

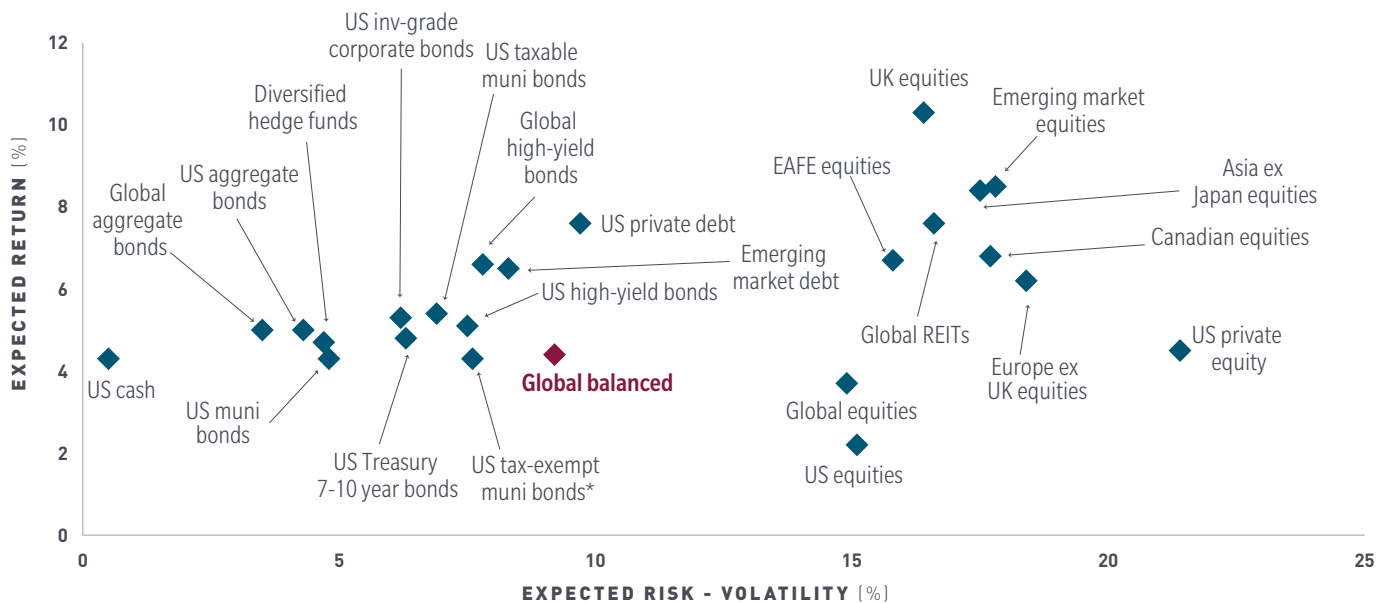
Executive Summary

MFS® is pleased to present the July 2024 edition of *MFS Long-Term Capital Market Expectations*. These proprietary expectations look at return and risk across a variety of asset classes and regions as of July 2024. Below are highlights, details of our market expectations and our view of current economic and capital market conditions.

Our long-term nominal total return expectation for global equities is 3.7%, modestly lower than our January outlook of 4.5%. Global equities continued to grind higher through the first half of 2024 as earnings growth met expectations and large cap technology stocks maintained their leadership over the rest of the market. Investor enthusiasm around AI has not abated, with three companies now valued at over \$3 trillion each. Although market concentration at the start of the year was already extreme relative to history, concentration rose further in the first half, with the top 10 companies currently comprising 37% of the market capitalization of the S&P 500 Index. In contrast, a decade ago the top 10 companies made up just 17% of the index, and accounted for about \$3 trillion in market cap. While there has been some modest dispersion of performance among the Magnificent 7, the top five continue to be the key drivers of the US market. On a sector basis, information technology, communication services and financials have led while health care, materials and real estate have lagged.

Overall macroeconomic conditions have been solid, although there have been some early signs of moderate slowing in the US economy in recent months, particularly in labor markets. The US Federal Reserve has maintained an elevated policy rate, allowing restrictive monetary conditions the time needed to start slowing economic activity. The Fed has been on hold for almost a year, defying market expectations at the start of the year that it would cut rates six times in 2024. Fed officials promised a wait-and-see approach as they looked for confirming data that inflation was moderating,

Exhibit 1: MFS Long Term Market Expectations



Global balanced portfolio is 60% global equity, 40% global fixed income. Expected Risk-Volatility is represented by standard deviation.
 *US tax-exempt muni bonds = US muni bonds return expectation/(1-37%). 37% is the highest marginal tax rate.

A global, balanced portfolio is expected to provide a nominal total return of 4.4% with a volatility of 9.2%

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and that is exactly what transpired. Futures markets are now pricing in around two cuts through the end of the year, but inflation and the labor market will need to maintain their current trajectories for that to play out.

During 2023, many central banks paused rate increases and waited for tighter conditions to slow their economies. However, economies proved much more resilient to higher interest rates than many anticipated. What could be different about this tightening cycle?

