PENNSYLVANIA STATE EMPLOYEES' RETIREMENT SYSTEM
DEFERRED COMPENSATION PLAN

Financial Statements
with Required Supplementary Information

December 31, 2019 and 2018

(With Independent Auditors' Report Thereon)

PENNSYLVANIA STATE EMPLOYEES' RETIREMENT SYSTEM
DEFERRED COMPENSATION PLAN

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Independent Auditors' Report

The Members of the Board
Pennsylvania State Employees' Retirement System
Deferred Compensation Plan:

We have audited the accompanying financial statements of the Pennsylvania State Employees' Retirement System Deferred Compensation Plan as of and for the years ended December 31, 2019 and 2018, and the related notes to the financial statements, which collectively comprise the Deferred Compensation Plan's financial statements as listed in the table of contents.

Management's Responsibility for the Financial Statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with U.S. generally accepted accounting principles; this includes 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.

Auditors' Responsibility

Our responsibility is to express an opinion on these financial statements based on our audits. We conducted our audits in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditors' judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditors consider internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion, the financial statements referred to above present fairly, in all material respects, the net position available for benefits of the Pennsylvania State Employees' Retirement System Deferred Compensation Plan as of December 31, 2019 and 2018, and the changes in its net position available for benefits for the years then ended, in accordance with U.S. generally accepted accounting principles.

Other Matters

Required Supplementary Information

U.S. generally accepted accounting principles require that the management's discussion and analysis on pages 3-5 be presented to supplement the financial statements. Such information, although not a part of the financial statements, is required by the Governmental Accounting Standards Board who 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.

KPMG LLP

Harrisburg, Pennsylvania
May 29, 2020

This section presents management's discussion and analysis of the Pennsylvania State Employees' Retirement System Deferred Compensation Plan's (Deferred Compensation Plan) financial statements and the significant events and conditions that affected the operations and performance of the Deferred Compensation Plan during the years ended December 31, 2019, 2018, and 2017.

Overview of the Financial Statements

1. **Financial Statements**. The Deferred Compensation Plan presents Statements of Net Position Available for Benefits as of December 31, 2019 and 2018 and Statements of Changes in Net Position Available for Benefits for the years then ended. These statements reflect resources available for the payment of benefits as of year end, and the sources and uses of those funds during the year.

2. **Notes to Financial Statements**. The notes to financial statements are an integral part of the financial statements and provide additional detailed information to provide a better understanding of the financial statements. The notes discuss, among other things, the Deferred Compensation Plan's organization, contributions, investment options, and how asset values are determined.

Background

The State Employees' Retirement Board (SERB) is the trustee for the Deferred Compensation Plan, an Internal Revenue Code (IRC) Section 457(b) retirement plan for eligible government employees and officers. The Deferred Compensation Plan started as a voluntary tax-deferred supplemental retirement plan but also allows voluntary post-tax contributions through a Roth option. The participants may direct their deferrals among 11 investment options. A third-party administrator (TPA) maintains individual participant records. Investment advisors selected by the SERB manage the Deferred Compensation Plan's investment options. The Deferred Compensation Plan began accepting initial deferrals in 1988.

The investments are composed of primarily three core equity index funds – U.S. Large Company Stock Index Fund that is a Standard & Poor's (S&P) 500 index of large-cap companies, a U.S. Small/Mid Company Stock Index Fund that is an index of domestic mid and small-cap companies, and an International Company Stock Index Fund. The Deferred Compensation Plan also offers a U.S. Bond Index Fund, a Stable Value Fund, a Short-Term Investment Fund, and Self-Directed Brokerage Accounts. Three "Risk Profile Funds" are also available to the participants. These funds are composed of a mix of the equity, cash, and bond core index funds, tailored to a participant's risk profile that allows them to invest in a conservative, moderate, or aggressive portfolio. The Deferred Compensation Plan also offers a 60/40 Balanced Stock & Bond Fund, which uses a mix of the U.S. Large Company Stock Index and the U.S. Bond Index Funds. These portfolios are automatically rebalanced each quarter by the TPA.

(Continued)

Financial Highlights

Net Position Available for Benefits

The net position was $3.9 billion and $3.3 billion as of December 31, 2019 and 2018, respectively, which was an increase of approximately $568 million. In 2017, plan net position was $3.5 billion. Of the three asset classes of equities, bonds, and cash, 54.1% and 50.3% of the total investments are invested in the three core equity funds (large-cap; mid and small-cap; and international equities) as of December 31, 2019 and 2018, respectively. The fixed income portfolios, U.S. Bond Index Fund and Stable Value Fund, accounted for 40.1% and 44.1% of plan net position as of December 31, 2019 and 2018, respectively. The Short-Term Investment Fund accounted for 2.1% of the plan net position available for benefits as of December 31, 2019 and 2018, respectively.

