
How we forecast income tax

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This publication is available at www.fiscalcommission.scot

Any enquiries regarding this publication should be sent to us at: Scottish Fiscal Commission, Governor's House, Regent Road, Edinburgh EH1 3DE or info@fiscalcommission.scot

ISBN: 978-1-911637-33-2

Published by the Scottish Fiscal Commission, May 2021

Foreword

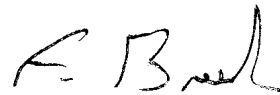
As Scotland's independent forecaster, the Commission is committed to openness and transparency in all of our work. We regularly produce reports to inform users of our forecasts about the approaches used to develop them. This report sets out our approach to forecasting income tax.

The report is intended for a general audience, so we have endeavoured to capture the most important aspects of each forecast model, alongside the most important assumptions we have to make during the creation of our forecasts. Readers who are interested in additional details of our models can get in touch with us directly by e-mailing info@fiscalcommission.scot.

By being transparent in our forecasting, we aim to help people interested in our forecasts understand how they are constructed, and we welcome any feedback to help us improve them.



Dame Susan Rice DBE



Professor Francis Breedon



Professor Alasdair Smith



Professor David Ulph

26 May 2021

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Chapter 1

Overview of methodology

Background to income tax

- 1.1 Income tax is partially devolved. Non-savings and non-dividend (NSND) income tax rates and bands are controlled and determined by the Scottish Parliament. These powers were transferred to the Scottish Parliament via the Scotland Act 2016. The UK Government is responsible for setting or changing income tax reliefs, defining the income tax base and setting the personal allowance.
- 1.2 The main sources of NSND income are pension income, employment income, profits for the self-employed and income from property.
- 1.3 Her Majesty's Revenue and Customs (HMRC) is responsible for the collection and management of Scottish income tax. The Scotland Act 2012 defines a Scottish taxpayer as someone who is a UK taxpayer and has their main place of residence in Scotland. We expect income tax in Scotland will raise around £12 billion in 2021-22.
- 1.4 This paper will set out our approach to forecasting income tax. In the remainder of this chapter we provide an overview of the key steps involved in producing a forecast. Subsequent chapters will explain each of these steps in greater detail.

