



HM Revenue
& Customs

The Exchequer effect of the 50 per cent additional rate of income tax

March 2012



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ISBN 978-1-84532-966-2
PU1292

Contents

	Page
Executive Summary	2
Chapter 1 – Introduction	4
Chapter 2 – The 50 per cent additional rate, incomes, and the economy	5
Chapter 3 – The previous Exchequer estimates	12
Chapter 4 – Evidence on behavioural responses	18
Chapter 5 – The 2010-11 Self Assessment returns and the Exchequer yield	27
Chapter 6 – Conclusions	46
Annex A – Budget 2012 policy costing: reduction in the additional rate	48
Annex B – Extrapolation methodology	54
Annex C – Adjusted underlying impact calculation	55

Executive summary

- The 50 per cent additional rate of income tax was introduced on 6 April 2010. It was the first increase in the highest rate of tax in the UK for over 30 years, and was expected to yield around £2.5 billion. However, because of the uncertainty regarding how those affected would respond, and its impact on the economy, the yield estimates were highly uncertain.
- This report provides the first comprehensive ex-post assessment of the additional rate yield using a range of evidence including the 2010-11 Self Assessment returns. The analysis shows that there was a considerable behavioural response to the rate change, including a substantial amount of forestalling: around £16 billion to £18 billion of income is estimated to have been brought forward to 2009-10 to avoid the introduction of the additional rate of tax.
- The uncertainty regarding the extent to which the unwinding of this forestalled income depressed incomes in 2010-11 makes isolating the true underlying behavioural response to the additional rate challenging. A number of approaches were considered but the most statistically robust model has much in common with the approach contained in the Mirrlees review¹, which examined responses to tax rates changes in the 1970s and 1980s.
- The modelling suggests the underlying behavioural response was greater than estimated previously in Budget 2009 and in March Budget 2010, decreasing the pre-behavioural yield by at least 83 per cent. This result is also consistent with that contained in the Mirrlees review, and suggests the additional rate is a highly distortionary form of taxation.
- 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. The conclusion that can be drawn from the Self Assessment data is therefore that the underlying yield from the additional rate is much lower than originally forecast (yielding around £1 billion or less), and that it is quite possible that it could be negative.
- This conclusion is supported by wider academic literature which generally suggests a greater behavioural response than was included in the Budget 2009 and March Budget 2010 estimates. Evidence from the U.S. suggests the behavioural responses could be even higher, with an even lower yield.
- The conclusion is also consistent with the view 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.
- The results can only be considered an estimate of the yield in the very short term and as such may be higher than the long term yield, particularly as some behavioural responses such as the possibility that those affected might leave the UK may take place over a number of years. Similarly, the fact that the additional rate may have been viewed as

¹ Brewer, M, Saez E and Shephard A 2010. "Means-testing and Tax Rates on Earnings." In The Mirrlees Review: Reforming the Tax System for the 21st Century, Institute for Fiscal Studies.

temporary may mean that behavioural responses such as migration are smaller than if it had been a permanent change. Conversely, a temporary increase may make it more likely that individuals postpone withdrawing income from investments in anticipation of the rate going down, thereby increasing the size of the behavioural response.

- Although the analysis is only based on one year's data, this does not invalidate the results. Future years' data may improve the reliability of estimates, although estimating what incomes and tax revenues would have been in the absence of the additional rate also becomes more difficult as time elapses further from the 'base' year (the year before the additional rate became effective).
- The report also describes how the impact of introducing the additional rate may extend well beyond the direct Exchequer impacts. In particular, other things equal, high tax rates in the UK make its tax system less competitive and make it a less attractive place to start, finance and grow a business. The longer the additional rate remains in place the more people are likely to consider it a permanent feature of the UK tax system and the more damaging it would be for competitiveness. This suggests the negative impact on GDP may increase over time, and therefore the direct yield (and revenues from other tax bases) might fall over time toward or beyond zero.
- The evidence contained in this report has also been used to inform the Exchequer estimates for the Budget 2012 measure to reduce the additional rate of tax from 50 per cent to 45 per cent. An explanation of the methodology used in this estimation is contained in Annex A.

Chapter 1 – Introduction

1.1 In the November 2008 Pre-Budget Report, the then Government announced that from the 6 April 2011, an additional rate of tax of 45 per cent would be introduced for those with taxable income in excess of £150,000. In Budget 2009, the then Government announced that the additional rate would be increased to 50 per cent, and that its introduction would be brought forward to the 6 April 2010.

1.2 There was considerable uncertainty regarding the Exchequer effects of the additional rate, largely because the UK's top rate of income tax had not changed since 1988, so there was very little recent evidence on how those affected by the additional rate would respond. Although there is a great deal of academic literature on the behavioural response to income tax rate changes, there is no consensus on the size of the response.

1.3 In his Budget 2011 statement, the Chancellor of the Exchequer asked HMRC to find out how much revenue the additional rate actually raises. In response this report provides the first estimates of the ex-post Exchequer impact of the introduction of the additional rate of income tax. It is largely based on information obtained from Self Assessment tax returns for the tax year 2010-11. Around 90 per cent of the expected returns were available at the time of this report. The incompleteness of returns at this stage gives the results and conclusions a margin of uncertainty.

1.4 The remainder of this report is set out as follows:

- Chapter 2 provides background on the way in which the introduction of the additional rate of tax can be expected to affect incomes and the economy;
- Chapter 3 describes how the Budget 2010 Exchequer impacts were estimated, including a description of the characteristics of the affected population;
- Chapter 4 sets out some key academic evidence on the way in which individuals respond to changes in tax rates, as well as an international comparison of top income tax rates;
- Chapter 5 uses the 2010-11 Self Assessment data to provide a first estimate of the ex-post impact of the additional rate on taxable incomes and revenues; and
- Chapter 6 contains the report's conclusions.

1.5 An addition, Annex A explains how the evidence contained in this report has been used to inform the behavioural estimates used in the costing of the Budget 2012 decision to reduce the additional rate of income tax from 50 per cent to 45 per cent from April 2013.

Chapter 2 – The 50 per cent additional rate, incomes, and the economy

2.1 This Chapter sets out:

- How individuals may respond to changes in their marginal rates of tax, including changes in their tax planning and labour supply decisions;
- How those responses may impact directly on the level of GDP; and
- The wider effect that high tax rates can have on economic growth.

The impact of the additional rate on behaviour

2.2 Understanding the behavioural response to the introduction of the additional rate of tax is particularly important as it is generally accepted that individuals with higher incomes are more responsive to changes in tax rates, such that the revenue impact of any resulting behavioural responses can sometimes offset any pre-behavioural yield. In addition, in general the greater the behavioural response the greater economic distortion imposed by the tax.

2.3 The behavioural responses associated with changes in personal tax rates can broadly be grouped into two categories: labour supply responses; and changes in tax planning, avoidance and evasion.

Labour supply responses

2.4 There are two main types of labour supply responses:

- **A reduction in the number of hours people work or the amount of effort they make.** A higher tax rate reduces the reward for working. This means individuals have an incentive to work less and take more leisure time (the substitution effect). It also impacts negatively on entrepreneurship as it reduces the incentive to start, finance and grow a business. On the other hand, individuals have lower take-home pay so value the last pound earned more highly, providing incentives for them to work longer or make more effort (the income effect). The overall impact of tax rate changes on marginal labour supply decisions is therefore ambiguous, although most evidence for high earners suggests the substitution effect may outweigh the income effect i.e. the overall effect of a tax rate increase on labour supply is negative; and
- **A reduction in UK labour market participation.** An increase in marginal tax rates and average tax rates can impact on UK labour participation decisions, including migration (both inward and outward), and retirement decisions. These behavioural responses, on the extensive margin, are particularly relevant for the additional rate of income tax as a disproportionate number of those affected (i) operate in an internationally competitive labour market so are more likely to leave the UK in response to high tax rates; and (ii) are over 55 (the minimum age at which pensions can be withdrawn) so are more likely to retire.

2.5 It is worth noting that the Exchequer impacts of labour supply responses extend beyond the direct impacts on income tax and National Insurance revenues. In particular, a reduction in real income is usually associated with a reduction in expenditure and corresponding indirect tax revenues (this is estimated in Chapter 5). In addition, a reduction in labour supply could have a wider impact on tax revenues through its impact on economic growth. Methods of estimating these wider impacts will continue to be explored.

2.6 It is also worth noting that the Exchequer impacts of changes in migration can be considerable as the Exchequer loses the tax on the individuals' entire income rather than just the income subject to the additional rate.

Changes to tax planning/avoidance/evasion

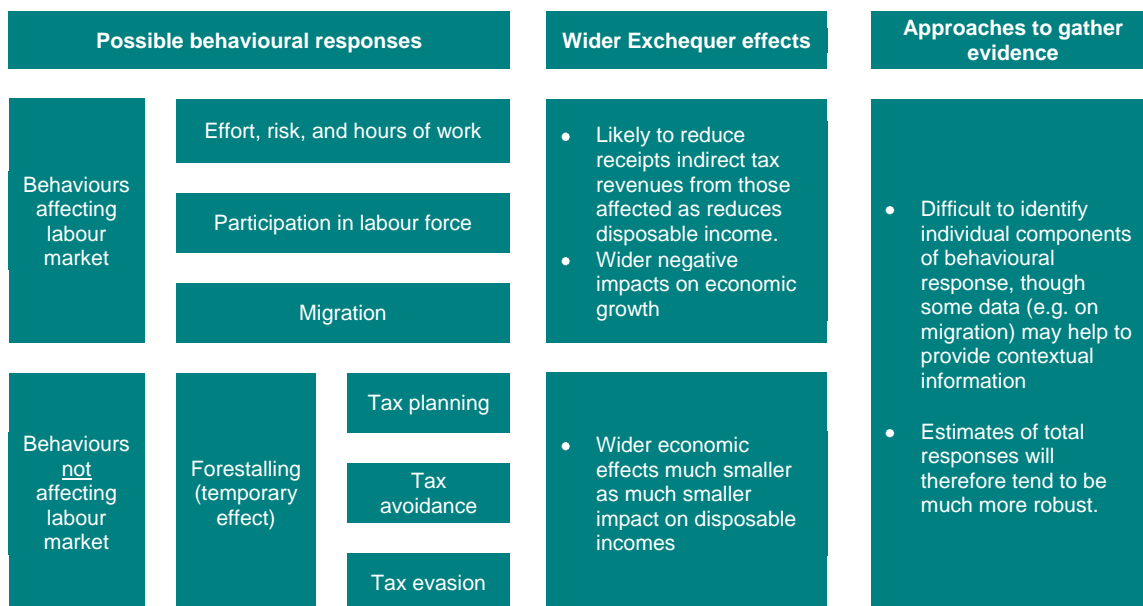
2.7 Behavioural responses are also expected around tax planning, avoidance and evasion. It is useful to sub-divide these behavioural responses into three groups:

- **An increase in tax planning or avoidance activity that can have an ongoing impact on tax liabilities**, e.g. making more use of tax reliefs, or substituting income subject to a higher rate of tax into capital gains that are taxed at lower rates, or entering into artificial avoidance schemes;
- **An increase in evasion that can have an ongoing impact on tax liabilities**. This involves a criminal attempt to not pay tax owed; and
- **An increase in tax planning or avoidance activity that has a one off impact on tax liabilities e.g. forestalling**. If the tax change is announced in advance of implementation (as it was in the case of the additional rate), there may be further one-off behavioural effects. These occur when individuals change the timing of their income to minimise exposure to the higher rate. Thus individuals could find opportunities to bring forward income, which would otherwise have arisen in 2010-11 and been subject to the 50 per cent rate to the previous year, thereby making a tax saving of 10 per cent on the income. In the case of the additional rate paying population, this will be particularly relevant for individuals that are owner-directors of companies as they have more scope to change the timing of their dividend payments. This behavioural response is entirely legitimate and difficult to prevent using anti-avoidance legislation.

2.8 The impact of these types of behavioural effects on other tax revenues is smaller than in the case of labour supply responses as they have much less effect on productivity and consumption. However, they still result in a significant direct Exchequer impact, and are still wasteful from an economic point of view as they require individuals to spend more time and resources tax planning, resulting in other economic distortions.

2.9 A summary of the behavioural effects is shown below. It is important to note that these behavioural responses are to some extent substitutes for each other. For example, if an individual can easily avoid paying the additional tax through tax planning, then there is less need to reduce labour supply.

Chart 2.1 – Responses to income tax rate changes



Temporary and permanent rate changes

2.10 The behavioural response to the additional rate is also dependent on whether the rate is viewed as temporary or permanent. A temporary rate change may mean that some individuals are less likely to undertake behavioural responses that have significant upfront costs. For example, individuals may chose not to move abroad, or spend time and money working out how the additional rate could be avoided through tax planning.

2.11 Conversely, a temporary rate change may result in some behavioural responses that would not have occurred had the rate been viewed as permanent. For example, owner-directors of companies may postpone paying themselves a dividend from their company until the additional rate has been removed, thereby avoiding the additional rate of tax. This behaviour would reduce taxable incomes in the years in which the additional rate was in place.

Short and long term responses

2.12 The short run and long run behavioural responses to a rate change can also differ. For example, labour supply responses such as migration or changes in employment may take some time. This may mean the long-term behavioural responses are larger than the short term. In addition, and as explained later, higher rates of tax can have negative effects on economic growth, which may also mean the longer run impacts are greater.

The impact on the level of GDP

2.13 The impact of the behavioural responses on the level GDP vary by type of response: labour supply responses such as reduced hours or effort will have a direct impact on GDP as they reduce the amount of economic activity in the UK. The impact of increases in tax planning and avoidance will be much smaller as they do not necessarily impact on economic output.

2.14 Although there has been much academic study of the behavioural response to tax rate changes, most focus on the overall response. However, few researchers have tried to distinguish between behaviours that genuinely reduce incomes and those that simply shift income to channels in which it cannot be taxed.

2.15 The evidence suggests that between one-third and one-half of the behavioural response to changes in income tax rates represents a labour supply response. In Chapter 5 these estimates are combined with the estimated overall response to the additional rate to provide an estimate of its impact on GDP.

The impact on economic growth

2.16 In addition to their impact on the level of GDP, changes in tax rates can have an impact on economic growth. Other things equal, high tax rates in the UK make its tax system less competitive and make it a less attractive place to start, finance and grow a business. Entrepreneurs and high-skilled workers may find it more rewarding to implement their ideas in other countries. The prospect of less reward for their work effort may also deter top managers of both foreign and domestic firms from investing in the UK. An international comparison of tax rates is contained in Chapter 4.

2.17 The relationship between tax and growth has been extensively studied in research undertaken by the OECD². Their analysis suggests that corporate taxes are the most harmful type of tax for economic growth, followed by personal income taxes and then consumption taxes, with taxes on immovable property being the least harmful tax. This ranking reflects the way that each category of tax affects the decisions that firms and individuals make. These decisions determine the amount of labour that is supplied by households and demanded by firms, as well as the levels of saving, investment and the accumulation of human capital.

2.18 The OECD's analysis also highlights that high top rates of income tax may be harmful for economic growth. An important reason for this is that companies compete in global markets for the managerial and organisational skills that are needed by medium and large corporations, and for the entrepreneurial skills that are the hallmark of successful start-ups. Personal income taxes can influence where workers, particularly those who are highly paid, choose to live and work, and also where companies locate their staff.

2.19 The determinants of economic growth are often assessed using a growth accounting framework. In this framework the level of output depends on the quantity of the labour and capital used in production, together with a measure of how productively they are used, which is often considered to be a measure of technological progress. The growth in output then depends on the growth of labour and capital inputs and of technological progress.

2.20 Theories of economic growth have highlighted the importance of ideas, institutions and human capital in promoting economic growth. These elements allow the development and management of the complex supply chains and distribution networks that enable producers to source inputs cheaply and to exploit economies of scale in production. The accumulation and

² OECD (2010) *Tax policy reform and economic growth*

diffusion of skills, knowledge and ideas allow firms to develop and implement more efficient methods of production³.

2.21 This framework provides insights into how the top rate of tax can affect economic growth. One avenue is in terms of the level of labour input. This has two dimensions: the amount of hours worked and the amount of human capital (the knowledge and skills of each worker) that is deployed. The amount of hours worked may be adversely affected by high rates of tax because the return from working declines relative to the return from other activities, notably leisure.

Human capital

2.22 Economic growth depends on the “human capital” in an economy. This describes the skills, specialist knowledge and entrepreneurial flair of the workforce. Economic growth originates at the level of individual firms and enterprises, reflecting their ability to raise their own productivity. This may be achieved through a number of channels, including: by improving the quality of their labour and capital inputs, through adapting and improving existing techniques and processes, and by making use of the new technologies developed by other firms.

2.23 Modern theories of economic growth highlight that higher levels of human capital raise the productivity levels of the workforce both directly and indirectly⁴. The indirect effects come through the greater capacity of more highly skilled individuals to raise productivity through “learning by doing”, and through the spillovers that are achieved by passing their knowledge on to their colleagues. More highly skilled workers are more likely to be quicker to identify the potential of new technologies, and to adapt them successfully to the needs of their own business.

2.24 Empirical studies confirm that higher levels of education facilitate the development and diffusion of new techniques and products, thereby boosting economic growth⁵. For example:

- One study that surveyed results from over twenty other studies concluded that “there is compelling evidence that human capital increases productivity”;⁶ and
- Another study that takes account of educational attainment and on-the-job skills acquisition estimates that a 1 per cent increase in human capital raises the level of productivity (output per worker) by between 0.07 percent and 0.19 per cent.⁷

2.25 High tax rates may affect the amount of human capital available through two channels. One is that they reduce the post-tax returns to human capital, and therefore individuals may invest less in education and training than they might otherwise have chosen. The second channel, already mentioned, is that part of the skilled workforce may opt to live and work in a country where taxes on income are lower.

