MEKETA

INVESTMENT GROUP

City of Quincy Retirement System

December 31, 2022

Interim Update

Agenda

Executive Summary

Economic and Market Update

Data as of December 31, 2022

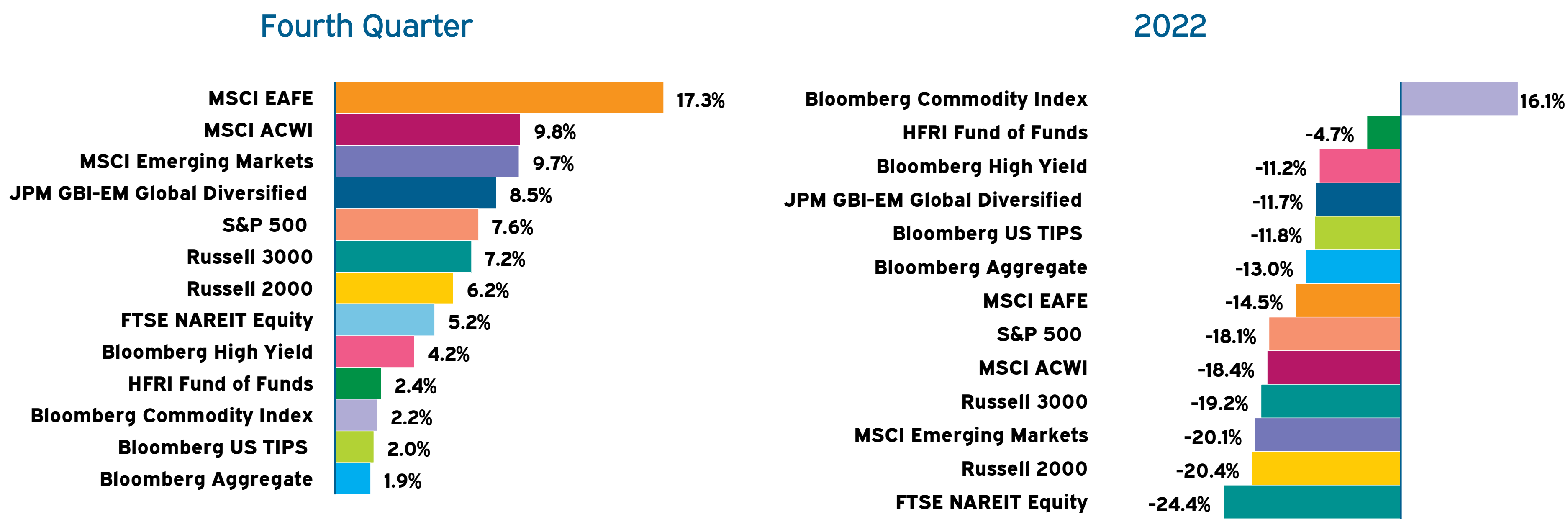
Commentary

→ Ending a very tough year, most asset classes posted gains in the fourth quarter on signs that policy tightening would slow given cooling inflation.

- Chairman Powell's testimony in November reiterated previous messaging on persistent and high inflation and the need for an extended period of monetary tightening weighing on assets in December. Markets remained focused though on signs that inflation is falling and that the size of future Fed rate hikes could be lower.
- US equity markets sold off (-5.9%) in December but returned 7.2% in the fourth quarter as investors balanced the Fed's caution with improving inflation data.
- In developed equity markets outside the US, sentiment deteriorated somewhat in December, but they posted a strong fourth quarter return of 17.3% driven by a falling US dollar and results in Europe where inflation started to slow.
- Emerging market equities declined in December too (-1.4%) but less than the US and also had a strong fourth quarter (+9.7%). A weaker US dollar, declining inflation globally, and signs of China reopening its economy all contributed to the results.
- Bonds experienced one of the worst years on record given inflation levels and the rapid rise in interest rates. Optimism over declining inflation and a slower pace of policy tightening benefited bonds overall in the fourth quarter though.

→ Looking to 2023, the path of inflation and monetary policy, slowing growth globally, China reopening its economy, and the war in Ukraine will all be key.

Index Returns[1]



→ After broad declines in Q3 driven by expectations for further policy tightening, most major asset classes were up in the fourth quarter on hopes of inflation and policy tightening peaking.

→ Outside of commodities, all other public market asset classes declined in 2022. It was the first time since the 1960s that both stocks and bonds declined together in a calendar year.

[1] Source: Bloomberg and FactSet. Data is as of December 31, 2022.

Domestic Equity Returns[1]

Domestic Equity	December (%)	Q4 (%)	1 YR (%)	3 YR (%)	5 YR (%)	10 YR (%)
S&P 500	-5.8	7.6	-18.1	7.7	9.4	12.6
Russell 3000	-5.9	7.2	-19.2	7.1	8.8	12.1
Russell 1000	-5.8	7.2	-19.1	7.3	9.1	12.4
Russell 1000 Growth	-7.7	2.2	-29.1	7.8	11.0	14.1
Russell 1000 Value	-4.0	12.4	-7.5	6.0	6.7	10.3
Russell MidCap	-5.4	9.2	-17.3	5.9	7.1	11.0
Russell MidCap Growth	-6.0	6.9	-26.7	3.9	7.6	11.4
Russell MidCap Value	-5.1	10.5	-12.0	5.8	5.7	10.1
Russell 2000	-6.5	6.2	-20.4	3.1	4.1	9.0
Russell 2000 Growth	-6.4	4.1	-26.4	0.6	3.5	9.2
Russell 2000 Value	-6.6	8.4	-14.5	4.7	4.1	8.5

US Equities: Russell 3000 Index declined 5.9% for December but gained 7.2% for the quarter. Historic inflation and rapidly rising interest rates led to significant declines (-19.2%) for the full year.

→ US stocks fell broadly in December on the Federal Reserve signaling its continued resolve to raise rates but gained overall for the quarter on hopes that interest rates could be peaking soon given slowing inflation.

→ All sectors declined during December, led by consumer discretionary and technology with defensive sectors declining less. For the quarter though, most sectors were up led by energy and industrials.

→ In a continuation on the overall trend in 2022 value stocks outperformed growth stocks in the fourth quarter given higher interest rates and slowing growth.

[1] Source: Bloomberg. Data is as of December 31, 2022.

Foreign Equity Returns[1]

Foreign Equity	December (%)	Q4 (%)	1 YR (%)	3 YR (%)	5 YR (%)	10 YR (%)
MSCI ACWI ex. US	-0.7	14.3	-16.0	0.1	0.9	3.8
MSCI EAFE	0.1	17.3	-14.5	0.9	1.5	4.7
MSCI EAFE (Local Currency)	-3.0	8.7	-7.0	3.6	3.8	7.6
MSCI EAFE Small Cap	1.1	15.8	-21.4	-0.9	0.0	6.2
MSCI Emerging Markets	-1.4	9.7	-20.1	-2.7	-1.4	1.4
MSCI Emerging Markets (Local Currency)	-2.0	6.6	-15.5	0.1	1.3	4.6
MSCI China	5.2	13.5	-21.9	-7.5	-4.5	2.4

Developed international equities (MSCI EAFE) rose 0.1% in December and an impressive 17.3% in the fourth quarter. Emerging markets (MSCI EM) fell -1.4% in December but gained 9.7% for the quarter. Inflation and rising rates also weighed on international equities last year, as well as a strong US dollar for most of the year.

→ International developed market equities, specifically Europe, held up better relative to the rest of the world in December with the MSCI EAFE up 0.1%. In the fourth quarter, they returned a significant 17.3% due in part to the recent weakness in the US dollar (they returned only 8.7% in local terms) leading to lower declines for the year.

→ In December emerging markets outperformed the US but trailed developed market equities as China's rally was not enough to offset weakness elsewhere (e.g., India -5.5%). For the quarter, a weakening US dollar and China reopening led to strong results (+9.7%), but emerging markets remained the weakest for 2022 due to China.

→ Like the US, value outpaced growth globally in 2022.

[1] Source: Bloomberg. Data is as of December 31, 2022.

Fixed Income Returns[1]

Fixed Income	December (%)	Q4 (%)	1 YR (%)	3 YR (%)	5 YR (%)	10 YR (%)	Current Yield (%)	Duration (Years)
Bloomberg Universal	-0.3	2.2	-13.0	-2.5	0.2	1.3	5.1	6.2
Bloomberg Aggregate	-0.5	1.9	-13.0	-2.7	0.0	1.1	4.7	6.4
Bloomberg US TIPS	-1.0	2.0	-11.8	1.2	2.1	1.1	4.4	6.7
Bloomberg High Yield	-0.6	4.2	-11.2	0.0	2.3	4.0	9.0	4.4
JPM GBI-EM Global Diversified (USD)	2.2	8.5	-11.7	-6.1	-2.5	-2.0	5.8	4.9

Fixed Income: The Bloomberg Universal fell -0.3% in December but rose 2.2% for the fourth quarter. Last year was one of the worst on record, with the broad bond market declining 13%.

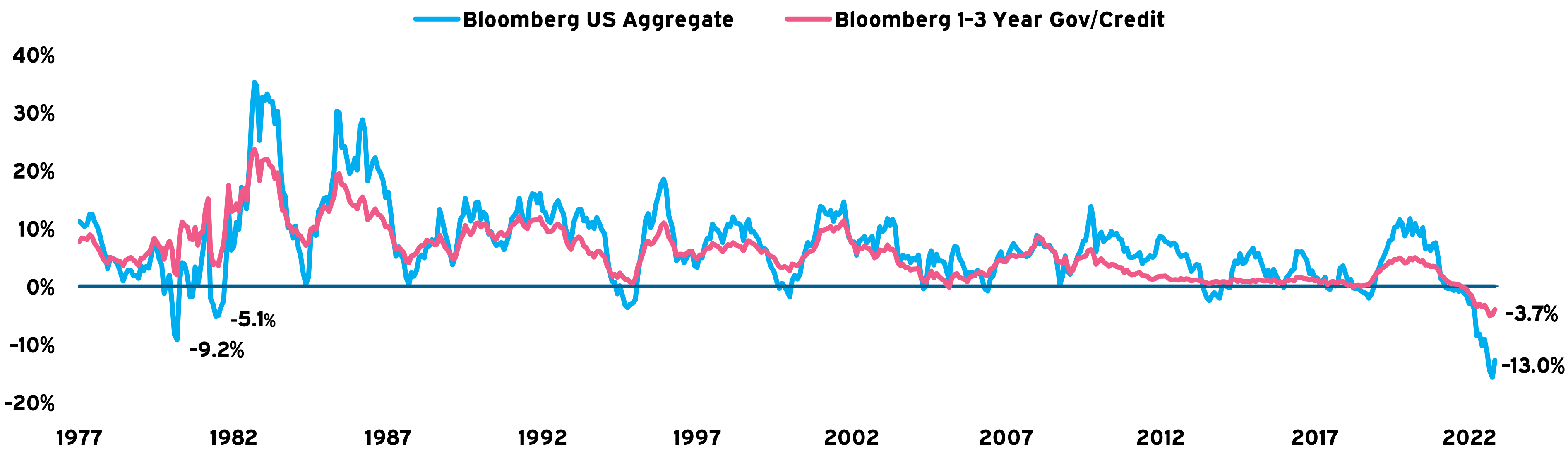
→ The Federal Reserve reconfirming its commitment to tighten policy in the face of high inflation weighed on US fixed income in December. For the quarter though the broad US bond market (Bloomberg Aggregate) was up 1.9% on hopes that inflation would continue to decline and corresponding expectations for the slowing of policy rate hikes.

→ TIPS produced similar results to the broad US bond market for the quarter but outperformed for the year given their inflation adjustment.

→ Riskier bonds outperformed for the quarter due to improving risk sentiment with emerging market bonds performing particularly well.

[1] Source: Bloomberg. JPM GBI-EM data is from InvestorForce. Data is as of December 31, 2022. The yield and duration data from Bloomberg is defined as the index's yield to worst and modified duration respectively.

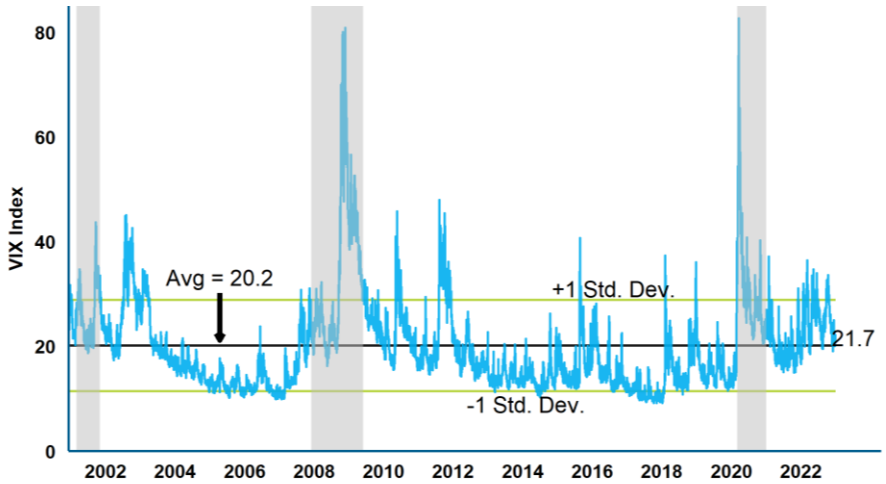
Fixed Income
Rolling One-year Returns[1]

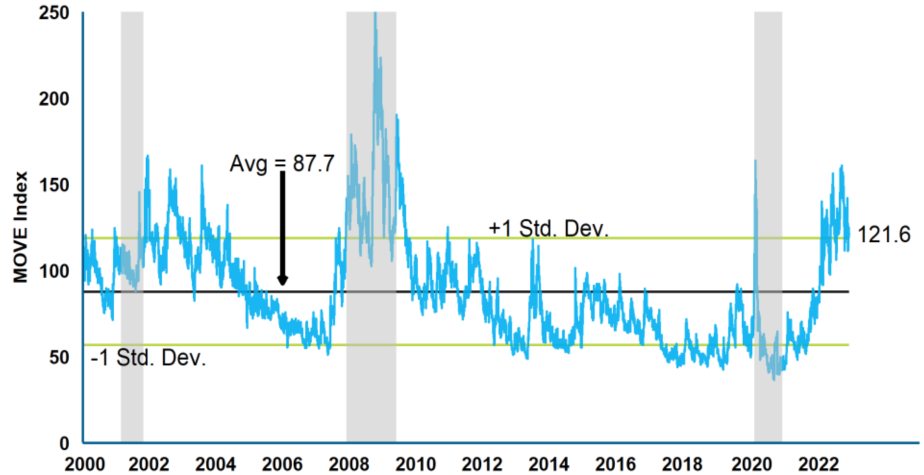


- → Last year was one of the worst return periods for the US bond market given the historic inflation levels and the corresponding rapid rise in interest rates.
- → The broad bond market (Bloomberg US Aggregate) declined 13% in 2022 making it one of the worst periods on record.
- → Short-term bond declines were far smaller (-3.7%) last year, but also were one of the worst on record.

[1] Source: Bloomberg. Data is as of December 31, 2022.

Equity and Fixed Income Volatility[1]



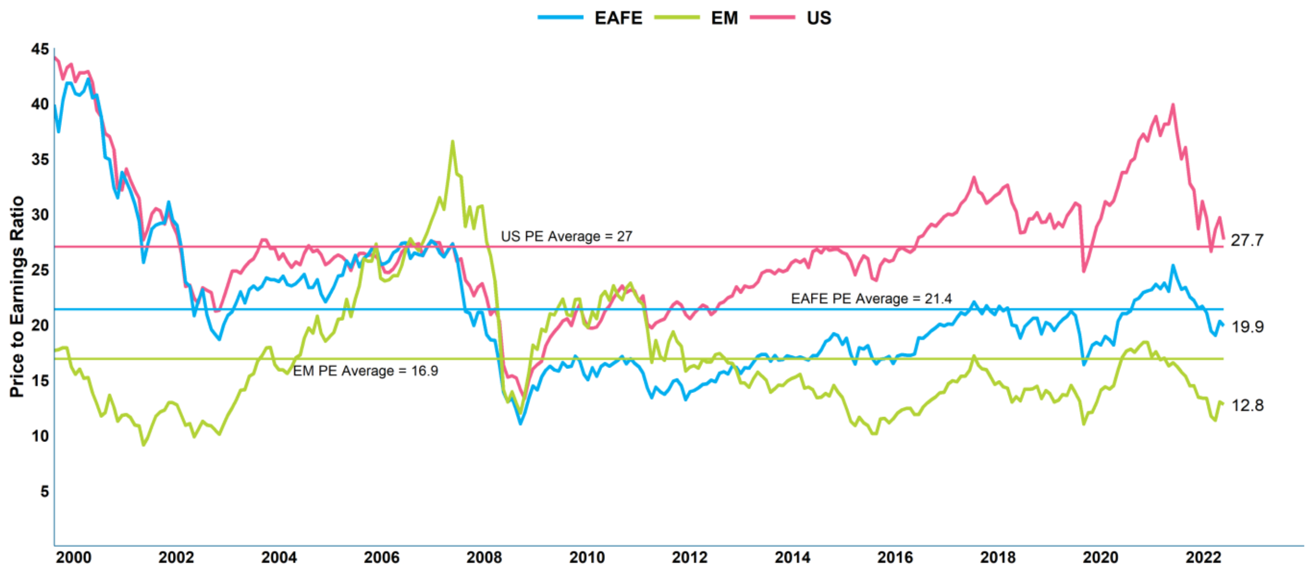


→ Volatility in equities (VIX) finished the year down from its highs and near its long run average as investors anticipated the potential end of Fed rate hikes this year.

→ Fixed income (MOVE) remained elevated and well above its long-run average at year-end due to the uncertain path of US interest rates as the Federal Reserve continues its hawkish stance on inflation.

[1] Equity and Fixed Income Volatility – Source: Bloomberg. Implied volatility as measured using VIX Index for equity markets and the MOVE Index to measure interest rate volatility for fixed income markets. Data is as of December 2022. The average line indicated is the average of the VIX and MOVE values between January 2000 and the recent month-end respectively.

Equity Cyclically Adjusted P/E Ratios[1]



- → After December's sell-off, US equity price-to-earnings ratio finished the year near its long-term (21st century) average.
- → International developed market valuations rose but remain below their own long-term average, with those for emerging markets the lowest and well under the long-term average.
- → Price declines have been the main driver of recent multiple compression as earnings have remained resilient. Concerns remain over whether earnings strength will continue in the face of slowing growth.

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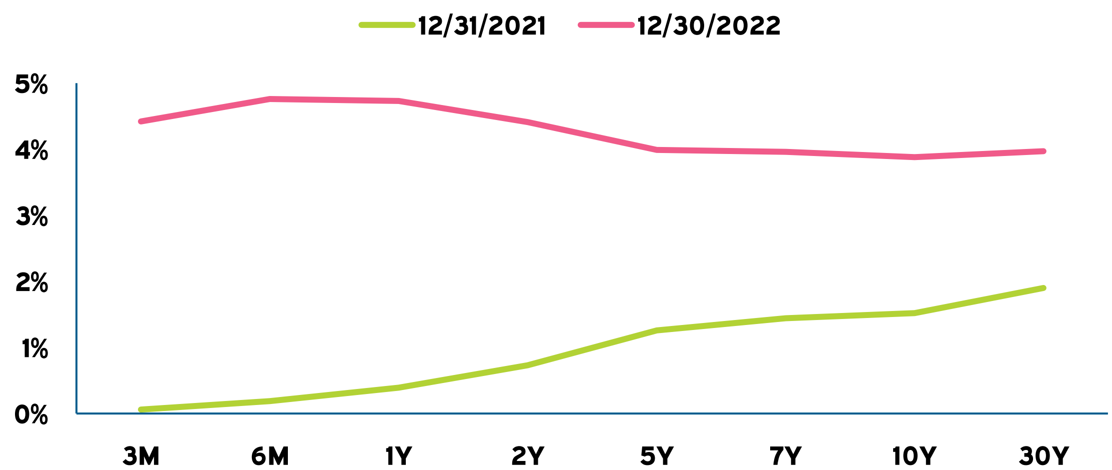
[1] US Equity Cyclically Adjusted P/E on S&P 500 Index. Source: Robert Shiller, Yale University, and Meketa Investment Group. Developed and Emerging Market Equity (MSCI EAFE and EM Index) Cyclically Adjusted P/E – Source: MSCI and Bloomberg. Earnings figures represent the average of monthly "as reported" earnings over the previous ten years. Data is as of December 2022. The average line is the long-term average of the US, EM, and EAFE PE values from December 1999 to the recent month-end respectively.

