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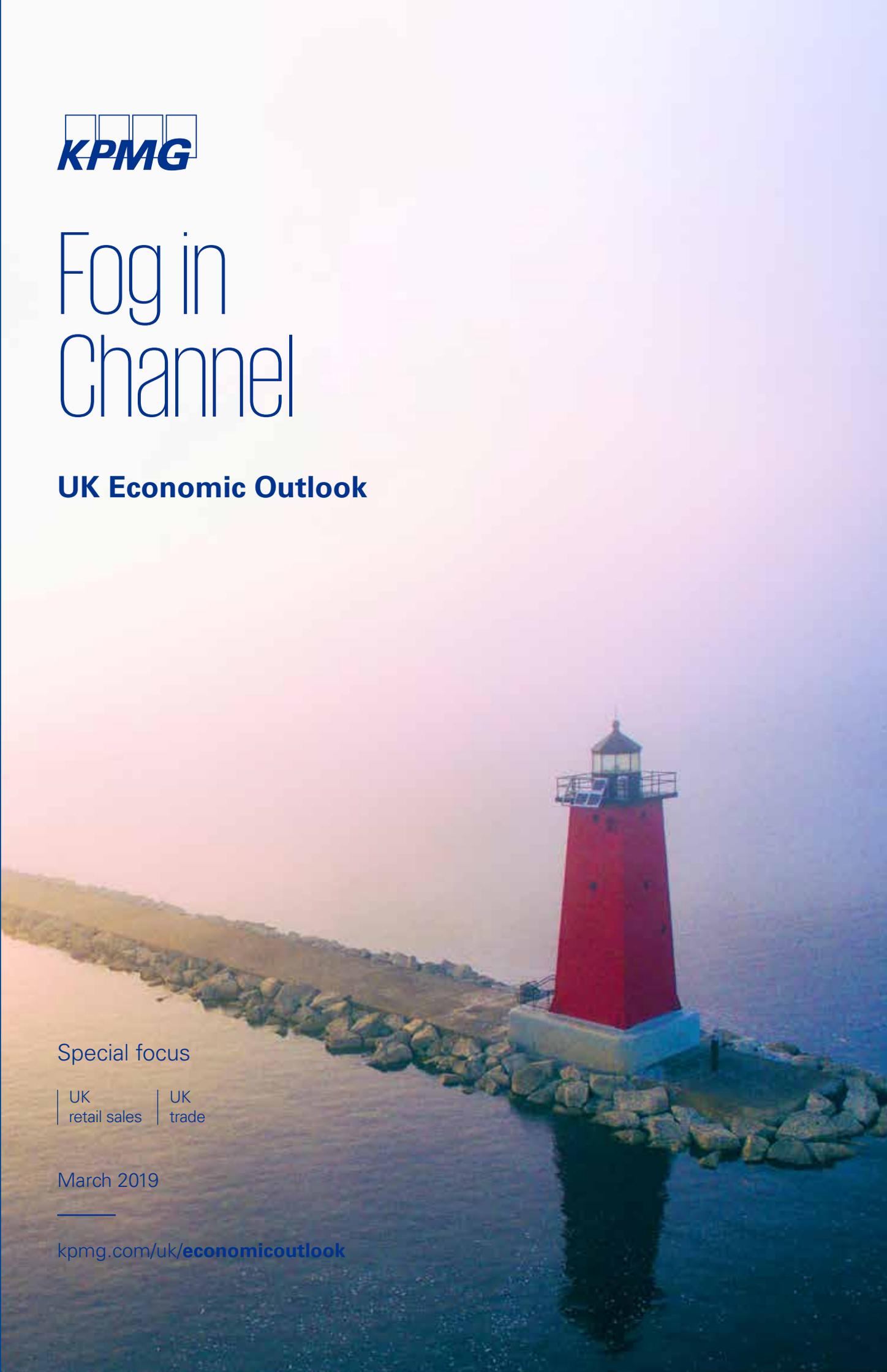
UK Economic Outlook

Special focus

UK retail sales | UK trade

March 2019

kpmg.com/uk/economicoutlook



Chief Economist's introduction



Caught in the Brexit impasse, the UK economy is grinding to a halt. Are we waiting for Godot¹? My particular concern is that, in the meantime, business investment is lost. Without strong investment we will not see a meaningful rise in UK productivity and hence in future growth.

As we look beyond Brexit, the focus needs to shift into two areas: the UK's future relationship with the EU, its largest trading market; and ways to lift the UK's productivity performance and create more inclusive growth.

The nature of the final agreement with the EU will have a significant impact on the UK's role within 'factory Europe'. The close integration of production processes means the loss in output to the UK's economy could be disproportionately large, with companies reorganising their production to bypass the UK entirely. As the UK government decides the nature of the future relationship with the EU, it should consider the supply chain effect for UK-based businesses, and aim to minimise trade frictions between the UK and EU.

The latest surveys also show a significant dispersion in prospects among the UK's regions for this year, coming on the back of long-standing differences in productivity performance and opportunities for people across UK regions. Whatever the outcome of Brexit negotiations, more focus will need to be made by government, businesses and everyone else on lifting growth momentum and creating more opportunities for people across the UK.

Yael Selfin,
Chief Economist, KPMG in the UK

¹ Beckett, Samuel. *Waiting for Godot: Tragicomedy in 2 Acts*. New York: Grove Press, 1954

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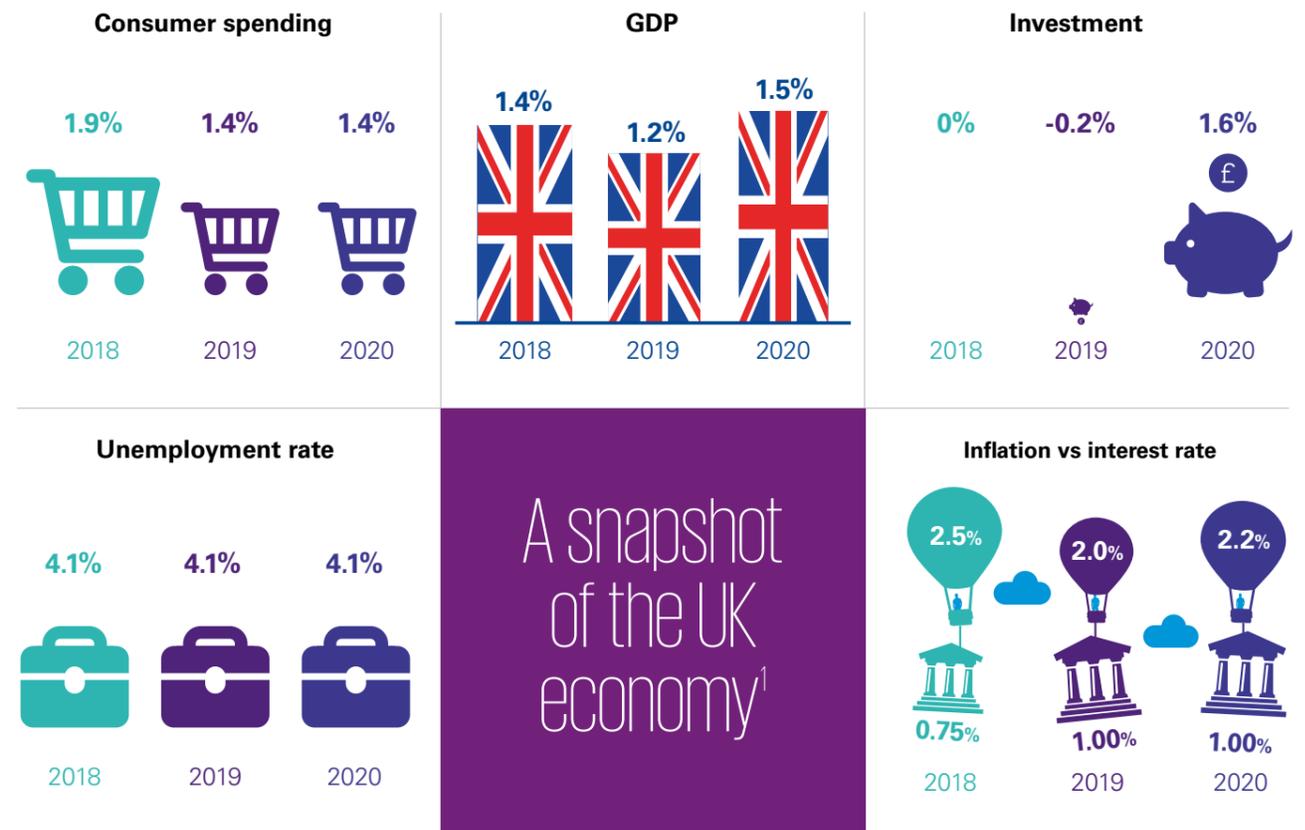
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Current Outlook