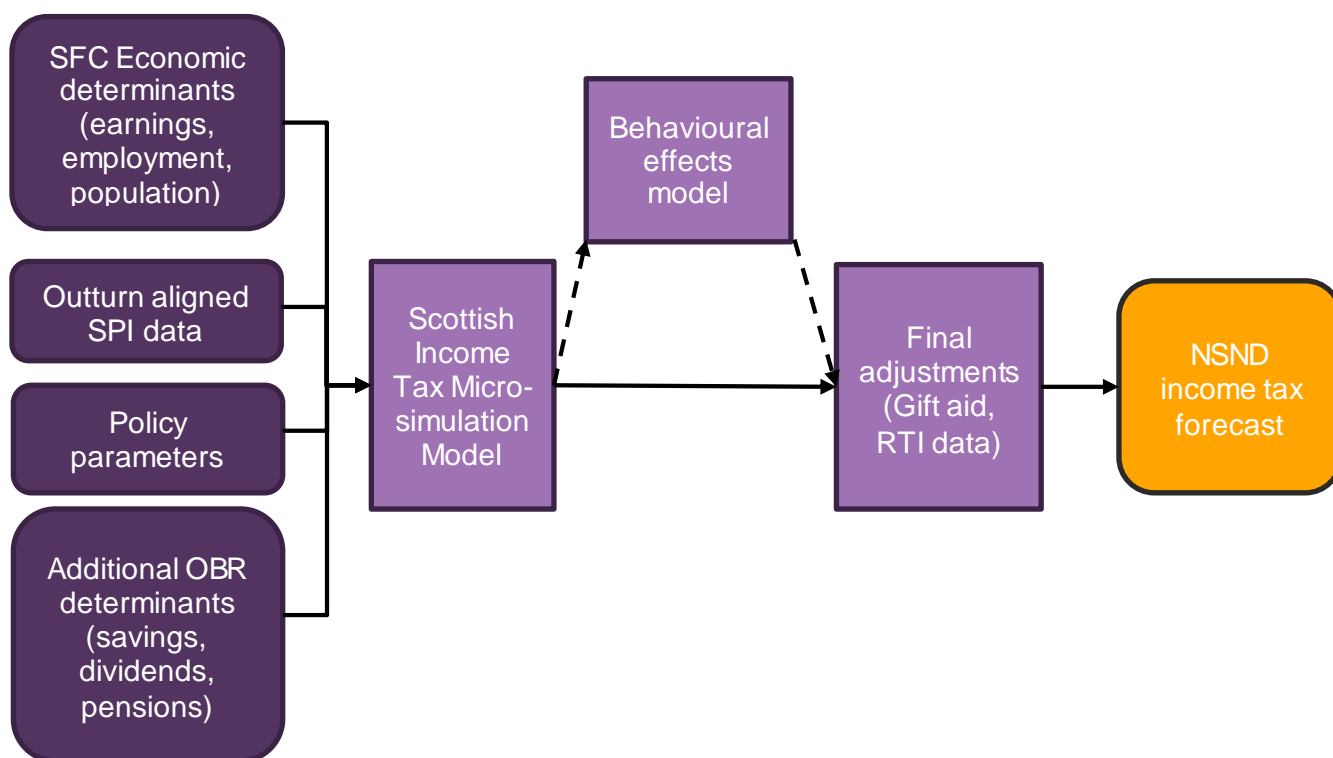
Modelling approach

- 1.5 Figure 1.1 provides an overview of our income tax forecasting process. The process centres on our Scottish Income Tax Micro-Simulation Model (SITM). There are four main inputs to the SITM model:
 - Forecasts of growth in earnings, employment and the population from our main economy forecasts (see Chapter 2).
 - Detailed micro-data on Scottish taxpayers from the Survey of Personal Incomes (SPI), adjusted for the latest outturn data (see Chapter 3).
 - Scottish income tax policy parameters, including the income tax rates and bands (see Chapter 3).
 - Additional information on expected changes in incomes from the OBR, for example on savings, dividends and pensions (see Chapter 3).
- 1.6 SITM takes the latest data on Scottish taxpayers from the SPI and grows the forecast earnings and number of taxpayers in line with our economic determinants and those from the OBR. This gives us a forecast of the distribution of taxpayers by income. We then apply Scottish income tax policy parameters to forecast the amount of NSND income tax paid on this income. This is covered in detail in Chapter 3.
- 1.7 There are other factors which affect Scottish income tax revenues that we cannot capture directly in SITM. These factors include certain reserved UK tax policies, information on tax induced

incorporations, gift aid and real time information from HMRC. Once we have our income tax revenue estimate from SITM we make some further adjustments for these factors. This is covered in further detail in Chapter 4.

- 1.8 We also take account of any announced changes in Scottish Government income tax policy. We do this in two stages. In the first stage we assume that any change in policy has no effect on the number of Scottish taxpayers or their incomes and hence on the distribution of these incomes across the proposed new tax bands. We can then mechanically calculate the amount of tax revenue raised and compare it to the baseline revenue calculated. This gives us what we call a static costing of the policy change. In the second stage we allow for the possibility that the changes in tax policy might cause some behavioural changes – for example tax migration, tax planning or changes in work incentives, which may alter the distribution of income across tax bands. Taking these into account enables us to produce the full costing of the policy changes. This process is covered in detail in Chapter 5.

Figure 1.1: Schematic of the income tax forecast model



Source: Scottish Fiscal Commission

Chapter 2

Economic determinants forecast

Introduction

2.1 The three main economic determinants used to produce the income tax forecast are population, employment and income. This chapter describes where our forecasts of population, employment and incomes come from. Chapter 3 explains how these forecasts are used in our income tax forecasts.

Forecast of income by type

2.2 Each of these types of incomes can grow differently over time, and so we use different methodologies to forecast each type. Figure 2.1 highlights the different types of income in our model, and where they are sourced from.

Figure 2.1: Type and source of income streams

Type of income	Source of income stream
Income from employment – private sector (including self-employment)	SFC economy earnings private sector forecast
Income from employment – public sector	SFC economy earnings public sector forecast
State pension income	Calculated from the OBR Triple Lock state pension forecast
Occupational, personal or other pension income	Calculated from historic SPI growth of pension income
All other income excluding savings and dividends	SFC economy earnings private sector forecast

Source: Scottish Fiscal Commission

2.3 Income from employment (including Self-Employment) is by far the largest source of income, accounting for around 77 per cent of all income. Forecasts of employment and earnings come from our economy forecast model. Alongside this paper, we have published an updated guide to how we forecast the Scottish economy, which provides further information on how we forecast employment and earnings.¹

2.4 For growth in income from employment, we can use forecasts directly from the economy team. Income from employment is further split by private and public sector, both in our economy forecasts and in our income tax model. We also use growth in private sector earnings as a proxy for growth in other income types otherwise not covered, including income from property rental. This is a feature of our modelling that we may revise if adequate data becomes available.

¹ Scottish Fiscal Commission (2021) How we forecast the Scottish economy – May 2021 ([link](#))

- 2.5 The UK state pension is a reserved policy area, and the state pension is set at the UK level. Therefore, to forecast growth in income from the state pension in Scotland we use the OBR's state pension forecast.
- 2.6 Occupational, personal and other pensions will be affected by factors such as annuity rates and stock market performance at the UK level. We do not produce separate Scottish forecasts of these factors. When calculating occupational, personal or other pension income we use the historic growth from the SPI.

Forecast of the number of taxpayers

- 2.7 Our forecast of the number of Scottish taxpayers includes a breakdown by age allowing our forecast to take into account Scotland's changing demographics and labour market trends. This is important as average incomes and therefore income tax paid can vary significantly across age groups. In recent years the working age population has been shrinking in Scotland, and this trend is expected to continue, exacerbated by COVID-19. We capture this change in the Scottish population in our income tax forecasts.
- 2.8 The inputs which are used to develop the number of taxpayers forecast are:
- Population projections by year of age
 - Unemployment rate by year of age
 - Participation rate by year of age
 - Economy employment forecast
- 2.9 We combine these to produce a forecast of employment levels for the 16-64 age groups. This is used as a proxy to forecast the number of taxpayers by age. For the over 65 age group the population is only grown in line with our population projections. The growth rate in the number of taxpayers by age is calculated and used in the model described in the next chapter.
- 2.10 Prior to our January 2021 forecast our Scottish population projections were based on the available Office for National Statistics (ONS) population variants. From January 2021 we have been using our own bespoke population projections made in-house. At each forecast we make assumptions about mortality, fertility and migration. These assumptions will be guided in-part by the available ONS population projection variants, but we'll also make additional assumptions to reflect recent events or changes in trends, such as the effect of COVID-19.

