Invesco

2022 Long-Term Capital Market Assumptions

Invesco Investment Solutions | Japanese yen (JPY)

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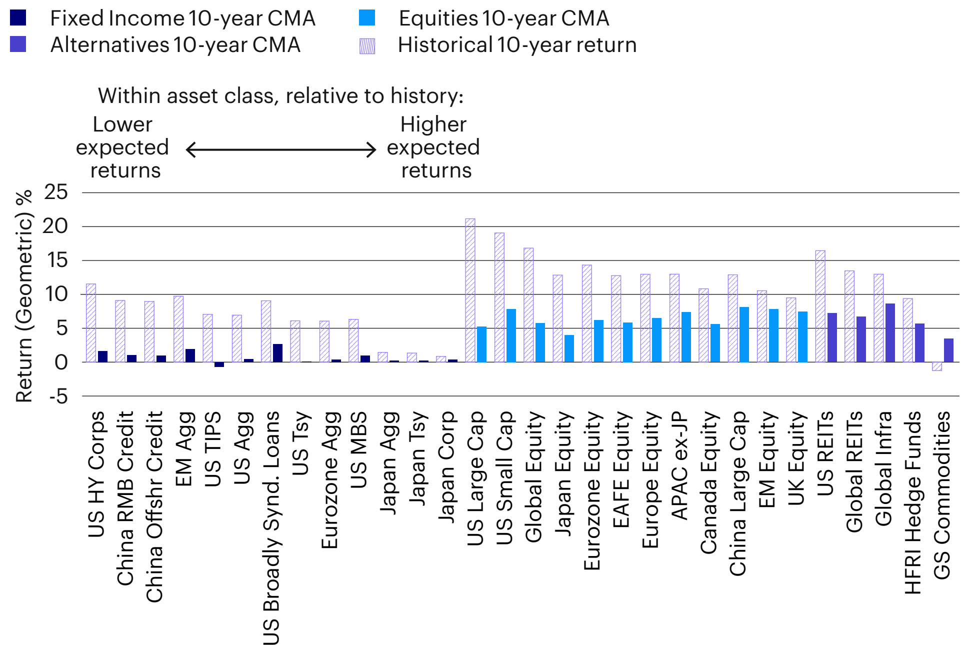
Executive Summary

Duy Nguyen
CIO, Invesco Investment Solutions

Invesco Investment Solutions is proud to present our 2022 Capital Market Assumptions (CMAs). We hope the insights and data presented in this publication assist in your asset allocation process as you begin to rebalance portfolios in the coming months. We have made significant enhancements this year for our CMAs including the launch of custom client CMAs and an industry benchmarking process within our analytics platform, Vision. As detailed in our accompanying annual methodology document, we have expanded our coverage to include APAC direct real estate CMAs, taxable US municipal bonds, improved our modeling of private infrastructure equity, US TIPS and inflation in developed markets, and carried out additional COVID-19 fundamental adjustments on our earnings growth expectations. Overall, we are covering over 170 assets in nearly 20 currencies across public and private markets to aid our clients globally in assessing their investment opportunities.

- **Strategic Perspective:** Many of the risks that existed before the pandemic are still relevant today; elevated valuations in developed economies will likely detract from prices, and some of the largest bubbles exist outside of equities, within the fixed income market, centered on duration and inflation risks as rates are low and rising, with spreads on most credit assets back to pre-pandemic tights.
- **Tactical View:** Our framework still points toward an expansionary regime. However, hawkish monetary policy repricing and flattening of global yield curves is a reminder of rising slowdown risks into 2022. We maintain a higher risk posture than our benchmark[1], favoring equities, credit, cyclical factors/sectors, and emerging markets. We have further reduced our exposure to foreign currencies, given negative growth surprises outside the US.
- **Global Market Outlook:** As we look ahead, we expect an improving economic environment in the fourth quarter, largely driven by the US. The US is benefiting from a drop in COVID-19 cases, helped by a modest increase in vaccination levels, which should result in an acceleration in economic growth. However, we expect a moderation in economic growth towards longer-term trend rates in 2022 as fiscal stimulus declines and the economy normalizes.

Figure 1: Expectations relative to historical average (JPY)



Source: Invesco, estimates as of Sept. 30, 2021. Proxies listed in **Figure 14**. 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.

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

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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.

Strategic perspective

As we set our sights on the year ahead, we chose to use the 2022 annual edition of our Capital Market Assumptions (CMAs) to reflect on how our longer-term forecasts have changed over the past year. Notably, our team at Invesco Investment Solutions remains confident in our approach to managing risk amid what was one of the most significant disruptions to daily life in a century. Our flexible and scenario-based methodology proved to be extremely valuable as we observed a jarring sequence of economic shutdowns, extraordinary policy measures, and rollout of rapid medical advancements, which have gotten us to this point.

Last year, we were leaning into what we believed were the beginnings of a new business cycle, where risk-taking is particularly rewarded, aligning with our upside scenario of improving earnings globally that would help fundamentals grow into their valuations. By most measures of economic activity and market performance, the swiftest and sharpest correction in history has been met with a similar rebound.

Today, over half of the global population has received one or more doses of the vaccine, almost eight billion shots in total, allowing travel to become a part of many of our lives once again and just in time for the holiday season. Restrictions between major regions like the US and EU are being lifted, and antiviral treatments are coming to market that are highly effective in reducing COVID-19 symptoms, making pre-COVID behaviors seem all the more likely. While we anticipate reconnection will likely cause some viral flair-ups, we do not believe it is enough to stop the maturing recovery and economic momentum that has built up recently. Besides vaccination rates, a barometer we are monitoring for the next portion of the recovery is the convergence of goods-producing industries with those that are service-oriented and are accounting for it using a fundamental adjustment in our CMA process for equity earnings. Regions like Europe or APAC that have been slower to reopen will likely see higher earnings growth similar to the reopening of the US last year.

As optimistic as we seem, there are many risks to our outlook worth mentioning, namely; persistently high inflation, the reversal of globalization, US tax and infrastructure bills, and China's common prosperity initiative. While we are unable to predict the next viral variant popping up, we are consistently focused on long-term trends that could shape the way we model assets and portfolios. We do believe there is room for the business cycle to continue expanding and elaborate upon these risks further in the following sections containing our near-term tactical view and scenario-based market commentary.

- **Inflation:** Upside inflationary pressures are front and center at every Fed meeting for the first time in decades. We anticipate that as long as unemployment remains high and, longer-term inflation expectations remain low, there will be little incentive for central banks in developed markets to derail what has been successful navigation of the pandemic so far with hawkish rate hikes. Supply disruptions from COVID-19, though waning as inventories are built back up, play into the broader populist narrative of deglobalization and onshoring, which we see as inflationary barring productivity enhancements.
- **US fiscal policy:** We view the proposed bills from the Biden admiration as largely neutral for US equity investors. Increased taxes in our view are a potential drag on the consumer and have the downstream effect of slowing US economic activity. By using additional tax proceeds to fund fiscal spending on infrastructure improvements, the cumulative policy effect on growth may be net zero.
- **Common prosperity:** In what has been the largest shift in China's approach to businesses since opening up their economy to foreign markets, Beijing's approach to the redistribution of wealth and influence over various sectors has caught many off guard. Our analysis of this policy is still underway, however recent actions against technology companies could potentially slow earnings growth or reduce risk appetite for equity ownership within the region, reducing valuations. Other possibilities include divestment of business operations in China, benefitting nearby markets in APAC.

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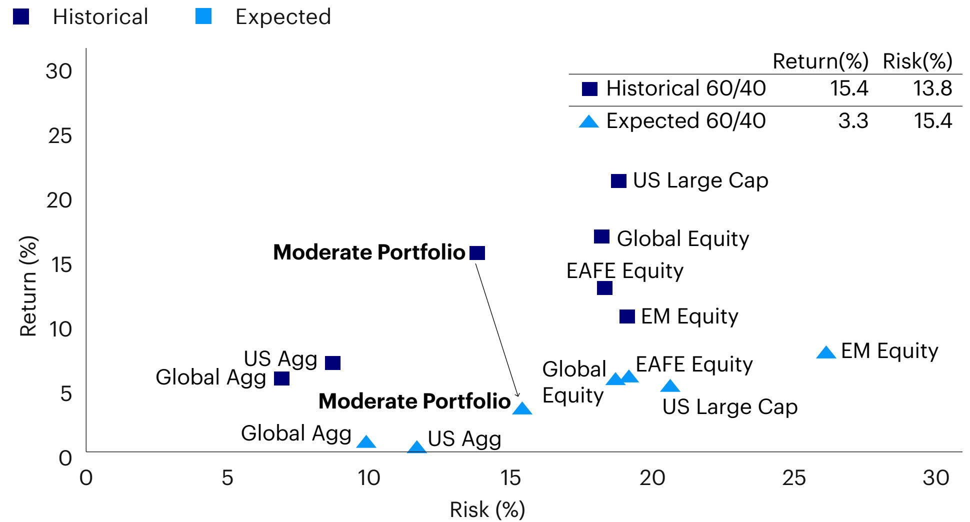
Our **strategic perspective** is that many of the risks that existed before the pandemic are still relevant today; elevated valuations in developed economies will likely detract from prices, and some of the largest bubbles exist outside of equities, within the fixed income market, centered on duration and inflation as rates are low and rising, with spreads on most credit assets back to pre-pandemic tights.

Figure 2: Significant drop in expected return for traditional 60/40 portfolios amid increased risk (JPY)



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Strategic asset allocation (SAA) guidance

- Compared to a global 60/40 benchmark[1], our strategic portfolio has slightly higher equity exposure (3.3%), sourced from fixed income.
- Within equities, we are underweight the US (-11.4%) in favor of ex-US markets, developed markets (DM) (+8%) and emerging markets (EM) (+3.3%).
- In fixed income, we have a large underweight in investment grade US corporates (-12.1%) and US MBS (-5.3%), while adding to US high yield (HY) (+4%), EM aggregate bonds (+6.9%) and broadly syndicated loans (+6.9%).
- Looking forward for income-based investors, dividends that have been cut during COVID-19 may be soon reversing, allowing more equity exposure within those models.