³ Jones, C and Romer, P (2010) *The New Kaldor Facts: ideas, institutions, population and human capital*, American Economic Journal: Macroeconomics, American Economic Association, vol. 2(1).

⁴ Jones, R and Fender, V (2011) *Human capital estimates 2010*, Office for National Statistics

⁵ Hanushek, E and Woessmann (2011) *How much do education outcomes matter in OECD countries?* Economic Policy.

⁶ Sianesi, B and van Reenen, J (2000) *The returns to education: a review of the macro-economic literature*, Centre for the economics of education, London School of Economics.

⁷ Mason, G., B. O’Leary and M. Vecchi (2009) “*Revisiting the impact of human capital on productivity: new cross-country evidence at the sector level*”, Middlesex University discussion paper.

Productivity growth

2.26 High rates of tax may also affect the rate of productivity growth. An important element in productivity growth is the diffusion of new ideas and technologies. This can take place through a range of channels including through: successful businesses sharing ideas with their suppliers; the development of new products and processes within a firm; and the imitation of successful innovations undertaken by a rival firm. The transfer of knowledge may be facilitated by employees moving between firms.

Foreign direct investment

2.27 A particular example of the importance of the diffusion of ideas and technologies is the effect that foreign direct investment (FDI) has been found to have on productivity levels of local firms. For example:

- an IMF study found “strong evidence that FDI and portfolio equity boost Total factor productivity growth”.⁸
- a study of technology to US manufacturing firms estimated that spillovers from foreign direct investment accounted for around 14 per cent of productivity growth in US firms between 1987-1996.⁹ It found that FDI spillovers were particularly strong in high tech sectors.

2.28 Much of the literature on FDI flows focuses on the role of corporate tax rates on the decision of companies whether to invest in a particular country. There is now a growing body of evidence that shows corporate tax rates are important in affecting decisions over where companies direct their FDI. Increasing corporate tax rates have been shown to reduce FDI flows¹⁰, other things equal.

2.29 The discussion on the drivers of FDI flows also suggest that while corporate tax rates are an important determinant, other factors also play their part. This can include institutional factors and other aspects of the tax regime that affect particular companies and activities. It is therefore possible that higher marginal rates of personal tax could affect FDI flows, and therefore future economic growth. This would most likely be the case for companies and activities that depend on more highly-skilled and therefore more highly-paid workers.

2.30 Of the studies looking at the determinants of FDI flows, very few explicitly model the effect of personal income tax. One paper¹¹ that does consider personal taxation is based on cross-sectional analysis of data from 84 countries. This shows that there can be a negative relationship between the highest rate of personal income tax and FDI flows, though the effects for personal income taxes are smaller than the effects of corporate taxes.

⁸ Kose, M, Prasad, E and Terrones, M (2008) *Does openness to international flows raise productivity growth?* IMF Working paper WP/08/242.

⁹ Keller, W and Yeaple, S.(2009). “Multinational Enterprises, International Trade, and Productivity Growth: Firm-Level Evidence from the United States.” *Review of Economics and Statistics*, 91(4): 821-31.

¹⁰ See *Tax Effects on Foreign Direct Investment*, OECD Policy Brief, 2008, for a discussion of the issues.

¹¹ *The Effect of Corporate Taxes on Investment and Entrepreneurship*, Djankov, Ganser, McLiesh, Ramalho and Shleifer, NBER Working Paper 13756, (<http://www.nber.org/papers/w13756>)

Empirical estimates of taxation and growth

2.31 Empirical studies provide some evidence that high marginal rates of tax can act to depress rates of economic growth. For example:

- Results from one study suggest that a 10 percentage point increase in the marginal tax rate could reduce annual growth by around $\frac{1}{4}$ percentage point. Over a ten year period this corresponds to around $2\frac{1}{2}$ per cent of GDP.¹²
- The OECD tax and growth study found that “sizeable adverse effects of progressive income tax schedules on GDP per capita, which go over and above the effects working through human capital accumulation.”¹³ The study estimates that a reduction of 5 percentage points in the marginal income tax could raise the level of GDP per capita by around 1 per cent in the long run¹⁴.
- A comprehensive survey of both the theoretical and empirical work concludes that “in cross country data there is a negative correlation between the tax rate and the growth rate” and “there is weak evidence from regression analysis that the marginal rate of tax is negatively related to growth”.¹⁵
- A regression result in a recent study implies that higher taxes may reduce real GDP per capita levels, although the results are not conclusive.¹⁶

2.32 These results need to be interpreted with some caution, as they are affected by methodological issues.¹⁷ In particular, since economic growth is affected by a wide range of institutions and policies, it is difficult to isolate the effects of individual variables with any precision.

Summary of dynamic effects on growth

2.33 High marginal rates of income tax risk weighing on the growth potential of the economy by deterring the most highly productive individuals from living and working in the UK, and through deterring the foreign direct investment that can be an important element in the diffusion of new technologies and techniques. These effects are likely to be modest if those who are liable to pay the additional rate of tax expect that it will be temporary.

2.34 However, if the rate were to remain at 50 per cent for an extended period, there would be a risk that the effects on growth could become more material. Even a small reduction would erode revenues in the longer run as lower levels or rates of economic growth reduce receipts across the economy. Based on the current tax to GDP ratio of 37 per cent, a £1 billion fall in the level of GDP corresponds to a £370 million fall in tax revenues.

¹² Padovano, F. and Galli, E. (2002) *Comparing the growth effects of marginal vs. average tax rates and progressivity*, European Journal of Political Economy,

¹³ OECD (2010) Tax policy reform and economic growth

¹⁴ Arnold, J. (2008), “Do Tax Structures Affect Aggregate Economic Growth? Empirical Evidence from a Panel of OECD Countries”, OECD Economics Department Working Papers, No. 643.

¹⁵ Myles, G (2007) Economic growth and the role of taxation, paper prepared for the OECD

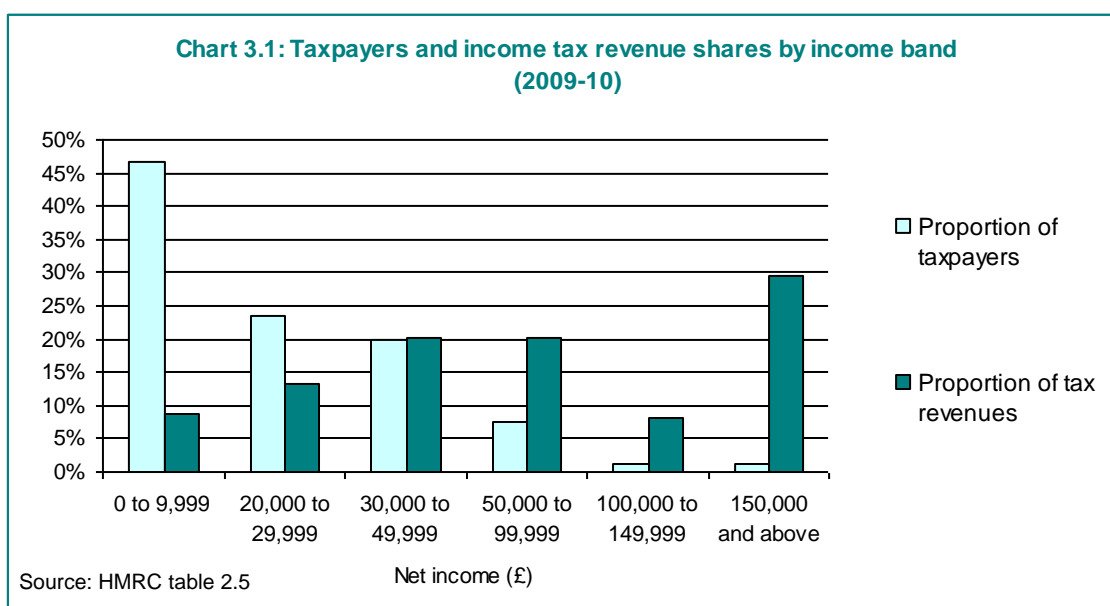
¹⁶ Piketty, T, Saez, E and Stantcheva, S (2011) *Optimal taxation of top labor incomes*, NBER working paper no. 17616

Chapter 3 – The previous Exchequer estimates

3.1 This Chapter provides an explanation of the Exchequer estimates of the introduction of the additional rate that were published in March Budget 2010. It starts with a description of the tax base, in particular the number and characteristics of the individuals that were expected to be affected by the additional rate. It then gives an explanation of the original behavioural response estimate, before bringing these to components together in the estimated Exchequer impact.

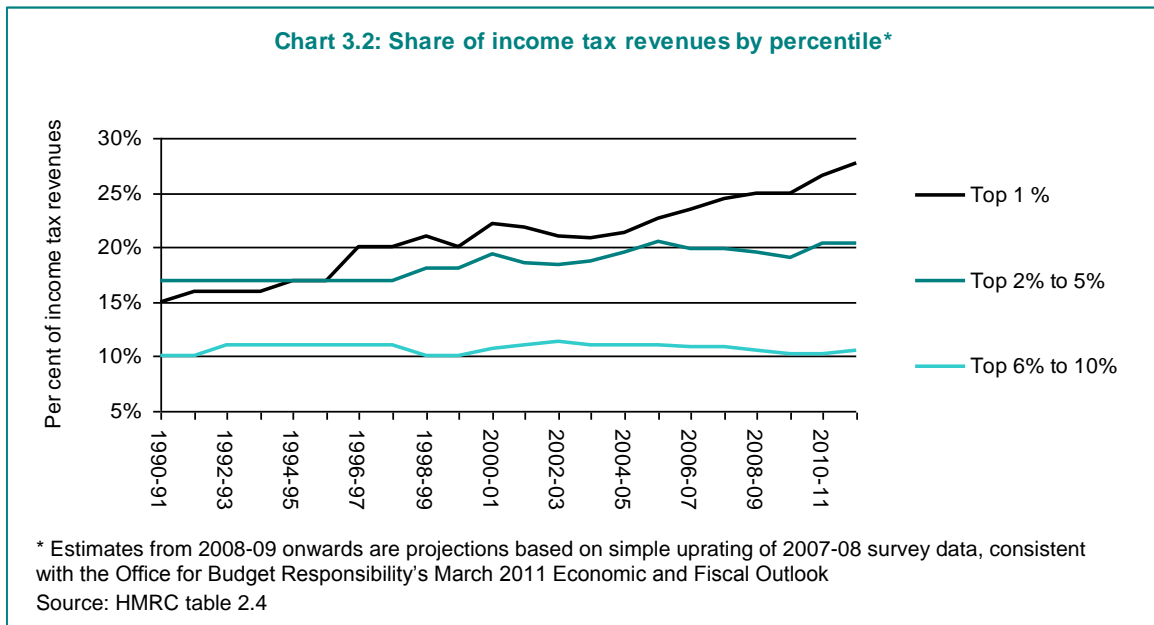
The tax base

3.2 The additional rate was expected to affect around 300,000 individuals (around 1 per cent of taxpayers). However, as shown in Chart 3.1, these individuals contribute a disproportionate amount of tax, around 30 per cent of income tax revenues in 2009-10.

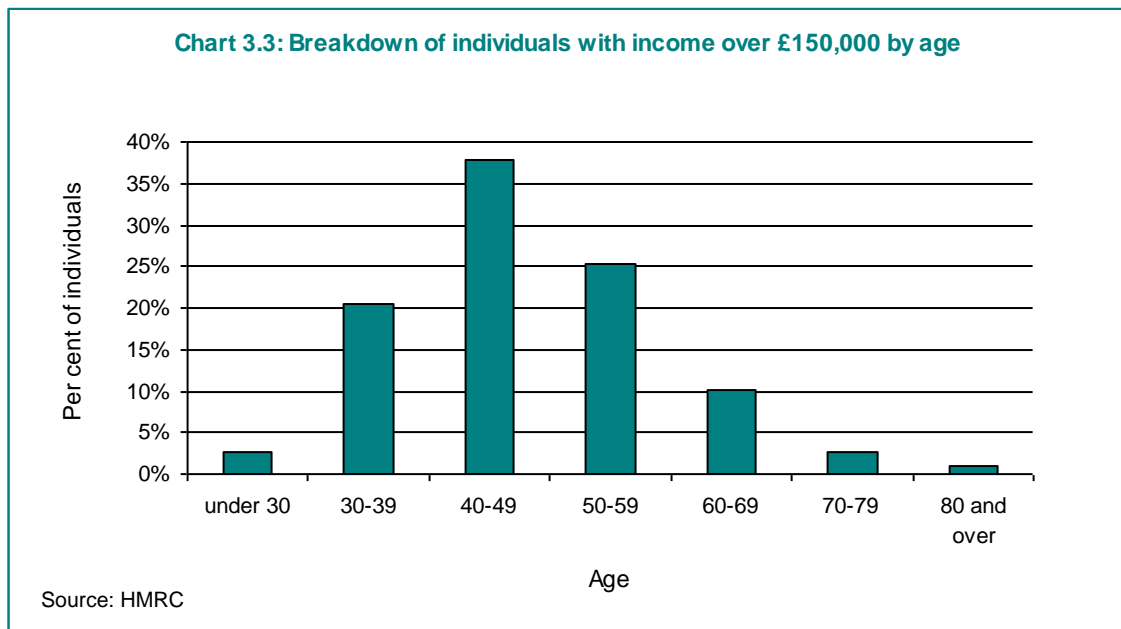


3.3 Chart 3.2 shows that the top percentile share of tax has increased steadily over time, from around 15 per cent in 1991-91, to just over an estimated 27 per cent in 2011-12.

¹⁷ Engen, E.M. and Skinner, J. (1996) *Taxation and economic growth*, National Tax Journal, 49, 617 - 642.

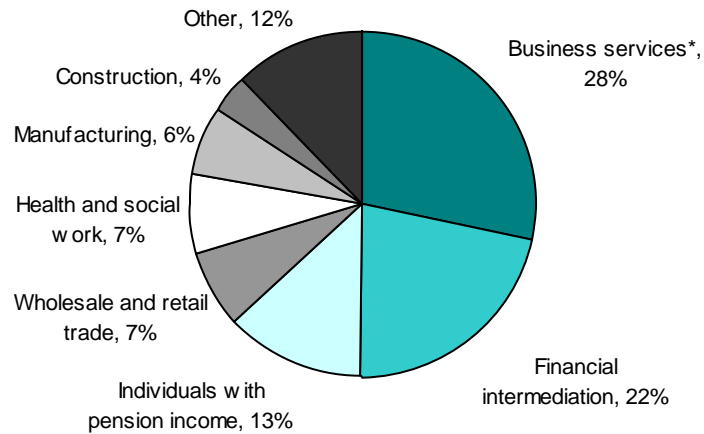


3.4 Chart 3.3 breaks down the additional rate paying population by age, and shows that over one third of those affected are aged between 40 and 49.



3.5 Chart 3.4 breaks down the affected population by sector. It shows that almost half the individuals affected work in either business services (which includes many professional practices such as law), or financial intermediation.

Chart 3.4: Breakdown of individuals with income over £150,000 by sector



* Includes real estate, renting and other business services such as legal services and accounting
Source: HMRC

3.6 The total value of taxable incomes over £150,000 for these individuals as estimated in March Budget 2010 is shown in table 3.1 below. The pre-behavioural yield estimates are simply the value of these incomes multiplied by the change in the tax rate (10 per cent).

Table 3.1: Pre-behavioural ex-ante costings (£ bn)

	2010-11	2011-12	2012-13
Taxable incomes over £150,000	64.7	68.8	74.8
Pre-behavioural yield (liabilities)	6.5	6.9	7.5

Estimating behavioural responses – Taxable Income Elasticities

3.7 As explained in Chapter 2, there are a number of ways in which individuals may respond to changes in tax rates. The measure of the overall responsiveness of total taxable incomes to changes in marginal tax rates is the “taxable income elasticity” (TIE). This estimates the percentage change in total taxable incomes in response to a one per cent change in the net-of-tax rate (the proportion of each additional pound earned received by the individual after tax, also known as the marginal retention rate), and therefore captures all the behavioural responses described in Chapter 2.

3.8 TIEs are extremely important to policy decisions since they are critical in producing accurate costings of policies. If the response measured by the TIE is large then people will reduce their taxable incomes by a large amount in response to a tax increase. Increasing tax rates will result in a smaller increase in tax revenue than would have been expected because of this fall in taxable income. If the TIE is large enough then it is even possible that the increase in taxes could

result in a sufficient fall in taxable income to cause a net decrease in tax revenues. A detailed illustrative example of how TIEs are used in estimating the exchequer effects of changes in tax rates is shown in Box 3.1 below.

Box 3.1 – An illustrative example of the impact of behaviour on yield from a 10 percentage point increase in the tax rate			
Step 1 - Estimate the change in the Marginal Retention Rate (MRR)			
	Base	Option	Change
Income tax rate (A)	40.0%	50.0%	
Employee NIC rate (B)	1.0%	1.0%	
Employer NIC rate (C)	12.8%	12.8%	
MRR ($D = 1 - (A+B+C)/(1+C)$)	52.30%	43.44%	-17%
Step 2 - Estimate the pre-behavioural yield			
Pre-behavioural costing			
Total taxable income (E)			120
of which: Above £150k (F)			70
Change in tax rate (G)			10%
Pre-behavioural yield ($H = F \cdot G$)			7.0
Step 3 - Estimate the behavioural effect			
Taxable Income Elasticity (I)			0.35
Percentage change in MRR (J)			-17%
Reduction in total taxable income (%) ($K = I \cdot J$)			-5.9%
Reduction in total income (£ bn) ($L = E \cdot K$)			-7.1
Reduction in incomes above £150k ($M = L$)			-7.1
Average tax rate on incomes (inc. NICs) ($N = A+B+C$)			63.8%
Impact of behaviour on yield ($O = M \cdot N$)			-4.5
Step 4 - Estimate the post-behavioural yield			
Post-behavioural yield ($P = H + O$)			2.5

3.9 Evidence on the size of the TIE for those affected by the additional rate is extremely limited as the last time the highest rate of income tax was changed in the UK was in 1988, when it was reduced from 60 per cent to 40 per cent. Estimating a TIE for policy use will therefore inevitably involve some judgement. The TIE used in the March Budget 2010 estimates was 0.35 which was in the lower range of elasticities surveyed (though many of these studies were for the U.S.). This was based on the view that the TIE for the affected group would be lower than the average of these mainly US studies as:

- There are arguably more opportunities for tax planning in the US (the source of most of the studies); and

- The Government had introduced a number of measures in recent years that had reduced the opportunities to engage in tax avoidance.

