



Investment Insights

Capital market assumptions Q3 2019

United States Dollar (USD)

Invesco Investment Solutions develops capital market assumptions (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 a 10-year investment time horizon, are intended to guide strategic asset allocations. For each selected asset class, we develop assumptions for expected return, standard deviation of return (volatility) and correlation with other asset classes.

This document summarizes quarterly changes in our long-term asset class expectations.

Executive summary

- The US Federal Reserve has led many central banks in turning dovish as evidence of a global slowdown, concentrated in manufacturing and investment, especially in trade-surplus economies, continued to gather in response to trade tensions. Deficit and consumption/services-led economies have also suffered collateral damage both via financial conditions, business/consumer confidence and direct economic shocks.
- A truce in US-China trade tensions and the Fed, by validating market expectations of a rate cut, have eased financial conditions, raising hope that the US expansion, already the longest since World War II and global growth, will extend further.
- Even so, major risks remain. US-China tensions are far from resolved. Concerns persist about Europe. The rising risk of a “no-deal” Brexit is pressuring confidence and investment in the UK; an actual no-deal Brexit could precipitate a recession in the UK and tip Continental Europe’s already weak growth closer to a recession.
- Wider worries also weigh on growth, including “weaponization” of the economy by tariffs; by links to immigration raised by Brexit and challenges to the new NAFTA; by sanctions that curtail access to the dollar-based global financial system.
- Uncertainty is compounded by doubts about commitment to agreed deals, like efforts to re-open the Brexit Withdrawal Agreement, to link the new NAFTA to immigration; and claims of backtracking on progress in US-China trade talks.
- The risk of US intervention to weaken the dollar is also a new challenge which could prevent currency realignment and force adjustment on net trade, imposing additional downside risks to global growth and inflation.
- Hence the broader backdrop is one of higher barriers to trade and investment, and greater uncertainty in the global economy than at any time in recent decades, pointing to investment and trade diversion. Accordingly, confidence in capital markets assumptions, and in the prospect of mean reversion in global economic growth, inflation and asset valuations may well be lower as the potential distribution of outcomes widens, potentially skewed to downside risks.

The document is intended only for Professional Clients in Continental Europe (as defined under Important Information); for Qualified Investors in Switzerland; for Professional Clients in Dubai, Ireland, the Isle of Man, Jersey and Guernsey, and the UK; for Institutional Investors in Australia; for wholesale investors (as defined in the Financial Markets Conduct Act) in New Zealand, for Professional Investors in Hong Kong; for Qualified Institutional Investors in Japan; for Institutional Investors and/or Accredited Investors in Singapore; for certain specific Qualified Institutions/Sophisticated Investors only in Taiwan and for Institutional Investors in the USA. The document is intended only for accredited investors as defined under National Instrument 45-106 in Canada. It is not intended for and should not be distributed to, or relied upon, by the public or retail investors.

- A silver lining is that trade and investment barriers are likely to produce greater variation in economic and financial performance, boosting diversification benefits both geographically and across asset classes.
- For USD-based investors, our 10-year expected returns relative to historical risk resembles a traditional efficient frontier, with greater returns for greater risk across many asset classes and regional exposures (though not all), with domestic asset classes ranging across the risk spectrum as well as overseas assets. USD-based investors can therefore avail themselves of diversification opportunities both at home and globally, depending on their preferences for global exposure or home bias, in line with views on economic fundamentals and financial valuations - including of the dollar - vs. risks of more severe trade or investment restrictions.

Global overview

Risks to the structure of global trade and investment persisted in Q2, remaining a threat to global potential growth. Major central banks, led by the US Federal Reserve, turned decisively dovish as evidence of slowing growth and sliding inflation spread across developed and emerging economies. Such concerns also contributed to a pause in US-China trade friction, but some damage has already very likely been done to both the current cycle and to potential growth given weakening investment growth.

The slowdown in investment started on the demand side, manufacturing on the supply side and current-account/trade surplus economies geographically. But “soft” survey data and actual activity data have also weakened in consumption/services/trade-deficit economies as financial conditions shocks – “risk-off” in equity, credit and EM – combined with confidence concerns across firms, financials and households threaten to slow growth and darken the outlook. Brexit seems to have aggravated challenges to growth in Europe. In the UK, stockpiling ahead of the original March 29 Brexit date helped support growth in Q1, but is now passing, contributing to Q2 slowdown in both the UK and the Eurozone (EZ), an effect that may repeat ahead of the new October 31 deadline.

Cyclical and structural challenges to global growth seem likely to persist. Brexit will likely continue to pose significant downside risks in Europe, especially in the UK, smaller EZ economies and major trading partners, as well as threaten investment. US-China tensions may have stabilized for now, but uncertainty persists amid few signs of tangible progress and little indication of de-escalation. An easier stance by major central banks already seems to be reducing the impact of these challenges via easier financial conditions and higher asset prices.

