Scottish Fiscal Commission

How we forecast behavioural responses to income tax policy

March 2018

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Contents

1. Introduction 1
2. Background to Scottish income tax 3
3. Overview of taxpayer behavioural responses 4
4. Changes in marginal tax rates 11
5. Changes in average effective tax rates 22
6. Forestalling 24
Annex A: Correction notice 31

1. Introduction

1.1 The Commission is committed to being open and transparent in its approach to forecasting. We are therefore publishing a series of technical papers to aid understanding of our recent forecasts. One area of particular interest is how we modelled taxpayer behavioural responses to changes in income tax policy. This paper sets out the background to our taxpayer behavioural response calculations and judgements.

1.2 The detail presented in this paper is based on the methodology we used to forecast the behavioural effects of the income tax policy announced at Stage 1 of the Budget (Scotland) (No.2) Bill debate on 31 January 2018.[1][2] The approach to modelling taxpayer behavioural responses to changes in policy will always be particular to the exact details of the policy being introduced. This paper sets out how we modelled the impacts of the income tax policies introduced in the Budget 2018-19. However, for a different set of policies, we might take a different approach, or consider additional factors. In addition, modelling and forecasting is an on-going process of development and refinement. The Commission will continue to analyse and attempt to better understand taxpayer behavioural responses as new data and evidence become available. We will continue to review our approach in the coming years and will provide additional detail as our approach evolves as appropriate.

1.3 Taxpayer behavioural change is uncertain and challenging 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 impacts on tax revenues. Because of the difficulty of identifying and quantifying taxpayer behavioural change, the Commission's approach is necessarily broad brush. However, the challenges in pinpointing a precise figure to quantify behavioural change does not make it any less important that the Commission must fully consider the potential impact of behavioural change on its forecasts.

1.4 There are different types of taxpayer behavioural responses in response to different situations. The Commission considered three distinct types of taxpayer behavioural responses:

- Marginal tax rate changes: behavioural change in responses to changes in a taxpayers marginal rate of tax. We call this the marginal effective tax rate, or METR, responses.

[1] Scottish Parliament (2018) Budget (Scotland) (No.2) Bill (link)

[2] Scottish Fiscal Commission (2018) Scotland's Economic and Fiscal Forecasts Supplementary Publication Updated Income Tax Forecasts February 2018 (link)

- Average effective tax rate changes: behavioural change in response to changes in a taxpayers average rate of tax (excluding those induced by a change in a taxpayers marginal rate). We call this our AETR response.
- Forestalling: A one-off opportunity to shift the timing of income around tax policy changes to capture a lower rate of tax

1.5 Table 1.1 shows how our February 2018 income tax policy costing breaks down between these three effects.

Table 1.1: Final income tax policy costing

£ million	2018-19	2019-20	2020-21	2021-22	2022-23
Static Costing	**276**	**287**	**302**	**319**	**338**
Behavioural change of which:	**-56**	**-59**	**-63**	**-67**	**-71**
METR effect	-42	-44	-47	-50	-53
AETR effect	-14	-15	-16	-17	-18
Forestalling	0	0	0	0	0
Final Costing	**219**	**228**	**239**	**252**	**267**

Source: Scottish Fiscal Commission. Figures may not sum to totals because of rounding

1.6 Following a brief overview of income tax in Scotland, these three strands of our approach are discussed in more detail in this paper.

2. Background to Scottish income tax

2.1 The Scotland Act 2016 transferred new tax powers to the Scottish Parliament. From 2017-18, the Scottish Parliament took full responsibility for setting non-savings and non-dividend (NSND) income tax rates and thresholds, with the exception of the personal allowance.[3] Since April 2017, the Scottish Government receives all the revenue from income tax on the NSND income of Scottish taxpayers.

2.2 For 2017-18, the first year of operation of the Scotland Act 2016 income tax powers in Scotland, most rates and bands were set at the same level as the UK. The only difference was the higher rate threshold, which was unchanged in cash terms at £43,000 from its 2016-17 UK value – below the level set by the UK Government of £45,000. For Budget 2017-18, income tax revenues were forecast by the Scottish Government with scrutiny of the forecast provided by the Commission.

2.3 From April 2017, the Commission has had responsibility for forecasting income tax revenues, as well as modelling the impact on revenues of changes in policy. The Commission produced forecasts on 14 December 2017 to inform the 2018-19 Draft Budget, based on the policy then announced by the Scottish Government.[4] Subsequently, on 31 January 2018 the Scottish Government announced further income tax policy changes, and as a result the Commission produced updated costings and forecasts.[5]

[3] This is primarily income from employment, pensions and rental income from property.

[4] Scottish Fiscal Commission (2017) Scotland's Economic and Fiscal Forecasts December 2017 (link)

[5] Scottish Fiscal Commission (2018) Scotland's Economic and Fiscal Forecasts Supplementary Publication Updated Income Tax Forecasts February 2018 (link)

3. Overview of taxpayer behavioural responses

3.1 This section provides a general overview of taxpayer behavioural responses. It introduces some important terms, and explains what sorts of behaviour are considered when the Commission talks about behavioural responses. This section also provides a breakdown of the final policy costings and behavioural response estimates for Budget 2018-19.

3.2 Behavioural change covers a wide range of responses of taxpayers to a change in taxes. This 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 or increase their hours worked.
- migration, both into and out of Scotland

3.3 In addition, a divergent UK and Scottish income tax system may create new opportunities for behaviour such as artificially shifting income to or from the UK or migrating into or from Scotland. This will also depend on Scottish taxpayers correctly being identified via their Scottish tax code (S-code).

3.4 It is generally expected that the majority of taxpayers would change their behaviour little in response to a change in taxes, unless the tax changes were very large. 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.

3.5 The response of the highest earners is of greatest interest. These individuals have the largest incentives to change their behaviour. They will also have greater means to change their behaviour, for example the money and connections to access sophisticated and expensive avoidance schemes. Whilst significant changes in behaviour may be limited to a small number of high income individuals, these individuals pay large amounts of tax revenue, and so can have a disproportionate impact on tax revenues.