3.10 The decrease in the average marginal retention rate (MRR) as a result of the introduction of the additional rate was around 17 per cent. When combined with the TIE, this suggests total taxable incomes of those affected would have been reduced by around 6 per cent. This not only reduces income tax revenues, but also has a direct impact on National Insurance Contributions (NICs). As a result, the behavioural responses were expected to reduce annual income tax and NIC revenues from those affected by around £4.5 billion – two thirds of the pre-behavioural yield.

The March Budget 2010 Exchequer estimates

3.11 The March Budget 2010 expected Exchequer impacts are summarised in Table 3.2 below.

Table 3.2 – Ex-ante costings (£ bn)

	2010-11	2011-12	2012-13
Pre behavioural yield (liabilities)	6.5	6.9	7.5
Behavioural impacts (liabilities)	-4.1	-4.5	-4.9
Post behavioural yield (Liabilities)	2.4	2.4	2.6
Post behavioural yield (National Accounts)	1.3	3.1	2.7

3.12 The Exchequer impacts are shown on a liabilities and National Accounts basis:

- The 'liabilities basis' shows the impact of the measure on tax liabilities in any particular tax year, as opposed to a 'cash basis' which shows the impact on tax payments (there is often a lag between a tax liability arising and the date at which it must be paid to HMRC).
- The National Accounts basis is a mixture of liabilities and cash, depending on the type of tax. In particular, PAYE receipts are recorded on a liabilities basis, while Self Assessment receipts, which are partly due in the year after the liability arises, are scored on a cash basis. This basis is used in the published Budget measures table.

3.13 In addition, and in line with Budget costings methodology, the costings only include the direct impact on income tax and National Insurance revenues from those affected by the measure. That is they exclude second-round effects such as reduced VAT from reduced expenditure by those affected, and wider macro-economic effects. These second-round effects are taken into account in the overall tax forecast. Similarly, the costings do not take account of any additional Capital Gains Tax revenue that may result in future from individuals substituting away from income that is taxed at the additional rate to capital gains, or the longer term increase in income tax on pensions that would have resulted from increased pension contributions.

3.14 As was made clear at the time, there was considerable uncertainty with these estimates. This stemmed from two areas:

- **The size of the tax base.** The tax base estimates were based on the survey of personal incomes (SPI) for 2007-08, projected forward to 2010-11 and beyond in line with Treasury economic forecasts. The tax base estimates were therefore subject to forecasting variances; and
- **The size of the behavioural response.** Deciding on a TIE was particularly difficult as there are a wide range of TIEs in the academic literature from different countries and based on different time periods. Moreover, small changes to the TIE can have large impacts on the costing.

Chapter 4 – Evidence on behavioural responses

4.1 This Chapter provides a brief summary of some of the main academic evidence on the behavioural responses to changes in tax rates, and a comparison of international tax rates.

Academic evidence

4.2 The academic literature on the responsiveness of income to tax rate changes, as measured by the TIE, is extensive, but there is a lot of variation in the results and the type of effects found. To illustrate, a selection of the most relevant studies and their findings are presented in Table 4.1 below.

Table 4.1 – Sample of TIE estimates from academic research

Author(s) (year of study)	Country	Range of Taxable Income Elasticity Estimates	Lesson learnt and points made
Lindsey (1987) ¹⁸	USA	Central view 1.75, but as high as 2.75.	<ul style="list-style-type: none"> May overstate the TIE as does not control from income trends, so may attribute rising income inequality to tax rate changes.
Long (1999) ¹⁹	USA	Net-of-tax elasticities, by income group: 0-\$50,000 = 0.1-0.8 \$50,000 – \$100,000 = 0.6-0.8 \$100,000 – \$150,000= 0.7-0.8 \$150,000 – \$200,000 = 0.7-0.8	<ul style="list-style-type: none"> High income taxpayers are found to be more responsive to rate changes than lower-income individuals, thought to be primarily due to access to reliefs and deductions.
Goolsbee (2000) ²⁰	USA	Short run: 1 Long Run: 0.1-0.33 >\$1m = 0.56	<ul style="list-style-type: none"> Focuses on a very high income group only, corporate executives most of which have incomes greater than \$150,000. Short-run forestalling response – income shifting into the low-tax period. Among different income sources, stock options are the most responsive to tax rate changes.
Gruber and Saez (2002) ²¹	USA	Average all incomes = 0.4 \$10,000 to \$50,000 = 0.2-0.3 \$50,000 to \$100,000 = 0.1 -0.3 \$100,000 and above= 0.5-0.7	<ul style="list-style-type: none"> Use three-year intervals to focus on longer-term response, recognizing and controls for mean reversion and exogenous trends in income. Very comprehensive study. Estimates vary over the different income groups.
Aarbu and Thoresen (2001) ²²	Norway	Min:-0.6 Max: 0.2	<ul style="list-style-type: none"> Norwegian tax reform of 1992 included tax increases for high-income earners. Estimates are lower than similar studies in the U.S.

¹⁸ Lindsey, Lawrence. 1987. "Individual Taxpayer Response to Tax Cuts: 1982-1984, with Implications for the Revenue Maximizing Tax Rate." *Journal of Public Economics*, 33(2): 173-61 206.

¹⁹ Long, J E. (1999). "The Impact of Marginal Tax Rates on Taxable Income: Evidence from State Income Tax Differentials." *Southern Economic Journal* 65(4): 855-869.

²⁰ Goolsbee, A., (2000) "What happens when you tax the rich? Evidence from executive compensation." *Journal of Political Economy* 108(2), 352-378.

²¹ Gruber, Jon, and Saez, Emmanuel, 2002. The Elasticity of Taxable Income: Evidence and Implications, *Journal of Public Economics*, 84, 1-32.

²² Aarbu, Karl and Thor Thoreson. 2001. "Income Responses to Tax Changes: Evidence from the Norwegian Tax Reform," *National Tax Journal*, 54(2): 319-334.

Table 4.1 continued

Author(s) (year of study)	Country	Range of Taxable Income Elasticity Estimates	Lesson learnt and points made
Selén (2002) ²³	Sweden	Central view: 0.4-0.5	<ul style="list-style-type: none"> Using the 1990s tax reform in Sweden. The preferred elasticity estimates fall in the range of 0.4 to 0.5, similar to US studies.
Blow and Preston (2002) ²⁴	UK	Range of results (1.4-2.8), but self-employed shown to be more responsive.	<ul style="list-style-type: none"> Focus on the self-employed, suggests taxable income can respond positively to cuts in tax rates. Income is very sensitive potentially due to reporting and evasion. Looks at different occupational groups and regions of the UK, but not specifically those on high incomes.
Saez (2004) ²⁵	USA	Top 1% = 0.5 - 0.71	<ul style="list-style-type: none"> Considers data from 1960 to 2000. Only the top 1% incomes show evidence of behavioural response to taxation.
Kopczuk (2005) ²⁶	USA	Using the same data as Gruber and Saez (2000), finds a TIE of 0.21 when using the full sample (includes taxpayers with less than \$10,000). Comparable result for high earners is still 0.57.	<ul style="list-style-type: none"> Highlights the uncertainty around any TIE estimates. Results very sensitive to the model specification and sample.
Brewer, Saez, and Shephard (2008 - 2010) ²⁷	UK	Estimate of 0.46 for high earners (top 1%), (some estimates as high as 0.7 without controls).	<ul style="list-style-type: none"> Most applicable study as UK based. Considers the reforms in the UK in the 1970 and 1980s. Difference-in-differences framework, comparing the top 1 per cent to income groups just below.
Cheety et al (2011) ²⁸	Denmark	Lower bound of 0:34 (all income groups).	<ul style="list-style-type: none"> Looking at behavioural responses using bunching around kink-points in data from Danish tax records rather than discrete policy changes. Cheety 2009²⁹ is a theoretical paper shows that the effects of tax rates on labour supply are shaped by adjustment costs.

4.3 The academic evidence shows the difficulty in accurately estimating behavioural responses. There are four broad analytical challenges that affect this evidence:

²³ Selen, J (2002). "Taxable income response to tax changes: Evidence from the 1990/91 Swedish Tax Reform," FIEF Working Paper No. 177.

²⁴ Blow, Laura and Ian Preston, 2002. "Deadweight Loss and Taxation of Earned Income: Evidence from Tax Records of the UK Self-Employed", IFS Working Paper No. 02/15.

²⁵ Saez, E. (2004), "Reported Incomes and Marginal Tax Rates, 1960-2000: Evidence and Policy Implications", NBER Working Paper No.10273, National Bureau of Economic Research.

²⁶ Kopczuk, W. 2005. "Tax Bases, Tax Rates and the Elasticity of Reported Income." *Journal of Public Economics*, 89(11-12): 2093-2119.

²⁷ Brewer, M, Saez E and Shephard A 2010. "Means-testing and Tax Rates on Earnings." In *The Mirrlees Review: Reforming the Tax System for the 21st Century*, Institute for Fiscal Studies.

²⁸ Chetty, Raj, John Friedman, Tore Olsen, and Luigi Pistaferri. 2011. "Adjustment Costs, Firm Responses, and Micro vs. Macro Labor Supply Elasticities: Evidence from Danish Tax Records." *Quarterly Journal of Economics* 126 (2): 749–804.

²⁹ Chetty, Raj. 2009 "Bounds on Elasticities with Optimization Frictions: A Synthesis of Micro and Macro Evidence on Labor Supply." National Bureau of Economic Research Working Paper 15616.

- **Diverging income trends** – growth in income can be different at different parts of the income distribution. Studies that do not allow for this may incorrectly attribute some of this growth to the tax rate change.
- **Sample selection** – whether or not the underlying data source was stratified or selected to accurately reflect the income distribution can be important. If this is not the case then high income individuals may be underrepresented, causing only a partial estimate of the underlying effects. Kopczuk (2005) shows how some results can be sensitive to a small number of cases.
- **Volatile income growth** – high earners’ incomes often exhibit many temporary changes, randomly increasing income in some year. This is likely to be driven by bonuses and variation in profitability at the individual level, but if this “mean reversion”, that would happen anyway, is attributed to the tax rate change this could bias any results. This is highlighted, and controlled for, in studies such as Gruber and Saez (2002).
- **Forestalling and timing effects** – impacts could be different in the short run compared with the medium and long-run impacts. A likely response to a pre-announced tax rate change is that income is brought forward or pushed back so it is taxed at the lower rate. Longer-run effects could gradually feed through to the wider macroeconomy.

4.4 The most relevant study estimating a TIE for high incomes in the UK is Brewer, Saez and Shephard (2008) as reported in the Mirrlees Review. They estimate a TIE of 0.46 for the top 1 per cent of earners based on the top rate changes from the 1970s and 1980s. The study uses a difference-in-differences framework, comparing the top 1 per cent with incomes groups just below this. While the income group studied is relevant to the additional rate – those with incomes over £150,000 account for approximately the top 1 per cent of income tax payers – the study does not explicitly control for diverging income trends. Since the 1970s and 1980s labour mobility has increased, suggesting the TIE today might be higher than reported in this study. The use of artificial avoidance schemes might also have increased, although in response to such schemes successive Governments have taken action to reduce the scope for tax avoidance, which might result in a lower TIE.

4.5 Studies using US data have shown that TIEs tend to be higher for those with higher incomes as they engage more in tax planning and are more mobile. A comprehensive study by Gruber and Saez (2002) estimated a TIE of between 0.5 and 0.7 for incomes above \$100,000, compared to an estimate of 0.1 to 0.3 for incomes between \$50,000 and \$100,000. Other studies on high incomes produced estimates of 0.7-0.8 for incomes above \$100,000 (Long 1999), 0.56 for incomes above \$1m (Goolsbee 2000), and 0.5 to 0.7 for the top 1 per cent (Saez 2004). While all of these studies suggest a TIE of at least 0.5, they are based on the US income tax system which is widely considered to have a narrower base than in the UK and greater opportunities for tax planning. This suggests a slightly lower estimate for the UK with its broader income tax base and disclosure regime.

4.6 The elasticity is generally found to be higher for the self-employed (Blow and Preston, 2002), the UK population of which has increased since the 1970s and 80s, but self employment income only makes up around 6 per cent of the total. The greater use of performance-related remuneration and share schemes, which have been shown to be some of the more responsive

forms of income in some studies, (e.g. in Goolsbee (2000)), may have increased this responsiveness.

4.7 Some studies attempted to estimate short and long-run elasticities. TIEs are higher in the short run when timing responses and forestalling around a rate change are possible, for example forestalling impacts are clearly apparent in some studies. Medium-run effects can be assessed by considering more than a year's worth of data after a tax rate change occurs, for example Gruber and Saez (2002). In the long run, it is possible that the elasticity could increase gradually over time as the higher tax rate could cause a persistent change in investment and the reallocation of resources in the labour market. However the effects on long-run wages, profitability and skills and productivity growth are difficult to disentangle in the data. Estimates struggle to appropriately isolate and identify any causality. In a recent critical review of the literature Saez, Slemrod and Giertz (2012)³⁰ concluded that due to these factors it may not possible to reliably estimate such long-run effects.

4.8 Saez (2004) looks at the history of TIE estimates and comments that the effects observed for each of the historic policy changes are notably different. This is likely to be due to structural factors, the nature of the tax system at different times and the studies not correctly picking up varying income trends, but it highlights how any measure of behavioural response is not an enduring facet of the economy but depends on the nature of the tax system and individuals affected at the time.

4.9 There is no consistent difference between reductions and increases in the studies assessed. Saez et al (2012) suggests that "asymmetric response to increases versus decreases might affect the size of behavioural response" and that this should be an area for future study. It is likely that responses that required investment and search costs to find and put in place will not necessarily be reversed-out immediately. Up-front investment in tax planning could lead to some "stickiness" when the income tax rate is reduced – for example avoidance scheme would still be more tax efficient and may have been setup to operate for a number of years. Taxpayers who shifted to evasion behaviours may still under report their income. Where individuals have migrated it is possible that they may not moved back to the UK. Chetty (2009) suggests a theoretical model where the resource costs of sheltering income from the tax authorities are incorporated into the model, this leads to "imperfect optimization", particularly for smaller changes in rates, due to the need to pay adjustment costs to respond. (This may also suggest that the elasticity increases with the size of the tax variation – so responses may well be non-linear).

4.10 The TIE estimate of 0.35 used in the Budget 2010 Exchequer estimate set out in Chapter 3 was deliberately at the low end of the academic elasticities surveyed. It is therefore difficult to find reliable studies in the academic literature that suggest a central estimate of the TIE should be 0.35 – most of the studies considered here produce TIEs in the range of 0.4 to 0.7 for higher income groups, with the exceptions of lower response in a study based on data from Norway (Aarbu and Thoresen (2001)).

³⁰ Saez, E, Slemrod, J and Giertz S.H (2012) "The Elasticity of Taxable Income with Respect to Marginal Tax Rates: A Critical Review", *Journal of Economic Literature* 2012, 50:1, 3–50.

International competitiveness and migration

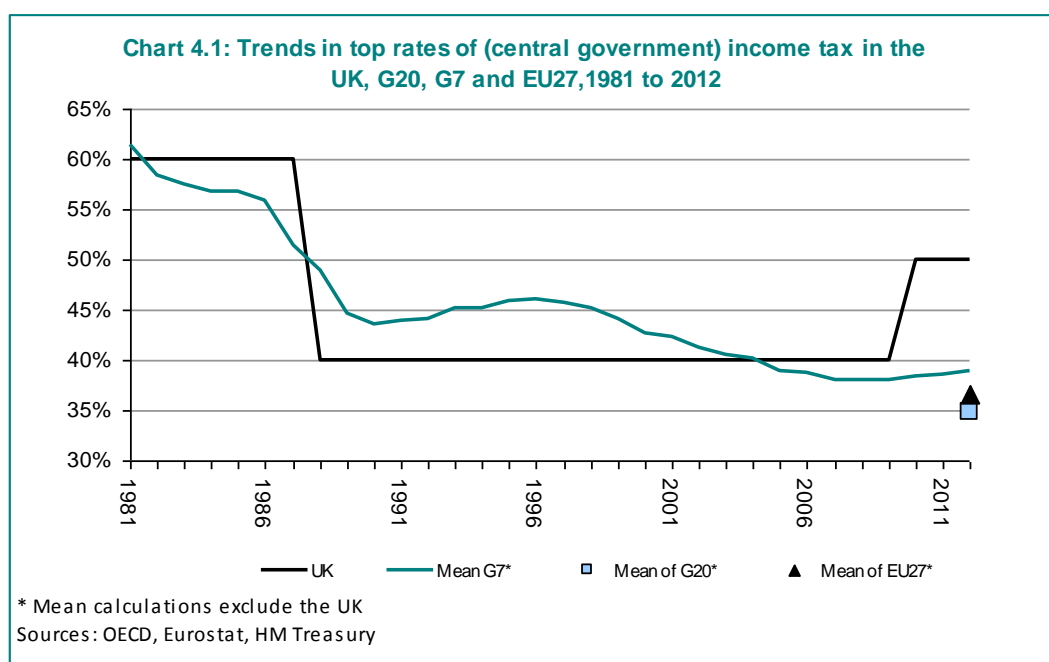
4.11 The discussion of the TIE estimates shows they can be affected by the opportunities and incentives for individuals to move abroad to countries with lower tax rates. This section therefore describes the international perspective, highlighting recent trends in tax rates, and migration and mobility.

