Applied philosophy
The Shiller P/E and S&P 500 returns

Valuations are the ultimate refuge of contrarians, and they tell us that the S&P 500 is expensive compared to historical norms even for those with a decade-long investment horizon. We consider the Shiller P/E to be one of the most reliable guides to long-term forward returns. We use it as a case study to approximate expected returns on the S&P 500 for the next 10 years. Should we ignore our contrarian instincts?

The lights are down, the tree has gone. The Christmas cheer faded a long time ago. We are staring at the grey skies and the darkness envelops us in its cold embrace. In the bleak midwinter only our questions remain: what does this year have in store for us?

We outlined our expectations and forecasts in November 2023 feeling hopeful about risk assets. We were moderately positive about even the S&P 500, despite its rich valuations. With the benefit of hindsight our forecast turned out to be too conservative in the short term. Perhaps that is a disadvantage of being early publishing our 2024 Outlook, perhaps we were not optimistic enough.

How could we have been more optimistic? Valuations told us the same story then that they are telling now: US equities are expensive when compared to historical norms, no matter the valuation metric used. Our favoured measure, the cyclically-adjusted price/earnings (CAPE) ratio stood at 35.7x at the end of December 2023 (using the Datastream US Total Market Index), while the Shiller P/E (its inflation-

adjusted equivalent) was at 31.3x, according to our estimates (**Figure 1**).

To put that into perspective, these ratios were higher only during extreme market events: around the "tech bubble" between 1998 and 2002 and the recent post-pandemic market peak between 2020 and 2022. Since January 1983 (the first available data point) the CAPE was higher only 12% and the Shiller P/E 15% of the time (using monthly data).

Of course, a logical argument would be that we are using the wrong tools to try to determine equity returns (or at least their direction) over a relatively short investment horizon. Indeed, the relationship between our CAPE and 1-year forward returns on the S&P 500 index between 1983 and 2022 is practically random. However, this predictive power improves using 10-year forward returns to an R-squared of 0.78 (between 1983 and 2013).

Interestingly, using the longer history of the Shiller P/E – available from 1881 – does not strengthen the relationship: the R-squared falls to 0.11. It seems that this predictive power may be a recent phenomenon. However, if we use the 30-year period before 1983 (starting in 1953), the R-squared jumps to 0.78. If we combine the two periods into 1953-2013 the R-squared drops to 0.42 suggesting that a structural split happened in the mid-1980s, which changed the relationship.

Figure 1 – S&P 500 Shiller P/E, cyclically-adjusted P/E and future returns since 1881
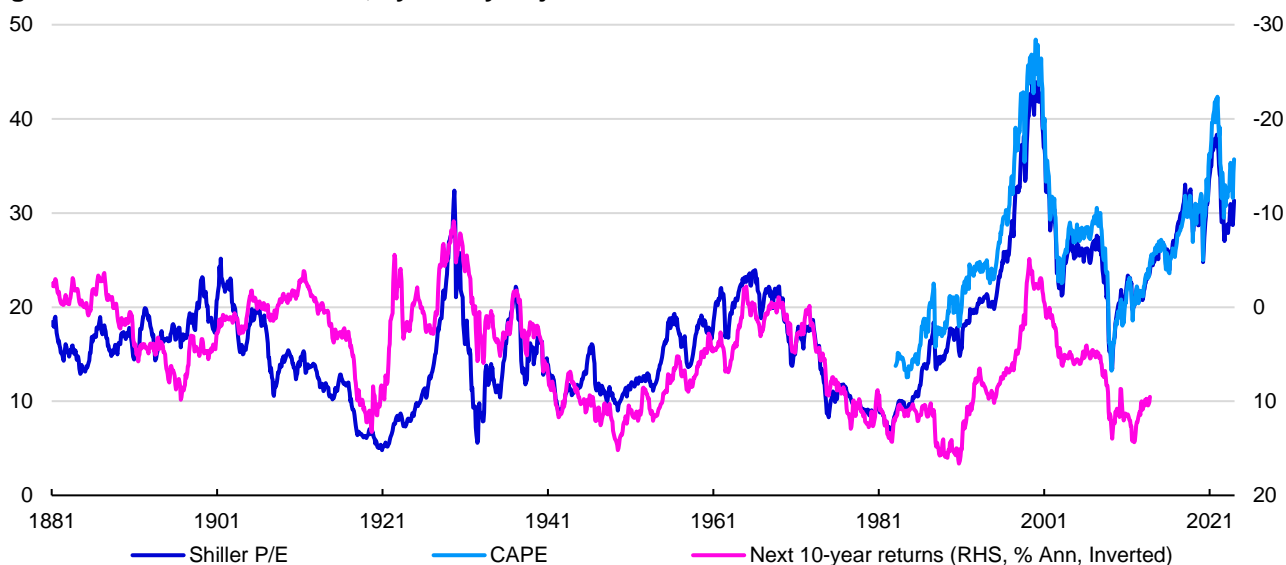
Notes: **Past performance is no guarantee of future results.** Data as of 31 December 2023. We use monthly data since January 1881. See appendix for the definition of the Shiller P/E. Future returns are calculated using monthly average values for the S&P 500 index.
Source: LSEG Datastream, Robert Shiller, Invesco Global Market Strategy Office

