CALSTRS
HOW WILL YOU SPEND YOUR FUTURE?

INVESTMENT COMMITTEE

PORTFOLIO RISK REPORT

Contents

Investment portfolio as of December 31, 2021

Chart 1. Portfolio value

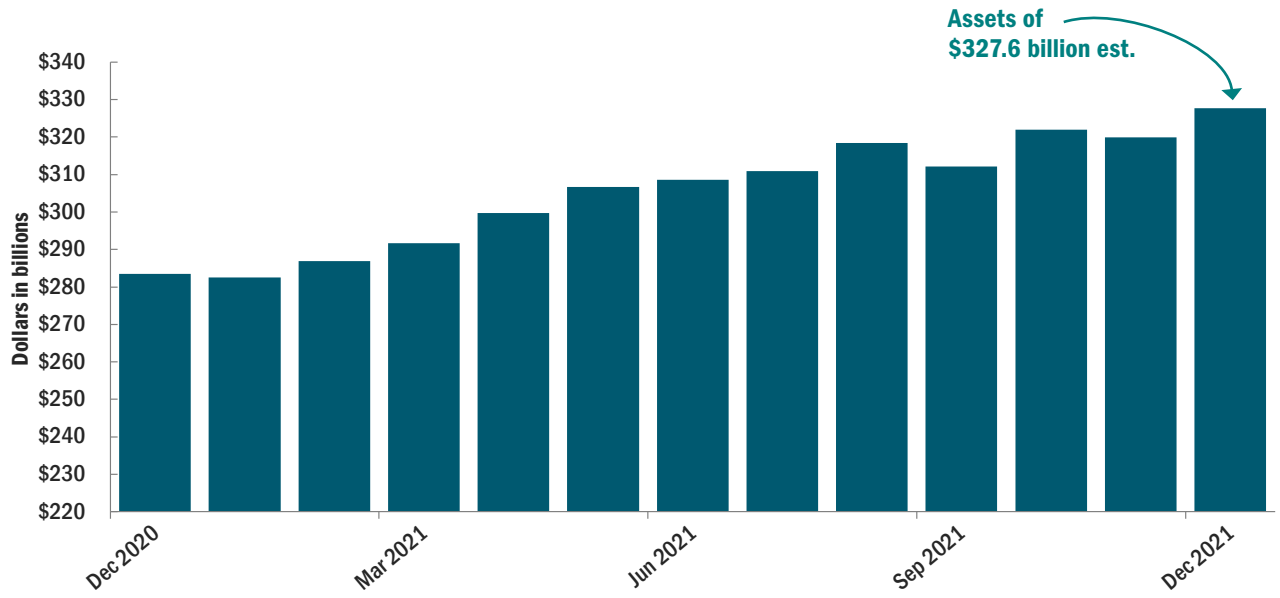


Chart 2. Asset allocation

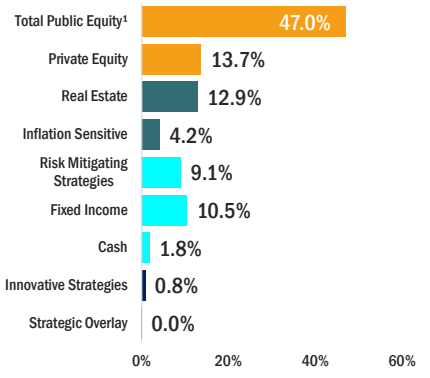
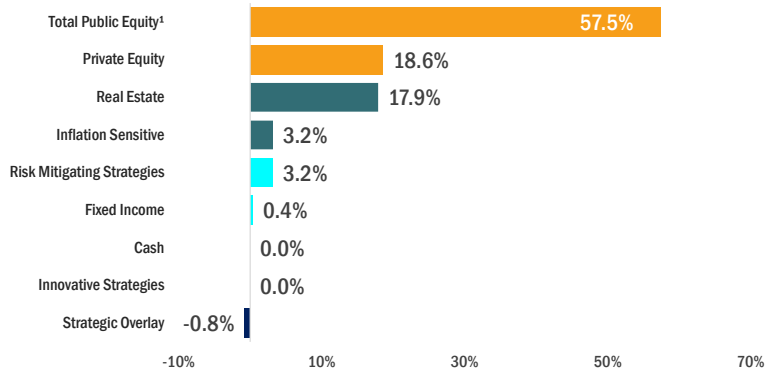


Chart 3. Portfolio risk

Expected volatility: 12.7%



Equity & Growth | Real Assets & Inflation | Diversifying | Other

[1] Total Public Equity includes the following sub-units: Global Equity, SISS and Innovation GE.

Total fund risk and asset allocation as of December 31, 2021

The Risk team utilizes the BlackRock Aladdin risk management system for the total plan portfolio. According to the BlackRock risk model, approximately 58% of the total risk in the CalSTRS Investment Portfolio comes from Public Equity, versus an approximately 47% asset weight. Public Equity risk and Private Equity risk combined now comprise over 76% of portfolio risk. Portfolio risk increased significantly due to spiked market volatility in March and April 2020 and it remains elevated.

Chart 4. Asset allocation over the past three years (monthly)

