Uncommon truths

The economic and market consequences of war

We put some numbers on the effect of Russia's invasion of Ukraine. We guess it could reduce global GDP by 0.5%-1.0% (while boosting inflation) but policy support may dampen that effect.

What a tragedy for the people of Ukraine. They must feel alone in the fight against a big, bullying invader. Even worse, global financial markets which entered a temporary frenzy on news of the invasion, seemed to draw succour on Friday from the initial rapid advance of Russian forces (presumably in the belief that the conflict would be short-lived), and the limited nature of sanctions imposed by the West. However, matters have become more complicated over the weekend with news of the stubborn resistance from Ukrainian forces and more meaningful sanctions (particularly the greater likelihood of Russia being partially excluded from the SWIFT payments system).

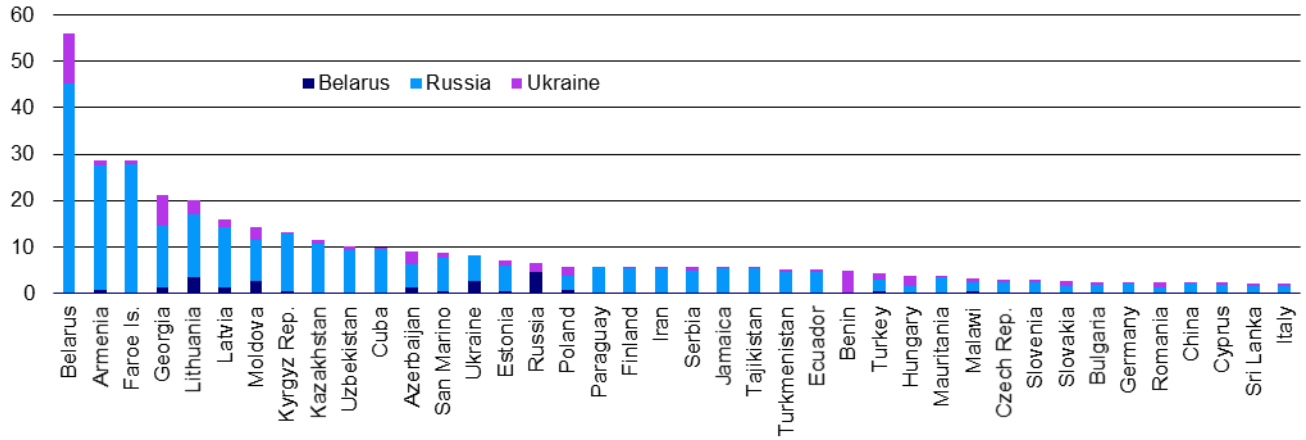
So, has the investment landscape been changed by the events of the last week? The first thing to acknowledge is that it may be far from over, either as a battle between Russia and Ukraine or, much worse, if Russia casts its eyes on other neighbouring countries. A look at a map of the region shows the precarious position of countries such as Moldova, Romania, Hungary, Slovakia and Poland, all of which share a border with Ukraine. Then of course, there are the former Soviet Baltic states to the North, along with Finland. This could get much worse, though it is interesting to note that even Europe's populist leaders have condemned Russia and that China didn't back Russia in the UN Security Council vote (along with India and the UAE, it abstained).

We analyse four potential ways in which the invasion of Ukraine could impact the global economy and financial markets: first, reduced exports to Russia, Ukraine and Belarus; second, a reduced flow of imports from Russia, in particular energy; third, higher energy prices and inflation; fourth, the potential impact on fiscal and monetary policies. We include Belarus since it has allowed Russia to launch part of the invasion from its territory and we assume it will be sanctioned in the same way as Russia.

Exports to these three economies are likely to be disrupted for a number of reasons: first, because of the damage inflicted on Ukraine, which may limit its ability to import goods & services (though other countries are trying to send armaments, food, medicines etc. in the form of aid) and, second, because sanctions are being imposed on Russia and Belarus that will either ban the sale of goods & services to them or make it difficult for them to be financed.

These are not large economies: Russia, Ukraine and Belarus accounted for 1.8%, 0.2% and 0.1%, respectively, of global GDP in 2020, according to World Bank data. So, they collectively accounted for 2.1% of global GDP in 2020, suggesting that a 10% recession across the three would directly reduce global GDP by around 0.2%. Further, exports to them added up to around 0.5% of the GDP of the rest of the world in 2020. Hence, if exports to the three of them fell to zero, the first round effect could be a loss of 0.5% of GDP for the rest of the world, with more coming through multiplier effects. However, that is overly pessimistic, if only because countries such as China will continue exporting to Russia (and may fill the vacuum left by other countries). Also, NATO countries are likely to try sending goods and services to Ukraine (financed by their own governments). That financing by NATO governments is one way in which fiscal policy could cushion the effect on economies. Central banks could also help (of which more later).

