Uncommon truths
Global debt review 2021

Global debt ratios increased by a record amount in 2020. Half was due to rising government debt and the biggest gains were in developed countries. Falling bond yields dampened the rise in debt service ratios but that may not last, in our opinion.

The man from Mars may question whether planet Earth has a debt problem (if so, to whom is it owed?). However, the global financial crisis (GFC) showed that, even if net debt is zero, it is difficult to unwind that debt when there are so many interlinkages. We therefore assume that more debt brings more risk. Hence, our annual review of global debt. Now that the Bank for International Settlements (BIS) has published its 2020 data, we are able to deliver the next instalment.

The Covid-19 pandemic caused a sharp rise in debt-to-GDP ratios: partly because debt usually rises during recession; partly because governments increased spending to protect business and household cash flows and partly because GDP declined (which mechanically increases those ratios in which GDP is the denominator).

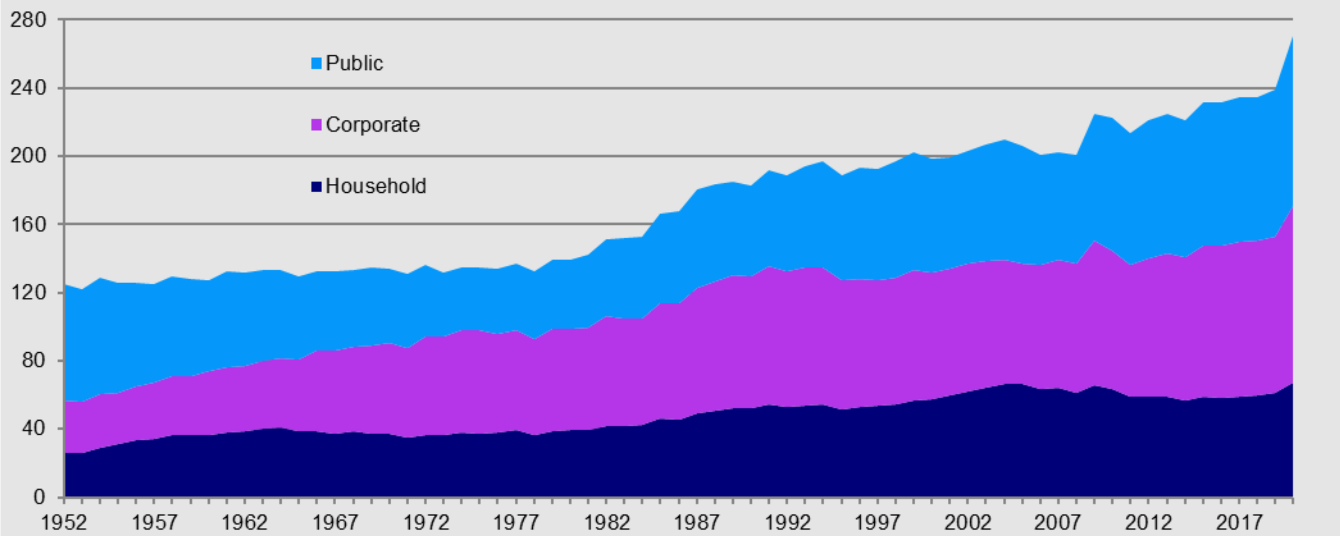
The global debt-to-GDP ratio increased from 226.2% in 2019 to 256.2% in 2020 (based on the BIS "All-Country" non-financial sector debt-to-GDP ratio, using purchasing power parity (PPP) exchange rates to convert all data to US dollars). This 30-percentage point jump is by far the largest annual gain since this data was first made available in 2001, when the ratio was 172.6% (the next biggest gain was the 13.7 percentage points seen in 2009). According to our calculations, around four-fifths of that 30-percentage point gain was due to the rise in debt (the rest being due to the fall in GDP).

We believe that using PPP exchange rates is the best way to calculate such aggregates, since the use of market exchange rates causes too much volatility in the global series. For example, using market exchange rates, the BIS All-Country aggregate debt-to-GDP ratio would have risen even more (from 245.2% in 2019 to 289.9% in 2020), having fallen by 10-percentage points in 2018 and then recovering that decline the next year.

