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The OBR's forecast performance

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Abstract

This working paper takes a comprehensive look at the OBR's overall forecasting record since we were established in 2010, comparing our economic and fiscal forecasts against those of external UK forecasters, the Bank of England, other official forecasters in Europe, and the official UK forecasts produced by the Treasury during the 20 years before the OBR was established. We find that the OBR has tended to overestimate real GDP growth and underestimate government borrowing over the medium term, with the latter due mainly to a tendency to underestimate the medium-term level of government spending. Our real GDP growth forecast differences are similar to those of external forecasters, but our borrowing forecasts tend to be less accurate beyond the first year of the forecast. Similarly, the OBR's forecasts for real GDP growth in the UK are more accurate than the average of other official forecasters in Europe, but the UK's borrowing forecasts are less accurate than the average beyond the first year. However, both our real GDP growth and borrowing forecasts are more accurate and less biased than the previous UK official forecasts produced by the Treasury.

The OBR's forecast performance

Overview

1.1   The Office for Budget Responsibility was established in 2010 to examine and report on the sustainability of the public finances. Parliament has stipulated that our work must be carried out *"objectively, transparently and impartially"*. One of our statutory duties under the Budget Responsibility and National Audit Act of 2011 is to produce economic and fiscal forecasts twice a year, alongside the Government's Budgets and Spring or Autumn Statements. We are also required by the same Act to assess the accuracy of our past forecasts at least once a year. This latter assessment is carried out each year in our *Forecast evaluation reports* (*FER*s), which provide both a detailed analysis of the performance of recent forecasts against the latest outturns, and a summary of the overall performance of all OBR forecasts compared with other forecasters.

1.2   This paper takes a more comprehensive look at our overall forecasting record since the OBR was established in 2010. The paper compares the OBR's economic and fiscal forecasts against the latest outturns using data from all 27 of the *Economic and fiscal outlooks* (*EFO*s) we published between June 2010 and March 2023. It then compares the accuracy (the *absolute* average difference between our central forecasts and outturn, a measure of how closely our forecasts predict future outcomes) and bias (the simple *average* difference between our central forecasts and outturn, a measure of how systematic our differences are) of our forecasts against those of (i) external UK forecasters; (ii) the Bank of England; (iii) other official forecasters in Europe; and (iv) the official UK forecasts produced by the Treasury during the 20 years before the OBR was established. Annex A provides a set of detailed charts comparing the average Treasury and OBR forecast accuracy and bias in each year of the five-year forecast horizon.

1.3   One should not necessarily expect the OBR's economic and fiscal forecasts to be consistently more or less accurate than those of other forecasters. We are no better equipped to see into the future than other forecasters, base our forecasts largely on the same information (while others can draw on the detail of our forecasts once published), and are relatively modestly resourced compared to some other external forecasters. We are also subject to some constraints that many other forecasters are not, like the legal requirement to condition our central forecasts on stated (rather than anticipated) Government policy and to produce our forecasts when the Government requests them rather than when the latest data might be available. Rather, one should expect the OBR's forecasts to reflect our best objective judgement – free from political, commercial, or other subjective motivations – and to be explained and evaluated as transparently as possible.

1.4   This analysis of how our central forecasts compare to outturn over the past 13 years shows:

- **The OBR's forecast differences for real GDP growth and government borrowing are small relative to the variation in outturn.** Actual real GDP growth and government borrowing have varied significantly during the period in which the OBR produced forecasts, and more so than in the period during which the Treasury produced forecasts. For real GDP growth three years ahead, 50 per cent of outturns lie within a 1.3 percentage point range around the median, while the OBR's median forecast difference is 0.6. For borrowing, 50 per cent of outturns lie within a 2.5 percentage point range around the median, while the OBR's median forecast difference is 1.2.

- **The OBR has tended to overestimate real GDP growth and underestimate government borrowing over the medium term.** Our tendency to overestimate real GDP growth is due to a combination of persistently overestimating the post-financial crisis recovery in productivity and, more recently, the large contraction in GDP in the wake of the pandemic. Our tendency to underestimate government borrowing is due mainly to a tendency to underestimate the medium-term level of government spending, in large part as we have to condition our forecasts on the Government's stated plans for departmental spending on public services (departmental expenditure limits or 'DELs').

- **The OBR's real GDP growth forecast differences are similar to those of other external forecasters.** Relative to other forecasters, our forecasts tend to be slightly more accurate three years ahead and slightly less accurate one, two and four years ahead. The OBR is less biased (in a statistical sense) than other forecasters at one and two years ahead, while more biased at three and four years. This is mostly driven by the OBR's early-2010s forecasts, which showed a greater tendency than externals to overestimate real GDP growth at three- and four-year forecast horizons. The OBR's real GDP growth forecasts are of similar accuracy to the Bank of England, which shared our tendency to overestimate real GDP growth.

- **The OBR's borrowing forecasts tend to be more accurate and less biased than external forecasters one year out but less accurate and more biased two, three, and four years out.** Prior to 2016, the OBR's tendency to underestimate the medium-term level of borrowing by more than externals likely reflects the OBR's greater overoptimism about real GDP growth. After 2016, when real GDP growth forecast differences between the OBR and external forecasters were broadly similar, our underestimation of borrowing is likely to owe more to our underestimating departmental spending (DELs) in the medium term given that we, unlike external forecasters, are required by Parliament to condition our forecasts on stated government policies. We did however, regularly highlight and estimate the likely risk of upward revisions to departmental spending plans in both our forecasts and risk reports.

- **While, at the outset of the pandemic, no forecaster accurately predicted the economic and fiscal shock from Covid, the OBR was quicker than external forecasters to recognise the likely scale of the shock to GDP and borrowing.** The OBR's April 2020 coronavirus reference scenario and July 2020 forecast were more accurate than external forecasters for real GDP and borrowing. Both external forecasters and the

OBR underpredicted the speed of the subsequent economic recovery and reduction in borrowing in 2021, with the OBR's forecasts less accurate than externals for real GDP but more accurate for borrowing.

- **Compared to 25 other official forecasters in Europe, the OBR's forecasts for real GDP growth in the UK are more accurate than the European average one, two and three years ahead.** In the period since the OBR was established, UK forecasts for real GDP growth are relatively more biased upwards, with a tendency to overestimate real GDP growth by more than the European average.

- **The UK's borrowing forecasts are more accurate than the European average one year ahead, but less accurate than the average two and three years out.** The UK is again relatively more biased, with a tendency to underestimate borrowing relative to the European average one, two and three years ahead, as would be expected given the importance of GDP growth for the fiscal outlook and the aforementioned tendency to underestimate the medium-term level of departmental spending.

- **Compared to the previous UK official forecasts produced by the Treasury, the OBR's forecasts for real GDP growth and government borrowing are more accurate than the previous Treasury forecasts at one-, two-, and three-year horizons, while the Treasury forecasts have slightly smaller median differences at four- and five-year horizons, largely because of the historically large hit to output and to borrowing during the pandemic.** Compared to the previous UK official forecasts produced by the Treasury, OBR forecasts for real GDP growth and borrowing are also less biased over one-, two- and three-year-ahead horizons than the Treasury forecasts that preceded them. Mirroring the picture on forecast accuracy, OBR biases are generally larger than the Treasury's at four- and five-year horizons.

Methodology

1.5 To evaluate our forecasting record over the past 13 years, we consider two measures of forecast performance in this working paper:

- the **absolute average difference** between outturn and forecast values, which **ignores the sign of the difference** (i.e. whether it is positive or negative) and is a summary measure of **forecast accuracy**; and

- the **simple average difference** between outturn and forecast values, which **takes account of the sign of the difference** (i.e. netting overshoots off against undershoots) and is a summary measure of **forecast bias**.

1.6 To calculate average differences, we always subtract outturn data from forecast data. Positive values therefore indicate higher-than-expected outcomes, while negative values indicate lower-than-expected outcomes. Positive real GDP growth differences therefore indicate that we were – with the benefit of hindsight – overly 'pessimistic' and underestimated growth. In contrast, positive public sector net borrowing (PSNB) differences indicate that we were overly 'optimistic' and underestimated borrowing.[1]

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[1] Throughout this report, "borrowing" refers to public sector net borrowing excluding public sector banks unless otherwise stated.

1.7   For most of this report we analyse median differences to abstract from the large shocks such as the pandemic and energy crisis, which skew the mean.[2] We deviate from this approach and analyse mean differences when decomposing OBR and HMT nominal GDP and public sector borrowing differences as it is not possible to decompose medians.

Box 1.1: The value of economic and fiscal forecasting

This paper focuses on the arithmetic difference between our central forecasts and subsequent outturns. As with all forecasts, the OBR's forecasts differ from outturns, and differences are larger the further ahead we look because of the greater scope for surprises. The fact that forecasts turn out to be wrong does not imply that they are no use to decision-makers. Weather forecasts rarely predict the precise high temperature on a given day or rainfall in a given week, but they can still provide a useful guide for what to wear in the morning or pack for a holiday.

Single point economic forecasts of an uncertain future are almost certain to be wrong – a single point forecast of an outcome (such as the inflation rate next year, level of GDP growth in three years' time, or for the size of the fiscal deficit at the end of a parliament) has virtually no chance of being correct. Economies are subject to unexpected shocks such as the Covid pandemic or Russian invasion of Ukraine, which can cause output, inflation, and other key macroeconomic variable outturns to differ dramatically from our initial expectations. Our fiscal forecasts are also conditioned on existing Government policy, which can also change over a five-year forecast horizon – sometimes in response to shocks and sometimes reflecting shifting pollical preferences within and between Governments. Statistical methods used by the Office for National Statistics (ONS) when compiling or reporting economic and fiscal data can change between forecast and outturn. And, of course, the models and judgement we use to construct our forecasts can insufficiently account for the behaviour of complex systems like the economy and public finances.

Even in the simple case of tossing a fair coin 100 times, the most likely outcome is that there are 50 heads – although the probability of tossing precisely 50 heads is less than 8 per cent. The central forecast will most likely be wrong (with greater than 92 per cent probability) yet it is both the most likely outcome and an unbiased forecast, with equal chances that the outcome is above or below it. In the previous example, calculating the probability of different outcomes shows that the chance that the number of heads is between 45 and 55 is just over 72 per cent – and the chances that the number of heads will be above 70 is extremely small, at less than one in 62,000.

This paper focuses on how past central point forecasts (the equivalent of "50" in the coin tossing case) differ from subsequent outcomes. It is conventional shorthand to call the differences between outcomes and previous forecasts of the single most likely outcome "errors" even though such errors are inevitable and the most relevant evaluation is whether judgements about the likelihood of different outcomes in bands either side of a central forecast are reliable over the long run. The chances of outcomes deviating by small and large amounts from a central forecast is valuable information which is why we analyse the likelihood of debt and deficits falling within

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[2] This has been our standard approach since before the pandemic, first reported in the 2018 *Forecast evaluation report*.

broad bands. Economic analysis is valuable even when forecasts are no better than a coin toss, as they can reveal why some outcomes might be unforecastable.

While unlikely to precisely predict the future, central economic forecasts are useful for what they make explicit. When forecasting the public finances, there are many forces driving overall government tax revenue and spending, and forecasts of the differences between the two – fiscal deficits – can deviate substantially from a central forecast even a few quarters ahead. But as a tool to assess the implications of changing a particular tax or spending policy – and in isolation from a host of other shocks – the results could be highly informative. Knowing what is likely to happen in the absence of either fortuitous or unlucky random events that either offset or exacerbate the effect of that policy change is itself useful. The simulation properties of a model could be reliable even if point forecasts of an outcome where numerous factors are at play cannot be very precise. This is why the OBR undertakes many simulations of alternative possible scenarios – these are "what if" exercises and likely to be useful in assessing a range of possible economic and fiscal futures.

OBR forecasts vs. outturns

1.8   As the analytical basis for all of the results presented in this paper, we start with a comparison of how the OBR's economic and fiscal forecasts over the past 12 years compare with outturn data. The forecasts used are the 27 semi-annual *Economic and fiscal outlooks* we have published since we were established in June 2010 and for which we have outturn. Outturn data for the economy and public finances are as reported by the ONS in its most recent National Accounts and Public Sector Finances releases respectively[3].

1.9   Charts 1.1 and 1.2 present our forecasts (in yellow) for real GDP growth and public sector net borrowing (PSNB) from June 2010 to November 2022 compared to final outturn (in purple). Real GDP *growth* rates have less persistence than the *level* of borrowing, so we should expect to (and do) see greater increases in the size of forecast differences at longer horizons for borrowing than for GDP growth. Simplifying greatly, borrowing differences by year five will reflect the cumulative effect of GDP growth differences across all five years, not just the difference between the GDP growth forecast and outturn in year five.
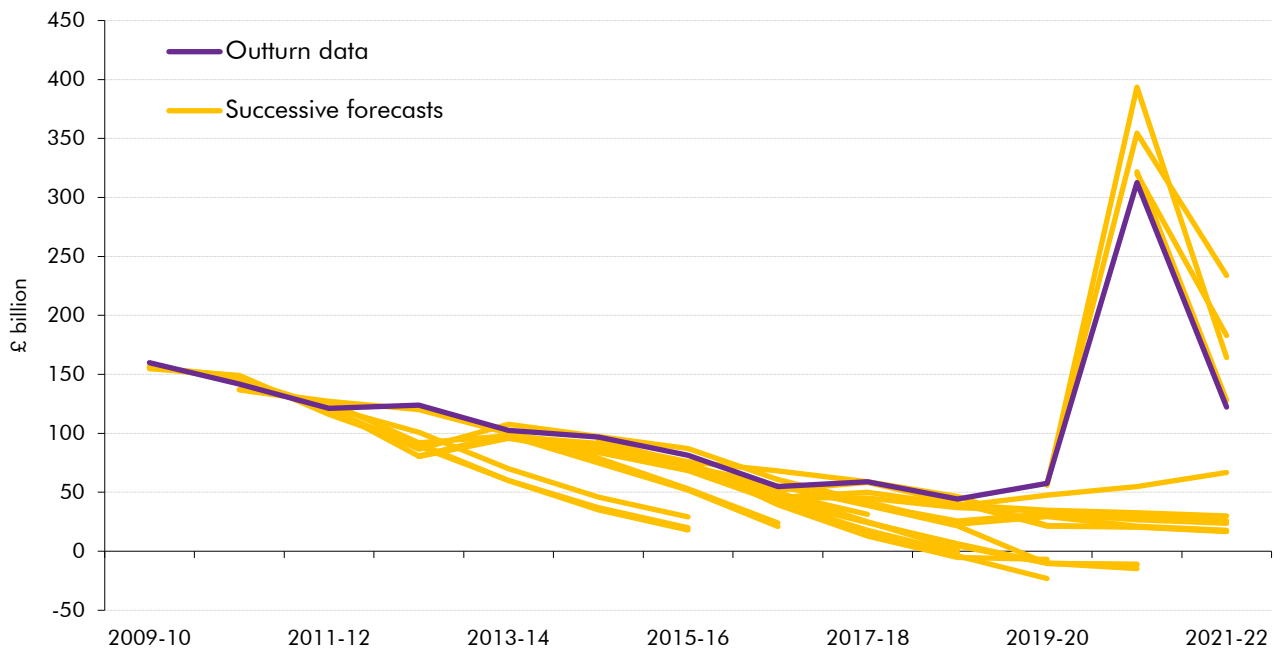
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[3] We use the June 2023 public sector finances statistics throughout this paper, the latest available at the time of analysis.

Chart 1.1: Successive OBR real GDP growth forecasts and outturn
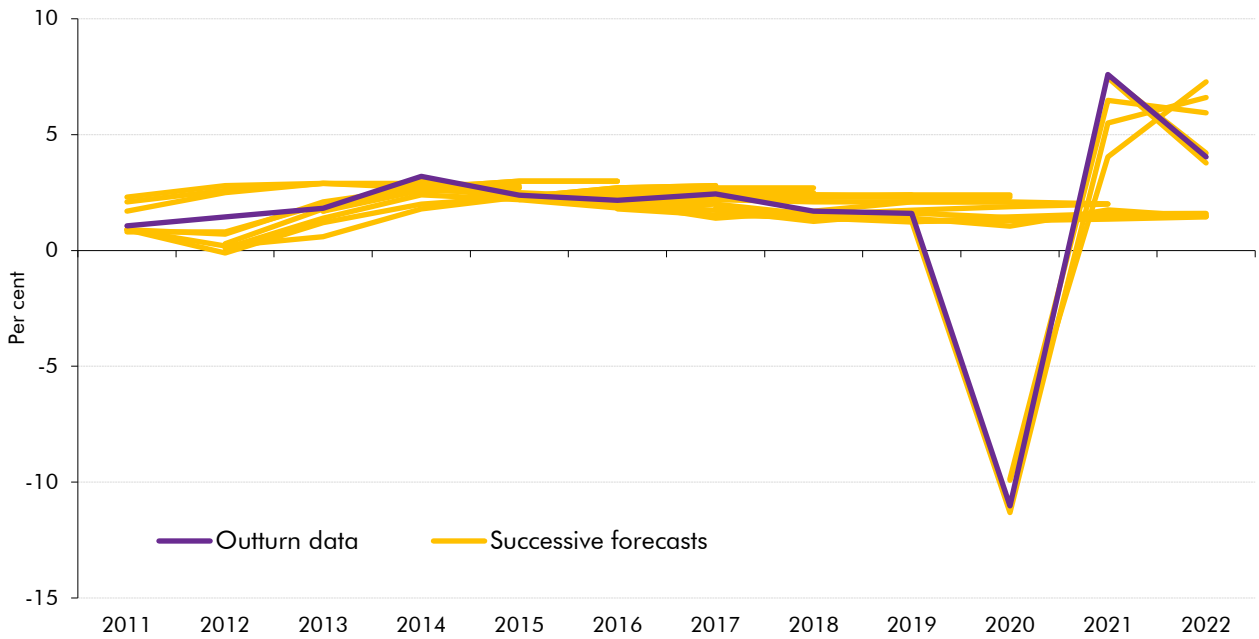
Source: ONS, OBR

## Chart 1.2: Successive OBR PSNB forecasts and outturn

Source: ONS, OBR

Forecast accuracy

1.10   Looking at the average accuracy of our forecasts, our absolute economic and fiscal forecasting differences tend to be larger the further ahead we are looking, reflecting the fact that uncertainty increases with time[4]. Chart 1.3 shows our median average absolute one-to-five-year-ahead forecast differences for real GDP growth and borrowing since we were established in 2010. Our absolute forecast difference for real GDP growth rises from 0.7 percentage points for the year ahead to 0.9 percentage points for five years ahead. Our absolute forecast difference for borrowing rises more steeply from 0.5 per cent of GDP for the year ahead to 3.1 per cent of GDP five years ahead. The larger medium-term differences for borrowing as a share of GDP reflect the cumulative effects of economic and policy surprises as well as the fact that borrowing is the difference between two very large numbers – public sector receipts and spending – for which our absolute forecast differences are smaller.

