2023 Long-Term Capital Market Assumptions

Invesco Investment Solutions | Japanese yen (JPY) | Q1 Update

1

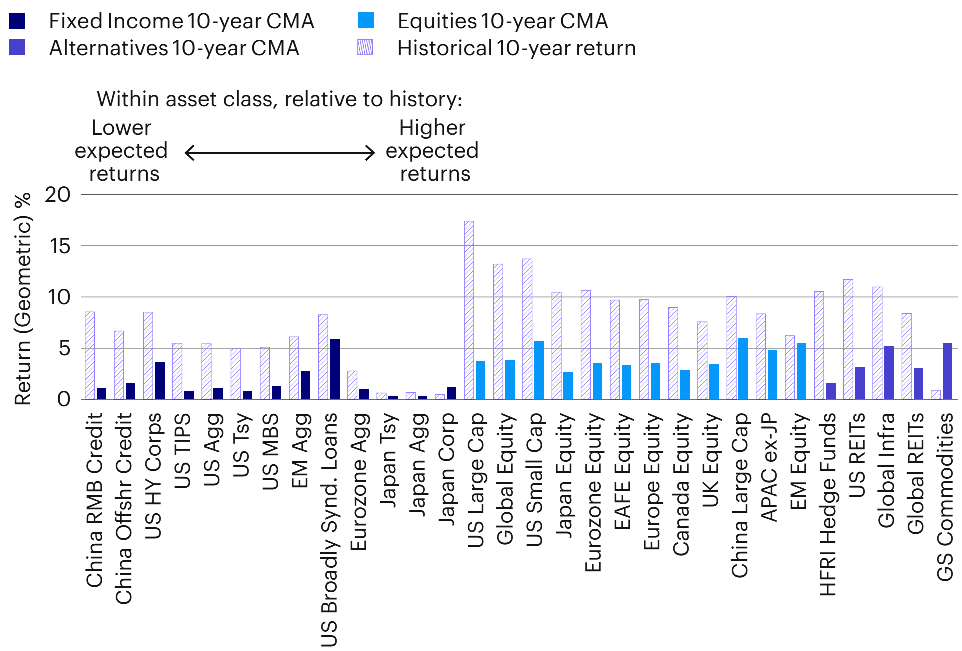
Executive Summary

Duy Nguyen
CIO, Invesco Investment Solutions

Invesco Investment 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.

- Our team at Invesco Investment Solutions remains quite positive on our long-term capital market assumptions (CMAs). Most of the 170+ assets we cover are expected to return more in the coming decade than the last decade.
- Current forecasts place nominal global equity returns near 7% (USD) assuming a 2% rate of inflation. For those looking to add additional return to their equity allocations, EM and small cap equities are anticipated to have higher growth rates and better valuations than large cap or developed markets.
- Most fixed income CMAs are yielding 4% or higher (in USD) and are well above their historical return estimates, this is particularly pronounced in credit instruments like loans, high yield, and EM local debt. All investors will have to adjust their expectations over the coming decade to react to these higher levels of yields and projected returns.

Figure 1: Expectations relative to historical average (JPY)



Source: Invesco, estimates as of December 31, 2022. Proxies listed in **Figure 8**. These estimates are forward-looking, are not guarantees, and they involve risks, uncertainties, and assumptions. Please see page 9 for information about our CMA methodology. These estimates reflect the views of Invesco Investment Solutions, the views of other investment teams at Invesco may differ from those presented here.

2

Asset Allocation Insights

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

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

Strategic perspective

The first few months of 2023 have been a whirlwind. The fear leading up to the end of the year quickly turned into euphoria and hopes of a "soft landing" as earnings proved stronger than anticipated, China reopened, inflation softened and the US unemployment rate fell even further. More recently, inflation data has proven itself more resilient to the lagged effects of policy tightening than most would have hoped for, and a re-run of the horrors of 2022 have begun to play in investor's minds. Is it possible we see further large interest rate hikes until something bad happens to the economy? What will that mean for markets and portfolios?

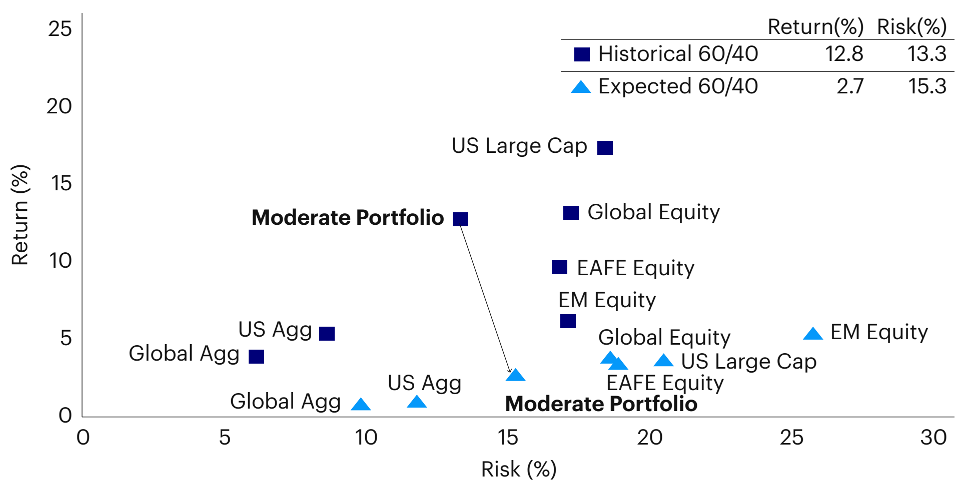
Luckily, with a long time horizon, we're able to reposition our portfolios to best approach these questions from a strategic perspective. Here are some points we are confident about when it comes to our capital market assumptions (CMA's) and strategic asset allocation (SAA):

1. Recessions tend to last one to two years and are not always the catastrophe of the global financial crisis or COVID-19. Missing the year or two before a recession while waiting for it to materialize or waiting until after for the NBER to formalize it, also has dire implications for returns. Our 5-to-10-year strategic approach looks at many examples of the business cycle to determine expected returns, many of those periods having one or more recessions within them.