Contributions and Investment Income

Contributions increased to $155.6 million in 2019 from $145.7 million in 2018. Contributions were $135.4 million in 2017.

Net investment income in 2019 was $615.9 million compared to a loss of $114.2 million in 2018. Net investment income was $370.3 million in 2017. The increase in net investment income in 2019 was attributed primarily to higher broad market equity returns as the S&P 500 Index and the Dow Jones U.S. Completion Stock Market Index returned 31.49% and 27.94%, respectively, versus returns of -4.38% and -9.57%, respectively, in 2018. The S&P 500 Index and the Dow Jones U.S. Completion Stock Market Index returned 21.83% and 18.12%, respectively, in 2017.

Program Benefits and Expenses

Benefits paid to participants increased to $112.1 million in 2019 from $107.4 million in 2018. Benefits paid to participants in 2017 were $98.4 million. The election to select a payment is voluntary up to age 70½ and is typically dependent upon the participant's separation from service. The Deferred Compensation Plan offers a variety of payout methods. A majority of participants select a periodic payment either annually, semiannually, quarterly, or monthly. The number of participants receiving payments increased to approximately 9,500 for 2019 from approximately 9,000 for 2018. The number of participants receiving payments in 2017 was approximately 8,300. A 457(b) plan is permitted to accept rollovers from other retirement plans, and to permit rollovers out of the Deferred Compensation Plan into Individual Retirement Accounts (IRAs), 401(k) plans, or other qualified plans. Transfers into the Deferred Compensation Plan were $62.1 and $62.0 million in 2019 and 2018, respectively. Transfers out of the Deferred Compensation Plan were $148.1 and $149.4 million in 2019 and 2018 respectively.

Deferred Compensation Plan participants are responsible for all Deferred Compensation Plan fees. The TPA expenses were $4.6 million in 2019 and $4.4 million in 2018. In 2017, these expenses were $4.2 million. In October 2019, a new TPA contract was enacted and the fees are based on the number of participants in the plan whereas the fees were previously based on both percentage of plan assets and the number of participants.

(Continued)

PENNSYLVANIA STATE EMPLOYEES' RETIREMENT SYSTEM
DEFERRED COMPENSATION PLAN

Management's Discussion and Analysis

December 31, 2019 and 2018

(Unaudited)

Condensed Financial Information

($ millions)

	Net Position				
Assets	**2019**	**Increase (decrease)**	**2018**	**Increase (decrease)**	**2017**
Total receivables	$ 8	$ 2	$ 6	$ 1	$ 5
Total investments	3,889	566	3,323	(169)	3,492
Securities lending collateral pool	—	—	—	(22)	22
Total assets	3,897	568	3,329	(190)	3,519
Liabilities					
Total payables and accrued expenses	2	—	2	—	2
Obligations under securities lending	—	—	—	(22)	22
Total liabilities	2	—	2	(22)	24
Total net position	$ 3,895	$ 568	$ 3,327	$ (168)	$ 3,495

	Changes in Net Position				
Additions	**2019**	**Increase (decrease)**	**2018**	**Increase (decrease)**	**2017**
Net investment income/(loss)	$ 616	$ 730	$ (114)	$ (484)	$ 370
Contributions	155	9	146	10	136
Plan transfers in	62	—	62	(1)	63
Total additions	833	739	94	(475)	569
Deductions					
Benefit payments	112	4	108	10	98
Plan transfers out	148	(1)	149	12	137
Third party and administrative expenses	5	—	5	—	5
Total deductions	265	3	262	22	240
Increase/(decrease) in net position	$ 568	$ 736	$ (168)	$ (497)	$ 329

FINANCIAL STATEMENTS

PENNSYLVANIA STATE EMPLOYEES' RETIREMENT SYSTEM
DEFERRED COMPENSATION PLAN

Statements of Net Position Available for Benefits

December 31, 2019 and 2018

($ thousands)

		2019		2018
Assets:				
Receivables:				
Contributions receivable	$	7,589	$	5,392
Accrued investment income receivables		208		246
Other receivables		128		93
Total receivables		7,925		5,731
Investments:				
Cash and temporary investments		2,710		2,591
Short-term investment fund		81,332		70,823
U.S. bond index fund		445,440		403,335
U.S. large company stock index fund		1,397,701		1,109,041
U.S. small/mid company stock index fund		465,890		372,001
International company stock index fund		243,724		191,621
Stable value fund		1,118,261		1,063,254
Group annuity contract		927		1,034
Self-directed brokerage accounts		133,447		109,487
Total investments		3,889,432		3,323,187
Total assets		3,897,357		3,328,918
Liabilities:				
Participant payables		108		134
Fees payable and accrued expenses		1,478		1,416
Other payables		484		305
Total liabilities		2,070		1,855
Net position available for benefits	$	3,895,287	$	3,327,063

See accompanying notes to financial statements.

