Investment Section

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PSERS
Partners for your Future

COMMONWEALTH OF PENNSYLVANIA
PUBLIC SCHOOL EMPLOYEES' RETIREMENT SYSTEM

James H. Grossman Jr., CPA, CFA
Chief Investment Officer

October 27, 2017

Dear Members of The PSERS Board of Trustees:

It is a privilege to present to you the Investment Section of the Comprehensive Annual Financial Report for the fiscal year ended June 30, 2017.

Authority and Fiduciary Standard

The Board has the responsibility to invest funds of the System in accordance with guidelines and limitations set forth in the Code and other applicable state law. As fiduciaries, the members of the Board and Staff must act solely in the interests of the members of the System and for the exclusive benefit of the System's members. In performance of their duties, the members of the Board and Staff who have been delegated with investment authority shall be held to the Prudent Investor Standard.

The Prudent Investor Standard, as articulated in the Code, means "the exercise of that degree of judgment, skill, and care under the circumstances then prevailing which persons of prudence, discretion, and intelligence who are familiar with such matters exercise in the management of their own affairs not in regard to speculation, but in regard to the permanent disposition of the fund, considering the probable income to be derived therefrom as well as the probable safety of their capital."

The Prudent Investor Standard requires a trustee to act prudently and with caution, discretion, loyalty, and care but does not restrict the assets in which the Board can invest. Under the Prudent Investor Standard, which recognizes modern portfolio theory, the Board's investment and management decisions with respect to individual assets shall be considered in the context of the portfolio as a whole and as part of an overall investment strategy, and not in isolation. No specific investment or course of action, taken alone, shall be considered inherently prudent or imprudent. This Standard recognizes the trade-off between risk and return.

Policies and Objectives

The Board is responsible for the formulation of investment policies for the System. Staff is responsible for the implementation of those investment policies. The overall investment objectives of the System are as follows:

Return Objectives – the System has a return objective of meeting or exceeding the targeted actuarial rate of return of 7.25% over the long-term (i.e. 25 to 30 years). In addition, the Board has the following broad objectives:

1. The assets of the System shall be invested to maximize the returns for the level of risk taken; and,
2. The System shall strive to achieve a net of fee return that exceeds the Policy Index (the Policy Index is a custom benchmark, based on the Board-established asset allocation structure that seeks to generate a return that meets the actuarial rate of return assumption).

Risk Objectives

1. The assets of the System shall be diversified to minimize the risk of losses at the portfolio level and within any one asset class, investment type, industry or sector distribution, maturity date, or geographic location. Failure to do so could impair the System's ability to achieve its funding and long-term investment goals and objectives; and,
2. The System's assets shall be invested so that the probability of investment losses (as measured by the Policy Index) in excess of 15% in any one year is no greater than 2.5% (or two standard deviations below the expected return).

To achieve these objectives, the Board meets during the second half of the calendar year to review the overall asset allocation plan and investment policies for the System. Implementation of investment policies is accomplished through the use of external investment management firms, who act as agents for the System and through the use of internal investment managers. The Board also retains various investment consultants to assist with the formulation and implementation of investment policies.

Operations

The Board, via its Investment Committee, provides oversight of investment activities. The Investment Committee generally conducts six meetings per year and may meet more frequently as needed. Investment Office professionals, as well as external investment advisors, Investment Accounting staff, and Internal Audit staff, assist the Board in achieving investment objectives and monitoring compliance with investment policies. For the fiscal year ended June 30, 2017, Aon Hewitt Investment Consulting, Inc. (Aon Hewitt) served as the general investment consultant to assist the Board and Staff in formalizing investment objectives, establishing an asset allocation plan, conducting investment advisor searches, reviewing performance, and commenting on compliance with investment policies. In addition, the Board retained Aksia, LLC as an absolute return consultant, Courtland Partners, Ltd. as a real estate consultant, and Portfolio Advisors, LLC as an alternative investment consultant. Alternative investments generally consist of investments in private debt, private equity, and venture capital limited partnerships. Investment Office professionals implement the investment decisions within the guidelines established in the Investment Policy Statement, Objectives and Guidelines regarding asset allocation, manager selection, security selection, and other objectives directed by the Board.

The Board employs both external investment management firms and internal investment professionals to manage the investment portfolio of the System. At fiscal year-end, 39 external public market investment management firms were managing $18.1 billion in assets of the System, $17.1 billion in assets were managed by the System's internal investment professionals, and the remaining $17.3 billion in assets were managed by numerous alternative investment and real estate investment managers. The performance of each external investment management firm and each internal professional is monitored quarterly against a pre-established benchmark as well as the performance of the manager's peer group.

Asset Allocation

The Board reviews the long-term asset allocation targets of the System annually. The Board will consult with its actuary, consultants, Investment Office professionals, and other sources of information it deems appropriate in formulating the asset allocation plan. The level of risk assumed by the System is largely determined by the Board's strategic asset allocation plan. The Board, in determining its long-term asset allocation, takes the following factors into consideration:

- The System's investment time horizon;
- The demographics of the plan participants and beneficiaries;
- The cash flow requirements of the System;
- The actuarial assumptions approved by the Board;
- The funded status of the System;
- The employers' (Commonwealth and school districts) financial strength; and,
- The Board's willingness and ability to take risk.

In approving the asset allocation for the System that is recommended by Investment Office professionals and PSERS' general investment consultant, the Board considers capital market expectations for expected return, volatility, and asset class correlations as prepared by its general investment consultant. The current long-term, top-down asset allocation targets of the Board, based on targeted exposures, are discussed in the following paragraphs. Targeted exposures include positions obtained through derivative exposure with minimal capital requirements.

The current target allocation as of June 30, 2017, included an equity target allocation of 35.0%, consisting of publicly traded stocks (19.0%) and private markets (16.0%). Specific publicly traded stock targets have been established for U.S. equity (7.4%) and non-U.S. equity (11.6%). Within the U.S. equity target, the portfolios are diversified between large and small capitalization investment mandates. The non-U.S. equity exposure includes both developed and emerging markets portfolios as well as large and small capitalization investment mandates. The non-U.S. developed markets equity exposure is 75% currency-hedged back to the U.S. Dollar. The primary vehicle used to invest funds in private markets is the limited partnership. The partnerships are established by individual management groups that have been selected by the System for the purpose of investing in and managing private equity, venture capital, and debt positions on behalf of PSERS and other limited partners.

The fixed income target allocation of 36.0% consisted of investment grade exposure (9.0%), credit-related exposure (9.0%), inflation-protected exposure (15.0%) and cash (3.0%). Investment grade exposure consisted of U.S. core fixed income (5.0%), U.S. Long Treasuries (3.0%), and non-U.S. developed market fixed income (1.0%). Credit-related exposure consisted of high yield (8.0%) and emerging markets fixed income (1.0%). Inflation protected exposure consisted of U.S. and Non-U.S. inflation-linked bonds. Within these categories, all sectors of the fixed income market are represented. The high yield exposure is primarily private debt. The cash allocation consisted of short-duration, high quality government and investment grade securities. The Board, Investment Office professionals, and Aon Hewitt deemed it prudent to have an allocation to cash given the known and potential cash flow requirements of the System.

