

SERS' Market Update

Commonwealth of Pennsylvania
State Employees' Retirement System

March 26, 2020

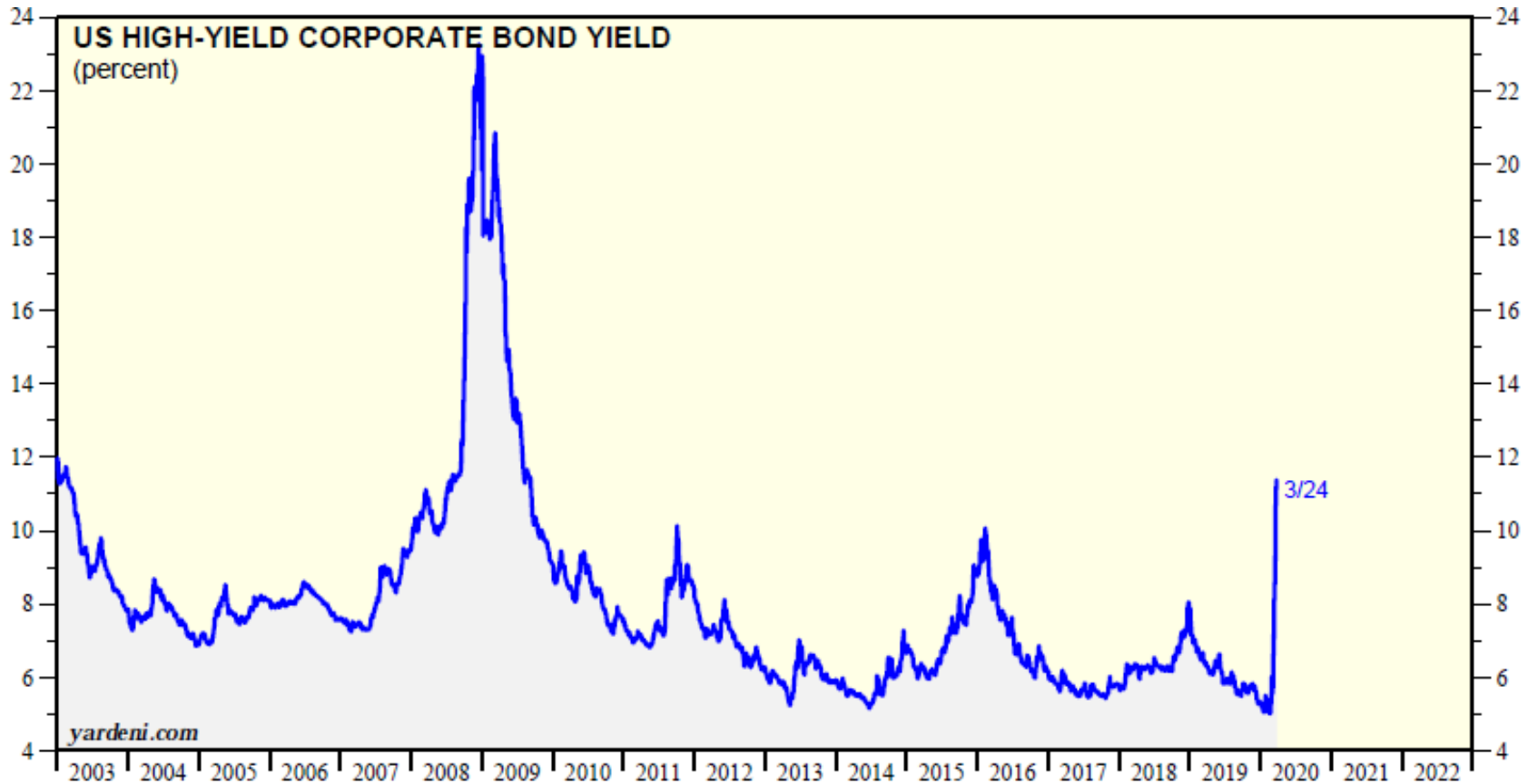


Agenda

- **Capital Markets Update**
- **SERS' Portfolio Update**
- **Investment Recommendations**
- **Securities Lending Update**

