Applied philosophy
The Visegrád Group on life support

Another spring in lockdown approaches, a year after Covid-19 first reached Europe. In the first wave the Visegrád Group of countries were held up as examples of how to efficiently suppress the spread of the virus. However, they were slow to reintroduce restrictions during the second wave and are now struggling to contain the spread. Luckily, the new EU recovery fund will help kick start their recoveries when vaccination programmes permit the reopening of their economies. However, we worry that they have become too dependent on EU support.

It has been over a year since the virus reached Europe with the first confirmed case in Italy. Despite their generally good quality universal healthcare systems, countries on the continent have had a tough time containing the pandemic, as suggested by relatively high levels of confirmed deaths in population-adjusted terms. After a brief respite in the summer of 2020, the second (and in some countries the third) wave of the virus forced authorities to introduce and maintain tight restrictions on mobility and socialisation.

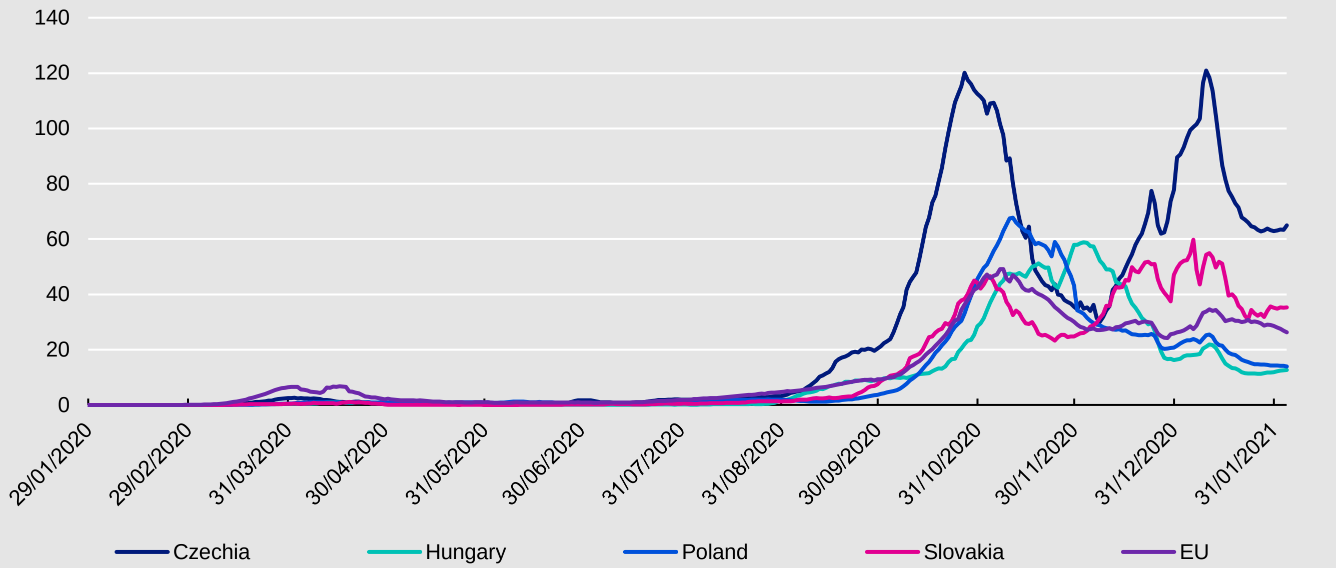
Vaccinations may give hope that an end is in sight but, after a sputtering start (the UK excepted), the return to normality may have been pushed back to the end of 2021 or early-2022. Nevertheless, when the recovery gathers speed, we expect European and Emerging Market assets to outperform the rest of the world. In fact, in our 2021 Outlook we expressed a preference for these regions, especially within risk assets. In the intersection of those two regions we find the so-called Visegrád Group (Czechia, Hungary, Poland and Slovakia), which went from success stories to cautionary tales in their management of the pandemic. What went wrong and what are their prospects?

