

**Behavioural Responses to Changes in Income Tax Rates:  
What Will Happen in Scotland?**

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## 1. Introduction

This paper discusses behavioural responses to changes in income tax rates. With Scotland about to take control of income tax bands and rates, this is now a relevant issue for the Scottish Parliament. We address a number of issues in the paper:

What kind of response might we expect when income tax rates change?

What responses have been observed in practice and how far are the lessons from this evidence applicable to Scotland?

We address these in turn.

## 2. Responses to changes in income tax

An increase in tax on labour income implies a reduction in workers real wages - the amount of goods and services that they can buy. In response to an increase in tax, workers could:

- ignore the cut in their real wage and continue to work as they did before
- reduce the labour they are willing to supply because taking time off is now less costly
- increase their working time or seek a more attractive job offer to maintain their real wage

Economists describe the responsiveness of work to changes in tax rates as the “elasticity of labour supply”. Precisely, the elasticity measures the percentage change in working time supplied for a small percentage change in real wages. There is no theoretical reason why any of the responses listed above should not happen. In the population, there are likely to be some workers who ignore the cut, some who increase their labour supply and some who reduce it. What matters as far as governments wishing to increase their tax revenues are concerned, is how these three groups balance out.

Thus, suppose that an increase in income tax cause real wages to fall by 1% and that, on average, workers reduce their hours by 0.5%. Then the value of the elasticity of labour supply is 0.5. This will mean that the government gathers less revenue than it might have expected had workers chosen not to reduce their labour supply. To anticipate some of the empirical results that we discuss subsequently, from now on we assume that tax increases have a negative effect on labour input.

Reducing their hours of work is not the only adjustment that workers might make. They could:

### 1. **Withdraw from the labour market altogether:**

This could involve retiring or concentrating on other non-market activities – such as volunteering, caring or looking after children. This might cause an increase in payments of state benefits. Therefore, since most benefits will continue to be paid by DWP, withdrawal from the labour market could have implications for Scotland under the second “no detriment” principle as defined in the Smith Commission report.

### 2. **Migrate to a jurisdiction with lower tax rates:**

This behaviour would only be rational if the returns to migration exceed the costs. These costs include the monetary, social and psychological costs associated with moving. Social and psychological costs include the effects of moving away from friends or family and other social networks.

Note that these costs would also apply to migrants considering a move **to** Scotland. If Scotland is perceived, or expected, to be a high tax jurisdiction then the flow of migrants

into Scotland could be reduced if the higher tax rates in addition to the social and psychological costs deter immigrants. This would be potentially very damaging for the Scottish economy, but is extremely difficult to measure.

The benefits from migration will be realised over the remainder of the persons working life if the move is permanent. Thus migration tends to be concentrated among the young who can offset the costs of migration because they can realise the gains from migration – lower tax rates - over the remainder of their working life. Migration is also focused on high earners, for whom the fixed costs of moving are less significant. Increased emigration and/or reduced immigration will reduce economic activity in Scotland below what it would otherwise have been. Therefore there will also be a reduction in receipts from other taxes in Scotland, which would affect UK revenues. Whether this effect is relevant under the “no detriment” principle depends on whether the net migration flows are to the rest of the UK, which would result in offsetting increases in taxes there, with perhaps only a marginal effect on UK government revenues. On the other hand if increased taxes in Scotland increases emigration from the UK as a whole, then HMRC could argue that this action has reduced its revenues from national insurance, VAT, excise duties etc.

Finally, it is often whole households rather than individuals who migrate. Thus migrants often include children and partners. Given that migration tends to be concentrated in younger age groups, this can have a negative effect on demographic structure. This has been the recent experience of several Eastern European countries and was the historic experience of Scotland (During the period 1950-2000, Scotland experienced net emigration of around 900,000 (own estimates)).

**3. Continue to work the same number of hours, but reduce effort:**

Workers have less incentive to seek advancement within their workplace. They continue to work the same number of hours but their contribution to firm output falls. This can only happen where worker output is not closely monitored. It would have the effect of reducing company profits.

**4. Bargain for higher wages:**

This is what Picketty, Saez and Stantcheva (2013) refer to as “compensation bargaining”. This idea captures the notion that workers bargain to increase their wages when confronted by a tax increase. If successful, workers maintain their wages but again company profits are reduced. Many large companies have “equivalisation” schemes in place to ensure that workers are not disadvantaged by the local tax system when posted to a new jurisdiction. Nevertheless, reduced profits will act as a disincentive to companies extending their activities in high tax jurisdictions.

