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ENTERPRISE
SUCCESS**



PERIOD ENDING: SEPTEMBER 30, 2022

Investment Performance Review for

Illinois Police Officers' Pension Investment Fund

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Executive summary

Executive Summary

- Total assets grew from \$2.7 billion to \$5.7 billion over the quarter, as assets continued to transfer into the Fund. Asset growth was partially offset by investment losses.
- The challenging market environment continued through the third quarter, as both stocks and bonds fell broadly around the world, leading to a return of -5.4% for the Total Fund¹ and -4.8% for the IPOPIF Investment Portfolio over the quarter. These performance figures can be compared the Policy Index of -5.0% and the Broad-Based Policy Index² of -6.6% over the same time period.
- Since its inception in April, the IPOPIF Portfolio has returned -14.8%, which is right in line with the Policy Index and significantly ahead of the Broad-Based Policy Index of -19.4%.
- As a primarily passively invested investment strategy (through the transition period), the IPOPIF Portfolio has experienced minimal variance to its Policy Index.
- Similarly, individual managers performed in line with their specific strategy benchmarks during the quarter, as expected given the passive nature of most investment strategies. Modest exceptions were noted with Emerging Markets Equity and Debt strategies, which underperformed their benchmarks by approximately 60 and 50 basis points, respectively.
- The IPOPIF Portfolio ranked in the 75th percentile relative to a representative universe of Public Pensions with assets greater than \$1 billion for the quarter. The relatively low ranking continues to be largely the result of high equity and fixed income allocations and low alternative investments, most notably private markets investments, compared to peers³. IPOPIF's 3Q ranking compared more favorably (69th percentile) to Public Pensions with assets less than \$1 billion, as smaller pensions generally have smaller allocations to alternative investments.
- The investment team actively monitors current vs. policy target asset allocations and makes rebalancing trades as appropriate. As of 9/30/22, all asset allocation values were very close to policy targets.

Notes:

¹Total Fund assets includes Member Fund and Transition accounts that have not yet been invested in the IPOPIF Investment Portfolio.

²The Broad-Based Policy Index represents a passively invested 70/30 global stock/bond portfolio.

³IPOPIF has implemented a short-term asset allocation which is primarily passively invested in public markets. Following the Transition Period IPOPIF will move toward the long-term asset allocation, including active management and private market assets.

Economic environment

3rd quarter summary

THE ECONOMIC CLIMATE

- U.S. real GDP fell in Q2 for a second consecutive quarter, down -0.6% annualized (+1.6% over the past full year). Forecasts suggest a potential growth turnaround in the third quarter; the Atlanta Fed GDPNow forecast indicated a growth rate of 2.8% and economists expected 0.9% as of October 14th.
- The U.S. dollar delivered an impressive rally year-to-date, appreciating approximately 15% relative to major currencies. A stronger dollar may result in slowing U.S. exports as domestic goods become more expensive to foreign buyers, and lower inflation as American businesses and households are able to purchase foreign goods at cheaper prices.

PORTFOLIO IMPACTS

- September inflation figures conveyed two stories: first, U.S. core CPI (excludes food & energy) remained elevated, rising 0.6% during the month to a new 40-year high of 6.6% year-over-year; second, headline inflation (includes all prices) continued to show another more moderate monthly print of 0.4% but remained high at 8.2% year-over-year.
- Credit performance was mixed during Q3, with lower duration exposures faring better than higher duration. Fears of a looming recession remained as the Fed's 75 basis point rate hikes in both July and September reinforced its intention to fight inflation until the "job is done."

THE INVESTMENT CLIMATE

- The Russia Ukraine war may be taking a turn, as Ukraine's counteroffensive gains steam. In a rare admission, Russia's Defense Ministry spokesman Igor Konashenkov acknowledged recent defeats: "With numerically superior tank units in the direction of Zolota Balka and Oleksandrivka, the enemy managed to forge deep into our defenses."
- The broad market selloff increased in intensity as global central banks hiked interest rates, effectively withdrawing liquidity from the financial system. Higher interest rates and central bank balance sheet winddowns mark a major change from the liquidity-driven environment of the past decade.

ASSET ALLOCATION ISSUES

- Markets year-to-date have delivered sharp losses across nearly every asset class, including double digit losses of core fixed income (Bloomberg US Aggregate Bond -10.8%). Historically speaking, these moves have been highly unusual and reflect an environment where diversification has not served investors well.
- Growth stocks outperformed value stocks during the quarter (Russell 1000 Growth -3.6% vs Russell 1000 Value -5.6%), and small capitalization stocks outperformed large capitalization stocks (Russell 2000 -2.2%, Russell 1000 -4.7%).

The broad market selloff has increased in severity, as central banks remove liquidity from the global financial system

What drove the market in Q3?

“U.S. Consumer Prices Rise Sharply Despite Fed Rate Increases”

HEADLINE CONSUMER PRICE INFLATION (YEAR-OVER-YEAR)

Apr	May	Jun	Jul	Aug	Sep
8.3%	8.6%	9.1%	8.5%	8.3%	8.2%

Article Source: Financial Times, October 13th, 2022

“U.S. Job Growth Eases, but Is Too Strong to Suit Investors”

CHANGE IN NON-FARM PAYROLLS

Apr	May	Jun	Jul	Aug	Sep
+368k	+386k	+293k	+526k	+315k	+263k

Article Source: New York Times, October 7th, 2022

“Dollar’s Rise Spells Trouble for Global Economies”

U.S. DOLLAR INDEX PRICE LEVEL

Apr	May	Jun	Jul	Aug	Sep
103.0	101.8	104.7	105.9	108.8	112.1

Article Source: Wall Street Journal, September 19th, 2022

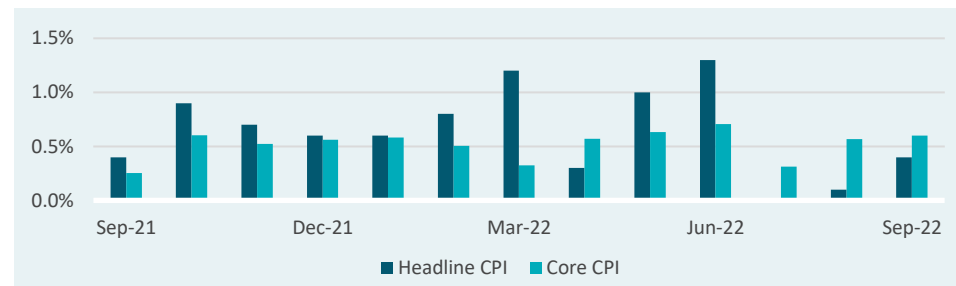
“Mortgage Demand Drops as Rates Top 6%”

FREDDIE MAC U.S. 30-YEAR FIXED RATE MORTGAGE RATE

Sep 2021	May	Jun	Jul	Aug	Sep
3.01%	5.10%	5.70%	5.30%	5.66%	6.70%

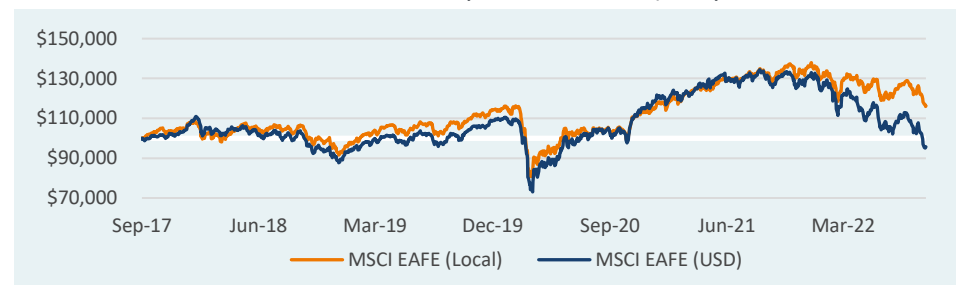
Article Source: CNBC, September 14th, 2022

U.S. HEADLINE & CORE CPI (MONTH-OVER-MONTH)



Source: Bureau of Labor Statistics, as of 9/30/22

MSCI EAFE LOCAL VS USD RETURNS, GROWTH OF \$100,000



Source: MSCI, Bloomberg, as of 9/30/22

U.S. EXISTING HOME SALES (YEAR-OVER-YEAR % CHANGE)



Source: National Association of Realtors, as of 8/31/22

U.S. economics summary

- U.S. real GDP fell in Q2 for a second consecutive quarter, down -0.6% annualized (+1.6% over the past full year). Forecasts suggest a potential growth turnaround in the third quarter; the Atlanta Fed GDPNow forecast indicated a growth rate of 2.8% and economists expected 0.9% as of October 14th.
- U.S. core CPI remained elevated in September, rising 0.6% during the month to a new 40-year high of 6.6% year-over-year. Headline inflation continued to show another more moderate monthly print of 0.4% but remained high at 8.2% year-over-year.
- Unemployment fell slightly from 3.6% in June to 3.5% in September, which did not reflect an increase in employment but rather the departure of some Americans from the job market altogether. Weekly initial jobless claims—a measure of the number of workers who filed for unemployment during any given week—moved higher during Q2 to 244,000 in early July but has since fallen to 193,000 in late September.
- The U.S. dollar has appreciated roughly 15% relative to major currencies. A stronger dollar may result in slowing U.S. exports as domestic goods become more expensive to foreign buyers, and lower inflation as American businesses and households are able to purchase foreign goods at cheaper prices.
- Coverage of COVID-19 has tended to focus on the health impacts in a binary way: either the infected individual recovers (and lives) or does not recover (and is deceased). There is a growing body of research by medical experts that suggests a significant portion of survivors face longer-term, often severe, health problems. These issues are known as “long COVID” and may be the primary cause for a severe shrinking of the U.S. labor force.

	Most Recent	12 Months Prior
Real GDP (YoY)	1.6% 6/30/22	12.5% 6/30/21
Inflation (CPI YoY, Core)	6.6% 9/30/22	4.0% 9/30/21
Expected Inflation (5yr-5yr forward)	2.1% 9/30/22	2.2% 9/30/21
Fed Funds Target Range	3.00% – 3.25% 9/30/22	0.00% – 0.25% 9/30/21
10-Year Rate	3.83% 9/30/22	1.49% 9/30/21
U-3 Unemployment	3.5% 9/30/22	4.7% 9/30/21
U-6 Unemployment	6.7% 9/30/22	8.5% 9/30/21

Inflation

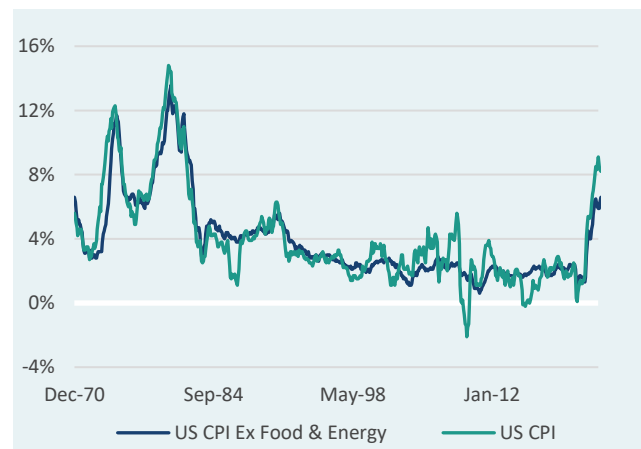
The September inflation print conveyed two separate stories: first, that U.S. core CPI (excludes food & energy) remained elevated, rising 0.6% during the month to a new 40-year high of 6.6% year-over-year; second, headline inflation (includes all prices) continued to show another more moderate monthly print of 0.4%, but remains high at 8.2% year-over-year.

