2020 Long-Term Capital Market Assumptions

Q1 update

Invesco Investment Solutions | Pound Sterling (GBP)

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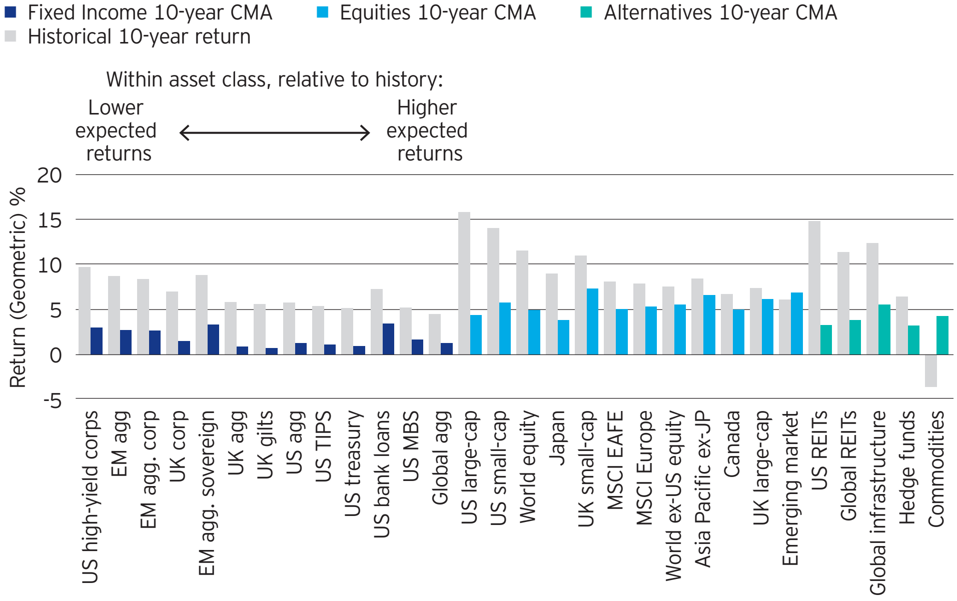
Executive Summary

+ **The Strategic Perspective.** The year ended on a high note, with most assets posting positive returns during the last quarter of the decade. Risk-on sentiment crept through the trade-tension headlines as a phase one agreement came to be, calming market fears. US large cap equities were up significantly in the fourth quarter, bringing calendar-year 2019 returns to the largest one-year gain since 2013! Even Developed non-US equities, a laggard in the expansion, participated in the quarter's rally. One might think all is rosy in markets, but as strategic investors, we must position ourselves for a less optimistic path. Looking forward, we are constructing portfolios to weather the ups and downs, which is why diversification is central to our investment thesis. Absolute returns will be hard to come by, and for those concerned with risk-adjusted figures, the next 10 years could be challenging. A US or Global 60/40[1] may not be enough for those seeking nominal returns above 5%. Non-US equities, albeit with more risk, and alternatives, like hedge funds and commodities, are the most attractive long-term CMAs relative to their historical returns **(Figure 1)**. Direct investments in Private Equity and Debt could provide diversification against US overvaluation, expected increases in volatility, and declining yields.
+ **The Tactical View.** Over the next few months we expect our leading economic indicators to deteriorate, especially for China and emerging markets due to the coronavirus, "catching-up" with the information currently discounted by asset prices. The impact to Developed markets leading indicators will likely be more modest, but negative nonetheless. Following these developments, we have rotated a portion of our equity exposure from Emerging markets (EM) into Developed markets (DM), resulting in an underweight position to emerging equities versus an overweight to DM both US and non-US. The recent deterioration in the macro environment has also led to a meaningful outperformance in defensive equity factors such as quality and low volatility, which we expect to continue in an environment of increasing risk aversion and downward revisions to growth.
+ **Regional Outlook.** Over three years since the original Brexit referendum, precious little has been settled about the form of Brexit or the future relationship with the European Union. We expect the UK to eventually tilt to the centre-right over the long run, consistent with the risk-return trade-off and the distribution of expected returns over 10-year vs. 5-year time frames in our Capital Markets Assumptions – which have some of the highest returns in domestic UK assets. Of course, this is based substantially on mean reversion in returns relative to historical volatility, consistent with the view that the UK electorate would like to move towards a pro-growth, pro-investment future. Signals point to significant fiscal easing to help cushion the effects of Brexit and the damage of underinvestment in public services including health, education and security across the political spectrum, which should help alleviate concerns about social stability.

Figure 1: Expectations relative to historical average (GBP)



Source: Invesco, estimates as of Dec. 31, 2019. Proxies listed in **Figure 12**. These estimates are forward-looking, are not guarantees, and they involve risks, uncertainties, and assumptions. Please see Page 13 for information about our CMA methodology. Please see our methodology paper for additional CMA information. These estimates reflect the views of Invesco Investment Solutions, the views of other investment teams at Invesco may differ from those presented here.

[1] US 60/40 represented by 60% S&P 500 Index and 40% BBG BARC US Aggregate Bond Index. Global 60/40 represented by 60% MSCI ACWI Index and 40% BBG BARC Global Aggregate Bond Index.

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Global Macroeconomic Outlook

Duy Nguyen
CIO, Invesco Investment Solutions

The strategic perspective

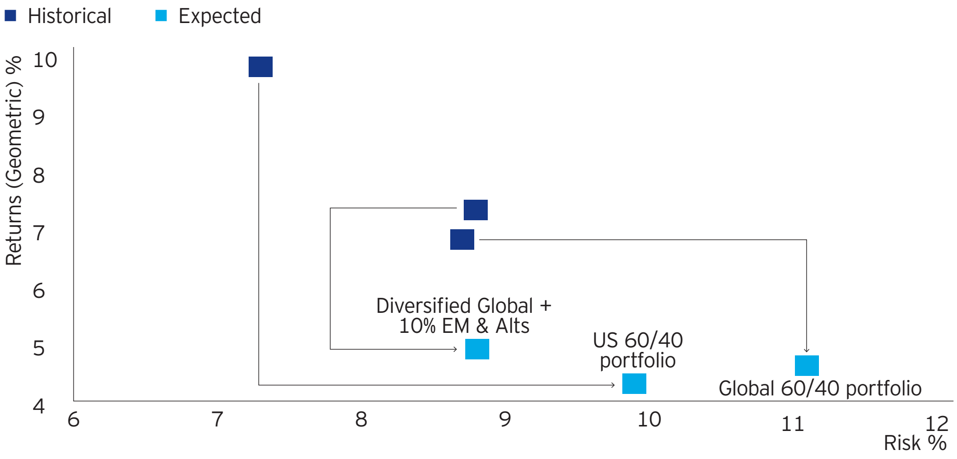
Providing our clients with a smooth investment experience is one of our core objectives. Our goal is to construct portfolios that will partake in the upswings with a risk-aware approach to minimizing drawdowns in downturns and we are fortunate to have robust analytic tools and risk diagnostics at our fingertips. Understanding the headwinds investors could face over the coming cycle, we are focused on diversifying assets to mitigate risk, enhance returns and navigate the uncertainty ahead.