Chapter 3

Scottish income tax micro-simulation model

Introduction

- 3.1 We use our Scottish income tax micro-simulation model (SITM) to produce a detailed baseline forecast of the distribution of taxpayers, their incomes and their tax liabilities.
- 3.2 There are four main inputs into SITM:
- Detailed Survey of Personal Incomes (SPI) data, adjusted for outturn
 - The growth rate of income by type (discussed in Chapter 2)
 - The growth rate of the number of taxpayers by age (discussed in Chapter 2)
 - Scottish income tax baseline and policy parameters

The Survey of Personal Incomes

- 3.3 The SPI is a single consistent source of income tax data created by HMRC. The SPI is a one per cent to two per cent sample of all HMRC income tax taxpayer records for each tax year. It contains over 40,000 individual taxpayer records for Scotland. The SPI provides details at the individual taxpayer level, of income by source and allowances, deductions and reliefs. These individual taxpayer records are then grossed up to get values for the whole of Scotland.
- 3.4 The Commission uses a publicly available version of the SPI called the Public Use Tape (PUT). The PUT is an anonymised version of the SPI with some records grouped together to prevent any private information being disclosed. This is the primary resource for income tax analysis and is used by the OBR for income tax forecasts and policy costings. We always use the PUT data for the most recently available tax year, though there is a lag in the availability of the data of around 13 months after the end of the tax year. In our January 2021 forecast the most recently available PUT data were from tax year 2017-18.
- 3.5 HMRC NSND income tax outturn data is the definitive value of income tax in Scotland, and the outturn data is what the Scottish Budget is based on. Although the outturn data provide the correct value of total income tax in Scotland, they do not contain the detailed taxpayer distribution information we need to run SITM, which instead comes from the PUT. As the PUT is based on a sample, there are differences between the total income tax liabilities in Scotland implied by the PUT and the official outturn estimate. We therefore align the latest available PUT to the latest available outturn data. To align the PUT we use a ‘bottom-up’ method that:
- aligns the number of taxpayers by tax band in the PUT to the number of taxpayers in the outturn data
 - adjusts the remaining difference in tax revenues between the two data sources through scaling taxpayer earnings in the PUT

3.6 For our February 2021 forecast we aligned the 2017-18 PUT with 2018-19 outturn income tax data.

SITM: Applying earnings and taxpayer growth forecasts

3.7 For each taxpayer record in the PUT, SITM grows each type of income in line with the growth forecast described in Chapter 2.

3.8 As described above the PUT includes a sample of all Scottish taxpayers, with each record being representative of a number of taxpayers. Each record has a grossing factor which can be used to scale the PUT up to whole population values. To reflect changes in the number of taxpayers over time, we apply the projected population and employment growth rates from chapter 2 to the grossing factor for each record, depending on the age group of the record. For example, a single record in age group 25-34 in the PUT might have a grossing factor of 12, meaning it represents 12 taxpayers aged 25-34. If we think the cohort of taxpayers aged 25-34 is going to grow by 1 per cent, we'd increase the grossing factor by 1 per cent to 12.12. Applied across all records, this results in changes in the total population of taxpayers, and also changes in the distribution of taxpayers by different age groups.

3.9 By applying growth in earnings and taxpayer population forecasts to each PUT record, SITM creates a new version of the PUT for each forecast year.

SITM: tax calculation

3.10 Once we have a new PUT within SITM for each forecast year detailing individual taxpayer incomes, we can then apply separate tax parameters for each year of the forecast to create an estimate of total income tax revenues. The SITM tax calculator has several stages:

- **Reliefs and deductions:** We first allocate total income into NSND, savings income and dividend income. Reliefs and deductions are then taken from total income. Pension contributions, Gift Aid and various investments are some of the reliefs and deductions which are removed.
- **Personal Allowance:** The Personal Allowance is the amount of income an individual is allowed to receive without paying income tax. For 2021-22 the personal allowance is set at £12,570. The Personal Allowance reduces by £1 for every £2 that the gross income is above £100,000. After a gross income of £125,140 the Personal Allowance is zero. The income tax calculator accounts for the personal allowance and tapering.
- **Liabilities:** Different liabilities are calculated including gross NSND tax liability, savings tax liability, gross dividend liability and net tax liability. Income sources must be allocated into their respective types, with NSND processed first followed by savings income and finally dividend income.
- **Non-savings and non-dividend income:** Taxable NSND income tax in Scotland is split into rates and bands. The rates and bands for each year of the forecast are used by the tax calculator to calculate the amount of income tax from an individual's tax liabilities.

- **Tax credits:** While reliefs and deductions are reductions of the tax base, tax credits are a reduction in total income tax liabilities. Examples of tax credits include Venture Capital Trusts, Community Investment tax relief and Enterprise Investment Schemes. The PUT data provides individual taxpayer tax credit data. The tax calculator uses this tax credit data and reduces the gross tax liabilities, producing net tax liabilities. The tax credit allocation is apportioned across NSND income tax, savings and dividends. As a result of this apportionment, our model also calculates a taxpayers savings and dividends liabilities.