4.12 The migration response to the additional rate of income tax is particularly important because:

- If an individual leaves the UK in response to the additional rate they take all of their taxable income with them, not just their income above the threshold, so the impact on revenues is larger;
- Unlike avoidance, migration entails a loss of real incomes to the UK economy, which reduces the level of GDP and revenues from other tax bases, particularly consumption taxes; and
- Losing (or failing to attract) high-skilled labour and foreign direct investment to the UK can lower the long-run rate of economic growth as these are important channels for the diffusion of new technologies and productivity spill-overs.

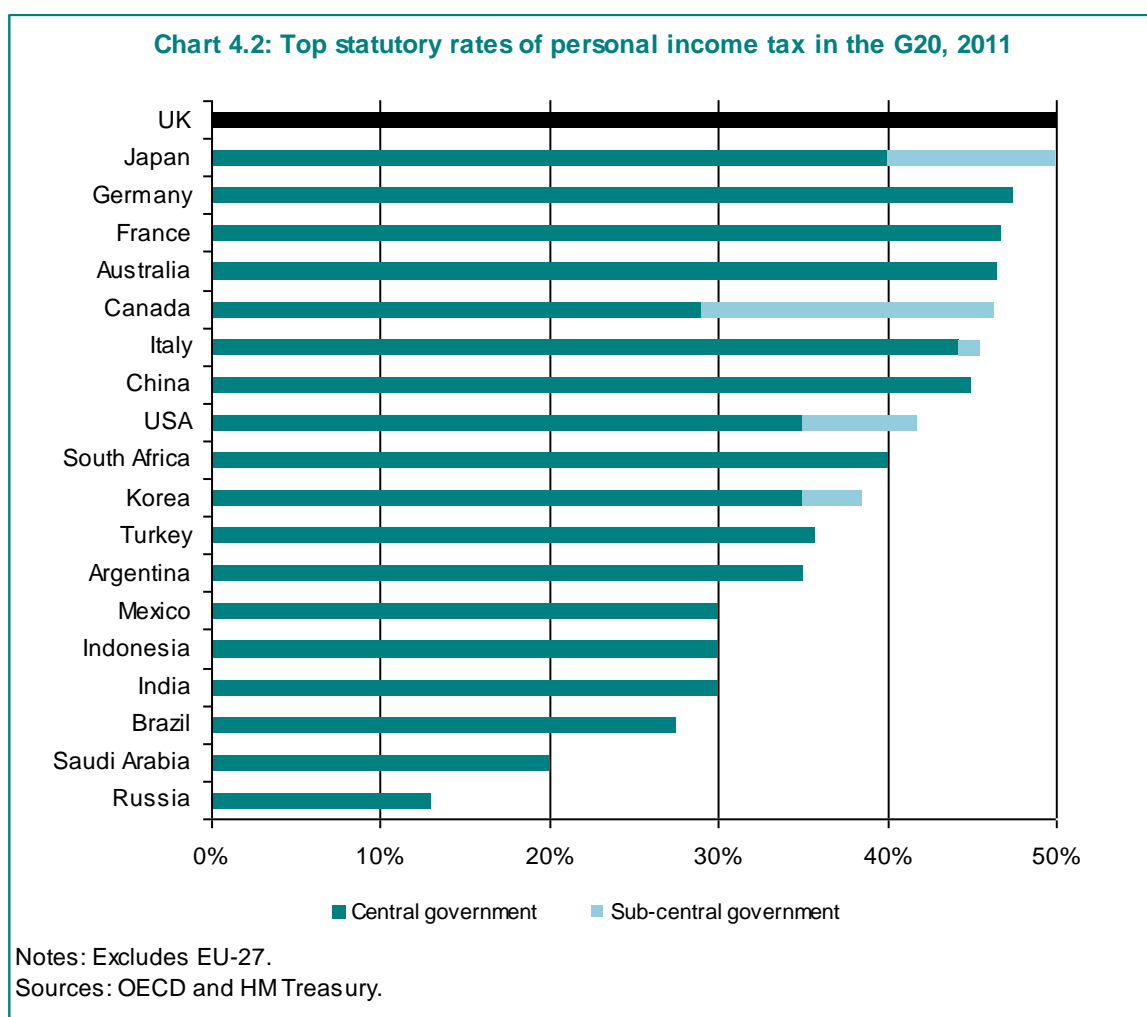
Tax rate comparisons

4.13 In the 1970s and 1980s, many countries had top marginal personal income tax rates in excess of 65 per cent; the trend over the past 30 years has been for these rates to be reduced. Average central government top rates of income tax for the G7 since 1981, and the current averages in the G20 and EU-27 are shown in Chart 4.1.



4.14 In the early 1980s the top rate of income tax in the UK on earned income was 60 per cent; near the average rate for other G7 members. The 1988-89 income tax reforms reduced the top rate to 40 per cent; the UK then had a lower top rate than the average of other G7 countries until around 2004 when the average fell below 40 per cent. The introduction of the additional rate in 2010-11 increased the top personal income tax rate in the UK to 50 per cent; over ten per cent higher than the average of other top central Government rates in the G7 and EU-27 and over fifteen per cent higher than the average in the rest of the G20.

4.15 Some countries also charge income tax at a sub-central level, for example by State. Chart 4.2 below shows top rates of income tax in the G20, including indicative figures for sub-central rates. Even after taking into account local rates, the UK has the highest top rate of personal income tax in the G20, level only with Japan when taking into account Japan's local income taxes. This means that there are many more countries to which individuals can move to reduce their tax burden than 20 years ago.



4.16 KPMG produce an annual survey of individual income tax and social security rates³¹. According to their research there are only a few countries with top rates of income tax as high as the UK. The coverage of this report extends beyond the G20 and OECD, including 96 countries, and surveys the highest marginal income tax rate payable in each country. The additional rate puts the UK as the fifth highest in 2011, behind (in ascending order) the Netherlands, Denmark, Sweden and Aruba (a small Caribbean island with a very small indirect tax base). The UK top rate is the third highest in the OECD, alongside Belgium, Austria, and Japan which also levy a 50 per cent. The KPMG survey shows that the income threshold at which the UK's top rate becomes payable is, however, higher than in many other countries, although lower than in the US, Germany, Singapore and Spain.

4.17 Cross-country comparisons of income tax are complicated as different countries will have different local rates, allowances and social contributions. The effective tax rate for a given income level will depend on all of these factors. For simplicity, comparisons often focus on the top central government rates of income tax, which are seen as an important signal for competitiveness. Irrespective of these complications, a ten per cent increase in the top marginal rate in the UK will have made the UK less competitive. Few countries have increased their top rates in recent years and those that have increased rates have usually announced relatively modest increases of less than 5 per cent, often as a temporary measure to support fiscal consolidation. Italy, for example, introduced a 3 per cent surcharge on incomes above €300,000 effective from 1 January 2011 to 31 December 2013, while Portugal's "solidarity tax" of 2.5 per cent on income exceeding €153,300 applies only for tax years 2012 and 2013.

Migration trends

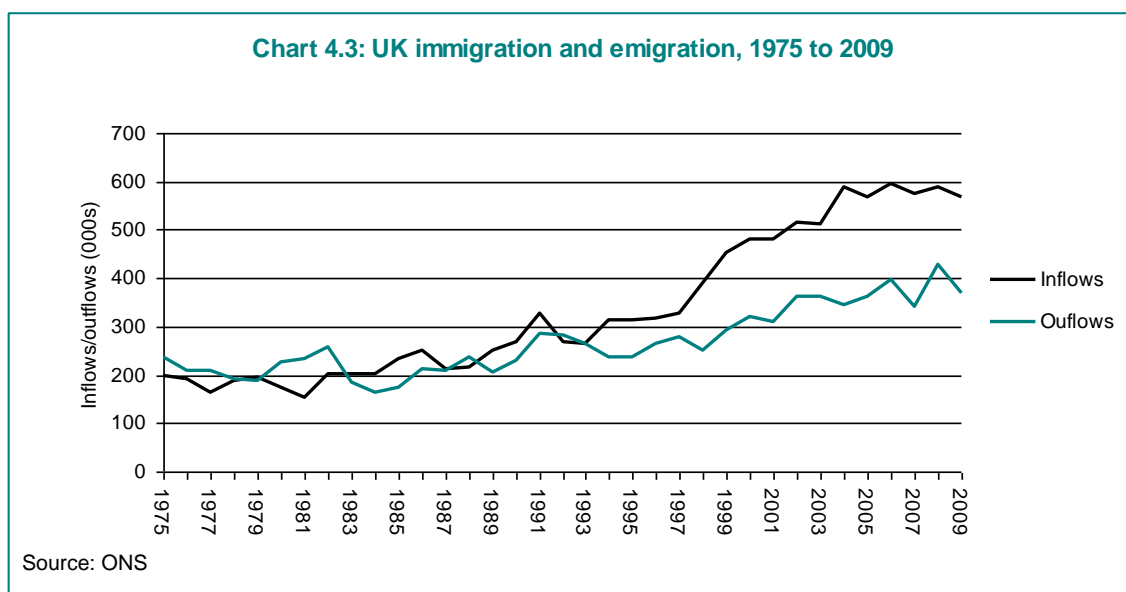
4.18 Personal income tax rates can affect migration decisions by changing the net-of-tax wage differential between different countries, although other factors will also affect international labour flows. High-income individuals might be more likely to relocate as they are likely to see the highest marginal income tax rates due to most developed countries having a progressive tax system; and they are likely to have sufficient wealth to meet the transactional costs associated with migration. While it is difficult to model the impact of high marginal tax rates on migration due to the range of other factors involved in decision making, it is possible that the migration response to the additional rate in 2010 could be higher than in the 1970s and 1980s due to labour becoming more mobile due to globalisation.

4.19 According to an OECD study into the taxation of mobile highly-skilled workers in 2010³² labour mobility has increased in the last 15 to 20 years as both legal impediments and general migration costs have been reduced. The study finds that this "has particularly been the case for highly-skilled workers who are now subject to relatively liberal immigration policies in many OECD countries" and furthermore "the growth of multinational enterprises has made markets for managers, scientists and other professionals more international, thereby increasing international demand for highly-skilled workers".

³¹ KPMG's Individual Income Tax and Social Security Rate Survey 2011, <http://www.kpmg.com/Global/en/IssuesAndInsights/ArticlesPublications/Documents/individual-income-tax-social-security-rate-survey-September-2011.pdf>

³² *The taxation of mobile highly-skilled workers*, OECD, 2010

4.20 Data from the Office for National Statistics *International Passenger Survey* show these trends apply to the UK. Since 1990 inflows to the UK have grown at an average annual rate of 4.0 per cent per year; for the period 1975 to 1989 average annual growth was just 1.7 per cent per year.



4.21 The combination of a large differential between the top rate of tax in the UK and the median rate in the G20 and increased labour mobility suggests that the migration response to the additional rate of income tax might be greater than in the 1970s and 1980s, although it should be noted that other factors, such as changes to the tax system that make avoidance more difficult, work in the opposite direction. The evidence on the impact of the 50 per cent rate on migration since its introduction in 2010 is more qualitative and anecdotal at this stage.

4.22 In a survey carried out for the Skandia³³ life assurance company, 55.9 per cent of high net worth individuals would consider moving abroad under certain circumstances. High taxation was the most frequently cited reason for considering leaving the UK with 31 per cent of respondents.

4.23 Figures from the Swiss Federal Migration Office³⁴ showed that 383 British citizens working in banking and financial services moved to Switzerland in 2010, an increase of 28 per cent on the previous year³⁵. Under the broader rubric of banking, insurance and consulting, which includes IT, 1,379 Britons were given permission to work long-term in Switzerland in 2010. This is an increase of 29 per cent over the 2009 figure. The Federal Migration Office points out that the economic recovery is a factor in the increased migration rate. But the increase in the rate of immigration of Britons in financial services exceeds that of other nationalities. Excluding Britons, the increase in financial services migration was 14 per cent, half as much as the British rate.

³³ Skandia Millionaires Monitor: a study of UK millionaires, edition 1, June 2011.

http://www2.skandia.co.uk/Images/Investor%20news%20assets/Investing_for_financial_goals/Millionaire_monitor_report.pdf

³⁴ As reported on Channel 4 News website: : <http://www.channel4.com/news/british-bankers-head-to-switzerland> 17/02/2011, Ben King.

³⁵ Channel 4 News website: <http://www.channel4.com/news/british-bankers-head-to-switzerland> 17/02/2011, Ben King.

4.24 With the possibility of such a strong behavioural response, the indications a Government provides of its future intentions can be very powerful. The migration response might have been relatively muted so far if the additional rate has been perceived as temporary as a result of statements from both the previous and current Chancellor of the Exchequer.³⁶

4.25 The longer the additional rate remains in place the more people are likely to consider it a permanent feature of the UK tax system and the more likely they are to relocate. This suggests that the negative impact on GDP may increase over time, and therefore the direct yield (and revenues from other tax bases) might fall over time toward or beyond zero.

³⁶ For example, in an interview in March 2010 the then Chancellor of the Exchequer said about the additional rate: "Now I've made it pretty clear that I thought putting the tax rate up to 50 pence whilst we get through this period, that was justified, but I'm very conscious of the fact that we've got to make sure that our tax rates are properly competitive" (The Andrew Marr Show, 21 March 2010, http://news.bbc.co.uk/1/hi/programmes/andrew_marr_show/8578801.stm). The current Chancellor of the Exchequer said "I am clear that the 50 pence tax rate would do lasting damage to our economy if it were to become permanent. That is why I regard it as a temporary measure (Chancellor of the Exchequer's Budget 2011 statement, 23 March 2011, http://www.hm-treasury.gov.uk/2011budget_speech.htm).

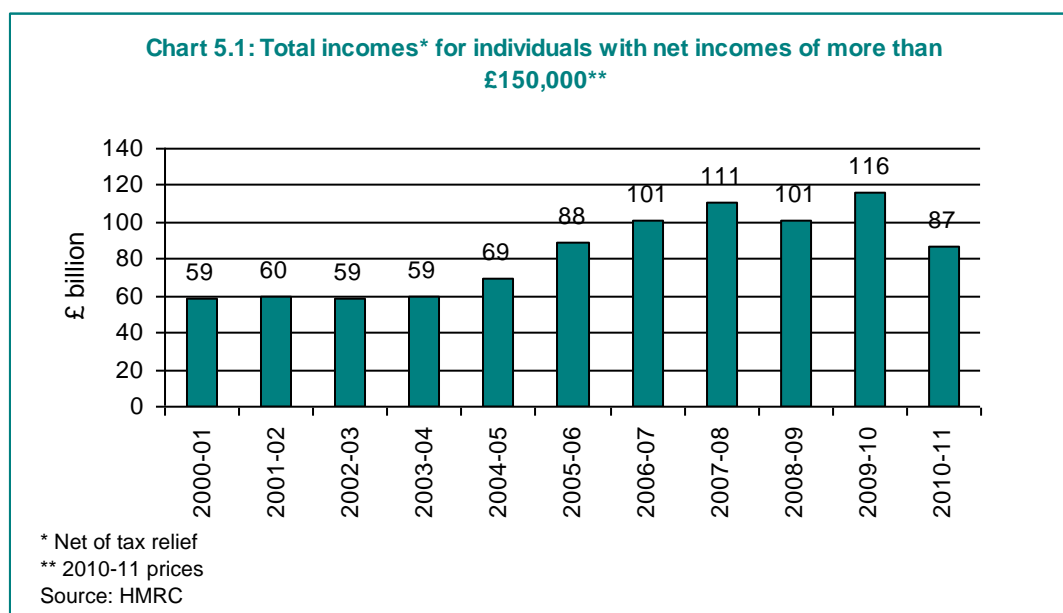
Chapter 5 – The 2010-11 Self Assessment returns and the Exchequer yield

5.1 This Chapter contains an analysis of the 2010-11 Self Assessment returns which provide a first ex-post estimate of the impact of the additional rate on incomes and the Exchequer yield. At the time of producing this report around 90 per cent of returns had been received for the entire population of Self Assessment income tax payers. Extrapolation methods have therefore been used to produce grossed up estimates. Details of the extrapolation methods can be found in Annex B.

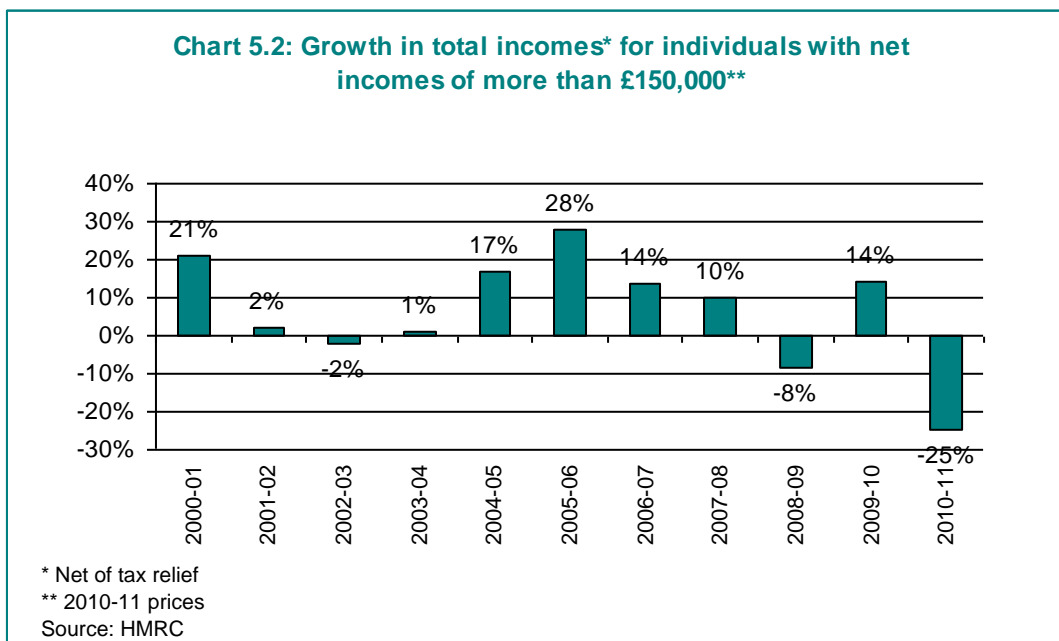
5.2 The Chapter starts by looking at some key descriptive statistics on total net incomes (taxable income plus personal allowances) for those individuals affected by the additional rate in the years preceding and following its introduction, before explaining how the data has been used to provide an estimate of the Exchequer yield.