Figure 1 – Share of national exports that went to Belarus, Russia and Ukraine in 2020 (%)



Notes: the chart shows the share of each country's exports in 2020 that were destined for Russia, Ukraine or Belarus.
Source: IMF Direction of Trade Statistics and Invesco

However, the pain would not be spread equally, as indicated by **Figure 1**. Not surprisingly, neighbouring countries are particularly exposed to Russia, Belarus and Ukraine (and the three of them are relatively exposed to each other). Among Western European countries, it is the Baltic States and Finland that are most exposed, with Russia, Ukraine and Belarus receiving 15%-20% of the exports of Latvia and Lithuania. A disruption to those trading relationships could have severe economic consequences, especially since the Baltic nations also do a lot of trade among themselves, suggesting large second-round effects. Among the larger European economies, Germany is the most exposed with around 2.5% of exports going to those three countries.

Of course, trade goes in both directions and Russia exports a lot of energy. For example, OEC data suggests energy accounted for around 60% of Russia's goods exports in 2019, including crude petroleum (30.3% of total exports), refined petroleum (16.3%), gas (6.5%), coal (4.3%), coal tar oil (1.1%), electricity (0.2%) and coke (0.2%). Indeed, Russia is an important source of hydrocarbons and accounted for 12.1% of global oil production in 2020 (just behind Saudi Arabia's 12.5% but well below the US at 18.6%, according to the BP Statistical Review of World Energy July 2021). Russia accounted for an even bigger share of natural gas production (16.6% in 2020), which put it second only to the US (23.7%). Middle East producers of natural gas are a long way behind, with Iran (6.5%) and Qatar (4.4%) leading the way in 2020.

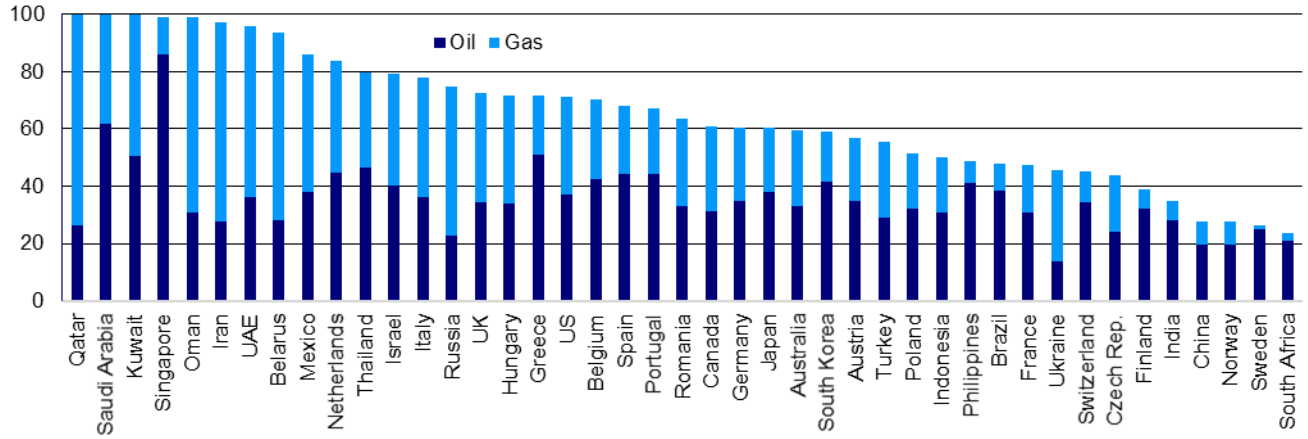
This is where Europe's vulnerability becomes apparent. Russia supplied 29% of Europe's crude oil imports in 2020 and 39% of its imports of petroleum products (Europe's production is around one-quarter of its consumption but that exaggerates its self-sufficiency as it needs to mix grades).

Europe produces around 40% of its own natural gas (as of 2020), with the bulk coming from Norway, the UK, the Netherlands and…Ukraine (the latter accounting for 9% of Europe's production and this is presumably lost, at least for the foreseeable future). Unfortunately, Russia supplied around 80% of Europe's pipeline imports in 2020, though only 15% of its LNG (liquified natural gas) imports (Europe receives more LNG from Qatar and the US, with Algeria and Nigeria also being large suppliers). Total imports of gas from Russia added up to 34% of Europe's consumption in 2020. Of large European countries, Germany is the most dependent on Russian gas, with pipeline imports from Russia being 65% of its 2020 consumption. Also notable were Turkey (34%), the Netherlands (31%) and Italy (29%).