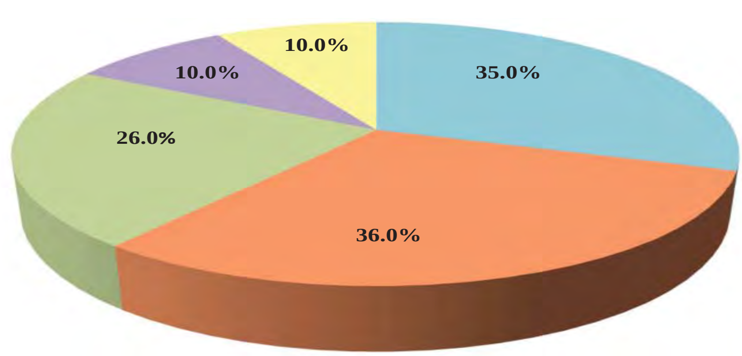
The real asset exposure of 26.0% consisted of real estate (12.0%), master limited partnerships (4.0%), infrastructure (2.0%) and commodities (8.0%, including 3% to gold). The real estate allocation consisted primarily of limited partnerships. The types of partnerships the System invests in include core, value-added, and opportunistic real estate limited partnerships. The commodities allocation consisted primarily of commodity futures, commodity swaps and commodity-related publicly traded stocks. Commodities are included in the allocation for inflation protection and to diversify the System's total portfolio risk. The Master Limited Partnership (MLP) allocation consisted of publicly traded partnerships that own and operate assets such as pipelines, processing facilities, and storage facilities for natural gas, crude oil, and refined products that are a vital part of the U.S. energy infrastructure. MLPs are included in the allocation due to their attractive current yields, reasonable growth potential, and ability to diversify the System's total portfolio risk. The Infrastructure allocation targets stable, defensive investments primarily within the energy, power, water, and transportation sectors. Infrastructure plays a strategic role within the System by providing steady returns and cash yields, defensive growth, inflation protection, capital preservation, and diversification benefits. Infrastructure consists of publicly traded companies.

The absolute return target allocation of 10.0% consisted primarily of investment managers retained by the System to generate positive returns over time that are independent of how the equity, fixed income, and commodity markets perform. Strategies implemented to achieve this target include, but are not limited to, global macro, event-driven, and relative value strategies such as insurance-linked securities and long/short credit. The absolute return program is included in the allocation to generate returns equal to or greater than LIBOR plus 3.5% with low volatility and low correlation to the public financial markets to diversify the System's total portfolio risk.

The risk parity allocation of 10.0% consisted primarily of global equities, global nominal bonds, global inflation-linked securities, and commodities in an allocation that balances risk across these asset classes with structurally offsetting biases to the primary drivers of asset class returns - growth and inflation. Risk parity provides diversification and liquidity to the System.

Leverage was utilized at the asset allocation level to provide additional exposure to diversifying asset classes. The System utilized 17.0% leverage through use of derivative instruments that allow the System to gain asset class exposure with minimal margin requirements. Leverage is utilized in the fixed income, real asset, and risk parity allocations.

Asset Allocation Exposures as of June 30, 2017*



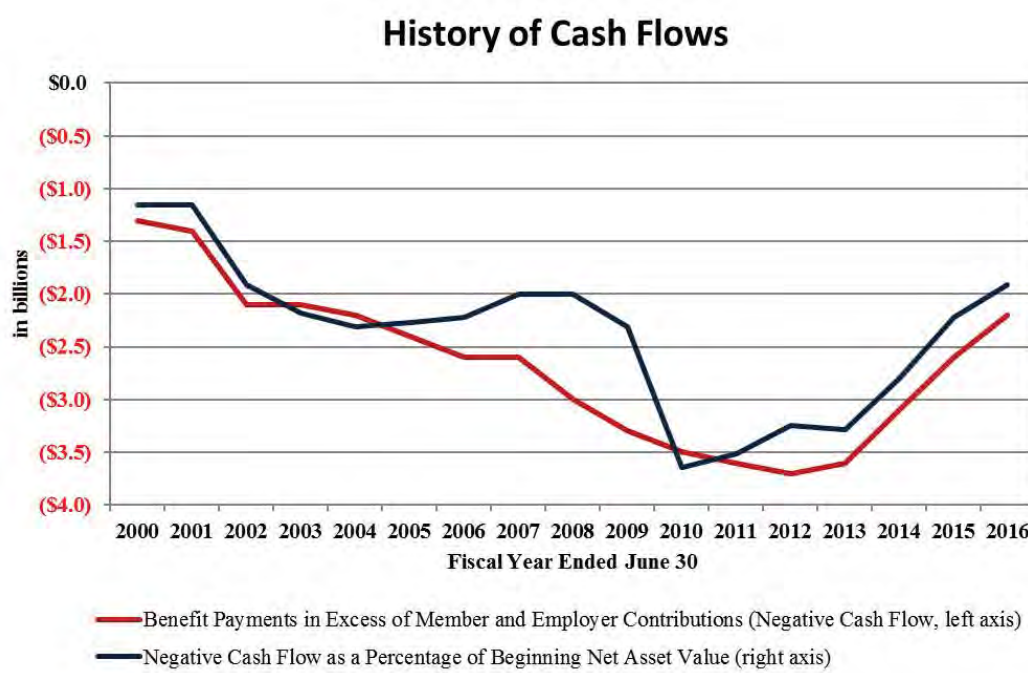
*Financing represents a negative 17% allocation and is not relected in the pie chart.

The System also participates in a securities lending program administered by Deutsche Bank AG. This program is designed to provide incremental income to the System by lending publicly traded securities in the System's portfolio held by the System's custodial bank, The Bank of New York Mellon, to securities dealers in exchange for cash collateral, which can be reinvested to generate income. This program generated $11.8 million in net income during the year.

Liquidity and Asset Allocation

The System's risk profile is, in part, driven by its liquidity needs. Over the past fifteen fiscal years, the System has paid out $42.2 billion more in benefits than it has received in member and employer contributions (i.e., the System has experienced negative cash flow). The average negative cash flow was approximately $2.8 billion per year during this period. This annual funding deficiency has amounted to 3.0% or more of beginning net assets each year and represents the amount of investment return needed each year to make up the shortfall (i.e., if the System earned 3.0% in a given year with a 3.0% cash flow shortfall, then the net assets of the System will be unchanged). The large negative annual cash flow has improved significantly since fiscal year 2012 due to the implementation of Act 120 in 2010 (see the History of Cash Flows chart below). Act 120 provided for increased employer contributions to the actuarial required contribution levels. The large annual cash flow shortfall, while much improved, will continue over the next few years and necessitates a larger liquidity position and lower risk profile than a retirement system that has smaller liquidity requirements.

Given the significant net cash outflows, the Board has prudently reduced the risk profile of the System since the financial crisis in 2008. It has done so by decreasing its return dependence on the equity markets and increasing its risk exposures to asset classes that are less correlated to equity markets such as inflation-linked bonds, commodities, and absolute return. The goal of such an allocation is to generate the desired return profile with less volatility. While such an allocation will not provide for a large upside in returns, it is expected to minimize downside risks to the System's assets in the event of a large equity market drawdown as experienced during the financial crisis in 2008.