Descriptive statistics

5.3 Charts 5.1 and 5.2 below show total incomes and income growth for individuals with net incomes over £150,000.³⁷



³⁷ At 2010-11 prices.



5.4 It can be seen that between 2003-04 and 2007-08 incomes for very high earners grew by around £50 billion, which would have increased their tax payments by at least £20 billion. In 2008-09, the economic downturn meant that incomes fell by almost 10 per cent. However, despite the continued weakness of the economy, incomes grew by around 14 per cent in 2009-10. This is believed to be largely a result of the forestalling behaviour described in Chapter 2.

5.5 The analysis presented later in this Chapter suggests that between £16 billion and £18 billion of income was brought forward to 2009-10 to avoid the additional rate of tax. This corresponds to a one-off reduction in the potential yield from the additional rate of around £1.6 billion to £1.8 billion, although the actual impact would be lower (around £1 billion) as this income would have been subject to greater behavioural responses had it been declared in 2010-11 or later when it would have been subject to the 50 per cent rate. The magnitude of the forestalling demonstrates how responsive high income taxpayers are to changes in tax rates.

5.6 The chart also shows that incomes fell by 25 per cent in 2010-11. This will partly reflect both the unwinding of the forestalling described above, and other behavioural effects resulting from the introduction of the additional rate such as reduced labour supply and increased avoidance.

The components of taxable income growth

5.7 Table 5.1 below shows the components of incomes for individuals with net incomes over £150,000 over the past three years.

Table 5.1 – Components of income (£bn)

	Levels			Growth		
	2008-09	2009-10	2010-11	2008-09	2009-10	2010-11
Employment income	55.2	63.4	55.0	-12%	15%	-13%
Self-employment income	6.7	6.7	4.9	-4%	1%	-27%
Partnership income	20.3	18.9	16.4	-2%	-7%	-13%
Dividends*	9.6	17.2	4.7	-7%	78%	-73%
Other income	11.5	11.2	7.9	-5%	-3%	-30%
Total gross income	103.4	117.4	88.9	-9%	14%	-24%
Reliefs, deductions**	2.0	1.8	1.8	-14%	-12%	4%
Total income***	101.3	115.7	87.0	-8%	14%	-25%

* Gross of tax credits

** Only reliefs recorded on the SA return i.e. will exclude reliefs such as tax relief on investment returns on ISA saving

*** Net of tax reliefs

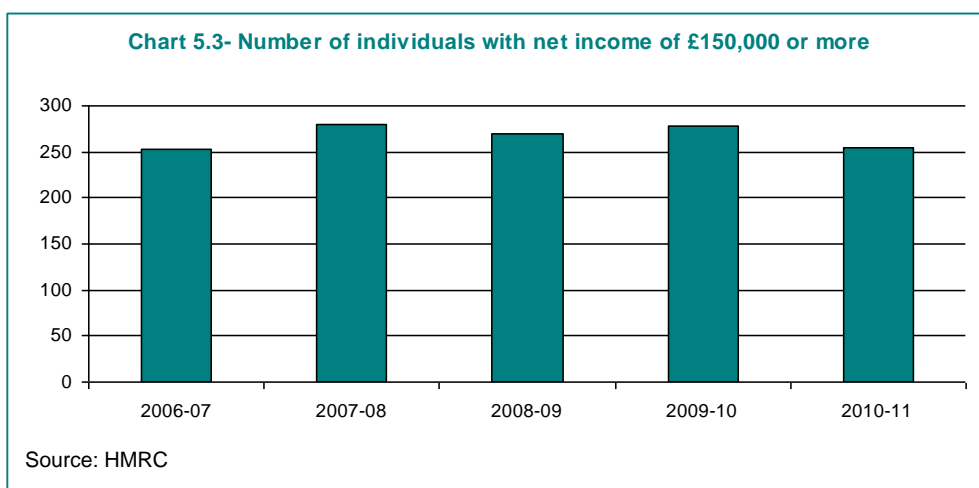
5.8 As shown, there was a significant increase in dividend income in 2009-10 followed by a corresponding fall in 2010-11. This is thought to be the main source of the forestalling behaviour as it is the main source of income for owner-directors of companies who have much more flexibility than others in terms of the timing of their remuneration.

5.9 The table also shows strong growth in employment income in 2009-10 followed by a fall in 2010-11. Again this is thought to be partly explained by forestalling, and will include individuals exercising unapproved share scheme options.

5.10 The use of tax reliefs recorded on the tax returns remained fairly stable in each of the years. In the case of pensions tax relief, this may be partly explained by the anti-forestalling provisions that were introduced in 2009-10 as part of the 2009 Pre-Budget Report pensions tax relief measure.

Number of people with taxable incomes over £150k

5.11 Chart 5.3 shows the number of individuals with taxable incomes over £150,000.



5.12 The population of individuals with net incomes above £150,000 grew until the onset of the recession, from when it declined. The figure in 2009-10 may have been boosted by forestalling of the tax changes in the following year, masking an underlying decline during the economic downturn. The reduction in 2010-11 may be partly explained by behavioural effects from the introduction of the additional rate of tax.

5.13 These descriptive statistics suggest there was a considerable behavioural response to the introduction of the additional rate. However, these statistics alone cannot be used to estimate the yield from the additional rate. This is because annual changes in tax revenues will be driven by many factors in addition to tax rate changes, such as underlying changes in salaries and bonuses. To estimate the yield from the additional rate, a counterfactual (what incomes and revenues would have been in 2010-11 the absence of the additional rate) needs to be established, which can then be compared with observed incomes and revenues to produce an estimate of the additional rate yield.

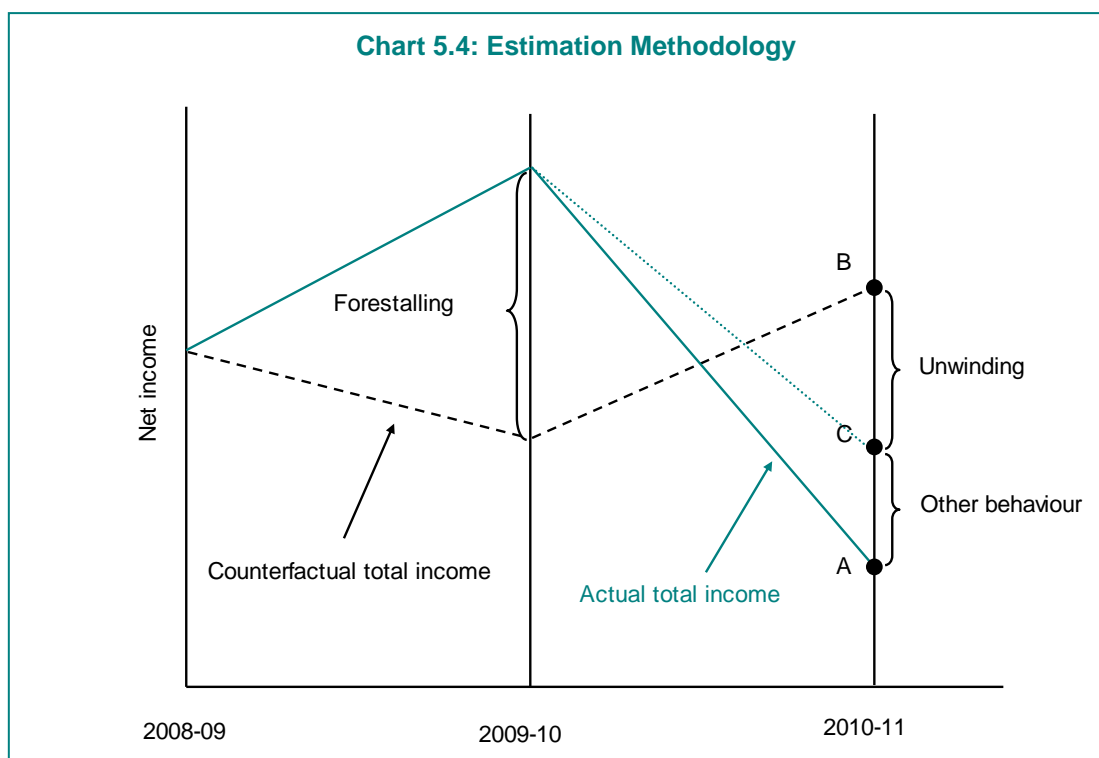
Estimating the yield - The basic methodology

5.14 Establishing a counterfactual in 2010-11 is particularly problematic as there were a number of other policies being introduced at around the same time that would have had an impact on taxable incomes of those affected by the additional rate. Any methodology therefore needs to be able to strip out the impacts of these other measures to isolate the impact of the additional rate.

5.15 In addition, to inform judgements about the medium and longer term Exchequer effects of the additional rate, the methodology needs to be able to break down any difference between counterfactual and actual incomes in 2010-11 between temporary factors such as the unwinding of forestalling, and more permanent underlying behavioural effects such as changes in labour supply. These underlying behavioural effects can then be used to produce estimates of the implied underlying taxable income elasticity (TIE). This basic methodology can be reduced to four key stages, as illustrated in Chart 5.4.

- **Stage 1** – Estimate post measure incomes (Point A);
- **Stage 2** – Estimate counterfactual incomes (Point B)

- **Stage 3** – Estimate unwinding (Point B less Point C); and
- **Stage 4** – Estimate the underlying behavioural effect (Point C less Point A)



5.16 The methods used to produce the estimates in each of these stages and the issues faced are described in more detail below.

Stage 1 – Estimate post-measures income

5.17 The estimate of post-measure incomes comes directly from the Self Assessment returns. At the time of carrying out the analysis in this report, around 90 per cent of the 2010-11 returns should have been received. Extrapolation methods have therefore been used to produce a grossed up estimate (see Annex B) which increases the margin of uncertainty around any resulting TIE estimates.

Stage 2 – Estimate counterfactual income

5.18 A number of approaches were considered to estimate the counterfactual income, including difference-in-difference (DiD) analysis on individual tax return data, and Regression Discontinuity Design (RDD). However, each of these approaches had a number of problems which either meant they would not fully capture all the behavioural responses, or easily produce an estimate of the overall impact of the additional rate on incomes. For example, neither model could easily capture the impact of the measure on inward migration. Similarly, at its basic level the DiD approach would

have produced an estimate of the unweighted average affect of the measure, whereas this analysis needed a weighted estimate to take account of the fact that behavioural responses tend to increase further up the income distribution. It became clear that analysis of incomes at an aggregate level was best able to create the counterfactual needed to estimate the Exchequer yield.

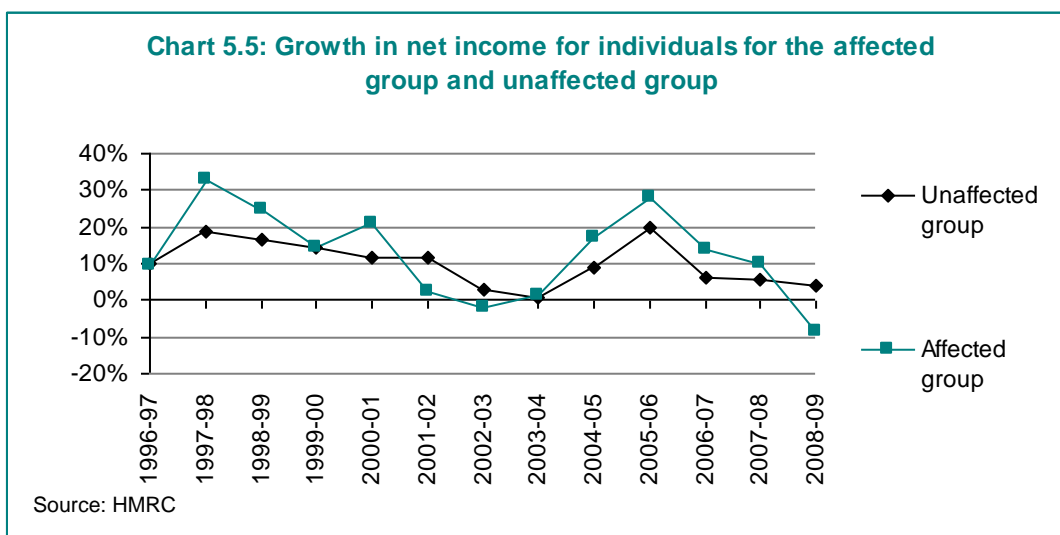
5.19 The chosen approach initially attempted to create a counterfactual by examining to what extent changes in total net income in previous years for individuals with net incomes over £150,000 (the affected group) could be explained by other economic factors such as equity prices and economic growth. If they were able to explain a large proportion of the annual change, then as growth in these other factors in 2010-11 is known, it would have been possible to produce an estimate of what net incomes would have been in 2010-11 in the absence of the additional rate. The main problem with this approach is that it was extremely difficult to identify and measure all the factors that impact on net incomes.

5.20 An alternative approach was to see to what extent changes in the net incomes of the affected group were in line with changes in the net incomes of a different group who are subject to the same economic variables as the affected group, but are not affected by the additional rate of tax. In a sense the unaffected group is being used as a proxy for all the economic factors that drive net incomes for the affected group. This approach has much in common with approaches used in other studies such and that is used by Brewer, Saez and Shephard (2008) in arriving at the estimated TIE of 0.46, and was informed by discussions with external technical experts. The main difference is that the Brewer, Saez and Shephard (2008) study tried to explain changes in the income share of the top one per cent of earners (broadly equivalent to those earning over £150,000 in 2009-10), whereas this study attempts to explain changes in the value of total incomes.

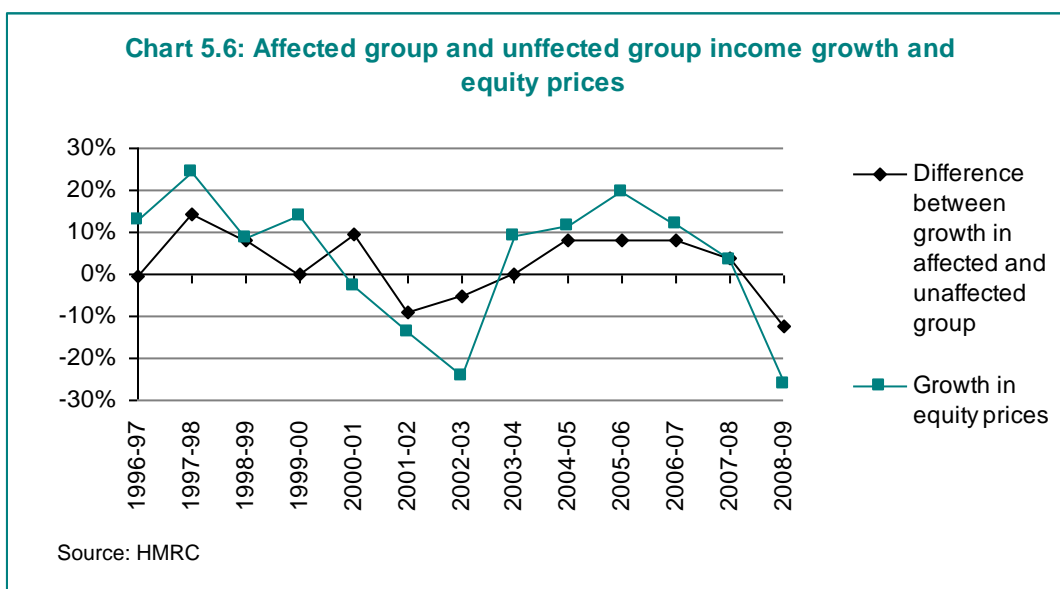
5.21 In theory the 'value of incomes' approach should be better at picking up the impact of the additional rate on migration. This is because if a number of additional rate paying individuals leave the country, then the total value of incomes over £150,000 would be reduced by the sum of their individual incomes. However, the impact on the share of total income accruing to the top one per cent will be much smaller as the share will now include the incomes of individuals that were previously just below the top percentile but are now in it because of the outward migration of those that were previously in it. The 'share of income' approach will therefore tend to underestimate the true TIE in respect of migration, although it may be a more suitable approach for studies of changes over a very long period, which was the time horizon used in the Brewer, Saez and Shephard study.

5.22 Of all individuals not affected by the additional rate, those with the highest incomes should have most in common with those that are affected. Chart 5.5 therefore plots the growth rates in total net incomes for the affected group (individuals with net incomes over £150,000) with growth in net incomes for those individuals with net incomes between £115,000 and £150,000³⁸ (the unaffected group) over time.

³⁸ £115,000 was chosen as the lower bound as below this amount individuals were subject to the tapering away of the personal allowance. To ensure sufficient sample sizes in early years, the affected group and unaffected group income thresholds have been held constant in real terms.