2. Valuations matter and there are pockets of growth to be found around the world at cheap prices, often in places that have been ignored for quite some time by investors, such as in EM, Value equities, or Small Caps.

3. Fixed income, and the massive increase in yields across the global, is quite possibly the biggest story of the next decade and should be accounted for in portfolios accordingly. Investors now have choices on how to allocate capital, giving them the option to invest into lower risk, higher returning assets and still potentially reach overall portfolio return targets.

Figure 2: Historical returns for the 60/40 have fallen amid recent selloff while expected returns are improving (JPY)



Source: Invesco, estimates as of December 31, 2022. Proxies listed in **Figure 8**. These estimates are forward-looking, are not guarantees, and they involve risks, uncertainties, and assumptions. Please see page 9 for information about our CMA methodology. These estimates reflect the views of Invesco Investment Solutions, the views of other investment teams at Invesco may differ from those presented here. The 60/40 Portfolio is a blend of 60% S&P 500 Index and 40% Bloomberg Barclays US Aggregate Index.

1Q23 CMA Observations (10Y, USD):

Equities: We have revised our equity CMAs downward between 0.5% and 1%, mostly coming from a rise in the valuation building block at the end of 2022, particularly a decline in the trend rate. Our methodology for valuations looks at current levels versus an estimated "fair value" (FV) level determined by a model of interest rates and inflation. Presently, valuations are near FV and the trajectory appears to be downward. The direction of the FV is intuitive in a rising interest rate environment, creating a higher hurdle for valuations going forward. For example, FV's trend for US valuations from 1973 (the beginning of our database) to 1983 was downward, coinciding with the turn of 10-year interest rates. Since then, the trend for FV has been positive until mid-2021, only shifting marginally downwards during recessions or growth shocks. While the data is not presently a cause for alarm, this could represent a regime shift for valuations. Current forecasts place nominal global equity returns near 7% assuming a 2% rate of inflation. For those looking to add additional return to their equity allocations, EM and small cap equities are anticipated to have higher growth rates and better valuations than large cap or developed markets.

Fixed Income: Most fixed income instruments are at 4% or higher and are well above their historical return estimates, this is particularly pronounced in credit instruments like loans, high yield, and EM local debt. All investors will have to adjust their expectations over the coming decade to react to these higher levels of yields and projected returns. Improved sharpe ratios of fixed income relative to equities or alternatives have made their allocation significantly more attractive even for those with high return targets on their portfolios. This past quarter, loans became more attractive relative to high yield as the CMA for loans approached 9.3% while high yield decreased to 7%. We are cautious of duration in a rising rate environment and are limiting interest rate risk in the form of duration exposure given a severely inverted yield curve.

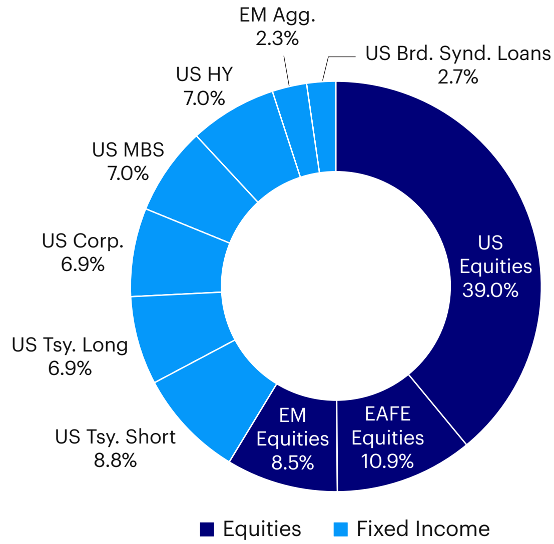
Alternatives: Our private equity CMA reduced in similar fashion to public equities (roughly 0.5%) due to lower growth, softened by slightly lower cost of financing, and are estimated to return 12.4%. Unlevered core real estate and infrastructure remained flat, near 7%, as there was not much movement in either interest rates or cap rates. On a levered basis, returns are still anticipated to be near 9%. Private debt's unlevered CMA continued to increase 0.4% over the quarter to 9.6%, 13.4% after applying standard levels of leverage, highlighting the opportunity appearing in shorter-duration alternative credit.

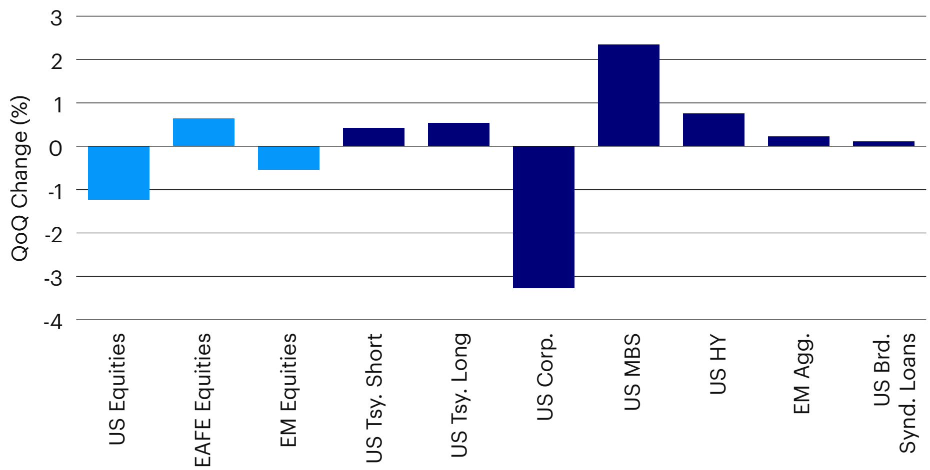
The strategic asset allocation (SAA) displayed here is denominated in USD and is representative of our CMA's applied in a hypothetical portfolio context for global investors.

