Fundamentals:

How Bulls Die...

Six years into a bull market and with many equity indices at all-time highs it is understandable that investors are nervous about when the party will end. Unfortunately (or fortunately) predicting the end of a bull market is not as easy as looking at a calendar.

In this edition of Fundamentals, Equity Strategist Lars Kreckel takes a closer look at the circumstances historically associated with a bull turning into a bear market and how equities have behaved in the later stages of a market cycle.

Let's start with the easy bit! There are several factors that are often mentioned in relation to the end of bull markets but old age (ie duration) and high valuations are perhaps the most common. Yet we find no evidence that they are in fact a useful guide to when a bull market will end.

BULLS DON'T DIE OF OLD AGE

The commonly held belief that the duration and extent of historic bull markets helps us predict when the current bull market will end feels intuitive, but unfortunately we find no data to support it.

There is no reliable pattern to how long or strong bull markets have been throughout history. There have been very short ones, like the 1980 bull market which delivered a 43% rally, but lasted a mere eight months. At the same time, at the other end of the spectrum, there have been very long bull markets like those which started in 1948 and 1990, each lasting close to a decade **(figure 2)**. So while the average bull market lasted 56 months, there is an enormous standard deviation of 32 months. Not surprisingly the same applies to the speed of the rallies, with annualised returns averaging 23% but with a standard deviation of 15%.

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Figure 1. Bull and Bear markets since 1940*

Bull Markets						Bear Market				
Trough	Peak	Return	Annualised return	Duration (months)	PE at peak	Peak	Trough	Return	Annualised return	Duration (months)
Apr-42	May-46	158%	26%	50	21.7	May-46	Mar-48	-28%	-17%	22
Mar-48	Jul-57	255%	14%	114	14.1	Jul-57	Oct-57	-21%	-57%	3
Oct-57	Dec-61	86%	16%	50	22.5	Dec-61	Jun-62	-28%	-45%	7
Jun-62	Feb-66	80%	17%	44	17.5	Feb-66	Oct-66	-22%	-31%	8
Oct-66	Nov-68	48%	20%	26	18.4	Nov-68	May-70	-36%	-26%	18
May-70	Jan-73	73%	23%	32	18.1	Jan-73	Oct-74	-48%	-31%	21
Oct-74	Feb-80	90%	13%	65	7.6	Feb-80	Mar-80	-17%	-79%	1
Mar-80	Nov-80	43%	69%	8	9.2	Nov-80	Aug-82	-27%	-17%	21
Aug-82	Aug-87	229%	26%	61	21.4	Aug-87	Dec-87	-34%	-77%	3
Dec-87	Jul-90	65%	21%	32	16.8	Jul-90	Oct-90	-20%	-60%	3
Oct-90	Mar-00	417%	19%	115	28.3	Mar-00	Oct-02	-49%	-23%	31
Oct-02	Oct-07	101%	15%	61	20.7	Oct-07	Mar-09	-57%	-44%	17
Mar-09	today			74	20.1					
Average		**137%**	**23%**	**56**	**18.2**			**-32%**	**-42%**	**13**
Median		**88%**	**19%**	**50**	**18.4**			**-28%**	**-38%**	**13**

***bear markets are all declines of at least 20% plus the 1980 example 17%**
Source: Shiller, LGIM, Bloomberg

Arguably this should not come as a big surprise. After all, arguing that share prices are likely to fall because they have gone up for a certain amount of time implies that past performance is a guide to future returns. If only it was that easy! Unsurprisingly we find no evidence that such a correlation exists. In fact, the 140% rally in the S&P 500 over the past six years ranks in the 94% percentile of six-year performances, while bull runs of this length have been followed by returns ranging from -20% to +40% over the next twelve months.

What about the current bull market? It has indeed been one of the longer and stronger bull markets on record, but at 74 months it is less than one standard deviation longer than the average and remains two years short of those in the 1950s and 1990s.