Indeed, winners and losers are starting to emerge, at least in relative terms, even if global growth in absolute terms will be lower than in a flatter world with lower trade and investment barriers. There is growing evidence of trade and investment diversion as global supply chains are relocated to reduce exposure to geopolitical/geo-economic risks like US-China rivalry and tensions in UK-EU relations. Plus, firms and investors also worry that the US may unilaterally intervene to weaken the dollar to offset the effect of tariffs or monetary easing on currencies, which could prevent global exchange rate shifts, instead inducing weaker global growth.

United States

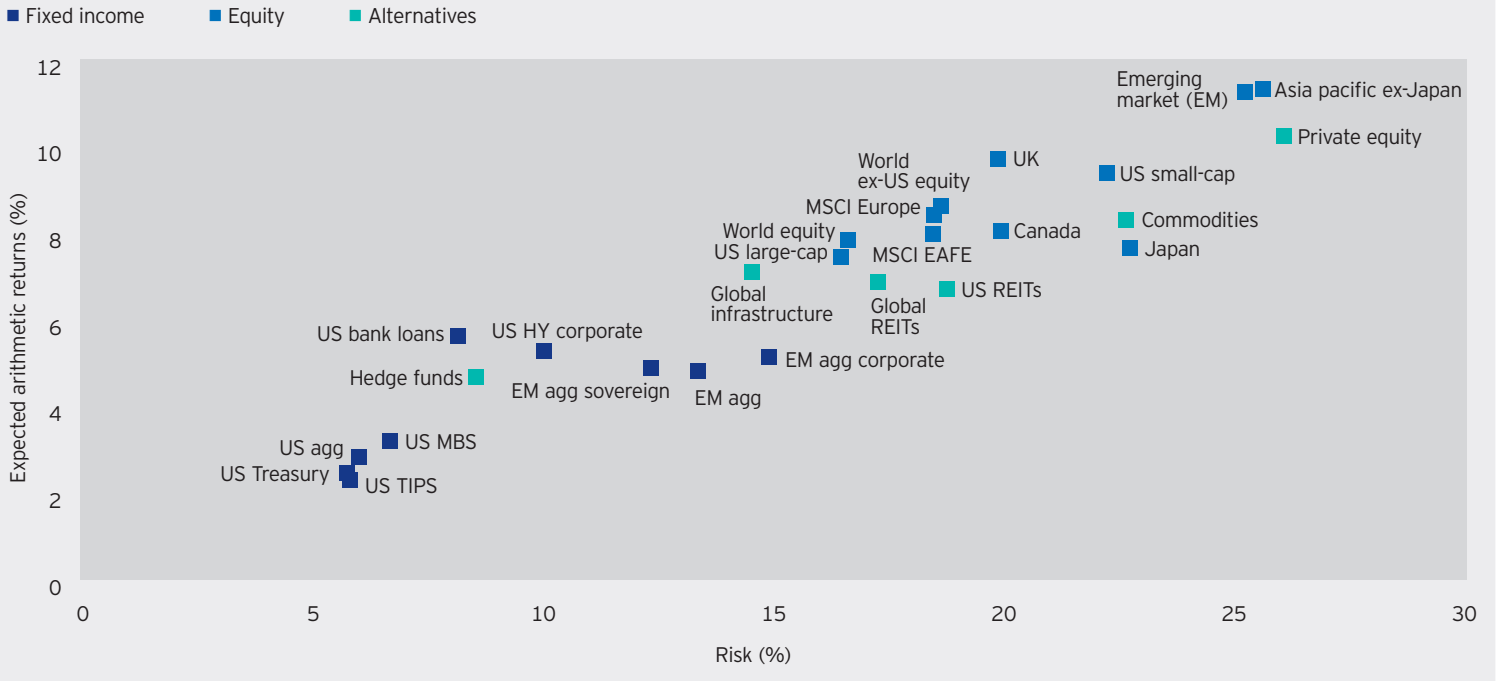
The Fed's dovish shift has helped shift the yield curve slope from inverted (widely linked to recessions) into a "bear steepening", raising longer dated bond yields. This twist has boosted risky asset prices by reducing perceived recession risk. But the dollar has not fallen by much and the yield curve is nearly flat rather than positively sloped. Investors may well see the price action across asset classes as suggesting that the Fed's dovish policy tilt is necessary but insufficient to sustainably raise growth to trend or inflation to target, which would likely be accompanied by an upward sloping yield curve.

Dollar stability and a flat yield curve may also be due in part to expectations of global easing that would prevent a global redistribution of growth from one major economy to another. However, even global easing may not be enough to reinvigorate global growth in the face of the structural challenges to both the current cycle as uncertainties weigh on investment and demand today and as weak investment today points to lower potential growth in future. If China-US trade tensions re-escalate, if a no-deal Brexit materializes or if such risks reduce as well as redirect investment, fiscal easing and structural reform might be required to boost cyclical or potential growth.

Despite these issues, our 10-year USD projection of expected returns and risk once again resembles a traditional efficient frontier - with higher historical risk/volatility compensated by higher expected returns. Furthermore, the risk/return trade-off across asset classes and geographic exposure offers options for both geographic diversification and home bias, depending on views of dollar-based investors about shifts in valuations and the structural challenges posed by trade, investment, technology or geopolitical frictions to various asset-class or geographic exposures. Our sense is that the tensions will persist - that is, there will be no major or decisive breakdown in relations or negotiations, nor a conclusive resolution. The challenges will therefore continue, but the world economy will continue to be largely open for trade and investment, which in turn calls for selective diversification rather than indiscriminate home bias. The relatively high valuations of the dollar and US assets also support the case for diversification.