We see a variety of economic developments that suggest inflation is abating, although the level of inflation may not fall to pre-pandemic levels due to the breadth of price movement. These developments include: lower commodity prices,

dramatically lower international shipping costs, and the general slowdown of economic activity on the back of Federal Reserve tightening.

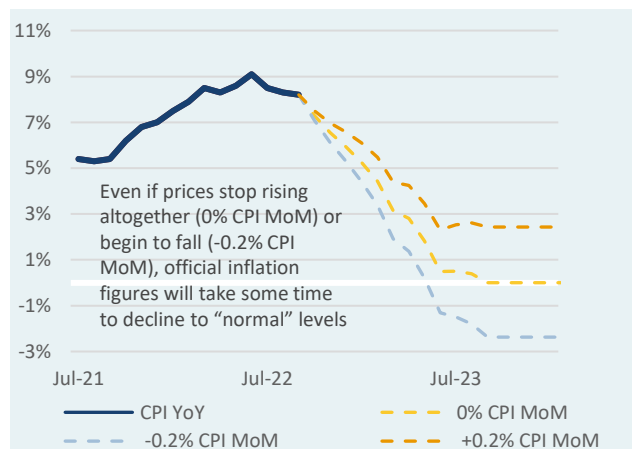
Inflation will take some time to fall back to normal levels, even if *monthly* inflation is 0% in the future. Below we illustrate a few scenarios of *monthly* future price movement. Even if prices stop rising completely (a monthly inflation rate of 0%), the U.S. inflation rate will still likely take until spring of 2023 to fall back to 2%.

U.S. CPI (YOY)



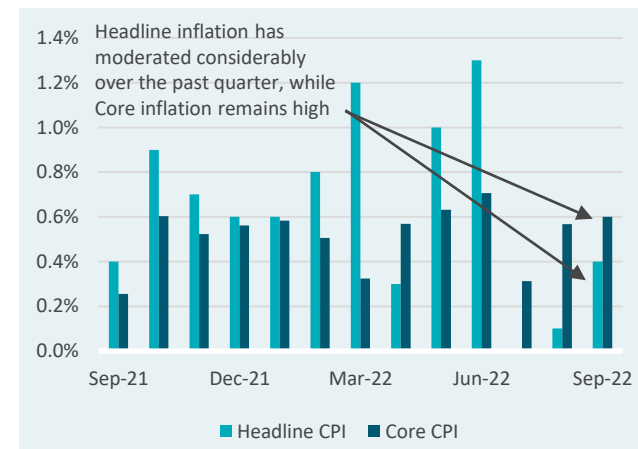
Source: BLS, as of 9/30/22

INFLATION IS A SLOW-MOVING METRIC



Source: Verus, BLS, as of 9/30/22

MONTHLY PRICE MOVEMENT



Source: BLS, as of 9/30/22

Labor market

The U.S. labor market continues to be strong, which is arguably the biggest factor empowering the Federal Reserve’s aggressive policy stance. However, while employment is strong, high inflation has eaten away at household purchasing power, as demonstrated by the consistent decline in inflation-adjusted weekly earnings since mid-2020.

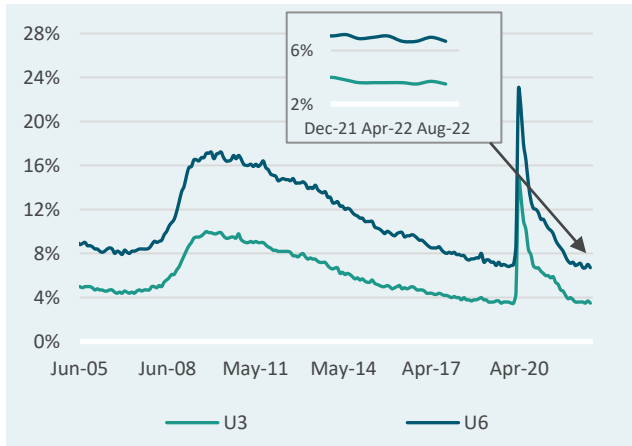
Unemployment fell slightly from 3.6% in June to 3.5% in September, which did not reflect an increase in employment but rather the departure of some Americans from the job market altogether. Weekly *initial jobless claims*—a measure of

the number of workers who filed for unemployment on any given week—moved higher during Q2 to 244,000 in early July but has since fallen to 193,000 in late September.

The gap in labor force participation rates across different age cohorts remains notable, with the age 55+ cohort failing to recover. Previously we had assumed that abnormally early retirements of older workers during the pandemic was likely the main cause for this effect. However, as we propose on the next page, the apparently very widespread health effects of “Long COVID” may be playing a role in this story.

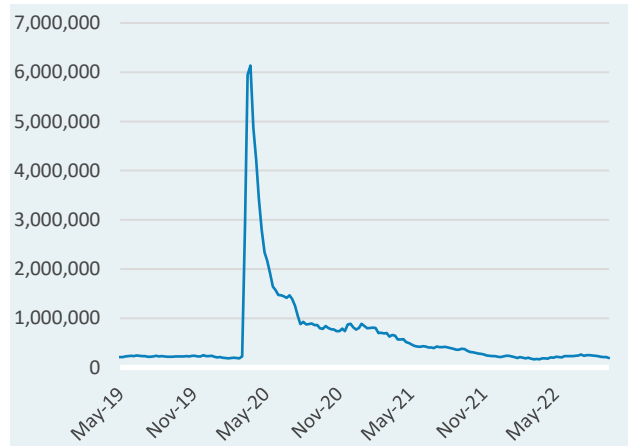
The labor market appears tight according to most metrics, but workers’ wages are falling on an inflation-adjusted basis

U.S. UNEMPLOYMENT



Source: FRED, as of 9/30/22

INITIAL JOBLESS CLAIMS



Source: FRED, as of 9/25/22

U.S. AVERAGE WEEKLY REAL WAGES



Source: FRED, as of 6/30/22

Housing

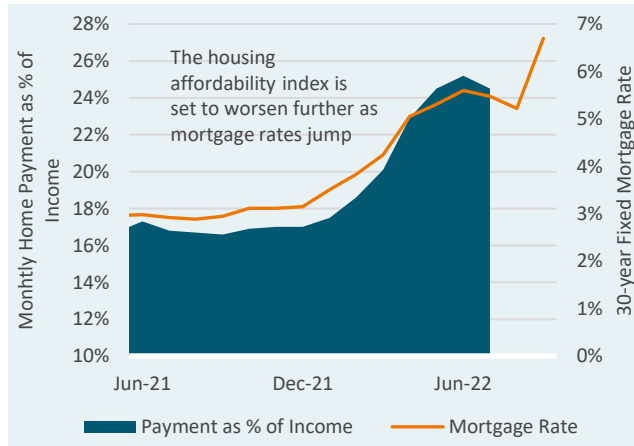
U.S. home prices fell -0.3% from June to July, according to the S&P CoreLogic Case-Shiller U.S. National Index, which might signal a reversal of the remarkable upward march in real estate values. The index suggested home prices were 15.8% higher over the past full year. Sales volumes have dropped precipitously since the beginning of 2022 which has coincided with a notable jump in monthly inventory levels.

Higher home prices and much higher mortgage interest rates have translated to the average monthly home payment rising from 16% of an average family's income to more than 24% in July, according to the National Association of Realtors. Further

increases in mortgage rates since July suggest that affordability has likely deteriorated further.

The housing market may be in the midst of a material slowdown as mortgage rates have more than doubled during 2022, from 3.1% at the beginning of the year to 6.7% at the end of the third quarter. Spiking mortgage rates in the past have coincided with a softening of the real estate market and placed downward pressure on home values. In recent years, low home inventories have been a support to markets, but this may be receding as inventories are now above average.

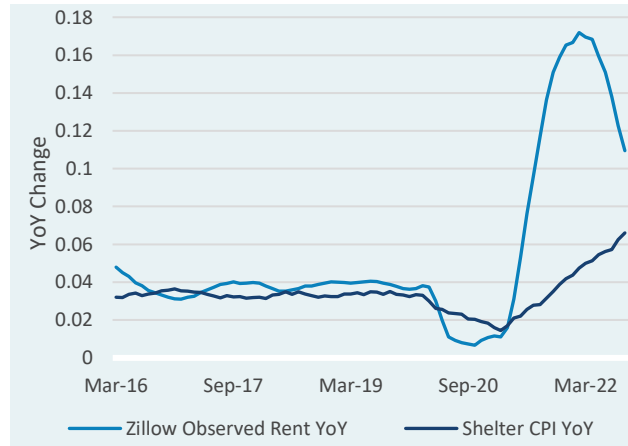
CHANGE IN HOUSING AFFORDABILITY



Source: NAR, as of 7/31/22, FRED as of 9/30/22

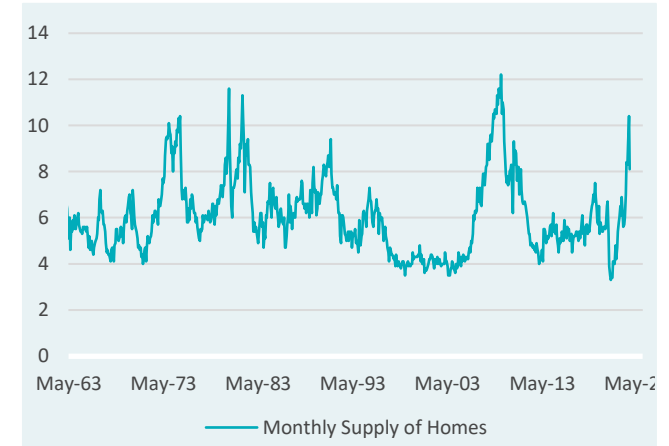
Census Bureau median family income is compared here to the monthly cost (principal + interest) of an average priced home

HOUSING & RENT COSTS



Source: Zillow, FRED, as of 9/30/22

SUPPLY OF HOMES



Source: FRED, as of 8/31/22

International economics summary

- Economic growth expectations continue to weaken around the world, and recession appears possible in some developed countries. High inflation has placed central banks in a corner, requiring a choice between tightening (lower inflation with possible recession) or accommodation (stronger economic activity with possibly continued high inflation).
- Multi-decade high inflation continues to spread across Europe, as consumer prices in September rose 10% from the prior year. Food and energy were major drivers, although the core inflation number is also elevated at 4.8%. Inflation remains a challenge in Europe and the U.S., as prices have been relatively stable in the Asia-pacific region.
- Unemployment rates have been stable and tight in most markets, though this may now be seen as a problem as central bankers work to slow economies and weaken labor markets in order to fight inflation.
- The Russia Ukraine war may be taking a turn, as Ukraine’s counteroffensive gains steam. In a rare admission, Russia’s Defense Ministry spokesman Igor Konashenkov acknowledged recent defeats: “With numerically superior tank units in the direction of Zolata Balka and Oleksandrivka, the enemy managed to forge deep into our defenses.”
- Still dealing with the highest inflation seen in four-decades, the U.K. economy continues to struggle, especially as the Bank of England tightens economic conditions in the face of a recession. The situation worsened following newly elected Prime Minister Liz Truss’ new growth plan announcement, which introduced a large tax cut initiatives without additional funding sources secured.