Even a quick glance reveals that valuations seem to have shifted higher in the 1980s: from an average of 15.6x between 1953 and 1983 to 24.2x between 1983 and 2023. What were considered extreme values in the first 100 years of the history of the Shiller P/E reached only in 1929, became more "normal".

When valuations change, our first suspect is usually the discount rate. Indeed, while 10-year Treasury yields rose from 2.3% in 1954 to around 15% in 1981 following the path of inflation, they declined from that level until our present day during the "Great Moderation" of the 1990s and deleveraging of the post-GFC period.

This implies that, assuming no structural change in the direction of inflation and interest rates, we ought to rely on the post-1983 model to predict long-term returns on the S&P 500 (**Figure 4**). Not to mention that on the pre-1983 model the current Shiller P/E would be literally "off the charts" (the peak between 1953 and 1983 was 23.9x). Also, at this point, we think the probability of inflation reaccelerating is low over both the short and medium term. Without that, we do not think valuations would revert to pre-1980s levels.

Figure 2 illustrates the relationship between the Shiller P/E and 10-year annualised forward returns on the S&P 500 since 1983. If that persists, our model suggests that annualised returns over the next 10 years could be around 3.5%, below the long-term average of 4.7% (since 1871 based on Shiller data), though significantly higher than the -10% returns implied by **Figure 1**.

Assuming the S&P 500 dividend yield stays close to the 10-year average of 1.8%, a 3.5% capital return would imply a total return of around 5.3%. This appears disappointing compared to the 9.2% annualised total return since 1871 and the 12% seen in the last ten years. If the dividend yield stayed close to that 10-year average, the increase in future capital returns needed to generate a 9.2% total return would require a 24% fall in the S&P 500 from the December 2023 average (taking the Shiller P/E to 23.9x).

We think that would either necessitate a recession, which is outside our base case for now, or could be the result of higher real treasury yields on equity discount factors. On the other hand, the rise in earnings required to bring the Shiller P/E down to that level would also be immense (about 430% with a one-year timeframe, and a doubling followed by a 50% rise if we model it over two years). Perhaps we must simply accept lower-than-average returns.

Or we could look outside the US. Within equities no other region seems obviously overvalued based on CAPE, their valuations all being below their respective historical averages (**Figure 3**). At the same time, a comparison of yields across asset classes reveals that only Japanese government and corporate bonds have less attractive absolute valuations as of 31 December 2023. In light of these, we see no reason to change our allocation to US equities, especially after strong returns in 2023 mainly driven by a small group of technology stocks. We remain Underweight (see **Figure 8**).