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 Investment Solutions representative.

Strategic Asset Allocation Trends:

Figure 3: 2023 Q1 SAA Rebalance (USD)





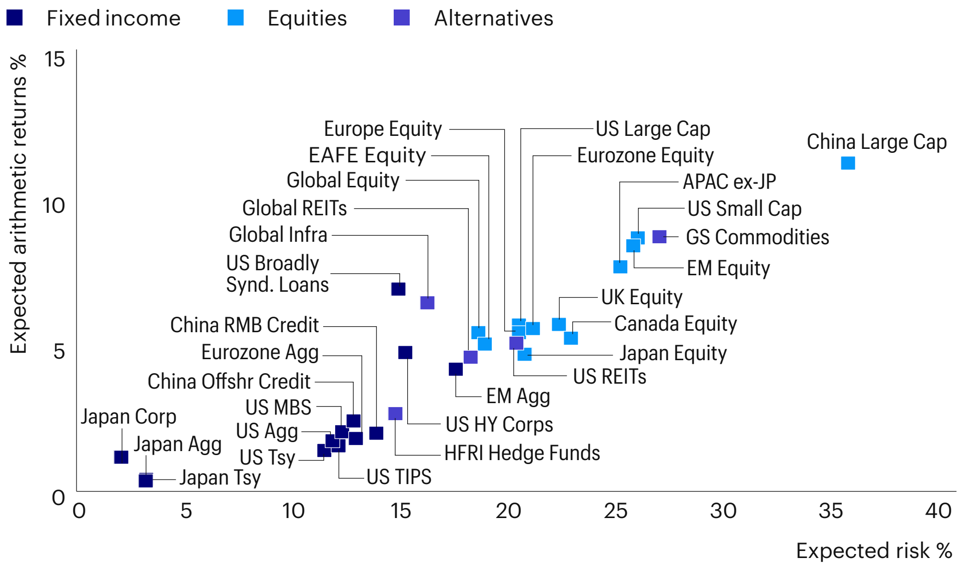
Source: Invesco Investment Solutions, as of December 31, 2022. Proxies listed in **Figure 8**. These estimates reflect the views of Invesco Investment Solutions, the views of other investment teams at Invesco may differ from those presented here. References to overweights and underweights are relative to a 60% global equity and 40% global aggregate fixed income benchmark.

- **Portfolio level:** We added to our overweight of fixed income by 1.1% at the expense of our equity position as interest rates have risen and sharpe ratios for the asset class has improved.
- **Within equities:** We reduced our overweights to US and EM equities by 1.2% and 0.5% respectively. We added to developed equities ex-US as regions like Japan have improved their growth outlook and valuations appear more attractive.
- **Within fixed income:** We have added to our treasury position, both long and short, along with high yield. Within investment grade, we have reduced our overweight to corporate bonds and substituted them with an increased allocation to MBS as spreads in real estate debt have risen.

3

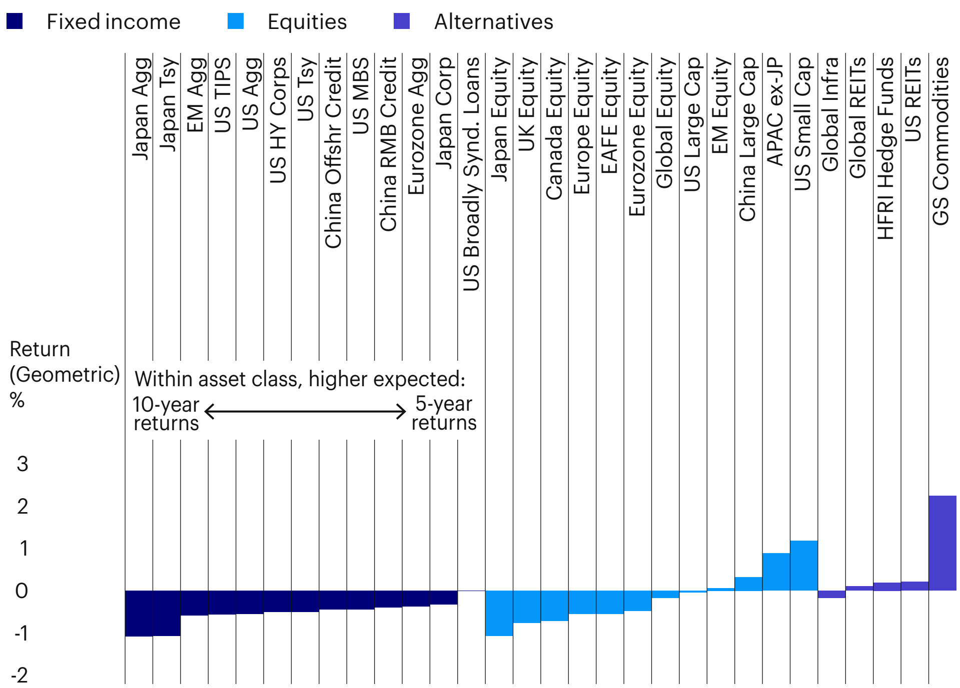
2023 Capital Market Assumptions

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



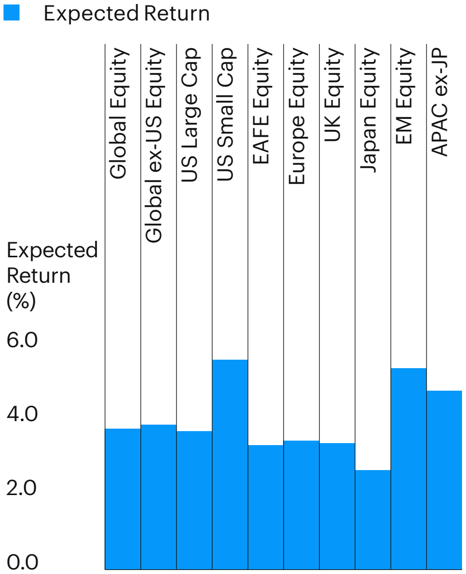
Source: Invesco, estimates as of December 31, 2022. Proxies listed in **Figure 8**. These estimates are forward-looking, are not guarantees, and they involve risks, uncertainties, and assumptions. Please see page 9 for information about our CMA methodology. These estimates reflect the views of Invesco Investment Solutions, the views of other investment teams at Invesco may differ from those presented here. **Performance, whether actual or simulated, does not guarantee future results.**