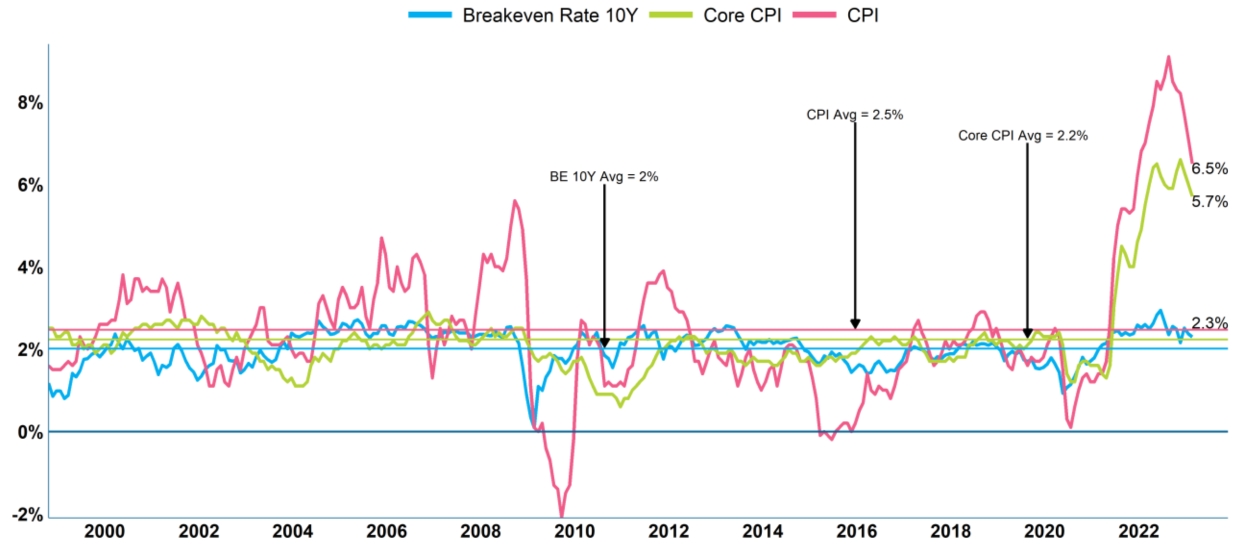
US Yield Curve[1]



- → In December, policy-sensitive interest rates at the front-end of the curve continued to rise with the two-year Treasury yield increasing from 4.3% to 4.4%. Longer dated ten-year Treasury yields also increased (3.6% to 3.9%). For the year, the yield curve rose dramatically across maturities and moved from steep to inverted.
- → The Fed remains strongly committed to fighting inflation, as it increased rates another 50 basis points to a range of 4.0% to 4.5% at its December meeting. This brought the total number of increases for 2022 to seven.
- → The yield spread between two-year and ten-year Treasuries narrowed somewhat to -0.54% after finishing November at -0.70%. The more closely watched measure by the Fed of three-month and ten-year Treasuries also remained inverted. Historically, inversions in the yield curve have often preceded recessions.

[1] Source: Bloomberg. Data is as of December 31, 2022.

Ten-Year Breakeven Inflation and CPI[1]



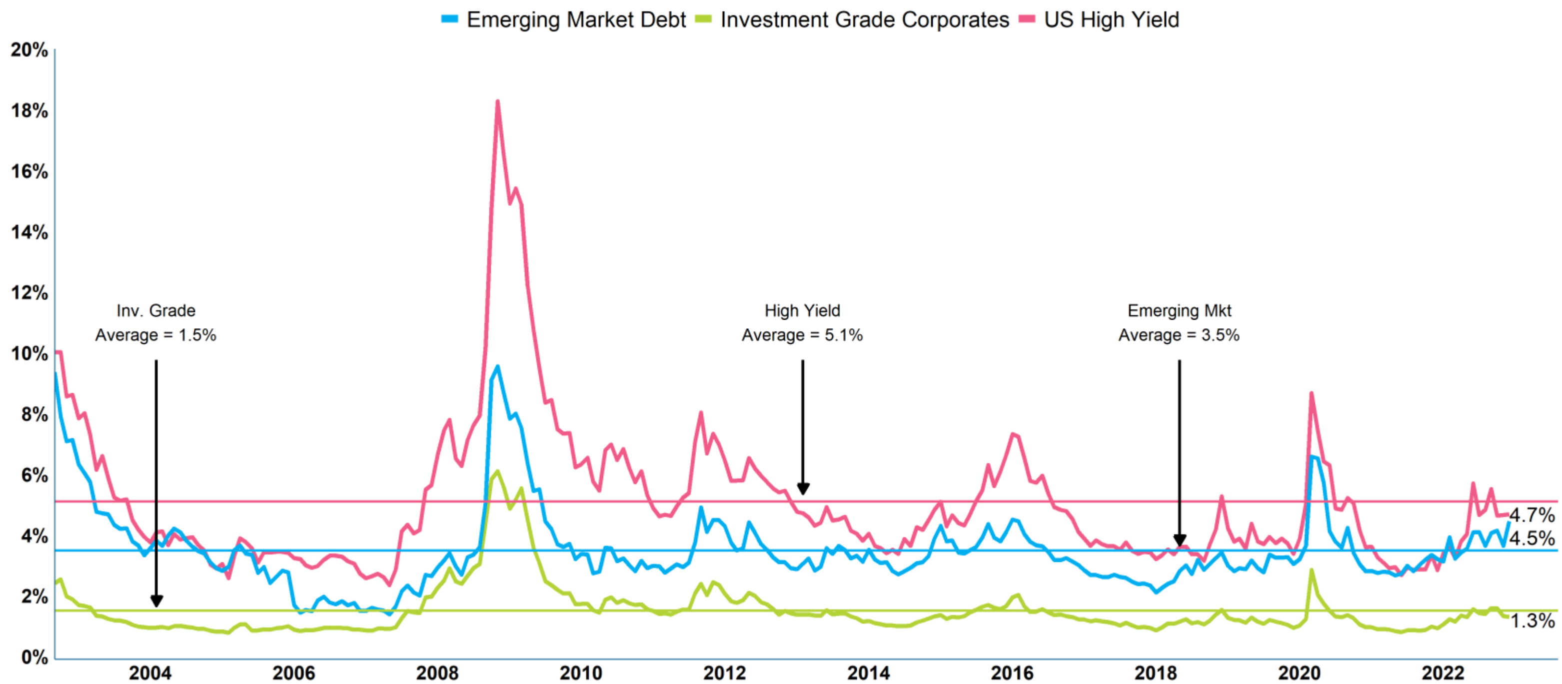
→ In December inflation continued to decline (6.5% versus 7.1%) matching expectations and providing support for the Fed to slow the pace of policy tightening. Energy prices fell again for the month but remain up 7.3% from a year prior, while food prices fell slightly, and stickier service prices continued to increase.

→ Core inflation – excluding food and energy – also continued to decline in December (5.7% versus 6.0%) and matched estimates.

→ Inflation expectations (breakevens) declined slightly for the month (2.3% versus 2.4%) and remain well below current inflation levels as investors anticipate a significant moderation in inflation.

[1] Source: Bloomberg. Data is as of December 2022. The CPI and 10 Year Breakeven average lines denote the average values from August 1998 to the present month-end respectively. Breakeven values represent month-end values for comparative purposes.

Credit Spreads vs. US Treasury Bonds[1]

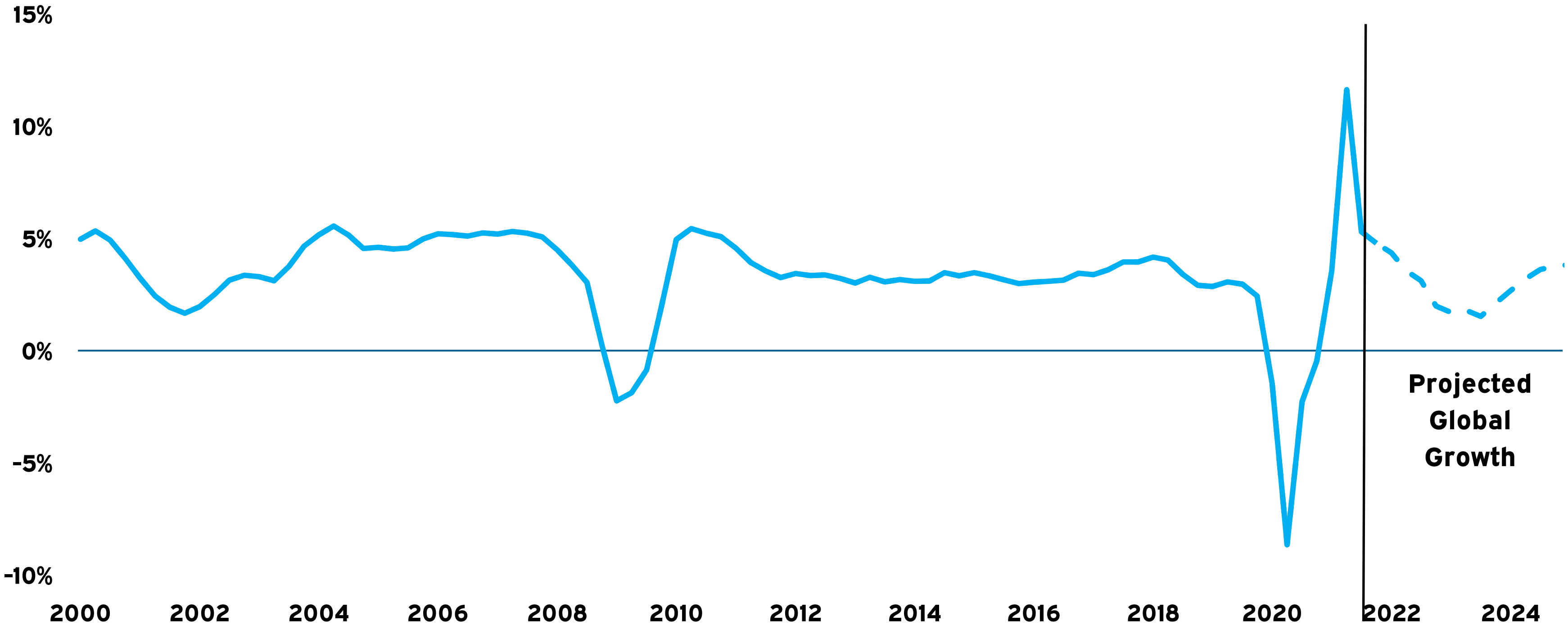


→ High yield spreads (the added yield above a comparable maturity Treasury) finished December at 4.7% (the same as the end of November) remaining below their long-run average.

→ Investment grade spreads also held steady at 1.3% as attractive yields and strong balance sheets continued to attract investors, while emerging market spreads rose (4.5% versus 3.6%) due to concerns regarding slower growth and lower commodity prices.

[1] Sources: Bloomberg. Data is as of December 31, 2022. Average lines denote the average of the investment grade, high yield, and emerging market spread values from August 2000 to the recent month-end respectively.

Global Real Gross Domestic Product (GDP) Growth[1]



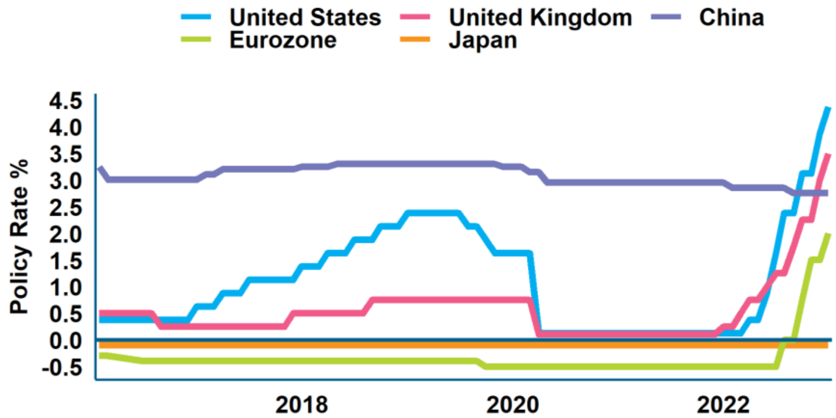
→ Global economies are expected to slow in 2023 compared to 2022, with risks of recession increasing given persistently high inflation and related tighter monetary policy.

→ The delicate balancing act of central banks trying to reduce inflation without dramatically impacting growth will remain key.

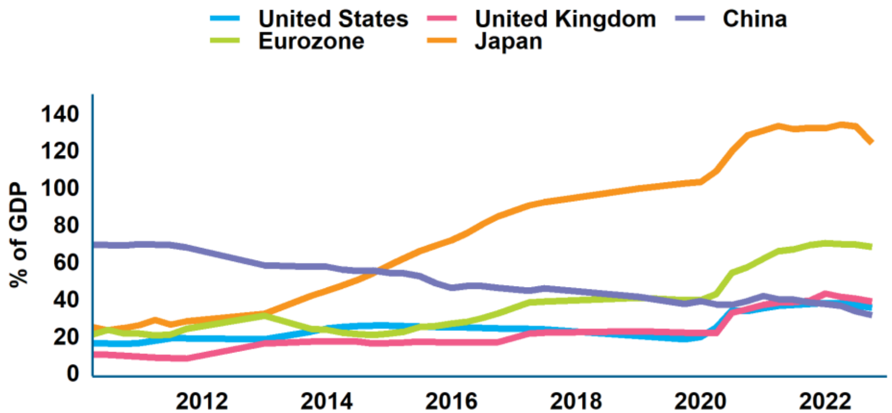
[1] Source: Oxford Economics (World GDP, US$ prices & PPP exchange rate, real, % change YoY). Updated December 2022.

Central Bank Response[1]

Policy Rates



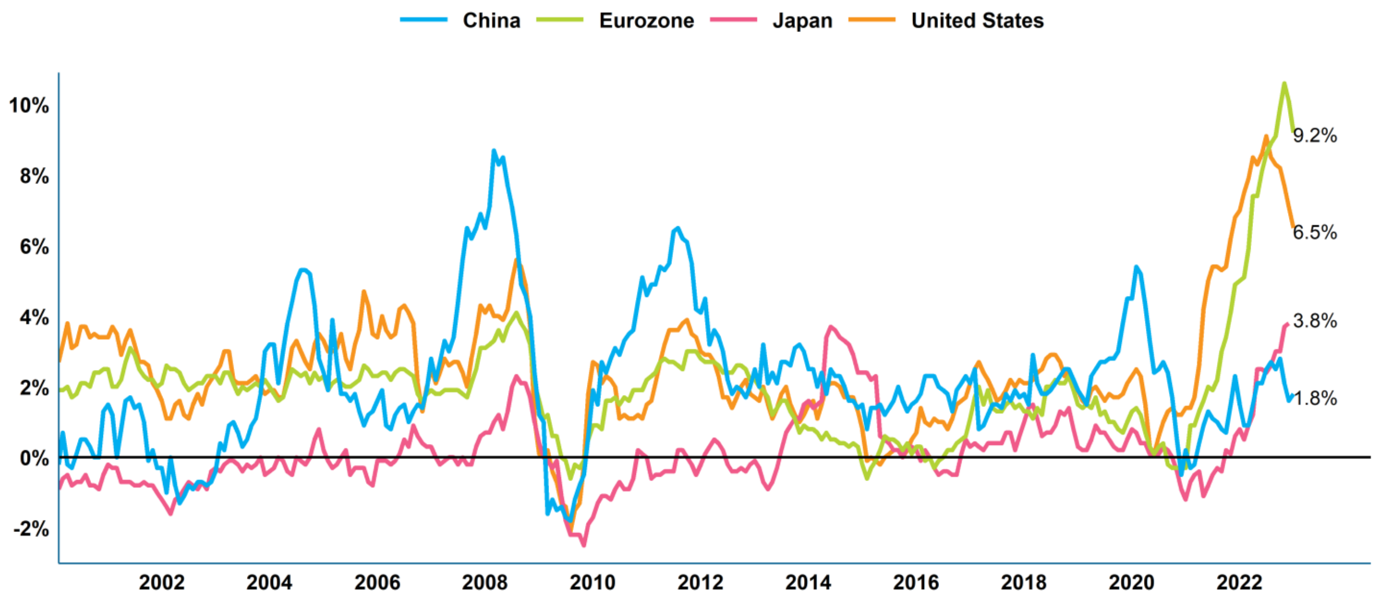
Balance Sheet as % of GDP



- → In 2022 many central banks aggressively reduced pandemic-era policy support in the face of high inflation with the US taking a more aggressive approach.
- → In December, the Bank of Japan relaxed its target yield for the 10-year bond which may mark an incremental step toward policy normalization after eight years of quantitative easing.
- → The one notable central bank outlier is China, where the central bank has lowered rates and reserve requirements in response to slowing growth.
- → The risk remains for a policy error, particularly overtightening, as record inflation and aggressive tightening to date could heavily weigh on global growth. The Federal Reserve's policy rate path could diverge from others this year given their strong early start to tightening.

[1] Source: Bloomberg. Policy rate data is as of December 31, 2022. China policy rate is defined as the medium-term lending facility 1 year interest rate. Balance sheet as % of GDP is based on quarterly data and is as of December 31, 2022.

Inflation (CPI Trailing Twelve Months)[1]



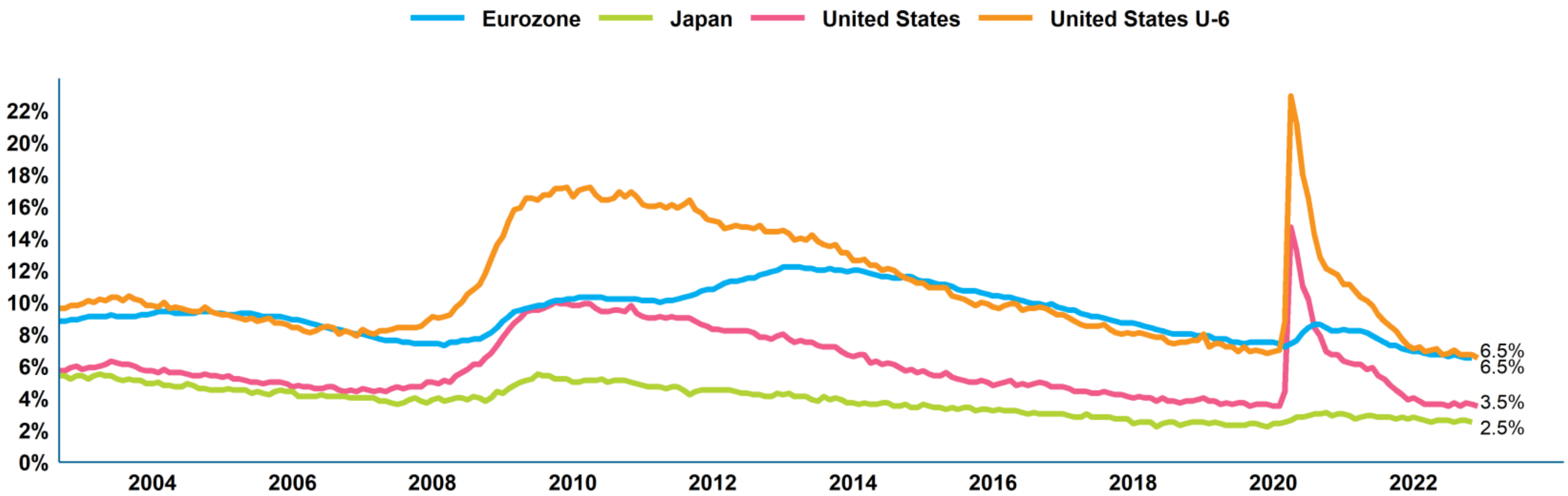
→ Inflation increased dramatically from the lows of the pandemic, particularly in the US and Eurozone where it has reached levels not seen in many decades.