First, the long-tailed impact from the extraordinary government stimulus programs enacted in recent years can't be underestimated. While savings appear to be back to normal levels, there are still pockets of stimulus that are slowly bleeding into the economy through state and local government channels, which are administratively slow.

Second, many consumers locked in low rates and pushed out the terms of their debt, including the most significant element of consumer debt, mortgages. This was particularly acute in the United States, where fixed-rate mortgages are the norm and nearly 80% of mortgage holders have locked in rates of 5% or below, according to Redfin. Many companies, particularly higher-quality ones, were also able to refinance their debt, locking in favorable terms. As a result, the higher cost of capital may not have had the same impact as it had in the past because consumers and companies lowered their debt service costs due to a low-interest-rate regime.

Third, a tighter US job market led to higher wage growth. Wage growth recently peaked at around 5%, considerably higher than the longer-term average of around 2.8%.

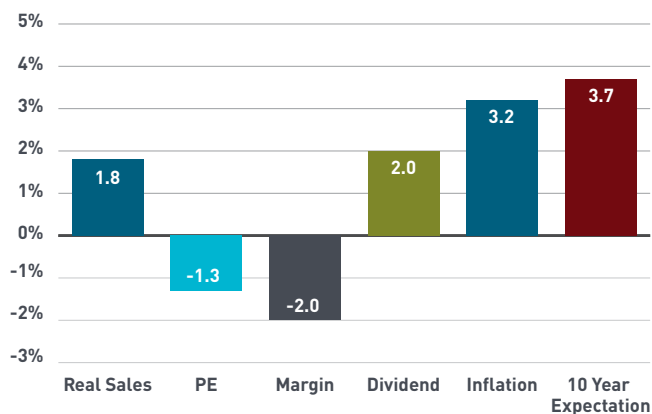
Finally, higher asset prices including investment portfolios and real estate likely contributed to consumer confidence, helping keep spending high.

The combination of these factors makes for a unique cycle. To the frustration of many market participants, this means that many of the recession indicators that have historically had predictive power didn't work this time around, or at least they haven't yet. Examples include the inverted Treasury yield curve and the deeply negative Index of Leading Economic Indicators, both of which have pointed to recession for several quarters. Time will tell whether these indicators have lost their efficacy, or if it is just taking longer for them to be proven right.

With both inflation and the labor market heading in the right direction, the odds are increasing that the US economy will achieve a soft landing. After a reacceleration of the US economy in the second half of 2023, there was concern that the economy could be in for a no-landing scenario where growth and inflation would run too hot, raising the specter of further rate increases. Today, this seems like an unlikely scenario given the moderation of economic activity and the Fed's still restrictive policy rate stance.

With policy tight, the Fed has expressed a desire to ease from current levels once it has more evidence that inflation is heading closer to its 2% target. Core PCE, the central bank's preferred measure of inflation, is now below 2.6% and headline CPI fell to 3% in June. With the federal funds rate on hold, the decline in inflation has meant a rise in real interest rates. One Fed measure estimates that the 10-year real interest rate is around 2%, close to the highest level since October 2007. Should real rates remain at this level, at some point these higher rates will begin to meaningfully bite into economic activity. While the Fed awaits more evidence of economic moderation, other central banks are taking divergent paths. For example, the European Central Bank and the Bank of Canada recently cut rates while the Bank of Japan is moving to normalize them after years of negative interest rate policy.

Exhibit 2: Global Equity Building Blocks

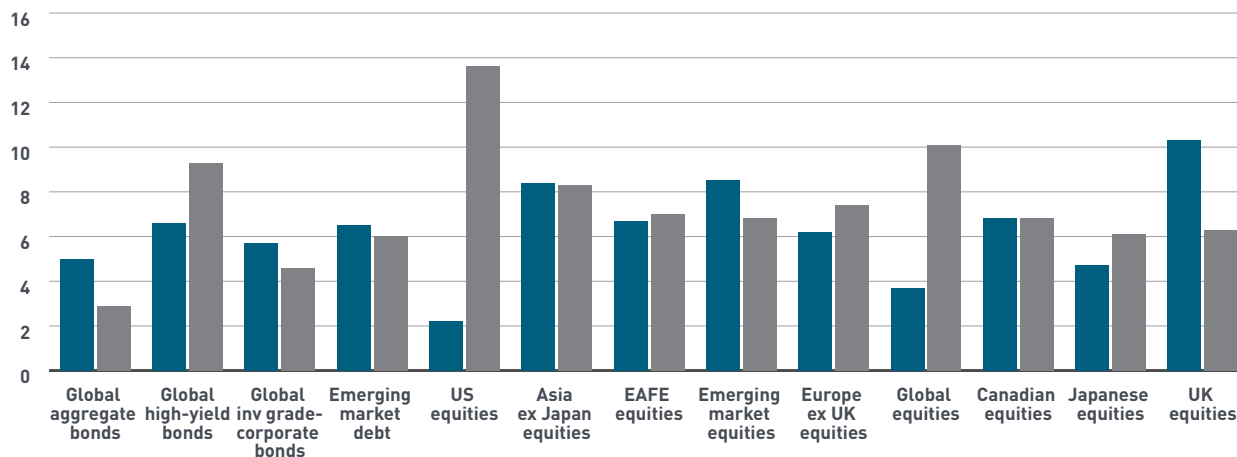


For illustration purposes only, numbers may not add due to rounding.