Box 3.1: Important terms

Taxpayer behavioural response is a complicated area with many technical terms. This box provides an overview and brief explanation of some of the key terms used in this paper.

Average effective tax rate (AETR): This is the proportion of a taxpayer's income which is paid in tax. A taxpayer who earns £60,000 and pays £15,000 in tax, will have an AETR of 25%.

Marginal effective tax rate (METR): 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%.

Intensive margin response: This 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 typically in response to a change in METR.

Extensive margin response: This is a type of behavioural response 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. This type of behaviour is typically in response to a change in AETR.

Tax avoidance: The arrangement of one's financial affairs to minimise tax liability within the law, often through complex and convoluted schemes that are technically within the letter if not the spirit of the law.

Tax evasion: The illegal non-payment or underpayment of tax, for example failing to declare income to the tax authority.

Baseline behaviour: Taxpayer avoidance and evasion behaviour that is already captured in our modelling datasets and is not in response to the income tax policy changes being currently considered.

3.6 Changes in METR will have a different impact on taxpayers to changes in AETR. A change in marginal tax rates will affect an individual's incentive to earn more or less money. It may also affect their incentive to avoid or evade tax on additional income earned. An increase in a taxpayers marginal tax rate will reduce their income from an additional £1 earned. A change in marginal tax rates may affect a taxpayers decision on:

- how hard to work

- how many hours to work
- whether or not to seek a higher paying job or promotion
- how much effort to put in to tax avoidance or evasion

3.7 For example, an increase in marginal tax rates may reduce the incentive to apply for a promotion, as the individual would get to keep less of the additional income earned, whereas the additional effort to get the promotion would stay the same. In technical terms, a change in METR affects a taxpayers decision at the intensive margin.

3.8 Changes in a taxpayer's AETR, induced by changes in tax thresholds or changes in rates below the taxpayers marginal rate, will not directly affect the incentive to earn additional income. A reduction in the higher rate threshold of £1,000 would lead to all higher and top rate taxpayers paying a flat £200 extra tax per year. However, it would not change the amount of tax they would have to pay on any additional income earned. Instead, it will change the total amount of income retained after tax. This will affect incentives on whether or not to earn NSND income and pay NSND income tax in Scotland compared to other options. These types of behavioural responses are known as changes at the extensive margin. An increase in AETR on NSND income may lead taxpayers to:

- leave paid employment, for example to study, volunteer, travel, retire, or care for the family or home
- shift how they receive income, switching from NSND income on which they pay Scottish NSND income tax, to dividends, corporate profits or capital gains, on which they would pay UK income tax, corporate taxes or capital gains tax
- change their tax residence, to change the jurisdiction in which they pay tax; or change their location, for example by choosing not to relocate from rUK to Scotland when they would have otherwise done so

3.9 An increase in AETR may make these other options relatively more attractive. In most cases, this would lead to a total loss of tax revenues. Consider the example of a couple, both of whom initially work, and pay for care for their children. An increase in AETR would reduce their total income from employment, and may mean the couple would be better off overall if one of them left work to provide care for the children themselves.

3.10 Intensive margin responses are more incremental in nature than responses at the extensive margin, which would involve much greater changes in behaviour for an individual taxpayer. Whilst a small change in marginal tax rates may lead to small changes in work effort, an equally small change in average tax rates is less likely to lead to an individual leaving the labour market.

3.11 One important point to note is that all changes in METR will also induce a change in AETR. However, a change in AETR would not necessarily mean a change in METR. In general, for a given scale of effect, we would expect changes in METR to lead to a greater behavioural response than changes in AETR, particularly for taxpayers at the top of the income distribution.

3.12 Modelling behavioural responses to changes in a taxpayer's top marginal rate, which is primarily a change in METR, is discussed in Section 4, whilst behavioural responses to changes in AETR is discussed in Section 5.

Budget 2018-19 policy costings

3.13 Tables 3.1 and 3.2 provide different breakdowns of the policy costings and the behavioural responses from our final Budget 2018-19 forecast. Table 3.1 separates the costing out by each individual sub-component of the policy, while Table 3.2 shows the impact on taxpayers in different income ranges.

3.14 Table 3.1 shows how much each individual sub-component of the income tax policy is expected to raise and how much they affect behaviour in isolation. Whilst the introduction of the 19 per cent starter rate of tax is expected to cost money overall, our costing includes an additional £1 million income tax liabilities from positive behavioural responses. This will include, for example, some individuals on lower incomes moving in to the labour market because of the lower tax rates.

3.15 Most of the behavioural responses are expected to reduce tax liabilities. The increase in the higher rate of tax to 41 per cent, and the increase in the top rate of tax to 46 per cent, are both expected to lead to a loss of income tax liabilities of £20 million to £30 million. Whilst the response of top rate taxpayers is expected to be individually greater, there are a far larger number of higher rate taxpayers, and so the total impact on liabilities is similar.

Table 3.1: Breakdown of policy and behavioural responses by individual component of policy change

£ million	2018-19	2019-20	2020-21	2021-22	2022-23
Static costing of which	**276**	**287**	**302**	**319**	**338**
Introduction of starter rate	-48	-49	-51	-53	-55
Introduction of intermediate rate	140	146	152	160	168
Adjustment to high rate threshold	61	63	67	70	75
Increase in higher rate	95	99	103	109	115
Introduction of top rate	27	29	31	33	35
Behavioural change of which	**-56**	**-59**	**-63**	**-67**	**-71**
Introduction of starter rate	1	1	1	1	1
Introduction of intermediate rate	-6	-6	-6	-7	-7
Adjustment to high rate threshold	-5	-5	-6	-6	-6
Increase in higher rate	-21	-22	-24	-25	-27
Introduction of top rate	-25	-26	-28	-30	-32
Final costing of which	**219**	**228**	**239**	**252**	**267**
Introduction of starter rate	-47	-49	-50	-52	-54
Introduction of intermediate rate	135	140	146	153	161
Adjustment to high rate threshold	55	58	61	64	68
Increase in higher rate	74	76	80	84	88
Introduction of top rate	3	3	3	3	3

Source: Scottish Fiscal Commission. Figures may not sum to totals because of rounding

3.16 Table 3.2 shows the impact on tax liabilities of the policy broken down by taxpayers in different income groups. This shows that most of the behavioural response is driven by taxpayers in the higher and top rate groups.