The Economy During The Past Fiscal Year

The U.S. Economy

The U.S. economy improved, but growth remained modest this past fiscal year. Monetary conditions in the U.S. tightened this past year as the Federal Reserve increased interest rates three times. The Federal Reserve continues to contemplate shrinking its balance sheet that grew significantly from its quantitative easing programs since the Great Recession. The Federal Funds target rate increased by 0.75% during the past fiscal year and has a range of 1.00% to 1.25%. While interest rates increased, they continue to be historically low which has provided a low cost of borrowing so that broad economic conditions can continue to improve. The U.S. real Gross Domestic Product (GDP) increased year-over-year an average of 2.1% per quarter during the past fiscal year with a range of 1.2% to 2.8%. The official unemployment rate (otherwise known as the U3 unemployment rate) fell during the fiscal year from 4.9% as of June 2016 to 4.4% as of June 2017, approaching what the Fed would consider full employment. The more encompassing U6 unemployment rate, which measures not only people without work seeking full-time employment (U3 unemployment rate) but also counts "marginally attached workers and those working part-time for economic reasons", returned to more normal levels at 8.6% as of fiscal year end, down from 9.6% at the end of the last fiscal year. However, the U.S. Labor Participation Rate (LPR), which measures the total labor force as a percentage of the working age population, remains depressed relative to historical levels. The LPR modestly increased from 62.7% in June 2016 to 62.8% in June 2017. The LPR was as high as 67.3% in March 2000. If the LPR were at 2000 levels today, the official unemployment rate would probably be significantly higher.

The U.S. economy showed increasing momentum during the fiscal year as measured by the manufacturing Institute of Supply Management (ISM) Purchasing Managers Index (PMI), an indicator of activity in the sector. During the fiscal year, the ISM PMI increased by 5.0 points to 57.8 at June 30, 2017, solidly in expansionary territory (a contraction/expansion is indicated whenever the index is below 50/above 50). Concurrently, U.S. consumer confidence, as measured by the Conference Board's Consumer Confidence Index, increased from 97.4 at June 2016 to 117.3 at June 2017.

Inflation in the United States, even with improving economic conditions and very accommodative interest rates, remains below the Fed's target inflation rate of 2.0% as the burdens of high global debt create a more deflationary environment worldwide. The U.S. Core Consumer Price Index (CPI) increased 1.6% year-over-year as of June 2017, an increase from 1.0% year-over-year as of June 2016. During the middle of the fiscal year, there were transitory increases in CPI to as high as 2.7% as oil prices spiked in the middle of the year but fell back by the end of the fiscal year.

Select Non-U.S. Economies

The Euro Area economy has shown improvement from last year. As of the second quarter 2017, the Euro Area is growing at a 2.2% annual pace, an improvement from the 1.6% pace one year earlier. The unemployment rate, while still elevated, has significantly improved to 9.1% as of June 2017 from 10.1% a year earlier. Inflation, while below the European Central Bank (ECB) target of 2.0%, has also significantly improved from a year earlier. Inflation during the past year was 1.3% versus 0.1% in the previous year. Evidence of an improving Euro Area economy can be found in the improvement in the Markit Eurozone Manufacturing PMI which increased 4.6 points during the past fiscal year from 52.8 to 57.4. Aggressive actions by the ECB have generated improvements in economic growth, employment, and inflation. The ECB has continued its policy of very accommodative overnight interest rates (negative 0.4%) and is purchasing $68 billion (down from $88 billion last year) a month in euro-denominated sovereign and corporate debt in an effort to put liquidity into the economy as well as ease financial conditions.

Japan's economy has grown for six straight quarters, the longest streak in 11 years. As of the second quarter 2017, Japan's real GDP increased by an annualized rate of 4.0%, but grew much slower in the first three quarters of the past year. Japan's demographics are poor as the population ages which generally means that robust growth will be difficult to sustain over the long term. However, since the size of the working age population is decreasing, unemployment has been very low and was 2.9% in June 2017, down from 3.2% last year. The inflation rate in Japan was positive 0.4% over the past year, up from negative 0.4% at the end of last year. Japanese policy makers continue to aggressively attempt to stimulate their economy through a combination of low interest rates (the Bank of Japan policy rate is negative 0.1%), the purchase of higher risk assets by the Bank of Japan, coordinated diversification into higher risk assets by large public investors, and fiscal spending policies to encourage liquidity to move into riskier assets. Economic conditions are improving as evidenced by the Nikkei Japan Manufacturing PMI increasing 4.3 points from 48.1 at June 2016 to 52.4 at June 2017. Time will tell if the necessary economic and structural reforms can be put in place for a sustained period of economic prosperity.

China had robust growth compared to the other developed regions of the world. China's real GDP increased by 6.9% over the past year, slightly faster than the 6.7% pace as of June 2016. Inflation in China has remained relatively stable over the past year at 1.5% compared to 1.9% last year. Economic conditions have been relatively stable as evidenced by the China Manufacturing PMI increasing 1.7 from 50.0 at June 2016 to 51.7 at June 2017. As noted in previous years, China is struggling to rebalance its economy from an investment-oriented economy to a consumer-oriented economy, while maintaining political stability. The Chinese government is continuing to target economic growth of between 6.5% and 7.0% over the foreseeable future.

Investment Results

Aon Hewitt calculates the total investment return of the System as well as the performance of each external investment management firm and each internal investment manager retained by the Board to invest the System's assets. Performance is calculated using a time-weighted return methodology.

For the one-year period ended June 30, 2017, the System generated a total net of fee return of 10.14%. This return exceeded not only the actuarial required return of 7.25%, but also the total fund Policy Index return of 6.39% by 375 basis points. Annualized total net of fee returns for the three-, five-, ten-, and twenty five-year periods ended June 30, 2017 were 4.76%, 7.35%, 3.80%, and 8.03%, respectively. The three-, five- and ten-year returns ended June 30, 2017 exceeded the total fund Policy Index returns by 127, 188, and 100 basis points, respectively.

Significant positive contributors to performance this past fiscal year included:

- U.S. Equity, as represented by the MSCI USA Investible Market Index (IMI), was up by 18.4% and Non-U.S. Equity, as represented by the MSCI All-Country World Indexed ex. U.S. IMI was up 19.7%. Returns in equities were driven by improving growth, improving company earnings, expectations of reflationary policies under a Donald Trump presidency, and reduced political risk in Europe;
- High Yield Fixed Income, as represented by the Barclays Corporate High Yield Index, was up 12.70%, as fundamentals were strong and credit spreads fell, driving high yield bond prices higher.

Significant detractors from performance this past fiscal year included:

- U.S. Long Treasuries, as represented by the Barclays Capital U.S. Treasury Long Index, were down 7.2%. Returns in long-term treasuries were driven by increasing interest rates (the 10-year yield increased from 1.47% at June 30, 2016 to 2.30% at June 30, 2017) and decreased demand for safe haven assets;
- Commodities, as represented by the Bloomberg Commodity Index, were down 6.9%, led by a fall in oil prices, precious metals and some agricultural commodities such as sugar; and
- Gold, as represented by the Bloomberg Gold Index, was down 6.5%. Gold represents a safe haven asset and benefits from global uncertainty and ultra-low and negative interest rates in many global markets. Given the increasing appetite of investors to take risk, gold prices fell.

