In this edition of Fundamentals, LGIM economist James Carrick considers the fundamental drivers of growth – demographics, debt, regulations, energy, globalisation and technology – concluding that although GDP growth should remain below average over the next five years, it should be closer to ‘normal’ than stagnant.

Advanced economy growth has been weak over the past five years (2010-14), averaging around 1.5% against a long-run average (i.e. over the past 40 years) of around 2.5%. We expected the recovery to be subdued given the need for public and private sector deleveraging yet, while growth has been disappointing, employment has been surprisingly strong. The difference between the two is reflected in persistently weak productivity.

Increasing employment can deliver growth for a while but, once labour markets run out of slack, GDP growth can only be sustained by improvements in productivity. The key is an acceleration of capital expenditure (capex) to boost labour productivity as labour markets tighten.

LABOUR MARKET
The most obvious reason to expect continued weak growth compared to the past 40 years is demographics. The birth rate peaked at the end of the Second World War. These ‘baby boomers’ are now retiring. While some countries are increasing retirement ages, this merely represents ‘running to stand still’. The working-age population is projected to SHRINK by 0.3% instead of rising by around...
0.7% on average over the past 40 years (figure 1) – a swing factor of minus 1%.

There is scope for female participation to rise in some countries, notably Japan, but again the big gains are behind us (1970s and 1980s). However, the internet means it’s never been easier and cheaper to access information and retrain, which should increase the flexibility of the labour market.

DEBT

Nevertheless, it’s not just that there are fewer new workers, due to declining birth rates, but there are also more dependents to support, due to rising life expectancy. So a concern is how to meet those pension and healthcare liabilities for a greying population.

While long-term government solvency remains a concern, it’s unclear whether it will cause a sudden collapse in confidence in the next five years. Indeed, the rate of increase in government debt – borrowing – has fallen to more sustainable levels in recent years as a result of prior painful spending restraint and tax hikes. So the ‘drag’ on the economy from fiscal tightening is likely to be less intense going forward.

The academic debate about the impact of high debt levels on economic growth continues. But a recent IMF working paper argues that – while a surge in debt hurts growth over five years, as borrowing is painfully curtailed – once the debt ratio has stabilised, the longer-term effects are less severe (see figure 2). However, indebted economies are found to be more volatile because they have less room to loosen fiscal policy in the event of a negative shock.

A combination of zero interest rates and quantitative easing means debt interest servicing burdens are currently low. High debt makes an economy more sensitive to interest rate changes, so central banks are likely to be cautious about normalising monetary policy. In addition, with central banks owning a large share of their own government’s debt, there is less risk of the forced selling which typically exacerbates financial crises. As a result, debt remains a concern, but less so than five years ago.

The best example of this is fracking. In response to high energy prices, US entrepreneurs

CREATIVE DESTRUCTION

A potential side effect of ultra-loose monetary policy is ‘zombie companies’ limiting creative destruction. Aggregate productivity is depressed as weak firms are kept afloat but new firms struggle to expand as they are starved of capital. Recent data show an encouraging recovery in labour market churn (hiring, firing and quits) and new business formation in both the US and the UK (figure 3). So this drag could be fading. We could also see another self-reinforcing recovery in bank lending given asset prices are rising and unemployment is falling. And increasing digitalisation should reduce barriers to entry by making it easier to connect buyers and sellers for goods and services.

In the long run, it is the disruption caused by such new technologies that drives economic growth. Unlike some academics (e.g. Robert Gordon), we don’t think innovation has stopped because the legal system hasn’t changed. Laws protecting patents and forbidding the destruction of machines were the catalysts for the industrial revolution. While Luddites remain today (e.g. taxi drivers slashing Uber tires in France), technological innovations continue.

The best example of this is fracking. In response to high energy prices, US entrepreneurs
discovered new ways to extract gas and oil from the ground. The result has been a plunge in US natural gas prices and, more recently, global oil prices as OPEC’s cartel has collapsed. Academics Ayres and Warr believe the relative price of power is a key (and usually overlooked) driver of long-run growth. So we are encouraged by recent developments.

