Uncommon truths
China in the balance

China continues to invest more than other nations. That may depress capital efficiency. However, saving is even higher, which makes China self-financing and more balanced than many countries.

The title of this document could refer to the recent increase in Covid-19 cases and deaths in China but it doesn't. Equally, it could refer to China's increasing isolation on the world's geopolitical stage. Again, it doesn't. What is referenced is the thorny question of whether China's economy is out of balance.

It is received wisdom among many commentators that the Chinese economy is fundamentally imbalanced, the only questions being to what extent and with what eventual consequences. Over recent years we have published extensive picture books about China and its financial system to test that hypothesis and have generally concluded that, though there are some issues, the problems have been greatly exaggerated (see Pictures of China from September 2015 and More pictures of China from May 2018).

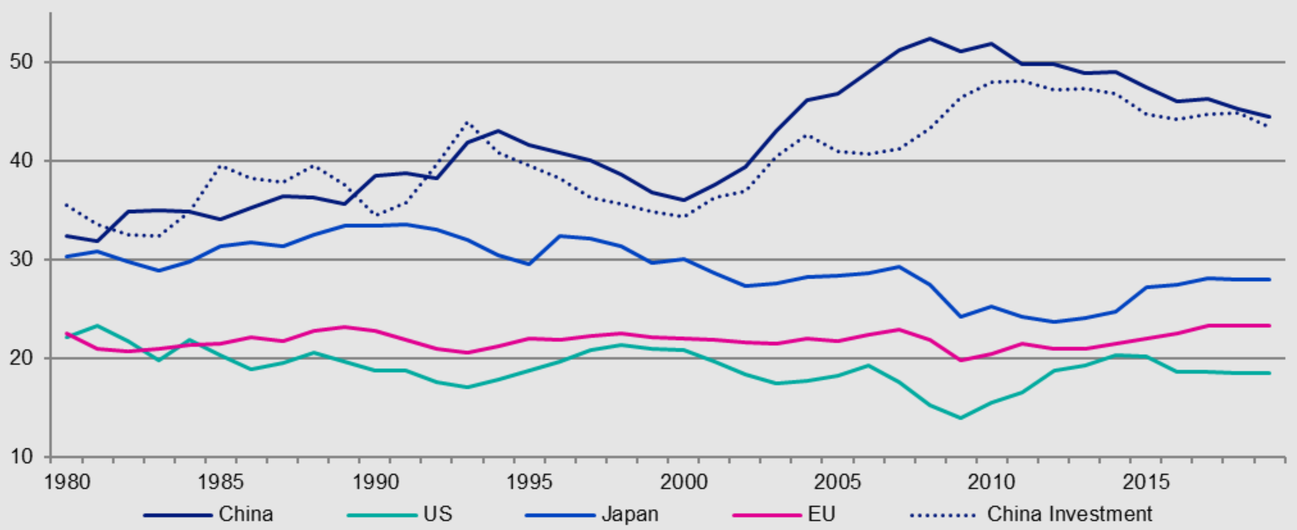
This is the first in a series of mini updates to those tomes and focuses on the overall balance of the economy. Subsequent editions will focus on investment spending, the banking sector and the broader financial system (including shadow banking).

As background, it is well known that China faces a demographic challenge. UN estimates suggest the working age population (20-64-year olds) has already started to shrink. Having grown by 43% in the 30 years to 2020, the UN expects a 17% decline in the next 30 years, with a further 22% decline in the 30 years thereafter. We think that suggests less economic growth in the future (unless GDP per capita accelerates). Though the world faces demographic issues, the problem is far worse in China than in the rest of the world. Looking to 2100, the UN expects annualised working age population growth of -0.7% in China versus +0.5% in the rest of the world (growth rates since 1950 were +1.7% and +1.8%, respectively).