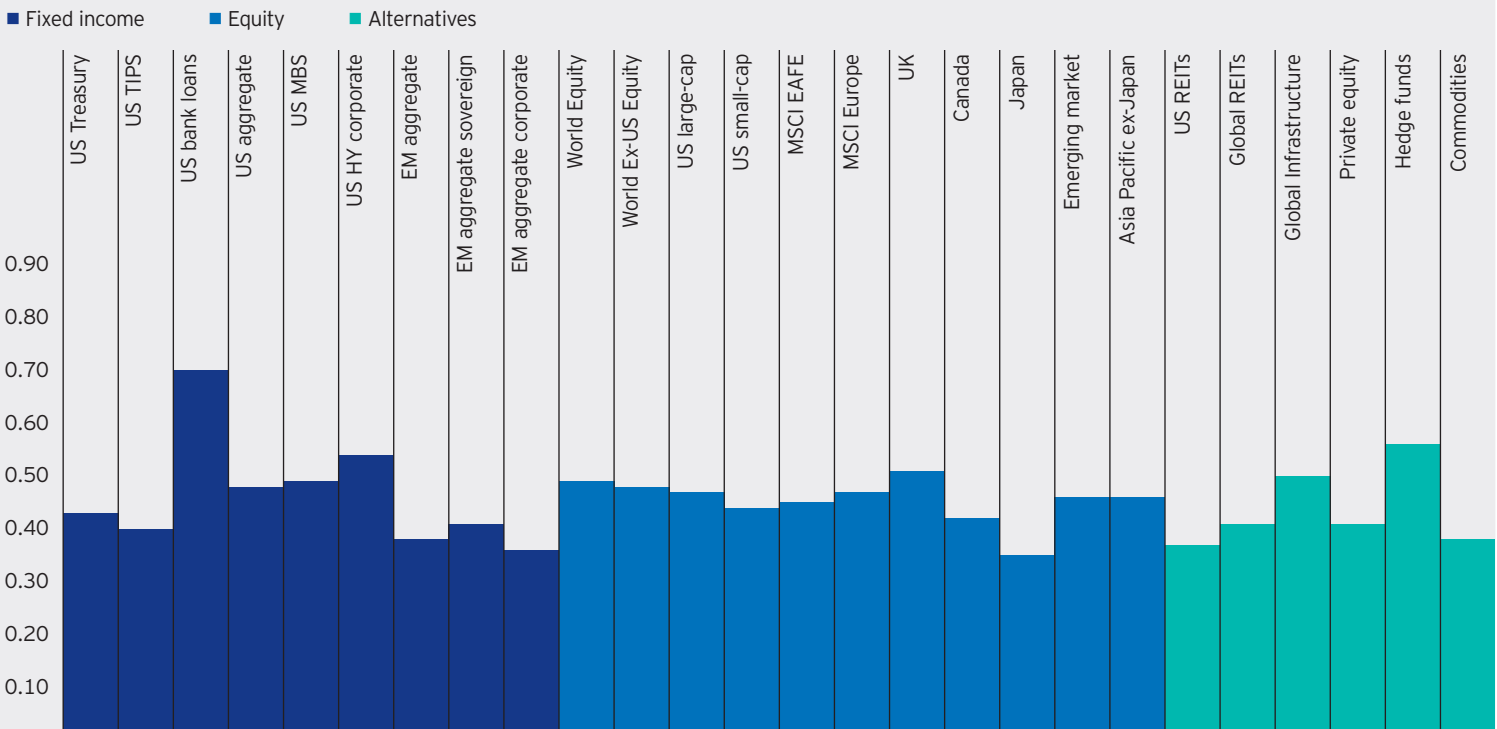
Overview

Figure 1: 10-year asset class expectations (USD)



Source: Invesco, estimates as of June 30, 2019. Proxies listed in figure 7. These estimates are forward looking, are not guarantees, and they involve risks, uncertainties, and assumptions. Please see page 8 for information about our CMA methodology. Please see page 10 for the complete CMA disclosure. These estimates reflect the views of Invesco Investment Solutions, the views of other investment teams at Invesco may differ from those presented here.