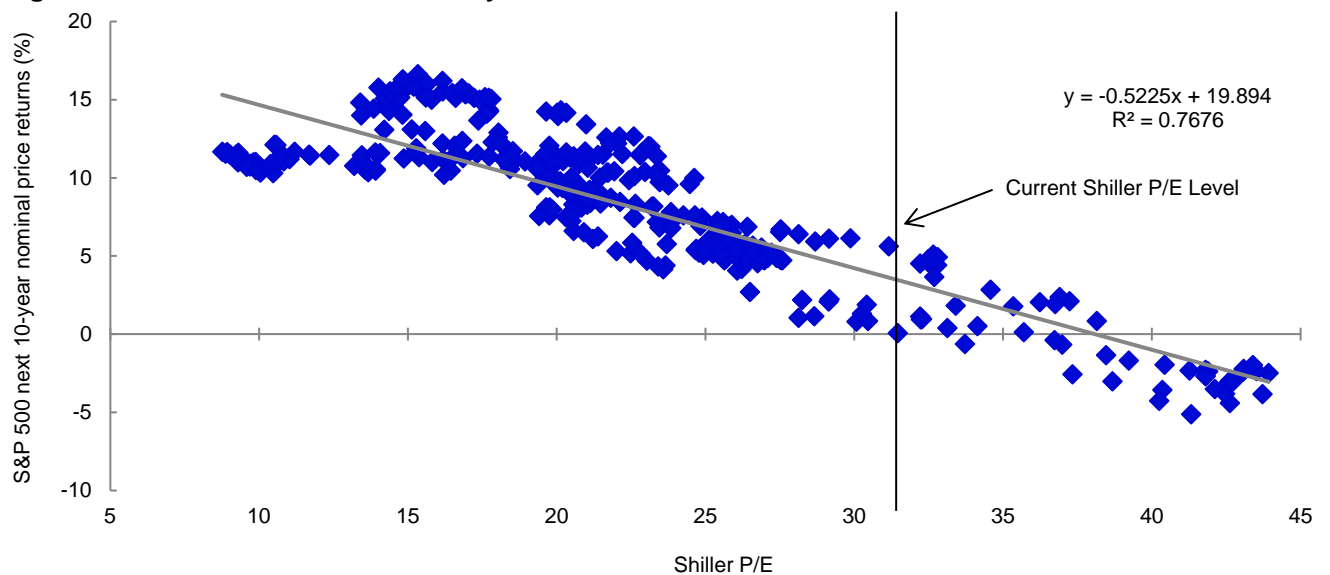**Figure 2 – S&P 500 Shiller P/E and future returns since 1983**
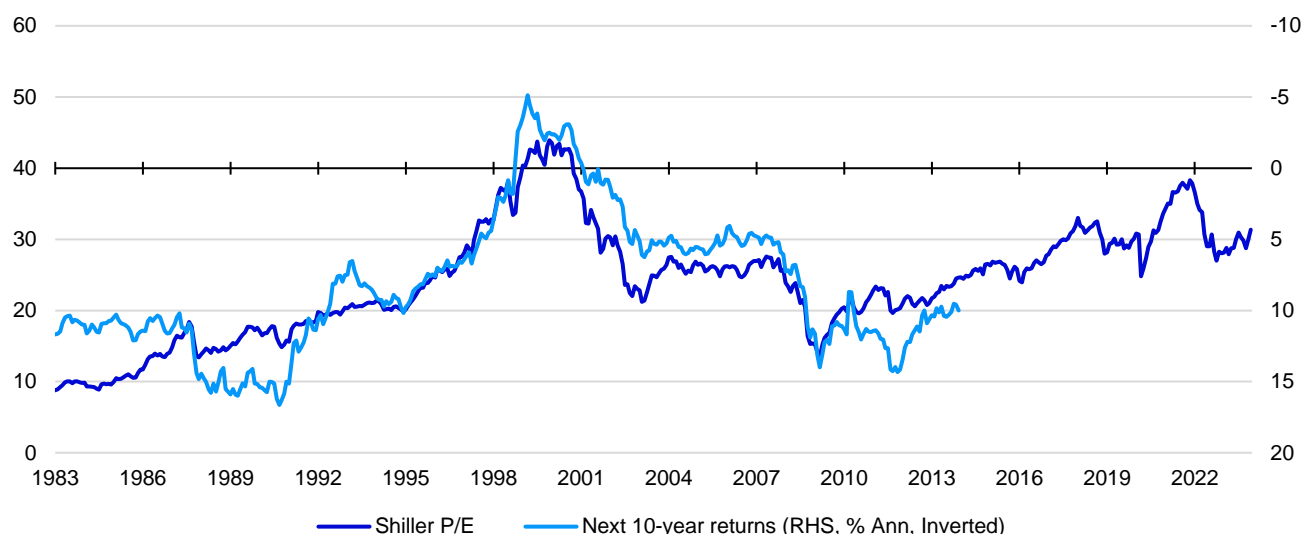
Notes: Data as of 31 December 2023. **Past performance is no guarantee of future results.** We use monthly data from January 1983. See appendix for the definition of the Shiller P/E. Future returns are calculated using monthly average values for the S&P 500 index.
Source: LSEG Datastream, Robert Shiller, Invesco Global Market Strategy Office