The problem with BIS All-Country aggregates is that they only go back to 2001, so we have constructed our own version by aggregating the data for the world's 25 largest economies (as of 2019, measured by GDP). **Figure 1** shows the results and suggests that the global debt-to-GDP ratio hit a new high of 270.5% in 2020 (up from 239.2% in 2019). Unfortunately, our measure is based upon market exchange rates, so we use a smoothing process to dampen the effect of exchange rate movements (see the note to **Figure 1**).

Casual inspection of **Figure 1** suggests that debt-to-GDP has recently increased in all three sectors (households, corporates and governments).

Figure 1 – Global non-financial sector debt-to-GDP from 1952 to 2020 using market exchange rates (%)



Note: Based on annual data for the 25 largest economies in the world (as of 2019). Data was not available for all 25 countries over the full period considered. Starting with only the US in 1952, the data set was based on a successively larger number of countries until in 2008 all 25 were included in all categories. The data for all countries is converted into US dollars using market exchange rates. Unfortunately, debt is a stock measured at the end of each calendar year, whereas GDP is a flow measured during the year so that when the dollar trends in one direction it can distort the comparison between debt and GDP. To minimise this problem, we use a smoothed measure of debt which takes the average over two years (for example, debt for 2020 is the average of debt at end-2019 and at end-2020).
Source: BIS, IMF, OECD, Oxford Economics, Refinitiv Datastream and Invesco

Figure 2 shows the detail of last year's rise in debt by country and sector (in terms of changes to debt-to-GDP ratios). Total debt ratios increased in all 25 countries that we follow, with the biggest jumps seen in the developed world. Most of the countries with the largest gains in debt ratios were in North America or Europe, though the Netherlands is the country with the lowest gain. Not surprisingly, those countries with the biggest gains in debt had a relatively bad Covid experience (in terms of mortality rates and/or economic damage). The obvious exception is Japan, which seemed to control the virus pretty well but suffered among the highest gains in debt.

Judging by the global data, around half the gain in debt/GDP ratios was due to rising government debt, which is not surprising given the support provided by many governments during the pandemic. Of the other half, the gain was split around two-thirds to one-third between corporate and household debt, respectively.

Figure 2 suggests that most countries suffered a similar spread across the various segments of debt, though there were some important exceptions. In particular, a range of countries including Australia, Indonesia and especially the Netherlands experienced a decline in corporate debt/GDP ratios (presumably because government support to businesses was very generous).

Also, there were only small gains in household debt in Argentina, Poland, Indonesia and Mexico, again presumably because of governments support (and because such debt was limited in size pre-pandemic).

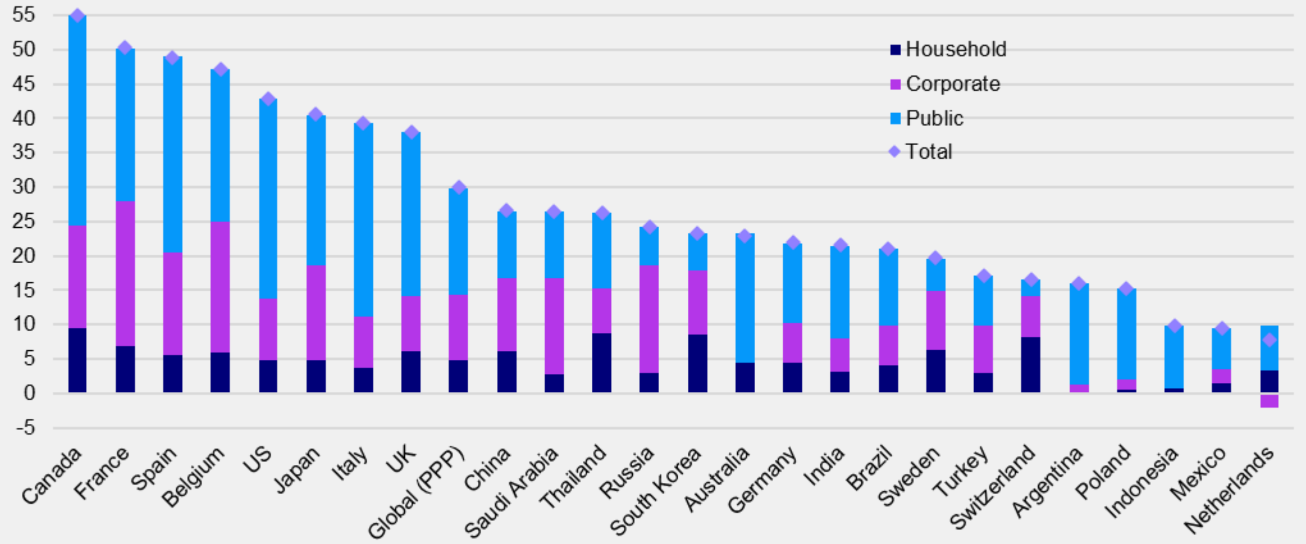
At the other end of the spectrum, gains in corporate debt accounted for a large proportion of the rise in debt in countries such as Russia and Saudi Arabia, perhaps because such debt is a large part of the total within those countries (see **Figure 3**).

