Uncommon truths
How we avoid forecasting

We need to forecast but most of us are bad at it. Reverse engineering can help to avoid it. Such a process leads us to favour European over US equities and to prefer telecoms to technology.

Forecasting is an unavoidable part of everyday life: will I get across this road in one-piece, will it rain tonight, will that train get me there on time, when will the next recession start and will the Fed raise rates this year? Unfortunately, when it comes to economies and markets, the average person (including myself) has little clue about what will happen to these amazingly complex systems. Bizarrely, I feel that shortening the time horizon reduces my ability to get it right.

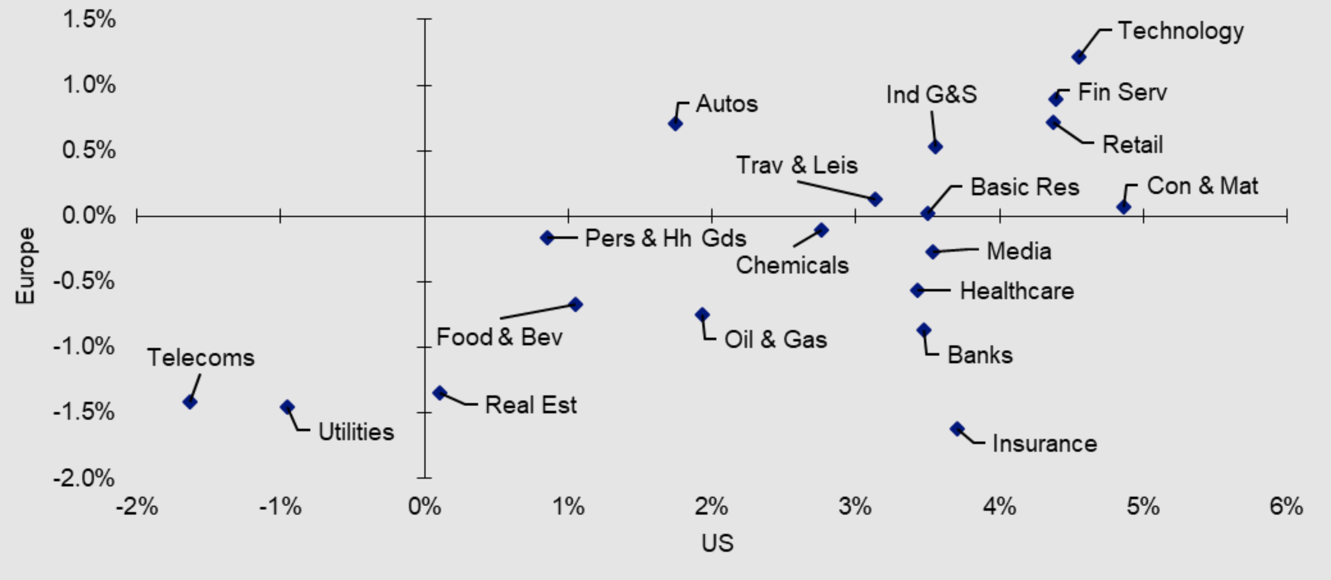
There is a way to avoid making explicit market forecasts which is to ask what one needs to believe to make an investment worthwhile and then decide whether that seems credible. To take one of the examples above, to believe that I will get across the road in one-piece, I need to believe that I can avoid being hit by a car, bus or lorry. That belief would seem highly credible if there is no traffic and not so credible if the road in question is that surrounding the Arc de Triomphe during the evening rush-hour.

Over the years, I have used implied perpetual dividend growth rates to assess equity market valuations. This involves reverse engineering a constant growth dividend discount framework to derive the perpetual growth rates that would justify purchase at prevailing market prices. **Figure 1** shows the results for US and European sectors (it is shown in the Strategic Sector Selector document published quarterly by Andras). Though not shown in that chart, we also derive market-wide implied perpetual dividend growth rates: they are currently 3.2% for the US and -0.4% for Europe (which includes the UK).

What do these numbers mean? First, they are in real terms to remove the distorting influence of inflation. Second, it appears that to invest in the US equity market, we need to be far more optimistic about future growth: 3.2% real annualised dividend growth into the infinite future versus -0.4% in Europe (**Figure 1** suggests US sectors need to produce more growth, on average, than European sectors to justify investment). Third, some sectors (technology, financial services and retail) seem more challenged than others in both regions, while telecoms and utilities could see dividends shrink each year, forever, and still give an acceptable return on investment (in both regions).

