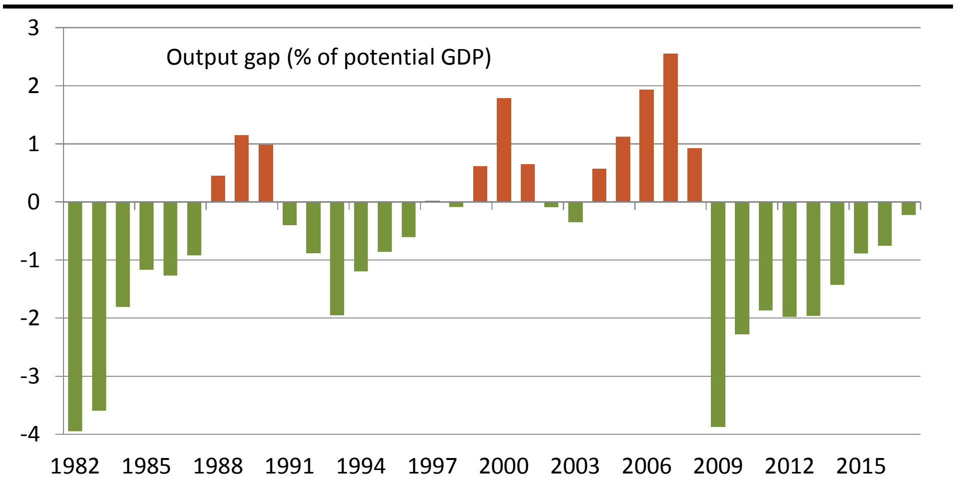
Can productivity growth keep inflation at bay?

- **Productivity matters:** Living standards that rise at 2% per year will double roughly every 35 years. Living standards that rise at 1% per year will double roughly every 70 years. The sharp slowdown in the rate of productivity growth after the financial crisis is a cause for concern.
- **Something is missing:** Except for the current upswing, productivity growth has rebounded sharply during the upswing in all cycles since the 1980s in the developed world. In the post-Lehman upswing, only employment has recovered at its normal rate. Productivity growth has languished – rising at only around half the rate common for the late 20th century. Due to this shortfall in output-per-worker growth, real GDP growth rates have been around a third lower than in the past.
- **The age of caution:** Since the financial crisis, cautious households and firms have held higher precautionary cash balances than usual. They have saved more while investing and spending less than in previous upturns. The necessary deleveraging and reallocation of capital away from unproductive real estate has further weighed on demand and risk-taking. Firms have hired workers to produce more to meet the rising demand rather than investing in new capacities. As a result, capital-to-labour ratios and rates of productivity growth have stagnated.
- **The normalisation begins (base case):** After seven years of caution, 2017 marked the partial return to normal cyclical dynamics. Over time, stronger growth will put strains on available resources. Many advanced economies are close to, or at, full capacity. Firms will soon need to raise capacities in order to produce more. In the coming years, healthy demand growth should translate into higher investment and stronger gains in productivity. Typically, advanced economies enjoy a good three years of strong growth after the output gap is closed before the correction comes – Chart 1. This would imply that the current upswing can last roughly until 2020/21.
- **Watch the "stagflation" risk:** If productivity growth does not rise as economies hit supply constraints, real GDP gains will slow and inflation could surprise on the upside. Such a shift towards higher inflation and slower growth would shock markets and present a challenge for central banks. This is not our base case. It describes the tail risk and explains why productivity matters.
- In the second part of this report, we analyse the key trends and issues relating to productivity in the US, Japan, Germany, the UK and France.

Chart 1: Output gap (% potential GDP), advanced countries



Annual data. Source: International Monetary Funds, Berenberg calculations

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Kallum Pickering
Senior UK Economist
kallum.pickering@berenberg.com
+44 20 3465 2672

The missing ingredient: productivity growth

Productivity growth is essential for economic progress

Productivity growth is the essential ingredient of economic progress. In the long run, material living standards cannot increase unless workers are able to increase the amount of output they produce relative to their labour input. Through innovation, saving and investment that raises the quality and quantity of an economy's capital stock, productivity can rise over time.

Sharply rising living standards began with the First Industrial Revolution

The high and rising living standards we enjoy today in the advanced world began with the First Industrial Revolution that started in Great Britain in the late 18th century. Within a few decades, the other major advanced economies of the time, including the US and Germany, also began to industrialise. Over the next 50 or so years, the rate of productivity growth coming from technological progress in Europe and North America outpaced anything that had happened before.

Continued rising productivity cannot be taken as a given

Since living conditions for the average person were more or less stagnant for most of human history, continued economic progress and rising productivity cannot be taken as a given. Although economists can describe the recipe for improved productivity, when it actually comes to accumulating these ingredients, well, that is a different matter altogether. Investment and innovation require, among other things, stable politics, the rule of law, sound property rights, along with saving, investment and risk-taking. Only when this set of special circumstances exist together can we expect to see serious economic progress.

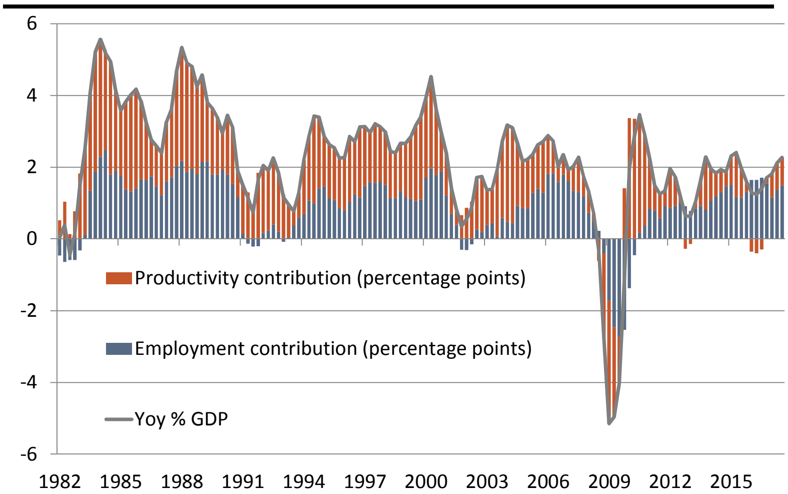
The sharp slowdown in productivity growth is a cause for concern

To illustrate why productivity growth matters so much, consider the following: living standards that rise at 2% per year will double roughly every 35 years; living standards that rise at 1% per year will double roughly every 70 years. Because life is already too short, the sharp slowdown in productivity growth after the financial crisis is a cause for concern.

Productivity growth has averaged around half the rate of the late 20th century

Typically, growth in advanced economies bounces back strongly after a severe downturn. Such is the experience of the post-war period. In a normal cyclical recovery, strong investment leads to rising capital per worker and rising productivity. As Chart 2 shows, employment and productivity in advanced countries have risen together during all major cycles since 1980 apart from the most recent one. In the post-Lehman upswing only employment has recovered at its normal rate. Productivity growth has languished, rising at only around half the rate common for late 20th century. Because of this shortfall in output-per-worker growth, growth rates have been around a third lower than the averages of the past.

Chart 2: G7 GDP growth split by productivity and employment



Quarterly data. Source: OECD, Institut National de la Statistique et des Etudes Economiques, Deutsche Bundesbank, Cabinet Office of Japan, Office of National Statistics, Bureau of Economics Analysis, Istituto Nazionale di Statistica, Statistics Canada, Berenberg calculations. G7 countries: US, Japan, Germany, UK, France, Italy, Canada.

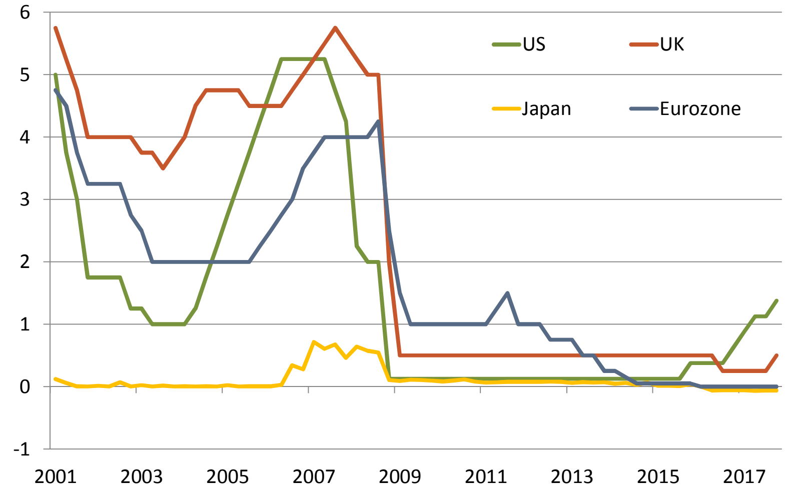
The consequences of slow productivity are deep and widespread

The consequences of the disappointing pace of productivity growth are deep and widespread. Real wages and profits have increased more slowly than before. Confidence and economic agents' appetite for risk-taking have been depressed. Both of these features of the post-Lehman world show up in the slower rates of nominal GDP growth and high demand for low-risk assets such as government bonds. Continued low growth rates have weighed on expectations for the future, partly reinforcing the dynamic. Meanwhile, the growth impulse from economic policies designed to speed up the recovery has disappointed relative to initial expectations.

