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# 2021 Long-Term Capital Market Assumptions

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Q3 Update | Invesco Investment Solutions | Japanese yen (JPY)

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# 1

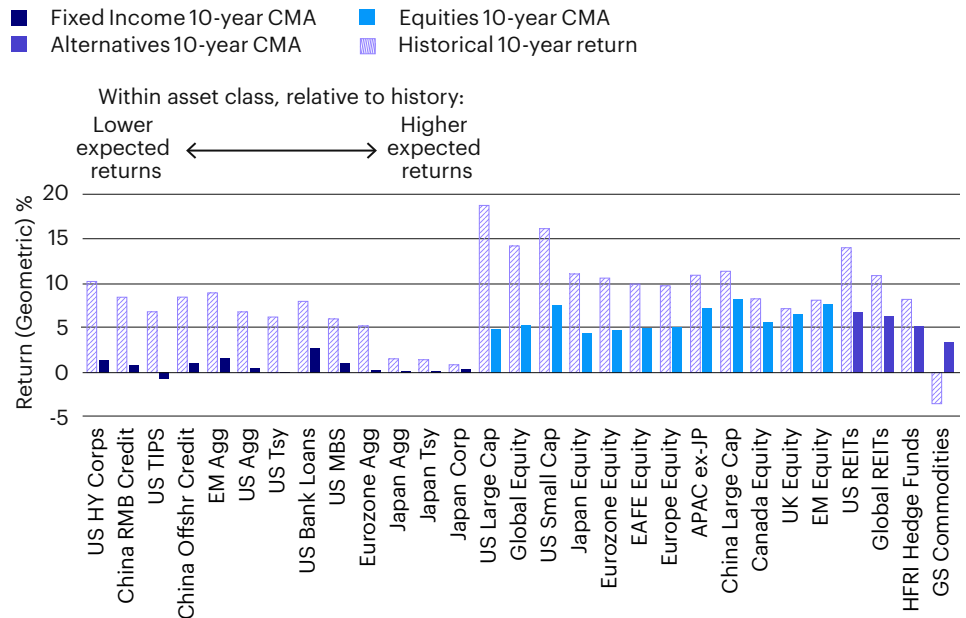
## Executive Summary



**Duy Nguyen**  
CIO, Invesco Investment Solutions

- Strategic Perspective:** In March of 2020, as COVID-19 shutdowns began to constrict economies globally, few could have anticipated that in a handful of quarters, the US large-cap equity market would double from its depths and be roughly a third higher than its peak from the previous cycle. While our Capital Market Assumptions (CMAs) anticipated a significant improvement in earnings from that low point, the pace of the recovery has been astounding. While COVID-19 has changed many aspects of our lives, our strategic perspective is that many of the themes we see in the investment landscape will continue. We anticipate the next ten years to be significantly different than the last as investment challenges remain in a low-rate and low-growth world facing rising inflation and duration risks (**Figure 1**).
- Tactical View:** Leading economic indicators for the major regions around the world are peaking at the same time global risk appetite is stabilizing at cyclical highs. Our macro regime framework remains in an expansionary regime, but it is increasingly flagging the potential for an inflection point in the next few months. These transitions at the peak of the growth cycle are notoriously unstable, characterized by range-bound price action in asset prices and shifting themes, with overall positive performance for risky assets. While we believe the early-cycle reflation trade is not exhausted, it is approaching its last stages as evidenced by the recent pullback in the performance of value relative to growth, the performance of small-caps and mid-caps relative to large-cap equities, and the meaningful rally in long-term bond yields.
- Global Market Outlook:** Since the pandemic began, the global economy has been taken on a roller coaster ride. The last several months have seen the spread of Delta and other COVID-19 variants, raising the specter of renewed lockdowns in some places. The risk of even more contagious and dangerous mutations developing has continued thanks to a slow vaccine rollout in some countries and regions. In addition, some questions have recently arisen about how long COVID-19 vaccinations remain effective. Fears about higher inflation triggering a hastening of Fed tightening have abated somewhat, although that remains a distinct concern for some investors. In this environment, we continue to have conviction in our base case scenario, which anticipates that the reopening will continue, resulting in accelerating economic growth.

**Figure 1: Expectations relative to historical average (JPY)**



Source: Invesco, estimates as of June 30, 2021. Proxies listed in **Figure 13**. These estimates are for forward-looking, are not guarantees, and they involve risks, uncertainties, and assumptions. Please see page 15 for information about our CMA methodology. These estimates reflect the views of Invesco Investment Solutions, the views of other investment teams at Invesco may differ from those presented here.

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## Asset Allocation Insights



**Jacob Borbidge**  
Senior Portfolio Manager,  
Head of Investment Research,  
Invesco Investment Solutions

For further details on our process for defining scenarios and adjustments, please refer to our CMA Methodology paper.

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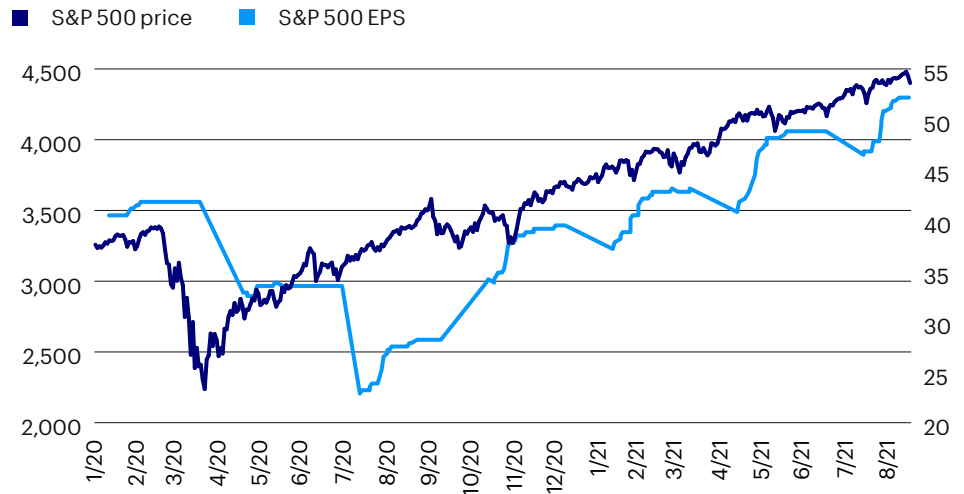
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## Strategic perspective

In March of 2020, as COVID-19 shutdowns began to constrict economies globally, few could have anticipated that in a handful of quarters, the US large-cap equity market would double from its depths<sup>1</sup> and be roughly a third higher than its peak<sup>2</sup> from the previous cycle. While our Capital Market Assumptions (CMAs) anticipated a significant improvement in earnings from that low point, the pace of the recovery has been astounding (**Figure 2**). As with any market recovery, this rapid rise in asset prices has led to common questions from our clients, which, when paraphrased, amount to “Are we close to the end of the cycle, and if so, what will cause it?”.

**Figure 2: US large-cap equity prices have led adjusted earnings per share**



Source: Bloomberg L.P., S&P, as of Aug. 18, 2021.

In the following section of this report, our colleagues in Invesco’s Global Market Strategy (GMS) office have highlighted two possible near-term risks to our base case outlook of a continued, healthy economic expansion, namely, renewed shutdowns returning us to the aforementioned COVID-19 depths and inflationary pressures that may cause policymakers to raise rates sooner than expected.

Within Solutions, we do not portend the moves of policymakers, forecast the latest medical advances, or try to explain the latest market narrative, and instead build diversified portfolios using a risk-aware investment process over the full market cycle and its regimes. This framework, combining strategic and tactical asset allocation, aims to identify trends in asset behaviors over various time horizons. While COVID-19 has changed many aspects of our lives, our **strategic perspective** is that many of the themes we see in the investment landscape will continue. We anticipate the next ten years to be significantly different than the last as investment challenges remain in a low-rate and low-growth world facing rising inflation and duration risks.

## 3Q21 CMA observations

### Equities

- The second quarter of 2021 has been a standout for global equities, led by the US and specifically large growth firms. Not all regions have had similar experiences to the US due to a litany of reasons that stifled growth, such as the limited availability of effective vaccines, tighter restrictions on businesses and mobility, and more conservative policy measures. Our long-term CMAs of risk assets in emerging markets (EM) and developed markets (DM) outside of the US anticipate strength coming from lower relative valuations, higher yields, and higher earnings growth compared to the US.
- Despite our global equity CMAs being much higher than a year ago, our models have begun to discount future earnings growth; thus, the earnings building block of the equity CMAs has become a detractor relative to last quarter. This trend is due to a higher base effect, with lower levels of earnings in the quarter post-COVID-19 rolling off. Cyclical regions, like the UK, Canada, and EM, were those most affected by this trend in earnings data.
- Within the US, large-capitalization firms were up slightly over the quarter, and the size premium of small grew to be larger. Valuations are high globally, and the building block is estimated to be a detractor in all major regions, with the US being the most overvalued compared to DM ex-US and EM.
- Higher expected inflation has increased nominal returns, while real returns are down slightly. Over our 10-year horizon, we anticipate the dollar will be weaker in the future compared to DM and slightly stronger than EM currencies. Recent updates to our PPP<sup>3</sup> model have shown strength in the US path of inflation and have improved the currency's prospects.

### Fixed income

- The flattening of global yield curves this past quarter decreased expected fixed income returns broadly. Within credit assets, there was a pronounced decrease in high yield returns driven by compression in spreads. Our TIPS CMA is up significantly as inflation expectations have risen.