3.11 The tax calculator repeats these calculations to estimate NSND income tax liabilities for each PUT taxpayer for each forecast year. These individual tax liability estimates can then be scaled up to whole population values using the forecast grossing factors.

Chapter 4

RTI alignment and other adjustments

Introduction

- 4.1 SITM provides a baseline forecast of income tax liabilities and the number of taxpayers. However, there are additional factors that cannot be easily captured in SITM, which include:
- Real-time Information (RTI) data alignment
 - Tax Motivated Incorporations (TMI)
 - Gift Aid
 - Self-Assessment settlements
 - UK reserved policies
- 4.2 This chapter explains why and how we adjust our baseline SITM forecast for each of these factors.

Real Time Information (RTI) tax alignment

- 4.3 HMRC publish RTI income tax revenue data, RTI earnings data, and Scottish outturn income tax data.² All of the RTI data are full administrative data, and not a survey-based estimate such as the SPI. But in contrast to the SPI, these data are aggregated and so can't be directly applied to our SITM. We are particularly interested in the RTI tax revenue data which are a much more timely source of information. For example, at the time of developing our January 2021 forecast, the latest Scottish outturn tax data were for the year 2018-19, in comparison to RTI tax data that were available up to October 2020.
- 4.4 Our January 2021 forecast was the first time that we directly aligned to the RTI tax data. Our economy forecasts have always considered RTI earnings data in relation to assumptions on average earnings. As discussed in our January 2021 SEFF report we now align to RTI tax data for two main reasons:
- The RTI data from 2018-19 showed a stronger correlation to Scottish income tax outturn data. Previously there had been only a weak correlation between the two but with additional data points we now have increased confidence in the RTI data as a guide to overall Scottish income tax data.
 - RTI tax data are available more frequently than SPI data and outturn data. This gives us a more timely picture of the income tax landscape. With Scotland's economic and income tax situation continually changing we have placed greater weight on RTI as a source of information.

² HMRC (2020) Scottish Income Tax Outturn Statistics: 2018 to 2019 ([link](#))

- 4.5 The RTI tax data are a snapshot from the HMRC PAYE administration system, and do not represent the final tax position of individuals, particularly those who also or only file a Self-Assessment (SA) tax return.
- 4.6 In addition to RTI tax not fully reflecting final tax liabilities for a year, they also only reflect the tax regime each individual is liable for – such as Scottish, Welsh or English – when the data are compiled. Taxpayers may become, or cease to be, a Scottish taxpayer due to address changes by the time their liability is determined after the end of the tax year. RTI provides us with data on PAYE only. We are assuming that the Self-Employment liabilities will broadly match the RTI PAYE tax data.
- 4.7 The process of alignment with RTI involves growing the RTI forecast after first taking into account historic trends in the data and adjusting for seasonality. We then apply these growth rates to the income tax liabilities forecast from the SPI model, giving a post RTI income tax liabilities forecast. The adjustment for the January 2021 forecast was a one to three per cent downward revision.

Other adjustments

- 4.8 We make further adjustments to our SITM baseline forecast to account for TMI, Gift Aid, self-assessment settlements and UK reserved policies. We cannot model the effects of these factors directly in SITM as SITM does not include the requisite data on these factors, and so instead we use other available information to make adjustments to our aggregate forecast.

Tax Motivated Incorporations

- 4.9 Throughout the last decade in the UK there has been a steady rise in the proportion of people working for themselves, rather than as an employee. Individuals who choose to work for themselves may be self-employed or have the option to incorporate and manage their business as directors of a limited company. In their 2019 Fiscal Risk Report, the OBR outlined how three people doing very similar work can face differing tax treatment depending on their employment classification. Employed individuals generally experience a higher tax burden.³
- 4.10 This rise in people working for themselves places a downward pressure on the Scottish NSND forecast. A particular risk concerns those individuals who choose to incorporate. Depending on how the individual then structures their income within and out with the company, they may pay corporation taxes on profits, income taxes on dividends taken out of the company, or income taxes and National Insurance Contributions on income taken out of the company as an employee. As corporation tax and income tax on dividends flows to the UK exchequer, the Scottish Government loses taxes through these channels that might otherwise have been taxed through NSND income tax.⁴
- 4.11 We have been liaising with the OBR and HMRC on their incorporations modelling work. The HMRC model aims to forecast the rising trend in incorporated owner-managers. HMRC has been providing us with modelling and projections of incorporations behaviour in Scotland. We use these figures to adjust our forecast to capture the impact of a changing incorporations behaviour response. In previous forecasts it has resulted in a downward reduction of around £50 million in the first forecast year by the end of the forecast this downward reduction has increased to around £700 million.

³ OBR (2019) Fiscal Risks Report – July 2019 ([link](#))

⁴ Additional UK revenue on dividends and corporation tax may partially flow back to Scotland through the Barnett funding arrangements, if the underlying driver behind Scottish incorporations also increase rUK incorporations.

Gift Aid

4.12 Gift Aid is a way for charities to claim back the basic rate tax already paid on donations by the donor through HMRC. Gift aid isn't fully captured in the SPI so we rely on information from HMRC to apply an ad-hoc adjustment to our forecast. It reduces our forecast by around £100 million in each year.