Capital Markets Update

Fear Has Gripped Investors as High Yield Spread Widens significantly (as of 3/24/2020)

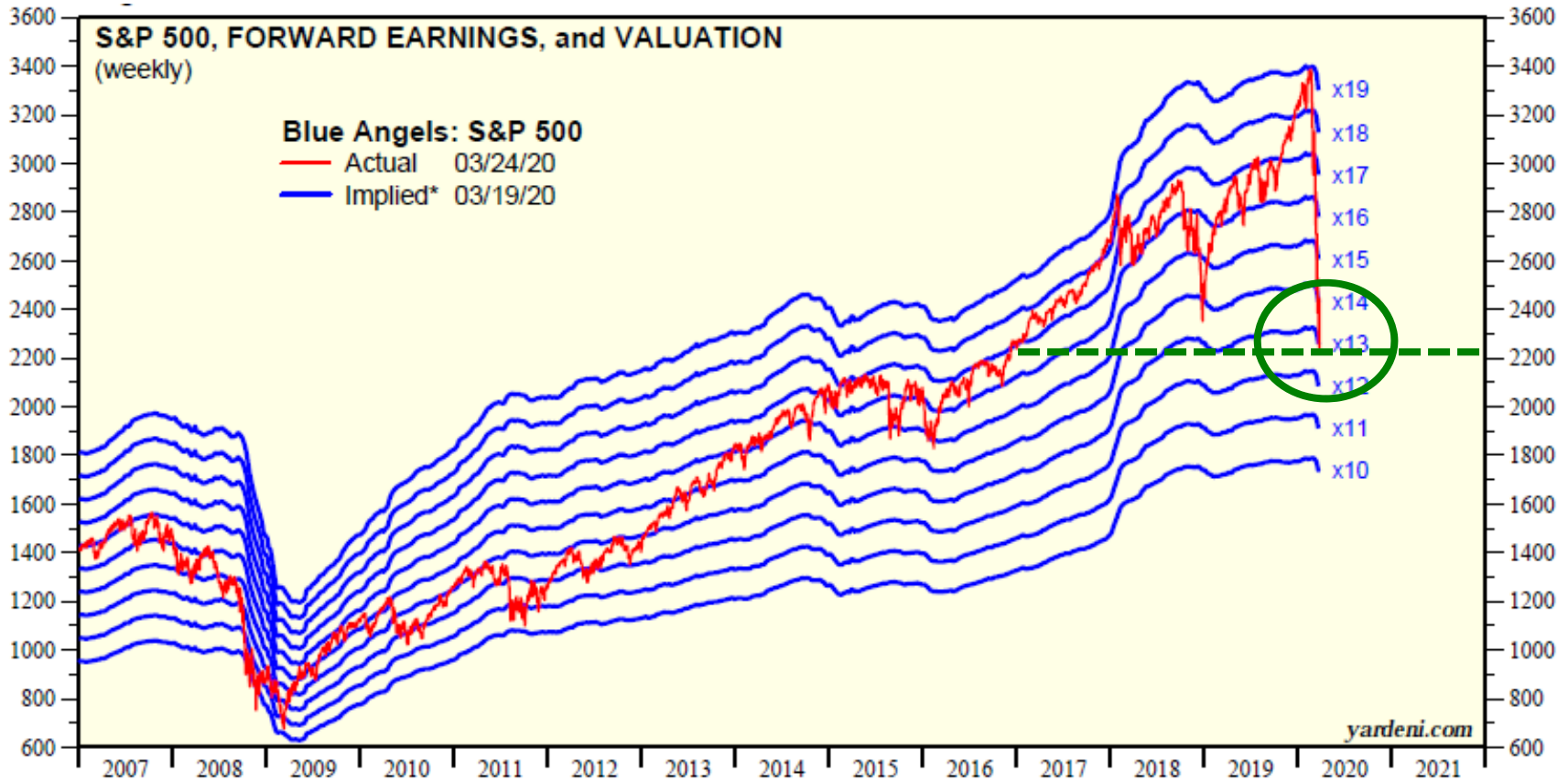


Source: Merrill Lynch.