3.17 When comparing Tables 3.1 and 3.2, it is important to keep in mind that additional rate taxpayers are affected by all of the individual elements of the policy, including the changes to the basic rate limit and higher rates of tax.

Table 3.2: Breakdown of policy and behavioural responses by taxpayer income range, £ million

Income Range 2018-19	Tax Band	2018-19	2019-20	2020-21	2021-22	2022-23
Static costing of which		**276**	**287**	**302**	**319**	**338**
11,850 – 13,850	Starter rate	-2	-3	-3	-3	-3
13,850 – 24,000	Basic rate	-21	-21	-22	-22	-23
24,000 – 43,430	Intermediate rate	51	53	55	57	60
43,430 – 44,273	Move to Higher rate	5	5	5	6	5
44,273 – 150,000	Higher rate	187	193	202	212	224
150,000+	Top rate	56	60	64	69	74
Behavioural change of which		**-56**	**-59**	**-63**	**-67**	**-71**
11,850 – 13,850	Starter rate	0	0	0	0	0
13,850 – 24,000	Basic rate	0	0	0	0	0
24,000 – 43,430	Intermediate rate	-1	-1	-1	-1	-1
43,430 – 44,273	Move to higher rate	-1	-1	-1	-1	-1
44,273 – 150,000	Higher rate	-23	-24	-25	-27	-28
150,000+	Top rate	-32	-34	-36	-39	-42
Final costing of which		**219**	**228**	**239**	**252**	**267**
11,850 – 13,850	Starter rate	-2	-3	-3	-3	-3
13,850 – 24,000	Basic rate	-21	-21	-22	-22	-23
24,000 – 43,430	Intermediate rate	51	52	55	57	59
43,430 – 44,273	Move to Higher rate	4	4	4	5	5
44,273 – 150,000	Higher rate	163	168	177	185	196
150,000+	Top rate	24	26	28	30	32

Source: Scottish Fiscal Commission. Figures may not sum to totals because of rounding

Baseline behaviour

3.18 At any point in time there will be a range of tax avoidance and evasion opportunities available for those looking to reduce their tax liabilities. These continually change as tax authorities clamp down on one opportunity only for a new one to appear elsewhere.

3.19 In aggregate, tax avoidance and evasion behaviour, and the impact on economic incentives of taxes, is already captured in our forecast baseline. The missing income and tax revenues due to avoidance and evasion behaviour do not appear in our SPI income tax dataset, and so our forecast already allows for such behaviour. Our forecasts include an implicit tax gap, between the amount of income tax HMRC actually collects, and a theoretical amount it would collect in the absence of any tax avoidance or evasion.

3.20 If there were a material change in the scale of avoidance or evasion behaviour over time which is not induced by a change in Scottish income tax policies, or we expected such a change over the forecast horizon, this would need to be accounted for in our baseline.

3.21 Such a change in behaviour in the baseline is distinct from behavioural change in response to a particular policy change. We deal with behavioural change in our tax baseline, for example through consideration of the impact of increasing Tax Motivated Incorporations (TMI).

3.22 The focus of this paper is on taxpayer behavioural change in response to income tax policy changes only. Further information on the Commission's judgements and modelling about behaviour change in the forecast baseline is available in our December 2017 report.[6]

[6] Scottish Fiscal Commission (2017) Scotland's Economic and Fiscal Forecasts December 2017 (link)

4. Changes in marginal tax rates

Introduction to Taxable Income Elasticities (TIEs)

4.1 This section sets out further detail on the Commission's approach to modelling behavioural responses to changes in marginal tax rates, including the evidence behind the Commissions TIEs used for Budget 2018-19.

4.2 We account for behavioural responses to changes in a taxpayer's top 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 4.1 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 recent studies by HMRC and estimates by the Institute for Fiscal Studies (IFS) for the UK.

Box 4.1: 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 x F	-4%
(H)	Taxable income		£200,000
(I)	Change in taxable income	G x H	- £8,000
(J)	Change in tax liabilities	I x C	- £3,600

Available research and evidence on TIEs

4.3 Behavioural responses are highly uncertain. This is broadly for two reasons:

- The counterfactual problem - the difficulty of isolating behavioural responses amongst other factors that affect tax revenues, even where extensive data are available
- The context-specific nature of behavioural change

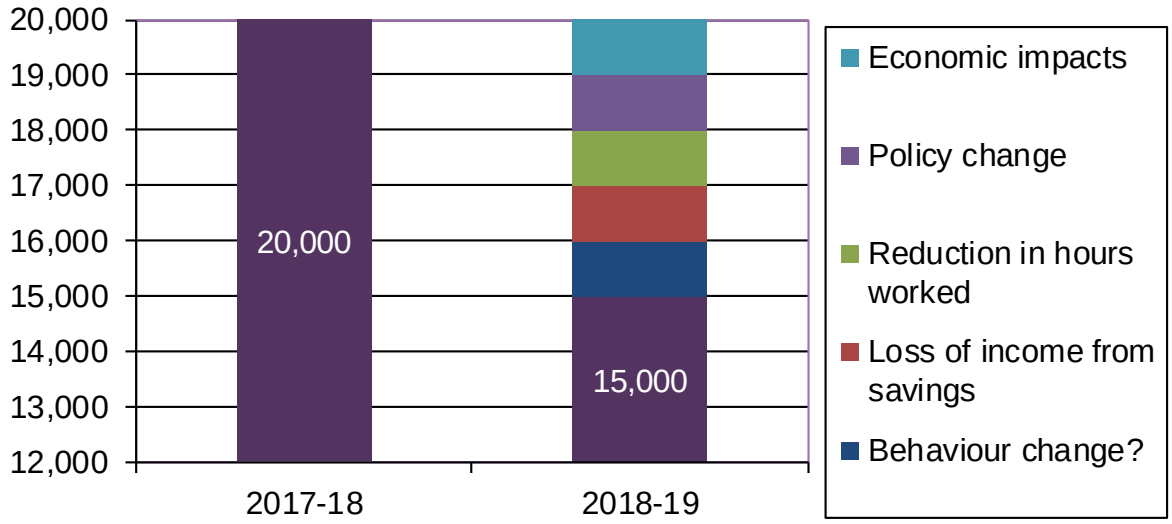
The counterfactual problem

4.4 Behaviour change cannot be directly observed in the data available on tax liabilities. Where detailed historic data on tax liabilities are available, down to the individual taxpayer level, we can observe how reported income and tax liabilities have changed over time. However, we cannot know with certainty why tax liabilities have changed, whether for an individual taxpayer or in aggregate. We cannot know whether or not any particular change in reported income or tax liabilities is due to behavioural change in response to a change in tax policy against all the other factors that affect incomes and tax liabilities.