We suspect that demographic drag was one of the factors behind the gradual decline in China's GDP growth rate over recent years (ignoring the peak growth years of 2007-11, World Bank data suggests a steady decline from 7.9% in 2012 to 6.1% in 2019). 2020 has been an altogether different story as a result of Covid-19, with GDP growth of -9.8% QOQ in Q1 followed by +11.5% in Q2 (according to China's National Bureau of Statistics). The net result was that first-half GDP was 1.6% below the year ago level, which is quite a deficit versus the circa 6% growth that might otherwise have been expected. Hope may come from the improving trend but reported daily Covid-19 infections have gone above 200 in recent days. This is well below the rate seen elsewhere but is the highest reported in China since February. If that continues, further lockdowns may be imminent.

Returning to the long term, one solution to the demographic deficit could be to boost productivity via more investment spending. However, excessive investment is one of the charges frequently levelled at China. **Figure 1** shows that investment accounted for 40%-50% of GDP for most of this century (dotted line). That is indeed high, especially when compared to the 20%-25% typically seen in the EU, Japan and the US.

Figure 1 – Gross national saving as a percent of GDP (1980-2019)



Note: Annual data from 1980 to 2019. "China Investment" shows Chinese investment spending as % of GDP.
Source: IMF and Invesco

Even Japan and South Korea didn't reach such levels during their development phases, when their investment/GDP ratios peaked at around 39%. We can think of two reasons why high levels of investment could be problematic: first, because it drives down the marginal efficiency of capital, thus acting as a drag on future growth and, second, because it is not affordable, thus requiring financing from overseas.

Our original documents pointed to a decline in capital productivity (GDP/capital) and marginal efficiency of capital (GDP gain per unit of investment) and we will return to this topic in a future edition. For now, we will focus on the affordability of China's investment, which is why **Figure 1** is focused on saving. As can be seen, though China has been investing a lot, it has been saving even more since the mid-1990s (often said to be due to the lack of a social safety net).

One implication of saving exceeding investment is consistent current account surpluses (the size of which can be judged by the gap between saving and investment in **Figure 1**). It could perhaps have been argued in the 2007-09 period that China's current account surplus was excessive (saving was way too high relative to investment). However, that imbalance has since diminished, initially due to a rise in investment but more recently because saving has fallen more than investment (as percentages of GDP).

A second implication of consistent current account surpluses is that China has been able to finance its own investment spending while also providing finance to the rest of the world. China may have a lot of debt but it is owed to itself, which makes it hard for a debt crisis to be imposed from outside.

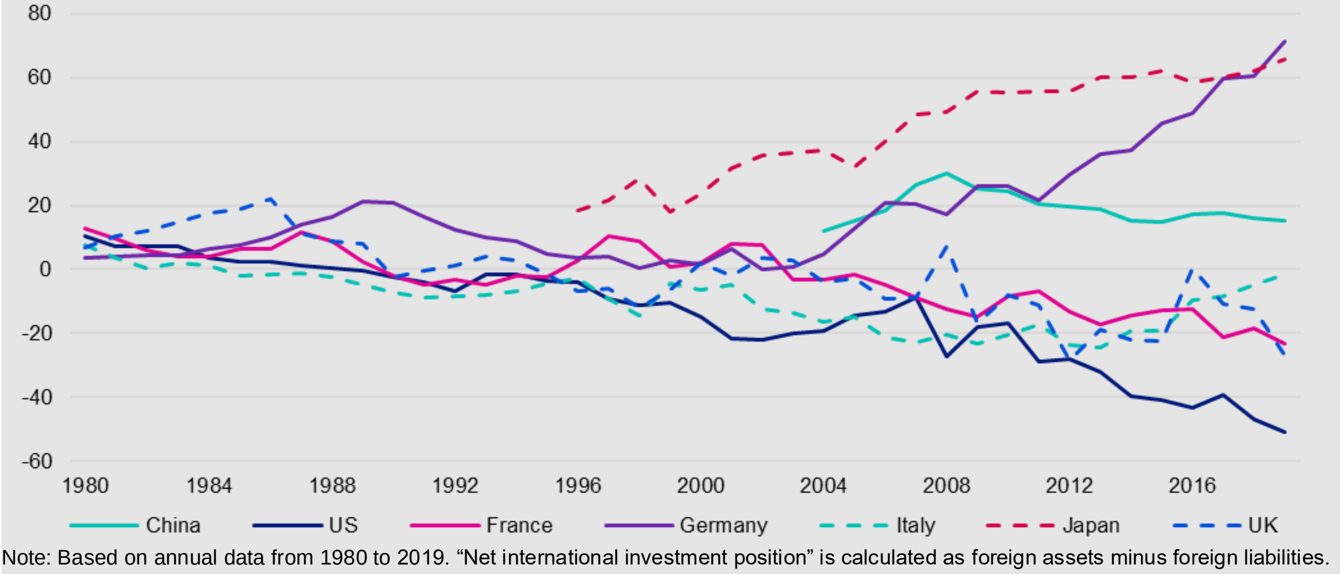
China's status as an international creditor can be seen in **Figure 2**, which shows net international investment positions (NIIP) as a percent of GDP. NIIPs are the result of accumulated current account surpluses and deficits. For example, Germany's NIIP/GDP ratio has been increasing because current account surpluses have exceeded 6% of GDP in most years since 2006. Japan has a similar creditor status, as does Switzerland (NIIP of 117% of GDP in 2019 but not shown). China is not in that league and its NIIP/GDP ratio has been trending down in recent years because GDP has grown faster than NIIP. It is on the right side of zero but does not appear imbalanced.