Among larger economies, the US, UK, Italy and Spain stand out with gains in public sector debt that account for a larger than average share of the rise in overall national debt. The US can at least feel that it has reaped the economic benefits of that government support, with faster than average growth, but it is hard to conclude likewise for the European countries in this list (government spending may have prevented an even worse outcome but hasn't really sparked dynamic growth beyond an automatic rebound).

So where does this leave accumulated debt across countries? **Figure 3** shows debt-to-GDP ratios for the 25 countries that we follow. As has been the case for some time, the countries with the biggest debt burdens are to be found in the developed world, with Japan once again leading the way (its debt-to-GDP ratio increased from 378.3% in 2019 to 418.9% in 2020, according to BIS data). France and Belgium now have debt burdens above 370% of GDP and Canada's is just short of 360%, having experienced the biggest rise among the countries we follow.

Having advanced rapidly since 2008 (139% of GDP), China's debt burden had reached 252% in 2016 but then levelled out in the 250%-260% range until jumping to 290% in 2020. Nevertheless, we now hear much less concern about China's debt problem.

Figure 2 – Change in non-financial sector debt/GDP ratios during 2020 (%)



Note: Based on year-end local currency non-financial sector debt-to-GDP ratios. "Global (PPP)" uses BIS "All reporting countries" data, using PPP exchange rates (it is based on a larger sample of countries than is shown in the chart). The change is calculated as the end-2020 debt to GDP ratios minus those of end-2019. The countries shown are the 25 largest in the world by GDP, as of 2019. Source: BIS and Invesco

Invesco

Indeed, China fell down the debt league table from 9th in 2019 to 12th in 2020. This should come as no surprise given that China's economy recovered more rapidly than most. Also moving down the league table were Switzerland (from 7th to 9th on 302% of GDP), Belgium (2nd to 3rd), Netherlands (4th to 5th), Argentina (20th to 21st) and Turkey (21st to 22nd).

The big movers in the other direction were Spain (from 10th to 7th on 309%) and Russia (from 22nd to 20th on 137%), with smaller moves for France (3rd to 2nd), Canada (5th to 4th), Italy (11th to 10th) and the US (12th to 11th).

Of course, the real question is whether these changes in debt burdens have any meaning. If increased debt renders financial systems less stable (or more vulnerable to shocks), then higher debt ratios may be considered to increase the general level of investment risk. This may only be a background concern but it is nonetheless present.

However, debt is unlikely to become a problem unless debt service ratios rise. Governments have the luxury of being able to use the tax system to increase income if debt service ratios increase. The private sector has no such ability (raising prices may damage sales), so it is perhaps more important to focus on the affordability of private sector debt. There are two items of good news concerning the rise in debt burdens during 2020: first, to the extent some of the rise in debt-to-GDP ratios was due to falling GDP, those debt ratios may decline as economies rebound (we estimate around one-fifth of the rise in global debt ratios was due to GDP) and, second, the decline in bond yields and interest rates during 2020 helped to depress debt service costs.

