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Modelling the Distributive Impact of Indirect Taxation Changes in the Republic of Ireland

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ABSTRACT

Changes to indirect taxes are a regular feature of annual Budgets. Despite this, the distributive impact of these changes are rarely considered – something that is in contrast to accompanying Budget changes to direct taxes or transfers.

This paper estimates the distributive impact of possible Budget changes to five key areas of indirect taxation: VAT, fuel excises, insurance levies, tobacco excises and alcohol excises. In doing so the paper examines how these changes impact across the income distribution alongside estimating the average household cost/gain and the full year exchequer revenue effect.

The changes examined are as follows:

(i) **VAT**: 1% increase in the standard rate; 1% increase in the first reduced rate; and a 1% increase in the second reduced rate.
(ii) **Fuel**: 5c increase in a litre of petrol; and a 5c increase in a litre of diesel.
(iii) **Insurance levies**: 1% increase in non-life insurance levies.
(iv) **Tobacco**: 10c increase in a pack of 20 cigarettes.
(v) **Alcohol**: 25c increase in a bottle of wine; 10c increase in a pint of Beer/Cider; and a 10c increase in a standard measure of spirits.

While the paper models increases to each of these indirect taxes, a similar (inverse) distributive impact emerges when reductions to these taxes are examined. The paper also includes tests on the reliability of the estimates using comparisons with the overall VAT yield and Department of Finance estimates on the full-year revenue effects of these changes.

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INTRODUCTION

Changes to indirect taxes are a regular feature of annual Budgets. Despite this, the distributive impact of these changes are rarely considered – something that is in contrast to accompanying Budget changes to direct taxes or transfers.

This paper estimates the distributive impact of possible Budget changes to five key areas of indirect taxation: VAT, fuel excises, insurance levies, tobacco excises and alcohol excises. In doing so the paper examines how these changes impact across the income distribution alongside estimating the average household cost/gain and the full year exchequer revenue effect.

The changes examined are as follows:

(i) **VAT**: 1% increase in the standard rate; 1% increase in the reduced rate; and a 1% increase in the second reduced rate.
(ii) **Fuel**: 5c increase in a litre of petrol; and a 5c increase in a litre of diesel.
(iii) **Insurance levies**: 1% increase in non-life insurance levy.
(iv) **Tobacco**: 10c increase in a pack of 20 cigarettes.
(v) **Alcohol**: 25c increase in a bottle of wine; 10c increase in a pint of Beer/Cider; and a 10c increase in a standard measure of spirits.

The paper builds on previous work by Collins and Turnbull (2013) and Collins (2014a, 2014c) to examine these distributive impacts. Using projections for the 2014 tax year, VAT and excise duties are expected to generate 31% of exchequer taxation revenue (see table A1 in the appendix). While the indirect taxation sources examined in this paper represent many of the most lucrative, and most frequently changed areas of indirect taxes, there are others which, though not examined here, represent notable current or past sources of exchequer revenue. These include the air travel levy, TV licence, water charges, property taxes, vehicle registration tax and stamp duties on bank and credit cards, cheques, share transactions and health insurances.[1]

While acknowledging that indirect taxation changes generally take place in the context of a Budget/Fiscal package, and that Governments may consider any distributional impacts in the context of the overall Budgetary package, this paper at the least offers a heretofore lacking insight into the distributive impact of these changes. Given the structure of the taxation system, and the composition of household contributions to it, it remains important that considerations of the impact of taxation changes are more comprehensive than just exclusively looking at income taxation changes.

The remainder of this paper is structured as follows. The next section outlines the data and indirect taxation model used to undertake the analysis in this paper. Following this, assumptions used in the paper and the robustness of the estimates are considered before the

[1] The air travel tax was reduced to 0% in Budget 2014 but is incorporated into the indirect taxation estimates in Collins (2014a). Residential property taxes and domestic water charges were not in place when the 2009/10 HBS data was collected and currently are not a feature of the indirect taxation model. A decomposition of the various excise duty sources (for 2012) and stamp duty sources (for 2011 and 2012) is provided in tables A2a and A2b of the appendix.

paper reviews some previous research on indirect taxes generally. Next the paper outlines the results of its examination of the various indirect taxation changes. Finally, the paper concludes.

DATA AND THE INDIRECT TAXATION MODEL

This paper uses the indirect taxation model developed by Collins and Turnbull (2013) and Collins (2014a) as the basis for its analysis. That model uses microdata from the Central Statistics Office's (CSO) 2009-2010 Household Budget Survey (HBS), the seventh such national survey since 1973.[2] The survey occurred over the period from August 2009 to September 2010 collecting data from a representative sample of 5,891 households throughout the state. For the purposes of the HBS, the CSO consider a household to be a single person or group of people who regularly reside together in the same accommodation and who share the same catering arrangements; household members are not necessarily related by blood or by marriage (CSO, 2012a:133).[3] As part of the survey, each participating household completed a detailed household questionnaire which included questions on tenure status, household appliances, household facilities and housing costs (e.g. mortgage, rent). In addition, each household member aged 16 years and over completed a personal questionnaire which included questions on income, education, work status and other demographic related questions. To assess expenditure patterns, all household members aged 16 and over completed a paper diary over a two week period, detailing all their expenditure throughout that period (CSO, 2012a:133). The CSO published their report from the HBS 2009-10 in March 2012.

Expenditure across a total of 538 items (white bread, hairdryers etc) or good/service-groups (garden tools, legal fees etc) is recorded for all household groups in the HBS. These are classified into the nine consumption categories listed below with the overall average proportion of total expenditure spent on items in these categories presented in parentheses.

- Food (16.2%)
- Alcoholic drink and tobacco (4.9%)
- Clothing and footwear (4.9%)
- Fuel and light (4.4%)
- Housing (18.2%)
- Household non-durables (2.0%)
- Household durables (3.7%)
- Transport (14.3%)
- Miscellaneous, services and other (31.3%)[4]

While the HBS provides the only comprehensive source of household expenditure data, it, like all survey based data sources, is far from a perfect measure. While the sample controls for under-representation and non-response, it is dependent on the accuracy and reliability of the information provided by participating individuals and households in the survey. Where reported/recorded consumption differs from actual consumption the results have the potential to under or over state true patterns (most likely to former). Traditionally, consumption surveys experience difficulties with consumption figures for alcoholic drink and tobacco – which are

[2] Earlier urban-only expenditure surveys occurred in 1951-52 and 1965-66.
[3] As such the data does not cover individuals living in institutions (hospitals, prisons etc) who do form part of the population and are responsible for some of the expenditure and indirect tax in the economy.
[4] This category includes: betting and lotteries, charitable donations, education and training, holidays, medical, sports and leisure activities, telephone, television and a list of other un-categorised items.

generally underreported; implying the overall average 4.9% of all consumption recorded for this category may be an underestimate.[5] The reliability of these expenditure figures is considered further later in the paper.

Alongside expenditure data, the paper also uses HBS income data. The presence of compatible income and expenditure data in the one survey makes much of the analysis in this paper possible. However, income data remains a bi-product of the HBS, as the expenditure composition of the typical household's basket of goods is its primary focus. In national terms, the HBS data is secondary to the income data derived from the Survey on Income and Living Conditions (SILC).[6] While the results from both are similar, there are a number of classification and methodological differences between the two surveys, most particularly differences in the income reference period and differences in how employer social insurance contributions, occupational pensions and regular inter-household transfers are treated (see CSO, 2012b:41). The usual drawbacks associated with any income survey are also present in the HBS – issues well summarised by Collins (2013:3).

Collins and Turnbull (2013) used this data to develop a model that estimated the indirect taxation contributions of households across the income distribution. Their initial assessment considered the overall proportion of household income/expenditure that was consumed by indirect taxes. Subsequently, Collins (2014a) developed the model to reflect expenditure and income at the equivalised households/adult level. That process adjusted the data to account for differences in household size and composition. The analysis used the national equivalence scale with values of 1 for the first adult, 0.66 for each additional adult (aged 14yrs+) and 0.33 to each child aged less than 14 years. Following equivalisation, households have been ranked by gross income and divided into deciles – ten percent groups of the household population spanning the 10% with the lowest income (the bottom decile) to the 10% with the highest income (the top decile). These equivalised household deciles are used for policy simulations later in the paper.

The baseline results from Collins (2014a) serve as the starting point for this papers assessment of the two recent VAT changes. Table 1 outlines the structure of indirect taxation across the income distribution covering VAT, Excise, Levies and other indirect measures. The latter category captures vehicle taxes (running cost taxes not registration taxes - VRT) and the television licence. The table presents the expenditure in each category as a proportion of equivalised gross income.

On average 10.36% of gross income is allocated to indirect taxation, although this number varies considerably across the income distribution. Overall, indirect taxes are regressive, consuming a higher proportion of resources the further down the income distribution you go. As the table shows, the bottom seven deciles contribute more in indirect taxation that the average.

Concluding this section chart 1 summarised the indirect tax contributions of households across the income distribution while chart 2 explores the importance of indirect taxes in overall taxation contributions across the deciles. The latter presents the proportion of the total taxes paid by households which derive from indirect taxes and highlights the relative significance of indirect taxes in the bottom half of the income distribution.

[5] See CSO (2012a:5; 2012b: 39-40) where these response and accuracy issues are discussed further.
[6] See CSO (2014)

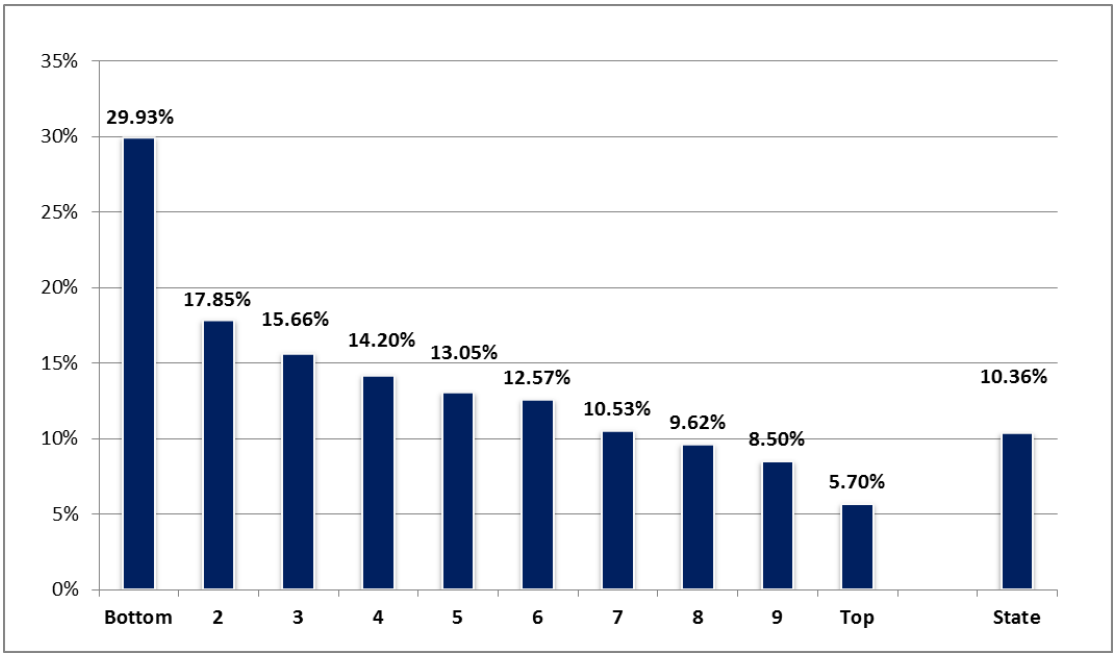
Table 1: Indirect Taxation sources by decile, 2009/10 as % of Equivalised Gross Income (Equivalised data)

Decile	VAT	Excise	Levies	Other Indirect	Total Indirect
Bottom	17.63%	8.82%	0.44%	3.01%	29.93%
2	10.05%	5.66%	0.21%	1.90%	17.85%
3	8.99%	4.84%	0.23%	1.58%	15.66%
4	8.23%	4.20%	0.23%	1.53%	14.20%
5	7.48%	3.85%	0.23%	1.47%	13.05%
6	7.44%	3.52%	0.23%	1.36%	12.57%
7	6.23%	2.85%	0.21%	1.24%	10.53%
8	5.97%	2.39%	0.21%	1.04%	9.62%
9	5.31%	2.07%	0.18%	0.94%	8.50%
Top	3.80%	1.16%	0.12%	0.61%	5.70%
State	**6.27%**	**2.76%**	**0.19%**	**1.12%**	**10.36%**

Source: Collins (2014a:18)