The fiscal year can be characterized as a "risk-on" period where taking concentrated equity risk paid off as opposed to holding a diversified portfolio of assets. Improving economic fundamentals, improving global growth, low but rising inflation, and improving corporate profitability were all contributors to strong equity performance. Three other events helped to propel equity prices during the past fiscal year. The first was the Brexit vote in the United Kingdom at the end of last fiscal year which sharply reduced expectations of interest rate increases by major central banks and boosted equity returns. The second was the election of Donald Trump as President of the United States in November 2016. Expectations of reflationary policies under a Trump administration, such as infrastructure spending, tax cuts, and fewer regulations, drove a rotation out of bonds and into stocks in the U.S. The third was an easing of the political risks in Europe with the election of pro-European Union candidate Emmanuel Macron in France in May 2017. His election encouraged greater risk appetite in the European region. In addition, central banks globally remained generally very accommodative with the European Central Bank and the Bank of Japan keeping short-term interest rates in negative territory and the Federal Reserve Bank in the U.S. increasing interest rates slower than expected.

Diversification is Undeniably Effective

Diversification into asset classes such as U.S. Long Treasuries, commodities, and gold were a drag on overall performance this past fiscal year. Many investment professionals discuss diversification using terms such as standard deviation, correlation, and co-variance. However, at its most basic level, diversification is insurance against bad future outcomes. The System diversifies simply because it doesn't know how actual events in the future will transpire relative to what is priced into the market. Diversification is a very humble approach to investing. If an investor knew with certainty which asset class would perform best the next month, quarter, or year, the investor would simply invest in that one asset class. However, without such perfect foresight, the downside risk of such a strategy could be devastating. As Peter Bernstein, the late American financial historian, economist, and educator once wrote, “Diversification is the only rational deployment of our ignorance.”

Accomplishments

A significant accomplishment during the past fiscal year was the completion of a nine-month-long performance audit of the System by the Pennsylvania Department of the Auditor General that had no findings of violations of law, regulations, by-laws and other policies in areas covered by the audit. The audit commended the System’s reporting and transparency practices and noted that they surpass peer organizations. The audit also noted that the System appropriately manages investment expenses. Finally, the audit stated that the System’s attention to diversification, risk management, and asset allocation were all adequate and reasonable and recommended continuation of these policies and practices. I commend the professionalism of the Auditor General’s staff and appreciate all of the time and effort that the Investment Office and other PSERS’ staff committed to this audit.

Summary

This past fiscal year, investment performance was solid with a net of fee return of 10.14%. However, pension plans like PSERS are built to generate long-term returns, so one good or bad year is not going to make or break the Fund. The System focuses on long-term returns. Since the end of the Great Recession, our annualized net of fee return for that eight-year period was 9.28%, comfortably above our actuarial assumed rate of return of 7.25%. Looking forward, even with cash rates having risen to around 1%, the System still needs to take prudent risks to achieve its long-term goal of a 7.25%. The System has built a diversified allocation to allow it to collect risk premiums over the long-term. In the short-term, no one knows what will happen and the System should expect to go through years where returns are below 7.25%, perhaps significantly below. The System continues to believe the best way to achieve its long-term objectives is to maintain a very diversified portfolio which includes virtually all asset classes available to us, such as equities, fixed income, real assets, risk parity and absolute return. In any given year, the System expects some assets to perform well, such as U.S. and non-U.S. equities did this past fiscal year, and some to not do as well, such as U.S. Long Treasuries and commodities this past fiscal year. However, over the long run, the System expects each of its asset classes to generate a positive return commensurate with the risks taken. The future is uncertain, but we believe we are well positioned to accomplish our objectives.

James H. Grossman Jr., CPA, CFA
Chief Investment Officer

The following table provides the System's total time-weighted investment returns for each major asset class and the total portfolio, including, where applicable and available, respective benchmark indexes used by asset class and median performance by asset class:

	Annualized Total Returns (%) Net of Fees Ended June 30, 2017			
	1 Year	**3 Years**	**5 Years**	**10 Years**
PSERS Total Portfolio	10.14	4.76	7.35	3.80
Total Fund Policy Index	6.39	3.49	5.47	2.80
Median Public Defined Benefit Plan (DBP) Fund Universe (Aon Hewitt Database)	11.73	5.04	8.58	5.20
PSERS U.S. Equity Portfolios	19.32	9.68	15.04	7.15
U.S. Equity Policy Index (1)	18.43	9.14	14.59	7.21
PSERS Non-U.S. Equity Portfolios	22.57	7.12	10.97	3.96
Non-U.S. Equity Policy Index (2)	22.32	5.60	10.19	2.96
PSERS Fixed Income Portfolios (10)	5.22	4.51	5.17	7.36
Fixed Income Policy Index (3)	3.09	2.69	2.83	6.10
PSERS Commodity Portfolios (10)	-3.48	-8.02	-4.62	-3.42
Commodity Policy Index (4)	-6.41	-10.45	-6.49	-5.08
PSERS Absolute Return Portfolios	9.00	3.16	4.09	4.99
Absolute Return Policy Index (5)	4.53	4.10	5.45	6.67
PSERS Risk Parity Portfolios (11)	7.17	2.05	N/A	N/A
Risk Parity Policy Index (6)	5.81	3.33	N/A	N/A
PSERS Master Limited Partnership (MLP) Portfolios	4.19	-8.71	7.23	N/A
Standard & Poor's MLP Index	3.23	-11.25	2.48	5.99
PSERS Real Estate (7) (10)	8.38	10.36	11.18	0.66
Blended Real Estate Index (8)	2.92	7.38	8.59	5.20
PSERS Alternative Investments (7)	14.36	6.68	8.89	7.74
Burgiss Median, Vintage Year Weighted Index (9)	3.00	3.50	4.33	3.02