Chart 1.3: OBR median absolute GDP and PSNB differences: 2009-10 to 2022-23
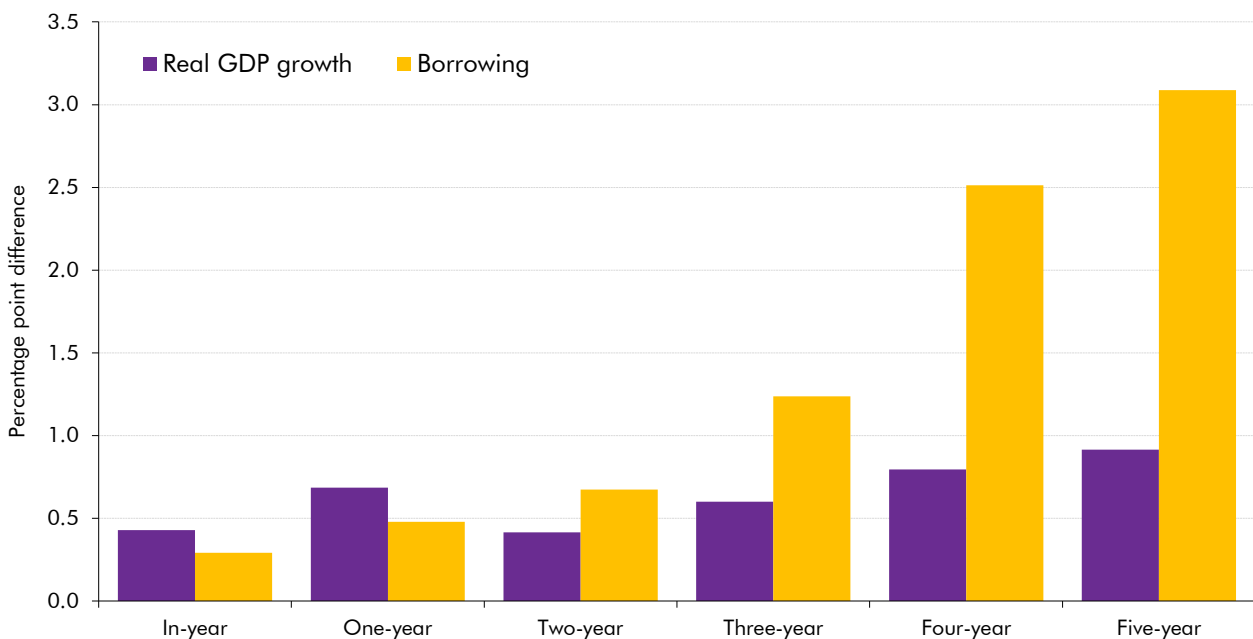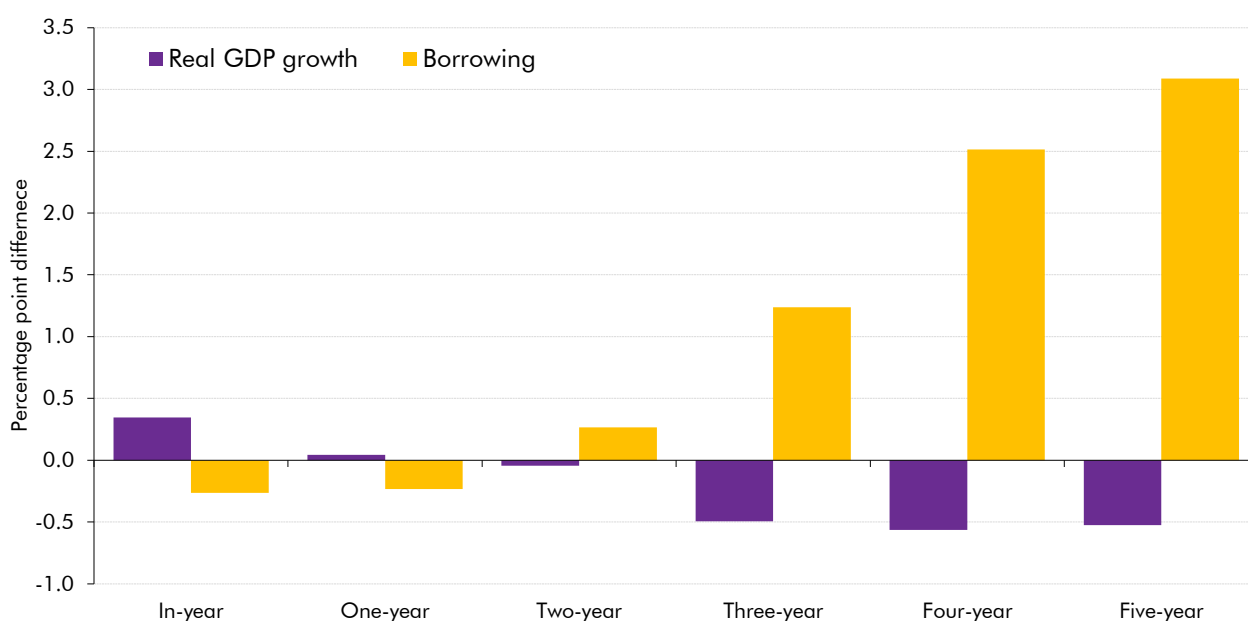

Source: ONS, OBR

Forecast bias

1.11   Looking at the degree of bias in our forecasts, both our economic and fiscal forecasts have shown relatively little tendency to overoptimism or overpessimism over the first two years but have *over*estimated real GDP growth and *under*estimated government borrowing in the medium term. Chart 1.4 shows that our simple average forecast differences for real GDP growth were a slight overestimate in-year (0.3 percentage points), but underestimates after the one-year horizon. This means we have, more often than not, been overly optimistic

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[4] Despite this tendency, our one-year-ahead differences for real GDP growth are larger than our two- and three-year-ahead differences. This is because our one-year-ahead forecast differences for 2022 were among our largest one-year-ahead differences. If we excluded the real GDP growth forecast differences for 2022 for one-year-ahead forecasts, the median difference would be 0.5 – below the three-year-ahead forecast difference and only slightly above the two-year-ahead forecast difference.

about real GDP growth in five years' time by around 0.5 percentage points. This overoptimism in our GDP forecast reflects, especially in the early years, our overoptimism about the recovery in productivity growth after the financial crisis and, more recently, our failure to anticipate the large and adverse economic shock associated with the pandemic. Partly because borrowing differences by year five will reflect the cumulative effect of GDP growth differences and partly because of the tendency for governments to respond to our underlying structural forecast revisions with looser fiscal policy, our average borrowing differences show a similar pattern, rising from an average overestimate of 0.3 per cent of GDP in-year, to an average underestimate of 3.1 per cent of GDP in year five.[5]

Chart 1.4: OBR median GDP and PSNB differences: 2009-10 to 2022-23

Note: Borrowing forecasts have been reclassified to account for revisions due to ONS classification changes.
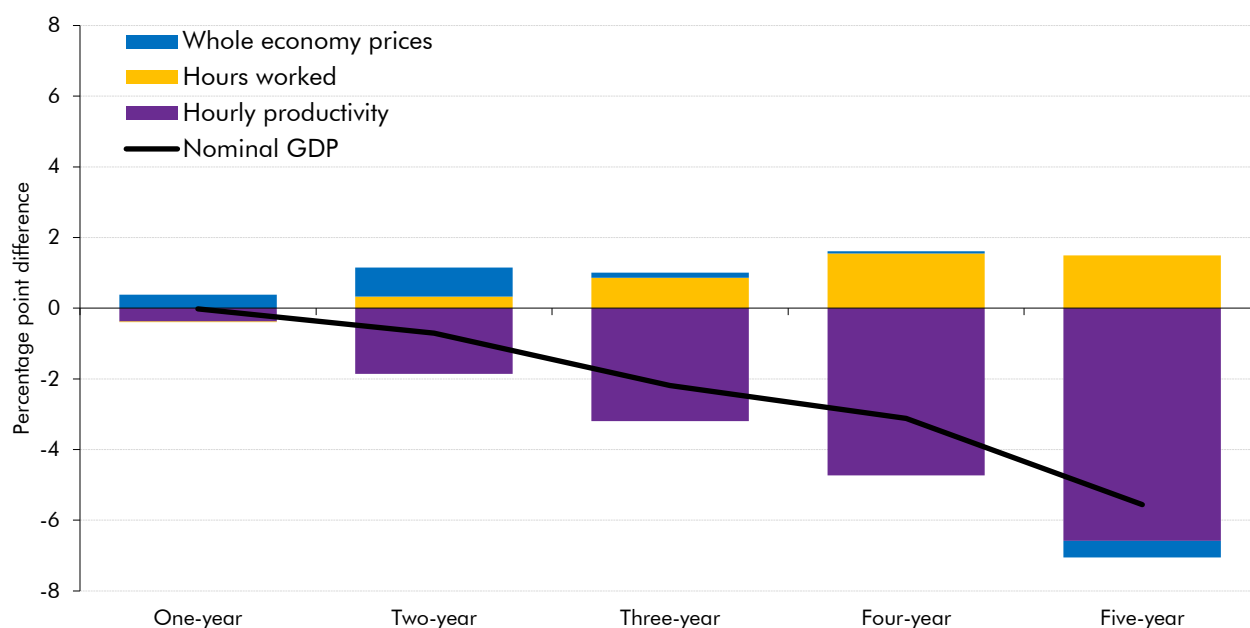Source: ONS, OBR

Economy forecast differences

1.12   The main source of difference in our economy forecasts has been our serial overestimation of productivity growth.[6] As shown in Chart 1.5, overestimation of growth in hourly productivity led us to overestimate the cumulative growth in nominal GDP in five years by 6.6 per cent. We also tended to underestimate growth in the number of hours being worked over the period, as more people entered the labour force than we expected. On average we underestimate inflation between the first- and fourth-year horizons, largely reflecting our underestimates of inflation in 2022-23 (following the unexpectedly strong rises in the prices of tradable goods in the wake of the pandemic and in energy associated with the Russian invasion of Ukraine).

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[5] We discussed patterns in governments' responses to our underlying structural forecast revisions in Chapter 8 of our 2019 *Fiscal risks report*.
[6] This decomposition of our economy and fiscal forecast differences compares forecast and actual cumulative growth in nominal GDP, PSNB, and other fiscal and economy variables to abstract from revisions to GDP data and revisions to spending categories such as DEL and welfare. The pattern of increasing differences as the forecast horizon extends is the same, but the level is slightly different to that reported in Chart 1.4, as here we report our forecasts differences in cumulative growth rather than levels. This section only considers fiscal forecast differences up to and including 2021-22 because 2022-23 outturn data was not split by the spending categories we forecast as of August 2023. Economy forecast differences are reported up to and including 2022-23.

Chart 1.5: OBR average cumulative nominal GDP difference: 2010-11 to 2022-23
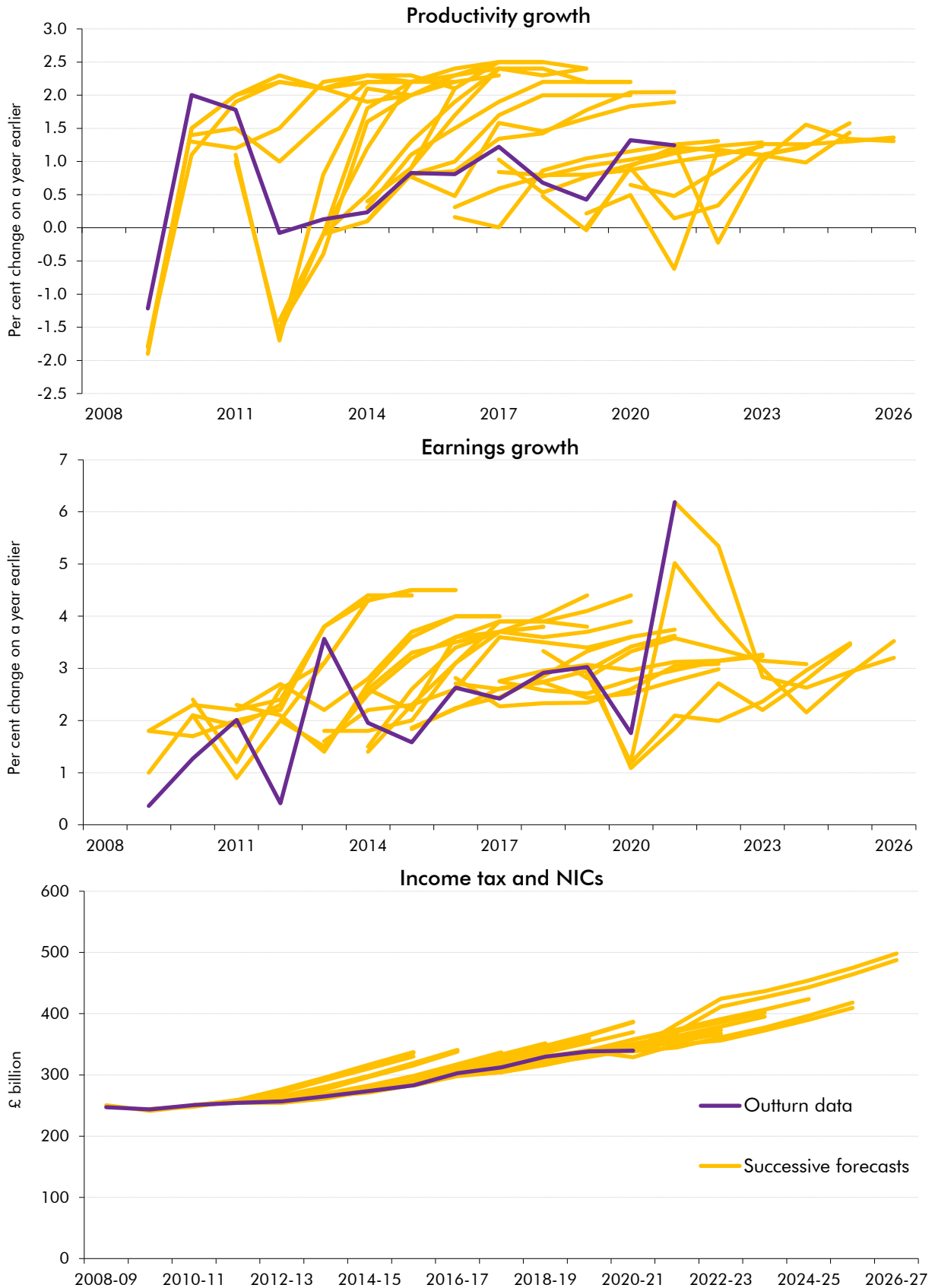

Source: ONS, OBR

1.13   Our overoptimism regarding productivity growth reflected the fact that up until March 2016, we assumed that growth in hourly productivity would return to its pre-financial-crisis average of around 2.1 per cent a year in the final year of our forecast. In outturn, productivity growth turned out to be 0.3 per cent per year between 2010 and 2015. In our March 2016 *EFO*, we decided to place more weight on the persistently weak recent performance and downgrade our medium-term productivity forecast to 2.0 per cent. This was followed by further downward revisions in November 2016 and again in November 2017, to 1.3 per cent at the forecast horizon, reflecting continued shortfalls in outturn productivity, weak investment, and the outcome of the Brexit referendum.[7] This lower productivity assumption performed better until the pandemic. Looking solely at our November 2017 to March 2019 forecasts for productivity growth, our forecasts had smaller average overestimates of 0.5 percentage points one year ahead and 1.2 percentage points two years ahead, compared to 0.5 and 1.8 percentage points, respectively, in our pre-November 2017 forecasts.

Fiscal forecast differences

1.14   Productivity growth and other differences between our economy forecast and outturn have knock-on impacts to our public finances forecast, particularly receipts. In our forecasts from the early 2010s, overestimation in productivity growth (Chart 1.6, top panel) led to overestimation of earnings growth (Chart 1.6, middle panel), which were in turn the major driver of our overestimation of receipts from income tax and National Insurance (Chart 1.6, bottom panel). The resulting fiscal shortfalls are large – if our July 2015 income tax and NICs forecast had been correct, income tax and NICs receipts in 2019-20 would have been 8.3 per cent (£27.9 billion) higher. This is equivalent to 1.2 per cent of GDP in that year.

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[7] See our November 2017 *Economic and fiscal outlook*, pp. 45-48.

Chart 1.6: OBR forecasts for productivity growth, earnings, income tax and NICs

Source: ONS, OBR

1.15   However, looking at the overall performance of our fiscal forecasts across the five-year horizon, our tendency to underestimate government borrowing derives primarily from our tendency to underestimate the medium-term level of government *spending*. Most of this spending-driven difference has been underestimates of departmental spending, specifically resource departmental expenditure limits (RDEL)[8], which has been slightly offset by lower-than-expected debt interest payments thanks to lower-than-expected interest rates. Looking three years ahead, resource DEL being higher-than-forecast explains around half of the overall difference between borrowing forecasts and outturns, followed by around a third from other spending being higher-than-expected, and just under a quarter from lower-than-expected income tax and NICs receipts. About one-sixth per cent of these differences are offset by lower-than-forecast spending on debt interest.

Chart 1.7: OBR average cumulative PSNB differences by source: 2011-12 to 2021-22
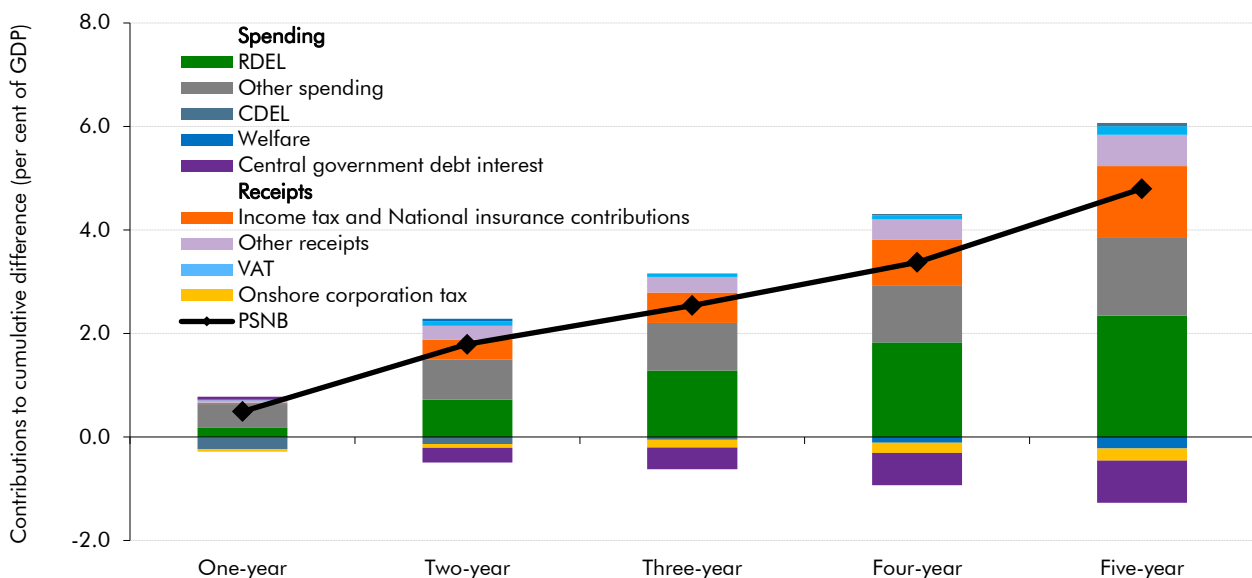
Note: Central government debt interest is net of the Asset Purchase Facility. RDEL and CDEL are PSCE in RDEL and PSGI in CDEL respectively.
Source: ONS, OBR

Sources of fiscal forecast differences over time

1.16   Our fiscal forecast differences can be divided into three main time periods:

- **2011-12 to 2015-16** during which our underestimation of borrowing was driven by a tendency to **overestimate government receipts;**

- **2016-17 to 2019-20** during which our underestimation of borrowing was driven by a tendency to **underestimate government spending**; and

- **2020-21 – 2021-22** during which our underestimation of borrowing was driven by the sudden and dramatic **fall in receipts and rise in spending in the wake of the pandemic.**

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[8] DEL spending is government spending on public services, grants and administration that is subject to departmental expenditure limits.