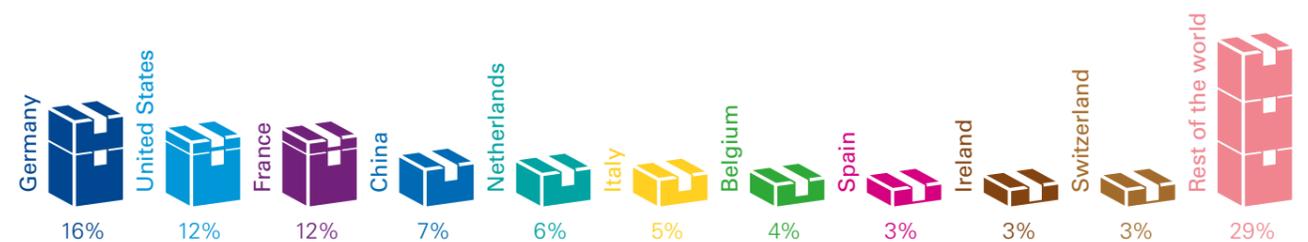
Executive summary

- The lack of clarity around Brexit and the potential for a no-deal outcome is causing a high level of uncertainty for businesses. The uncertainty is having a paralysing effect on economic activity and planning in the first half of the year. Even assuming a favourable resolution that does not damage the UK's trade links with the EU, the short term outlook is for weaker growth.
- Headwinds from the global economy are likely to weigh on growth over the outlook period. Disappointing data in the eurozone, the waning stimulus in the US and a slowdown in China are making for a challenging global environment.
- The short-term outlook is for widespread weakness across all sectors and regions. Surveys suggest that the construction sector as a whole and a full third of regional economies appear to be contracting. **Assuming that a Brexit deal can be reached, the economy will expand at a rate of 1.2% in 2019.**
- The UK should then experience a modest recovery in the medium term with **GDP growth for 2020 reaching 1.5%.**
- Business investment is bearing the brunt of Brexit jitters and slumped by 1.4% in the closing quarter of 2018 alone.** Investment as a whole is expected to shrink by 0.2% in 2019 with businesses making the choice to delay their investment plans, waiting for clarity.
- Housing remains a key driver of activity in construction with initiatives like Help-To-Buy fuelling demand from first time buyers. But overall the sales-to-stock ratio appears to be deteriorating, pointing to a loss of momentum in the housing market.
- Manufacturing underwent a significant contraction in 2018. With concerns over Brexit, a slowdown in global growth and intensifying trade tensions haunting the world economy, the manufacturing sector is facing a mixed outlook.
- Services were resilient through 2018, ending the year with a moderate 0.4% quarter-on-quarter growth.** Buoyant domestic demand helped fill the gap from weaker service exports. Reports of decline in incoming work and employment in early 2019 show that the Brexit uncertainty is reaching activity in this sector.
- Exports as a whole have continued to disappoint:** revised data for 2018 show a lower boost from a weaker Sterling exchange rates in 2018. A weaker global economy will continue to hold back exports in our outlook.
- The labour market remains tight, shown by a high number of unfilled vacancies. Yet surveys indicate that as the economy slows, firms' demand for labour is showing signs of weakening.
- The growth in real earnings continues to strengthen as businesses compete for scarce candidates. However, the lack of progress on productivity in the face of escalating wages is driving higher labour costs and raise a question mark over the sustainability of wage rises.
- Consumption growth, though weak, is the main pillar supporting the economy and is expected to grow by 1.4% in 2019 and 2020.** Low unemployment rates and resilient wage growth should help support consumer demand over the outlook period.
- Latest inflation was at 1.9%, just below the 2% target level of the Bank of England,** due to negative contributions from the introduction of OFGEM's energy price cap in January and weaker global oil prices. This will be partly offset by the changes to the price cap planned for April, but **inflation should stay at an average of 2.0% for 2019 and 2.2% in 2020.** Stagnant productivity and rising wages will add up to rising domestic cost pressures in the medium term.
- Weaker inflation and the uncertainty surrounding the Brexit process will see the Bank of England hold interest rates at the current 0.75% until at least November 2019 before another long pause.
- Strong wage growth and moderating inflation should support retail sales to grow at 1.6% in 2019.** Rising levels of internet penetration will continue to create challenging conditions for the UK's High Street.
- Regardless of the outcome of Brexit, the EU will continue to be one of the largest markets for the UK by virtue of its size and proximity. But the end agreement will have a significant impact on the UK's role within 'factory Europe'.

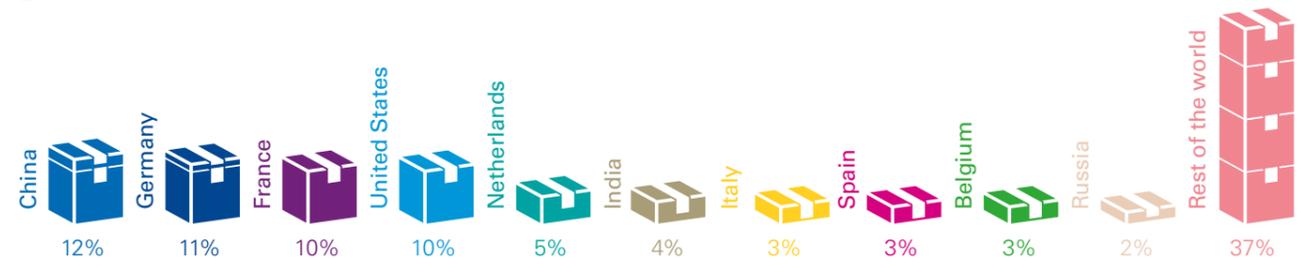


UK exports markets size adjusted for distance, 2018 and 2050

2018



2050



¹ These figures represent our central scenario under which the UK secures a transition agreement after Brexit and a relatively friction-free trade deal after that. Figures for GDP, consumer spending, investment and inflation represent % change on previous year.

The global economy: Into the slow lane

The global economy has drifted into a slow lane, with growth expected to ease from 3.7% in 2018 to 3.5% in 2019. A patchwork of separate problems is – for now – adding up to a loss of momentum. More bad news could tip the global economy into an all-out recession.

US tax cut boost to wear off

Among the advanced economies, the US was an exceptionally strong performer in 2018, thanks to the impact of the government's tax cuts. But, as the impact of fiscal policy recedes, the boost to growth this year will be much smaller. The US government's shutdown, higher interest rates, and rising trade tensions will also represent a drag on growth in 2019.

Furthermore, some fiscal consolidation will be necessary to put the size of the debt on a more sustainable path in the future. Persistently higher deficits are the other side of tax cuts. They're ballooning the size of government debt to reach 104% of GDP.

Overall growth is expected to reach 2.1% in 2019 and 0.6% the year after that; down from 2.9%-3.0% in 2018.

Eurozone stumbles

The eurozone began to stumble earlier in 2018, with a slowdown in Germany, and the Italian economy dipping into a technical recession in the second half of the year. Growth for 2019 is expected to reach only 1.3% in the eurozone; around half the peak two years ago. Potential trade tensions with the US and the impact of Brexit could further hamper the growth of exports.

Asia slowdown

In Japan, economic activity is expected to be curtailed following the announcement by the government of a VAT increase in 2020. Most forecasters expect growth to suffer, falling from 0.9% in 2019 to just 0.4% in 2020.

Other factors include a slowing Chinese economy: even with growth expected to reach 6.2% in 2019, this would be the slowest rate of growth since 1990. The country's high dependence on rising levels of debt remains the biggest source of risk: despite GDP rising rapidly, it is outpaced by the rising level of outstanding debt.

The risk of a full-blown financial crisis has been held in check for now, as that debt is mostly held domestically and the economy remains under close government control. The sustainability of the debt burden may not be an issue as long as the economy continues to grow strongly, but if the economic slowdown deepens, there is an increased risk that it triggers a debt-deflation spiral. This could happen if an increase in loan defaults triggers a slowdown in economic activity and weaker inflation; which would feedback into raising the debt burden for borrowers and yet more defaults.

Continuing trade tensions between the US and China are a more immediate source of concern. China's exports to the US fell by 3.5% in 2018. While the direct impact on economic growth remains modest, continuing trade tensions could have a knock-on effect on confidence and investment.

Rates on hold

With growth in emerging markets no longer expected to outpace developed economies, the global outlook is again becoming more synchronised. Central banks are also moving in unison and becoming increasingly dovish.

The change is most abrupt for the US Fed, influenced by warning signs of a significant deceleration in growth, including the near inversion of the yield curve. This occurs when the market expects interest rates to fall in the medium-term and be higher in the short term than those for longer-dated borrowing. The US central bank is now pausing further rate rises.

Financial markets reacted sharply to the changing outlook. There has been a significant increase in volatility in equity and foreign exchange markets, and long-term bond yields have fallen across all advanced economies since the end of 2018.

Falling oil prices represent one of the few upsides by helping to ease inflationary pressures for oil-importing countries, although this is consequence of the coming slowdown. Since October 2018, the price of crude oil has fallen by 27% and with softer global demand set to continue, prices could stay below the 70 US\$/bbl mark.

Limited room for manoeuvre

Political risk will continue to dominate the narrative over the next two years. Elections to the European Parliament in May 2019, and US elections in November 2020 are likely to become the next key milestones. A persistent theme across most advanced economies has been discontent about the effects of globalisation: the Brexit vote is the clearest illustration, but protests in France, the dispute around Italy's budget and trade tensions around the world are all taking their toll.

The current slowdown could have severe consequences because policymakers around the world have limited room for manoeuvre. Among the advanced economies, the US is the only one with significant room to loosen monetary policy in the face of a negative shock. Fiscal policy appears constrained by a reluctance from governments to add to the already sizable piles of debt they inherited from the previous crisis. And with international relations strained, the chances of a co-ordinated global policy response appear slim.



¹ According to the IMF World Economic Outlook Update, January 2019.

Forecast for the UK economy

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Leading indicator shows Brexit headwinds

Early data indicate the UK economy is slowing down in the first half of 2019; the economy could stage a modest recovery in the second half of the year if there is a weakening of the headwinds from Brexit-related uncertainty.

That uncertainty, together with the more general global economic slowdown, is starting to take its toll. The survey of Purchasing Managers (PMI), which tends to be a good guide for the short-term economic outlook, shows just that. The index for services reached a two-and-a-half year low in January, before a modest recovery in February to 51.3. Also in February, the index for construction fell below the 50 point mark, indicating a contraction in that sector. The index for manufacturing fell in both January and February, to a value of 52.0 (see Chart 1).

Across all three main economic sectors, the latest levels of the PMI are significantly below their averages in 2018, by between 1.8 and 2.7 points. And as 2018 was the year when GDP grew by 1.4%, in the beginning of 2019 it looks to be weaker still.

Taken together, the UK All Sectors index, which combines all three main indices, stood at 51.4 in February, up from 50.3 in January 2019. This indicates only a marginal expansion in output.

The falls in the services and construction indices are a strong indicator of the wide-reaching implications of the current headwinds affecting the economy. These show the extent to which the domestic economy is slowing over and above the impact on exports.

Chart 1: Purchasing managers' outlook is deteriorating



Source: IHS Markit

Widespread weakness across the UK

The regional outlook also points to deteriorating prospects. The latest PMI values are down from six months ago across all regions and in a quarter of UK regions, the PMIs point to a potential fall in output over the coming six months. These include the North East, London and Scotland (see Chart 2).

The first indication of a fall in output was shown in the North East in September 2018. In part, this is linked to the downturn in global oil prices after 2014. As the region is home to a large number of engineering suppliers to the offshore oil and gas sector, overall activity fell alongside falling investment of the offshore oil and gas sector.