A Flight to Safety is Present as Recession Fears Mount

Index	YTD Return as of 3/24/20
Russell 3000 Index	-25.16%
MSCI World ex US Net Dividend Index	-28.86%
MSCI EM Net Dividend Index	-27.89%
Bloomberg Barclays US Agg Bond Index	1.37%
Bloomberg Barclays US TIPS Index	2.22%
Bloomberg Barclays 10 Year Bellwethers Index	10.65%
US 3 Month Treasury Bill Index	0.46%
20+ Year Treasury Bond ETF	21.30%

S&P 500 Index Trading at Prices Not Seen Since 2017



* Implied price index calculated using forward earnings times forward P/Es. Weekly data start January 2007.
Source: Standard & Poor's and I/B/E/S data by Refinitiv.

SERS' Portfolio Update

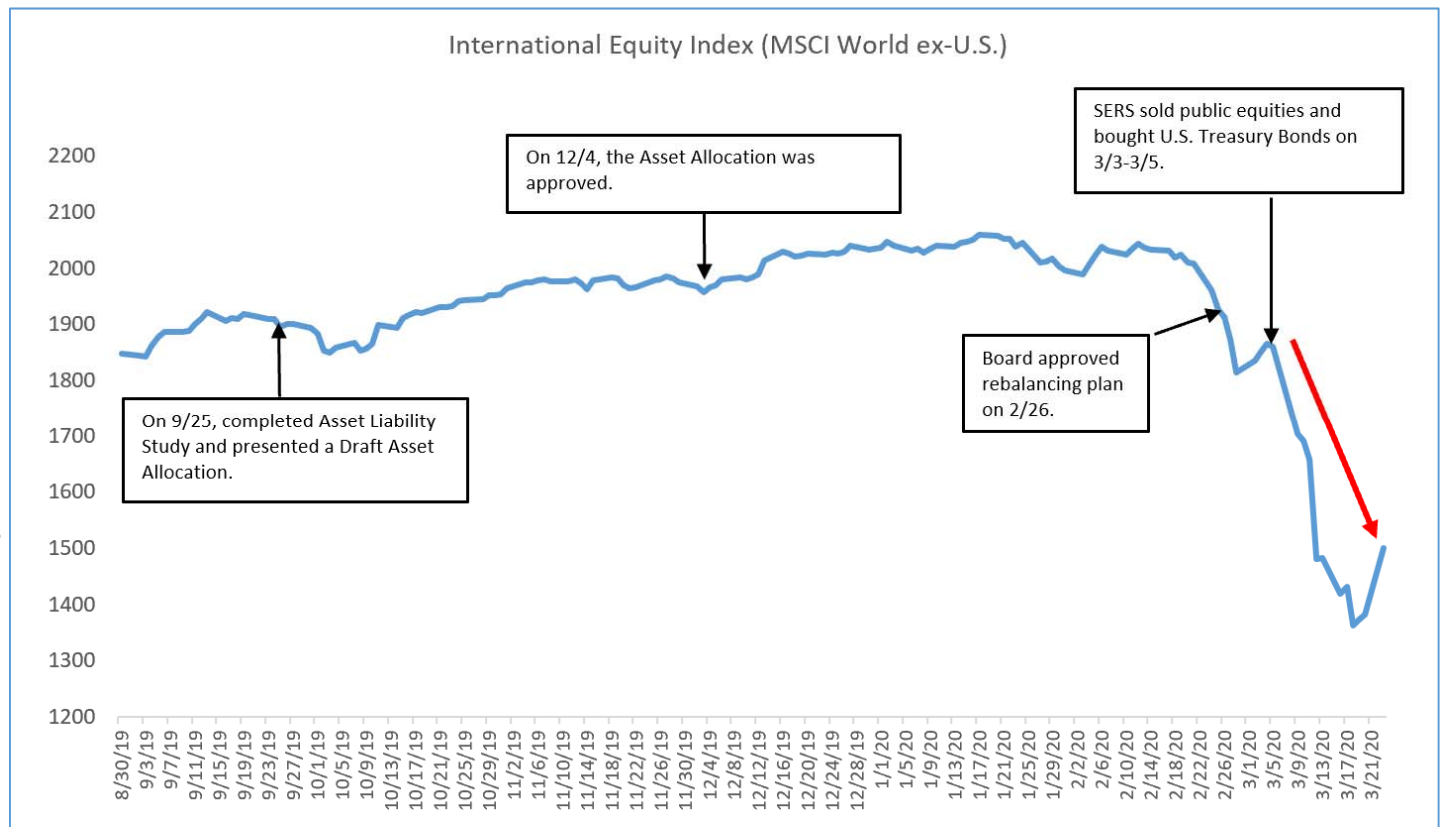
SERS YTD Public Markets Performance (Estimated)