Area	GDP (Real, YoY)	Inflation (CPI, YoY)	Unemployment
United States	1.8% 6/30/22	8.2% 9/30/22	3.5% 9/30/22
Eurozone	4.1% 6/30/22	10.0% 9/30/22	6.6% 8/31/22
Japan	1.6% 6/30/22	2.8% 9/30/22	2.5% 8/31/22
BRICS Nations	1.9% 6/30/22	4.5% 9/30/22	5.2% 12/31/21
Brazil	3.2% 6/30/22	7.2% 9/30/22	8.9% 8/31/22
Russia	(4.1)% 6/30/22	13.7% 9/30/22	3.8% 8/31/22
India	13.5% 6/30/22	7.4% 9/30/22	6.4% 9/30/22
China	0.4% 6/30/22	2.8% 9/30/22	5.3% 8/31/22

NOTE: India lacks reliable government unemployment data. Unemployment rate shown above is estimated from the Centre for Monitoring Indian Economy. The Chinese unemployment rate represents the monthly surveyed urban unemployment rate in China.

International economics

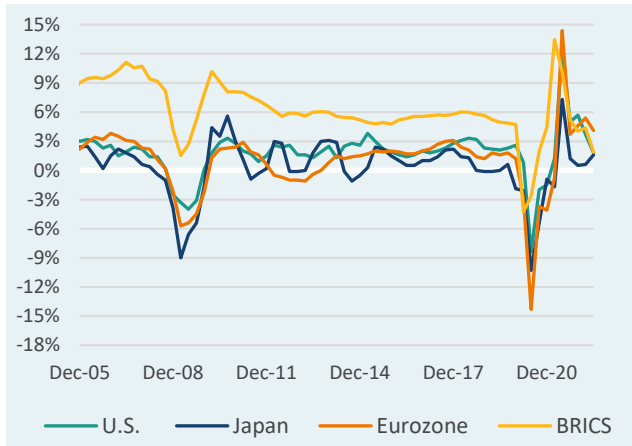
Growth expectations have further weakened around the world, and recession appears possible in some developed countries. Throughout 2022, headline inflation remained stubbornly high in many places such as the United States and Europe. Other areas, such as Japan, had avoided the initial wave of inflation but are now seeing larger price rises in recent months.

Many central banks are walking a tightrope in their fight against inflation since overly aggressive monetary policy could quickly send an economy into recession. Inflation has

become a lightning rod for political leaders, as rising prices squeeze household budgets and standards of living. This is perhaps evident most recently in the U.K., where Prime Minister Liz Truss came under harsh scrutiny for a proposal to cut tax rates and spend which seemed to conflict with Bank of England efforts to combat inflation.

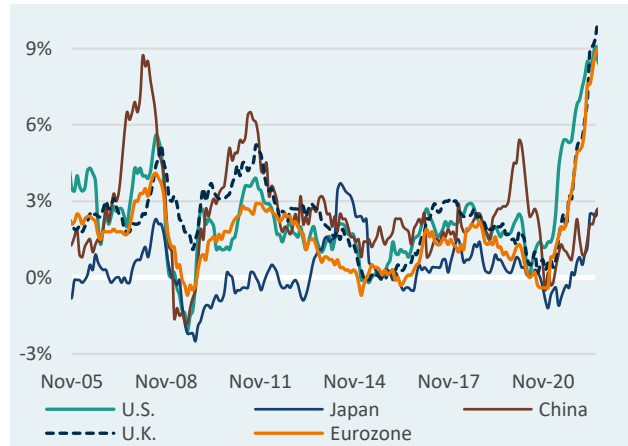
Unemployment rates are stable and tight in most markets, though central bankers may now see this as a problem standing in the way of efforts to slow economies and fight rising prices.

REAL GDP GROWTH (YOY)



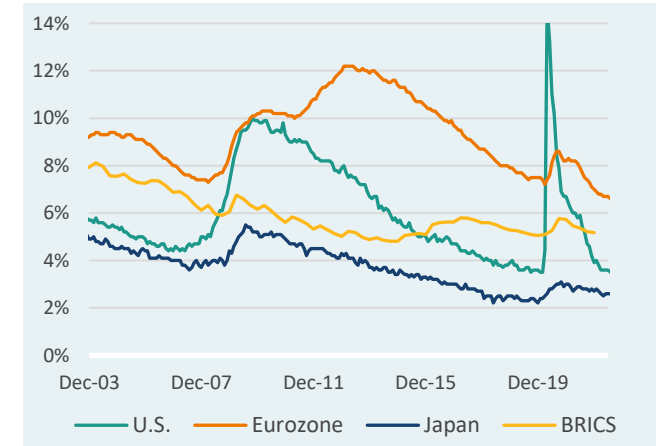
Source: Bloomberg, as of 6/30/22

INFLATION (CPI YOY)



Source: Bloomberg, as of 9/30/22 – or most recent release

UNEMPLOYMENT



Source: Bloomberg, as of 9/30/22 – or most recent release

Equity environment

— Equity markets saw further losses during Q3, extending the selloff deeper into bear market territory. Emerging market equities (MSCI Emerging Markets -11.6%) experienced the greatest drawdown, on an unhedged currency basis, followed by international developed (MSCI EAFE -9.4%) and domestic equities (S&P 500 -4.9%).

— Many markets now trade at valuation levels below their historical average. According to FactSet, the S&P 500 sat at a forward price/earnings of 15.4 as of September 30th, below the five-year average of 18.6 and 10-year average of 17.1. Interestingly, earnings expectations have been fairly resilient at 7.4% for calendar year 2022 and 7.9% for 2023.

— Investors with unhedged foreign currency exposure have seen extreme losses recently. A U.S. investor with an international developed equity investment

(MSCI EAFE) suffered a loss of -15.7% over the past year from currency movements. Investors in non-US equity (MSCI ACWI ex-US) saw a -12.0% loss. Currency risk is typically the second largest risk in institutional portfolios and is not expected to be compensated over the long term. We continue to believe that more forward-thinking currency solutions can materially improve portfolio outcomes.

— Value stocks underperformed growth stocks mildly during the quarter (Russell 1000 Value -5.6% vs Russell 1000 Growth -3.6%), and small capitalization stocks outperformed large capitalization stocks (Russell 2000 -2.2%, Russell 1000 -4.7%).

— Volatility remained elevated as the Cboe VIX Index rose further from 28.7% to 31.6%. Risk assets sold-off on concerns of Federal Reserve tightening and liquidity being broadly removed from the global financial system.

	QTD TOTAL RETURN		1 YEAR TOTAL RETURN	
	(unhedged)	(hedged)	(unhedged)	(hedged)
U.S. Large Cap (S&P 500)	(4.9%)		(15.5%)	
U.S. Small Cap (Russell 2000)	(2.2%)		(23.5%)	
U.S. Equity (Russell 3000)	(4.5%)		(17.6%)	
U.S. Large Value (Russell 1000 Value)	(5.6%)		(11.4%)	
US Large Growth (Russell 1000 Growth)	(3.6%)		(22.6%)	
Global Equity (MSCI ACWI)	(6.8%)	(4.6%)	(20.7%)	(15.9%)
International Large (MSCI EAFE)	(9.4%)	(2.8%)	(25.1%)	(9.4%)
Eurozone (Euro Stoxx 50)	(9.8%)	(3.1%)	(28.9%)	(14.1%)
U.K. (FTSE 100)	(10.6%)	(2.3%)	(16.5%)	1.8%
Japan (NIKKEI 225)	(7.2%)	0.2%	(31.0%)	(8.5%)
Emerging Markets (MSCI Emerging Markets)	(11.6%)	(8.2%)	(28.1%)	(22.5%)

Source: Russell Investments, MSCI, STOXX, FTSE, Nikkei, as of 9/30/22

Fixed income environment

- The 10-year U.S. Treasury yield rose materially from 2.89% to 3.83% as the Federal Reserve reaffirmed its aggressive stance and markets questioned whether interest rates might be held at higher levels for longer than previously anticipated.
- Credit performance was mixed over Q3 with lower duration exposures faring better than higher duration exposures. Fears of a looming recession remained as the Fed’s 75 basis point rate hikes in July and September reinforced its intention to fight inflation until the “job is done.” Leveraged loans performed the best, returning 1.2%, followed by high yield credit and investment grade credit which returned -0.6% and -4.9%, respectively.
- Default activity continued to pick up in the third quarter with seven companies defaulting on loans and bonds totaling \$16.5 billion. This was the highest quarterly total seen since the second quarter of 2020.

Activity represented a significant jump from the \$1.6 billion and \$10.4 billion shown in Q1 and Q2, respectively.

- The U.S. Yield Curve inverted during the quarter, with the 10-year 2-year spread falling from 0.1% to -0.4%. An inverted curve has historically suggested recession within two years or so.
- Throughout the third quarter, the Federal Reserve continued its path to reduce the balance sheet, beginning in June with the paced redemption of maturing securities. The initial June monthly redemption caps of \$30 billion for Treasuries and \$17.5 billion for agency MBS were increased to \$60 billion and \$35 billion in September. Markets have seemingly digested the reduction well, although the total drawdown has been relatively small so far, around \$200 billion against the peak size of \$8.97 trillion in April 2022.

	QTD Total Return	1 Year Total Return
Core Fixed Income (Bloomberg U.S. Aggregate)	(4.8%)	(14.6%)
Core Plus Fixed Income (Bloomberg U.S. Universal)	(4.5%)	(14.9%)
U.S. Treasuries (Bloomberg U.S. Treasury)	(4.3%)	(12.9%)
U.S. High Yield (Bloomberg U.S. Corporate HY)	(0.6%)	(14.1%)
Bank Loans (S&P/LSTA Leveraged Loan)	(1.4%)	(2.5%)
Emerging Market Debt Local (JPM GBI-EM Global Diversified)	(4.7%)	(20.6%)
Emerging Market Debt Hard (JPM EMBI Global Diversified)	(4.6%)	(24.3%)
Mortgage-Backed Securities (Bloomberg MBS)	(5.3%)	(9.0%)

Source: Bloomberg, as of 9/30/22

Credit environment

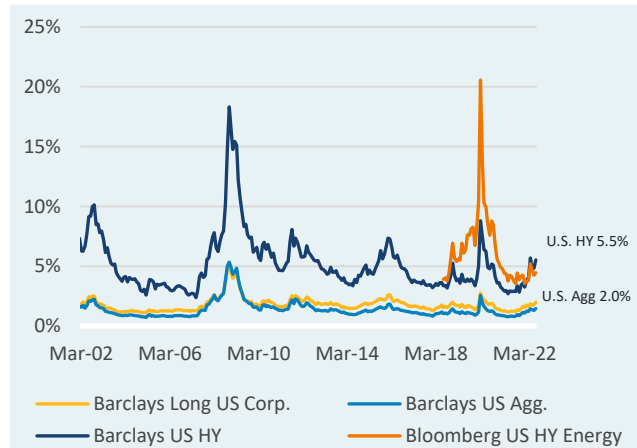
Credit market performance was mixed over the third quarter, with lower duration exposures faring better than higher duration exposures. Fears of a looming recession remained as the Fed's 75 basis point rate hikes in July and September reinforced its intention to fight inflation until the "job is done." Leveraged loans performed the best, returning 1.2%, followed by high yield corporate credit and investment grade credit which returned -0.6% and -4.9%, respectively.