Self-Assessment settlements

4.13 The Self-Assessment (SA) settlement adjustment takes into account HMRC's compliance activities. HMRC conducts compliance activity to make sure individuals and businesses pay the correct amount of tax. As part of the compliance process if an individual is found to have underpaid tax an assessment can be raised by HMRC to collect the outstanding balance. One of the ways HMRC collects these balances from taxpayers is to raise a settlement agreement; this means that the outstanding debt is settled via a contract between HMRC and the taxpayer.

4.14 Our income tax forecasting model takes into account SA settlements by looking at the amount of UK SA settlements. We take account of the historic trends and growth rates of the UK SA settlements. We use these growth rates to build a forecast of SA settlements and apply this adjustment to our income tax liabilities forecast. The adjustment results in a small upward revision of around £15 million in earlier years rising to around £50 million at the end of the forecast period.

UK reserved policies

4.15 We undertake additional modelling for certain policy measures introduced by the UK Government which affect Scottish NSND income tax liabilities. One example of this are changes to the UK Personal Allowance. The policy is part of the UK Government's income tax powers, but policy changes directly affect Scottish tax liabilities.

4.16 We calculate the necessary adjustment by using information from the following three sources:

- OBR's policy measure database
- OBR's devolved taxes forecast
- Internal information shared between SFC and OBR

4.17 We provide commentary in our SEFF publications about UK reserved policies that significantly change our forecast.

Chapter 5

Policy costings and behaviour

Overview

5.1 Modelling income tax policy is a crucial part of our income tax forecast. Since these new powers have been devolved there has been a policy change in every year apart from 2021-22. Figure 5.1 below summarises all the income tax policies that have been implemented, and the effect it had on our 2021-22 forecast. No policies were introduced for the 2021-22 year.

Figure 5.1: Post-behavioural policy costings for 2021-22 year

£ million	Policy description	Forecast last costed	Costing in 2021-22
2017-18 policy	Higher rate threshold frozen at £43,000 compared to inflationary increase	May 2019	85
2018-19 policy	Introduction of new five band income tax system. Higher rate threshold increases by 1% in comparison to inflation	February 2020	212
2019-20 policy	Higher rate threshold set at £43,430 compared to inflationary increase	January 2021	69
2020-21 policy	Higher rate threshold set at £43,430 compared to inflationary increase	January 2021	49

Source: Scottish Fiscal Commission

- 5.2 As shown in Figure 5.1, the most significant policy costing was in 2018-19 when the five band income tax system was introduced. On 4 September 2019, we published our ‘Approach to policy costings’ paper that explains how the Commission cost Government policies.⁵ This section will add an income tax specific viewpoint on policy costings, and explain our methodology behind our behavioural assumptions.
- 5.3 We approach every policy costing in four stages, as shown in Figure 5.2. This section will discuss each policy costing step in turn.

⁵ Scottish Fiscal Commission (2019) Approach to Policy Costings – September 2019 ([link](#))

Figure 5.2: Overview of Commission’s approach to policy costings



Source: Scottish Fiscal Commission

Cost base

- 5.4 The cost base is our estimate of the population that will be affected by the policy change. For income tax we are fortunate to have access to a valuable data source in the PUT. As explained in Chapter 3, this provides income and tax details of Scottish taxpayers.
- 5.5 As part of our main forecast methodology the cost base is projected forward in the future using economic determinants on earnings, employment and population changes. We directly use this dataset for policy costings since it is already tailored to forecasting needs.

Static costing

- 5.6 A static costing involves calculating the immediate fiscal effect of a policy change without considering any behavioural responses from those affected by the change or any knock-on effects to the wider economy.
- 5.7 For income tax we calculate the static costing by using the policy rates and bands feeding these through into our SITM model. We have the same level of confidence of our static costings as we do with our general forecasting model. However, these static costings assume that taxpayers do not respond in any way to the policy changes. For a full understanding of the potential revenue consequences of policy changes we need to allow for possible behavioural responses.

Behavioural responses to tax policy changes

Overview

- 5.8 In March 2018 we published an occasional paper setting out in detail what we mean by behavioural responses to policy changes, the challenges of quantifying them, the available evidence and our approach to handling behavioural responses in our income tax forecasts at the time.⁶ The material in our March 2018 occasional paper remains relevant reading on this subject and we direct readers to

⁶ Scottish Fiscal Commission (2018) How we forecast behavioural responses to income tax policy ([link](#))

this paper for detailed background material. This chapter provides a brief overview of how we forecast behavioural responses to policy change and an update on the latest developments in this area.

- 5.9 Taxpayer behavioural responses are uncertain and therefore hard to quantify, even when good historic data are available. However, there is strong international evidence that taxpayers do respond to changes in tax policy and that this affects tax revenues. Because of the difficulty of identifying and quantifying taxpayer behavioural change, our approach is necessarily broad-brush. Although quantifying the impacts of behavioural change is not easy, it is important to account for it in our forecast.
- 5.10 Behavioural change covers a wide range of responses of taxpayers to tax policy. These may include:
- greater use of tax planning
 - avoidance, artificially reducing one's tax liability, often through complex and convoluted but legal schemes
 - evasion, which illegally reduces tax liabilities - for example, failing to declare income to HMRC
 - economic responses, such as individuals choosing to seek a job, increase their hours worked or reduce their hours worked
 - migration, both into and out of Scotland
- 5.11 It is generally expected that the majority of taxpayers would not change their behaviour in response to small tax changes. A basic rate or even a higher rate taxpayer who primarily has earnings from employment and pays tax through PAYE would have limited scope to avoid or evade tax. There may however be some impact on their incentives to work affecting the number of hours worked, as compared to hours spent, for example, studying, travelling or caring for the family and home.
- 5.12 The response of the highest earners is of greatest interest as they have the largest incentives to change their behaviour. They also have greater means to change their behaviour, for example the money and connections to access avoidance schemes. While significant changes in behaviour may be limited to a small number of high income individuals, these individuals are liable for large amounts of tax, and so can have a disproportionate impact on tax revenues.
- 5.13 We cover behavioural responses in four areas:
- Intensive margin responses to changes in marginal tax rates
 - Extensive margin responses to changes in average effective tax rates
 - Additional intra-UK migration responses
 - Short-term forestalling responses
- 5.14 Our modelling approach to intensive margin responses, extensive margin responses and forestalling responses is largely unchanged since our March 2018 occasional paper, and so we only provide a brief summary here. Our modelling of intra-UK migration responses has developed more since 2018, and so we go into more detail on this particular aspect of modelling behavioural responses in this chapter.