1.17   As shown in Chart 1.8, our June 2010 to March 2015 forecasts for the years prior to the 2015 Spending Review were dominated by large *overestimates of receipts*. Looking three years ahead, receipts differences more than explained the overall borrowing forecast difference. Higher other spending was more than offset by lower welfare and debt interest payments. The large receipts differences in these forecasts primarily reflect income tax and National Insurance Contributions, which explains over four-fifths of the receipts difference at the three year horizon. The large income tax and National Insurance Contributions overestimates reflect both our over-optimism about productivity and earnings growth, and a series of government decisions to increase the income tax personal allowance in the early 2010s.

Chart 1.8: OBR average cumulative PSNB differences by source: 2011-12 to 2015-16
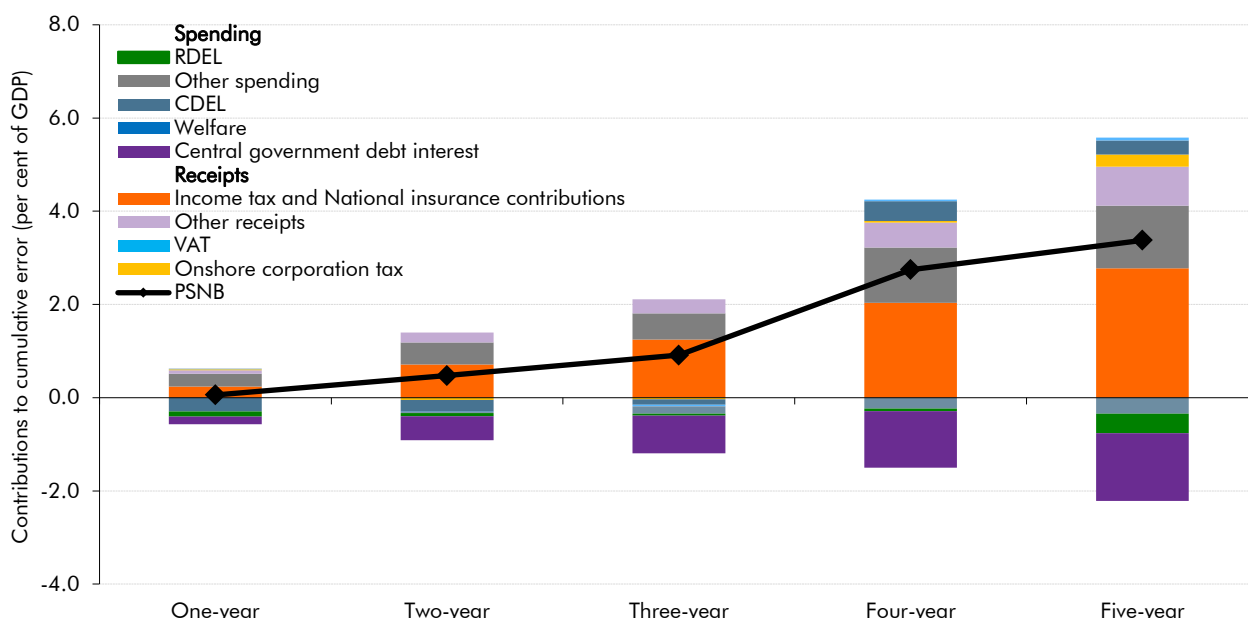
Central government debt interest is net of the Asset Purchase Facility. RDEL and CDEL are PSCE in RDEL and PSGI in CDEL.
Source: ONS, OBR

1.18   The second period – our June 2010 to March 2015 forecasts for the years 2016-17 to 2019-20 – saw larger *underestimates in spending* (Chart 1.9). At all forecast horizons, higher-than-expected resource DEL spending more than explained the overshoot in borrowing relative to forecast. This was mostly due to the Cameron and May Governments increases to resource DEL spending at the 2015 Spending Review and at subsequent fiscal events. The Cameron Government increased DEL spending by an average of £15.9 billion each year at the July 2015 Summer Budget, with a further £5.8 billion average increase in the November 2015 Spending Review, reflecting its decisions to substantially increase the overall spending envelope in the summer 2015 budget,[9] and again at the Autumn 2015 Spending Review.[10] The May Government further increased DEL at the Autumn 2018 Budget following the NHS five-year funding settlement agreed outside the Spending Review (although most of this increase was planned for the years after 2019-20).[11] Cash RDEL

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[9] See our July 2015 *Economic and fiscal outlook*, pp. 118-120.
[10] See our November 2015 *Economic and fiscal outlook*, pp. 127-130.
[11] DHSC & HMT, *Prime Minister sets out 5-year NHS funding plan*, June 2018.

spending ultimately grew by 13.3 per cent between 2015-16 and 2019-20, in contrast to our final pre-2015 Spending Review forecast that it would fall by 2.6 per cent over that period based on the RDEL totals that had been set out by the Cameron Government at the time.

Chart 1.9: OBR average cumulative PSNB differences by source: 2016-17 to 2019-20
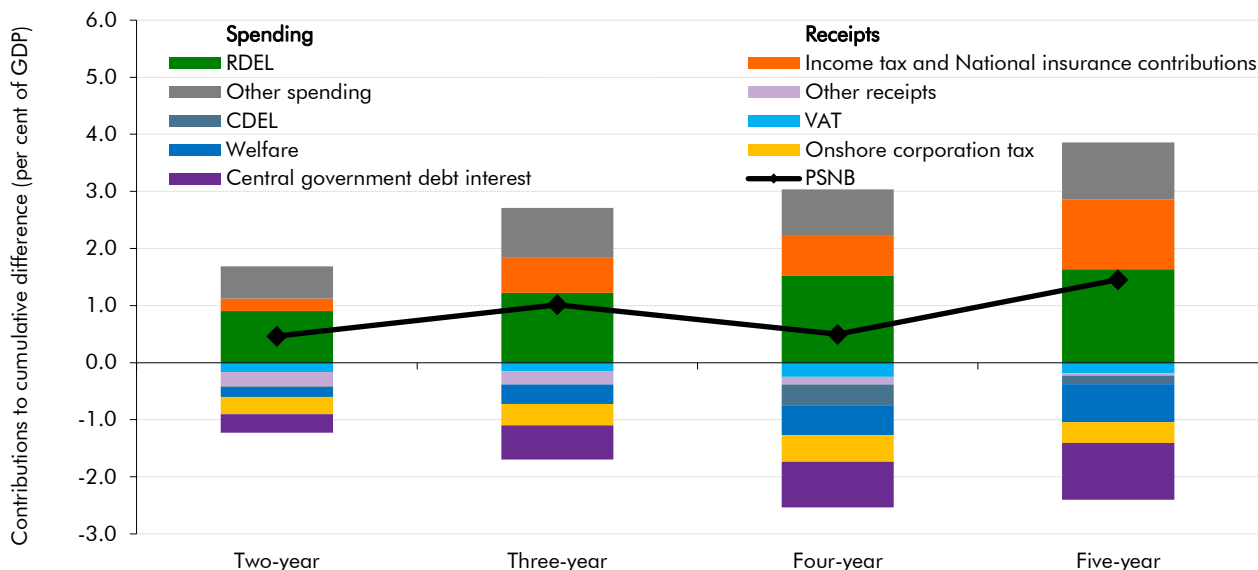
Note: Central government debt interest is net of the Asset Purchase Facility. RDEL and CDEL are PSCE in RDEL and PSGI in CDEL
There are no one-year-ahead forecasts before the 2015 Spending Review for the years after the 2015 Spending Review, so the chart starts at the two-year horizon
Source: ONS, OBR

1.19   The large differences in our RDEL forecasts reflect the fact that our spending forecasts are premised on Government plans (as required by Parliament), and that these can and do change. For years covered by periodic Spending Reviews, we base our DEL forecasts on detailed spending limits given to departments by the Treasury, making only small adjustments for expected in-year underspends. For years outside of Spending Reviews, governments indicate how much they plan to spend in total in resource and capital DELs (RDEL and CDEL), with no departmental breakdown.[12] The main differences therefore emerge when governments replace the latter indicative aggregate spending plans with detailed department-by-department spending limits at Spending Reviews, with additional differences when governments revise departmental spending limits between Spending Reviews. Since the OBRs establishment, the average revision to DEL spending at Spending Reviews was an increase of £14.3 billion a year, compared to an average increase of £1.5 billion a year at fiscal events outside of Spending Reviews. The two largest upward revisions at Spending Reviews were 2015 and 2021, where the government increased DEL spending by £27.5 billion and £30.6 billion respectively.

1.20   The other spending overestimates in this period reflect a variety of volatile small lines. Of the difference due to other spending, most of the difference was due to underestimates of local authority self-financed expenditure, which accounts for around two-thirds of the

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[12] In our earlier forecasts, they did this implicitly by setting an indicative plan for total spending that left a residual for DEL. See OBR, *Spending assumptions 2011-2015*, March 2015.

difference in other spending (or just over one-third of the borrowing difference) at the forecast horizon. These reflect underestimates of local authority self-financed spending, principally because of the introduction of council tax precepts, which let local authorities increase council tax without holding a referendum, allowing them to spend more than expected.

1.21 The final period – our forecasts made for 2020-21 and 2021-22 – saw large PSNB underestimates due to both higher government spending and lower revenues caused by the dramatic drop in nominal GDP and large-scale fiscal support put in place due to the pandemic. More detail on the composition and drivers of these forecast differences can be found in our December 2021 and January 2023 *Forecast evaluation reports*).

Chart 1.10: OBR average cumulative PSNB differences by source: 2020-21 to 2021-22
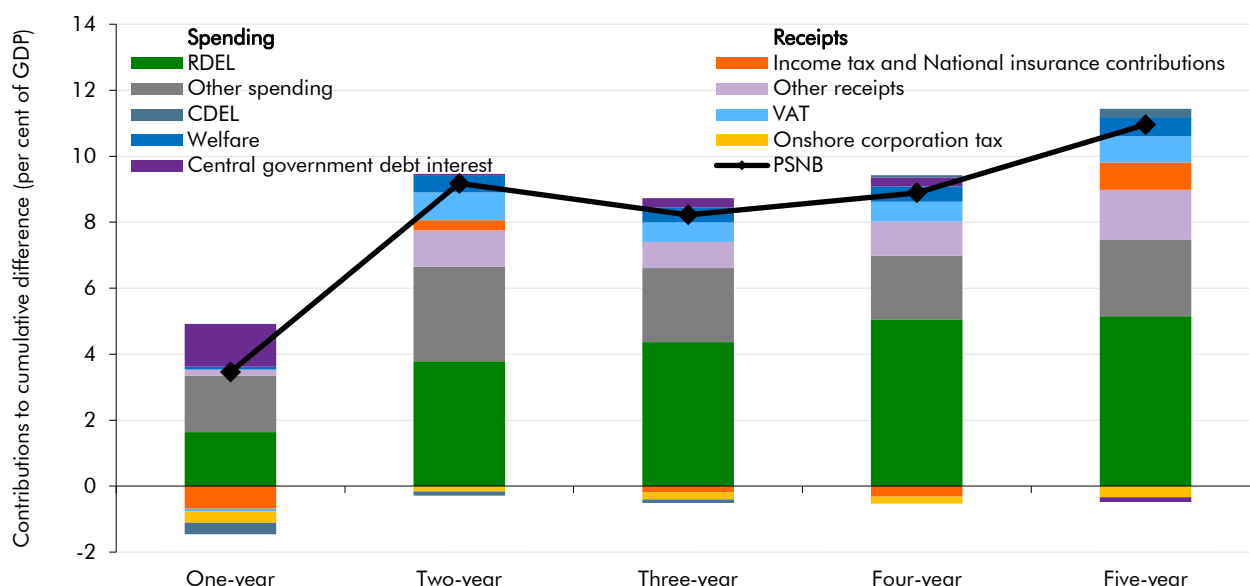
Note: Central government debt interest is net of the Asset Purchase Facility. RDEL and CDEL are PSCE in RDEL and PSGI in CDEL
Source: ONS, OBR

OBR forecast performance vs. external UK forecasters

1.22 To put the OBR's forecasting record in context, we begin by evaluating it in comparison to that of external forecasters who published a forecast for the UK at or around the same time as our *EFOs*.[13] This provides a sense of how our forecasts compare with those prepared by other professional forecasters (banks, consultancies, membership organisations, and research institutes) who were looking at roughly the same information at roughly the same time. For this analysis, we focus on the median differences to abstract from the large pandemic differences, which skew the mean for both externals and the OBR (an analysis of the OBR's forecasts compared to external forecasters during the pandemic is explored in Box 1.2).

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[13] External forecasts for borrowing and real GDP growth are taken from the average of new independent forecasts from HM Treasury's *Forecasts for the UK economy*. These are based on the average of forecasts published in either the same month or where contemporaneous external forecasts are not available (as is the case for some two-, three- and four-year-ahead forecasts) in the month immediately preceding the *EFO*. Sample size for the external forecaster comparison differs by variable: for real GDP growth, sample size ranges from around 20 for one-year-ahead forecasts to 14 for four-year-ahead forecasts; and for borrowing from around 17 for one-year-ahead forecasts to 13 for four-year-ahead forecasts.

1.23   Chart 1.11 provides a comparison of the OBR's absolute and simple median forecast differences to those of external forecasters for real GDP growth and borrowing across forecast periods ranging from one- to four-years. These comparisons are not completely like-for-like – the OBR is required to condition forecasts on current policy whereas other forecasters are free to anticipate future policy changes; the OBR has access to some private information that these external forecasters do not; and some of these forecasters base their forecasts on information provided by the OBR, especially in respect of the public finances.[14] But, even so, such comparisons provide an illustration of the relative performance of OBR forecasts under similar circumstances.[15]

Chart 1.11: OBR differences for GDP and PSNB vs. externals: 2010-11 to 2022-23

Real GDP

PSNB

Note: OBR forecasts are conditional on the future implementation of current, stated government policies while external forecasts reflect likely future policies. Four-year ahead forecasts for borrowing from the June 2010, November 2010, November 2011 and December 2012 are not available for external forecasters so are also excluded from the OBR's average.
Source: HM Treasury, ONS, OBR

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[14] Based on interviews with a range of external forecasters, forecasters generally use material provided in *EFOs* as well as supplementary OBR materials such as the *monthly profiles* and *ready reckoners* to construct their forecasts of borrowing. These are often constructed using a 'bottom-up' approach i.e. taking OBR forecasts and then adjusting for differences in economic and policy decision assumptions.
[15] Both the OBR and external forecasts of borrowing have been restated to take account of revisions related to classification changes.

1.24   For forecasts of real GDP growth, differences are broadly similar between the OBR and externals. The OBR is moderately less accurate (the median absolute forecast difference is greater) than externals over one-, two- and four-year horizons by 0.1, 0.1 and 0.2 percentage points respectively, but more accurate for three-year forecast horizons by 0.1 percentage point. In terms of bias, the OBR's forecasts for real GDP growth are less biased over one and two-year forecasts by 0.1 percentage point but more biased over three- and four-year periods by 0.4 and 0.6 percentage points respectively. Again, these differences are small relative to the uncertainty around any forecast and are not statistically significant at the 10 per cent level.[16]

1.25   The somewhat larger difference in bias at longer horizons is driven particularly by the OBR's earlier forecasts, which showed a greater tendency than externals to overestimate real GDP growth. For example, while real GDP growth averaged 2.4 per cent between 2013 and 2016, the OBR's average three-year-ahead forecast for the same period was 2.8 per cent, compared to the external average of 2.4 per cent. This likely reflects more pessimistic views on trend productivity growth among external forecasters.[17] In contrast, both the OBR and externals' three-year-ahead forecasts for the period 2017 to 2019 were overoptimistic by similar amounts (0.4 percentage points on average).

1.26   For one-year-ahead forecasts of government borrowing, the OBR has tended to be more accurate than externals with the OBR's median absolute average difference 0.2 per cent of GDP less than the external average difference. However, over longer forecast horizons, external forecasters tend to be more accurate, with the relative difference between the OBR's average absolute forecast difference and externals' increasing by forecast horizon, reaching 1.1 per cent of GDP for four-year-ahead forecasts. Both the OBR and externals tend to overestimate one-year-ahead borrowing, but underestimate – by increasing margins – two-, three- and four-year-ahead borrowing. The OBR's forecasts for government borrowing are on average less biased than external forecasters for one-year forecasts but more biased over two-, three- and four-year forecasts by 0.5, 0.8 and 1.1 per cent of GDP respectively. However, none of these results are statistically significant at the 10 per cent level.

1.27   Looking at these differences over time, the OBR on average underpredicts borrowing relative to externals, both in the period before 2016 and the period from 2016 to 2020. As noted above, given differences in borrowing are generally correlated with real GDP growth – as receipts tend to rise in line with GDP – the OBR's larger underpredictions of borrowing in its two-, three- and four-year forecast horizons in this earlier period are likely to reflect its relative overoptimism in its real GDP growth forecasts. However, when looking at forecast differences between 2016 and 2020, as real GDP growth forecast differences are broadly similar between the OBR and externals, this is unlikely to be the case. Instead, one potential driver could be differences in forecasts for spending, given RDEL is the largest driver of the OBR's underpredictions of borrowing during this period and the OBR, unlike external forecasters, is required by Parliament to condition its forecasts on stated government

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[16] We use Mood's median test to test the null hypothesis of equality of medians between externals and the OBR. Throughout this paper, given the small sample size of OBR forecast differences and presence of outliers from the pandemic, we only test statistical differences in medians rather than means.

[17] For example, see Chart 3.4 and commentary from our external forecast comparison in the March 2012 *Economic and fiscal outlook*.

policies. Of the external forecasters that we spoke to, all stated that they often make different assumptions around policy to the government and therefore OBR. A couple of examples given included assuming fuel duty rates would remain frozen, and that DEL spending would rise more than stated by the government outside of Spending Review periods. These examples have also been routinely highlighted as upside risks to borrowing in our *EFO* documents and so provide a basis for external forecasters to assume higher spending/lower borrowing and higher borrowing should they so wish.[18]

Box 1.2: Comparing OBR and external forecasts during the pandemic

While comparing average forecast differences over longer time periods helps to illustrate overall forecasting performance, it can also be instructive to consider how the OBR's forecasts perform in the context of sudden and dramatic changes in the economic and fiscal outlook. This can help to illustrate how nimble and adaptable forecasters are in the face of heightened uncertainty and rapidly evolving information. In this box, we therefore look at OBR and external forecasts for real GDP growth and borrowing during the first and second year of the pandemic. In the first year, the OBR produced four forecasts (two more than usual), reflecting the fast-moving nature of events and the premium placed on having an up-to-date picture of a rapidly changing outlook.