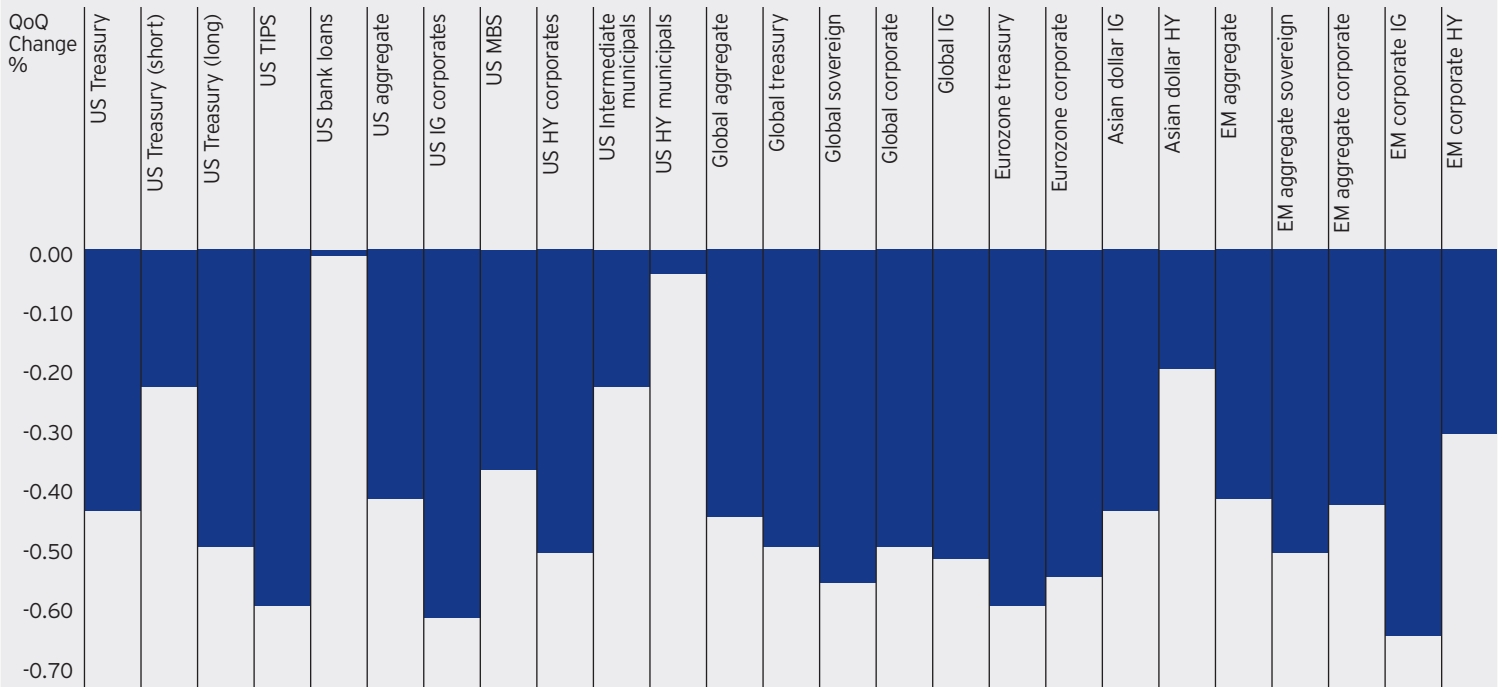
Figure 2: 10-year asset class expected return-to-risk (USD)



Source: Invesco, estimates as of June 30, 2019. Proxies listed in figure 7. These estimates are forward looking, are not guarantees, and they involve risks, uncertainties, and assumptions. Please see page 8 for information about our CMA methodology. Please see page 10 for the complete CMA disclosure. These estimates reflect the views of Invesco Investment Solutions, the views of other investment teams at Invesco may differ from those presented here.