Nominal GDP growth has slowed despite aggressive monetary policies

Central banks including the Fed, the ECB, the BoE and the BoJ have gone further into their policy arsenals than before, adding massive bond purchases – quantitative easing (QE) – and in some cases, negative policy rates, in their efforts to revive growth. Still, growth has remained weak, and easy monetary policies have lasted far longer than initially expected – Chart 3.

Chart 3: Major central banks' policy rates (%)



Quarterly data. Source: Federal Reserve Board, European Central Bank, Bank of England, Bank of Japan

Policymakers have faced a trade-off between employment and fiscal prudence

On the fiscal side, few major economies have managed to achieve both a balanced public sector budget and high employment during the post-Lehman upswing. Slower-than-expected growth has meant that tax revenues have generally disappointed relative to expectations. With the exception of Germany and some smaller similar countries such as the Netherlands, policymakers have faced a trade-off between employment and fiscal prudence.

Some countries have not achieved low unemployment or a stable fiscal position

For economies that prioritised a return to low unemployment, such as the US and the UK, considerable fiscal rebalancing is still needed. Meanwhile, the economies of southern Europe that prioritised fiscal discipline over growth and employment have managed to stabilise their fiscal position but still suffer high unemployment. Other countries like France and Italy have achieved neither low unemployment nor a sustainable fiscal position.

Potential causes of the productivity puzzle

Productivity growth was already slowing before the Lehman crisis

Productivity growth was already slowing before the Lehman-crisis. However, leading up to the crash, the weakening growth in underlying productivity had been masked by the housing and credit-fuelled boom in demand and output. Remember, most measures of productivity simply take some measure of total output and divide it by some measure of labour input. Until the economic drivers become unsustainable and the correction happens, even credit-driven output growth can be mistaken as reflecting rising productivity growth for a while.

G7 growth in output per worker has fallen to 0.9% from 1.5% before 2008

At any rate, the slowdown in output-per-worker growth in the advanced world, dubbed the "productivity puzzle" in the UK, is dramatic. G7 annual growth in output per worker has fallen from 1.5% before 2008 to 0.9% thereafter. We cover examine the four major explanations for this slowdown below.

1) Secular stagnation: The slowdown in productivity growth is due to a persisting "secular" weakness in demand.

Secular stagnation is not a new concept

Secular stagnation was first theorised by US economist Alvin Hansen on the eve of World War II, when the western world was reeling in the wake of the great depression. Since the Lehman-crisis, it has been repopularised by US economist Larry Summers[1].

1 "The Age of Secular Stagnation", Lawrence H. Summers

Summers argues that the abnormally low interest rates and disinflationary headwinds during the post-Lehman period are the product of excess savings relative to investment, which act as a drag on economic growth. The persistently slow pace of demand growth weakens the impetus to invest in capital and R&D, thus reinforcing the slow rates of growth in the quantity and quality of the capital stock growth relative to the labour supply.

Excess savings relative to investment acts as a drag on economic growth

Proponents of the secular stagnation argue that monetary policy is ineffective at reviving demand. Instead, they argue that only through fiscal policy – by governments soaking up excess savings and investing them directly – can economies escape the slow-productivity-growth equilibrium.

Monetary policy could be ineffective at reviving demand

Secular stagnation extends other similar neo-Keynesian lines of thinking that arose after the initial crisis in 2008 when it was observed that central banks' stimuli were having less of an impact on nominal demand than the standard macro framework would have predicted. Some economists argued that the advanced world was in a "liquidity trap" and that central banks had "hit the lower bound" with their policy rates. The symptoms of these earlier prognoses are similar to what one might observe from secular stagnation: slow nominal growth and excess savings relative to investment. Secular stagnation differs because it is an argument for the long-run: it says the infliction is permanent rather than transitory.

Secular stagnation extends the neo-Keynesian thinking that arose after the initial crisis

Secular stagnation provides a good fit for parts of the post-Lehman story until early 2016. Since then it is seems less convincing. Beginning in late-2016, economic growth has improved in the western world without the prescribed fiscal stimulus. After a painful period of balance sheet strengthening and capital reallocation, nominal demand growth along with private investment and wages are now rising towards more normal rates across most of the advanced world.

Secular stagnation seems less likely in light of recent data

2) Mismeasurement: The gains in material living standards triggered by innovations are not properly captured by the standard toolkit of economic statisticians.

What if productivity growth has not really slowed at all? What if we simply are not measuring it properly? This argument has found growing support in recent years amid the perceived paradox between the slow rate of productivity growth and the strong anecdotal evidence of rapid technological progress. Traditional measures of productivity – total factor productivity and labour productivity – take GDP as the measure of output and simply divide it by some measure of labour input. But GDP as a measure can be poor at capturing rising consumer utility and improved business efficiency.

Could we be mismeasuring productivity growth?

There are a two major potential sources of underestimating total output and productivity growth.

Traditional measures of GDP can struggle to capture true value

1) Advanced economies are experiencing a rising share of "free" services, especially internet-based ones such as search engines and communication apps. These outputs do not have an obvious monetary value in the way that, say, a stamp or pair of shoes has when purchased. Instead, consumers pay with their data. As a result, these services are not adequately tallied in the standard measure of output.

2) Quality improvements in information technologies are not always properly captured by their prices or other obvious metrics. Therefore, the price deflators used to convert nominal values into real values or volumes are likely to be excessive, thus leading to an overestimation of the nominal change relative to the real change.

As advanced economies have shifted towards more services, which are more prone to accounting problems, and away from industrial production, mismeasurement problems have probably worsened over time. This would fit well with the observed declining growth rates in output per worker. In the future, as statistical agencies invent better methods of measuring quality improvements and price deflators for new modern sectors, we can probably expect the occasional upward revision to the historical series of real output.

The measurement story sits well with the observed declining growth rates in productivity

Is mismeasurement of productivity a valid argument? Yes. Does it account for the whole story? Probably not. Broader economic trends over the past decade, such as low confidence, precautionary saving, austerity, external and internal imbalances that needed to be corrected, would have been expected to weigh on growth for a time anyway.

Does mismeasurement account for the whole story? Probably not

3) Persistent supply-side weakness: The good times are over – marginal returns from future innovations will be permanently lower than in the past.

US economist Robert Gordon argues that the golden age of productivity growth is over[2]. While his analysis focuses mainly on the US, it applies more broadly to the advanced world. Gordon argues that the period from 1870 to 1970 was a "special century" when the grounds for the modern economy were developed. The transformative conditions during this 100 year period, he argues, are unmatched in history and are unlikely to be repeated soon. Note how this explanation differs from the "secular stagnation" hypothesis: if the slowdown is due to permanent weakness on the supply side of the economy, rather than the demand side, as Summer's argues, then fiscal stimulus to utilise the excess saving would be futile. Instead, it would simply lead to higher public debt and deficits.

Some argue that the golden age of productivity growth is over

In our analysis of long-term productivity trends Patiently waiting: the productivity super-cycle, 31 July 2017, we similarly argued that there are observable long-term trends in productivity. We showed that productivity growth in the western world had slowed materially since the 1980s. However, we remained more optimistic about the potential productivity gains in the decades ahead from the new generation of innovations such as advanced robotics, 3D printing and nanotechnologies.

Productivity growth in the western world has slowed since the 1980s

4) The age of caution: In the past eight years, households and firms, scarred by the excesses that led to the Great Financial Crisis, have acted with much more caution than before. Two oil price shocks and the euro crisis further weighed on the already fragile confidence.

In our view, this "age of caution" explains the major part of the surprise drop in productivity growth since the financial crisis. Yes, structural features of advanced economies – plus some measurement issues – explain why productivity growth has trended downwards in recent decades, but the post-Lehman period is still abnormally low, even in the context of this longstanding trend.