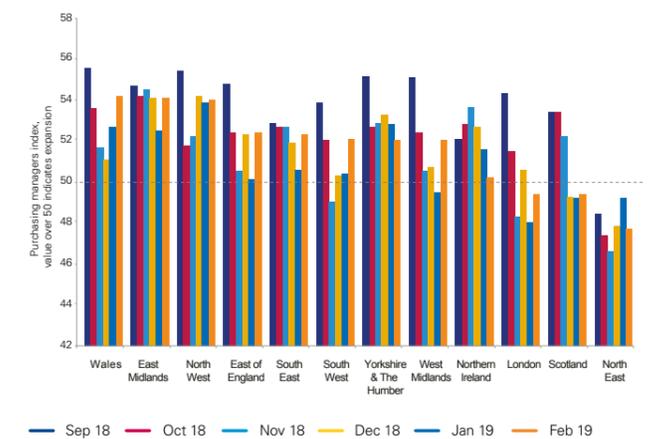
The lowest PMI in January was recorded in London, at 48.0, and reflects the sharp downturn in the services sector for the UK overall. Since then it recovered to 49.4 in February, but continues to signal a contraction in output.

Wales has so far bucked the overall negative outlook, with the highest reading of the PMI index of anywhere in the UK in February. The East Midlands and the North West have likewise remained resilient since a dip last September.

Disappointment looms

The evidence from PMIs suggests that GDP growth in the first half of the year is likely to be disappointing and overshadowed by the uncertainty generated by Brexit negotiations in the run-up to the end of March. This is supported by a widespread slowdown, both geographically and across different sectors. Under our main scenario (which comprises a favourable resolution to the Brexit process that doesn't disrupt existing trade links in the short term), we expect a mild recovery in the second half of the year. That should be reflected in the PMI data over the coming months.

Chart 2: A quarter of regional PMI indices are now in contractionary territory



Source: IHS Markit/NatWest

Outlook in our central scenario

We are publishing this edition of the economic outlook just four days before the UK was expected to leave the EU on 29 March. At the time of writing, no deal has been agreed. However, under most scenarios the UK will be spared significant changes to its trading relationship with the EU until at least January 2021.

The only scenario that does lead to a significantly-altered trading relationship is the so-called 'no-deal Brexit'. We don't rule out this possibility, but we do consider it less likely than three alternative scenarios: a June agreement; a longer delay; or a move to put the decision to a further public vote. Every option other than a 'no deal' therefore implies short term continuity with the UK's current trading relationships, but also the continuation of significant uncertainty around the shape of a final deal with the EU.

Uncertainty weighing on investment

Even if 'no deal' is not the most likely outcome, while it remains on the table businesses are enduring risk, particularly regarding investments, but also in their borrowing, expansion plans and contractual relationships.

We have revised down our expectations of GDP growth to just 1.2% in 2019 from 1.6% in our December edition of the Economic Outlook and unchanged in 2020 at 1.5%. The effect ongoing uncertainty is having on economic activity is the prime factor behind this downward revision.

Even if the UK were to successfully conclude the Withdrawal Agreement with the EU, this would only partially address the uncertainty because we still wouldn't have clarity about what direction the future relationship with the EU is going to take.

We therefore expect investment to contract by 0.2% in 2019 and project investment growth to stage a modest recovery in 2020, growing at 1.6%.

Still relying on the consumer

Consumption will remain the dominant force supporting the economy. We see consumption expanding at 1.4% throughout our forecast period to 2020. Low levels of unemployment and resilient increases in wages should help maintain confidence across British households. We expect unemployment to remain near record lows – increasing to only 4.1% in mid-2019 and 2020. Assuming we get a Brexit deal, we should then see a boost to consumer confidence in Q2 2019, which in turn should encourage households to start loosening the strings of what should be growing purses as incomes rise.

Rates look steady

We expect the rate of inflation to stay subdued, averaging 2.0% for 2019 as a whole in line with the Bank of England's 2% target. Weakness in world oil prices will help to push inflation down at the start of the year as it has led to a slower pace in the growth of fuel and energy prices. We do not expect significant movements in oil prices, but the increase in OFGEM's price caps in April could offset some of the falls earlier in the year. Further on, generally weak demand in the economy should restrain inflation. A more benign economic environment in 2020 could see the rate of inflation accelerate to 2.2% based on rising domestic labour costs.

Given the moderate inflationary pressures, the Bank of England will not find it necessary to accelerate the pace of interest rate increases. We therefore expect the next move to come at the November meeting of the MPC, and for rates to be raised by another 25 basis points to head off the threat of higher domestic inflation. The latest guidance from the Monetary Policy Committee is for further rate rises to remain "gradual and to a limited extent". This course of policy will put the Bank of England firmly in the middle of the pack of the advanced economy central banks ending 2019, with a policy rate of 1%.

Table 1. Our main scenario for the UK economy

KPMG economic forecasts	2018	2019	2020
GDP	1.4	1.2	1.5
Consumer spending	1.9	1.4	1.4
Investment	0	-0.2	1.6
Unemployment rate	4.1	4.1	4.1
Inflation	2.5	2.0	2.2
Base interest rates (end-of-period)	0.75	1.00	1.00

Source: ONS, KPMG forecasts. Average % change on previous calendar year except for unemployment rate, which is average annual rate. Investment represents Gross Fixed Capital Formation, inflation measure used is CPI and unemployment measure is LFS. Interest rate represents level at the end of calendar year.



Brexit uncertainty has acted like a dam on investment in the UK since the referendum. We've seen this in the media, with a string of high-profile companies relocating their operations outside the UK. We've seen it behind closed doors, with businesses looking to invest in Europe downplaying the UK's desirability.

Once business is clear how the UK will exit the EU that dam will be broken and we should see a wave of investment as corporates pivot to growth. This process will then be repeated as the UK and the EU settle the UK's future relationship, and stability can finally return. The UK's underlying trading conditions in terms of 'language, law, longitude', tax and capital markets mean it remains a good location to invest."

James Stewart,

UK Head of Brexit & Vice Chair, KPMG in the UK

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Continued weakness in growth against a backdrop of uncertainty

The UK economy grew at its slowest rate since 2012 last year, ending on a downbeat 0.2% increase for the final quarter. Business investment and net trade both dragged on Q4 growth. And while household consumption demonstrated some resilience, its contribution was modest. The economy would have contracted by 0.1% compared with the third quarter had it not been for a sharp increase in government spending during the fourth quarter. Preliminary GDP data for January point at some recovery early this year, although surveys evidence indicate a slow start for 2019.

The weakness in Q4 should not come as a surprise. Neither domestic factors nor the global environment were particularly conducive for growth. Domestically, the political disputes surrounding Brexit unsettled businesses and consumers. And globally, the slowdown in some of our major trading partners started to be felt through UK exports.

Weak consumption drives growth

Household consumption remained the main driver of growth in 2018. Despite some deterioration in consumer confidence, the rate of consumption growth remained steady at 0.4% in the second half of the year (see Chart 3). Continued tightness in the labour market and lower inflation meant wages rose faster than prices, letting some pressure off households' budgets.

Chart 3: Consumption was moderate but resilient over 2018, while business investment declined



Source: ONS

Business investment hit hard as Brexit uncertainty climbs

Investment bore the brunt of Brexit jitters in 2018 and businesses blamed the uncertainty surrounding the UK's EU exit as the reason for a decline in business investment in every quarter of the year. As fears over a no-deal Brexit mounted, in Q4 alone business investment slumped 1.4% from the previous quarter – the biggest decline since Q1 2016.

The contraction in business investment was driven by uncertainty – which can be measured by the LSE equity volatility index, an indicator of the market view of economic uncertainty – which was significantly higher than 2017 (Chart 4).

Chris Hearld, chairman of KPMG's Northern Region said larger companies, with significant international exposure, were more nervous about the potential risks around Brexit and that local councils had reported resulting holdbacks in inward investment that could boost local economies.

At the same time, some smaller operators are able to take advantage of opportunities for domestic manufacturing and we have seen evidence of food manufacturers in the North for example, switching to local producers in order to ensure continuity of supply.

Sterling weakness fails to boost trade

Despite sterling weakness, we have not seen net trade making the kind of strong contribution to UK growth that we'd hoped for after the referendum. The ONS revision of historical net trade figures revealed that the reduction of the trade deficit after the referendum was both overestimated and short-lived compared to previous estimates (Chart 5). Part of that can be explained by exporters being discouraged from investing into capacity expansion because of uncertainty about future access to trading partners after Brexit (even though growth in global demand was firm in 2017 and the first half of 2018.)

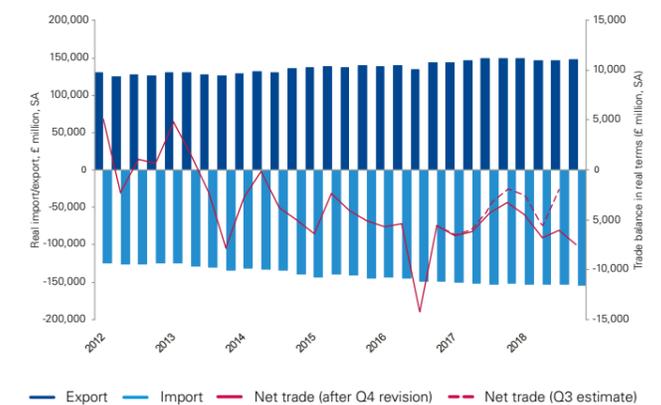
More recently, a range of new risks started to weigh in, pushing the contribution of net trade to growth into the negative territory in Q4 2018. Global demand – from Europe and China in particular – began to show signs of a cyclical slowdown, putting an additional constraint on exports. January trade data show further widening of the trade deficit, driven by a significant rise in imports, with Brexit-related concerns driving UK businesses to stockpile more.

Chart 4: Business investment has declined for four consecutive quarters in the face of high uncertainty



Source: ONS

Chart 5: The role of the post-referendum sterling depreciation in helping the trade deficit was overestimated



Source: ONS

All sectors hit by Brexit uncertainty

In the face of heightened anxiety over Brexit, sectoral performance varied in Q4 2018. While services continued to report some moderate growth, manufacturing and construction suffered sizable falls in output (Chart 6). Compared to manufacturing, it took longer for Brexit-related uncertainties to make their impact felt on the services sector. GDP estimates for January 2019 showed some pick up across sectors, although survey evidence still points at a weak start to the year.