2022 CMA observations

- **Equities:** Our US large-cap estimate (in USD) over the next decade is 6.7%, just about 10% lower than the returns over the past decade. This is significant as US equities consist of more than half of global market-cap exposure. While much smaller in market capitalization, our CMA for emerging markets is about 3% higher than in the past, a stark contrast to the US, with a return of 9.2% due to improved earnings and valuation building blocks. Most equity CMAs have increased over the past quarter and are on average significantly higher than a year ago (global equities are up 0.3% and 0.7%, respectively), with the only outliers being in the UK and France due to lower earnings estimates. Real earnings, specifically in developed markets (DM), are up over the past year but are slightly lower than last quarter. Inflation is expected to be higher in most economies globally, and we've adjusted our preferred measure this year, utilizing market-based inflation rather than consensus estimates. Detractors from equity returns over the past year have been higher valuations and lower dividend yields. The USD is expected to fall relative to DM, thus providing a return tailwind but slightly detracting from emerging markets.
- **Fixed income:** CMAs within fixed income are coming off of historical lows, with the global aggregate bond expected to return 2.2% and global high yield only 4.3%. Rates are broadly higher than they were a year ago, and we anticipate for them to continue climbing across the yield curve, both slightly increasing our CMAs for global bonds. Roll return is up as the shape of the curve is steeper. We believe the environment for high yield credit has become more difficult as both current yields are down and credit spreads are smaller than they were a year ago, while this past quarter has seen a slight reversal in both trends given recent volatility. Credit losses are expected to be lower in most markets, adding to return.
- **Alternatives:** Real assets, like real estate, infrastructure, and commodities, are higher this quarter, while the picture over the past year has been a bit mixed. We consider both to be inflation pass-throughs as increases in inflation are seen as positive drivers. Most of the additional return in our broad commodity estimate has come from real spot return and collateral return, with the dynamics more prevalent in inflation-sensitive sectors like energy or livestock rather than precious metals. Within REITs, higher valuations have been a CMA detractor compared to a year ago, coupled with lower expected dividends. Global infrastructure has had similar building block moves but benefited from higher expected dividends and earnings than REITs.
- **Private assets:** Private assets continue to provide premia over public markets in all of our estimates despite slightly different building blocks. Private equity estimates are up over the quarter due to larger growth rates and slightly higher valuations yet are flat year-over-year. We note that financing costs to issue debt are significantly lower over the past year; however, this is negated by higher valuations and lower earnings growth. Our core real estate estimate is up slightly compared to last year, driven by higher incomes, inflation, and NOI growth and offset by increased valuations. Within private debt, we see lower loss rates adding to our CMAs.

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

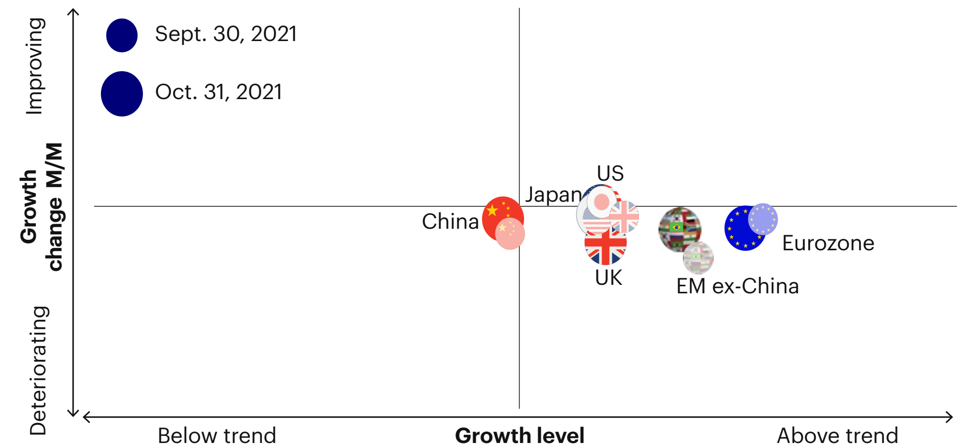
Leading economic indicators continue to decelerate at a moderate pace across regions. In the United States, weakness remains concentrated in consumer sentiment surveys, while business surveys, manufacturing activity, and housing indicators remain resilient. In the eurozone and the UK, slowing manufacturing demand expectations, rising inventories, and weak consumer confidence confirm the slowdown of the past few months. While China's activity is likely to remain below trend growth in the near term, the negative momentum in manufacturing and real estate surveys is dissipating, suggesting some stabilization, while monetary and credit conditions are gradually improving. Our macro regime framework remains in an expansionary regime, with global economic activity above its long-term trend and global risk appetite improving **(Figure 3a, 3b, and 4)**.

Figure 3a: Macro framework points to an expansionary regime, China begins its recovery

Region	LEIs Current level of growth		Global risk appetite Expected change in global growth		Expected macro regimes
Global	**Above trend**	&	**Improving growth expectations**	=	**Expansion**
United States	**Above trend**				**Expansion**
Developed markets ex-USA	**Above trend**				**Expansion**
Europe	Above trend				Expansion
United Kingdom	Above trend				Expansion
Japan	Above trend				Expansion
Emerging markets	**Above trend**				**Expansion**
China	Below trend				Recovery
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 Oct. 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.

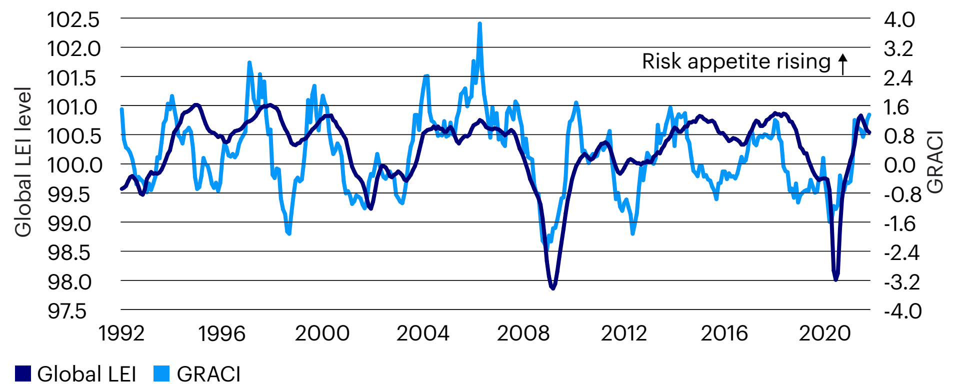
Figure 3b: Leading economic indicators continue to decelerate at a moderate pace across regions



Sources: Bloomberg L.P., Macrobond, Invesco Investment Solutions research and calculations. Proprietary leading economic indicators of Invesco Investment Solutions. Macro regime data as of Oct. 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: Global risk appetite remains on a rising trend

IIS: GRACI and the global business cycle

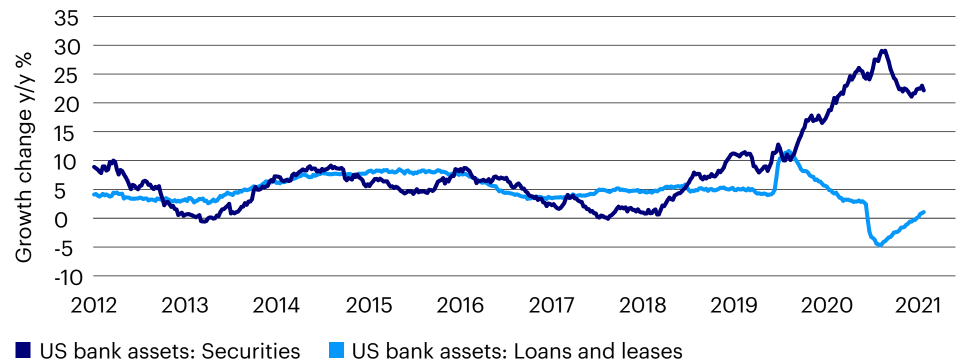


Sources: Bloomberg L.P., MSCI, FTSE, Barclays, JPMorgan, Invesco Investment Solutions research and calculations, from Jan. 1, 1992 to Oct. 31, 2021. The Global Leading Economic Indicator (LEI) is a proprietary, forward-looking measure of the growth level in the economy. A reading above (below) 100 on 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.

The repricing of monetary policy expectations in the past few weeks across both developed and emerging markets has been impressive, and it is signaling a consistent view by market participants that impending tightening cycles are likely to be front-loaded and short-lived. Rate hike expectations have increased meaningfully, triggered by above-target inflation and ongoing concerns about supply chain bottlenecks. The current policy stance of central banks is being challenged. In the US, bond markets are pricing in the first hike by mid-2022, much sooner than current Federal Reserve (Fed) projections. The Bank of Canada has brought quantitative easing (QE) to a premature end, and local bond markets have front-loaded two rate hikes within a year. The Reserve Bank of Australia has effectively given up on its yield curve control strategy, allowing two-year bond yields to rise to 80 basis points (bps) compared to a policy target of 10bps. Hawkish repricing has occurred for European and UK yield curves as well.[2]

However, in a somewhat unprecedented fashion, this hawkish repricing has not led to a rise in long-term bond yields. On the contrary, yield curves have been flattening aggressively, with the long end unchanged or lower over the past few months. These dynamics are consistent with market expectations for a short-lived tightening cycle and a return to the low-growth, low-inflation, post-GFC (global financial crisis) world, where the equilibrium level of interest rates remains low. Downward pressure on long-term bond yields is indicative of persistently large precautionary savings in the private sector. Demand for credit remains weak despite abundant credit availability and easy financial conditions. Thus far, the strong money supply growth of the past few years is channeling into financial assets rather than consumption and investments. As shown in **Figure 3**, bank holdings of financial assets (mainly Treasury and agency securities) have grown by over 20% year-on-year, while loan growth is flat.[3] As the fiscal impulse begins to wane in 2022, private sector demand needs to make up the slack, but evidence in the economy thus far suggests this may be a challenging transition. Global yield curves are repricing accordingly.

Figure 5: Money supply channeled into bond markets rather than loan growth, as credit demand remains weak



Sources: Federal Reserve, Bloomberg L.P, as of Oct. 31, 2021

While we remain today in an expansionary regime, these developments increase the likelihood of a cyclical peak in the near term. When global market sentiment begins to discount a deceleration in growth more broadly across both fixed income and equity markets, our framework will transition to a more defensive asset allocation stance.