Are those growth rates feasible? First, I think it unlikely that dividend growth can outstrip economic growth forever (otherwise, dividends would eventually be bigger than the economy). Second, in the fifty years from 1965 to 2015, the US economy grew at an annualised 2.8% and major European economies grew in the 2.0%-2.5% range. Finally, demographics suggest to me that US GDP growth will be around 1% lower than that over the rest of this century and that of Europe will be 0.5%-1.0% lower. I conclude that the US market will be growth challenged; Europe will not.

Figure 1 – Implied perpetual real dividend growth (using historical betas and market bond yields)



Note: As of 31 December 2018. Implied perpetual real dividend growth rates are the growth rates required to generate an acceptable rate of return given current price. See "Definitions of data and benchmarks" section for methodology/abbreviations. Source: Datastream, Invesco.

To fully understand what the numbers mean, it is necessary to delve into the methodology. Put simply, implied growth is calculated as discount factor minus dividend yield. The discount factor is real 10-year bond yield (TIPS in the US and the average of inflation protected gilt and eurozone yields in Europe) plus beta adjusted risk premium (sector beta multiplied by long run historical risk premium taken from the US market).

So, all else being equal, the higher the dividend yield today, the less optimistic one needs to be about growth to justify investment (by the way, we construct the yield using consensus estimates of the next full year of dividends to capture common knowledge about what will happen to dividends in the near term). The risk premium is derived from US equity and bond returns dating back to 1871 (the higher the risk premium, the more optimistic one needs to be about growth). Sector betas are based on the history of the last five years, relative to their local market index (the higher the beta, the more optimistic one needs to be about growth).

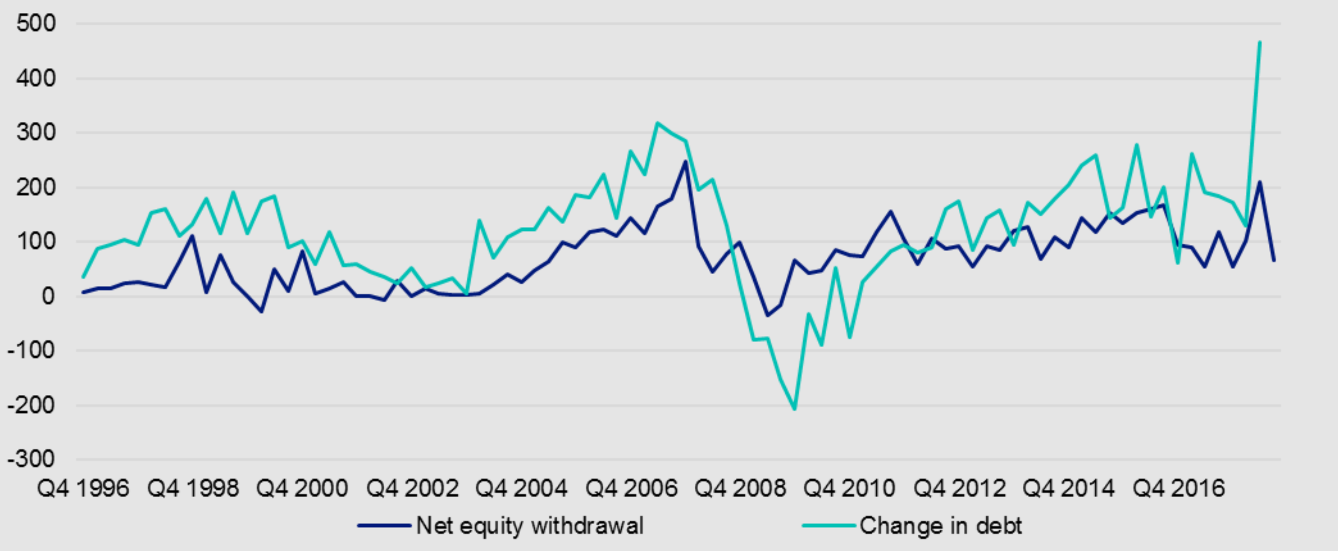
The evidence above suggests to me that there is more chance of getting a decent return on European than US equities and that telecoms and utilities offer better prospects than technology, financial services and retail.

