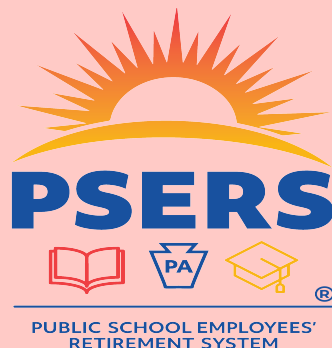


PSERS BUDGET REPORT - FY2022-2023

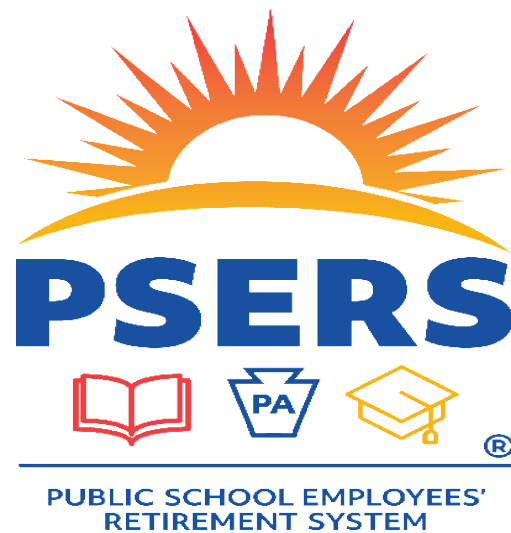


SECTION 3 - INVESTMENT INFORMATION

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Investment Guidelines, Philosophy and Risk Management



Investment Guidelines, Philosophy, and Risk Management

Investment Objectives

The Board has established investment objectives for the Fund as follows:

To generate returns to support the System's actuarial soundness so it may provide its members with benefits as required by law.

To earn a long-term total return, net of fees and investment expenses, that equals or exceeds the Actuarial Assumed Rate approved by the Board.

To earn a long-term total return, net of fees and investment expenses, that equals or exceeds the Policy Index approved by the Board.

To prudently manage investment risks that are related to the achievement of investment goals.

Investment Philosophy

The PSERS Board of Trustees believes PSERS assets should be managed in accordance with PSERS unique liability stream, funding sources, cash flows, and portfolio size, focusing on the prudent accumulation of wealth over the long term to meet the retirement benefit obligations established by the plan sponsor to its members.

PSERS assets should be managed based on the following beliefs:

1. Uncertainty

The future is difficult to forecast with any accuracy or certainty, particularly changes in the economic and market environment.

2. Asset Allocation

The strategic asset allocation mix, more than implementation or any other factor or decision, largely determines the portfolio's overall risk and return.

3. Diversification

Diversification is the best approach to addressing future uncertainty and therefore meeting PSERS long-term investment objectives.

Diversification should be across multiple dimensions: By and within asset classes.

- By geography.
- By strategy (e.g., in Public Equity: growth and value, concentrated and diversified, quantitative and fundamental).
- By vintage year for Private Investments (investment pacing in and out of investments helps mitigate the impact of market volatility).

Over any given period, any number of asset classes, geographies, strategies, and vintages will underperform others; that is to be expected and accepted.

4. Risk

For an underfunded plan or for a plan with negative cash flow (benefits paid exceed contributions received), the path of compounding of investment returns – from month to month, quarter to quarter, and year to year -- matters more than for a plan that is fully funded or has positive cash flow; for the former type of plan, peak-to-trough declines transform unrealized losses into permanent ones.

Drawdown risk should be mitigated, especially as the environment in which drawdowns occur is likely. Also the environment where the Plan Sponsor's willingness and ability to make contributions to the plan may be less than in normal times.

Liquidity should be managed to reasonably ensure that the fund can meet its obligations during periods of market dislocations.

5. Leverage

Leverage at the total fund level can be an effective tool to enhance diversification, since asset classes, over the long-term, have similar risk-adjusted returns, different correlations to each other, and different responses to changes in the economic and market environment.

Leverage can be a vital tool to increase or decrease total fund risk in a diversified manner.

Investment Philosophy (continued)

6. Rebalancing

Disciplined rebalancing enhances long term returns as it is an inherently contrarian process.

Rebalancing restores strategic asset allocation as the primary driver of return and risk.

7. Portfolio Size

Managing a large pool of assets provides investors unique access to investment opportunities not available to smaller institutional investors or individual investors.

PSERS should use its size to its advantage to enhance its net-of-fees return and diversification opportunities.

8. Private Investments

Allocations to Private Equity, Private Credit, Private Real Estate, Private Infrastructure, and other illiquid asset classes may be justified by the illiquidity risk premium available to investors.

Allocations to these asset classes may also be justified by the diversification benefit they provide, through exposure to sectors, businesses, and mode of corporate governance not obtainable through public markets.

9. Active Management

Passive investing, rather than active management, is the default choice to be used for any asset class that is highly efficient or where skilled active managers are less likely to be identified.

Certain asset classes continue to exhibit information inefficiency, where skilled active management and well-resourced investors such as PSERS can potentially persistently outperform peers and the benchmark for that asset class.

There will be short-term periods when a skilled active manager may under perform peers and the benchmark; that is to be expected and accepted; therefore a long-term perspective will be employed.

10. Internal Management

PSERS has developed skilled internal investment managers; as such internal investment management is preferred over external investment

management in cases where internal management most likely can match or exceed the long term, net of fees, risk-adjusted returns provided by External Managers, provided the internal investment and operational resources are available to do so.

11. Investment Fees

Investment management fees for external management are one of the few aspects of investment management that are certain and over which the investor has control.

Investment management and performance fees should be managed to (i) maximize long term, net of fees, risk-adjusted returns, (ii) split the value added fairly between the Investment Manager and PSERS, and (iii) align the interests of Investment Manager with PSERS.

Risk Management

Risk management is essential to the entire investment process. The goal of investment risk management is to find the appropriate balance between expected returns and the risks taken to generate those returns. An entirely risk-free investment portfolio that has a high probability of meeting all investment goals does not exist. Therefore, PSERS does not attempt to eliminate all risk but instead seeks to limit the possibility of permanent loss. Risk itself is neither good nor bad, but it is necessary that the System expose itself to some appropriate level of risk if it is to generate the long-term investment returns required to maintain stable and cost-effective contribution rates.

The future is difficult to forecast with any accuracy or certainty, particularly changes in the economic and market environment but PSERS can understand the future as a range of probabilities, some desirable and some not, and can position its current investments to guard against undesirable outcomes and to make desirable outcomes more likely. In positioning for future developments, PSERS cannot know with complete certainty how markets or particular investment strategies will perform. The strategic asset allocation mix, more than implementation or any other factor or decision, largely determines the portfolio's overall risk and return.

Section 3 Investment Information

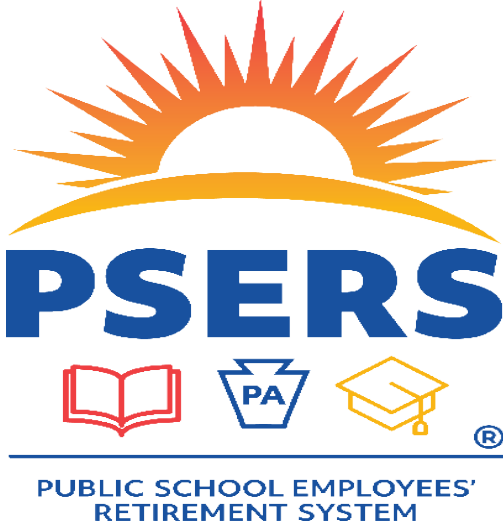
Investment Risk Management (continued)

Given its long-term investment horizon, PSERS accepts prudent investment risk in exchange for acceptable levels of additional incremental return. PSERS Board sets long-term asset allocation and risk parameters. The Investment Office implements

investment policies within these approved guidelines. The Investment Office works closely with PSERS Board to establish, monitor, and report its various risk metrics and has the required authority to efficiently and effectively implement associated actions.

The Policies of the Board can be found on the Investment page on PSERS website.

Capital Market Assumptions



Capital Market Assumptions

Capital Market Assumptions (CMAs) are estimates of expected returns and risks for a given set of asset classes, and expectations of the relationship (correlations) between these asset classes over long periods of time. They are issued periodically by investment consultants, asset managers, and investment banks. Inflation, real short-term interest rates, and economic data frequently provide the foundation used by CMAs for expected returns across global asset classes. These are the primary building blocks for developing equity and fixed income returns expectations, which in turn are used in setting expectations for alternative asset class returns. PSERS collects and evaluates this information when considering its long-term actuarial rates of return assumptions and in setting its Asset Allocation Policy.

Compared to 2020, 2021 survey results under the 20-year forecast indicate a decrease in return assumptions across most asset classes. CMAs are forecasting slower growth and lower asset returns over the coming decade than has been experienced in past decades. We elaborate on select asset classes below.

Fixed Income

Nominal government bond returns are a function of long-term expectations for inflation and government yields. Corporate bond returns are a function of expected inflation, government yields, and expectations for credit spreads, defaults and downgrades. Most of the decrease in bond return assumptions from 2016 – 2021 can be explained by falling yields and tightening credit spreads. In response to the COVID-19 pandemic, the Federal Reserve lowered the target range for the federal funds rate to 0% to 0.25% in 2020 and maintained the target range in 2021.

Equities

Equity return assumptions are driven by market valuations, earnings growth expectations and assumed dividend payouts: Non-US Equity return expectations have declined relative to 2020, driven

by rising valuations and slowing growth. Equity market return assumptions over the past few years have been driven by rising valuations.

Real Estate

Global real estate return assumption in 2021 decreased relative to expected returns from 2020. Lower initial yields and slowing growth impacted the real return assumption in 2021.

Hedge Funds

Hedge Fund assumptions reflect changes in the underlying equity, fixed income and cash capital market assumptions. Decrease in the hedge fund assumption from 2020 to 2021 reflect the declining expectations for fixed income and cash.

An alternative approach to asset allocation that is sometimes suggested to pension plans is to establish a stereotypical 60% equity/40% fixed income policy that remains static over time. Tables 9.1 and 9.2 illustrate one reason why such an approach would not be prudent. Because PSERS can select from a broad array of asset allocation alternatives, we can analyze alternative allocation strategies using asset classes with varying expected returns and expected risk in order to formulate an optimal asset allocation policy most likely to achieve the investment return and investment risk goals established by the Board. In recent years, lower risk projections have afforded PSERS valuable flexibility in identifying different combinations of asset allocations that can achieve our current long-term goal of 7.00% at acceptable levels of risk even as return assumptions have fallen. Furthermore, PSERS applies leverage opportunistically in implementing its asset allocation policy, providing an additional mechanism to increase expected volatility in order to target higher expected return when warranted. A stereotypical 60%/40% strategy would have precluded such flexibility and exposed the system to artificial and harmful limits on our ability to manage the Fund.

Section 3 Investment Information

Capital Market Assumptions (continued)

The table below summarizes the average expected capital market geometric return assumptions of 20-30 surveyed independent investment advisors in 2017 - 2021.

Table 9.1					
PSERS Capital Market Assumptions (CMA's)					
Average Expected Geometric Returns (2017 - 2021)					
Asset Class	2017 Survey	2018 Survey	2019 Survey	2020 Survey	2021 Survey
U.S. Equity - Large Cap	7.8%	7.4%	7.1%	7.1%	6.7%
U.S. Equity - Small/Mid Cap	8.4%	8.2%	7.5%	7.6%	7.0%
Non-U.S. Equity - Developed	7.6%	7.7%	7.7%	7.5%	7.1%
Non-U.S. Equity - Emerging	8.7%	8.8%	8.7%	8.4%	7.8%
U.S. Corporate Bonds - Core	4.4%	4.5%	4.3%	3.6%	3.2%
U.S. Corp Bonds - Long Duration	4.8%	4.4%	4.4%	3.6%	3.4%
U.S. Corporate Bonds - High Yield	6.2%	5.8%	5.8%	5.6%	5.0%
Non-U.S. Debt - Developed	3.5%	3.2%	3.4%	2.3%	2.3%
Non-U.S. Debt - Emerging	6.2%	6.1%	6.1%	5.9%	5.3%
U.S. Treasuries (Cash Equivalent)	3.2%	3.1%	3.0%	2.3%	1.9%
TIPS (Inflation-Protected)	4.0%	4.0%	3.5%	2.7%	2.4%
Real Estate	6.7%	6.7%	6.8%	6.6%	6.2%
Hedge Funds	6.0%	6.2%	6.2%	5.7%	5.3%
Commodities	5.0%	4.9%	4.7%	4.0%	4.0%
Infrastructure	7.1%	7.1%	7.2%	7.3%	6.8%
Private Equity	10.1%	9.5%	10.1%	9.9%	9.7%
Private Debt	—	—	7.8%	7.9%	6.9%
Inflation	2.4%	2.5%	2.3%	2.2%	2.2%

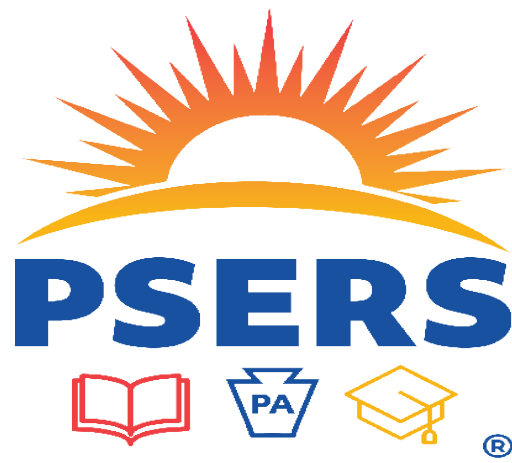
Section 3 Investment Information

Capital Market Assumptions (continued)

The CMA surveys also included forecasts for 20 year average expected risk (Table 9.2). The numbers below reflect the expected standard deviation in % around the expected return.

<u>Asset Class</u>	<u>2017 Survey</u>	<u>2018 Survey</u>	<u>2019 Survey</u>	<u>2020 Survey</u>	<u>2021 Survey</u>
US Equity – Large Cap	16.6%	16.4%	16.2%	16.2%	16.4%
US Equity – Small/Mid Cap	20.2%	20.2%	20.2%	20.2%	20.2%
Non-US Equity – Developed	18.9%	18.7%	18.2%	18.1%	18.3%
Non-US Equity – Emerging	25.4%	24.9%	24.7%	24.2%	24.3%
US Corporate Bonds – Core	5.5%	5.7%	5.5%	5.5%	5.5%
US Corporate Bonds – Long Duration	10.4%	10.8%	10.5%	10.2%	10.4%
US Corporate Bonds – High Yield	10.6%	10.2%	10.1%	9.8%	9.9%
Non-US Debt – Developed	7.4%	6.9%	7.6%	7.0%	7.2%
Non-US Debt – Emerging	11.8%	11.4%	11.3%	11.0%	11.3%
US Treasuries (Cash Equivalent)	3.0%	2.7%	2.3%	1.8%	1.3%
TIPS (Inflation-Protected)	6.3%	6.3%	6.1%	6.1%	5.6%
Real Estate	14.5%	13.9%	15.0%	16.8%	17.6%
Hedge Funds	8.0%	7.9%	8.4%	8.0%	8.1%
Commodities	17.9%	17.6%	17.7%	17.6%	17.3%
Infrastructure	14.6%	14.7%	14.4%	14.6%	17.0%
Private Equity	22.0%	22.2%	22.0%	22.0%	22.3%
Private Debt	—	—	11.6%	12.1%	11.4%
Inflation	1.7%	1.8%	1.7%	1.7%	2.1%

Asset Exposure and Investment Program Summary



PUBLIC SCHOOL EMPLOYEES'
RETIREMENT SYSTEM

Asset Exposure (as of June 30, 2021)

While the Board can choose to modify its asset allocation at any time it determines that changes are warranted (for example, due to changing liquidity circumstances or opportunities in the marketplace), the Board maintains a disciplined and thorough process to establish a new asset allocation policy annually. This process begins following the Board's review and acceptance of the actuary's annual report, as described in Tab 5. PSERS investment professionals and general investment consultant collaborate to analyze potential asset allocations (using actuarial as well as capital market return assumptions) in order to identify those potential asset allocations that meet the long-term return and risk objectives of the Fund. The Board is then presented with alternative

asset allocations with detailed analysis of probable long-term return and risk characteristics from which it will select a new Asset Allocation Policy for further implementation by staff.

The Board reviews the long-term asset allocation targets of the System at least annually. In establishing the asset allocation plan, the Board will consult with its actuary, consultants, investment staff, and other sources of information it deems appropriate in formulating this allocation. The purpose of the asset allocation is to meet the long-term financial needs and investment objectives of the System.

Section 3 - Investment Information

Asset Exposure (continued)

Table 10.1 represents PSERS asset exposure and target allocation plan that became effective April 1, 2021, and was in effect on June 30, 2021.