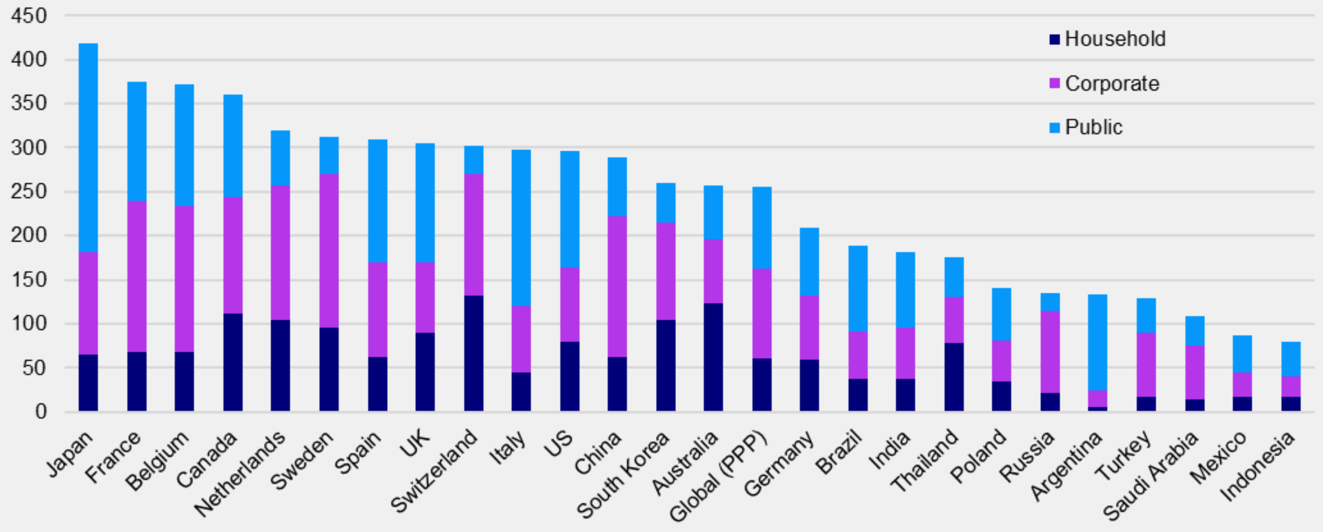
In fact, BIS data suggests that private sector debt service ratios fell between the end of 2019 and the end of 2020 in a range of countries: Australia, Brazil, Canada, Indonesia, Netherlands, Poland and the US. Of the other countries, the most sizeable increases in debt service ratios occurred in Turkey (13.7% to 17.4%), Sweden (23.7% to 26.3%), France (19.5% to 21.5%), Japan (14.7% to 16.3%), China (19.3% to 20.8%) and Belgium (19.0% to 20.4%). BIS debt service ratios compare interest costs to gross disposable income.

Of course, just as we expect GDP to rebound, we think interest costs will eventually increase. Also, debt levels often continue to increase during the early stages of economic recovery and this may be even more so this time with the ending of government support measures. Hence, debt ratios may not fall as rapidly as might be expected in the early stages of this economic recovery and debt service ratios could rise along with bond yields.

If private sector debt is to become a risk, we suppose the biggest threat would be in countries where debt service ratios are the highest. As of end-2020 this list of countries would be Sweden (private sector debt service ratio of 26.3%), Canada (23.6%), France (21.5%), South Korea (20.9%), China (20.8%) and Belgium (20.4%). For the most part, those are the countries in which private sector debt is the most elevated.

Unless stated otherwise, all data as of 29 June 2021.

Figure 3 – Non-financial sector debt/GDP in 2020 (%)



Note: "Global" uses BIS "All reporting countries" data and is calculated using PPP exchange rates (it is based on a larger sample of countries than is shown in the chart). The countries shown were the 25 largest in the world by GDP, as of 2019.
Source: BIS, Refinitiv Datastream and Invesco