Many investors have a hard time with such an approach: first, they don't like the focus on dividends (but that is the only thing shareholders have a right to) and, second, they don't like a framework that projects into the infinite future. We know (or I think we know) that the Earth does not have an infinite future ahead of it (four billion years at best and more likely one billion!). However, using our numbers for the US market (implied growth and discount factor), 88% of the net present value of that infinite dividend stream falls within the first 100 years and 98% within 200 years. Admittedly, most companies do not last even that long but it makes the process seem less fantastical.

Many investors also object to the exclusion of share buybacks from the analysis. I may be in a minority but I have never understood how the shareholders of a company think they can enrich themselves by buying shares from themselves and many analyses suggest they have not (see those of Societe Generale's Andy Lapthorne, for example).

Of course, buybacks are encouraged by the tax wedge between capital gains and income but it must be asked for how long that will survive in these populist times? Further, when looking over the infinite future, there is a limit to how many shares can be repurchased before a company ceases to exist (assuming there is a limit to how long executives can burden their companies with debt to buy back shares that they then award to themselves). **Figure 2** shows how net equity withdrawal by US non-financial corporations has correlated with debt issuance (net equity withdrawal is the retirement of equities through buybacks and M&A activity less equity issuance). Since the beginning of 2008, the value of share buybacks by US non-financial corporations is equal to around 80% of the rise in their debt. Put another way, the US corporate sector now has an unprecedented level of debt, not because it has been investing in productive capacity but because it has been engaged in financial engineering.

Figure 2 – Quarterly debt issuance and net equity withdrawal of US non-financial corporations (US$bn)



Note: Quarterly data from 1996 Q4 to 2018 Q3. Net equity withdrawal by non-financial corporates is retirement of equities (repurchases and M&A activity) less gross equity issuance. Source: BIS, US Federal Reserve, Invesco.

There are also technical objections to the evidence portrayed in **Figure 1** but the solutions take us into the realm of forecasting. First, that bond yields are historically low does not mean equity investors should lower their hurdle rate of return. Rather than taking current market based real bond yields as our anchor, we can also use an estimate of where those real yields should be over the long term.

Assuming that real yields should be in line with long term economic growth, and based on the demographic analysis outlined above, I feel comfortable using a real bond yield of 2.0% for the US and 1.5% for Europe. This naturally makes the process more demanding. To see this, consider that the implied real perpetual growth rate for US dividends now becomes 4.2% (versus 3.2% previously) and for Europe 2.6% (versus -0.4%). These are more challenging hurdles and, I believe, unrealistic but less so for Europe than for the US.

The other technical objection is the use of historical betas. Sector betas vary over time and to assume a sector beta will remain above 1.0 implies that its value will eventually overtake that of the market, if the market trends upward. Hence, we also impose the restriction that all sector betas are equal to 1.0. Versus the evidence shown in **Figure 1**, this will penalise low-beta sectors (food & beverage and utilities, say) and reward those with the highest historical betas (banks, autos, basic resources and financial services, say).

The net result of these two technical changes can be seen in **Figure 3**. As expected, the implied perpetual growth rates now look more challenging, overall. No sector now has negative implied perpetual growth rates (the position of utilities has worsened more than that of telecoms because it has a lower historical beta).