### Alternatives

- Real assets like commodities have seen increases in their CMAs over the past year due to higher spot returns, collateral returns, and expected inflation. REIT CMAs are lower than last quarter as valuations and smaller dividend yields have followed many quarters of higher than average returns from the asset class. Our leveraged buyout (LBO) CMA is down significantly as we anticipate slower growth within this part of the market, notably debt has become more expensive because of higher carrying costs; thus, less leverage is anticipated to be applied.

1. Source: Bloomberg L.P., US large-cap equities represented by the S&P 500 Index. Data as of Aug. 18, 2021.

2. Source: Bloomberg L.P., prior peak recorded at Feb. 19, 2020. Data as of Aug. 18, 2021.

3. PPP stands for purchasing power parity. Further information on our currency model or any other information on how we develop our CMAs can be found in our annual methodology document.



**Alessio de Longis**  
Senior Portfolio Manager,  
Head of Tactical Asset Allocation,  
Invesco Investment Solutions

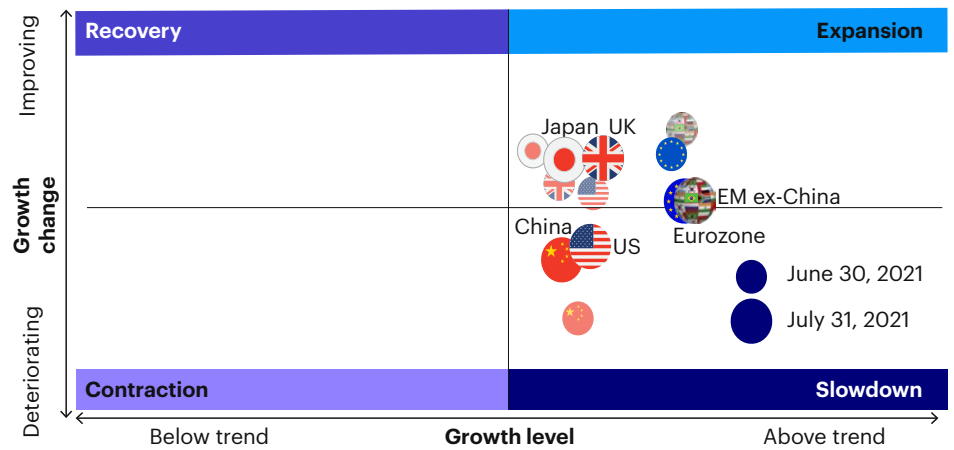
For further details on our macro regime framework, please refer to our CMA Methodology paper.

## Tactical view

Leading economic indicators for the major regions around the world are peaking (**Figures 3 and 4**) at the same time global risk appetite is stabilizing at cyclical highs. Our macro regime framework remains in an expansionary regime, but it is increasingly flagging the potential for an inflection point in the next few months. These transitions at the peak of the growth cycle are notoriously unstable, characterized by range-bound price action in asset prices and shifting themes, with overall positive performance for risky assets. While we believe the early-cycle reflation trade is not exhausted, it is approaching its last stages as evidenced by the recent pullback in the performance of value relative to growth, the performance of small-caps and mid-caps relative to large-cap equities, and the meaningful rally in long-term bond yields.

**Figure 3: While the global economy remains in expansion, some regions have shifted toward a slowdown cycle**

Current Leading Economic Indicators (LEIs) – July 31, 2021

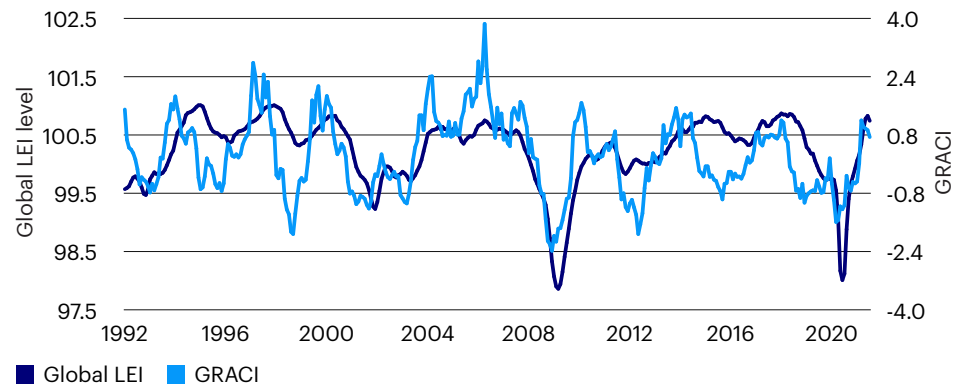


|                                 | LEIs                           | Global Risk Appetite                        | Expected macro regimes |
|---------------------------------|--------------------------------|---|------------------------|
| <b>Region</b>                   | <b>Current level of growth</b> | <b>Change in global growth expectations</b> |                        |
| <b>Global</b>                   | <b>Above Trend</b>             | & <b>Improving growth expectations</b> =    | <b>Expansion</b>       |
| <b>United States</b>            | <b>Above Trend</b>             |   | <b>Expansion</b>       |
| <b>Developed Markets ex-USA</b> | <b>Above Trend</b>             |   | <b>Expansion</b>       |
| Europe                          | Above Trend                    |   | Expansion              |
| United Kingdom                  | Above Trend                    |   | Expansion              |
| Japan                           | Above Trend                    |   | Expansion              |
| <b>Emerging Markets</b>         | <b>Above Trend</b>             |   | <b>Expansion</b>       |
| China                           | Above Trend                    |   | Expansion              |
| Emerging Markets ex-China       | Above Trend                    |   | Expansion              |

Sources: Bloomberg L.P., Macrobond. Invesco Investment Solutions research and calculations. Proprietary Leading Economic Indicators of Invesco Investment Solutions. Macro regime data as of July 31, 2021. The Leading Economic Indicators (LEIs) are proprietary, forward-looking measures of the level of economic growth. The Global Risk Appetite Cycle Indicator (GRACI) is a proprietary measure of the markets' risk sentiment.

**Figure 4: Invesco Investment Solutions leading indicators – GRACI and the global LEI**

IIS: GRACI and the global business cycle



Sources: Bloomberg L.P., MSCI, FTSE, Barclays, JPMorgan, Invesco Investment Solutions research and calculations, from Jan. 1, 1992 to July 31, 2021. The Global Leading Economic Indicator (LEI) is a proprietary, forward-looking measure of the growth level in the economy. A reading above (below) 100 on the Global LEI signals growth above (below) a long-term average. The Global Risk Appetite Cycle Indicator (GRACI) is a proprietary measure of the markets' risk sentiment. A reading above (below) zero signals a positive (negative) compensation for risk-taking in global capital markets in the recent past. Past performance does not guarantee future results.

Emerging market (EM) equities have continued to underperform over the past month. Our overweight positioning to the asset class relative to developed market (DM) equities is certainly the most challenged active exposure in our portfolio, but one we continue to hold based on our macro framework. Several factors have contributed to the setback in EM equities after their strong outperformance between Q4 2020 and mid-February 2021.

- First, the rise in US bond yields in the first quarter of this year, coupled with a stronger US dollar, led to a tightening in EM financial conditions due to a higher dependence on external/US dollar funding relative to developed markets.
- Next, slower vaccination progress, coupled with a resurgence of the virus via the Delta variant, moderated the expectation that the broad-based global reflation trade would lift local EM equities.
- Finally, China's recent regulatory crackdown on the technology sector, among others, introduced additional uncertainty for foreign investors, causing additional underperformance in local equity markets.

This last development deserves more attention, given its potentially erratic nature, and the nexus between regulatory policy, macroeconomic policy, and investor confidence. Chinese authorities have shown a strong commitment to regulate market sectors that are growing rapidly with insufficient scrutiny over issues such as data security, consumer rights protection, fair competition, and oversight of overseas share listings. While the uncertainty of these steps can certainly shake investor confidence in the near term, the willingness to introduce a solid regulatory framework in fast-growing sectors should benefit investors in the long term.

Furthermore, despite their ongoing efforts to tighten rules on technology firms, Chinese leaders are also expected to intensify policy support in the second half of the year to support the economy. The Politburo meeting on July 31 signaled more targeted support for the local economy through a focus on medium and small businesses, boosted fiscal spending, and the potential reduction of the reserve requirement ratio for banks. Finally, the Politburo formally stated its aim of "enhancing independence of macroeconomic policy," which would also imply an increasingly independent People's Bank of China (PBOC) policy from the Federal Reserve (Fed). This would allow the Chinese monetary stance to be more accommodative to local growth needs at a time when the Fed is entering into a gradual policy normalization path.

### Our overweight exposure to EM equities is driven by two key factors:

- Expectations that the global business cycle is in an expansionary regime, with rising risk appetite signaling the potential outperformance of riskier, more cyclical asset classes such as EM equities.
- Expectations for medium-term US dollar depreciation, supported by more favorable currency valuations outside the US, both in DM and EM; easing financial conditions; and capital inflows into EM assets.

The three broad developments that in our opinion have negatively affected the performance of EM equities have thus far slowed, but not derailed, market sentiment and global risk appetite, therefore leaving our investment framework tilted in favor of the asset class. While our investment process is not expected to anticipate idiosyncratic fundamental developments such as the recent regulatory clampdown by Chinese authorities, we expect our framework to react in the event such policy shock derails global market sentiment and global growth expectations, in which case we would adjust our positioning accordingly.