Our optimism on wholesale oil and gas prices is tempered by the ongoing need to reduce carbon emissions, which suggests we previously over-consumed ‘dirty’ fuels like coal as these were priced too cheaply. Retail energy prices should keep rising as governments meet their renewable energy commitments. But solar panel prices have fallen faster than academics expected. Augmented with a revolution in battery storage and forthcoming Liquid Natural Gas supplies, upside risks to energy prices seem limited.

GLOBALISATION

While we have seen significant progress in energy technology, we remain concerned by the “Peak of Globalisation” (Fundamentals, May 2013). Adam Smith showed how specialisation boosts productivity. The collapse of the Soviet Union (1991), the European single market (1992), NAFTA (1994), European single currency (1999) and China joining the WTO (2001) all led to a surge in trade between countries and therefore specialisation, economies of scale and efficiency. But since 2006, figure 4 shows that world trade as a share of GDP has stalled, which may have damaged productivity.

Looking ahead, there is scope for liberalisation of trade in services (Trans-Pacific and Transatlantic Trade and Investment Partnerships). But as yet, nothing has been agreed. There is a more pressing danger that the UK votes to leave an unreformed European Union, which could disrupt UK and European trade, particularly in financial services.

GDP MISMEASUREMENT

Services are harder to measure than goods and underreporting of services could explain weak productivity of recent years. In the late 1990s, statisticians found they had been overestimating inflation (and therefore underestimating real GDP and productivity) by over 0.5% per year by failing to fully capture rapid changes in IT hardware prices (e.g. US Boskin Commission). They began ‘hedonically’ adjusting prices of goods like computers to take into account faster processors, larger hard drives etc. Given the latest revolution has been about ‘cloud computing’, e.g. using low powered and small storage capacity devices like phones and tablets to access services and content over the internet (e.g. access to Google Maps, Wikipedia, Youtube), statisticians could be behind the curve again.

Academics such as Brynjolfsson and Oh believe statisticians are drastically underestimating the value consumers get from using free services on the internet and the welfare gains from increased choice. For example, being able to listen to any song on demand instead of having to own and carry all the albums. But hasn’t this always been the case? Is moving from renting DVDs by post to on-demand streaming a bigger improvement than renting DVDs by post relative to going to your local video rental store? How about the introduction of satellite TV, the VCR or the TV itself? And since the Boskin Report, statisticians have updated the frequency with which they introduce new items into the CPI to avoid missing out on...
rapid deflation of new goods and services.

Nevertheless, the UK’s Office for National Statistics has already announced plans to revise up the growth of UK real software investment by 70% as it acknowledges it is overestimating software prices. But this upward revision will be spread over 16 years, so the impact on GDP growth is a paltry 0.03% per year. More fundamentally, changing the mix between prices and volumes has no impact on cash GDP, which is what matters for debt sustainability. But it does raise questions as to whether our standard of living (real wages) has really stagnated in recent years or instead we’ve experienced a deflationary boom driven by lower prices and free services.

**CAPITAL STOCK**

Going forward, we see deflationary pressures abating as labour markets tighten. US and UK firms report acute recruitment difficulties as job vacancies remain unfilled (Fundamentals: Deflation Defeated, September 2014) and evidence of stronger wage inflation is broadening. Firms’ response to this will determine the strength and duration of the recovery going forward.

Firms might try and maintain margins and pass on higher wage costs directly to consumers. If so, the recovery could be curtailed as central banks hike rates quicker than planned. Alternatively, firms might struggle when their profit margins get squeezed. Hiring would freeze, undermining the consumer recovery. But the more benign and, in our view, likely outcome is capital deepening – a recovery in capex as labour becomes relatively scarce.