PENNSYLVANIA STATE EMPLOYEES' RETIREMENT SYSTEM
DEFERRED COMPENSATION PLAN

Statements of Changes in Net Position Available for Benefits

Years ended December 31, 2019 and 2018

($ thousands)

	2019	2018
Additions:		
Investment income:		
From investing activities:		
Net appreciation/(depreciation) in fair value of investments	$ 604,352	$ (125,981)
Interest	12,847	12,950
Total investing activities income/(loss)	617,199	(113,031)
Less investment expenses	1,263	1,167
Net income/(loss) from investing activities	615,936	(114,198)
From securities lending activities:		
Securities lending income	—	7
Net income from securities lending activities	—	7
Net investment income/(loss)	615,936	(114,191)
Contributions from participants	155,626	145,662
Plan transfers in	62,141	62,034
Total additions	833,703	93,505
Deductions:		
Plan transfers out	148,087	149,417
Benefits and refunds to participants	112,111	107,447
Third party expenses	4,641	4,432
Administrative expenses	640	476
Total deductions	265,479	261,772
Increase/(decrease) in net position	568,224	(168,267)
Net position available for benefits, beginning of year	3,327,063	3,495,330
Net position available for benefits, end of year	$ 3,895,287	$ 3,327,063

See accompanying notes to financial statements.

(1) Organization and Description of the Plan

(a) Program Summary

The following description of the Pennsylvania State Employees' Retirement System Deferred Compensation Plan (Deferred Compensation Plan) provides only general information. Participants should refer to the Plan Document for a more complete description of the Deferred Compensation Plan provisions.

The Deferred Compensation Plan was established by the Commonwealth of Pennsylvania General Assembly on November 6, 1987, through Act 81 and in accordance with Section 457(b) of the Internal Revenue Code (IRC) of 1986, as amended. Under the Deferred Compensation Plan provisions, eligible employees of the Commonwealth of Pennsylvania (commonwealth) may voluntarily elect to contribute a portion of their compensation into the Deferred Compensation Plan through payroll deductions. The commonwealth does not make any contributions to the Deferred Compensation Plan. The Deferred Compensation Plan is included in the commonwealth's financial reports as a pension trust fund.

(b) Contributions

Under the Deferred Compensation Plan provisions, eligible employees may contribute to the Deferred Compensation Plan through payroll deductions. In accordance with Section 457(b) of the IRC, the amount of an individual's annual contributions for 2019 was limited to an amount not to exceed the lesser of $19,000 or 100% of the individual's gross compensation. In 2018, the annual contribution limit was $18,500. Individuals age 50 or over may make an additional "catch-up" contribution. In 2019 and 2018, the additional "catch-up" contribution was $6,000. Special catch-up is allowed for previously missed contributions for participants within three years of normal retirement age. In 2019 and 2018, the deferral limit for special catch-up was $38,000 and $37,000, respectively. Contributions can be made to the Deferred Compensation Plan using either the before-tax method in which amounts are deferred for federal income tax purposes or the Roth option in which contributions are made on an after-tax basis.

Contributions receivable represent amounts withheld from employees' pay but not remitted to the investment managers at December 31. Contributions are credited by the applicable investment managers upon receipt from the commonwealth.

(c) Participant Accounts

Participants electing to contribute to the Deferred Compensation Plan have the option of investing their contributions in any of the following core investments:

- *Short-Term Investment Fund*, which invests in a variety of securities including those issued by the U.S. Treasury, agency securities, short-term corporate debt instruments such as commercial paper, repurchase agreements, and certificates of deposit, is managed by the Commonwealth of Pennsylvania Treasury Department (Treasury Department).
- *U.S. Bond Index Fund*, which is a collective investment fund that invests in investment grade corporate and government issues, mortgage-backed securities, asset-backed securities, and commercial mortgage-backed securities, is managed by Mellon Capital Management Corporation (Mellon).

- *U.S. Large Company Stock Index Fund*, which is a collective investment fund that invests in publicly traded common stocks included in the S&P 500 Index, is managed by Mellon.
- *U.S. Small/Mid Company Stock Index Fund*, which is a collective investment fund that invests in medium and small capitalization components of the U.S. equity market (primarily the portion not covered by the S&P 500 Index), is managed by Mellon.
- *International Company Stock Index Fund*, which is a collective investment fund that invests in international stocks in the European, Australian, and Far East markets, is managed by Mellon.
- *Stable Value Fund*, which is a structure that allows participants an opportunity to gain exposure to fixed income investments without the return volatility normally associated with bond funds because of an associated insurance wrap provider. Participants receive the quarterly agreed-upon crediting rates regardless of actual investment performance.