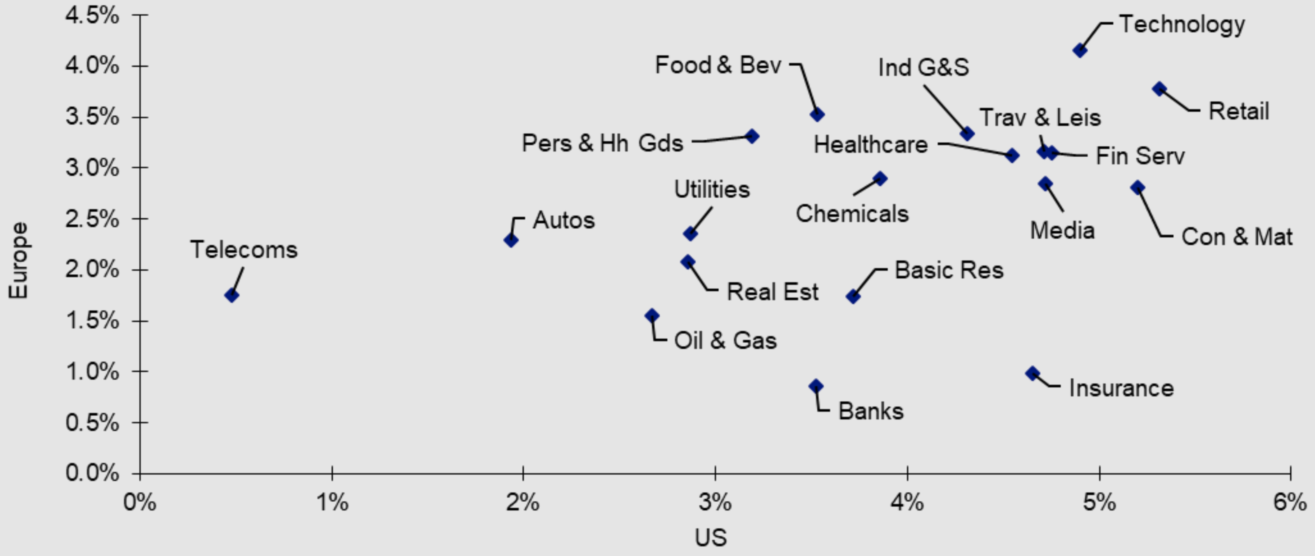
Though it is hard to find any sector which looks better in absolute terms after these adjustments, the relative positions have changed. Food & beverage and utilities no longer look as attractive as they did in **Figure 1**, while basic resources and autos now look relatively better than did (in my opinion).

In absolute terms, the telecoms sector still needs to produce less dividend growth than most to generate the hurdle rate of return, especially in the US (it is then for each of us to decide whether those implied growth rates are realistic). Other sectors in a similar position are oil & gas, autos and banks. At the other end of the spectrum, technology and retail remain the most growth challenged and therefore, in my opinion, seem most likely to disappoint.

In conclusion, we can escape making forecasts by reverse engineering the investment process but at the end of the day we still need to judge the realism of the outputs. In my opinion, European equities have a better chance of providing an acceptable return than do those of the US. Across sectors, I conclude that telecoms have the best chance of producing an acceptable rate of return, whereas technology and retail seem most likely to disappoint.

Unless stated otherwise, all data as of 25 January 2019.

Figure 3 – Implied perpetual real dividend growth (using adjusted beta and bond yields*)



Note: As of 31 December 2018. Implied perpetual real dividend growth rates are the growth rates required to generate an acceptable rate of return given current price. See "Definitions of data and benchmarks" section for methodology/abbreviations. *In this case, rather than using historical sector betas and current bond yields, it is assumed that each sector beta is equal to 1.0, that US real bond yields are 2.0% and that European real bond yields are 1.5%. Source: Datastream and Invesco.

