

## PROSPECTS FOR THE UK ECONOMY

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### *Section 1. The economic effects of the Covid-19 pandemic*

- Measures to limit the spread of Covid-19 are causing a severe contraction in economic activity of uncertain magnitude. In our main-case scenario, GDP falls by 7 per cent in 2020 and public sector borrowing rises above £200 billion in 2020–21, over £150 billion more than in the OBR's forecast at budget time.
- The government's announced measures to limit the long-term economic effect of Covid-19 are estimated to add about £75 billion to the deficit in our main-case scenario. It is estimated that without these measures GDP would have fallen by a further 2 per cent.
- The cost to the public finances of Covid-19 is easily manageable in our main-case scenario but there are significant risks. A lockdown lasting for more than a few weeks increases the risk of serious long-term damage to the economy. But ending the lockdown too early increases the risk of more premature deaths. The government could improve the trade-off by easing the lockdown in the key 'upstream' sectors of the economy, such as manufacturing, construction and non-essential retail, where it is safe to do so, thereby helping the economy as it saves lives.
- The most significant challenges are likely to come when the lockdown is eased and the government's supportive measures are withdrawn. Then many businesses could struggle to bear the operating costs of being open while demand and sales are reduced because of the need to maintain social distancing. In those circumstances the government schemes will need to be adapted to prevent unnecessary business failures as the economy recovers.

The economic outlook in the past three months has changed beyond recognition. At the time of our last *Review*, the emerging Covid-19 pandemic was seen as a worrying health threat that could affect China and neighbouring economies, but was not central to our assessment of the global economic outlook. Since then, countries around the world have imposed a range of social distancing measures to 'flatten the curve' and limit the spread of Covid-19. These measures have had the effect of stopping much economic activity, as discussed in the world economy chapter of this *Review*.

In the United Kingdom, the situation changed rapidly following the first cases of the virus being reported on 31 January. Initially the virus was confined to foreign visitors or British citizens returning from abroad, but the first cases of people who had contracted the virus in the UK were reported by late February. Much of the economy was locked down by late March. Initially, social distancing measures were advisory rather than statutory, but schools, universities, restaurants, pubs, clubs, and indoor sport and leisure facilities were closed by 20 March. Further wide-ranging statutory

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restrictions were placed on freedom of movement on 23 March. These ‘stay at home’ measures will remain in force at least until 7 May when they are due to be reviewed.

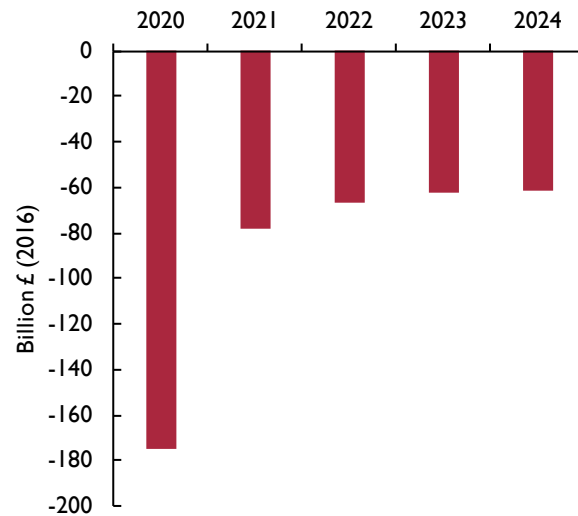
The economic effects of Covid-19 are extremely uncertain, but it is clear that locking down the economy to save lives has a substantial cost. While some people may have stayed away from work anyway to protect themselves from infection, the stay-at-home measures have resulted in the usual market-based organisation of the economy being temporarily suspended with work restricted to those who are either key workers or can work from home. While saving many lives, the decision to lock down much of the economy has disrupted normal activity and is contributing to a sharp decline in some people’s incomes and most people’s spending. This has been mitigated by government financial support for businesses and people who are unable to work. Inevitably government borrowing will rise significantly in the short term adding to the overall stock of debt, raising questions about how best to fight and pay for the war against the pandemic.

In this *Review*, we set out a main-case forecast scenario where UK GDP falls by 7 per cent in 2020 and then rises by 7 per cent in 2021 as the economy returns towards normal. In this scenario, public sector borrowing rises above £200 billion in 2020–21, over £150 billion more than in the Office for Budget Responsibility’s (OBR) budget forecast, and debt rises above 90 per cent of GDP. Higher public sector borrowing is matched by higher private sector saving in this scenario. In effect, the cost of Covid-19 is socialised with the government stepping in to replace the incomes of those who are unable to work by borrowing from those who are unable to spend. With interest rates remaining low, this extra debt burden is easily affordable with no obvious need to raise taxes immediately to pay for it.

In this main-case scenario, GDP is lower by about £175 billion in 2020 and £75 billion in 2021 than we had expected in January (figure 1). It is also lower in future years reflecting a very uncertain permanent scarring effect from Covid-19. Over the next ten years this loss of output cumulates to around £800 billion, or £11,000 per head. This is equivalent to a loss of GDP of around 3½ per cent each year over the next ten years, though the economic cost is front-loaded.

This comforting scenario is only one possible outcome among many. In particular, it is consistent with an optimistic conditioning assumption that the lockdown

Figure 1. The estimated GDP shortfall due to Covid-19



Note: Shortfall computed as the difference between the main-case forecast scenario for GDP and NIESR’s February 2020 central case. Cumulated shortfall over the next ten years is 3½ per cent of forecast GDP in that period.

can be progressively eased in a relatively safe way before a Covid-19 vaccine is available. This might be achieved by a number of selective measures such as re-opening schools, allowing non-essential retail to re-open if social distancing can be guaranteed, limiting the number of seats sold on trains and aeroplanes to avoid overcrowding and extensive testing and contact tracing. Yet, without a vaccine, there is a significant risk that the virus will spread quickly again whenever a return to business as usual is attempted.

### Channels of Covid-19

Given the uncertainty about the economic and epidemiological outlook, and to understand better the effects of different approaches to relaxing the lockdown, it is helpful to list some of the possible direct channels by which Covid-19 is affecting the UK economy:

1. *Lower productivity and hours of work of those in employment.* This supply-side effect comes about as people reduce their working hours as they become ill, self-isolate or care for their children who are unable to attend school. ONS survey evidence suggests that about 5 per cent of the working population have been unable to work because of sickness and self-isolation and a further 10 per cent have needed to care for school-age children.

2. *Lower economic activity due to establishments being locked down.* This applies particularly to pubs, restaurants, non-essential retail, sports facilities, tourist attractions and theatres that are not allowed to trade. It applies to some extent to schools, universities and places of worship, for example, where buildings are closed but some activity is continuing offsite. It also applies to other areas, such as construction and manufacturing establishments where it is not possible to practise social distancing. This is both a shock to supply and effective demand that has repercussions throughout supply chains.
3. *Lower desired consumer spending and investment.* This demand-side effect comes about because of heightened uncertainty as households aim to build precautionary saving balances and businesses defer investment until there is greater clarity about the course of the virus and its effects.
4. *Lower demand and supply from other countries fighting Covid-19.* This includes the effect on the supply of essential parts to UK producers from lower production in other countries. It also includes the effects of lower tourism into the UK.
5. *Lower demand for risky assets due to lower confidence and less risk appetite.* This affects the cost of capital to businesses through lower asset prices and higher corporate bond spreads. It also reduces the willingness of banks to lend without loan guarantee schemes.

These different direct channels are likely to interact and to some extent counteract each other in ways that need to be taken into account in working out their overall effect. To take one obvious example, lower desired consumer spending (channel 3) matters less when shops are not open (channel 2), similarly lower tourism (channel 4) has less impact when tourist attractions and theatres are closed (channel 2).

### *Impact on economic activity*

At present, with the lockdown in place, economic activity is being largely determined by what can be safely supplied. This varies significantly across sectors depending on whether staff can work from home or can practise social distancing at work. Table 1 sets out sectoral estimates of the amount of economic activity being lost during the lockdown period. This is intended to take account of the effects of all the channels listed above. This points to overall activity being about 30 per cent lower than normal while strict social distancing

measures are in place. This estimate is based on recent evidence from surveys and other timely indicators, but is very uncertain. Using a similar approach, the Office for Budgetary Responsibility (OBR) estimated that activity could be 35 per cent lower than normal when lockdown measures were in place (assumed by OBR to affect all of the second quarter). Consistent with these estimates, an ONS survey of the business impact of the coronavirus carried out between 23 March and 5 April found that 25 per cent of businesses had temporarily closed, and 38 per cent of those that remained open reported that their turnover was substantially lower than normal.

### *Second-round effects of the lockdown*

An investigation of the relationship between activities carried out in different sectors is useful in considering how the effects of the lockdown spread across the economy.

The sectors listed in table 1 are not independent of each other but are related by the extent to which they supply and create demand for other sectors. The table is ordered roughly according to the extent to which each sector supplies final demand or intermediate demand from other sectors. Starting from the top, public sector output relies mainly on government spending (a component of final demand) and creates demand for other sectors. Similarly, the output of the private non-traded services sector (including retail) depends on consumers' expenditure and creates demand for other sectors. At the other end of the scale, parts of the private traded services and finance sectors mainly supply business customers and make relatively little use of the output of other sectors.

To provide some quantification of the linkage between upstream and downstream activities, we use a new Dynamic Sectoral Model (DSM) that is being developed at NIESR to evaluate the effect of the current lockdown working through some of the different channels listed earlier.<sup>1</sup> These calculations highlight the potential damage to downstream activities of a prolonged lockdown.

In line with the estimates in table 1, these calculations assume that stay-at-home measures reduce output directly by 15 per cent in the public sector, 60 per cent in the private non-traded sector activity, 50 per cent in commercial real estate, 60 per cent in construction, 40 per cent in manufacturing and 20 per cent in the private traded sector. Other sectors are assumed here not to be directly affected by stay-at-home measures because of the ability of staff to work from home.

Table 1. Estimated sectoral effects of short lockdown

Sector and industry	Weight per 1000	% that have ever worked at home <sup>(a)</sup>	% that laid off staff <sup>(b)</sup>	% not confident of survival <sup>(b)</sup>	Recent evidence	Assumed reduction in activity (%)
<i>Public:</i>						15
Health	75	20	12	4	High demand for NHS & other health services.	
Education	59	38	11	10	Education establishments closed but some online supervision.	
Administration	47	29	–	–		
<i>Private non-traded services</i>						60
Wholesale and retail	104	13	30	13	Online delivery, large supermarkets very busy.	
Accommodation and food	30	10	52	31	Pubs & restaurants closed.	
Other services	21	30	39	27	Theatres, sports arenas closed.	
<i>Real estate</i>						20
Commercial real estate	38	40			Housing transactions stopped.	50
Imputed rent	100					
<i>Construction</i>	60	26	39	17	Construction PMI fell to 39.3 in March.	
<i>Manufacturing</i>	100	21	25	14	Manufacturing PMI at 47.8 in March.	
<i>Mining &amp; quarrying</i>	10	25				0
<i>Private traded services:</i>						
Transport and storage	43	11	33	13	Large drop in rail and air journeys.	80
Information and communication	63	53	12	6	High demand for online information.	15
Professional and support	123	35	30	16		15
<i>Financial services</i>	73	39			Online financial activities continue and some bank branches open.	15
<i>Utilities</i>						
Agriculture	7	39			Electricity consumption	0
Electricity	17	29			–20% lower than expected	10
Water supply	10	20	30	11		5
<b>Total</b>	<b>1000</b>		<b>29</b>	<b>15</b>		<b>30</b>

Sources: ONS, Markit, NIESR calculations.

Notes: (a) Coronavirus and homeworking in the UK labour market, ONS, 24 March 2020. (b) Coronavirus, the UK economy and society, faster indicators: 16 April 2020.

Figure 2. Illustrative effect of stay-at-home measures on sectoral GDP



Source: NIESR Dynamic Sectoral Model.

The stay-at-home measures result in output being reduced directly in the sectors where they are applied. There are also knock-on effects as those sectors lay off workers and reduce their demand for inputs from other sectors. Figure 2 shows the direct quarterly effect of stay-at-home measures applied for 6–7 weeks on sectoral GDP and their estimated overall effect within the same quarter when spillovers onto other sectors are taken into account.

This figure highlights that a set of stay-at-home measures that directly reduced GDP by 15 per cent could reduce GDP by around 25 per cent once spillovers are taken into account. As might be expected, the spillovers mainly impact on downstream sectors like the private traded sector, finance and utilities.

As it happens, the finance and private traded sectors are among those whose activities can be performed adequately away from the usual place of business. But they are very vulnerable to the loss of demand for their services that comes from the shutdown of other sectors. Similarly, many businesses exist only to support other businesses and would not survive without their ‘upstream’ counterparts.

A similar consideration applies within businesses. All businesses perform a range of different functions including front-line production and sales and a range of support activities such as marketing, finance and human resource management. While support activities can be carried out

effectively from home, they would not be needed for long if production and sales could not take place.

### *Easing the lockdown*

These factors are important in estimating the economic effects of targeted measures to get the economy back to work. They suggest that to get the economy moving again it will be important to allow as many upstream and complementary activities to start as early as possible while maintaining safe social distancing. This would point to opening up construction, manufacturing and private non-traded activities while insisting that other more downstream industries and activities continue to be done from home.

But, as mentioned earlier, the different channels by which Covid-19 affects the economy may interact with and counteract each other. So the benefits of opening manufacturing will depend partly on what other countries do. If there is no effective overseas demand or if essential parts cannot be sourced, then manufacturing businesses would not be able to operate effectively. Similarly, opening schools to allow parents to return to work would be ineffective if the industry where they normally work is locked down.

### *Policy measures to support the economy beyond the lockdown*

In practice, the adverse effect of the lockdown is likely to be smaller than these calculations suggest because of

the various mitigation measures that the government has introduced.

Box B summarises the various mitigation measures that have been announced by the UK government and estimates that these reduce the adverse impact of Covid-19 on GDP by about 2 per cent at a direct cost to the exchequer of about £75 billion.

One of the key mitigating policies has been the introduction of the Coronavirus Job Retention Scheme (CJRS). This is currently planned to run up to the end of June and appears to be providing businesses with a lifeline to survival. But it is very important that it is retained and adapted beyond the full lockdown period.

