

Office for
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Responsibility**

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In-year fiscal forecasting and monitoring

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Abstract

One of our core duties is to monitor the performance of the public finances throughout the fiscal year. In this paper, we present our approach to in-year forecasting and monitoring of the public finances, and discuss how we assess our forecasts against the published data. The paper examines some of the key challenges posed by in-year forecasting and provides evidence of why simple extrapolation approaches are likely to provide inaccurate results. Among the issues discussed are the key factors that affect specific spending and receipts streams, how the timing of these affects the yearly profile of borrowing and sources of data revisions (both in-year and months after the year's end). The paper assesses our in-year forecasting performance, examining sources of error over previous forecasts, and compares our performance with that of other commentators. The paper demonstrates that our in-year forecasts have tended to over-predict deficits, due in part to methodological and data revisions, although our forecasts are shown to be somewhat better than the outside average. The paper concludes with lessons learnt that we intend to apply to future forecasts.

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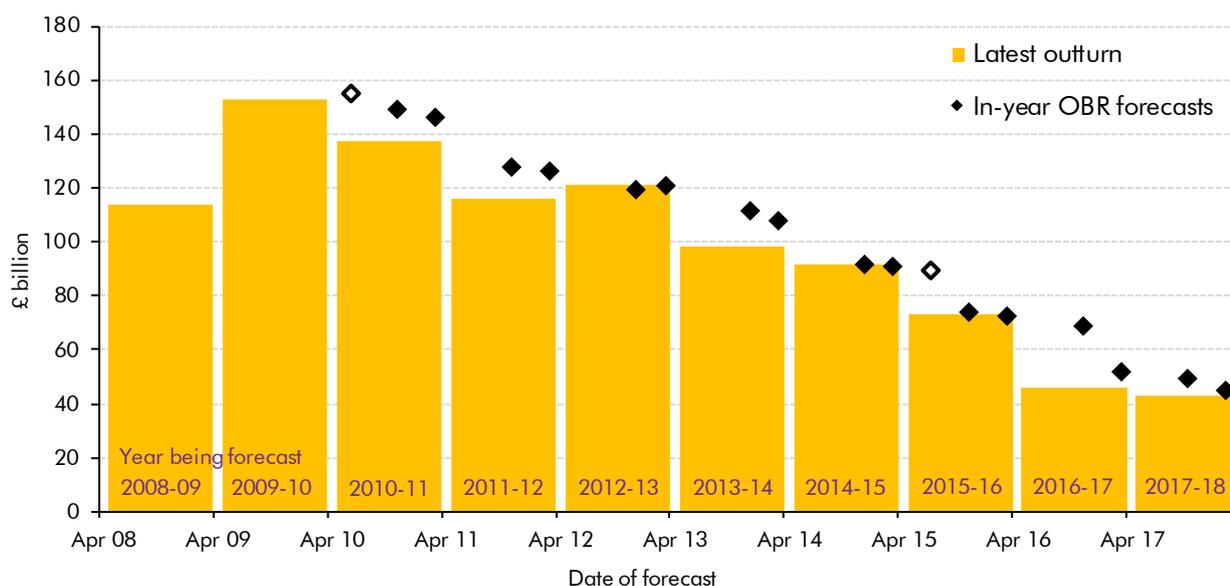
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1 Introduction

Introduction

- 1.1 The performance of the public finances through the fiscal year is watched closely by City economists and financial market participants, primarily as a guide to the amount of debt that the government is likely to have to issue. It also plays a critical role in determining the starting point for our medium-term fiscal forecasts. Our 2017 *Forecast evaluation report (FER)* found that the accuracy of our in-year receipts and spending forecasts had been a significant determinant of longer-term forecast performance and warranted further analysis.
- 1.2 In this paper, we set out the challenges of in-year public finance forecasting and of monitoring in-year forecasts against early vintages of outturn data. We also assess the performance of our in-year forecasts since 2010 and draw lessons for future ones.
- 1.3 Chart 1.1 shows the latest outturn estimates for public sector net borrowing – the headline measure of the budget deficit – over the past decade, together with the in-year forecasts that we have produced since the creation of the OBR in 2010. Each year we produced forecasts alongside the regular Budget and Autumn/Spring Statement, plus two additional ones to accompany the post-election Budgets held by the incoming governments in June 2010 and July 2015. (We treat these as ‘in-year’ forecasts for 2009-10 and 2014-15, given the provisional nature of most outturn data that soon after the end of the fiscal year.)

Chart 1.1: In-year forecasts: comparison with latest ONS outturns



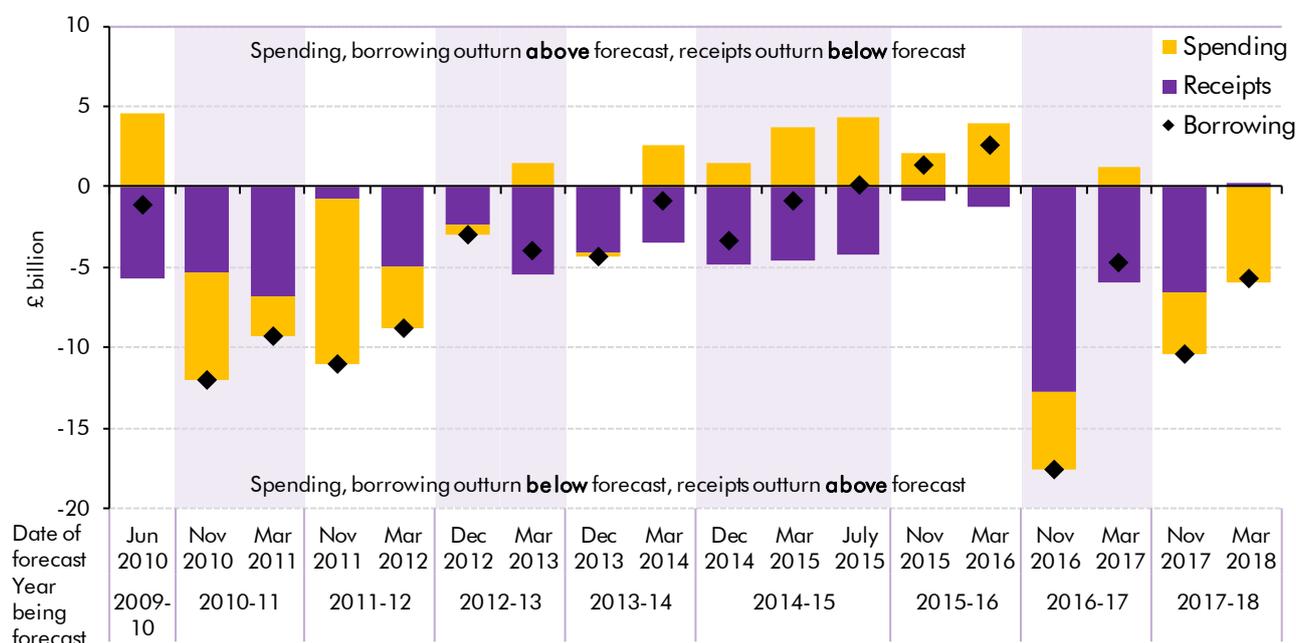
Note: Unfilled diamonds reflect estimates for the previous financial year. 'In-year' is assumed to be 2009-10 and 2014-15 for the June 2010 and July 2015 forecasts respectively.

Source: HM Treasury, ONS, OBR

- 1.4 The chart shows a fairly consistent pattern, with our in-year forecasts over-predicting the latest outturn estimate for borrowing by an average of £6.0 billion a year. (Outside forecasts collated by the Treasury at the same time as our autumn forecasts show a slightly larger average over-estimate than ours.) As we discuss in Chapters 4 and 5, our over-estimates in part reflect the impact of classification and methodological changes to the outturn data by the Office for National Statistics. Restating our forecasts on a like-for-like basis, reduces the figure to £5.2 billion. On this same basis, our average over-prediction has fallen from £6.0 billion in the first nine forecasts we produced to £4.3 billion in the second, but has been larger than average in the last two fiscal years.
- 1.5 Most of our fiscal forecasting models predict the *growth* in receipts or spending from an estimated starting point, rather than the *level* of receipts or spending directly. Rather than using the previous year's outturn as that starting point, we usually produce a more up-to-date 'within-year forecast' for the year in progress that supplements our model outputs with a range of administrative and operational information. This 'jumping-off' point is extremely important in our medium-term forecasts, since any difference between forecast and outturn at the start can be compounded over the remainder of the five-year period.
- 1.6 Chart 1.2 shows the differences between our in-year forecasts (restated for classification and methodological changes) and the latest estimated outturns.¹ The chart shows that:
- Our in-year forecasts have systematically under-estimated **receipts**, by an average of £4.7 billion a year in our autumn forecasts and £4.0 billion a year in spring (when more information is available because they are later in the April-to-March fiscal year).
 - Our in-year forecasts over-estimated **spending** between 2010 and 2012, but have been more balanced since then. Over the full period we over-estimated spending by an average of £2.8 billion in our autumn forecasts and under-estimated it by an average of £0.1 billion in our spring forecasts. The absolute differences (i.e. ignoring whether they are over- or under-estimates) have also been smaller for spending than for receipts, averaging £3.8 billion in autumn and £3.2 billion in spring.
 - The majority of our 'in-year' forecasts have over-estimated **borrowing**, with higher-than-expected receipts being the main factor. In around half of them, receipts and spending forecast differences compounded each other, pushing the borrowing difference in the same direction. In the other half, the differences offset each other.
 - The differences between our in-year forecasts and outturns were larger for **2016-17 and 2017-18** than over the preceding four years (and this was true to an even greater degree for the average outside forecast). In our case, the differences reflect a number of specific tax and spending factors that we discuss below. There is no sign that they reflect assumptions that we made about the impact of the EU referendum vote.

¹ The analysis in this working paper is based on the July 2018 vintage of ONS public finances data that was released on 21 August. Annex A briefly updates the analysis for 2017-18 based on the August 2018 vintage published on September 21.

Chart 1.2: In-year receipts, spending and borrowing forecast differences



Note: For comparability, 'in-year' is assumed to be 2009-10 and 2014-15 for the June 2010 and July 2015 forecasts respectively. Forecast errors have been adjusted for major classification changes (see Chapter 4).

Source: ONS, OBR

1.7 The largest difference between forecast and outturn is in our November 2016 forecast for 2016-17. After restating for methodology and classification changes, borrowing in that year was £17.6 billion below forecast, reflecting a £12.8 billion under-estimate of receipts and a £4.8 billion over-estimate of spending. This was the first forecast we made following the EU referendum, but the difference does not appear to have been the result of the judgements we made regarding the impact of the vote. It was partly driven by unusually big revisions to the in-year receipts and spending outturn data that underpinned our in-year forecast (see Box 3.1 of our 2017 Forecast evaluation report (*FER*)) and partly by a number of compounding tax and spending factors related neither to each other nor to the EU vote:

- Nearly half of the receipts difference was driven by unexpectedly strong **non-self-assessment income tax and national insurance (non-SA IT and NICs)** receipts during the second half of 2016-17. This partly reflected stronger-than-expected bonus payments in the final months of the financial year.
- Just over a third of the receipts difference reflected strong **onshore corporation tax (CT) and value added tax (VAT)** receipts in the second half of the year, with the pattern of receipts during that year more end-loaded than usual. (Chapter 3 describes the challenges of forecasting business tax payment patterns during the year).
- More than half of the spending difference reflected greater **underspending against central government departmental spending plans**. In our March 2017 *EFO*, we recognised that departments had been underspending against their plans by more than we expected and we revised our spending forecast downwards.

- The remaining difference reflected **other smaller compounding factors**, including the timing of expenditure transfers to the EU and strong capital gains tax (CGT) receipts.

1.8 The relative pessimism of our November 2016 in-year forecast carried through into the one-year ahead forecast for the following year, 2017-18. This was also too high – by £16.2 billion on the same restated basis, largely explained by the over-estimate of the starting point in 2016-17. On average, differences in the starting points of our fiscal forecasts tend to explain the bulk of our forecast differences at a one-year time horizon. Beyond two years, however, judgements regarding the growth in different receipts and spending lines from the starting point become more important. And while our in-year forecasts have tended to be too pessimistic, our medium-term forecasts have more often been too optimistic.

How we monitor the public finances through the year

The institutions that we work with

- 1.9 To understand monthly developments in public sector net borrowing, it is important to take a bottom-up approach that addresses receipts and spending separately and that attempts to identify what is driving the data and the implications that might have for our subsequent forecast. We work closely with colleagues across different government departments to monitor revenues and spending through the year. In particular:
- We work with analysts in **HM Revenue and Customs (HMRC)** to monitor tax receipts (the vast majority of central government income) and some items of welfare spending (tax credits, child benefit and tax-free childcare). We do not have access to the detailed underlying data (to protect taxpayer confidentiality), but we work closely with HMRC analysts to understand the drivers of monthly patterns in the data, particularly if there are any operational or timing effects that need to be factored in.
 - We work with analysts in the **Department for Work and Pensions (DWP)** to understand monthly developments in social security spending. Respecting the confidentiality of claimants' personal information, this process begins with high-level monthly reports on the department's expenditure on each of the benefits it administers. In-year monitoring provides insights into the performance of key forecast judgements, for example about the size and composition of the incapacity and disability benefits caseloads and the implications of the continuing rollout of universal credit.
 - Analysts in **HM Treasury** assist us in assessing the outputs of the department's public spending database 'OSCAR' (the Online System for Central Accounting and Reporting). This is the main source of the central government spending data reported in the ONS public sector finances release. The Treasury also works with the Debt Management Office and the Bank of England to produce data on debt interest spending. We meet the Treasury's analysts monthly to monitor these data.
 - Most local government data are published annually by the **Ministry of Housing, Communities and Local Government (MHCLG)** and the **devolved administrations**.

MHCLG undertakes quarterly surveys of English local authorities, but final figures are usually only available with a lag of 8 to 12 months.

- Monthly and quarterly data are published by statisticians in **Revenue Scotland** and the **Welsh Revenue Authority** for fully devolved taxes. Officials in both organisations help us in understanding monthly patterns. We also invite officials from the **Scottish Fiscal Commission** and the **Scottish and Welsh Governments** to our devolved taxes forecast challenge meetings to assist us in understanding any effects that are specific to Wales or Scotland that could distort the monthly profile of receipts.
- We also work closely with the **Office for National Statistics (ONS)** to understand other developments in the public finances data. For example, non-HMRC sources of income (such as interest and dividend receipts and BBC licence fee income) are published by the ONS on a monthly basis. The ONS also collects quarterly data on public corporations, but these are prone to revision until final, audited accounts for each corporation are available. The lag between the end of the financial year and the availability of final outturn data can be as long as nine months for some entities.

The approaches we use

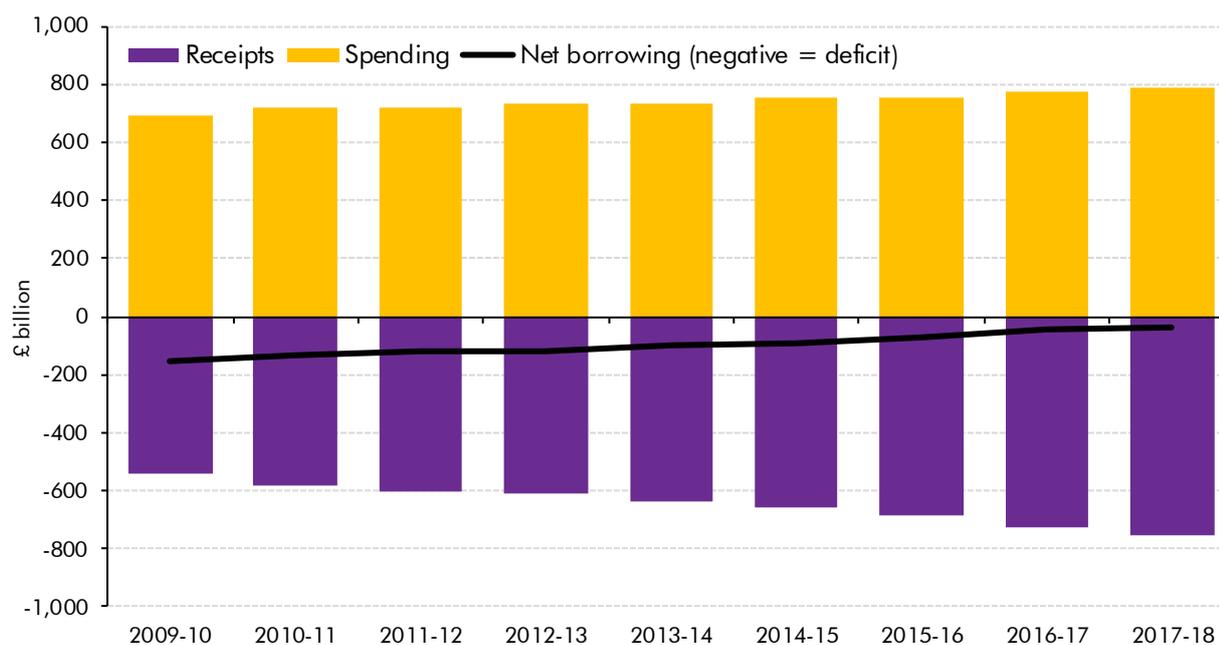
- 1.10 A range of analytical techniques and information sources are available to monitor the performance of the public finances through the year. We use assessments based on these to calibrate our in-year forecasts. It is important to consider insights from a range of approaches, as each has benefits and drawbacks. These are context-specific, so the weight we place on each approach varies over time and across forecasts.

Extrapolating year-to-date changes

- 1.11 One of the simplest approaches to monitoring in-year performance is to look at cumulative year-on-year growth rates – in other words, by how much a category of receipts or spending has grown comparing the months available for the year to date with the same period of the previous year. This appears to be the most common approach taken by outside commentators when they compare the ONS's monthly borrowing figures to our latest full-year forecasts. It is simple and transparent, but has several potential drawbacks:
- In many cases, **outturn data are prone to revision** for several months after the first data release. As Box 4.1 sets out, most receipts data for the most recent month in each ONS release are based on forecasts and so will not provide a meaningful indication of outturns for the full-year. Chapter 4 provides more information on data revisions.
 - **Cashflows may be spread unevenly within the year.** When this is the case, the cumulative year-to-date growth on a year earlier does not provide a meaningful guide to full-year growth. Self-assessment income tax is an extreme example (see Chapter 3), where in effect no useful information is available on receipts performance for the year as a whole until balancing payments are made at the end of January.

- **Specific issues may distort the year-on-year growth rate.** Known timing, policy or operational factors should be taken into account when interpreting a year-to-date extrapolation. In particular, ‘base effects’ may distort the picture if they affect the profile of cashflows in either the previous or current years. We aim to communicate any material issues of this sort in our monthly commentaries on the public finances.
- **Year-on-year growth rates in balance measures are particularly prone to misinterpretation.** As Chart 1.3 shows, public sector net borrowing is the relatively small difference between two very large flows: current receipts (around £750 billion in 2017-18) and total managed expenditure (around £790 billion in 2017-18). As the deficit gets smaller, the percentage change in the deficit for a given percentage change in receipts and spending increases. In 2017-18, if receipts were just 1 per cent lower and spending just 1 per cent higher, the deficit would be 39 per cent larger than currently estimated. Applying the same 1 per cent differences in receipts and spending in 2009-10 would increase the deficit in that year by just 8 per cent.²

Chart 1.3: Public sector receipts, spending and net borrowing



Source: ONS

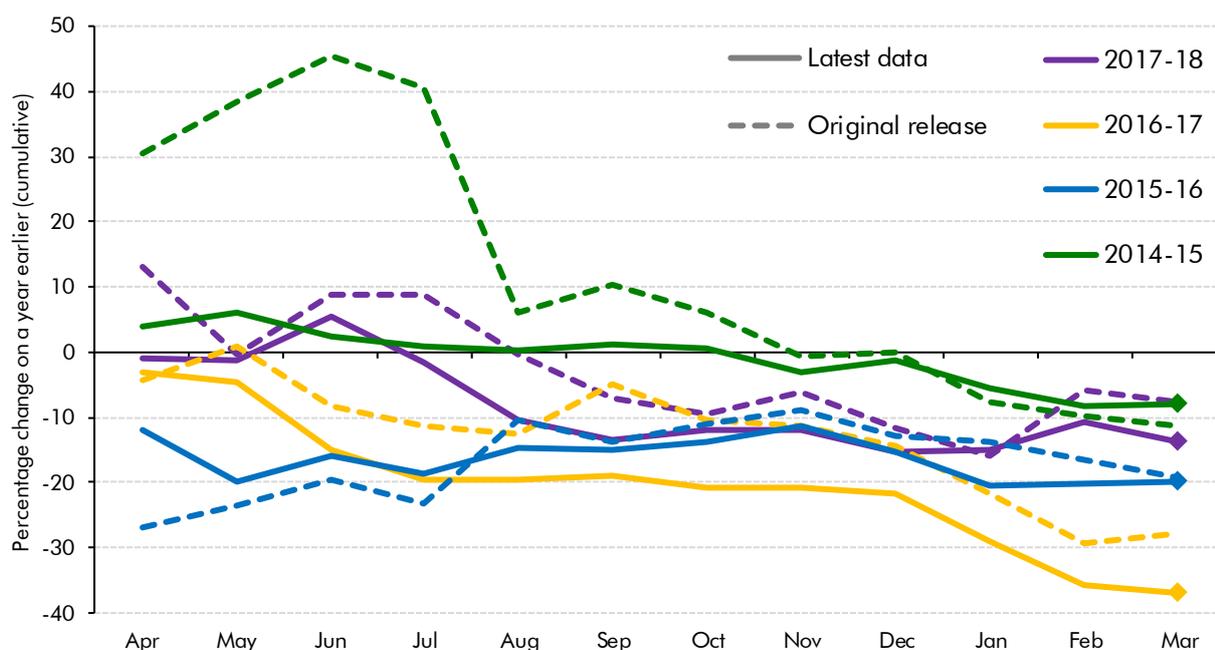
1.12 Chart 1.4 shows how the cumulative percentage change in the budget deficit over the year to date is often a poor guide to the eventual full-year picture – both because the cumulative change can vary significantly as the year progresses and because the outturn estimates for both years can be revised significantly after the financial year has ended. The dashed lines show the cumulative changes reported in the contemporaneous data available at each point in time, while the solid lines are based on the latest estimates. The end of each solid line shows the latest ‘outturn’ estimate for year-on-year growth in PSNB in each fiscal year.

² For the same reason, the percentage ‘error’ in the forecast for the budget deficit is a particularly poor metric for forecast performance as the budget balance gets smaller. A forecast of a £1 deficit when the outturn is a £1 surplus would be astonishingly accurate, but a percentage error of 200 per cent.

1.13 To take the most dramatic example, three months into the 2014-15 financial year the deficit for the year to date was estimated to be 45 per cent larger than in the same period the previous year, but the first estimate for the full year showed it 11 per cent smaller. Subsequent revisions to the outturn data for both 2013-14 and 2014-15 now suggest that the deficit fell by 8 rather than 11 per cent over the full year and that the increase over the first three months was 2 rather than 45 per cent. The scale of these revisions is in part a reflection of the public finances data being moved from the 1995 to the 2010 version of the European System of Accounts in the September 2014 data release.

1.14 Looking over the past four years, the chart shows that extrapolating mechanically from in-year performance typically paints too pessimistic a picture for the full year, particularly in the early months of the fiscal year. The difference between the solid and dashed lines also shows that in four fifths of the months shown, the latest data show a more favourable (i.e. less positive or more negative) change in the deficit than the initial data did.

