**Radu Gabudean, Ph.D.**
Sr. Portfolio Manager & Head of Research
Multi-Asset Strategies

**Rich Weiss**
Chief Investment Officer
Multi-Asset Strategies

American Century Investments®

# Comprehensive Capital Market Assumptions

Building robust asset class forecasts to power client solutions.

## Key Takeaways

- These capital market return assumptions forecast risk and return for 50 asset classes over a medium-term horizon using a multi-model approach. They are an essential component of the investment tools and capabilities we deploy to aid clients in developing portfolio solutions and to inform our own strategic asset allocations.
- Our goal is to help clients define the appropriate strategic asset allocation for their unique goals, risk tolerances and horizon in the context of the dynamic forces shaping economic and market outcomes over time.
- Macroeconomic assumptions are consistent across our forecast methodologies and reflect our recent work developing macroeconomic scenarios based on economic, political, demographic and sociological "super factors." The implications of these potential next-decade scenarios infuse our CMAs.
- One advantage of our approach is that clients can effectively "choose their own adventure"; that is, our framework makes it possible to view comprehensive asset class forecasts in the context of these competing economic scenarios.
- Our *return* forecasts are the product of a multi-model approach that allows for a holistic, nuanced view across financial markets and asset classes. These include a classic valuation approach, a risk-premia approach and a historical risk and return analysis.
- *Volatility* and *correlations* are evaluated across multiple time periods and frequencies to develop robust estimates.
- Our forecast suggests that the next five years are likely to look very different from the recent past. We see better prospects for fixed-income investors, challenges for large-cap U.S. growth and more favorable conditions for small companies and non-U.S. equities.

***Capital markets assumptions are not meant to reflect any projection or promise of performance. No guarantee or representation is being made that any account will or is likely to achieve the assumptions shown.***
***Forecasts are not a reliable indicator of future performance.***

# Table of Contents

*Introduction* ..... 2

*FORECAST OVERVIEW* ..... 3

*METHODOLOGY* ..... 5

*Approach 1: Macroeconomic Scenarios* ..... 7

*Approach 2: Technical Scenarios for Bond Returns* ..... 9

*Approach 2: Technical Scenarios for Equity Returns* ..... 11

*Approach 2: Technical Scenarios for Returns by Style, Small-Cap and Non-U.S. Equities* ..... 14

*Approach 3: Historical Risk Premia* ..... 15

*Approaches to Volatility and Correlation* ..... 17

*Medium-Term (3- to 5-Year) Capital Markets Assumptions* ..... 18

# Introduction

This paper provides the methodology and intuition that underlie our capital market assumptions (CMAs) — risk and return forecasts for a broad array of asset classes over a medium-term, three- to five-year horizon.

These CMAs are an essential component of the capabilities we use to provide investment solutions to our clients. These capabilities rest on fundamental economic insights and quantitative methodologies grounded in academic theory and investment practitioner experience.

Our methodology incorporates multiple lenses, including macroeconomic scenario analysis, reversion to long-term historical average valuations and risk premia relationships. This multi-model approach provides a more nuanced view than any single approach or stand-alone model.

One enhancement over prior years is that we've explicitly incorporated our work modeling long-term macroeconomic super factors into these CMAs. The resulting scenario analysis recognizes and probability weights a number of likely economic outcomes reflecting technological, environmental, demographic and geopolitical influences. One important takeaway of this macroeconomic scenario analysis is that interest rates and market returns going forward are unlikely to resemble those of the prior decade. Indeed, our findings suggest that U.S. large-cap equities face headwinds, while the forecast for fixed-income and non-U.S. equities is more positive in comparison with recent past performance.

A clear value-add for our clients is that because we explicitly model and assign probabilities to likely future economic scenarios, clients can adapt these probabilities to reflect their own economic views and incorporate them into their own CMAs.

## A Multi-Model Approach to Capital Market Return Assumptions

One essential truth of forecasting is that no single model can rule them all. Instead, we deploy an array of models and formulations, each providing a distinct lens on the financial world. These various lenses can be triangulated to provide greater clarity and understanding than any single model in isolation. The resulting multi-model approach approximates the "dragonfly eyes" Gardner and Tetlock proposed in their seminal work, "Superforecasting: The Art and Science of Prediction."

It's also worth keeping in mind that CMAs produce discrete mathematical outputs — numbers that suggest a degree of precision that simply doesn't exist. Forecasting is necessarily a probabilistic exercise beset by uncertainty. Consider the unprecedented events of the last five years, which include a pandemic, one actual and one anticipated recession, massive monetary and fiscal stimulus, multi-decade highs in inflation and interest rates, and a potential artificial intelligence revolution resulting in the most concentrated stock market in history.

These extraordinary events highlight the forecaster's challenge. We can contemplate "known knowns." It's even possible to think about the potential implications of "known unknowns." But "unknown unknowns" are beyond any forecasters' ken. In a world of limited, imperfect information, what's needed is a way to think systematically about factors that influence potential economic and market outcomes. As a result, the enduring, tangible benefits of these CMAs are the processes and steps we take to get there.

## Multi-Asset Strategies (MAS) Team Research Principles

These forecasts are an output of our research process, the goal of which is to enhance our multi-asset products and client solutions. Our research process is characterized by:

1. Parsimony — the belief that the simplest solution is best.
2. Economically sound and intuitive underpinnings.
3. Transparency to the underlying assumptions.
4. Systematic development and review to reduce biases.
5. Consistent assumptions (e.g. macroeconomic inputs) across forecast methodologies.
6. A multi-faceted approach that incorporates different views, methods and inputs.

With these principles in mind, we use diverse techniques to model the "building blocks" or key determinants of our return forecasts. These building blocks form the basis for an internally consistent set of projections across more than 50 asset classes.

Building blocks for our return forecasts include fundamental inputs such as inflation, cash, real yields and real earnings growth. We evaluate possible values for these key determinants of return using scenario-based analyses and historical behavior. We then broaden our approach to all asset classes, utilizing models appropriate to each.

## CMAs in the Context of MAS Forecasting Capabilities

First, let's put these CMA forecasts in the broader context of various forecast capabilities within the team. In **Figure 1**, we show the full spectrum of client allocation solutions based on the forecast horizon. At the shortest end, we have a model forecasting the likelihood of sharp equity selloffs over a one- to five-day horizon.

Next, the one- to three-month forecast powers our tactical asset allocation (TAA) capabilities. These are pairwise models, forecasting the relative performance within the pair (e.g. U.S. growth versus value; U.S. large-cap versus small-cap equities; U.S. versus non-U.S. equities; and high-yield versus investment-grade bonds). The one-year horizon is an extension of our shorter TAA models.

### Figure 1 | Varied Forecast Horizons for Varied Client Needs

Multiple Forecast Horizons Serve Different Use Cases

| Forecast Horizon | 1-5 day | 1-3 month | 1 year | 3-5 years | 20+ years |
|---|---|---|---|---|---|
| Output | Likelihood of sharp selloff | Relative pair forecasts | Stock vs bond relative performance | Full CMAs | Full CMAs |
| Application | Short-term risk management | TAA, return enhancement | Risk positioning; longer-term TAA | Strategic Asset Allocation | Long-term ALM; Lifecycle analysis |

Source: American Century Investments.