Investors in US equities and broadly in fixed income, are likely to face a very different return experience going forward. The standard US 60/40 equity/fixed income portfolio is expected to return 4.3% in US dollars, on average, through 2030, less than half the return provided over the most recent decade with about a quarter higher risk (9.9%) **(Figure 2)**. A similar but less dramatic experience is expected for global equities, given more attractive valuations and higher yields. Emerging markets and Non-US developed markets appear more likely positioned to provide higher returns over the next decade, albeit with slightly higher levels of volatility. Alternatives present opportunities for both higher returns and risk reduction, particularly in direct investments such as private equity and private debt.

Meeting with our global base of clients, we hear a common concern of where to allocate capital when valuations are full, growth is low, and uncertainty is high. Fixed income returns look rather bleak, due to low or negative yields. Investors are turning to equities to fill this income void, a partial reason why many defensive sectors were bid up to lofty valuations in 2019. As long-term investors, we are focused on ensuring our asset classes are serving their intended purposes, as to not get confused by the short-term noise. We expect equities to provide price appreciation first and income secondarily. If investors follow this mantra of "make your fixed income work smarter, and equities work harder," we can begin to add diversification beyond these traditional assets in the form of alternative risk premia.

The unique backdrop whereby investors have been penalised for diversification is a theme we plan to capitalise on over the next decade. If volatility does increase as we expect, alternative strategies should provide investors with risk-mitigation through diversification. Selectivity will be important for investing late in the business cycle. From a risk-adjusted perspective, we believe US large caps are more attractive than their smaller counterparts, but in absolute terms, we favor small caps. Equities in the UK and Asia Pacific have attractive return prospects but are expected to have above-average volatility. Within fixed income assets, we prefer shorter duration and high-quality credit risk. Due to how flat, negative or inverted yield curves are around the world, long-term fixed income prospects are less attractive. Overall, we believe the next decade will be notably different from the last. Our strategic view is that investors should maintain a focus on diversification in the face of the unique challenges of lower yields, lower returns on capital, increased volatility, and higher correlations.

Figure 2: 60/40 Portfolios, less return and more risk over the next 10 years (USD)



Source: Invesco Investment Solutions proprietary research, Dec. 31, 2019. US 60/40 represented by 60% S&P 500 Index and 40% BBG BARC US Aggregate Bond Index. Global 60/40 represented by 60% MSCI ACWI Index and 40% BBG BARC Global Aggregate Bond Index. "Diversified Global + 10% EM & Alts" represented by 11% S&P 500 Index, 10% Russell 2000 Index, 5% Russell 1000 Value Index, 17.5% MSCI ACWI Index, 10% MSCI EM Index, 14% BBG BARC US Aggregate Index, 7% BBG BARC US Treasury Index, 7.5% CSFB Leverage Loan Index, 8% BBG BARC Global Aggregate Index, 2% FTSE NAREIT Equity Index, 6% HFRI HF Index, 2% Dow Jones Brookfield Global Infrastructure Composite Index. These estimates are forward-looking, are not guarantees, and they involve risks, uncertainties, and assumptions. Please see Page 13 for information about our CMA methodology. Please see the CMA methodology paper for additional CMA information. 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.**

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Alessio de Longis
Senior Portfolio Manager,
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The tactical view[2]

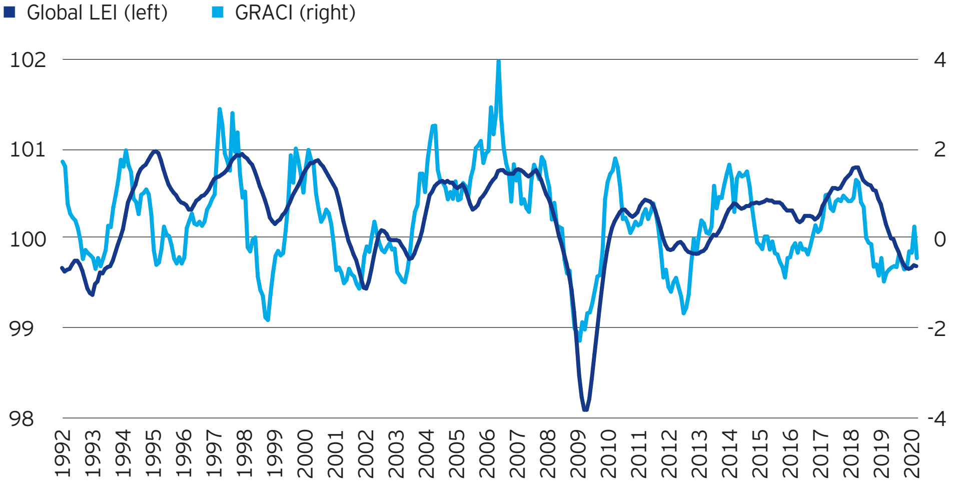
The coronavirus presents a sudden exogenous shock to the global growth cycle, at a time when the world economy was on the cusp of a new synchronised cyclical upswing. Within our macro regime framework, this negative shock has led to a noticeable decline in our market sentiment indicator, foreshadowing downward revisions to future growth expectations, particularly for China and the rest of emerging Asia **(Figure 3)**. In our last update, we had indicated how this region was likely to lead the impending global cyclical upturn based on information from our leading economic indicators; however, the regional concentration of the coronavirus shock directly challenges this thesis, at least for now. In light of this new information, our framework places the global economy in a **contraction regime** for the near-term, i.e. growth below-trend and expected to decelerate. The duration of this regime is likely to depend on two things: 1) the duration of the virus outbreak and 2) its impact on the economy.

Duration of the virus outbreak: likely over by the spring
From this perspective, the virus outbreak per se is unlikely to derail the global growth outlook for 2020, as it is reasonable to assume the outbreak will follow the typical path of any seasonal flu, which hits most of the northern hemisphere this time of year, and largely runs its course within 2-3 months, i.e. by the spring. Indeed, this is also what we experienced with SARS in 2003, which provided a similar near term hit to markets and growth and ran its course by mid-April. Therefore, by itself the outbreak can be considered a temporary economic event.

Impact on the economy: temporary and longer-lasting shocks
The growth impact is likely to be most pronounced in China and the rest of Asia, particularly for Q1 2020, driven by the disruption to economic activity caused by quarantines, factories shutdowns and canceled transportation services. Revenues from consumer spending, travel and tourism services are likely to suffer the most given the Lunar New Year holidays. However, this should represent only a one-off, temporary drag to growth. On the contrary, the industrial side is likely to experience both a near-term shock and a more uncertain long-term drag. The loss of Chinese output in Q1 will likely lead to a sharp drawdown in inventories, followed by a similarly sharp rebound in production in Q2 and Q3, depending on the disruption to global supply chains and global demand outside the region. Given the much larger share of global GDP coming from China today (~18% compared to 5% in 2003), the impact to global growth is likely to be larger than during the SARS episode. On the positive side, the meaningful decline in industrial commodity and energy prices (~10% year-to-date) should provide some support to industrial and consumer demand going forward.

