Scottish Fiscal Commission

Report on Draft Budget 2017-18

December 2016

1. Foreword

This has been a year of significant change for the Commission. While our remit for this Draft Budget remains the same as in the previous two years - to provide independent scrutiny of the relevant Scottish Government forecasts - the fiscal framework has significantly changed the Commission's future role.

Next year, the Commission will begin to produce its own independent forecasts of Scottish tax revenues and Scottish GDP. Over the summer, our small team expanded to support not only our ongoing work in scrutinising the Scottish Government's forecasts, but also to manage our transition to becoming a statutory body. From April 2017 the Commission will become a Non-Ministerial Department.

We were joined during the summer by an interim Commissioner, Professor Charles Nolan, who has seamlessly stepped in to contribute to our work, following the resignation of Professor Andrew Hughes Hallet. The Commission notes the valuable contribution of Andrew Hughes Hallet to the Scottish Fiscal Commission over its first two years.

During the current forecasting round, the Commission held 11 scrutiny and challenge meetings with officials in the Scottish Government, and joined one session hosted by the Office of Budget Responsibility (OBR). These have provided opportunities for the Commission to explore and challenge the methodologies and processes undertaken by the forecasters.

The Commission is grateful to everyone involved for their hard work, expertise and professionalism in responding to our queries over the course of the year. The level of cooperation and transparency which consistently marked our discussions with the Scottish Government forecasters greatly facilitated our ability to scrutinise properly the forecast methodologies they adopted. We also greatly appreciated the willing and helpful cooperation of staff in the OBR regarding their latest forecasts.

And I am personally grateful to our own staff, ongoing and new, whose dedication and sheer hard work sit underneath this report, and of course to my two fellow Commissioners whose expertise and commitment inform the entire document.

In this report, we present our assessment of the reasonableness of the Scottish Government's forecasts in relation to the '17-'18 Draft Budget. We do this against extensive analysis of the forecasts and the approaches taken. We have also expanded on our recent Outturn Report and offered some commentary on the Additional Dwelling Supplement, undertaking preliminary work to compare the in-year outturn figures for the devolved taxes to the forecasts.

However, we repeat the point that a proper judgement about outturn revenues against actual forecast can only be made once a full year's receipts are in hand. Finally, we have included some sensitivity analysis of the Scottish Government's tax forecasts. This information is provided, not in any way as alternative forecasts, but rather to deepen understanding of the important drivers of each forecast.

During the year, the current members of the Commission began a process of knowledge transfer around the models in anticipation of our new responsibilities next year. And we began a major transition project to prepare us our change in statutory status in April. It will undoubtedly be another busy year and we look forward to it. Meanwhile, we hope you find this report of some interest and, as always, would be pleased to receive feedback on any aspect of our analysis or the presentation of the analysis in the report. This can be sent to info@fiscalcommission.scot.

Lady Susan Rice, CBE
Chair, Scottish Fiscal Commission

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2. Introduction

Origins and remit of the Commission

2.1 The Scottish Fiscal Commission was established in June 2014 as a non-statutory body to provide independent scrutiny of Scottish Government forecasts of receipts and economic determinants from taxes devolved to Scotland.

2.2 Under powers in the Scotland Act 2012, two taxes were devolved to Scotland with effect from 1 April 2015. At that point the Scottish Government (SG) began to receive revenues from the Land and Buildings Transaction Tax (LBTT) and the Scottish Landfill Tax (SLfT) to fund a proportion of public spending in Scotland. The Commission has produced reports on previous Draft Budgets, undertaking independent scrutiny and assessment of the forecasts prepared by the Scottish Government of receipts from LBTT and SLfT and of the economic determinants underpinning Scottish Government forecasts of income from Non- Domestic Rates.

2.3 The Scotland Act 2012 also provided the Scottish Parliament with the power to set the Scottish Rate of Income Tax from 6 April 2016. The forecast for receipts arising from the Scottish rate in 2016-17 was made by the OBR. The Scottish Fiscal Commission participated in challenge meetings to be informed of the forecasting methodologies employed by the OBR.

2.4 The Scotland Act 2016 devolves further fiscal powers to the Scottish Parliament. The most significant change relates to income tax; from April 2017 the rates and band thresholds applying to non-savings non-dividend Income Tax paid by Scottish taxpayers will be devolved. The Scottish Government will set the rates and band thresholds (excluding the personal allowance) for tax year 2017-18. This will be the first time the Commission has provided independent scrutiny of the Scottish Government's forecasts of Income Tax liabilities.

2.5 The Commission operates independently providing impartial and expert scrutiny of the Scottish Government's tax forecasts. Its aim is to give both the Scottish Parliament and the public assurance about the reasonableness and integrity of the forecasts. It has full discretion over how it fulfils its purpose and delivers its remit. This extends to determining its judgements and deciding the content of its analytical publications and its own work plan.

2.6 Three Commissioners, whose appointments were recommended by the Deputy First Minister and approved by the Scottish Parliament, were appointed in July 2014 on staggered contracts. Lady Susan Rice was

appointed as Chair of the Commission and Professors Andrew Hughes Hallet and Campbell Leith were appointed as Commissioners.

2.7 Professor Andrew Hughes Hallet resigned from the Scottish Fiscal Commission from 1 August 2016 for personal and practical reasons. The Commission wishes to record the valuable contribution of Andrew Hughes Hallet to the Scottish Fiscal Commission over its first two years.

2.8 Professor Charles Nolan was appointed as a Commissioner for a fixed term appointment to run from 1 August 2016 to 30 March 2017. Short biographies for Prof Campbell Leith, Prof Charles Nolan and Lady Susan Rice are attached at Annex A.

2.9 To support the effective functioning of the Commission as a statutory body, the Scottish Government is taking forward the appointment of two new Commissioners with effect from 1 April 2017, taking to four the number of Commissioners for the statutory Commission. These appointments, which will be regulated by the Commissioner for Ethical Standards in Public Life in Scotland, will also be subject to Parliamentary approval.

Changes to the Commission's Role

2.10 The Fiscal Framework agreed by the Scottish and UK Governments in March this year to accompany the Scotland Act 2016 changed the remit of the Scottish Fiscal Commission. It will become responsible for the production of forecasts. These changes were reflected in the Scottish Fiscal Commission Act 2016 (SFCA) which received Royal Assent on 14 April 2016.[1]

2.11 From 1 April 2017 the Scottish Fiscal Commission will be constituted as a non-Ministerial Department. The duties of the Commission are set out in the SFCA. The key roles for the 2018-19 Draft Budget onwards are to:

- Prepare independent forecasts of all revenue from fully devolved taxes including LBTT and SLfT; and Non-Domestic Rate income.
- Prepare independent forecasts of income tax receipts arising from the rate-setting powers devolved to the Scottish Parliament.
- Lay before the Scottish Parliament a report on its forecasts, at the same time as the Scottish Government publishes and lays before the Scottish Parliament its Draft Scottish Budget.
- Set out the Commission's assessment of the reasonableness of Scottish Ministers' projections as to their borrowing requirements.

[1] The legislation can be found on the legislation website (link)

- Conduct its business independently and within the bounds of relevant legislation as defined by the Scottish Fiscal Commission Act 2016.

2.12 The Scottish Fiscal Commission is structurally and operationally independent. Commissioners are accountable to and give evidence to Parliament as required. This will continue once the Commission becomes a statutory body.

2.13 The Scottish Government has recently consulted on legislative provisions to expand the Commission's functions in the SFCA to include areas devolved by the Scotland Act 2016. In the future it is expected that the Commission will also forecast onshore GDP in Scotland, devolved demand led social security expenditure in Scotland and other taxes as they are devolved, including a Scottish replacement for Air Passenger Duty, expected from 2018, and Aggregates Levy.

2.14 The SFCA places on the Commission a duty to cooperate with the Office for Budget Responsibility (section 11). Prior to the SFCA coming into force a section 104 Order (under the Scotland Act 1998) will be passed in the UK Parliament. That section 104 Order will place a reciprocal duty of cooperation on the Office for Budget Responsibility. Detail of the Commission's engagement this year with the OBR is set out in further detail below.

Work over the last year

2.15 The Commission has continued to build organisational capability. A number of staff have joined on secondment from the Scottish Government to manage the transition to a statutory body. These staff have also played a role in supporting the Commission in their work scrutinising the forecasts produced by the Scottish Government.

2.16 The Commission agreed a protocol for the scrutiny of the Scottish Government's forecasts for Draft Budget 2017-18.[2] The protocol sets out the manner in which the SFC and the SG will engage during the scrutiny process; the respective responsibilities of each party and the procedures for handling draft reports. The production and publication of the protocol is intended to secure the independence of the Commission and to ensure there is transparency in the interactions between the SFC and Scottish Government officials during the scrutiny process. A new framework document and protocol with the Scottish Government will be agreed from April 2017 to reflect the expanded statutory remit of the Commission.

[2] Protocol between the Scottish Fiscal Commission and the Scottish Government for the Commission's scrutiny of the 2017-18 Draft Budget (link).

2.17 This year's scrutiny process began in February when the Commission met with the Scottish Government forecasters to discuss the recommendations made in the previous years and how the forecasting work would develop during the current year. The Scottish Government set out their response to the Commission's recommendations and the steps taken are considered further in the commentary on the forecasts set out in subsequent chapters.

2.18 The challenge meetings began in May and there have since been a total of eleven meetings. In these meetings with Scottish Government forecasters, the approach taken by the Commission has been to explore in depth the methodologies and processes undertaken by the forecasters. A simple rule of thumb for the Commission has been to ask itself – is there evidence to support the approach adopted? Short summaries of each challenge meeting have been published on the Commission's website over the course of the scrutiny process. The full minutes of these challenge meetings are attached as Annex B.

2.19 Where the Commission felt that there would be benefit from approaching a tax from different or additional perspectives from those taken, such challenges were suggested as action points. For example in the case of Scottish Landfill Tax the Scottish Government has adopted an approach based on forecasting the amount of waste that will be sent to landfill each year rather than employing a target-based approach. In each case, the forecasters choose themselves whether or not to pursue these alternative approaches. It is not the role of the Commission to determine how the Scottish Government produce their forecasts.

2.20 The Commission has regularly requested and received analytical work, with explanations, underpinning the Government's forecasts and received the final models for review shortly before the Draft Budget was due to be laid before Parliament. In line with the protocol the Commission has concluded its assessment of the reasonableness of these forecasts, sending a final embargoed copy of this report to the Scottish Government, for a fact-check. The Report was then finalised and prepared for publication in time to be released as the Minister announced Draft Budget 2017-18. At that time, copies will be made available in Parliament and the Report is posted on the Commission's website, www.fiscal.scot.

Move to a statutory body from April 2017

2.21 A Transition Programme team began working as part of the interim Commission in June. The programme aims to enable the Commission to become a non-Ministerial Department and equip it to fully discharge its

statutory functions from 1 April 2017. To do so, this builds on existing Commission practice, putting in place support arrangements and developing relationships with stakeholders to ensure compliance with legislation, recruit staff, transfer knowledge, establish working practices and build office support.

2.22 The interim team are located in Governor's House, Edinburgh, which they share with the Scottish Human Rights Commission.

2.23 The Commission is currently recruiting for a permanent Chief Executive and analytical staff. These new relationships and responsibilities will build upon legislation and will be agreed in a Protocol and Framework document, which will be prepared in advance of 1 April and published as soon as possible thereafter once the statutory Commission is established.

Engagement of the Commission

2.24 Over the past year, the Commission has continued to deepen and expand relationships and ways of working with a range of stakeholders.

2.25 The Commission continued to build on its working relationships with the OBR, Revenue Scotland, HMRC and other bodies in preparation for fulfilling its statutory remit. The Commission agreed Information Sharing Agreements with Revenue Scotland in 2016-17 to cover access to data for its outturn reports and this report accompanying the Draft Budget. It is currently working on establishing agreements setting out arrangements for the working relationships and data access in its statutory role. A Memorandum of Understanding on co-operation with the OBR is being developed alongside arrangements for information sharing with Revenue Scotland, HMRC and other relevant organisations. It is anticipated that these agreements will be finalised by next April.

2.26 Those discussions are in line with the interim Framework Agreement which sets an expectation that the Commission will have access to such information and data as it requires to fulfil its remit, from the Scottish Government and its agencies, as well as the OBR, the UK Government and its agencies, pending appropriate memoranda of understanding. The Scottish Fiscal Commission Act will create a right of access to information the Commission requires to perform its functions where that information is held by bodies including the Scottish Government, Revenue Scotland, Registers of Scotland and the Scottish Environment Protection Agency (section 10).

2.27 During the year, the Commission responded to requests from the Finance Committee for comment on outturn numbers for the devolved taxes. The Commission's outturn report covering 2015-16 was published in September,[3] and a commentary on the initial outturn data for the Additional Dwelling Supplement was published in November.[4] The Commission has extended the analysis in this report, whilst repeating and emphasising the point that a proper judgement about outturn revenues against actual forecast can only be made once a full year's receipts received.

2.28 The Commission gave evidence at two meetings of the Finance Committee during 2016, providing an opportunity to consider the range of views held by Committee members. In addition a written update was provided to the Committee on progress to establish the Commission as a statutory body.

2.29 The Commission developed closer ties with the OECD, again linking into its network of Independent Fiscal Institutions (IFIs). The Commission presented at the OECD Annual Meeting of OECD Parliamentary Budget Officials and Independent Fiscal Institutions in Paris in April this year. The next annual meeting will be held in Edinburgh in April next year, hosted by the Scottish Parliament, and will be an opportunity for Commission to deepen further its engagement with other IFIs.

2.30 The Commission's interim Chief Executive serves on the Budget Process Review Group which is tasked with reviewing the Scottish Parliament's budget process following the devolution of further powers in the Scotland Act 2012 and Scotland Act 2016.[5] Professor Nolan has also presented evidence to the group on behalf of the SFC.

2.31 An overview of the work of the Commission is shown in Annex C.

[3] Scottish Fiscal Commission (September 2016) Outturn Report 2015-16 (link)
[4] Scottish Fiscal Commission (November 2016) Additional Dwelling Supplement Preliminary Outturn Report (link)
[5] Scottish Parliament Budget Process Review Group (link)

3. Executive Summary

3.1 What follows is the Commission's assessment of the reasonableness of the Scottish Government (SG)'s forecasts on the currently devolved taxes.

3.2 In the subsequent sections, the forecasting methods applied to each devolved tax and the economic determinants of non-domestic rates are considered in turn, each followed by an assessment of forecasts vs. outturns, as well as a sensitivity analysis of the forecasts made in Draft Budget 2017-18.

3.3 This Executive Summary highlights the key conclusions of the extensive scrutiny undertaken with respect to each of the devolved taxes.

Income Tax

3.4 The SFC considers the Scottish Government's forecasts of non-saving, non-dividend income tax, shown in table A, to be reasonable.

Table A: Scottish Government Income Tax Forecasts

(£ million)

	2017-18	2018-19	2019-20	2020-21	2021-22
NSND Income Tax	11,829	12,290	12,912	13,647	14,559

3.5 The Scotland Act (2016) devolved additional income tax powers to the Scottish Parliament from 2017-18. These powers, covering all revenue raised from non-savings, non-dividend (NSND) income tax paid by Scottish taxpayers, allow the Scottish Parliament to vary rates of tax by band (excluding the personal allowance which remains reserved), introduce new bands and vary the thresholds between bands. Other income tax revenues remain reserved.

3.6 To model NSND tax liabilities, SG analysts have developed a new forecasting model. That model forecasts the tax base by constructing detailed forecasts of taxpayers by age group and by income source and by sector.

3.7 The model uses data from HMRC's Survey of Personal Incomes (SPI) an annual sample of HMRC records for individuals who could be liable to UK Income Tax.[6] The latest data are from 2013-14.

3.8 To forecast the number of taxpayers by age, SG analysts draw on Office for National Statistics (ONS) projections of population growth[7] combined with

[6] For a more detailed description of the SPI see HMRC's Personal Income Statistics publication (link).

their own forecasts of labour market participation, again broken down by age group. Building the model upon this age group decomposition is quite complex but has the advantage of being able to incorporate potential cohort effects if and when they arise and to reflect other aspects of the distribution of income in Scotland. In addition to the demographic trends and labour market activity that are required, the model also relies in important ways on forecast paths for aggregate employment and earnings.

3.9 The forecast path for hourly earnings is taken from the OBR's November 2016 Economic and Fiscal Outlook.[8] That forecast is input into the SG's macroeconomic forecasting model, SGGEM, and produces a forecast path for annual earnings. Combining the labour market participation forecasts, the macroeconomic forecasts for employment growth and annual earnings, projections for pensions and other income and a presumed split between private sector and public sector earnings growth, allows SG analysts to project forward from the SPI data and forecast the NSND tax base.

3.10 Changes in NSND tax rates and bands could have an effect on labour market participation and other decisions. Such behavioural effects are widely acknowledged to be difficult to estimate precisely and so the SG analysts have incorporated a range of possible values. Other factors which may affect the tax base are handled off-model on a case by case basis.

3.11 Outturn data on NSND tax liabilities are available once self-assessment tax returns are made; this involves a lag of up to 18 months. Subsequently SPI data will be produced, which is then used by both the Scottish Government and HMRC to forecast income tax liabilities.

3.12 In the challenge meetings and in the sensitivity analysis in this report, the SFC has sought to understand the key drivers of this new model. The sensitivity analysis in this report focuses on the split between public and private sector earnings growth rates, the aggregate path of nominal earnings growth and the aggregate path of employment growth. This finds that for the given path of aggregate nominal earnings analysed, the split between private and public sector earnings growth had relatively limited impact on forecast NSND liabilities. Of more significance was the growth of average earnings and then employment.

3.13 Looking forward to the SFC assuming responsibility for producing the NSND income tax forecasts, it will be important to develop further the economic modelling of the Scottish labour market. That could provide an additional

[7] ONS principle population projections (link)
[8] OBR (November 2016) Economic and Fiscal Outlook (link)

source of information on earnings and employment trends in the Scottish labour market. These trends are important to the NSND tax liabilities forecast.

3.14 There are likely to be behavioural effects to any change in income tax policy and wider changes to the NSND tax base caused by changing employment trends. That is a challenge to policymakers. It will be important to keep under review the SFC's understanding of these issues and to consider whether evidence exists or may be generated that might shed further light on these issues that will be useful in a Scotland-specific setting.

Residential Land and Buildings Transactions Tax (LBTT)

3.15 The SFC considers the Scottish Government's forecasts of residential LBTT revenues, set out in Table B, to be reasonable.

Table B: Scottish Government forecasts for residential LBTT Revenues

(£ million)

	2017-18	2018-19	2019-20	2020-21	2021-22
Residential LBTT	211	235	251	265	280

3.16 Scottish Government analysts have increased the sophistication of their residential LBTT forecasts in several ways since the last forecasting round. All the economic determinants are now forecast using statistical models which, where necessary, seek to control for the impact of the financial crisis as well as recent episodes of forestalling activity associated with the introduction of LBTT and Additional Dwelling Supplement (ADS). In combination with the outturns for 2015-16, this new methodology has tended to result in less buoyant forecasts for the Scottish housing market in Draft Budget 2017-18 relative to its predecessor.

3.17 The headline forecast for residential LBTT in Draft Budget 2016-17 was £295m. At the same time SG forecasters estimated that behavioural responses to the introduction of ADS would reduce these revenues to £282m.

3.18 Extrapolating the in-year revenues received between April and October 2016, estimated outturns for 2016-17 are £208m, an estimated difference from forecast of £74m.[9] This can be attributed, partly, to the lower than expected outturns in 2015-16, which in turn were largely driven by lower than expected revenues in the £325k-£750k price band. This was not known fully at the time

[9] Using only data beyond Q1 2016-17 to allow for the possibility that revenues were suppressed in the early part of the year due to forestalling effects, reduces the estimated forecast error to £69m.

of the Draft Budget 2016-17. The remaining difference arises due to a general flatness in the market in the first half of 2016-17.

3.19 Although the difference in revenues from forecast in the £325k-£750k band accounts for most of the estimated £74m difference from forecast, this does not imply that there has been a deterioration in this segment of the market relative to others. In the outturn data from Revenue Scotland for 2016-17 until September, the ratio of median to mean prices is not significantly different from the previous year implying that there has been no major change in the shape of the distribution of transactions. Instead, both median and mean house prices have not grown as expected across the whole market, but since the £325k-£750k price band accounts for over 60% of revenues this is where the difference appears most clearly.

3.20 The SFC has also explored the extent to which local conditions in the Aberdeen housing market may have been responsible for the apparent difference in revenue from forecast. Due to the significant fall in economic activity in the region as a result of falling oil prices. It should be stressed that a lack of regional outturn data for residential LBTT revenues mean that this analysis is highly speculative. Nevertheless, it suggests that the performance of the housing market in the Aberdeen area could potentially account for a significant proportion of the difference between revenue and forecast.

3.21 The SFC has undertaken illustrative sensitivity analysis of the economic determinants underpinning the residential LBTT forecast, which is largely consistent with the SG's approach. This highlights two issues which may impact on the forecast. Firstly, to what extent are transactions expected to continue their post-crisis recovery? Secondly, will recent trends in median house prices relative to average house prices be sustained or not? The SFC explored the sensitivity of the forecasts to different answers to these questions.

3.22 In addition to the statistical modelling of the economic determinants of residential LBTT the forecasts in Draft-Budget 2017-18 also contain an adjustment to reflect the fact, that while the model can accurately forecast aggregate revenues when fed appropriate economic determinants, it struggled to capture the distribution of revenues across, in particular, the upper price bands in 2015-16. Analysis of the 2016-17 in-year outturn data suggests that these adjustments appear to continue to be applicable.

3.23 Finally, it should be noted that the general approach followed extrapolates short-term trends in the economic determinants to produce the residential LBTT revenue forecast. To the extent that the residential housing market is subject to shocks which are not implicit in these trends the forecasts will

necessarily move off track. The SFC will continue to monitor developments in housing and other markets in an attempt to pick up breaks in these short-term trends as quickly as possible. Moreover, the experience in scrutinising the residential LBTT forecast and outturns highlights the need to understand how different sectors of the market are performing, and that understanding should be deepened wherever possible.

Additional Dwelling Supplement (ADS)

3.24 The Commission considers the Scottish Government's forecasts of revenues from the ADS, set out in Table C, to be reasonable.

Table C: Scottish Government forecasts for ADS Revenues

(£ million)

	2017-18	2018-19	2019-20	2020-21	2021-22
ADS	72	75	78	80	82

3.25 The SFC's current estimates of the extrapolated in-year outturns for ADS in 2016-17 are that it lies between £64m and £78m depending on whether the level of repayments rises to the amount households have indicated they hope to reclaim or whether repayments only rise to the rate observed currently for the first month of 2016-17.[10] This contrasts with an ADS forecast of £29m-£43m for 2016-17.

3.26 The forecasts for revenues from ADS have risen significantly relative to Draft Budget 2016-17. This upward revision is driven by observed outturn data for 2016-17 which suggests that the initial estimate of the tax base was too low due to the lack of available information. At the same time, the subsequent rate of growth in ADS revenues is less than previously forecast as a result of the fact that the economic determinants for residential LBTT (which also drive the ADS forecasts) are more subdued in Draft Budget 2017-18.

3.27 It is hoped that these revisions will narrow the size of future forecast errors, although there remain several potential sources of forecast uncertainty, particularly the extent to which homeowners will seek to reclaim their initial ADS tax liabilities, which the SFC will continue to closely monitor.

[10] ADS paid may be reclaimed when the tax payer sells their previous main residence within 18 months of the date of the transaction that was liable to the ADS supplement.

Non-Residential LBTT

3.28 The SFC considers the forecasts for non-residential LBTT revenues, set out in Table D, to be reasonable.

Table D: Non-Residential LBTT revenue forecasts

(£ million)

	2017-18	2018-19	2019-20	2020-21	2021-22
Revenue	224	233	242	252	262

3.29 The approach to forecasting non-residential LBTT is largely unchanged from the previous Draft Budget – applying OBR's forecasts of the UK commercial property market to a smoothed estimate of the tax base. There is some evidence that outturns for 2016-17 are below forecast, although this assessment is complicated by the fact that seasonal factors observed in 2015-16 were not as expected at the time of the Commission's last report. This means the in-year assessment of outturns is highly uncertain – ranging from £164m-£202m, implying an overprediction of revenues of between £18m and £56m depending on whether or not the large revenues received in December and March of 2015-16 are repeated in 2016-17.

3.30 The current forecast does not directly account for the part-year outturn data, although it implicitly captures in-year data to the extent that the OBR's forecasts of the UK commercial property market contain such data. SFC calculations suggest that incorporating in-year outturn data in the smoothed base would slightly depress the non-residential LBTT forecast by £12m in 2017-18 rising to £14m by 2021-22, which is not a meaningful difference in the context of a tax base which is inherently volatile.

3.31 Looking ahead to its new remit, the SFC shall explore the possibility of utilising more Scotland-specific microeconomic data in forecasting non-Residential LBTT. However, such a task may be complicated by taxpayer confidentiality issues and the thinness and volatility inherent in the commercial property market in Scotland.

Scottish Landfill Tax (SLfT)

3.32 The SFC considers the Scottish Government's forecasts of Scottish Landfill Tax, set out in Table E, to be reasonable.

Table E: SLfT revenue forecasts

(£ million)

	2017-18	2018-19	2019-20	2020-21	2021-22
SLfT Revenue	149	118	109	112	106

3.33 Standard Rate waste levels—the key driver of SLfT liabilities—have not decreased as anticipated in previous forecasts. In Draft Budget 2016-17, forecast revenues from SLfT were £133 million. Based on data from the first quarter, SLfT liabilities are estimated to be in the region of £150 million for full year 2016-17.

3.34 In previous reports the SFC has expressed concern around the evidence base for the SLfT forecasts. As a result of these concerns SG analysts have developed a new forecasting model. The model is built around a number of key developments over the forecast period which have the potential to deliver substantial, measurable reductions in landfill waste.

3.35 The new forecast reflects two factors. First, and in contrast to the previous modelling approach, there are no assumed underlying trends in Standard Rate waste, Lower Rate waste and biodegradable municipal waste arisings; these are assumed constant at their current levels. Second, there is a marked increase over the forecast horizon in incinerator capacity. That growth in capacity means that an increasing amount of waste is assumed not to go to landfill.

3.36 The incorporation into the model of a more detailed evidence base for forecasting landfill is welcome. Nevertheless, substantial uncertainties surround the key assumptions underpinning the forecast.

3.37 Large increases in incinerator capacity are imminent over the next few years. That incinerator capacity growth is central through most of the forecast horizon in delivering large falls in Standard Rate waste to landfill and hence in determining the revenues from SLfT. That growth in capacity may be subject to delays which, when they occur, experience seems to indicate can be substantial. It is important to monitor closely the increase in incinerator capacity and any delays in sites becoming operational. Such close monitoring may also help identify downside risk to the forecast in the form of identifiable and quantifiable increases in pre-processing capacity.

3.38 Another uncertainty surrounds the effect of the ban on biodegradable municipal waste. That ban takes effect from January 2021. Following discussions with the SFC, the ban is incorporated as a downside risk to the forecast, rather than in the central forecast. That is appropriate as the ban requires, in the final two years of the forecast period, a substantial diversion of

waste from landfill by local authorities and waste management companies in ways other than via incineration. It is not yet fully clear how that will happen. Whilst the ban does not come into force until January 2021, any substantive delay in incinerator capacity coming on stream in the meantime will consequently require additional diversion to recycling or other residual waste treatment.

3.39 When the SFC assumes its new remit from April 2017, it will seek to work closely with SG analysts to continue building an evidence base for SLfT liabilities focusing on: quantifying the existence and operational effectiveness of pre-processing capacity; documenting and quantifying the effectiveness of local authority recycling policies; assessing quantitatively measures that will facilitate the ban on biodegradable municipal waste. Continued efforts to relate trends in waste arisings to wider economic determinants will also be important.

Non-Domestic Rates Income

3.40 The Commission's current remit in respect of Non-Domestic Rates is to assess the reasonableness of the "economic determinants underpinning Scottish Government forecasts of Non-Domestic Rate Income". Specifically, this covers:

(a) the change predicted to the rateable value of the lands and heritages on the valuation rolls, and

(b) the rate of inflation used for the purposes of the forecast of the non-domestic rate to be prescribed.

