Invesco

2024 Long-Term Capital Market Assumptions

Invesco Solutions I United States Dollar (USD) I Q2 Update

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Executive Summary

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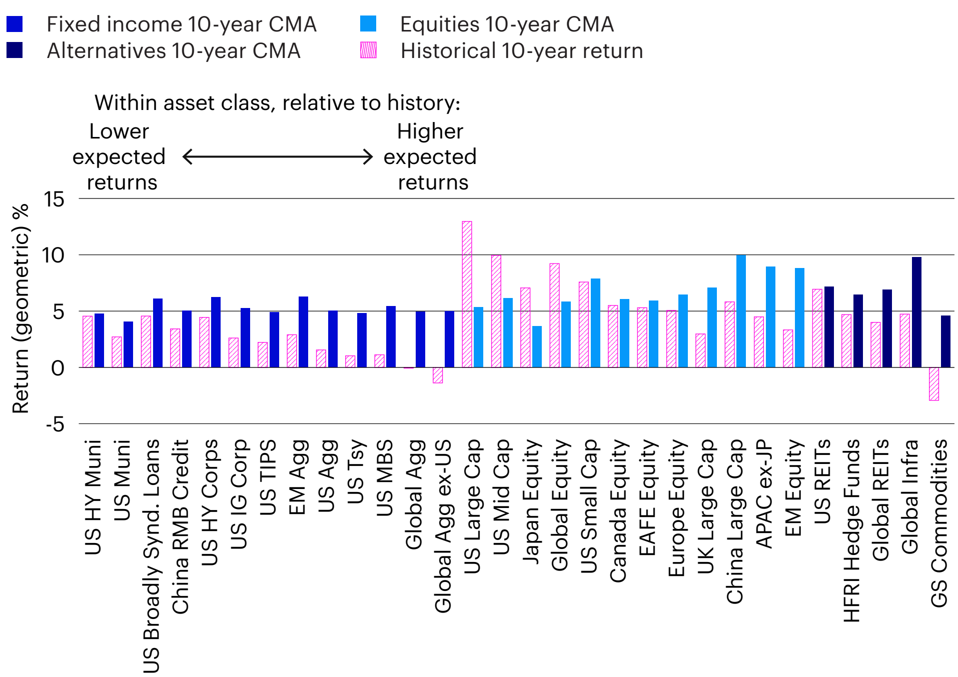
Invesco Solutions provides forecasts for 170+ assets in over 20 currencies, including 10 private assets. For additional CMA data, views, or analysis, please reach out to your Invesco representative.

- As we highlighted in the previous quarterly edition of Invesco's Long-term capital market assumptions (CMAs), concentration in US large-capitalization equities is a risk even for moderate, globally diversified investors. We believe diversification could potentially mitigate some of this risk. However, some of the challenges that stem from overvalued concentrated equity markets are pervasive beyond the US.
- Our CMA valuation building block model considers two critical variables when determining a fair valuation for equities: Inflation expectations, and interest rates, which we then compare to current valuations to determine whether they are likely to expand or contract over our forecast period. Both variables have an inverse relationship with valuations, making elevated valuations more difficult to justify in a macroenvironment with higher interest rates and inflation.
- Higher valuations are likely to be challenging for equities over the long term. Relative to fixed income, equities are significantly less attractive than they were just a couple of years ago. Not all is lost for equity investors as there are areas of opportunity highlighted by our CMAs, such as in US small caps and emerging markets.

Figure 1: Expectations relative to historical average (USD)



Source: Invesco, estimates as of March 31, 2024. Proxies listed in **Figure 8**. These estimates are forward-looking, are not guarantees, and they involve risks, uncertainties, and assumptions. Please see page 11 for information about our CMA methodology. These estimates reflect the views of Invesco Solutions; the views of other investment teams at Invesco may differ from those presented here.

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Asset Allocation Insights

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

Strategic perspective

As we highlighted in the previous quarterly edition of Invesco's long-term capital market assumptions (CMAs), concentration in US large-capitalization equities is a risk even for moderate, globally diversified investors. We believe diversification could potentially mitigate some of this risk. However, some of the challenges that stem from overvalued concentrated equity markets are pervasive beyond the US. A simple review of price-to-equity (P/E) ratios across major regions compared to their own long-term averages would result in a conclusion that the US is overvalued by around 19% and the rest of the world, split into developed markets (DM) ex-US and emerging markets (EM), are undervalued by around 13% and 23% respectively.[1] To expand on this analysis by utilizing our CMA methodology for the equity valuations building block, we find that valuations within most developed equity markets globally are a headwind to expected returns, while those within EM are undervalued.

