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Forecast evaluation report

December 2021

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Foreword

The Office for Budget Responsibility (OBR) was created in 2010 to provide independent and authoritative analysis of the UK public finances. At least twice a year – and usually at the time of each Budget and Autumn or Spring Statement – we publish a set of official forecasts for the economy and the public finances over the coming five years in our *Economic and fiscal outlook* (*EFO*). The Government uses these forecasts as the basis for its Budget decisions. And we use these forecasts to assess the Government's progress against the fiscal targets that it has set for itself.

In each *EFO*, we stress the uncertainty that lies around all such forecasts. We compare our central forecasts to those of other forecasters. We highlight the limited confidence that should be placed in our central forecast given the inaccuracy of past official forecasts. We use sensitivity and scenario analysis to show how the public finances could be affected by alternative economic outcomes. And we highlight the residual uncertainties in the public finances, even if one were confident about the path the economy was going to take – for example, because of uncertain estimates of the cost or yield associated with new policy measures.

Notwithstanding these uncertainties – and the fact that no one should expect any forecast to be met in its entirety – we believe that it is important to spell out our forecast in considerable quantitative detail. We also believe that it is important to examine regularly how our forecasts compare to outturn data and to explain any discrepancies so that we can learn from our mistakes.

The arrival of the coronavirus pandemic in the UK in early 2020 prompted an intensification in our forecast activity, with five medium-term scenarios and forecasts produced in the 12 months beginning in March 2020: the March 2020 *EFO*, April 2020 *Coronavirus reference scenario*, July 2020 *Fiscal sustainability report*, the November 2020 *EFO*, and the March 2021 *EFO*. It also prompted us to place particular emphasis on the uncertainty surrounding our central forecasts by publishing, alongside that forecast, upside and downside scenarios illustrating the implications of alternative paths of the virus and associated public health interventions.

This year our *Forecast evaluation report* analyses the accuracy of those forecasts and scenarios which were produced amidst the largest shock to the UK economy in a century. The disruption wrought by the pandemic will mean that our forecast errors for last year and the next few years will be much larger than is typically the case, and the average accuracy of our forecasts will also be heavily affected by the unprecedented shock to the economy. In this report, we focus our evaluation on the judgements and conclusions of our five forecasts and scenarios for fiscal year 2020-21, the latest year for which we have outturn data, and draw some preliminary lessons for future exercises.

It is worth noting that when we use the word 'errors' in this report we are simply referring to the arithmetic difference between the forecast and the outturn. We are not implying that it would have been possible to avoid them given the information available at the time the forecast was made – differences with outturns may reflect unforeseeable developments after the forecast was made and the policy responses to those developments.

The forecasts we publish represent the collective view of the three independent members of the OBR's Budget Responsibility Committee (BRC). We take full responsibility for the judgements underpinning the forecasts and for the performance of them presented in this report.

In line with our memorandum of understanding with government departments, we provided a full and final copy of this report to the Treasury 24 hours in advance of publication.

Richard Hughes Sir Charles Bean Andy King

The Budget Responsibility Committee

1 Executive summary

1.1 The focus of this year's report is the performance of our forecasts and scenarios immediately prior to, and during, the coronavirus pandemic. The pandemic and associated public health measures produced one of the largest shocks to the UK and world economies in modern times. It resulted in UK real GDP falling by 10 per cent in 2020 as a whole, the largest drop in output since 1921, and an 11 percentage point shortfall relative to our March 2020 forecast – by some distance the largest year-ahead forecast error on record. It also resulted in a peacetime record budget deficit of £323 billion in 2020-21 (15 per cent of GDP), £268 billion higher than our March 2020 forecast, another record forecast error.

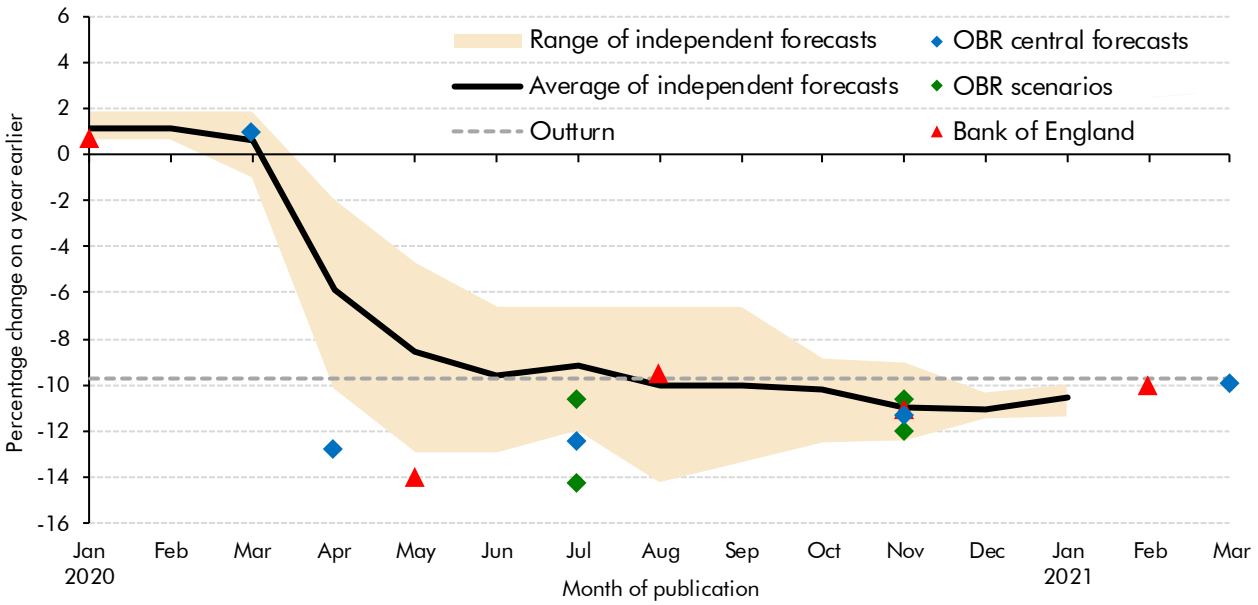
1.2 In the face of such an unprecedented shock, this report looks not only at the errors against our pre-pandemic March 2020 *Economic and fiscal outlook* (*EFO*), but also how our understanding of the economic and fiscal impact of the pandemic evolved over our four subsequent forecasts. Rising case numbers across Europe, the emergence of the new Omicron variant, and the reimposition of travel and other public health restrictions in recent weeks serve as a reminder that the pandemic is far from over. In this context, our account of the lessons from our successive attempts to forecast the economy and public finances during the pandemic remains highly relevant and will help to inform our future forecasts.

The evolution of our economy forecasts since March 2020

1.3 The global reach of the pandemic only became apparent after we had finalised our March 2020 forecast, which assumed only a minor 0.1 per cent reduction in UK GDP in 2020, primarily as a result of reduced activity in Asia. In April, once the severity of the pandemic had become clear, we rapidly produced a *Coronavirus reference scenario* – our first attempt to quantify the economic and fiscal implications of the pandemic. It was followed by our first official projection of the full impact of the pandemic in our July 2020 *Fiscal sustainability report*, with subsequent forecasts appearing in our *EFO*s in November 2020 and March 2021. The evolution of these five forecasts produced in the first year of the pandemic – shown in comparison to those of other UK forecasters in Chart 1.1 – was driven by changes in key forecast judgements for:

- the **epidemiological situation**, including the path of the virus, associated public health restrictions, and the development and rollout of vaccines;
- the degree of **economic adaptation** to pandemic conditions;
- the **Government's economic support** measures; and
- the degree of **scarring to potential output** from the pandemic.

Chart 1.1: Range of forecasts for 2020 real GDP growth



Note: OBR's April forecast and Bank of England's May forecast were illustrative coronavirus scenarios. OBR's July and November scenarios were upside and downside scenarios around the central forecast based on different assumptions about the pandemic.
Source: Bank of England, HM Treasury, OBR

1.4 Relative to other forecasters, we were quicker in our April scenario to recognise the severity of the pandemic, and the huge widening in the range across forecasters is symptomatic of the very high degree of uncertainty at the time around all four key forecast judgements. But we also consistently overestimated the shortfall in GDP in 2020 and were consistently more pessimistic than most other forecasters. This was largely because, while we underestimated the number of transmission waves and lockdowns, we overestimated both the duration of those lockdowns (particularly the first) and their effect on economic activity, which repeatedly proved more adaptable than we expected. Our forecasts were also based (as required by legislation) on the Government's stated plans for the duration of support schemes, which in the event were frequently extended as the economic consequences of the virus persisted.

1.5 One striking feature of the pandemic was how sectorally differentiated its economic effects were – necessitating a more disaggregated sector-by-sector approach to forecasting near-term GDP. Output plummeted in the first lockdown in sectors where close proximity between customers and/or the workforce is unavoidable, but was much less affected in sectors where remote working is feasible. As the pandemic unfolded, households and businesses became increasingly adapted to the virus and associated restrictions as consumers shifted purchases online, businesses made premises Covid-safe, and employees further adjusted to working remotely. As a result, whereas output dropped to around 25 per cent below pre-pandemic levels in April 2020 it was only 9 per cent lower in January 2021, despite both being spent in full national lockdown.

1.6 Once the pandemic struck, the differences between our initial forecasts and outturn were partly due to some sectors, such as manufacturing and construction, rebounding much faster from the first lockdown, and partly due to measurement issues in the public and real estate sectors. And while we expected smaller impacts on output in the second and third

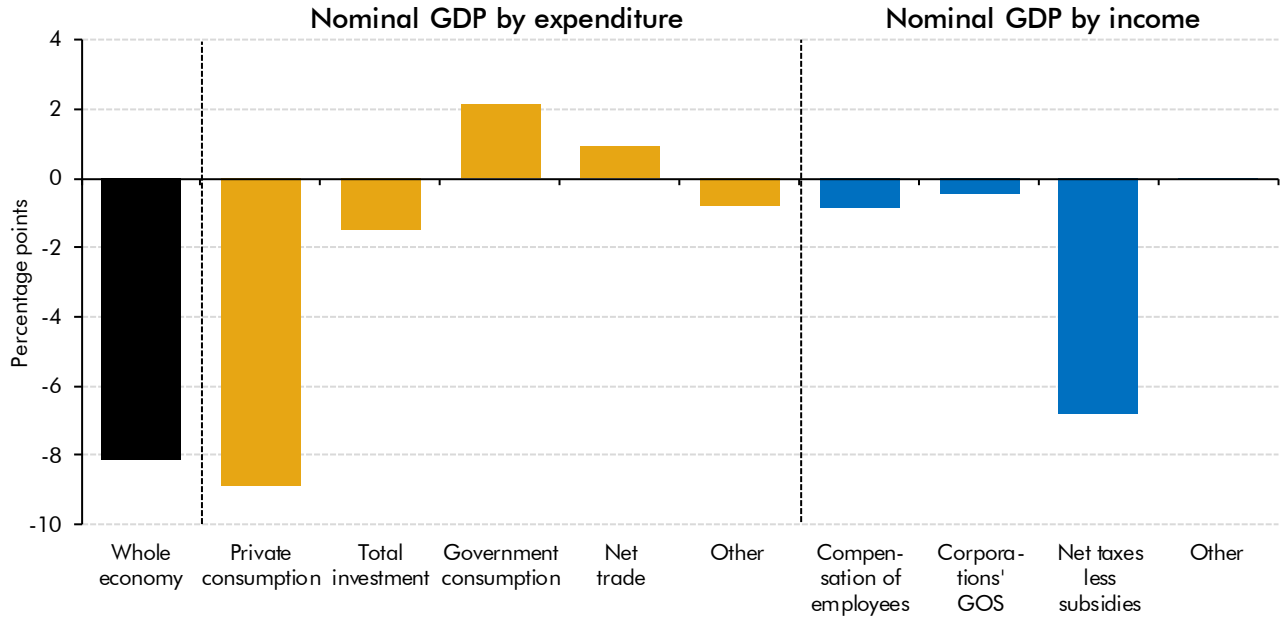
lockdowns than in the initial one, we still underestimated the degree of adaptability to lockdown conditions and therefore overestimated the extent to which output was hit.

1.7 This adaptability was aided by the £229 billion of government support for households, businesses and public services in 2020-21. The repeated extensions of the furlough scheme, in particular, were instrumental in explaining our successive overestimates of unemployment. In our earlier forecasts, Government policy was to end the furlough scheme before the vaccines had been fully rolled out and economic activity had recovered. Our forecasts assumed that this would result in large numbers of furloughed employees becoming unemployed. But our November 2020 upside scenario showed how aligning the end of furlough more closely to the recovery of output could limit any rise in unemployment. By the March 2021 Budget, the furlough scheme was extended far enough for this to be true in our central forecast too. Indeed, the subsequent strong recovery has meant that the end of furlough appears to have had remarkably little immediate impact on the labour market.

Explaining our March 2020 fiscal forecast error

1.8 The 8 percentage point shortfall in nominal GDP (which is more important than real GDP for the public finances) in 2020-21 relative to our March 2020 forecast was somewhat smaller than the 12 percentage point real GDP shortfall, reflecting higher than expected (measured) inflation. But the effects of the pandemic – and particularly the Government's support measures – also led to unusual changes in the composition of nominal GDP, which had important fiscal consequences. The virus and public health restrictions hit nominal consumption (left panel of Chart 1.2), but government support measures largely preserved private sector incomes (right panel).

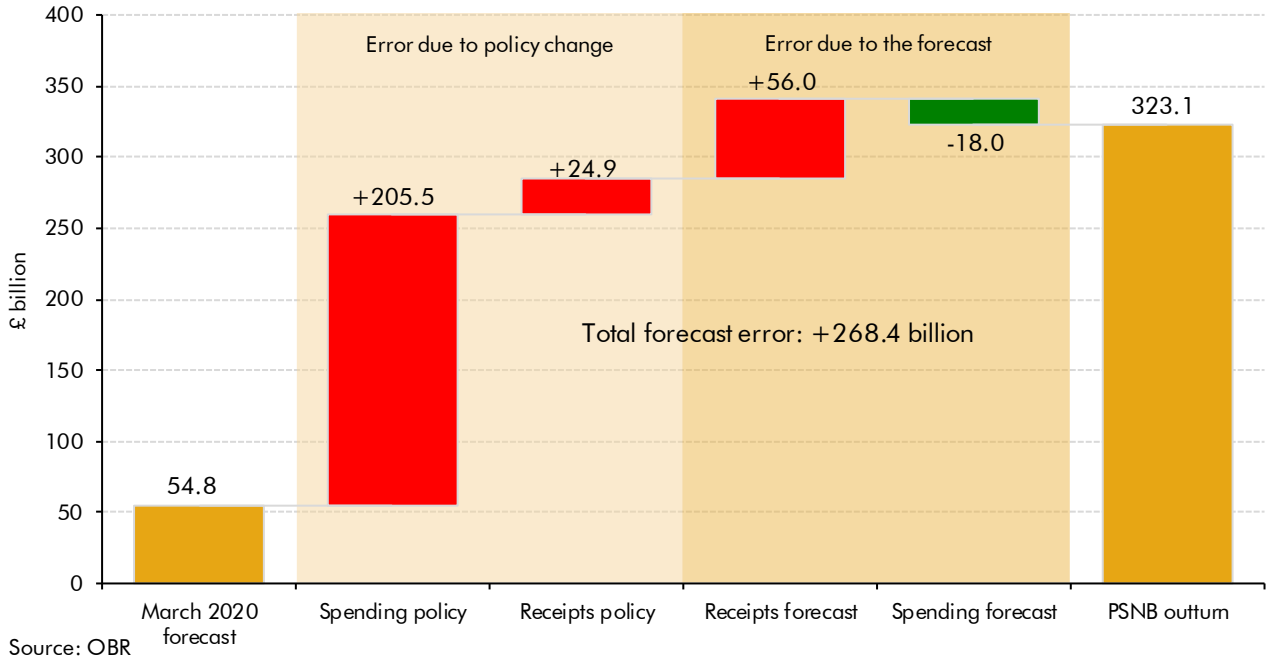
Chart 1.2: March 2020 forecast errors in contributions to nominal GDP growth in 2020-21



Note: Corporations' GOS stands for private corporations' gross operating surplus.
Source: OBR

1.9 This divergence between income and expenditure played an important role in the errors relative to our fiscal forecasts. Public sector net borrowing (PSNB) in 2020-21 exceeded our March 2020 forecast by £268 billion (12.5 per cent of GDP) – a far larger margin than the sum of all ten of our previous year-ahead Spring forecast errors. The cost of pandemic-related government spending explains more than three-quarters of that error (Chart 1.3), with this spending error more than explained by pandemic-related policies introduced since March 2020. By contrast, receipts policy (in the form of net tax cuts) explains less than a tenth of our overall 2020-21 borrowing error. The impact of the pandemic on receipts is instead felt via the economic damage wrought to tax bases, which explains just over a fifth of the overall borrowing error (a smaller hit than would have been the case without the support for private sector incomes provided by the policies embodied in the large spending error). Forecast-related shortfalls in spending (in particular lower debt interest costs) provided a modest offset to these sources of higher borrowing.

Chart 1.3: Sources of the March 2020 PSNB forecast error



Source: OBR

Refining our forecasts

1.10 Previous *Forecast evaluation reports* have identified specific issues with elements of our normal forecasting approach that have caused us to refine and develop particular economic and fiscal forecasting models and techniques. But the challenges to forecasting created by the pandemic have been more fundamental in nature and prompted us to reassess elements of our whole approach. The three key lessons we have drawn for our economy and fiscal forecasts are that we need to, especially in the context of major shocks:

- **Be analytically agile in responding to unexpected developments, adapting our approaches to uncertain and rapidly changing circumstances**. Rather than expecting to be able to prepare in detail for all specific risks or economic shocks, we need to be capable of quickly developing new analytical tools in response. For our economy

forecast, our response to the pandemic included a more sectorally driven approach to forecasting output, while our fiscal forecast needed to apply more judgement than usual when operating models, particularly in relation to in-year estimates. And across our economy and fiscal forecasts we made more use of epidemiological (and other) scenarios and advanced our methods for estimating and communicating forecast uncertainty. While these specific approaches may not be the appropriate ones in the face of future shocks, the adaptability they reflected will be.

- **Understand and make use of the multiple new sources of high frequency real-time data.** These data are produced both by the official sector (e.g. the ONS Business Impact of Covid-19 Survey and HMRC's real-time information (RTI) from the PAYE system) and by private sector organisations (e.g. Google mobility data and the Blavatnik School's public health stringency indicators). For our economy forecast, these real-time data sources proved invaluable in understanding the rapidly changing epidemiological and economic situation and calibrating our models to new forecast determinants. High frequency mobility data, HMRC RTI data and Treasury cash management data were particularly instructive as up-to-date sources of information for our fiscal forecast. And we also contributed to the production of such timely and disaggregated fiscal information in our close work with the ONS and HMRC, and by publishing monthly profiles consistent with our forecasts for the public finances.

- **Draw on international experiences and expertise outside government as necessary.** Our forecasts over the past year and a half have benefited greatly from the expertise of others – from epidemiologists, public health experts and behavioural scientists, to other economic and fiscal forecasters in the UK and overseas. While future shocks and challenges will require different sources of expertise, the benefits of continuing to draw on information from other fields and jurisdictions are clear. For example, the ongoing implementation of the Brexit deal will require a deeper understanding of trade and migration flows, and external expertise will be necessary to build on our analysis of the costs of climate change and decarbonisation.

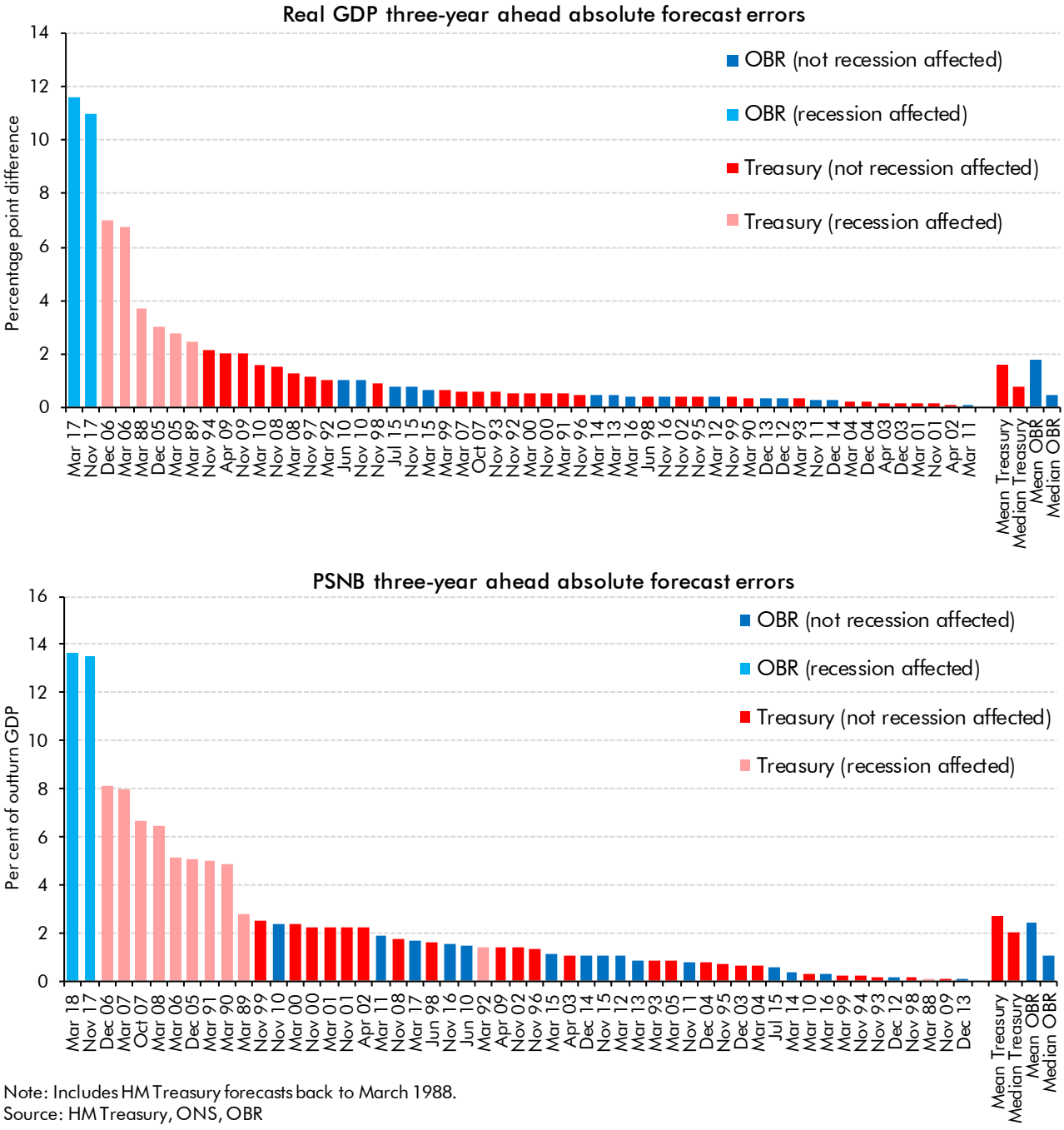
Comparison with past official forecasts

1.11 In Annex A we compare the OBR's forecasts for real GDP, public sector net borrowing and receipts and spending against the latest outturns. We also compare our average forecast errors since the OBR was created in 2010 with those in official Treasury forecasts produced during the 20 years before the OBR was established, as summarised in Chart 1.4.

1.12 We evaluate the relative accuracy of our forecasts using the median absolute forecast errors under the OBR and the preceding Treasury forecasts. Because these median errors are much less affected than mean errors by the presence of rare but large 'catastrophic' shocks, such as the pandemic (in the OBR era) and the financial crisis (in the Treasury era), we believe it is sensible to focus on them as a measure of underlying forecast performance in 'normal' times. But we are, of course, also transparent about the very large forecast differences that occur when large shocks do happen.

1.13 Despite the OBR period now containing the largest forecast errors on record as a result of the pandemic, it remains the case that our median absolute forecast errors for real GDP and net borrowing are smaller in size than the median errors in official forecasts of the 20 years before the OBR was created. Prior to the pandemic this was also the case for mean errors, but the size of our pandemic-related forecast errors has pushed our mean absolute forecast error for real GDP slightly above that for the 20 years before the OBR's creation.

Chart 1.4: Three-year ahead forecast errors for real GDP and PSNB



Note: Includes HM Treasury forecasts back to March 1988.
Source: HM Treasury, ONS, OBR

2 The economy

Introduction

2.1 This chapter assesses the performance of our economic forecasts and scenarios immediately prior to, and during, the coronavirus pandemic. In doing so it:

- discusses how our **approach to macroeconomic forecasting** has differed from usual practice in the light of the pandemic;
- describes the four **new conditioning assumptions** that this required;
- explores **how our forecasts and scenarios evolved** over the course of pandemic;[1] and
- assesses the main sources of errors against **our March 2020 economy forecast**.

Macroeconomic forecasting during a pandemic

2.2 The coronavirus pandemic was one of the largest peacetime economic shocks the UK and the world have experienced in modern times. UK GDP fell by 9.7 per cent in 2020, the largest contraction since 1921 and almost twice the size of the recession in the wake of the 2008 financial crisis.[2] It was also a truly global shock, with world GDP falling by 3.1 per cent and around 85 per cent of countries experiencing a fall in output in 2020. While there was a global influenza pandemic in 1918-19, that was before most countries began collecting comprehensive macroeconomic data and its economic impact was clouded by post-World War I demobilisation. As forecasters, we therefore had few clear historical parallels on which to draw once the pandemic struck.

2.3 The coronavirus shock was unusual not only in its scale but also in its nature:

- Unlike most previous post-war recessions in the UK, the shock **originated from outside the economy** in the form of a highly infectious and potentially fatal disease. The depth and duration of the shock therefore depended less on the economic policy response and more on public health policy – in particular, the effectiveness of measures to contain transmission of the virus and the speed at which effective vaccines could be developed and deployed.

[1] Details of the forecasts and errors that are discussed in this chapter are contained in Tables 2.7 and 2.8 at the end of the chapter.
[2] Data revisions mean that the fall in output in 2020 is no longer the largest since the Great Frost of 1709, with the fall having been revised down from 9.8 per cent to 9.7 per cent, therefore leaving it a touch smaller than the 9.7 per cent fall recorded in 1921.

- The coronavirus shock was also unusual in the heterogeneity of its **sectoral impact**. While those sectors most dependent on face-to-face interaction, like accommodation and food services, experienced an initial loss of output of around 90 per cent relative to the pre-pandemic level, other sectors that could be delivered almost entirely remotely saw much smaller falls (such as financial services where output fell by 6 per cent). Thus, conventional macroeconomic models, which focus on the balance of income and expenditure across broad institutional sectors (i.e. households, corporations, government, and the rest of the world), offered little guidance as to the likely extent and persistence of the economic damage wrought by the pandemic.

- Finally, the introduction of public health restrictions and the behavioural response of individuals to the pandemic ('voluntary social distancing') sharply **depressed supply as well as demand**. While supply shocks are not unusual – for instance, resulting from sharp movements in commodity prices or as a consequence of the financial crisis – the exceptional size, speed, and sectorally differentiated nature of the pandemic shock rendered it particularly difficult both to evaluate and to forecast the margin of spare capacity in the economy as a whole at different points in time.

2.4 Reflecting these unusual characteristics, estimating the immediate and medium-term consequences of the pandemic for the economy required several departures from our conventional forecasting practices. In particular:

- Producing the forecast required the introduction of new **conditioning assumptions, in part drawn from epidemiology**. These included assumptions regarding: the transmission and evolution of the virus; the impact of public health restrictions and the behavioural response of households and businesses; and the prospects for the development and rollout of effective vaccines. In putting together our forecasts, we therefore drew on the expertise of government virologists, epidemiologists, public health experts, and behavioural scientists, though the resulting assumptions concerning the course of the pandemic remained our own.

- These new assumptions evolved and interacted in complex ways, requiring **a flexible approach to forecasting**. Academic researchers were quick to develop simple economic models that factored in epidemiological considerations.[3] But such 'epi-macro' models, though instructive in illustrating the mechanisms at work, were of only limited direct applicability in forecasting. Moreover, the continual emergence of variants, the evolution of the public health response, and the behavioural adaptation of households and businesses meant that the relationship between infection rates, public health restrictions, and economic activity were constantly in flux and challenging to capture in a static model. So we also needed to be flexible and quick to adapt our own understanding and analysis.

[3] See, for instance, Martin S. Eichenbaum, Sergio Rebelo, and Mathias Trabandt, *The Macroeconomics of Testing and Quarantining*, NBER Working Paper No. 27104, May 2020.