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



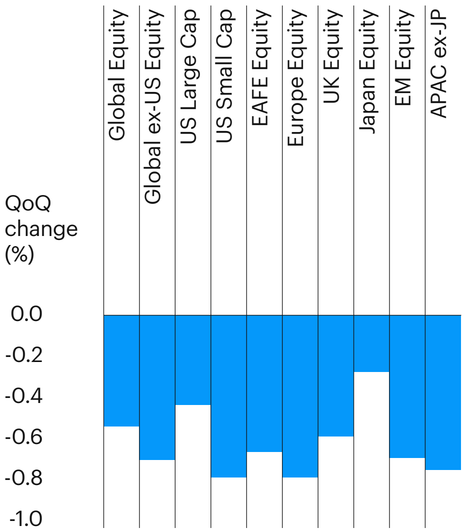
Source: Invesco, estimates as of December 31, 2022. Proxies listed in **Figure 8**. These estimates are forward-looking, are not guarantees, and they involve risks, uncertainties, and assumptions. Please see page 9 for information about our CMA methodology. These estimates reflect the views of Invesco Investment Solutions, the views of other investment teams at Invesco may differ from those presented here. **Performance, whether actual or simulated, does not guarantee future results.**

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



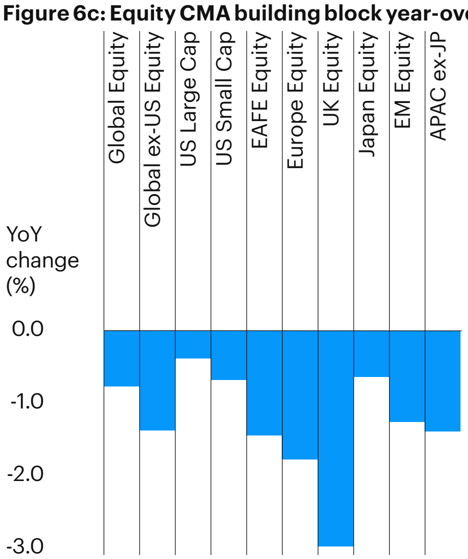
	Dividend Yield	Buyback Yield	LT Earnings Growth	Expected Inflation	Valuation Change	Currency Adj. (IRP)
Global Equity	2.24	0.75	1.82	2.07	-0.03	-3.09
Global ex-US Equity	3.14	0.00	1.77	1.75	-0.26	-2.52
US Large Cap	1.66	1.25	1.86	2.28	0.12	-3.46
US Small Cap	1.53	0.79	3.18	2.28	1.27	-3.46
EAFE Equity	3.14	0.00	1.29	1.42	-0.52	-1.99
Europe Equity	3.15	0.00	1.23	1.90	-0.45	-2.38
UK Equity	3.82	0.00	1.50	2.20	-0.91	-3.24
Japan Equity	2.59	0.00	1.22	-0.53	-0.60	0.00
EM Equity	3.18	0.00	2.92	2.42	0.45	-3.60
APAC ex-JP	2.83	0.00	2.36	2.38	0.75	-3.55

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



	Dividend Yield	Buyback Yield	LT Earnings Growth	Expected Inflation	Valuation Change	Currency Adj. (IRP)
Global Equity	-0.07	-0.03	-0.08	-0.11	-0.40	0.12
Global ex-US Equity	-0.15	0.00	-0.08	-0.15	-0.48	0.13
US Large Cap	-0.06	-0.02	-0.07	-0.07	-0.33	0.10
US Small Cap	-0.02	-0.01	-0.13	-0.07	-0.69	0.10
EAFE Equity	-0.17	0.00	-0.06	-0.07	-0.40	0.00
Europe Equity	-0.21	0.00	-0.15	-0.08	-0.37	0.00
UK Equity	-0.20	0.00	-0.25	-0.26	-0.55	0.66
Japan Equity	-0.06	0.00	0.22	-0.09	-0.34	0.00
EM Equity	-0.15	0.00	0.01	-0.32	-0.61	0.35
APAC ex-JP	-0.20	0.00	0.00	-0.25	-0.63	0.29

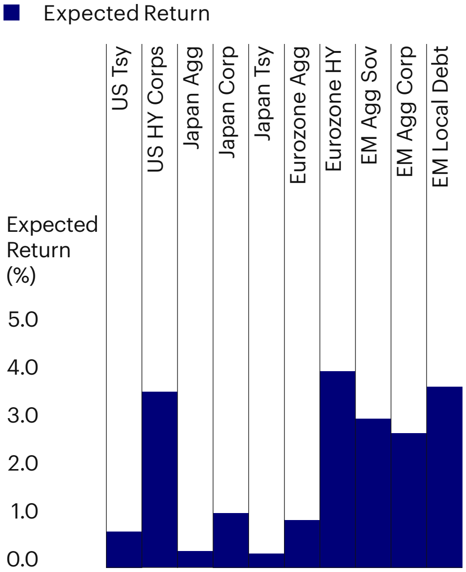
Figure 6c: Equity CMA building block year-over-year change and contribution (JPY) (%)