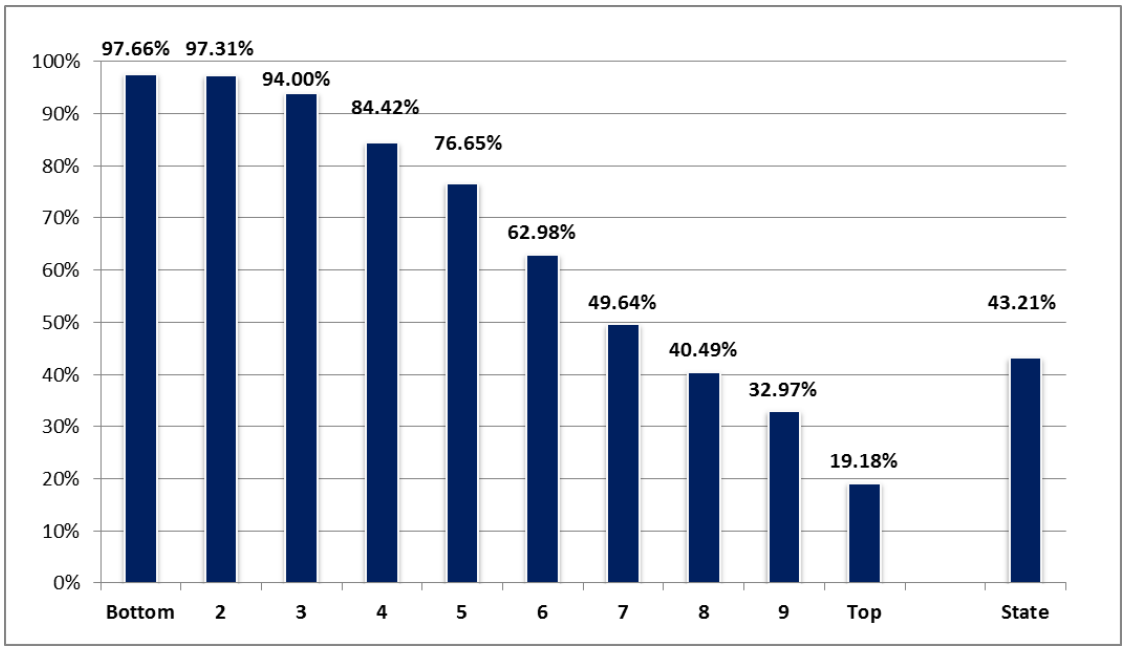
Notes: Tables A3a and A3b in the appendix present another set of comparisons benchmarked against equivalised disposable income and equivalised household expenditure. The disposable income results are broadly similar while those compared to expenditure mitigate some of the regressivity reported above.

Chart 1: Total Indirect Taxes as a % of Gross Income (Equivalised data)



Source: Collins (2014a:19)

Chart 2: Total Indirect Taxes as a % of Total Tax Paid, by decile (Equivalised data)



ASSUMPTIONS & REPRESENTATIVENESS OF THE ESTIMATES

As assumption of this paper is that the household expenditure data from 2009/10 is taken to offer a good representation of current household expenditure. Over the period from 2009/10 to 2013 overall household consumption, as recorded in national accounts statistics, remained flat (see table 2) - a persistent feature of comments on the sluggish nature of Ireland's recovery from it banking, property and fiscal crash in 2008/09. As such, the paper assumes that the expenditure patterns in the HBS offer a credible insight into the nature and composition of household consumption across the income distribution.[7]

Table 2: Personal Expenditure on Consumer Goods and Services, 2009-2013

Year	€ millions
2009	83,565
2010	82,447
2011	82,969
2012	82,468
2013	83,335

Source: CSO Quarterly National Accounts online database

Similarly, the paper considers the distributive impact of these indirect taxation changes relative to household gross income. Again, changes to its values might alter the representativeness of the results established later. Looking at data from the CSO's Survey on Income and Living

[7] An alternative is to accompany the results of the analysis with a sensitivity test to capture possible changes. However, given the small changes in consumption levels, such an assessment would hardly alter the estimates established later in the paper.

Conditions (SILC) over the years 2009-2012, table 3 shows how nominal gross household income and equivalised gross household income has changed over that period.[8] Unsurprisingly, given the economic climate, it decreased with equivalised income being almost 6% lower in 2012 compared to 2009. Data from the HBS suggests an average equivalised household income for 2009/10 of €524.70; a figure slightly lower than the average SILC value for those two years and closer to the average SILC value over the years 2010-2012 (€525.38). Given the similarity of the HBS value to the SILC equivalised income values, the paper has assumed that the reported HBS income values offer a representative picture of gross income levels.[9]

Table 3: Trends in Gross Household Income, 2009-2012

Year	Gross household income €	Gross equivalised household income €
2009	1,083.21	551.39
2010	1,037.42	534.66
2011	1,014.75	522.87
2012	1,001.63	518.60

Source: CSO SILC (2014: 17)

Note: The HBS average equivalised household income for 2009/10 was €524.70.

As a means of assessing the robustness of the modelled indirect taxation, table 4 compares the calculated total VAT tax take (the average household level times the number of households) with the exchequer revenue from VAT. Overall the modelled VAT collected from households equals just over €5.5 billion representing between 54.5% and 56% of the exchequer VAT collected in 2009 and 2010. Estimates from the European Commission for the period 2000-2011 suggest Irish households contributed on average 49% of the total VAT tax take; with the remainder coming from investment (28%), industry (18%) and Government and non-profits (2%) (2013:60-61). The EC household VAT estimates for 2009 and 2010 were 51% and 53% respectively suggesting the modelled indirect taxation used in the remainder of this paper offers a good representation of the indirect taxation experience of households.

The simulated distributive impacts established in this paper are *ceteris paribus* estimates and therefore ignore any consumption pattern or behavioural changes that might have occurred as a result of the policy implementation. While it is probable that such 'second-round effects' would occur, most particularly for higher cost goods and services where price elasticities are likely to exceed one, the composition of their overall and distributive nature is difficult to robustly assess. If any such changes are symmetrically distributed across the income distribution, relative to gross income, they would not alter the distributive shape of the policy impacts identified below. Similarly, the analysis assumes that the incidence of the tax change falls on the consumer i.e. that the indirect taxation increase is passed on in full. Where this is not the case

[8] SILC data is only available up to 2012. The 2013 data will be released in late 2014 or early 2015.

[9] A more detailed examination of the distributive impacts of recent income changes has yet to be undertaken (a focus of a future research paper using the SILC data). However, if there are variations in the decile and income group impacts of income changes these may alter the representativeness of the results; although it would be unlikely to significantly alter their overall shape and magnitude.

and the changes are completely or partially absorbed by the supply-side (producers, retailers etc), there are likely to be differences between the actual and modelled outcomes.

Table 4: Comparing Modelled Household VAT Contributions to Exchequer Yield

Average VAT per household	€3,360.16
No of Households in the state[1]	1,649,691
Modelled total VAT from households €	5,543,225,711
Modelled total VAT from households €m	5,543
Exchequer VAT in 2009 €m[2]	10,175
Exchequer VAT in 2009 €m[2]	9,862
Modelled VAT as % of Exchequer VAT 2009	54.5%
Modelled VAT as % of Exchequer VAT 2010	56.2%
EC estimate of VAT from households 2009[3]	51%
EC estimate of VAT from households 2010[3]	53%

Source: Collins (2014a: 38)

Notes: 1. As per Murray and Collins (2012) using data from Census 2011
2. Data from CSO National Income and Expenditure Annual Results Table 22
3. Estimates calculated from European Commission (2013: 60-61, 116-117)

There are various other assumptions, specifically related to the individual policy simulations and these are outlined with their examination below.

PREVIOUS EXAMINATIONS

The number of studies that have assessed the composition and distribution of indirect taxation contributions in Ireland is quiet small. The most comprehensive have been a series of CSO reports, entitled *Redistributive Effects of State Taxes and Benefits on Household Income*, which followed the publication of HBS data across the 1970s and 1980s (CSO, 1980, 1983 and 1995). These distinguished between four phases of income redistribution namely (i) receipt of cash benefits; (ii) payment of direct taxes; (iii) receipt of non-cash benefits; and (iv) payment of indirect taxes. In each case the reports identified the total sums of direct and indirect taxes paid by various household types across the state.[10] Collectively the studies reflect that over the period from 1973-1987 there was an increase in the importance of direct taxation over time and a small decline in indirect taxation. The distributional breakdown from 1987 points to a progressive direct income taxation system and a regressive indirect tax system.[11]

The work of Barrett and Wall (2006) reignited the discussion and analysis of indirect taxation in a more contemporary Irish context. Using HBS data from 1999/00, as well as information from

[10] Murphy (1984) also reviewed the 1973 and 1980 HBS redistributive results.
[11] See Collins (2014a: 3-4) for a more detailed summary.

the Department of Finance and the Revenue Commissioners, they focused on indirect taxation and quantified the regressive nature of both VAT and excise duties. They found that these indirect taxes had a highly regressive nature, with those in the lowest income decile paying a far greater share of their income than those in the highest decile. They also found, amongst other things, that a "third of the difference in tax share between the lowest and highest deciles can be accounted for by taxes on drink and tobacco", and that, therefore, eliminating taxes on drink and tobacco was the best way of reducing regressivity in the Irish case (2006: 29). Although Barrett and Wall do not specifically examine the impacts of any specific indirect tax changes, they do simulate structural reforms to the VAT system in a similar way to that outlined earlier for this paper (2006: 23-27).

Verde and Tol (2009) used the subsequent HBS data, from 2004/05, to assess the effects of carbon taxation across the income distribution in Ireland and found that "carbon tax is markedly regressive as expected" (2009: 330).[12] As with the Barrett and Wall (2006) study, the Verde and Tol paper indicates that the 'lifestyles' of lower income individuals may exacerbate the regressivity of indirect taxation, specifically carbon taxes in this case, as they tend to live in less energy efficient homes and use more carbon intensive fuels. They also state that the carbon tax would "probably be less regressive if compared to consumption rather than disposable income" (2009: 333), an issue that is raised by other studies.

Prior to the emergence of the various papers associated with this project (Collins and Turnbull 2013 and Collins 2014a, 2014c), the most recent Irish research on the issue of distributional effects of indirect taxes came from Leahy *et al.* (2011). Their assessments are based on indirect taxes (primarily VAT) paid by households as a proportion of weekly disposable income. The researchers use data from the HBS complemented with data from the *Growing Up in Ireland* survey with the latter used to assess excise taxes per household on things like alcohol and tobacco, rather than attempting to estimate the excise using the HBS data. The research also considers indirect tax payments outside of the HBS such as payments on the sale of houses. The authors conclude, broadly in line with the Irish research before them, that the "current system is highly regressive" (2011: 213). Leahy *et al.* also simulate the distributive impacts of some policy reforms including an increase in the standard VAT rate (2011: 228-229).

Finally, the taxation literature highlights an important point regarding how policy reforms are judged, one relevant to any short-term considerations of the distributive impact of the changes discussed later. In the context of structural changes to a tax system, as part of a process of developing an overall more equitable system, it may be the case that transitional inequities are inevitable; an unavoidable feature of enhancing equity.[13]

MODELLING THE DISTRIBUTIVE IMPACT OF INDIRECT TAXATION CHANGES

Changes to indirect taxes are a regular feature of annual Budgets although *ex post* or *ex ante* assessments of their distributive impacts have been limited. Given the aforementioned indirect taxation model, this paper examines *ex ante* the distributive impact of a suite of indirect taxation policies.

[12] See also Callan et al (2009) who examine this issue in a related paper.
[13] See Collins (2014b) for a further discussion.

The changes examined are as follows:

(i) **VAT**: 1% increase in the standard rate; 1% increase in the first reduced rate; and a 1% increase in the second reduced rate.
(ii) **Fuel**: 5c increase in a litre of petrol; and a 5c increase in a litre of diesel.
(iii) **Insurance levies**: 1% increase in non-life insurance levies.
(iv) **Tobacco**: 10c increase in a pack of 20 cigarettes.
(v) **Alcohol**: 25c increase in a bottle of wine; 10c increase in a pint of Beer/Cider; and a 10c increase in a standard measure of spirits.

Each of these changes is examined in turn below. While the paper models and presents results for increases to each of these indirect taxes, a similar (inverse) distributive impact emerges when reductions to these taxes are examined. In each case, any specific assumptions or simulation choices are outlined.

(i) VAT

Ireland has an established tradition of regularly altering VAT rates. Relative to other EU member states, Ireland is the country that most frequently alters VAT rates; a record which when judged from the perspective of potential revenue was considered by the European Commission to have registered small actual effects on potential revenue and was "perhaps a case of tinkering at the margin" (EC, 2013:14).[14]

This section looks at the distributive and revenue implications of changes to three VAT rates.

1% increase in the standard rate

The standard rate of VAT in Ireland is 23%, a rate which sits above the EU-28 average (22%) and in the top 10 rates applied in EU member states. Across the EU changes to VAT rates have been a central part of countries response to the recent economic crisis. By mid-2014, 20 member states had increased their standard VAT rate since the onset of the economic crisis in 2008 (European Commission, 2014). Overall, standard VAT rates range from 15% in Luxembourg to 27% in Hungary.[15]

As part of Budget 2012 (December 2011), Ireland increased its standard rate from 21% to 23%. The distributive impact of that increase, part of the programme of measures implemented under various Memoranda of Understanding with the Troika (European Union, European Central Bank and the International Monetary Fund) and initially proposed as part of the 2010 *National Recovery Plan*, is examined in an earlier paper (see Collins 2014c).