Figure 4 – Asset class total returns

Data as at 25/01/2019	Index	Current Level/RY	Total Return (USD, %) 1w	1m	QTD	YTD	12m	Total Return (Local Currency, %) 1w	1m	QTD	YTD	12m
Equities												
World	MSCI	485	0.2	11.3	6.4	6.4	-9.1	0.1	10.8	6.1	6.1	-6.2
Emerging Markets	MSCI	1032	1.4	9.0	6.9	6.9	-15.9	1.4	7.8	6.2	6.2	-10.5
US	MSCI	2538	-0.2	13.7	6.6	6.6	-4.3	-0.2	13.7	6.6	6.6	-4.3
Europe	MSCI	1567	0.4	6.4	5.5	5.5	-15.3	-0.3	5.5	4.9	4.9	-7.4
Europe ex-UK	MSCI	1848	0.7	6.7	5.8	5.8	-15.7	0.5	6.9	6.2	6.2	-7.7
UK	MSCI	1080	-0.3	5.5	4.7	4.7	-14.2	-2.3	1.9	1.3	1.3	-6.8
Japan	MSCI	3087	0.6	11.5	5.2	5.2	-14.8	0.6	10.6	5.1	5.1	-14.1
Government Bonds												
World	BofA-ML	1.29	0.6	0.9	0.5	0.5	-1.8	0.4	0.5	0.4	0.4	1.9
Emerging Markets	JPM	6.62	0.4	4.1	3.2	3.2	-8.0	0.4	1.3	0.9	0.9	4.1
US (10y)	Datastream	2.75	0.3	0.7	-0.1	-0.1	1.5	0.3	0.7	-0.1	-0.1	1.5
Europe	Bofa-ML	0.79	1.2	1.3	1.2	1.2	-6.8	0.9	1.4	1.5	1.5	2.2
Europe ex-UK (EMU, 10y)	Datastream	0.14	1.0	0.9	0.7	0.7	-3.8	0.7	1.0	1.0	1.0	5.5
UK (10y)	Datastream	1.31	2.5	3.2	3.1	3.1	-4.6	0.4	-0.3	-0.3	-0.3	3.6
Japan (10y)	Datastream	0.00	0.1	1.0	0.2	0.2	0.4	0.1	0.3	0.1	0.1	1.3
IG Corporate Bonds												
Global	BofA-ML	3.32	0.7	1.2	1.1	1.1	-3.4	0.6	1.0	1.1	1.1	-0.4
US	BofA-ML	4.14	0.7	1.1	1.1	1.1	-0.6	0.7	1.1	1.1	1.1	-0.6
Europe	BofA-ML	1.27	0.7	0.5	0.3	0.3	-9.3	0.4	0.7	0.6	0.6	-0.5
UK	BofA-ML	3.00	2.7	4.3	4.4	4.4	-8.6	0.6	0.7	0.8	0.8	-0.7
Japan	BofA-ML	0.39	0.0	0.7	0.0	0.0	-0.4	0.0	0.0	-0.1	-0.1	0.5
HY Corporate Bonds												
Global	BofA-ML	6.86	0.2	3.7	3.3	3.3	-1.8	0.2	3.6	3.4	3.4	0.0
US	BofA-ML	7.19	0.0	4.4	3.9	3.9	0.6	0.0	4.4	3.9	3.9	0.6
Europe	BofA-ML	4.50	0.4	1.6	1.4	1.4	-11.3	0.1	1.7	1.7	1.7	-2.7
Cash (Overnight LIBOR)												
US		2.38	0.0	0.2	0.2	0.2	1.9	0.0	0.2	0.2	0.2	1.9
Euro Area		-0.47	0.4	0.4	-0.5	-0.5	-8.3	0.0	0.0	0.0	0.0	-0.4
UK		0.68	2.6	4.1	3.5	3.5	-6.1	0.0	0.1	0.0	0.0	0.6
Japan		-0.11	0.2	0.7	0.0	0.0	-0.2	0.0	0.0	0.0	0.0	-0.1
Real Estate (REITs)												
Global	FTSE	1843	1.5	10.1	7.6	7.6	-0.4	1.2	10.3	7.9	7.9	9.3
Emerging Markets	FTSE	2161	1.7	9.0	6.2	6.2	-16.2	1.4	9.2	6.5	6.5	-8.1
US	FTSE	2914	1.3	12.2	7.8	7.8	7.4	1.3	12.2	7.8	7.8	7.4
Europe ex-UK	FTSE	3419	2.1	6.6	7.5	7.5	-5.4	1.8	6.7	7.9	7.9	3.8
UK	FTSE	1341	3.0	9.3	9.9	9.9	-12.2	0.9	5.5	6.3	6.3	-4.6
Japan	FTSE	2645	-0.1	7.8	4.3	4.3	-2.6	-0.1	6.9	4.3	4.3	-1.7
Commodities												
All	GSCI	2411	-0.8	11.6	9.4	9.4	-9.6	-	-	-	-	-
Energy	GSCI	439	-1.5	18.9	14.6	14.6	-11.0	-	-	-	-	-
Industrial Metals	GSCI	1238	1.8	3.4	4.2	4.2	-14.8	-	-	-	-	-
Precious Metals	GSCI	1542	1.3	2.6	1.4	1.4	-6.0	-	-	-	-	-
Agricultural Goods	GSCI	359	-0.2	1.6	2.8	2.8	-5.8	-	-	-	-	-
Currencies (vs USD)*												
EUR		1.14	0.5	0.5	-0.5	-0.5	-7.9	-	-	-	-	-
JPY		109.55	0.2	0.7	0.0	0.0	-0.1	-	-	-	-	-
GBP		1.32	2.0	3.6	3.4	3.4	-7.9	-	-	-	-	-
CHF		1.01	0.2	-0.7	-1.2	-1.2	-5.3	-	-	-	-	-
CNY		6.75	0.5	2.1	1.9	1.9	-6.3	-	-	-	-	-