High profit margins are expected to compress, but solid real sales growth and a favorable dividend yield are likely to contribute to global equity returns.

Exhibit 3: Expectations vs Historical Return

■ Expectation ■ Historical



Source: FactSet. Historical performance is for the trailing 15-year period as of 31 May 2024. Asset class proxies: Global aggregate bonds – Bloomberg Global Aggregate USD Hedged Index; Global high yield bonds - Bloomberg Global High Yield USD Hedged Index; Global investment grade corporate bonds - Bloomberg Global Aggregate Corporate USD Hedged Index; Emerging market debt – J.P. Morgan EMBI Global Index; US equities – Russell 3000 Index; Asia ex Japan – MSCI AC Asia Ex Japan Index (\$Net); EAFE equities – MSCI EAFE Index (\$Net); Emerging market equities – MSCI Emerging Markets Index (\$ Net); Europe ex UK equities – MSCI Europe Ex-UK Index (\$Net); Global equities – MSCI AC World Index (\$Net); Japanese equities – MSCI Japan Index (\$Net); UK equities - MSCI United Kingdom Index (\$Net).

US equities grind higher

US equities reached all-time highs at midyear, and now constitute 65% of the MSCI All Country World Index, up from just 48% a decade ago, illustrating their strong relative performance. Performance has been driven by both earnings growth and valuation expansion, with the next-twelve-months P/E ratio rising from just below 19.5x at the end of 2023 to more than 21x today.

Japan equities, the second largest single-country equity market behind the US, remained strong, posting a 21% total return year in the first half of the year in Japanese yen terms. However, recent yen weakness significantly tempers that return for US investors, bringing it down to 6.4% through midyear. Our 10-year expectation for Japanese equities is 4.7%, modestly higher than our global equity expectation of 3.7%, and improving corporate governance trends in Japan continue to be a secular tailwind for the country. On a regional basis, European equities were also up sharply on the year, led by Italian and German equities, which started the year with relatively low valuations.

Globally, over the next 10 years we expect modest real sales growth and dividend payouts to be the primary contributors to global equity returns. Valuations, which were around long-term averages at the start of the year, have expanded to the higher end of their long-term range, so further multiple expansion is not expected to contribute to returns. Global equity profit margins, at around 9.7%, remain elevated relative to their 10-year average of 8.4%, so sales growth and dividends will need to do some heavy lifting for returns to exceed expectations, based on a building-blocks methodology.

Within fixed income, despite a difficult first half of 2024, we see compelling opportunities across several fixed income asset classes. For the first time in years, US Treasuries are offering meaningful yields across the curve and the prospect of a late-year rate cut or two would further bolster prospects for the asset class. In credit, although spreads remain tight, all-in yields are near their highest level in the past 20 years, based on percentile rankings, creating a compelling risk/reward profile considering the high correlation between starting yields and long-term returns. However, given the low level of overall credit spreads, selectivity across sectors and issuers will be key. Our long-term, nominal total return expectation for global bonds is 5%, down from 5.3% in January.

The slightest of cracks in the labor market

While the US economy is still in growth mode, the labor market appears to be slowing with the unemployment rate ticking up to 4.1% in June from 3.7% at the start of the year. In addition, wage growth, which had been running at more than 4%, has seen a number of sequential declines, providing welcome relief for companies competing for workers. While the participation rate has risen for many age cohorts, it has moved in the opposite direction for the over-55 cohort, reflecting a continuation of the retiring baby boomers trend. In addition, the Job Openings and Labor Turnover survey indicates that job openings per unemployed person have returned to prepandemic levels. With inflation moderating, the labor market cooling and economic activity slowing, Fed rate cuts are more likely.

A cycle in a category of its own

While economic and market cycles differ, there are several aspects of the current expansion that put the post-COVID era in a category of its own. While central banks in developed markets consistently undershot their inflation targets in the wake of the global financial crisis, the onset of the pandemic led to the rapid deployment of massive amounts of both monetary and fiscal stimulus. While the monetary accommodation may have laid the groundwork for a spike in inflation, fiscal spending was the real star of the show. In all, the US deployed around \$5 trillion in fiscal stimulus in a short timeframe through a range of programs including the US CARES Act, the Inflation Reduction Act and the Chips and Science Act. Deficit spending as a percentage of GDP reached levels last seen during World War II, and while it has moderated since, it is expected to remain elevated in the years ahead. With elections looming this fall, politicians and the electorate alike appear unlikely to embrace austerity measures anytime soon. The US Congressional Budget Office projects that the latest spending spree will keep the US budget deficit at around 6% to 7% of GDP over the next decade.