3.41 The Scottish Government's forecasting methodology for estimating income from Non-Domestic rates depends upon a number of factors:

- the size of the tax base (the total amount of rateable value (RV) contained on the Valuation Roll)
- the poundage and large business supplement rate– these tax rates are applied to the rateable value in order to estimate gross bills. Poundage is typically adjusted in line with inflation to maintain the revenue's real value; and,
- the value of any reliefs granted, and;
- other factors relating to events in prior years or to policies that interact with the NDR system such as the backdating of appeals.

3.42 The Commission has concluded that both the buoyancy and inflation forecasts, set out in Table F, are reasonable.

Table F: NDR Buoyancy and RPI Inflation Forecasts

(%)

Financial Year	2017-18	2018-19	2019-20	2020-21	2021-22
Assumed year of 2017 Revaluation Cycle [1]	1	2	3	4	5
Buoyancy Forecast [1]	1.7	1.8	1.1	0.9	1.0
Inflation Forecast [2]	2.0	3.2	3.5	2.0	2.0

Notes to table:

[1] Scottish Government analysis

[2] Inflation forecasts are based on OBR forecasts for September of the previous financial year. September 2016 RPI, which is used in the 2017-18 forecast, is known. For the period up to 2019-20 RPI inflation is used, 2020-21 onwards uses CPI inflation.

3.43 From April 2017 the Scottish Fiscal Commission will become responsible for the production of forecasts of receipts from Non-Domestic Rates; at this point the Commission will consider all aspects of the data, methodology and assumptions underpinning forecasts of Non-Domestic Rates Income.

4. Income Tax Forecasts

Introduction

4.1 Under the Scotland Act 2016 additional income tax powers will be devolved to the Scottish Parliament from 2017-18. These powers, covering all revenue raised from non-savings, non-dividend income tax paid by Scottish taxpayers, allow the Scottish Parliament to vary rates of tax by band, introduce new bands and vary the thresholds between bands. Some matters remain reserved to Westminster, such as setting the level of the personal allowance, changing existing reliefs and exemptions, as well as introducing new reliefs and exemptions.

Overview: Approach to forecasting the tax liabilities in Scotland from non-savings, non-dividend income

4.2 Forecasting income tax liabilities is a somewhat complicated process. To forecast total liabilities, one has to forecast the tax base; that means forecasting the distribution of non-savings, non-dividend (NSND) income. There are a number of possible ways to do that. The preferred methodology of the Scottish Government involves constructing detailed forecasts of taxpayers by age group[11] and by income source (income from employment and pensions, principally) and by sector (private and public). In effect, a distribution of NSND income is forecast for each age group and then combined to arrive at the aggregate NSND distribution of income. The methodology adopted is described in more detail below.

4.3 At the centre of the forecasting model is data from HMRC's Survey of Personal Incomes (SPI) which is an annual sample of HMRC records for individuals who could be liable for UK Income Tax. The survey includes, at the individual level, data by gender, age group, income and tax distribution (including allowances, deductions and reliefs), income source, country and geographical area.[12] The Scottish sample in the 2013-14 SPI, the latest data available, contains around 45,000 individual records. By way of comparison, there are an estimated 2.56 million people liable to pay income tax in Scotland in 2016-17.[13]

[11] Sometimes these age groups are referred to as age cohorts. However, that does not mean that individuals are tracked through their lifetime. The effects of this type of cohort analysis is discussed below.

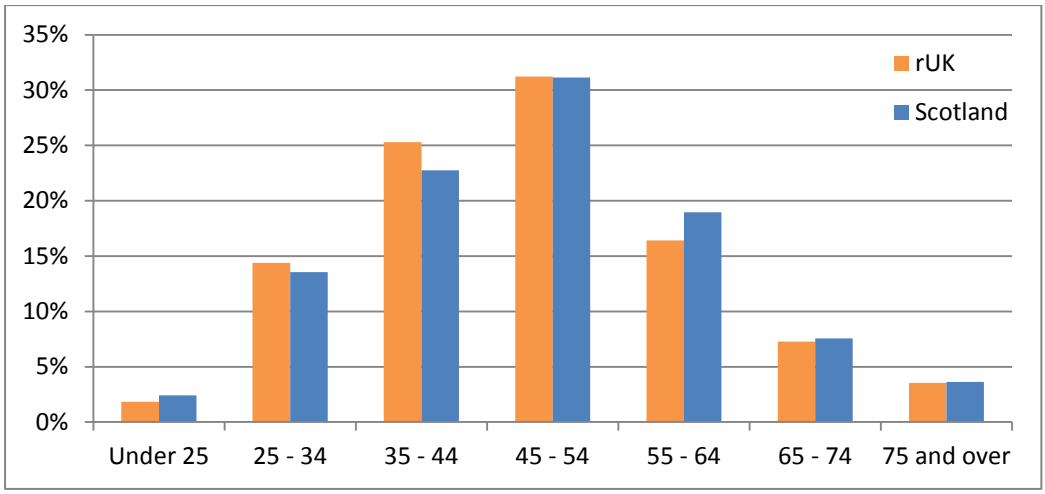
[12] For a more detailed description of the SPI see HMRC's Personal Income Statistics publication (link).

[13] There are an estimated 30.1 million individual income taxpayers in the UK as a whole in 2016-17. Estimates of taxpayers are based on the 2013-14 SPI combined with ONS population projections. The total SPI sample is 700,000. Source: HMRC Number of individual income taxpayers by marginal rate, gender and age, by country and region (link)

Overview: Challenges in forecasting NSND income tax liabilities

4.4 In practice, the forecast for NSND income tax liabilities is highly reliant on the forecast of earnings growth, especially nominal earnings growth in the private sector. The next most important variable is employment growth, a key driver of the growth in the number of taxpayers. It is also important to forecast accurately different age groups since their relative contributions to total tax liabilities rise with age, peak for those aged 45-54 and decline again thereafter – a pattern also observed in the rest of the UK (rUK).

Figure 1: Proportion of all NSND liabilities by age group, 2013-14



Source: SFC analysis of the 2013-14 SPI dataset.

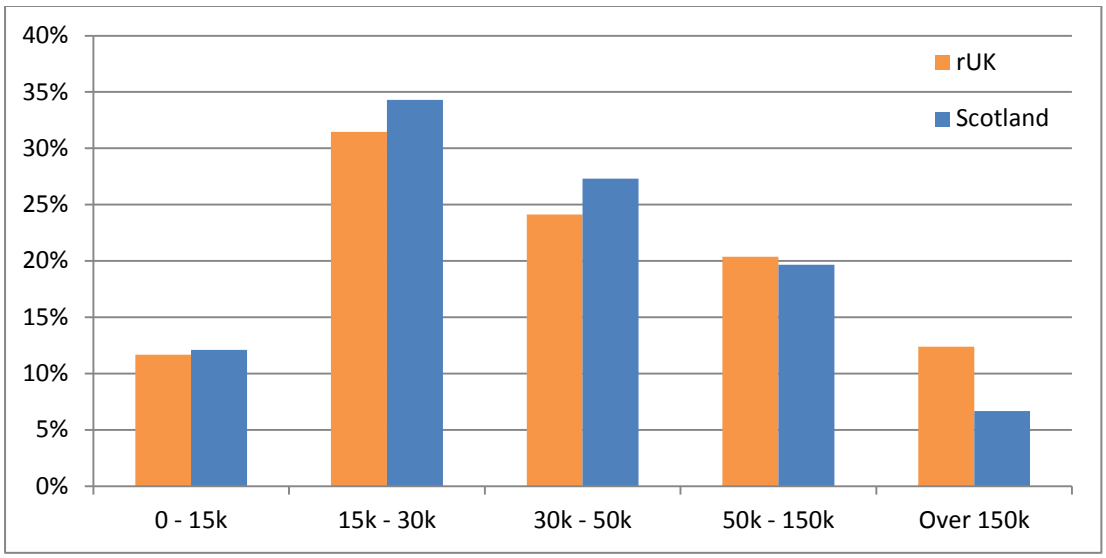
4.5 The current forecast of earnings growth depends upon the Office for Budget Responsibility's (OBR's) forecast of hourly earnings, and hours worked as forecast by the SG's macroeconomic model, SGGEM. This is discussed in more detail later.

4.6 The income tax forecasting model, like the powers granted under the 2016 Scotland Act, is new and so there is limited information on how well it is likely to perform. However, there is evidence that, on recent SPI data, it outperforms attempts to forecast NSND income tax liabilities using projections based on income growth by deciles.

4.7 The Scottish Government forecasters could have taken the approach of disaggregating the forecast by income decile. That would have had the advantage of allowing the Government to grow incomes at different points in the income distribution differently. However, the Scottish income distribution differs from the UK income distribution in that it has fewer very top earners (see Figure 2). The Scottish Government presented evidence to the SFC that there was very little variation in income growth rates across the income

distribution in Scotland over time and therefore little to gain from factoring that explicitly into the model. Although there is annual variation it does not appear to form as robust a pattern in Scotland as for the rest of the UK.

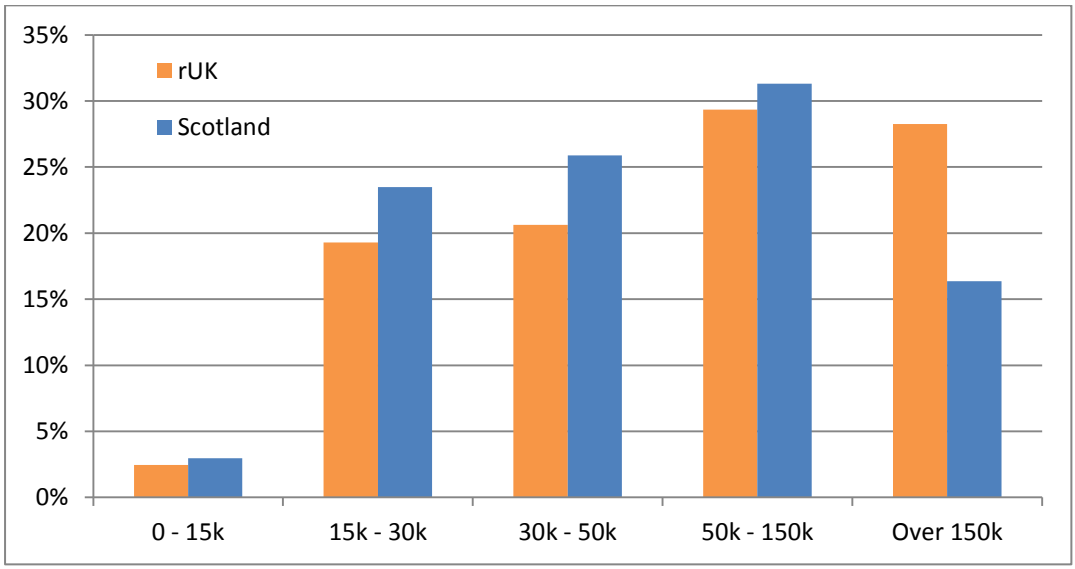
Figure 2: Share of total NSND income by band, 2013-14



Source: SFC analysis of the 2013-14 SPI dataset. Income band is based on total NSND income.

4.8 That difference in the income distribution has implications for the distribution of income tax liabilities. In Scotland, compared to rUK, there is a proportionally much smaller tax take from those earning £150,000 and above, as Figure 3 indicates.

Figure 3: Proportion of total NSND income tax liabilities by NSND income band, 2013-14



Source: SFC analysis of the 2013-14 SPI dataset. Income band is based on total NSND income.

4.9 The alternative approach which the Scottish Government has taken is to produce the forecasts based on disaggregation by age group. There is evidence at the Scottish level about how participation has changed by age[14] and demographic trends may also differ in Scotland compared to rUK. For instance, the rest of the UK has faster population growth (due to a mix of immigration and higher birth rates) whilst Scotland has a larger proportion of the population over the state pension age.[15] So, overall the Scottish Government approach to modelling NSND income tax liabilities is driven by a view that the impacts of demographic change are a potentially more revealing way to reflect some changes in the underlying distribution of income than the impact of different growth rates across the income distribution.

4.10 However, assessing forecast accuracy ex post will take time. Outturn data on NSND tax liabilities are available once self-assessment tax returns are made; this involves a lag of up to 18 months. Subsequently SPI data will be produced, this data is then used by both the Scottish Government and HMRC to forecast income tax liabilities. This is the best available data and the use of this data is appropriate.[16]

Forecasting NSND Income tax liabilities in detail

4.11 There are a number of contributory forecasts and assumptions that feed into the Scottish Government's approach to forecasting the distribution of NSND income. These include:

1. Forecasts of NSND income growth;
2. Forecasts of the number of taxpayers;
3. Possible behavioural effects; and
4. Off model adjustments.

4.12 The main elements of each of these are now outlined in turn.

[14] Employment rates for younger workers (16 – 24) have been falling since 2008 whilst employment rates for those aged over 50 have been increasing. Source: Scottish Government analysis of the Annual Population Survey (link)
[15] See ONS 2014-based population projections by country (link)
[16] Outturn data will be available from HMRC around 18 months after the end of the financial year. Following this the Survey of Personal Incomes will be produced and made available for analysis. This means there is a significant lag in the availability of outturn data, and the opportunity to assess any forecast error.

Forecasting taxpayer income[17]

4.13 The SPI permits a breakdown of NSND income by type and source. Specifically, income is broken down into income from employment and may be allocated, with a reasonable degree of accuracy, to private sector or public sector employment; income from state or other type of pension; and other types of NSND income. In the 2013-14 SPI, the relative importance of these income sources is shown in Table 1, below:

Table 1: Sources of Non-Savings, Non-Dividend Income in the 2013-14 SPI

	Non-State Pension	State Pension	Income from employment-public sector	Income from employment-private sector	Other income
Total Income *(£ million)*	7,161	4,025	17,132	41,817	788
Share of total	10.1%	5.7%	24.2%	59.0%	1.1%

Note to table:
Source: SG analysis of SPI data

4.14 Table 1 shows that non-state pensions, worth in aggregate just over £7 billion pounds, comprised around 10% of total NSND income in 2013-14. Most of that income went to those aged 65 and over. That is almost double the total value of income accruing from state pensions. The table also shows that by far the single most important source of income is income from employment in the private sector. The following table shows the tax liabilities associated with the above income sources.

4.15 Given the profile in Table 1, there is little that is surprising in the ranking of income sources in terms of their contribution to total tax liabilities. However, it is worth noting that private sector income contributes a greater share to tax liabilities than the proportion of total NSND income unlike for the other income sources (except other income). That is a reflection of the progressivity of the NSND tax code and the distribution of income within the private sector. These figures also indicate why accurately forecasting income from employment may be especially important for the overall accuracy of the NSND income tax forecast. This is discussed further below.

[17] An alternative to forecasting the distribution of NSND income by age, as noted earlier, is to forecast by income deciles. The Scottish Government analysts also tried this approach in their preliminary work but rejected it in favour of the by age group/source of income approach described herein. The rationale for that decision was that the deciles-based analysis may be less accurate than the by age group approach, in part because the former failed to exploit important systematic differences across age groups, such as participation rates and average income tax liabilities.

Table 2: Non-savings, non-dividend income tax liabilities by source: 2013-14

	Non-State Pension	State Pension	Income from employment-public sector	Income from employment-private sector	Other income
Income tax liabilities *(£ million)*	£891	£316	£2,270	£7,317	£130
Share of total	8.2%	2.9%	20.8%	67.0%	1.2%

Note to table:
Source: SG analysis of SPI data

Income from Pensions

4.16 Forecasting non-state pension income is challenging as historic data is limited. Data from the SPI, available from 2002-03 to 2013-14 (although three years of observations are not available), show that such income has grown, on average, at an annualised rate of 3.1% per year. Throughout the forecast period, non-state pensions are therefore assumed to grow at that rate.

Table 3: Pension Growth Assumptions

(%)

	2017-18	2018-19	2019-20	2020-21	2021-22
State Pensions	2.5	2.5	2.7	3.3	3.6
Private Pensions	3.1	3.1	3.1	3.1	3.1

Note to table:
Source: Scottish Government Analysis

4.17 The forecast of state pensions is more straightforward in that it reflects the UK Government's "triple lock". That commits to increasing state pensions by the greatest of growth in average earnings, inflation or 2.5%.[18] The OBR produce a forecast of the impact of the triple lock and this is incorporated in the Scottish Government forecast.

Income from employment

4.18 The SPI dataset contains details of the industry in which an individual is employed. That information is used to estimate the proportionate split between private and public sector employment. Forecasts of income growth from employment can then be applied to these employment shares. The

[18] Specifically, average incomes are measured by average weekly earnings growth and inflation is measured by CPI inflation at the previous September.

forecasts of income from employment are central to forecast accuracy. The assumption in the current forecast is for earnings in the public sector to grow at 2.2% through the whole forecast period. That assumed growth rate reflects the SG's judgment that the period over the forecast horizon is likely to be similar to the recent past. Between 2009-10 and 2013-14 (the latest available SPI data) average earnings of public sector employees have grown by 2.2%.

4.19 The earnings growth assumptions which are fed into the income tax forecasts are based on annual earnings; that is, hourly earnings times annual hours worked. Hourly earnings are derived from the OBR's forecast. This path for earnings is then fed into the Scottish Government's macroeconomic forecasting model, SGGEM, which then produces a forecast for the average hours worked in Scotland. The OBR's forecast for hourly earnings is adopted because the SG argues that UK and Scottish earnings tend to move closely together.

4.20 As noted, combining the forecast of earnings with the forecast of average hours worked delivers a forecast series for annual earnings. However, as that earnings growth is an economy-wide measure (an average of private sector and public sector earnings) it has to be decomposed into its public and private sector components. Given the assumed growth path for public sector earnings just described, that can be done by subtracting public sector earnings growth from the growth in aggregate earnings.[19] The table below details the paths of public and private sector earnings growth in the forecast.

Table 4: Earnings Growth Assumptions

(%)

	2017-18	2018-19	2019-20	2020-21	2021-22
Public Sector	2.2	2.2	2.2	2.2	2.2
Private Sector	2.3	3.2	4.2	4.8	4.9

Note to table:
Source: Scottish Government analysis

4.21 The earnings growth forecasts from SGGEM and average earnings growth in the income tax model are thus consistent.

[19] That is, the growth in private sector earnings is given by

$$\frac{aggregate\ nominal\ wage\ growth\ -\ 29.1\% \times 2.2\%}{70.9\%}$$

where 29.1% is the public sector income share and 70.9% is the private sector income share in the SPI data in 2013-14.

Forecasting the number of taxpayers

4.22 The SPI dataset provides a split of those of working age into 5 different age groups: under 25; 25 – 34; 35 – 44; 45 – 54; and 55 – 64. In addition to these age groups there are data on those aged 65 – 74 and those 75 and older. The forecast of the total number of taxpayers includes separate projections for the number of taxpayers within each age group. Building up, in this way, from each age group to a projection of the number of taxpayers in aggregate is intended to exploit the fact that the SPI data show that average income tax liabilities vary significantly by age. In particular, average income tax liabilities peak in middle age, the 45 – 54 year old group, and so forecasting that age group accurately may contribute significantly to overall forecast accuracy.

4.23 For those of working age, there are several steps to producing projections, by age, of the number of taxpayers. The process begins by applying the 2014-based principal ONS population projections[20] for the total number of individuals in each age group. The trend in labour market participation by age is then calculated using data from the Annual Population Survey.[21]

4.24 The underlying trend in participation is calculated based on the trend in the historical participation rate time series.[22] These data show a declining participation rate in the 16 – 24 group, a broadly stable participation rate for the 25 – 34 age group and rising participation across the remaining groups, 35 – 49 and 50 – 64. For those aged over 65 in the SPI dataset, the number of taxpayers is projected in line with the ONS population projections.[23]

4.25 Participation rates can be an important issue to track. Significant changes in labour market participation can occur as young people exit full time education and enter the labour force and as workers age and transition out of full time employment. That latter transition can have an important impact on forecasting NSND income as workers earn less in earnings and start to receive more of their income in pensions. It is an advantage of the SG's approach to modelling NSND income tax that these effects can be explicitly taken into account.

[20] The OBR also use principal population projections in the November 2016 Economic and Fiscal Outlook to reflect their view of the likely impact of Brexit on population growth.
[21] This data is based on the Labour Force Survey. The age groups in the SPI and the APS unfortunately do not completely align and an approximation is required to map data from one source into the other. (link)
[22] More specifically, the Hodrick-Prescott filter is used to recover the trend. This filter can be parameterised in order to smooth out all but the longer term variations in a particular time series—the participation rate by age groups in this case.
[23] ONS principle population projections (link)

4.26 The next step in forecasting the number of taxpayers is to work out how many of those participating in the labour market are likely to be in employment. To project trend unemployment rates within each age group, the pre-2008 average unemployment rate, by age, is used. As the data only go back to 2004 this is a short sample. However, the financial crisis which began around 2008 impacted strongly on the economy meaning there are few options for extending the sample. Given these trend projections, it is now possible to calculate the employment levels, by age group, of those of working age.

4.27 Although it is difficult to analyse equilibrium employment rates by age, the Scottish Government's macroeconomic model can provide an additional check on the aggregate outcome of the income tax model so far as aggregate employment is concerned. By combining the projections for population growth, labour market participation and unemployment rates the Scottish Government creates a set of projections of employment levels by age group. The aggregate of these employment levels can be adjusted ex post for each year of the forecast period to ensure that these employment levels match the core employment forecast from SGGEM. In practice this ex post adjustment is small. No adjustment is made to the split of employment across the private and public sectors by age.

Cohort effects

4.28 A potential shortcoming of the forecasting approach relates to so-called *cohort effects*. In the context of the income tax forecasting model, such effects refer to any factors common to one or other age-group that may need to be tracked through the life cycle in order accurately to forecast NSND income tax liabilities. For example, individuals currently aged in their 40s have some of the highest earnings relative to those from previous generations at the same age. This could be driven by, for example, more female participation in the labour market and higher average education levels. If such factors are driving higher earnings, then they may also apply to the (same) individuals who are in their 50s in ten years' time. The Scottish Government's approach to modelling income tax takes account of changing participation rates between cohorts, however it does not account for potentially different incomes amongst cohorts.

4.29 Another example of cohort effects that has been discussed in academic literature relates to so-called 'scarring' whereby poor employment opportunities early in life can have long-lasting effects on employment and earning opportunities. The SPI data set produced by HMRC does not permit explicit tracking of such effects as it is a sample of the income distribution each year. In other words, it does not track the same sample of potential taxpayers through time.

4.30 There are many other examples of potential cohort effects, such as changing education levels, large differences in cohort size, changing retirement profiles on account of altered pension expectations, rising savings behaviour as younger generations save for deposits on houses or repay educational loans, and so on.

4.31 Following discussions with the Scottish Fiscal Commission, an analysis of some of the literature on cohort effects was undertaken along with some work on potential cohort effects in the SPI data pertaining to changing income profiles between the 45-54 and 55-64 age cohorts. Whilst these analyses concluded that cohort effects are potentially significant, over the forecast horizon the Scottish Government analysts feel that they are unlikely dramatically to influence the forecast and the forecast errors. Moreover, the advantage of modelling underlying participation rates explicitly and incorporating forecasts of income by source, is that emergent cohort effects may be incorporated in the income tax forecast in a timely way.

Behavioural effects

4.32 Where taxpayers are given advanced notice of a change in NSND taxes, action may be taken to limit the negative impact of that change on their income tax liabilities. And in general changes in NSND (and other) taxes could be expected to entail behavioural changes, whether anticipated or not. The Scottish Government has reviewed the academic literature and adopted a range of Taxable Income Elasticities (TIE) drawing also on the TIEs adopted by HMRC. These elasticities, lowest for basic rate taxpayers and highest for additional rate taxpayers, effectively reduce (increase) the tax base to which any NSND income tax rate rise (cut) is applied. Broadly speaking, this elasticity measures the change in declared income to changes in the tax rate. It is constructed to reflect, in a single elasticity measure, all responses to changes in income taxation rates. These responses include variations in the labour supply (participation), changes to the nature of one's income so that it is taxed more favourably, and tax evasion.[24] A similar set of elasticities also applies to changes in thresholds, which affect average tax rates, although these elasticities are typically smaller than those for changes in marginal tax rates. It was these lower TIE's that were used to calculate response to changes in the Higher Rate Threshold on the Scottish Government's March policy proposals.

[24] The central attraction of the TIE is that it summarises all those effects in one number. However, the downside is that it is necessarily estimated using reduced form statistical models and averages over many effects whose individual economic impacts may be obscured.

4.33 In practice, Scottish Government analysts have adopted TIE's for Basic Rate and Higher Rate taxpayers that are small. That reflects a judgement that for taxpayers in these bands there are few options for income shifting (almost all their income is from employment and pensions) or tax avoidance and that any variation in participation is likely to be limited. For Additional Rate taxpayers, a range of TIE's is applied: 0.35 – 0.75 in the case of variation in marginal tax rates. These higher values indicate that declared income of Additional Rate taxpayers will likely respond more than other taxpayers' incomes as they have the greatest incentive, and ability, to alter behaviour.

4.34 That more responsive behaviour may reflect two principle factors. The first is the ability to shift (some of their) income from being NSND income or otherwise reduce their income tax liability. Whilst little evidence on this for Scotland appears to exist, such behavioural responses have been detected in the UK and other countries.[25] Second, it could reflect changes in participation. The relationship between changes in income tax rates and labour supply has been an especially controversial area amongst economists. In theory, a change in income tax could boost labour supply as workers try to replace lost income. On the other hand, because work pays less, they may be encouraged to supply less labour. Ultimately, this is an empirical question. In practice, most researchers, but not all,[26] argue that income tax changes do not affect male labour supply decisions very strongly but can have a stronger effect on second earners, especially women. There is also evidence that for higher rate taxpayers there is little change in the supply of their labour as taxes rise but that they are more likely to make efforts to avoid taxes. However, in the Scottish context it could be that the labour supply response (whether virtual or real) is higher than typically found in the literature due to the relative ease of migration to the rest of the UK as a strategy to avoid paying taxes. Again, there seems to be little evidence on the importance of this.

4.35 The Scottish Government emphasises that substantial uncertainty surrounds the elasticities that they have applied to the income tax model. That uncertainty reflects the wide range of extant estimates in the literature.[27] And as just indicated, evidence for Scotland is doubtless especially challenging to evaluate as changes in Scottish income tax rates relative to the UK are not yet a feature of the data.

[25] Saez, E (2010) 'Do Taxpayers Bunch at Kink Points?' *American Economic Journal: Economic Policy* 2: 180-212. Some indicative evidence using the SPI for the UK is presented by Alan Manning (2015) "Top rate of income tax" Centre for Economic Policy, London School of Economics.

[26] For example, see Manski, C (2012), "Identification of Income-Leisure Preferences and Evaluation of Income Tax Policy", Cemmap Working Paper 07/12, Institute for Fiscal Studies.

[27] See for example Saez, E., J. Slemrod and S. Giertz (2012), "The Elasticity of Taxable Income with Respect to Marginal Tax Rates: A Critical Review", *Journal of Economic Literature*, 50: 3-50.

Off model adjustments

4.36 It may be necessary to make certain ad hoc adjustments to the forecast, say to the definition of income, which are not reflected in the core SPI data. Following the recent Autumn Statement, a number of off-model adjustments, in line with the OBR, of this sort were made. For example, an adjustment was made to account for an increase in the number of people expected to incorporate, and therefore pay tax on dividends or profits rather than employment income. That reduces non savings non dividend (NSND) income. A further adjustment was made to deduct the basic rate element of Gift Aid that charities claim from HMRC.

The NSND income tax policy over the forecast period

4.37 The Scottish Government's income tax policy determines the policy assumptions of the forecast. These are as set out in March 2016, that is the Higher Rate Threshold is fixed in real terms in 2017-18 and rises by the September CPI inflation forecast from the OBR until 2021-22. The assumed policy is that the Personal Allowance is increased to £12,750 by the end of the Scottish Parliament (2021-22).[28] The policy parameters are set out in the table below followed by the forecast liabilities.