While most businesses can muddle through a short period of closure, there is a danger that many would not survive an extended lockdown or a partial easing of the lockdown. Some business intelligence suggests that a partial lockdown could be the worst of both worlds in some sectors, such as non-essential retail or hospitality. Then, businesses would be liable for the operating costs of being open while demand and sales would be reduced by the need to maintain social distancing. In those circumstances the government schemes would need to be adapted to help businesses survive in a partially recovered economy. Rather than paying a percentage of the wages of those who are furloughed, they might instead subsidise the pay of those who are working.

Extending the mitigation measures in this way would clearly add to their cost. But the cost of not doing so could be worse.

The sudden change in the fiscal position in our main-case scenario does not pose an immediate threat to the government's medium-term fiscal rules. The public sector deficit rises above £200 billion and the debt stock goes above 90 per cent of GDP. In our last *Review*, we criticised the existing fiscal rules for potentially constraining public investment unnecessarily and for being arbitrary. If nothing else, the Covid-19 crisis ought

to draw attention to the importance of transparent long-term planning in the public sector. We argued then that fiscal policy ought to pay more attention to the public sector balance sheet.

The public sector balance sheet has been weakened by the effects of the Covid-19 pandemic, but not dramatically. With interest rates at very low levels there is no urgency to pay off the debt accumulated during the crisis. Moreover we do not believe that the crisis should distract the government from its long-term aim of levelling up opportunities in the United Kingdom.

In his March budget, the Chancellor announced that an HM Treasury review of the fiscal framework would be carried out by the time of the Autumn budget. This review, if it takes place, is likely to consider how to pay for the extra debt arising from the response to the Covid-19 pandemic. We would recommend that the main priority in the short term is for fiscal policy to continue to protect the economy from long-term damage due to Covid-19.

This is likely to mean further support to businesses through a more flexible CJRS and extended loan guarantee schemes. But, even with this support, the economy is likely to suffer from weak global demand, suggesting that more conventional policy support may be needed. This can be directed at delivering the government's plans to level up the regions and improve the national infrastructure.

For our optimistic main-case forecast scenario to come true it is necessary to believe that the complex network of relationships that make up the economy can be restored after the lockdown without having suffered any significant long-term damage. That will depend on the duration of the lockdown and the effectiveness of the various government measures aimed at keeping existing businesses and job matches alive. So far the signs are promising, but the most significant challenges are likely to come when the lockdown ends and the schemes are withdrawn. In those circumstances, the government schemes will need to be adapted to help businesses survive in a partially recovered economy.



## Section 2. Main-case forecast scenario in detail

The economic outlook is extremely uncertain and depends critically on the effectiveness of policies to manage the economy while limiting the spread of Covid-19. In this section, we describe our main-case forecast scenario and our assessment of the substantial economic risks around it.

### Summary

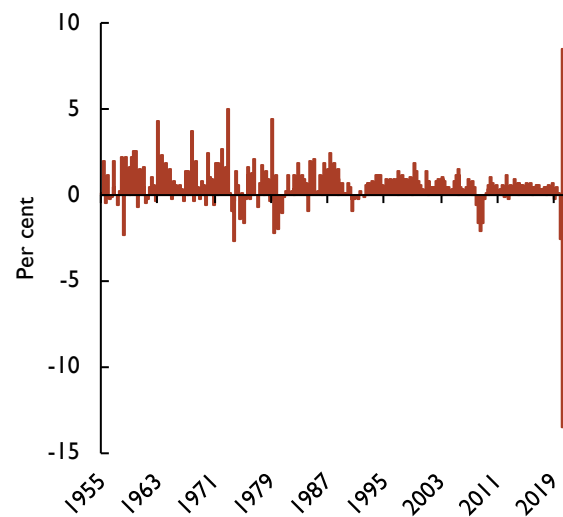
Our main-case forecast scenario is relatively optimistic. It is conditioned on an assumption that the lockdown period starts to be eased from the middle of May and that ways are found for economic activity to resume safely in the second half of the year. In the meantime, businesses and jobs are supported by the government's various schemes that limit the long-term damage to the economy. In this scenario the economic cost of Covid-19 is lost output of about £175 billion in 2020 and £75 billion in 2021.

Prior to the emergence of Covid-19, the economy had shown some signs of improvement following the decisive result of the December 2019 general election and the UK's formal exit from the European Union on 31 January. Business surveys had become more optimistic at the beginning of the year, and the housing market was showing new life, though monthly GDP for January and February remained flat.

As yet, there is little hard data for the lockdown period that began in the middle of March, but there is a range of evidence that points to a material impact on output. Our calculations described in Section 1 suggest that GDP may be reduced by about a third when the lockdown is in operation. That would be consistent with around a third of workers continuing to go to their normal place of work, a third working from home, and a third no longer working, either because they have been laid off, furloughed or otherwise inactive.

With the lockdown assumed to be operative from around the middle of March to the middle of May, UK GDP falls by around 5 per cent in 2020Q1 and 15 per cent in 2020Q2. On the assumption of a progressive relaxation of stay-at-home measures, GDP then recovers some of the lost ground and almost re-attains its 2019Q4 level by 2021Q4. GDP falls by just over 7 per cent in 2020 as a whole and rises by almost 7 per cent in 2021. If correct, the decline and recovery of quarterly GDP

Figure 3. Quarterly GDP growth rate



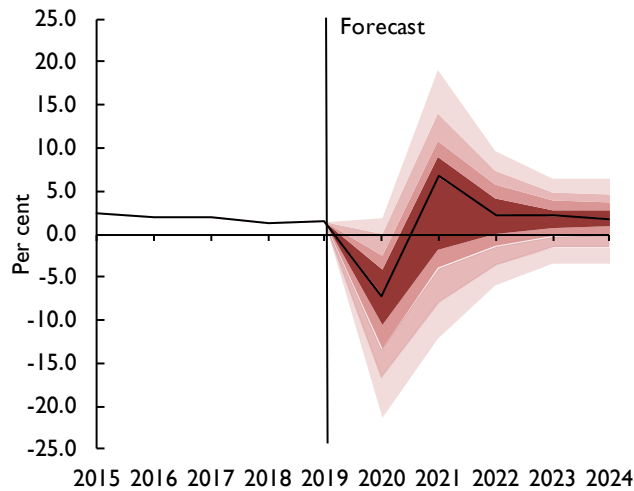
Source: NIESR forecast.

growth is unprecedented in recent times (figure 3). Box A describes the circumstances in 1921, when quarterly GDP growth is estimated to have followed a similar pattern.

The main counterparts to the reduction in output in 2020 are falls in household consumption and private sector fixed investment, partly because it is not possible to spend in the lockdown period. Higher government consumption helps support demand and net trade makes a positive contribution to growth in 2020 because imports fall by more than exports. Domestic demand falls by 8½ per cent in 2020 and rises by 8½ per cent in 2021.

The reduction in output in 2020 is associated with a relatively limited fall in employment, despite a substantial temporary fall in labour demand, when furloughed workers are assumed to be counted as remaining in employment. The CJRS is assumed to be effective in limiting the fall in employment in 2020 to around 1½ million. This pushes unemployment up to around 3 million, about 8½ per cent of the labour force. Employment rises again in 2021 as the activity recovers, but only by around 800,000. Unemployment falls back towards 2 million in 2021.

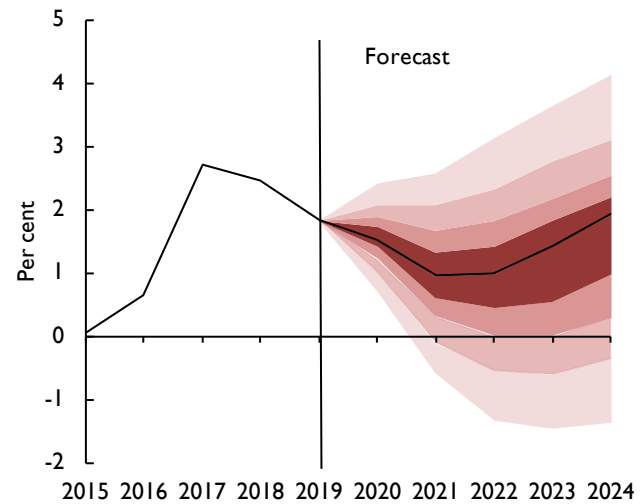
Figure 4. GDP growth fan chart (per cent per annum)



Source: NIESR forecast and judgement.

Note: The fan chart is intended to represent the uncertainty around the main-case forecast scenario shown by the black line. There is a 10 per cent chance that GDP growth in any particular year will lie within any given shaded area in the chart. There is a 20 per cent chance that GDP growth will lie outside the shaded area of the fan.

Figure 5. Inflation fan chart (per cent per annum)



Source: NIESR forecast and judgement.

Note: The fan chart is intended to represent the uncertainty around the main-case forecast scenario shown by the black line. There is a 10 per cent chance that CPI inflation in any particular year will lie within any given shaded area in the chart. There is a 20 per cent chance that CPI inflation will lie outside the shaded area of the fan. The Bank of England's CPI inflation target is 2 per cent per annum.

CPI inflation falls below the 2 per cent inflation target in the main-case forecast scenario, but remains positive. This limited effect is because the Covid-19 shock is interpreted as reducing both demand and supply and having a broadly neutral effect on inflationary pressure.

On average, household incomes are not much affected by the economic contraction, despite higher unemployment, because of government measures to protect incomes. Real wages remain subdued, and fall by about 1 per cent in 2021. But higher transfers from government mean that real household disposable income is fairly flat over 2020 and 2021. The household saving ratio rises from around 6 per cent in 2019 to 17 per cent in 2020, when spending opportunities are limited, before falling back to 8 per cent in 2021.

Public sector borrowing rises from 2.6 per cent of GDP in 2019–20 to just over 10 per cent of GDP in 2020–21. The counterpart to higher public sector borrowing is higher private sector saving. The deficit on the current account of the balance of payments falls from 3.8 per cent of GDP in 2019 to around ½ per cent of GDP in 2020 before increasing again to 2½ per cent of GDP in 2021.

There are enormous risks around this main-case forecast scenario, mostly to the downside. The most significant risks include Covid-19 becoming more virulent and the lockdown period being extended; significant long-term damage to the UK economy; policy mitigation measures being withdrawn prematurely. On top of these Covid-19-related risks are the risks associated with Brexit, covered extensively in previous editions of this *Review*.

The uncertainty around our forecast is illustrated by fan charts for GDP and inflation in figures 4 and 5. Fan charts are generated by stochastic simulation of NiGEM assuming that standard monetary and fiscal rules remain in place. A bootstrapping method is applied using the historical distribution of residuals to generate confidence intervals in ‘normal’ times. However, in the current situation where a shock of an unprecedented size is hitting the economy, such confidence bands don’t reflect the increased uncertainty around our mean forecast. We have therefore increased the size of the confidence bands around GDP by a factor of 15 in the first year, calibrated on the size of the shock. The confidence bands then narrow in the following years of the forecast horizon to reflect the view that the economy should return to a





also agreed to provide monetary finance directly to the government through a temporary extension of the Ways and Means facility.

On top of these measures, the government is guaranteeing 80 per cent of loans made to smaller companies through its Coronavirus Business Interruption Loan Scheme (CBILS). On 16 April it announced a scheme for large businesses through the Coronavirus Large Business Interruption Loan Scheme (CLBILS). These measures are intended to support businesses through a period of severe deterioration in their cash flow.

It is not yet clear how effective the measures introduced by the government have been in providing credit at low cost to businesses. According to UK Finance, by 21 April over 9,000 loans had been provided through the scheme out of 36,000 completed applications, and £2.8 billion had been lent. But there were reports that businesses had had difficulty in accessing the scheme. The BCC Coronavirus Business Impact Tracker from 8–10 April reported that 2 per cent of respondents had successfully accessed the CBILS, but that 9 per cent of survey respondents were unsuccessful, with slow or no response from lenders being cited as the main reason.

On the household side, existing mortgage borrowers are being supported by payment holidays. According to UK Finance, lenders had put in place mortgage holidays for 1.2 million of their mortgage customers by 14 April. This represented just over 10 per cent of mortgage borrowers. Mortgage borrowers on variable rates would be further supported by the cuts in Bank Rate. With housing market activity having been stopped during the lockdown there was no new mortgage demand coming on stream.

It is unclear how quickly activity in the housing market will resume when the lockdown ends in this sector. In principle, housing market transactions that are already in the pipeline can pick up where they were left when the lockdown started. But the circumstances of many buyers and sellers are likely to have changed substantially in the meantime so that many deals probably will not go ahead. While average household incomes are not expected to fall sharply in our main-case forecast scenario, some potential buyers will need to reassess what they can afford. This is likely to mean that house prices will fall somewhat, though they will be underpinned by lower mortgage rates if Bank Rate cuts are passed through to borrowers. Supporting this view, the April RICS survey for prices over the coming three months dropped from +20 to -82, the lowest since January 2009. In our main-

case forecast scenario we have pencilled in a fall in house prices of 4 per cent in 2020 when we had previously been forecasting a rise of 3 per cent.

## Aggregate demand

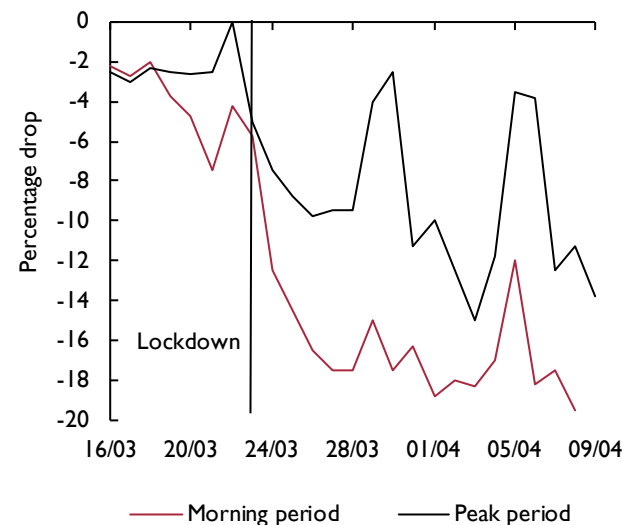
### Output and components of demand

UK economic activity is estimated to have taken a sharp downturn since March when the Covid-19 pandemic hit the UK. While the health crisis was severe with the official death toll reaching 14,000 on 17 April, it is the policy response of locking down a large part of the population that has triggered a negative economic shock on a scale and particularly speed never witnessed before in modern times.