Figure 3 – Cyclically adjusted price/earnings ratios within historical ranges
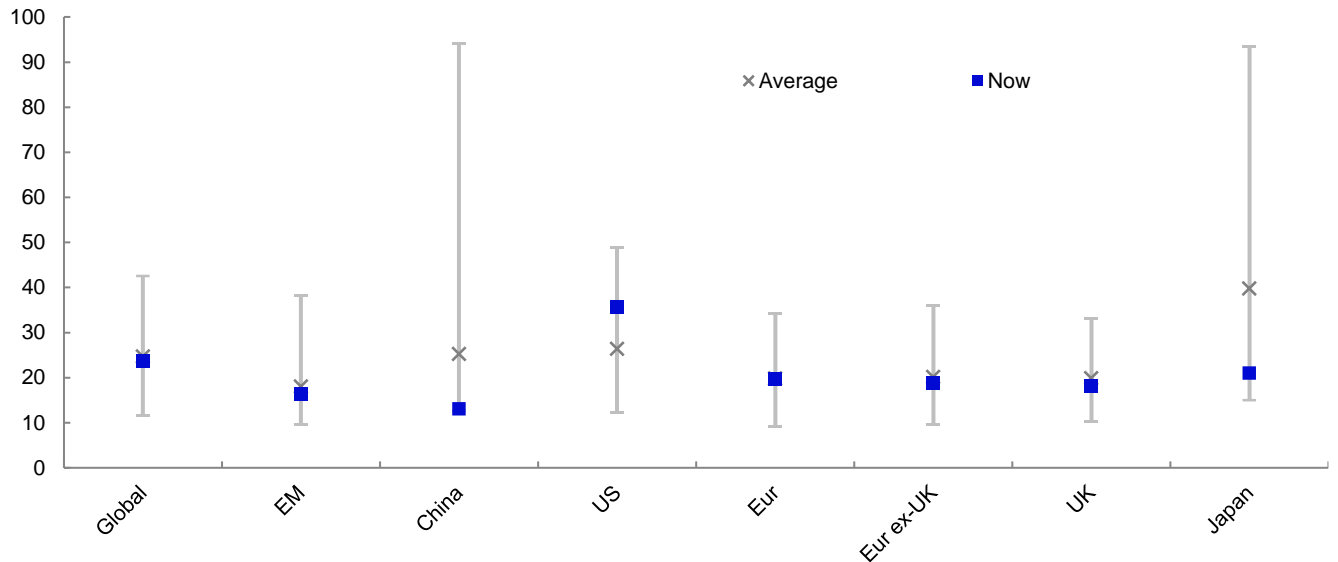
Notes: Data as of 31 December 2023. **Past performance is no guarantee of future results.** Cyclically Adjusted Price/Earnings uses a 10-year moving average of earnings. Based on daily data from 3 January 1983 (except for China from 1 April 2004 and EM from 3 January 2005), using Datastream Total Market indices.
Source: LSEG Datastream and Invesco Global Market Strategy Office

Figure 4 – Shiller P/E and S&P 500 10-year annualised forward returns since 1983

$y = -0.5225x + 19.894$
$R^2 = 0.7676$

Current Shiller P/E Level

Notes: Data as of 31 December 2023. **Past performance is no guarantee of future results.** We use monthly data from January 1983. See appendix for the definition of the Shiller P/E. Future returns are calculated using monthly average values for the S&P 500 index.
Source: LSEG Datastream, Robert Shiller, Invesco Global Market Strategy Office

Figure 5 – Asset class total returns (%, annualised)