Our model considers two critical variables when determining a fair valuation for equities: Inflation expectations, and interest rates, which we then compare to current valuations to determine whether they are likely to expand or contract over our forecast period. Both variables have an inverse relationship with valuations, making elevated valuations more difficult to justify in a macroenvironment with higher interest rates and inflation. In the case of interest rates, higher rates increase the cost of capital and lower the present value of future earnings. Inflation reduces sales and real profit margins, assuming a higher cost of goods sold and limiting the ability of companies to fully pass through costs by raising prices.[2]

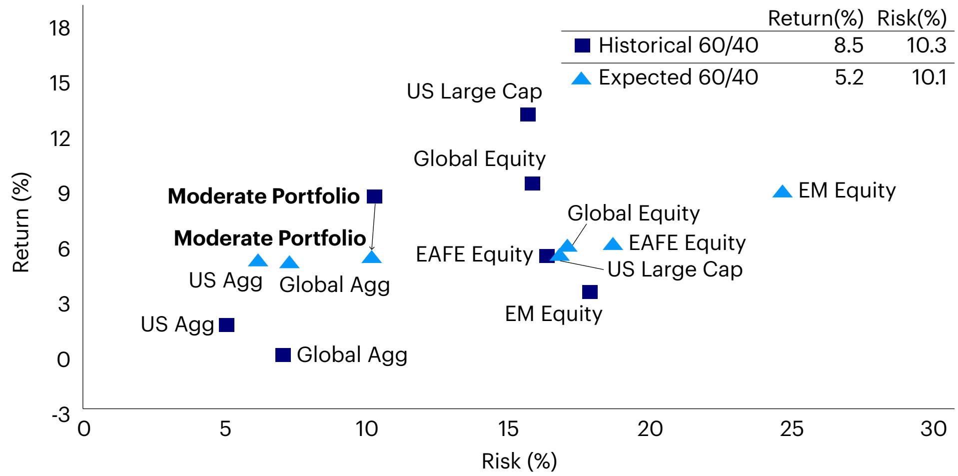
Despite various global consumer price indices being higher than policy targets, our CMA methodology uses long-term expectations as our preferred inflation measure as they are forward-looking and tend to be more stable than headline readings. While long-term inflation expectations for global equities are slightly higher compared to their recent pre-COVID-19 history, averaging 1.7% from 2009-2019 versus 2% today, this is not the primary reason for the higher hurdle for valuations. DM interest rates are at their highest levels since 2012, rising rapidly from their lows of March 2020, when 10-year rates for the US, eurozone, Canada, and Japan were all less than 1%, some even negative. At current levels of interest rates and inflation for US equity markets, where 10-year rates are 4.2%, we would expect a detraction to our CMA returns of -1.2% and for DM ex-US, a detraction of -1.4%. This is in stark contrast with EM economies, many of which surprisingly have lower interest rates than in developed countries; for example, China, South Korea, Thailand, and Taiwan all have 10-year rates below that of the US. After accounting for the macro environment, the low valuations in EM are a net positive going forward and are expected to add 0.4% annualized over the next 10 years. Within the US, smaller-capitalization equities have not experienced the same valuation expansion as their larger counterparts and, thus, are relatively cheaper.

Higher valuations are likely to be challenging for equities over the long term. Relative to fixed income, equities are significantly less attractive than they were just a couple of years ago. Not all is lost for equity investors as there are areas of opportunity highlighted by our CMAs, such as in US small caps and EM, and we maintain that diversification is key when building a multi-asset portfolio. Equities, in general, are still needed for investors to reach higher return targets beyond that of traditional fixed income.

1 Representative indices for US equities, DM-ex US equities, and EM equities are the S&P 500, MSCI EAFE, and MSCI EM, respectively. Their current annual adjusted price to estimated earnings ratios as of Mar. 31, 2024, compared to their long-term average, 26 years starting Mar. 31, 1998, which is the longest common available history, are 21.16 vs 18.1, 15 vs 17.4, and 12.6 vs 16.3.

2 A study of long-term interest rates and inflation and equities within the US since 1871 can be found on Robert Shiller's website, which clearly demonstrates their inverse relationship with valuations.

Figure 2: Comparing historical and expected risk and return for a moderate 60/40 portfolio (USD)



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2Q24 CMA observations (10Y, USD)

Equities: Our global equity CMA has fallen slightly below a nominal 6% expected return and is lower by 1% in the quarter. The US, which is the largest portion of the global equity market, currently has a CMA return of 5.36% and is also lower by -1%, our lowest CMA for the US since July of 2020. Global equities outside of the US are significantly higher at 6.75%, and while they are also lower on the quarter, they are only down -0.8%. Developed ex-US equities are mostly expected to fare better than the US, with Canada at 6% (-1.1% quarter-over-quarter), Europe at 6.45% (-0.9%) and the UK at 7.6% (-0.2%). Japan is currently at 3.65%, down -1.4%. The currency building block remains a large positive driver of expected return for global equities outside of the US, with a contribution of +1.3% as we expect the USD to depreciate significantly relative to a basket of other currencies over the long term. This currency tailwind is mostly pronounced within Europe (+1.5%) and Japan (+3.5%) in DM, and China within EM (+1.9%).

Fixed income: Most fixed income assets are near 5% and are incredibly attractive on a risk-adjusted basis relative to equities and their own history. Risky credit assets, like broadly syndicated loans, have expected returns of 6.1% and a yield of 8.8%, with an expected volatility of less than half of global equities, at 8.2%, more than compensating for normal levels of expected losses. Over the past quarter, US aggregate bonds and Treasuries were both higher by 0.25% due to higher current and expected yields, with a slightly flatter yield curve. Loans were higher by 0.2% due to higher average yields and slightly tighter spreads. High yield and EM aggregate bonds were flat in the quarter. EM Local debt was higher by 0.3% due to currency effects.