5.23 The chart shows a reasonably strong correlation between the different groups. In addition, it is noticeable that growth in the affected group is above the unaffected group in that late 1990s, and between 2004-05 and 2007-08, and vice-versa between 2001-02 and 2002-03 and in 2008-09. As shown in Chart 5.6, this pattern coincides with trends in the equity markets at the time.



5.24 The findings in Chart 5.6 reflect the fact that the unaffected group will be predominantly high earners in employment across the economy generally together with certain professional categories in self-employment, whereas the treatment group's incomes (especially at the upper end) will be more closely linked to conditions in the financial markets such as equity price movements.

5.25 These charts suggested that it was possible to estimate a strong statistical relationship between growth in the net income of the affected group, the unaffected group, and equity prices. A number of different equations were tested, and the results for the one that is best able to explain growth in previous years are shown in Box 5.1.

Box 5.1 – Regression results

Equation: $GTY150+_t = a_1GTY115_150_t + a_2GAVEP_t + e_t$

Where:

$GTY150+_t$	=	$(TY150+_t / TY150+_{t-1}) - 1$
$GTY115_150_t$	=	$(GTY115_150_t / GTY115_150_{t-1}) - 1$
$GAVEP_t$	=	$(AVEP_t / AVEP_{t-1}) - 1$
$TY150+_t$	=	the sum of net incomes of those individuals with net incomes of £150k* and above in year t
$TY115_150_t$	=	the sum of net incomes of those individuals with net incomes between £115k* and £150k* in year t
$AVEP_t$	=	Average UK equity prices in year t

Results of regression

Variable	Coefficient	Standard error	Probability coefficient = 0
GTY115_150	1.116	0.132	0.000
GAVEP	0.382	0.093	0.002

$R^2 = 0.931$

* Adjusted for inflation

5.26 The regression suggests that growth in the unaffected group and equity prices can explain 93 per cent of the annual variation in net incomes for the affected group. The existence of such a close relationship means it is possible to combine the results of this regression with what is known about growth in the unaffected group and equity prices in 2009-10 and 2010-11 to produce a fairly accurate estimate of the counterfactual. This could then be compared with actual incomes from Stage 1 to produce an estimate of the impact of the additional rate.

5.27 To reduce the risk of bias in the results, it was necessary to adjust the counterfactual and actual incomes estimates to take account of other measures being introduced at the time. Not to do so would mean the behavioural responses from these measures would be wrongly attributed to the additional rate. The three main measures that were being introduced at the time that could have an impact on incomes were:

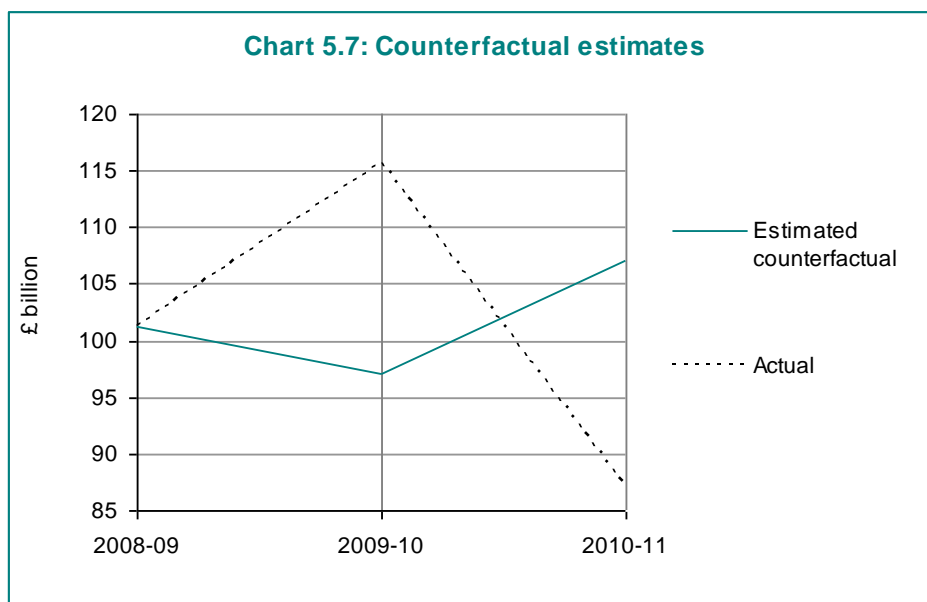
- **The bank payroll tax.** Banking sector bonuses in excess of £25,000 that were paid between 9 December 2009 and 5 April 2010 were subject to a bank payroll tax of 50 per cent. One behavioural response believed to have resulted from this measure was a timing effect where higher remuneration was paid by employers in 2010-11 to compensate for lower awards that had been made in 2009-10 to mitigate the impact of the tax. The effect on incomes for the affected group beyond any effects apparent in the unaffected group will

therefore partly offset the forestalling of the additional rate and be picked up in estimate of that forestalling effect, which means they will not bias the estimates of the underlying behavioural effect. The model therefore already automatically strips out the bank payroll tax measure from the underlying estimates, although it does have an impact on the forestalling estimates.

- **Restrictions to pensions tax relief.** In advance of the restrictions to pensions tax relief that were due to come in April 2011, anti-forestalling provisions were introduced that reduced the extent to which individuals could obtain relief on increased pension contributions³⁹. The main impact of the pensions restriction anti-forestalling regime was that high income individuals would not be able to increase their pension contributions in 2010-11 to reduce their net income. This would have reduced the behavioural response and increased the yield from the additional rate. However, since relief is now only given on pension contributions up to £50,000, the anti-forestalling regime means the behavioural response seen in 2010-11 corresponds more accurately to what would be expected if the additional rate was changed today. In view of this, no adjustment to 2010-11 incomes has been made to take account of the pensions anti-forestalling regime.
- **Changes to Capital Gains Tax (CGT).** In June 2010 the rate of CGT for net gains above the higher rate threshold was increased from 18 per cent to 28 per cent. One of the expected responses from this change was to change the composition of income between gains and other forms of income. Before the rate change the difference between CGT and income tax rates gave taxpayers an incentive to prefer income in the form of capital growth (from investment returns, equity-based remuneration, etc.) rather than dividends, wages and salaries, rent, etc. Bringing CGT more in line with income tax rates therefore reduced the income to gains shifting built into the tax forecasts based on the historical position, increasing the income tax base. This was expected to increase net income in the affected group by £600 million, and income in the unaffected group by £80 million. If the effect was larger then this would tend to bias the estimate of the TIE downwards and the estimate of the yield upwards. These amounts have been stripped out the 2010-11 outturn income data to isolate the impact of the additional rate.

5.28 The resulting adjusted counterfactual and actual incomes are shown in Chart 5.7.

³⁹ The effect of the anti-forestalling regime was that pension contributions would retain full tax relief up to the level of: (i) normal, ongoing pension contributions (defined as quarterly or more regularly); (ii) the lower of £30,000 and average contributions over the past three years if contributions are less regular than quarterly; or (iii) £20,000; whichever is highest.



5.29 The model suggests that 2009-10 incomes were around £18 billion higher than they otherwise would have been as a result of the additional rate, which is entirely due to forestalling. The model also suggests incomes in 2010-11 were considerably lower than they otherwise would have been. This is partly due to the unwinding of forestalling, but also due to other underlying behavioural affects.

Stage 3 – Estimate the level of unwinding

5.30 To estimate the underlying behavioural effects, short-term behavioural effects such as unwinding need to be stripped out the total behavioural effects derived in Stage 2. However, estimating the level of unwinding in 2010-11 is extremely difficult as it is not clear to what extent the income brought forward to 2009-10 came from 2010-11 or later years. This is because there is no information on tax returns that provides a direct measure of the year in which the income was due to be taxed, and there are no recent tax rate changes that are associated with the same level of forestalling as the additional rate which could be used as a basis for estimating the speed of unwinding.

5.31 One possible solution considered was to look at the taxpayer data and see to what extent net incomes grew in 2009-10 by more than would be expected with one year's forestalling. Moreover, if incomes grew by more than 100 per cent, then it may be reasonable to assume that more than one year's income was brought forward. However, there were two problems with this approach:

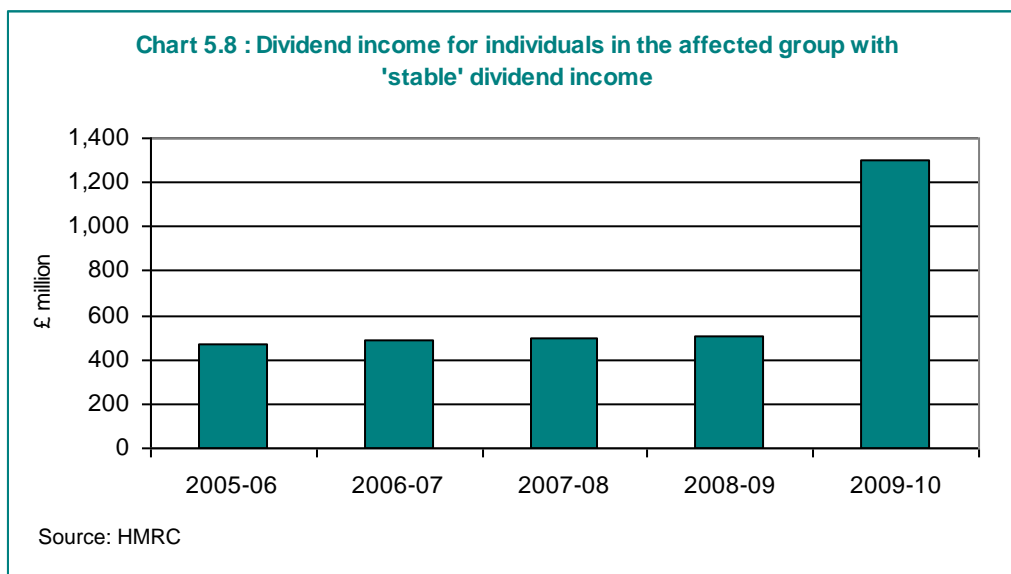
- If the income stream that can be brought forward only represents a proportion of total income, then it would be possible for an individual to bring forward more than one year's income from this stream without increasing total income by more than 100 per cent; and
- The implicit assumption in the above approach is that in the absence of forestalling, incomes would have remained at their 2008-09 level. However, analysis of the taxpayer data shows that there is a wide range of growth rates at an individual level, which makes it extremely difficult to estimate how much of any growth in income in 2009-10 represents

forestalling and how much of that represents more than one year's worth on income. For example, only 10 per cent of those individuals affected by the additional rate and in receipt of dividends have dividend income which has fluctuated by less than 30 per cent in each of the past three years.

5.32 The approach that has been taken, which can never be a perfect solution to these difficulties, is to estimate the unwinding period separately for each main stream of income (dividends, employment income and other) by measuring the growth rate of income for the subset of individuals whose income from these sources has been relatively stable in the immediately preceding years. For example, if an individual has 'normal' dividend income of £100 per year, and in 2009-10 dividend income was £250, then £100 is assumed to have been brought forward from 2010-11, and £50 is assumed to have been brought forward from 2011-12 or beyond. The implied duration of unwinding is then assumed for the rest of the population, i.e. those with very volatile income streams as well.

Dividend income

5.33 As shown in Chart 5.8, among those individuals whose dividend income was relatively stable in the three years prior to 2009-10, dividend income increased on average by around 160 per cent (£800 million). Analysis of data at an individual level showed that a substantial proportion of this growth (around £500 million, 60 per cent) was in excess of one "normal" year's dividend income i.e. it came from 2011-12 any beyond. This suggests that only around 40 per cent of forestalled dividends came from 2010-11. This estimate was lower than expected and would imply a greater proportion of the observed fall in incomes in 2010-11 was due to underlying behavioural effects. As a result a higher estimate of 45 per cent is used in the calculations to reduce the risk of overstating the underlying response to the additional rate.



5.34 This approach has clear limitations. It has been necessary to assume that on average those whose dividend income rose or fell sharply in the year before the tax change will on average be unwinding their forestalled income over a similar period to those whose dividend income was fairly stable. Furthermore, it does not take into account that individuals may have been able to

forestall dividends from their shareholdings in some companies but not others. However, it has resulted in an overall estimate which appears reasonable.

Employment income

5.35 It is believed that the main opportunities to bring forward employment income by more than one year came from share schemes. For example, if at the end of 2009-10 an individual held a share option which had passed its vesting period of three years, and had the option to exercise the option at any time up to 10 years from the date of grant, then the individual may have been prompted to exercise the option in 2009-10 to take advantage of the lower rate of tax of 40 per cent. If the individual would otherwise have exercised the option in, say, 2011-12, the reversal of the forestalling would not have occurred in 2010-11 and the unwinding period would be two years. However, data held by HMRC from companies' returns of unapproved share option schemes suggests that early exercise of options in 2009-10 was probably not a major factor.

5.36 The estimate of the proportion of forestalled employment income that came from 2010-11 is therefore based on the same methodology that was used for dividends, and suggests that around 80 per cent of forestalled employment income came from 2010-11. As with the dividend assumption, this has been adjusted upwards to 85 per cent in the calculation to reduce the risk of overstating the underlying response to the additional rate.

5.37 Forestalling of income other than dividends and employment income is relatively low, and it is assumed that the proportion unwound in 2010-11 matches that of employment income.

Stage 4 - Estimate the underlying behavioural effects

5.38 Stage 4 involves estimating the impact of other underlying behavioural effects. This is simply point C less point A. The level of uncertainty associated with this estimate is therefore driven by the uncertainty of all the other stages described above.

Estimated Exchequer impacts

5.39 The model suggests that if the additional rate had not been introduced, total net incomes for those with incomes over £150,000 would have been around £107 billion. This compares with the observed total income figure of £87 billion, a difference of £20 billion. The model also suggests around £12.3 billion of this difference can be explained by the unwinding of forestalling, with the remaining £7.7 billion attributed to other underlying behaviour. These total income estimates can be used to produce Exchequer estimates, as shown in table 5.2 below.

Table 5.2 – Estimated impact of the additional rate on tax liabilities (£bn)

	2009-10	2010-11
Pre-behavioural yield	0.0	6.2
Behavioural impacts	7.3	-11.2
<i>Of which:</i>		
- Forestalling/unwinding*	7.3	-6.6
- Other	0.0	-4.6
Post behavioural yield	7.3	-5.0

* Excluding the behavioural impacts on forestalled income

5.40 Although subject to a wide range of uncertainty, forestalling is estimated to have increased 2009-10 liabilities by £7.3 billion, with a corresponding reduction in 2010-11 liabilities of £6.6 billion. The overall impact of forestalling on combined 2009-10 and 2010-11 liabilities is therefore around £0.7 billion. However, the full impact of forestalling will be very different as unwinding continues to reduce revenues in 2011-12 and beyond. The actual overall impact of forestalling is a one off negative impact on the potential yield from the additional rate of around £1.8 billion, before taking account of behavioural impacts on the forestalled income.

5.41 The table also shows that despite the introduction of the additional rate, liabilities in 2010-11 were around £5.0 billion lower than they would otherwise have been. This is due to the unwinding and other behavioural effects.

5.42 To estimate the true underlying impact of measure, the impact of forestalling and unwinding therefore need to be excluded from the results. This is complicated by the fact that unwinding and other behavioural effects are to some extent substitutes for each other. If individuals can avoid paying the additional rate by forestalling/unwinding, then there is no need to undertake other behavioural effects. An 'Adjusted other behavioural effect' estimate has therefore been produced that attempts to show what the other behavioural effects would have been in the absence of forestalling. This involves applying the estimated underlying behavioural affects to the 2010-11 income that was brought forward to 2009-10 (see Annex C). This is based on the argument that had the income remained in 2010-11, it would have been subject to the same underlying behavioural responses as other forms of income. These estimates are more comparable with the behavioural effects built into the March Budget 2010 costing, and are summarised in Table 5.3 below. The table also includes an estimate of the implied Taxable Income Elasticity (TIE).

Table 5.3 – Adjusted impact on 2010-11 tax liabilities

	£ bn
Pre-behavioural yield	6.2
Other Behavioural impacts (adjusted for forestalling)	-5.2
Post behavioural yield	1.1
Implied TIE	0.48

5.43 The model suggests the adjusted underlying behavioural effects reduced the pre-behavioural yield by £5.2 billion, **resulting in a post-behavioural yield of around £1.1 billion, with an implied TIE of 0.48**, and decreasing the pre-behavioural yield by at least 83 per cent. These estimates are much more in line with the academic evidence than the behavioural estimates used in the March Budget 2010 costing, which had a yield estimate of £2.4 billion and TIE of 0.35. This also implies that the cost of forestalling after taking account of the adjusted other behaviour is around £1 billion.

Uncertainty

5.44 Because of difficulties in estimating the counterfactual incomes and the amount of unwinding in 2010-11, the estimates above are subject to a wide range of uncertainty. To quantify this uncertainty a range of estimates was produced using Monte Carlo simulations. This involves assigning each key assumption in the calculation a range of possible values, each with a likelihood of occurring. Monte Carlo estimation then simulates the calculation 10,000 times, each time drawing a different assumption from their range of values and producing a different yield and TIE estimate.

5.45 The Monte Carlo simulation confirmed that there are considerable uncertainties around these estimates. The standard error around the adjusted TIE is around 0.33, suggesting that the true TIE for the model is likely to lie anywhere in the range of 0.14 to 0.81, with the most likely estimate at the centre at 0.48. However, simple Monte Carlo modelling may overstate the likely range of uncertainty as there are likely to be some connections between assumptions, e.g. between forestalling and the number of years of unwinding, which are not taken account of in the simulations.

Alternative regression

5.46 As mentioned in paragraph 5.25, a number of different equations were tested for the regression. It was found that the results were sensitive to the way in which equity prices were reflected in the model. The model presented above used the average equity price index for the year. An alternative regression was performed using the growth in the index during the year⁴⁰ rather than the average level. In all other respects this alternative model is the same as the first.