Chart A compares the OBR's four forecasts for real GDP growth and borrowing made during 2020 (in March, April, July, and November) in the first year of the pandemic to the average of external forecasts from the same month. As shown by the large March 2020 forecast differences, neither the OBR nor external forecasters anticipated, in their initial forecasts, the severity of the shock to the economy from the pandemic. While real GDP fell by 11.0 per cent in 2020, the OBR and externals forecast growth of 1.1 and 0.6 per cent respectively. The OBR was quicker to recognise the severity of the pandemic with its coronavirus reference scenario produced in April predicting a fall in real GDP of 12.8 per cent, far below the external consensus of a contraction of 5.8 per cent, but closer to eventual outturn. Both the OBR and the external forecasts from July and November proved to be more accurate, but with forecast differences occurring in different directions. The OBR's more pessimistic forecasts for real GDP growth may reflect that its forecasts were predicated on (as required by legislation) the announced expiry dates of Government support schemes, which were, in reality, often extended.

Chart A: Forecast differences during first year of pandemic vs. externals

Real GDP growth (2020)

PSNB (2020-21)

Legend: OBR (purple), Average independent (yellow)

Source: HM Treasury, OBR

The pandemic also saw borrowing spike upwards to a post-war high of 15.0 per cent of GDP in 2020-21. So forecast differences for borrowing in 2020-21 were likewise large in the March 2020 forecasts, with the OBR and externals underestimating borrowing by 12.4 and 12.2 per cent of GDP respectively. This reflected both the unexpected hit to the economy from the pandemic, which reduced receipts in cash terms, but also the scale of Government support-schemes, which raised spending. The OBR's April and July forecasts proved to be more accurate, under and overpredicting borrowing by 1.9 and 0.4 per cent of GDP respectively compared to externals who underpredicted borrowing by 6.7 per cent and 0.7 of GDP respectively. The OBR and externals overestimated borrowing in their November forecasts by 3.9 and 2.6 respectively, with the OBR's forecast difference reflecting pandemic-related underspends. The OBR's consistently higher estimates of borrowing relative to externals during this period is likely to partly reflect its more pessimistic real GDP growth forecasts over the period.

Chart B compares the OBR's forecasts in 2021 to externals for the second year of the pandemic. 2021 was characterised by the recovery in the economy and public finances, with the economy growing by 7.6 per cent of GDP and public sector net borrowing falling to 5.2 per cent of GDP. Both the OBR and externals underestimated the speed of the recovery, with the OBR underestimating growth by 3.6 percentage points compared to the external average of 2.8 percentage points. Much of the OBR's forecast difference related to faster-than-expected consumption growth (thanks in part to the effective vaccine rollout) with private consumption growth increasing by 6.2 per cent compared to the OBR's forecast of 2.9 per cent.[a] External forecasters also underpredicted consumption growth but to a lesser extent – the average of external forecasters from March 2021 was for annual growth of 5.0 per cent. The underprediction in real GDP growth is also seen in overestimates of borrowing for both the OBR and externals in 2021-22, with higher-than-expected receipts explaining most of the OBR's forecast difference. External forecasters overestimated borrowing to a greater degree than the OBR at both the March and October 2021 forecasts.

18

The OBR's forecast performance

Chart B: Forecast differences during second year of pandemic vs. externals

Real GDP growth 2021

PSNB (2021-22)

Source: HM Treasury, OBR
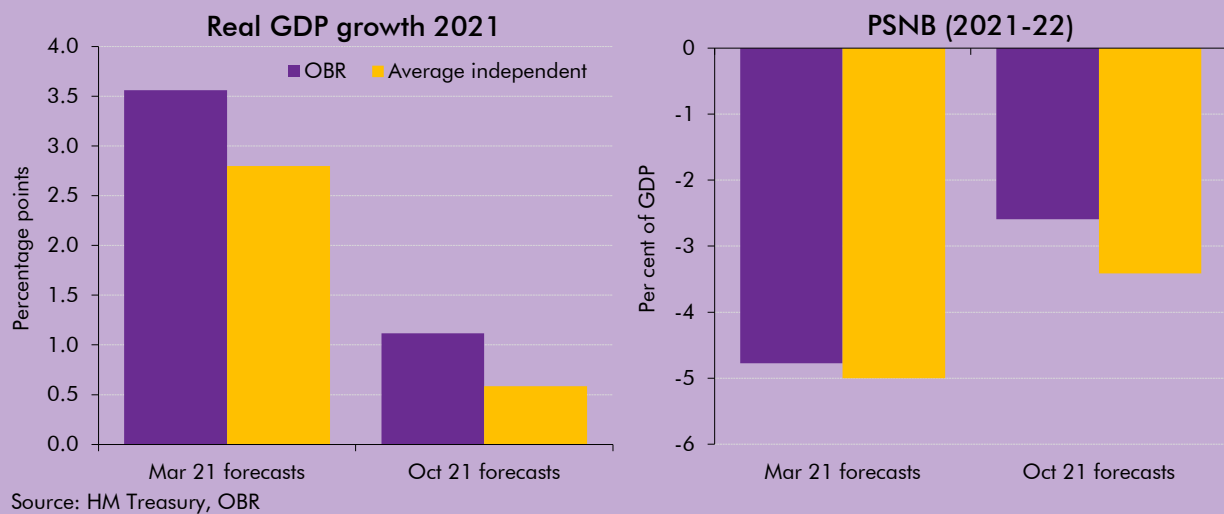
[a] See OBR, *Forecast Evaluation Report*, January 2023

OBR forecast performance vs. the Bank of England

1.28   The Bank of England is the only other public body in the UK that regularly produces economic forecasts. Unlike the OBR, the Bank of England only produces economic forecasts and not fiscal forecasts. We therefore only compare the OBR's real GDP growth forecasts published in the twice-yearly *EFOs* to the Bank of England's real GDP growth forecasts in its quarterly *Monetary Policy Reports* (formerly *Inflation Reports*), comparing OBR forecasts to the closest month in which the Bank published a forecast.[19]

1.29   The overall differences between the OBR and the Bank of England are small. Our forecast accuracy only notably differs two years ahead, where the OBR has a median absolute difference of 0.4 percentage points, compared to a Bank of England median absolute difference of 0.8 percentage points. This is driven by more optimistic Bank of England forecasts in the early 2010s, notably in May 2010, November 2010, and November 2011.

1.30   The Bank of England has also tended to overestimate growth two and three years out, although, unlike the OBR, has not underestimated growth one-year out. The Bank of England overestimated growth one year ahead in 14 of the 24 forecasts we consider, in comparison to the 12 where the OBR overestimated it. This reflects forecasts made in March 2014, December 2014, March 2018, and November 2018, where the Bank of England had stronger forecasts for growth in business investment[20] and productivity,[21] respectively. The OBR is slightly more optimistic on real GDP growth three years ahead than the Bank.

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[19] For example, we compare the OBR June 2010 *Economic and fiscal outlook* forecast to the Bank of England's May 2010 *Inflation Report*. Of the 22 forecasts in our sample, the Bank of England's forecast is from the same month six times, one month before 14 times, and one month after twice.
[20] OBR, *Economic and fiscal outlook*, March 2014, p. 85; OBR, *Economic and fiscal outlook*, December 2014, p. 91.
[21] OBR, *Economic and fiscal outlook*, March 2018, p. 81; OBR, *Economic and fiscal outlook*, October 2018, p. 83.

19   The OBR's forecast performance

Chart 1.12: OBR and Bank of England median real GDP growth forecast differences: 2011 to 2022
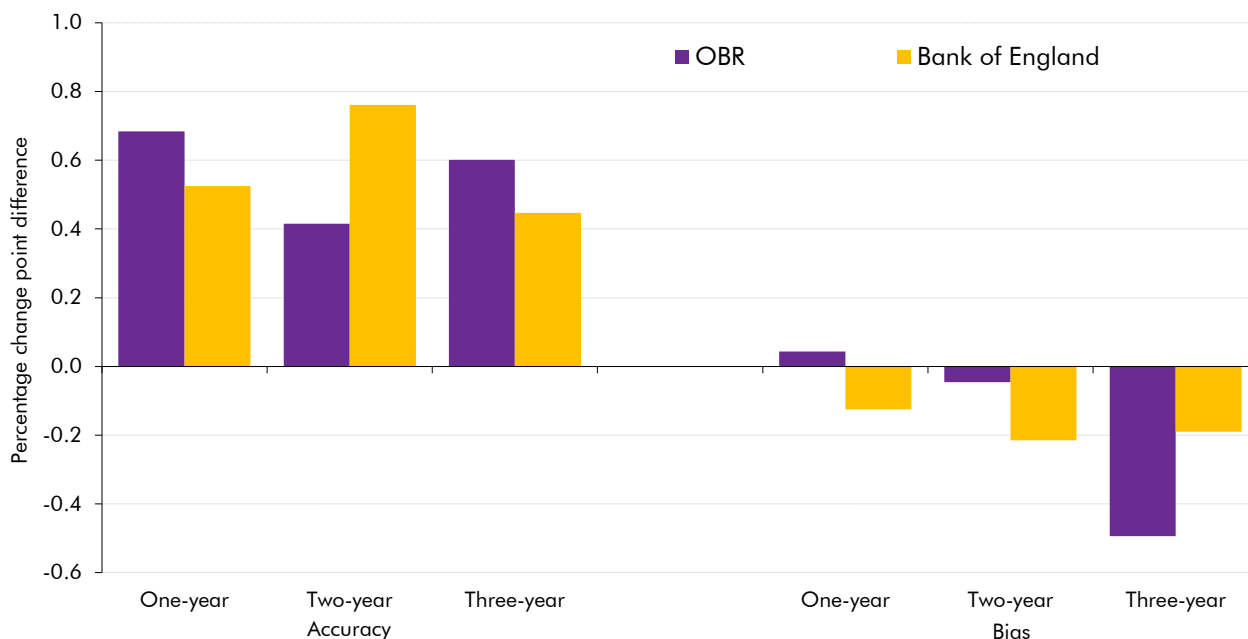
Source: Bank of England, OBR

OBR performance vs. other European official forecasters

1.31   Alongside comparisons to contemporaneous UK forecasters, another way of benchmarking performance is to compare the OBR's forecast accuracy to that of official fiscal forecasters in other countries. International comparisons are generally more difficult because forecasters in other countries often forecast different variables to different time horizons. In the following analysis, we therefore use forecasts and outturn from the Stability and Convergence Plans produced by EU Member States,[22] which report forecasts on a consistent basis for the UK (while it was a member of the EU) and other official forecasters in Europe over the period.

1.32   Comparing forecasts across countries is made more difficult by the volatility of data outturns and the incidence of country-specific shocks. To partly mitigate this, we once again focus on the median differences for individual countries, which unlike the mean, are not skewed by the effect of one-off localised shocks or isolated data oddities for individual countries. Nevertheless, caution should be made when drawing conclusions about the quality of forecasts from this analysis. Rather, it is informative for understanding the common trends and issues that affect forecasters across countries.

1.33   Charts 1.13 and 1.14 show the absolute and simple median forecast differences for European official forecasters including the OBR over the period 2010 to 2019 for real GDP growth and general government net borrowing (a slightly narrower measure than the UK's

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[22] Members of the euro area produce 'stability' plans, while non-members produce 'convergence' plans.
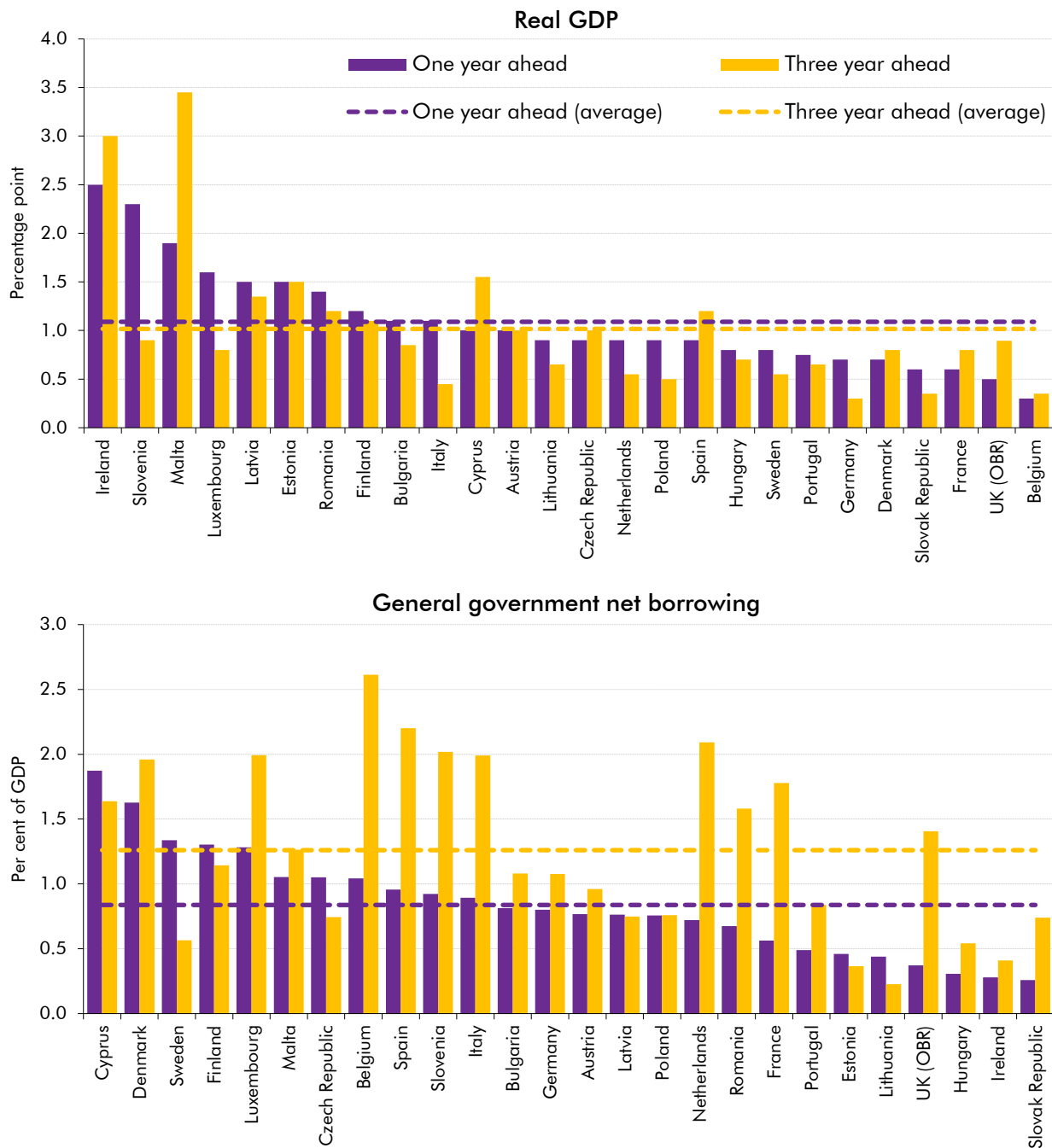
headline measure of PSNB) across one- and three-year forecast horizons.[23] There is overall a large degree of variation in forecast accuracies for real GDP growth and borrowing across European official forecasters. This variation is partly a result of the volatility in outturn, reflecting both the stresses of the eurozone crisis of the 2010s and the relatively small size of some economies. For example, the standard deviation for real GDP growth outturn in Ireland, which has the highest one-year real GDP growth absolute difference at 2.3 times the average, is 4 times greater than the average. We also see a trend, albeit weaker, when looking at the relationship between outturn borrowing variance and forecast differences.

1.34   Among the 26 European official forecasters, the OBR has the second most accurate one year ahead forecast for real GDP growth after Belgium. The OBR's median absolute forecast differences for real GDP growth of 0.5 of a percentage point was half the European average of 1.1 percentage points. There is a similar picture for borrowing, with the UK having the fourth lowest median absolute borrowing difference for one year ahead forecasts (0.5 per cent of GDP below the European average). Over longer forecast periods, however, the OBR's forecast differences converge towards the European average with the UK's absolute forecast difference three years out 0.1 percentage points below the European average for real GDP growth and 0.1 per cent of GDP greater than the European average for borrowing.

1.35   There is also considerable variation in bias for real GDP growth and borrowing forecasts between European official forecasters. But across European forecasters, these forecast differences broadly balance with countries generally either consistently under- or over-estimating real GDP growth and borrowing. The OBR's forecasts for the UK are relatively more biased in a statistical sense than the average, with the degree of overoptimism for real GDP growth and borrowing increasing by forecast horizon. It is not clear whether other official forecasters are subject to the same methodological constraint that has partly driven this overoptimism for the OBR, namely the requirement to take the Government's stated spending totals for public services spending (RDEL in the UK) as given.

1.36   Comparative analysis by Beetsma *et al* (2022), also using data from the Stability and Convergence Programmes but across a longer timeframe (1990 to 2019), reaches similar conclusions finding that the average degree of bias across European fiscal institutions for one year ahead forecasts of borrowing is close to zero. They also look into the drivers of fiscal forecast differences across European countries and find that GDP growth is the single most important explanatory factor, with overoptimistic real GDP growth forecasts tending to lead to underestimates of borrowing and vice versa. They also consider the role of political factors and independent fiscal institutions on projection differences and conclude that *"independent fiscal institutions with high media impact producing or assessing the macroeconomic forecast appear to lead to better budgetary performance relative to projections."*[24]

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[23] We have excluded two-year forecasts from the charts for brevity, but two-year forecasts follow a similar pattern with the UK's forecast differences rising relative to other European forecasters for real GDP growth and borrowing.
[24] Beetsma, R., M. Busse, L. Germinetti, M. Giuliodori, and M. Larch, *Is the Road to Hell Paved with Good Intentions? An Empirical Analysis of Budgetary Follow-Up in the EU*, May 2022.

Chart 1.13: Median absolute forecast differences for real GDP growth and borrowing across European official forecasters: 2010 to 2019

Note: We have excluded two-year forecasts for real GDP and general government net borrowing for brevity. The OBR's average biases for borrowing and real GDP are slightly different to those presented earlier in the paper. This reflects a combination of factors including the exclusion of the pandemic years, different vintages of outturn data and that borrowing forecasts relate to general government rather than the public sector and have not been reclassified.
Source: European Commission, IMF

Chart 1.14: Simple median forecast differences for real GDP growth and borrowing across European official forecasters: 2010 to 2019

Real GDP

General government net borrowing

Note: We have excluded two-year forecasts for real GDP and general government net borrowing for brevity. The OBR's average biases for borrowing and real GDP are slightly different to those presented earlier in the paper. This reflects a combination of factors including the exclusion of the pandemic years, different vintages of outturn data and that borrowing forecasts relate to general government rather than the public sector and have not been reclassified.
Source: European Commission, IMF

OBR forecast performance vs. HM Treasury pre-2010

1.37　A final means of evaluating the OBR's forecast performance is to compare our forecast differences with those of the Treasury when it was responsible for producing the official economic and fiscal forecasts in the years prior to 2010. When comparing forecast performance in different time periods, it is important to take account of differences in the prevailing macroeconomic environment. Forecasting the economy and public finances is likely to be more difficult in a more volatile environment. This volatility may come from: large shocks like the financial crisis and pandemic; less dramatic short-run surprises like movements in commodity prices and exchange rates; and policies announced since forecasts were made (although to the extent that such policies respond to the fiscal costs of unforeseen shocks, they can serve to temper forecast differences, particularly over longer time horizons). All else equal, one would expect greater volatility in economic and fiscal outcomes to be associated with forecasts being less accurate on average since it implies a greater number and scale of unpredictable shocks to contend with. And given the tendency of large shocks to affect the economy and public finances adversely, we should also expect bias to show greater overoptimism in periods of greater volatility.

