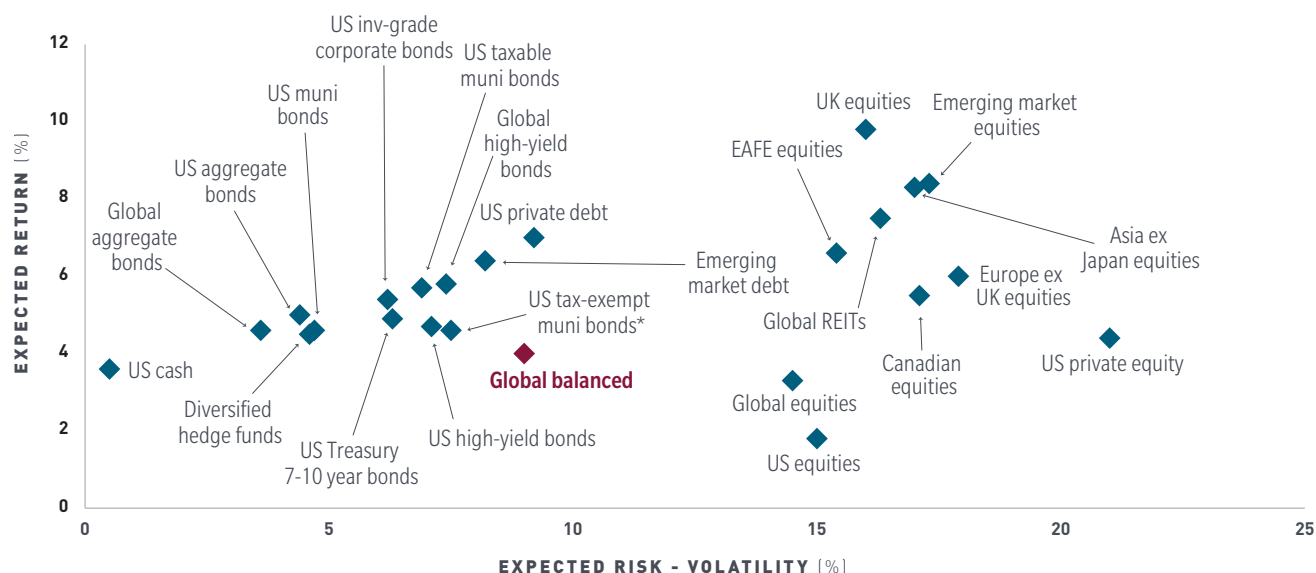


## Executive Summary

MFS® is pleased to present the July 2025 edition of Long-Term Capital Market Expectations, offering its proprietary outlook on return and risk across a variety of asset classes and regions. This edition highlights improved projections for global equities, reflecting a long-term nominal total return expectation of 3.3%, up from January's forecast of 2.9%. The first half of 2025 saw global equities gain over 10% in total returns, with developed international and emerging markets equities outperforming US equities, marking a shift in leadership after two years of US dominance. However, this period was marked by significant volatility as investors navigated the implications of a flurry of executive orders issued by the Trump administration, particularly around tariffs. These policies introduced uncertainty into global trade and logistics systems that had been stable for decades, leaving businesses, consumers and financial markets grappling with the unknown.

Risk markets reacted sharply in early April when tariffs and deadlines for trade agreements were first announced. Concerns mounted over the potential for higher prices on imported goods to increase consumer costs and weigh on corporate profitability. However, markets rebounded as some tariffs were postponed, allowing time for negotiation. By late July, agreements had been reached with nations like the UK and Vietnam, while other deals faced an August 1 deadline. Despite the initial shock, US equity markets recovered their April losses and surged to record highs in June, buoyed by renewed optimism. Large-cap growth stocks, which were hit hardest by the initial tariff announcements, rebounded impressively, gaining over 30% from April's low through the end of June. Sector-wise, industrials, financial services and communication services emerged as top performers, while consumer discretionary, health care and energy lagged behind.

## 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. 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 assumptions are no guarantees of future performance. The expected returns are not targeted or projected performance for any MFS portfolio or advisory service.

A global balanced portfolio is expected to provide a nominal total return of 4.0% with volatility of 9.0% over the next 10 years.