All four countries introduced strict lockdowns at a very early phase in the first wave (from early March to the end of May), which helped them suppress the virus before widespread community infection. Indeed, population-adjusted confirmed new daily cases remained below the European Union average in that period. There was even speculation that high levels of BCG vaccination rates in these countries contributed to lower susceptibility to infections.

After case numbers dwindled to sufficiently low levels, all four countries opened their economies gradually and returned to something resembling pre-pandemic normality, perhaps even more so than most other European countries. However, when case numbers picked up towards the end of the summer, the respective governments were reluctant to announce new restrictions both to protect economies and to avoid the appearance of losing control of the virus. All four countries are led by populist governments that proved ill-equipped to deal with a problem that can be neither wished away, nor defeated by rhetoric. By the time new lockdowns were introduced, new daily cases were rising exponentially to higher levels than in the first wave (although some of that may be due to the impact of more testing).

This more cavalier approach to the second wave is

Figure 1 – 7-day rolling average of new Covid-19 daily cases per 100,000



Notes: Data as of 4 February 2021. Population data is from OurWorldinData.
Source: JHU CSSE COVID-19 Data, OurWorldinData and Invesco

baffling, because the underlying demographic and health picture should have suggested caution. Studies showed early on that the risk of death from Covid-19 increases with age and in all four countries those over 65 form a relatively large part of the total population (16% for Slovakia, 18% for Poland and 20% for Czechia and Hungary). This may be in line with other European countries, but the general level of health is much lower in these four countries according to the Bloomberg Global Health Index, which ranks countries based on certain risks (tobacco use, high blood pressure, obesity, availability of clean water, life expectancy, malnutrition and causes of death). Among our sample of four countries, Czechia has the highest ranking at 29th (out of 56), followed by Poland at 40th, Slovakia at 45th and Hungary at 48th.

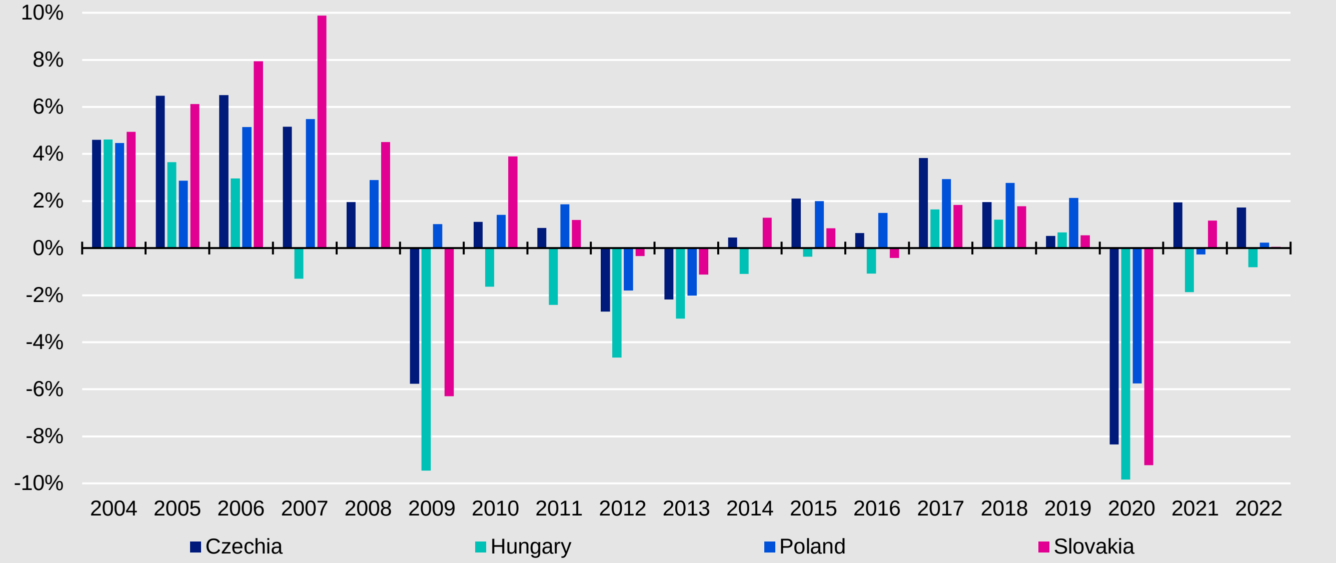
Having said that, we understand why they would want to protect a fledgling recovery, because the economic impact of the first lockdowns was severe. The peak-to-trough decline in real GDP was 14.9% for Hungary, 13% for Slovakia, 11.5% for Czechia to 9.2% for Poland (between Q4 2019 and Q2 2020). This shock is close to the peak-to-trough declines experienced by these countries during the transition to market economies after the end of communism. Real GDP fell by about 10% on average between 1989 and 1992, which was almost twice as severe as during the Global Financial Crisis (GFC). This underscores not only how deep, but also how fast, was the Covid-19-induced recession. It is also possible, given how stringent and protracted are the current restrictions, that these economies experience a double-dip recession.