→ Inflation pressures are slowly declining in the US, but they remain elevated, while in Europe they have reached historic levels due to skyrocketing energy prices and a weak euro.

→ Supply issues related to the pandemic, record monetary and fiscal stimulus, strict COVID-19 restrictions in China, and higher commodity prices driven by the war in Ukraine have been key global drivers of inflation.

[1] Source: Bloomberg. Data is as of December 2022. The most recent Japanese inflation data is as of November 2022.

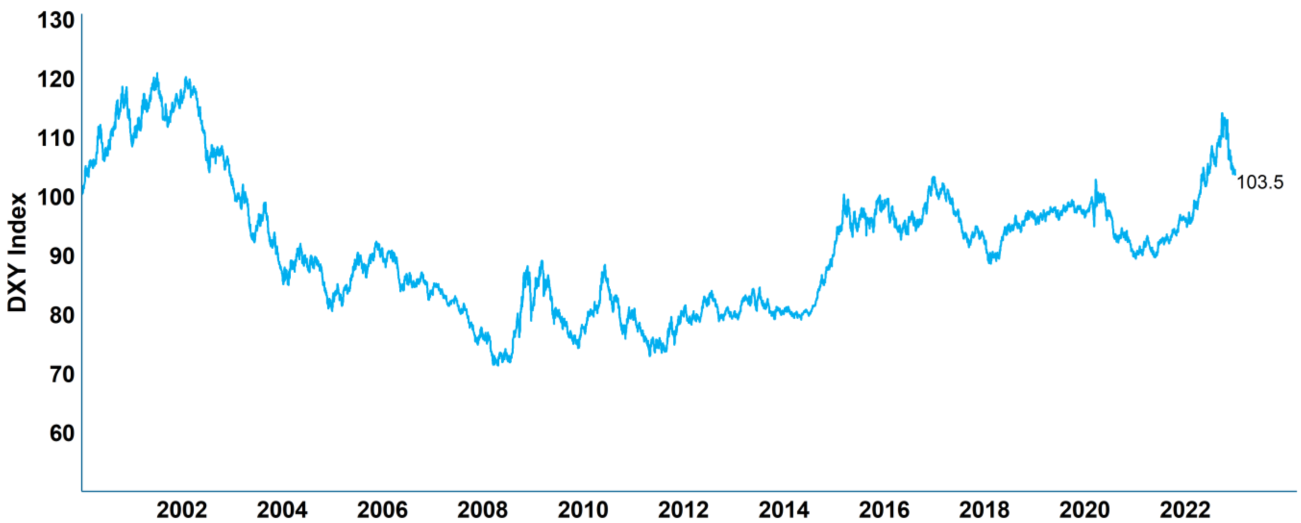
Unemployment[1]



- → As economies have largely reopened, helped by vaccines for the virus, improvements have been seen in the labor market.
- → Despite slowing growth and high inflation, the US labor market remains a bright spot. Unemployment in the US, which experienced the steepest rise from the pandemic, has remained in a tight 3.5%-3.7% range for most of the year.
- → The strong labor market and higher wages, although beneficial for workers, motivates the Fed's efforts to fight inflation, likely leading to higher unemployment.

[1] Source: Bloomberg. Data is as December 31, 2022, for the US. The most recent data for Eurozone and Japanese unemployment is as of November 30, 2022.

US Dollar versus Broad Currencies[1]



→ Overall, the US dollar continued to weaken from its recent peak in December as declining inflation supported the case for the Federal Reserve to slow its tightening.

→ The dollar finished the year much higher than it started though due to the increased pace of policy tightening, stronger relative growth, and safe-haven flows.

→ As we look to 2023, the track of inflation across economies and the corresponding monetary policy will likely be key drivers of currency moves.

[1] Source: Bloomberg. Data as of December 31, 2022.

Summary

Key Trends:

→ The impacts of record high inflation will remain key, with market volatility likely to stay high.

→ Monetary policy could diverge in 2023 with the Fed pausing and others continuing to tighten. The risk of policy errors in both directions remains.

→ Growth will continue to slow globally next year, with many economies likely falling into recessions. Inflation, monetary policy, and the war will all be key.

→ In the US the end of many fiscal programs is expected to put the burden of continued growth on consumers. Higher energy and food prices could weigh on consumer spending.

→ Valuations have significantly declined in the US to around long-term averages, largely driven by price declines. The key going forward will be whether earnings can remain resilient if growth continues to slow.

→ Outside the US, equity valuations remain lower in both emerging and developed markets, but risks remain, including potential continued strength in the US dollar, higher inflation particularly weighing on Europe, and China's rushed exit from COVID-19 restrictions and on-going weakness in the real estate sector.

Manager Highlights

Driehaus Emerging Markets Growth

→ Driehaus underperformed in December, returning -4.0% vs. the benchmark which lost 1.4%.

- The relative gains that the portfolio had seen during the previous three quarters from being underweight China reversed as the unexpected COVID reopening caused a sharp rally, which benefited higher beta and higher volatility stocks. Being underweight a high beta and strongly performing market weighed on relative returns even as the underweight position to the country had been reduced from its highs in Q3.
- Unfortunately, despite moving from roughly 1500 basis points underweight China at its most extreme to around 600 basis points at year-end, Driehaus still lagged relative to the index.
- Since inception, Driehaus has returned 3.9%, well outpacing the benchmark, which has been flat over that same period, and ranking in the top 16th percentile of its peer group.

Axiom International Small Cap Equity

→ Axiom underperformed its benchmark by 1.8% in December, posting a -1.1% return for the month.

- Information technology, consumer staples, and consumer discretionary were the largest relative detracting sectors for the fourth quarter.
- From a country perspective, the largest relative detractor was Japan, followed by France and the United Kingdom.

→ Since inception, Axiom has returned 6.3%, trailing the benchmark by 1.4%.

IFM Global Infrastructure Fund

→ IFM outperformed in December, returning 2.9% vs. the benchmark which gained 0.1%.

- The return for the December quarter reflects outperformance in GCT Global Container Terminals ("GCT") (+45.6%) and M6toll (+43.1%), mainly driven by the incorporation of transaction adjustments made by independent valuers to reflect agreed prices for partial divestments signed during the quarter. Performance was also driven by increases in listed asset share prices, alongside other top performers including IFM Net Zero Infrastructure Fund ("IFM NZIF") (+15.3%), Impala Terminals (+13.3%) and Colonial Pipeline (+7.8%).
- The Fund received distributions totaling US$273.8 million during the quarter, primarily from Indiana Toll Road, Colonial Pipeline, GlasfaserPlus and Aqualia.

→ Since inception, IFM has returned 10.8%, well outpacing the benchmark, which has returned 9.1% over that same period.

Brown Small Cap Fundamental Value

→ Brown outperformed its benchmark by 1.4% in December, posting a return of -5.2% vs the benchmark's -6.6%.

- Brown's value bias coupled with their stock selection in the energy, industrials, and health Care sectors contributed positively to performance during the quarter.

→ Since inception, Brown has returned 7.5%, per year underperforming the Russell 2000 Value by 0.4%, net of fees.

Interim Update
As of December 31, 2022

Allocation vs. Targets and Policy

	Current Balance	Current Allocation	Policy	Policy Range
US Equity	$171,080,400	22%	24%	19% - 29%
Developed Market Equity	$93,139,837	12%	13%	8% - 18%
Emerging Market Equity	$60,310,996	8%	12%	7% - 17%
Investment Grade Bonds	$71,393,649	9%	5%	2% - 8%
Long-Term Government Bonds	$24,754,939	3%	7%	2% - 12%
TIPS	$15,549,584	2%	4%	1% - 7%
Emerging Market Bonds	--	--	2%	0% - 4%
High Yield Bonds	$39,049,554	5%	6%	3% - 9%
Bank Loans	$7,929,902	1%	2%	0% - 4%
Private Equity	$130,885,461	17%	10%	5% - 15%
Real Estate	$86,265,411	11%	10%	5% - 15%
Natural Resources	$17,472,666	2%	3%	0% - 6%
Infrastructure	$12,330,840	2%	2%	0% - 5%
Opportunistic	$35,897,961	5%	0%	0% - 5%
Balanced Assets	$14,662,274	2%	--	--
Cash	$9,289,386	1%	0%	0% - 5%
Total	**$790,012,861**	**100%**	**100%**	

	Current Balance	Current Allocation	Policy	Policy Range
Total Equity Including PE	$456,516,472	59%	59%	--
Total Fixed Income	$158677,628	20%	26%	--
Real Assets	$114,969,139	15%	15%	--
Other	$59,099,096	6%	0%	--

Asset Class Performance Summary

	Market Value ($)	% of Portfolio	1 Mo (%)	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	20 Yrs (%)	Inception (%)	Inception Date
Total Retirement System (gross)	**790,012,861**	**100.0**	**-1.7**	**4.4**	**-10.2**	**6.0**	**6.2**	**7.1**	**7.1**	**8.1**	**Jan-89**
Total Retirement System			**-1.7**	**4.4**	**-10.3**	**5.9**	**6.0**	**6.9**	**6.8**	**7.8**	
Domestic Equity Assets	**171,080,400**	**21.7**	**-5.5**	**8.1**	**-16.9**	**6.5**	**8.3**	**11.8**	**9.8**	**9.6**	**Jul-93**
Russell 3000			*-5.9*	*7.2*	*-19.2*	*7.1*	*8.8*	*12.1*	*9.9*	*9.6*	*Jul-93*
International Developed Market Equity Assets	**93,139,837**	**11.8**	**0.0**	**16.0**	**-17.9**	**-0.3**	**0.2**	**4.1**	**5.7**	**4.5**	**Feb-98**
MSCI EAFE			*0.1*	*17.3*	*-14.5*	*0.9*	*1.5*	*4.7*	*6.4*	*4.3*	*Feb-98*
International Emerging Market Equity Assets	**60,310,996**	**7.6**	**-2.8**	**6.4**	**-19.8**	**1.7**	**2.0**	**2.7**	**--**	**5.6**	**Sep-08**
MSCI Emerging Markets			*-1.4*	*9.7*	*-20.1*	*-2.7*	*-1.4*	*1.4*	*8.7*	*2.4*	*Sep-08*
Investment Grade Bond Assets	**71,393,649**	**9.0**	**-1.1**	**1.0**	**-16.9**	**-4.2**	**-0.9**	**0.6**	**2.9**	**4.1**	**Jul-93**
Bloomberg US Aggregate TR			*-0.5*	*1.9*	*-13.0*	*-2.7*	*0.0*	*1.1*	*3.1*	*4.4*	*Jul-93*
Long-Term Government Bond Assets	**24,754,939**	**3.1**	**-1.3**	**0.7**	**-18.3**	**-2.9**	**0.2**	**--**	**--**	**1.4**	**Dec-15**
PRIT Core Fixed Income			*-1.3*	*0.7*	*-18.3*	*-2.9*	*0.2*	*1.9*	*3.6*	*1.4*	*Dec-15*
TIPS Assets	**15,549,584**	**2.0**	**-1.2**	**1.9**	**-12.0**	**1.1**	**2.1**	**1.1**	**--**	**3.4**	**Mar-07**
Bloomberg US TIPS TR			*-1.0*	*2.0*	*-11.8*	*1.2*	*2.1*	*1.1*	*3.8*	*3.5*	*Mar-07*
High Yield Bond Assets	**39,049,554**	**4.9**	**-0.4**	**3.7**	**-9.0**	**0.9**	**2.6**	**3.7**	**--**	**5.2**	**Apr-07**
Bloomberg US High Yield TR			*-0.6*	*4.2*	*-11.2*	*0.0*	*2.3*	*4.0*	*7.3*	*5.7*	*Apr-07*
Bank Loan Assets	**7,929,902**	**1.0**	**0.4**	**3.2**	**-1.7**	**1.6**	**2.7**	**--**	**--**	**2.9**	**Aug-14**
Credit Suisse Leveraged Loans			*0.4*	*2.3*	*-1.1*	*2.3*	*3.2*	*3.8*	*4.7*	*3.4*	*Aug-14*
Total Real Estate	**86,265,411**	**10.9**	**-1.7**	**-1.4**	**6.5**	**7.8**	**6.9**	**8.6**	**--**	**--**	**Jan-89**
NCREIF ODCE			*-5.0*	*-5.0*	*7.5*	*9.9*	*8.7*	*10.1*	*8.4*	*7.5*	*Jan-89*

Some asset classes may show skewed performance relative to month over month changes in market value, this is due to PRIM General Allocation funds having their performance user entered while their market values are estimated using PRIM's current asset allocation.

	Market Value ($)	% of Portfolio	1 Mo (%)	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	20 Yrs (%)	Inception (%)	Inception Date
Private Equity Assets	**130,885,461**	**16.6**									
Natural Resources Assets	**17,472,666**	**2.2**									
Infrastructure Assets	**12,330,840**	**1.6**									
Opportunistic Assets	**35,897,961**	**4.5**									
Balanced Assets (PRIT General Allocation Fund)	**14,662,274**	**1.9**	**-1.7**	**4.1**	**-10.8**	**6.4**	**6.5**	**8.0**	**8.1**	**8.2**	**Apr-90**
60% Wilshire 5000 & 40% Barclays Aggregate			*-3.7*	*5.1*	*-16.4*	*3.7*	*5.7*	*7.9*	*7.5*	*8.3*	*Apr-90*
Cash	**9,289,386**	**1.2**									

Trailing Net Performance

	Market Value ($)	% of Portfolio	% of Sector	1 Mo (%)	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	20 Yrs (%)	Inception (%)	Inception Date
Total Retirement System (gross)	**790,012,861**	**100.0**	**--**	**-1.7**	**4.4**	**-10.2**	**6.0**	**6.2**	**7.1**	**7.1**	**8.1**	**Jan-89**
Total Retirement System				**-1.7**	**4.4**	**-10.3**	**5.9**	**6.0**	**6.9**	**6.8**	**7.8**	
Domestic Equity Assets	**171,080,400**	**21.7**	**21.7**	**-5.5**	**8.1**	**-16.9**	**6.5**	**8.3**	**11.8**	**9.8**	**9.6**	**Jul-93**
Russell 3000				*-5.9*	*7.2*	*-19.2*	*7.1*	*8.8*	*12.1*	*9.9*	*9.6*	*Jul-93*
RhumbLine Russell 1000 Growth Index	20,198,472	2.6	11.8	-7.6	2.2	-29.1	7.8	11.0	14.1	--	10.3	Jun-05
Russell 1000 Growth				*-7.7*	*2.2*	*-29.1*	*7.8*	*11.0*	*14.1*	*10.8*	*10.4*	*Jun-05*
Large Growth MStar MF Median				*-6.8*	*3.2*	*-30.4*	*5.3*	*8.6*	*12.0*	*9.8*	*9.2*	*Jun-05*
Large Growth MStar MF Rank				*68*	*64*	*43*	*16*	*15*	*10*	*--*	*18*	*Jun-05*
RhumbLine Russell 1000 Value Index	26,296,175	3.3	15.4	-4.0	12.4	-7.5	6.0	6.7	10.2	--	7.4	Jun-05
Russell 1000 Value				*-4.0*	*12.4*	*-7.5*	*6.0*	*6.7*	*10.3*	*8.8*	*7.5*	*Jun-05*
Large Value MStar MF Median				*-4.1*	*13.1*	*-5.3*	*7.5*	*7.5*	*10.5*	*8.8*	*7.8*	*Jun-05*
Large Value MStar MF Rank				*47*	*64*	*70*	*79*	*72*	*63*	*--*	*66*	*Jun-05*
Rhumbline QSI Index	29,397,787	3.7	17.2	-5.0	8.8	-14.9	6.7	8.9	--	--	10.8	Aug-13
QSI Index				*-5.1*	*8.9*	*-14.9*	*6.7*	*8.9*	*12.5*	*10.3*	*11.0*	*Aug-13*
Russell 3000				*-5.9*	*7.2*	*-19.2*	*7.1*	*8.8*	*12.1*	*9.9*	*10.7*	*Aug-13*
Large Cap MStar MF Median				*-5.3*	*8.6*	*-18.0*	*6.9*	*8.3*	*11.5*	*9.5*	*10.2*	*Aug-13*
Large Cap MStar MF Rank				*45*	*50*	*41*	*56*	*37*	*--*	*--*	*31*	*Aug-13*
Brown Small Cap Fundamental Value	16,382,788	2.1	9.6	-5.2	11.9	-8.7	4.5	4.3	--	--	7.5	Jul-16
Russell 2000 Value				*-6.6*	*8.4*	*-14.5*	*4.7*	*4.1*	*8.5*	*9.0*	*7.9*	*Jul-16*
Small Value MStar MF Median				*-5.8*	*11.2*	*-10.5*	*7.0*	*5.1*	*9.3*	*9.6*	*8.4*	*Jul-16*
Small Value MStar MF Rank				*37*	*37*	*39*	*83*	*71*	*--*	*--*	*78*	*Jul-16*
PRIT General Allocation Domestic Equity	78,805,177	10.0	46.1	-5.7	7.3	-18.5	--	--	--	--	-18.5	Jan-22
PRIT Domestic Equity Benchmark				*-5.8*	*7.2*	*-18.6*	*--*	*--*	*--*	*--*	*-18.6*	*Jan-22*