Table 10.1

PSERS Asset Exposure and Target Asset Allocation Plan (as of June 30, 2021)

<u>Asset Class</u>	<u>Market Value (in millions)</u>	<u>Percentage of Gross Asset Exposure</u>	<u>Percentage of Net Asset Exposure</u>	<u>Target Allocation %</u>	<u>Target Allocation Range</u>
Public Equity	\$ 17,079.0	22.5 %	24.8 %	27.0 %	
Private Equity	10,931.5	14.4 %	15.9 %	12.0 %	
Total Equity	\$ 28,010.5	36.9 %	40.7 %	39.0 %	± 5
Public Fixed Income*	\$ 16,188.7	21.3 %	23.5 %	27.0 %	
Private Credit	5,617.0	7.4 %	8.2 %	8.0 %	
Total Fixed Income	\$ 21,805.7	28.7 %	31.7 %	35.0 %	± 5
Public Commodities*	\$ 7,894.4	10.4 %	11.5 %	10.0 %	
Public Infrastructure*	4,894.5	6.4 %	7.1 %	4.0 %	
Public Real Estate*	1,760.1	2.3 %	2.6 %	3.0 %	
Total Public Real Asset	\$ 14,549.0	19.1 %	21.2 %	17.0 %	± 3
Private Commodities	\$ 282.9	0.4 %	0.4 %	0.0 %	
Private Infrastructure	480.1	0.6 %	0.7 %	4.0 %	
Private Real Estate	5,002.3	6.6 %	7.3 %	7.0 %	
Total Private Real Asset	\$ 5,765.3	7.6 %	8.4 %	11.0 %	± 3
Tail Risk Mitigation	\$ 36.6	— %	0.1 %	— %	
Absolute Return	\$ 5,858.5	7.7 %	8.5 %	8.0 %	± 3
Gross Asset Exposure	\$ 76,025.6	100.0 %	110.6 %	110.0 %	
Cash	\$ 3,020.0	4.0 %	4.4 %	3.0 %	
Explicit Leverage	(10,299.8)	(13.5)%	(15.0)%	(13.0)%	
Net Leverage	(7,279.8)	(9.5)%	(10.6)%	(10.0)%	10 to -20
Net Asset Exposure	\$ 68,745.8	100.0%	100.0%		

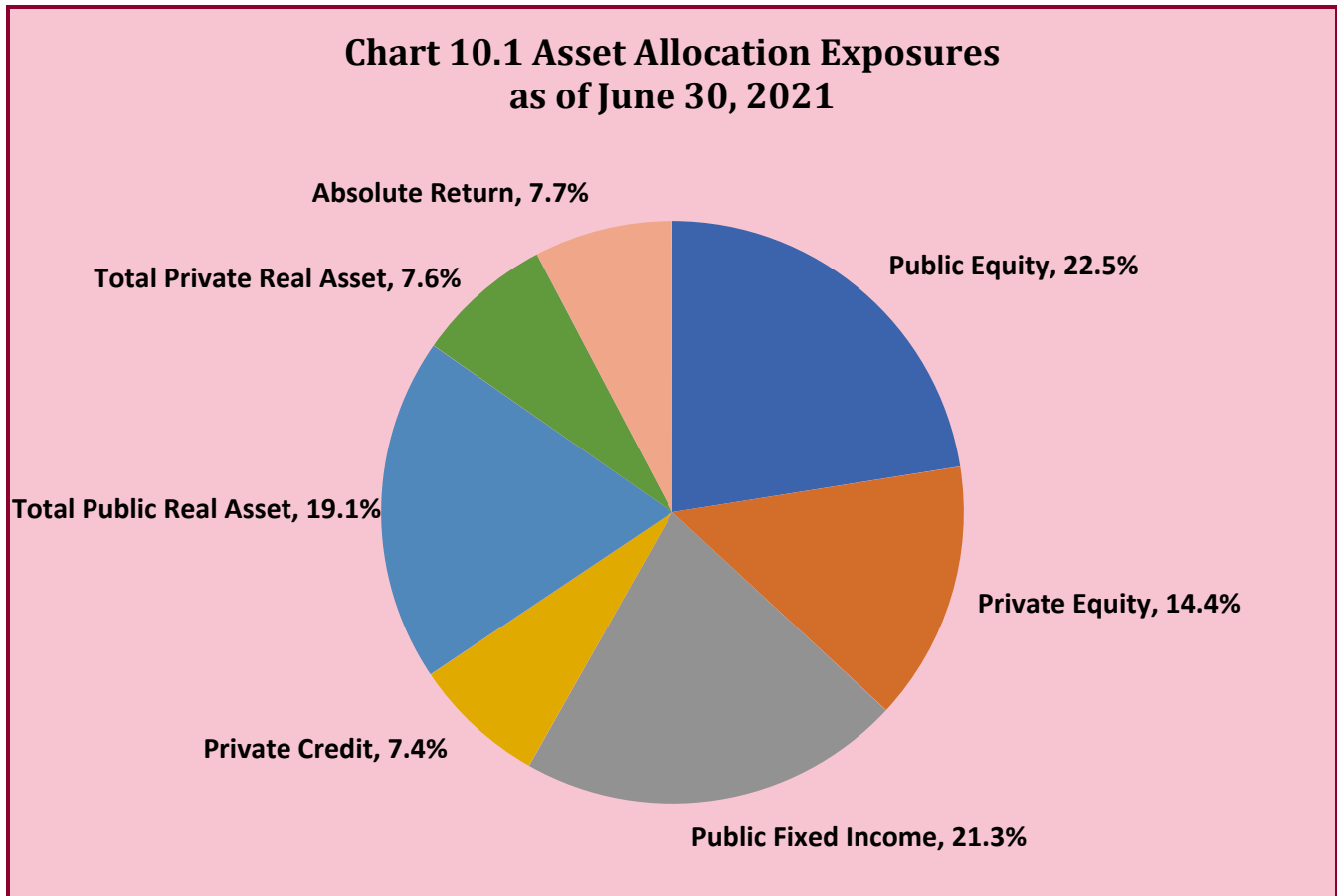
*PSERS uses leverage to achieve increased economic exposure to diversifying asset classes to manage the overall portfolio risk while maintaining an allocation designed to achieve the long-term return goals of the System. Increased economic exposure is generally achieved through the use of either derivative positions or higher volatility funds. As of June 30, 2021, PSERS had total increased economic exposure of \$10.3 billion related to the following asset classes: Equity (\$-.1 Billion); Fixed Income (\$3.3 billion); Infrastructure (\$1.4 billion); Real Estate (\$0.8 billion) and Commodities (\$4.9 billion). An allocation of 4% to Cash is included in the Target Allocation.

Note: PSERS asset allocation was updated December 17, 2021 and is available for review at <https://www.psers.pa.gov>

Section 3 - Investment Information

Asset Exposure (continued)

Chart 10.1 illustrates PSERS asset allocation exposure as of June 30, 2021:

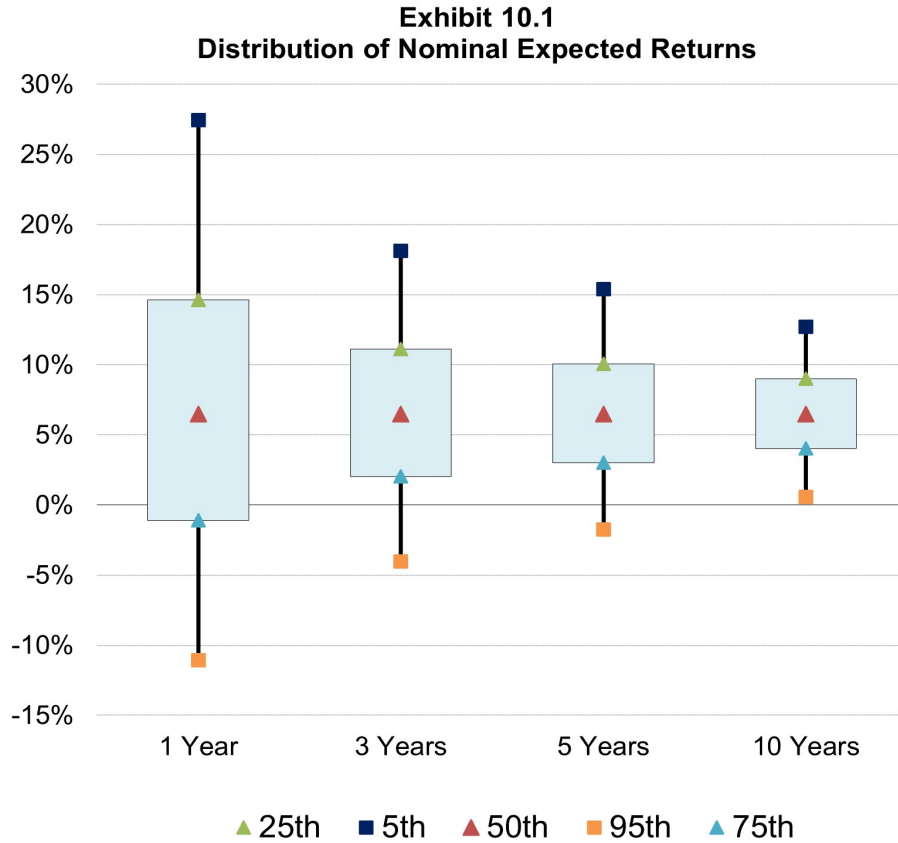


Note: Financing represents a negative 9.5% allocation and is not reflected in Chart 10.1.

Section 3 - Investment Information

Asset Exposure (continued)

The purpose of the asset allocation is to meet the long-term investment objectives of the System. PSERS considers the expected range of returns for 1, 3, 5, and 10 year periods of various alternative asset allocations (as seen in Exhibit 10.1) to select the optimal asset allocation annually. While the range of returns can be high for any single year, volatility will decrease and converge around a median return over time. This is demonstrated in Exhibit 10.1 below, which depicts expected future returns for PSERS current asset allocation:



Range of Returns				
Percentiles	1 Year	3 Years	5 Years	10 Years
5%	27.5%	18.1%	15.4%	12.7%
25%	14.6%	11.1%	10.0%	9.0%
50%	6.5%	6.5%	6.5%	6.5%
75%	(1.1)%	2.0%	3.0%	4.0%
95%	(11.1)%	(4.0)%	(1.8)%	0.6%

Source: Aon Hewitt's 30-year capital market assumptions as of June 30, 2021.

Public Market Investments

Public Equity Investments

PSERS seeks to diversify assets by obtaining broad exposure to publicly traded equity markets. Public Equity plays a strategic role within the Fund, by providing a return premium over inflation, thereby preserving and enhancing the real value of the Fund, and by performing well when economic growth is stronger than expected or inflation is lower than expected. To maintain diversification within the asset class, the Fund pursues a global investment strategy across regions, sectors, market capitalization segments, and investment styles.

Public Equity assets may be invested in instruments that provide equity returns. Instruments used may be exchange-traded or non-exchange-traded and may be physical securities or derivatives.

Private Equity Investments

PSERS seeks to diversify its assets by providing exposure to private investments as part of the overall investable universe and to take advantage of the ability to accept less liquidity in exchange for higher potential returns, stronger investor rights and protections, and better alignment of interests. Private Equity also provides access to investment opportunities not available in Public Equity markets. The Private Equity asset class targets risk-adjusted returns in excess of the benchmark, net of fees, over a full market cycle. The Private Equity portfolio will achieve diversification by investing in funds and co-investments that are complementary in nature regarding fund size, sector, strategic, geographic and industry focus, and vintage year.

Private Equity assets may be committed to, but not limited to, funds, co-investments, secondaries, separate accounts, joint ventures, partnerships, limited liability companies, and operating companies (collectively "Private Equity Investments") investing in Private Equity strategies. Private Equity Investments may result in exposure to any type of private (sometimes public) security throughout the capital structure. PSERS will only consider investment structures that provide limited liability to PSERS which limits PSERS losses to the amount invested.

Public Fixed Income Investments

PSERS seeks to diversify assets by obtaining broad exposure to publicly traded fixed income markets. Public Fixed Income plays a strategic role within the Fund in a variety of ways. Nominal bonds serve as a hedge against lower inflation and weak economic growth, produce current income in the form of periodic interest payments, and provide liquidity to meet the Fund's obligations. Inflation protected bonds serve as a hedge against higher inflation and weaker economic growth and provide liquidity. Credit-related securities such as emerging market debt and public high yield bonds generate higher current income relative to investment grade debt and tend to do well when economic growth is stronger than expected. To maintain diversification within the asset class, the Fund pursues a global investment strategy across regions, sectors, maturity segments, credit quality, and investment styles.

Public Fixed Income assets may be invested in instruments that provide fixed income returns. Instruments used may be exchange-traded or non-exchange-traded and may be physical securities or derivatives.

Private Credit Investments

PSERS seeks to diversify its assets by providing exposure to private investments as part of the overall investable universe and to take advantage of the ability to accept less liquidity in exchange for higher potential returns, stronger investor rights and protections, and better alignment of interests. Private Credit typically provides enhanced yields over publicly-traded fixed income markets and serves as a diversifier to the overall portfolio due to the variety of underlying collateral types not easily accessed in traditional asset classes. The Private Credit asset class targets risk-adjusted returns in excess of the benchmark, net of fees, over a full market cycle. The Private Credit asset class will achieve diversification by investing in funds, both

Private Credit Investments (continued)

closed-end and evergreen, and co-investments that are complementary in nature regarding fund size, sector, strategic focus, geographic and industry focus and vintage year.

Private Credit assets may be committed to, but not limited to, funds, co-investments, secondaries and separate accounts (collectively "Private Credit Investments") investing in Private Credit strategies. Private Credit Investments may result in exposure to diverse securities throughout the capital structure. Private Credit assets also allow for structures which may not conform precisely to the previous list but whose intent is to capture private credit exposure and returns. PSERS will only consider investment structures that provide limited liability to PSERS which limits PSERS losses to the amount committed.

Public Commodities Investments

PSERS seeks to diversify assets by obtaining broad exposure to publicly traded commodities markets. Commodity investments consist of energy, precious metals, industrial metals, and agricultural. The prices of commodities are determined primarily by near-term events in global supply and demand conditions and are positively related with both the level of inflation and changes in the rate of inflation. Public Commodities play a strategic role within the Fund, by providing a hedge against unanticipated inflation and diversification benefits. To maintain diversification within the asset class, the Fund pursues an investment strategy across all key commodities and across investment styles.

Public Commodities assets may be invested in instruments that provide publicly traded commodities returns. Instruments used may be exchange-traded or nonexchange-traded and may be physical securities or derivatives, and leverage may be employed. In the case of Gold, the instruments may include physical gold (bullion).

Public Infrastructure Investments

PSERS seeks to diversify assets by obtaining broad exposure to publicly traded infrastructure markets. Public Infrastructure investments target stable, defensive investments with steady cash flows primarily within the energy, power, water, and

transportation sectors. Public Infrastructure plays a strategic role within the Fund, by providing steady returns and cash yields, defensive growth, inflation protection, capital preservation, liquidity and diversification benefits. To maintain diversification within the asset class, the Fund pursues a global investment strategy across geographic regions, sectors, market capitalization segments, and investment styles.

Public Infrastructure assets may be invested in instruments that provide publicly-traded infrastructure returns. Instruments used may be exchange-traded or nonexchange-traded and may be physical securities or derivatives, and leverage may be employed.

Public Real Estate Investments

PSERS seeks to diversify assets by obtaining broad exposure to publicly-traded real estate markets. Public Real Estate provides a strategic role within the Fund, by providing steady returns and cash yields, inflation protection, defensive growth, capital preservation, liquidity and diversification benefits. To maintain diversification within the asset class, the Fund pursues a global investment strategy across geographic regions, property sectors, market capitalization segments, and investment styles.

Public Real Estate assets may be invested in instruments that provide publicly-traded real estate returns. These include, but are not limited to, US and Non-US publicly-traded real estate investment trusts (REITs). Instruments used may be exchange-traded or non-exchange-traded and may be physical securities or derivatives.

Private Infrastructure Investments (continued)

Private Infrastructure Investments

PSERS seeks to diversify its assets by providing exposure to private investments as part of the overall investable universe. Additionally, when compared to other investable opportunities, private investments are intended to provide exposure to higher potential returns, stronger investor rights and protections, and better alignment of interests. While providing a current income return and a potential hedge against inflation, Private Infrastructure also provides access to investment opportunities not available in Public Infrastructure markets. The Private Infrastructure asset class targets risk-adjusted returns in excess of the benchmark, net of fees, over a full market cycle. The Private Infrastructure asset class will achieve diversification by investing in funds, both closed-end and evergreen and co-investments that are complementary in nature regarding fund size, sector, strategic focus, regional footprint and vintage year.

Private Infrastructure assets can be committed to, but not limited to, funds, co-investments, separate accounts, joint ventures, partnerships, limited liability companies, and operating companies (collectively "Private Infrastructure Investments") investing in private infrastructure strategies. Private Infrastructure Investments may result in exposure to any type of security throughout the capital structure. Notwithstanding investments in Separate Accounts, PSERS will only consider investment structures that provide limited liability to PSERS which limits PSERS losses to the amount committed.

Private Real Estate Investments

PSERS seeks to diversify its assets by providing exposure to private investments as part of the overall investable universe and to take advantage of the ability to accept less liquidity in exchange for higher potential returns, stronger investor rights and protections, and better alignment of interests. Private Real Estate typically provides current income, appreciation, and a potential hedge against inflation, and serves as a diversifier to the overall portfolio. Private Real Estate also provides access to investment opportunities not available in the publicly traded real estate markets. The Private Real Estate asset class targets risk-adjusted returns in excess of the benchmark, net of fees, over a full market cycle. The Private Real Estate asset class will achieve diversification by investing in funds, both closed-end and evergreen, and co-investments that are complementary in nature regarding fund size, property type, strategic focus, regional footprint and vintage year.

Private Real Estate investments can be committed to, but not limited to, funds, co-investments, separate accounts, joint ventures, partnerships, limited liability companies, private REITS and real estate operating companies (collectively "Private Real Estate Investments") investing in private real estate strategies. Private Real Estate Investments may be considered throughout the entire capital structure. Notwithstanding investments in Separate Accounts, PSERS will only consider investment structures that provide limited liability to PSERS which limits PSERS losses to the amount committed.