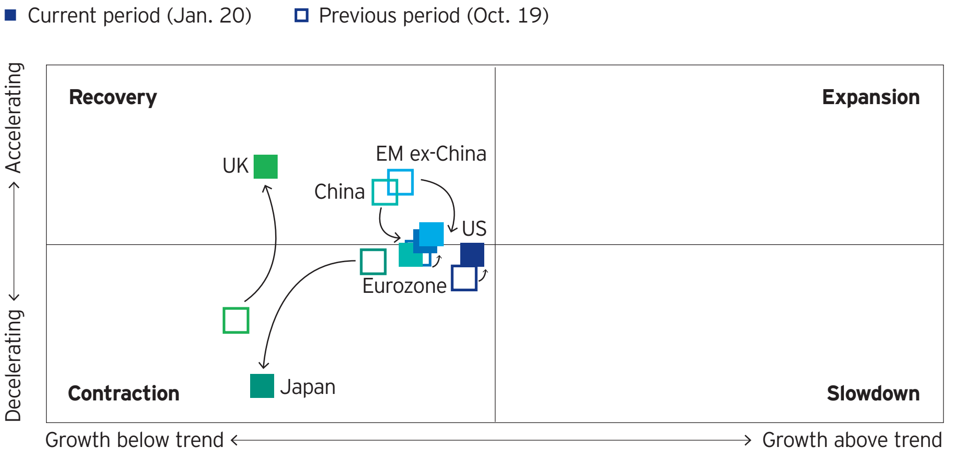
In summary, over the next few months we expect our leading economic indicators to deteriorate, especially for China and emerging markets, "catching-up" with the information currently discounted by asset prices. The impact to developed markets leading indicators will likely be more modest, but negative nonetheless. More importantly, we will continue to monitor trends in global risk appetite to gauge whether economic data will surprise positively or negatively versus financial markets expectations.

Figure 3: Duration of the virus outbreak: likely over by the spring
Coronavirus shock to market sentiment challenges the nascent growth recovery, increasing near-term downside risks in a below-trend growth environment.



Sources: Federal Reserve, BEA, Moody's, Jan. 31, 2020. GRACI is an acronym for IIS' proprietary Global Risk Appetite Cycle Indicator.

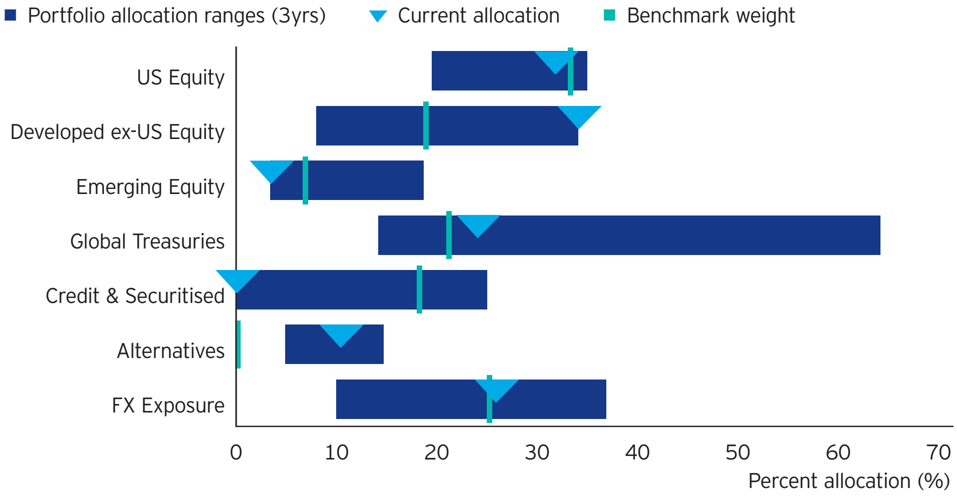
Figure 4: Impact on the economy: temporary and longer-lasting shocks
Leading Indicators likely to dip back into contraction, especially for China and emerging markets.



Sources: Invesco Investment Solutions proprietary research, Jan. 31, 2020.

Following these developments, we have rotated a portion of our equity exposure from emerging into developed markets, resulting in an underweight position to emerging equities versus an overweight to developed markets both US and non-US **(Figure 5)**. The recent deterioration in the macro environment has also led to a meaningful outperformance in defensive equity factors such as quality and low volatility, which we expect to continue in an environment of increasing risk aversion and downward revisions to growth. Finally, barring renewed easing rhetoric by global central banks, the decline in bond yields over the past month appears appropriate, flattening yield curves once again and largely reflecting the increased risk aversion.

Figure 5: Tactical Moderate Portfolio vs. Global Benchmark



Source: Invesco, Jan. 31, 2020. This chart depicts the application of Invesco Investment Solutions tactical views relative to a static, Global 60/40 benchmark, represented by 60% MSCI ACWI Index and 40% BBG BARC Global Aggregate Bond Index. Hypothetical portfolio allocations are displayed in terms of notional value and may exceed 100% due to leverage.

[2] The Tactical view's data and comments are as of Jan. 31, 2020.

Regional Market Outlook

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Pound Sterling

The global economic cycle has been given a new lease on life by improvements in key geopolitical and geo-economic uncertainties, which were weighing on both growth and inflation worldwide for much of 2019. The US-China "Phase I" trade deal should stabilise bilateral relations, even though tariffs remain elevated and complex US concerns, such as China's industrial policies and subsidies, and intellectual property protection, remain. Thus, global confidence concerns may continue to constrain major investment and big-ticket consumption decisions that the improvement will prove to be a temporary, election-year reprieve for the Trump administration or a palliative for China. Even so, the Phase I deal represents a confidence-boosting confirmation that governments share strong interests in negotiating unresolved differences.

The combination of monetary policy easing started by the Fed and followed by most major developed and emerging market (DM and EM) central banks, together with improvements in the global trade policy outlook should help release pent up demand for discretionary investment and consumption, that had previously been held back by trade and other geopolitical tensions. But it is unlikely to unleash a sustained new wave of strategic new, big-ticket decisions, so the economic outlook is likely to look up, yet consumption, investment and inflation remain subdued, given concerns about the longer-term outlook for US-China, US-EU and UK-EU relations. On balance, current and leading indicators suggest that these global policy shifts are already producing cyclical stabilisation and perhaps even a bit of an uplift to both global manufacturing industry and trade.

We believe the associated easing in geopolitical tensions and global financial conditions is already being complemented by other improvements in the global environment. Perhaps most notable among these, the decisive Conservative Party majority in the December 2019 UK election, means Brexit will proceed. The specifics of the EU-UK future relationship remain uncertain, but it seems likely that divergence from EU rules would be accompanied by growth-enhancing economic liberalisation and efforts to boost investment, instead of growth-depressing concerns about renationalisation and redistribution had Labour won. We expect political stabilization together with the recent weak data to push the Bank of England to catch up to the global monetary easing. This, together with the prospect for Brexit progress, should support UK, Eurozone (EZ) and global growth to some extent.

Other downside risks remain front of mind, however. The outbreak of novel coronavirus in Mainland China during the lunar new-year holiday travel season represents both a tragic threat to public health as well as to cyclical growth performance. At the time of writing, China has imposed domestic travel restrictions and international restrictions are starting to be used as well. Tourism, associated services and consumption, which had held up well during the trade tensions, may well suffer headwinds, in Asia and globally. The global growth impact may exceed the impact of the SARS pandemic given the significant increase in China's economic weight in the world through various direct and indirect channels. Other differences from the SARs episode are also worth noting: A global recovery was gathering steam during 2003 – the Fed began slowly raising rates the next year – and globalization was progressing rapidly. Now, much of the world economy has been growing amid mid-cycle ups and downs for almost a decade; the Fed and other major central banks have shifted back to easing.

Global economic effects are likely to come through domestic and outbound tourism, industrial production and consumption, and demand for commodities and other inputs. Knock-on effects are also likely via financial conditions, as risk assets have suffered major corrections and "safe-haven" government bonds and currencies have rallied. These effects are likely to lead to significantly weaker-than-expected first-quarter GDP growth and possibly beyond Q1, especially in Asia. All that said, if and when the tragic spread of the virus is contained, there is likely to be a significant bounceback in activity, and in risk asset valuations.