Table 5: Tax Parameters used in Scottish Income Tax Forecasts

	2017-18	2018-19	2019-20	2020-21	2021-22
Personal Allowance	11,500	11,833	12,167	12,500	12,750
Basic rate	20%	20%	20%	20%	20%
Basic rate limit	31,930	32,682	33,462	34,051	34,732
Higher rate threshold	43,430	44,516	45,629	46,551	47,482
Higher rate	40%	40%	40%	40%	40%
Personal allowance limit	100,000	100,000	100,000	100,000	100,000
Additional Rate threshold	150,000	150,000	150,000	150,000	150,000
Additional rate	45%	45%	45%	45%	45%

4.38 These policy decisions result in the forecast for NSND income tax liabilities in Table 6.

[28] Note: The SG Government proposal is to increase Higher Rate Threshold by a *maximum* of inflation post 2017-18. The SG forecasts have assumed the upper limit of this proposal, and the increase each year is in line with forecasts for September CPI inflation. The Scottish Government's income tax policy was set out in March 2016 (link)

Table 6: NSND Income Tax Forecasts for Scotland

(£ million)

	2017-18	2018-19	2019-20	2020-21	2021-22
NSND Income Tax revenue	11,829	12,290	12,912	13,647	14,559

4.39 The basic approach to calculating NSND tax liabilities has been described above. Two of the key ingredients are paths for aggregate earnings and aggregate employment. Additional manipulations and assumptions are then required for these paths to tie down the growth rates of private sector earnings, public sector earnings and other income, as well as the employment growth rate associated with each age group.

4.40 The growth in employment through the forecast period is given in the top row in the following table, whilst the growth in economy-wide average earnings can be read off from the bottom row (since other income is constrained in the forecast to follow that path). Given that path for earnings, an assumed path for public sector earnings growth and applying the share of earnings accounted for by the public sector, one derives a path for private sector earnings growth.

Table 7: SG Forecast: Employment and earnings paths

(%)

SG Assumptions	2017-18	2018-19	2019-20	2020-21	2021-22
Growth in Employment	0.3	0.2	0.3	0.0	0.5
Private Sector Earnings Growth	2.3	3.2	4.2	4.8	4.9
Public Sector Earnings Growth	2.2	2.2	2.2	2.2	2.2
Other Income Growth [(1)]	2.3	2.9	3.6	4.1	4.1

Note to Table:
[(1)] Other income is constrained to grow at the rate of total earnings growth.

Alternative Earnings and Employment Assumptions

4.41 The analysis in the following Box alters some of the above paths for earnings and employment in order to consider the impact on revenues.

Box A: Sensitivity Analysis

In order to see how the employment and earnings paths above influence forecast outturns for NSND income tax liabilities, the Commission has run a number of variants of the forecast model changing several of the earnings and employment paths in the above Table 7. This helps understand which of the economic determinants are most crucial in generating the path of forecast liabilities. First, the path of aggregate earnings and employment are incorporated as in the SG forecast, but how far the paths of private and public earnings may deviate from one another is constrained. Next, the analysis alters, in turn, the paths of aggregate earnings and

employment using alternative data-motivated scenarios. Finally, the analysis adopts the forecast path for employment produced by the OBR for the UK in the November 2016 Economic and Fiscal Outlook.[29] All other parameters of the tax code are kept as in the SG's forecast.

It is worth emphasising that these alternative scenarios below are not alternative forecasts. That is because these are not forecasts of alternative employment and earnings paths adopted in the sensitivity analysis, merely imposing them on the income tax model in order better to understand some of its key features. The aim of this section is to illustrate the important drivers of the forecast by testing alternative assumptions.

Equal growth in earnings scenario

In the SG forecast, the gap between the growth in private sector earnings and public sector earnings widens through time. That reflects an assumed path for public sector pay growth that remains fixed at 2.2%[30] alongside the OBR forecast of average earnings growth. By the end of the forecast the implied gap between public and private sector earnings growth may be larger than seen historically. For example, the Annual Survey of Hours and Earnings shows that median weekly earnings growth for full-time employees have grown 0.6 percentage points faster in the private sector than the public sector over the last three years.[31] The first scenario examined then is one where private and public sector earnings grow at the same rate. This scenario may reflect, in a rather stylised way, a situation where recruitment issues compel public sector pay growth not to deviate too far from private sector pay growth. The employment and earnings growth assumptions throughout this scenario are reported in the table below.

Relative to the SG forecast scenario, here private sector earnings growth is lower, and public sector pay growth rather more robust. It is worth noting that in this alternative scenario aggregate nominal earnings growth in the economy follows the same path as in the SG forecast. All that has changed here is that average earnings growth has been 'reallocated' across sectors.

[29] OBR (November 2016) Economic and Fiscal Outlook (link)

[30] The historic SPI data show that over the period 2009-10 to 2013-14 average employee earnings in the public sector grew 2.2% on average each year.

[31] Source: Annual Survey of Hours and Earnings 2016 (link)

NB: Since 1997 median gross weekly earnings for full-time employees have, on average, grown faster in the public sector (3.1%) than in the private sector (2.9%).

Table 8: Equal growth in earnings: Employment and earnings paths

(%)

	2017-18	2018-19	2019-20	2020-21	2021-22
Growth in Employment	0.3	0.2	0.3	0.0	0.5
Private Sector earnings Growth	2.3	2.9	3.6	4.1	4.1
Public Sector earnings Growth	2.3	2.9	3.6	4.1	4.1
Other Income Growth [(1)]	2.3	2.9	3.6	4.1	4.1

Note to Table:
[(1)] Other income is set to grow at the rate of total earnings growth.

In this scenario the differences are small. In the first two years of this alternative scenario there is almost no difference in the tax liabilities generated compared to the SG forecast. As the private sector tends to have higher proportion of higher earners this reallocation has a slight depressing effect on tax liabilities in the final three years. The SG's forecast for public sector pay reflects recent data, a backdrop of pay restraint in the public sector and is reasonably close to the path forecast by the OBR. The above scenario models a rather extreme deviation from the likely path of public sector earnings growth. Nevertheless, given the average growth in earnings presumed in the above scenario, the split in growth rates between public sector pay and private sector pay has a somewhat limited effect on total NSND tax liabilities.

The implied NSND tax liabilities in this and the other scenarios below are reported in Table 12 and the difference between those implied liabilities and the SG forecast in Table 13.

Having considered the relative growth rates of earnings in the public and private sectors, the effect of the growth rate of average earnings is now considered.

Average earnings growth scenario

The average growth in earnings through the forecast period is 3.4%, rising from 2.3% in 2017-18 to 4.1% in 2021-22. The effect of earnings growing at a (constant) rate of 2.7% through the forecast period is now considered; this shows the effects of earnings growth being both above and below forecast. That growth rate is the average earnings growth from the ONS Annual Survey of Hours and Earnings (covering the period 2004-05 to 2015-16). The aggregate employment path is taken from the SG's forecast. The employment and earnings paths are now as in Table 9.

Table 9: Average earnings growth: Employment and earnings paths

(%)

	2017-18	2018-19	2019-20	2020-21	2021-22
Growth in Employment	0.3	0.2	0.3	0.0	0.5
Private Sector earnings Growth	2.9	2.9	2.9	2.9	2.9
Public Sector earnings Growth	2.2	2.2	2.2	2.2	2.2
Other Income Growth [(1)]	2.7	2.7	2.7	2.7	2.7

Note to table:

[(1)] Other income grows at the historical rate of earnings growth.

The sample average growth rate for earnings of 2.7% through the forecast period has the effect of boosting private sector earnings earlier on in the forecast period relative to the SG's forecast. In this scenario public sector pay growth continues to match the SG's forecast. Together, this causes tax liabilities to be higher in the first two years of this scenario. However, the differences are rather modest: in 2017-18 total NSND tax liabilities are greater than under the SG forecast by around £80 million and by £40 million the year after. However, after that initial two year period total tax liabilities are less than in the SG forecast. That is because private sector earnings growth is somewhat above average for the rest of the forecast period in the SG forecast. That robust earnings growth means that total tax liabilities are almost £800 million higher in the final year of the forecast than if private sector earnings had grown at their historical average (throughout the whole forecast period). Taken together, these findings suggest that variations in earnings growth are a significant driver in the forecast.

Having considered some variations in the earnings assumptions being fed into the model, the employment assumptions are considered next.

Average employment growth scenario

This scenario adopts the average earnings growth as in the SG forecast but employment is now assumed to grow at the rate of 0.62%, the average (running from 2002 to the end of the forecast period in the SGGEM database), of the SG's macroeconomic forecasting model.

Table 10: Average employment growth: Employment and earnings paths

(%)

	2017-18	2018-19	2019-20	2020-21	2021-22
Growth in Employment	0.6	0.6	0.6	0.6	0.6
Private Sector earnings Growth	2.3	3.2	4.2	4.8	4.9
Public Sector earnings Growth	2.2	2.2	2.2	2.2	2.2
Other Income Growth	2.3	2.9	3.6	4.1	4.1

Note to table:
(1) Other income grows at the historical rate of earnings growth.

Compared to the SG forecast path, employment growth is now somewhat more robust in each year. That persistently stronger growth rate results in total NSND tax liabilities being higher in each year compared to the SG forecast, and the gap widens as the forecast period unfolds. In the first year of the forecast the SG predict that employment will grow by 0.3%, less than half the rate in the alternative scenario. That results in NSND tax liabilities being higher than predicted under the SG forecast by a relatively modest £30 million in 2017-18 (with total NSND tax liabilities of £11,860 million compared with £11,829 million).

OBR Employment growth scenario

The final variant considered assumes Scotland follows the employment growth rate forecast for the UK as produced by the OBR in its November 2016 Economic and Fiscal Outlook.[32] As noted above the OBR forecast for earnings is a key assumption in the macroeconomic forecast produced by the SG. Adopting that earnings forecast, the macroeconomic model, SGGEM, then delivers a forecast for employment growth which is then factored into the income tax model. The following scenario uses the SG earnings forecast and incorporates the OBR employment growth forecast. All other variables are held to the profile of the SG forecast.

[32] OBR (November 2016) Economic and Fiscal Outlook (link)

Table 11: OBR Employment growth: Employment and earnings paths

(%)

	2017-18	2018-19	2019-20	2020-21	2021-22
Growth in Employment	0.1	0.2	0.5	0.4	0.4
Private Sector Earnings Growth	2.3	3.2	4.2	4.8	4.9
Public Sector Earnings Growth	2.2	2.2	2.2	2.2	2.2
Other Income Growth	2.3	2.9	3.6	4.1	4.1

Note to table:
(1) Other income grows at the historical rate of earnings growth.

The OBR forecasts of employment growth rates are weaker across the first two years of the forecast and stronger through the final three years. Indeed in the first year of the forecast the OBR employment growth rate is half the SG forecast rate of growth of Scottish employment. That results in the NSND tax liabilities at first falling short and then exceeding the SG forecast tax liabilities. However, those differences between the tax liabilities generated under these alternatives are small. In 2017-18 the difference is around £20 million and in 2018-19 it is around £10 million.

Summary

These scenarios are intended to shed light on some important inputs underlying income tax forecasts. The tables below collect the results from each of these scenarios. These, are not alternative forecasts. In interpreting that data it is more useful to consider the absolute values of these numbers as these indicate which scenarios identify important drivers for forecast liabilities.

Table 12: NSND Income Tax Liabilities

(£ million)

	2017-18	2018-19	2019-20	2020-21	2021-22
Scottish Government Forecast	11,829	12,290	12,912	13,647	14,559
Equalised earnings growth	11,830	12,290	12,890	13,610	14,490
Average earnings growth	11,910	12,330	12,770	13,200	13,760
Average employment growth	11,860	12,370	13,040	13,850	14,780
OBR Employment growth	11,810	12,280	12,920	13,710	14,600

Note to Table:
Figures rounded to the nearest £10m.

Table 13: NSND Income Tax Liabilities; Difference from SG Forecast

(£ million)

	2017-18	2018-19	2019-20	2020-21	2021-22
Equalised earnings growth	0	0	-20	-40	-70
Average earnings growth	80	40	-140	-450	-800
Average employment growth	30	80	130	200	220
OBR Employment growth	-20	-10	10	60	40

Notes to Table:
Figures rounded to the nearest £10m.
A negative number implies NSND liabilities are higher in the SG Forecast than in the alternative scenario

To sum up: the indications from these exercises are that, other things constant, average nominal earnings growth is a significant driver of the forecast. The "Average earnings growth" scenario presented above showed that persistent deviations from the average rate of growth of earnings could have significant consequences for NSND income tax liabilities. Of less significance for the path of NSND income tax liabilities is the split between private and public sector earnings growth, for the given path of average earnings considered here. Finally, variations in the growth rate of employment are considered. In the scenarios considered here deviations from average employment growth had important implications for NSND tax liabilities if persistent.

Conclusions

4.42 The model developed to forecast NSND income tax liabilities is new and quite complex. It has a number of contributory elements that have to be forecast ranging from demographic trends and labour market activity data, to aggregate paths for employment and earnings. This section of the report attempts to highlight some of the critical features of the model. The 2013-14 SPI data reveal that 67% of total NSND liabilities were raised from income from employment in the private sector and just over 24% raised from income from employment in the public sector. That would suggest that earnings growth is an important driver of forecast revenue. The robustness analysis presented above confirmed that. It also suggested that employment growth is also important. Finally, over the forecast horizon, and for a given aggregate earnings profile, less critical was the precise difference between earnings growth rates in the private and public sector.

4.43 The OBR forecast of UK earnings drove the SGGEM forecast for earnings growth in Scotland in the current forecast round. Future work could usefully pursue further economic modelling of the Scottish labour market. That would

help provide earnings and employment projections for possible use in the modelling of the economy as a whole and as input for income tax projections.

4.44 There are likely to be behavioural effects to any change in income tax policy and wider changes to the NSND tax base caused by changing employment trends. That is a challenge to policymakers. It will be important to keep under review the SFC's understanding of these issues and to consider whether evidence exists or may be generated that might shed further light on these issues that will be useful in a Scotland-specific setting.

4.45 These points notwithstanding, the Scottish Fiscal Commission’s conclusion is that the overall approach to forecasting income tax is reasonable.

5. Land and Buildings Transaction Tax (LBTT)

5.1 The forecasting of the tax revenue from LBTT is divided into residential and non-residential components. These are modelled separately and are considered in turn below.

The Residential Model

5.2 The residential forecast begins by using historical data on property transactions to describe the probability that any observed property transaction will occur at a particular price within the estimated price distribution. The Scottish Government forecasters then use statistical models to forecast average and median house prices. These projections are then used to adjust the parameters of the distribution for the period of the forecast in question.

5.3 Finally a simple ARIMA model[33] of the turnover ratio (the ratio of residential property transactions to the number of households) is used to infer a projection for transactions volumes over the forecast horizon. This forecasted volume of transactions can be combined with the forecasted (repositioned) distribution of property transactions in different price categories to generate forecasts for the volume of transactions in each price category. The relevant tax schedule can then be applied to calculate forecast tax revenues per price category and in total.

Forecasting Methodology and Developments Since Draft Budget 2016-17

5.4 There have been a number of significant changes in residential LBTT forecasting methods since Draft Budget 2016-17, largely responding to recommendations in previous reports.

5.5 The relevant extract from the Scottish Fiscal Commission's initial report is given below:

"The forecasts of average house prices and the volume of transactions are both areas where, ideally, the forecasts would be based on a reliable statistical model which took account of the economic determinants of these variables. These determinants would include, for example, the evolution of the economic cycle, the level of household indebtedness, the level of interest rates, the regulation of mortgages or other, similar, factors. However, successfully developing such

[33] A time series variable, once appropriately transformed, will typically vary around a long run mean value. If some of this variation is predictable, an ARIMA model will seek to take the most recent observations and create a path back to the long run mean based on historic patterns of that variable.

models is notoriously difficult and they are unlikely to be successful in this instance given the available data.

Accordingly, in the short to medium term, as more data become available, we would like to see development, and exploration, of a range of simple statistical models of the path of the house price and transactions data, either individually or jointly. A simple statistical model is currently employed in forecasting average house prices, but extending this to the forecast of residential housing transactions is likely to be particularly important as this variable is volatile and the current approach is unlikely to be robust at all stages of the business cycle."

Scottish Government Response to SFC Recommendations

5.6 Following the Commission's recommendations that the Scottish Government explore alternative approaches to forecasting the housing market including multivariate approaches, the Scottish Government has commissioned a review of forecasting models for the housing market. The Commission was provided with the opportunity to comment on the review and ensured that areas the Commission previously recommended were covered. The contract was awarded to Alma Economics in September. Over the last few months Commission staff have sat on the research advisory group, commenting on the scope of the review and on a first draft of the report. The final draft of the report is due to be submitted by late-December and will be published in early 2017.

5.7 At the same time the SG have extended their short-term statistical modelling of house prices to develop similar models for both the turnover ratio (which in turn generates a forecast of transactions volume) and the ratio of the median-to-mean house price (which determines the shape of the distribution of transactions across price bands). The SFC welcomes these developments.

5.8 Finally, in Draft Budget 2017-18 the SG analysts also adjust the distribution of forecast revenues across price bands. This reflects the fact that while the model can generate relatively accurate aggregate outturn data when fed appropriate economic determinants, it appeared to misallocate transactions across in particular the two upper bands in 2015-16.

5.9 In order to assess these modelling innovations, the SFC has also undertaken sensitivity analysis of this modelling work.

Evolution of the Forecasts for 2016-17 and 2017-18

5.10 An effective way of discerning the impact of new outturn data as well as the various methodological changes implemented by the Scottish Government forecasters since the last budget round is to examine the evolution of the residential LBTT forecasts over time. Before doing so it is helpful to see how the economic determinants underpinning the forecast have evolved between the 2016-17 and 2017-18 Draft Budgets. The forecasts for these are detailed in Table 14.

Table 14: Changes to Housing Market Projections between Draft Budgets 2016-17 and 2017-18

(Growth in %)

	2016-17 Draft Budget		2017-18 Draft Budget	
	2016-17	2017-18	2016-17	2017-18
Mean Price Growth	5.6	5.3	-0.1	1.8
Median Price Growth	5.6[(1)]	5.3[(1)]	0.9	0.1
Transactions Growth	4.6	3.8	-2.3	0.8

Note to table:
[(1)] Median price growth is assumed to be the same as mean price growth in Draft Budget 2016-17. Figures for 2016-17 at the Draft Budget 2017-18 do not constitute revised official forecasts of the Scottish Government.

5.11 In the previous Draft Budget mean house price growth was estimated using a simple ARIMA model which essentially extrapolated the relatively buoyant real house price growth of the previous year for 2015-16 and 2016-17, before assuming house price inflation slows to a long-run growth rate of 4.5% which reflected assumed 2.5% real growth and 2% inflation. Median house prices were assumed to grow in line with the mean, and the transactions growth rate was expected to fall gradually from its current rate towards a long-run value implied by the historical average of the turnover ratio (the ratio of transactions to the number of households) over the course of the forecast horizon.

5.12 The revised forecast methodology utilises separate statistical models for each of the economic determinants of the forecast, and use these throughout the entire forecast horizon. Unlike the previous forecast these control for breaks in the relevant series caused by the financial crisis. Therefore, in the case of average house prices an ARIMA in house price inflation was estimated using data from 2004Q2 until 2016Q3 allowing for breaks in the mean growth rate pre-crisis, during the crisis and post crisis, as well as attempting to control for the impact of forestalling activity associated with the introduction of LBTT and Additional Dwelling Supplement (ADS). This dramatically reduces the projected inflation in average house prices.

5.13 The median house price forecast is obtained by running an AR model on the ratio of median to mean house prices. SG analysts did not find any break in this ratio over the sample period (2003Q2 to 2016Q3). In combination with the mean house price forecast, this can be used to infer a forecast for median house prices. This forecast implies a rise in the ratio in 2016-17 followed by a decline throughout the rest of the forecast. This is consistent with a shift in transactions away from the top end of the market in 2016-17, before a relative recovery throughout the remainder of the forecast horizon.

5.14 Finally transactions are modelled in terms of the turnover ratio on the grounds that this serves as a natural way of capturing the long-run limits to the growth in the volume of transactions. The projections for households in Scotland are produced by the National Records of Scotland; these allow the SG forecasters to project a figure for transactions growth based on their forecast for the turnover ratio. Transactions in 2016-17 are forecast to fall by 2.3% relative to 2015-16; this forecast has been produced using the outturn data and reflects the forestalling associated with the introduction of ADS reducing transactions in the current year and increasing transactions in the previous year.

5.15 This has tended to result in a more subdued short to medium-term outlook for the residential housing market in Scotland.

Table 15: Residential LBTT – Evolution of Scottish Government Forecasts.

(£ million)

	2015-16 Forecast	2016-17 Forecast	2017-18 Forecast
Draft Budget 2015-16	203-230[(1)]	-	-
Draft Budget 2016-17	*213-240*[*(1), (4)*]	282[(2)]	347[(2)]
Draft Budget 2017-18	-	*181*[*(4)*]	211
Outturn	208	208[(3)]	-

Notes to Table:

(1) The 2015-16 pre-forestalling forecasts of £235m and £240m respectively have been adjusted for forestalling effects associated with the introduction of LBTT and ADS.

(2) The forecasts produced at Draft Budget 2016-17 are adjusted for the indirect impact of ADS on standard LBTT revenues as detailed in the SFC's preliminary outturn report for ADS. The original pre-measures forecasts were £295m for 2016-17 and £355m for 2017-18.

(3) The outturn figures for 2016-17 are extrapolated from in year outturns – see paragraph 5.18 below.

(4) Figures based on SFC calculations and do not constitute revised official forecasts of the Scottish Government.

5.16 Table 15 examines the evolution of the forecast over the last three budget rounds. Focusing on the forecast for 2016-17 there has been a significant reduction in forecast LBTT revenues since Draft Budget 2016-17 bringing the

2016-17 revenue forecast generated as a by-product of the 2017-18 forecast closer to extrapolated in-year outturns.

Box B: Decomposition of Changes in Forecast

This section tries to identify the factors that have driven this downward revision to the forecast. Firstly, as discussed in the outturn report for 2015-16 both average and median house price growth was not as large as expected. Secondly, this was particularly true for average prices implying a shift away from the upper end of the market in terms of the type of transactions underpinning LBTT revenues. The SFC's outturn report then examined the distribution of residential LBTT revenues across house price bands and concluded that the main reason for the short-fall in revenues was due to less than expected revenues being generated by the £325k-£750k price band. Using these mean/median price and transaction outturns in 2015-16 results in a significant lowering of projected revenues for 2016-17 and 2017-18 – see row "Base Adjustment Only".[34] However, this is not sufficient to explain the full extent of the downward revision in the implied forecast.

Table 16: Residential LBTT – Evolution of Forecasts.

(£ million)

	2015-16	2016-17	2017-18
Reconciling the Draft Budget 2016-17(1) and Draft Budget 2017-18 Forecasts			
Base Adjustment Only	196	243	296
Base + Transactions	196	227	269
Base + Mean Prices	196	144	122
Base + Median Prices	196	304	445
Base + Mean + Median Prices	196	193	233
Base + All	196	181	212
Outturns			
Outturn	208	208(2)	-

Notes to Table:
(1) The Draft Budget 2016-17 forecasts are adjusted for the indirect impact of ADS on standard LBTT revenues as detailed in the SFC's preliminary outturn report for ADS. The original pre-measures forecasts were £295m and £355m, respectively.
(2) Outturn figure for 2015-16 is from Revenue Scotland (2016) Annual Report 2015-16 – Devolved Taxes Account (link)
(3) The outturn figure for 2016-17 is extrapolated from in-year outturns – see below.
The Revised Forecasts are based on SFC calculations and do not constitute revised official forecasts of the Scottish Government. The revenue calculations apply the adjustment to the distribution of revenues across bands applied by the SG in the Draft Budget 2017-18 forecast.

The projections for house price and transactions growth assumed in Draft Budget 2016-17 are sequentially replaced with those used in Draft Budget 2017-18. These

[34] The economic determinant data used for 2015-16 comes from Revenue Scotland residential LBTT returns which imply mean prices of £166,000, median prices of £140,000 and transactions of 103,700.

assumptions are detailed in the Table 14 above. Therefore the second last row of Table 16 implements all the changes and replicate the Draft Budget 2017-18 forecast.

Returning to Table 16 the impact of these changes on the forecast can be analysed. The assumed lower rate of growth in transactions reduces the revenue projections, although not by that much. Instead the bigger effects come from assumptions about mean and median house price growth. The reduction in average house price inflation has a quite marked impact on the forecast, while similar reductions in median house price inflation have the opposite impact serving to dramatically increase the projected revenues. The reason for this is that the relative growth rate of median and mean house prices determines the shape of the distribution of transactions across price bands. Maintaining average house price growth at Draft Budget 2016-17 forecast, but reducing median house price growth tilts transactions towards the upper end of the market which, given the progressive structure of the LBTT tax schedule, implies a significant increase in revenue. Therefore the combined effect of the revised mean and median house price forecast are responsible for the bulk of the residual adjustment in the forecast after recalibrating the base to outturns in 2015-16.

The breakdown of the forecast revision highlights the importance of forecasting both the buoyancy of the housing market overall and the relative evolution of the mean and median house prices as this ties down which parts of the market are performing relatively well. This is an issue returned to in the sensitivity analysis below. Although the main LBTT forecast does not include any behavioural responses to taxes – forecasting divergence or convergence of mean and median house prices serves to reallocate anticipated transactions to different parts of the market in much the same way as might be expected with varying behavioural responses to the tax or other differential effects on the housing market.

Outturns vs. Forecast for 2015-16

5.17 The SFC published their outturn report for 2015-16 in September 2016. In terms of residential LBTT revenues the pre-forestalling forecast of £235m compared to outturn data of £208m. The Commission's analysis of this discrepancy focused on the extent to which this could be attributed to a forestalling effect due to the introduction of LBTT in April 2015, as well as how revenues were being generated across price bands. The executive summary of that report stated, in relation to residential LBTT:

"In the case of residential LBTT we find that revenues were £27m less than those expected in the absence of forestalling at the time of the SG's forecast in January 2015. Outturn revenues were in the lower part of the range forecast by the

Scottish Government once incorporating the loss of revenue as a result of expected forestalling activity. Our analysis suggests that this shortfall is largely due to reduced transactions in the £325k-£750k price band. A large part of this can be attributed to forestalling activity, as people brought forward house purchases for properties costing more than £325k to the previous tax year. However, our analysis also suggests that the volume of transactions in this section of the housing market remained subdued throughout the entire fiscal year, excluding March 2016."

Outturns vs. Forecast for 2016-17

Table 17: Residential LBTT - Monthly Forecast vs. Outturn

Month	Expected Tax Revenues *(%)*	Expected Tax Revenues *(£ million)*	Actual Liabilities *(£ million)*	Difference *(£ million)*	Cumulative Difference *(£ million)*
Apr	7.5	21.2	16.0	5.2	5.2
May	8.1	22.8	14.5	8.3	13.5
Jun	9.3	26.2	19.0	7.2	20.7
Jul	10.3	29.0	19.8	9.2	30.0
Aug	9.2	25.9	21.5	4.4	34.4
Sep	9.6	27.1	19.4	7.7	42.1
Oct	9.1	25.7	20.8	4.9	46.9
Nov	8.4	23.7			
Dec	9.8	27.6			
Jan	5.5	15.5			
Feb	6.1	17.2			
Mar	7.2	20.0			
Total	100	282			

Note to Table: The estimation of monthly Tax Revenues is based on SFC calculations building on SG estimates of seasonality in house prices and transactions. The Actual Liabilities are from Revenue Scotland, 'LBTT Monthly Statistics', October 2016. (link)

5.18 The first column of Table 17 gives the percentage of the annual revenues that would be expected to be received in that month in the absence of any forestalling effects due to the introduction of ADS. This is not uniform across each month as there is a seasonal pattern in both prices and transactions in the residential housing market. Using Scottish Government estimates of that seasonality, two peaks in housing market activity are identified, in July and immediately before Christmas, which are well known in the industry. Contrasting the monthly allocation of the forecast with the outturn data for residential LBTT in the third column of figures shows the monthly breakdown in the difference in revenues from forecast over the period from April to

October 2016, which cumulates to around £46.9m. It should be noted that the forecast has been reduced from £295m to £282m in line with the SG's allocation of impact on introducing ADS on standard LBTT revenues. This captures a behavioural impact where the reduction in transactions in additional dwellings subdues the market more generally, as well as a short-lived forestalling effect.[35]

5.19 Extrapolating the revenues received for the year to date, if they were to continue at this rate, the outturn for the year as a whole would be expected to be £207.6m, a difference from forecast of £74.4m.[36] This may either reflect a failure in the applicability in the lognormal distribution when translating the economic determinants into a pattern of transactions across price bands or a mis-forecast of the economic determinants themselves.

