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Julian Hodge Institute of
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HODGE
BANK



Patrick Minford, Economic Adviser to Hodge Bank

“If Mrs. May sticks with her current proposals and the EU refuses to change its demands, then there will very probably be no trade deal, the default option with Parliament voting them down. According to the Treasury there would then be severe disruption with the EU border being subject to long delays as new inspections were brought in and also problems with standards not being recognised as being met by UK goods. However, these actions would be quite illegal under WTO Rules and can therefore be ruled out. No Deal disruption will be minimal, and will usher in a desirable clean Brexit.”



Commercial Lending



Commercial Deposits

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In spite of the continuing uncertainty over Brexit policy the UK economy has continued to grow and generate a record number of jobs. So while getting the Brexit policy into place is vital for the UK to make a start on the new opportunities Brexit opens up, uncertainty itself is not as damaging as widely made out. This is because people can insure and take decisions on the current data available to them, while getting protection against endemic uncertainty by hedging and insuring; Brexit is just one of the many things to be taken into account in this process.

Looking ahead, the world economy continues to grow, with raw materials in plentiful supply. As usual, emerging economies are growing the fastest, while the major developed economies are growing in the 1-3% range. This means that world growth is running at comfortably below the 5% rate that proved excessive in the 2000s. Monetary policy is being tightened, with the US taking the lead. This should prevent another damaging credit boom as in the 2000s, that led in turn to the 'stop' of the financial crisis.

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Patrick Minford explains why he backed Brexit and why current Civil Service forecasts for it remain seriously flawed.



UNCERTAINTY: NOT AN IMPORTANT ISSUE

The economy carries on regardless of Brexit uncertainty. One of the endless cries during this Brexit process has been about uncertainty affecting either aggregate demand or supply or both. Yet there is barely any evidence of either.

On the demand side, as we have pointed out repeatedly, there is none, as the economy is at full employment, with real wages now rising with some strength. It is hard to argue that without Brexit we would have had more than full employment. Possibly the economy could have overheated more; but the claim is that Brexit has caused weakness, and weak it is plainly not.

If we turn to aggregate supply, again employment has not been reduced, as it is at an all-time record.

As for capital, it is abundant, as witnessed by the usual indices of excess capacity from CBI surveys. Thus, in the July CBI Survey 45% of firms were working below capacity. Investment has grown in the past year, in spite of this abundance. This could reflect the labour market tightness, with capital substituting for labour.

What about econometric evidence of uncertainty affecting investment or any other sort of spending? It is sparse to non-existent. All the models we have make spending respond to expected income and borrowing costs, not uncertainty measures of any sort. This rather explains why we see no effects today, even though there is Brexit uncertainty.

Some commentators point to the financial Crisis as evidence of uncertainty effects. But it is no such thing. The crisis crudely cut off credit supplies because of bank illiquidity; this in turn reduced demand and trade by sharply raising the cost of credit.

As far as theory goes, we know that households and firms will insure idiosyncratic risks. They can also insure general, e.g. political risks, by buying certain sorts of assets. This ability to insure could explain why uncertainty is not a factor in spending decisions.

None of this is meant as a celebration of policy uncertainty. Rather we should get its effects into perspective. Often economies have to endure some uncertainty in order to allow necessary policy change bringing long-run gains. This is the case with Brexit. The focus of discussion should be on its effects on the long-run supply side of the economy, not on short run issues or transitional uncertainty.

Table 1: Summary of Forecast

	2016	2017	2018	2019	2020	2021	2022
GDP Growth ¹	1.9	1.8	1.5	1.9	2.0	2.1	2.3
Inflation CPI	1.1	2.6	2.5	2.2	2.0	2.0	2.0
Wage Growth	2.4	2.9	2.7	2.4	1.7	2.4	2.3
Unemployment (Mill.) ²	0.8	0.8	0.8	0.8	0.7	0.7	0.6
Exchange Rate ³	82.1	77.4	77.4	76.2	75.4	75.5	75.2
3 Month Interest Rate	0.5	0.4	0.6	1.1	2.4	3.1	3.1
5 Year Interest Rate	0.7	0.6	1.5	2.5	3.4	2.9	2.6
Current Balance (£bn)	-90.9	-66.3	-60.3	-49.5	-39.7	-31.0	-17.9
PSBR (£bn)	45.1	39.4	30.7	21.8	5.6	-6.7	-15.1

¹Expenditure estimate at factor cost
²U.K. Wholly unemployed excluding school leavers (new basis)
³Sterling effective exchange rate, Bank of England Index (2005 = 100)

As for that long-run effect, we have argued throughout the Brexit debate that it will be highly positive due to:

- Opening up free trade around the world, lowering our prices and boosting competition. This can be done without creating trade barriers against the EU, simply by moving to a simple EU Free Trade Agreement.
- Improving regulation by bringing it under our own pragmatic control — whether in labour markets, or in product innovation, or in the City and finance.
- Regaining control of immigration so that we can focus on obtaining necessary skills from around the world, and avoiding the problems caused by free access to our benefit system from EU unskilled workers.
- Indeed, Brexit can be seen as a way of ensuring the strong continuation of the Thatcher supply-side reform programme which our EU membership derailed in a number of ways.

THE UK OUTLOOK UNDER NO EU TRADE DEAL

There is an impasse in the negotiations with the EU. Even if this is broken, the chances are that Mrs. May's latest proposals will not get passed by Parliament unless the EU takes out the Irish 'backstop', under which the UK and N Ireland would be trapped under EU rules until a UK-EU trade agreement was signed, so putting us in a very weak bargaining position ; many Eurosceptic Tory MPs are committed to voting against them and it appears less than few Labour MPs are willing to vote for them. Mrs. May has a better chance if she 'pivots' to Canada+ proposals but she has little time to do that, having dug in behind the current proposals. If somehow, she did so pivot and bring these to the House, she might well succeed in getting them through. The dozen or so hard Remainer Tories would probably so dislike the alternative 'no (trade) deal' scenario that in the end most would vote for the government, while a few Labour Leavers would also probably do so.

We have set out the prospects under a Canada+ deal before. In the short run, given there is a transition to end 2020, we would have the status quo; but allied to expectations on new FTAs around the world, UK-based regulation and an end to uncontrolled EU unskilled migration. All this would boost the economy, not just in the longer run but also in the near term.

However, if Mrs. May sticks with her current proposals, then there will very probably be no trade deal, the default with Parliament voting them down.

In this case we should expect that all the other elements in the Withdrawal Agreement, which it seems have been pretty much agreed, would be put into action by executive order on the basis of inter-governmental agreement. Alternatively, a Withdrawal Agreement shorn of its trade element could be rushed through the House.

But what would the no trade deal part do to the economy in the short run?

According to the Treasury there would be severe disruption with the EU border being subject to long delays as new inspections were brought in and also problems with standards not being recognised as being met by UK goods. However, these actions would be quite illegal under international law and would open up the EU or the governments that sponsored them to court actions not merely by the UK in the WTO but also by European and UK firms in the European law courts and ultimately the ECJ. This illegality stems from WTO rules on discrimination in standards and on technical discharge of border activity, requiring a 'seamless' border. EU and UK standards are currently the same, so plainly exporters on both sides satisfy required standards. The seamless border already occurs for non-EU trade and once the UK is out must similarly occur for UK-EU trade. Typically for developed countries 98% of traffic crosses borders without

any border inspection, having been pre-cleared online; the other 2% is inspected and goes through within 24 hours.

A good example of how this illusion of disruption has been created was President Macron's recent assertion that the port of Calais would materially slow down the border process. This assertion was immediately shot down by the President of the Calais region as absurd and not to be permitted by the region, as it would constitute its economic suicide. This highlights how ports are a business, indeed a vital one for their economies, and these businesses would not tolerate illegal actions that imperil their viability.

To all this some say that the WTO is under attack on all sides, for example by President Trump. But this is first to misunderstand totally how international law works inside the EU itself. WTO rules are embedded already in EU domestic law as lower level mandated procedures to be followed by customs and trading businesses. Secondly, the current tariff wars between Trump, China and the EU have nothing to do with the rules on borders and standards, which are not being challenged. Rather these are tariff threats that can be carried out under various WTO exceptions such as for national security or anti-dumping or within FTAs such as NAFTA or simply as MFN tariffs that are general but exempted for some under FTAs. The general business of the WTO continues unchanged; indeed, for example WTO judgements on Airbus are still pending and its judgements over GM food and seeds are being obeyed by the EU.

Thus, the simple truth is that any such threats as the Treasury conjures up could not be carried out, just as has been illustrated in the key Calais case.

Of course, there could be a few weeks in which there is disorganisation as new procedures are introduced to deal with the new status of UK-EU trade. But the port businesses would make all possible efforts to avoid this; and in any case such disorganisation cannot cause much of an effect on the economy, considering it would occur only at one or two ports experiencing bottlenecks or staff shortages. With EU trade only 12% of GDP and these ports a small percentage in turn of this, we are looking at perhaps a disturbance of less than 0.1% of GDP for three weeks, a tiny effect on GDP in Q2 of 2019. Compare this with the disruption caused to GDP in the first quarter by a sharp fall in construction activity, which did reduce GDP growth that quarter by perhaps 0.2%. One can see that trade disruption due to no trade deal is really not in the same class at all. It is in the Millennium Bug category — another case where great fears were conjured up, to be found to be groundless in the event.

In other respects, no trade deal under WTO rules has a direct benefit to the UK economy and Treasury revenue. There would be a reduction and probable elimination of the £39 billion to be paid to Brussels during the now-non-existent transition period. Tariff revenues of some £13



billion would be paid to the Treasury on imports from the EU; these have to be absorbed by EU exporters who would otherwise lose their sales in the UK to a potential flood of non-EU imports that could flow in at current (tariff-inclusive) prices. Our exports to the EU would be charged £5 billion in EU tariffs but again because of home competition at existing prices our exporters would continue to charge these prices to their EU importers; the latter would then in effect have to pay the EU tariff from their margins.

The last point to remember is that the Brexit would have been brought forward to March 2019; this means that the UK can immediately embark on FTAs with key trading partners, instead of waiting until the end of the transitional period. It can also immediately implement its own regulation agenda, as well as its own immigration controls. This brings forward the extra growth due to Brexit.

The future casts its shadow or luminescence over the present due to rational expectations. So, this better long term prospect will have an immediate effect on UK economic confidence. Domestic investment and foreign direct investment will both respond positively. Neither of these effects will be visible except in some surveys perhaps, for a little time. They will not have an effect on short run demand which in any case is pushing up against the economy's supply constraints. But they will improve longer term forecasts and react in time on productivity.

Some commentators look for effects on trade volumes, thinking that our trade pattern will change sharply away from the EU. This is not what our models predict. Rather prices will adjust to maintain trade flows since these traded volumes are necessary parts of the businesses creating them. Our models also predict that there will be expansion in services production in the UK, as that is our comparative advantage and also not protected by the EU. Agriculture and manufacturing will lose EU protection and will need to raise productivity long term, which they can easily do; resources they release will move into traded and non-traded services. This in turn will gradually shift the pattern of trade towards countries that demand our services away from those that demand our goods. But this will be a gradual process; and it is also not easy to forecast which those countries will be.

To sum up, if there is no trade deal, then from April 2019 we will see much the same goods going through our ports to much the same places. The border process will be as quick, with the required standards the same. Some money

will change hands in tariff payments, but this will leave UK prices at the border unchanged, both exports and imports. One or two ports may experience some teething problems with these changes, but they have strong incentives to keep these short and modest. But under the generally unruffled surface of the UK economy expectations of the future will change radically for the better as long term changes in trade policy, regulation and migration are put in place as rapidly as possible.

What will Mrs. May do? It is generally best to bet on politicians wanting to survive. From our calculus above, Mrs. May is on a loser with the Withdrawal Agreement as now drafted but has a good hope of getting a Canada+ deal through Parliament; alternatively if the EU removed the Irish backstop, the withdrawal agreement could well pass Parliament and so bring the current crisis to an end, paving the way for the EU transition period and EU trade talks. The EU has already offered a Canada+ deal, seeing it as in principle not problematic in that it does not undermine the EU Single Market and Customs Union. No doubt they would try to push it as close to the status quo as possible in the talks to come; however, that is something for the UK to resist. At least the result would be a negotiated FTA in which two sovereigns retained their sovereignty, unlike Chequers. It seems to us that whether now or later there will be such an FTA with the EU. For the EU it is superior to no trade deal economically; for us, while strictly inferior and losing us some modest gains, it represents agreement with a neighbour which it is worth sacrificing such gains to have. Hence in our forecasting we maintain our assumption of Canada+.

THE LAST BUDGET

The political classes are in uproar, arguing over the various possible forms of Brexit, including one with no EU trade deal at all, exiting under WTO rules. Yet the economy sails on serenely, clocking up yet more record employment, with inflation coming down towards its target, interest rates finally rising, productivity recovering, the balance of payments improving and growth proceeding close to 2%. The pro-Remain media trumpet the ‘uncertainties’ and even the possible ‘terrors’ of no trade deal; and no one takes any notice apparently, outside the usual representatives of ‘industry’ such as the CBI.

What on earth is going on? We sometimes hear from pundits that ordinary people are ignorant of economic issues. Yet when we check the behaviour of their economies we typically find that their expectations are rational. This is not surprising since it is their interests that are at stake; and it is a stupid person indeed who ignores his or her very own interests.

The truth is that ordinary people have got this right: they realise that for all the posturing by politicians trade will continue largely undisturbed by Brexit but that Brexit will bring some longer term trend changes that they have by a substantial majority approved. The formal referendum majority was 4%. But it is well-known from previous polls that British people’s opinion has been by a much larger majority ‘eurosceptic’ for a very long time; when they joined the EEC they did not expect or want to be ruled by Brussels in the way things turned out and then threatened to go further in the journey towards political union. Probably a fair percentage of the electorate was sufficiently scared by the doomladen warnings of Project Fear into voting Remain. Now we know from the same polls that the vast majority of the electorate regard the issue of Brexit as settled and want the government just to ‘get on with it’.