Volatility and outflows contributed to investment grade credit spreads widening during the quarter. After reaching a 2022 high of 164 basis points in mid-September, investment grade credit spreads finished the third quarter at 159 basis points, an increase of 4 basis points from the

previous quarter's end. High yield spreads decreased by 17 basis points throughout the quarter to 552 basis points, though remaining above the long term non-recessionary average of 454 bps. Despite this recent decline, high yield spreads remain up 269 basis points year-to-date.

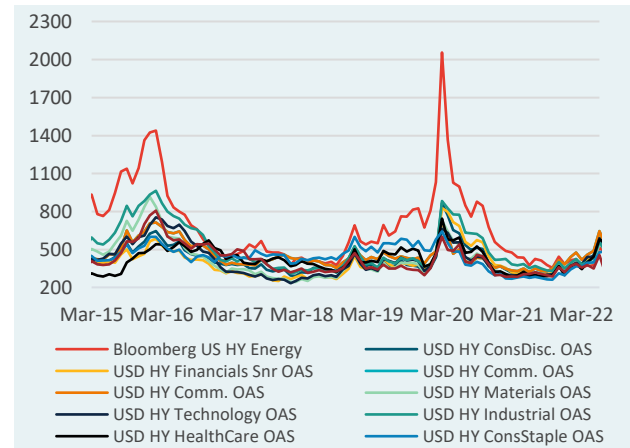
Over the course of the year, total yields have risen significantly within credit markets with the Bloomberg US High Yield Index now at 9.7%—almost double the levels of 4.9% seen at the start the year. Similarly, the yield of the Bloomberg US Corporate Investment Grade Index was 5.7%, up from 2.4% at the start of the year.

SPREADS



Source: Barclays, Bloomberg, as of 9/30/22

HIGH YIELD SECTOR SPREADS (BPS)



Source: Bloomberg, as of 9/30/22

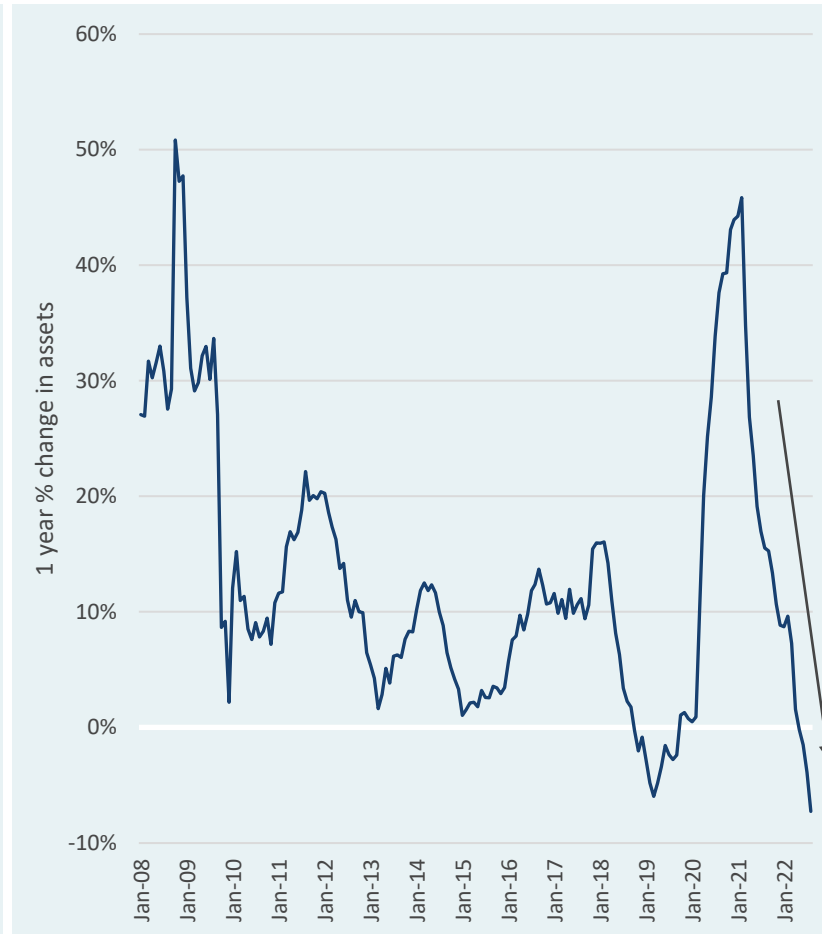
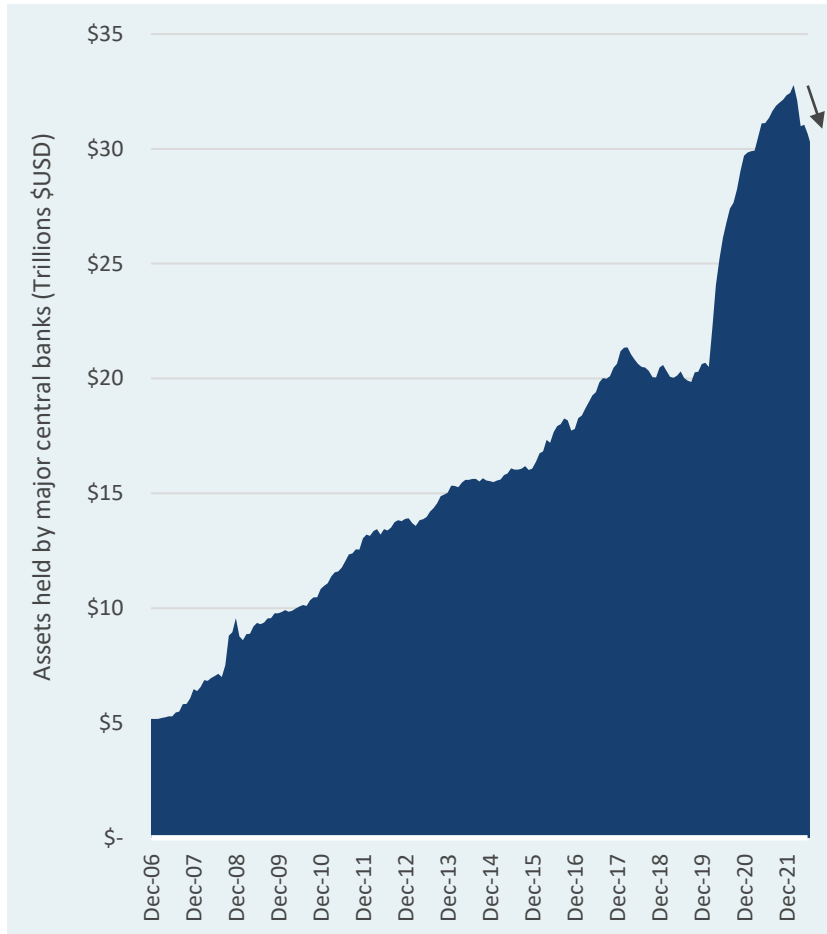
Market	Credit Spread (OAS)	
	9/30/22	9/30/21
Long U.S. Corp	2.0%	1.2%
U.S. Inv Grade Corp	1.6%	0.8%
U.S. High Yield	5.5%	2.9%
U.S. Bank Loans*	6.0%	4.3%

Source: Barclays, Credit Suisse, Bloomberg, as of 9/30/22

*Discount margin (4-year life)

The great liquidity withdrawal

Central banks are planning to remove substantial liquidity from the global financial system



Markets are entering an unusual time of mass central bank asset roll-off

Source: Bloomberg, Verus, as of 9/30/22 – includes Fed, BOE, ECB, BoJ, PBOC

Detailed index returns

DOMESTIC EQUITY

	Month	QTD	YTD	1 Year	3 Year	5 Year	10 Year
Core Index							
S&P 500	(9.2)	(4.9)	(23.9)	(15.5)	8.2	9.2	11.7
S&P 500 Equal Weighted	(9.2)	(4.8)	(20.7)	(13.5)	7.7	8.0	11.5
DJ Industrial Average	(8.8)	(6.2)	(19.7)	(13.4)	4.4	7.4	10.5
Russell Top 200	(9.2)	(5.0)	(24.7)	(16.4)	9.0	10.0	12.1
Russell 1000	(9.3)	(4.6)	(24.6)	(17.2)	7.9	9.0	11.6
Russell 2000	(9.6)	(2.2)	(25.1)	(23.5)	4.3	3.6	8.6
Russell 3000	(9.3)	(4.5)	(24.6)	(17.6)	7.7	8.6	11.4
Russell Mid Cap	(9.3)	(3.4)	(24.3)	(19.4)	5.2	6.5	10.3
Style Index							
Russell 1000 Growth	(9.7)	(3.6)	(30.7)	(22.6)	10.7	12.2	13.7
Russell 1000 Value	(8.8)	(5.6)	(17.8)	(11.4)	4.4	5.3	9.2
Russell 2000 Growth	(9.0)	0.2	(29.3)	(29.3)	2.9	3.6	8.8
Russell 2000 Value	(10.2)	(4.6)	(21.1)	(17.7)	4.7	2.9	7.9

INTERNATIONAL EQUITY

	Month	QTD	YTD	1 Year	3 Year	5 Year	10 Year
Broad Index							
MSCI ACWI	(9.6)	(6.8)	(25.6)	(20.7)	3.7	4.4	7.3
MSCI ACWI ex US	(10.0)	(9.9)	(26.5)	(25.2)	(1.5)	(0.8)	3.0
MSCI EAFE	(9.4)	(9.4)	(27.1)	(25.1)	(1.8)	(0.8)	3.7
MSCI EM	(11.7)	(11.6)	(27.2)	(28.1)	(2.1)	(1.8)	1.0
MSCI EAFE Small Cap	(11.5)	(9.8)	(32.1)	(32.1)	(2.2)	(1.8)	5.3
Style Index							
MSCI EAFE Growth	(9.7)	(8.5)	(33.0)	(30.3)	(1.5)	0.7	4.7
MSCI EAFE Value	(9.0)	(10.2)	(21.1)	(20.2)	(2.8)	(2.7)	2.4
Regional Index							
MSCI UK	(8.8)	(10.8)	(18.7)	(14.1)	(1.7)	(1.1)	1.9
MSCI Japan	(10.4)	(7.7)	(26.4)	(29.3)	(2.6)	(0.6)	4.8
MSCI Euro	(8.4)	(10.0)	(32.7)	(30.0)	(3.8)	(3.2)	3.2
MSCI EM Asia	(13.2)	(14.0)	(28.8)	(29.5)	(0.8)	(1.1)	3.1
MSCI EM Latin American	(3.3)	3.6	3.0	0.2	(3.4)	(2.6)	(2.3)

FIXED INCOME

	Month	QTD	YTD	1 Year	3 Year	5 Year	10 Year
Broad Index							
Bloomberg US TIPS	(6.6)	(5.1)	(13.6)	(11.6)	0.8	2.0	1.0
Bloomberg US Treasury Bills	0.2	0.4	0.4	0.4	0.6	1.1	0.7
Bloomberg US Agg Bond	(4.3)	(4.8)	(14.6)	(14.6)	(3.3)	(0.3)	0.9
Bloomberg US Universal	(4.3)	(4.5)	(14.9)	(14.9)	(3.1)	(0.2)	1.2
Duration							
Bloomberg US Treasury 1-3 Yr	(1.2)	(1.5)	(4.5)	(5.1)	(0.5)	0.5	0.6
Bloomberg US Treasury Long	(7.9)	(9.6)	(28.8)	(26.6)	(8.5)	(1.6)	0.6
Bloomberg US Treasury	(3.5)	(4.3)	(13.1)	(12.9)	(3.1)	(0.2)	0.5
Issuer							
Bloomberg US MBS	(5.1)	(5.3)	(13.7)	(14.0)	(3.7)	(0.9)	0.5
Bloomberg US Corp. High Yield	(4.0)	(0.6)	(14.7)	(14.1)	(0.5)	1.6	3.9
Bloomberg US Agency Interm	(1.8)	(2.4)	(7.2)	(7.9)	(1.4)	0.2	0.6
Bloomberg US Credit	(5.1)	(4.9)	(18.1)	(17.9)	(3.6)	(0.0)	1.6