There is as yet little hard data for the post-lockdown period, but many indicators point towards a record-breaking drop in economic activity and confidence. The March Services PMI, collected before the lockdown, had already dropped from an above average reading in February to a record low of 34.5, even lower than during the global financial crisis. Construction and manufacturing March PMIs confirmed that the downturn is broad-based.

Other more timely indicators point to the scale of the reduction in activity in exposed areas. Not surprisingly, retail footfall has fallen since the lockdown, by over 80 per cent according to according to the latest BRC-

Figure 8. Electricity consumption compared to pre-Covid 19 forecast



Source: National Grid Electricity System Operator, NIESR.

ShopperTrak footfall monitor, and travel on public transport has fallen to less than 20 per cent of its previous level.

There has also been a sharp fall in electricity consumption. National Grid data point to a fall in electricity consumption relative to expectations of 10–20 per cent (figure 8).

ONS has increased its monitoring of the economy in response to this crisis, providing more frequent data and a new Business Impact of Coronavirus (Covid-19) Survey (BICS). In the first wave, for the period 9 March to 22 March 2020, nearly half of respondents reported that their turnover was lower than normal. For accommodation and food service activities, over 90 per cent of responding businesses reported that turnover was lower than normal for this period. In the second wave, for the period 23 March to 5 April, 25 per cent of businesses had temporarily closed and of those that remained open, 38 per cent reported their turnover was ‘substantially lower than normal’.

These survey results point to a substantial decline in activity, though it is worth noting that not all businesses experienced a drop in sales. As people anticipated shortages in the provision of some essential goods, there was a surge in demand for some products driven by

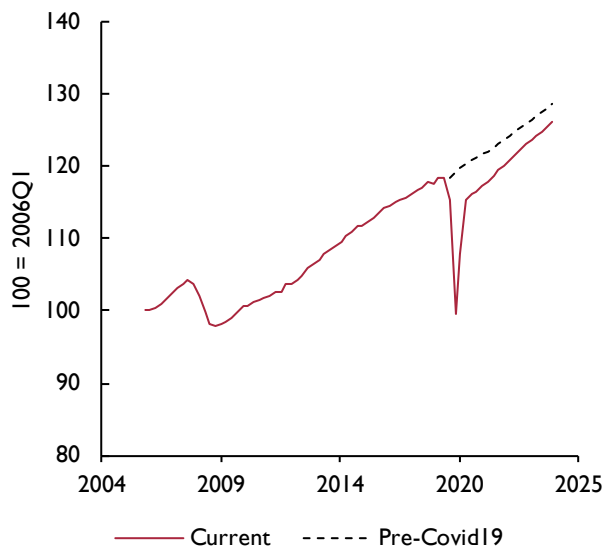
stockpiling and panic buying. For example, supermarket chain Tesco reported a 30 per cent increase in sales in the first few weeks of the crisis.<sup>2</sup>

This crisis presents a unique challenge because it is affecting all sectors in a synchronised shock. There is massive uncertainty about how long and how severe this crisis will be. While a lot of businesses can survive a short shutdown, it is very doubtful that a lot of them can survive an extended lockdown period. The ONS BICS showed that only 40 per cent of businesses were confident they could continue operating during the lockdown.

Putting this information together, NIESR’s GDP Tracker estimates that GDP decreased by 5 per cent in the first quarter and is on track to fall by a further 15 to 25 per cent in the second quarter, pushing the UK economy into a severe contraction. In our main-case forecast scenario we have built in a fall of GDP of 15 per cent in 2020Q2, followed by a rise of around 10 per cent in 2020Q3 and 7 per cent in 2020Q4. GDP returns to its end-2019 quarterly level around the end of 2021 (figure 9).

There is also the risk that there may be second-round effects from this crisis. For example, in a recently published paper, Guerrieri *et al.* (2020) argue that a large supply-side shock like the one currently experienced with large-scale shutdowns, layoffs and firm exits, may trigger by itself an even larger demand shock.

Figure 9. GDP forecast compared to pre-Covid 19 forecast



Source: NIESR.

### Household and NPISH sector

Household consumption grew moderately in 2019. Consumption growth weakened from a high of half a per cent in the second quarter of 2019 to –0.1 per cent in the fourth quarter. Real personal disposable income grew quite erratically, increasing in the second and fourth quarters but declining in the first and third. Consistent with this, the savings rate was stable at around 6 per cent.

In 2020, we forecast consumption to take the lion’s share of the hit from the Covid-19 outbreak.

Already, the GfK Consumer Confidence index survey gathered between 16 and 27 March had declined by 25 points, which is a decline of a magnitude last seen in 2008. Our assessment of the economic impact of Covid-19 is that consumption could collapse by around 25 per cent in the second quarter.

Our main-case forecast scenario builds in a modest rebound in the following quarters that makes up only

part of the loss in consumption. Workers becoming unemployed or furloughed will have to reduce their consumption. With an associated rise in the economic uncertainty, we predict that households will aggressively increase their precautionary spending. As a reference, the savings ratio increased after the financial crisis to nearly 13 per cent, or twice the ratio at the end of 2019. Consumers' expenditure is forecast to decline by over 10 per cent in 2020, and to rebound by a slightly smaller percentage in 2021.

**Investment**

Gross fixed capital formation (GFCF) growth in the private and public sector are expected to diverge, with private sector GFCF declining in response to the Coronavirus shock but public sector GFCF continuing on its upwards path.

Business investment was broadly flat in 2019, after having decreased by 1.5 per cent in 2018. There were tentative signs of an increase in investment intentions in following the decisive result of the General Election in December 2019. Unfortunately, the Coronavirus crisis has caused a peak in uncertainty for businesses that have to focus first on surviving the crisis and have left behind their investment plans. As a result, we have revised down our forecast and we now forecast business investment to decline by about 8 per cent in 2020, which is about half the percentage point decline in 2009 (figure 10).

Housing investment was also broadly flat in 2019, after having increased by 6.5 per cent in 2018. Because of the lockdown, the housing market has largely been frozen: prospective buyers cannot visit new properties, surveyors cannot access properties to value the collateral for the lenders, lenders have removed their product offers with high loan-to-value and it is nearly impossible to find a moving company still working. We forecast housing investment to decline by about 6 per cent in 2020 (figure 10). There is a clear downside risk to our forecast if the lockdown were to be extended.

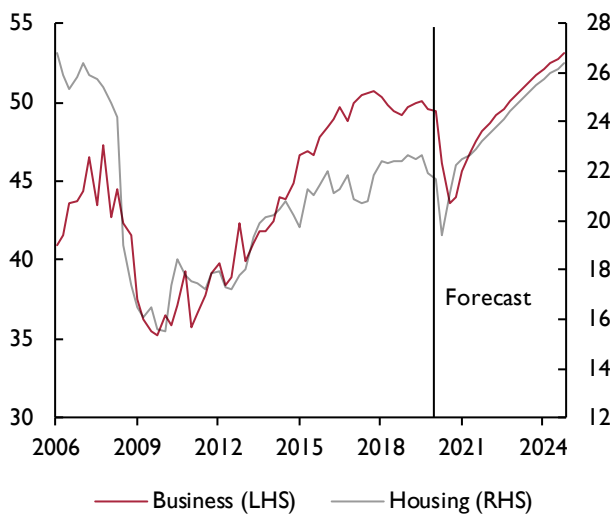
Chancellor Rishi Sunak has confirmed in his March budget the plan to ramp up public investment. Consistent with this goal, we conditioned our forecast on the assumption that government investment growth will increase from around 2 per cent in 2019 to 3 per cent in 2020, 6 per cent in 2021 and reaching around 8 per cent in 2022.

Taking public and private investment activity together, our forecast is for whole-economy fixed investment to decline by about 5 per cent in 2020, before rebounding strongly by 4–5 per cent per annum until 2023.

**External sector**

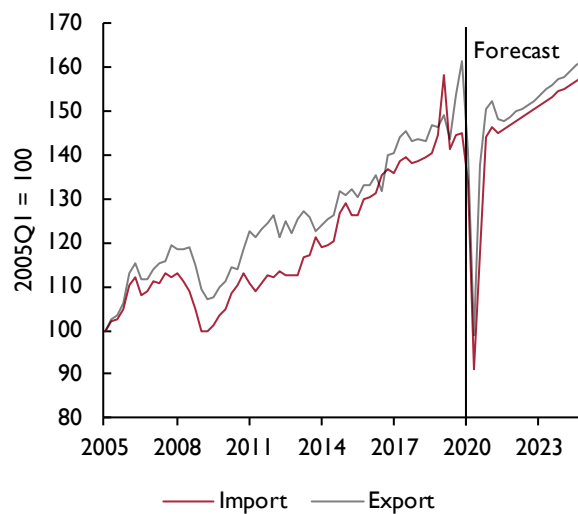
Import and export volumes were volatile in 2019, particularly around expected Brexit dates. But 2020 should witness even larger swings in trade volumes. The restrictions on international air, ground and sea travel

Figure 10. Business and housing investment in billion GBP, 2016 prices



Source: NIESR.

Figure 11. Import and export volumes



Source: NIESR.

imposed by many countries in response to the crisis will probably have a huge impact on trade, beyond the direct impact of highly volatile global demand. We forecast exports and imports to collapse by a third in the second quarter when the effect of the lockdown should be most severe (figure 11). Such a rapid and sudden fall in trade would be unprecedented in post-war United Kingdom. In the following quarters, the relative depreciation of sterling should make exports more competitive and import more expensive.

We have maintained our previous assumptions for the long-run path of imports and exports. With trade tensions likely to persist, export growth is likely to stay subdued in the medium term. We maintain our conditioning assumption that the UK will move to a standard free trade agreement with the EU at the end of 2020 that would increase trade frictions compared to the current situation (see Hantzsche and Young, 2020, box A).

The volatility of import volumes growth is being carried forward in our forecast, explaining a drop in the growth rate to  $\frac{1}{2}$  per cent per annum in 2020 before picking up to more than 4 per cent in 2021.

## Aggregate supply

### Labour market

The labour market had been in good shape prior to the impact of Covid-19. The employment rate in the three months to February 2020 was at a record high of 76.6 per cent and the unemployment rate was at 4 per cent, close to its record low of 3.7 per cent of the past 30 years. There were an estimated 795,000 vacancies in the UK in the period from January to March 2020, which was 52,000 fewer than a year earlier.

The labour market is expected to be particularly hit by the crisis, with many workers laid off or put onto the government's Coronavirus Job Retention Scheme (CJRS) whereby the government covers 80 per cent of the pay of employees being furloughed up to a maximum of £2,500 per month.

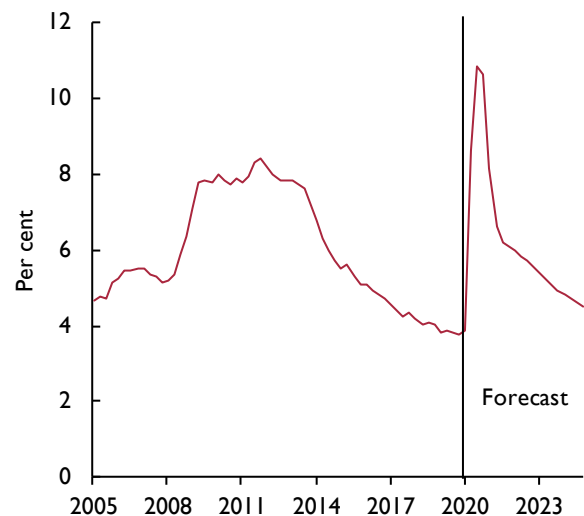
The British Chamber of Commerce Coronavirus Business Impact Tracker<sup>3</sup> survey showed that 66 per cent of businesses interviewed between 8–10 April had already furloughed some staff and 31 per cent of respondents had furloughed at least three quarters of their workforce. The ONS BICS 23 March–5 April survey found for businesses that were still trading that 21 per cent of the workforce had been furloughed under the terms of the

CJRS. Seventy per cent were still working as normal and 5 per cent were off sick or in self-isolation because of the coronavirus.

With over 22 million private sector employees in the UK, this survey suggests that around 4–5 million employees could be furloughed. On the first day of applications to the CJRS, the Chancellor Rishi Sunak announced that more than 140,000 companies employing a total of about a million workers had applied to the scheme.

While the government's scheme will preserve some jobs, it will probably not be able to fully offset the impact of the sharp downturn in activity. On 14 April, the Work and Pensions Secretary Therese Coffey announced that there had been 1.4 million claims for Universal Credit since 16 March.<sup>4</sup> Assuming that all these people are counted as unemployed, then it would mean that the unemployment rate is already close to 8 per cent. This assumption is of course tempered by the fact that Universal Credit doesn't only cover people out of work but also people on low income. Nonetheless, we forecast unemployment to increase temporarily to about 10 per cent of the workforce in the second half of 2020, averaging about 8 per cent for the full year, before slowly going back down to its non-accelerating inflation rate of unemployment (NAIRU) of 4 per cent (figure 12). We expect some hysteresis in the unemployment rate because it will be difficult for workers who have lost

Figure 12. UK ILO unemployment rate and forecast



Source: NiGEM database and NIESR forecast.

their job to return to their previous job or find a new one. For example, following the Great Financial Crisis, it took seven years for the unemployment rate to decline from its peak of 8 per cent in 2011 to 4 per cent in 2018.

### Productivity

Labour productivity, as measured by output per hour, saw a small rise of 0.3 per cent in the fourth quarter of 2019 compared with the same quarter a year ago. This rise was caused by gross value added growing at 1.1 per cent, slightly faster than hours worked which grew by 0.8 per cent. Labour productivity is estimated to be 20 per cent lower now than a continuation of the pre-financial crisis trend suggests (see Crafts and Mills, 2020). This makes the productivity slowdown unprecedented in 250 years of UK history.

Covid-19 is likely to have mixed effects on productivity in the short-run. On the one hand, output is expected to decline sharply because of a fall in demand and businesses shutting down, in particular in the second quarter when the effect of the lockdown is expected to be the most severe. On the other hand, hours worked are also expected to drop because workers are being furloughed, asked to take holidays or simply being laid off. As a result of such a large shock, productivity is expected to be very volatile quarter-by-quarter this year and more difficult to measure than in normal times.