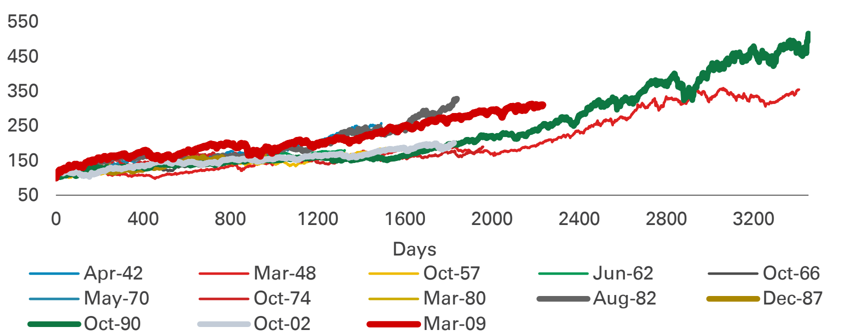
BULLS DON'T DIE OF OVERVALUATION

Another frequent theory is that the bull market will soon end because valuations are very high or have expanded considerably. Again this has some intuitive appeal, but is not supported by the data.

As we showed in the July 2014 Fundamentals 'Rethinking Equity Valuations' there is a strong link between valuations and long-term returns, but no empirical evidence of such a link between valuations and short-term performance, which is why for tactical purposes our approach is 'valuation aware' rather than 'valuation driven'. History has no clear steer as to what return we should expect from US equities over the next year. The trailing PE of the S&P 500 (20x) may only have been higher 19% of the time, but buying the index at this valuation level in the past would have delivered an incredibly wide range of returns, from -20% to +40%, over the next year.

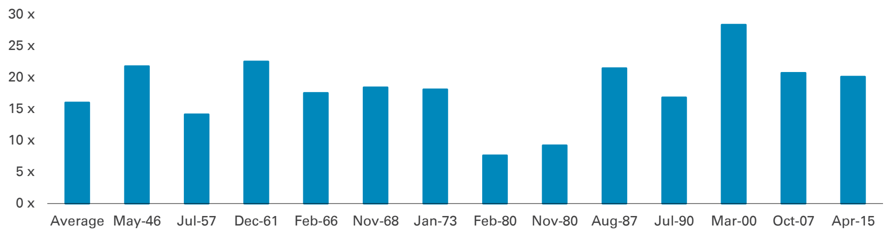
A look at valuations when bull markets have ended in the past also reveals no pattern. The bull market most firmly anchored in investors' minds is the TMT bubble of the 1990s when PEs reached a lofty 28x ahead of the

Figure 2. Bull market durations (Indexed to 100)



Source: Bbg

Figure 3. PE at historic bull market peaks



Source: LGIM, Shiller

subsequent bear market. But we should beware of anchoring our expectations to a recent high profile event. At the end of the bull markets of the late 1970s and early 1980s, PEs were in single digits – far from bubble levels – when equities reversed into bear markets. In fact, since WWII, the average bull market peak PE is not materially different from the average PE observed over the entire 70 year period.

IT'S THE ECONOMY, STUPID

If it is not age or overvaluation that ends bull markets, what does? Both of the above notions imply that bull markets will eventually just collapse due to time or price. Instead, we argue it is more useful to identify events or catalysts that can end a bull market and trigger a bear market. Are there common historical circumstances to the ends of bull markets?

Our work of mapping the economic cycle onto asset returns suggests that the cycle matters greatly to equity returns. Equities have historically delivered the best risk-adjusted returns of the major asset classes throughout the various expansionary phases of the economic cycle, but the worst risk-adjusted returns in the phases where the cycle shifted from expansion to contraction.

With this analysis in mind it is not a great surprise that equity bull markets have almost always ended around the time the economy went into a recession. **Figure 4** plots bull market peaks and recessions showing that, when ten out of thirteen bull markets ended, a recession occurred within the next year. The three remaining cases were market crashes that reversed relatively quickly.