Chart 1.4: Cumulative year-on-year change in PSNB over the year



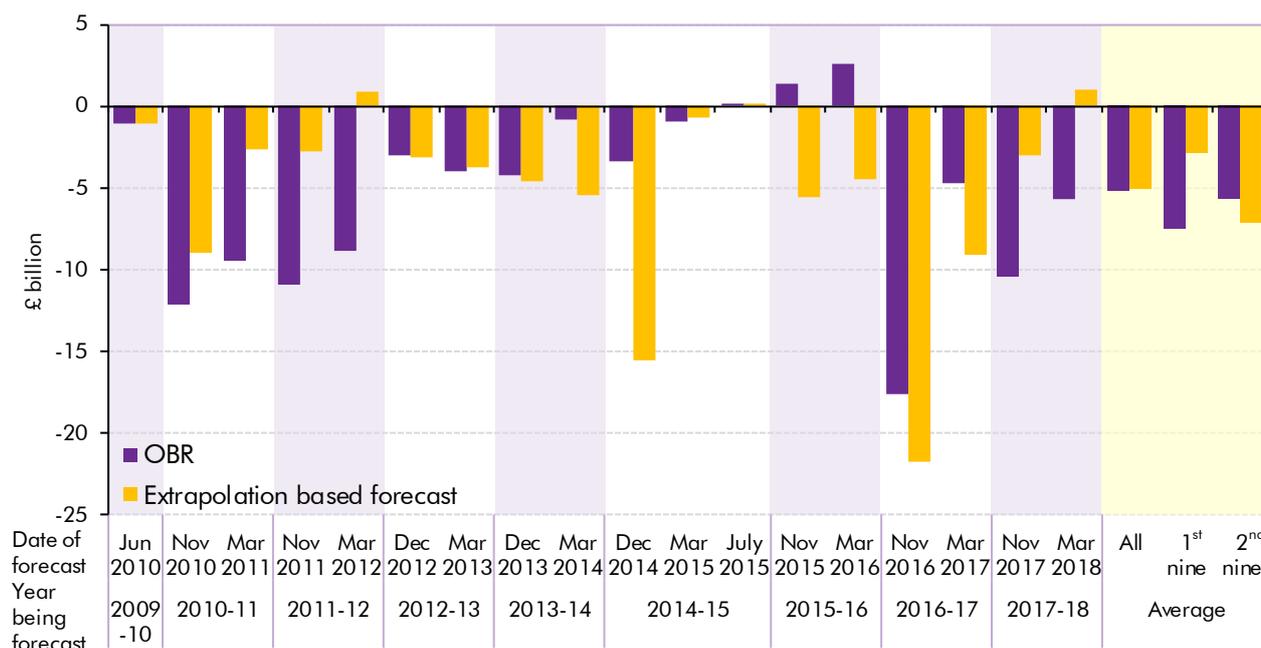
Source: ONS

1.15 Chart 1.5 shows our in-year *Economic and fiscal outlook (EFO)* forecast differences relative to an extrapolated forecast using both the data that were available at the time and the August 2018 vintage of data. We have adjusted each forecast for major classification and methodological changes, as set out in Chapter 4. The chart shows that:

- Relative to **our first nine forecasts**, an extrapolated forecast based on data available at the time would on average have performed better than our in-year forecasts. This largely reflects our forecasts for self-financed local authority spending, which were consistently too high during this period. Both the extrapolated forecasts and our own were too pessimistic on average.

- Relative to **our most recent nine forecasts**, an extrapolated forecast using the data available at the time would on average have performed worse than our in-year forecasts. Both were too pessimistic on average, but the extrapolated forecasts were particularly affected by the uneven monthly paths of receipts in 2014-15 and 2016-17. This also reflects the fact that borrowing was lower during this period, increasing the volatility of percentage changes.

Chart 1.5: Forecast differences: OBR versus extrapolated in-year forecasts



Source: ONS, OBR

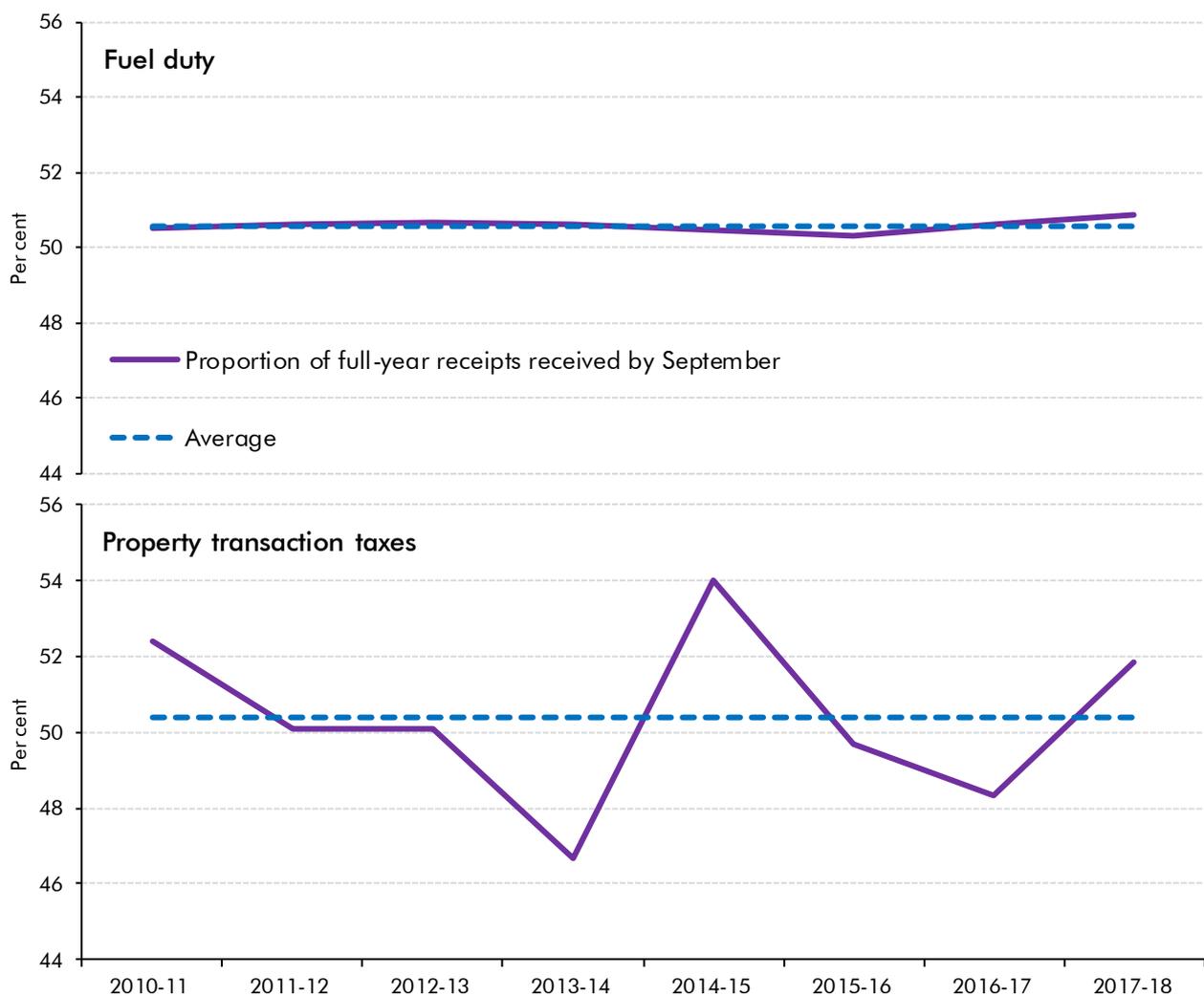
Comparing historical monthly shares

- 1.16 Instead of looking at growth rates, we can scale up receipts or spending totals for the year to date by looking at the share of the full-year total that would typically be recorded by that point in the year based on historical experience. This approach is less distorted by unusual base effects from the previous year, but still suffers from many of the drawbacks associated with extrapolating year-on-year growth rates described above.
- 1.17 The accuracy of forecasts derived by scaling up outturns for the year to date, based on historical shares, will depend on how stable the monthly distribution of the receipt or spending item in question is from year to year. And this will depend importantly on the degree to which it has been subject to changes in policy that alter the monthly distribution either permanently or temporarily.
- 1.18 Chart 1.6 compares one relatively stable category of tax receipts – fuel duty – with one relatively unstable one – property transaction taxes.³ For each it shows the proportion of full-year receipts collected by September, half way through the financial year, in each of the last eight years and on average over that period.

³ Property transaction taxes include: stamp duty land tax (SDLT), the Scottish land and buildings transaction tax (LBTT), the Welsh land transaction tax (LTT) and the UK-wide annual tax on enveloped dwellings (ATED).

1.19 For fuel duty, the proportion of receipts collected in the first half of the year averaged 50.6 per cent and varied only from 50.3 to 50.9 per cent. For property transaction taxes, it averaged 50.4 per cent but varied from 46.7 per cent in 2013-14 to 54.0 per cent in 2014-15. The monthly distribution of property transaction tax receipts has been distorted at various points, for example by forestalling ahead of pre-announced policy changes (like the introduction of a surcharge on second properties in April 2016 that boosted receipts in late 2015-16 and depressed them in early 2016-17). Scaling up a full-year forecast for 2016-17 based on the average year-to-September revenue share would have resulted in a 4.2 per cent (£500 million) underestimate relative to actual receipts. The same scaling up for fuel duty would show an overestimate of only 0.1 per cent (£30 million).

Chart 1.6: Proportion of full-year receipts received by September



Source: ONS

Comparing to departments' monthly forecasts

1.20 In some cases, analysts in government departments generate internal monthly forecasts based on our annual forecast to help monitor spending and revenues. Among other things, these are used to inform the Treasury's cash management operations and departments' main and supplementary estimates to Parliament. They are typically generated via a

mechanical approach, using historical monthly shares, and may be adjusted for known timing effects, so they carry the same potential drawbacks as that approach.

- 1.21 Given the large number of tax and spending streams that we forecast, we do not generate a monthly profile for our PSNB forecast. But we do draw on departments' monthly profiling where it is available – in particular, HMRC's analysis of various tax receipts and spending on tax credits and DWP's in-year monitoring of benefit expenditure. These monthly profiles are developed within departments using historical cashflow patterns and may be informed by confidential operational information on expected taxpayer behaviour over the year.

Incorporating other factors

- 1.22 We complement these largely backward-looking approaches by tracking wider developments in the economy and the operational environment, as well as insights from departments' analysts and forecast models. This allows us to anticipate some forthcoming issues. For example:
- Businesses and individuals tend where possible to limit the impact of pre-announced tax rises (or exploit the impact of pre-announced cuts) by shifting their activity or income between tax years. We discussed these **forestalling effects** in respect of property purchases in *Working paper No. 10: Forestalling ahead of property tax changes* and of incomes in Box 4.3 of our March 2017 EFO.
 - We reflect near-term **economic developments** in our in-year forecasts. For example, we incorporate our latest judgement on near-term RPI movements into our in-year forecasts for debt interest spending, where the accrued interest on index-linked gilts is sensitive to small changes in the monthly path of inflation. We also incorporate our near-term forecasts for residential property transactions and house prices into our in-year estimate for property transaction tax receipts.
 - Where possible, we incorporate other **operational factors and timing effects**. For example, year-on-year growth rates for taxes on consumer spending can be affected by where Easter falls in March or April. We can also anticipate the effect of previously announced policy measures that are due to come into force later in the fiscal year.

How we produce our in-year fiscal forecasts

- 1.23 We start our in-year forecast by assessing the performance of receipts and spending over the year to date relative to our previous forecast. We use this information to decide how best to complete the full-year forecast for the fiscal year in progress. No single approach is applied mechanically, since different approaches will give clearer signals at different times. For example, when forecasting a tax stream for which HMRC has estimated an in-year monthly profile based on our previous forecast, we may start by considering the year-to-date performance against that profile, then cross-check that against the historical proportions analysis and wider information on performance of the tax base. We also take into account the output of the underlying forecast model and economic determinants.

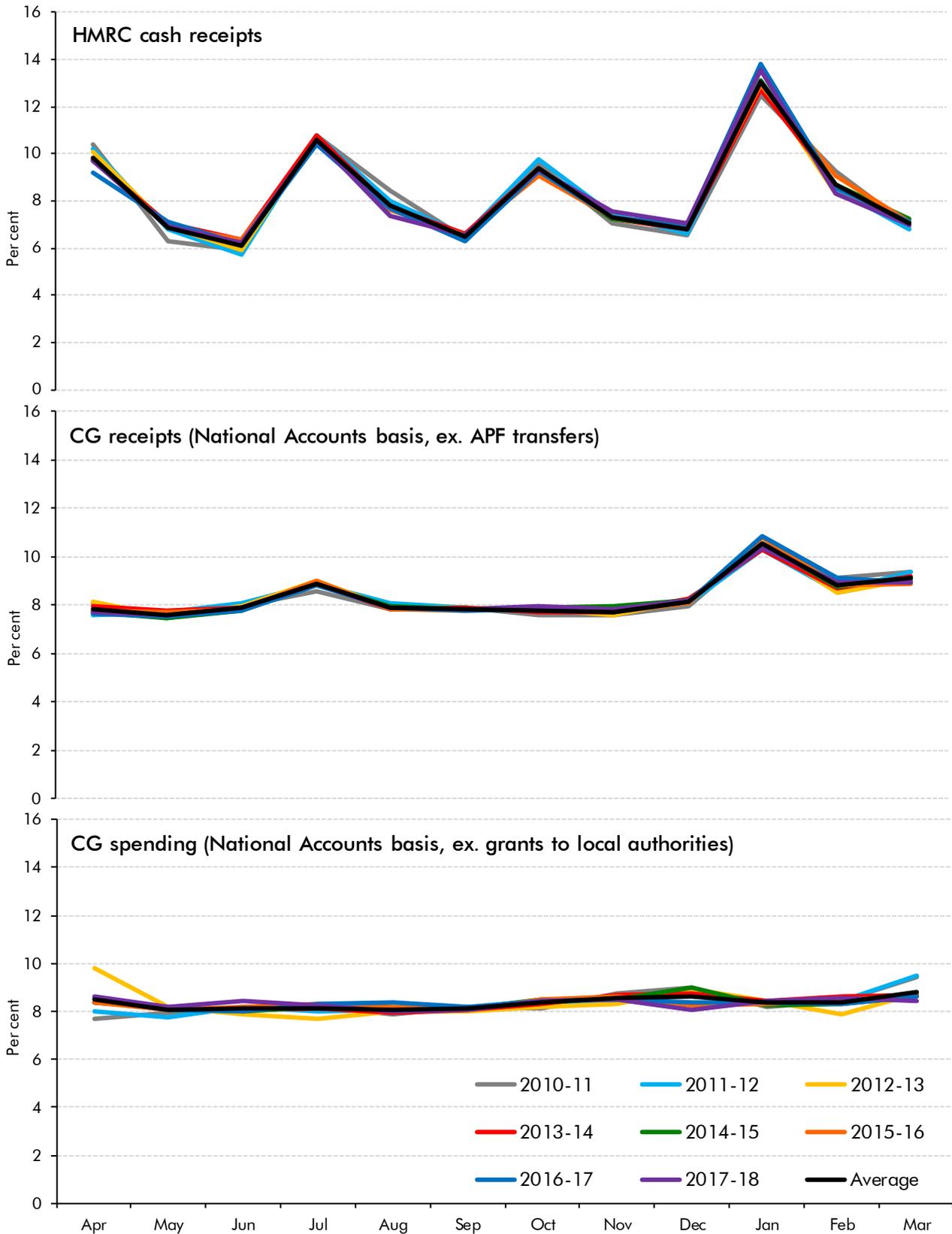
2 The public finances month by month

Introduction

- 2.1 In this chapter we review issues that arise in specific months of each fiscal year that help explain the evolution of receipts and spending through the year. These in turn help explain the monthly profile of public sector net borrowing. The ONS publishes detailed monthly data only for central government (CG) and so we focus on that sector here.
- 2.2 Chart 2.1 shows the average proportion of total full-year CG receipts and spending recorded in each month of the financial year over the past eight years.¹ For receipts, it shows two measures: the months in which HMRC receives the cash and the months in which those receipts are recorded on a National Accounts basis by the ONS after making adjustments (where practical) to accrue them more closely to the time when the activity generating the receipts occurred (see Chapter 4). Overall:
- **HMRC cash receipts** peak in April, July, October and January, reflecting the monthly pattern of the main HMRC taxes (income tax, VAT and corporation tax). The largest peak is in January, when capital gains tax and self-assessment balancing payments in respect of income tax and NICs are received.
 - **Central government receipts (measured on a National Accounts basis)** peak in July and January, reflecting payment deadlines for self-assessment income tax and capital gains tax (which are measured on a cash basis in the National Accounts rather than attempting to accrue them to the period when the tax liabilities were generated). The VAT and onshore corporation tax (CT) cash peaks are smoothed out over the year by the ONS accruals adjustment methodology (see Box 4.1).
 - **Central government spending** is much more evenly spread over the year.

¹ These charts show CG receipts and spending, excluding key intra-public sector flows (APF transfers from the Bank of England to HM Treasury and grants from central government to local authorities), which are neutral for public sector net borrowing in the short-term.

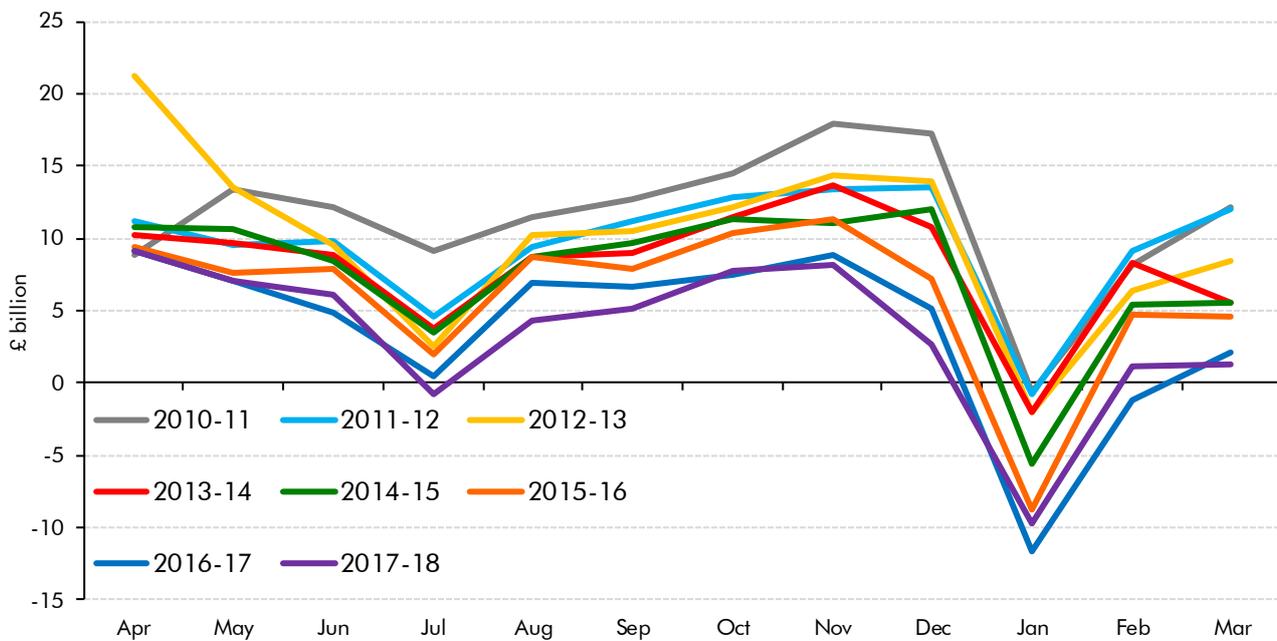
Chart 2.1: Central government receipts and spending by month



Source: ONS

2.3 Chart 2.2 shows how the monthly profiles of receipts and spending have helped shape the evolution of public sector net borrowing (which is measured largely on an accrued basis) through recent years. Most notably, it shows that monthly net borrowing tends to be at its lowest in July and January, reflecting the peaks in receipts.

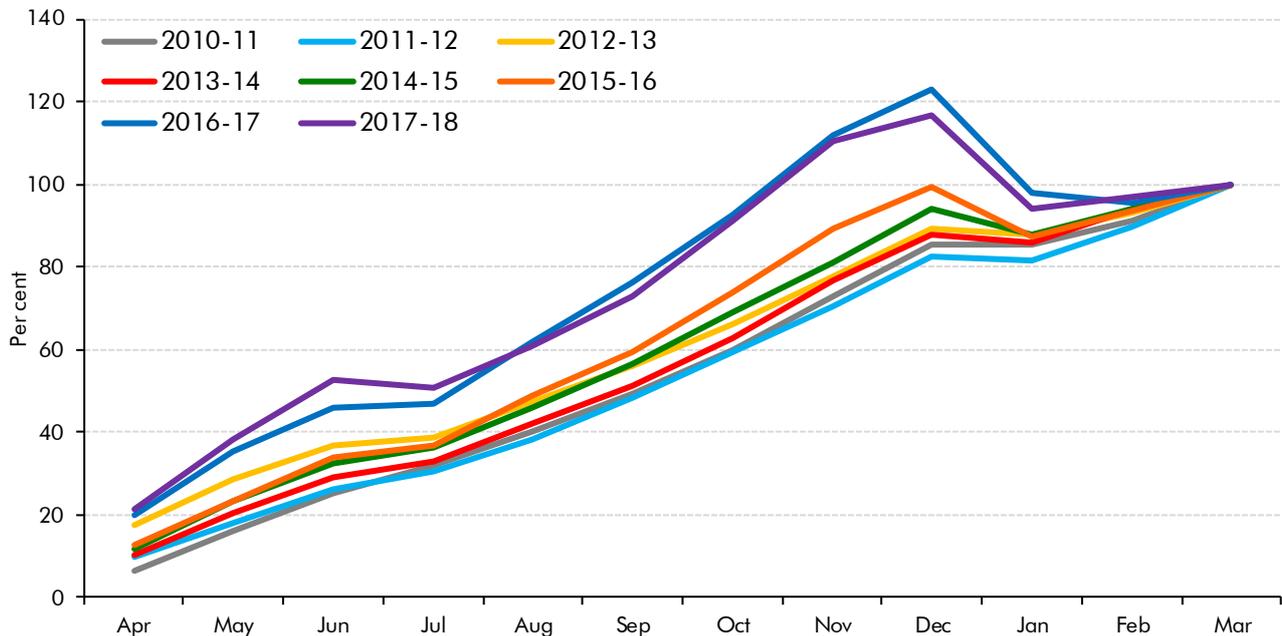
Chart 2.2: Public sector net borrowing by month



Source: ONS

2.4 Chart 2.3 shows how the cumulative proportion of full-year borrowing builds up through the year and what that means in cumulative percentage terms through each year. It demonstrates that as the full-year deficit has fallen, and the monthly surplus in January has risen, the cumulative position by December has moved from 82.4 per cent of the full-year total in 2010-11 to 116.7 per cent of the full-year total in 2017-18.

Chart 2.3: Cumulative proportion of full-year borrowing by month



Source: ONS

Key tax and spending issues by month

2.5 The following sections set out the key tax and spending issues that typically arise in each month of the year.

April

2.6 April is typically the largest month of the year for central government spending and the third largest month for HMRC cash receipts, although the bulk of these are accrued back to the previous fiscal year when the activity to which they relate took place. On average over the past 10 years, April has accounted for 8.3 per cent of full-year central government spending and 9.9 per cent of full-year HMRC cash receipts (compared to 7.8 per cent if they were spread evenly).

2.7 The main issues affecting April receipts include:

- March is the most important month of the year for employee bonuses, particularly in the high-paying financial sector, which means that April is the largest month of the year for **cash PAYE income tax and NICs** receipts. This means there is greater scope for the forecast-based initial estimate of accrued receipts in March to be revised when the April cash data become available. In Chapter 3 we discuss some of the challenges in forecasting end-of-year bonus payments and associated tax receipts.
- April is a peak month for **onshore CT** and **VAT** cash payments, all of which are accrued back to the previous year in the ONS data. The extent to which cash VAT payments are concentrated in April depends in part on the timing of Easter. Over the

past 10 years, excluding those affected by main rate changes, April has accounted for between 9.3 and 10.8 per cent of full-year cash VAT receipts.

- Historically, May has been one of the smallest months of the year for **cash alcohol and tobacco duties**, which accrues back to April under the ONS accounting treatment. This reflects forestalling in March, when manufacturers front-load the clearing of their products with HMRC ahead of the March Budget. The Government announced a new uprating schedule at Autumn Budget 2017, so this is now likely to happen earlier in the year. It is not possible to say precisely when, since the timing of autumn fiscal events has historically varied more than that of spring events.
- CG receipts tend to be flattered in April, July, October and January, when excess profits from the Bank of England's **Asset Purchase Facility (APF)** – in which the gilts and other financial instruments bought under quantitative easing are held – are usually transferred from the Bank to the Treasury. This transfer is neutral for the public sector overall, since they have an offsetting effect on public corporations' net borrowing.

2.8 The main issues affecting CG spending include:

- **Debt interest spending** tends to peak in April, reflecting the usual February spike in the retail prices index (RPI) following the New Year sales. Chapter 3 discusses this further.
- **Central government transfers to local authorities** generally peak in April. But the immediate impact of these transfers is neutral for the public sector, as the resulting increase in CG spending is offset by lower local authority net borrowing.