	Market Value ($)	% of Portfolio	% of Sector	1 Mo (%)	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	20 Yrs (%)	Inception (%)	Inception Date
International Developed Market Equity Assets	**93,139,837**	**11.8**	**11.8**	**0.0**	**16.0**	**-17.9**	**-0.3**	**0.2**	**4.1**	**5.7**	**4.5**	**Feb-98**
MSCI EAFE				*0.1*	*17.3*	*-14.5*	*0.9*	*1.5*	*4.7*	*6.4*	*4.3*	*Feb-98*
SSgA MSCI EAFE Index	37,409,690	4.7	40.2	0.1	17.4	-14.1	1.2	1.9	5.0	--	4.8	Oct-09
MSCI EAFE				*0.1*	*17.3*	*-14.5*	*0.9*	*1.5*	*4.7*	*6.4*	*4.5*	*Oct-09*
Foreign MStar MF Median				*-1.8*	*16.2*	*-17.3*	*0.7*	*1.2*	*4.6*	*6.7*	*5.0*	*Oct-09*
Foreign MStar MF Rank				*7*	*32*	*30*	*39*	*32*	*38*	*--*	*58*	*Oct-09*
Axiom International Small Cap Equity	10,324,394	1.3	11.1	-1.1	9.7	-32.8	--	--	--	--	6.3	May-20
S&P Developed Ex-U.S. SmallCap				*0.7*	*16.4*	*-21.4*	*-0.9*	*-0.2*	*5.8*	*8.9*	*7.7*	*May-20*
MSCI EAFE Small Cap				*1.1*	*15.8*	*-21.4*	*-0.9*	*0.0*	*6.2*	*9.0*	*7.6*	*May-20*
PRIT General Allocation Int. Equity	45,405,753	5.7	48.8	0.2	16.4	-17.0	--	--	--	--	-17.0	Jan-22
Custom MSCI World Ex-US IMI Net Divs				*-0.4*	*15.9*	*-15.4*	*--*	*--*	*--*	*--*	*-15.4*	*Jan-22*
International Emerging Market Equity Assets	**60,310,996**	**7.6**	**7.6**	**-2.8**	**6.4**	**-19.8**	**1.7**	**2.0**	**2.7**	**--**	**5.6**	**Sep-08**
MSCI Emerging Markets				*-1.4*	*9.7*	*-20.1*	*-2.7*	*-1.4*	*1.4*	*8.7*	*2.4*	*Sep-08*
Driehaus Emerging Markets Growth	34,644,557	4.4	57.4	-4.0	3.9	-21.7	0.1	--	--	--	3.9	Mar-19
MSCI Emerging Markets				*-1.4*	*9.7*	*-20.1*	*-2.7*	*-1.4*	*1.4*	*8.7*	*0.0*	*Mar-19*
Diversified Emerging Mkts MStar MF Median				*-2.4*	*10.1*	*-22.4*	*-3.0*	*-1.5*	*1.6*	*8.6*	*0.5*	*Mar-19*
Diversified Emerging Mkts MStar MF Rank				*90*	*95*	*45*	*24*	*--*	*--*	*--*	*16*	*Mar-19*
Acadian Emerging Markets Small Cap	8,821,196	1.1	14.6	-0.8	10.4	-13.8	6.2	2.7	--	--	5.8	Jun-14
MSCI Emerging Markets Small Cap				*-1.0*	*8.2*	*-18.0*	*5.1*	*1.1*	*3.2*	*10.0*	*2.8*	*Jun-14*
Diversified Emerging Mkts MStar MF Median				*-2.4*	*10.1*	*-22.4*	*-3.0*	*-1.5*	*1.6*	*8.6*	*1.6*	*Jun-14*
Diversified Emerging Mkts MStar MF Rank				*11*	*45*	*10*	*2*	*5*	*--*	*--*	*1*	*Jun-14*
PRIT General Allocation EME	16,845,243	2.1	27.9	-1.5	9.6	-18.6	--	--	--	--	-18.6	Jan-22
Custom MSCI Emerging Market IMI Net Divs				*-1.4*	*9.5*	*-19.7*	*--*	*--*	*--*	*--*	*-19.7*	*Jan-22*

	Market Value ($)	% of Portfolio	% of Sector	1 Mo (%)	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	20 Yrs (%)	Inception (%)	Inception Date
Investment Grade Bond Assets	**71,393,649**	**9.0**	**9.0**	**-1.1**	**1.0**	**-16.9**	**-4.2**	**-0.9**	**0.6**	**2.9**	**4.1**	**Jul-93**
Bloomberg US Aggregate TR				*-0.5*	*1.9*	*-13.0*	*-2.7*	*0.0*	*1.1*	*3.1*	*4.4*	*Jul-93*
SSgA U.S. Aggregate Bond Index-NL	20,239,411	2.6	28.3	-0.6	1.7	-13.2	-2.7	0.0	1.0	--	2.9	Apr-04
Bloomberg US Aggregate TR				*-0.5*	*1.9*	*-13.0*	*-2.7*	*0.0*	*1.1*	*3.1*	*2.9*	*Apr-04*
Intermediate Core Bond MStar MF Median				*-0.5*	*1.7*	*-13.3*	*-2.6*	*0.0*	*1.1*	*3.2*	*3.0*	*Apr-04*
Intermediate Core Bond MStar MF Rank				*72*	*48*	*41*	*61*	*54*	*59*	*--*	*63*	*Apr-04*
PRIT General Allocation Core FI	51,154,238	6.5	71.7	-1.3	0.7	-18.3	--	--	--	--	-18.3	Jan-22
PRIT Core Fixed Income				*-1.3*	*0.7*	*-18.3*	*-2.9*	*0.2*	*1.9*	*3.6*	*-18.3*	*Jan-22*
Long-Term Government Bond Assets	**24,754,939**	**3.1**	**3.1**	**-1.3**	**0.7**	**-18.3**	**-2.9**	**0.2**	**--**	**--**	**1.4**	**Dec-15**
PRIT Core Fixed Income				*-1.3*	*0.7*	*-18.3*	*-2.9*	*0.2*	*1.9*	*3.6*	*1.4*	*Dec-15*
PRIT Core Fixed Income	24,754,939	3.1	100.0	-1.3	0.7	-18.3	-2.9	0.2	--	--	1.4	Dec-15
PRIT Core Fixed Income				*-1.3*	*0.7*	*-18.3*	*-2.9*	*0.2*	*1.9*	*3.6*	*1.4*	*Dec-15*
TIPS Assets	**15,549,584**	**2.0**	**2.0**	**-1.2**	**1.9**	**-12.0**	**1.1**	**2.1**	**1.1**	**--**	**3.4**	**Mar-07**
Bloomberg US TIPS TR				*-1.0*	*2.0*	*-11.8*	*1.2*	*2.1*	*1.1*	*3.8*	*3.5*	*Mar-07*
SSgA TIPS Index	15,549,584	2.0	100.0	-1.2	1.9	-12.0	1.1	2.1	1.1	--	3.4	Mar-07
Bloomberg US TIPS TR				*-1.0*	*2.0*	*-11.8*	*1.2*	*2.1*	*1.1*	*3.8*	*3.5*	*Mar-07*
Inflation-Protected Bond MStar MF Median				*-0.8*	*2.0*	*-11.5*	*1.4*	*2.1*	*0.9*	*3.5*	*3.2*	*Mar-07*
Inflation-Protected Bond MStar MF Rank				*80*	*65*	*67*	*60*	*50*	*34*	*--*	*25*	*Mar-07*

	Market Value ($)	% of Portfolio	% of Sector	1 Mo (%)	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	20 Yrs (%)	Inception (%)	Inception Date
High Yield Bond Assets	**39,049,554**	**4.9**	**4.9**	**-0.4**	**3.7**	**-9.0**	**0.9**	**2.6**	**3.7**	**--**	**5.2**	**Apr-07**
Bloomberg US High Yield TR				*-0.6*	*4.2*	*-11.2*	*0.0*	*2.3*	*4.0*	*7.3*	*5.7*	*Apr-07*
Loomis Sayles High Yield Conservative	11,354,086	1.4	29.1	-0.6	4.1	-13.1	-0.3	1.5	3.3	--	4.3	Feb-12
Bloomberg US High Yield TR				*-0.6*	*4.2*	*-11.2*	*0.0*	*2.3*	*4.0*	*7.3*	*4.8*	*Feb-12*
High Yield Bond MStar MF Median				*-0.5*	*4.1*	*-10.7*	*-0.1*	*1.9*	*3.5*	*6.4*	*4.3*	*Feb-12*
High Yield Bond MStar MF Rank				*51*	*48*	*95*	*56*	*77*	*68*	*--*	*51*	*Feb-12*
Columbia High Yield	11,286,819	1.4	28.9	-0.9	4.4	-10.2	0.0	2.4	--	--	3.4	Dec-16
Bloomberg US High Yield TR				*-0.6*	*4.2*	*-11.2*	*0.0*	*2.3*	*4.0*	*7.3*	*3.4*	*Dec-16*
High Yield Bond MStar MF Median				*-0.5*	*4.1*	*-10.7*	*-0.1*	*1.9*	*3.5*	*6.4*	*3.0*	*Dec-16*
High Yield Bond MStar MF Rank				*83*	*25*	*41*	*45*	*26*	*--*	*--*	*33*	*Dec-16*
PRIT General Allocation Value Added FI	16,408,650	2.1	42.0	0.0	2.9	-5.4	--	--	--	--	-5.4	Jan-22
PRIT Public Value-Added Fixed Income				*0.3*	*4.4*	*-7.6*	*-0.1*	*1.5*	*1.8*	*6.0*	*-7.6*	*Jan-22*
Bank Loan Assets	**7,929,902**	**1.0**	**1.0**	**0.4**	**3.2**	**-1.7**	**1.6**	**2.7**	**--**	**--**	**2.9**	**Aug-14**
Credit Suisse Leveraged Loans				*0.4*	*2.3*	*-1.1*	*2.3*	*3.2*	*3.8*	*4.7*	*3.4*	*Aug-14*
Beach Point Loan Fund	7,929,902	1.0	100.0	0.4	3.2	-1.7	1.6	2.7	--	--	2.9	Aug-14
Credit Suisse Leveraged Loans				*0.4*	*2.3*	*-1.1*	*2.3*	*3.2*	*3.8*	*4.7*	*3.4*	*Aug-14*
Bank Loan MStar MF Median				*0.2*	*2.6*	*-1.7*	*1.4*	*2.4*	*3.1*	*4.3*	*2.8*	*Aug-14*
Bank Loan MStar MF Rank				*38*	*10*	*51*	*39*	*27*	*--*	*--*	*38*	*Aug-14*

	Market Value ($)	% of Portfolio	% of Sector	1 Mo (%)	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	20 Yrs (%)	Inception (%)	Inception Date
Total Real Estate	**86,265,411**	**10.9**	**10.9**	**-1.7**	**-1.4**	**6.5**	**7.8**	**6.9**	**8.6**	**--**	**--**	**Jan-89**
NCREIF ODCE				*-5.0*	*-5.0*	*7.5*	*9.9*	*8.7*	*10.1*	*8.4*	*7.5*	*Jan-89*
UBS Trumbull Property Income Fund	11,154,123	1.4	12.9	-2.8	-2.8	3.7	6.0	5.9	7.1	7.3	7.3	Jan-89
NCREIF ODCE (net)				*-5.2*	*-5.2*	*6.5*	*9.0*	*7.7*	*9.1*	*7.4*	*6.5*	*Jan-89*
UBS Trumbull Property Fund	2,898,069	0.4	3.4	-5.3	-5.3	-3.1	2.2	1.9	5.1	5.9	6.4	Jan-89
NCREIF ODCE (net)				*-5.2*	*-5.2*	*6.5*	*9.0*	*7.7*	*9.1*	*7.4*	*6.5*	*Jan-89*
JPMCB Strategic Property Fund	11,397,237	1.4	13.2	-2.4	-5.0	6.0	8.8	--	--	--	7.8	Jan-19
NCREIF ODCE (net)				*-5.2*	*-5.2*	*6.5*	*9.0*	*7.7*	*9.1*	*7.4*	*7.8*	*Jan-19*
AEW Partners VII	522,722	0.1	0.6									
Rockwood X	6,562,090	0.8	7.6									
Torchlight Debt Opportunity Fund VI	3,632,861	0.5	4.2									
TerraCap Partners IV (Institutional), L.P.	4,457,357	0.6	5.2									
Rockwood Capital Real Estate Partners Fund XI, L.P.	6,311,130	0.8	7.3									
PRIT General Allocation Real Estate	39,329,823	5.0	45.6	-2.3	-0.8	8.7	--	--	--	--	8.7	Jan-22
PRIT Real Estate Benchmark				*-0.1*	*6.1*	*18.3*	*--*	*--*	*--*	*--*	*18.3*	*Jan-22*

	Market Value ($)	% of Portfolio	% of Sector	1 Mo (%)	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	20 Yrs (%)	Inception (%)	Inception Date
Private Equity Assets	**130,885,461**	**16.6**	**16.6**									
Adams Street Partners 2010	6,055,919	0.8	4.6									
Goldman Sachs Private Equity Partners 2005	462,364	0.1	0.4									
North American Strategic Partners 2006	65,081	0.0	0.0									
Brookfield Capital Partners IV	3,809,337	0.5	2.9									
PRIT Vintage Year 2001	65,906	0.0	0.1									
PRIT Vintage Year 2002	7,851	0.0	0.0									
Ridgemont Equity Partners II	5,377,446	0.7	4.1									
TA XII	3,090,921	0.4	2.4									
LLR Equity Partners V	6,400,494	0.8	4.9									
Wellspring Capital Partners VI	6,496,987	0.8	5.0									
Trilantic Capital Partners VI	5,616,788	0.7	4.3									
Brookfield Capital Partners V, L.P.	4,149,982	0.5	3.2									
FS Equity Partners VIII L.P.	6,015,191	0.8	4.6									
Ridgemont Equity Partners III	9,025,521	1.1	6.9									
Searchlight Capital III	3,879,708	0.5	3.0									
Charlesbank Technology Opportunities Fund	5,654,393	0.7	4.3									
LLR Equity Partners VI, L.P	2,606,108	0.3	2.0									
PRIT General Allocation Private Equity	62,105,465	7.9	47.5	0.1	-0.5	-4.7	--	--	--	--	-4.7	Jan-22
State Street PE Index (SSPEI) All PE Excluding PD				*-1.6*	*-1.6*	*-2.2*	--	--	--	--	*-2.2*	*Jan-22*

	Market Value ($)	% of Portfolio	% of Sector	1 Mo (%)	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	20 Yrs (%)	Inception (%)	Inception Date
Natural Resources Assets	**17,472,666**	**2.2**	**2.2**									
Hancock Timberland IX	3,549,954	0.4	20.3									
PRIT General Allocation Timberland	12,188,243	1.5	69.8	3.0	3.5	1.0	--	--	--	--	1.0	Jan-22
NCREIF Timberland				*4.9*	*4.9*	*12.9*	*7.5*	*5.4*	*5.8*	*7.0*	*12.9*	*Jan-22*
Oppenheimer Natural Resources	1,734,469	0.2	9.9									
Infrastructure Assets	**12,330,840**	**1.6**	**1.6**									
IFM Global Infrastructure (U.S.), L.P.	8,337,000	1.1	67.6	2.9	4.0	8.2	9.4	--	--	--	10.8	Oct-18
CPI+5%				*0.1*	*1.2*	*11.7*	*10.1*	*9.0*	*7.7*	*7.6*	*9.1*	*Oct-18*
Global Infrastructure Partners IV	3,993,840	0.5	32.4									
Opportunistic Assets	**35,897,961**	**4.5**	**4.5**									
HarbourVest Co-Investment Fund V, L.P.	4,538,578	0.6	12.6									
EnTrustPermal Special Opportunities Evergreen Fund, Ltd.	4,436,100	0.6	12.4									
PRIT General Allocation Hedge Funds	26,923,283	3.4	75.0	0.4	1.5	-1.9	--	--	--	--	-1.9	Jan-22
HFRI FOF Composite Index				*0.3*	*1.7*	*-5.7*	*3.6*	*2.9*	*3.5*	*3.5*	*-5.7*	*Jan-22*
Balanced Assets (PRIT General Allocation Fund)	**14,662,274**	**1.9**	**1.9**	**-1.7**	**4.1**	**-10.8**	**6.4**	**6.5**	**8.0**	**8.1**	**8.2**	**Apr-90**
60% Wilshire 5000 & 40% Barclays Aggregate				*-3.7*	*5.1*	*-16.4*	*3.7*	*5.7*	*7.9*	*7.5*	*8.3*	*Apr-90*
PRIT General Allocation	14,662,274	1.9	100.0	-1.7	4.1	-10.8	6.4	6.5	8.0	8.1	8.2	Apr-90
60% Wilshire 5000 & 40% Barclays Aggregate				*-3.7*	*5.1*	*-16.4*	*3.7*	*5.7*	*7.9*	*7.5*	*8.3*	*Apr-90*
Cash	**9,289,386**	**1.2**	**1.2**									
Cash Account	8,275,560	1.0	89.1									
91 Day T-Bills				*0.4*	*0.8*	*1.5*	*0.6*	*1.2*	*0.7*	*1.2*	*1.2*	*Jan-02*
PRIM Cash Account	1,013,827	0.1	10.9									

Cash Flow Summary

	Beginning Market Value	Contributions	Withdrawals	Net Investment Change	Ending Market Value	Month Return
Acadian Emerging Markets Small Cap	$8,884,244	$0	-$9,189	-$53,859	$8,821,196	-0.81%
Adams Street Partners 2010	$6,324,975	$0	-$96,300	-$172,756	$6,055,919	-2.73%
AEW Partners VII	$521,639	$0	$0	$1,083	$522,722	0.21%
Axiom International Small Cap Equity	$10,440,807	$0	-$6,883	-$109,530	$10,324,394	-1.11%
Beach Point Loan Fund	$7,899,563	$0	-$3,304	$33,643	$7,929,902	0.38%
Brookfield Capital Partners IV	$3,848,617	$0	-$8,856	-$30,424	$3,809,337	-0.79%
Brookfield Capital Partners V, L.P.	$4,141,770	$0	$0	$8,211	$4,149,982	0.20%
Brown Small Cap Fundamental Value	$17,273,049	$0	-$15,018	-$875,243	$16,382,788	-5.24%
Cash Account	$8,556,532	$0	-$280,972	$0	$8,275,560	0.00%
Charlesbank Technology Opportunities Fund	$5,163,940	$490,453	$0	$0	$5,654,393	0.00%
Columbia High Yield	$11,389,530	$0	-$3,856	-$98,855	$11,286,819	-0.90%
Driehaus Emerging Markets Growth	$36,078,800	$0	$0	-$1,434,243	$34,644,557	-3.98%
EnTrustPermal Special Opportunities Evergreen Fund, Ltd.	$4,946,470	$0	$0	-$510,370	$4,436,100	-10.32%
FS Equity Partners VIII L.P.	$5,656,260	$0	$0	$358,931	$6,015,191	6.35%
Global Infrastructure Partners IV	$3,565,686	$362,258	$0	$65,896	$3,993,840	1.84%
Goldman Sachs Private Equity Partners 2005	$481,149	$0	$0	-$18,785	$462,364	-3.90%
Hancock Timberland IX	$3,549,954	$0	$0	$0	$3,549,954	0.00%
HarbourVest Co-Investment Fund V, L.P.	$4,587,707	$0	$0	-$49,129	$4,538,578	-1.07%
IFM Global Infrastructure (U.S.), L.P.	$8,101,130	$0	$0	$235,870	$8,337,000	2.91%
JPMCB Strategic Property Fund	$11,680,151	$0	$0	-$282,914	$11,397,237	-2.42%
LLR Equity Partners V	$6,400,494	$0	$0	$0	$6,400,494	0.00%
LLR Equity Partners VI, L.P	$2,606,108	$0	$0	$0	$2,606,108	0.00%
Loomis Sayles High Yield Conservative	$11,412,962	$0	-$4,258	-$54,618	$11,354,086	-0.55%
North American Strategic Partners 2006	$65,081	$0	$0	$0	$65,081	0.00%