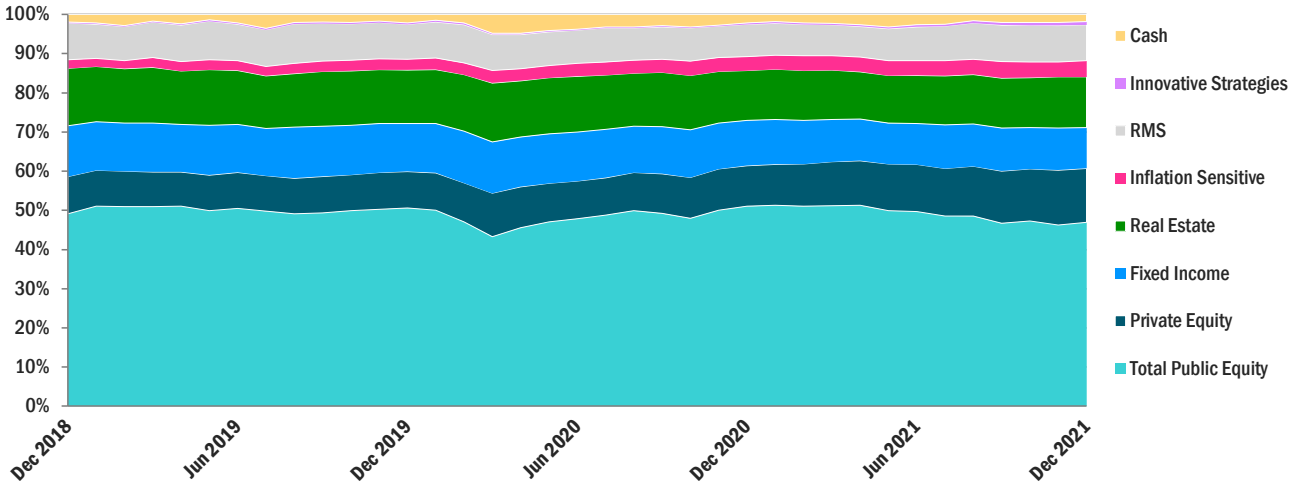
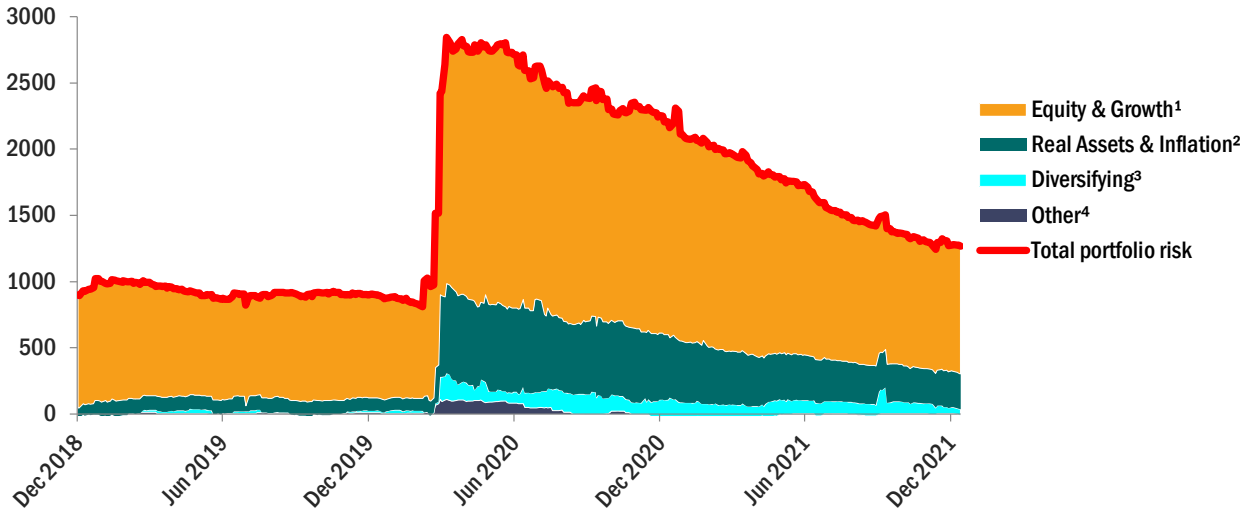


Chart 5. Sources of portfolio risk



[1] Equity & Growth includes Total Public Equity and Private Equity.
[2] Real Assets & Inflation includes Real Estate and Inflation Sensitive.
[3] Diversifying includes Risk Mitigating Strategies, Fixed Income & Cash.
[4] Other includes Innovative Strategies and Strategic Overlay.

CalSTRS market exposures

Across all asset classes, the fund has significant exposure to the U.S. with approximately 76.8% of the portfolio invested in the U.S. The next largest exposure is 2.7% in Japan. Taiwan rounded out the top 10, followed closely by South Korea and Hong Kong, ranked 11th and 12th, respectively. Chart 7 shows the top 10 total fund portfolio exposures by parent company, as a percentage of the total portfolio.

Chart 6. Top 10 market value exposures by country as of December 31, 2021

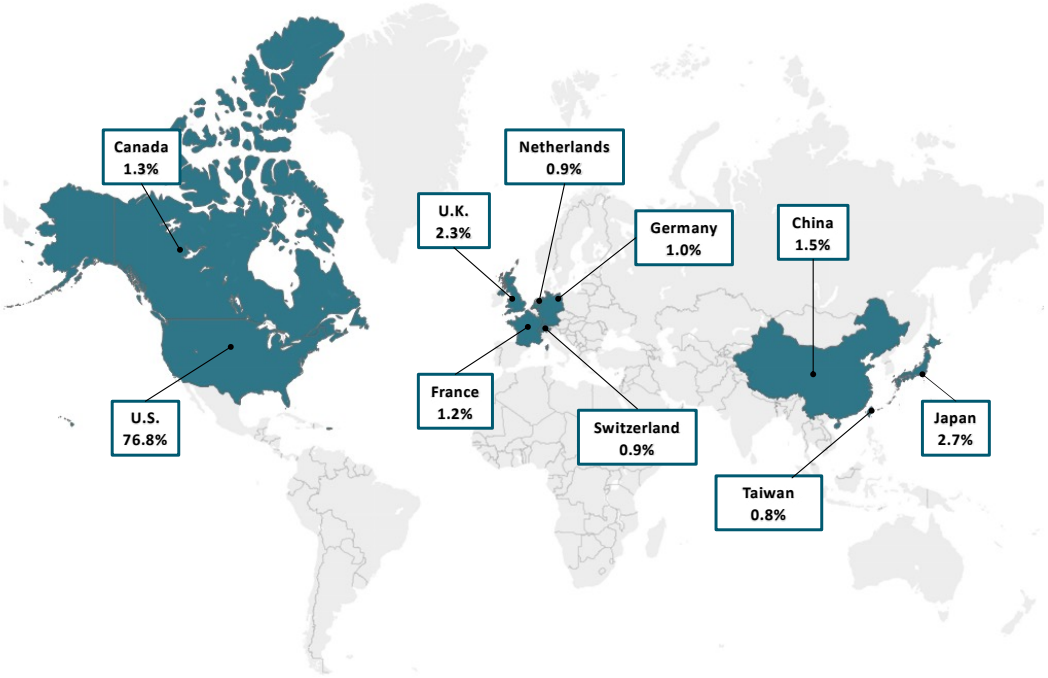
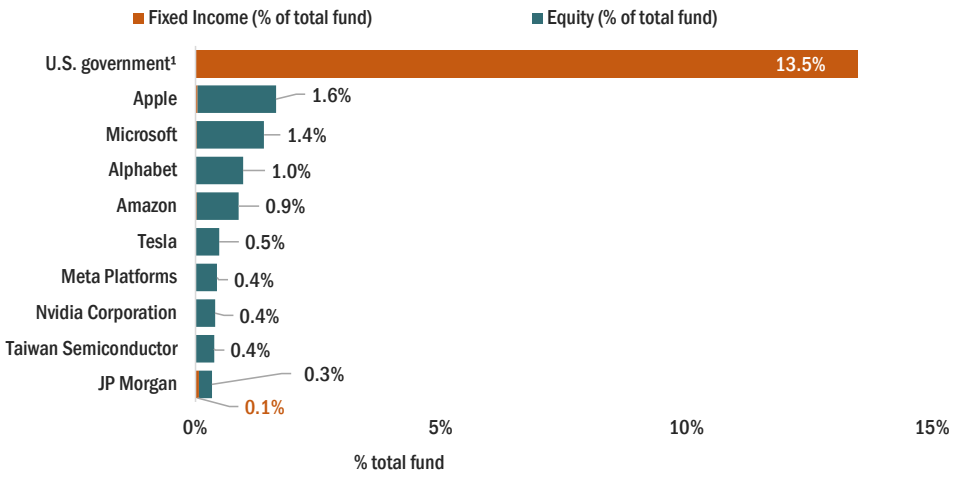


Chart 7. Total fund top 10 exposures [1]



[1] U.S. government includes U.S. Treasuries, Agency MBS and other government agency debt.

