Uncommon truths

The Aristotle List: 10 improbable but possible outcomes for 2022

It is time to forget central scenarios and think about improbable but possible outcomes. Market sentiment is now mixed (thanks to the Fed), so our list of surprises contains something for everybody (these hypothetical predictions are our views of what could happen even if they do not necessarily form part of our central scenario).

Aristotle said that “probable impossibilities are to be preferred to improbable possibilities”, meaning that we find it easier to believe in interesting impossibilities (B52s on the moon, say) than in unlikely possibilities. The aim of this document is to seek those unlikely possibilities -- out-of-consensus ideas for 2022 that we believe have at least a 30% chance of occurring. The concept was unashamedly borrowed from erstwhile colleague Byron Wien, who recently published his 10 surprises for 2022.

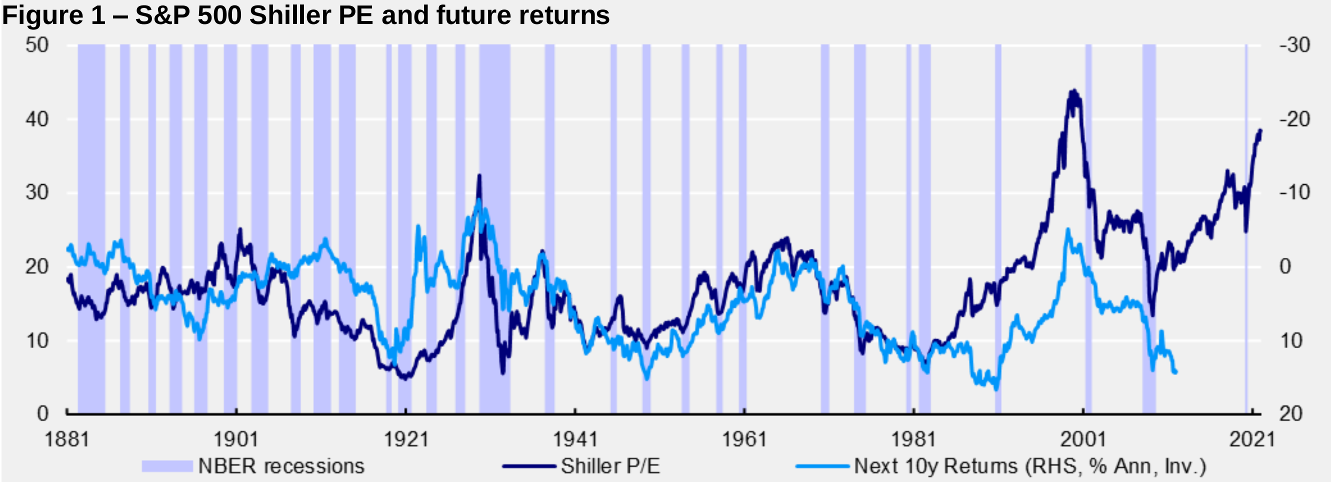
We believe the biggest returns are earned (or the biggest losses avoided) by successfully taking out-of-consensus positions. A year ago, the mood was hopeful on the back of vaccine optimism. Hence, our improbable but possible ideas were biased to the negative side (“S&P 500 finishes the year lower than it started”; “US 10-year treasury yield goes above 2.0%”; “Bitcoin falls below $10,000” were examples of ideas that didn’t work but that we have adapted for this year’s list). The mood is now mixed (given the Fed’s more hawkish stance) and so is our list – don’t look for internal consistency, as there is none.

1. S&P 500 closes the year lower than it started
In the last three years, the S&P 500 has generated total returns of 26.4%, 18.4% and 28.3%. There have been only nine occasions since 1915 when real total returns have exceeded 15% for three years in a row. However, they were grouped into four separate episodes, with three successive years going on to become four or even five years in three of those four episodes (1926-1928, 1951-52 and 1997-98). That may give hope for 2022 but with a Shiller PE above 38, the market has rarely been so expensive and history suggests that S&P 500 returns over the coming 10 years will be limited (see **Figure 1**). On top of which, the Fed appears more hawkish than for some time (with three rate hikes a possibility this year, along with balance sheet shrinkage), which may bring short-term volatility.