	Beginning Market Value	Contributions	Withdrawals	Net Investment Change	Ending Market Value	Month Return
Oppenheimer Natural Resources	$1,734,469	$0	$0	$0	$1,734,469	0.00%
PRIM Cash Account	$1,512,739	$3,487,260	-$4,000,000	$13,827	$1,013,827	0.92%
PRIT Core Fixed Income	$25,071,027	$0	-$2,269	-$313,819	$24,754,939	-1.26%
PRIT General Allocation	$15,169,723	$0	-$3,487,183	$2,979,734	$14,662,274	-1.65%
PRIT General Allocation Core FI	$52,197,300	$0	$0	-$1,043,062	$51,154,238	-1.25%
PRIT General Allocation Domestic Equity	$83,807,117	$0	$0	-$5,001,940	$78,805,177	-5.73%
PRIT General Allocation EME	$17,262,099	$0	$0	-$416,856	$16,845,243	-1.53%
PRIT General Allocation Hedge Funds	$27,126,156	$0	$0	-$202,873	$26,923,283	0.42%
PRIT General Allocation Int. Equity	$47,302,635	$0	$0	-$1,896,882	$45,405,753	0.17%
PRIT General Allocation Private Equity	$61,911,901	$0	$0	$193,564	$62,105,465	0.07%
PRIT General Allocation Real Estate	$40,427,687	$0	$0	-$1,097,864	$39,329,823	-2.25%
PRIT General Allocation Timberland	$11,919,068	$0	$0	$269,175	$12,188,243	2.96%
PRIT General Allocation Value Added FI	$16,514,822	$0	$0	-$106,173	$16,408,650	0.01%
PRIT Vintage Year 2001	$65,168	$2	$0	$735	$65,906	1.13%
PRIT Vintage Year 2002	$7,906	$0	-$80	$25	$7,851	0.31%
Rhumbline QSI Index	$30,960,757	$0	-$1,715	-$1,561,255	$29,397,787	-5.05%
RhumbLine Russell 1000 Growth Index	$21,867,791	$0	-$1,136	-$1,668,182	$20,198,472	-7.63%
RhumbLine Russell 1000 Value Index	$27,395,887	$0	-$1,479	-$1,098,233	$26,296,175	-4.01%
Ridgemont Equity Partners II	$5,457,847	$0	-$80,401	$0	$5,377,446	0.00%
Ridgemont Equity Partners III	$8,479,932	$0	-$80,920	$626,509	$9,025,521	7.39%
Rockwood Capital Real Estate Partners Fund XI, L.P.	$5,139,627	$1,099,778	$0	$71,725	$6,311,130	1.39%
Rockwood X	$6,727,457	$0	-$127,541	-$37,827	$6,562,090	-0.56%
Searchlight Capital III	$3,927,941	$0	$0	-$48,233	$3,879,708	-1.23%
SSgA MSCI EAFE Index	$37,385,910	$0	-$3,117	$26,897	$37,409,690	0.06%
SSgA TIPS Index	$15,737,779	$0	-$777	-$187,418	$15,549,584	-1.20%

	Beginning Market Value	Contributions	Withdrawals	Net Investment Change	Ending Market Value	Month Return
SSgA U.S. Aggregate Bond Index-NL	$20,367,696	$0	-$1,012	-$127,273	$20,239,411	-0.63%
TA XII	$3,124,281	$0	$0	-$33,360	$3,090,921	-1.07%
TerraCap Partners IV (Institutional), L.P.	$4,327,530	$0	$0	$129,827	$4,457,357	3.00%
Torchlight Debt Opportunity Fund VI	$3,573,733	$0	$0	$59,128	$3,632,861	1.65%
Trilantic Capital Partners VI	$5,390,908	$0	$0	$225,880	$5,616,788	4.19%
UBS Trumbull Property Fund	$3,152,569	$0	-$87,900	-$166,601	$2,898,069	-5.29%
UBS Trumbull Property Income Fund	$11,481,039	$0	$0	-$326,916	$11,154,123	-2.85%
Wellspring Capital Partners VI	$6,292,523	$0	$0	$204,464	$6,496,987	3.25%
Total	**$806,397,641**	**$5,439,752**	**-$8,304,166**	**-$13,520,367**	**$790,012,861**	--

Private Market Managers' Performance Overview[1]

Managers	Strategy	Vintage Year	Commitment Amount ($mm)	% called	Median Peer IRR	Quartile Rank	Net IRR	Net Multiple
Real Estate Managers								
AEW Partners VII	Opportunistic	2014	5.0	93%	20.0	4	10.6%	NA
Rockwood X	Value-Added	2016	10.0	94%	15.1	3	10.4%	1.4x
Torchlight Debt Opportunity Fund VI	Opportunistic	2019	5.0	100%	21.9	4	8.7%	1.2x
TerraCap Partners IV	Value-Added	2019	5.0	100%	19.5	3	12.5%	NA
Rockwood XI	Value-Added	2019	8.0	51%	19.5	2	23.3%	1.3x
Private Equity Managers								
Adams Street Partners	Fund of Funds	2010	10.0	89%	9.8	NA	15.2%	2.3x
Goldman Sachs PE Partners	Fund of Funds	2005	10.0	100%	8.0	NA	NA	NA
North American Strategic Partners	Fund of Funds	2006	9.1	88%	NA	NA	NA	NA
PRIT Vintage Year 2001	Fund of Funds	2001	2.5	NA	9.0	NA	NA	NA
PRIT Vintage Year 2002	Fund of Funds	2002	0.5	NA	8.8	NA	NA	NA
Brookfield Capital Partners IV	Buyout	2015	4.0	87%	22.0	1	47.4%	2.8x
LLR Equity Partners V	Buyout	2017	5.0	92%	22.0	2	22.0%	1.7x
Ridgemont Equity Partners II	Buyout	2015	6.0	92%	22.0	3	18.6%	2.6x

[1] As of 6/30/2022.
[2] NM indicates that a fund is early in its investment period; therefore, the return is not yet meaningful. NA indicates that the relevant data is not available at the time of report generation.

Private Market Managers' Performance Overview (continued)[1]

Managers	Strategy	Vintage Year	Commitment Amount ($mm)	% called	Median Peer IRR	Quartile Rank	Net IRR	Net Multiple
TA XII	Growth Equity	2016	4.0	100%	23.5	1	40.0%	2.9x
Wellspring VI	Buyout	2017	5.0	88%	22.0	2	26.1%	1.5x
Trilantic Capital Partners VI	Buyout	2018	5.0	74%	23.2	3	19.6%	1.4x
Brookfield Capital Partners V	Buyout	2019	4.0	77%	22.7	3	17.6%	1.3x
FS Equity Partners VIII	Buyout	2019	5.0	62%	22.7	2	33.6%	1.5x
Ridgemont Equity Partners III	Buyout	2019	6.0	67%	22.7	1	56.1%	1.8x
Searchlight Capital III	Special Situations	2020	5.0	56%	16.9	1	51.8%	1.7x
Charlesbank Technology Opportunities	Buyout	2019	5.0	38%	NM	NM	NM	NM
LLR Equity Partners VI	Buyout	2020	4.0	54%	NM	NM	NM	NM
Opportunistic Managers								
HarbourVest Co-Investment Fund IV	Opportunistic	2019	4.0	78%	NA	NA	30.3%	1.7x
EnTrustPermal Spec. Opps. Evergreen Fund	Opportunistic	2020	6.0	55%	NM	NM	NM	NM
Infrastructure Managers								
Global Infrastructure Partners IV	Value-Added	2019	5.0	48%	--	--	--	--
Natural Resources Managers								
Hancock Timberland	Timber	2008	8.0	100%	--	--	-0.3%	1.0x
Oppenheimer Natural Resources	Natural Resources	2010	7.0	100%	--	--	-4.3%	0.7x

[1] As of 6/30/2022.
[2] NM indicates that a fund is early in its investment period; therefore, the return is not yet meaningful. NA indicates that the relevant data is not available at the time of report generation.

Current Issues

Emerging Markets Small Cap Equity
RFP Respondents Review

Background

→ The Quincy Retirement System currently has a 12% target allocation to Emerging Markets Equities.

- As of December 31, 2022, Emerging Markets equity constituted roughly 8% of total assets, with Emerging Markets Small Cap equities equating to a little over 1% of total assets.
- Acadian has managed the Emerging Markets Small Cap portfolio, on behalf of the system, since June of 2014. Since inception, the portfolio has generated an annual return of 5.8%, outperforming the benchmark by approximately 3.0%, per year.

→ Consistent with the requirements of Chapter 176, which require that an RFP be issued every 7 years, Meketa recently conducted a search on the System's behalf in 2021.

- Subsequently, the Board was prohibited from hiring new managers, so despite choosing to liquidate Acadian and invest the proceeds in Cedar Street, they remained invested in Acadian.
- Given that over a year had passed since this decision was made, the Board decided it would be prudent to reissue the search and reevaluate the universe of respondents.
- On November 23, 2022, Meketa Investment Group issued the search for emerging market small cap managers. All responses were due back on December 16, 2022.
- 16 firms responded to the search. We subsequently evaluated each respondent and summarized our assessment on the following pages.

RFP Respondents (2023 Search)

Manager	Headquarters	Strategy	Overall Rating
Acadian Asset Management	Boston, MA	Emerging Markets Small-Cap Equity	Highly Advantageous
Cedar Street Asset Management	Chicago, IL	Cedar Street Emerging Markets Small Cap Value	Highly Advantageous
LSV Asset Management	Chicago, IL	Emerging Small Cap Value	Highly Advantageous
Acuitas Investments	Seattle, WA	Acuitas Emerging Markets Small Cap	Advantageous
EAM Global Investors	Solana Beach, CA	EAM Emerging Markets Small Cap	Advantageous
J O Hambro Capital Management	London, UK	JOHCM Emerging Markets Small and Mid Cap	Advantageous
Kayne Anderson Rudnick	Los Angeles, CA	Emerging Markets Small Cap	Advantageous
Matthews Asia	San Francisco, CA	Emerging Markets Small Companies Strategy	Advantageous
Numeric Investors	Boston, MA	Emerging Markets Small Cap	Advantageous
Seven Canyons Advisors	Salt Lake City, UT	Ark Global Emerging Companies	Advantageous
State Street Global Advisors	Boston, MA	Emerging Markets Small Cap Equity	Advantageous
Vaughan Nelson	Houston, TX	Emerging Market Opportunities Fund	Advantageous
Victory Capital Management	Boston, MA	Trivalent Emerging Markets Small Cap Equity	Advantageous
Wasatch Global Investors	Salt Lake City, UT	Emerging Markets Small Cap	Advantageous
Westwood Global Investments	Boston, MA	WGI Emerging Markets Smaller Companies Fund	Advantageous
Fisher Investments	Camas, WA	Emerging Markets Equity Small Cap ESG	Not Advantageous

Acadian Asset Management

Rating Criteria	Rating	Rationale
Overall	Highly Advantageous	
Organization	Advantageous	• Acadian Asset Management is based in Boston and is a wholly-owned subsidiary of BrightSphere Investment Group (NYSE: BSIG), a publicly-traded company that was formerly known as Old Mutual Asset Management (NYSE: OMAM). • Acadian manages approximately $83 billion* in assets across 50+ predominantly quantitative equity strategies. The Emerging Markets Small-Cap Equity strategy was incepted in April 2011 and has $3.2* billion in assets.
Team	Highly Advantageous	• Acadian has a deep, global, long-only equity research team led by CIO Brendan Bradley. Mr. Bradley, who has 24+ years of industry experience, is supported by 14 portfolio managers and a bench of over 50 research analysts. This team also supports the entirety of the firm's global equity strategies.
Investment Philosophy	Advantageous	• Acadian utilizes multi-factor quantitative models, which they believe help remove human biases and exploit market inefficiencies.
Investment Process	Advantageous	• The investment process starts with a quantitative evaluation of the global investable market of approximately 43,500 traded securities, including 15,500 emerging markets small cap stocks. Acadian utilizes models to develop bottom-up stock level return forecasts and top-down country/industry peer group forecasts. • Bottom-up stock models evaluate companies against their region/industry peer group on valuation, growth, quality, and technical strength. Top-down forecasts are created for industries at the country level using a similar combination of value, growth, and technical factors (note that quality is excluded), but these forecasts also include risk and macro factors. • The investment team seeks to build a portfolio of stocks with high expected return forecasts, subject to strict limitations on idiosyncratic, stock-specific risk derived from the firm's optimization tools. The portfolio typically holds 500-1,600 securities. Turnover ranges from 40-80% per annum.
Performance	Highly Advantageous	• Since inception in 2011, Acadian has generated gross excess returns of 7.37% with a tracking error of 4.61%, resulting in an information ratio of 1.60 through Dec. 2022.
Fees	Not Advantageous	• Commingled Fund: estimated effective fee of 1.41%. Ranks above the median of respondents.

*Figures as of 9/30/22

Cedar Street Asset Management

Rating Criteria	Rating	Rationale
Overall	Highly Advantageous	
Organization	Highly Advantageous	• Cedar Street is an independent investment management firm based in Chicago, Illinois. The firm was founded in April 2016 by CIO Jonathan Brodsky and is 100% employee-owned by six current employees. • Prior to founding the firm, Mr. Brodsky had worked at Advisory Research, where he served as a portfolio manager on the International Small Cap Value product since its inception. • The firm manages $300 million* in assets across three international equity strategies, with approximately $52.7 million* in the EM Small Cap Value product.
Team	Highly Advantageous	• The investment team is led by portfolio manager and founder Jonathan Brodsky. Mr. Brodsky has 21+ years of investment experience and is responsible for all global and non-U.S. small cap strategies at the firm. • Mr. Brodsky is supported by one co-PM, Waldemar Mozes, three dedicated research analysts, and one trader.
Investment Philosophy	Advantageous	• Cedar Street employs a conservative, long-term, bottom-up approach to value investing that includes elements from the classic Graham & Dodd investment style (deep value). The strategy focuses on capital preservation and requires each stock to have an identifiable catalyst in the near- to medium-term to unlock the stock's perceived value.
Investment Process	Highly Advantageous	• Cedar Street begins with a series of screens on the investable universe with a focus on value factors, such as price/tangible book value, as well as quality factors, such as ROE and low debt levels, for example. • Once ideas are identified, the team focuses on what Cedar Street terms "financial analysis." Here the team seeks to estimate the maximum potential downside for a given company, largely by focusing on financial statement analysis and stress tests. • Next, Cedar Street conducts "business analysis", whereby they seek to estimate the potential upside of a particular company using a combination of management interviews, site visits, and competitive analysis. At this stage, Cedar Street looks for management teams with a commitment to shareholders, a strong operating history, and a consistent track record of prudent capital allocation decisions. The portfolio holds between 45-65 stocks and given their long-term approach, employs low portfolio turnover.
Performance	Not Advantageous	• Since inception in 2013, Cedar Street has generated gross excess returns of 1.39% with a tracking error of 5.33%, resulting in an information ratio of 0.26 through Dec. 2022.
Fees	Highly Advantageous	• Commingled Fund: estimated effective fee of 0.85%. Ranks below the median of respondents.

*Figures as of 9/30/22

LSV Asset Management

Rating Criteria	Rating	Rationale
Overall	Highly Advantageous	
Organization	Advantageous	• LSV Asset Management is a quantitative manager based in Chicago, Illinois. Founded in 1994, the firm is partially employee-owned (61%), with the remaining ownership belonging to SEI Funds, Inc. (39%), a wholly-owned subsidiary of SEI Investments. Josef Lakonishok is the CEO, CIO and one of the founding partners. He owns 25% of the firm. • LSV manages $82.4 billion* in AUM across twenty equity strategies. $758 million* resides in the Emerging Small Cap Value product, which was incepted in 2005.
Team	Advantageous	• Key personnel are Josef Lakonishok, Menno Vermeulen, Puneet Mansharamani, Guy Lakonishok and Greg Sleight. Together, these five are responsible for day-to-day portfolio management and are involved in ongoing research pertaining to the LSV model. • LSV implements the same management team and model across all of its strategies. In addition to its five PMs, the investment team has several quantitative research analysts and three academic advisors at its disposal.
Investment Philosophy	Advantageous	• LSV believes that superior long-term results can be achieved by systematically exploiting the judgmental biases and behavioral weaknesses that influence many investors' decisions (e.g., the tendency to extrapolate the past too far into the future, mistaking a good company for a good investment, ignoring statistical evidence, and creating a "mindset" about a company).
Investment Process	Highly Advantageous	• The portfolio decision-making process is quantitative and entirely driven by bottom-up stock selection. LSV's process involves two main components: a proprietary model that ranks securities based on fundamental measures of value and indicators of recent recovery and a risk control process that controls for residual benchmark risk while maximizing the expected return of the portfolio. • A universe of approximately 16,400 equity securities is screened for market capitalization between $100 million and $5 billion and for liquidity that yields an investable universe of approximately 3,800 securities. These securities are ranked by LSV's quantitative model driven by a security's fundamental measures of value, past performance and indicators of near-term potential. • The top 15% of stocks in each country are ranked by expected return (approximately 500 securities) and then optimized for risk control. This produces a buy list of approximately 175-225 securities. Holdings historically range from 300-400 names and turnover rate is low, with a typical investment horizon of 3-5 years.
Performance	Highly Advantageous	• Since inception in 2005, LSV has generated gross excess returns of 4.00% with a tracking error of 3.83%, resulting in an information ratio of 1.04 through Dec. 2022.
Fees	Not Advantageous	• Mutual Fund: estimated effective fee of 1.50%. Ranks above the median of respondents.

*Figures as of 9/30/22

Acuitas Investments

Rating Criteria	Rating	Rationale
Overall	Advantageous	
Organization	Advantageous	• Acuitas Investments was founded in 2011 by Chris Tessin and Dennis Jensen as a global small cap equity investment firm focused on selecting and investing in small cap managers. The founding partners worked together for many years at Russell Investments, where Mr. Tessin was the Portfolio Manager on all Micro & Small Cap portfolios and Mr. Jensen served as a tenured leader within the manager research group. The firm is based in Seattle, Washington and is 100% privately owned, with the majority stake held by Mr. Tessin. • Acuitas offers multi-manager strategies across domestic, international, and emerging market small cap equities. The firm manages $769 million* across four investment products, with $3.29* million in the Emerging Markets Small Cap strategy.
Team	Advantageous	• The Acuitas Emerging Markets Small Cap Portfolio is managed by two PMs: Chris Tessin and Doug Porter. Each manager has over 21 years of investment experience. Additionally, three research analysts support the strategy.
Investment Philosophy	Advantageous	• Acuitas aims to build manager-of-manager portfolios of complementary managers, leaning on its research efforts to identify return opportunities before they are on the institutional radar.
Investment Process	Advantageous	• Acuitas seeks to discover talented managers with experience investing in small or microcap securities in emerging markets. To this end, the investment team performs deep and thorough manager research on fund managers, conducting due diligence to understand the repeatability and durability of a manager's process. • While each underlying investment strategy carries a significant amount of active risk (high tracking error), total portfolio risk is controlled by using multiple managers who execute their strategies in various countries/regions and may employ different investment approaches. • Acuitas' Emerging Markets Small Cap currently utilizes four underlying managers. The portfolio typically holds anywhere from four to six underlying managers, with 200-300 portfolio companies in combination. Manager turnover is usually 75% over a market cycle.
Performance	Highly Advantageous	• Since inception in 2015, Acuitas has generated gross excess returns of 3.61% with a tracking error of 6.51%, resulting in an information ratio of 0.56 through Dec. 2022.
Fees	Not Advantageous	• Commingled "Fund of funds": Fee schedule entails a double layer of fees, with underlying managers' fees charged in addition to a 0.1% Acuitas "Founders' Fee".

*Figures as of 9/30/22

EAM Global Investors

Rating Criteria	Rating	Rationale
Overall	Advantageous	
Organization	Advantageous	• Solana Beach, California-based EAM Investors was established in 2007 and is the parent company to EAM Global Investors; the former houses the firm's US equity products and the latter is set up as a joint venture to house EAM's non-US equity strategies. Both entities are not publicly traded and are partially employee owned. • The firm manages $2.3 billion* in assets across seven equity strategies. The Emerging Markets Small Cap strategy was incepted in 2012 and has $335 million* in assets.
Team	Advantageous	• EAM's 10-person investment team has been led by co-PMs Josh Moss and John Scripp since the strategy's inception. Mr. Moss has over 23 years of investment experience, while Mr. Scripp is nearing two decades in the industry. The team is supported by eight dedicated research analysts functioning as generalists.
Investment Philosophy	Not Advantageous	• EAM believes that momentum is a reliable source of alpha generation and focuses on companies with accelerating/improving growth rates and favorable changes in investor expectations. EAM seeks to invest in these companies at the inflection point of change, relying on opportune timing to enter these positions before the broader market. All stocks held in the portfolio must possess a perceived catalyst for company growth acceleration and, as such, are currently mispriced by the market.
Investment Process	Not Advantageous	• The investment process begins by screening the larger EM small cap universe using momentum signals to identify companies undergoing change, isolating potentially attractive investments to a handful of candidates. • From there, the team hones in on the drivers of change and the opportunity for alpha. The process is entirely bottom-up and relies heavily on technical analysis, specifically relative price strength, a momentum investing technique. The strategy should be expected to do well in a trending market but is likely to struggle when there is no clear trend. EAM's due diligence is modest, and they do not consider how management allocates capital. • The portfolio typically holds 100-150 stocks, with a maximum position size limit of 2% to minimize single-stock risk. Portfolio turnover is high and is usually between 200-250% per annum.
Performance	Not Advantageous	• Since inception in 2012, EAM has generated gross excess returns of 3.69% with a tracking error of 8.81%, resulting in an information ratio of 0.42 through Dec. 2022.
Fees	Highly Advantageous	• Commingled Fund: estimated effective fee of 0.75%. Ranks below the median of respondents.