Nor are they worried that the government will somehow renege on ‘full Brexit’. The British have enormous confidence in their democracy. They know full well that no government can survive by standing out against settled public opinion. The Conservatives are now reacting sharply to the unpopularity of this government’s proposed Withdrawal Agreement which has greatly alienated the referendum majority and caused a swing away from the Conservatives that could be sufficient to let in a Corbyn government.

With these proposals now clearly unacceptable, we have set out above the possible scenarios. There are two main possibilities: exit under WTO rules or a revised Withdrawal Agreement. Both would eventually lead to a Canada+ trade deal. Both offer a full Brexit as demanded by the referendum result; both produce a long term economic gain for the UK economy, with free trade, own-regulation, control of borders, and no further budget contributions. Under WTO rules though the EU stands to lose a lot: no transition budget contribution, substantial tariff payments to the UK Treasury, and Brexit effects damaging their trade

returns coming two years earlier. Their loss is largely the UK’s gain. It seems likely enough that as this possibility becomes a reality, the EU will be happy to switch to Canada+.

The British public know this. They are scornfully disregarding the daily scare stories about ‘No Deal’ put about by the Remain lobbies. WTO rules prevail for other countries outside the EU and they do not cause queues at the border, or stop aircraft flying, or interrupt energy supplies (look at the Russian gas piped into Germany). WTO rules are in fact highly prescriptive: such things as border hold-ups and discrimination on standards are simply illegal, and the EU knows this, which is why it does not try them on with third countries such as we will shortly become.

The irony of the present negotiations between the EU and the UK government within the Withdrawal Agreement framework is that the Agreement could easily be changed so as to pass Parliament and the trade discussions then can easily be ‘pivoted’ into a Canada+ framework where essentially the same ‘access’ will be achieved, but without the paraphernalia of the Chequers-proposed ‘EU rulebook’. This simply cannot ultimately be agreed by either side: ours because it requires foreign rule, the EU’s because it does not include the ‘fourth freedom’ of free migration.

Policy and the Economy

The Bank of England has now reconciled itself broadly to Brexit. It is now eager to retake its role as regulator of the City in world markets. In its monetary policy judgements it is returning to normal analysis, arguing that whatever the trends in the economy due to non-monetary factors such as Brexit or productivity drivers it is simply their job to control inflation, not to try and use monetary policy to offset such trends — which it is incapable of affecting anyway in anything other than the very short term.

The last policy shoe to fall is the Treasury. This remains unreconciled to Brexit. In this attitude it reminds one of the Treasury in the very early years of Mrs. Thatcher, unreconciled then to her monetarist policies. Then as now it staged a mandarin rebellion. After a decent interval those mandarins had to go, having totally misjudged the democratic mood.

The Treasury is playing the game of announcing doomladen forecasts still. Yet as Denis Healey memorably remarked ‘when in a hole, stop digging’. The Treasury’s predictions of doom were so badly wrong that they are entirely discredited as a forecasting organisation — even the last Brexit secretary has poked fun at them. Embarrassingly for the Treasury, in their home area of revenue, the money now keeps pouring in. The PSBR keeps on contracting, with the latest forecast for 2018–19 coming down to £30 billion, 1.5% of GDP, with the public debt/GDP ratio now having fallen steadily since 2015



(remembering to use the right debt definition, which must exclude all the Bank of England's market operations).

It is high time the Treasury came around to accepting Brexit and making policy to optimise our economic prospects, building on the free trade and potential deregulation it will bring. For all the Remain efforts to defend our position within a protectionist EU, the truth has always been that free trade brings benefits in the form of lower prices and more competition. Furthermore, this freedom does not need to come at the expense of barriers with the EU: even under WTO rules these barriers will consist solely of tariffs which are in general fairly low but under Canada+ they will be effectively non-existent. In any case once our markets are open to the world, any barriers with the EU will have an insignificant effect on our economy.

In the Economists for Free Trade 'Budget for Brexit' the possibilities for imaginative Treasury policies on tax and public spending were carefully set out. For this Conservative government they suggested that at last the Treasury could get away from its position of endless austerity and create opportunities for greater growth.

The Economic Outlook at Home and Abroad

With plenty of excess capacity in world raw material markets the world outlook remains good for a long period ahead. The main challenge for the UK is to create growth from rising productivity now that the economy is hitting up against the limits of full employment. Some of this will occur naturally but after long years of austerity and a negative approach to growth-friendly policy the government now has a good chance to grasp the growth-creating opportunities from Brexit. Improved infrastructure, reformed funding of the NHS, and tax cuts can all usher in a new environment that will build on the extra productivity coming directly from Brexit itself.

The usual round of 'Brexit analyses' from City and other firms continues — 'showing' that growth has been lower than it would have been because of Brexit. The favourite method, used by several before including the Bank of England and now recycled by UBS in a recent offering, is to create a 'comparator group' of countries and to compare their growth and other behaviour with that of the UK. These countries can be a variety, such as euro-zone or north American. The problem with this method for judging business cycle behaviour is simple and damning: cyclical experience is highly individual if one is judging percent changes over very short periods. Consider for example how specific the euro-zone's experience is compared with the UK: it weathered the early financial crisis well, then the

euro's own crisis hit, then there was a late burst of QE from the ECB, finally it is coping with difficult banking problems across the zone but especially in Italy. Or the US with its 'Trump effect'. The margin of error due to non-comparable features is simply too great to estimate differences in short term growth of a few percent. The method has reasonable validity when one looks at long periods of growth: for example, if you compare the much faster growth of mainland Europe from 1945 to 1979 with the UK's you can reasonably treat this as evidence that we failed to achieve our potential during that period. In this case of a long period of history enough features of the two economies are similar to use the difference in long run growth to support good analysis based on economic modelling.

We have argued before that it is hard to ascribe any significant 'demand effect' to Brexit when the UK economy keeps on setting employment records in the region of full employment: could we have got 'more than full' employment without Brexit? On the supply side, any effect on investment would have only a miniscule effect on the capital stock (this being some 20 times the size of investment). As for productivity how could Brexit yet affect that, a longstanding 'puzzle' since the financial crisis hit? Brexit will have its long run effect on the supply side once it comes in. We will then be in a position to judge whether free trade has brought a productivity gain or whether a 'gravity effect' of distancing ourselves somewhat from the EU comes into play to diminish it.

Monetary Policy

Meanwhile the business of normalising monetary conditions needs to continue with due deliberate speed. As we have argued before, now that the economy is plainly not in the financial crisis situation any more, crisis monetary policy must be brought to an end. Interest rates need to go on rising and the Bank needs to sell its government bonds.

THE UK ECONOMY

Vo Phuong Mai Le

The third quarter showed further expansion in growth. Real GDP rose 0.6%, up from 0.4% in Q2. The expansion was registered in all sectors with the highest contribution from construction (+2.3% in Q3, after 0.5% in Q2). Manufacturing output recovered and rose at 0.5%, after a decrease in the previous two quarters (-0.4% in Q2 and -0.2% in Q1). Services remained strong with a Q3 growth rate of 0.5%, following 0.6% in Q2. On the expenditure side, a positive contribution came from private consumption (0.5% in Q3, unchanged from Q2), investment (0.5% after -0.8% in Q2) and net trade with exports growth recovering (1.1% in Q3, after -1.4% in Q2) and exceeding that of imports (0.8% after 0.1% in Q2).

Recent data and surveys however show signs of more moderate economic growth in Q4. According to the ONS the economy grew at 0.3% during the three months to November. Although all of the December Purchasing Market Indices are above the 50 zero-growth threshold, the improvement is small. The Markit/CPIS UK Services PMI was 51.2 in December, marginally up from the 28-month low of 50.4 in November. For manufacturing, it rose to 54.2 in December, up from 53.6 December; and for construction it was 52.8, down from 53.4 in November.

Labour market, costs and prices

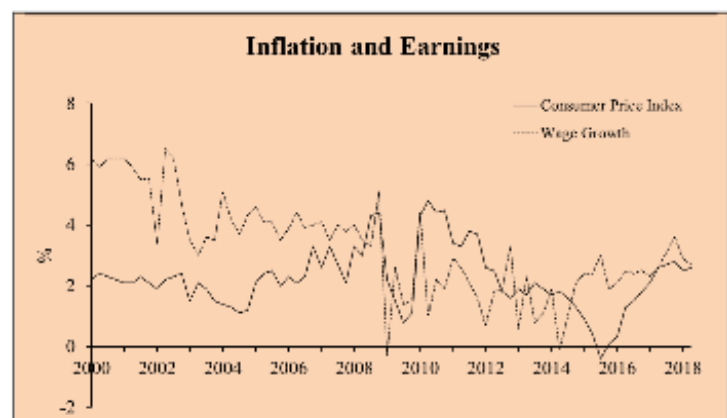
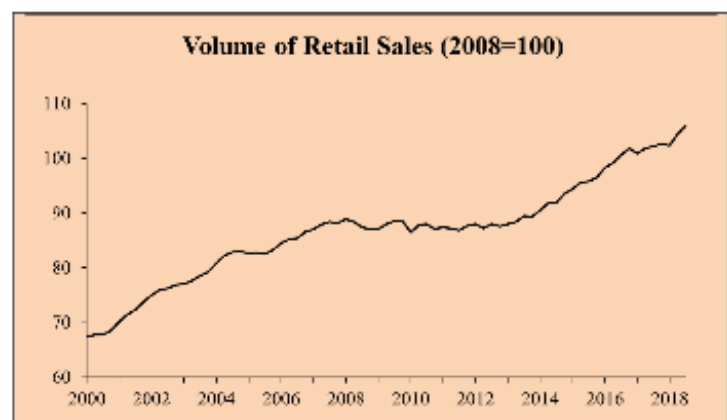
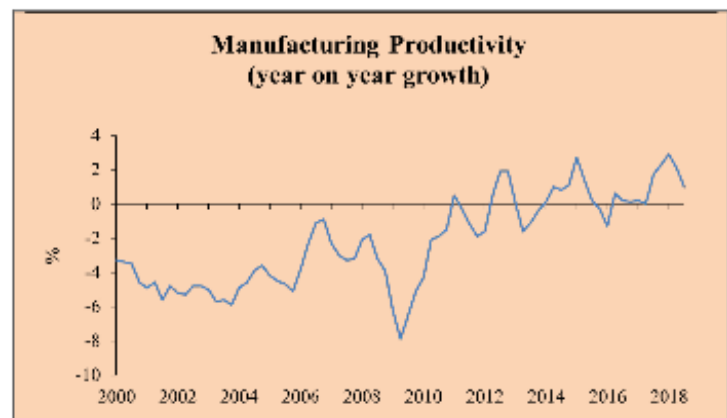
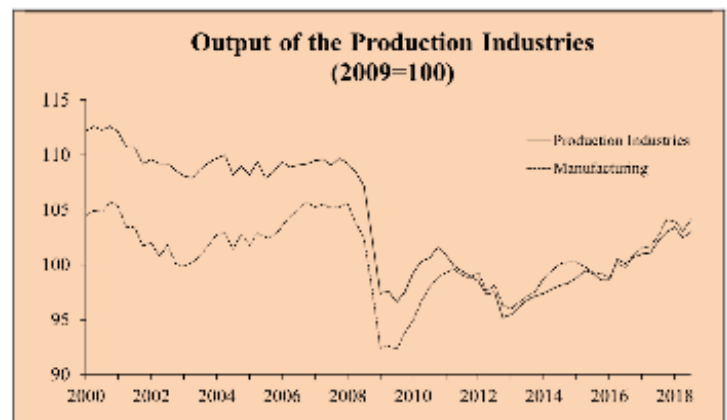
The labour market remained tight. The employment rate for Q3 was 75.7%, up from 75.5% in Q2; and the unemployment rate in Q3 remained 4.1%. The tight conditions continued to push up wage growth. The year-on-year growth rate of average weekly earnings, excluding bonuses, increased to 3.3% in Q3, up from 2.9% in Q2.

CPI year-to-year inflation was 2.3% in November, down from 2.4% in October. The decrease partly reflected a fall in energy prices. Annual input price inflation rose 5.6%, down from 10.3% in October. The Bank of England expects CPI inflation to be under the target of 2% in the coming months. They seem to consider the fall in oil prices could partially offset the inflationary upward pressure from the fast wage growth.