Investment positioning

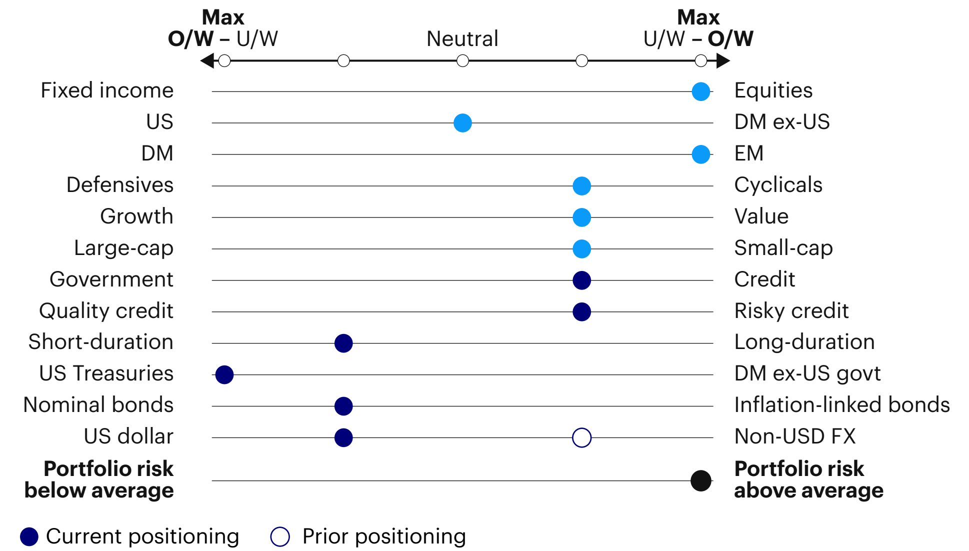
We maintain a **higher risk posture** than our benchmark[1] in the Global Tactical Asset Allocation model, with an **overweight to equities, risky credit, and cyclical factors at the expense of government bonds, higher-quality credit assets, and defensive factors and sectors** (**Figure 4, 5, and 6**). In particular:

- Within **equities**, we favor emerging markets, driven by above-trend global growth, rising risk appetite, and expensive US dollar valuations, which tend to support non-US earnings and equity prices over the medium term. 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 factor portfolio diversification relative to the past few years.
- In **fixed income**, we are overweight credit risk[4] 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 emerging markets 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 have further reduced our exposure to foreign currencies and moved to an overweight exposure to the US dollar, as negative growth surprises outside the US provide some near-term risk to foreign currencies despite attractive valuations. Within developed markets, 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. In emerging markets, we favor high yielders with attractive valuations such as the Russian ruble, the Indian rupee, the Indonesian rupiah, and the Brazilian real.

1 Global 60/40 benchmark (60% MSCI ACWI / 40% Bloomberg Barclays Global Agg USD hedged)
2 All policy pricing references as of Nov. 1, 2021.
3 Source: Federal Reserve, Assets and Liabilities of Commercial Banks in the United States - H.8, Oct. 29, 2021
4 Credit risk defined as DTS (duration times spread).
5 See our white paper "Dynamic Multifactor Strategies: A Macro Regime Approach" (de Longis, Haghbin, 2020).

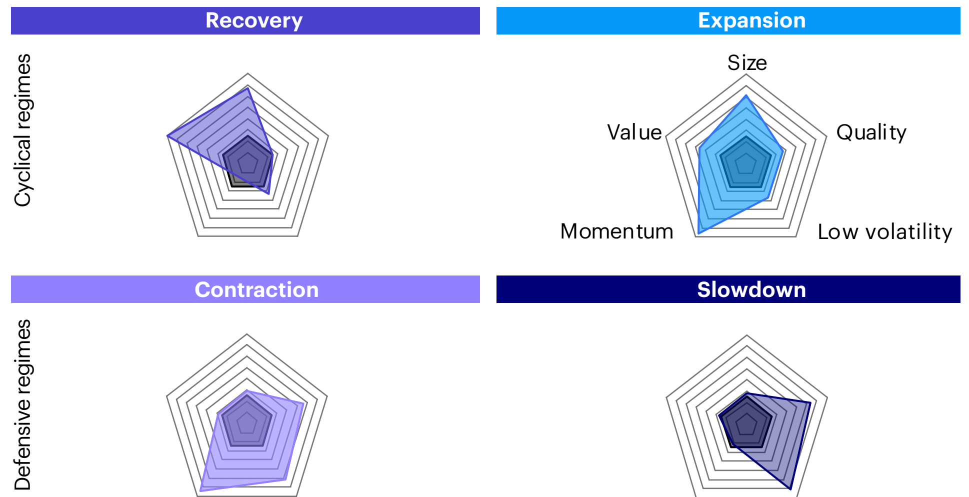
Figure 6: Relative tactical asset allocation positioning

Moving to an overweight US dollar exposure



Source: Invesco Investment Solutions, Oct. 31, 2021. DM = developed markets. EM = emerging markets. FX = foreign exchange. For illustrative purposes only.

Figure 7: Factor tilts within the expansion regime are toward size (small), value, and momentum[5]

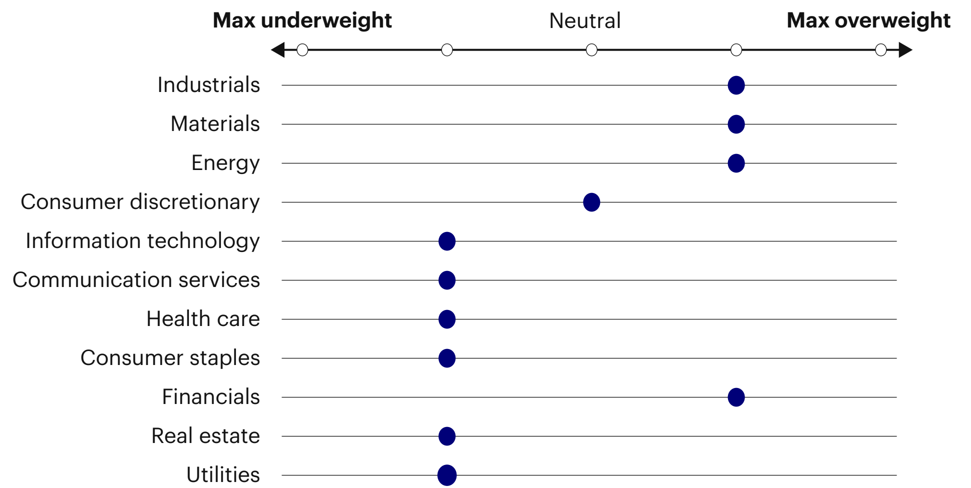


Source: Invesco Investment Solutions, Benchmark (Russell 1000 Index), Dynamic (Russell 1000 Dynamic Multifactor Strategy), weekly returns, July 2001 to September 2021. Sample period chosen based on index data availability.

Spider plots for the four regime portfolios, reflecting the factor exposures for their excess returns versus the benchmark.

Figure 8: Tactical sector positioning

Sectors remain tilted toward cyclicals and away from defensives



Source: Invesco Investment Solutions, Oct. 31, 2021. Sector allocations derived from factor and style allocations. For illustrative purposes only.

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Global Market Outlook

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Review

The third quarter saw a more challenging economic environment globally than in the second quarter. The global expansion continued, albeit at a more modest pace, as many countries faced headwinds from the spread of the COVID-19 delta variant as well as supply chain disruptions. US economic growth slowed substantially in the third quarter, hurt by those factors.

Global equities came under pressure from a variety of factors, including rising yields, and finished the quarter relatively flat. Emerging market equities lost ground as a result of slowing growth and concerns about increasing regulatory actions in China. Commodities were a standout, experiencing strong gains during the period. The yield on the 10-year US Treasury bond rose significantly at the end of the period. Most fixed income categories were relatively flat during the quarter.

Outlook

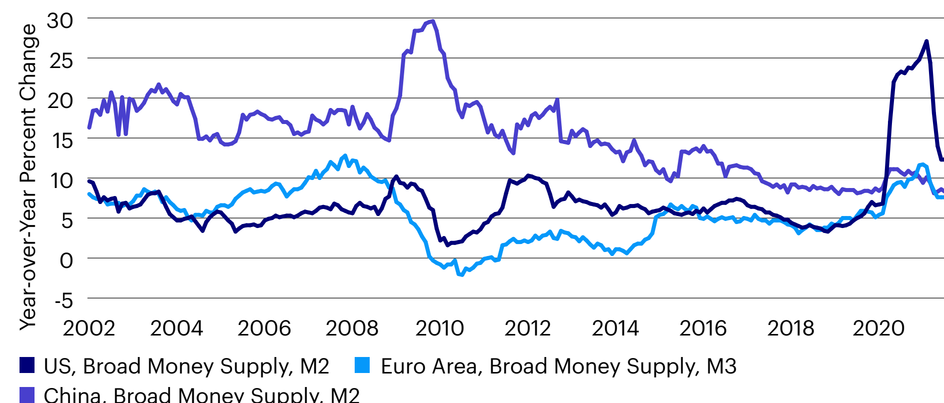
As we look ahead, we expect an improving economic environment in the fourth quarter, largely driven by the US. The US is benefiting from a drop in COVID-19 cases, helped by a modest increase in vaccination levels, which should result in an acceleration in economic growth. However, we expect a moderation in economic growth towards longer-term trend rates in 2022 as fiscal stimulus declines and the economy normalizes.

In this environment, we continue to have conviction in our base case scenario, which anticipates that the reopening will continue. We expect greater effort by countries to accelerate vaccinations. We also expect policymakers, especially in the US, to remain supportive in the face of any pandemic resurgence. Continued progress in vaccinations, as well as the development of pills that are effective in reducing hospitalizations and deaths due to COVID-19, should support a return to a more normal, pre-pandemic world in 2022.