On the other hand, a range of countries are net debtors and are heading in the wrong direction, with worsening imbalances, including France and the UK (Italy has seen improvement). The US appears to be in a league of its own among debtors, though Turkey (not shown) is nearly as bad (47% of GDP in 2019). It is not as though the US invests too much (around 20% of GDP in recent years) but rather that it saves too little (less than 19% of GDP in 2019). Luckily, the US owns the world's reserve currency, otherwise we doubt it would get away with such an imbalance.

In conclusion, China may invest a lot and this may depress returns on investment. However, it is self-financing and from this perspective has fewer imbalances than the US, the UK and France. That is relatively comforting from a financial stability perspective. Among surplus countries, it appears better balanced than Germany and Japan, which could ease growing geopolitical pressures on China.

Unless stated otherwise, all data as of 31 July 2020

Figure 2 – Net international investment position as percent of GDP (1980-2019)



Note: Based on annual data from 1980 to 2019. "Net international investment position" is calculated as foreign assets minus foreign liabilities.
Source: IMF and Invesco

Invesco

Figure 3 – Asset class total returns

Data as at 31/07/2020	Index	Current Level/RY	Total Return (USD, %) 1w	1m	QTD	YTD	12m	Total Return (Local Currency, %) 1w	1m	QTD	YTD	12m
Equities												
World	MSCI	552	0.8	5.3	5.3	-1.0	7.8	0.4	4.0	4.0	-1.3	6.8
Emerging Markets	MSCI	1079	1.8	9.0	9.0	-1.5	6.9	1.7	8.2	8.2	2.4	11.1
US	MSCI	3154	1.9	5.9	5.9	3.6	13.1	1.9	5.9	5.9	3.6	13.1
Europe	MSCI	1590	-1.5	3.9	3.9	-9.0	-0.8	-3.3	-1.4	-1.4	-12.5	-7.2
Europe ex-UK	MSCI	1993	-1.6	4.6	4.6	-4.4	4.2	-3.2	-0.5	-0.5	-9.5	-2.4
UK	MSCI	909	-1.2	1.4	1.4	-22.2	-15.0	-3.7	-4.5	-4.5	-21.4	-20.7
Japan	MSCI	3105	-4.6	-1.6	-1.6	-8.4	1.7	-4.7	-3.6	-3.6	-10.9	-0.9
Government Bonds												
World	BofA-ML	0.20	1.0	3.3	3.3	7.5	8.4	0.3	0.9	0.9	5.3	5.4
Emerging Markets	BBloom	4.92	1.0	5.0	5.0	2.3	3.9	1.0	5.0	5.0	2.3	3.9
US (10y)	Datastream	0.54	0.5	1.2	1.2	16.0	17.9	0.5	1.2	1.2	16.0	17.9