These deficits will need to be funded through borrowing, so the already-high level of government debt could further rise from the current level of around 120% of GDP, a level that exceeds that of WWII. As interest rates remain elevated, newly issued government debt with higher coupon rates will be replacing bonds with lower coupons, further raising debt servicing costs. In 2024, the US is expected to spend more serving its debt than it spends on defense, a first for the nation. In addition, more spending coupled with higher tariffs, could lead to periodic bouts of inflation that are both uneven and unpredictable, keeping the Fed on guard.

In emerging markets, India's economy continues to be among the region's strongest, with GDP growth expected to continue its 7% pace throughout 2024, making it the fastest growing of the OECD economies. Under Prime Minister Modi's leadership, India has been

making significant investments in infrastructure to bolster its manufacturing capabilities as it courts manufacturers that are looking to diversify away from China. The Chinese economy continues to struggle under the weight of slower industrial production and a still-struggling property market. With property a key investment for many households, the sector's challenges have weighed on consumer spending and confidence.

Exhibit 4: 10-Year and 30-Year Expectations

Asset Class	10-Year Return Expectation	30-Year Return Expectation
Global equities	3.7%	7.5%
US large-cap equities	2.0%	7.3%
EAFE equities	6.7%	7.3%
Emerging market equities	8.5%	8.1%
Global aggregate bonds	5.0%	4.9%
US aggregate bonds	5.0%	4.7%
Global high-yield bonds	6.6%	6.6%
Emerging Market Debt	6.5%	6.9%

Low 10-year expectations for US large cap equities contrast with our solid 30-year return expectation.

PORTFOLIO CONSIDERATIONS FOR 2024

Through the first half of 2024, a 60/40 balanced portfolio performed well, primarily due to the strong run up in global equities, which gained 11.6%, with the largest country weighting, the US, up 15.3%. Global bonds have been disappointing year to date, with a meager .13% total return as rates have backed up from the start of the year. While US large-cap growth has garnered all the attention recently, over the three years through the end of 2023, US value and US growth had near-identical performance on an annualized basis, a reminder of how important it is for investors to have exposure to both styles. We continue to favor international equities over US, considering their more reasonable valuations and favorable dividend profiles, and because they present better opportunities for diversification.

While many investors have grown frustrated with the underperformance of developed international versus US equities, our Long-Term Capital Market Expectations have international equities significantly outperforming US equities over the next 10 years. Emerging market equities fall into a similar camp with a few notable differences. Economic and global trade dynamics suggest opportunity for companies in emerging market economies that could benefit from reglobalization — the idea that global trading relationships and supply chains will be reconstituted in coming years, creating new opportunities.

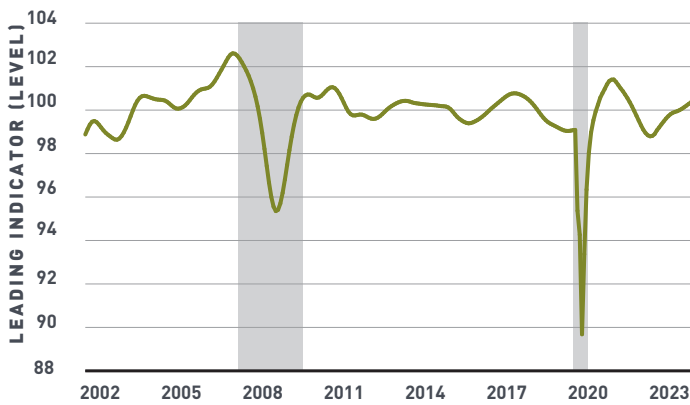
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However, we caution against a passive allocation to emerging market equity, considering China’s weighting in the index. Nearly 30% of the MSCI Emerging Markets index is in China equities, which lost around 42% over the three years through the end of 2023. While there continue to be reasonable opportunities for investment on a company-by-company basis in China, selectivity and differentiation from the index will be critical. The geopolitical risks associated with investing in China is a key consideration and one that is likely to continue to increase in importance. In addition, changing trade practices could weigh on China equities. The White House recently imposed new tariffs on the import of select Chinese goods, including a 100% tariff on Chinese electric vehicles; the European Union is proposing new tariffs as well.

Exhibit 5: OECD G20 Leading Economic Indicator



Source: Bloomberg as of 31 May 2024. Shaded areas = US recessions. G20 = Group of 20 is an intergovernmental forum comprising 19 countries and the European Union (EU).

OECD leading economic indicators suggest the global economy is much more resilient than feared a year ago.

