



Uncommon truths

Private equity is from Mars; hedge funds are from Venus

What role can alternative assets play in our model asset allocation framework? We look at real estate, commodities, private equity, hedge funds, diamonds and fine wines. We think some are core assets, others tactical while some have no role. We also examine how they have coped during 2020.

We are often asked for views on alternative assets, by which we guess people mean non-liquid assets that are usually beyond the reach of the average investor. Examples could include direct real estate investments, private equity and many hedge fund strategies (distressed assets, merger arbitrage etc.). Commodities may also fall into this category, given the difficulty of delivery and storage. Many such assets have now become more accessible (REITs, private equity funds, publicly traded hedge funds, commodity funds and certificates etc.) but many investors still consider them to be alternative.

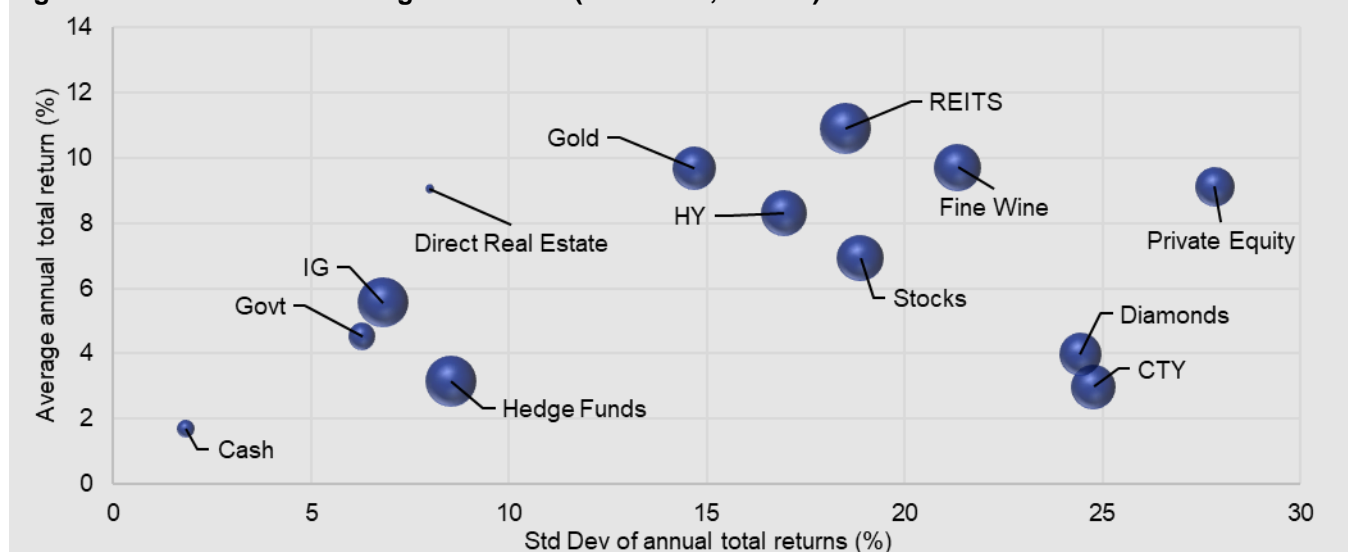
There is, of course, another category of alternatives which can best be described as collectibles: real assets that are often collected for reasons other than financial gain. However, they often rise in price over the long term. Examples include, fine wines, rare stamps and coins, art, jewellery, baseball cards etc. Collectibles for the most part lack a liquid market and the worth of an asset is often judged by the most recent sale price of an equivalent asset.

For the purposes of this analysis we are primarily interested in what role hedge funds and private equity could play in our asset allocation framework, which already includes commodities (see **Figure 8**). We also compare direct real estate with REITs. Finally, we look at those collectibles for which we have been able to find reasonable data: fine wines and diamonds.

Figure 1 puts some of those alternative assets into the risk-reward space that we use for traditional assets. Note that if we started the analysis one year earlier, the private equity bubble would be much higher (17.5% average annual return versus 9.1%) and further to the right (46.1% standard deviation versus 27.8%) due to the outsized 184% return in 1999. However, we think **Figure 1** is a better representation of what we would expect from private equity over time (a bit more return than stocks but with more volatility).

Among other interesting features in **Figure 1** is the fact that direct real estate seems to give lower returns than REITs, though with lower volatility and less correlation with other assets (the smaller the bubble, the less the correlation). This may be due to the fact we are comparing US direct real estate with global REITs but the comparison is even starker with US REITs, which produced higher returns than global REITs over the period considered, with similar volatility.

Figure 1 – Risk and reward on global assets (2000-2019, in USD)



Note: Based on calendar year data from 2000 to 2019 (except for diamonds which is from 2003 to 2019). Area of bubbles is in proportion to average correlation with the other assets in the chart. Calculated using total return indices in US dollars unless stated otherwise: spot price of gold per ounce, spot price of one carat flawless diamonds (Polished Prices Index), BofAML 0-3 month US treasury total return index (Cash), BofAML Global Government Index (Govt), BofAML Global Corporate Index (IG), BofAML Global HY Index (HY), GPR General World Index (REITs), S&P GSCI total return index for commodities (CTY), MSCI World Index (Stocks), Hedge Fund Research Global Hedge Fund Index (Hedge Funds), LPX Major Market Listed Private Equity Index (Private Equity), US NCREIF Property Total Return Index (Direct Real Estate), Liv-ex Fine Wine Investable (Fine Wine, price index converted to US dollars). Past performance is no guarantee of future results. Source: Bloomberg, Refinitiv Datastream, BofA ML, MSCI, Polished Prices, S&P GSCI, GPR, LPX, FHFA, Liv-ex, Hedge Fund Research, Invesco



Interestingly, direct real estate would be close to the efficient frontier for the 2000-2019 period, suggesting it could play a role in optimal portfolios (note that REITs would be at one end of the efficient frontier, with cash at the other end).