This policy simulation examines a 1% increase in the standard rate. In modelling the policy reform the paper:

[14] The EC examined the VAT system over the year from 2000-2011. A longer overview, since 1972, is available from European Commission (2014). It should be noted that the objective of revenue generation may not be the only intention of VAT rate reforms.
[15] Note, there are differences in the VAT based to which these rates are applied in each country.

- Takes as a baseline the indirect taxation contributions established in Collins (2014a) for equivalised household deciles (Table 1).
- The model has been set up so that each HBS expenditure item is classified as being subject to one of six VAT classifications (see details in Collins, 2014a: 9-10). The analysis simulates an increase in the VAT rate for those items subject to the standard rate while leaving all other expenditure data unchanged.[16]
- The household expenditure and income data from 2009/10 is taken to offer a good representation of household expenditure at the time of the policy's implementation (see earlier text).
- The simulated distributive impacts are *ceteris paribus* estimates and therefore ignore any consumption pattern or behavioural changes that might have occurred as a result of the policy implementation.
- The analysis assumes that the incidence of the tax increase falls on the consumer i.e. that the VAT increase is passed on in full.
- The results are reported as increases in expenditure costs as a proportion of gross income – the normal method of assessing the progressivity or regressivity of a taxation reform measure. Assuming stable consumption patterns following the adoption of the policy, the VAT increase is analogous to a cash transfer (lump sum tax) from households to Government.

Table 5 and Chart 3 present the results of the modelled policy simulation. Overall the measure is regressive, impacting more heavily on lower income households than on those further up the income distribution. On average, the 1% standard rate increase is equivalent to a 0.21% per annum increases in living costs for households, with the bottom 60% of the income distribution experiencing an above average impact.

In nominal terms, the average household effect equals an increase in living costs of €113.61 per annum. Overall, this implies that households would contribute an additional €187.4m to the exchequer as a result of such a change. Table 5 also compares this overall household revenue effect to Department of Finance exchequer revenue estimates for such a reform. Comparing the modelled simulation and these figures suggests that households would contribute 75% of all the additional exchequer revenue. *A priori,* given the composition of goods and services to which the standard rate applies, one would expect the household contribution to be above the average figures established by the EC (see table 4). However, it may be that the Department of Finance revenue estimate is pessimistic which thereby overstates the relative household contribution; for example if households contributed 66% of the exchequer revenue from this change, the overall revenue gain would be approximately €284m (€35m higher than that in table 5).

[16] To best capture a 1% increase in the standard VAT rate the analysis simulates a 1% increase based on both the 2009 and 2010 expenditure levels although two different standard VAT rates applied during that period.

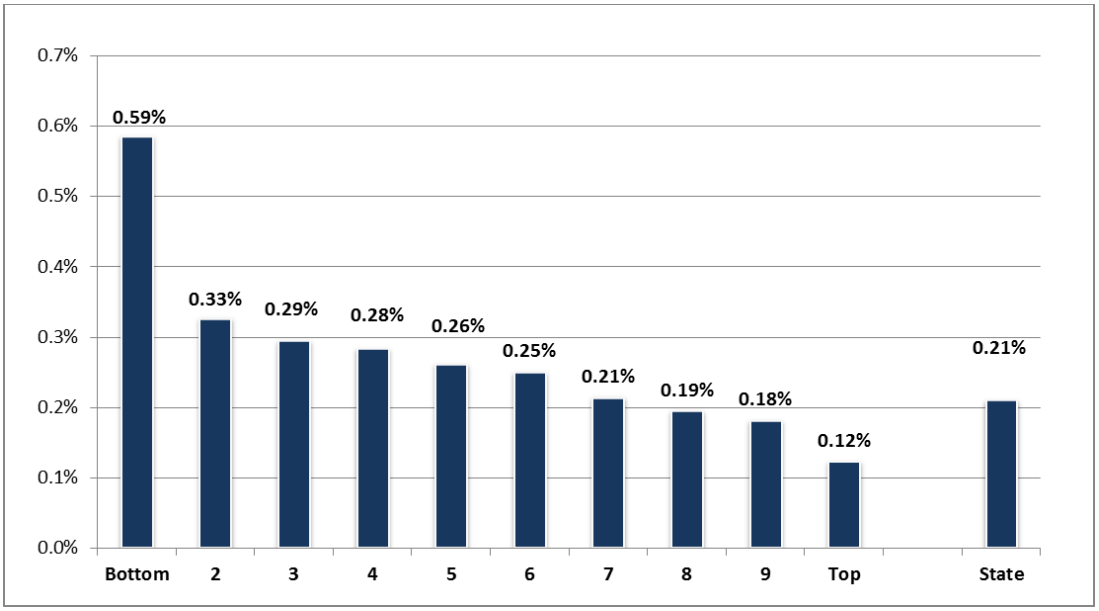
Table 5: The Distributive and Revenue Impacts of a 1% increase in the standard VAT rate

Distributive Impact	
Decile	**% Gross Income**[1]
Bottom	0.59%
2	0.33%
3	0.29%
4	0.28%
5	0.26%
6	0.25%
7	0.21%
8	0.19%
9	0.18%
Top	0.12%
State	**0.21%**

Revenue Impact	
Average Household expenditure effect[2]	+€113.61
Exchequer Revenue yield from households	€187.4m
Overall Exchequer yield[3]	€249m
Household yield as % of overall	75.3%

Notes: 1. Figures represent the increase in expenditure costs associated with the VAT change.
2. Calculation based on the number of households as per Table 4. This approach is used for establishing average household effects and yields in the remainder of the simulations.
3. Department of Finance estimate from TSG 13/04 p2.
4. Table A4a and A4b in the appendix presents the distributive impacts measured against disposable income and total expenditure.

Chart 3: The Distributive Impact of a 1% increase in the standard VAT rate, % Gross Income by income decile



1% increase in the first reduced rate

VAT rates within the EU are governed by the EU VAT Directive (2006) so as to adhere to rules regarding free trade and a common EU wide market. The current Directive reflects an update of the original 1977 VAT Directive and its subsequent amendments.[17] It dictates that Member States must apply a standard VAT rate of at least 15% and provides an option for countries to apply one or two reduced VAT rates to a specified list of goods and services where these reduced rates must be more than 5%. Up to 2011 Ireland possessed a standard VAT rate and one reduced rate (13.5%). As part of that years 'Jobs Initiative' programme, the Government introduced a new second reduced rate (9%).

Reforms to the first reduced rate have been a feature of VAT policy changes on a number of occasions over the last few decades. In 2003 the rate increased from 12.5% having previously increases from a level of 10% in 1991. During the 1970s and 1980s the rate varied from 5.26% (1972) to 23% (1983). The most recent Programme for Government (2011) proposed its reduction from 13.5% to 12%, although the aforementioned introduction of the second reduced rate was adopted instead.

This policy simulation examines a 1% increase in the first reduced rate (from 13.5% to 14.5%). In modelling the policy reform the paper:

- Takes as a baseline the indirect taxation contributions established in Collins (2014a) for equivalised household deciles (Table 1).
- The model has been set up so that each HBS expenditure item is classified as being subject to one of six VAT classifications (see details in Collins, 2014a: 9-10). The analysis

[17] The original 6th VAT Directive was updated on 26th November 2006 as the Council Directive 2006/12/EC.

simulates an increase in the VAT rate for those items subject to the first reduced rate while leaving all other expenditure data unchanged.

- The household expenditure and income data from 2009/10 is taken to offer a good representation of household expenditure at the time of the policy's implementation (see earlier text).
- The simulated distributive impacts are *ceteris paribus* estimates and therefore ignore any consumption pattern or behavioural changes that might have occurred as a result of the policy implementation.
- The analysis assumes that the incidence of the tax increase falls on the consumer i.e. that the VAT increase is passed on in full.
- The results are reported as increases in expenditure costs as a proportion of gross income. Assuming stable consumption patterns following the adoption of the policy, the VAT increase is analogous to a cash transfer (lump sum tax) from households to Government.

Table 6: The Distributive and Revenue Impacts of a 1% increase in the first reduced VAT rate

Distributive Impact	
Decile	**% Gross Income**[1]
Bottom	0.39%
2	0.23%
3	0.20%
4	0.16%
5	0.14%
6	0.16%
7	0.13%
8	0.14%
9	0.11%
Top	0.09%
State	**0.14%**

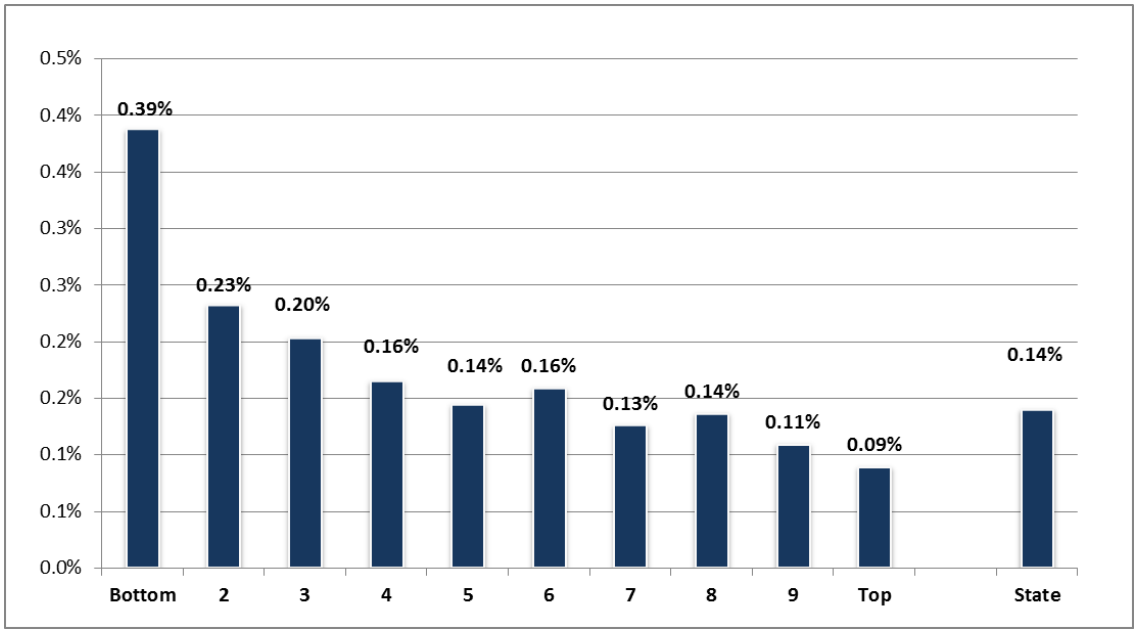
Revenue Impact	
Average Household expenditure effect	+€73.69
Exchequer Revenue yield from households	€121.6m
Overall Exchequer yield[2]	€247m
Household yield as % of overall	49%

Notes: 1. Figures represent the increase in expenditure costs associated with the VAT change.
2. Department of Finance estimate from TSG 13/04 p2.
3. Table A4a and A4b in the appendix presents the distributive impacts measured against disposable income and total expenditure.

Table 6 and Chart 4 present the results of the modelled policy simulation. Overall the measure is regressive, impacting more heavily on lower income households than on those further up the income distribution. On average, the 1% first reduced rate increase is equivalent to a 0.14% per annum increases in living costs for households, with the bottom 40% of the income distribution experiencing an above average impact.

In nominal terms, the average household effect equals an increase in living costs of €73.69 per annum. Overall, this implies that households would contribute an additional €121.6m to the exchequer as a result of such a change. Table 6 also compares this overall household revenue effect to Department of Finance exchequer revenue estimates for such a reform. Comparing the modelled simulation and these figures suggests that households would contribute 49% of all the additional exchequer revenue. The contribution from households is in line with the EC average figures reported earlier and lower than that found for the standard rate increase. This is likely to be a reflection of the types of good and services classified at this VAT level and the greater prominence of non-household contributions at this rate.

Chart 4: The Distributive Impact of a 1% increase in the first reduced VAT rate, % Gross Income by income decile



1% increase in the second reduced rate

The 2011 'Jobs Initiative' introduced a new second reduced VAT rate at 9%. Although first announced as a temporary measure, due to expire at the end of 2013, the reform was retained as an ongoing feature of the VAT structure in Budget 2014.

The VAT reform was targeted at the tourism sector, perceived as an under-utilised labour intensive sector which has suffered a 25% decline in inbound tourist numbers and a 30% decline in earnings over the period from 2007-2010. The goods and services reclassified from 13.5% to the 9% rate mainly included restaurant and catering services, hotel and holiday

accommodation, various entertainment services such as admission to cinemas, theatres, museums, fairgrounds, amusement parks and the use of sporting facilities. It also applied to hairdressing and printed matter such as brochures, maps, programmes and newspapers.[18] The distributive impact of this change is examined in an earlier paper (see Collins 2014c).