At the three- to five-year, medium-term horizon, we derive expected returns and covariances for more than 50 asset classes at a granular level, as shown in **Figure 2**. For example, global large-cap equities are broken down into six geographic components: U.S., Europe, U.K., Japan, Asia developed non-Japan, and emerging markets. For U.S. and non-U.S. developed, these asset classes are further broken out based on size and style.

The medium-term CMAs we detail here influence sub-asset class decisions in our own multi-asset portfolios, as well as informing our client and partner strategic allocation decisions. Our longer-term, 20-plus-year CMAs simulate long-term asset class performance and apply to lifecycle/retirement or asset-liability matching (ALM) applications. Clients interested in seeing these long-term forecasts should contact us directly.

## Comprehensive Medium-Term CMA Process

We model medium-term expected returns for 50 asset classes in three ways, detailed in **Figure 2** and outlined here:

1. Macro scenarios: We derive foundational determinants of return within a macroeconomic framework linked to our work on long-term super factors/megatrends.
2. Technical scenarios: We derive those same determinants of return by looking through the lenses of momentum and mean reversion.
3. We generate a third set of forecasts using historical risk-premia relationships.

### Figure 2 | Three Approaches, 50 Asset Classes

| Model Approach | Inflation | Cash USD | U.S. Short Bond | U.S. MBS | U.S. Corporate Bonds | U.S. Govt Bonds | U.S. Long govt bonds | U.S. Municipal Bonds | U.S. Short TIPS | U.S. TIPS | NonUS Dev Bond | NonUS Dev Bond Hedged | UK Bonds IG | Eurozone Bonds IG | Japan Bonds IG | Asia nonJP Bonds IG | EM Bond, USD | EM Bond, Local | U.S. High Yield Bond | U.S. Bank Loans | U.S. Preferred Stock | U.S. Convertible Bonds |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Macro Scenarios | X | X | | | | X | | | | | | | | | | | | | | | | |
| Technical Scenarios | X | X | | X | X | X | X | X | | X | X | X | X | X | X | X | | | X | | | |
| Risk Premia | | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |

| Model Approach | U.S. Large Growth | U.S. Large Core | U.S. Large Value | U.S. Mid Growth | U.S. Mid Core | U.S. Mid Value | U.S. Small Growth | U.S. Small | U.S. Small Value | NonUS Dev Growth | NonUS Dev Core | UK Core | Eurozone Core | Japan Core | Asia NonJP Core | NonUS Dev Value | NonUS Dev Small/Mid Cap | Emerging Market | Hedge Fund Composite | Global REITs | Private Equity/VC | Commodities | GBPUSD | EURUSD | AUDUSD | JPYUSD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Macro Scenarios | | X | | | | | | | | | | | | | | | | | | | | | | | | |
| Technical Scenarios | X | X | X | | X | | | X | | X | X | X | X | X | X | X | X | X | | | | X | | | | |
| Risk Premia | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |

Source: American Century Investments.

Because we begin our CMAs with macroeconomic scenarios derived from our work on long-term super factors, the foundational economic assumptions such as inflation, cash and longer-term rates, etc., are consistent across forecast techniques. Any competing views or outputs are reconciled through team reviews and additional analysis as necessary. Ultimately, we triangulate our final medium-term CMAs from these diverse inputs.

## A Note on Return Types

Before we dig into how we derive the various asset class return assumptions, we make an important note on the distinction between arithmetic and geometric returns. There is a strong mathematical connection between the two, whereby the arithmetic returns equal the geometric returns plus half the squared volatility. This formula has both theoretical and empirical support. It holds true theoretically under the assumption of returns being normally distributed, an admittedly constraining assumption. Importantly, it also holds true in historical samples of equity returns. Furthermore, this differential increases in importance nonlinearly with risk. Looking at bonds, a lower-risk asset class, the effect is 0.1%, while for core equities it is 1.1%. Higher-risk small-cap equities see a 2% difference.

Arithmetic returns are well-suited for portfolio analysis because the arithmetic expected return of a portfolio is the weighted average of the arithmetic expected return of its assets. In contrast, geometric returns, also known as compounded returns, are more suited for time series analysis. Because the derivation of expected asset class returns involves time series and trend analyses, we compute our forecasts in geometric terms and then convert them to arithmetic returns.

## Identifying the Determinants of Asset Class Returns

The determinants decomposition uses a valuation model specific to each asset class. These valuation models allow for an intuitive decomposition, positioning us to better specify how these pieces evolve over the forecast horizon.

For example, one of the simplest and most widely accepted pricing models for equity is the dividend discount model (DDM). The DDM can be further processed to include earnings expectations and valuations.

In equation form, the single-period return can be expressed as **Equation 1** [equation uses the typical notation as *P* for price, *E* for earnings, and subscript for time period]. Further, we can write the expression in inflation-adjusted terms, which means the *E* terms are also inflation-adjusted:

**Equation 1**:

$$1 + R_1 = \frac{P_1 + Div_1}{P_0} = \frac{Div_1}{P_0} + \frac{E_1}{E_0} \times \frac{P_1/E_1}{P_0/E_0}$$

This equation can be approximated as:

Equity Return = Inflation + Dividend Yield + Real Earnings Growth + Valuation Change

This means that the four determinants we need for our equity return forecast are the four terms above.

Next, we show the determinants for bond return with no default risk, e.g. U.S. Treasuries, in **Equation 2**. [*y_a,b* is the notation for the yield of a bond with maturity b at date a]

**Equation 2**:

$$1 + R_1 = \frac{P_1 + C_1}{P_0} = \frac{C_1}{P_0} + \frac{P(y_{1,m})}{P(y_{0,m})} \times \frac{P(y_{1,m-1})}{P(y_{1,m})} \cong y_{0,m} - Dur_m \times \left[(y_{1,m} - y_{0,m}) + (y_{1,m-1} - y_{1,m})\right]$$

In words:

Bond Return = Yield + Change in Yield Effect + Rolldown Effect + Second-Order Terms

This second equation shows the elements we need to derive the bond return forecast: current bond yield, next-period bond yield, and the local slope of the yield curve next period. These two equations capture the fundamental building blocks of return in our process. As a result, we begin not by forecasting asset class returns directly but by solving first for these determinants of return — inflation, earnings, valuation (P/E), dividend yield, starting bond yields, the slope of the curve, and therefore, also bond yields one year out.

## Approach 1: Macroeconomic Scenarios

These medium-term forecasts exist in the context of our work on longer-term economic cycles and megatrends. Specifically, we considered how macroeconomic, technological, demographic, geopolitical and environmental super factors currently unfolding could influence economies and markets going forward.

Our work envisions a constellation of four possible long-term outcomes around our base case of moderately higher real rates than we experienced over the prior decade:

- **Deglobalization/multi-polar world** emphasizes trade frictions, reshoring/nearshoring and increased geopolitical tensions.
- **Artificial intelligence revolution**, of course, takes on the AI theme and posits a world of rising productivity and growth and falling inflation.
- **Green economy** leans into the energy transition and considerable public and private investment in renewable energy and sustainability, with resulting implications for growth and inflation.
- Potential for resumption of pre-pandemic **secular stagnation** via debt overhang/aging population.
- Our **base case** rests at the intersection of the four competing scenarios. It anticipates roughly the same economic growth but higher interest rates and inflation than in the prior decade, with concomitant implications for asset class returns.