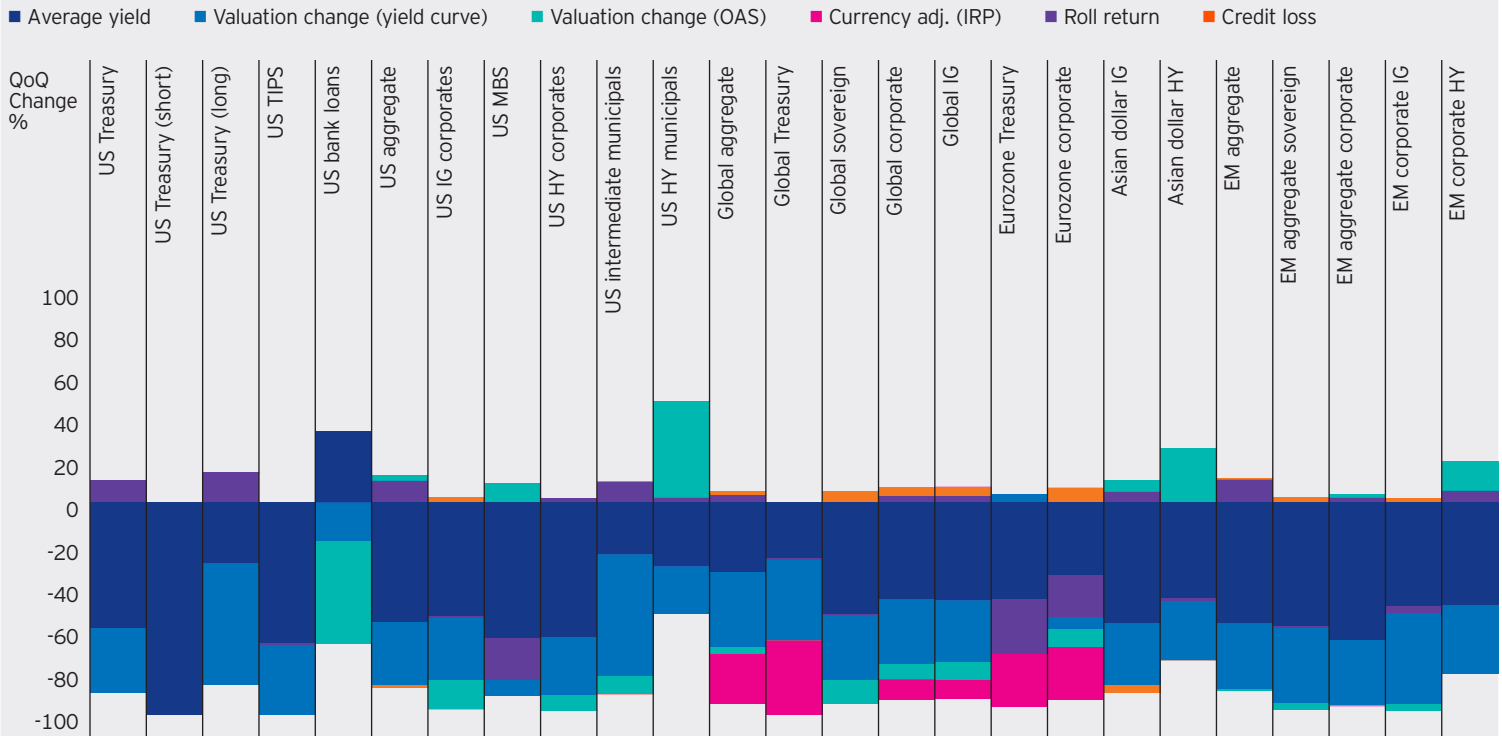
Fixed income

Figure 3: QoQ change in 10-year return expectations (USD)



Source: Invesco, estimates as of June 30, 2019. Proxies listed in figure 7. These estimates are forward looking, are not guarantees, and they involve risks, uncertainties, and assumptions. Please see page 8 for information about our CMA methodology. Please see page 10 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 4: Attribution of QoQ change in 10-year return expectations (USD)



Source: Invesco, estimates as of June 30, 2019. Proxies listed in figure 7. These estimates are forward looking, are not guarantees, and they involve risks, uncertainties, and assumptions. Please see page 8 for information about our CMA methodology. Please see page 10 for the complete CMA disclosure. These estimates reflect the views of Invesco Investment Solutions, the views of other investment teams at Invesco may differ from those presented here.