This policy simulation examines a 1% increase in the second reduced rate. In modelling the policy reform the paper:

- Takes as a baseline the indirect taxation contributions established in Collins (2014a) for equivalised household deciles (Table 1).
- The model has been set up so that each HBS expenditure item is classified as being subject to one of six VAT classifications (see details in Collins, 2014a: 9-10). The analysis simulates an increase in the VAT rate for those items subject to the second reduced rate while leaving all other expenditure data unchanged.
- The household expenditure and income data from 2009/10 is taken to offer a good representation of household expenditure at the time of the policy's implementation (see earlier text).
- The simulated distributive impacts are *ceteris paribus* estimates and therefore ignore any consumption pattern or behavioural changes that might have occurred as a result of the policy implementation. As the analysis is based on 2009/10 data they also ignore any consumption changes that would have occurred following the introduction of the second reduced rate in 2011.
- The analysis assumes that the incidence of the tax increase falls on the consumer i.e. that the VAT increase is passed on in full.
- The results are reported as increases in expenditure costs as a proportion of gross income. Assuming stable consumption patterns following the adoption of the policy, the VAT increase is analogous to a cash transfer (lump sum tax) from households to Government.

Table 7 and Chart 5 present the results of the modelled policy simulation. Overall the measure is mildly regressive; aside from the bottom decile the impact is almost the same as you increase up the income distribution until you reach the top two deciles. On average, the 1% increase is equivalent to a 0.06% per annum increases in living costs for households.

In nominal terms, the average household effect equals an increase in living costs of €31.14 per annum. Overall, this implies that households would contribute an additional €51.4m to the exchequer as a result of such a change. Table 7 also compares this overall household revenue effect to Department of Finance exchequer revenue estimates for such a reform, where the Departments figures are based on their Budget 2014 estimate of the full-year cost of retaining the 4% reduction in this rate (2013: A8). Comparing the modelled simulation and these figures suggests that households would contribute 66% of all the additional exchequer revenue. That figure is higher than the 2013 EC figure of 49% reported earlier, likely reflecting the greater orientation of the reclassified goods and services to household consumption. However, *a priori* one would expect a reasonable proportion of the exchequer cost of such a measure would flow to households outside the state (tourists) as well as to other sectors of the economy.

[18] The full details of the goods and services impacted by the reduction are listed in paragraphs 3(1) to (3)7, 8, 11, 12 and 13(3) of Schedule 3 of the VAT Consolidation Act 2010.

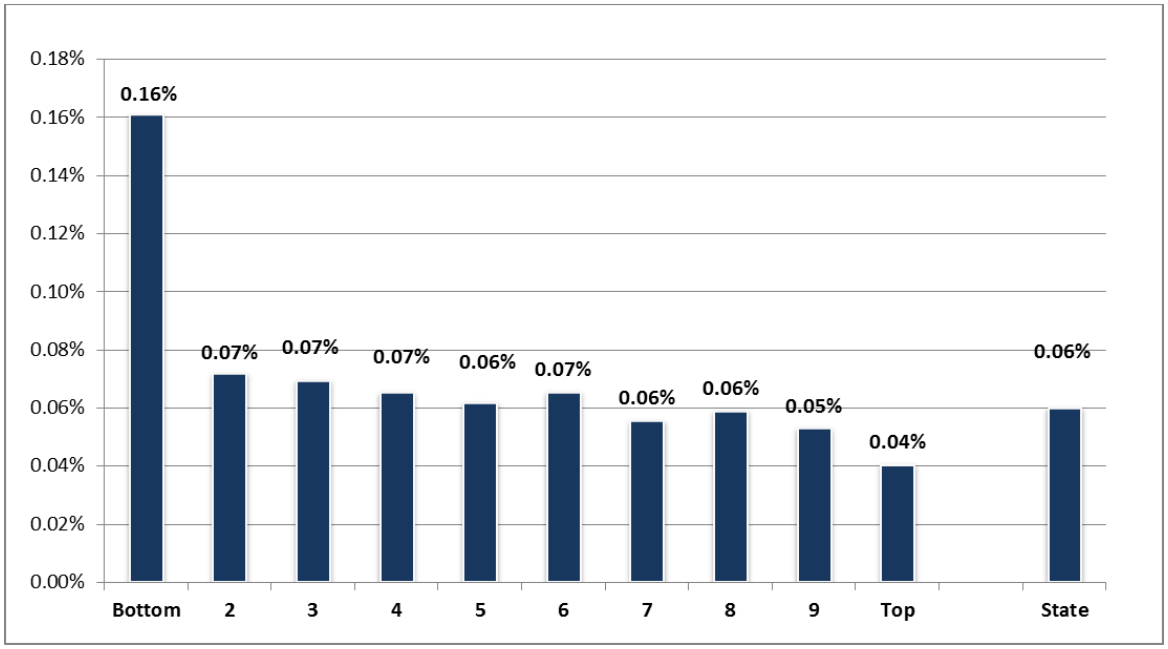
Table 7: The Distributive and Revenue Impacts of a 1% increase in the second reduced VAT rate

Distributive Impact	
Decile	**% Gross Income**[1]
Bottom	0.16%
2	0.07%
3	0.07%
4	0.07%
5	0.06%
6	0.07%
7	0.06%
8	0.06%
9	0.05%
Top	0.04%
State	**0.06%**

Revenue Impact	
Average Household expenditure effect	+€31.14
Exchequer Revenue yield from households	€51.4m
Overall Exchequer yield[2]	€78m
Household yield as % of overall	66%

Notes: 1. Figures represent the increase in expenditure costs associated with the VAT change.
2. Based on Department of Finance Budget 2014 estimate of a 4% decrease (2013: A8).
3. Table A4a and A4b in the appendix presents the distributive impacts measured against disposable income and total expenditure.

Chart 5: The Distributive Impact of a 1% increase in the second reduced VAT rate, % Gross Income by income decile



(ii) Fuel

This section examines the distributive effects of indirect taxation increases in both petrol and diesel. While a 5 cent per litre increase in the price of both goods is examined, they are looked at separately for reasons of their different consumption patterns across the income distribution and because Budgets often alter indirect taxes on petrol and diesel in different ways. For example, Budget 2011 increased petrol by 4 cent per litre and diesel by 2 cent.

As this paper is focused on the distributive impact across individuals and households, it should be noted that it does not capture any knock-on effect of fuel price increases. However, it is likely that such price increase feed through to transport costs in general which in turn impact more broadly on consumer prices and household budgets. However, such second round effects are difficult to accurately capture empirically.

This section looks at the distributive and revenue implications of changes to two fuel taxation changes.

5 cent increase in a litre of petrol

In modelling this policy reform the paper:

- Takes as a baseline the indirect taxation contributions established in Collins (2014a) for equivalised household deciles (Table 1).
- The HBS data provides expenditure information on petrol which for the purposes of these estimates has been converted to the number of litres consumed given average petrol prices in the HBS periods of 2009 and 2010 (see details in Collins, 2014a: 10, 37).

- The modelled 5 cent indirect tax increase in the price of petrol is VAT inclusive – as this is the format it is announced in Budgets. In effect a 5 cent increase is a 4.065 cent increase in excise and a 0.935 cent increase in VAT.
- The analysis simulates an increase in the per litre of petrol price while leaving all other expenditure data unchanged.
- The household expenditure and income data from 2009/10 is taken to offer a good representation of household expenditure at the time of the policy's implementation (see earlier text).
- The simulated distributive impacts are *ceteris paribus* estimates and therefore ignore any consumption pattern or behavioural changes that might have occurred as a result of the policy implementation. However, despite the inelastic nature of the demand for fuel, consistent fuel price increases since the HBS period may imply that there have been some reductions in consumption since then. This may result in the costs established below being marginally overestimated.
- The analysis assumes that the incidence of the tax increase falls on the consumer i.e. that the increase is passed on in full.
- The results are reported as increases in expenditure costs as a proportion of gross income. Assuming stable consumption patterns following the adoption of the policy, the excise increase is analogous to a cash transfer (lump sum tax) from households to Government.

Table 8 and Chart 6 present the results of the modelled policy simulation. Overall the measure is regressive, impacting more heavily on lower income households than on those further up the income distribution. On average, the 5c per litre increase is equivalent to a 0.10% per annum increases in living costs for households, with the bottom 80% of the income distribution experiencing an above average impact.

In nominal terms, the average household effect equals an increase in living costs of €53.84 per annum. Overall, this implies that households would contribute an additional €88.8m to the exchequer as a result of such a change. Table 8 also compares this overall household revenue effect to revenue estimates derived using Revenue Commissioner data on litres of petrol consumed in Ireland. While there are figures available from Department of Finance Tax Strategy paper (see for example, 13/03 p4), these seem to notably underestimate any revenue gains given overall levels of consumption.[19] Comparing the modelled simulation and those derived from the data on overall consumption suggests that households would contribute 92.7% of all the additional exchequer revenue.[20]

The estimates in Table 8 should be interpreted in the context of further reductions in petrol consumption since 2009/10. Revenue Commissioners data show decreases of over 8.8% in

[19] The estimate used in this paper takes Revenue Statistical Report (2013: 19) data for petrol consumption in 2009 and 2010 and weighs this in proportion to the HBS sample period with 5/14th in 2009 and 9/14th in 2010 (for more details see Collins 2014a). Having established a level of petrol consumption for this period the number of litres is multiplied by 5 cent to estimate the revenue yield. The result is then weighted to reflect reported difference in the Revenue Commissioners data between modelled and actual yield - reflecting this, the estimate is reduced by 4%.

[20] A comparison of the modelled household (HBS based) consumption data and Revenue Commissioner data on petrol consumption and excise yields found that in 2009/10 household were responsible for 89% of all petrol consumption and 92.8% of excise yields from petrol.

2010 and 5.5% in 2011. These decreases will have impacted on the revenue estimates, implying that a 5c increase is more likely to generate approximately €88m in additional exchequer revenue.[21] Despite these consumption decreases, the distributive shape of the policy's impact is unlikely to have altered significantly from that reported in Table 8 and Chart 6.

Table 8: The Distributive and Revenue Impacts of a 5c (VAT inclusive) increase in excise on a litre of petrol

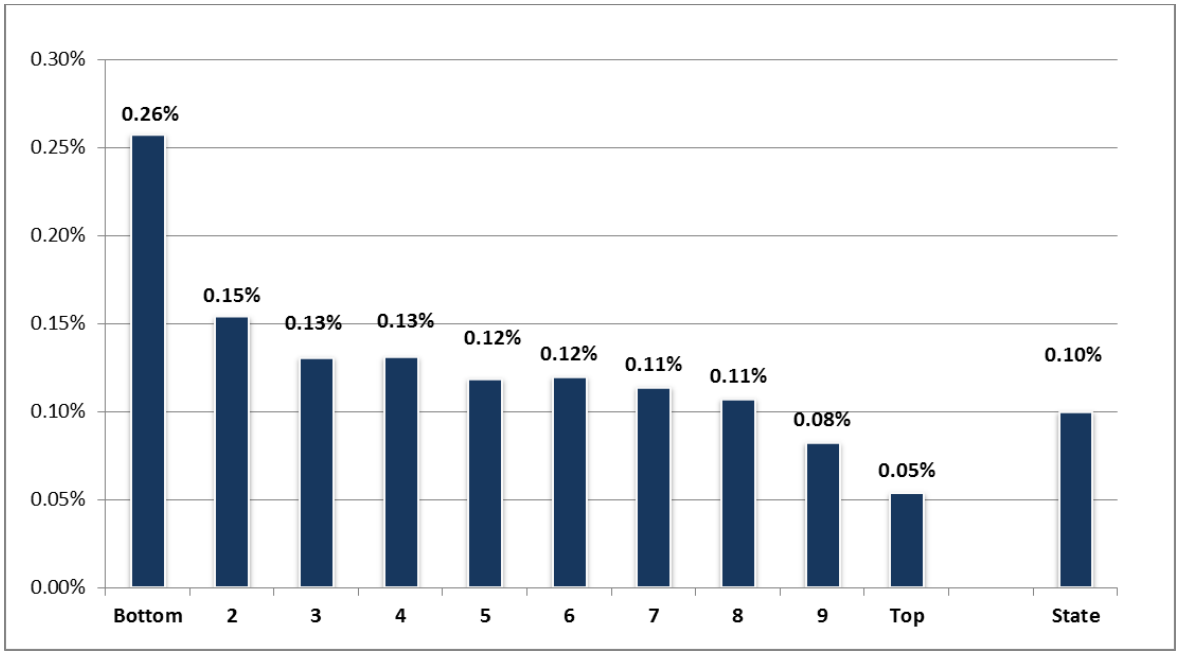
Distributive Impact	
Decile	**% Gross Income**[1]
Bottom	0.26%
2	0.15%
3	0.13%
4	0.13%
5	0.12%
6	0.12%
7	0.11%
8	0.11%
9	0.08%
Top	0.05%
State	**0.10%**

Revenue Impact	
Average Household expenditure effect	+€53.84
Exchequer Revenue yield from households	€88.8m
Overall Exchequer yield[2]	€95.8m
Household yield as % of overall	92.7%

Notes: 1. Figures represent the increase in expenditure costs associated with the excise change.
2. Based on calculations using Revenue Commissioners data on quantity of petrol purchased in 2009 and 2010.
3. Table A4a and A4b in the appendix presents the distributive impacts measured against disposable income and total expenditure.