5.20 Using the realised data on the economic determinants for the first half of the year to date and feed these into the lognormal distribution this implies a forecast for 2016-17 of £199m without the distribution adjustment applied by the SG or £205m with, which are indistinguishable from the extrapolated outturn data of £204m.[37,38] This reveals the key reason for the apparent difference from forecast is that the underlying economic determinants have been mis-forecast. The basic forecasting model continues to perform reasonably well in aggregate if fed the appropriate economic determinants.

5.21 The evolution of the forecast of economic determinants between Draft Budget 2016-17 and Draft Budget 2017-18 discussed above can therefore help cast light on the cause of this difference from forecast. A substantial part of the difference from forecast can be attributed to the realisation of the economic determinants in 2015-16. As shown in Table 16 this would have reduced the forecast for 2016-17 from £282m to £243m. The residual difference is then largely due to the fact that average and median house prices were further reduced relative to the forecast for 2016-17 in Draft Budget 2016-17 even after accounting for the fall in average relative to median prices in 2015-16.

[35] This is discussed in detail in the Commission's publication "Additional Dwelling Supplement Preliminary Outturn Report", November 2016.

[36] If the first quarter data are excluded when extrapolating part year outturns the estimated outturn for the year would be £213m and estimated forecast error of £69m. This suggests that the impact of forestalling in the first quarter of 2016-17 could be around £5m.

[37] The half-year outturns for 2016-17 for the economic determinants underpinning the forecast, based on Revenue Scotland data imply mean prices of £169,000, median prices of £141,000 and extrapolated transactions of 96,389.

[38] This comparison is based on the half-year data up to September and does not include the data for October due to the fact that the Commission has access to Revenue Scotland outturn data for mean and median prices up to September.

5.22 This analysis suggests that there has been an ongoing deterioration of revenues relative to forecast even after accounting for the realised outturns of economic determinants in 2015-16. Table 18 contrasts the revenues forecast to be generated across price bands using the log-normal distribution and forecast economic determinants in Draft Budget 2016-17 and contrasts that with extrapolated within year outturns across the same bands. Again the extrapolated outturn estimate is based on data for the first half of the year.

Sectoral Composition of 2016-17 Estimated Difference from Forecast

Table 18: Residential LBTT – Annual Forecast vs. Extrapolated Outturn by Price Band 2016-17

(£ million)

Threshold Band	Forecast Revenues	Extrapolated Outturns	Difference
£145k-£250k	39.2	27.8	11.4 (29%)
250k-£325k	44.6	30.4	11.1 (32%)
£325k-£750k	171.5	109.8	61.7 (36%)
>£725k	26.7	34.4	-7.7 (-29%)
Total	282	202.6	79.7

Note to Table:
The Forecast Revenues come from an analysis of the SG's forecasting model used at the time of Draft Budget 2016-17 undertaken by the SFC. The original pre-ADS forecast of £295m is rescaled to match the post-ADS estimate of £282m, but the pattern of allocations across price bands contained in the initial forecast are retained. The outturns by price band come from data provided by Revenue Scotland and reflect tax declared due on returns received in 2016-17 not, strictly speaking, accrued revenues. The outturn data cover the period to September 2016.

5.23 Breaking the tax receipts into threshold bands as in Table 18, shows that the bulk of the extrapolated difference from forecast comes from overpredicting the revenues expected to be generated from the £325k-£750k price band. To some extent this is not surprising since over 60% of residential LBTT revenues were expected to come from this price band in 2016-17. In proportional terms the anticipated differences from forecast do rise as one move up the first three price bands, although the trend is not as dramatic. Interestingly, the highest band remains robust with revenues currently anticipated to be £7.7m above forecast.

5.24 In order to assess to what extent the under performance of the £325-£750k price band was based on changes in the market in 2015-16 versus 2016-17 the decomposition of the differences from forecast across price band is calculated after updating the values of the economic determinants with actual data for residential outturns in 2015-16. The growth rates for 2016-17 forecast

in Draft Budget 2016-17 are then applied to this revised base. This is shown in Table 19.

Table 19: Residential LBTT – Annual Forecast vs. Extrapolated Outturn by Price Band 2016-17 (Revised Base)

Threshold Band	Forecast Revenues *(£ million)*	Extrapolated Outturns *(£ million)*	Difference *(£ million, %)*
£145k-£250k	32.7	27.8	4.9 (15%)
£250k-£325k	39.2	30.4	8.8 (22%)
£325k-£750k	146.5	109.8	36.7 (25%)
>£725k	18.7	34.4	-15.7 (-83%)
Total	237.2	202.6	34.7

Notes to Table:
Outturn data for 2015-16 is used to form the base before the forecast growth rates contained in Draft Budget 2016-17 are applied to construct a revised forecast. The Forecast Revenues come from an analysis of the SG's forecasting model undertaken by the SFC. The outturns by price band come from data provided by Revenue Scotland and reflect tax declared due on returns received in 2016-17 not, strictly speaking, accrued revenues. Note that since the forecast revenues have not been subject to the adjustment applied in Draft Budget 2017-18 the total (revised base) forecast of £237m is less than the £243m reported in Table 16.

5.25 Table 19 suggests that there is a residual difference to forecast largely driven by revenues in the £325-£750k price band being lower than expected even after accounting for the relatively weak outturns in 2015-16. This is consistent with the finding that the evolution of average and median house prices could account for most of the residual difference to forecast after adjusting the base for 2015-16 outturns.

5.26 Although the difference in revenues from forecast in the £325k-£750k band accounts for most of the estimated £74 m difference from forecast, this does not imply that there has been a deterioration in this segment of the market relative to others. In the outturn data from revenue Scotland for 2016-17 until September, the ratio of median to mean prices is not significantly different from the previous year implying that there has been no major change in the shape of the distribution of transactions. Instead, both median and mean house prices have not grown as expected across the whole market, but since the £325k-£750k price band accounts for over 60% of revenues this is where the difference appears most clearly.

Box C: The Fit of the Lognormal

The outturn report of 2015-16 discussed the possible break down in the fit of the lognormal distribution at the top end of the market. This was reflected in the fact that while, given observed economic determinants, the model could accurately predict aggregate tax revenues, it misallocated some of those revenues across, in particular, the top two bands – overstating them in the £325-£750k band and understating them in the >£750k band. Table 20 shows that the model generates a forecast of £199m using part-year data for economic determinants[39] which is in line with extrapolated outturn data of £202.6m. However, the revenues generated by the £325-£750k band are below the level predicted by the lognormal distribution and the revenues in the >£750k band are higher than predicted. The order of magnitude of these effects is not dissimilar to that found in the outturn data for 2015-16.

Table 20: Residential LBTT – 2016-17 Forecast vs. Estimated Outturn Based on Part-Year Outturn Data

	Updated Forecast *(£ million)*	Extrapolated Outturn *(£ million)*	Difference *(%)*
£145k-£250k	27.3	27.8	-0.5 (-2%)
£250k-£325k	32.1	30.4	1.7 (5%)
£325k-£750k	122.1	109.8	12.3 (10%)
>£750k	17.0	34.4	-17.4 (102%)
Total	199	202.6	

Note to Table:
The extrapolated outturns and updated forecast are based on data for the first six months of 2016-17 provided by Revenue Scotland to the SFC.

Undertake the same shifting of revenues between bands as employed by the SG analysts in Draft Budget 2017-18 results in the distributional pattern of differences from forecasts shown in Table 21. This suggests that the distributional correction employed by the SG in the 2017-18 forecast is not obviously inconsistent with the observed part-year outturns in 2016-17.

[39] This uses extrapolated transactions of 96,389 and mean and median prices over the six months to September 2016 of £169,000 and £141,000.

Table 21: Residential LBTT – 2016-17 Forecast vs. Estimated Outturn Based on Part-Year Outturn Data – Adjusted Forecast

	Adjusted Updated Forecast *(£ million)*	Extrapolated Outturn *(£ million)*	Difference *(%)*
£145k-£250k	29.1	27.8	1.3 (4%)
£250k-£325k	31.8	30.4	1.4 (4%)
£325k-£750k	115.5	109.8	5.7 (5%)
>£750k	28.1	34.4	-6.3 (-22%)
Total	205	202.6	

Note to Table:
The Adjusted Updated Forecast uses part-year outturn data for the first half of the year for the economic determinants to generate an unadjusted forecast. This is then adjusted in the same way as the SG analysts adjust the allocation of forecast revenues across bands in the Draft Budget 2017-18.

The Market in Aberdeen

5.27 There has been some evidence that the residential property market in the Aberdeen area has not been performing well. As this regional property market contains properties valued significantly above the national average, it could be that the difference in expected revenues to forecast in the £325-£750k price range reflect regional disparities in the performance of the Scottish housing market. Box D assesses this possibility.

Box D: Assessing the impact of the market in Aberdeen

Table 22 gives Registers of Scotland outturn data for the same economic determinants which underpin the main residential LBTT forecast, for the Aberdeen City and Aberdeenshire areas.

It is clear from Table 22 that there has been a decline in both median and average prices in the Aberdeen area, as well as the volume of transactions over the last two years. Unfortunately outturn data for LBTT is not available broken down by region in order to assess directly the impact this has on LBTT revenues. However, the SG's forecasting model is used to infer what the revenues would have been expected to be had the housing market in Aberdeen grown in line with the overall Scottish forecast and contrast that with expected revenues given the actual performance of the Aberdeen housing market detailed in Table 23.

Table 22: The Residential Housing Market in the Aberdeen Area

Aberdeen City			
	2014-15	2015-16	2016-17*
Average Price	£218,518	£215,037	£205,753
Median Price	£182,556	£178,288	£176,000
Transactions	5,265	4,822	3,885
Aberdeenshire			
	2014-15	2015-16	2016-17*
Average Price	£233,480	£227,733	£212,461
Median Price	£217,225	£210,064	£193,500
Transactions	5,713	4,974	3,913

Notes to Table:
Data is sourced from Registers of Scotland publication, Quarterly Statistics Time Series which contains the latest July-September 2016 quarterly data (link).
* 2016-17 data are half year averages. The transactions data for 2016-17 have been annualized by applying the typical seasonality found in the Scottish housing market.

Before performing this analysis it is worth noting some caveats relating to the applicability of this approach. Firstly, this only directly assesses the revenues expected under different scenarios – there are not data available on actual revenues received in the region. To the extent that the underlying model does not match the pattern of transactions in this market this will be inaccurate. Secondly, the SG's forecasts were for the Scottish housing market overall and did not contain any specific forecast for any of the regions of Scotland. Therefore, the calculation of expected revenues for the Aberdeen area does not necessarily reflect the view of the Scottish Government as to the likely distribution of LBTT revenues across Scottish Regions. Instead these calculations can be considered to be a speculative thought experiment designed to assess the possible impact of local market conditions in the Aberdeen area on the aggregate residential LBTT tax take.

As noted above, the forecast for 2016-17 for residential LBTT revenues has been reduced significantly as a result of the methodological changes implemented in the Scottish Government's approach to forecasting the housing market. A large part of this revision comes from the economic determinants for 2015-16 differing from their implicit forecast in Draft Budget 2016-17. That is, Draft Budget 2016-17 revenue forecast is built on observed house price and transaction data for 2014-15 before forecasting the growth in house prices and transactions for 2015-16 onwards. The Draft Budget 2017-18 forecast instead, uses actual economic determinant data for 2015-16 and part-year data in forecasting economic determinants for 2016-17.

Expected LBTT revenues for the Aberdeen area can be estimated conditioned on similar vintages of data to assess to what extent the revenues from LBTT in this region may have fallen short of expectations. Table 23 details expected LBTT revenues in 2015-16 and 2016-17 for Aberdeen City and Aberdeenshire based on

extrapolating either the 2014-15, 2015-16 or 2016-17 economic determinants.

Table 23: Expected LBTT Revenues in the Aberdeen Area

(£ million)

Aberdeen City		
	2015-16	2016-17
2014-15 Base	27.0	33.0
2015-16 Base	20.0*	24.2
2016-17 Base	-	12.8**
Aberdeenshire		
	2015-16	2016-17
2014-15 Base	24.0	29.6
2015-16 Base	16.0(1)	19.6
2016-17 Base	-	10.3(2)

Notes to Table:
(1) Indicates the calculation of expected revenues is based on actual data for economic determinants.
(2) Indicates calculation is based on part-year data for economic determinants where transactions have been annualised using standard patterns of seasonality.

The rows labelled “2014-15 Base” are the implicit revenues expected from the region given the level of house prices and transactions in 2014-15 and assuming the forecast growth in these economic determinants will be the same as detailed in Draft Budget 2016-17 for Scotland as a whole. The rows labelled “2015-16 Base” then use the actual price and transactions data for 2015-16 when calculating expected revenues. This suggests that the part of the forecast of £235m residential LBTT revenues coming from the Aberdeen area in 2015-16 at the time of Draft Budget 2016-17 could be calculated as £51m, but that expected revenues given how the regional housing market actually performed would be £36m, an estimated difference of £15m in 2015-16. At the same time this lower base in 2015-16 would have reduced forecasts for 2016-17 markedly.

Repeating this exercise using the part-year data on economic determinants for 2016-17 suggests that for 2016-17 expected revenues from the Aberdeen area would be £23.1m in contrast to the amount implicitly consistent with Draft Budget 2016-17 of £62.6m an estimated difference of £39.5m. This suggests that a major part, but not all, of the extrapolated difference in revenue from forecast for 2016-17 of £74m may be due to the underperformance of the housing market in the Aberdeen area. Of the estimated difference from forecast of £39.5m, £20.7m reflects the weaker performance in Aberdeen when compared to the overall Scottish Forecast.

Sensitivity Analysis

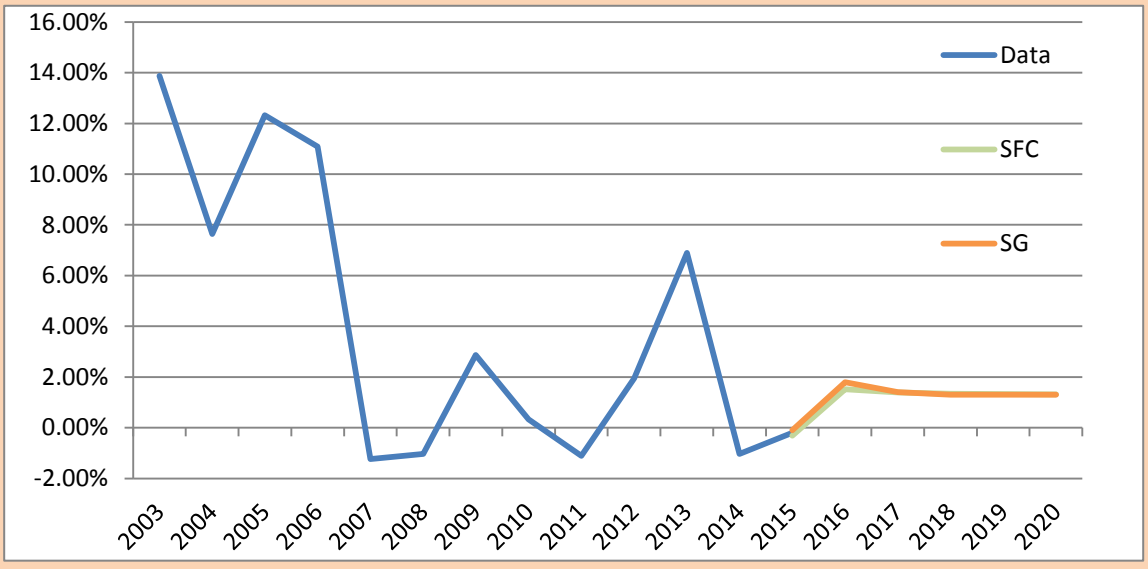
5.28 In the above analysis the evolution of the forecast over Draft Budgets has been explored as well as attempted to reconcile forecasts with outturn data. This section of the report examines the sensitivity of the forecast revenues to economic determinants differing from what is expected in Draft Budget 2017-18.

Box E: Sensitivity Analysis

Table 14 details the forecast assumptions relating to the key economic determinants of the residential LBTT forecast.

In order to assess the robustness of the Scottish Government's forecasts the SFC has undertaken illustrative modelling relating to the economic determinants underpinning the residential LBTT forecast, to test the sensitivity of different assumptions. It should be stressed that these do not constitute SFC forecasts, but are merely intended as an exploration of alternative interpretations of recent trends in the data as a means of assessing which factors are most important in driving the SG's residential LBTT forecasts. In terms of average prices the SFC'S ARIMA model generates forecasts very close to those of the SG's analysts with minor differences due to slightly different approaches to control for the episodes of forestalling experienced in the recent data – see Figure 4.

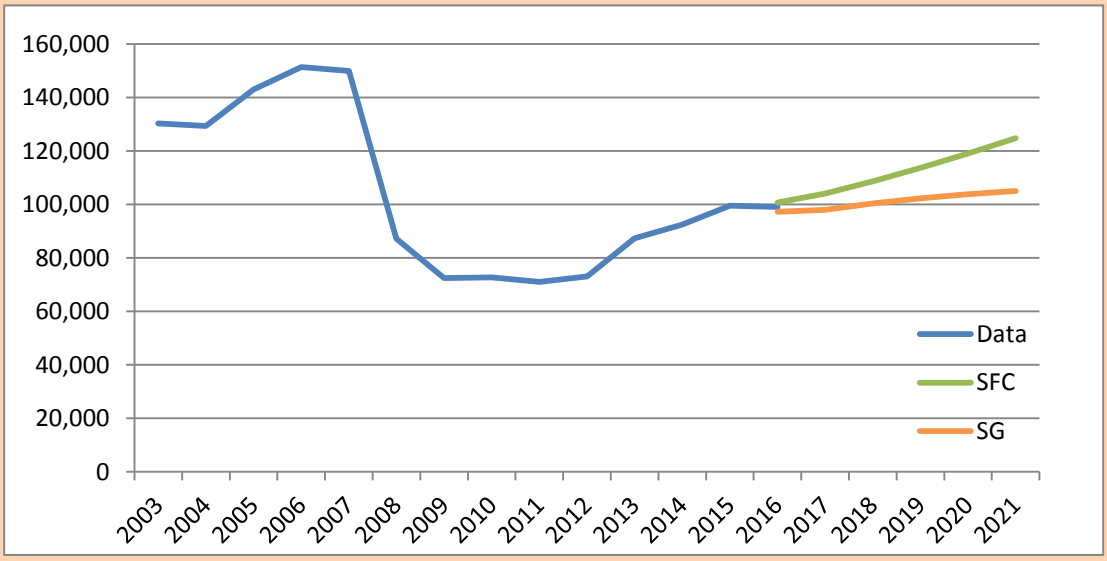
Figure 4: Annualised Average Price Growth



Turning to transactions the SFC tested a different approach to that of the Scottish Government. The Scottish Government modelled the ratio of house purchases to the number of households (the turnover ratio) after allowing for different means for this variable pre and post-financial crisis. The motivation for adopting such an approach is that such a variable may be thought to capture a natural long-run

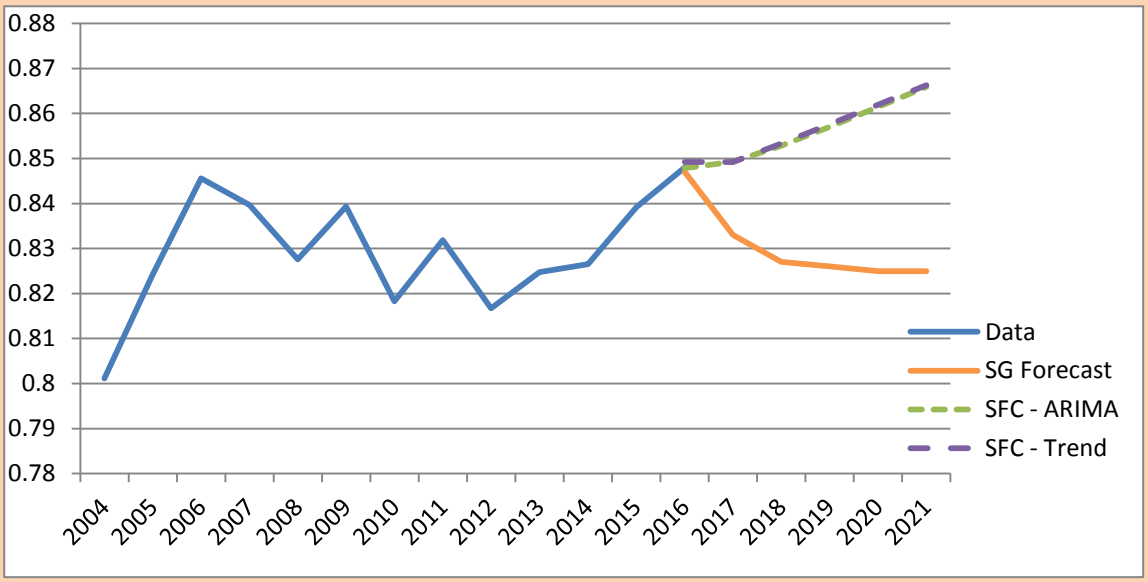
constraint on the rate at which transactions in the housing market can grow. This has the effect of allowing for fairly modest growth in the level of transactions over the forecast horizon. The SFC has considered an alternative illustrative approach in the sensitivity analysis, modelling the growth in transactions directly, again after allowing for different mean growth rates pre and post-crisis. This tends to imply a faster rate of recovery in housing market transactions, although still falling well short of pre-crisis levels.

Figure 5: Transactions



Finally, the SG forecasters adopt a simple AR(1) model in forecasting the ratio of median-to-mean house prices. This tends to imply a fairly rapid return to the long-run average of this variable of 0.825. This results in a fall in median prices relative to mean prices in the early years of the forecast. Again, in order to assess robustness, the SFC tested two different approaches. Firstly, the SFC modelled the growth in median prices through an ARIMA in a manner analogous to the mean house price, again controlling for forestalling and allowing for different mean growth rates pre and post-crisis. Secondly, the SFC's sensitivity analysis considered an alternative specification for the ratio of median-to-mean price, but fitted linear trends to the data which were allowed to differ pre- and post-crisis. In both cases the recent upward tick in median prices relative to mean is projected to continue throughout the forecast period.

Figure 6: Ratio of Median to Mean House Prices



The following text considers the impact of this sensitivity analysis on the residential LBTT forecast. Table 24 begins with the SG forecast and then recomputes the revenues replacing each alternative scenario for the economic determinants, the final row combines all the possible changes simultaneously. It should be noted that in each case the forecast is the adjusted one which reallocates transactions between bands in the same way as Draft Budget 2017-18 to correct for the failure of fit of the lognormal distribution in this dimension. Removing this correction would not materially affect the implications of this exercise.

Table 24: Illustrative Impact of Sensitivity Analysis of Economic Determinants on the (adjusted) LBTT revenue forecast.

(£ million)

	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
SG Forecast	181	211	235	250	265	279
Illustrative SFC – Mean Prices	173	197	221	236	251	265
Illustrative SFC – Median Prices	183	198	206	212	217	222
Illustrative SFC – Transactions	187	223	253	277	303	330
Illustrative SFC – All	182	197	209	221	235	249

Table 24 illustrates the impact of sensitivity analysis of changes in both prices and transactions. First, the SFC's scenario considering transactions in terms of their growth rate rather than the turnover ratio tends to suggest that there will be an

ongoing recovery in transactions, although still falling well short of pre-crisis levels. By the end of the forecast horizon this would raise forecast revenues from £279m to £330m. Secondly, the SG's modelling of the ratio of median-to-mean house prices tends to imply that this ratio will fall over the forecast horizon. This, in turn, implies that the upper end of the market is expected to recover. If, for example, the short-term trend in median house prices relative to average prices continues then revenues would fall to £222m by the end of the forecast horizon. It should be noted that the statistical uncertainties attached to these projections would imply that none of these forecasts are statistically significantly different from the other.

In summary, the two key issues highlighted by this sensitivity analysis are (1) to what extent is the recovery in transactions in the residential housing market likely to continue and (2) how will average house prices perform relative to median house prices thereby determining the shape of the distribution of transactions.

It is important to stress that the current approach to modelling the economic determinants of the residential housing market relies heavily on extrapolating recent trends in the data. The differences discussed immediately above simply reflect different choices about how to capture those trends and one approach is not obviously better than the other. Of potentially greater significance to the forecast are the uncertainties associated with Brexit. Here, the spike in inflation anticipated by some forecasters[40] following the depreciation of sterling may or may not be manifested in house prices. Given the progressivity of the tax the fiscal drag implied by this would tend to boost revenues relative to forecast, other things being equal. The current forecast implicitly assumes it will not. Similarly, although the precipitous drop in housing market transactions observed during the financial crisis is unlikely given the current level of transactions, any Brexit-related slowdown would be expected to impact on activity in the housing market.

Conclusions

5.29 Scottish Government analysts have increased the sophistication of their residential LBTT forecasts in several ways since the last forecasting round. All the economic determinants are now forecast using simple statistical models which, where necessary, seek to control for the impact of the financial crisis as well as recent episodes of forestalling activity associated with the introduction of LBTT and ADS.

5.30 The SFC considers the Scottish Government's forecasts of residential LBTT revenues to be reasonable.

[40] See, for example, the Bank of England's Inflation Report, November 2016.

5.31 The SFC has undertaken illustrative sensitivity analysis, which is largely consistent with the SG's approach. The comparison highlights two issues which may impact on the forecast. Firstly, to what extent are transactions expected to continue their post-crisis recovery? Secondly, will recent trends in median house prices relative to average house prices be sustained or not? The latter question essentially asks to what extent are the revenues in the £325-£750k segment of the market expected to recover following their below expectation performance in 2015-16 and in the part-year outturn data for 2016-17. The SFC explored the sensitivity of the forecasts to different answers to these questions.[41]

5.32 In addition to the statistical modelling of the economic determinants of residential LBTT the forecasts in Draft-Budget 2017-18 also adjust the distribution of forecast revenues across price bands following the apparent failure of the lognormal distribution to fit, in particular, the upper bands in 2015-16. Analysis of the 2016-17 in-year outturn data suggest that these adjustments appear to continue to be applicable.

5.33 Finally, it should be noted that the general approach followed extrapolates short-term trends in the economic determinants to produce the residential LBTT revenue forecast. To the extent that the residential housing market is subject to shocks which are not implicit in these trends the forecasts will necessarily move off track. The SFC will continue to monitor developments in housing and other markets in an attempt to pick up breaks in these short-term trends as quickly as possible. Moreover, the Commission's experience in scrutinising the residential LBTT forecast and outturns highlights the need to understand how different sectors of the market are performing, and that understanding should be deepened wherever possible.

The Additional Dwelling Supplement

5.34 The Commission's recent report to the Finance Committee on the in-year outturns associated with the ADS captures most of its current thinking on this new tax.[42] The in-year outturns for 2016-17 appear to be running ahead of forecast. However, given that ADS may be reclaimed within 18 months provided the homeowner's original main residence is sold within that period there is uncertainty around the precise level of revenues generated in any tax year until 18 months after the end of that year.

[41] Different answers to these questions will also affect the distribution of tax revenues across price bands on top of any implications for the aggregate tax take.
[42] See, "Additional Dwelling Supplement Preliminary Outturn Report", November 2016.

5.35 Since publishing the preliminary report an additional month's ADS outturn data have been published. This largely confirms the analysis. The most notable development is that the extent to which the ADS liabilities created in the first quarter of the year have been reclaimed has risen from 14.5% to 17.8%, with the rate of repayment for the first month of 2016-17 having risen to 19%. This rate of repayment is used; as well as the rate implied by the intention to reclaim submitted by households for the first half of the year of 34% in computing an updated estimate of the outturn revenues for ADS in 2016-17.

5.36 In order to do so gross revenues are extrapolated from the period beyond the first quarter of the year using the seasonality observed historically in the residential housing market. The first quarter is excluded on the grounds that forestalling effects may make observed outturns unrepresentative of the year as a whole. This is then adjusted for the range of repayment rates discussed above. Finally, the extent to which revenues received in Q1 fall short of what the extrapolated outturns would suggest is deducted as a means of controlling for forestalling effects.

5.37 As a result, the Commission's current estimates of the extrapolated in-year outturns for ADS in 2016-17 are that they lie between £63.5m and £77.9m depending on whether the level of repayments rises to the amount households have indicated they hope to reclaim or whether repayments only rise to the rate observed for the first month of 2016-17. This contrasts with an ADS forecast of £29m-£43m for 2016-17, this forecast was made on the basis of revenues after all eligible transactions have been refunded.[43]

5.38 This apparent short-fall arises due to the underestimation of the size of the tax base to which ADS applies which was highlighted as being highly uncertain at the time of the initial forecast. Table 2 from the preliminary outturn report is updated with this additional data – see Table 25 below.