Index	YTD Return as of 3/24/20	SERS Weight	Contribution to Total Fund Return
U.S. Equity - Russell 3000 Index	-25.2%	22.5%	-5.7%
International Dev Mkts Equity - MSCI World ex US Net Dividend Index	-28.9%	10.9%	-3.1%
Emerging Mkts Equity - MSCI EM Net Dividend Index	-27.9%	3.5%	-1.0%
Opportunistic Fixed Income - Estimates from Managers and BNYM	-14.0%	8.7%	-1.2%
Core Fixed Income - Bloomberg Barclays US Agg Bond Index	1.4%	20.6%	0.3%
Inflation Protection - Bloomberg Barclays US TIPS Index	2.2%	4.7%	0.1%
U.S. Treasuries - Bloomberg Barclays 10 Year Bellwethers Index	10.7%	2.5%	0.3%
Cash - U.S. 3 Month Treasury Bill Index	0.5%	2.1%	0.0%
Total Fund YTD Return Estimate			-10.3%

(Excludes Private Markets)

SERS Asset Allocation Implementation Summary

- Board approved rebalance plan on 2/26/20 to sell \$2.85 billion of public equities
- SERS sold 98% of public equities by 3/5/20
- Selling majority of equities by 3/5/20 equates to preventing approximately \$500 million of losses to SERS (red arrow in chart)
- Rebalancing Plan transitions completed on 3/20/20



SERS' Estimated Asset Allocation (as of 3/24/20)

Public Equities are under target and Fixed Income is over target as of 3/24/20.

Asset Class	Current Exposure \$ millions	Current Exposure % of Total Fund	Target %	Over/Under Target %	Range	In/Out of Range
Public Equity						
U.S. Equity	\$5,899.1	22.5%	25.0%	2.5% Under	20% - 30%	In Range
International Equity	\$2,853.3	10.9%	13.0%	2.1% Under	8% - 18%	In Range
Emerging Markets Equity	\$906.2	3.5%	4.0%	0.5% Under	0% - 8%	In Range
Total Public Equity	\$9,658.5	36.9%	42.0%	5.1% Under	n/a	
Total Private Equity	\$3,985.6	15.2%	14.0%	1.2% Over	n/a	
Total Equity	\$13,644.2	52.2%	56.0%	3.8% Under	n/a	
Total Real Estate	\$2,004.2	7.7%	8.0%	0.3% Under	n/a	
Total Private Credit	\$371.4	1.4%	4.0%	2.6% Under	n/a	
Fixed Income						
Core Fixed Income (w/Treasuries)	\$6,056.1	23.1%	22.0%	1.1% Over	n/a	
Opportunistic Fixed Income	\$2,281.4	8.7%	4.0%	4.7% Over	n/a	
Total Fixed Income¹	\$8,339.1	31.9%	26.0%	5.9% Over	21% - 31%	0.9% over top Range
Total Inflation Protection (TIPS)	\$1,231.3	4.7%	4.0%	0.7% Over	1% - 7%	In Range
Cash	\$539.4	2.1%	2.0%	0.1% Over	0% - 7%	In Range
Total Fund	\$26,163.3	100.0%				

¹Total Fixed Income is made up of Core FI and Opportunistic FI with a 22% target to Core FI and a 4% target to Opportunistic FI.
Table excludes .1% exposure to Legacy Hedge Funds.