Inflation remains a significant tail risk. As economies continue to reopen and spending increases, inflation should remain elevated, but we believe this is unlikely to cause the Federal Reserve (Fed) to hasten tightening. The Fed continues to maintain a patiently accommodative stance and appears to have learned its lessons from 2013; it 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. Furthermore, we expect inflation to peak by mid-2022 as supply chain issues improve and pent-up demand fades. Over the longer term, we expect demographics and innovation to place downward pressure on inflation.

Figure 9: Money supply growth has peaked

Broad money supply growth for selected economies



Source: Macrobond, US Federal Reserve, European Central Bank, People's Bank of China, US Census Bureau, and Invesco, as of October 31, 2021.

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

Asset class implications

In our base case scenario, we expect equities to outperform fixed income in the coming months, although more modestly. 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 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.

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

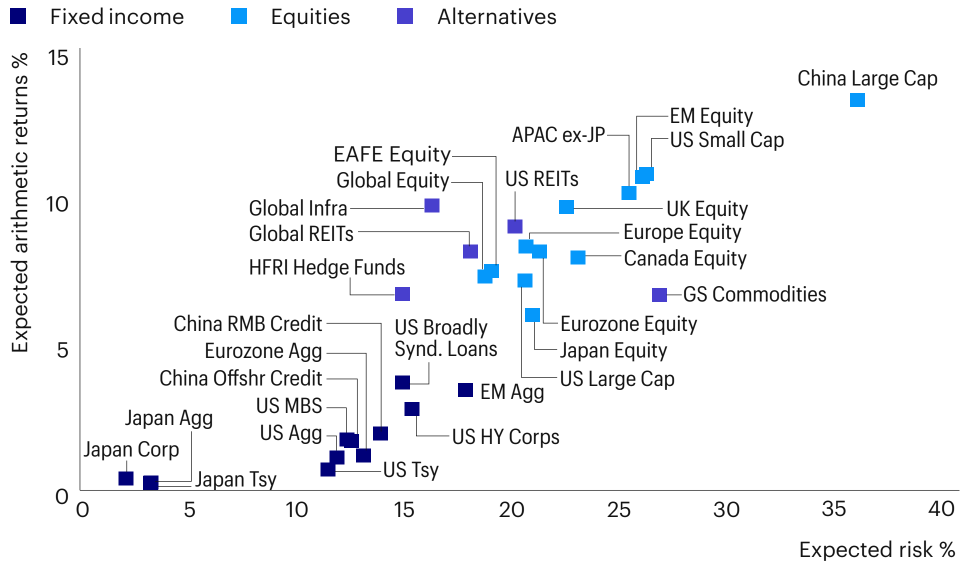

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Figure 11: CMA difference: 5-year minus 10-year assumptions (JPY)

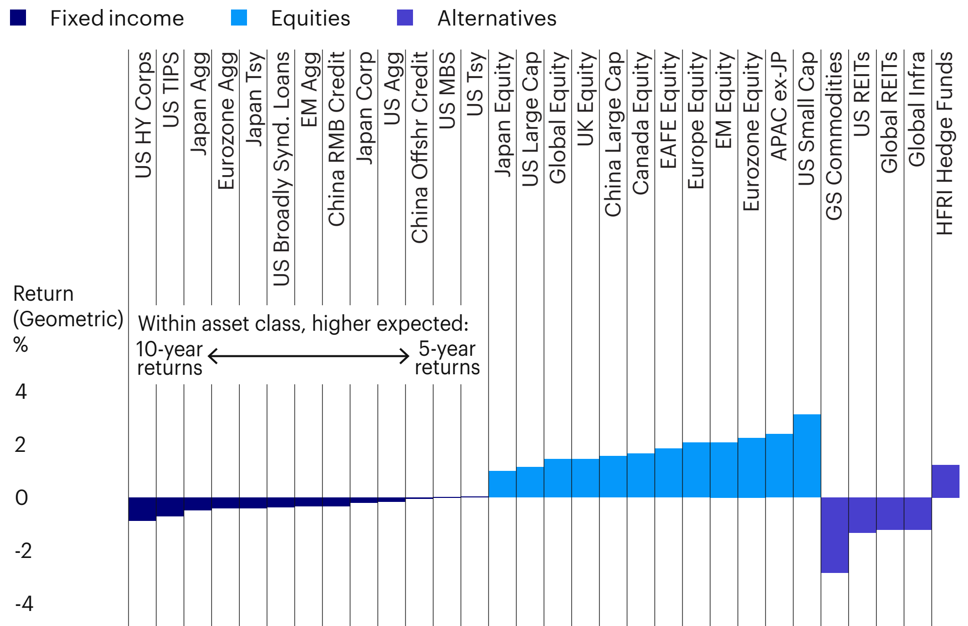

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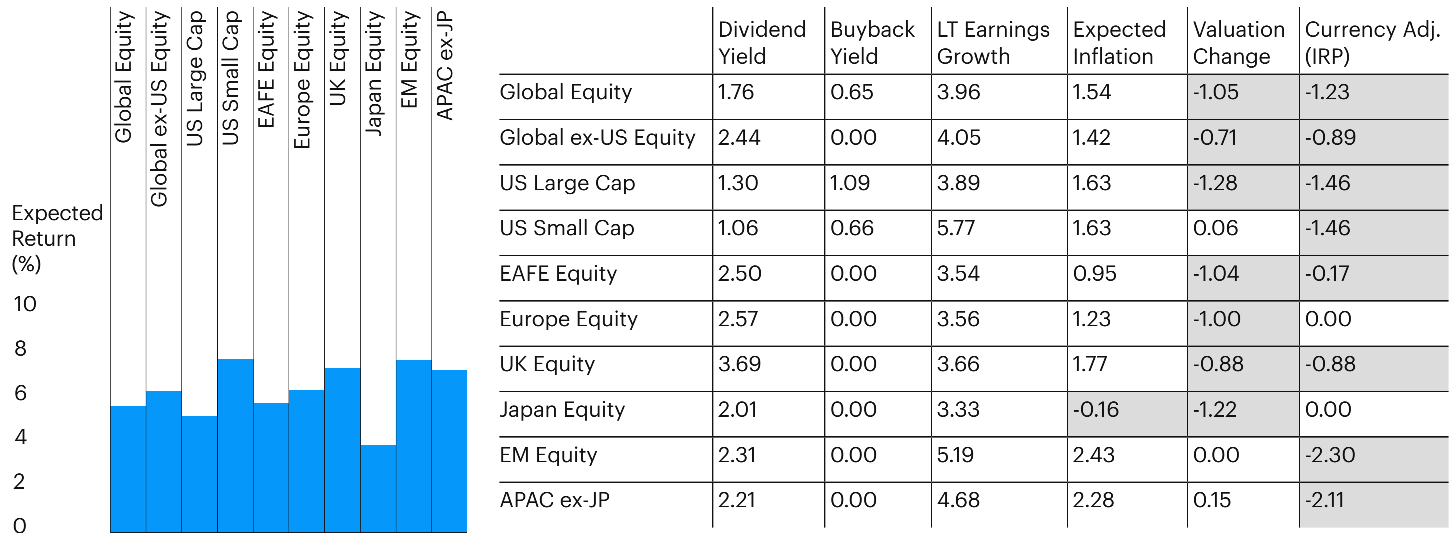
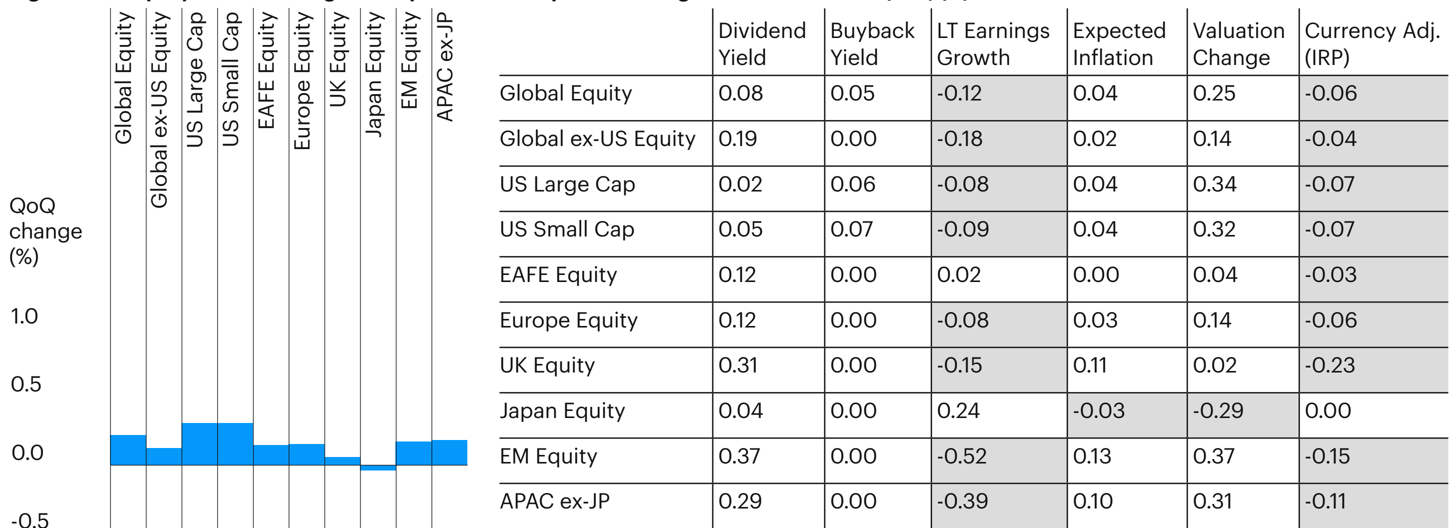
Figure 12a: Equity CMA building block contribution (JPY) (%)