[43] The headline policy costing at the time of Draft Budget 2016-17 was for revenues of between £17 and £29m. However, this incorporated various forestalling effects and impacts on standard residential LBTT revenues more generally. The forecast of £29m-£43m does not imply any revision to the forecast merely an allocation of the policy costing between impacts on ADS directly, and LBTT indirectly.

Table 25: Additional Dwelling Supplement – Monthly Forecast vs. Outturn with Alternative Repayment Rates

Month	Expected Tax Revenues *(%)*	Mid-Range of Expected Tax Revenues *(£ million)*	Adjusted Net Liabilities *(£ million)*		Difference *(£ million)*	
			(1)	(2)	(1)	(2)
Apr	7.5	2.7	1.7	1.4	-1.0	-1.3
May	8.1	2.9	5.0	4.1	2.1	1.2
Jun	9.3	3.3	6.7	5.5	3.4	2.1
Jul	10.3	3.7	8.0	6.5	4.3	2.8
Aug	9.2	3.3	8.1	6.7	4.8	3.3
Sep	9.6	3.5	7.9	6.5	4.5	3.0
Oct	9.1	3.3	8.7	7.2	5.5	3.9
Nov	8.4	3.0				
Dec	9.8	3.5				
Jan	5.5	2.0				
Feb	6.1	2.2				
Mar	7.2	2.6				
Total	100	36				

Notes to Table:
The estimation of monthly Tax Revenues is based on SFC calculations building on SG estimates of seasonality in house prices and transactions. The adjusted liabilities are calculated from Revenue Scotland data with gross liabilities; two scenarios for the net liabilities are modelled.
(1) deducts 19% from Gross liabilities to capture anticipated repayments.
(2) deducts 34% from gross liabilities to capture anticipated repayments.

Developments in Forecasting Methodology since Draft Budget 2016-17

5.39 The forecast for the revenues from ADS in its year of introduction had to begin by deducing the likely size of the tax base to which the new tax applied. This was a difficult task given the scarcity of data. SG analysts combined data on buy-to-let mortgages, the proportion of houses expected to be mortgage financed, council tax data on second home ownership and historical turnover ratios in the residential housing market to produce an initial estimate. A permanent behavioural response to the new tax was then applied to obtain a "static" estimate of the tax base, which was then further adjusted to capture temporary forestalling effects associated with the announcement and subsequent introduction of the new tax.

5.40 Forecasting revenues for 2017-18 onwards is now much simpler in that the outturn data for 2016-17 are used to calibrate a base which implicitly incorporates these behavioural effects, such that no further adjustment is

required (assuming no change in the tax schedule). This new methodology is explored more easily by highlighting how the forecast has evolved since Draft Budget 2016-17– see Table 26.

Table 26: ADS forecasts between Draft Budgets 2016-17 and 2017-18

(£ million)

	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
Draft Budget 2016-17	36	51	56	62	66	-
Draft Budget 2017-18	-	72	75	78	80	82

5.41 The revision to the forecast between Draft Budget 2016-17 and 2017-18 largely reflects the in-year outturn data which have been used to recalibrate the size of the ADS tax base. Here the SG analysts have taken the transactions recorded as being subject to ADS between July and September 2016. This reflects the fact that data from the first quarter of 2016-17 may not be representative as a result of forestalling effects. They have then deducted the proportion of transactions where the homeowners have indicated an intention to reclaim the ADS paid after selling their previous main residence. This implies that net ADS transactions are expected to be around 16% of standard residential LBTT transactions in Q2 of 2016-17. This ratio is then applied to future projections of residential LBTT transactions to generate the number of properties expected to be subject to ADS. This approach may underestimate the expected proportion of transactions subject to ADS to the extent that homeowners do not fully achieve the rate of repayment of ADS they hope to achieve.

5.42 At the same time the SG forecasters previously assumed that the typical property subject to ADS was 10% cheaper than those involved in other LBTT transactions. While there does not appear to be any difference between the average value properties paying ADS and standard LBTT at the time of the initial transaction, there does appear to be a tendency for higher value properties to successfully reclaim the ADS paid. This will tend to reduce the price of the typical property for which ADS will be paid, but never reclaimed. As a result of this SG analysts retain the assumption that prices of such transactions are 10% lower than for standard LBTT transactions.

5.43 As a result of these changes the base from which ADS revenues are extrapolated has been increased, but since the forecast rate of growth of transactions and prices in the residential LBTT market have fallen relative to Draft Budget 2016-17, the rate of growth in ADS revenues relative to the base is lower.

Box F: Sensitivity Analysis of Repayment Rates

There are two possible ways of reaching a forecast of net ADS revenues. One could adjust average prices to account for the fact higher value properties seem to be more likely to be subject to an ADS repayment and use an anticipated level of net ADS transactions. Alternatively, one could forecast gross revenues using a projection for gross transactions and the same mean price forecast for residential LBTT and then adjust for an expected repayment rate. These two approaches should ultimately be equivalent, but the latter sweeps the difficulty involved in forecasting net transactions and prices into a single adjustment for repayments. Table 27 shows the implications of alternative repayment rates for the forecast tax revenues from ADS.

Table 27: Alternative Repayment Rates and the ADS Revenue Forecast.

(£ million)

	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
DB 2017-18	71[(1)]	72	75	78	80	82
SFC – 19% Repayment	84[(1)]	87	90	93	95	98
SFC - 25% Repayment	78[(1)]	80	83	86	88	91
SFC – 34% Repayment	69[(1)]	71	73	76	78	80

Note to Table:
[(1)] Does not include the forestalling effect included in extrapolated estimates of revenues for 2016-17 discussed above SFC report, "Additional Dwelling Supplement Provisional Outturn Report", November 2016.

Table 27 takes the forecasts for mean prices and the growth in transactions underpinning the residential forecast in Draft Budget 2016-17. A base level of transactions for ADS is constructed by extrapolating the level of observed transactions between July and October 2016 using historical levels of seasonality in transactions in the residential property market. This implies an annual level of gross transactions in 2016-17 of 21,554. These transactions are then assumed to grow over the forecast horizon at the same rate as the SG's forecast for LBTT transactions in Draft Budget 2017-18. Gross tax revenues are then obtained by applying the 3% tax rate to these transactions assuming an average house price in line with the SG's projections. Three alternative repayment rates of 19%, 25% and 34% are then applied to the gross revenues to infer anticipated net ADS revenues across the forecast horizon. The lowest of these rates is the rate of repayment observed for the first month of ADS by October 2016. The highest is the value of ADS liabilities households have indicated they wish to reclaim. While the 25% figure is a hypothetical middle ground.

As can be seen from these alternative scenarios assuming a repayment rate of 34% almost exactly replicates the SG's forecast. The table also highlights that a key factor in determining expected revenues from ADS is whether or not the initial liabilities will ultimately be reclaimed. The SG's current forecasts, conservatively, assume that the full extent of households' intention to reclaim ADS as indicated in the paperwork associated with the initial tax return will be realised. If, for any reason, the households do not reclaim at the rate assumed then the tax revenues could increase quite significantly.

Other Forecast Uncertainties

5.44 While the recalibration of the base from which the ADS revenue forecast extrapolates should improve forecast accuracy, this recalibration relies on the second quarter's outturn data from 2016-17. Forestalling effects in the first quarter mean that data from this quarter are likely to be unreliable as a basis for extrapolation. To the extent that the second quarter's data are not wholly representative of ADS transactions further revisions to the estimated tax base may be expected.

5.45 Like residential LBTT, forecast uncertainties may also result from mis-forecasting of the economic determinants of the forecast, namely the growth in house prices and transactions. However, since this tax is relatively proportional, failure to capture the relative movements in mean and median house prices are likely to be far less critical than in the case of standard LBTT revenues due to the progressive tax schedule associated with the latter tax.

5.46 Finally, the nature of repayments associated with ADS remains an issue which can materially affect tax revenues. As noted above the ultimate rate of repayment for 2016-17 will only be known 18 months after the tax year has ended. Therefore, it remains unclear how this element of the ADS forecast will play out. Moreover, even once the degree of repayments experienced in the first year becomes clear, it may be that households and their legal representatives change their behaviour in future years to avoid paying the initial tax before subsequently reclaiming it.

Conclusions

5.47 The Commission considers the Scottish Government's forecasts of revenues from the ADS to be reasonable.

5.48 The forecasts for revenues from ADS have risen significantly relative to Draft Budget 2016-17. This upward revision is driven by observed outturn data for 2016-17 which suggests that the initial estimate of the tax base was too low. At the same time, the subsequent rate of growth in ADS revenues is less than previously forecast as a result of the fact that the economic determinants for residential LBTT (which also drive the ADS forecasts) are more subdued in Draft Budget 2017-18.

5.49 It is hoped that these revisions will narrow the size of future forecast errors, although there remain several potential sources of forecast uncertainty which the SFC will continue to monitor.

The Non-Residential Model

5.50 The non-residential element of the LBTT forecast uses Office for Budget Responsibility (OBR) forecasts for commercial property prices and transactions for the UK as a whole. A smoothing adjustment is applied to the base of Scottish non-residential LBTT revenues before the OBR's projected growth rates are applied. The smoothing is designed to overcome the fact that a small number of particularly large transactions can have significant effects on tax revenues in Scotland at particular points in time. It ensures the initial base for the extrapolation averages observed tax receipts over the last three years in order that the forecasts shall not be too dependent on the peculiarities of the transactions in any one year.

Forecasting Methodology and Development since Draft Budget 2016-17

5.51 In the report on Draft Budget 2016-17 the Commission made the following recommendations:

"OBR forecasts for non-residential LBTT rely on HMRC estimates of the distribution of transactions across property values in much the same way as the Scottish Government's forecasting of residential LBTT. Given the thinness of the market at the upper end it is difficult for the Scottish Government forecasters to get access to such data at the same level of disaggregation without compromising tax payer confidentiality. Nevertheless, we would recommend that the Scottish Government attempt to enhance the use of micro-data to underpin the forecast as a possible means of both identifying the extent of any fiscal drag and as a first pass at attempting to analyse behavioural responses to variations in tax rates.

Given that indexation to recent outcomes of SDLT is considered necessary to set the initial conditions for this forecasting model, there is a case for using the information contained in the part-year outturn data on non-residential LBTT

revenues to improve the base from which non-residential LBTT revenues are projected forwards, particularly when outturn data for the majority of the year are released before the forecast is made."

5.52 There continues to be a lack of suitable Scotland-specific data, as the Commission assumes responsibility for the production of non-residential LBTT forecasts next year it will work with Revenue Scotland to explore the options available to improve access to Scottish data. There has been no significant change in the forecasting on non-Residential LBTT revenues since the last report. Therefore the major new piece of information relative to the last forecasting round has been a year of outturn data for 2015-16 and some part-year data for 2016-17.

Evolution of Forecast

Table 28: Changes to Non-Residential Property Market Projections between Draft Budgets 2016-17 and 2017-18.

(%)

	2016-17 Budget		2017-18 Budget	
	2016-17	2017-18	2016-17	2017-18
Price Growth	3.1	1.8	-5.1	-3.2
Transactions Growth	3.7	2.4	6.7	1.3

Notes to Table:
The projections in Draft Budget 2016-16 come from the OBR's Economic and Fiscal Outlook (EFO), November 2015, while those for Draft Budget 2017-18 come from the EFO of November 2016.

Outturn Data vs. Forecast 2015-16

5.53 Non-residential LBTT revenues for 2015-16 were forecast to be £146m in Draft Budget 2015-16. Outturn data from Revenue Scotland on an accruals basis recorded revenues of £217m. The SFC's outturn report of September 2016 discussed this discrepancy which arose for three reasons – the base from which the projected revenues were extrapolated was too low, and price and transactions growth were higher than expected. Of these the underestimation of the base was the most material reflecting both higher than expected revenues in 2014-15 and the failure to index past outturns to inflation when constructing the smoothed base.

Outturn Data vs. Forecast 2016-17

5.54 The forecast for 2016-17 in Draft Budget 2016-17 adopted a base which indexed previous outturn figures to inflation. This resulted in a forecast for 2016-17 of £220m.

5.55 The part-year outturn numbers for 2016-17 can be compared to the forecast. As always, the difficulty in undertaking this calculation lies in correctly identifying any likely seasonal pattern in the data. The Commission's previous report used the observed seasonality in UK commercial property transactions which were largely flat throughout the year suggesting a fairly limited degree of seasonality.[44] However, the first full-year outturn data for non-Residential transactions in 2015-16 shows quite marked seasonality in both transactions and prices especially around December and March. As discussed in the Outturn report of September 2016, there were very large non-Residential returns in December of 2015 and March of 2016, possibly connected to firms' financial year ends. This analysis therefore considers three alternative measures of seasonality: (1) Historical seasonality in commercial property transactions, (2) Transactions seasonality in the 2015-16 non-Residential LBTT outturns and (3) Revenue seasonality in 2015-16 non-Residential LBTT outturns.

5.56 Table 29 then allocates the forecast revenues of £220m for 2016-17 across months in line with the three measures of seasonality, before comparing them with outturns for the year to date. With the original measure of seasonality there is a cumulated difference from forecast of £32.8m, which can be extrapolated to an estimated outturn for the year of £163.9m implying an estimated difference from forecast of £56.1m. If instead the pattern of transactions observed in 2015-16 is used then extrapolated outturn revenues are £177.8m and the estimated difference from forecast is £42.1m. Finally, using the observed seasonality in revenues in the 2015-16 outturn then the cumulative difference from forecast falls further to £8.7m, the extrapolated outturn for the year is £201.7m and the estimated annual difference from forecast £18.3m.

5.57 This means the in-year assessment of outturns is highly uncertain – ranging from £164m-£202m, implying an overprediction of revenues of between £18.3m and £56.1m depending on whether or not the large revenues received in December and March of 2015-16 are expected to be repeated in 2016-17.

[44] HMRC, UK Property Transactions Statistics, Released 24th November 2015.

Table 29: Non-Residential LBTT - Monthly Forecast vs. Outturn 2016-17

	Expected Tax Revenues				Difference		
Month	(1)	(2)	(3)	Actual Liabilities	(1)	(2)	(3)
Apr	17.4	11.7	11.2	15.5	1.9	-3.8	-4.3
May	18.9	15.6	13.0	12.9	6.0	2.7	0.1
Jun	18.3	18.2	14.3	16.3	2.0	2.0	-2.0
Jul	18.5	18.6	18.6	11.0	7.5	7.6	7.6
Aug	17.8	17.3	15.9	12.1	5.7	5.2	3.8
Sep	18.5	18.6	16.2	11.0	7.5	7.6	5.2
Oct	19.1	18.3	15.2	16.9	2.2	1.4	-1.7
Nov	19.6	21.1	23.1	-	-	-	-
Dec	18.3	21.7	35.5	-	-	-	-
Jan	15.4	17.5	12.3	-	-	-	-
Feb	16.3	18.6	10.6	-	-	-	-
Mar	21.6	22.7	34.1	-	-	-	-
Total	220	220	220	95.7	32.8	22.7	8.7

Notes to Table: The range of estimates reflects alternative measures of seasonality:
(1) Historical levels of transactions seasonality for the UK
(2) Transactions seasonality in non-residential LBTT outturns in 2015-16
(3) Revenue seasonality in non-residential LBTT outturns in 2015-16.

5.58 The above outturn data are not used in the forecasts generated for Draft Budget 2017-18. Therefore, there is a revised forecast for 2016-17 of £228m, up from £220m in Draft Budget 2016-17. This places the implicit revised forecast above the range of estimates of extrapolated outturns. However, it is important to stress that this is not an official revised forecast for 2016-17, but instead represents the extrapolation of the smoothed tax base using the revised commercial property market projections from the OBR.

5.59 The Commission's report last year argued that there could be a case for using the part-year outturn data to update the smoothed outturn base. This recommendation is complicated by the fact that the observed seasonality in the 2015-16 outturn data was not as expected making it more difficult to accurately extrapolate the within year outturn data to obtain an annualised amount. Nevertheless, the Commission shall continue to monitor whether such data can usefully improve forecast quality. Treating the mid-point of the range of extrapolated outturn data as another observation to add to the smoothed base would reduce the 2017-18 forecast to £212m from the SG's Draft Budget 2017-18 forecast of £224m which is well within the bounds of uncertainty associated with the tax revenues associated with non-residential LBTT.

Conclusions

5.60 The approach to forecasting non-residential LBTT is largely unchanged from the previous Draft Budget. There is some evidence that outturns for 2016-17 are below forecast, although this assessment is complicated by the fact that seasonal factors observed in 2015-16 were not as expected at the time of the last report.

Table 30: Non-Residential LBTT – Scottish Government Forecasts

(£ million)

	2017-18	2018-19	2019-20	2020-21	2021-22
Revenue	224	233	242	252	262

5.61 The current forecast does not directly account for the part-year outturn data, although it implicitly captures in-year data to the extent that the OBR's forecasts of the UK commercial property market contain such data. SFC calculations suggest that incorporating in-year outturn data in the smoothed base would slightly depress the non-residential LBTT forecast by £12m in 2017-18 rising to £14m by 2021-22, which is not a statistically significant amount in the context of a tax base which is inherently volatile.

5.62 The SFC considers the forecasts for non-residential LBTT revenues to be reasonable.

5.63 Looking ahead to its new remit, the SFC shall explore the possibility of utilising more Scotland-specific microeconomic data in forecasting non-Residential LBTT. However, such a task may be complicated by taxpayer confidentiality issues and the relatively small number of transactions in the commercial property market in Scotland.

6. Scottish Landfill Tax (SLfT)

6.1 The Scottish Landfill Tax forecasts described in previous reports were driven by a trajectory that assumed that the Scottish Government would achieve its targets for a reduction in landfill waste by 2025. That reduction followed a linear extrapolation from the level of waste sent to landfill at the start of the forecast period, to the target value of 5% of total waste ending up in landfill.[45]

6.2 In Draft Budget 2016-17 report, the SFC noted:

"An obvious concern with a forecast implicitly driven by a long-term target is that if there was ever any slippage in achieving the target such that landfill waste was higher than projected, then the forecasting methodology would imply a more aggressive reduction in landfill waste in the future. It is therefore imperative that the forecast remains on track, and any substantial upward drift in landfill waste volumes may trigger a need to re-evaluate the appropriateness of the forecast method."

Forecasting Methodology and Developments since Draft Budget 2016-17

6.3 Discussions with Scottish Government analysts in this year's challenge meetings have sought to clarify the current and prospective mechanisms through which quantifiable reductions in landfill waste will be effected. One avenue pursued has been to begin to explore potential linkages between types of waste arising and indicators of wider economic activity. That work is still in its early stages.

6.4 Whilst Standard Rate waste levels have not decreased as anticipated in previous forecasts, Scottish Government analysts point to a number of key developments over the forecast period which will, they argue, deliver substantial, measurable reductions in landfill waste. These developments, described and evaluated in the next few paragraphs, now underpin the forecast of SLfT liabilities, replacing the previous assumed linear, decreasing trajectory for landfill waste.

6.5 The 2017-18 forecast of SLfT is driven by two key assumptions. First, and in contrast to the previous modelling approach, there is no assumed trend reduction in Standard Rate waste. Instead, the forecast assumes a constant level of residual waste arisings which would be Standard Rate waste if

[45] More specifically, previous forecasts assumed that two policy targets would be met: First, that total waste arising by 2025 would be 85% of the 2011 level; and second, that total disposal to landfill in 2025 would fall to 5% of total waste.

landfilled. The amount of Standard Rate waste is the most important determinant of total SLfT liabilities accounting for almost all of the revenue. That assumption is also applied to Lower Rate waste and, where relevant, in the sensitivity analysis, to the underlying volume of biodegradable municipal waste (BMW).

6.6 Second, there is a marked increase over the forecast horizon in incinerator capacity. That growth in capacity means that an increasing amount of waste over the forecast horizon is assumed not to go to landfill but is instead incinerated (although some waste is produced and landfilled as a by-product of the incineration process itself).

6.7 SG analysts have also noted a potential third key development. That is a ban on BMW going to landfill which takes effect from January 2021. However, at this stage the effects that ban has on the path of landfill volumes are not easy to estimate and so the effect of the ban is included not in the central forecast but as a downside risk. Aspects of the ban are discussed below. The table below summarises the SG's assessment of the impact of these policies to show how the central forecast is derived. It also breaks down Standard Rate waste into municipal and other waste.

6.8 The first forecast assumption is that there is a constant underlying level for residual waste arising which would be Standard Rate waste if landfilled, throughout the whole forecast period. On the one hand, that may appear to be a conservative assumption compared with the previous forecast methodology and compared to longer-run trends in Standard Rate waste, especially in the UK. On the other hand, there is some more recent tentative evidence that trends in Standard Rate waste to landfill in the UK and Scotland have diverged, with the UK Standard Rate waste continuing to decrease while it appears to have stalled in Scotland. Similarly, there are a number of Scottish Government policy initiatives related to waste reduction and recycling whose impact on landfill waste has been difficult to quantify but which could in theory be successfully countering an underlying rising trend. In any event, recent data from Revenue Scotland do not indicate a strong presumption for a falling or rising trend.

Table 31: SG forecasts of landfill volumes and tax liability

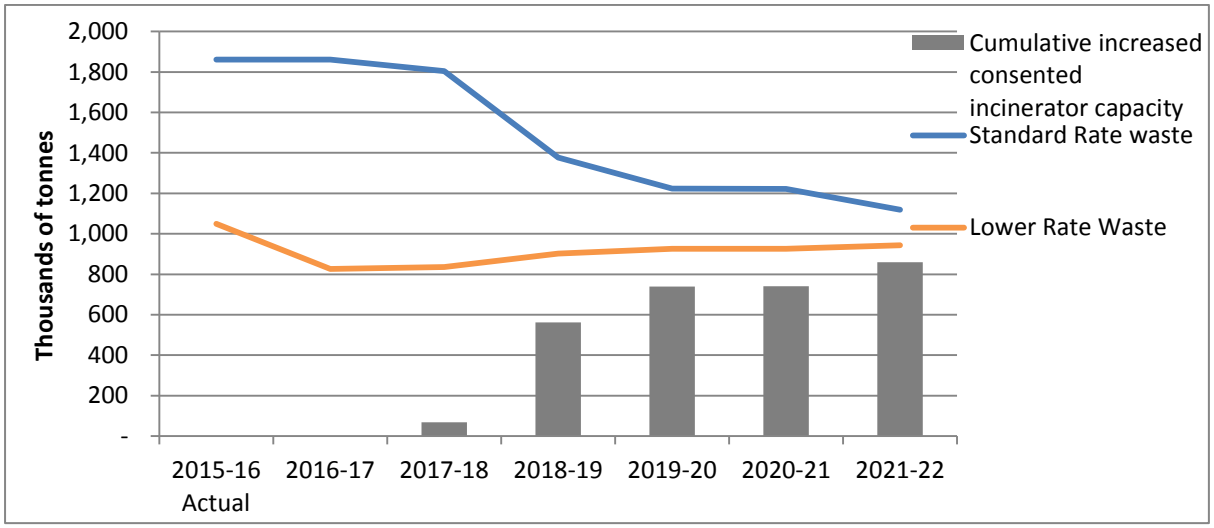
	2016-17 Estimates	2017-18	2018-19	2019-20	2020-21	2021-22
Baseline for Standard Rate waste *(tonnes)*	1,861,736	1,861,736	1,861,736	1,861,736	1,861,736	1,861,736
Biodegradable municipal waste (BMW) *(tonnes)* (1)	1,301,839	1,301,839	1,301,839	1,301,839	1,301,839	1,301,839
Incinerator capacity (IC) *(tonnes)* (2)		60,750	505,913	665,438	666,900	773,775
BMW – IC (3)		1,241,089	795,908	636,401	634,939	528,064
Effect of ban on BMW *(tonnes)* (4)		N/A	N/A	N/A	158,735	528,064
Forecast Standard Rate waste *(tonnes)* (5)		1,803,416	1,376,060	1,222,916	1,221,512	1,118,912
SLfT Liabilities *(£ million)* (6)	150	149	118	109	112	106

Notes to table:
(1) Estimate based on SG calculations for 2015.
(2) Assumes incinerators operate at 90% of consented capacity.
(3) BMW minus Incinerator Capacity.
(4) Assumes that the ban operates for the final quarter only of 2020-21. The effect of the ban is not included in the central forecast.
(5) Assumes incineration results in 4% of hazardous waste landfilled at Standard Rate.
(6) Net revenue after subtracting Scottish landfill communities fund contributions.

6.9 The second key assumption underlying the forecast relates to the profile of increasing incinerator capacity. That capacity is forecast to rise sharply in 2018-19, resulting in a sharp net fall in Standard Rate waste and hence in SLfT liabilities, and a small increase in Lower Rate tonnage as some of the residue from incineration is taken to landfill and charged at the Lower rate.[46] Thereafter, incinerator capacity is forecast to rise steadily, though less dramatically than at first. Figure 7 shows the impact on waste levels.

[46] There is also hazardous waste residue as a result of incineration and this is assumed landfilled at the Standard Rate.

Figure 7: Actual and forecast Standard and Lower Rate waste tonnages



Source: Scottish Government analysis

6.10 The incinerator capacity included in the forecasts relates to five plants in varying stages of construction. The Scottish Government has investigated the risks around these facilities. All of the facilities are still in construction and one was granted planning permission in October of this year and will not start commissioning until after the ban on biodegradable waste comes into force in 2021. The first major site due to come on-line (January 2018) is currently almost complete although the gasification subcontractor is in administration. Typically, these facilities have entered into long term contracts with local authorities prior to construction although that is not yet the case for one facility expected to be fully commissioned by Q2 2018-19. In any event, the implementation of the ban on BMW discussed below is partially reliant on this substantial increase in incinerator capacity.

6.11 The Scottish Government has investigated the likelihood and possible magnitude of delays in the incinerator capacity becoming operational. In addition to its own research, it has consulted with SEPA and commissioned research from a specialist waste consultant. A number of possible reasons for delays were highlighted by the consultant, including those related to general construction and planning issues and delays related to regulatory preparedness (such as obtaining requisite certificates to begin incineration). These delays, it was reported, can be quite substantial although no systematic evidence appears available reliably to guide the forecast. For example, it appears difficult to assess actual delays experienced elsewhere in the UK where incinerator capacity is somewhat more common than in Scotland. The commissioned external research also suggested that plants ought to be modelled as operating at 90% of their licensed capacity and that has been factored into the forecast.

6.12 An additional uncertainty surrounds the costs of incineration as opposed to landfill. The Scottish Government analysts have suggested that the requirement to pre-sort waste for incineration could cost up to £25 per tonne. Given existing estimates of gate fees, that could imply that at some sites incineration is more expensive than landfill disposal. However, where that waste has been sorted in advance, pre-sorting is not required. Unfortunately, detailed information on the extent to which local authorities will avoid such pre-sorting costs is not currently available. The hope is that such costs will encourage recycling earlier in the waste disposal process ahead of the pre-sorting that is necessary prior to incineration.

6.13 As noted above, a ban on biodegradable municipal waste (BMW) going to landfill is due to take effect fromJanuary 2021. The precise amount of biodegradable municipal waste that will be affected is not known with certainty but is currently estimated at about 1.3 million tonnes. That number is calculated as the average (in 2015) of the Scottish Government's estimate of municipal waste currently landfilled and containing any biodegradable waste (1.6 million tonnes) and SEPA's provisional estimate of waste which is biodegradable (1.0 million tonnes). Biodegradable municipal waste thus comprises over 70% of Standard Rate waste. That means that by the time the ban comes into force in 2020-21 local authorities and waste management companies will need to divert additional biodegradable municipal waste from landfill to recycling and other residual waste processing. This amounts to just under 160,000 tonnes in the final quarter of 2020-21, rising to just under 530,000 tonnes in 2021-22 although the SG anticipate much of this diversion may be phased in sooner.

6.14 The central forecast for SLfT liabilities below is compared with two alternative scenarios. Scenario 1 is where incinerator capacity comes on stream fully, but with a twelve month delay. Scenario 2 adds in the Scottish Government's best estimate of the ban on biodegradable municipal waste in the final two years of the forecast (and it assumes that incinerator capacity has come on stream as per the central forecast).