In a deregulated labour market, workers are more flexible than machines. It’s easier to lay off staff in a broad economic downturn than it is to sell an underutilised building or machine. So the ratio of capital (buildings and machines) to workers soared during the recession as workers were laid off but the capital stock remained. Since then, firms have rehired workers to use that existing capital stock, reducing capital per worker and therefore productivity (output per worker). As the labour market tightens and its relative price increases, firms should slow hiring and accelerate capex, particularly as credit conditions continue to ease. This will boost output per worker, justifying higher nominal pay (figure 5).

**CONCLUSION**

Advanced economy growth has been weak over the past five years. The optimists argue this is largely due to cyclical headwinds which should fade as economies heal from the financial crisis. The pessimists see structural impediments to growth which increase the risk of recurring crises.

In our assessment, summarised in figure 6, there is merit to both sides of the debate. We share concerns on demographics, globalisation and, to a lesser extent, debt. But we have seen positive signs from technological progress, particularly in energy and software. When combined with deregulation and improving credit conditions, our growth scorecard (see figure 6) suggests advanced economy growth will remain below average over the medium term, but closer to ‘normal’ than ‘stagnation’. The key is an acceleration of capex as unemployment continues to fall.

**Figure 6. LGIM advanced-economy growth scorecard**

<table>
<thead>
<tr>
<th>Factor</th>
<th>Score</th>
<th>Pros</th>
<th>Cons</th>
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<tbody>
<tr>
<td>Demographics</td>
<td>-2</td>
<td>Declining working age population</td>
<td>Borrowing already reduced Low debt servicing / QE</td>
</tr>
<tr>
<td>Debt</td>
<td>-1</td>
<td></td>
<td>Still extremely high Unsustainable commitments</td>
</tr>
<tr>
<td>Regulations and Technology</td>
<td>+1</td>
<td>Software revolution Internet reduced barriers to entry</td>
<td>Statisticians always behind curve Increased government regulation</td>
</tr>
<tr>
<td>Energy</td>
<td>+1</td>
<td>Fracking, solar, LNG OPEC cartel collapsed</td>
<td>Carbon regulations</td>
</tr>
<tr>
<td>Globalisation</td>
<td>-2</td>
<td>Peak of globalisation since 2006 UK’s EU referendum</td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>-1</td>
<td></td>
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Market overview: Grecian gripes

It’s been hard to focus on anything but Greece over the month. Negotiations between Athens and its creditors have swung from supposed compromise to breakdown and back again. In the mass coverage, it’s challenging to sort the relevant developments from the irrelevant. The situation is still fractious with Tsipras yet to receive approval for proposals domestically and open discussions on capital controls as Greek bank run fears escalate. The market still expects a resolution and signs of easing tensions were welcomed by risk markets.

<table>
<thead>
<tr>
<th>UK</th>
<th>Growth in real wages</th>
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<tr>
<td>In the three months to April, average weekly pay increased by 2.7% as inflation dipped into negative territory at -0.1%. This meant that real earnings growth reached the highest level since the financial crisis in 2007. However, economists have argued that the growth rate is unsustainable unless there is a pickup in UK productivity. As part of the UK Financial Investments (UKFI) ongoing strategy to sell down the Treasury’s stake in Lloyds Banking Group, the government stake has now reduced from 41% to 17% with about £11.5bn returned to the taxpayer so far. After performing well in May, UK equities markets were weaker in June but remain in positive territory year-to-date. UK government bond yields increased over the month, particularly at the long end of the curve.</td>
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<th>US</th>
<th>Fed policy</th>
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<tr>
<td>The Federal Reserve chair Yellen strayed little from previous rhetoric in her latest statement – short-term interest rates will rise gradually in coming years as the Fed cautiously tightens monetary policy. Yellen conceded that there were signs that the US economy had regained momentum after a poor start to the year, reaffirming rate hike expectations for September. The Fed is acutely aware of the balancing act in its hands as it approaches its first rate rise since 2006 with the risk of a market tantrum that could damage global growth. The IMF waded into the mix this month, voicing its concerns that a hike this year could prematurely choke off the recovery. As the situation in Greece ebbs and flows, it’s inevitable that the market returns its full focus to Fed rate policy.</td>
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Figure 1. Global equity markets