CalSTRS market exposures

Chart 8 shows the top 10 total Public Equity portfolio exposures by parent company as a percentage of the total Public Equity Portfolio.

Chart 8. Total Public Equity top 10 exposures

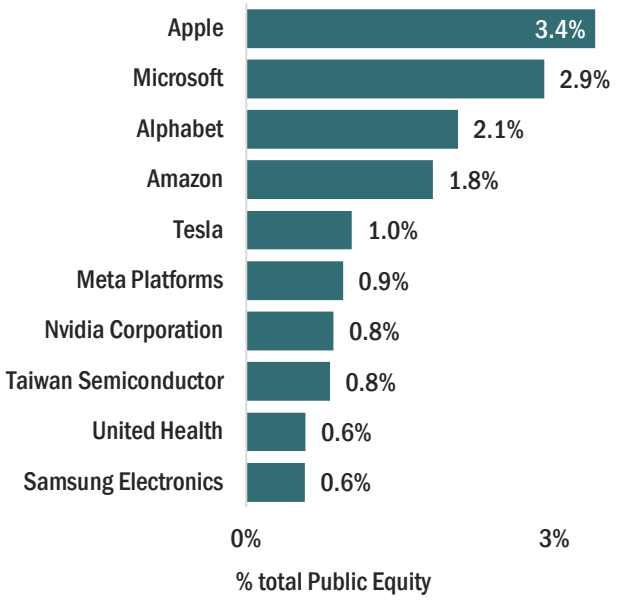
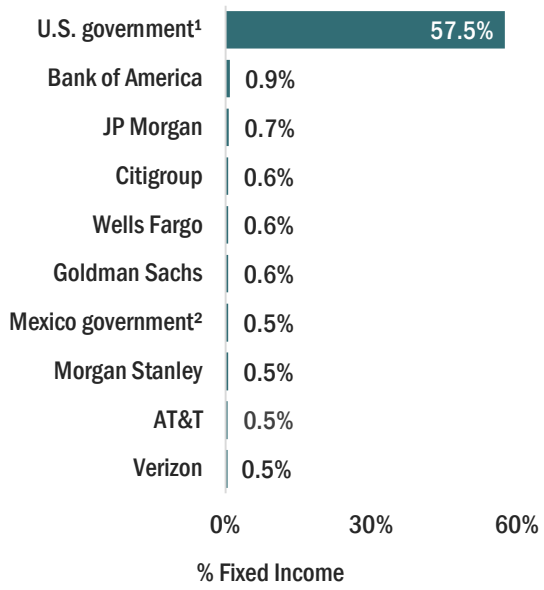
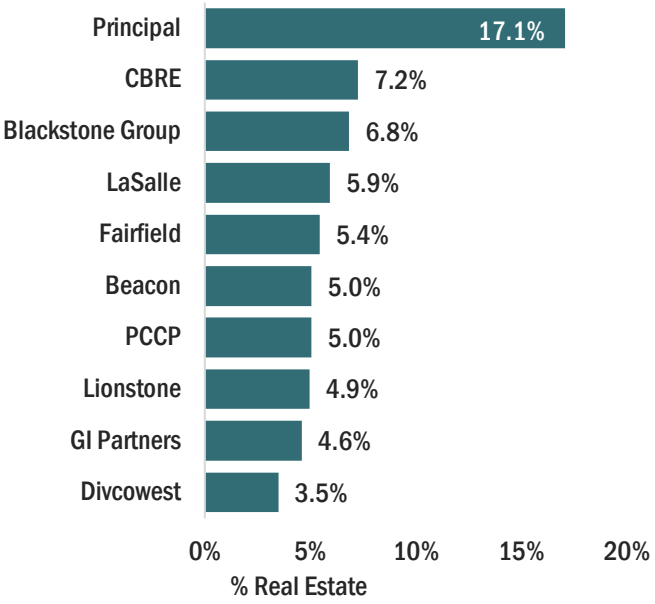


Chart 9. Fixed Income top 10 exposures



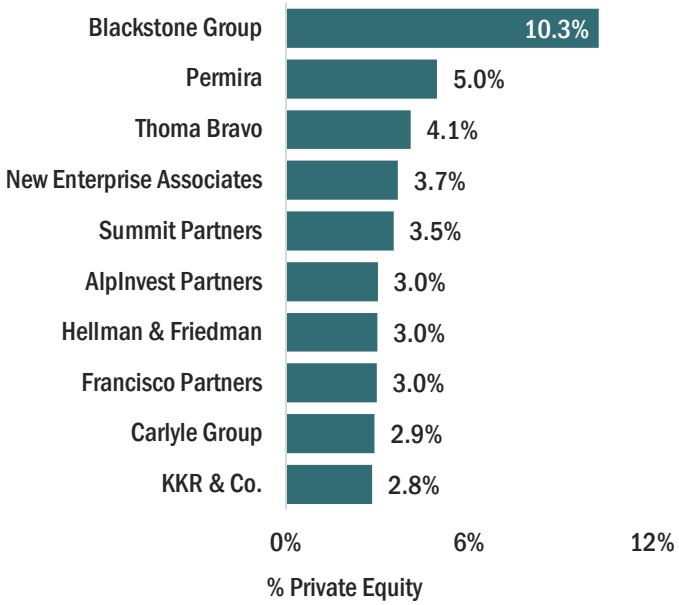
¹ U.S. Treasuries, Agency MBS and other government agency debt.
² PEMEX and Mexico government debt.

Chart 10. Real Estate top 10 exposures[3]



[3] As of December 31, 2021.