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

Data as at 29/06/2021		Current	Total Return (USD, %)					Total Return (Local Currency, %)				
	Index	Level/RY	1w	1m	QTD	YTD	12m	1w	1m	QTD	YTD	12m
Equities												
World	MSCI	722	1.0	1.6	7.8	12.8	41.6	1.0	2.3	7.4	13.8	39.0
Emerging Markets	MSCI	1377	2.4	1.5	5.3	7.8	41.8	2.1	2.0	4.0	8.2	37.0
China	MSCI	109	4.5	2.0	2.8	2.3	28.7	4.4	2.2	2.5	2.3	27.5
US	MSCI	4182	1.2	2.7	8.8	14.8	44.7	1.2	2.7	8.8	14.8	44.7
Europe	MSCI	2050	0.1	-0.3	9.0	13.6	37.3	0.2	2.0	7.7	15.9	28.1
Europe ex-UK	MSCI	2585	0.3	0.0	9.6	13.6	38.8	0.2	2.3	8.0	17.1	31.4
UK	MSCI	1147	-0.6	-1.4	6.8	13.4	32.1	0.0	1.1	6.5	12.1	17.2
Japan	MSCI	3898	-0.2	-0.2	0.5	2.2	26.9	-0.4	0.3	0.5	9.4	30.2
Government Bonds												
World	BofA-ML	0.51	0.0	-0.6	1.0	-4.8	-0.1	0.0	0.4	0.7	-2.5	-2.0
Emerging Markets	BBloom	4.30	0.0	1.0	5.9	-1.9	7.6	0.0	1.0	5.9	-1.9	7.6
China	BofA-ML	3.01	0.4	-1.6	2.8	3.5	11.9	0.1	-0.2	1.3	2.2	2.1
US (10y)	Datastream	1.48	0.0	1.3	3.4	-3.5	-5.3	0.0	1.3	3.4	-3.5	-5.3
Europe	Bofa-ML	0.07	0.0	-2.1	0.3	-5.9	5.5	0.0	0.2	-1.0	-3.3	-0.5
Europe ex-UK (EMU, 10y)	Datastream	-0.22	0.1	-2.0	0.5	-5.7	3.3	0.1	0.3	-0.7	-3.1	-2.4
UK (10y)	Datastream	0.77	-0.2	-1.8	1.5	-3.5	7.2	0.4	0.7	1.2	-4.7	-4.9
Japan (10y)	Datastream	0.06	0.2	-0.2	0.5	-6.7	-2.5	0.0	0.2	0.5	-0.1	0.1
IG Corporate Bonds												
Global	BofA-ML	1.67	0.1	0.2	2.6	-1.8	5.5	0.2	1.0	2.2	-1.1	3.3
Emerging Markets	BBloom	3.83	0.0	0.6	3.0	1.1	12.0	0.0	0.6	3.0	1.1	12.0
China	BofA-ML	3.83	0.4	-1.2	2.8	3.6	12.6	0.1	0.2	1.2	2.3	2.8
US	BofA-ML	2.12	0.2	1.5	3.4	-1.3	3.4	0.2	1.5	3.4	-1.3	3.4
Europe	BofA-ML	0.45	0.1	-2.0	1.4	-3.2	9.6	0.1	0.3	0.2	-0.6	3.4
UK	BofA-ML	1.80	-0.2	-1.6	2.2	-1.5	14.8	0.4	0.8	1.9	-2.7	2.5
Japan	BofA-ML	0.37	0.2	-0.3	0.4	-6.1	-1.2	0.0	0.2	0.4	0.5	1.2
HY Corporate Bonds												
Global	BofA-ML	4.52	0.3	0.4	2.6	2.5	15.6	0.3	0.9	2.3	3.0	14.2
US	BofA-ML	4.54	0.4	1.3	2.7	3.6	15.5	0.4	1.3	2.7	3.6	15.5
Europe	BofA-ML	2.85	0.2	-1.7	2.8	0.2	18.2	0.1	0.6	1.5	3.0	11.5
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		-0.58	-0.4	-2.5	1.3	-2.9	5.2	0.0	0.0	-0.1	-0.3	-0.6
UK		0.04	-0.8	-2.5	0.4	1.2	12.6	0.0	0.0	0.0	0.0	0.0
Japan		-0.14	0.1	-0.6	0.2	-6.6	-2.8	0.0	0.0	0.0	0.0	-0.1
Real Estate (REITs)												
Global	FTSE	2009	-0.8	1.1	8.6	15.1	33.3	-0.8	3.4	7.2	18.3	26.0
Emerging Markets	FTSE	1934	-0.2	-2.7	-4.0	0.6	6.8	-0.3	-0.4	-5.2	3.4	0.9
US	FTSE	3398	-0.5	2.7	11.9	22.7	41.1	-0.5	2.7	11.9	22.7	41.1
Europe ex-UK	FTSE	3860	-1.7	-1.3	13.3	5.1	32.3	-1.7	1.0	11.8	8.0	25.0
UK	FTSE	1496	-2.9	-2.6	8.1	12.6	39.1	-2.3	-0.1	7.9	11.3	23.4
Japan	FTSE	2929	-0.5	2.9	5.0	13.4	31.2	-0.7	3.4	5.0	21.4	34.6
Commodities												
All	GSCI	2569	0.9	3.1	14.4	29.9	56.1	-	-	-	-	-
Energy	GSCI	395	0.7	9.2	21.6	47.8	71.0	-	-	-	-	-
Industrial Metals	GSCI	1678	2.9	-3.3	10.0	19.9	50.5	-	-	-	-	-
Precious Metals	GSCI	2049	-0.7	-7.5	3.0	-6.9	0.2	-	-	-	-	-
Agricultural Goods	GSCI	454	1.4	-4.5	7.0	13.5	53.7	-	-	-	-	-
Currencies (vs USD)*												
EUR		1.19	-0.4	-2.4	1.4	-2.6	5.8	-	-	-	-	-
JPY		110.52	0.1	-0.6	0.2	-6.6	-2.7	-	-	-	-	-
GBP		1.38	-0.6	-2.4	0.3	1.2	12.8	-	-	-	-	-
CHF		1.09	-0.3	-2.3	2.5	-3.9	3.3	-	-	-	-	-
CNY		6.46	0.3	-1.5	1.4	1.0	9.6	-	-	-	-	-