Cautious behaviour explains the major part of the productivity puzzle

Since the financial crisis, cautious households and firms have demanded higher precautionary cash balances than usual. This has pushed up rates of saving while depressing spending and investment. Furthermore, the necessary deleveraging of both the public and private sectors (austerity) and reallocation of capital away from unproductive real estate has further weighed on demand and risk-taking. Firms have hired workers to produce more to meet the rising demand rather than investing to raise their capital stock. As a result, capital-to-labour ratios have stagnated along with rates of productivity growth.

Repairing economies after the Lehman crisis has weighed on investment

In our view, however, weak productivity growth will not become a permanent feature of the post-Lehman world. Instead, as fundamentals improve and the memories of the crisis gradually fade, firms and households will begin to behave more normally again. Unlike the "secular" prognosis described above, we think that the unusually slow rates of productivity growth are only a cyclical phenomenon.

Weak productivity growth will not become a permanent feature

An unusual amount of regulatory and institutional uncertainty has further weighed on both aggregate supply and aggregate demand in the post-Lehman period. While the factors weighing on confidence in the US and Europe were different in nature, the consequences pointed in the same direction. In the US, a creeping regulatory burden constrained business activity during the Obama era. The rise in US business confidence since the beginning of 2017 partly reflects the newly elected Republican congress rolling back much of this red tape. In Europe, the euro crisis knocked confidence in the structure of the eurozone and its institutional framework. Rebuilding business confidence has taken time. European reforms proposed by France's President Macron that would strengthen EU and eurozone institutions could further bolster confidence.

Rebuilding business confidence has taken time

Indeed we are already seeing the early signs of a recovery towards more normal behaviour. After seven years of caution, 2017 marked the partial return to normal cyclical dynamics. With the fading of the post-crisis fear factor, the economic upswing gathered more momentum than expected a year ago. But the critical questions remain: can this normalisation continue, and what happens next?

We are seeing the early signs of a recovery towards more normal behaviour

2 "The rise and fall of American growth", Robert Gordon

What comes next: more growth or more inflation?

The economic cycle in the advanced world has approached a critical juncture

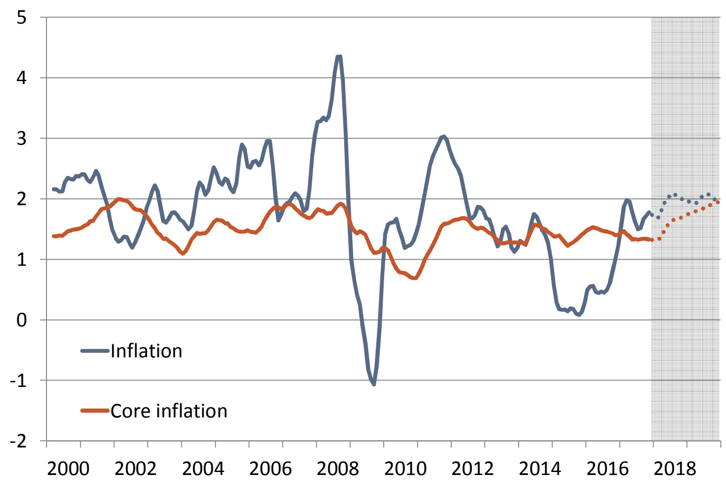
The economic cycle in the advanced world has approached a critical juncture. After many years of restrained demand growth, supply is now becoming scarcer. Measures of capacity utilisation in production industries are at a post-Lehman high in major parts of the advanced world. And as our cover chart shows, the output gap is approaching zero for G7 economies. Meanwhile, in the economies with the most mature upswings such as the US, Germany, and the UK, unemployment is well below pre-Lehman lows. For the G7 overall, unemployment is at a 40-year low of 5.4%. Now that the recovery from the post-Lehman recession is complete, how long the upswing can last now depends on how producers respond to continued growing demand. Will they raise prices, raise production, or a bit of both? We examine two potential scenarios below.

1) Normalisation: more inflation, more productivity growth

Soon firms will need to increase investment to raise their productive capacities

Over time, above-trend growth will put strains on available resources. Soon firms will need to increase investment to raise their productive capacities. But, except in the Brexit-stricken UK, where headline inflation has risen above the BoE's 2% target, inflation is not likely to head up rapidly in major parts of the advanced world, even though many advanced economies are close to, or at, full capacity – see Chart 4.

Chart 4: Inflation – weighted average of US, eurozone, Japan and UK



Yoy changes in %, 3-month average; core inflation excludes food and energy. Sources: BLS, ECB, ONS, Ministry of Internal Affairs and Communications, Berenberg calculations

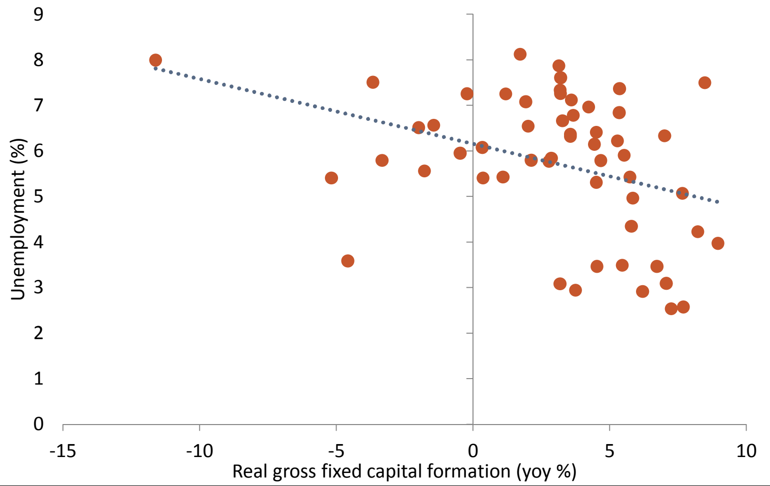
As firms run into capacity constraints, they typically increase investment

With the improving global backdrop, rising profits and asset prices, fading memories of the crisis, and still low costs of capital thanks to global central banks' accommodative policies, firms that are running into capacity constraints are well placed to invest more in the years ahead. This would be consistent with historical trends. As Chart 5 shows, unemployment and annual growth in investment are negatively correlated. As firms run into capacity constraints they typically invest more. By raising the quantity of capital per worker as employment gains slow, higher investment will help to lift productivity growth.

We see early evidence of accelerating wage gains already

As inflation reacts with a lag to changes in the balance of aggregate demand and supply, the upside surprise in global demand growth in 2017 could be followed by an upside surprise in inflation in 2018. We see early evidence of rising wage gains already. The extent and speed at which core inflation will pick up from its current subdued rates depends partly on how much productivity growth recovers. If the synchronised global upswing and rising confidence that goes with it encourage firms to raise investments at a rapid rate – say 5-10% per year – then productivity growth could surprise strongly to the upside, thereby limiting the rise in inflation. The upswing could continue for longer without overheating.

Chart 5: Investment versus unemployment (G7)



Annual data from 1962 to 2016. Source: OECD, Berenberg calculations

It is hard to predict by just how much productivity growth will improve

Typically, advanced economies enjoy a good three years of strong growth after the output gap has closed before the correction comes. This would imply that the current upswing continues until 2020/21. But how long the good times last will depend on the extent of productivity rebound. This is the critical question. It will also determine at what pace central banks will tighten their monetary policies. After years of subdued productivity growth while economies have absorbed their labour market slack, it is hard to predict by just how much productivity growth will improve. Consensus forecasts and those of central banks with their mostly stable or higher projections for employment and GDP growth than on average for recent years implicitly assume a rebound in productivity in the coming years.

2) The critical risk: softer real growth, higher inflation

Managing higher inflation and lower growth would challenge central banks

If the productivity growth rates that have prevailed so far during the post-Lehman upswing continue and employment gains slow as labour markets reach full employment, then major advanced economies will struggle to grow at more than 1.5% per annum in real terms in the coming years. This would imply a sharp slowdown ahead, following the c2% average growth rates achieved so far during the upswing. Such an outcome would be a major surprise to us and to markets that are expecting sustained above-trend growth rates in the coming years for major advanced economies coupled with only a modest rise in inflation. The shift towards higher inflation and slow growth would present a real challenge for central banks that still worry about the general balance sheet health of the global economy.