**5. Switch the way in which their income is accounted for:**

Typically this would mean taking income as profits rather than earnings and would require the individual to be a sole proprietor, a partner or an incorporated business. This would mean that the worker could opt to be taxed on his/her profits rather than his/her earnings and thus take advantage of whichever rate of tax was lower. There are around 300,000 self-employed workers in Scotland. 330,000 small and medium-sized enterprises in Scotland with less than 50 employees. It is difficult to know how many of these individuals might be able to take advantage of income switching and also how many would benefit from so doing. Again,

there will be costs associated with switching and the procedure is likely to be most attractive to the relatively well-rewarded. Note that this method of avoiding higher tax rates will not have any other implications for the receipts of other taxes in Scotland or for overall economic activity.

Responses to tax changes are not limited to income tax. All taxes reduce individuals' ability to consume goods and services. While this argument clearly applies to direct taxes (taxes on income), it also applies to indirect taxes (taxes on goods and services). Reductions in income may cause individuals to change their behaviour, which in turn may have adverse consequences for the economy, such as lowering aggregate income and increasing unemployment.

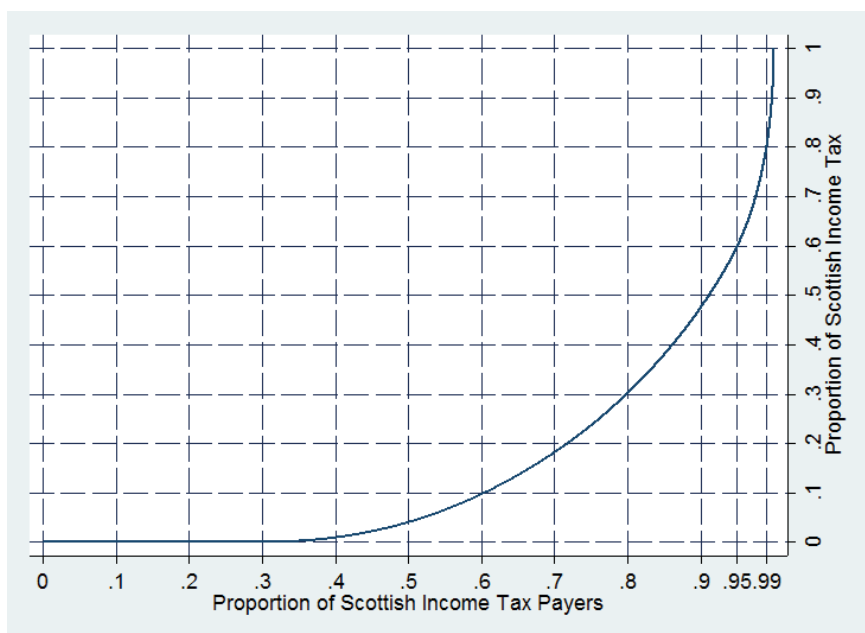
Some taxes are introduced to deter what are seen as bad behaviours. A good example of this is the recently introduced charge on carrier bags. However most taxes are taxes on good behaviours, such as working. The hope is that they do not alter the good behaviours substantially, while simultaneously raising as much revenue as possible so that government can fund its public services.

### What key facts do we know about income taxpayers in Scotland?

Before we review the empirical evidence on the effects of varying income tax rates, it is worth noting some important facts around how income tax payments are distributed across the Scottish population. Because Scotland has a very unequal distribution of income, it follows that the amount of income tax paid varies widely across taxpayers: some pay a lot; most pay very little.

This is best explained in Figure 1, which shows the proportion of total income tax paid by Scottish taxpayers ordered from those with least income (0 on the horizontal scale) to those with most income (0.99 on the horizontal scale). Reading from the horizontal scale and then from the vertical scale shows that the poorest 60 per cent of Scottish income taxpayers pay only 10 per cent of Scotland's total income tax revenues. The poorest 90 percent of Scottish taxpayers contribute just under 50 per cent of total income tax revenue.

Figure 1: Lorentz curve for Scottish taxpayers 2010-11



This means that the richest 10 per cent of taxpayers pay more than 50 percent of income tax revenues. And the top 5 per cent of tax payers (those to the right of 0.95 in Figure 1) contribute 40

per cent of Scottish tax revenue. There are around 2.6 million taxpayers in Scotland – 5 per cent of these comprise around 130,000 people. Income tax will be the Scottish Government’s main future revenue source, but a large proportion of that revenue is dependent on a relatively small number of taxpayers. So how this group reacts to changes in tax rates will be very important for the health of the Scottish economy.