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 29/06/2021	Global				
	1w	**1m**	**QTD**	**YTD**	**12m**
Energy	**-1.5**	**1.1**	**-1.4**	**3.2**	**-8.1**
Basic Materials	**0.0**	**-4.7**	**-1.0**	**1.5**	**9.9**
Basic Resources	0.6	-6.0	0.4	3.3	14.9
Chemicals	-0.8	-2.9	-2.8	-0.8	3.8
Industrials	**-0.7**	**-1.3**	**-0.4**	**1.2**	**4.7**
Construction & Materials	-0.4	-2.6	-1.5	1.6	5.1
Industrial Goods & Services	-0.8	-1.1	-0.3	1.1	4.6
Consumer Discretionary	**0.5**	**0.6**	**-1.1**	**-2.7**	**3.7**
Automobiles & Parts	1.5	2.6	-1.1	0.6	39.8
Media	1.1	0.2	-5.3	-7.5	1.4
Retailers	0.5	2.2	-0.2	-4.3	-9.2
Travel & Leisure	-3.2	-5.6	-9.2	-6.2	1.2
Consumer Products & Services	1.6	0.3	3.5	1.2	9.6
Consumer Staples	**-0.6**	**-2.0**	**-2.2**	**-6.4**	**-13.5**
Food, Beverage & Tobacco	-0.5	-2.2	-0.6	-4.6	-10.7
Personal Care, Drug & Grocery Stores	-0.8	-1.5	-5.1	-9.6	-18.5
Healthcare	**0.3**	**2.0**	**1.7**	**-2.9**	**-10.8**
Financials	**-0.3**	**-3.9**	**-1.1**	**4.3**	**5.4**
Banks	-0.5	-4.9	-2.3	5.6	6.2
Financial Services	0.3	-1.3	2.9	5.9	8.0
Insurance	-0.5	-5.6	-4.3	-1.2	-0.7
Real Estate	**-1.2**	**-0.1**	**0.8**	**1.3**	**-7.2**
Technology	**1.5**	**4.9**	**4.0**	**2.9**	**8.5**
Telecommunications	**-1.1**	**-1.4**	**-2.9**	**-3.4**	**-9.9**
Utilities	**-1.5**	**-3.3**	**-5.3**	**-9.0**	**-13.0**

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 (%)