Construction troubles lasting into Q1 2019

After a strong Q3, the construction industry underwent a 0.3% contraction in Q4, making 2018 the lowest annual growth rate since 2012. Much of the contraction took place in December, when repair and maintenance work saw a sharp decline at -5.0%, and new work also contracted, at -1.6% month-on-month.

The industrial and commercial segments are in deeper trouble than the residential. Whereas housing still saw some modest growth over the year, both private industrial and private commercial construction saw a lower level of output in Q4 2018 than the same quarter last year. The February and March 2019 PMI surveys highlighted even faster reductions in commercial building and civil engineering activities, suggesting that the troubles in those segments continued into the start of 2019.

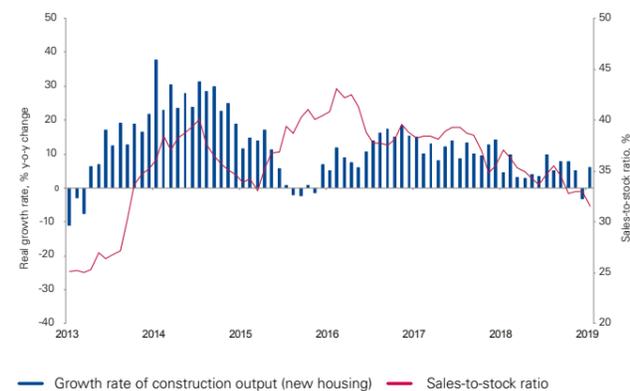
Housing is the best performing area within construction, but its resilience appears quite fragile. Sales-to-stock ratio gives an estimate of the strength of housing market demand relative to supply, so it tends to be a leading indicator for growth in new housing construction. Chart 7 shows that this ratio has been deteriorating since the referendum, and the downswing has accelerated since the second half of 2018. Past trends suggest that further falls in new housing projects can follow. Unless schemes like Help-To-Buy can reverse the momentum, the overall outlook for housing construction is also for weaker growth.

Chart 6: Manufacturing and construction output contracted in Q4 2018, while services demonstrated more resilience in growth



Source: ONS

Chart 7: Declining sales-to-stock ratio in the residential housing market discourages new housing projects



Source: ONS, RICS

Manufacturing: as the benefit of Sterling weakness wanes, Brexit worries weigh in

With a -0.9% decline in output reported in Q4 2018, manufacturing saw the steepest contraction in output since 2012 (Chart 6). Stockpiling in the run-up to Brexit generated some demand, but this wasn't enough to negate the impact of a sluggish domestic economy and softening global growth momentum. The February PMI survey indicates that manufacturing's optimism regarding future output fell to lows not seen since 2014.

Most of the contraction in Q4 was attributable to capital and intermediate goods, which declined by -1.6% and -0.8% respectively quarter-on-quarter. Consumer goods output was more stable: Consumer durables remained almost stagnant, at a growth rate of 0.1%, and non-durables declined at a moderate rate of -0.3%. This reflects the relatively stronger growth of consumer demand, relative to the current slump in business investment. Nevertheless, none of the major segments was strong enough to serve as an engine for growth.

By the end of 2018, it has become clear that the gains from export-led growth due to the Sterling depreciation were only temporary. Manufacturing output is heavily dependent on exports: Chart 8 illustrates how manufacturing GVA moves closely together with goods exports. Following the Brexit referendum, manufacturing output enjoyed a strong boost in 2017, thanks to the subsequent Sterling depreciation that raised export demand. After Q4 2017, goods exports started to fall, and manufacturing output followed suit. Out of the top five goods categories exported by the UK, three saw a contraction in 2018 relative to 2017 (cars, medical and pharmaceuticals and aircraft).

Chart 8: Manufacturing growth is heavily driven by goods exports



Source: ONS



The healthy pipeline of work that was fuelling construction towards the end of last year has dropped off somewhat and is showing a slowdown in momentum. We're detecting nervousness in the sector and are worried companies may be tempted to bid at unsustainable rates in an effort to win work. Construction firms also have their heads down in contingency planning for every outcome, but what this means for the long-term health of the sector is uncertain. It seems as though many businesses are in defensive mode and do not have the confidence or clarity to make future plans.

While overall growth in construction and manufacturing is showing a decline, there are still some investors looking to the UK as an opportunity. The £1bn investment in Gatwick airport is a recent transaction that underlines the UK's appeal and reputation as a global transport hub. That said, a 'wait-and-see' approach is being adopted by some investors.

Housebuilding is still under the spotlight, but we are seeing an uptick in momentum. It remains one of the key drivers of activity given build-rate targets and the ongoing effect of demand-side initiatives like Help-To-Buy. It is likely housebuilding will continue to provide a robust foundation for growth for the wider sector."

Jonathan White,
Head of Construction, KPMG in the UK

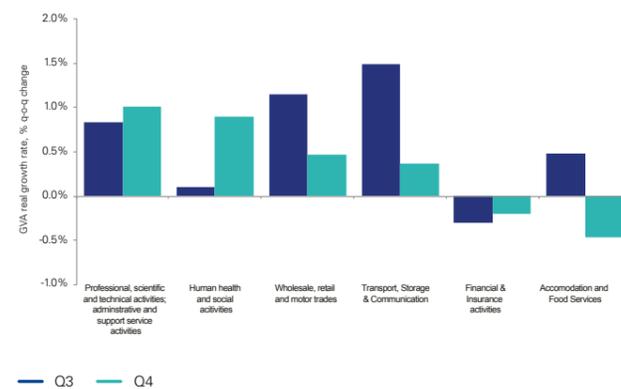
For most of 2018, the overall fall in goods exports was largely attributable to demand from the EU, with a combination of a weakening EU economy and Brexit uncertainties holding back exporters. By comparison, non-EU goods exports continued to increase on an annual basis. However, the particularly weak Q4 was a result of shrinking non-EU demand. Non-EU goods exports experienced a -2.2% decline in Q4, suggesting that weak global demand is exerting additional pressure on the sector.

The services sector is more resilient but prone to risks

In Q4 2018, with a growth rate of 0.4%, services remained relatively resilient with a strong contribution from professional services, which expanded by 1% over the previous quarter (Chart 9).

Nevertheless, by the start of 2019, the weaker economic environment has also filtered through to the services sector. February surveys of Purchasing Managers reported incoming new work falling, and employment numbers declining at the fastest pace for over seven years since the start of the year. Respondents cited Brexit uncertainty as the most prominent factor hindering business growth. Some of KPMG business services advisors are concerned that the potential risks Brexit poses to professional services might be vastly underestimated by politicians and the public.

Chart 9: Professional services grew ahead of other service sectors, while financial services and accommodation and food services contracted in Q4



Source: ONS, RICS



Exporters have realised that they must plan for a no-deal Brexit as their base scenario. For those trading goods this means mapping supply chains and ensuring their resilience; understanding the impact of customs duties and tariffs; reviewing pricing and margins; ensuring access to working capital and refinancing debt; Brexit proofing contracts and SLAs; ensuring regulatory compliance e.g. is the CE Mark still valid; and considering the impact on their people's ability to travel and work. For service exporters, they need to compare their business model and ability to service their customers against EU Regulations and the General Agreement on Trade in Services to determine how the four possible modes of supply of services might be disrupted. In many cases the response will be to open to an entity in the EU.

And given that services enable trade and underpin manufacturing, indeed in many instances there is no bright-line distinction between the two, it is important for the future of UK trade that, post Brexit, the professional services sector is able to compete on a level playing field in the EU and across the world."

David Slater,
Director of Trade
Centre of Excellence,
KPMG in the UK

Justin Zatoureff,
Partner, Advisory,
KPMG in the UK

Kevin Smith,
Partner, National
Markets Sales,
KPMG in the UK

Labour market tightness continues into early 2019

Tight labour market despite weaker sentiment

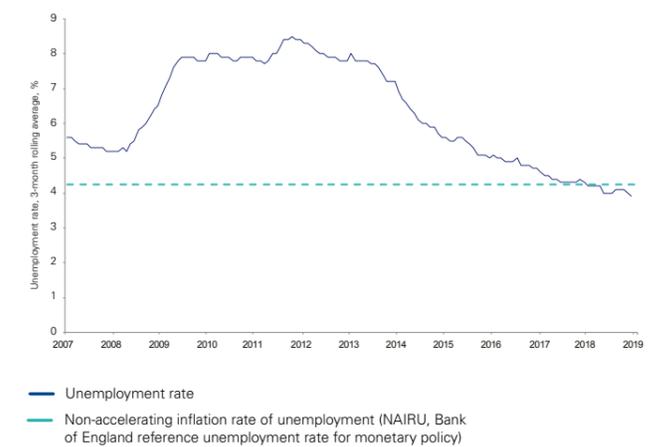
Despite uncertainties affecting the wider economy, the unemployment rate in the three months to January 2019 fell further to 3.9% (Chart 10). The market is tight. Fewer candidates are seeking jobs, according to the KPMG-REC (i.e. The Recruitment & Employment Confederation) report.

The tight labour market is feeding the earnings growth we already noted in our last economic outlook. For now, businesses are absorbing the higher wages rather than passing higher costs on to customers. But, the key question is for how much longer.

Mixed start to 2019

While the lack of new candidates seeking out new jobs could be a factor of Brexit uncertainty, figures on job creation remain mixed, with ONS data for Nov-Jan still strong. Manufacturing and services PMI surveys reported two consecutive months of job losses in January and February 2019. The construction sector was still creating jobs in January, but the rate of employment growth hit two-and-a-half year low.

Chart 10: Unemployment rate reached a new low since 1975 at the end of 2018



Source: ONS, Bank of England



Earnings pick up doesn't reach manufacturing

The tight employment market is feeding through to the pick-up in earnings growth we noted in our last economic outlook report. This has continued as wage rises have outpaced the rate of inflation which means "real" wages have increased by 1.7% in January thanks to the fall in inflation. The vacancy rate stayed at a high level of 2.8 vacancies per 100 filled jobs in the three months to February, which continued to fuel pay rises as businesses tried to attract staff. The information and communications sectors continued to experience the most acute staff shortages in the three months to February, with the vacancy rate increasing from 3.6% in June to 4.1% in December-February.