It would also appear that gold would be close to the efficient frontier, though we suspect this is an outcome very specific to the period considered. The price of gold was below \$300 at the start of 2000, which was close to a multi-decade low in real terms. It has since climbed to around \$1700, which is well above the long-term historical average (since 1833) of around \$600 (expressed in today's prices). As shown in the [21st Century Portfolio](#), the positioning of gold within the risk-reward framework over the long-term is very similar to that of broad commodity indices (CTY) in **Figure 1**. Note that diamonds have produced a similar outcome to CTY since 2000.

Turning to hedge funds and private equity, they would appear to have very different characteristics. Over the period considered, hedge funds appear to have produced less return with more volatility than government debt (and with higher correlation to other assets). **Figure 2** also shows that hedge funds have experienced more downside than government debt (again based on calendar year returns).

Over the period considered hedge funds could be grouped with fixed income assets such as cash,

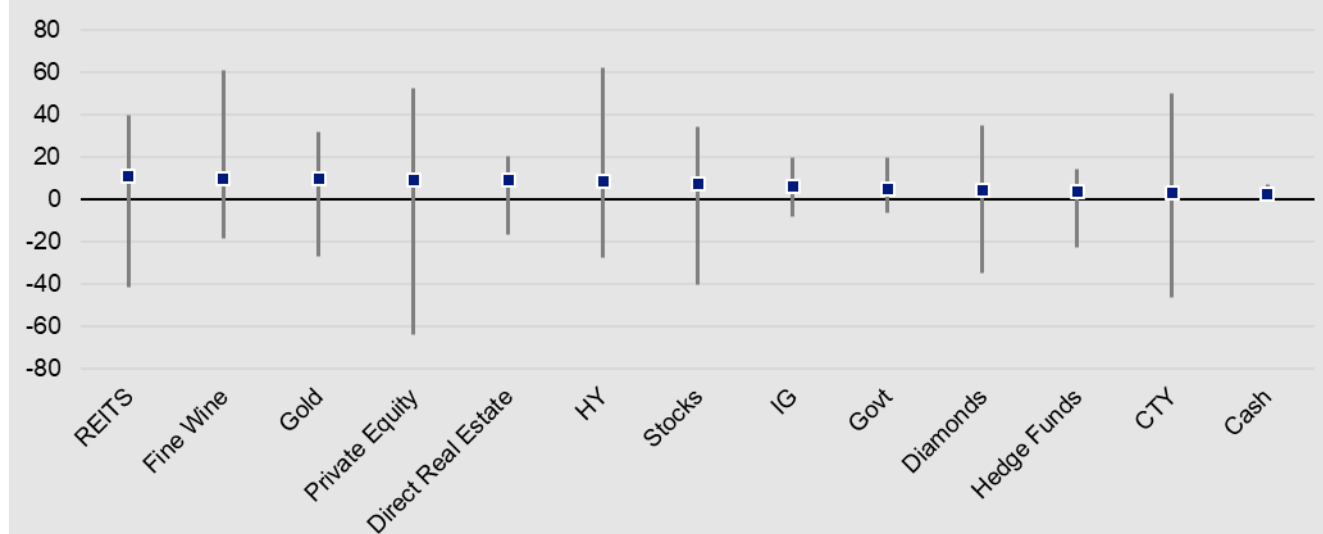
government debt and investment-grade credit (IG). However, they could be said to have been dominated by government bonds and didn't offer a viable trade-off (in terms of getting more return in exchange for more risk). Nevertheless, they did offer an option versus cash – it is a matter of personal choice as to whether we prefer the higher returns of hedge funds, given that they come with higher volatility than cash.

Private equity, on the other hand, is where we might have expected it to be in relation to publicly quoted equities (more return but with more volatility), as evidenced in **Figures 1 & 2**. Based on this, we would guess that private equity performs particularly well in market upswings and poorly in downswings. Indeed, this would appear to be the case, based on the asset class betas shown in **Figure 3** (note that the betas are calculated relative to stocks, which we use as a proxy for the economic and market cycle).

Private equity (1.27) is the only asset class with a beta relative to stocks above 1.0, though high-yield (0.69) and REITs (0.77) also have elevated betas, which is why we group them along with equities into an “equity-like” category. Our analysis would suggest that we can now add private equity to that group.

Given their different characteristics, it could be said that private equity is from Mars (which blows hot and cold), while hedge funds are from Venus (where the temperature is relatively stable, if extremely hot).