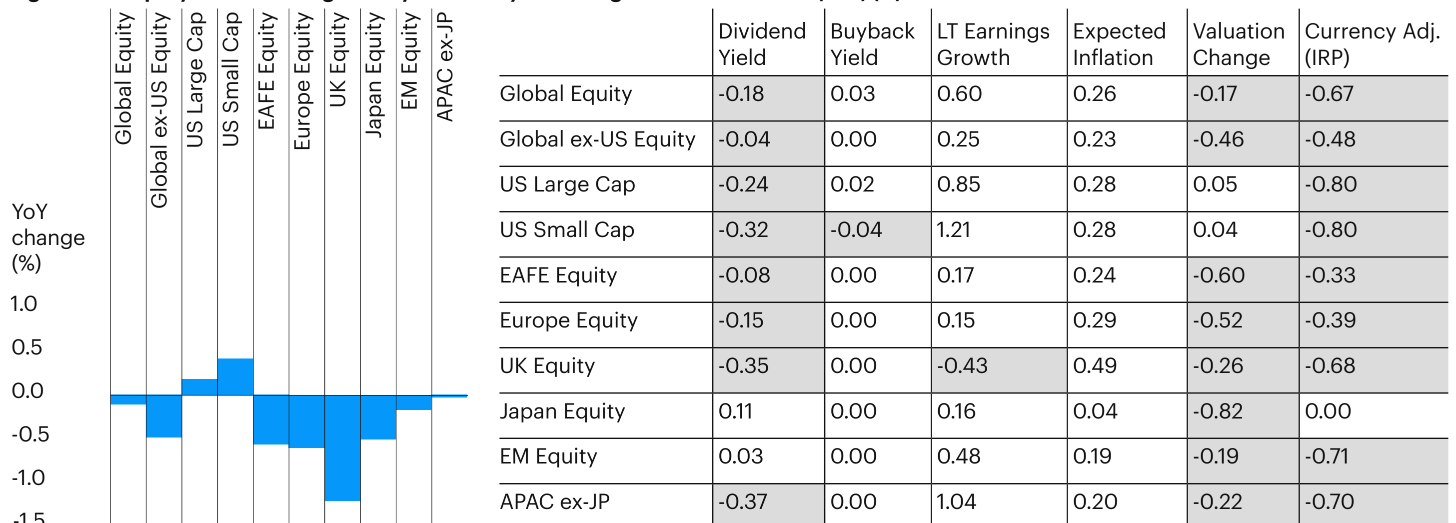
	Dividend Yield	Buyback Yield	LT Earnings Growth	Expected Inflation	Valuation Change	Currency Adj. (IRP)
Global Equity	1.76	0.65	3.96	1.54	-1.05	-1.23
Global ex-US Equity	2.44	0.00	4.05	1.42	-0.71	-0.89
US Large Cap	1.30	1.09	3.89	1.63	-1.28	-1.46
US Small Cap	1.06	0.66	5.77	1.63	0.06	-1.46
EAFE Equity	2.50	0.00	3.54	0.95	-1.04	-0.17
Europe Equity	2.57	0.00	3.56	1.23	-1.00	0.00
UK Equity	3.69	0.00	3.66	1.77	-0.88	-0.88
Japan Equity	2.01	0.00	3.33	-0.16	-1.22	0.00
EM Equity	2.31	0.00	5.19	2.43	0.00	-2.30
APAC ex-JP	2.21	0.00	4.68	2.28	0.15	-2.11

Figure 12b: Equity CMA building block quarter-over-quarter change and contribution (JPY) (%)



	Dividend Yield	Buyback Yield	LT Earnings Growth	Expected Inflation	Valuation Change	Currency Adj. (IRP)
Global Equity	0.08	0.05	-0.12	0.04	0.25	-0.06
Global ex-US Equity	0.19	0.00	-0.18	0.02	0.14	-0.04
US Large Cap	0.02	0.06	-0.08	0.04	0.34	-0.07
US Small Cap	0.05	0.07	-0.09	0.04	0.32	-0.07
EAFE Equity	0.12	0.00	0.02	0.00	0.04	-0.03
Europe Equity	0.12	0.00	-0.08	0.03	0.14	-0.06
UK Equity	0.31	0.00	-0.15	0.11	0.02	-0.23
Japan Equity	0.04	0.00	0.24	-0.03	-0.29	0.00
EM Equity	0.37	0.00	-0.52	0.13	0.37	-0.15
APAC ex-JP	0.29	0.00	-0.39	0.10	0.31	-0.11

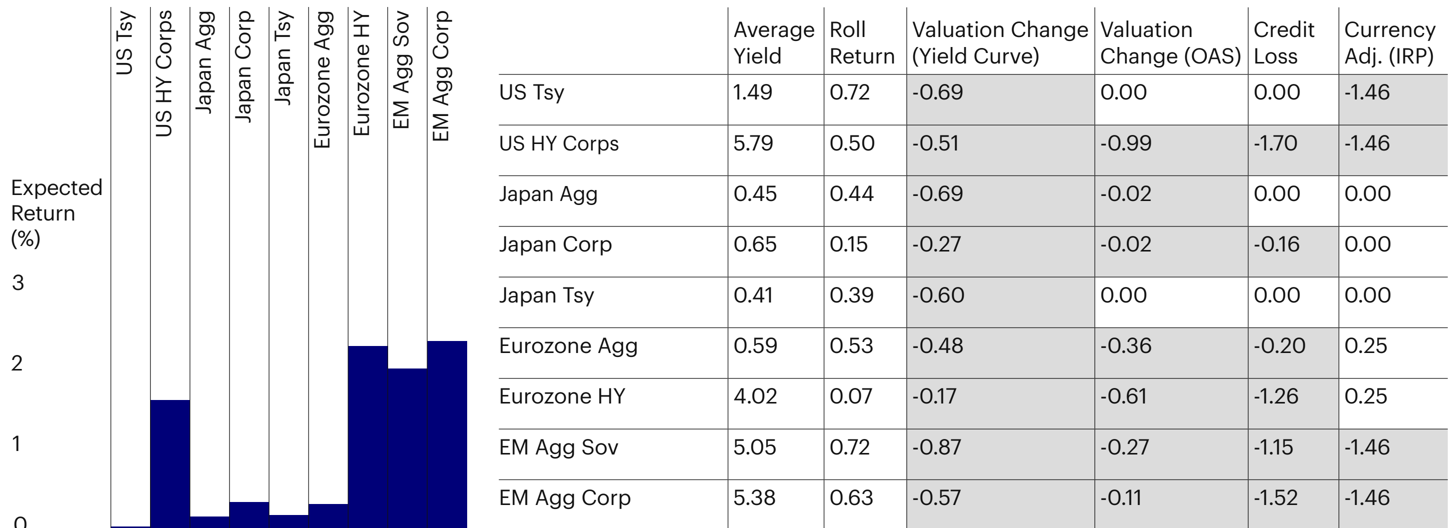
Figure 12c: Equity CMA building block year-over-year change and contribution (JPY) (%)



	Dividend Yield	Buyback Yield	LT Earnings Growth	Expected Inflation	Valuation Change	Currency Adj. (IRP)
Global Equity	-0.18	0.03	0.60	0.26	-0.17	-0.67
Global ex-US Equity	-0.04	0.00	0.25	0.23	-0.46	-0.48
US Large Cap	-0.24	0.02	0.85	0.28	0.05	-0.80
US Small Cap	-0.32	-0.04	1.21	0.28	0.04	-0.80
EAFE Equity	-0.08	0.00	0.17	0.24	-0.60	-0.33
Europe Equity	-0.15	0.00	0.15	0.29	-0.52	-0.39
UK Equity	-0.35	0.00	-0.43	0.49	-0.26	-0.68
Japan Equity	0.11	0.00	0.16	0.04	-0.82	0.00
EM Equity	0.03	0.00	0.48	0.19	-0.19	-0.71
APAC ex-JP	-0.37	0.00	1.04	0.20	-0.22	-0.70

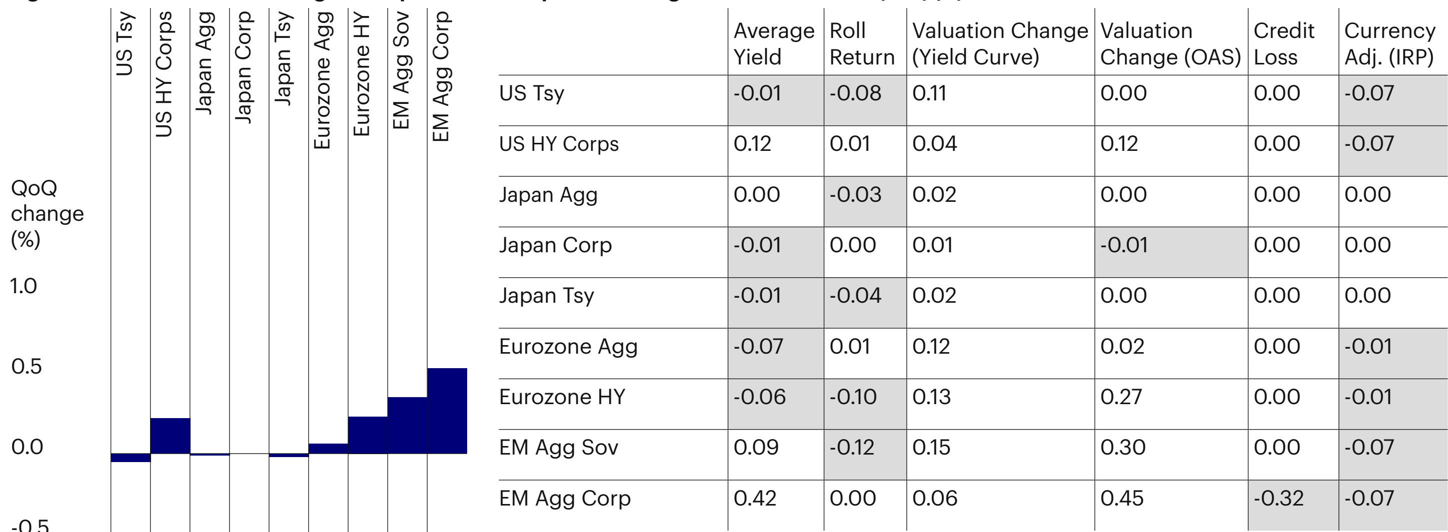
Source: Invesco, estimates as of Sept. 30, 2021. Proxies listed in **Figure 14**. These estimates are forward-looking, are not guarantees, and they involve risks, uncertainties, and assumptions. Please see page 16 for information about our CMA methodology. These estimates reflect the views of Invesco 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 13a: Fixed CMA building block contribution (JPY) (%)