May

2.9 CG receipts tend to be lower than average in May, accounting for between 7.5 and 7.8 per cent of the full-year total over the past eight years. CG spending also tends to be slightly lower than average, accounting for between 7.8 and 8.2 per cent of the full-year total.

June

2.10 The annual historical gross national income (GNI) and VAT-based EU contributions adjustment updates previous interim contributions to the EU (net of rebate) to reflect VAT and GNI outturns.² This used to take place in December each year, including the large surcharge in 2014 that was prompted by historical revisions to estimates of GNI published in Blue Book 2014. In 2016 the adjustment was moved to the following June.

July

2.11 July is usually the second largest month for HMRC cash receipts – accounting for 10.7 per cent of the full-year total on average over the past 10 years. Most of these cash receipts accrue back to earlier months in the fiscal year.

² Also known as the 'annual surcharge', although the adjustment can be a payment or a credit, depending on the scale and direction of revisions to historical VAT and GNI data in the UK and how these relate to revisions in other EU Member States.

The public finances month by month

2.12 The main issues affecting July receipts include:

- The first quarterly instalment payment of **onshore CT** in respect of profits in the calendar year in progress is due in July. This can give an early indication of companies' own profit expectations for the year. This is also the first month of the calendar quarter, which tends to be the peak month in the **VAT** quarterly pattern.
- The **second payment-on-account of self-assessment income tax liabilities** is due in July. For the vast majority of self-assessment taxpayers, these payments simply reflect a mechanical calculation based on their previous year's liability and so it is not a good indicator of tax receipts for the full-year. In Chapter 3 we discuss the self-assessment payment-on-account system and how it affects our in-year forecasts.

2.13 Revisions to central government receipts in the previous fiscal year are more likely to take place in July than in later months of the year. This is when the ONS aligns its receipts estimates with HMRC's final, audited 'Trust Statement' – its annual report on the collection and allocation of the receipts for which it is responsible.

August

2.14 Both CG receipts and CG spending tend to be lower than average in August. CG receipts have averaged between 7.8 and 8.1 per cent of the full-year total over the past eight years, while CG spending has averaged between 7.9 and 8.4 per cent of the full-year total.

September

2.15 In the September data release, the ONS typically incorporates two important pieces of information about spending in the previous fiscal year. This often results in larger-than-usual revisions to previous borrowing estimates. These are:

- **Initial local authority spending and financing outturns for England**, published by the Ministry of Housing, Communities and Local Government. These are still liable to revision, with final audited resource accounts for English authorities generally available only in November – eight months after the end of the fiscal year. The lag tends to be greater in Scotland, Wales and Northern Ireland.
- **'Final' CG spending estimates**, consistent with the Treasury's annual *Public expenditure statistical analyses* (PESA) publication. Again, these remain subject to future revisions.

2.16 CG debt interest payments are usually relatively low in September, reflecting the usual July dip in the RPI as a result of the summer sales. This feeds through to accrued interest on index-linked gilts with a lag.

October

2.17 October is a peak month in the quarter for cash onshore CT and VAT payments, making it typically the fourth largest month for HMRC cash receipts. The bulk of these will accrue to earlier months within the same fiscal year (other than those from small companies who do

not pay their CT quarterly, which are accrued back to the previous year). Over the past 10 years, October has on average accounted for 9.4 per cent of full-year HMRC cash receipts.

November

- 2.18 November tends to be the fourth largest month for central government expenditure. Welfare spending tends to peak in November, reflecting winter fuel payments of around £2 billion.

December

- 2.19 On average over the past 10 years, December has been the third largest month for central government spending, accounting for 8.8 per cent of the full-year total. That largely reflects higher-than-average current departmental spending, thanks to several factors, including the timing of central government grants to local authorities.

January

- 2.20 January is usually the largest month for cash and accrued tax receipts. Over the past 10 years, January has on average accounted for 13.0 per cent of full-year HMRC cash receipts and 10.4 per cent of the ONS accrued measure of public sector receipts. This reflects:

- Balancing payments on the previous year's **self-assessment income tax** and **capital gains tax** liabilities are due at the end of the month. These are recorded on a cash basis rather than being time-shifted back to approximate when the liabilities accrued.
- **PAYE income tax and NICs** receipts tend to be slightly higher than average in January, reflecting tax paid on employers' Christmas bonuses to their employees in December.
- January also tends to be the largest month for cash **VAT** receipts (reflecting both Christmas retail sales and the usual monthly pattern within each quarter) and **onshore CT** receipts. The bulk of both payments will accrue to earlier months in the year.

February

- 2.21 To deal with budgetary pressures, the European Commission can 'draw forward' up to two months' worth of Member State contributions into the first quarter of the calendar year – so that they contribute five months' worth in total. The first quarter of the calendar year is the final quarter of the preceding fiscal year for the UK. These payments have typically taken place in February and March, but can also take place in January. They can be an important source of volatility in year-to-date spending growth, as we discuss in Chapter 3.

March

- 2.22 March is typically the second largest month for central government spending, accounting for 8.9 per cent of the full-year total on average over the past 10 years. This reflects:

- Spending from **departmental budgets (DEs)** is usually higher than average in March as departments look to spend the amounts they have been allocated before the end of the fiscal year. With Treasury agreement, some underspends can be carried forward to

future years under the 'Budget Exchange' scheme. But any underspending that cannot be carried forward is surrendered, which partly explains the surge in March spending. As regards current spending, some of this surge also reflects data reporting conventions, with residual yearly spending not previously attributed to a specific month often being accrued to March. For capital spending, it reflects an increase in capital grants and gross fixed capital formation spending. The latter tends to be higher in March for several reasons, including timing effects caused by project delays in the preceding months, for example due to adverse weather conditions over the winter.

- **Grants to local authorities** tend to be larger than average in March.

2.23 Partly offsetting those factors, central government debt interest payments are usually much lower than average in March, because New Year sales push down the RPI in January.

The OBR forecast timetable

2.24 We produce two fiscal forecasts each year, alongside the Budget and the supplementary Spring or Autumn Statement. The spring fiscal event is almost always in mid-March and the autumn event generally takes place between mid-November and early December.

2.25 During our autumn forecast rounds, we typically begin forecasting based on the August *Public sector finances* release (published in September). This allows us to incorporate the important revisions to CG spending and local authority borrowing that are usually incorporated into that release. In six of the eight autumn forecasts we have produced, we have been able to base the final published forecast on the October *Public sector finances* release (published in November), which contains important information on the October peak for CG receipts. In both the November 2016 and November 2017 *EFOs*, we were unable to incorporate the October release into our forecasts because of an earlier timetable than usual, but we were able to draw on some administrative receipts data from HMRC.

2.26 The Chancellor has announced that this year's Budget will take place on 29 October. This means that our in-year forecast for 2018-19 will be based on less information than normal. Specifically, we will not have access to administrative data for October. This will affect all our in-year estimates, but could be particularly important for corporation tax receipts, where October is a peak month and cash receipts have been growing strongly so far this year.

2.27 In our spring forecasts, we typically begin forecasting based on the December *Public sector finances* release (published in January). In all our spring *EFOs* to date, the final forecast was based on the January release (published in February).

3 The main forecasting challenges

Introduction

3.1 This chapter discusses seven of the most significant challenges that we face when producing in-year receipts and spending forecasts. These have been important in explaining the performance of our in-year forecasts relative to outturn. They are:

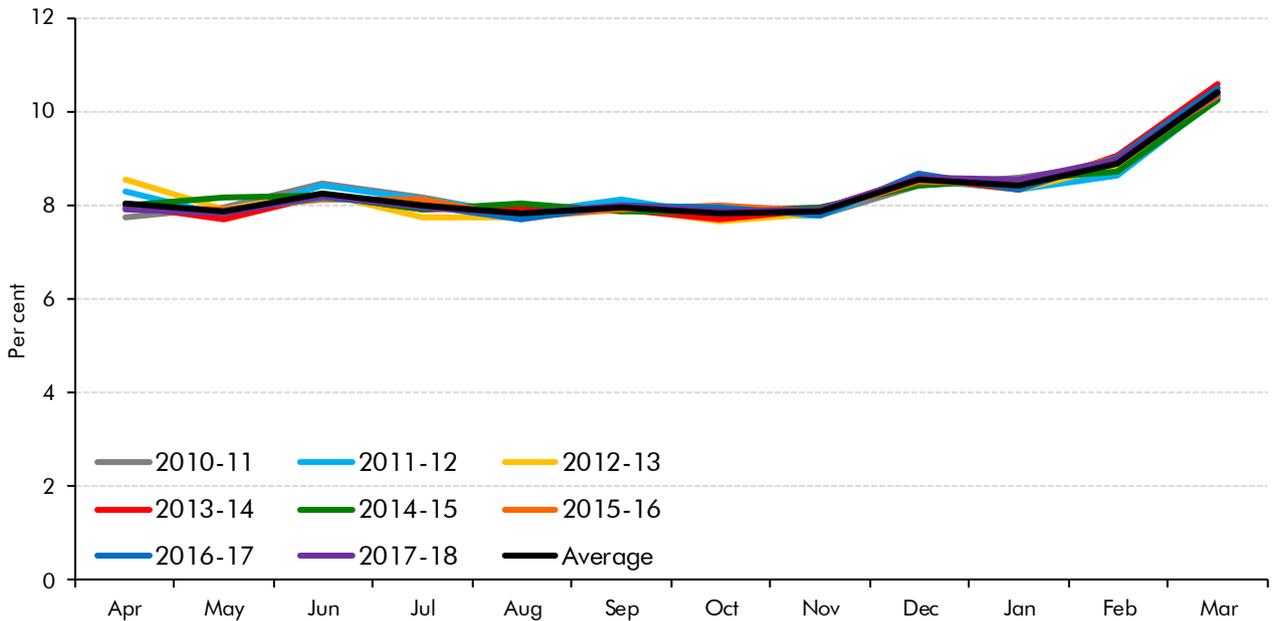
- Tax payments on employees' bonuses;
- Business tax payment patterns;
- The self-assessment income tax payment system;
- Central government departmental spending;
- The timing of expenditure transfers to the EU;
- Central government debt interest spending; and
- Local authority net borrowing.

Tax payments on employees' bonuses

3.2 Accrued receipts from PAYE income tax and NICs are fairly evenly spread across most of the year, but – as Chart 3.1 shows – they are higher than average in December and January (reflecting Christmas bonuses) and even more so in February and March (reflecting end-of-year bonuses). Not only is overall taxpayer income higher than usual in these months, but so too is the amount of tax paid per pound of income. This is because bonuses will be subject to each taxpayer's marginal tax rate, which will be higher than the average rate paid across all their income. In addition, a large proportion of bonuses are paid to higher and additional rate taxpayers (especially those in the financial sector).

3.3 The peaks in PAYE IT and NICs receipts are relatively modest and relatively stable compared to those for some other taxes. For example, the peak average PAYE IT and NICs monthly share over the past eight years was 10.4 per cent in March (reflecting a range from 10.2 to 10.6 per cent), whereas the peak share for cash onshore corporation tax was 21.1 per cent in January (reflecting a range from 17.8 to 26.6 per cent). But because PAYE IT and NICs are the largest single stream of tax receipts, even these relatively small percentage concentrations at the end of the year can be material to our in-year forecasts.

Chart 3.1: Monthly pattern of PAYE income tax and NICs receipts



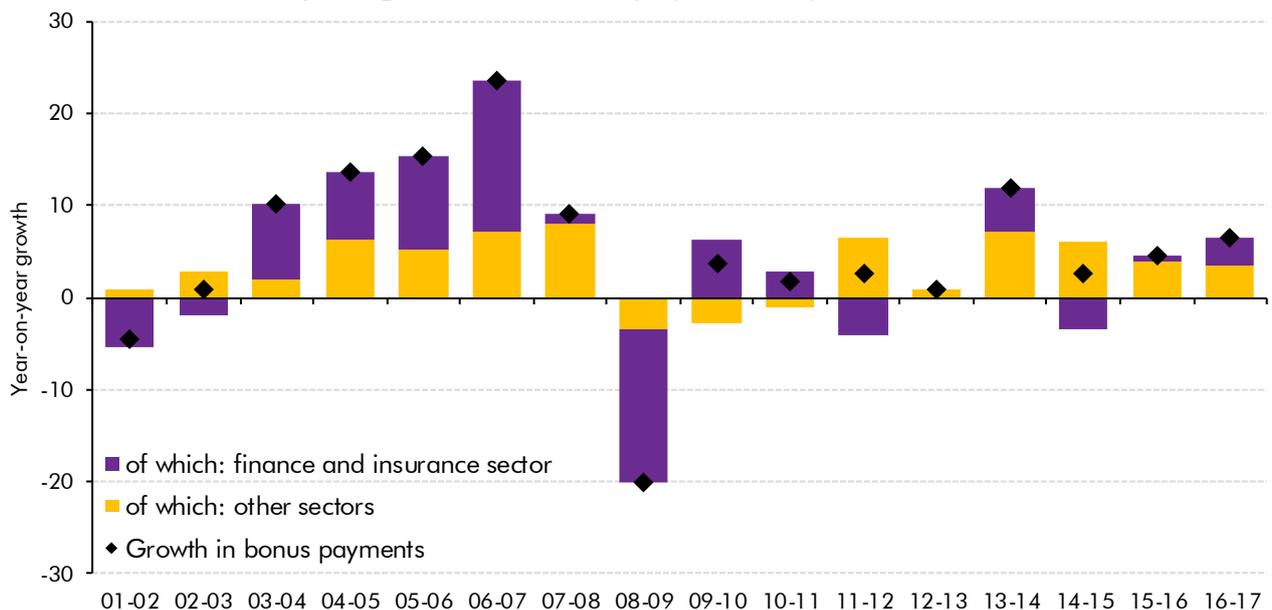
Source: ONS

ONS data on bonus payments

3.4 Each year, the ONS produces an analysis of bonus payments in Great Britain, using the 'average weekly earnings' (AWE) dataset, which provides monthly estimates of the level of weekly earnings per employee. This is not available in time to help inform our in-year forecasts, but it provides useful context to historical trends in bonus payments.

3.5 Chart 3.2 shows that before the financial crisis, growth in bonus payments tended to be concentrated in the financial sector. Since 2009-10, it has been more broadly based, although the financial sector still accounts for around a third of overall bonus payments.

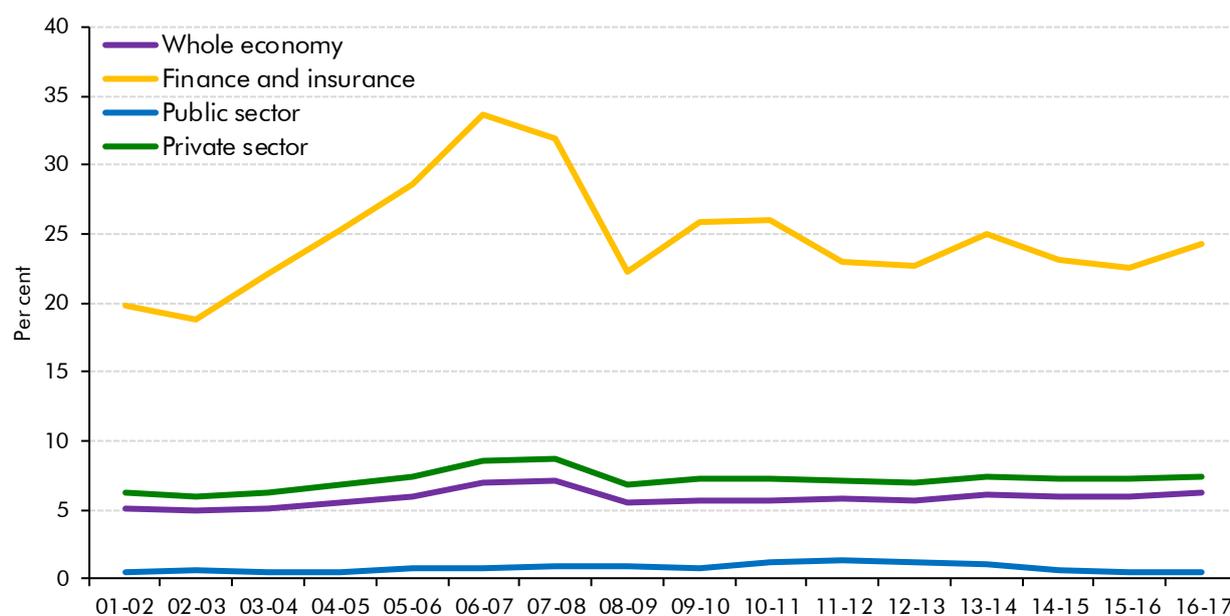
Chart 3.2: Year-on-year growth in bonus payments by sector



Note: Great Britain only.
Source: ONS

3.6 Chart 3.3 shows that the proportion of total pay accounted for by bonuses peaked in 2007-08, immediately prior to the financial crisis, at 7.1 per cent. That peak was much higher for the private sector (8.7 per cent) than the public sector (0.9 per cent), and particularly in the financial sector (33.7 per cent, a year earlier in 2006-07). Having dropped sharply during the crisis, bonuses have made up a gently rising proportion of total pay since then.

Chart 3.3: Bonuses as a proportion of total pay



Note: Great Britain only.
Source: ONS

Our approach to forecasting tax payments on bonuses

3.7 Tax payments on bonuses are significantly harder to forecast than non-bonus receipts, for several reasons:

- **Generating a historical dataset of tax payments on bonuses is difficult.** Our current approach is set out below. In future, we hope to draw on HMRC's real-time information (RTI) system to help generate this dataset.
- There is **little information during the year on which to base our forecast.** The underlying performance of tax receipts and press and analysts' reports on the size of financial companies' bonus pools tend to be our only useful sources.
- **Tax payments on employee bonuses have historically been far more volatile than underlying tax receipts.** These tax payments are driven by the number of employees receiving bonuses, the average value of these bonuses and the effective tax rates paid on them, all of which are volatile – particularly as they are concentrated in the financial sector.

The main forecasting challenges

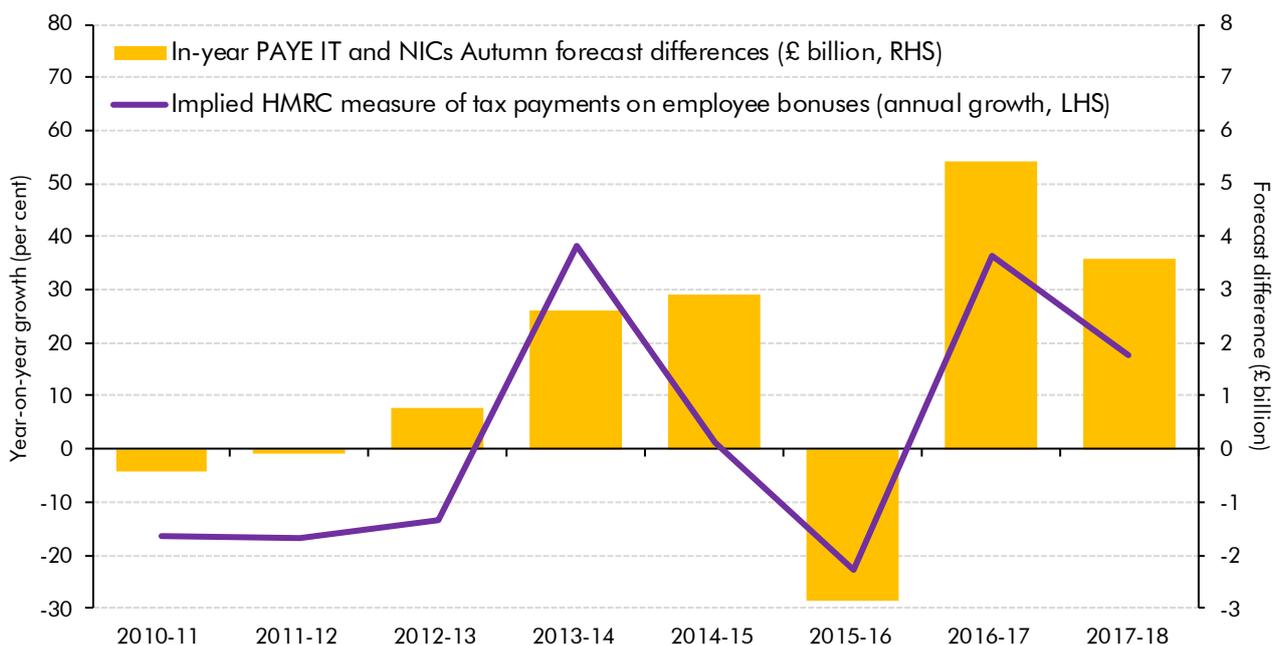
3.8 Our current approach to approximating the historical amount of tax paid on employee bonuses and generating a forecast involves:

- Creating a ‘counterfactual’ monthly flow of receipts, based on the **first eight months of the year**. Receipts in these months tend to be spread relatively smoothly (see Chart 3.1) and are not usually significantly affected by bonus payments.
- Comparing receipts over **the final four months of the year** to this counterfactual as a proxy for the excess receipts related to bonus payments.
- **Applying a growth assumption to the previous year’s estimated outturn** to derive a forecast for the current year. This assumption is usually informed by the performance of tax receipts in the year-to-date, as well as press and analysts’ reports on the size of financial sector bonus pools.

3.9 Chart 3.4 shows year-on-year growth in this HMRC measure of tax payments on employee bonuses. Reflecting the factors set out above, the growth rate is volatile (varying from *minus* 23 per cent in 2015-16 to *plus* 38 per cent in 2013-14). The volatility is far greater than for PAYE IT and NICs receipts growth as a whole (which has ranged from 0 to 5 per cent over the past eight years).

3.10 The chart also shows that the in-year errors in our autumn forecasts are highly correlated with the strength or weakness of these bonus payments. Our bonus growth assumptions have tended to lie between flat and 10 per cent growth, so errors in this assumption explain up to half of the forecast differences in our non-SA IT and NICs in-year forecasts since November 2010. We will be working with HMRC to improve our approach to measuring and forecasting tax payments on employee bonuses by utilising detailed RTI data.

Chart 3.4: HMRC implied measure of tax payments on bonuses



Source: HMRC, OBR

3.11 In recent years, the European Banking Authority has introduced various measures to regulate variable pay in the financial sector, including a cap on bonuses for large banks (which began in 2014) and other regulations (particularly for staff who are judged to be 'material risk takers'). As we saw in Chart 3.3 above, bonus payments in the financial and insurance sector fell in 2014-15 according to ONS data, although it is difficult to isolate the effect of regulation from underlying performance in the sector.

Business tax payment patterns

3.12 Tax payments by businesses tend to follow a quarterly pattern (particularly for corporation tax (CT) and VAT). This can make it difficult to track progress month-by-month, because payments are generally concentrated in just four months of the year (April, July, October and January). Relatively small changes in payment behaviour by companies can have a material impact on these patterns, which can make it difficult to separate timing effects from true underlying developments in the monthly flow of cash receipts. Because VAT and onshore CT receipts are such large sources of revenue (£125.0 billion and £54.4 billion in 2017-18 respectively) even small changes in this pattern through the year can lead to large cash differences between forecast and outturn.

VAT receipts

3.13 The VAT system generally operates on a quarterly basis. Businesses generate liabilities over three months, reflecting the value added in the goods and services they produce. The timing of payments of these liabilities generally depends on the size of the firm:

- **Large firms** (with an annual VAT liability of at least £2.3 million) make a 'payment on account' in the second and third months of each VAT quarter. A balancing payment is then made when the VAT return is submitted (no later than the last working day of the next calendar month).
- **Some smaller firms** (with an annual VAT liability below this threshold) have to submit their VAT return (and pay HMRC) no more than one calendar month and seven days after the end of each VAT quarter.
- Other small firms pay their VAT via an **annual accounting scheme** that allows taxpayers to submit only one VAT return a year. Payments on account are made in equal monthly instalments over the tax year.

3.14 Businesses are assigned to a VAT 'stagger period' by HMRC, which determines the month in which their VAT quarter ends.¹ Firms can ask HMRC to change their stagger period. This introduces a monitoring challenge, as the pattern of VAT receipts can change from year-to-year, depending on the size, number and composition of firms on each one.