1. MSCI USA Investable Market Index effective April 1, 2009; previously was the Dow Jones Wilshire 5000 Index.
2. MSCI ACWI ex USA IMI with DM 75% Hedged to USD (Net) Index effective April 1, 2016. From October 1, 2014 to March 31, 2016, the index was the MSCI ACWI ex USA IMI with DM 100% Hedged to USD (Net) Index. From July 1, 2008 to September 30, 2014, the index was the MSCI All Country World (ACW) ex. USA Investable Market Index. Before July 1, 2008, the MSCI ACW ex. U.S. Index was used. The benchmark was 30% hedged to the U.S. dollar from July 1, 2006 to March 31, 2009.
3. Returns presented are a blend of the Barclays Capital U.S. Aggregate Index (17.5%), Barclays Capital Global Aggregate GDP Weighted Dev x U.S. (Unhedged) Index (3.5%), Barclays Capital Emerging Mkt 10% Country Cap Index (7.0%), Barclays Capital U.S. Treasury Long Index (8.8%), Barclays Capital U.S. High Yield Index (21.1%), and Barclays Capital U.S. TIPS Index (42.1%) effective April 1, 2016. Prior to July 1, 2013, the blend was Barclays Capital U.S. Universal Index (24.7%), JP Morgan GBI EM Global Diversified Index (9.4%), Barclays Capital U.S. High Yield Index (28.2%), Barclays Capital Multiverse Index (14.1%), and Blended Policy (Net Levered TIPS) (23.6%).
4. Returns presented are a blend of the Bloomberg Commodity Gold Index (37.5%) and the Bloomberg Commodity Index (62.5%). On July 1, 2014, the indices names were changed from DJ/UBS to Bloomberg. The returns have been adjusted for leverage.
5. Three month LIBOR +3.50% effective July 1, 2014. Previously, was based on the assumed actuarial rate of return for the Fund which was 8.0% from July 1, 2009 through June 30, 2011. The assumed rate changed to 7.5% on July 1, 2011 and was used as the Absolute Return Policy Index through June 30, 2014.
6. Effective July 1, 2014 returns presented are a blend of MSCI ACW Index ($Net) (50%); Barclays Capital U.S. Treasury Index (75%); Barclays Capital World Inflation Linked Bond Index Hedged (55%); Bloomberg Commodity Index (Total Return) (15%); Bloomberg Gold Subindex (5%); and 3-Month LIBOR (-100%). The weights to these indices have varied in previous quarters. The returns have been adjusted for volatility.
7. Returns reported on a one-quarter lag, except for publicly traded real estate security investments.
8. Effective April 1, 2015, comprised of a blended benchmark consisting of the National Council of Real Estate Investment Fiduciaries (NCREIF) – Open End Diversified Core Equity (ODCE) Index and Burgiss Private iQ (for Value-Added Real Estate and Opportunistic Real Estate) reported on a one-quarter lag. For periods between April 1, 2010 and March 31, 2015, the benchmark was comprised of a blended benchmark of NCREIF-ODCE (core) and various private real estate benchmarks for Value-Added and Opportunistic (including NCREIF-Closed-End Value-Added (CEVA), NCREIF/Townsend and NCREIF-NPI) reported on a one-quarter lag. For all prior periods, the benchmark was comprised of a blended benchmark strategically split between public/private using various public REIT indices (FTSE EPRA/NAREIT Global Real Estate, Wilshire Real Estate Securities and Wilshire REIT) and NCREIF-NPI (for all non-core) reported on a one-quarter lag.
9. Burgiss Median, Vintage Year Weighted Index effective January 1, 2011. Previously, the Thompson ONE, Vintage Year Weighted Index was used. Returns reported on a one-quarter lag.
10. Returns are presented on an unleveraged basis for comparability purposes to the Policy Index.
11. Returns are presented on a volatility-adjusted basis for comparability purposes to the Policy Index.

Portfolio Summary Statistics
Asset Allocation
As of June 30, 2017

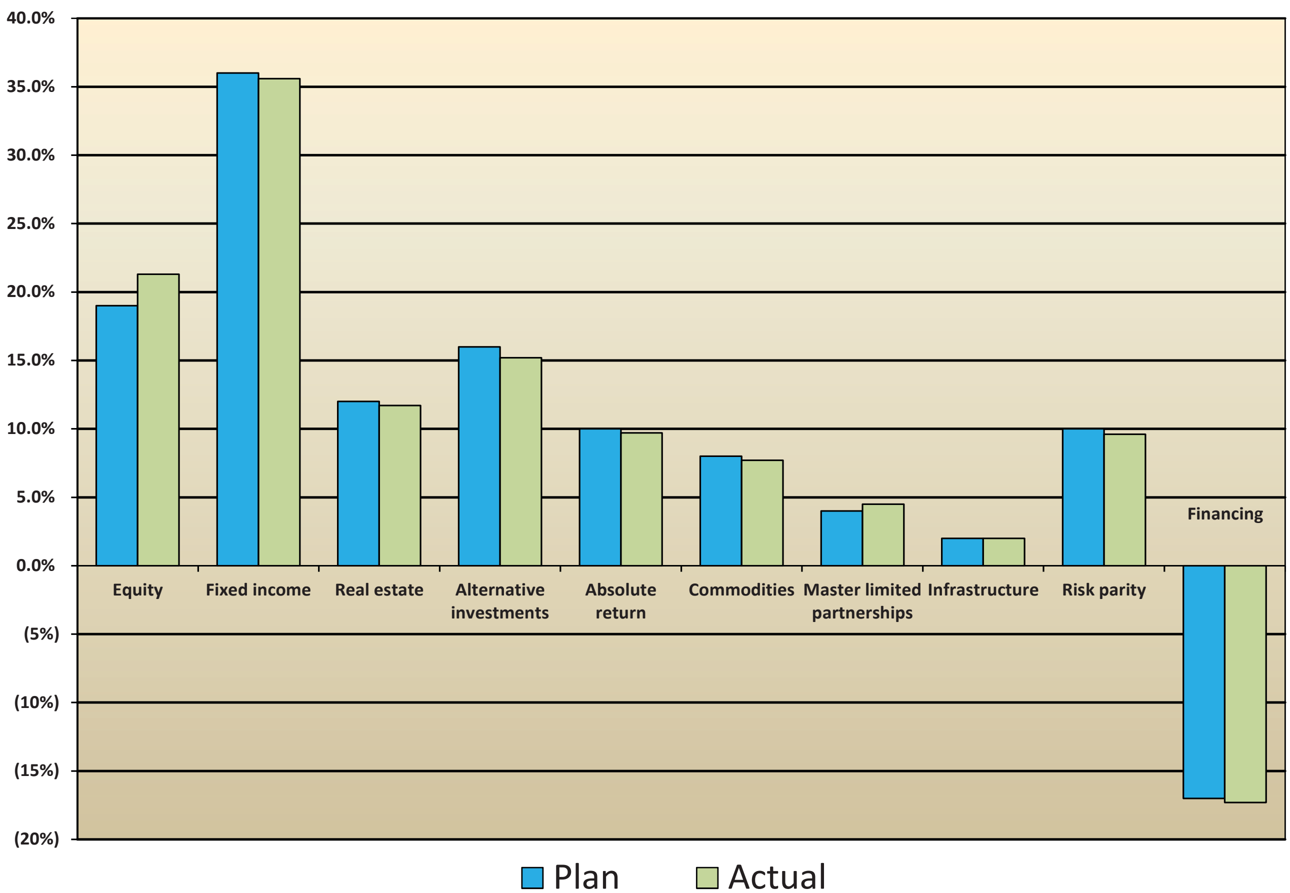
(Dollar Amounts in Thousands)

Pension investments		Fair Value	% Fair Value
Common and preferred stock (Equity):			
Large and mid cap stocks	$	4,961,290	9.5
Small cap stocks		793,825	1.5
Emerging markets stocks		1,155,026	2.2
Total Non-U.S. equity		**6,910,141**	**13.2**
Large cap stocks		2,841,884	5.4
Mid and small cap stocks		1,379,985	2.6
Microcap stocks		21,570	0.1
Total U.S. equity		**4,243,439**	**8.1**
Total Common and preferred stock - Asset Allocation Basis		**11,153,580**	**21.3**
Fixed income:			
Investment grade fixed income		7,753,813	14.8
High yield fixed income		4,486,570	8.6
Total U.S. Fixed income		**12,240,383**	**23.4**
Non-U.S. developed markets fixed income		4,542,528	8.7
Emerging markets fixed income		345,980	0.6
Total Non-U.S. Fixed income		**4,888,508**	**9.3**
Cash and cash equivalents		**1,531,579**	**2.9**
Total Fixed income - Asset Allocation Basis		**18,660,470**	**35.6**
Real estate		**6,146,728**	**11.7**
Alternative investments:			
Private equity		5,895,261	11.3
Special situations (Private debt)		1,028,670	2.0
Venture capital		985,995	1.9
Total Alternative investments - Asset Allocation Basis		**7,909,926**	**15.2**
Absolute return		**5,082,149**	**9.7**
Commodities		**4,052,402**	**7.7**
Master limited partnerships		**2,369,627**	**4.5**
Infrastructure		**1,055,092**	**2.0**
Risk parity		**5,038,035**	**9.6**
Financing		**(9,070,910)**	**(17.3)**
Total Pension investments - Asset Allocation Basis		**52,397,099**	**100.0**
Net Asset Allocation Adjustment*		(213,956)	
Pension investments per Statement of Fiduciary Net Position		**52,183,143**	
Postemployment Healthcare investments	**$**	**302,668**	**100.0**

* Includes reclassifications of certain investments between asset classes and investment receivables/payables to adjust the Statement of Fiduciary Net Position classification to the basis used to measure Asset Allocation. See the table and graph which follow.