Fiscal and Monetary Developments

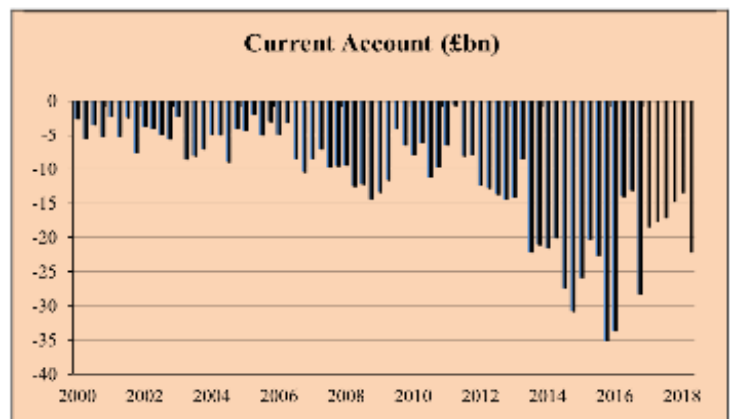
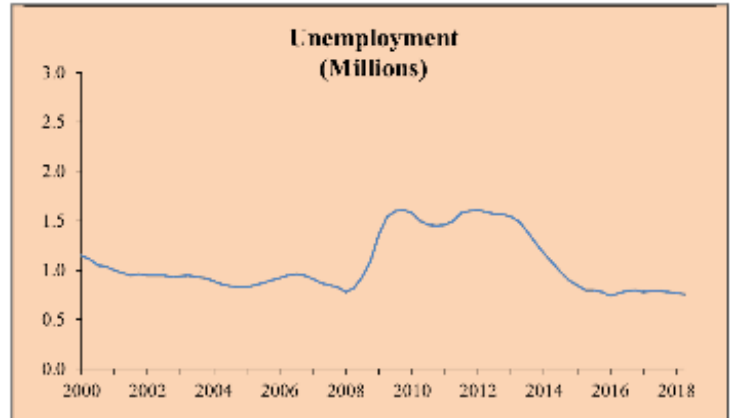
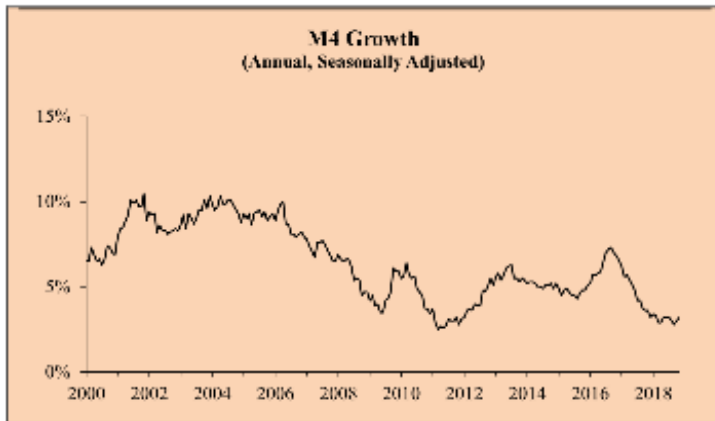
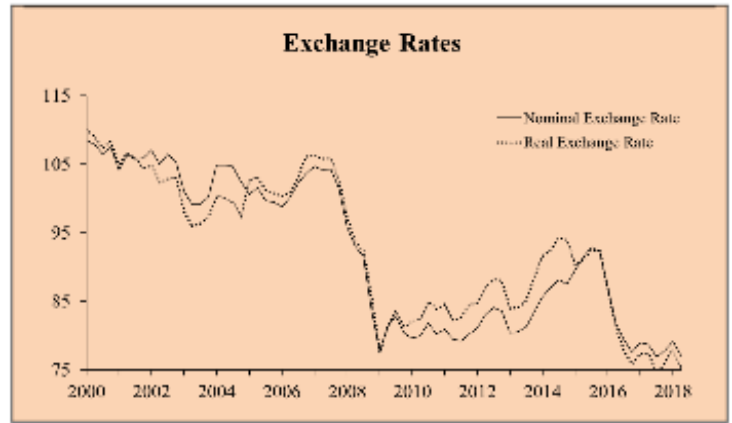
Considering economic growth performance and the inflation outlook as well as uncertainty about the Brexit deal vote, the Bank of England kept the Bank rate at 0.75% in its December meeting. It left the current level of bond stocks purchased by printing money and central bank reserves unchanged, at £435 billion in government bonds and £10 billion of corporate bonds.

The year-to-year aggregate credit growth, M4 lending excluding intermediate other financial corporates (OFCs),



was 3.5% in November, up from 3.4% in October. This rate shows that the credit growth was rather slow and thus contributed to a slowdown in money growth. The year-on-year M4 (excluding intermediate OFCs) growth rate was 2.2% in November, down from 2.6% in the previous month.

In the current fiscal year 2018/2019 to date total public net borrowing has been £32.8 billion, down from £46.4 billion in the same period in 2017/2018. It is the lowest rate of borrowing over this part of the year for 16 years. The continuous reduction in net borrowing has brought about a further reduction in net debt as a percentage of GDP. At the end of November 2018, public sector net debt (excluding both public sector banks and Bank of England) was £1606.5 billion (equivalent to 75.1% of GDP). This compares with 76.1% in November 2017.



UK FORECAST DETAIL

Prices, Wages, Interest Rates and Exchange Rate Forecast (Seasonally Adjusted)

	Inflation % ¹ (CPI)	Short Dated (5 Year) Interest Rates	3 Month Int. Rates	Nominal Exchange Rate (2005=100) ²	Real Exchange Rate ³	Real 3 Month Int. Rates % ⁴	Inflation (RPIX)	Real Short Dated Rate of Interest ⁵
2017	2.6	0.6	0.4	77.4	75.5	-1.6	3.8	-1.5
2018	2.5	1.5	0.6	77.4	75.8	-1.5	3.5	-0.5
2019	2.2	2.5	1.1	76.2	74.9	-1.0	2.9	0.5
2020	2.0	3.4	2.4	75.4	74.3	0.4	2.6	1.4
2021	2.0	2.9	3.1	75.5	74.9	1.0	2.5	0.9
2022	2.0	2.6	3.1	75.2	74.8	1.1	2.6	0.6
2017:1	2.2	0.6	0.3	76.8	75.0	-1.7	3.3	-1.5
2017:2	2.6	0.4	0.4	78.2	76.4	-1.5	3.8	-1.7
2017:3	2.7	0.6	0.3	76.7	74.5	-1.5	4.0	-1.5
2017:4	2.8	0.8	0.4	77.9	76.0	-1.7	4.1	-1.3
2018:1	2.5	1.0	0.5	79.2	78.0	-1.6	3.6	-1.0
2018:2	2.6	1.5	0.5	77.0	75.4	-1.7	3.6	-0.5
2018:3	2.5	1.8	0.8	77.1	75.4	-1.4	3.5	-0.2
2018:4	2.5	1.8	0.8	76.2	74.4	-1.4	3.4	-0.2
2019:1	2.2	2.5	0.8	76.6	75.4	-1.3	2.9	0.5
2019:2	2.2	2.5	1.0	76.5	75.4	-1.1	2.9	0.5
2019:3	2.2	2.5	1.0	75.9	74.4	-1.0	2.8	0.5
2019:4	2.2	2.5	1.5	75.7	74.3	-0.5	2.9	0.5
2020:1	2.1	3.0	2.1	75.5	74.3	0.1	2.7	1.0
2020:2	2.1	3.0	2.1	75.3	74.3	0.1	2.7	1.0
2020:3	2.0	3.8	2.0	75.6	74.4	0.0	2.5	1.8
2020:4	2.0	4.0	3.3	75.4	74.3	1.3	2.6	2.0
2021:1	1.9	3.0	3.2	75.2	74.4	1.2	2.4	1.0
2021:2	2.0	2.8	2.9	75.8	75.4	0.9	2.5	0.8
2021:3	2.0	2.8	3.0	76.0	75.3	0.9	2.5	0.8
2021:4	2.0	2.8	3.2	75.1	74.4	1.2	2.5	0.8
2022:1	1.9	2.7	3.2	75.7	75.3	1.1	2.4	0.7
2022:2	2.0	2.6	3.3	75.5	75.3	1.3	2.6	0.6
2022:3	2.0	2.5	2.9	74.9	74.3	0.9	2.6	0.5
2022:4	2.0	2.5	3.0	74.7	74.3	1.0	2.6	0.5

¹ Consumer's Expenditure Deflator

² Sterling Effective Exchange Rate Bank of England

³ Ratio of UK to other OECD consumer prices adjusted for nominal exchange rate

⁴ Treasury Bill Rate less one year forecast of inflation

⁵ Short Dated 5 Year Interest Rate less average of predicted 5 year ahead inflation rate



Labour Market and Supply Factors (Seasonally Adjusted)

	Average Earnings (1990=100) ¹	Wage Growth ²	Unemployment (New Basis) Percent ³	Millions	Real Wage Rate ⁴ (1990=100)
2017	259.1	2.9	2.2	0.8	141.7
2018	265.8	2.7	2.2	0.8	142.2
2019	272.3	2.4	2.1	0.8	142.5
2020	276.9	1.7	1.9	0.7	142.7
2021	283.4	2.4	1.9	0.7	142.3
2022	289.8	2.3	1.5	0.6	142.9
2017:1	258.1	2.3	0.8	142.2	190.2
2017:2	257.3	2.6	0.8	141.6	192.2
2017:3	260.2	3.1	0.8	142.7	194.0
2017:4	260.9	3.6	0.8	142.2	196.0
2018:1	264.6	2.9	0.8	142.8	196.1
2018:2	264.3	2.7	0.8	141.8	199.6
2018:3	267.0	2.6	0.8	142.9	201.3
2018:4	267.3	2.5	0.8	142.2	203.1
2019:1	269.7	2.0	0.7	142.3	203.0
2019:2	271.9	2.9	0.7	142.7	204.9
2019:3	272.8	2.2	0.7	142.9	206.7
2019:4	274.8	2.8	0.7	143.0	208.5
2020:1	275.3	2.1	0.7	142.3	208.4
2020:2	277.4	2.0	0.7	142.6	210.4
2020:3	277.1	1.6	0.7	142.3	212.2
2020:4	277.7	1.1	0.7	141.6	214.1
2021:1	282.5	2.6	0.7	143.3	214.0
2021:2	283.9	2.4	0.6	143.2	216.0
2021:3	283.6	2.4	0.6	142.8	217.9
2021:4	283.7	2.1	0.6	141.9	219.8
2022:1	288.1	2.0	0.5	143.3	219.7
2022:2	290.8	2.4	0.5	143.7	221.8
2022:3	289.7	2.2	0.5	143.0	223.7
2022:4	290.7	2.5	0.5	142.5	225.7

¹ Whole Economy

² Average Earnings

³ Wholly unemployed excluding school leavers as percentage of employed and unemployed, self employed and HM Forces

⁴ Wage rate deflated by CPI

Estimates and Projections of the Gross Domestic Product¹ (£ Million 1990 Prices)

	Expenditure Index	£ Million '90 prices	Non-Durable Consumption ²	Private Sector Gross Investment Expenditure ³	Public Authority Expenditure ⁴	Net Exports ⁵	AFC
2017	162.3	777336.9	443745.6	302292.1	198857.7	-65371.5	102187.0
2018	164.7	788702.9	452535.4	300001.6	200246.3	-62820.3	101237.1
2019	167.8	803486.7	458033.7	303844.4	200602.7	-55631.9	103388.8
2020	171.1	819157.6	466811.5	305454.3	201938.2	-49424.8	105622.7
2021	174.6	836277.7	476328.1	309328.2	203070.4	-44408.2	108042.3
2022	178.6	855233.2	486139.0	312409.7	204308.6	-36921.2	110703.2
2017/16	1.8		0.6	0.8	0.4	-0.7	0.6
2018/17	1.5		2.0	-0.7	0.7	-0.8	2.0
2019/18	1.9		1.2	1.3	0.2	2.1	1.2
2020/19	2.0		1.9	0.5	0.7	2.2	1.9
2021/20	2.1		2.0	1.3	0.6	2.3	2.0
2022/21	2.3		2.1	1.0	0.6	2.5	2.1
2017:1	161.5	193340.7	110460.5	76110.0	50838.0	-16948.9	27118.9
2017:2	161.9	193817.5	111360.7	74039.4	48893.4	-16008.3	24467.6
2017:3	162.6	194710.8	110910.0	75858.8	49324.8	-15656.7	25726.1
2017:4	163.3	195468.0	111014.4	76284.0	49801.5	-16757.6	24874.3
2018:1	163.6	195906.9	110726.8	75395.5	51361.5	-16549.5	25007.4
2018:2	164.3	196658.4	113112.9	76462.4	49463.3	-17119.9	25257.6
2018:3	165.0	197581.8	114100.5	74023.6	49577.5	-14658.4	25458.2
2018:4	165.8	198555.8	114595.2	74120.1	49844.0	-14492.5	25513.8
2019:1	166.7	199543.9	113052.0	76413.1	50526.0	-14820.6	25636.7
2019:2	167.3	200322.9	114121.4	76582.8	50009.7	-14624.9	25773.7
2019:3	168.2	201324.8	115127.6	74790.6	50056.5	-12733.9	25925.3
2019:4	169.0	202295.1	115732.7	76058.0	50010.4	-13452.6	26053.1
2020:1	169.8	203298.7	115618.0	76877.1	50860.0	-13866.3	26192.1
2020:2	170.7	204318.6	116339.1	76180.8	50335.5	-12197.7	26338.8
2020:3	171.4	205259.6	117061.9	76323.5	50315.1	-11966.6	26474.2
2020:4	172.3	206280.7	117792.5	76072.8	50427.6	-11394.1	26617.5
2021:1	173.2	207302.5	118163.2	77790.4	51177.9	-13066.7	26763.1
2021:2	174.0	208319.9	118775.4	77524.6	50636.9	-11709.9	26907.2
2021:3	175.2	209811.5	119388.5	76993.4	50637.7	-10095.0	27112.6
2021:4	176.1	210843.8	120000.9	77019.8	50617.9	-9536.7	27259.3
2022:1	177.0	211888.0	120614.5	78065.4	51486.4	-10870.2	27407.3
2022:2	177.9	212936.6	121228.6	78213.5	50964.1	-9913.9	27556.1
2022:3	179.3	214686.5	121841.6	77992.8	50934.7	-8286.7	27796.2
2022:4	180.2	215722.2	122454.3	78138.1	50923.4	-7850.4	27943.7

¹ GDP at factor cost. Expenditure measure; seasonally adjusted

² Consumers expenditure less expenditure on durables and housing

³ Private gross domestic capital formation plus household expenditure on durables and clothing plus private sector stock building