Marginal effective tax rate (METR) response

- 5.15 The METR measures how much a £1 rise in gross earnings is lost to payments of tax. A basic rate taxpayer who earns £20,000, and pays 20p in income tax on the next pound earned, has an METR of 20 per cent. The marginal response is a type of behavioural response where taxpayers may change their effort either to earn more or pay less tax. For example, working more hours, or increasing use of tax avoidance schemes. This type of behaviour is usually in response to a change in METR.
- 5.16 We account for behavioural responses to changes in a taxpayer’s marginal rate of tax primarily through the use of Taxable Income Elasticities (TIEs). TIEs estimate the percentage change in total taxable incomes in response to a one per cent change in the net-of-tax rate. Box 5.1 describes how we use TIEs to adjust our policy costings. We developed our TIEs by reviewing the existing literature and through discussions with external experts. Our approach draws on studies by HMRC and estimates by the Institute for Fiscal Studies (IFS) for the UK.

Box 5.1: Illustrative TIE calculation

The calculation below provides an illustrative example of how we used TIEs to estimate the behavioural response of a taxpayer to a change in their top marginal rate of tax. The TIE is multiplied by the percentage change in the taxpayers marginal retention rate – one less their marginal tax rate – to give the expected change in the taxpayers taxable income. This change in taxable income is multiplied by the taxpayers marginal tax rate to capture the impact on tax revenues of the change in behaviour. The illustrative example is based on a taxpayer with income of £200,000 whose marginal tax rate is increased by five percentage points, from 40 per cent to 45 per cent.

	Formula	Example Calculation
(A) Original marginal tax rate		40%
(B) Initial marginal retention rate	$1 - A$	60%
(C) Marginal tax rate after policy change		45%
(D) Marginal retention rate after policy change	$1 - C$	55%
(E) % change in marginal retention rate	$(D - B) / B$	-8%
(F) TIE		0.5
(G) % change in taxable income	$E \times F$	-4%
(H) Taxable income		£200,000
(I) Change in taxable income	$G \times H$	- £8,000
(J) Change in tax revenue	$I \times C$	- £3,600

The TIEs we used in our forecast

- 5.17 We gathered TIEs from a range of international studies. These are discussed in detail in our March 2018 occasional paper. From the available range of TIEs, the Commission considered how the context in Scotland may differ to other countries, particularly the UK as a whole. Three of the key considerations were:

- Income tax policy in Scotland applies to NSND income only. Opportunities for behavioural change may be greater for dividend income than for NSND income. This may reduce TIEs in Scotland relative to the UK.
 - The opportunities for migration from Scotland, particularly to the rest of the UK, are greater than opportunities for migration from the UK to other countries. This would tend to increase TIEs in Scotland.
 - In the UK, some of the loss of tax revenues in NSND income tax due to income shifting behaviour change will be recouped elsewhere, for example through taxes on dividends, Corporate Taxes and Capital Gains tax.
- 5.18 In Scotland, behaviour that shifts income from NSND income to another form will mean a total loss of tax revenue in Scotland. This would mean implicitly greater TIEs in Scotland.
- 5.19 On balance, our judgement is that the opportunity for migration, particularly for the highest income taxpayers, and the risk of income shifting leading to a total loss of revenues in Scotland, outweighs the impact of the policy applying to NSND income only. This means for changes specifically in Scotland, we judge TIEs for those with the very highest incomes to be greater in Scotland than in the UK.
- 5.20 Figure 5.3 shows the TIEs used by the Commission in its Budget 2020-21 forecasts.

Figure 5.3: SFC’s taxable income elasticities

Taxable income start (£)	Taxable income end	Taxable income elasticity
Low	Basic rate limit	0.015
Basic rate limit	80,000	0.1
80,001	150,000	0.2
150,001	300,000	0.35
300,001	500,000	0.55
500,001	High	0.75

Source: Scottish Fiscal Commission

Average effective tax rate (AETR) response

- 5.21 This section provides detail on the second type of behavioural change, changes in behaviour in response to changes in average tax rates. The AETR is the proportion of a taxpayers income which is paid in tax, which can be changed even if their marginal rate doesn’t change. A taxpayer who earns £60,000 and pays £15,000 in tax, will have an AETR of 25 per cent. The extensive margin behaviour response is where taxpayers choose between earning money in a particular tax jurisdiction against other options. Other options may include studying, caring for the family or home, retirement, or migration to another tax jurisdiction.
- 5.22 Gathering evidence on responses to changes in AETR, excluding changes in a taxpayer’s marginal tax rate, faces the same challenges discussed in the section above for METR. The available evidence for this particular type of behavioural response is more limited. However, it is important to take account of the extensive margin response to changes in AETR. The Commission took a simpler approach for this particular type of behavioural response based on analysis and discussions with experts. As with the TIEs, we assume that the size of behavioural response increases with

taxpayer income. These AETR factors are not directly comparable to our TIEs as the calculation works in a different way.