Recent Cash Flows Support a Slight Overweight to Cash

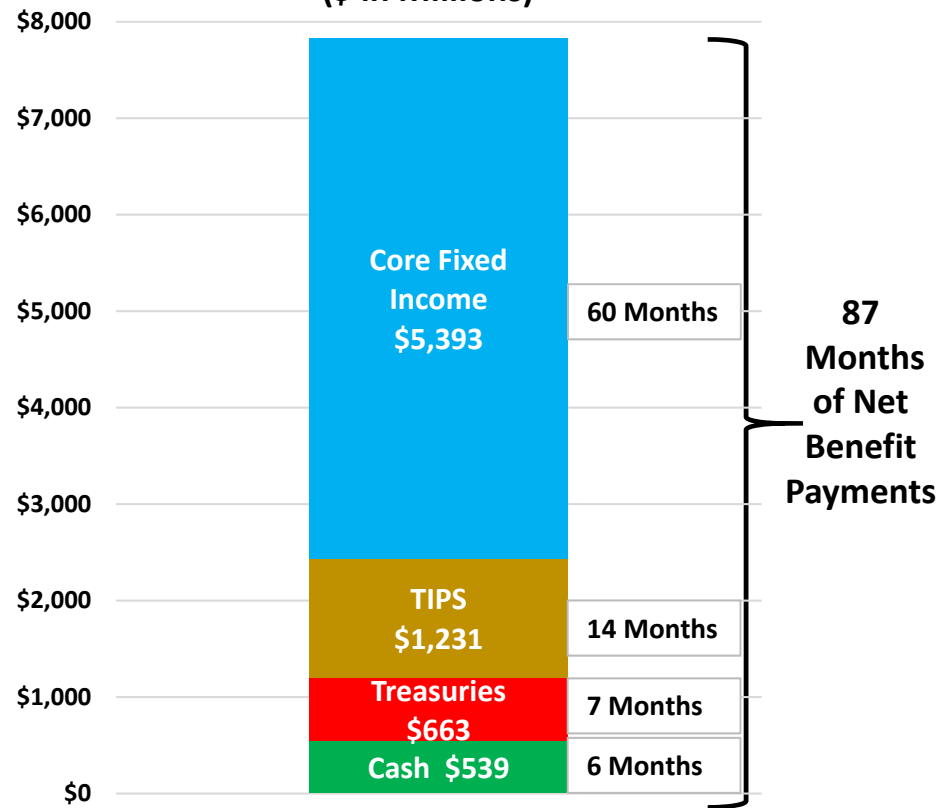
SERS' Actual Cash Flow (\$ in Millions)

	December 2019	January 2020	February 2020
<u>Cash Inflows</u>			
Employer Contributions	173	172	179
Employee Contributions	31	35	31
Private Equity Distributions	63	40	34
Real Estate Distributions	39	6	8
Total Cash Inflows	306	253	252
<u>Cash Outflows</u>			
Benefit Payments & Expense	(283)	(293)	(307)
Private Equity Contributions	(79)	(69)	(46)
Real Estate Contributions	(36)	(7)	(12)
Total Cash Outflows	(398)	(369)	(365)
Net Cash Flows	(92)	(116)	(113)

Source: StepStone and OFA

SERS' Liquid Assets with Low Correlation to Public Equity

Liquidity Chart
 Estimated as of 3/24/2020
 (\$ in Millions)



Investment Recommendations

SERS' Emergency Situations & Rebalancing Policy from Investment Policy Statement

After consulting with Investment Committee Chair, Board Chair, Callan, and SERS' Board Counsel, SERS is making the following investment recommendation to the Investment Committee under the Emergency Situations policy established in the SERS' Investment Policy Statement (12/4/19).

Emergency Situations

The Board delegates authority to the Chief Investment Officer to make investment decisions on behalf of the Board in emergency situations. Emergency situations are defined as those that are unforeseeable and in the absence of action taken, the Fund may be adversely impacted. The Chief Investment Officer shall consult with the Investment Committee Chair and Board Chair prior to executing any emergency actions. In the event such action is taken, the Board will be apprised as soon as practical, but no later than the next scheduled Board meeting.