Although they are not necessarily outliers in this sense, they remain vulnerable, in our view. How quickly their economies recover will depend on three factors. First, how soon they can exit and leave behind lockdowns. Where they may be at a disadvantage is the sourcing of enough vaccine doses to allow the acceleration of their flagging vaccination programmes. Perhaps one of the reasons why, for example, Hungary has been keen to buy Chinese and Russian vaccines (apart from the political considerations) is that the EU's vaccination purchase programme has had a very slow start. Another problem may be relatively high levels of vaccine scepticism.

Second, as relatively open economies, they rely on what happens elsewhere. They have strong links with and are highly dependent on the Eurozone economy (especially Germany) and, thus have indirect exposure to China. The Chinese economy seems to be one of the bright spots for now, even if their vaccination programme got off to a slow start. This reliance on other countries may threaten their recovery if a new and more dangerous strain of Sars-Cov-2 develops.

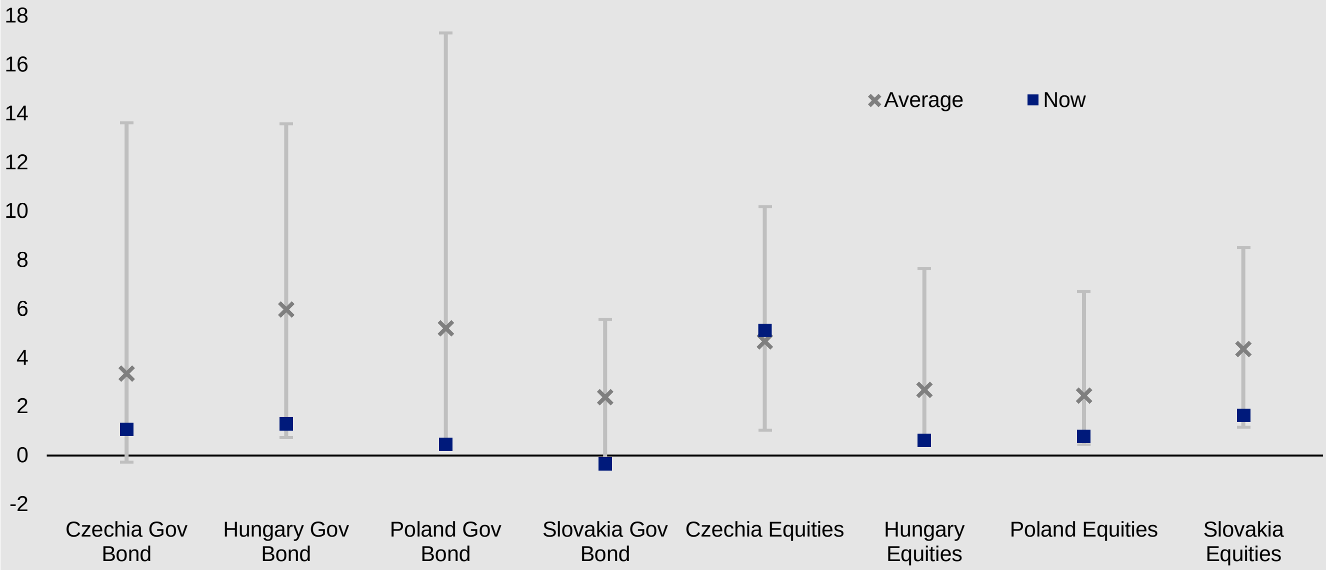
Third, V4 countries need investor sentiment towards them to remain positive. We think that the new EU budget will help in that respect, although we are concerned that the Visegrád Group of countries have