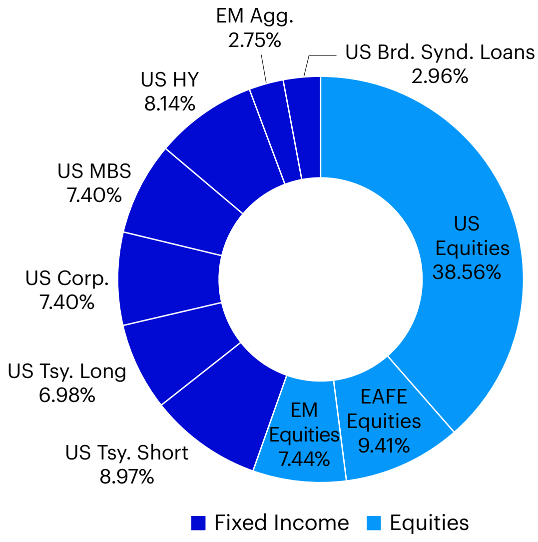
Alternatives: US REITs (7.2%) and global infrastructure (9.8%) are both attractive options for those looking to diversify out of traditional equities into higher returning assets. Hedge funds also have an attractive 6.5% return, higher than global equities, with a volatility of 8.6%, providing one of the highest expected risk/return ratios within our CMAs.

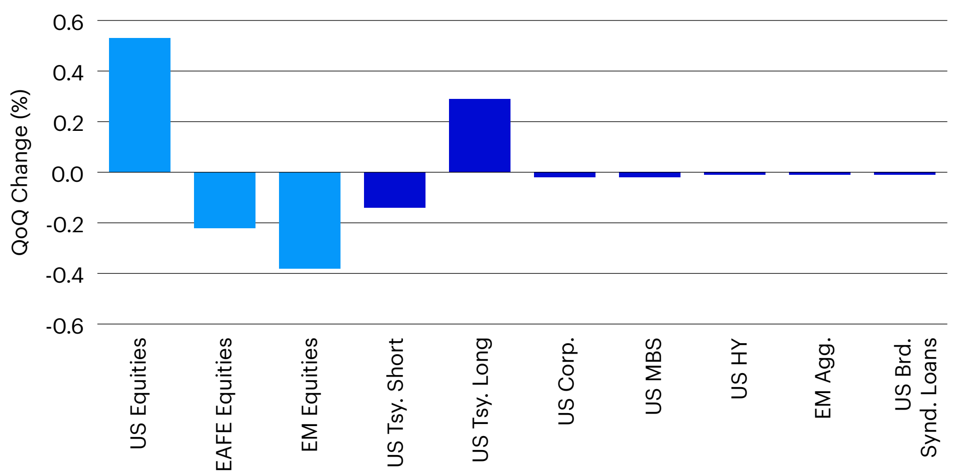
The strategic asset allocation (SAA) displayed here is denominated in USD, and is representative of our CMA's applied in a hypothetical portfolio context for global investors.

There are many considerations for investors beyond CMA's when it comes to asset allocation decisions. To learn more about our investment process or discuss your own portfolio needs, please reach out to your Invesco Solutions representative.

Strategic asset allocation trends:

Figure 3: 2Q24 SAA rebalance (USD)





Source: Invesco Solutions, as of March 31, 2024. Proxies listed in **Figure 8**. These estimates reflect the views of Invesco Solutions; the views of other investment teams at Invesco may differ from those presented here. References to overweights and underweights are relative to a 60% global equity and 40% global aggregate fixed income benchmark.

- **Portfolio level:** Compared to a global 60/40 benchmark, our strategic portfolio (5-10Y) is slightly overweight fixed income relative to equities. Overall, our portfolio has not shifted significantly into or out of any asset classes this quarter.
- **Within equities:** We are overweight EM and US large cap equities while underweight DM ex-US equities due to a lower expected risk/return ratio. We added slightly to our US equity exposure and funding from global ex-US equities.
- **Within fixed income:** Presently overweight both treasuries and risky credit. Neutral duration compared to our benchmark. We added slightly to long treasuries while funding from short-term Treasuries and some equity exposure.

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Figure 4: 10-year asset class expectations (USD)