In the interest of completeness, we expand our long-term macroeconomic forecast from five to six stylized scenarios for the next five-year forecast horizon, incorporating both "hard" and "soft" economic landings, as depicted in **Figure 3**. These scenarios spell out all the determinants we need to complete the equations above. This approach has the additional benefit of consistency across asset class forecasts. That is, the scenarios — which inform growth, inflation and interest rate assumptions — are the same across stock and bond forecasts (and indeed all asset classes).

Using these inputs, we derive the four major return forecasts indicated in **Figure 2**: inflation, cash, Treasury returns and U.S. large-cap core equity. For the other asset classes, we will rely on the risk-premia/relative view to keep them consistent with these macro views. For example, by analyzing U.S. corporate bond returns in relation to U.S. Treasury bond returns, we will necessarily capture the economic assumptions embedded in the Treasury forecast.

To achieve our objective of five-year returns, we need to specify not just the endpoint but also the path to get there. That's why each scenario in **Figure 3** shows an "end" value and an "average" value, which add insight into the route to the finish line. What's important for our purposes is that in each scenario we specify a dynamic that allows us to derive the determinants of asset class returns: yields, earnings, P/E and inflation.

These scenarios span the range of the possible. Again, it's less about precisely divining the single outcome of future events. It's more about having a methodology in place to approximate the effect of coming megatrends on asset class performance going forward. In the majority of cases, we see higher rates and more modest equity returns ahead. Of course, the ultimate numbers could be higher or lower than these, but we believe the projections and relations between scenarios are directionally correct.

## Figure 3 | 5-Year Scenario Development

Each scenario comes with its own growth, inflation, interest rate and cash level. These statistics become inputs to our CMA macro scenarios.

| Economic Scenario | Link to LT Scenario | GDP - END | GDP (AVG) | INFLATION - END | INFLATION – (AVG) | LT NOM YIELD - END | LT NOM YIELD (AVG) | EPS GROWTH (AVG) | CASH YIELD (AVG) |
|---|---|---|---|---|---|---|---|---|---|
| All Great: IT productivity & growth expansion | AI Economy | 3.8% | 3.5% | 1.8% | 2.3% | 5.5% | 5.0% | 13% | 4.0% |
| Inflation flare-up: Gov't spending on transition | Green Economy | 3.0% | 2.8% | 3.0% | 3.8% | 5.5% | 5.3% | 8.0% | 4.3% |
| Soft Landing: no US recession this cycle | Baseline | 2.3% | 1.8% | 2.3% | 2.0% | 4.3% | 4.0% | 6.5% | 3.0% |
| Hard Landing: US recession in 2024 | Baseline | 2.3% | 1.3% | 2.3% | 1.5% | 4.3% | 3.5% | 2.0% | 2.3% |
| Supply shock: geopolitical strains | Multipolar World | 2.0% | 0% | 3.5% | 3.8% | 4.8% | 4.3% | 6.0% | 3.8% |
| Weak demand revives loose monetary policy | Secular Stagnation | 2.0% | 1.5% | 1.8% | 2.0% | 2.5% | 3.3% | 6.0% | 2.3% |

Data as of 3/31/2024. Source: American Century Investments.

Now that we have modeled the macroeconomic determinants of return across each of these economic scenarios, we can choose one on which to base our CMAs. Clients could in effect "choose their own adventure," infusing their fundamental economic views into the forecast as provided in **Figure 4**. For our part, rather than fixate on a single outcome, we probability weight them to derive an arguably more nuanced forecast. We do this in **Figure 5**, **Scheme 1**, which depicts the resulting key forecasts for inflation, cash, stocks and bonds that follow from our assigned probabilities.

## Figure 4 | Choose Your Own Adventure: Stock and Bond Forecasts Under Each Scenario

### Build-Up Asset Class Returns

| Economic Scenario | Link to LT Scenario | INFLATION (AVG) | **CASH RET – (AVG)** | COUPON (AVG) | DURATION | **BONDS (incl ROLL)** | EPS GROWTH (AVG) | P/E ADJUST | **EQUITY (+ DIV YLD 1.6%)** |
|---|---|---|---|---|---|---|---|---|---|
| All Great: IT productivity & growth expansion | AI Economy | 2.3% | 4.0% | 5.0% | -1.3% | 4.3% | 12.8% | 0% | 14.4% |
| Inflation flare-up: Gov't spending on transition | Green Economy | 3.8% | 4.3% | 5.3% | -1.3% | 4.1% | 8.0% | -2.6% | 6.8% |
| Soft Landing: no US recession this cycle | Baseline | 2.0% | 3.0% | 4.0% | 0.3% | 4.5% | 6.5% | -2.6% | 5.3% |
| Hard Landing: US recession in 2024 | Baseline | 1.5% | 2.3% | 3.5% | 0.3% | 4.0% | 2.0% | -3.6% | -0.1% |
| Supply shock, geopolitical strains | Multipolar World | 3.8% | 3.8% | 4.3% | -0.3% | 3.8% | 6.0% | -3.6% | 3.8% |
| Weak demand revives loose monetary policy | Secular Stagnation | 2.0% | 2.3% | 3.3% | 2.5% | 6.0% | 6.0% | -5.6% | 1.7% |

Source: American Century Investments.

Forecasts are not a reliable indicator of future performance. The scenarios are hypothetical and contain assumptions that are intended for illustrative purposes only and are not representative of the performance of any security. There is no assurance similar results can be achieved, and this information should not be relied upon as a specific recommendation to buy or sell securities.

To reiterate, different scenarios or a different set of probabilities (such as **Figure 5, Scheme 2**) result in very different projections. This is a clear benefit of a nimble approach, which can accommodate differentiated views in the forecast.

## Figure 5 | Probability Weighting the Macroeconomic Scenarios

### Probability-Weighted Returns Proposals

| Economic Scenario | Probability 1 | Probability 2 |
|---|---|---|
| All Great: IT productivity & growth expansion | 20% | 5% |
| Inflation flare-up: Gov't spending on transition | 20% | 5% |
| Soft Landing: no US recession this cycle | 25% | 30% |
| Hard Landing: US recession in 2024 | 15% | 50% |
| Supply shock, geopolitical strains | 10% | 5% |
| Weak demand revives loose monetary policy | 10% | 5% |
| | 100% | 100% |

| Probability Scheme | INFLATION | CASH | BONDS (GEOM) | EQUITY (GEOM) |
|---|---|---|---|---|
| 1 | **2.5%** | **3.3%** | **4.4%** | **6.0%** |
| 2 | **1.9%** | **2.7%** | **4.6%** | **2.9%** |

Source: American Century Investments.
Forecasts are not a reliable indicator of future performance. The scenarios are hypothetical and contain assumptions that are intended for illustrative purposes only and are not representative of the performance of any security. There is no assurance similar results can be achieved, and this information should not be relied upon as a specific recommendation to buy or sell securities.