2. US 10-year treasury yield goes above 2.50%
With the 10-year yield currently around 1.76% (as of 7 January 2022), it is easy to see it reaching 2.00% but 2.50% seems more ambitious (our year-end forecast is 2.20%). In fact, it seems so unlikely that we think it worth considering, especially given the possible fallout. What could produce this outcome? We suspect a combination of strong economic growth (the great reopening), persistent inflation, rate hikes and balance sheet shrinkage could do the trick. We expect the inflation-adjusted 10-year yield to move towards zero (it was -0.77% on 7 January). We believe this could temporarily disrupt financial markets.

3. Travel & leisure outperforms on great reopening
If any sector has been penalised by the pandemic it is travel & leisure. **Figure 5** shows that the sector has underperformed the Datastream World Index by an annualised 10.4% over the last three years. Only Energy has done worse (-14.0%), while the top performing sector was technology (+17.1%). If there is a silver lining to Omicron it is the apparent weakening of the virus (in terms of symptoms). This may have brought us closer to being able to live with the virus, thus enabling a return to “normality”. We suspect travel & leisure would benefit enormously from that.

Figure 1 – S&P 500 Shiller PE and future returns



Monthly data from January 1881 to December 2021 (as of 31 December 2021). NBER recessions are periods of US economic recession as defined by the US National Bureau of Economic Research. **Past performance is no guarantee of future results.** See appendices for definitions and disclaimers.
Source: Federal Reserve Bank of St. Louis, NBER, Robert Shiller and Invesco

4. The US Senate remains Democrat

It seems almost a no-brainer to suggest that the US Congress will be Republican after the mid-term elections on 8 November 2022. President Biden is the least popular post-WW2 president (except Donald Trump) at this stage of the presidency and that is usually a good barometer of the swing away from the party of the incumbent president (see analyses done by FiveThirtyEight, for example, which shows that his net approval rating has slipped from +17 upon entering the White House to -8.4 now). The Republican Party also has a slight lead in generic ballot polls (asking which party an individual intends to vote for). However, the Senate elections are hard to predict with only 34 of the 100 seats up for grabs (20 of which are currently Republican and 14 Democrat, with five of the Republicans retiring versus only one Democrat). The eight seats that are not considered relatively safe for the incumbent party (Arizona and Georgia, for example), are currently split equally between the two parties. With the Republicans only needing a single net gain to take control, the odds may be stacked in their favour. But with all the uncertainties, we suspect a surprise is possible. A Republican House and Democrat Senate would still make life difficult for President Biden but not as much as if the Republican's made a clean sweep (it could also carry a message for the Trump presidential campaign).

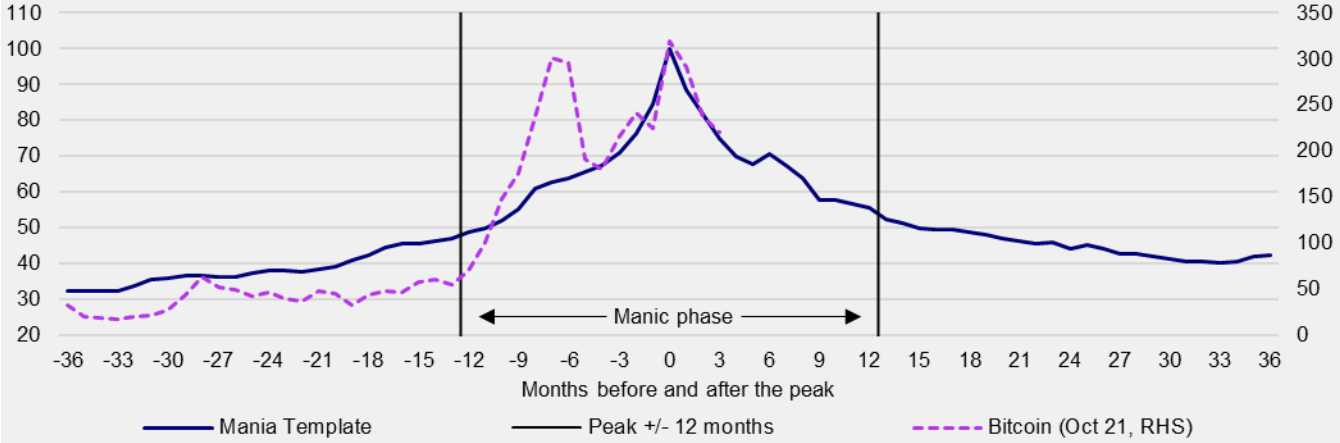
5. Australia changes government and emissions policies