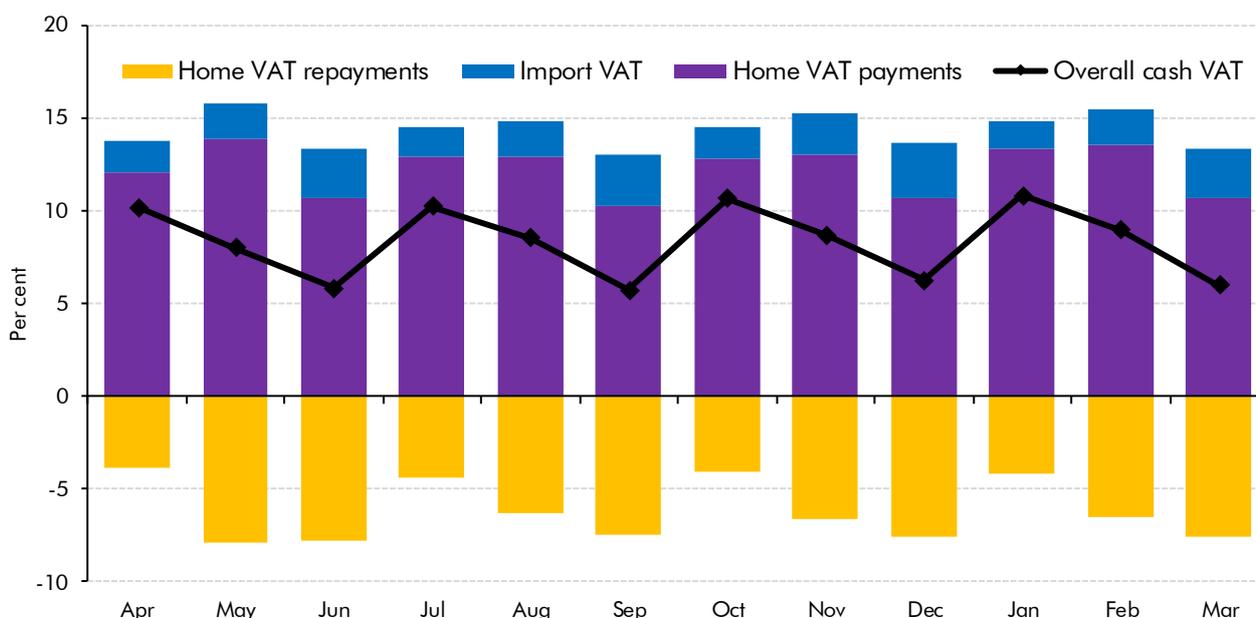
¹ Stagger group 1: Quarter ends in March, June, September and December. Stagger group 2: Quarter ends in April, July, October and January. Stagger group 3: Quarter ends in May, August, November and February.

3.15 We monitor three key pieces of information that make up firms' VAT liabilities:

- **'Home VAT' payments** are due on sales and other outputs during the quarter.
- **'Import VAT'** is levied on goods imported from outside the VAT territory of the EU. Around 95 per cent of import VAT is paid under the 'duty deferment scheme', which in broad terms allows traders to pay their liability in the subsequent calendar month. Services supplied from outside the UK and imported goods from within the EU are generally accounted for through a 'Home VAT' reverse charge system.²
- **'Home VAT repayments'** are the amounts that traders reclaim from HMRC on goods and services that they purchased during the period.

3.16 Chart 3.5 shows the average pattern of these cashflows through the year since 2001-02. The peaks and troughs generally reflect the quarterly payment profiles of large businesses. The variation looks relatively modest, but the sums of money involved mean that this can be a material source of forecast uncertainty. For example, by October – often the final outturn estimate on which we can base our autumn forecasts – the proportion of full-year cash receipts that have been paid to HMRC has varied between 58.2 per cent in 2015-16 and 59.6 per cent in 2006-07 (excluding years in which the standard rate was changed). Applying these proportions to the October position in 2017-18 would have resulted in forecast differences of minus £1.7 billion and plus £1.3 billion respectively, illustrating the challenge these variations can create.

Chart 3.5: Average monthly pattern of cash VAT receipts since 2001-02



Source: HMRC

² A reverse charge is a mechanism by which a trader acts as both a supplier and a customer in the VAT calculation. A trader will charge themselves the VAT on the purchase and then (assuming that the good or service relates to VAT taxable supplies that they make) will claim it back, cancelling the two effects out.

Onshore corporation tax receipts

3.17 Onshore corporation tax (CT) mainly operates via two payment systems:

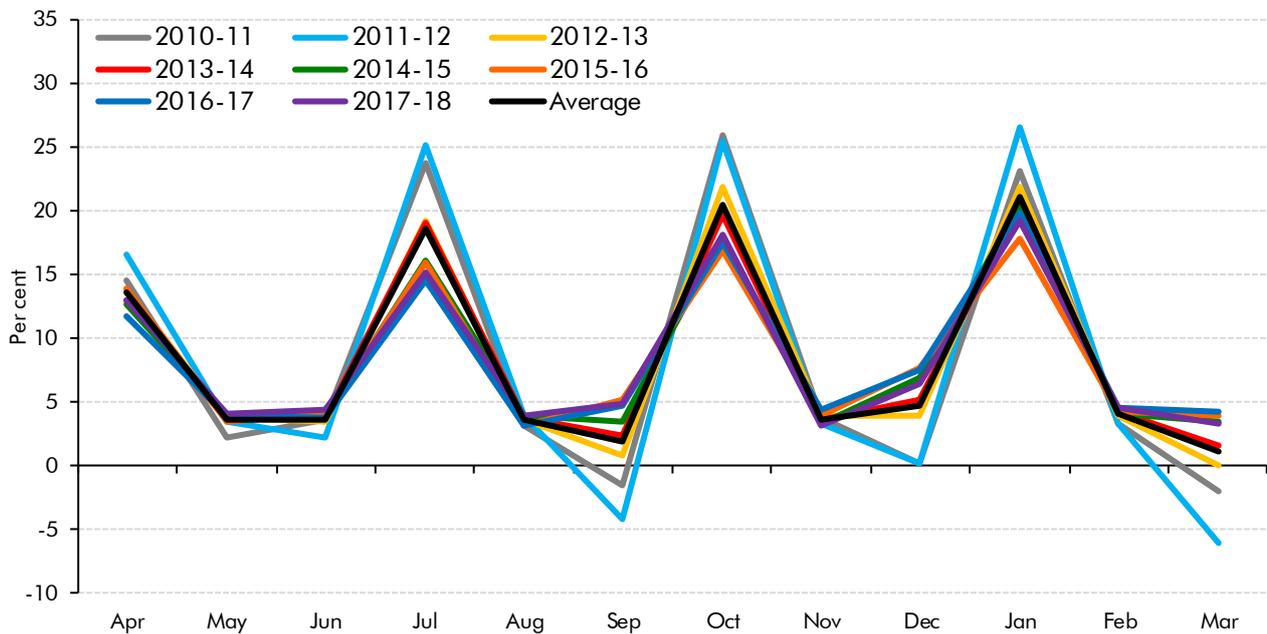
- **Companies with profits of more than £1.5 million a year** are generally required to pay their tax via the quarterly instalment payment (QIP) system. QIP companies are required to estimate their tax liabilities over a 12-month accounting period and then pay this in four instalments, starting 6½ months into the end of their accounting period.³ This estimate can and does change over the year, meaning that companies will either top up or reduce their payments as their profit forecasts evolve. Companies with an accounting period covering the calendar year account for the bulk of QIP receipts (around 58 per cent of receipts and around 13 per cent of QIP-paying firms). The next largest group is companies with an April-to-March financial year accounting period (around 17 per cent of receipts and around 29 per cent of QIP-paying firms). This means that most instalment payments arrive in April, July, October and January, so this is the most important payment pattern for our in-year forecast judgements.
- **Companies with profits of less than £1.5 million a year** do not generally have to pay via the QIP system and make an annual payment that is due no more than nine months and one day after the end of their 12-month accounting period. Many non-QIP-paying companies operate either an April-to-March accounting period (around 22 per cent) or a calendar year accounting period (13 per cent), so cash receipts from these companies peak in January and October.

3.18 Chart 3.6 shows that on average over the past eight years 74 per cent of cash receipts were received in April, July, October and January, reflecting the weight of the large companies in the QIP system. These payments are designed to be spread evenly through the year, although they can change significantly over time as profit and liability expectations evolve. Of the CT paid in the four peak QIP months, 56 per cent on average (in a range of 54 to 59 per cent) has been paid in October and January. This suggests that companies' profit and liability expectations have generally been revised up through the year over this period.

3.19 After the tax year has ended, a reconciliation process begins between HMRC and individual firms to settle on a final tax liability for the year. This may involve further payments or repayments and can take several years to reconcile in full. This arrears process introduces a further forecasting challenge and may mean that the tax liabilities data are subject to revision for a number of years.

³ From accounting periods starting in April 2019, instalment payments will be required three months earlier than previously (so the first instalment payment would be due 3½ months into their accounting period).

Chart 3.6: Monthly pattern of cash onshore corporation tax receipts



Source: ONS

Self-assessment income tax payment system

3.20 Payments of self-assessment (SA) income tax are due to HMRC by the 31 January after the end of the tax year when the tax liability was generated. For most SA income taxpayers, HMRC also requires 'payments on account' to ensure that the bulk of the tax bill is paid in advance of the final due date and that payments are spread more evenly through the year.⁴

3.21 The first payment on account is due on 31 January before the end of the tax year, alongside the final balancing payment for the previous tax year. The second payment on account is due six months later on 31 July. Unlike corporation tax, the ONS does not time-shift cash SA receipts to align them more closely with the true point in time when the liability arose.

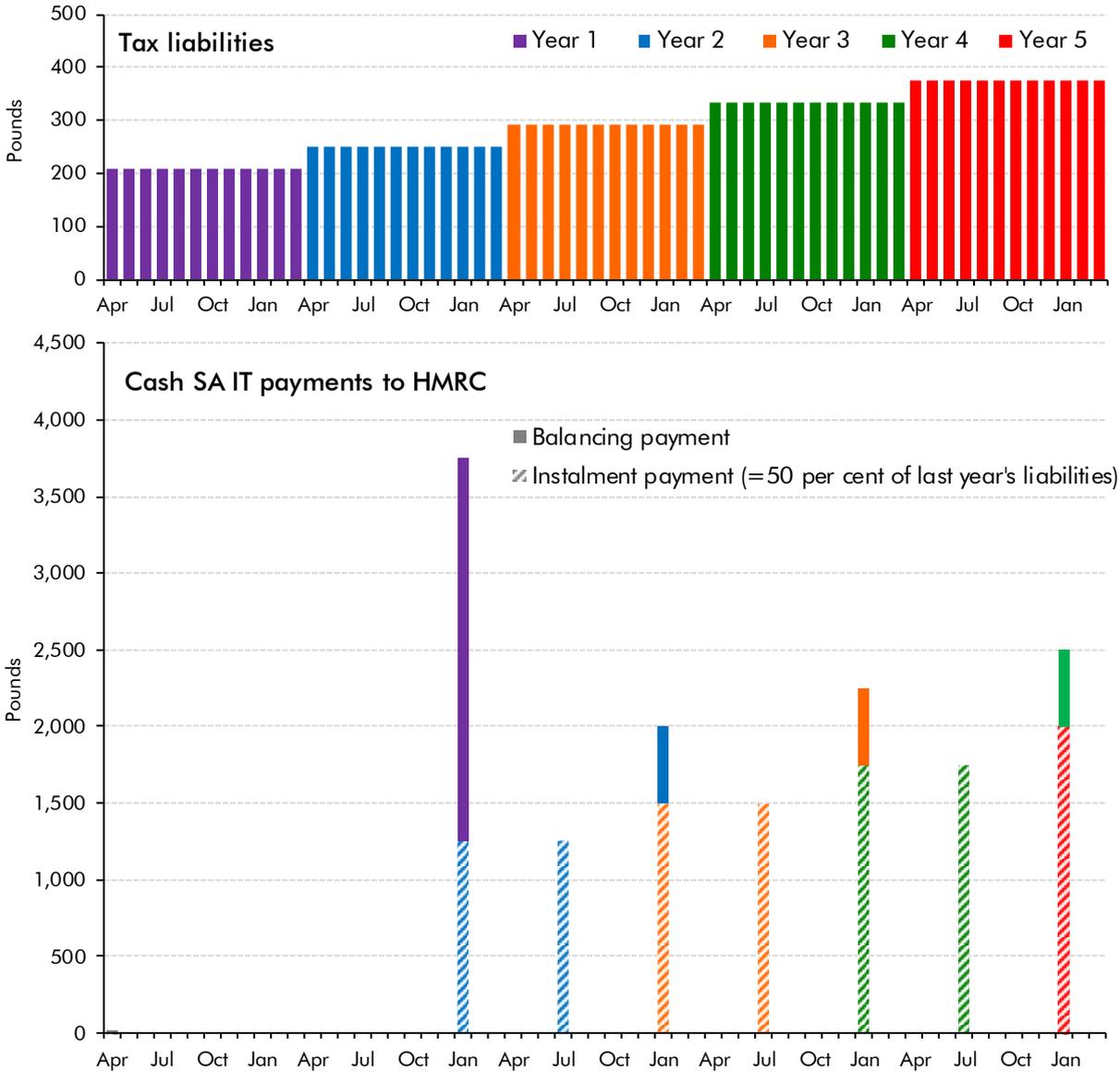
3.22 Chart 3.7 illustrates this pattern for a hypothetical SA income tax payer, with income evenly spread across the months of the tax year and that rises each year. It shows that:

- When the **taxpayer enters the SA system**, they pay a full balancing payment to cover the entirety of their first year's liabilities in the January after the tax year has ended.
- **Payments on account** are made in two instalments (each equal to half the previous year's liability) in the January of the tax year in progress and the July of the tax year that follows. For the new SA taxpayer, this means paying 150 per cent of their first-year liability when they make their first January SA payment.

⁴ Taxpayers with a previous year bill of less than £1,000 or who have already paid more than 80 per cent of tax owed (i.e. through the PAYE system) do not generally have to make payments on account.

- Another **balancing payment** is made in the January of the following tax year to settle the second year’s liabilities, taking into account the two payments already made in respect of that year. This balancing payment can be positive or negative (i.e. from HMRC to the taxpayer or vice versa) depending on whether the taxpayer’s liability was higher or lower in the previous year than it was in the year that determined the payments on account.
- This **overlapping process of payments on account followed by balancing payments continues** for as long as the taxpayer remains in the SA system and meets the terms that require payments on account to be made. This means that the January SA IT payment generally consists of a balancing payment on the previous year’s liabilities, as well as a first payment on account for the current year’s liabilities.

Chart 3.7: Illustrative payment pattern for a new SA IT taxpayer

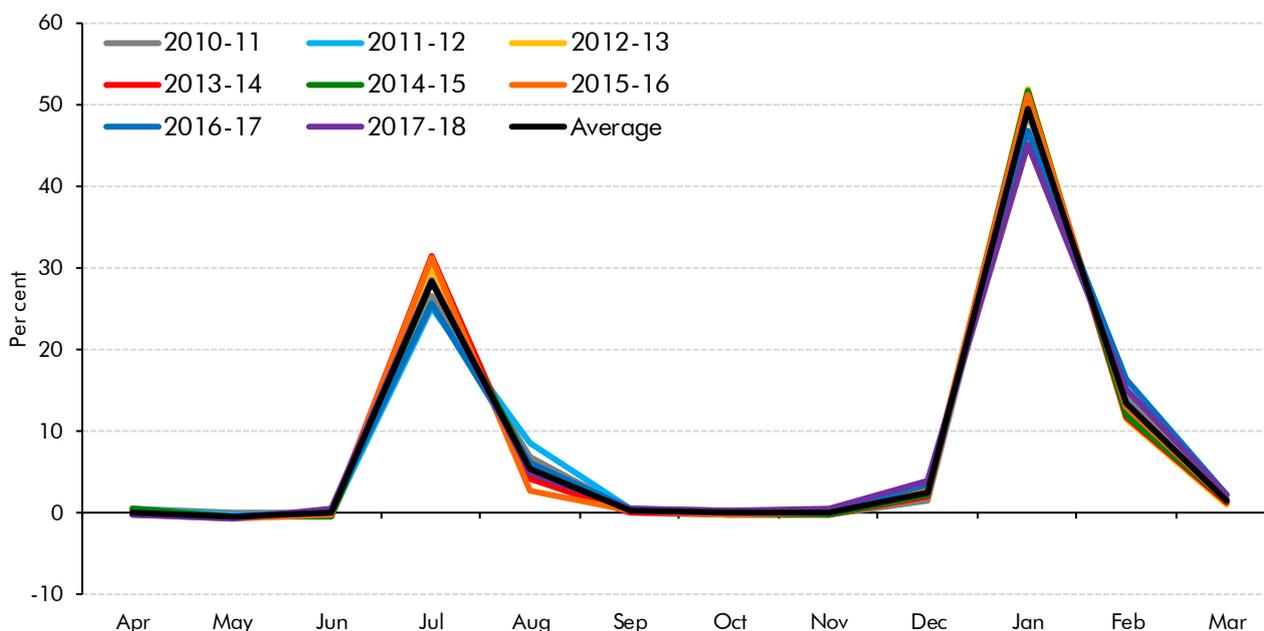


Source: OBR

The main forecasting challenges

- 3.23** This payment on account process means that the bulk of the SA IT payments received by HMRC in July simply reflect a mechanical calculation based on known information. (Taxpayers can opt to reduce their payment on account if they have good reason to expect their liability to fall.) In general, only the balancing payment received in January contains new information. This can be used to inform our medium-term forecast, once HMRC's analysts have stripped out the effect of payments on account from the total SA IT payments received each January.
- 3.24** Payments for SA IT are generally due on 31 July and 31 January. In some years, these dates fall at the weekend, so more cash than usual is recorded in August and February in the HMRC systems. This can depend on the method of payment as well as when it is made. We work closely with analysts in HMRC to understand total payments over these two-month periods to get the clearest possible picture of receipts during the year.
- 3.25** As Chart 3.8 shows, on average over the past eight years 77.9 per cent of full-year receipts have been recorded in July and January, and 18.7 per cent in August and February, leaving just 3.3 per cent recorded in other months. In recent years more taxpayers have chosen to pay early in December, with the proportion rising from an average of 2.0 per cent in the six years to 2015-16 to 3.5 per cent in 2016-17 and 3.9 per cent in 2017-18. This change in the monthly profile, which may be related to HMRC communications activity encouraging taxpayers to pay early, adds a new consideration for in-year forecasting.

Chart 3.8: Monthly pattern on self-assessment income tax receipts



Source: ONS

Central government departmental spending

3.26 Central government departments are given ‘Departmental expenditure limits’ (DELs) by the Treasury for their resource and capital spending. Preliminary outturn estimates of the spending covered by these limits are generally subject to substantial revisions through the year, so in-year monitoring of the data has to bear this in mind. Specifically:

- **‘Outturn’ data early in the year are largely based on forecasts** by departments, rather than genuine outturns. These forecasts may not be accurate nor central.
- **Data lags** mean that in-year data in some spending areas are never more than part forecast, part outturn. The largest example is the Department of Health and Social Care’s (DHSC) DEL spending, which includes that by the NHS. DHSC has a quarterly data collection exercise for spending data (a month in arrears) by NHS trusts. So the in-year data used in the interim will always contain forecast elements.
- **Final audited data are not available until after the year-end.** In-year data are not subject to the same controls and assurance processes as final outturn data (although they use the same ledger) and so are subject to greater revision and variation. Some outturns are not available until long after the year-end – for example, the Department for Education’s (DfE) data on spending by academy schools.

3.27 Charts 3.9 and 3.10 show the closest proxies available in the monthly ONS data for monthly Resource and Capital DEL spending (RDEL and CDEL, respectively) across all departments. RDEL and CDEL spending is usually higher than average in February and March as departments look to spend the amounts they have been allocated before the end of the financial year. Some underspends can be carried forward to future years, if formally agreed as part of the Treasury’s Budget Exchange process. But any underspending that cannot be carried forward is surrendered and lost, which partly explains the surge in March spending. As regards current spending, some of this end-of-year surge will also reflect data reporting conventions – residual yearly spending that has not previously been attributed to a specific month is often accrued to March. For capital, the year-end increase will also partly reflect the timing of gross fixed capital formation spending (which tends to be higher in March for several reasons, including timing effects caused by project delays in the preceding months, for example due to adverse weather conditions over the winter).

The main forecasting challenges

Chart 3.9: Monthly pattern of CG current expenditure on goods and services

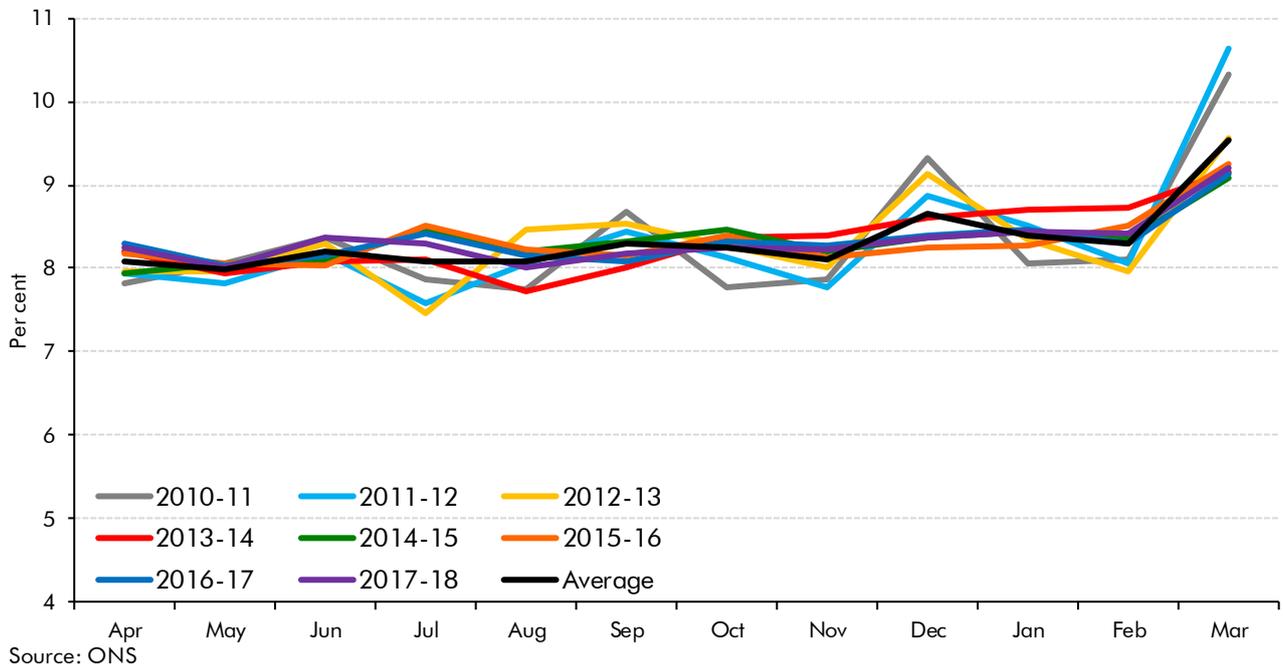
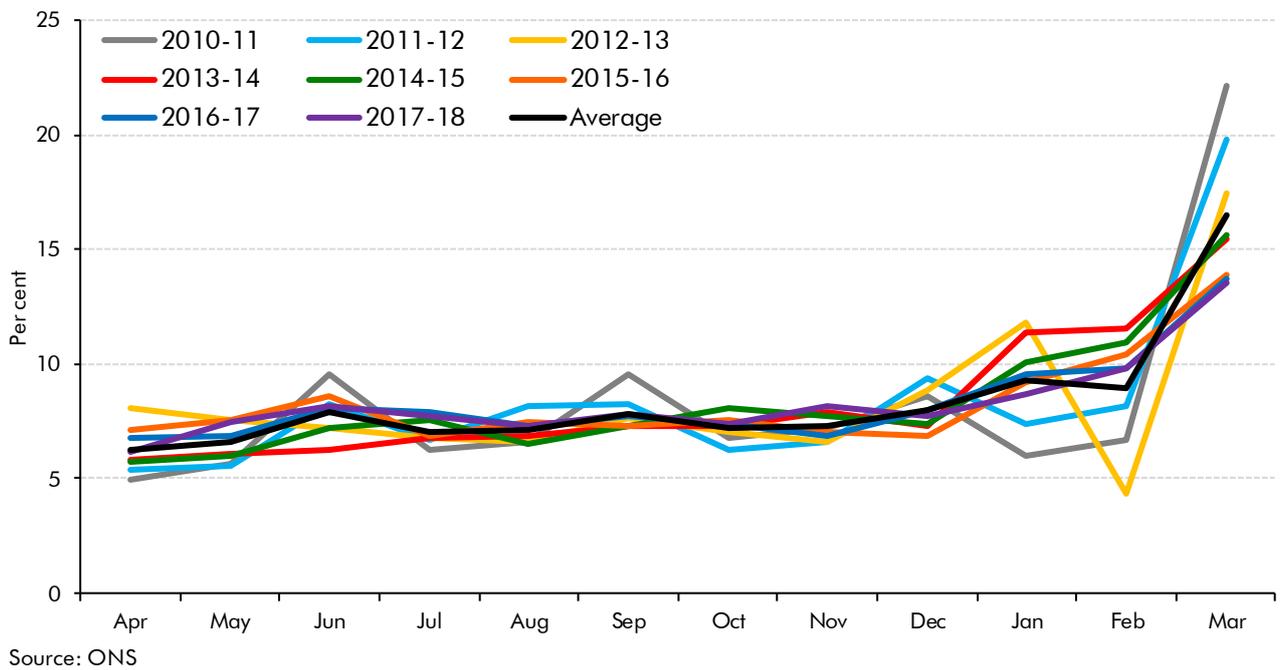