Rebalancing Policy

The Chief Investment Officer may use index portfolios and cash to rebalance within 90 business days after any liquid asset class breaches its policy range. The Chief Investment Officer shall assess liquid asset class market values relative to policy ranges using the monthly asset allocation report developed by SERS' Office of Finance & Administration. This rebalancing must move market values for these liquid asset classes within their policy allocation ranges. The Chief Investment Officer shall consult with the Investment Committee Chair and Board Chair prior to executing any rebalancing actions.

The Chief Investment Officer shall report all rebalancing actions at the next scheduled Board meeting.




Pages 14-16 Redacted

SERS' Securities Lending Update

Securities Lending

There are 3 types of risk in which SERS may be exposed in a SEC lending program:

1. **Borrower/counter-party risk** – risk the borrower does not return to SERS the securities borrowed. SERS is indemnified by BNY Mellon against this type of risk. BNY Mellon can sell the collateral and use the proceeds to purchase the securities that were not returned.
2. **Operational Risk** – BNY Mellon does not mark-to-market daily (e.g. does not have enough collateral to cover the securities that were loaned). BNY Mellon indemnifies SERS against operational risk.
3. **Collateral Reinvestment risk** – The risk of taking cash collateral and investing or reinvesting in volatile and/or illiquid assets. This is not the case with SERS since it is investing in overnight U.S. government repo (e.g. U.S. Treasury and Agency securities).

	Borrower	Operational	Investment
 Risk	Borrower does not return lent security	Interest or dividends are not posted, delivery fails, failure to adequately mark-to-market, etc. as a result of negligence or misconduct of BNY Mellon	Investment subject to interest rate risk, credit risk, liquidity risk and market risk
 Mitigating Factor	BNY Mellon provides remedy as negotiated in the Securities Lending Authorization Agreement	BNY Mellon provides remedy as negotiated in the Securities Lending Authorization Agreement	Client retains risk
 Controls	<ul style="list-style-type: none"> • Independent due diligence performed • Client approves borrowers for their program • Ongoing periodic review • Diversification • Daily mark-to-market • Borrowing limits • Limited # of borrowers • Contractual borrower default provisions 	<ul style="list-style-type: none"> • Policies and procedures • Contractual settlement and income provisions • Cross-training of personnel • Automatic posting of distributions 	<ul style="list-style-type: none"> • Conservative credit policy and procedures • Dedicated research team • Regular reviews • Oversight committees • Conservative guidelines • Trading and control systems

SERS' Securities Lending

SERS' has a conservative Securities Lending program.

- Limit of \$700 million of securities on loan
- Only accept Cash or U.S. Government and Agency securities as collateral
- Only permit investments in overnight U.S. Government securities in the collateral reinvestment pool
- There have been no instances of borrowers failing to return securities.