Prime-Minister Scott Morrison's Conservative government has now set a net-zero target of 2050 but our analysis suggests that, on recent trends, net-zero CO_2 emissions will not be achieved until 2080 (see Economic Transition Monitor). Indeed, Australia has faced a lot of criticism from the rest of the world for its refusal to fully engage with the climate change issue. As a large producer of coal it has a vested interest in delaying mitigation actions (The BP Statistical Review of World Energy suggests that in 2020 Australia accounted for 14% of the world's coal reserves and 6% of its production). However, opinion polls suggest there will be a change to a Labor government at the next election (to be held on or before 21 May 2022). The Labor Party of Anthony Albanese has committed to a 43% cut in emissions by 2030 (compared to 2005 levels) versus the 26%-28% cut committed to by the government of Tony Abbott in 2015 and the 35% forecast (but not commitment) of the current government. A change of approach and attitude could bring Australia back into the developed world mainstream on this issue, though it will be interesting to see how it impacts the export of coal to China (and indeed overall relations with China).

6. Bitcoin falls below $30,000 during 2022

Last year we spoke of Bitcoin falling below $10,000 but instead it reached a peak of around $68,000. The mass marketing of Bitcoin reminds us of the activity of stockbrokers in the run up to the 1929 crash (as brilliantly described in John Kenneth Galbraith's The Great Crash, 1929). We know how that ended and Bitcoin has already fallen to around $42,000 (as of 7 January 2022), following closely the downward path of our mania template (see **Figure 2**). That template suggests a loss of 45% is experienced in the 12 months after the peak of a typical financial mania. If that pattern is followed (assuming we have seen the peak), the price of Bitcoin would fall to $34,000-$37,000 by the end of October, depending upon whether we use daily or monthly data to define the peak (the latter is used in **Figure 2**). The template also suggests that bubbles typically deflate for a further two years. Hence, we think it is not too much of a stretch to imagine Bitcoin falling below $30,000 this year (with the health warning that we have got this wrong before and that it seems to be going through a series of bubbles).

Figure 2 – Bursting of the Bitcoin bubble?



Note: based on monthly data. See appendix for construction methodology of "Mania template". "Bitcoin" is constructed using the hypothesis that the 31 October 2021 level was the peak (month zero) and the final datapoint is for January 2022 (as of 7 January 2022). **Past performance is not a guide to future returns**. Source: Refinitiv Datastream and Invesco.

7. Turkey government debt outperforms

As we noted in the recent [2021 in review](), Turkey's currency and financial market performance has been hampered by misguided policy decisions. The country appears to be caught in an inflation/currency depreciation spiral (the lira declined by 44% versus the USD in 2022 and CPI inflation reached 36% in December). This could make it un-investible but there is a price for everything and sometimes the best opportunities appear in the darkest of moments. The yield on 10-year USD denominated Turkish Government bonds is currently 8.0% (as of 7 January), while the 5-year yield is 7.8% (compared to 1.5% for the US, 3.3% for Brazil and 2.8% for Russia). That is quite a cushion, unless of course Turkey defaults. Even better, the yield on local currency 10-year government debt is 23.0%, compared to 1.8% in the US, which gives a nice cushion versus future currency depreciation, in our opinion, especially since the currency has recently weakened so much.

8. Brazilian stocks to outperform major indices

In our search for exotic stock market opportunities, we usually look for the holy grail of a dividend yield that exceeds the price/earnings ratio. Examples are rare, but can currently be found in Kenya, Laos, Pakistan and Russia. Another example is Brazil, where after a 12% index decline in 2021, the current IBOVESPA price/earnings ratio is 6.6 and the dividend yield is 8.5% (though changing to 7.6 and 7.4%, respectively, based on consensus 2022 forecasts, according to Bloomberg). Having been in the bottom three equity markets for each of the last two years, we suspect 2022 could be the year of rebound, despite (and perhaps because of) the possible election of a left-wing president (opinion polls have Lula well in front).