Our estimates suggest that there are around 11,000 additional rate taxpayers in Scotland (source: survey of personal incomes). This means that they comprise less than 0.5% of Scottish taxpayers. Therefore, since from Figure 1 the top 1% contribute around 20% of Scotland’s income tax revenues, this smaller group probably accounts for around 10% of total income tax receipts.

### **3. Empirical evidence**

Whereas it is relatively easy to understand the basic concepts underlying behavioural responses to changes in income tax rates, constructing estimates of how populations will respond to changes in these rates is highly technical. There are also difficulties in knowing the extent to which lessons learned from other jurisdictions, or at other periods of time, can be transferred to Scotland’s current situation. A recent contribution by Manski (2012) suggested that economists should be cautious about making bold claims based on the, admittedly extensive, number of studies that have been undertaken to determine the tax elasticity of labour supply. However, he did argue that the evidence did clearly point to one conclusion, namely that “increasing tax rates usually reduces work effort.” Manski (2012). For Scotland, this would imply that the tax revenue likely to be raised from increased income tax rates would be less than a simple arithmetic projection would suggest.

Thus, the key question which this section addresses is how individual labour supply is affected by changes in income tax rates. Because of the importance of the very high earners in generating a disproportionate share of Scotland’s aggregate income tax revenues, we mainly focus on the top marginal rate, which in the UK is known as the “Additional Rate” and is currently set at 45%. This is not to say that other tax rates matter, but this rate will clearly come under the direct control of the Scottish Parliament. The rules around how tax credits are tapered (and subsequently universal credit) effectively set the income tax rate for lower income workers. These are important issues around participation in the labour market, but are not currently planned to come under the control of the Scottish Parliament and may anyway not have a massive effect on tax revenues.

Alan Manning (2015) investigates whether the introduction of the additional rate of income tax at 50% for those with income over £150,000 in 2010 generated the increased revenues that the Labour Government of the time expected. Only around 0.9% of UK taxpayers have taxable income in that range. This group pay 25% of total income tax revenues in the UK as a whole. Though their number is relatively small, it is substantially higher than the proportion of Scottish taxpayers who pay the additional rate.

Manning makes the following points:

- There is little evidence that high-paid employees work less in response to changes in tax rates. However, there is clear evidence that avoidance increases when tax rates rise. For example, high earners may choose to take income as profits rather than wages or they may seek to reallocate tax liabilities from one year to another.
- Increases in the additional rate of income tax have implications for other tax revenues. For example, VAT revenues are likely to fall as are national insurance receipts. Note that in the

Scottish case, this has implications for a strict interpretation of the second “no detriment” condition.

- Of all of the possible behavioural responses to increases in the additional rate, increased avoidance is most likely.
- The most important concept for the analysis of responses to changes in income tax is the “marginal effective tax rate” (METR). The METR measures the fraction of the output produced by worker which is claimed by government after taking account of *all* taxes. Table 1 shows the highest tax rate, the METR paid by the top 1% of earners and the average METR for selected countries in 2015. It is clear that the UK METR is around average for the group of countries selected (relatively low in European comparisons, but higher than the USA and Japan). The same is true for its average METR.

**Table 1: Top tax rates in selected countries 2013**

Country	Highest tax rate	METR (top 1%)	METR (average)
UK	45.00%	60.40%	49.10%
United States	46.30%	51.40%	44.70%
France	54.50%	69.20%	67.20%
Germany	47.50%	55.90%	66.60%
Denmark	56.20%	65.00%	53.80%
Sweden	56.70%	73.60%	58.40%
Japan	50.80%	53.90%	39.20%

Source: Manning 2015

- Table 2 below shows the average and marginal rates from *personal* taxation in the UK vary across different levels of taxable income (and different percentiles within the income distribution). Compared with Table 1, it excludes the effects of indirect taxes.

**Table 2: Average and Marginal Rates of Personal Tax for Selected Levels of Earnings**

Taxable Income	Percentile	Marginal Rate			Average Rate		
		Income Tax	National Insurance	Total	Income Tax	National Insurance	Total
£22,004	50	20%	12%	32%	11%	9%	19%
£30,945	75	20%	12%	32%	14%	9%	22%
£48,250	90	40%	2%	42%	19%	9%	27%
£105,000	97	60%	2%	62%	31%	5%	36%
£122,000	99	40%	2%	42%	35%	5%	40%
£150,000		45%	2%	47%	36%	4%	40%
£200,000		45%	2%	47%	38%	4%	42%
£1,000,000		45%	2%	47%	44%	2%	46%

This table shows that the highest rates of tax are payable on those earning between £100,000 and £120,000 per year. This is due to the withdrawal of the personal allowance at a rate of £1 for each extra £2 in earnings over that income band.