Overall macroeconomic conditions in the US appear reasonably solid despite a weak first-quarter GDP report, which was largely attributed to companies frontloading imports ahead of the tariff announcements. This led to a sharp decline in net exports, weighing heavily on GDP calculations. The US Federal Reserve, under Chair Jerome Powell, has maintained steady policy rates, citing the need to assess the inflationary impact of tariffs in the coming months. Meanwhile, other central banks, including the Bank of Canada and the European Central Bank, have taken a more aggressive stance to lowering rates in response to moderating inflation and the anticipated drag of tariffs on their export-driven economies. For these nations, US tariffs represent the opposite side of the inflationary coin, as they may dampen demand for their goods.

### In the Midst of a Regime Shift

While risk markets have largely absorbed the immediate impacts of US trade policies, MFS identifies deeper, more transformative dynamics at play, suggesting the global economy may be undergoing a significant regime shift. Such shifts, characterized by secular changes in economic and market structures, typically arise from a confluence of events rather than any single trigger. The regime from 2010 to 2019 was defined by low interest rates, low inflation and low economic growth. The scars resulting from the global financial crisis at the end of the prior decade contributed to the decade-long regime of tepid economic growth. In contrast, the

current shift is driven by entirely different forces including changing global trade, fiscal profligacy and inflation variability.

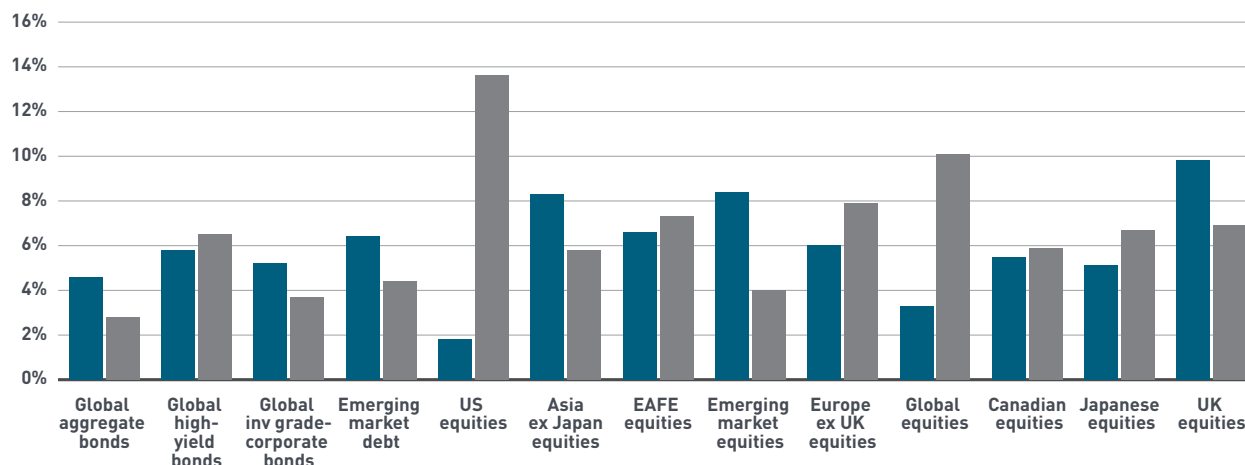
### Changing Global Trade

One key driver of the emerging regime is a fundamental transformation in global trade dynamics. For decades, net manufacturing flowed predominantly in one direction, with US and European companies outsourcing manufacturing to emerging markets, particularly China, to reduce costs and boost efficiency. With many developed economies eager to outsource, China's entry into the World Trade Organization in 2001 catalyzed its manufacturing boom. But frictions started to build over intellectual property theft, poor labor conditions and China's authoritarian government.

Further questions arose around the benefits to global supply chains when the COVID-19 pandemic exposed vulnerabilities as mobility ground to a halt and logistics mismatches stifled goods assembly. This fragility was further exacerbated by Russia's invasion of Ukraine, which resulted in stranded assets while Mideast tensions threatened shipping routes through the Red Sea, adding costs and logistical challenges. Now, US tariffs — central to Trump's policy agenda — signal a broader effort to reorient trade relationships and repatriate certain types of manufacturing. The administration argues that outsourcing has not only displaced American jobs but also created excessive reliance on foreign goods.

### Exhibit 2: Expectations Versus Historical Return

■ Expectation ■ Historical



Source: FactSet. Historical performance is for the trailing 15-year period as of 31 May 2025. 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); Canadian equities – MSCI Canada Index (\$Net); Japanese equities – MSCI Japan Index (\$Net); UK equities - MSCI United Kingdom Index (\$Net).