Private Real Estate Investments (continued)

Absolute Return Investments

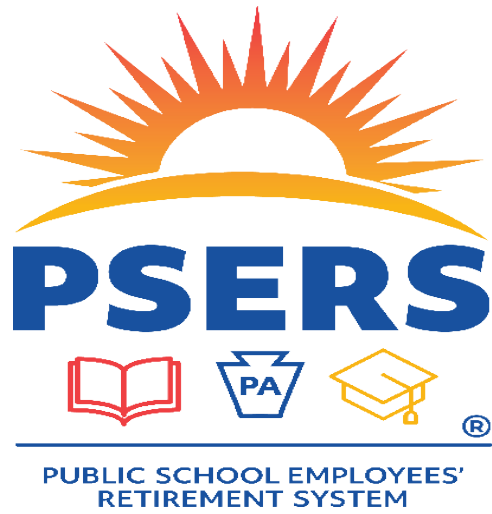
Through investment in Absolute Return strategies, PSERS seeks to reduce the risk and/ or enhance the returns of PSERS overall investment program through investment in a diversified basket of portfolios. The Absolute Return asset class targets managers which provide idiosyncratic returns and portfolios that exhibit low correlation to equities, fixed income, commodities, and other sources of low cost beta over a full market cycle. The Absolute Return asset class targets risk-adjusted returns in excess of the benchmark, net of fees, over a full market cycle. The Absolute Return asset class will achieve diversification by investing in funds, both closed-end and evergreen, and co-investments that are complementary in nature regarding fund size, sector, and strategic focus.

All strategies are eligible for inclusion in the Absolute Return asset class including event driven, relative value, tactical trading, and long/short equity. Investments are diversified by strategy in order to reduce the impact from any one strategy. Absolute Return assets can be committed to, but not limited to, funds, co-investments, separate accounts, joint ventures, partnerships, and limited liability companies (collectively “Absolute Return Investments”) investing in Absolute Return strategies. Absolute Return Investments may result in exposure to diverse securities throughout the capital structure. This Policy also allows for structures which may not conform precisely to the previous list but whose intent is to capture absolute return exposure and returns. PSERS will only consider investment structures that provide limited liability to PSERS which limits PSERS losses to the amount committed.

The Board of Trustees voted to end the Absolute Return program in December 2021, and it is anticipated it will be fully liquidated over the next few years.

PSERS Asset Class Policies can be found on our website at <https://www.psers.pa.gov/About/Investment/Pages/Guide.aspx>

Performance



Section 3 - Investment Information

Performance

PSERS general investment consultant 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, 2021, the System generated a total net of fee return of 24.58%. This

return exceeded the Total Fund Policy Index return of 20.58% by 400 basis points. Annualized total net of fee returns for the three-, five-, and ten-year periods ended June 30, 2021 were 10.35%, 10.10%, and 8.04%, respectively. The three-, five-, ten-year return ended June 30, 2021 exceeded the Total Fund Policy Index returns by 25, 71, and 44 basis points respectively.

Table 11.1 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:

Table 11.1	Annualized Total Returns (%) Net of Fees Ended June 30, 2021					
	1 Year	3 Year	5 Year	10 Year	15 Year	20 Year
PSERS Total Fund	24.58	10.35	10.10	8.04	6.64	7.14
Total Fund Policy Index	20.58	10.10	9.39	7.60	6.45	6.57
Median Public Defined Benefit Plan (DBP) Fund Universe (Aon Hewitt Database)	26.98	10.86	10.55	8.22	7.01	6.88
60% Global Equity / 40% Barclays U.S. Aggregate Bond Index	22.27	11.53	10.59	7.62	6.79	6.69
PSERS U.S. Equity Portfolios	46.73	17.77	17.32	14.54	10.49	9.00
U.S. Equity Policy Index	45.60	17.88	17.39	14.47	10.62	8.94
PSERS Non-U.S. Equity Portfolios	40.41	13.69	14.78	9.01	7.92	9.02
Non-U.S. Equity Policy Index	35.56	10.51	12.36	7.32	6.37	7.72
PSERS Fixed Income Portfolios (4)	6.16	7.07	6.60	6.36	7.18	7.13
Fixed Income Policy Index	3.77	6.93	5.19	4.39	5.96	5.89
PSERS Commodity Portfolios (4)	14.36	9.11	5.73	-0.66	N/A	N/A
Commodity Policy Index	14.65	3.78	1.83	-3.28	N/A	N/A
PSERS Absolute Return Portfolios	12.72	4.73	5.60	4.23	5.28	N/A
Absolute Return Policy Index	16.16	7.86	6.68	6.36	6.90	N/A
PSERS Infrastructure Portfolios	19.60	14.08	-2.34	-1.48	0.86	1.34
Infrastructure Policy Index	14.78	0.74	2.70	N/A	N/A	N/A
PSERS Real Estate (2) (4)	14.72	8.18	9.29	10.18	4.72	8.08
Blended Real Estate Index	12.17	5.63	7.39	9.34	7.45	8.49
PSERS Alternative Investments (3)	57.14	18.75	17.35	12.56	12.16	11.71
Burgiss Median, Vintage Year Weighted Index	42.48	16.46	15.93	13.12	10.57	8.52
<i>Other Footnotes to the Total Portfolio are available on page 102 of PSERS Annual Comprehensive Financial Report.</i>						

Performance (continued)

The past fiscal year was positive for the System with a net of fee return of 24.58%, exceeding the Total Fund Policy Index by 4.00%. The following asset classes were significant contributors to absolute returns this past fiscal year:

- U.S. Small Cap Equities, as represented by the S&P SmallCap 600 Index, were up 67.4%. U.S. small cap stocks performed well due to supportive fiscal and monetary stimulus measures, the rollout of the vaccine, and a stronger than expected economic recovery.
- Private Equity, as represented by Burgiss Private Equity, was up 42.5%.

Significant detractors from absolute performance this past fiscal year included:

- U.S. Long Treasuries, as represented by the Bloomberg U.S. Long Treasury Index, were down 10.6%. Returns in long-term treasuries were driven by rising interest rates.
- Gold, as represented by the Bloomberg Gold Subindex Total Return, was down 3.9%.

As noted, two of the best performing asset classes this past fiscal year were U.S. Small Cap Equities and Commodities, which were both up over 45%, while one of the worst performers was U.S. Long Treasuries, returning -10.6% for FY2021. This illustrates the importance of diversification. 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 outcomes. The System diversifies simply because it does not 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. PSERS employs diversification across a wide variety of public and private markets. Exposure to U.S. Equities, Commodities, and Private Equity aided the System's overall performance during the past fiscal year. Diversification into asset classes such as U.S. Long Treasuries and Gold resulted in a drag on overall performance.

In analyzing performance, PSERS Board, general investment consultant and staff pay attention to the Sharpe ratio, which tells an investor what portion of a portfolio's performance is associated with risk taking. The Sharpe ratio measures a portfolio's added value relative to its total risk; the higher a portfolio's Sharpe ratio, the better its risk-adjusted return. PSERS Sharpe ratio, as calculated by the general investment consultant, was 1.22 for the 5-year period ending June 30, 2021, a top 3rd percentile score among public pension plans with assets above \$1 billion.

During the past fiscal year, the equity markets performed strongly due to supportive monetary and fiscal stimulus measures and optimism of an economic recovery. Since the COVID-19 pandemic, U.S. fiscal stimulus totaled approximately \$6 trillion from early 2020 throughout the end of June 2021. Due to the vaccination efforts in the U.S. outpacing those other regions, U.S. stocks were the top performing region within the global equity market. In the U.S., economic activity rebounded as vaccination rates increased and lockdown restrictions eased. Non-U.S. stocks lagged their U.S. counterparts due to COVID-19 cases increasing more rapidly and economies growing more slowly.

Section 3 - Investment Information

Performance (continued)

In response to the COVID-19 pandemic major central banks implemented accommodative monetary policies. In the U.S., the Federal Reserve kept the target range for the federal funds rate to 0% to 0.25% in 2021 and projected to increase rates in 2022 due to elevated inflation. Headline inflation, as measured by the Consumer Price Index, rose by 5.4% over the fiscal year. The U.S. nominal yield curve shifted upward as yields rose across medium- to longer-term maturities during the fiscal year. The 10-year U.S. Treasury yield ended the fiscal year at 1.45%, 79 basis points lower than the beginning of the year. The sharp increase in interest rates resulted in a negative return for long government bonds. Due to optimism of an economic recovery and rising interest rates, investors flocked away from safe-haven assets, such as gold.

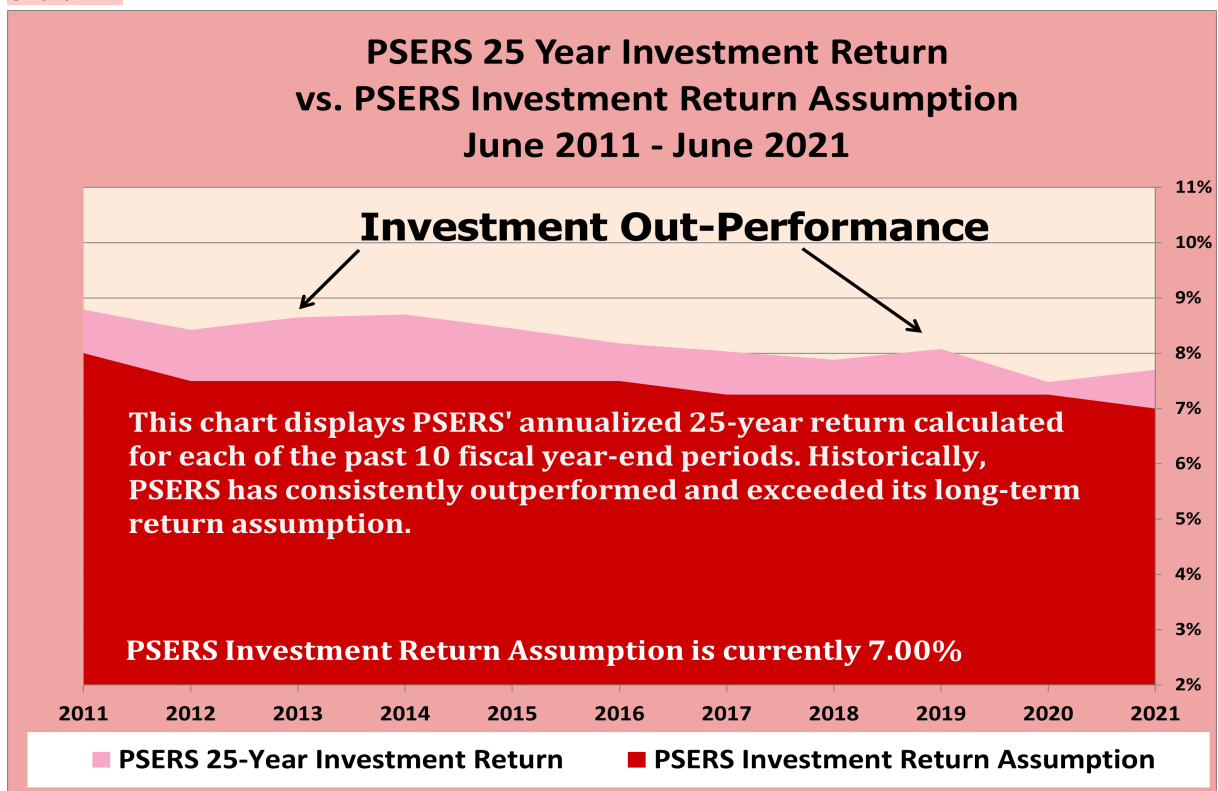
Commodities produced strong positive returns over the 12 months ended June 30, 2021, largely driven by the energy sector and rising crude oil prices. Oil prices advanced sharply as consumer demand returned around the world due to the increase of vaccination rates and easing of lockdown restrictions. Oil prices rose to their highest level in three years after failing into negative territory for the first time in April 2020 when investors faced storage facility shortages and a decreasing demand because of the COVID-19 pandemic. The price of MTI crude oil increased by ~87% over the past 12 months to US\$73/bbl.

Long Term Investment Performance Consistently Outperforms

The assets of the System are invested to maximize the returns for the level of risk taken. Chart 11.1 shows PSERS 25-Year Trailing Investment Return for each of the past 10 fiscal years and Chart 11.2 depicts PSERS Fiscal Year Investment Return versus PSERS Investment Return Assumption for the past 10 fiscal years.

As shown in Chart 11.1, the 25-year trailing investment return has exceeded the investment return assumption over the last ten years including the Great Recession.

Chart 11.1



Section 3 - Investment Information

Performance (continued)

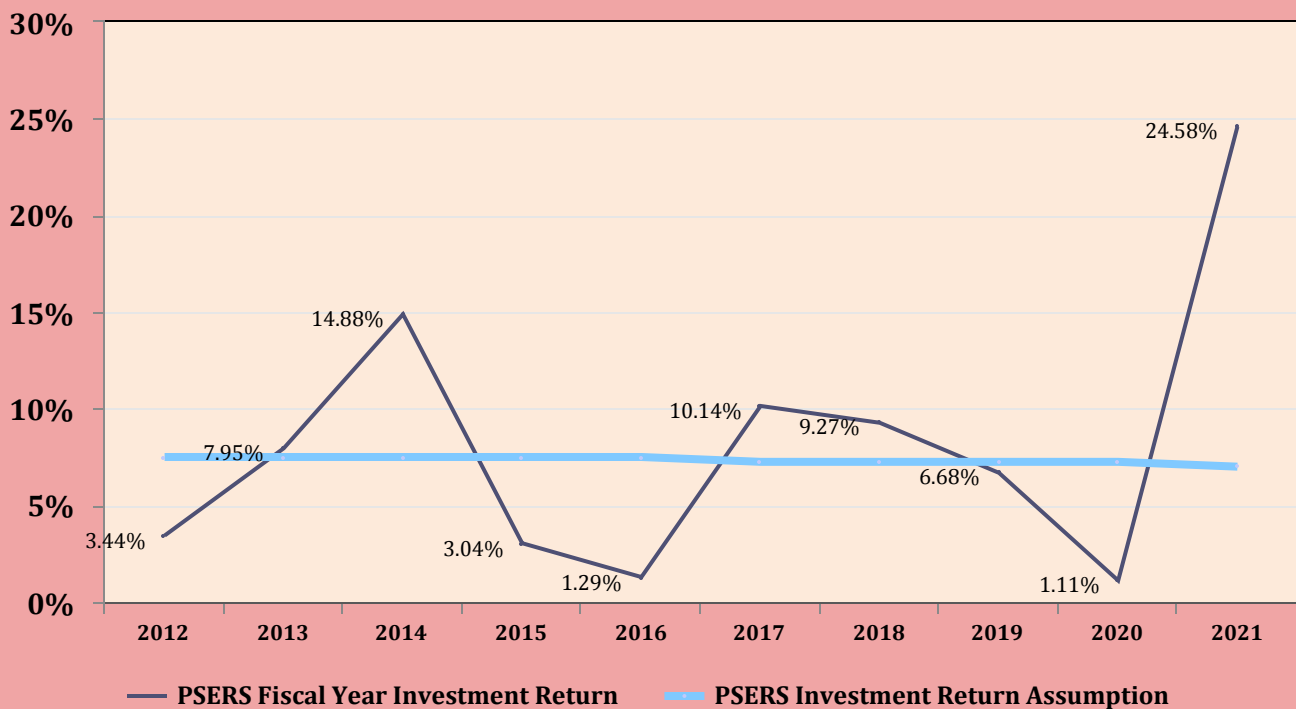
PSERS ten-year annualized net of fee return has been 8.04%, exceeding the actuarial assumed rate of return of 7.00%. With interest rates at historically low levels, the System needs to take prudent risks to achieve its long-term goal of a 7.00% return. An important concept to remember from the last sentence is “long-term.” The System has built a diversified allocation to allow it to collect risk premia over the long- term.

In the short term, no one knows what will happen, and the System can experience periods of time of sub-7.00% annual returns. The System continues to

believe the best way to achieve its long-term objectives is to maintain a very diversified portfolio which includes all asset classes available to it, such as equities, fixed income, and real assets. In any given year, the System expects some assets to perform well, such as U.S. Small Cap Equities and Commodities did this past fiscal year, and some assets to not perform as well, such as U.S. Long Treasuries this past fiscal year. However, over the long term, the System expects each of its asset classes to generate a positive return commensurate with the risks taken. The future is uncertain, but PSERS believes it is well positioned to accomplish its objectives.

As depicted in chart 11.2, PSERS one-year investment return was well above the investment return assumption for the fiscal year 2021. Five of the ten fiscal years, it performed above the assumption.

**Chart 11.2 PSERS Fiscal Year Investment Return vs. PSERS Investment Return Assumption
June 2012 - June 2021**



Section 3 - Investment Information

Performance (continued)

Table 11.2 demonstrates that over the past 22 fiscal years, on average, every dollar PSERS has spent in investment fees and expenses has resulted in investment earnings of \$2.04 above the Policy Benchmark's dollar returns.

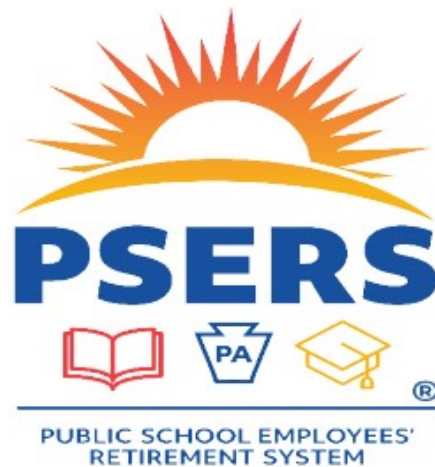
Table 11.2

PSERS Investment Earnings over Policy Benchmark Fiscal Years Ended June 30

Fiscal Year	Total Investment Expenses *	PSERS Net Return over Policy Benchmark (AFTER Payment of all Expenses)	PSERS Investment Earnings over Policy Benchmark Net of Total Investment Expenses *	\$'s of Gross Alpha for every \$1 of Investment Expenses
2021	\$618	4.00%	2,181	4.53
2020	515	(1.47)%	(816)	(0.59)
2019	450	(1.22)%	(653)	(0.45)
2018	468	1.03%	514	2.10
2017	474	1.75%	801	2.69
2016	416	(1.96)%	(996)	(1.39)
2015	455	0.05%	9	1.02
2014	482	0.50%	222	1.46
2013	558	1.27%	579	2.04
2012	481	1.09%	518	2.08
2011	515	1.02%	415	1.81
2010	522	2.20%	890	2.71
2009	478	(5.22)%	(3,133)	(5.55)
2008	399	(0.98)%	(618)	(0.55)
2007	314	4.36%	2,360	8.52
2006	211	3.26%	1,635	8.75
2005	193	2.36%	1,090	6.65
2004	191	3.51%	1,388	8.27
2003	179	(0.42)%	(142)	(0.21)
2002	163	0.56%	319	2.96
2001	144	2.13%	1,200	9.33
2000	125	1.85%	934	8.47
Total	\$8,351		8,697	\$2.04

*Dollar amounts in millions.

