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Total Direct and Indirect Tax Contributions of Households in Ireland:

Estimates and Policy Simulations

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TOTAL DIRECT AND INDIRECT TAX CONTRIBUTIONS OF HOUSEHOLDS IN IRELAND: ESTIMATES AND POLICY SIMULATIONS

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ABSTRACT

Too often considerations of the taxation system are focused on income taxes, or income related taxes like social insurance; a narrow perspective given the composition of taxation revenue collected. Projections for the Republic of Ireland's taxation revenue suggest that just over €50 billion will be collected across all taxation categories during 2014. While corporations and other businesses contribute a sizeable proportion of this sum (principally through profit taxes, local authority charges and employer social insurance) the largest proportion flows from households.

Households contribute to financing the state in a number of ways. Household's direct tax contributions from earnings, through income taxes and social insurance, are apparent; albeit that we tend to have greater knowledge of benchmark taxation rates (both effective and marginal) than the actual rates households pay taking account of various tax expenditures. Household indirect taxation contributions, through consumption taxes (VAT, excise duties), levies, local taxes and charges, are less apparent.

Using data from the most recent Household Budget Survey, this paper estimates both the direct and indirect taxation contributions of households. The paper examines, individually and collectively, the direct and indirect tax paid by households across the income deciles, alongside the overall average household contributions. The data is presented at the households and equivalised adult level.

In establishing these estimates, the paper aims to provide a more comprehensive understanding of the distribution and composition of household tax contributions. Given this evidence, the paper also considers the distributive implications of two recent VAT reforms.

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** This paper updates an earlier NERI Working Paper (Collins and Turnbull 2013/No.8) including the incorporation of equivalised household contribution data, robustness and sensitivity tests and simulations of recent indirect taxation policy reforms.

TOTAL DIRECT AND INDIRECT TAX CONTRIBUTIONS OF HOUSEHOLDS IN IRELAND: ESTIMATES AND POLICY SIMULATIONS

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INTRODUCTION AND CONTEXT

Too often considerations of the taxation system are focused on income taxes, or income related taxes like social insurance; a narrow perspective given the composition of taxation revenue received by the exchequer. Indeed, the oft-cited phrase 'taxpayers' is generally taken to mean income taxpayers rather than its more appropriate meaning of all those paying taxes – whether from income, expenditure or other contributions. Projections for the Republic of Ireland's taxation revenue suggest that just over €50 billion will be collected across all taxation categories during 2014 (see Table A1 in the appendix). While corporations and other businesses contribute a sizeable proportion of this sum (principally through profit taxes, local authority charges and employer PRSI) the largest proportion flows from households.

Households contribute to financing the exchequer in a number of ways. Household's direct tax contributions from earnings, through income taxes (including the Universal Social Charge (USC)) and social insurance, are apparent; albeit that we tend to have greater knowledge of benchmark taxation rates (both effective and marginal) than the actual rates households pay taking account of entitlements to tax expenditures. Household indirect taxation contributions, through VAT, excise duties, levies, local taxes and charges, are less apparent.

Using data from the most recent Household Budget Survey (HBS), this paper estimates both the direct and indirect taxation contributions of households in Ireland. As the HBS is only undertaken every five years, the opportunity to examine the composition of household expenditure, and the associated indirect taxes experienced by individuals or households, is infrequent. Using the latest data, published in 2012 for the period 2009-2010 (detailed later), it is possible to establish estimates of the overall tax contributions made by households. The paper examines, individually and collectively, the direct and indirect tax paid by households across the income deciles, alongside the overall average household contribution. The data is presented at the household and equivalised adult level.

In establishing these estimates, the paper aims to provide a more comprehensive understanding of the distribution and composition of household tax contributions. Understanding the overall shape of household tax contributions offers a firmer basis for considerations of policy options, or critiques of previous policy changes. Limitations in this understanding have been obvious in recent policy considerations, most particularly given the limited assessment of the Budget 2012 VAT standard-rate increase (from 21% to 23%) – only Callan et al (2012) and Social Justice Ireland (2011) made any detailed empirical based comment, with only the latter challenging the assertion by Government that the increase was progressive. This paper models the distributive impact of that reform alongside considering the distributive implications of another recent VAT change - the introduction and retention of a second reduced rate of VAT (a special 9% VAT level for certain sectors).