OTHER

	Month	QTD	YTD	1 Year	3 Year	5 Year	10 Year
Index							
Bloomberg Commodity	(8.1)	(4.1)	13.6	11.8	13.5	7.0	(2.1)
Wilshire US REIT	(12.3)	(10.2)	(29.7)	(17.6)	(2.2)	2.9	6.1
CS Leveraged Loans	(2.2)	1.2	(3.3)	(2.6)	2.1	3.0	3.7
S&P Global Infrastructure	(11.8)	(9.6)	(10.1)	(6.0)	(0.1)	2.1	5.7
Alerian MLP	(7.5)	8.4	19.0	20.0	3.1	1.2	1.7
Regional Index							
JPM EMBI Global Div	(6.4)	(4.6)	(23.9)	(24.3)	(7.2)	(2.6)	1.1
JPM GBI-EM Global Div	(4.9)	(4.7)	(18.6)	(20.6)	(7.1)	(3.9)	(2.4)
Hedge Funds							
HFRI Composite	(2.3)	(0.6)	(6.2)	(5.8)	6.2	4.5	4.6
HFRI FOF Composite	(0.6)	0.7	(5.9)	(5.5)	4.5	3.3	3.6
Currency (Spot)							
Euro	(2.6)	(3.9)	(13.9)	(15.5)	(3.5)	(3.7)	(2.7)
Pound Sterling	(4.1)	(8.3)	(17.6)	(17.2)	(3.2)	(3.6)	(3.6)
Yen	(4.2)	(7.7)	(20.4)	(22.9)	(9.3)	(4.9)	(6.0)

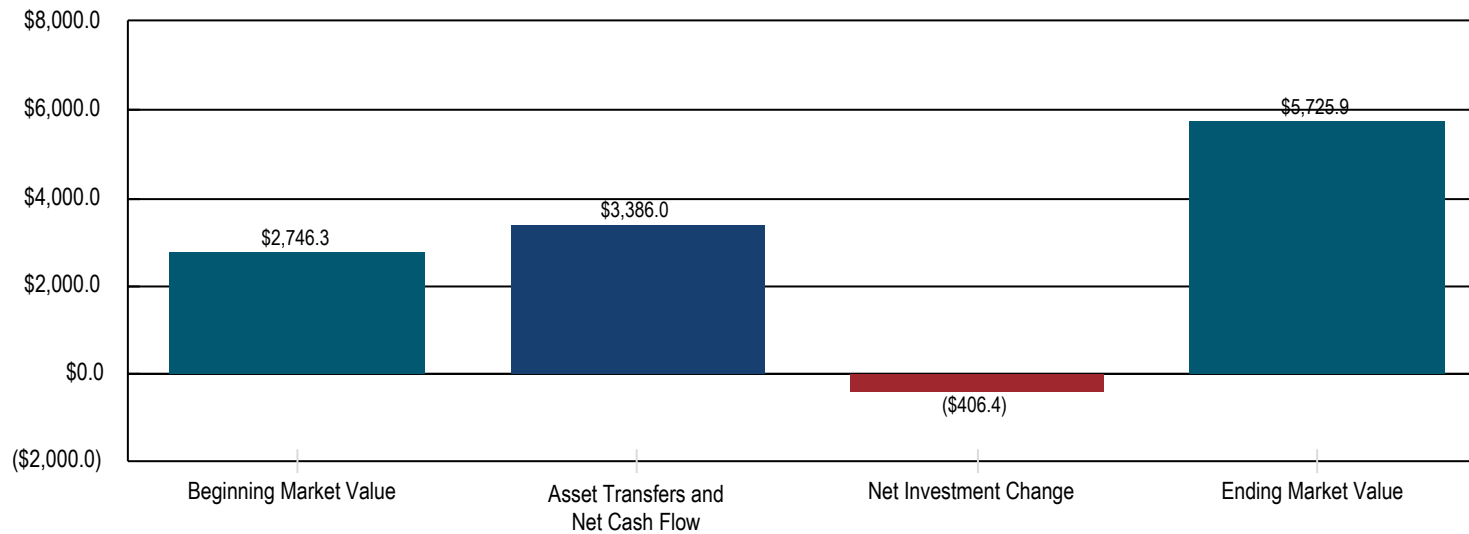
Source: Morningstar, HFRI, as of 9/30/22.

Investment performance review

Portfolio Reconciliation

Total Fund with Member Funds and Transition Accounts		Quarter-To-Date
Beginning Market Value		\$2,746,308,452
Asset Transfers and Net Cash Flow		\$3,385,951,292
Net Investment Change		-\$406,367,090
Ending Market Value		\$5,725,892,654

Change in Market Value
Last Three Months

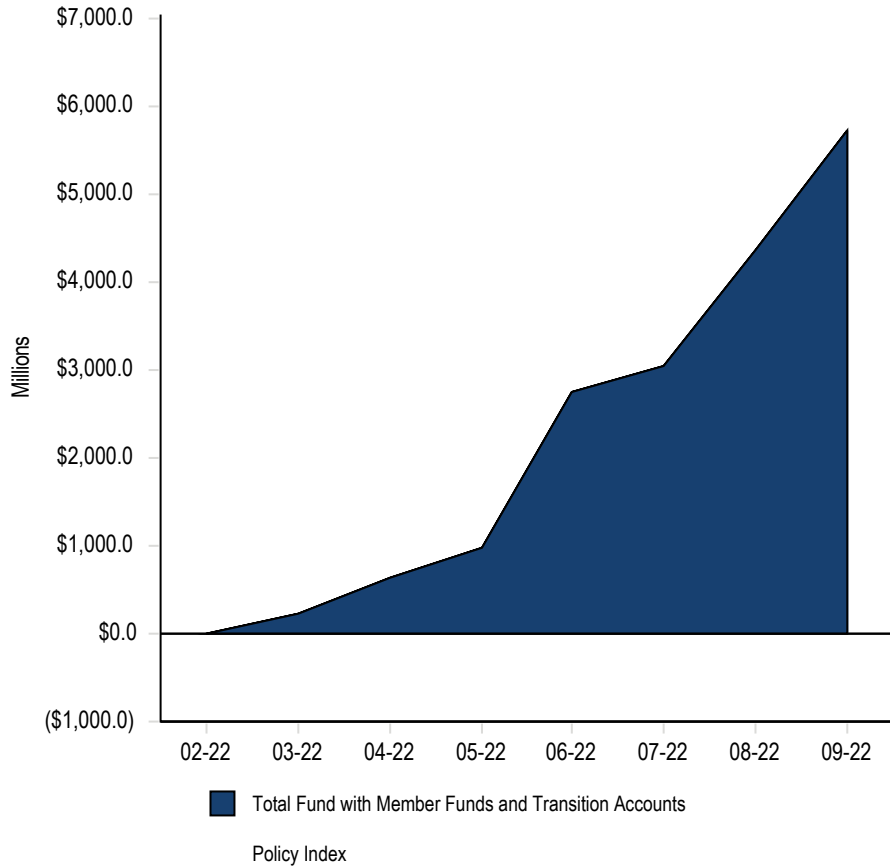


The portfolio reconciliation includes the Member Funds and Transition Account.

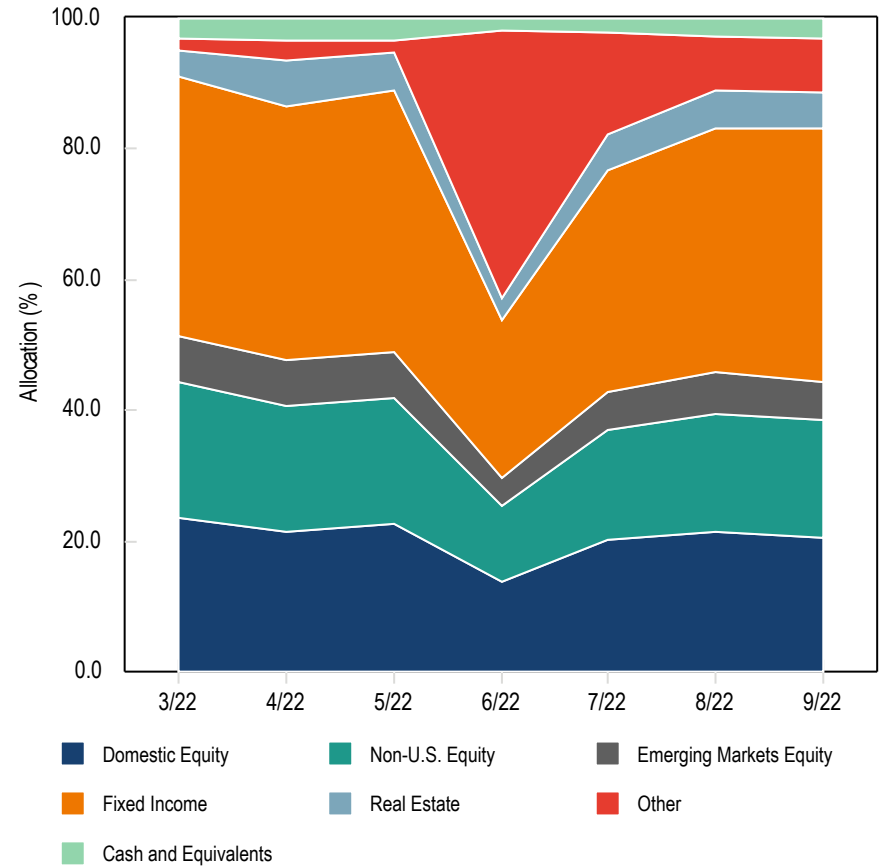
Total Fund
Asset Allocation History

Illinois Police Officers' Pension Investment Fund
Period Ending: September 30, 2022

Market Value History



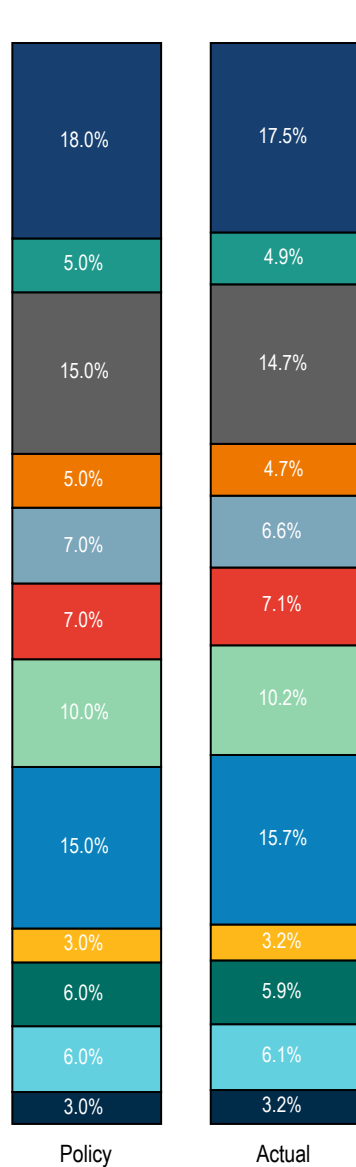
Asset Allocation History



Market value and asset class history includes Transition Accounts and Member Funds as represented by the Other category in the asset allocation history chart. The Other category reflects the June 24th transfers into the Members Funds account.