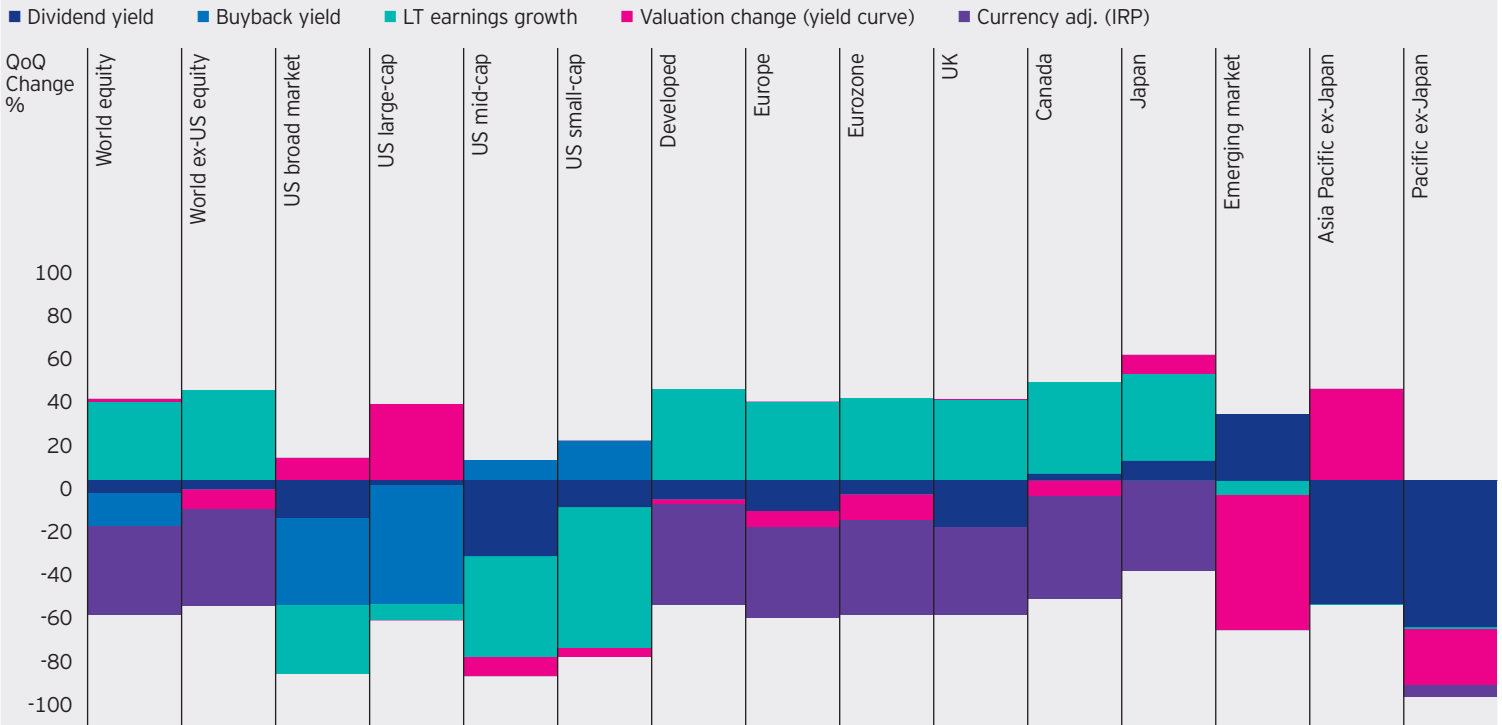
Equity

Figure 5: QoQ change in 10-year return expectations (USD)



Source: Invesco, estimates as of June 30, 2019. Proxies listed in figure 7. These estimates are forward looking, are not guarantees, and they involve risks, uncertainties, and assumptions. Please see page 8 for information about our CMA methodology. Please see page 10 for the complete CMA disclosure. These estimates reflect the views of Invesco Investment Solutions, the views of other investment teams at Invesco may differ from those presented here.

Figure 6: Attribution of QoQ change in 10-year return expectations (USD)



Source: Invesco, estimates as of June 30, 2019. Proxies listed in figure 7. These estimates are forward looking, are not guarantees, and they involve risks, uncertainties, and assumptions. Please see page 8 for information about our CMA methodology. Please see page 10 for the complete CMA disclosure. These estimates reflect the views of Invesco Investment Solutions, the views of other investment teams at Invesco may differ from those presented here.

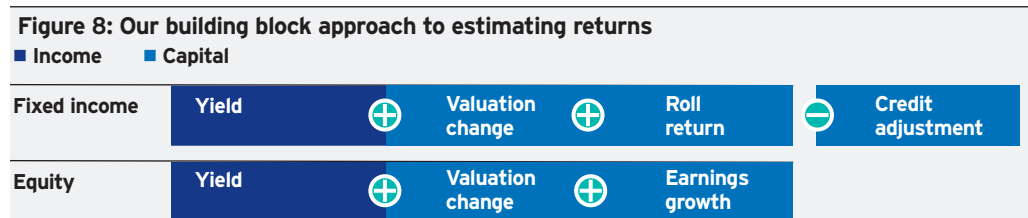
Figure 7: 10-year asset class expected returns and volatility (USD)

	Asset class	Index	Expected geometric return (%)	Expected arithmetic return (%)	Risk (%)
Fixed income	US Treasury (short)	Bloomberg Barclays US Treasury Short	2.4	2.4	1.6
	US Treasury (intermediate)	Bloomberg Barclays US Treasury Intermediate	2.0	2.1	4.6
	US Treasury (long)	Bloomberg Barclays US Treasury Long	1.6	2.2	11.4
	US TIPS	Bloomberg Barclays US TIPS	2.1	2.2	5.8
	US bank loans	CSFB Leverage Loan Index	5.2	5.6	8.1
	US aggregate	Bloomberg Barclays US Aggregate	2.6	2.8	6.0
	US IG corporates	Bloomberg Barclays US Investment Grade	2.4	2.7	7.6
	US MBS	Bloomberg Barclays US MBS	2.9	3.1	6.7
	US preferred stocks	BOA ML Fixed Rate Pref Securities	3.9	4.7	12.7
	US HY corporates	Bloomberg Barclays US High Yield	4.7	5.2	10.0
	US intermediate municipals	BOA ML US Municipal (3Y-15Y)	2.6	2.8	6.1
	US HY municipals	Bloomberg Barclays Municipal Bond High Yield	2.2	2.6	9.0
	Global aggregate	Bloomberg Barclays Global Aggregate	2.4	2.6	6.9
	Global aggregate ex-US	Bloomberg Barclays Global Aggregate Ex US	2.2	2.8	10.5
	Global Treasury	Bloomberg Barclays Global Treasuries	2.3	2.6	8.7
	Global sovereign	Bloomberg Barclays Global Sovereign	1.9	2.2	6.7
	Global corporate	Bloomberg Barclays Global Corporate	2.6	2.9	7.4
	Global IG	Bloomberg Barclays Global Corporate Inv Grd	2.6	2.9	7.6
	Eurozone corporate	Bloomberg Barclays Euro Aggregate Credit Corporate	2.6	3.5	13.5
	Eurozone Treasury	Bloomberg Barclays Euro Aggregate Government Treasury	2.6	3.4	12.8
	Asian dollar IG	BOA Merrill Lynch ACIG	3.0	3.4	8.8
	Asian dollar HY	BOA Merrill Lynch ACHY	6.4	8.0	18.8
	EM aggregate	Bloomberg Barclays EM Aggregate	3.9	4.7	13.4
	EM aggregate sovereign	Bloomberg Barclays EM Sovereign	4.1	4.8	12.3
	EM aggregate corporate	Bloomberg Barclays EM Corporate	4.0	5.1	14.9
	EM corporate IG	Bloomberg Barclays Emerging Markets USD Aggregate Corporate IG	2.9	3.2	8.3
Equities	World equity	MSCI ACWI	6.5	7.8	16.6
	World ex-US equity	MSCI ACWI ex-US	7.0	8.5	18.6
	US broad market	Russell 3000	6.2	7.6	17.2
	US large-cap	S&P 500	6.1	7.4	16.5
	US mid-cap	Russell Midcap	6.5	8.1	19.0
	US small-cap	Russell 2000	7.1	9.3	22.2
	Developed	MSCI EAFE	6.5	8.0	18.5
	Europe	MSCI Europe	6.8	8.3	18.5
	Eurozone	MSCI Euro ex-UK	6.4	8.1	19.5
	UK large-cap	FTSE 100	7.3	9.1	19.8
	UK small-cap	FTSE Small Cap UK	8.7	11.4	25.1
	Canada	S&P/TSX Composite	6.2	8.0	19.9
	Japan	MSCI Japan	5.2	7.6	22.7
	Emerging market	MSCI EM	8.4	11.2	25.2
	Asia Pacific ex-Japan	MSCI AC Asia Pacific ex-Japan	8.4	11.2	25.6
	Pacific ex-Japan	MSCI Pacific ex-Japan	7.3	10.0	24.9
Alternatives	US REITs	FTSE NAREIT Equity	5.0	6.6	18.8
	Global REITs	FTSE EPRA/NAREIT Developed	5.4	6.8	17.3
	Global infrastructure	Dow Jones Brookfield Global Infrastructure Composite	6.0	7.0	14.5
	Private equity	DJ Private Equity Total Return	7.2	10.2	26.1
	Hedge funds	HFRI HF	4.3	4.6	8.5
	Commodities	S&P GSCI	5.9	8.2	22.7
	Agriculture	S&P GSCI Agriculture	1.2	3.4	21.6
	Energy	S&P GSCI Energy	8.4	13.4	34.9
	Industrial metals	S&P GSCI Industrial Metals	5.5	8.1	24.3
	Precious metals	S&P GSCI Precious Metals	3.5	5.2	18.8