The risk to productivity is in our view tilted to the downside because the disruptions to the economy may have some long-lasting effects. As this is a global pandemic leading to the temporary closure of borders, supply chains may be damaged, and it could be difficult to reinstall them quickly. Such long-lasting effects appear because of sunk costs in a process called hysteresis (see for example Gocke, 2002 or Cross *et al.*, 2009 for a discussion of hysteresis in economics). The experience of slow productivity growth after the financial crisis may be seen as a recent reminder of such effects. We forecast productivity to decline in 2020, before rebounding in 2021. We did not change our view about long-run productivity growth. Our forecast is for moderate productivity growth of around 1 per cent per annum from 2022 onwards, based on the assumption of continued trade tension and moderate technological progress.

### Capital stock

Estimates of the capital stock are relatively unreliable, reflecting inherent difficulties in measurement and regular revisions. We estimate that private sector capital

stock growth slowed to 1.3 per cent in 2019, down from 1.6 per cent the previous year. With a background of high uncertainty related to the Coronavirus crisis, we forecast private capital to increase by only half a per cent this year, the lowest growth rate since 2015 (table A6). By contrast, as a result of expected public investment initiatives, we forecast public sector capital stock growth to reach more than 3 per cent per annum in the years ahead. We may however be prudent about the planned public sector investment increase because the forecast increase in public debt may lead the government to set less ambitious public spending objectives.

### Wages and prices

Wage growth slowed down somewhat from its peak in the middle of 2019. Average weekly earnings (AWE) excluding bonus payments expanded by 2.9 per cent year-on-year in the three months to February 2020, and by 2.8 per cent if bonus payments are taken into account. This is down from the peak of nearly 4 per cent for both measures in the three months to June 2019. Growth in median pay for employees in the three months to February 2020 was highest in Scotland (4.1 per cent) and lowest in Northern Ireland (2.4 per cent). In real terms, AWE growth also declined from 2 per cent in the three months to June 2019 to 1.2 per cent in the three months to February 2020.

The labour market was until March in a situation of full employment and limited excess capacity but this is not the case anymore. The KPMG and REC Report of Jobs survey collected between 12 and 25 March picked up the first impact of Coronavirus on the labour market. It noticed a sharp decline in both permanent and temporary placements in March and a slowdown in wage inflation. Consistent with an opening of significant slack in the labour market, we forecast wage pressure to weaken further. The NIESR Wage Tracker suggests that nominal earnings growth will be close to 3 per cent in the first quarter and around 2½ per cent in the second quarter of 2020. Private sector wage growth is expected to decline more, reaching 2 per cent in the second quarter, while public sector wages are forecast to continue growing at a rate of around 3 per cent after ten years of public sector pay restraint. We also expect a decline in bonuses in the private sector because of the financial stress a lot of companies are experiencing. An upside risk to this forecast is that the distribution of people being furloughed or reducing their hours worked may be tilted towards lower paid workers who cannot work from home. If that is the case, then average weekly earnings may actually increase.



Looking further ahead, we forecast wage growth to continue to decline until next year because of continued slack in the labour market, before slowly recovering towards a growth rate of 3 per cent at the end of the forecast horizon.

With consumer price inflation of around 1½ per cent in the short term, our forecast suggests that real earnings growth may be 1½ per cent in the first quarter of 2020, declining to 1 per cent in the second quarter. We forecast real earnings growth to decline further into next year, before recovering towards a growth rate of 1–1½ per cent towards the end of the forecast horizon (table A5).

The impact of the crisis on unit labour costs (ULC) is uncertain. Labour compensation can be expected to decline because workers are forced to reduce their number of hours worked, unemployment is expected to increase and there will be less pressure on wages than before. However, production is also expected to decline because of the shutdown of large sectors of the economy. As ULC is the ratio of labour compensation to production, we forecast ULC growth to be very volatile in the short term. In the next few years, we forecast ULC growth to increase gradually towards its pre-crisis trend of 3 per cent per annum, supported by productivity gains.

The Consumer Prices Index including owner occupiers' housing costs (CPIH) 12-month inflation rate was 1.5

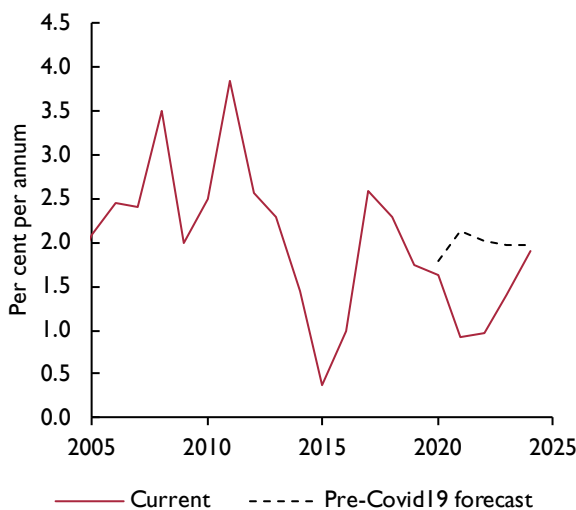
per cent in March 2020, having broadly declined since its peak of 2.8 per cent in November 2017. NIESR's CPI Tracker, a trimmed measure of inflation, also declined in March to 0.7 per cent, reaching the lowest inflation rate for about a year. Inflation was lowest in clothing and footwear and motor fuels. At the regional level, trimmed inflation was highest in Northern Ireland at 1 per cent and lowest in the South West and East Anglia at 0.4 per cent.

When the volume of trade is very low in some product or sectors, it can be difficult to evaluate how prices are moving. The price of some essential goods that may be in limited supply may increase a lot while the price of some non-essential goods may collapse because of a lack of demand.

An attempt by the ONS to measure online prices on a weekly basis shows that high-demand products have increased by 4.4 per cent in the first three weeks since the beginning of the lockdown on 23 March. High-demand products include food, household essentials and some medicines.

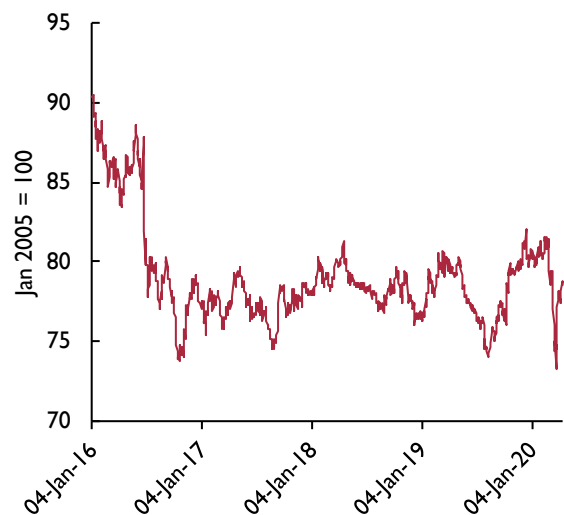
The global demand shock from the reduction in activity related to the coronavirus is expected to put further downward pressure on prices. In particular, lower commodity prices are expected to feed into lower consumer prices. Despite the Bank of England reducing its Bank Rate to 10 basis points, **we have revised our**

Figure 13. Consumer price inflation (including owner occupiers' housing costs)



Source: NIESR.

Figure 14. Sterling effective exchange rate



Source: Bank of England.

**inflation forecast downwards.** We now forecast consumer price inflation including owner occupiers' housing costs to decrease from 1½ per cent this year to 1 per cent in 2021, and then to grow back to 2 per cent at the end of the forecast horizon (figure 14).

Our forecast of a decline in inflation is likely to be limited by the depreciation of sterling since the beginning of the virus outbreak. In the context of unusually high market volatility, the effective exchange rate computed by the Bank of England temporarily declined to its lowest point since 1990 on 23 March, before regaining most of its loss (figure 15). The lower effective exchange rate compared to the last quarter of 2019 will likely pass-through to consumer prices and limit some of the downside risk to inflation.

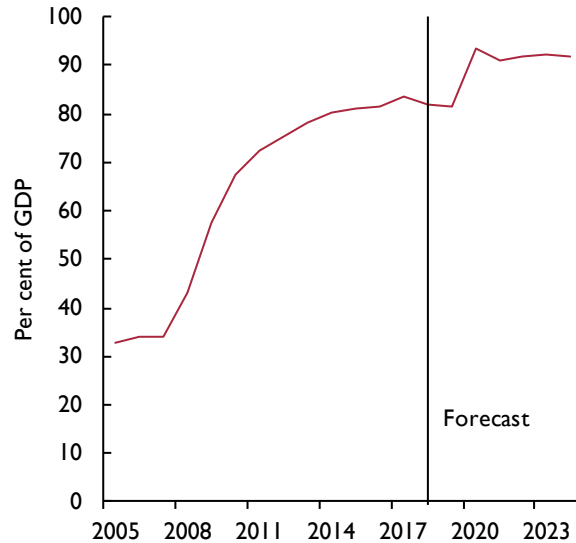
### Public finances

Public sector net borrowing from April 2019 to February 2020 is estimated by the OBR to be £44 billion, which is about 10 per cent more than last year.<sup>5</sup> Central government receipts (excluding 'quantitative easing') were up 2.8 per cent over the year to February while central government spending was up by 2.7 per cent over the same period. This doesn't take into account any measures related to the response to the Covid-19 outbreak, which are expected to push up public sector net borrowing. As a percentage of GDP, public sector net debt is expected by the OBR to have decreased by 1.1 percentage points in February 2020 compared to February 2019. Public sector net debt (PSND) is expected to finish the fiscal year slightly above 80 per cent of GDP, which is lower than the peak of 85 that it reached in 2017–18.

On 11 March, the Chancellor announced the new budget for fiscal year 2020–21.<sup>6</sup> This is the first budget of the current Parliament. The measures announced include an increase in public expenditure focused on health care, education and infrastructure. New infrastructure investments are aimed at bridging the North-South divide. On the revenue side, the National Insurance Contribution threshold will increase from £8,632 to £9,500, saving a typical employee around £104 a year from April. Businesses will also benefit from an increase in the Employment Allowance for Employer National Insurance Contributions from £3,000 to £4,000, which represents an average saving of £850 per year and per business. The National Living Wage (NLW) will increase from £8.21 to £8.72. It was also announced that the NLW would reach two-thirds of median earnings and to be extended to workers aged 21 and over by 2024.

The budget was completed by emergency measures to

Figure 15. Public sector net debt



Source: NiGEM database and NIESR forecast.

support the economy during the Covid-19 outbreak. Those measures are described in Box B of this *Review*. Put together, the budget and the emergency measures will lead to a large increase in government borrowing, with revenues declining and expenditure increasing.

We forecast that the fiscal stimulus combined with the quantitative easing will increase the PSND from 82 per cent of GDP in 2019–20 to 94 per cent in 2020–21, and that the PSND will stay above 90 per cent of GDP until the end of the forecast horizon. The details of the public sector forecast are in table A8. It is worth remembering that the PSND increased in the ten years after the financial crisis by about 50 per cent of GDP. If the current crisis were to have the same long-term impact as the financial crisis on PSND, then it would increase to 130 per cent of GDP. This constitutes an upside risk to our PSND forecast.

The current stress on public finances means that the first fiscal rule is unlikely to be met. The rule says that the current budget should be in balance no later than the third year of the forecast period. Yet, we forecast Public Sector Net Borrowing to be 10 per cent of GDP in 2020–21, declining to 4½ per cent in 2021–22 and 3½ per cent in 2022–23. As part of the Budget announcement, the Government explained that it intended to review the fiscal rules before the next budget. Chadha (2019) argued that the rules should be made more flexible and integrated in a wider “strategy of macroeconomic management”.

## Sectoral balances

Table A9 shows the saving and investment balances of the household, corporate and public sectors of the economy and the resulting balance with the rest of the world. If investment is greater than saving for a sector, then that sector is a net borrower. The aggregation of these three domestic sectors is the current account balance.

Looking at annual averages, the current account deficit in 2019 was 3.8 per cent of GDP, very similar to the deficit of 3.9 per cent in 2018. This year, we expect the household sector to increase its saving from 4 per cent of GDP in 2019 to more than 10 per cent because of greater economic uncertainty and Covid-19. In contrast, we forecast the government to decrease its saving from 1.6 per cent of GDP to a dissaving of 5½ per cent because of the large fiscal package to fight the coronavirus. This would be the first year since 2015 that the government sector would have had negative saving. On the corporate side, we expect investment to decline from 10½ per cent of GDP in 2019 to 9½ per cent because of the persistent effect of the crisis on demand. Aggregating all sectors, we expect the current account deficit to be smaller this year at about 1 per cent of GDP, but to quickly go back to 2½ per cent starting next year and until the end of the forecast horizon.

## Brexit

For the first time in three years, our forecast doesn't feature a prominent part dedicated to Brexit. This is because the scale of the Covid-19 pandemic has eclipsed Brexit as the main concern for the UK economy. However, the intensity of the pandemic will decrease at some point, and policy makers will have to go back to thinking about long-term issues for the UK economy. And the relationship with the EU will surely be again one of those key issues. There may be some pressure for the government to extend the transition period beyond the current end date of 31 December 2020 because the negotiations with the EU over the new trade arrangements were interrupted during the Covid-19 pandemic. While we wait for more clarity, we did not change our assumption, described in Hantzche and Young (2020, box A), about a standard trade agreement entering into force in 2021.

On Brexit, the government has made it clear that it wants to negotiate a deep free trade agreement with the EU by the time that the transition period ends on 31 December 2020. But the short timetable, and the government's apparent preference for regulatory divergence, is likely to result in a bare-bones agreement. As such, UK exporters will face increasingly costly non-tariff barriers to trade with the EU from next year. In the long term leaving the EU single market and customs union is expected to reduce GDP by 3–4 per cent relative to what it would have been had the UK remained in the EU.

## NOTES

- 1 The Dynamic Sectoral Model is an open-economy New Keynesian-type model where output is largely demand-determined in the short run and supply-determined in the long run. Each of the nine sectors in the model has a well-defined production function and are linked to each other by supply chains in line with ONS Supply and Use tables.
- 2 Tesco preliminary results 2019/2020 <https://www.tescopl.com/media/755614/tesco-plc-preliminary-results-1920.pdf>.
- 3 <https://www.britishchambers.org.uk/news/2020/04/bcc-coronavirus-business-impact-tracker-two-thirds-of-respondents-awaiting-funds-from-furlough-scheme-as-payday-approaches>.
- 4 <https://www.standard.co.uk/news/uk/universal-credit-applications-rise-coronavirus-crisis-a4413701.html>.
- 5 <https://obr.uk/docs/Mar-2020-PSF-Commentary.pdf>.
- 6 <https://www.gov.uk/government/news/budget-2020-what-you-need-to-know>.