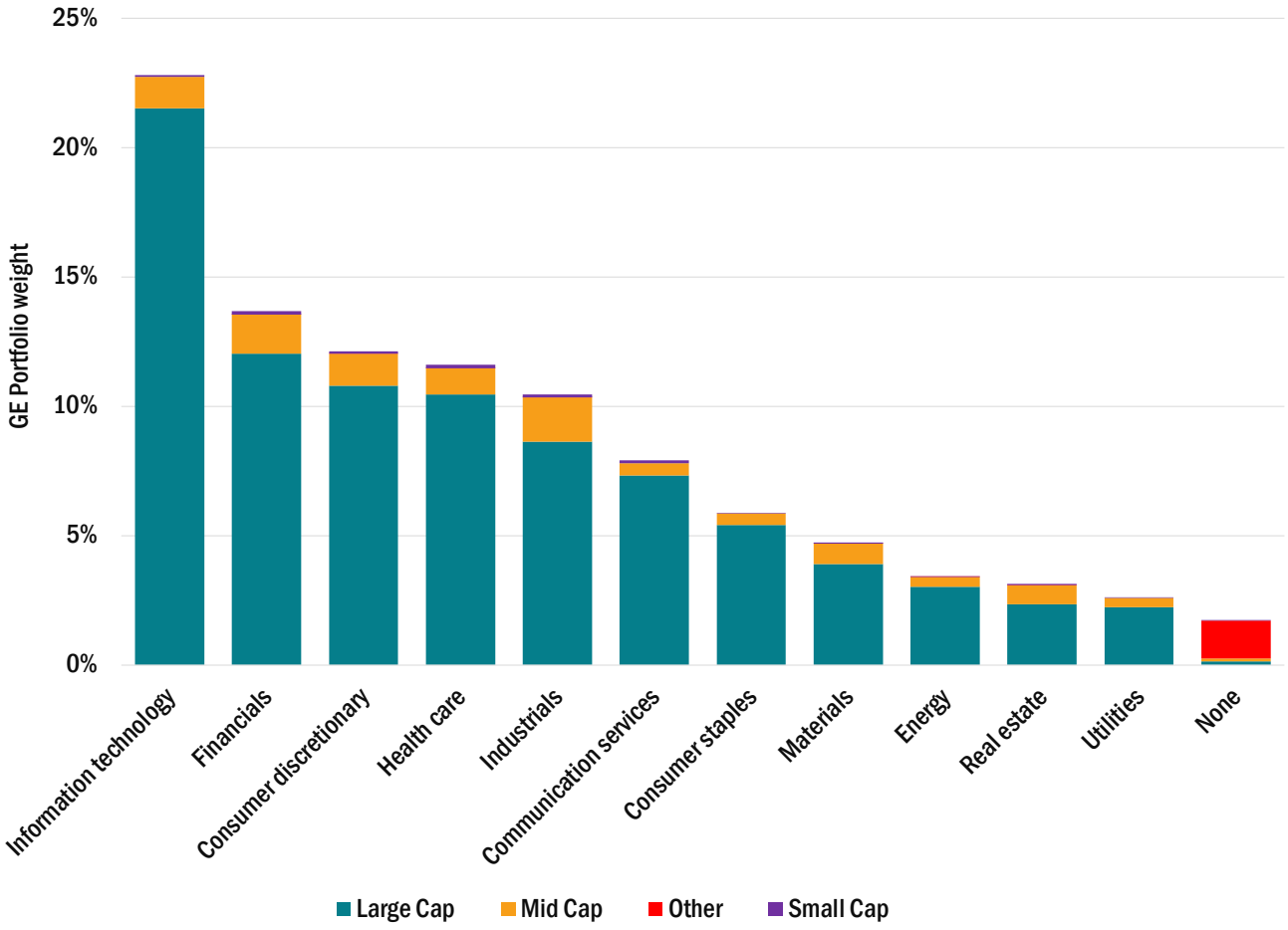
Chart 11. Private Equity top 10 exposures[4]



[4] As of September 30, 2021.

CalSTRS sector portfolio exposures

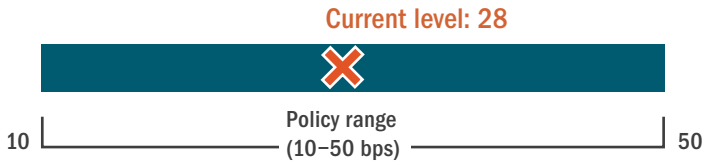
Chart 12. Global Equity—Sector portfolio exposures as of December 31, 2021



Global Equity—Active risk summary

Chart 13. Current active risk (bps)[1]

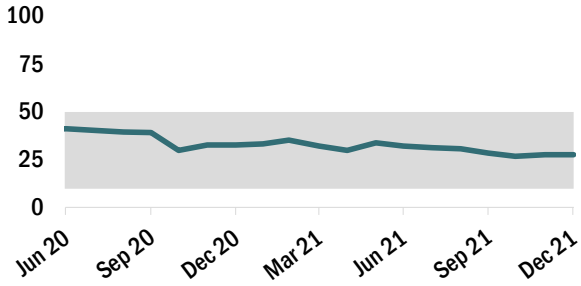
At the July 2021 Investment Committee meeting, the committee approved a new benchmark for Global Equity, effective August 1, 2021. As of December 31, 2021, the expected active risk of the Global Equity Portfolio is 28 basis points.



[1] Forecasted active risk based on BlackRock Aladdin model calculation.

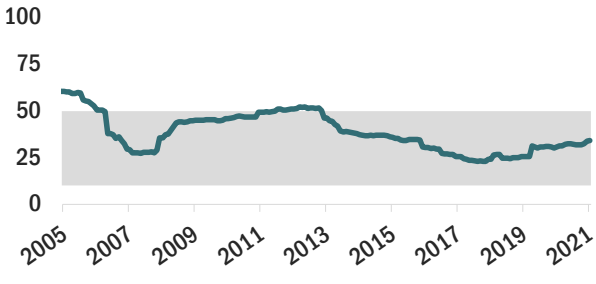
Historical active risk (bps)

Chart 14. Forecasted[2]



[2] Forecasted active risk based on the Global Equity Portfolio and market conditions over time.

Chart 15. Realized[3]



[3] Based on a rolling 60-month period of realized returns through December 31, 2021.