Managing Investment Fees, Expenses, and Carried Interest

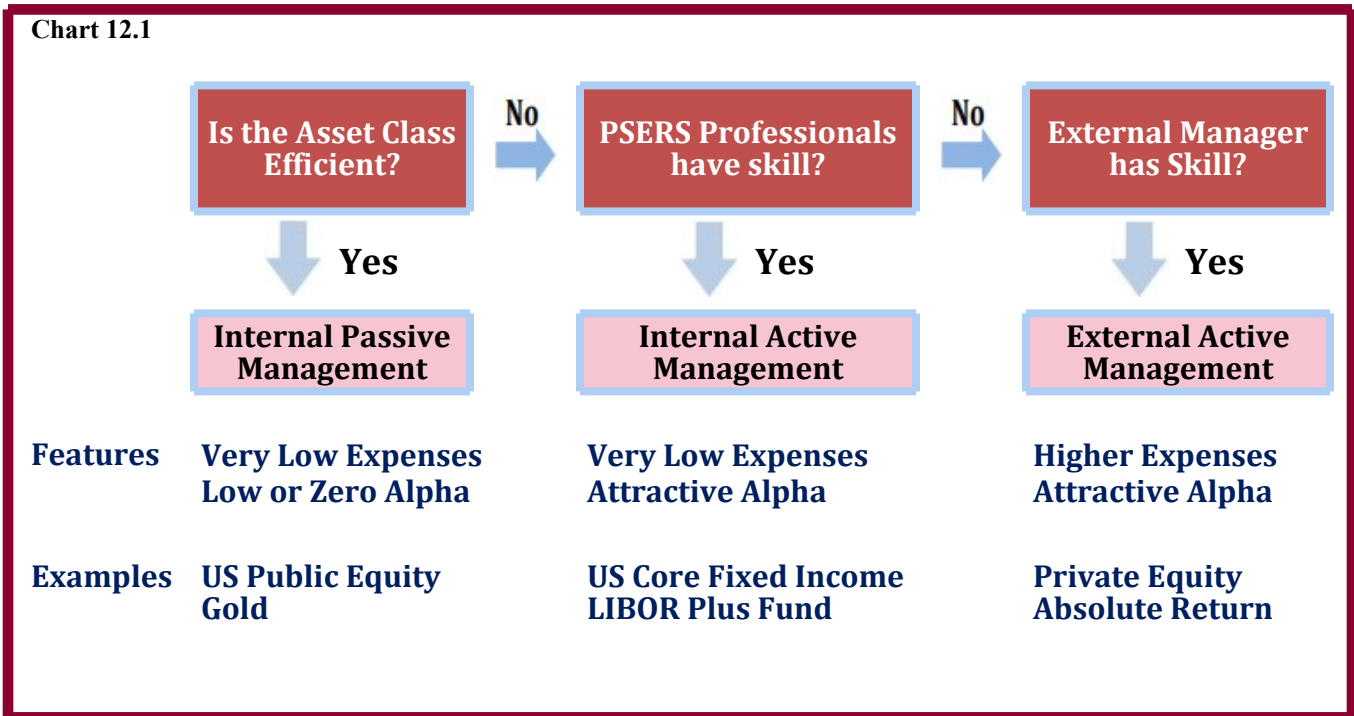


Section 3 - Investment Information

Managing Investment Fees, Expenses, and Carried Interest

PSERS investment professionals annually formulate an Asset Allocation Policy (as more fully described in Tab 9) with input from the general investment consultant, and work on an ongoing basis to implement the Policy through identification of attractive investment strategies and well-qualified investment managers. The Board reviews and approves the long-term asset

allocation targets of the System annually. A fundamental part of this implementation process is making key decisions with regard to use of active or passive strategies implemented by internal professionals or external investment managers, as depicted in Chart 12.1.



Management of investment fees and expenses is integrated into the process of making these key decisions, so analysis of these costs must also occur within this context. If one assumes that, under PSERS Asset Allocation Policy, all of PSERS investments could be made in a passive manner resulting in negligible fees and expenses while earning investment returns equal to the Policy Benchmark, then one can also assume that all of PSERS actual investment fees and expenses are incurred with the goal of earning investment returns that exceed the Policy Benchmark (of course, as the prudent investor realizes, not all investments can be made in passive strategies, not

all passive strategies have low fees, and not all passive strategies deliver the market returns targeted). These assumptions allow PSERS to analyze how much excess investment return above the Policy Benchmark the System has been able to generate over time for the level of fees and expenses actually paid.

PSERS ability to select a prudent combination of both internal and external managers, and both active and passive strategies, has generated and continues to generate significant excess risk-adjusted, net of fee returns relative to the Policy Benchmarks.

Section 3 - Investment Information

Managing Investment Fees, Expenses, and Carried Interest (continued)

Chart 12.2 below demonstrates that over the past 22 fiscal years, PSERS has earned \$8.8 billion in additional investment returns above the Board-approved Policy Index, net of fees.

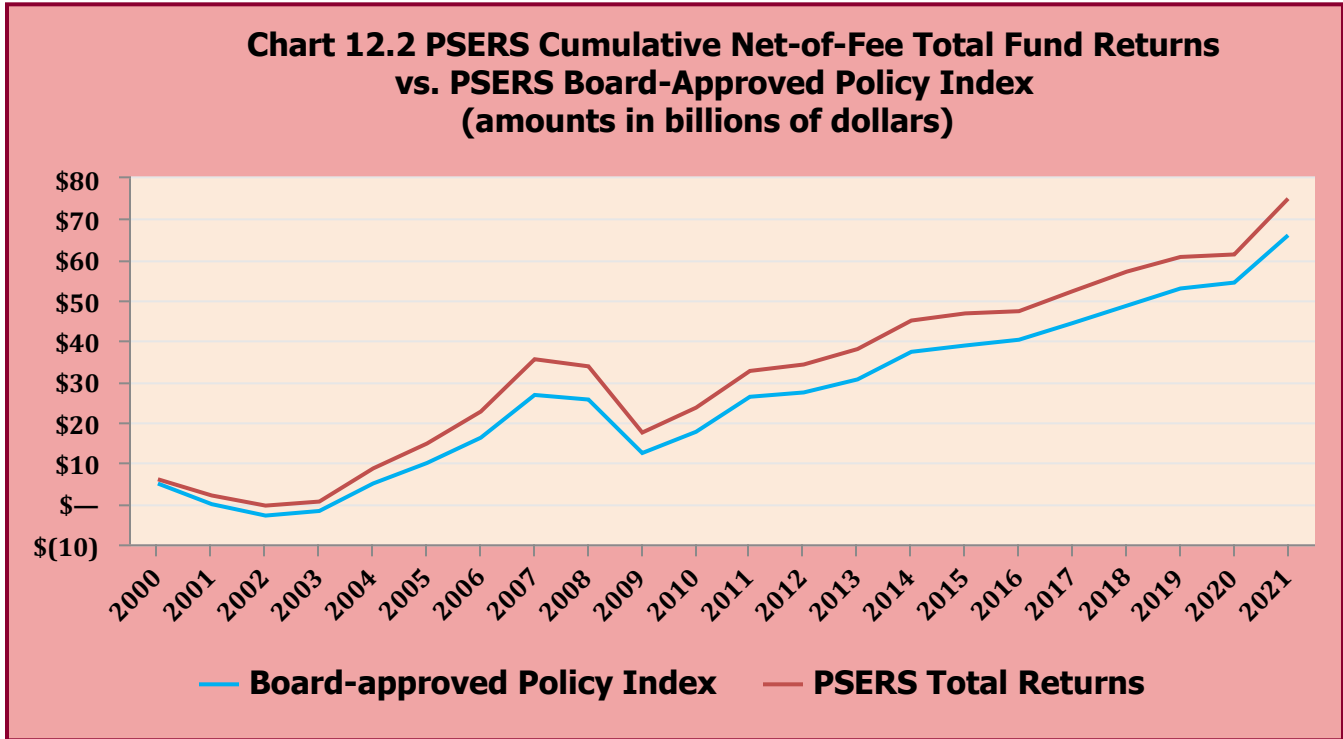
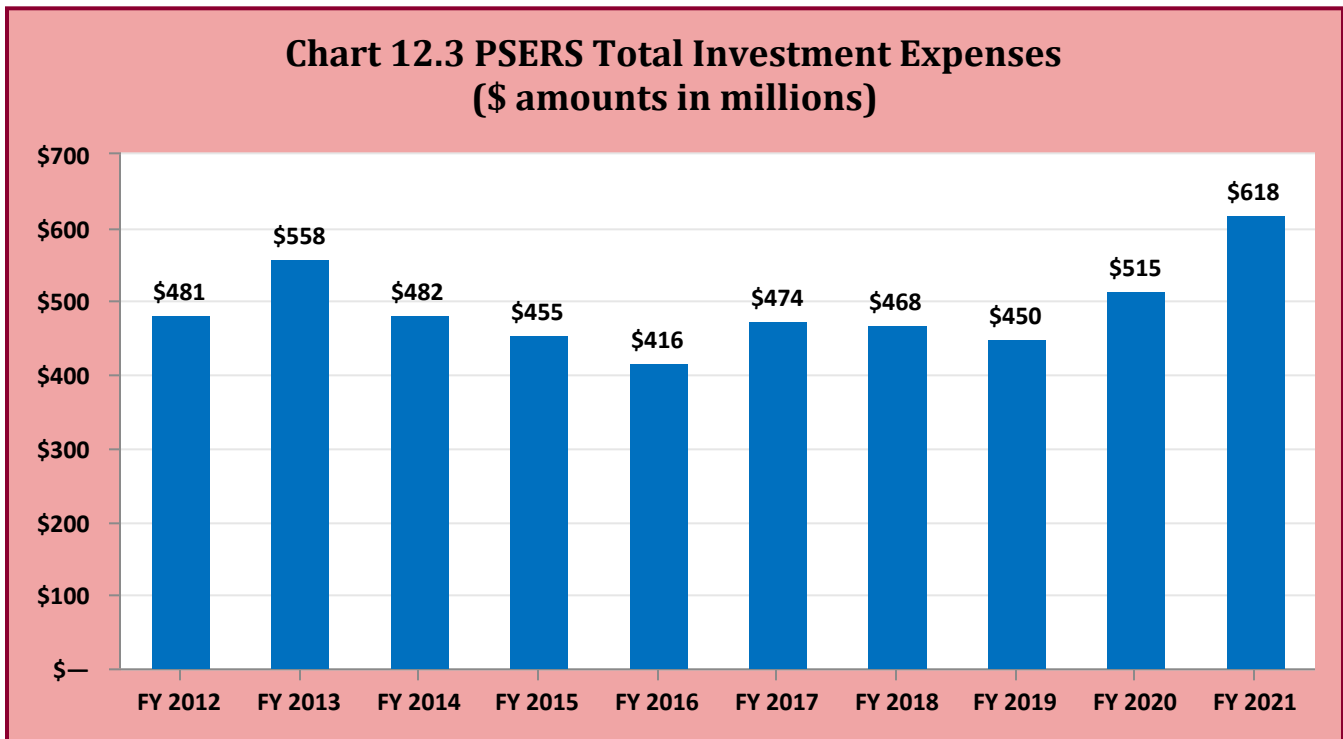


Chart 12.3 shows PSERS Total Investment Expenses over the past ten fiscal years



Section 3 - Investment Information

Key Decision: Internal vs. External Investment Management

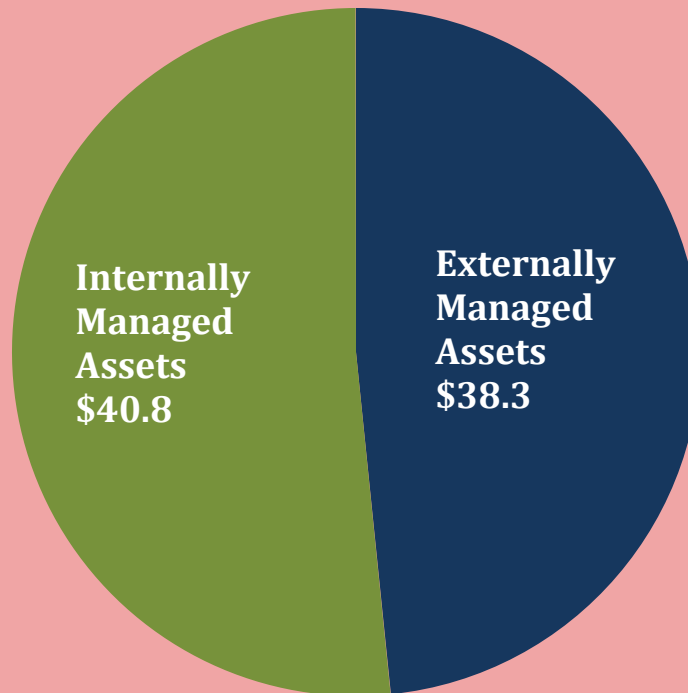
PSERS generally prefers to assign investment management responsibilities to internal professionals rather than to external investment management companies when certain conditions are present (see Chart 12.1). For example, it must be clear that internal professionals can achieve risk-adjusted returns that are at least equal to what might be earned by external investment managers in equivalent strategies, and PSERS investment professionals must simultaneously have the operational capacity to take on the additional work. When assets are assigned to PSERS professionals, the total costs (e.g., salary and benefits, computers and office supplies) are much lower than using

even the largest “very low fee” index mutual fund companies charge, giving PSERS a significant advantage.

When PSERS does select external investment managers, the decision is based in part on the fees the System has negotiated and in part on the likelihood the manager will meet or exceed the performance expected. Fee negotiations begin with the expectation that the contract with the investment manager will have a “Most Favored Nations” clause guaranteeing that PSERS fees will be at least as low as other clients with a similar investment amount, and the System then negotiates fees lower from that point wherever possible.

Chart 12.4 displays the distribution of PSERS managed assets as of June 30, 2021.

**Chart 12.4 PSERS Asset Exposures under Management
as of June 30, 2021
(\$ Billions)**



Note: Financing represents a negative \$7.3 billion allocation exposure and is not reflected in Chart 12.4.

Section 3 - Investment Information

Key Decision: Internal vs. External Investment Management

PSERS investment staff managed 27 portfolios internally, with a total estimated net asset value of over \$40 billion on June 30, 2021, resulting in significant fee savings. For the entire fiscal year,

PSERS incurred costs of approximately \$26 million to manage these portfolios internally, as well as oversee all of the external managers, manage the asset allocation, oversee risk, and perform other tasks in managing the overall investment program.

As shown in Table 12.1 below, managing these assets externally would have cost PSERS over \$42 million in additional fees (\$ amounts in thousands):

Table 12.1

Internally Managed Accounts as of June 30, 2021

Account	Asset Class	Market Value as of 6/30/21*	Estimated Annual Fee %	Estimated Cost to Manage Externally
PSERS - S&P 500 Index	U.S. Equities	\$ 4,904,289	0.05%	\$ 2,452
PSERS - S&P 400 Index	U.S. Equities	831,065	0.03%	249
PSERS - S&P 600 Index	U.S. Equities	872,493	0.04%	349
Misc. PSERS Equity Accounts	U.S. Equities	1,201	0.00%	—
U.S. Equities Total		\$ 6,609,048		\$ 3,050
PSERS ACWI ex. U.S. Index**	International Equity	3,326,292	0.17%	5,655
Emerging Markets Equity	International Equity	322,774	0.03%	97
International Equity		\$ 3,649,066		\$ 5,752
Private Equity Co-Investments	Private Equity	1,053,984	1.00%	10,540
FIGS, Inc.	Private Equity	498,174	0.10%	498
Private Equity Total		\$ 1,552,158		\$ 11,038
Private Credit Co-Investments	Fixed Income	149,811	1.00%	1,498
PSERS Active Aggregate	Fixed Income	651,261	0.21%	1,368
PSERS TIPS Portfolio	Fixed Income	1,122,225	0.13%	1,459
PSERS TIPS SIP**	Fixed Income	3,312,937	0.03%	994
PSERS Funded Passive U.S.	Fixed Income	3,045,360	0.03%	914
PSERS Long Treasuries	Fixed Income	4,511,856	0.03%	1,354
Active High Yield**	Fixed Income	204,358	0.44%	899
Fixed Income Total		\$ 12,997,808		\$ 8,486
PSERS Infrastructure Index	Infrastructure	2,731,400	0.03%	819
PSERS Public Infrastructure**	Infrastructure	1,222,614	0.35%	4,279
Infrastructure Co-Investments	Infrastructure	35,697	1.00%	357
Infrastructure Total		\$ 3,989,711		\$ 5,455
PSERS Commodity Beta**	Commodities	2,640,862	0.03%	792
PSERS Gold Fund**	Commodities	4,324,467	0.03%	1,297
Private Commodities Co-Investments	Commodities	57,247	1.00%	572
Commodities Total		\$ 7,022,576		\$ 2,661
PSERS REIT Index**	Real Estate	1,526,244	0.03%	458
Real Estate Co-Investments	Real Estate	70,388	0.49%	345
Real Estate Direct Investment	Real Estate	298,460	0.50%	1,492
Real Estate Total		\$ 1,895,092		\$ 2,295
Absolute Return Co-	Absolute Return	13,347	1.00%	133
Absolute Return Total		\$ 13,347		\$ 133
Tail Risk Mitigation**	Tail Risk	36,589	1.50%	549
Tail Risk Total		\$ 36,589		\$ 549
PSERS Cash Management	Cash Management	3,019,957	0.10%	3,020
Cash Management Total		\$ 3,019,957		\$ 3,020
Grand Total		\$ 40,785,352		\$ 42,439

**Market values include cash and derivatives exposure

Key Decision: Active vs. Passive Investment Management

Passive investment strategies form the basis that the Fund uses to attain market exposure in many public market asset classes. The advantage of passive strategies, such as indexing, is that they are generally very inexpensive to implement. If solely using passive strategies, however, performance will be limited to general market performance with little or no potential for excess earnings.