4.5 For an individual taxpayer, their tax liabilities can change for a number of reasons that have nothing to do with taxation, as illustrated in Figure 4.1. These include:

- general changes in the economy and inflation
- a change in working pattern due to family circumstance
- a promotion
- choosing to save more for retirement by increasing pensions contributions, leading to reduced income tax liabilities

Figure 4.1: Illustrative change in tax liabilities for an individual taxpayer, £



Source: Scottish Fiscal Commission

4.6 Figure 4.1 displays an illustrative example of an income taxpayer who had tax liabilities in 2017-18 of £20,000 and £15,000 in 2018-19, a reduction of £5,000. The coloured bars show examples of the generally unobservable factors behind this change. For any change in tax liabilities following a change in policy, it is very challenging to disentangle the impact of behavioural change amongst other factors.

4.7 There are various analytical approaches to trying to isolate behavioural change in response to changes in tax policy. These generally involve trying to estimate what a taxpayer's liabilities would have been without a change in policy – the counterfactual – and comparing this to actual tax liabilities, whilst subtracting off the mechanical or static impact of the policy change.

4.8 This can only be attempted when detailed taxpayer data are available for a large number of taxpayers over a long period of time. By understanding how tax liabilities change over time in the absence of policy change, in a year in which a policy change is introduced, estimates can be made of what liabilities would have been without the change in policy.

4.9 Even where a long run of detailed taxpayer data are available, the behavioural change estimate will still be uncertain and subjective. The results will depend on the analytical approaches used, and the analysis may produce a range of estimates.

4.10 These challenges will remain in the future. Detailed 2018-19 income tax data will not be available until 2020. Whilst the Commission will do as much as it can to evaluate in detail the impact of these policy changes on income tax liabilities as data become available, the counterfactual problem will mean that we will never have a single definitive answer.

Context-specific nature of behavioural change

4.11 Another difficulty in modelling behavioural change in Scotland is the context-specific nature of behavioural change. The way taxpayers respond to a change in taxes will depend on a number of factors, which will differ over time and across different tax jurisdictions. These include:

- labour market structures
- which taxpayers are primarily targeted by any particular change in tax policy
- cultural attitudes towards taxation
- the system of tax collection
- the rules governing tax liabilities and collection
- the breadth and strength of enforcement by the tax collection agency
- ease of migration to other tax jurisdictions (based on practical, geographic, cultural and economic factors)

4.12 As far as the Commission is aware, there are no studies of taxpayer behavioural responses specifically relating to Scotland. In part, this is due to the limited availability of detailed historic Scottish taxpayer data, particular covering the short period when Scotland has had its own income tax policy.

4.13 This means that the Commission must look to evidence from other countries. However, no country or tax jurisdiction is a perfect proxy for income tax policy in Scotland in 2018. The available evidence is a starting point only for the consideration of behavioural responses in Scotland, and any resulting methodologies will be broad-brush.

Available evidence

4.14 The available evidence suggests a broad range of TIEs across different countries, income levels, type of policy change and over time. However, there are some issues that most of the literature is in agreement on:

- taxpayer behavioural responses are highly uncertain
- despite this, taxpayer behavioural responses can be significant and must be considered as part of any tax forecast
- the scale of taxpayer behavioural responses will be highest for those with the highest incomes

4.15 As taxpayer behavioural responses tend to be largest for those with the highest incomes, most of the available literature focuses on changes in the top rate of tax.

4.16 Evidence submitted to the Finance and Constitution Committee by David Bell concluded: [7]

"The worldwide evidence on behavioural responses to tax changes tends to agree only on the belief that higher income tax rates will lead to behaviours that have a negative effect on tax revenues. These include reducing labour supply, tax avoidance and migration. There is some evidence for each of these kinds of response, but their applicability to Scotland is difficult to judge.

Particularly important are the responses of high income earners who generate a disproportionate share of Scotland's income tax revenues. There is certainly evidence of avoidance behaviour occurring as the additional rate was introduced and then changed."

4.17 And from HMRC's 2012 paper on the introduction of the 50p additional rate of tax: [8]

"The analysis shows that there was a considerable behavioural response to the rate change…. The modelling suggests that underlying behavioural response was greater than estimated previously…. Decreasing the pre-behavioural yield by at least 83 per cent… Although there is uncertainty around these estimates, sensitivity testing demonstrates that [it] is difficult to construct a plausible outcome consistent with a yield estimate as high as those original forecasts [with lower TIEs]."

4.18 In November 2017, the Institute for Fiscal Studies (IFS) published three working papers as part of a series in "Estimating the responsiveness of top incomes to tax". [9] [10] [11] In their summary briefing note, they state: [12]

"…Different methods and different assumptions lead to central estimates of the relevant [TIE] elasticity that range from 0.31 to around 1, and moreover, there is significant statistical uncertainty around these central estimates. Beyond this, different assumptions about the precise nature of the behavioural responses being captured by the income elasticities estimated mean that a

[7] David Bell (2015) Behavioural Responses to Change in Income Tax Rates: What Will Happen in Scotland? (link)

[8] HMRC (2012) The Exchequer effect of the 50 per cent additional rate of income tax (link)

[9] J. Browne and D. Phillips (2017) Updating and critiquing HMRC's analysis of the UK's 50% top marginal rate of tax (link)

[10] J. Browne and D. Phillips (2017) Estimating the size and nature of responses to changes in income tax rates on top incomes in the UK: a panel analysis (link)