	Dividend Yield	Buyback Yield	LT Earnings Growth	Expected Inflation	Valuation Change	Currency Adj. (IRP)
Global Equity	0.54	0.09	-0.90	0.39	0.97	-1.84
Global ex-US Equity	0.67	0.00	-1.00	0.19	0.38	-1.60
US Large Cap	0.43	0.16	-0.84	0.53	1.35	-2.01
US Small Cap	0.50	0.09	-1.01	0.53	1.22	-2.01
EAFE Equity	0.62	0.00	-1.01	0.36	0.40	-1.81
Europe Equity	0.61	0.00	-1.05	0.55	0.48	-2.37
UK Equity	0.15	0.00	-0.95	0.27	-0.09	-2.34
Japan Equity	0.45	0.00	-1.07	-0.36	0.33	0.00
EM Equity	0.83	0.00	-1.05	-0.27	0.44	-1.18
APAC ex-JP	0.60	0.00	-1.11	-0.11	0.59	-1.33

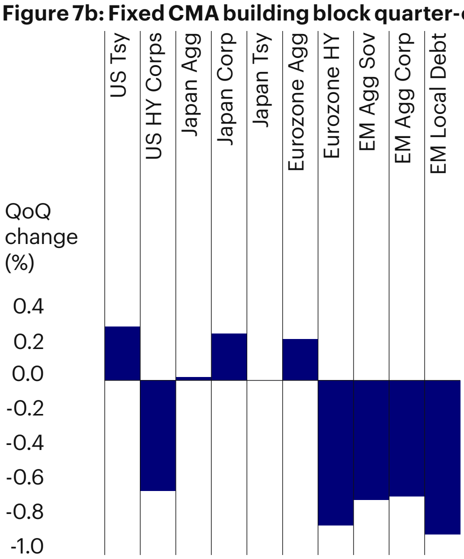
Source: Invesco, estimates as of December 31, 2022. Proxies listed in **Figure 8**. These estimates are forward-looking, are not guarantees, and they involve risks, uncertainties, and assumptions. Please see page 9 for information about our CMA methodology. These estimates reflect the views of Invesco Investment Solutions, the views of other investment teams at Invesco may differ from those presented here. **Performance, whether actual or simulated, does not guarantee future results.**

Figure 7a: Fixed CMA building block contribution (JPY) (%)



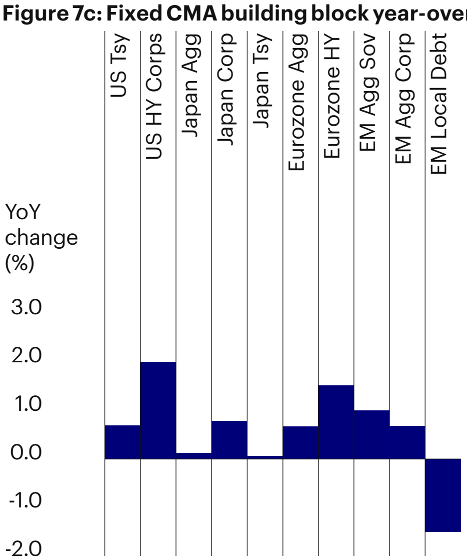
	Average Yield	Roll Return	Valuation Change (Yield Curve)	Valuation Change (OAS)	Credit Loss	Currency Adj. (IRP)
US Tsy	4.32	0.05	-0.17	0.00	0.00	-3.46
US HY Corps	9.17	-0.12	-0.01	-0.15	-1.79	-3.46
Japan Agg	1.41	0.54	-1.59	-0.02	0.00	0.00
Japan Corp	1.40	0.52	-0.60	0.10	-0.29	0.00
Japan Tsy	1.34	0.54	-1.59	0.00	0.00	0.00
Eurozone Agg	3.56	0.03	-0.13	-0.01	-0.35	-2.11
Eurozone HY	7.68	-0.15	-0.01	-0.01	-1.32	-2.11
EM Agg Sov	7.80	0.07	-0.38	0.22	-1.17	-3.46
EM Agg Corp	8.19	-0.08	-0.09	-0.13	-1.65	-3.46
EM Local Debt	7.19	0.51	-0.33	0.00	0.00	-3.61

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



	Average Yield	Roll Return	Valuation Change (Yield Curve)	Valuation Change (OAS)	Credit Loss	Currency Adj. (IRP)
US Tsy	0.06	0.16	-0.01	0.00	0.00	0.10
US HY Corps	-0.34	-0.02	0.04	-0.33	-0.09	0.10
Japan Agg	0.35	-0.03	-0.30	0.00	0.00	0.00
Japan Corp	0.29	0.11	-0.11	0.03	-0.06	0.00
Japan Tsy	0.33	-0.03	-0.30	0.00	0.00	0.00
Eurozone Agg	0.55	0.01	-0.05	-0.14	0.09	-0.23
Eurozone HY	-0.14	-0.11	0.08	-0.39	-0.06	-0.23
EM Agg Sov	-0.33	0.10	-0.11	-0.53	0.08	0.10
EM Agg Corp	-0.39	0.02	-0.04	-0.44	0.08	0.10
EM Local Debt	-0.38	-0.03	-0.08	0.00	0.00	-0.41

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



	Average Yield	Roll Return	Valuation Change (Yield Curve)	Valuation Change (OAS)	Credit Loss	Currency Adj. (IRP)
US Tsy	2.81	-0.34	0.23	0.00	0.00	-2.01
US HY Corps	3.47	-0.47	0.27	0.83	-0.09	-2.01
Japan Agg	0.91	0.05	-0.84	0.00	0.00	0.00
Japan Corp	0.73	0.38	-0.32	0.12	-0.13	0.00
Japan Tsy	0.89	0.11	-0.94	0.00	0.00	0.00
Eurozone Agg	2.94	-0.35	0.29	0.27	-0.12	-2.36
Eurozone HY	3.48	-0.22	0.18	0.51	-0.06	-2.36
EM Agg Sov	2.77	-0.29	0.18	0.36	-0.01	-2.01
EM Agg Corp	3.04	-0.47	0.22	0.23	-0.31	-2.01
EM Local Debt	0.99	-0.06	0.15	0.00	0.00	-2.58