Source: Invesco, estimates as of June 30, 2019. All total returns data is annual. These estimates are based on our capital market assumptions which are forward looking, are not guarantees, and they involve risks, uncertainties and assumptions. Please see page 8 for information about our CMA methodology. Please see page 10 for the complete CMA disclosure. 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 8). 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.



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 normalize 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 optimization 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 optimization 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.

Contact**Neil Blundell**

Head of Global Client
Solutions Development

Tel: (212) 278-9174

Email: neil.blundell@invesco.com

About 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 estimates for the behavior of different asset classes. Our estimates for returns, volatility, and correlation serve as guidelines for long-term, strategic asset allocation decisions.

Assisting clients in Europe, North America and Asia, the Invesco Investment Solutions team consists of more than 50 professionals, with 20+ 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.

Contributors

Duy Nguyen
CFA, CAIA
CIO, Head of Global Advisory
Solutions

Jacob Borbidge
CFA, CAIA
Head of Research

Greg Chen
PhD
Quantitative Research Analyst

Christopher Armstrong
CFA, CAIA
Head of Manager Selection

Chang Hwan Sung
PhD, CFA, FRM
Director, Solutions Research,
APAC

Kenneth Blay
Head of Solutions
Thought Leadership

Kristina Hooper
Chief Market Strategist

Arnab Das
Global Market Strategist,
EMEA

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 a 10-year investment time horizon, 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.

Important information

The document is intended only for Professional Clients in Continental Europe; for Qualified Investors in Switzerland; for Professional Clients in Dubai, Ireland, the Isle of Man, Jersey and Guernsey, and the UK; for Institutional Investors in Australia; for wholesale investors (as defined in the Financial Markets Conduct Act) in New Zealand; for Professional Investors in Hong Kong; for Qualified Institutional Investors in Japan; for Institutional Investors and/or Accredited Investors in Singapore; for certain specific Qualified Institutions/ Sophisticated Investors only in Taiwan and for Institutional Investors in the USA. The document is intended only for accredited investors as defined under National Instrument 45-106 in Canada. It is not intended for and should not be distributed to, or relied upon, by the public or retail investors.

For the distribution of this document, Continental Europe is defined as Austria, Belgium, Denmark, Finland, France, Germany, Greece, Italy, Liechtenstein, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden and Switzerland.

This does not constitute a recommendation of any investment strategy or product for a particular investor. Investors should consult a financial professional before making any investment decisions.