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: Datastream and Invesco

Figure 5 – Equity sector total returns relative to local market (%)

Data as at 25/01/2019	US					Europe				
	1w	1m	QTD	YTD	12m	1w	1m	QTD	YTD	12m
Oil & Gas	**-1.2**	**2.8**	**3.0**	**3.0**	**-12.2**	**-1.4**	**-0.1**	**-0.6**	**-0.6**	**9.0**
Materials	**-0.5**	**-1.1**	**-1.2**	**-1.2**	**-11.3**	**-0.1**	**0.2**	**0.5**	**0.5**	**-3.6**
Basic Resources	-2.4	-4.4	-1.1	-1.1	-22.5	1.0	2.5	2.9	2.9	-1.2
Chemicals	-0.6	-1.6	-2.1	-2.1	-8.6	-0.8	-1.2	-1.1	-1.1	-5.2
Industrials	**0.1**	**2.5**	**2.3**	**2.3**	**-6.4**	**0.7**	**2.9**	**2.0**	**2.0**	**-2.4**
Construction & Materials	-0.6	0.5	1.7	1.7	-19.4	0.7	2.6	1.4	1.4	-6.3
Industrial Goods & Services	0.2	2.9	2.5	2.5	-6.2	0.7	2.9	2.1	2.1	-1.4
Consumer Discretionary	**0.2**	**3.2**	**1.9**	**1.9**	**4.3**	**1.3**	**3.1**	**2.9**	**2.9**	**-2.2**
Automobiles & Parts	1.1	4.2	8.2	8.2	-13.1	2.5	3.5	5.6	5.6	-17.8
Media	-0.3	1.3	1.6	1.6	-3.3	0.4	-0.2	-0.7	-0.7	12.8
Retail	-0.5	2.7	0.7	0.7	9.4	2.5	5.9	5.2	5.2	7.1
Travel & Leisure	1.6	-1.4	-0.7	-0.7	1.6	1.0	1.0	-0.3	-0.3	-1.4
Consumer Staples	**-1.2**	**-6.4**	**-4.2**	**-4.2**	**-4.9**	**-0.5**	**-2.8**	**-2.4**	**-2.4**	**1.5**
Food & Beverages	-1.0	-7.2	-4.0	-4.0	-4.5	-0.1	-3.1	-1.6	-1.6	8.0
Personal & Household Goods	-0.6	-4.0	-2.4	-2.4	-7.0	-0.8	-2.6	-3.0	-3.0	-2.8
Healthcare	**-1.1**	**-2.8**	**-3.3**	**-3.3**	**5.5**	**-1.4**	**-3.6**	**-3.2**	**-3.2**	**9.4**
Financials	**0.2**	**2.8**	**2.6**	**2.6**	**-7.5**	**0.3**	**2.2**	**2.0**	**2.0**	**-8.9**
Banks	0.4	6.5	6.7	6.7	-9.7	0.2	2.5	2.1	2.1	-17.9
Financial Services	0.1	2.1	1.5	1.5	-11.7	-0.2	3.5	2.5	2.5	-1.3
Insurance	0.1	0.2	0.3	0.3	-5.5	0.3	1.7	1.3	1.3	3.8
Real Estate	1.7	-1.9	0.5	0.5	12.2	1.5	0.7	2.7	2.7	8.0
Technology	**1.2**	**1.0**	**0.1**	**0.1**	**3.5**	**2.8**	**4.3**	**2.9**	**2.9**	**3.7**
Telecommunications	**-0.5**	**0.4**	**1.0**	**1.0**	**-2.5**	**-2.7**	**-8.5**	**-7.5**	**-7.5**	**-3.0**
Utilities	**0.6**	**-8.8**	**-5.3**	**-5.3**	**13.2**	**0.4**	**-1.4**	**0.3**	**0.3**	**18.8**