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## Box A. The slump of the 1920s

by Jagjit S. Chadha

The largest quarterly fall in output in modern times in the UK (so far) was in the second quarter of 1921 when GDP at constant market prices fell by 12.3 per cent. This was directly followed by the largest quarterly increase in output of 13.7 per cent in the very next quarter (see Mitchell *et al.*, 2012, who estimated the quarterly data). Figure A1 shows the percentage quarterly change in output for the inter-war period and we can see that these two quarters dwarf subsequent fluctuations in the rest of this volatile period. In this Box, we try to place in context the events of the postwar slump in UK economic activity and understand the likely causes of the prolonged decline and its acceleration in the first half of 1921.

In the immediate aftermath of the Peace, the winding down of the war economy promoted a sharp decline in activity, as did the orthodox deployment of targets for a return to the Gold Standard and a fiscal tightening, which led to a real exchange rate appreciation in the face of declining world demand. In the labour market, wages did not adjust to lower levels of labour productivity and meant that firms laid off some employees. The postwar financial boom was burst by successive increases in Bank Rate. The depth of the recession in 1921 was also in part caused by a coal strike which seems to have accounted for a significant but by no means a complete account of the decline. The end of the strike triggered some growth and it was also fostered by a recovery in global demand, but what became known as the Doldrums ensued as a result of continued tight monetary and fiscal policies.

### Detail

The shockingly bad second quarter of 1921 was immediately followed by a rapid return in output in the second half of 1921, but the slump had in fact started in the third quarter of 1920 and output did not in the end pass its pre-crisis peak, in the second quarter of 1920, until the second quarter of 1924. At the trough at the end of the second quarter of 1921, output was nearly 20 per cent below its peak. This four-year long recession was termed *The Slump* by Pigou in 1947 and he ascribed much of the cause to the collapse of export markets, whereas Hawtrey placed a lot more weight on tight monetary policy aiming for a return to the Gold Standard in 1925, with Bank Rate raised to 7 per cent in April 1920. Chadha (2014) presents evidence to suggest that monetary policy focussed on the return to the Gold Standard was the dominant cause of the slump.

As it happens, the economy weakened well before that historic quarter, from the middle of 1920 until March 1921. And during April and May both industrial production and GDP followed an accelerated decline but rose rapidly again by July-August 1921. The proximate cause was a coal strike that began on 31 March with coal rationing introduced on 3 April. The strike ended on 28 June 1921 and helps explain the sharp recovery in July. The coal strike contributed to the loss of some 85.9 million working days in 1921, which was just over a half of the 162.2 million days lost during the better-known General Strike of 1926. Overall, around three quarters of a week was lost by the whole workforce out of some 47 working weeks in 1921, which was around 1.5 per cent of overall labour input that year.<sup>1</sup>

Figure A1. Quarter on quarter % growth rates in GDP at 1938 constant prices (1920–38)

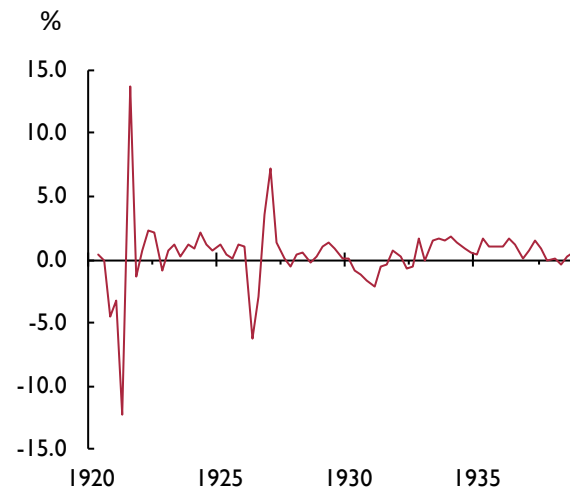
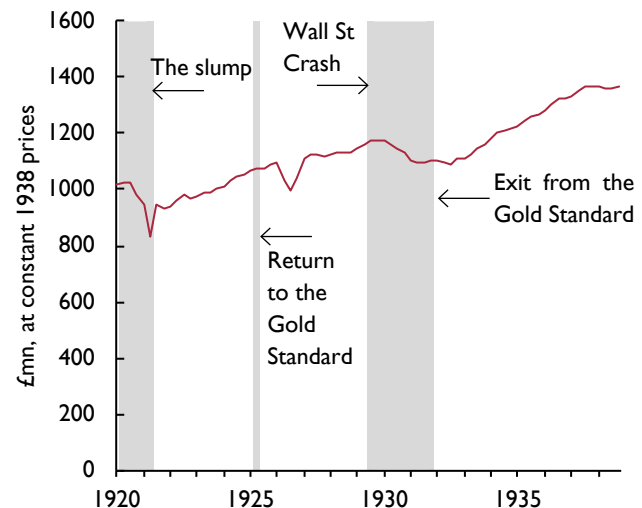


Figure A2. GDP in £mn at 1938 at constant prices (1920–38)



### Box A. (continued)

The literature on the 1920–I recession accounts for the slump in terms of both the demand and the supply side. On the demand side, in 1919, the Cunliffe Committee announced the aim of returning Britain to the Gold Standard at the pre-war par value, which resulted in contractionary interest rate rises, which brought about a significant real exchange rate appreciation. The pursuit of a reduction in the burden of public debt under the so-called ‘Treasury View’ also led to large-scale spending cuts to balance the budget under several initiatives, perhaps most famously Geddes Axe in 1921/2. On the supply side, the literature has stressed the reduction in hours worked with employment and average weekly hours falling from 19.8 million and 52.2 hours in 1919 to 18.3 million and 47.4 hours by 1924, which created a ‘wage gap’ as productivity failed to adjust. Although these factors clearly acted to provoke a downturn in the economy, the data suggest that the ferocity of fluctuation in 1921 cannot be explained fully by these factors alone and the coal strike offers a further obvious explanation.

Dow (1998) argues that although it was not confined to the UK, the recession was deeper here than elsewhere and nothing comparable occurred in the 1930s or after World War II. It was a special event. The war economy was being rapidly run down, leading to a sharp reduction of some 25 per cent in government expenditure over 1919–20; not all demobilised men could be deployed leading to a sharp reduction in labour supply, which was accentuated as the female participation rate fell. Total final expenditure fell by some 7 per cent in 1921, which was accounted for by large falls in consumer expenditure and net exports, as well as a fall in inventories, and some of the downturn in the cycle was amplified by end of the postwar speculative bubble which also fed into a collapse of world demand. The recovery that started in the second half of 1921 was probably due to some recovery in exports and world demand, a return of stockbuilding and looser monetary policy with Bank Rate cut to 5.5 per cent in July 1921.

As Eichengreen (2004) argues, the overvaluation and concentration of production in high cost industries accounts for much of the decline in this period and although new industries sprung up they did not absorb all the labour shed. British financial institutions and markets were not very well suited for supporting the activities of new small firms and what became termed the ‘Macmillan gap’ persisted. Arguably, the lack of finance for small and medium sized firms resonates strongly today. The change in attitudes whereby policymakers started to take more active responsibility for economic outcomes can also, to an extent, be traced to this period (Chadha, 2014).

#### NOTE

I See Sheet 3.3A in Chadha et al., 2019. Column U reports that there was 0.69 weeks lost on average compared to a working year of 47.3 weeks.

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## Box B. Fiscal measures will soften the economic blow from the coronavirus crisis

by Dawn Holland and Cyrille Lenoël<sup>1</sup>

The UK government has initiated an unprecedented plan in size and scope to mitigate the impact of the coronavirus crisis on companies and workers. The primary objective of this plan is to ensure that more businesses have the resources they need to survive the enforced shutdown period without having to lay off too many staff. The measures announced by Chancellor Rishi Sunak are a mix of business grants, tax rebates, income support, government spending and loans. These policies dramatically scale up the initial measures announced in the March Budget (see Chadha *et al.*, 2020). In this box, we discuss in more detail the measures and their expected economic impact with the help of a model simulation.

The first fiscal measure is a nationwide Coronavirus Job Retention Scheme. Companies whose operations have been severely affected by coronavirus can furlough employees and apply for a grant that covers 80 per cent of their usual monthly wage costs, up to £2,500 a month per employee, plus the associated Employer National Insurance contributions and pension contributions. A similar scheme has been set up to cover the self-employed up to the same amount. Both plans started on 1 March and will last 3 months. ONS survey evidence suggests that 20 per cent of private sector employees had been furloughed by early April. The IFS<sup>2</sup> estimated that the job retention scheme would cost £10 billion if 10 per cent of employees were to be covered by this plan for 3 months, whereas the OBR<sup>3</sup> estimated the costs to be £40 billion for a coverage of 30 per cent. In our simulation, we assume a middle of the road scenario where 20 per cent of employees are furloughed for 3 months at a cost of £20 billion to government finances. In line with the OBR's assumption, we assume that the scheme for self-employed will cost roughly half that.

Companies will also be able to claim up to 2 weeks of Statutory Sick Pay rebate for employees who were unable to work as a result of coronavirus. Households in need will receive state support in the form of social transfers and housing benefits, amounting to nearly £7.8 billion in total: the Universal Credit standard allowance will be increased by £1,000 a year for the next 12 months and the basic element of Working Tax Credit by the same amount, local Housing Allowance will be increased to cover at least 30 per cent of market rents. Just over a tenth of households have agreed mortgage holidays with their lenders.

Companies in the retail, hospitality and leisure sectors will not have to pay business rates for 12 months in England and a similar business support scheme will be made available by devolved administrations with funding computed using the Barnett formula. Businesses who are eligible for the business rates holiday will also receive grants of up to £25,000. The total cost of business rates holiday and grants is estimated by the Treasury to amount to £23.5 billion.

Another aspect of the plan is the deferral of some tax payments that would be coming due, to ease short-term liquidity constraints. VAT payments due between 20 March 2020 and 30 June 2020 can be deferred until 31 March 2021. Self-Assessment payment due on 31 July 2020 can be deferred to January 2021. Overall, the Treasury estimates that £30 billion of taxes will be deferred until 2021. HMRC has also signalled that they are open to supporting businesses and self-employed people with outstanding tax liabilities on a case-by-case basis.

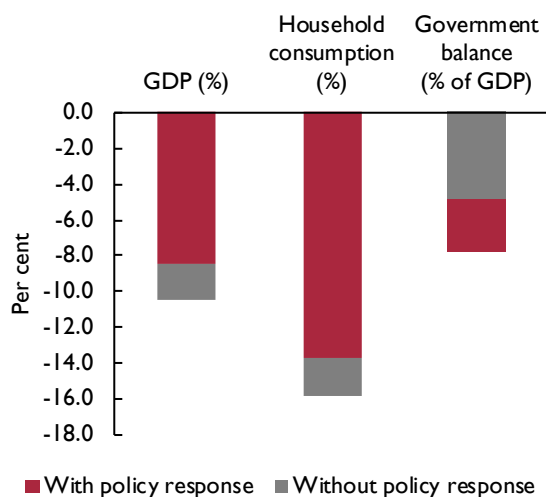
The government has set up two loan schemes, one for small and medium size businesses (Coronavirus Business Interruption Loan Scheme – CBILS) and two for larger businesses (Covid-19 Corporate Financing Facility – CCF and Coronavirus Large Business Interruption Loan Scheme – CLBILS). They amount to £330 billion of government support, through loans and guarantees, which is equivalent to 15 per cent of GDP. We model this support as a decline in the risk premium on private sector borrowing by 1 percentage point, ignoring the rise in contingent liabilities that the Treasury would be exposed to in the event of loan defaults.

Table B1. The fiscal measures to mitigate the economic impact of the virus

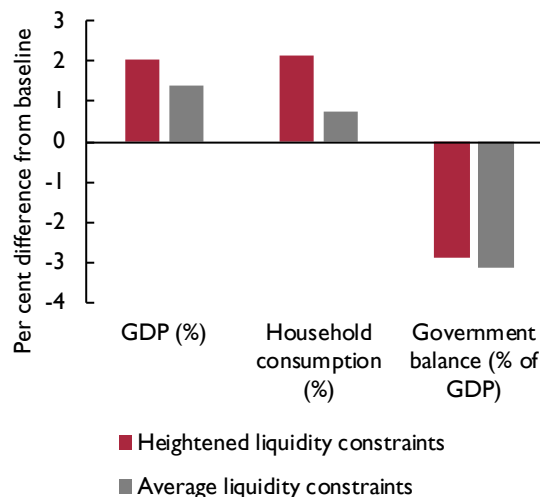
Measure	Estimated cost £bn	Modelled as
Job retention scheme	20	Social transfer
Self-employment scheme	10	Social transfer
Universal credit and other welfare measures	7	Social transfer
Housing benefit	0.8	Social transfer
Business rates and grants	23.5	Corporate tax rebate
Public spending (NHS)	10	Govt consumption
Deferral of VAT and other taxes	-30 then +30	Corporate tax deferral
Business loans schemes	No direct cost	Decrease in risk premium
Estimated total cost of measures	71.3	

Notes: We assume all the shocks are spread over the initial year. Transfers and government consumption are then gradually reduced over the next year. Corporate tax is cut in the first year and increases in the second year to take into account tax deferrals. We model VAT deferral as corporate tax deferral that supports short-term liquidity. Risk premium decreases by 1 percentage point for 2 years. Monetary policy is fixed on base for 2 years. Household liquidity constraints among the targeted social transfer recipients are assumed to be significantly higher than the national average.



**Box B. (continued)****Figure B1. Impact in 2020 of the coronavirus crisis with and without fiscal support on GDP, consumption and government balance**

Source: NiGEM simulations.

**Figure B2. Impact of fiscal measures on key variable under heightened and average liquidity constraints**

Source: NiGEM simulations.

The total amount of extra funding committed to the NHS is officially £5 billion; but in line with the OBR, we assume that extra spending on the NHS and other accompanying measures reach £10 billion in 2020. The government has also waived duties and VAT on vital medical imports, including ventilators, coronavirus testing kits and protective clothing.