5.23 Figure 5.4 below shows the AETR factors used in our February 2021 forecast.

Figure 5.4: SFC’s extensive AETR factors

Taxable income start (£)	Taxable income end (£)	Extensive AETR factors
Low	Basic rate limit	0
Basic rate limit	80,000	0.06
80,001	150,000	0.06
150,001	300,000	0.25
300,001	500,000	0.25
500,001	High	0.25

Source: Scottish Fiscal Commission

- 5.24 The factors apply directly to the change in liabilities of the taxpayer. While a change in METR will also affect AETR, the factors in Figure 5.4 strictly applies to changes in liabilities from changes in AETR.
- 5.25 For example, for a top rate taxpayer, an increase in the top rate of one percentage point from 45 per cent to 46 per cent will affect the taxpayer’s METR and AETR. However, in this case, we would only apply the METR TIE behavioural costing described in Section 3. For a top rate taxpayer, we would apply the AETR factor approach only for changes in thresholds or changes to tax rates below the top rate, for example a change in the higher rate of tax.
- 5.26 Because of the limited changes in policy for those taxpayers at the lower part of the income distribution, we assumed a low behavioural response for this group. Labour market incentives at the extensive margin can be particularly important for this group, and so the Commission may consider additional modelling or higher behavioural factors for any future more significant changes in policy affecting this group.
- 5.27 Box 5.2 sets out an example calculation for applying the Commission’s AETR elasticity.

Box 5.2: Illustrative average effective tax factor calculation

The extensive effect factor applies directly to the change in liabilities for a taxpayer as a result of changes in the taxpayers AETR excluding changes in their marginal tax rate.

	Formula	Example Calculation
(A) Change in tax liabilities below marginal band		£300
(B) Extensive effect factor		0.06
(C) Change in tax liability	$A * B$	£18

Policy divergence and intra-UK migration

5.28 Figure 5.5 shows the difference in income tax liabilities by gross income in Scotland and the rest of the UK (rUK), showing how this has changed over the last few years. While taxpayers in Scotland earning less than £27,393 in 2021-22 will pay less tax than in the UK, taxpayers earning over this will pay more. The differences increase rapidly in the £40,000 region as taxpayers move into higher rate tax.

Figure 5.5: Scottish policy position relative to the rest of the UK in 2021-22

Gross Income	Position relative to the rest of the UK in 2021-22	As proportion of income (per cent)
£15,000	+ £20.97	0.1
£20,000	+ £20.97	0.1
£30,000	- £26.07	-0.1
£40,000	- £126.07	-0.3
£45,000	- £443.67	-1.0
£50,000	- £1,493.67	-3.0
£60,000	- £1,647.67	-2.7
£100,000	- £2,047.67	-2.0
£120,000	- £2,347.67	-2.0
£150,000	- £2,673.37	-1.8

Source: Scottish Fiscal Commission

5.29 All else equal, significantly lower income tax in the UK for gross incomes above the £43,662 Scottish higher rate threshold will affect incentives to locate in Scotland. We consider three different types of behaviour change in response to this difference in taxation:

- **Migration from Scotland to rUK:** Taxpayers currently resident in Scotland who move to rUK as a result of tax differences. We estimate that there are currently 250,000 taxpayers earning over £50,000 in Scotland who could pay less income tax in the rest of the UK.
- **Migration from rUK to Scotland:** Taxpayers currently in rUK who would have moved to Scotland in the future, but now decide not to as a result of higher income tax. There are around 4.9 million higher rate and additional rate taxpayers in the UK, of whom a small minority will relocate to Scotland each year.
- **Tax residency change:** Taxpayers who have flexibility about where they report their location to HMRC within the UK, and for whom reporting a rUK rather than Scottish address may need only a small change in behaviour, notably taxpayers who already own properties in both Scotland and rUK.

5.30 In the short term, we expect tax residency responses to have the greatest impact on liabilities. For those individuals who already split their lives between Scotland and the rest of the UK, swift, small changes in behaviour may allow them to pay less tax. This could include elements of tax planning, avoidance or evasion.

- 5.31 In the longer run, small changes in migration patterns will also start to affect liabilities. In 2018-19 around 47,000 individuals moved to Scotland from the rest of the UK, with around 37,000 individuals moving the other way. Even very small changes in these flows could have an effect on tax liabilities.
- 5.32 To account for the policy divergence and intra-UK migration behaviour, we developed a framework which captures the effect on Scottish tax revenues of additional migration responses on top of those already captured in our METR and AETR behaviour framework.
- 5.33 The framework applies to any divergence between Scottish and UK income tax, and so we use it even when there is only a change in UK income tax policy. We start by calculating for each taxpayer the percentage difference between what that taxpayer pays in Scotland and what they would pay if they were resident in the rest of the UK. We then apply an elasticity to the Scottish-UK percentage tax differential. This elasticity varies by income level – from 0.06 for higher rate taxpayers to 0.25 for top rate taxpayers. The elasticity represents the loss of tax revenue for a particular divergence in Scottish and rUK income tax policy. We also apply a time profile that allows the behavioural response to build over time.
- 5.34 We expect the impact of changes in migration behaviour to build up over time, increasing from around £30 million in 2021-22 to around £60 million by the end of the forecast. We will continue to keep our modelling approach for capturing this type of behaviour under review.