Elsewhere, other geopolitical or economic growth concerns point to the continuation of easy monetary policies. Further flare-ups of tensions in the Mid East cannot be ruled out. Positive but weak global growth is likely to keep oil prices from collapsing or spiking, absent an actual supply disruption. Significantly higher oil prices could be significantly more challenging for the global economy and capital markets than the range-bound trading we expect to continue through 2020; a surge would probably spill over into demand destruction, given the already relatively soft growth of global consumption. However, the persistence of growth-supportive monetary policies, high expectations that the Fed would ease further if needed, and continued, even if weak, global growth suggest that temporary supply hits are unlikely to produce a stagflationary oil shock that would limit monetary easing; actual supply restrictions would probably be needed.

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This outlook for weak growth and inflation, in turn, is likely to keep central banks biased towards holding policy easing, to be biased to ease even further in the event of further downside shocks to growth or inflation. Conversely, we would expect most major central banks to remain on hold in the face of any upside surprises, given the sustained, widespread underperformance of inflation. The monetary policy reviews now underway at several major central banks seem likely to support expectations of continued easy monetary policy, given the weak inflation outlook. Significant concerns about financial stability due to increasing yield-seeking, duration and liquidity mismatches among financial intermediaries and investors are likely to be addressed by so-called ''macro-prudential'' restraints. Such efforts, in our view, would be desirable to prevent financial instability, but are themselves likely to keep growth and inflation quiescent, policy easy, and thereby support the valuations of risk assets.

The global backdrop of weak growth, low inflation but easy monetary and financial conditions seems likely to apply to Brexit Britain, but with some important differences. The Brexit process has affected both UK cyclical performance as well as the outlook for potential growth in a more immediate and tangible fashion than perhaps any other major geo-economic or geopolitical shock. The result is a unique set of expected risk-return trade-offs where domestic assets are expected to deliver among the highest risk adjusted returns for sterling-based investors, arguing against diversification and for increasing home bias. This, in turn, owes to the high chances that the substantial, Brexit-related valuation discounts relative to history that now attach to domestic assets will diminish over time as the UK economy reverts to something closer to past macroeconomic trends.

Indeed, we continue to believe that many UK investors are, in effect, following this logic, because the financing of both the acquisition of domestic assets and the still-substantial UK current account deficit comes from the repatriation of foreign assets. Many UK investors would appear to agree with some foreign investors that both sterling and UK assets are available at excessive, if not unprecedented, and unsustainable discounts. Domestic assets are expected to offer higher risk-adjusted returns than even alternatives and relatively illiquid assets – uniquely among the major base currencies in our CMA sample.

By extension, the implied asset allocation strategy of increasing home bias at a time of still-significant domestic policy uncertainty would be tantamount to taking a bullish, highly-geared view that Brexit will work out well. We believe this may well be the case in the long run, if Brexit takes the form of economic liberalisation as a way of offsetting any increase in trade barriers faced by the UK with its largest trading partner, the EU – even if accompanied by greater public debt to finance investment in regional infrastructure, education, regional reallocation of public and administrative services and the like. Indeed, this expectation is gathering some currency with the strong Conservative Party December 2019 election victory and subsequent policy signals. Such a kinder, gentler form of capitalism that provides greater regional opportunity as well as encouraging the entire national economy to be more flexible and adaptable to technological progress and global competition could work well indeed. Most countries that have liberalised have done well; very few, if any, have seen their long-run performance decline.

Even so, we would suggest that meaningful global diversification continues to be desirable because even a liberalising Brexit (as opposed to the nationalist, redistributive vision of Brexit, or a no-change Brexit in name only) could entail significant economic and financial dislocation for the UK economy as a whole. Additionally, trade negotiations the UK is entering with partners around the world are likely to prove a considerable challenge in the years to come – perhaps even more so with a liberalising Brexit. The risk-return map of our CMAs for the UK points towards a kind of barbell of US and UK asset classes, ranging from corporate credit and bank loans via large-cap to small-cap equities, along with emerging markets. Even so, it would probably be prudent to hold modest Eurozone exposure as a diversifier and to participate in differential economic performance as Brexit-driven regulatory divergence unfolds, given that there can be no guaranty of the success of post-Brexit policies on the horizon that would be required for reversing the recent weakness in domestic demand and performance of UK risk assets geared toward growth.

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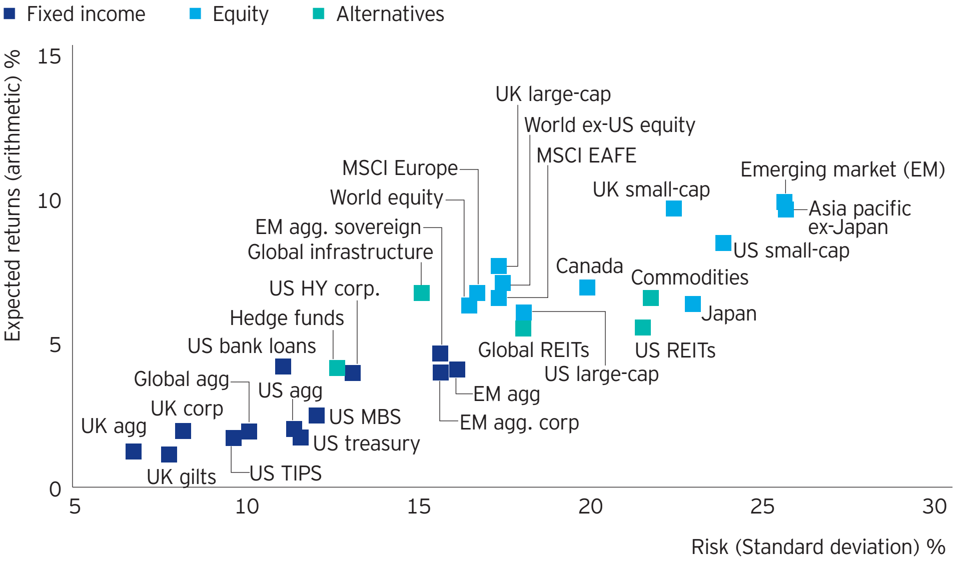
Figure 6: 10-year asset class expectations (GBP)



Source: Invesco, estimates as of Dec. 31, 2019. Proxies listed in **Figure 12**. These estimates are forward-looking, are not guarantees, and they involve risks, uncertainties, and assumptions. Please see Page 13 for information about our CMA methodology. Please see our methodology paper for additional CMA information. 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 7: CMA difference: 5-year minus 10-year assumptions (GBP)