The measures aimed at preserving jobs and helping households should support household income. Our simulation suggests that part of that extra income will be saved and part of it will lead to a smaller fall in consumption compared to the scenario without fiscal support. The measures aimed directly at businesses should support their profits and allow them to continue to operate with more staff than they would have done without the support. Business investment would also be higher thanks to the loan scheme. Overall, the scenario suggests that the measures outlined in table B1 can be expected to offset 2 percentage points of the decline in GDP in 2020. Whereas in the absence of the outlined policy interventions we estimate that the impact of the coronavirus crisis would have reduced GDP by 10½ per cent, this can be described as a mild offsetting policy that reduces the GDP loss to 8½ per cent compared to our pre-coronavirus forecast (figure B1). The fiscal measures explain 2.9 percentage points of the nearly 8 per cent of GDP increase in public sector net borrowing in 2020–21 as a result of the coronavirus crisis.

The scenario is run allowing for household liquidity constraints among the targeted social transfer recipients that are significantly higher than the national average (see Appendix A in Bagaria *et al.* (2012) for an analysis of liquidity constraints and fiscal multipliers using NiGEM). The income support measures that have been introduced are targeted at households that would have been more likely to find themselves cash constrained, with limited savings to fall back on, in the absence of these measures. As a result, we would expect a greater percentage of these social transfers to be spent on short-term consumption compared to a scenario in which the equivalent level of social transfers was distributed evenly across all households. Under this assumption, the plan would push up household consumption by 2.1 per cent in the first year, offsetting some of the nearly 16 per cent contraction in consumption that we would have expected without the fiscal support.

Households that are not cash constrained would be expected to spread out any extra income over several years, making stimulus measures targeted at unconstrained households less effective in the short run. Figure B2 compares the estimated first-year impact of the policy interventions in table B1 under our assumption of heightened liquidity constraints to a scenario where social transfer recipients exhibit liquidity constraints in line with the estimated national average in normal times. The stimulus to household spending and GDP would be greatly reduced, and the fiscal costs somewhat higher in such a scenario, as a greater share of social transfer payments would be saved rather than recycled into consumer spending.

### Box B. (continued)

Under heightened liquidity constraints, the deficit would deteriorate by about 2.9 per cent of GDP as a result of these measures, or £67 billion. Roughly a third of the stimulus would therefore pay for itself thanks to the extra tax receipts from employees that remain in employment and companies that stave off bankruptcy. Under average liquidity constraints, the deficit would be expected to rise by closer to £73 billion.

Our result is of course sensitive to the assumptions that we have made. If the Coronavirus Job Retention Scheme were to be applied to more people, as suggested by the OBR, or extends beyond 3 months, then it would deliver a stronger stimulus to the economy, while worsening the government budget balance. In the current situation where GDP is falling, unemployment is rising and the policy rate is at the zero-lower bound, it is possible that fiscal multipliers may be temporarily higher than usual. For example, Auerbach and Gorodnichenko (2012) estimated spending multipliers to be approximately zero in expansions and as high as 2 or 3 in recessions for the US economy. This suggests that the announced fiscal measures may have a more stimulative impact on the economy than our estimates suggest, posing an upside risk to the outlook. But fundamentally it is clear that fiscal policy will not fully shield against the dramatic economic shock posed by the coronavirus crisis.

#### NOTES

- 1 The authors would like to thank Jagjit Chadha and Garry Young for helpful comments.
- 2 <https://www.ifs.org.uk/publications/14771>.
- 3 <https://obr.uk/coronavirus-reference-scenario/>.

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## Box C. Judgement-augmented forecasting with the Warwick Business School forecasting system

by Ana Galvão, Anthony Garratt and James Mitchell

By design, the WBSFS forecasts presented each quarter in this Box since 2017 are mechanically produced from a set of statistical models. The forecasts are not adjusted judgementally or otherwise, other than reflecting standard modelling decisions required to be made. For example, regarding the choice of variables to include in the model, data transformations and lag length. They are deemed 'simply' to represent the economic data's best probabilistic view of what will happen to the macroeconomy, taking into account historical patterns and known uncertainties in past economic data. They are designed to offer a judgement-free benchmark against which other density forecasts can be compared; they need not represent the 'best' or even a 'plausible' forecast, particularly at times of sudden change, even though historically the WBSFS forecasts have performed quite well.<sup>1</sup>

Accordingly, given the large shock to the world economy, stemming from the coronavirus pandemic, the forecasts from the WBSFS should not yet be expected to pick up the macroeconomic disruption due to the shutdowns designed to contain the spread of the coronavirus. Therefore, in addition to presenting as usual the judgement-free WBSFS probabilistic forecasts, we present one variant of our forecast that conditions or 'tilts' on the consensus or combined judgement-based forecasts of others, whose information set is likely more up-to-date. This is one of many approaches that might be adopted to address forecasting in times of sudden change. Entropic tilting, introduced into macroeconomic forecasting by Robertson *et al.* (2005), consists of modifying a given predictive distribution into a new predictive distribution, such that it satisfies a set of restrictions but minimises the relative entropy or distance between the two distributions. In our illustrative application, the restriction we impose involves tilting the WBSFS density forecast towards the mean or consensus forecast from the FocusEconomics survey. The distance between these two density forecasts, measuring their differing probabilistic views about the macroeconomic outlook, serves as one quantitative measure of the impact of the coronavirus shock as expected by the panel of professional forecasters polled by FocusEconomics.

Macroeconometric forecasting models and systems, like the WBSFS, rely largely on what McCracken (2020) refers to as "slow moving" publicly available and aggregated economic data, like quarterly GDP, which do not currently reflect the effects of the coronavirus shock. Some faster moving monthly economic data, like survey indicators and financial data, do form part of the dataset used in the WBSFS. But in exploiting regularities in past data to decide automatically how, in effect, to weigh up these different data sources, the WBSFS does not yet know that it should pay more attention to these data; although a prior, reflecting our judgement, could be imposed to force the model to do so. Moreover, our judgement could also be deployed if the model were to be augmented with more timely, but less traditional data published at the higher-frequency with shorter lags. For example, in the US, Lewis *et al.* (2020) have found it helpful when monitoring the US economy during the current crisis to consult weekly data from private sources; these faster moving data better capture aspects of how the macroeconomy is being disrupted by the coronavirus. In normal circumstances, use of lower frequency data when forecasting is perfectly adequate. But right now, these data do not fully capture the emerging effects of the coronavirus pandemic. Indeed, in these unprecedented circumstances, where the future path of the economy is dependent not least on policies to contain, control and monitor the coronavirus, some form of judgement is required to form any sensible macroeconomic forecast.

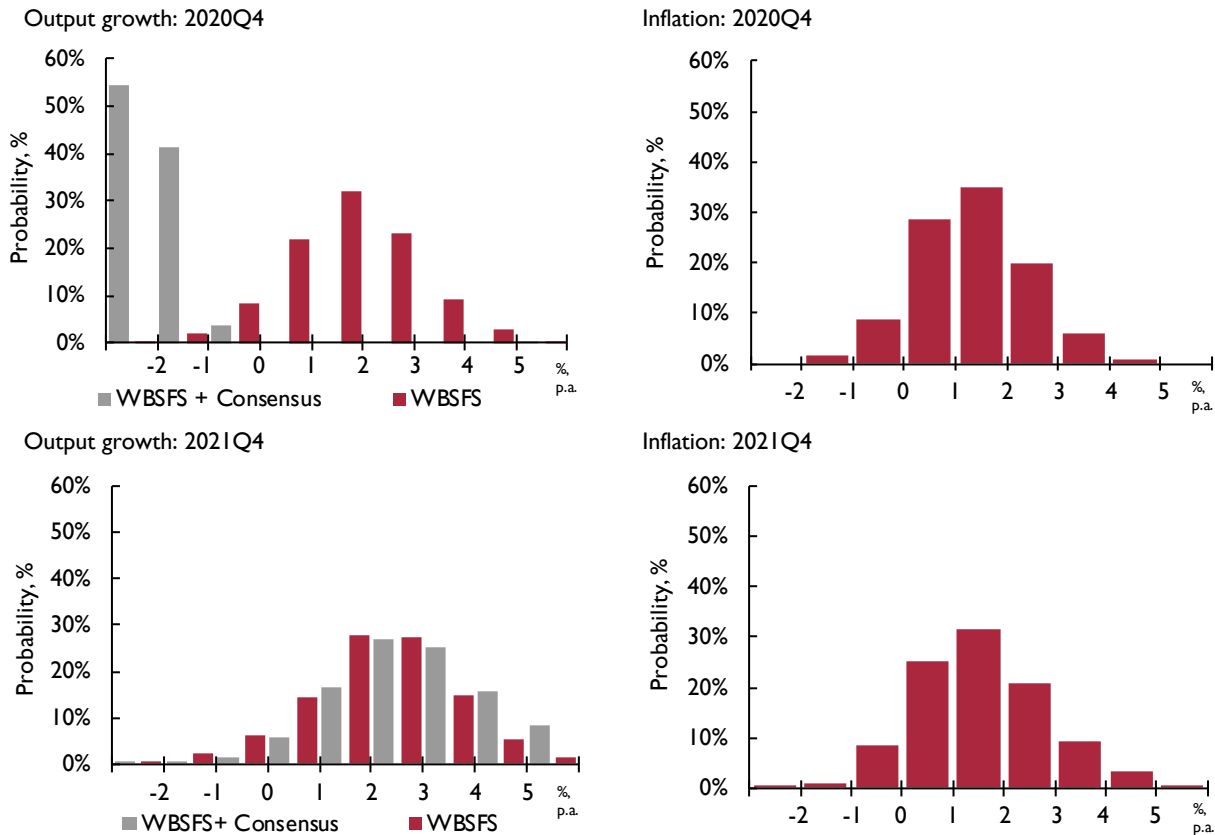
Specifically, to help gauge the forecast size of the effects of coronavirus shock on the macroeconomy, we 'tilt' the judgement-free WBSFS density forecast to match the consensus point forecast from the FocusEconomics forecast survey (of 8 April 2020). Each month FocusEconomics poll a panel of several hundred leading economists. Use of a consensus or combined judgement-based forecast means that, while bringing outside judgements to bear on the WBSFS density forecasts, we are not siding with one individual expert over another. It is also well-established in the forecasting literature that consensus point forecasts from professional forecasters are hard to beat; see Timmermann (2006). Our recent research (Galvão, Garratt and Mitchell, 2020) has found that conditioning on external information from judgement-augmented consensus point forecasts can improve the accuracy of the WBSFS probabilistic forecasts, precisely at times of sudden change and heightened macroeconomic uncertainty, given that statistical models take time to adjust.

We emphasise that any forecast, even with judgement, is subject, understandably, to a wider range of 'unknown unknowns' than usual. Any attempt to quantify these will involve judgements being made *inter alia* about how long the shutdowns designed to contain the coronavirus last and on the associated economic disruption. In short, in the current crisis, there is heightened uncertainty about both the uncertainty forecasts embedded in any density forecast and the conditioning assumptions and judgements made in producing it.

The figure below presents WBSFS's latest (as of 15 April 2020) probabilistic forecasts for real GDP growth and inflation – defined as year-on-year growth rates for 2020Q4 and 2021Q4 – as histograms.<sup>2</sup> The information set used to produce these forecasts includes

**Box C. (continued)**

Figure C1. WBSFS forecast probabilities for real GDP growth and inflation, year-on-year



information on GDP growth up to 2019Q4 and data on CPI inflation up to February 2020. For GDP growth, we also present forecasts with consensus judgement applied via the tilting. The consensus point forecasts for GDP growth from FocusEconomics are -2.6% for 2020Q4 and 3.0% for 2021Q4 (see FocusEconomics Coronavirus Weekly Update, 8 April, page 18, UK).

The consensus view of inflation, as captured in the FocusEconomics survey, differs little from the benchmark WBSFS forecast; we therefore do not impose any judgement on the inflation density forecasts from the WBSFS. This itself is revealing, suggesting that, at least currently, the GDP effects of the coronavirus crisis are expected by professional forecasters to be larger than its effects on inflation. This may well reflect the underlying and possibly offsetting demand and supply side macroeconomic effects of the coronavirus shock.

Tables C1 and C2 extract from these histogram forecasts the probabilities of specific output growth and inflation events. The events considered are the probability of output growth being less than 0%, 1% and 2%, and of inflation lying outside the 1–3% target range (i.e., the probability of the Bank of England’s Governor having to write a letter explaining how and why inflation has breached its target range). Also reported are the individual probabilities of inflation being less than 1% and greater than 3%, to indicate which side of the target range is most likely to be breached.

In table C1 we present the probability of specific output growth events, with and without tilting towards the external information. Not accounting for the judgement, we observe that the revision in the probabilities from the January (bottom right) to April (top right) forecast is relatively small for both 2020Q4 and 2021Q4. There is approximately a 1-in-10 probability of negative growth in all cases; the most likely growth outcome is forecast to be between 1–2%. However, bringing outside information to bear on the WBSFS density, via tilting, shifts the density for 2020Q4 (top left) markedly to the left: the probability of a GDP contraction rises from 11% to 100% when the WBSFS is updated to reflect the consensus judgement.

This 89 percentage points increase in the chance of a GDP contraction offers one measure of the macroeconomic effect of the coronavirus pandemic, as judged by the professional forecasters surveyed by FocusEconomics.

**Box C. (continued)****Table C1. Real GDP growth (annualised %) probability event forecast for 2020Q4 and 2021Q4 (extracted from the WBSFS forecast histograms)**

Year	WBSFS + Consensus			WBSFS		
	Pr(growth<0%)	Pr(growth<1%)	Pr(growth<2%)	Pr(growth<0%)	Pr(growth<1%)	Pr(growth<2%)
<b>Updated forecasts (April 2020)</b>						
2020Q4	100%	100%	100%	11%	33%	65%
2021Q4	2%	8%	24%	9%	23%	51%
<b>Previous forecasts (January 2020)</b>						
2020Q4	NA	NA	NA	10%	29%	58%
2021Q4	NA	NA	NA	10%	23%	50%

In fact, the tilted density gives a slightly higher than one-in-two chance that output growth is less than -2% in 2020Q4. In 2021Q4, we observe a large shift towards high growth in the tilted output growth distribution, such that relative to the judgement-free WBSFS density forecast there is now a higher probability of output growth greater than 2%, of 76% versus 49% for the case where we do not adjust the densities using consensus judgement. This reflects the consensus judgement in FocusEconomics that GDP growth will bounce back to 3.0% in 2021Q4. A less optimistic judgement, perhaps reflecting a view that the pandemic will persist or recur or that the economic contraction will have scarring effects, would not lead to forecasts of such a V-shaped GDP recovery.