9. EU carbon goes above €100 per tonne

In the 2020 list we suggested EU carbon would finally break above €30 (it did, even in a recession year) and last year we suggested it would go above €50 (it is now around €85). Climate change is the ultimate externality and we think internalising the problem via pricing mechanisms has a big role to play in limiting its extent (see [21st Century Portfolio]()). The EU carbon allowance scheme is one such solution, where the right to emit carbon can be bought and sold, thus leaving it to the market to figure out the most efficient way to reduce emissions (the number of allowances is reduced over time). The Stern Review (2006) calculated the social cost of carbon to be $85 per tonne (around €96 per tonne at today's exchange rate). We suspect that cost will have increased since then. With the world now focused on mitigating climate change, and the global economy perhaps accelerating later in the year if the great reopening occurs, we believe there is a good chance that EU carbon may exceed €100/t at some stage during 2022. And, yes, we feel uneasy about including this idea for a third straight year.

10. Argentina wins FIFA World Cup 2022

This year's World Cup is being played in December (to avoid the worst of the Qatari summer). Bookmakers seem to favour five-times champions Brazil and reigning champions France (see oddschecker.com). However, we don't even know the groups (as play-offs in March will decide the remaining participants), so it is impossible the chart the path to the final. Nevertheless, armed with an incomplete information set, we suspect that Argentina and England have as good a chance as any and we are going with the former, to avoid accusations of home bias.

As a gift for the new year, we offer **Figures 4, 5** and **6** which show long term performance data across assets, sectors and factors.

Unless stated otherwise, all data as of 31 December 2021

Figure 3 – The price of carbon in the European Union (€ per tonne)

Notes: daily data from 22 April 2005 to 7 January 2022. Based on the ICE ECX EUA Daily Futures Contract, which shows the price of buying EU allowances (EUA) on the European Climate Exchange (ECX). One unit gives the right to emit one tonne of carbon. **Past performance is no guarantee of future results.** Source: Refinitiv Datastream and Invesco.

Figure 4 – Asset class total returns (% annualised)