⁴ General government current and capital expenditure including stock building

⁵ Exports of goods and services less imports of goods and services


Financial Forecast

	PSBR/GDP % ¹	GDP ¹ (£bn)	PSBR (£bn) Financial Year	Debt Interest (£bn)	Current Account (£ bn)
2017	2.0	2047.3	39.4	79.9	-66.3
2018	1.4	2131.8	30.7	82.7	-60.3
2019	1.0	2219.8	21.8	87.5	-49.5
2020	0.2	2309.9	5.6	94.6	-39.7
2021	-0.3	2406.9	-6.7	98.0	-31.0
2022	-0.6	2513.2	-15.1	99.5	-17.9
2017:1	-2.9	507.9	-14.6	20.0	-15.7
2017:2	5.0	503.8	25.3	20.0	-20.5
2017:3	2.3	510.3	11.8	19.7	-15.3
2017:4	3.2	513.3	16.5	19.9	-14.8
2018:1	-2.7	520.0	-14.3	20.2	-13.4
2018:2	1.3	525.5	6.8	20.3	-22.2
2018:3	1.5	529.4	7.7	20.7	-13.5
2018:4	1.5	535.0	7.8	20.8	-11.3
2019:1	1.6	541.9	8.5	21.0	-10.8
2019:2	1.1	547.3	5.9	21.3	-18.4
2019:3	0.9	551.2	5.1	21.3	-10.6
2019:4	0.8	557.4	4.6	22.0	-9.6
2020:1	1.1	563.9	6.2	22.8	-9.4
2020:2	0.2	570.1	1.3	22.9	-14.7
2020:3	0.1	573.3	0.3	22.9	-9.4
2020:4	0.1	580.1	0.8	24.4	-6.2
2021:1	0.5	586.4	3.1	24.3	-8.1
2021:2	-0.1	592.9	-0.3	24.2	-13.9
2021:3	-0.3	598.0	-1.8	24.3	-6.1
2021:4	-0.4	604.8	-2.7	24.7	-2.9
2022:1	-0.3	611.1	-1.8	24.8	-4.1
2022:2	-0.2	618.7	-1.2	25.0	-10.9
2022:3	-0.6	624.5	-3.6	24.6	-3.0
2022:4	-0.9	631.7	-5.6	24.9	0.1

¹ GDP at market prices (Financial Year)

THE WORLD ECONOMY

US

Economic activity has remained robust. The quarter-to-quarter GDP growth was 0.85% in Q3, following a big expansion of over 1% in Q2. The growth was driven by strong domestic demand. The biggest positive contribution came from investment, rising 3.8% in Q3 after falling 0.125% in the previous quarter. Real consumption continued to grow strongly (0.87% in Q3, after 0.94% in Q2). Net exports subtracted 0.5 percentage points from Q3 growth, as exports fell (-1.2% after a rise of 2.3% in Q2) and imports rose sharply (2.3% in Q3, after -0.15% in Q2), probably reacting to recent tariff rises in the Trump tariff war.

The labour market continued to strengthen. The average unemployment rate for in Q4 was 3.8%, unchanged from Q2 and the lowest level since 1969 Q3. Job gains were strong with nonfarm payroll employment increasing by a further 312,000 in December. Strong labour market conditions generated a further increase in wages, with annual average hourly earnings rising by 2.8% in December (after 2.5% in November).

The economic data indicate a slower growth pace in Q4. The tax reform continued to have a positive effect on domestic demand, while the trade war with China may be affecting investment and activity adversely to some extent. Both service and manufacturing sectors grew weaker in December with the service business activity index at 54.4 (compared to 54.7 in November) and the manufacturing business index at 53.8 (compared to 55.3 in November), the lowest in 15 months.

At the December meeting, the FOMC increased the Fed funds target rate by 25 basis points, from 2.25% to 2.5%. The Fed's policy remains to achieve a gradual rise in interest rates, to be consistent with its 2% inflation objective.

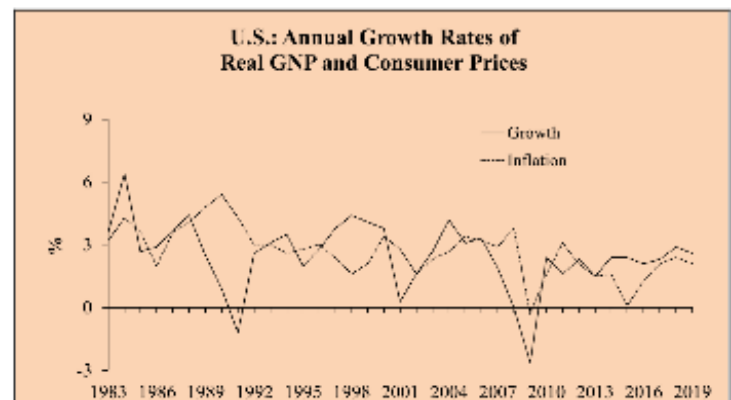
Japan

The economy contracted sharply in Q3 after a rebound in the previous quarter. This was very much a result of several natural disasters during the summer months. Real GDP fell 0.6% in Q3, after 0.8% growth in Q2. The contraction happened in many GDP expenditure components. Private consumption fell 0.2% after rising 0.7% in Q2. Private non-residential investment decreased -2.8% after rising 3.1% in Q2. Net trade subtracted 0.1 percentage points from growth in Q3, as a decrease in exports (-1.8% after 0.3% in Q2) dominated the drop in imports (-1.4% after 1.0% in Q2).

The recent data has signalled a return to growth in Q4. Manufacturing output expanded at the fastest rate since April, with the December PMI at 52.4, up from 52.2 in

November. The service sector also continued to expand, but at a slower pace. Its business activity index was 51.0 in December, compared to 52.3 in November.

The monetary policy stance continued to be accommodative. At the December meeting, the Bank of Japan decided to keep its policy unchanged with the short-term policy rate at -0.1%, and continued with Quantitative Easing. It continued to purchase government bonds to maintain the long-term interest rate on 10-year government bond yields at around zero percent. It pledged to keep interest rates extremely low for an extended period. It decided to increase Japanese government bonds holding by about 80 trillion yen a year. It would also increase holdings of exchange-traded funds by 6 trillion yen a year and Japan real estate investment trusts by 90 billion yen a year in order to lower the risk premia of asset prices.



US

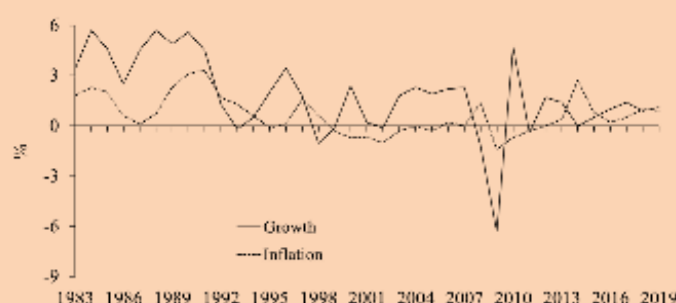
	2014	2015	2016	2017	2018	2019
Real GDP Growth (% p.a.)	2.4	2.4	1.6	2.2	2.9	2.6
Inflation (% p.a.)	1.6	0.1	1.3	2.1	2.4	2.1
Real Short Int. Rate	-0.1	-1.1	-1.6	-0.9	0.5	1.0
Nominal Short Int. Rate	0.0	0.2	0.5	1.4	2.6	3.0
Real Long Int. Rate	0.7	0.3	0.5	0.8	1.1	1.4
Nominal Long Int. Rate	2.2	2.2	2.5	2.8	3.2	3.4
Real Ex. Rate (2000=100) ¹	83.9	93.0	94.0	94.5	94.8	95.0
Nominal Ex. Rate ²	89.40	103.08	101.91	102.20	102.40	102.50

¹The real exchange rate is the domestic price level relative to the foreign price level converted into domestic currency. A rise in the index implies an appreciation of the real exchange rate.

² The series for the USA is a trade weighted index (1990=100)



Japan: Annual Growth Rates of Real GNP and Consumer Prices

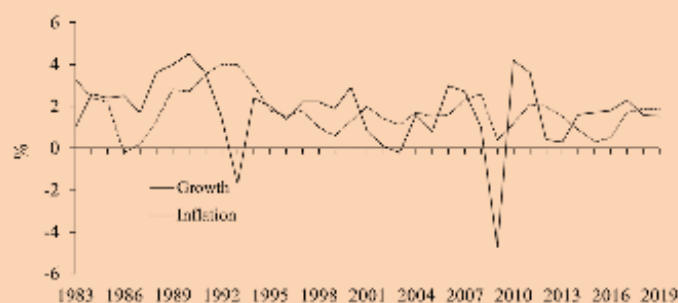


Japan

	2014	2015	2016	2017	2018	2019
Real GDP Growth (% p.a.)	-0.1	1.3	0.6	1.9	0.9	1.1
Inflation (% p.a.)	2.7	0.8	-0.1	0.5	1.0	0.9
Real Short Int. Rate	-0.6	0.1	-0.4	-0.8	-0.9	-1.2
Nominal Short Int. Rate	0.2	0.2	0.1	0.1	0.0	0.0
Real Long Int. Rate	-1.1	-0.5	-1.0	-1.1	-0.9	-1.2
Nominal Long Int. Rate	0.3	0.3	0.0	0.1	0.1	0.2
Real Ex. Rate (2000=100) ¹	59.8	56.0	58.4	58.3	58.1	58.4
Nominal Ex. Rate	106.7	121.11	108.61	112.18	114.10	112.00

¹The real exchange rate is the domestic price level relative to the foreign price level converted into domestic currency. A rise in the index implies an appreciation of the real exchange rate.

Germany: Annual Growth Rates of Real GNP and Consumer Prices



German

	2014	2015	2016	2017	2018	2019
Real GDP Growth (% p.a.)	1.6	1.7	1.9	2.2	1.6	1.5
Inflation (% p.a.)	0.9	0.3	0.5	1.8	1.9	1.9
Real Short Int. Rate	-0.2	-0.6	-2.0	-2.0	-2.2	-2.2
Nominal Short Int. Rate	0.1	-0.1	-0.3	-0.3	-0.3	-0.2
Real Long Int. Rate	-0.8	-0.9	-1.7	-1.5	-1.4	-1.1
Nominal Long Int. Rate	0.5	0.6	0.1	0.4	0.5	0.8
Real Ex. Rate (2000=100) ¹	99.9	94.7	95.0	94.3	94.9	95.1
Nominal Ex. Rate	0.76	0.90	0.90	0.88	0.85	0.86

¹The real exchange rate is the domestic price level relative to the foreign price level converted into domestic currency. A rise in the index implies an appreciation of the real exchange rate.

Germany

The economy shrank by 0.2% in Q3 after growth of 0.5% in Q2. This was the first decline in growth since 2015 Q1 and it was driven by weak domestic and foreign demand. Net trade subtracted 1.0 percentage point from the quarterly growth as exports declined by 0.9% (after +0.8% in Q2) and imports grew 1.3% (following 1.5% in Q2). In addition, private consumption fell by 0.3% after rising 0.3% in Q2. The only positive contribution came from investment, which rose 0.8% in Q3 after 0.5% in Q2.

The recent data and surveys signal a further weakening in economic growth in Q4. Monthly industrial production fell sharply by 4.7% in November (yoy) following a rise of 0.5% in October. Business confidence in the private sector has been in decline since September with the business climate index at 101 in December, down from 102 in November. New manufacturing orders fell 1% in November (after -0.2% in October).

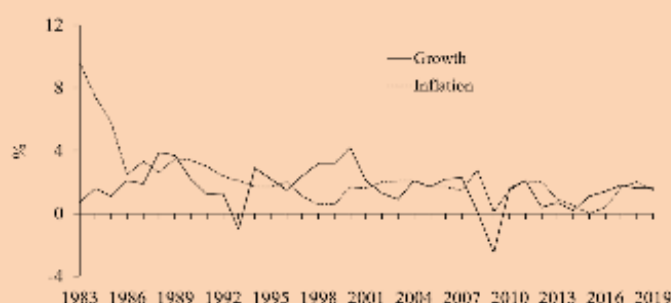
Despite the weak economic data, the labour market remained robust. The unemployment rate stood at the record low of 3.3% in November and October.

France

Economic growth continued recovered in Q3. Real GDP rose 0.4%, up from 0.2% in Q2. The growth was driven by a rebound in both domestic and external demand. Private consumption expanded 0.5% after falling 0.1% in Q2. Investment rose 0.8% following 0.9% growth in Q2. Net trade contributed 0.1 percentage points to the quarterly growth (compared with -0.2 percentage points in Q2), as export growth accelerated (0.7% compared with 0.1% in Q2) and import growth slowed (0.3% after 0.7% in Q2).

The economic outturn for Q4 appears unfavourable. Despite the expectations of a positive impact of fiscal measures such as tax cuts and increases in social benefits and of a robust labour market on consumer spending, consumers' confidence about their personal financial position seemed to worsen. The confidence index is on a downward trend, declining sharply to 87 in December from 91 in November and staying below the long run average of 100 for 8 months. Manufacturing output for the three months of September to November fell 1.4% compared to the same period of 2017 and as a whole industrial production output fell by -1.2%. Business investment growth is expected to slow down with the business confidence index decreasing to 104 in December from 105 in November.

France: Annual Growth Rates of Real GNP and Consumer Prices

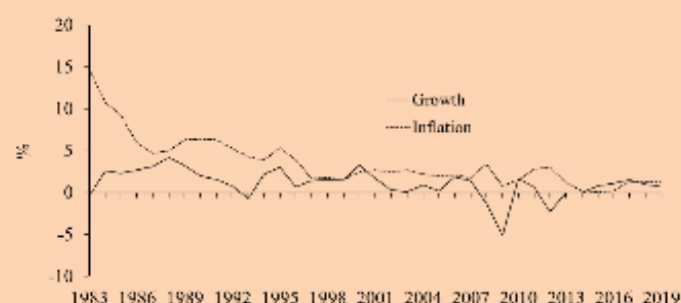


France

	2014	2015	2016	2017	2018	2019
Real GDP Growth (% p.a.)	0.2	1.0	1.1	2.0	1.9	1.7
Inflation (% p.a.)	0.5	0.0	0.2	1.0	2.0	1.5
Real Short Int. Rate	0.1	-0.2	-1.3	-1.6	-1.8	-1.7
Nominal Short Int. Rate	0.1	-0.1	-0.3	-0.3	-0.3	-0.1
Real Long Int. Rate	-0.5	-0.7	-0.9	-0.9	-0.6	-0.5
Nominal Long Int. Rate	0.5	1.0	0.7	0.8	0.9	1.1
Real Ex. Rate (2000=100) ¹	100.8	96.2	96.0	95.3	95.1	95.5
Nominal Ex. Rate ²	0.76	0.90	0.90	0.88	0.85	0.86

¹The real exchange rate is the domestic price level relative to the foreign price level converted into domestic currency. A rise in the index implies an appreciation of the real exchange rate.