Source: Invesco, estimates as of December 31, 2022. Proxies listed in **Figure 8**. These estimates are forward-looking, are not guarantees, and they involve risks, uncertainties, and assumptions. Please see page 9 for information about our CMA methodology. These estimates reflect the views of Invesco Investment Solutions, the views of other investment teams at Invesco may differ from those presented here. **Performance, whether actual or simulated, does not guarantee future results.**

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

	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	0.7	1.5	1.0	12.1	0.12
	US Tsy IM	BBG US Tsy IM	0.6	1.3	0.7	11.3	0.11
	US Tsy Long	BBG US Tsy Long	-0.1	0.8	0.6	13.9	0.06
	US TIPS	BBG US TIPS	0.8	1.5	0.9	12.1	0.13
	US Broadly Synd. Loans	CSFB Leverage Loan	5.9	6.9	7.2	14.9	0.46
	US Agg	BBG US Agg	1.0	1.7	1.2	11.8	0.15
	US IG Corp	BBG US IG	1.3	2.0	2.0	12.4	0.16
	US MBS	BBG US MBS	1.3	2.0	1.3	12.2	0.16
	US Preferred Stocks	BOA ML Fixed Rate Pref Securities	2.1	3.1	3.8	14.5	0.21
	US HY Corps	BBG US HY	3.6	4.7	5.5	15.2	0.31
	UK Linker	BofA ML UK Inflation-Linked Gilt	-0.4	0.7	0.6	14.8	0.05
	UK Gilts	BBG Sterling Agg Gilts	1.0	1.7	0.6	12.1	0.14
	UK Corp	BBG Sterling Agg Non-Gilts Corp	1.8	3.1	2.6	16.6	0.19
	Global Agg	BBG Global Agg	0.9	1.4	1.1	9.8	0.14
	Global Agg ex-US	BBG Global Agg ex-US	0.9	1.3	1.1	9.2	0.14
	Global Tsy	BBG Global Tsy	0.8	1.2	0.9	8.1	0.14
	Global Sov	BBG Global Sov	0.7	1.5	1.4	12.7	0.12
	Global Corp	BBG Global Corp	1.5	2.3	2.1	13.1	0.18
	Global IG	BBG Global Corp IG	1.5	2.5	2.2	14.2	0.17
	Eurozone Corp	BBG Euro Agg Credit Corp	1.6	2.6	2.2	14.9	0.18
	Eurozone Tsy	BBG Euro Agg Gov Tsy	1.1	1.8	1.1	12.6	0.15
	Asian Dollar IG	BOA ML AC IG	1.6	2.6	2.4	14.3	0.18
	EM Agg	BBG EM Agg	2.7	4.2	4.1	17.5	0.24
	EM Agg Sov	BBG EM Sov	3.1	4.3	4.3	16.3	0.27
	China Policy Bk & Tsy	BBG China PB Tsy TR	0.9	1.8	0.3	13.2	0.13
	China RMB Credit	BBG China Corporate	1.0	2.0	1.1	13.8	0.14
Equities	Global Equity	MSCI ACWI	3.8	5.4	-0.1	18.6	0.29
	Global ex-US Equity	MSCI ACWI ex-US	3.9	5.6	0.6	19.2	0.29
	US Broad Market	Russell 3000	4.0	6.0	-0.6	21.1	0.28
	US Large Cap	S&P 500	3.7	5.7	-0.6	20.5	0.28
	US Mid Cap	Russell Midcap	4.2	6.6	-0.6	22.9	0.29
	US Small Cap	Russell 2000	5.7	8.7	-1.1	26.0	0.33
	EAFE Equity	MSCI EAFE	3.4	5.0	1.2	18.9	0.27
	Europe Equity	MSCI Europe	3.5	5.4	0.8	20.5	0.26
	Eurozone Equity	MSCI Euro ex-UK	3.5	5.5	0.8	21.1	0.26
	UK Large Cap	FTSE 100	3.0	5.3	0.6	22.2	0.24
	UK Small Cap	FTSE Small Cap UK	4.7	8.0	0.2	27.3	0.29
	Canada Equity	S&P TSX	2.8	5.2	0.1	22.9	0.23
	Japan Equity	MSCI JP	2.7	4.7	2.6	20.7	0.23
	EM Equity	MSCI EM	5.4	8.4	-0.4	25.8	0.33
	China Small Cap	CSI 500	6.6	12.5	-0.7	37.9	0.33
	Pacific ex-JP Equity	MSCI Pacific ex-JP	4.0	7.1	0.6	26.3	0.27
Alternatives	US REITs	FTSE NAREIT Equity	3.1	5.0	0.5	20.3	0.25
	Global REITs	FTSE EPRA/NAREIT Developed	3.0	4.6	1.2	18.2	0.25
	HFRI Hedge Funds	HFRI HF	1.6	2.6	-	14.7	0.18
	GS Commodities	S&P GSCI	5.5	8.7	-	27.0	0.32
	Agriculture	S&P GSCI Agriculture	1.0	3.7	-	24.2	0.15
	Energy	S&P GSCI Energy	8.2	14.5	-	39.5	0.37
	Industrial Metals	S&P GSCI Industrial Metals	4.8	7.7	-	25.6	0.30
	Precious Metals	S&P GSCI Precious Metals	2.6	4.2	-	18.7	0.23

Source: Invesco, estimates as of December 31, 2022. These estimates are forward-looking, are not guarantees, and they involve risks, uncertainties, and assumptions. Please see page 9 for information about our CMA methodology. These estimates reflect the views of Invesco Investment Solutions, the views of other investment teams at Invesco may differ from those presented here. Agg = Aggregate, Infra = Infrastructure, Corp = Corporate, DJ = Dow Jones, HY = High Yield, Muni = Municipals, Tsy = Treasury, IM = Intermediate, ML = Merrill Lynch, Sov = Sovereign, EM = Emerging Markets, IG = Investment Grade, APAC = Asia Pacific, Gov = Government, MBS = Mortgage Backed Securities, TIPS = Treasury Inflation Protected Securities.