Similarly, there has been limited consideration of who gains or loses from increases to excise duties, amendments to insurance levies or extensions of various indirect tax changes. While this

paper does not address each of these issues, in establishing an up-to-date baseline understanding of the total tax contribution distribution, it provides a basis and context to begin to consider these issues.[1] Such a framework should also assist in the inevitable future considerations of where tax reductions for individuals/households might best be targeted. Perspectives on such choices are likely to be different when judged across overall household tax contributions rather than solely on income taxation.

The remainder of this paper is structured as follows. The next section overviews previous research in this area, including that undertaken in Ireland by the Central Statistics Office (CSO) in the 1980s and 90s. It then outlines the data used in this paper and details the assumptions made in compiling the indirect taxation estimated presented later. Following this it presents findings for direct taxation contributions and then indirect taxation contributions. In the latter we examine household's contributions through VAT, excises, levies and other indirect taxes. The paper then draws these results together to establish the shape of overall household tax contributions and uses this new baseline to simulate the distributive impacts of two recent VAT reforms. Finally, the paper concludes.

PREVIOUS RESEARCH

The linked issues of the composition and distribution of household tax contributions have been looked at in a number of previous studies. In the case of Ireland, the number of studies which have touched upon this topic, either directly or indirectly, is quite 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. 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.[2]

Table 1 summarises this data for the three HBS' (1973, 1980 and 1987) where reports were published and includes a decomposition of the 1987 findings by gross household income decile.[3] The data reflect 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.

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 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

[1] A forthcoming paper (Collins, 2014) builds on this analysis to examine the distributive impact of changes to various indirect taxation measures.
[2] Murphy (1984) also reviewed the 1973 and 1980 HBS redistributive results.
[3] Only the 1987 report provides a decomposition by decile.

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).

Table 1: Results from CSO Analysis of HBS' 1973, 1980 and 1987

Decile	Direct	Indirect	Total
1973	9.80%	18.52%	28.32%
1980	15.11%	14.60%	29.71%
1987	18.83%	15.93%	34.76%
Decile Decomposition for 1987			
Bottom	0.53%	24.95%	25.48%
2	0.90%	23.25%	24.15%
3	1.23%	21.28%	22.50%
4	4.57%	21.10%	25.67%
5	10.20%	20.96%	31.16%
6	14.78%	17.94%	32.72%
7	17.27%	16.58%	33.86%
8	20.19%	15.52%	35.71%
9	23.96%	13.99%	37.95%
Top	27.81%	11.91%	39.72%
State	18.83%	15.93%	34.76%

Source: Calculated from CSO (1980, 1983 and 1995).
Note: See table A2 in the appendix for the corresponding nominal amounts.

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).[4] 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.

The most recent Irish research on the issue of distributional effects of indirect taxes comes 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.[5] 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).

[4] See also Callan et al (2009) who examine this issue in a related paper.
[5] This paper attempts to use the HBS data to estimate these excise duty expenditures.

One key aspect of the present study is that it combines both direct and indirect taxation in order to show the overall tax contributions of households. To the knowledge of the authors, this is the first such Irish study since the aforementioned work of the CSO. However, looking slightly further afield to the UK, research from the Office of National Statistics (ONS) provides an assessment of the combined distributional effects of both direct and indirect tax contributions by households. ONS analysis of the 2010/11 and 2011/12 Family Resource Survey (FRS) finds that although "richer households pay more in indirect taxes than poorer ones, they pay less as a proportion of their income…this means that indirect taxes act to increase inequality of income" (2013: 6). Interestingly, the ONS study also finds that total tax is regressive when using tax as a percentage of gross income, disposable income and expenditure.