- Manning argues that one of the obvious indicators that there is behavioural response to the additional rate is the bunching of taxable income around the additional rate threshold. It is

clear that reported taxable income varies with income tax rate. The elasticity of response to tax rates depends on the type of worker and is highest for the self-employed. One recent estimate of this elasticity put its value at 0.46 (Brewer et al 2010).

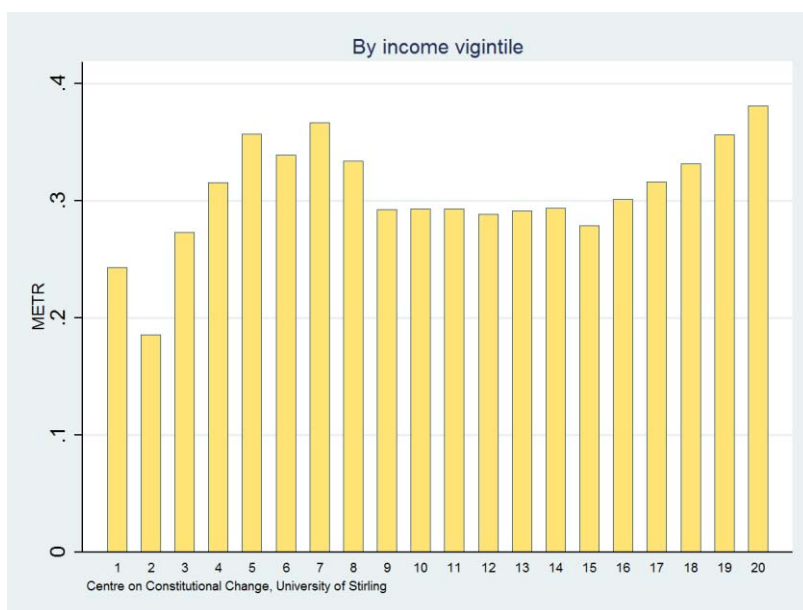
- However, echoing the earlier quote from Manski, Manning argues that “it is not possible to answer questions such as ‘how much extra revenue would be raised by raising the top rate from 45% to 50%?’ with any degree of confidence.” (Manning 2015 P6).

Our estimates of the METR for Scottish income taxpayers at the University of Stirling are shown in Figure 2. These show how much net income changes for a £1 increase in gross income. We include both the employed and the self-employed. The underlying calculations take account of income tax, national insurance, and tax credits. The figure again ranks taxpayers from lowest income to highest income and divides them into groups of 5% (vigintiles). In Figure 3, we make the same calculations but aggregate from the individual to the household level. Whereas, changes in tax bands have an obvious effect on marginal tax rate increases at the individual level, the effects of income tax rates on households are much more complex. Some low income households face very high marginal rates of tax largely due to the effects of the withdrawal of tax credits. They may also be affected by the structure of the household and the ways in which its members’ incomes combine. Policymakers have to be aware that while tax policy is generally determined at the individual level, these have to be translated to the household level to understand their effects on family budgets and behaviour.

Figure 2: Marginal effective tax rates for Scottish taxpayers by income vigintile.



Figure 3: Marginal effective tax rates for Scottish households by income vigintile



- Tax shifting is a legal form of tax avoidance. It is likely to be marked when changes in tax rates are signalled in advance.
- Manning concludes that increasing the top rate of tax from 45% to 50% would generate less than the expected £3.3 billion extra revenue if there was no behavioural response. Top taxpayers will not work any less hard, but they will seek ways to avoid paying tax.