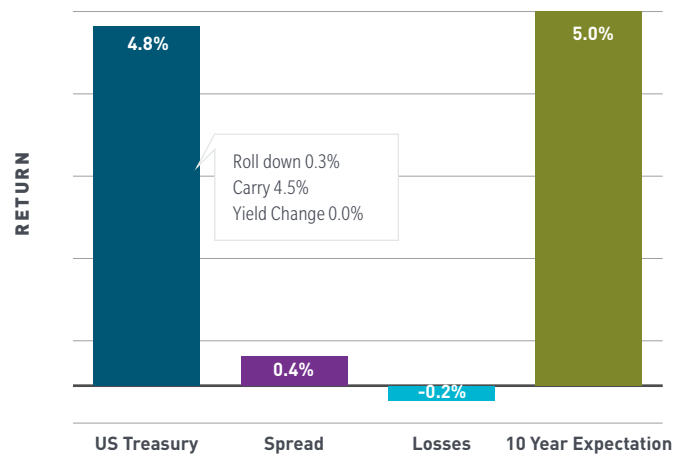
Opportunities in fixed income

Our fixed income expectations focus on the underlying building blocks of return such as yield, yield curve roll-down, price change and credit spreads. Across the fixed income spectrum, higher all-in yields present a compelling entry point for many investors. Although credit spreads remain tight, meaningful sovereign yields provide a significant cushion against any spread-widening, and we believe these tight spreads are reflective of both strong corporate balance sheets and a robust technical bid. After a prolonged period in which credit risk was the only way to achieve meaningful yields, higher rates across sovereign curves have resulted in yields not seen in more than a decade, with global investment-grade sporting a 4.8% yield to worst and global high yield an 8.3% YTW as of the end of June.

Corporate balance sheets remain solid, with few signs of stress at the aggregate level. In addition, we believe that concerns over a credit maturity wall are likely overblown. To begin with, overall maturities are not stacked in any one year. Rather, they are smoothed over the next several. In addition, because bonds are set to mature does not necessarily mean they must be refinanced: Companies can simply let them mature or they can explore myriad alternative channels of funding.

Credit markets remain wide open, allowing companies, particularly higher-quality ones, to issue new debt at will. For investors with the appropriate risk profile, emerging market debt remains one of the most promising fixed income opportunities in the period ahead, supported by a decent global growth outlook, robust fundamentals and favorable inflation dynamics. However, there are serious sovereign-specific risks that will require an active credit selection process to successfully navigate.

Exhibit 6: US core fixed income building blocks



For illustration purposes only, numbers may not add due to rounding.

Higher US Treasury yields underpin our US core fixed income expectations.

Exhibit 7: Credit and Emerging Market Debt Spreads Have Tightened

- J.P. Morgan EMBI Global Spread (LHS)
- Bloomberg Barclays Global High Yield Avg OAS (LHS)
- Bloomberg Barclays Global Aggregate Corporate Avg OAS (RHS)



Source: Bloomberg, as of 28 June 2024 (daily). Spreads are option adjusted spreads (OAS) for Bloomberg Barclays Global High Yield and Bloomberg Barclays Global Aggregate Corporate.

Global spreads have tightened back to multi-year lows, with only the lowest quality tiers still having relative spread value.

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Region	Asset class	Long-term return expectation ¹	Long-term risk expectation
	Inflation	3.2%	1.1%
Equities (Unhedged nominal total return)			
US	US equities	2.2%	15.1%
	US large-cap equities	2.0%	14.7%
	US small-cap equities	4.3%	19.7%
NON-US REGIONAL	Asia ex Japan equities	8.4%	17.5%
	EAFE equities	6.7%	15.8%
	Emerging market equities	8.5%	17.8%
	Europe ex UK equities	6.2%	18.4%
	Global equities	3.7%	14.9%
COUNTRY	Australian equities	6.0%	21.3%
	Canadian equities	6.8%	17.7%
	Japanese equities	4.7%	13.9%
	UK equities	10.3%	16.4%
Fixed Income (Hedged nominal total return)			
US	US cash	4.3%	0.5%
	US aggregate bonds	5.0%	4.3%
	US high-yield bonds	5.1%	7.5%
	US inv-grade corporate bonds	5.3%	6.2%
	US TIPS	5.7%	5.1%
	US Treasury 7-10-year bonds	4.8%	6.3%
	US Long Treasury	5.1%	12.5%
	US Long Corporate	5.6%	10.9%
	US Long Govt/Credit	5.3%	10.6%
	US Muni Bonds	4.3%	4.8%
	US Taxable Muni Bonds	5.4%	6.9%
GLOBAL	Emerging market debt	6.5%	8.3%
	Global aggregate bonds	5.0%	3.5%
	Global high-yield bonds	6.6%	7.8%
	Global investment-grade bonds	5.7%	5.3%
NON-US REGIONAL	European aggregate bonds	4.1%	4.5%
	European high-yield bonds	4.9%	8.2%
	European investment-grade bonds	4.5%	4.5%
Alternatives (Unhedged nominal return)			
NON-LIQUID	US private equity ²	4.5%	21.4%
	US direct real estate	5.6%	6.4%
	Diversified hedge funds	4.7%	4.7%
	US private debt	7.6%	9.7%
LIQUID	Global REITs	7.6%	16.6%
	Global infrastructure	6.4%	12.4%
	Commodities	7.5%	14.4%

¹ Geometric return.