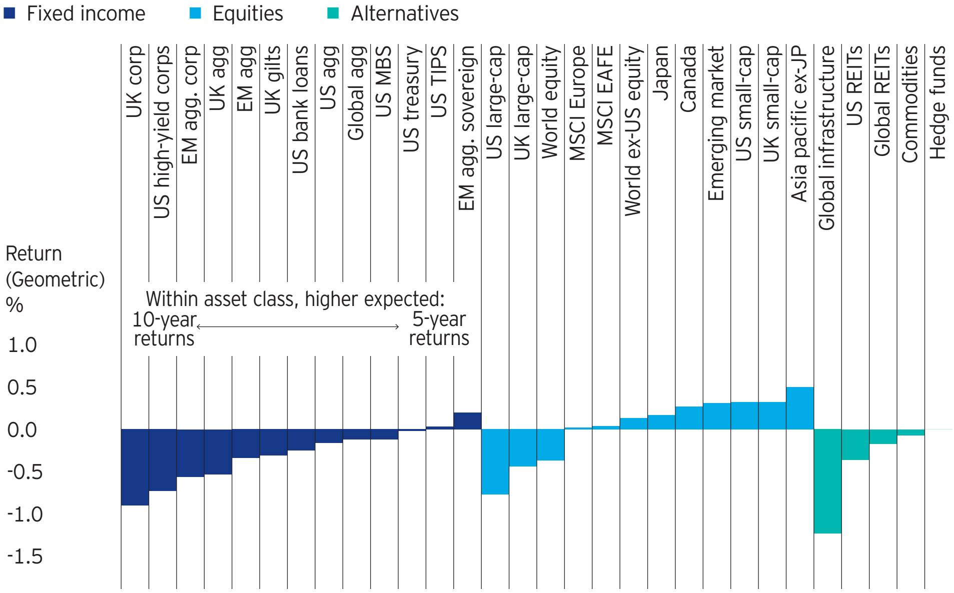


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Figure 8: Equity quarter-over-quarter change (GBP)

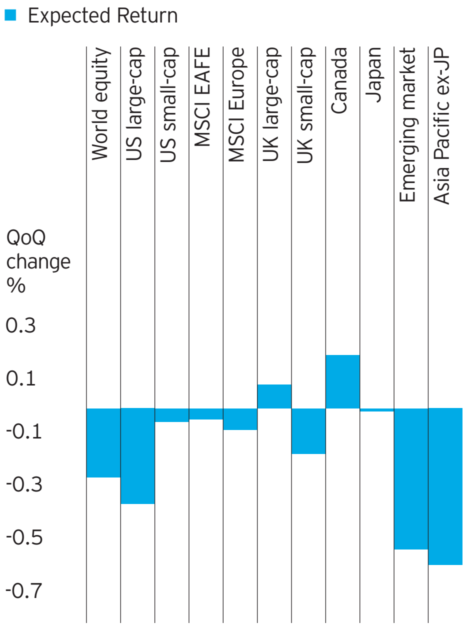

Figure 9: Fixed income quarter-over-quarter change (GBP)

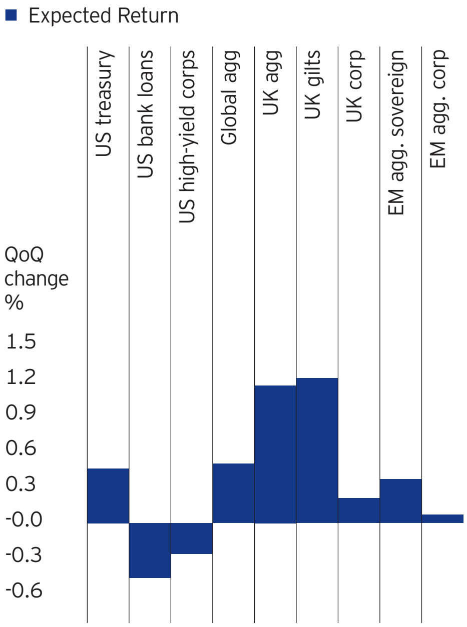

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Figure 10: Equity quarter-over-quarter change attribution (GBP)

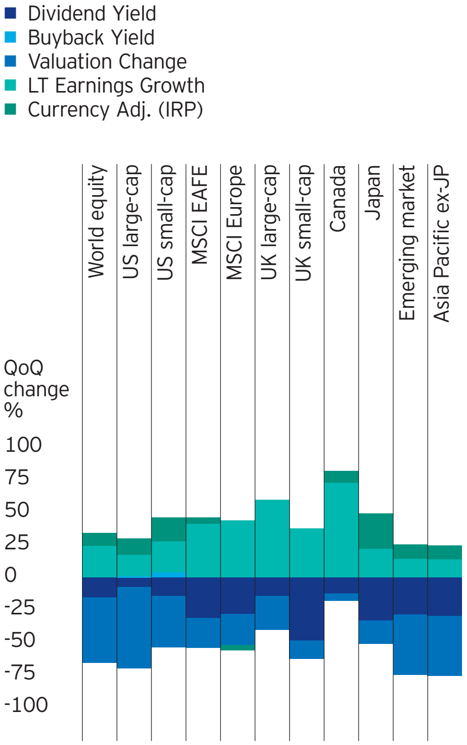

Figure 11: Fixed income quarter-over-quarter change attribution (GBP)

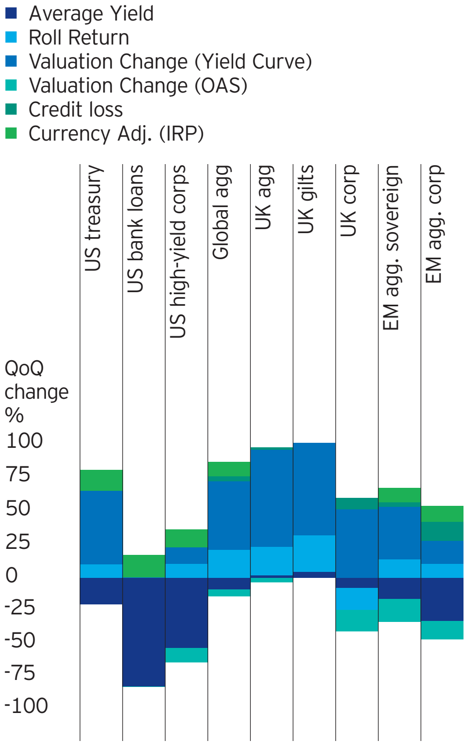

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Figure 12: 10-year asset class expected returns, risk, and return-to-risk (GBP)