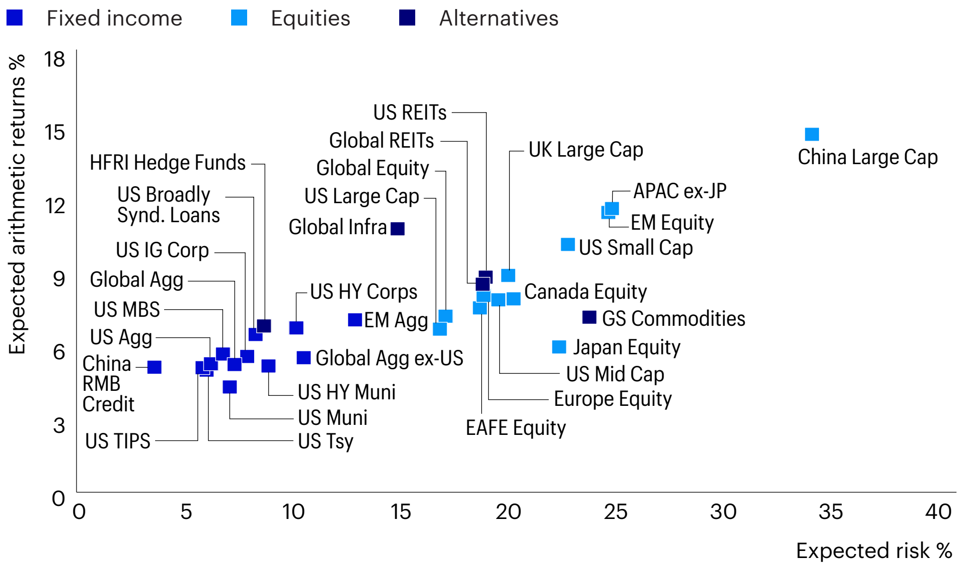

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Figure 5: CMA difference: 5-year minus 10-year assumptions (USD)

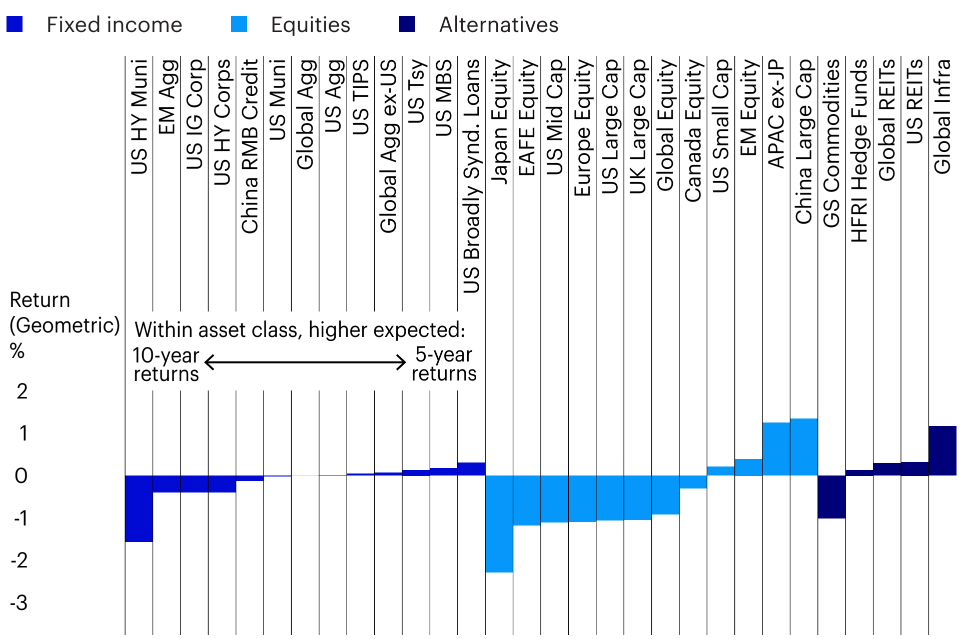

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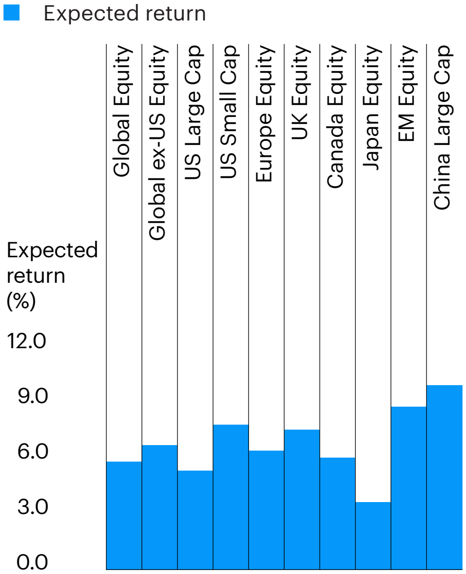
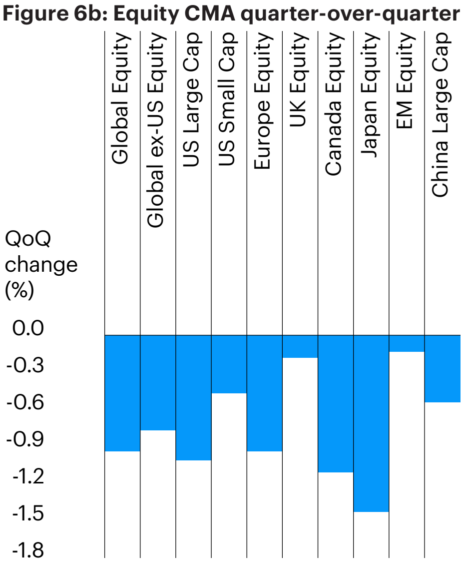
Figure 6a: Equity CMA and building block contribution (USD) (%)