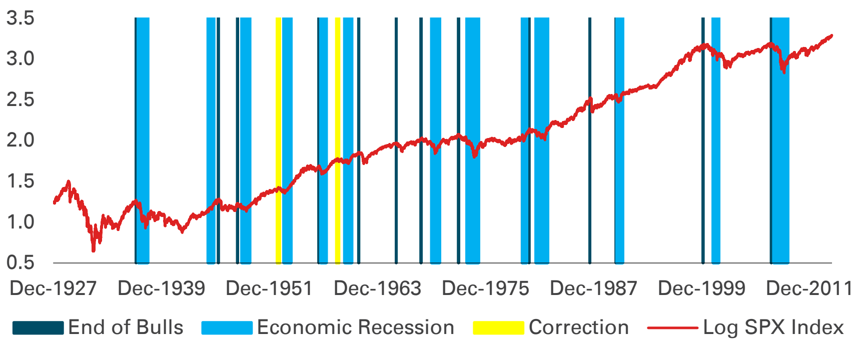
It may seem intuitive that there is a connection between equity returns and recessions, but it is worth remembering that earnings are the direct link. Anything that can cause a negative earnings shock will naturally cause a reappraisal of the present value of future cashflows. Economic recessions are the primary cause of earnings recessions, with all seven of the economic recessions since 1960 having been associated with earnings recessions. As revenue growth turns negative with declining real GDP, operating leverage means that earnings can easily decline many times as much as GDP.

IT'S THE CREDIT CYCLE, STUPID

Alongside the turn in the economic cycle, the turn in the credit cycle is another systematic bull-killer. Conceptually, the credit cycle is straightforward; but empirically, it is rather difficult to measure. In principle, we know that the availability of credit fluctuates through time as a function of economic and financial conditions which in turn impacts demand for financial assets.

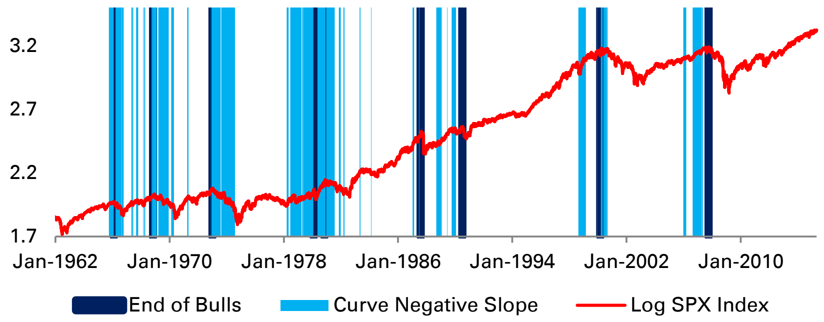
To assess the availability of credit, it is sensible to use a range of indicators. However, one simple shorthand is to consider the slope of the yield curve as a proxy. An upward-sloping yield curve indicates that short-dated credit is cheap and readily available; a flat or inverted yield curve indicates tightness in monetary conditions. Indeed, seven of the past eight bull markets ended around the time when the global yield curve was flat or inverted, with the 1987 'flash crash' the standout exception. Like recession, tightening credit conditions are therefore not a necessary condition for a significant equity market correction, but they certainly make it more likely.

Figure 4. Bull markets and recessions



Source: LGIM, Bloomberg

Figure 5. Bull markets and yield curves



Source: LGIM, Bloomberg

DON'T STRESS THE LITTLE THINGS

Just as important as correctly forecasting the end of a bull market is avoiding prematurely forecasting it. Our macro mapping work shows that equities typically deliver the best risk-adjusted returns throughout the expansionary phases of the economic cycle, so 'long equities' should be the default position for the majority of the expansion.

Looking more closely at the period around the start of recessions, however, shows that equities tend to fall in anticipation of the recession. On average the peak in equities occurred about six months before the start of a recession.

This has several implications for investors. Assuming investors have imperfect timing skills for the start of a recession, it would be prudent to become more cautious on equities as the economic cycle progresses into its late cycle phase.

It also suggests that while the economy remains in a mid-cycle environment and recession risk is deemed to be very low, it is important not to get too stressed about things that are unlikely to change one's view of the cycle. At any given time there is a long list of things investors could worry about. **Figure 6** shows just a few of the things that markets have anxiously discussed over the past two and a half years and how equity markets reacted very little: the forces of the economic expansion and growing earnings dominated.