# Approach 2: Technical Scenarios for Bond Returns

In this section, we turn to technical scenarios to derive the inputs needed to solve **Equations 1** and **2** above. To be clear, we are still after the same building blocks as in the macro scenarios above, but we'll derive them from a momentum, trend and mean reversion perspective. One difference is that the macro scenarios above allowed us to address stocks and bonds simultaneously. These technical scenarios, however, require that we evaluate them separately.

Here we focus on the bond equation: Bond Return = Yield + Change in Yield Effect + Rolldown Effect + Second-Order Terms.

We begin with the analysis shown in **Figure 6**. The upper-left panel shows three technical scenarios, designated T1, T2 and T3, each of which reflects a return forecast under different yield-change scenarios over time. For comparison, the graphic also includes the six macroeconomic scenario bond forecasts as M1…M6.

We choose to model the return of a seven-year Treasury because this roughly matches the duration of the broad Treasury index. To compute the price return, we note that we need a scenario not only for the yield of a seven-year bond, but also for a six-year bond. These yields will allow us to use the more complex version of **Equation 2**, complete with second-order effects, to compute the bond returns.

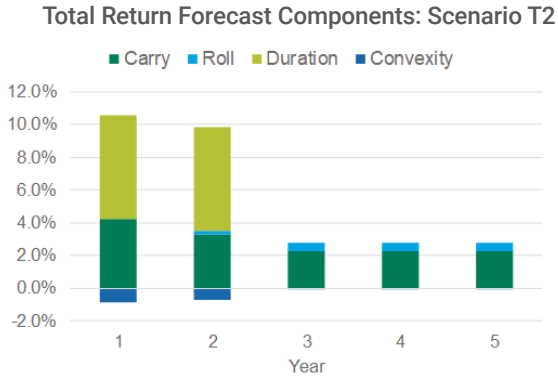
For each scenario, we construct an annual return for each of the five years of our forecast horizon. As a first scenario and intuitive anchor, we assume bond yields remain unchanged. This is depicted as T1. In this scenario, the difference between the yield (4.25%) and the average expected return (4.4%) is a result of the roll-down return due to a bond's shrinking maturity.

Scenarios T2 and T3 are more complex, however. T2 assumes bond yields revert to their average of the last five years and do so in just two years. T3 assumes we experience a reversion to the 15-year average yield over the course of five years. In the interest of brevity, we'll show a detailed breakout of only T2. As a result, the other three panels in Figure 6 expand on the inputs needed to derive the return forecast for scenario T2.

## Figure 6 | Scenario T2: U.S. Treasury Forecast Assuming Yields Revert to Five-Year Average in Two Years

### Technical Scenarios: Bonds Example

| | | Total Return Forecast (ann. arithm.) |
|---|---|---|
| **Macro Scenarios:** | | |
| M1 | Macro 1: AI Econ | 4.4% |
| M2 | Macro 2A: Base Soft | 4.6% |
| M3 | Macro 2B: Base Hard | 4.1% |
| M4 | Macro 4: Sec Stagnation | 6.1% |
| M5 | Macro 5: Supply Shock | 3.9% |
| M6 | Macro 6: Green Econ | 4.2% |
| **Additional Technical Scenarios** | | |
| T1 | Unchanged | 4.4% |
| T2 | Mean reversion to 5yr w/in 2 yrs | 5.4% |
| T3 | Mean reversion to 15yr w/in 5 yrs | 6.3% |




Mean reversion to 5 yr average yield in 2 years:

**Yield Scenarios**

| Year | Cash | 5 Yr | 7 Yr |
|---|---|---|---|
| 0 | 5.25% | 4.25% | 4.25% |
| 1 | 3.65% | 3.20% | 3.28% |
| 2 | 2.05% | 2.15% | 2.30% |
| 3 | 2.05% | 2.15% | 2.30% |
| 4 | 2.05% | 2.15% | 2.30% |
| 5 | 2.05% | 2.15% | 2.30% |

**Total Return Forecast Components**

| Year | Carry | Roll | Duration | Convexity | Total |
|---|---|---|---|---|---|
| 0 | | | | | |
| 1 | 4.3% | 0.0% | 6.3% | -0.89% | **9.7%** |
| 2 | 3.3% | 0.2% | 6.3% | -0.73% | **9.1%** |
| 3 | 2.3% | 0.5% | 0.0% | -0.05% | **2.7%** |
| 4 | 2.3% | 0.5% | 0.0% | -0.05% | **2.7%** |
| 5 | 2.3% | 0.5% | 0.0% | -0.05% | **2.7%** |

| | |
|---|---|
| Average Ret (geom.) | 5.34% |
| Volatility (CMA) | 4.50% |
| **Average Ret (arithm.)** | **5.44%** |

Source: American Century Investments.
Forecasts are not a reliable indicator of future performance. The scenarios are hypothetical and contain assumptions that are intended for illustrative purposes only and are not representative of the performance of any security. There is no assurance similar results can be achieved, and this information should not be relied upon as a specific recommendation to buy or sell securities.

The detailed mean reversion piece in the bottom-left panel shows a rapid, two-year return to the average yield of the last five years. The bottom-right panel details the other return components (carry, roll, etc.) of our bond return equation year by year.

The upshot of T2 (and indeed also T3) is that backward-looking scenarios that contemplate a reversion to historical yield levels produce meaningfully higher return forecasts than virtually all our forward-looking macroeconomic scenarios. The only macro scenario that produces bond returns comparable to T2 and T3 is a return to secular stagnation, which is our lowest probability occurrence. But again, the comparison and contrast of the competing lenses is precisely the point, as opposed to a myopic focus on a single method, scenario or outcome.

# Approach 2: Technical Scenarios for Equity Returns

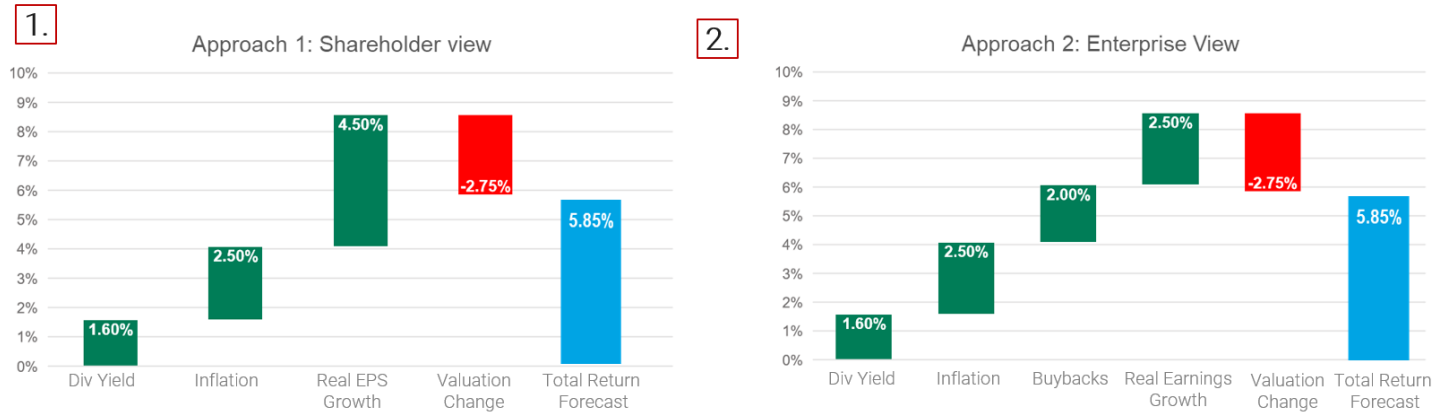
Next, we solve our stock return equation using inputs from technical scenarios. Let's recall the simplified version of **Equation 1**, Equity Return = Inflation + Dividend Yield + Real Earnings Growth + Valuation Change. These building blocks are displayed in **Figure 7**. We'll complete this exercise for U.S. large-cap core equity, represented by such indices as the Russell 1000® Index and S&P 500® Index.