[21] Using the 2011 Revenue Commissioners data, the yield would be €87.8m.

Chart 6: The Distributive Impact of a 5c (VAT inclusive) increase in excise on a litre of petrol, % Gross Income by income decile



5 cent increase in a litre of diesel

In modelling this policy reform the paper:

- Takes as a baseline the indirect taxation contributions established in Collins (2014a) for equivalised household deciles (Table 1).
- The HBS data provides expenditure information on diesel which for the purposes of these estimates has been converted to the number of litres consumed given average diesel prices in the HBS periods of 2009 and 2010 (see details in Collins, 2014a: 10, 37).
- The modelled 5 cent indirect tax increase in the price of diesel is VAT inclusive – as this is the format it is announced in Budgets. In effect a 5 cent increase is a 4.065 cent increase in excise and a 0.935 cent increase in VAT.
- The analysis simulates an increase in the per litre of diesel price while leaving all other expenditure data unchanged.
- The household expenditure and income data from 2009/10 is taken to offer a good representation of household expenditure at the time of the policy's implementation (see earlier text).
- The simulated distributive impacts are *ceteris paribus* estimates and therefore ignore any consumption pattern or behavioural changes that might have occurred as a result of the policy implementation. However, despite the inelastic nature of the demand for fuel, consistent fuel price increases since the HBS period may imply that there have been some reductions in consumption since then. This may result in the costs/revenue established below being marginally overestimated.
- The analysis assumes that the incidence of the tax increase falls on the consumer i.e. that the increase is passed on in full.

- The results are reported as increases in expenditure costs as a proportion of gross income. Assuming stable consumption patterns following the adoption of the policy, the excise increase is analogous to a cash transfer (lump sum tax) from households to Government.

Table 9 and Chart 7 present the results of the modelled policy simulation. Overall the measure has a mixed impact across the income deciles. On average, the 5c per litre increase is equivalent to a 0.04% per annum increases in living costs for households. The bottom decile experiences the highest impact reflecting a high level of expenditure on diesel in that decile relative to all others. The transitional nature of a proportion of the households in this decile may assist in explaining this finding.[22]

In nominal terms, the average household effect equals an increase in living costs of €23.19 per annum. Overall, this implies that households would contribute an additional €38.3m to the exchequer as a result of such a change. Table 9 also compares this overall household revenue effect to revenue estimates derived using Revenue Commissioner data on litres of diesel consumed in Ireland. While there are figures available from Department of Finance Tax Strategy paper (see for example, 13/03 p4), these seem to notably underestimate any revenue gains given overall levels of consumption.[23] Comparing the modelled simulation and those derived from the data on overall consumption suggests that households would contribute 31.8% of all the additional exchequer revenue.[24] As might be expected, the proportion of auto diesel consumed by households is considerably smaller than the corresponding figures for petrol – a finding which reflects the more common use of diesel in business activities.

The estimates in Table 9 should be interpreted in the context of further reductions in diesel consumption since 2009/10. Revenue Commissioners data show decreases of 5.5% between 2009 and 2010 and a subsequent small increase in 2011. These (overall) decreases will have impacted on the Revenue Estimates, implying that a 5c increase is more likely to generate approximately €118m in additional exchequer revenue.[25] Despite these consumption decreases, the distributive shape of the policy's impact is unlikely to have altered significantly from that reported in Table 9 and Chart 7.

[22] The composition of the bottom deciles is addressed in Collins (2014a: 8).
[23] The estimate takes Revenue Statistical Report (2013: 19) data for diesel consumption in 2009 and 2010 and weighs this in proportion to the HBS sample period with 5/14th in 2009 and 9/14th in 2010 (for more details see Collins 2014a). Having established a level of diesel consumption for this period the number of litres is multiplied by 5 cent to estimate the revenue yield. The result is then weighted to reflect reported difference in the Revenue Commissioners data between modelled and actual yield - reflecting this, the estimate is reduced by 8%.
[24] A comparison of the modelled household (HBS based) consumption data and Revenue Commissioner data on diesel consumption and excise yields found that in 2009/10 household were responsible for 29.3% of all diesel consumption and 31.7% of excise yields from petrol.
[25] Using the 2011 Revenue Commissioners data, the yield would be €117.9m.

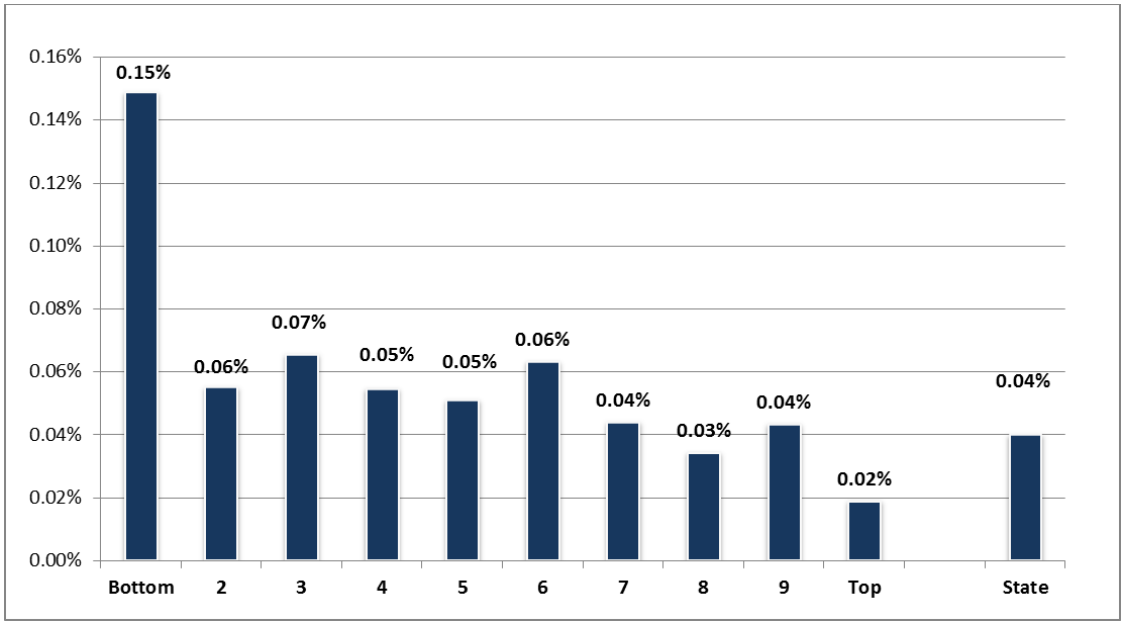
Table 9: The Distributive and Revenue Impacts of a 5c (VAT inclusive) increase in excise on a litre of diesel

Distributive Impact	
Decile	**% Gross Income**[1]
Bottom	0.15%
2	0.06%
3	0.07%
4	0.05%
5	0.05%
6	0.06%
7	0.04%
8	0.03%
9	0.04%
Top	0.02%
State	**0.04%**

Revenue Impact	
Average Household expenditure effect	+€23.19
Exchequer Revenue yield from households	€38.3m
Overall Exchequer yield[2]	€120.3m
Household yield as % of overall	31.8%

Notes: 1. Figures represent the increase in expenditure costs associated with the VAT change.
2. Based on calculations using Revenue Commissioners data on quantity of diesel purchased in 2009 and 2010.
3. Table A4a and A4b in the appendix presents the distributive impacts measured against disposable income and total expenditure.

Chart 7: The Distributive Impact of a 5c (VAT inclusive) increase in excise on a litre of diesel, % Gross Income by income decile



(iii) Insurance Levies

Levies and stamp duties on insurance policies have been in place since the mid 1980s and collect revenue from both life and non-life policies. There are currently two charges on non-life insurance policies totalling 5% of the premium price and these are collected at source by insurance companies. Life assurance policy holders pay stamp duty of 1% on premiums and this is also collected at source.

This section focuses on the distributive effects of changes to levies on non-life insurance policies. The modelled effects are the same for a 1% change to stamp duties.

The current 2% levy on non-life insurance policies is payable to the Insurance Compensation Fund (ICF) and operates under the Insurance Act of 1964 as amended by the Insurance (Amendment) Act 2011. The aim of the ICF is to protect policy holders if an insurance company goes into liquidation or administration. It was originally introduced in 1984 at a rate of 2% to meet the liabilities from the collapse of the PMPA insurance company. Subsequently it was reduced to 1% (from January 1992) and to 0% from January 1993. The levy was re-introduced at a rate of 2% following the collapse of the Quinn Insurance Company from January 2012. The ICF is reviewed annually by the Central Bank who determine if the fund has sufficient income to serve its purpose and if so they can recommend the levy is reduced below the 2% rate. As the Quinn Insurance rescue required the exchequer to advance an estimated €1.1 billion to the fund – all of which has to be paid back plus interest to the exchequer – it is likely that the levy will remain for some time. An increase to the levy above 2% (as modelled below) would require an amendment to the 2011 Act.

Non-life insurance premiums are also subject to a 3% stamp duty. This was also introduced in the 1980s at a rate of 1% in 1982 and increased to 2% in 1993. It applied to almost all non-life insurance premiums with exceptions for reinsurance, voluntary health insurance, marine,

aviation and transit insurance and export credit insurance. Commenting on the purpose of the stamp duty in 2008, the then Minister for Finance indicated that "was introduced to broaden the stamp duty base" (Oireachtas Éireann, PQ 24348/08). The rate was increases to its current level of 3% in the Supplementary Budget of April 2009.

While changes to the 2% levy are linked to the financial position of the ICF, they are in effect a policy choice for Government. Changes to the stamp duty levels are also a policy choice, and as highlighted above, both rates have been moved around on a number of occasions over the past three decades. Suggestions to increase the insurance levy have also been raised in response to situations where unexpected exchequer costs arise – such as following flooding events in early 2014.[26] In all cases, the focus has been on revenue generation and issues regarding the distributive impact of the proposals are absent – a void this paper attempts to fill.

1% increase in the non-life insurance levy

In modelling this policy reform the paper:

- Takes as a baseline the indirect taxation contributions established in Collins (2014a) for equivalised household deciles (Table 1).
- The HBS data provides expenditure information on a number of non-life insurance products (primary dwelling, accident, travel, accident/sickness/sports & animal insurance, and other insurance) and these have been used as the basis of the simulation.[27]
- The analysis simulates a 1% increase in the base premium price while leaving all other expenditure data unchanged.
- The household expenditure and income data from 2009/10 is taken to offer a good representation of household expenditure at the time of the policy's implementation (see earlier text).
- The simulated distributive impacts are *ceteris paribus* estimates and therefore ignore any consumption pattern or behavioural changes that might have occurred as a result of the policy implementation. While the demand for insurance is likely to be inelastic, there are likely to be some decreases in demand as a result of a levy induced price increase. This may result in the costs/revenue established below being marginally overestimated.
- The analysis assumes that the incidence of the tax increase falls on the consumer i.e. that the increase is passed on in full.
- The results are reported as increases in expenditure costs as a proportion of gross income. Assuming stable consumption patterns following the adoption of the policy, the excise increase is analogous to a cash transfer (lump sum tax) from households to Government.

Table 10 and Chart 8 present the results of the modelled policy simulation. Overall the measure is small yet regressive. On average, the 1% levy increase is equivalent to a 0.021% per annum

[26] See for example Parliamentary Question 16811/14 regarding a levy on insurance companies to provide a distress fund for homeowners without flood insurance cover.
[27] Expenditure on medical/dental insurance and life assurance is excluded.

increases in living costs for households, with the bottom 70% of the income distribution experiencing an above average impact.

In nominal terms, the average household effect equals an increase in living costs of €11.18 per annum. Overall, this implies that households would contribute an additional €18.4m to the exchequer as a result of such a change. Table 10 also compares this overall household revenue effect to the likely overall exchequer yield, where the calculation is based on the reported full-year revenue from the measure over the years 2010-2012. Comparing the modelled simulation and these figures suggests that households would contribute 52% of all the additional exchequer revenue. The remainder comes from other sectors of the economy.