Total Fund
Asset Allocation vs. Policy

Illinois Police Officers' Pension Investment Fund
Period Ending: September 30, 2022



	Current Balance (\$)	Current Allocation (%)	Policy Allocation (%)	Excess Allocation (%)	Excess Allocation (\$)	Policy Range (%)	Within IPS Range?
Domestic Equity Large Cap	918,224,466	17.5	18.0	-0.5	-26,818,624	16.0 - 20.0	Yes
Domestic Equity Small Cap	258,500,642	4.9	5.0	-0.1	-4,011,327	4.0 - 6.0	Yes
International Equity Large Cap	772,835,123	14.7	15.0	-0.3	-14,700,786	13.0 - 17.0	Yes
International Equity Small Cap	248,834,737	4.7	5.0	-0.3	-13,677,233	4.0 - 6.0	Yes
Emerging Markets Equity	348,737,532	6.6	7.0	-0.4	-18,779,226	6.0 - 8.0	Yes
Domestic Fixed Income Core	373,858,495	7.1	7.0	0.1	6,341,738	6.0 - 8.0	Yes
Domestic Fixed Income High Yield	535,666,126	10.2	10.0	0.2	10,642,187	9.0 - 11.0	Yes
Domestic Fixed Income Short Term	826,841,690	15.7	15.0	0.7	39,305,781	14.0 - 16.0	Yes
Domestic Fixed Income Real Return	168,606,330	3.2	3.0	0.2	11,099,148	2.5 - 3.5	Yes
Emerging Markets Fixed Income	309,251,249	5.9	6.0	-0.1	-5,763,115	5.0 - 7.0	Yes
Real Estate	322,513,325	6.1	6.0	0.1	7,498,961	5.0 - 7.0	Yes
Cash and Equivalents	166,369,677	3.2	3.0	0.2	8,862,495	0.0 - 5.0	Yes
Total	5,250,239,390	100.0	100.0	0.0			

Asset Allocation reflects short-term policy targets and excludes the Transition Account and Member Funds.

Total Fund
Executive Summary (Gross of Fees)

Illinois Police Officers' Pension Investment Fund
Period Ending: September 30, 2022

	Market Value	% of Portfolio	3 Mo	Inception	Inception Date
Total Fund with Member Funds and Transition Accounts	5,725,892,654	100.0	-5.4	-14.1	Mar-22
<i>Policy Index</i>			-5.0	-14.5	
<i>Policy Index- Broad Based</i>			-6.6	-18.9	
IPOPIF Investment Portfolio	5,250,239,390	91.7	-4.8	-14.8	Apr-22
<i>Policy Index</i>			-5.0	-14.8	
<i>Policy Index- Broad Based</i>			-6.6	-19.4	
Growth	2,547,132,499	44.5	-7.2	-21.5	Apr-22
<i>Growth Benchmark</i>			-7.4	-21.4	
Income	844,917,374	14.8	-2.6	-14.1	Apr-22
<i>Income Benchmark</i>			-2.1	-11.8	
Inflation Protection	491,119,654	8.6	-4.9	-9.7	Apr-22
<i>Inflation Protection Benchmark</i>			-5.1	-12.9	
Risk Mitigation	1,367,069,862	23.9	-2.1	-3.8	Apr-22
<i>Risk Mitigation Benchmark</i>			-2.2	-3.8	
Transition Accounts	457,977,873	8.0			
Member Accounts	17,675,391	0.3			

Total Fund
Executive Summary (Gross of Fees)

Illinois Police Officers' Pension Investment Fund
Period Ending: September 30, 2022

	Market Value	% of Portfolio	3 Mo	Inception	Inception Date
Total Fund with Member Funds and Transition Accounts	5,725,892,654	100.0	-5.4	-14.1	Mar-22
<i>Policy Index</i>			-5.0	-14.5	
<i>Policy Index- Broad Based</i>			-6.6	-18.9	
<i>All Public Plans > \$1B-Total Fund Rank</i>			92		
IPOPIF Investment Portfolio	5,250,239,390	91.7	-4.8	-14.8	Apr-22
<i>Policy Index</i>			-5.0	-14.8	
<i>Policy Index- Broad Based</i>			-6.6	-19.4	
<i>All Public Plans > \$1B-Total Fund Rank</i>			75		
Growth	2,547,132,499	44.5	-7.2	-21.5	Apr-22
RhumbLine Russell 1000 Index	918,224,466	16.0	-4.7	-13.7	Mar-22
<i>Russell 1000 Index</i>			-4.6	-13.5	
<i>eV US Large Cap Core Equity Rank</i>			43		
RhumbLine Russell 2000 Index	258,500,642	4.5	-2.2	-14.0	Mar-22
<i>Russell 2000 Index</i>			-2.2	-13.6	
<i>eV US Small Cap Core Equity Rank</i>			28		
SSgA Non-US Developed Index	772,835,123	13.5	-9.1	-17.4	Mar-22
<i>MSCI World ex U.S. (Net)</i>			-9.2	-17.6	
<i>eV EAFE Core Equity Rank</i>			37		
SSgA Non-US Developed SC Index	248,834,737	4.3	-9.2	-21.2	Mar-22
<i>MSCI World ex U.S. Small Cap Index (Net)</i>			-9.5	-21.3	
<i>eV EAFE Small Cap Core Rank</i>			31		
SSgA Emerging Markets Equity Index	348,737,532	6.1	-12.2	-19.6	Mar-22
<i>MSCI Emerging Markets (Net)</i>			-11.6	-17.9	
<i>eV Emg Mkts Equity Rank</i>			82		
Income	844,917,374	14.8	-2.6	-14.1	Apr-22
SSgA High Yield Corporate Credit	535,666,126	9.4	-1.1	-11.1	Mar-22
<i>Bloomberg U.S. High Yield Very Liquid Ind</i>			-0.9	-11.7	
<i>eV US High Yield Fixed Inc Rank</i>			88		
SSgA EMD Hard Index Fund	309,251,249	5.4	-5.1	-14.9	Mar-22
<i>JPM EMBI Global Core Index</i>			-4.6	-14.5	
<i>Emerging Markets Bond Rank</i>			84		

Policy Index constituents include 3% 90 day T-bill, 15% Bloomberg 1-3 Year Gov/Credit Index, 7% Bloomberg U.S. Aggregate Index, 3% Bloomberg U.S. TIPS 0-5 Year, 10% Bloomberg U.S. Corporate High Yield Index, 6% 50/50 JPM EMBI/GBI EM Global Diversified, 23% Russell 3000, 20% MSCI AC World Ex USA IMI (Net), 7% MSCI Emerging Markets IMI (Net), 4% Wilshire US REIT Index and 2% NCREIF Property Index. Broad Based Policy Index constituents: 70% MSCI ACWI IMI (Net), 30% Bloomberg Global Multiverse.
*IPOPIF Investment Portfolio and underlying asset class composites inceptioned on April 1, 2022.

Total Fund
Executive Summary (Gross of Fees)

Illinois Police Officers' Pension Investment Fund
Period Ending: September 30, 2022

	Market Value	% of Portfolio	3 Mo	Inception	Inception Date
Inflation Protection	491,119,654	8.6	-4.9	-9.7	Apr-22
SSgA US TIPS Index	168,606,330	2.9	-2.8	-5.2	Mar-22
<i>Blmbg. U.S. TIPS 0-5 Year</i>			-2.6	-4.3	
<i>eV US TIPS / Inflation Fixed Inc Rank</i>			5		
Principal USPA	150,200,989	2.6	0.6	3.7	Apr-22
<i>NCREIF ODCE</i>			0.3	4.9	
SSgA REITs Index	172,312,336	3.0	-10.4	-22.9	Mar-22
<i>Dow Jones U.S. Select REIT</i>			-10.4	-23.3	
<i>eV US REIT Rank</i>			48		
Risk Mitigation	1,367,069,862	23.9	-2.1	-3.8	Apr-22
SSgA Core Fixed Income Index	373,858,495	6.5	-4.7	-9.7	Mar-22
<i>Blmbg. U.S. Aggregate Index</i>			-4.8	-9.6	
<i>eV US Core Fixed Inc Rank</i>			80		
SSgA Short-Term Gov't/Credit Index	826,841,690	14.4	-1.4	-2.5	Mar-22
<i>Blmbg. 1-3 Year Gov/Credit index</i>			-1.5	-2.6	
<i>eV US Short Duration Fixed Inc Rank</i>			64		
Cash	166,369,677	2.9	0.2	0.3	Mar-22
<i>90 Day U.S. Treasury Bill</i>			0.5	0.6	
Transition Account	457,977,873	8.0			
Member Accounts	17,675,391	0.3			

Policy Index constituents include 3% 90 day T-bill, 15% Bloomberg 1-3 Year Gov/Credit Index, 7% Bloomberg U.S. Aggregate Index, 3% Bloomberg U.S. TIPS 0-5 Year, 10% Bloomberg U.S. Corporate High Yield Index, 6% 50/50 JPM EMBI/GBI EM Global Diversified, 23% Russell 3000, 20% MSCI AC World Ex USA IMI (Net), 7% MSCI Emerging Markets IMI (Net), 4% Wilshire US REIT Index and 2% NCREIF Property Index. Broad Based Policy Index constituents: 70% MSCI ACWI IMI (Net), 30% Bloomberg Global Multiverse.
*IPOPIF Investment Portfolio and underlying asset class composites inceptioned on April 1, 2022.

Total Fund
Investment Fund Fee Analysis

Illinois Police Officers' Pension Investment Fund
Period Ending: September 30, 2022

Name	Asset Class	Vehicle Type	Market Value	% of Portfolio	Estimated Fee Value	Expense Fee (%)
RhumbLine Russell 1000 Index	Domestic Equity	Separate Account	\$918,224,466	17.49	\$45,911	0.0050
RhumbLine Russell 2000 Index	Domestic Equity	Separate Account	\$258,500,642	4.92	\$12,925	0.0050
SSgA Non-US Developed Index	Non-U.S. Equity	Commingled Fund	\$772,835,123	14.72	\$119,789	0.0155
SSgA Non-US Developed SC Index	Non-U.S. Equity	Commingled Fund	\$248,834,737	4.74	\$38,569	0.0155
SSgA Emerging Markets Equity Index	Emerging Markets Equity	Commingled Fund	\$348,737,532	6.64	\$54,054	0.0155
SSgA High Yield Corporate Credit	Fixed Income	Commingled Fund	\$535,666,126	10.20	\$83,028	0.0155
SSgA EMD Hard Index Fund	Fixed Income	Commingled Fund	\$309,251,249	5.89	\$47,934	0.0155
SSgA US TIPS Index	Fixed Income	Separate Account	\$168,606,330	3.21	\$26,134	0.0155
Principal USPA	Real Estate	Commingled Fund	\$150,200,989	2.86	\$1,201,608	0.8000
SSgA REITs Index	Real Estate	Commingled Fund	\$172,312,336	3.28	\$26,708	0.0155
SSgA Core Fixed Income Index	Fixed Income	Commingled Fund	\$373,858,495	7.12	\$57,948	0.0155
SSgA Short-Term Gov't/Credit Index	Fixed Income	Commingled Fund	\$826,841,690	15.75	\$128,160	0.0155
Cash	Cash and Equivalents	Commingled Fund	\$166,369,677	3.17		
IPOPIF Investment Portfolio			\$5,250,239,390	100.00	\$1,842,770	0.035