PSERS evaluates and selects active managers on a case by case basis with strong emphasis on understanding the manager's sustainable investment edge. If PSERS investment professionals and consultants have conviction that the manager's process will generate attractive and potentially uncorrelated risk-adjusted net of fee returns in excess of the most competitive passive benchmarks, the active manager will be considered. Active strategies are also used by PSERS in asset classes where passive strategies are not available, such as Private Equity.

In selecting active managers, PSERS strives to hire managers that meet the following criteria:

- have a unique insight or process;
- have the ability to add long-term excess returns above passive alternatives, net of fees;
- have adequate capacity to execute the strategy;
- add diversification to PSERS existing investment structure;
- do not exhibit style drift; and
- exhibit a high level of ethical behavior.

The advantage of active strategies is that they endeavor to generate net of fee returns in excess of the passive alternatives, if available, and/or provide diversification benefits which help manage total portfolio risk. The disadvantages of active strategies include being more expensive to implement than passive strategies and the risk that they may underperform passive strategies.

PSERS regularly measures the performance of active strategies relative to alternative passive strategies. In cases where PSERS is not receiving investment earnings from its active strategies in excess of alternative passive strategies, when all investment fees are taken into account, capital is redeployed either to other active strategies or to passive strategies. If PSERS determines that the active managers are not meeting expectations as a group, the Fund would endeavor to exit active strategies altogether and move to a purely passive implementation.

Section 3 - Investment Information

Investment Advisory Fees

Table 12.2 summarizes total investment expenses for the fiscal year ended June 30, 2021. “Total External Management” includes all fees paid to external investment managers as either a base fee or a share of profits earned (performance fee). “Total Internal Management” includes all staff salaries related to PSERS Investment Office as well as costs needed to support their work (e.g., vendor services, hardware and software, office supplies). “Total Other Expenses” include fees paid to the custodian bank, consultants, and legal services providers.

Table 12.2

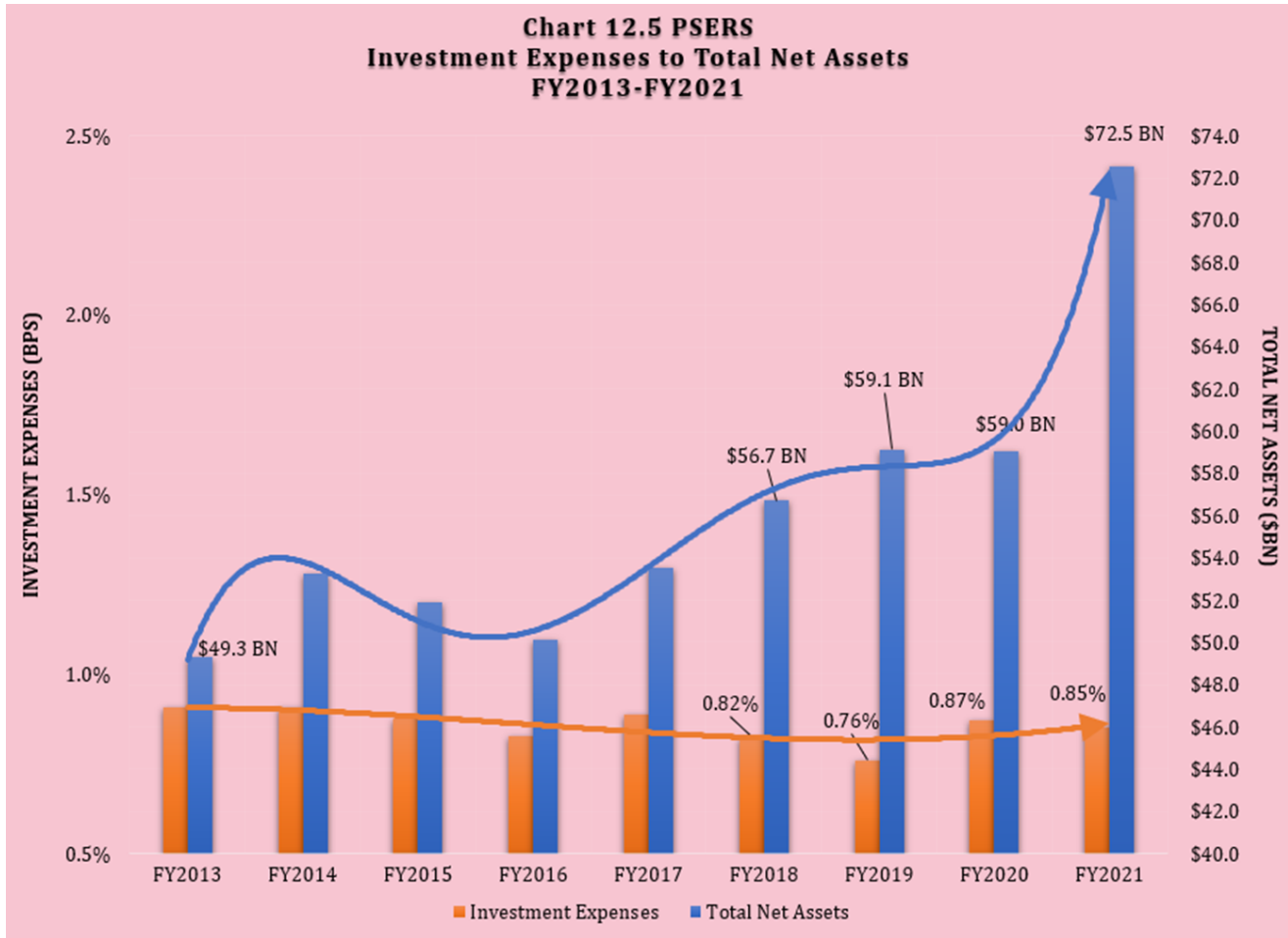
Summary of Investment Advisory Fees Fiscal Year Ended June 30, 2021 (Dollar Amounts in Thousands)

	<u>Base Fees</u>	<u>Performance Fees</u>	<u>Total Fees</u>	<u>Basis Points</u>
External Management				
Domestic Equity	\$ 558	\$ 2,500	\$ 3,058	123
International Equity	26,486	66,575	93,061	172
Fixed Income	35,364	27,304	62,668	83
Private Credit	57,990	—	57,990	108
Real Estate	51,618	—	51,618	104
Alternative Investments	101,569	—	101,569	119
Absolute Return	93,073	102,585	195,658	298
Commodities	7,259	—	7,259	207
Infrastructure	5,052	—	5,052	43
Master Limited Partnerships	786	1,686	2,472	32
Risk Parity	4,021	—	4,021	75
Defined Contribution	97	—	97	158
Total External Management	\$ 383,873	\$ 200,650	\$ 584,523	153
Total Internal Management			\$ 26,407	7
Total Investment Management			\$ 610,930	83
Custodian Fees			\$ 2,496	
Consultant & Legal Fees			4,626	
Total Other Expenses			\$ 7,122	
Total Investment Expenses			\$ 618,052	84

Section 3 - Investment Information

Investment Advisory Fees (continued)

Increasing the number and size of portfolios managed internally has been a core initiative in reducing PSERS Total Investment Expenses in recent years. As Chart 12.5 illustrates, Total External Management fees have remained fairly even from Fiscal Year 2013 to Fiscal Year 2021, while Total Net Assets have increased significantly from \$49.3 billion to \$72.5 billion. It is worth noting that these decreases have occurred while Total Internal Management and Total Other Expenses have remained flat.



Section 3 - Investment Information

External management fees are treated as a reduction of the investment revenue of the Fund rather than as a budgeted administrative expense.

Table 12.3

Investment Fees by Manager Fiscal Year ended June 30, 2021 (Dollar amounts in Thousands)

<u>Manager</u>	<u>Base Fees</u>	<u>Performance Fees</u>	<u>Total</u>
U.S. Equity			
Radcliffe Capital Management LP	\$ 558	\$ 2,500	\$ 3,058
Total - U.S. Equity	\$ 558	\$ 2,500	\$ 3,058
Non - U.S. Equity			
Acadian Asset Management, LLC	\$ 1,294	\$ —	\$ 1,294
Baillie Gifford Overseas Ltd.	2,662	2,851	5,513
BlackRock Financial Management, Inc.	1,866	9,497	11,363
Cederberg Greater China EQ FD	—	—	—
ECM Feeder Fund 2 LP	—	126	126
Insight Investment International Limited	1,004	—	1,004
Marathon Asset Management Limited	3,134	—	3,134
Oberweis Asset Management, Inc.	2,615	—	2,615
QS Batterymarch Financial Management, Inc.	790	—	790
Steadview Capital Partners LP	2,297	21,925	24,222
The Children's Investment Fund LP	6,345	30,585	36,930
Wasatch Advisors, Inc.	4,479	1,591	6,070
Total - Non - U.S. Equity	\$ 26,486	\$ 66,575	\$ 93,061
Fixed Income			
BlackRock Financial Management, Inc.	\$ 4,290	\$ 10,293	\$ 14,583
Bridgewater Associates, LP	22,219	—	22,219
Brigade Capital Management, LLC	4,964	15,199	20,163
Capula Investment Management, LP	19	—	19
Mariner Investment Group, LLC	732	—	732
Pacific Investment Management Company (PIMCO)	37	—	37
Penn Mutual Asset Management, LLC	52	(23)	29
Radcliffe Capital Management, L.P.	510	1,835	2,345
SEI Investments Company	509	—	509
Templeton Investment Counsel, LLC	2,032	—	2,032
Total - Fixed Income	\$ 35,364	\$ 27,304	\$ 62,668
Private Credit			
Apollo European Principal Finance Fund II (Dollar A), L.P.	\$ 278	\$ —	\$ 278
Apollo European Principal Finance Fund III (Dollar A), LP	1,858	—	1,858
Avenue Energy Opportunities Fund, L.P.	1,462	—	1,462
Avenue Energy Opportunities Fund II, L.P.	850	—	850
Avenue Europe Special Situations Fund III (U.S.), L.P.	1,419	—	1,419

Section 3 - Investment Information

Table 12.3

Investment Fees by Manager Fiscal Year ended June 30, 2021 (Dollar amounts in Thousands)

<u>Manager</u>	<u>Base Fees</u>	<u>Performance Fees</u>	<u>Total</u>
Private Credit (Continued)			
Bain Capital Credit Managed Account (PSERS), L.P.	\$ 1,744	\$ —	\$ 1,744
Bain Capital Distressed and Special Situations 2013 (A), L.P.	657	—	657
Bain Capital Distressed and Special Situations 2016 (A), L.P.	2,606	—	2,606
Bain Capital Distressed and Special Situations 2019 (A), L.P.	1,034	—	1,034
Bain Capital Middle Market Credit 2014, LP	751	—	751
Carlyle Energy Mezzanine Opportunities Fund II, L.P.	1,531	—	1,531
Carlyle Energy Mezzanine Opportunities Fund-Q, L.P.	113	—	113
Cerberus PSERS Levered Loan Opportunities Fund, L.P.	8,647	—	8,647
Clearlake Opportunities Partners (P) II, L.P.	758	—	758
Galton Onshore Mortgage Recovery Fund IV, L.P.	382	—	382
Hayfin SOF II USD Co-Invest, L.P.	106	—	106
Hayfin SOF II USD, L.P.	2,624	—	2,624
HayFin Special Opportunities Credit Fund (Parallel), L.P.	401	—	401
ICG Europe Fund V, L.P.	1,520	—	1,520
ICG Europe Fund VI, L.P.	1,129	—	1,129
ICG Europe Fund VII Feeder SCSp	1,875	—	1,875
International Infrastructure Finance Company Fund, L.P.	374	—	374
Latitude Management Real Estate Capital IV, Inc.	675	—	675
LBC Credit Partners III, L.P.	699	—	699
LBC-P Credit Fund, L.P.	6,051	—	6,051
Park Square - PSERS Credit Opportunities Fund, L.P.	4,049	—	4,049
PIMCO BRAVO Fund III Onshore Feeder, LP	1,951	—	1,951
PSERS TAO Partners Parallel Fund, L.P.	4,284	—	4,284
Sixth Street Fundamental Strategies Partners (A), L.P.	100	—	100
Sixth Street Specialty Lending Europe II, L.P.	182	—	182
SSG Capital Partners V Sidecar, L.P.	443	—	443
SSG Capital Partners V, L.P.	2,182	—	2,182
TOP NPL (A), L.P.	3	—	3
TPG Opportunities Partners II (A), L.P.	21	—	21
TPG Opportunities Partners III (A), L.P.	639	—	639
TSSP Opportunities Partners IV (A), L.P.	2,247	—	2,247
Varde Scratch and Dent Feeder I-A, L.P., The	490	—	490
Varde Scratch and Dent Feeder, L.P., The	455	—	455
Whitehorse Liquidity Partners (Onshore) IV, L.P.	1,400	—	1,400
Total - Private Credit	\$ 57,990	\$ —	\$ 57,990
Real Estate-Direct Ownership			
Bell Partners Inc.	\$ 922	\$ —	\$ 922
Charter Oak Advisors, Inc.	960	—	960

Section 3 - Investment Information

Table 12.3

Investment Fees by Manager Fiscal Year ended June 30, 2021 (Dollar amounts in Thousands)

<u>Manager</u>	<u>Base Fees</u>	<u>Performance Fees</u>	<u>Total</u>
Real Estate-Direct Ownership (Continued)			
GF Management, Inc.	\$ 131	\$ —	\$ 131
L & B Realty Advisors, L.L.P.	128	—	128
Subtotal - Real Estate-Direct Ownership	\$ 2,141	\$ —	\$ 2,141
Real Estate-Partnerships/Funds			
AG Core Plus Realty Fund III, L.P.	\$ 196	\$ —	\$ 196
AG Core Plus Realty Fund IV, L.P.	1,320	—	1,320
AG Europe Realty Fund II, L.P.	707	—	707
AG Europe Realty Fund III, L.P.	1,009	—	1,009
AG Realty Value Fund X, L.P.	1,271	—	1,271
Almanac Realty Securities V, L.P.	1	—	1
Almanac Realty Securities VI, L.P.	149	—	149
Almanac Realty Securities VII, L.P.	571	—	571
Almanac Realty Securities VIII, L.P.	1,872	—	1,872
Ares European Real Estate Fund IV, L.P.	681	—	681
Ares U.S. Real Estate Fund VIII, L.P.	518	—	518
Ares U.S. Real Estate Fund IX, L.P.	1,049	—	1,049
ARS VII (Sidecar V), L.P.	75	—	75
ARS VIII (SC V), L.P.	46	—	46
Avenue Real Estate Fund (Parallel) L.P.	661	—	661
Bell Institutional Fund V, L.P.	705	—	705
Bell Institutional Fund VI, L.P.	1,048	—	1,048
Bell Institutional Fund VII, L.P.	1,407	—	1,407
Blackstone Real Estate Debt Strategies II, L.P.	10	—	10
Blackstone Real Estate Debt Strategies III, L.P.	888	—	888
Blackstone Real Estate Partners Europe III, L.P.	282	—	282
Blackstone Real Estate Partners Europe IV, L.P.	386	—	386
Blackstone Real Estate Partners VII, L.P.	1,249	—	1,249
Blackstone Real Estate Partners VIII, L.P.	2,734	—	2,734
Brookfield Strategic Real Estate Partners, L.P.	738	—	738
Brookfield Strategic Real Estate Partners II, L.P.	1,806	—	1,806
Brookfield Strategic Real Estate Partners III-A, L.P.	2,620	—	2,620
Cabot Industrial Core Fund, L.P.	1,229	—	1,229
Cabot Industrial Core Fund II, L.P.	560	—	560
Cabot Industrial Value Fund V, L.P.	1,500	—	1,500
Cabot Industrial Value Fund VI, L.P.	1,188	—	1,188
Carlyle Realty Partners V, L.P.	140	—	140
Carlyle Realty Partners VI, L.P.	95	—	95
Carlyle Realty Partners VII, L.P.	375	—	375
Carlyle Realty Partners VIII, L.P.	1,729	—	1,729

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Table 12.3

Investment Fees by Manager Fiscal Year ended June 30, 2021 (Dollar amounts in Thousands)