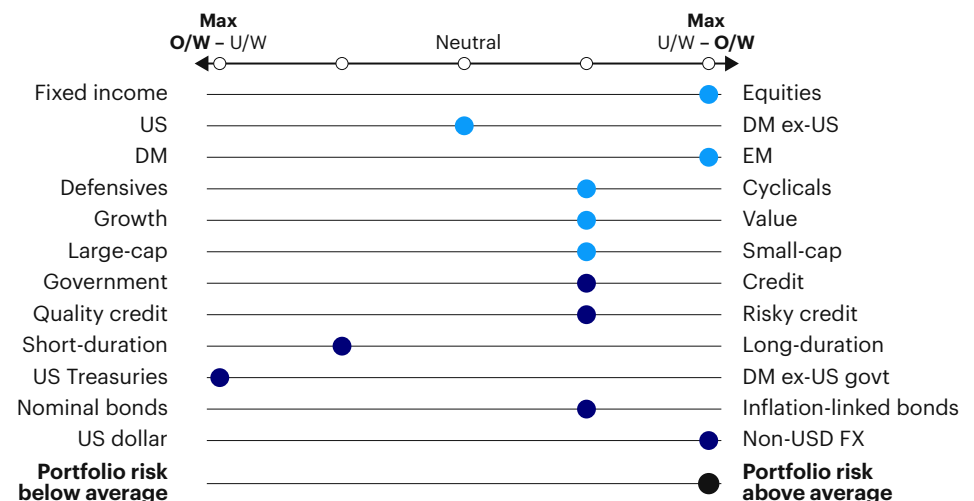
## Investment positioning

We maintain a higher risk posture than our benchmark in the Global Tactical Asset Allocation model,<sup>4</sup> with an overweight to equities and risky credit at the expense of government bonds and higher-quality credit assets (**Figure 5**).

- Within **equities**, we favor EM, driven by above-trend global growth, rising risk appetite, and medium-term US dollar depreciation to support the asset class. We have neutralized our exposure to DM outside the US, relative to US equities, as leading indicators point to a near-term softening of the cyclical upturn in Europe. However, we remain tilted in favor of (small) size and value across regions. In addition, we are tilted in favor of momentum which currently captures value and smaller-capitalization equities, therefore concentrating risk in cyclical factors and reducing portfolio diversification relative to the past few years.
- In **fixed income**, we are overweight credit risk<sup>5</sup> and underweight duration versus the benchmark. We favor risky credit despite tight spreads, seeking income in a low-volatility environment. We are overweight high yield, bank loans, and EM debt at the expense of investment grade credit and government bonds. We favor US Treasuries over other developed government bond markets given the yield advantage.
- In **currency markets**, we maintain an overweight exposure to foreign currencies, positioning for long-term US dollar depreciation. We remain constructive on EM foreign exchange given attractive valuations, an improving cycle, and a favorable backdrop for capital inflows, favoring the Indian rupee, the Indonesian rupiah, the Russian ruble, and the Brazilian real. Within DM, we favor the euro, the yen, the Canadian dollar, the Singapore dollar, and the Norwegian kroner, while we underweight the British pound, the Swiss franc, and the Australian dollar.

**Figure 5: Relative tactical asset allocation positioning**

Global cycle remains in Expansion Regime



4. Global 60/40 benchmark (60% MSCI ACWI / 40% Bloomberg Barclays Global Agg USD hedged).

5. Credit risk defined as DTS (duration times spread).

Source: Invesco Investment Solutions, August 2021. For illustrative purposes only.

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## Global Market Outlook



**Kristina Hooper**  
Chief Global Market Strategist



**Arnab Das**  
Global Market Strategist - EMEA



**Brian Levitt**  
Global Market Strategist -  
North America

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## Mid-Year Outlook 2021

**Review**

The second quarter was a strong one for the global economy, which accelerated during this period as many countries benefited from the economic reopening underway. The US economy has made a powerful comeback from the deep hit created by the pandemic and continues to improve — helped by generous fiscal and monetary stimulus.

Risk assets benefited from this economic environment. Global equities had a strong quarter, led by US stocks. Within fixed income, credit assets outperformed sovereign debt. Commodities benefited from rising demand related to the reopening, as well as a falling US dollar.

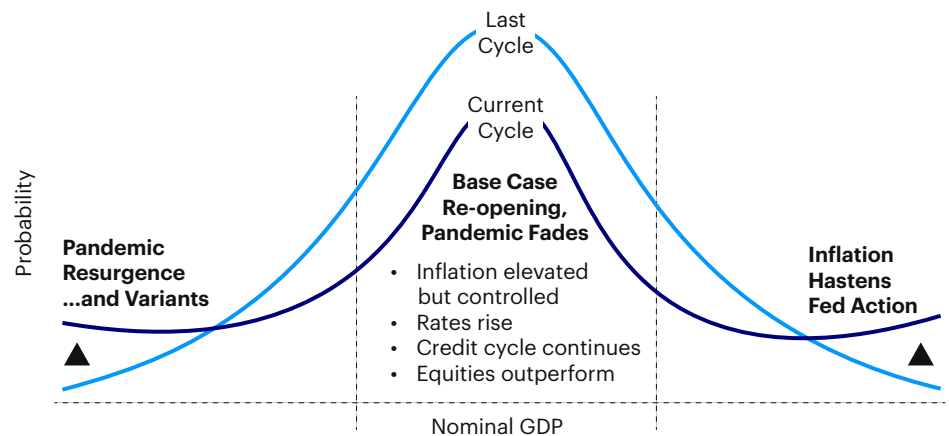
**Outlook**

Since the pandemic began, the global economy has been taken on a roller coaster ride. The last several months have seen the spread of Delta and other COVID-19 variants, raising the specter of renewed lockdowns in some places. The risk of even more contagious and dangerous mutations developing has continued thanks to a slow vaccine rollout in some countries and regions. In addition, some questions have recently arisen about how long COVID-19 vaccinations remain effective. Fears about higher inflation triggering a hastening of Fed tightening have abated somewhat, although that remains a distinct concern for some investors.

In this environment, we continue to have conviction in our base case scenario, which anticipates that the reopening will continue, resulting in accelerating economic growth. We continue to believe that any accompanying rise in inflation would be largely transitory. We expect greater effort by countries to accelerate vaccinations. We also expect policymakers, especially in the US, to remain very supportive in the face of any pandemic resurgence. As economies continue to reopen and spending increases, inflation should rise significantly, especially in the US as the Fed expects, but we still expect it will moderate to a rate faster than pre-crisis trends but not sufficient to induce action from central banks. Over the longer term, we expect demographics and innovation to place downward pressure on inflation.

**Figure 6: We believe the pandemic continues to fade, and re-opening continues**

Inflation to rise on the back of policy and pent-up demand, then moderate



Source: Invesco. For illustrative purposes only.



We do recognize that two key tail risks remain — the pandemic resurgence and a hastening of Fed tightening caused by higher inflation — although we still believe they are both unlikely. While COVID-19 cases are on the rise, the data continues to indicate that vaccines are very effective. While countries now need to reach a higher level of vaccinations in order to achieve ‘herd immunity’ given the greater contagiousness of the Delta variant, the global economic reopening has continued with limited hiccups. In terms of the Fed hastening tightening, we believe this is also very unlikely. The Fed appears to have learned its lessons from 2013 and is moving gingerly in terms of normalizing monetary policy. It has greater flexibility to do that given its adoption of a flexible average inflation targeting (FAIT) policy last year.

For more information on Invesco’s market and economic positioning, please refer to our forthcoming 2021 Mid-Year Outlook.

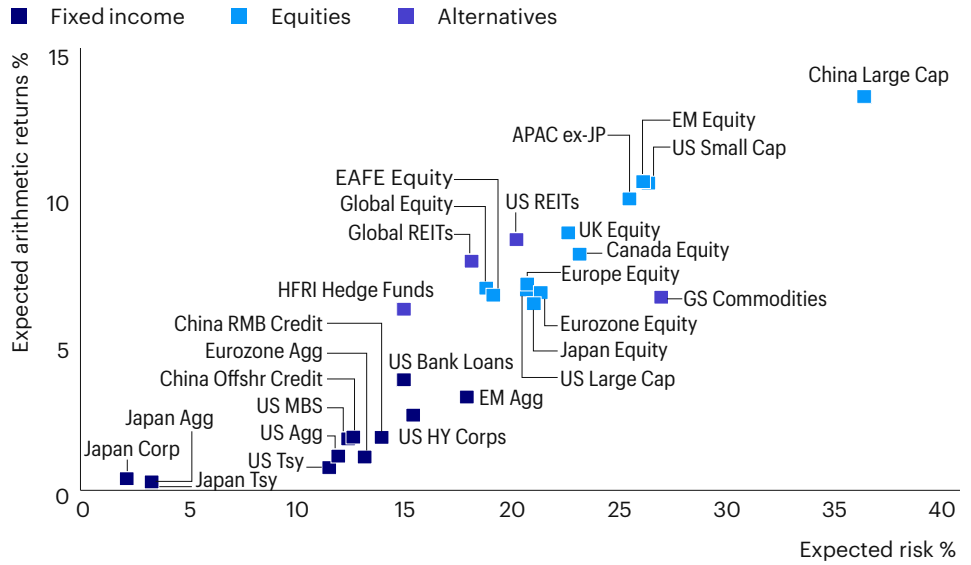
#### **Asset Allocation Implications**

In our base case scenario, we continue to take a ‘risk on’ approach, expecting equities to outperform fixed income as economies continue to accelerate for the next several quarters. We expect the 10-year US Treasury yield to finish at a higher level by year-end. We expect more cyclical regions, sectors, and styles to outperform in the near term, although at some point, we expect a pivot to narrow outperformance by growth and defensive stocks. If the pandemic resurgence tail-risk scenario were to come to fruition, we would, of course take a ‘risk off’ approach, expecting outperformance from sovereign debt, investment grade debt, gold, and cash. If the high inflation scenario were to come to fruition, we would expect commodities, real estate, Treasury inflation-protected bonds, and equities, especially financials, to perform well.