	Asset class	Index	Expected geometric return %	Expected arithmetic return %	Expected risk %	Arithmetic return to risk ratio
Fixed income	US Treasury (short)	BBG BARC US Treasury Short	0.7	1.2	10.0	0.12
	US Treasury (intermediate)	BBG BARC US Treasury Intermediate	0.8	1.4	11.0	0.13
	US Treasury (long)	BBG BARC US Treasury Long	0.8	2.0	15.5	0.13
	US TIPS	BBG BARC US TIPS	1.1	1.6	9.6	0.17
	US bank loans	CSFB Leverage Loan	3.5	4.1	11.0	0.37
	US aggregate	BBG BARC US Aggregate	1.3	1.9	11.4	0.17
	US IG corporates	BBG BARC US Investment Grade	1.3	1.9	11.8	0.16
	US MBS	BBG BARC US MBS	1.7	2.4	12.0	0.20
	US preferred stocks	BOA ML Fixed Rate Pref Securities	2.6	3.7	15.4	0.24
	US HY corporates	BBG BARC US High Yield	3.0	3.8	13.1	0.29
	UK linker	BofA ML UK Inflation-Linked Gilt	-0.3	0.1	9.0	0.01
	UK gilts	BBG BARC Sterling Aggregate Gilts	0.7	1.0	7.7	0.13
	UK corp	BBG BARC Sterling Aggregate Non-Gilts - Corporate	1.5	1.8	8.1	0.23
	Global aggregate	BBG BARC Global Aggregate	1.3	1.8	10.1	0.18
	Global aggregate ex-US	BBG BARC Global Aggregate ex-US	1.3	1.8	10.2	0.17
	Global treasury	BBG BARC Global Treasuries	1.3	1.9	11.3	0.17
	Global sovereign	BBG BARC Global Sovereign	0.8	1.3	9.5	0.13
	Global corporate	BBG BARC Global Corporate	1.4	1.8	8.7	0.20
	Global IG	BBG BARC Global Corporate Inv Grd	1.4	1.8	8.6	0.20
	Eurozone corporate	BBG BARC Euro Aggregate Credit Corporate	1.4	1.8	9.2	0.19
	Eurozone treasury	BBG BARC Euro Aggregate Government Treasury	1.4	2.0	10.7	0.18
	Asian dollar IG	BOA Merrill Lynch ACIG	1.8	2.6	13.4	0.20
	EM aggregate	BBG BARC EM Aggregate	2.7	4.0	16.1	0.25
	EM aggregate sovereign	BBG BARC EM Sovereign	3.4	4.5	15.6	0.29
	EM aggregate corporate	BBG BARC EM Corporate	2.7	3.9	15.6	0.25
	EM aggregate IG	BBG BARC EM USD Aggregate IG	1.5	2.4	13.1	0.18
Equities	World equity	MSCI ACWI	4.9	6.2	16.5	0.38
	World ex-US equity	MSCI ACWI ex-US	5.6	7.0	17.4	0.40
	US broad market	Russell 3000	4.5	6.1	18.7	0.33
	US large-cap	S&P 500	4.4	5.9	18.1	0.33
	US mid-cap	Russell Midcap	5.0	6.9	20.3	0.34
	US small-cap	Russell 2000	5.8	8.3	23.9	0.35
	MSCI EAFE	MSCI EAFE	5.1	6.4	17.3	0.37
	MSCI Europe	MSCI Europe	5.3	6.6	16.7	0.40
	Eurozone	MSCI Euro X UK	4.9	6.4	18.3	0.35
	UK large-cap	FTSE 100	6.2	7.6	17.3	0.44
	UK small-cap	FTSE Small Cap UK	7.3	9.6	22.4	0.43
	Canada	S&P TSX	5.0	6.8	19.9	0.34
	Japan	MSCI JP	3.8	6.2	23.0	0.27
	Emerging market	MSCI EM	6.9	9.8	25.6	0.38
	Asia Pacific ex-Japan	MSCI APXJ	6.6	9.5	25.7	0.37
	Pacific ex-Japan	MSCI Pacific X JP	6.2	9.0	24.8	0.36
Alternatives	US REITs	FTSE NAREIT Equity	3.3	5.4	21.5	0.25
	Global REITs	FTSE EPRA/NAREIT Developed	3.9	5.4	18.0	0.30
	Global infrastructure	Dow Jones Brookfield Global Infrastructure Composite	5.6	6.6	15.1	0.44
	Hedge funds	HFRI HF	3.3	4.0	12.6	0.32
	Commodities	S&P GSCI	4.3	6.5	21.8	0.30
	Agriculture	S&P GSCI Agriculture	-0.4	1.9	22.2	0.09
	Energy	S&P GSCI Energy	6.7	11.6	33.9	0.34
	Industrial metals	S&P GSCI Industrial Metals	3.8	6.1	22.2	0.27
	Precious metals	S&P GSCI Precious Metals	2.0	3.7	19.0	0.19

Source: Invesco, estimates as of Dec. 31, 2019. These estimates are forward-looking, are not guarantees, and they involve risks, uncertainties, and assumptions. Please see Page 13 for information about our CMA methodology. Please see our methodology paper for additional CMA information. These estimates reflect the views of Invesco Investment Solutions, the views of other investment teams at Invesco may differ from those presented here. HY = high yield; IG = Investment Grade, TIPS = treasury inflation protected securities, EM = emerging markets, and MBS = mortgage backed securities.

Figure 13: 10-year correlations (GBP)