![Global equity markets chart](image-url)

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

**Greece is the word**

It’s been a month dominated by emergency summits of EU leaders on Greek government debt relief in exchange for reforms. Whether Greece defaults on its loan repayment due to the International Monetary Fund at the end of June is only part of the problem. If there’s no deal, then a referendum on Greece’s euro membership, rather than an automatic Grexit, may be the logical next step. The markets appear to be relatively sanguine about a Greek exit, in part due to reduced bank contagion risk – 85% of Greek government debt is held by official creditors – and because the euro area is in much better shape than in 2012 during the last Greek crisis. Nevertheless, a Grexit could cause financial market volatility, a rush to safe haven assets, business confidence would suffer and peripheral yields could spike. For now, markets continue to welcome signs of resolution in both equity and bond markets.

**JAPAN**

**Third arrow expansion**

Japan’s prime minister Abe released a draft plan on tackling its large outstanding public debt. The plan outlines a stimulus strategy, which aims to boost growth through measures including a university revamp to make Japan more globally competitive, permitting higher immigration levels and encouraging its tourism industry. The strategy contains no big spending cuts or revenue rises beyond the 2% rise in consumption tax already planned for 2017, includes an optimistic growth outlook above the US and sets a primary deficit target of 1% of GDP by 2018.

**ASIA PACIFIC/EMEA**

**Weaker data from China**

Chinese manufacturing data (PMI) edged up to a three-month high of 49.6 in June but remained below the 50 mark, which separates contraction from expansion. This means that factory activity has in fact been shrinking for three straight months and there was also evidence that factories have had to cut prices. Against this backdrop, and despite ongoing stimulus, some economists now believe it’s unlikely that China will see 7% GDP growth for the first time since the Global Financial Crisis. There has been volatility in Chinese equity markets, which have fallen considerably in the last week but remain in firm positive territory year-to-date.

**FIXED INCOME**

**Higher yields**

As European government bond yields have increased, in the opposite direction to prices, they are no longer anchoring other developed market yields down. As a result, government bond yields across the UK, US, Japan, New Zealand and Australia all moved to this year’s highs in June. Against this backdrop, corporate bond returns have struggled. Many central banks remain cautious on monetary tightening action but should the Federal Reserve raise rates, it may spark some action elsewhere in the world.
**Snapshot:**

### US labour productivity and capital deepening

In a primitive agricultural economy, there are three ways to produce more food: hire more labourers, give each labourer a shovel, or teach them new technologies such as how to irrigate the land.

In recent years, the US economy has expanded chiefly by using more labour. But it is now running out of workers. With the labour force slowing as baby boomers retire, unemployment has fallen rapidly towards its long-run average. This has led to a surge in unfilled job vacancies and the number of firms reporting recruitment difficulties.

If the economy can no longer expand by hiring more workers, we need to see an increase in productivity – output per worker. But, in recent years, US hourly labour productivity has been dismally weak, averaging just 0.25% per year since 2011 vs a long-run average of 1.5% since 1975.

We can split this weak productivity performance into two components: capital deepening (the number of tools and machines per worker) and total factor productivity (the effectiveness of workers and machines).

**Figure 1. Labour inputs have grown faster than capital inputs in the last four years**

Total factor productivity has disappointed, growing by 0.5% over the past four years versus a long-run average of just over 1%. But there has also been a drag from capital deepening (see figure 5 in the main article). The number of machines per hour worked has fallen in recent years whereas, typically, the capital stock has grown 1% faster than labour inputs.