# 4

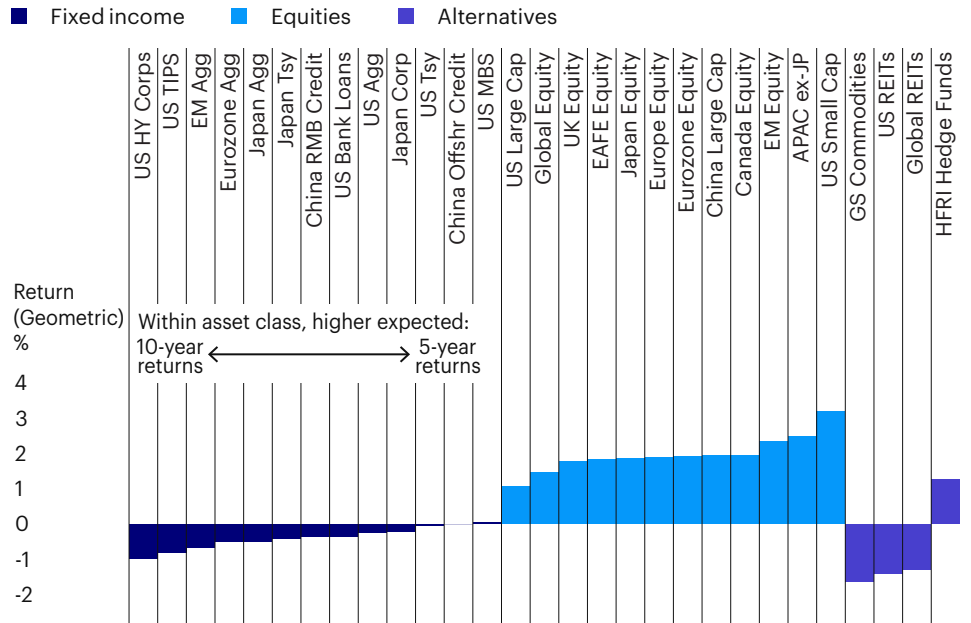
## 2021 Capital Market Assumptions - Q3 Update

**Figure 7: 10-year asset class expectations (JPY)**



Source: Invesco, estimates as of June 30, 2021. Proxies listed in Figure 13. These estimates are for forward-looking, are not guarantees, and they involve risks, uncertainties, and assumptions. Please see page 15 for information about our CMA methodology. These estimates reflect the views of Invesco Investment Solutions, the views of other investment teams at Invesco may differ from those presented here. **Performance, whether actual or simulated, does not guarantee future results.**

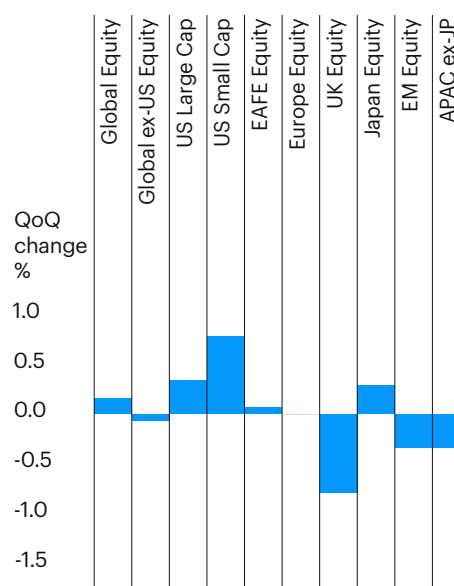
**Figure 8: CMA difference: 5-year minus 10-year assumptions (JPY)**



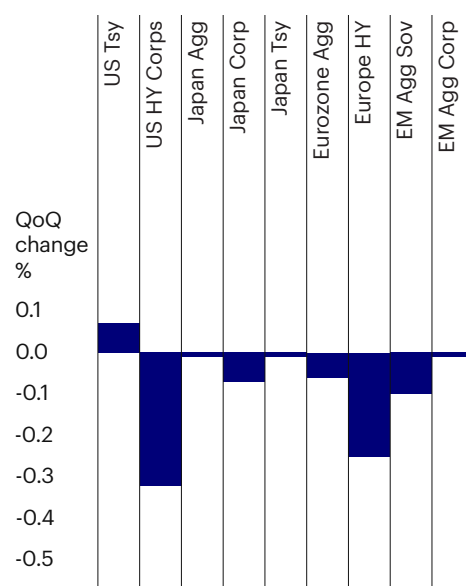
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**Figure 9: Equity quarter-over-quarter change (JPY)**

■ Expected Return

**Figure 10: Fixed income quarter-over-quarter change (JPY)**

■ Expected Return



Source: Invesco, estimates as of June 30, 2021. Proxies listed in **Figure 13**. These estimates are for forward-looking, are not guarantees, and they involve risks, uncertainties, and assumptions. Please see page 15 for information about our CMA methodology. These estimates reflect the views of Invesco Investment Solutions, the views of other investment teams at Invesco may differ from those presented here. **Performance, whether actual or simulated, does not guarantee future results.**

**Figure 11: Equity quarter-over-quarter change attribution (JPY) (%)**

|                     | Global Equity | Global ex-US Equity | US Large Cap | US Small Cap | EAFE Equity | Europe Equity | UK Equity | Japan Equity | EM Equity | APAC ex-JP |
|---------------------|---------------|---------------------|--------------|--------------|-------------|---------------|-----------|--------------|-----------|------------|
| Dividend Yield      | -3.1          | 2.8                 | -6.2         | -0.6         | 5.5         | 5.0           | -2.6      | 4.3          | 2.1       | -1.5       |
| Buyback Yield       | 2.8           | 0.0                 | 3.6          | -0.4         | 0.0         | 0.0           | 0.0       | 0.0          | 0.0       | 0.0        |
| LT Earnings Growth  | -41.0         | -52.8               | -30.9        | -28.0        | -46.6       | -45.2         | -64.0     | -41.9        | -59.9     | -58.5      |
| Expected Inflation  | 15.2          | 24.0                | 7.5          | 5.4          | 27.9        | 31.7          | 10.9      | 19.6         | 16.1      | 14.4       |
| Valuation Change    | 26.8          | 19.4                | 32.5         | 51.6         | 18.8        | 12.5          | 19.0      | 34.2         | 16.7      | 18.7       |
| Currency Adj. (IRP) | 11.3          | 1.0                 | 19.3         | 13.9         | -1.3        | -5.5          | 3.5       | 0.0          | 5.1       | 6.9        |

**Figure 12: Fixed income quarter-over-quarter change attribution (JPY) (%)**

|                                | US Tsy | US HY Corps | Japan Agg | Japan Corp | Japan Tsy | Eurozone Agg | Eurozone HY | EM Agg Sov | EM Agg Corp |
|--------------------------------|--------|-------------|-----------|------------|-----------|--------------|-------------|------------|-------------|
| Average Yield                  | -15.8  | -40.6       | -74.5     | -30.5      | -70.9     | 0.4          | -17.3       | -36.8      | -24.6       |
| Roll Return                    | -28.2  | -9.6        | 7.3       | -35.8      | 18.8      | -10.2        | -4.7        | 1.9        | -22.1       |
| Valuation Change (Yield Curve) | 10.7   | 12.0        | 17.0      | 8.7        | 10.4      | 32.7         | -3.1        | 8.3        | 13.9        |
| Valuation Change (OAS)         | 0.0    | -14.4       | 1.2       | -14.0      | 0.0       | 4.5          | -25.5       | -19.3      | -3.9        |
| Credit Loss                    | 0.0    | 0.0         | 0.0       | 11.0       | 0.0       | 0.0          | 0.0         | 0.6        | 4.3         |
| Currency Adj. (IRP)            | 45.4   | 23.4        | 0.0       | 0.0        | 0.0       | -52.2        | -49.3       | 33.1       | 31.1        |

Source: Invesco, estimates as of June 30, 2021. Proxies listed in **Figure 13**. These estimates are for forward-looking, are not guarantees, and they involve risks, uncertainties, and assumptions. Please see page 15 for information about our CMA methodology. These estimates reflect the views of Invesco Investment Solutions, the views of other investment teams at Invesco may differ from those presented here. **Performance, whether actual or simulated, does not guarantee future results.**

Figure 13: 10-year asset class expected returns, risk, and return-to-risk (JPY)