Figure 9: 10-year correlations (JPY)

Greater than 0.70
0.30 to 0.70
Less than 0.30

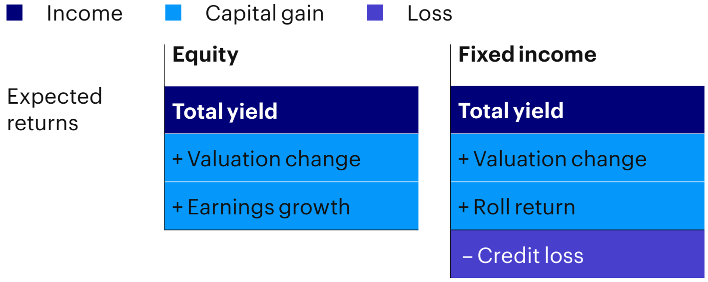
		Fixed income												Equities										Alternatives			
	Asset class	US Tsy IM	US TIPS	US Broadly Synd. Loans	US Agg	US IG Corp	US HY Corps	US Muni	US HY Muni	Global Agg	Global Agg ex-US	EM Agg	China RMB Credit	Global Equity	China Large Cap	US Large Cap	US Mid Cap	US Small Cap	EAFE Equity	UK Large 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	0.86	1.00																								
	US Broadly Synd. Loans	0.75	0.78	1.00																							
	US Agg	0.96	0.91	0.79	1.00																						
	US IG Corp	0.79	0.86	0.82	0.92	1.00																					
	US HY Corps	0.63	0.76	0.90	0.74	0.85	1.00																				
	US Muni	0.88	0.84	0.82	0.93	0.87	0.76	1.00																			
	US HY Muni	0.71	0.76	0.82	0.79	0.81	0.77	0.90	1.00																		
	Global Agg	0.82	0.87	0.76	0.89	0.90	0.80	0.83	0.74	1.00																	
	Global Agg ex-US	0.57	0.70	0.61	0.67	0.74	0.72	0.62	0.59	0.93	1.00																
	EM Agg	0.66	0.79	0.82	0.79	0.89	0.89	0.79	0.79	0.86	0.78	1.00															
	China RMB Credit	0.86	0.75	0.79	0.84	0.71	0.67	0.79	0.67	0.77	0.60	0.66	1.00														
Equities	Global Equity	0.44	0.61	0.71	0.56	0.70	0.85	0.57	0.59	0.74	0.78	0.79	0.55	1.00													
	China Large Cap	0.32	0.35	0.42	0.39	0.45	0.45	0.36	0.38	0.49	0.49	0.49	0.43	0.51	1.00												
	US Large Cap	0.49	0.64	0.72	0.60	0.71	0.83	0.59	0.59	0.73	0.72	0.75	0.57	0.97	0.45	1.00											
	US Mid Cap	0.44	0.61	0.73	0.56	0.70	0.86	0.57	0.59	0.70	0.70	0.76	0.53	0.96	0.45	0.97	1.00										
	US Small Cap	0.42	0.56	0.69	0.52	0.64	0.81	0.52	0.54	0.64	0.64	0.69	0.52	0.91	0.43	0.92	0.96	1.00									
	EAFE Equity	0.40	0.55	0.67	0.51	0.66	0.81	0.53	0.56	0.72	0.78	0.77	0.51	0.97	0.49	0.90	0.90	0.84	1.00								
	UK Large Cap	0.40	0.55	0.68	0.50	0.63	0.79	0.54	0.57	0.70	0.75	0.74	0.53	0.93	0.48	0.87	0.86	0.81	0.96	1.00							
	Canada Equity	0.34	0.55	0.67	0.46	0.62	0.79	0.48	0.54	0.65	0.70	0.73	0.47	0.91	0.47	0.86	0.89	0.84	0.87	0.87	1.00						
	Japan Equity	0.40	0.51	0.61	0.50	0.60	0.71	0.50	0.49	0.61	0.60	0.67	0.51	0.83	0.44	0.78	0.78	0.75	0.86	0.78	0.71	1.00					
	EM Equity	0.27	0.45	0.58	0.40	0.57	0.71	0.41	0.49	0.62	0.70	0.73	0.43	0.86	0.61	0.75	0.78	0.73	0.86	0.81	0.83	0.72	1.00				
Alternatives	Global REITs	0.34	0.57	0.63	0.49	0.66	0.78	0.50	0.57	0.67	0.71	0.74	0.42	0.88	0.38	0.84	0.87	0.81	0.86	0.82	0.82	0.71	0.76	1.00			
	Global Infra	0.46	0.64	0.69	0.58	0.71	0.80	0.60	0.62	0.73	0.74	0.77	0.50	0.88	0.41	0.85	0.85	0.77	0.86	0.85	0.85	0.70	0.75	0.86	1.00		
	GS Commodities	0.31	0.45	0.61	0.34	0.41	0.60	0.38	0.46	0.47	0.50	0.52	0.44	0.61	0.27	0.56	0.59	0.56	0.61	0.68	0.71	0.49	0.56	0.51	0.60	1.00	
	HFRI Hedge Funds	0.74	0.77	0.92	0.78	0.81	0.88	0.78	0.75	0.81	0.70	0.82	0.81	0.84	0.52	0.83	0.83	0.81	0.80	0.80	0.78	0.72	0.70	0.70	0.76	0.66	1.00

Source: Invesco, estimates as of December 31, 2022. Proxies listed in **Figure 8.** These estimates are forward-looking, are not guarantees, and they involve risks, uncertainties, and assumptions. Please see page 9 for information about our CMA methodology. These estimates reflect the views of Invesco Investment Solutions, the views of other investment teams at Invesco may differ from those presented here.

About our capital market assumptions methodology

We employ a fundamentally based "building block" approach to estimating asset class returns. Estimates for income and capital gain components of returns for each asset class are informed by fundamental and historical data. Components are then combined to establish estimated returns (Figure 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 assumption methodology 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 in the growth of earnings based on the long-term average real GDP per capita and inflation.