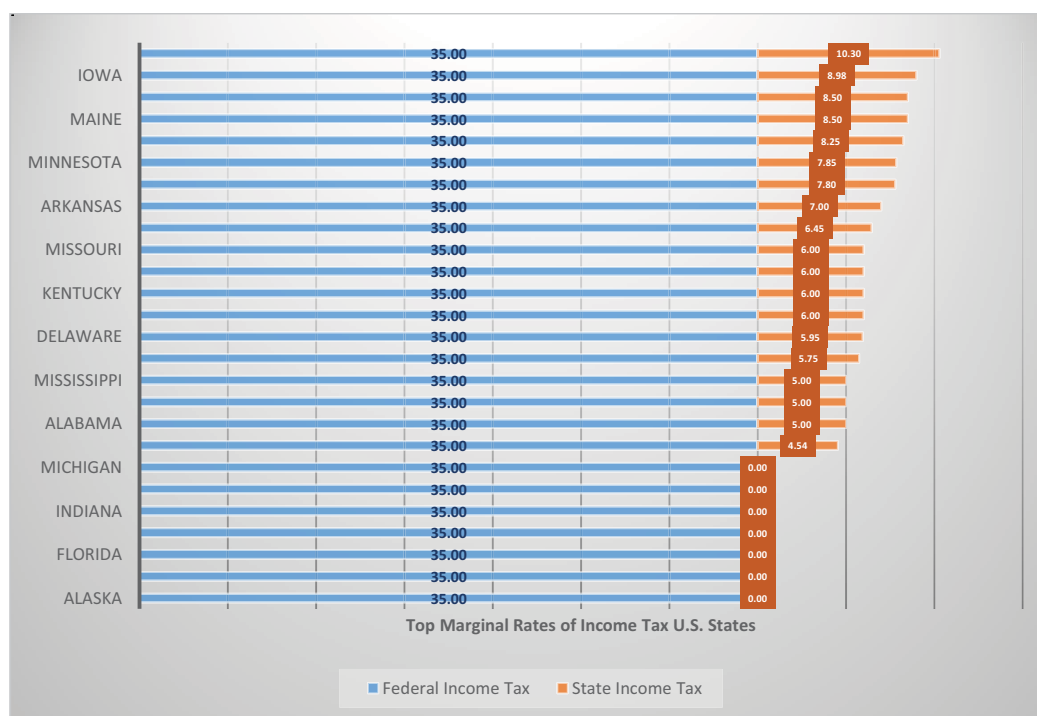
Manning does not address the issue of a migration response to differences in tax rates. The most relevant current estimates come from Kleven et al. (2014). They look at a scheme introduced by the Danish government in 1991 which gave new immigrants with high earnings a preferential flat rate of income tax for three years. The scheme doubled the number of highly paid foreigners in Denmark relative to other foreigners who were slightly less well-paid. This implies a very large elasticity of migration with respect to the METR of between 1.5 and 2. This suggests that it can be desirable from the perspective of a single country to adopt preferential schemes for highly paid foreigners. Clearly that these will have negative spillover effects on other countries.

How far these findings can be applied in the Scottish context is difficult to assess. The evidence of its effects is both from another country and relates to tax cuts rather than to tax increases. Whether such a scheme might be feasible within the Scotland Bill 2015 is not clear. Nevertheless, it does indicate that migration responses are potentially important and have to be considered when redesigning the personal tax structure, given that there are no substantial labour market barriers between Scotland and the rest of the UK.

However, in contrast, there is evidence that some countries have an extensive history of differences in personal income tax rates at subnational level. Figure 4 shows the top marginal rates of personal income tax in some US states and how these are allocated at the federal and state level.