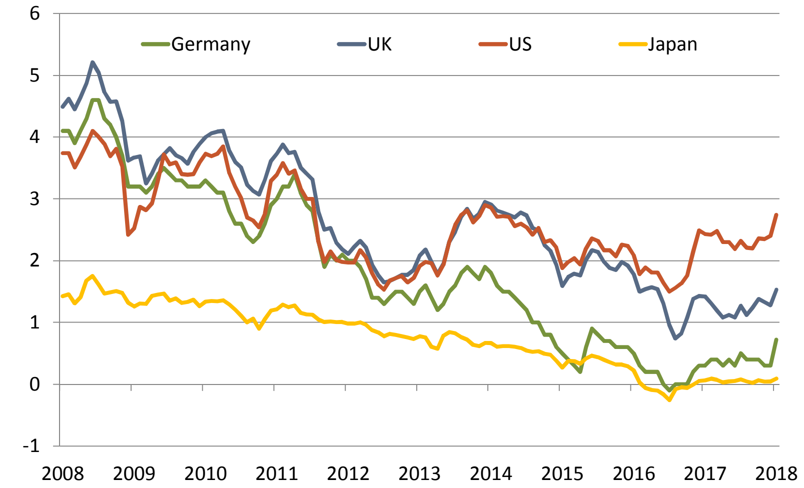
When economies are supply-constrained, slow growth does not mean low inflation

If the recent gains in nominal demand did not trigger higher investment and stronger productivity growth but led to slower real growth and higher inflation instead, central banks would be forced to respond by tightening their monetary policies more aggressively. While global central banks have maintained stimulative monetary policies in response to the weak demand growth during the post-Lehman recovery and are likely to go slowly with their exits, this is all predicated on inflation rising only gradually, as we expect. This is where the risks lie.

Rate hikes in response to stagflation could trigger a cyclical downturn

Inflation risks rise when demand surges or economies become supply-constrained. When there is little or no slack, or when inflation expectations rise above central banks' targets, central banks cannot trust that inflation will return to target, even when growth does not accelerate. In such circumstances, central banks would be forced to tighten to avoid an overheating in wage and price inflation. Even though bond yields have recently risen a bit to reflect the rising growth and inflation expectations – see Chart 6 – they remain well below past levels that would be consistent with current consensus growth expectations. An aggressive monetary tightening in response to stagflation that led to a sharp rise in bond yields would therefore jar financial markets, tighten credit conditions in the real economy, and most probably bring any real economic expansion to an end.

Chart 6: Nominal 10-year government bond yields



Monthly data. Source: Deutsche Bundesbank, Bank of England, US Treasury, Ministry of Finance Japan. January values taken from daily data on 1 February 2018

Some memories never die. A few economists including ex-Fed chair Alan Greenspan, have argued that productivity growth is unlikely to pick up and speculate that "stagflation" is around the corner. They liken the recent low inflation period to the 1960s before the last major bout of stagflation in the 1970s. In the 1970s, stagflation was triggered by a sharp rise in the oil prices, a substantial expansion of public welfare spending and major wage increases. Taken together, these factors caused a recession and high unemployment. But that dynamic was compounded by excessively stimulative fiscal and monetary policies that were used to try and counter the downturn.

We see two reasons why this upswing is unlikely to turn into stagflation

Like "secular stagnation", the risk of "stagflation", while containing a kernel of truth, is probably overdone. We see two reasons why the risk of stagflation is low this time.

Stagflation risk is overdone

1) A commodity shock seems unlikely. Thanks to US shale, the global oil market is more price-elastic than before. OPEC's weakened grip on the oil market limits the chance of a sustained surge in oil prices either from a direct effort by OPEC to constrain supply to boost prices, or from an eruption of geopolitical risks in a major oil-producing region. In addition, advanced economies are much less oil-dependent than they used to be.

A commodity price shock seems unlikely

2) Before the 1970s, central bankers were firmly committed to Phillips curve thinking: they believed they could simply trade off inflation and unemployment, and that high inflation and high unemployment were mutually exclusive events. Central bankers thought they need not worry about high inflation during periods of rising unemployment. This proved to be a mistake. Economists now understand that the Phillips curve can shift. If inflation expectations rise, both inflation and unemployment can increase together. Therefore, if inflation expectations started to rise on a sustained basis during some future downturn, inflation-targeting central banks such as the Fed, the ECB, the BoE and the BoJ would be reluctant to overstimulate demand in the way they did in the 1970s.

Central banks understand the limits to Phillips curve logic

Conclusion: the outlook is positive

Major advanced economies seem to be close to full supply capacity, based on output gap estimates and central banks' estimates of full employment. Market observers might worry that because a late-stage upswing is a little unusual, inflation risks could be more pronounced than normal. However, we see two major reasons why gains in productivity and aggregate supply will promote healthy real GDP growth while keeping inflation risks a bay:

Productivity gains should promote healthy real GDP growth

1) Firms are becoming less risk-averse and increasingly confident that revenues will remain strong in the years ahead. They are thus choosing to increase productive capacities through higher investment in response to the rise in demand. Since rising demand is being met by rising supply, the risk that inflation could surge above central banks' targets is low.

Rising demand is being met by rising supply

2) Rising labour market participation in the US and Japan and inflows of skilled migrant workers from around Europe into Germany, and to a lesser extent since the Brexit vote, the UK, can continue to add to total labour supply in these economies. Continued rising participation and labour supply growth will limit wage pressure. Therefore, even as labour

Wage growth is likely to accelerate only modestly markets tighten according to standard measures, further wage growth should accelerate only modestly.

Healthy gains in aggregate supply are reflected in our above-consensus forecasts

Our outlook for healthy gains in aggregate supply is reflected in our above-consensus forecasts – see Table 1 – for real GDP growth in major advanced economies. Productivity growth and the employment of underutilised resources – especially in the labour market – will dampen the pass through of a gradual wage pickup to consumer price inflation.

Table 1: More growth without much higher inflation – Berenberg forecasts versus consensus

	GDP		Inflation	
	2018	2019	2018	2019
US	0.3	0.5	0.3	0.2
Japan	0.2	0.0	0.1	0.1
UK	0.4	0.4	0.2	0.2
Germany	0.2	0.2	0.0	0.0
France	0.3	0.6	0.1	0.0

Difference between Berenberg forecasts and Bloomberg consensus, in ppt; green (red) colour: Berenberg above (below) consensus. Source: Bloomberg consensus taken on 1 February 2018; Berenberg projections

Central banks are unlikely to put the brakes on the upswing

The probably modest uptick in core inflation is unlikely to be pronounced enough to scare central banks into tightening policy by more than is needed to prevent a premature overheating of the cycle. Critically, a gradual tightening of monetary policy that simply reflects the rise in returns and higher demand for credit and investment would not dampen the recovery in productivity and real GDP.

Policies of global central banks should remain easy into the medium term

Even with a gradual monetary tightening in the US, the UK and eventually the eurozone, the monetary policies of global central banks should remain accommodative well into the medium term. Real policy rates should remain low or negative, and well below estimates of equilibrium interest rates, while balance sheets should remain large by historical standards.

Measures of where we are in the cycle might be unreliable

As an aside, because of the unusual nature of the post-Lehman upswing, even more than before, we must be cautious in how we rely on and interpret some of the economic variables that we typically use to assess where we are in the cycle. While metrics like the output gap, potential growth, and the NAIRU (non-accelerating inflation rate of unemployment) can be useful rules of thumb, contemporaneous estimates can be unreliable and are prone to frequent revision.

Supply does not represent a fixed pie relative to demand

The output gap, which we refer to on the cover – calculated as the difference between aggregate supply and aggregate demand – can often be misinterpreted. Supply does not represent a fixed pie relative to demand. Both aggregate supply and aggregate demand are dynamic variables. Even if the output gap is zero and demand growth suddenly accelerates, if aggregate supply growth can keep up, inflation need not rise.

Analysis of major advanced economies

So far we have discussed the key issues and general trends in the advanced world. But as major economies all differ slightly, it is worth focusing on some of them to try to better understand what trends we can expect in the coming years. In the following pages we take an overview of the key issues relating to productivity in the US, Japan and the major economies of Europe.

US: tax and reform policies help improve economic performance

The US has the most advanced upswing of all major economies

The US has the most advanced upswing of all major economies. IMF estimates of the output gap suggest that the US was operating at slightly above its potential in 2017 for the first time in a decade. As a result, the Fed is further ahead with its rate hike cycle. Compared with the ECB, which we merely expect to stop increasing its stock of purchased assets later this year, the Fed is well into its rate cycle and is likely to raise the Fed Funds Rate four times this year. We expect the Fed funds rate corridor to reach 2.25-50% by the end of 2018. Such rate hikes will occur while the Fed gradual unwinds the stock of assets it has purchased under QE. The tightening of US policy is likely to go hand-in-hand with both rising inflation and stronger productivity growth.