Italy: Annual Growth Rates of Real GNP and Consumer Prices



Italy

	2014	2015	2016	2017	2018	2019
Real GDP Growth (% p.a.)	-0.3	1.0	0.9	1.5	1.4	1.1
Inflation (% p.a.)	0.2	0.1	-0.1	1.2	1.2	1.3
Real Short Int. Rate	0.0	0.0	-1.5	-1.4	-1.6	-1.6
Nominal Short Int. Rate	0.1	-0.1	-0.3	-0.3	-0.3	-0.1
Real Long Int. Rate	-0.5	0.4	0.1	0.3	2.3	2.2
Nominal Long Int. Rate	0.5	1.6	1.7	1.9	3.6	3.7
Real Ex. Rate (2000=100) ¹	107.5	102.1	102.0	101.2	101.1	101.1
Nominal Ex. Rate ²	0.76	0.90	0.90	0.88	0.85	0.86

¹The real exchange rate is the domestic price level relative to the foreign price level converted into domestic currency. A rise in the index implies an appreciation of the real exchange rate.

Italy

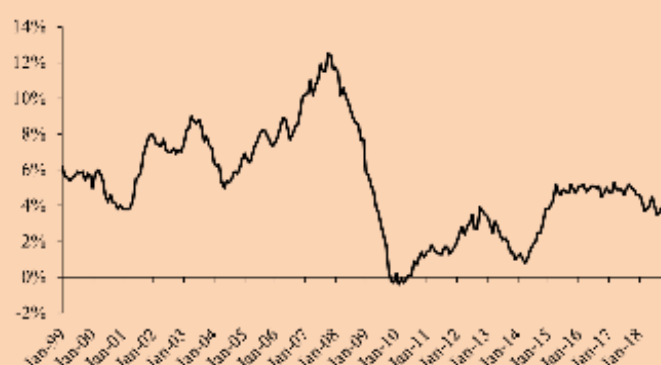
The economy has stagnated after over three years of moderate growth. Real GDP remained unchanged, after 0.2% growth in Q2. The only positive contribution came from external demand, while weak domestic demand subtracted from growth. Private consumption fell 0.1% (after rising 0.1% in Q2) and investment decreased sharply by 1.1% (after rising 2.9% in Q2).

For Q4 the economic outturn appears to have been quite negative. Manufacturing sector output declined in the whole three months of Q4. Its PMI was 49.2 in December, following 48.6 in November. In December the consumer confidence index was 113.1 (down from 114.7 in November) and the business confidence climate index was 99.8 (down from 101 in November). This weak economic performance certainly would have put a lot of pressure on the fiscal stance.

Euro-zone monetary policy

The Harmonised Index of Consumer Prices' inflation rate was 2.0% in November, down from 2.2% in October. Although a tight labour market has pushed the wage growth up, inflation expectations have fallen below the 2% target in response to the sharp decline in the energy prices. The European Central Bank decided to keep its accommodative policy by keeping its interest rates unchanged and intending to reinvest all principal payments from maturing securities purchased under the asset purchases scheme (which ended in December 2018) for an extended period in order to maintain favourable liquidity conditions.

Eurozone annual M3 Growth



WORLD FORECAST DETAIL

Growth Of Real GNP

	2015	2016	2017	2018	2019	2020
U.S.A.	2.9	1.6	2.2	2.9	2.6	2.5
U.K.	2.3	1.9	1.8	1.5	1.9	2.0
Japan	1.3	0.6	1.9	0.9	1.1	1.2
Germany	1.7	1.9	2.2	1.6	1.5	2.0
France	1.0	1.1	2.0	1.9	1.7	1.9
Italy	1.0	0.9	1.5	1.4	1.1	1.2

Growth Of Consumer Prices

	2015	2016	2017	2018	2019	2020
U.S.A.	0.1	1.3	2.1	2.4	2.1	2.0
U.K.	0.2	1.1	2.6	2.5	2.0	2.0
Japan	0.8	-0.1	0.5	1.0	0.9	1.2
Germany	0.3	0.5	1.8	1.9	1.9	1.9
France	0.0	0.2	1.0	2.0	1.5	1.6
Italy	0.1	-0.1	1.2	1.2	1.3	1.5

Real Short-Term Interest Rates

	2015	2016	2017	2018	2019	2020
U.S.A.	-1.1	-1.6	-0.9	0.5	1.0	0.8
U.K.	0.0	-1.2	-1.5	-1.0	0.4	1.0
Japan	0.1	-0.4	-0.8	-0.9	-1.2	-1.1
Germany	-0.6	-2.0	-2.0	-2.2	-2.1	-1.9
France	-0.2	-1.3	-1.6	-1.8	-1.7	-1.6
Italy	0.0	-1.5	-1.4	-1.6	-1.6	-1.5

Nominal Short-Term Interest Rates

	2015	2016	2017	2018	2019	2020
U.S.A.	0.2	0.5	1.4	2.6	3.0	2.8
U.K.	0.6	0.5	0.4	0.6	1.1	2.4
Japan	0.2	0.1	0.1	0.0	0.0	0.1
Germany	-0.1	-0.3	-0.3	-0.3	-0.2	0.0
France	-0.1	-0.3	-0.3	-0.3	-0.1	0.0
Italy	-0.1	-0.3	-0.3	-0.3	-0.1	0.0

Real Long-Term Interest Rates

	2015	2016	2017	2018	2019	2020
U.S.A.	0.3	0.5	0.8	1.1	1.4	1.8
U.K.	-0.7	-1.5	-1.5	-0.5	0.5	1.4
Japan	-0.5	-1.0	-1.1	-0.9	-1.2	-1.1
Germany	-0.9	-1.7	-1.5	-1.4	-1.1	-0.9
France	-0.7	-0.9	-0.9	-0.6	-0.5	-0.1
Italy	0.4	0.1	0.3	2.3	2.2	1.3

Nominal Long-Term Interest Rates

	2015	2016	2017	2018	2019	2020
U.S.A.	2.2	2.5	2.8	3.2	3.4	3.8
U.K.	1.3	0.7	0.6	1.5	2.5	3.4
Japan	0.3	0.0	0.1	0.1	0.2	0.1
Germany	0.6	0.1	0.4	0.5	0.8	1.0
France	1.0	0.7	0.8	0.9	1.1	1.5
Italy	1.6	1.7	1.9	3.6	3.7	2.7

Index Of Real Exchange Rate(2000=100)¹

	2015	2016	2017	2018	2019	2020
U.S.A.	93.0	94.0	94.5	94.8	95.0	95.2
U.K.	92.2	81.4	75.5	75.8	74.9	74.3
Japan	56.0	58.4	58.3	58.1	58.4	58.3
Germany	94.7	95.0	94.3	94.9	95.1	95.0
France	96.2	96.0	95.3	95.1	95.5	95.4
Italy	102.1	102.0	101.2	101.1	101.1	101.0

¹ The real exchange rate is the domestic price level relative to the foreign price level converted into domestic currency. A rise in the index implies an appreciation in the real exchange rate.

Nominal Exchange Rate

(Number of Units of Local Currency To \$1)

	2015	2016	2017	2018	2019	2020
U.S.A. ¹	103.08	101.91	102.20	102.40	102.50	102.50
U.K.	1.53	1.35	1.30	1.29	1.30	1.32
Japan	121.11	108.61	112.18	114.10	112.00	112.50
Eurozone	0.90	0.90	0.88	0.85	0.86	0.85

¹ The series for the USA is a trade weighted index (1990=100); the series for the UK is \$ per £

* Forecasts based on the Liverpool World Model

EMERGING MARKETS

Anupam Rastogi

India

India remained the world's fastest growing large economy but its year-to-year expansion slowed to 7.1% in the third quarter of 2018 compared with 8.2% in the quarter before that. We expect GDP growth to be 7.6% in the current fiscal year as it is supported by pick up in capital goods sector. In the next fiscal year we expect GDP growth to be around 7.5%.

The Reserve Bank of India's monetary policy committee kept its repurchase rate steady at 6.5% in December after raising it twice in 2018. Inflation was below the RBI's medium-term target of 4% for a fourth straight month and the first time, since July 2017, it was below 3%. This gives us hope that the RBI's Monetary Policy Committee will cut 25bp in February/April 2019. The government appointed Shaktikanta Das, a career bureaucrat, as India's new central bank governor. He pledged to uphold the independence of the Reserve Bank of India two days after his predecessor, Dr Urjit Patel, quit after months of tensions with the government. He is expected to reset the relationship between the RBI and the government and handle better the working relationship between the RBI and the government.

India's trade deficit narrowed to \$16.7 billion, benefitting from a sharp fall in crude oil prices and only 4.3% growth in imports. Though the growth in India's merchandise exports slumped to 0.8% in November from 17.9% in October.

With oil prices falling by over 30% since October, India's external outlook is expected to improve.

The current account deficit is projected to be 2.5% of GDP, which is easy to finance. Before the crash in oil prices, the INR fell below the 74-barrier and reached an all-time low of 74.39 rupees to a dollar. However, the rupee has clawed back some ground against the US dollar as fears of a glut in the supply of oil have sent Crude and Brent prices tumbling. The rupee has been hovering around the 70-mark and is unlikely to depreciate much in 2019.

Companies and investors alike are betting that India — once seen as bureaucratically sclerotic and unpredictable — is turning into a destination that offers opportunity driven by hundreds of millions of consumers. Other deal drivers include industry consolidation, a better bankruptcy system and a growing willingness among owners of large family businesses to cash out.

In all, mergers and acquisitions targeting Indian companies totalled \$93.7 billion this year — up 52% from a year earlier — which is the highest tally since the economy started opening up in the 1990s, according to Dealogic. The value of overseas purchases in India has overtaken those in

India: BSE Sensitive



China. Acquirers spent \$39.5 billion in India versus \$32.8 billion in China, where growth is slowing and a trade battle with the U.S. is underway.

The S&P BSE Sensex index was up 4.2% in 2018, making it one of the few benchmarks in the world in positive territory.

Prime Minister Narendra Modi is facing headwinds. His party, the Bharatiya Janata Party, had electoral defeat in three major Indian states. The losses have made people to say that voters may throw Mr. Modi out of office in the General Elections due in May 2019. But it is too early to write off Mr. Modi's prospects. He remains a popular figure and a powerful orator, and his party is India's best-funded and best-organized. Yet it's clear Mr. Modi's tax-and-spend model of development is failing to enthrone voters. The main issue is that his government built plenty of roads, houses and toilets, and provided villages with electricity, cooking gas and internet connections, but they fell short in boosting incomes of farmers. Crop prices have risen slowly over the past four years in a part of the country that depends on agriculture and few non-farm jobs have materialized.

Modi still cultivates his image as a diligent and incorruptible leader who strives to make India a prouder, more powerful country. We have to wait and watch to see if voters would get swayed by this or not.

	17-18	18-19	19-20	20-21	21-22
GDP (%p.a.)	6.7	7.6	7.5	8.0	8.0
WPI (%p.a.)	3.5	4.5	4.7	4.2	4.0
Current A/c(US\$ bill.)	-26.0	-70.0	-64.0	-64.0	-60.0
Rs./\$(nom.)	65.0	70.2	71.5	72.5	73.5



China

China's manufacturing sector unexpectedly fell to 49.4 in December from 50.0 in November. This is the lowest level in nearly three years and pointing to gathering headwinds for the world's second-largest economy. Besides this there are other indicators showing that the Chinese economy is struggling with anaemic demand at home, global slowdown and the protracted trade fight with the U.S. The International Monetary Fund (IMF) expects China's GDP growth to weaken from 6.6% in 2018 to 6.2% in 2019. Our forecast also remains unchanged at 6.5% for 2018 and 6% for 2019. Chinese officials have said the economy would hit the official growth target of around 6.5% in 2018.

While it's easy to blame the trade tussle with the U.S. for the slowdown in the economy, the deceleration so far is mostly domestic driven, with infrastructure spending contracting sharply and consumer spending slowing down.

China's producer price index (PPI) grew 2.7% year-on-year last month, slowing from 3.3% in October. The People's Bank of China has moved into high gear and easing monetary policy to boost economic growth. The bank has announced that enterprises with bank credit lines less than 10 million yuan (\$1.5 million) now are seen as small and micro enterprises, and bank lending to these companies, if reaching certain amount, can make lenders eligible for lower reserve requirements. Previously, only loans to companies with less than 5 million-yuan credit lines had been seen as small and micro loans.

Overall, Chinese exports in November slowed unexpectedly as demand weakened in most markets, except in the U.S. Chinese exports to emerging and developed economies also slowed across the board in November, with growth slipping by more than half from October. Total exports grew 5.4% from a year earlier — the slowest pace in eight months — decelerating from a 15.6% increase in October.

China's imports expanded 3% year over year in November, down from a 21.4% increase in the previous month. We believe that slowdown is going to happen, regardless of the outcome of the trade talks because of structural changes in the economy.

One dollar is about 6.8658 yuan, after a 5.2% fall this year in renminbi. We expect renminbi to hover around 7 in 2019. However, China will probably continue to prevent the yuan exchange rate from falling further as a prerequisite for a trade deal with the United States before the March 1 deadline.

China's foreign-exchange reserves are likely to shrink moderately, from \$3.04 trillion at the end of 2018 to \$2.89 trillion at the end of 2019. China's holdings of U.S. government bonds dipped again in October, to \$1.138 trillion. That is the fifth straight month of decline and the lowest total since May 2017.

China: SSE Composite Index



Chinese stocks have proved the worst performers among major world markets in 2018. The benchmark Shanghai Composite Index was down 24.6% in 2018.