Europe	Bofa-ML	-0.04	2.1	6.4	6.4	8.7	10.2	0.4	1.1	1.1	3.2	3.8
Europe ex-UK (EMU, 10y)	Datastream	-0.56	2.6	5.9	5.9	9.3	7.4	0.8	0.6	0.6	3.7	1.1
UK (10y)	Datastream	0.07	2.9	6.8	6.8	6.4	13.8	0.2	0.5	0.5	7.4	6.1
Japan (10y)	Datastream	0.02	0.1	2.3	2.3	2.7	1.3	0.0	0.2	0.2	-0.1	-1.3
IG Corporate Bonds												
Global	BofA-ML	1.65	0.8	4.2	4.2	7.0	10.1	0.3	2.6	2.6	5.8	8.2
Emerging Markets	BBloom	4.36	0.6	3.6	3.6	4.9	10.3	0.6	3.6	3.6	4.9	10.3
US	BofA-ML	1.98	0.2	3.2	3.2	8.1	12.0	0.2	3.2	3.2	8.1	12.0
Europe	BofA-ML	0.67	2.0	6.9	6.9	5.6	5.9	0.3	1.5	1.5	0.2	-0.3
UK	BofA-ML	1.79	3.1	8.2	8.2	4.2	14.1	0.4	1.9	1.9	5.1	6.4
Japan	BofA-ML	0.49	0.2	2.3	2.3	2.6	2.3	0.1	0.3	0.3	-0.2	-0.4
HY Corporate Bonds												
Global	BofA-ML	5.99	0.9	4.8	4.8	0.4	4.0	0.6	3.8	3.8	-0.5	2.8
US	BofA-ML	6.03	0.9	4.8	4.8	-0.2	3.1	0.9	4.8	4.8	-0.2	3.1
Europe	BofA-ML	4.36	1.5	7.2	7.2	1.8	5.2	-0.2	1.8	1.8	-3.3	-0.9
Cash (Overnight LIBOR)												
US		0.09	0.0	0.0	0.0	0.3	1.1	0.0	0.0	0.0	0.3	1.1
Euro Area		-0.58	1.0	4.8	4.8	4.7	5.7	0.0	-0.1	-0.1	-0.3	-0.6
UK		0.05	2.3	5.6	5.6	-1.1	8.1	0.0	0.0	0.0	0.2	0.4
Japan		-0.10	0.3	1.9	1.9	2.5	2.6	0.0	0.0	0.0	-0.1	-0.1
Real Estate (REITs)												
Global	FTSE	1613	2.8	2.9	2.9	-18.8	-13.2	1.1	-2.3	-2.3	-22.9	-18.2
Emerging Markets	FTSE	1932	0.5	3.3	3.3	-19.6	-11.3	-1.2	-1.9	-1.9	-23.7	-16.5
US	FTSE	2595	4.9	3.5	3.5	-17.9	-13.9	4.9	3.5	3.5	-17.9	-13.9
Europe ex-UK	FTSE	3203	2.5	5.9	5.9	-13.0	-1.0	0.8	0.6	0.6	-17.4	-6.7
UK	FTSE	1208	5.5	8.5	8.5	-23.2	2.3	2.8	2.2	2.2	-22.5	-4.6
Japan	FTSE	2300	-1.9	-0.8	-0.8	-22.1	-16.0	-2.1	-2.8	-2.8	-24.2	-18.2
Commodities												
All	GSCI	1713	-0.6	3.8	3.8	-33.9	-31.2	-	-	-	-	-
Energy	GSCI	236	-2.4	2.6	2.6	-52.6	-50.2	-	-	-	-	-
Industrial Metals	GSCI	1195	0.8	6.8	6.8	-1.9	-1.0	-	-	-	-	-
Precious Metals	GSCI	2283	3.4	10.3	10.3	27.6	35.8	-	-	-	-	-
Agricultural Goods	GSCI	306	0.4	1.4	1.4	-12.1	-8.7	-	-	-	-	-
Currencies (vs USD)*												
EUR		1.18	1.0	4.8	4.8	5.0	6.3	-	-	-	-	-
JPY		105.90	0.3	2.0	2.0	2.6	2.7	-	-	-	-	-
GBP		1.31	2.6	6.2	6.2	-0.9	7.2	-	-	-	-	-
CHF		1.10	0.8	3.8	3.8	6.0	8.9	-	-	-	-	-
CNY		6.98	0.6	1.3	1.3	-0.2	-1.3	-	-	-	-	-