Data as at 26/01/2024	Index	Current Level/RY	Total Return (USD, %)					Total Return (Local Currency, %)				
			1w	1m	QTD	YTD	12m	1w	1m	QTD	YTD	12m
Equities												
World	MSCI	734	1.3	1.5	1.0	1.0	15.7	1.3	2.1	1.8	1.8	16.8
Emerging Markets	MSCI	985	1.5	-1.2	-3.7	-3.7	-3.6	1.4	-0.3	-2.5	-2.5	-1.1
China	MSCI	52	3.4	-2.4	-6.9	-6.9	-28.9	3.3	-2.3	-6.7	-6.7	-28.3
US	MSCI	4662	1.0	2.4	2.5	2.5	22.8	1.0	2.4	2.5	2.5	22.8
Europe	MSCI	2009	2.9	0.1	-0.5	-0.5	10.3	2.8	1.3	1.1	1.1	8.6
Europe ex-UK	MSCI	2509	3.1	0.3	-0.2	-0.2	11.9	3.0	1.9	1.8	1.8	10.5
UK	MSCI	1159	2.6	-0.6	-1.5	-1.5	5.4	2.2	-0.7	-1.3	-1.3	2.3
Japan	MSCI	3735	-0.7	3.4	1.0	1.0	14.8	-0.7	7.3	6.1	6.1	30.3
Government Bonds												
World	BofA-ML	3.18	-0.1	-2.7	-2.9	-2.9	-2.3	0.0	-1.5	-1.4	-1.4	0.4
Emerging Markets	BBloom	7.98	0.1	-2.5	-2.9	-2.9	6.5	0.1	-2.5	-2.9	-2.9	6.5
China	BofA-ML	2.40	0.5	0.5	-0.5	-0.5	-0.2	0.4	1.0	0.8	0.8	5.8
US (10y)	Datastream	4.15	0.0	-1.6	-1.9	-1.9	-1.8	0.0	-1.6	-1.9	-1.9	-1.8
Europe	Bofa-ML	2.89	0.1	-3.4	-3.0	-3.0	2.6	0.2	-1.9	-1.4	-1.4	2.5
Europe ex-UK (EMU, 10y)	Datastream	2.27	0.2	-3.7	-3.4	-3.4	2.1	0.4	-2.2	-1.8	-1.8	2.0
UK (10y)	Datastream	4.05	0.1	-3.3	-3.4	-3.4	2.7	-0.2	-3.4	-3.2	-3.2	-0.3
Japan (10y)	Datastream	0.69	-0.5	-4.1	-5.4	-5.4	-12.9	-0.4	-0.4	-0.6	-0.6	-1.2
IG Corporate Bonds												
Global	BofA-ML	4.89	0.3	-1.1	-1.3	-1.3	3.9	0.3	-0.6	-0.8	-0.8	4.0
Emerging Markets	BBloom	6.97	0.4	0.5	0.0	0.0	5.1	0.4	0.5	0.0	0.0	5.1
China	BofA-ML	3.16	0.4	0.2	-0.7	-0.7	-0.9	0.2	0.7	0.5	0.5	5.0
US	BofA-ML	5.32	0.2	-0.5	-0.8	-0.8	3.6	0.2	-0.5	-0.8	-0.8	3.6
Europe	BofA-ML	3.77	0.4	-2.1	-2.2	-2.2	5.1	0.6	-0.6	-0.5	-0.5	5.0
UK	BofA-ML	5.57	0.4	-2.2	-2.4	-2.4	6.0	0.1	-2.3	-2.2	-2.2	2.9
Japan	BofA-ML	0.88	-0.1	-3.7	-4.9	-4.9	-11.1	-0.1	0.0	-0.1	-0.1	1.0
HY Corporate Bonds												
Global	BofA-ML	7.85	0.6	0.2	0.0	0.0	8.7	0.6	0.5	0.3	0.3	8.6
US	BofA-ML	7.91	0.6	0.2	0.0	0.0	9.1	0.6	0.2	0.0	0.0	9.1
Europe	BofA-ML	6.51	0.5	-0.6	-0.9	-0.9	9.5	0.7	0.9	0.8	0.8	9.4
Cash (Overnight LIBOR)												
US		5.32	0.1	0.4	0.4	0.4	5.1	0.1	0.4	0.4	0.4	5.1
Euro Area		3.91	-0.3	-1.4	-1.4	-1.4	3.1	0.1	0.3	0.3	0.3	3.4
UK		5.19	0.1	0.3	0.2	0.2	7.3	0.1	0.5	0.4	0.4	4.8
Japan		-0.01	0.0	-3.9	-4.8	-4.8	-12.2	0.0	0.0	0.0	0.0	0.0
Real Estate (REITs)												
Global	FTSE	1570	-0.1	-3.3	-3.9	-3.9	-2.2	0.1	-1.8	-2.3	-2.3	-2.3
Emerging Markets	FTSE	1203	1.4	-3.2	-5.6	-5.6	-13.8	1.6	-1.7	-4.0	-4.0	-13.9
US	FTSE	2977	-0.7	-3.1	-2.9	-2.9	1.4	-0.7	-3.1	-2.9	-2.9	1.4
Europe ex-UK	FTSE	2397	2.2	-6.1	-6.6	-6.6	2.2	2.3	-4.7	-5.0	-5.0	2.1
UK	FTSE	828	3.2	-5.1	-4.8	-4.8	1.3	2.9	-5.2	-4.6	-4.6	-1.6
Japan	FTSE	2112	-0.9	0.4	-2.7	-2.7	1.5	-0.9	4.2	2.2	2.2	15.2
Commodities												
All	GSCI	3534	4.3	2.7	5.6	5.6	-0.3	-	-	-	-	-
Energy	GSCI	634	6.0	4.7	9.5	9.5	3.2	-	-	-	-	-
Industrial Metals	GSCI	1577	3.7	-0.5	-1.5	-1.5	-14.0	-	-	-	-	-
Precious Metals	GSCI	2259	-0.4	-2.5	-2.5	-2.5	3.1	-	-	-	-	-
Agricultural Goods	GSCI	507	0.9	-2.3	-1.1	-1.1	-9.3	-	-	-	-	-
Currencies (vs USD)*												
EUR		1.09	-0.4	-1.7	-1.7	-1.7	-0.3	-	-	-	-	-
JPY		148.18	0.0	-3.9	-4.8	-4.8	-12.1	-	-	-	-	-
GBP		1.27	0.3	0.1	-0.2	-0.2	3.0	-	-	-	-	-
CHF		1.16	0.5	-1.3	-2.6	-2.6	6.5	-	-	-	-	-
CNY		7.18	0.2	-0.5	-1.1	-1.1	-5.5	-	-	-	-	-