Since President Trump and Chinese President Xi Jinping met in Buenos Aires on December 1, Beijing has pledged to cut tariffs, buy more U.S. goods and services, ease restrictions on foreign companies operating in China and further open sectors for foreign investment. The 90-day talks are due to wrap up on March 1. If no agreement is reached, the U.S. said it will boost tariffs on \$200 billion of Chinese goods to 25% from the current 10%, potentially having a big impact on electronics, furniture, machinery and other U.S. industries that rely on Chinese imports. It could also deepen a slowdown in China's economy, which would have broad consequences for global growth. Beijing has rolled out a number of trade initiatives in the last one month. They include a temporary suspension in tariffs on U.S.-made autos, purchases of U.S. soybeans despite Chinese tariffs on U.S. agriculture, and pledges to revamp industrial policies in China that disadvantage foreign firms.

But, the arrest in Canada of Meng Wanzhou, chief financial officer of Chinese telecommunications giant Huawei, and the resulting response by Beijing suggests that a near-term détente between the world's two biggest economies is unlikely. At the heart of all this is structural changes on the fundamental issue of non-economic technology transfer and China's 'Made in China 2025' plan. President Xi has declared that no one is in the position to dictate to the Chinese people what should and should not be done. This public posture provides a stark counterpoint to reports that China has offered to scale back the 'Made in China 2025' plan which is all set to dominate high-tech industries in decades to come. We are all set to witness a new Cold War. The real goal is to prevent an adversary from gaining the edge at a pivotal moment when the technologies that will shape the 21st century are up for grabs, from 5G networks to artificial intelligence and quantum computing. What happens next in the Huawei affair could reverberate through the global economy. If the U.S. government decides to take down China's technology standard-bearer, it could put at risk a swath of U.S. business in China. Huawei's technical expertise, combined with its ties to China's blue-chip firms and government, could let it engineer another surprise in what many see as the critical backbone of future technology.

	17	18	19	20	21
GDP (%p.a.)	6.9	6.5	6.0	5.6	5.4
Inflation (%p.a.)	1.6	2.2	2.3	2.3	2.0
Trade Balance(US\$ bill.)	400	300	300	300	260
Rmb/\$(nom.)	6.6	6.8	7.0	7.1	7.1

South Korea

South Korea's economy grew only 0.6% in the third quarter of 2018 and may be able to post 2.6% growth for the full year. We assume that the last quarter figures come out to be positive. South Korea's inflation rate in December slowed to 1.3% on year, the weakest in five months, to end 2018 at an annualized rate of 1.5%. The inflation remained below the 2% annual target for the third straight year. Prices remained subdued throughout 2018 on weak domestic demand amid growing concerns over the country's economic growth and dismal job market. As oil prices are likely to remain soft, inflation would not exceed 1.7% in 2019.

Exports fell 1.2% from a year earlier to \$48.5 billion in December. Imports rose 0.9% from a year earlier to \$43.9 billion, creating a trade surplus of \$4.6 billion.

For the whole year, exports gained 5.5% in 2018 — much slower than a 15.8% increase in 2017.

The country's exports of refined oil and petrochemicals have also recently been hit by declining crude prices. The ongoing trade dispute between the U.S. and China — the top trading partners of South Korea — is weighing on Korean exports.

South Korean exports surpassed the annual \$600-billion mark for the first time this year, allowing the economy to become the world's seventh country to touch exports of more than \$600 billion. The country exported \$605.5 billion while importing \$535 billion for the whole of 2018. South Korea shares this distinction with the United States, Germany, China, Japan, the Netherlands and France.

The South Korean parliament ratified a revised free-trade agreement with the U.S., the first such pact the Trump administration has successfully renegotiated. The approval meant that South Korean lawmakers backed down from their earlier demand that their country be exempt, in the event President Trump follows through on his threat to impose global auto tariffs in the name of national security. Mr. Trump had said that the original 2012 trade pact was unfair to the U.S. He has praised its revision as a "great" deal. Under the revised terms, Seoul agreed to double the cap on the number of vehicles each U.S. auto maker can sell annually in South Korea from 25,000 to 50,000 for cars that meet U.S. safety rules, not Korean ones. The new deal also let the U.S. keep a 25% tariff on Korean pickup trucks until 2041 — two decades longer than set by the original agreement.

Korea: Composite Index



Taiwan: Weighted TAIEX Price Index



	17	18	19	20	21
GDP (%p.a.)	3.1	2.6	2.8	2.9	2.7
Inflation (%p.a.)	1.9	1.5	1.7	1.7	1.7
Current A/c(US\$ bill.)	88.0	86.0	80.0	78.0	70.0
Won/\$(nom.)	1100	1130	1150	1150	1160

Taiwan

Taiwan's biggest economic challenges in 2019 are the U.S.-China trade war, financial market volatility, and geopolitical risks. Taiwan's economic growth is tapering off, and these three risk factors could lead to a potential economic downturn. In 2018, the economy grew 2.6% and in 2019, the economy is expected to grow by around 2.2%.

Inflation has been low at 0.31% in November from 1.17% in October. Taiwan's central bank left policy rate unchanged in its last meeting held in December. The central bank held its benchmark discount rate at 1.375%, where it has stood since June 2016. As the economy will be weaker in 2019, we expect the central bank to maintain a loose monetary policy to support the economy. In 2018 core inflation was 1.2% and is unlikely to remain around this in 2019 as well.

Taiwan's exports have been bolstered by global demand for electronics in the last quarter of 2018, but the trade sector will get affected by growing trade protectionism and tensions in 2019.

The U.S. dollar rose almost 3% against the Taiwan dollar in 2018, as successive interest rate hikes by the U.S. Federal Reserve led many investors to park their funds in



US-denominated assets. The Taiwan dollar was relatively stable against the U.S. dollar compared with other currencies in 2018.

The leaders of China and Taiwan brawled over the prospects of unification, showing the decades-old split remains potentially volatile under intensifying pressure from Chinese President Xi Jinping to change the status quo. It seems that the Chinese president wants to resolve the 70-year split during his tenure. In a tightly calibrated 33-minute speech, meant as an address to Taiwan, Chinese President Xi Jinping said differences in political systems can't be used as an excuse to resist unification. He promised Taiwanese people a peaceful and prosperous future with the mainland while suggesting that Beijing's patience would wear thin if its overtures fail. He said unification between China and Taiwan is inevitable and that Beijing prefers peaceful means for achieving that goal, and military measures remain an option.

His remarks were a direct response to Taiwan President Tsai Ing-wen, who in her New Year's Day address said that the island's people want to preserve their own political system. She rejected Mr. Xi offer, saying Taiwanese voters won't go for the proposal, known as "one country, two systems." The framework would place the island under China's rule with limited autonomy, as has been done in Hong Kong.

	17	18	19	20	21
GDP (%p.a.)	2.6	2.6	2.2	2.1	2.1
Inflation (%p.a.)	0.6	1.2	1.2	1.2	1.0
Current A/c(US\$ bill.)	68.0	68.0	70.0	71.0	70.0
NTS/S(nom.)	31.0	29.8	31.0	31.0	31.5

Brazil

The expected rebound of the Brazilian economy did not happen in 2018 and it grew only an estimated 1% in the year as a whole and is forecast to expand 3% this year. But Brazilians are optimistic about the economy. An opinion poll suggests that 65% of Brazilians are optimistic about the economy after the presidential election.

Brazil's inflation rate — as measured by the IPCA index — eased to 4.05% in the 12 months through November compared to 4.56% recorded in October. The country's central bank is targeting a 4.5% year-end rate for 2018 and 4.25% in 2019, plus or minus 1.5 percentage points. In their December meeting, the bank's nine-member monetary policy committee, known as Copom, kept the benchmark Selic rate at 6.50%. The new central bank governor is Roberto Campos Neto who is a University of California, Los Angeles trained economist and former senior executive of Santander Bank Brazil. We expect the Selic rate to be left unchanged for a long time as inflationary expectations are low and price rises are well within the central bank's target range.

Brazil, under the new President Jair Bolsonaro, is expected to lead the change which shall boost sluggish growth, while signalling plans to cut the deficit in part by scaling back Brazil's pension system. Mr. Bolsonaro plans to align Brazil more closely with developed nations and particularly the U.S., shifting South America further to the right after decades of mostly leftist rule.

Soon after being sworn in as president on January 1, he has issued many presidential decrees that include a cut to a planned increase in the minimum wage, a money-saving reduction in the number of government ministries and a victory for the country's powerful agricultural sector. His administration's biggest challenge will be attacking Brazil's generous pension system. Mr. Bolsonaro's party doesn't have enough votes on its own to get laws approved in either house of Congress, so his government will have to seek support from other parties. Efforts by previous presidents to reduce pension spending have met resistance from unions, legislators and the judiciary.

Lot of optimism is pinned on two of his appointees. First is the new justice minister, Sérgio Moro. He is supposed to deal with corruption and crime — the two maladies which badly affect the Brazilian society at present. As a judge, he led the Lava Jato (Car Wash) investigations into political corruption over the past four years. He was responsible for the jailing of Luiz Inácio Lula da Silva, a former president from the left-wing Workers' Party.

The second appointee is Paulo Guedes. He is a University of Chicago trained economist and will lead a ministry that will absorb those of finance, planning and industry. Mr. Guedes's support for deregulation, privatization, lower barriers to international trade and, above all, reform of Brazil's unaffordable pension system, could provide a tonic that the economy has long needed. He has assembled a team of market-oriented economists and is expected to push for a law that would give the central bank formal independence. But his market oriented agenda may get stunted as Mr. Bolsonaro's Social Liberal Party holds less than a tenth of the seats in the Congress. The president has shown a preference dealing with congressional caucuses, such as those representing the so-called bullet, beef and Bible (gun, ranching and religion) interests. Since the election, he has spent more time with friendly groups, like those representing pastors and police, than with parties. He hopes to assemble case-by-case coalitions in congress to pass legislation. Congressmen will bow to popular pressure, he believes. He believes that he has the support of the public and congress will follow.

	17	18	19	20	21
GDP (%p.a.)	1.0	1.0	3.0	3.5	3.5
Inflation (%p.a.)	3.0	4.4	4.5	4.2	4.5
Current A/c(US\$ bill.)	4.0	-18.0	-16.0	-16.0	-16.0
Real/S(nom.)	3.2	3.8	3.7	3.6	3.8

Other Emerging Markets

Hong Kong: FT-Actuaries



Indonesia: Jakarta Composite



**Malaysia: FT-Actuaries
(US\$ Index)**



Thailand: Composite Index



Singapore: Straits Times Index



Philippines: Manila Composite



COMMODITY MARKETS

Commodity Price Index (Dollar)
(Economist, 2000=100)



Oil Price: North Sea Brent (in Dollars)



Commodity Price Index (Sterling)
(Economist, 2000=100)



Gold Price (in Dollars)



Commodity Price Index (Euro)
(Economist)



THE EFFECTS OF BREXIT ON THE UK ECONOMY

Patrick Minford

I was astonished during late 2015 to discover that most economists in the UK favoured staying in the EU on the basis of what appeared to be neo-protectionist arguments derived from recent 'gravity-related' trade thinking. In late additions to the second edition of my book 'Should the UK leave the EU?' (Minford et al, 2015) I pointed out that the gravity modelling was of a partial equilibrium nature and that attempts hitherto made to turn it into general equilibrium were misconceived. It soon became apparent that my professional colleagues were not going to take any notice of these points; and indeed the Treasury economists promptly enlisted help from the LSE's gravity trade group in developing the gravity-based case for retaining existing trade links with the EU regardless of the costs of its well-known protectionism. In the same vein they disregarded the effects of both EU regulation and uncontrolled EU unskilled immigration. Accordingly I felt compelled to enter the EU referendum debate and with the help of friends and colleagues founded Economists for Brexit, which after the referendum was renamed and expanded as Economists for Free Trade; the aim of this group has been to explain the economic arguments for leaving the EU. In this paper I set out these arguments and the modelling and facts from which they are derived. I also relate them to the ongoing debate in the UK media and Parliament.

I begin in section I with an account of my and coauthors' modelling work on trade and my comments on the various rival approaches. I then go on in section II to set out the quantitative analysis we reached on Brexit, using these tools and the policy assumptions from available data; and contrast it with the equivalent work of others. I conclude in a brief section III with our estimates of the net gains or losses from various options that have been the subject of negotiations with the EU.

I. Trade modelling:

Gravity Models

During the referendum debate and since, the Remain side has relied on a 'consensus' of trade economists in favour of the 'gravity model'. The Treasury's case against Brexit was based on this, as has been the work at the London School of Economics (LSE) on which the Treasury relied for much advice (Breinlich et al, 2016).

A gravity model is in principle a full model of the economy open to international trade, investment and borrowing. It (e.g. Costinot and Rodriguez-Clare, 2014) regards trade as an outcrop of internal trade, the only difference being that it crosses borders. Otherwise trade grows naturally due to the specialisation and division of labour within neighbouring markets. Viewed through the lens of the gravity model, a customs union merely makes official what is already a fact of neighbourly inter-trade. Other sorts of trade, with more

distant markets, grow analogously but more weakly, the greater the distance; size of distant markets may make up for their distance to some extent, because they are a 'neighbourhood' that naturally leads to inter-trade. 'Gravity' in trade creation can be thought of as a function of distance and size. In this view of trade, it makes no sense to put obstacles in the way of trade with close neighbours, such as the EU, in the hope of boosting trade with distant markets via new trade agreements that lower trade costs. The disruption from the former will reduce welfare while the gains from the latter will be small, simply because the reduced trade costs will have little effect in switching demand from existing products in the presence of weak and imperfect competition.

Under this model trade is determined largely by the forces of demand, from neighbours wanting imports and from others modified by the factor of distance - due to transport costs and border costs; competition is rather limited, highly 'imperfect', and prices are set by producers as a mark-up on costs, so they move rather little. Once demand has determined trade and the production to meet it, foreign direct investment (FDI) and associated innovation follow it, boosting productivity. In short, while supply is important in this gravity approach, supply is largely determined by the forces of demand.