To put those numbers into perspective, it is worth bearing in mind that in 2020 natural gas accounted for 25% of Europe's energy usage, with Italy (42%), the Netherlands (39%) and the UK (39%) the most exposed (in Germany the ratio was 26% and in France 17%). Adding oil to the analysis shows that 59% of Europe's energy came from oil and natural gas in 2020, with the Netherlands (84%), Italy (80%) and the UK (72%) once again the most exposed. If Russian supplies were cut off, it is hard to see how the European economy could function in the short term, though we presume that Russia would supply other countries such as China and that those currently supplying China could eventually redirect to Europe.

Figure 2 shows the dependency of major global economies on oil and gas. Apart from energy rich countries, non-European countries that feature among the most dependent are Thailand, Israel and the US, suggesting they are among the most vulnerable to supply and/or price disruptions.

Figure 2 – Share of primary energy consumption fuelled by oil and gas in 2020 (%)



Source: BP Statistical Review of World Energy July 2021 and Invesco

Even without trade effects or energy supplies being turned off, the invasion of Ukraine can have an important economic effect via inflation. Energy prices have already risen, with Brent temporarily touching $105/barrel at one point last week and European natural gas prices doubling at one stage. To give an idea of the orders of magnitude involved, and using 2020 GDP and oil consumption data, we reckon that a $10 increase in the price of a barrel adds around $325bn to the world's oil bill, which is around 0.4% of global GDP. The dramatic swings in the price of gas have no doubt imposed an even greater increase in the cost to the world (our estimates suggest that from current prices, a 10% increment to the price of gas will boost global energy bills by around 0.4% of GDP).

Of course, those estimates are an exaggeration: first, when prices rise, we will use less energy and, second, those price rises represent a transfer from one group (energy consumers) to another (energy producers), rather than a loss to the global economy as a whole. Regarding the latter point, the impact on the global economy depends upon the respective marginal propensities to consume among energy consumers and producers. We guess that consumers will cut back spending by more than producers will increase it but there will nevertheless be some netting-out that will reduce the overall global effect.

Nevertheless, energy prices have been an important factor behind the rise in inflation. Though energy has a weighting of only 7% within the US consumer price index (it was closer to 10% during the last oil price bubble) it also has an indirect effect since it is an important cost component of many other goods and services. **Figure 3a** suggests there is a correlation between changes in the price of US oil and changes in the consumer price index (though it is clear that other factors are also now at play, such as supply chain disruptions).

Without an offsetting rise in wages this could squeeze household spending power and could dampen spending. Indeed **Figure 3b** shows that real personal disposable income is now lower than a year ago (it fell for the sixth month in a row in January). Spending has not yet suffered to the same extent because households are saving less (the savings rate fell from 10.5% in July 2021 to 6.4% in January 2022). However, if inflation continues at the current rate, it is possible that expenditure volumes will decline. Indeed, retail sales volumes (a subset of personal spending) have been trending down in recent months.

Luckily, the inflationary impact of each successive $10 rise in the price of oil is less than the one before (in terms of percentage impact). Nor is it necessary for oil and other energy prices to fall for the rate of inflation to decline: if they remain at current levels, the rate of headline CPI inflation would fall back towards that of the core-CPI index. Nevertheless, the recent uptick in energy prices as a result of the invasion of Ukraine is likely to keep inflation higher for longer.

This presents central banks with a dilemma: should they respond to higher inflation by raising rates more aggressively or should they react to the decline in spending power and consumer confidence by holding off on the intended tightening. If the "Powell put" exists, the recent volatility in financial markets may also be reason for caution, especially since it is hard to know all the financial-system ramifications of the sanctions being imposed upon Russia, especially those involving the SWIFT payments system.

Figure 3a – US oil price and inflation

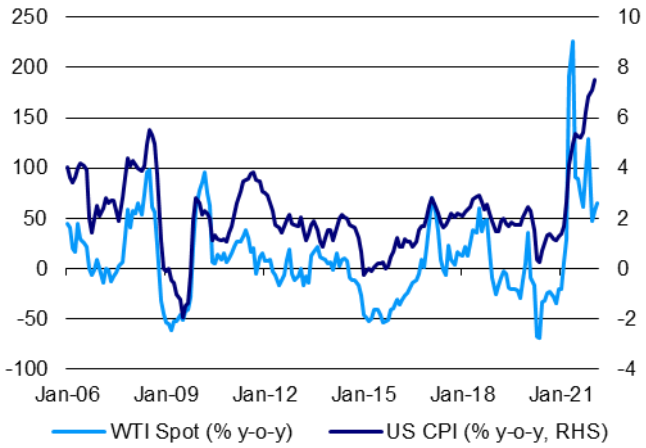
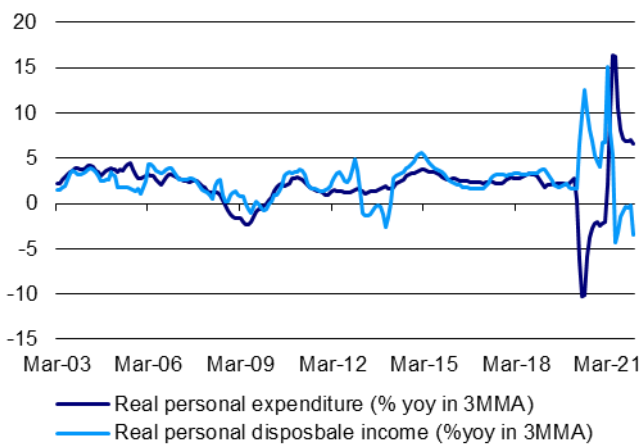