Notes: *The currency section is organised so that in all cases the numbers show the movement in the mentioned currency versus USD (+ve indicates appreciation, -ve indicates depreciation). **Past performance is no guarantee of future results.** Please see appendix for definitions, methodology and disclaimers.
Source: LSEG Datastream and Invesco Global Market Strategy Office

Figure 6 – Global equity sector total returns relative to market (%)

Data as at 26/01/2024	Global				
	1w	1m	QTD	YTD	12m
Energy	**0.6**	**-2.8**	**-1.9**	**-1.9**	**-8.6**
Basic Materials	**0.5**	**-6.3**	**-5.7**	**-5.7**	**-15.4**
Basic Resources	1.1	-5.8	-6.1	-6.1	-16.1
Chemicals	-0.2	-7.1	-5.0	-5.0	-14.5
Industrials	**-0.2**	**-1.1**	**-1.1**	**-1.1**	**-0.9**
Construction & Materials	-0.1	-1.2	-1.4	-1.4	7.6
Industrial Goods & Services	-0.3	-1.1	-1.1	-1.1	-2.0
Consumer Discretionary	**0.1**	**-1.8**	**-1.5**	**-1.5**	**-1.5**
Automobiles & Parts	-4.8	-10.7	-10.2	-10.2	-2.4
Media	4.5	5.2	5.8	5.8	0.2
Retailers	0.0	0.3	0.8	0.8	4.2
Travel & Leisure	-0.8	-0.3	-0.3	-0.3	-4.3
Consumer Products & Services	2.9	-0.7	-0.8	-0.8	-6.4
Consumer Staples	**-0.6**	**-1.2**	**-1.7**	**-1.7**	**-11.9**
Food, Beverage & Tobacco	-1.0	-1.6	-2.0	-2.0	-12.6
Personal Care, Drug & Grocery Stores	0.2	-0.5	-1.1	-1.1	-10.7
Healthcare	**-1.1**	**1.2**	**0.7**	**0.7**	**-6.8**
Financials	**0.6**	**0.5**	**0.0**	**0.0**	**-3.1**
Banks	0.6	-0.2	-0.8	-0.8	-5.2
Financial Services	0.7	0.2	0.2	0.2	0.6
Insurance	0.4	2.9	2.0	2.0	-4.1
Real Estate	**-1.1**	**-4.2**	**-4.5**	**-4.5**	**-14.6**
Technology	**0.3**	**4.2**	**4.6**	**4.6**	**27.6**
Telecommunications	**0.0**	**1.8**	**0.9**	**0.9**	**-5.1**
Utilities	**-1.1**	**-2.6**	**-2.9**	**-2.9**	**-10.9**

Notes: Returns shown are for Datastream sector indices versus the total market index. **Past performance is no guarantee of future results.** Source: Refinitiv Datastream and Invesco

Figure 7a – US factor index total returns (% annualised)

Data as at 26/01/2024	Absolute					Relative to Market				
	1w	1m	QTD	YTD	12m	1w	1m	QTD	YTD	12m
Growth	0.7	1.0	1.2	1.2	20.7	-0.3	-1.5	-1.3	-1.3	-1.4
Low volatility	1.0	2.3	1.8	1.8	6.0	-0.1	-0.2	-0.8	-0.8	-13.4
Price momentum	0.7	1.4	1.6	1.6	11.7	-0.3	-1.1	-1.0	-1.0	-8.7
Quality	1.2	-0.5	0.2	0.2	11.0	0.2	-3.0	-2.4	-2.4	-9.3
Size	1.7	-1.6	-1.2	-1.2	2.2	0.6	-4.0	-3.7	-3.7	-16.5
Value	1.6	-0.5	-0.4	-0.4	2.1	0.5	-3.0	-2.9	-2.9	-16.6
Market	1.1	2.5	2.6	2.6	22.4					
Market - Equal-Weighted	1.0	-0.3	-0.2	-0.2	6.6					