Figure 2 – Visegrád Group "excess GDP growth"



Notes: We deduct the European Union Operating Budgetary Balance (OBB) in each year from the year-on-year change in real GDP growth. The EU Operating Budgetary Balance is the difference between a country's contributions and receipts from the EU budget. OBB for year 2020 is the average of the preceding 6 years. The OBB figures for 2021 and 2022 are derived using IMF real GDP growth forecasts. We use 0.6%, the average between 2014 and 2019, of the forecast GDP to calculate contributions to the EU budget for each country. We deduct those contributions from the total pre-allocated funds for each country to calculate OBB for 2021 and 2022.
Source: Eurostat, European Commission, IMF, Refinitiv Datastream and Invesco.

Figure 3 – Visegrád Group yields within historical ranges (%)



Notes: Gov Bond = government bond. Government bond series using Bofa-ML indices start on 03/01/2000 for Hungary and Poland, 31/12/1997 for Czechia and 02/02/2004 for Slovakia. We use Datastream Total Market indices for dividend yields starting on 31/12/1994 for Czechia, Hungary and Poland, and on 01/03/2006 for Slovakia. As of 4th February 2021. Past performance is no guarantee of future results. Source: Refinitiv Datastream and Invesco.

become too dependent on EU funds and may struggle to generate economic growth independently. To get a handle on this, we calculated the difference between their year-on-year real GDP growth and the amount of net EU funds received as a percentage of their annual real GDP. This "excess GDP growth" figure can give us an indication of how much redistribution contributes to their growth (see **Figure 2**).

Unfortunately, since the Visegrád Group of countries were able to access the full allocations in various programmes, their growth has been driven almost entirely by EU funding. It almost seems that having made a real effort to get into the club, once inside they stopped trying. Or perhaps they are struck with the more generalised EM malaise and are thus struggling in the post-GFC winner-takes-all environment. Luckily the rest of the EU is there to support them and the next two years look promising based on the pre-allocated 2021-2027 EU budget that includes the new recovery fund, called NextGenerationEU. However, the medium term looks more worrying and we are concerned that growth will slow after the initial bump this year and the next.

Apart from the hope that short-term momentum can continue with the help of major developed central banks, we find little reason to be positive on these countries' assets. In terms of valuations (see **Figure 3**), they are closer to the Eurozone than EM, especially in sovereign debt. Slovakia's bonds barely offer a yield pickup over Bunds, but even Hungary, whose yields are the highest in this group, is almost on par with US Treasuries. Valuations in their equity markets look just as rich, except for Czechia, whose dividend yield is above historical averages. We think this means that most of the expected recovery may have been priced in, so at this moment, we would look elsewhere for cyclical exposure within EM.

Invesco

Figure 4 – Asset class total returns (%, annualised)