Figure 3b – US personal income and spending



Notes: Figure 3a is based on monthly data from January 2006 to February 2022 (as of 25 February 2022). Figure 3b is based on monthly data from March 2003 to January 2022 and shows the year on year change in the 3-month moving average of each indicator. **Past performance is no guarantee of future results**. Source: Refinitiv Datastream and Invesco

At the very least we suspect a 50bp rate hike is no longer on the table for the 16 March Fed meeting. If markets remain volatile, we expect the FOMC to delay the first rate hike until May. Apart from concerns about financial market instability, the Fed could reason that the recent hike in energy prices is doing its job for it by depressing spending power (assuming the rate hikes were meant to dampen the economy).

This may come as a short-term relief to financial markets but we would prefer that the Fed were in a position to tighten. We note that Fed Funds Futures suggest that market participants are still expecting a rate hike in March, the first of a total of six this calendar year. That seems very aggressive right now, though it is also notable that the US treasury five-year inflation-breakeven last week nudged above 3% for the first time in its history, which may worry the Fed.

Other support to economies is already coming from efforts to supply Ukraine with military, medical and humanitarian aid. A lot of this will come from governments, suggesting a widening of budget deficits in the first instance. This will be supplemented by NATO deployments to member countries that border Russia and Ukraine.

We suspect this boost to defence spending will become permanent. Just today, the German government vowed to take its defence spending above 2% of GDP, in line with pre-existing NATO commitments. World Bank data suggests that its military spending in 2020 was only 1.4% of GDP and that it had been below 2% since 1991, reaching a low of 1.1% in 2005 (Russia's military spending was 4.3% of GDP in 2020, while that of the US was 3.7%). This suggests the potential for a decent boost to the economy, especially if we take the pre-2020 ratio of 1.1%-1.2% as the baseline, though it depends upon how rapidly it is implemented and how it is financed.

Germany is not alone. Italy's military spending (1.6% of GDP in 2020) has been below 2% since 1990 and Ireland (0.3%), Luxembourg (0.8%), Switzerland (0.8%), Austria (0.8%), Belgium (1.1%), Slovenia (1.1%), Sweden (1.2%), Czech Republic (1.4%), Spain (1.4%), Netherlands (1.4%), Denmark (1.4%), Finland (1.5%), Italy (1.6%), Hungary (1.6%), Slovakia (1.8%), Bulgaria (1.8%), Croatia (1.8%) and Norway (1.9%) are among European countries also below the threshold. Of course, not all are in NATO but it should also be remembered that 2020 GDP was severely reduced, so these ratios were as good as they had been for some years. It feels like a boost to military spending is in the offing and that could offset some of the above mentioned negative economic effects.

Hopefully, we never have to experience a conflict between Russia and NATO but **Figure 4a** offers some perspective about how bad things may or may not become for stock markets. This chart summarises the performance of US equities during six major armed conflicts, starting with WW1 and finishing with the Iraq war that started in 2003 (see the footnote for details). The good news is that when averaged across the six episodes, a broad index of US equities lost only 9% before bottoming (that bottom occurring within 12 months, with losses eliminated within 18 months).