- Translating the epidemiological and public health assumptions into an economic forecast required a **finer disaggregation of output** than usual. Because of its highly differentiated impact on different types of economic activity, modelling the economic effects associated with the pandemic (and Brexit, which was unfolding in parallel) required a more disaggregated assessment of the sectoral composition of output than provided by our conventional expenditure-based approach.[4] We therefore supplemented our 'top-down' modelling that focuses on income and expenditure, with a 'bottom-up' model breaking output down into 16 individual sectors. Estimates of the levels of activity possible in each sector under different rates of infection and stringency of public health restrictions were then constructed. We evaluate the performance of these near-term output-based forecasts in Box 2.1 below.

- Understanding the impact of the virus and associated public health restrictions on each sector in real time also required us to draw on **new high-frequency datasets**. We used daily mobility data to track the impact of the pandemic (and later Brexit) on transport use, retail consumption, and trade. We also made increasing use of surveys such as the ONS's novel Business Impacts of Covid-19 Survey (BICS) to get a picture of the impact of the pandemic and the Government's policy response on firms' turnover. The ONS introduced this survey very quickly, with the first results released only a few weeks after the onset of the pandemic, and further questions added when new issues emerged. The lack of back series for these new datasets (both official and from the private sector) meant that, initially at least, we were unsure of their information content and that made it hard to map them against conventional economic statistics. We also found the Bank of England's Decision Maker Panel survey useful in understanding the effect of the pandemic on firms' investment and employment intentions.

- Communicating the risks around the outlook required a **different approach to representing uncertainty**. Our previous approach involved using fan charts based on historical forecast errors, developing scenarios around key macroeconomic judgements, and testing the sensitivity of our central forecast to changes in individual forecast determinants. But forecast errors drawn from the past 30 years did not include any events remotely like the pandemic. And this time the key sources of uncertainty were epidemiological – in particular, in relation to the stringency of public health restrictions, changes in voluntary social distancing, the effectiveness of the test and trace regime, and the success of various candidate vaccines in bringing the virus under control. As our standard approaches could not adequately capture the distribution of possible outcomes, we instead generated alternative upside and downside scenarios alongside our central forecast based on different assumptions about the effectiveness of different public health interventions and their subsequent economic effects.

- The pandemic also required us to **forecast supply and demand in parallel rather than sequentially**. This was necessary both to estimate the impact of the pandemic on economic activity in the near term and the legacy of the pandemic for the supply

[4] Our typical approach to near-term forecasting involves nowcasting and near-term forecasting on an output basis, but focused on just the broad manufacturing, construction and service sectors (for which many timely business survey indicators are available).

potential of the economy over the longer term. A pivotal, but highly uncertain, forecast judgement concerned the extent of the longer-term 'scarring' of potential output as a result of the pandemic (in the form of a smaller labour force, foregone investment, and lower total factor productivity). Reflecting the unprecedented nature of the shock, and the wide range of possible epidemiological outcomes (depending on effectiveness of vaccines and emergence of new variants), our scenarios reflected a range of possible impacts on potential GDP – with no scarring in an upside scenario (in which vaccines were quickly developed and rolled out); 3 per cent scarring in our central forecast (in which vaccines were widely deployed by mid-2021); and 6 per cent scarring in a downside scenario (in which no effective vaccine was developed).[5] We later revised our central assumption down to 2 per cent in our October 2021 forecast, reflecting the emerging evidence of the impact of the highly effective vaccines, the effectiveness of government support in preserving viable jobs and businesses, and the reduced likelihood of the worst epidemiological outcomes.

2.5 The construction of these forecasts was made more challenging by problems in measuring the economy during the pandemic. There were no official population projections taking account of the pandemic and the primary source of information on migration (the ONS international passenger survey) was suspended. Our forecasts for the population were (and still are) consequently more uncertain than usual. And face-to-face surveys were suspended, which generated particular uncertainties in understanding developments in the labour market.[6] There were additional challenges in measuring levels of economic activity, with the ONS having to introduce new methods to measure virtual teaching and the testing, tracing and vaccination programmes.[7] As discussed in Box 2.4 of our March 2021 *Economic and fiscal outlook* (*EFO*), the ONS uses direct measures of public sector output whereas some other statistical agencies use deflated costs of inputs, which made international comparisons of GDP more difficult in the pandemic, when there were significant impacts on the indicators used to directly measure public sector output.

Conditioning assumptions during a pandemic

2.6 Like other forecasters, our understanding of the nature of the virus, its economic impact, and the effectiveness of various public health interventions evolved as the pandemic progressed. In the following sections we therefore discuss how the following four key judgements changed through the pandemic:

- the **epidemiological situation**, including the path of the virus, associated public health restrictions, voluntary social distancing, and development and rollout of vaccines;
- the degree of **economic adaptation** to pandemic conditions;

[5] See OBR, *Fiscal sustainability report,* July 2020.
[6] ONS, Labour Force Survey weighting methodology, May 2021.
[7] ONS, *Coronavirus and the impact on measures of UK government education output: March 2020 to February 2021*, March 2021 and ONS, *Measuring the economic output of COVID-19 testing, tracing and vaccinations: April 2020 to June 2021*, September 2021.

- the **Government's support measures** for the economy; and
- the degree of **scarring to potential output** as a result of the pandemic.

2.7 Of course, these factors interacted with each other, so our conditioning assumptions could not be set in isolation, further complicating the task of forecasting. For instance, the path of the virus and public health restrictions influenced the degree and nature of the fiscal support provided. The utilisation of that fiscal support was partly determined by the degree of economic adaptation to the pandemic, while also partly determining the degree to which economic adaptation could take place. And the effectiveness of vaccines, degree of adaptation, and extent of fiscal support all fed through into our scarring judgement.

Epidemiological assumptions

2.8 Our assumptions regarding the course of the pandemic, the associated restrictions, and the degree of voluntary social distancing became the most important determinant of our near-term forecasts. All else equal, the higher the rate of infection, the greater the stringency and duration of lockdowns, and the more voluntary social distancing the greater the fall in economic activity. Over the medium term, the effectiveness of vaccines and the speed at which they could be developed and rolled out determined, in concert with fiscal support, the degree to which economic activity could return to its pre-pandemic levels and modalities, and thereby, as discussed above, the extent of any long-term scarring.

2.9 As Table 2.1 sets out, we updated our assumptions as the pandemic and associated public health response evolved, and as our understanding of their economic implications improved. Changes in these epidemiological assumptions were one of the key drivers behind revisions to our forecasts and the final errors against them. For instance, our first forecast in April 2020 overestimated the size of the output fall in the second quarter of 2020 in part because we assumed the initial lockdown would last for three months rather than two (although further lockdowns took place in November 2020 and in early 2021, taking the total number of months spent in some version of lockdown to five).

2.10 Our conditioning assumptions also became more detailed as the public health response became more multi-faceted, incorporating regionally tiered restrictions (albeit briefly), test, trace and isolate (TTI) systems, and finally vaccines. To highlight the uncertainty surrounding them, our November 2020 *EFO* included, alongside our central forecast, a set of scenarios explicitly conditioned on alternative epidemiological assumptions, ranging from an upside scenario (in which an effective TTI system, and relatively modest health restrictions, were enough to prevent exponential growth in cases after the November lockdown ended until a highly effective vaccine was rolled out early in 2021) to a downside scenario (in which an ineffective TTI system necessitated a very high level of restrictions to be maintained and no effective vaccine was developed).

Table 2.1: Epidemiological assumptions and associated restrictions

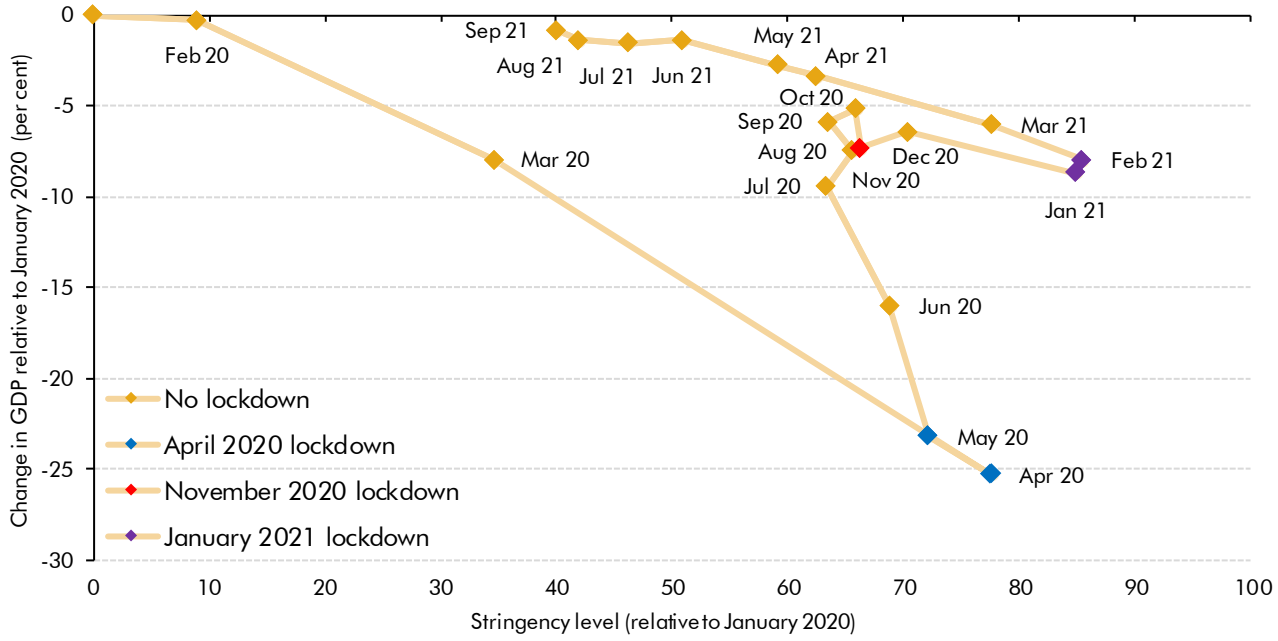
	Public health measures	Vaccine assumptions
April 2020	Lockdown in the second quarter of 2020, with restrictions lifted over the subsequent three months.	Not explicitly conditioned on a specific vaccine assumption (although no long-run scarring was assumed).
July 2020	Not conditioned on a single set of public health restrictions/vaccine assumptions (consistent with effective vaccines/treatments taking a year to deliver, or with a faster resolution of the health threat but greater persistence in its economic consequences).	
November 2020	After a one-month November lockdown, relatively stringent health restrictions remain until spring 2021.	Effective vaccines lead to restrictions being eased in the second half of 2021.
March 2021	After a two-month January lockdown, restrictions eased to low level by June 2021 (broadly in line with the Government's *Roadmap*).	Continued rollout assumed (broadly in line with Government's plan to offer first doses to all adults by 31 July).
October 2021	Restrictions tighten modestly (or voluntary social distancing increases) over winter 2021-22.	Ongoing rollout of vaccines and boosters assumed to continue.
What has happened so far	• Two-month lockdown from late March 2020, restrictions eased over the summer. • One-month November lockdown (plus tiered restrictions in late-October/December). • Two-month lockdown from January 2021, restrictions eased between March and June.	Acquired and rolled out in 2021 broadly in line with the Government's plan (with first doses offered to all adults by 19 July, 12 days ahead of schedule).

Economic adaptation

2.11 A second important determinant of our economy forecasts was the extent to which households and businesses were able to adapt the way in which they consume, produce, and sell goods and services to pandemic conditions. As discussed in Chapter 2 of our July 2021 *Fiscal risks report*, the economy proved increasingly resilient to lockdown conditions as consumers made more purchases online, businesses found ways to make their premises Covid-safe, and employees became more adept at working remotely. As shown in Chart 2.1, this meant that the relationship between the stringency of public health restrictions and the level of output weakened over time, with the second and third lockdowns causing significantly less economic damage than the first. Looking ahead, these pandemic-induced adaptations may leave their own mark on the geographic and sectoral distribution of economic activity, possibly necessitating further adjustments after the pandemic has ended.[8]

[8] See Box 2.2 of our October 2021 *Economic and fiscal outlook*.

Chart 2.1: Degree of adaptation over successive lockdowns



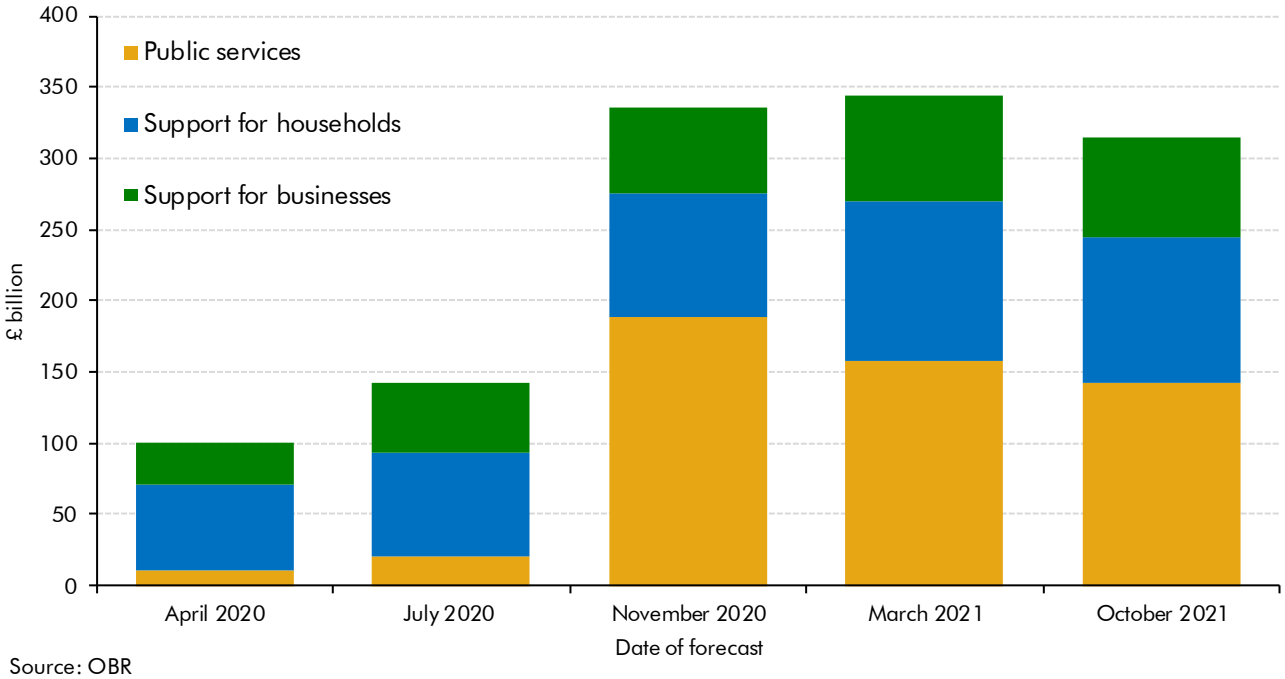
Source: Blavatnik School of Government, ONS, OBR

Government support measures

2.12 Government support to firms, households, and public services during the pandemic was unprecedented in both scale and scope, resulting in the highest level of borrowing since World War II. It played a key role in shielding the economy from the effects of the pandemic and preserving supply potential until the pandemic receded. The nature and scale of fiscal support also evolved with 17 major pandemic-related policy announcements over the course of the pandemic. Chart 2.2 shows what was known about the cost of this fiscal support at the time of each of our forecasts.

2.13 We are required to condition our forecasts on stated policy, which means the intial estimates included primarily the early phases of the furlough scheme (the CJRS), grants, loans, business tax reliefs, and the initial tranche of additional support for public services. As the pandemic proceeded, support for employees and businesses was extended and expanded, while further amounts were allocated to support public services (especially on personal protective equipment (PPE), Test and Trace, and vaccines in the NHS). The evolving policy reponse fed back into our economic forecasts and partly explains some of our most significant forecast errors. Most notably, our forecasts all overestimated the rise in unemployment, with the errors much greater in the earlier forecasts. But that was partly because they assumed that the furlough scheme and other support measures were withdrawn before completion of the vaccine roll-out and the restoration of economic activity.

Chart 2.2: Cost of pandemic response measures



Source: OBR

Scarring of potential output

2.14 Our assumption regarding the degree of long-term scarring represents our best estimate of the lasting impact of the pandemic on the productive potential of economy relative to its pre-pandemic trajectory. But, as we noted in July 2020 when a scarring assumption was first introduced, our initial estimate was highly uncertain since it was based on only limited available evidence. We assumed that a plausible range of outcomes would be from 0 and 6 per cent. Our initial central scarring assumption of 3 per cent simply represented the midpoint of this range rather than any strong view as to the most likely outcome.

2.15 In November 2020, we added a putative decomposition of the 3 per cent figure into three main categories:

- A lower **labour supply** accounted for 1.0 percentage points. Within this, half was due to lower labour force participation, reflecting the long-run health consequences of the virus for some of the infected and the decision of some older workers to retire earlier. The remainder was split roughly equally between: a modestly higher equilibrium unemployment rate as a result of the need to reallocate some workers across jobs, sectors and occupations; and a smaller population as a result of lower net inward migration, as foreign workers returned home or stayed away.

- A smaller **capital stock** ('capital shallowing') accounted for a further 0.8 percentage points. This reflected our initial estimate of the shortfall in business investment as a result of the pandemic.

- Lower **total factor productivity** (TFP) accounted for the remaining 1.2 percentage points. This reflected the lasting effects of the pandemic on the efficiency of production (for example, due to foregone research and development (R&D) investment or the premature scrapping of capital assets, which would show up as lower TFP in the official statistics).[9]

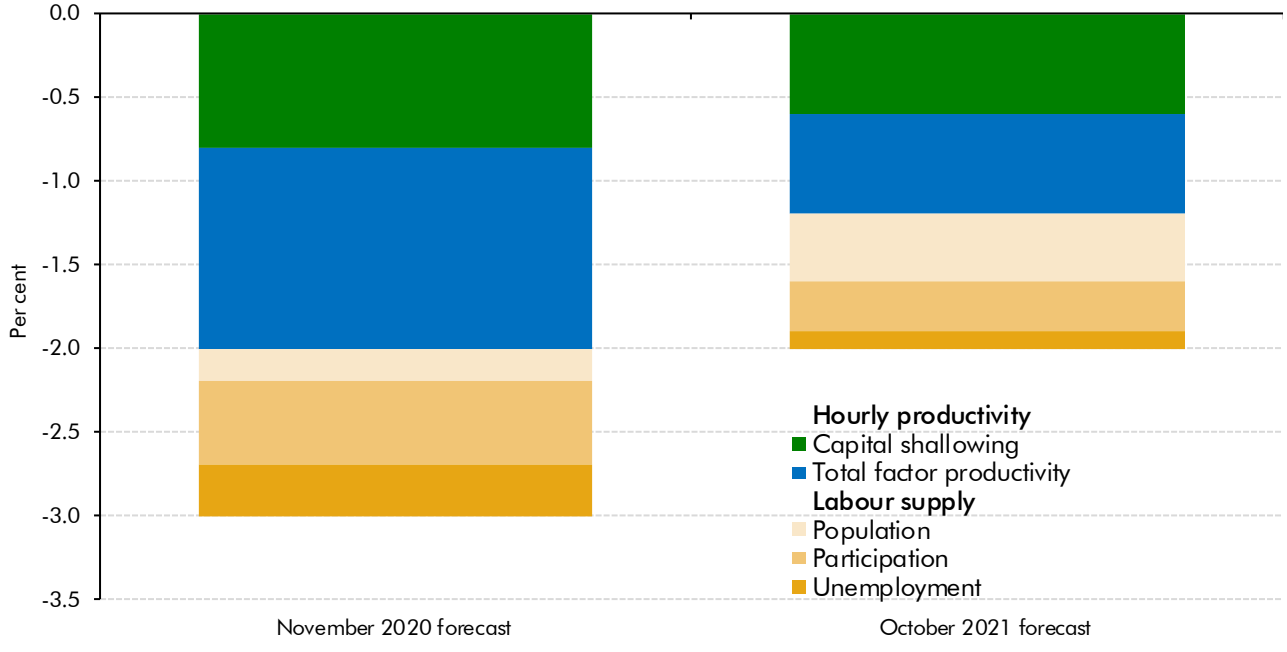
2.16 We revised down our scarring estimate in our October 2021 forecast from 3 to 2 per cent. This downward revision reflected primarily the rapid rollout of highly effective vaccines, the success of the Government's support measures in protecting viable firms and jobs, and emerging evidence of the adaptability of the economy to pandemic conditions. Within this:

- The **labour supply** scarring component was revised down from 1.0 to 0.8 percentage points. That reflected the net effect of two adverse developments (higher than expected mortality and evidence of lower inward net migration) and two beneficial ones (higher than expected participation and lower anticipated structural unemployment).

- The contribution of **capital shallowing** was revised down to 0.6 percentage points, reflecting a smaller shortfall in business investment.

- The **total factor productivity** contribution was lowered to 0.6 percentage points, reflecting the effectiveness of government support schemes in supporting corporate balance sheets, the resilience of investment in intangibles, surprisingly strong foreign direct investment during the pandemic, and a 'batting average' effect resulting from the closure of less productive firms.

Chart 2.3: Pandemic-related economic scarring assumptions for GDP in 2025



Source: OBR

[9] Bloom, N., *et al.*, *The Impact of Covid-19 on Productivity*, NBER Working Paper 28233, December 2020.

The evolution of our forecasts through the pandemic

How successive forecasts have performed

2.17 The changing picture in relation to the four conditioning assumptions described above explains a large part of why and how our economic forecasts evolved over the course of the pandemic:

- In our **March 2020 *EFO***, we closed our pre-measures economy forecast on 18 February before the full global impact of the novel coronavirus had become apparent. By this time, just eight cases of coronavirus had been recorded in the UK, while our forecast incorporated only a 0.1 percentage point reduction in GDP growth in 2020 as a result of the virus, mainly reflecting weaker growth in Asia as a result of the new virus. By Budget day, 11 March 2020, seven coronavirus-related deaths had been recorded in the UK, and we noted that the global spread of the virus since we had closed our economy forecast meant that it could "*no longer be regarded as central*".

- In **April 2020**, we produced a *Coronavirus reference scenario (CRS)*, which was our first attempt to quantify the effects of the pandemic. It assumed economic activity would be severely restricted for three months, and that output would fall sharply as a result of those restrictions (by 35 per cent in the second quarter of 2020, rather than the 20 per cent that transpired) and that the unemployment rate would rise sharply (peaking at 10 per cent in the same quarter). But the effect of restrictions on economic activity were assumed to ease progressively over the subsequent quarter so that the recession was 'V-shaped' in nature, with output regaining its pre-pandemic peak in the fourth quarter of 2020. At that point, we incorporated no allowance for long-run scarring with output returning to its pre-crisis trajectory at the start of 2021.

- Our **July 2020 *FSR*** central scenario represented our first official projection during the pandemic. It assumed that, in line with Government policy at the time, the CJRS would close in October 2020. But the planned closure of the scheme was well before we expected output to regain its pre-pandemic level (in the fourth quarter of 2022). This resulted in a much higher unemployment rate in the fourth quarter of 2020 (12 per cent) than actually transpired (5 per cent) as the scheme was subsequently extended. Our July 2020 central scenario also introduced for the first time some long-run scarring of potential output, of 3 per cent.

- In our **November 2020 *EFO***, the forecast was finalised as the second wave of infections took hold, and a second national lockdown was imposed. This forecast assumed that output would fall by 7 per cent in November (significantly less than in the first lockdown), taking activity to 15 per cent below its pre-pandemic level. But it soon became apparent that we had underestimated the degree of economic adaptation to lockdown conditions, with the latest data suggesting that output fell by only 2.3 per cent in that month. An extension of the CJRS to the end of March 2021 meant the rise in unemployment following its closure was smaller than before, as output was assumed to have recovered more. Indeed, in the upside scenario published in this *FSR*,

output losses were largely recovered by the time the CJRS closed and the rise in unemployment was quite modest – presaging what actually transpired.

- Our **March 2021** *EFO* was produced during the third lockdown, although before its impact had shown up in the official statistics for GDP. Again, we underestimated the degree of economic adaptation, forecasting an 11 per cent shortfall in output in January 2021 relative to the pre pandemic peak, compared to the 9 per cent that occurred. Partly reflecting generous temporary investment incentives announced in the Budget, we brought forward the date at which the pre-crisis peak in output was regained by around six months, to the second quarter of 2022. And the CJRS was extended once more, this time to September 2021, resulting in a further downward revision to the expected peak in unemployment.

- For our **October 2021** *EFO*, we had initial outturn data for 2020-21, but Blue Book revisions after we closed our pre-measures forecast mean that this forecast differs from the latest outturns. These revisions were significant, with cumulative real GDP growth between the fourth quarter of 2019 and second quarter of 2021 revised up by 1.1 percentage points. Nevertheless, as discussed in Box 2.3 of our October 2021 *EFO*, we expect this to have little effect on real GDP in the medium term, given evidence that supply bottlenecks and inflation are likely to provide an offsetting drag on growth from the second half of 2021 onwards. The faster recovery in output and unchanged end date for the CJRS meant another downward revision to peak unemployment.

Output shortfalls, unemployment peaks and the furlough scheme

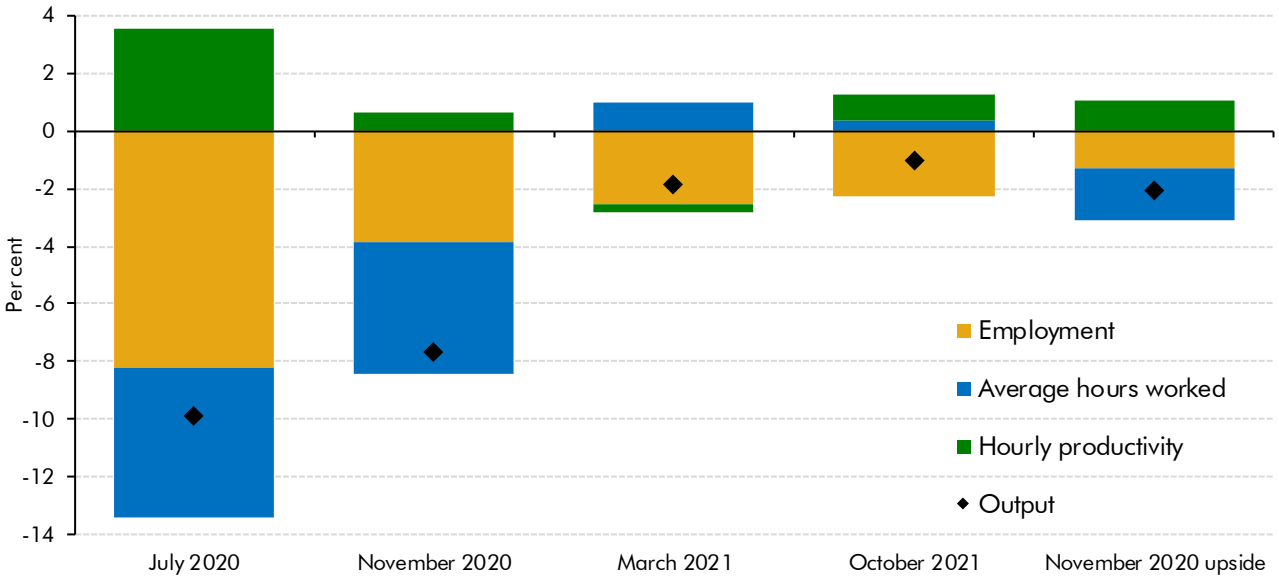
2.18 Chart 2.4 illustrates the interaction between the assumed end date of the CJRS and a decomposition of the shortfall in output into its labour (heads and average hours) and productivity components after the CJRS was withdrawn across successive forecasts. While the CJRS was in place, the shortfall in output and total hours showed up in lower average hours worked (because some of those recorded as being employed were on furlough). But after the closure of the CJRS, that balance shifts towards lower employment rather than lower average hours as some of the surplus workers are assumed to be laid off.

2.19 In all our forecasts, we expected output to remain below its pre-pandemic level when the CJRS closed, but the shortfall was much greater in the forecasts produced in July 2020 and, to a lesser extent, November 2020 than in March and October 2021. As such, in those earlier forecasts, large numbers were expected to be on furlough when the scheme closed, and that alternative job opportunities would be scarce. We therefore assumed that closure would result in much higher unemployment (peaking at 12 and 7½ per cent in July 2020 and November 2020 respectively). But in our November 2020 upside scenario, where the closure of the CJRS coincided with an almost complete recovery in output, unemployment rose only modestly to 5 per cent.

2.20 In the following March Budget, the Chancellor extended the CJRS to September 2021, such that the date of closure was more closely aligned to the recovery of output in our central forecast. This resulted in a lower peak for unemployment of 6½ per cent. Upside surprises

in output growth and the increasingly promising vaccine news meant that in our October 2021 forecast the output shortfall was smaller still at the time of the scheme's closure. Taken together with better labour market outcomes through the year, this led us to revise down the peak in unemployment further to 5¼ per cent, more in line our November 2020 upside scenario. The latest data suggest that the peak may be lower still, with remarkably little effect visible in surveys and high-frequency indicators to date.