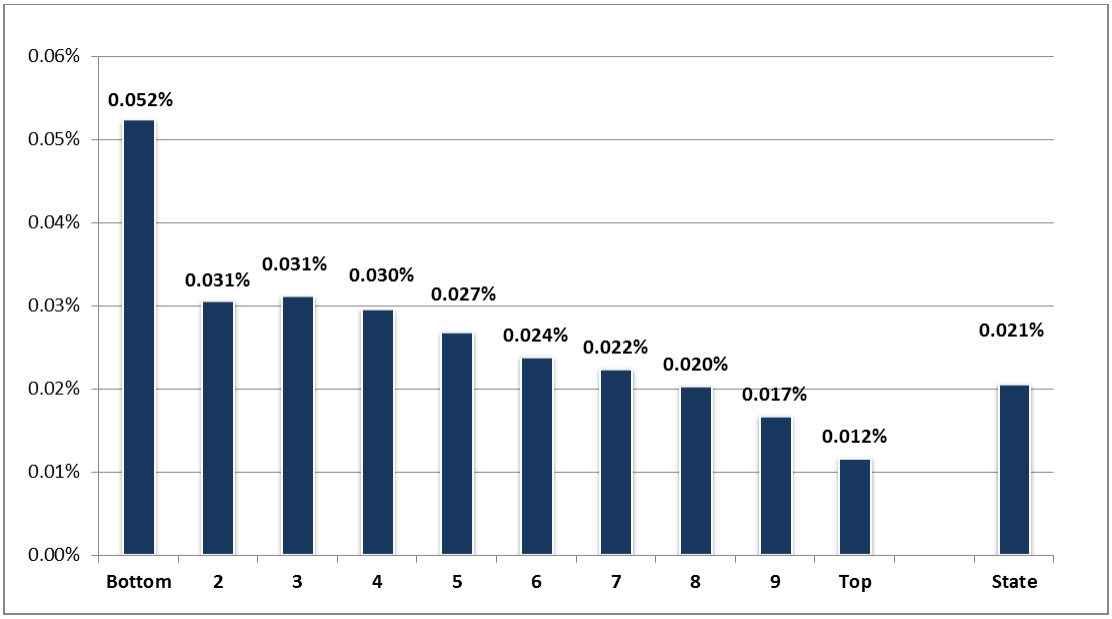
Table 10: The Distributive and Revenue Impacts of a 1% increase in the non-life insurance levy

Distributive Impact	
Decile	**% Gross Income**[1]
Bottom	0.052%
2	0.031%
3	0.031%
4	0.030%
5	0.027%
6	0.024%
7	0.022%
8	0.020%
9	0.017%
Top	0.012%
State	**0.021%**

Revenue Impact	
Average Household expenditure effect	+€11.18
Exchequer Revenue yield from households	€18.4m
Overall Exchequer yield[2]	€35.5m
Household yield as % of overall	52%

Notes: 1. Figures represent the increase in expenditure costs associated with the 1% levy.
2. Based on an average of the stamp duty yield from 2010 (€109m), 2011 (€106.4m) and 2012 (€104.16m) from TSG papers 12/12 (p13) and 13/6 (p10).
3. Table A4a and A4b in the appendix presents the distributive impacts measured against disposable income and total expenditure.

Chart 8: The Distributive Impact of a 1% increase in the non-life insurance levy, % Gross Income by income decile



(iv) Tobacco

Excise increases in tobacco products are a recurring feature of budgetary policy, driven both by a desire to elicit behavioural change in smoking habits and to generate revenue. Tobacco taxes adhere to structures set out under EU law and require both specific and *ad valorem* components. The current Directive (2011/12/EU) allows the specific component to be up to 76.5% of the total tax take of the weighted average retail selling price of a packet of 20 cigarettes. The current (2014) rate of excise on cigarettes is €241.83 per 1,000 cigarettes, together with an amount equal to 8.72% of the retail price, or €275.62 per 1,000 cigarettes, whichever is the greater. When VAT is included, the total tax as a proportion of the price amounts to 78.3% of the retail price of the most popular price category for a packet of 20 cigarettes.

This section examines the distributive effects of a 10c increase in indirect taxes on tobacco. However, as outlined earlier, households surveys tend to experience difficulty in recording accurate consumption data on both tobacco and alcohol consumption. In general this reflects both the way much of it is purchased (in social settings or from vending machines which provide no receipts) and a reluctance of consumers to record their actual consumption levels. Given that, this section first considers the reliability of the HBS data used in this paper for modelling these tax change effects.

Estimating the under-reporting of tobacco consumption in the HBS

To assess the scale of under-reporting of tobacco expenditure data, table 11 compares the overall household consumption level identified in the HBS data with the exchequer yield from tobacco excises. It uses prices and taxation levels from 2010 as the basis of its assessment - using data from Department of Finance Tax Strategy Papers and the 2011 Revenue Commissioners Statistical Report. The calculations assume that households in the state are

responsible for 90% of all legitimate tobacco expenditure within the state, a reasonable assumption given the product and the probability that there is likely to be consumption by tourists and those in institutions within the state not included in the HBS.[28] It finds that the HBS underreports tobacco consumption by an average of 29.5 packets of cigarettes per households, equivalent to 25.7% of overall consumption. The scale of this underreporting should be taken into account in any considerations of the estimates and distributive effects identified below.

Table 11: Estimate of Underreported HBS Tobacco Consumption

Total excise per pack of 20 cigarettes in 2010[1]	€5.23
Average household consumption (packs)	85.27
Average household tax on cigarettes per annum	€572.19
Average household excise on cigarettes per annum	€445.99
No. of households in state[2]	1,649,691
Excise yield – using HBS estimates	€735,743,857
Actual excise yield in 2010 – exchequer[3]	€1,100,902,733
Assume 90% of this from households in state	€990,812,460
Difference between estimate and actual	€255,068,603
Expressed in packs of cigarettes	48,770,287
Packs per households underreported	29.56
Estimated total packs of cigarettes given DOF excise yield in 2010	189,447,889
Underreported %	25.7%

Notes: 1. From Tax Strategy Group paper 10/21 pages 2 and 11.
2. As per Murray and Collins (2012) using data from Census 2011.
3. Revenue Commissioners (2013: 24)

10 cent increase in a pack of 20 cigarettes

In modelling this policy reform the paper:

- Takes as a baseline the indirect taxation contributions established in Collins (2014a) for equivalised household deciles (Table 1).
- The HBS records expenditure on tobacco products across three headings: cigarettes & cigarette papers; cigars & snuff; and other tobacco. Of the average annual household expenditure on these products 95.1% is accounted for by cigarettes & cigarette papers with the remaining two categories representing 1.1% and 3.9% respectively. For the purposes of the earlier analysis in Collins (2014a) and the simulations here, it is assumed that 100% of the expenditure is considered as cigarettes. Given the relatively small expenditure in the other categories, and given similar taxation regimes across all three, this is unlikely to make significant difference to the overall excise and VAT calculations.
- The HBS expenditure data on tobacco products has been converted to the number of packets of 20 cigarettes purchased assuming a standard price of €8.55 per packet of 20

[28] This assumption is in line with the simulation findings reported in Table 12.

cigarettes. This price level comes from a 2010 Department of Finance Tax Strategy paper (2010/21: 2, 10). [29]

- The simulation models a 10 cent increase in the retail price of a packet of 20 cigarettes – as this is the format it is announced in Budgets (with a *pro rata* increase for other tobacco products). In effect a 10 cent increase is an increase of 0.82c in the ad Valorem excise, 1.87c in VAT and 7.31c in specific excise (given the tax structure in 2014).
- The analysis simulates an increase in tobacco expenditure while leaving all other expenditure data unchanged.
- The household expenditure and income data from 2009/10 is taken to offer a good representation of household expenditure at the time of the policy's implementation (see earlier text).
- The simulated distributive impacts are *ceteris paribus* estimates and therefore ignore any consumption pattern or behavioural changes that might have occurred as a result of the policy implementation. However, despite the inelastic nature of the demand for tobacco, price and taxation increases since the HBS period may imply that there have been some reductions in consumption since then. This may result in the costs/revenue established being marginally overestimated.
- The analysis assumes that the incidence of the tax increase falls on the consumer i.e. that the increase is passed on in full.
- The results are reported as increases in expenditure costs as a proportion of gross income. Assuming stable consumption patterns following the adoption of the policy, the excise increase is analogous to a cash transfer (lump sum tax) from households to Government.

Table 12 and Chart 9 present the results of the modelled policy simulation. Overall the measure is regressive, reflecting the nature of smoking in Ireland which, based on consumption patterns from the HBS, is clearly concentrated in the bottom 60% of the income distribution – where it accounts for between 2-4% of all expenditure. On average, the 10c per packet increase is equivalent to a 0.016% per annum increases in living costs for households.

In nominal terms, the average household effect equals an increase in living costs of €8.53 per annum. Overall, this implies that households would contribute an additional €14.07m to the exchequer as a result of such a change. Table 12 also compares this overall household revenue effect to Department of Finance TSG exchequer revenue estimates for such a reform. Comparing the modelled simulation and these figures suggests that households would contribute 92.7% of all the additional exchequer revenue.

The revenue estimates in table 12 do not take account of the underreporting of tobacco consumption in the HBS (see table 11) nor do they factor in the decrease in tobacco consumption since the HBS period. Of these, the former implies that the average household effects would be higher at around €10.72 per annum giving an overall yield of €17.7m from households. If approximately 10% of tobacco taxation revenue flows from outside the domestic household sector, this implies an overall exchequer revenue yield of €19.65m – almost 28% above Department of Finance TSG estimates. Subsequent consumption decreases are likely to have further reduced these estimates with data from the Revenue Commissioners suggesting an

[29] See Collins, 2014a: 10 and 36.

8.3% decline in tobacco excise receipts (not including VAT) between 2010 and 2013.[30] This suggests an overall exchequer yield of approximately €18m and an average household effect of approximately €9.84.[31]

Table 12: The Distributive and Revenue Impacts of a 10c (VAT inclusive) increase in the retail price of a packet of 20 cigarettes

Distributive Impact	
Decile	**% Gross Income**[1]
Bottom	0.059%
2	0.052%
3	0.037%
4	0.031%
5	0.030%
6	0.020%
7	0.014%
8	0.010%
9	0.008%
Top	0.003%
State	**0.016%**

Revenue Impact	
Average Household expenditure effect	+€8.53
Exchequer Revenue yield from households[2]	€14.07m
Overall Exchequer yield[3]	€15.4m
Household yield as % of overall	91.3%

Notes: 1. Figures represent the increase in expenditure costs associated with the indirect taxation increase.
2. This estimate is from the HBS based simulation and does not take account of the under-reporting estimated in table 11.
3. Based on Department of Finance TSC 13/02 (p7).
4. Table A4a and A4b in the appendix presents the distributive impacts measured against disposable income and total expenditure.

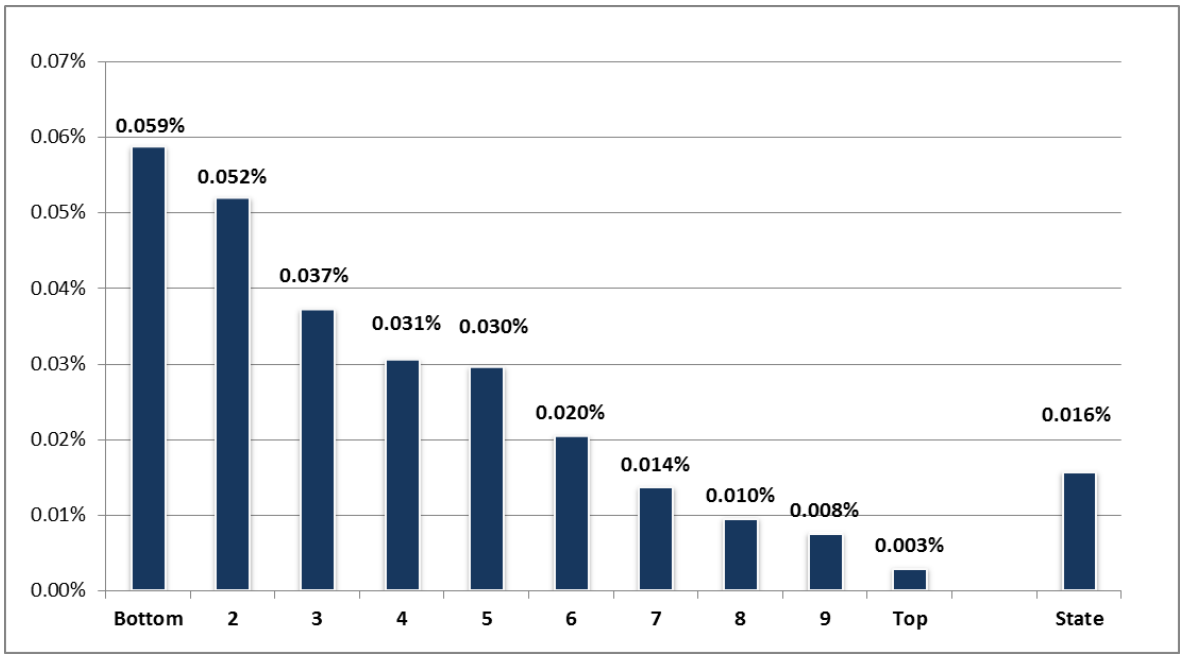
There are a number of final notes to add to these simulations. First, we have no knowledge of the distribution of underreporting across the income distribution – just an estimate of its overall level in table 11. If that underreporting follows the overall consumption pattern, i.e. that people are as likely to underreport irrespective of where they are in the income distribution, then the overall shape of the distributive effects is likely to be similar to that established in table 12. Second, while recent consumption decreases have occurred, despite these the distributive shape

[30] Data from Revenue Commissioners Statistical Report 2012 (table EX2) and PQ 14230/14.
[31] More recent Parliamentary Questions have reported a Department of Finance/Revenue Commissioners expectation of a 10c increase leading to a full-year revenue yield of €12.8m (PQs: 31218/14 and 28675/14).

of the policy's impact is unlikely to have altered significantly from that reported in Table 12 and Chart 9. Third, the analysis is only recording expenditure on cigarettes which are legitimately purchased in Ireland and therefore while it is useful in terms of measuring indirect taxation returns, it missed the growing amount of tobacco consumption resulting from legitimately and illegally imported tobacco.[32]

Finally, choices regarding the taxation of tobacco products balance a number of objectives – not just revenue generation. Reflecting this the 2009 Commission on Taxation recommended that "the policy approach to determining the level of excise duty applicable to alcohol and tobacco products should take account of factors such as health outcome, public order issues, cross-border trade and other societal issues" (2009: 135). Furthermore, given the health implications associated with tobacco consumption, it is more than likely that the regressive implications of indirect taxation increases are outweighed by the benefits of reducing tobacco consumption and incrementally pursuing Government policy to create a smoke-free society by 2025.