## Figure 7 | U.S. Large-Cap Core Equity Technical Scenarios (Shareholder View)

### Technical Scenario: U.S. Equity Example

Two related approaches:

1. Shareholder View: Return = Div Yield + Inflation + Real EPS Growth + Change in P/E = 6% (geom.)
2. Enterprise View: Return = (Div Yield + Net Buybacks) + Inflation + Real Earnings Growth + Change in P/E = 6% (geom.)




Source: American Century Investments.
Forecasts are not a reliable indicator of future performance. The scenarios are hypothetical and contain assumptions that are intended for illustrative purposes only and are not representative of the performance of any security. There is no assurance similar results can be achieved, and this information should not be relied upon as a specific recommendation to buy or sell securities.

We detail each of the four elements in the equity return forecast in **Figure 8, Panel 1**. Dividend yield and inflation are straightforward:

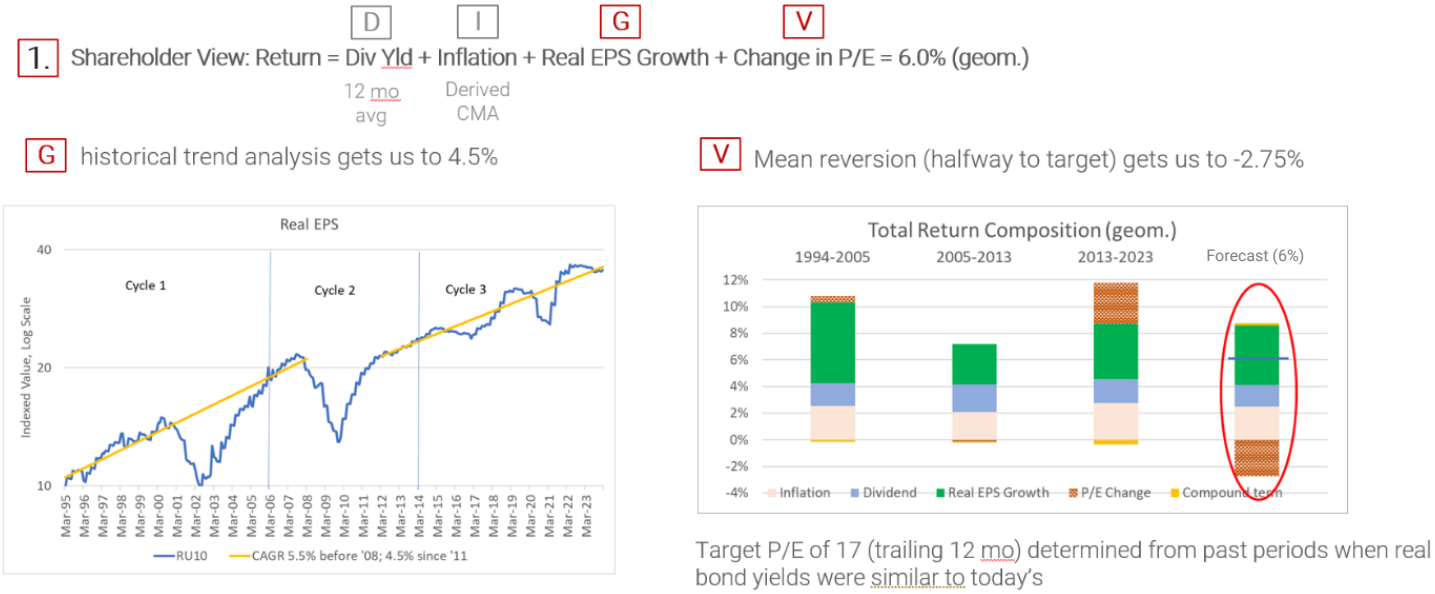
- *D*—1.6% using trailing 12-month average dividend yield.
- *I*—2.5% derived from the probability-weighted macroeconomic scenarios above.

The hard yards of the equation are down to two pieces: earnings growth (*G*) and valuation changes (*V*). To determine the value for *G*, we need to establish a historical earnings growth trend and assess how near or far we are from the trend.

Similarly, *V* requires identifying an equilibrium P/E level. Then we assume some reversion to these historic means of growth and valuation over the five-year forecast horizon. We follow a scenario where valuations return 50% of the way to historical norms.

## Figure 8 | Equity Return Forecast Under Different Technical Scenarios Breakout (Shareholder View)

### Technical Scenario: U.S. Equity Detail




Source: FactSet and American Century Investments.
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### Determining Real Earnings Growth and Valuation Rates

We turn to historical evidence to derive some steady-state levels to derive *G* and *V* for our equation. Remember, two terms contribute to expected earnings growth. One is the trend line of growth, and the second is a reversion to that trend line or the catch-up effect if earnings are depressed/stretched. Meanwhile, valuation change is a function of the adjustment from the current P/E to its historical equilibrium level. The adjustment doesn't have to be complete over the forecast period. The interaction between prices and earnings over a longer period can be illustrated by the following decomposition:

$$\frac{P_5}{P_0} = \frac{E_5}{E_0} \times \frac{P_5/E_5}{P_0/E_0}$$

The decomposition shows that price returns are a product of earnings growth and change in P/E valuations even over longer periods. This explains the need to identify these longer-term trends in both quantities.

**Figure 8**, **Panel G**, depicts three distinct periods and sensible (to us!) trends in EPS growth. For example, before the Great Financial Crisis, we see EPS growing at a 5.5% real annual rate. In the period after the GFC recovery, EPS growth stabilized at 4.5%, albeit with greater variation. Today we are right on the recent trend line, so 4.5% seems a reasonable input for G.

For P/E, it is trickier to identify "stable" levels from **Figure 8**, **Panel V**, which are needed to get to the "$P_5/E_5$" term. For that, we must disentangle the P from the E. To do so, we start with trailing 12-month earnings. Building on the EPS growth piece, we want E to be close to trend, i.e., not depressed or on a sugar high. Meanwhile, the P contains embedded expectations of future earnings growth one, two, *n* years out. The implication is that if we can identify a time when E growth is stable, this would allow us to reason that the future expected earnings reflected in P are also "on trend," and in turn that should make that P/E level a sensible anchor for our assumptions.

Essentially what is required is an "earnings-trend" adjusted P/E. This concept bears a close intuitive relation to the well-known cyclically adjusted P/E (CAPE). CAPE, to be systematic, averages the past 10 years of earnings and calls that a "cycle." Our trend-adjusted earnings are more carefully identifying the earnings trend from the data, albeit in a more subjective manner. While we philosophically prefer being systematic, in this case we choose to trade off some subjectivity for better precision.