Data as at 29/06/2021	Absolute					Relative to Market				
	1w	1m	QTD	YTD	12m	1w	1m	QTD	YTD	12m
Growth	2.1	4.9	10.8	20.6	57.5	1.0	2.6	2.2	4.8	10.3
Low volatility	-0.1	-1.2	5.3	9.5	29.4	-1.2	-3.3	-2.9	-4.9	-9.3
Price momentum	1.1	-1.9	5.1	11.1	37.2	0.1	-4.0	-3.1	-3.5	-3.9
Quality	1.4	0.5	6.2	20.1	52.1	0.3	-1.7	-2.1	4.3	6.5
Size	-0.3	-3.1	4.7	27.4	77.1	-1.4	-5.2	-3.4	10.7	24.0
Value	0.1	-3.7	5.4	31.7	77.5	-1.0	-5.8	-2.7	14.5	24.3
Market	1.1	2.2	8.4	15.1	42.8					
Market - Equal-Weighted	0.7	-0.1	6.7	18.9	52.5					

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 29/06/2021	Absolute					Relative to Market				
	1w	1m	QTD	YTD	12m	1w	1m	QTD	YTD	12m
Growth	1.2	2.7	12.1	23.2	53.4	1.2	0.9	4.3	5.7	17.8
Low volatility	-0.1	2.9	8.0	14.1	24.4	-0.1	1.1	0.5	-2.1	-4.5
Price momentum	0.4	0.4	5.4	11.5	32.1	0.4	-1.4	-2.0	-4.3	1.5
Quality	-0.4	1.1	8.2	17.4	45.6	-0.5	-0.7	0.6	0.8	11.8
Size	-0.2	0.5	6.2	17.0	48.1	-0.2	-1.3	-1.2	0.4	13.7
Value	-0.8	-1.2	5.4	24.0	56.7	-0.8	-3.0	-2.0	6.5	20.4
Market	0.0	1.8	7.5	16.5	30.2					
Market - Equal-Weighted	0.0	1.2	6.9	15.8	37.7					

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%**		**22%**	
Government	25%	10-40%		**17%**	
US	8%			5%	
Europe ex-UK (Eurozone)	7%			4%	
UK	1%			1%	
Japan	7%			4%	
Emerging Markets	2%			3%	
China**	0.2%			0%	
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%			5%	
Euro	1%			0%	
Equities	**45%**	**25-65%**	↑	**51%**	
US	25%			18%	
Europe ex-UK	7%			12%	
UK	4%		↑	8%	
Japan	4%			5%	
Emerging Markets	5%			8%	
China**	2%			2%	
Real Estate	**8%**	**0-16%**		**16%**	
US	2%			4%	
Europe ex-UK	2%			4%	
UK	1%			1%	
Japan	2%			4%	
Emerging Markets	1%			3%	
Commodities	**2%**	**0-4%**	↓	**1%**	
Energy	1%		↓	0%	
Industrial Metals	0.3%			0%	
Precious Metals	0.3%			0%	
Agriculture	0.3%			1%	
Total	**100%**			**100%**	

Currency Exposure (including effect of hedging)				
USD	48%		↓	39%
EUR	20%			22%
GBP	7%		↑	11%
JPY	15%			14%
EM	9%			14%
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	**6.1%**	**Underweight**	**US**
Basic Materials	**4.5%**	**Neutral**	**Europe**
Basic Resources	2.5%	Neutral	Europe
Chemicals	2.0%	Neutral	US
Industrials	**12.9%**	**Neutral**	**US**
Construction & Materials	1.6%	Neutral	Europe
Industrial Goods & Services	11.3%	Neutral	US
Consumer Discretionary	**16.2%**	**Overweight**	**US**
Automobiles & Parts	2.8%	Underweight	Japan
Media	1.3%	Overweight	US
Retailers	5.8%	Neutral	US
Travel & Leisure	2.2%	Overweight	US
Consumer Products & Services	4.0%	Overweight	EM
Consumer Staples	**6.3%**	**Overweight**	**Japan**
Food, Beverage & Tobacco	4.1%	Overweight	Japan
Personal Care, Drug & Grocery Stores	2.2%	Underweight	Europe
Healthcare	**9.8%**	**Underweight**	**Europe**
Financials	**14.7%**	**Neutral**	**Japan**
Banks	7.4%	Underweight	Japan
Financial Services	3.8%	Overweight	US
Insurance	3.4%	Neutral	Europe
Real Estate	**3.4%**	**Overweight**	**EM**
Technology	**18.9%**	**Overweight**	**US**
Telecommunications	**4.0%**	**Neutral**	**Europe**
Utilities	**3.2%**	**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

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

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