² As of January 2022, the methodology for US private equity risk has changed from using a fund of funds proxy to using listed private equity companies.

Exhibit 8: Currency Expectations

		Long Currency									
		Pound Sterling	US Dollar	Canadian Dollar	Swiss Franc	Norwegian Krone	Swedish Krona	Japanese Yen	Australian Dollar	New Zealand Dollar	Euros
Base Currency	Pound Sterling	0.0%	-2.1%	0.0%	-2.0%	2.5%	3.2%	5.5%	-0.9%	-2.1%	0.0%
	US Dollar	2.2%	0.0%	2.2%	0.2%	4.7%	5.5%	7.8%	1.3%	0.1%	2.2%
	Canadian Dollar	0.0%	-2.1%	0.0%	-2.0%	2.5%	3.2%	5.5%	-0.9%	-2.1%	0.0%
	Swiss Franc	2.0%	-0.2%	2.0%	0.0%	4.6%	5.3%	7.6%	1.1%	-0.1%	2.0%
	Norwegian Krone	-2.4%	-4.5%	-2.5%	-4.4%	0.0%	0.7%	2.9%	-3.3%	-4.5%	-2.5%
	Swedish Krona	-3.1%	-5.2%	-3.1%	-5.1%	-0.7%	0.0%	2.2%	-4.0%	-5.1%	-3.1%
	Japanese Yen	-5.2%	-7.2%	-5.2%	-7.1%	-2.8%	-2.1%	0.0%	-6.0%	-7.2%	-5.2%
	Australian Dollar	0.9%	-1.3%	0.9%	-1.1%	3.4%	4.2%	6.4%	0.0%	-1.2%	0.9%
	New Zealand Dollar	2.1%	-0.1%	2.1%	0.1%	4.7%	5.4%	7.7%	1.2%	0.0%	2.1%
	Euros	0.0%	-2.1%	0.0%	-2.0%	2.5%	3.2%	5.5%	-0.9%	-2.1%	0.0%

Appendix

The MFS Long-Term Capital Markets Expectations (LTCME) for 2024 includes return and risk expectations for equity, fixed income and alternative asset classes across country, regional and global markets. The focus of these expectations is to provide a strategic, long-term, forward-looking view of various global markets. We use a proprietary top-down approach by employing quantitative, country-based models as the foundation for our expectations. Elements of these models are influenced by views from our fundamental equity and fixed income teams.

Our expectations are developed across 26 countries comprising 18 developed countries and 8 emerging market countries.

Equity expectations

MFS equity market expectations are displayed in unhedged, nominal total return and are developed using a building-blocks approach.

Elements of market history and mean reversion are incorporated into our models. Reversion speed and target levels are calibrated based on our analysis of historical data and forward looking expectations. Any return figure should be viewed as the mid-point in that range of outcomes.

Fixed income expectations

MFS fixed income market expectations are displayed in nominal total return, hedged to the investor's home currency. As with our equity model, our fixed income model employs a building-blocks approach.

And, again like the equity model, the fixed income model derives its reversion speed and target level parameters from careful historical research as well as forward looking expectations.

In our forecast, we focus on the returns from carry, yield change, roll-down and credit loss (where appropriate). Using this framework, we develop expectations across a range of sovereign, global credit and regional credit markets, while being careful to tune our models in accordance with the unique attributes of the various fixed income markets.

Alternative expectations

Due to the unique characteristics and varying drivers of return in alternatives, we vary our approach for each category. Our equity and fixed income capital market expectations serve as key variables in our alternatives models.

Currency Expectations

We use a mean reversion approach to calculate currency expectations. Currency expectations represent the nominal excess returns which are nominal total return less domestic carry. Nominal total return is calculated as nominal price change plus foreign currency carry. Domestic and foreign currency carry comes from the MFS Long Term Capital Expectations cash forecasting model. Nominal price change is real price change plus inflation differential between currencies.