Not all sectors are experiencing increased growth in wages, however. The latest KPMG-REC permanent salaries and temporary wages index shows that pay rises for both permanent and temporary positions have continued into February 2019. But in the manufacturing sector pay growth has been easing in the face of significant Brexit uncertainty. Despite consistent increases in vacancies since 2016, and a high vacancy rate of 2.5% in the three months to February 2019, the sector has so far not reported a sustained strengthening of earnings growth.

One possible explanation for the fall in earnings growth during the year is that more jobs were created in lower-skilled, lower-paying positions – reducing average earnings across the sector.

Productivity "puzzle" could impede wage rises

Stronger pay growth has come at a time of non-existent productivity growth. In no quarter throughout 2018 did the level of productivity even reach the level achieved in Q4 2017.

The lack of productivity growth raises questions as to whether the recent boost in earnings growth is sustainable. While businesses are currently absorbing higher wages, this seems unlikely to continue. Eventually, higher wages will need to be accompanied by either a stronger rate of price increases or higher productivity growth - or both.

The factors behind the 'productivity puzzle' are multi-faceted and pre-date the current issues around Brexit. However, the uncertainty of the past two years, and the subsequent weaker level of business investment, will do little to help productivity recover.

Chart 11: In general, vacancy rate tends to lead nominal earnings growth, but the manufacturing sector has not seen improvement in earnings growth despite rising vacancy rate

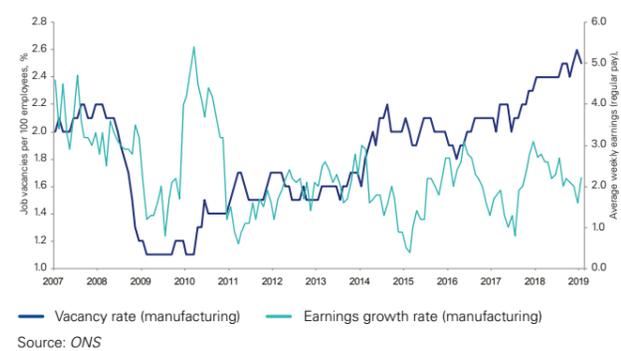
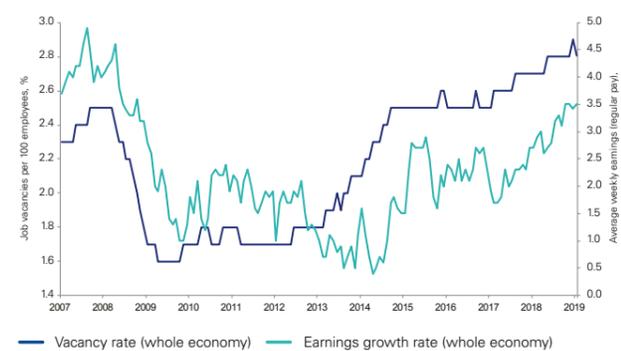
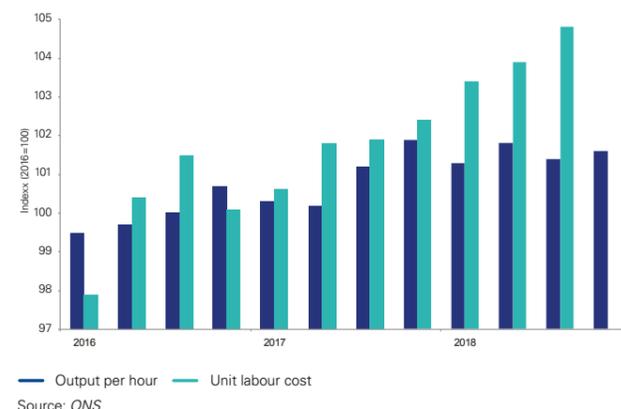


Chart 12: While unit labour cost rose, productivity remained stagnant in 2018, putting pressure on margins



Inflation stable, but credit markets hit by higher uncertainty

Inflation fell to 1.8%, its lowest level for two years, in January 2019, before recovering to 1.9% in the following month; but still below the Bank of England's target of 2%.

As global oil prices fell by 27%, this translated to an 8% fall in the price of road fuel. Taking into account that 58p of the total price consists of fuel duty, with an additional 20% of the total due to VAT, the scope for further fuel price reductions appears close to being used up.

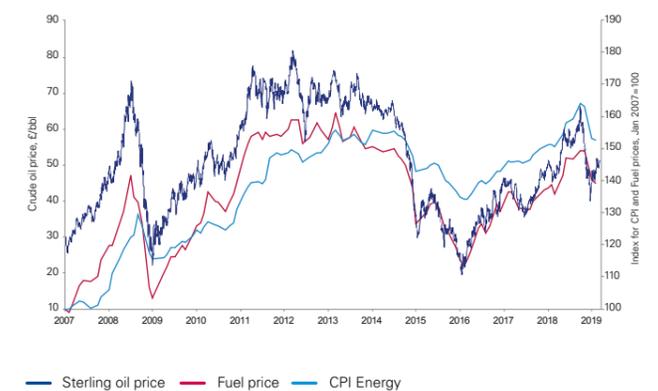
In addition, the reading for January was pushed down by the introduction of OFGEM's price cap on Standard Variable Tariffs. Together with a falling price of fuel, the combined annual inflation in energy prices (shown as CPI energy in chart 13) fell to 1.1% in January 2019, down from 10.4% just three months before.

The Bank of England's Monetary Policy Committee (MPC) kept base interest rates unchanged since August 2018, when the MPC voted to raise rates to 0.75%. Despite the policy rate staying unchanged, the current environment of rising uncertainty is having an effect on credit markets.

Evidence points to businesses and households responding to the prevailing uncertainty by cutting back on larger purchases and investments. With this comes a reduced need to borrow. Already in Q4 2018, the Bank of England noted a fall in demand for credit from households and from small and large corporate sectors. The medium-sized business sector was the only one where demand for credit rose in the end of 2018, but was expected to fall in the following quarter. In the market for household credit this led to a fall in lending spreads for households, although the corporate sector didn't experience a similar reduction.

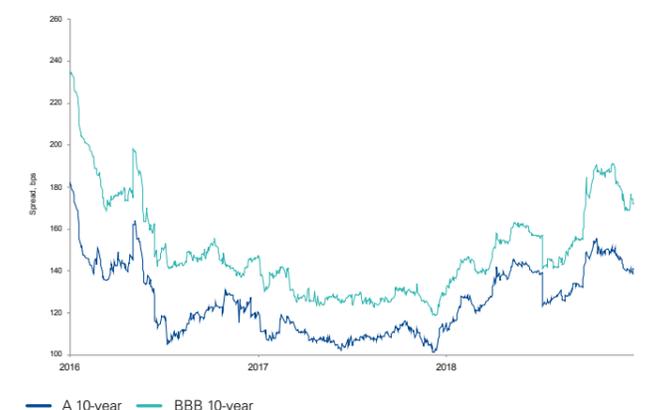
On the contrary, the market appears to be pricing in an elevated level of risk for the corporate sector. Chart 14 shows that spreads on corporate bonds relative to the government bond benchmarks have increased at the end of 2018, before a modest fall at the start of this year. Compared to a year ago spreads on A-rated bonds have increased by 30 basis points, while for BBB-rated bonds, the increase has been closer to 40 basis points. This increase reflects the potential for higher risk that exists under a potential no-deal Brexit scenario, which currently appears a more severe issue for businesses.

Chart 13: Fall in crude oil, fuel and energy prices drives inflation down



Source: Bank of England, ONS, FT markets via Haver

Chart 14: Spreads on corporate bonds against government bonds



Source: Refinitiv

Altogether, the developments in credit markets imply a financial tightening reflecting the current higher levels of uncertainty and are consistent with the weaker performance of business investment we've seen so far. However, as this tightening is tied to the uncertainty generated by Brexit, we expect it to be temporary and become unwound during the second quarter 2019.

Looking beyond Brexit associated uncertainties, the Bank of England will be paying close attention to the state of domestic inflationary pressures. The current state of strong wage growth combined with weak productivity means rising costs for businesses, which will eventually translate into higher prices for consumers. Up until now, businesses have been content to absorb the cost increases into their margins, and strong wages have not led to higher rates of inflation.

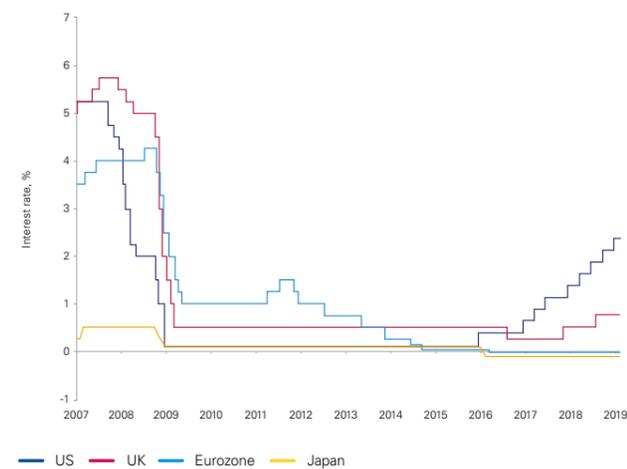
This current course of policy puts the Bank of England firmly in the middle of the pack of developed economy central banks, with a policy rate of 0.75%.

The implication for Sterling could be a gradual appreciation against the US Dollar, and a gradual depreciation against the euro. So far, the value of Sterling in foreign exchange markets has been volatile, but responding more to changes in Brexit fortunes than to interest rates differentials, while the latest data shows the exchange rate with the US Dollar is similar to the levels seen in November 2018.

With inflation seemingly under wraps, and assuming Brexit doesn't throw up any more surprises, the threats to price stability appear distant. Rising labour costs stand as the only issue on the Bank of England's radar in the medium term, but so far the economy has been able to absorb these. And with a weaker global economy, there appears to be even more reason to hold off on interest rate rises.