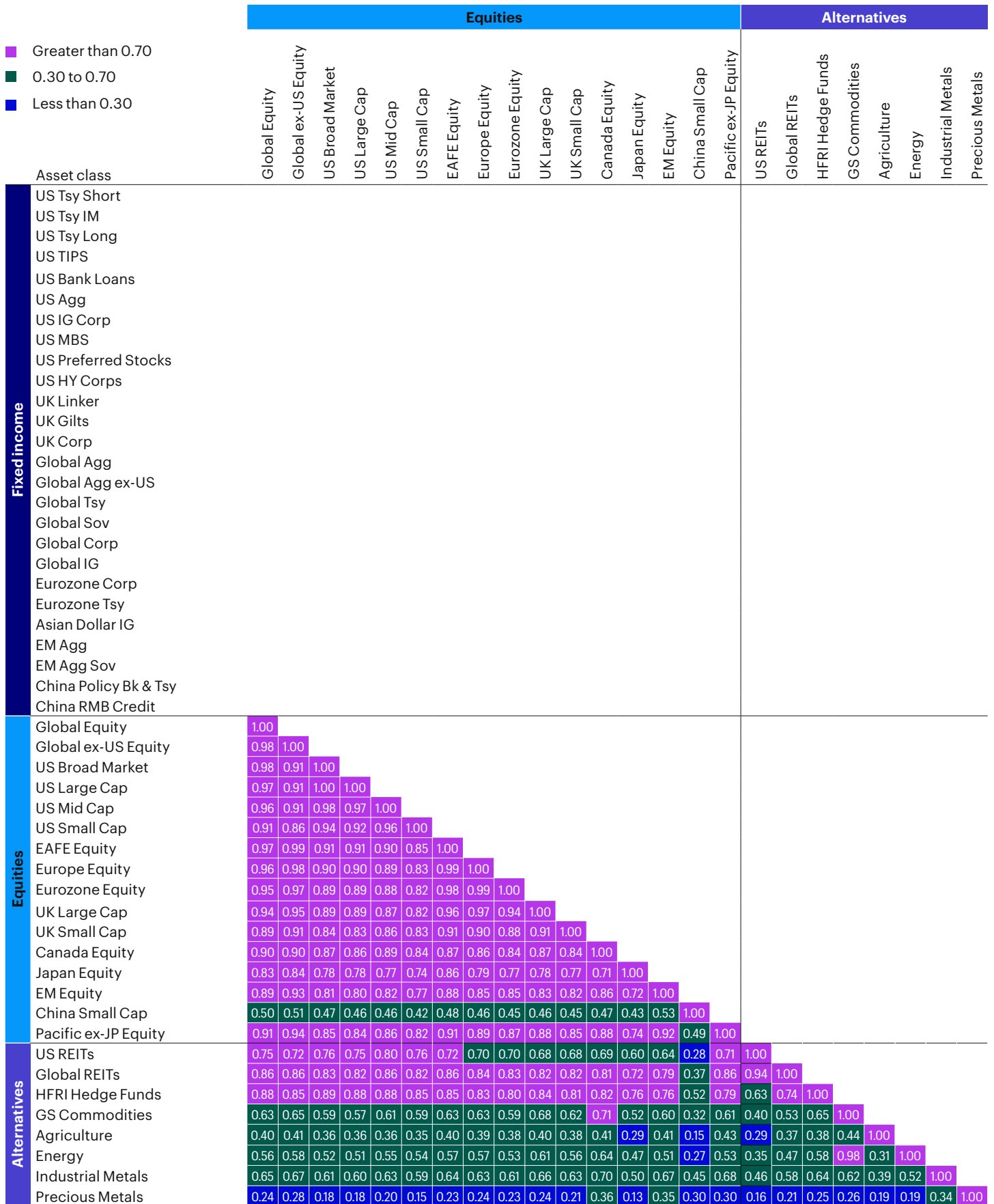
|                      | Asset class              | Index                                | Expected geometric return % | Expected arithmetic return % | Expected risk % | Arithmetic return to risk ratio |      |
|----------------------|--------------------------|--------------------------------------|-----------------------------|------------------------------|-----------------|---------------------------------|------|
| Fixed income         | US Tsy Short             | BBG BARC US Tsy Short                | -0.6                        | 0.1                          | 12.0            | 0.01                            |      |
|                      | US Tsy IM                | BBG BARC US Tsy IM                   | -0.1                        | 0.5                          | 11.3            | 0.05                            |      |
|                      | US Tsy Long              | BBG BARC US Tsy Long                 | -0.5                        | 0.5                          | 14.0            | 0.03                            |      |
|                      | US TIPS                  | BBG BARC US TIPS                     | -0.7                        | 0.1                          | 12.2            | 0.01                            |      |
|                      | US Bank Loans            | CSFB Leverage Loan                   | 2.7                         | 3.8                          | 14.9            | 0.25                            |      |
|                      | US Agg                   | BBG BARC US Agg                      | 0.5                         | 1.2                          | 11.9            | 0.10                            |      |
|                      | US IG Corp               | BBG BARC US IG                       | 0.3                         | 1.0                          | 12.6            | 0.08                            |      |
|                      | US MBS                   | BBG BARC US MBS                      | 1.0                         | 1.7                          | 12.3            | 0.14                            |      |
|                      | US Preferred Stocks      | BOA ML Fixed Rate Pref Securities    | 1.6                         | 2.6                          | 14.6            | 0.18                            |      |
|                      | US HY Corps              | BBG BARC US HY                       | 1.4                         | 2.5                          | 15.4            | 0.17                            |      |
|                      | UK Linker                | BofA ML UK Inflation-Linked Gilt     | 0.2                         | 1.1                          | 14.0            | 0.08                            |      |
|                      | UK Gilts                 | BBG BARC Sterling Agg Gilts          | 0.4                         | 1.1                          | 11.9            | 0.09                            |      |
|                      | UK Corp                  | BBG BARC Sterling Agg Non-Gilts Corp | 0.4                         | 1.8                          | 16.9            | 0.11                            |      |
|                      | Global Agg               | BBG BARC Global Agg                  | 0.8                         | 1.3                          | 9.9             | 0.13                            |      |
|                      | Global Agg ex-US         | BBG BARC Global Agg ex-US            | 1.0                         | 1.4                          | 9.4             | 0.15                            |      |
|                      | Global Tsy               | BBG BARC Global Tsy                  | 0.8                         | 1.1                          | 8.2             | 0.13                            |      |
|                      | Global Sov               | BBG BARC Global Sov                  | 0.3                         | 1.1                          | 12.8            | 0.08                            |      |
|                      | Global Corp              | BBG BARC Global Corp                 | 0.7                         | 1.5                          | 13.4            | 0.11                            |      |
|                      | Global IG                | BBG BARC Global Corp IG              | 0.5                         | 1.5                          | 14.5            | 0.10                            |      |
|                      | Eurozone Corp            | BBG BARC Euro Agg Credit Corp        | 0.5                         | 1.6                          | 15.2            | 0.11                            |      |
|                      | Eurozone Tsy             | BBG BARC Euro Agg Gov Tsy            | 0.5                         | 1.3                          | 12.7            | 0.11                            |      |
|                      | Asian Dollar IG          | BOA ML AC IG                         | 1.0                         | 2.0                          | 14.4            | 0.14                            |      |
|                      | EM Agg                   | BBG BARC EM Agg                      | 1.7                         | 3.2                          | 17.9            | 0.18                            |      |
|                      | EM Agg Sov               | BBG BARC EM Sov                      | 1.7                         | 3.0                          | 16.6            | 0.18                            |      |
|                      | China Policy Bk & Tsy    | BBG BARC China PB Tsy TR             | 0.5                         | 1.4                          | 13.2            | 0.10                            |      |
|                      | China RMB Credit         | BBG BARC China Corporate             | 0.9                         | 1.8                          | 13.9            | 0.13                            |      |
|                      | Equities                 | Global Equity                        | MSCI ACWI                   | 5.3                          | 6.9             | 18.8                            | 0.37 |
|                      |                          | Global ex-US Equity                  | MSCI ACWI ex-US             | 5.8                          | 7.6             | 19.4                            | 0.39 |
| US Broad Market      |                          | Russell 3000                         | 5.1                         | 7.2                          | 21.3            | 0.34                            |      |
| US Large Cap         |                          | S&P 500                              | 4.9                         | 6.8                          | 20.7            | 0.33                            |      |
| US Mid Cap           |                          | Russell Midcap                       | 5.8                         | 8.2                          | 23.2            | 0.35                            |      |
| US Small Cap         |                          | Russell 2000                         | 7.5                         | 10.5                         | 26.3            | 0.40                            |      |
| EAFE Equity          |                          | MSCI EAFE                            | 5.0                         | 6.6                          | 19.1            | 0.35                            |      |
| Europe Equity        |                          | MSCI Europe                          | 5.1                         | 7.0                          | 20.7            | 0.34                            |      |
| Eurozone Equity      |                          | MSCI Euro ex-UK                      | 4.7                         | 6.7                          | 21.3            | 0.32                            |      |
| UK Large Cap         |                          | FTSE 100                             | 6.5                         | 8.8                          | 22.5            | 0.39                            |      |
| UK Small Cap         |                          | FTSE Small Cap UK                    | 7.4                         | 10.7                         | 27.7            | 0.39                            |      |
| Canada Equity        |                          | S&P TSX                              | 5.7                         | 8.1                          | 23.1            | 0.35                            |      |
| Japan Equity         |                          | MSCI JP                              | 4.3                         | 6.4                          | 21.0            | 0.30                            |      |
| EM Equity            |                          | MSCI EM                              | 7.6                         | 10.5                         | 26.1            | 0.40                            |      |
| China Small Cap      |                          | CSI 500                              | 8.6                         | 14.6                         | 38.8            | 0.38                            |      |
| Pacific ex-JP Equity |                          | MSCI Pacific ex-JP                   | 5.7                         | 8.8                          | 26.7            | 0.33                            |      |
| Alternatives         |                          | US REITs                             | FTSE NAREIT Equity          | 6.7                          | 8.5             | 20.2                            | 0.42 |
|                      | Global REITs             | FTSE EPRA/NAREIT Developed           | 6.3                         | 7.8                          | 18.1            | 0.43                            |      |
|                      | HFRI Hedge Funds         | HFRI HF                              | 5.1                         | 6.2                          | 14.9            | 0.41                            |      |
|                      | GS Commodities           | S&P GSCI                             | 3.3                         | 6.6                          | 26.9            | 0.24                            |      |
|                      | Agriculture              | S&P GSCI Agriculture                 | -1.2                        | 1.5                          | 24.2            | 0.06                            |      |
|                      | Energy                   | S&P GSCI Energy                      | 5.8                         | 12.1                         | 39.5            | 0.31                            |      |
|                      | Industrial Metals        | S&P GSCI Industrial Metals           | 3.1                         | 6.0                          | 25.6            | 0.24                            |      |
| Precious Metals      | S&P GSCI Precious Metals | 0.9                                  | 2.6                         | 18.9                         | 0.14            |                                 |      |