*Figures as of 9/30/22

J O Hambro Capital Management

Rating Criteria	Rating	Rationale
Overall	Advantageous	
Organization	Advantageous	• J.O. Hambro Capital Management ("JOHCM") was founded in 1993 by James Hambro and Christopher Mills. The firm is based in London, England and is a subsidiary of Pendal Group Limited, a publicly listed Australian investment management firm. • JOHCM manages $26.62 billion* across thirteen global, international, and emerging markets equity strategies and one multi-asset product. The Emerging Markets Small Cap Mid Cap strategy was launched in 2014 and has $240 million* in assets.
Team	Advantageous	• The strategy has been managed by Emery Brewer, Ivo Kovachev, and Stephen Lew since inception. The managers have 32, 28, 23 years of industry experience respectively. • Mr. Brewer and Mr. Kovachev joined JOHCM from Driehaus in March 2010 to launch JOHCM's Emerging Markets strategy. Mr. Lew joined in September 2013. They are supported by two dedicated analysts.
Investment Philosophy	Advantageous	• JOHCM seeks to exploit the growth versus value inefficiency found in stocks, as well as earnings/revenue forecasts versus expectations. They are looking for companies that have the potential to beat expectations over multiple reporting periods.
Investment Process	Advantageous	• The investment process begins with a review of the market to identify companies delivering strong earnings growth, positive earnings revisions and rising returns on equity. The team also uses fundamental and technical screening tools to generate ideas via reports on a daily, weekly and monthly basis. • From there, the team evaluates the earnings growth quality and sustainability of the business and the competitive landscape of attractive investment candidates. The team favors companies that are demonstrating strong operational performance such as revenue and earnings growth, margin expansion, and rising earnings and revenues estimates. • The result is a 90-120 stock portfolio. Annual turnover of the JOHCM Emerging Markets Small Mid Cap strategy is around 100% - 150%.
Performance	Highly Advantageous	• Since inception in 2014, JOHCM has generated gross excess returns of 5.37% with a tracking error of 4.76%, resulting in an information ratio of 1.13 through Dec. 2022.
Fees	Not Advantageous	• Mutual Fund or Commingled Fund: estimated effective fees of 1.49% and 1.25% respectively. Ranks above the median of respondents.

*Figures as of 9/30/22

Kayne Anderson Rudnick Investment Management

Rating Criteria	Rating	Rationale
Overall	Advantageous	
Organization	Advantageous	• Kayne Anderson Rudnick Investment Management ("KAR") was founded in 1984 by Richard Kayne and John Anderson. The firm is headquartered in Los Angeles, California and is a wholly owned subsidiary of Virtus Partners, Inc., which is wholly owned by Virtus Investment Partners, Inc. ("Virtus") (NASDAQ: VRTS). • KAR has offices across the US (including Boston, MA) and manages $45.2 billion in assets* in 20+ equity strategies. The Emerging Markets Small Cap strategy was incepted in 2014 and has $578 million* in assets.
Team	Advantageous	• The KAR Emerging Markets Small Cap strategy is managed by Hyung Kim and Craig Thrasher. Mr. Kim is the lead portfolio manager and joined KAR in 2017. Mr. Thrasher has been working with the strategy since its inception and has been with the firm since 2008. Both Messrs. Kim and Thrasher have 18+ years of equity research experience. • The PMs are supported by three dedicated research analysts. KAR's CIO Douglas Foreman lends oversight to the portfolio as well.
Investment Philosophy	Advantageous	• KAR believes that an emphasis on high-quality businesses, anchored by first-hand fundamental research, will achieve attractive risk-adjusted returns for its clients over a complete market cycle.
Investment Process	Advantageous	• KAR believes in high conviction investing. As fundamental, bottom-up investors, KAR focuses on identifying and buying "best-in-breed" companies at a reasonable price regardless of either market environment or in-favor themes. This universe tends to be fairly static over time, so analysts are able to perform very in-depth analysis on these companies, should their stock screen well. • In addition to its quant screens and industry research, the investment team performs very thorough due diligence, conducting on-site visits with the goal of developing an information advantage. The portfolio managers work side-by-side with the analysts on all investment ideas. • All of KAR's small cap strategies hold about 30-60 stocks. Despite their high concentration, the strategies' quality bias has historically kept both beta and standard deviation below the level of the index for all strategies. This bias has helped the strategies protect well in down markets, but, not surprisingly, has led to underperformance when quality is out-of-favor. Turnover is low, and usually sits around 25-30%.
Performance	Advantageous	• Since inception in 2014, KAR has generated gross excess returns of 2.89% with a tracking error of 8.68%, resulting in an information ratio of 0.33 through Dec. 2022.
Fees	Highly Advantageous	• Commingled Fund (CIT): estimated effective fee of 0.95%. Ranks below the median of respondents.

*Figures as of 9/30/22

Matthews Asia

Rating Criteria	Rating	Rationale
Overall	Advantageous	
Organization	Advantageous	• Matthews Asia was founded in 1991 and is a privately-held investment manager headquartered in San Francisco, CA. The firm is partially employee-owned and is an Asia- and emerging markets-specialist with $14.1 billion in AUM across nearly twenty credit and equity strategies as of 9/30/2022. • The Matthews Emerging Markets Small Companies Strategy was incepted in 2008 and holds 345.4 million in AUM as of 9/30/2022; however, prior to April 30, 2021, the Fund was managed as the Asia Small Companies Fund.
Team	Advantageous	• Vivek Tanneeru is the Lead Manager of the strategy and is responsible for day-to-day investment decisions. Jeremy Sutch is the Co-Manager and performs a supporting and consulting role. Both Mr. Tanneeru and Mr. Sutch have 24+ years of industry experience. The managers are supported by Knowledge Platforms, or groups of research analysts organized around key domain specializations. The team also has members conducting extensive research on the ground in Asia.
Investment Philosophy	Advantageous	• With Asia representing over 75% of the MSCI EM Small Cap Index and Asian demand becoming an important component for many companies outside the region, Matthews believes that Asia will lead global emerging markets in terms of growth, innovation, market size and liquidity.
Investment Process	Advantageous	• The strategy is benchmark-agnostic and can best be described as GARP. The core of the approach, and the main driver of alpha, is its fundamental, bottom-up stock selection. The process begins with the universe of companies in emerging and frontier markets. This is narrowed down to nearly 11,000 companies with a market cap between $100 million and $5 billion and average daily trading volume of $500,000. • Within this universe, Matthews employs a variety of financial metrics to examine a company's scalability and sustainability, focusing on identifying quality businesses that are inefficiently priced. The process is supplemented by quant screens and research trips to Asia, whereby the team conducts in-depth due diligence on candidates for investment. • The portfolio typically holds 40-80 names. Average portfolio name turnover from 2017-2021 was about 50%.
Performance	Not Advantageous	• Performance has been strong for the Asia Small Companies Fund over the three-, five- and ten-year trailing periods; however, the track record for the EM strategy is too short to draw any definitive conclusions.
Fees	Not Advantageous	• Mutual Fund: estimated effective fee of 1.15%. Ranks above the median of respondents.

*Figures as of 9/30/22

Numeric Investors

Rating Criteria	Rating	Rationale
Overall	Advantageous	
Organization	Advantageous	• Numeric Investors ("Man Numeric") is a global, quantitative investment manager based in Boston, Massachusetts. Man Numeric was first partially acquired by London Stock Exchange-listed Man Group (LON:EMG) in 2014 and became a wholly-owned subsidiary in 2019. • The firm manages $29.1 billion* in assets across a range of 30+ equity, fixed income, multi-asset, and real estate strategies. The Emerging Markets Small Cap strategy was incepted in 2014 and has $241 million* in assets.
Team	Advantageous	• The strategy is team-managed by Ori Ben-Akiva, Director of Portfolio Management, Mikael Nouvellon, Senior Portfolio Manager, Ziang Fang, Portfolio Manager, and the rest of the Equities portfolio management team. Mr. Ben-Akiva joined the firm in 1998 and spearheaded the launch of Man Numeric's international and emerging markets strategies, including the EM Small Cap strategy. • The investment team is small and consists of the management team, two portfolio analysts and one researcher. Oversight responsibilities also fall to Dan Taylor, Man Numeric's CIO.
Investment Philosophy	Advantageous	• Man Numeric believes that markets are generally efficient and real economic performance drives returns; however, markets may contain pockets of inefficiency, with stock prices not always reflecting updates to securities' underlying information set and return drivers. Man believes that a disciplined, quantitative security selection process can systematically harvest potential alpha opportunities.
Investment Process	Advantageous	• The investment process is primarily bottom-up and begins with an investable universe of 4,200 stocks that meet capitalization, liquidity, and analyst coverage criteria across the 26 emerging market countries that make up the benchmark, the MSCI EM Small Cap Index. • Man Numeric strategies employ systematic security selection models underpinned by bottom-up, fundamentally based signals. Stock selection is based on the output of the models and validated by the Portfolio Managers' fundamental knowledge of the investable universe. Stocks are selected from the universe using five primary selection models: Valuation, Momentum, Quality, Informed Investor and Factor Selection. • The goal of the models is to aid in forecasting a company's momentum, the direction and magnitude of its earnings, and investor sentiment. The result of the process is a portfolio of 300-600 securities. Turnover is high and expected to average 150-200% one-way per annum.
Performance	Highly Advantageous	• Since inception in 2014, Man Numeric has generated gross excess returns of 6.14% with a tracking error of 4.92%, resulting in an information ratio of 1.25 through Dec. 2022.
Fees	Advantageous	• Commingled (BVI-domiciled) Fund: estimated effective fee of 1.10%. Ranks at the median of respondents.

*Figures as of 9/30/22

Seven Canyons Advisors

Rating Criteria	Rating	Rationale
Overall	Advantageous	
Organization	Advantageous	• Seven Canyons Advisors was founded in 2017 by four managing partners: Josh Stewart, Sam Stewart, Spencer Stewart, and Eric Moessing. The firm is 100% employee-owned, with ownership shared amongst the four partners. The firm is based in Salt Lake City, Utah. • Seven Canyons Advisors manages a total of $199.1 million* in firm-wide assets across its three strategies. About $58 million* sits in its emerging markets small cap strategy, Ark Global Emerging Companies ("AEC"), which was incepted in early 2018. The firm's clientele is 50% institutional and 50% retail in terms of AUM.
Team	Advantageous	• The AEC team comprises four portfolio managers and two research analysts. The lead portfolio manager on the strategy is Spencer Stewart, who has been managing the strategy since its inception. Prior to Seven Canyons, Mr. Stewart was the portfolio manager of the World Innovators Fund at Wasatch Advisors.
Investment Philosophy	Advantageous	• The investment team seeks to invest in high-quality growth companies. The team believes earnings growth drives stock performance over time, and that there are short term inefficiencies in the market that create attractive entry points.
Investment Process	Advantageous	• The investment process begins with a front-end screen of the emerging markets small cap equity stock universe by sector and geography. They seek to identify and score companies based on financial metrics and trends. Specifically, they are looking for companies which are growing sales at a double-digit rate, showing margin and ROA improvement, and demonstrating a strong balance sheet. • After reviewing the screen, the team assesses the sustainability of growth (barriers to entry, business plan, secular backdrop, reinvestment into the business), the quality of the business (management team, balance sheet, ESG), and the attractiveness of valuation based on future earnings expectations. • The result of the process is a benchmark-agnostic portfolio of 50-70 stocks. Portfolio turnover is typically between 70% and 120%.
Performance	Advantageous	• Seven Canyons Advisor's track record is too short to draw any definitive conclusions. Since inception in 2018, the strategy has strongly outperformed over most trailing periods, gross of fees.
Fees	Not Advantageous	• Commingled Fund: 1.5% management fee with a 5% performance fee on returns above a certain "high water mark". Ranks above the median of respondents.

*Figures as of 9/30/22

State Street Global Advisors

Rating Criteria	Rating	Rationale
Overall	Advantageous	
Organization	Advantageous	• State Street Global Advisors (SSGA) is headquartered in Boston, MA and serves as the asset management arm of State Street Corp. (NYSE: STT). SSGA is one of the world's largest managers in terms of AUM. • The firm manages $3.26 trillion* in assets across a multitude of equity, fixed income and multi-asset strategies. The Emerging Markets Small Cap Equity strategy has $2.02 billion* in assets.
Team	Advantageous	• State Street's Active Quantitative Equity Group is responsible for managing the EM Small Cap strategy. Christopher Laine serves as the strategy's lead PM, with backup responsibilities falling to Jay Siegrist. Both Messrs. Laine and Siegrist have been in the industry for nearly 30 years. • The Active Quant Equity (AQE) team was established in 1984 and is comprised of 38 investment professionals with an average of 15 years' experience. Alejandro Gaba, based in the Boston, is the director of the group and oversees all research efforts. The group's CIO, Olivia Engel, has ultimate responsibility for any buy or sell decisions.
Investment Philosophy	Advantageous	• AQE's philosophy is predicated on the belief that markets, especially in the EM small cap space, are inefficient. It believes that market participants often exhibit behavioral biases, and a systematic, research-driven quantitative approach can exploit market inefficiencies.
Investment Process	Advantageous	• Quantitative research serves as the cornerstone of the team's investment process. The goal of the team's research is to identify the most attractive stocks within each industry. To do this, AQE relies on a stock-selection model with a diverse range of quantitative factors that seeks companies with high quality, growth potential, attractive valuations, strong cash flows and positive sentiment. The model employs four independent and mostly uncorrelated core drivers (Value, Quality, Sentiment and Catalyst) to forecast ex-ante expected returns for the nearly 3,000 securities within the EM small cap universe. • The next step is portfolio construction, which attempts to maximize exposure to highly ranked stocks generated in the stock selection step, while adhering to risk parameters to ensure a core portfolio exposure relative to the benchmark. The optimizer creates a list of stocks that should be traded, either bought or sold, to create the optimal portfolio. • The result is a portfolio of 400-500 stocks with normal turnover of 80% one-way per year.
Performance	Highly Advantageous	• Since inception in 2007, SSGA has generated gross excess returns of 3.27% with a tracking error of 3.64%, resulting in an information ratio of 0.90 through Dec. 2022.
Fees	Highly Advantageous	• Commingled Fund: estimated effective fee of 1.05%. Ranks below the median of respondents.

*Figures as of 9/30/22

Vaughan Nelson Investment Management

Rating Criteria	Rating	Rationale
Overall	Advantageous	
Organization	Advantageous	• Vaughan Nelson was established in 1970 and is headquartered in Houston, Texas. It is wholly owned by Boston-based Natixis Investment Managers but operates autonomously from its affiliates. • The firm manages roughly $12.7 billion* in assets across eight fixed-income and equity products, with $28 million* in the Emerging Markets Opportunities Fund, which is a SMID cap strategy.
Team	Advantageous	• Marco Priani and Kevin Ross are the lead Portfolio Managers and have headed up the EM Opportunities Fund since its inception in 2013. Both Mr. Priani and Mr. Ross have about two decades of industry experience. The team has two research associates supporting the strategy. Both researchers act as generalists in the process.
Investment Philosophy	Advantageous	• CIO Chris Wallis's research led him to seek out three types of investments: Undervalued Earnings Growth, Undervalued Asset and Undervalued Dividend Yield. It is the team's ongoing belief that the market discounts these companies at different times in the market cycle, and by adjusting holdings between these three types over the cycle, the strategy can earn a return based on its 50% targeted return over a 3-year holding period. This philosophy leads to high active share (90%+) with a benchmark agnostic approach.
Investment Process	Advantageous	• To achieve its targeted return, the investment team conducts rigorous, bottom-up fundamental research looking for companies it believes are at least 50% undervalued. The strategy claims to be benchmark agnostic but uses the MSCI EM SMID Cap index to generally define its investable universe. Once an idea has been identified, it is assigned to a member of the team to perform the initial due diligence, whereby it is determined if the stock meets one of the three investment criteria. If so, the stock progresses to the valuation process. If it is determined the current price is attractive, the PMs will decide how large of a position should be established. • Vaughan Nelson relies very little on quantitative models. Its research is fundamental and uses a standard DCF to model valuation. The portfolio typically holds 60-80 stocks. Portfolio turnover is 30% to 50% on a name basis.
Performance	Not Advantageous	• Performance has been weak versus the MSCI EM Small Cap Index (gross excess returns of 0.12% since inception). This is not the strategy's preferred benchmark, but is the standard index chosen to evaluate performance for this search. Returns are modest versus the primary benchmark, the MSCI EM SMID Cap Index.
Fees	Advantageous	• Mutual Fund: estimated effective fee of 1.10%. Ranks at the median of respondents.

*Figures as of 9/30/22

Victory Capital Management

Rating Criteria	Rating	Rationale
Overall	Advantageous	
Organization	Advantageous	• Trivalent Investments, Victory Capital's international equity investment arm and the manager of the proposed strategy, was founded in 1998 and is headquartered in Boston, Massachusetts. Victory Capital is a wholly-owned subsidiary of Victory Capital Holdings, (NSDQ: VCTR). • Victory Capital manages $147.3 billion* in AUM across 60+ fixed-income and equity products, with $62.1 million* in the Trivalent Emerging Markets Small Cap Equity strategy.
Team	Advantageous	• The Trivalent Investments team is headed up by Lead Manager John W. Evers and Co-Manager Robert D. Cerow. Both Mr. Evers and Mr. Cerow have been managing the strategy since its inception in 2013 and have nearly 30 years of industry experience. • All members of the 8-person team serve as sector experts and report to Trivalent Investment's CIO Daniel B. LeVan.
Investment Philosophy	Advantageous	• The team believes that superior risk-adjusted performance is achieved over time through both rigorous fundamental analysis and disciplined risk adjustment. The team focuses on its stock-selection process as the primary driver of alpha.
Investment Process	Advantageous	• Trivalent's investment process combines quantitative framework with fundamental analysis and is 100% bottom-up. The process begins with a quant screening of the investable universe, typically between 1,500-1,800 companies. • The team then conducts further analysis on stocks which have passed the screening process, relying on models to examine the relative value, quality and business momentum characteristics of each stock. The result of this process is a score that is used to rank attractiveness on a sector/peer-relative basis. • Next the team performs fundamental analysis, deemed the "heart" of the stock-selection process, that seeks to identify the key factors that have led to a company's successful operating results. • The result of the process is a portfolio of approximately 120-160 stocks and a targeted turnover of 60-100% annually.
Performance	Highly Advantageous	• Since inception in 2013, Trivalent has generated gross excess returns of 4.05% with a tracking error of 5.40%, resulting in an information ratio of 0.75 through Dec. 2022.
Fees	Highly Advantageous	• Commingled Fund (As a newly launched CIT): estimated effective fee of 0.75%. Ranks below the median of respondents.