Figure 2 – Maximum, minimum and average annual global asset total returns since 2000 (% in USD)



Note: Based on calendar year data from 2000 to 2019 (except for diamonds which is from 2003 to 2019). Blue squares show the average annual return over the period considered. Arranged in descending order based on average annual return. Calculated using total return indices in US dollars unless stated otherwise: spot price of gold per ounce, spot price of one carat flawless diamonds (Polished Prices Index), BofAML 0-3 month US treasury total return index (Cash), BofAML Global Government Index (Govt), BofAML Global Corporate Index (IG), BofAML Global HY Index (HY), GPR General World Index (REITs), S&P GSCI total return index for commodities (CTY), MSCI World Index (Stocks), Hedge Fund Research Global Hedge Fund Index (Hedge Funds), LPX Major Market Listed Private Equity Index (Private Equity), US NCREIF Property Total Return Index (Direct Real Estate), Liv-ex Fine Wine Investable (Fine Wine, price index converted to US dollars). Past performance is no guarantee of future results. Source: Bloomberg, Refinitiv Datastream, MSCI, BofA ML, Polished Prices, S&P GSCI, GPR, LPX, FHFA, Liv-ex, Hedge Fund Research, Invesco



Interestingly, direct real estate is at the other end of the scale to REITs, with a beta close to zero (0.04) and low volatility (suggesting no cyclical). Of course, the problem with direct real estate is one of liquidity (the sale price may not match the estimations that go into the indices). As with selling a home, such assets are only worth what a buyer will pay when we want to sell and liquidity has habit of drying up when we most need it.

There are of course ways to console oneself if things go wrong. **Figures 1 and 2** suggest that fine wine investments have performed somewhere between private equity and REITs, though with less cyclical (Figure 3). If delivery can be taken in kind, investment could turn to consumption, though we must then accept the disappointment of corked bottles (the vintners equivalent of default risk!).

If the role of private equity in a diversified portfolio seems clear (high beta exposure to market upswings), that of hedge funds is less obvious. However, perhaps we are being overly harsh on hedge funds: first, it is always possible that the last 20 years is not representative of their performance and, second, there is a wide spectrum of hedge fund strategies and grouping them all together may be wrong.

Concerning the representativeness of the last 20 years, it is interesting to note that among the 13 asset classes we consider, hedge funds were in the top three

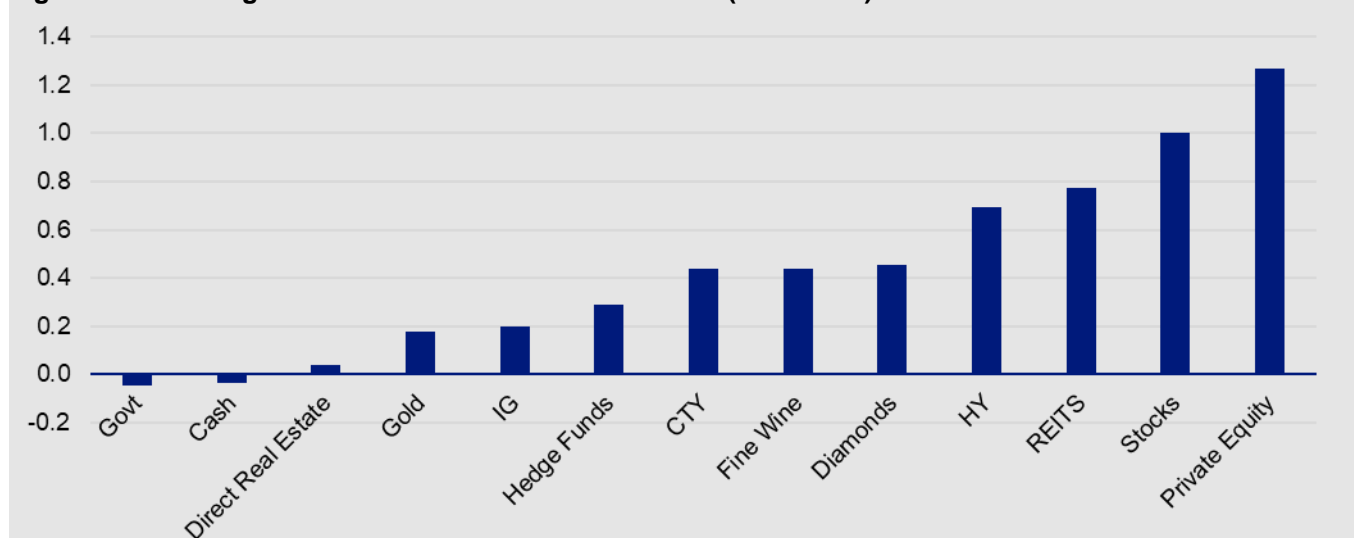
performers in 1999, 2000 and 2001. However, until 2020 they had since been among the top half of assets only once (2013). That is a long time to be out of favour: we doubt it is an unrepresentative period.

There is a plethora of hedge fund strategies. The performance records of the more common strategies suggest to us that they behave more like cash and government bonds than equities. This is true even for equity hedge funds (see **Figure 4**). Indeed, the risk-reward profiles of many strategies appear to be somewhere between those of cash and stocks. This is true for absolute return, macro/CTA (commodity trading advisors), event driven and equity strategies.

This may be by design, with the aim of offering investors a range of risk profiles. If it is, the strategies have not been very successful. Combinations of cash and equities would have done better due to the convex nature of the efficient frontier: because the correlation between the two assets is less than one, the return available for any given level of volatility is higher than that indicated by the straight line running between the two assets (not shown in **Figure 4**).

The only hedge fund strategy that appears to have done better than the cash/equity efficient frontier is merger arbitrage, which has a similar profile to government debt. Note that market neutral equity strategies have produced less return than cash, with higher volatility.