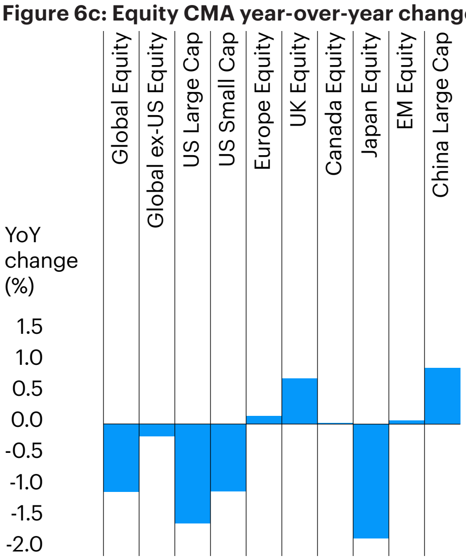
	Dividend yield	Buyback yield	LT earnings growth	Expected inflation	Valuation change	Currency Adj. (IRP)
Global Equity	1.87	0.68	1.97	1.96	-1.12	0.47
Global ex-US Equity	2.85	0.00	1.98	1.51	-0.93	1.31
US Large Cap	1.31	1.07	1.97	2.21	-1.23	0.00
US Small Cap	1.41	0.80	3.37	2.21	0.01	0.00
Europe Equity	3.11	0.00	1.49	1.82	-1.55	1.54
UK Equity	3.87	0.00	1.74	2.11	-0.43	0.27
Canada Equity	2.91	0.00	1.64	1.87	-1.12	0.73
Japan Equity	1.92	0.00	0.78	-0.81	-1.72	3.48
EM Equity	2.65	0.00	3.47	2.03	0.41	0.19
China Large Cap	2.67	0.00	3.43	0.39	1.60	1.88

Figure 6b: Equity CMA quarter-over-quarter change and building block contribution (USD) (%)



	Dividend yield	Buyback yield	LT earnings growth	Expected inflation	Valuation change	Currency Adj. (IRP)
Global Equity	-0.14	-0.05	0.02	-0.09	-0.71	0.04
Global ex-US Equity	-0.15	0.00	-0.02	-0.15	-0.59	0.14
US Large Cap	-0.10	-0.11	0.04	-0.06	-0.78	0.00
US Small Cap	-0.06	0.02	-0.02	-0.06	-0.34	0.00
Europe Equity	-0.12	0.00	-0.02	-0.07	-0.73	0.01
UK Equity	0.01	0.00	0.03	-0.02	-0.11	-0.08
Canada Equity	-0.23	0.00	-0.10	-0.09	-0.64	-0.05
Japan Equity	-0.32	0.00	0.00	-0.02	-1.31	0.21
EM Equity	-0.07	0.00	0.09	-0.29	-0.08	0.24
China Large Cap	-0.16	0.00	-0.14	-0.63	-0.17	0.58

Figure 6c: Equity CMA year-over-year change and building block contribution (USD) (%)



	Dividend yield	Buyback yield	LT earnings growth	Expected inflation	Valuation change	Currency Adj. (IRP)
Global Equity	-0.35	-0.06	0.21	-0.15	-0.90	0.15
Global ex-US Equity	-0.32	0.00	0.28	-0.28	-0.36	0.48
US Large Cap	-0.28	-0.16	0.17	-0.10	-1.23	0.00
US Small Cap	-0.15	-0.02	0.22	-0.10	-1.02	0.00
Europe Equity	-0.15	0.00	0.32	-0.10	-0.58	0.64
UK Equity	-0.14	0.00	0.28	-0.13	0.44	0.29
Canada Equity	-0.05	0.00	0.31	-0.14	-0.22	0.12
Japan Equity	-0.60	0.00	-0.38	-0.25	-0.91	0.31
EM Equity	-0.52	0.00	0.55	-0.50	0.12	0.41
China Large Cap	0.32	0.00	-0.68	-1.39	1.46	1.26

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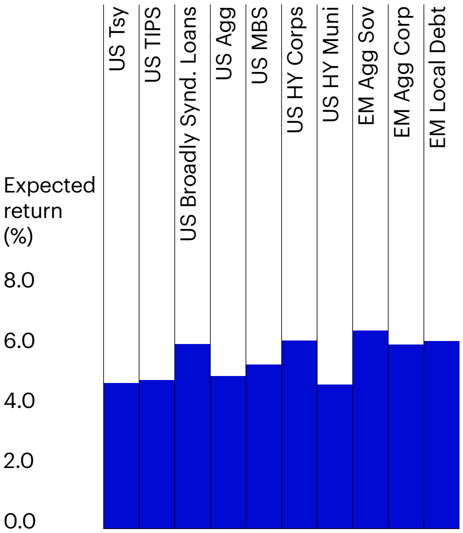
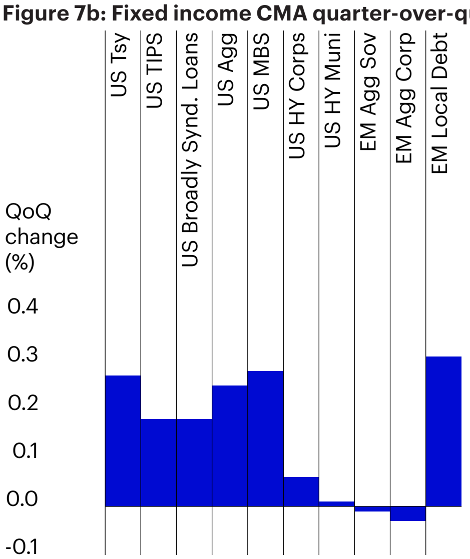
Figure 7a: Fixed income CMA and building block contribution (USD) (%)