Exposures vs. benchmark (market value %)

Chart 16. Geographic active exposures

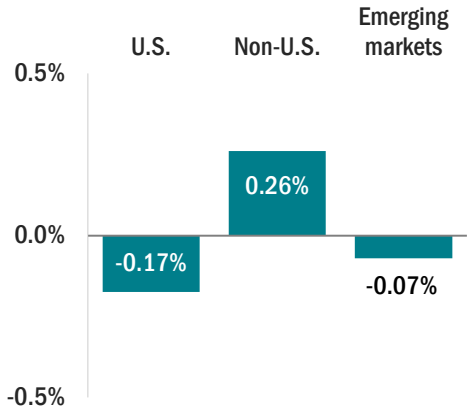
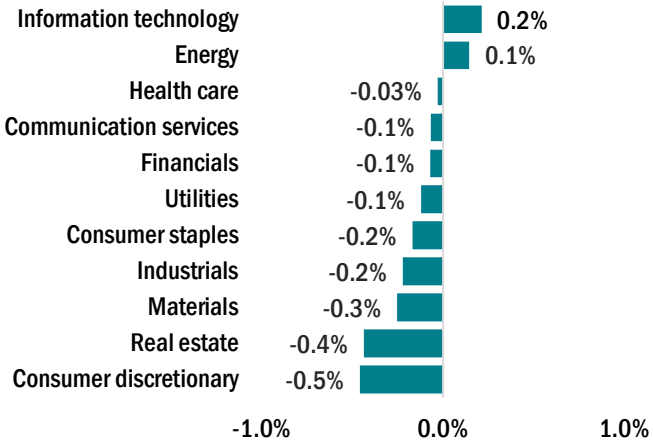


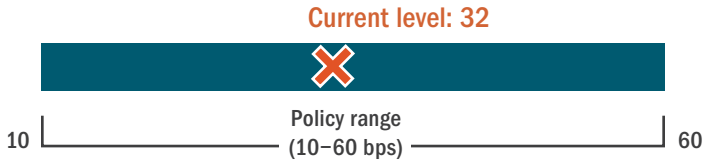
Chart 17. Sector active exposures



Fixed Income—Active risk summary

Chart 18. Current active risk (bps)[1]

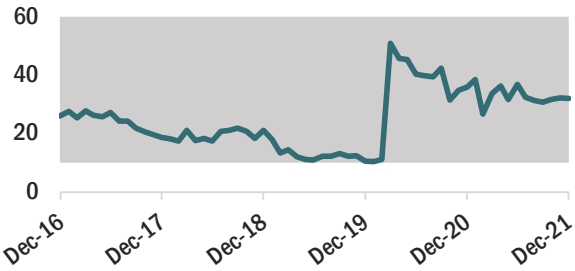
At the September 2021 Investment Committee meeting, the committee approved a new governance policy for Fixed Income, establishing an active risk budget range of 10 to 60 basis points. As of December 31, 2021, the expected active risk of the Fixed Income Portfolio is 32 basis points.



[1] Forecasted active risk based on BlackRock Aladdin model calculation.

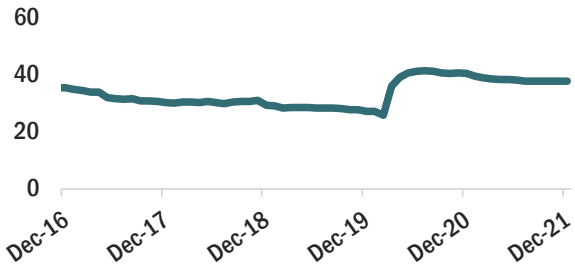
Historical active risk (bps)

Chart 19. Forecasted[2]



[2] Forecasted active risk based on the Fixed Income Portfolio and market conditions over time.

Chart 20. Realized[3]



[3] Based on a rolling 60-month period of realized returns through December 31, 2021.

Fixed Income exposures vs. benchmark (market value %)

Chart 21. Geographic active exposures

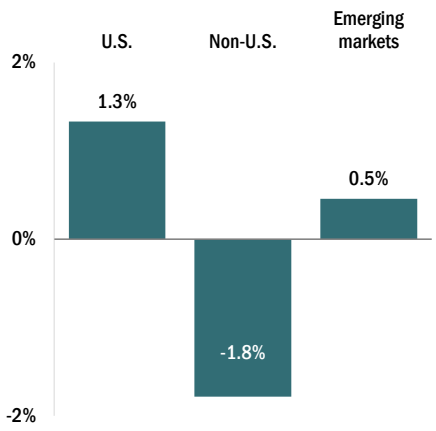
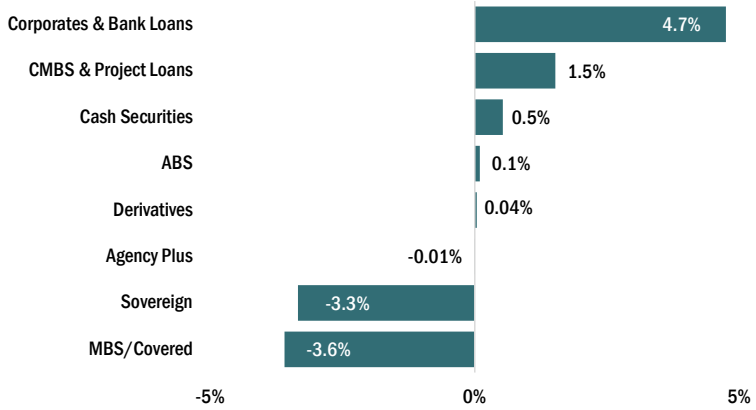


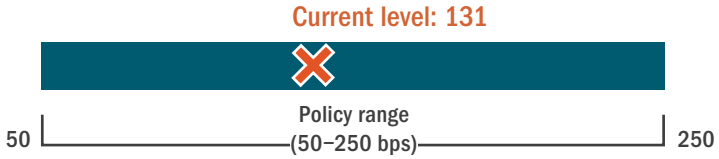
Chart 22. Sector active exposures



SISS—Active risk summary

Chart 23. Current active risk (bps)[1]

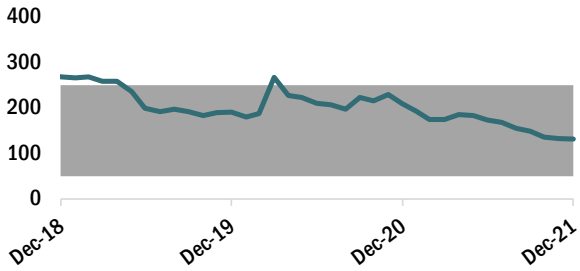
At the September 2021 Investment Committee meeting, the committee approved a new governance policy for SISS, establishing an active risk budget range of 50 to 250 basis points. As of December 31, 2021, the expected active risk of the SISS portfolio is 131 basis points.



[1] Forecasted active risk based on BlackRock Aladdin model.

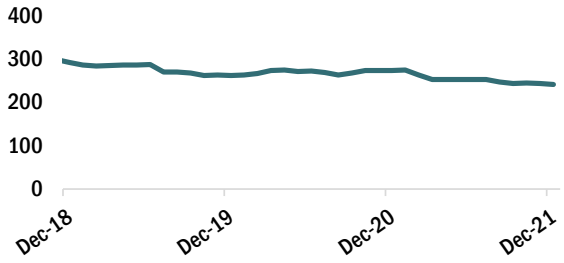
Historical active risk (bps)

Chart 24. Forecasted[2]



[2] Forecasted active risk based on current SISS portfolio and market conditions over time.