Source: Invesco, estimates as of June 30, 2021. These estimates are forward-looking, are not guarantees, and they involve risks, uncertainties, and assumptions. Please see page 15 for information about our CMA methodology. These estimates reflect the views of Invesco Investment Solutions, the views of other investment teams at Invesco may differ from those presented here. Agg = Aggregate, Infra = Infrastructure, Corp = Corporate, DJ = Dow Jones, HY = High Yield, Muni = Municipals, Tsy = Treasury, IM = Intermediate, ML = Merrill Lynch, Sov = Sovereign, EM = Emerging Markets, IG = Investment Grade, APAC = Asia Pacific, Gov = Government, MBS = Mortgage Backed Securities, TIPS = Treasury Inflation Protected Securities.

Figure 14: 10-year correlations (JPY)

|                       |                     | Fixed income |           |             |         |               |        |            |        |                     |             |           |          |         |            |                  |            |            |             |           |               |              |                 |        |            |                       |                  |  |  |  |  |  |  |  |
|-----------------------|---------------------|--------------|-----------|-------------|---------|---------------|--------|------------|--------|---------------------|-------------|-----------|----------|---------|------------|------------------|------------|------------|-------------|-----------|---------------|--------------|-----------------|--------|------------|-----------------------|------------------|--|--|--|--|--|--|--|
| Asset class           |                     | US Tsy Short | US Tsy IM | US Tsy Long | US TIPS | US Bank Loans | US Agg | US IG Corp | US MBS | US Preferred Stocks | US HY Corps | UK Linker | UK Gilts | UK Corp | Global Agg | Global Agg ex-US | Global Tsy | Global Sov | Global Corp | Global IG | Eurozone Corp | Eurozone Tsy | Asian Dollar IG | EM Agg | EM Agg Sov | China Policy Bk & Tsy | China RMB Credit |  |  |  |  |  |  |  |
| Fixed income          | US Tsy Short        | 1.00         |           |             |         |               |        |            |        |                     |             |           |          |         |            |                  |            |            |             |           |               |              |                 |        |            |                       |                  |  |  |  |  |  |  |  |
|                       | US Tsy IM           | 0.95         | 1.00      |             |         |               |        |            |        |                     |             |           |          |         |            |                  |            |            |             |           |               |              |                 |        |            |                       |                  |  |  |  |  |  |  |  |
|                       | US Tsy Long         | 0.38         | 0.58      | 1.00        |         |               |        |            |        |                     |             |           |          |         |            |                  |            |            |             |           |               |              |                 |        |            |                       |                  |  |  |  |  |  |  |  |
|                       | US TIPS             | 0.81         | 0.87      | 0.58        | 1.00    |               |        |            |        |                     |             |           |          |         |            |                  |            |            |             |           |               |              |                 |        |            |                       |                  |  |  |  |  |  |  |  |
|                       | US Bank Loans       | 0.83         | 0.72      | 0.16        | 0.77    | 1.00          |        |            |        |                     |             |           |          |         |            |                  |            |            |             |           |               |              |                 |        |            |                       |                  |  |  |  |  |  |  |  |
|                       | US Agg              | 0.93         | 0.97      | 0.63        | 0.92    | 0.79          | 1.00   |            |        |                     |             |           |          |         |            |                  |            |            |             |           |               |              |                 |        |            |                       |                  |  |  |  |  |  |  |  |
|                       | US IG Corp          | 0.79         | 0.81      | 0.54        | 0.88    | 0.84          | 0.92   | 1.00       |        |                     |             |           |          |         |            |                  |            |            |             |           |               |              |                 |        |            |                       |                  |  |  |  |  |  |  |  |
|                       | US MBS              | 0.97         | 0.98      | 0.53        | 0.87    | 0.78          | 0.98   | 0.84       | 1.00   |                     |             |           |          |         |            |                  |            |            |             |           |               |              |                 |        |            |                       |                  |  |  |  |  |  |  |  |
|                       | US Preferred Stocks | 0.53         | 0.50      | 0.21        | 0.57    | 0.62          | 0.58   | 0.69       | 0.52   | 1.00                |             |           |          |         |            |                  |            |            |             |           |               |              |                 |        |            |                       |                  |  |  |  |  |  |  |  |
|                       | US HY Corps         | 0.71         | 0.62      | 0.14        | 0.74    | 0.93          | 0.73   | 0.85       | 0.69   | 0.70                | 1.00        |           |          |         |            |                  |            |            |             |           |               |              |                 |        |            |                       |                  |  |  |  |  |  |  |  |
|                       | UK Linker           | 0.55         | 0.55      | 0.35        | 0.71    | 0.67          | 0.64   | 0.71       | 0.58   | 0.53                | 0.68        | 1.00      |          |         |            |                  |            |            |             |           |               |              |                 |        |            |                       |                  |  |  |  |  |  |  |  |
|                       | UK Gilts            | 0.61         | 0.63      | 0.41        | 0.71    | 0.62          | 0.69   | 0.70       | 0.65   | 0.47                | 0.61        | 0.88      | 1.00     |         |            |                  |            |            |             |           |               |              |                 |        |            |                       |                  |  |  |  |  |  |  |  |
|                       | UK Corp             | 0.56         | 0.52      | 0.19        | 0.66    | 0.73          | 0.62   | 0.75       | 0.57   | 0.58                | 0.75        | 0.84      | 0.91     | 1.00    |            |                  |            |            |             |           |               |              |                 |        |            |                       |                  |  |  |  |  |  |  |  |
|                       | Global Agg          | 0.80         | 0.83      | 0.48        | 0.87    | 0.77          | 0.89   | 0.89       | 0.84   | 0.62                | 0.78        | 0.78      | 0.82     | 0.80    | 1.00       |                  |            |            |             |           |               |              |                 |        |            |                       |                  |  |  |  |  |  |  |  |
|                       | Global Agg ex-US    | 0.57         | 0.58      | 0.28        | 0.70    | 0.63          | 0.65   | 0.72       | 0.60   | 0.54                | 0.69        | 0.77      | 0.79     | 0.82    | 0.93       | 1.00             |            |            |             |           |               |              |                 |        |            |                       |                  |  |  |  |  |  |  |  |
|                       | Global Tsy          | 0.71         | 0.77      | 0.51        | 0.82    | 0.66          | 0.82   | 0.81       | 0.77   | 0.55                | 0.68        | 0.77      | 0.82     | 0.76    | 0.98       | 0.95             | 1.00       |            |             |           |               |              |                 |        |            |                       |                  |  |  |  |  |  |  |  |
|                       | Global Sov          | 0.74         | 0.76      | 0.44        | 0.86    | 0.79          | 0.85   | 0.90       | 0.79   | 0.62                | 0.83        | 0.76      | 0.74     | 0.77    | 0.95       | 0.88             | 0.92       | 1.00       |             |           |               |              |                 |        |            |                       |                  |  |  |  |  |  |  |  |
|                       | Global Corp         | 0.74         | 0.74      | 0.39        | 0.85    | 0.84          | 0.84   | 0.94       | 0.77   | 0.70                | 0.87        | 0.80      | 0.79     | 0.87    | 0.96       | 0.89             | 0.90       | 0.95       | 1.00        |           |               |              |                 |        |            |                       |                  |  |  |  |  |  |  |  |
|                       | Global IG           | 0.74         | 0.74      | 0.40        | 0.85    | 0.84          | 0.85   | 0.95       | 0.77   | 0.70                | 0.87        | 0.79      | 0.79     | 0.86    | 0.96       | 0.89             | 0.91       | 0.95       | 1.00        | 1.00      |               |              |                 |        |            |                       |                  |  |  |  |  |  |  |  |
|                       | Eurozone Corp       | 0.52         | 0.50      | 0.14        | 0.63    | 0.64          | 0.58   | 0.68       | 0.53   | 0.56                | 0.71        | 0.71      | 0.71     | 0.80    | 0.87       | 0.97             | 0.88       | 0.85       | 0.88        | 0.87      | 1.00          |              |                 |        |            |                       |                  |  |  |  |  |  |  |  |