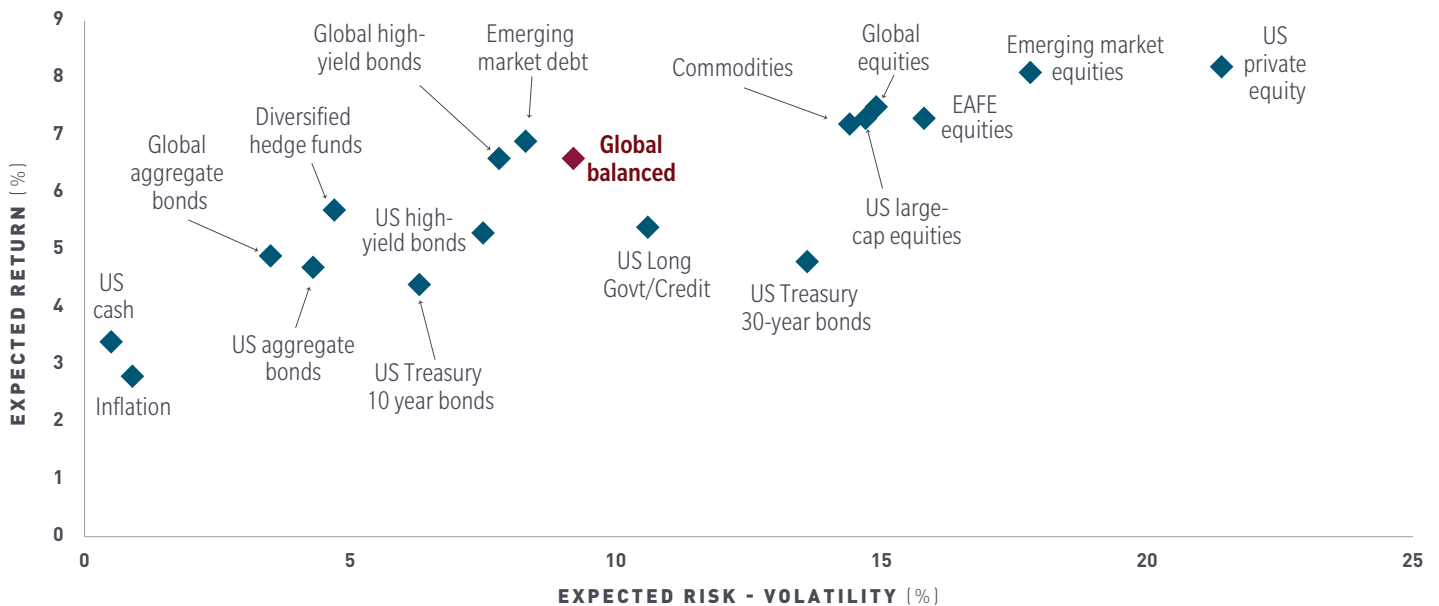
Appendix II MFS 30-Year Capital Market Expectations

In addition to our 10-year capital market expectations, MFS is pleased to release our 30-year capital market expectations to provide perspective across the different time horizons.

In this release, we provide asset class expectations over a period long enough to encompass a variety of equity and credit market cycles and multiple economic regimes. Our 30-year annualized expectation is 7.5% for global equity and 4.9% for global fixed income with a 60/40 global balanced portfolio expected to return 6.6% over that timeframe. These 30-year market expectations are a critical input to the asset allocation process and have a number of practical applications that enable investment professionals to do the following:

- Analyze risk and return relationships across asset classes
- Compare and contrast 10-year expectations with 30-year expectations
- Compare historical market performance with forward-looking expectations
- Develop objective-based multi-asset portfolios
- Serve as inputs for mean variance optimization
- Calculate expected long-term risk and return for policy portfolio
- Develop Monte Carlo simulations and stress tests on portfolios

Exhibit 9: 30 year return and risk expectations



Source: MFS Long Term Market Expectations (US Edition) as of July 2024. Global balanced portfolio is 60% global equity, 40% global fixed income. Risk-Volatility is represented by standard deviation. The expected returns presented are hypothetical in nature and are not representative of an actual account. Certain assumptions have been made for modeling purposes and are unlikely to be realized. No representation or warranty is made as to the reasonableness of the assumptions made or that all assumptions used in calculating returns have been stated or fully considered. Projections and forward-looking

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	30-Year Return Expectation ¹	30-Year Risk Expectation
Inflation	2.8%	0.9%
Equities (Unhedged nominal total return)		
US large-cap equities	7.3%	14.7%
EAFE equities	7.3%	15.8%
Emerging market equities	8.1%	17.8%
Global equities	7.5%	14.9%
Fixed Income (Hedged nominal total return)		
US Cash	3.4%	0.5%
US Treasury 10-year bonds	4.4%	6.3%
US Treasury 30-year bonds	4.8%	13.6%
US aggregate bonds	4.7%	4.3%
US high-yield bonds	5.3%	7.5%
US Long Govt/Credit	5.4%	10.6%
Emerging market debt	6.9%	8.3%
Global aggregate bonds	4.9%	3.5%
Global high-yield bonds	6.6%	7.8%
Alternatives (Unhedged nominal total return)		
US private equity*	8.2%	21.4%
Diversified hedge funds	5.7%	4.7%
US REITs	7.7%	17.5%
Global REITs	7.3%	16.6%
Global infrastructure	6.2%	12.4%
Commodities	7.2%	14.4%
Convertible bonds	6.2%	12.1%

¹ Geometric return.

* As of January 2022, the methodology for US private equity risk has changed from using a fund of funds proxy to using listed private equity companies.