[11] S. Adam, J. Browne, D. Phillips and B. Roantree (2017) Frictions and taxpayer responses: evidence from bunching at personal tax thresholds (link)

[12] J. Browne and D. Phillips (2017) Estimating the responsiveness of top incomes to tax: a summary of three new papers, IFS Briefing Note (link)

given elasticity estimate can translate into quite different revenue effects from a given tax change…"

4.19 The IFS report provides a summary table which is replicated below. Please see the IFS report for further details. Broadly, it shows a wide range of elasticity estimates implying a high degree of uncertainty about the revenue effects of changing the top rate of income tax in particular. As Table 4.1 shows, the evidence available from various studies on the impact of changing the top rate of tax in the UK could lead to either a loss or gain of tax revenues from an increase in the top rate of tax by five percentage points. At one end a five percentage point increase in the additional rate of tax in the UK could raise an estimated £2.8 billion, or at the other end lead to a loss of revenues of £4.4 billion.

Table 4.1: IFS report on revenue effects of a 50 per cent top income tax rate under different TIEs and assumptions about behavioural responses for the UK

	Elasticity	Revenue effect of increasing top rate of income tax from 45% to 50% (£ billion)		
		A*	B	C
Browne and Phillips, lower bound of confidence interval for taxable income elasticity (three year average method)	0.09	+2.6	+2.7	+2.8
Browne and Phillips, central estimate for taxable income elasticity (three-year average method)	0.31	+0.8	+1.1	+1.5
HMRC central estimate	0.48	-0.6	-0.1	+0.5
Browne and Phillips, central estimate for broad income elasticity (three-year average method)	0.71	-2.4	-1.8	-0.9
Browne and Phillips, estimate for 2011-12 using updated forestalling assumptions and assuming some 'reverse forestalling'	0.80	-3.1	-2.4	-1.5
Browne and Phillips, estimate for 2011-12 using updated forestalling assumptions	0.95	-4.4	-3.5	-2.4

Source: IFS (link)

*Approaches A, B and C refer to a range of analytical approaches to estimating the revenue impact of a change in policy including or excluding various factors. Please see the IFS report for further details.

4.20 The IFS material is provided primarily to show that, even in the UK where more comprehensive data are available on an historic tax change, there are a wide range of estimates of the impact of a change in the top rate of tax.

4.21 The Commission has done some further research to look at the TIEs available from other studies. The table below shows some TIEs estimated for other countries for historic changes in tax policy.

Table 4.2: TIE literature review

Author	TIE estimates		Comments
	Income range	TIE	
Gruber and Saez (2002)[13]	All income $10,000 - $50,000 $50,000 - $100,000 $100,000 and above	0.40 0.18 0.11 0.57	Research based on official US tax returns from the 1980s.
Kopczuk and Wojceich (2005)[14]	All income High earners	0.21 0.57	Research from University of Michigan US tax returns data for the 1979 - 1990 period.
Brewer, Saez and Shepard (2008)[15]	Top 1% of earners, short-run Top 1% of earners, long-run	0.08–0.41 0.64–0.86	UK study - looked at incomes of richest 1% and 5% between 1962 - 2003.
Giertz and Seth (2010)[16]	Up to $10,000 Up to $50,000	0.30–0.36 0.33–0.54	Used official US tax returns (1989 - 1995)
Saez, Slemrod and Giertz (2012)[17]	Top 1% of earners Top 2% to 10% of earners Next 49% of earners	0.58–0.82 0.47 0.50	Looked at official US tax returns over the 1960 - 2006 period.
Kleven, Jacobsen, Schultz and Anton (2014)[18]	All income	0.20–0.30	Uses a series of Danish tax reforms and population-wide administrative date since 1980.
Burns and Ziliak (2017)[19]	All incomes	0.40–0.55	Two-year matched panels of US Current Population Survey (CPS) for 1980-2009

4.22 As with the conclusion of the IFS study, Table 4.2 shows a broad range of TIE estimates from different studies, with estimates of TIEs as high as 0.9 for the highest earners.

[13] Gruber and Saez (2002) The Elasticity of Taxable Income: Evidence and Implications, (Journal of Public Economics, 84, 1-32)

[14] Kopczuk and Wojceich (2005) Tax Bases, Tax Rates, and the Elasticity of Reported Income, (Journal of Public Economics 89 (11-12): 2093-2119)

[15] Brewer, Saez and Shephard (2008) Means-testing and tax rates on earnings, IFS (link)

[16] Giertz and Seth (2010) The Elasticity of Taxable Income during the 1990s: New Estimates and Sensitivity Analyses, (Southern Economic Journal 77 (2): 406-33)

[17] Saez, Slemrod and Giertz (2012) The elasticity of Taxable Income with Respect to Marginal Tax Rates: A Critical Review, (Journal of Economic Literature 50(1), 3-50)

[18] Kleven, Jacobsen, and Schultz (2014) Estimating Taxable Income Responses Using Danish Tax Reforms, (American Economic Journal: Economic Policy, 6(4): 271-301)

[19] Burns and Ziliak (2017) Identifying the Elasticity of Taxable Income. Econ J, (127: 297–329)

4.23 However, as discussed, it is unclear how close a proxy any of these estimates are for the current Scottish context. We will continue to monitor the literature as it develops, but it is unlikely that any one study will provide a definitive result.

The TIEs used by the Scottish Fiscal Commission

4.24 The Commission used the TIEs estimated in the academic literature and by HMRC as a starting point in considering the behavioural response to income tax policies introduced in 2018-19. However, there is no full meta-study to bring these TIEs together with a clear conclusion. If such a study existed it would not be clear how applicable it is to Scotland.

4.25 The estimated TIEs available are on a range of bases and definitions. The Commission applies TIEs to changes in a taxpayers top marginal rate of tax, primarily inducing a change in METR, and uses a separate approach for estimating behavioural responses to changes in AETR induced by changes to tax excluding the taxpayers marginal rate. This is in line with the approach used by HMRC, but different studies may have different approaches to these types of response.

4.26 Again, this means the TIEs we use and our overall approach to behaviour is broad-brush. We believe that the approach we used in our recent forecasts was central, but with a wide range of uncertainty.