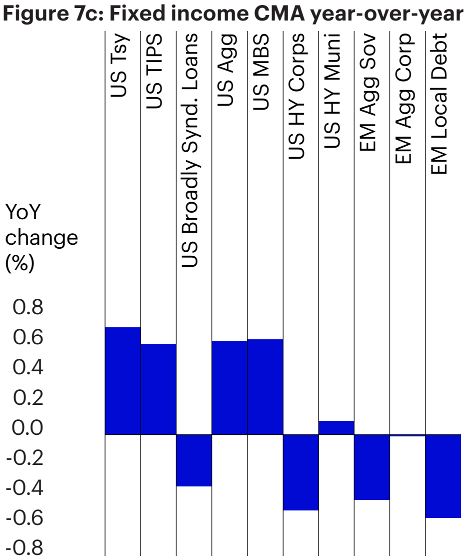
	Average yield	Roll return	Valuation change (yield curve)	Valuation change (OAS)	Credit loss	Currency Adj. (IRP)
US Tsy	4.24	0.35	0.23	0.00	0.00	0.00
US TIPS	4.29	0.37	0.26	0.00	0.00	0.00
US Broadly Synd. Loans	7.20	0.00	0.00	-0.15	-0.92	0.00
US Agg	4.75	0.35	0.23	-0.11	-0.16	0.00
US MBS	4.81	0.35	0.23	0.04	0.00	0.00
US HY Corps	8.31	-0.07	0.27	-0.60	-1.68	0.00
US HY Muni	6.58	0.32	0.09	-1.69	-0.52	0.00
EM Agg Sov	7.41	0.40	0.16	-0.27	-1.15	0.00
EM Agg Corp	7.32	0.26	0.26	-0.84	-0.92	0.00
EM Local Debt	6.31	0.53	-0.04	0.00	0.00	-0.58

Figure 7b: Fixed income CMA quarter-over-quarter change and building block contribution (USD) (%)



	Average yield	Roll return	Valuation change (yield curve)	Valuation change (OAS)	Credit loss	Currency Adj. (IRP)
US Tsy	0.26	-0.10	0.11	0.00	0.00	0.00
US TIPS	0.11	0.04	0.02	0.00	0.00	0.00
US Broadly Synd. Loans	0.27	0.00	0.00	-0.09	0.00	0.00
US Agg	0.24	-0.10	0.11	-0.02	0.01	0.00
US MBS	0.26	-0.10	0.11	0.01	0.00	0.00
US HY Corps	0.06	-0.04	0.09	-0.06	0.01	0.00
US HY Muni	0.02	-0.09	0.18	-0.27	0.16	0.00
EM Agg Sov	0.07	-0.02	0.13	-0.20	0.01	0.00
EM Agg Corp	-0.08	-0.01	0.11	-0.28	0.23	0.00
EM Local Debt	-0.06	-0.04	0.14	0.00	0.00	0.27

Figure 7c: Fixed income CMA year-over-year change and building block contribution (USD) (%)



	Average yield	Roll return	Valuation change (yield curve)	Valuation change (OAS)	Credit loss	Currency Adj. (IRP)
US Tsy	0.56	0.10	0.05	0.00	0.00	0.00
US TIPS	0.46	0.07	0.07	0.00	0.00	0.00
US Broadly Synd. Loans	-0.05	0.00	0.00	-0.34	0.05	0.00
US Agg	0.49	0.10	0.05	-0.10	0.07	0.00
US MBS	0.56	0.10	0.05	-0.09	0.00	0.00
US HY Corps	-0.10	-0.09	-0.01	-0.40	0.09	0.00
US HY Muni	0.13	-0.13	0.15	-0.42	0.36	0.00
EM Agg Sov	0.01	-0.01	0.21	-0.68	0.04	0.00
EM Agg Corp	-0.19	0.15	0.02	-0.73	0.73	0.00
EM Local Debt	-0.43	-0.04	0.11	0.00	0.00	-0.20

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Figure 8: 10-year asset class expected returns, risk, and return risk (USD)

