COMMONWEALTH OF PENNSYLVANIA
PUBLIC SCHOOL EMPLOYEES' RETIREMENT SYSTEM

Leverage Policy

TABLE OF CONTENTS

Revision History

Leverage Policy Established	**March 6, 2020**
Policy Revised	**March 5, 2021**

I. SCOPE

This Policy applies to the use of leverage within the Pennsylvania Public School Employees' Retirement System ("PSERS") Defined Benefit Fund ("The Fund").

II. PURPOSE

This Policy provides the broad strategic framework for managing the Fund's leverage in internally and externally managed portfolios. Asset Allocation Leverage, as defined below, is implemented for the purpose of greater diversification in the strategic asset allocation so as to achieve a higher risk adjusted return.

III. ROLES AND RESPONSIBILITIES

Roles and Responsibilities related to this Policy are identified within PSERS' Investment Policy Statement ("IPS").

IV. PHILOSOPHY

Leverage is a term that has many meanings and applications. This is true even within the fields of corporate finance or investment management, where it is widely used. Broadly speaking, leverage is an ability to amplify an outcome in such a way that does not require a corresponding increase in resources or inputs. More specifically from an investment perspective, PSERS views leverage as a condition in which the economic or market exposure of an investment exceeds the total capital deployed.

The use of leverage on a single asset or asset class will amplify profits or losses on a given amount of capital, thereby increasing the volatility of returns, although leverage as part of a portfolio construct does not necessarily create additional market risk or variation in market returns. Use of leverage may result in a portfolio with greater diversification and lower market risk than an unleveraged portfolio. Leverage is used where it can improve investment portfolio efficiency in terms of return for risk versus alternative choices that do not use leverage. Leverage will also be used to improve portfolio diversification and reduce portfolio concentration.

Asset Allocation Leverage reflects any excess allocation to the combined cash and investment exposures that is greater than 100%. Asset Allocation Leverage does not include Strategy Leverage. Strategy Leverage is used within an asset class and portfolios to achieve target return-risk characteristics. Asset Allocation Leverage may be deployed within any Public Markets asset class per the IPS where it is prudent efficient to do so, within the limits of the Policy Range and Net Leverage constraints in the Asset Allocation section of the IPS.

V. PERMITTED USE OF LEVERAGE

The Investment Office is authorized to use the following in order to create Asset Allocation Leverage or Strategy Leverage:

a. Derivative strategies in accordance with the risk parameters established by the asset allocation ranges of this Policy and applicable legal restrictions;

b. Short sales via derivatives in accordance with this Policy (short sales of physical securities are not allowed);

c. Currency hedging in accordance with this Policy;

d. Embedded leverage within Non-Recourse fund structures; and

e. Collateralized fundings including securities lending activities, pledges, repurchase and reverse repurchase agreements and other external funding mechanisms.

f. Line of credit (borrowing)

VI. RISK MANAGEMENT

A number of approaches are used to measure and manage risks associated with leverage, depending upon the source and resultant risk exposures, including a combination of controls in policies, portfolio guidelines, procedures and operative legal documents.

Asset Allocation Leverage:

Asset Allocation Leverage is the absolute value of the Explicit Leverage in the Asset Allocation section of the IPS and represents economic exposure in excess of capital. For the purposes of this Policy, the Explicit Leverage amount applies only to identified Explicitly Leveraged Portfolios. Explicitly Leveraged Portfolios are portfolios whose express purpose is to gain exposure in excess of capital. Currently, the list of Explicitly Leveraged Portfolios includes US Inflation Linked, Non-US Inflation Linked, Commodities, Gold, Infrastructure, Real Estate, and Long US Treasuries. IOP maintain the list of the Explicitly Leveraged Portfolios. Explicitly Leveraged Portfolios do not include portfolios with only Strategy Leverage. Economic Exposure is defined as the Explicit Leverage plus capital allocated as depicted in the Asset Allocation (see example below).