For CPI inflation, seen in table C2, the revision to the WBSFS forecast (recall this is a judgement-free forecast) is much smaller. In general, relative to January, there is now a slightly higher chance of lower inflation. For 2020Q4 and 2021Q4 the chance of inflation being less than 1% increases from 26% and 29% to 39% and 35%, respectively.

**NOTES**

- 1 The forecasts produced by the WBSFS or any statistical model do of course involve the use of types of judgement. For example, over the choice of data to include in the model, data transformation, sample size, lag length etc., not all of which can be purely automated. Here “not adjusted for judgement” is taken to mean the forecasts a model produces, given these choices, where no other post-forecast intervention is undertaken. Such a mechanical use of statistical models is as close an example to a ‘pure model’ forecast as one is likely to see.
- 2 WBSFS forecasts for UK output growth and inflation have been released every quarter since November 2014. Details of the releases are available at <https://www2.warwick.ac.uk/fac/soc/wbs/subjects/emf/forecasting/> and a description of the models in the system and of the indicators employed is available at [https://www2.warwick.ac.uk/fac/soc/wbs/subjects/emf/forecasting/summary\\_of\\_wbs\\_forecastingng\\_system.pdf](https://www2.warwick.ac.uk/fac/soc/wbs/subjects/emf/forecasting/summary_of_wbs_forecastingng_system.pdf).

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**Table C2. CPI inflation probability event forecasts for 2020Q4 and 2021Q4 (extracted from the WBSFS forecast histograms)**

Year	WBSFS		
	Pr(letter)	Pr(CPI<1%)	Pr(CPI>3%)
<b>Updated forecasts (April 2020)</b>			
2020Q4	45%	39%	7%
2021Q4	48%	35%	13%
<b>Previous forecasts (January 2020)</b>			
2020Q4	40%	26%	14%
2021Q4	46%	29%	18%

## Appendix – Details of main-case forecast scenario

Table A1. Exchange rates and interest rates

	UK exchange rates			FTSE All-share index	Interest rates			
	Effective 2011 = 100	Dollar	Euro		3-month rates	10-year gilts	World <sup>(a)</sup>	Bank Rate <sup>(b)</sup>
2014	110.7	1.65	1.24	3551	0.50	2.50	0.90	0.50
2015	117.5	1.53	1.38	3566	0.60	1.80	0.80	0.50
2016	105.8	1.35	1.22	3512	0.50	1.30	0.90	0.25
2017	100.0	1.29	1.14	4011	0.40	1.20	1.30	0.41
2018	101.9	1.34	1.13	4021	0.70	1.40	2.00	0.75
2019	101.6	1.28	1.14	3967	0.80	0.90	2.10	0.75
2020	102.4	1.25	1.14	3131	0.50	0.40	1.00	0.10
2021	102.3	1.25	1.14	3661	0.30	0.80	0.80	0.10
2022	102.7	1.25	1.14	3986	0.30	1.10	1.00	0.10
2023	103.2	1.26	1.14	4032	0.50	1.50	1.20	0.47
2024	103.6	1.26	1.14	4119	0.80	1.80	1.50	0.73
2019 Q1	102.5	1.30	1.15	3846	0.90	1.20	2.30	0.75
2019 Q2	102.0	1.29	1.14	3999	0.80	1.00	2.30	0.75
2019 Q3	98.5	1.23	1.11	4001	0.80	0.60	2.10	0.75
2019 Q4	103.2	1.29	1.16	4024	0.80	0.70	1.70	0.75
2020 Q1	103.1	1.28	1.16	3787	0.70	0.50	1.40	0.61
2020 Q2	102.1	1.24	1.14	3074	0.60	0.30	0.80	0.10
2020 Q3	102.2	1.25	1.14	2665	0.30	0.40	0.80	0.10
2020 Q4	102.2	1.25	1.14	2998	0.30	0.50	0.80	0.10
2021 Q1	102.2	1.25	1.14	3249	0.30	0.60	0.80	0.10
2021 Q2	102.3	1.25	1.14	3590	0.30	0.70	0.80	0.10
2021 Q3	102.4	1.25	1.14	3830	0.30	0.80	0.80	0.10
2021 Q4	102.5	1.25	1.14	3974	0.30	0.90	0.90	0.10
<i>Percentage changes</i>								
2014/2013	7.6	5.3	5.4	4.3				
2015/2014	6.1	-7.2	11.1	0.4				
2016/2015	-9.9	-11.4	-11.2	-1.5				
2017/2016	-5.5	-4.9	-6.7	14.2				
2018/2017	1.9	3.6	-1.0	0.3				
2019/2018	-0.3	-4.4	0.9	-1.3				
2020/2019	0.8	-1.8	0.3	-21.1				
2021/2020	0.0	-0.5	-0.5	16.9				
2022/2021	0.3	0.2	-0.1	8.9				
2023/2022	0.5	0.5	-0.1	1.1				
2024/2023	0.5	0.6	-0.1	2.2				
2019Q4/18Q4	2.1	0.1	3.2	5.7				
2020Q4/19Q4	-1.0	-3.3	-2.0	-25.5				
2021Q4/20Q4	0.3	0.1	-0.1	32.5				

Notes: We assume that bilateral exchange rates for the fourth quarter of this year are the average of information available to 10 April 2020. We then assume that bilateral rates remain constant for the following two quarters before moving in line with the path implied by the backward-looking uncovered interest rate parity condition based on interest rate differentials relative to the US. (a) Weighted average of central bank intervention rates in OECD economies. (b) End of period.



Table A2. Price indices 2016=100

	Unit labour costs	Imports deflator	Exports deflator	World oil price (\$) <sup>(a)</sup>	Consump- tion deflator	GDP deflator (market prices)	RPI <sup>(b)</sup>	Consumer prices CPI <sup>(c)</sup> CPIH <sup>(d)</sup>	
2014	97.5	102.2	99.8	98.4	98.6	97.3	97.3	99.3	98.7
2015	97.9	96.9	96.0	52.1	98.6	97.9	98.3	99.4	99.0
2016	100.0	100.0	100.0	42.9	100.0	100.0	100.0	100.0	100.0
2017	102.3	105.4	104.5	54.0	101.4	101.9	103.6	102.7	102.6
2018	105.4	108.4	107.7	70.4	104.1	104.1	107.0	105.2	104.9
2019	108.6	109.5	109.4	63.7	105.5	106.0	109.8	107.1	106.8
2020	112.9	110.8	109.9	41.2	106.9	107.5	111.1	108.8	108.5
2021	108.8	113.2	112.2	57.3	108.0	108.6	113.1	109.8	109.5
2022	110.1	114.5	113.5	61.4	109.0	109.9	115.6	110.9	110.6
2023	111.8	115.6	114.5	62.3	110.6	111.6	118.7	112.4	112.1
2024	114.3	117.4	116.1	63.3	112.7	113.9	122.4	114.6	114.2
<i>Percentage changes</i>									
2014/2013	0.1	-3.5	-1.6	-8.7	1.5	1.8	2.4	1.4	1.5
2015/2014	0.4	-5.2	-3.8	-47.0	0.0	0.6	1.0	0.1	0.4
2016/2015	2.2	3.2	4.2	-17.7	1.4	2.1	1.7	0.7	1.0
2017/2016	2.3	5.4	4.5	25.8	1.4	1.9	3.6	2.7	2.6
2018/2017	3.0	2.8	3.1	30.5	2.6	2.1	3.3	2.4	2.3
2019/2018	3.0	1.0	1.5	-9.6	1.3	1.9	2.6	1.8	1.7
2020/2019	4.0	1.2	0.5	-35.2	1.4	1.4	1.2	1.5	1.6
2021/2020	-3.7	2.2	2.1	38.9	0.9	1.1	1.9	0.9	0.9
2022/2021	1.2	1.1	1.1	7.1	1.0	1.1	2.2	1.0	1.0
2023/2022	1.6	1.0	0.9	1.6	1.4	1.6	2.7	1.4	1.4
2024/2023	2.3	1.6	1.4	1.6	1.9	2.0	3.1	1.9	1.9
2019Q4/18Q4	2.5	-0.5	0.5	-8.1	1.0	1.8	2.2	1.5	1.4
2020Q4/19Q4	-5.1	2.0	1.1	-26.5	1.9	1.8	1.3	1.7	1.8
2021Q4/20Q4	5.2	1.9	1.5	33.2	0.5	0.5	1.8	0.5	0.5

Notes: (a) Per barrel, average of Dubai and Brent spot prices. (b) Retail price index. (c) Consumer price index. (d) Consumer prices index, including owner occupiers' housing costs.

Table A3. Gross domestic product and components of expenditure

£ billion, 2016 prices

	Final consumption expenditure		Gross capital formation		Domestic demand	Total exports <sup>(c)</sup>	Total final expenditure	Total imports <sup>(c)</sup>	Net trade	GDP at market prices <sup>(d)</sup>
	Households & NPISH <sup>(a)</sup>	General govt.	Gross fixed in-vestment	Changes in inventories <sup>(b)</sup>						
2014	1217	371	320	21	1925	532	2458	545	-13	1913
2015	1253	378	332	16	1980	552	2533	575	-22	1958
2016	1299	382	344	4	2028	568	2595	600	-32	1996
2017	1328	383	349	-8	2052	602	2654	621	-19	2033
2018	1349	384	349	-2	2079	610	2689	633	-24	2061
2019	1363	398	351	2	2113	639	2752	662	-23	2090
2020	1192	415	331	-6	1933	555	2488	547	8	1940
2021	1331	417	348	6	2102	627	2728	656	-30	2072
2022	1364	417	366	6	2153	635	2787	670	-35	2117
2023	1389	420	381	6	2196	654	2849	687	-34	2162
2024	1411	424	391	6	2233	671	2904	703	-32	2201
<i>Percentage changes</i>										
2014/2013	2.3	2.0	6.6		3.4	1.0	2.9	3.6		2.6
2015/2014	3.0	1.8	3.7		2.9	3.8	3.1	5.4		2.4
2016/2015	3.6	1.0	3.6		2.4	2.7	2.5	4.4		1.9
2017/2016	2.2	0.3	1.6		1.2	6.1	2.3	3.5		1.9
2018/2017	1.6	0.4	-0.2		1.3	1.2	1.3	2.0		1.3
2019/2018	1.1	3.5	0.6		1.6	4.8	2.3	4.6		1.4
2020/2019	-12.6	4.4	-5.5		-8.5	-13.1	-9.6	-17.3		-7.2
2021/2020	11.6	0.5	4.9		8.7	12.9	9.7	19.9		6.8
2022/2021	2.5	-0.1	5.3		2.4	1.3	2.2	2.1		2.2
2023/2022	1.8	0.9	4.0		2.0	3.0	2.2	2.6		2.1
2024/2023	1.6	1.0	2.8		1.7	2.7	1.9	2.3		1.8
<i>Decomposition of growth in GDP (percentage points)</i>										
2014	1.5	0.4	1.1	0.3	3.4	0.3	3.7	-1.1	-0.7	2.6
2015	1.9	0.3	0.6	-0.3	2.9	1.1	3.9	-1.5	-0.5	2.4
2016	2.3	0.2	0.6	-0.6	2.4	0.8	3.2	-1.3	-0.5	1.9
2017	1.4	0.0	0.3	-0.6	1.2	1.7	2.9	-1.0	0.7	1.9
2018	1.0	0.1	0.0	0.3	1.4	0.4	1.7	-0.6	-0.2	1.3
2019	0.7	0.7	0.1	0.2	1.6	1.4	3.1	-1.4	0.0	1.4
2020	-8.2	0.8	-0.9	-0.4	-8.6	-4.0	-12.6	5.5	1.5	-7.2
2021	7.2	0.1	0.8	0.6	8.7	3.7	12.4	-5.6	-1.9	6.8
2022	1.6	0.0	0.9	0.0	2.5	0.4	2.9	-0.7	-0.3	2.2
2023	1.2	0.2	0.7	0.0	2.0	0.9	2.9	-0.8	0.1	2.1
2024	1.0	0.2	0.5	0.0	1.7	0.8	2.5	-0.7	0.1	1.8

Notes: (a) Non-profit institutions serving households. (b) Including acquisitions less disposals of valuables and quarterly alignment adjustment. (c) Includes Missing Trader Intra-Community Fraud. (d) Components may not add up to total GDP growth due to rounding and the statistical discrepancy included in GDP.

Table A4. External sector

	Exports of goods <sup>(a)</sup>	Imports of goods <sup>(a)</sup>	Net trade in goods <sup>(a)</sup>	Exports of services	Imports of services	Net trade in services	Export price competitive- ness <sup>(c)</sup>	World trade <sup>(d)</sup>	Terms of trade <sup>(e)</sup>	Current balance
	£ billion, 2016 prices <sup>(b)</sup>						2016=100	% of GDP		
2014	286	397	-111	247	148	99	107.0	91.7	97.6	-4.7
2015	301	413	-112	251	162	90	105.7	96.7	99.1	-4.9
2016	298	432	-134	270	168	102	100.0	100.0	100.0	-5.2
2017	317	445	-128	285	176	109	96.5	105.0	99.1	-3.5
2018	316	445	-129	293	188	105	100.1	108.8	99.4	-3.9
2019	332	454	-122	307	208	99	99.1	113.0	99.9	-3.8
2020	292	366	-74	263	182	82	98.6	101.7	99.2	-0.6
2021	335	462	-127	292	194	97	98.7	116.9	99.2	-2.5
2022	337	483	-146	298	187	111	98.2	119.7	99.2	-2.8
2023	347	504	-157	307	183	123	98.1	124.1	99.1	-2.8
2024	356	521	-165	315	182	133	98.2	128.7	99.0	-2.7
<i>Percentage changes</i>										
2014/2013	1.1	2.9		1.0	5.8		4.0	4.6	2.0	
2015/2014	5.4	4.1		1.8	9.1		-1.2	5.4	1.5	
2016/2015	-1.2	4.6		7.3	3.8		-5.4	3.4	0.9	
2017/2016	6.3	2.9		5.9	5.1		-3.5	5.0	-0.9	
2018/2017	-0.2	0.1		2.8	6.9		3.7	3.7	0.3	
2019/2018	5.0	2.1		4.7	10.5		-1.0	3.8	0.5	
2020/2019	-12.1	-19.5		-14.2	-12.6		-0.6	-9.9	-0.6	
2021/2020	14.9	26.4		10.6	6.9		0.1	14.9	-0.1	
2022/2021	0.6	4.6		2.1	-3.9		-0.4	2.3	0.0	
2023/2022	2.9	4.2		3.0	-1.7		-0.2	3.7	0.0	
2024/2023	2.7	3.3		2.7	-0.6		0.1	3.7	-0.2	

Notes: (a) Includes Missing Trader Intra-Community Fraud. (b) Balance of payments basis. (c) A rise denotes a loss in UK competitiveness. (d) Weighted by import shares in UK export markets. (e) Ratio of average value of exports to imports.