Figure 4a – US stocks during major conflicts

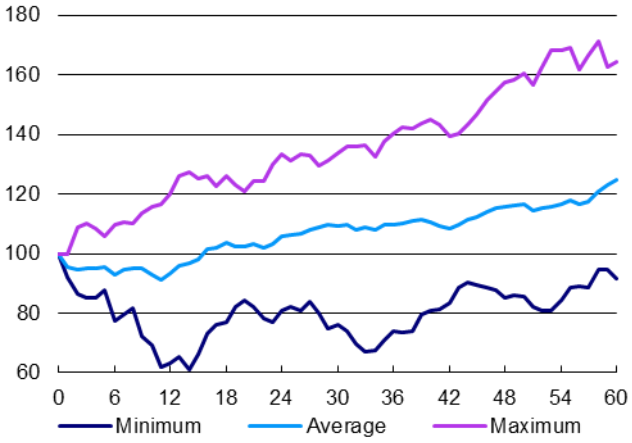
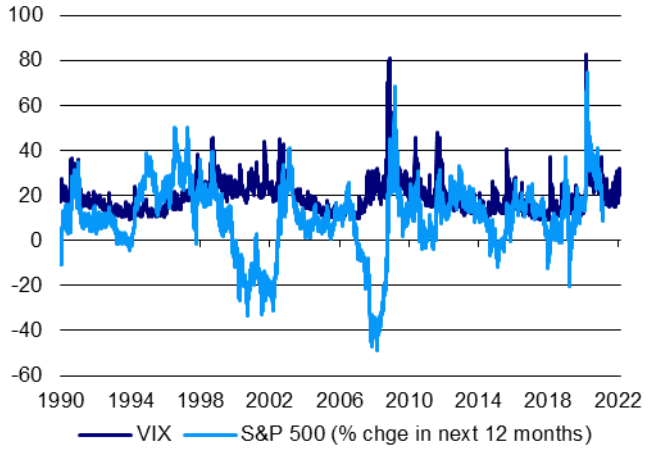


Figure 4b – VIX index and future S&P 500 returns



Notes: Figure 4a is based on the monthly performance of the S&P 500 (or US equity market equivalent prior to its existence as constructed by Robert Shiller) in the five years from the onset of tension during WW1, WW2, the Cuban Missile Crisis (1962), the Yom Kippur War (1973), the Kuwait War (1990-91) and the Iraq War (2003-11). For each episode, the index is rebased to 100 at the outset (month zero) and is then calculated over the following 60 months. "Average" is the average path of the equity index across the six episodes. "Minimum" is the lowest index reading at that point across all six episodes. Likewise, for "Maximum". Figure 4b is based on daily data from 2 January 1990 to 24 February 2022. "VIX" is the CBOE VIX Index and is generated from the price of S&P 500 index options. It can be thought of as representing the market's expectations of volatility over the next month. **Past performance is no guarantee of future results.**
Source: Refinitiv Datastream, Robert Shiller and Invesco

Of course, each episode is different, with US stocks actually rising in the aftermath of the invasion of Iraq in 2003 (we had been expecting the attack for some time and equities had just gone through the bursting of the dotcom bubble). The worst performance ("Minimum") came in the aftermath of the Yom Kippur war of 1973, as it was an important factor in OPEC's supply restrictions that almost quadrupled the price of oil (at a time when the world economy was far more reliant on oil). That drove inflation higher, squeezed profits, pushed major economies into recession and led to a 40% decline in the S&P 500 (based on monthly data).

That may seem frightening given the recent rise in the price of oil but remember that most of the gain in the last two years was a rebound from recession levels and the move in response to Russia's actions is a thin layer of icing on top of that cake.

Last week brought a lot of volatility in financial markets, though you wouldn't know it from the weekly data shown in **Figure 5**. The worst of it came on Thursday when the VIX index peaked at 38, though it had fallen to 28 by the end of the week. **Figure 4b** puts that into historical perspective and also suggests that spikes in VIX have often been associated with improved returns over the next 12 months (the correlation between the VIX and S&P 500 returns over the following 12 months is around 0.15, based on daily data since 1990). We usually prefer to buy equities when others are panicking.

Of course, the S&P 500 is unlikely to be the most accurate barometer of the horrors of a war that is raging in a far off land. **Figure 5** suggests that emerging market assets suffered last week, with MSCI Emerging Markets falling by 5% in US dollars. Not surprisingly, this was led by Russia and Ukraine, with their MSCI indices down 44% in USD in the first four days of the week. Friday brought something of a rebound but the losses for the week amounted to 29% for MSCI Russia and 41% for MSCI Ukraine. Other interesting features of the week were that Chinese stocks were down 6% and global bond yields were mainly up on the week.

The question is whether the calm at the end of last week will continue into the week ahead. This is a rapidly changing situation and just over the weekend we have seen stiff resistance from Ukrainian forces (suggesting that Russia is not getting the quick victory that it desired); harsher sanctions on Russia from NATO/Western countries including the expulsion of some Russian banks from the SWIFT system; the feeling that China is distancing itself from Russia (as much as it can); NATO military deployments to Russia's neighbours; Russia's nuclear forces being put on higher alert (according to Bloomberg) and Ukraine's government saying it is willing to meet Russian counterparts on the border of Belarus, though it remains sceptical about the outcome.

With so many cross-currents we are happy to have cash as our diversifier within the Model Asset Allocation shown in **Figure 8** and note that moments like these underline the benefits of diversification. With the potential for economic damage outlined above, we guess that global GDP could be 0.5%-1.0% lower this year than otherwise. That would add to the slowdown that is already occurring but would not produce recession. As also outlined, the effect would be more severe in Europe, with Russia's neighbours particularly vulnerable (Europe's EM markets are suffering). The likelihood of a Europe-wide recession would be that much higher if Russia closes its oil and gas taps (or sanctions make it impossible to pay for those energy resources).