Figure 3 – Beta of global asset returns relative to stocks (2000-2019)



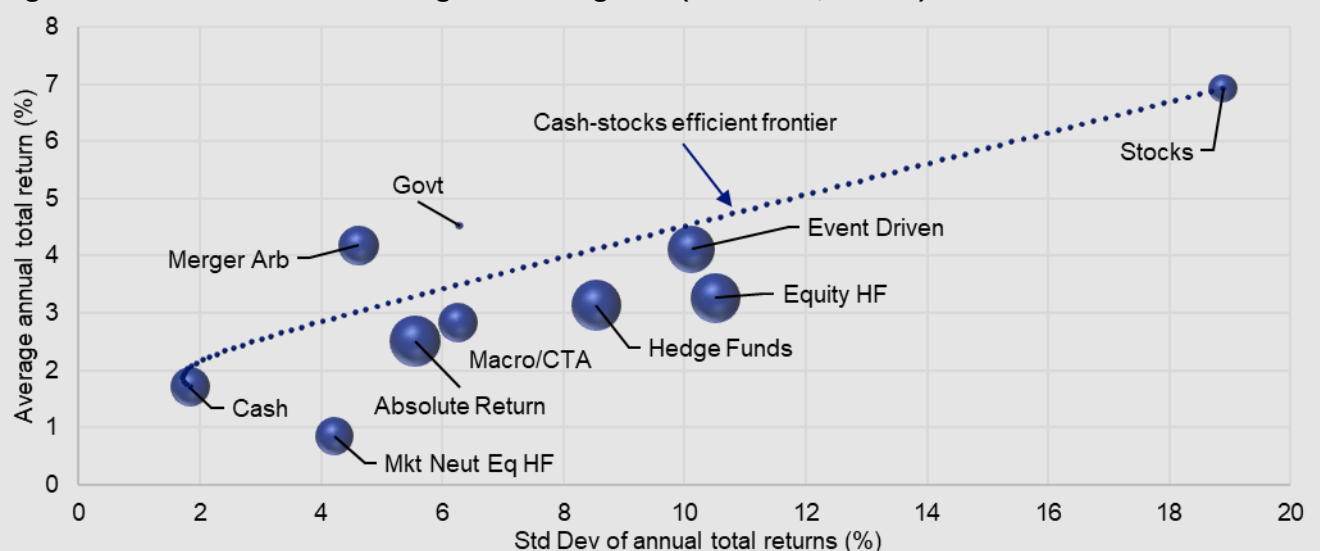
Note: Based on calendar year data from 2000 to 2019 (except for diamonds which is from 2003 to 2019). Beta is covariance of annual returns versus those of stocks divided by variance of stock returns. Calculated using total return indices in US dollars unless stated otherwise: spot price of gold per ounce, spot price of one carat flawless diamonds (Polished Prices Index), BofAML 0-3 month US treasury total return index (Cash), BofAML Global Government Index (Govt), BofAML Global Corporate Index (IG), BofAML Global HY Index (HY), GPR General World Index (REITs), S&P GSCI total return index for commodities (CTY), MSCI World Index (Stocks), Hedge Fund Research Global Hedge Fund Index (Hedge Funds), LPX Major Market Listed Private Equity Index (Private Equity), US NCREIF Property Total Return Index (Direct Real Estate), Liv-ex Fine Wine Investable (Fine Wine, price index converted to US dollars). Past performance is no guarantee of future results. Source: Bloomberg, Refinitiv Datastream, MSCI, BofA ML, Polished Prices, S&P GSCI, GPR, LPX, FHFA, Liv-ex, Hedge Fund Research, Invesco



In summary, we draw the following conclusions about the alternative assets that we have examined:

- First, real estate would appear to have an important role to play in an asset allocation framework. REITs would have been at one end of our efficient frontier (based on data from the last 20 years). Direct real estate investments offered lower returns than REITs but with lower volatility and correlation to other assets (thus offering interesting diversification opportunities). Given the lower liquidity of direct real estate, we view it as a core strategic rather than tactical asset.
- Private equity should be part of the “equity-like” group, with more volatility and higher return potential than publicly quoted stocks. However, given the higher volatility (no doubt linked to lower liquidity), we would consider private equity to be more “early-cycle” than “late-cycle”. To this extent it has much in common with high-yield credit.
- Hedge funds are more problematic (in our opinion). In many cases they have performed like fixed income assets but with worse characteristics (more volatility and lower returns than government debt). A combination of cash and stocks would have done better than most strategies. Given the illiquidity of many hedge funds, it is hard to view them as a tactical asset. However, these are comments about broad categories and may not apply to individual hedge funds.
- To the extent that commodities are considered an alternative asset, the experience of the last 20 years seems to be in line with much longer sample periods: for the same sort of volatility as stocks they generate total returns more in line with cash. Nevertheless, our optimisations based on long term returns suggest a strategic role for commodities, no doubt due to the low correlation with other assets (see the [21st Century Portfolio](#)). However, they can also perform a tactical role, with industrial commodities, for example, tending to perform well in the latter stages of the economic cycle (according to our analyses).
- Gold is a conundrum. There is no arguing with the performance history of the last 20 years. With hindsight, it should have been a core holding over that period but who was that brave 20 years ago when gold was touching multi-decade lows in real terms? Measured over longer periods, it has performed more like broad commodity indices have done over the last 20 years, while offering less diversification. We would view it as a tactical, rather than strategic, holding.
- Sticking with jewellery, diamonds have done less well than gold over the last 20 years and have been more in line with broad commodity indices. We do not feel the need to include them in our framework.
- Finally, though fine wines have held their own from a performance perspective over the last 20 years, we do not consider them suitable for our asset allocation purposes. However, even this tee-total author can appreciate the attraction.