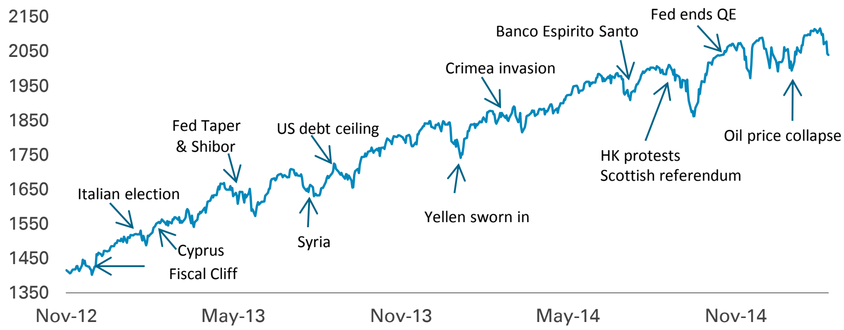
When the economy is mid cycle and recession risk is low, the risk of the bull market ending and a bear market drawdown is equally low. Most events in that situation cause a relatively small and very difficult to trade correction – typically 5-10%, seen on average three times a year. Our analysis shows that an investor with perfect timing skills would have been able to generate around 8% of performance by selling at the peak and buying back at the trough of these corrections. But assuming imperfect timing skills, missing the peak and trough by only four days would have reduced the gains to less than 3%. It does not take much to end up destroying value.

With the benefit of hindsight it is easy to say that none of these had a material impact on equities, but it is more difficult to decide in real time how material a specific risk is. None of these factors should have been ignored but, when the economy is mid cycle and recession risk is low, we should be more relaxed about the constant stream of risks discussed by markets than when the economy is in a late cycle stage and therefore the bull market is more vulnerable. In each case we should ask the question: Can this factor trigger a recession or at least a material change in the path of future growth? If the answer is 'no' or 'low' then our positive mid-cycle view should prevail.

HOW TO USE THIS

Our approach to medium-term risk taking is driven by three key factors: the economic cycle, valuations and the probability of a financial crisis. Focusing on these factors in combination with the above analysis of how bull markets end allows LGIM's asset allocation team to concentrate on what really matters, ignore the noise and benefit from the bull market that started in 2009.

Figure 6. Climbing the wall of worry (S&P 500)



Source: LGIM, Bloomberg

Market overview:
Weaker data and more easing

The month was mainly dominated by weaker data releases from the US and China, the supposed powerhouses of global growth. Accommodative monetary policy remained the norm, with Europe and China further adding to easing policy while weaker US data made an imminent rate hike from the Federal Reserve look less and less likely. Against this backdrop, US equities pushed through to new all-time highs. German government bond yields have tumbled since the start of the European Central Bank's quantitative easing programme with bunds out to eight-year maturities dropping into negative yields.

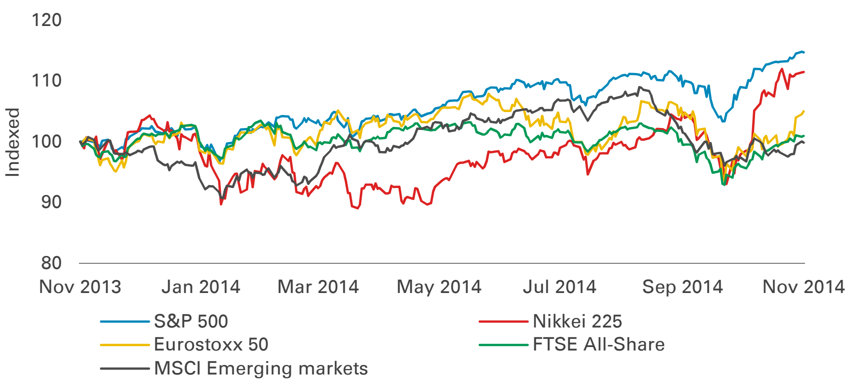
UK
Electioneering

In what is contested to be one of the most open elections in a generation, it's hard to get away from the spin-doctors' rhetoric. Underlying the imminent yet unpredictable election result is a relatively solid economic situation with the latest unemployment numbers posted at 5.6%, well below the average seen over the past forty years. However, recent manufacturing numbers disappointed. The uncertainty over the future government was mirrored by volatility in UK equities as prices fell sharply at the end of March but have since recovered. There was also a sharp rise in gilt yields on April 23 after a hawkish Bank of England meeting; the 10-year yield climbed 0.15% to 1.71%.