Notes: showing annualised returns. We use a sector classification created by merging the two main systems used by Standard & Poor's (S&P) for the US and STOXX for Europe. We have decided to classify our 10 top level industries using categories that most closely resemble the Global Industry Classification Standard (GICS) and at the level below that (super sectors) we are using the Industry Classification Benchmark (ICB). The former is used for the S&P 500 index and the latter for the STOXX 600, our benchmark indices. The two systems overlap in most cases and the only material difference seems to be in the consumer sectors. Therefore, we define consumer staples as the aggregate of personal & household goods and food & beverage, while consumer discretionary includes automobiles & parts, media, retail and travel & leisure. For the rest, we assume 100% overlap for the corresponding top-level sectors. Past performance is no guarantee of future results.
Source: Datastream and Invesco

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

Data as at 25/01/2019	Absolute					Relative to Market				
	1w	1m	QTD	YTD	12m	1w	1m	QTD	YTD	12m
Growth	0.8	16.7	9.1	9.1	-0.9	1.0	2.8	2.5	2.5	3.5
Low volatility	0.1	8.9	4.3	4.3	5.0	0.3	-4.0	-2.0	-2.0	9.7
Price momentum	-0.3	13.2	5.7	5.7	-6.7	0.0	-0.2	-0.7	-0.7	-2.6
Quality	0.5	14.2	7.2	7.2	-3.6	0.7	0.6	0.8	0.8	0.7
Size	0.2	17.5	11.3	11.3	-2.3	0.4	3.5	4.6	4.6	2.0
Value	1.0	18.5	12.0	12.0	-8.8	1.3	4.4	5.3	5.3	-4.8
Market	-0.2	13.5	6.4	6.4	-4.3					
Market - Equal-Weighted	0.1	14.9	8.3	8.3	-5.1					

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: Datastream and Invesco

Figure 6b – European factor index total returns relative to market (%)

Data as at 25/01/2019	Absolute					Relative to Market				
	1w	1m	QTD	YTD	12m	1w	1m	QTD	YTD	12m
Growth	0.8	10.2	8.5	8.5	-4.6	0.6	3.1	2.3	2.3	2.7
Low volatility	0.1	5.1	4.8	4.8	-0.2	-0.2	-1.6	-1.2	-1.2	7.4
Price momentum	1.1	8.2	7.2	7.2	-7.6	0.8	1.3	1.1	1.1	-0.5
Quality	0.9	10.8	9.4	9.4	-9.7	0.6	3.7	3.2	3.2	-2.9
Size	0.9	12.0	10.5	10.5	-8.0	0.7	4.9	4.2	4.2	-1.0
Value	1.0	10.4	9.3	9.3	-10.5	0.7	3.3	3.1	3.1	-3.7
Market	0.2	6.8	6.0	6.0	-7.1					
Market - Equal-Weighted	0.8	9.2	8.1	8.1	-6.9					

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: Datastream and Invesco

Figure 7 – 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%**	**44%**			
Government	30%	10-50%	20%			
US	10%		14%			
Europe ex-UK (Eurozone)	8%		0%			
UK	2%		2%			
Japan	8%		0%			
Emerging Markets	2%		4%			
Corporate IG	10%	0-20%	16%			
US Dollar	5%		10%			
Euro	3%		2%			
Sterling	1%		2%			
Japanese Yen	1%		2%			
Corporate HY	5%	0-10%	8%			
US Dollar	4%		8%			
Euro	1%		0%			
Equities	**45%**	**20-70%**	**40%**			
US	25%		8%			
Europe ex-UK	7%		13%			
UK	4%		4%			
Japan	4%		8%			
Emerging Markets	5%		7%			
Real Estate	**3%**	**0-6%**	**6%**			
US	1%		2%			
Europe ex-UK	1%		1%			
UK	0.5%		1%			
Japan	0.5%		0%			
Emerging Markets	0%		2%			
Commodities	**2%**	**0-4%**	**0%**			
Energy	1%		0%			
Industrial Metals	0.3%		0%			
Precious Metals	0.3%		0%			
Agriculture	0.3%		0%			
Total	**100%**		**100%**			
Currency Exposure						
USD	49%		47%			
EUR	21%		18%			
GBP	8%		10%			
JPY	14%		11%			
EM	7%		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.
Source: Invesco