Table 2: US GDP, employment, investment and productivity

Average	1981-2000	2001-07	2010-2017
Real GDP (yoy %)	3.4	2.5	2.1
Employment (yoy %)	1.7	1.0	1.3
Investment (% GDP)	22.4	22.4	19.5
Output per worker (yoy %)	1.6	1.5	0.9

Source: Bureau of Economic Analysis, OECD, Berenberg calculations

US real GDP growth has slowed sharply during the post-Lehman upswing

As Table 2 shows, US real GDP growth in the post-Lehman upswing has averaged merely 2.1% per year, well below the 3.4% average for 1981-2000, and below the pre-crisis average of 2.5%. While employment growth has accelerated relative to the pre-Lehman period, productivity growth has disappointed (0.9% yoy versus 1.6% yoy), reflecting the lower contribution of investment spending to GDP.

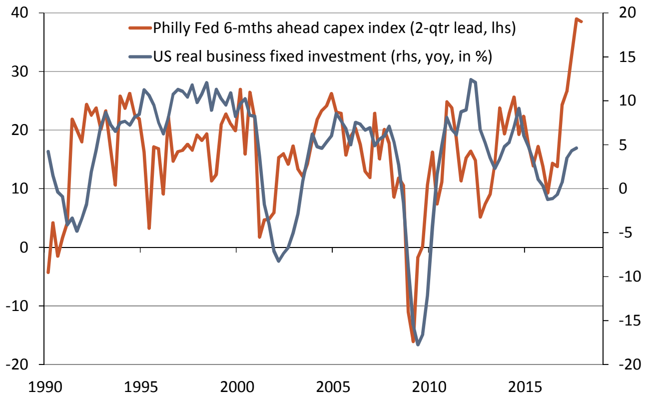
The US is likely to signal what other economies can expect

Because of the more advanced nature of the upswing in the US, observers from outside the country will look to it for signs of what they can expect as their own economies approach full employment. If what comes next in the US is stronger capital expenditure, rising capital-to-labour ratios and improving productivity growth, market watchers and economists will be more hopeful that this trend will occur elsewhere too.

US economic reform should boost capital expenditure

While the normalisation of US aggregate demand growth had already started in late-2016, the economic plan enacted this year by the newly elected Republican President and Congress looks set to raise the US's productivity potential. The lower regulatory burden and tax cuts for businesses will simplify and increase the space for businesses in the US to operate. This should lead to higher overall capital expenditure and more efficient capital allocation.

Chart 7: US Philly Fed capex versus real business fixed investment



Source: Bureau of Economic Analysis, Federal Reserve Bank of Philadelphia

During the post-Lehman upswing, the US Fed has consistently revised down its estimate of long-run US potential growth as productivity growth continued to disappoint. The Fed's current estimate of potential growth is 1.8%, down from 2.5% before the Lehman crisis. If US productivity growth surprises to the upside over the medium term, the Fed will gradually re-raise its estimate of US growth potential.

The Fed's current estimate of potential growth is 1.8%

Outlook for the US: The outlook for stronger productivity growth in the US is promising. As Chart 7 shows, soft data on investment signals a likely upsurge in real business investment growth over the course of 2018. This will help the US maintain solid growth momentum while keeping inflation risks at bay. Meanwhile, continued rising labour market participation can help underpin growth in aggregate supply. Although current US headline unemployment is low at a near-18 year low of 4.1% the employment ratio is still 3ppt below the pre-crisis peak of 63.0%, but it is rising. Continued demand gains that translate into further rises in labour participation could slow the expected acceleration in productivity growth.

The outlook for stronger productivity growth in the US is promising

Japan: next comes the real test for Abenomics

Amid widespread concerns about Japan's negative demographics, the economy is growing comfortably faster than potential, profits are rising sharply and the Nikkei has surged by c20% year-to-date to a 25-year high of 23,200. Through improved employment growth, the Japanese economy has grown at a modestly stronger rate since 2010 (1.5% average per annum) compared with the run-up to the financial crisis (1.3% average). However, compared with its boom-era in the 1980s, Japanese real GDP and productivity growth remains subdued – Table 3 – and is low relative to other advanced economies[3].

The Japanese economy is growing comfortably faster than potential

Table 3: Japanese GDP, employment, investment and productivity

Average (yoy %)	1981-1990	1991-2007	2010-2017
Real GDP (yoy %)	4.5	1.3	1.5
Employment (yoy %)	1.9	0.8	0.7
Investment (% GDP)	30.6	24.8	23.0
Output per worker (yoy %)	2.6	0.5	0.8

Source: Cabinet Office of Japan, OECD, Berenberg calculations

Japan has absorbed its spare capacity at a steady rate during the post-Lehman upswing. Meanwhile, the combined efforts of Prime Minister Abe's economic reforms plus ultra-low costs of capital, thanks partly to the BoJ's easy-money policies, have encouraged Japanese firms to rebuild their capital stocks. Japanese non-residential real net-capital stock has rebounded sharply since 2013 and is close to its all-time high of 2008 – see Chart 8. But the real measure of success for Abenomics will be if the ongoing capital accumulation continues to add momentum to productivity growth as the labour market tightens further and the economy hits capacity constraints.

Ongoing capital accumulation will add momentum to productivity growth

The Bank of Japan (BoJ) recently increased its estimate of Japan's potential growth to 0.8-1.0% from 0.5%, reflecting the strengthening labour force and improving productivity fundamentals. Meanwhile, the dramatic rise in the labour force participation rate of women is boosting employment growth, effectively offsetting the negative impact of the declining working-aged population.

The BoJ recently increased its estimate of Japanese potential growth

3 Note that the periods in the table of economic aggregates differ for Japan, owing to the structural break present in the data after the asset price bubble, which burst at the start of the 1990s.

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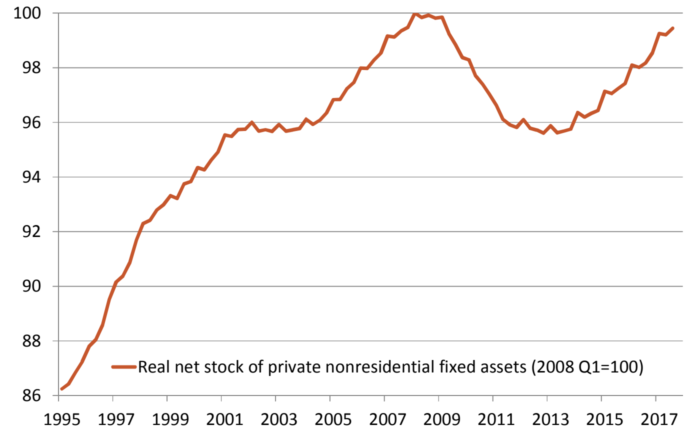
Chart 8: Japanese real private net capital stock (non-residential)



Quarterly data. Source: Cabinet Office of Japan

Outlook for Japan: Labour productivity for the total economy has been rising modestly – 0.9% in the last three quarters – but it has been much stronger in manufacturing. These increases in productivity are beginning to be reflected in higher real wages. With the unemployment rate at 2.8% – its lowest since mid-1994 – and evidence of tight labour markets, a further pickup in female labour market participation, productivity growth and real household income growth seems likely.

Increases in productivity are beginning to push up real wages

Germany: still enjoying its golden decade

Germany, unlike other major advanced economies, has outperformed during the post-Lehman period relative to its pre-Lehman days. German real GDP growth has averaged 2.1% since 2010, 0.7ppt higher than the average during the pre-Lehman upswing. However, the improvement in the headline growth rate has been primarily due to an acceleration in employment growth from 0.4% before Lehman to 1.2% afterwards. The improved growth after the financial crisis is mainly attributable to the economic reforms implemented by Chancellor Gerhard Schröder around 2004. These reforms transformed the German economy from the sick man of Europe to its strongest performer with a Thatcher-style labour market reform that cured Germany of its persistently high unemployment – see Chart 9.

Germany has outperformed during the post-Lehman period

Table 4: German GDP, employment, investment and productivity

Average (yoy %)	1981-2000	2001-07	2010-2017
Real GDP (yoy %)	2.2	1.4	2.1
Employment (yoy %)	0.0	0.4	1.2
Investment (% GDP)	24.9	20.0	19.6
Output per worker (yoy %)	2.1	1.0	0.9

Source: Deutsche Bundesbank, OECD, Berenberg calculations

As in other advanced economies, German productivity growth has disappointed in the past eight years, averaging 0.9% yoy – less than half the rate managed in the 20 years to 2000. Much like the US and the UK, the German economy is currently running at full capacity. The IMF's output gap estimate even shows the German economy operating at around 1% above its potential. Other data are consistent with the German economy at close to, or even above, full capacity: while measures of capacity utilisation are at record highs, wage inflation is above the eurozone average and seems to be rising gradually. What happens next for Europe's biggest economy depends on how much firms raise capital investment as any remaining spare capacity is absorbed and demand continues to expand.