However, two earlier papers from the UK published by the Institute for Fiscal Studies (IFS), namely Crawford *et al.* (2008) and Crossley *et al.* (2009), question the findings of other research, and the largely accepted consensus that indirect taxes such as VAT are regressive. Crawford *et al.* postulate that "a uniform consumption tax, levied at an unchanging rate over time, is equivalent to a proportional tax on wage, transfer and profit income" (2009: 7). The Crossley *et al.* paper elaborates further by stating that VAT appears regressive but it is not necessarily the case as wealthier people save more than poorer people so it appears that they avoid the tax but they will incur it when they spend their savings. The paper further suggests that assessing gains and losses from VAT as a proportion of expenditure, the UK's VAT system is mildly progressive.

However, Murphy (2010) is strongly critical of the finding of these IFS papers. He states that in the UK "an unambiguous conclusion can be drawn: VAT is regressive" (2011: 4). Murphy goes on to say that "the IFS claim [to the contrary] is surprising: it claims VAT is progressive by changing the rules for calculating what is a progressive and regressive tax" (2010: 8). Using the aforementioned ONS FRS based study as a benchmark for the UK, it does seem that a claim that indirect taxation, including VAT, could be found to be progressive is difficult to empirically support; certainly it does not seem to be so in the short-term.[6] Furthermore, the ONS (2013) also measured indirect taxation as a proportion of expenditure and found it to be regressive.

Elements of the arguments that are posited by the IFS papers are the most common ones made in support of indirect taxes, or rather against the idea that indirect taxes are regressive. The American research of Poterba (1991) aims to answer the question 'are gasoline taxes regressive'. In a similar fashion to the IFS papers, Poterba takes a 'life-cycle' view of indirect taxation. He puts forward the idea that because people can move between income deciles, over the course of a lifetime, indirect taxes are less regressive than is commonly assumed. However, the author still concedes that excise on petrol is regressive, although, as a percentage of expenditure excise on petrol is less regressive than under an income based model.[7] This is something which is also broadly confirmed in the Irish context by the aforementioned work of Verde and Tol (2009). The research of Caspersen & Metcalf (1993), citing the work of Porterba (1991), uses measures of 'lifetime income'. They find that under this methodology that VAT in

[6] Crawford et al's (2008) input into the UK's Mirrlees report also points towards this reading of the UKs indirect taxation data. See also Keen and Lockwood (2007).
[7] See a similar approach in Poterba (1989).

the US would be proportional, or even slightly progressive, over the lifetime.[8] Others, like Metcalf and Fullerton (2002), Ebrill et al (2001) and Jenkin et al (2006), are not as definitive, but point towards a more nuanced assessment of the scale of regressivity when judged across the life-cycle.

In general, though, the majority of research into the nature of indirect tax contributions by individuals and households use the 'traditional' indirect tax as a percentage of income approach as the 'life-cycle' view relies quite heavily on assumptions. Charlet and Owens (2010) argue that using a 'life-cycle' approach assumes that "all individuals have the same life expectancy and earn on average the same income. The salary of a lower qualified person may not reach a peak at middle life" as most 'life-cycle' studies assume (2010: 950). The 'life-cycle' approach also ignores that even if people move between income deciles, thus reducing the regressivity of the indirect taxes, while they are in the lower deciles taxes such as VAT present a significant burden that makes them less well off. The fact that they may someday transcend to a better relative income position does not mitigate the present undesirable distribution of tax contributions.

Looking at some further studies that use the 'traditional' approach to assessing regressivity, we find that broadly speaking, indirect taxes such as VAT are accepted to be regressive. Aasness et al. conclude that "a general reduction of VAT…leads to a small increase in equality" in Norway (2002: 11). Elsewhere, looking at France, Ruiz and Trannoy (2006) find that the average amount of indirect taxes paid by the highest decile is 2.5 times higher than that of the first decile. An analysis of these taxes in relation to household incomes, however, shows the regressive character of indirect taxation (2006: 4). Taking a combined tax approach (i.e. direct and indirect) the authors come to the conclusion that "the progressive profile of direct taxes [in France] is in very sharp contrast to the regressive profile of indirect taxes" (2006: 6).