Chart 9: The Distributive Impact of a 10c (VAT inclusive) increase in the retail price of a packet of 20 cigarettes, % Gross Income by income decile



(v) Alcohol

Like tobacco, excise increases on alcohol products are a recurring feature of budgetary policy; although their frequency has decreased over time. Prior to the recent economic crisis excise duties on beer had remained unchanged since the Budget of January 1994 and on other products since 2001/2002.[33] Recently, Budget 2010 decreased the excise on all alcohol

[32] See for example Reidy and Walsh (2011: 24-28), Department of Finance TSG (13/02: 3-4) and Chaloupka and Tauras (2011: 8).
[33] Over the period there were small changes to the taxes on alcopops and the excise rates on low alcohol beer and cider.

products by approximately 20% while Budget 2013 increased the excise on wine by €1 per bottle and by 10c on a standard measure of spirits with a *pro rata* increase in the price of a standard measure of liquer and a 10 cent increase in a pint of beer or cider. Budget 2014 delivered a similar increase for beer, cider, spirits and liquer and a 50 cent increase in a bottle of wine.

This section examines the distributive effects of two increases in indirect taxes on alcohol, structured in the way they tend to be announced in annual Budgets. These are:

- a 25 cent increase in the price of a bottle of wine (75cl); and
- a 10 cent increase in a standard measure of spirits with a *pro rata* increase in the price of a standard measure of liquer and a 10 cent increase in a pint of beer or cider.

As outlined earlier, households surveys tend to experience difficulty in recording accurate consumption data on both tobacco and alcohol consumption. Reflecting this, we first consider the reliability of the HBS alcohol consumption data used in this paper for modelling these tax change effects.

Estimating the under-reporting of alcohol consumption in the HBS

To assess the scale of under-reporting of alcohol expenditure data, table 13 compares the modelled average household excise from alcohol with the actual amounts collected over that period.[34] As there was a significant change in the levels of alcohol excises following Budget 2010, excise yield data from 2009 and 2010 is weighted to be representative of the HBS period.

Table 13: Estimate of Underreported HBS Alcohol Consumption

Average household excise on alcohol per annum[1]	€164.74
No. of households in state[2]	1,649,691
Excise yield – using HBS estimates	€271,765,428
Actual excise yield in 2010 – exchequer[3]	€826,418,430
Assume 75% of this from households in state	€657,742,371
Difference between estimate and actual €	€385,976,943
Difference between estimate and actual %	58.7%

Notes:
1. Calculated using the indirect taxation model detailed in Collins (2014a)
2. As per Murray and Collins (2012) using data from Census 2011.
3. The estimate takes Revenue Statistical Report 2012 (Table EX2) data for alcohol excise in 2009 and 2010 and weighs this in proportion to the HBS sample period with 5/14th in 2009 and 9/14th in 2010 (for more details see Collins 2014a). Given the decrease in excise in Budget 2010, this offers a better measure of the yield across the HBS period. The yields in 2009 were €968m and 2010 €826m.

[34] The average household excise contribution is calculated as the average equivalised amount multiplied by the average national equivalence scale. This is multiplied by the number of households in the state to establish the HBS household yield reported in table 13.

The calculations assume that households in the state are responsible for 75% of all alcohol excises; a reasonable assumption given the product and the probability that there is likely to be a significant amount of consumption by tourists alongside some by business/other institutions. It finds that the HBS underreports household alcohol consumption significantly - by 58.7%. Such a result is unsurprising given the product and the history of household surveys. However, having an estimate of the scale of underreporting is of benefit when using HBS data and when interpreting the simulated results below. The estimate implies a need for caution on the results and their interpretation.

25 cent increase in a bottle of wine

In modelling this policy reform the paper:

- Takes as a baseline the indirect taxation contributions established in Collins (2014a) for equivalised household deciles (Table 1).
- The HBS records expenditure on alcohol both for consumption in the home and outside it. The analysis in Collins (2014a) uses representative prices to establish consumption quantities and subsequently estimate the VAT and excise components of expenditure on alcohol. This process, including sensitivity tests of the representative prices, is outlined in Collins (2014a: 9-10 and 33-36).
- The simulation examines an increase in table wine, sparkling wine and fortified wine as these increase tend to be announced together as an increase in wine and *pro rata* for other products. Technically fortified wine is not 'wine' in tax definition terms (although it is a wine in actual terms), but while it is included here it has limited impact on the calculations and it represents a small amount of expenditure.[35] The calculations assume all expenditure in the champagne, sparkling wine and wine with mixer category is on sparkling wine and that all expenditure in the fortified wine, port, sherry, vermouth & Martini is on fortified wine.
- The simulation models a 25 cent (VAT inclusive) increase in the excise on a bottle of wine. In effect, assuming VAT is 23%, an increase of 25c in the retail price of a bottle of wine is an increase of 20.32c in excise and 4.67c in VAT. For wine and sparkling wine this implies an increase in excise of 33.33 cent per litre and for fortified wine it is €1.66 per litre of pure alcohol.
- The analysis simulates an increase in expenditure on these wine products while leaving all other expenditure data unchanged.
- The household expenditure and income data from 2009/10 is taken to offer a good representation of household expenditure at the time of the policy's implementation (see earlier text).
- The simulated distributive impacts are *ceteris paribus* estimates and therefore ignore any consumption pattern or behavioural changes that might have occurred as a result of the policy implementation. Data suggests that wine consumption has fallen since 2009/10 (Department of Finance, TSG 13/02: 8).

[35] Wine and sparkling wine are charged excise per hectolitre while fortified wine is levied per litre of pure alcohol.

- The analysis assumes that the incidence of the tax increase falls on the consumer i.e. that the increase is passed on in full.
- The results are reported as increases in expenditure costs as a proportion of gross income. Assuming stable consumption patterns following the adoption of the policy, the excise increase is analogous to a cash transfer (lump sum tax) from households to Government.
- The results should be interpreted in the context of the underreporting found in table 13.

Table 14 present the results of the modelled policy simulation. Overall the measure has a mixed impact across the income deciles. On average, the 25c increase is equivalent to a 0.02% per annum increases in living costs for households. The bottom decile experiences the highest impact reflecting a high level of expenditure on wine, and alcohol in general, in that decile relative to all others. The transitional nature of a proportion of the households in this decile may assist in explaining this finding.[36]

In nominal terms, the average household effect equals an increase in living costs of €8.22 per annum. Overall, this implies that households would contribute an additional €13.56m to the exchequer as a result of such a change. However, these estimates do not take account of the underreporting of alcohol consumption in the HBS (see table 13) nor do they factor in any changes in wine consumption since the HBS period. Given both these effects, the average household increase is likely to be higher as is the exchequer yield – although this would move it well in excess of Department of Finance estimates for overall yields from this measure (from households and others) which were estimated as €14m per annum (TSG, 13/02: 11). The Department's estimate is likely to be very conservative.

There are a number of final notes to add to these simulations. First, we have no knowledge of the distribution of underreporting across the income distribution – just an estimate of its overall level in table 13. If that underreporting follows the overall consumption pattern, i.e. that people are as likely to underreport irrespective of where they are in the income distribution, then the overall shape of the distributive effects is likely to be similar to that established in table 14. Second, choices regarding the taxation of alcohol products balance a number of objectives – not just revenue generation.

[36] The composition of the bottom deciles is addressed in Collins (2014a: 8).

Table 14: The Distributive Impact of a 25c (VAT inclusive) increase in the retail price of a bottle of wine

Distributive Impact	
Decile	**% Gross Income**[1]
Bottom	0.04%
2	0.01%
3	0.02%
4	0.01%
5	0.01%
6	0.02%
7	0.01%
8	0.01%
9	0.02%
Top	0.01%
State	0.02%

Notes: 1. Figures represent the increase in expenditure costs associated with the indirect taxation increase.
2. The estimates are from the HBS based simulation and do not take account of the under-reporting estimated in table 13.
3. Table A4a and A4b in the appendix presents the distributive impacts measured against disposable income and total expenditure.
4. Table A5 in the appendix decomposes the gross income distributive impacts into those on table wine, sparking and fortified individually.

A 10 cent increase in a standard measure of spirits with a pro rata increase in the price of a standard measure of liquer and a 10 cent increase in a pint of beer or cider

In modelling this policy reform the paper:

- Takes as a baseline the indirect taxation contributions established in Collins (2014a) for equivalised household deciles (Table 1).
- The HBS records expenditure on alcohol both for consumption in the home and outside it. The analysis in Collins (2014a) uses representative prices to establish consumption quantities and subsequently estimate the VAT and excise components of expenditure on alcohol. This process, including sensitivity tests of the representative prices, is outlined in Collins (2014a: 9-10 and 33-36).
- The simulation reports results for the collective change (see table 15) although these are each performed as separate and simultaneous simulations. Assumptions regarding each of them are outlined next.
- Spirits cover expenditure in the home (off sales) on spirits (e.g. gin, vodka & whiskey), liquer & cocktails (e.g. Baileys & Daiquiri) and alcopops & alcoholic soft drinks and expenditure outside the home on spirits, liquer & cocktails, alcopops & alcoholic soft drinks and spirits with a mixer.

- Alcopops are included in the spirits simulation as they are the same rate of excise as spirits. For spirits with a mixer it is assumed, for the purposes of excise calculations, that they contain 50% of the alcohol of spirits.
- A standard measure of spirits is 35.5ml, a standard measure of liquers is 71ml (both from HSE, 2009:7) and alcopops are measured in long neck bottles of 275ml and the increase is taken to be the same amount as for other drinks (+10 cent). In all cases the excise is charged per litre of alcohol and there is a lower rate for liquers and cocktails – the simulation reflects this structure. The modelled 10c increase in the price of spirits is more-or-less equivalent to a 5c increase in the price of the same volume of liqueur, but as the standard measure of liqueur is twice the standard measure of spirits, it is modelled as a 10c increase in the price of a glass of liquer.
- Beer covers expenditure in and out on beers (including pale ales and stout) and lagers and continental beers. Excise is charged per litre of the product and the changes are modelled to reflect this.
- The simulation models a 10 cent (VAT inclusive) increase in the price of a pint of beer. In effect, assuming VAT is 23%, an increase of 10c in the retail price of a pint of beer is an increase of 8.13c in excise and 1.87c in VAT. The decomposition between VAT and excise is the same for the 10c increase in cider taxes.
- Cider covers expenditure in and out on Cider and Perry. Excise is charged per litre of the product and the changes are modelled to reflect this.
- The analysis simulates an increase in expenditure on these products while leaving all other expenditure data unchanged.
- The household expenditure and income data from 2009/10 is taken to offer a good representation of household expenditure at the time of the policy's implementation (see earlier text).
- The simulated distributive impacts are *ceteris paribus* estimates and therefore ignore any consumption pattern or behavioural changes that might have occurred as a result of the policy implementation. Data suggests that beer, cider and alcopops consumption has fallen since 2009/10 while spirits has increased (Department of Finance, TSG 13/02: 8).
- The analysis assumes that the incidence of the tax increase falls on the consumer i.e. that the increase is passed on in full.
- The results are reported as increases in expenditure costs as a proportion of gross income. Assuming stable consumption patterns following the adoption of the policy, the excise increase is analogous to a cash transfer (lump sum tax) from households to Government.
- The results should be interpreted in the context of the underreporting found in table 13.

Table 15 present the results of the modelled policy simulation. Overall the measure is regressive, impacting more heavily on lower income households than on those further up the income distribution. On average, the increase is equivalent to a 0.07% per annum increases in living costs for households, with the bottom 70% of the income distribution experiencing an above average impact. The regressive shape reflects the finding of other studies, such as Fuller (2012) and Barrett and Wall (2006), who found that the prevalence of alcohol consumption is greater the further down the income distribution you go.