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

Invesco

Figure 4 – World equity sector total returns relative to market (%)

Data as at 31/07/2020	Global				
	1w	**1m**	**QTD**	**YTD**	**12m**
Energy	**-2.3**	**-5.3**	**-5.3**	**-29.4**	**-32.4**
Basic Materials	**-1.5**	**2.7**	**2.7**	**1.9**	**1.8**
Basic Resources	-0.6	4.9	4.9	4.6	6.7
Chemicals	-2.5	0.2	0.2	-1.2	-4.0
Industrials	**-1.4**	**-1.6**	**-1.6**	**-5.6**	**-6.0**
Construction & Materials	-2.0	-0.6	-0.6	-6.5	-4.7
Industrial Goods & Services	-1.3	-1.7	-1.7	-5.5	-6.2
Consumer Discretionary	**-0.4**	**0.6**	**0.6**	**4.5**	**3.4**
Automobiles & Parts	-4.4	0.3	0.3	-1.4	0.4
Media	0.2	1.1	1.1	-3.7	-4.5
Retailers	1.5	3.3	3.3	26.0	24.1
Travel & Leisure	-2.4	-4.6	-4.6	-24.5	-26.6
Consumer Products & Services	-0.8	-0.8	-0.8	3.9	3.5
Consumer Staples	**0.1**	**0.6**	**0.6**	**0.8**	**-2.2**
Food, Beverage & Tobacco	-0.3	0.4	0.4	-2.8	-8.4
Personal Care, Drug & Grocery Stores	0.8	1.0	1.0	7.8	6.5
Healthcare	**-0.2**	**-0.8**	**-0.8**	**11.3**	**16.2**
Financials	**-2.0**	**-1.9**	**-1.9**	**-17.9**	**-18.4**
Banks	-2.6	-4.1	-4.1	-25.3	-25.9
Financial Services	-1.2	-0.1	-0.1	-8.0	-7.2
Insurance	-1.6	0.1	0.1	-14.2	-15.4
Real Estate	**1.8**	**-1.4**	**-1.4**	**-10.5**	**-11.5**
Technology	**3.8**	**3.2**	**3.2**	**26.5**	**32.1**
Telecommunications	**-0.5**	**-0.5**	**-0.5**	**1.7**	**-1.5**
Utilities	**0.1**	**1.9**	**1.9**	**-0.5**	**-1.4**

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 5a – US factor index total returns (%)

Data as at 31/07/2020	Absolute					Relative to Market				
	1w	1m	QTD	YTD	12m	1w	1m	QTD	YTD	12m
Growth	1.5	6.2	36.7	7.2	17.8	-0.3	0.6	7.3	4.7	5.2
Low volatility	1.7	7.4	27.3	7.0	12.5	-0.1	1.7	0.0	4.5	0.5
Price momentum	2.7	7.0	29.0	6.0	11.0	1.0	1.3	1.3	3.6	-0.9
Quality	0.9	5.5	28.0	-4.5	3.3	-0.9	-0.1	0.6	-6.8	-7.7
Size	-0.7	3.3	35.4	-20.6	-15.2	-2.4	-2.3	6.3	-22.5	-24.3
Value	-1.6	0.3	33.5	-22.7	-17.2	-3.3	-5.1	4.8	-24.5	-26.1
Market	1.8	5.6	27.3	2.4	12.0					
Market - Equal-Weighted	0.6	4.8	27.6	-6.4	0.6					

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

Figure 5b – European factor index total returns relative to market (%)