The volatility of the forecasting environment

1.38　A simple way of summarising the volatility of economic and fiscal conditions that the OBR and the Treasury have faced is the standard deviations of the year-on-year changes in real GDP and the level of borrowing in their respective eras (Chart 1.15). The standard deviation of real GDP growth was very similar for OBR forecasts in the nine years before the pandemic in 2020, and for Treasury forecasts in the decade before the financial crisis to 2007, at 0.5 percentage points. Including the pandemic and subsequent recovery, however, results in a much more volatile environment in the 'OBR era' than during the 'Treasury era.' The standard deviation of real GDP growth was 3.6 percentage points between 2010 and 2021, almost double the 2.0 percentage point average between 1988 and 2010 (the Treasury era with the financial crisis included).

Chart 1.15: Real GDP growth
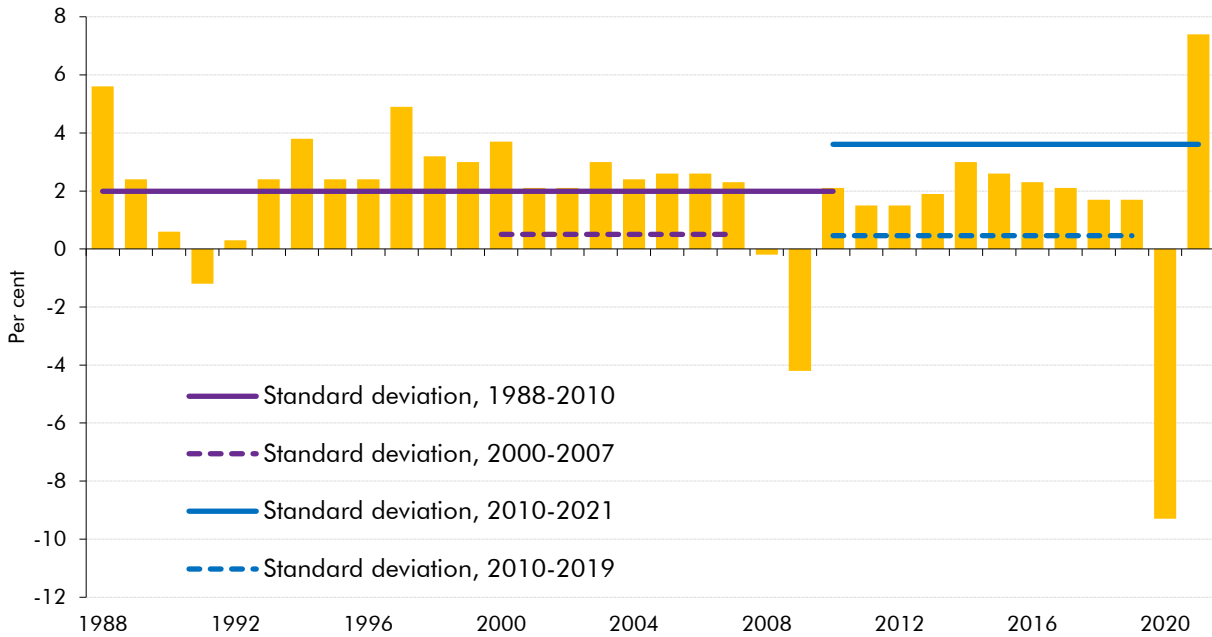
Source: HM Treasury, OBR

1.39   The story for public sector net borrowing is similar. Excluding the financial crisis years (2008-09 and 2009-10) for the Treasury period and the pandemic years (2020-21 and 2021-22) for the OBR period, the standard deviation of borrowing for both averaged 2.2 per cent of GDP. Including the crisis years for both periods, the standard deviation of borrowing was 3.4 percent of GDP during the OBR years between 2010-11 and 2021-22, 0.5 percentage points greater than the 2.8 per cent of GDP during the Treasury years between 1986-87 and 2009-10.

Chart 1.16: Public sector net borrowing
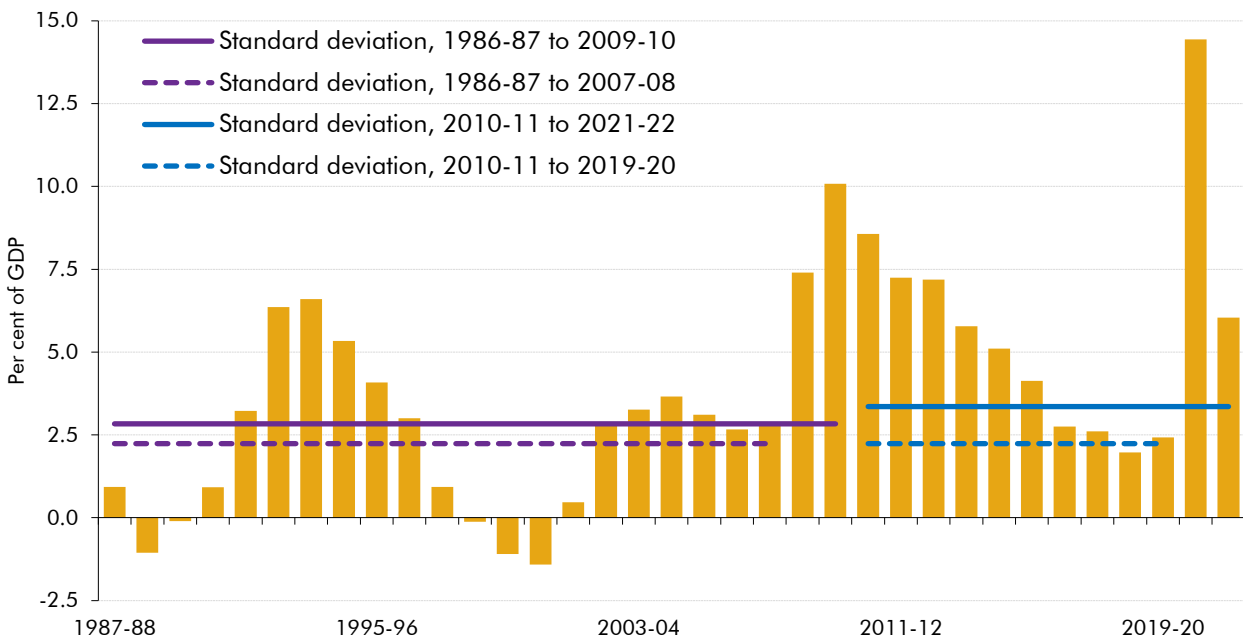
Source: HM Treasury, OBR

1.40   Both HMT and OBR forecast differences are small relative to outturn. In the OBR period, 50 per cent of three-year-ahead real GDP growth outturns lie within a 1.3 percentage point range around the median, while the OBR's median forecast difference is 0.6. In the HMT period, 50 per cent of three-year-ahead real GDP growth outturns lie within a 1.2 percentage point range around the median, while HMT's median forecast difference is 0.8. Likewise for borrowing, 50 per cent of three-year-ahead borrowing outturns in the OBR period lie within a 2.5 percentage point range around the median, while the OBR's median forecast difference is 1.2. In the HMT period, 50 per cent of three-year-ahead borrowing outturns lie within a 4.5 percentage point range around the median, while HMT's median forecast difference is 1.5.

OBR forecast accuracy vs. HM Treasury

1.41   The principal metric we use to evaluate the relative *accuracy* of our forecasts compared to the preceding Treasury forecasts is the *median absolute* forecast difference. We moved to using the *median* absolute difference, instead of the *mean*, in our 2018 *FER*, after it became clear that comparing performance based on the mean flattered us relative to the Treasury. That was because the Treasury sample included the large differences 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. The very large fall in real GDP and spike in borrowing during the pandemic mean there is now a similar (indeed, somewhat larger) skew in the distribution of our own forecast differences (as shown in Annex A). But we continue to believe that it is sensible to focus on median absolute differences as the best summary measure of an institution's long-run forecasting accuracy, as they are much less affected by a few, large shocks.

1.42   The median OBR forecasts for real GDP growth and government borrowing are more accurate than the previous Treasury forecasts at one-, two-, and three-year horizons, while the Treasury forecasts have smaller median differences at four- and five-year horizons. Chart 1.17 summarises the OBR and the Treasury mean and median absolute forecast differences at one-, two-, three-, four-, and five-year time horizons. While all OBR forecasts for borrowing have covered five years, the Treasury did not start producing five-year borrowing forecasts until March 1992 (and only consistently so after June 1998), so the sample for five-year-ahead differences is smaller than for shorter horizons. The difference in median between the OBR and HMT is only statistically significant at the 5 per cent level for one- and two-year-ahead borrowing.

1.43   Excluding the years during and immediately after the financial crisis and pandemic – when the OBR and Treasury faced similar adverse surprises in economic growth and public sector borrowing – the median OBR forecast for real GDP growth was still more accurate at one-, two-, and three-year horizons. The Treasury's median forecasts are still more accurate at four- and five-year horizons, although the difference between the OBR and the Treasury is smaller at five years. The median OBR forecast for borrowing remains more accurate than the Treasury median forecast at the one-to-four-year horizons, with a marginally smaller difference between the OBR and the Treasury at five years ahead.

1.44 Because of the huge and unforecastable hit to output and to borrowing from the pandemic, the OBR's mean forecast differences are now larger than the Treasury's at each year horizon. However, excluding the years during and after the financial crisis and pandemic, the OBR's mean forecast differences are smaller at all horizons aside from five years ahead. The forecast differences for real GDP growth in 2020, 2021, and 2022, and for borrowing in 2020-21, 2021-22, and 2022-23, reflected the largest contraction in economic output in around a century and the hundreds of billions of pounds of pandemic-related fiscal support that pushed the deficit to a peacetime high. These differences were detailed in Chapters 2 and 3 of our 2021 and 2022 *FER*s.

Chart 1.17: Absolute forecast differences for real GDP growth and PSNB: 1988 to 2022

Real GDP growth
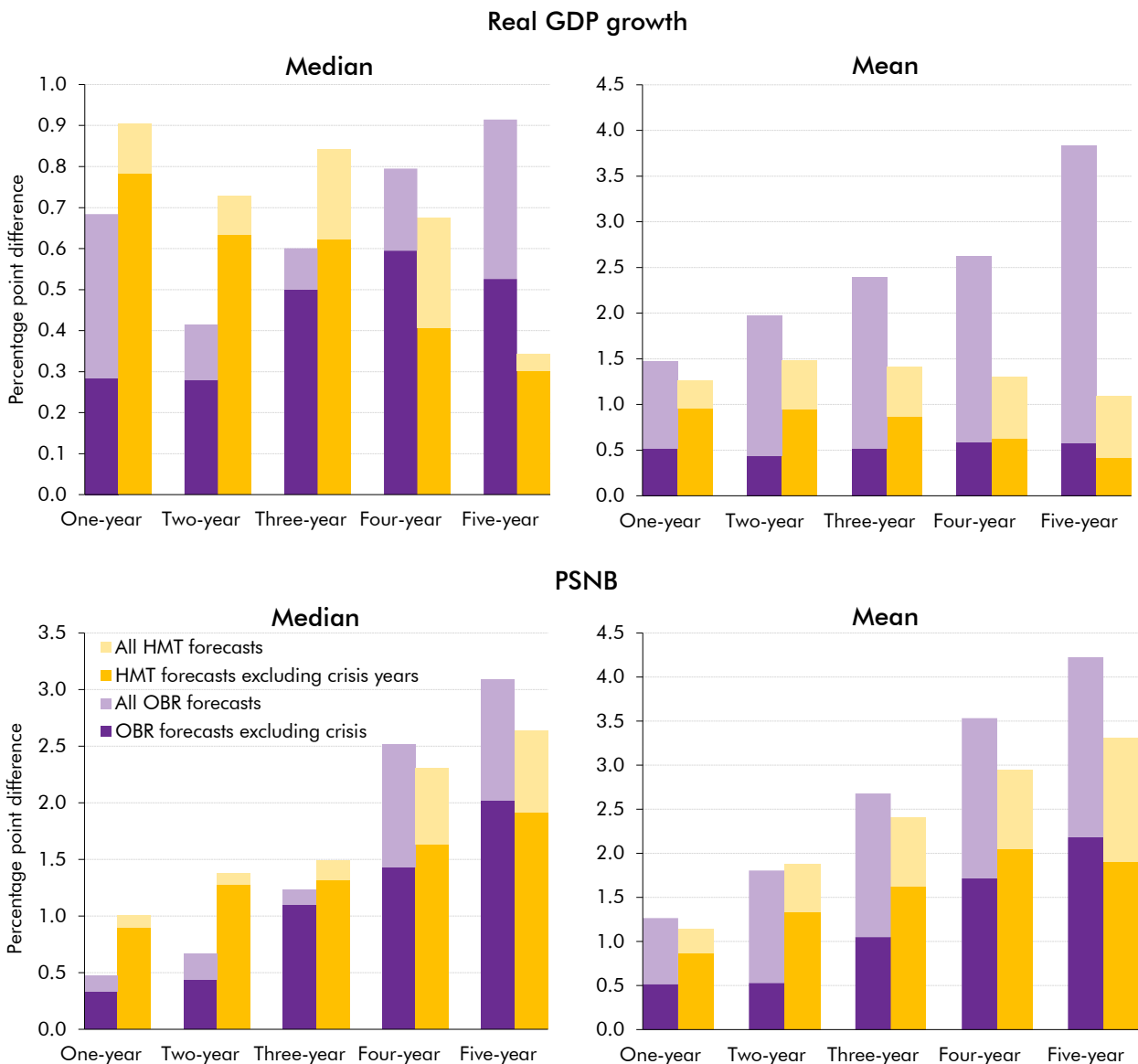
Source: HM Treasury, ONS, OBR

OBR forecast bias vs. HM Treasury

1.45   Given one of the motivations for the creation of the OBR was to remove the risk of political interference in forecasting, we also evaluate the bias in our economic and fiscal forecasts relative to the Treasury – using the simple average (rather than absolute average) forecast difference. Chart 1.18 shows that:

- both previous Treasury and OBR forecasts generally overestimated real GDP growth and underestimated public sector net borrowing in most years of the forecast.[25] However the extent of these forecast biases is much smaller in most years if one excludes the years affected by three crises: the financial crisis, the pandemic, and the energy crisis (2008-10 and 2020-21);

- on a median basis, the OBR's forecasts for both real GDP growth and borrowing are less biased than those of the Treasury one, two, and three years ahead and somewhat more biased four and five years ahead. These differences in median bias are statistically significant at the 5 per cent level for one- and two-year-ahead borrowing and for one- and two-year-ahead forecasts of borrowing at the 10 per cent level. Excluding crisis years further improves the Treasury's GDP forecasting record relative to the OBR in years four and five to a small overestimate but renders the OBR PSNB forecasts less biased than the Treasury's in all but the fifth year of the forecast;

- on a mean basis, the OBR's forecasts for GDP growth are less biased than those of the Treasury one, two, three, and four years ahead. The OBR's borrowing forecasts are more biased at each time horizon aside from one-year-ahead. Excluding crisis years, the OBR's GDP growth forecasts were less biased than the Treasury one, four, and five years ahead, and the OBR's borrowing forecasts were less biased one, two, and three years ahead.

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[25] The main exception is in one-year-ahead forecasts, where the OBR generally underestimates real GDP growth and overestimates borrowing. This is also the case for our in-year borrowing forecasts, which we studied in detail in Taylor, J. and A. Sutton, *OBR Working Paper No.13: In-year fiscal forecasting and monitoring*, September 2018.

Chart 1.18: Average differences for real GDP growth and PSNB: 1988 to 2022

Real GDP growth

PSNB

Legend:
- All HMT forecasts
- HMT forecasts excluding crisis years
- All OBR forecasts
- OBR forecasts excluding crisis years
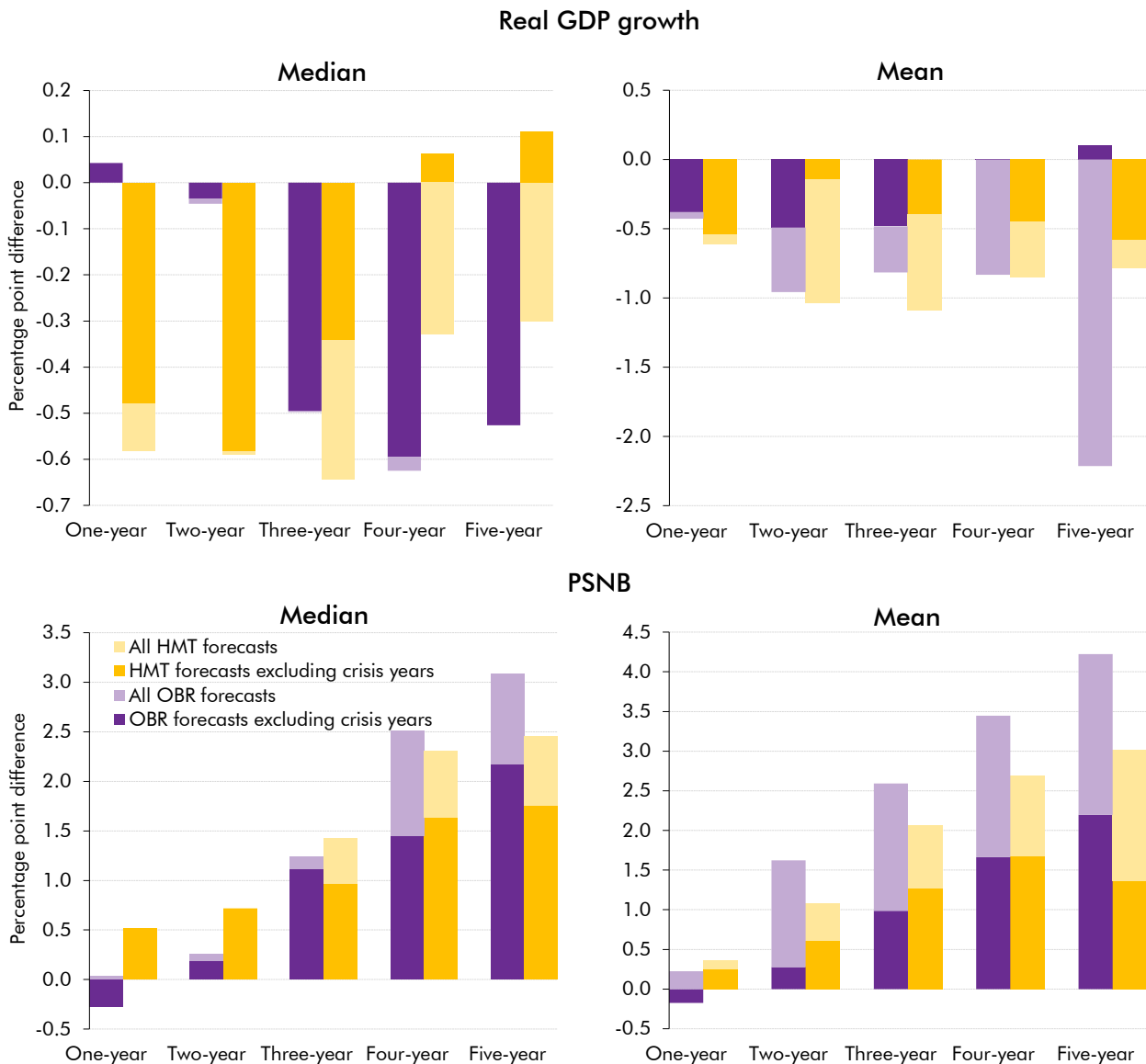
Source: HM Treasury, ONS, OBR

OBR vs. HM Treasury differences for government receipts and spending

1.46 Tables 1.1 and 1.2 delve further into the accuracy and bias of the OBR and Treasury borrowing forecasts by breaking them down into their component parts – receipts and spending. Based on restated forecasts,[26] we compare our forecasts of cash spending and receipts as a share of GDP to outturn, the latter of which largely abstracts from changes due to revisions to the GDP denominator. We find that for both the mean and the median differences:

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[26] We restate HMT and OBR forecasts here in the same way as in our *FER*s, so that they are broadly consistent with the latest statistical treatments in outturn data published by the ONS. This 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.