Figure 4 – Risk and reward on hedge fund categories (2000-2019, in USD)



Note: Based on calendar year data from 2000 to 2019. Area of bubbles is in proportion to average correlation with the other assets in the chart. Calculated using total return indices in US dollars unless stated otherwise: BofAML 0-3 month US treasury total return index (Cash), BofAML Global Government Index (Govt), MSCI World Index (Stocks), Hedge Fund Research Global Hedge Fund Index (Hedge Funds), Hedge Fund Research Absolute Return Index (Absolute Return), Hedge Fund Research Event Driven Index (Event Driven), Hedge Fund Research Macro/CTA Index (macro/CTA), Hedge Fund Research Merger Arbitrage index (Merger Arb), Hedge Fund Research Equity Hedge Fund Index (Equity HF), Hedge Fund Research Market Neutral Equity Hedge Fund Index (Mkt Neut Eq HF). CTA is an abbreviation of commodity trading advisors. “Cash-stocks efficient frontier” shows the maximum return that could have been achieved for each level of risk (standard deviation), by varying the mix of cash and stocks in a two-asset portfolio. Past performance is no guarantee of future results. Source: Bloomberg, Refinitiv Datastream, BofA ML, MSCI, Hedge Fund Research and Invesco

Figure 5 shows 2020 performance (up to 20 May) and the outcomes are broadly in line with what might be expected during a period of recession: the more “defensive” assets (gold, government debt, cash and IG) are at the top of the rankings, while the more “cyclical” categories (commodities, REITS, private equity, stocks and HY) are at the bottom.

Among alternatives, the conclusions of the above analysis seem to have held during this extraordinary environment: first, private equity has suffered more than its publicly quoted brethren (stocks); second, hedge funds (HF) have been a poor version of government debt and, third, gold has been the best defensive asset, while commodities has been the most cyclical. None of the HF strategies that we measure produced positive returns: Macro/CTA came the closest (-0.2%), while equity and market-neutral equity strategies were the worst (-9.3% for both).

More surprising is that direct real estate (property) has done so well. However, the data for that asset class is only up to March 31. Given the illiquid nature of the asset, we suspect it will need time for the full effect of this recession to be reflected in values. Hence, we expect the index performance to deteriorate relative to

that of more liquid assets that have already integrated the recession into their values (REITS for example).

Looking forward to the recovery from recession, we would expect a reversal of many of those year-to-date patterns. Indeed, the performance so far during the second quarter (QTD) gives some clues as to what we think could happen. **Figure 6** shows that cyclical categories such as equities, HY and some emerging market assets are leading the way, while government debt is struggling. Not shown in that table, private equity and HF have produced QTD returns of 17.0% and 3.6%, respectively (as of 20 May).

There are, however, some surprising elements that suggest cross currents: first, gold (precious metals) continues to be strong (perhaps due to concern about the implications of all the policy support); second, REITS are not yet recovering in the same way as equities (perhaps due to fears of long-term damage to the demand for commercial real estate) and, finally, the rebound in oil is not fully reflected in the quarter-to-date performance of energy (because oil didn't bottom until the end of April).

All data as of 22 May, unless stated otherwise.

Figure 5 – Calendar year total returns (2005-2020*, in USD)