Data as at 04/02/2021		Current	Total Return (USD, %)					Total Return (Local Currency, %)				
	Index	Level/RY	1w	1m	QTD	YTD	12m	1w	1m	QTD	YTD	12m
Equities												
World	MSCI	667	1.9	3.8	3.3	3.3	19.8	2.2	4.4	3.9	3.9	17.7
Emerging Markets	MSCI	1388	2.9	6.5	7.6	7.6	31.1	2.8	7.4	8.4	8.4	31.5
China	MSCI	122	4.2	12.7	13.0	13.0	49.1	4.2	12.7	12.9	12.9	47.7
US	MSCI	3789	2.4	5.0	3.4	3.4	22.4	2.4	5.0	3.4	3.4	22.4
Europe	MSCI	1848	0.3	-0.5	0.5	0.5	7.7	1.4	1.3	2.3	2.3	0.1
Europe ex-UK	MSCI	2330	0.7	-0.5	0.5	0.5	12.7	2.0	2.0	2.7	2.7	3.9
UK	MSCI	1036	-1.0	-0.5	0.5	0.5	-7.1	-0.6	-1.0	0.6	0.6	-11.4
Japan	MSCI	3903	0.3	1.6	1.2	1.2	19.1	1.3	3.9	3.4	3.4	14.8
Government Bonds												
World	BofA-ML	0.31	-1.2	-2.3	-2.3	-2.3	5.8	-0.5	-1.2	-1.1	-1.1	2.0
Emerging Markets	BBloom	4.00	0.1	-1.7	-1.7	-1.7	3.0	0.1	-1.7	-1.7	-1.7	3.0
China	BofA-ML	3.13	0.2	0.3	1.4	1.4	9.6	0.0	0.3	0.2	0.2	1.4
US (10y)	Datastream	1.14	-0.8	-2.0	-2.0	-2.0	7.1	-0.8	-2.0	-2.0	-2.0	7.1
Europe	Bofa-ML	-0.15	-1.6	-3.3	-2.9	-2.9	10.5	-0.4	-1.0	-0.8	-0.8	1.8
Europe ex-UK (EMU, 10y)	Datastream	-0.49	-2.0	-3.5	-3.0	-3.0	9.2	-0.8	-1.2	-0.9	-0.9	0.7
UK (10y)	Datastream	0.46	-1.8	-1.8	-2.1	-2.1	6.8	-1.4	-2.3	-2.1	-2.1	1.8
Japan (10y)	Datastream	0.06	-1.3	-2.4	-2.3	-2.3	3.0	-0.2	-0.2	-0.2	-0.2	-0.7
IG Corporate Bonds												
Global	BofA-ML	1.52	-0.7	-1.6	-1.6	-1.6	7.3	-0.3	-1.0	-1.0	-1.0	4.8
Emerging Markets	BBloom	3.55	0.2	-0.2	0.0	0.0	9.9	0.2	-0.2	0.0	0.0	9.9
China	BofA-ML	4.06	0.2	0.3	1.5	1.5	10.8	0.0	0.3	0.3	0.3	2.4
US	BofA-ML	1.97	-0.4	-1.3	-1.4	-1.4	6.2	-0.4	-1.3	-1.4	-1.4	6.2
Europe	BofA-ML	0.36	-1.2	-2.7	-2.2	-2.2	10.1	0.0	-0.3	-0.1	-0.1	1.5
UK	BofA-ML	1.63	-1.5	-1.4	-1.8	-1.8	9.1	-1.1	-2.0	-1.7	-1.7	4.0
Japan	BofA-ML	0.41	-1.1	-2.1	-2.0	-2.0	3.8	0.0	0.0	0.0	0.0	0.0
HY Corporate Bonds												
Global	BofA-ML	4.70	0.4	0.3	0.4	0.4	8.2	0.6	0.7	0.8	0.8	6.5
US	BofA-ML	4.83	0.5	1.0	0.9	0.9	6.9	0.5	1.0	0.9	0.9	6.9
Europe	BofA-ML	3.03	-0.4	-1.6	-1.0	-1.0	12.3	0.8	0.8	1.1	1.1	3.5
Cash (Overnight LIBOR)												
US		0.08	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.2
Euro Area		-0.59	-1.3	-2.4	-2.1	-2.1	7.7	0.0	-0.1	-0.1	-0.1	-0.6
UK		0.04	-0.3	0.7	0.0	0.0	5.0	0.0	0.0	0.0	0.0	0.1
Japan		-0.08	-1.3	-2.3	-2.2	-2.2	3.7	0.0	0.0	0.0	0.0	-0.1
Real Estate (REITs)												
Global	FTSE	1784	0.8	2.7	0.5	0.5	-9.0	2.0	5.2	2.7	2.7	-16.2
Emerging Markets	FTSE	1918	-0.6	-1.1	-2.7	-2.7	-11.9	0.6	1.4	-0.6	-0.6	-18.8
US	FTSE	2889	1.9	6.8	2.9	2.9	-9.2	1.9	6.8	2.9	2.9	-9.2
Europe ex-UK	FTSE	3576	-0.8	-4.3	-4.7	-4.7	-4.3	0.4	-1.9	-2.7	-2.7	-11.8
UK	FTSE	1326	-0.8	-0.7	-1.5	-1.5	-11.1	-0.4	-1.3	-1.5	-1.5	-15.3
Japan	FTSE	2670	2.0	3.7	2.0	2.0	-10.9	3.1	6.0	4.2	4.2	-14.1
Commodities												
All	GSCI	2153	3.9	9.3	8.9	8.9	-4.8	-	-	-	-	-
Energy	GSCI	307	6.9	16.6	15.0	15.0	-24.7	-	-	-	-	-
Industrial Metals	GSCI	1408	-0.1	-1.4	0.6	0.6	25.4	-	-	-	-	-
Precious Metals	GSCI	2086	-2.3	-7.8	-5.2	-5.2	14.9	-	-	-	-	-
Agricultural Goods	GSCI	424	1.5	5.8	6.0	6.0	24.8	-	-	-	-	-
Currencies (vs USD)*												
EUR		1.20	-1.3	-2.3	-2.1	-2.1	8.3	-	-	-	-	-
JPY		105.55	-1.3	-2.3	-2.2	-2.2	3.8	-	-	-	-	-
GBP		1.37	-0.5	0.6	-0.1	-0.1	4.9	-	-	-	-	-
CHF		1.11	-1.7	-2.5	-2.1	-2.1	7.2	-	-	-	-	-
CNY		6.47	-0.3	-0.2	0.8	0.8	8.1	-	-	-	-	-