Chart 2.4: Contributions to output shortfalls following the closure of the CJRS



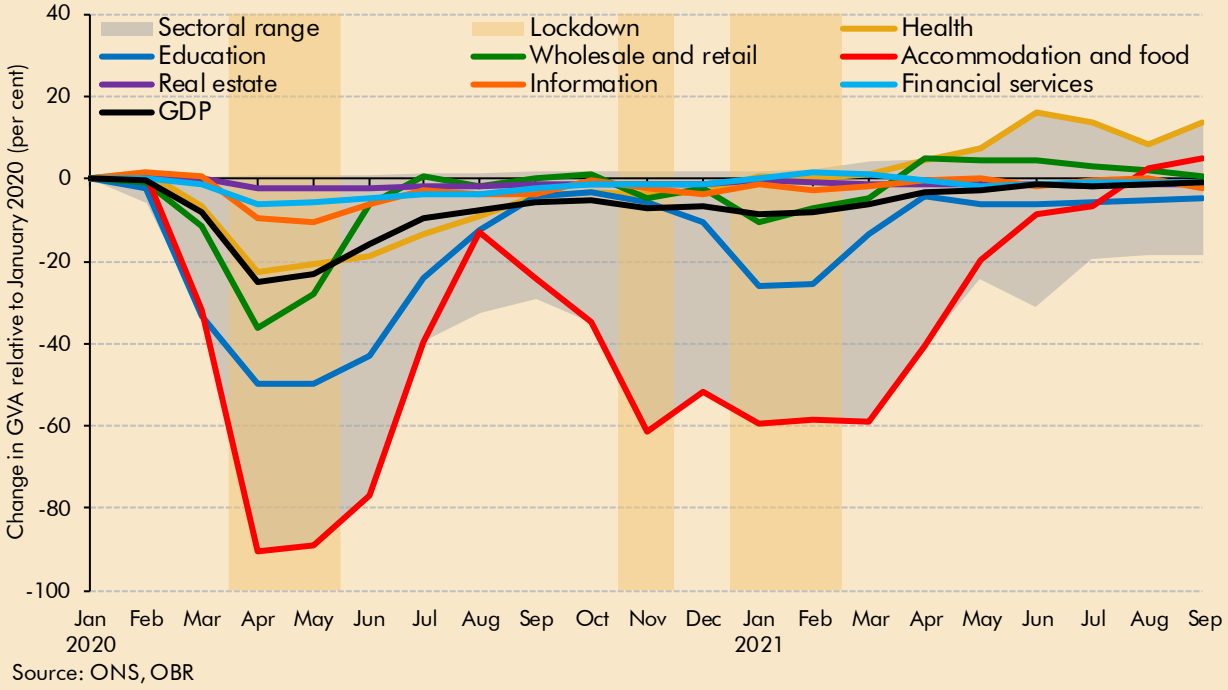
Note: The bars reflect the change between Q4 2019 and the quarters in which the start of the period following the closure of the CJRS fell, which were: Q4 2020 (July 2020 *FSR*), Q2 2021 (November 2020 *EFO*) and Q4 2021 (March 2021 and October 2021 *EFO*s).
Source: OBR

2.21 The combined effect of fiscal policies that supported incomes and public health restrictions that constrained people's ability to spend led to a significant increase in 'forced' savings. In our October 2021 *EFO*, we estimated that these stood at around £170 billion. One key forecast judgement has been the pace of the unwind of these excess savings. At 11 per cent in the medium term, our July 2020 forecast for the saving ratio implied a persistent rise in precautionary saving. We revised this down to around 7.5 percent in November 2020 and assumed that around 5 per cent of the excess savings would be spent each year, plus a little more than that in the near term as pent-up demand for durable goods was released. In our October 2021 forecast, we further lowered the saving ratio to settle at 5 per cent, as we expected the removal of the worst of the pandemic-related downside risks and a smaller rise in unemployment to lessen the need for precautionary saving. This assumption will be a key determinant of the size of our forecast error for consumption in the coming years.

Box 2.1: Forecasting sectoral output during the pandemic

One of the unique features of the coronavirus shock was its extraordinary degree of sectoral differentiation. Some sectors, such as hospitality, transport, and arts and entertainment, where close proximity between customers and/or the workforce is almost impossible to avoid, experienced very large falls in output as a result of the pandemic and associated health restrictions. By contrast, sectors where output could be more easily produced and delivered remotely, such as financial services, and IT and communications, experienced modest falls in output and almost no contraction in subsequent lockdowns.

Chart A: Change in level of output relative to January 2020 by sector



Source: ONS, OBR

This feature of the pandemic therefore required a more sectorally differentiated approach to forecasting than we have traditionally employed. In normal times, we look at manufacturing, construction and services output to forecast the current and next quarter's GDP growth, but do not publish disaggregated forecasts for the components of the output measure of GDP. Starting in April 2020, in order to cross-check our 'top-down' income- and expenditure-based GDP forecasts, we also published, for the first time, 'bottom-up' near-term projections of output in 16 sectors that comprise the output-based measure of GDP. This box examines the accuracy of these sectoral output forecasts, focusing on our contemporaneous estimates for the fall in activity at the trough of the three lockdowns in April 2020, November 2020, and January 2021.

Our forecast errors in Table A show the evolution in our understanding of the economic impact of the pandemic and some of the more esoteric aspects of national accounting methods. In the first lockdown in April 2020, we overstated the loss of output at the trough, partly because we overestimated the losses in output in less contact-intensive sectors, such as professional, IT, and other services. In health and education, however, the large errors reflect a miscalculation of how measured output would be affected. We expected health output to jump alongside the surge in

coronavirus patients, but measured output actually fell as the number of GP appointments and elective procedures declined. We also thought that education output would fall more sharply than it did when schools were closed, as we did not anticipate that the ONS would treat remote learning as output. In real estate our error reflected an oversight in respect of the treatment of the imputed output from owner-occupied housing. Large errors elsewhere (from -17 percentage points in agriculture to +35 percentage points in information and communication) reflect not only the difficulties associated with anticipating the sectoral impact of lockdowns but also that other factors, such as Brexit and the weather, affected output too.

When forecasting the second and third lockdowns, in November 2020 and January 2021, we more consistently underestimated sectors' adaptability to lockdown conditions, albeit by smaller amounts. On both occasions we expected smaller impacts than in the initial lockdown, reflecting changing restrictions (for example, construction continued in the second and third lockdowns) and that some adaptation was likely to occur. But the extent of adaptation continued to be even greater than we anticipated, businesses changed their operating models (such as restaurants offering more takeaways and offices improving their remote working arrangements) and consumers proved more able to spend than anticipated (partly by shifting more consumption online), dampening the hit from both lockdowns and increasing our forecast error. This process of adaptation may have also been supported by generous fiscal measures to a greater extent than our forecasts assumed.

Table A: Forecast errors in the April, November, and January lockdowns

Sector	Weight[3]	Lockdown period[1,2]								
		April 2020			November 2020			January 2021		
		Forecast	Outturn	Difference	Forecast	Outturn	Difference	Forecast	Outturn	Difference
Accommodation and food services	3	-85	-90	-5	-68	-62	7	-71	-59	12
Other services	4	-60	-46	14	-40	-37	3	-45	-35	10
Construction	6	-70	-44	26	-14	-6	8	-6	-8	-2
Transportation	4	-35	-33	2	-22	-14	8	-23	-16	7
Education	6	-90	-43	47	-19	-6	13	-19	-26	-7
Wholesale and retail	10	-50	-34	16	-19	-5	14	-10	-11	-1
Administrative and support	5	-40	-33	7	-32	-19	12	-19	-18	1
Human health	8	50	-21	-71	-24	-4	21	-8	1	9
Manufacturing	10	-55	-29	26	-11	-2	9	-4	-5	-1
Professional, scientific and technical	8	-40	-17	23	-14	-4	10	-5	-4	1
Information and communication	7	-45	-10	35	-8	-2	5	-8	-1	7
Agriculture	1	0	-17	-17	-4	-12	-8	-11	-14	-3
Energy and water	3	-20	-9	11	-4	-4	-1	-7	-2	5
Finance and insurance	7	-5	-6	-1	-3	-1	1	-3	0	3
Real estate	14	-20	-2	18	-2	-1	1	-2	0	2
Public admin and defence	5	-20	1	21	1	2	0	2	2	0
Total		**-35**	**-23**	**12**	**-15**	**-7**	**8**	**-11**	**-9**	**2**

[1] April 2020 numbers are for the loss of output between the first quarter of 2020 and April 2020, November 2020 and January 2021 is the loss of output relative to January 2020.

[2] Forecast numbers are from the April 2020 reference scenario, the November 2020 *EFO* and the March 2021 *EFO*.

[3] Weight in April 2020 reference scenario.

Comparisons with other independent forecasts

2.22 Comparing the evolution of our forecast for real GDP in 2020 over the course of the year to those of the Bank of England and the range and average of independent forecasters of the UK economy reveals several features. As shown in Chart 2.5:

- First, **we were quicker to recognise the severity of the pandemic's economic impact than other forecasters**, with our April 2020 reference scenario coming in 3.1 per cent below the final outturn compared to the consensus which remained 3.9 per cent above at the time. (Among independent forecasters that provided updated forecasts in April, Société Générale proved to be the most accurate, predicting a 10.2 per cent full-year fall.) The Bank of England's first pandemic forecast came a month later in its May *Monetary Policy Report* and was even more pessimistic because it assumed a slower recovery, with GDP reaching its pre-pandemic level in the second half of 2021, and some long-term scarring to potential output.

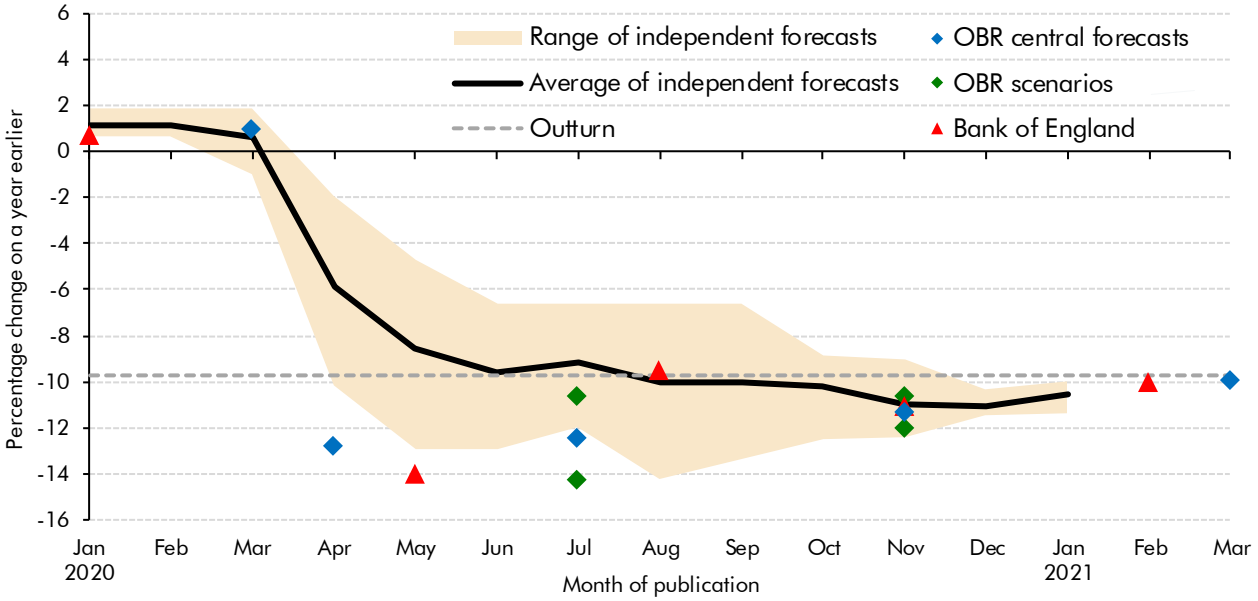
- Second, from April **we consistently overestimated the hit to GDP**, particularly early in the pandemic (see Box 2.1). In April, this reflected three factors. We overestimated the impact of a full lockdown on GDP by assuming a quarterly fall of 35 per cent, compared to the 20 per cent that eventually transpired. We assumed the first full lockdown would last for three months, whereas it was actually closer to two. And we assumed the impact of restrictions and voluntary social distancing on GDP in the third quarter of 2020 would be half that in the second quarter, but the actual impact was closer to a third. These three factors were partially offset by our overoptimistic assumption that output would return to pre-pandemic levels in the fourth quarter of 2020. We continued to overestimate the hit to GDP in subsequent forecasts and even our November forecast overestimated the fall in GDP by 1.6 percentage points.

- Third, from April **our forecasts were consistently more pessimistic than most other forecasters**. This is partly because we are required to produce forecasts conditional on the Government's stated policy at the time. So, in some forecasts, we were forced to assume that support schemes, such as the CJRS, were closed well in advance of a complete recovery in output.

- Fourth, **ex post revisions to GDP data were significant** – the consensus forecast in December 2020 was for an 11.1 per cent fall in GDP compared to the latest outturn which shows a smaller fall of 9.7 per cent.

- Finally, the huge widening in the range of independent forecasts between February and April is symptomatic of the **high levels of uncertainty** and the difficulty of forecasting during the initial phases of a pandemic.

Chart 2.5: Range of forecasts for 2020 GDP growth



Note: OBR's April forecast and Bank of England's May forecast were illustrative coronavirus scenarios. OBR's July and November scenarios were upside and downside scenarios around the central forecast based on different assumptions about the pandemic.
Source: Bank of England, HM Treasury, OBR

2.23 Comparing our forecasts for UK GDP in 2020 against the first 'post-outbreak' forecasts produced by other independent fiscal institutions (IFIs) for output in their respective countries suggests that pessimism was widespread at the initial stage of the pandemic.[10] Like-for-like comparisons are not possible as the pandemic affected countries at different times in 2020, some forecasters had the benefit of seeing its initial impact in other countries first, and there were varying degrees of government support. But nonetheless, Table 2.2 shows how a collection of first estimates of the pandemic compare to the latest outturn figures reported by the IMF.[11] Of the six IFIs, all but the Canadian Parliament Budget Office and Korean National Assembly Budget Office initially overestimated the loss of GDP. Our forecast error is larger than the average, but this is partly because we experienced a more severe contraction in GDP than other countries.

Table 2.2: First estimates of pandemic-induced GDP falls

Institution	Date of forecast	2020 real GDP growth		Forecast error
		Forecast	Outturn (IMF)	Percentage points
CPB (Netherlands)[1]	26 March 2020	-5.3	-3.8	-1.5
PBO (Canada)	27 March 2020	-5.1	-5.3	0.2
NABO (Korea)	31 March 2020	1.6	-0.9	2.5
Danish Economic Council[1]	6 April 2020	-4.5	-2.1	-2.4
OBR (UK)	14 April 2020	-12.8	-9.8	-2.9
CBO (USA)[2]	27 April 2020	-5.6	-2.4	-3.2
Average		-5.3	-4.0	-1.2

[1] The CPB's forecast is the average of four scenarios and the Danish Economic Council's is the average of two scenarios.
[2] GDP forecast and outturn for the USA is percentage change from fourth quarter to fourth quarter.

[10] OECD, Independent fiscal institutions: Promoting transparency and accountability early in the COVID-19 crisis, in *Government at a Glance 2021*, 2021.
[11] Estimates are for the six advanced-economy IFIs in the OECD that produce official or alternative economic forecasts.

Accounting for the March 2020 forecast error

2.24 Having explored how our forecasts evolved over 2020, this section details how our March 2020 *EFO* forecast for fiscal year 2020-21 compared with outturns, and what accounts for the differences. This underpins the decomposition of our fiscal forecast errors set out in Chapter 3. As described above, in that initial March 2020 forecast, the virus was assumed to remain largely confined to Asia and to have only a limited impact on the UK economy via weaker global GDP. Specifically, based on estimates of the impact of SARS in 2003, we lowered our forecast for Chinese GDP growth in 2020 by 1 percentage point (to 5 per cent), with smaller adjustments in other parts of Asia, the US and the euro area, that together reduced world GDP growth by 0.3 percentage points. On this basis, we lowered our forecasts for the growth of world trade and UK export markets by 0.5 and 0.2 percentage points respectively. This knocked only 0.1 percentage points off UK GDP growth in 2020.

Real and nominal GDP growth

2.25 The shortfall in real GDP growth in 2020-21 relative to our March 2020 forecast was 12 percentage points, with private consumption accounting for most of the difference as the pandemic and associated public health restrictions limited people's ability to spend. Private investment also fell, as restrictions directly curtailed construction activity, while elevated uncertainty and lower demand led firms to hold back other forms of business investment. Net trade was the only component of GDP that exceeded our March 2020 forecast, as the shortfall in imports relative to forecast was greater than the shortfall in exports.

Table 2.3: Expenditure contributions to real GDP growth in 2020-21

	Percentage points						
	Private consumption	Business investment	Private residential investment	Total government	Net trade	Other	GDP
March 2020 forecast	0.8	0.0	-0.1	0.8	-1.1	1.0	1.3
Latest data	-8.2	-1.5	-0.4	-0.7	-0.4	0.5	-10.6
Difference[1]	**-9.0**	**-1.5**	**-0.3**	**-1.4**	**0.7**	**-0.6**	**-12.0**

[1] Difference in unrounded numbers.

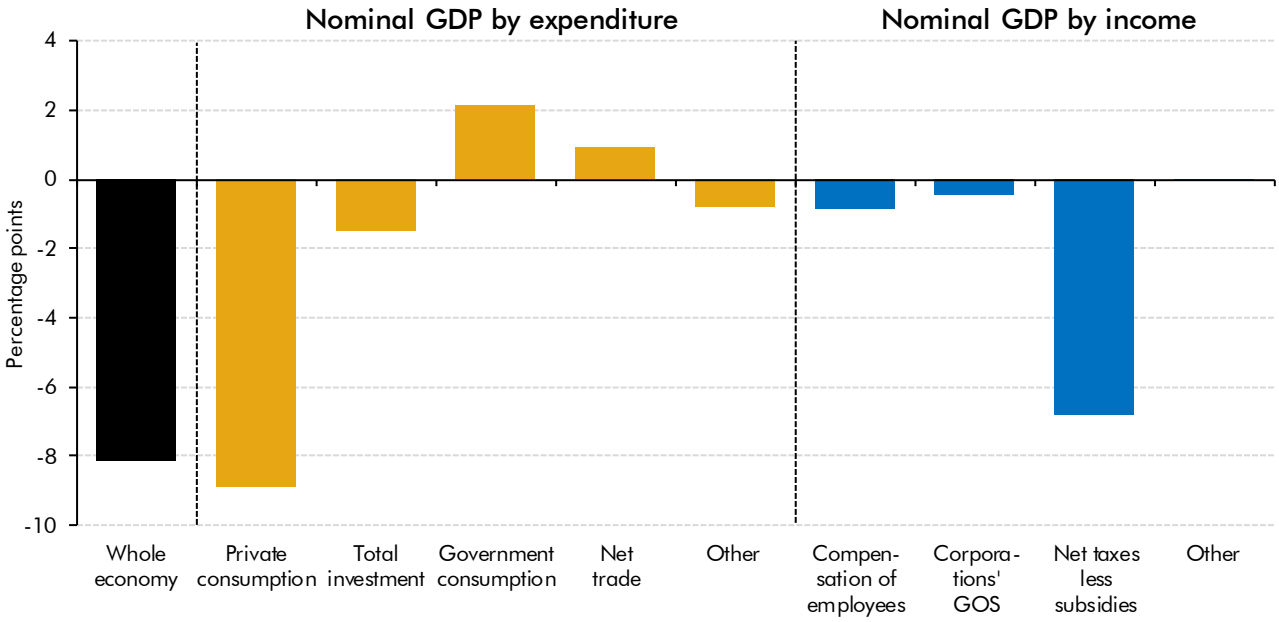
2.26 Nominal GDP – the cash value of goods and services produced in the economy – is more important than real GDP for the public finances. That is because tax liabilities are mostly determined by cash quantities. In addition, a large share of public spending is also set in nominal terms, either through multi-year cash plans (public services and capital spending) or because it is linked to inflation (social security and public service pensions).

2.27 Chart 2.6 shows that the nominal GDP growth shortfall relative to forecast was somewhat smaller at 8 percentage points, due to GDP deflator inflation exceeding our forecast. This partly reflects an increase in the implied price of health and education services (so, while nominal government spending increased relative to our March 2020 forecast, real expenditure was lower than forecast), and partly upward revisions to nominal GDP growth in 2020-21 in the September 2021 Quarterly National Accounts release.

2.28 The relative scale of forecast errors across the contributions of different expenditure and income components is important for understanding the fiscal forecast errors described in Chapter 3. In particular, on an income basis, employee incomes and company operating surpluses (a measure of profits) were only modestly weaker than expected despite the large shortfall in nominal GDP. These two forms of income are relatively highly taxed. By contrast, on an expenditure basis, the shortfall in private consumption, which is also relatively highly taxed, more than explained the overall shortfall in nominal GDP.

2.29 These patterns reflect the fiscal support delivered during the year, with the furlough scheme supporting employee incomes relative to output, business grants and tax reliefs supporting corporate profits relative to sales, and elevated government procurement supporting the incomes of those providing those goods and services. This can be seen in the large negative contribution from taxes and subsidies on the income side and the large positive contribution from government consumption on the expenditure side. The protection of private sector incomes in the face of public health restrictions on output and consumption was a key driver in tax revenues holding up better than might have been expected last year.

Chart 2.6: March 2020 forecast errors in contributions to nominal GDP growth in 2020-21



Note: Corporations' GOS stands for private corporations' gross operating surplus.
Source: OBR

Labour market

2.30 Employment fell over the course of the year, compared to the small increase we had expected in March 2020 (although, as noted above, the fall was much less than in our initial pandemic forecasts). As with private incomes, the fall was smaller than might have been expected given the falls in output and total hours worked. That reflected the effectiveness of the furlough scheme in ensuring that average hours (rather than employment) bore the brunt of the shortfall in output. Overall, the 12 percentage point

shortfall in real GDP growth was made up of a 0.4 percentage point upside surprise in the contribution from hourly productivity growth and a 12.4 percentage point downside surprise in the contribution from the shortfall in total hours worked. Thanks to the furlough scheme, that was made up of a 10.4 percentage point shortfall due to lower average hours worked but only a 2.1 percentage point shortfall in employment growth (equivalent to 683,000 people). Part of the fall in employment reflected migrant workers returning home or staying away, with estimates suggesting that net migration fell to 34,000 in 2020, an 88 per cent decrease on a year earlier[12], as well as other workers leaving the labour force.

2.31 Average earnings growth was lower than our March 2020 forecast, but again by much less than would have been expected given the output loss experienced. Average earnings growth across the year as a whole was just 1.4 percentage points weaker than expected, whereas growth in nominal GDP per person was around 8 percentage points weaker. This largely reflects the CJRS protecting jobs by paying 80 per cent of wages for much of the year (although for those not receiving top-ups from their employers, that also reduced average wage levels). With roughly a third of employees on furlough at the scheme's peak in the second quarter of 2020 and still over 10 per cent by April 2021, the flow of employees onto and off the scheme had a notable impact on both wage levels and growth rates. Bank of England analysis suggests the scheme reduced private sector regular pay growth on average by 1.6 percentage points over the year. This was offset by compositional effects due to a concentration of job losses in lower paid roles, which boosted pay by 1.8 per cent.[13]

2.32 Hourly productivity growth was unexpectedly volatile in 2020-21, but the net effect of two competing forces left it 0.4 percentage points above our pre-pandemic prediction. On the one hand, the loss of efficiency arising from changes in working practices necessitated by the virus lowered productivity. But on the other, the concentration of the effect of lockdown on hours worked in below-average productivity jobs generated an offsetting upward 'batting average' effect. We initially expected this batting average effect to occur straight away, causing an immediate spike in productivity. In the event, it did not appear until the third quarter of 2020.

Table 2.4: 2020-21 labour market indicators

	Change, per cent, unless otherwise stated								
	Total hours		Average hours		Total employment		Unemployment rate	Average earnings	Productivity per hour
		(millions)		(hours)		(000s)	ppts		
March 2020 forecast	0.3	(3)	-0.1	(0.0)	0.4	(126)	0.0	3.6	1.0
Latest data	-12.0	(-126)	-10.5	(-3.3)	-1.7	(-556)	0.9	2.2	1.5
Difference[1]	**-12.4**	**(-129)**	**-10.4**	**(-3.3)**	**-2.1**	**(-683)**	**0.9**	**-1.4**	**0.4**

[1] Difference in unrounded numbers.

[12] ONS, *Long-term international migration, provisional estimates year ending December 2020,* November 2021.
[13] Bank of England, *Monetary Policy Report*, Chart 2.22, November 2021.

Inflation

2.33 As Table 2.5 shows, both CPI and RPI inflation were around one percentage point lower than in our March 2020 forecast for 2020-21 as a whole. This downward pressure resulted partly from a margin of spare capacity opening up, as the pandemic and behavioural change weighed on demand by slightly more than supply. Falls in fuel prices due to lower oil prices also lowered inflation over this period, by reducing utility bills and petrol prices. Government policies also had significant direct impacts on prices, with the introduction of the Eat Out to Help Out scheme and the temporary VAT cut for hospitality businesses helping to lower year-on-year inflation to a trough of 0.2 per cent in August 2020.

Table 2.5: 2020-21 inflation indicators

	Percentage change on a year earlier				
	2020			2021	2020-21
	Q2	Q3	Q4	Q1	
CPI inflation					
March 2020 forecast	1.2	1.3	1.4	1.5	1.4
Latest data	0.6	0.6	0.5	0.6	0.6
Difference[1]	**-0.6**	**-0.7**	**-0.9**	**-0.9**	**-0.8**
RPI inflation					
March 2020 forecast	2.0	2.0	2.1	2.3	2.1
Latest data	1.2	1.1	1.1	1.4	1.2
Difference[1]	**-0.8**	**-0.9**	**-1.0**	**-0.9**	**-0.9**

[1] Difference in percentage points.

2.34 It appears likely that in future reports our forecast errors for inflation in the first quarter of 2022 and beyond will be large and positive, rather than small and negative. This is partly because, prior to our October 2021 forecast, we expected the recovery in demand to lag supply, whereas there now appears to have been a faster rebound in demand than supply through the middle of this year as restrictions were relaxed. This has also been apparent in global product markets, where bottlenecks have put upward pressure on prices. There has been particularly strong upward pressure on gas prices due to both surging demand and limited responsiveness of supply. The potential implications of higher and more persistent inflation were discussed in Box 2.4 of our October 2021 *EFO*.

Monetary policy, the exchange rate, and commodity prices

2.35 Table 2.6 shows that Bank Rate was lower than assumed in our March 2020 forecast. The Bank of England responded to the pandemic by lowering it from 0.75 to 0.1 per cent at the start of the pandemic and it has remained there since. It also roughly doubled the scale of quantitative easing, although the associated asset purchases have not yet been completed. Oil and equity prices fell sharply at the onset of the pandemic as industrial production and financial markets responded to the increase in uncertainty and fall in aggregate demand, although both have recovered as the development and deployment of vaccines enabled much economic activity to resume and demand recovered faster than supply. The exchange rate was volatile in 2020-21 and was on average lower than assumed in March 2020.

Table 2.6: 2020-21 monetary policy, exchange rate and commodity prices

	Bank Rate (per cent)	Quantitative easing[1] (£ billion)	Oil price (£ per barrel)	Equity prices (FTSE All-share)	ERI exchange rate (index)
March 2020 forecast	0.75	445.0	41.1	4245	82.8
Latest data	0.10	794.1	34.3	3490	78.4
Difference[2]	**-0.65**	**349.2**	**-16.6**	**-17.8**	**-5.3**

[1] Total asset purchases, including corporate bonds, at the end of the 2020-21 financial year.

[2] Per cent difference except Bank Rate (percentage points) and quantitative easing (£ billion).