- 🟧 Greater than 0.70
- 🟩 0.30 to 0.70
- 🟦 Less than 0.30

		Fixed income																									
	Asset class	US Treas short	US Treas IM	US Treas long	US TIPS	US bank loans	US agg	US IG corp	US MBS	US pref stocks	US HY corp	UK linker	UK gilts	UK corp	Global agg	Global agg ex-US	Global treas	Global sover	Global corp	Global IG	Euroz corp	Euroz treas	Asian dollar IG	EM agg	EM agg sover	EM agg corp	EM agg IG
Fixed income	US Treasury (short)	1.00																									
	US Treasury (IM)	0.96	1.00																								
	US Treasury (long)	0.75	0.87	1.00																							
	US TIPS	0.84	0.91	0.87	1.00																						
	US bank loans	0.79	0.70	0.49	0.71	1.00																					
	US aggregate	0.94	0.99	0.90	0.94	0.74	1.00																				
	US IG corporates	0.85	0.90	0.86	0.92	0.77	0.95	1.00																			
	US MBS	0.97	0.99	0.85	0.90	0.74	0.99	0.91	1.00																		
	US preferred stocks	0.56	0.56	0.49	0.58	0.54	0.61	0.68	0.56	1.00																	
	US HY corporates	0.58	0.53	0.40	0.63	0.85	0.61	0.73	0.58	0.61	1.00																
	UK linker	0.33	0.42	0.57	0.57	0.38	0.49	0.54	0.42	0.38	0.42	1.00															
	UK gilts	0.38	0.53	0.76	0.60	0.22	0.58	0.59	0.51	0.32	0.23	0.76	1.00														
	UK corp	0.03	0.11	0.31	0.27	0.23	0.21	0.40	0.13	0.33	0.39	0.55	0.64	1.00													
	Global aggregate	0.82	0.90	0.86	0.90	0.61	0.92	0.90	0.89	0.61	0.58	0.55	0.63	0.28	1.00												
	Global agg ex-US	0.63	0.73	0.74	0.76	0.44	0.76	0.76	0.71	0.54	0.48	0.54	0.59	0.30	0.95	1.00											
	Global treasury	0.77	0.86	0.85	0.86	0.52	0.88	0.85	0.84	0.57	0.49	0.55	0.64	0.25	0.99	0.97	1.00										
	Global sovereign	0.76	0.84	0.82	0.89	0.66	0.89	0.92	0.84	0.61	0.69	0.59	0.60	0.38	0.95	0.89	0.91	1.00									
	Global corporate	0.76	0.83	0.80	0.88	0.70	0.89	0.95	0.83	0.69	0.73	0.59	0.61	0.47	0.94	0.88	0.90	0.96	1.00								
	Global IG	0.74	0.81	0.80	0.87	0.69	0.88	0.95	0.82	0.69	0.74	0.60	0.61	0.49	0.92	0.86	0.87	0.96	1.00	1.00							
	Eurozone corporate	0.32	0.40	0.40	0.49	0.29	0.45	0.53	0.39	0.45	0.45	0.43	0.36	0.37	0.70	0.82	0.69	0.73	0.75	0.76	1.00						
	Eurozone treasury	0.50	0.58	0.59	0.62	0.34	0.61	0.63	0.57	0.45	0.44	0.48	0.48	0.29	0.81	0.89	0.81	0.81	0.79	0.79	0.94	1.00					
	Asian dollar IG	0.85	0.90	0.83	0.93	0.80	0.94	0.96	0.92	0.59	0.72	0.54	0.57	0.34	0.88	0.73	0.81	0.92	0.92	0.92	0.52	0.62	1.00				
	EM aggregate	0.65	0.67	0.62	0.78	0.73	0.75	0.83	0.71	0.56	0.82	0.52	0.43	0.42	0.75	0.66	0.69	0.87	0.85	0.86	0.58	0.66	0.86	1.00			
	EM agg sovereign	0.66	0.69	0.66	0.78	0.70	0.76	0.84	0.73	0.56	0.79	0.53	0.46	0.42	0.77	0.69	0.72	0.89	0.85	0.86	0.58	0.69	0.85	0.99	1.00		
	EM agg corporate	0.58	0.61	0.57	0.75	0.73	0.69	0.80	0.66	0.52	0.83	0.52	0.41	0.42	0.70	0.63	0.63	0.83	0.83	0.84	0.62	0.59	0.86	0.96	0.91	1.00	
	EM agg IG	0.75	0.80	0.77	0.89	0.75	0.87	0.93	0.82	0.62	0.79	0.57	0.53	0.40	0.85	0.74	0.79	0.95	0.92	0.93	0.60	0.69	0.94	0.95	0.94	0.92	1.00
Equities	World equity	0.15	0.07	-0.01	0.17	0.41	0.15	0.28	0.12	0.41	0.64	0.17	-0.03	0.37	0.21	0.24	0.14	0.36	0.38	0.39	0.42	0.33	0.27	0.53	0.50	0.53	0.43
	World ex-US equity	0.02	-0.03	-0.07	0.10	0.31	0.05	0.21	0.02	0.36	0.57	0.17	-0.05	0.41	0.17	0.23	0.10	0.32	0.34	0.35	0.47	0.35	0.19	0.50	0.47	0.50	0.37
	US broad market	0.26	0.17	0.04	0.23	0.49	0.23	0.33	0.22	0.43	0.66	0.14	-0.02	0.28	0.23	0.21	0.16	0.36	0.37	0.38	0.32	0.26	0.32	0.52	0.49	0.50	0.44
	US large-cap	0.28	0.19	0.06	0.25	0.49	0.25	0.34	0.24	0.44	0.65	0.15	-0.01	0.28	0.25	0.23	0.18	0.38	0.39	0.40	0.33	0.29	0.33	0.52	0.50	0.51	0.45
	US mid-cap	0.20	0.12	0.02	0.22	0.49	0.19	0.31	0.17	0.42	0.67	0.15	-0.02	0.30	0.20	0.19	0.12	0.33	0.35	0.37	0.32	0.24	0.30	0.52	0.49	0.51	0.43
	US small-cap	0.15	0.05	-0.06	0.11	0.39	0.10	0.20	0.10	0.33	0.58	0.07	-0.07	0.20	0.10	0.08	0.03	0.21	0.23	0.24	0.22	0.10	0.19	0.40	0.37	0.37	0.31
	MSCI EAFE	0.03	-0.02	-0.07	0.09	0.30	0.05	0.21	0.03	0.36	0.56	0.16	-0.05	0.42	0.16	0.22	0.10	0.31	0.33	0.34	0.46	0.35	0.18	0.47	0.45	0.47	0.36
	MSCI Europe	-0.04	-0.09	-0.13	0.01	0.24	-0.02	0.13	-0.04	0.30	0.50	0.14	-0.06	0.41	0.10	0.17	0.04	0.25	0.26	0.28	0.45	0.33	0.11	0.41	0.39	0.40	0.29
	Eurozone	-0.02	-0.08	-0.12	0.02	0.23	0.00	0.14	-0.03	0.30	0.49	0.14	-0.06	0.39	0.12	0.19	0.06	0.26	0.28	0.29	0.48	0.37	0.11	0.41	0.39	0.40	0.30
	UK large-cap	-0.07	-0.12	-0.17	-0.02	0.23	-0.05	0.10	-0.07	0.26	0.46	0.11	-0.08	0.42	0.03	0.08	-0.04	0.17	0.20	0.22	0.32	0.19	0.08	0.36	0.34	0.35	0.24
	UK small-cap	-0.22	-0.29	-0.29	-0.17	0.17	-0.21	-0.04	-0.23	0.16	0.42	0.01	-0.18	0.37	-0.15	-0.09	-0.20	-0.01	0.04	0.06	0.18	-0.02	-0.06	0.24	0.20	0.22	0.09
	Canada	0.03	-0.02	-0.06	0.13	0.33	0.05	0.20	0.03	0.30	0.54	0.14	-0.07	0.26	0.13	0.18	0.08	0.26	0.28	0.29	0.34	0.23	0.19	0.46	0.43	0.47	0.35
	Japan	0.23	0.18	0.12	0.25	0.38	0.23	0.33	0.21	0.39	0.51	0.17	0.00	0.28	0.26	0.25	0.21	0.35	0.38	0.37	0.29	0.25	0.31	0.45	0.43	0.47	0.39
	Emerging market	-0.01	-0.05	-0.07	0.11	0.27	0.03	0.19	0.00	0.30	0.54	0.16	-0.03	0.35	0.15	0.22	0.10	0.29	0.30	0.32	0.42	0.34	0.18	0.49	0.47	0.48	0.36
	Asia Pacific ex-Japan	0.03	-0.01	-0.03	0.13	0.28	0.07	0.22	0.04	0.33	0.54	0.14	-0.01	0.36	0.17	0.22	0.12	0.31	0.32	0.33	0.39	0.32	0.21	0.46	0.45	0.47	0.36
	Pacific ex-Japan	0.01	-0.02	-0.03	0.14	0.28	0.06	0.22	0.03	0.33	0.54	0.16	0.00	0.39	0.18	0.25	0.13	0.33	0.35	0.36	0.46	0.35	0.21	0.49	0.47	0.49	0.39
Alternatives	US REITs	0.23	0.23	0.25	0.35	0.46	0.31	0.41	0.26	0.47	0.63	0.38	0.27	0.44	0.36	0.35	0.32	0.48	0.48	0.48	0.39	0.37	0.41	0.53	0.53	0.53	0.52
	Global REITs	0.14	0.14	0.20	0.30	0.41	0.24	0.38	0.18	0.49	0.63	0.37	0.25	0.54	0.33	0.36	0.29	0.47	0.48	0.49	0.47	0.42	0.37	0.56	0.55	0.56	0.51
	Global infrastructure	0.32	0.34	0.36	0.47	0.51	0.42	0.53	0.37	0.53	0.69	0.45	0.32	0.43	0.50	0.52	0.46	0.62	0.61	0.62	0.56	0.53	0.51	0.66	0.67	0.60	0.63
	Hedge funds	0.77	0.70	0.50	0.69	0.82	0.73	0.76	0.74	0.61	0.80	0.34	0.24	0.26	0.67	0.53	0.60	0.72	0.76	0.75	0.42	0.50	0.76	0.77	0.75	0.73	0.76
	Commodities	-0.05	-0.10	-0.17	0.04	0.18	-0.08	-0.02	-0.08	0.07	0.21	0.08	-0.15	0.04	-0.02	0.03	-0.06	0.02	0.05	0.04	0.18	0.03	0.01	0.14	0.10	0.17	0.07
	Agriculture	0.16	0.17	0.10	0.22	0.17	0.18	0.21	0.16	0.24	0.25	0.12	0.01	-0.01	0.26	0.30	0.26	0.27	0.28	0.26	0.29	0.27	0.22	0.27	0.25	0.29	0.27
	Energy	-0.13	-0.18	-0.23	-0.06	0.10	-0.16	-0.11	-0.17	0.00	0.13	0.03	-0.18	0.02	-0.12	-0.07	-0.16	-0.08	-0.06	-0.07	0.09	-0.08	-0.09	0.04	0.01	0.06	-0.03
	Industrial metals	0.08	0.03	-0.07	0.13	0.27	0.06	0.12	0.05	0.18	0.34	0.10	-0.05	0.12	0.15	0.20	0.13	0.20	0.22	0.22	0.31	0.27	0.16	0.30	0.26	0.30	0.21
	Precious metals	0.31	0.39	0.42	0.49	0.23	0.41	0.43	0.38	0.17	0.27	0.34	0.37	0.24	0.53	0.57	0.55	0.52	0.50	0.48	0.43	0.50	0.45	0.47	0.47	0.48	0.47