Data as at 31/07/2020	Absolute					Relative to Market				
	1w	1m	QTD	YTD	12m	1w	1m	QTD	YTD	12m
Growth	-1.8	1.0	24.1	0.7	12.3	1.2	2.0	10.1	15.2	18.2
Low volatility	-0.9	0.9	15.6	-5.9	1.5	2.1	1.8	2.6	7.6	6.9
Price momentum	-0.8	3.1	22.2	2.2	11.9	2.2	4.0	8.4	16.9	17.8
Quality	-2.7	-0.3	18.8	-14.8	-1.2	0.3	0.6	5.4	-2.5	4.0
Size	-2.0	-0.1	21.2	-18.1	-4.4	1.0	0.8	7.5	-6.4	0.7
Value	-5.8	-4.1	11.9	-31.2	-22.6	-2.9	-3.2	-0.8	-21.3	-18.5
Market	-3.0	-0.9	12.7	-12.6	-5.0					
Market - Equal-Weighted	-2.6	0.1	16.7	-13.8	-4.7					

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

Invesco

Figure 6 – Model asset allocation

	Neutral	Policy Range		Allocation	Position vs Neutral	Hedged	Currency
Cash	**5%**	**0-10%**	↑	**10%**			
Cash	2.5%		↑	10%			
Gold	2.5%		↓	0%			
Bonds	**45%**	**10-80%**	↑	**51%**			
Government	30%	10-50%	↑	25%			
US	10%		↑	12%			
Europe ex-UK (Eurozone)	8%			0%			
UK	2%		↑	4%			
Japan	8%		↑	5%			
Emerging Markets	2%			4%			
Corporate IG	10%	0-20%		20%			
US Dollar	5%			10%			
Euro	2%			2%			
Sterling	1%			4%			
Japanese Yen	1%			1%			
Emerging Markets	1%			3%			
Corporate HY	5%	0-10%	↑	6%			
US Dollar	4%		↑	6%			
Euro	1%			0%			
Equities	**40%**	**20-60%**	↓	**25%**			
US	24%			14%			
Europe ex-UK	6%		↓	0%			
UK	3%		↓	3%			
Japan	3%		↓	5%			
Emerging Markets	4%		↑	4%			
Real Estate	**8%**	**0-16%**	↓	**12%**			
US	2%		↓	2%			
Europe ex-UK	2%			2%			
UK	1%		↓	0%			
Japan	2%			5%			
Emerging Markets	1%			3%			
Commodities	**2%**	**0-4%**	↓	**2%**			
Energy	1%		↓	1%			
Industrial Metals	0.3%		↓	0%			
Precious Metals	0.3%			0%			
Agriculture	0.3%			1%			
Total	**100%**			**100%**			
Currency Exposure (including effect of hedging)							
USD	49%		↑	51%			
EUR	20%		↓	4%			
GBP	7%		↓	12%			
JPY	15%			18%			
EM	8%		↑	14%			
Total	**100%**			**100%**			

Notes: 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 7 – Model allocations for Global sectors

	Neutral	Invesco	
Energy	**4.2%**	**Neutral**	↓
Basic Materials	**4.2%**	**Neutral**	
Basic Resources	2.3%	Underweight	
Chemicals	2.0%	Overweight	
Industrials	**12.4%**	**Underweight**	
Construction & Materials	1.5%	Underweight	
Industrial Goods & Services	10.9%	Underweight	
Consumer Discretionary	**14.5%**	**Underweight**	
Automobiles & Parts	2.1%	Underweight	↓
Media	1.3%	Underweight	
Retailers	5.4%	Neutral	
Travel & Leisure	1.9%	Underweight	
Consumer Products & Services	3.9%	Neutral	↑
Consumer Staples	**7.4%**	**Overweight**	
Food, Beverage & Tobacco	4.7%	Overweight	
Personal Care, Drug & Grocery Stores	2.7%	Overweight	
Healthcare	**11.0%**	**Neutral**	
Financials	**14.7%**	**Neutral**	
Banks	6.7%	Overweight	
Financial Services	4.4%	Neutral	
Insurance	3.6%	Underweight	
Real Estate	**3.9%**	**Overweight**	
Technology	**19.2%**	**Overweight**	
Telecommunications	**4.9%**	**Neutral**	
Utilities	**3.6%**	**Neutral**	↑

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

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 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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