In figure 1, we plot the growth in the capital stock (blue line) vs the growth in labour inputs (red line). Labour inputs are more volatile because it is cheaper to fire a worker than scrap a machine. So, in the depths of the recession in 2009, the ratio of capital per worker soared (yellow line). Since then, firms have rehired workers to use the existing capital stock, so capital per worker has fallen. The capital-labour ratio is now back in line with its long-run average, suggesting there is no longer a glut of idle machines. With labour market slack diminishing, we need to see firms substitute capital for labour for the recovery to continue. An increase in investment, particularly in new technologies, would boost the capital stock (figure 2) and also output per worker.

**Figure 2. The growth in the capital stock is the difference between gross investment and depreciation**
UK forecast:
You never had it so good

<table>
<thead>
<tr>
<th>UK economy</th>
<th>Price inflation (CPI)</th>
<th>GDP (growth)</th>
<th>10-year gilt yields</th>
<th>Base rates</th>
<th>$/£</th>
<th>£/€</th>
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<tbody>
<tr>
<td>Market participants’ forecasts</td>
<td>2015  %</td>
<td>2016  %</td>
<td>2015  %</td>
<td>2016%</td>
<td>2015  %</td>
<td>2016%</td>
</tr>
<tr>
<td>High</td>
<td>1.50</td>
<td>2.40</td>
<td>3.00</td>
<td>3.00</td>
<td>2.50</td>
<td>3.10</td>
</tr>
<tr>
<td>Low</td>
<td>-0.10</td>
<td>0.80</td>
<td>1.70</td>
<td>1.80</td>
<td>1.70</td>
<td>1.50</td>
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<tr>
<td>Median</td>
<td>0.40</td>
<td>1.60</td>
<td>2.50</td>
<td>2.40</td>
<td>2.18</td>
<td>2.59</td>
</tr>
<tr>
<td>Last month median</td>
<td>0.40</td>
<td>1.60</td>
<td>2.50</td>
<td>2.40</td>
<td>2.03</td>
<td>2.39</td>
</tr>
<tr>
<td>Legal &amp; General Investment Management</td>
<td>0.40</td>
<td>1.50</td>
<td>2.30</td>
<td>2.40</td>
<td>2.35</td>
<td>3.00</td>
</tr>
</tbody>
</table>

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

LGIM economists are not renowned for their sunny disposition. But as we head into the summer months, we have a pretty positive view on the UK consumer. We mentioned this a couple of months ago, as part of our analysis of the impact of lower oil prices. Oil has since rebounded somewhat, but our view has actually been reinforced – at least on a short-term basis.

The short reason for this is that UK consumers are feeling a bit richer. Wages are picking up. We had identified falling unemployment and survey data suggesting that firms were finding it hard to recruit the right people as catalysts for higher wages. This took some time to come through, but we have now had several months where growth has been materially higher – typically 2-3% rather than the underwhelming 1% levels seen in 2013 and much of 2014. Although this relates to the private sector (public sector pay growth is still being restrained), it is relatively broad-based, rather than confined to a handful of sectors.

At the same time, inflation as measured by the CPI index has been hovering around zero. At the margin, having more money to spend in an environment where prices are stable should lead to greater retail spending. Sure enough we saw a 4.6% year-on-year increase in sales volumes in May.

Will it last? While wage growth is decent and the job market is tightening, there will certainly be support for increased retail sales. However, this will be tempered by the potential for more austerity in the new Government’s first budget in July. But interest rates will remain key – UK consumers are much more sensitive to interest rate moves than their US equivalents, simply because so many of them are on variable rate mortgages.

We see little scope for a rate rise this year. Although we’re sure the Bank of England would never admit it, we think that it would prefer to see the Fed move first. And with inflation still firmly in ‘MPC letter writing territory’ and no obvious signs of rising sharply in the near term, the Bank can afford to play a waiting game. While the MPC’s hawks – Martin Weale and Ian McCafferty – might start voting for rate hikes again this year, the rest of the committee is likely to wait and see. The UK consumer can therefore probably spend happily for the next few months before needing to apply the brakes. Enjoy the summer.

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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