*Figures as of 9/30/22

Wasatch Global Investors

Rating Criteria	Rating	Rationale
Overall	Advantageous	
Organization	Highly Advantageous	• Wasatch Global Investors was founded in 1975 and is based in Salt Lake City, Utah. The firm is 100% employee-owned, with ownership shared amongst 32 employees. • Wasatch Global Investors manages a total of $21.7 billion* across 20+ equity strategies, including $1.6 billion* in the Emerging Markets Small Cap strategy.
Team	Highly Advantageous	• The Emerging Markets Small Cap Equity team is led by Ajay Krishnan, who has the final authority for all decisions in the portfolio including security selection and portfolio construction. Mr. Krishnan is supported by four other portfolio managers and ten research analysts. • Ajay Krishnan was named Lead Portfolio Manager of the Wasatch Emerging Markets Small Cap Strategy in January 2019, replacing Roger Edgley, who retired. Mr. Krishnan has been with the firm for nearly three decades and has worked on this strategy since its inception in 2007.
Investment Philosophy	Advantageous	• Wasatch believes that long-term, stable, sustainable earnings growth drives investment returns and risk-adjusted outperformance. The team aims to identify high quality companies that can grow earnings for long periods of time.
Investment Process	Highly Advantageous	• The investment process begins with a front-end screen of the emerging markets small cap equity stock universe by market cap. They seek to identify high quality growth companies as proxied by steady earnings growth, rising return on assets, high ROA vs. its history and peers, accelerating sales, improving cash flows, and strong cash flow return on equity. • Once attractive stocks are identified, the team performs rigorous fundamental research. Any possible investment ideas are discussed in team meetings, where an analyst gathers input and questions for further analysis. The team pays close attention to return on equity, cash return on capital, earnings growth, and balance sheet strength, which they believe are key drivers of future earnings growth. The analyst also conducts a review of business opportunities through on-site visits, meetings with competitors, and general research on industry dynamics. • The result of the process is a portfolio of 50-80 stocks. Portfolio turnover is typically between 20% and 40%.
Performance	Highly Advantageous	• Since inception in 2007, Wasatch has generated gross excess returns of 4.38% with a tracking error of 8.47%, resulting in an information ratio of 0.52 through Dec. 2022.
Fees	Advantageous	• Commingled Fund, set up as a CIT: estimated effective fee of 1.10%. Ranks at the median of respondents.

*Figures as of 9/30/22

Westwood Global Investors

Rating Criteria	Rating	Rationale
Overall	Advantageous	
Organization	Advantageous	• Westwood Global Investors (WGI) was founded in 2003 by Meg Reynolds and Bryan Ward, who had previously worked together at Putnam Investments in the early stages of their careers. The firm is based in Boston and is 100% employee owned. Equity ownership is not broad, and succession planning remains a question mark. • WGI manages $8.4 billion* in AUM across four investment products. The firm's flagship product is Global Emerging Markets, which has $6.7 billion* in AUM. Emerging Markets Smaller Companies has $469.9 million* in assets and was incepted in 2012.
Team	Advantageous	• The investment team consists of co-PMs Bryan Ward and Meg Reynolds, who each have 30+ years of industry experience, and seven research analysts. • Historically, the analyst team has experienced modest turnover. Eight analysts have left the firm since December 2012.
Investment Philosophy	Advantageous	• WGI believes that bottom-up stock selection focused on companies with strong free-cash-flow and high-quality management teams supports positive investment outcomes over time. They believe in the merits of concentrated, high conviction portfolios and a long-term investment horizon.
Investment Process	Advantageous	• WGI's investment process is purely bottom-up. As opposed to the traditional market cap guidelines used by other small cap managers, WGI screens the universe for stocks that trade at or below $10m in daily trading volume. Thus, liquidity, and not market cap, defines WGI's investment universe. However, this criteria makes benchmarking the strategy somewhat difficult. • From there, the investment team analyzes companies using a traditional approach to fundamental research. The team makes site visits and meets with management teams to assess the quality of the business. Additionally, the team will perform financial statement analysis and analyze the company's historical cash flows. • Portfolios are concentrated in 25 to 35 high conviction stocks. The PMs use a 3-5 year investment horizon and low portfolio turnover.
Performance	Not Advantageous	• Since inception in 2012, WGI has generated gross excess returns of 0.83% with a tracking error of 8.33%, resulting in an information ratio of 0.10 through Dec. 2022.
Fees	Not Advantageous	• Commingled Fund: estimated effective fee of 1.20%. Ranks above the median of respondents.

*Figures as of 9/30/22

Fisher Investments

Rating Criteria	Rating	Rationale
Overall	Not Advantageous	
Organization	Not Advantageous	• Founded in 1979, Fisher Investments is a Camas, Washington-based independent asset management firm. Fisher is 100% employee owned. It is estimated that the firm's founder, Ken Fisher, and his family own over 75% of the firm. Fisher manages nearly $156 billion* in assets across 40+ equity strategies. About 75% of the firm's total AUM is managed in retail accounts, with the remainder managed on behalf of its institutional investors. Assets in the Emerging Markets Equity Small Cap ESG strategy total $121.03 million*.
Team	Advantageous	• Fisher's Investment Policy Committee (IPC) makes all strategic investment decisions affecting the $156 billion managed firm wide and consists of Ken Fisher, Jeffery Silk, William Glaser, Aaron Anderson and Michael Hanson. All five members serve as portfolio managers for the strategy, with the first four since its inception in 2016. • The IPC is supported by a large team of 61 research analysts*; however, it should be noted that the IPC is responsible for setting the top-down views across all of Fisher's 20+ equity strategies.
Investment Philosophy	Advantageous	• Fisher believes that supply and demand of securities are the sole determinants of stock prices. As such, Fisher believes capital markets are highly effective discounters of widely known information and seeks to add value by processing and interpreting this widely known information more accurately than other market participants.
Investment Process	Not advantageous	• Fisher's investment process is almost entirely top down and focuses on three basic decisions. First, the IPC attempts to identify drivers to determine country and sector allocations. Once country and sector weights are determined, the Securities Research Team uses a series of quant screens to decide which securities to select within these country and sector weights. Analysts screen out securities largely based on insufficient liquidity or solvency. The prospect list is then narrowed further by the IPC, which eliminates stocks that are not directly linked to the portfolio's top-down themes. • The result is a portfolio of about 70-110 stocks. Annual turnover is low and is expected to be around 25%.
Performance	Not advantageous	• Since inception in 2016, Fisher has generated gross excess returns of 0.21% with a tracking error of 7.62%, resulting in an information ratio of 0.03 through Dec. 2022.
Fees	Not advantageous	• Commingled Fund: estimated effective fee of 1.25%. Ranks above the median of respondents.

*Figures as of 9/30/22

Manager Trailing Performance (Net of Fees as of 12/31/22)

Manager	1 Year Returns (%)	3 Year Returns (%)	5 Year Returns (%)	10 Year Returns (%)
Acadian Asset Management	-12.13	8.71	4.67	9.50
Cedar Street Asset Management	-8.07	3.22	3.03	--
Acuitas Investments	-14.22	13.65	7.83	--
LSV Asset Management	-7.22	6.46	2.59	5.99
EAM Investors	-28.60	5.36	0.41	5.70
Fisher Investments	-32.99	-1.71	-0.57	--
State Street Global Advisors	-14.11	6.48	3.07	7.25
Kayne Anderson Rudnick	-22.04	3.60	5.14	--
Numeric Investors	-10.73	13.38	5.76	--
J O Hambro Capital Management	-20.31	7.91	3.78	--
Matthews Asia	-15.67	--	--	--
Seven Canyons Advisors	-21.35	15.45	10.15	--
Wasatch Global Investors	-37.17	5.46	4.99	5.12
Westwood Global Investments	-3.79	3.38	1.50	3.48
Victory Capital Management	-11.85	9.99	4.62	--
Vaughan Nelson Investment Management	-10.81	4.04	0.18	--
Benchmark	**1 Year Returns (%)**	**3 Year Returns (%)**	**5 Year Returns (%)**	**10 Year Returns (%)**
MSCI Emerging Markets Small Cap Index	-18.02	5.11	1.06	3.21
MSCI Emerging Markets Small Cap Growth Index	-23.25	5.08	0.79	2.60
MSCI Emerging Markets Small Cap Value Index	-12.48	4.94	1.18	3.74

Proposed Fees

Manager	Investment Vehicle Type	Estimated Effective Fee
Acadian Asset Management	Commingled Fund	1.41%
Cedar Street Asset Management	Commingled Fund	0.85%
Acuitas Investments	Commingled Fund	0.01%[1]+ Underlying Fees
LSV Asset Management	Mutual Fund	1.50%
EAM Investors	Commingled Fund	0.75%
Fisher Investments	Commingled Fund	1.25%
State Street Global Advisors	Commingled Fund	1.05%
Kayne Anderson Rudnick	Commingled Fund	0.95%
Numeric Investors	Commingled Fund	1.10%
J O Hambro Capital Management	Commingled Fund	1.25%
Matthews Asia	Mutual Fund	1.15%
Seven Canyons Advisors	Commingled Fund	1.50% + 5%
Wasatch Global Investors	Commingled Fund	1.10%
Westwood Global Investments	Commingled Fund	1.20%
Victory Capital Management	Commingled Fund	0.75%
Vaughan Nelson Investment Management	Mutual Fund	1.10%
Median Respondent Fee[2]		*1.10%*

[1] This represents the management fee. Operating expenses and underlying management fees will also be incurred.
[2] Excludes Acuitas' & Seven Canyons' Fees

Passive Index Equity RFP
Respondent Review

Background

→ Under Chapter 176 of the Acts of 2011, the Retirement System is required to issue RFPs every seven years for its open-ended investment strategies.

- The System's existing passive portfolios, currently managed by Rhumbline and SSGA, were put out to bid with responses due in December 2022.

Asset Class	Preferred Benchmark	Size ($mm)	Preferred Vehicle
Large Cap Growth Domestic Equity	Russell 1000 Growth	$20	Commingled Fund
Large Cap Value Domestic Equity	Russell 1000 Value	$20	Commingled Fund
Style-Tilted Domestic Equity	QSI Index	$25	Commingled Fund
Developed Non-US Equity	MSCI EAFE	$30	Commingled Fund
Core Fixed Income	Bloomberg US Aggregate	$20	Commingled Fund
US Inflation Protected Bonds	Bloomberg US TIPS	$15	Commingled Fund

→ Three firms responded to the search. We subsequently evaluated each respondent and summarized our assessment on the following pages

RFP Respondents

Manager	Headquarters	Overall Rating
Northern Trust.	Chicago, IL	Highly Advantageous
SSGA	Boston, MA	Highly Advantageous
Rhumbline	Boston, MA	Highly Advantageous

Strategy Availability

Strategy	Northern Trust	Rhumbline	SSGA
Large Cap Growth Domestic Equity	Russell 1000 Growth	Russell 1000 Growth	Russell 1000 Growth
Large Cap Value Domestic Equity	Russell 1000 Value	Russell 1000 Value	Russell 1000 Value
Style-Tilted Domestic Equity	NA	QSI	QSI
Developed Non-US Equity	MSCI EAFE	MSCI EAFE	MSCI EAFE
Core Fixed Income	Bloomberg Aggregate	Bloomberg Aggregate	Bloomberg Aggregate
US Inflation Protected Bonds	Bloomberg US TIPS	Bloomberg US TIPS	Bloomberg US TIPS

→ All respondents proposed pooled vehicles with daily liquidity.

Northern Trust

Rating Criteria	Rating	Rationale
Overall	Highly Advantageous	
Organization	Advantageous	• Northern Trust is a publicly traded, multi-line financial services firm based in Chicago, IL with custody, asset management, brokerage, and wealth management subsidiaries. • The firm manages $1.0 trillion in assets under management across a mix of strategies and asset classes with approximately $481.0 million managed in various institutional strategies.
Team	Advantageous	• Brent Reeder leads the US-based indexing team. Mr. Reeder has worked on the indexing team since 1998, with his prior five year of industry experience in Trust Operations. He reports to the Director of Global Equity Jacob Weaver. • The team, composed of over 30 portfolio managers and numerous support staff, is managed.in a team-based fashion with periodic rotation of mandates among portfolio managers to ensure familiarity with different account types.
Investment Philosophy & Process	Highly Advantageous	• Northern applies a balanced approach cross its strategies, balancing replicating target benchmark characteristics against liquidity conditions and transaction costs. In some cases, this will result in replicated or optimized approaches depending on the underlying benchmark and market conditions. • One differentiated aspect of the Northern process is seeking to maintain wealth through index changes at the risk of incurring a minor amount of additional tracking error.
Performance	Advantageous	• Tracking error tends to be in line with or slightly elevated relative to peers though Northern's index differential is within reasonable bounds and generally positive over time. • Non-US tracking error appears higher due to Northern's approach to fair value pricing. However, index differential, over time is in line with peers.
Fees	Highly Advantageous	• Northern's fee schedule is highly competitive, with the lowest available fee if securities lending vehicles are used and a slightly higher effective fee for non-lending vehicles.

Rhumbline

Rating Criteria	Rating	Rationale
Overall	Highly Advantageous	
Organization	Highly Advantageous	• Rhumbline is an employee-held, boutique index manager with its sole office in Boston, MA. The firm's only business line is passive asset management. • Rhumbline manages $88.0 billion in assets, the entirety of which is passive. The vast majority (84%) of the firm's assets are indexed in equity strategies. • The firm recently restructured its ownership with the retirement of CEO Wayne Owen, a personnel change expected for some time. President Denise D'Entremont assumed the CEO title as well as majority ownership of the firm (making it a women-owned firm). • Rhumbline currently manages index mandates for Massachusetts public retirement systems.
Team	Advantageous	• Although a smaller team than many indexing firms, with 5 portfolio managers, the team is well tenured with an average of approximately 15 years of industry experience. Turnover is exceedingly low across the firm. • The investment team is led by CIO Alex Ryer, who took over chief investment duties from Norman Meltz in 2017. Mr. Ryer began his 23-year career at Rhumbline, leaving to manage a variety of quantitative strategies at other indexing firms such as SSGA, Northern Trust, and Blackrock.
Investment Philosophy & Process	Advantageous	• Though Rhumbline will generally replicate portfolios, if possible, the firm is exceptionally focused on optimizing its trading, putting considerable effort into modeling transaction costs, including client-specific custody costs for SMAs to reduce transaction drag while being attentive to tracking error.
Performance	Advantageous	• Tracking error is reasonable compared to industry peers. • Index dispersion is low relative to peers for the desired asset classes.
Fees	Highly Advantageous	• Rhumbline has proposed a flat relationship fee at 3.0 basis points, the lowest effective fee among non-lending vehicles. • The flat fee applies regardless of the underlying allocation among the strategies.

SSGA

Rating Criteria	Rating	Rationale
Overall	Highly Advantageous	
Organization	Advantageous	• State Street Global Advisors is the investment management division of State Street Corporation (NYSE: STT); a large, publicly-traded financial services and bank holding company. The firm is headquartered in Boston, MA. • State Street manages $3.5 trillion in assets across a range of passive, enhanced index, and active investment products across asset classes. • SSGA currently manages index mandates for Massachusetts public retirement systems.
Team	Advantageous	• SSGA's indexing teams are broadly broken down into equity and fixed income beta groups. The teams tend to be composed of a mixture of internal and external hires to allow for employees with strong operational knowledge to contribute, while also incorporating new approaches. • Global Equity Beta was previously led by Lynn Blake, a 20+ year State Street veteran with significant experience in all aspects of index management but she recently from her role in the Fall of 2021. She was replaced by a similarly tenured colleague John Tucker, most recently COO for Investments but previously head of North American indexing for almost two decades. • Team turnover has been moderate and in line with industry peers.
Investment Philosophy & Process	Highly Advantageous	• SSGA attempts to minimize tracking error versus the benchmark subject to implementation costs across all of its strategies. Most equity strategies utilize replication to construct the portfolio while most fixed income strategies (with the arguable exclusion of TIPS) are based on optimized sampling methods. • A key differentiator for SSGA is its ability to "cross trade" a significant portion of its trading volume. State Street's asset management, custodial, and broker/dealer clients provide a pool of liquidity with each other to trade securities with minimal transaction costs and significantly lowered tracking error. While the impact of cross trading is stronger in equities, SSGA retains the ability to cross trade fixed income securities as well, where appropriate.
Performance	Highly Advantageous	• Performance is consistent with the underlying benchmarks. • 5-year tracking error for all strategies is very low compared to industry peers.
Fees	Advantageous	• SSGA's initial fee level (3.8 bps) is reasonable on an absolute basis but is not as competitive as the other respondents.

5-Year Trailing Performance Metrics (Gross of Fees)[1]

As of September 30, 2022

	Index Differential		
Mandate	Northern Trust (%)	Rhumbline (%)	SSGA (%)
Large Cap Growth Domestic Equity	-0.04	0.00	-0.01
Large Cap Value Domestic Equity	0.07	0.00	0.05
Style-Tilted Domestic Equity	NA	-0.04	-0.02
Developed Non-US Equity	0.22	0.29	0.25
Core Fixed Income	0.03	0.06	0.03
US Inflation Protected Bonds	0.00	0.00	0.02

	Tracking Error		
Mandate	Northern Trust (%)	Rhumbline (%)	SSGA (%)
Large Cap Growth Domestic Equity	0.05	0.04	0.02
Large Cap Value Domestic Equity	0.05	0.07	0.04
Style-Tilted Domestic Equity	NA	0.05	0.04
Developed Non-US Equity	1.61	0.18	0.11
Core Fixed Income	0.21	0.29	0.03
US Inflation Protected Bonds	0.39	0.14	0.02

→ Index differential measures the difference of a portfolio versus its benchmark, tracking error measures the volatility of the difference of a portfolio versus its benchmark.

[1] Non-lending composite performance used where available to aid comparability.

Management Fee Schedule Summary

Strategy	Northern Trust (Lending)	Northern Trust (Non-Lending)	Rhumbline (All Non-Lending)	SSGA (All Non-Lending)
Large Cap Growth Domestic Equity	1.5 bps	2.0 bps	Aggregate assets: 3.0 bps	3.0 bps
Large Cap Value Domestic Equity	1.5 bps	2.0 bps	*See above*	3.0 bps
Style-Tilted Domestic Equity	NA	NA	*See above*	6.0 bps
Developed Non-US Equity	2.0 bps	3.0 bps	*See above*	4.0 bps
Core Fixed Income	2.0 bps	3.0 bps	*See above*	3.0 bps
US Inflation Protected Bonds	1.75 bps	2.0 bps	*See above*	3.0 bps

Effective Management Fee Estimates

Strategy	Northern Trust[1] (Lending)	Northern Trust[1] (Non-Lending)	Rhumbline	SSGA
Total Fee ($)	$26,125	$33,500	$39,000	$49,500
Total Fee (bps)	2.5 bps	3.2 bps	3.0 bps	3.8 bps

[1] Northern Aggregate fees include the cost of the least expensive available QSI portfolio from competitors, as Northern did not submit an option.

Private Markets Commitment Pacing Study

Introduction

→ Meketa Investment Group reviews the private markets pacing at least annually, this includes private equity and real estate.

→ The following document outlines the approach to allocating within private markets and shows the recommended annual allocation to private markets investments.

→ Private markets allocations are a bit more nuanced, due to the nature of closed end investments. Unlike public markets, private market commitments are called over time at the underlying managers' discretion. Therefore, managing these allocations can be complex.

→ The table below shows the Fund's current allocations and target allocations to private markets assets. In addition, the Fund allocates to other asset classes like core real estate and infrastructure which is accessed through predominantly open ended investment opportunities.

Private Markets Asset Class	Current Allocation (12/31/22)[1]	Target Allocation
Private Equity	17%	10%
Real Estate	11%	10%

[1] Private markets are valued quarterly, therefore the majority of these values are one quarter lagged and cash flow adjusted through the end of the fourth quarter.