### Fiscal Profligacy

Another significant factor shaping the new regime is fiscal profligacy. Between 2020 and 2022, US government spending reached unprecedented levels outside of wartime, initially as a crisis response to the pandemic but later expanding due to new programs. The deficit now stands at approximately 6.4% of GDP, exacerbated by the recently passed One Big Beautiful Bill, which extends individual and corporate tax cuts while increasing spending. Consequently, US net debt-to-GDP levels have climbed to around 100%, which contributed to Moody's downgrade of the country's credit rating in May 2025. While this downgrade was anticipated, given similar moves by other major rating agencies in prior years, it nonetheless hurts confidence. These factors, combined with the disruption of longstanding tariff policies, have weighed heavily on the US dollar as a side effect.

The trend of expanding fiscal budgets is not confined to the US. Several European nations are also increasing spending, albeit to a lesser extent. Traditionally fiscally conservative Germany has lifted its debt brake to fund defense, infrastructure and climate-related investments. Similarly, Sweden has boosted spending on defense and infrastructure to strengthen its military capabilities and stimulate its sluggish economy. While these nations maintain lower debt-to-GDP ratios than the US, the broader pattern of increased fiscal spending is evident as countries adapt to a multipolar world.

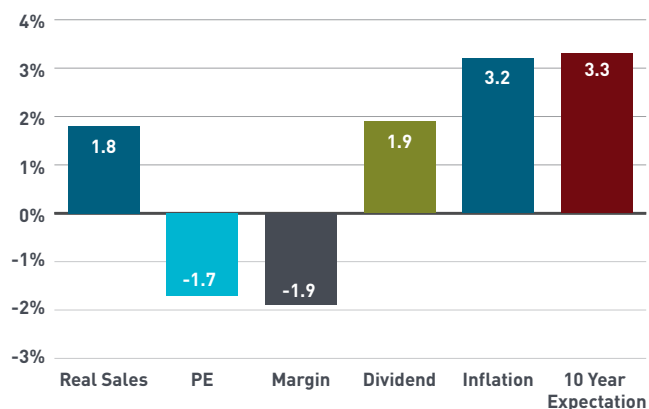
### Inflation Variability

From 2010 to 2020, inflation was largely an afterthought for investors, averaging a modest 1.8% and periodically dipping below 1%. During this period, the primary concern was the risk of deflation rather than rising prices. However, the current economic regime has brought inflation back into focus, fueled by simultaneous supply and demand shocks, massive fiscal spending and disruptions to global trade relationships. These factors have introduced the potential for higher prices and greater variability in inflation rates. A closer look at inflation trends reveals a shift in dynamics during the pandemic that are worth noting. Initially, goods prices surged during lockdowns, driven by supply chain disruptions and fiscal-driven demand, but as mobility resumed and supply chains normalized, inflation pressures shifted toward services. Today, while goods inflation has receded, services inflation remains stubbornly high. This stickiness in services inflation, combined with the potential for tariffs to reignite goods inflation, raises the risk of inflationary pressures. The reorientation of global trade relationships further amplifies the likelihood of variability in inflation rates over the long term.

### Valuation Focus

Turning to equity fundamentals, global equities continue to trade at relatively high multiples, with a forward price-to-earnings ratio of 18x compared to a 10-year average of 16.4x. This P-E expansion has been driven by both US and non-US equities, with the latter outperforming US equities by double digits in the first half of the year. Renewed investor interest in non-US equities, coupled with a weaker dollar boosting repatriated earnings, has contributed to this outperformance. However, US equities remain near the upper end of their historical valuation range, leading to a modest 10-year return expectation of 1.8%. In contrast, international and emerging markets equities are projected to deliver higher returns at 6.6% and 8.4%, respectively. This disparity is driven by cheaper valuations and expectations for profit margin expansion outside the US. Global equity profit margins, currently at 12%, are elevated compared to their 10-year average of 10.3%, but much of that is driven by the US. As a result, future returns are expected to be driven primarily by sales growth and dividends rather than further margin expansion or valuation increases.

#### Exhibit 3: 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 favorable dividend yields are likely to contribute to global equity returns.**

In fixed income markets, starting yields are near or above long-term total returns, presenting attractive opportunities for credit investors. However, inflation remains a key risk, particularly given the stickiness of US inflation and the possibility of renewed inflationary pressures stemming from tariffs, supply chain disruptions, or other unforeseen events. MFS maintains a long-term nominal total return expectation of 4.6% for global bonds, consistent with January's outlook.