Table 2.7: Summary of pandemic economic forecasts

	Levels, 2019-20 = 100 (unless stated otherwise)				
	Outturn	Forecasts for 2020-21			
	2020-21	July 2020	Nov 2020	Mar 2021	Oct 2021
UK economy					
Gross domestic product (GDP)	89.4	86.7	87.1	88.5	89.1
Nominal GDP	95.2	88.9	93.0	94.6	94.7
Expenditure components of GDP					
Domestic demand	89.9	87.6	85.5	89.4	89.1
Household consumption[1]	87.2	84.4	83.0	87.2	86.8
General government consumption	94.6	100.2	95.8	94.1	94.6
Fixed investment	91.3	72.8	83.3	89.9	91.0
Business investment	85.5	70.1	76.3	84.5	85.3
Government investment	113.6	93.7	111.5	109.6	112.5
Private dwellings investment[2]	90.6	66.0	81.9	89.9	90.4
Change in inventories[3]	99.8		100.1	100.3	100.0
Exports of goods and services	83.5		85.8	81.2	83.2
Imports of goods and services	84.6		80.7	84.8	83.1
Balance of payments current account					
Per cent of GDP	-2.3	-4.0	-2.0	-4.5	-3.2
Inflation					
CPI	100.6	100.5	100.6	100.6	100.6
RPI	101.2	100.9	101.1	101.3	101.2
GDP deflator at market prices	106.5	102.5	106.7	107.0	106.2
Labour market					
Employment (million)	32.3	30.6	32.5	32.5	32.3
Productivity per hour	101.5	106.0	101.4	100.5	101.2
Wages and salaries	102.1	94.2	101.2	100.9	101.4
Average earnings[4]	102.2	99.9	100.9	100.7	101.4
LFS unemployment (% rate)	4.8	10.7	4.7	4.8	4.8
Unemployment (million)	1.6	3.7	1.6	1.6	1.6
Household sector					
Real household disposable income	99.2	97.0	99.2	98.7	99.3
Saving ratio (level, per cent)	16.3	18.5	22.6	18.7	18.5
House prices	104.7	96.7	102.4	104.8	104.7

[1] Includes households and non-profit institutions serving households.

[2] Includes transfer costs of non-produced assets.

[3] Contribution to GDP growth, percentage points.

[4] Wages and salaries divided by employees.

Table 2.8: Summary of pandemic economic forecast errors

	Errors in difference relative to 2019-20 level in percentage points (unless stated otherwise)			
	Jul 2020	Nov 2020	Mar 2021	Oct 2021
UK economy				
Gross domestic product (GDP)	2.7	2.2	0.9	0.2
Nominal GDP	6.4	2.2	0.6	0.5
Expenditure components of GDP				
Domestic demand	2.3	4.4	0.5	0.8
Household consumption[1]	2.8	4.3	0.0	0.4
General government consumption	-5.6	-1.3	0.5	0.0
Fixed investment	18.5	8.0	1.4	0.2
Business investment	15.4	9.3	1.0	0.3
Government investment	19.9	2.1	4.0	1.1
Private dwellings investment[2]	24.6	8.8	0.8	0.2
Change in inventories[3]		-0.3	-0.5	-0.2
Exports of goods and services		-2.3	2.3	0.3
Imports of goods and services		4.0	-0.2	1.6
Balance of payments current account				
Per cent of GDP	1.7	-0.3	2.1	0.9
Inflation				
CPI	0.1	0.0	-0.1	0.0
RPI	0.3	0.1	-0.1	0.0
GDP deflator at market prices	4.0	-0.2	-0.5	0.3
Labour market				
Employment (million)	1.7	-0.2	-0.2	0.0
Productivity per hour	-4.5	0.0	1.0	0.3
Wages and salaries	7.9	0.9	1.3	0.8
Average earnings[4]	2.3	1.3	1.5	0.8
LFS unemployment (% rate)	-5.9	0.1	0.0	0.0
Unemployment (million)	-2.0	0.0	0.0	0.0
Household sector				
Real household disposable income	2.2	0.0	0.5	-0.1
Saving ratio (level, per cent)	-2.2	-6.3	-2.4	-2.2
House prices	8.0	2.3	-0.2	0.0

[1] Includes households and non-profit institutions serving households.

[2] Includes transfer costs of non-produced assets.

[3] Contribution to GDP growth, percentage points.

[4] Wages and salaries divided by employees.

3 The public finances

Introduction

3.1 This chapter discusses the evolution of our fiscal forecasts over the course of the pandemic, comprising our pre-pandemic March 2020 *Economic and fiscal outlook* (*EFO*), April 2020 *Coronavirus reference scenario (CRS)*, July 2020 *Fiscal sustainability report* (*FSR*), November 2020 *EFO* and March 2021 *EFO*.[1] It also compares these forecasts with the latest outturn data for 2020-21 and details the sources of the errors against our March 2020 forecast.

3.2 In our *Forecast evaluation reports* (*FER*s), we restate our previous forecasts so that they are broadly consistent with the latest statistical treatments in outturn data published by the Office for National Statistics (ONS). This usually involves generating forecasts for items that have subsequently been classified into the public sector (and thus into the scope of our forecasts) or removing them for those that have been classified out. For the former, we tend to assume that our forecasts would have been correct, so that they do not affect the analysis of why outturn differed from forecast. The forecasts presented in this chapter and in Annex A have been adjusted to be consistent with the 2020-21 outturn data where necessary.[2]

Evolution of the forecast during the pandemic

Public sector net borrowing

3.3 Our forecasts for public sector net borrowing (PSNB) since March 2020 have been driven by a combination of (i) evolving assumptions about the path of the pandemic and associated public health restrictions; (ii) their implications for the economy; and (iii) the cost of the Government's fiscal policy response. As shown in Table 3.1, the pandemic generated the largest forecast error in our history relative to our March 2020 forecast, but also some historically very large errors since then. Looking at how this forecast changed over the year:

- Our **March 2020 *EFO*** forecast a deficit of £54.8 billion. It included only a modest impact from coronavirus (since it assumed its effects would be largely confined to Asia, and therefore would only affect the UK economy via trade channels). As a result, it underestimated borrowing by £268.4 billion. That was more than twice as large as the largest previous short-term forecast error on record – the March 2008 Budget forecast for 2009-10, which underestimated the outturn by £115.0 billion.

[1] Given the range of uncertainty surrounding the course of the pandemic in its earlier stages, our July 2020 *FSR* and November 2020 *EFO* both included upside, central, and downside scenarios based on different assumptions about the path of the virus and effectiveness of various public health interventions. Unless otherwise stated, comparisons are made against the central scenarios in these publications.
[2] Details of the adjustments made for this *Forecast evaluation report* are available on our website.

- Our **April 2020 *CRS*** forecast a deficit of £273.0 billion. It assumed a three-month lockdown, followed by three months of easing restrictions, a short, sharp recession with full recovery of output by the end of the year, and fiscal support including the coronavirus job retention scheme (CJRS), self-employment income support scheme (SEISS) (both for an initial three months), an extra £8 billion in welfare support, and a £13 billion business rates holiday. Relative to our March *EFO*, we revised receipts down by 15 per cent and revised spending up by 9 per cent. Despite the simple conditioning assumptions and huge uncertainty around the virus at the time – plus the large increases in the cost of fiscal support measures that followed – the borrowing prediction was 'only' £50.2 billion lower than the latest outturn.

- Our **July 2020 *FSR*** incorporated greater persistence in the effects of the pandemic, the greater cost of the policy response, and an expected surge in unemployment as support schemes were due to be withdrawn before output had recovered. As a result, we revised up our borrowing forecast to £322.0 billion (thanks to a 5 per cent upward revision to spending, with receipts little changed). In the event, this has proved to be our most accurate pandemic-era PSNB forecast for 2020-21, with an error of just £1.2 billion (considerably smaller than average pre-pandemic in-year errors), although that was due to largely offsetting underestimates for both receipts and spending.

- Our **November 2020 *EFO*** revised up the deficit further to £393.5 billion, but as a result overestimated it by £70.4 billion. Receipts were revised up by 4 per cent from July as monthly outturns came in stronger than expected, but spending was revised up by 10 per cent from July to reflect the greater cost of the policy response, including the extension of the furlough scheme across the full year and large additions to the amounts set aside for public services in the November 2020 Spending Review. Our receipts forecast proved too pessimistic, but the largest source of the borrowing error was spending coming in £49.4 billion lower than predicted. In large part, that reflected underspending against the amounts set aside for pandemic-related spending at this stage, with NHS Test and Trace in particular costing much less than expected.

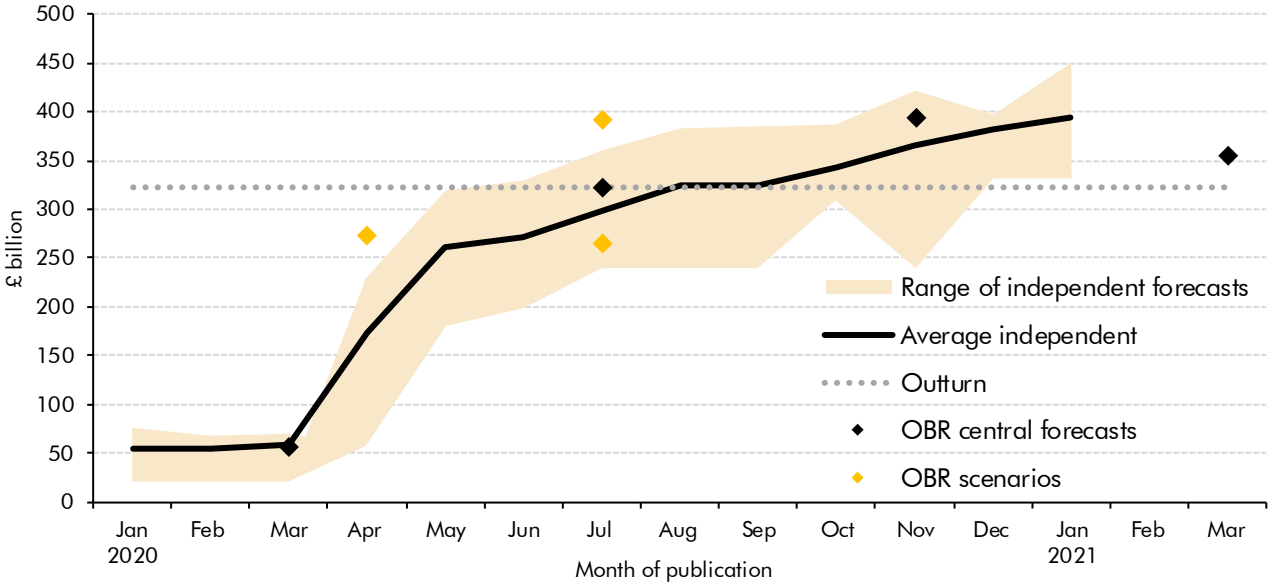
- Our **March 2021 *EFO*** revised borrowing down to £354.6 billion, which was still £31.5 billion higher than outturn. We revised up receipts to reflect continued strength in monthly outturns, with assumptions about the cost of tax debt and deferrals from November being revised down materially. As a result, receipts exceeded our forecast by a relatively modest £5.7 billion. Spending was revised down from November as we assumed larger underspends against pandemic-related public services allocations, plus lower costs for the furlough and self-employment support schemes. But even so we still overestimated outturn spending by £25.8 billion.

Table 3.1: 2020-21 receipts, spending and net borrowing forecasts versus outturn

	2020-21 outturn	2020-21 forecast (Difference from outturn)				
		Mar 2020	Apr 2020	Jul 2020	Nov 2020	Mar 2021
Receipts (PSCR)	792.1	872.9 (-80.9)	742.7 (49.3)	740.3 (51.8)	771.0 (21.0)	786.3 (5.7)
Spending (TME)	1115	927.7 (187.5)	1,016 (99.5)	1,062 (52.9)	1,165 (-49.4)	1,141 (-25.8)
Borrowing (PSNB)	323.1	54.8 (268.4)	273.0 (50.2)	322.0 (1.2)	393.5 (-70.4)	354.6 (-31.5)

3.4 As we have access to much more information about fiscal prospects and the cost of individual policies than other forecasters – which is not the case for our economy forecasts – one would expect our forecasts to lead the consensus in a year like 2020-21 that contains large surprises. That was indeed the case, as Chart 3.1 shows. Our April *CRS* was higher than any outside forecast made in April, but by May the average independent forecast had been revised up to close to that scenario, with a wide range around it. (The most pessimistic forecast in May 2020 came from Bank of America Merrill Lynch, which at £322.0 billion was accurate to within £1.2 billion.) Up until March 2021, our forecasts were consistently higher than the prevailing independent average, which is likely to reflect both our relatively pessimistic GDP forecasts (see Chapter 2) and overestimating the cost of policy measures.

Chart 3.1: Range of forecasts for 2020-21 PSNB



Note: OBR's April forecast were illustrative coronavirus scenarios. OBR's July scenarios were upside and downside scenarios around the central forecast based on different assumptions about the pandemic.
Source: HMT, OBR

Receipts

3.5 Table 3.2 shows the evolution of our receipts forecasts for 2020-21. Our pre-pandemic March 2020 forecast overestimated receipts by £80.9 billion (9.3 per cent). Our April 2020 *CRS* revised receipts down significantly from March, which proved to be overly pessimistic, underestimating outturn by £49.3 billion (6.6 per cent). Thereafter we revised receipts up materially in each of our July *FSR*, November 2020 *EFO* and March 2021 *EFO* forecasts. Even so, they all underestimated receipts outturns for 2020-21, albeit by decreasing margins of £51.8 billion (7.0 per cent), £21.0 billion (2.7 per cent) and £5.7 billion (0.7 per cent) respectively. The four largest sources of error relative to our March 2020 forecast were income tax and NICs, VAT, onshore corporation tax, and business rates. These forecast errors are explored in the rest of this section.

Table 3.2: 2020-21 receipts forecasts versus outturn

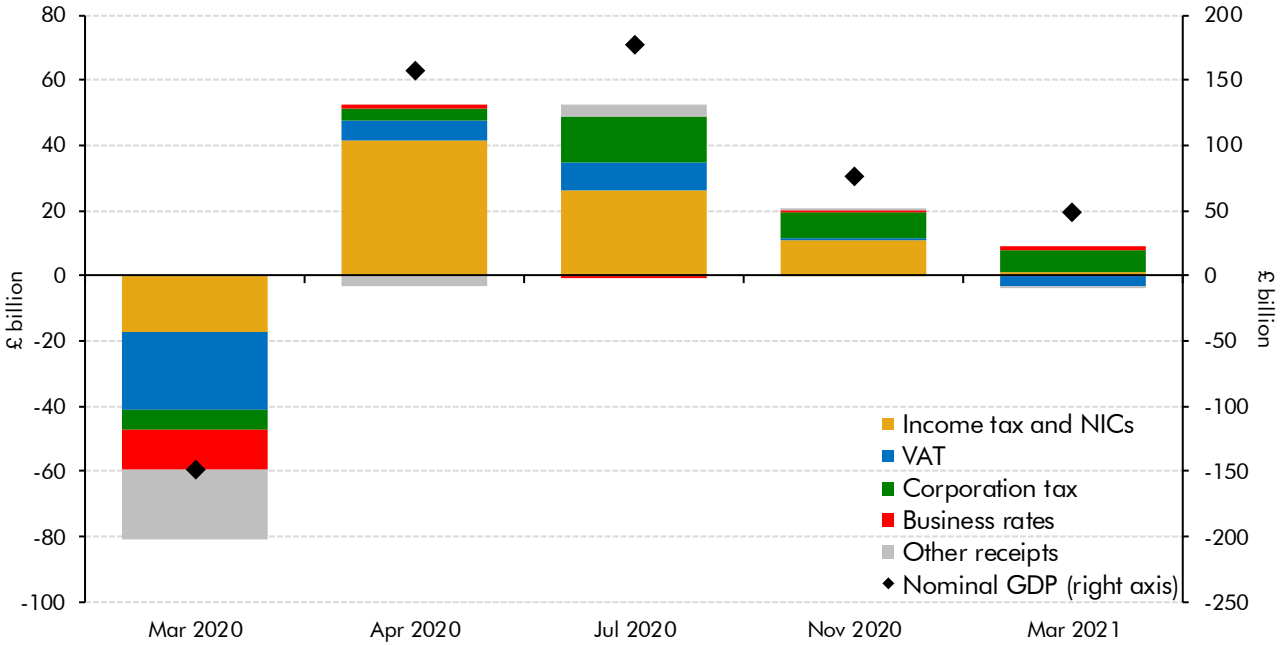
	£ billion					
	2020-21 outturn	2020-21 forecast (Difference from outturn)				
		Mar 2020	Apr 2020	Jul 2020	Nov 2020	Mar 2021
Income tax (gross of tax	196.2	207.5 (-11.4)	174.0 (22.2)	182.4 (13.7)	188.2 (7.9)	194.8 (1.4)
of which:						
Pay as you earn (PAYE)	169.2	175.5 (-6.3)	141.9 (27.3)	152.9 (16.3)	166.9 (2.3)	167.3 (1.9)
Self assessment (SA)	31.2	34.3 (-3.1)	34.3 (-3.1)	31.8 (-0.6)	24.7 (6.5)	30.8 (0.4)
Other income tax	-4.2	-2.2 (-2.0)	-2.2 (-2.0)	-2.2 (-2.0)	-3.4 (-0.8)	-3.3 (-0.9)
National insurance	144.1	150.2 (-6.1)	124.7 (19.5)	131.7 (12.4)	140.8 (3.3)	143.8 (0.4)
Value added tax	116.7	140.6 (-23.8)	110.7 (6.0)	108.2 (8.6)	116.3 (0.5)	119.9 (-3.2)
Corporation tax	52.0	58.1 (-6.1)	48.2 (3.8)	37.5 (14.5)	43.8 (8.2)	45.5 (6.5)
of which:						
Onshore	51.3	57.2 (-5.9)	47.3 (4.0)	36.8 (14.5)	43.2 (8.1)	45.0 (6.4)
Offshore	0.7	0.9 (-0.2)	0.9 (-0.2)	0.6 (0.0)	0.6 (0.1)	0.6 (0.1)
Petroleum revenue tax	-0.2	-0.3 (0.0)	-0.3 (0.0)	-0.3 (0.0)	-0.3 (0.0)	-0.3 (0.0)
Fuel duties	20.9	27.5 (-6.6)	20.1 (0.8)	22.8 (-1.8)	21.8 (-0.9)	21.5 (-0.6)
Business rates	19.5	31.5 (-12.0)	18.5 (1.0)	20.3 (-0.8)	19.3 (0.3)	18.1 (1.5)
Council tax	38.4	37.9 (0.5)	37.9 (0.5)	37.2 (1.2)	38.1 (0.3)	38.1 (0.4)
VAT refunds	20.2	20.2 (0.1)	20.2 (0.1)	20.3 (-0.1)	25.2 (-4.9)	21.5 (-1.3)
Capital gains tax	11.1	11.4 (-0.3)	11.4 (-0.3)	10.5 (0.7)	8.1 (3.0)	10.1 (1.0)
Inheritance tax	5.4	5.5 (-0.2)	5.5 (-0.2)	5.4 (-0.0)	5.2 (0.2)	5.2 (0.1)
Stamp duties[1]	13.2	17.4 (-4.2)	11.5 (1.7)	11.6 (1.6)	12.5 (0.7)	13.1 (0.1)
of which:						
Stamp duty land tax[1]	9.5	13.8 (-4.3)	7.9 (1.6)	8.4 (1.1)	9.1 (0.4)	9.6 (-0.1)
Stamp duty on shares	3.7	3.6 (0.1)	3.6 (0.1)	3.2 (0.5)	3.4 (0.3)	3.5 (0.2)
Tobacco duties	9.8	9.0 (0.8)	9.0 (0.8)	9.0 (0.8)	8.7 (1.1)	9.0 (0.8)
Alcohol duties	12.1	11.9 (0.3)	10.8 (1.4)	10.9 (1.2)	12.9 (-0.8)	12.7 (-0.5)
Air passenger duty	0.3	4.0 (-3.7)	2.6 (-2.2)	1.3 (-1.0)	0.5 (-0.1)	0.6 (-0.3)
Insurance premium tax	6.3	6.6 (-0.3)	6.6 (-0.3)	6.6 (-0.2)	6.4 (-0.1)	6.3 (-0.0)
Climate change levy	1.8	2.2 (-0.4)	2.2 (-0.4)	1.8 (-0.1)	1.8 (-0.1)	1.7 (0.1)
Other HMRC taxes	7.2	7.6 (-0.4)	7.6 (-0.4)	6.7 (0.4)	6.8 (0.3)	6.8 (0.4)
of which:						
Landfill tax	0.7	0.8 (-0.0)	0.8 (-0.0)	0.5 (0.2)	0.7 (0.0)	0.7 (0.0)
Aggregates levy	0.4	0.4 (0.0)	0.4 (0.0)	0.4 (0.0)	0.4 (0.0)	0.4 (0.0)
Betting and gaming duty	3.0	3.2 (-0.2)	3.2 (-0.2)	2.9 (0.2)	2.9 (0.1)	2.9 (0.2)
Customs duties	3.0	3.2 (-0.2)	3.2 (-0.2)	3.0 (0.0)	2.8 (0.2)	2.8 (0.2)
Vehicle excise duties	6.7	7.1 (-0.3)	7.1 (-0.3)	6.6 (0.1)	6.9 (-0.1)	6.9 (-0.2)
Bank levy	1.9	1.9 (-0.0)	1.9 (-0.0)	1.1 (0.8)	2.0 (-0.1)	1.9 (0.0)
Bank surcharge	1.1	1.6 (-0.4)	1.6 (-0.4)	0.8 (0.4)	1.2 (-0.0)	1.2 (-0.0)
BBC Licence fee receipts	3.7	3.6 (0.1)	3.6 (0.1)	3.6 (0.1)	3.6 (0.1)	3.8 (-0.1)
Apprenticeship levy	2.9	3.0 (-0.1)	3.0 (-0.1)	2.7 (0.2)	2.9 (0.0)	2.9 (-0.0)
Environmental levies	8.5	9.6 (-1.1)	9.6 (-1.1)	9.6 (-1.1)	9.6 (-1.1)	9.5 (-1.0)
EU ETS auction receipts	1.3	9.0 (-7.7)	9.0 (-7.7)	7.7 (-6.4)	7.8 (-6.6)	8.0 (-6.7)
Other taxes	8.5	9.4 (-0.9)	9.0 (-0.4)	7.7 (0.8)	7.8 (0.7)	8.0 (0.6)
National Account taxes	**709.8**	**786.2 (-76.4)**	**658.6 (51.2)**	**657.9 (51.9)**	**691.6 (18.2)**	**704.2 (5.6)**
Less own resources contribution to EU	-2.2	-2.4 (0.2)	-2.4 (0.2)	-2.4 (0.2)	-2.1 (-0.1)	-2.1 (-0.1)
Interest and dividends	23.3	27.6 (-4.3)	25.0 (-1.7)	25.4 (-2.1)	22.8 (0.6)	23.5 (-0.2)
Gross operating surplus	57.6	57.0 (0.6)	57.0 (0.6)	54.9 (2.7)	54.7 (2.8)	56.5 (1.1)
Other receipts	3.5	4.5 (-1.0)	4.5 (-1.0)	4.5 (-1.0)	4.0 (-0.5)	4.1 (-0.6)
Current receipts	**792.1**	**872.9 (-80.9)**	**742.7 (49.4)**	**740.3 (51.8)**	**771.0 (21.0)**	**786.3 (5.7)**

[1] Excludes Scottish LBTT and Welsh LTT.

[2] Excludes Scottish LFT and Welsh LDT.

3.6 Overall, the differences between our successive receipts forecasts during the pandemic and 2020-21 outturn largely reflect our success in forecasting economic output (detailed in Chapter 2), overlaid by the cost of tax cuts. This is illustrated in Chart 3.2, which compares the differences between our receipts and nominal GDP forecasts for 2020-21 with outturns in cash terms. (Our March 2020 forecast predicted a receipts-to-GDP ratio in 2020-21 of 37.9 per cent of GDP, so the vertical axes are also roughly equal in percentage terms.) The correlation between the receipts and nominal GDP errors – and the importance of all the major tax streams to the overall receipts errors – shows the importance of these tax base forecast errors. Relative to our March 2020 forecast, the receipts shortfall exceeded the nominal GDP shortfall proportionately. In large part that reflects the additional £24.9 billion cost of tax cuts (as detailed in the final section of this chapter).

Chart 3.2: Evolution of our 2020-21 receipts and nominal GDP forecast errors



Source: OBR

Income tax and NICs

3.7 Overall income tax (IT) and NICs receipts in 2020-21 fell short of our March 2020 forecast by £17.4 billion (4.9 per cent) but exceeded our four subsequent pandemic forecasts, albeit by declining amounts (Table 3.3). The upside surprise relative to these later forecasts partly reflects developments in Government policy to support incomes, and therefore the income tax and NICs base, and what was known about these policies at the time. In particular:

- **PAYE IT and NICs receipts versus the CJRS.** In line with Government policy at the time, July's *FSR* assumed the CJRS would close in October 2020 and (partly as a consequence) the overall employment rate would drop from 61.7 per cent in 2019-20 to 57.1 per cent in 2020-21. This was reflected in a 12 per cent downward revision to our PAYE IT and NICs forecast relative to March 2020. Ahead of the November 2020 forecast, the CJRS was extended until the end of March 2021 – a key factor raising our employment rate forecast to 60.7 per cent, resulting in a tax-base-driven upward

revision to PAYE IT and NICs receipts of 5 per cent relative to July. Our employment forecast was broadly similar in March 2021, while PAYE IT and NICs receipts were raised as a result of stronger monthly outturns showing a higher effective tax rate. Our November and March forecasts were £11.2 billion and £1.7 billion below outturn.

- **Self-assessment (SA) income tax receipts versus support for the self-employed and the self-assessed tax and NICs payment deferral.** SA income tax payments reflect liabilities generated the year before (2019-20 liabilities for 2020-21 receipts), meaning the tax stream responds with a lag to events. We will see more of the pandemic's impact in outturn data for 2021-22. Our April *CRS* assumed all the effect would be felt in that year. From July, we assumed that the SA income tax-paying population would defer and reduce payments during 2020-21 as their businesses suffered. Given this assumption, and the generous tax deferral measures that were introduced and then expanded, by November 2020 we had revised down our forecast by 28 per cent relative to March 2020. That proved much too pessimistic (by £6.5 billion). In March 2021, with evidence of much lower take-up of these deferral measures than expected, we revised receipts back up by 25 per cent, though still £0.4 billion below outturn. It seems likely that the main cause of these errors was underestimating the extent to which other support measures allowed taxpayers to remain up-to-date with their SA payments. This includes SEISS grants (tax on which will be paid in 2021-22 and 2022-23), which were extended twice through the year,[3] plus several other grants, loans and tax reliefs.[4] Box 3.2 looks at tax deferral across receipts in more detail.

3.8 Beyond the direct effects of policy on the income tax and NICs base, our first two forecasts during the pandemic failed to anticipate the more tax-rich composition of wages and salaries, reflecting the fact that those in lower-paid jobs were the most likely to experience job loss or furlough without pay top-ups, while higher earners were more likely to experience improvements in their incomes. They therefore underestimated the effective tax rate as well as the tax base. These effects are discussed in Box 3.1.

[3] Over the course of 2020-21, successive SEISS grants were announced: the first and second prior to July's *FSR*; a third payment had been announced and a fourth payment in 2021 promised by our November *EFO*; and the fourth grant confirmed by our March 2021 *EFO*.
[4] Support to the self-assessment population included the business rates holiday for retail, hospitality and leisure businesses announced in March 2020; the Bounce Back Loan Scheme (BBLS) and other pandemic-related loan schemes, which were due to remain open for six months at the time of our July *FSR*, but had been extended to the end of January by November's *EFO*; and local authority administered grants for small businesses and for those in the retail, hospitality and leisure industries.

Table 3.3: 2020-21 income tax and NICs forecasts versus outturn

	£ billion					
	Outturn	Mar 2020	Apr 2020[1]	Jul 2020	Nov 2020	Mar 2021
Income tax (gross of tax credits)	196.2	207.5		182.4	188.2	194.8
of which:						
Pay as you earn (PAYE)	169.2	175.5		152.9	166.9	167.3
Self assessment (SA)	31.2	34.3		31.8	24.7	30.8
Other income tax	-4.2	-2.2		-2.2	-3.4	-3.3
NICs	144.1	150.2		131.7	140.8	143.8
Income tax and NICs	**340.3**	**357.7**	**298.7**	**314.2**	**329.1**	**338.6**
Difference		-17.4	41.6	26.1	11.2	1.7
of which:						
Policy costs		-1.8		-0.4	2.7	0.0
Tax base[2]		-12.8		16.8	5.5	5.5
Effective tax rate		-2.9		9.7	3.0	-3.8

[1] It is not possible to break down the error for the reference scenario given the simplified methodology by which it was produced.
[2] Tax base is calculated as the sum of wages and salaries and mixed income.