With so much uncertainty, it would be easy to give in to panic. However, as also outlined above, US stocks have often performed less badly than you might imagine during some pretty serious conflicts. Many of us have also experienced living in fear of nuclear attacks (remember the 1960s and 1970s) and came through it. Hopefully, the same will be true this time and we will not have to confront that reality.

The S&P 500 is down 9% since the peak in early January, which by coincidence is the average decline reported during conflicts in **Figure 4a**, though much of the recent weakness had more to with the Fed than Vladimir Putin. We guess that more downside is possible if the situation escalates but we think it is too late to reduce the equity allocation within our Model Asset Allocation. We will instead be looking for opportunities to add to them (the next Big Picture quarterly update is due in mid-March). As for bonds, we still believe they are underestimating the durability of inflation and the need for real rates to rise, so we are happy to remain Underweight developed world sovereign debt markets.

From a regional perspective, our preference for UK and EM assets has served us relatively well so far this year and the big question is whether to pivot back towards the US given its distance form the battlefield. We shall be thinking long and hard about that over the coming weeks.

We wish the people of Ukraine all the luck in the world.

All data as of 25 February 2022, unless stated otherwise.

Figure 5 – Asset class total returns (%)

Data as at 25/02/2022		Current	Total Return (USD, %)					Total Return (Local Currency, %)				
	Index	Level/RY	1w	1m	QTD	YTD	12m	1w	1m	QTD	YTD	12m
Equities												
World	MSCI	699	-0.6	-0.1	-7.3	-7.3	6.7	-0.4	0.1	-7.0	-7.0	9.1
Emerging Markets	MSCI	1172	-4.8	-3.1	-4.8	-4.8	-13.2	-4.3	-3.0	-4.6	-4.6	-11.4
China	MSCI	78	-5.8	-5.9	-7.0	-7.0	-33.5	-5.7	-5.7	-6.9	-6.9	-33.4
US	MSCI	4204	0.9	1.0	-8.3	-8.3	14.2	0.9	1.0	-8.3	-8.3	14.2
Europe	MSCI	1942	-2.3	-1.2	-7.0	-7.0	5.1	-1.4	-0.7	-5.8	-5.8	12.8
Europe ex-UK	MSCI	2381	-2.7	-2.1	-9.6	-9.6	2.9	-1.9	-1.6	-8.3	-8.3	11.0
UK	MSCI	1193	-1.0	1.8	2.1	2.1	12.9	0.2	2.3	3.0	3.0	18.9
Japan	MSCI	3589	-2.8	-3.0	-6.8	-6.8	-8.8	-2.5	-1.6	-6.4	-6.4	-0.8
Government Bonds												
World	BofA-ML	1.14	-0.6	-2.5	-3.7	-3.7	-7.0	-0.2	-2.1	-3.2	-3.2	-2.4
Emerging Markets	BBloom	5.93	-3.2	-4.8	-9.1	-9.1	-6.9	-3.2	-4.8	-9.1	-9.1	-6.9
China	BofA-ML	2.67	0.1	-0.2	1.5	1.5	8.6	-0.1	-0.4	0.5	0.5	6.3
US (10y)	Datastream	1.99	-0.7	-1.9	-4.3	-4.3	-2.0	-0.7	-1.9	-4.3	-4.3	-2.0
Europe	Bofa-ML	0.55	-0.9	-3.2	-4.6	-4.6	-11.7	-0.1	-3.0	-3.5	-3.5	-4.1
Europe ex-UK (EMU, 10y)	Datastream	0.19	-1.1	-3.2	-4.6	-4.6	-11.4	-0.2	-2.9	-3.5	-3.5	-3.7
UK (10y)	Datastream	1.46	-1.9	-3.2	-5.3	-5.3	-9.6	-0.7	-2.7	-4.4	-4.4	-4.8
Japan (10y)	Datastream	0.21	-0.3	-2.0	-1.5	-1.5	-8.2	0.1	-0.7	-1.2	-1.2	-0.1
IG Corporate Bonds												
Global	BofA-ML	2.72	-1.0	-3.5	-5.7	-5.7	-6.0	-0.8	-3.3	-5.4	-5.4	-3.6
Emerging Markets	BBloom	5.85	-2.9	-5.6	-8.5	-8.5	-11.9	-2.9	-5.6	-8.5	-8.5	-11.9
China	BofA-ML	3.48	0.2	0.2	1.6	1.6	7.5	0.0	0.0	0.7	0.7	5.3