	Asset class	Index	Expected geometric return %	Expected arithmetic return %	Total yield %	Expected risk %	Arithmetic return to risk ratio
Fixed income	US Tsy Short	BBG US Tsy Short	3.5	3.5	5.3	1.5	2.36
	US Tsy IM	BBG US Tsy IM	4.3	4.4	4.4	4.6	0.95
	US Tsy Long	BBG US Tsy Long	4.4	5.1	4.4	12.2	0.42
	US TIPS	BBG US TIPS	4.9	5.1	4.5	5.7	0.89
	US Broadly Synd. Loans	CSFB Leverage Loan	6.1	6.4	8.8	8.2	0.78
	US Agg	BBG US Agg	5.1	5.2	4.9	6.1	0.86
	US IG Corp	BBG US IG	5.3	5.5	5.3	7.8	0.71
	US MBS	BBG US MBS	5.4	5.6	5.0	6.7	0.84
	US Preferred Stocks	BOA ML Fixed Rate Pref Securities	5.0	5.7	6.4	12.2	0.47
	US HY Corps	BBG US HY	6.2	6.7	7.7	10.1	0.66
	US Muni	BOA ML US Muni	4.1	4.3	3.6	7.0	0.61
	US Muni (Taxable)	ICE BOA US Taxable Muni Securities Plus	5.1	5.4	5.1	8.0	0.68
	US HY Muni	BBG Muni Bond HY	4.8	5.1	5.5	8.8	0.58
	Global Agg	BBG Global Agg	5.0	5.2	4.7	7.2	0.72
	Global Agg ex-US	BBG Global Agg ex-US	5.0	5.5	4.7	10.4	0.53
	Global Tsy	BBG Global Tsy	5.0	5.3	4.5	8.6	0.62
	Global Sov	BBG Global Sov	5.0	5.3	5.0	8.1	0.65
	Global Corp	BBG Global Corp	5.3	5.6	5.4	8.0	0.70
	Global IG	BBG Global Corp IG	5.4	5.7	5.4	8.2	0.69
	Eurozone Corp	BBG Euro Agg Credit Corp	5.3	6.1	5.6	13.4	0.46
	Eurozone Tsy	BBG Euro Agg Gov Tsy	5.2	6.0	4.8	12.7	0.47
	Asian Dollar IG	BOA ML AC IG	5.4	5.7	5.5	8.1	0.70
	EM Agg	BBG EM Agg	6.3	7.0	7.0	12.8	0.55
	EM Agg IG	BBG EM USD Agg IG	5.3	5.6	5.5	8.8	0.64
	China Policy Bk & Tsy	BBG China PB Tsy TR	4.6	4.6	4.1	4.0	1.15
	China RMB Credit	BBG China Corporate	5.0	5.1	4.8	3.5	1.46
Equities	Global Equity	MSCI ACWI	5.9	7.2	3.0	17.0	0.42
	Global ex-US Equity	MSCI ACWI ex-US	6.7	8.3	4.2	18.8	0.44
	US Broad Market	Russell 3000	5.3	6.7	2.5	17.5	0.38
	US Large Cap	S&P 500	5.4	6.7	2.4	16.8	0.40
	US Mid Cap	Russell Midcap	6.1	7.9	2.7	19.5	0.40
	US Small Cap	Russell 2000	7.9	10.1	2.2	22.7	0.45
	EAFE Equity	MSCI EAFE	5.9	7.5	4.8	18.7	0.40
	Europe Equity	MSCI Europe	6.4	8.0	4.6	18.8	0.43
	Eurozone Equity	MSCI Euro ex-UK	6.1	7.9	4.8	19.8	0.40
	UK Large Cap	FTSE 100	7.1	8.9	4.2	20.0	0.44
	UK Small Cap	FTSE Small Cap UK	8.7	11.5	4.5	25.6	0.45
	Canada Equity	S&P TSX	6.1	7.9	3.6	20.2	0.39
	Japan Equity	MSCI JP	3.7	5.9	5.4	22.3	0.27
	EM Equity	MSCI EM	8.8	11.4	2.8	24.6	0.46
	APAC ex-JP	MSCI APXJ	8.9	11.6	2.8	24.8	0.47
	China Large Cap	CSI 300	10.0	14.7	4.6	34.1	0.43
Alternatives	Global Infra	DJ Brookfield Global Infra	9.8	10.8	4.5	14.8	0.73
	Global REITs	FTSE EPRA/NAREIT Developed	6.9	8.5	4.6	18.8	0.45
	HFRI Hedge Funds	HFRI HF	6.5	6.8	-	8.6	0.79
	GS Commodities	S&P GSCI	4.6	7.2	-	23.7	0.30
	Agriculture	S&P GSCI Agriculture	4.0	6.0	-	21.2	0.28
	Energy	S&P GSCI Energy	5.8	11.5	-	36.9	0.31
	Industrial Metals	S&P GSCI Industrial Metals	4.7	7.2	-	23.9	0.30
	Precious Metals	S&P GSCI Precious Metals	-1.9	-0.2	-	18.4	-0.01

Source: Invesco, estimates as of March 31, 2024. These estimates are forward-looking, are not guarantees, and they involve risks, uncertainties, and assumptions. Please see page 11 for information about our CMA methodology. These estimates reflect the views of Invesco 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 9: 10-year correlations (USD)