Box 3.1: Tax implications of pandemic-induced changes in the income distribution

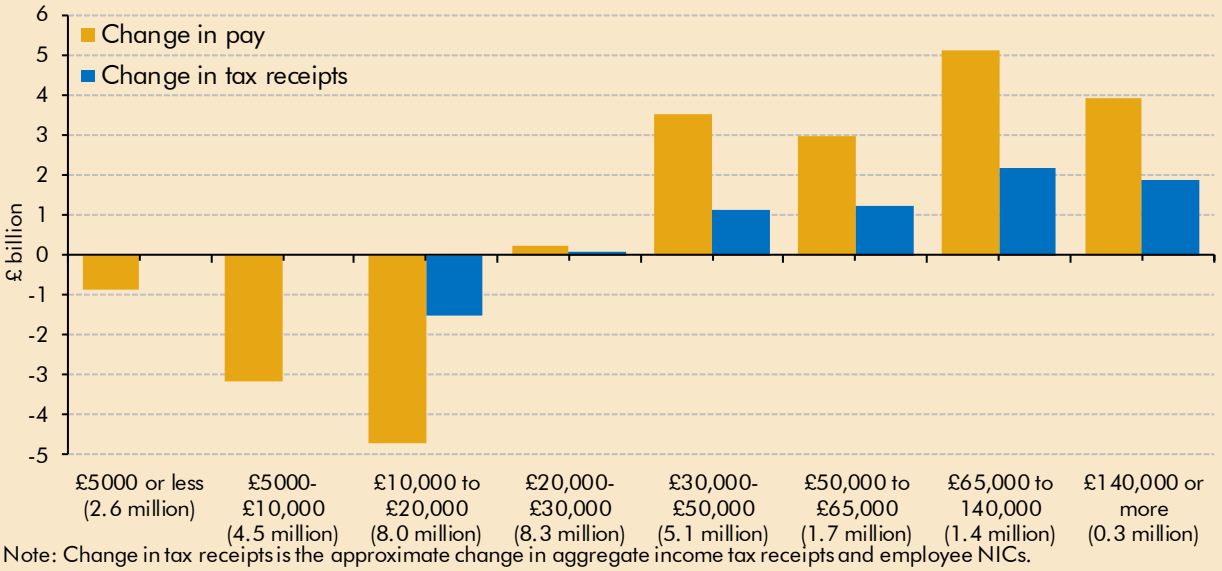
The resilience of income tax and NICs receipts in 2020-21 partly reflects the fact that pandemic-related hits to incomes have been concentrated towards the lower end of the income distribution, where earnings are far less tax-rich. Chart A shows that on the basis of HMRC's PAYE real-time information: employees earning less than £20,000 in 2019-20 on average saw total earnings fall in 2020-21; those earning between £20,000 and £30,000 saw them rise modestly; while those earning above £30,000 saw them rise more materially. This pattern is important for understanding the performance of tax receipts in 2020-21. For example:

- The £8.8 billion fall in total earnings for **the roughly 15 million employees earning less than £20,000** in 2019-20 generated a £1.5 billion fall in receipts. This implies a low effective marginal tax rate of 17 per cent thanks to many in this bracket earning less than the personal allowance.

- The £256 million increase in total earnings for **the roughly 8 million employees earning between £20,000 and £30,000** generated a modest £82 million increase in receipts. This implies a marginal effective tax rate of 32 per cent, reflecting the fact that each additional pound earnt in this bracket is liable to basic rate income tax plus employee NICs.

- The £15.6 billion rise in total earnings for **the roughly 8½ million employees earning between £30,000 and £140,000 or more** generated a £6.4 billion rise in receipts. This implies a higher effective marginal tax rate of 41 per cent as around two-fifths of employees in this bracket pay the higher rate of income tax, as well as paying NICs.

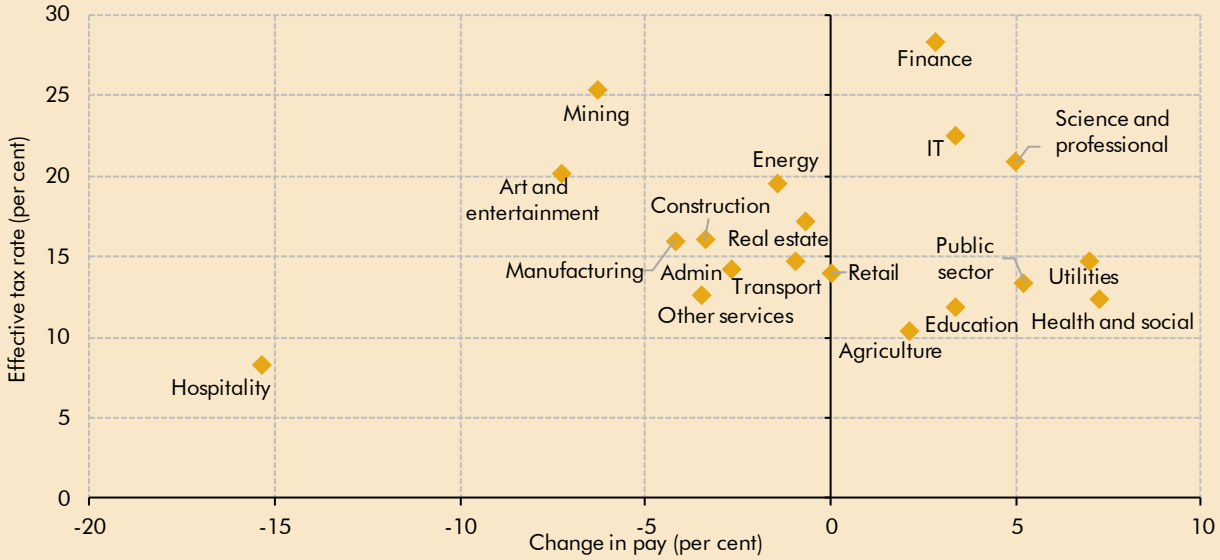
Chart A: Changes in pay and tax receipts across the employee earnings distribution between 2019-20 and 2020-21



Note: Change in tax receipts is the approximate change in aggregate income tax receipts and employee NICs.
Approximate number of taxpayers in each group in parentheses.
Source: HMRC, OBR

Part of the explanation for the pattern of earnings growth and tax paid across the income distribution is the sectoral impact of the pandemic. The majority of job losses and furloughing without pay top-ups from employers was concentrated in lower-paid sectors, which were hardest hit by the pandemic and so most reliant on furlough to support income. Although they make up a large proportion of the labour force, both their average pay and their effective tax rates are relatively low, meaning a smaller impact on receipts for a given loss of earnings. As Chart B shows, there was some (albeit weak) correlation between earnings growth and effective tax rates (ETRs) across sectors, with the low-ETR hospitality sector seeing total earnings hit particularly hard while the high-ETR financial and professional services sectors saw total earnings rise.

Chart B: Total pay growth in 2020-21 and average effective tax rate by sector



Note: This chart uses ONS real-time information data, and includes PAYE employees only.
Source: HMRC, ONS, OBR

VAT

3.9 Overall VAT receipts in 2020-21 fell short of our March 2020 forecast by £23.8 billion (16.9 per cent), but came in above our first three pandemic forecasts by varying amounts, before falling short of our March 2021 forecast (Table 3.4). The shortfall relative to March 2020 was largely explained by nominal consumer spending falling short of forecast, but we also overestimated the share of goods taxed at the standard rate. Policy measures introduced after our March 2020 forecast, such as the temporary VAT rate cut from 20 to 5 per cent for the hospitality sector, cost £6.3 billion too. The impact of lower consumer spending was partially offset by higher government procurement relating to the pandemic where much of the extra spending was not eligible for VAT refunds.

3.10 We revised receipts down by over a fifth (£29.8 billion) in our April *CRS* to reflect the impact of the lockdown on consumer spending, but this proved too pessimistic by £6.0 billion compared to outturn. Our July *FSR* revised receipts down by a further £2.6 billion, partly due to tax measures announced by then, increasing the undershoot versus outturn to £8.6 billion. Our April and July estimates did not anticipate the full extent to which online retail would support consumer spending, including due to increased demand for durable goods relating to home working (notably household appliances and computers, spending on which exceeded pre-pandemic levels). In addition, the VAT deferral scheme meant that total VAT repayments exceeded payments for the first three months of 2020-21. This distorted the real-time data at the start of the year, limiting its value in informing our July estimate.

3.11 Stronger than expected outturns for both receipts and ONS consumer spending data meant we revised VAT receipts up in November 2020 by £8.1 billion relative to July. This was still £24.3 billion down on our March 2020 forecast, but was just £0.5 billion below outturn. This reflected a stronger tax base than assumed, partly offset by a lower than expected effective tax rate. In our March 2021 forecast, we revised receipts up again (by £3.7 billion) reflecting stronger outturn, although this was partly offset by an additional hit to receipts in the first quarter of 2021 due to the reimposition of lockdown measures. This ended up exceeding outturn by £3.2 billion reflecting a weaker than expected effective tax rate.

Table 3.4: 2020-21 VAT forecasts versus outturn

	£ billion					
	Outturn	Mar 2020	Apr 2020[1]	Jul 2020	Nov 2020	Mar 2021
Value added tax	116.7	140.6	110.7	108.2	116.3	119.9
Difference		-23.8	6.0	8.6	0.5	-3.2
of which:						
Policy costs		-6.3		-4.1	-0.6	0.0
Tax base[2]		-15.2		5.8	9.3	2.9
Effective tax rate		-2.3		6.9	-8.2	-6.1

[1] It is not possible to break down the error for the reference scenario given the simplified methodology by which it was produced.
[2] Underlying tax base is household consumption.

Onshore corporation tax

3.12 Onshore corporation tax receipts in 2020-21 were £5.9 billion (10.2 per cent) lower than predicted in our pre-pandemic March 2020 forecast but exceeded each of our subsequent four pandemic forecasts by varying and often large amounts. The largest error was in our July 2020 *FSR*, which underestimated receipts by £14.5 billion (28.2 per cent).

3.13 Our initial post-pandemic scenarios in April and July 2020 assumed that profits would drop by more than nominal GDP in 2020, in line with what has generally happened in previous recessions. Greater use of losses in-year would further reduce receipts. We placed more weight than usual on the signal about full-year profit expectations in large firms' quarterly tax payments, on the basis that they would have the best view of how the pandemic was affecting their finances. A combination of firms rapidly revising down profit expectations in the initial lockdown and some unauthorised tax debt meant that cash receipts were very weak in the early months of 2020-21. Likewise, corporation tax from the financial sector was revised down in light of the large loan-loss provisions being made by many banks. In the event, the signal we took from these developments was overly pessimistic.

3.14 We revised receipts up in both November 2020 and March 2021. Profits held up much better than expected, with ONS data now showing a rise of 1.8 per cent in non-oil, non-financial profits in 2020. This includes £15.3 billion of government grants to the sector, but even excluding these grants profits only fell by 2.3 per cent (compared with a 4.4 per cent fall in nominal GDP). Profitability benefited not only from direct government grants but also from other large-scale government support schemes such as the CJRS and the loan schemes, plus the profits earned on some pandemic-related procurement spending. While a detailed sectoral breakdown of 2020-21 receipts is not yet available, some of the bigger paying sectors such as professional and financial services were less affected by the pandemic. Stronger profits delivered very strong onshore corporation tax receipts in the second half of 2020-21, with firms revising their full-year profit expectations up sharply and making large instalment payments after underestimating their liabilities earlier in the year.

3.15 Receipts from the financial sector for the whole of 2020-21 were close to our March 2020 forecast. While large loan-loss provisions were made in 2020, other drivers of financial sector profitability such as trading activities and mergers and acquisitions were strong. Receipts from the sector also picked up strongly in the second half of 2020-21.

Table 3.5: 2020-21 onshore corporation tax forecasts versus outturn

	£ billion					
	Outturn	Mar 2020	Apr 2020[1]	Jul 2020	Nov 2020	Mar 2021
Onshore corporation tax	51.3	57.2	47.3	36.8	43.2	45.0
Difference		-5.9	4.0	14.5	8.1	6.4
of which:						
Policy costs		-1.0		-2.1	-2.1	0.7
Tax base[2]		-0.1		11.5	6.1	3.1
Effective tax rate		-4.7		5.0	4.1	2.5

[1] It is not possible to break down the error for the reference scenario given the simplified methodology by which it was produced.
[2] Underlying tax base is simplified as being non-oil non-financial profits.

Business rates

3.16 Business rates receipts in 2020-21 were £12.0 billion (38 per cent) lower than our March 2020 forecast. That shortfall was almost entirely explained by the £11.9 billion cost of the business rates holiday for retail, leisure and hospitality businesses in Great Britain. The cost of the holiday for England was revised up by £1.1 billion in our November 2020 forecast.

Table 3.6: 2020-21 business rates forecasts versus outturn

	£ billion				
	Outturn	Mar 2020	Jul 2020	Nov 2020	Mar 2021
Business rates	19.5	31.5	20.3	19.3	18.1
Difference		-12.0	-0.8	0.3	1.5
of which:					
Policy		-11.9	-1.1	0.1	0.0
Other factors		-0.1	0.3	0.2	1.5

Box 3.2: The rise and fall of tax debt during the pandemic

In our July 2020 *Fiscal sustainability report*, we outlined the possible impacts of non-payment of tax liabilities on prospects for tax receipts, noting also that these effects were highly uncertain. The economic impact of the pandemic and the Government's decision to suspend some debt collection led to a large increase in tax owed in the initial phase of the pandemic.

The Government introduced several **authorised tax debt deferral schemes**:

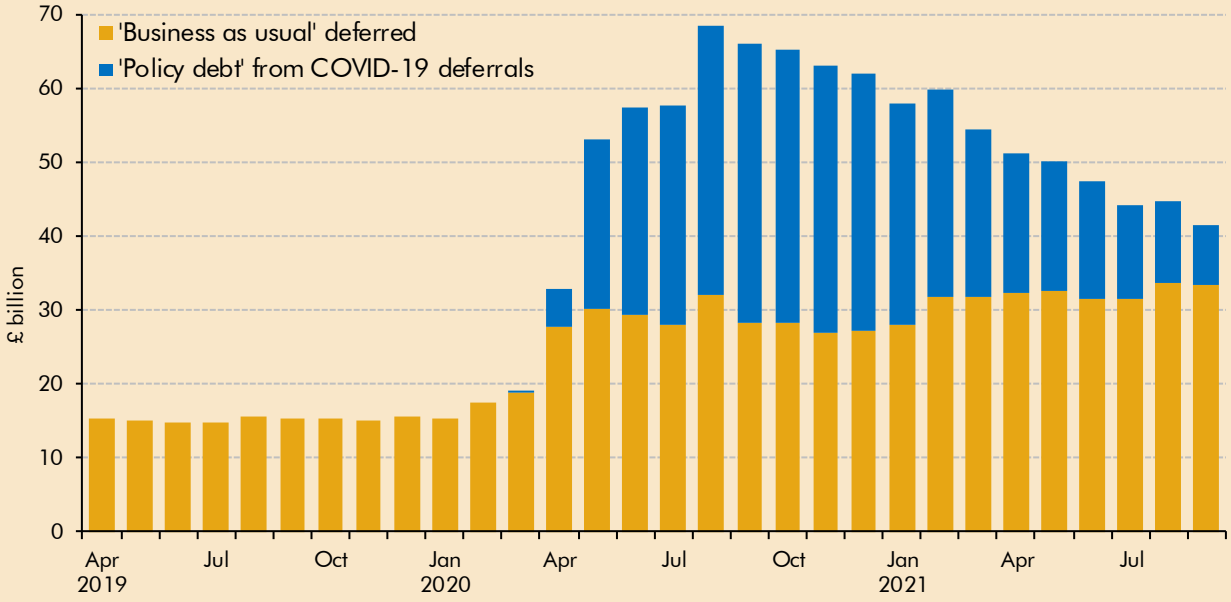
- The **VAT deferral** measure allowed companies to defer VAT payments from between 20 March and 30 June 2020 to 31 March 2021, while the **VAT new payment scheme (NPS)** allowed deferred VAT payments to be repaid in up to 11 equal monthly instalments extending into 2021-22. The latest data suggest that total VAT deferred stands at around £33.5 billion. Of that figure, £27.2 billion has been repaid, £10.2 billion by the 31 March deadline and £17.1 billion by the end of October. Most of the remainder is expected to be paid through the VAT NPS or through other arrangements. Our October 2021 forecast assumes the total cost of deferrals never repaid will be around £0.5 billion.
- The **self-assessment (SA) deferral** policy allowed payments due in July 2020 to be deferred until the end of January 2021. An estimated £6.6 billion was deferred, much lower than the £11.8 billion we initially expected. Much of this was paid on or before the deadline, so that the policy merely moved payments within the 2020-21 tax year. The additional SA **self-serve time-to-pay** measure announced in the Winter Economy Plan extended eligibility to allow those with up to £30,000 in tax debts to arrange a 12-month repayment plan online. Around 209,000 SA payment plans were set up for an estimated £1.3 billion in tax owed. Take-up was 90 per cent lower than we initially assumed. There appears to have been little non-compliance and few defaults, resulting in the total cost of the measure expected to be a modest £60 million.

There was also a sharp rise in **unauthorised tax debt** in the initial lockdown – i.e. some taxpayers delayed payments without first agreeing that with HMRC:

- **PAYE tax debt** increased significantly at the start of 2020-21, rising from just over £3 billion pre-pandemic to a peak of over £12 billion in May 2020. With companies receiving grants, business rates reliefs, government-guaranteed loans, and having some payroll costs covered by the CJRS, the debt balance fell back as employers' finances were supported. HMRC estimates that almost 90 per cent of PAYE debts from April to August 2020 have been repaid. But PAYE debt over a year old has increased from approximately 7 per cent in April 2020 to 30 per cent in October 2021, which may be because pauses in debt collection led to older debt building up alongside new pandemic-related debts. Total PAYE tax debt remains around £5 billion (150 per cent) higher than pre-pandemic, with these older debts being slower to be repaid than the new ones.
- **Other tax debts**, including SA and VAT (excluding authorised deferrals) and corporation tax, have also seen increases in amounts outstanding. Total non-PAYE debt remains around £11.2 billion (80 per cent) higher than pre-pandemic.

As Chart C shows, total tax debt rose from March 2020 during the first national lockdown. It peaked at £67 billion in August 2020 then began to decline gradually, despite the second and third national lockdowns. At the end of September 2021, HMRC's tax debt balance had fallen back to £42 billion. This was still more than double the pre-pandemic level, with further payments of deferred VAT expected to continue reducing this balance over the remainder of 2021-22. Compared with January 2020, it is estimated that an additional 2.4 million taxpayers are in tax debt as of September 2021. By contrast, the level of debt write-offs and remissions by HMRC in 2020-21 halved relative to 2019-20, from £4 billion to £2 billion.[a] This was due to the moratorium on insolvencies and extensive fiscal support measures reducing the number of business failures. To the extent that insolvencies have been delayed rather than avoided altogether, revenue losses from the elevated debt balance could increase as fiscal support ends.

Chart C: HMRC tax debt balance



Source: HMRC, OBR

[a] Write-offs relate to debts that HMRC considers are no longer possible to recover. Remissions relate to debts capable of recovery that are not pursued on grounds of value for money or hardship.

Spending

3.17 Table 3.7 shows the evolution of our detailed spending forecasts for 2020-21. Our pre-pandemic March 2020 forecast underestimated spending by £187.5 billion (16.8 per cent). Our April 2020 *CRS* revised spending up by £88 billion from March, but still fell £99.5 billion (8.9 per cent) short of outturn. Our July *FSR* forecast underestimated spending by £52.9 billion (4.7 per cent). This forecast did not include a full breakdown of expenditure, so Table 3.7 shows our FSR forecast plus the spending measures announced in the Summer Economic Update on 8 July, for which we produced a detailed breakdown.[5] This estimate for total spending was only £6.6 billion (0.6 per cent) less than outturn, whereas our November 2020 and March 2021 forecasts overestimated spending for 2020-21 by £49.4 billion (4.4 per cent) and £25.8 billion (2.3 per cent), respectively.

Table 3.7: 2020-21 spending forecasts versus outturn

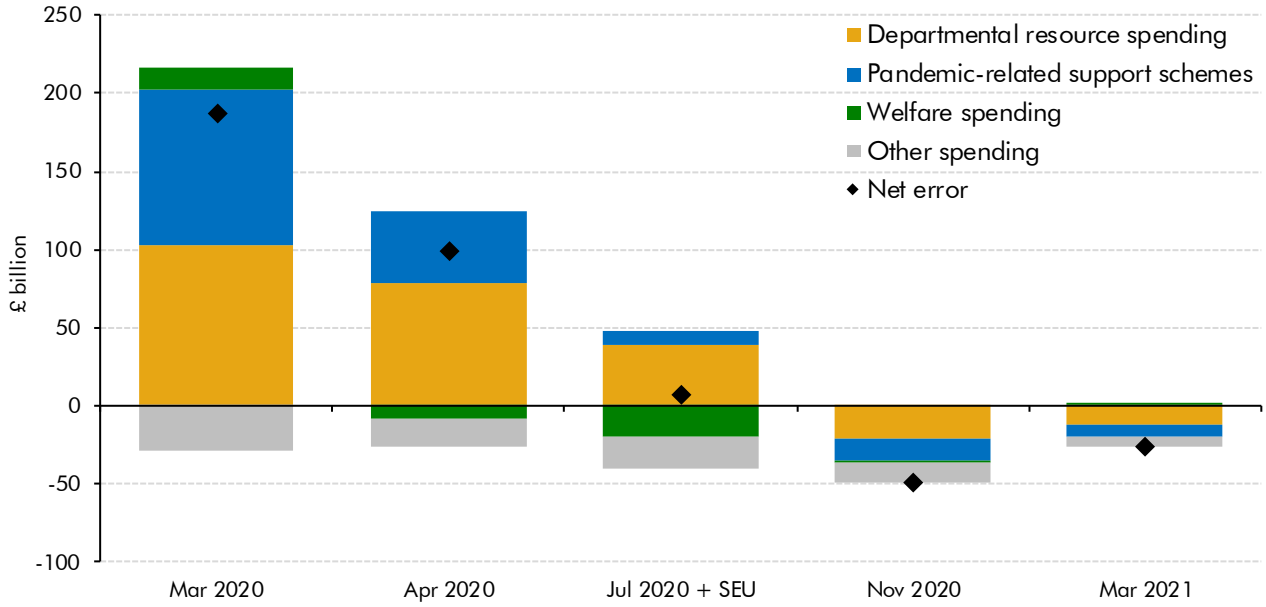
	£ billion					
	Outturn	2020-21 forecast (Difference from outturn)				
	(2020-21)	Mar 2020	Apr 2020	Jul 2020[1]	Nov 2020	Mar 2021
Public sector current expenditure (PSCE)						
PSCE in RDEL[2]	**476.5**	**373.3 (103.3)**	**398.3 (78.3)**	**437.7 (38.8)**	**498.2 (-21.7)**	**488.4 (-11.9)**
PSCE in AME	**554.6**	**476.0 (78.5)**	**505.5 (49.1)**	**570.4 (-15.9)**	**572.9 (-18.4)**	**566.6 (-12.0)**
of which:						
Welfare spending	245.4	231.2 (14.2)	254.0 (-8.6)	265.2 (-19.8)	246.2 (-0.8)	244.8 (0.6)
CJRS and SEISS[3]	78.0	0.0 (78.0)	52.0 (26.0)	73.3 (4.6)	83.4 (-5.5)	79.7 (-1.7)
Current LASFE	48.9	55.0 (-6.1)	55.5 (-6.6)	60.3 (-11.3)	48.8 (0.1)	48.3 (0.6)
CG debt interest ex APF[4]	22.4	34.5 (-12.1)	24.2 (-1.8)	20.6 (1.8)	23.5 (-1.1)	23.9 (-1.5)
Current VAT refunds	17.8	17.7 (0.2)	17.7 (0.2)	17.9 (-0.0)	23.0 (-5.2)	19.5 (-1.6)
Other PSCE items	107.2	104.0 (3.2)	102.0 (5.2)	101.7 (5.5)	105.5 (1.7)	105.9 (1.3)
NA adjustments[5]	-7.2	0.1 (-7.3)	0.1 (-7.3)	-2.0 (-5.2)	0.2 (-7.4)	1.2 (-8.3)
Total PSCE	**989.1**	**815.8 (173.3)**	**903.7 (85.3)**	**974.6 (14.4)**	**1,029 (-39.8)**	**1,012 (-22.5)**
Public sector gross investment (PSGI)						
PSGI in CDEL[6]	**77.2**	**75.9 (1.4)**	**75.9 (1.4)**	**81.2 (-3.9)**	**77.1 (0.2)**	**76.0 (1.3)**
PSGI in AME	**53.4**	**40.7 (12.7)**	**36.1 (17.3)**	**60.9 (-7.5)**	**63.6 (-10.2)**	**58.3 (-4.9)**
of which:						
Virus-related loan schemes	20.9	0.0 (20.9)	0.0 (20.9)	17.0 (3.9)	29.5 (-8.6)	27.2 (-6.3)
Other PSGI items	31.2	36.4 (-5.2)	36.4 (-5.2)	36.0 (-4.9)	31.6 (-0.4)	28.6 (2.6)
NA adjustments[5]	-3.2	-0.3 (-2.9)	-0.3 (-2.9)	-0.3 (-2.9)	-2.4 (-0.8)	-2.4 (-0.7)
Total PSGI	**126.1**	**111.9 (14.2)**	**111.9 (14.2)**	**133.9 (-7.8)**	**135.7 (-9.6)**	**129.4 (-3.2)**
Less depreciation	-53.5	-52.2 (-1.2)	-52.2 (-1.2)	-52.2 (-1.2)	-54.1 (0.6)	-53.5 (0.0)
PSNI[7]	**72.7**	**59.7 (12.9)**	**59.7 (12.9)**	**81.7 (-9.0)**	**81.6 (-8.9)**	**75.9 (-3.2)**
TME[8]	**1,115**	**927.7 (187.5)**	**1,016 (99.5)**	**1,109 (6.6)**	**1,165 (-49.4)**	**1,141 (-25.8)**

[1] This includes Summer Economic Update spending measures announced on 8 July 2020, too late to include in our *FSR*.
[2] Includes RDEL and Scottish government AME.
[3] Includes the coronavirus job retention scheme and the self-employment income support scheme.
[4] Includes reductions in debt interest payments due to the APF.
[5] National Account adjustments.
[6] Includes CDEL and Scottish government capital spending.
[7] Public sector net investment.
[8] Total managed expenditure.

[5] Further detail is available in our November 2020 *EFO*, where this '*FSR* plus SEU' forecast formed the baseline against which developments since the *FSR* were compared.

3.18 Chart 3.3 shows that the vast majority of our spending forecast errors relate to departmental resource spending, pandemic-related support schemes, and welfare spending. Our July *FSR* forecast error, including the 8 July spending measures, was smaller than both earlier and later forecasts (an underestimate of just 0.6 per cent, compared to underestimates of 16.8 and 8.9 per cent in March 2020 and April 2020 and overestimates of 4.4 and 2.3 per cent in November 2020 and March 2021), but this is due to a large underestimate for resource spending offsetting equally large overestimates for welfare and other spending. The gross errors in each category diminish across successive forecasts.

Chart 3.3: Evolution of our 2020-21 spending forecast errors



Note: Departmental resource spending includes RDEL and Scottish Government AME.
Source: OBR

Departmental resource spending

3.19 Departmental resource spending is the largest contributor to the differences between our successive spending forecasts over the course of the pandemic and 2020-21 outturn, with outturn spending £94.8 billion (almost one-third) higher than our March 2020 forecast. The largest surprises related to spending on health, transport subsidies and business grants.

3.20 With the Treasury adding very large amounts to departmental resource budgets over the course of the year, a key forecast challenge for us was judging the extent to which those budgets would be spent. In practice, departments always underspend their budgets slightly (due to the penalties associated with breaching amounts voted by Parliament). Typically, resource budgets are underspent by around 1 per cent in aggregate. We expected proportionately larger underspending against the pandemic-related additions to budgets in 2020-21, but underestimated the scale of these shortfalls, which reached an unprecedented £30.4 billion. Greater than expected underspending explains why actual spending was lower than our November 2020 and March 2021 forecasts predicted. It also explains why spending was only £30.3 billion higher than our July 2020 forecast despite the Treasury adding £52.5 billion to resource spending limits after that forecast had been published.

3.21 As we detailed in our October 2021 *EFO*, underspending was concentrated in budgets related to the response to the pandemic:

- Underspends were largest in respect of **NHS Test and Trace**, with a £9.2 billion underspend being recorded against a budget of £20.4 billion, reflecting the generous budget cover put in place for uncertain quantities of testing in particular.
- The **vaccine programme** had a proportionately large underspend of £2.2 billion against a budget of £3.0 billion, largely because budget cover was provided for a very rapid rollout of vaccines to all adults by the end of the financial year, when in reality the programme extended well into 2021-22.
- **Grants to local authorities** to cover payments to business were also underspent due to fewer businesses being identified than Valuation Office Agency data indicated.
- Additionally, **core NHS activities** also underspent materially – by £5.4 billion relative to a budget of £147.5 billion, reflecting fewer elective treatments due to the focus on treating coronavirus cases and people choosing to try not to burden the NHS.