Asset Allocation Leverage will not be used to exceed the risk parameters established by the Asset Allocation Ranges in the IPS. IOP will establish target leverage ratios for portfolios used for Asset Allocation Leverage based on the volatility of the specific underlying exposure, but in no cases will the leverage ratio of any given portfolio exceed 10:1. Should any portfolio exceed a leverage ratio of 10:1 due to market movements, the portfolio shall be brought back into compliance no later than the end of the month in which the leverage ratio was exceeded.

For the majority of Explicitly Leveraged Portfolios – namely those invested in separate account portfolios - the calculations of Leverage and Leverage Ratio for a portfolio or account are as follows:

Leverage = Economic Exposure less Net Asset Value (NAV)
Leverage Ratio = Economic Exposure divided by NAV

Where:

- Cash as defined in the Cash Policy is not considered to have market exposure for purposes of Economic Exposure in the calculations. Market exposures which are fully backed or collateralized by cash held in an explicitly leveraged segregated account are not considered to be leveraged (i.e., leverage ratio is 1:1).
- Non-U.S. Dollar currency exposure that is hedged to U.S. Dollar is not considered leverage and is excluded.
- Short positions in derivatives used for the purposes of bringing the Asset Allocation Leverage in line with the Asset Allocation's Target Explicit Leverage are considered to be offsetting in the determination of Economic Exposure.

<u>Example of the calculations of Leverage and Leverage Ratio:</u>

- Assumptions:
  - An Explicitly Leveraged Public Real Estate Portfolio obtains $1.0 billion of market exposure to Public Real Estate via a swap
  - This Portfolio has $500 million in cash supporting the swap, which is the accounting NAV of the portfolio
- Therefore:
  - This Portfolio's Economic Exposure is $1.0 billion; cash is not considered to have market exposure
  - This Portfolio's Leverage is $500 million, which is $1.0 billion Economic Exposure less $500 million NAV
  - This Portfolio's Leverage Ratio is 2:1, which is the ratio of Economic Exposure divided by NAV
  - The Explicit Leverage of this Portfolio as a percentage of the Fund is $500 million divided by the Fund's total Economic Exposure.
  - The Fund's total Economic Exposure is the sum of the total NAV for all non-Explicitly Leveraged Portfolios plus the total Economic Exposure for all Explicitly Leveraged Portfolios

<u>Example of the calculation of Active Risk in which some of the Economic Exposure in a sub-asset class is provided by an Explicitly Leveraged Portfolio:</u>

- Assumptions:
  - The same Explicitly Leveraged Public Real Estate Portfolio in the example above

  - The swap is a total return swap of the Public Real Estate Policy Benchmark, so the Explicitly Leveraged Portfolio is considered to have Tracking Error of 0%
  - Additional Economic Exposure is provided by an actively managed portfolio of $250 million NAV which is not an Explicitly Leveraged Portfolio; this portfolio has Tracking Error of 6% to the Public Real Estate Policy Benchmark
- Therefore:
  - Public Real Estate has a total Economic Exposure is $1.25 billion, which is $1.0 billion from the Explicitly Leveraged Portfolio plus $250 million NAV from the actively managed portfolio
  - Active Risk for the Public Real Estate sub-asset class is the weighted average of the Tracking Error of 0% on $1.0 billion and 6% on $250 million:

$$\frac{1.0 \text{ billion x } 0\% + \$0.25 \text{ billion x } 6\%}{\$1.25 \text{ billion}} = 1.2\%$$

Strategy Leverage:

Strategy Leverage is any leverage deployed within passive plus, including collateralizing derivative positions with LIBOR-Plus portfolios, or actively managed portfolio mandates, whether in a fund or separately managed account structure (see the example below). Leverage within a separately managed account, specifically for portable alpha purposes fully collateralized with cash, LIBOR-based portfolios, or absolute return portfolios, or for risk management purposes, is managed via separately managed account guidelines. For clarity sake, portfolios which seek to magnify the economic exposure of the mandate will be considered Explicitly Leveraged Portfolios with Asset Allocation Leverage. Leverage within a fund, such as for funds within the Non-Traditional Investments asset classes (e.g. Private Equity, Private Real Estate, Private Credit, Private Infrastructure and Absolute Return) is typically identified and constrained in the fund's governing documents.