5.47 The results for the alternative regression are shown in Box 5.2.

⁴⁰ Growth during the calendar year ending within each financial year was used, reflecting the December year ends of most banks which pay bonuses based on their results for their reporting year.

Box 5.2 – Equation results for alternative regression

Alternative regression: $GTY150_{+t} = a_1GTY115_150_t + a_2GCYEP_t + e_t$

Where:

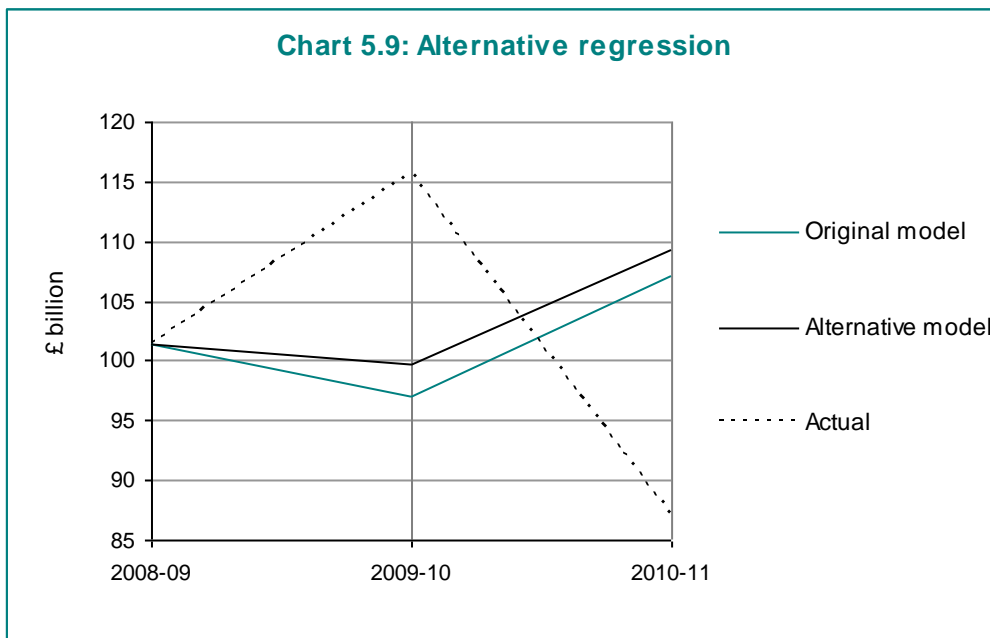
GCYEP = Growth in equity prices over the year

Results of alternative regression

Variable	Coefficient	Standard error	Probability coefficient = 0
GTY115_150y	1.173	0.138	0.000
GCYEP	0.312	0.088	0.004

R² = 0.919

5.48 The estimate of the counterfactual from the alternative regression is compared with that of the original model in the chart below.



5.49 The reason why the counterfactual from the alternative regression is higher than from the original model is that average equity prices only grew by 10 per cent in 2009-10, whereas equity prices between 1 Jan 2009 and 31 December 2009 grew by 22 per cent.

5.50 The results from the alternative regression are shown in tables 5.4 and 5.5.

Table 5.4 – Alternative regression estimates (£bn)

	2009-10	2010-11
Pre-behavioural yield	0.0	6.5
Behavioural impacts	6.1	-12.6
<i>Of which:</i>		
- Forestalling/unwinding*	6.1	-5.5
- Other	0.0	-7.1
Post behavioural yield	6.1	-6.1

* Excluding the behavioural impacts on forestalled income

Table 5.5 – Alternative regression: adjusted impact on 2010-11 tax liabilities

	£ bn
Pre-behavioural yield	6.5
Other Behavioural impacts (adjusted for forestalling)	-7.9
Post behavioural yield	-1.4
Implied TIE	0.71

5.51 As with the original model, the behavioural response to the additional rate is much greater than assumed in the March Budget 2010 estimates, and as a result the yield is much lower. In fact the alternative regression suggests the yield was negative.

5.52 The estimated TIE from the alternative regression of 0.71 is on the high side of the range of other academic estimates. The alternative regression does not generate as close a fit with income growth in previous years as the original model. However, the alternative regression produces a lower estimate of forestalled income (£16 billion compared to £18 billion on the original model), which evidence from income tax receipts suggests may have been a more likely outcome.

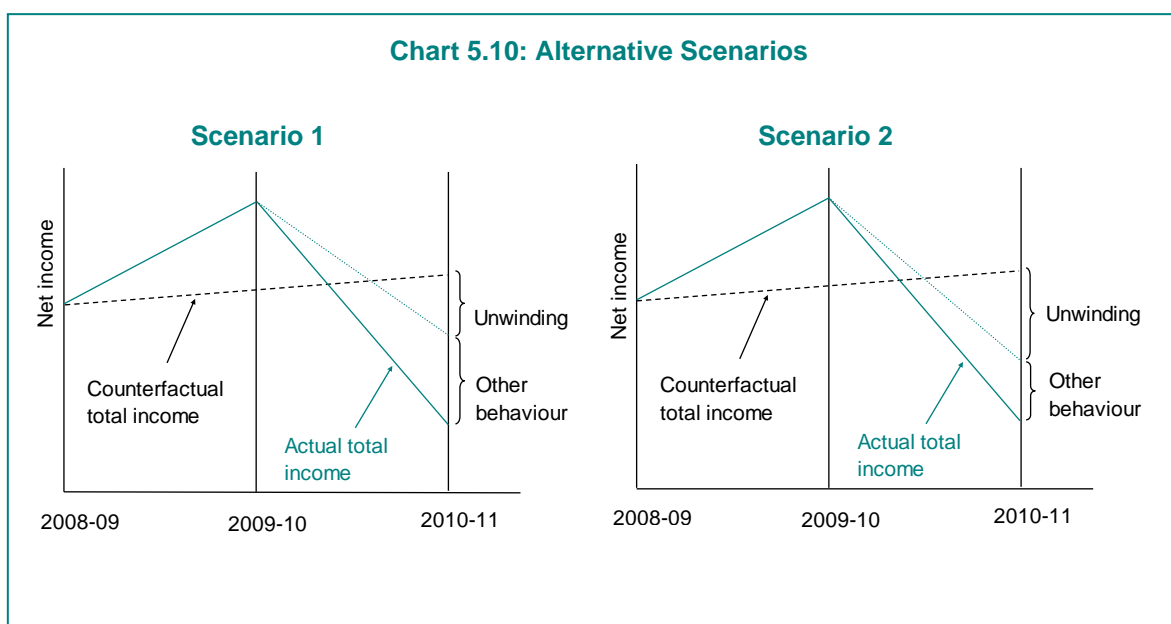
5.53 The alternative regression, while not viewed as a central estimate, reinforces the evidence that the TIE is significantly higher than that assumed when the additional rate was introduced, and provides assurance that such a conclusion is robust to alternative treatments of equity prices in the model.

Sensitivity analysis

5.54 To explore the sensitivity of the results to the counterfactual estimates further, two illustrative scenario estimates have been produced below, using simple assumptions for counterfactual growth and unwinding, rather than the counterfactuals derived from the regression approach above.

- Scenario 1 assumes counterfactual incomes would have grown at three per cent a year in cash terms, which implies a lower amount of forestalling than estimated by the original model or the alternative regression. This represents a modest rate of growth compared to the actual historical growth rate of 12.5 per cent a year during the previous 15 years.

- Scenario 2 is the same as Scenario 1, except all the forestalled income is assumed to unwind in 2010-11.



5.55 The TIEs under Scenario 1 and Scenario 2 are 0.82 and 0.56 respectively. These illustrations are enlightening, as they show that the conclusion of a relatively high elasticity is not dependent on modelling a high counterfactual growth in 2010-11. They show that even with lower forestalling in 2009-10, or the most extreme assumption possible about the timing of unwinding, the elasticity remains above that assumed in the original costing.

5.56 A review of the values of total income for the years in question tends to confirm that a very significant underlying behavioural effect has taken place, whatever the assumptions on forestalling.

Table 5.6 – Net taxable incomes for the affected group (£ bn)

	2006-07	2007-08	2008-09	2009-10	2010-11
£ bn	97.1	111.1	101.3	115.7	87.0

5.57 Total income of the affected group in 2009-10 (the forestalling year) and 2010-11 combined was £203 billion. This was 5 per cent below the combined total of £212 billion for the preceding two years, even though:

- Based on the historical average, this group's incomes would have grown by 26 per cent over a two year period; and
- Incomes in 2009-10 included incomes brought forward from 2011-12 and beyond.

5.58 If the estimates of forestalling were overstated, then this would imply the gap between actual and counterfactual incomes in 2010-11 was even higher. Conversely, a greater estimate of forestalling implies a longer unwinding period, which would maintain the value of the elasticity. The extent of the shortfall in tax liabilities in 2010-11 is such that it is relatively difficult to construct a plausible scenario in which there was not a substantial underlying behavioural loss in that year.

5.59 This observation is reinforced by the evidence on financial sector bonuses in the years in question. HMRC is able to infer the level of bonuses paid by employers quite reliably by analysing the monthly patterns of their PAYE returns. The resulting estimates show that financial sector bonuses in 2009-10 grew sharply from their depressed level in 2008-09, and in 2010-11 grew again more moderately. The combined figure for 2009-10 and 2010-11 was 7 per cent higher than the total for the preceding two years. Furthermore, the growth of bonuses suggests counterfactual incomes in 2009-10 could be even higher than the model's estimates and therefore makes it less likely that forestalling has been under-estimated.

The Impact on indirect tax revenues

5.60 As explained in Chapter 2, any behavioural responses that reduce disposable incomes could result in a reduction in expenditure and corresponding indirect tax revenues. Estimating the proportion of any overall response that relates to real changes that affect incomes (rather than responses such as increased tax planning and avoidance which do not) is difficult as most academic studies only estimate the overall behavioural response. However, considering studies which do attempt to breakdown the behavioural response suggest that between one-third and one-half of the response comes from genuine reductions in disposable income.

5.61 An estimate has therefore been made of the possible impact on indirect taxes. Assuming (i) 50 per cent of the reduction in taxable incomes represents a fall in real disposable income; (ii) 50 per cent of that income would have been spent; and (iii) a weighted indirect tax rate on expenditure of high earners of 10 per cent⁴¹, the estimated impact on indirect tax revenues from the introduction of the additional rate is around £220 million. This is lower than the estimates contained in the IFS Green Budget⁴² which shows the impact under the extreme assumptions where all of the reduction in taxable incomes represents a fall in real disposable income, that all of it would have been spent, and that the average tax rate on expenditure is 17 per cent.

The Impact on the level of GDP and economic efficiency

5.62 The estimate that between one-third and one-half of the behavioural effect comes from genuine reductions in income suggests that total income fell by around between £2.9 billion and £4.4 billion. Other things equal, this would translate into GDP being between 0.2 per cent and 0.3 per cent smaller than would otherwise have been the case. It is important to remember that this is an effect on the level of GDP, and not an ongoing effect on the annual growth rate of GDP. However, and as discussed in Chapter 2, there is some evidence that higher marginal tax rates could affect growth rates in the longer-term, suggesting that the negative impact on GDP could become progressively larger over time.

5.63 The significant behavioural response (at least an 83 per cent reduction in the pre-behavioural yield) suggested by the analysis would mean that the additional rate is a distortive and economically inefficient way of raising revenue.

⁴¹ Consumption share assumptions and indirect tax liabilities for high income individuals are based on HM Treasury Inter-Governmental Tax and Benefit Model (IGOTM).

⁴² The IFS Green Budget, February 2012, Chapter 9

Summary

5.64 This Chapter has described how the 2010-11 Self Assessment data has been used to provide a first ex-post assessment of the additional rate Exchequer yield. Although the estimates are subject to a wide range of uncertainty, they suggest that the underlying yield is much lower than originally forecast, possibly only raising £1 billion at most. These results are more in line with those that would be produced using the behavioural response estimates contained in academic literature. This conclusion is also consistent with the £3.6 billion shortfall in Self Assessment tax revenues observed in January and February 2012 (the months in which balancing payments relating to 2010-11 liabilities are received).

Chapter 6 – Conclusions

6.1 A common theme across all the chapters of this report is that it is challenging to estimate the impact of changing higher rates of income tax. This is because the behavioural responses to tax rate changes are often large and highly uncertain. A number of academic studies have attempted to quantify the behavioural responses, and show a wide variation in the results which may reflect differences in the context in which the rate is changed. Many of the studies also relate to experiences outside the UK (mainly in the US) which may affect their relevance. Nonetheless, even after taking account of these factors, the literature does suggest that the behavioural responses to increases in the higher rates of tax can often largely offset any pre-behavioural yield, and in some cases could even result on a reduction in tax revenues.

6.2 Evidence on the impact of changes in the higher rates of tax in the UK is limited as the highest rate of income tax had not been changed since 1988. The analysis of the rate changes in the UK in the 1970s and 1980s by Brewer, Saez and Shephard (2008), as contained in the Mirrlees review, suggested a behavioural response that was greater than assumed in the original additional rate yield estimates. Changes in the tax structure and the opportunities for tax avoidance may mean that the behavioural responses may be smaller today. On the other hand, the increases in the international mobility of labour and the relative rise of the highest rate of tax in the UK may mean that the behavioural response to the additional rate is larger.

6.3 The analysis of the Self Assessment data contained in this report is the first and only comprehensive ex-post study of the impact of the additional rate. This analysis shows that there was a considerable behavioural response to the rate change, including a substantial amount of forestalling: between £16 billion and £18 billion of income is estimated to have been brought forward to 2009-10 to avoid the additional rate of tax. This behavioural response is entirely legitimate, and difficult to prevent using anti-avoidance legislation.

6.4 The uncertainty regarding the extent to which the unwinding of this forestalled income depressed incomes in 2010-11 makes isolating the true underlying behavioural response to the additional rate challenging. A number of approaches were considered, but the most statistically robust model has much in common with the approach used by Brewer, Saez and Shephard (2008). The modelling suggests the underlying behavioural response was greater than estimated previously in Budget 2009 and in March Budget 2010, decreasing the pre-behavioural yield by at least 83 per cent, with an implied TIE of 0.48. This result is also consistent with that contained in the Mirrlees review, and suggests the additional rate is a highly distortionary form of taxation.

6.5 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. The conclusion that can be drawn from the Self Assessment data is therefore that the underlying yield from the additional rate is much lower than originally forecast (yielding around £1 billion or less), and that it is quite possible that it could be negative.

6.6 As the analysis is only based on one year's data, the results can only be considered an estimate of the yield in the very short term. The longer term impacts could be different, particularly as some behavioural responses such as the possibility that those affected might leave the UK may take place over a number of years. In addition, the fact that the rate is viewed as a temporary measure may mean that behavioural responses such as migration may be smaller than if it had been a permanent change. Conversely, a temporary rate may make it more likely that individuals postpone withdrawing income from investments that would be subject to the additional rate, thereby increasing the size of the behavioural response.

6.7 Although the analysis is only based on one year's data, this does not invalidate the results. Future years' data may improve the reliability of estimates, although estimating what incomes and tax revenues would have been in the absence of the additional rate also becomes more difficult as time elapses further from the 'base' year (the year before the additional rate became effective).

6.8 This report has also described how the impacts of increasing the highest rates of tax may extend well beyond the direct Exchequer impacts. In particular, other things equal, high tax rates in the UK make its tax system less competitive and make it a less attractive place to start, finance and grow a business. The longer the additional rate remains in place the more people are likely to consider it a permanent feature of the UK tax system and the more damaging it would be for competitiveness. This suggests the negative impact on GDP may increase over time, and therefore the direct yield (and revenues from other tax bases) might fall over time toward or beyond zero.

Annex A – Budget 2012 policy costing: reduction in the additional rate

A.1. This Annex explains how the estimated cost of the Budget 2012 decision to reduce the additional rate from 50 per cent to 45 per cent in April 2013 has been estimated. This includes an explanation of how the evidence contained in this report has also been used to inform the taxable income elasticity.

Measure description

A.2. This measure reduces the additional rate of income tax from 50 per cent to 45 per cent (with a corresponding reduction in the rate applicable to trusts) and the additional rate of income tax on dividends from 42.5 per cent to 37.5 per cent with effect from 6 April 2013.

The tax base

A.3. The tax base is the total of all individuals' taxable incomes in excess of £150,000. This is estimated using the latest available Survey of Personal Incomes (2009-10), projected forwards in line with the Office for Budget Responsibility's (OBR) economic forecasts. Adjustments are made to the income base to reflect behavioural effects from the introduction of the additional rate in 2010-11, including forestalling in 2009-10.

Static costing

A.4. The static cost is the loss in tax revenue from those incomes which are subject to the additional rate, i.e. the tax base multiplied by 5 per cent.

A.5. Adjustments are then made to the timing of the reduction in receipts, to reflect the fact that some tax is paid through Self Assessment after the liability year.

Table A1 – Static Exchequer impact (£m)

	2012-13	2013-14	2014-15	2015-16	2016-17
Exchequer impact	0	-3,010	-3,350	-3,750	-4,190

Post-behavioural costing

A.6. Individuals with high incomes are expected to respond to a reduction in their marginal tax rate by increasing their taxable incomes. As explained in Chapter 3 of this report, the responsiveness of total taxable incomes to changes in tax rates may be represented by a taxable income elasticity (TIE).

A.7. There is considerable uncertainty over the true level of the elasticity. The sources of evidence on the level of taxable income elasticities are diverse, with a wide range of estimates. Furthermore, the elasticity itself may change over time, as the structure of the tax system alters the scope for tax planning or avoidance, or as economic factors such as labour mobility evolve. Much

of the evidence on elasticities is from outside the UK, from the US in particular, but the elasticity in one country will not necessarily be a reliable guide to that in another country.