Like other advanced economies, German productivity growth has disappointed

German outlook: The conditions for stronger capital investment and labour productivity growth seem favourable. Thanks partly to the ECB's low-rate policy and asset purchases, the real costs of capital are low. Meanwhile, German private sector confidence is riding high amid falling political risks in Europe. Due its strong export orientation, Germany can benefit even more from rising global demand than other comparable European countries. Meanwhile, as Germany is a magnet for migrant labour, especially from eastern Europe, the supply constraints on the labour side are less than the headline unemployment numbers indicate.

Conditions for stronger labour productivity growth seem favourable

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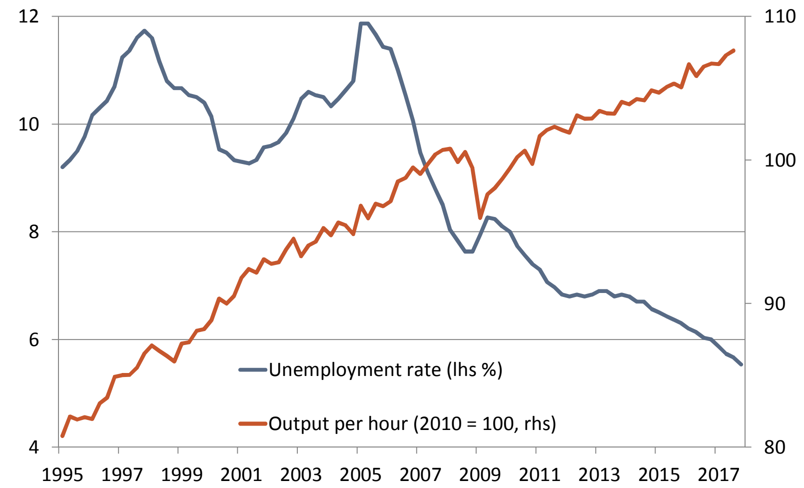
Chart 9: German unemployment versus productivity growth



Quarterly data. Source: Deutsche Bundesbank, Federal Statistical Office

UK: Brexit poses serious risks

UK output-per-worker growth had slowed ahead of the financial crisis

UK headline real GDP growth has slowed from 2.7% to 2.0% since 2010. Although employment growth has managed an impressive 0.9% yoy increase, up from 0.3% pre-2000, average annual rise in output per worker has fallen from 1.9% before 2008 to 1.1% thereafter. As table 5 shows, UK output-per-worker growth had already slowed ahead of the financial crisis relative to pre-2000 period. The worsening productivity picture corresponds to the declining share of investment as a proportion of GDP.

Table 5: UK GDP, employment, investment and productivity

Average (yoy %)	1981-2000	2001-07	2010-2017
Real GDP (yoy %)	2.7	2.7	2.0
Employment (yoy %)	0.3	0.8	0.9
Investment (% GDP)	20.0	18.0	16.6
Output per worker (yoy %)	2.5	1.9	1.1

Source: Office of National Statistics, OECD, Berenberg calculations

Companies have relied on the UK's flexible labour markets

Amid the post-Lehman caution, companies have relied on the UK's flexible labour markets to cheaply expand their workforces to raise productive capacities while shying away from big risky investments in illiquid capital. But this process cannot go on indefinitely. As the UK labour market is now at, or close to, full employment, employment gains will slow. Companies will thus need to raise capacities through higher investment to produce more. Doing so would help to eliminate the cyclical shortfall in productivity growth. If companies do not raise their investment at faster rates, real GDP growth would decline.

The Brexit-stricken UK faces a higher risk of stagflation

The risks to the outlook for UK productivity growth are significant. On the one hand, with its liberal labour and product markets, the UK is well placed to translate rising global economic momentum into higher investment and productivity growth. On the other hand, the UK could suffer from weaker investment growth because of Brexit and its related uncertainty. The UK thus seems more exposed to the stagflation risk than the other countries analysed in this report. Nevertheless, this risk is still low even in the Brexit-stricken UK.

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Table 6: Possible scenarios for UK post-Brexit economic relations with the EU

	EU member/No Brexit	Soft Brexit	Semi-soft Brexit	Hard Brexit
Probability	*(5%)*	*(30%)*	*(45%)*	*(20%)*
Free trade within the area	Yes	Yes on almost most goods and many non- financial services	Yes for most goods but very few services	No
Financial passporting within EU	Yes	No – but with some potential for equivalence agreements	No	No
Customs union with EU (no border checks)	Yes	No	No	No
Free to set external trade policy	No	Yes in all markets not covered by the customs union	Yes in all markets not covered by the customs union	Yes
Covered by EU external trade agreements	Yes	No	No	No
Free movement of people	Yes	Yes with few exceptions	Some restrictions on EU citizens entering the UK labour market	No
Votes on EU laws/regulations	Yes	No	No	No
Under ECJ jurisdiction[1]	Yes	Yes indirectly	Yes indirectly	No
Contribution to EU budget	Yes	Yes	Some	No
Long-term trend growth (%, pa)	>2.0%	1.7-1.9%	1.5-1.7%	<1.5%

[1] *As the European Court of Justice (ECJ) adjudicates on all Single Market issues, countries in the customs union, or that have agreements with the EU, as well as EEA countries are all indirectly under the ECJ's jurisdiction. Source: Berenberg*

Brexit risks to near-term demand have not materialised

The good news is that, so far, the downside risks to near-term demand growth since the Brexit vote have not materialised in a major way. Yes, growth would have been higher than the 1.8% managed in 2017 – probably above 2.5% – without Brexit, but firms' hiring and investment have held up well. This bodes well for a medium-term recovery in productivity growth.

A soft Brexit would limit downside risks to productivity growth

If the UK pursues a soft Brexit, it could see a sharper rebound in productivity growth in the coming years. In 2018, UK firms, households and markets could be less worried about the risk that the UK might crash out of the EU in March 2019 without an agreed framework for future trade with the bloc. They could, therefore, be less risk-averse than before. With the BoE's easy monetary policy keeping the costs of capital low, investment and productivity growth could surprise to the upside in the coming year.

Far-left Labour leader Jeremy Corbyn adds to the UK's long-run risks

Because of persistently weak gains in productivity, growth in real incomes and real GDP per capita have been much weaker during the post-Lehman recovery than in previous upswings. These economic problems have exacerbated the drift towards populism in the UK; they may even be a major cause of it. If Brexit worsens the UK's long-run prospects, it may indeed fuel the populist fire rather than diminish it. Meanwhile, the prospect of far-left Labour leader Jeremy Corbyn eventually becoming prime minister adds to the UK's long-run risks. If Mr Corbyn became prime minister, he would likely follow a misguided policy of expanding the state via increased public ownership in key industries alongside higher taxation and public spending. By inhibiting the private sector's capacity to create wealth, such policies would further weaken the UK's long-term productivity outlook.

The long-term risks from Brexit still loom large

UK outlook: The long-term risks from Brexit loom large. Brexit could damage the UK's trade and investment relationship with it biggest market, the EU, which would weigh on the recovery in productivity. Including the effects on the labour force from lower inward migration, we estimate that Brexit could reduce the UK's real GDP growth potential by more than 0.5ppt from 2.0% (as an EU member), depending on the nature of future UK-EU relations; around half of this decline would stem from weaker productivity growth compared with a no-Brexit scenario – Table 6.

France: golden decade ahead

France looks set to outperform both Germany and the UK

French economic growth has slowed dramatically over the last four decades, down from 2.3% in the period 1981-2000, to 1.9% between 2001 and 2007, and to a mediocre 1.2% during the post-Lehman recovery. Productivity growth declined from 1.7% to 0.7% over that period. However, in coming years, a reformed France could well outperform a Germany that remains strong but is becoming more complacent with every election, and a UK that is constraining its supply potential by leaving its major export market, the EU.

Table 7: French GDP, employment, investment and productivity

Average (yoy %)	1981-2000	2001-07	2010-2017
Real GDP (yoy %)	2.3	1.9	1.2
Employment (yoy %)	0.6	0.7	0.5
Investment (% GDP)	21.8	22.3	22.7
Output per worker (yoy %)	1.7	1.1	0.7

Source: Institut national de la statistique et des études économiques, OECD, Berenberg calculations

For France, economic reforms are long overdue

For France, economic reforms are long overdue. Its experiments with high levels of government spending and regulations compared with other major European economies like Germany and the UK have not turned out well. But the French economy has improved in recent years thanks a series of economic reforms that began in 2015 when current president Macron was finance minister in the Socialist government under the then president François Hollande. If all goes well, recently elected President Emmanuel Macron could transform the French economy from "sick man of Europe" to one of its strongest members over the next ten years.