Data as at 31/12/2021	Index	Current Level/RY	Total Return (USD, %) 1y	3y	5y	10y	Total Return (Local Currency, %) 1y	3y	5y	10y
Equities										
World	MSCI	744	19.0	21.0	15.0	12.4	21.4	20.9	14.6	13.6
Emerging Markets	MSCI	1248	-2.2	11.3	10.3	5.9	0.1	12.3	10.9	8.4
China	MSCI	88	-21.6	7.9	9.5	7.4	-21.6	7.4	9.4	7.3
US	MSCI	4507	27.0	26.6	18.8	16.6	27.0	26.6	18.8	16.6
Europe	MSCI	2032	17.0	15.6	10.8	8.8	23.3	14.7	9.1	10.2
Europe ex-UK	MSCI	2564	16.5	17.9	12.4	10.3	24.4	17.5	10.7	11.6
UK	MSCI	1136	18.5	8.7	6.2	5.1	19.6	6.5	4.3	6.6
Japan	MSCI	3900	2.0	12.1	8.9	8.7	13.8	13.9	8.6	13.1
Government Bonds										
World	BofA-ML	0.62	-6.9	2.4	2.7	1.0	-2.3	2.6	2.0	2.6
Emerging Markets (USD)	BBloom	4.78	-3.0	7.1	5.6	7.1	-3.0	7.1	5.6	7.1
China	BofA-ML	2.82	8.6	7.2	5.7	3.9	5.9	4.5	3.9	4.1
US (10y)	Datastream	1.47	-2.4	6.4	4.2	2.9	-2.4	6.4	4.2	2.9
Europe	Bofa-ML	-0.01	-10.2	2.9	3.5	2.4	-3.4	3.1	1.9	3.8
Europe ex-UK (EMU, 10y)	Datastream	-0.35	-10.1	1.7	3.2	2.1	-3.3	1.8	1.7	3.4
UK (10y)	Datastream	0.76	-6.6	4.0	4.0	1.8	-5.7	1.9	2.1	3.2
Japan (10y)	Datastream	0.05	-10.3	-1.4	0.6	-2.3	0.0	0.2	0.4	1.7
IG Corporate Bonds										
Global	BofA-ML	1.90	-3.0	6.1	4.7	3.8	-1.0	6.0	4.2	4.5
Emerging Markets (USD)	BBloom	5.27	-4.3	9.3	7.5	9.4	-4.3	9.3	7.5	9.4
China	BofA-ML	3.63	7.8	7.0	5.4	4.2	5.1	4.4	3.6	4.4
US	BofA-ML	2.40	-1.0	7.5	5.3	4.8	-1.0	7.5	5.3	4.8
Europe	BofA-ML	0.51	-8.0	2.4	3.3	2.3	-1.0	2.6	1.8	3.6
UK	BofA-ML	1.88	-3.9	7.5	5.7	4.5	-3.0	5.3	3.7	5.9
Japan	BofA-ML	0.35	-9.7	-1.1	0.8	-3.1	0.7	0.5	0.5	0.9
HY Corporate Bonds										
Global	BofA-ML	5.23	1.4	7.6	5.8	6.5	2.9	7.6	5.5	6.8
US	BofA-ML	4.97	5.4	8.6	6.1	6.7	5.4	8.6	6.1	6.7
Europe	BofA-ML	3.24	-3.9	5.5	5.6	5.6	3.3	5.7	4.0	7.0
Cash (Overnight LIBOR)										
US		0.07	0.1	0.9	1.1	0.6	0.1	0.9	1.1	0.6
Euro Area		-0.58	-7.5	-0.8	1.1	-1.6	-0.6	-0.6	-0.5	-0.3
UK		0.04	-1.0	2.3	2.2	-1.0	0.0	0.3	0.3	0.4
Japan		-0.08	-10.4	-1.7	0.2	-4.0	-0.1	-0.1	-0.1	0.0
Real Estate (REITs)										
Global	FTSE	2057	23.0	11.4	8.5	9.1	32.4	11.6	6.8	10.5
Emerging Markets	FTSE	1685	-13.4	-2.7	4.4	4.4	-6.8	-2.6	2.9	5.8
US	FTSE	3716	42.8	17.1	9.9	10.9	42.8	17.1	9.9	10.9
Europe ex-UK	FTSE	3741	3.7	9.8	9.5	10.0	11.5	9.9	7.8	11.5
UK	FTSE	1287	27.7	14.6	8.7	9.2	28.9	12.3	6.8	10.7
Japan	FTSE	2673	2.7	4.2	3.5	7.0	14.5	5.9	3.2	11.4
Commodities										
All	GSCI	2775	40.4	8.0	2.8	-5.5	-	-	-	-
Energy	GSCI	429	60.7	3.8	-0.3	-8.9	-	-	-	-
Industrial Metals	GSCI	1814	29.6	15.2	10.1	1.6	-	-	-	-
Precious Metals	GSCI	2086	-5.1	11.1	8.2	0.2	-	-	-	-
Agricultural Goods	GSCI	499	24.7	12.6	3.0	-3.3	-	-	-	-
Currencies (vs USD)**										
EUR		1.14	-6.9	-0.3	1.6	-1.3	-	-	-	-
JPY		115.09	-10.3	-1.6	0.3	-3.9	-	-	-	-
GBP		1.35	-0.9	2.1	1.9	-1.4	-	-	-	-
CHF		1.10	-3.0	2.5	2.2	0.3	-	-	-	-
CNY		6.36	2.7	2.7	1.8	-0.1	-	-	-	-

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: Refinitiv Datastream and Invesco

Figure 5 – Global equity sector total returns relative to market (% annualised)