US
Disappointing data

US data has failed to pick up from below expectations as industrial production contracted and new housing starts moved weaker. The problem is partly said to be down to the US consumer. Instead of spending the relief provided by the lower oil price, consumers seem to be saving more. Indeed, the latest savings rate was 5.8%, the highest level since 2012. Despite this backdrop, US equity markets have once again reached new highs and, as the likelihood that the Federal Reserve will raise rates appears to have diminished, for the near term at least, government bonds yields have remained low.

Figure 1. Global equity markets



Source: Bloomberg L.P. chart shows price index performance in local currency terms

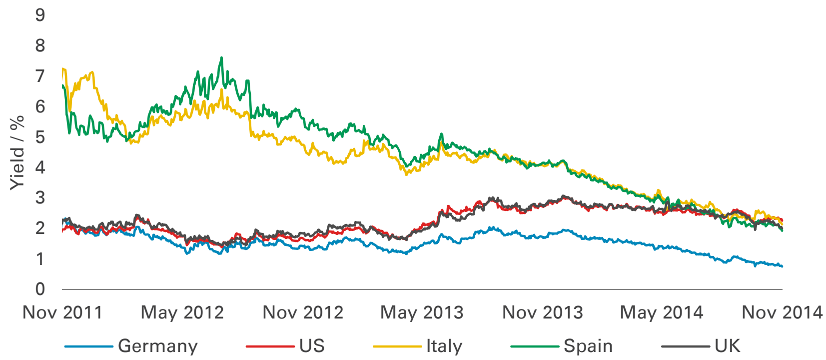
EUROPE
Grecian grumbles

Quantitative easing in Europe has continued to significantly distort markets over the month, with German government bond yields out to eight years now negative and many European bond yields at or near all-time lows. This strong demand managed to suppress any spillover associated with the ongoing fractious Greek bailout negotiations but the situation is far from resolved. Prime Minister Varaoufakis was said to be increasingly isolated both at home and in Brussels, with officials seeking to bypass him in order to push through bailout negotiations. Signs emerged that the situation in Greece is spreading to the rest of the periphery, distracting from the generally constructive backdrop. Indeed, in contrast to US data, European data releases have been positively surprising expectations, albeit with a lower bar to beat.

JAPAN
Third arrow

Japan looks set to lower its forecasts for both inflation and growth, calling into question whether further stimulus in the form of the third arrow of Abenomics will be implemented. Although the Bank of Japan Governor Haruhiko Kuroda argued that the current inflation-boosting programme is on track, many international investors expect further stimulus by the end of 2015. The massive stimulus programme already undertaken has ballooned Japan's government debt and the repercussions of this saw Fitch downgrade Japan's credit rating as the agency predicts that Japan's debt-to-GDP ratio will reach 244% by the end of the year.

Figure 2. 10-year government bond yields



Source: Bloomberg L.P.

ASIA PACIFIC/EMEA
China rate cut

As weaker data from China emerged alongside slower domestic growth, the People's Bank of China (PBOC) cut its reserve requirement ratio (RRR) by 1%. In addition, certain rural financial institutions received an extra 1% cut and a 2% cut was granted for agricultural development. The net effect of these cuts is a huge boost to liquidity and further evidence of the determination of Chinese authorities to rebalance growth effectively. With production costs increasing and economic growth slowing in China, India has emerged a beneficiary. In 2014, India was one of the fastest growing recipients of foreign direct investment as international investors continue to respond positively to Prime Minister Modi's reforms.

FIXED INCOME
QE led yields

Government bond yields in Europe continued to tumble (in the opposite direction to prices) after the European Central Bank started its quantitative easing programme. The exceptionally low rates in Europe have attracted many non-European domiciled corporations to issue in the European marketplace. With Federal Reserve rate hikes in the US pushed further and further into the future, the grab for yield has been boosted once more.