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020*
Priv Eq 37.8%	Wine 60.5%	Wine 55.5%	Govt 10.9%	HY 62.0%	Priv Eq 41.1%	Dmond 25.7%	Priv Eq 29.2%	Priv Eq 37.8%	Dmond 25.5%	Property 13.3%	Wine 20.7%	Dmond 34.8%	Property 6.7%	Priv Eq 46.4%	Gold 14.8%
CTY 25.6%	REITS 39.6%	CTY 32.7%	Gold 3.1%	Priv Eq 52.3%	Wine 33.1%	Property 14.3%	REITS 27.3%	Stocks 27.4%	REITS 12.1%	Priv Eq 12.3%	HY 14.8%	Stocks 23.1%	Cash 1.8%	Stocks 28.4%	Govt 3.2%
Property 20.1%	Dmond 30.9%	Gold 31.8%	Cash 1.7%	REITS 33.0%	Gold 29.3%	Gold 11.1%	HY 19.3%	Property 11.0%	Property 11.8%	REITS 0.1%	Priv Eq 11.6%	Wine 20.2%	Dmond 0.2%	REITS 21.7%	Property 0.7%
Gold 17.0%	Gold 23.8%	Dmond 31.1%	Property -6.5%	Stocks 30.8%	REITS 18.6%	Govt 6.8%	Stocks 16.5%	HY 8.0%	Priv Eq 9.9%	Cash 0.0%	CTY 11.4%	REITS 13.9%	Govt -0.3%	Gold 18.7%	Cash 0.5%
REITS 11.0%	Stocks 20.7%	Property 15.8%	IG -8.3%	Dmond 29.0%	HY 13.9%	IG 4.5%	IG 11.1%	H Fund 6.7%	Stocks 5.5%	Stocks -0.3%	Gold 9.0%	Gold 12.6%	Gold -1.7%	CTY 17.6%	IG -0.9%
Stocks 10.0%	Property 16.6%	Govt 10.7%	Wine -17.4%	Gold 27.1%	Property 13.1%	HY 2.6%	Property 10.5%	Wine 4.6%	IG 3.1%	Govt -2.6%	Stocks 8.2%	Priv Eq 12.0%	HY -3.3%	HY 13.7%	H Fund -3.5%
Cash 3.0%	HY 13.5%	Stocks 9.6%	H Fund -23.3%	Wine 22.1%	Stocks 12.3%	Cash 0.1%	Gold 5.6%	REITS 3.3%	Govt 0.2%	H Fund -3.6%	Property 8.0%	HY 10.2%	IG -3.5%	IG 11.4%	Wine -5.0%
H Fund 2.7%	Priv Eq 11.2%	IG 7.3%	HY -27.9%	IG 19.2%	CTY 9.0%	CTY -1.2%	H Fund 3.5%	IG 0.1%	Cash 0.0%	IG -3.8%	REITS 4.4%	IG 9.2%	Wine -4.3%	H Fund 8.6%	Dmond -7.3%
HY 1.5%	H Fund 9.3%	Cash 4.8%	Dmond -29.9%	CTY 13.5%	IG 6.0%	Stocks -5.0%	Govt 1.7%	Cash 0.0%	HY -0.1%	HY -4.2%	IG 4.3%	Property 7.0%	REITS -5.4%	Property 6.4%	HY -8.2%
Wine -0.7%	IG 7.2%	H Fund 4.2%	Stocks -40.3%	H Fund 13.4%	Govt 5.6%	REITS -5.6%	CTY 0.1%	CTY -1.2%	H Fund -0.6%	Wine -9.0%	H Fund 2.5%	Govt 6.5%	H Fund -6.7%	Govt 5.5%	Stocks -10.4%
IG -3.0%	Govt 6.2%	HY 3.1%	REITS -41.8%	Govt 2.3%	H Fund 5.2%	H Fund -8.9%	Cash 0.1%	Govt -4.3%	Gold -1.8%	Gold -10.4%	Govt 1.7%	H Fund 6.0%	Stocks -8.2%	Cash 2.2%	Priv Eq -18.1%
Govt -6.5%	Cash 4.8%	REITS -2.8%	CTY -46.5%	Cash 0.1%	Dmond 1.9%	Wine -12.9%	Wine -6.8%	Dmond -9.0%	Wine -18.5%	Dmond -14.9%	Cash 0.2%	CTY 5.8%	Priv Eq -10.8%	Wine -4.7%	REITS -22.1%
Dmond -20.7%	CTY -15.1%	Priv Eq -16.8%	Priv Eq -64.5%	Property -16.9%	Cash 0.1%	Priv Eq -17.2%	Dmond -32.3%	Gold -27.3%	CTY -33.1%	CTY -32.9%	Dmond -34.8%	Cash 0.8%	CTY -13.8%	Dmond -11.6%	CTY -40.5%

Note: *Based on calendar year data from 2005 to 2019 and year-to-date data for 2020 (as of 20 May, except for: Property (31 March), Dmond (31 March) and REITS (30 April)). Calculated using total return indices in US dollars unless stated otherwise: spot price of gold per ounce, spot price of one carat flawless diamonds Polished Prices Index (Dmond), BofAML 0-3 month US treasury total return index (Cash), BofAML Global Government Index (Govt), BofAML Global Corporate Index (IG), BofAML Global HY Index (HY), GPR General World Index (REITS), S&P GSCI total return index for commodities (CTY), MSCI World Index (Stocks), Hedge Fund Research Global Hedge Fund Index (H Fund), LPX Major Market Listed Private Equity Index (Priv Eq), US NCREIF Property Total Return Index (Property), Liv-ex Fine Wine Investable (Wine, price index converted to US dollars). Past performance is no guarantee of future results. Source: Bloomberg, Refinitiv Datastream, BofA ML, MSCI, Polished Prices, S&P GSCI, GPR, LPX, FHFA, Liv-ex, Hedge Fund Research, Invesco