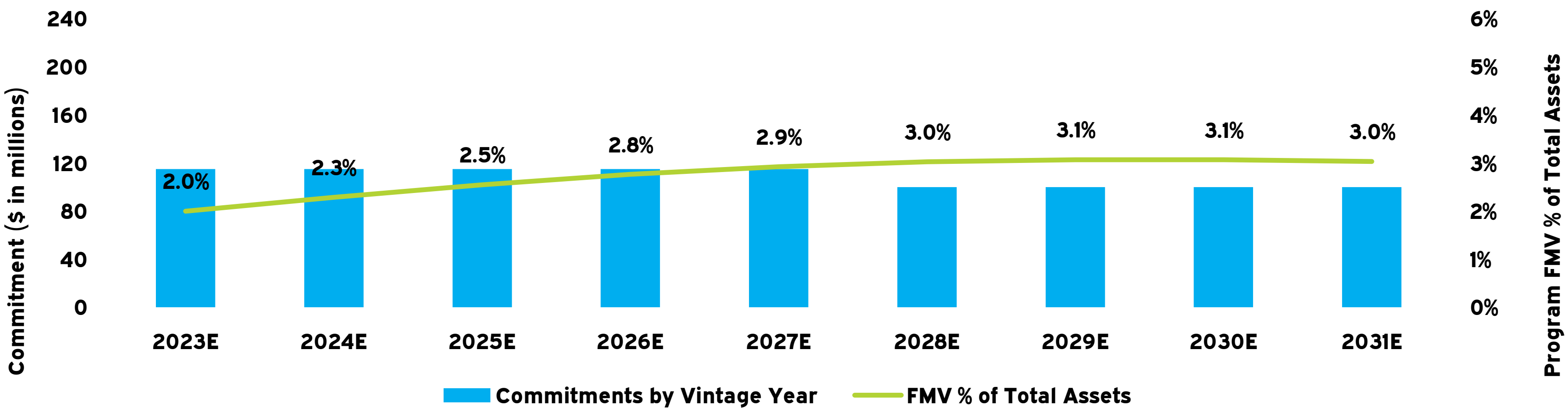
What is Commitment Pacing?

→ The primary output of the commitment pacing study is an annual commitment budget designed to approach or maintain an investor's target allocation to a private market asset class.

→ The commitment pacing study helps answer questions like:

- "How long will it take to reach the target allocation?"
- "How should commitments be allocated across time and strategies to reach ideal diversification?"
- "When will a program become cash flow positive?"

Example Pacing Study Output



Introduction

Why is Commitment Pacing Necessary?

→ The process of determining the appropriate level of capital commitments is challenged by a number of complexities that are unique to private markets:

Fund Structure

→ Private market investments are typically made through illiquid, closed-end vehicles.

- Investors are not able to gain and eliminate exposures at their discretion but are "locked in" for long periods of time.

→ Private market managers have significant discretion over when they buy and sell assets.

- Predicting the timing and size of individual cash inflows and outflows is difficult, at best.

→ This structure makes it difficult to know when a basket of private market funds will reach maturity and new commitments will be required to maintain exposure.

Introduction

Why is Commitment Pacing Necessary? (continued)

Program Diversification

→ Private market programs require vintage year diversification.

- Make steady commitments annually to avoid potential over-exposure to adverse market environments.

→ Private market programs also require diversification by strategy.

- Individual funds tend to have narrowly defined strategies.
- This calls for numerous fund commitments each year to gain adequate breadth.

→ As such, mature programs typically include dozens of active funds of varying maturities.

- This complicates the process of making inferences about ongoing commitment pacing.

→ The complexities described above have spurred investors to create tools to aid in the determination of appropriate ongoing capital commitment levels to private market funds.

Commitment Pacing Process

- → We update commitment pacing studies on at least an annual basis.
- → The determination of the appropriate level of future commitments is an iterative process that seeks to build the private markets program in alignment with investor goals and objectives, as well as within the various diversification parameters governing the program.
- → For new programs, we typically seek consistent, sustained annual commitments at a level that builds the program to its target allocation within five to seven years.
- → We have completed several studies to test how actual portfolios have behaved relative to our pacing study estimates, and the results were favorable. Our cash flow projections aligned closely with the experience of investors over longer term periods.

Summary

- → The nature of private market investment structures creates complexity as it relates to determining the appropriate size and timing of commitments required to reach and maintain target allocations to private market asset classes.
- → However, the combination of structured fund lifecycles and the availability of reasonably robust fund cash flow data allows for management of this complexity through a relatively simple pacing model framework.
- → Meketa Investment Group has developed a model, grounded in industry best practices and proprietary research, to manage the complex elements of private market program construction and provide a simple, flexible structure to facilitate commitment pacing decisions.

Quincy Retirement System Pacing Studies

Background

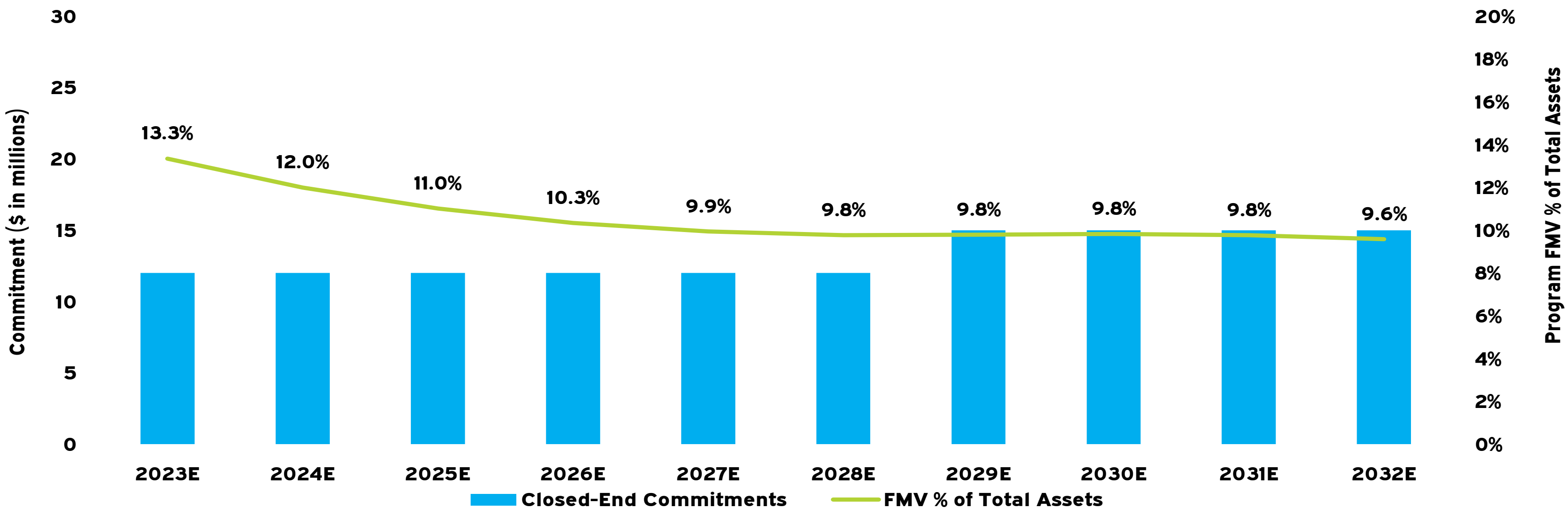
→ Meketa Investment Group evaluated the pacing for the Retirement System's private markets allocations.

→ Meketa used the following assumptions as the foundation for our estimated pacing results:

	Assumptions
Actuarial Return Assumption	7.25%
Initial Net Cash Outflows	~1.29%
Total Fund Market Value as of June 30, 2022	**$418.1 million[1]**

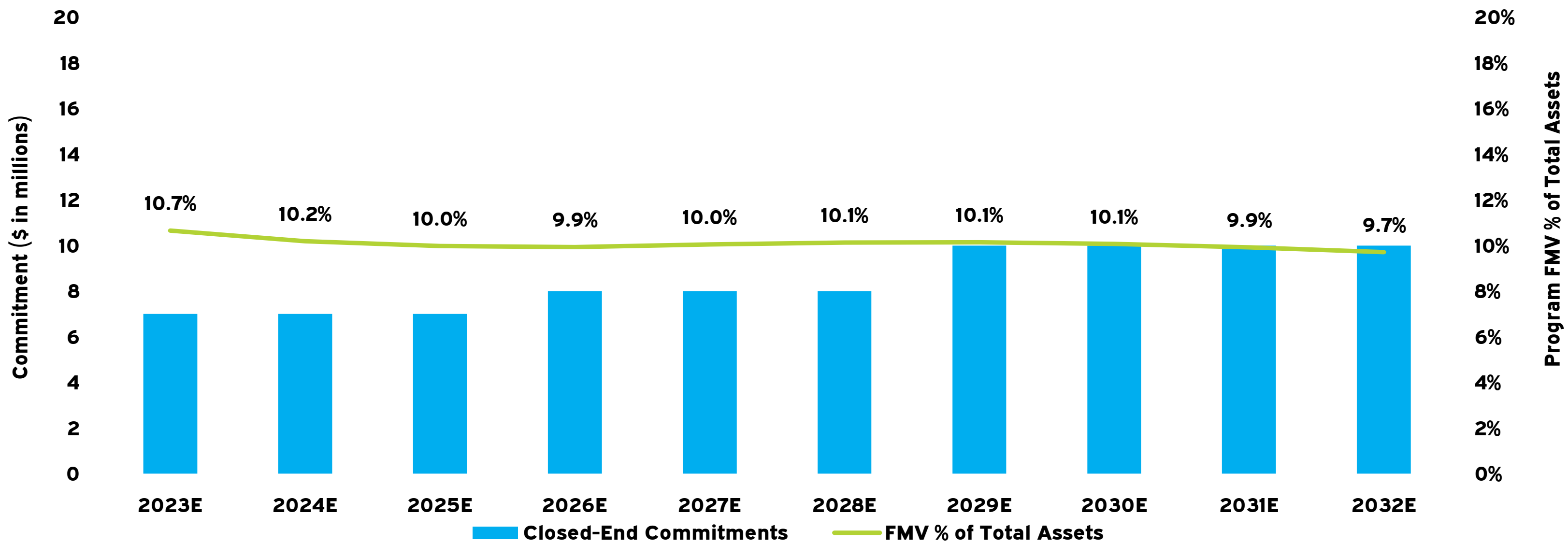
[1] Reflects legacy assets and excludes proceeds currently invested in PRIM from the POB.

Private Equity Pacing Results at a 10% Target



($ in millions)	2023E	2024E	2025E	2026E	2027E	2028E	2029E	2030E
Private Market Investments								
Closed-End Commitments	12	12	12	12	12	12	15	15
Contributions	-5	-6	-8	-10	-11	-11	-12	-13
Distributions	15	16	17	16	16	15	15	15
Net Cash Flow	10	10	8	7	5	4	3	3
Fair Market Value	60	57	56	56	58	61	66	72
FMV % of Total Assets	13.3%	12.0%	11.0%	10.3%	9.9%	9.8%	9.8%	9.8%

Real Estate Pacing Results at a 10% Target



($ in millions)	2023E	2024E	2025E	2026E	2027E	2028E	2029E	2030E
Private Market Investments								
Closed-End Commitments	7	7	7	8	8	8	10	10
Contributions	-3	-4	-5	-6	-7	-7	-8	-8
Distributions	6	6	6	6	5	6	7	8
Net Cash Flow	4	2	1	0	-1	-1	-1	0
Fair Market Value	48	49	51	54	59	64	73	78
FMV % of Total Assets	10.7%	10.2%	10.0%	9.9%	10.0%	10.1%	10.1%	9.9%

Summary & Recommendations

	2023 Planned Commitments ($ in millions)	Number of Commitments
Private Equity	12.0	2-3
Real Estate	7.0	1-2

→ For the 2023 calendar year, Meketa Investment Group's pacing study suggests the Retirement System commit an additional $12.0 million to Private Equity and $7.0 million to Real Estate.

→ Meketa recommends that the Board interview and select managers over the course of the year, targeting commitments of between $4.0 to $6.0 million per manager.

Disclaimer, Glossary, and Notes

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Credit Risk: Refers to the risk that the issuer of a fixed income security may default (i.e., the issuer will be unable to make timely principal and/or interest payments on the security.)

Duration: Measure of the sensitivity of the price of a bond to a change in its yield to maturity. Duration summarizes, in a single number, the characteristics that cause bond prices to change in response to a change in interest rates. For example, the price of a bond with a duration of three years will rise by approximately 3% for each 1% decrease in its yield to maturity. Conversely, the price will decrease 3% for each 1% increase in the bond's yield. Price changes for two different bonds can be compared using duration. A bond with a duration of six years will exhibit twice the percentage price change of a bond with a three-year duration. The actual calculation of a bond's duration is somewhat complicated, but the idea behind the calculation is straightforward. The first step is to measure the time interval until receipt for each cash flow (coupon and principal payments) from a bond. The second step is to compute a weighted average of these time intervals. Each time interval is measured by the present value of that cash flow. This weighted average is the duration of the bond measured in years.

Information Ratio: This statistic is a measure of the consistency of a portfolio's performance relative to a benchmark. It is calculated by subtracting the benchmark return from the portfolio return (excess return), and dividing the resulting excess return by the standard deviation (volatility) of this excess return. A positive information ratio indicates outperformance versus the benchmark, and the higher the information ratio, the more consistent the outperformance.

Jensen's Alpha: A measure of the average return of a portfolio or investment in excess of what is predicted by its beta or "market" risk. Portfolio Return- [Risk Free Rate+Beta*(market return-Risk Free Rate)].

Market Capitalization: For a firm, market capitalization is the total market value of outstanding common stock. For a portfolio, market capitalization is the sum of the capitalization of each company weighted by the ratio of holdings in that company to total portfolio holdings; thus it is a weighted-average capitalization. Meketa Investment Group considers the largest 65% of the broad domestic equity market as large capitalization, the next 25% of the market as medium capitalization, and the smallest 10% of stocks as small capitalization.

Market Weighted: Stocks in many indices are weighted based on the total market capitalization of the issue. Thus, the individual returns of higher market-capitalization issues will more heavily influence an index's return than the returns of the smaller market-capitalization issues in the index.

Maturity: The date on which a loan, bond, mortgage, or other debt/security becomes due and is to be paid off.

Prepayment Risk: The risk that prepayments will increase (homeowners will prepay all or part of their mortgage) when mortgage interest rates decline; hence, investors' monies will be returned to them in a lower interest rate environment. Also, the risk that prepayments will slow down when mortgage interest rates rise; hence, investors will not have as much money as previously anticipated in a higher interest rate environment. A prepayment is any payment in excess of the scheduled mortgage payment.

Price-Book Value (P/B) Ratio: The current market price of a stock divided by its book value per share. Meketa Investment Group calculates P/B as the current price divided by Compustat's quarterly common equity. Common equity includes common stock, capital surplus, retained earnings, and treasury stock adjusted for both common and nonredeemable preferred stock. Similar to high P/E stocks, stocks with high P/B's tend to be riskier investments.

Price-Earnings (P/E) Ratio: A stock's market price divided by its current or estimated future earnings. Lower P/E ratios often characterize stocks in low growth or mature industries, stocks in groups that have fallen out of favor, or stocks of established blue chip companies with long records of stable earnings and regular dividends. Sometimes a company that has good fundamentals may be viewed unfavorably by the market if it is an industry that is temporarily out of favor. Or a business may have experienced financial problems causing investors to be skeptical about is future. Either of these situations would result in lower relative P/E ratios. Some stocks exhibit above-average sales and earnings growth or expectations for above average growth. Consequently, investors are willing to pay more for these companies' earnings, which results in elevated P/E ratios. In other words, investors will pay more for shares of companies whose profits, in their opinion, are expected to increase faster than average. Because future events are in no way assured, high P/E stocks tend to be riskier and more volatile investments. Meketa Investment Group calculates P/E as the current price divided by the I/B/E/S consensus of twelve-month forecast earnings per share.

Quality Rating: The rank assigned a security by such rating services as Fitch, Moody's, and Standard & Poor's. The rating may be determined by such factors as (1) the likelihood of fulfillment of dividend, income, and principal payment of obligations; (2) the nature and provisions of the issue; and (3) the security's relative position in the event of liquidation of the company. Bonds assigned the top four grades (AAA, AA, A, BBB) are considered investment grade because they are eligible bank investments as determined by the controller of the currency.

Sharpe Ratio: A commonly used measure of risk-adjusted return. It is calculated by subtracting the risk free return (usually three-month Treasury bill) from the portfolio return and dividing the resulting excess return by the portfolio's total risk level (standard deviation). The result is a measure of return per unit of total risk taken. The higher the Sharpe ratio, the better the fund's historical risk adjusted performance.

STIF Account: Short-term investment fund at a custodian bank that invests in cash-equivalent instruments. It is generally used to safely invest the excess cash held by portfolio managers.

Standard Deviation: A measure of the total risk of an asset or a portfolio. Standard deviation measures the dispersion of a set of numbers around a central point (e.g., the average return). If the standard deviation is small, the distribution is concentrated within a narrow range of values. For a normal distribution, about two thirds of the observations will fall within one standard deviation of the mean, and 95% of the observations will fall within two standard deviations of the mean.

Style: The description of the type of approach and strategy utilized by an investment manager to manage funds. For example, the style for equities is determined by portfolio characteristics such as price-to-book value, price-to-earnings ratio, and dividend yield. Equity styles include growth, value, and core.

Tracking Error: A divergence between the price behavior of a position or a portfolio and the price behavior of a benchmark, as defined by the difference in standard deviation.

Yield to Maturity: The yield, or return, provided by a bond to its maturity date; determined by a mathematical process, usually requiring the use of a "basis book." For example, a 5% bond pays $5 a year interest on each $100 par value. To figure its current yield, divide $5 by $95—the market price of the bond—and you get 5.26%. Assume that the same bond is due to mature in five years. On the maturity date, the issuer is pledged to pay $100 for the bond that can be bought now for $95. In other words, the bond is selling at a discount of 5% below par value. To figure yield to maturity, a simple and approximate method is to divide 5% by the five years to maturity, which equals 1% pro rata yearly. Add that 1% to the 5.26% current yield, and the yield to maturity is roughly 6.26%.

$$\frac{\text{5\% (discount)}}{\text{5 (yrs. to maturity)}} = \begin{matrix}\text{1\% pro rata, plus} \\ \text{5.26\% (current yield)}\end{matrix} = \text{6.26\% (yield to maturity)}$$

Yield to Worst: The lowest potential yield that can be received on a bond without the issuer actually defaulting. The yield to worst is calculated by making worst-case scenario assumptions on the issue by calculating the returns that would be received if provisions, including prepayment, call, or sinking fund, are used by the issuer.

NCREIF Property Index (NPI): Measures unleveraged investment performance of a very large pool of individual commercial real estate properties acquired in the private market by tax-exempt institutional investors for investment purposes only. The NPI index is capitalization-weighted for a quarterly time series composite total rate of return.

NCREIF Fund Index - Open End Diversified Core Equity (NFI-ODCE): Measures the investment performance of 28 open-end commingled funds pursuing a core investment strategy that reflects funds' leverage and cash positions. The NFI-ODCE index is equal-weighted and is reported gross and net of fees for a quarterly time series composite total rate of return.

Sources: Investment Terminology, International Foundation of Employee Benefit Plans, 1999.
The Handbook of Fixed Income Securities, Fabozzi, Frank J., 1991

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Throughout this report, numbers may not sum due to rounding.

Returns for periods greater than one year are annualized throughout this report.

Values shown are in millions of dollars, unless noted otherwise.