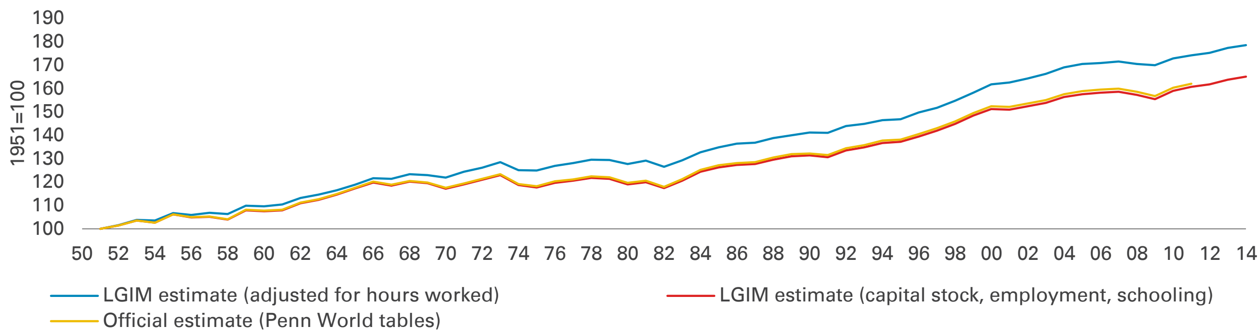
Snapshot:

Energy prices, technological progress and economic growth

The US economy has grown over seven times since the 1950s. But we can only explain 60% of this by a cost-weighted-average of traditional ‘factor inputs’: machines and workers. The remaining 40% is attributed to ‘productivity’ which has risen by just under 1% per year. Some economists (e.g. Robert Gordon) worry we could be heading for stagnation, raising fears over the sustainability of global debt, though recent data suggest US productivity has resumed its upward trend **(figure 1)**.

Academics Ayres and Warr believe productivity can be explained by a third factor of production – energy. Or, more specifically, the amount of energy extracted times its conversion efficiency. In a 2007 book (The Economic Growth Engine), they worried about ever-rising power prices as the world headed for ‘peak oil and gas’ as well as limits to efficiency conversion. They believe the ratio of wages to power prices is the main driver of economic growth, because lower prices increase purchasing power, leading to stronger demand and economies of scale. Moreover, as machines run on energy, cheaper power prices encourage the purchase of new machines, further boosting productivity.

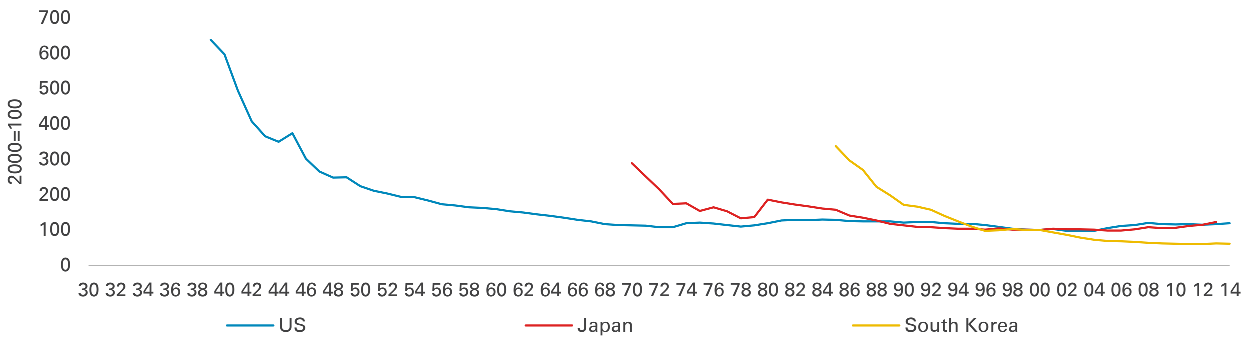
Figure 1. US total factor productivity appears to be on its upward trend



Source: Macrobond, LGIM estimates, PENN world tables

Using Ayres and Warr’s framework, we are encouraged by the recent collapse in global energy prices. It suggests the surge in US production due to fracking technology has busted OPEC’s oil cartel. Australia is also set to rapidly boost world Liquid Natural Gas (LNG) supplies in coming years. Ayres and Warr’s book showed how diesel was quickly adopted by heavy energy users like railroads and ships after WW2 and LNG could have a similar effect. Solar panel prices have fallen faster than academics expected and companies such as Tesla hope to augment this with cheap battery technology. The reduction in renewable energy costs is critical because it limits the need to impose additional carbon taxes if low-carbon technologies become more competitive.