Table 32: Central SLfT forecast, with two additional scenarios

(£ million)

	2017-18	2018-19	2019-20	2020-21	2021-22
Central forecast for SLfT liabilities	149	118	109	112	106
Scenario 1: Forecast for SLfT liabilities	153	154	122	112	116
Scenario 2: Forecast for SLfT liabilities	149	118	109	98	57

Note to table: Source: SG calculations

6.15 The delay in incinerator capacity coming on-stream has its principal effects in 2018-19 and 2019-20, when much of the capacity is otherwise due. That apart, the effect of the delay appears rather limited.

6.16 Adding in the effects of the ban, as in Scenario 2, highlights that local authorities and waste management companies will need to divert an estimated additional 530,000tonnes of biodegradable municipal waste from landfill in other ways than incineration in Scotland by the time the landfill ban takes effect in January 2021. To indicate the potential scale of the challenge, note that this diversion of waste, in terms of additional increased incinerator capacity, is equivalent to around 177,000 tonnes in 2020-21 and almost 590,000 tonnes in the final year of the forecast. These numbers represent the additional consented incinerator capacity that would be required if that waste were to be incinerated and are equivalent to an almost 70% increase over the forecast cumulative incinerator capacity of 860,000 tonnes in 2021-22.

6.17 Rather than being incinerated, however, SG analysts expect that this will be achieved through a combination of waste prevention, recycling and other residual waste processing. For example, SG analysts have tentatively indicated that there may be considerable scope for improvements in local authority recycling rates and have identified additional residual waste pre-processing capacity at existing and new incinerator sites. It has been suggested these two factors could jointly divert several hundred thousand tonnes of Standard Rate waste from landfill. However, beyond these broad indications of potential waste management capabilities, it has been difficult precisely to quantify how local authorities and waste management companies will meet their responsibilities under the ban and the timescales for when such activity will take effect. The central forecast excludes the effect of the ban due to limitations in the available evidence to underpin estimates of its effects on Landfill Tax revenues.

Scottish Government Response to SFC Recommendations

6.18 As discussed in the previous sub-section, the forecast methodology has changed for this forecast round, and is no longer based solely on targets, something that the Commission last year raised as a concern.

6.19 The Draft Budget 2016-17 report also noted that:

"Overall, given the current data availability, this approach to forecasting revenues from the SLfT is not unreasonable, although the Commission would hope to continue monitoring closely the validity of the assumptions underpinning the

forecast as further Scotland-specific data on landfill waste and tax receipts become available."

6.20 The next sub-section of this analysis gives an example of where additional analysis and monitoring has taken place as Scotland-specific data have become available. The Commission will continue to monitor the forecast methodology as more data become available.

Outturns vs. Forecast for 2016-17

6.21 Before turning to the outturn data, the revised forecast methodology is briefly compared with the previous forecast approach. The following table sets out the 2016-17 and 2017-18 revenue profile for SLfT. It is apparent that the revised methodology results in a profile for forecast revenues that tracks closely in years 2018-19 and 2019-20. However after that, the assumption of no trend in Standard Rate waste underpins SLfT liabilities, unlike under the previous methodology. Although not set out here, if the Scottish Government's best estimate of the effect of the ban in BMW to landfill were to be included, the two forecast approaches would align closely in 2020-21 also. A major advantage of the revised approach is that it is based on specific factors which can be monitored whereas the previous approach assumed an exogenous trend rate of decrease. However, the revised methodology is not without challenges as discussed further below.

Table 33: SLfT forecast in Draft Budget 2016-17 and Draft Budget 2017-18

(£ million)

Year	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
2016-17 Forecast	133	123	114	104	94	
2016-17 Estimated outturn	150 (1)					
2017-18 Forecast		149	118	109	112	106

Note to table:
(1) Using 2016 Q1 data, the estimated revenues are just over £150 million. See text for details.

6.22 The first quarter's provisional outturn data from Revenue Scotland show a SLfT liability of £39.2m, up from £37.7m in Q1 2015-16.[47] That rise in tax revenue reflects a rise in Standard Rate waste, up on the same quarter last year, and is despite a fall of over 20% in Lower Rate waste.

6.23 In 2016-17 around 26% of the full year's Standard Rate waste was reported in Q1, and 24% of Lower Rate waste was reported (see Table 34). This can be

[47] Revenue Scotland (2016) "SLfT Statistics – April to June 2016". (link)

used to generate an indicative "in year forecast": Assuming that the same proportion of total waste is reported in Q1 of this year, then total tonnage can be estimated for the year. The outturn SLfT revenue for 2016-17 can therefore be estimated at £159.3 million, or £150.4 million net of the assumed maximal (5.6%) contribution to the Scottish Landfill Community Fund (SLCF).

Table 34: Scottish Landfill Tax: Estimated 2016-17 Outturn

	Seasonality tonnages, based on 2015-16 outturn *(%)*[1]		Actual and Estimated Waste, 2016-17 *(tonnage)*	
	Standard Rate	Lower Rate	Standard Rate	Lower Rate
Q1	26	24	476,016 [2]	198,443 [2]
Q2	25	27		
Q3	24	25		
Q4	25	25		
Implied Full Year Outturn (2016-17)			1,861,736	826,386
Implied Full Year SLfT liabilities (2016-17) *(£ million)* [3]			157	2.2

Notes to table:
[1] Shares may not sum to 100 due to rounding. Shares based on 2015-16 outturn data.
[2] Q1 data is outturn, from Revenue Scotland, SLfT Statistics. (link).
[3] Note: these implied liabilities do not include any contributions to the SLFCF. Including these would reduce the total revenue from Standard and Lower Rates waste combined to £150 million.

6.24 Table 35 compares this "in year forecast" to the forecast for 2016-17 published in last year's budget, of £133 million. The difference from forecast (around £17.4 million), then, is largely the result of higher than anticipated Standard Rate waste. This type of "in year" forecasting is helpful in identifying how well the forecast is performing. Although it is based on one quarter of data, there does not appear to be strong seasonal variation in Standard or Lower Rate waste.

Table 35: SLfT "in year" forecast for 2016-17, and difference from previous forecast

(£ million)

Total Implied SLfT liabilities	Implied SLCF contribution [1]	2016-17 Forecast	Difference [2]
159	8.9	133	17.4

Note to table:
[1] SCLF contributions are 5.6% of total implied liabilities.

[2] The difference is equal to total implied liabilities net of the implied SCLF contribution, less the 2016-17 forecast.

Conclusions

6.25 The incorporation into the model of a more detailed evidence base for forecasting landfill is welcome. Nevertheless, substantial uncertainties surround the key assumptions underpinning the forecast, particularly towards the end of the forecast horizon.

6.26 The first uncertainty surrounds the assumption that residual waste arisings which, if landfilled, would be Standard Rate waste is constant. The SFC has encouraged work that sought to relate landfill waste trends to economic determinants. It was hoped that such work might have helped identify the fundamental drivers of landfill waste, particularly Standard Rate waste. So far, that work has not delivered usable insights. Further research along this dimension is needed. In the absence of further evidence the assumption of a constant level of Standard Rate waste appears reasonable.

6.27 Second, large increases in incinerator capacity are imminent over the next few years. That incinerator capacity growth is central through most of the forecast horizon in delivering large falls in Standard Rated waste to landfill and hence in determining the revenues from SLfT. That growth in capacity may be subject to delays due to several factors highlighted by research commissioned by the Scottish Government. Experience seems to indicate that these delays, if they occur, can be substantial. The risks surrounding incinerator capacity are therefore skewed to the downside. It is important to monitor closely the increase in incinerator capacity and any delays in sites becoming operational. Such close monitoring may also help to identify downside risk to the forecast in the form of identifiable and quantifiable increased pre-processing capacity. Overall, the central assumptions on incinerator capacity appear reasonable.

6.28 Finally, the ban on landfilling biodegradable municipal waste is a downside risk to the forecast. However, the ban requires, in the final two years of the forecast period, a substantial diversion of waste from landfill by local authorities and waste management companies; indeed by 2021-22 over 500,000 tonnes of such waste would be diverted from landfill in other ways than incineration in Scotland. Whist the ban does not come into force until January 2021, any substantive delay in incinerator capacity coming on stream in the meantime will consequently require additional diversion to recycling or other residual waste treatment. It is important to continue to build a detailed evidence base for the forecast: quantifying the existence and operational effectiveness of pre-processing capacity; documenting and quantifying the effectiveness of local authority recycling policies; and assessing quantitatively

other policies that will support the ban on landfilling biodegradable municipal waste. However, given the current level of knowledge around the scale of its impact it is prudent to view the ban as a downside risk rather than an assumption driving the central forecast.

7. Non-Domestic Rate Income

7.1 The Commission's current remit in respect of Non-Domestic Rates is to assess the reasonableness of the "economic determinants underpinning Scottish Government forecasts of Non-Domestic Rate Income". Specifically, this covers:

(a) the change predicted to the rateable value of the lands and heritages on the valuation rolls, and

(b) the rate of inflation used for the purposes of the forecast of the non-domestic rate to be prescribed.

7.2 From April 2017 the Scottish Fiscal Commission will become responsible for the production of forecasts of receipts from Non-Domestic Rates, at this point the Commission will consider all aspects of the data, methodology and assumptions underpinning forecasts of Non-Domestic Rates Income.

Economic Determinants and Developments since Draft Budget 2016-17

7.3 The Scottish Government's forecasting methodology for estimating income from Non-Domestic rates depends upon a number of factors:

- the size of the tax base (the total amount of rateable value (RV) contained on the Valuation Roll)
- the poundage and large business supplement rate– these tax rates are applied to the rateable value in order to estimate gross bills. Poundage is typically adjusted in line with inflation to maintain the revenue's real value;
- the value of any reliefs granted, and;
- other factors relating to events in prior years or to policies that interact with the NDR system such as the backdating of appeals.

7.4 These four components are forecasted separately and the Commission scrutinises the methodology for forecasting buoyancy and inflation underpinning the forecasts.

7.5 Buoyancy is the increase in the tax base (from, e.g. new builds, extensions and demolitions) accounting for the effect of revaluation appeals. It does not include any annual changes in the value per square foot of floor space.

7.6 The Scottish Government's forecast methodology for Draft Budget 2017-18 is consistent with their methodology for 2016-17. Essentially, this involves taking historical average buoyancy and applying a cyclical adjustment, to take account of the nature of buoyancy over the revaluation cycle. The Commission considers this approach to be reasonable.

7.7 Once set at the start of a revaluation cycle, the applicable poundage rate is typically uprated in line with inflation. The Scottish Government's inflation forecast adopts inflation forecasts from the OBR, which the Commission confirms is reasonable.

Scottish Government Response to SFC Recommendations

7.8 The Commission's report last year made a number of recommendations relating to the approach taken to forecasting buoyancy.

Recommendation (a) regarding the impact of large scale projects on buoyancy

7.9 The Commission raised concerns during the last forecasting cycle around the impact of large scale projects to buoyancy outturns, given that a large proportion of total buoyancy can be accounted for by a small number of large projects. The Scottish Government began monitoring such projects with the Scottish Assessors Association (SAA) last year. The Commission's previous report recommended that the Scottish Government investigate forward-looking predictors of buoyancy, such as planning applications. The Scottish Government has subsequently begun consulting with a range of experts, which the Commission notes as reassuring.

7.10 In particular, the forecasters have engaged with external experts and relevant officials in the Scottish Government, to better understand how it could be possible to accurately forecast the completion dates and subsequent RV of large projects. These discussions have focussed on planning data and other measures of project progress, including building standards and discussions with property experts.

7.11 Scottish Government forecasters instructed the SAA to survey its members to understand if any very large (in excess of £10 million) projects were due to be added to the valuation roll in the short term. Currently no such projects have been identified with any certainty around timing in the forecast horizon, but the Commission will continue to monitor this in future.

7.12 Going forward, the SAA have offered to assist the Commission by ensuring access to this information – combining their knowledge of the planning applications, local development conditions and property valuations. This information will be incorporated into the wider NDR income forecasts as the Commission assumes responsibility for their production.

Recommendations (b) and (c) regarding cyclicality

7.13 Of particular interest and discussion during the scrutiny process last year was the cyclical adjustment made to account for cyclical patterns over the revaluation cycle. The Scottish Government forecasters addressed some of the Commission's concerns and a cyclical adjustment was made at Draft Budget 2016-17 to account for the cyclicality in buoyancy caused by the delay to any running roll appeals made on a property where a revaluation appeal has also been made. However, the Commission recommended that further work should be undertaken to explore buoyancy data to identify the expected magnitude and pattern of cyclicality. The Commission also requested that once this was complete, forecasters returned to previous work to relate the buoyancy data to wider economic conditions.

7.14 The Scottish Government forecasters undertook extensive analysis of cyclicality by analysing the "Effective Date" allocated to all properties on the Valuation Roll based on the date changes to a property's value actually occurred. This allowed the forecasters to produce an alternative buoyancy series for the current revaluation cycle that more closely mirrored the date when physical changes were made to properties.

Table 36: Comparison of cyclical adjustment approaches

(%)

Year	Budget 2016-17 forecast methodology	Forecast using alternative series	Outturn
2010-11	1.7	1.6	1.7
2011-12	1.8	1.5	1.3
2012-13	1.1	1.2	0.9
2013-14	0.9	0.8	0.6
2014-15	0.9	0.9	0.8

Note on table:
Source: Scottish Government analysis

7.15 Analysis of this alternative series showed evidence of a cyclical pattern, and that it acted in a similar direction and magnitude to that identified in the forecast for Draft Budget last year, as shown in table 36. This is additional evidence to support the hypothesis that the observed cyclicality is due to the timing of running roll appeals, and when they are heard. However, despite considerable additional work by the forecasters, this analysis is still limited and so it is not possible to conclusively attribute the observed cyclicality to the impact of running roll appeals. The Commission will continue to monitor the impact of the timing of appeals on the cyclical adjustment as it takes on its forecasting role.

7.16 Scottish Government analysts then undertook preliminary econometric analysis to attempt to identify key determinants of buoyancy. This analysis

was unable to reliably identify economic determinants for buoyancy. Therefore, the approach taken is to use historical average buoyancy, and apply a cyclical adjustment to generate the non-domestic rates buoyancy forecasts.

Future Work Plan

7.17 From April next year the Commission will assume responsibility for the production of forecasts of revenues from Non-Domestic Rate income. At that point the Commission will consider all aspects of the data, methodology and assumptions underpinning forecasts of Non-Domestic Rates Income. The Commission will then produce its first independent forecasts of revenues from Non-Domestic Rate income for Draft Budget 2018-19.

8. Comparison of Forecasts

8.1 We conclude by summarising the various forecasts of the devolved taxes that were made for the 2016-17 and 2017-18 fiscal years by both the Scottish Government and the OBR. These are presented in the following tables in the chronological order in which they were made. The final row gives an extrapolation of outturn data for each tax. It should be stressed that the Scottish Government forecasts of December 2016 for the 2016-17 fiscal year are not official Scottish Government forecasts but were generated as a by-product of forecasting revenues for the 2017-18 Draft Budget.

8.2 The estimates for Scottish Landfill Tax revenues in 2016-17 show a convergence in OBR and SG forecasts which reflects the weight given to the recent outturn data in both cases. The forecasts of other taxes remain further apart but not significantly so given the alternative methods employed to generate the respective forecasts.

Table 37: Summary - OBR vs. SG Forecasts for 2016-17

(£ million)

	Residential LBTT (excluding ADS).	ADS	Non-residential LBTT	SLfT
OBR-JUL-2015	324	-	291	88
OBR-NOV-2015	253	-	243	131
SG- Dec-2015	282[(1)]	36	220	133
OBR – Mar-2016	256[(1)]	36	217	134
OBR – NOV-2016	206[(1)]	87	190	154
SG – Dec-2016[(4)]	181	71	228	150
Extrapolated Outturn	208	64-78[(3)]	164-202[(2)]	150

Notes to Table:
[(1)] Adjusted for impact of introduction of ADS on general LBTT revenues.
[(2)] The range of extrapolated outturns for non-residential LBTT reflects the range of possible patterns of seasonality discussed in the non-residential section of the report above.
[(3)] The range reflects alternative rates of repayment.
[(4)] These forecasts are based on SFC calculations and do not constitute revised official forecasts of the Scottish Government.

8.3 The evolution of the LBTT forecasts tends to reflect the gradual convergence of forecast to extrapolated outturn as more data become available. Therefore, across both the SG and OBR forecasts there is a gradual downgrading of both

the residential and non-residential forecasts for 2016-17, although with an upward revision in the profile of ADS revenues to reflect the higher than expected revenues in the first year of the new tax. At the same time the forecasts of revenues from SLfT have been upgraded to reflect the higher than expected volumes of Standard Rate waste going to landfill in the Revenue Scotland outturn data.

8.4 Turning to the forecast for 2017-18, this follows a similar pattern – a gradual reduction in the forecast for residential and non-residential LBTT across forecast rounds, but an increase in the forecasts for SLfT.

Table 38: Summary - OBR vs. SG Forecasts for 2017-18

(£ million)

	Residential LBTT (exc. ADS)	Additional Dwelling Supplement	Non-residential LBTT	SLfT
OBR-July-2015	385	-	304	87
OBR-NOV-2015	302	-	255	120
SG- Dec-2015	347(1)	51	230	123
OBR – Mar-2016	301	51	229	121
OBR – Nov-2016	235	105	199	134
SG – Dec-2016	211	72	224	149

Notes to Table:
(1) Adjusted for impact of introduction of ADS on general LBTT revenues.

8.5 The greatest difference in forecasts lies in residential LBTT. The SG's new methodological approach of modelling mean and median house prices, as well as the turnover ratio after controlling for apparent breaks in the behaviour of the housing market pre and post-financial crisis, has tended to result in a far more subdued outlook for the Scottish Housing market. Essentially, the SG's approach extrapolates the relatively subdued performance of the Scottish housing market following the financial crisis. The OBR's approach uses the full sample of SDLT transactions from 2013-14 and projects these forward based on forecasts of UK transactions and price growth before applying the LBTT rates and thresholds to calculate tax revenues.[48] Given the progressive nature of the residential LBTT tax schedule differences in house price growth have significant revenue implications.

[48] The OBR also undertakes various adjustments to reflect the change in tax regime.

8.6 The OBR's approach to forecasting non-residential LBTT revenues follows a similar approach to its residential LBTT forecast. The Scottish Government's approach constructs a smoothed indexed base of historical receipts before projecting these forward using the OBR's forecasts of UK commercial property prices and transactions.

8.7 This is the first occasion on which both the Scottish Government and the OBR are forecasting the revenues from NSND income tax. The table below reports their respective forecasts. The differences are due to two factors. First, the underlying assumptions on policy parameters differ. And second, there are methodological differences in the modelling of NSND tax liabilities. Nevertheless, it is notable that the two are quite closely aligned throughout the forecast horizon. Given the inherent uncertainties in forecasting, these differences seem unlikely to be statistically significant.

Table 39: NSND Income Tax Forecasts for Scotland

(£ million)

	2017-18	2018-19	2019-20	2020-21	2021-22
Scottish Government	11,829	12,290	12,912	13,647	14,559
OBR	11,768	12,220	12,770	13,432	14,181

8.8 The table below reproduces the policy parameters underlying the OBR forecast and can be compared with Table 5 in the section above covering the Scottish Government NSND income tax forecast.

Table 40: Tax Parameters used in OBR Income Tax Forecasts

	2017-18	2018-19	2019-20	2020-21	2021-22
Personal Allowance	11,500	11,790	12,090	12,340	12,590
Basic rate	20%	20%	20%	20%	20%
Basic rate limit	33,500	34,400	35,300	36,100	36,900
Higher rate threshold	45,000	46,190	47,390	48,440	49,490
Higher rate	40%	40%	40%	40%	40%
Personal allowance limit	100,000	100,000	100,000	100,000	100,000
Additional Rate threshold	150,000	150,000	150,000	150,000	150,000
Additional rate	45%	45%	45%	45%	45%

Notes to Table:
These parameters are based on SFC calculations and the OBR's stated policy in the Economic and Fiscal Outlook (November 2016) (link)

Annex A: Commissioners Biographies

Lady Susan Rice, Chair

Susan Rice CBE, a Chartered Banker, is inter alia Chairman of Scottish Water, non-executive director of J Sainsbury, the Banking Standards Board, and a lay member of Court of Edinburgh University. Previously, she was Chairman and Chief Executive of Lloyds TSB Scotland plc, the first woman to head a UK clearing bank, and Managing Director of Lloyds Banking Group. Before that, she was senior Vice President at NatWest Bancorp in New York and, earlier, a dean at Yale and Colgate Universities in America and a published medical researcher. She has been senior independent director and chaired the Remuneration Committee of FTSE 30 Scottish and Southern Energy, and a member of Court and chair of the Audit and Risk Committee of the Bank of England. She is also a founding director of Big Society Capital and chairs the Chartered Banker Professional Standards Board. Susan Rice has degrees from Wellesley and Aberdeen University. She is a Regent of the Royal College of Surgeons Edinburgh and a Fellow of the RSA, the Chartered Banker Institute and of the Royal Society of Edinburgh.

Professor Campbell Leith

Professor Campbell Leith has been Professor of Macroeconomics at the University of Glasgow since 2005. He previously held positions at the Universities of Strathclyde and Exeter. He specialises in the theoretical and empirical analyses of monetary and fiscal policy and their interactions. His proposal for the creation of a Fiscal Council was cited as providing the rationale for the establishment of the Office for Budget Responsibility. He has presented his work at several central banks including the Bank of England and the European Central Bank, and between 2004 and 2008 was commissioned by HM Treasury to undertake research on fiscal stabilisation in the EMU.

Professor Charles Nolan

Professor Charles Nolan has been appointed to join the Scottish Fiscal Commission from 1 July 2016 to 30 March 2017. Professor Nolan was educated at the University of Strathclyde and Birkbeck College, University of London. He worked for eight years as an economist at the Bank of England, has taught at the University of Reading and was a Reader in Economics at the University of Durham. Prior to joining the University of Glasgow in 2010, he was a Professor of Economics at the University of St Andrews. His areas of expertise are Monetary policy, Macroeconomics, Banking and Macro, Fiscal Policy and Macro prudential issues. His research interests are quantitative general equilibrium macroeconomics and monetary theory, international finance and business cycle analysis. He has published in Econometrica, Journal of Monetary Economics, Journal of Money, Credit, and Banking and Economic Journal and is a member of the European Monetary Forum. He is a Fellow of The Royal Society of Edinburgh.

Annex B: Minutes from the Scrutiny and Challenge Meetings

Minutes from Scrutiny and Challenge meeting 12 May 2016

Present
Lady Susan Rice, Chair, Scottish Fiscal Commission (Chair)
Professor Campbell Leith, Commissioner, Scottish Fiscal Commission
Professor Andrew Hughes Hallett, Commissioner, Scottish Fiscal Commission
Mattia Ricci, Research Assistant, Scottish Fiscal Commission
Petros Varthalitis, Research Assistant, Scottish Fiscal Commission
Laura Zeballos, Interim Secretariat, Scottish Fiscal Commission
Communities Analytical Division, Scottish Government
Fiscal Responsibility Division, Scottish Government
Office of the Chief Economic Adviser, Scottish Government

1. **Budget 2016-17 wash up/ action plan**

The Scottish Government discussed their Action Plan setting out progress against actions for forecasters outlined by the Commission in their Report on Draft Budget 2016-17.

The Commission were content that all actions from their Report were addressed. It was agreed that the Scottish Government should now focus on integrating progress against the Action Plan into mainstream activity for Draft Budget 2017-18. Scottish Government will therefore update on progress against the Action Plan as part of broader papers and discussion on devolved tax forecasting rather than as a standalone item.

Action:

- Scottish Government to confirm whether there are published outturn figures for Non-Domestic Rate buoyancy

2. **Protocol for the Commission's scrutiny of Draft Budget 2017-18**

The Commission led a discussion about the way they intend to scrutinise Draft Budget 2017-18. The discussion covered a range of points, including that:

- The Commission would set a schedule of scrutiny meetings to cover Draft Budget 2017-18, and for each would set the agenda;
- The Scottish Government will provide papers for those scrutiny meetings, where required, no later than 5 working days prior to meetings;
- The sponsor team will continue to act as the designated point of contact within the Scottish Government for the Commission.

In addition, it was agreed that the Scottish Government should review the Framework Agreement with the Fiscal Commission and propose updates if required.

Action:

- Fiscal Commission Secretariat and Scottish Government sponsor team to discuss and propose text for a draft protocol, for review by Commissioners.
- Scottish Government to review Framework Agreement.

3. Income Tax Forecasting

The Scottish Government presented an overview of the Income Tax and the SGGEM models; the latter has been developed with NIESR.

It was noted in discussion that the SGGEM model uses a broad mix of exogenous and endogenous data. In response to a query from the Commission, the Scottish Government clarified that in feeding in exogenous data they focus on Scottish specific data and on the broader world economy; and tend to add exogenous data emanating from highly sophisticated external models and expert sources such as the Office for National Statistics data on population growth.

The Commission sought and received confirmation that non-savings non-dividend income was separately identifiable from total income within the Survey of Personal Incomes (SPI) data set, to allow them to fulfil their remit of forecasting revenue based on non-savings non-dividend income only.

The Commission noted the rich input that external experts could bring to inform forecasts of economic determinants, through sharing their own judgements and knowledge about economic performance, and asked how the Scottish Government planned to harness the breadth of knowledge available to them. The Scottish Government confirmed their intention to draw on a wide range of external sources, in much the same way as the OBR does.

In addition, there was a wide ranging discussion about the assumptions that underpin the model including the length of time needed to return to trend on potential output, the basis for assumptions about growth in earnings, and consideration of behavioural factors.

The Commission asked Scottish Government staff to arrange a separate demonstration of the model itself.

Actions:

- Scottish Government to circulate detail of sources of SPI data.

- Scottish Government to arrange a demonstration of the model for Commissioners.
- Scottish Government to provide Commissioners with a paper on how the OBR and OECD produce macroeconomic forecasts.
- Scottish Government to confirm the timeline for return to long run trend on potential output; the implied steady state rate of unemployment; and the basis for growth in earnings.
- Scottish Government to provide a note on the process by which SGGEM model outputs are converted to the economic determinants underpinning income tax forecasts.

Minutes from Scrutiny and Challenge meeting 2 June 2016

Present

Scottish Fiscal Commission (SFC) Participants
Lady Susan Rice, Chair
Professor Campbell Leith, Commissioner
Professor Andrew Hughes Hallett, Commissioner (by phone)
Petros Varthalitis, Research Assistant
Sean Neill, Interim Chief Executive
Laura Zeballos, Interim Secretariat
Claire Nichols, Head of Budget Preparation

Scottish Government (SG) Participants
The following divisions were represented:
Fiscal Responsibility Division, Scottish Government
Office of the Chief Economic Adviser, Scottish Government
Local Government and Analytical Services Division, Scottish Government

1. **Protocol for the Commission's scrutiny of Draft Budget 2017-18**

The Commission led a discussion on the draft text for a protocol; this identified a number of areas where further clarifications were required. These included arrangements for correspondence between the Commission and the Scottish Government, and the process for publishing minutes of meetings and ensuring that commercially sensitive information and privileged tax information is kept confidential prior to the publication of the Draft Budget. In addition the discussion covered the process for publishing the protocol once finalised.

Action:

- Fiscal Commission Secretariat and Scottish Government to revise draft protocol to reflect discussion.

2. **Income Tax Forecasting**

The Scottish Government discussed a paper prepared in response to the discussion at the previous scrutiny meeting.

The use of earnings data as a proxy for taxable income growth was discussed including how these data feed into the SPI model. The Commission noted that the estimates of earnings growth from the SGGEM model could be picking up changes in non- earnings variables; for example, changes in hours worked are currently exogenously determined in the model. The need was identified for further research

on the labour market adjustment process in Scotland, in particular the balance between adjustments in earnings and hours.

The primary data source for income tax analysis was discussed. The Scottish Government explained how HMRC conduct the Survey of Personal Incomes (SPI) to create a single consistent source for analysis of income tax data at both the UK and Scottish level. The Scottish Government has access to the Public Use Tape (PUT) version of the SPI which anonymises data by combining a very small number of very high value records to prevent disclosure. The Scottish Government presented the results of analysis comparing the SPI and the Public Use Tape (PUT) undertaken by HMRC. The Commission noted that it may be necessary to scale the records held for taxpayers at the top end to ensure that the composite records used are not skewed by the incomes of those in London and the South East of England.

The methodologies and data sources used to estimate potential output and the output gap were also discussed.

In addition, the Scottish Government presented a timetable to produce the final forecasts for income tax; this covered the dates of relevant data releases and the schedule for further developments to both the SGGEM and income tax models over the summer.