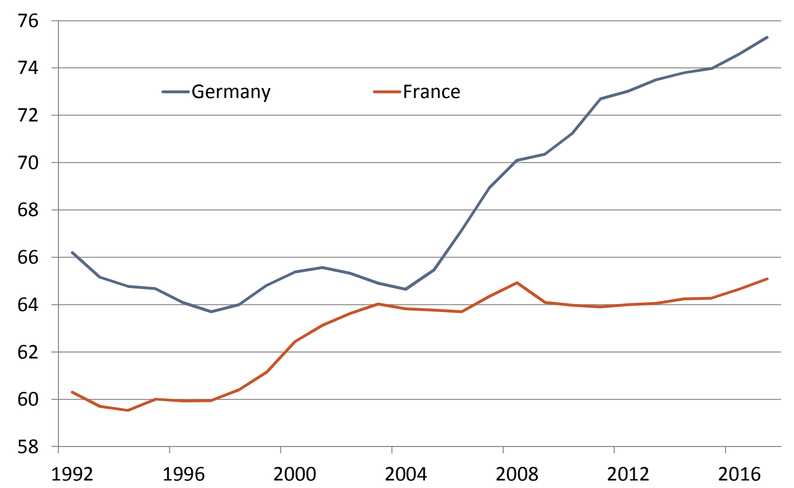
Turning France around will take time

Turning France around will take time. So far, however, President Macron seems to be on track. He is implementing the reforms that he outlined in his election campaign. Having already signed a major labour market reform comparable to Germany's "Agenda 2010" of 2003/04, he and his government are following up with more changes. France is restructuring the way it finances its social system in a way that eases the burden on workers and employers modestly. 2018 will also bring a further step in the gradual reduction of the French corporate tax rate from 33.3% to 25% by 2022. Some further reforms are in the pipeline.

Over time, France should become a better place for inward investment

French outlook: Over time, France should become a better place for inward investment. This would support a recovery in productivity growth. However, initially, France might see its productivity rebound by less than other countries. The current gap between German and French employment rates indicates the potential that France could unlock with its reforms. France can easily grow by hiring – Chart 10. If France follows the trend of other economies where the expansion is more mature, employment gains will precede the uptick in labour productivity. However, if France is lucky, and helped a bit by the strong global confidence, both employment and productivity could rise together in the coming years.

Chart 10: French and German employment: big gap means big potential



Annual data. Employment as a percentage of working age population (16-64 years)
Source: Eurostat

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Economics

BERENBERG
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JOH. BERENBERG, GOSSLER & CO. KG

Internet www.berenberg.com

E-mail: firstname.lastname@berenberg.com

EQUITY RESEARCH

AEROSPACE & DEFENCE	
Ryan Booker	+44 20 3753 3074
Andrew Gollan	+44 20 3207 7891
Charlotte Keyworth	+44 20 3753 3013
Ross Law	+44 20 3465 2692
AUTOMOTIVES	
Cristian Dirpes	+44 20 3465 2721
Alexander Haissl	+44 20 3465 2749
Fei Teng	+44 20 3753 3049
BANKS	
Adam Barrass	+44 20 3207 7923
Stephanie Carter	+44 20 3207 3106
Michael Christodoulou	+44 20 3207 7920
Andrew Lowe	+44 20 3465 2743
Andreas Markou	+44 20 3753 3022
Alex Medhurst	+44 20 3753 3047
Eoin Mullany	+44 20 3207 7854
Peter Richardson	+44 20 3465 2681
BEVERAGES	
Javier Gonzalez Lastra	+44 20 3465 2719
Matt Reid	+44 20 3753 3075
BUSINESS SERVICES, LEISURE & TRANSPORT	
Roberta Ciaccia	+44 20 3207 7805
Najet El Kassir	+44 20 3207 7836
William Fitzalan Howard	+44 20 3465 2640
Stuart Gordon	+44 20 3207 7858
Annabel Hay-Jahans	+44 20 3465 2720
Josh Puddle	+44 20 3207 7881
Kate Somerville	+44 20 3753 3081
Joel Spungin	+44 20 3207 7867
CAPITAL GOODS	
Nicholas Housden	+44 20 3753 3050
Sebastian Kuenne	+44 20 3207 7856
Philippe Lorrain	+44 20 3207 7823
Rizk Maidi	+44 20 3207 7806
Jaroslaw Pominkiewicz	+44 20 3753 3035
Simon Toennessen	+44 20 3207 7819
Ethan Zhang	+44 20 3465 2634

CHEMICALS	
Sebastian Bray	+44 20 3753 3011
Anthony Manning	+44 20 3753 3092
Rikin Patel	+44 20 3753 3080
CONSTRUCTION	
Saravana Bala	+44 20 3753 3043
Zaim Beekawa	+44 20 3207 7855
Lush Mahendrarajah	+44 20 3207 7896
Robert Muir	+44 20 3207 7860
DIVERSIFIED FINANCIALS	
Charles Bendit	+44 20 3465 2729
Philip Ross	+44 20 3465 2726
Chris Turner	+44 20 3753 3019
FOOD MANUFACTURING AND H&PC	
Rosie Edwards	+44 20 3207 7880
Philip Patricha	+44 20 3753 3039
Fintan Ryan	+44 20 3465 2748
James Targett	+44 20 3207 7873
FOOD RETAIL	
Dusan Milosavljevic	+44 20 3753 3123
GENERAL MID CAP - DACH	
Martin Comtesse	+44 20 3207 7878
Charlotte Friedrichs	+44 20 3753 3077
Gustav Fröberg	+44 20 3465 2655
Julia Kochendörfer	+44 20 3753 3052
Alexander O'Donoghue	+44 20 3207 7804
Gerhard Orgonas	+44 20 3465 2635
Henrik Paganetty	+44 20 3453 3140
Benjamin Pfannes-Varrow	+44 20 3465 2620
GENERAL MID CAP - EU core	
Christoph Gruelich	+44 20 3753 3119
Anna Patrice	+44 20 3207 7863
Trion Reid	+44 20 3753 3113
GENERAL MID CAP - UK	
Joseph Barron	+44 20 3207 7828
Calum Battersby	+44 20 3753 3118
Robert Chantry	+44 20 3207 7861

GENERAL MID CAP - UK (cont'd)	
Ned Hammond	+44 20 3753 3017
Omar Ismail	+44 20 3753 3102
Ian Osburn	+44 20 3207 7814
Antony Plom	+44 20 3207 7908
Edward James	+44 20 3207 7811
Benjamin May	+44 20 3465 2667
Owen Shirley	+44 20 3465 2731
Donald Tait	+44 20 3753 3031
GENERAL RETAIL	
Thomas Davies	+44 20 3753 3104
Michelle Wilson	+44 20 3465 2663
HEALTHCARE	
Scott Bardo	+44 20 3207 7869
Alistair Campbell	+44 20 3207 7876
Klara Fernandes	+44 20 3465 2718
Tom Jones	+44 20 3207 7877
Joseph Lockey	+44 20 3465 2730
Samantha Osborne	+44 20 3207 7882
Michael Ruzic-Gauthier	+44 20 3753 3128
Laura Sutcliffe	+44 20 3465 2669
Charles Weston	+44 20 3465 2746
INSURANCE	
Trevor Moss	+44 20 3207 7893
Emanuele Musio	+44 20 3207 7916
Iain Pearce	+44 20 3465 2665
LUXURY GOODS	
Mariana Horn	+44 20 3753 3044
Lauren Molyneux	+44 20 3207 7892
Zuzanna Pusz	+44 20 3207 7812
MEDIA	
Robert Berg	+44 20 3465 2680
Laura Janssens	+44 20 3465 2639
Alastair Reid	+44 20 3207 7841
Sarah Simon	+44 20 3207 7830
REAL ESTATE	
Kai Klose	+44 20 3207 7888
Tina Munda	+44 20 3465 2716

METALS & MINING	
Charlie Clark	+44 20 3207 3133
Fawzi Hanano	+44 20 3207 7910
Laurent Kimman	+44 20 3465 2675
Michael Stoner	+44 20 3465 2643
TECHNOLOGY	
Josep Bori	+44 20 3753 3058
Georgios Kertsos	+44 20 3465 2715
Tej Sthankiya	+44 20 3753 3099
Gordon Tveito-Duncan	+44 20 3753 3100
Tammy Qiu	+44 20 3465 2673
TELECOMMUNICATIONS	
David Burns	+44 20 3753 3059
Ondrej Cabejsek	+44 20 3753 3071
Nicolas Didio	+44 20 3753 3091
Usman Ghazi	+44 20 3207 7824
Laura Janssens	+44 20 3465 2639
THEMATIC RESEARCH	
Nick Anderson	+44 20 3207 7838
Oyvind Bjerke	+44 20 3753 3082
Steven Bowen	+44 20 3753 3057
Asad Farid	+44 20 3207 7932
Robert Lamb	+44 20 3465 2623
Paul Marsch	+44 20 3207 7857
Saliha Shariff	+44 20 3753 3097
James Sherborne	+44 20 3753 3073
TOBACCO	
Jonathan Leinster	+44 20 3465 2645
UTILITIES	
Oliver Brown	+44 20 3207 7922
Andrew Fisher	+44 20 3207 7937
Neha Saxena	+44 20 3753 3048
Lawson Steele	+44 20 3207 7887