Figure 6 – Asset class total returns

Data as at 22/05/2020	Index	Current Level/Ry	Total Return (USD, %)					Total Return (Local Currency, %)				
			1w	1m	QTD	YTD	12m	1w	1m	QTD	YTD	12m
Equities												
World	MSCI	492	2.9	5.2	11.6	-12.1	-0.4	2.7	4.9	11.6	-10.6	0.4
Emerging Markets	MSCI	905	0.5	2.0	7.0	-18.2	-6.5	0.0	1.3	6.8	-13.5	-2.5
US	MSCI	2833	3.4	6.3	15.5	-7.2	6.2	3.4	6.3	15.5	-7.2	6.2
Europe	MSCI	1406	4.3	3.9	5.6	-20.0	-10.9	3.7	3.6	6.4	-16.7	-9.3
Europe ex-UK	MSCI	1725	4.4	4.2	6.4	-17.7	-7.9	3.8	3.5	6.9	-15.5	-6.8
UK	MSCI	863	3.8	2.9	3.4	-26.4	-19.3	3.3	4.1	5.1	-20.0	-16.2
Japan	MSCI	2985	1.4	4.9	5.5	-12.1	0.8	1.5	4.5	5.0	-13.0	-1.8
Government Bonds												
World	BofA-ML	0.30	0.3	0.6	0.3	3.0	7.0	0.1	0.4	0.4	4.2	7.3
Emerging Markets	BBloom	5.72	4.1	9.7	9.9	-7.1	1.1	4.1	9.7	9.9	-7.1	1.1
US (10y)	Datastream	0.65	-0.1	-0.4	0.0	14.3	20.8	-0.1	-0.4	0.0	14.3	20.8
Europe	BofA-ML	0.22	1.1	2.6	-0.4	-2.3	2.8	0.5	2.0	0.3	0.7	5.3
Europe ex-UK (EMU, 10y)	Datastream	-0.49	0.3	1.2	-0.5	0.0	1.8	-0.4	0.6	0.2	3.1	4.2
UK (10y)	Datastream	0.13	1.1	0.1	-0.1	-1.7	5.4	0.6	1.2	1.6	6.8	9.5
Japan (10y)	Datastream	0.00	-0.1	0.3	0.7	1.1	2.4	0.0	0.0	0.3	-0.1	-0.2
IG Corporate Bonds												
Global	BofA-ML	2.28	1.4	1.5	5.1	-0.8	5.8	1.2	1.4	5.2	0.6	6.7
Emerging Markets	BBloom	5.73	2.2	5.0	11.2	-3.8	6.0	2.2	5.0	11.2	-3.8	6.0
US	BofA-ML	2.62	1.6	1.5	6.3	2.0	10.0	1.6	1.5	6.3	2.0	10.0
Europe	BofA-ML	1.29	1.1	1.6	2.2	-6.1	-3.1	0.4	1.1	3.0	-3.3	-0.8
UK	BofA-ML	2.33	1.5	0.1	3.9	-7.3	2.3	0.9	1.2	5.7	0.7	6.3
Japan	BofA-ML	0.51	-0.1	0.3	0.3	0.7	2.5	0.0	0.0	-0.1	-0.4	-0.1
HY Corporate Bonds												
Global	BofA-ML	7.63	2.6	3.4	7.3	-7.9	-2.3	2.5	3.3	7.4	-7.2	-1.9
US	BofA-ML	7.70	2.7	2.9	6.6	-7.4	-2.2	2.7	2.9	6.6	-7.4	-2.2
Europe	BofA-ML	5.65	2.5	2.4	5.8	-11.7	-6.6	1.8	1.8	6.6	-9.0	-4.3
Cash (Overnight LIBOR)												
US		0.00	0.0	0.0	0.0	0.3	1.5	0.0	0.0	0.0	0.3	1.5
Euro Area		0.00	0.8	0.7	-1.3	-3.0	-2.8	0.0	0.0	-0.1	-0.2	-0.5
UK		0.00	0.5	-1.4	-2.0	-8.1	-3.4	0.0	0.0	0.0	0.1	0.6
Japan		0.00	-0.6	0.1	-0.1	0.9	2.4	0.0	0.0	0.0	0.0	-0.1
Real Estate (REITs)												
Global	FTSE	1465	4.3	1.2	1.9	-27.0	-20.9	3.7	0.6	2.7	-24.8	-19.0
Emerging Markets	FTSE	1739	-1.2	-1.9	-1.1	-29.4	-16.5	-1.8	-2.5	-0.3	-27.2	-14.5
US	FTSE	2339	7.7	1.8	3.4	-26.6	-22.0	7.7	1.8	3.4	-26.6	-22.0
Europe ex-UK	FTSE	2779	3.6	3.3	0.3	-25.5	-16.6	2.9	2.7	1.1	-23.2	-14.6
UK	FTSE	1028	4.6	-4.6	-4.1	-34.9	-19.4	4.1	-3.5	-2.5	-29.2	-16.3
Japan	FTSE	2288	3.4	5.2	2.4	-23.0	-14.7	3.5	4.8	2.0	-23.9	-16.9
Commodities												
All	GSCI	1524	4.5	17.6	2.0	-41.2	-40.4	-	-	-	-	-
Energy	GSCI	202	9.1	41.4	4.1	-59.5	-59.5	-	-	-	-	-
Industrial Metals	GSCI	1026	2.5	1.3	2.2	-15.8	-13.0	-	-	-	-	-
Precious Metals	GSCI	2013	-0.5	1.2	10.2	12.5	34.1	-	-	-	-	-
Agricultural Goods	GSCI	295	0.2	-2.5	-6.4	-15.2	-11.0	-	-	-	-	-
Currencies (vs USD)*												
EUR		1.09	0.8	0.7	-1.2	-2.8	-2.2	-	-	-	-	-
JPY		107.63	-0.6	0.1	-0.1	0.9	2.5	-	-	-	-	-
GBP		1.22	0.5	-1.1	-1.7	-8.0	-3.7	-	-	-	-	-
CHF		1.03	0.1	0.0	-1.0	-0.3	4.0	-	-	-	-	-
CNY		7.13	-0.4	-0.7	-0.7	-2.3	-3.1	-	-	-	-	-

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

Data as at 22/05/2020	Global				
	1w	1m	QTD	YTD	12m
Energy	2.3	4.7	5.9	-22.7	-28.0
Basic Materials	1.2	4.3	6.4	-1.1	-1.5
Basic Resources	1.0	5.8	9.6	-0.6	-0.5
Chemicals	1.5	2.7	2.9	-1.7	-2.9
Industrials	1.9	2.4	0.0	-4.7	-4.7
Construction & Materials	1.2	1.2	-2.6	-8.2	-8.8
Industrial Goods & Services	2.0	2.5	0.3	-4.2	-4.2
Consumer Discretionary	0.8	1.3	3.9	2.9	2.0
Automobiles & Parts	1.1	2.4	2.4	-6.5	-5.2
Media	-0.2	3.0	1.8	-2.2	-3.5
Retailers	-0.8	0.1	7.3	20.4	19.7
Travel & Leisure	3.4	1.0	2.9	-16.9	-18.2
Consumer Products & Services	1.9	2.0	1.4	2.0	0.9
Consumer Staples	-2.0	-4.7	-5.4	2.0	-1.5
Food, Beverage & Tobacco	-1.8	-3.9	-5.3	-0.7	-6.6
Personal Care, Drug & Grocery Stores	-2.3	-6.0	-5.6	7.2	4.4
Healthcare	-2.2	-1.9	2.3	17.0	21.7
Financials	-0.2	-3.2	-8.1	-18.2	-19.5
Banks	-1.0	-4.0	-11.0	-24.1	-26.4
Financial Services	0.6	-0.1	-1.5	-10.0	-8.3
Insurance	0.2	-5.5	-10.0	-15.3	-17.3
Real Estate	0.0	-4.1	-6.8	-9.6	-13.1
Technology	0.1	4.2	6.7	19.9	31.4
Telecommunications	-1.3	-3.0	-4.0	5.1	0.2
Utilities	-0.2	-5.2	-6.6	-0.2	-3.0