US	BofA-ML	3.25	-0.8	-3.4	-6.1	-6.1	-3.5	-0.8	-3.4	-6.1	-6.1	-3.5
Europe	BofA-ML	1.35	-1.8	-3.7	-5.2	-5.2	-11.9	-0.9	-3.5	-4.1	-4.1	-4.2
UK	BofA-ML	2.88	-2.5	-4.9	-6.9	-6.9	-9.7	-1.3	-4.4	-6.0	-6.0	-4.9
Japan	BofA-ML	0.45	-0.3	-1.7	-0.8	-0.8	-7.7	0.1	-0.3	-0.5	-0.5	0.4
HY Corporate Bonds												
Global	BofA-ML	6.10	-0.5	-2.7	-4.6	-4.6	-4.1	-0.3	-2.7	-4.3	-4.3	-2.4
US	BofA-ML	5.79	0.4	-2.0	-3.9	-3.9	0.4	0.4	-2.0	-3.9	-3.9	0.4
Europe	BofA-ML	4.32	-1.9	-3.8	-5.5	-5.5	-10.3	-1.0	-3.6	-4.4	-4.4	-2.5
Cash (Overnight LIBOR)												
US		0.08	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1
Euro Area		-0.65	-0.5	-0.3	-1.0	-1.0	-8.0	0.0	-0.1	-0.1	-0.1	-0.6
UK		0.18	-1.4	-0.7	-0.9	-0.9	-4.3	0.0	0.0	0.0	0.0	0.1
Japan		-0.09	-0.5	-1.5	-0.4	-0.4	-8.2	0.0	0.0	0.0	0.0	-0.1
Real Estate (REITs)												
Global	FTSE	1970	0.1	-0.5	-6.6	-6.6	9.3	0.9	-0.3	-5.6	-5.6	18.8
Emerging Markets	FTSE	1651	-5.7	-2.4	1.9	1.9	-15.6	-4.8	-2.1	3.0	3.0	-8.3
US	FTSE	3562	2.1	-0.4	-8.4	-8.4	22.6	2.1	-0.4	-8.4	-8.4	22.6
Europe ex-UK	FTSE	3507	-0.6	-0.3	-7.3	-7.3	1.7	0.3	0.0	-6.3	-6.3	10.6
UK	FTSE	1213	-0.8	-2.3	-7.6	-7.6	11.3	0.4	-1.8	-6.7	-6.7	17.2
Japan	FTSE	2468	-3.0	-0.5	-5.0	-5.0	-11.4	-2.6	1.0	-4.6	-4.6	-3.7
Commodities												
All	GSCI	3267	1.4	7.7	17.7	17.7	39.0	-	-	-	-	-
Energy	GSCI	537	2.2	10.0	25.1	25.1	56.1	-	-	-	-	-
Industrial Metals	GSCI	1991	1.1	4.7	9.7	9.7	23.1	-	-	-	-	-
Precious Metals	GSCI	2151	-0.6	1.6	3.1	3.1	3.3	-	-	-	-	-
Agricultural Goods	GSCI	549	1.2	5.3	10.1	10.1	25.1	-	-	-	-	-
Currencies (vs USD)*												
EUR		1.13	-0.5	-0.3	-0.9	-0.9	-7.5	-	-	-	-	-
JPY		115.57	-0.5	-1.5	-0.4	-0.4	-8.1	-	-	-	-	-
GBP		1.34	-1.2	-0.5	-0.9	-0.9	-5.1	-	-	-	-	-
CHF		1.08	-0.4	-0.7	-1.4	-1.4	-2.2	-	-	-	-	-
CNY		6.32	0.1	0.1	0.6	0.6	2.2	-	-	-	-	-

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

Data as at 25/02/2022	Global				
	1w	1m	QTD	YTD	12m
Energy	**2.3**	**5.0**	**18.1**	**18.1**	**17.9**
Basic Materials	**-0.8**	**2.5**	**7.3**	**7.3**	**2.8**
Basic Resources	-0.6	6.1	12.9	12.9	5.3
Chemicals	-1.0	-2.3	0.2	0.2	-0.4
Industrials	**-0.2**	**-1.2**	**-2.2**	**-2.2**	**-3.1**
Construction & Materials	-1.9	-2.6	-4.4	-4.4	-1.1
Industrial Goods & Services	0.0	-1.0	-1.9	-1.9	-3.4
Consumer Discretionary	**-1.5**	**-1.1**	**-4.8**	**-4.8**	**-10.4**
Automobiles & Parts	-3.7	-7.5	-8.0	-8.0	0.3
Media	0.3	5.2	-6.6	-6.6	-19.2
Retailers	-0.7	0.9	-3.8	-3.8	-11.7
Travel & Leisure	-2.2	3.0	3.5	3.5	-14.9
Consumer Products & Services	-0.9	-2.1	-6.6	-6.6	-9.8
Consumer Staples	**-0.3**	**0.6**	**5.5**	**5.5**	**4.6**
Food, Beverage & Tobacco	-0.2	1.6	7.3	7.3	7.8
Personal Care, Drug & Grocery Stores	-0.5	-1.5	2.0	2.0	-1.2
Healthcare	**2.6**	**1.4**	**-2.8**	**-2.8**	**-2.3**
Financials	**-1.9**	**-0.4**	**6.3**	**6.3**	**7.7**
Banks	-2.9	-0.1	10.4	10.4	9.9
Financial Services	-0.3	-0.8	-0.3	-0.3	5.7
Insurance	-2.0	-0.7	7.7	7.7	5.7
Real Estate	**0.1**	**-1.6**	**-0.7**	**-0.7**	**-0.3**
Technology	**0.9**	**-1.0**	**-7.3**	**-7.3**	**-1.0**
Telecommunications	**-0.4**	**0.1**	**4.6**	**4.6**	**-3.2**
Utilities	**1.5**	**0.3**	**2.5**	**2.5**	**4.1**