Fixed Income: It’s Still About the Carry

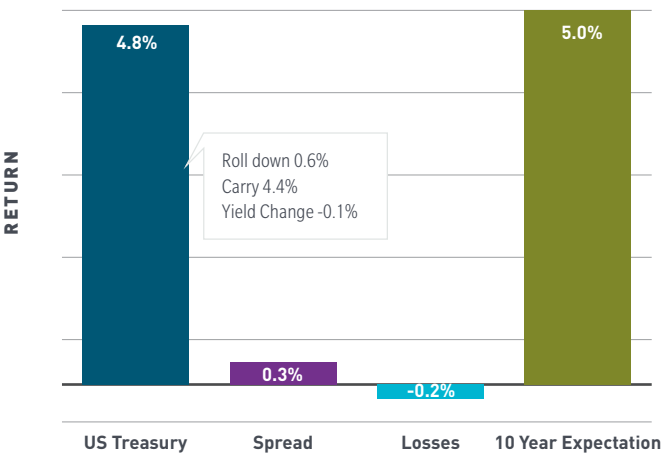
We continue to see carry as the primary driver of fixed income returns in coming years, rather than falling rates. Our expectations are built on key building blocks such as starting yield, yield curve roll-down, price change and credit spreads. Across the fixed income spectrum, higher all-in yields offer compelling entry points for investors. Credit spreads widened significantly in April due to concerns over tariffs and trade disruptions but tightened in subsequent months as fears subsided. A combination of strong technical demand, solid fundamentals and positive US growth momentum has supported tighter spreads. Global investment-grade bonds yielded 4.3% at mid-year, while global high-yield bonds offered a yield of 7%, both slightly lower than their levels at the start of the year. Corporate balance sheets remain robust, bolstered by the passage of the One Big Beautiful Bill, which extended corporate tax cuts and introduced additional provisions to reduce corporate tax burdens. While deregulation could provide further support to corporate credit, progress on this front under the Trump administration has been slower than anticipated.

equities outperformed their US counterparts, but given that US equities comprise 64% of the global equity universe, they remained the key contributor to overall returns. While MFS remains constructive on US equities, we expect international equities to outperform US equities over the next decade. Emerging market equities are also projected to deliver relatively strong returns, although near-term challenges, such as trade and tariff headwinds, may pose obstacles for certain countries unable to negotiate favorable agreements.

Opportunities within equity markets are particularly pronounced in mid-cap and smaller capitalization stocks. Mid-caps, which are trading at around two standard deviations cheaper relative to large caps, present an attractive entry point for portfolios overweight in large-cap stocks. The mid-cap universe offers greater diversification, with the top ten holdings comprising only 8% of the Russell Midcap® Index, compared to 38% in the S&P 500. Sector exposures also differ significantly, with mid-caps offering higher allocations to industrials and real estate and lower allocations to information technology and communication services. Furthermore, developed international equities continue to offer opportunities, supported by favorable valuations and the tailwind of a weaker dollar. Furthermore, higher fiscal spending by European countries could spark activity, particularly in the industrial, energy and defense sectors.

Within fixed income, agency mortgage-backed securities stand out as a bright spot, benefiting from improving fundamentals and technical conditions. Corporate credit also remains well-supported, with corporate tax cuts now permanently extended and additional provisions around capital expenditures that could spur increased research and development. These factors, combined with robust corporate balance sheets, provide a solid foundation for fixed income investors looking to navigate the evolving economic landscape.

Exhibit 4: US Core Fixed Income Building Blocks



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

Fixed income investors shouldn’t expect meaningful returns to come from spread compression, given low current levels

PORTFOLIO CONSIDERATIONS FOR 2025

The first half of 2025 was favorable for balanced portfolios, with a 60/40 portfolio gaining approximately 7.7%. This performance was driven primarily by strong global equity returns, which rose 11.1%, while global bonds delivered 2.5% — impressive figures for just six months. Non-US

Exhibit 5: 10-Year and 30-Year Expectations

Asset Class	10-Year Return Expectation	30-Year Return Expectation
Global equities	3.3%	7.3%
US large-cap equities	1.5%	7.0%
EAFE equities	6.6%	7.1%
Emerging market equities	8.4%	7.1%
Global aggregate bonds	4.6%	5.0%
US aggregate bonds	5.0%	4.7%
Global high-yield bonds	5.8%	6.5%
Emerging Market Debt	6.4%	6.9%