A.8. At the time of the announcement of the 50 per cent additional rate in Budget 2009, there had not previously been a change in the top rate of income tax in the UK for over twenty years. This meant that the evidence on the true current level of the elasticity was particularly uncertain. The evidence was either based on studies in the UK of tax changes made a very long time ago, since when the scope and tendency for behaviour may have changed, or studies in other countries with different circumstances. Estimating the elasticity when the additional rate was introduced therefore involved considerable exercise of judgement.

A.9. The introduction of the additional rate in 2010-11 has now provided an opportunity to obtain much more recent, and therefore more relevant, evidence on the extent of the behavioural effects and hence the value of the TIE. The analysis contained in Chapter 5 provides an important new source of evidence.

A.10. In arriving at a judgement of the appropriate value for the TIE to be used in costing the reduction in the rate now being announced, it is therefore still necessary to take account of the wider body of evidence on behavioural responses, alongside the new evidence in Chapter 5.

HMRC estimates based on Self Assessment returns

A.11. The modelling described in Chapter 5 of this report produces an estimate of the TIE of 0.48, which is within the range of academic studies and is close to the only other UK study focusing on high income individuals. Sensitivity analysis provides other illustrative central estimates that confirm that this is a reasonable and credible model. Indeed the report proceeds to explain that there are certain modelling assumptions made in producing this estimate, which if modified would result in a higher estimate of the TIE.

A.12. All the estimates are significantly higher than the assumption of 0.35 used in the original Budget 2009 costing. The conclusion is therefore that it is difficult to construct a plausible scenario that would result in a yield estimate that is in line with those original forecasts. Thus the study provides clear evidence that the original costings overstated the yield considerably.

A.13. The modelling, however, is not sufficiently conclusive to establish by precisely how much the original estimate was too high. The modelling only looks at the short run response to the changes; the longer-term response could be higher or lower. It also looks at the response to a tax increase; the response to a subsequent tax reduction might be different from this, as discussed below. In addition, there are uncertainties around the modelling of 2010-11 Self Assessment returns. To reach a conclusion on the TIE therefore requires an examination of wider evidence.

The wider evidence

A.14. Chapter 4 of this report summarises existing international academic evidence on the value of TIEs. Particular reference is made to the only study of high income individuals in the UK, published by the Institute of Fiscal Studies (IFS), which estimated the TIE in the UK at 0.46. This was based on historical changes in tax rates mainly in the 1970s and 1980s, and the report notes that this estimate could either overstate or understate the current elasticity. This could be because of greater international labour mobility; higher propensity to engage in tax planning; fewer

opportunities for avoidance given changes to the tax system; and potential bias introduced by the methodology.

A.15. Estimates from the US tend to be in the range 0.4 to 0.7. It is possible that the structure of the US tax system offers greater scope than in the UK for taxpayers to arrange their affairs in such a way that they do not have to pay the top rate. If this is the case, an estimate for the UK towards the lower end of this range may be appropriate.

A.16. Chapter 4 of the report also summarises trends in international competitiveness and migration. There is strong evidence that labour mobility has increased in recent years, particularly in the international banking and financial services sectors. The greater scope for cross-border relocation suggests, other things being equal, the TIE would have become higher over time. The report highlights that the UK's 50 per cent rate is currently uncompetitive internationally.

Asymmetries in responses

A.17. The methodology behind TIEs implicitly assumes that people respond to tax falls in the same way as tax rises. There is some reason to believe that these elasticities may not be 'symmetric' for reductions in tax rates that follow increases (see paragraph 4.8). This is because tax planning arrangements to mitigate the tax increase may not be unwound if the tax rate subsequently falls again, as the costs of making the arrangements have already been incurred. Individuals who have emigrated since the tax increase might not decide to return after the tax cut. Likewise, some individuals who have chosen to retire earlier in response to the tax rate may decide not to return to work if the tax rate falls. This suggests the elasticity for the rate reduction could be slightly lower than observed by HMRC for the preceding rate increase.

Conclusion on elasticity

A.18. Overall, the analysis in Chapter 5, together with the evidence from the academic literature, firmly suggests that the original estimate of 0.35 was too low. Considerations of the latest trends in labour mobility and the competitive position of the UK's top tax rate reinforce this view.

A.19. The Government's view is that a TIE of 0.45 is a sensible central assumption for the present policy change. A TIE of 0.45 is consistent with all the available evidence to date:

- It is consistent with the range of estimates from HMRC's analysis, especially if one considers the possible asymmetry of responses referred to above.
- It is slightly more cautious than the IFS study (which was based mainly on falling tax rates and therefore consistent with the direction of this policy measure). While this study uses historical data, there have been changes in the economy and tax system that could either have increased or decreased the TIE since then.
- It is also within the range of academic studies, though it is towards the lower end of the range of U.S. estimates, reflecting the possible effect of differences in the tax systems.

A.20. The Government will continue to monitor the evidence from the introduction of the 50p rate and the academic literature and will update its estimate of the TIE if compelling evidence emerges that 0.45 is not a sensible central assumption.

Calculating the post-behavioural yield

A.21. Box 3.1 in this report sets out how the TIE is used to estimate the post-behavioural cost of a tax change (excluding forestalling impacts). Applying this methodology, the underlying cost of the 5 per cent reduction of the additional rate in 2013-14 is as follows:

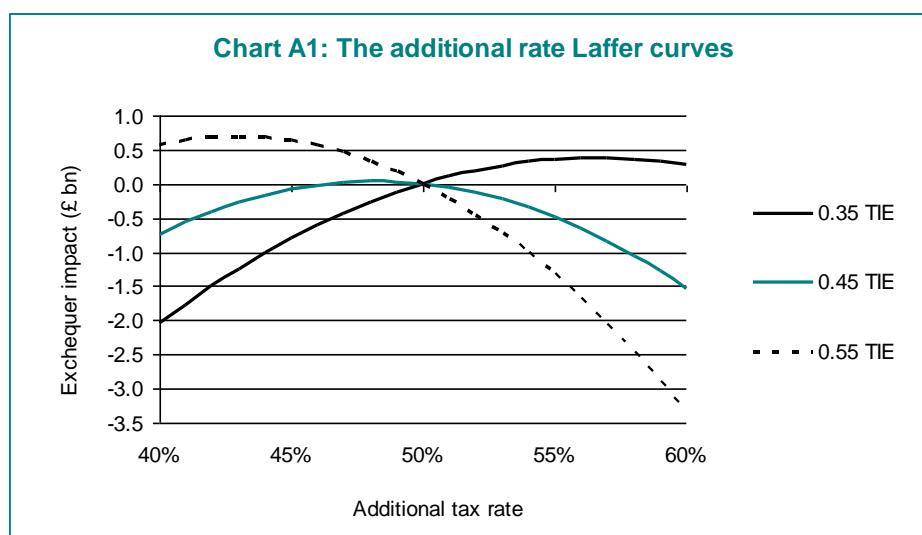
Table A2 – Post-behavioural Exchequer impact, liabilities and national accounts bases (£m)

	2012-13	2013-14	2014-15	2015-16	2016-17
Static cost	0	-3,010	-3,350	-3,750	-4,190
Behavioural impact	0	2,930	3,270	3,650	4,080
Post-behavioural yield (liabilities)	0	-80	-80	-100	-110
Post-behavioural yield (national accounts)	0	-50	-100	-100	-110

Note: The above excludes the effects of forestalling from the reduction of the additional rate, discussed below.

Laffer curves

A.22. The effect of varying the additional rate of tax on Exchequer yield can be represented by a chart known as a Laffer Curve. The Laffer curve based on the TIE of 0.45 used for this costing is shown below, together with illustrative curves for alternative TIEs⁴³.



A.23. The Laffer curve for the 0.45 TIE shows that the estimated revenue-maximising rate of tax for those with incomes over £150,000 is between 45 per cent and 50 per cent, and that the Exchequer impact of varying the rate close to this level is relatively low. It can also be seen, for example, that the cost of reducing the rate to 40 per cent with this TIE would be around £0.7 billion. This is not exactly the opposite of the yield that would have been estimated from the introduction of the 50 per cent additional rate in 2010-11 using the same elasticity. The difference is due to the

⁴³ The Laffer curve presented here is a mechanical extrapolation of the data used to cost the change in the additional rate. It therefore only provides a guide to the Exchequer effects of changes to the additional rate of income tax.

changes in the tax base between 2010-11 and 2013-14, and differences in the tax rate starting point.

Indirect tax effects

A.24. As set out in Chapter 5, the introduction of the 50 per cent additional rate is estimated to have reduced indirect tax receipts by around £220 million per annum. Using the same assumptions and methodology, the reduction of the rate to 45 per cent is estimated to increase indirect tax receipts by around £130 million per annum. This effect is not included in the direct cost of the additional rate reduction.

Forestalling

A.25. As mentioned above, the pre-announcement of the additional rate in Budget 2009-10 led to a considerable amount of income being brought forward from 2010-11 to 2009-10. This bringing forward of income may be expected to reverse in 2010-11 and subsequent years. Chapter 5 explains in detail how estimates of the underlying behavioural effects have been separated out from the forestalling effects.

A.26. The 5 per cent reduction in the additional rate with effect from 2013-14 is also likely to lead to some anticipatory behaviour, this time in the form of deferral of income from 2012-13. The observed level of forestalling ahead of the introduction of the additional rate has been used to inform an estimate of this deferral of income. Simply assuming that a 5 per cent reduction would lead to half the annual forestalling from the introduction of the 50 per cent rate⁴⁴ would suggest around £5 billion of income would be moved from 2012-13 into 2013-14. Some allowance has, however, been made to reflect that it may be easier for taxpayers to delay income than it was for them to bring it forward. The final figure used is therefore £6.25 billion. Clearly there is some uncertainty in this regard.

A.27. Presented here are the estimated Exchequer impacts of forestalling of both the additional rate reduction and the cap on unlimited reliefs measure also announced in this Budget as there may be some overlap between the two.

A.28. The announcement of the cap on unlimited reliefs measure in advance of implementation will incentivise individuals to bring forward some reliefs usage in order to maximise their tax relief before the cap comes into effect. For example, individuals may choose to make a donation to charity a few months earlier in order to maximise use of reliefs in the year before the policy measure. It is estimated that forestalling of the relief cap will bring 14 per cent of reliefs claimed in 2013-14 forward to 2012-13, at which point the 50 per cent tax rate will apply. The bringing forward of reliefs which could not be used in 2013-14 (as a result of the cap) is assumed not to impact on the yield from the measure in 2013-14.

A.29. The table below shows the Exchequer impact of forestalling of the two measures, taking into account the lag of receipts from Self Assessment.

⁴⁴ The estimate of total forestalling used is £16 billion, with £10 billion of this amount moved by one year.

Table A3 – Exchequer impact of forestalling effects, national accounts basis (£m)

	2012-13	2013-14	2014-15	2015-16	2016-17
Additional rate reduction	-2,400	900	1,710	-370	0
Proportional relief cap	0	-140	40	0	0
Combined forestalling	-2,400	760	1,750	-370	0

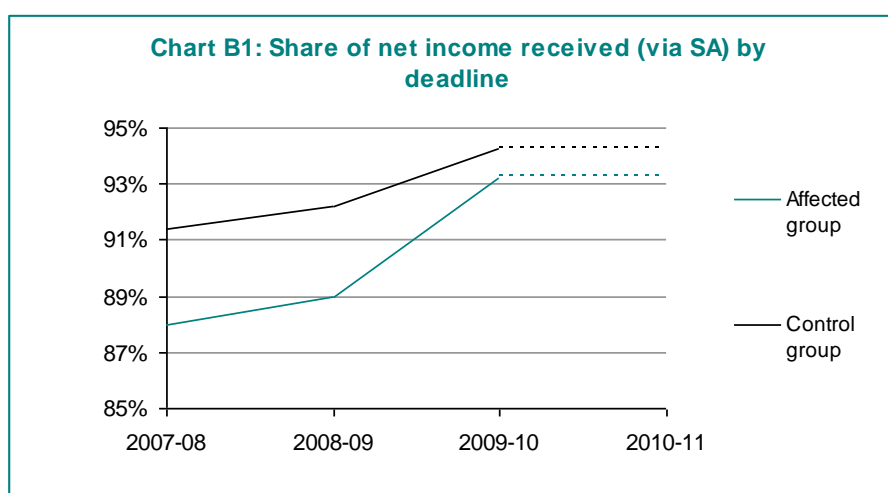
Areas of uncertainty

- There is uncertainty around the level of the TIE, as discussed in this note.
- The costings are based on projections of income growth for the top end of the income distribution, which are subject to uncertainty.
- The level of forestalling presents additional uncertainty.

Annex B – Extrapolation methodology

B.1. Around 94 per cent of 2010-11 Self Assessment returns for high income individuals should have been received at the time of producing the report. This percentage is based on the proportion received at the same data in 2011 for 2009-10 returns.

B.2. Net income from returns up until the end of January as a proportion of net income from all returns (includes late returns) separately for the treatment and control groups is shown in Chart B1 below.



B.3. The rate of filing on time has improved in recent years, with over 90 per cent of net income of the affected group declared by the SA deadline (31 January 2011). This rate of filing is assumed to have continued for 2010-11, and hence data 2010-11 has been extrapolated under the assumption that the data extract taken shortly after the deadline represents about 94 per cent of the total net income by the affected group.

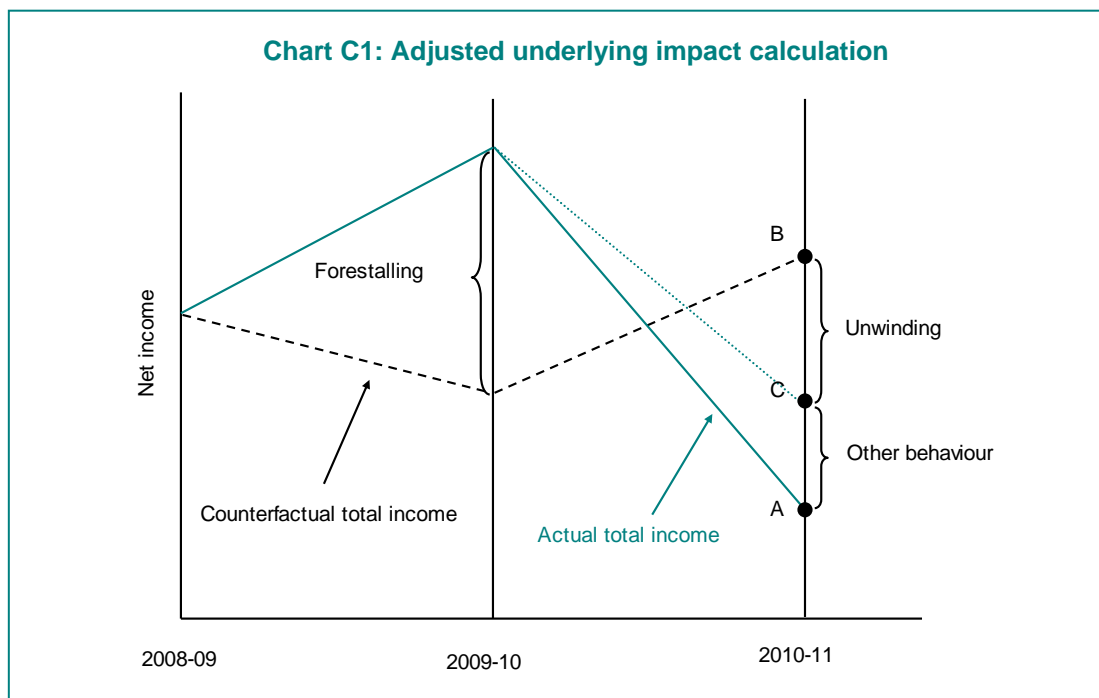
B.4. The grossing up allows for the fact that returns not received by the due date could either be due to the taxpayer making a late return, or because the individual no longer has income that needs to be reported (possibly as a result of a behavioural response to the tax change). An alternative extrapolation to the number of SA forms sent out by HMRC would not suffice as behaviour in response to the measure may reduce the number of SA forms HMRC will ultimately receive.

B.5. A different extrapolation percentage is assumed for the control group, who have historically filed more promptly (possibly due to the penalties incurred from filing late being more significant to those with relatively lower incomes).

B.6. There is considerable uncertainty here (highlighted earlier). If the filing rates of 2010-11 Self Assessment returns were substantially different to 2009-10, this analysis could affect the result once complete 2010-11 data is in.

Annex C – Adjusted underlying impact calculation

C.1. The unwinding and other behavioural effects estimated in Chapter 5 are to some extent substitutes for each other: if individuals can avoid paying the additional rate by forestalling/unwinding, then there is no need to undertake other behavioural effects. This means that the 2010-11 other behavioural effects estimate contained in table 5.2 is lower than it would otherwise have been had the forestalling and unwinding not taken place. To account for this an 'Adjusted other behavioural effect' estimate has been calculated.



C.2. In Chart C1, the unadjusted underlying behavioural effect could be viewed as $C - A$. This is, other things equal, an understatement of the effect. Some of the income that has been forestalled ($B - C$ on the chart) would have been subject to the behavioural response. To estimate how much, the following steps are taken.

C.3. The unadjusted other behavioural effect is equal to:

$$C - A$$

C.4. The unadjusted other behavioural effect as a proportion of available income is:

$$\frac{C - A}{C}$$

C.5. This ratio is then applied to the forestalled income that is being unwound in 2010-11 ($B - C$), to estimate how much of this forestalled income would have been subject to the underlying behavioural effect. This is:

$$(B - C) \frac{(C - A)}{C}$$

C.6. The 'Adjusted other behavioural effect' is therefore the original effect $(C - A)$ plus the effect on the forestalled income:

$$(C - A) + (B - C) \frac{(C - A)}{C}$$

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ISBN 978-1-84532-966-2



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