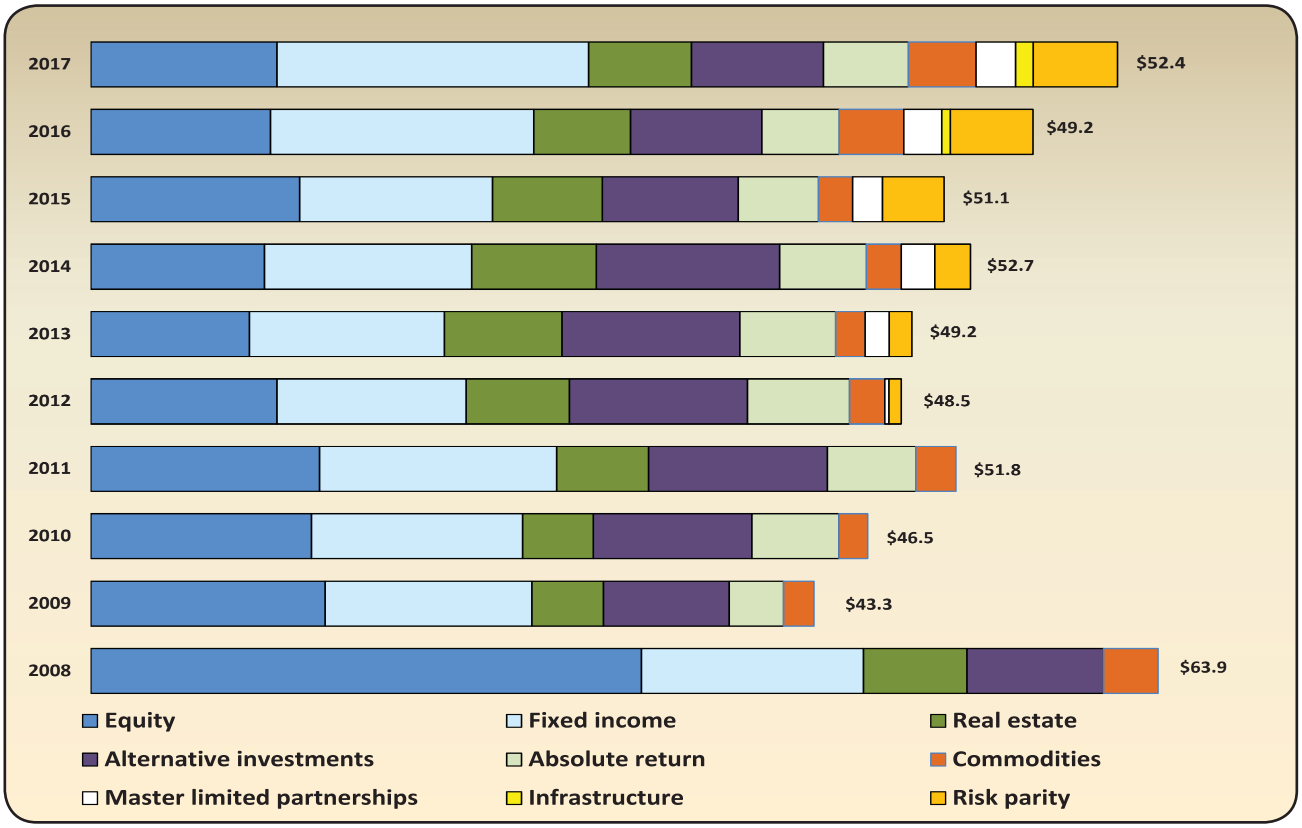
Comparison of Actual Portfolio Distribution to Asset Allocation Plan As of June 30, 2017

Asset Category	Plan	Actual
Common and preferred stock (Equity)	19.0%	21.3%
Fixed income	36.0	35.6
Real estate	12.0	11.7
Alternative investments	16.0	15.2
Absolute return	10.0	9.7
Commodities	8.0	7.7
Master limited partnerships	4.0	4.5
Infrastructure	2.0	2.0
Risk parity	10.0	9.6
Financing	(17.0)	(17.3)
Total	**100.0%**	**100.0%**



Portfolio Capital Distribution 10 Year Trend*

(Fair Value - Dollar Amounts in Billions)



*Financing is not reflected in the Portfolio Capital Distribution 10 Year Trend Chart.

The following lists of portfolio detail statistics present the ten largest holdings by descending order of fair value for the largest public market asset classes. Information on the complete holdings of the System can be downloaded from the PSERS website at www.psers.pa.gov.

Common and Preferred Stock - Non-U.S. Equity

10 Largest Holdings in Descending Order by Fair Value

As of June 30, 2017

(Dollar Amounts and Shares in Thousands)

Description	No. of Shares	Fair Value
BlackRock Emerging Markets Alpha Advantage Fund Ltd.- Class D	319	$ 413,829
iShares MSCI ETF	3,973	203,065
The 32 Capital Fund Ltd.	93	178,300
BlackRock Emerging Markets Alpha Advantage Fund Ltd.- Class P	35	136,835
Nestle SA	824	71,792
Taiwan Semiconductor Manufacturing Company	7,747	53,099
Samsung Electronics Co., Ltd.	25	52,892
Royal Dutch Shell PLC	1,568	45,655
SAP SE	377	39,327
Roche Holding AG	143	36,508
Total of 10 Largest Holdings		**$ 1,231,302**

Common and Preferred Stock - U.S. Equity

10 Largest Holdings in Descending Order by Fair Value
As of June 30, 2017
(Dollar Amounts and Shares in Thousands)

Description	No. of Shares	Fair Value
SPDR Trust Unit Series 1	1,980	$ 478,781
Enterprise Products Partners, L.P.	10,735	290,714
Energy Transfer Partners, L.P.	11,859	241,812
Energy Transfer Equity, L.P.	10,181	182,855
Security Capital Preferred Growth	13,039	180,458
MPLX, L.P.	3,812	127,327
Williams Partners, L.P.	3,154	126,497
Plains All American Pipeline, L.P.	3,873	101,735
Magellan Midstream Partners, L.P.	1,251	89,184
Buckeye Partners, L.P.	1,372	87,698
Total of 10 Largest Holdings		**$ 1,907,061**