<u>Manager</u>	<u>Base Fees</u>	<u>Performance Fees</u>	<u>Total</u>
Real Estate-Partnerships/Funds (Continued)			
DRA Growth and Income Fund IX, LLC	\$ 1,603	\$ —	\$ 1,603
DRA Growth and Income Fund VII, L.P.	230	—	230
DRA Growth and Income Fund VIII, LLC	1,212	—	1,212
DRA Fund IX Industrial Co-Investment LLC	99	—	99
DRA Growth and Income Fund VIII Co-Investment I, LLC	137	—	137
DRA Growth and Income Master Fund X, LLC	529	—	529
Exeter Core Industrial Club Fund II, L.P.	778	—	778
Exeter Industrial Core Fund III, L.P.	195	—	195
Exeter Industrial Value Fund III, L.P.	169	—	169
Exeter Industrial Value Fund IV, L.P.	1,059	—	1,059
Exeter Industrial Value Fund V, L.P.	823	—	823
Latitude Management Real Estate Capital III, Inc.	553	—	553
LEM Multifamily Fund V, L.P.	1,000	—	1,000
LEM Multifamily Senior Equity Fund IV, L.P.	605	—	605
PGIM Real Estate Capital VII, SCSp	171	—	171
Pramerica Real Estate Capital VI, L.P.	692	—	692
RCG Longview Debt Fund V, L.P.	30	—	30
RCG Longview Debt Fund VI, L.P.	936	—	936
RCG Longview Equity Fund, L.P.	42	—	42
Security Capital Preferred Growth (Public)	1,824	—	1,824
Senior Housing Partnership Fund V, L.P.	754	—	754
Stockbridge Real Estate Fund II, LP	71	—	71
Stockbridge Real Estate Fund III, LP	298	—	298
Stockbridge Real Estate Fund, L.P.	3,788	—	3,788
Stockbridge I Secondary	80	—	80
UBS (US) Trumbull Property Fund, L.P.	249	—	249
Subtotal - Real Estate-Partnerships/Funds	\$ 48,742	\$ —	\$ 48,742
Real Estate-Farmland			
Prudential Agricultural Group	735	—	735
Subtotal - Real Estate-Farmland	\$ 735	\$ —	\$ 735
Total Real Estate	\$ 51,618	\$ —	\$ 51,618
Private Equity			
Actis Global 4, L.P.	\$ 1,359	\$ —	\$ 1,359
Apax Digital, L.P.	1,590	—	1,590
Apax X USD, L.P.	1,370	—	1,370

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Table 12.3

Investment Fees by Manager Fiscal Year ended June 30, 2021 (Dollar amounts in Thousands)

<u>Manager</u>	<u>Base Fees</u>	<u>Performance Fees</u>	<u>Total</u>
Private Equity (Continued)			
Bain Capital Asia Fund II, L.P.	\$ 620	\$ —	\$ 620
Bain Capital Asia Fund III-A, L.P.	1,903	—	1,903
Bain Capital Asia Fund IV-B, L.P.	1,500	—	1,500
Bain Capital Fund XI-A, L.P.	355	—	355
Bain Capital Fund XII, L.P.	1,648	—	1,648
Baring Asia Private Equity Fund V, L.P.	3,075	—	3,075
Baring Asia Private Equity Fund VI, L.P.	1,242	—	1,242
Blue Point Capital Partners III (B), L.P.	589	—	589
Blue Point Capital Partners IV, L.P.	840	—	840
Bridgepoint Development Capital III, L.P.	750	—	750
Bridgepoint Europe IV, L.P.	527	—	527
Bridgepoint Europe V, L.P.	1,428	—	1,428
Bridgepoint Europe VI, L.P.	1,126	—	1,126
Capital International Private Equity Fund VI, L.P.	451	—	451
Catterton Growth Partners II, L.P.	932	—	932
Catterton Growth Partners III, L.P.	1,165	—	1,165
Catterton Growth Partners, L.P.	371	—	371
Catterton Partners VI, L.P.	577	—	577
Catterton Partners VII, L.P.	1,729	—	1,729
Catterton VIII, L.P.	1,169	—	1,169
Cinven Fund (Fifth), L.P.	181	—	181
Cinven Fund (Sixth), L.P.	283	—	283
Coller International Partners VI, L.P.	700	—	700
Coller International Partners VII, L.P.	997	—	997
Crestview Partners II, L.P.	926	—	926
Crestview Partners III, L.P.	834	—	834
Crestview Partners, L.P.	250	—	250
Crown CG Private Equity Fund 2019, L.P.	531	—	531
Denham Commodity Partners Fund VI, L.P.	564	—	564
Energy & Minerals Group Fund III, L.P.	835	—	835
Equistone Partners Europe Fund V E, L.P.	655	—	655
Equistone Partners Europe Fund VI E, SCSp	387	—	387
GoldPoint Partners Co-Investment V, L.P.	276	—	276
Hahn & Company III L.P.	2,250	—	2,250
Hahn & Company III-S L.P.	239	—	239
Hg Genesis 9 A, L.P.	166	—	166
Hg Saturn 2 A L.P.	1,089	—	1,089
HgCapital 7 A, L.P.	557	—	557
HgCapital 8 D, L.P.	1,875	—	1,875
HGGC Fund II, L.P.	970	—	970
HGGC Fund III, L.P.	1,327	—	1,327

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Table 12.3

Investment Fees by Manager Fiscal Year ended June 30, 2021 (Dollar amounts in Thousands)

<u>Manager</u>	<u>Base Fees</u>	<u>Performance Fees</u>	<u>Total</u>
Private Equity (Continued)			
Incline Elevate Fund, L.P.	\$ 575	\$ —	\$ 575
Incline Equity Partners III (PSERS), L.P.	280	—	280
Incline Equity Partners IV, L.P.	898	—	898
K4 Private Investors, L.P.	1,800	—	1,800
Landmark Equity Partners XIV, L.P.	252	—	252
Lindsay Goldberg V, L.P.	1,525	—	1,525
Milestone Partners FS 2, L.P.	275	—	275
Milestone Partners IV, L.P.	345	—	345
New Mountain Partners IV, L.P.	516	—	516
New Mountain Partners V, L.P.	979	—	979
New Mountain Partners VI, L.P.	1,184	—	1,184
NGP Natural Resources X, L.P.	443	—	443
NGP Natural Resources XI, L.P.	946	—	946
North Haven PE Asia Fund IV, L.P. (Morgan Stanley)	1,085	—	1,085
Odyssey Investment Partners Fund V, L.P.	1,270	—	1,270
Orchid Asia V, L.P.	110	—	110
Orchid Asia VI, L.P.	1,072	—	1,072
Orchid Asia VII, L.P.	1,454	—	1,454
PAI Europe VI, L.P.	1,218	—	1,218
PAI Europe VII, L.P.	1,783	—	1,783
Palladium Equity Partners IV, L.P.	461	—	461
Partners Group Secondary 2011 (USD), L.P. Inc.	864	—	864
Partners Group Secondary 2015 (USD) A, L.P.	1,219	—	1,219
Platinum Equity Capital Partners V, L.P.	252	—	252
Platinum Equity Small Cap Fund, L.P.	765	—	765
Portfolio Advisors Secondary Fund III, L.P.	1,605	—	1,605
Portfolio Advisors Secondary Fund IV, L.P.	88	—	88
Portfolio Advisors Secondary Fund, L.P., PA	129	—	129
Strategic Partners Fund V, L.P.	89	—	89
Strategic Partners Fund VI, L.P.	403	—	403
Strategic Partners Fund VII, L.P.	1,250	—	1,250
Trilantic Capital Partners V (North America), L.P.	534	—	534
Trilantic Capital Partners VI (North America), L.P.	2,250	—	2,250
Webster Capital IV, L.P.	35	—	35
Subtotal - Private Equity	\$ 70,162	\$ —	\$ 70,162
Private Debt			
Apollo Investment Fund IX, L.P.	\$ 2,667	\$ —	\$ 2,667
Apollo Investment Fund VIII, L.P.	634	—	634
Cerberus Institutional Partners V, L.P.	50	—	50
Cerberus Institutional Partners VI, L.P.	2,064	—	2,064

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Table 12.3

Investment Fees by Manager Fiscal Year ended June 30, 2021 (Dollar amounts in Thousands)

<u>Manager</u>	<u>Base Fees</u>	<u>Performance Fees</u>	<u>Total</u>
Private Debt (Continued)			
Cerberus Institutional Partners, L.P. (Series 4)	\$ 1	\$ —	\$ 1
Clearlake Capital Partners IV, L.P.	280	—	280
Clearlake Capital Partners V, L.P.	570	—	570
Clearlake Capital Partners VI, L.P.	669	—	669
Searchlight Capital II, L.P.	590	—	590
Searchlight Capital III, L.P.	2,460	—	2,460
Venor Special Situations Fund II, L.P.	527	—	527
Versa Capital Fund II, L.P.	1,235	—	1,235
Versa Capital Fund III, L.P.	1,515	—	1,515
Subtotal - Private Debt	\$ 13,262	\$ —	\$ 13,262
Venture Capital			
Aisling Capital IV, L.P.	\$ 73	\$ —	\$ 73
Insight Opportunities Fund I, L.P.	142	—	142
Insight Partners XI, L.P.	2,413	—	2,413
Insight Venture Partners X, L.P.	1,405	—	1,405
Greenoaks Capital Opportunities Fund III	667	—	667
LLR Equity Partners III, L.P.	39	—	39
LLR Equity Partners IV, L.P.	1,238	—	1,238
LLR Equity Partners V, L.P.	3,000	—	3,000
LLR Equity Partners VI, L.P.	457	—	457
Oak HC/FT Partners IV, L.P.	451	—	451
Sante Health Ventures III	2,382	—	2,382
StarVest Partners II (Parallel), L.P.	243	—	243
Summit Partners Growth Equity Fund IX, L.P.	1,142	—	1,142
Summit Partners Growth Equity Fund VIII, L.P.	1,022	—	1,022
Summit Partners Growth Equity Fund X, L.P.	215	—	215
Summit Partners Venture Capital Fund III, L.P.	172	—	172
Summit Partners Venture Capital Fund IV, L.P.	752	—	752
Tenaya Capital VI, L.P.	573	—	573
Tenaya Capital VII, L.P.	1,456	—	1,456
Tenaya Capital V-P, L.P.	303	—	303
Subtotal - Venture Capital	\$ 18,145	\$ —	\$ 18,145
Total Alternative Investments	\$ 101,569	\$ —	\$ 101,569

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Table 12.3

Investment Fees by Manager Fiscal Year ended June 30, 2021 (Dollar amounts in Thousands)

<u>Manager</u>	<u>Base Fees</u>	<u>Performance Fees</u>	<u>Total</u>
Absolute Return			
Aeolus Capital Management Ltd.	\$ 6,700	\$ 1,414	\$ 8,114
AKAZ Offshore Fund LTD	3,165	1,996	5,161
Bridgewater Associates, Inc.	22,676	—	22,676
Brigade Capital Management	3,173	8,419	11,592
Capula Investment Management, LLP	11,338	3,177	14,515
Caspian Capital, LP	3,020	7,165	10,185
Falko Regional Aircraft Opportunities Fund II L.P.	1,085	—	1,085
Garda Capital Partners, LP	9,400	15,079	24,479
HS Group Sponsor Fund II Ltd.	918	—	918
Independence Reinsurance Partners GP, LLC	3,249	479	3,728
Nephila Capital Ltd.	2,524	—	2,524
Nimbus Weather Fund	2,267	5,441	7,708
Oceanwood Opportunities Fund	924	7,209	8,133
OWS Credit Opportunity Offshore Fund III, Ltd.	5,622	15,200	20,822
Pacific Investment Management Company (PIMCO)	9,104	23,448	32,552
Perry Partners, L.P.	66	—	66
Sciens Aviation Special Opportunities Investment Fund III, L.P.	1,496	—	1,496
Sciens Aviation Special Opportunities Investment Fund IV, L.P.	1,657	—	1,657
Sciens Aviation Special Opportunities Investment Fund V, L.P.	2,564	—	2,564
Two Sigma Risk Premia Enhanced Fund	317	—	317
Venor Capital Offshore	1,808	13,558	15,366
Total - Absolute Return	\$ 93,073	\$ 102,585	\$ 195,658
Commodities			
Denham Mining Fund, L.P.	\$ 2,053	\$ —	\$ 2,053
Gresham Investment Management, LLC	995	—	995
NGP Natural Resources XII, L.P.	3,145	—	3,145
Wellington Management Company, LLP	1,066	—	1,066
Total - Commodities	\$ 7,259	\$ —	\$ 7,259
Diversified Infrastructure			
Blackstone Infrastructure Partners L.P.	\$ 3,002	\$ —	\$ 3,002
International Infrastructure Finance Company II, LP	391	—	391
GCM Grosvenor Customized Infrastructure Strategies II, LP	498	—	498
Strategic Partners Real Assets II, L.P.	1,161	—	1,161
Total - Infrastructure	\$ 5,052	\$ —	\$ 5,052

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Table 12.3

Investment Fees by Manager Fiscal Year ended June 30, 2021 (Dollar amounts in Thousands)

<u>Manager</u>	<u>Base Fees</u>	<u>Performance Fees</u>	<u>Total</u>
<u>Master Limited Partnerships</u>			
Salient Capital Advisors, LLC	\$ 393	\$ —	\$ 393
Stein Roe Investment Counsel D/B/A Atlantic Trust	393	1,686	2,079
Total - Master Limited Partnerships	\$ 786	\$ 1,686	\$ 2,472
<u>Risk Parity</u>			
BlackRock Institutional Trust Company, N.A.	\$ 712	\$ —	\$ 712
Bridgewater Associates, LP	2,291	—	2,291
D.E. Shaw Investment Management, L.L.C.	1,018	—	1,018
Total - Risk Parity	\$ 4,021	\$ —	\$ 4,021
<u>Defined Contribution</u>			
T. Rowe Price Target Date Funds	\$ 97	\$ —	\$ 97
Total - Defined Contribution	\$ 97	\$ —	\$ 97
Total External Management	\$ 383,873	\$ 200,650	\$ 584,523
Total Internal Management			\$ 26,407
Total Investment Management			\$ 610,930

*Internal Management expenses include salaries and fringe benefits of \$14,905 and operating expenses of \$11,502.

Investment Fees and Expenses Initiatives

PSERS continues to pursue several avenues intended to maintain a reasonable cost structure. These initiatives include:

- For external managers making traditional investments, reduce base fees and create better alignment of interests by moving to a lower base fee coupled with a profit share.
- For external managers making traditional and absolute return investments, enter into arrangements for netting of profit shares for managers with multiple PSERS mandates.
- For external managers making nontraditional investments, continue to grow co-investments (which have lower fees and profit shares).
- For external managers making nontraditional investments, move away from paying on committed capital and towards paying on invested capital whenever possible.
- For external managers, re-underwriting all fee arrangements to ensure that the fee arrangements are fair and equitable.
- Research firms specializing in investment management fee negotiations, considering their credentials, references, past performance in reducing investment management fees for clients, and probable cost effectiveness for PSERS, for possible retention.

Carried Interest Reported by Manager

PSERS, as part of its historic commitment to transparency, has evolved its reporting on private markets fees and costs. PSERS disclosed profit share (carried interest), net management fees, and other fund expenses by fund in one report for the calendar year ended 2020. PSERS uses a best effort approach to gather the necessary data by canvassing our active funds for carried interest, management fee offsets and other fund expenses detailed out by fund. This information was presented to PSERS Board in March 2022 and the full report is available on our website at www.pasers.pa.gov.

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Table 12.4

Carried Interest Reported by Manager Calendar Year ended December 31, 2020 (Dollar amounts in Thousands)

<u>Manager</u>	<u>Net Mgmt Fees</u>	<u>Net Carried Interest</u>	<u>Partnership Expenses</u>	<u>Total</u>
Private Equity				
Actis Emerging Markets 3, L.P.	\$ —	\$ —	\$ 329	\$ 329
Actis Global 4, L.P.	1,358	1,916	182	3,456
Adams Capital Management, L.P.	—	—	6	6
Aisling Capital II L.P.	—	—	27	27
Aisling Capital III, L.P.	—	(157)	26	(131)
Aisling Capital IV, L.P.	750	9,604	253	10,607
Allegheny New Mountain Partners, L.P.	—	22	27	49
Apax Digital, L.P.	1,657	7,792	571	10,020
Apax Europe VII, L.P.	—	(1,643)	14	(1,629)
Apax X USD, L.P.	3,063	1,244	497	4,804
Apollo Investment Fund IX, L.P.	2,743	1,527	756	5,026
Apollo Investment Fund VIII, L.P.	698	1,095	460	2,253
Avenue Special Situations Fund VI, L.P.	—	—	16	16
Bain Capital Asia Fund II, L.P.	675	732	39	1,446
Bain Capital Asia Fund III-A, L.P.	2,600	20,773	420	23,793
Bain Capital Asia Fund IV-B, L.P.	1,500	1,973	472	3,945
Bain Capital Fund XI-A, L.P.	414	5,547	41	6,002
Bain Capital Fund XII-A, L.P.	1,875	1,665	668	4,208
Baring Asia Private Equity Fund IV, L.P.	—	3,213	253	3,466
Baring Asia Private Equity Fund V, L.P.	3,073	(10,872)	1,886	(5,913)
Baring Asia Private Equity Fund VI, L.P.	1,342	5,600	1,080	8,022
Blue Point Capital Partners (B), L.P.	—	—	3	3
Blue Point Capital Partners II (B), L.P.	8	—	27	35
Blue Point Capital Partners III (B), L.P.	592	1,538	102	2,232
Blue Point Capital Partners IV, L.P.	939	—	105	1,044
Bridgepoint Capital II (Secondary)	—	—	1	1
Bridgepoint Development Capital III, L.P.	1,299	6,414	407	8,120
Bridgepoint Europe I	—	—	1	1
Bridgepoint Europe II	—	(18)	65	47
Bridgepoint Europe III A, L.P.	—	—	77	77
Bridgepoint Europe IV, L.P.	407	(1,437)	184	(846)
Bridgepoint Europe V, L.P.	1,194	4,099	241	5,534
Bridgepoint Europe VI, L.P.	1,367	—	382	1,749
Capital International Private Equity Fund V L.P.	—	—	29	29
Capital International Private Equity Fund VI, L.P.	582	—	43	625
Catterton Growth Partners II, L.P.	960	11,712	57	12,729

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Table 12.4

Carried Interest Reported by Manager Calendar Year ended December 31, 2020 (Dollar amounts in Thousands)