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 (%)

Data as at 04/02/2021	Global				
	1w	1m	QTD	YTD	12m
Energy	**-1.7**	**-1.9**	**-1.5**	**-1.5**	**-25.4**
Basic Materials	**-1.5**	**-4.1**	**-1.8**	**-1.8**	**12.1**
Basic Resources	-1.5	-5.8	-2.2	-2.2	16.8
Chemicals	-1.4	-1.7	-1.1	-1.1	6.9
Industrials	**0.5**	**-1.7**	**-2.0**	**-2.0**	**-1.6**
Construction & Materials	0.3	-1.7	-0.9	-0.9	-3.2
Industrial Goods & Services	0.6	-1.7	-2.1	-2.1	-1.4
Consumer Discretionary	**0.9**	**1.2**	**0.9**	**0.9**	**12.4**
Automobiles & Parts	1.5	6.2	7.9	7.9	49.2
Media	0.5	0.4	-0.9	-0.9	5.9
Retailers	0.0	1.2	0.5	0.5	12.2
Travel & Leisure	2.3	-0.9	-2.5	-2.5	-10.4
Consumer Products & Services	1.1	-0.8	-0.7	-0.7	13.3
Consumer Staples	**-2.2**	**-4.7**	**-4.4**	**-4.4**	**-11.2**
Food, Beverage & Tobacco	-1.8	-4.4	-4.4	-4.4	-12.7
Personal Care, Drug & Grocery Stores	-3.0	-5.1	-4.4	-4.4	-8.5
Healthcare	**-1.4**	**-0.6**	**-0.5**	**-0.5**	**0.4**
Financials	**1.0**	**-0.2**	**-0.2**	**-0.2**	**-13.6**
Banks	1.1	0.1	0.1	0.1	-18.4
Financial Services	1.5	1.1	1.6	1.6	-3.7
Insurance	-0.1	-2.3	-2.9	-2.9	-15.0
Real Estate	**-0.9**	**-1.2**	**-2.4**	**-2.4**	**-21.1**
Technology	**1.2**	**5.2**	**4.8**	**4.8**	**27.8**
Telecommunications	**-1.1**	**-2.2**	**-1.8**	**-1.8**	**-9.4**
Utilities	**-1.3**	**-3.6**	**-3.3**	**-3.3**	**-14.7**