In addition to the core investments, the Deferred Compensation Plan also offers the following:

- *Aggressive Portfolio Fund*, which is a blend of the core investments, consists of 48% in the U.S. Large Company Stock Index Fund, 20% in the U.S. Bond Index Fund, 20% in the International Company Index Fund, and 12% in the U.S. Small/Mid Company Stock Index Fund.
- *Moderate Portfolio Fund*, which is a blend of the core investments, consists of 40% in the U.S. Bond Index Fund, 36% in the U.S. Large Company Stock Index Fund, 15% in the International Company Index Fund, and 9% in the U.S. Small/Mid Company Stock Index Fund.
- *Conservative Portfolio Fund*, which is a blend of the core investments, consists of 50% in the U.S. Bond Index Fund, 20% in the Short-Term Investment Fund, 17% in the U.S. Large Company Stock Index Fund, 8% in the International Company Index Fund, and 5% in the U.S. Small/Mid Company Stock Index Fund.
- *60/40 Balanced Stock & Bond Fund*, which is a blend of the core investments, consists of 60% in the U.S. Large Company Stock Index Fund and 40% in the U.S. Bond Index Fund.
- *Self-Directed Brokerage Accounts*, which is a mutual fund window whereby a participant may choose to invest in a variety of mutual funds offered through the Charles Schwab Corporation.

Investment income includes the realized and unrealized gains/losses and interest for each of the funds. These funds do not distribute dividends to shareholders. Earnings and dividends on securities held are reinvested. Purchases and sales of securities are recorded on a trade-date basis.

The Pennsylvania State Employees' Retirement System provides certain management and administrative services to the Deferred Compensation Plan on an ongoing basis. During 2019 and 2018, the Deferred Compensation Plan paid approximately $640,000 and $476,000 for those services, respectively. The Deferred Compensation Plan receives $275,000 annually from the third-party administrator (TPA) to cover these costs, which is a reduction of third-party expenses.

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(d) Payment of Benefits

Participants may withdraw the current value of funds contributed to the Deferred Compensation Plan upon termination of employment, death, disability, retirement, or approved unforeseeable emergencies within Deferred Compensation Plan guidelines. Accounts that have no activity in a two-year period and a balance under $5,000 may also be voluntarily distributed.

Upon retirement or termination of service, participants may elect various payout options including lump-sum, equal annual payments, or elect to defer receipt of funds until some future date. Minimum distributions as required by Internal Revenue Service guidelines must commence no later than age 70½ including the Roth option. Rollovers to other qualified retirement plans or IRAs are permitted. All investments are for the exclusive benefit of participants and their beneficiaries.

Upon a participant's death, with certain exceptions, any amount due under the participant's account is paid to the beneficiary or the estate. Distributions to participants are recorded at the time withdrawals are made from participant accounts.

(2) Summary of Significant Accounting Policies

(a) Basis of Accounting in Preparing Financial Statements

The financial statements of the Deferred Compensation Plan are prepared on the accrual basis of accounting under which deductions are recorded when the liability is incurred, additions are recorded in the accounting period in which they are earned and become measurable, and investment purchases and sales are recorded as of their trade date.

(b) Use of Estimates

Management of the Deferred Compensation Plan has made certain estimates and assumptions relating to the reporting of assets and liabilities and the disclosure of contingent assets and liabilities to prepare these financial statements in conformity with accounting principles generally accepted in the United States of America. Actual results could differ from those estimates.

(c) Valuation of Investments

The Short-Term Investment Fund is valued at cost, which approximates fair value. The U.S. Bond Index Fund, U.S. Large Company Stock Index Fund, U.S. Small/Mid Company Stock Index Fund, International Company Stock Index Fund, and Self-Directed Brokerage Accounts are valued based on quoted redemption values on the last business day of the calendar year, which represents fair value.

The Stable Value Fund uses a fund manager to oversee the two main components to its investment strategy. The first component addresses building a diversified investment portfolio of high-quality fixed income securities with the second component maintaining an insurance wrap provider. This second component provides the stability of the return stream by smoothing investment returns over time. The Deferred Compensation Plan mitigates risk by having the fund manager allocate across six different investment managers and six insurance wrap providers. Stable Value Fund is valued at net asset value (NAV), which approximates fair value. NAV for the Stable Value Fund represents the consolidated values of the multiple managers that were hired by the fund manager.

The group annuity contract, which is no longer offered to participants as an investment option, is valued at contract value, which approximates fair value. Contract value for the group annuity contract represents contributions made under the contract, plus earnings, less payments made to retirees and terminated participants.

(d) Reclassification

Certain 2018 balances have been reclassified to conform to the 2019 presentation. The reclassifications did not impact the net position.

(3) Agreement with Third-Party Administrator

The State Employees' Retirement Board (SERB) selected Great-West Life & Annuity Insurance Company (Great-West) as the Deferred Compensation Plan TPA. Empower Retirement is the brand name for Great-West's services division. In October 2019, a new contract was negotiated with Great-West, which resulted in a change in the third-party administration fee.