Fixed Income

10 Largest Holdings in Descending Order by Fair Value
As of June 30, 2017
(Dollar Amounts and Shares in Thousands)

Description	No. of Shares	Fair Value
Bridgewater International Inflation-Linked Bond Fund	426	$ 1,445,933
BlackRock US Extended Core Global Alpha Bond Fund Ltd.	448	935,238
Bridgewater Pure Alpha Fund II Ltd.	138	575,828
iShares TIPS Bond ETF	4,884	554,003
PIMCO Multi-Sector Strategy Fund Ltd.	346	409,723
Bain Capital Credit Managed Account, L.P.	N/A	362,672
Bain Capital Distressed and Special Situations 2013 A, L.P.	N/A	297,822
Garda Inflation Opportunity Fund Class B	323	295,800
Brigade Structured Credit Offshore Fund Ltd.	200	255,515
TAO Partners Parallel Fund, L.P.	N/A	253,400
Total of 10 Largest Holdings		**$ 5,385,934**

Absolute Return
10 Largest Holdings in Descending Order by Fair Value
As of June 30, 2017
(Dollar Amounts and Shares in Thousands)

Description	No. of Shares	Fair Value
Bridgewater Pure Alpha Fund II, Ltd.	240	$ 865,200
Capula Global Relative Value Fund, Ltd.	3,000	424,246
Garda Fixed Income Relative Value Opportunity Fund Ltd.	291	399,386
Capula Tail Risk Fund Ltd.	3,977	326,172
Brigade Leveraged Capital Structures Offshore Ltd.	170	303,259
BlackRock Capital Structure Investments Offshore Fund Ltd.	198	287,843
PIMCO Global Credit Opportunity Offshore Fund Ltd.	280	278,754
PIMCO Absolute Return Strategy V Offshore Fund Ltd.	259	266,119
Palmetto Fund Ltd.	191	249,928
OWS Credit Opportunity Offshore Fund III, Ltd.	200	243,955
Total of 10 Largest Holdings		**$ 3,644,862**

Postemployment Healthcare Investments
10 Largest Holdings in Descending Order by Fair Value
As of June 30, 2017
(Dollar Amounts in Thousands)

Description	Maturity Date	Interest Rate (%)	Par Value	Fair Value
PSERS Short-Term Investment Fund	Various	Various	$ 152,012	$ 152,012
Wilmington US Government MM	N/A	Various	90,065	90,065
American Honda Finance Corp	09/20/17	1.724%	2,403	2,405
Capital One Multi-Asset Execution Trust	07/15/20	1.480%	2,390	2,391
Government National Mortgage Association	12/16/49	3.813%	2,132	2,144
American Express Credit Account Master Trust	06/15/20	1.430%	1,600	1,600
SLM Student Loan Trust 2005-5	04/25/25	1.256%	1,177	1,176
Berkshire Hathaway Finance Corp	01/12/18	1.456%	1,000	1,001
PFS Financing Corp	10/15/19	1.759%	1,000	1,001
Mercedes-Benz Auto Lease Trust 2017-A	04/16/18	1.150%	991	991
Total of 10 Largest Holdings				**$ 254,786**

Comparison of Investment Activity Income
Fiscal Years Ended June 30, 2017 and 2016
(Dollar Amounts in Thousands)

Investment Activity	2017	2016
Net appreciation in fair value of investments	**$ 4,204,248**	$ (160,866)
Short-term	**69,422**	18,489
Fixed income	**156,837**	145,326
Common and preferred stock	**295,427**	311,356
Collective trust funds	**3,379**	3,168
Real estate	**236,650**	246,217
Alternative investments	**493,426**	314,270
Total investment activity income	**$ 5,459,389**	$ 877,960

Brokers' fees on equity investment transactions for the fiscal year ended June 30, 2017 were $4.0 million. The System has commission recapture contracts with several brokers. These contracts generally stipulate that the brokers rebate a percentage of commissions earned on investment transactions directly to the System. During the fiscal year ended June 30, 2017, the System earned $70,000 from the commissions recapture program. A list of the brokers receiving fees in excess of $100,000 during the fiscal year follows:

Summary Schedule of Brokers' Fees
(Cumulative Fiscal Year Amounts Exceeding $100,000)
Fiscal Year Ended June 30, 2017

Broker Name	Fees Paid	Broker Name	Fees Paid
Citigroup Inc.	$ 428,210	Bank of America Merrill Lynch	$ 135,656
Instinet Corporation	257,110	Macquarie Bank Ltd.	124,988
Fimat USA	226,455	Bloomberg Tradebook, LLC	123,163
UBS Securities	205,667	Credit Suisse	117,664
JP Morgan Chase & Company	147,511	ITG Securities	104,451
Jones Trading	141,432	FBN Securities	104,314
Morgan Stanley & Company	136,871	Goldman Sachs & Company	100,556
Liquidnet Inc.	136,638		

Professional Consultants
External Investment Advisors
As of June 30, 2017

Absolute Return Managers
- Apollo Aviation Services II & III, LP
- Aeolus Capital Management, Ltd.
- BlackRock Financial Management, Inc.
- Bridgewater Associates, Inc.
- Brigade Capital Management
- Capula Investment Management, LLP
- Caspian Capital, LP
- Garda Asset Management, LLC
- Ellis Lake Capital, LLC
- Independence Reinsurance Partners, LP
- Nephila Capital, Ltd.
- Oceanwood Capital Management, Ltd.
- One William Street Capital Management, LP
- Pacific Investment Management Company
- Perry Capital, LLC
- Two Sigma Risk Premia Enhanced Fund
- Venor Capital Offshore Fund

Publicly-Traded Real Estate Securities Manager
- Security Capital Research & Management, Inc.

Non-U.S. Equity Managers
- Acadian Asset Management, Inc.
- Baillie Gifford Overseas, Ltd.
- BlackRock Financial Management, Inc.
- Fidelity Institutional Asset Management, LLC
- Marathon Asset Management, LLP
- Oberweis Asset Management, Inc.
- QS Investors, LLC
- Wasatch Advisors, Inc.

Commodity Managers
- Gresham Investment Management, LLC
- Pacific Investment Management Company
- Wellington Management Company, LLP

U.S. Core Plus Fixed Income Managers
- BlackRock Financial Management, Inc.
- Pugh Capital Management, Inc.
- SEI Investment Management Corporation

High Yield Fixed Income Managers
- Apollo Management International, LLP
- Avenue Capital Group
- BlackRock Financial Management, Inc.
- Brigade Capital Management
- Cerberus Institutional Partners, LP
- Haymarket Financial, LLP
- Intermediate Capital Group, PLC
- Latitude Real Estate Investors, Inc.
- LBC Credit Partners
- Mariner Investment Group, LLC
- Oaktree Capital Management, LP
- Park Square Capital, LLP
- Radcliffe Capital Management, LP
- Sankaty Advisors, LLC
- Summit Partners
- The Carlyle Group
- TPG Partners, LP
- Varde Partners

Non-U.S. Developed Markets Fixed Income Manager
- AllianceBernstein, LP

Emerging Markets Debt Manager
- Franklin Templeton Investments

Multi-Sector Fixed Income Manager
- Pacific Investment Management Company

Global Treasury Inflation - Protected Securities Managers
- Bridgewater Associates, Inc.
- Garda Asset Management, LLC

Passive Currency Hedging Overlay Program Manager
- Pareto Investment Management, Ltd.