<u>Manager</u>	<u>Net Mgmt Fees</u>	<u>Net Carried Interest</u>	<u>Partnership Expenses</u>	<u>Total</u>
Private Equity (continued)				
Catterton Growth Partners, L.P.	\$ 458	\$ (6,088)	\$ 83	\$ (5,547)
Catterton Partners VI, L.P.	412	1,594	55	2,061
Catterton Partners VII, L.P.	1,393	2,548	108	4,049
Cerberus Institutional Partners V, L.P.	197	5,395	643	6,235
Cerberus Institutional Partners VI, L.P.	2,039	10,203	1,566	13,808
Cerberus Institutional Partners, L.P. (Series 3)	—	51	36	87
Cerberus Institutional Partners, L.P. (Series 4)	—	33,068	528	33,596
Clearlake Capital Partners IV, L.P.	593	2,598	122	3,313
Clearlake Capital Partners V, L.P.	699	3,536	310	4,545
Clearlake Capital Partners VI, L.P.	966	1,079	371	2,416
Clearlake Flagship Plus Partners, L.P.	—	110	96	206
Co-Investment 2000 Fund, L.P.	—	—	(144)	(144)
Co-Investment Fund II, L.P.	—	—	120	120
Coller International Partners VI, L.P.	738	330	23	1,091
Coller International Partners VII, L.P. - Series A	1,094	675	37	1,806
Crestview Partners II, L.P.	907	5,461	318	6,686
Crestview Partners III, L.P.	1,246	2,510	433	4,189
Crestview Partners, L.P.	250	(2,340)	7	(2,083)
Cross Atlantic Technology Fund II	—	—	7	7
Cross Atlantic Technology Fund, L.P.	—	—	1	1
Crown CG Private Equity Fund 2019, L.P.	1,709	—	523	2,232
Crown CG Private Equity Fund 2019S, L.P.	—	—	119	119
CVC Capital Partners Asia Pacific III, L.P.	—	(1,638)	63	(1,575)
CVC European Equity Partners V (A), L.P.	—	3,370	9,674	13,044
DCPF VI Oil and Gas Co-Investment Fund, L.P.	41	822	11	874
Denham Commodity Partners Fund VI, L.P.	677	—	65	742
Equistone Partners Europe Fund V E, L.P.	859	—	98	957
Equistone Partners Europe Fund VI E, SCSp	1,313	—	295	1,608
First Reserve Fund XII, L.P.	—	—	92	92
Gleacher Mezzanine Fund II, L.P.	—	(126)	22	(104)
Gold Hill Venture Lending 03, L.P.	35	(13)	17	39
GoldPoint Partners Co-Investment V, L.P.	304	48	27	379
Hahn & Company III L.P.	2,250	—	528	2,778
Hahn & Company III-S L.P.	172	—	70	242
Hg Genesis 9 L.P.	288	—	170	458
Hg Saturn 2 A L.P.	844	—	(232)	612

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Table 12.4

Carried Interest Reported by Manager Calendar Year ended December 31, 2020 (Dollar amounts in Thousands)

<u>Manager</u>	<u>Net Mgmt Fees</u>	<u>Net Carried Interest</u>	<u>Partnership Expenses</u>	<u>Total</u>
Private Equity (continued)				
HgCapital 7 A, L.P.	\$ 645	\$ —	\$ 1,193	\$ 1,838
HgCapital 8 D, L.P.	1,638	—	393	2,031
HGGC Fund II, L.P.	1,094	2,812	126	4,032
HGGC Fund III, L.P.	1,487	7,618	275	9,380
Incline Elevate Fund, L.P.	900	11,074	161	12,135
Incline Equity Partners III (PSERS), L.P.	—	2,161	34	2,195
Incline Equity Partners IV, L.P.	1,079	4,495	114	5,688
Incline Equity Partners V, L.P.	139	—	275	414
Insight Opportunities Fund I, L.P.	6	—	—	6
Insight Partners XI, L.P.	2,616	2,371	479	5,466
Insight Venture Partners X, L.P.	1,297	2,697	96	4,090
Irving Place Capital MB-PSERS II, L.P.	—	(1,356)	63	(1,293)
Irving Place Capital Partners III SPV, L.P.	—	5,073	137	5,210
K4 Private Investors, L.P.	1,894	3,613	216	5,723
L Catterton Growth Partners III, L.P.	1,184	9,723	101	11,008
L Catterton VIII, L.P.	1,178	11,417	76	12,671
Landmark Equity Partners XIII, L.P.	—	—	100	100
Landmark Equity Partners XIV, L.P.	266	1,571	33	1,870
Lindsay Goldberg V, L.P.	329	655	443	1,427
LLR Equity Partners II, L.P.	—	10	26	36
LLR Equity Partners III, L.P.	340	1,913	90	2,343
LLR Equity Partners IV, L.P.	2,011	3,276	132	5,419
LLR Equity Partners V, L.P.	3,446	2,717	608	6,771
LLR Equity Partners VI, L.P.	932	—	7	939
Milestone Partners FS 2, L.P.	(219)	1,738	81	1,600
Milestone Partners III, L.P.	61	—	29	90
Milestone Partners IV, L.P.	298	(1,999)	215	(1,486)
NEPA Venture Fund II	—	392	246	638
New Mountain Partners III L.P.	—	11,472	53	11,525
New Mountain Partners IV, L.P.	607	6,691	27	7,325
New Mountain Partners V, L.P.	3,250	15,411	405	19,066
New Mountain Partners VI, L.P.	1,000	—	232	1,232
New York Life Capital Partners I, L.P.	—	—	79	79
New York Life Capital Partners III-A, L.P.	—	—	164	164
New York Life Capital Partners IV-A, L.P.	1	(240)	149	(90)
NGP Natural Resources X, L.P.	455	—	124	579

Section 3 - Investment Information

Table 12.4

Carried Interest Reported by Manager Calendar Year ended December 31, 2020 (Dollar amounts in Thousands)

<u>Manager</u>	<u>Net Mgmt Fees</u>	<u>Net Carried Interest</u>	<u>Partnership Expenses</u>	<u>Total</u>
Private Equity (continued)				
NGP Natural Resources XI, L.P.	\$ 982	\$ —	\$ 46	\$ 1,028
North Haven Private Equity Asia IV, L.P.	1,109	(2,493)	262	(1,122)
OCM Opportunities Fund VII L.P.	—	—	24	24
OCM Opportunities Fund VII-b L.P.	—	(913)	21	(892)
Odyssey Investment Partners Fund V, L.P.	1,345	—	45	1,390
Orchid Asia V, L.P.	120	(124)	28	24
Orchid Asia VI, L.P.	1,110	3,161	309	4,580
Orchid Asia VII, L.P.	1,500	4,454	252	6,206
PA Portfolio Advisors Secondary Fund, L.P.	88	—	219	307
PAI Europe IV-B2, L.P.	—	(933)	17	(916)
PAI Europe V, L.P.	—	(1)	28	27
PAI Europe VI, L.P.	1,056	5,571	60	6,687
PAI Europe VII, L.P.	1,453	26	520	1,999
Palladium Equity Partners IV, L.P.	484	(4,219)	200	(3,535)
Partners Group Secondary 2008, L.P.	—	156	170	326
Partners Group Secondary 2011 (USD), L.P. Inc.	911	2,590	62	3,563
Partners Group Secondary 2015 (USD) A, L.P.	1,250	1,149	76	2,475
Permira IV, L.P.	—	(547)	5	(542)
Platinum Equity Capital Partners IV, L.P.	—	18,081	769	18,850
Platinum Equity Capital Partners V, L.P.	2,761	1,197	1,419	5,377
Platinum Equity Capital Partners-A II, L.P.	—	4,826	—	4,826
Platinum Equity Capital Partners-A III, L.P.	—	19,721	124	19,845
Platinum Equity Capital Partners-A, L.P.	—	(38)	—	(38)
Platinum Equity Small Cap Fund, L.P.	1,989	—	871	2,860
Portfolio Advisors Secondary Fund III, L.P.	1,485	—	184	1,669
Portfolio Advisors Secondary Fund IV, L.P.	79	—	261	340
Sante Health Ventures III	2,382	—	160	2,542
SCP Private Equity Partners II, L.P.	—	—	75	75
Searchlight Capital II, L.P.	512	11,986	121	12,619
Searchlight Capital III, L.P.	2,433	2,115	223	4,771
StarVest	—	—	13	13
StarVest Partners II (Parallel), L.P.	227	—	160	387
StepStone International Investors III L.P.	—	—	36	36
Sterling Capital Partners, L.P.	—	(304)	48	(256)
Sterling Venture Partners, L.P.	—	—	10	10
Strategic Partners Fund III VC, L.P.	—	—	35	35

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Table 12.4

Carried Interest Reported by Manager Calendar Year ended December 31, 2020 (Dollar amounts in Thousands)

Manager	Net Mgmt Fees	Net Carried Interest	Partnership Expenses	Total
Private Equity (continued)				
Strategic Partners Fund IV VC, L.P.	\$ 49	\$ 1,957	\$ 30	\$ 2,036
Strategic Partners Fund IV, L.P.	73	218	32	323
Strategic Partners Fund V, L.P.	218	751	68	1,037
Strategic Partners Fund VI, L.P.	455	(22)	63	496
Strategic Partners Fund VII, L.P.	1,250	(2,596)	353	(993)
Summit Partners Growth Equity Fund IX-A, L.P.	502	12,807	53	13,362
Summit Partners Growth Equity Fund VIII-A, L.P.	1,062	4,663	52	5,777
Summit Partners Growth Equity Fund X-A, L.P.	—	2,390	265	2,655
Summit Partners Venture Capital Fund III-A, L.P.	212	1,509	13	1,734
Summit Partners Venture Capital Fund IV-A, L.P.	793	3,908	88	4,789
Tenaya Capital VI, L.P.	353	(674)	58	(263)
Tenaya Capital VII, L.P.	641	5,344	45	6,030
Tenaya Capital V-P, L.P.	1,745	2,877	80	4,702
The Energy & Minerals Group Fund III, L.P.	907	—	25	932
The Fifth Cinven Fund, L.P.	409	(12,443)	56	(11,978)
The Fourth Cinven Fund, L.P.	—	—	(9)	(9)
The Sixth Cinven Fund, L.P.	664	(2,886)	98	(2,124)
Trilantic Capital Partners IV L.P.	—	(486)	75	(411)
Trilantic Capital Partners V (North America), L.P.	546	257	111	914
Trilantic Capital Partners VI (North America), L.P.	2,255	—	356	2,611
Venor Special Situations Fund II, L.P.	623	—	292	915
Versa Capital Fund I, L.P.	—	—	174	174
Versa Capital Fund II, L.P.	1,395	—	395	1,790
Versa Capital Fund III, L.P.	1,811	—	726	2,537
Webster Capital IV, L.P.	133	5,623	89	5,845
Total - Private Equity	\$ 115,886	\$ 329,495	\$ 43,432	\$ 488,813
Private Credit				
Apollo European Principal Finance Fund II (Dollar A)	\$ 307	\$ (5,829)	\$ 187	(5,335)
Apollo European Principal Finance Fund III (Dollar A)	2,352	441	1,528	4,321
Avenue Energy Opportunities Fund II, L.P.	850	—	645	1,495
Avenue Energy Opportunities Fund, L.P.	1,579	—	674	2,253
Avenue Europe Special Situations Fund III (U.S.), L.P.	1,571	—	604	2,175
Bain Capital Credit Managed Account (PSERS), L.P.	1,622	—	299	1,921
Bain Capital Distressed & Spec. Situations 2013 (A)	1,310	(3,785)	352	(2,123)
Bain Capital Distressed & Spec. Situations 2016 (A)	2,622	(1,252)	720	2,090
Bain Capital Distressed & Spec. Situations 2019 (A)	545	—	949	1,494

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Table 12.4

Carried Interest Reported by Manager Calendar Year ended December 31, 2020 (Dollar amounts in Thousands)

<u>Manager</u>	<u>Net Mgmt Fees</u>	<u>Net Carried Interest</u>	<u>Partnership Expenses</u>	<u>Total</u>
Private Credit (continued)				
Bain Capital Middle Market Credit 2010, L.P.	\$ 50	\$ 14	\$ 77	\$ 141
Bain Capital Middle Market Credit 2014, LP	815	(4,541)	126	(3,600)
Brigade Distressed Value Offshore Fund	1,674	95	1,002	2,771
Brigade Structured Credit Offshore Fund	2,708	(115)	518	3,111
Carlyle Energy Mezzanine Opportunities Fund II, L.P.	1,313	—	333	1,646
Cerberus Levered Loan Opportunities Fund I, L.P.	—	(114)	192	78
Cerberus Levered Loan Opportunities Fund II, L.P.	605	(7,182)	657	(5,920)
Cerberus PSERS Levered Loan Opps Fund, L.P.	8,084	6,170	3,694	17,948
Clearlake Opportunities Partners (P) II, L.P.	822	1,438	490	2,750
Galton Onshore Mortgage Recovery Fund III, L.P.	—	—	258	258
Galton Onshore Mortgage Recovery Fund IV, L.P.	586	—	799	1,385
Hayfin SOF II USD Co-Invest, L.P.	102	—	—	102
Hayfin SOF II USD, L.P.	2,491	(3,257)	—	(766)
HayFin Special Opps Credit Fund (Parallel), L.P.	424	1,988	—	2,412
ICG Europe Fund V, L.P.	534	(293)	293	534
ICG Europe Fund VI, L.P.	994	10,192	810	11,996
ICG Europe Fund VII Feeder SCSp	1,875	(70)	420	2,225
International Infrastructure Finance Co Fund, L.P.	601	645	301	1,547
Latitude Management Real Estate Capital IV, Inc.	685	—	125	810
LBC Credit Partners III, L.P.	767	690	184	1,641
LBC-P Credit Fund, L.P.	6,134	5,108	643	11,885
Oaktree Loan Fund 2X, LP	—	—	76	76
Opps NPL (A), L.P.	—	(208)	131	(77)
Park Square - PSERS Credit Opportunities Fund, L.P.	5,834	627	4,682	11,143
PIMCO BRAVO Fund III Onshore Feeder, LP	1,890	(7,144)	1,389	(3,865)
PIMCO Commercial Real Estate Debt Fund, L.P.	—	2,826	343	3,169
PSERS TAO Partners Parallel Fund, L.P. - (TAO 2.0)	1,827	2,749	802	5,378
PSERS TAO Partners Parallel Fund, L.P. - (TAO 3.0)	1,829	2,218	736	4,783
PSERS TAO Prtnrs Parallel Fund, L.P. (TAO Cntngnt)	276	2,592	609	3,477
Sankaty Credit Opportunities IV, L.P.	224	185	69	478
Sixth Street Fundamental Strategies Partners (A), L.P.	13	507	268	788
Sixth Street Opportunities Partners II (A), L.P.	—	(141)	119	(22)
Sixth Street Opportunities Partners III (A), L.P.	718	(438)	295	575
Sixth Street Opportunities Partners IV (A), L.P.	2,250	3,794	432	6,476
Sixth Street Specialty Lending Europe II, L.P.	140	20	368	528
SSG Capital Partners V Sidecar, L.P.	64	1,594	197	1,855

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Table 12.4

Carried Interest Reported by Manager Calendar Year ended December 31, 2020 (Dollar amounts in Thousands)

<u>Manager</u>	<u>Net Mgmt Fees</u>	<u>Net Carried Interest</u>	<u>Partnership Expenses</u>	<u>Total</u>
Private Credit (continued)				
SSG Capital Partners V, L.P.	\$ 1,972	\$ 1,795	\$ 344	\$ 4,111
Summit Partners Credit Fund II, L.P.	—	(851)	97	(754)
TCI Real Estate Partners Fund III	—	1,084	75	1,159
Varde Scratch and Dent Feeder I-A, L.P., The	614	(520)	347	441
Varde Scratch and Dent Feeder, L.P., The	503	(1,059)	284	(272)
Whitehorse Liquidity Partners (Onshore) IV, L.P.	1,042	3,948	700	5,690
Total - Private Credit	\$ 63,218	\$ 13,921	\$ 29,243	\$ 106,382
Private Commodities				
Denham Mining Fund, L.P.	\$ 2,115	\$ —	\$ 265	\$ 2,380
NGP Natural Resources XII, L.P.	3,142	—	151	3,293
Total - Private Commodities	\$ 5,257	\$ —	\$ 416	\$ 5,673
Private Infrastructure				
Blackstone Infrastructure Partners L.P.	\$ 2,221	\$ —	\$ 930	\$ 3,151
GCM Grosvenor Customized Infra Strategies II, LP	418	561	168	1,147
International Infrastructure Finance Company II, L.P.	803	1,159	308	2,270
ISQ Global Infrastructure Fund III, L.P.	1,485	—	510	1,995
Strategic Partners Real Assets II, L.P.	1,056	3,228	242	4,526
Total - Private Infrastructure	\$ 5,983	\$ 4,948	\$ 2,158	\$ 13,089
Private Real Estate				
AG Core Plus Realty Fund III, L.P.	\$ 194	\$ (413)	\$ 46	\$ (173)
AG Core Plus Realty Fund IV, L.P.	1,320	(1,212)	234	342
AG Europe Realty Fund II, L.P.	829	1,380	219	2,428
AG Europe Realty Fund III, L.P.	1,041	—	(7)	1,034
AG Realty Value Fund X, L.P.	1,196	2,001	269	3,466
Almanac Realty Securities V, L.P.	2	(18)	69	53
Almanac Realty Securities VI, L.P.	149	(2,519)	11	(2,359)
Almanac Realty Securities VII, L.P.	537	652	33	1,222
Almanac Realty Securities VIII, L.P.	1,875	—	28	1,903
Ares European Real Estate Fund III, L.P.	—	—	27	27
Ares European Real Estate Fund IV, L.P.	632	(266)	409	775
Ares U.S. Real Estate Fund IX, L.P.	983	1,894	206	3,083
Ares U.S. Real Estate Fund VII, L.P.	—	13	72	85
Ares U.S. Real Estate Fund VIII, L.P.	602	2,446	95	3,143

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Table 12.4

Carried Interest Reported by Manager Calendar Year ended December 31, 2020 (Dollar amounts in Thousands)