- Third-party administration fee – From January through September 2019, the fee that was charged was a blend of a flat fee per participant and a basis point fee on participants' asset values. A $24.00 annual fee and 0.07% was charged to each participant during that time period. Effective October 2019, the flat fee increased to $59.50, with no basis point fees being charged on a participant's asset balance.
- Investment management fee – This charge is assessed monthly on the value of all accounts in the Deferred Compensation Plan. The fee varies depending on the type of investment. Manager fees ranged from 0.00% to 0.305%. This fee is assessed against the account of each participant proportionately according to the value of each individual account.
- Investment advice fee – Great-West, through its subsidiary Advised Assets Group LLC, provides participants with online advisory tools and services based upon the level of involvement desired in managing their accounts. Guidance is offered at no additional cost. Advice is offered for an annual fee of $25.00. All advice fees are assessed quarterly. Managed accounts provide ongoing professional asset management at the individual participant level. Plan participants receive a personalized and strategically designed retirement portfolio that is automatically managed quarterly. The managed account fee structure is asset based and ranged from 0.15% to 0.45%.

(4) Investments

(a) Program Overview

The Deferred Compensation Plan's core investments are managed by three fund managers. At December 31, 2019 and 2018, one fund manager, Mellon, managed approximately 65.6% and 62.5%, respectively, of the Deferred Compensation Plan total investment portfolio. There is also concentration in the fixed income type of investment. The fixed income portfolios, which consist of the U.S. Bond Index Fund and the fixed income investments within the Stable Value Fund, made up 40.2% and 44.1% of the Deferred Compensation Plan total investment portfolio as of December 31, 2019 and 2018, respectively. These concentrations are solely determined by the participants' elections to invest in the available investment options selected by the SERB.

(b) Fair Value Hierarchy

The fair value hierarchy, which contains three levels, is based on the valuation inputs used to measure an asset's fair value. Level 1 inputs are quoted prices in active markets for identical assets or liabilities. Level 2 inputs are quoted prices for similar assets or liabilities in active markets, quoted prices for identical or similar assets or liabilities in markets that are not active, or other than quoted prices that are observable. Level 3 inputs are unobservable inputs used to measure fair value if relevant observable inputs are not available for the asset or liability at the reporting date.

Collective investment funds and self-directed brokerage accounts are reported at fair value based on the Deferred Compensation Plan's ownership percentage of underlying investments as of the last business day of the calendar year and are categorized as Level 1. The collective investment funds comprise two U.S. equity funds, one international equity fund, and one U.S. bond fund. Using a mix of these funds, the Deferred Compensation Plan offers a balanced fund and three risk profile funds, aggressive, moderate, and conservative.

The Stable Value Fund is a multi-manager and multi-insurance wrap set-up and is not valued within the fair value hierarchy. The Stable Value Fund is valued at Net Asset Value (NAV), which approximates fair value. NAV for the Stable Value Fund represents the consolidated values of the multiple managers that were hired by the fund manager.

The Deferred Compensation Plan also has investments that are not measured at fair value or NAV. The Short-Term Investment Fund (STIF) and commonwealth Treasury Department's STIF are valued at cost plus accrued interest, which approximates fair value. The group annuity contract, which is no longer offered to participants, is valued at contract value, which approximates fair value. Contract value for the group annuity contract represents contributions made under the contract, plus earnings, less payments made to retirees and terminated participants.

The Deferred Compensation Plan has the following recurring fair value, NAV, and other measurements as of December 31, 2019 and 2018:

	2019 ($ thousands)			
	Level 1 Fair value	NAV	Other	Total
Cash and temporary investments	$ —	$ —	$ 2,710	$ 2,710
Short-term investment fund	—	—	81,332	81,332
Collective investment funds:				
U.S. bond index fund	445,440	—	—	445,440
U.S. large company stock index fund	1,397,701	—	—	1,397,701
U.S. small/mid company index fund	465,890	—	—	465,890
International company stock index fund	243,724	—	—	243,724
Stable value fund	—	1,118,261	—	1,118,261
Group annuity contract	—	—	927	927
Self-directed brokerage accounts	133,447	—	—	133,447
Total	$ 2,686,202	$ 1,118,261	$ 84,969	$ 3,889,432

	2018 ($ thousands)			
	Level 1 Fair value	NAV	Other	Total
Cash and temporary investments	$ —	$ —	$ 2,591	$ 2,591
Short-term investment fund	—	—	70,823	70,823
Collective investment funds:				
U.S. bond index fund	403,335	—	—	403,335
U.S. large company stock index fund	1,109,041	—	—	1,109,041
U.S. small/mid company index fund	372,001	—	—	372,001
International company stock index fund	191,621	—	—	191,621
Stable value fund	—	1,063,254	—	1,063,254
Group annuity contract	—	—	1,034	1,034
Self-directed brokerage accounts	109,487	—	—	109,487
Total	$ 2,185,485	$ 1,063,254	$ 74,448	$ 3,323,187

(c) Concentration of Credit, Custodial Credit, Credit, Interest Rate, and Foreign Currency Risk

The Deferred Compensation Plan cash and temporary investments, Short-Term Investment Fund, Stable Value Fund, and U.S. Bond Index Fund are subject to various risks. Among these risks are concentration of credit risk, custodial credit risk, credit risk, interest rate risk, and foreign currency risk. Each of these risks are discussed below.