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

# Capital Markets

July 2025

Region	Asset class	Long-term return expectation <sup>1</sup>	Long-term risk expectation
	Inflation	3.2%	0.9%
<b>Equities (Unhedged nominal total return)</b>			
<b>US</b>	US equities	1.8%	15.0%
	US large-cap equities	1.5%	14.5%
	US small-cap equities	4.5%	19.7%
<b>NON-US REGIONAL</b>	Asia ex Japan equities	8.3%	17.0%
	EAFE equities	6.6%	15.4%
	Emerging market equities	8.4%	17.3%
	Europe ex UK equities	6.0%	17.9%
	Global equities	3.3%	14.5%
<b>COUNTRY</b>	Australian equities	5.3%	20.6%
	Canadian equities	5.5%	17.1%
	Japanese equities	5.1%	13.8%
	UK equities	9.8%	16.0%
<b>Fixed Income (Hedged nominal total return)</b>			
<b>US</b>	US cash	3.6%	0.5%
	US aggregate bonds	5.0%	4.4%
	US high-yield bonds	4.7%	7.1%
	US inv grade-corporate bonds	5.4%	6.2%
	US TIPS	5.3%	5.1%
	US Treasury 7-10-year bonds	4.9%	6.3%
	US Long Treasury	5.6%	12.7%
	US Long Corporate	6.0%	10.8%
	US Long Govt/Credit	5.7%	10.7%
	US Muni Bonds	4.6%	4.7%
	US Taxable Muni Bonds	5.7%	6.9%
<b>GLOBAL</b>	Emerging market debt	6.4%	8.2%
	Global aggregate bonds	4.6%	3.6%
	Global high-yield bonds	5.8%	7.4%
	Global investment-grade bonds	5.2%	5.2%
<b>NON-US REGIONAL</b>	European aggregate bonds	4.6%	4.6%
	European high-yield bonds	5.0%	7.4%
	European investment-grade bonds	4.8%	4.5%
<b>Alternatives (Unhedged nominal return)</b>			
<b>NON-LIQUID</b>	US private equity <sup>2</sup>	4.4%	21.0%
	US direct real estate	5.2%	5.0%
	Diversified hedge funds	4.5%	4.6%
	US private debt	7.0%	9.2%
<b>LIQUID</b>	Global REITs	7.5%	16.3%
	Global infrastructure	6.0%	12.2%
	Commodities	6.8%	14.3%

<sup>1</sup> Geometric return.

<sup>2</sup> 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 6: Currency Expectations

		Long Currency									
Base Currency		Pound Sterling	US Dollar	Canadian Dollar	Swiss Franc	Norwegian Krone	Swedish Krona	Japanese Yen	Australian Dollar	New Zealand Dollar	Euros
	Pound Sterling	0.0%	-1.3%	0.9%	-1.9%	2.9%	3.2%	5.1%	0.3%	-0.9%	0.3%
	US Dollar	1.4%	0.0%	2.2%	-0.6%	4.3%	4.6%	6.5%	1.7%	0.4%	1.7%
	Canadian Dollar	-0.9%	-2.2%	0.0%	-2.8%	2.1%	2.3%	4.2%	-0.5%	-1.8%	-0.5%
	Swiss Franc	2.0%	0.6%	2.9%	0.0%	5.0%	5.2%	7.2%	2.3%	1.1%	2.3%
	Norwegian Krone	-2.9%	-4.2%	-2.0%	-4.8%	0.0%	0.2%	2.1%	-2.5%	-3.7%	-2.5%
	Swedish Krona	-3.1%	-4.4%	-2.2%	-5.0%	-0.2%	0.0%	1.8%	-2.7%	-3.9%	-2.8%
	Japanese Yen	-4.8%	-6.1%	-4.0%	-6.7%	-2.0%	-1.8%	0.0%	-4.5%	-5.7%	-4.5%
	Australian Dollar	-0.3%	-1.7%	0.5%	-2.3%	2.6%	2.8%	4.7%	0.0%	-1.2%	0.0%
	New Zealand Dollar	0.9%	-0.4%	1.8%	-1.1%	3.9%	4.1%	6.0%	1.3%	0.0%	1.2%
	Euros	-0.3%	-1.7%	0.5%	-2.3%	2.6%	2.8%	4.7%	0.0%	-1.2%	0.0%

## Appendix

The MFS Long-Term Capital Markets Expectations (LTCME) for 2025 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 prices 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.