Risk Parity Managers
- BlackRock Financial Management, Inc.
- Bridgewater Associates, Inc.
- D.E. Shaw Investment Management, LLC

Master Limited Partnership Advisors
- Atlantic Trust Private Wealth Management
- Harvest Fund Advisors, LLC
- Salient Capital Advisors, LLC

Real Estate Advisors
- Charter Oak Advisors, Inc.
- GF Management, Inc.
- L&B Realty Advisors, LLP

Real Estate Partnerships
- AG Core Plus Realty Fund III, LP
- Almanac Realty Securities V & VI, LP
- Apollo Real Estate Finance Corp.
- AREFIN Co-Invest Corp.
- Ares European Real Estate Fund III, LP
- Ares U.S. Real Estate Fund VII, LP
- AvalonBay Value Added Fund I, LP
- Avenue Real Estate Fund, LP
- Bell Institutional Fund IV, V, & VI, LP
- BlackRock Asia Property Fund III, LP

Professional Consultants (Continued)

- BlackRock Europe Property Fund III, LP
- Blackstone Real Estate Debt Strategies II, LP
- Blackstone Real Estate Partners V, VI, & VII, LP
- Blackstone Real Estate Partners Europe III & IV, LP
- BPG/PSERS Co-Investment Fund, LP
- Brookfield Strategic Real Estate Partners I & II, LP
- Cabot Industrial Value Fund III & IV, LP
- Carlyle Realty Partners III, IV, V, & VI, LP
- DRA Growth and Income Fund VI & VII, LLC
- Exeter Core Industrial Club Fund II, LP
- Exeter Industrial Value Fund II, LP
- Fortress Investment Fund I, IV, & V, LP
- JP Morgan Strategic Property Fund
- LAI Real Estate Investors, LLC
- Latitude Management Real Estate Capital III, Inc.
- Legg Mason Real Estate Capital I & II, Inc.
- LEM Multifamily Senior Equity Fund
- LEM Real Estate High Yield Debt and Preferred Equity Fund III, LP
- LEM Real Estate Mezzanine Fund II, LP
- Paramount Group, Inc.
- Pramerica Real Estate Capital VI, LP
- PRISA
- Prudential Agricultural Group
- RCG Longview Debt Fund IV, V, & VI, LP
- RCG Longview Equity Fund, LP
- Senior Housing Partnership Fund IV, LP
- Silverpeak Legacy Partners I, LP
- Stockbridge Real Estate Fund I, II, & III, LP
- Strategic Partners II, III, & IV RE, LP
- UBS (US) Trumbull Property Fund, LP

Farmland Advisor

- Prudential Agricultural Group

Private Equity/Venture Capital Partnerships

- ABS Capital Partners II, LP
- Actis Emerging Markets 3, LP
- Actis Global 4, LP
- Adams Capital Management, LP
- Aisling Capital Partners II, III & IV, LP
- Allegheny New Mountain Partners, LP
- Apax Europe VII, LP
- Bain Capital Asia Fund II & III, LP
- Bain Capital Fund XI, LP
- Baring Asia Private Equity Fund III, IV, & V, LP
- Blue Point Capital Partners I, II, & III, LP
- Bridgepoint Capital II, LP
- Bridgepoint Europe I, II, III, IV & V, LP
- Capital International Private Equity Fund V & VI, LP
- Catterton Growth Partners I, II & III, LP
- Catterton Partners V, VI, & VII, LP
- Co-Investment Fund 2000, LP
- Co-Investment Fund II, LP
- Coller International Partners VI & VII, LP
- Crestview Partners I & II, LP
- Cross Atlantic Technology Fund I & II, LP
- CVC Capital Partners Asia Pacific III, LP
- CVC European Equity Partners V, LP
- DCPF VI Oil and Gas Co-Investment Fund, LP
- Denham Commodity Partners VI, LP
- Equistone Partners Europe Fund VE, LP
- Evergreen Pacific Partners I & II, LP
- First Reserve Fund XI & XII, LP
- Goldpoint Partners Co-Investment Fund V, LP
- HgCapital 7, LP
- HGGC Fund II
- Incline Equity Partners III, LP
- Irving Place Capital Partners II & III, LP
- KBL Healthcare Ventures, LP
- Landmark Equity Partners IV, V, XIII, & XIV, LP
- Landmark Mezzanine Partners, LP
- Lexington Capital Partners I, LP
- Lindsay, Goldberg & Bessemer, LP
- LLR Equity Partners I, II, III, & IV, LP
- Milestone Partners II, III, & IV, LP
- Morgan Stanley Dean Witter Capital Partners IV, LP
- North Haven Private Equity Asia Fund IV, LP
- NEPA Venture Fund II, LP
- New Mountain Partners I & III, LP
- New York Life Capital Partners I, II, III, & IV, LP
- NGP Natural Resources X, LP
- Novitas Capital I & II, LP
- Odyssey Investment Partners, LLC
- Orchid Asia V, LP
- PAI Europe IV & V, LP
- Palladium Equity Partners II-A & IV, LP
- Partners Group Secondary 2008, 2011 & 2015, LP
- Permira IV, LP
- Perseus-Soros Bio-Pharmaceutical Fund, LP
- Platinum Equity Capital Partners I, II, III, & IV, LP
- PNC Equity Partners I & II, LP
- Psilos Group Partners III, LP
- Quadrangle Capital Partners I, LP
- Quaker BioVentures I & II, LP
- SCP Private Equity Partners I & II, LP
- StarVest Partners I & II, LP
- StepStone International Investors III, LP
- Sterling Capital Partners, LP
- Sterling Venture Partners, LP
- Strategic Feeder, LP
- Strategic Partners II, III, III-B, & III-VC, IV, IV-VC, V, VI, & VII, LP
- Summit Partners Growth Equity Fund VIII & IX, LP
- Summit Partners Venture Capital Fund III & IV, LP
- Tenaya Capital IV-P , V-P, & VI, LP
- The Energy & Minerals Group
- The Fifth Cinven Fund No. 1, LP
- The Fourth Cinven Fund
- Trilantic Capital Partners IV, LP

Professional Consultants (Continued)

- Trilantic Capital Partners V (North America), LP

Special Situations (Private Debt) Partnerships

- Apollo Investment Fund VIII, LP
- Avenue Asia Special Situations Fund II, III, & IV, LP
- Avenue Special Situations Fund IV, V, & VI, LP
- Cerberus Institutional Partners, II, III, IV, V & VI, LP
- Clearlake Capital Partners IV, LP
- Gleacher Mezzanine Fund I & II
- Gold Hill Venture Lending, LP
- GSC Partners CDO Investors IV, LP
- GSC Recovery II & III, LP
- New York Life Investment Management Mezzanine Partners I & II, LP
- OCM Opportunities Fund VII & VII-B, LP
- Searchlight Capital II, LP
- Venor Special Situations Fund II, LP
- Versa Capital Fund I, II & III, LP
- Windjammer Senior Equity Fund III & IV, LP

Alternative Investment Consultant

- Portfolio Advisors, LLC

Custodian Bank

- The Bank of New York Mellon Corporation

Securities Lending Agent

- Deutsche Bank AG

Absolute Return Consultant

- Aksia, LLC

Investment Accounting Application Service Provider

- STP Investment Services, LLC

Investment Evaluator and General Investment Consultant

- Aon Hewitt Investment Consulting, Inc.

Proxy Voting Agent

- Glass, Lewis & Co., LLC

Real Estate Investment Consultant

- Courtland Partners, Ltd.