However you get there, the reality you confront with any process that seeks to normalize earnings is that today's valuations are far out of line with history. As a result, forecasts using this methodology anticipate disappointing returns for equities relative to the post-GFC trend.

- For EPS growth, we keep the current 4.5% trend identified in **Figure 8, Panel G**.
- For P/E, we assume a 50% reversal to trend over the next five years, resulting in a -2.75% valuation effect. In contrast, the current cycle that started in 2013 has seen a +3% addition to equity returns from valuation.

Of course, the level of interest rates has something to do with this. Interest rates had been in secular decline for approximately 40 years until 2022-2023. Given the unprecedented level of peacetime government debt and trends in geopolitics and demographics, secular declines in interest rates appear to be a thing of the past. Maybe someday we'll look back on 2009-2024 as an unprecedented "golden age" for equities. Whatever the case, forward return projections using normalized earnings and/or interest rates can't help but fall short of these outsized historical (historic?) gains.

Putting it all together, we get an approximately 6% forecast return (geometric) for U.S. large-cap core equity:

- *D*—1.6% using trailing 12-month average dividend yield.
- *I*—2.5% derived from our probability-weighted macroeconomic scenarios.
- *G*—4.5% using historical EPS trend analysis.
- *V*—(2.75%) 50% P/E mean reversion requires a -2.75% detraction from the expected return.

As another check on our numbers and an additional lens through which to view this question, we can look at historical P/Es in relation to real bond yields. Real rates today are at roughly the same level as they were in 2004-2006, about 2%. If we use the historical average P/E from that period, then our historical target P/E is 17, compared with more than 20 today. Again, to retrace 50% of that level, the valuation change must detract meaningfully from our medium-term forecast.

Now, let's look at this conclusion in light of our earlier work: This combination of EPS growth expectations and valuation changes takes us to the same expected return as those derived from our macro-based scenarios forecast, making the two views consistent. You can compare our forecast using probability-weighted macroeconomic inputs in **Figure 5**.

# Approach 2: Style, Small-Cap and Non-U.S. Equities

We can apply the same methodology we used for U.S. large-cap stocks to other asset classes, including U.S. small-company equity, value- and growth-style U.S. equity, and non-U.S. developed market equities.

These exercises rely on the same equations/determinants of return as the U.S. large-cap core analysis. That is, we look at the same three historical earnings cycles discussed in **Figure 8**, **Panels G** and **V**. You can see the return composition for these asset classes and periods in **Figure 9**.

- U.S. large-cap growth equity return = 0.9 + 2.5 + 6.5 – 4.0 = approximately 6% geometric.
- U.S. large-cap value equity return = 2.4 + 2.5 + 2.5 – 1.5 = approximately 6% geometric.
- U.S. small-cap core equity return = 1.6 + 2.5 + 2.5 + 0.0 = approximately 6.75% geometric.
- Non-U.S. large-cap equity return = 3.0 + 2.5 + 0.5 +0.8 = approximately 7% geometric.

With respect to returns by style, value and growth returns must together equal core returns. Interestingly, different paths sometimes lead to the same destination — we get the same forward returns for these distinct styles but with very different EPS growth and valuation effects. Note that the valuation adjustment for our U.S. style returns uses the historical level from 2005 when real rates were similar to today's levels. Then, U.S. large-cap growth had a P/E of 20 versus 15 for value.

## Figure 9 | Non-U.S. Large-Cap Core Forecasts Under Different Technical Scenarios

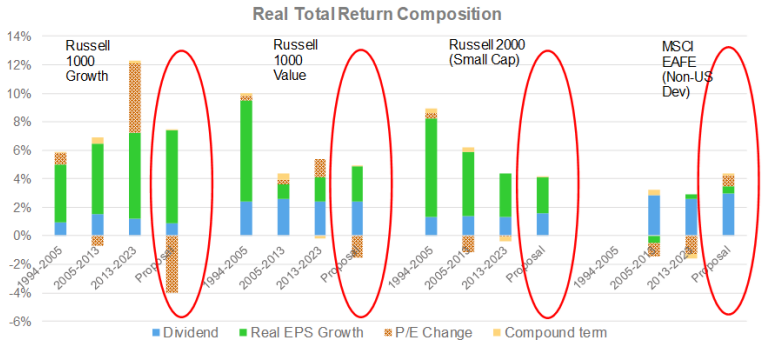
### Technical Scenario: Other Equity Markets

Apply shareholder view: U.S. Large Growth; U.S. Large Value; U.S. Small-Cap; Non-U.S. Developed Core

G Real EPS Growth: much larger for U.S. Large Growth in recent history → We assume it will continue

V Change in P/E: assume reversion to target, 1/2 way for overvalued markets

- Target P/E determined same way
- Much larger reversion for U.S. Large Growth




| | U.S. Large Growth | U.S. Large Value | U.S. Small | Non US Dev |
|---|---|---|---|---|
| | Forecast | Forecast | Forecast | Forecast |
| Dividend | 0.9% | 2.4% | 1.6% | 3.0% |
| Real EPS Growth | 6.5% | 2.5% | 2.5% | 0.5% |
| P/E Change | -4.0% | -1.5% | 0.0% | 0.8% |
| Compound term | 0.1% | 0.1% | 0.1% | 0.1% |
| Inflation | 2.5% | 2.5% | 2.5% | 2.5% |
| **Total return (geom.)** | **6.0%** | **6.0%** | **6.8%** | **7.0%** |
| Volatility | 15.5% | 15.5% | 19.5% | 17.0% |
| **Total return (arithm.)** | **7.2%** | **7.2%** | **8.7%** | **8.4%** |

Source: FactSet and American Century Investments. Proposal = 3-5 Year Forecast in Real Total Return Composition chart.
Forecasts are not a reliable indicator of future performance. The scenarios are hypothetical and contain assumptions that are intended for illustrative purposes only and are not representative of the performance of any security. There is no assurance similar results can be achieved, and this information should not be relied upon as a specific recommendation to buy or sell securities.

# Approach 3: Historical Risk Premia

Our next approach relies on historical relationships among asset classes. We leverage this approach to construct the forecast for some smaller asset classes with shorter histories/less robust data. Intuition, experience and economic fundamentals inform us about which asset classes should have strong relationships. We validate the strength of these presumed relationships with historical data.