Notes: **Past performance is no guarantee of future results.** All indices are subsets of the S&P 500 index, they are rebalanced monthly, use data in US dollars and are equal-weighted. Growth includes stocks in the top third based on both their 5-year sales per share trend and their internal growth rate (the product of the 5-year average return on equity and the retention ratio); Low volatility includes stocks in the bottom quintile based on the standard deviation of their daily returns in the previous three months; Price momentum includes stocks in the top quintile based on their performance in the previous 12 months; Quality includes stocks in the top third based on both their return on invested capital and their EBIT to EV ratio (earnings before interest and taxes to enterprise value); Size includes stocks in the bottom quintile based on their market value in US dollars. Value includes stocks in the bottom quintile based on their price to book value ratios. The market represents the S&P 500 index. Source: LSEG Datastream and Invesco Global Market Strategy Office

Figure 7b – European factor index total returns relative to market (% annualised)

Data as at 26/01/2024	Absolute					Relative to Market				
	1w	1m	QTD	YTD	12m	1w	1m	QTD	YTD	12m
Growth	3.9	-3.1	-3.5	-3.5	2.4	0.7	-4.5	-4.5	-4.5	-7.0
Low volatility	1.5	1.6	1.2	1.2	9.0	-1.6	0.2	0.1	0.1	-1.1
Price momentum	2.6	0.5	0.1	0.1	8.3	-0.5	-0.8	-0.9	-0.9	-1.7
Quality	3.5	-1.5	-1.4	-1.4	4.8	0.4	-2.9	-2.5	-2.5	-4.8
Size	3.8	-1.4	-1.6	-1.6	1.5	0.6	-2.8	-2.6	-2.6	-7.9
Value	2.8	-2.1	-2.0	-2.0	2.8	-0.3	-3.4	-3.0	-3.0	-6.7
Market	3.1	1.4	1.1	1.1	10.2					
Market - Equal-Weighted	3.1	-0.5	-0.7	-0.7	6.0					

Notes: **Past performance is no guarantee of future results.** All indices are subsets of the STOXX 600 index, they are rebalanced monthly, use data in euros and are equal-weighted. Growth includes stocks in the top third based on both their 5-year sales per share trend and their internal growth rate (the product of the 5-year average return on equity and the retention ratio); Low volatility includes stocks in the bottom quintile based on the standard deviation of their daily returns in the previous three months; Price momentum includes stocks in the top quintile based on their performance in the previous 12 months; Quality includes stocks in the top third based on both their return on invested capital and their EBIT to EV ratio (earnings before interest and taxes to enterprise value); Size includes stocks in the bottom quintile based on their market value in euros; Value includes stocks in the bottom quintile based on their price to book value ratios. The market represents the STOXX 600 index. Source: LSEG Datastream and Invesco Global Market Strategy Office

Figure 8 – Model asset allocation

	Neutral	Policy Range		Allocation	Position vs Neutral	Hedged	Currency
Cash Equivalents	**5%**	**0-10%**	↓	**0%**			
Cash	2.5%		↓	0%			
Gold	2.5%			0%			
Bonds	**40%**	**10-70%**	↑	**50%**			
Government	25%	10-40%		22%			
US	8%			13%			
Europe ex-UK (Eurozone)	7%			2%			
UK	1%			1%			
Japan	7%			2%			
Emerging Markets	2%			4%			
China**	0.2%			0%			
Corporate IG	10%	0-20%	↑	20%			
US Dollar	5%			10%			40% JPY
Euro	2%		↑	4%			
Sterling	1%			2%			
Japanese Yen	1%		↑	1%			
Emerging Markets	1%			3%			
China**	0.1%			0%			
Corporate HY	5%	0-10%	↑	8%			
US Dollar	4%		↑	6%			
Euro	1%		↑	2%			
Bank Loans	**4%**	**0-10%**	↑	**7%**			
US	3%		↑	5%			
Europe	1%			2%			
Equities	**45%**	**25-65%**	↑	**37%**			
US	25%			12%			
Europe ex-UK	7%		↑	10%			
UK	4%		↑	5%			
Japan	4%			2%			
Emerging Markets	5%			8%			
China**	2%			4%			
Real Estate	**4%**	**0-16%**	↑	**6%**			
US	1%		↑	2%			
Europe ex-UK	1%			1%			
UK	1%		↑	2%			
Japan	1%		↓	1%			
Emerging Markets	1%			0%			
Commodities	**2%**	**0-4%**		**0%**			
Energy	1%			0%			
Industrial Metals	0.3%			0%			
Precious Metals	0.3%			0%			
Agriculture	0.3%			0%			
Total	**100%**			**100%**			