| Eurozone Tsy          | 0.53                | 0.55         | 0.28      | 0.63        | 0.54    | 0.61          | 0.64   | 0.56       | 0.47   | 0.60                | 0.68        | 0.71      | 0.71     | 0.89    | 0.97       | 0.93             | 0.84       | 0.82       | 0.82        | 0.95      | 1.00          |              |                 |        |            |                       |                  |  |  |  |  |  |  |  |
| Asian Dollar IG       | 0.86                | 0.88         | 0.51      | 0.92        | 0.86    | 0.95          | 0.94   | 0.91       | 0.60   | 0.83                | 0.70        | 0.71      | 0.71     | 0.91    | 0.73       | 0.83             | 0.91       | 0.91       | 0.91        | 0.68      | 0.66          | 1.00         |                 |        |            |                       |                  |  |  |  |  |  |  |  |
| EM Agg                | 0.69                | 0.66         | 0.31      | 0.80        | 0.84    | 0.77          | 0.88   | 0.72       | 0.62   | 0.90                | 0.69        | 0.63      | 0.72     | 0.84    | 0.75       | 0.76             | 0.91       | 0.89       | 0.89        | 0.73      | 0.67          | 0.89         | 1.00            |        |            |                       |                  |  |  |  |  |  |  |  |
| EM Agg Sov            | 0.65                | 0.63         | 0.33      | 0.77        | 0.80    | 0.75          | 0.86   | 0.69       | 0.60   | 0.87                | 0.68        | 0.61      | 0.71     | 0.82    | 0.74       | 0.75             | 0.91       | 0.87       | 0.87        | 0.72      | 0.66          | 0.85         | 0.99            | 1.00   |            |                       |                  |  |  |  |  |  |  |  |
| China Policy Bk & Tsy | 0.89                | 0.85         | 0.31      | 0.76        | 0.74    | 0.84          | 0.72   | 0.87       | 0.50   | 0.67                | 0.54        | 0.62      | 0.59     | 0.78    | 0.62       | 0.72             | 0.69       | 0.71       | 0.71        | 0.57      | 0.57          | 0.78         | 0.67            | 0.64   | 1.00       |                       |                  |  |  |  |  |  |  |  |
| China RMB Credit      | 0.90                | 0.86         | 0.28      | 0.77        | 0.78    | 0.84          | 0.73   | 0.88       | 0.50   | 0.69                | 0.56        | 0.63      | 0.61     | 0.79    | 0.63       | 0.73             | 0.71       | 0.73       | 0.73        | 0.59      | 0.59          | 0.80         | 0.69            | 0.66   | 0.98       | 1.00                  |                  |  |  |  |  |  |  |  |
| Equities              | Global Equity       | 0.56         | 0.46      | -0.01       | 0.58    | 0.76          | 0.55   | 0.68       | 0.52   | 0.67                | 0.85        | 0.61      | 0.58     | 0.74    | 0.71       | 0.73             | 0.64       | 0.74       | 0.79        | 0.78      | 0.75          | 0.63         | 0.65            | 0.79   | 0.77       | 0.59                  | 0.61             |  |  |  |  |  |  |  |
|                       | Global ex-US Equity | 0.50         | 0.40      | -0.04       | 0.54    | 0.72          | 0.50   | 0.65       | 0.47   | 0.64                | 0.82        | 0.61      | 0.58     | 0.75    | 0.70       | 0.75             | 0.64       | 0.74       | 0.78        | 0.77      | 0.78          | 0.67         | 0.62            | 0.78   | 0.77       | 0.55                  | 0.57             |  |  |  |  |  |  |  |
|                       | US Broad Market     | 0.60         | 0.49      | 0.02        | 0.59    | 0.78          | 0.57   | 0.68       | 0.56   | 0.67                | 0.85        | 0.57      | 0.55     | 0.70    | 0.69       | 0.66             | 0.60       | 0.72       | 0.76        | 0.75      | 0.68          | 0.57         | 0.65            | 0.76   | 0.74       | 0.61                  | 0.62             |  |  |  |  |  |  |  |
|                       | US Large Cap        | 0.61         | 0.50      | 0.03        | 0.60    | 0.77          | 0.58   | 0.68       | 0.57   | 0.67                | 0.84        | 0.57      | 0.55     | 0.70    | 0.69       | 0.66             | 0.61       | 0.72       | 0.76        | 0.75      | 0.68          | 0.57         | 0.66            | 0.76   | 0.74       | 0.62                  | 0.63             |  |  |  |  |  |  |  |
|                       | US Mid Cap          | 0.56         | 0.45      | 0.00        | 0.58    | 0.78          | 0.55   | 0.68       | 0.52   | 0.67                | 0.86        | 0.58      | 0.53     | 0.69    | 0.67       | 0.65             | 0.59       | 0.71       | 0.76        | 0.75      | 0.68          | 0.56         | 0.64            | 0.77   | 0.75       | 0.58                  | 0.60             |  |  |  |  |  |  |  |
|                       | US Small Cap        | 0.53         | 0.42      | -0.05       | 0.52    | 0.74          | 0.50   | 0.62       | 0.48   | 0.61                | 0.81        | 0.51      | 0.50     | 0.65    | 0.61       | 0.59             | 0.52       | 0.63       | 0.69        | 0.68      | 0.62          | 0.49         | 0.58            | 0.70   | 0.68       | 0.56                  | 0.57             |  |  |  |  |  |  |  |
|                       | EAFE Equity         | 0.52         | 0.42      | -0.03       | 0.55    | 0.72          | 0.51   | 0.65       | 0.49   | 0.64                | 0.82        | 0.62      | 0.58     | 0.75    | 0.71       | 0.75             | 0.65       | 0.74       | 0.78        | 0.77      | 0.78          | 0.67         | 0.62            | 0.77   | 0.76       | 0.56                  | 0.58             |  |  |  |  |  |  |  |
|                       | Europe Equity       | 0.50         | 0.41      | -0.03       | 0.53    | 0.70          | 0.50   | 0.63       | 0.47   | 0.62                | 0.80        | 0.62      | 0.59     | 0.75    | 0.70       | 0.76             | 0.65       | 0.73       | 0.77        | 0.76      | 0.79          | 0.68         | 0.60            | 0.75   | 0.74       | 0.53                  | 0.55             |  |  |  |  |  |  |  |
|                       | Eurozone Equity     | 0.48         | 0.39      | -0.03       | 0.51    | 0.67          | 0.48   | 0.61       | 0.45   | 0.61                | 0.78        | 0.60      | 0.56     | 0.72    | 0.69       | 0.75             | 0.65       | 0.73       | 0.76        | 0.75      | 0.79          | 0.69         | 0.58            | 0.74   | 0.73       | 0.51                  | 0.53             |  |  |  |  |  |  |  |
|                       | UK Large Cap        | 0.53         | 0.42      | -0.05       | 0.54    | 0.73          | 0.51   | 0.64       | 0.50   | 0.61                | 0.80        | 0.64      | 0.63     | 0.79    | 0.70       | 0.73             | 0.63       | 0.71       | 0.77        | 0.76      | 0.76          | 0.64         | 0.61            | 0.75   | 0.73       | 0.57                  | 0.58             |  |  |  |  |  |  |  |
|                       | UK Small Cap        | 0.46         | 0.34      | -0.11       | 0.48    | 0.73          | 0.44   | 0.61       | 0.42   | 0.58                | 0.80        | 0.61      | 0.60     | 0.79    | 0.63       | 0.67             | 0.55       | 0.64       | 0.73        | 0.72      | 0.71          | 0.57         | 0.56            | 0.71   | 0.69       | 0.51                  | 0.53             |  |  |  |  |  |  |  |
|                       | Canada Equity       | 0.44         | 0.34      | -0.06       | 0.53    | 0.71          | 0.44   | 0.61       | 0.41   | 0.59                | 0.79        | 0.57      | 0.51     | 0.69    | 0.62       | 0.66             | 0.55       | 0.66       | 0.73        | 0.71      | 0.69          | 0.56         | 0.57            | 0.74   | 0.72       | 0.47                  | 0.49             |  |  |  |  |  |  |  |
|                       | Japan Equity        | 0.52         | 0.42      | 0.01        | 0.51    | 0.66          | 0.49   | 0.58       | 0.48   | 0.58                | 0.71        | 0.51      | 0.48     | 0.62    | 0.59       | 0.57             | 0.52       | 0.61       | 0.66        | 0.64      | 0.59          | 0.50         | 0.57            | 0.66   | 0.64       | 0.56                  | 0.58             |  |  |  |  |  |  |  |
| EM Equity             | 0.40                | 0.30         | -0.06     | 0.48        | 0.63    | 0.41          | 0.57   | 0.37       | 0.56   | 0.76                | 0.54        | 0.50      | 0.67     | 0.62    | 0.68       | 0.56             | 0.66       | 0.70       | 0.69        | 0.72      | 0.60          | 0.54         | 0.74            | 0.72   | 0.47       | 0.49                  |                  |  |  |  |  |  |  |  |
| China Small Cap       | 0.37                | 0.34         | 0.06      | 0.42        | 0.42    | 0.38          | 0.44   | 0.37       | 0.31   | 0.47                | 0.38        | 0.39      | 0.44     | 0.46    | 0.45       | 0.43             | 0.47       | 0.49       | 0.48        | 0.45      | 0.39          | 0.46         | 0.49            | 0.47   | 0.42       | 0.43                  |                  |  |  |  |  |  |  |  |
| Pacific ex-JP Equity  | 0.42                | 0.33         | -0.03     | 0.52        | 0.66    | 0.44          | 0.62   | 0.41       | 0.60   | 0.77                | 0.56        | 0.52      | 0.71     | 0.65    | 0.71       | 0.60             | 0.69       | 0.75       | 0.73        | 0.74      | 0.61          | 0.58         | 0.75            | 0.74   | 0.48       | 0.49                  |                  |  |  |  |  |  |  |  |
| Alternatives          | US REITs            | 0.38         | 0.34      | 0.13        | 0.49    | 0.61          | 0.45   | 0.59       | 0.39   | 0.61                | 0.72        | 0.53      | 0.46     | 0.57    | 0.56       | 0.56             | 0.52       | 0.62       | 0.64        | 0.63      | 0.55          | 0.47         | 0.54            | 0.65   | 0.65       | 0.40                  | 0.39             |  |  |  |  |  |  |  |
|                       | Global REITs        | 0.41         | 0.35      | 0.08        | 0.54    | 0.67          | 0.47   | 0.65       | 0.41   | 0.66                | 0.78        | 0.60      | 0.55     | 0.70    | 0.65       | 0.68             | 0.60       | 0.70       | 0.74        | 0.73      | 0.68          | 0.58         | 0.59            | 0.74   | 0.74       | 0.45                  | 0.45             |  |  |  |  |  |  |  |
|                       | HFRI Hedge Funds    | 0.82         | 0.72      | 0.14        | 0.77    | 0.92          | 0.78   | 0.83       | 0.77   | 0.66                | 0.90        | 0.67      | 0.65     | 0.76    | 0.82       | 0.72             | 0.72       | 0.81       | 0.86        | 0.86      | 0.72          | 0.63         |                 |        |            |                       |                  |  |  |  |  |  |  |  |