Chart 3.10: Monthly pattern of CG gross fixed capital formation



The timing of expenditure transfers to the EU

- 3.28 For the period during which the UK has been a member of the European Union, contributions have been made to the EU budget via a set of calculations based on the gross national income (GNI) of EU Member States, a measure of their VAT bases and, in the UK's case since 1985, a rebate based on an agreed formula.⁵
- 3.29 The timing of the associated transfers to EU institutions affects our in-year spending forecasts. Exchange rate and wider economic developments across Member States affect the level of spending from year to year, but these are not the primary causes of the lumpy profile of spending, nor are they the main drivers of differences in the monthly profile of spending across years.
- 3.30 Larger year-to-year fluctuations tend to take place towards the end of the financial year (between January and March). To deal with budgetary pressures, the European Commission can 'draw forward' up to two months' of contributions into the first quarter of the calendar year (which is also the accounting year for the EU budget). This means that up to five months' worth of the full-year contributions can be requested in total in the first quarter, which in the UK's case is the final quarter of the preceding fiscal year. Up until 2016, the Commission typically drew forward the maximum amount, but low levels of budget implementation in 2016, 2017 and 2018 resulted in a comparatively low draw-forward in these years, creating year-to-year variations in the profile of monthly spending.
- 3.31 Fluctuations across years in other months reflect several factors, the timing of which are not always certain. The most material is the annual historical GNI and VAT contributions adjustment. This is a scheduled adjustment that updates and reconciles previous interim contributions (net of rebate) to reflect the latest outturns for VAT and GNI bases across all Member States. The adjustment used to take place in December but, following the change in timing that took effect in 2016, it now takes place in June.⁶
- 3.32 As shown in Chart 3.11, the timing of EU contributions through the year is volatile relative to other spending and receipts streams. Over the past eight years the variation has been greatest in December, with spending ranging from a high of £2.5 billion in 2014-15 to a low of *minus* £1.2 billion in 2017-18. The spike in December 2014 largely reflected the implications for the UK's historical contributions of a series of GNI and other ONS data revisions implemented in Blue Book 2014, the effects of which were largely accrued to the December of that year.⁷ The trough in December 2017 reflected amendments to the EU's budget, due to lower spending on structural and investment funds (in addition to the standard updates to Commission estimates of Member States' contributions).⁸

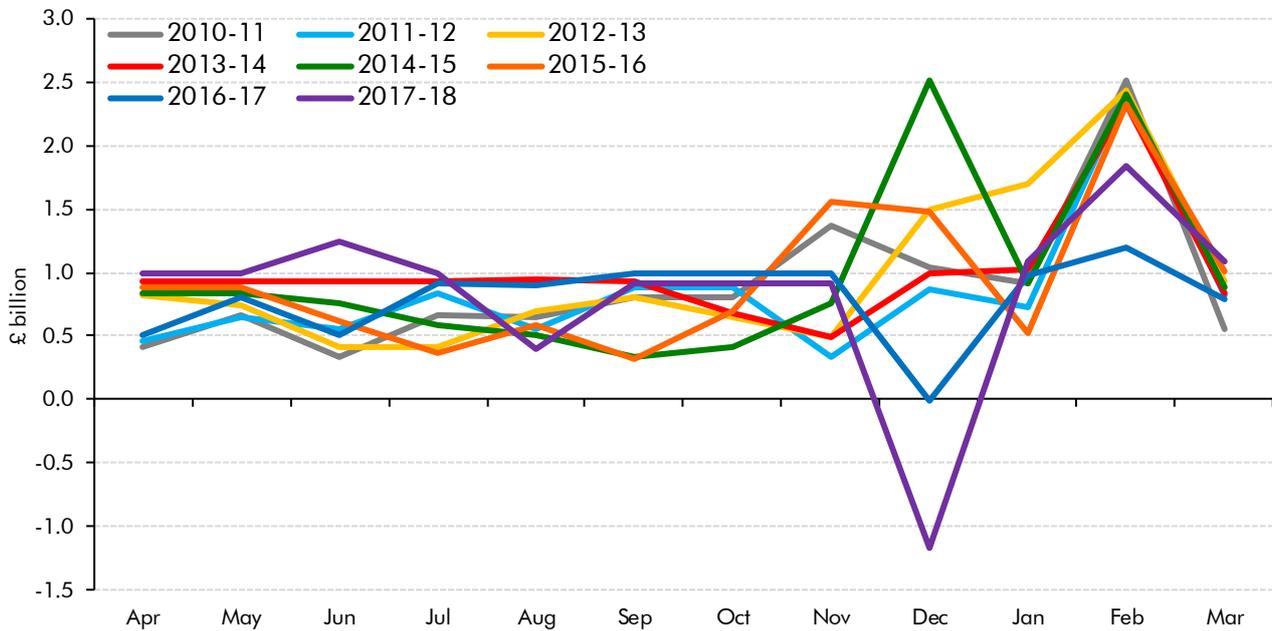
⁵ This system and how we forecast it was described in Annex B of our November 2017 *Economic and fiscal outlook*.

⁶ The 2014 exercise also saw part payment in the following June: some of the sizeable surcharge was paid in December and the remainder in the following June, as part of a one-off agreement.

⁷ The rebate element of the surcharge was reported when received rather than being accrued to December 2014.

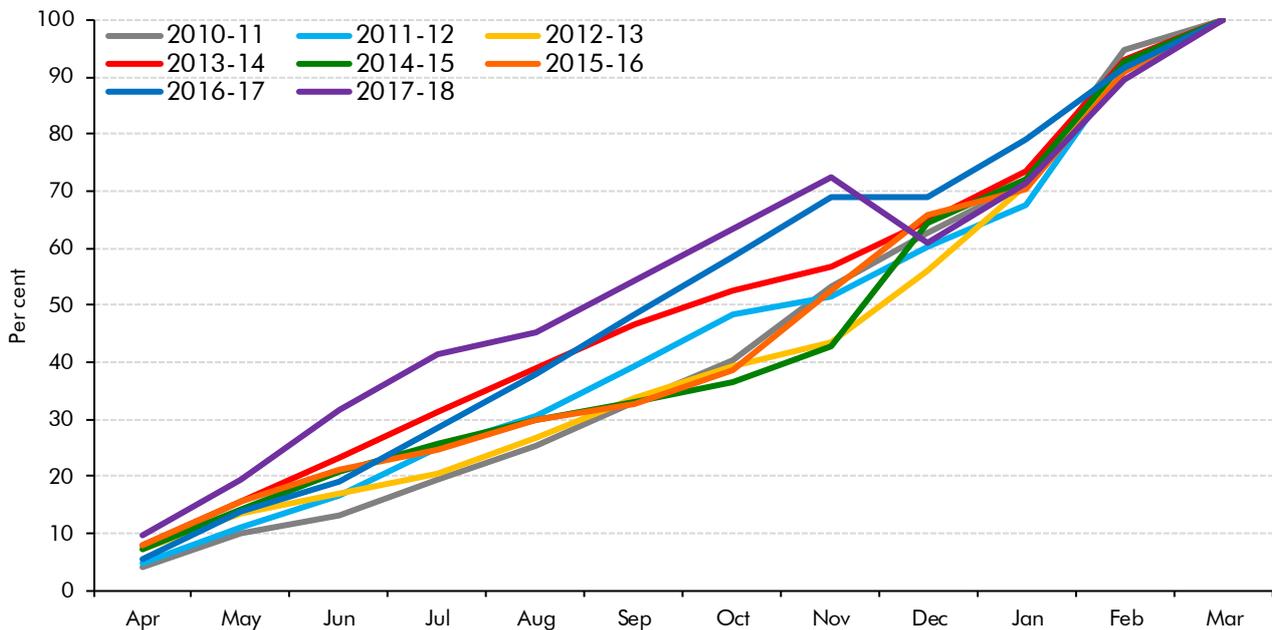
⁸ Member State contributions were also revised down due to the surplus on the 2016 budget, with this year's underspend being used to lower Member State contributions in 2017. This part of the budget-setting process can also create large timing effects, causing year-to-year spending profile fluctuations.

Chart 3.11: UK VAT plus GNI contributions to the EU budget, net of abatement



Source: ONS

Chart 3.12: Cumulative proportion of full-year EU contributions by month



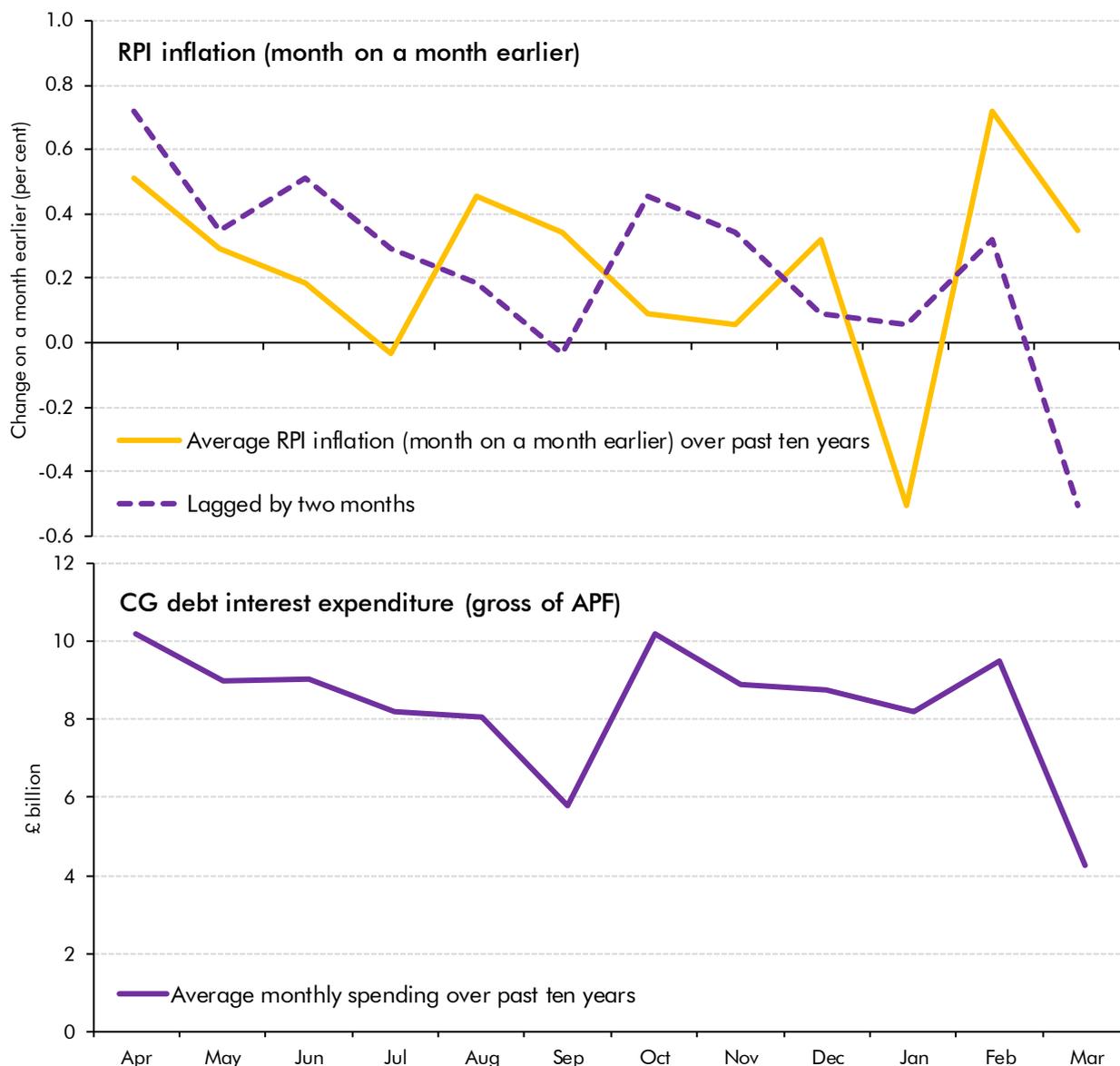
Source: ONS

3.33 When producing our in-year forecasts, we can anticipate some of these factors. Some are trailed through the EU’s ‘draft amending budget’ process and the effect of ONS data revisions is predictable because the formula applied to calculate contributions in light of relative GNI bases is known and is applied mechanically. But we can rarely anticipate the effect of other Member States’ data revisions. The very large surcharge in 2014 did not just reflect the absolute size of the (upward) ONS revisions to historical GNI estimates in the UK, but also the fact that the revisions were large relative those in other Member States.

Central government debt interest spending

- 3.34 Debt interest spending is volatile month to month. This largely reflects variations in accrued interest on index-linked gilts. Principal and coupon payments on these gilts are linked to the retail prices index (RPI) – when the RPI rises, the inflation uplift that applies to both the coupon payment and the final payment at maturity also rises. Accrued interest on index-linked gilts made up around a third of total central government debt interest spending in 2017-18 – a year when RPI inflation was relatively high by recent standards.
- 3.35 Most index-linked gilts use the RPI index lagged by three months to calculate the RPI inflation uplift (which is recorded as accrued debt interest spending in the public finances data). Some older index-linked gilts issued before September 2005 use an eight-month lag. In practice, changes in the monthly RPI index affect debt interest spending with a two-month lag, reflecting the uplift calculations incorporated into the gilt contracts.
- 3.36 As Chart 3.13 illustrates, over the past ten years the usual dip in the RPI index in January and July (reflecting January and summer sales in the retail sector) has fed through into a dip in debt interest spending in March and September. The bounce-back in the RPI in February and August means that accrued interest on index-linked gilts tends to peak in April and October. It is also worth noting that RPI movements are themselves uneven from month to month, reflecting factors like oil price movements (which affect petrol and diesel prices) or the timing of Easter (which affects airfares). This means that care must be taken when interpreting year-on-year changes in monthly debt interest spending.

Chart 3.13: Monthly CG debt interest spending and the RPI



Source: ONS

Local authority net borrowing

3.37 Local authorities receive the bulk of their revenue in grants from central government, with 64 per cent of total local authority current spending in 2016-17 financed from this source. A further 29 per cent came from the main local taxes, namely council tax and retained business rates. Local authority spending can be divided into current items (such as providing social care services) and capital expenditure (such as investment in infrastructure).

3.38 Local authority net borrowing (LANB) is the difference between total local authority receipts and expenditure. The main contributors to LANB are:

- **Any temporary in-year shortfall between revenue and expenditure.** Local authorities are legally required to balance their revenue accounts over the year, so that their

current spending is fully financed by their net income. They are not allowed to borrow to finance current spending beyond the year-end. But, within the year, local authorities do borrow to finance any temporary shortfalls. In aggregate, recent years have seen surpluses at the start of the year followed by borrowing towards the end of year, reflecting the front-loading of central government grant funding.

- **Local authorities' net changes to their current reserves** to finance any gap between their current spending and other sources of revenue, in order to balance their accounts over the year. In the National Accounts, net borrowing reflects any excess of spending over revenue, with the net use of current reserves one way to finance net borrowing. We consider LANB from both perspectives – looking at current spending pressures that might lead to overspends against budgets (for instance, on social care), but also at local authorities' behaviour in using or adding to their current reserves (i.e. how they have adjusted spending in light of any changes in income). Our forecasts for the current year also reflect the latest in-year quarterly spending data and comparisons with local authority budgets. Forecasting local authorities' net use of reserves has been particularly challenging. English authorities, in aggregate, responded to cuts in funding by adding large amounts to their reserves between 2010-11 and 2014-15 – in contrast to the draw-down we assumed in our early forecasts. They did eventually draw down reserves in 2015-16 and 2016-17, but added to them again in 2017-18.
- **Capital spending financed by 'prudential' borrowing.** The bulk of this borrowing reflects loans from the Public Works Loan Board (PWLB), a statutory body that issues loans from the National Loans Fund (a central government entity) to local authorities in England, Scotland and Wales. New lending to authorities does not immediately hit borrowing aggregates in the National Accounts, only affecting them when authorities spend the money they have borrowed (i.e. when spending financed by this borrowing takes place and the money leaves the public sector). This is a significant challenge when we forecast local authority capital spending financed by prudential borrowing: in a given year, authorities can finance new capital spending through new borrowing or from borrowing in previous years.

3.39 Generating an in-year forecast for LANB is a particular challenge, as outturn data are generally subject to significant lags. Local authority tax receipts are also smoothed to put them on a National Accounts basis. For example, council tax is generally paid over the first 10 months of the year, but then accrued over the full 12 months. Provisional outturn data for the financial year are not typically available until September and final data are usually released in November, more than six months after the year's end.

3.40 In terms of the data that we and the ONS can use while a fiscal year is in progress:

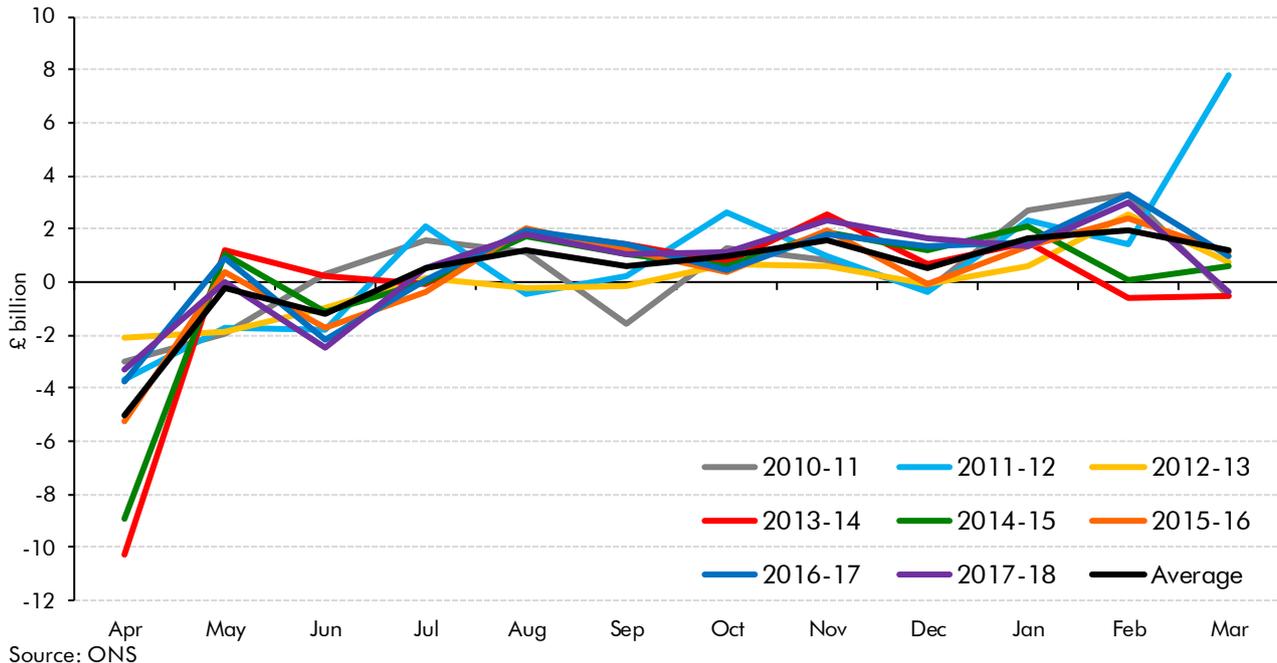
- The **ONS 'outturn' at the beginning of the year** is typically based on our full-year forecast for local authority spending, split across the year.

The main forecasting challenges

- **Once local authority budgets for the current year become available**, the ONS will take a view on the extent to which they will be underspent and will reflect that in its 'outturn' estimates. These underspend adjustments do not always align with ours, which creates a potential difference between our forecast for LANB and ONS LANB estimates.
- **As provisional quarterly outturn data become available**, we and the ONS refine our views of total local authority spending and the extent to which budgets will be underspent. We make our decisions and the reasons for them available to the ONS and invite ONS analysts to the forecast meetings where these issues are discussed. But, again, the ONS may take a different view to us, creating differences between our respective views of in-year LANB.

3.41 Chart 3.14 shows that in recent years local authorities have tended to run a surplus over the first quarter of the financial year and a deficit thereafter. This largely reflects the front-loading of central government grants, although the precise timing can vary from year to year. The chart shows that there was particularly significant front-loading of grants in 2013-14 and 2014-15. It also shows a peak in borrowing in March 2011, which reflects an £8.1 billion payment from local to central government in respect of Housing Revenue Account reforms. As with grant payments, this payment was neutral overall for PSNB.

Chart 3.14: Monthly pattern of LA net borrowing



4 Sources of data revisions

- 4.1 In common with most economic data, outturn measures of the public finances are often subject to revision. This poses a challenge for in-year monitoring of the data available at any given time and for judging forecast performance in retrospect.
- 4.2 The ONS defines a revision as “a scheduled change to any published ONS output which may be made in order to incorporate better source data or to reflect improved methodology”. In this chapter we consider the main sources of data revisions, which range from major changes to methodology, classification or accounting treatment to the more routine updating that takes place when new information becomes available.

Methodology, classification and accounting treatment

- 4.3 Substantive changes to ONS methodology (e.g. the move to the 2010 European System of Accounts), sectoral classification (e.g. the reclassification of housing associations into and out of the public sector) and accounting treatment (e.g. time-shifting corporation tax receipts) explain some of the differences between our in-year forecasts and the latest outturns. As these changes accumulate over time, it becomes harder to compare like with like when trying to judge and learn from forecast performance.
- 4.4 When we publish our forecasts, we try to anticipate known future revisions and classification changes, so that they will be as close as possible to the eventual treatment in outturn. In general, this requires two main criteria to be met:
- First, the **change needs to have been formally announced by the ONS.**
 - Second, **we need sufficient information to know which entities will be affected and how**, so that we can produce a central estimate of the effect on each year of our forecast. In practice, this means that we need to have a good idea how the prospective revisions would have affected outturn data for earlier years.
- 4.5 Sometimes the ONS will announce a forthcoming classification or methodological change, but then take time to implement it. For example, in October 2015 the ONS announced that it would reclassify ‘private registered providers’ of social housing in England into the public sector. We incorporated our own estimate of the impact of this change in our November 2015 forecast, but the ONS did not implement it in the outturn data until January 2016.
- 4.6 In some cases, the lag between a decision being announced and implemented can be much longer, which creates a wedge between our forecasts and ONS outturns in the interim. In light of this, alongside each *Economic and fiscal outlook (EFO)* publication we produce a supplementary table on our website setting out these differences. Table 4.1 reports the main

ONS classification and accounting treatment changes that have affected our forecasts since June 2010. More detail can be found in our *Forecast revisions database* online.¹

Table 4.1: Major ONS classification, methodological and accounting changes

		£ billion
		Average annual effect on PSNB over each <i>EFO</i> forecast period
November 2011	3G spectrum auction treatment change	-1.0
March 2012	Royal Mail Pension Plan transferred to the public sector	-28.0 ¹
December 2012	Reclassification of B&B and NRAM into the public sector	-0.6
December 2012	Change in treatment of APF cash transfers	-9.8
December 2013	Renewables obligation certificates: methodological change	0.0
December 2014	Various changes related to ESA10 and PSF review	-0.4
March 2015	Various changes, including multilateral development bank subscriptions	0.0
July 2015	Tax litigation provision switched from receipts to negative spending	0.0
November 2015	Reclassification of English housing associations into the public sector	2.1
November 2016	Reclassification of Scottish, Welsh and Northern Irish housing associations into the public sector	0.5
November 2016 and March 2017	Corporate taxes moved onto a time-shifted cash basis	1.1
November 2017	Reclassification of English housing associations into the private sector and other small changes	-4.8

¹ £28.0 billion effect in 2012-13.