Methodology

In the development of these expectations, we employ a quantitative framework with our 10-year capital market expectations as a starting point and then incorporate a historical risk premium approach to extend the time horizon to 30 years. The equity risk premium is the higher return over a risk free asset that is offered by equities to compensate for additional volatility and can be estimated on both a historical and forward-looking basis. Combining these two approaches creates extended horizon expectations that incorporate both the current market environment and a long-term historical perspective. Our 10-year market expectations are developed using a building blocks approach where a degree of mean reversion is assumed for fundamental drivers of return such as P/E and profit margin for equity and yield and credit spread for fixed income. For years 11 through 30, we determine historical risk premium and return relationships across asset classes and then build up to an asset class level expectations. Expectations for the two time periods are then proportionally weighted.

GLOSSARY

Equity Expectations Building Blocks

Our equity building blocks are measured at the index level for each country.

Price/Earnings (P/E) ratio Price to earnings ratio is the trailing 12-month P/E ratio as measured by the index level divided by the trailing 12-month earnings for the constituent members of that index. We use P/E ratio as a measure of valuation. Our very-long-term reversion target for P/E ratios is 18.

Profit margins Profit margins are a measure of profitability and are measured in percentage terms. Our margin expectations are assumed to revert toward a target based on long term history.

Sales growth Sales growth is a measure of increase or decrease in real sales per share. To estimate this, we incorporate elements of economic theory and examine current levels relative to trends.

Dividends Dividends are measured in percentage terms, and we assume that a country's dividend payout ratio, over our forecast horizon, will be equal to its trailing 5-year average.

Fixed Income Expectations Building Blocks

Our fixed income building blocks are measured at the index level for each country.

Nominal yield Nominal yield is the observed yield at the index level. Nominal yields consist of both a real yield component and an inflation expectation component.

Real yield Real current yield is a nominal yield less the trailing 5-year annualized change in the Consumer Price Index.

Carry The carry return is calculated as the average of the current nominal yield and the expected nominal yield.

Yield change return The yield change return is calculated as the expected yield change multiplied by the current duration and then annualized.

Inflation Inflation is measured as a 5-year trailing change in the US Consumer Price Index. We then assume that inflation reverts towards a global equilibrium value.

Roll down The roll down return expectations are based on index duration as well as localized curve steepness for the maturity being forecast.

Regional credit markets For regional credit markets, we take a building-blocks approach incorporating duration-matched risk-free return, spread return and loss return.

Duration-matched risk-free return This represents the estimated return of a sovereign bond portfolio with the same duration and nationality as the regional credit in question.

Spread return The spread return is measured by the differential between the yield in the index and the yield of the sovereign bonds for that country. This is the return that can be earned for taking on credit risk.

Credit losses Credit losses are determined based on historical rates of default losses and credit quality migration that are reflective of the index being forecast.

Global credit Because of the complexities of multiple durations and multiple loss provisions across several countries, we take the current yield of the index, assume a constant roll down and subtract any loss return expectations based on expected default rates.

US Treasury Inflation-Protected Securities For TIPS, we forecast a future real yield based on the same mean reverting assumptions we use for other sovereign indices. We then calculate a real carry return, a real yield change return, and a real roll-down return in the same manner with which we calculated nominal versions of these returns for sovereign indices. We then add back inflation expectations to produce a nominal return.

US cash Our estimate of future cash returns reflects the sum of expected real cash rates and expected inflation, both of which are based on mean reversion.

Alternatives Expectations Building Blocks

Real estate For global real estate investment trusts (REITs), we rely upon current dividend yield based on the fact that REITs pay out a considerable percentage of their funds from operations in the form of dividends.

For US direct real estate (RE), we capture the historical relationship between REITs and direct RE by unsmoothing direct RE returns and then estimating beta.

Private equity Our private equity approach starts with our capital markets expectations for global developed markets and then makes adjustments based on the higher levels of risk associated with private equity.

Global infrastructure Our global infrastructure expectations are calculated based off of the relationship between listed global infrastructure and real estate.

Hedge funds We would note that hedge fund investments are pools of capital invested at the discretion of the manager, and as such, risk and return are highly dependent on skill and timing. In addition, within the hedge fund universe, there is a divergent range of asset classes, strategies and implementation approaches. We take a diversified hedge fund portfolio approach where we assume an investment across multiple hedge fund types. To calculate hedge fund expectations, we use a regression based approach to estimate relationships between certain hedge fund styles and public markets. For hedge fund styles that do not appear to hold relationships to public markets, we use steady state expectations plus cash. Expectations for each hedge fund style are allocated to create a diversified hedge fund portfolio.

Commodities We develop our commodities expectations to represent broad exposure to the commodities market through a fully collateralized commodity position. Three primary building blocks — collateral return, spot return and roll return — are estimated and then added to determine our long-term commodities expectation.

Risk and correlations Our risk and correlation expectations are derived largely from historical observed risk and correlation patterns. Risk, as measured by standard deviation, and correlations across broad asset classes tend to be relatively stable over long periods of time. However, over shorter periods of time or during periods of market disruption, this stability can quickly break down. We use the 15-year historical standard deviation and correlations of proxy indices where available. Where a 15-year history is not available, we use the longest available history and make adjustments based on historical patterns and relationships to other asset classes.

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