Action:

- Scottish Government to examine the extent to which the labour market adjusts through changes to earnings and hours worked.
- Scottish Government to explore how different sources of data on the labour market could be used in the SGGEM model and to consider the breakdown of compensation of employees.
- Scottish Government to update analysis on the output gap.

3. Non-domestic Rates Economic Determinants Forecasting

The Scottish Government presented two papers on NDR Forecasting. The first responded to the Commission's recommendation following the Draft Budget 2016-17 that further work should be undertaken to explore cyclicality in buoyancy data. The following discussion covered the challenges in undertaking the analysis and the cyclicality of different types of changes to the Roll including those which are purely administrative and those which relate to new properties being added to the Roll. The Commission requested further analysis of the impact on growth rates of buoyancy. Sensitivity analysis was discussed including the relative impact of inflation and buoyancy on total revenue estimates and the potential impact of very large additions to the Roll. The Commission asked for data on buoyancy to understand the effect of large projects added to the Roll.

The second paper provided an update on the work of Scottish Government officials to address a Commission recommendation that the Scottish Government continue analysis and consideration of the planning system to see if any insights could improve future forecasts. There was a wide-ranging discussion about the possible role of external bodies and information sources in predicting future buoyancy. A number of challenges were discussed particularly around identifying in advance the completion date of building projects and how information could be translated into a practical output to inform forecasts.

The Scottish Government suggested that the Commission may want to engage with the Scottish Assessors Association about trialling a method of identifying when large projects are likely to come onto the roll, and therefore to increase buoyancy, which might be possible in the longer term (recognising that the Commission will assume responsibility for the preparation of the forecast of non-domestic rate income from the 2018-19 financial year onwards).

Action:

- Scottish Government to provide outturn buoyancy figures for 2015-16 with and without the two large projects identified.
- Scottish Government to provide estimates of the growth rate in buoyancy over the 2010-11 to 2014-15 cycle and to use the forecast methodology used at Draft Budget 2016-17 to assess the cyclical adjustment and effective date analysis over the same time period.
- Scottish Government to provide further advice on whether an analysis of data on the previous revaluation cycle could add significant value to the discussion and understanding of any cyclicality observed in the annual buoyancy data.

Minutes from Scrutiny and Challenge meeting 21 June 2016

Present

Scottish Fiscal Commission (SFC) Participants
Lady Susan Rice, Chair
Professor Campbell Leith, Commissioner
Professor Andrew Hughes Hallett, Commissioner (by phone)
Mattia Ricci, Research Assistant
Petros Varthalitis, Research Assistant
Sean Neill, Interim Chief Executive
Claire Nichols, Head of Budget Preparation

Scottish Government (SG) Participants
The following divisions were represented:
Communities Analysis Division
Fiscal Responsibility Division
Office of the Chief Economic Adviser

1. **Protocol for the Commission's scrutiny of Draft Budget 2017-18**

The Commission set out changes to the latest version of the draft, these changes were discussed and a further draft will be circulated incorporating Scottish Government comments on these changes. At the Scottish Government's suggestion, this draft will also include a section regarding the Commission's right of access to data and information to mirror the provisions in the Scottish Fiscal Commission Act.

Action:

- Scottish Government to revise the Protocol and send to the Commission.

2. **Land and Buildings Transaction Tax Forecasting**

The Scottish Government presented analysis of the 2015-16 outturn figures for residential transactions. This period of time covered two forestalling effects, the first due to the introduction of LBTT in April 2015 and the second due to the introduction of the Additional Dwelling Supplement in April 2016. The Commission interrogated the outturn figures and the analysis produced by the Scottish Government.

The total revenue forecast was approximately in line with the lower bound of the forecast. The assumptions of the number of transactions used to forecast receipts in 2015-16 were broadly in line with expectations; however outturn figures showed relatively flat average prices whilst the model had forecast growth of around 5% per annum. The Commission noted that the effect on transactions should be explored

further as the increase in transaction volumes to pre-crash levels is a key assumption driving the results of the model over the medium term.

There was an extensive discussion on use of the log-normal distribution and the extent to which the model was over-predicting revenue in the £325k-£750k range and under-predicting revenue in the £750k and above range. The extent to which this result was driven by the fit of the log-normal distribution or by a long-term behavioural response to the introduction of LBTT was discussed. The Scottish Government has not found evidence of a long-term behavioural response in analysis conducted to date. It was agreed that the Scottish Government would consider whether there was an alternative distribution which better fits the data and explore the option of correcting the log-normal to better fit the distribution.

The timetable for data releases covering revenues from the Additional Dwelling Supplement was noted. It was agreed that forecasts of revenues from non-residential transactions would be discussed at the next meeting on the 30th June.

Action:

- Scottish Government to explore alternative distributions to fit historic price data and to examine the option of correcting the log-normal distribution to improve the fit.
- Scottish Government to explore using the ARIMA approach for median as well as mean prices.
- Scottish Government to discuss arrangements with HMRC for access to historic SDLT data.
- Commission to provide Scottish Government with feedback on the research specification for tax revenue forecasting models for the housing market.

3. Income Tax Forecasting

The Scottish Government presented an overview of the 2013-14 SPI data which had recently been received from HMRC and compared these results to the forecasts of 2013-14 which had been produced based on the previously available 2010-11 data. The differences in forecasts of the numbers of taxpayers earning between £40k and £70k per annum were discussed and further work was recommended.

The Government also discussed potential refinements to the income tax model, which aim at improving forecasts for the number of taxpayers and taxpayers' income by varying growth assumptions by age group and source of income. Results from this new approach were presented, showing the number of taxpayers and their average income tax payment broken down by age group. The Commission noted that there may be cohort effects in both labour market participation and earning potential and suggested that labour market trends should be examined by age

cohort, in particular with regard to the 16-24 and the 50-64 age cohorts, and the analysis should be cross-checked against longitudinal studies and other data sources.

The Commission also noted that there had been significant changes in public policy affecting retirement decisions and therefore labour market participation and income amongst older workers – in particular the abolishment of the default retirement age; the removal of the requirement to purchase annuities with pension pots; the increases in the female State Pension Age (SPA) and the future increase in the SPA to 66 by 2020. The effect of these changes on participation rates should be explored by examining labour market data and trends. Whilst the model already contains a projection for increasing labour market participation of older age groups, the Scottish Government should explore whether or not this adequately captures these effects. It was agreed that the Scottish Government would disaggregate the income data by age, gender and income source.

Action:

- Scottish Government to break down income by source and age group and gender.
- Scottish Government to provide a chart plotting the income distribution.
- Scottish Government to provide their numerical analysis of HMRC and OBR historic errors in forecasts of income tax to the Scottish Fiscal Commission.
- Scottish Government to look at the 16-24 and 50-64 age cohorts and labour market trends (including state pension age and higher education participation rates).
- Scottish Government to explore the literature and other cross-sectional data to check if there is a drop in earnings at older ages.
- Scottish Government to explore data sources to model growth in state pension income.
- Scottish Government to produce analysis showing the demographic composition of the Scottish taxpayer population and how it changes over time.

Minutes from Scrutiny and Challenge meeting 30 June 2016

Present

Scottish Fiscal Commission (SFC) Participants
Lady Susan Rice, Chair
Professor Campbell Leith, Commissioner
Professor Andrew Hughes Hallett, Commissioner (by phone)
Mattia Ricci, Research Assistant
Sean Neill, Interim Chief Executive
Laura Zeballos, Interim Secretariat
Claire Nichols, Head of Budget Preparation

Scottish Government (SG) Participants
The following divisions were represented:
Communities Analysis Division
Fiscal Responsibility Division
Office of the Chief Economic Adviser

1. **Protocol for the Commission's scrutiny of Draft Budget 2017-18**

The revised version of the draft protocol was discussed and agreed with three minor corrections in the text. A final version of the protocol will be shared between the Commission and the Scottish Government prior to publication.

Action:

- Scottish Fiscal Commission to send the final agreed Protocol to the Scottish Government.

2. **Land and Buildings Transaction Tax Forecasting**

The Scottish Government presented analysis of the 2015-16 outturn figures for non-residential transactions. Outturn figures were significantly above the initial forecast. The nature of the non-residential market was discussed highlighting how the market is less homogenous than the residential sector and that a small number of high value transactions contribute large amounts of revenue.

A wide-ranging discussion covered the results of the analysis including a comparison of data from HMRC and Revenue Scotland. The Scottish Government advised that further data were required from Revenue Scotland. The Commission noted that the spikes in transactions in December and March coincided with financial year ends in the UK and abroad, it was agreed that the Scottish Government would investigate whether data were available to show the split between domestic and foreign ownership for these transactions.

The Scottish Government set out how the existing methodology uses OBR forecasts of commercial property price and transaction growth which appear to have underestimated growth in Scotland in 2015-16. The Scottish Government proposed that exploratory work could be undertaken to consider whether Scottish specific forecasts of commercial property price and transaction growth could be developed. The Commission agreed that this should be considered and it was agreed that the use of the economic determinants forecast by SGGEM could be explored to this end. It was noted that Gross Capital Formation could be used as a proxy measure and the correlation between this variable and non-residential data should be investigated.

It was noted that as leasehold transactions account for a significant proportion of revenues, there is a need to develop an improved understanding of these transactions.

The revised research specification for a review of forecasting models for the housing market was discussed along with the recommendation from the Commission that Bayesian techniques should be considered as part of the review.

The Commission queried what actions the Scottish Government is taking to assess the economic impact of Brexit. The Scottish Government set out a wide range of actions including engagement with the private sector, monitoring the results of business surveys, discussions with other forecasters in Scotland and the OBR and other forecasters across the UK. Emerging data will be compared to historical data from the financial crisis from 2008 onwards to assess the scale of the effect on the economy. The Commission noted how the LBTT model for residential transactions assumes a return to long-run trends; however this assumption would need to be tested in light of emerging economic conditions. It was noted that the modelling of the macroeconomic outlook will require judgements to be made about the impact of Brexit.

Actions:

- Scottish Government to explore options for forecasting price and volume growth for non-residential transactions including using Gross Capital Formation, although the existing OBR forecasts should continue to be considered an option.
- Scottish Government to review the approach to calculating the baseline and consider whether a different baseline may be appropriate.
- Scottish Government to investigate whether data is available to show the split between domestic and foreign ownership for transactions.
- Scottish Government to request data from Revenue Scotland on the outturn average price.

- Scottish Government to review historical data to assess the sensitivity of transactions to macroeconomic indicators

3. Income Tax Forecasting

The Scottish Government talked through two papers on income tax forecasting prepared in response to questions raised by the Commission at previous meetings.

The discussion on cohort effects and the use of cross-sectional data was continued from the previous meeting. The Commission recommended that analysis was undertaken to explore the extent to which the drop in earnings between the ages 45-54 and 55-64 could be explained by reductions in hours, participation rates and other factors and the extent to which a cohort effect may occur. The impact of increases in the female State Pension Age on participation rates was discussed, including the interlinkages with possible cohort effects. The Commission queried how the methodology applying increases in participation rates corresponded to any changes in the mix of individuals' income by source. It was agreed that the Scottish Government would undertake further work in this area.

The Scottish Government presented analysis showing the trends in participation by age group. The Commission requested sensitivity analysis to assess the impact of assumptions on participation rates on the forecasts.

The Scottish Government presented analysis of growth rates in income and earnings levels by decile from both the Survey of Personal Incomes (SPI) and the Annual Survey of Hours and Earnings (ASHE). The Commission suggested that the SPI data could be used to plot the income distribution to see how this has changed over time.

The Scottish Government presented a chart showing the errors in income tax forecasts produced by HMRC and the OBR over the last 15 years. The positive bias in forecasts due to an expectation that the economy returned to trend was noted. The Scottish Government agreed to share the analysis with the Commission.

The approach taken to assessing behavioural effects was discussed including the use of estimates from the UK level. The Commission noted that in the long-term analysis could be undertaken to understand the behavioural responses of Scottish taxpayers.

Actions:

- Scottish Government to undertake sensitivity analysis to assess the impact of different variables on the forecasts; these include the impact of different types of income by source and participation rates of young people and older people.

- Scottish Government to review literature and evidence on cohort effects and lifetime earnings to decompose the causes of the drop in earnings between the ages of 45-54 and 55-64.
- Scottish Government to investigate the impact of changes to the participation rate on the change in the composition of income and whether the model should adjust the source of individuals' income if employment rates change.
- Scottish Government to produce chart showing the different income sources as a share of liabilities.
- Scottish Government to plot income distribution over multiple years to see how the income distribution has evolved over time.
- Scottish Government to share spreadsheet analysis of HMRC/OBR income tax forecast errors.
- Scottish Government to apply the two different forecasting methodologies to the historic data to see how the forecasting approaches compare.
- As a longer term objective Scottish Government to consider the extent to which behavioural effects from the introduction of the 50p additional rate can be identified in Scottish data.

Minutes from Scrutiny and Challenge meeting 19 July 2016

Present

Scottish Fiscal Commission (SFC) Participants
Lady Susan Rice, Chair
Professor Campbell Leith, Commissioner
Professor Charles Nolan, Commissioner
Mattia Ricci, Research Assistant
Claire Nichols, Head of Budget Preparation

Scottish Government (SG) Participants
The following divisions were represented:
Fiscal Responsibility Division
Office of the Chief Economic Adviser
Rural and Environmental Science and Analytical Services Division
Communities Analysis Division

1. Welcome and apologies

Professor Charles Nolan was welcomed to his first scrutiny and challenge meeting. Apologies were received from Professor Andrew Hughes Hallett and Sean Neill. Professor Andrew Hughes Hallett provided comments via email on the papers discussed at the meeting.

The Commission recorded their thanks to Professor Hughes Hallett for his valuable contribution to the Scottish Fiscal Commission over the last two years and wished him well in the future.

2. Minutes from previous meetings

The minutes from the meetings held on the 2nd June, 21st June and 30th June were agreed. The Commission and Scottish Government agreed to circulate a list of actions within a day of each scrutiny meeting to ensure the maximum time to respond to the actions.

3. Income Tax Forecasting

The Scottish Government talked through papers on income tax forecasting prepared in response to questions raised by the Commission at previous meetings.

The results of two different forecast methodologies were compared to outturn figures for two time periods. It was noted that although only two forecast periods were compared, the methodology based on age groups and income sources appeared to produce smaller forecast errors for Scotland than the methodology based on deciles.

The Commission queried how the forecast for earnings growth from the SG's economic forecasting model (SGGEM) was applied in the income tax model and whether the combined effect with the assumptions about demographic change resulted in the implied earnings growth rate in the income tax model differing from the initial SGGEM forecast. The Scottish Government took an action to investigate this issue further.

The Commission queried when outturn data would be available and whether these data could be used to refine tax forecasts in the future. The Scottish Government set out that outturn data would be available around 15 months after the end of the tax year in question mostly due to the significant time lag in data due to the returns of self-assessments. They also noted how they are continuing to work with HMRC to discuss in-year receipts data in terms of what may be available when, and how robust and useful it may be. . Work is on-going between the SG and HMRC to ensure the process for identifying Scottish taxpayers remains appropriate and robust. The results of this process and how it corresponds to the SPI dataset will be monitored as data become available.

The Scottish Government presented the results of a literature review of the age-earnings profile; this covered the effects of cohort size, education levels and the economic cycle. Analysis of the 55-64 age group in the SPI dataset was also presented. The Commission continued to challenge the Scottish Government forecasters to assess whether cohort effects have a significant impact on earnings which the current model is not picking up. The Scottish Government agreed to disaggregate the income gap between the 45 – 54 age group and the 55 – 64 age group by applying relative levels rather than absolute levels as had been presented in this meeting.

It was agreed that the focus of the next meeting would be on the forecasting of economic determinants which feed into the income tax model.

Actions:

- Scottish Government to compare the earnings growth forecast from the SGGEM model to the implied average earnings growth from the income tax model after demographic changes have been applied.
- Scottish Government to disaggregate the income gap between the 45 – 54 age group and the 55 – 64 age group applying relative levels rather than absolute levels.
- Chart 8 from the Distributional Analysis and Income Mix paper to be reproduced providing average NSND liabilities rather than total liabilities.
- Outstanding action on sensitivity analysis and the key factors affecting the forecasts.

- Following clarification from the SFC, Scottish Government will consider whether further work is possible on cohort effects.

4. Scottish Landfill Tax Forecasting

The Scottish Government presented a paper setting out the forecast methodology for Landfill Tax.

The inconsistency between HMRC data and SEPA waste data was noted during forecasting meetings for previous Draft Budgets. Whilst Revenue Scotland data appear to be more consistent with the SEPA data it was agreed that there should be further investigation into any differences between Revenue Scotland data and SEPA data for 2015-16.

The forecasting methodology continues to assume that the policy goal of zero waste by 2025 will be achieved, based on a straight line trajectory. Commission queried whether this assumed trajectory was still realistic given the figures for 2015-16 do not appear to show a reduction in waste relative to the previous years. The Commission challenged the Scottish Government to consider forecasting methodologies based on alternative trajectories for waste. In particular the large drop in waste in 2008 and 2009 was noted and it was suggested that this could be linked to the slowdown in economic activity during the financial crisis. The Commission suggested considering a methodology linked to economic activity.

The Commission also asked the Scottish Government to clarify, and quantify, any planned policy interventions to reduce waste and how this maps to the assumed trajectory for waste.

Actions:

- Scottish Government to explore forecasting methodology based on alternative trajectories for waste including those linked to economic activity.
- Scottish Government to clarify planned policy interventions to reduce waste and how this maps to the assumed trajectory for waste.
- Scottish Government to explore the SEPA waste data for 2015-16 and compare to the Revenue Scotland data.

5. Land and Buildings Transaction Tax Forecasting

The Commission noted how they had received the paper on LBTT forecasting one and a half working days prior to the meeting and that this did not allow sufficient time for the Commission to prepare. Future papers should be received five working days in advance of the meeting as set out in the protocol.

The Scottish Government presented analysis of the price and transactions components of LBTT revenues. The Government noted that the price analysis using the ARIMA model is heavily influenced by the 2016Q1 results due to the likely forestalling effect associated with the Additional Dwelling Supplement. The Commission suggested that dummy variables (-1,1) could be added to the first and second quarters of 2016 to account for this forestalling effect. The inclusion of seasonality factors in the analysis was discussed and the Scottish Government will provide the underlying formula from the analysis.

The results from time series modelling of transactions were discussed. The Commission noted that the turnover ratio and average prices were returning to base in different years. It was agreed that unless there is a rationale then the long-run trends should be reached in the same year for both prices and transactions. The Scottish Government agreed to explore alternative methods of smoothing the transactions projections. The forecasts for the number of dwellings were discussed and the Scottish Government will review the consistency of the approach with other demographic forecasts.

The Scottish Government presented adjustments to the log-normal distribution based on the volume of transactions to account for the over-prediction in the second top band (£325k to £750k) and the under-prediction in the top band (above £750k). The Commission queried whether an adjustment based on tax revenues had been considered and whether a combined adjustment could be used. The Scottish Government agreed to look at this in further detail.

Comparisons of mean and median house prices were presented; in previous years the Scottish Government has applied price changes equally to both the mean and median. The Commission noted that an ARIMA approach could also be applied to estimate median prices.

A wide ranging discussion took place around fiscal drag and the potential for behavioural effects over longer time horizons.

Actions:

- Scottish Government to provide the formula used for ARIMA modelling for prices to understand how seasonality is taken into account.
- ARIMA model for prices to be re-run with dummy variables (1,-1) to be added to relevant quarters for forestalling.
- Scottish Government to re-run analysis with latest data once available.
- Turnover ratio and average prices to return to base in same year unless there are grounds for supposing otherwise.

- Scottish Government to explore alternative methods of smoothing transactions projection to ensure it hits long-run average without introducing a break in the initial period of the projection.
- Consider applying an ARIMA model to the ratio of transactions to household formation as a way of forecasting transactions without the need to impose an off model long-run or any kind of smoothing.
- Check the consistency of the approach to forecasting the number of dwellings with demographic forecasts.
- Compare adjustments to the log normal based on volume of transactions and tax revenues and consider a combined adjustment.
- Consider looking at ARIMA modelling of median house prices and assessing whether the fluctuations in the ratio of average and median prices are predictable.
- Longer term action to consider fiscal drag and behavioural effects.

Minutes from Scrutiny and Challenge meeting 12 August 2016

Present

Scottish Fiscal Commission (SFC) Participants
Lady Susan Rice, Chair
Professor Campbell Leith, Commissioner
Professor Charles Nolan, Commissioner
Mattia Ricci, Research Assistant
Petros Varthalitis, Research Assistant
Claire Nichols, Head of Budget Preparation

Scottish Government (SG) Participants
The following divisions were represented:
Fiscal Responsibility Division
Communities Analysis Division
Environmental Quality Division
Rural and Environmental Science and Analytical Services Division
Office of the Chief Economic Adviser

1. **Welcome and apologies**

All attendees were welcomed to the meeting. Apologies were received from Sean Neill.

2. **Minutes from previous meetings**

The minutes from the meeting held on the 19th July were discussed and agreed. The requirement for a clarification to the action on cohort effects at a future date was noted.

3. **Land and Buildings Transaction Tax Forecasting**

The Scottish Government presented revised analysis of the price and transactions components of LBTT revenues incorporating dummy variables to account for forestalling activity. Following a discussion it was agreed that the analysis would be re-run using growth rates in each variable rather than changes in growth rates. The results of ARIMA modelling for the ratio between mean and median prices were discussed and the approach was noted.

The approach to forecasting Additional Dwelling Supplement was presented by the Scottish Government. The Commission asked whether analysis had been undertaken of the initial outturn data for ADS. The Scottish Government agreed to provide the Commission with further analysis whilst highlighting how the impact of forestalling activity is evident in the available outturn data. The need for on-going

monitoring of ADS revenues was noted, since the fact that only a few months' data is available at this stage makes it difficult to disentangle the forestalling impact from underlying trends. A further difficulty in identifying underlying trends so soon after the introduction of ADS is that there is an 18 month time limit for purchasers to change their main residence and therefore reclaim the ADS.

The Scottish Government presented analysis of the fit of the log-normal distribution to the outturn data in 2015-16. The Commission asked whether the historical Registers of Scotland data and analysis of the fit of the log-normal distribution could be shared, the Government agreed to share the data and analysis.

The fiscal drag effects associated with residential LBTT were discussed. As part of a longer-term action on fiscal drag and behavioural effects, the Scottish Government agreed to look at evidence from the UK market of the impact of fiscal drag in particular HMRC estimates of scale of behavioural effects for Stamp Duty Land Tax.

Actions:

- Scottish Government to run the ARIMA model for mean prices and volumes fitted to the first order, this should include constant variables for pre- and post-financial crisis.
- Scottish Government to obtain data on ADS from Revenue Scotland and undertake analysis of the ADS transactions by price band and compare the distribution to transactions for all LBTT revenues.
- Scottish Government to provide historical Registers of Scotland data with mean and median prices and analysis of the fit of the log-normal distribution.
- Longer term action to consider fiscal drag and behavioural effects.

4. Scottish Landfill Tax Forecasting

The Scottish Government presented a paper setting out a revised forecast methodology for Landfill Tax covering two policy measures and the estimated impact on future waste trajectories.

The basis for the assumptions around incineration capacity and corresponding reductions in landfill waste were discussed. The Scottish Government clarified that the incineration figures are based on SEPA data on sites in construction or with construction about to start. The Commission noted that delays to these projects may result in incineration capacity not increasing as fast as expected.

The Commission asked for clarifications of the assumptions used to assess the impact of the ban on biodegradable waste going to landfill. The Scottish Government clarified how the policy differed from previous policies to reduce waste as the legal

responsibility sits with landfill sites (as well as companies producing and carrying waste) and SEPA will monitor and enforce the ban.

The Scottish Government agreed to undertake further work and sensitivity analysis to present a range of scenarios for waste trajectories. The Commission noted the impact of the financial crisis on waste trends and that cyclical factors could dominate waste trends in future years. The Scottish Government agreed to present analysis on waste intensity and the correlation between waste levels and measures of activity in key sectors at a future meeting.

The Scottish Government clarified that the discrepancies between SEPA data and Revenue Scotland waste data appear to be largely due to SEPA presenting restoration waste as recycled tonnages whilst Revenue Scotland cover this waste in the exempt category. For 2016-17 Revenue Scotland tax returns are covering an enhanced data breakdown and any future discrepancies in the data will be monitored and investigated.

Actions:

- Scottish Government to extrapolate the post-financial crisis trend in waste to compare to alternative trajectories.
- Scottish Government to undertake sensitivity analysis and present a range of scenarios for alternative trajectories for waste including those linked to economic activity.
- Scottish Government to present analysis of waste intensity and the correlation with measures of activity in key sectors.

5. Income Tax Forecasting – Economic Determinants

The Scottish Government presented a paper illustrating the economic forecasting process undertaken with the Scottish Government Global Econometric Model (SGGEM).

The Scottish Government set out how Brexit may impact on economic forecasts in both the short run and the medium term. Whilst there is still uncertainty about Brexit, assumptions must be made about future political agreements in order to inform the economic forecasts. The timing for the final forecasts will determine the assumptions made and the information and data available. The Commission noted that a range of scenarios could be considered for sensitivity analysis and identifying the key variables for the forecast. The Scottish Government agreed that a range of scenarios should be considered, but noted that a single forecast is required for the Draft Budget. The Commission recommended that the results from SGGEM should be cross-validated with other forecasts and studies on the impact of Brexit.

The approach to modelling a number of key variables in the model were discussed, these included the modelling of trade with rUK and the rest of the world, population projections and prices in Scotland and rUK.

There was a wide ranging discussion on the earnings forecasts and adjustment mechanisms in the model and the Scottish Government agreed to present a paper on earnings at a future meeting; this paper will cover comparisons of historical earnings data at the Scottish and UK levels.

The Scottish Government presented short run forecasts of key variables, based on discussions these forecasts will be refined and the results shared.

Actions:

- Scottish Government to explore how the results from SGGEM could be cross-validated with other forecasts and studies on the impact of Brexit.
- Scottish Government to undertake analysis of the correlation between Scottish and UK earnings growth using historical data.
- Scottish Government to refine SR modelling of key variables and share the results with the Commission.

Minutes from Scrutiny and Challenge meeting 23 August 2016

Present

Scottish Fiscal Commission (SFC) Participants
Lady Susan Rice, Chair
Professor Campbell Leith, Commissioner
Professor Charles Nolan, Commissioner
Mattia Ricci, Research Assistant
Petros Varthalitis, Research Assistant
Sean Neill, Interim Chief Executive
Claire Nichols, Head of Budget Preparation

Scottish Government (SG) Participants
The following divisions were represented:
Fiscal Responsibility Division
Communities Analysis Division
Office of the Chief Economic Adviser

1. **Welcome**

All attendees were welcomed to the meeting.

2. **Income Tax Forecasting**

The Scottish Government presented results from sensitivity analysis assessing the impact and importance of the key variables affecting the income tax forecasts. The forecasts were found to be most sensitive to private sector income growth and employment growth. The Commission queried whether some shocks could be correlated. The Scottish Government agreed to provide data on migration and consider whether shocks are correlated and the impact of correlated shocks on NSND liabilities. The annual changes in private pension income were discussed and the Scottish Government agreed to provide annual growth rates for pension income in the SPI dataset.

The Scottish Government presented a paper comparing the SGGEM earnings forecast which feed into the income tax forecasting model and the implied average earnings growth produced by the income tax model after demographic changes have been applied. The Commission noted the relatively small effect on earnings forecasts and that this demonstrates part of the cohort effect whereby relatively stronger increases in the population of age groups with lower average earnings, compared to other age groups, reduce the implied average earnings growth for the taxpayer population as a whole in the model.

The Scottish Government presented a third paper on income tax liabilities by age. The Scottish Fiscal Commission requested that the data was presented to show the "weighted" contribution of each age group to average NSND liabilities.

Actions:

- SG to decompose historic and projected population growth in Scotland to assess the impact of migration trends.
- SG to investigate correlation of shocks and extend the sensitivity analysis by running "joint" shocks.
- SG to provide historic data on annual growth in average private pension income from the SPI.
- SG to provide chart showing the "weighted" contribution of each age group to average NSND liabilities.
- [Outstanding action point from previous meeting:] SG to disaggregate the income gap between the 45 – 54 age group and the 55 – 64 age group applying relative levels rather than absolute levels.