Table 3.8: 2020-21 departmental resource spending forecasts versus outturn

	Outturn	£ billion				
	(2020-21)	Mar 2020	Apr 2020	Jul 2020	Nov 2020	Mar 2021
Actual resource spending	434.5	339.8	364.8	404.2	456.0	445.0
Difference		94.8	69.8	30.3	-21.4	-10.5
of which:						
Treasury limits		122.0	97.0	52.5	-3.0	0.0
Underspending		-27.2	-27.2	-22.2	-18.4	-10.5

Pandemic-related income support schemes

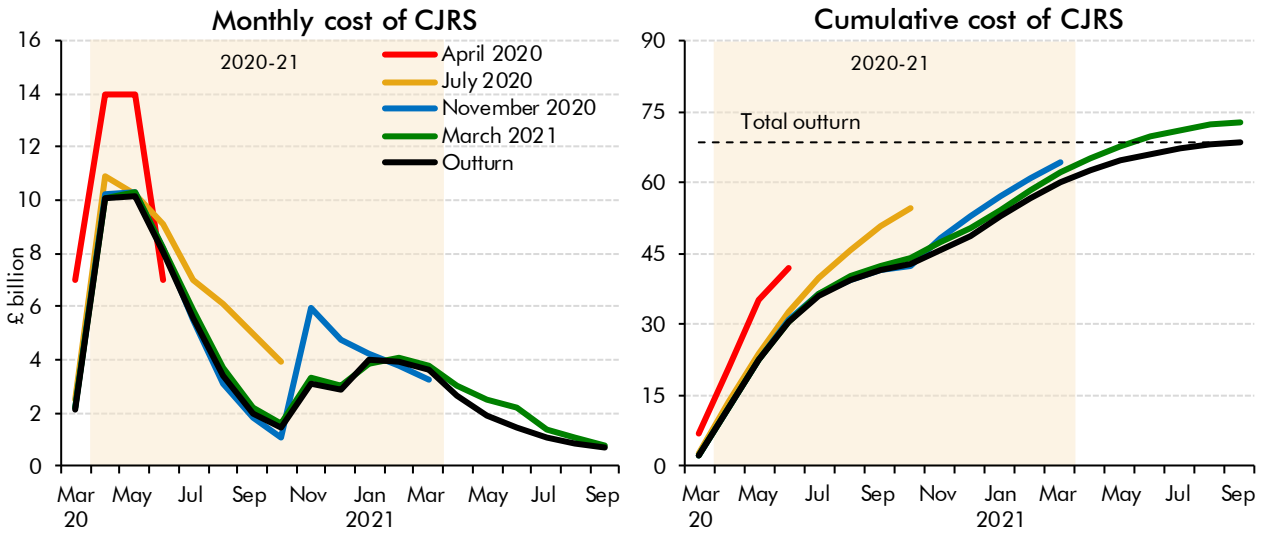
3.22 Spending on the CJRS and SEISS accounts for the overwhelming majority of the difference in current AME spending relative to our March 2020 forecast (£78.0 billion in 2020-21). The schemes were introduced in April 2020 in response to the pandemic. The evolution of their cost reflects both changes to policy (as the schemes were repeatedly extended) and revisions to the cost of each stage of the scheme (as outturn data allowed us to improve our estimates). The combined effects can be seen in Charts 3.4 and 3.5, which show that:

- Our **April and July 2020 estimates** of the cost of the schemes were too low. In both cases, the errors were more than explained by extensions to the schemes, with the cost during the period that they were due to remain open according to Government policy at the time being lower than expected. Our July forecast assumed the CJRS would remain open until the end of October 2020, and that two SEISS grants would be paid covering six months of income. The combined cost of the two schemes was expected to be £73.3 billion (5.9 per cent lower than outturn).
- Our **November 2020 *EFO*** assumed the CJRS would remain open until March 2021 and that a third SEISS grant would be paid. We revised up spending on the schemes

by £10.1 billion, with the cost of these extensions being partly offset by lower outturns and forecasts for earlier elements of each scheme. The combined cost of £83.4 billion in this forecast was 7.0 per cent higher than outturn.

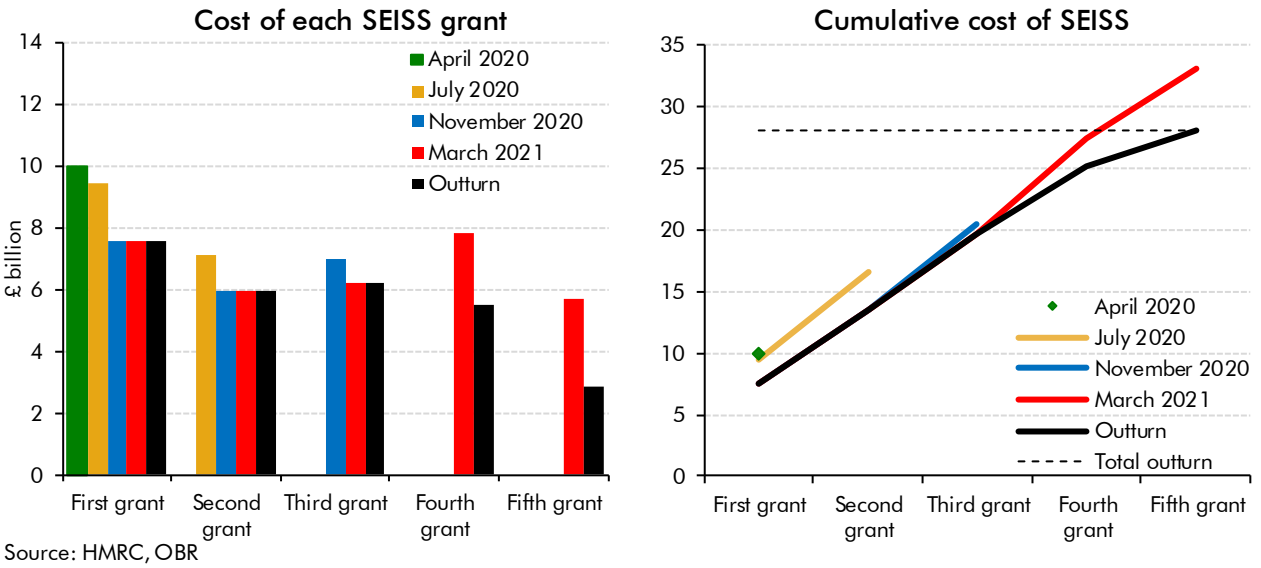
- Our **March 2021 *EFO*** incorporated the cost of a further extension to the CJRS to September 2021 (the cost of which falls in 2021-22) and a fourth and fifth SEISS grant, as well as revisions to the cost of both schemes reflecting monthly outturns. Within 2020-21, this led us to revise down total spending by £3.8 billion. This was still £1.7 billion (2.2 per cent) above outturn, reflecting a lower than expected cost of the CJRS, as both the numbers furloughed and the average value of claims were lower than expected.

Chart 3.4: Successive CJRS forecasts versus outturn



Source: HMRC, OBR

Chart 3.5: Successive SEISS forecasts versus outturn



Source: HMRC, OBR

Pandemic-related loan schemes

3.23 As part of its response to the pandemic, the Government introduced several government-backed loan schemes during 2020-21: the Coronavirus Business Interruption Loan Scheme (CBILS), the Bounce Back Loan Scheme (BBLS) and the Coronavirus Large Business Interruption Loan Scheme (CLBILS). The fiscal costs of these arise from the proportion of the loans extended that are written off (the 'loss rates', which are in turn a factor of the proportion of loans that default and the loss given default rate for those that do default), and the proportion of the resulting losses that are covered by the Exchequer via the guarantee. The ONS has determined that the cost of these expected losses should be recorded in the year that the guarantees are extended rather than when the defaults actually occur and associated cash payments are made. The Government has also directly issued convertible loans to 'innovative' start-up enterprises through the Future Fund.

3.24 The evolution of our estimates of these costs in 2020-21 (Table 3.9) reflects:

- An initial estimate of the cost of loan guarantee write-offs that was provided in our **July 2020 *FSR***. With very little evidence on which to base our assumptions at this stage, we assumed the total costs would be around £17 billion, reflecting a fiscal loss rate of over a fifth of the loans that were expected to be taken up in 2020-21. This estimate is £3.9 billion less than the current ONS estimate included in outturn.

- Our **November 2020 *EFO*** was able to draw on estimated loss rates prepared by the British Business Bank for the Department for Business, Energy and Industrial Strategy 2019-20 Annual Report. These were materially higher than we had assumed in July, giving a weighted average fiscal loss rate of around a third. Coupled with an upward revision to the value of loans issued, this resulted in an upward revision of £12.4 billion to the overall cost of these loan schemes in 2020-21. That estimate is £8.6 billion higher than the latest 'outturn'.

- Our **March 2021 *EFO*** reduced the estimate of spending by £2.2 billion, entirely due to the £6.6 billion downward revision to expected loan take-up. This in turn reflected lower loan take-up in outturn. The cost is £6.3 billion higher than the latest 'outturn' estimate. As detailed in our October 2021 *EFO*, which incorporated the latest data, this difference reflects: a lower value of loans extended; lower expected loss rates; the impact of discounting and a timing effect pushing some of the cost into 2021-22; as well as a reprofiling of costs related to the Future Fund.

3.25 The estimate contained in ONS 'outturn' for 2020-21 is still subject to huge uncertainty. We will not know the final write-off costs associated with these schemes for a decade given the terms of the BBLS in particular. Over the coming years, the current historically informed estimates of fiscal loss rates will slowly be replaced by outturns as some loans are repaid and others default leading to calls on the guarantees. Revisions to loss rates associated with this information flow are not expected to result in revisions to 2020-21 spending but are instead likely to be recorded in PSNB as they become apparent. We will continue to provide a running commentary on these costs in our *EFO*s.

Table 3.9: Expected value of pandemic-related loans and associated losses

	£ billion (unless otherwise stated)			
	Jul 2020	Nov 2020	Mar 2021	Oct 2021[1]
Loan volume	76.4	87.0	80.4	78.0
Fiscal loss rate (per cent)	22	34	34	27
Total cost	**17.0**	**29.5**	**27.2**	**20.9**
Difference from previous forecast	17.0	12.4	-2.2	-6.3
Difference from latest estimate	-3.9	8.6	6.3	0.0

[1]Our October revision to loss rates also included the application of a discounting treatment.

Welfare spending

3.26 Conventional welfare spending in 2020-21 (i.e. not including the CJRS and SEISS schemes) exceeded our March 2020 forecast by £14.2 billion (6.2 per cent), but was £19.8 billion (7.5 per cent) lower than our July 2020 forecast. Our November 2020 and March 2021 forecasts were much closer to outturn. Across all forecasts, our welfare spending errors were almost entirely due to universal credit (UC) and its legacy benefit predecessors. In turn, these errors were driven by both the evolution of our economy forecast (thereby mirroring the overall story of the evolution of our receipts forecast) and the cost of UC and tax credits policy measures, which added £7.6 billion to spending relative to our March 2020 forecast.

3.27 The evolution of our welfare spending forecasts through the pandemic reflects:

- Our **April 2020 *CRS*** reflected the £8.0 billion cost of policies announced by that point (in particular the £20 a week increase in UC and working tax credit), plus a further £14.8 billion to reflect a pandemic-driven increase in caseloads (largely in UC). This £22.8 billion upward revision relative to our March 2020 forecast led to an estimate that was £8.6 billion higher than outturn. That was largely due to unemployment coming in lower than expected, plus the effect of excess deaths on the pensioner benefit caseload (which we did not try to estimate at this stage).

- Our **July 2020 *FSR*** revised welfare spending up by £11.2 billion from April, largely due to higher forecast unemployment and increased UC uptake. We also revised up the cost of policies announced since March 2020. The £19.8 billion overestimate of spending in this forecast was more than explained by UC and legacy spending.

- By the time of our **November 2020 *EFO*** it was clear that unemployment was not rising as much as previously expected (thanks in part to the furlough scheme being extended), while UC caseloads were rising even less. As a result, we revised spending down by £19.0 billion relative to July, leaving it just £0.8 billion above outturn. The remaining error was concentrated in pensioner spending.

- Our **March 2021 *EFO*** was also close to outturn.

3.28 In addition to unemployment-related errors in our UC caseload forecasts, the large error in our July forecast also relates to overestimating the average UC awards of new claimants.

We assumed they would be broadly similar to existing cases, but in reality, average awards for new claimants were significantly lower than for pre-pandemic cases. This was partly due to different characteristics of new claimants, who were on average less likely to have children and less likely to be eligible for housing support payments.

Table 3.10: 2020-21 welfare spending forecasts versus outturn

£ billion

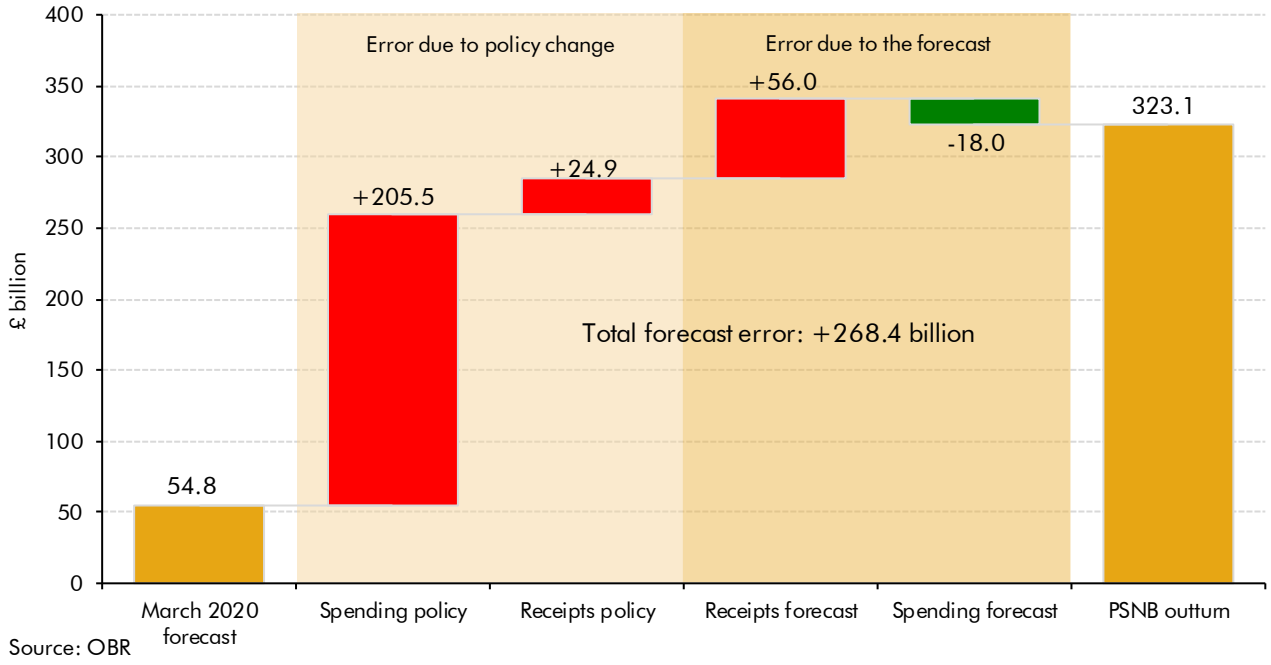
	Mar 2020			Apr 2020			Jul 2020			Nov 2020			Mar 2021		
	Difference	*of which:* Policy	Other	**Difference**	*of which:* Policy	Other	**Difference**	*of which:* Policy	Other	**Difference**	*of which:* Policy	Other	**Difference**	*of which:* Policy	Other
Pensioner spending[1]	**-1.1**	0.0	-1.1	**-1.1**	0.0	-1.1	**-0.5**	0.0	-0.6	**-0.6**	0.0	-0.7	**-0.4**	-0.1	-0.3
UC and legacy[2]	**14.3**	7.6	6.7	**-7.6**	0.6	-8.2	**-20.0**	-1.7	-18.3	**-0.1**	-0.4	0.3	**0.9**	-0.4	1.3
Disability benefits[3]	**0.7**	0.2	0.5	**0.7**	0.1	0.6	**0.7**	0.2	0.6	**0.3**	0.0	0.3	**0.1**	0.0	0.1
Child benefit	**-0.1**	0.0	-0.1	**-0.1**	0.0	-0.1	**-0.2**	0.0	-0.2	**-0.1**	0.0	-0.1	**-0.1**	0.0	-0.1
Other spending[4]	**0.5**	0.2	0.3	**-0.5**	-0.8	0.3	**0.3**	0.0	0.3	**-0.2**	0.0	-0.2	**0.1**	0.0	0.1
Total	**14.2**	8.0	6.3	**-8.6**	0.0	-8.5	**-19.8**	-1.6	-18.2	**-0.8**	-0.4	-0.4	**0.6**	-0.5	1.1

[1] Pensioner spending includes pensioner housing benefit, pension credit, state pension expenditure and winter fuel payment.
[2] UC and legacy equivalents includes personal tax credits, housing benefit (excluding pensioner part), income-related and contributory employment and support allowance, income support and income-based and contributory jobseeker's allowance.
[3] Disability benefits includes disability living allowance, personal independence payment, and attendance allowance.
[4] Other spending includes Northern Ireland social security expenditure.

Decomposition of our March 2020 fiscal forecast errors

3.29 Borrowing in 2020-21 exceeded our March 2020 forecast by £268.4 billion – a far larger margin than the sum of all ten of our previous year-ahead Spring forecast errors. As Chart 3.6 shows, the cost of pandemic-related spending explains more than three-quarters of that error, with tax cuts explaining less than a tenth. The impact of the pandemic on receipts via the damage wrought to tax bases explains just over a fifth of the error. Forecast-related shortfalls in spending (in particular lower debt interest costs) provided a modest offset to these sources of higher borrowing. In this section we detail the sources of these forecast errors using an approach closer to our conventional forecast evaluations.

Chart 3.6: Sources of our March 2020 PSNB forecast error



Source: OBR

March 2020 receipts forecast error

3.30 By re-running our March 2020 forecast models using outturn determinants in place of our March 2020 economy forecast, we can drill down into the sources of the £80.9 billion overestimate of receipts. On this basis (Table 3.11), there are large contributions from tax cuts (£24.9 billion), shortfalls in economic determinants (£39.0 billion), and shortfalls related to assumptions specific to our receipts forecasts (£19.5 billion). Classification changes only had a modest offsetting effect (raising receipts by £2.5 billion).

3.31 The largest sources of these changes relate to:

- **Income tax and NICs receipts.** The £17.4 billion (4.9 per cent) shortfall was primarily due to determinants of the tax base (£11.3 billion). The shortfalls in average earnings (£5.2 billion) and employee numbers (£1.6 billion) were the largest sources of error in respect of PAYE receipts, while dividend income (£1.7 billion) and self-employment income (£1.3 billion) were the largest sources for SA receipts. The one-year delay to the introduction of new IR35 rules for the private sector was the main policy change affecting PAYE receipts, while the enhanced time-to-pay measure announced in November 2020 was the largest cost for SA. The shortfall in SA receipts came despite most SA income tax received in 2020-21 relating to pre-pandemic 2019-20 liabilities, with taxpayers reducing their first 'payment on account' for 2020-21 liabilities paid in January 2021 to take account of the fact that these would be significantly lower.

- **VAT receipts.** The £23.8 billion (17 per cent) shortfall was largely explained by economic factors, which lowered receipts by £19.8 billion as a result of lower nominal consumption. Policy measures further lowered VAT receipts by £6.3 billion, accounting

for around a quarter of the error, in particular thanks to the temporary VAT rate cut for hospitality, accommodation and attractions, as well as removing VAT liabilities in respect of PPE purchases. The large effects on the timing of cash receipts as a result of the VAT deferral measures only affect accrued receipts to the extent that we assume some of the deferred payments will ultimately go unpaid.

- **Onshore corporation tax receipts.** The £5.9 billion (10.2 per cent) shortfall included £1.0 billion in policy measures, £1.4 billion due to economic determinant errors, £0.5 billion due to a classification change in the treatment of corporation tax credits, leaving a larger £3.0 billion error due to assumptions specific to the fiscal forecast. As noted earlier, extensive government support meant that non-oil, non-financial profits were only modestly weaker than assumed in our March 2020 forecast, but lower financial sector profits explain around £0.6 billion of the determinant error. The fiscal forecasting error is likely to reflect a variety of issues such as greater losses in some sectors and modelling issues around payment patterns including the move to a quicker payment regime for very large companies. The largest policy costs were due to anticipatory effects in respect of the super-deduction and loss carry back measures.

- **Fuel duties.** The £6.6 billion (24 per cent) shortfall is entirely explained by economic factors and fiscal forecasting errors that relate to the amount of fuel purchased. Underperformance in real GDP and consumption lowered receipts by £2.1 billion, while the additional shortfall in road travel relative to this weaker than expected economic activity is captured by the £4.5 billion fiscal forecasting error.

- **Business rates.** The £12.0 billion (38 per cent) shortfall is almost entirely explained by business rates relief measures, which cost £11.9 billion.

- **Stamp duty land tax (SDLT).** The £4.3 billion shortfall was largely due to the stamp duty holiday that was announced in July 2020, which is estimated to have cost £2.9 billion in 2020-21. About £1 billion can be attributed to economic factors, with both average property prices and transaction volumes lower than forecast in March 2020 (albeit surprising to the upside relative to later forecasts).

- **Air passenger duty.** The £3.7 billion shortfall was the largest percentage error across our receipts forecast at 92 per cent. £0.6 billion related to economic determinants thanks to the weakness of real GDP, but the bulk (£3.1 billion) is the fiscal forecasting error that captures the fact that the pandemic and lockdown restrictions had a much more detrimental effect on air travel than on the wider economy.

- **Other receipts.** Tobacco and alcohol duties both exceeded our March 2020 forecast, as consumption held up in the face of the pandemic. Statistical issues were important for interest and dividends and environmental levies. For the former, the £4.3 billion shortfall was only partly due to lower interest rates (£0.9 billion), whereas the £4.1 billion fiscal forecast difference largely related to a reduction in the discount rate used by the ONS in respect of funded pension schemes, which itself was partly offset by the reclassification of interest on Asset Purchase Facility (APF) corporate bond holdings as

receipts rather than negative spending (£0.7 billion). For environmental levies, the error is largely explained by the capacity markets scheme, which has yet to be included in the ONS outturn figures.

Table 3.11: March 2020 receipts forecast error by source

	£ billion						
	Forecast	Outturn	Difference	*of which:*			
				Classification changes	Policy changes	Economic factors	Fiscal forecast difference
Income tax and NICs	357.7	340.3	-17.4	0.0	-1.8	-11.3	-4.3
Value added tax (VAT)	140.6	116.7	-23.8	0.0	-6.3	-19.8	2.3
Onshore corporation tax	57.2	51.3	-5.9	-0.5	-1.0	-1.4	-3.0
Fuel duties	27.5	20.9	-6.6	0.0	0.0	-2.1	-4.5
Business rates	31.5	19.5	-12.0	0.0	-11.9	0.0	-0.1
Stamp duty land tax	13.8	9.5	-4.3	0.0	-2.9	-1.0	-0.4
Air passenger duty	4.0	0.3	-3.7	0.0	0.0	-0.6	-3.1
Tobacco duties	9.0	9.8	0.8	0.0	-0.1	-0.1	0.9
Alcohol duties	11.9	12.1	0.3	0.0	0.0	-2.0	2.3
Environmental levies	9.6	8.5	-1.1	-1.1	0.0	0.0	0.0
EU ETS auction receipts	1.2	1.3	0.1	0.0	0.0	0.1	0.0
Other taxes	122.2	119.4	-2.8	0.4	-1.0	0.0	-2.2
National Accounts taxes	786.2	709.8	-76.4	-1.2	-24.9	-38.1	-12.2
Interest and dividends	27.6	23.3	-4.3	0.7	0.0	-0.9	-4.1
Gross operating surplus	57.0	57.6	0.6	3.0	0.0	0.0	-2.4
Other non-tax receipts	2.1	1.4	-0.7	0.0	0.0	0.0	-0.7
Current receipts	872.9	792.1	-80.9	2.5	-24.9	-39.0	-19.5

March 2020 spending forecast error

3.32 Table 3.12 reports the breakdown of differences between our March 2020 forecast and outturn for spending in 2020-21 split between policy and other changes. It shows that the cost of pandemic-related policy measures more than explains the overall difference (adding £205.5 billion to spending), with other factors reducing spending by £18.0 billion.

Table 3.12: March 2020 spending forecast error by source

	£ billion				
	Forecast	Outturn	Difference	*of which:*	
				Policy	Other
Public sector current expenditure (PSCE)					
PSCE in RDEL and SG AME	**373.3**	**476.5**	**103.3**	**104.8**	**-1.5**
PSCE in AME	**476.0**	**554.6**	**78.5**	**80.5**	**-2.0**
of which:					
Welfare spending	231.2	245.4	14.2	8.0	6.3
Virus-related income support schemes[1]	0.0	78.0	78.0	78.0	0.0
Locally financed current expenditure	55.0	48.9	-6.1	-6.5	0.4
CG debt interest ex APF[2]	34.5	22.4	-12.1	0.0	-12.1
EU financial settlement	9.0	10.4	1.4	0.0	1.4
Net public service pension payments	4.2	4.1	-0.1	0.0	-0.1
Company and other tax credits	7.4	8.7	1.3	0.0	1.3
BBC current expenditure	4.0	3.5	-0.5	0.0	-0.5
National Lottery current grants	1.3	1.5	0.2	0.0	0.2
General government imputed pensions	1.3	0.8	-0.5	0.0	-0.5
Public corporations' debt interest	0.4	0.2	-0.2	0.0	-0.2
Funded public sector pension schemes	20.5	19.1	-1.3	0.0	-1.3
General government depreciation	44.1	46.7	2.5	0.0	2.5
Current VAT refunds	17.7	17.8	0.2	0.0	0.1
Environmental levies	10.6	10.4	-0.2	0.0	-0.2
Other PSCE items in AME	1.2	1.9	0.6	1.1	-0.4
Other National Accounts adjustments	0.1	-7.2	-7.3	0.0	-7.3
Total public sector current expenditure	**815.8**	**989.1**	**173.3**	**185.3**	**-12.0**
Public sector gross investment (PSGI)					
PSGI in CDEL and SG capital	**75.9**	**77.2**	**1.4**	**0.0**	**1.3**
PSGI in AME	**40.7**	**53.4**	**12.7**	**20.1**	**-7.4**
of which:					
Locally financed capital expenditure	10.9	11.0	0.0	0.0	0.0
Public corporations' capital expenditure	11.4	10.0	-1.4	0.2	-1.5
Student loans	10.6	10.6	0.0	-0.1	0.1
Funded public sector pension schemes	0.9	-0.3	-1.2	0.0	-1.2
Tax litigation	1.8	0.0	-1.8	0.0	-1.8
Calls on virus-related loan schemes	0.0	20.9	20.9	20.9	0.0
Other PSGI items in AME	0.8	-0.1	-0.9	-0.9	0.0
Other National Accounts adjustments	-0.3	-3.2	-2.9	0.0	-2.9
Total public sector gross investment	**111.9**	**126.1**	**14.2**	**20.2**	**-6.0**
Less public sector depreciation	-52.2	-53.5	-1.2	0.0	-1.2
Public sector net investment	**59.7**	**72.7**	**12.9**	**20.2**	**-7.2**
Total managed expenditure	**927.7**	**1,115**	**187.5**	**205.5**	**-18.0**

[1] Includes the coronavirus job retention scheme and the self-employment income support scheme.