Source: Invesco, estimates as of Dec. 31, 2019. Proxies listed in **Figure 12**. These estimates are forward-looking, are not guarantees, and they involve risks, uncertainties, and assumptions. Please see Page 13 for information about our CMA methodology. Please see our methodology paper for additional CMA information. These estimates reflect the views of Invesco Investment Solutions, the views of other investment teams at Invesco may differ from those presented here.

Figure 13: 10-year correlations (GBP)

■ Greater than 0.70
■ 0.30 to 0.70
■ Less than 0.30

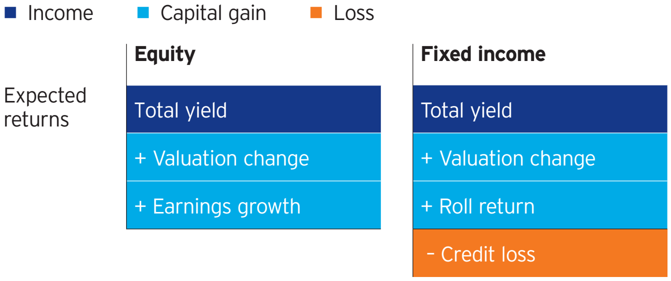
		Equities																Alternatives								
	Asset class	World equity	World ex-US equity	US broad	US large-cap	US mid-cap	US small-cap	MSCI EAFE	MSCI Europe	Eurozone	UK large-cap	UK small-cap	Canada	Japan	Emerging market	Asia pac ex-Japan	Pacific ex-Japan	US REITs	Global REITs	Global infrastruc	Hedge funds	Commodities	Agriculture	Energy	Industrial metals	Precious metals
Fixed income	US Treasury (short)																									
	US Treasury (IM)																									
	US Treasury (long)																									
	US TIPS																									
	US bank loans																									
	US aggregate																									
	US IG corporates																									
	US MBS																									
	US preferred stocks																									
	US HY corporates																									
	UK linker																									
	UK gilts																									
	UK corp																									
	Global aggregate																									
	Global agg ex-US																									
	Global treasury																									
	Global sovereign																									
	Global corporate																									
	Global IG																									
	Eurozone corporate																									
	Eurozone treasury																									
	Asian dollar IG																									
	EM aggregate																									
	EM agg sovereign																									
	EM agg corporate																									
	EM agg IG																									
Equities	World equity	1.00																								
	World ex-US equity	0.96	1.00																							
	US broad market	0.95	0.83	1.00																						
	US large-cap	0.95	0.82	1.00	1.00																					
	US mid-cap	0.93	0.83	0.97	0.94	1.00																				
	US small-cap	0.82	0.73	0.89	0.84	0.93	1.00																			
	MSCI EAFE	0.95	0.98	0.83	0.82	0.83	0.72	1.00																		
	MSCI Europe	0.92	0.95	0.79	0.79	0.79	0.70	0.97	1.00																	
	Eurozone	0.90	0.94	0.78	0.77	0.78	0.69	0.96	0.99	1.00																
	UK large-cap	0.87	0.90	0.76	0.76	0.75	0.64	0.91	0.93	0.87	1.00															
	UK small-cap	0.73	0.78	0.62	0.60	0.68	0.63	0.78	0.78	0.76	0.76	1.00														
	Canada	0.81	0.82	0.75	0.72	0.78	0.71	0.75	0.72	0.69	0.74	0.64	1.00													
	Japan	0.70	0.71	0.63	0.62	0.61	0.54	0.73	0.57	0.56	0.54	0.52	0.51	1.00												
	Emerging market	0.84	0.90	0.70	0.68	0.72	0.63	0.82	0.78	0.77	0.73	0.70	0.78	0.58	1.00											
	Asia Pacific ex-Japan	0.82	0.87	0.69	0.68	0.70	0.62	0.79	0.74	0.73	0.70	0.68	0.71	0.57	0.96	1.00										
	Pacific ex-Japan	0.84	0.89	0.72	0.71	0.74	0.65	0.85	0.79	0.77	0.77	0.68	0.76	0.57	0.88	0.87	1.00									
Alternatives	US REITs	0.63	0.57	0.64	0.63	0.69	0.63	0.57	0.54	0.53	0.48	0.45	0.50	0.44	0.49	0.48	0.55	1.00								
	Global REITs	0.75	0.74	0.70	0.69	0.75	0.66	0.74	0.68	0.67	0.64	0.59	0.63	0.57	0.67	0.66	0.75	0.92	1.00							
	Global infrastructure	0.74	0.71	0.69	0.69	0.69	0.55	0.69	0.65	0.63	0.64	0.39	0.66	0.50	0.64	0.61	0.67	0.69	0.76	1.00						
	Hedge funds	0.65	0.56	0.70	0.69	0.68	0.61	0.54	0.47	0.46	0.43	0.31	0.55	0.56	0.52	0.52	0.50	0.47	0.49	0.64	1.00					
	Commodities	0.33	0.36	0.28	0.26	0.32	0.28	0.32	0.31	0.27	0.38	0.28	0.53	0.21	0.35	0.28	0.33	0.10	0.18	0.30	0.24	1.00				
	Agriculture	0.23	0.24	0.19	0.19	0.20	0.13	0.22	0.19	0.19	0.18	0.11	0.28	0.14	0.26	0.23	0.30	0.20	0.25	0.23	0.24	0.27	1.00			
	Energy	0.26	0.29	0.22	0.20	0.26	0.24	0.26	0.26	0.22	0.33	0.25	0.46	0.16	0.27	0.20	0.24	0.03	0.10	0.22	0.14	0.97	0.09	1.00		
	Industrial metals	0.48	0.49	0.42	0.41	0.44	0.37	0.44	0.40	0.38	0.45	0.39	0.57	0.28	0.53	0.50	0.54	0.31	0.41	0.34	0.37	0.42	0.25	0.30	1.00	
	Precious metals	0.13	0.17	0.08	0.07	0.10	0.04	0.11	0.07	0.08	0.06	-0.03	0.29	0.12	0.26	0.22	0.22	0.18	0.21	0.29	0.35	0.20	0.27	0.09	0.32	1.00

Source: Invesco, estimates as of Dec. 31, 2019. Proxies listed in **Figure 12**. These estimates are forward-looking, are not guarantees, and they involve risks, uncertainties, and assumptions. Please see Page 13 for information about our CMA methodology. Please see our methodology paper for additional CMA information. 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 14: 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 earning 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

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 60 professionals, with 15+ years of experience across the leadership team. The team benefits from Invesco's on-the-ground presence in more than 20 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 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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