- Two-thirds of the OBR's spending forecasts have had smaller differences than the Treasury's median spending forecasts across all time horizons. OBR forecast differences were more likely to exceed the Treasury's as the pandemic and energy crisis years come into the forecasting horizon. (Table 1.1).

- Half of the OBR's receipts forecasts have had smaller differences than the Treasury's median receipts forecasts across all time horizons, (Table 1.2). In particular, the OBR's receipts forecasts have been less biased than the Treasury's – they are on average slightly pessimistic, in contrast to a tendency for overoptimism in the Treasury era averaging 1.1 per cent of GDP at the forecast horizon. As with spending, OBR forecast differences were more likely to exceed the Treasury's as the pandemic and energy crisis years come into the forecasting horizon.

1.47 A full breakdown of OBR and Treasury forecast accuracy and bias for real GDP growth and borrowing by forecast, at each time horizon, is provided in Annex A.

Table 1.1: Forecast differences for cash spending

Fiscal years ahead:	Per cent of outturn GDP					
	In-year	One	Two	Three	Four	Five
Forecast differences (colours reflect magnitude relative to pre-OBR median) [1]						
June 2010 [1]	0.6	0.1	-0.1	-0.3	-0.2	-0.3
November 2010	0.1	-0.2	-0.3	0.1	0.0	-0.7
March 2011	0.3	-0.6	-0.8	-0.5	-0.5	-1.2
November 2011	-0.2	-0.4	-0.1	-0.1	-0.3	-0.2
March 2012	0.2	-0.2	0.0	0.0	-0.2	-0.1
December 2012	0.3	0.1	0.2	-0.1	0.2	0.9
March 2013	0.4	0.1	0.3	-0.1	0.2	1.0
December 2013	0.2	0.3	-0.1	0.1	1.0	1.5
March 2014	0.4	0.2	-0.1	0.2	1.2	1.6
December 2014	0.3	0.2	0.9	1.9	2.3	4.8
March 2015	0.3	0.4	1.2	2.2	2.6	4.1
July 2015	0.4	0.4	0.5	1.1	1.4	3.7
November 2015 [2]	0.2	0.0	0.7	1.0	3.4	12.5
March 2016	0.3	0.1	0.8	1.1	3.9	13.3
November 2016	-0.2	0.2	0.5	3.3	12.6	7.2
March 2017	0.1	0.0	0.4	3.1	12.6	7.2
November 2017	0.2	0.3	2.8	12.4	7.3	10.2
March 2018	0.1	0.1	2.4	12.2	7.2	10.2
November 2018	0.1	2.1	11.6	6.4	9.2	
March 2019	0.2	2.1	11.6	6.5	9.2	
March 2020	0.1	8.6	2.8	5.7		
November 2020	-2.7	1.3	6.5			
March 2021	-1.6	-0.5	6.4			
October 2021	-0.1	4.3		Smaller than median absolute difference		
March 2022	0.7	2.7		Median sized difference		
November 2022	-1.1			Less than ½ std. dev. above median absolute		
March 2023	-0.7			More than ½ std. dev. above median absolute		
Median absolute differences over the 20 years preceding the creation of the OBR						
Spring/summer	1.2	1.2	1.2	1.5	1.9	2.1
Autumn	1.0	0.8	1.0	1.1	1.8	2.3
Forecast differences (colours reflect magnitude relative to pre-OBR mean) [1]						
June 2010 [1]	0.6	0.1	-0.1	-0.3	-0.2	-0.3
November 2010	0.1	-0.2	-0.3	0.1	0.0	-0.7
March 2011	0.3	-0.6	-0.8	-0.5	-0.5	-1.2
November 2011	-0.2	-0.4	-0.1	-0.1	-0.3	-0.2
March 2012	0.2	-0.2	0.0	0.0	-0.2	-0.1
December 2012	0.3	0.1	0.2	-0.1	0.2	0.9
March 2013	0.4	0.1	0.3	-0.1	0.2	1.0
December 2013	0.2	0.3	-0.1	0.1	1.0	1.5
March 2014	0.4	0.2	-0.1	0.2	1.2	1.6
December 2014	0.3	0.2	0.9	1.9	2.3	4.8
March 2015	0.3	0.4	1.2	2.2	2.6	4.1
July 2015	0.4	0.4	0.5	1.1	1.4	3.7
November 2015 [2]	0.2	0.0	0.7	1.0	3.4	12.5
March 2016	0.3	0.1	0.8	1.1	3.9	13.3
November 2016	-0.2	0.2	0.5	3.3	12.6	7.2
March 2017	0.1	0.0	0.4	3.1	12.6	7.2
November 2017	0.2	0.3	2.8	12.4	7.3	10.2
March 2018	0.1	0.1	2.4	12.2	7.2	10.2
November 2018	0.1	2.1	11.6	6.4	9.2	
March 2019	0.2	2.1	11.6	6.5	9.2	
March 2020	0.1	8.6	2.8	5.7		
November 2020	-2.7	1.3	6.5			
March 2021	-1.6	-0.5	6.4			
October 2021	-0.1	4.3				
March 2022	0.7	2.7		Smaller than mean absolute difference		
November 2022	-1.1			Mean sized difference		
March 2023	-0.7			Bigger than mean absolute difference		
Mean absolute differences over the 20 years preceding the creation of the OBR						
Spring/summer	1.3	1.2	1.3	1.7	1.9	2.1
Autumn	1.2	0.9	1.1	1.3	1.8	2.3

[1] For comparability, 'in-year' is assumed to be 2009-10 and 2014-15 for the June 2010 and July 2015 forecasts respectively.

Note: Positive figures denote outturn above forecast. Forecasts adjusted for major ONS classification changes.

Table 1.2: Forecast differences for changes in receipts as a share of GDP

Fiscal years ahead:	Per cent of GDP					
	In-year	One	Two	Three	Four	Five
Forecast differences (colours reflect magnitude relative to pre-OBR median)[1]						
June 2010[1]	0.6	0.8	0.3	-0.7	-1.0	-1.3
November 2010	0.4	0.1	-0.8	-1.0	-1.3	-1.0
March 2011	0.1	-0.3	-0.9	-1.3	-1.4	-1.1
November 2011	-0.1	-0.6	-0.7	-0.9	-0.5	0.0
March 2012	0.2	-0.5	-0.7	-1.0	-0.6	-0.2
December 2012	-0.6	-1.0	-1.1	-1.0	-0.5	-0.4
March 2013	-0.6	-0.8	-0.9	-0.7	-0.6	-0.5
December 2013	0.4	0.1	-0.1	0.0	0.0	0.3
March 2014	0.3	0.1	-0.1	0.1	0.2	0.6
December 2014	0.3	0.4	0.4	0.5	0.9	1.4
March 2015	0.1	0.5	0.6	0.6	1.0	1.6
July 2015	0.1	0.1	0.2	0.2	0.6	1.1
November 2015[2]	0.1	0.0	-0.3	0.1	0.7	1.8
March 2016	-0.4	-0.4	-0.3	0.0	0.1	1.5
November 2016	0.3	-0.1	0.3	0.8	2.0	3.3
March 2017	0.1	0.2	0.2	0.6	2.0	3.3
November 2017	0.1	0.2	0.8	2.0	3.4	4.3
March 2018	-0.1	0.1	0.6	1.8	3.3	4.2
November 2018	-0.2	0.6	1.7	3.0	3.9	
March 2019	-0.4	0.4	1.4	2.7	3.7	
March 2020	-0.7	0.3	1.4	2.1		
November 2020	1.3	1.7	3.2			
March 2021	1.0	3.6	3.5			
October 2021	2.0	1.4		Smaller than median absolute difference		
March 2022	0.3	0.1		Median sized difference		
November 2022	-0.2			Less than ½ std. dev. above median absolute		
March 2023	-0.4			More than ½ std. dev. above median absolute		
Median absolute differences over the 20 years preceding the creation of the OBR						
Spring/summer	*0.2*	*0.8*	*0.9*	*0.8*	*0.6*	*1.3*
Autumn	*0.3*	*0.7*	*0.8*	*0.7*	*0.5*	*1.1*
Forecast differences (colours reflect magnitude relative to pre-OBR mean)[1]						
June 2010[1]	0.6	0.8	0.3	-0.7	-1.0	-1.3
November 2010	0.4	0.1	-0.8	-1.0	-1.3	-1.0
March 2011	0.1	-0.3	-0.9	-1.3	-1.4	-1.1
November 2011	-0.1	-0.6	-0.7	-0.9	-0.5	0.0
March 2012	0.2	-0.5	-0.7	-1.0	-0.6	-0.2
December 2012	-0.6	-1.0	-1.1	-1.0	-0.5	-0.4
March 2013	-0.6	-0.8	-0.9	-0.7	-0.6	-0.5
December 2013	0.4	0.1	-0.1	0.0	0.0	0.3
March 2014	0.3	0.1	-0.1	0.1	0.2	0.6
December 2014	0.3	0.4	0.4	0.5	0.9	1.4
March 2015	0.1	0.5	0.6	0.6	1.0	1.6
July 2015	0.1	0.1	0.2	0.2	0.6	1.1
November 2015[2]	0.1	0.0	-0.3	0.1	0.7	1.8
March 2016	-0.4	-0.4	-0.3	0.0	0.1	1.5
November 2016	0.3	-0.1	0.3	0.8	2.0	3.3
March 2017	0.1	0.2	0.2	0.6	2.0	3.3
November 2017	0.1	0.2	0.8	2.0	3.4	4.3
March 2018	-0.1	0.1	0.6	1.8	3.3	4.2
November 2018	-0.2	0.6	1.7	3.0	3.9	
March 2019	-0.4	0.4	1.4	2.7	3.7	
March 2020	-0.7	0.3	1.4	2.1		
November 2020	1.3	1.7	3.2			
March 2021	1.0	3.6	3.5			
October 2021	2.0	1.4				
March 2022	0.3	0.1		Smaller than mean absolute difference		
November 2022	-0.2			Mean sized difference		
March 2023	-0.4			Bigger than mean absolute difference		
Mean absolute differences over the 20 years preceding the creation of the OBR						
Spring/summer	*0.5*	*0.9*	*1.0*	*1.1*	*1.1*	*1.5*
Autumn	*0.5*	*0.8*	*1.0*	*1.0*	*1.0*	*1.2*

[1] For comparability, 'in-year' is assumed to be 2009-10 and 2014-15 for the June 2010 and July 2015 forecasts respectively.
Note: Positive figures denote outturn above forecast. Forecasts adjusted for major ONS classification changes.

A OBR and HM Treasury forecasts

A.1   This annex provides a full breakdown of OBR and HM Treasury forecast accuracy and bias for real GDP growth and borrowing by forecast, at each time horizon. The underlying data for all the charts and tables in this working paper can be found on our website.

## Figure A.1: Forecast differences for real GDP growth

Calendar years ahead:	Per cent					
	In-year	One	Two	Three	Four	Five

Forecast differences (colours reflect magnitude relative to pre-OBR median)

	In-year	One	Two	Three	Four	Five
June 2010	1.2	-1.2	-1.4	-1.1	0.5	-0.3
November 2010	0.6	-1.0	-1.2	-1.1	0.4	-0.3
March 2011	-0.6	-1.1	-1.1	0.3	-0.4	
November 2011	0.2	0.7	-0.3	0.5	-0.6	-0.8
March 2012	0.6	-0.2	0.5	-0.6	-0.8	
December 2012	1.5	0.6	1.2	0.1	-0.5	-0.4
March 2013	1.2	1.4	0.1	-0.5	-0.4	
December 2013	0.4	0.8	0.2	-0.4	-0.3	-1.0
March 2014	0.5	0.1	-0.4	-0.2	-0.8	
December 2014	0.2	0.0	0.0	0.0	-0.6	-0.7
March 2015	-0.1	-0.1	0.1	-0.6	-0.8	
July 2015[1]	0.0	-0.1	0.0	-0.7	-0.8	-13.4
November 2015	0.0	-0.2	-0.1	-0.7	-0.7	-13.3
March 2016	0.2	0.2	-0.4	-0.5	-13.1	
November 2016	0.1	1.0	0.0	-0.5	-13.1	5.6
March 2017	0.4	0.2	-0.1	-12.9	5.6	
November 2017	0.9	0.3	0.3	-12.3	6.1	2.5
March 2018	0.2	0.3	-12.3	6.2	2.7	
October 2018	0.4	0.0	-12.5	6.1	2.6	
March 2019	0.4	-12.5	6.0	2.5	-1.6	
March 2020	-12.1	5.8	2.6			
November 2020	0.3	2.1	-2.5			
March 2021	3.6	-3.2		Smaller than median absolute difference		
October 2021	1.1	-1.8		Median sized difference		
March 2022	0.3			Less than ½ std. dev. above median absolute		
November 2022	-0.1			More than ½ std. dev. above median absolute		

Median absolute differences over the 20 years preceding the creation of the OBR

	In-year	One	Two	Three	Four	Five
Spring/summer	0.9	0.9	0.8	0.8	0.7	0.7
Autumn	0.6	0.9	0.7	0.8	0.6	0.3

Forecast differences (colours reflect magnitude relative to pre-OBR mean)

	In-year	One	Two	Three	Four	Five
June 2010	1.2	-1.2	-1.4	-1.1	0.5	-0.3
November 2010	0.6	-1.0	-1.2	-1.1	0.4	-0.3
March 2011	-0.6	-1.1	-1.1	0.3	-0.4	
November 2011	0.2	0.7	-0.3	0.5	-0.6	-0.8
March 2012	0.6	-0.2	0.5	-0.6	-0.8	
December 2012	1.5	0.6	1.2	0.1	-0.5	-0.4
March 2013	1.2	1.4	0.1	-0.5	-0.4	
December 2013	0.4	0.8	0.2	-0.4	-0.3	-1.0
March 2014	0.5	0.1	-0.4	-0.2	-0.8	
December 2014	0.2	0.0	0.0	0.0	-0.6	-0.7
March 2015	-0.1	-0.1	0.1	-0.6	-0.8	
July 2015[1]	0.0	-0.1	0.0	-0.7	-0.8	-13.4
November 2015	0.0	-0.2	-0.1	-0.7	-0.7	-13.3
March 2016	0.2	0.2	-0.4	-0.5	-13.1	
November 2016	0.1	1.0	0.0	-0.5	-13.1	5.6
March 2017	0.4	0.2	-0.1	-12.9	5.6	
November 2017	0.9	0.3	0.3	-12.3	6.1	2.5
March 2018	0.2	0.3	-12.3	6.2	2.7	
October 2018	0.4	0.0	-12.5	6.1	2.6	
March 2019	0.4	-12.5	6.0	2.5	-1.6	
March 2020	-12.1	5.8	2.6			
November 2020	0.3	2.1	-2.5			
March 2021	3.6	-3.2				
October 2021	1.1	-1.8		Smaller than mean absolute difference		
March 2022	0.3			Mean sized difference		
November 2022	-0.1			Bigger than mean absolute difference		

Mean absolute differences over the 20 years preceding the creation of the OBR

	In-year	One	Two	Three	Four	Five
Spring/summer	0.8	1.4	1.5	1.3	1.3	0.7
Autumn	0.7	1.2	1.3	1.3	1.3	1.1

Note: Positive figures denote outturn above forecast.

Figure A.2: Forecast differences for cash PSNB

Fiscal years ahead:	Per cent of outturn GDP					
	In-year	One	Two	Three	Four	Five
Forecast differences (colours reflect magnitude relative to pre-OBR median)[1]						
June 2010[1]	-0.1	-0.8	0.1	1.5	2.5	3.0
November 2010	-0.7	0.0	1.4	2.4	3.2	3.1
March 2011	-0.6	-0.3	0.8	1.9	2.6	2.5
November 2011	-0.6	-0.3	0.3	0.8	1.3	1.4
March 2012	-0.5	-0.2	0.4	1.1	1.4	1.6
December 2012	-0.2	-0.3	-0.1	-0.1	-0.1	0.9
March 2013	-0.3	-0.8	-0.7	-0.8	-0.7	0.3
December 2013	-0.3	0.0	0.0	0.1	1.2	1.7
March 2014	-0.1	0.0	0.2	0.4	1.5	1.8
December 2014	-0.2	-0.2	0.1	1.2	1.4	3.8
March 2015	-0.2	-0.2	0.2	1.2	1.5	3.1
July 2015	-0.1	0.1	0.0	0.7	0.9	3.2
November 2015[2]	0.0	-0.2	0.9	1.1	3.3	15.9
March 2016	0.0	-0.5	0.2	0.4	3.3	15.7
November 2016	-1.1	-0.8	-0.8	1.9	14.2	4.7
March 2017	-0.3	-0.7	-0.5	2.0	14.2	4.7
November 2017	-0.4	-0.6	1.2	13.5	4.0	4.3
March 2018	-0.1	-0.5	1.2	13.6	4.1	4.5
November 2018	0.1	1.3	13.7	4.2	4.5	
March 2019	0.2	1.5	14.0	4.5	4.7	
March 2020	0.6	12.4	2.4	2.9		
November 2020	-3.8	-1.8	1.2			
March 2021	-2.0	-4.8	1.0			
October 2021	-2.6	2.0		Smaller than median absolute difference		
March 2022	-0.2	1.3		Median sized difference		
November 2022	-1.7			Less than ½ std. dev. above median absolute		
March 2023	-0.7			More than ½ std. dev. above median absolute		
Median absolute differences over the 20 years preceding the creation of the OBR						
Spring/summer	0.2	0.9	1.4	1.6	2.3	2.6
Autumn	0.4	1.1	1.4	1.4	2.2	2.5
Forecast differences (colours reflect magnitude relative to pre-OBR mean)[1]						
June 2010[1]	-0.1	-0.8	0.1	1.5	2.5	3.0
November 2010	-0.7	0.0	1.4	2.4	3.2	3.1
March 2011	-0.6	-0.3	0.8	1.9	2.6	2.5
November 2011	-0.6	-0.3	0.3	0.8	1.3	1.4
March 2012	-0.5	-0.2	0.4	1.1	1.4	1.6
December 2012	-0.2	-0.3	-0.1	-0.1	-0.1	0.9
March 2013	-0.3	-0.8	-0.7	-0.8	-0.7	0.3
December 2013	-0.3	0.0	0.0	0.1	1.2	1.7
March 2014	-0.1	0.0	0.2	0.4	1.5	1.8
December 2014	-0.2	-0.2	0.1	1.2	1.4	3.8
March 2015	-0.2	-0.2	0.2	1.2	1.5	3.1
July 2015	-0.1	0.1	0.0	0.7	0.9	3.2
November 2015[2]	0.0	-0.2	0.9	1.1	3.3	15.9
March 2016	0.0	-0.5	0.2	0.4	3.3	15.7
November 2016	-1.1	-0.8	-0.8	1.9	14.2	4.7
March 2017	-0.3	-0.7	-0.5	2.0	14.2	4.7
November 2017	-0.4	-0.6	1.2	13.5	4.0	4.3
March 2018	-0.1	-0.5	1.2	13.6	4.1	4.5
November 2018	0.1	1.3	13.7	4.2	4.5	
March 2019	0.2	1.5	14.0	4.5	4.7	
March 2020	0.6	12.4	2.4	2.9		
November 2020	-3.8	-1.8	1.2			
March 2021	-2.0	-4.8	1.0			
October 2021	-2.6	2.0				
March 2022	-0.2	1.3		Smaller than mean absolute difference		
November 2022	-1.7			Mean sized difference		
March 2023	-0.7			Bigger than mean absolute difference		
Mean absolute differences over the 20 years preceding the creation of the OBR						
Spring/summer	0.3	1.0	1.9	2.7	3.0	3.4
Autumn	0.5	1.3	2.0	2.2	2.8	3.2

[1] For comparability, 'in-year' is assumed to be 2009-10 and 2014-15 for the June 2010 and July 2015 forecasts respectively.
Note: Positive figures denote outturn above forecast. Forecasts adjusted for major ONS classification changes.