By accepting this document, you consent to communicate with us in English, unless you inform us otherwise. This overview contains general information only and does not take into account individual objectives, taxation position or financial needs. Nor does this constitute a recommendation of the suitability of any investment strategy for a particular investor. It is not an offer to buy or sell or a solicitation of an offer to buy or sell any security or instrument or to participate in any trading strategy to any person in any jurisdiction in which such an offer or solicitation is not authorized or to any person to whom it would be unlawful to market such an offer or solicitation. It does not form part of any prospectus. All material presented is compiled from sources believed to be reliable and current, but accuracy cannot be guaranteed. As with all investments, there are associated inherent risks. Please obtain and review all financial material carefully before investing. Asset management services are provided by Invesco in accordance with appropriate local legislation and regulations. The opinions expressed are those of Invesco Investment Solutions team and may differ from the opinions of other Invesco investment professionals. Opinions are based upon current market conditions, and are subject to change without notice. Performance, whether actual, estimated, or backtested, is no guarantee of future results. Diversification and asset allocation do not guarantee a profit or eliminate the risk of loss.

Unless otherwise stated, all information is sourced from Invesco, in USD and as of June 30, 2019.

Further information is available using the contact details shown overleaf.

This publication is

Issued in **Australia** by Invesco Australia Limited (ABN 48 001 693 232), Level 26, 333 Collins Street, Melbourne, Victoria, 3000, Australia which holds an Australian Financial Services Licence number 239916.

The information in this document has been prepared without taking into account any investor's investment objectives, financial situation or particular needs. Before acting on the information the investor should consider its appropriateness having regard to their investment objectives, financial situation and needs.

This document has not been prepared specifically for Australian investors. It:

- may contain references to dollar amounts which are not Australian dollars;
- may contain financial information which is not prepared in accordance with Australian law or practices;
- may not address risks associated with investment in foreign currency denominated investments; and
- does not address Australian tax issues.

Issued in **Austria** by Invesco Asset Management Österreich-Zweigniederlassung der Invesco Asset Management Deutschland GmbH, Rotenturmstraße 16-18, 1010 Vienna, Austria.

Issued in **Belgium** by Invesco Asset Management SA Belgian Branch (France), Avenue Louise 235, B-1050 Bruxelles, Belgium.

Issued in **Canada** by Invesco Canada Ltd., 5140 Yonge Street, Suite 800, Toronto, Ontario, M2N 6X7.

Issued in **Denmark, Finland, France, Luxembourg, Norway and Portugal** by Invesco Asset Management SA, 16-18, rue de Londres, 75009 Paris, France.

Issued in **Dubai** by Invesco Asset Management Limited. PO Box 506599, DIFC Precinct Building No 4, Level 3, Office 305, Dubai, UAE. Regulated by the Dubai Financial Services Authority.

Issued in **Germany** by Invesco Asset Management Deutschland GmbH, An der Welle 5, 60322 Frankfurt am Main, Germany.

Issued in **Ireland** by Invesco Asset Management Limited, Perpetual Park, Perpetual Park Drive, Henley-on-Thames, Oxfordshire, RG9 1HH, United Kingdom. Authorised and regulated by the Financial Conduct Authority.

Issued in **Italy and Greece** by Invesco Asset Management SA, Sede Secondaria, Via Bocchetto 6, 20123 Milan, Italy.

Issued in **Japan** by Invesco Asset Management (Japan) Limited, Roppongi Hills Mori Tower 14F, 6-10-1 Roppongi, Minatoku, Tokyo 106-6114; Registration Number: The Director- General of Kanto Local Finance Bureau (Kin-sho) 306; Member of the Investment Trusts Association, Japan and the Japan Investment Advisers Association.

Issued in **Jersey and Guernsey** by Invesco International Limited, 2nd Floor, Orviss House, 17a Queen Street, St. Helier, Jersey, JE2 4WD. Invesco International Limited is regulated by the Jersey Financial Services Commission.

Issued in **The Netherlands** by Invesco Asset Management S.A., Dutch Branch, Vinoly Building, Claude Debussylaan 26, 1082 MD, Amsterdam, The Netherlands.

Issued in **New Zealand** by Invesco Australia Limited (ABN 48 001 693 232), Level 26, 333 Collins Street, Melbourne, Victoria, 3000, Australia which holds an Australian Financial Services Licence number 239916.

Issued in **Singapore** by Invesco Asset Management Singapore Ltd, 9 Raffles Place, #18-01 Republic Plaza, Singapore 048619.

Issued in **Spain** by Invesco Asset Management SA, Sucursal en España, C/ GOYA, 6 - 3º, 28001 Madrid, Spain.

Issued in **Switzerland and Liechtenstein** by Invesco Asset Management (Schweiz) AG, Talacker 34, 8001 Zurich, Switzerland.

Issued in **Sweden** by Invesco Asset Management SA (France) Swedish Filial, c/o Conventum, Jakobsbergsgatan 16, Box 16404, SE-111 43 Stockholm, Sweden.

Issued in **Taiwan** by Invesco Taiwan Limited, 22F, No.1, Songzhi Road, Taipei 11047, Taiwan (0800-045-066). Invesco Taiwan Limited is operated and managed independently.

Issued in **the United Kingdom** by Invesco Asset Management Limited which is authorised and regulated by the Financial Conduct Authority. Invesco Asset Management Ltd, Perpetual Park, Perpetual Park Drive, Henley-on-Thames, RG9 1HH, UK.

Issued in the **United States of America** by Invesco Advisers, Inc., Two Peachtree Pointe, 1555 Peachtree Street, N.E., Suite 1800, Atlanta, GA 30309, USA.