Examples to illustrate what is and what is not Strategy Leverage:

- Portfolio A consists of $100 of cash and $100 of S&P 500 futures.
  - This is a pure passive portfolio.
  - It does not have Strategy Leverage, as the cash is a risk-less asset.
  - It does not have Asset Allocation Leverage as the $100 of cash fully collateralizes the $100 of futures.
- Portfolio B consists of $100 of Libor-Plus and $100 of S&P 500 futures.
  - This is a passive plus portfolio.
  - It does have Strategy Leverage, as Libor-Plus has a risk premium over cash.
  - It does not have Asset Allocation Leverage, as the $100 of Libor-Plus fully collateralizes the $100 of futures.

- Portfolio C consists of $100 of Libor-Plus and $120 of S&P 500 futures.
  - It does have Strategy Leverage, as Libor-Plus has a risk premium over cash.
  - It does have $20 of Asset Allocation Leverage, as the $100 of Libor-Plus does not fully collateralize the $120 of futures. This Portfolio would be added to the list of Explicitly Leveraged Portfolios, and $20 would count toward Explicit Leverage.

The primary risks and controls associated with leverage are shown below.

A. Derivatives Risk

Risks associated with derivatives usage are described in PSERS Derivatives Policy. Derivatives usage is permitted in selected separately managed accounts, subject to portfolio guidelines and relevant governing documents, and must comply with the Derivatives Policy.

B. Liability/Recourse Risk

Except as provided for in the Liquidity Policy, borrowing agreements with recourse to the Fund are not permitted.

When borrowing is permitted within specific portfolios as a means to generate leverage, the investment structure must contain terms designed to limit the extent of the loss to the capital investment, such that there is no direct recourse to the Fund.

- For investments in fund structures, IOP shall endeavor to utilize a limited liability structure such as a limited partnership or a limited liability company, with terms designed to limit the total potential loss, including losses caused by derivatives, to the amount initially invested or committed by PSERS.

C. Liquidity Risk

Liquidity risk associated with margin or collateralization requirements or instrument illiquidity may increase with the usage of leverage. For Asset Allocation Leverage this is managed through notional targets in line with the IPS Target, the aggregate Explicit Leverage limitations within the Asset Allocation section of the IPS and leverage ratio constraints at the portfolio level.

D. Counterparty Risk

Counterparty risk will be evaluated in the context of the Derivatives Policy.

E. Collateral Risk

Cash and cash equivalents used as collateral may not perform as expected. Other collateral such as fixed income securities and absolute return strategies may also provide liquidity risk in certain market extremes. In addition, the (1) reinvestment or (2) re-use (re-hypothecation) of collateral proceeds (both cash and securities) may produce leverage resulting from the added economic exposure of the reinvestment or re-hypothecation activity.

Re-investment of collateral received as part of the Securities Lending program is permitted, subject to the Securities Lending Policy.

F. Legal Risk

Use of leverage may rely on the successful implementation of various forms of operative documents, including but not limited to trading agreements, partnership agreements, and investment management agreements. PSERS Investment Operations and Office of Chief Counsel are used to review contracts and operative documents to limit the risks of inadequate documentation.

G. Correlation Risk

When using leverage to diversify a portfolio, assumptions regarding the correlations of assets are required. To the extent the realized correlations among assets differ significantly from what was estimated portfolio risk may be higher than that of an unleveraged, less diversified portfolio.

H. Volatility Risk

Increased market exposure resulting from leverage creates the risk of amplified return volatility. Measurement of active risk and total risk is used to manage the overall volatility risk associated with leverage.

VII. MONITORING AND REPORTING

See Monitoring and Reporting section of the IPS.