Chart A.1: Forecast accuracy at one-year horizon

Real GDP

PSNB
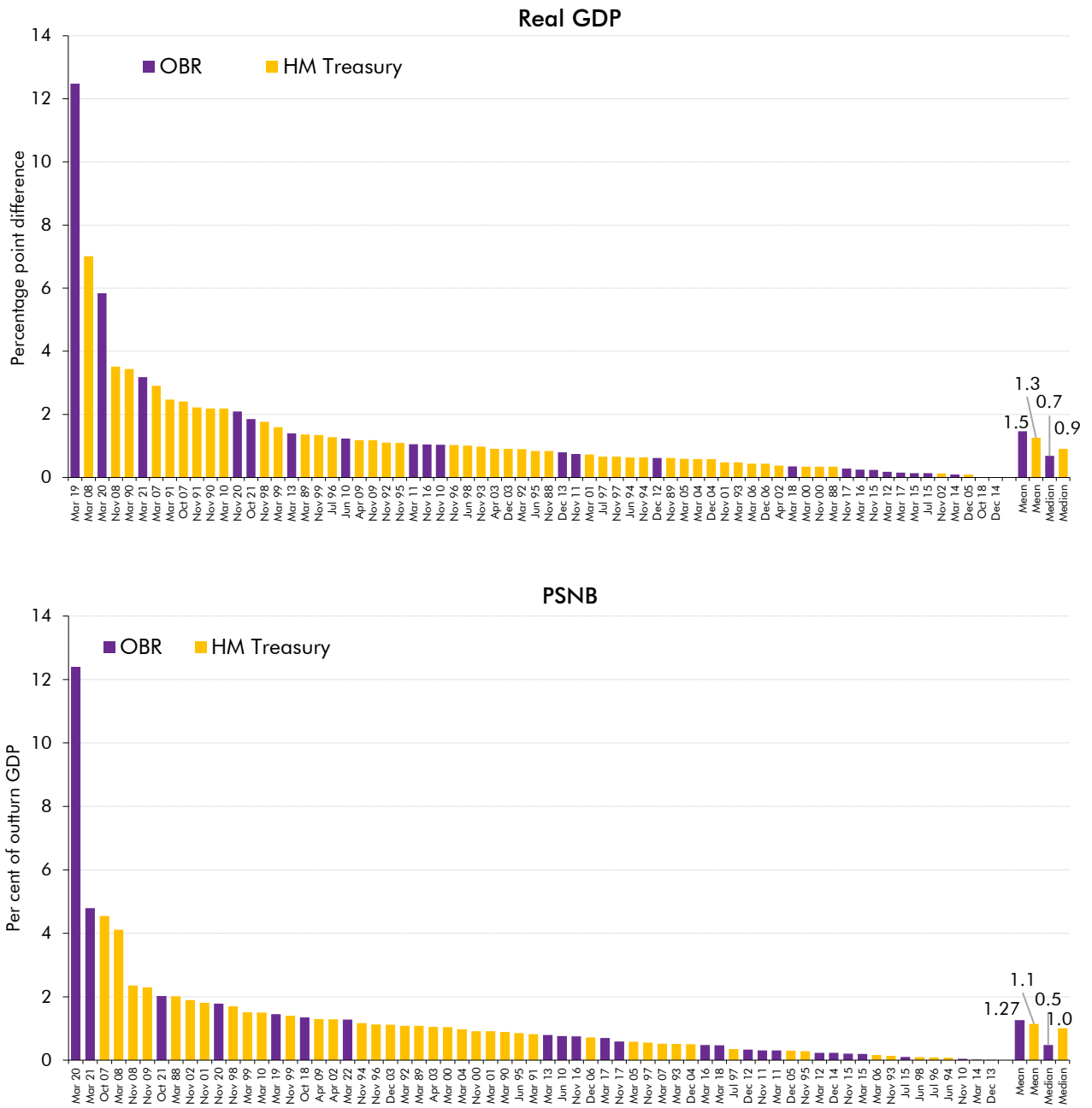
Source: HM Treasury, OBR

Chart A.2: Forecast bias at one-year horizon

Real GDP

PSNB

Source: HM Treasury, OBR
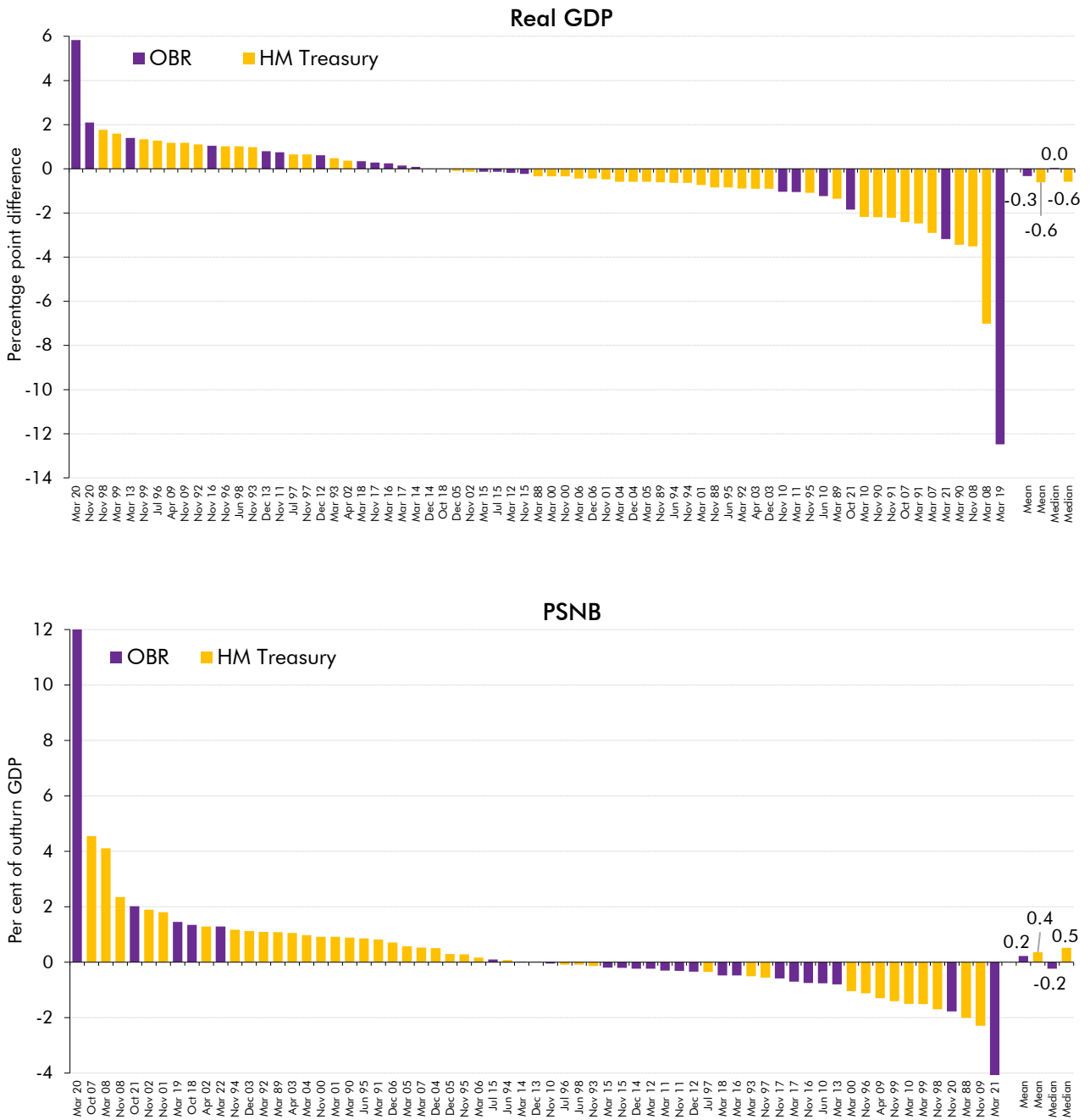
Chart A.3: Forecast accuracy at two-year horizon

Real GDP

PSNB
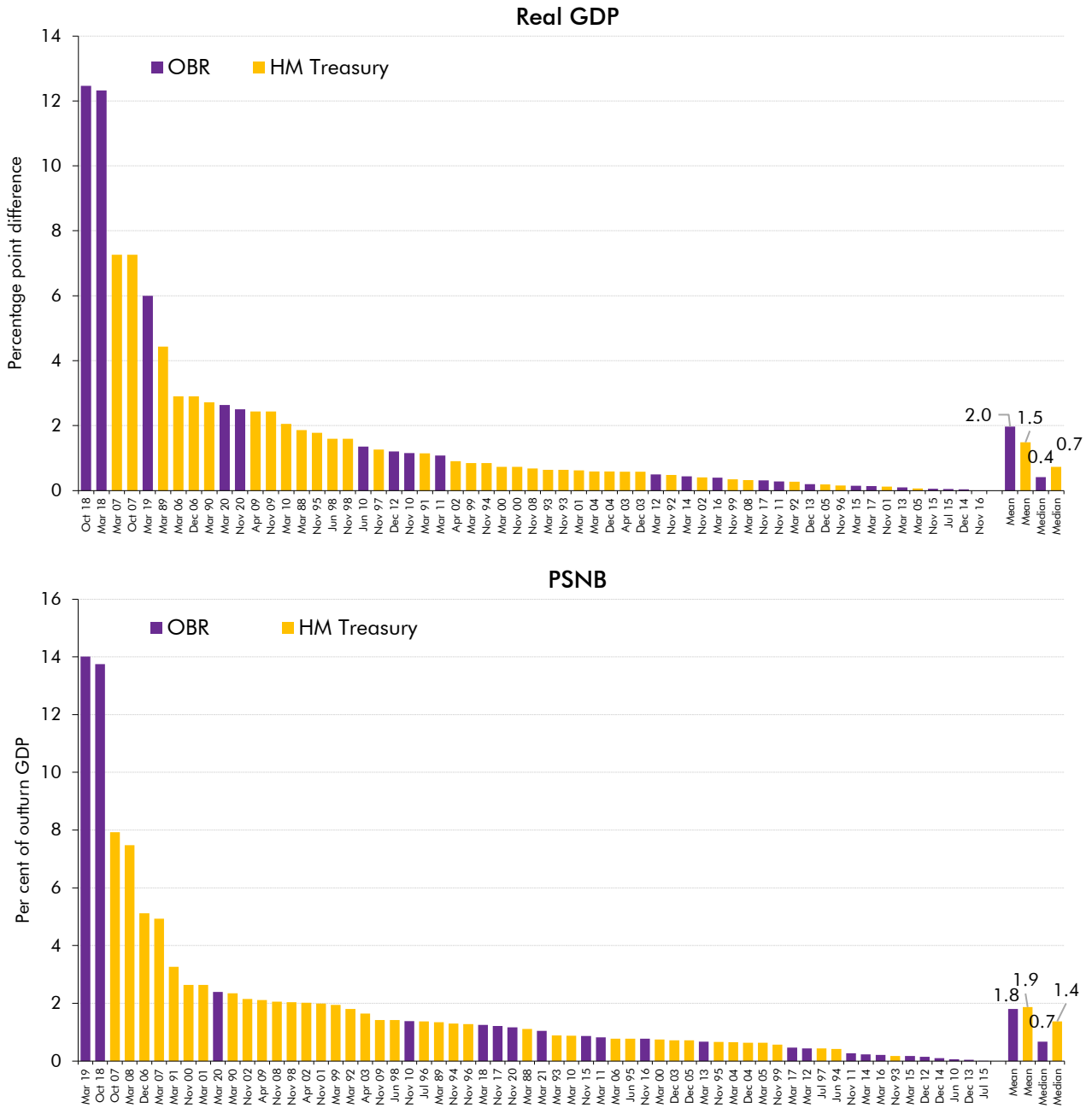
Source: HM Treasury, OBR

Chart A.4: Forecast bias at two-year horizon

Real GDP

PSNB

Source: HM Treasury, OBR

The OBR's forecast performance
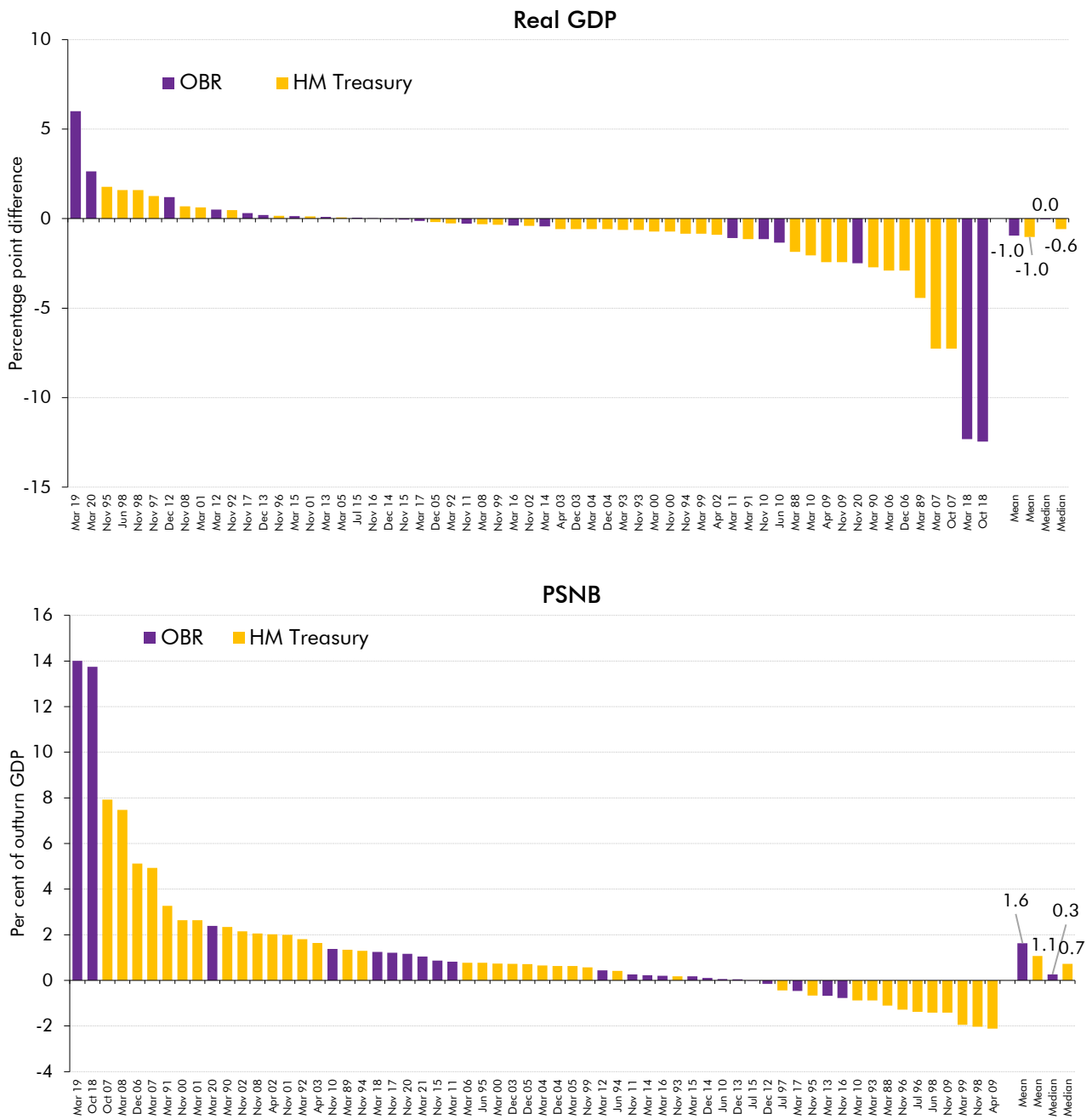
Chart A.5: Forecast accuracy at three-year horizon