Securities Lending – Collateral Type and Lending Limit

BNY MELLON		Global Securities Lending Summary - Collateral Held by Asset Class - Final			Commonwealth of Pennsylvania - SERS	
The Bank of New York Mellon LEI HPFHU00Q28E4N0NFVK49		As of 3/18/2020			Report ID: GSL100F Reporting Currency: USD	
Collateral Type / Asset Class	Number of Loans	Average Days Out	Market Value Securities on Loan	Collateral Held	Collateral Percentage	Collateral Denom.
Cash						
Agencies/Other Gvt	14	139	1,149,561.44	1,173,451.39	102.08%	USD
Corporate	93	20	15,328,338.21	15,731,763.58	102.63%	USD
Equity	1276	66	57,650,552.16	59,825,482.60	103.77%	USD
Exchange Traded	2	1	21,674.00	22,200.00	102.43%	USD
US T-Bonds	5	3	3,227,104.08	3,301,566.83	102.31%	USD
US T-Notes	10	9	6,844,165.48	6,990,840.41	102.14%	USD
U.S. Government Agencies (TriParty)						
US T-Bonds	4	93	2,379,094.27	2,428,099.12	102.06%	USD
US T-Notes	2	2	2,800,862.59	2,858,555.07	102.06%	USD
U.S. Government Debt (Bilateral)						
Corporate	28	26	6,315,477.94	6,476,877.92	102.56%	USD
Equity	2429	73	521,018,961.52	535,602,600.33	102.80%	USD
Exchange Traded	8	40	999,899.93	1,020,822.84	102.09%	USD
U.S. Government Mortgages (TriParty)						
US T-Bonds	6	124	3,709,500.33	3,799,923.75	102.44%	USD
US T-Notes	31	39	21,788,085.26	22,235,952.42	102.06%	USD
US Equities vsBNYM TriParty Bonds						
Equity	57	5	26,254,639.80	27,319,988.68	104.06%	USD
Total US	3965	68	669,487,917.01	688,788,124.92	102.88%	
Cash						
Equity	8	60	1,104,460.16	1,211,265.49	109.67%	USD
Sovereign	2	45	908,178.33	1,108,880.00	122.10%	USD
U.S. Government Debt (Bilateral)						
Equity	18	163	4,507,156.67	5,293,018.88	117.44%	USD
Total Non-US	28	125	6,519,795.16	7,613,164.37	116.77%	
Cash Loans	1410	63	86,234,033.86	89,365,450.30	103.63%	
Non Cash Loans	2583	71	589,773,678.31	607,035,839.00	102.93%	
Total Commonwealth of Pennsylvania - SERS	3993	68	676,007,712.17	696,401,289.30	103.02%	

SERS only accept cash or U.S. Government and Agency securities as collateral from borrowers

SERS has \$700m limit of securities on loan

Securities Lending – Cash Collateral Investments

Detailed holdings of cash collateral reinvestment portfolio

BNY MELLON		Global Securities Lending Statement of Holdings Report As of 3/18/2020				COMMONWEALTH OF PA-SERS Report ID: GSL403 Reporting Currency: USD									
The Bank of New York Mellon LEI HPFHU00Q28E4N0NFVK49															
Security ID	Description	Maturity/Expected			Sector Code	Ratings S&P/Mdy/Fitch	Price	Par Value	Amortized Cost	Market Value	Unrealized Gain/ (Loss)	Book* Yield	Days to Reset / Mat	% of Amt Cost	Not in Bank
		Maturity Date **	Purchase Date	Settle Date											
Repo															
1991361940	TD D (Agency MBS & Pass	03/19/20	03/18/20	03/18/20	0035	100.00	6,165,430	6,165,430	6,165,430	0	0.12	1	6.90%		
1991361929	DEUTSCHE D (Agency MBS &	03/19/20	03/18/20	03/18/20	0035	100.00	20,802,361	20,802,361	20,802,361	0	0.12	1	23.29%		
1991361938	RBC D (Agency MBS & Pass	03/19/20	03/18/20	03/18/20	0035	100.00	20,802,361	20,802,361	20,802,361	0	0.12	1	23.29%		
1991361919	HSBC C (Agency Debentures)	03/19/20	03/18/20	03/18/20	0035	100.00	20,802,361	20,802,361	20,802,361	0	0.11	1	23.29%		
1991361939	CITI D (Agency MBS & Pass	03/19/20	03/18/20	03/18/20	0035	100.00	20,802,361	20,802,361	20,802,361	0	0.10	1	23.29%		
Repo Total:							89,374,874	89,374,874	89,374,874	0	0.11	1	100.06%		
Payable/Receivable															
1000	NR	/NR	/NR				281	281	281	0	0.00	0	0.00%		
1000	NR	/NR	/NR				-53,307	-53,307	-53,307	0	0.00	0	-0.06%		
Payable/Receivable Total:							-53,026	-53,026	-53,026	0	0.00	0	-0.06%		
Grand Total:							89,321,848	89,321,848	89,321,848	0	0.11	1	100.00%		

SERS' cash collateral received from borrowers is invested in overnight U.S. Government and Agency securities

A repurchase agreement (repo) is a form of short-term borrowing for dealers in government securities. In the case of a repo, a dealer sells government securities to investors, usually on an overnight basis, and buys them back the following day at a slightly higher price. This is a collateralized investment. SERS restricts the type of collateral to U.S. Government securities and restricts the tenor of the trade to 1 business day.

Contact

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