Figure 14: 10-year correlations (JPY)

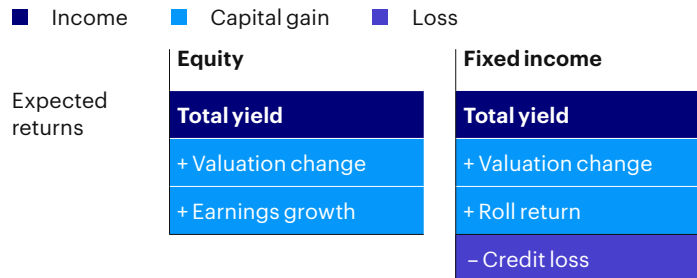


Source: Invesco, estimates as of June 30, 2021. Proxies listed in Figure 13. These estimates are forward-looking, are not guarantees, and they involve risks, uncertainties, and assumptions. Please see page 15 for information about our CMA methodology. These estimates reflect the views of Invesco Investment Solutions, the views of other investment teams at Invesco may differ from those presented here.

### About our capital market assumptions methodology

We employ a fundamentally based “building block” approach to estimating asset class returns. Estimates for income and capital gain components of returns for each asset class are informed by fundamental and historical data. Components are then combined to establish estimated returns (Figure 14). Here we provide a summary of key elements of the methodology used to produce our long-term (10-year) estimates. Five-year assumptions are also available upon request. Please see Invesco’s capital market assumption methodology whitepaper for more detail.

**Figure 15: Our building block approach to estimating returns**



For illustrative purposes only.

**Fixed income** returns are composed of:

- **Average yield:** The average of the starting (initial) yield and the expected yield for bonds.
- **Valuation change (yield curve):** Estimated changes in valuation given changes in the Treasury yield curve.
- **Roll return:** Reflects the impact on the price of bonds that are held over time. Given a positively sloped yield curve, a bond’s price will be positively impacted as interest payments remain fixed but time to maturity decreases.
- **Credit adjustment:** Estimated potential impact on returns from credit rating downgrades and defaults.

**Equity** returns are composed of:

- **Dividend yield:** Dividend per share divided by price per share.
- **Buyback yield:** Percentage change in shares outstanding resulting from companies buying back or issuing shares.
- **Valuation change:** The expected change in value given the current Price/Earnings (P/E) ratio and the assumption of reversion to the long-term average P/E ratio.
- **Long-term (LT) earnings growth:** The estimated rate in the growth of earnings based on the long-term average real GDP per capita and inflation.

**Currency adjustments** are based on the theory of Interest Rate Parity (IRP) which suggests a strong relationship between interest rates and the spot and forward exchange rates between two given currencies. Interest rate parity theory assumes that no arbitrage opportunities exist in foreign exchange markets. It is based on the notion that, over the long term, investors will be indifferent between varying rate of returns on deposits in different currencies because any excess return on deposits will be offset by changes in the relative value of currencies.

**Volatility estimates** for the different asset classes, we use rolling historical quarterly returns of various market benchmarks. Given that benchmarks have differing histories within and across asset classes, we normalise the volatility estimates of shorter-lived benchmarks to ensure that all series are measured over similar time periods.

**Correlation estimates** are calculated using trailing 20 years of monthly returns. Given that recent asset class correlations could have a more meaningful effect on future observations, we place greater weight on more recent observations by applying a 10-year half-life to the time series in our calculation.

**Arithmetic versus geometric returns.** Our building block methodology produces estimates of geometric (compound) asset class returns. However, standard mean-variance portfolio optimisation requires return inputs to be provided in arithmetic rather than in geometric terms. This is because the arithmetic mean of a weighted sum (e.g., a portfolio) is the weighted sum of the arithmetic means (of portfolio constituents). This does not hold for geometric returns. Accordingly, we translate geometric estimates into arithmetic terms. We provide both arithmetic returns and geometric returns given that the former informs the optimisation process regarding expected outcomes, while the latter informs the investor about the rate at which asset classes might be expected to grow wealth over the long run.

## Contributors

### Investment Solutions

**Duy Nguyen**

CFA, CAIA  
CIO, Invesco Investment Solutions

**Jacob Borbidge**

CFA, CAIA  
Senior Portfolio Manager,  
Head of Investment Research,  
Invesco Investment Solutions

**Alessio de Longis**

CFA  
Senior Portfolio Manager,  
Head of Tactical Asset  
Allocation, Invesco  
Investment Solutions

**Greg Chen**

PhD, CFA  
Senior Analyst

**Patrick Hamel**

MS, MBA  
Quantitative Research Analyst

**Chang Hwan Sung**

PhD, CFA, FRM  
Portfolio Manager,  
Solutions Research, APAC

**Debbie Li**

CFA  
Senior Analyst

**Diane Ellis**

MS  
Macro Research Analyst

**Yu Li**

PhD  
Quantitative Research  
Analyst

### Global Market Strategy

**Kristina Hooper**

Chief Global Market  
Strategist

**Arnab Das**

Global Market Strategist,  
EMEA

**Brian Levitt**

Global Market Strategist,  
NA

### Investment Solutions Thought Leadership

**Kenneth Blay**

Head of Research,  
Global Thought Leadership

**Drew Thornton**

CFA  
Head of Solutions Thought  
Leadership

Invesco Investment Solutions is an experienced multi-asset team that seeks to deliver desired client outcomes using Invesco's global capabilities, scale and infrastructure. We partner with you to fully understand your goals and harness strategies across Invesco's global spectrum of active, passive, factor and alternative investments that address your unique needs. From robust research and analysis to bespoke investment solutions, our team brings insight and innovation to your portfolio construction process. Our approach starts with a complete understanding of your needs:

- We help support better investment outcomes by delivering insightful and thorough analytics.
- By putting analytics into practice, we develop investment approaches specific to your needs.
- We work as an extension of your team to engage across functions and implement solutions.

The foundation of the team's process is the development of capital market assumptions — long-term forecasts for the behavior of different asset classes. Their expectations for returns, volatility, and correlation serve as guidelines for long-term, strategic asset allocation decisions.

Assisting clients in North America, Europe and Asia, Invesco's Investment Solutions team consists of over 75 professionals, with 20+ years of experience across the leadership team. The team benefits from Invesco's on-the-ground presence in 25 countries worldwide, with over 150 professionals to support investment selection and ongoing monitoring.

### About the Invesco Global Market Strategist office

The GMS office is comprised of investment professionals based in different regions, with different areas of expertise. It provides data and commentary on global markets, offering insights into key trends and themes and their investment implications.

## Invesco Investment Solutions



### Investment risks

The value of investments and any income will fluctuate (this may partly be the result of exchange rate fluctuations) and investors may not get back the full amount invested.

Invesco Investment Solutions develops CMAs that provide long-term estimates for the behavior of major asset classes globally. The team is dedicated to designing outcome-oriented, multi-asset portfolios that meet the specific goals of investors. The assumptions, which are based on 5- and 10-year investment time horizons, are intended to guide these strategic asset class allocations. For each selected asset class, we develop assumptions for estimated return, estimated standard deviation of return (volatility), and estimated correlation with other asset classes. This information is not intended as a recommendation to invest in a specific asset class or strategy, or as a promise of future performance. Estimated returns are subject to uncertainty and error, and can be conditional on economic scenarios. In the event a particular scenario comes to pass, actual returns could be significantly higher or lower than these estimates.

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Unless otherwise stated, all information is sourced from Invesco, in JPY and as of June 30, 2021.

Further information is available using the contact details shown overleaf.

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- **Switzerland, Liechtenstein** by Invesco Asset Management (Schweiz) AG, Talacker 34, CH-8001 Zurich, Switzerland.
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- **The United States of America** by Invesco Advisers, Inc., Two Peachtree Pointe, 1555 Peachtree Street, N.W., Suite 1800, Atlanta, Georgia 30309, US.



## Contact

Mark Humphreys  
Head of EMEA Client Solutions  
Development

+44 (0) 207 543 3537  
mark\_humphreys@ldn.invesco.com

Ella Gillett  
Client Solutions Associate

+44 (0)1491 416252  
ella.gillett@invesco.com

Rebecca Dobson  
Client Solutions Associate

+44 (0)1491 417231  
rebecca.dobson@invesco.com