Figure 4: Top Marginal Rates of Income Tax in US States

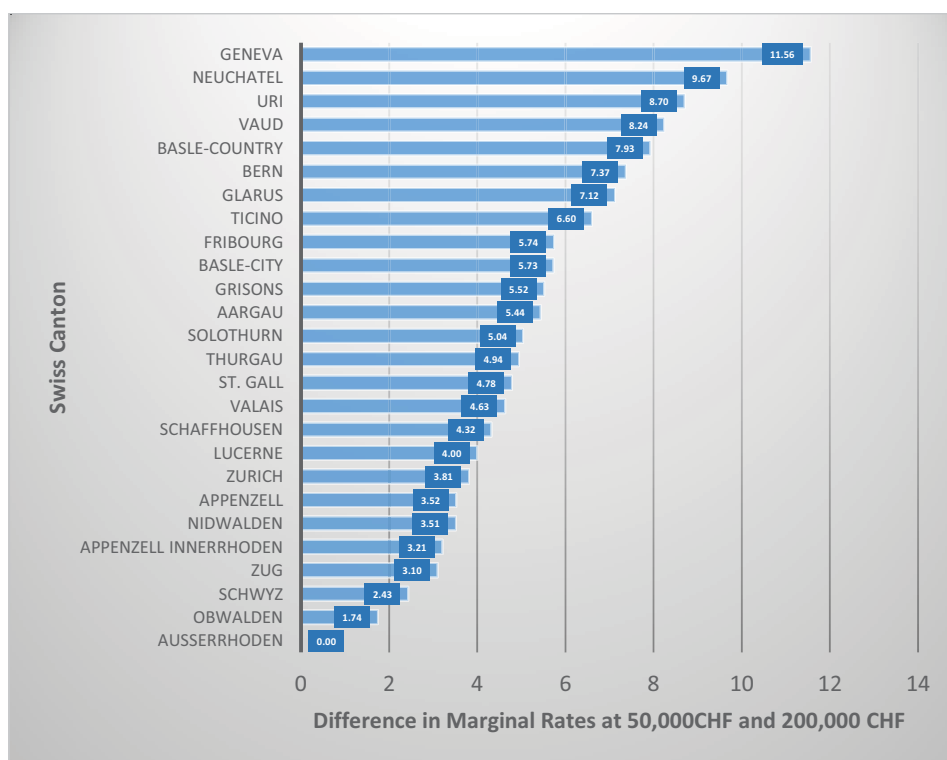


Source: Almendral and Vaillancourt (2011)

Whereas Massachusetts does not levy a state income tax, nearby Maine levies a rate of 8.5%. Clearly though states have to generate tax revenue, they do so using different tax mechanisms, which will create different incentives. Where these mechanisms involve mobile tax bases, this may create an incentive to seek a lower tax jurisdiction. However, there is no evidence at the international level that top tax rates have a detrimental effect on economic growth (Picketty et al. 2014). Indeed, Scandinavian countries have maintained significantly higher top marginal rates of tax than other developed countries for a considerable period without falling behind OECD growth rate averages.

Subnational governments can also differ in the progressiveness of their income tax structure. Figure 5 shows the difference in marginal tax rates at different levels of income (measured in Swiss francs) across Swiss Cantons.

Figure 5: Differences in Marginal Tax Rates at Different Levels of Income in Swiss Cantons



Source: Derived from Almendral and Vaillancourt (2011)

Thus, the increase in the tax rate for those increasing their income from 50,000CHF to 200,000CHF would only be 4% in if they worked in Lucerne but almost 12% if they worked in Geneva. It appears that these significant differences in tax rate progression between cantons have not destabilised the Swiss economy.

Again, it is not clear how applicable this observation may be in relation to the future Scottish tax structure. Cultural acceptance of tax rate differences is probably country specific. HMRC, when assessing the Exchequer effects of the 50p additional rate of income tax, argued that “international labour mobility has increased in the last 15 to 20 years as both legal impediments and general migration costs have been reduced, which means the adverse affect of high rates of personal taxation on both inward and outward migration to the UK and tax revenues can be significant.” (HMRC 2012). Note that alongside the possibility that the structure of personal taxation may encourage emigration, part of the HMRC concern its possible deterrence of immigration, an issue which has received virtually no consideration in the literature largely because of the difficulty of identifying and collecting evidence from those who might have emigrated but chose not to because of the levels of personal taxation in the destination jurisdiction.

#### 4. Conclusions

This paper has considered potential behavioural responses to changes in Scotland’s income tax structure. The focus has been on this tax because it is by far the most important of the new tax powers coming to the Scottish Parliament.

Changes to tax rates and tax bands can cause many kinds of behavioural change which will lead to differences between the revenues that might be expected in the absence of such change and those

which are actually collected. The larger this difference, the more potential problems there are for the Finance Ministry of the affected jurisdiction.

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.

There is also evidence from Denmark that high earners respond to tax incentives by changing their migration behaviour. If it is the case that the costs of migration have fallen in recent years, then there is a strong case for moving cautiously when considering changes to the higher rates of income tax in Scotland, even though there may be no evidence that they have a detrimental effect on rates of economic growth in the long run.

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## Annex One

The marginal effective tax rate (METR) is defined as  $METR = 1 - \frac{(1 - \tau - \tau_{NI})}{(1 + \tau_{NIemp})(1 + \tau_{IND})}$ <sup>1</sup> where

$\tau$  = the additional rate (45%)

$\tau_{NI}$  = the national insurance rate payable on high incomes (2%)

$\tau_{NIemp}$  = National Insurance employers' contribution (13.8%)

$\tau_{IND}$  = indirect tax rate (15%) (combination of VAT and other duties)

The value of the METR is 59.5% which suggests that additional rate taxpayers pay around 60% of the last pound that they earn in tax.

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<sup>1</sup> Manning (2015) p 13