Chart 25. Realized[3]



[3] Based on a rolling 60-month period of realized returns through December 31, 2021.

SISS exposures vs. benchmark (market value %)

Chart 26. Geographic active exposures

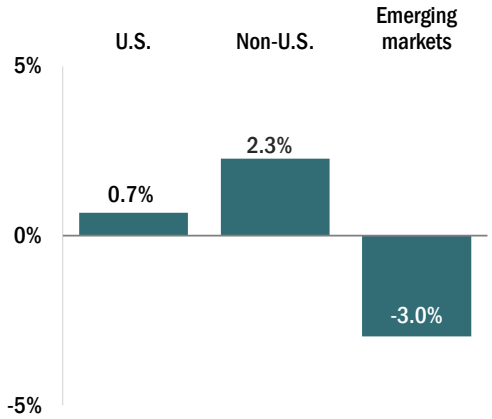
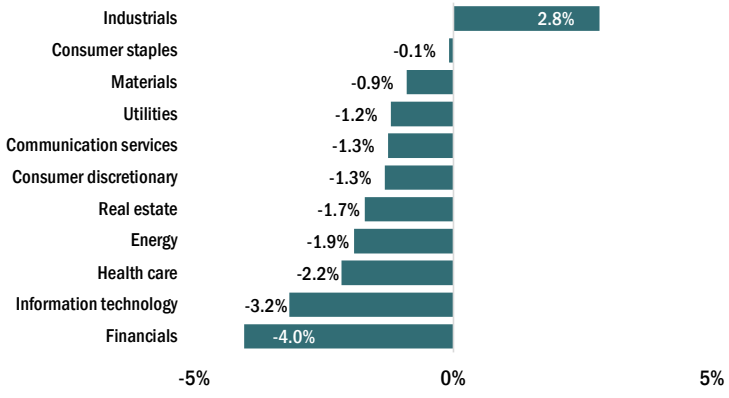


Chart 27. Sector active exposures



Real Estate

At the July 2021 Investment Committee meeting, the committee approved a new CalSTRS Real Estate Investment Policy. The policy sets limits on Real Estate leverage depending on CalSTRS' level of control. Controlled structures have a leverage limit of 50% and are typically separate accounts and joint ventures where CalSTRS is the majority investor. Non-controlled structures have a leverage limit of 65% and are typically commingled funds where CalSTRS is a minority partner with typical limited-partner rights.

Real Estate data is based on CalSTRS' share of gross asset value as of June 30, 2021.

Real Estate leverage

Chart 28. Leverage and limits

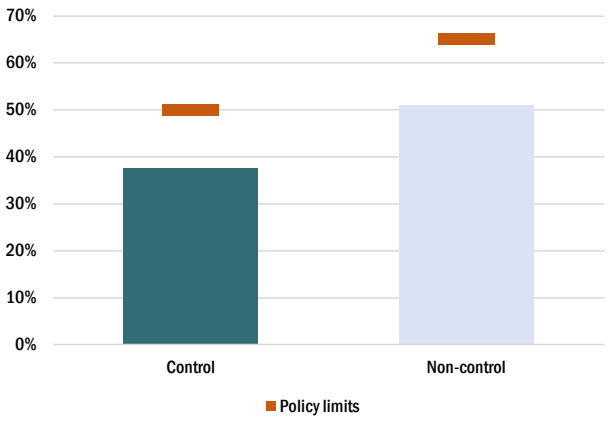
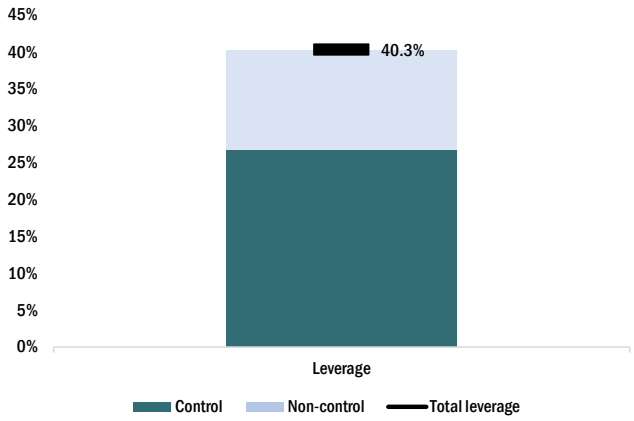


Chart 29. Total leverage



Real Estate Portfolio exposure

Chart 30. Geographic exposure

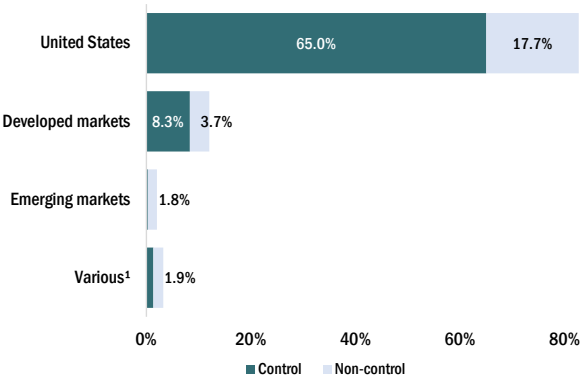
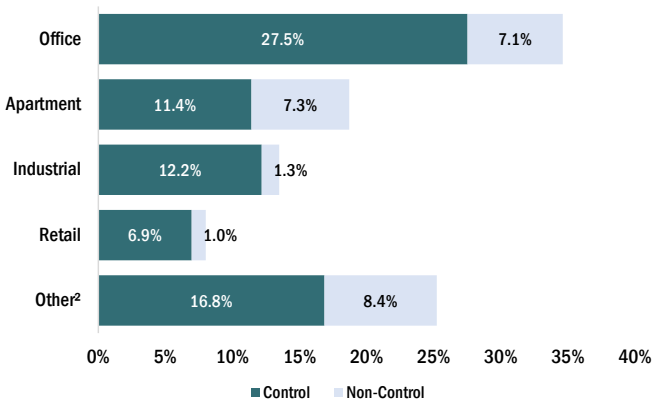


Chart 31. Property type exposure



[1] Various investments have properties in multiple countries that could be in multiple regions.

[2] Other property type includes diversified investments that include multiple property types and all other property types (for example, hotels or land).