	Average Yield	Roll Return	Valuation Change (Yield Curve)	Valuation Change (OAS)	Credit Loss	Currency Adj. (IRP)
US Tsy	1.49	0.72	-0.69	0.00	0.00	-1.46
US HY Corps	5.79	0.50	-0.51	-0.99	-1.70	-1.46
Japan Agg	0.45	0.44	-0.69	-0.02	0.00	0.00
Japan Corp	0.65	0.15	-0.27	-0.02	-0.16	0.00
Japan Tsy	0.41	0.39	-0.60	0.00	0.00	0.00
Eurozone Agg	0.59	0.53	-0.48	-0.36	-0.20	0.25
Eurozone HY	4.02	0.07	-0.17	-0.61	-1.26	0.25
EM Agg Sov	5.05	0.72	-0.87	-0.27	-1.15	-1.46
EM Agg Corp	5.38	0.63	-0.57	-0.11	-1.52	-1.46

Figure 13b: Fixed CMA building block quarter-over-quarter change and contribution (JPY) (%)



	Average Yield	Roll Return	Valuation Change (Yield Curve)	Valuation Change (OAS)	Credit Loss	Currency Adj. (IRP)
US Tsy	-0.01	-0.08	0.11	0.00	0.00	-0.07
US HY Corps	0.12	0.01	0.04	0.12	0.00	-0.07
Japan Agg	0.00	-0.03	0.02	0.00	0.00	0.00
Japan Corp	-0.01	0.00	0.01	-0.01	0.00	0.00
Japan Tsy	-0.01	-0.04	0.02	0.00	0.00	0.00
Eurozone Agg	-0.07	0.01	0.12	0.02	0.00	-0.01
Eurozone HY	-0.06	-0.10	0.13	0.27	0.00	-0.01
EM Agg Sov	0.09	-0.12	0.15	0.30	0.00	-0.07
EM Agg Corp	0.42	0.00	0.06	0.45	-0.32	-0.07

Figure 13c: Fixed CMA building block year-over-year change and contribution (JPY) (%)

	Average Yield	Roll Return	Valuation Change (Yield Curve)	Valuation Change (OAS)	Credit Loss	Currency Adj. (IRP)
US Tsy	0.51	0.10	0.03	0.00	0.00	-0.80
US HY Corps	-0.51	0.27	-0.13	-0.94	0.25	-0.80
Japan Agg	0.04	-0.01	-0.02	0.00	0.00	0.00
Japan Corp	-0.03	0.02	-0.01	-0.08	0.06	0.00
Japan Tsy	0.04	-0.02	-0.01	0.00	0.00	0.00
Eurozone Agg	0.12	0.18	0.00	-0.07	0.04	-0.29
Eurozone HY	-0.60	-0.04	0.02	-0.44	0.12	-0.29
EM Agg Sov	0.35	-0.13	0.06	-0.44	0.24	-0.80
EM Agg Corp	0.42	0.29	-0.07	-0.13	0.12	-0.80

Source: Invesco, estimates as of Sept. 30, 2021. Proxies listed in **Figure 14**. These estimates are forward-looking, are not guarantees, and they involve risks, uncertainties, and assumptions. Please see page 16 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 14: 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	-0.2	0.8	13.9	0.06
	US TIPS	BBG BARC US TIPS	-0.7	0.0	12.2	0.00
	US Broadly Synd. Loans	CSFB Leverage Loan	2.6	3.7	14.9	0.25
	US Agg	BBG BARC US Agg	0.4	1.1	11.8	0.09
	US IG Corp	BBG BARC US IG	0.3	1.0	12.5	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	1.5	2.5	14.6	0.17
	US HY Corps	BBG BARC US HY	1.6	2.8	15.3	0.18
	UK Linker	BofA ML UK Inflation-Linked Gilt	-0.6	0.3	13.9	0.02
	UK Gilts	BBG BARC Sterling Agg Gilts	0.4	1.1	11.9	0.09
	UK Corp	BBG BARC Sterling Agg Non-Gilts Corp	0.5	1.8	16.8	0.11
	Global Agg	BBG BARC Global Agg	0.7	1.2	9.9	0.12
	Global Agg ex-US	BBG BARC Global Agg ex-US	0.9	1.3	9.3	0.14
	Global Tsy	BBG BARC Global Tsy	0.7	1.0	8.2	0.13
	Global Sov	BBG BARC Global Sov	0.2	1.0	12.8	0.08
	Global Corp	BBG BARC Global Corp	0.6	1.5	13.4	0.11
	Global IG	BBG BARC Global Corp IG	0.4	1.5	14.5	0.10
	Eurozone Corp	BBG BARC Euro Agg Credit Corp	0.6	1.7	15.1	0.11
	Eurozone Tsy	BBG BARC Euro Agg Gov Tsy	0.6	1.4	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	1.9	3.4	17.8	0.19
	EM Agg Sov	BBG BARC EM Sov	2.0	3.3	16.6	0.20
	China Policy Bk & Tsy	BBG BARC China PB Tsy TR	0.5	1.3	13.2	0.10
	China RMB Credit	BBG BARC China Corporate	1.0	1.9	13.9	0.14
Equities	Global Equity	MSCI ACWI	5.7	7.3	18.7	0.39
	Global ex-US Equity	MSCI ACWI ex-US	6.4	8.1	19.4	0.42
	US Broad Market	Russell 3000	5.5	7.5	21.3	0.35
	US Large Cap	S&P 500	5.2	7.2	20.6	0.35
	US Mid Cap	Russell Midcap	6.2	8.6	23.2	0.37
	US Small Cap	Russell 2000	7.8	10.8	26.3	0.41
	EAFE Equity	MSCI EAFE	5.8	7.5	19.1	0.39
	Europe Equity	MSCI Europe	6.4	8.3	20.6	0.40
	Eurozone Equity	MSCI Euro ex-UK	6.1	8.2	21.3	0.38
	UK Large Cap	FTSE 100	7.4	9.6	22.4	0.43
	UK Small Cap	FTSE Small Cap UK	8.3	11.6	27.6	0.42
	Canada Equity	S&P TSX	5.5	7.9	23.1	0.34
	Japan Equity	MSCI JP	4.0	6.0	20.9	0.28
	EM Equity	MSCI EM	7.7	10.7	26.1	0.41
	China Small Cap	CSI 500	7.9	13.9	38.5	0.36
	Pacific ex-JP Equity	MSCI Pacific ex-JP	6.5	9.6	26.6	0.36
Alternatives	US REITs	FTSE NAREIT Equity	7.2	9.0	20.1	0.45
	Global REITs	FTSE EPRA/NAREIT Developed	6.7	8.1	18.1	0.45
	HFRI Hedge Funds	HFRI HF	5.7	6.7	14.9	0.45
	GS Commodities	S&P GSCI	3.4	6.7	26.9	0.25
	Agriculture	S&P GSCI Agriculture	-1.2	1.6	24.1	0.06
	Energy	S&P GSCI Energy	5.9	12.3	39.4	0.31
	Industrial Metals	S&P GSCI Industrial Metals	3.1	6.0	25.6	0.24
	Precious Metals	S&P GSCI Precious Metals	0.8	2.5	18.8	0.13

Source: Invesco, estimates as of Sept. 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.

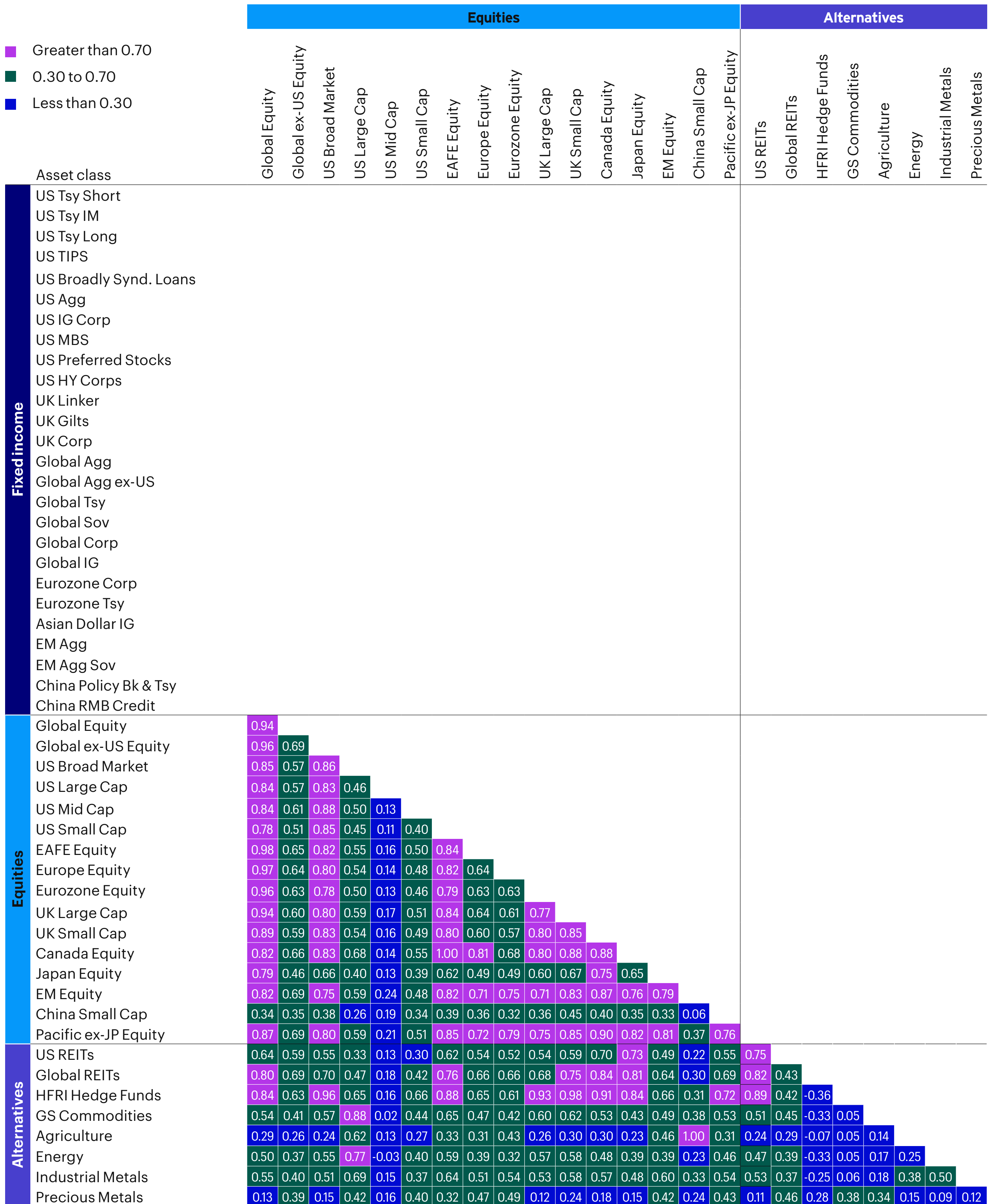
Figure 15: 10-year correlations (JPY)