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 8a – US factor index total returns (%)

Data as at 22/05/2020	Absolute					Relative to Market				
	1w	1m	QTD	YTD	12m	1w	1m	QTD	YTD	12m
Growth	6.1	12.6	22.2	-5.7	9.5	2.7	6.4	6.5	2.2	3.7
Low volatility	1.0	3.1	12.8	-5.2	3.8	-2.2	-2.6	-1.7	2.8	-1.7
Price momentum	1.5	4.6	14.3	-6.1	2.0	-1.7	-1.1	-0.4	1.8	-3.3
Quality	4.7	6.7	14.0	-15.0	-4.0	1.4	0.9	-0.6	-7.8	-9.1
Size	9.1	12.1	20.2	-29.5	-22.4	5.7	5.9	4.8	-23.6	-26.5
Value	9.0	11.7	20.5	-30.2	-22.3	5.6	5.6	5.0	-24.4	-26.4
Market	3.3	5.8	14.7	-7.8	5.6					
Market - Equal-Weighted	5.6	6.9	14.7	-15.9	-5.7					

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 8b – European factor index total returns relative to market (%)

Data as at 22/05/2020	Absolute					Relative to Market				
	1w	1m	QTD	YTD	12m	1w	1m	QTD	YTD	12m
Growth	5.8	7.5	15.3	-6.0	7.8	2.0	3.6	7.7	13.2	16.8
Low volatility	3.2	3.8	10.2	-10.3	-0.6	-0.6	0.1	2.9	7.9	7.8
Price momentum	4.1	6.1	14.1	-4.5	6.7	0.3	2.3	6.5	14.9	15.6
Quality	5.2	6.0	12.4	-19.4	-4.9	1.4	2.1	5.0	-2.9	3.1
Size	5.8	8.4	12.6	-23.9	-9.5	2.0	4.5	5.1	-8.4	-1.9
Value	4.0	3.7	2.9	-36.7	-29.8	0.3	0.0	-3.9	-23.7	-23.9
Market	3.7	3.7	7.1	-16.9	-7.7					
Market - Equal-Weighted	4.5	5.6	9.3	-19.2	-9.0					

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 9 – Model asset allocation

	Neutral	Policy Range	Allocation	Position vs Neutral	Hedged	Currency
Cash	5%	0-10%	10%	↑		
Cash	2.5%		5%			
Gold	2.5%		5%	↑		
Bonds	45%	10-80%	40%	↓		
Government	30%	10-50%	20%	↑		
US	10%		9%	↑		
Europe ex-UK (Eurozone)	8%		0%			
UK	2%		3%	↑		
Japan	8%		4%			
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%	0%	↓		
US Dollar	4%		0%	↓		
Euro	1%		0%	↓		
Equities	40%	20-60%	30%	↓		
US	24%		14%	↑		
Europe ex-UK	6%		2%	↓		
UK	3%		6%	↑		
Japan	3%		6%	↓		
Emerging Markets	4%		2%	↓		
Real Estate	8%	0-16%	16%			
US	2%		5%	↑		
Europe ex-UK	2%		2%			
UK	1%		1%	↑		
Japan	2%		5%	↑		
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	49%		47%	↑		
EUR	20%		7%	↓		
GBP	7%		16%	↑		
JPY	15%		18%	↑		
EM	8%		13%	↓		
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 10 – Model allocations for Global sectors

	Neutral	Invesco
Energy	4.1%	Overweight ↑
Basic Materials	4.0%	Neutral ↑
Basic Resources	2.1%	Underweight ↓
Chemicals	1.9%	Overweight ↑
Industrials	12.4%	Underweight
Construction & Materials	1.5%	Underweight ↓
Industrial Goods & Services	10.9%	Underweight
Consumer Discretionary	13.7%	Underweight ↓
Automobiles & Parts	2.0%	Neutral
Media	1.3%	Underweight ↓
Retailers	4.9%	Neutral ↑
Travel & Leisure	1.9%	Underweight ↓
Consumer Products & Services	3.7%	Underweight ↓
Consumer Staples	8.0%	Overweight
Food, Beverage & Tobacco	5.1%	Overweight
Personal Care, Drug & Grocery Stores	2.9%	Overweight
Healthcare	11.2%	Neutral ↓
Financials	15.6%	Neutral ↑
Banks	7.3%	Overweight ↑
Financial Services	4.4%	Neutral ↑
Insurance	3.9%	Underweight
Real Estate	4.2%	Overweight
Technology	17.6%	Overweight ↑
Telecommunications	5.2%	Neutral ↑
Utilities	4.0%	Underweight

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 6

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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