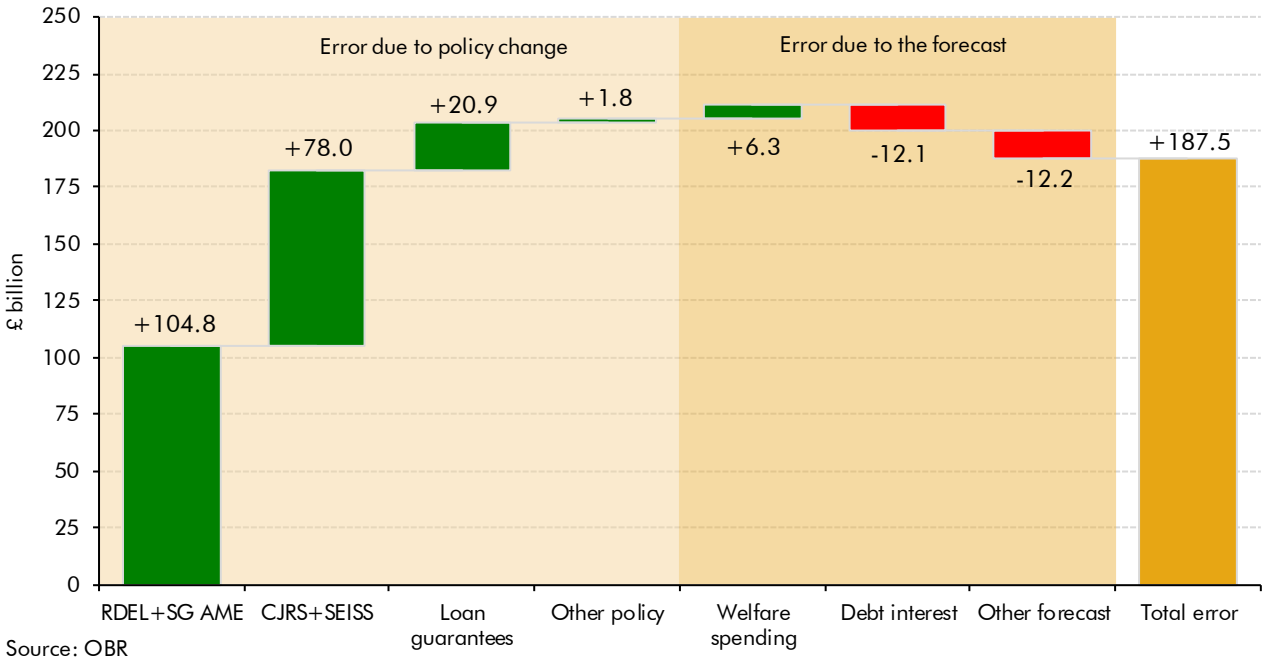
[2] Includes reductions in debt interest payments due to the APF.

3.33 The dominance of policy costs in explaining the £187.5 billion overestimate of spending in our March 2020 forecast is illustrated in Chart 3.7. It shows that:

- **departmental resource spending** was £104.8 billion higher than expected, reflecting an even larger increase in departmental budgets, not all of which was spent;
- **the CJRS and SEISS** cost £78.0 billion;
- write-offs for the coronavirus **loan guarantee schemes** added £20.9 billion;
- **other policy measures** cost £1.8 billion, with additions including the £20 a week increase to UC and working tax credit partially offset by reductions elsewhere;
- the weaker labour market and other underlying forecast changes increased **welfare spending** by £6.3 billion (though by much less than initially feared);
- **debt interest** cost £12.1 billion less than expected despite debt being 17.5 per cent of GDP higher than expected by the end of the year, thanks largely to lower short-term interest rates (particularly the cuts in Bank Rate); and
- **other underlying forecast errors** resulted in spending being a further £12.2 billion lower than expected, largely explained by National Accounts adjustments.

3.34 The largest non-policy contributions to the error were welfare spending, debt interest spending and National Accounts adjustments, which are discussed in more detail below.

Chart 3.7: Sources of our March 2020 spending forecast error



Source: OBR

Welfare spending

3.35 The largest non-policy-related upside surprise in spending relative to our March 2020 forecast was in conventional welfare spending (Table 3.13). Of the £14.2 billion overall surprise, £8.0 billion was explained by policy measures, with the £20 a week uplift for UC and working tax credit much the largest cost. More modest policy costs elsewhere in the welfare system largely related to easements that reduced the need for face-to-face contact between administrators and recipients, or supported incomes.

3.36 The remaining £6.3 billion of upside surprise as a result of the pandemic and other forecast-related errors reflects:

- **UC and its legacy benefit predecessors.** Spending exceeded our March 2020 forecast by £6.7 billion due to non-policy reasons, more than explaining the overall welfare spending error. Nine-tenths of this difference related to UC itself, where the caseload leapt at the onset of the pandemic – with more than a million starts to UC in both April and May 2020. Spending on jobseeker's allowance and housing benefit was higher than expected as a result of the labour market impact of the pandemic, while spending on tax credits and incapacity benefits was lower than expected due to the surge in people claiming UC instead of these legacy benefits as their circumstances changed.

- **Pensioner benefits.** Spending was £1.1 billion lower than forecast in March 2020. This was mainly driven by pandemic-related excess mortality. The 0.8 per cent shortfall in state pensions spending compares to the 100,000 excess deaths among those aged 65 and over, which was equivalent to 0.8 per cent of the population of those ages.

- **Disability benefits.** Spending was £0.5 billion higher than our March 2020 forecast, largely due to higher average awards for personal independence payment and a slightly higher caseload for disability living allowance. Lower spending on attendance allowance partly offsets this, mainly due to excess mortality as a result of the pandemic and a fall in new claims during the pandemic.

- **Child benefit.** Spending was £0.1 billion lower than expected. This partly reflected lower take-up in respect of new-borns, which may have been due to lack of awareness as fewer representatives were present on maternity wards to issue bounty packs.

- **Other welfare spending.** Spending was £0.3 billion higher than expected. That was more than explained by higher welfare spending in Northern Ireland, mirroring the pandemic-induced increase spending in Great Britain. This was partly offset by lower than expected costs of tax-free childcare (due to the lockdown-related disruption to childcare provision) and industrial injuries benefits (due to less industrial activity).

Table 3.13: March 2020 welfare spending forecast error by source

	£ billion				
	Forecast	Outturn	Difference	*of which:*	
				Policy	Other
Pensioner benefits	**114.7**	**113.6**	**-1.1**	**0.0**	**-1.1**
State pension	101.8	101.0	-0.8	0.0	-0.8
Pensioner housing benefit	5.7	5.6	-0.1	0.0	-0.1
Pension credit	5.3	5.1	-0.2	0.0	-0.2
Winter fuel payments	1.9	2.0	0.0	0.0	0.0
UC and its legacy benefit predecessors	**66.1**	**80.4**	**14.3**	**7.6**	**6.7**
Universal credit	26.6	38.2	11.6	5.6	6.0
Personal tax credits	14.4	15.3	0.9	1.7	-0.8
Incapacity benefits[1]	13.7	13.5	-0.2	0.0	-0.2
Working-age housing benefit	9.9	11.3	1.4	0.3	1.1
Income support (non-incapacity)	1.1	1.1	0.0	0.0	0.0
Jobseeker's allowance	0.4	1.0	0.6	0.0	0.6
Disability benefits	**24.1**	**24.8**	**0.7**	**0.2**	**0.5**
Personal independence payment and disability living allowance	18.5	19.5	1.0	0.2	0.8
Attendance allowance	5.6	5.3	-0.3	0.0	-0.3
Child benefit	**11.6**	**11.5**	**-0.1**	**0.0**	**-0.1**
Other welfare spending	**14.7**	**15.2**	**0.5**	**0.2**	**0.3**
Northern Ireland social security	6.5	7.1	0.7	0.2	0.5
Carer's allowance	3.1	3.0	0.0	0.0	0.0
Maternity and paternity pay	2.6	2.7	0.0	0.0	0.0
Industrial injuries benefits	0.8	0.7	-0.1	0.0	-0.1
Bereavement benefits	0.4	0.4	0.0	0.0	0.0
Tax-free childcare	0.3	0.2	-0.1	0.0	-0.1
Other items	1.0	0.9	0.0	0.0	0.0
Total welfare	**231.2**	**245.4**	**14.2**	**8.0**	**6.3**

[1] Incapacity benefits includes incapacity benefit, employment and support allowance, severe disablement allowance and income support (incapacity part).

Debt interest spending

3.37 The largest downside surprise relative to our March 2020 spending forecast was the £12.1 billion lower than expected cost of debt interest. While the debt stock ended 2020-21 £317 billion higher than forecast in March 2020 (as described below), the cost of servicing that debt was reduced by lower interest rates (particularly lower Bank Rate), lower inflation, and an expansion of Bank of England gilt purchases under quantitative easing (which in effect swapped higher interest gilts for lower interest central bank reserves).

3.38 Central government debt interest spending, net of savings associated with gilts held in the APF as a result of quantitative easing, totalled £22.4 billion in 2020-21. The £12.1 billion shortfall in spending relative to forecast was split between a £5.8 billion surprise in gross debt interest spending and a £6.3 billion surprise in the saving associated with the APF. Lower than expected gross costs were primarily the result of lower inflation and lower interest rates, with higher financing adding only modestly to spending (because interest rates on that additional borrowing were so low). The higher than expected APF saving was

largely due to the cut in Bank Rate from 0.75 to 0.1 per cent, which saved a further £6.0 billion relative to our March 2020 assumption that Bank Rate would remain at 0.75 per cent throughout the year. Nearly £1 billion of additional saving came from the nearly £350 billion expansion of quantitative easing completed during 2020-21. The ONS reclassification of the interest received by the APF on its corporate bond holdings as interest receipts rather than negative spending raised debt interest by £0.7 billion.

Table 3.14: March 2020 debt interest spending forecast error by source

	£ billion		
	March 2020 forecast	Outturn	Difference
Central government debt interest, net of APF	**34.5**	**22.4**	**-12.1**
of which:			
Central government debt interest	**44.7**	**38.9**	**-5.8**
of which:			
Interest rates			-1.9
Inflation			-3.5
Financing			0.6
Other factors			-1.0
Asset Purchase Facility	**-10.2**	**-16.5**	**-6.3**
of which:			
Classification changes			0.7
Interest rates			-6.0
Volume of gilt purchases			-0.9
Memo: Public sector net debt	*1,818*	*2,136*	*317*

National Accounts adjustments

3.39 National Accounts adjustments are used to align our bottom-up spending control based forecasts to the definitions of current and capital expenditure used in the public sector finances data. They cover both timing effects and differences in classification (such as lending to the private sector, which is managed in departments' budgets but is treated as a financial transaction rather than accrued spending). In total across current and capital spending, National Accounts adjustments overestimated outturn by £10.2 billion:

- In **resource spending** this relates to unallocated differences between the outturn estimates we are using for the various detailed components of spending and the latest total spending outturns included in the ONS public finances release. These could reflect temporary timing differences when comparing the latest OSCAR and other source data with the data underlying the ONS estimates, but there could also be genuine underlying factors that would affect our future forecasts. Some of the larger adjustments relate to local government spending, so the fact that ONS figures are yet to reflect final local government outturn for 2020-21 suggests that this error may reduce as new data are incorporated.

- In **capital spending** the net effect is driven by adjustments for capital grants to the private sector, with an offsetting impact from various timing differences.

Public sector net debt

3.40 Our March 2020 forecast underestimated public sector net debt (PSND) at the end of 2020-21 by £323.3 billion (17.5 per cent of GDP). Our forecast for the cash level of debt at the end of 2019-20 was relatively accurate (explaining just 0.2 percentage points of the error), while the large shortfall in nominal GDP explained 3.3 percentage points, but it was the error in our forecast for the change in cash debt in 2020-21 that explained the majority of the overall error (14.4 percentage points of GDP).

3.41 The bulk (£268.4 billion) of this £323.3 billion error was in the forecast for PSNB, for the reasons described so far in this chapter. But there was also a £55.0 billion error in the transactions that contribute to debt but are not included in PSNB:

- Our March 2020 forecast assumed that the size of **the Bank of England's Term Funding Scheme** (TFS) would reduce by £43.7 billion as loans that were issued in 2016-17 (when the scheme was introduced after the Brexit referendum) came due and were repaid. However, at a special Monetary Policy Committee meeting in March 2020 a new 'Term Funding Scheme with additional incentives for small and medium-sized enterprises' (TFSME) was introduced. Consequently, the TFSME expanded as the original TFS shrank and the overall balance of TFS loans fell only slightly on the year, resulting in a positive forecast error of £39.6 billion. (The reserve liabilities issued to finance the TFS increase debt but the loan assets are not netted off in PSND.)

- **Gilt premia** valuation effects arise from the recording of gilt liabilities at their face or redemption value rather than the cash raised by selling them or spent acquiring them. These premia were considerably higher than expected, by £22.4 billion. This reflected the effect of the Bank of England buying gilts above their face value as part of an expanded quantitative easing programme, which was only partially offset by the Treasury issuing more debt at a premia to finance the much larger deficit.

- The £20.9 billion recorded in the accrued deficit for **calls on loan guarantees** will be paid in cash terms in later years as borrowers default and lenders call on the Exchequer to meet the guarantee. As there were no cash outlays in respect of these guarantees in 2020-21, an offsetting accruals adjustment is recorded to reconcile the accrued and cash measures of the deficit. This shows as a £20.9 billion negative forecast error relative to our March 2020 forecast.

- The **remaining error** of £13.9 billion is more than explained by differences between cash and accrued taxes being much larger than anticipated, partly as a result of the VAT deferral policies that shifted some cash receipts from 2020-21 to 2021-22.

Table 3.15: March 2020 PSND forecast error by source

	Outturn	Forecast	Difference
Per cent of GDP	94.9	77.4	17.5
of which:			
Nominal GDP			3.3
Cash debt at end 2019-20			-0.2
Change in cash debt 2020-21			14.4
£ billion			323.3
of which:			
Policy-related PSNB			231.3
Forecast-related PSNB			37.1
Term Funding Scheme			39.6
Gilt premia			22.4
Loan guarantees			-20.9
Other			13.9

4 Refining our forecasts

Introduction

4.1 In this chapter we:

- summarise **lessons learnt through the pandemic for forecasting** the economy and public finances; and
- report the results of our latest **review of fiscal forecasting models**.

Lessons learnt

What is the value of forecasts?

4.2 In the face of the unprecedented scale of the forecast errors discussed in Chapters 2 and 3, it is reasonable to ask: what is the value of forecasts when they can apparently provide such little guide to the future? Of course, the precise timing and scale of shocks is unknowable – that is why they come as a shock. So we, like all other forecasters, did not foresee a global pandemic in 2020. Central forecasts will rarely incorporate such shocks before they occur because the probability of them happening in any given period is usually less than 50 per cent (and often much less). That is why in our *Economic and fiscal outlooks* (*EFO*s) we also emphasise the risk and uncertainty around our central forecast through the use of fan charts, scenarios and sensitivity analysis.

4.3 That said, the possibility of being hit by a global pandemic was not an unidentified or unquantifiable risk. In fact, it sat near the top of the UK's National Risk Register for many years. And other, better resourced, independent institutions such as the Congressional Budget Office in the US and the World Bank had produced remarkably prescient analyses of the potential economic impact of a pandemic.[1] In our July 2021 *Fiscal risks report* (*FRR*), we therefore identified the need for our scenario analysis and fiscal stress tests to focus more – though not exclusively – on the risks identified in the National Risk Register. That is something we also began to do in the *FRR* with the scenario analysis of climate change.

4.4 Nevertheless, a pandemic was a 'tail risk' that was a long way removed from our, or anyone else's, central forecasts. And it would be highly disruptive to expect government to set fiscal policy on the basis that an idiosyncratic, once-in-a-century shock is always just around the corner. But by their very nature, low probability 'catastrophic' risks will crystallise

[1] See Arnold, R. et al., *A Potential Influenza Pandemic: Possible Macroeconomic Effects and Policy Issues*, US Congressional Budget Office, December 2005 (revised July 2006), and Brahmbhatt, M. and A. Dutta, *On SARS-type Economic Effects during Infectious Disease Outbreaks*, World Bank, January 2008.

from time to time and inflict significant damage on the public finances. As we discussed in the *FRR*, the difficulty of knowing which specific shock may hit the economy – and when – means that, in the face of such uncertainty, maintaining fiscal space may be the single most valuable risk management tool for policymakers. And better risk analysis can help policymakers to understand how much fiscal space may be needed to be able to absorb and respond to future shocks should they materialise.

4.5 Through the pandemic, starting with our July 2020 *Fiscal sustainability report* (*FSR*), we developed our presentation of uncertainty by giving greater prominence to scenario analysis, detailing upside and downside scenarios alongside our central forecast based on different possible paths for the virus. In our July 2021 *FRR,* we put greater emphasis on understanding and analysing tail risks, including climate change, a sharp rise in borrowing costs, and the pandemic itself. And our latest working paper, published alongside this report, sets out a new fan chart methodology that will allow us to capture a longer, and therefore perhaps more representative, history of shocks that have hit the UK economy.[2] It will not sidestep the need to calibrate the degree of uncertainty around the economic outlook, but it will provide us with more analytical flexibility with which to do so.

4.6 The need to improve our analysis of the risks and uncertainties surrounding the outlook does not obviate the need for a robust central forecast that captures our current understanding of the state of the world and implications of the Government's policies. The value of such a forecast is best illustrated by the way the Government's support to households and businesses during the pandemic developed in the light of our forecasts and scenarios, including our assessment of the likely economic impact of those policy measures. This can be seen most clearly in the interaction between our unemployment forecasts and scenarios and the introduction and extension of the furlough scheme. As discussed in Chapter 2, the closer the end date of the furlough scheme was to the point at which output was expected to return close to its pre-pandemic level, the lower the expected peak in unemployment. In the event, unemployment looks set to peak close to the level assumed in our November 2020 *upside* scenario, in which output had largely recovered when the furlough scheme was due to close, and much lower than in earlier forecasts where that was not the case. In this way, our forecasts provided a guide for when the Government's single most important pandemic-related support measure could be withdrawn while minimising adverse consequences for the labour market.

What have we learnt about our approach to economic forecasting?

4.7 Chapter 2 describes the many steps we took to adjust our approach to forecasting to fit the circumstances of a pandemic. The difficulty of anticipating which risk may crystallise or which shock will hit the economy next means that it is not sensible or practicable for us to develop forecast technologies that explicitly incorporate channels for all possible non-economic risks, such as cyberattacks or natural disasters. But we do need to be ready to respond to shocks when they happen. While we had not explicitly prepared for this shock, we were able to produce analysis quickly to inform the public debate, for example by

[2] Steel, D., *OBR working paper No. 17: Evaluating forecast uncertainty with stochastic simulations*, December 2021.

publishing our April reference scenario outside our usual publication cycle. And in so doing, we were able to draw on existing analyses of previous and potential future pandemics.[3]

4.8 A rapid response to events requires **analytical agility**. We needed to develop new analytical tools in order to translate our evolving understanding of the pandemic and associated public health measures into their economic consequences, primarily by deploying a more 'bottom-up' sectoral approach in the production of our forecast. Moreover, the economy is likely to continue to undergo significant structural adjustment over the coming years as the legacy of the pandemic and Brexit play out, and these too could usefully be analysed through the medium of a sectoral model. This would complement our conventional 'top-down' approach to forecasting, built on an analysis of income and expenditure at the level of broad institutional sectors (households, corporate, government and the rest of the world).

4.9 We also needed to understand and make use of the **multiple new sources of high frequency real-time data** produced by both official and private sector organisations. These real-time data sources proved invaluable in understanding the rapidly changing epidemiological and economic situation, and in calibrating our models to new forecast determinants. However, the lack of a long time series for these new datasets made it challenging to assess the signal-to-noise ratio of movements in the data. Nonetheless, we will continue to explore how to make best use of the growing array of real-time data sources in future forecasts.

4.10 Our forecasts over the past year and a half have also benefited greatly from **the expertise of others** – from epidemiologists, public health experts, and behavioural scientists, to other independent economic forecasters in the UK and overseas. These external insights were invaluable in understanding the economic implications of the pandemic given its global impact, the fact that some countries were affected earlier than the UK, and that conditioning assumptions were required in areas such as epidemiology and public health which are beyond our expertise. We will continue to draw on international experiences and expertise outside government in future forecasts, and expect to do so in at least the following areas:

- continued engagement with public health experts as **coronavirus** becomes endemic;
- the ongoing implementation of the **Brexit** deal, which will require a deeper understanding of trade and migration flows between the UK and rest of the world;
- building our analysis of the economic and fiscal implications of **climate change** and decarbonisation; and
- analysing other potentially **novel and idiosyncratic shocks** such as a major cyberattack.

[3] This included: Resolution Foundation, *Safeguarding governments' financial health during coronavirus: What can policymakers learn from past viral outbreaks?*, March 2020; Brahmbhatt, M. and A. Dutta, *On SARS-type Economic Effects during Infectious Disease Outbreaks*, World Bank, January 2008; Bullard, J., *Expected U.S. Macroeconomic Performance during the Pandemic Adjustment Period*, 2020; Barro, R. J., J. F. Ursúa, and J. Weng, *The coronavirus and the great influenza pandemic: Lessons from the "spanish flu" for the coronavirus's potential effects on mortality and economic activity*, 2020; and Correia, S., S. Luck, and E. Verner, *Fight the Pandemic, Save the Economy: Lessons from the 1918 Flu,* Federal Reserve Bank of New York, 2020.

What have we learnt about our approach to fiscal forecasting?

4.11 As with the economy forecast, the challenges of forecasting receipts and spending during a pandemic required greater use of high-frequency and administrative data, as well as changes to our usual forecasting approaches.

Novel use of data

4.12 Particularly important sources of data included:

- For taxes associated with those sectors most affected by public health restrictions, such as transport in the initial lockdown and air travel throughout the period, we used **high-frequency data on mobility** from the Department for Transport and Google, as well as other online indicators of air passenger numbers.

- For income taxes, **HMRC's PAYE real-time information (RTI) data** provided a more accurate and up-to-date picture of employment and earnings trends among payrolled employees than the official Office for National Statistics (ONS) labour force survey, which was affected by sampling and grossing issues (see Chapter 2). RTI data on changes in the distribution of employee earnings were also crucial in confirming that the tax-rich part of the income distribution was much less affected by the pandemic.

- **Administrative receipts and spending data**. We have access to the cash received from each tax stream early in each month. This provided a near real-time indication of how sectors most affected by the pandemic and related restrictions were faring. The steep drops in fuel and air passenger duty were consistent with other indicators, whereas the tax data showed that overall alcohol sales had held up despite the closure of pubs and restaurants. DWP's administrative data for universal credit (UC) are similarly timely, revealing both how quickly the caseload rose at the start of the pandemic and how little additional effect there was from subsequent lockdowns.

- **The Treasury's cash management data** were used to sense-check departments' forecasts of their own spending. With large additional amounts being allocated to departments' budgets and huge uncertainty over the cost of some pandemic-related activities, we placed increasingly greater emphasis on the Treasury's cash management data to understand the extent to which departments would underspend their allocations. The evidence suggests that we should have placed even greater emphasis on this source, which proved a better guide than departments' own forecasts for accrued spending to the very large underspends that were recorded in outturn.

4.13 In addition to our role as users of data, we also worked closely with the ONS and HMRC on measurement issues arising from the pandemic. For example, with respect to the treatment of tax deferrals and debt in the accruals estimates of various taxes. And we published monthly profiles consistent with our forecasts, which allowed the ONS and HMRC to draw on them as they saw fit for the forecast elements of early estimates of accrued receipts statistics (which are replaced with outturn figures as lagged cash payments are made).

New forecasting approaches

4.14 Our forecasts are always judgement driven – the models we use are tools deployed in the preparation of forecasts, rather than the ultimate source of each one. Even so, the pandemic required greater use of judgement than is normally the case.

4.15 We typically operate our fiscal forecasting models by imposing an in-year estimate (based on, for example, HMRC cash receipts for the year to date) and then allowing the model to project forward from that starting point using growth rates derived from determinants in our economy forecast and other judgements. This approach generates an in-year residual (i.e. the difference between what the model would predict for the current year and the estimate based on more up-to-date administrative data). This residual is generally pushed through proportionately to future years, in effect letting in-year data determine the effective tax rate in the current year, while the forecasting model determines the growth rates thereafter.

4.16 This approach clearly would not have worked in the context of temporary pandemic-related restrictions. We therefore devoted more time to working with our forecast stakeholders to determine how and when in-year residuals should be assumed to unwind given their temporary drivers. In doing so, we aimed to ensure that each element of our fiscal forecast was consistent with the virus-related conditioning assumptions in our economy forecasts, the impact of public health measures, and the adaptation of the economy to these restrictions.

4.17 Beyond these short-term effects, we also relied more heavily on top-down sense-checks of the plausibility of individual medium-term forecasts. We did this by looking at how estimates of tax bases and effective tax rates in the medium term compared with our pre-pandemic March 2020 forecast. The longer-term scarring assumed in our economy forecast would hit tax bases too, but given the highly uncertain judgements about in-year residuals, there was a risk of incorporating unintended scarring (or indeed the opposite) of taxes relative to GDP.

4.18 Where model outputs plus judgements about in-year residuals generated changes in medium-term effective tax rates relative to our pre-pandemic judgements, we tested their plausibility. If they failed that test, further adjustments were applied to the forecast. Through this process, we assumed some scarring in business rates and air passenger duty, for example, but ensured there was no additional scarring beyond that generated by economy forecast judgements in respect of small companies' corporation tax or VAT.

Review of fiscal forecasting models

4.19 In 2016, we introduced a more systematic approach to following up modelling issues revealed by our analysis of fiscal forecasting errors in *Forecast evaluation reports* (*FER*s) and raised in forecasting rounds while preparing *EFO*s. We have been working closely with our partners across government in doing so. We described the criteria and analysis we deploy when reviewing fiscal forecast models in Chapter 4 of our 2016 *FER*. In our 2019 *FER* we had identified 27 new priorities for model development and carried forward 18 recommendations that were not fully resolved from the previous review. Routine model maintenance and development were largely put on hold during the pandemic, so this

represents the first, scaled back, update on our fiscal modelling priorities since 2019. But the pandemic has not stopped all progress. In particular we have made much fuller use of RTI data and UC administrative data, which was identified as a priority in previous reviews.

4.20 We have published an updated 'model assessment database' on our website, which reviews progress against the priorities identified in 2019, and identifies new priorities for 2022:

- We are working with HMRC forecasters to scope and develop a new **onshore corporation tax** model. At times, it has been difficult to scrutinise the corporation tax forecast thoroughly due to the complexity of the model, and it is highly dependent on the expertise of a small number of staff. The aim is to produce a simpler and more transparent model that links more closely to the trends in the liabilities data.

- We plan to develop our **UK Emissions Trading Scheme** (ETS) forecast, which multiplies the number of allowances issued by the price paid for each allowance. This is a volatile and uncertain forecast, with receipts forecast to increase from £0.9 billion in 2021-22 to £4.9 billion in 2022-23. We will work with analysts in HMRC and the Department for Business, Energy and Industrial Strategy to better understand the profile of allowances that will be issued, and its consistency with the emissions trajectory and wider policies necessary to deliver the Government's legally binding carbon budget and net zero targets.

- Decarbonisation is also affecting the tax base for **fuel and vehicle excise duties**. While the sale of new fossil-fuel cars will not be banned until 2030 (and 2035 for hybrid cars), it seems that both purchaser and producer sentiment has shifted significantly towards electric vehicles (EVs). As set out in Box 3.2 of this year's *FRR* our recent forecasts have consistently underestimated the rapidly increasing market share of EVs in new car sales. We will work with analysts in HMRC, the Department for Transport and the Climate Change Committee to improve and ensure consistency of this aspect across our forecasts.

- We will need to develop our methodology for forecasting the **health and social care (H&SC) levy.** For Spring 2022, we will be reviewing our estimate of the impact of the levy, in light of updated data and our economic forecasts. We will then work with analysts in HMRC to develop a forecasting methodology for the levy, so that it can be run alongside other income tax and NICs models at each forecast round in the run up to an *EFO*. We will also work with HMRC to include the H&SC levy in its monitoring processes and other models that are affected, such as the personal tax model and the incorporations model.

- Further steps are necessary to integrate departments' OSCAR forecasts and the Treasury's cash management data to understand and forecast **departmental underspends**. The large forecast errors in this area described in Chapter 3 revealed the need to coordinate these information sources more effectively. With large sums set aside for pandemic-related catch-up spending, this will remain an important issue.

- As in our 2019 *FER*, other priorities for model development for our spending forecast remain **National Accounts adjustments**, the **funded pensions schemes** and **universal credit**. National Accounts adjustments were the second largest source of non-policy error relative to our March 2020 forecast. There is considerable volatility in our funded pension scheme forecasts, requiring further work with the ONS and scheme stakeholders to refine them. And although the Department for Work & Pensions has carried out significant work on the UC model (in challenging circumstances), the next steps of model development aim to enhance our ability to scrutinise and sense-check the spending forecasts it produces across different aspects of the system.

4.21 In our next *FER*, pandemic-permitting, we will review progress against these updated priorities and will set out new recommendations for work in 2023.

4.22 Outside the forecast process, we will continue to develop our ability to model and forecast the fiscal implications of climate change and the transition to net zero. Also following up this year's *FRR*, we intend to develop our capacity to model the economic and fiscal implications of a major cyberattack – another issue that has long featured in the National Risk Register.