In nominal terms, the average household effect equals an increase in living costs of €36.61 per annum. Overall, this implies that households would contribute an additional €60.4m to the

exchequer as a result of such a change. However, these estimates do not take account of the underreporting of alcohol consumption in the HBS (see table 13) nor do they factor in any changes in consumption since the HBS period. Given both these effects, the average household increase is likely to be higher as is the exchequer yield.[37]

There are a number of final notes to add to these simulations. First, we have no knowledge of the distribution of underreporting across the income distribution – just an estimate of its overall level in table 13. If that underreporting follows the overall consumption pattern, i.e. that people are as likely to underreport irrespective of where they are in the income distribution, then the overall shape of the distributive effects is likely to be similar to that established in table 15. Second, choices regarding the taxation of alcohol products balance a number of objectives – not just revenue generation.

Table 15: The Distributive Impact of a 10c (VAT inclusive) increase in the retail price of a standard measure of spirits (35.5ml), a *pro rata* increase in the price of a standard measure of liquer (+10c for 71ml) and a 10 cent increase in a pint of beer or cider

Distributive Impact	
Decile	**% Gross Income**[1]
Bottom	0.26%
2	0.12%
3	0.12%
4	0.11%
5	0.08%
6	0.08%
7	0.07%
8	0.06%
9	0.05%
Top	0.03%
State	0.07%

Notes:
1. Figures represent the increase in expenditure costs associated with the indirect taxation increase.
2. The estimates are from the HBS based simulation and do not take account of the under-reporting estimated in table 13.
3. Table A4a and A4b in the appendix presents the distributive impacts measured against disposable income and total expenditure.
4. Table A6 in the appendix decomposes the gross income distributive impacts into those on beer, spirits, liquers, cider and alcopops individually.

[37] Department of Finance estimates for the overall yield from this measure (from household and others) is €114.8m per annum (TSG, 13/02: 11). If the modelled household yield, at €60.4m, is corrected for the estimated missing consumption it becomes €102.9m and if consumption outside households is taken into account (+25%) the likely revenue yield is €128.6m. See table 13 for assumptions on household contributions.

CONCLUSION

Ex post and *ex ante* assessments of annual Budget changes tend to give significant attention to changes in income taxes and social insurance and limited, if any, attention to the impact of changes to indirect taxes. To a great degree this has been due to a lack of data on these impacts, a void this paper attempts to fill. Such an analytical gap has persisted despite the fact that indirect taxes represent a large proportion of overall tax revenues and annual tax changes, and are the way in which a large proportion of the population principally contribute to the exchequer.

Building on the development of an indirect taxation model in earlier papers, this paper has examined a series of changes to these taxes and considered both their distributive and revenue implications. Unsurprisingly, most of the increases examined are regressive – implying that decrease to these taxes would be progressive.

While acknowledging that indirect taxation changes generally take place in the context of a Budget/Fiscal package, and that Governments may consider any distributional impacts in the context of the overall Budgetary package, this paper at the least offers a heretofore lacking insight into the distributive impact of the main types of changes considered and implemented in Budgets. Given the structure of the taxation system, and the composition of household contributions to it, it remains important that considerations of the impact of taxation changes are more comprehensive than just exclusively looking at income taxation changes.

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APPENDICES

Table A1: Estimated Composition of Taxation Revenues, 2014

	2014	2014%
Income tax	17,045	33.9%
VAT	10,740	21.4%
Social Insurance	10,236	20.4%
Excise duties	4,815	9.6%
Corporation tax	4,380	8.7%
Stamp duties	1,475	2.9%
Local taxes/charges	550	1.1%
CGT	400	0.8%
CAT	380	0.8%
Customs	255	0.5%
Total	**50,276**	**100.0%**

Source: Collins (2014b) as calculated from Department of Finance, Budget 2014 (C15, C30)

Table A2a: Decomposition of 2012 Exchequer Excise Duty Income

	2012 €m
Beer	308.4
Spirits	261.3
Wine	225.2
Cider	42.6
Tobacco	945.0
Light Oils	906.3
Other Oils	1,126.7
Carbon	354.0
VRT	379.1
Other Excise	80.0
Motor Tax	46.5
Total Excise	**4,675.0**

Source: Reply to Parliamentary Question [1926/13]

Table A2b: Decomposition of 2011 and 2012 Exchequer Stamp Duty Receipts

	2011 €m	2012 €m
Property	134.54	105.41
Residential	*44.48*	*56.90*
Non-Residential	*90.06*	*48.51*
Shares	194.76	171.78
Companies Capital Duty	0.15	0.06
Cheques	33.23	30.97
Insurance Policies	2.54	1.83
General Deeds	0.07	0.00
Penalties	0.10	0.25
Credit Cards	51.80	51.64
Bank Levy	0.00	0.00
Non-Life Levy	106.40	104.16
Life Assurance Levy	31.60	24.12
ATM Cards	1.50	1.00
Debit Cards	0.03	0.03
Combined Cards	15.70	15.51
Health Insurance Levy	346.97	436.77
Pension Levy	463.23	482.88
Total Stamp Duty Receipts	**1,382.62**	**1,426.41**

Source: Reply to Parliamentary Question [1927/13]

Table A3a: Indirect Taxation sources by decile, 2009/10 as % Equivalised Disposable Income (Equivalised data)

Decile	VAT	Excise	Levies	Other Indirect	Total Indirect
Bottom	17.76%	8.88%	0.45%	3.03%	30.11%
2	10.10%	5.69%	0.21%	1.91%	17.91%
3	9.08%	4.89%	0.23%	1.60%	15.79%
4	8.45%	4.31%	0.23%	1.57%	14.57%
5	7.79%	4.01%	0.24%	1.54%	13.58%
6	8.03%	3.80%	0.25%	1.47%	13.55%
7	6.98%	3.19%	0.23%	1.38%	11.77%
8	6.95%	2.78%	0.24%	1.22%	11.19%
9	6.42%	2.50%	0.21%	1.14%	10.27%
Top	5.01%	1.52%	0.16%	0.81%	7.49%
State	**7.26%**	**3.20%**	**0.22%**	**1.30%**	**11.97%**

Table A3b: Indirect Taxation sources by decile, 2009/10 as % Equivalised Total Household Expenditure (Equivalised data)

Decile	VAT	Excise	Levies	Other Indirect	Total Indirect
Bottom	8.34%	4.17%	0.21%	1.42%	14.15%
2	8.74%	4.92%	0.19%	1.65%	15.50%
3	8.65%	4.66%	0.22%	1.52%	15.06%
4	8.09%	4.13%	0.22%	1.50%	13.94%
5	8.28%	4.26%	0.26%	1.63%	14.42%
6	8.35%	3.95%	0.26%	1.52%	14.08%
7	8.02%	3.66%	0.26%	1.59%	13.54%
8	7.83%	3.13%	0.28%	1.37%	12.61%
9	7.75%	3.01%	0.26%	1.37%	12.40%
Top	6.93%	2.10%	0.22%	1.12%	10.37%
State	**7.91%**	**3.48%**	**0.24%**	**1.42%**	**13.05%**

Table A4a: The Distributive Impact of the various policy changes as a % of Disposable Income

Decile	VAT Standard rate +1%	VAT 1st Reduced rate +1%	VAT 2nd Reduced rate +1%	5c increase in a litre of petrol	5c increase in a litre of diesel	1% ↑ in insurance levy	10c ↑ in 20 cigarettes	25c ↑ in bottle of wine	10c ↑ beer, cider, spirits/liquers
1	0.59%	0.39%	0.16%	0.26%	0.15%	0.053%	0.059%	0.04%	0.26%
2	0.33%	0.23%	0.07%	0.15%	0.06%	0.031%	0.052%	0.01%	0.12%
3	0.30%	0.21%	0.07%	0.13%	0.07%	0.032%	0.038%	0.02%	0.12%
4	0.29%	0.17%	0.07%	0.13%	0.06%	0.030%	0.031%	0.02%	0.11%
5	0.27%	0.15%	0.06%	0.12%	0.05%	0.028%	0.031%	0.01%	0.08%
6	0.27%	0.17%	0.07%	0.13%	0.07%	0.026%	0.022%	0.02%	0.09%
7	0.24%	0.14%	0.06%	0.13%	0.05%	0.025%	0.015%	0.02%	0.08%
8	0.23%	0.16%	0.07%	0.12%	0.04%	0.024%	0.011%	0.02%	0.07%
9	0.22%	0.13%	0.06%	0.10%	0.05%	0.020%	0.009%	0.02%	0.06%
10	0.16%	0.12%	0.05%	0.07%	0.02%	0.015%	0.004%	0.02%	0.03%
State	**0.24%**	**0.16%**	**0.07%**	**0.11%**	**0.05%**	**0.024%**	**0.018%**	**0.02%**	**0.08%**

Table A4b: The Distributive Impact of the various policy changes as a % of Total Expenditure

Decile	VAT Standard rate +1%	VAT 1st Reduced rate +1%	VAT 2nd Reduced rate +1%	5c increase in a litre of petrol	5c increase in a litre of diesel	1% ↑ in insurance levy	10c ↑ in 20 cigarettes	25c ↑ in bottle of wine	10c ↑ beer, cider, spirits/liquers
1	0.28%	0.18%	0.08%	0.12%	0.07%	0.025%	0.028%	0.02%	0.12%
2	0.28%	0.20%	0.06%	0.13%	0.05%	0.027%	0.045%	0.01%	0.11%
3	0.28%	0.20%	0.07%	0.13%	0.06%	0.030%	0.036%	0.02%	0.12%
4	0.28%	0.16%	0.06%	0.13%	0.05%	0.029%	0.030%	0.01%	0.11%
5	0.29%	0.16%	0.07%	0.13%	0.06%	0.030%	0.033%	0.01%	0.09%
6	0.28%	0.18%	0.07%	0.13%	0.07%	0.027%	0.023%	0.02%	0.09%
7	0.28%	0.16%	0.07%	0.15%	0.06%	0.029%	0.018%	0.02%	0.09%
8	0.26%	0.18%	0.08%	0.14%	0.05%	0.027%	0.013%	0.02%	0.08%
9	0.26%	0.16%	0.08%	0.12%	0.06%	0.024%	0.011%	0.02%	0.07%
10	0.22%	0.16%	0.07%	0.10%	0.03%	0.021%	0.005%	0.02%	0.05%
State	**0.26%**	**0.17%**	**0.07%**	**0.13%**	**0.05%**	**0.026%**	**0.020%**	**0.02%**	**0.09%**

Table A5: The Distributive Impact of a 25c (VAT inclusive) increase in the retail price of a bottle of wine – decomposed into table wine, sparkling wine and fortified wine.

Decile	Table Wine	Sparkling	Fortified	Overall
Bottom	0.04%	0.00014%	0.00028%	0.04%
2	0.01%	0.00018%	0.00022%	0.01%
3	0.02%	0.00011%	0.00033%	0.02%
4	0.01%	0.00011%	0.00031%	0.01%
5	0.01%	0.00020%	0.00014%	0.01%
6	0.02%	0.00015%	0.00013%	0.02%
7	0.01%	0.00014%	0.00034%	0.01%
8	0.01%	0.00012%	0.00019%	0.01%
9	0.01%	0.00019%	0.00013%	0.02%
Top	0.01%	0.00018%	0.00006%	0.01%
State	**0.01%**	**0.00016%**	**0.00017%**	**0.02%**

Note: This data is a decomposition of the distributive impacts reported in table 14

Table A6: The Distributive Impact of a 10c (VAT inclusive) increase in the retail price of a standard measure of spirits (35.5ml), a *pro rata* increase in the price of a standard measure of liquer (+10c for 71ml) and a 10 cent increase in a pint of beer or cider – decomposed into beer, spirits, liquer, cider and alcopops.

Decile	Beer	Spirits	Liquer	Cider	Alcopops	Overall
Bottom	0.119%	0.117%	0.002%	0.019%	0.002%	0.26%
2	0.065%	0.042%	0.003%	0.011%	0.001%	0.12%
3	0.040%	0.063%	0.004%	0.012%	0.001%	0.12%
4	0.054%	0.042%	0.001%	0.011%	0.001%	0.11%
5	0.042%	0.029%	0.002%	0.007%	0.001%	0.08%
6	0.040%	0.031%	0.005%	0.005%	0.002%	0.08%
7	0.033%	0.033%	0.002%	0.004%	0.001%	0.07%
8	0.031%	0.025%	0.002%	0.004%	0.001%	0.06%
9	0.028%	0.018%	0.001%	0.003%	0.000%	0.05%
Top	0.016%	0.007%	0.001%	0.002%	0.000%	0.03%
State	**0.033%**	**0.026%**	**0.002%**	**0.005%**	**0.001%**	**0.07%**

Note: This data is a decomposition of the distributive impacts reported in table 15