Revisions reflecting new information

- 4.7 In addition to methodological, classification and accounting treatment changes, the ONS also updates outturn data routinely as new information becomes available.
- 4.8 As we saw in Chapter 3, revisions are almost inevitable for items that are treated on an accruals basis in the public finances data (as most are) and where cash flows into and out of the private sector take place some time after the date to which they will eventually be accrued. In these cases, the initial outturn estimates have to be based on forecasts until the subsequent cash flow provides firmer information. Box 4.1 describes how this affects ONS estimates of accrued tax receipts.

¹ <http://www.ons.gov.uk/download/forecast-revisions-database>

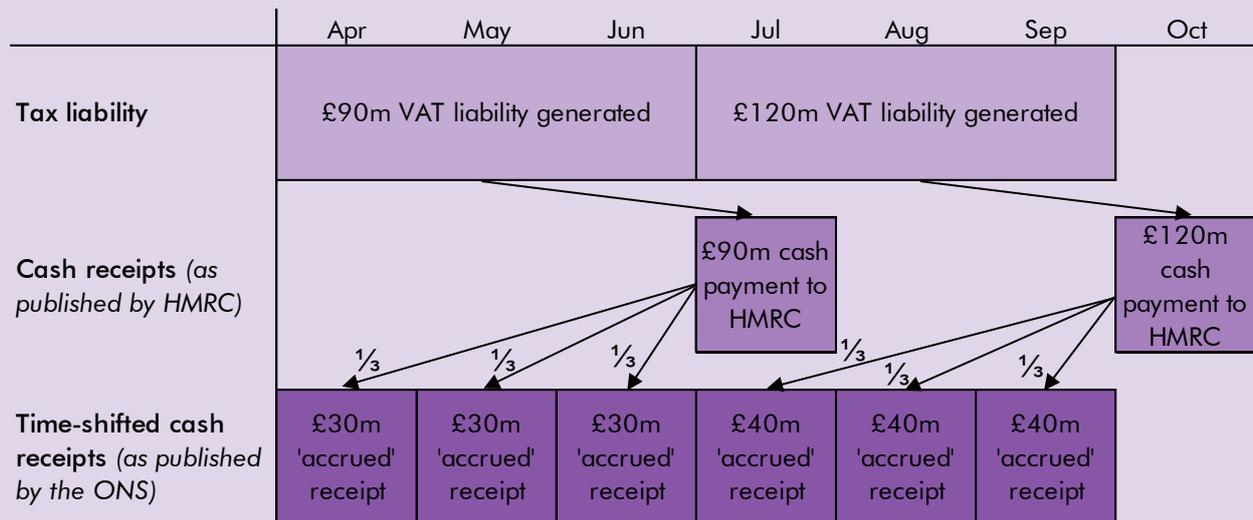
Box 4.1: Cash and accruals accounting for tax receipts

The ONS records developments in the public finances according to international standards and guidelines. These include the principle that where necessary and possible cash spending and revenue streams should be 'time-shifted' to ensure they are recorded as close as possible to the time of the underlying economic activity that generated them – i.e. on an 'accrued' basis.

Figure A illustrates how this works for VAT receipts. For the majority of VAT payments, the system is administered on a quarterly basis (see Chapter 3). Having made regular payments in advance, large companies submit VAT returns each quarter and have up to one calendar month to make a balancing payment to HMRC to ensure the correct amount has been paid.

These cash receipts generally relate to liabilities generated in the previous quarter, so the ONS approximates this relationship by spreading them evenly over the preceding three months. This ensures that the recorded monthly data broadly align with the underlying economy activity.

Figure A.1: Illustrative example of time-shifting cash VAT receipts



The time-shifting assumptions that the ONS uses relate to the standard payment patterns for each tax stream. For some, such as fuel and stamp duties, liabilities are paid within the month so the ONS does not apply any time-shifting adjustment. For others, there can be a long lag between the generation of a liability and eventual payment to HMRC. For example, small businesses that pay their corporation tax annually are given nine months and a day from the end of their accounting period to settle their liability. As accounting periods are also spread over the year, the ONS spreads cash receipts over the preceding 10 to 21 months in the recorded data.

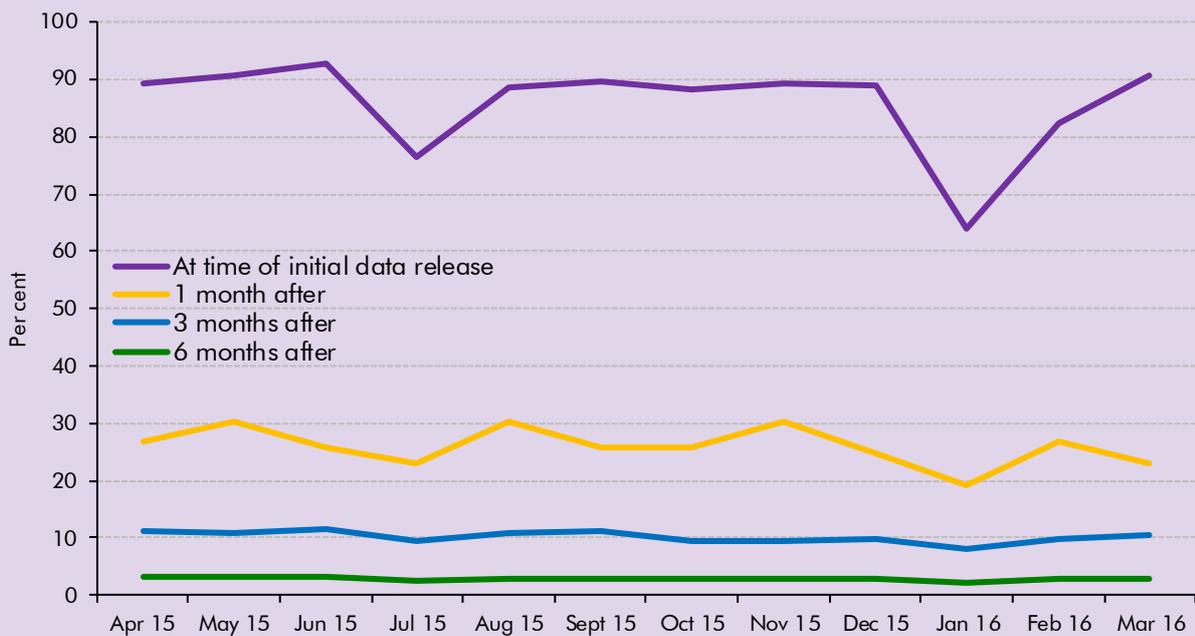
One implication of this methodology is that recent data points will at least in part be based on a forecast until the end of the time-shifting lag. For example, the most recent VAT receipts data point will be part-forecast until three extra months of cash data have been generated. This means that recent tax data points are highly prone to revision in the near term.

To illustrate this, Chart A sets out our estimate of the proportion of recorded outturn tax receipts that were based on a forecast in 2015-16, using these standard time-shifting assumptions:

- **In the initial data release**, around 90 per cent of the recorded outturn receipts in an average month were based on a forecast. This reflects the fact that there is a lag between tax liability and payment for most major taxes (PAYE income tax and NICs, CT and VAT). This share is lower in July and January, when payments of SA income tax and CGT are made. These taxes are currently recorded on a cash basis, even though the cash payments relate to liabilities accrued in the previous fiscal year.
- **One month after the initial data release**, around a quarter of the previous month’s estimated outturn receipts were still based on a forecast. The large drop relative to the initial month reflects PAYE income tax and NICs receipts, for which the lag between liability and payment is assumed to be one month. These made up nearly half of HMRC tax receipts in 2015-16.
- **Three months after the initial data release**, around 10 per cent of outturn receipts were still based on a forecast. The further drop reflects VAT, where payments are assumed to be lagged over the three months after the liability is generated. VAT made up around a fifth of HMRC receipts in 2015-16.
- **Six months after the initial data release**, less than 5 per cent of outturn receipts were still based on a forecast. This reflects the long payment lag for some corporation tax receipts. By this point all quarterly CT-payers would have paid at least an instalment payment on the tax liability generated in the original month, but annual CT-payers would not have made any payments at all. CT made up nearly a tenth of HMRC receipts in 2015-16.

Outturn receipts still have some forecast components 21 months after the original data release. This is the longest lag associated with CT receipts from generally smaller firms that pay annually.

Chart A: Proportion of recorded HMRC tax data based on forecast in 2015-16



Source: ONS, OBR

4.9 Not all routine data revisions are a consequence of accruals treatment. In some cases, they reflect general lags before outturn data become available and the auditing of provisional outturn data before they are finalised. For example:

- Lags between the Department of Health and Social Care (DHSC) collating **financial data from NHS trusts** and these being brought up to sufficient quality for the ONS to use them in the public finances release. These data are collected quarterly and NHS spending data in the public finances are revised when they become available.
- **Local authority spending and financing estimates for England**, published quarterly by the Ministry of Housing, Communities and Local Government, can be used to revise the public finances throughout the year. Provisional outturns for the full preceding year are not typically available until September and these are still liable to revision, with final audited resource accounts for English local authorities not generally available until November – eight months after the end of the fiscal year. The lag tends to be even greater in Scotland, Wales and Northern Ireland.
- **Final audited spending and receipts data for some public corporations** are not available until the December after the previous financial year.

4.10 Chart 4.1 shows that, since 2010-11, the initial full-year PSNB estimate published by the ONS in the month following the end of the fiscal year had been revised down by an average of £2.5 billion six months later and £3.3 billion twelve months later. So, on average, revisions following the end of the fiscal year have moved the outturn estimates of the budget deficit further away from our in-year forecasts (even though we try to anticipate them in our forecasts when we can).

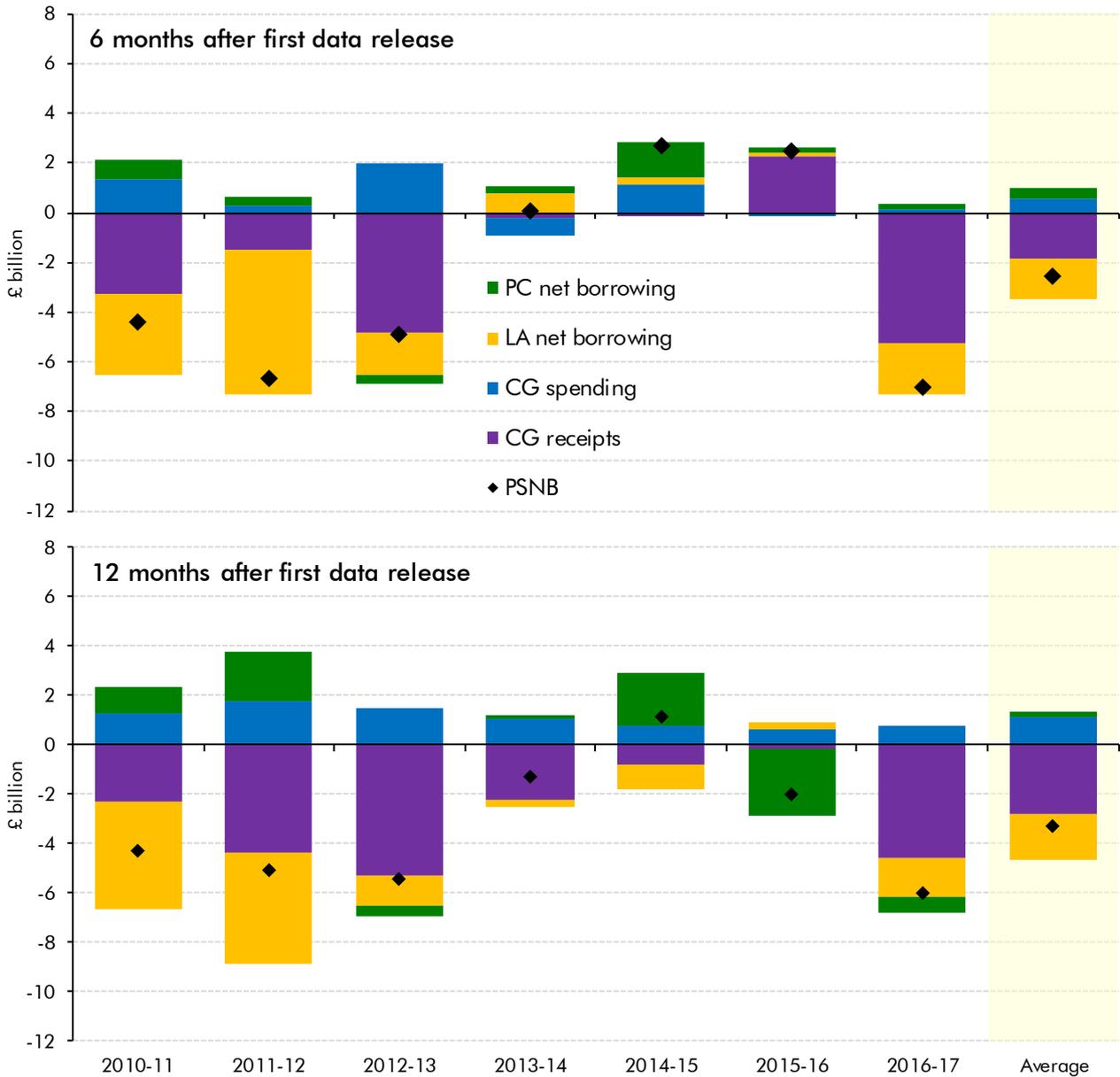
4.11 The main components of these revisions are:

- Full-year **central government receipts** have been revised up by £2.8 billion (0.5 per cent) on average over the 12 months following the initial data release. In recent years, this largely reflects the unexpected strength of cash onshore CT receipts, which feed into the outturn public finances data with a long lag under the new accounting treatment. In earlier years, this is likely to reflect revisions to non-tax receipts, such as the boost to interest receipts from the reclassification of the nationalised banks B&B and NRAM – and their mortgage loan books – into the central government sector.
- Full-year borrowing by **local authorities** has been revised down by £1.8 billion on average over the 12 months following the first data release. This largely reflects the fact that local authorities did not respond to the squeeze on their grant income by drawing down their stock of reserves, but rather added to them over the period 2010-11 to 2014-15 – i.e. they added to reserves and underspent their budgets by more than the ONS (and we) had assumed.
- **Central government spending** has been revised up by £1.1 billion (0.2 per cent) on average over the 12 months following the first data release. After six months, revisions

Sources of data revisions

to central government spending have been both up and down over this period, but after 12 months they have all been upward. This largely reflects higher Department for Education (DfE) estimates for spending by academy schools, which have been revised up by large amounts when outturn data were reported more than a year in arrears.

Chart 4.1: Sources of revision to public sector net borrowing



Source: ONS, OBR

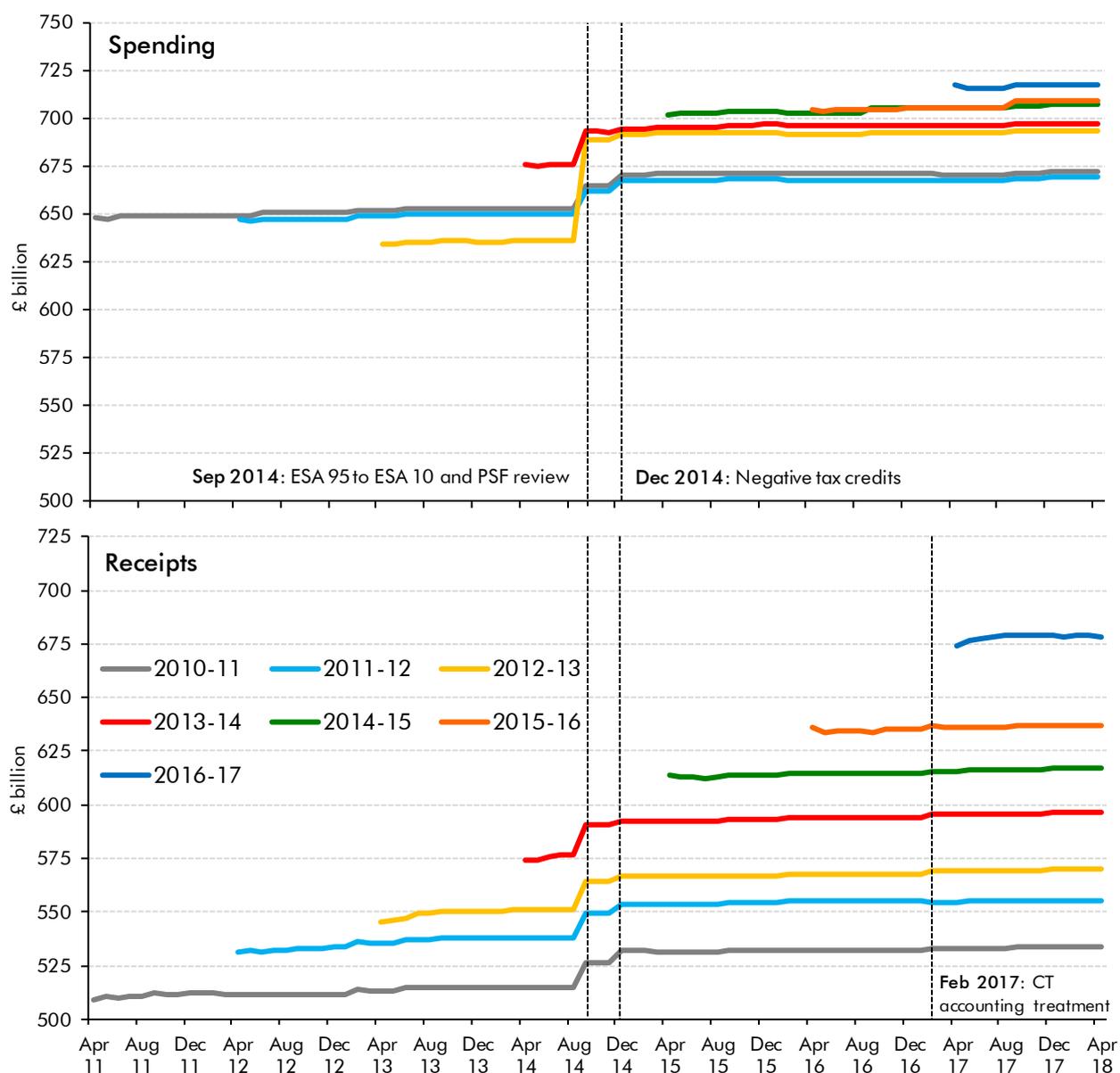
4.12 Most routine data revisions tend to occur within twelve months of the initial data release. But the outturn data may be subject to revision for years after the subsequent release, largely for methodological reasons. Chart 4.2 sets out successive vintages of central government receipts and spending for 2010-11 to 2016-17 using the 'revisions triangles' database

published by the ONS.² It shows that revisions to historical data can be substantial and can significantly change the overall picture of the public finances. For example:

- In the initial outturn data, the ONS recorded a year-on-year rise in **central government spending in 2015-16**. This was revised to a year-on-year fall in September 2016, reflecting updated source data. In September 2017 (17 months after the initial release), this was revised back to a year-on-year rise, reflecting Blue-Book-related methodological changes as well as further updates to source data.
- The largest single change relates to **central government spending in 2012-13**, where the initial data recorded the transfer of Royal Mail pension fund assets to central government as negative spending. Following methodological changes implemented in September 2014 the transfer of the pension deficit was treated as a capital grant (because the assets did not cover estimated future liabilities).
- Revisions to **central government receipts** have typically been smaller than revisions to spending – for example, in December 2014 the accounting treatment of tax credits was changed so that all were treated as spending rather than some as negative tax. This boosted receipts and spending, but had no net effect on borrowing.

² Public sector finances revisions analysis on main fiscal aggregates: Appendix C, ONS.

Chart 4.2: Central government spending and receipts: successive vintages of data



Source: ONS

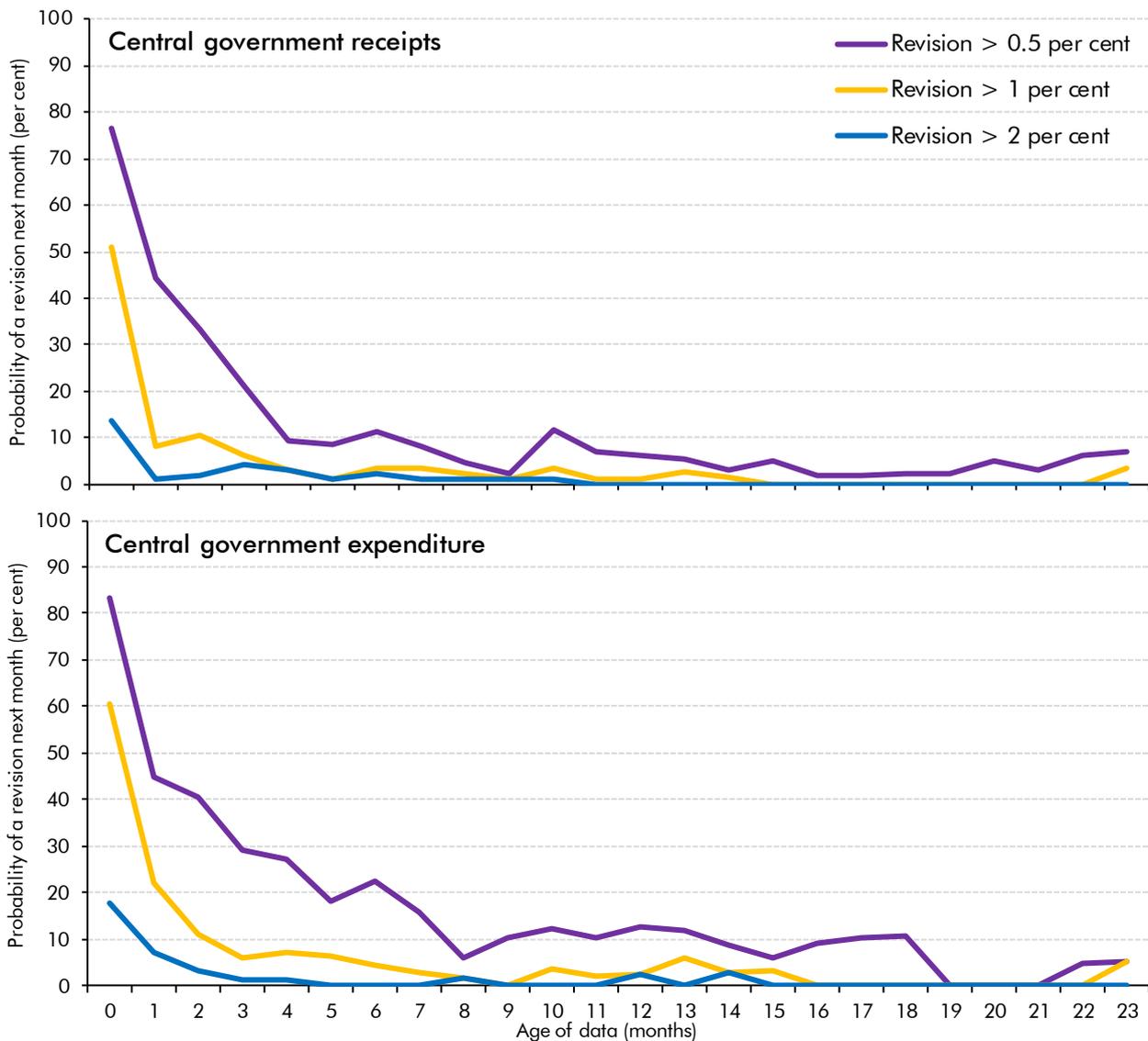
4.13 Based on the revisions since December 2008 recorded in the ONS revisions database, we can estimate the average probability that a central government receipts or expenditure data point will be revised in the next ONS data release.

4.14 Chart 4.3 shows our estimates of the probabilities of a revision of greater than 0.5, 1 and 2 per cent in the next data release, for different numbers of months after the data were first released. It shows that:

- For **central government receipts**, the chance of a sizeable revision to a data point is relatively high for around four months after its first release. This reflects the discussion in Box 4.1, where the majority of the recorded tax data are based on a forecast when they are first released because of the accruals-based accounting treatment.