Concentration of credit risk is the risk of loss attributed to the magnitude of investment in a single issuer. As of December 31, 2019, and 2018, the Deferred Compensation Plan had no single issuer that exceeded 5% of total investments. Investments issued or explicitly guaranteed by the U.S. government and investments in mutual funds, external investment pools, and other pooled investments were excluded.

Custodial credit risk is the risk that, in the event of the failure of the counterparty to a transaction, the Deferred Compensation Plan would be unable to recover the value of investment or collateral securities that are in the possession of an outside party. In accordance with the contractual relationship between the commonwealth Treasury Department and its custodial agent, where securities are used as evidence of the investment, these securities are held by the custodian in book-entry form. These securities are defined as insured or registered investments for which the securities are held by the agent in the Deferred Compensation Plan's name, and therefore have a minimal level of custodial credit risk losses. All remaining investments do not have securities that are used as evidence of the investments.

Credit risk is the risk that an issuer or the counterparty to an investment will not fulfill its obligations. The credit risk of a debt instrument is measured by nationally recognized statistical rating agencies such as Moody's Investor Services (Moody's), S&P, and Fitch Ratings (Fitch).

The Deferred Compensation Plan's proportionate share of the underlying investments of the U.S. Bond Index Fund, which is a collective investment fund, are included in the credit and interest rate risk tables below. The Deferred Compensation Plan's interest in the U.S. Bond Index Fund was 15.7% representing $445.4 million and 14.9% representing $403.3 million at December 31, 2019 and 2018, respectively.

For securities exposed to credit risk in the fixed income investments of the Deferred Compensation Plan, the following tables disclose aggregate fair value, by the least favorable credit rating issued using Moody's, S&P, and Fitch credit ratings at December 31, 2019 and 2018:

Debt Securities Exposed to Credit Risk (2019)
($ thousands)

	AAA	AA	A	BAA	BA and below	Short-term investments[1/]	Total exposed to credit risk[2/]
Mortgage-backed securities	$ 7,644	$ 125,855	$ —	$ 217	$ —	$ —	$ 133,716
Corporates	796	7,101	38,844	59,452	4,056	—	110,249
Short-term investments[1/]	—	—	—	—	—	86,265	86,265
Sovereign debt	7,910	1,473	2,423	3,950	1,175	—	16,931
Agencies	217	1,983	595	415	17	—	3,227
Asset-backed securities	1,848	52	—	—	—	—	1,900
Total	$ 18,415	$ 136,464	$ 41,862	$ 64,034	$ 5,248	$ 86,265	$ 352,288

Debt Securities Exposed to Credit Risk (2018)
($ thousands)

	AAA	AA	A	BAA	BA and below	Short-term investments[1/]	Total exposed to credit risk[2/]
Mortgage-backed securities	$ 6,739	$ 119,023	$ —	$ —	$ —	$ —	$ 125,762
Corporates	590	6,568	32,934	53,048	3,005	—	96,145
Short-term investments[1/]	—	—	—	—	—	74,027	74,027
Sovereign debt	8,288	1,957	2,124	4,090	27	—	16,486
Agencies	269	2,096	471	321	21	—	3,178
Asset-backed securities	2,028	55	—	—	—	—	2,083
Total	$ 17,914	$ 129,699	$ 35,529	$ 57,459	$ 3,053	$ 74,027	$ 317,681

1/ Represents investments in the commonwealth Treasury Department's STIF and Short-Term Investment Fund. This comprises short-term, investment grade securities, which are mainly U.S. Treasuries, agencies, or repurchase agreements. It also comprises short-term assets in the U.S. Bond Index Fund from the Statements of Net Position Available for Benefits.

2/ Debt securities exposed to credit risk and U.S. government guaranteed securities, as noted in the subsequent paragraph, comprises cash and temporary investments, the Short-Term Investment Fund and the U.S. Bond Index Fund from the Statements of Net Position Available for Benefits.

Obligations explicitly guaranteed by the U.S. government (treasuries and Government National Mortgage Association securities) with a fair value of $177 million and $159 million as of December 31, 2019 and 2018, respectively, are not included in the preceding tables because they are not considered to have credit risk.