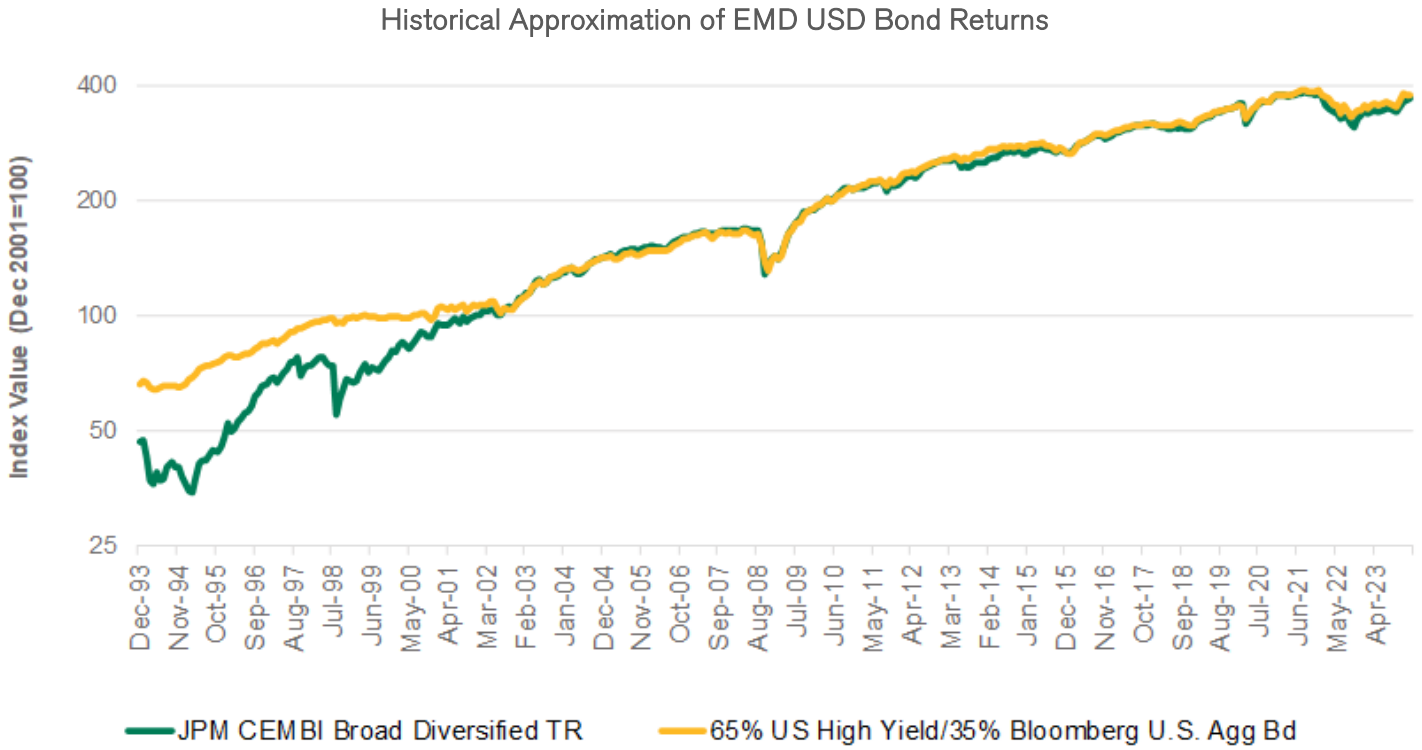
For an example of how these historical analyses can work in practice, consider **Figure 10**. The graphic details the tight historical return relationship between dollar-denominated emerging markets debt (EMD) and a constant mix of U.S. high-yield (HY) and investment-grade (IG) bonds. The rationale for why this historical relationship exists is detailed below:

- First, we are analyzing dollar-denominated EMD. Economic intuition holds that this asset should be similarly valued to defaultable bonds issued in USD with similar default ratings (a mix of high-yield and investment-grade bonds).
- Indeed, we find that for the past 20 years, dollar-denominated EMD returns track closely with a simple combination of U.S. IG and U.S. HY indices. (A chart showing yields would tell the same story.)
- This means that we can forecast dollar-denominated EMD returns by assigning a 0% risk premium to that combination of U.S. high-yield and investment-grade bonds.
- Given that our IG and HY bond forecasts are based on macro scenario analysis and assumptions, those scenarios are effectively incorporated into our EMD forecast as well.

## Figure 10 | Using Historical Return Relationships to Forecast Returns for Smaller Asset Classes

### Risk Premia: EM Bond Example

- Forecast for Emerging Markets Bond USD based on U.S. High Yield/U.S. Core Bond combination
  - Historically tight relationship with proxy over the past 20 years
  - EMD assumption = 65%*(U.S. High Yield) + 35%*(U.S. Aggregate Bond)




Data as of 2/28/2024. Source: FactSet. Composite: 65% Bloomberg U.S. Aggregate Credit – Corp – High Yield TR; 35% Bloomberg U.S. Aggregate TR.
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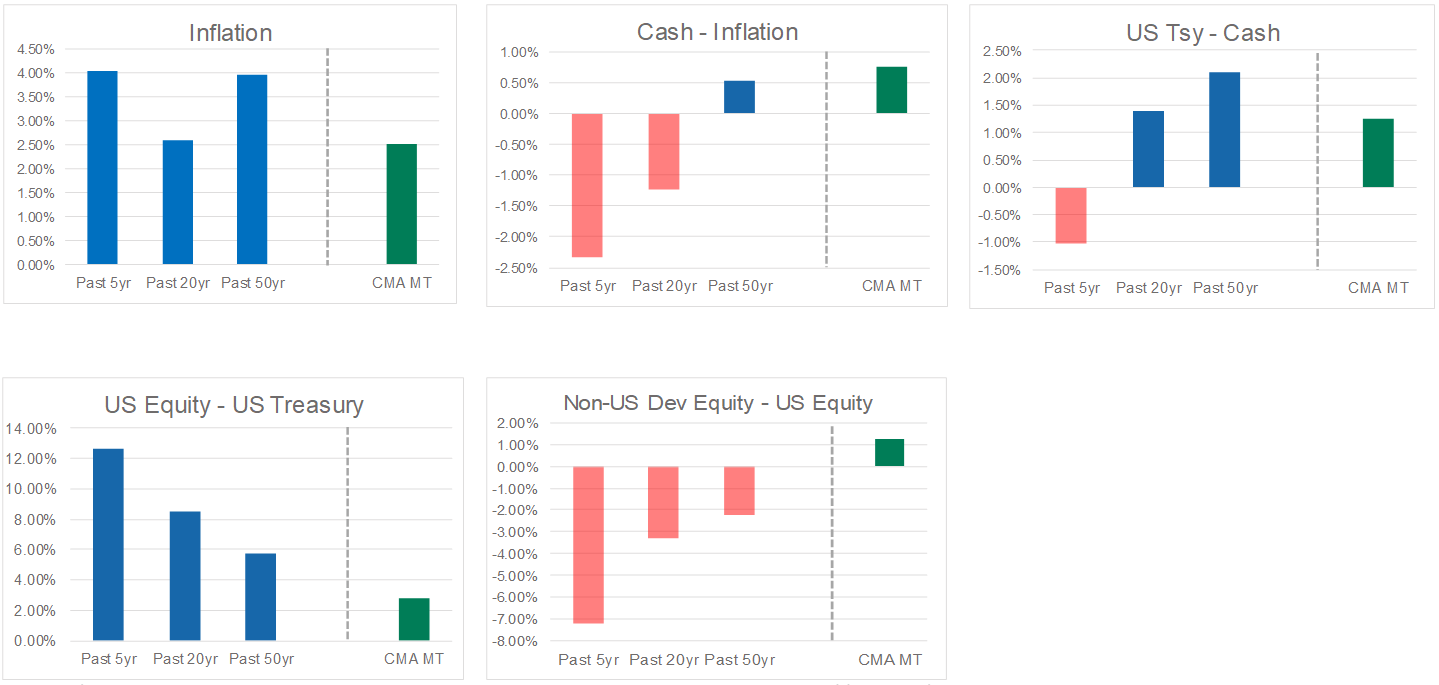
The realized historical experience validates the hypothesis. For our purposes, a combination of U.S. high-yield and investment-grade bonds can serve as an effective proxy for dollar-denominated emerging market debt.