However, the longer term situation remains challenging. Economic cycles are unpredictable and a downturn in the future is all but inevitable. As usual, our monetary policymakers will be the first line of defence. But with policy rates barely above their lower bound, more than 10 years after the last recession, it is not clear that lowering policy rates can stave off anything but a mild slowdown. This means that increasingly, the MPC will have to rely on other measures, such as quantitative easing, to help the economy through a tough patch.

Chart 15: Global stance of monetary policy has turned more dovish



Source: Bank of England, US FED, ECB and BoJ via Haver

Public finances: double dividend delayed

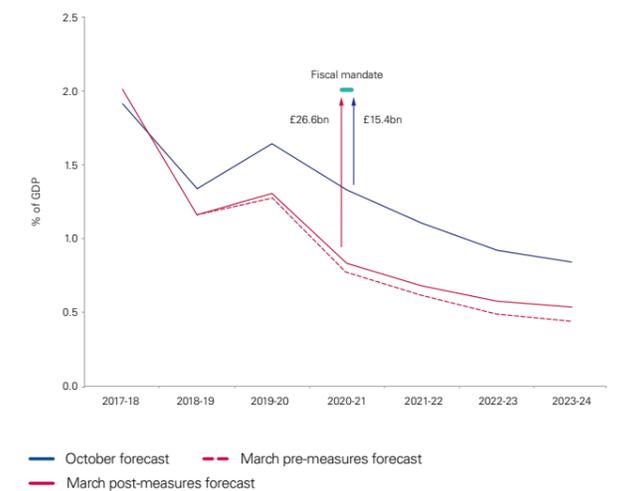
The 2019 Spring Statement and accompanying forecasts from the UK's fiscal watchdog, the Office for Budget Responsibility, brought a sharp downgrade of GDP growth forecasts for 2019 from 1.6% to 1.2%. Further down the line, the OBR expects growth to pick up to 1.4% in 2020 and 1.6% in 2021.

Alongside a downgrade in GDP growth prospects, the OBR expects to see an improvement in public sector finances of around £3bn in the current fiscal year. This will come from upgrades in projected wage incomes, which will lead to higher income taxes; and to lower outgoings on interest payments on government debt.

The overall forecast assumes there will be a smooth Brexit transition, while interest rate forecasts are based on current market expectations. A potential 'no deal' Brexit scenario is pulling down current interest rate forecasts, as market participants expect lower rates if the UK leaves the EU without a deal. If there is a deal, interest payments may end up higher than expected. The OBR's estimates show that a 1 percentage point increase in interest rates could increase debt interest payments by £5.5bn in the 2020-21 fiscal year.

The fiscal mandate requires the Chancellor to keep the level of cyclically adjusted public sector net borrowing below 2% in 2020-21. This target appears in easy reach, with current plans pointing to borrowing of only 0.8%. After the modest measures announced at the Spring Statement, most of the fall in the projected deficit has been held back. Chart 16 shows how the expected path of cyclically adjusted public sector net borrowing has changed between the October and March forecasts.

Chart 16: The improvement in the cyclically adjusted public sector net borrowing



Source: OBR

If a smooth Brexit transition can be achieved, the current plans leave around £26.6bn for spending increases in the Autumn Budget as well as in the Spending Review, which are currently held in reserve for Brexit emergencies. This is one half of the Brexit double-dividend that the Chancellor outlined before.

Changes to the accounting treatment of student loans could raise the deficit by around £11bn in the 2019-20 fiscal year. These changes allow for the fact that some students will never repay their loans (because they won't earn enough). The government will then write these loans off, meaning they're actually more similar to a grant.

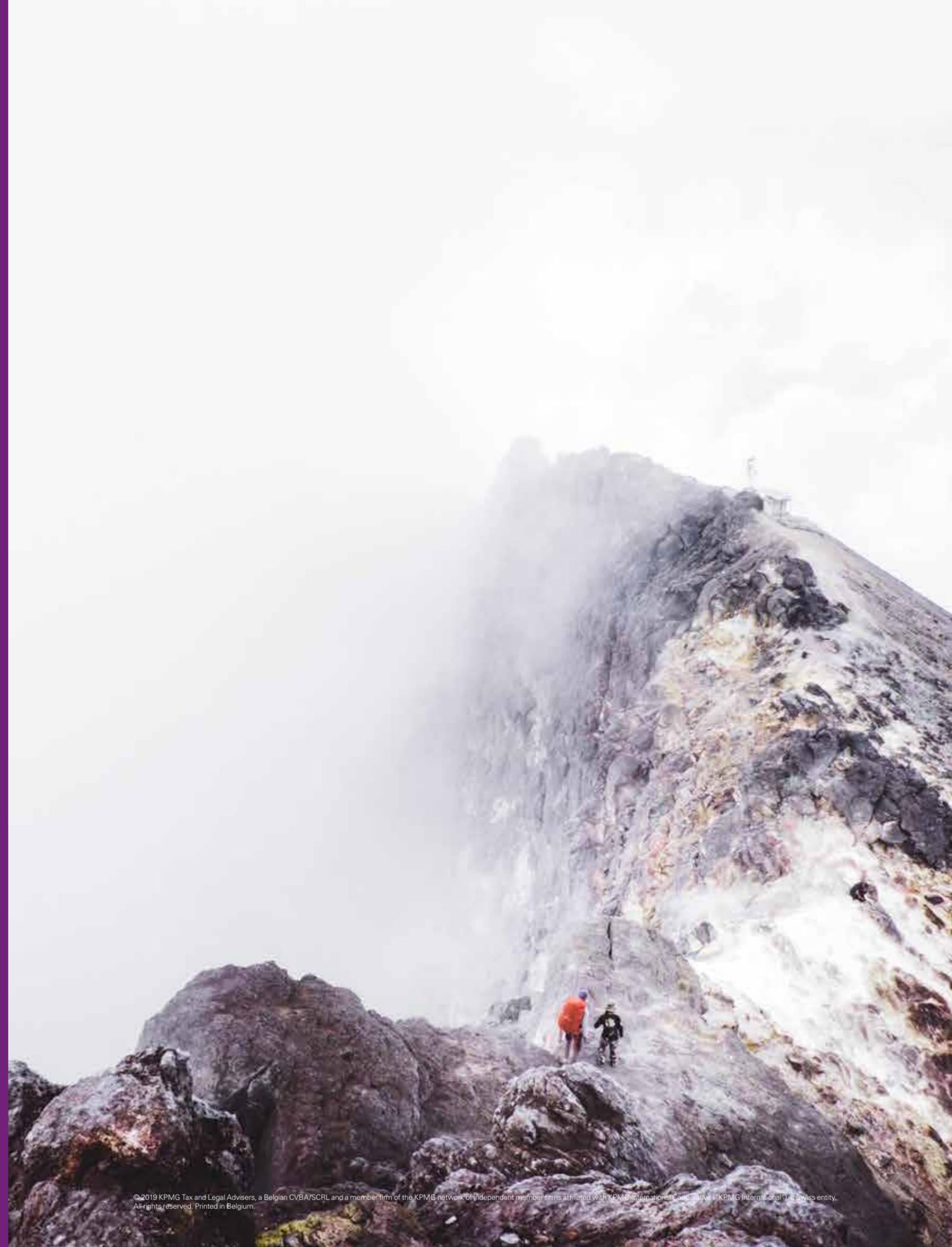
As it stands, the change to how the government counts student loans in public finances will not threaten the Chancellor's fiscal mandate. It is highly likely that the target would be revised to reflect this. On the other hand, a more explicit recognition of the costs of higher education on the Treasury may prompt a further review on the costs of higher education.

The forthcoming Spending Review could have room to increase government spending by as much as 1% of GDP, if the Chancellor decides to spend all of his savings pot. This could go a long way. The plans outlined in the October budget set out commitments to increase spending on the NHS and other protected departments, such as Defence and Overseas Aid. As it stands, the plans outlined at the last Budget still involve cuts to unprotected departments and an increase in overall spending could help avoid this.

While the extra funding could relieve the pressure on public services, it may not be enough to meet the deeper challenges facing the UK economy. Productivity remains a major issue; it is vital for maintaining and improving long-term prosperity and one where the government can, and should, take a leading role. The government has no better time than now, when the private sector is hampered by Brexit uncertainty, to put forward a positive plan for growth.



Outlook for UK retail sales



Outlook for UK retail sales

After a relatively disappointing Christmas, what sort of 2019 can British retailers expect? And to what extent is any pain they are feeling the result of wider economic conditions or longer-term structural changes? This review takes a closer look at how online sales are shaking up the established retail landscape.

Based on our research we forecast:

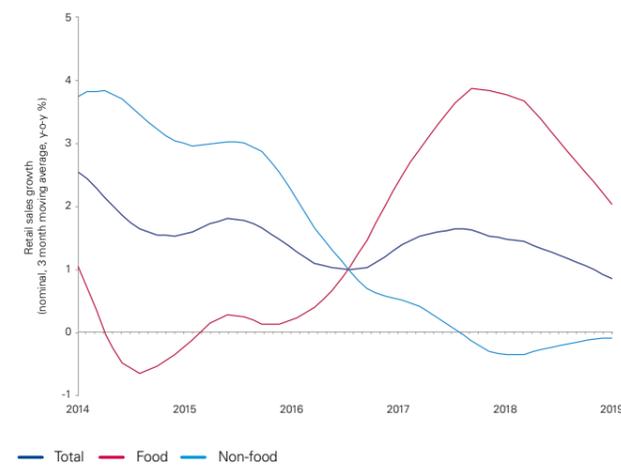
- 1) Retail sales to grow 1.6% year-on-year in 2019, as stronger wage growth combines with lower inflation.
- 2) The unknown direction that Brexit may take and the effect that has on consumer sentiment means that the outlook remains highly uncertain and could change dramatically in the future.
- 3) Falling sales in 2018 haven't been as severe as some data suggest, with price movements driving the retail values.
- 4) Online retail is taking away as much as 1.8 percentage points from the growth of overall sales for the High Street.

2018: Not as bad as the headlines suggested

Overall retail sales growth decelerated through the second half of 2018, especially among large, established stores that make up a large part of the British Retail Consortium's sales index (shown by the dark blue line on Chart 17). That deceleration was mainly in the food sector whereas non-food groups have been in decline since mid-2017.