Interest rate risk is the risk that will adversely affect the fair value of an investment, should market interest rates rise or fall. Option-adjusted duration is the measure of the portfolio's exposure to changes in interest rates. The following table discloses the interest rate types and durations of the fixed income investments of the Deferred Compensation Plan as of December 31, 2019 and 2018:

Debt Option-Adjusted Durations
($ thousands)

	2019		2018	
	Fair value	**Option-adjusted duration**	**Fair value**	**Option-adjusted duration**
Collective investment funds	$ 443,217	5.9	$ 402,722	5.9
Short-term investments[1/]	86,265	0.1	74,027	0.1
Total[2/]	$ 529,482		$ 476,749	

[1/] Represents investments in the commonwealth Treasury Department's STIF and Short-Term Investment Fund. This comprises short-term, investment grade securities, which are mainly U.S. Treasuries, agencies, or repurchase agreements, and also includes insignificant investments in cash, receivables, and payables. The investments are pooled together by utilization of the commonwealth Treasury Department's STIF, and the Deferred Compensation Plan recognizes its respective allocation.

[2/] Total fair values of the fixed income sector comprises cash and temporary investments, the Short-Term Investment Fund, and the U.S. Bond Index Fund from the Statements of Net Position Available for Benefits.

The Deferred Compensation Plan prohibits investments by the manager in the active bond portfolio in the following categories: real estate, Real Estate Investment Trust issues, mortgages (mortgage pass-throughs are exempt), secured term loans, oil and gas production properties, convertible or preferred stock, private placements (other than corporate debt purchased pursuant to SEC Rule 144A that has registration rights with the SEC), loaning of money or securities, hypothecating of any assets in the portfolio, interest and principal only strips, inverse floaters, and inverse interest-only securities.

Foreign currency risk is the risk that changes in the exchange rates will adversely affect the fair value of an investment. The International Company Stock Index Fund seeks to track more than 1,000 foreign stocks representing established companies in 21 countries located in Western Europe and the Pacific Rim. Since the International Company Stock Index Fund is a collective investment fund, the Deferred Compensation Plan is indirectly exposed to foreign currency risk through those underlying securities.

(5) Derivative Financial Instruments

The Deferred Compensation Plan, through investments in collective investment funds trusteed by The Bank of New York Mellon (BNY Mellon) and managed by employees of Mellon (in their capacities as dual officers of BNY Mellon), indirectly holds certain derivative financial instruments. A derivative is a risk shifting agreement, the value of which is derived from the value of an underlying asset. The underlying asset could be a physical commodity, an interest rate, a company's stock, a stock index, a currency, or virtually any other tradable instrument upon which two parties can agree. The derivatives most commonly used by Mellon include currency forwards, futures, options, and swaps. The Deferred Compensation Plan's exposure to these instruments was not significant as of December 31, 2019 and 2018. The collective investment funds that the Deferred Compensation Plan is invested in currently utilize the following derivative instruments:

- U.S. Large Company Stock Index Fund – stock index futures
- U.S. Small/Mid Company Stock Index Fund – stock index futures
- International Company Stock Index Fund – stock index futures, currency forwards

These instruments are used in the investment management of the collective funds to the extent that their use is consistent with the specific collective fund's objective. Derivatives are viewed within the context of the collective fund's total portfolio. Mellon has instituted policies and procedures designed to ensure that derivative transactions are in keeping with the overall strategy and that such transactions are properly reviewed and monitored.

Mellon may take long or short positions in derivative instruments for, but not limited to, the following purposes: to create or hedge required exposure; to create or hedge model driven recommended exposure; as an adjustment to asset exposures within the parameters set in the collective fund's investment instructions and guidelines; to achieve transactional efficiency; to adjust the duration of a fixed income portfolio; if applicable, to achieve the appropriate degree of leverage, as stated in the collective fund's investment instructions and guidelines; and to facilitate meeting the collective fund's objectives.

As an advisor to these funds, Mellon evaluates the risks associated with derivatives in these collective funds. SERS monitors the risks related to derivatives and monitors Mellon's evaluation of risks by reviewing Mellon financial statements, exposure reports, and holdings reports on an ongoing basis.

Some of the risks associated with the use of derivatives include the following:

Market Risk: Market risk represents the risk of adverse movements in markets (including asset prices, volatility, changes in yield curve, implied volatility, or other market variables) for the derivatives or the underlying assets, reference rate or index to which the derivative instrument relates. Such risk is created by holding any security, physical, or derivative, which creates exposure to movements in process of a security or market. Additionally, some derivatives involve economic leverage, which could increase the volatility of these investments as they may fluctuate in value more than the underlying instrument. Mellon assesses the risk associated with derivatives in the context of the collective fund's total portfolio, taking into account the effective exposure of derivative instruments.