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 (%)

Data as at 25/02/2022	Absolute					Relative to Market				
	1w	1m	QTD	YTD	12m	1w	1m	QTD	YTD	12m
Growth	1.7	1.3	-11.9	-11.9	15.7	0.8	0.5	-4.4	-4.4	-0.3
Low volatility	1.1	0.7	-4.5	-4.5	21.5	0.3	-0.1	3.6	3.6	4.6
Price momentum	1.1	4.4	-5.5	-5.5	11.4	0.3	3.6	2.5	2.5	-4.0
Quality	0.5	-0.2	-7.8	-7.8	17.4	-0.4	-1.0	0.0	0.0	1.1
Size	1.7	4.6	1.4	1.4	17.6	0.8	3.7	10.0	10.0	1.3
Value	0.4	2.9	5.2	5.2	25.1	-0.4	2.0	14.1	14.1	7.8
Market	0.8	0.8	-7.8	-7.8	16.1					
Market - Equal-Weighted	1.1	1.6	-4.7	-4.7	16.7					

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

Data as at 25/02/2022	Absolute					Relative to Market				
	1w	1m	QTD	YTD	12m	1w	1m	QTD	YTD	12m
Growth	-0.9	-4.6	-19.0	-19.0	8.9	0.6	-3.4	-13.0	-13.0	-3.7
Low volatility	-1.2	-1.0	-4.7	-4.7	16.5	0.4	0.2	2.3	2.3	3.1
Price momentum	-2.8	-2.3	-15.8	-15.8	-3.7	-1.3	-1.2	-9.6	-9.6	-14.8
Quality	-1.9	-4.1	-10.0	-10.0	8.8	-0.4	-2.9	-3.4	-3.4	-3.8
Size	-2.5	-3.5	-13.0	-13.0	0.2	-1.0	-2.4	-6.6	-6.6	-11.4
Value	-3.4	-0.9	-0.8	-0.8	20.2	-1.9	0.3	6.5	6.5	6.3
Market	-1.5	-1.2	-6.8	-6.8	13.1					
Market - Equal-Weighted	-2.2	-2.4	-9.5	-9.5	6.3					

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 8 – 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 9 – Model allocations for Global sectors

	Neutral	Invesco	Preferred Region
Energy	**5.9%**	**Neutral**	**US**
Basic Materials	**4.3%**	**Overweight**	**Europe**
Basic Resources	2.4%	Overweight	Europe
Chemicals	1.9%	Neutral	US
Industrials	**12.7%**	**Overweight**	**US**
Construction & Materials	1.6%	Neutral	EM
Industrial Goods & Services	11.1%	Overweight	US
Consumer Discretionary	**15.5%**	**Neutral**	**US**
Automobiles & Parts	3.0%	Underweight	Japan
Media	1.2%	Underweight	Europe
Retailers	5.4%	Overweight	US
Travel & Leisure	1.9%	Overweight ↑	US
Consumer Products & Services	4.0%	Neutral ↓	Japan
Consumer Staples	**6.0%**	**Neutral**	**US**
Food, Beverage & Tobacco	3.9%	Neutral	US
Personal Care, Drug & Grocery Stores	2.1%	Neutral	Europe
Healthcare	**9.9%**	**Neutral**	**US**
Financials	**14.5%**	**Underweight**	**Japan**
Banks	7.2%	Underweight	Japan
Financial Services	4.8%	Overweight	Japan
Insurance	2.5%	Underweight	US
Real Estate	**3.4%**	**Overweight**	**Japan**
Technology	**21.0%**	**Overweight**	**US**
Telecommunications	**3.5%**	**Underweight**	**Japan**
Utilities	**3.2%**	**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 3

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 ICE BofA 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: ICE BofA 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: ICE BofA 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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