Private Equity[1]

Chart 32. Sector exposure

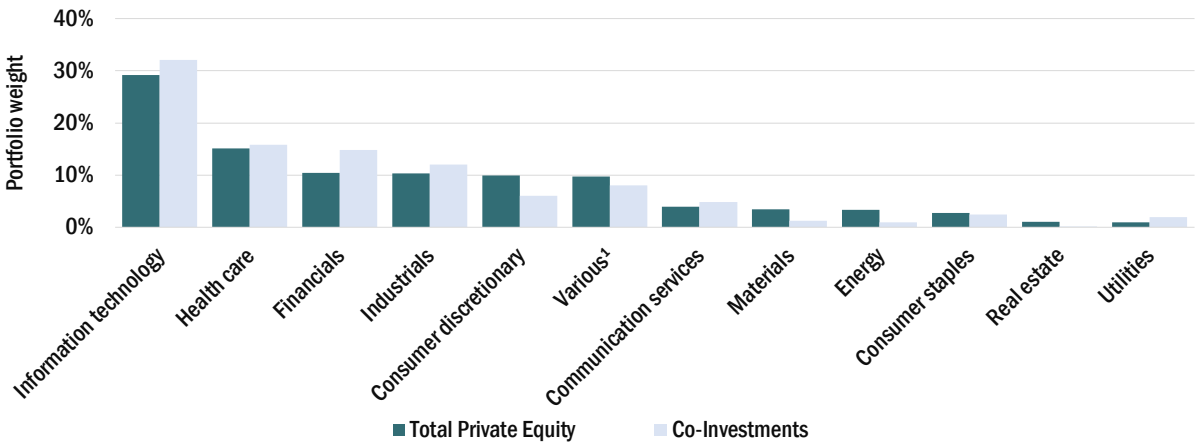
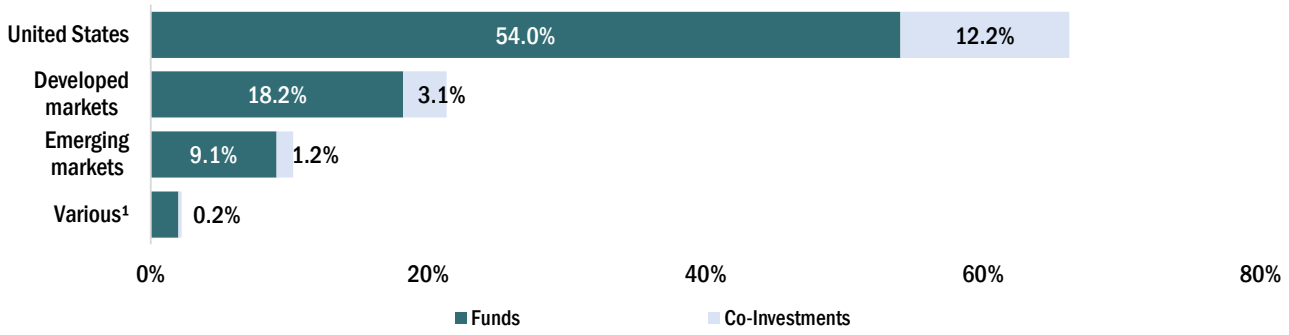


Table 1. Top 10 portfolio company exposure

Company	Investment vehicle	Market value (millions)	% of Private Equity
1	Co-Investments & funds	$448	1.04%
2	Co-Investments & funds	$345	0.80%
3	Co-Investments & funds	$324	0.75%
4	Co-Investments & funds	$290	0.67%
5	Co-Investments & funds	$282	0.65%
6	Co-Investments & funds	$255	0.59%
7	Funds	$252	0.58%
8	Funds	$250	0.58%
9	Co-Investments & funds	$233	0.54%
10	Funds	$225	0.52%

Chart 33. Geographic exposure



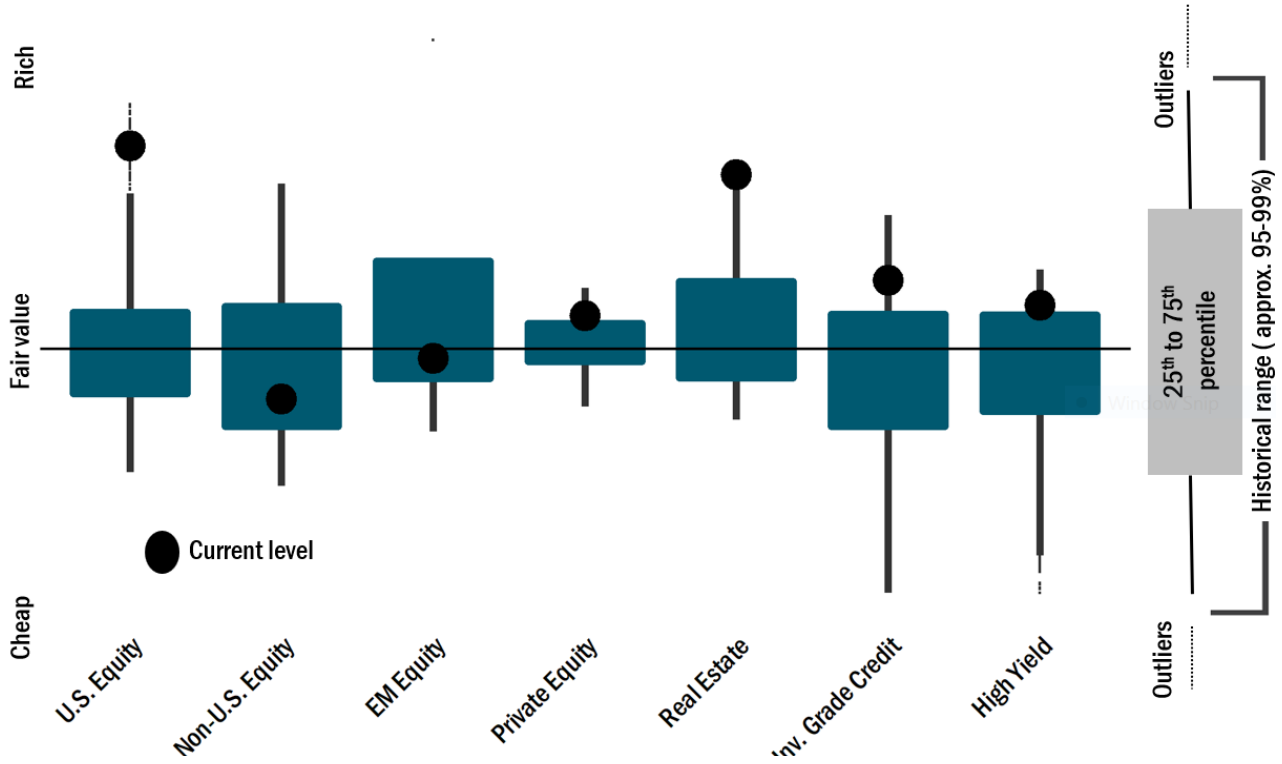
[1] Private Equity Portfolio company level data as of June 30, 2021.

[2] Various includes investments in which the sector or geography data is not available at the level of detail of the dataset.