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

Invesco

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

Data as at 04/02/2021	Absolute					Relative to Market				
	1w	1m	QTD	YTD	12m	1w	1m	QTD	YTD	12m
Growth	2.7	5.9	4.2	4.2	34.1	0.4	1.1	1.0	1.0	12.1
Low volatility	0.6	0.2	-1.4	-1.4	10.4	-1.6	-4.3	-4.5	-4.5	-7.7
Price momentum	2.3	4.7	3.4	3.4	20.6	0.0	-0.1	0.2	0.2	0.9
Quality	1.6	4.5	2.7	2.7	19.4	-0.6	-0.3	-0.5	-0.5	-0.1
Size	2.5	8.7	7.4	7.4	17.0	0.2	3.8	4.1	4.1	-2.2
Value	3.3	9.6	8.4	8.4	16.2	1.0	4.7	5.0	5.0	-2.8
Market	2.3	4.7	3.2	3.2	19.6					
Market - Equal-Weighted	2.3	5.0	3.3	3.3	16.3					

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 (%)

Data as at 04/02/2021	Absolute					Relative to Market				
	1w	1m	QTD	YTD	12m	1w	1m	QTD	YTD	12m
Growth	2.1	1.5	2.4	2.4	22.2	0.6	-0.6	-0.4	-0.4	21.6
Low volatility	1.1	1.2	2.3	2.3	1.0	-0.4	-0.8	-0.4	-0.4	0.5
Price momentum	2.4	2.5	4.2	4.2	17.6	0.8	0.5	1.4	1.4	17.0
Quality	2.9	3.5	4.2	4.2	10.3	1.3	1.4	1.4	1.4	9.8
Size	2.7	4.8	5.1	5.1	10.7	1.1	2.8	2.3	2.3	10.1
Value	2.8	4.4	3.9	3.9	-1.5	1.3	2.3	1.1	1.1	-2.0
Market	1.6	2.0	2.7	2.7	0.5					
Market - Equal-Weighted	2.0	2.7	3.3	3.3	5.1					

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

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%**	↓	**20%**	
Government	25%	10-40%		15%	
US	8%		↓	2%	
Europe ex-UK (Eurozone)	7%		↑	4%	
UK	1%		↑	2%	
Japan	7%		↓	3%	
Emerging Markets	2%			4%	
China**	0.2%			1%	
Corporate IG	10%	0-20%	↓	0%	
US Dollar	5%		↓	0%	
Euro	2%		↓	0%	
Sterling	1%		↓	0%	
Japanese Yen	1%		↓	0%	
Emerging Markets	1%		↓	0%	
China**	0.1%			0%	
Corporate HY	5%	0-10%	↑	5%	
US Dollar	4%		↓	4%	
Euro	1%		↓	1%	
Equities	**45%**	**20-60%**	↑	**50%**	
US	25%		↑	18%	
Europe ex-UK	7%		↑	12%	
UK	4%		↑	6%	
Japan	4%			6%	
Emerging Markets	5%		↑	8%	
China**	2%			3%	
Real Estate	**8%**	**0-16%**	↑	**16%**	
US	2%		↑	3%	
Europe ex-UK	2%		↑	4%	
UK	1%			3%	
Japan	2%		↓	3%	
Emerging Markets	1%		↑	3%	
Commodities	**2%**	**0-4%**	↑	**4%**	
Energy	1%		↑	2%	
Industrial Metals	0.3%		↑	1%	
Precious Metals	0.3%			0%	
Agriculture	0.3%		↑	1%	
Total	**100%**			**100%**	

Currency Exposure (including effect of hedging)				
USD	48%	↓	36%	
EUR	20%	↑	23%	
GBP	7%	↑	12%	
JPY	15%	↓	13%	
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 8 – Model allocations for Global sectors