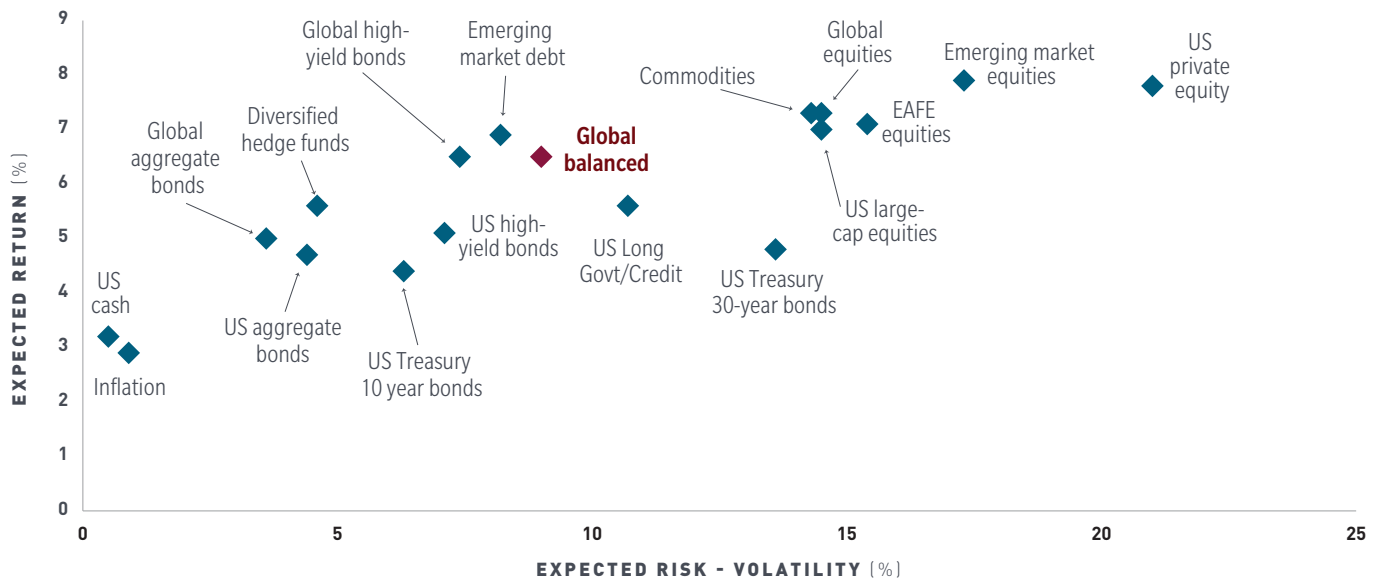
## Appendix II MFS 30-Year Capital Market Expectations

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 7.3% for global equity and 5.0% for global fixed income, with a 60/40 global balanced portfolio expected to return 6.5% 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 7: 30-Year Return and Risk Expectations



Source: MFS Long-Term Market Expectations (US Edition) as of July 2025. 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 assumptions are no guarantees of future performance. The expected returns are not targeted or projected performance for any MFS portfolio or advisory service.



# Capital Markets

July 2025

	30-Year Return Expectation <sup>1</sup>	30-Year Risk Expectation
Inflation	2.8%	0.9%
<b>Equities (Unhedged nominal total return)</b>		
US large-cap equities	7.0%	14.5%
EAFE equities	7.1%	15.4%
Emerging market equities	7.9%	17.3%
Global equities	7.3%	14.5%
<b>Fixed Income (Hedged nominal total return)</b>		
US Cash	3.2%	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%	4.4%
US high-yield bonds	5.1%	7.1%
US Long Govt/Credit	5.6%	10.7%
Emerging market debt	6.9%	8.2%
Global aggregate bonds	5.0%	3.6%
Global high-yield bonds	6.5%	7.4%
<b>Alternatives (Unhedged nominal total return)</b>		
US private equity*	7.8%	21.0%
Diversified hedge funds	5.6%	4.6%
US REITs	7.2%	16.8%
Global REITs	7.1%	16.3%
Global infrastructure	6.1%	12.2%
Commodities	7.3%	14.3%
Convertible bonds	6.0%	11.9%

<sup>1</sup> 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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