Table A5. Household sector

	Average <sup>(a)</sup> earnings	Compen- sation of employees	Total personal income	Gross disposable income	Real disposable income <sup>(b)</sup>	Final consumption expenditure	Saving ratio <sup>(c)</sup>	House prices <sup>(d)</sup>	Net worth to income ratio <sup>(e)</sup>
	2016=100	£ billion, current prices			£ billion, 2016 prices		per cent		
2014	96.4	905	1591	1256	1273	1217	9.4	97.1	6.5
2015	97.0	929	1674	1323	1341	1253	9.9	102.9	6.6
2016	100.0	968	1715	1346	1346	1299	7.2	110.1	7.1
2017	103.1	1009	1772	1383	1363	1328	5.3	115.1	7.1
2018	106.0	1054	1856	1453	1395	1349	5.8	118.8	6.8
2019	110.1	1100	1918	1490	1413	1363	5.7	120.2	7.0
2020	112.0	1059	1915	1506	1409	1192	16.9	115.7	6.6
2021	112.2	1093	1985	1532	1419	1331	7.6	117.8	7.3
2022	114.0	1130	2026	1558	1429	1364	5.9	123.2	7.2
2023	116.9	1172	2098	1614	1459	1389	6.0	126.1	7.1
2024	120.6	1220	2183	1679	1490	1411	6.4	127.6	7.0
<i>Percentage changes</i>									
2014/2013	1.0	2.7	3.4	3.6	2.1	2.3		8.0	
2015/2014	0.6	2.7	5.2	5.3	5.3	3.0		6.0	
2016/2015	3.1	4.1	2.5	1.8	0.4	3.6		7.0	
2017/2016	3.1	4.3	3.3	2.7	1.3	2.2		4.5	
2018/2017	2.8	4.4	4.8	5.0	2.4	1.6		3.2	
2019/2018	3.8	4.4	3.3	2.6	1.3	1.1		1.2	
2020/2019	1.8	-3.8	-0.2	1.1	-0.3	-12.6		-3.7	
2021/2020	0.1	3.2	3.6	1.7	0.7	11.6		1.8	
2022/2021	1.6	3.4	2.1	1.7	0.8	2.5		4.6	
2023/2022	2.6	3.7	3.5	3.5	2.1	1.8		2.3	
2024/2023	3.1	4.1	4.1	4.1	2.1	1.6		1.3	

Notes: (a) Average earnings equals total labour compensation divided by the number of employees. (b) Deflated by consumers' expenditure deflator. (c) Includes adjustment for change in net equity of households in pension funds. (d) Office for National Statistics, mix-adjusted. (e) Net worth is defined as housing wealth plus net financial assets.

Table A6. Fixed investment and capital £ billion, 2016 prices

	Gross fixed investment				User cost of capital (%)	Corporate profit share of GDP (%)	Capital stock	
	Business investment	Private housing <sup>(a)</sup>	General government	Total			Private	Public <sup>(b)</sup>
2014	175	82	63	320	14.5	24.9	3075	667
2015	188	84	60	332	13.5	24.5	3077	667
2016	196	86	62	344	13.0	24.4	3195	697
2017	202	84	64	349	11.7	24.4	3280	632
2018	199	90	60	349	12.1	23.8	3333	647
2019	199	90	62	351	12.1	23.1	3375	667
2020	183	85	63	331	12.2	20.8	3387	687
2021	189	91	67	348	12.2	24.4	3410	709
2022	197	96	73	366	12.4	24.5	3444	732
2023	203	100	77	381	12.4	24.6	3487	756
2024	208	104	79	391	12.3	24.7	3534	780
<i>Percentage changes</i>								
2014/2013	6.4	5.4	8.6	6.6			1.2	2.5
2015/2014	7.2	2.3	-4.4	3.7			0.1	0.0
2016/2015	4.3	3.3	2.2	3.6			3.8	4.5
2017/2016	2.9	-2.4	3.2	1.6			2.7	-9.3
2018/2017	-1.5	6.5	-5.1	-0.2			1.6	2.4
2019/2018	0.3	0.1	2.2	0.6			1.3	3.0
2020/2019	-8.0	-5.7	3.1	-5.5			0.3	3.1
2021/2020	3.0	7.9	6.4	4.9			0.7	3.2
2022/2021	4.5	4.9	8.1	5.3			1.0	3.2
2023/2022	3.1	4.7	5.7	4.0			1.2	3.2
2024/2023	2.4	3.8	2.6	2.8			1.4	3.2

Notes: (a) Includes private sector transfer costs of non-produced assets. (b) Including public sector non-financial corporations.

Table A7. Productivity and the labour market

*Thousands unless otherwise stated*

	Employment		ILO unemployment	Labour force <sup>(b)</sup>	Population of working age <sup>(c)</sup>	Productivity (2016=100) Per hour	ILO unemployment rate %
	Employees	Total <sup>(a)</sup>					
2014	25960	30754	2026	32780	40681	98.8	6.2
2015	26504	31285	1781	33066	40879	99.4	5.4
2016	26771	31744	1633	33377	41062	100.0	4.9
2017	27065	32057	1476	33533	41169	100.9	4.4
2018	27494	32439	1380	33819	41260	101.4	4.1
2019	27652	32799	1306	34105	41344	101.4	3.8
2020	26146	31350	2896	34245	41440	99.8	8.5
2021	26942	32169	2229	34399	41527	103.3	6.5
2022	27424	32673	1869	34543	41600	103.8	5.4
2023	27730	33001	1685	34686	41666	105.0	4.9
2024	27985	33278	1554	34832	41732	105.9	4.5
<i>Percentage changes</i>							
2014/2013	1.7	2.4	-18.1	0.8	0.3	-0.2	
2015/2014	2.1	1.7	-12.1	0.9	0.5	0.6	
2016/2015	1.0	1.5	-8.3	0.9	0.4	0.6	
2017/2016	1.1	1.0	-9.6	0.5	0.3	0.9	
2018/2017	1.6	1.2	-6.5	0.9	0.2	0.5	
2019/2018	0.6	1.1	-5.4	0.8	0.2	0.0	
2020/2019	-5.4	-4.4	121.8	0.4	0.2	-1.5	
2021/2020	3.0	2.6	-23.0	0.4	0.2	3.4	
2022/2021	1.8	1.6	-16.1	0.4	0.2	0.5	
2023/2022	1.1	1.0	-9.9	0.4	0.2	1.1	
2024/2023	0.9	0.8	-7.8	0.4	0.2	0.9	

Notes: (a) Includes self-employed, government-supported trainees and unpaid family members. (b) Employment plus ILO unemployment. (c) Population projections are based on annual rates of growth from 2016-based population projections by the ONS.



Table A8. Public sector financial balance and borrowing requirement £ billion, fiscal years

		2017–18	2018–19	2019–20	2020–21	2021–22	2022–23	2023–24	2024–25
Current receipts:	Taxes on income	446.3	471.5	487.3	465.8	513.4	533.5	553.7	577.2
	Taxes on expenditure	265.9	276.3	279.6	250.2	283.4	293.2	302.8	313.8
	Other current receipts	66.0	63.5	58.4	55.7	60.1	62.3	64.6	67.2
	Total	778.2	811.4	825.3	771.8	856.9	888.9	921.1	958.2
	(as a % of GDP)	37.3	37.5	37.3	36.8	37.8	37.9	37.8	37.8
Current expenditure:	Goods and services	388.0	400.3	426.0	454.5	460.7	470.4	485.9	504.9
	Net social benefits paid	236.8	242.4	243.4	315.4	278.3	272.3	276.1	283.9
	Debt interest	62.1	56.4	55.5	52.7	53.4	53.7	54.7	56.3
	Other current expenditure	54.8	59.4	61.9	63.8	68.2	70.3	72.6	75.1
	Total	741.7	758.5	786.9	886.4	860.5	866.7	889.3	920.1
	(as a % of GDP)	35.5	35.0	35.6	42.4	38.0	36.9	36.5	36.3
Depreciation		49.0	48.8	49.1	46.5	50.0	51.7	53.7	55.8
Surplus on public sector current budget <sup>(a)</sup>		-12.5	4.0	-10.8	-161.2	-53.6	-29.5	-21.9	-17.8
(as a % of GDP)		-0.6	0.2	-0.5	-7.8	-2.4	-1.3	-0.9	-0.7
Gross investment		92.1	91.3	94.7	94.8	101.2	106.4	109.4	113.3
Net investment		43.1	42.5	45.6	48.2	51.1	54.7	55.7	57.4
(as a % of GDP)		2.1	2.0	2.1	2.3	2.3	2.3	2.3	2.3
Total managed expenditure		833.8	849.8	881.7	981.2	961.7	973.1	998.8	1033.4
(as a % of GDP)		40.0	39.3	39.9	46.9	42.4	41.5	41.0	40.8
Public sector net borrowing		55.6	38.4	56.4	209.4	104.7	84.2	77.6	75.2
(as a % of GDP)		2.7	1.8	2.6	10.1	4.6	3.6	3.2	3.0
Public sector net debt (% of GDP) <sup>(b)</sup>		83.6	81.8	81.7	93.5	91.0	91.7	92.2	91.6
GDP deflator at market prices (2016=100)		102.4	104.5	106.4	107.9	108.9	110.3	112.1	114.5
Money GDP (£ billion)		2087	2165	2210	2100	2266	2347	2435	2532
Financial balance under Maastricht <sup>(c)</sup>		-2.5	-2.2	-2.1	-9.2	-5.6	-3.7	-3.3	-3.08
Gross debt under Maastricht <sup>(c)</sup>		85.5	85.0	84.7	98.9	97.2	97.6	97.2	96.5

Notes: These data are constructed from seasonally adjusted national accounts data. This results in differences between the figures here and unadjusted fiscal year data. Data exclude the impact of financial sector interventions, but include flows from the Asset Purchase Facility of the Bank of England. (a) Public sector current budget surplus is total current receipts less total current expenditure and depreciation. (b) Data for Q2. Seasonal adjustment applied in NiGEM results in differences between the figures here and official unadjusted PSF data. (c) Calendar year.

Table A9. Saving and investment

As a percentage of GDP

	Households		Companies		General government		Whole economy		Finance from abroad <sup>(a)</sup>		Net national saving
	Saving	Investment	Saving	Investment	Saving	Investment	Saving	Investment	Total	Net factor income	
2014	6.7	3.7	8.0	10.8	-2.3	2.6	12.4	17.1	4.7	2.0	-1.8
2015	7.1	3.9	6.5	11.0	-1.1	2.5	12.5	17.4	4.9	2.2	-1.8
2016	5.0	3.9	7.2	11.0	0.0	2.5	12.2	17.4	5.2	2.3	-2.1
2017	3.7	4.1	9.4	10.9	1.0	2.6	14.0	17.5	3.5	1.1	-0.4
2018	4.0	4.3	8.0	10.3	1.3	2.6	13.3	17.2	3.9	1.2	-1.3
2019	4.0	4.3	8.1	10.3	1.6	2.7	13.6	17.4	3.8	1.3	-1.2
2020	12.7	4.3	9.1	9.5	-5.5	3.1	16.3	16.9	0.6	-0.4	1.4
2021	5.3	4.3	11.1	9.6	-1.9	3.0	14.5	16.9	2.5	-0.5	-0.5
2022	4.0	4.4	10.5	9.8	0.1	3.2	14.6	17.4	2.8	-0.4	-0.4
2023	4.1	4.5	10.2	9.9	0.7	3.3	14.9	17.7	2.8	-0.3	-0.1
2024	4.3	4.6	9.9	10.0	1.0	3.3	15.2	17.9	2.7	-0.3	0.3

Notes: Saving and investment data are gross of depreciation unless otherwise stated. (a) Negative sign indicates a surplus for the UK.

Table A10. Medium and long-term projections

All figures percentage change unless otherwise stated

	2018	2019	2020	2021	2022	2023	2024	2025–29
GDP (market prices)	1.3	1.4	-7.2	6.8	2.2	2.1	1.8	1.3
Average earnings	2.8	3.8	1.8	0.1	1.6	2.6	3.1	3.7
GDP deflator (market prices)	2.1	1.9	1.4	1.1	1.1	1.6	2.0	2.6
Consumer Prices Index	2.4	1.8	1.5	0.9	1.0	1.4	1.9	2.4
Per capita GDP	0.7	0.8	-7.7	6.2	1.7	1.6	1.3	0.9
Whole economy productivity <sup>(a)</sup>	0.5	0.0	-1.5	3.4	0.5	1.1	0.9	1.0
Labour input <sup>(b)</sup>	0.8	1.4	-5.1	2.9	1.6	1.0	0.8	0.3
ILO Unemployment rate (%)	4.1	3.8	8.5	6.5	5.4	4.9	4.5	4.3
Current account (% of GDP)	-3.9	-3.8	-0.6	-2.5	-2.8	-2.8	-2.7	-1.4
Total managed expenditure (% of GDP)	39.4	39.3	46.1	43.1	41.6	41.1	40.9	41.1
Public sector net borrowing (% of GDP)	2.1	1.9	9.2	5.6	3.7	3.3	3.0	2.5
Public sector net debt (% of GDP)	82.4	80.9	91.9	91.0	91.3	92.2	91.8	89.0
Effective exchange rate (2011=100)	101.9	101.6	102.4	102.3	102.7	103.2	103.6	105.1
Bank Rate (%)	0.6	0.8	0.2	0.1	0.1	0.3	0.6	1.4
3 month interest rates (%)	0.7	0.8	0.5	0.3	0.3	0.5	0.8	1.6
10 year interest rates (%)	1.4	0.9	0.4	0.8	1.1	1.5	1.8	2.6

Notes: (a) Per hour. (b) Total hours worked.