Box 5.3: Other policy divergences that we cost behaviour for

There are times that other UK Government reserved income tax powers results in changes to Scottish income taxpayers behaviour. Examples include the increase of the Personal Allowance to £12,500, and the UK higher rate threshold to £50,000 for the 2019-20 tax year. Although the rUK higher rate threshold does not have a direct effect on Scottish taxpayers, it does affect the rate of NICs for employees. In recent years the UK Government aligned the 12 per cent NICs UEL with the income tax higher rate threshold, which for 2019-20 was £50,000. So in 2019-20 there was a portion of income between the Scottish higher rate of £43,430 and £50,000 for which taxpayers pay 53 per cent marginal tax on both IT and NICs.

In these sorts of examples we apply our standard behavioural framework to measure the effect it has on our income tax forecast. We provide updates in our SEFF publication when we do apply our framework in such cases.

Forestalling

- 5.35 The previous sections on METR and AETR behavioural responses dealt with how taxpayers may change their behaviour over the full five year forecast. Forestalling is an additional type of behaviour that is a one-off response to an expected change in policy.
- 5.36 When taxes change between one year and another, given sufficient notice, taxpayers may try to artificially shift the timing of their income from one tax year to another, either backwards or forwards in time.
- 5.37 For example, if an individual is expecting to receive a bonus from their employer in May 2022, but finds that, due to a change in tax policy, their marginal tax rate will increase between tax year 2021-22 and 2022-23, they may be able to negotiate with their employer to bring their bonus forward to March 2022. This would mean they pay a lower tax rate on that bonus, because of it appearing in tax year 2021-22, rather than in tax year 2022-23. This behaviour is known as forestalling.

- 5.38 We expect most forestalling responses to occur in the top rate population and the self-employed. There are a number of factors underpinning this judgement:
- top rate taxpayers have the most money at stake in absolute terms
 - top rate taxpayers are more likely to have access to the relevant mechanisms to take advantage of forestalling
 - evidence from previous UK tax policy changes shows the greatest response in the additional/top rate group
- 5.39 Top rate taxpayers have the greatest ability and access to mechanisms that allow NSND income shifting. Some examples of these mechanisms include:
- negotiating the timing of bonuses
 - company owners/directors moving their income received as an employee
 - company share schemes
- 5.40 Although some higher rate taxpayers may be in a position to use some of these methods, it is likely that the majority of this group will be more constrained.
- 5.41 For the 2018-19 Scottish income tax policy, where a new five band income tax regime was introduced including an increase to the top rate of tax from 45 to 46 per cent, we assessed the forestalling response. At the time of assessing the response, we considered the forestalling effects of a one per cent increase to be negligible. We developed a framework for assessing forestalling behaviour for increases to the top rate of between two and five per cent.
- 5.42 Using evidence on the changes to the UK's top rate of tax from 45 per cent to 50 per cent in 2010-11, we extrapolated what that could mean for changes to Scottish tax policy. This accounted for Scotland having a lower relative share of top rate taxpayers in comparison to rUK. Figure 5.6 highlights the conclusions of this work and what was used for the 2018-19 Scottish Budget. For future policies that affect the top rate of tax we may choose to adopt a different forestalling framework.

Figure 5.6: Commission's forestalling framework used for 2018-19 Scottish Budget

Increase in top rate (percentage points)	Relative degree of forestalling (per cent)	Taxable income shifted (£ million)	Gain of tax liabilities in 2017-18 (£ million)	Loss of tax liabilities in 2018-19 (£ million)	Net loss (£ million)
1	0	0	0	0	0
2	25	114	51	54	2
3	50	229	103	110	7
4	75	343	154	168	14
5	80	366	165	183	18

Source: Scottish Fiscal Commission

Additional information

Abbreviations

HMRC	Her Majesty's Revenue and Customs
NSND	Non-Savings and Non-Dividends
OBR	Office for Budget Responsibility
PAYE	Pay As You Earn
PUT	Public Use Tape
RTI	Real Time Information
SEFF	Scotland's Economic and Fiscal Forecasts
SFC	Scottish Fiscal Commission
SG	The Scottish Government
SPI	Survey of Personal Incomes
TMI	Tax Motivated Incorporations

A full glossary of terms is available on our website:

<https://www.fiscalcommission.scot/explainers/glossary/>

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All charts and tables in this publication have also been made available in spreadsheet form on our website. For technical enquiries about the analysis and data presented in this paper please contact the responsible analyst:

Income tax and public funding Chris Dunlop Chris.dunlop@fiscalcommission.scot

⁷ OECD (2014) Recommendation on Principles for Independent Fiscal Institutions ([link](#))

⁸ Scottish Fiscal Commission (2018) Compliance with the Code of Practice for Official Statistics ([link](#))

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ISBN: 978-1-911637-33-2

Published by the Scottish Fiscal Commission, May 2021