- Greater than 0.70
- 0.30 to 0.70
- Less than 0.30

	Asset class	US Tsy Short	US Tsy IM	US Tsy Long	US TIPS	US Broadly Synd. 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	0.17																									
Fixed income	US Tsy IM	0.77	0.19																								
Fixed income	US Tsy Long	0.76	0.07	0.54																							
Fixed income	US TIPS	0.76	0.03	0.73	0.79																						
Fixed income	US Broadly Synd. Loans	0.08	-0.12	0.44	0.02	0.66																					
Fixed income	US Agg	0.94	0.09	0.84	1.00	0.24	0.16																				
Fixed income	US IG Corp	0.80	-0.02	1.00	0.82	0.56	0.40	0.59																			
Fixed income	US MBS	0.77	0.16	0.56	0.86	0.05	0.06	0.14	0.45																		
Fixed income	US Preferred Stocks	0.28	-0.07	0.51	0.30	0.46	0.29	0.40	0.24	0.34																	
Fixed income	US HY Corps	0.24	-0.10	0.60	0.21	0.75	0.54	0.59	0.20	0.48	0.62																
Fixed income	UK Linker	0.48	0.00	0.57	0.46	0.52	0.29	0.77	0.81	1.00	0.42	0.49															
Fixed income	UK Gilts	0.46	0.05	0.50	0.48	0.41	0.22	0.86	0.93	0.83	0.33	0.41	0.27														
Fixed income	UK Corp	0.35	-0.03	0.58	0.33	0.63	0.42	1.00	0.72	0.77	0.51	0.67	0.47	0.57													
Fixed income	Global Agg	0.74	0.07	0.72	0.73	0.48	0.30	0.60	0.65	0.64	0.38	0.36	0.30	0.37	1.00												
Fixed income	Global Agg ex-US	0.59	0.05	0.59	0.56	0.50	0.30	0.62	0.60	0.62	0.40	0.41	0.34	0.42	0.98	0.93											
Fixed income	Global Tsy	0.70	0.09	0.60	0.70	0.34	0.19	0.49	0.63	0.57	0.27	0.22	0.20	0.25	0.96	0.85	0.06										
Fixed income	Global Sov	0.77	0.03	0.81	0.70	0.65	0.45	0.64	0.55	0.65	0.51	0.53	0.42	0.49	0.89	0.80	0.27	0.44									
Fixed income	Global Corp	0.68	-0.01	0.88	0.66	0.70	0.48	0.79	0.61	0.70	0.56	0.63	0.49	0.58	0.89	0.80	0.37	0.56	0.86								
Fixed income	Global IG	0.68	-0.01	0.88	0.66	0.70	0.48	0.79	0.61	0.70	0.56	0.63	0.49	0.58	0.87	0.79	0.38	0.56	0.86	0.36							
Fixed income	Eurozone Corp	0.42	0.01	0.55	0.37	0.65	0.41	0.72	0.47	0.61	0.51	0.62	0.50	0.57	0.85	0.95	0.36	0.55	0.99	0.34	0.88						
Fixed income	Eurozone Tsy	0.50	0.05	0.49	0.45	0.49	0.29	0.59	0.52	0.58	0.37	0.44	0.37	0.41	0.87	0.98	0.22	0.33	0.94	0.34	0.89	0.49					
Fixed income	Asian Dollar IG	0.75	-0.02	0.85	0.75	0.54	0.44	0.55	0.49	0.56	0.44	0.43	0.29	0.41	0.67	0.50	0.20	0.34	0.55	0.19	0.66	0.64	0.43				
Fixed income	EM Agg	0.55	-0.03	0.76	0.50	0.71	0.55	0.56	0.34	0.53	0.62	0.63	0.49	0.63	0.62	0.51	0.33	0.60	0.63	0.21	0.64	0.88	0.69	0.59			
Fixed income	EM Agg Sov	0.61	-0.02	0.77	0.54	0.69	0.53	0.55	0.37	0.54	0.60	0.60	0.47	0.59	0.65	0.52	0.31	0.56	0.62	0.23	0.67	0.84	0.66	0.55	0.56		
Fixed income	China Policy Bk & Tsy	0.13	0.03	0.12	0.13	0.13	0.15	0.24	0.19	0.16	0.17	0.13	0.20	0.24	0.29	0.27	0.13	0.20	0.27	0.17	0.34	0.12	0.26	0.18	0.32	0.15	
Fixed income	China RMB Credit	0.12	0.02	0.12	0.09	0.19	0.19	0.28	0.18	0.20	0.23	0.16	0.25	0.28	0.30	0.30	0.17	0.25	0.31	0.17	0.36	0.19	0.31	0.22	0.33	0.18	0.30
Equities	Global Equity	0.07	-0.05	0.39	0.02	0.82	0.56	0.61	0.20	0.41	0.71	0.91	0.73	0.82	0.38	0.43	0.58	0.92	0.60	0.35	0.45	0.81	0.87	0.87	0.39	0.91	0.60
Equities	Global ex-US Equity	0.11	-0.02	0.41	0.06	0.81	0.59	0.65	0.23	0.44	0.74	0.90	0.74	0.85	0.46	0.51	0.56	0.91	0.67	0.38	0.53	0.83	0.92	0.88	0.47	0.93	0.67
Equities	US Broad Market	0.03	-0.09	0.33	-0.02	0.78	0.50	0.53	0.15	0.33	0.63	0.87	0.67	0.73	0.27	0.31	0.56	0.89	0.48	0.30	0.34	0.74	0.76	0.80	0.27	0.83	0.48
Equities	US Large Cap	0.03	-0.09	0.33	-0.02	0.77	0.49	0.52	0.15	0.34	0.62	0.86	0.66	0.73	0.27	0.32	0.55	0.87	0.48	0.30	0.34	0.73	0.75	0.79	0.27	0.83	0.48
Equities	US Mid Cap	0.05	-0.09	0.38	0.00	0.80	0.52	0.53	0.15	0.35	0.66	0.86	0.69	0.74	0.29	0.32	0.56	0.92	0.49	0.30	0.35	0.78	0.77	0.82	0.28	0.82	0.49
Equities	US Small Cap	-0.03	-0.10	0.26	-0.10	0.71	0.47	0.46	0.08	0.26	0.59	0.79	0.63	0.67	0.19	0.24	0.50	0.88	0.40	0.24	0.26	0.70	0.71	0.77	0.19	0.75	0.40
Equities	EAFE Equity	0.09	-0.04	0.39	0.04	0.79	0.55	0.65	0.23	0.44	0.70	0.91	0.68	0.82	0.43	0.49	0.55	0.88	0.65	0.36	0.50	0.80	0.85	0.89	0.45	0.95	0.65
Equities	Europe Equity	0.09	-0.03	0.37	0.04	0.78	0.53	0.65	0.24	0.45	0.67	0.90	0.67	0.79	0.43	0.51	0.56	0.85	0.66	0.35	0.49	0.79	0.82	0.88	0.45	0.98	0.66
Equities	Eurozone Equity	0.10	-0.02	0.37	0.05	0.75	0.53	0.62	0.23	0.44	0.65	0.89	0.67	0.77	0.44	0.52	0.54	0.83	0.66	0.34	0.49	0.78	0.81	0.85	0.45	0.98	0.67
Equities	UK Large Cap	0.04	-0.04	0.34	-0.01	0.80	0.52	0.68	0.25	0.45	0.66	0.86	0.63	0.79	0.38	0.44	0.58	0.85	0.60	0.35	0.45	0.77	0.79	0.89	0.40	0.91	0.60
Equities	UK Small Cap	0.02	-0.10	0.36	-0.02	0.73	0.52	0.72	0.26	0.46	0.66	0.87	0.67	0.75	0.35	0.40	0.54	0.87	0.57	0.31	0.42	0.79	0.78	1.00	0.37	0.83	0.58
Equities	Canada Equity	0.11	0.00	0.42	0.06	0.84	0.52	0.59	0.19	0.42	0.70	0.80	0.66	0.78	0.40	0.42	0.58	0.88	0.58	0.40	0.48	0.79	0.82	0.80	0.41	0.78	0.57
Equities	Japan Equity	0.02	-0.08	0.28	0.00	0.58	0.39	0.45	0.10	0.28	0.58	0.76	0.48	0.62	0.27	0.28	0.38	0.71	0.41	0.28	0.32	0.58	0.64	0.68	0.28	0.66	0.41
Equities	EM Equity	0.13	0.03	0.41	0.09	0.72	0.64	0.58	0.22	0.40	0.74	0.75	0.83	0.85	0.46	0.49	0.50	0.85	0.63	0.38	0.52	0.79	1.00	0.78	0.47	0.77	0.63
Equities	China Small Cap	0.11	0.07	0.22	0.08	0.32	0.30	0.30	0.11	0.21	0.30	0.30	0.37	0.37	0.20	0.22	0.25	0.43	0.30	0.19	0.24	0.36	0.46	0.35	0.18	0.32	0.29
Equities	Pacific ex-JP Equity	0.17	0.00	0.46	0.12	0.77	0.63	0.63	0.23	0.41	0.73	0.82	0.74	0.87	0.48	0.50	0.54	0.86	0.64	0.35	0.55	0.80	0.90	0.81	0.47	0.81	0.65
Alternatives	US REITs	0.29	-0.05	0.48	0.26	0.61	0.44	0.47	0.30	0.42	0.49	0.72	0.49	0.58	0.41	0.34	0.36	0.59	0.44	0.22	0.42	0.66	0.57	0.61	0.37	0.60	0.44
Alternatives	Global REITs	0.30	-0.04	0.55	0.26	0.74	0.56	0.63	0.36	0.51	0.63	0.85	0.60	0.75	0.51	0.47	0.49	0.75	0.58	0.31	0.54	0.78	0.74	0.77	0.48	0.75	0.59
Alternatives	HFRI Hedge Funds	0.08	-0.06	0.42	0.01	0.83	0.57	0.61	0.15	0.40	0.70	0.82	0.74	0.77	0.34	0.36	0.69	0.99	0.54	0.52	0.41	0.80	0.84	0.86	0.33	0.80	0.54
Alternatives	GS Commodities	0.00	-0.02	0.17	-0.11	0.83	0.28	0.41	0.03	0.31	0.42	0.53	0.38	0.49	0.24	0.32	0.48	0.63	0.44	0.29	0.31	0.55	0.51	0.53	0.27	0.52	0.44
Alternatives	Agriculture	0.05	0.01	0.13	0.03	0.36	0.21	0.21	0.04	0.16	0.25	0.27	0.31	0.33	0.30	0.31	0.22	0.31	0.34	0.17	0.33	0.31	0.35	0.29	0.33	0.28	0.34
Alternatives	Energy	0.01	-0.03	0.16	-0.12	0.79	0.24	0.35	-0.01	0.27	0.37	0.49	0.30	0.43	0.18	0.25	0.44	0.58	0.37	0.25	0.24	0.52	0.43	0.48	0.20	0.48	0.36
Alternatives	Industrial Metals	-0.03	0.02	0.16	-0.06	0.58	0.35	0.38	0.08	0.27	0.47	0.54	0.53	0.56	0.31	0.38	0.43	0.59	0.47	0.31	0.36	0.51	0.60	0.56	0.35	0.52	0.48
Alternatives	Precious Metals	0.38	0.10	0.35	0.37	0.30	0.24	0.33	0.39	0.39	0.30	0.09	0.20	0.23	0.56	0.48	0.15	0.19	0.45	0.45	0.55	0.28	0.33	0.15	0.55	0.14	0.43