Because it is hard to break into new and distant markets it makes sense in this approach to support existing markets. Hence leaving the EU will damage existing markets' demand, so reducing trade and so reducing supply and productivity via falling FDI and innovation. Reducing trade barriers with the rest of the world will only weakly substitute for this loss of demand by stimulating more demand there.

Even though the EU protects its markets via trade barriers, this on the gravity view is good for the UK because it raises demand for our exports within the EU. Hence this school of thought is in favour of EU protectionism - it could be called 'neo-protectionist'. In general, free trade, according to the gravity approach, is something that must be evaluated case by case on the basis of its effects on demand for UK products and so the supply side of the economy.

Proponents of this gravity approach claim that it is supported by the 'facts' - consisting of many estimated relationships between exports and the GDP of the demanding countries, adjusted for distance. However, as already explained, we need to allow for a possible problem: that the rival classical model also generates these relationships. Indeed it has routinely been thought by proponents of this rival model that such gravity equations, first estimated by Tinbergen (1962) and well known since, would be implied by the model.



The Classical Model

This classical model was developed by the great trade theorists of the past two centuries - starting with Ricardo (1817) - and pursued in much empirical work based on it. The fact that these ideas come from a long tradition of thinking does not of course mean that they are thereby wrong because 'old'. We have also witnessed an earlier major reversal of classical thought, the Keynesian Revolution, which has now been largely ditched in favour of a return to classical principles.

The classical model assumes high competition across world markets, with world prices being the same across the world subject to transport costs and trade barriers; there is free entry into all industries so that prices equal average costs. Capital flows freely across borders in the modern world version, but each country has largely fixed supplies of other factors, namely unskilled labour, skilled labour and land. In this model, supply forces such as the supply factors and their productivity determine the size of a country's different sectors. The resulting income is then spent according to home demands and the surplus of supply over demand is then exported, the deficit imported in each sector. The model is silent on the allocation of demand to imports and home goods and on the allocation of exports to different foreign markets. However, it would be normal to add on some such allocative model of demand on top of the basic structure.

Thus, it can be seen that the causal structure of the classical model is quite different from that of gravity thinking. In the classical model supply determines the essential structure of trade; demand adjusts to be consistent with this. In the gravity approach demand determines the structure of trade and in turn forces supply to adjust to this.

How Do Gravity Modellers Implement Their Model?

You might think from this account of the gravity approach that you would expect to see - at the Treasury and at the LSE - a full computable general equilibrium (CGE) model of the UK's economy, trade and foreign investment, complete with final demands, markets for labour and capital, and market-clearing, including balance of payments equilibrium. But this is not what you will find. Instead, there will be some equations for bilateral trade in a lot of different goods with different countries in which GDP at home and in foreign countries figure together with relative prices; then another lot of equations for different countries relating foreign direct investment (FDI) to trade; then yet another lot of equations for UK industries relating productivity to FDI. The 'model' generates results by computing what under the first set of equations a trade regime change would do to trade; then this is 'fed' into the second set of equations relating FDI to total trade; finally the FDI effect is fed into the last set of equations relating

FDI to productivity. The resulting estimate of the productivity effect of the trade regime change is then put into a model of the economy. This procedure can be found in the Treasury's long-term assessment of the effects of Brexit (HMTreasury 2016). The LSE pursues a broadly similar methodology.

What we have is one set of empirical associations between trade and trade regimes; another set of associations between trade and FDI; then another set of associations between FDI and productivity. Only at the last stage when all this has been computed from these associations is a model brought in, where productivity is inputted into a standard 'macro' model in which the origins of trade and its interactions around the economy are not included. While all the empirical associations are based on data, they do not tell us what the causal origins of these associations are. There could be reverse causation (FDI could cause trade or productivity cause FDI; trade regimes could have been caused by closer trade), or simultaneous causation by a third factor (better policies could have led simultaneously to more trade, more FDI and more productivity). Association as is well known does not imply causation.

There is therefore a serious question of identification, that is interpretation of what causal processes are driving these associations. One would like the gravity modellers to write out a complete system of causal equations that they believe and set them side by side with a rival system such as the classical model. Then we could check which of these two systems comes closest to implying all these associations we observe - more precisely since this debate is about Brexit, implying the associations we find for specifically UK trade and the UK economy, i.e. the 'UK trade facts'.

But there neither was nor is in existence at the Treasury (see appendices to HM Treasury, 2016) and the LSE (see chapter 2 of Breinlich et al, 2016) any such complete gravity trade model linking all goods, labour, capital and land markets into one (UK) 'economy' linked to the rest of the world. Nor by implication has anyone in either place asked whether such a model would fit the UK trade facts; it simply has not occurred to them to build the model or to ask it this question. In some such associations, GDP and even prices are substituted out in favour of trade shocks, whether from trade policy or world developments such as globalisation, with which an average 'elasticity' is calculated for trade- this is recommended by Costinot and Rodriguez-Clare (2014) as a shortcut to achieving a general equilibrium model in reduced (i.e. solved-out) form. However, while this would work if the elasticity were the same for all such shocks, we know it cannot be so, from the workings of full theoretical trade models. Each shock will have its own reduced form relationship with the endogenous variables of the model. Hence to treat these as one unique relationship is plainly a mis-specification of the reduced form model for policy use; this is in no sense a proper general equilibrium model or a solution of it.

To make some progress on these issues, we spent a year doing work of this sort on a gravity model of the UK. We took a full classical trade/economy model and adjusted it for gravity assumptions: first, imperfect competition and second an effect from total trade to productivity (via FDI). What we found is detailed in Minford and Xu (2018).

We found that testing these models against the full array of associations found in the data the gravity model is statistically rejected while the classical model survives the test. As this is the first time to our knowledge that trade models have been tested in this way, it is of interest to show a few details of how this test was conducted. Formally, it is an indirect inference test in which the facts of UK trade relationships are summarised in some way, the ‘auxiliary model’, and the trade models to be tested are then simulated repeatedly to create alternative sample histories from each of which these summary facts are extracted. This creates a joint distribution of these facts which can be used to assess the probability of the trade model generating the actually observed facts. If the probability lies in the test’s tail (which we set at the usual 5% level), the model is rejected.

A first question concerns the power of this test which we assess by Monte Carlo experiment, hypothetically falsifying to an increasing extent some ‘true model’ similar to one of our models here. We create many samples from the true model; we then disturb the true parameters by + or - x% alternately and see how many of these samples reject our falsified model. The left hand column of Table 1 shows this x% ‘general mis-specification’ and the next column the rejection rate. It can be seen that this rejection rate which measures the power of the test rises sharply to virtually 100% once mis-specification reaches only 3%.

Table 9: Power of II Wald test: classical model as true, with w/h, eq1)-4)

Percent Mis-specified	Indirect Inference test
True	5.0
1	40.5
3	99.9
5	100.0
7	100.0
10	100.0
15	100.0
20	100.0

Source: Minford and Xu (2018)

Table 1: Source: Minford and Xu (2018) Table 9

Table 2 shows the Wald test results for the two models. As can be seen, the classical model is not rejected with a 0.09 p-value while the Gravity model is rejected with a 0.035 p-value. The power of the test implies that the Classical Model can be considered as highly accurate.

Table 10: II Wald test results when equations 1)-4) are used, with w/h

	Equations in auxiliary model	P-value
Classical trade model	1),2),3),4)	0.0904
Gravity model	1),2),3),4)	0.0350

Source: Minford and Xu (2018)

Table 2: Source: Minford and Xu (2018) Table 10

Some idea of just why these results occur due to UK trade facts can be seen from charts of various of these facts versus the average value of the facts simulated by each model, shown as Figure 1 taken from our paper.

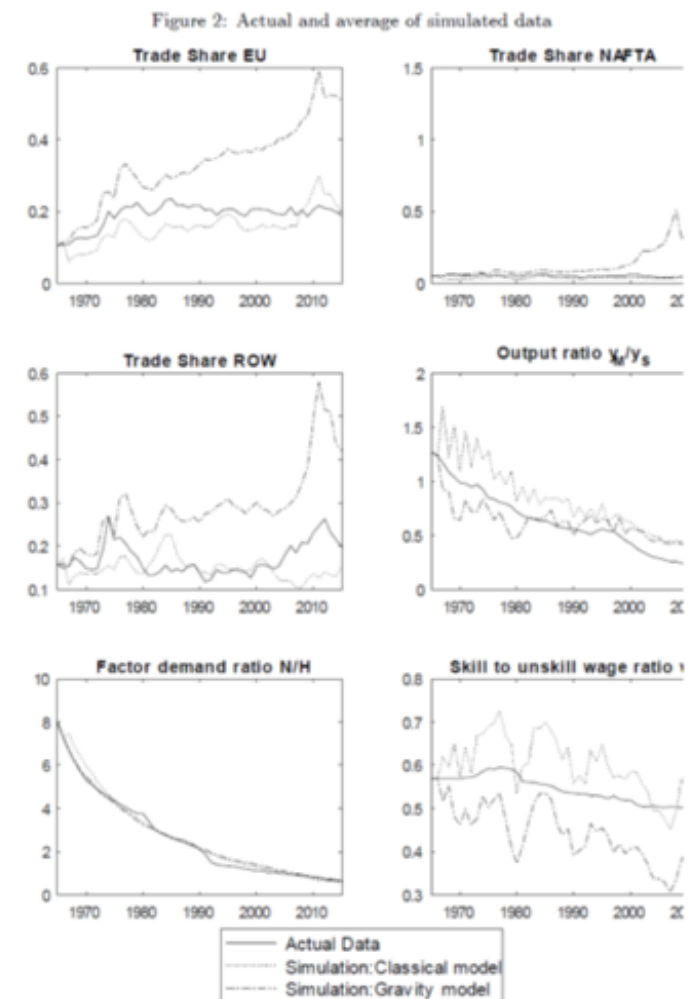


Figure 1: Source: Minford and Xu (2018) Figure 2

One can see from these charts that the simulated behaviour of UK trade shares and the skilled wage ratio according to the Gravity model lies well away from the actual behaviour compared with the simulated behaviour from the Classical model. This would tend to push the regression coefficients’ distribution further away from the ones found from the actual data.

The policy implications for Brexit of the two models

But a finding we made that is perhaps more important for policy: when we put the assumption of free trade into the gravity model it produces the same answer for the effects on UK welfare and GDP as the classical model.

What this means is had gravity modellers used the true underlying causal model of trade and the economy, together with the full free trade assumptions about policy, to compute the effects of Brexit they would have come to a strongly positive conclusion about post-Brexit economics, as we did. The reason is clear: even in the gravity model general free trade lowers consumer prices and stimulates resource movement to the more productive sectors.



The Treasury released no replies to our criticisms of these gravity-equation-based methods; nor indeed did any of the other modellers using similar methods. Rather the contrary; they happily allowed sympathetic outside commentators like the Institute of Fiscal Studies (IFS, 2016) to trumpet abroad the fact that our work was an 'outlier', without drawing attention to the differences of modelling method or of assumptions where the method was similar. In fact there has always been a spread of economists' analyses, giving the lie to the implication that we were the only economists who thought Brexit would or could have a positive trade effect on the economy.

Thus our group were not the only one to find that Brexit would have a positive long term trade effect under favourable policy assumptions. Another was Open Europe (2015) which used the GTAP model from Purdue University, Indiana; this is a well-known internationally developed CGE Model of world trade. It is a model of all countries, grouped into smaller groups, usually around 50, and of all goods and services sectors, usually around 40. Its equations are derived from trade theory, and the equilibrium in each market of supply and demand. Furthermore, as noted by Whyman and Petresku (2017), other studies finding negative Brexit effects used a variety of damaging assumptions that had nothing to do with trade, such as short term uncertainty, migration, and regulation.

However, more significantly, the Treasury and the rest of the UK Civil Service have now collectively abandoned the gravity-equations methods described above and so in terms of method have now joined us in using a general equilibrium model of trade, as evidenced by the Cross-Whitehall (2018) project. Thus had they shared our policy assumptions, they too would have come up with similarly positive assessments of the trade effects.

There is therefore now general agreement between ourselves, Open Europe and the collective UK Civil Service that Brexit must be evaluated by a Computable General Equilibrium model. The Cross-Whitehall Project (Civil Service, 2018) to evaluate Brexit like Open Europe also uses GTAP. This GTAP model has thus replaced the set of correlations (between trade agreements and trade; trade and FDI; FDI and productivity) previously used by the Treasury to produce its pre-referendum report on the long term trade effects of Brexit. What separates us all qualitatively is the assumptions we make as policy inputs into the particular CGE models being used, to which I now turn.

II. The Policy Assumptions made by ourselves and the Cross-Whitehall study; and their implications for UK welfare

The Cross-Whitehall study has made assumptions about 'general free trade via FTAs' that are conservative in the extreme. It has stated that gains from their general FTA assumption are only a 0.5-0.8% rise in UK GDP. From this it would seem that they assume either that EU trade barriers are rather small or that barriers are reduced by rather little.

This is puzzling since current EU protection of food and manufactures including non-tariff barriers is authoritatively estimated at 20% (Minford et al, 2015, chapter 4; also for non-tariff barriers Berden et al, 2009). Our assumption of the likely Brexit reduction of protection is deliberately cautious at 10%; it can be thought of as assuming either that only half is abolished or that somehow the EU would itself have abolished half anyway. With this 10% assumption our Cardiff World Trade Model predicts a 4% rise in GDP (Minford et al, 2015, chapter 4). If this 10% is fed into the GTAP model, then UK GDP would rise by 2%, while if all 20% EU protection were abolished it would rise by 4%. Interestingly, a recent study of Australian trade liberalisation over the past thirty years using GTAP (CIE, 2017) finds that its GDP has been increased by 5.4%- a figure rather similar to the gains being discussed for the UK's Brexit liberalisation.