<u>Manager</u>	<u>Net Mgmt Fees</u>	<u>Net Carried Interest</u>	<u>Partnership Expenses</u>	<u>Total</u>
Private Real Estate (continued)				
Atlanta Marriott	\$ 131	\$ —	\$ —	\$ 131
Avenue Real Estate Fund (Parallel) L.P.	661	—	348	1,009
Bell Institutional Fund IV, LLC	—	—	(2)	(2)
Bell Institutional Fund V, L.P.	801	1,523	655	2,979
Bell Institutional Fund VI, L.P.	868	831	594	2,293
Bell Institutional Fund VII, L.P.	1,149	—	210	1,359
BlackRock Europe Property Fund III, L.P.	—	—	(854)	(854)
Blackstone Real Estate Debt Strategies II, L.P.	23	30	—	53
Blackstone Real Estate Debt Strategies III, L.P.	968	(25)	—	943
Blackstone Real Estate Partners Europe III, L.P.	614	(993)	—	(379)
Blackstone Real Estate Partners Europe IV, L.P.	414	(1,359)	82	(863)
Blackstone Real Estate Partners V, L.P.	—	(223)	—	(223)
Blackstone Real Estate Partners VI, L.P.	—	3,874	66	3,940
Blackstone Real Estate Partners VII, L.P.	1,239	(7,255)	186	(5,830)
Blackstone Real Estate Partners VIII, L.P.	2,842	5,577	—	8,419
Brookfield Strategic Real Estate Partners II, L.P.	2,043	664	149	2,856
Brookfield Strategic Real Estate Partners III-A, L.P.	2,605	—	361	2,966
Brookfield Strategic Real Estate Partners, L.P.	774	(1,943)	379	(790)
Cabot Industrial Core Fund II, L.P.	508	106	73	687
Cabot Industrial Core Fund, L.P.	1,292	12,207	90	13,589
Cabot Industrial Value Fund V, L.P.	1,500	(433)	305	1,372
Cabot Industrial Value Fund VI, L.P.	751	—	78	829
Cabot UK Core Plus Industrial Fund SCSp	—	—	661	661
Carlyle Realty Partners III, L.P.	—	1,321	96	1,417
Carlyle Realty Partners IV, L.P.	7	—	97	104
Carlyle Realty Partners V, L.P.	142	2,987	169	3,298
Carlyle Realty Partners VI, L.P.	92	(969)	150	(727)
Carlyle Realty Partners VII, L.P.	397	82	106	585
Carlyle Realty Partners VIII, L.P.	1,714	4,015	497	6,226
Centerline High Yield CMBS III - Loan/Stock	44	—	—	44
DRA Growth and Income Fund IX, LLC	1,713	1,610	169	3,492
DRA Growth and Income Fund VI, L.P.	—	(179)	12	(167)
DRA Growth and Income Fund VII, L.P.	292	1,968	779	3,039
DRA Growth and Income Fund VIII, LLC	1,308	(2,754)	137	(1,309)
DRA Growth and Income Fund X, LLC	429	—	181	610

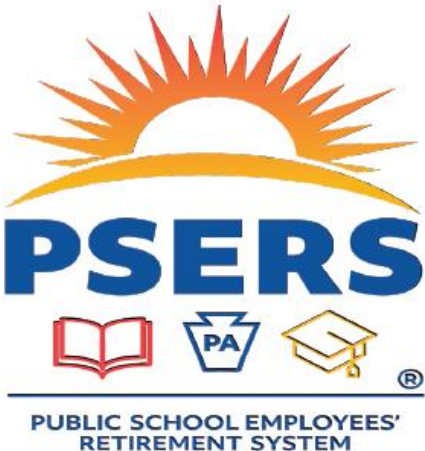
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Table 12.4

Carried Interest Reported by Manager Calendar Year ended December 31, 2020 (Dollar amounts in Thousands)

<u>Manager</u>	<u>Net Mgmt Fees</u>	<u>Net Carried Interest</u>	<u>Partnership Expenses</u>	<u>Total</u>
Private Real Estate (continued)				
Exeter Core Industrial Club Fund II, L.P.	\$ 776	\$ 1,246	\$ 105	\$ 2,127
Exeter Industrial Core Fund III, L.P.	102	—	44	146
Exeter Industrial Value Fund II, L.P.	—	8	20	28
Exeter Industrial Value Fund III, L.P.	192	455	60	707
Exeter Industrial Value Fund IV, L.P.	1,009	(1,808)	97	(702)
Exeter Industrial Value Fund V, L.P.	1,200	—	144	1,344
Five North 5th Street	53	—	—	53
Fortress Investment Fund IV LP	—	—	63	63
Fortress Investment Fund LLC	—	—	16	16
Fortress Investment Fund V (Fund A) L.P.	—	—	294	294
Keystone Portfolio	738	—	992	1,730
LAI Strategic Realty Investors, L.P.	—	20	25	45
Latitude Management Real Estate Capital III, Inc.	769	(472)	188	485
LEM Multifamily Fund V, L.P.	(236)	1,911	80	1,755
LEM Multifamily Senior Equity Fund IV, L.P.	525	3,484	137	4,146
LEM RE HY Debt & Pfd Equity Fund III, L.P.	—	—	35	35
Paramount Group Real Estate Fund VII, L.P.	—	—	36	36
PGIM Agricultural Separate Account	856	—	—	856
Pramerica Real Estate Capital VI, L.P.	546	(908)	502	140
PSERS YES Holdings, L.P.	—	—	97	97
RCG Longview Debt Fund V, L.P.	51	69	88	208
RCG Longview Debt Fund VI, L.P.	938	(1,220)	212	(70)
RCG Longview Equity Fund, L.P.	35	—	93	128
Rivercenter Mall	58	—	—	58
Senior Housing Partnership Fund IV, L.P.	16	(101)	64	(21)
Senior Housing Partnership Fund V, L.P.	734	(784)	122	72
Stockbridge Real Estate Fund II, LP	69	—	65	134
Stockbridge Real Estate Fund III, LP	298	—	106	404
Stockbridge Real Estate Fund, L.P.	3,527	(2,360)	234	1,401
Strategic Partners Fund IV RE, L.P.	36	—	53	89
The Galleria at Ft Lauderdale	484	—	—	484
UBS (US) Trumbull Property Fund, L.P.	260	—	15	275
Total - Private Real Estate	\$ 47,717	\$ 24,160	\$ 11,472	\$ 83,349
Grand Total	\$ 238,061	\$ 372,524	\$ 86,721	\$ 697,306

Commitment to Pennsylvania Based Investments



Commitment to Pennsylvania Financial Services Firms (as of June 30, 2021)

The members of the Board and Professional Staff are fiduciaries and must act in the interests of the members of the System and for the exclusive benefit of the System's members. In creating the investment program, the Board hires both external and internal investment managers. The Board has determined that it is in the best interest of the System to manage assets internally when (1) the System's investment professionals have the proven ability and capacity to manage portfolios internally at least as well as the external investment managers, and (2) the cost of investing those assets is no greater than the cost that would have been incurred to have those assets externally managed. The Board will also consider the diversification benefits that may be achieved by allocating assets to external portfolio managers even when conditions (1) and (2) are met.

The Board evaluates external managers based on a variety of factors, including: (1) a unique insight or

process; (2) the ability to add long-term excess returns above passive alternatives, net of fees; (3) adequate capacity to execute the strategy; (4) adding diversification to our existing investment structure; (5) not exhibiting style drift, and; (6) exhibiting a high level of ethical behavior. In selecting external managers, PSERS will show preference to Pennsylvania-based potential managers that demonstrate similar strengths to alternative managers without a Pennsylvania nexus.

PSERS has shown a strong commitment to Pennsylvania's financial services industry by having assets managed by firms based in Pennsylvania or by firms with offices in Pennsylvania. In FY2021, investment management fees paid to external firms managing PSERS assets from offices located in Pennsylvania amounted to \$27.8 million, or 4.8% of the total external investment manager fees.

Section 3 - Investment Information

Table 13.1 lists the asset exposures managed internally by PSERS, as of June 30, 2021.

Table 13.1

Pennsylvania-Based Asset Exposures Managed Internally

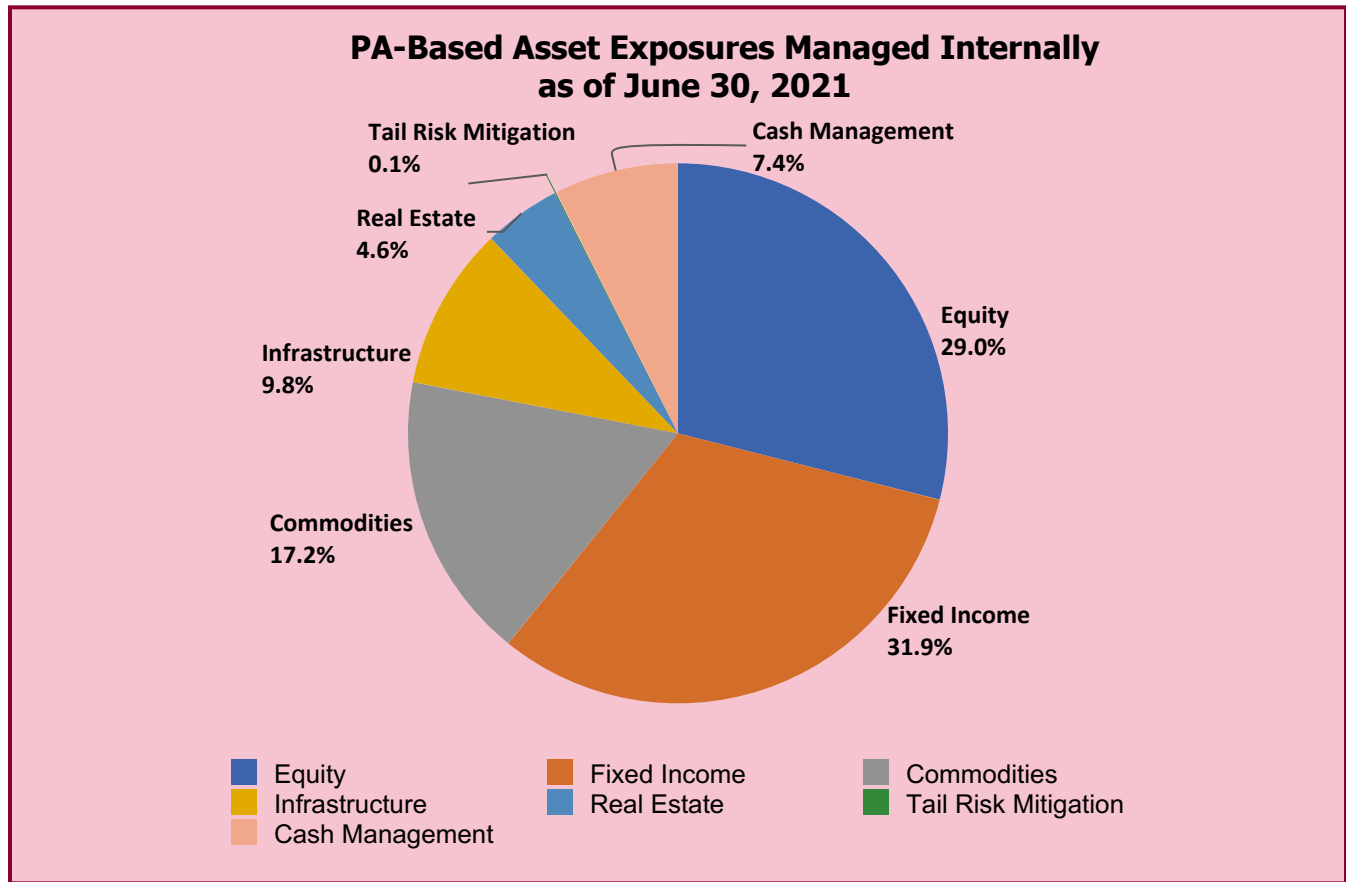
(as of June 30, 2021)

Asset Class	Market Value (in millions)	% of Total
Public Equity	10,258.1	25.2%
Private Equity	1,552.2	3.8%
Public Fixed Income	12,848.0	31.5%
Private Credit	149.8	0.4%
Public Commodities	6,965.3	17.1%
Private Commodities	57.2	0.1%
Public Infrastructure	3,954.0	9.7%
Public Real Estate	1,526.2	3.7%
Private Real Estate	368.8	0.9%
Private Infrastructure	35.7	0.1%
Absolute Returns	13.3	—
Tail Risk Mitigation	36.6	0.1%
Cash Management	3,020.0	7.4%
Totals	\$ 40,785.2	100.0%

Section 3 - Investment Information

Commitment to Pennsylvania Financial Services Firms (continued)

Chart 13.1 displays the distribution of exposures managed internally as of June 30, 2021.



Section 3 - Investment Information

Table 13.2 is a list of assets managed by external managers with headquarters or offices located in Pennsylvania, as of June 30, 2021.

Table 13.2	
Pennsylvania-Based External Managers	
Public Equity:	Private Equity:
Radcliffe Capital Management, L.P.	Adams Capital Management, L.P.
	Co-Investment 2000 Fund, L.P.
Public Fixed Income:	Co-Investment Fund II, L.P.
Radcliffe Capital Management, L.P.	Cross Atlantic Technology Fund II
	Cross Atlantic Technology Fund, L.P.
Private Credit:	Incline Elevate Fund II, L.P.
International Infrastructure Finance Company Fund, L.P.	Incline Elevate Fund, L.P.
LBC Credit Partners III, LP	Incline Equity Partners III, L.P.
LBC Credit Partners-P Credit Fund, LP	Incline Equity Partners IV, L.P.
	Incline Equity Partners V, L.P.
Private Real Estate:	LLR Equity Partners II, L.P.
	LLR Equity Partners III, L.P.
Exeter Core Industrial Club Fund II, L.P.	LLR Equity Partners IV, L.P.
Exeter Industrial Core Fund III, L.P.	LLR Equity Partners V, L.P.
Exeter Industrial Value Fund II, L.P.	LLR Equity Partners VI, L.P.
Exeter Industrial Value Fund III, L.P.	Milestone Partners FS 2, L.P.
Exeter Industrial Value Fund IV, L.P.	Milestone Partners III, L.P.
Exeter Industrial Value Fund V, L.P.	Milestone Partners IV, L.P.
GF Management	NEPA Venture Fund II
LEM Multifamily Fund V, L.P.	PNC Equity Partners II, L.P.
LEM Multifamily Senior Equity Fund IV, L.P.	SCP Private Equity Partners II, L.P.
Property Management, Inc.	Versa Capital Fund I, L.P.
	Versa Capital Fund II, L.P.
Private Infrastructure:	Versa Capital Fund III, L.P.
International Infrastructure Finance Company Fund II, L.P.	

Investments in Pennsylvania-Based Companies (as of June 30, 2021)

Pennsylvania Private Equity and Private Equity Co-Investments are sourced from funds where PSERS or its consultant is an investor. The Board, in managing the investment portfolio, will also be cognizant of concentration risk to any one region, including Pennsylvania. The Fund will continue to seek investments in Pennsylvania-based companies when the investment characteristics are equivalent to other favorable investments, subject to diversification considerations.

U.S. Equities

PSERS invests in the stock of Pennsylvania-based companies through the various U.S. Equity portfolios managed by internal portfolio managers. PSERS has always had investments in large national firms located in Pennsylvania.

Fixed Income Securities

PSERS invests in the debt of Pennsylvania-based companies through the various Fixed Income portfolios managed by external and internal portfolio managers. PSERS has always had investments in large national firms located in Pennsylvania.

Private Infrastructure

PSERS Private Infrastructure Program has committed \$1.3 billion to 5 partnerships. From the program inception to June 30, 2021, PSERS has committed capital to 1 partnership headquartered in Pennsylvania.

Private Real Estate

PSERS has investments in limited partnerships that have invested in Pennsylvania real estate properties. PSERS Real Estate program has committed \$16.8 billion to 141 partnerships. From the program inception to June 30, 2021, PSERS has committed capital to 19 partnerships headquartered in Pennsylvania.

Private Equity

PSERS Private Equity program has committed \$33.4 billion to 294 partnerships. From the program inception to June 30, 2021, PSERS has committed capital to 45 partnerships headquartered in Pennsylvania.

Private Equity and Private Real Estate Pennsylvania In-House Co-Investment Program

In April 2015, PSERS Board approved a \$250 million commitment for PSERS to co-investment in portfolio companies based in Pennsylvania. The portfolio companies are sourced from funds where PSERS or its consultant is an investor. As of June 30, 2021, PSERS has invested \$58.0 million and has a total value of \$124.5 million, resulting from \$65.9 million in distributions and \$58.6 million of net assets. The number of employees, payroll, and market value are included within their respective asset class in Table 13.3.

Private Credit

PSERS Private Credit Program has committed \$12.3 billion to 282 partnerships. From the program inception to June 30, 2021, PSERS has committed capital to 3 partnerships headquartered in Pennsylvania.

Section 3 - Investment Information

Table 13.3 displays Pennsylvania-based investments and other statistics at June 30, 2021 (\$'s in millions):

Table 13.3

Statistics of Pennsylvania-Based Investments

<u>Asset Class</u>	<i>Total PA Market Value (PSERS Portion)</i>	<i>Total PA Market Value (Total Invested)</i>	<i># of People Employed</i>	<u>Payroll</u>
US Equities	\$ 88.2	\$ 88.2	*	\$ *
Fixed Income	61.3	61.3	*	*
Private Real Estate	102.6	1,678.1	92.0	4.1
Private Equity:				
Buyout	1,826.2	41,763.2	55,904.0	524.8
Growth Equity	251.9	3,048.3	1,903.0	46.9
Venture Capital	20.3	39.8	126.0	10.7
Total	\$ 2,350.5	\$ 46,679.0	\$ 58,025.0	\$ 586.5

* Statistics for publicly traded companies not included due to the difficulty in obtaining the information.