Data as at 31/12/2021	Global			
	1y	3y	5y	10y
Energy	**3.9**	**-14.0**	**-11.3**	**-9.9**
Basic Materials	**-1.9**	**-0.2**	**-0.8**	**-3.4**
Basic Resources	-2.2	1.5	-0.3	-6.1
Chemicals	-1.2	-2.2	-1.8	-1.4
Industrials	**-1.1**	**0.3**	**-0.2**	**0.6**
Construction & Materials	3.7	-0.1	-2.1	-1.5
Industrial Goods & Services	-1.7	0.4	0.1	0.9
Consumer Discretionary	**-6.8**	**0.7**	**0.4**	**1.1**
Automobiles & Parts	9.1	10.7	3.6	2.3
Media	-11.2	-1.0	-2.2	1.3
Retailers	-11.8	0.9	1.9	1.6
Travel & Leisure	-13.6	-10.4	-6.0	-2.3
Consumer Products & Services	-4.8	2.7	1.6	1.3
Consumer Staples	**-7.8**	**-6.5**	**-4.9**	**-2.3**
Food, Beverage & Tobacco	-6.1	-6.5	-5.2	-3.0
Personal Care, Drug & Grocery Stores	-10.7	-6.8	-4.0	-1.8
Healthcare	**-2.8**	**-0.5**	**1.8**	**2.9**
Financials	**5.7**	**-4.2**	**-2.8**	**-0.9**
Banks	6.0	-7.9	-5.7	-3.2
Financial Services	9.2	3.2	2.8	3.3
Insurance	-0.5	-5.7	-3.6	0.3
Real Estate	**0.4**	**-6.1**	**-3.6**	**-1.9**
Technology	**8.6**	**17.1**	**13.8**	**9.1**
Telecommunications	**-8.6**	**-7.2**	**-6.8**	**-4.7**
Utilities	**-5.7**	**-5.3**	**-2.5**	**-3.5**

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 6a – US factor index total returns (% annualised)

Data as at 31/12/2021	Absolute				Relative to Market			
	1y	3y	5y	10y	1y	3y	5y	10y
Growth	36.9	34.6	23.2	18.4	6.4	6.7	4.0	1.6
Low volatility	23.3	21.6	17.4	16.4	-4.2	-3.5	-0.9	-0.2
Price momentum	22.0	21.8	15.4	15.9	-5.2	-3.4	-2.6	-0.6
Quality	33.1	23.7	17.0	16.4	3.4	-1.9	-1.3	-0.1
Size	32.2	20.1	12.1	14.8	2.7	-4.7	-5.4	-1.5
Value	39.5	22.6	12.1	15.8	8.4	-2.8	-5.4	-0.6
Market	28.7	26.1	18.5	16.6				
Market - Equal-Weighted	29.6	23.6	15.7	15.6				

Notes: 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. **Past performance is no guarantee of future results.**
Source: Refinitiv Datastream and Invesco

Figure 6b – European factor index total returns relative to market (% annualised)

Data as at 31/12/2021	Absolute				Relative to Market			
	1y	3y	5y	10y	1y	3y	5y	10y
Growth	36.0	33.2	19.9	17.2	8.4	14.4	9.5	5.9
Low volatility	22.3	16.1	12.2	14.4	-2.5	-0.3	2.5	3.3
Price momentum	17.4	21.4	13.7	16.4	-6.5	4.3	3.9	5.1
Quality	25.3	21.6	12.3	14.6	-0.2	4.5	2.6	3.5
Size	21.9	21.2	12.2	13.4	-2.9	4.1	2.4	2.4
Value	35.0	14.7	8.4	12.0	7.5	-1.5	-1.1	1.2
Market	25.5	16.4	9.5	10.7				
Market - Equal-Weighted	22.3	17.2	10.4	12.3				

Notes: 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. **Past performance is no guarantee of future results.**
Source: Refinitiv Datastream and Invesco

Figure 7 – Model asset allocation

	Neutral	Policy Range		Allocation	Position vs Neutral
Cash Equivalents	**5%**	**0-10%**		**10%**	
Cash	2.5%			10%	
Gold	2.5%			0%	
Bonds	**40%**	**10-70%**	↑	**29%**	
Government	25%	10-40%	↓	**10%**	
US	8%		↓	2%	
Europe ex-UK (Eurozone)	7%		↓	2%	
UK	1%		↓	0%	
Japan	7%		↓	3%	
Emerging Markets	2%			3%	
China**	0.2%			0%	
Corporate IG	10%	0-20%	↑	**9%**	
US Dollar	5%		↑	2%	
Euro	2%		↑	2%	
Sterling	1%		↑	1%	
Japanese Yen	1%		↑	2%	
Emerging Markets	1%		↑	2%	
China**	0.1%			0%	
Corporate HY	5%	0-10%	↑	**10%**	
US Dollar	4%		↑	8%	
Euro	1%		↑	2%	
Equities	**45%**	**25-65%**	↓	**45%**	
US	25%		↓	12%	
Europe ex-UK	7%		↓	10%	
UK	4%			8%	
Japan	4%		↓	5%	
Emerging Markets	5%			10%	
China**	2%			2%	
Real Estate	**8%**	**0-16%**		**16%**	
US	2%		↓	2%	
Europe ex-UK	2%		↑	4%	
UK	1%			3%	
Japan	2%		↓	3%	
Emerging Markets	1%		↑	4%	
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	48%		↓	31%	
EUR	20%		↑	22%	
GBP	7%			13%	
JPY	15%		↓	14%	
EM	9%		↑	19%	
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 8 – Model allocations for Global sectors