The other key assumption made by the Cross-Whitehall study is that large costs arise at the EU border for UK-EU trade even if we negotiate 'free trade' with the EU. One element of this appears to be related to pure 'border costs'; such things as time to get paperwork agreed before ships are allowed to unload.

However these assumptions have been bypassed by the progress of technology and WTO rules for customs procedures (WTO, 2018c; World Bank, 2016). Computerisation has more or less eliminated border costs among developed countries, since almost all cargoes are cleared before reaching port, with only some 2 per cent or so physically inspected and even this is taking only around a day typically. Prof. Dr. Michael Ambühl (ETH Zürich), who negotiated one of the Swiss-EU bilateral free trade deals, estimated that border costs were as low as 0.1% of the value of trade (Ambühl, 2018, slide 8).

Another assumption in the Cross-Whitehall study appears to be that UK-EU non-tariff protection would spring up after Brexit. The idea seems to be that the EU and maybe the UK too would claim that exporters do not satisfy required product standards; thus non-tariff barriers would sprout on the UK-EU border, regardless of any trade negotiations. However, current WTO rules (WTO, 2018 a and b) outlaw such behaviour as illegally discriminative, given that existing product standards are already exactly obeyed on both sides.

Thus it is hard to understand the Cross-Whitehall assumptions on EU-UK border costs post- Brexit. Nevertheless, on the basis of these assumptions, the Cross-Whitehall GTAP model calculates large losses in GDP, variously amounting to between 3 and 7%, depending on the 'closeness' of the eventual EU arrangements. On our calculations, these costs are simply not there in the event of a free trade (Canada-plus) agreement with the EU. We also have an assessment (Economists for Free Trade, 2018a) of the 'no deal' case within the Cardiff World Trade Model. In this case again non-tariff barriers and customs hold-ups are illegal but tariffs do apply; in our assessment the tariff element damages the EU but not the UK essentially because given that FTAs have driven UK prices to world

prices, tariffs in both directions must be absorbed by EU traders.

The Table below summarises how based on available GTAP simulations (Ciuriak et al, 2015 and 2017) we have reconstructed the assumptions made by Whitehall as well as their published impact on GDP according to the GTAP model; it sets them side by side with what the GTAP model would say based on the alternative assumptions we regard as reasonable for UK-EU trade barriers and an assumption for FTAs with the rest of the world that achieve the full abolition of EU protection of food and manufactures.

Table 3: Trade Effects under Brexit Scenarios According To GTAP-type model used by Whitehall

TABLE: TRADE EFFECTS UNDER BREXIT SCENARIOS ACCORDING TO GTAP-TYPE MODEL USED BY WHITEHALL

	A: Whitehall Assumptions		B: Variant Assumptions	
	Canada+	WTO	Canada+	WTO
Tariffs	-	4.5	-	4.5
Effect on GDP	-	-1.0	-	-1.0
New Standards	16.2	20.3	-	-
Effect on GDP	-3.6	-4.5	-	-
New Customs	5.8	5.8	-	-
Effect on GDP	-1.3	-1.3	-	-
Total Tariff Equivalent (%)	22.0	30.6	-	4.5
Total Effect on GDP (% of GDP)	-4.9	-6.8	-	-1.0
FTAs with rest of world				
Effect on GDP (% of GDP)+(0.3-)0.6.....	 +4.0*.....	

All Trade Effects on GDP
(% of GDP)

*assume all EU protection of food and manufactures (20% average on each) eliminated via FTAs

The Cross-Whitehall study therefore reaches its conclusions that Brexit reduces UK GDP on the basis of untenable assumptions. When reasonable assumptions are substituted for the extent of the trade barriers eliminated against the rest of the world and for the trivial UK-EU border costs, this reduction is turned into a substantial increase on both the GTAP model, and on the Cardiff World Trade Model. What is more this is true even on the Gravity version of that Cardiff model.

The Treasury in its latest Report published nov 28 has not materially changed its overall estimates of the costs to GDP of the different Brexit scenarios; my critique remains the same; that it is inputting false assumption- see Economists for FreeTrade (2018b).

III. Our estimates of how a full Brexit impacts on the economy

What are then the whole range of economic benefits we estimate from achieving a Clean Brexit - ie, leaving the Single Market and the Customs Union, regaining control over our borders, laws, and regulations, freeing ourselves from the European Court of Justice, and having the freedom to establish our own trading relationship with the rest of the world? Over the past two years, we have reported at length on the long run effects of such a 'Clean Brexit'. Here we briefly recapitulate the arguments and findings from our research.

A Clean Brexit produces long-run gains from four main sources (Minford, 2017):

1. Moving to free trade with non-EU countries that currently face high EU protection in goods trade
2. Substituting UK-based regulation for EU-based Single Market regulation
3. Ending the large subsidy the 'four freedoms' forces the UK to give to EU unskilled immigrants
4. Ending our Budget contribution to the EU

The gains under (1) come about because elimination of the EU's protection lowers consumer prices and increases competition in our home market, so raising productivity across our industries. With the economy at full employment and a flexible exchange rate, any jobs lost in industries where higher productivity releases labour will be offset by extra jobs in other (unprotected) industries where productivity is already high and where demand is projected to expand. For our calculations on our Cardiff World Trade Model (Minford et al, 2015,chapter 4), we assume that protection leading to higher prices of 10% in both food and manufactures is eliminated (as noted above detailed research shows prices inside the EU in both sectors currently are some 20% higher than world market prices). Our estimates are that consumer prices will fall by 8% and GDP will rise by 4%.

For (2), we rely on models of the economy developed by Cardiff researchers (see Minford et al, 2015, chapter 2) that assess the effects of regulation on the economy via their effect in raising business costs. We estimate that EU regulation has reduced GDP by around 6%; and that probably about a third of this can be reversed giving us a projected gain of 2% of GDP, or a growth rate 0.15% per annum faster over the next 15 years.

For (3), we have examined the costs to the taxpayer of EU unskilled immigrants owing to the entitlement to the full range of tax credits and other benefits, including free education and healthcare (Ashton, MacKinnon and Minford, 2016). A further effect is that wages of UK unskilled workers are depressed; this represents a transfer from unskilled workers to the consumers who use their products. A further relevant distributional element is that the taxpayer burden and wage effect are both highly localised in areas of immigration. From these costs, we find that Brexit would save 0.2% of GDP in taxpayer costs. Furthermore, there would be a particular benefit to UK low-income households of about 15% of their living costs from the combination of ending this unskilled immigrant subsidy and the trade-led reduction in the CPI (MacKinnon,



2018). For (4), we have followed the standard calculations made by the Office of Budget Responsibility and others, arriving at around 0.6% of GDP.

In total these four elements create a rise in GDP in the long term over the next decade and a half of about 7%, which is equivalent to an average rise in the growth rate of around 0.5% per annum.

Conclusions

In this paper I have summarised work my coauthors and I have done on the effects of Brexit on the UK economy, with particular emphasis on the trade effects where controversy has been greatest. I have also reviewed the work on trade done by others and particularly that of the Treasury and the rest of Whitehall who are responsible for official advice to Ministers.

The key point of this review is that this Civil Service work has taken a sharp turn in the past year towards the CGE methods we have been using throughout and has rightly in our view abandoned the original Treasury methodology of gravity-based associations which are incapable of establishing causality. In this methodological sense our work is certainly not, as repeatedly claimed by our opponents, an 'outlier' but rather entirely 'mainstream'. Where the Civil Service continues to differ from us is in their assumptions about the extent to which FTAs with the rest of the world can reduce current EU protection and also about the trade and border barriers that would be created between us and the EU. However these assumptions of theirs are almost impossible to justify, since such barriers would be illegal and the scope for reducing EU protection is very large.

Once one substitutes reasonable assumptions into the type of world trade model used by the Civil Service the trade effects estimated for Brexit become positive and potentially rather large. When one adds these to the less controversial gains from proceeding with UK-created regulation of the economy, the control of unskilled immigration and the ceasing of our payments into the EU budget, the gains to the UK economy suggest that growth could rise by around 0.5% per annum on average for the next decade and a half.

References:

Ambühl, M. (2018) 'Where Next on Brexit? Lessons from the Swiss Model', Policy Exchange presentation, London, 19 April.

Ashton, P, MacKinnon, N. and Minford, P. (2016) 'The economics of unskilled immigration', <http://www.economistsforfreetrade.com/the-economics-of-unskilled-immigration>

Berden, K., Francois, J., Tamminen, S., Thelle, M., & Wymenga, P. (2009) 'Non-Tariff Measures in EU-US Trade and Investment: An Economic Analysis,' Final report, Ecorys; cited in Breinlich et al (2016) [Table of ntbs on p 123.]

Breinlich, H., Dhingra, S, Ottaviano, G., Sampson, T., Van Reenen, J. & Wadsworth, J. (2016) 'BREXIT 2016: Policy analysis from the Centre for Economic Performance', (London, 2016), pp154.

CIE (2017) 'Australian Trade liberalisation - analysis of the impacts', Report prepared for the Australian Ministry of Foreign Affairs, Centre for International Economics, Canberra and Sydney. <https://dfat.gov.au/about-us/publications/trade-investment/Documents/cie-report-trade-liberalisation.pdf>

Ciuriak, D. & Jingliang X., with Ciuriak, N., Dadkhah, A., Lysenko, D. and Badri Narayanan G. (2015) 'The Trade-related Impact of a UK Exit from the EU Single Market' - a Research Report prepared for Open Europe by Ciuriak Consulting, (2015) <http://ssrn.com/abstract=2620718>

Ciuriak, D., Dadkhah, A., and Xiao, J. (2017) Brexit Trade Impacts: Alternative Scenarios, Ciuriak Consulting Inc. (Ottawa), June, 2017, <https://www.gtap.agecon.purdue.edu/resources/download/8782.pdf>

Civil Service (2018a) 'EU Exit analysis- a cross-Whitehall briefing', powerpoint slides, pp.27. <https://www.parliament.uk/documents/commons-committees/Exiting-the-European-Union/17-19/Cross-Whitehall-briefing/EU-Exit-Analysis-Cross-Whitehall-Briefing.pdf>

Costinot, A. and Rodriguez-Clare, A., 'Trade Theory with Numbers: Quantifying the Consequences of Globalization', chapter 4, Handbook of International Economics, vol.4, eds. Gopinath, G., Helpman, E. and Rogoff, K., Elsevier, 2014, pp. 197-261.

Economists for Free Trade (2018) 'Why World Trade Deal exit from the EU may be best for the UK', <https://www.economistsforfreetrade.com/wp-content/uploads/2018/06/Why-a-World-Trade-Deal-exit-from-the-EU-may-be-best-for-the-UK-Final-15.06.18.pdf>

Economists for Free Trade (2018 b) 'An overview of the Treasury's new Brexit forecasts', <https://www.economistsforfreetrade.com/publication/an-overview-of-the-treasurys-new-brexite-forecasts/>

HM Treasury (2016) 'HM Treasury analysis: the long-term economic impact of EU membership and the alternatives', Ref: ISBN 978-1-4741-3089-9, PU1908, Cm 9250PDF, 8.97

Institute of Fiscal Studies (2016), Emmerson, C., Johnson, P., Mitchell, I. and Philips, D. 'Brexit and the UK's Public Finances', IFS Report 116, IFS, May 2016. <https://www.ifs.org.uk/uploads/publications/comms/r116.pdf>

MacKinnon, N. (2018) 'Immigration: a central Brexit issue', <https://www.economistsforfreetrade.com/wp->

content/uploads/2018/11/Immigration-a-central-Brexit-issue.pdf

Minford, P., with Gupta, Le V., Mahabare, V. and Xu, Y. (2015) *Should Britain leave the EU? An economic analysis of a troubled relationship*, second edition, December 2015, pp. 197, (Cheltenham, 2015)

Minford, P. and Xu, Y. (2018) 'Classical or gravity: which trade model best matches the UK facts?' *Open Economies Review*, July 2018, Volume 29(3), pp 579–611 <https://link.springer.com/content/pdf/10.1007%2Fs11079-017-9470-z.pdf>

Minford, P. (2017) 'From Project Fear to Project Prosperity, an Introduction', <https://www.economistsforfreetrade.com/wp-content/uploads/2017/08/From-Project-Fear-to-Project-Prosperity-An-Introduction-15-Aug-17-2.pdf>

Minford, P. (2018) the flawed Assumptions of the treasury analysis of Brexit, downloadable at www.economistsforfreetrade.com

Open Europe (2015) Booth, S., Howarth, C., Persson, M., Ruparel, R. and Swidlicki, P. 'What if...? The consequences, challenges and opportunities facing Britain outside EU' Open Europe report 03/2015. <https://openeurope.org.uk/intelligence/britain-and-the-eu/what-if-there-were-a-brexit>

Ricardo, D. (1817) *On the principles of political economy and taxation*. John Murray, London

Tinbergen J (1962) *Shaping the world economy: suggestions for an International Economic Policy*. The Twentieth Century Fund, New York.

Whyman, P.B., and Petresku, A. I. (2017) *The economics of Brexit- a cost-benefit analysis of the UK's economic relationship with the EU*, Palgrave Macmillan, pp. 384.

World Bank (2016) *World Bank Logistics Performance Index, 2016 for Canada, US, UK, Germany, Sweden, Belgium, Netherlands, France, Italy, Spain, Norway, South Korea, Japan, Australia, and New Zealand*, downloadable from <https://lpi.worldbank.org/>

WTO (2018a), *WTO Technical Barriers to Trade Agreement (TBT)*, https://www.wto.org/english/tratop_e/tbt_e/tbt_e.htm

WTO (2018b), *The GATS (General Agreement on Trade in Services)*,

https://www.wto.org/english/tratop_e/serv_e/gatsqa_e.htm

WTO (2018c), *The WTO Trade Facilitation Agreement*, https://www.wto.org/english/tratop_e/tradfa_e/tradfa_e.htm



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