Source: Invesco, estimates as of Sept. 30, 2021. Proxies listed in **Figure 14.** These estimates are forward-looking, are not guarantees, and they involve risks, uncertainties, and assumptions. Please see page 16 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.

Figure 15: 10-year correlations (JPY)



- Greater than 0.70
- 0.30 to 0.70
- Less than 0.30

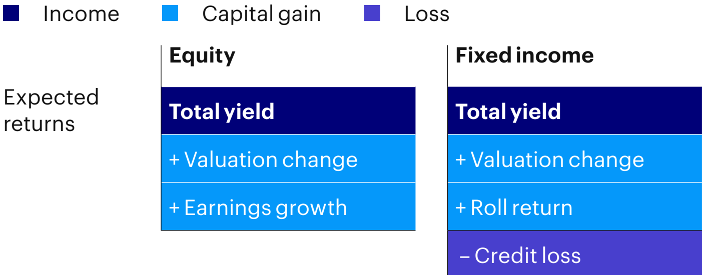
		Equities																Alternatives							
	Asset class	Global Equity	Global ex-US Equity	US Broad Market	US Large Cap	US Mid Cap	US Small Cap	EAFE Equity	Europe Equity	Eurozone Equity	UK Large Cap	UK Small Cap	Canada Equity	Japan Equity	EM Equity	China Small Cap	Pacific ex-JP Equity	US REITs	Global REITs	HFRI Hedge Funds	GS Commodities	Agriculture	Energy	Industrial Metals	Precious Metals
Fixed income	US Tsy Short																								
	US Tsy IM																								
	US Tsy Long																								
	US TIPS																								
	US Broadly Synd. 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																								
Equities	Global Equity	0.94																							
	Global ex-US Equity	0.96	0.69																						
	US Broad Market	0.85	0.57	0.86																					
	US Large Cap	0.84	0.57	0.83	0.46																				
	US Mid Cap	0.84	0.61	0.88	0.50	0.13																			
	US Small Cap	0.78	0.51	0.85	0.45	0.11	0.40																		
	EAFE Equity	0.98	0.65	0.82	0.55	0.16	0.50	0.84																	
	Europe Equity	0.97	0.64	0.80	0.54	0.14	0.48	0.82	0.64																
	Eurozone Equity	0.96	0.63	0.78	0.50	0.13	0.46	0.79	0.63	0.63															
	UK Large Cap	0.94	0.60	0.80	0.59	0.17	0.51	0.84	0.64	0.61	0.77														
	UK Small Cap	0.89	0.59	0.83	0.54	0.16	0.49	0.80	0.60	0.57	0.80	0.85													
	Canada Equity	0.82	0.66	0.83	0.68	0.14	0.55	1.00	0.81	0.68	0.80	0.88	0.88												
	Japan Equity	0.79	0.46	0.66	0.40	0.13	0.39	0.62	0.49	0.49	0.60	0.67	0.75	0.65											
	EM Equity	0.82	0.69	0.75	0.59	0.24	0.48	0.82	0.71	0.75	0.71	0.83	0.87	0.76	0.79										
	China Small Cap	0.34	0.35	0.38	0.26	0.19	0.34	0.39	0.36	0.32	0.36	0.45	0.40	0.35	0.33	0.06									
	Pacific ex-JP Equity	0.87	0.69	0.80	0.59	0.21	0.51	0.85	0.72	0.79	0.75	0.85	0.90	0.82	0.81	0.37	0.76								
Alternatives	US REITs	0.64	0.59	0.55	0.33	0.13	0.30	0.62	0.54	0.52	0.54	0.59	0.70	0.73	0.49	0.22	0.55	0.75							
	Global REITs	0.80	0.69	0.70	0.47	0.18	0.42	0.76	0.66	0.66	0.68	0.75	0.84	0.81	0.64	0.30	0.69	0.82	0.43						
	HFRI Hedge Funds	0.84	0.63	0.96	0.65	0.16	0.66	0.88	0.65	0.61	0.93	0.98	0.91	0.84	0.66	0.31	0.72	0.89	0.42	-0.36					
	GS Commodities	0.54	0.41	0.57	0.88	0.02	0.44	0.65	0.47	0.42	0.60	0.62	0.53	0.43	0.49	0.38	0.53	0.51	0.45	-0.33	0.05				
	Agriculture	0.29	0.26	0.24	0.62	0.13	0.27	0.33	0.31	0.43	0.26	0.30	0.30	0.23	0.46	1.00	0.31	0.24	0.29	-0.07	0.05	0.14			
	Energy	0.50	0.37	0.55	0.77	-0.03	0.40	0.59	0.39	0.32	0.57	0.58	0.48	0.39	0.39	0.23	0.46	0.47	0.39	-0.33	0.05	0.17	0.25		
	Industrial Metals	0.55	0.40	0.51	0.69	0.15	0.37	0.64	0.51	0.54	0.53	0.58	0.57	0.48	0.60	0.33	0.54	0.53	0.37	-0.25	0.06	0.18	0.38	0.50	
	Precious Metals	0.13	0.39	0.15	0.42	0.16	0.40	0.32	0.47	0.49	0.12	0.24	0.18	0.15	0.42	0.24	0.43	0.11	0.46	0.28	0.38	0.34	0.15	0.09	0.12

Source: Invesco, estimates as of Sept. 30, 2021. Proxies listed in **Figure 14**. These estimates are forward-looking, are not guarantees, and they involve risks, uncertainties, and assumptions. Please see page 16 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 16: 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.

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Invesco Investment Solutions

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- 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.
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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.

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 fullamount 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 Sept. 30, 2021.

Further information is available using the contact details shown overleaf.

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① 株価の変動リスク(価格変動リスク・信用リスク)、② 公社債価格の変動リスク(価格変動リスク・信用リスク)、③ REITの価格変動リスク、④ ETFにかかる乖離するリスク、⑤ 有価証券先物取引および有価証券指数等先物取引等にかかるリスク、⑥ 商品先物取引等にかかるリスク、⑦ 派生商品取引(通貨先物取引、金利先物取引、オプション、スワップ)等にかかるリスク、⑧ 不動産投資に伴うリスク、⑨ ベンチャー・キャピタル・ファンド投資に関する一般的なリスク、⑩ バイアウト・ファンド投資に関する一般的なリスク、⑪ 流動性リスク、⑫ デフォルト・リスク、⑬ カントリー・リスク、⑭ カウンターパーティ・リスク、⑮ コール・ローン等の相手先に関する信用リスク、⑯ 解約資金手当によるリスク、⑰ 原ファンドの評価価格に関するリスク、⑱ ファンドの資産に対して遡及される請求、⑲ マネジメント会社に関連するリスク、⑳ 各国法制度の法規制の対象となる可能性、㉑ キャピタルコールに伴うタイミングリスク、㉒ 投資家によるデフォルト、㉓ 資産配分に係るリスク、㉔ 訴訟リスク、㉕ 解約に係るリスク、㉖ フィーダー・ビークル等に係るリスク、㉗ 会計・監査報告書に関するリスク、㉘ 評価価格に関するリスク

オルタナティブ・ソリューション運用戦略に関する費用と税金

直接投資の場合にご負担いただく報酬 ・費用	• 【投資一任契約に係る報酬】 投資一任契約に係る報酬などの総計は、現時点で、当戦略の報酬料率を決定していないため、表示することができません。 • 【特定(金銭)信託の管理報酬】 当該信託口座の受託銀行である信託銀行に管理報酬をお支払いいただく必要があります。具体的料率については信託銀行にご確認下さい • 【組入有価証券の売買時に発生する売買委託手数料 等】 当該費用については、運用状況や取引量等により変動するものであり、事前に具体的な料率、金額、上限または計算方法等を示すことができません • 【費用合計額】 上記の費用の合計額については、運用状況などによって変動するものであり、事前に料率、上限額などを表示することができません。

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※デリバティブに関するリスクについては、巻末のディスクレーマーを必ずご確認下さい。

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