	Neutral	Invesco		Preferred Region
Energy	**6.3%**	**Neutral**	↑	**US**
Basic Materials	**4.3%**	**Overweight**	↑	**Europe**
Basic Resources	2.3%	Overweight	↑	Europe
Chemicals	1.9%	Neutral		US
Industrials	**12.9%**	**Overweight**	↑	**US**
Construction & Materials	1.6%	Neutral		EM
Industrial Goods & Services	11.3%	Overweight	↑	US
Consumer Discretionary	**15.6%**	**Neutral**	↑	**US**
Automobiles & Parts	2.8%	Underweight		Japan
Media	1.3%	Underweight	↓	Europe
Retailers	5.6%	Overweight	↑	US
Travel & Leisure	2.1%	Neutral	↑	US
Consumer Products & Services	3.9%	Overweight		Japan
Consumer Staples	**6.0%**	**Neutral**	↓	**Europe**
Food, Beverage & Tobacco	3.9%	Neutral	↓	US
Personal Care, Drug & Grocery Stores	2.1%	Neutral		Europe
Healthcare	**10.0%**	**Neutral**	↓	**US**
Financials	**14.9%**	**Underweight**		**Japan**
Banks	7.5%	Underweight		Japan
Financial Services	4.8%	Overweight	↑	Japan
Insurance	2.6%	Underweight		US
Real Estate	**3.4%**	**Overweight**		**Japan**
Technology	**19.8%**	**Overweight**		**US**
Telecommunications	**3.8%**	**Underweight**	↓	**Japan**
Utilities	**3.0%**	**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

Methodology for asset allocation, expected returns and optimal portfolios

Portfolio construction process

The optimal portfolios are theoretical and not real. We use optimisation processes to guide our allocations around "neutral" and within prescribed policy ranges based on our estimations of expected returns and using historical covariance information. This guides the allocation to global asset groups (equities, government bonds etc.), which is the most important level of decision. For the purposes of this document the optimal portfolios are constructed with a one-year horizon.

Which asset classes?

We look for investibility, size and liquidity. We have chosen to include equities, bonds (government, corporate investment grade and corporate high-yield), REITs to represent real estate, commodities and cash (all across a range of geographies). We use cross-asset correlations to determine which decisions are the most important.

Neutral allocations and policy ranges

We use market capitalisation in USD for major benchmark indices to calculate neutral allocations. For commodities, we use industry estimates for total ETP market cap + assets under management in hedge funds + direct investments. We use an arbitrary 5% for the combination of cash and gold. We impose diversification by using policy ranges for each asset category (the range is usually symmetric around neutral).

Expected/projected returns

The process for estimating expected returns is based upon yield (except commodities, of course). After analysing how yields vary with the economic cycle, and where they are situated within historical ranges, we forecast the direction and amplitude of moves over the next year. Cash returns are calculated assuming a straight-line move in short term rates towards our targets (with, of course, no capital gain or loss). Bond returns assume a straight-line progression in yields, with capital gains/losses predicated upon constant maturity (effectively supposing constant turnover to achieve that). Forecasts of corporate investment-grade and high-yield spreads are based upon our view of the economic cycle (as are forecasts of credit losses). Coupon payments are added to give total returns. Equity and REIT returns are based on dividend growth assumptions. We calculate total returns by applying those growth assumptions and adding the forecast dividend yield. No such metrics exist for commodities; therefore, we base our projections on US CPI-adjusted real prices relative to their long-term averages and views on the economic cycle. All expected returns are first calculated in local currency and then, where necessary, converted into other currency bases using our exchange rate forecasts.