4.27 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. 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.

4.28 On balance, the Commission's 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 that the Commission judges TIE's for those with the very highest incomes to be greater in Scotland than in the UK.

4.29 The Commission also considered the impact of increasing TMI behaviour in recent years on our TIE's. While there is no mechanical relationship, the general increase in TMI behaviour in recent years is another factor giving us greater confidence in having somewhat higher TIEs for Scotland than has been estimated for the UK in the past.

4.30 This does not mean that there will be relatively higher behavioural response in Scotland in absolute terms. The UK has a relatively greater number of very high earners with relatively higher incomes. However, this is accounted for in the process of calculating the behaviour response given a particular TIE. The Commission's greater TIEs for Scotland means that, for an individual taxpayer earning a given amount per year, their response to a policy change would be greater in Scotland than in the rest of the UK.

4.31 Our selected TIEs are subjective and broad brush and attempt to reflect the risks and the range of evidence available on behavioural change. These TIEs were judged appropriate for the particular policy being introduced. For different changes in policy, the Commission might consider different TIEs or additional types of behaviour.

4.32 For example, there were limited changes in policy affecting the lower part of the income distribution, and the Commission adopted relatively low TIEs for this group. However, the behavioural response of those on lower incomes can be significant, particularly at the extensive margin in terms of labour market responses. If a new policy were introduced that had a greater impact on the lower part of the income distribution, the Commission may undertake further analysis or adapt its TIEs to capture this particular effect.

4.33 Table 4.3 shows the TIEs used by the Commission in its Budget 2018-19 forecasts.

Table 4.3: SFC Budget 2018-19 TIE assumptions

Taxable income start (£)	Taxable income end (£)	Intensive elasticity
Low	Basic rate limit	0.015
Basic rate limit	80,000	0.10
80,001	150,000	0.20
150,001	300,000	0.35
300,001	500,000	0.55
500,001	High	0.75

Source: Scottish Fiscal Commission

4.34 The Commission disaggregated TIEs for top rate taxpayers in Scotland, applying a TIE of 0.75 for those earning over £500,000 a year. This is towards the top end of the TIEs available from the literature, and is applied to around 0.06 per cent of all Scottish income tax taxpayers.

4.35 For the purposes of comparison, we can weight our TIE's together to calculate a single figure for top rate taxpayers. This shows that our average effective TIE for additional rate taxpayers is 0.51, compared to HMRC's estimate of 0.48.[20] As discussed above, HMRC's TIE does not explicitly consider the greater risk for Scotland of intra-UK migration and the total loss of tax revenue from certain behavioural changes.

Applying TIEs in our latest costings

4.36 In our February 2018 report we published our latest estimate of behavioural responses to the announced policies. A breakdown of this is shown in Table 1.1 of this paper.[21] Table 4.4 below shows the impact on revenues of applying our TIEs in isolation, capturing the impact of changes in a taxpayers top marginal rate.

Table 4.4: Impact on revenues of TIE behavioural response to a change in METR Budget 2018-19 policy change

£ million	2018-19	2019-20	2020-21	2021-22	2022-23
METR behavioural response	-42	-44	-47	-50	-53

Source: Scottish Fiscal Commission

4.37 In this paper we have provided an example calculation of our TIEs (see Box 4.1) and our behavioural results from our latest costing work. A workbook

[20] HMRC's 0.48 TIE is based on all forms of income tax taxable income including savings and dividends. However, our application of the 0.51 TIE is applied to NSND income only.

[21] Scottish Fiscal Commission (2018) Scotland's Economic and Fiscal Forecasts Supplementary Publication Updated Income Tax Forecasts February 2018 (link)

published alongside this report shows the steps of the calculation of our behavioural analysis in greater detail for 2018-19.[22]

[22] Scottish Fiscal Commission (2018) Income tax behavioural responses detailed workbook calculation (link)

5. Changes in average effective tax rates

5.1 This section provides detail on the second type of behavioural change considered by the Commission, changes in behaviour in response to changes in average tax rates.

5.2 Gathering evidence on responses to changes in AETR, excluding changes in a taxpayer's marginal tax rate, faces the same challenges discussed in Section 4 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. Overall, this type of behavioural response is expected to have a lesser impact on tax revenues for the income tax policy announced at Budget 2018-19.

5.3 Table 5.1 shows the AETR factors assumed by the Commission in its Budget 2018-19 forecasts.

Table 5.1: Scottish Fiscal Commission AETR factor assumptions

Taxable income start (£)	Taxable income end (£)	Extensive factor
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

5.4 The factors apply directly to the change in liabilities of the taxpayer. Whilst a change in METR will also affect AETR, the factor strictly applies to changes in liabilities from changes in AETR as a result of changes in tax policy excluding a change in the taxpayers marginal rate.

5.5 For example, for a top rate taxpayer, an increase in the additional 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 additional rate, for example a change in the higher rate of tax.

5.6 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.

5.7 Box 5.1 sets out an example calculation for applying the Commission's AETR elasticity.

Box 5.1: 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 taxpayer's 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

AETR factor in our February 2018 costings

5.8 Table 5.2 presents our estimates of the impact on tax revenues of behavioural change from our AETR factors.

Table 5.2: Impact on revenues of TIE behavioural response to Budget 2018-19 policy change

£ million	2018-19	2019-20	2020-21	2021-22	2022-23
AETR factor response	-14	-15	-16	-17	-18

Source: Scottish Fiscal Commission

5.9 We provide full details of the costing from our February 2018 report in a workbook published alongside this paper.[23]

[23] Scottish Fiscal Commission (2018) Income tax behavioural responses detailed workbook calculation (link)

6. Forestalling

6.1 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 can only happen as a one-off in response to a change in policy.

6.2 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.

6.3 For example, if an individual is expecting to receive a bonus from their employer in May 2018, but finds that, due to a change in tax policy, their marginal tax rate will increase between tax year 2017-18 and 2018-19, they may be able to negotiate with their employer to bring their bonus forward to March 2018. This would mean they pay a lower tax rate on that bonus, because of it appearing in tax year 2017-18, rather than in tax year 2018-19. This behaviour is known as forestalling.