- For **central government spending**, the chances of a sizeable revision to a data point remains relatively high for longer – around eight months after its first release. This partly reflects the discussion in Chapter 3, where departmental spending data are often subject to revision well after the initial data release.
- **Both sets of data have a small chance of being revised significantly well after the initial data release.** These longer-term revisions are more likely to occur in specific months. For example, historical spending data are more prone to revision in September, when previous years' data are aligned to the Treasury's *Public expenditure statistical analyses* (PESA) publication (which contains four further years of outturn, in addition to the most recent year). The HMRC tax data are more prone to revision in June or July when outturn data are aligned to the HMRC *Trust Statement*.

Chart 4.3: Probability of a revision in the next data release (absolute terms)



Note: Adjusted for revisions related to ESA 10 and the PSF review and CT accounting treatment changes.
Source: ONS, OBR. Based on historic revisions since December 2008.

5 In-year forecast performance

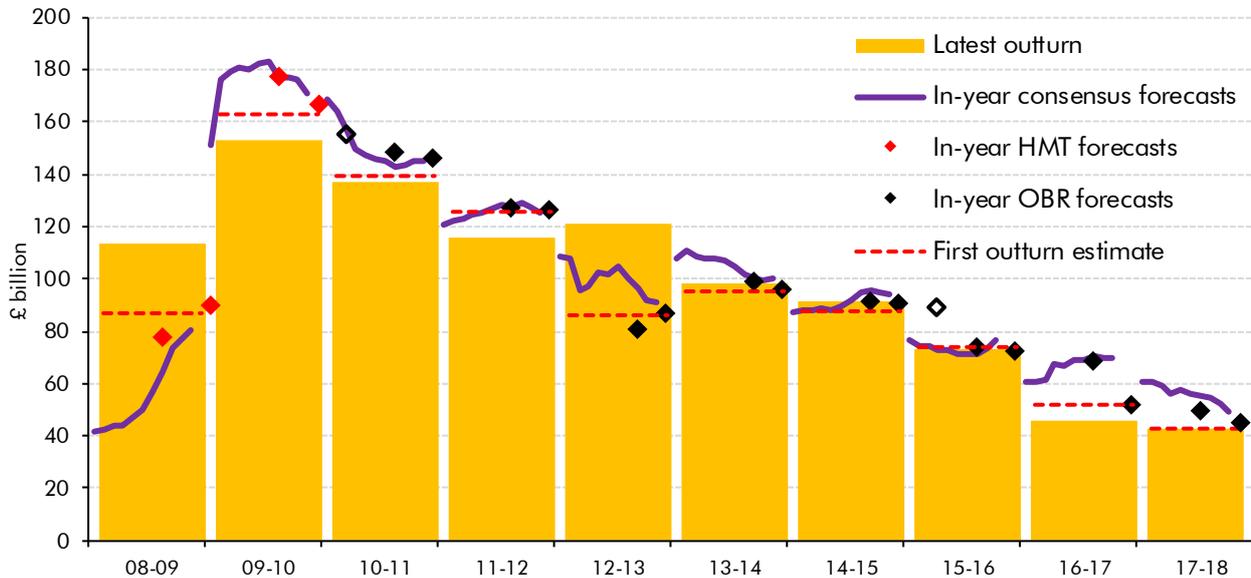
Introduction

- 5.1 This chapter describes how our in-year forecasts for the public finances have performed in recent years. As we have seen, judging this is hampered by the fact that the outturn data we compare them to are often revised significantly – and sometimes long after the event. In our briefing paper on *Evaluating forecast accuracy*, we set out the difficulties in measuring forecast accuracy and how we deal with this problem.¹
- 5.2 Chart 5.1 shows our in-year forecasts for PSNB, alongside the evolution of the average external forecast reported in the Treasury’s monthly *Forecasts for the UK economy* publication. We also show the initial full-year outturns published by the ONS and the latest outturn estimates, reflecting subsequent revisions and classification changes.
- 5.3 The chart shows that the average external forecast tends to be fairly volatile through the year. And, more often than not, it has been too pessimistic relative to the initial and latest outturn estimates. On an almost like-for-like basis, our own forecasts have been slightly more accurate and slightly less pessimistic on average than those of the outsiders.
- 5.4 For those of our forecasts where the Treasury published an outside average at the time, we over-estimated the deficit by an average of £6.9 billion and the outsiders by £9.3 billion.² The largest difference between forecast and latest outturn was our November 2016 forecast for 2016-17. Our forecast of £68.2 billion was significantly larger than the latest outturn estimate of £45.8 billion, partly as result of intervening methodological and classification changes. The outside average forecast at the time was higher still at £70.4 billion.
- 5.5 Different outsiders use different techniques to come up with their forecasts. Anecdotal evidence suggests many draw on our forecasts and on extrapolations of the in-year data, adjusted as necessary for differences in view on the likely performance of the economy and its implications for receipts and spending.

¹ *Briefing Paper No.7, Evaluating forecast accuracy*, available on our website.

² It is not possible to compare our forecasts to the average external forecast on a fully like-for-like basis because the Treasury’s comparison does not include an in-year forecast in February and March, when our spring forecasts are produced.

Chart 5.1: In-year forecast comparisons: official versus external average



Note: Unfilled diamonds reflect estimates for the previous financial year. 'In-year' is assumed to be 2009-10 and 2014-15 for the June 2010 and July 2015 forecasts respectively.
 Source: HM Treasury, ONS, OBR

OBR in-year forecast differences

- 5.6 Our in-year forecasts differ from the latest full-year outturns in part because of classification, accounting and methodological changes to the outturn data implemented by the ONS after our forecasts were published. So a simple comparison would not compare like with like. In order to make a meaningful assessment of our forecast performance in this paper, we restate our in-year forecasts on a basis more comparable with the latest outturn data.
- 5.7 Table 5.1 shows the original and restated forecasts and the adjustments made to move between the two. These reflect the items listed in Table 4.1.

Table 5.1: Original and restated PSNB forecasts

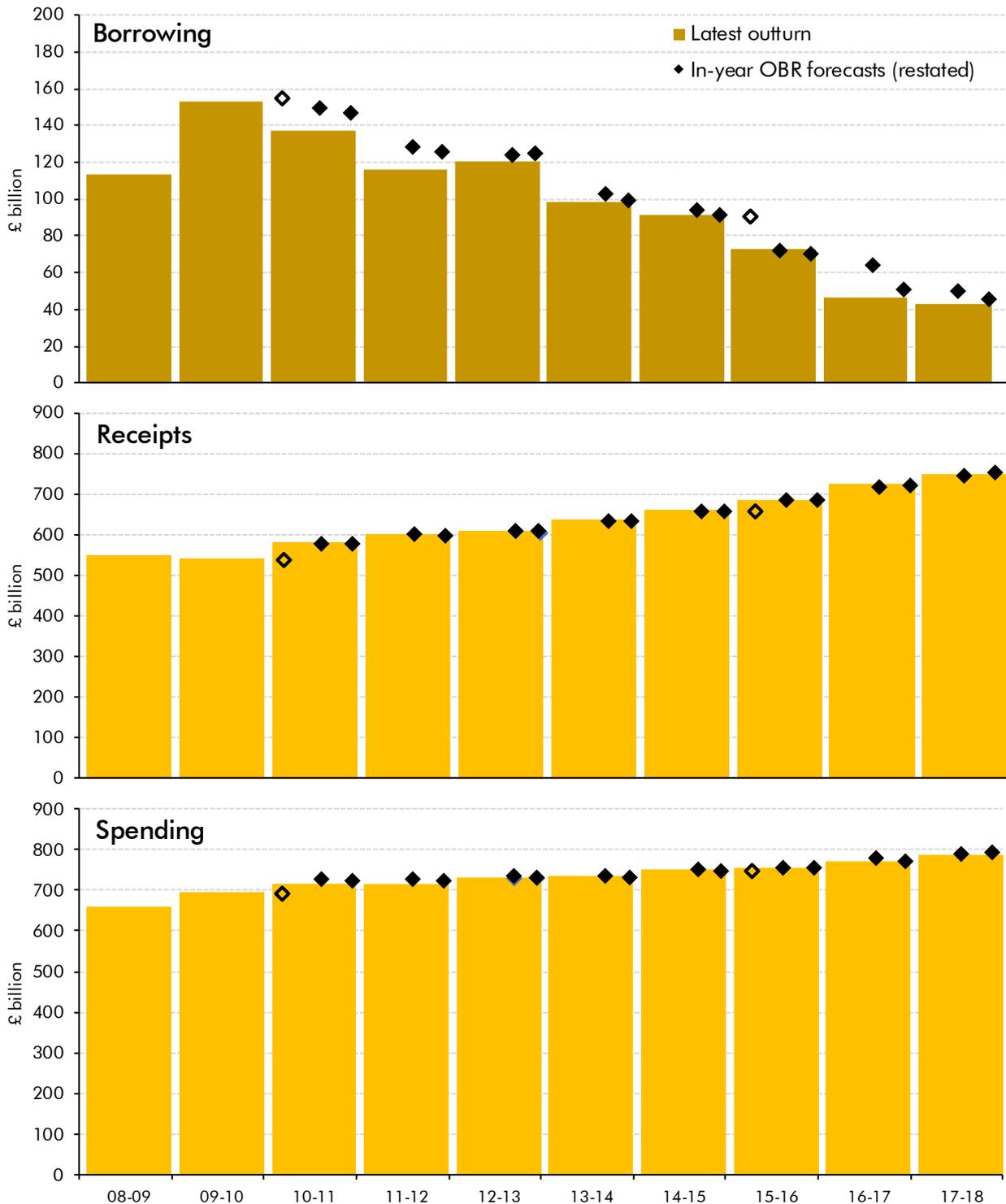
Public sector net borrowing (£ billion)														
	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23
Original forecasts (excluding Asset Purchase Facility and Royal Mail Pension Plan)														
Jun 2010	154.7	149.1	115.6	89.1	60.1	37.5	20.5							
Nov 2010	156.0	148.5	117.4	91.0	60.2	35.1	18.3							
Mar 2011	156.4	145.9	121.8	100.6	69.8	46.2	29.3							
Nov 2011	156.3	137.1	127.1	120.2	99.5	78.9	53.2	23.5						
Mar 2012	156.8	136.8	126.0	119.9	97.5	75.0	52.0	21.1						
Dec 2012	159.0	141.7	121.4	119.9	111.6	98.6	81.2	55.6	30.9					
Mar 2013	158.9	141.0	121.0	120.9	119.8	108.4	95.5	67.0	42.7					
Dec 2013	157.9	139.6	118.5	115.0	111.2	96.0	78.7	51.1	23.4	-2.2				
Mar 2014	157.3	139.2	117.4	114.8	107.8	95.5	75.2	44.5	16.5	-4.8				
Dec 2014	153.0	133.9	112.4	119.4	97.5	91.3	75.9	40.9	14.5	-4.0	-23.1			
Mar 2015	153.0	134.0	112.8	119.4	97.3	90.2	75.3	39.4	12.8	-5.2	-7.0			
Jul 2015	153.5	134.9	113.4	119.7	98.5	89.2	69.5	43.1	24.3	6.4	-10.0	-11.6		
Nov 2015	153.5	134.8	113.6	119.7	99.9	94.7	73.5	49.9	24.8	4.6	-10.1	-14.7		
Mar 2016	154.7	136.8	115.9	121.1	103.0	91.9	72.2	55.5	38.8	21.4	-10.4	-11.0		
Nov 2016	154.9	136.8	115.5	123.4	104.0	96.3	76.0	68.2	59.0	46.5	21.9	20.7	17.2	
Mar 2017	151.6	136.3	115.9	122.1	102.6	94.8	71.7	51.7	58.3	40.8	21.4	20.6	16.8	
Nov 2017	152.5	137.0	116.2	120.9	98.3	91.7	73.2	45.7	49.9	39.5	34.7	32.8	30.1	25.6
Mar 2018	153.0	137.1	116.2	120.8	98.2	91.4	73.0	45.8	45.2	37.1	33.9	28.7	26.0	21.4
Adjustments for major classification and methodological changes														
Jun 2010	-0.4	0.3	1.5	5.7	-7.1	-5.2	-6.6							
Nov 2010	-0.3	0.3	1.5	5.7	-7.1	-5.2	-6.6							
Mar 2011	-0.4	0.3	1.5	5.7	-7.1	-5.2	-6.6							
Nov 2011	-1.5	-0.8	0.5	4.7	-8.1	-6.2	-7.6	-9.1						
Mar 2012	-1.8	-1.8	-0.6	3.6	-9.3	-7.4	-8.8	-10.3						
Dec 2012	-2.5	-1.3	0.0	3.8	-8.7	-6.4	-8.0	-9.9	-8.3					
Mar 2013	-2.5	-1.3	0.0	3.8	-8.7	-6.4	-8.0	-9.9	-8.3					
Dec 2013	-2.5	-1.3	0.0	3.8	-8.7	-6.4	-8.0	-9.9	-8.3	-10.4				
Mar 2014	-2.5	-1.3	0.0	3.8	-8.7	-6.4	-8.0	-9.9	-8.3	-10.4				
Dec 2014	0.5	3.5	5.6	1.7	-0.3	2.5	0.2	-0.2	1.8	-2.4	6.4			
Mar 2015	-0.6	2.5	4.5	0.6	-1.3	1.2	-1.2	-1.5	0.4	-3.7	5.1			
Jul 2015	-0.6	2.5	4.5	0.6	-1.3	1.2	-1.2	-1.5	0.4	-3.7	5.1	3.0		
Nov 2015	-2.9	-0.6	1.2	-1.2	-2.2	-2.1	-2.3	-4.4	-2.9	-0.7	8.2	6.1		
Mar 2016	-2.9	-0.6	1.2	-1.2	-2.2	-2.1	-2.3	-4.4	-3.1	-0.6	8.3	6.1		
Nov 2016	-3.2	-1.1	0.8	-1.6	-2.3	-2.5	-2.3	-4.8	-3.4	-1.1	2.0	0.9	0.5	
Mar 2017	0.2	-0.3	0.1	-0.2	-1.0	-1.5	-1.1	-1.3	-2.6	1.2	1.1	1.3	1.2	
Nov 2017	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mar 2018	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Restated forecasts														
Jun 2010	154.3	149.4	117.1	94.8	53.0	32.3	13.9							
Nov 2010	155.7	148.8	118.9	96.7	53.1	29.9	11.7							
Mar 2011	156.0	146.2	123.3	106.3	62.7	41.0	22.7							
Nov 2011	154.8	136.3	127.6	124.8	91.4	72.7	45.5	14.4						
Mar 2012	155.0	135.0	125.4	123.5	88.2	67.7	43.2	10.8						
Dec 2012	156.5	140.4	121.4	123.7	102.9	92.2	73.2	45.7	22.6					
Mar 2013	156.4	139.7	121.0	124.7	111.1	102.0	87.5	57.1	34.4					
Dec 2013	155.4	138.3	118.5	118.8	102.5	89.6	70.7	41.2	15.1	-12.7				
Mar 2014	154.8	137.9	117.4	118.6	99.1	89.1	67.1	34.6	8.2	-15.2				
Dec 2014	153.5	137.5	118.0	121.0	97.3	93.8	76.1	40.7	16.3	-6.4	-16.7			
Mar 2015	152.5	136.5	117.3	120.0	96.0	91.4	74.1	37.9	13.2	-9.0	-1.9			
Jul 2015	152.9	137.3	118.0	120.3	97.1	90.4	68.3	41.6	24.7	2.7	-4.8	-8.6		
Nov 2015	150.5	134.2	114.8	118.5	97.7	92.5	71.1	45.5	21.9	4.0	-1.9	-8.6		
Mar 2016	151.8	136.2	117.1	119.9	100.8	89.7	69.8	51.1	35.7	20.8	-2.2	-4.9		
Nov 2016	151.7	135.7	116.3	121.8	101.7	93.7	73.7	63.3	55.5	45.4	23.9	21.6	17.7	
Mar 2017	151.8	136.0	116.0	121.8	101.6	93.3	70.5	50.4	55.6	42.0	22.5	21.9	18.0	
Nov 2017	152.8	137.0	116.2	120.9	98.3	91.7	73.2	45.7	49.9	39.5	34.7	32.8	30.1	25.6
Mar 2018	153.1	137.1	116.2	120.8	98.2	91.4	73.0	45.8	45.2	37.1	33.9	28.7	26.0	21.4

Note: In-year forecasts highlighted in purple.

In-year forecast performance

5.8 Chart 5.2 shows the latest outturns (as in Chart 5.1) and compares them with the restated in-year forecasts on a near-comparable basis. The rest of this chapter focuses on analysing these like-for-like forecast differences.

Chart 5.2: In-year forecasts: like-for-like comparison with latest ONS outturns



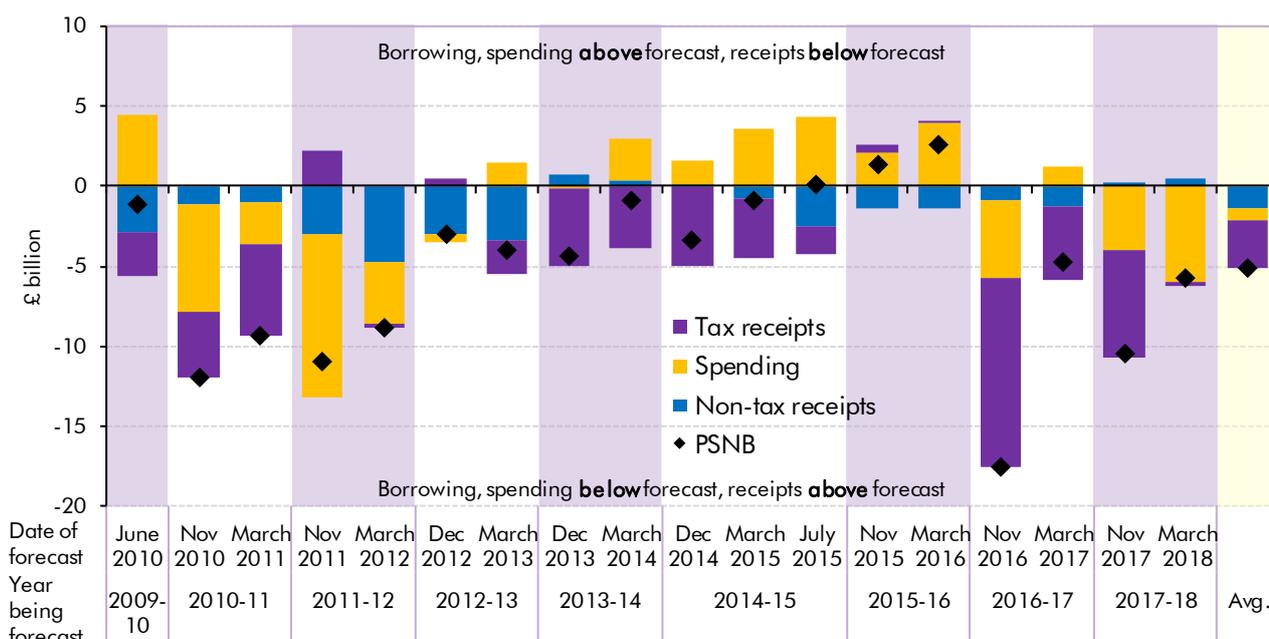
Note: Unfilled diamonds reflect estimates for the previous financial year. 'In-year' is assumed to be 2009-10 and 2014-15 for the June 2010 and July 2015 forecasts respectively.

Source: HM Treasury, ONS, OBR

- 5.9 As we noted in Chapter 1, the chart shows that our in-year forecasts for net borrowing have tended to be too pessimistic, even after restating them for major methodological, classification and accounting changes to the outturn data. On the restated basis, fifteen of our eighteen forecasts for completed fiscal years were too high and the forecasts as a whole were over-optimistic by an average of £5.2 billion (or 0.3 per cent of GDP, based on the latest estimates of nominal GDP in each year).
- 5.10 On a percentage basis, our restated forecasts over-estimated borrowing by an average of 6.2 per cent (ranging from a 27.7 per cent over-estimate in November 2016 to 3.8 per cent under-estimate in March 2016). But, as we noted in Chapter 1, small percentage differences between forecasts and outturns for receipts and spending translate into much bigger percentage differences for the balance between the two, especially as the deficit narrows and when the differences reinforce rather than offset each other. As the lower panels of Chart 5.2 show, the percentage differences for receipts and spending are far smaller than for borrowing, with an average under-estimate for receipts of just 0.7 per cent (ranging from a 0.03 per cent over-estimate in March 2018 to a 1.8 per cent under-estimate in November 2016) and an average over-estimate for spending of just 0.1 per cent (ranging from a 1.4 per cent over-estimate in November 2011 to a 0.7 per cent under-estimate in June 2010).
- 5.11 Our tendency to over-predict the in-year deficit contrasts with our medium-term forecasts, which have been too optimistic more often than they have been too pessimistic. At shorter horizons, the split between optimistic and pessimistic forecasts has been relatively even, but at four- and five-year horizons almost all our early forecasts – the only ones that we can currently compare with outturns over those horizons – were too optimistic. That largely reflected the unexpected productivity-related weakness in the wider economy, which put downward pressure on tax receipts – especially income tax. Our spring in-year forecasts have tended to be more accurate than our autumn ones, as we would expect given the additional months of data that we can draw upon when producing them.
- 5.12 Chart 5.3 breaks down the main sources of the in-year forecast differences. It shows that:
- **Our in-year forecasts for tax receipts** have on average been too low, by £3.0 billion (0.5 per cent) on average. Around half of this difference reflects non-SA income tax and NICs receipts, with the bulk of the remainder explained by the other large tax streams (notably onshore corporation tax and VAT).
 - **Our in-year forecasts for non-tax receipts** have on average also been too low, by £1.4 billion (2.9 per cent) on average. This is more than explained by revisions to the historical data that formed the basis of the forecasts.
 - **Our in-year spending forecasts** have on average been too high, by £0.7 billion (0.1 per cent) – half the forecasts were over-estimates and half under-estimates. Differences between our welfare spending forecasts and outturns – notably tax credits – more than explain this.

- By far the largest difference between in-year forecast and outturn was our November 2016 forecast for 2016-17. In that forecast we over-estimated the latest outturn by £22.4 billion on a raw basis and £17.6 billion like-for-like, the latter reflecting a £12.8 billion under-estimate of receipts and a £4.8 billion over-estimate of spending. That was the first forecast we made after the EU referendum, but the difference between forecast and outturn had little to do with the judgements we made about the impact of the vote. It was driven partly by unusually large revisions to the in-year receipts and spending data that underpinned our forecast – the April 2017 initial outturn estimate for the 2016-17 deficit had been revised down by £7 billion within six months (see Chart 4.1 and Box 3.1 of our 2017 *Forecast evaluation report*). Other key factors included the impact of unexpectedly strong bonus payments on income tax receipts, unusual end-loading of corporation tax and VAT receipts, greater-than-expected underspending by central government departments, the timing of expenditure transfers to the EU and strong capital gains tax receipts.