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

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

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

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

Contributors

Investment Solutions

Duy Nguyen
CFA, CAIA
CIO, Invesco Investment Solutions

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

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

Greg Chen
PhD, CFA
Senior Analyst

Patrick Hamel
MS, MBA
Quantitative Research Analyst

Chang Hwan Sung
PhD, CFA, FRM
Portfolio Manager, Solutions Research, APAC

Debbie Li
CFA
Senior Analyst

Diane Ellis
MS
Macro Research Analyst

Yu Li
PhD
Quantitative Research Analyst

Investment Solutions Thought Leadership

Drew Thornton
CFA
Head of Solutions Thought Leadership

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 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.

マルチアセット運用戦略に関する投資リスク

- 当運用戦略は、国内外の株式、債券、ETF、REIT、債券、短期公社債、派生商品取引、および不動産、インフラ等の実物資産、プライベート・エクイティ等に投資する現ファンドなどを主要投資対象としますので、組み入れた国内外の株式、ETF、REIT、債券、短期公社債、派生商品取引、不動産、インフラなどの実物資産、プライベート・エクイティ等の価格変動などの影響により、損失を被ることがあります。
- したがって、投資家の皆様の投資元本は保証されているものではなく、組入れ資産価格の下落により、損失を被り、投資元本を割り込むことがあります。
- 運用機関の指図に基づく行為により生じた利益および損失はすべて投資家に帰属します。

当運用における主な投資リスクとして以下が挙げられます。

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

マルチアセット運用戦略に関する費用と税金

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

※投資一任契約の締結に際しましては、重要事項説明書ならびに契約締結前交付書面を必ずご確認下さい。
※デリバティブに関するリスクについては、巻末のディスクレーマーを必ずご確認下さい。

オルタナティブ・ソリューション運用戦略に関する投資リスク

- 当運用戦略は、国内外の株式、債券、ETF、REIT、債券、短期公社債、派生商品取引、および不動産、インフラ等の実物資産、プライベート・エクイティ等に投資する現ファンドなどを主要投資対象としますので、組み入れた国内外の株式、ETF、REIT、債券、短期公社債、派生商品取引、不動産、インフラなどの実物資産、プライベート・エクイティ等の価格変動などの影響により、損失を被ることがあります。
- したがって、投資家の皆様の投資元本は保証されているものではなく、組入れ資産価格の下落により、損失を被り、投資元本を割り込むことがあります。
- 運用機関の指図に基づく行為により生じた利益および損失はすべて投資家に帰属します。

当運用における主な投資リスクとして以下が挙げられます。

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

オルタナティブ・ソリューション運用戦略に関する費用と税金

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

※投資一任契約の締結に際しましては、重要事項説明書ならびに契約締結前交付書面を必ずご確認下さい。
※デリバティブに関するリスクについては、巻末のディスクレーマーを必ずご確認下さい。

当資料ご利用上のご注意

当資料は情報提供を目的として、インベスコ・アセット・マネジメント株式会社（以下、「当社」）のグループに属する運用プロフェッショナルが英文で作成したものであり、法令に基づく開示書類でも金融商品取引契約の締結等の勧誘資料でもありません。内容には正確を期していますが、必ずしも完全性を当社が保証するものではありません。また、当資料は信頼できる情報に基づいて作成されたものですが、その情報の確実性あるいは完結性を表明するものではありません。当資料に記載されている内容は既に変更されている場合があり、また、予告なく変更される場合があります。当資料には将来の市場の見通し等に関する記述が含まれている場合がありますが、それらは資料作成時における作成者の見解であり、将来の動向や成果を保証するものではありません。また、当資料に示す見解は、インベスコの他の運用チームの見解と異なる場合があります。過去のパフォーマンスや動向は将来の収益や成果を保証するものではありません。当社の事前の承認なく、当資料の一部または全部を使用、複製、転用、配布等することを禁じます。

また、本書では、弊社のグループ関連会社が行う投資について説明している箇所がありますが、そこは、投資一任契約を通じてインベスコ・アセット・マネジメント株式会社（以下、「当社」といいます。）がご提供する場合を想定したものです。また過去の運用実績は、将来の運用成果を保証するものではありません。本書はお客様ニーズを把握するためのサウンディング資料であり、特定のファンドや有価証券等についての言及は、あくまで参考情報として提供するものであり投資の推奨や勧誘する意図で提供するものではありません。本文で詳述した本書の分析は、一定の仮定に基づくものであり、その結果の確実性を表明するものではありません。分析の際の仮定は変更されることもあり、それに伴い当初の分析の結果と重要な差異が生じる可能性もあります。

本書はインベスコのグループ会社の行う投資手法ならびにプロセスを説明するために、過去の一時点における投資行動の具体例、または特定企業・銘柄に対する評価事例を掲示いたしますが、これをもって当該銘柄に対する投資を推薦、勧誘する意図はありません。ポートフォリオ特性値、組入れ銘柄などは、あくまで過去の一時点におけるデータに過ぎず、将来のポートフォリオが同様の傾向、組入れを継続する保証はございません。
リスク情報につき、有価証券先物取引等のデリバティブ取引に係る事項の説明は、国内特定（金銭）信託口座に組入れるファンドにおいて行われるデリバティブ取引にかかるものです。実際の投資は日本国外のファンドで行い、国内特定（金銭）信託口座から日本国外のファンドに投資することを前提とします。国内特定（金銭）信託口座において、デリバティブ取引を行うことはございません。

※投資一任契約の締結に際しましては、重要事項説明書ならびに契約締結前交付書面を必ずご確認下さい。

インベスコ・アセット・マネジメント株式会社
金融商品取引業者　関東財務局長（金商）第306号
加入協会　一般社団法人投資信託協会
一般社団法人日本投資顧問業協会