Optimising the portfolio

Using a covariance matrix based on monthly local currency total returns for the last 5 years and we run an optimisation process that maximises the Sharpe Ratio. Another version maximises Return subject to volatility not exceeding that of our Neutral Portfolio. The optimiser is based on the Markowitz model.

Currency hedging

We adopt a cautious approach when it comes to currency hedging as currency movements are notoriously difficult to accurately predict and sometimes hedging can be costly. Also, some of our asset allocation choices are based on currency forecasts. We use an amalgam of central bank rate forecasts, policy expectations and real exchange rates relative to their historical averages to predict the direction and amplitude of currency moves.

Definitions of data and benchmarks for Figure 4

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). 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 Barclays Bloomberg emerging markets sovereign US dollar bond index.

Corporate investment grade (IG) bonds: Bank of America Merrill Lynch investment grade corporate bond total return indices, except for in emerging markets where we use the Barclays Bloomberg emerging markets corporate US dollar 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

Methodology, data and benchmarks for Mania Template

The Mania Template is based on monthly data during 15 historical manias, sourced from Refinitiv Datastream unless stated otherwise. For each mania, the relevant asset price is indexed to 100 at the peak (month zero) and is shown over the three years before and after that point. The template shows the average of the 15 manias at each point in time. The 15 manias are (with peak month and source):

1) UK equities during the South Sea Bubble -- an index that is an unweighted average of the prices of Bank of England, East India Company and South Sea Company (Jun 1720, Global Financial Data)

2) UK equities -- an index of UK stocks (including industrials but excluding banks, insurance and bridge stocks) calculated by Hayek as provided by Rostow and Schwartz in The Growth and Fluctuation of the British Economy (Jul 1864, GFD)

3) US oil -- West Texas Intermediate oil price (US$/barrel), from The Derrick's Handbook of Petroleum (Sep 1876, GFD)

4) US oil -- West Texas Intermediate oil price (US$/barrel), from The Derrick's Handbook of Petroleum (Dec 1895, GFD)

5) US equities -- S&P Composite Index (Sep 1929, Robert Shiller)

6) US bank stocks -- S&P 500 Diversified Banks calculated by Standard & Poor's based on historical price data (Sep 1929, GFD)

7) US wheat -- US Wheat #2 Cash Price (US$/bushel) from The Chicago Board of Trade (Jan 1974, GFD)

8) Gold -- bullion price on the London Bullion Market (US$/ounce) provided by ICE Benchmark Administration Ltd. (Sep 1980, Refinitiv Datastream)

9) Nikkei index (Dec 1989, Refinitiv Datastream)

10) Greek bank stocks -- Datastream Banks Index for Greece (Sep 1999, Refinitiv Datastream)

11) NASDAQ Composite (Feb 2000, Refinitiv Datastream)

12) Miami house prices (Feb 2007, FHFA index from Refinitiv Datastream)

13) China A-shares -- China A-DS Market Index calculated by Datastream (Oct 2007, Refinitiv Datastream)

14) US oil -- West Texas Intermediate oil price (US$/barrel), 40-degree API, f.o.b. Cushing Oklahoma (Jun 2008, GFD)

15) Bitcoin -- USD to Bitcoin on the Bitstamp exchange, from Thomson Reuters (Nov 2013, data to Jul 2011 from Bloomberg and thereafter Refinitiv Datastream)

"Bitcoin" and "FANG Plus" are indexed to start at the same level as the "Mania Template" (i.e. in month -36) and are sourced from Refinitiv Datastream.

Methodology, data and sources for long-term US equity index and Shiller PE

We have calculated a total return index for broad US stocks based on index and dividend data from US academic Robert Shiller and Datastream. The index prior to 1926 is Robert Shiller's recalculation of data from Common Stock Indexes by Cowles & Associates (see here). From 1926 to 1957, the Shiller data is based on the S&P Composite Index and thereafter is based on the S&P 500 as we know it today.

The Shiller PE is a price to earnings ratio constructed by dividing price by the average earnings per share 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).

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