Figure 2. Academics believe the ratio of energy prices to wages is the key driver of growth



Source: Reuters Ecowin

UK forecast:
Oil's gift

UK economy	Price inflation (CPI)		GDP (growth)		10-year gilt yields		Base rates		$/£		£/€	
Market participants' forecasts	2015 %	2016 %	2015 %	2016 %	2015 %	2016* %	2015 %	2016** %	2015	2016*	2015	2016*
High	1.60	2.40	3.00	3.10	2.60	3.10	1.00	1.50	1.59	1.82	0.77	0.84
Low	-0.10	0.60	2.30	1.70	1.35	1.60	0.50	0.75	1.33	1.25	0.64	0.56
Median	0.40	1.70	2.60	2.40	1.98	2.25	0.50	1.00	1.47	1.51	0.70	0.71
Last month median	0.50	1.70	2.60	2.40	2.20	2.36	0.63	1.00	1.50	1.52	0.70	0.72
Legal & General Investment Management	**0.40**	**1.50**	**2.50**	**2.30**	**2.20**	**3.00****	**0.50**	**1.00**	**n/a**	**n/a**	**n/a**	**n/a**

Source: Bloomberg L.P. and LGIM estimates
***Forecasts are for end of Q2 2016**
****Forecast for end of 2016**

In recent weeks, first quarter GDP growth in both the US and UK has been somewhat underwhelming. Does this mean we've changed our view on pretty decent global growth in 2015 and 2016? Not at all. We still expect to see decent growth this year, accelerating slightly next year.

While the US and UK have had disappointing growth in the first quarter, the outlook for Europe and Japan has improved markedly. Weaker currencies help. As we pointed out in the March Fundamentals, we forecast that the 10% fall in the trade-weighted euro will add around 0.5% to growth in one year's time. That's not a large number but, after years of near zero growth, that's a big tailwind.

As we discussed at length in the February Fundamentals, it's the oil price that underpins our expectation of decent global growth. Despite the recent rebound in the oil price, prices are still significantly lower than at the same point in 2014, and this is particularly welcome for economies such as the euro zone and Japan that essentially have to import all their energy.

When we look at the UK and US, in the short term, the fall is probably a negative, as both have reasonable oil-producing sectors that are currently slashing capital expenditure in response to the weaker oil price. After all, why spend a lot of money to get stuff out of the ground when the price of that stuff is falling?

But beyond this short-term impact, the positive impact on consumption will more than offset this. Consumption is around two-thirds of a modern developed economy, and the fall in the oil price is a turbo boost for spending power, typically feeding through after 12 months or so. If you spend less heating your home, filling your petrol tank or on other energy-related services such as air travel, you'll have more money in your pocket at the end of the month. Obviously the prudent will be saving some of this windfall, but history suggests that most prefer to spend it.

This all sounds like a short-lived effect, which is absolutely true. This is a cyclical recovery based largely on temporary factors rather than a strong base, but it shouldn't be written off as a result. It can help start a self-reinforcing cycle, as consumer services industries employ a lot of people. So as consumers spend more, jobs are created and people's fears over unemployment fall, adding further momentum to the economy. In addition, these temporary rebounds give economies such as the euro zone wiggle room to enact more fundamental reforms that can support better longer-term growth. Will the politicians use this room for manoeuvre wisely?

The forecasts above are taken from Bloomberg L.P. and represent the views of between 20–40 different market participants (depending on the economic variable). The 'high' and 'low' figures shown above represent the highest/lowest single forecast from the sample. The median number takes the middle estimate from the entire sample.

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