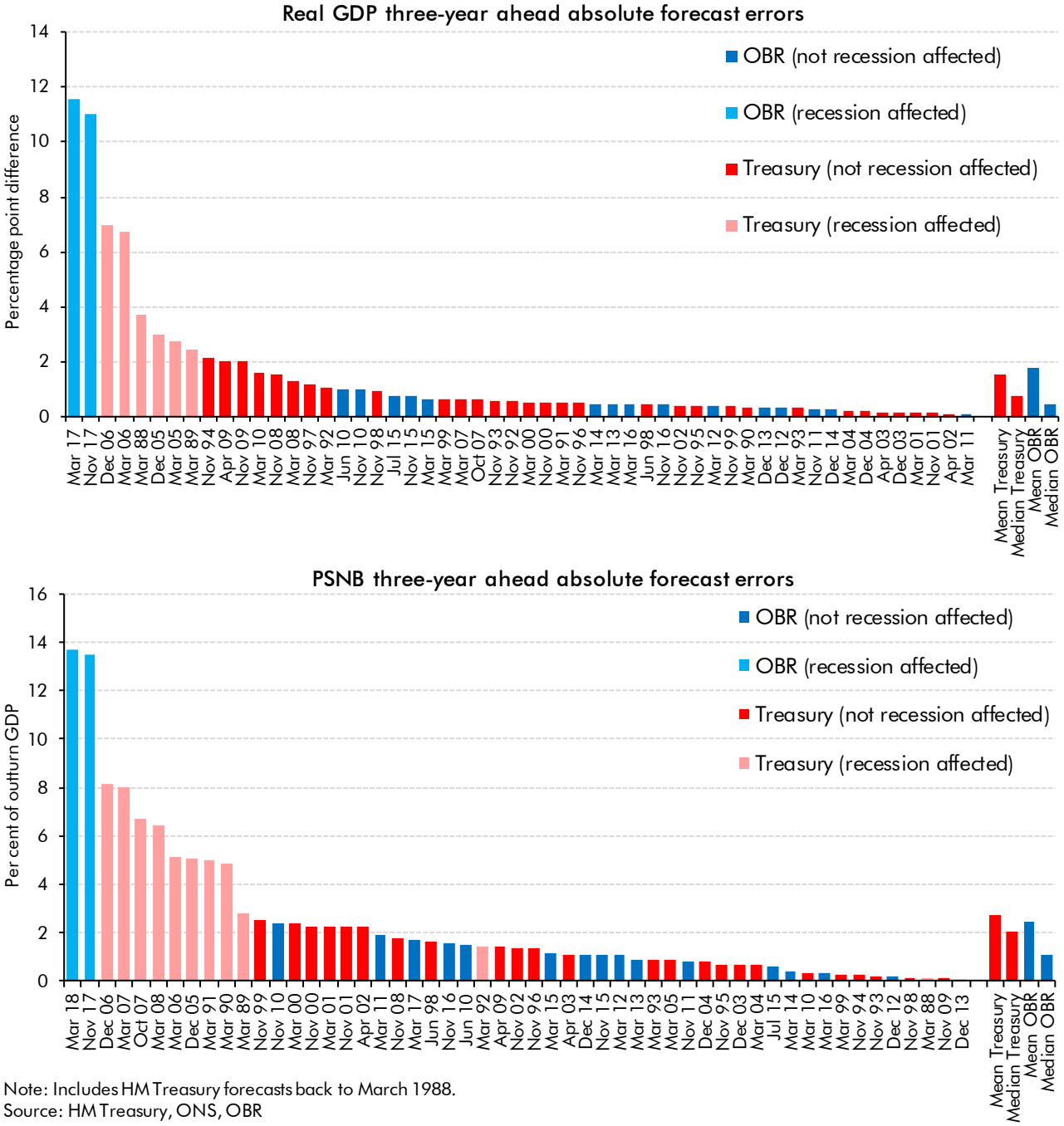
A Comparison with past forecasts

A.1 This annex compares the OBR's forecasts for real GDP, public sector net borrowing, receipts and spending against the latest outturns. It compares our average forecast errors since we were created in 2010 with those in official Treasury forecasts produced during the 20 years before the OBR was established, and considers how the former have been affected by the coronavirus shock.

A.2 We evaluate the relative accuracy of our forecasts using the median absolute forecast errors under the OBR and the preceding Treasury forecasts. We moved to using this metric, instead of the mean absolute forecast error, in our 2018 *Forecast evaluation report*, after it became clear that comparing performance on the basis of the mean flattered us relative to the Treasury. That was because the Treasury sample included the very large forecast errors associated with the late 2000s financial crisis and recession. These outliers meant that the mean under the Treasury was much larger than the corresponding median, whereas that was not true for OBR forecasts at that time.

A.3 The 9.7 per cent fall in real GDP in 2020 and the spike in borrowing to 15.0 per cent of GDP due to the pandemic means there is now a similar skew in the distribution of our own forecast errors. Indeed, the pandemic-related forecast errors are so large (the columns at the extreme left of Chart A.1) that the difference between the mean and median in the OBR era is now even larger than it was in the preceding Treasury era (as shown on the right of the chart). There is, of course, value in being transparent about these very large forecast errors, which result from unforeseen (and essentially unforeseeable) shocks. But we continue to believe that it is sensible to focus on median errors (which are much less affected by such large shocks) as a measure of underlying forecasting performance in 'normal' times.

Chart A.1: Three-year ahead forecast errors for real GDP and PSNB



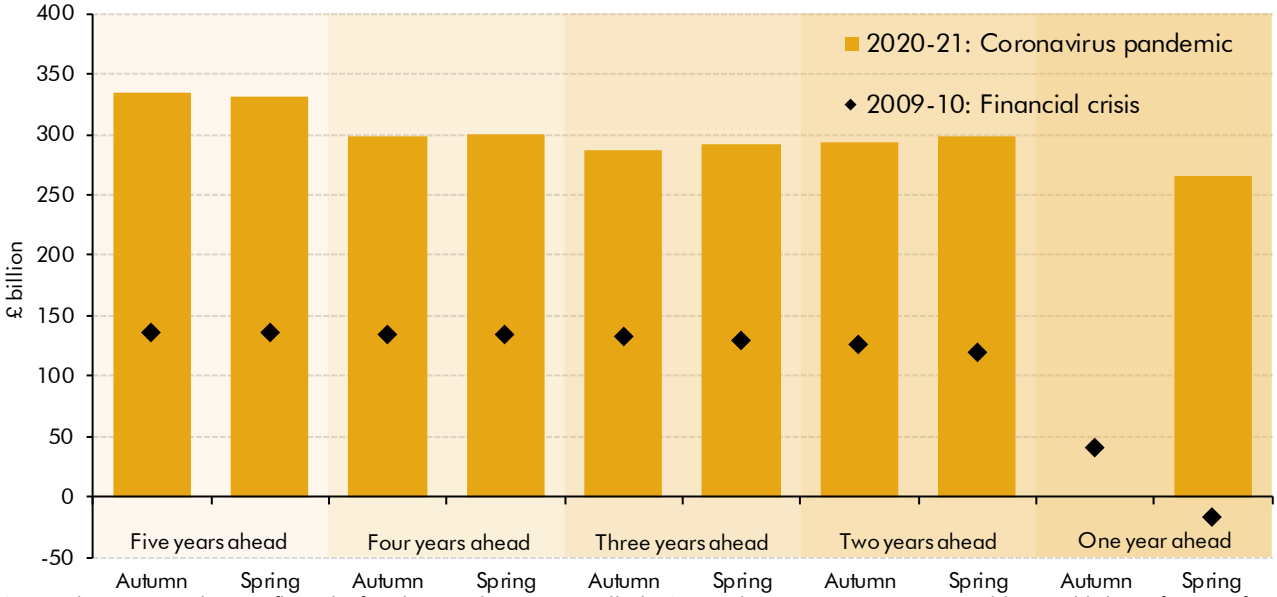
Note: Includes HM Treasury forecasts back to March 1988.
Source: HM Treasury, ONS, OBR

A.4 Despite the OBR era now containing the largest forecast errors on record as a result of the pandemic, it remains the case that, more often than not, our errors for real GDP and net borrowing have been smaller than the average errors in official forecasts during the preceding 20 years.

A.5 As the tables in this annex show, real GDP forecasts for 2020 and fiscal forecasts for 2020-21, which were first produced in our July 2015 *Economic and fiscal outlook* (*EFO*), have differed hugely from outturn. In terms of public sector net borrowing (PSNB), our March 2020 year-ahead forecast and the July 2015 five-year-ahead forecast have exhibited the

largest forecast errors yet. At all forecast horizons, the errors are more than twice those for 2009-10, when the effect of the financial crisis on the budget deficit was at its maximum (Chart A.2).

Chart A.2: PSNB forecast errors: pandemic versus financial crisis



Note: The missing column reflects the fact that an election was called in November 2019, meaning we could not publish our forecast for the cancelled Autumn Budget.
Source: ONS, OBR

Real GDP growth

A.6 Table A.1 shows our forecast errors for real GDP growth. No other forecast error either by the OBR or the Treasury comes close to that of the March 2020 in-year forecast. This error alone moved our mean in-year forecast error for real GDP growth up from 0.5 to 1.0 percentage points and the standard deviation from 0.5 to 2.2 percentage points. The March 2020 error was more than ten times the median error from the 20 years prior to the OBR's creation and more than 20 times the median error across our own previous forecasts.

A.7 Abstracting from the pandemic, two-thirds of our forecasts were more accurate than the median from the preceding 20 years, while just under a third were within half a standard deviation. Two notable periods stand out as subject to larger errors: the period affected by the euro area debt crisis in the first half of the 2010s, and that affected by the aftermath of the EU referendum that was held in 2016.

A.8 Only two forecasts prior to those affected by the pandemic were more than half a standard deviation away from the median error of the preceding 20 years: those in December 2012 and March 2013, which underestimated the strength of the recovery that was just taking hold (and which was much less apparent in early vintages of GDP data than it is now).

Table A.1: Forecast errors for real GDP growth

Calendar years ahead:	Per cent In-year	One	Two	Three	Four	Five
Forecast errors (colours reflect magnitude relative to pre-OBR median)						
June 2010	0.9	-0.8	-1.3	-1.0	0.3	-0.1
November 2010	0.3	-0.6	-1.1	-1.0	0.2	-0.1
March 2011	-0.2	-1.0	-1.0	0.1	-0.2	
November 2011	0.6	0.8	-0.2	0.3	-0.4	-0.7
March 2012	0.7	-0.1	0.3	-0.4	-0.7	
December 2012	1.6	0.7	1.0	0.3	-0.4	-0.7
March 2013	1.3	1.2	0.3	-0.4	-0.7	
December 2013	0.5	0.6	0.4	-0.3	-0.6	-1.0
March 2014	0.3	0.3	-0.3	-0.5	-0.8	
December 2014	0.0	0.2	0.1	-0.3	-0.6	-0.6
March 2015	0.1	0.0	-0.2	-0.6	-0.7	
July 2015[1]	0.2	0.0	-0.3	-0.7	-0.7	-12.1
November 2015	0.2	-0.1	-0.4	-0.7	-0.6	-12.0
March 2016	0.3	-0.1	-0.4	-0.4	-11.8	
November 2016	0.2	0.7	-0.1	-0.4	-11.8	
March 2017	0.1	0.1	-0.1	-11.6		
November 2017	0.6	0.2	0.4	-11.0		
March 2018	0.1	0.4	-11.0			
October 2018	0.4	0.1	-11.1	Smaller than median absolute difference		
March 2019	0.4	-11.1		Median sized difference		
March 2020	-10.8			Less than ½ std. dev. above median absolute		
November 2020	1.6			More than ½ std. dev. above median absolute		
Median absolute differences over the 20 years preceding the creation of the OBR						
Spring/summer	*0.7*	*0.8*	*0.7*	*0.5*	*0.5*	*0.4*
Autumn	*0.7*	*0.9*	*0.6*	*0.6*	*0.6*	*0.4*
Forecast errors (colours reflect magnitude relative to pre-OBR mean)						
June 2010	0.9	-0.8	-1.3	-1.0	0.3	-0.1
November 2010	0.3	-0.6	-1.1	-1.0	0.2	-0.1
March 2011	-0.2	-1.0	-1.0	0.1	-0.2	
November 2011	0.6	0.8	-0.2	0.3	-0.4	-0.7
March 2012	0.7	-0.1	0.3	-0.4	-0.7	
December 2012	1.6	0.7	1.0	0.3	-0.4	-0.7
March 2013	1.3	1.2	0.3	-0.4	-0.7	
December 2013	0.5	0.6	0.4	-0.3	-0.6	-1.0
March 2014	0.3	0.3	-0.3	-0.5	-0.8	
December 2014	0.0	0.2	0.1	-0.3	-0.6	-0.6
March 2015	0.1	0.0	-0.2	-0.6	-0.7	
July 2015[1]	0.2	0.0	-0.3	-0.7	-0.7	-12.1
November 2015	0.2	-0.1	-0.4	-0.7	-0.6	-12.0
March 2016	0.3	-0.1	-0.4	-0.4	-11.8	
November 2016	0.2	0.7	-0.1	-0.4	-11.8	
March 2017	0.1	0.1	-0.1	-11.6		
November 2017	0.6	0.2	0.4	-11.0		
March 2018	0.1	0.4	-11.0			
October 2018	0.4	0.1	-11.1			
March 2019	0.4	-11.1		Smaller than mean absolute difference		
March 2020	-10.8			Mean sized difference		
November 2020	1.6			Bigger than mean absolute difference		
Mean absolute differences over the 20 years preceding the creation of the OBR						
Spring/summer	*0.8*	*1.3*	*1.3*	*1.1*	*1.2*	*0.4*
Autumn	*0.7*	*1.1*	*1.2*	*1.2*	*1.2*	*1.0*

[1] The black outlines around some figures indicate that these outturn years were affected by the pandemic.

Note: Positive figures denote outturn above forecast.

Public sector net borrowing

A.9 As with real GDP, the pandemic-induced errors associated with our PSNB forecasts are by far the largest since the OBR was created and on record before that. Abstracting from these, just under two-thirds of our forecasts were subject to errors smaller than the median from the 20 years prior to the OBR, while just under a third were within one standard deviation.

A.10 One notable feature of our pre-pandemic PSNB forecasts is that our in-year forecast errors have often been greater than our forecasts for further into the future (Table A.2). This issue was most acute in our early forecasts, with the average in-year error up to December 2013 being twice as large as that between then and the pandemic. We discussed these and other reflections on our approach to in-year forecasting in a 2018 working paper.[1] It concluded that earlier errors reflected a range of factors including unforeseeable historical data revisions in respect of gross operating surplus, and early misjudgements in forecasting how local authorities would respond to cuts in central government grant funding.

A.11 Our spending forecasts have more often than not performed better than the median of the absolute errors of the pre-OBR period (Table A.3). Even abstracting from the pandemic, these forecast errors had been rising. But this largely reflected the increases in departmental spending that were announced between the Brexit referendum and the last election. Parliament requires our forecasts to reflect Government policies as they stand at the time each forecast is produced, so these are not forecast errors that could have been avoided.

A.12 Our pre-pandemic receipts forecasts have generally performed worse than our spending forecasts (Table A.4). This was particularly true for our earlier forecasts over longer time horizons, which were affected by the disappointing productivity growth and its consequences, in particular for income tax and NICs receipts. One striking difference for receipts relative to spending and PSNB relates to the pandemic-affected forecast errors, which are not historically large when viewed relative to GDP (although they were historically large in cash terms). That reflects the extent to which receipts in 2020-21 were supported by the Government's coronavirus rescue package for individuals and businesses.

A.13 Nominal GDP has been revised up significantly in recent years. This does not greatly affect our interpretation of how the public finances have evolved, but it does reduce the ratios of fiscal measures expressed relative to GDP. To facilitate historical comparisons, we therefore:

- compare **cash borrowing** (Table A.2) and **cash spending** (Table A.3) forecast errors relative to outturn nominal GDP; and
- compare changes in **receipts as a share of GDP** against outturns, which largely abstracts from changes due to revisions to the GDP denominator (Table A.4).[2]

[1] Taylor, J. and A. Sutton, *OBR Working paper No.13: In-year fiscal forecasting and monitoring*, September 2018.
[2] We have also restated our fiscal forecasts and adjusted outturns using the same methodology set out in the online annex in order to make like-for-like comparisons.

Table A.2: Forecast errors for cash PSNB

Fiscal years ahead:	Per cent of outturn GDP					
	In-year	One	Two	Three	Four	Five
Forecast errors (colours reflect magnitude relative to pre-OBR median)[1]						
June 2010[1]	-0.2	-0.8	0.1	1.5	2.4	3.0
November 2010	-0.7	0.0	1.4	2.4	3.1	3.0
March 2011	-0.6	-0.3	0.8	1.9	2.5	2.5
November 2011	-0.6	-0.3	0.2	0.8	1.2	1.3
March 2012	-0.5	-0.2	0.4	1.1	1.3	1.5
December 2012	-0.2	-0.4	-0.2	-0.1	-0.2	0.8
March 2013	-0.3	-0.8	-0.7	-0.9	-0.8	0.2
December 2013	-0.4	-0.1	0.0	0.0	1.1	1.6
March 2014	-0.2	0.0	0.2	0.4	1.4	1.7
December 2014	-0.3	-0.3	0.1	1.1	1.3	3.5
March 2015	-0.2	-0.3	0.1	1.1	1.4	2.8
July 2015	-0.2	0.0	-0.1	0.6	0.9	2.9
November 2015[2]	-0.1	-0.3	0.8	1.1	3.0	15.8
March 2016	0.0	-0.5	0.1	0.3	3.0	15.7
November 2016	-1.1	-0.8	-0.8	1.6	14.2	
March 2017	-0.3	-0.8	-0.5	1.7	14.2	
November 2017	-0.4	-0.6	0.9	13.5		
March 2018	-0.2	-0.5	0.9	13.7		
November 2018	0.0	1.0	13.8			
March 2019	0.1	1.1	14.0	Smaller than median absolute difference		
March 2020	0.3	12.5		Median sized difference		
November 2020	-3.3			Less than ½ std. dev. above median absolute		
March 2021	-1.5			More than ½ std. dev. above median absolute		
Median absolute differences over the 20 years preceding the creation of the OBR						
Spring/summer	*0.1*	*0.8*	*1.4*	*1.6*	*2.2*	*2.5*
Autumn	*0.4*	*1.1*	*1.4*	*1.3*	*2.0*	*2.5*
Forecast errors (colours reflect magnitude relative to pre-OBR mean)[1]						
June 2010[1]	-0.2	-0.8	0.1	1.5	2.4	3.0
November 2010	-0.7	0.0	1.4	2.4	3.1	3.0
March 2011	-0.6	-0.3	0.8	1.9	2.5	2.5
November 2011	-0.6	-0.3	0.2	0.8	1.2	1.3
March 2012	-0.5	-0.2	0.4	1.1	1.3	1.5
December 2012	-0.2	-0.4	-0.2	-0.1	-0.2	0.8
March 2013	-0.3	-0.8	-0.7	-0.9	-0.8	0.2
December 2013	-0.4	-0.1	0.0	0.0	1.1	1.6
March 2014	-0.2	0.0	0.2	0.4	1.4	1.7
December 2014	-0.3	-0.3	0.1	1.1	1.3	3.5
March 2015	-0.2	-0.3	0.1	1.1	1.4	2.8
July 2015	-0.2	0.0	-0.1	0.6	0.9	2.9
November 2015[2]	-0.1	-0.3	0.8	1.1	3.0	15.8
March 2016	0.0	-0.5	0.1	0.3	3.0	15.7
November 2016	-1.1	-0.8	-0.8	1.6	14.2	
March 2017	-0.3	-0.8	-0.5	1.7	14.2	
November 2017	-0.4	-0.6	0.9	13.5		
March 2018	-0.2	-0.5	0.9	13.7		
November 2018	0.0	1.0	13.8			
March 2019	0.1	1.1	14.0	Smaller than mean absolute difference		
March 2020	0.3	12.5		Mean sized difference		
November 2020	-3.3			Bigger than mean absolute difference		
March 2021	-1.5					
Mean absolute differences over the 20 years preceding the creation of the OBR						
Spring/summer	*0.3*	*0.9*	*1.8*	*2.6*	*3.0*	*3.4*
Autumn	*0.5*	*1.3*	*1.9*	*2.1*	*2.7*	*3.1*

[1] For comparability, 'in-year' is assumed to be 2009-10 and 2014-15 for the June 2010 and July 2015 forecasts respectively.
[2] The black outlines around some figures indicate that these outturn years were affected by the pandemic.
Note: Positive figures denote outturn above forecast. Forecasts adjusted for major ONS classification changes.

Table A.3: Forecast errors for cash spending

	Per cent of outturn GDP					
Fiscal years ahead:	In-year	One	Two	Three	Four	Five
Forecast errors (colours reflect magnitude relative to pre-OBR median) [1]						
June 2010[1]	0.6	0.2	0.0	-0.3	-0.2	-0.3
November 2010	0.1	-0.2	-0.2	0.0	0.0	-0.7
March 2011	0.3	-0.6	-0.8	-0.6	-0.6	-1.3
November 2011	-0.1	-0.4	-0.2	-0.2	-0.4	-0.2
March 2012	0.2	-0.2	0.0	0.0	-0.2	-0.1
December 2012	0.3	0.0	0.2	-0.2	0.1	0.9
March 2013	0.4	0.1	0.2	-0.1	0.1	0.9
December 2013	0.2	0.2	-0.2	0.0	1.0	1.4
March 2014	0.3	0.1	-0.1	0.2	1.1	1.5
December 2014	0.3	0.2	0.8	1.8	2.2	4.6
March 2015	0.3	0.4	1.1	2.2	2.5	3.8
July 2015	0.4	0.4	0.4	1.0	1.4	3.5
November 2015[2]	0.1	0.0	0.6	1.0	3.1	12.4
March 2016	0.2	0.1	0.8	1.0	3.6	13.2
November 2016	-0.3	0.2	0.5	3.0	12.5	
March 2017	0.0	0.0	0.4	2.9	12.5	
November 2017	0.1	0.2	2.5	12.3		
March 2018	0.0	0.1	2.2	12.1		
November 2018	0.1	1.9	11.5			
March 2019	0.1	1.9	11.6			
March 2020	-0.1	8.6				
November 2020	-2.3					
March 2021	-1.2					
Median absolute differences over the 20 years preceding the creation of the OBR						
Spring/summer	*0.7*	*0.9*	*0.9*	*1.2*	*1.6*	*2.0*
Autumn	*0.8*	*0.7*	*1.0*	*1.0*	*1.7*	*2.2*
Forecast errors (colours reflect magnitude relative to pre-OBR mean) [1]						
June 2010[1]	0.6	0.2	0.0	-0.3	-0.2	-0.3
November 2010	0.1	-0.2	-0.2	0.0	0.0	-0.7
March 2011	0.3	-0.6	-0.8	-0.6	-0.6	-1.3
November 2011	-0.1	-0.4	-0.2	-0.2	-0.4	-0.2
March 2012	0.2	-0.2	0.0	0.0	-0.2	-0.1
December 2012	0.3	0.0	0.2	-0.2	0.1	0.9
March 2013	0.4	0.1	0.2	-0.1	0.1	0.9
December 2013	0.2	0.2	-0.2	0.0	1.0	1.4
March 2014	0.3	0.1	-0.1	0.2	1.1	1.5
December 2014	0.3	0.2	0.8	1.8	2.2	4.6
March 2015	0.3	0.4	1.1	2.2	2.5	3.8
July 2015	0.4	0.4	0.4	1.0	1.4	3.5
November 2015[2]	0.1	0.0	0.6	1.0	3.1	12.4
March 2016	0.2	0.1	0.8	1.0	3.6	13.2
November 2016	-0.3	0.2	0.5	3.0	12.5	
March 2017	0.0	0.0	0.4	2.9	12.5	
November 2017	0.1	0.2	2.5	12.3		
March 2018	0.0	0.1	2.2	12.1		
November 2018	0.1	1.9	11.5			
March 2019	0.1	1.9	11.6			
March 2020	-0.1	8.6				
November 2020	-2.3					
March 2021	-1.2					
Mean absolute differences over the 20 years preceding the creation of the OBR						
Spring/summer	*1.2*	*1.1*	*1.2*	*1.6*	*1.8*	*2.0*
Autumn	*1.1*	*0.8*	*1.0*	*1.1*	*1.7*	*2.2*

Smaller than median absolute difference
Median sized difference
Less than ½ std. dev. above median absolute
More than ½ std. dev. above median absolute

Smaller than mean absolute difference
Mean sized difference
Bigger than mean absolute difference

[1] For comparability, 'in-year' is assumed to be 2009-10 and 2014-15 for the June 2010 and July 2015 forecasts respectively.
[2] The black outlines around some figures indicate that these outturn years were affected by the pandemic.
Note: Positive figures denote outturn above forecast. Forecasts adjusted for major ONS classification changes.

Table A.4: Forecast errors for changes in receipts as a share of GDP

	Per cent of GDP					
Fiscal years ahead:	In-year	One	Two	Three	Four	Five
Forecast errors (colours reflect magnitude relative to pre-OBR median)[1]						
June 2010[1]	0.6	0.9	0.3	-0.8	-1.3	-1.5
November 2010	0.4	0.0	-0.9	-1.3	-1.5	-1.3
March 2011	0.2	-0.4	-1.1	-1.6	-1.7	-1.4
November 2011	-0.2	-0.7	-0.9	-1.1	-0.8	-0.4
March 2012	0.1	-0.6	-1.0	-1.3	-0.9	-0.6
December 2012	-0.7	-1.2	-1.2	-1.1	-0.8	-0.5
March 2013	-0.7	-0.9	-0.9	-0.8	-0.7	-0.6
December 2013	0.3	0.0	-0.2	-0.2	0.0	0.2
March 2014	0.2	0.1	-0.2	0.0	0.1	0.4
December 2014	0.3	0.4	0.4	0.5	0.8	1.5
March 2015	0.2	0.5	0.5	0.7	1.0	1.6
July 2015	0.2	0.1	0.1	0.2	0.5	1.1
November 2015[2]	0.1	-0.1	-0.3	0.0	0.7	0.7
March 2016	-0.4	-0.5	-0.3	-0.1	0.1	0.4
November 2016	0.2	0.0	0.3	0.8	0.9	
March 2017	0.0	0.2	0.2	0.7	1.0	
November 2017	0.3	0.3	0.9	1.0		
March 2018	0.0	0.1	0.7	0.8		
November 2018	-0.3	0.6	0.6			
March 2019	-0.5	0.4	0.3	Smaller than median absolute difference		
March 2020	0.5	0.4		Median sized difference		
November 2020	0.2			Less than ½ std. dev. above median absolute		
March 2021	-0.2			More than ½ std. dev. above median absolute		
Median absolute differences over the 20 years preceding the creation of the OBR						
Spring/summer	*0.3*	*0.9*	*1.1*	*0.8*	*0.7*	*1.3*
Autumn	*0.3*	*0.8*	*0.9*	*0.8*	*0.6*	*1.2*
Forecast errors (colours reflect magnitude relative to pre-OBR mean)[1]						
June 2010[1]	0.6	0.9	0.3	-0.8	-1.3	-1.5
November 2010	0.4	0.0	-0.9	-1.3	-1.5	-1.3
March 2011	0.2	-0.4	-1.1	-1.6	-1.7	-1.4
November 2011	-0.2	-0.7	-0.9	-1.1	-0.8	-0.4
March 2012	0.1	-0.6	-1.0	-1.3	-0.9	-0.6
December 2012	-0.7	-1.2	-1.2	-1.1	-0.8	-0.5
March 2013	-0.7	-0.9	-0.9	-0.8	-0.7	-0.6
December 2013	0.3	0.0	-0.2	-0.2	0.0	0.2
March 2014	0.2	0.1	-0.2	0.0	0.1	0.4
December 2014	0.3	0.4	0.4	0.5	0.8	1.5
March 2015	0.2	0.5	0.5	0.7	1.0	1.6
July 2015	0.2	0.1	0.1	0.2	0.5	1.1
November 2015[2]	0.1	-0.1	-0.3	0.0	0.7	0.7
March 2016	-0.4	-0.5	-0.3	-0.1	0.1	0.4
November 2016	0.2	0.0	0.3	0.8	0.9	
March 2017	0.0	0.2	0.2	0.7	1.0	
November 2017	0.3	0.3	0.9	1.0		
March 2018	0.0	0.1	0.7	0.8		
November 2018	-0.3	0.6	0.6			
March 2019	-0.5	0.4	0.3			
March 2020	0.5	0.4		Smaller than mean absolute difference		
November 2020	0.2			Mean sized difference		
March 2021	-0.2			Bigger than mean absolute difference		
Mean absolute differences over the 20 years preceding the creation of the OBR						
Spring/summer	*0.5*	*0.9*	*0.9*	*1.1*	*1.1*	*1.5*
Autumn	*0.5*	*0.9*	*1.1*	*1.0*	*1.1*	*1.3*

[1] For comparability, 'in-year' is assumed to be 2009-10 and 2014-15 for the June 2010 and July 2015 forecasts respectively.
[2] The black outlines around some figures indicate that these outturn years were affected by the pandemic.
Note: Positive figures denote outturn above forecast. Forecasts adjusted for major ONS classification changes.

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