Real GDP

PSNB
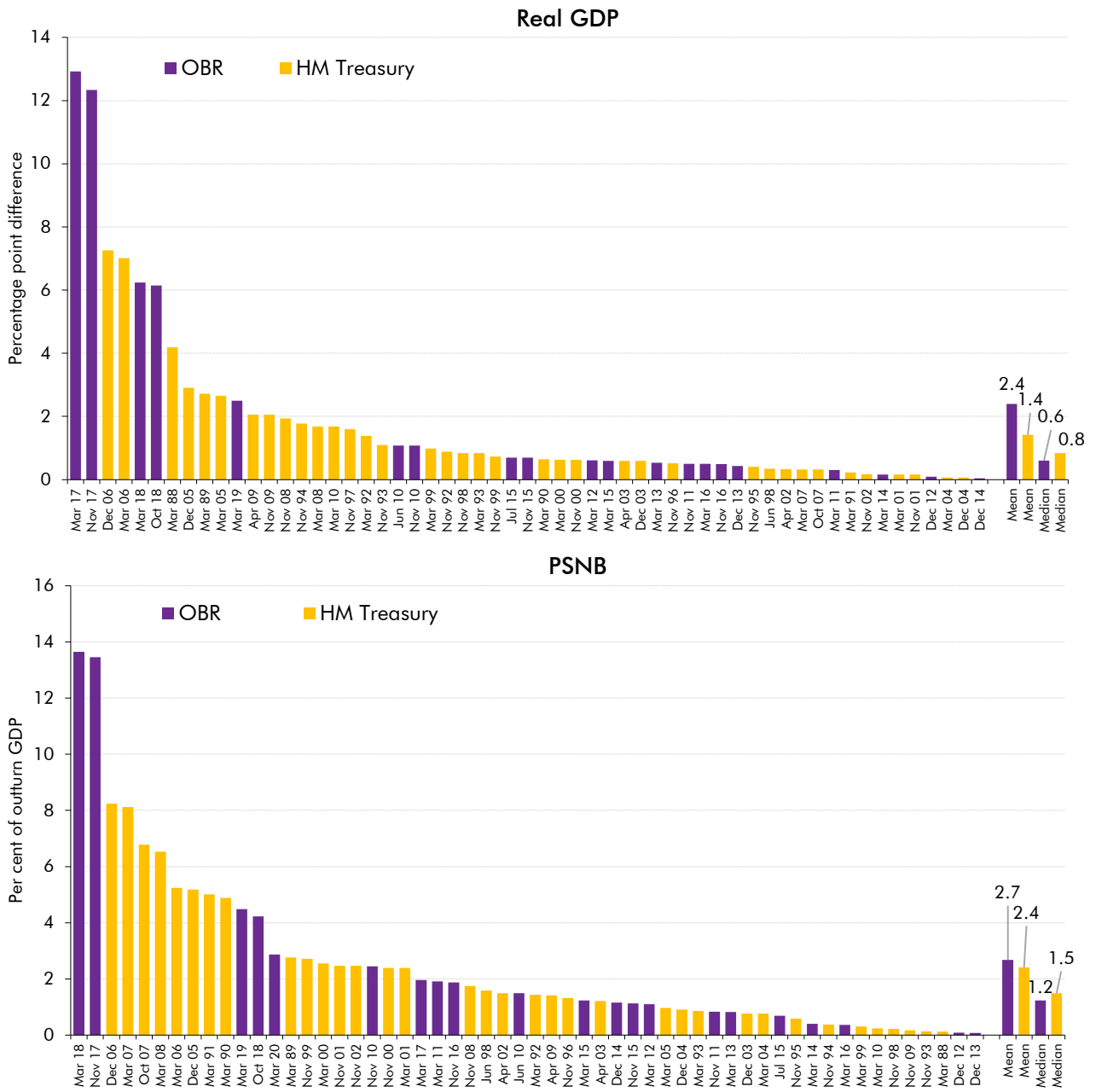
Source: HM Treasury, OBR

Chart A.6: Forecast bias at three-year horizon

Real GDP

PSNB

Source: HM Treasury, OBR

The OBR's forecast performance
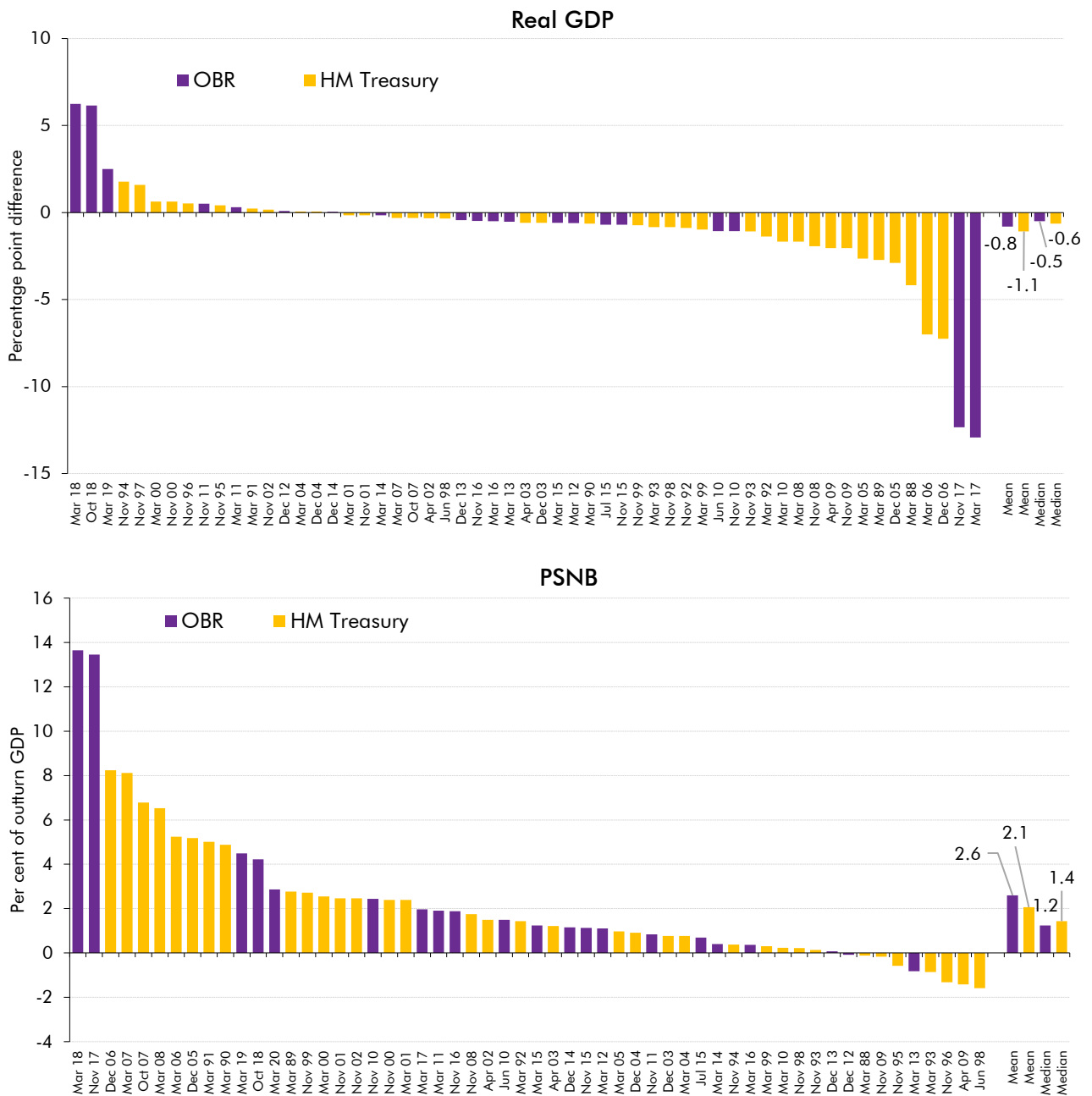
Chart A.7: Forecast accuracy at four-year horizon

Real GDP

PSNB
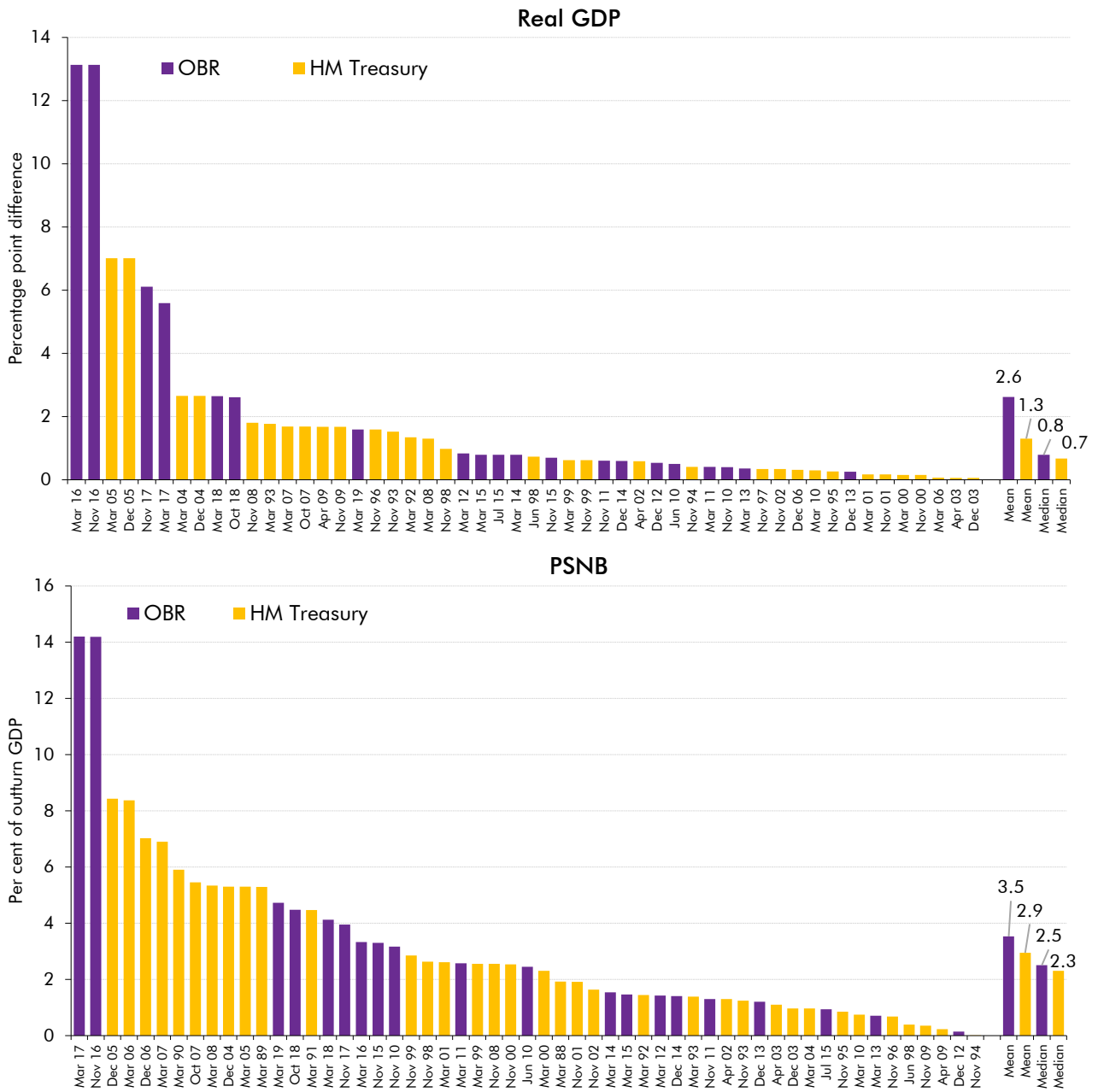
Source: HM Treasury, OBR

Chart A.8: Forecast bias at four-year horizon

Real GDP

PSNB
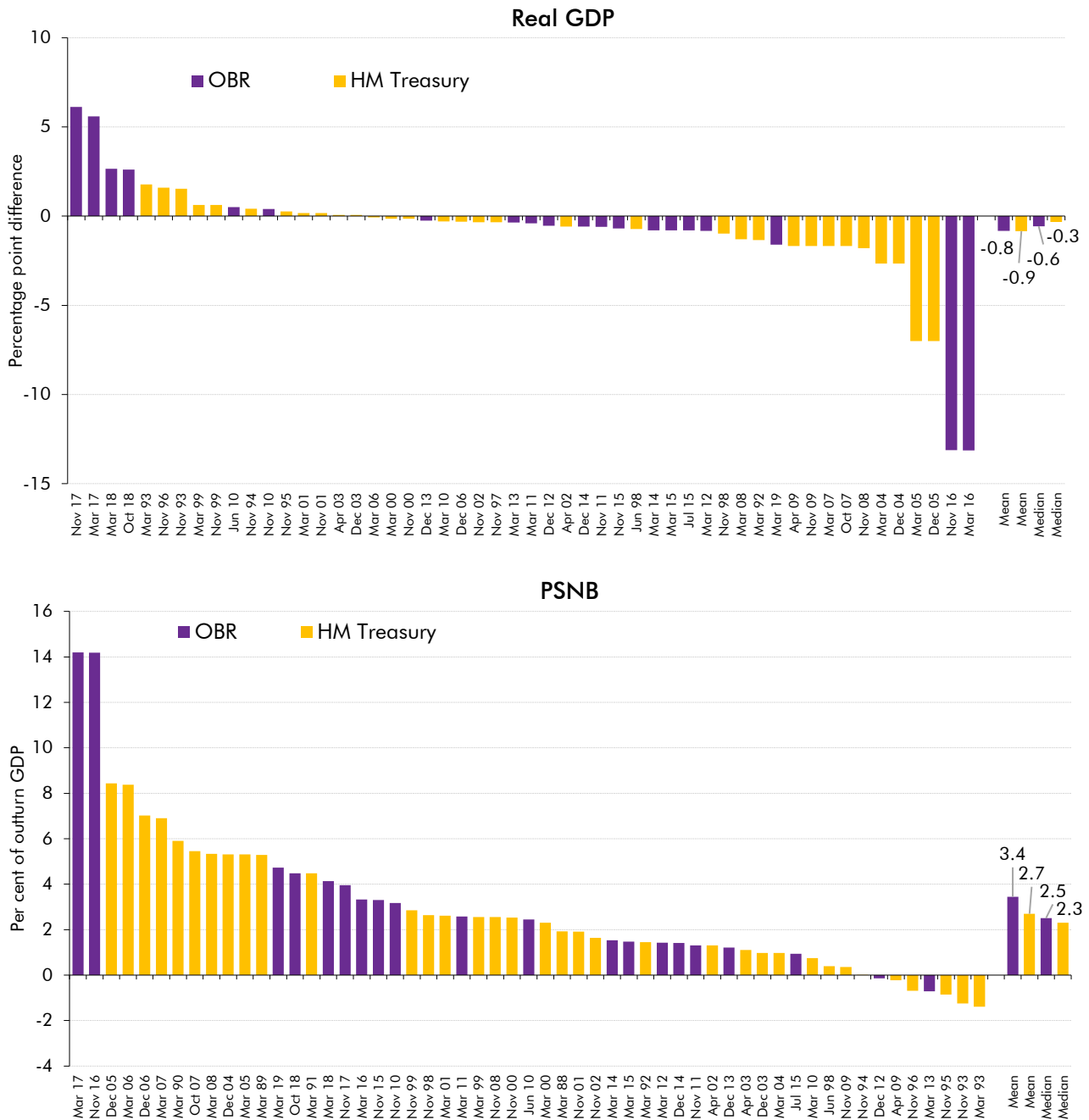
Source: HM Treasury, OBR

Chart A.9: Forecast accuracy at five-year horizon

Real GDP

PSNB
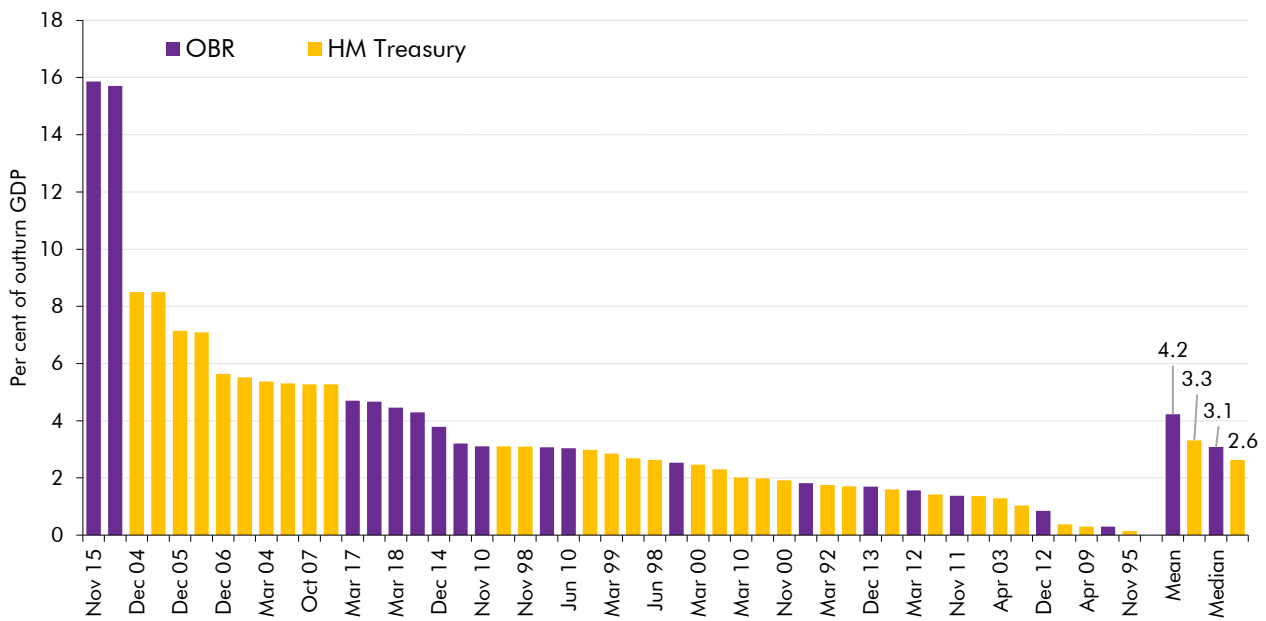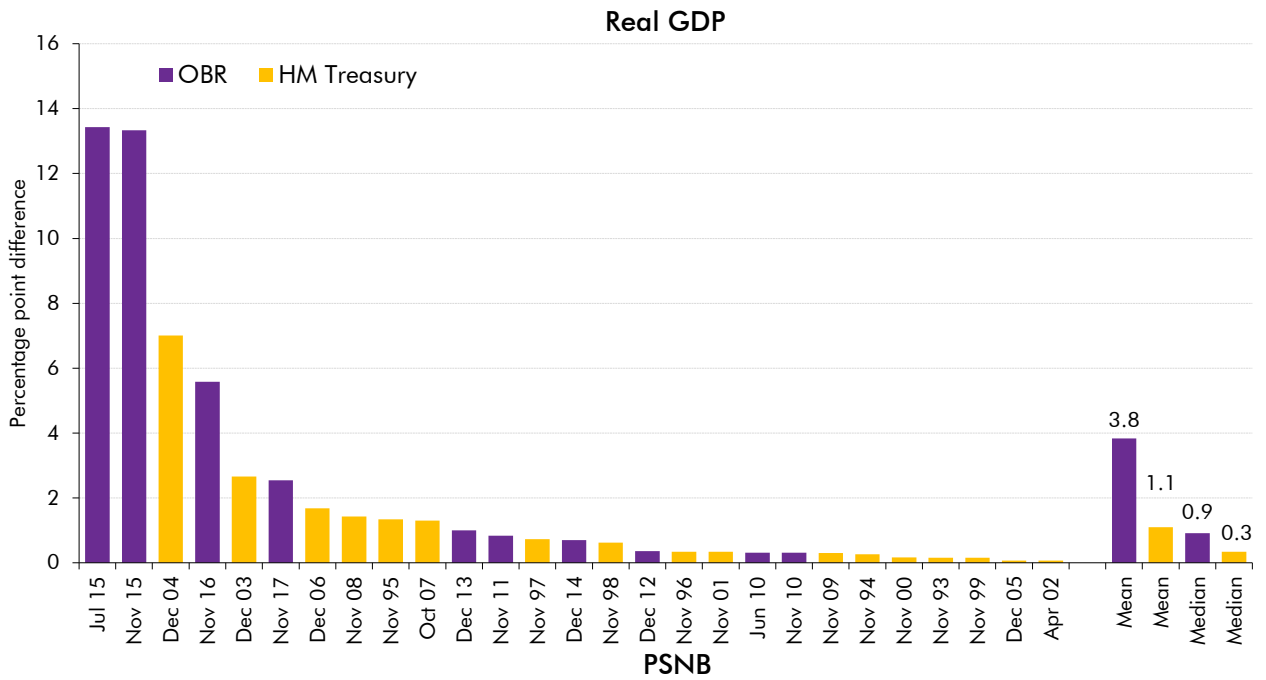
Source: HM Treasury, OBR

Chart A.10: Forecast bias at five-year horizon

Real GDP

PSNB

Source: HM Treasury, OBR