Liquidity Risk: Two types of liquidity risk are generally faced in derivative activities. The first is market liquidity risk, which applies to all investments. This is the risk that positions cannot easily be sold or unwound due to inadequate market depth or disruptions in the marketplace. The second is portfolio liquidity risk, which is the risk that there are insufficient funds in the portfolio to meet margin calls and other financial obligations resulting from derivative activities. Mellon has established restrictions and processes to assist with minimizing the impact of liquidity risk on the collective fund's portfolio.

Counterparty Risk: Counterparty risk is the risk that a counterparty (the party with whom a derivative contract is made) will fail to perform contractual obligations under a contract. This is also sometimes referred to as credit risk. Mellon has established guidelines and procedures designed to limit the impact of counterparty risk. The creditworthiness of counterparties is evaluated prior to approval and counterparty exposure and creditworthiness is reviewed regularly.

Operational Risk: Operational risk is the risk that deficiencies in the effectiveness and accuracy of the information systems or internal controls will result in a material loss. This risk is associated with human error, systems failures, inadequate procedures, and internal management controls. For example, there is risk that the valuation system incorrectly calculates a price for a derivative or its equivalent exposure.

The Deferred Compensation Plan offers participants the ability to invest in a Stable Value Fund, which is a Synthetic Guaranteed Investment Contract (SGIC). The SGIC provides a guaranteed crediting rate based on the underlying bond portfolio and is adjusted quarterly. For 2019, the annualized net-of-fee crediting rates were 2.439% for the first quarter, 2.522% for the second quarter, 2.570% for the third quarter, and 2.593% for the fourth quarter. For 2018, the annualized net-of-fee crediting rates were 2.164% for the first and second quarter, 2.293% for the third quarter, and 2.421% for the fourth quarter. The value of the underlying investments of the SGIC at December 31, 2019 was $1,118 million and the book value was $1,099 million. The value of the underlying investments of the SGIC at December 31, 2018 was $1,063 million and the book value was $1,077 million. In 2019, the book value – which was the total cost of the investment (amount paid at time of purchase plus or minus any additional deposits or withdrawals) plus accrued interest – exceeded the underlying investment value.

(6) Tax Qualification Status

According to the U.S. Treasury Department, the Deferred Compensation Plan is an eligible deferred compensation plan pursuant to IRC Section 457(b). Therefore, compensation deferred under the Deferred Compensation Plan, including income attributable to the deferred compensation, will be includible in gross income for the taxable year or years in which amounts are paid or otherwise made available to a participant or a participant's beneficiary in accordance with the terms of the Deferred Compensation Plan.

(7) Risks and Uncertainties

The Deferred Compensation Plan, as directed by participants, may invest in various types of investment securities. Investment securities are exposed to various risks, such as interest rate, market, and credit risk. Due to the level of risk associated with certain investment securities, it is possible that changes in the values of investment securities may occur in the near term and that such change could materially affect the amounts reported in the statements of net position available for benefits.

(8) Related Parties

Certain members of the SERB are participants in the Deferred Compensation Plan.

(9) Subsequent Events

(a) Changes to Investment Options

During 2019, the SERB moved to streamline and simplify the Deferred Compensation Plan's investment option choices. Starting in January 2020, target date funds were added, which also became the default investment option. In addition, four funds were eliminated including the 60/40 Balanced Stock & Bond Fund as well as the aggressive, moderate, and conservative risk profile funds. The SERB also added the Global Non-U.S. Stock Index Fund (includes Canada and emerging markets) to replace the International Company Stock Index Fund (excludes Canada and emerging markets).

(b) Change in Fair Value of Investment Portfolio Due to COVID-19

In March 2020, the World Health Organization declared COVID-19 a global pandemic as a result of the virus' widespread impact on multiple regions of the world. The full extent and duration of the impact of COVID-19 on the Deferred Compensation Plan's operations and financial performance is currently unknown, and depends on future developments that are uncertain and unpredictable, including the duration and spread of the pandemic, its impact on capital and financial markets on a macro-scale, and any new information that may emerge concerning the severity of the virus, its spread to other regions, and the actions to contain the virus or treat its impact, among others.

(c) Coronavirus Aid, Relief, and Economic Security Act (CARES Act)

On April 3, 2020, the SERB approved COVID-19-related distributions from SERS Deferred Compensation Plan accounts, consistent with the CARES Act. This allows participants to take early distribution withdrawals on a tax-penalty-free basis from their personal accounts to help them meet their immediate needs with the option to repay that money within three years. Participants who qualify may request a distribution from their account of up to $100,000 or the balance of their account, whichever is less.

The CARES Act also waived required minimum distributions from the Deferred Compensation Plan for 2020, regardless of whether the participant experienced a COVID-19-related event. As a result, no required minimum distribution payments will be made for the remainder of the year, and any required minimum distributions already issued may be rolled back into the Deferred Compensation Plan within 60 days of the distribution.