ECONOMICS

Florian Hense	+44 20 3207 7859
Carsten Hesse	+44 20 3753 3001
Kallum Pickering	+44 20 3465 2672
Holger Schmieding	+44 20 3207 7889

EQUITY SALES

SPECIALIST SALES

AEROSPACE & CAPITAL GOODS	
Cara Luciano	+44 20 3753 3146
AUTOS & TECHNOLOGY	
Edward Wales	+44 20 3207 7815
BANKS, DIVERSIFIED FINANCIALS & INSURANCE	
Iro Papadopoulou	+44 20 3207 7924
Calum Marris	+44 20 3753 3040
BUSINESS SERVICES, LEISURE & TRANSPORT	
Rebecca Langley	+44 20 3207 7930
CONSTRUCTION,CHEMICALS, METALS & MINING	
James Williamson	+44 20 3207 7842
CONSUMER DISCRETIONARY	
Victoria Maigrot	+44 20 3753 3010
CONSUMER STAPLES	
Molly Wylenzek	+44 20 3753 3064
HEALTHCARE	
David Hogg	+44 20 3465 2628
MEDIA & TELECOMMUNICATIONS	
Julia Thannheiser	+44 20 3465 2676
THEMATICS	
Chris Armstrong	+44 20 3207 7809

SALES

BENELUX	
Miel Bakker	+44 20 3207 7808
Bram van Hijfte	+44 20 3753 3000
FRANCE	
Alexandre Chevassus	+33 1 5844 9512
Dalila Farigoule	+33 1 5844 9510
SCANDINAVIA	
Mikko Vanhala	+44 20 3207 7818
Marco Weiss	+49 40 350 60 719
UK	
James Burt	+44 20 3207 7807
Fabian De Smet	+44 20 3207 7810
Marta De-Sousa Fialho	+44 20 3753 3098
Jules Emmet	+44 20 3753 3260
Robert Floyd	+44 20 3753 3018
David Franklin	+44 20 3465 2747
Karl Hancock	+44 20 3207 7803
Sean Heath	+44 20 3465 2742
James Hunt	+44 20 3753 3007
Gursumeet Jhaj	+44 20 3753 3041
James McRae	+44 20 3753 3036
David Mortlock	+44 20 3207 7850
Eleni Papoula	+44 20 3465 2741
UK (cntd)	
Bhavin Patel	+44 20 3207 7926
Kushal Patel	+44 20 3753 3038
Richard Payman	+44 20 3207 7825
Christopher Pyle	+44 20 3753 3076
Adam Robertson	+44 20 3753 3095
Joanna Sanders	+44 20 3207 7925
Mark Sheridan	+44 20 3207 7802
George Smibert	+44 20 3207 7911
Alexander Wace	+44 20 3465 2670
Paul Walker	+44 20 3465 2632
GERMANY	
Michael Brauburger	+49 69 91 30 90 741
Nina Buechs	+49 69 91 30 90 735
André Grosskurth	+49 69 91 30 90 734
Florian Peter	+49 69 91 30 90 740
Joerg Wenzel	+49 69 91 30 90 743
SWITZERLAND, AUSTRIA & ITALY	
Duncan Downes	+41 22 317 1062
Andrea Ferrari	+41 44 283 2020
Gianni Lavigna	+41 44 283 2038
Jamie Nettleton	+41 44 283 2026
Yeannie Rath	+41 44 283 2029

CRM	
Laura Cooper	+44 20 3753 3065
Jessica Jarmyn	+44 20 3465 2696
Madeleine Lockwood	+44 20 3753 3110
Vikram Nayar	+44 20 3465 2737
Rita Pilar	+44 20 3753 3066
COO Office	
Greg Swallow	+44 20 3207 7833
Fenella Neill	+44 20 3207 7868
CORPORATE ACCESS	
Lindsay Arnold	+44 20 3207 7821
Robyn Gowers	+44 20 3753 3109
Jennie Jiricny	+44 20 3207 7886
Ross Mackay	+44 20 3207 7866
Stella Siggins	+44 20 3465 2630
Lucy Stevens	+44 20 3753 3068
Abbie Stewart	+44 20 3753 3054
EVENTS	
Charlotte David	+44 20 3207 7832
Suzy Khan	+44 20 3207 7915
Natalie Meech	+44 20 3207 7831
Eleanor Metcalfe	+44 20 3207 7834
Rebecca Mikowski	+44 20 3207 7822
Ellen Parker	+44 20 3465 2684
Sarah Weyman	+44 20 3207 7801

SALES TRADING

PARIS	
Vincent Klein	+33 1 58 44 95 09
Antonio Scuotto	+33 1 58 44 95 03
LONDON	
Assia Adanouj	+44 20 3753 3087
Charles Beddow	+44 20 3465 2691
Mike Berry	+44 20 3465 2755
Joseph Chappell	+44 20 3207 7885
Stewart Cook	+44 20 3465 2752
Mark Edwards	+44 20 3753 3004
Tom Floyd	+44 20 3753 3136
Tristan Hedley	+44 20 3753 3006
Peter King	+44 20 3753 3139
Simon Messman	+44 20 3465 2754
AJ Pulleyn	+44 20 3465 2756
Matthew Regan	+44 20 3465 2750
Michael Schumacher	+44 20 3753 3006
Paul Somers	+44 20 3465 2753

EQUITY TRADING

HAMBURG	
David Hohn	+49 40 350 60 761
Gregor Labahn	+49 40 350 60 571
Lennart Pleus	+49 40 350 60 596
Marvin Schweden	+49 40 350 60 576
Omar Sharif	+49 40 350 60 563
Philipp Wiechmann	+49 40 350 60 346
Christoffer Winter	+49 40 350 60 559
LONDON	
Edward Burlison-Rush	+44 20 3753 3005
Richard Kenny	+44 20 3753 3083
Chris McKeand	+44 20 3207 7938
Ross Tobias	+44 20 3753 3137

ELECTRONIC TRADING

Jonas Doehler	+44 40 350 60 391
Matthias Führer	+49 40 350 60 597
Sven Kramer	+49 40 350 60 347
Matthias Schuster	+44 40 350 60 463

BERENBERG
PARTNERSHIP SINCE 1590

BERENBERG CAPITAL MARKETS LLC Member FINRA & SIPC

E-mail: firstname.lastname@berenberg-us.com

EQUITY RESEARCH

Andrew Fung	+1 646 445 5577
Donald McLee	+1 646 445 4857
Adam Mizrahi	+1 646 445 4878
Gal Munda	+1 646 445 4846
Patrick Trucchio	+1 646 445 4851

ECONOMICS

Mickey Levy	+1 646 445 4842
Roiana Reid	+1 646 445 4865

EQUITY SALES

SALES

Enrico DeMatt	+1 646 445 4845
Kelleigh Faldi	+1 617 292 8288
Ted Franchetti	+1 646 445 4864
Shawna Giust	+1 646 445 7216
Rich Harb	+1 617 292 8228
Zubin Hubner	+1 646 445 5572
Michael Lesser	+1 646 445 5575
Jessica London	+1 646 445 7218
Anthony Masucci	+1 617 292 8282
Ryan McDonnell	+1 646 445 7214
Emily Mouret	+1 415 802 2525
Peter Nichols	+1 646 445 7204
Kieran O'Sullivan	+1 617 292 8292
Rodrigo Ortigao	+1 646 445 7202
Ramnique Sroa	+1 415 802 2523
Matt Waddell	+1 646 445 5562

CRM

LaJada Gonzales	+1 646 445 7206
Monika Kwok	+1 646 445 4863

CORPORATE ACCESS

Olivia Lee	+1 646 445 7212
Tiffany Smith	+1 646 445 4874

EVENTS

Laura Hawes	+1 646 445 4849

SALES TRADING

Ronald Cestra	+1 646 445 4839
Michael Haughey	+1 646 445 4821
Christopher Kanian	+1 646 445 5576
Lars Schwartau	+1 646 445 5571
Brett Smith	+1 646 445 4873
Bob Spillane	+1 646 445 5574
Jordan White	+1 646 445 4858