For the asset classes discussed extensively during the earlier approaches — inflation, cash, U.S. Treasuries and U.S. large-cap core — **Figure 11** serves as another lens through which to assess our earlier work. This risk premium view allows us to see how our forward-looking analyses compare with history. Each panel in **Figure 11** shows historical average returns over five, 20 and 50 years set against the relevant current three- to five-year CMA forecast.

## Figure 11 | Viewing Our Macro and Technical Forecasts Through a Historical Lens

### Risk Premia – Historical Review




Data as of 4/30/2024. Source: American Century Investments. Forecasts are not a reliable indicator of future performance.

This historical view presents an opportunity to identify outliers in our current CMAs and invites us to consider any deviations. Of course, it wouldn't be a deal breaker if some of our forecasts fell well outside historical norms. But what it would do is provide another opportunity to reevaluate our findings in light of historical experience. For example, the clear standouts relative to past history are those involving U.S. equities (see panels U.S. Equity – U.S. Treasury and Non-U.S. Equity – U.S. Equity). Rather than give us pause, however, these comparisons are entirely consistent with the view we've presented throughout this paper — the next five years are highly unlikely to be similar to the prior five, or indeed 20 or 50 years.

## Approaches to Volatility and Correlation Vary with the Forecast Horizon

Just as we use multiple models to forecast asset class returns, so too do we use multiple views of volatility and correlation data as history and data series will allow. With respect to volatility, we view historical data across multiple horizons and frequencies. This is because market dynamics change and volatility regimes change, and we think it makes sense to view volatility in different ways in an attempt to capture those competing environments.

In this paper, we've focused on our medium-term CMAs. For these, we use monthly data over the past 20 years. This 20-year window captures the Great Financial Crisis and pandemic-related market disruptions, sandwiching a period of historically low stock and bond volatility from roughly 2009-2019. Given the different economic and market scenarios in this period, we believe this specification is appropriate for our medium-term analysis.

With respect to our long-term forecast, we use different frequencies (monthly and 12-month intervals) as well as multiple periods (20-, 30- and 50-year lookbacks). This diversified specification allows us to capture richer dynamics with less noise, as each frequency and period choice has its own benefits and limitations.

For newer asset classes that don't have enough historical data for our purely quantitative process, we use a more qualitative mapping process, where we infer the long-term behavior from their short(er)-history behavior and the difference between short- and long-term behavior of similar assets with full history. We note that at least one period, the 20-year, has full coverage, allowing us to infer longer-term behaviors for the missing asset classes. The resulting long-term correlations are available upon request.

# Medium-Term (3- to 5-Year) Capital Markets Assumptions

*Covariance Matrix Available Upon Request*

| 3- to 5-Year Forecast (annualized) | | | |
|---|---|---|---|
| **Asset Class** | **Return** | **Volatility (Std Dev)** | **Sharpe Ratio** |
| **Fixed Income** | | | |
| U.S. Short TIPS | 4.50% | 3.2% | 0.39 |
| U.S. High Yield Bond | 6.75% | 9.0% | 0.39 |
| U.S. Bank Loans | 5.75% | 6.5% | 0.38 |
| EM Bond, USD | 6.00% | 7.5% | 0.37 |
| U.S. Aggregate Bond | 4.75% | 4.1% | 0.37 |
| U.S. Corporate Bonds | 5.25% | 6.0% | 0.33 |
| U.S. MBS | 4.50% | 4.0% | 0.31 |
| U.S. TIPS | 5.00% | 5.8% | 0.30 |
| U.S. Govt Bonds | 4.50% | 4.5% | 0.28 |
| Non-US (EAFE) Bond Hedged | 4.00% | 3.0% | 0.25 |
| EM Bond, Local | 5.75% | 11.8% | 0.21 |
| U.S. Municipal Bonds | 4.25% | 4.7% | 0.21 |
| U.S. Short Bond | 3.50% | 1.4% | 0.18 |
| Non-US (EAFE) Bond | 4.00% | 8.0% | 0.09 |
| Cash USD | 3.25% | 0.5% | |
| **Hybrid** | | | |
| U.S. Convertible Bonds | 7.00% | 12.5% | 0.30 |
| U.S. Preferred Stock | 5.25% | 15.5% | 0.13 |
| **Equity** | | | |
| UK Core | 10.00% | 17.0% | 0.40 |
| Japan Core | 8.50% | 15.0% | 0.35 |
| Non-US (EAFE) Value | 9.00% | 18.0% | 0.32 |
| Non-US (EAFE) SMID | 9.00% | 18.0% | 0.32 |
| Non-US (EAFE) Core | 8.50% | 16.5% | 0.32 |
| Non-US (EAFE) Growth | 8.00% | 16.5% | 0.29 |
| U.S. Mid Value | 8.25% | 17.5% | 0.29 |
| U.S. Small | 8.75% | 20.0% | 0.28 |
| U.S. Large Core | 7.25% | 15.0% | 0.27 |
| Eurozone Core | 8.25% | 19.0% | 0.26 |
| U.S. Large Value | 7.25% | 15.5% | 0.26 |
| U.S. Mid Growth | 7.75% | 18.0% | 0.25 |
| Emerging Markets | 8.50% | 21.0% | 0.25 |
| U.S. Large Growth | 7.25% | 16.0% | 0.25 |
| Asia ExJPN Core | 8.00% | 20.0% | 0.24 |
| **Alternatives** | | | |
| Hedge Funds | 5.25% | 6.3% | 0.32 |
| Private Equity/VC | 7.25% | 13.5% | 0.30 |
| Global REITs | 8.00% | 19.5% | 0.24 |
| Commodities | 4.25% | 16.0% | 0.06 |
| U.S. Inflation | 2.50% | | |

Data as of April 2024. Source: American Century Investments.
Returns are simulated based on capital market assumptions from ACI Multi-Asset Strategies' medium-term forecasts (3-5 Years). Forecasts are not a reliable indicator of future performance. American Century Investments Capital Market Assumptions For each asset class, American Century develops a set of assumptions for return, risk, and correlation. Because asset class returns and relationships are ultimately grounded in economic fundamentals, we forecast over the equivalent of a complete economic and market cycle. We arrive at our return forecasts through various modeling techniques, such as a classic valuation approach, a risk-premium approach, and a historical risk and return analysis. In addition to this quantitative process, we employ a qualitative review, recognizing that there are elements that can't be easily captured by a quantitative process. Further, the quantitative models require forecasting various inputs, which again may contain qualitative elements.

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**American Century Investments ®**

4500 Main Street
Kansas City, MO 64111
1-866-628-8826

330 Madison Avenue
New York, NY 10017
1-646-658-7700

3945 Freedom Circle
Santa Clara, CA 95054
1-866-628-8826

360 E 2nd Street
Los Angeles, CA 90071
1-866-628-8826

2 Ice House Street
Central, Hong Kong
+852 3405 2600

12 Henrietta Street
London, WC2E 8LH
+44 207 024 7080

1 Farrer Place
Sydney, NSW 2000
+61 2 88233403

Taunusanlage 8
60329 Frankfurt, Germany
+49 69 8088 5501