	Neutral	Invesco	Preferred Region
Energy	**5.8%**	**Neutral**	**US**
Basic Materials	**4.3%**	**Underweight**	**Europe**
Basic Resources	2.4%	Underweight	Europe
Chemicals	1.9%	Neutral	US
Industrials	**12.8%**	**Neutral**	**US**
Construction & Materials	1.6%	Neutral	Europe
Industrial Goods & Services	11.3%	Neutral	US
Consumer Discretionary	**16.5%**	**Overweight**	**Japan**
Automobiles & Parts	2.7%	Underweight	Japan
Media	1.4%	Overweight	US
Retailers	6.1%	Underweight	EM
Travel & Leisure	2.1%	Overweight	US
Consumer Products & Services	4.2%	Overweight	Japan
Consumer Staples	**6.6%**	**Overweight**	**Europe**
Food, Beverage & Tobacco	4.3%	Overweight	Europe
Personal Care, Drug & Grocery Stores	2.3%	Underweight	Europe
Healthcare	**10.3%**	**Underweight**	**Europe**
Financials	**13.7%**	**Neutral**	**EM**
Banks	6.3%	Neutral	EM
Financial Services	4.1%	Overweight	US
Insurance	3.2%	Neutral	Europe
Real Estate	**3.4%**	**Overweight**	**EM**
Technology	**19.0%**	**Overweight**	**US**
Telecommunications	**4.2%**	**Neutral**	**Europe**
Utilities	**3.4%**	**Neutral**	**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

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 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

Factor index definitions

We focus on relatively large-cap stocks, as we suspect that most investors will be conscious of liquidity constraints when implementing such strategies. We have chosen six factors, that we think cover the classic definitions used by most investors. We aim to capture roughly a fifth of the market in each of our factor indices using the historical constituents of the STOXX 600 since August 1999 and the S&P 500 since September 1989, with monthly rebalancing. All our rankings are based on data in euros for Europe and in US dollars for the US. All factor indices are equal-weighted. We use the following definitions:

Growth: stocks in both the top third based on their 5-year sales per share trend and the top-third based on their internal growth rate (the product of the 5-year average return on equity and the retention ratio).

Low volatility: stocks in the bottom quintile based on the standard deviation of their daily returns in the previous three months.

Price momentum: stocks in the top quintile based on their performance in the previous 12 months.

Quality: stocks in both the top third based on their return on invested capital and the top third based on their EBIT to EV ratio (earnings before interest and taxes to enterprise value). This follows Joel Greenblatt's "magic formula" from his 2005 book: The little book that beats the market.

Size: stocks in the bottom quintile based on their market value.

Value: stocks in the bottom quintile based on their price to book value ratios.

Authors

András Vig
Multi-Asset Strategist
T. +44 (0)20 3370 1152
E. andras.vig@invesco.com

Paul Jackson
Global Head of Asset Allocation Research
T. +44 (0)20 3370 1172
E. paul.jackson@invesco.com

Telephone calls may be recorded

Data as of 4th February 2021 unless stated otherwise.

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Authors

Paul Jackson
Global Head of Asset Allocation Research
Telephone +44(0)20 3370 1172
paul.jackson@invesco.com
London, EMEA

András Vig
Multi-Asset Strategist
Telephone +44(0)20 3370 1152
andras.vig@invesco.com
London, EMEA

Global Market Strategy Office

Kristina Hooper
Chief Global Market Strategist
Kristina.Hooper@invesco.com
New York, Americas

Brian Levitt
Global Market Strategist, Americas
Brian.Levitt@invesco.com
New York, Americas

Talley Léger
Investment Strategist, Equities
Talley.Leger@invesco.com
New York, Americas

Ashley Oerth
Investment Strategy Analyst
Ashley.Oerth@invesco.com
London, EMEA

Arnab Das
Global Market Strategist
Arnab.Das@invesco.com
London, EMEA

Luca Tobagi, CFA*
Product Director / Investment Strategist
Luca.Tobagi@invesco.com
Milan, EMEA

Paul Jackson
Global Head of Asset Allocation Research
paul.jackson@invesco.com
London, EMEA

András Vig
Multi-Asset Strategist
andras.vig@invesco.com
London, EMEA

David Chao
Global Market Strategist, Asia Pacific
David.Chao@invesco.com
Hong Kong, Asia Pacific

Tomo Kinoshita
Global Market Strategist, Japan
Tomo.Kinoshita@invesco.com
Tokyo, Asia Pacific

* Affiliated member

Telephone calls may be recorded.