422 to reflect the LTDI program.

3 Employer contributions shown in the above tables includes Employer Required Contributions in addition to Early Retirement Contributions and Additional Contributions paid by employer on behalf of employee

4 As of calendar year 2017, the LTDI program is reported within the WRS. Beginning of year net position for 2017 was adjusted by $233,691,533 to reflect the LTDI program.

Wisconsin Retirement System
Schedule of Required Employer Contributions
(In Millions)

Calendar Year Ending December 31,	Actuarially Determined Contributions	Actual Contributions	Contribution Deficiency (Excess)	Covered Payroll	Actual Contributions as a % of Covered Payroll
2013	$905	$905	$0	$12,885	7.02%
2014	977	977	0	13,220	7.39
2015	968	968	0	13,531	7.15
2016	954	954	0	13,706	6.96
2017	1,015	1,015	0	13,943	7.28
2018	1,028	1,028	0	14,301	7.19
2019	1,045	1,045	0	14,832	7.05
2020	1,131	1,131	0	15,360	7.37
2021	1,163	1,163	0	15,781	7.37

Wisconsin Retirement System
Schedule of Investment Returns
Annual Money-Weighted Rate of Return, Net of Investment Expenses

	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012
Core Trust Fund	17.03 %	15.06 %	19.49 %	(3.56)%	15.85 %	8.29 %	(0.63)%	5.44 %	13.18 %	13.40 %
Variable Trust Fund	19.98 %	17.05 %	28.80 %	(7.61)%	23.27 %	10.49 %	(1.11)%	7.24 %	28.78 %	16.94 %

NOTES TO REQUIRED SUPPLEMENTARY INFORMATION

Changes in Benefit Terms and Assumptions related to Pension Liabilities (Assets)

Benefit Terms: There were no recent changes in benefit terms.

Assumptions:

Based on a three year experience study conducted in 2021 covering January 1, 2018 through December 31, 2020, the ETF Board adopted assumption changes that were used to measure the total pension liability beginning with the year-end December 31, 2021, including the following:

- Lowering the long-term expected rate of return from 7.0% to 6.8%
- Lowering the discount rate from 7.0% to 6.8%
- Lowering the price inflation rate from 2.5% to 2.4%
- Lowering the post-retirement adjustments from 1.9% to 1.7%
- Mortality assumptions were changed to reflect updated trends by transitioning from the Wisconsin 2018 Mortality Table to the 2020 WRS Experience Mortality Table.

Based on a three year experience study conducted in 2018 covering January 1, 2015 through December 31, 2017, the ETF Board adopted assumption changes that were used to measure the total pension liability beginning with the year-ended December 31, 2018, including the following:

- Lowering the long-term expected rate of return from 7.2% to 7.0%
- Lowering the discount rate from 7.2% to 7.0%
- Lowering the wage inflation rate from 3.2% to 3.0%
- Lowering the price inflation rate from 2.7% to 2.5%
- Lowering the post-retirement adjustments from 2.1% to 1.9%
- Mortality assumptions were changed to reflect updated trends by transitioning from the Wisconsin 2012 Mortality Table to the Wisconsin 2018 Mortality Table.

Significant methods and assumptions used in calculating Wisconsin Retirement System Actuarially Determined Contributions:

	2021	2020	2019	2018	2017
Valuation Date:	December 31, 2019	December 31, 2018	December 31, 2017	December 31, 2016	December 31, 2015
Actuarial Cost Method:	Frozen Entry Age	Frozen Entry Age	Frozen Entry Age	Frozen Entry Age	Frozen Entry Age
Amortization Method:	Level Percent of Payroll-Closed Amortization Period	Level Percent of Payroll-Closed Amortization Period	Level Percent of Payroll-Closed Amortization Period	Level Percent of Payroll-Closed Amortization Period	Level Percent of Payroll-Closed Amortization Period
Amortization Period:	30 Year closed from date of participation in WRS	30 Year closed from date of participation in WRS	30 Year closed from date of participation in WRS	30 Year closed from date of participation in WRS	30 Year closed from date of participation in WRS
Asset Valuation Method:	Five Year Smoothed Market (Closed)	Five Year Smoothed Market (Closed)	Five Year Smoothed Market (Closed)	Five Year Smoothed Market (Closed)	Five Year Smoothed Market (Closed)
Actuarial Assumptions					
Net Investment Rate of Return:	5.4%	5.4%	5.5%	5.5%	5.5%
Weighted based on assumed rate for:					
Pre-retirement:	7.0%	7.0%	7.2%	7.2%	7.2%
Post-retirement:	5.0%	5.0%	5.0%	5.0%	5.0%
Salary Increases					
Wage Inflation:	3.0%	3.0%	3.2%	3.2%	3.2%
Seniority/Merit:	0.1%-5.6%	0.1%-5.6%	0.1%-5.6%	0.1%-5.6%	0.1%-5.6%
Post-retirement Benefit Adjustments*:	1.9%	1.9%	2.1%	2.1%	2.1%
Retirement Age:	Experience-based table of rates that are specific to the type of eligibility condition. Last updated for the 2018 valuation pursuant to an experience study of the period 2015-2017.	Experience-based table of rates that are specific to the type of eligibility condition. Last updated for the 2018 valuation pursuant to an experience study of the period 2015 - 2017.	Experience-based table of rates that are specific to the type of eligibility condition. Last updated for the 2015 valuation pursuant to an experience study of the period 2012 - 2014.	Experience-based table of rates that are specific to the type of eligibility condition. Last updated for the 2015 valuation pursuant to an experience study of the period 2012 - 2014.	Experience-based table of rates that are specific to the type of eligibility condition. Last updated for the 2015 valuation pursuant to an experience study of the period 2012 - 2014.
Mortality:	Wisconsin 2018 Mortality Table. The rates based on actual WRS experience adjusted for future mortality improvements using the MP-2018 fully generational improvement scale (multiplied by 60%).	Wisconsin 2018 Mortality Table. The rates based on actual WRS experience adjusted for future mortality improvements using the MP-2018 fully generational improvement scale (multiplied by 60%).	Wisconsin 2012 Mortality Table. The rates based on actual WRS experience adjusted for future mortality improvements using the MP-2015 fully generational improvement scale (multiplied by 50%).	Wisconsin 2012 Mortality Table. The rates based on actual WRS experience adjusted for future mortality improvements using the MP-2015 fully generational improvement scale (multiplied by 50%).	Wisconsin 2012 Mortality Table. The rates based on actual WRS experience adjusted for future mortality improvements using the MP-2015 fully generational improvement scale (multiplied by 50%).

*No post-retirement adjustment is guaranteed. Actual adjustments are based on recognized investment return, actuarial experience and other factors. Value is the assumed annual adjustment based on the investment return assumption and the post-retirement discount rate.

Significant methods and assumptions used in calculating Wisconsin Retirement System Actuarially Determined Contributions:

	2016	2015	2014	2013
Valuation Date:	December 31, 2014	December 31, 2013	December 31, 2012	December 31, 2011
Actuarial Cost Method:	Frozen Entry Age	Frozen Entry Age	Frozen Entry Age	Frozen Entry Age
Amortization Method:	Level Percent of Payroll-Closed Amortization Period	Level Percent of Payroll-Closed Amortization Period	Level Percent of Payroll-Closed Amortization Period	Level Percent of Payroll-Closed Amortization Period
Amortization Period:	30 Year closed from date of participation in WRS	30 Year closed from date of participation in WRS	30 Year closed from date of participation in WRS	30 Year closed from date of participation in WRS
Asset Valuation Method:	Five Year Smoothed Market (Closed)	Five Year Smoothed Market (Closed)	Five Year Smoothed Market (Closed)	Five Year Smoothed Market (Closed)
Actuarial Assumptions				
Net Investment Rate of Return:	5.5%	5.5%	5.5%	5.5%
Weighted based on assumed rate for:				
Pre-retirement:	7.2%	7.2%	7.2%	7.2%
Post-retirement:	5.0%	5.0%	5.0%	5.0%
Salary Increases				
Wage Inflation:	3.2%	3.2%	3.2%	3.2%
Seniority/Merit:	0.1%-5.6%	0.1%-5.6%	0.1%-5.6%	0.1%-5.6%
Post-retirement Benefit Adjustments*:	2.1%	2.1%	2.1%	2.1%
Retirement Age:	Experience-based table of rates that are specific to the type of eligibility condition. Last updated for the 2012 valuation pursuant to an experience study of the period 2009 - 2011.	Experience-based table of rates that are specific to the type of eligibility condition. Last updated for the 2012 valuation pursuant to an experience study of the period 2009 - 2011.	Experience-based table of rates that are specific to the type of eligibility condition. Last updated for the 2012 valuation pursuant to an experience study of the period 2009 - 2011.	Experience-based table of rates that are specific to the type of eligibility condition. Last updated for the 2009 valuation pursuant to an experience study of the period 2006 - 2008.
Mortality:	Wisconsin 2012 Mortality Table. The rates based on actual WRS experience projected to 2017 with scale BB to all for future improvements (margin) in mortality.	Wisconsin 2012 Mortality Table. The rates based on actual WRS experience projected to 2017 with scale BB to all for future improvements (margin) in mortality.	Wisconsin 2012 Mortality Table. The rates based on actual WRS experience projected to 2017 with scale BB to all for future improvements (margin) in mortality.	Wisconsin Projected Experience Table - 2005 for women and 90% of the Wisconsin Projected Experience Table - 2005 for men.

*No post-retirement adjustment is guaranteed. Actual adjustments are based on recognized investment return, actuarial experience and other factors. Value is the assumed annual adjustment based on the investment return assumption and the post-retirement discount rate.