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

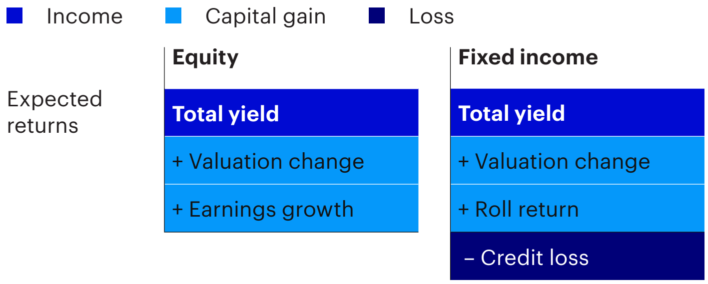
		Fixed income												Equities										Alternatives			
	Asset class	US Tsy IM	US TIPS	US Broadly Synd. Loans	US Agg	US IG Corp	US HY Corps	US Muni	US HY Muni	Global Agg	Global Agg ex-US	EM Agg	China RMB Credit	Global Equity	China Large Cap	US Large Cap	US Mid Cap	US Small Cap	EAFE Equity	UK Large Cap	Canada Equity	Japan Equity	EM Equity	Global REITs	Global Infra	GS Commodities	HFRI Hedge Funds
Fixed income	US Tsy IM	1.00																									
	US TIPS	0.69	1.00																								
	US Broadly Synd. Loans	-0.26	0.27	1.00																							
	US Agg	0.88	0.79	0.10	1.00																						
	US IG Corp	0.62	0.76	0.43	0.89	1.00																					
	US HY Corps	0.06	0.52	0.81	0.42	0.69	1.00																				
	US Muni	0.60	0.63	0.29	0.80	0.78	0.51	1.00																			
	US HY Muni	0.36	0.56	0.54	0.62	0.68	0.59	0.85	1.00																		
	Global Agg	0.72	0.76	0.19	0.86	0.83	0.52	0.69	0.55	1.00																	
	Global Agg ex-US	0.60	0.68	0.20	0.73	0.73	0.52	0.59	0.48	0.98	1.00																
	EM Agg	0.35	0.66	0.62	0.65	0.82	0.82	0.66	0.67	0.71	0.68	1.00															
	China RMB Credit	0.32	0.31	0.09	0.39	0.36	0.22	0.33	0.28	0.49	0.50	0.32	1.00														
Equities	Global Equity	0.01	0.41	0.63	0.34	0.57	0.81	0.38	0.45	0.52	0.55	0.71	0.29	1.00													
	China Large Cap	0.00	0.15	0.27	0.16	0.27	0.34	0.15	0.22	0.27	0.29	0.37	0.32	0.43	1.00												
	US Large Cap	0.00	0.39	0.59	0.31	0.52	0.76	0.34	0.40	0.44	0.46	0.62	0.23	0.97	0.36	1.00											
	US Mid Cap	-0.04	0.38	0.66	0.30	0.54	0.82	0.36	0.44	0.43	0.45	0.66	0.24	0.95	0.37	0.95	1.00										
	US Small Cap	-0.09	0.28	0.60	0.22	0.44	0.74	0.27	0.36	0.34	0.36	0.56	0.22	0.87	0.35	0.88	0.95	1.00									
	EAFE Equity	0.04	0.39	0.60	0.34	0.56	0.78	0.39	0.44	0.55	0.59	0.72	0.30	0.96	0.42	0.88	0.87	0.79	1.00								
	UK Large Cap	-0.05	0.33	0.61	0.24	0.47	0.74	0.32	0.41	0.46	0.51	0.64	0.28	0.90	0.40	0.82	0.82	0.75	0.95	1.00							
	Canada Equity	-0.03	0.41	0.66	0.29	0.53	0.78	0.33	0.44	0.48	0.51	0.68	0.26	0.89	0.41	0.84	0.87	0.80	0.86	0.86	1.00						
	Japan Equity	0.06	0.34	0.48	0.32	0.50	0.65	0.35	0.36	0.45	0.46	0.60	0.28	0.81	0.34	0.74	0.73	0.68	0.85	0.73	0.67	1.00					
	EM Equity	0.04	0.39	0.57	0.33	0.54	0.72	0.36	0.45	0.55	0.59	0.74	0.38	0.85	0.58	0.72	0.75	0.69	0.84	0.78	0.81	0.70	1.00				
Alternatives	Global REITs	0.13	0.51	0.62	0.45	0.65	0.80	0.47	0.54	0.58	0.58	0.74	0.29	0.86	0.32	0.82	0.85	0.78	0.84	0.80	0.80	0.67	0.74	1.00			
	Global Infra	0.15	0.51	0.56	0.45	0.62	0.75	0.49	0.53	0.58	0.59	0.71	0.27	0.83	0.33	0.79	0.80	0.69	0.82	0.81	0.82	0.64	0.73	0.85	1.00		
	GS Commodities	-0.29	0.12	0.52	-0.13	0.09	0.46	-0.02	0.20	0.10	0.18	0.31	0.09	0.49	0.17	0.42	0.47	0.44	0.50	0.60	0.62	0.35	0.46	0.38	0.46	1.00	
	HFRI Hedge Funds	-0.14	0.32	0.73	0.20	0.49	0.78	0.30	0.46	0.38	0.42	0.65	0.27	0.89	0.46	0.83	0.89	0.85	0.86	0.83	0.88	0.71	0.82	0.77	0.73	0.60	1.00

Source: Invesco, estimates as of March 31, 2024. Proxies listed in **Figure 8.** These estimates are forward-looking, are not guarantees, and they involve risks, uncertainties, and assumptions. Please see page 11 for information about our CMA methodology. These estimates reflect the views of Invesco 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 10). 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 assumptions: Methodology update whitepaper for more detail.

Figure 10: 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 of 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 rates of returns on deposits in different currencies because any excess return on deposits will be offset by changes in the relative value of currencies.

For 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.

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Invesco 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.
- 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 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.

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 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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