Figure 8 – Model sector allocations

	US		Europe		Preferred
	Neutral	Invesco	Neutral	Invesco	Region
Oil & Gas	**5.1%**	**Overweight**	**6.8%**	**Neutral**	**US**
Materials	**2.3%**	**Neutral**	**6.7%**	**Underweight**	**US**
Basic Resources	0.3%	Underweight	3.0%	Neutral	Europe
Chemicals	2.0%	Neutral	3.7%	Underweight	US
Industrials	**11.8%**	**Underweight**	**13.3%**	**Underweight**	**US**
Construction & Materials	0.4%	Neutral	2.7%	Underweight	US
Industrial Goods & Services	11.4%	Underweight	10.7%	Underweight	US
Consumer Discretionary	**15.6%**	**Underweight**	**9.9%**	**Overweight**	**Europe**
Automobiles & Parts	0.6%	Underweight	3.0%	Overweight	Europe
Media	2.5%	Overweight	2.0%	Underweight	US
Retail	9.7%	Underweight	3.3%	Overweight	Europe
Travel & Leisure	2.8%	Overweight	1.7%	Overweight	US
Consumer Staples	**7.5%**	**Overweight**	**16.6%**	**Overweight**	**Europe**
Food & Beverage	3.4%	Neutral	7.3%	Overweight	Europe
Personal & Household Goods	4.2%	Overweight	9.4%	Overweight	Europe
Healthcare	**14.1%**	**Neutral**	**13.2%**	**Underweight**	**US**
Financials	**17.8%**	**Neutral**	**20.0%**	**Overweight**	**Europe**
Banks	5.6%	Neutral	10.6%	Overweight	Europe
Financial Services	5.8%	Underweight	2.0%	Overweight	Europe
Insurance	3.5%	Neutral	5.6%	Overweight	Europe
Real Estate	2.9%	Overweight	1.8%	Underweight	US
Technology	**20.5%**	**Underweight**	**4.6%**	**Underweight**	**US**
Telecommunications	**2.1%**	**Overweight**	**3.9%**	**Overweight**	**Europe**
Utilities	**3.2%**	**Underweight**	**5.0%**	**Underweight**	**Europe**

Notes: These are theoretical allocations which are for illustrative purposes only. They do not represent an actual portfolio and are not a recommendation of any investment or trading strategy. See the latest Strategic Sector Selector for more details.
Source: Datastream and Invesco

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 JP Morgan emerging markets global composite government bond index.

Corporate investment grade (IG) bonds: Bank of America Merrill Lynch investment grade corporate bond total return indices.

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

Implied perpetual growth models (for Figures 1 and 3)
A valuation cross-check is sought by calculating the perpetual real growth in dividends required to justify current prices. This then allows an evaluation of whether those implied growth rates are realistic.

We use a simple perpetual growth model to calculate implied growth. If Price = Dividend/(Discount Factor - Growth), then Growth = Discount Factor – Dividend Yield. The Discount Factor is equal to Risk Free Rate + (Beta x Market Risk Premium). Everything is expressed in real terms to eliminate the distorting influence of inflation, the output being growth in real terms. The important ingredients are derived as follows:

- The risk-free rate is the 10yr US TIPS yield for the US market and the average between the 10yr UK indexed gilt yield and the 10yr Eurozone inflation protected yield for European sectors.
- Sector betas are calculated using five years of weekly price movements relative to the local market index.
- The risk premium is derived from US equity and treasury market returns since 1871.
- The dividend yield for each sector is calculated using end-of-calendar-year consensus forecasts (bottom-up process): for instance, in April 2017, we are using forecasts for dividends earned during 2016 but paid in 2017.

Sector name abbreviations:

Autos = Automobiles & parts
Basic Res = Basic Resources
Chem = Chemicals
Con & Mat = Construction & Materials
Fin Serv = Financial Services
Food & Bev = Food & Beverage
Ind G&S = Industrial Goods & Services
Pers & Hh Gds = Personal & Household Goods
Real Est = Real Estate
Tech = Technology
Telecoms = Telecommunications
Trav & Leis = Travel & Leisure

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