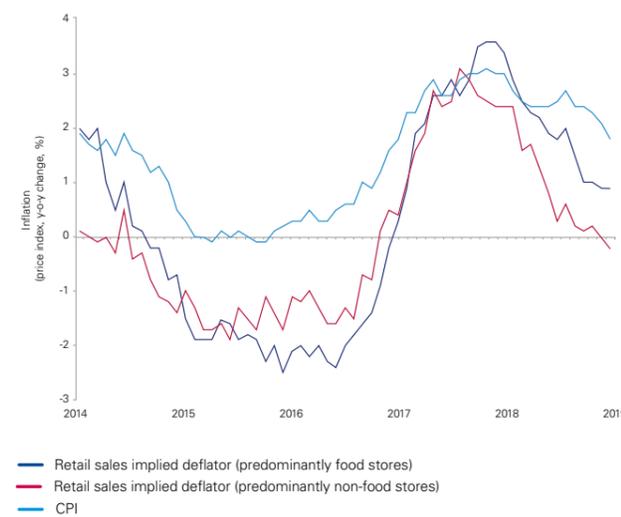
Why did we see this slide in sales growth? Inflationary effects are one reason. As Chart 18 shows, the fall in the pound after the 2016 referendum led to a sharp increase in imported inflation, which fed into consumer prices over time (a large proportion of UK consumption consists of imported goods, with around 50% of the food consumed in the UK in 2017 sourced from overseas²). That meant that through much of 2017, retail prices for both food and non-food rose in line with overall CPI inflation.

Chart 17: Total retail sales including food and non-food components¹



Source: BRC-KPMG retail sales monitor, ONS, KPMG analysis

Chart 18: Overall inflation and growth in retail prices



Source: ONS

¹The data has been smoothed using a seasonal-trend decomposition procedure based on a locally estimated scatterplot smoothing (Loess). The series shown are the trend components.

²<https://www.gov.uk/government/publications/food-statistics-pocketbook-2017/food-statistics-in-your-pocket-2017-global-and-uk-supply>

However, since the beginning of 2018 the rate of food and non-food price rises has slowed. By last December, food price inflation had decelerated to 0.9% while non-food prices were actually falling by -0.1%.

So in fact the picture for the second half of 2018 is not as bad as it seems. Stripping out the effects of price changes shows that the volume of **food sales** in real terms has increased at a relatively stable rate since 2015 (as Chart 19 shows).

The picture for non-food was also brighter than headline nominal data suggested. In real terms, non-food actually staged a recovery in sales volumes in the second half of 2018.

What we can say is that, as consumers were squeezed by higher prices in 2017 and 2018, consumers cut back on non-essentials. As a result we saw a fall in sales volumes disproportionately weighted towards **non-food** purchases.

Non-food sales to see some pick-up

Looking forward, we expect to see growth in **food sales** remaining close to current levels at around 1% in real terms. This is based on demand for food remaining broadly stable and given that we expect inflation to average 2% in 2019.

The outlook for sales volumes in the non-food segment also appears positive thanks largely to a pick-up in real earnings growth in the second half of 2018. Chart 20 shows the correlation between rising real incomes and faster non-food volume growth from 2014 (it was only as higher inflation began to eat into incomes in 2017 that non-food growth slowed). As long as the rate of earnings growth remains solid through the rest of 2019, non-food sales have a sound platform from which to grow through this year.

Chart 19: Volumes of food and non-food retailing in the UK



Source: BRC-KPMG Retail Sales Monitor, ONS, KPMG analysis

Chart 20: The pick-up in real earnings growth will support non-food sales growth



Source: BRC-KPMG Retail Sales Monitor, ONS, KPMG



Brexit uncertainty is a major risk factor

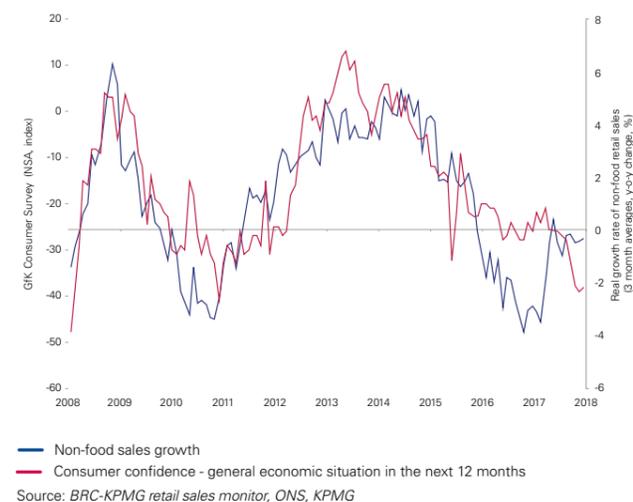
The impact of Brexit uncertainty on consumer sentiment could mean that growth in retail is weaker than we expect. Confidence has a much greater effect on non-food spending – particularly since a consumer can postpone a significant portion of non-food purchases such as electrical goods.

Non-food sales and consumer sentiment have had a very close correlation in recent times, as Chart 21 shows. What will therefore concern retailers is that the GfK Consumer Confidence Index is now at its lowest level since 2013, while expectations for the economy over the next 12 months are at their lowest since late 2008/early 2009³.

Despite positive earnings growth and moderating inflation we do not foresee an immediate improvement in consumer outlook given current Brexit uncertainties. Indeed, this more pessimistic views of the economy among British consumers has led us to revise our forecast for retail spending from around 1.9% to around 1.6% in 2019 – still a substantial improvement on the 1.2% in 2018 thanks primarily to rising real wages.

This projection is based on the UK and EU concluding some sort of agreement this year and avoiding significant disruption. If that weren't to happen the actual figure could look considerably different.

Chart 21: Consumer economic outlook for the next 12 months is a good indicator of non-food retail sales growth rate



More online sales than ever

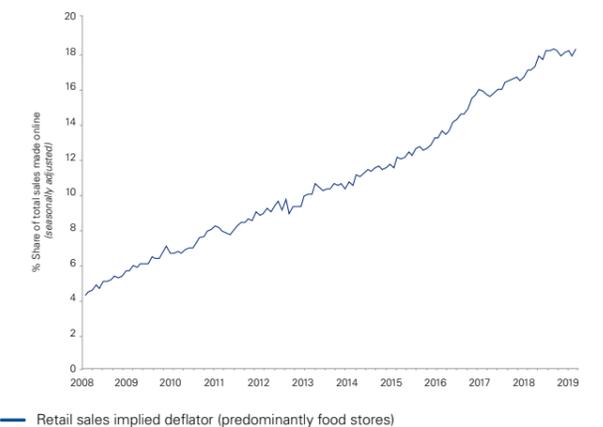
Even as we expect the overall growth of retail sales to recover, buoyed by a stronger rate of wage growth and allowing for the possible impact of Brexit on consumer confidence, a large share of the increases in purchases will be made online.

Online has long been the star in the retail firmament, growing at an annual rate of more than 10% over the past 10 years. The latest data show that online sales now account for nineteen pence out of every pound spent in the UK. No wonder, then, that the threat of online competition has been raising questions about the future of high street retailing.

Taking into account the growth of retail, we estimate that over the last 10 years, the impact of online retail lowered sales growth in high street stores by around 1.8%. This leaves many bricks and mortar stores facing a difficult choice adapting to the new environment.

But likewise there are questions about the sustainability of the online model, partially due to the higher costs of delivery, especially when taking the higher rate of returns into account. Clearly, the next decade will be crucial in determining the future role for the UK's High Street.

Chart 22: Proportion of total retail sales made online



Source: ONS

³ Our analysis breaks down the GfK consumer confidence index into its individual components, only using the index for consumer expectation for the general economic situation over the next 12 months. The General Economic Situation component of the GfK consumer confidence index is based on consumer responses to the following question: 'How do you expect the general economic situation in this country to develop over the next 12 months?' (a lot better - a little better - stayed the same - a little worse - a lot worse).

Outlook for UK trade

Beyond Brexit: prospects for UK trade

Brexit raises long-term questions about the position of the UK in the world and the role trade plays in the UK's economy. With much of current attention focussed on the future relationship with the EU, we consider how overall trade may be influenced by other factors such as technology and global geopolitical developments, as well as by the future size of different export markets.

Trade's place in the UK economy

Exports of goods and services make up 29% of UK GDP, while imports made up 30% of GDP, according to data for Q3 2018. These percentages grew strongly from the mid-90s until the start of the Great Recession of 2008 to 2009, as the UK became increasingly embedded in the global economy (see Chart 23).

Despite the increase in overall openness throughout this period, the UK economy has become ever-more weighted towards the service sector – the output of which is relatively less tradeable. Had the structure of the economy resembled that which existed in 1990 – when the output of the manufacturing sector made up 16% of the overall economy versus only 10% in 2018 – overall UK exports could stand around nine percentage points higher as a proportion of GDP than they do today.

The rising weight of services over the past three decades reflects the UK's competitive advantage in certain tradeable services, such as financial services, and a number of structural changes, including an ageing population and a shift in consumption towards leisure-related services.

So far, the net effect of these changes has been positive towards the overall share of trade in the UK economy. We would expect this to continue, especially as new digital and communications technologies could help service sectors become more tradeable in the future.

On the one hand, developments in communications technology would enable the UK to benefit from higher external demand for services, which could enable further growth in this sector.

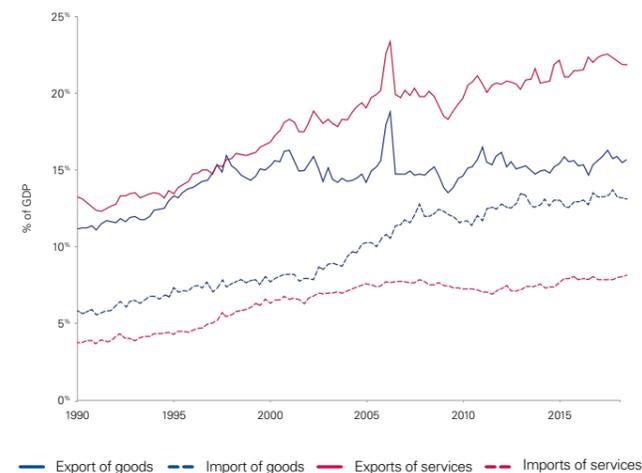
The danger to the UK economy and workers is that lower costs of communications would also enable businesses to take advantage of cheaper labour costs in developing countries in service industries.¹ While the threat of outsourcing will in part be mitigated by preferences towards service provision at home, taking the threat of automation into account, technological changes may require a significant expansion in the social safety net to mitigate the impact of job losses.