Valuations

For most of the larger asset classes in the portfolio, the price of the asset at any given time is an important component of expected return, particularly over the medium term (three to five years). Higher prices tend to precede periods of lower returns, an important consideration for the risk-return opportunities across the portfolio. Chart 34 shows several common measures of valuation converted to a common scale for comparability. In the past few months, the valuations for U.S. equity and investment grade credit rose while valuations for high yield bonds and emerging market equity fell. The valuation for non-U.S. developed equity remained relatively constant, and Real Estate valuations rose to historical highs. U.S. equity continues to have a higher valuation than non-U.S. developed and emerging market equity.

Chart 34. Asset class valuations



Valuation metrics: Long-Term P/E Ratio for Public Equity; Total Value/EBITDA for Private Equity; Transaction Cap Rate for Real Estate; Credit spreads for Inv. Grade and HY Credit.

Market volatility

The volatility index presented in Chart 35 and Chart 36 is an indicator of general market turbulence. The red lines provide a threshold by which to judge whether a day is an outlier or not. The long-term chart shows that, historically, periods of higher turbulence tend to cluster in time. The clustering of turbulent periods means that if a particular day is an outlier, the following day is much more likely to be an outlier. Several days in a row of outliers are a strong indicator that market turbulence could persist for many weeks or months. Market volatility and turbulence spiked considerably during the COVID-19 pandemic recession in February through April 2020. Market volatility and turbulence have decreased since the recession, but there continue to be intermittent clusters of turbulent days.

Chart 35. Market turbulence—long term

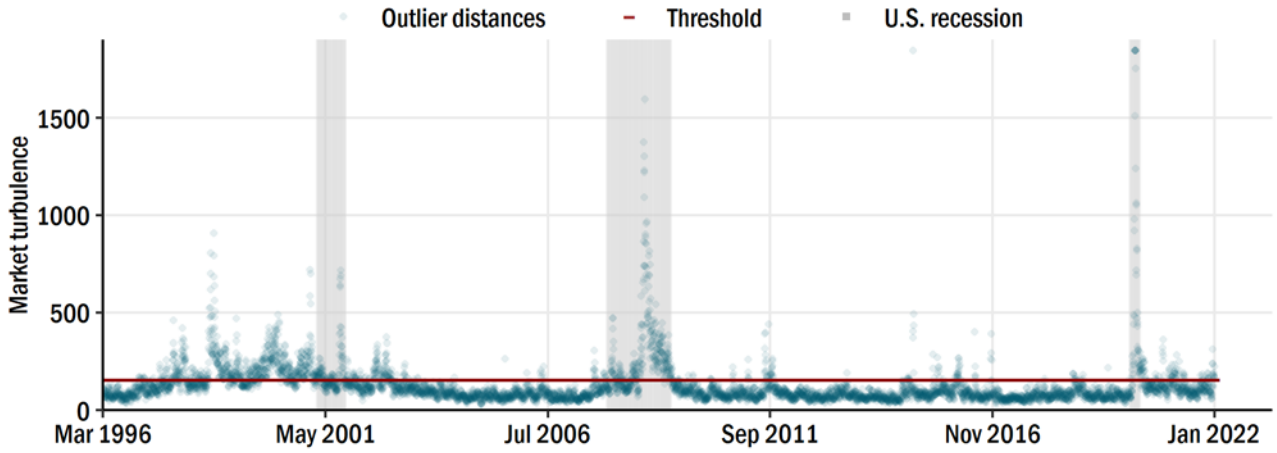
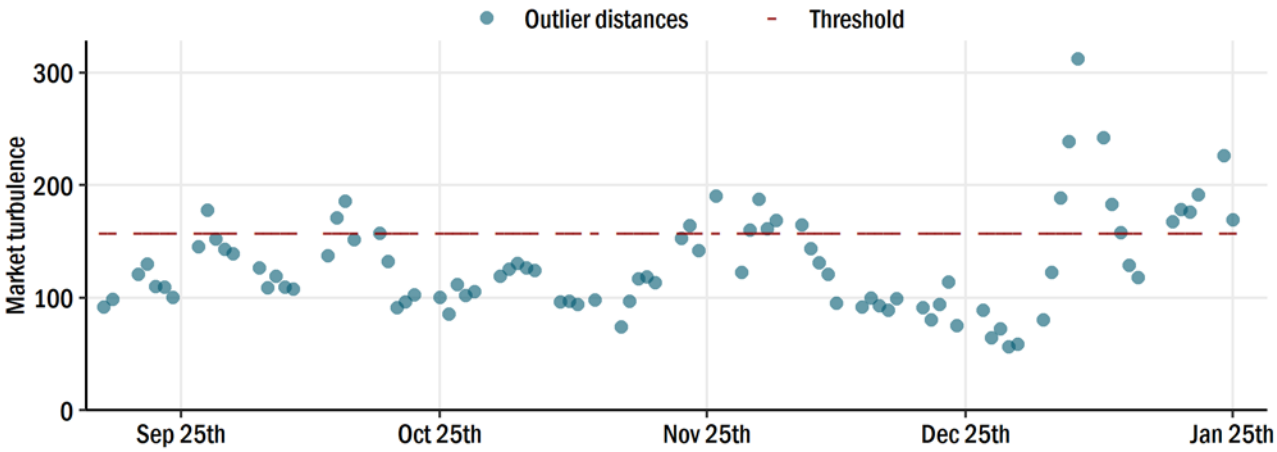


Chart 36. Market turbulence—recent



Fund liquidity

Paying timely benefit payments is a key objective that requires an appropriate level of cash or liquid assets that can be readily converted to cash. To ensure the fund has an appropriate level of liquidity, the Investment Policy specifies minimum levels of cash and other liquid assets. In addition to required policies, the Risk Allocation Committee manages portfolio rebalancing and timing in order to ensure cash is available when needed. A convenient framework for measuring how much liquidity is available is to break down the assets into multiple tiers:

- Cash.
- Tier 1 assets: Securities that trade frequently and can be readily converted to cash.
- Tier 2 assets: Generally liquid securities that can still trade at prevailing price levels even in periods of modest market stress.
- Less liquid assets: Securities that are by their nature illiquid, such as Private Equity Portfolio partnerships and otherwise liquid assets that become illiquid in periods of stress.

Table 2 shows the liquidity profile of the total portfolio. The combination of cash and Tier 1 assets provide a substantial cushion to ensure timely benefit payments, even in periods of extended market stress.

Table 2. Fund liquidity

Asset	Portfolio value (billions)	Months of benefit payments
Cash	$5.9	4.2
Tier 1 assets	$203.6	144.8
Tier 2 assets	$10.6	7.5
Less liquid assets	$102.1	72.6