6.4 For Budget 2018-19, we did additional modelling to capture this one-off and time limited effect in response to the policies introduced.

6.5 The Draft Budget 2018-19 announced a new income tax structure for financial year 2018-19, with a higher top rate of tax. This notice period for taxpayers creates an opportunity to bring forwards the timing of their NSND income from 2018-19 and in to 2017-18 to benefit from a more favourable tax rate. As discussed in our December 2017 forecast publication, we assessed the forestalling effects of the new income tax policy to be negligible.[24]

6.6 The judgement of a negligible forestalling response to the particular announced policy was based on a broader assessment of forestalling responses to a range of potential policy options. We published some of the detail of this broader assessment at the time, providing the calculation we used to assess the level of forestalling in response to different increases in the top rate of tax.

6.7 Since the publication of Scotland's Economic and Fiscal Forecasts (SEFF) December 2017 the Commission has found an analytical error in its forestalling analysis. This does not affect its forecasts or costings. The figures provided in this section have been corrected and are different to those provided in Table 3.11 of the SEFF December 2017. Further information is provided in Annex A.

[24] Scottish Fiscal Commission (2017) Scotland's Economic and Fiscal Forecasts December 2017 (link)

Evidence on forestalling

6.8 We expect the majority of forestalling responses to occur in the top rate population. 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

6.9 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; and
- company share schemes.

6.10 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.

HMRC and OBR evidence on 2009-10 UK income forestalled

6.11 OBR's 2013 Forecast Evaluation Report (FER) provides estimates of the impact on income tax liabilities of forestalling behaviour as a result of the UK introducing the 50 per cent additional rate of income tax in 2010-11.[25] This was an increase in tax rates of ten percentage points, from the previous rate of 40 per cent. These estimates are shown in Table 6.1.

Table 6.1: OBR and HMRC estimates of impact on tax receipts from forestalling activity following introduction of 50 per cent additional rate of tax [26]

£ billion	2009-10	2010-11	2011-12	2012-13
PAYE	4.4	-3.9	-0.7	0.0
Self-Assessment	0.0	2.4	-2.2	-0.5

Source: OBR (2013) impact of forestalling on income tax receipts (link)

6.12 This section will discuss the technical details of the calculation and the underlying judgements in more detail.

[25] OBR (2013) Forecast Evaluation Report (link)

[26] The table presents estimates on a receipts basis, that is, when cash is received by HMRC. SA payments are due later than through PAYE, hence the impact of forestalling on SA appearing in 2010-11 rather than 2009-10. On a liabilities basis, the timing of the impact on PAYE and SA can be expected to be the same.

6.13 The table shows that both PAYE and Self-Assessment (SA) taxes were brought forward, with an increase in tax receipts initially followed by an offsetting loss in later years. In aggregate, forestalling activity leads to a loss of tax receipts of around £0.5 billion.

6.14 In addition to evidence from the OBR and HMRC, the Commission had discussions with tax experts about the scope and likelihood of forestalling in Scotland. This confirmed that forestalling was an important factor to consider depending on the details of the policy being introduced.

Calculation of forestalling effect in Scotland

6.15 In order to estimate forestalling in Scotland following an increase in the top rate in 2018-19, we used the evidence from HMRC and the OBR presented in Table 6.1.

6.16 We assume that the £4.4 billion of receipts forestalled is equivalent to £11 billion of taxable income forestalled. This is calculated by dividing £4.4 billion by 40 per cent, the marginal tax rate on the income forestalled by taxpayers at the time.

6.17 From this starting point, we need to consider a number of factors to adjust the evidence to the Scottish context. The steps we go through are:

1. To take account of the change in the top rate in Scotland applying to NSND income only
2. To take account of the smaller number of and relatively lower income of top rate taxpayers in Scotland
3. To take account of different scales of changes in the top rate (for example a one percentage point increase compared to a 10 percentage point increase)
4. To take account of the timing of an announcement. Short notice between the tax change being announced and being implemented may limit the scope for forestalling

Step 1. Adjusting for NSND income

6.18 Table 6.2 provides information on the levels of forestalling for both PAYE and SA. As the self-assessment figure includes forestalling from both dividends and SA, we disregard this evidence and focus on the response in PAYE receipts.[27] We assume the behavioural response in PAYE receipts are a suitable proxy for NSND income.

[27] All additional rate taxpayers, that is, individuals earning over £150,000, will have to submit a Self-Assessment tax return. However, for those additional rate taxpayers with employment income, this will still be paid via PAYE.

6.19 However, the PAYE response does not include the impact of forestalling in self-employment income. Therefore, we scale up the impact on receipts in line with self-employment income as a share of all income from employment. This makes the implicit assumption that the scale of the behavioural response for self-employment income is the same as the response in employment income. To the extent that there are greater opportunities to forestalling self-employment income, this may somewhat underestimate the scale of the forestalling effect. Table 6.2 shows how the Commission scales the PAYE forestalling estimates from the OBR to take account of self-employment income.

Table 6.2: Scaling forestalling estimate to include self-employment income

	2009-10
UK PAYE forestalled (A) (£ billion)	11.0
Factor to adjust for self-employment income (B) (%)	15.5
Self-employed forestalling (C= A * B) (£ billion)	1.7
Total UK NSND income forestalled (A+C) (£ billion)	12.7

Source: OBR, ONS, Scottish Fiscal Commission

Step 2. Adjusting for size and income of top rate population in Scotland

6.20 To apply the forestalling effect in Scotland we need to adjust for the relative size and income level of the top rate taxpayers in Scotland. To do this, we estimate the scale of the forestalling effect in the UK as a share of total NSND income of the additional rate population, then scale this for the relative size and income level of the top rate population in Scotland. This calculation is shown step-by-step in Table 6.3.

Self-Assessment returns will primarily capture non-employment forms of income. Though not perfectly related, the Commission judges PAYE to be the best proxy for NSND.