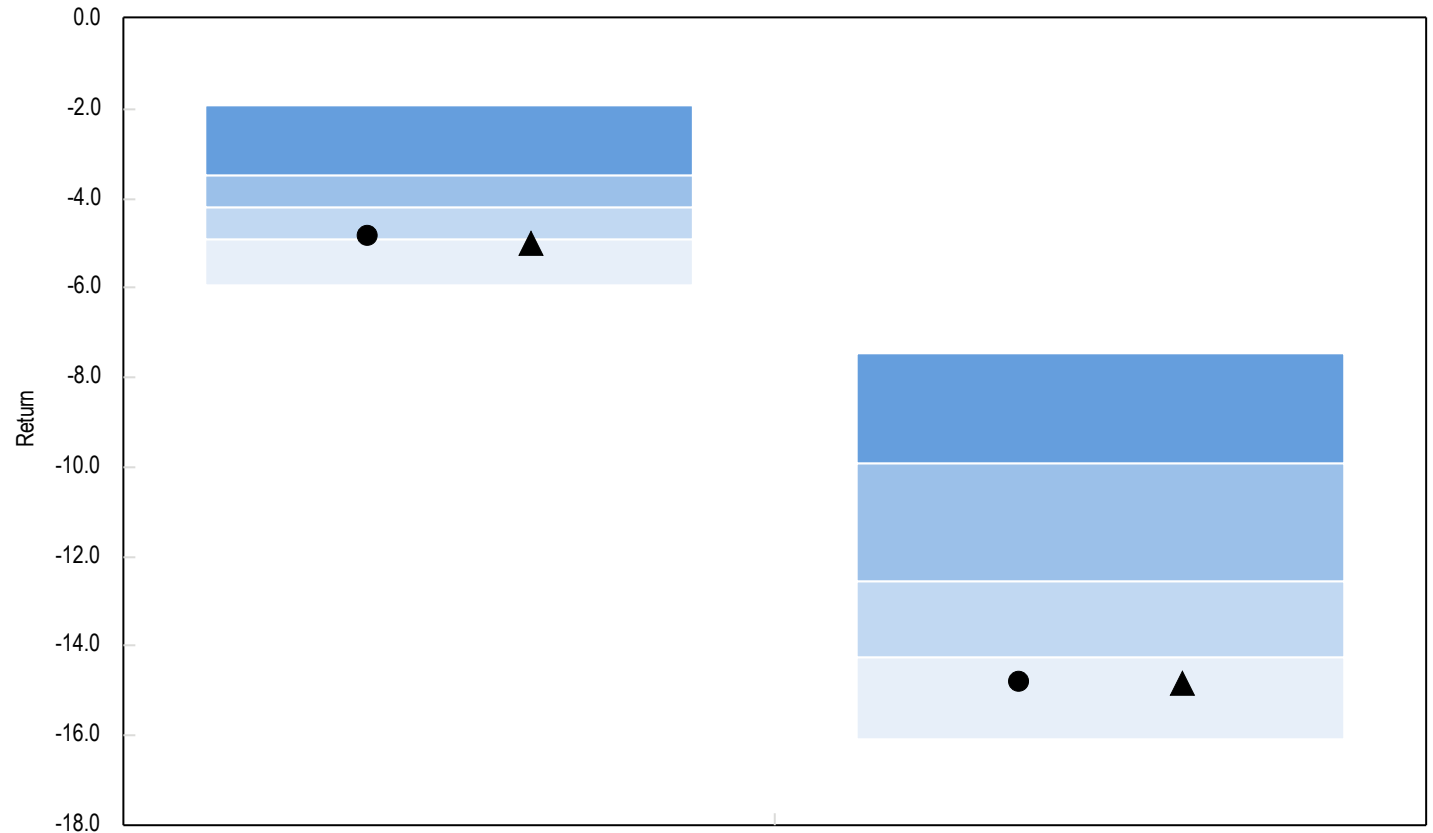
SSGA charges a flat 0.0155% fee through 2022 and an aggregate asset-based fee thereafter.

Total Fund
Cash Flow by Manager - Last Three Months

Illinois Police Officers' Pension Investment Fund
Period Ending: September 30, 2022

	Beginning Market Value	Contributions	Distributions	Net Cash Flows	Net Investment Change	Ending Market Value
RhumbLine Russell 1000 Index	\$292,655,482	\$696,549,607	-	\$696,549,607	-\$70,980,624	\$918,224,466
RhumbLine Russell 2000 Index	\$81,519,822	\$192,373,257	-	\$192,373,257	-\$15,392,437	\$258,500,642
SSgA Non-US Developed Index	\$242,594,658	\$597,536,231	-	\$597,536,231	-\$67,295,766	\$772,835,123
SSgA Non-US Developed SC Index	\$80,126,765	\$211,625,667	-\$19,000,000	\$192,625,667	-\$23,917,696	\$248,834,737
SSgA Emerging Markets Equity Index	\$114,019,550	\$270,822,096	-	\$270,822,096	-\$36,104,115	\$348,737,532
SSgA High Yield Corporate Credit	\$160,280,906	\$393,870,912	-	\$393,870,912	-\$18,485,692	\$535,666,126
SSgA EMD Hard Index Fund	\$94,771,046	\$231,045,756	-	\$231,045,756	-\$16,565,554	\$309,251,249
SSgA US TIPS Index	\$53,293,955	\$119,396,959	-	\$119,396,959	-\$4,084,584	\$168,606,330
Principal USPA	\$70,492,447	\$79,034,414	-	\$79,034,414	\$674,129	\$150,200,989
SSgA REITs Index	\$27,952,758	\$165,004,103	-	\$165,004,103	-\$20,644,525	\$172,312,336
SSgA Core Fixed Income Index	\$114,534,269	\$274,923,320	-	\$274,923,320	-\$15,599,094	\$373,858,495
SSgA Short-Term Gov't/Credit Index	\$241,483,090	\$594,381,245	-	\$594,381,245	-\$9,022,646	\$826,841,690
Cash	\$47,978,523	\$118,456,819	-\$291,728	\$118,165,092	\$226,063	\$166,369,677
Transition Account	\$429,305,077	\$3,953,160,120	-\$3,833,504,584	\$119,655,536	-\$90,982,740	\$457,977,873
Member Accounts	\$695,300,104	\$3,221,609,233	-\$3,881,042,137	-\$659,432,904	-\$18,191,809	\$17,675,391
Total Fund with Member Funds and Transition Accounts	\$2,746,308,452	\$11,119,789,740	-\$7,733,838,449	\$3,385,951,292	-\$406,367,090	\$5,725,892,654

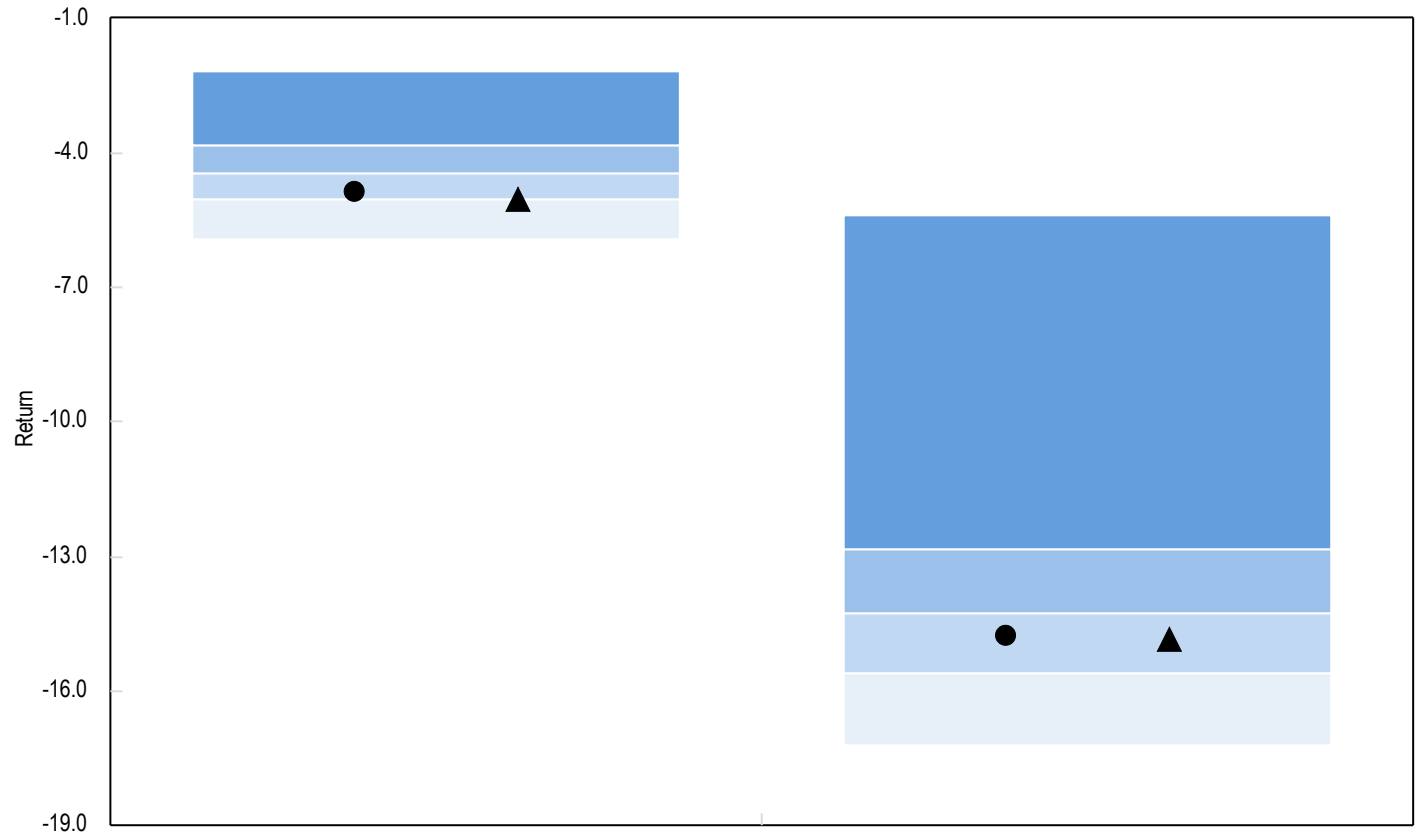
IPOPIF Investment Portfolio vs. All Public Plans > \$1B-Total Fund



	Quarter	2 Quarters
● IPOPIF Investment Portfolio	-4.8 (75)	-14.8 (85)
▲ Policy Index	-5.0 (80)	-14.8 (86)
5th Percentile	-1.9	-7.5
1st Quartile	-3.5	-9.9
Median	-4.2	-12.5
3rd Quartile	-4.9	-14.2
95th Percentile	-5.9	-16.1
Population	128	123

Performance shown for IPOPIF Investment Fund which excludes the Transition Account and Member Funds.