3. Land and Buildings Transaction Tax Forecasting

The Scottish Government presented analysis of dis-aggregated data for non-residential LBTT revenues. The availability of data was discussed including the issues with Registers of Scotland data; it was noted that Revenue Scotland data would provide the most accurate data as it provides information on reliefs and exemptions and that unlike in the case of residential transactions, Registers of Scotland does not publish comprehensive time-series statistics on non-residential transactions which would allow for a comparison of pre- and post-LBTT trends.. The Commission asked the Scottish Government to provide a chart of historical OBR forecast errors.

The discussion covered the approach to uplifting historical revenue data to create the base year for the forecasts. The Commission queried whether consideration had been given to using a moving three-year average for the base.. It was agreed that the Scottish Government would produce this analysis for the next meeting.

Actions:

- Scottish Government to provide chat of historical OBR forecast errors.
- Scottish Government to produce forecasts using a moving three-year average of the base

Minutes from Scrutiny and Challenge Meeting 9 September 2016

Present

Scottish Fiscal Commission (SFC) Participants
Lady Susan Rice, Chair
Professor Campbell Leith, Commissioner
Professor Charles Nolan, Commissioner
Mattia Ricci, Research Assistant
Petros Varthalitis, Research Assistant
Claire Nichols, Head of Budget Preparation

Scottish Government (SG) Participants
The following divisions were represented:
Fiscal Responsibility Division
Environmental Quality Division
Rural and Environmental Science and Analytical Services Division
Communities Analysis Division
Office of the Chief Economic Adviser
Local Government and Analytical Services Division

1. Welcome

All attendees were welcomed to the meeting. Apologies were received from Sean Neill. Attendees agreed the minutes from the last two meetings.

2. Economic Forecasting

The Scottish Government presented two papers. The first paper covered the forecasting of earnings in SGGEM and analysis of earnings growth in Scotland and the rest of the UK. The second paper set out the process to be used to create short run economic forecasts to create a baseline reflecting current circumstances. The paper didn't cover the final approach which will depend on the timing for producing the final forecast and the data available at that time.

There was a wide ranging discussion covering the different sources of data on earnings and employment income including how the compensation of employees includes elements such as pension contributions which are not subject to income tax. The Scottish Government took an action to provide data on the compensation of employees exploring the relationship at the UK level between average weekly earnings and compensation of employees.

The Scottish Government presented analysis of labour market adjustment in Scotland; data suggest that the main adjustment occurs in employment but that there is also some adjustment in earnings. The extent to which labour market adjustment

is reflected in the SGGEM model was discussed. Both the Commission and the Government will explore cross validations of the results from the SGGEM with forecasts to be created based on UK variables and then cross validated by producing forecasts based on Scottish data using the VAR approach.

The approach to short-run economic forecasts was discussed in detail and the Scottish Government will clarify the approach taken to transforming variables and the use of logs vs. normalised data. The Scottish Government will also compare the results to historical data.

Actions:

- The Scottish Government to provide data on the compensation of employees and analyse the relationship at the UK level between average weekly earnings and compensation of employees
- Commission and Scottish Government to cross-validate the results from the SGGEM to forecasts produced using the VAR approach. Scottish Government to provide relevant data to the Scottish Fiscal Commission.
- Scottish Government to clarify approach to transforming variables for short-run economic forecasts.
- Scottish Government to compare results from short-run economic forecasts to historical data.

3. Land and Buildings Transaction Tax Forecasting

The Scottish Government presented analysis of historical data covering the price and transactions components of residential LBTT revenues, this incorporated dummy variables to account for the effect of the financial crisis. The discussion covered how to best reflect the effect of the financial crisis and whether a single break point or two break points representing the start and end of the effect on the housing market would be most appropriate. Both the Government and the Commission took an action to examine the data and assess the most appropriate break-points in the series and discuss via correspondence.

The approach to modelling ADS was also discussed including the data limitations. It was agreed that the Commission staff will liaise with Scottish Government analysts to identify the data requirements from Revenue Scotland. A single joint request will then be made to Revenue Scotland as the Commission will need to produce commentary on ADS outturn data for the Finance Committee in the autumn.

Scottish Government presented analysis of non-residential revenues comparing OBR forecast accuracy to the approach to methodology taken by the Scottish Government. Analysis suggested the approach results in similar forecast errors.

Actions:

- Scottish Government to provide Commission staff with data for price and transactions components of LBTT revenues.
- Scottish Government and Commission to examine data on price and transactions for residential properties and assess the most appropriate break-points in the series and discuss via correspondence.
- Scottish Government and Commission staff to identify data requirements for ADS.

4. Landfill Tax Forecasting

Scottish Government presented paper responding to actions from the previous meeting. The Commission queried the source of SEPA estimates for future incinerator capacity; the Scottish Government took an action to explore further with SEPA the context behind the estimates. A second action was agreed to test the assumptions underpinning the baseline, this includes analysing historical UK waste data and the effect of incinerator capacity on waste.

The Scottish Government presented analysis of the correlation between landfill waste, GDP and other measures of economic activity including construction and house building. It was noted that waste taxed in landfill is residual waste i.e. waste that is not recycled or reused; the relationship with GDP and economic activity is therefore less clear cut. The drop in waste around the financial crisis was noted, the Government took an action to explore this in further detail and consider how this was linked to economic activity. A further action was agreed to explore the potential uses of data available in the Quarterly National Accounts.

Actions:

- Scottish Government to explore with SEPA the context behind the estimates for future incinerator capacity.
- Scottish Government to test the assumptions underpinning the baseline, this includes analysing historical UK waste data and the effect of incinerator capacity on waste.
- Scottish Government to explore the drop in waste around the financial crisis and consider how this was linked to economic activity
- Scottish Government to explore the potential uses of data available in the Quarterly National Accounts.

5. Non-Domestic Rates

Scottish Government presented papers setting out the proposed approach to forecasting inflation and buoyancy for the Draft Budget 2017-18. The previous work

undertaken by the Scottish Government to identify and strengthen the evidence base on the observed cyclical pattern in buoyancy data was noted.

The Commission noted that historical data on buoyancy involved incomplete series; the Scottish Government took an action to consider the use of previous series on buoyancy and fitted values.

The Commission noted that the Scottish Government's proposal to monitor the addition of very high value properties to the roll was reassuring.

Actions:

- Scottish Government to consider the use of previous series on buoyancy and fitted values.

Minutes from Scrutiny and Challenge Meeting 24 October 2016

Present

Scottish Fiscal Commission (SFC) Participants
Lady Susan Rice, Chair
Professor Campbell Leith, Commissioner
Professor Charles Nolan, Commissioner
Sean Neill, Chief Executive
Claire Nichols, Head of Budget Preparation
Mattia Ricci, Research Assistant
Petros Varthalitis, Research Assistant

Scottish Government (SG) Participants
The following divisions were represented:
Fiscal Responsibility Division
Environmental Quality Division
Rural and Environmental Science and Analytical Services Division
Office of the Chief Economic Adviser

1. **Welcome**

All attendees were welcomed to the meeting. Attendees agreed the minutes from the last meeting.

2. **Economic Forecasting**

Scottish Government presented two papers summarising the forecasting of earnings and employment in Scotland. The use of the SGGEM model and statistical models to produce short-run forecasts were discussed.

The impact of the OBR forecasts at the Autumn Statements on forecasts of Scottish economic variables was discussed. It was noted that significant changes may be required following the Autumn Statement. The Scottish Government set out a proposed process for producing the economic forecasts and the appropriate points for Commission scrutiny were noted. The challenges associated with the short timescales were noted. At the meeting on the 15th November the Scottish Government will present a forecast with UK determinants exogenously determined based on an average of independent forecasts of the UK economy.

Actions:

- The Scottish Government to run the SGGEM model with earnings endogenised rather than exogenised to the UK economy.

- Scottish Government to share files and model code with the Commission to aid scrutiny.

3. Income Tax

The Scottish Government presented three papers on income tax following up on actions from previous meetings. The first paper examined to which extent the assumptions feeding into the income tax model may be correlated and considered the effect of combined shocks on income tax revenues. Whilst the analysis showed that earnings growth and employment growth may be weakly correlated, the impact of running a combined shock in the SPI model are largely additive.

The second paper examined migration trends and the possible impact of changes in international net migration on the income tax forecasts. The analysis demonstrated that a reduction in migration flows is expected to have a limited impact on NSND liabilities in 2017-18 since net migration is concentrated amongst the younger age groups who tend to have lower earnings and, in the case of the 16-24 year olds, the lowest employment rates. The significant uncertainties regarding the impact of Brexit on net migration were noted.

The third paper presented analysis disaggregating the income gap between the 45-54 and 55-64 age groups. Retirement decisions explained around 80% of the income gap and the remainder could be due to either self-selection as higher earners retire earlier or due to cohort effects with younger generations having higher earnings than their predecessors. The Commission noted that lifetime employment decisions are considered in the approach to modelling income tax taken by the Scottish Government but cohort effects in earnings are not taken into account.

4. Landfill Tax Forecasting

Scottish Government presented paper setting out landfill methodology and revised assumptions for the timing of incinerator capacity coming on-stream based on a report Commissioned from an external consultant. The Commission queried the status of the incinerator sites included in the forecast and the state of construction for each of those sites. The Scottish Government agreed to provide further information on these areas.

The Commission queried how the forecasts were constructed and asked the Scottish Government to provide further information on how the forecasts are computed. The Commission queried key assumptions around new incinerators displacing waste from Scottish landfills and deliverability of the ban on landfilling of biodegradable municipal waste.

Actions:

- Scottish Government to provide the external consultant's report on incinerator capacity.
- Scottish Government to provide detail on the number of incinerators, their status, capacity etc and the stage of construction for each incinerator.
- Scottish Government to provide a more detailed version of Table 3 from the paper setting out the detailed breakdown of waste, incinerator capacity and the impact of the BMW ban. This should set out all the assumptions and how the forecasts are computed. The relevant spreadsheets should be provided to allow sensitivity analysis.

Minutes from Scrutiny and Challenge Meeting 4 November 2016

Present

Scottish Fiscal Commission (SFC) Participants
Lady Susan Rice, Chair
Professor Campbell Leith, Commissioner
Professor Charles Nolan, Commissioner
Sean Neill, Chief Executive
Claire Nichols, Head of Budget Preparation
Mattia Ricci, Research Assistant
Petros Varthalitis, Research Assistant

Scottish Government (SG) Participants
The following divisions were represented:
Fiscal Responsibility Division
Environmental Quality Division
Rural and Environmental Science and Analytical Services Division
Zero Waste Scotland (Non-SG)
Office of the Chief Economic Adviser
Communities Analysis Division

1. **Welcome**

All attendees were welcomed to the meeting. Attendees agreed the minutes from the last meeting.

2. **Residential Land and Buildings Transaction Tax**

The Scottish Government presented a paper responding to the actions from the previous meeting considering the impact of adding dummy variables to cover three time periods: pre-crisis, crisis and post-crisis. The Government noted that the addition of these three dummy variables made the model more theoretically coherent however the impact on final forecasts was minimal.

The Commission queried the extent to which forecasts had changes due to revisions to the data series. The Government noted that since the previous meeting additional data had been published by Registers of Scotland for Q3 2016 and revisions had taken place to other data.

A wide ranging discussion took place on forecasts of the turnover ratio and transactions. This included the appropriateness of including a moving average term when the time period considered does not have a clear regular cycle.

Actions:

- Scottish Government to provide final forecasts and details of the methodology and the narrative behind the methodology for the meeting on the 15th November.
- Scottish Government to provide more details as to their view that the Commission's conclusion in its 2015-16 outturn report that revenues in the £350k to £750k band were below expectations was not justified by the test that had been applied.
- Scottish Government to provide a reconciliation of Draft Budget residential LBTT revenues, which had been provided on a pre- and post-measures basis with a final forecast broken down into the main and ADS elements.

3. Economic Forecasting

The Scottish Government presented their approach to short-run forecasting which will be used to in the production of economic forecasts to inform the income tax revenue forecasts. This approach uses a wide range of sources of timely intelligence to bridge the gap between the periods when historical data is available and the start of the forecasting period. The approach has been refined to use a model averaging approach.

Issues with Scottish data were noted including where small sample sizes result in a large amount of volatility in the data. The Commission noted that there may be some data sources requiring improvements to provide better Scottish data, for example to boost surveys or improve the timeliness of releases. It was noted that the Commission should consider this further and discuss with key stakeholders in 2017.

It was noted how the short-run modelling was effectively returning variables to their long-run trend whilst using the additional available information to refine the path. It was agreed that the approach to forecasting key variables in the short-run was helpful. The Commission asked that the results be presented alongside historical data.

Actions:

- Scottish Government to provide economic narrative explaining the forecasts presented on the 15th November.
- Scottish Government to plot charts showing historical data and forecasts for key variables.

4. Landfill Tax Forecasting

The Scottish Government presented two papers, the first followed up on the actions from the previous challenge meeting. The second paper provided a summary of how the model works and a detailed breakdown of the calculations.

The Commission queried how biodegradable municipal waste (BMW) would be dealt with if it was not incinerated. The Scottish Government set out a number of policies which they expect to reduce BMW including diversion for recycling at the collection stage and the requirement to pre-sort waste sent to incineration to remove waste which is recyclable.

The costs of incineration vs. landfill were discussed and it was noted that the requirement to pre-sort waste for incineration at a cost of approximately £25 per tonne could result in incineration becoming more expensive than landfill. The Scottish Government noted that where it could be guaranteed that the waste has been sorted in advance pre-sorting is not required, this incentivises local authorities to encourage recycling earlier in the system to save on the costs of pre-sorting prior to incineration. The Scottish Government noted that in some cases there is a huge variation in the performance of local authorities in recycling levels. Presently the Scottish Government does not have data or information to quantify the effect of pre-sorting on the overall levels of waste going to landfill however in future years there should be more information available which can feed into the forecasts.

The Commission noted that the schedule for incinerator capacity coming on-stream was based on current expectations although it had been revised from previous meetings and slippage potential had been modelled as a sensitivity. In future years the Scottish Fiscal Commission will need to monitor incinerator capacity and how development of key sites is progressing.

Actions:

- Scottish Government to present a forecast of Scottish Landfill Tax and the methodology used on the 15th November and the narrative justifying the approach taken.
- Scottish Government to set out the key risks to the forecasts and the impact of those risks on the forecasts.

Minutes from Scrutiny and Challenge Meeting 15 November 2016

Present

Scottish Fiscal Commission (SFC) Participants
Lady Susan Rice, Chair
Professor Campbell Leith, Commissioner
Professor Charles Nolan, Commissioner
Sean Neill, Chief Executive
Claire Nichols, Head of Budget Preparation
Mattia Ricci, Research Assistant
Petros Varthalitis, Research Assistant

Scottish Government (SG) Participants
The following divisions were represented:
Fiscal Responsibility Division
Environmental Quality Division
Rural and Environmental Science and Analytical Services Division
Office of the Chief Economic Adviser
Communities Analysis Division

1. Residential Land and Buildings Transaction Tax

Additional Dwelling Supplement

The Scottish Government presented a their methodology for forecasting revenues from the Additional Dwelling Supplement (ADS) for the Draft Budget. The challenges associated with forecasting the refund rate for ADS were noted. The latest available data showed between 14-15% of revenues for the first three months had been refunded. However Revenue Scotland data indicated that up to 34% of revenues were associated with taxpayers indicating intent to reclaim. The 18 month reclaim period means uncertainties around reclaim rates will remain for some time. The Government noted their intention to use an assumption that 34% of revenues are reclaimed, the appropriateness of this assumption will be monitored as more data becomes available. The Scottish Government confirmed its intention to continue to use the estimate that average prices for properties subject to ADS are 10% lower than the overall price distribution. The Scottish Government noted that the forecast produced is for final outturn rather than revenue on a cash basis which would include revenues subsequently refunded. The Commission suggested that the presentation of ADS revenues could make it clear the revenues before and after refunds.

The Commission asked whether any information was available on cash purchases for additional properties. The Scottish Government agreed to look further at data availability around cash purchases.

Residential LBTT

Scottish Government presented paper setting out methodology and final forecasts for residential LBTT revenues. The paper set out the rationale for approach taken to forecasting LBTT and set out the context for the forecasts with the housing market.

Scottish Fiscal Commission noted that the economic narrative added in the paper was very helpful. Scottish Fiscal Commission noted that there are a number of assumptions in the forecasts where future data should provide more information. These areas which include the mean-to-median ratio and the price distribution will be monitored as further data becomes available.

Actions:

- Scottish Government to look at data availability on cash purchases for ADS.

2. Non-Residential Land and Buildings Transaction Tax

The Scottish Government presented their forecast methodology for Non-Residential LBTT revenues. The key assumption underpinning the methodology is that trends in the Scottish non-residential market do not differ significantly from the UK non-residential market. As the OBR forecasts for growth in prices and transactions at the UK level will be revised next week, updated forecasts of non-residential LBTT revenues will be produced and provided to the Commission.

The Commission noted that access to data on non-residential transactions is more of an issue than for residential transactions where Registers of Scotland data is regularly published. Further consideration will be given to data requirements in due course.

Actions:

- Scottish Government to provide a final forecast of Non-Residential LBTT receipts after the Autumn Statement.

3. Non-Domestic Rates

The Commission had a brief discussion of the papers provided on NDR. It was noted that an updated forecast would be provided after the Autumn Statement.

4. Landfill Tax

The Scottish Government presented a paper summarising the methodology for forecasting Scottish Landfill Tax. The paper also assessed the risks to the forecast and the impact on forecasts of delays to incinerators coming on stream, additional recycling and pre-processing capacity and the effectiveness of the ban on BMW.

There was a discussion on possible changes in advance of the BMW ban including diversion for recycling and additional pre-processing capacity. Currently the model assumes the impact of the BMW ban occurs primarily in the final year rather than occurring in the run up to the ban. This is discussed in the sensitivity analysis around recycling and pre-processing capacity. The Commission noted the need to monitor this on an on-going basis. The Commission queried whether the BMW ban could result in waste being exported, the Government noted that there is a legal requirement to pre-process waste before exporting and that this is an area for future work. Scottish Fiscal Commission noted that the effectiveness of the ban would depend on compliance and that SEPA will have an enforcement role for the BMW ban.

Actions:

- Scottish Government to provide a final forecast of Scottish Landfill Tax receipts after the Autumn Statement.

5. Income Tax and Economic Modelling

Scottish Government presented a pre-Autumn Statement forecast of income tax receipts and the economic determinants underpinning the income tax forecasts. These forecasts reflected the short-run uncertainty around Brexit, however the long-term effects of Brexit were not represented. The final economic forecasts produced after the Autumn Statement will reflect the OBR's assumptions around the impact of Brexit.

There was a wide ranging discussion of the economic narrative and recent trends seen in key economic variables including GDP, employment and unemployment, nominal and real earnings.

The Scottish Government presented analysis following up on the action from the last meeting to endogenise earnings in the forecasts. The effect was a faster return to trend which doesn't reflect the uncertainty in the economy.

The Scottish Government's income tax forecasts were discussed including the consideration of behavioural effects. The Commission asked for confirmation that the Government would provide pre- and post-policy baselines as well as the behavioural assumptions to aide their scrutiny. The Government confirmed this would be the case and agreed to provide the Taxable Income Elasticities (TIEs) used in the assumptions.

The Scottish Government noted that ministers will have to confirm their policy proposals for income tax after the Autumn Statement, currently the modelling has used the Scottish Government's proposal for income tax which was published in March.

The Scottish Government asked whether the information on the forecasts was in a suitable format to enable the Commission to scrutinise the forecasts. The Scottish Fiscal Commission confirmed that the spreadsheet and narrative provided were appropriate but noted that data sources should be made clearer.

Actions:

- Scottish Government to provide final income tax forecasts after the Autumn Statement.
- Scottish Government to provide taxable income elasticities.

Annex C: Commissioner Activities Log December 2015 – December 2016

Week December 12th

- SFC Governance meeting
- SFC Budget Prep/Transition meeting
- SFC prep meeting ahead of session with Finance and Constitution Committee
- Draft Budget ’18-’19 laid before Parliament
- SFC Report on Draft Budget ’18-’19 published

Week December 5th

- SFC meeting with Finance and Constitution Minister to discuss progress on SFC Report
- SFC Chief Executive interviews (SR)

Week November 28th

- SFC call to discuss the assessment of reasonableness
- SFC call to discuss recruitment progress and contingency
- SFC Chief Executive Shortlist individual information chats with candidates (SR)
- SFC call in advance of new Commissioners shortlist meeting (SR)
- SFC New Commissioners Shortlist Meeting (SR)

Week November 21st

- CN gave evidence to the Budget Process Review Group.

Week November 14th

- SFC New Commissioners Shortlist meeting (SR)
- SFC second Chief Executive Sift meeting (SR)
- SFC Forecasting/Scrutiny meeting with SG
- SFC C2 Sift meeting (CL&CN)
- SFC C1 Sift meeting (CL)
- SFC Recruitment Catch Up Meeting
- SFC B-band Sift meeting (CN)

Week November 7th

- SFC first Chief Executive Sift meeting (SR)
- SFC Gateway Review (SR&CN)

Week October 31st

- SFC Forecasting/Scrutiny meeting with SG
- SFC Transition Board
- SFC/OBR Challenge meeting (CL&CN)
- SFC Programme governance meeting

Week October 24th

- SFC Forecasting/Scrutiny meeting with SG
- SFC Chair introductory meeting with new Finance Committee Convener (SR)
- SFC Commissioners' conference call

Week October 10th

- SFC telephone conference re Budget Requirements 5 year plan
- Call in relation to Commissioners search (SR)

Week October 3rd

- Finance and Constitution Committee – Private session to discuss search for two new Commissioners, attended by DG Finance, Commissioner of Public Appointments and Chair of SFC (SR)
- SFC Commissioners prep session for Finance Committee
- SFC attendance at meeting of Finance and Constitution Committee

Week September 26th

- Knowledge Transfer session between SG and SFC (CL, CN and two Research Assistants)
- Planning Meeting of Panel for appointment of new Commissioners (SR)

Week September 19th

- SFC Commissioners telephone conference
- SFC Governance meeting
- Discussion of process for appointment of new Commissioners (SR)

Week September 5th

- SFC meeting to discuss Operating Model and Staff Requirements
- SFC Forecasting/Scrutiny meeting with SG

Week August 29th

- SFC Commissioners telephone conference

Week August 22nd

- SFC Commissioners attended a session with Chair of the OBR at the Finance Committee Business Planning Day
- SFC Chair joined Finance Committee members for a working dinner
- SFC Transition Board meeting
- SFC Forecasting/Scrutiny meeting with SG

Week August 15th

- SFC meeting pre-Finance Committee Business Planning Day

Week August 8th

- SFC Forecasting/Scrutiny meeting with SG
- SFC Chair pre-Transition Board briefing

Week August 1st

- Commissioners (Professors Leith and Nolan) and two SFC Research Assistants attended Knowledge Transfer session with SG

Week July 18th

- SFC Forecasting/Scrutiny meeting with SG
- SFC Chair meeting with DG Finance

Week June 27th

- Professor Charles Nolan was welcomed as a new Commissioner effective 1 July.
- SFC Commissioners telephone conference
- SFC Chair first meeting with new Convener of the Finance Committee
- SFC Chair meeting with new member of Transition Board
- SFC Forecasting/Scrutiny meeting with SG

Week June 20th

- Professor Andrew Hughes Hallett gave notice of his intention to resign as a Commissioner with effect from 1 August.
- SFC Forecasting/Scrutiny meeting with SG
- SFC Transition Board meeting
- SFC Chair phone call with Cabinet Secretary for Finance and the Constitution following the result of the EU Referendum
- SFC Chair call with colleagues from Finance Division and SFC executive

Week June 6th

- SFC Chair phone call with Cabinet Secretary for Finance and the Constitution

Week May 30th

- SFC Forecasting/Scrutiny meeting with SG

Week May 23rd

- SFC meeting with SG re: Fiscal Framework implications
- SFC Governance meeting
- SFC Chair meeting Sean Neill of SG re: SFC Governance
- CL attended session with SG re: Income Tax Modelling Teach In, together with SFC's two Research Assistants.
- SFC Chair introductory lunch meeting with new Chief Executive of Revenue Scotland to discuss ways of working between the two organisations

Week May 9th

- SFC meeting with SG re: Budget/forecasting/protocol 2017-18
- SFC internal pre-meeting for Budget report wrap-up
- SFC Chair meeting with Auditor General for Scotland to discuss SFC plans for '16-'17 and beyond

Week May 2nd

- SFC meeting with SG re: Fiscal Framework

Week April 11th

- SFC Chair attended and presented at OECD 8th Annual Meeting of Parliamentary Budget Officials and Independent Fiscal Institutions in Paris
- AHH discussed the independent use of existing models for forecasting Scottish GDP and income tax as a possible approach to generating SFC forecasts with the Chief Economic Advisor

Week March 7th

- SFC Chair meeting with DG Finance
- SFC Chair meeting with Convener, Finance Committee
- SFC meeting re Fiscal Framework Technical Annex
- SFC responded to the Finance Committee on the LBTT (Amendment) Bill Report
- Scottish Fiscal Commission Bill was passed by Scottish Parliament
- Andrew Hughes Hallett discussed models for forecasting GDP and SRIT with Chief Economic Advisor

Week February 29th

- Commissioners attended a conference call challenge meeting with the OBR on devolved taxes
- SFC meeting to discuss the Transition Project, Fiscal Framework amendments and the Commission's response to the Finance Committee's invitation to respond to the LBTT (Amendment) Bill Report
- Commissioner, Campbell Leith, met with Graeme Roy to discuss the Fiscal Framework
- Commissioner, Campbell Leith, met with Dan Cookson of PRS4Scotland to discuss the availability of housing market data, particularly in relation to the buy-to-let market
- SFC meeting re Scottish Fiscal Commission Bill

Week February 22nd

- SFC meeting re changes to SFC remit following agreement of the Fiscal Framework and the transition project
- Telephone call between Chair of the SFC and Deputy First Minister re agreement of the Fiscal Framework
- SFC responded to the request from the Finance Committee with its views on their recommendations published in its Report on Draft Budget 2016-17

Week February 15th

- Telephone call with DFM on progress with Fiscal Framework discussions and how they might effect the Scottish Fiscal Commission
- Andrew Hughes Hallett met Fraser Institute on forecasting methods for welfare spending

Week February 8th

- Telephone call with Scottish Government for update on current status of negotiations on the fiscal framework
- SFC meeting with Vice Principal of University of Glasgow to discuss future accommodation

and support

- SFC internal meeting to discuss transition project and recent requests from the Convener of the Finance Committee
- SFC responded to the request from the Finance Committee in relation to those issues in the Stage 1 Bill which pertain to the operation of the Commission and how it performs its scrutiny

Week February 1st

- SFC meeting to discuss response to request from the Convener of the Finance Committee in relation to FC Stage 1 Report on the SFC Bill
- SFC meeting with SG to plan how the SG intends to take forward the recommendations in the Draft Budget report from December
- SFC received a request to respond to the recommendations published by the Finance Committee in its Report on Draft Budget 2016-17

Week January 18th

- SFC received a request from the Finance Committee to respond to those issues in the Stage 1 Bill which pertain to the operation of the Commission and how it performs its scrutiny

Week January 11th

- SFC responded to the Finance Committee's Call for Evidence on the Proposed LBTT supplement on additional residential homes
- SFC received a copy of correspondence from the Deputy First Minister on the Finance Committee's Stage 1 Report on the Scottish Fiscal Commission Bill

Week January 4th

- SFC received a request to respond to the Finance Committee's Call for Evidence on the Proposed LBTT supplement on additional residential homes
- SFC received a copy of the Finance Committee's Stage 1 Report on the Scottish Fiscal Commission Bill
- SFC internal meetings to discuss call for evidence
- SFC gave evidence at a Finance Committee meeting
- SFC internal meeting to discuss LBTT consultation

Week December 14th

- SFC internal meeting re Governance & Budget Report
- SFC published Report on Draft Budget 2016-17
- SFC Chair quarterly meeting with the DG Finance

Abbreviations used:

AHH	Andrew Hughes Hallet (former Commissioner)
CL	Campbell Leith (Commissioner)
CN	Charles Nolan (Commissioner)
HMRC	Her Majesty's Revenue and Customs
HMT	Her Majesty's Treasury
NDRI	Non-Domestic Rates Income
OBR	Office of budget responsibility
OECD	Organisation of Economic Cooperation and Development
SEPA	Scottish Environmental Protection Agency
SFC	Scottish Fiscal Commission
SG	Scottish Government
SR	Lady Susan Rice (Chair)

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