Table 6.3: Scaling forestalling estimates for size and income level of Scottish top rate population

	2009-10
Total forestalling from Table 6.2 (A) (£ billion)	12.7
Total UK additional rate NSND income (B) (£ billion)	103.7
Forestalling as a share of NSND income UK (C = A/(B-A)) (%)	14.0
Scottish share of NSND taxable income from AR taxpayers (D) (%)	16.6
UK share of NSND taxable income from AR taxpayers (E) (%)	26.7
Scottish scaling factor (F = D / E) (%)	62.2
Forestalling as a share of NSND income Scotland (G = C x F) (%)	8.7

Source: Scottish Fiscal Commission

6.21 Table 6.3 shows that, for an equivalent change in taxes in Scotland and the same scale of behavioural response, the forestalling response is expected to equal 8.7 per cent of NSND income of top rate taxpayers.

Step 3. Apply judgement for the scale of the tax change

6.22 The OBR estimates in Table 6.1 are in the context of a ten percentage point increase in the additional rate. For smaller changes in tax rates, we would expect a lesser amount of forestalling activity. The Commission made a set of judgements about the scale of forestalling activity in response to different changes in the top rate.

6.23 The greater the difference between tax rates in one year and another, the greater the incentive for taxpayers to forestall. Forestalling is likely to have some costs associated with it, such as time and effort spent reorganising one's finances, the cost of paying for professional help to manage one's finances, and the practical costs to an individual or a business from adjusting the timing of payments. Individuals will also have some inertia, and may not change their behaviour for relatively small gains. These relatively fixed costs of behavioural change will create a hurdle, below which point the gain from forestalling income is simply not attractive enough for small changes in tax rates. Past a certain point, for larger changes in tax rates, forestalling will become more attractive to larger numbers of taxpayers.

6.24 The Commission's judgement is that the degree of forestalling will be highly non-linear between a one percentage point change and the ten percentage point change when the 50 per cent rate was first introduced. For small differences, taxpayer behavioural change will be limited. At a point where the difference between tax rates is sufficiently large, forestalling activity will increase rapidly. With limited evidence, the Commission made a judgement on the degree of forestalling activity, relative to the ten percentage point increase, for a range of potential policy changes. These scaling adjustments relative to a ten percentage point increase are shown in Table 6.4.

Table 6.4: Relative impact on forestalling activity of different changes in the top rate of tax relative to a 10 percentage point increase

New top rate in 2018-19	46	47	48	49	50
Forestalling share (%)	0	25	50	75	80

Source: Scottish Fiscal Commission

6.25 The Commission's judgement is that, for a one percentage point increase in the top rate to 46 per cent, this will have a negligible impact on forestalling behaviour, and so the forestalling share is zero per cent. This share increases for greater increases in the top rate of tax, with the assumption that a five percentage point increase in the top rate would lead to 80 per cent of the forestalling effect as a ten percentage point increase.

Step 4. Judgement on impact of timing of announcement

6.26 For the introduction of the 50 per cent additional rate of tax in 2010-11, taxpayers had around twelve months to respond. The later the announcement of a change in taxes, the less time taxpayers have to change their behaviour and shift the timing of income. The Scottish Government's top rate policy has been announced with more than three months before the end of the tax year. Our judgement is that taxpayers will have sufficient time to bring forward their income, and no adjustment is made to account for the difference between twelve months' notice and three.

Conclusion

6.27 Table 6.5 brings the above calculations together to create the final estimates of the impact on liabilities of forestalling activity in response to a change in the top rate of tax. As noted at the start of this section, this table has been corrected since SEFF December 2017 following the discovery of an analytical error. Further details are available in Annex A.

Table 6.5: Final calculation of behavioural responses

New top rate in 2018-19 (A) (%)	46	47	48	49	50
Forestalling share (B) (%)	0	25	50	75	80
2017-18 estimated NSND taxable income of Scottish top rate taxpayers (C) (£m)	5,263	5,263	5,263	5,263	5,263
Forestalling/total income (Scotland) (D) (%)	8.7	8.7	8.7	8.7	8.7
Taxable income shifted (E=B*C*D) (£ million)	0	114	229	343	366
Gain of tax in 2017-18 (45%*E) (£ million)	0	51	103	154	165
Loss of tax in 2018-19 (A*E) (£ million)	0	54	110	168	183

Source: Scottish Fiscal Commission

6.28 While the Commission considers forestalling activity to be significant for larger changes in the top rate, the Commission's judgement is that the impact of

forestalling activity for a one percentage point change is not of sufficient magnitude to include an adjustment.

6.29 The Commission will keep these models and underpinning judgements under review.

Table 6.6: Impact on revenues of forestalling behavioural response to Budget 2018-19 policy change

£ million	2018-19	2019-20	2020-21	2021-22	2022-23
Forestalling response	0	0	0	0	0

Source: Scottish Fiscal Commission

Annex A: Correction notice

A.1 An analytical error has been found in the forestalling analysis published in the Commission's December 2017 report Scotland's Economic and Fiscal Forecasts (SEFF December 2017), Table 3.11.[28] This analytical error does not affect the Commission's forecasts or policy costings. In line with the Commission's voluntary compliance with the Statistical Code of Practice, we are alerting our users to this analytical error in this report, which contains corrected values.[29]

A.2 Table 6.1 of this report - the OBR's estimates of forestalling responses - contains information on income tax receipts forestalled. For the calculation presented in December, these values were mistakenly treated as if they were taxable income forestalled. This led to the Commission underestimating the impact on income tax liabilities given a particular level of forestalling response. However, it does not change the Commissions judgement that an increase in the top rate of tax from 45 per cent to 46 per cent will lead to a negligible forestalling response.

A.3 Table A.1 provides a corrected version of Table 3.11 from SEFF December 2017.

Table A.1: Forestalling assumptions and impact on income tax liabilities

Increase in additional rate (% point)	Relative degree of forestalling (%)	Taxable income shifted (£m)	Gain of tax liabilities in 2017-18 (£m)	Loss in tax liabilities in 2018-19 (£m)	Net loss (£m)
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. Figures may not sum to totals because of rounding

[28] Scottish Fiscal Commission (2017) Scotland's Economic and Fiscal Forecasts December 2017 (link)

[29] Scottish Fiscal Commission (2018) Voluntary Compliance with Code of Practice (link)

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