Currency Exposure (including effect of hedging)							
USD	52%		↑	44%			
EUR	19%		↑	21%			
GBP	7%		↓	10%			
JPY	13%		↓	10%			
EM	9%			15%			
Total	**100%**			**100%**			

Notes: **China is included in Emerging Markets allocations. This is a theoretical portfolio and is for illustrative purposes only. See the latest The Big Picture document for more details. It does not represent an actual portfolio and is not a recommendation of any investment or trading strategy. Arrows indicate the direction of the most recent changes.
Source: Invesco

Figure 9 – Model allocations for Global sectors

	Neutral	Invesco	Preferred Region
Energy	**7.2%**	**Neutral**	**US**
Basic Materials	**4.2%**	**Neutral**	**Europe**
Basic Resources	2.5%	Underweight	Europe
Chemicals	1.7%	Neutral	US
Industrials	**13.1%**	**Overweight**	**Europe**
Construction & Materials	1.7%	Underweight	US
Industrial Goods & Services	11.4%	Overweight	Europe
Consumer Discretionary	**14.5%**	**Neutral**	**US**
Automobiles & Parts	2.7%	Underweight	Europe
Media	1.1%	Overweight	US
Retailers	4.9%	Neutral	US
Travel & Leisure	2.1%	Underweight	EM
Consumer Products & Services	3.7%	Neutral	Europe
Consumer Staples	**5.7%**	**Overweight**	**US**
Food, Beverage & Tobacco	3.7%	Overweight	US
Personal Care, Drug & Grocery Stores	2.0%	Overweight	US
Healthcare	**9.3%**	**Overweight**	**US**
Financials	**15.4%**	**Neutral**	**Europe**
Banks	7.4%	Overweight	Europe
Financial Services	5.1%	Underweight	Japan
Insurance	2.9%	Neutral	US
Real Estate	**2.9%**	**Overweight**	**Japan**
Technology	**20.8%**	**Neutral**	**US**
Telecommunications	**3.5%**	**Underweight**	**Japan**
Utilities	**3.3%**	**Underweight**	**Europe**

Notes: These are theoretical allocations which are for illustrative purposes only. They do not represent an actual portfolio and are not a recommendation of any investment or trading strategy. See the latest Strategic Sector Selector for more details.
Source: Refinitiv Datastream and Invesco

Appendix

US Shiller P/E: the Shiller P/E is a price to earnings ratio constructed by dividing price by the average EPS in the previous 10 years (with both numerator and denominator adjusted for inflation). It is what is commonly known as a cyclically adjusted PE ratio. It is constructed by US academic Robert Shiller. Data is monthly from 1881 (source Robert Shiller – see here).

Definitions of data and benchmarks for Figure 8

Sources: we source data from Datastream unless otherwise indicated.

Cash: returns are based on a proprietary index calculated using the Intercontinental Exchange Benchmark Administration overnight LIBOR (London Interbank Offer Rate). From 1st January 2022, we use the Refinitiv overnight deposit rate for the euro, the British pound and the Japanese yen. The global rate is the average of the euro, British pound, US dollar and Japanese yen rates. The series started on 1st January 2001 with a value of 100.

Gold: London bullion market spot price in USD/troy ounce.

Government bonds: Current levels, yields and total returns use Datastream benchmark 10-year yields for the US, Eurozone, Japan and the UK, and the Bank of America Merrill Lynch government bond total return index for the World and Europe. The emerging markets yields and returns are based on the Bloomberg Barclays emerging markets aggregate government bond index.

Corporate investment grade (IG) bonds: Bank of America Merrill Lynch investment grade corporate bond total return indices. The emerging markets yields and returns are based on the Bloomberg Barclays emerging markets aggregate corporate bond index.

Corporate high yield (HY) bonds: Bank of America Merrill Lynch high yield total return indices

Equities: We use MSCI benchmark gross total return indices for all regions.

Commodities: Goldman Sachs Commodity total return indices

Real estate: FTSE EPRA/NAREIT total return indices

Currencies: Global Trade Information Services spot rates

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