Chart 5.3: Sources of in-year PSNB forecasting differences



Note: For comparability, 'in-year' is assumed to be 2009-10 and 2014-15 for the June 2010 and July 2015 forecasts respectively. Forecast errors have been adjusted for major classification changes (see Chapter 4). Source: ONS, OBR

5.13 In the rest of this chapter, we drill further into the sources of these in-year differences.

Tax receipts

5.14 On average, we have under-estimated tax receipts during the year in progress by £3.0 billion (or 0.5 per cent of total tax receipts). Chart 5.4 shows that:

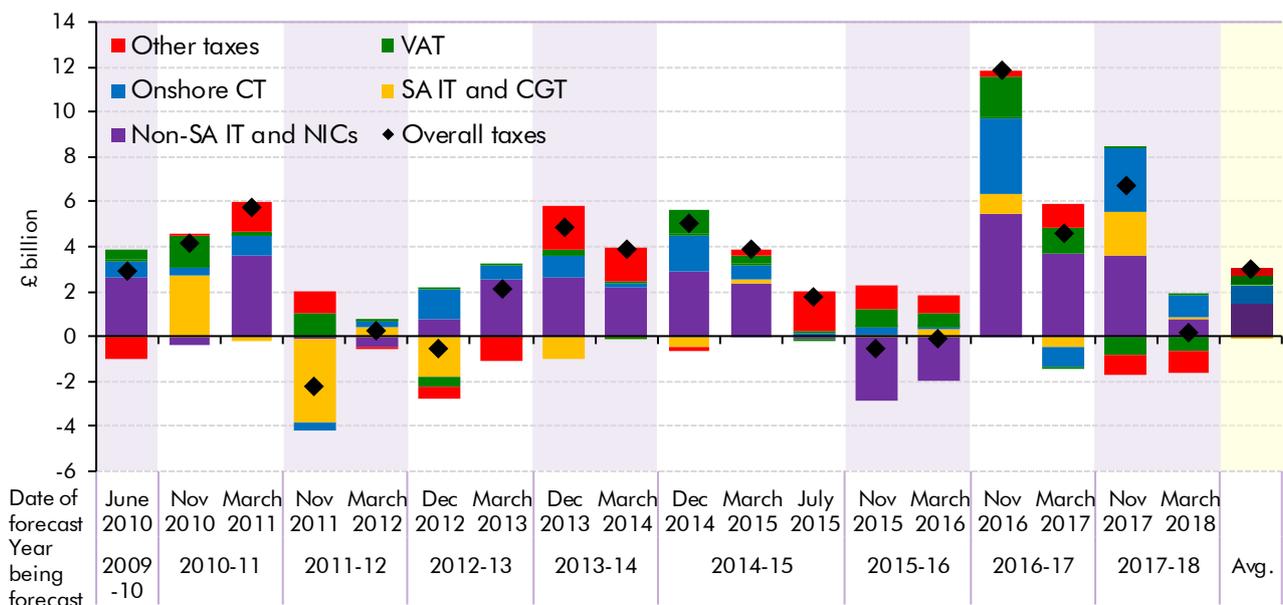
- Non-SA income tax and NICs** explain the bulk of our under-estimation of tax receipts, coming in around £1.5 billion higher than expected on average. While large in absolute terms, this represents an average difference between forecast and outturn of

just 0.6 per cent of what is the largest source of public sector receipts. This reflects both underlying developments in the pattern of receipts over the year, as well as differences between forecasts and outturns for bonus payments (described in Chapter 3).

- **Onshore corporation tax** receipts (abstracting from the change in accounting treatment in 2017) have on average come in £0.8 billion (4.9 per cent) higher than our in-year forecasts. As described in Chapter 3, this appears to reflect upside surprises for larger companies. Their quarterly CT payments have tended to increase through the year rather than being evenly spread, as you would expect if their initial profit expectations proved accurate on average. Onshore CT is an area that we are considering again in this year’s fiscal forecast model review and where further investigation continues.
- **VAT** receipts have on average come in around £0.4 billion (0.4 per cent) higher than our in-year forecasts. As described in Chapter 3, the pattern of the monthly data available at the time of our autumn forecasts has been uneven, making it difficult to distinguish underlying trends from changes in the pattern of receipts through the year.

5.15 On an individual forecast basis, the differences between our SA income tax and CGT forecasts have been relatively large in absolute terms: in the nine forecasts where we underestimated these sources of revenue the average error was £0.7 billion (2.6 per cent), while in the nine where we overestimated them the average error was £0.9 billion (3.1 per cent). But taken together, these differences have been offsetting, with the average difference across all eighteen forecasts being an overestimate of just £0.1 billion (0.3 per cent).

Chart 5.4: Sources of in-year forecast difference: tax receipts



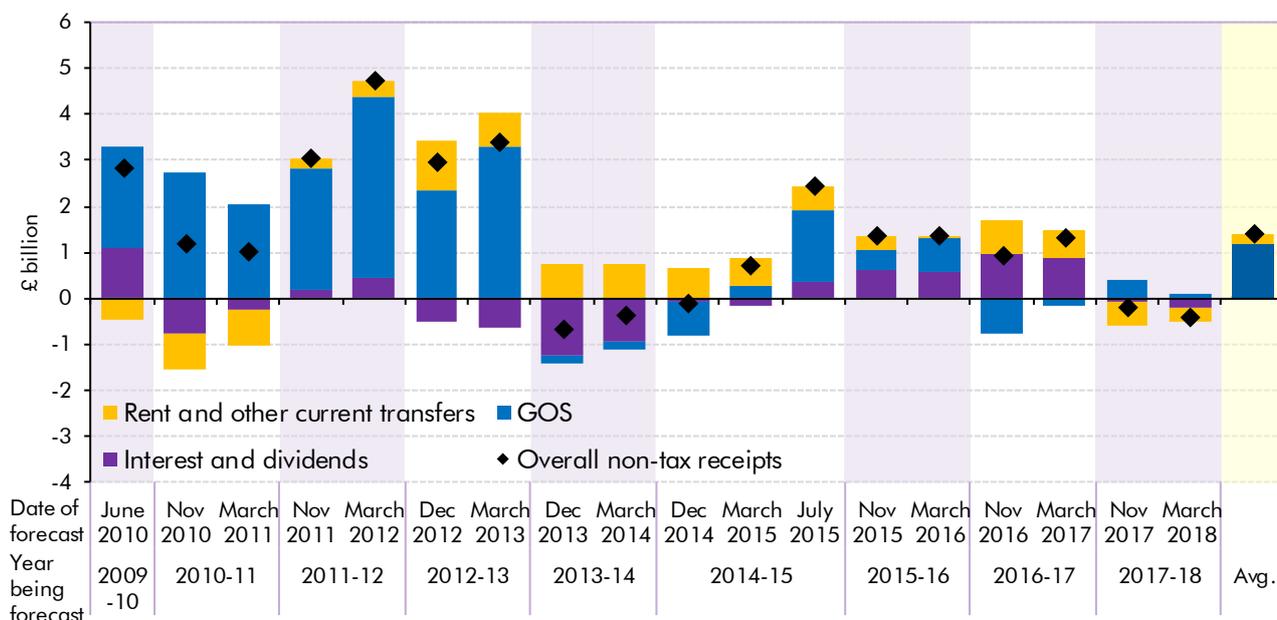
Note: For comparability, 'in-year' is assumed to be 2009-10 and 2014-15 for the June 2010 and July 2015 forecasts respectively. Forecast errors have been adjusted for major classification changes (see Chapter 4).
Source: ONS, OBR

Non-tax receipts

5.16 On the basis of the latest data, non-tax receipts have come in around £1.4 billion (2.9 per cent) higher than forecast on average. (This is half the average cash difference for tax receipts, even though non-tax receipts are typically only one-tenth the size of tax receipts.) Chart 5.5 shows that this can be explained by:

- **Rent and other current transfers.** The majority of these differences reflect reconciliation work undertaken by the ONS and the Treasury to reduce the discrepancy between the central government net cash requirement (CGNCR – the measure of cash borrowing that feeds directly into the Government’s financing plans) and public sector net borrowing (PSNB).³ This led to previously unrecorded receipts and spending streams being incorporated into the headline PSNB measure, which we could not have anticipated. It is not possible to restate our previous forecasts for this effect, as the changes were implemented over a period of time.
- Our forecasts for the **gross operating surplus (GOS)** have been too low on average. This largely reflects revisions to the outturn data that we could not have anticipated, including several in Blue Book 2013 that boosted our GOS forecast by over £2 billion a year in December 2013. Given the lack of other information about GOS, any revisions to the historical outturn data on which our forecast is based will tend to feed one-for-one into forecast differences.

Chart 5.5: Sources of in-year forecast difference: non-tax receipts



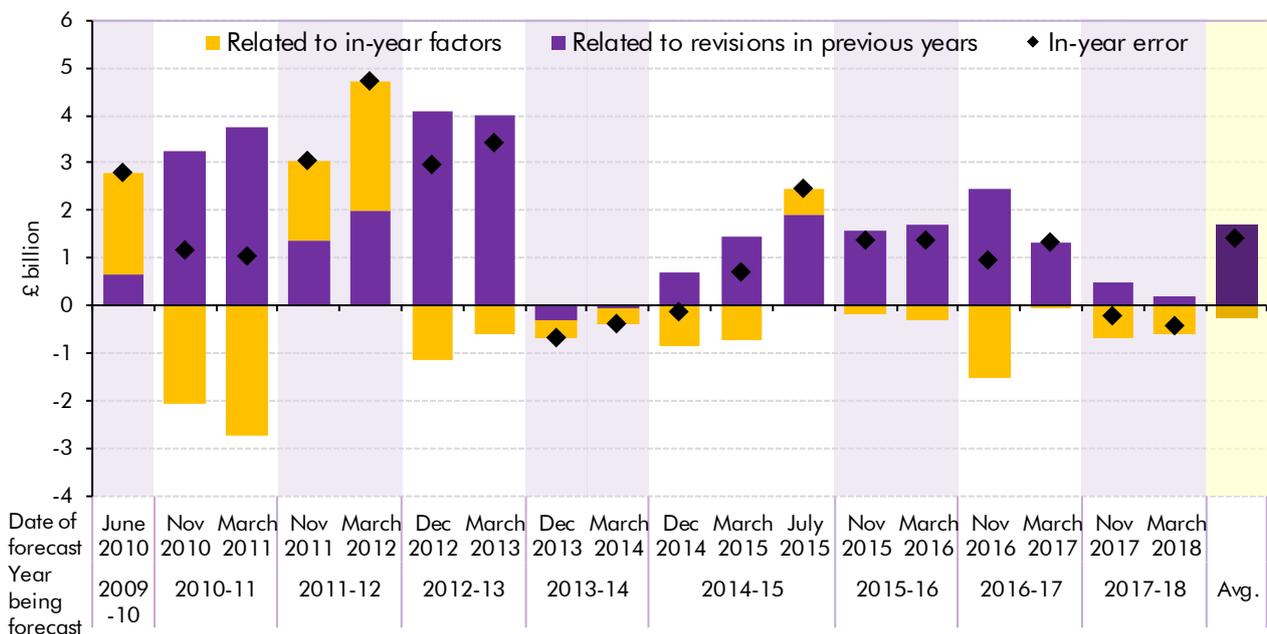
Note: For comparability, 'in-year' is assumed to be 2009-10 and 2014-15 for the June 2010 and July 2015 forecasts respectively. Forecast errors have been adjusted for major classification changes (see Chapter 4).

Source: ONS, OBR

³ See Box 4.3 of our July 2015 EFO.

5.17 The latest outturn data are important for all in-year forecasts, but that is particularly true for non-tax receipts, where there is little else to base our forecasts on. Chart 5.6 illustrates how revisions to the historical data used at the time of each forecast more than explain our in-year forecasting differences for non-tax receipts. The chart splits the forecast differences into two components: one that is equal to the revision to the outturn data preceding the starting point of each forecast and a residual that reflects the judgements we made about how the year in progress would vary from the available outturn data. This second part can be considered a genuine ‘underlying’ in-year difference. It averages minus £0.3 billion across all our in-year forecasts – just minus 0.4 per cent of non-tax revenues.

Chart 5.6: Sources of in-year forecast difference: non-tax receipts



Note: For comparability, 'in-year' is assumed to be 2009-10 and 2014-15 for the June 2010 and July 2015 forecasts respectively. Forecast errors have been adjusted for major classification changes (see Chapter 4). Source: ONS, OBR

Total managed expenditure

5.18 Chart 5.7 sets out the sources of our in-year public spending forecast differences. It shows that there has been no bias on average over the period, with positive and negative differences largely offsetting. Within the components of public spending:

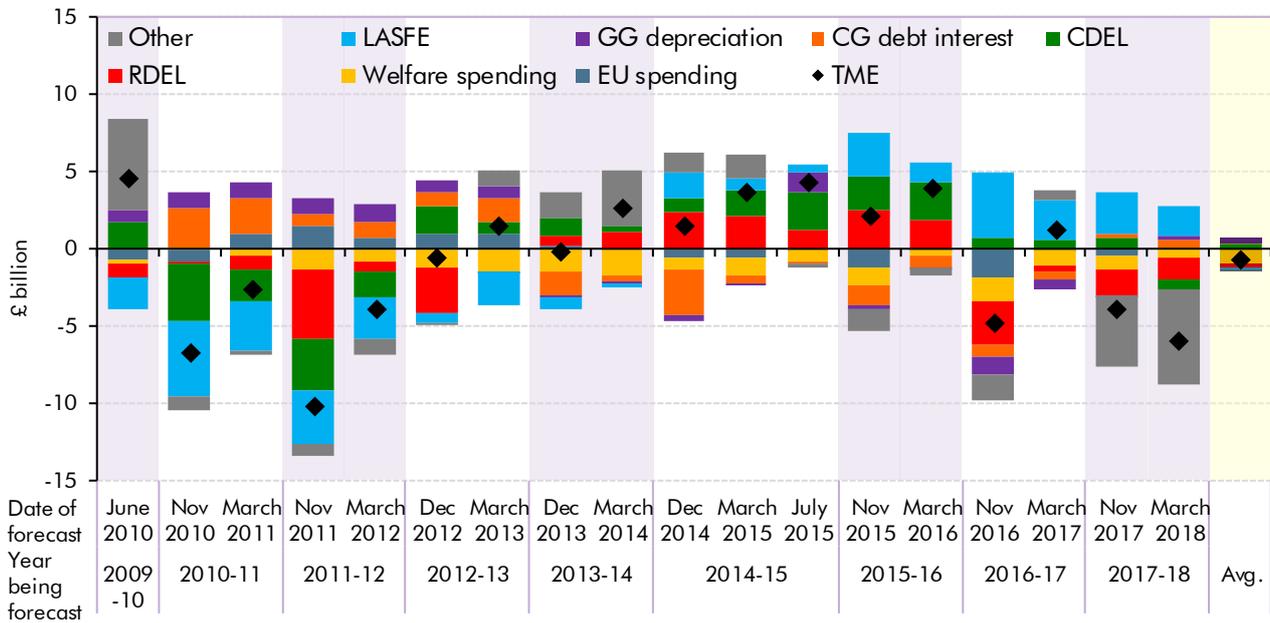
- Departmental spending (DEL)** often drives in-year forecast-to-outturn differences, although these have been in both directions since June 2010. For autumn forecasts, this reflects uncertainty over the extent to which the government will change its in-year spending plans in the Supplementary Estimates process and the extent to which those final plans will then in turn be underspent. For spring forecasts, it is just the underspending against final plans that we need to worry about. Underspending has varied significantly from year to year over the period.

- As set out in Chapter 3, in-year differences between forecasts and outturns for **expenditure transfers to the EU** are largely explained by timing effects, which have also tended to offset each other taken across all our forecasts. We recognised this as an issue in our October 2014 *FER* and took steps to align our forecast more closely with the expected monthly profile of spending, including forecasting when retroactive adjustments were likely to be made.
- **Welfare spending** has typically come in below forecast, by £0.9 billion (0.4 per cent) on average. Part of this reflects small but consistent over-estimates of spending on tax credits. We have been reviewing this forecast for some time and made significant changes to key assumptions about income growth in the tax credits population in our most recent *EFO*.⁴ The remainder appears to reflect accounting treatment differences between the ONS and DWP, which are currently being reviewed, and a variety of smaller one-off factors.
- Differences between forecast and outturn for **central government debt interest spending** have tended to be driven by the monthly path of outturn RPI (see Chapter 3). Accrued interest on index-linked gilts is very sensitive to what we assume about the month-on-month change in the RPI in January, which is subject to significant uncertainty since it is influenced by the discounting during the New Year sales.
- Our in-year forecasts for **local authorities' self-financed expenditure (LASFE)** were generally too high between 2010 and 2014. We recognised this as an issue in our December 2012 *FER*, noting that we had wrongly predicted that local authorities would draw down on their reserves as cuts to central government grant-funding hit their spending power. We stepped up our engagement with local government experts to get a better picture of the likely response of local authorities to these pressures. Since 2014, we have tended to under-predict local authority spending as authorities have switched to drawing down reserves to a greater extent than we were expecting.

5.19 The drivers of the 'other spending' category include methodological revisions to data that we could have not anticipated, and which have often boosted both spending and receipts. Recent differences are largely due to capital expenditure by public corporations, where we are not able to draw on timely data during the year in progress at the time of each forecast.

⁴ See Box 4.3 of our March 2018 *EFO*.

Chart 5.7: Sources of in-year forecast difference: spending



Note: For comparability, 'in-year' is assumed to be 2009-10 and 2014-15 for the June 2010 and July 2015 forecasts respectively. Forecast errors have been adjusted for major classification changes.

Source: ONS, OBR

6 Conclusions

6.1 In this working paper, we have reviewed the performance of our in-year forecasts and the challenges that we face in producing them. These should be borne in mind by anyone monitoring the monthly flow of public finances data.

6.2 In terms of monitoring, the main conclusions include:

- the importance of **drawing on more than one analytical approach**, since there are merits and drawbacks to each;
- the value in **reviewing known timing and one-off effects**, so that simple extrapolation approaches can be supplemented where they are likely to give a poor indication of full-year trends; and
- **initial monthly data are prone to significant revision**, so it is important to recognise that in-year we are monitoring a very early draft of fiscal history.

6.3 In terms of our in-year forecast performance, we conclude that:

- On a simple comparison with the latest outturns, **our in-year forecasts have over-predicted the budget deficit** by an average of £6.0 billion a year.
- **This in part reflects methodological and classification changes to outturn data** announced and implemented after our forecasts were made. Adjusting for these, we have over-predicted the deficit by an average of £5.2 billion a year.
- The average over-estimate has been reduced between our first nine forecasts and our second, but there have been **relatively large over-estimates in the last two years**. This is for a variety of reasons, specific to particular spending and revenue forecasts, that have little to do with our judgements regarding the impact of the EU referendum vote.
- The latest outturns are lower than our in-year forecasts on average in part because the **ONS has tended to revise its initial outturn estimates of the deficit lower** – by an average of £3.3 billion a year within 12 months of the end of the fiscal year. Where possible we have attempted to anticipate these revisions in our forecasts.
- Adjusting for methodological and classification changes, **our in-year forecasts have been somewhat more accurate and less biased than the average external forecast**. The differences between our forecasts and the outturns on this underlying basis have averaged 0.7 per cent for receipts and *minus* 0.1 per cent for spending.

Conclusions

6.4 Table 6.1 summarises the main sources of the differences between our in-year forecasts and the latest outturns, as described in Chapter 5.

Table 6.1: Summary of in-year PSNB forecast differences

	£ billion		Overall
	First nine OBR forecasts	Past nine OBR forecasts	
Average PSNB forecast difference	-7.1	-4.9	-6.0
<i>Effect of ONS classification, methodological and accounting treatment changes</i>	1.1	0.7	0.9
Like-for-like difference	-6.0	-4.3	-5.2
<i>of which:</i>			
Non-self assessment income tax and national insurance contributions	-1.5	-1.5	-1.5
Historical revisions to non-tax receipts	-2.1	-1.3	-1.7
Welfare spending	-1.0	-0.9	-0.9
Onshore corporation tax	-0.5	-1.0	-0.8
Local authority self-financed expenditure	-2.2	2.1	-0.1
Other factors	1.3	-1.6	-0.2
<i>Memo:</i>			
<i>Number of over-forecasts</i>	9	6	15
<i>Number of under-forecasts</i>	0	3	3

Note: This table uses the convention that a negative number means that PSNB and spending were below forecast/receipts were above forecast.

6.5 Based on our analysis of these specific sources of in-year forecast differences, we have drawn some lessons that we can apply in future forecasts. Among them:

- The **bonus assumptions in our income tax and NICs forecasts** have on average helped us under-estimate revenues. Tax payments on employee bonuses are very volatile, so forecast differences are always likely to be relatively large, but it appears that starting from an assumption that they grow in line with wages and salaries (plus a little for the marginal tax rate effect) rather than average earnings would help. The falling share of whole economy bonus pay accounted for by the financial sector also points to the need to take greater account of trends outside the banking sector when informing the judgements we make. There may also be greater insight to be extracted from HMRC's real-time information, as this source continues to be developed.
- Our **onshore corporation tax** forecasts have exhibited consistent in-year pessimism in recent years. We have been working with HMRC to develop a new in-year forecasting tool that utilises a wider range of the forecasting approaches set out in Chapter 1. More generally, we will look into the detailed, though heavily lagged, liabilities data to try to understand which forecast assumptions have been the source of our under-estimates – e.g. under-estimating profits versus over-estimating deductions. In some sense, our in-year forecast boils down to judging whether larger companies' own profit forecasts that are embodied in their initial quarterly instalments will prove accurate. Since early estimates of profits in the GDP statistics are poor indicators of the true

picture – which the ONS ultimately aligns to HMRC’s lagged liabilities data – there is little meaningful information on which to base such a judgement.

- Revisions to ONS estimates for **gross operating surplus** have exhibited a significant upward bias that has fed through to the pessimistic bias in our overall receipts and borrowing forecasts. We will work with the ONS to gain a fuller understanding of whether this historical bias tells us anything about whether future data revisions are more likely to up than down, so that we could anticipate them in our GOS forecasts

6.6 Our welfare spending forecasts have been a source of in-year borrowing pessimism, with tax credits being the largest systematic source of spending over-estimates. We hope that the recent changes made to our assumptions about income growth in the tax credits population will address that bias, although as with all forecast assumptions they will remain under review. But one issue that has become more prominent in recent forecasts, and that will continue to do so, is understanding the effects of universal credit on in-year spending.

6.7 The pace at which universal credit is rolled out influences in-year spending on the six legacy benefits and tax credits that it is replacing. But it is not simply the case that each pound that is spent on universal credit reflects a pound not spent in the legacy system – universal credit changes the amounts that people receive and also the number of people claiming. It is almost impossible to track these marginal effects in real time. Spending on universal credit and its legacy equivalents amounts to around £60 billion a year, so the significant uncertainties generated by the rollout could well have material effects on our in-year borrowing forecasts. The scale and complexity of the structural and behavioural changes caused by the rollout also means that it is hard to extrapolate from past information to inform current and future in-year forecasts.

A The public finances in 2017-18

A.1 In the September 2018 *Public sector finances* release, the ONS revised its estimate of PSNB in 2017-18 up by £0.5 billion relative to the previous month's release (which formed the basis of the analysis in the main body of this working paper). This revision reflects:

- **Provisional outturn data for central government (CG) spending** (consistent with the Treasury's 2018 Public Expenditure Statistical Analysis (PESA) publication) led to CG spending and PSNB being revised up by £0.5 billion.
- **Provisional outturns for local authority current and capital expenditure in England** (consistent with recent data releases from the Ministry of Housing, Communities and Local Government) reduced local authority spending and PSNB by £0.1 billion.

A.2 Table A.1 decomposes the difference between this latest data and our November 2017 and March 2018 forecasts, after restating for items included in OBR forecasts that the ONS has not yet included in outturn (see paragraph 4.6). It shows that both forecasts over-estimated borrowing in 2017-18. The main drivers were:

- **Local authority net borrowing** was lower than we forecast on both occasions. Relative to the assumptions in these forecasts, this reflects two partly offsetting factors: local authorities' current spending fell short of income, allowing them to add to their reserves, but capital spending financed by prudential borrowing was markedly higher.
- **Corporation tax** receipts were higher than predicted in both forecasts. As set out in Chapter 6, we have recognised that our in-year CT forecasts have tended to be too pessimistic and we are working with HMRC to develop new tools and approaches to inform our forecasts.
- Lower **other CG current and capital spending** than predicted in our March 2018 forecast. This largely reflects lower departmental current and capital spending. Around £1.2 billion of this relates to a one-off data correction issue, where the Department of Health and Social Care had been incorrectly recording some debt interest payments. Correcting the error reduces RDEL, with the payments now instead being correctly recorded as annually managed expenditure. Most of the rest relates to larger underspends (mostly on current spending) across several departments

A.3 Relative to our November 2017 forecast, higher-than-expected SA income tax, PAYE income tax and NICs receipts also contributed to the PSNB over-estimate. This largely reflected higher receipts in January, which we incorporated into our March 2018 *EFO* forecast.

Table A.1: Breakdown of the difference between our November 2017 and March 2018 forecasts and latest outturn

	£ billion	
	November 2017	March 2018
Forecast	49.9	45.2
<i>Items included in OBR forecasts that the ONS has not yet included in outturn</i>	0.3	0.4
Restated forecast	50.2	45.6
Outturn (September 2018 PSF)	39.9	39.9
Like-for-like difference	-10.3	-5.7
<i>of which:</i>		
LA net borrowing (ex. grants from CG)	-3.9	-2.7
Corporation tax	-3.4	-1.2
PAYE IT and NICs	-1.9	-0.2
SA IT and CGT receipts	-1.8	0.1
Other current and capital CG spending (mostly DEL)	0.6	-2.6
PC net borrowing (ex. APF transfers)	1.1	0.8
Other factors	-1.0	0.2

Note: A negative number means lower-than-expected spending and borrowing, higher-than-expected receipts.