Services represent 80% of the UK economy and in these industries proximity to customers is not important to the UK's ability to compete internationally. Post Brexit, there is room for optimism, particularly if we can get wider services provisions within future FTAs."

David Slater,
Director of Trade, KPMG in the UK

Chart 23: UK openness to trade



Source: ONS

¹ R. Baldwin; If this is Globalisation 4.0, what were the other three?; Dec 2018

The UK's future trading partners

Looking ahead, which countries will be the UK's main trading partners?

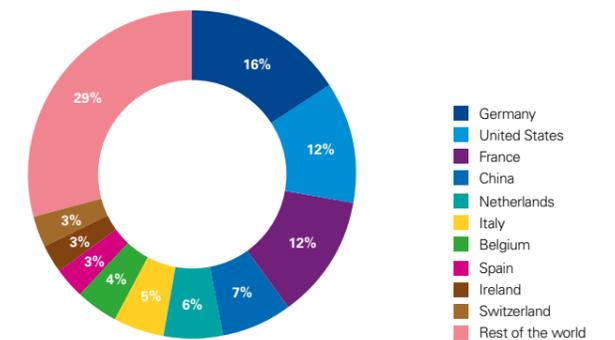
Results of gravity modelling point to economic size and the overall cost of trading^{2, 3} as key determinants of trade flows, as well as the relative remoteness of the country with the rest of the world. Using estimates from recent studies, Chart 24 shows the distance-adjusted relative size of the 10 largest⁴ markets for the UK in 2018.

The two largest world economies, China and the US are among the top four, but both are below the 16% adjusted market size that Germany represents for the UK due to its relative proximity. Japan and India, on the other hand, while being 3rd and 7th world economies by size, do not feature in the top 10 league due to their relative remoteness.

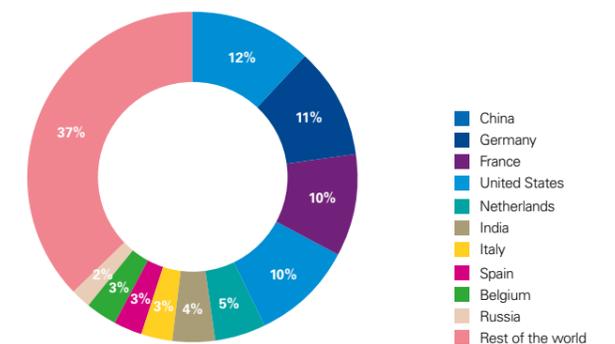
The list of countries making up the main trading partners appears little changed by 2050⁵, except for a more prominent role played by the BRIC economies. We expect China to take up the top spot, by virtue of the size of the economy, with 12% of the overall potential market for the UK. India is in 6th place, with 4% of the total. Further down the rankings, both France and Germany may represent a larger share of the overall potential market, while the Netherlands remains in 5th spot.

Chart 24: UK export markets size adjusted for distance, 2018 and 2050

Export markets adjusted for distance, 2018



Export markets adjusted for distance, 2050



Source: CEPIL, IMF WEO Oct 2018, KPMG analysis

² M. Larch, Y. Yotov; General equilibrium trade policy analysis with structural gravity; WTO; 2016

³ Head, Keith & Mayer, Thierry, 2014. "Gravity Equations: Workhorse, Toolkit, and Cookbook," Handbook of International Economics, Elsevier

⁴ Adjustment carried out using estimated from Head and Mayer (2013) and 2018 GDP at current PPP exchange rates from IMF WEO (2018). Distance used from CEPIL, with an elasticity of 0.88.

⁵ Market size in 2050 is estimated using the results of the KPMG 2050 long term economic growth model.

The economic size of an export destination, adjusted for distance from the UK, has a strong influence on determining bilateral trade flows and closely aligns with the actual observed patterns of UK trade. Chart 25 compares the actual proportion of trade with 10 destinations with expected market share based on size and distance. The proportion of exports to the US and Ireland is larger than their economic size and distance from the UK would imply. This likely reflects the importance of historic economic links and a shared language.

Considering the role that the trade costs play in determining the potential size of a UK exporters market, developments in new technologies offer exciting possibilities. The adoption of autonomous vehicles, and robotics to facilitate goods loading and unloading, could help reduce the costs of transportation, while the use of machine translation could also help cut the trade costs associated with different languages. The overall impact of these changes would be to increase overall trade, and increase the relative share of trade with more distant trading partners.

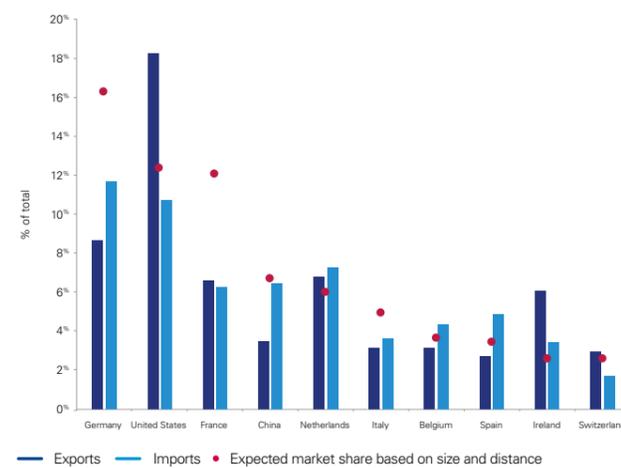
Impact of global value chains

One missing factor in the story so far is the development of global value chains (GVCs). Improvements in information and communications technology have allowed firms to disperse different stages of the production process geographically. This allows them to take advantage of economies of scale, geography, specialisation and differentials in skills and wages across countries.

Between the mid-90s and the start of the Great Recession in 2008 there was a sharp increase in the volume of GVC trade. As distance continues to be an important determinant of both the cost of transporting intermediate goods and the cost of controlling the production process, the value chains have tended to be regional rather than truly global.

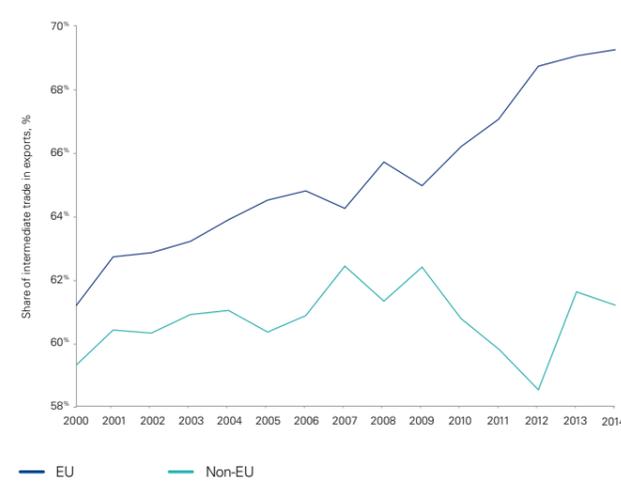
The UK's pattern of trade clearly indicates it is part of 'factory Europe' and has become increasingly so in recent years⁶. Intermediate goods and services accounted for 61% of UK exports to the EU 2000, according to data from the World Input-Output Database (WIOD)⁷. By 2014, that figure was 69%. Yet over the same period, the share of intermediates in exports to non-EU countries barely changed (increasing from 59% to 61%).

Chart 25: Trade shares of the UK's ten largest trading partners



Source: ONS

Chart 26: Share of intermediates in UK exports, by destination



Source: WIOD 2016 edition, KPMG analysis

It is less clear whether global value chains will develop further in the longer term, even working on the assumption that the long-term impact of Brexit will not impair the UK's access to the EU market. Without further technological improvements lowering the costs of trade and co-ordinating production across different geographic areas, it may no longer be possible to sustain increases in the slicing up of the value chain. In this case, trade flows could continue to move in line with global GDP, rather than the pre-crisis average of 7.1%⁸.

Stronger growth in trade is possible, but only if we see new technologies emerge. A technology like the 'Internet of Things' (IoT) can deliver further reductions in communication costs, for example with machine-to-machine communication used to help co-ordinate production across different geographies and plants. In this scenario, we would expect to see an upgrading and deepening of regional value chains and the extension of these value chains to countries outside the region itself.

Another possibility is a reversal of global value chain integration altogether. Technologies such as 3D printing and developments in AI/robotics could shift the calculus against slicing up production chains. As these production processes represent a shift towards more capital intensive production, the benefits of offshoring parts of the production chain to lower-wage countries are reduced. While 3D printing currently accounts for a very small share of current manufacturing, less than a tenth of 1%⁹, some estimates suggest that widespread adoption of this technology could reduce the volume of global trade by up to 40%¹⁰ in 2040.

Conclusion

Regardless of the outcome of Brexit, the EU will continue to be one of the largest markets for the UK by virtue of its size and proximity. Any tariff or non-tariff barriers would restrict trade, but EU countries will continue to be among UK's most prominent trade partners.

However, UK's current role within 'factory Europe' cannot be taken for granted. The trade links currently most at risk are those which form part of existing production chains. In the event of a reversion to trade on the basis of WTO rules these links would be disrupted.

Ultimately, such barriers to trade could lead to a reorganisation of many value chains that bypasses the UK entirely.



The biggest concern to goods exporters today is the practical aspects of trade and financial stability as they transition into a post Brexit world. Longer term the growth in future demand for UK goods will come from other parts of the world and not just Europe."

Bina Mehta,
Advisory Partner of National Markets Sales, KPMG in the UK

⁶ See R. Baldwin, J.Lopez-Gonzalez; Supply-Chain Trade: A Portrait of Global Patterns and Several Testable Hypotheses; 2013
⁷ <http://www.wiod.org/database/wiots16>

⁸ C.Constantinescu, A. Mattoo, M. Ruta; the Global Trade Slowdown: Cyclical or Structural?; IMF WP/15/6
⁹ EU; Adding it up: The economic impact of additive manufacturing; 2018
¹⁰ ING, 3D Printing: A Threat to Global Trade; 2017

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