IPOPIF Investment Portfolio vs. All Public Plans < \$1B-Total Fund



	Quarter	2 Quarters
● IPOPIF Investment Portfolio	-4.8 (69)	-14.8 (59)
▲ Policy Index	-5.0 (74)	-14.8 (61)
5th Percentile	-2.1	-5.4
1st Quartile	-3.8	-12.8
Median	-4.4	-14.3
3rd Quartile	-5.0	-15.6
95th Percentile	-5.9	-17.2
Population	350	344

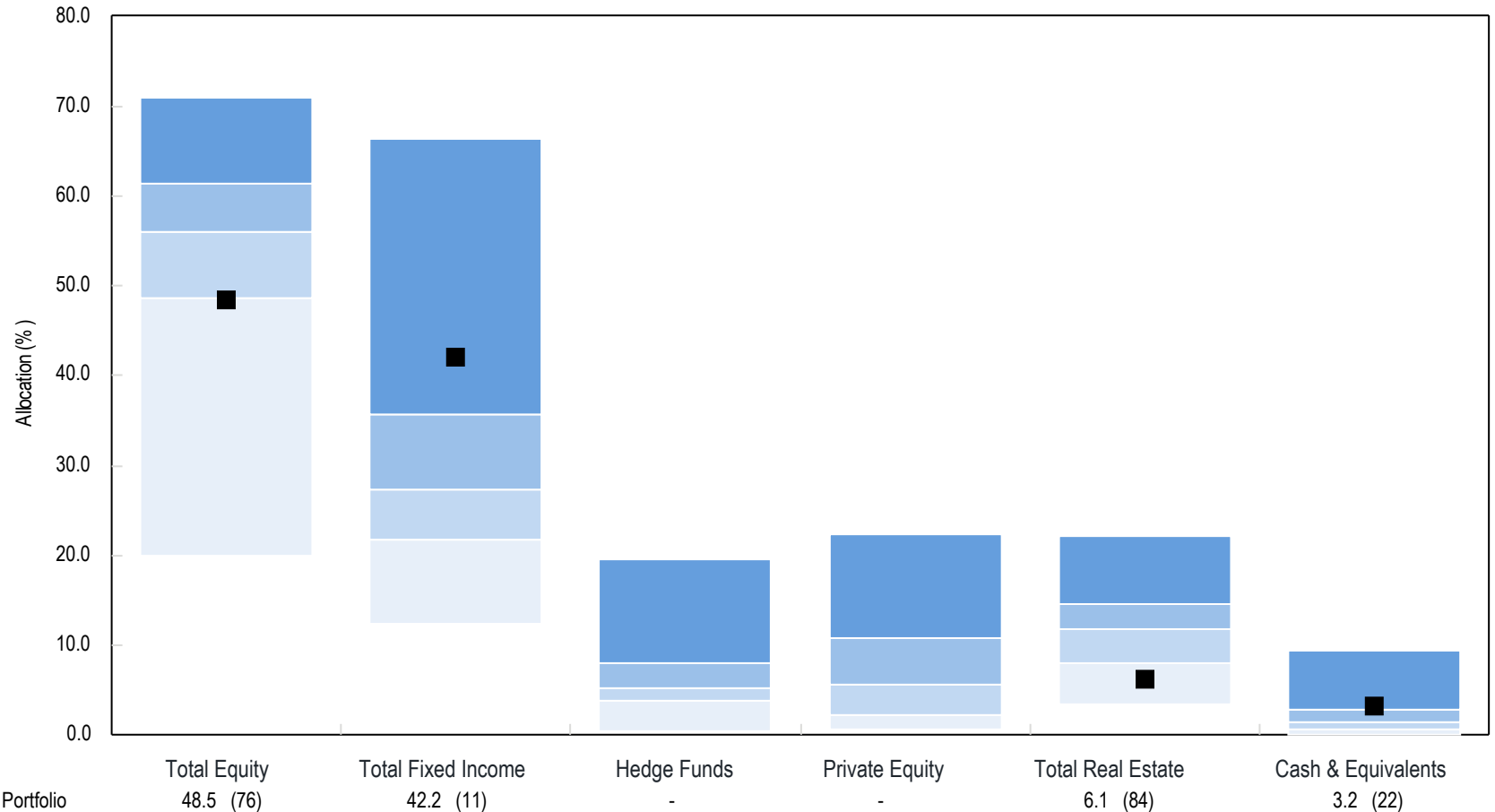
Performance shown for IPOPIF Investment Fund which excludes the Transition Account and Member Funds.

Total Plan Allocation vs. All Public Plans > \$1B-Total Fund
As of September 30, 2022



Parenteses contain percentile rankings. Excludes Transition Account and Member Funds. Real Assets contains Core Real Estate and REITs.

Total Plan Allocation vs. All Public Plans < \$1B-Total Fund
As of September 30, 2022



Parenteses contain percentile rankings. Excludes Transition Account and Member Funds. Real Assets contains Core Real Estate and REITs.

Total Fund

Data Sources and Methodology Page

Period Ending: September 30, 2022

Performance Return Calculations

Performance is calculated using Time Weighted Rates of Return (TWRR) methodologies. Monthly returns are geometrically linked and annualized for periods longer than one year.

Data Source

Verus is an independent third party consulting firm and calculates returns from best source book of record data. Returns calculated by Verus may deviate from those shown by the manager in part, but not limited to, differences in prices and market values reported by the custodian and manager, as well as significant cash flows into or out of an account. It is the responsibility of the manager and custodian to provide insight into the pricing methodologies and any difference in valuation.

Illiquid Alternatives

Due to the inability to receive final valuation prior to report production, closed end funds (including but are not limited to Real Estate, Hedge Funds, Private Equity, and Private Credit) performance is typically reported at a one-quarter lag. Valuation is reported at a one-quarter lag, adjusted for current quarter flow (cash flows are captured real time). Closed end fund performance is calculated using a time-weighted return methodology consistent with all portfolio and total fund performance calculations. For Private Markets, performance reports also include Verus-calculated multiples based on flows and valuations (e.g. DPI and TVPI) and manager-provided IRRs.

Manager Line Up

Manager	Inception Date	Data Source
RhumbLine Russell 1000 Index Fund	3/15/2022	State Street
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SSgA Non-US Developed Index Fund	3/10/2022	State Street
SSgA Non-US Developed SC Index Fund	3/10/2022	State Street
SSgA Emerging Markets Equity Index Fund	3/10/2022	State Street
SSgA High Yield Corporate Credit	3/18/2022	State Street
iShares JPM Emerging Market Bond Index ETF	3/14/2022	State Street

Manager	Inception Date	Data Source
SSgA US TIPS Index Fund	3/17/2022	State Street
Principal USPA	4/6/2022	State Street
SSgA REITs Index Fund	3/10/2022	State Street
SSgA Core Fixed Income Index Fund	3/17/2022	State Street
SSgA Short-Term Gov't/Credit Index Fund	3/17/2022	State Street
Cash	3/22/2022	State Street

Policy Index Composition

As of 3/31/2022	Policy	Growth	Income	Inflation Protection	Risk Mitigation
Russell 3000	23%	46.0%			
MSCI ACWI ex USA IMI	20%	40.0%			
MSCI Emerging Markets IMI	7%	14.0%			
Bloomberg US Aggregate Index	7%				28.0%
Bloomberg 1-3 Year Gov/Credit Index	15%				60.0%
Bloomberg US Corporate High Yield Index	10%		62.5%		
Bloomberg US TIPS 0-5 Year	3%			33.3%	
50% JPM EMBI GD/50% JPM GBI EM GD	6%		37.5%		
NCREIF Property Index	2%			22.2%	
Wilshire US REIT Index	4%			44.5%	
90 Day US Treasury Bill Index	3%				12.0%

Glossary

Allocation Effect: An attribution effect that describes the amount attributable to the managers' asset allocation decisions, relative to the benchmark.

Alpha: The excess return of a portfolio after adjusting for market risk. This excess return is attributable to the selection skill of the portfolio manager. Alpha is calculated as: $\text{Portfolio Return} - [\text{Risk free Rate} + \text{Portfolio Beta} \times (\text{Market Return} - \text{Risk free Rate})]$.

Benchmark R squared: Measures how well the Benchmark return series fits the manager's return series. The higher the Benchmark R squared, the more appropriate the benchmark is for the manager.

Beta: A measure of systematic, or market risk; the part of risk in a portfolio or security that is attributable to general market movements. Beta is calculated by dividing the covariance of a security by the variance of the market.

Book to Market: The ratio of book value per share to market price per share. Growth managers typically have low book to market ratios while value managers typically have high book to market ratios.

Capture Ratio: A statistical measure of an investment manager's overall performance in up or down markets. The capture ratio is used to evaluate how well an investment manager performed relative to an index during periods when that index has risen (up market) or fallen (down market). The capture ratio is calculated by dividing the manager's returns by the returns of the index during the up/down market, and multiplying that factor by 100.

Correlation: A measure of the relative movement of returns of one security or asset class relative to another over time. A correlation of 1 means the returns of two securities move in lock step, a correlation of -1 means the returns of two securities move in the exact opposite direction over time. Correlation is used as a measure to help maximize the benefits of diversification when constructing an investment portfolio.

Excess Return: A measure of the difference in appreciation or depreciation in the price of an investment compared to its benchmark, over a given time period. This is usually expressed as a percentage and may be annualized over a number of years or represent a single period.

Information Ratio: A measure of a manager's ability to earn excess return without incurring additional risk. Information ratio is calculated as: excess return divided by tracking error.

Interaction Effect: An attribution effect that describes the portion of active management that is contributable to the cross interaction between the allocation and selection effect. This can also be explained as an effect that cannot be easily traced to a source.

Portfolio Turnover: The percentage of a portfolio that is sold and replaced (turned over) during a given time period. Low portfolio turnover is indicative of a buy and hold strategy while high portfolio turnover implies a more active form of management.

Price to Earnings Ratio (P/E): Also called the earnings multiplier, it is calculated by dividing the price of a company's stock into earnings per share. Growth managers typically hold stocks with high price to earnings ratios whereas value managers hold stocks with low price to earnings ratios.

R Squared: Also called the coefficient of determination, it measures the amount of variation in one variable explained by variations in another, i.e., the goodness of fit to a benchmark. In the case of investments, the term is used to explain the amount of variation in a security or portfolio explained by movements in the market or the portfolio's benchmark.

Selection Effect: An attribution effect that describes the amount attributable to the managers' stock selection decisions, relative to the benchmark.

Sharpe Ratio: A measure of portfolio efficiency. The Sharpe Ratio indicates excess portfolio return for each unit of risk associated with achieving the excess return. The higher the Sharpe Ratio, the more efficient the portfolio. Sharpe ratio is calculated as: $\text{Portfolio Excess Return} / \text{Portfolio Standard Deviation}$.

Sortino Ratio: Measures the risk adjusted return of an investment, portfolio, or strategy. It is a modification of the Sharpe Ratio, but penalizes only those returns falling below a specified benchmark. The Sortino Ratio uses downside deviation in the denominator rather than standard deviation, like the Sharpe Ratio.

Standard Deviation: A measure of volatility, or risk, inherent in a security or portfolio. The standard deviation of a series is a measure of the extent to which observations in the series differ from the arithmetic mean of the series. For example, if a security has an average annual rate of return of 10% and a standard deviation of 5%, then two thirds of the time, one would expect to receive an annual rate of return between 5% and 15%.

Style Analysis: A return based analysis designed to identify combinations of passive investments to closely replicate the performance of funds

Style Map: A specialized form or scatter plot chart typically used to show where a Manager lies in relation to a set of style indices on a two dimensional plane. This is simply a way of viewing the asset loadings in a different context. The coordinates are calculated by rescaling the asset loadings to range from -1 to 1 on each axis and are dependent on the Style Indices comprising the Map.

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