Finally, research for the OECD by Warren (2008) is generally supportive of the overall findings of the above cited pieces of research. Warren reviews a broad range of previous research into the area of indirect taxation and concludes that "beyond methodological differences, all studies agree that consumption taxes have a significant regressive impact on the distribution of household disposable income" (2008: 4).

Overall, previous research on indirect taxes points to a number of conclusions. Firstly, there is a broad agreement that when assessing indirect taxation as a percentage of household income, indirect taxes are regressive as they disproportionally impact upon the less well off in society. Conversely, there is agreement that direct taxes, such as income taxes, are progressive. In terms of methodology, most studies cited use some form of equivilised income in order to assess the nature of the direct and indirect tax contribution of households and individuals.

In an Irish context, it has been some years since research, such as this paper, has looked to estimate both the direct and the indirect tax contributions of households. There is also broad agreement that the HBS is the most practical source of data to use in attempting such estimation.

[8] Note the paper was written before VAT/GST had actually been introduced in the US.

DATA AND ASSUMPTIONS

This paper uses data from the CSO's 2009-2010 Household Budget Survey (HBS), the seventh such national survey since 1973.[9] 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).[10] 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.

Table 2 summarises the key income and expenditure data from the 2009-10 HBS. The data is decomposed using deciles of gross household income which have been compiled by ordering all households from lowest to highest gross income and splitting them into ten equally sized groups. Consequently, the bottom decile represents the 10% of households with the lowest gross income and the top decile the 10% with the highest income. Gross income measures income after direct income (various earnings) plus transfers.[11]

Table 2: Average Gross Income, Disposable Income and Expenditure, by decile 2009/10

Decile	Average Gross Income €	Average Disposable Income €	Average Expenditure €
Bottom	9,887.07	9,857.32	18,459.15
2	15,827.24	15,705.14	20,039.78
3	22,778.14	22,504.19	24,926.24
4	29,453.52	28,657.26	30,043.78
5	36,642.36	34,932.42	34,236.05
6	45,789.52	41,877.58	40,638.61
7	57,111.53	50,720.53	46,718.03
8	71,410.42	61,771.73	54,874.23
9	92,095.61	76,843.40	63,563.14
Top	154,966.77	119,459.85	89,563.37
State	**53,576.86**	**46,216.82**	**42,297.63**

Source: Calculated from CSO, 2012b.

[9] Earlier urban-only expenditure surveys occurred in 1951-52 and 1965-66.
[10] 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.
[11] For more information see CSO (2012a: 138) and Collins and Kavanagh (2006).

Table 2 shows that on average Irish households had a gross income of just over €53,500 in the year covered by the survey. Households' disposable income, calculated as gross income minus income taxes (including USC) and social insurance contributions averaged €46,217 while average household expenditure was just over €42,000 during that year.

As the table shows, there are pronounced differences in average incomes across the deciles – a feature explored in more detail elsewhere by Collins (2013a, 2013b) and Social Justice Ireland (2013) among others. It also reveals that expenditure exceeds disposable income for the bottom four deciles, most notably for the bottom quintile, reflecting the composition of these households (for example pensioners who may also be living on past savings, the temporarily unemployed and students), their difficulties in making ends meet and the structure of the HBS which compiles its income and expenditure data on a current basis over the two weeks of a households participation in the survey.[12] Overall, the distribution of expenditure across the income deciles is progressive although the variations, like those of the average income levels, are marked.

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. Tables A3 and A4 in the appendix provide a more detailed decomposition of expenditure across these categories for each of the decile groups.[13]

- 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%)[14]

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

[12] It is likely that many of these income versus expenditure differences would disappear if households were observed over a longer period. That said, the literature points towards certain groups of lower income households who tend to consume more than their current income; reflecting Friedman's (1957) 'Permanent Income Hypothesis'.

[13] The CSO's HBS 2009-2010 reports (Volumes 1 and 2) provide a more detailed discussion and comparison over time of these expenditure levels (2012a, 2012b)

[14] 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.[15]

Using this expenditure data to facilitate the identification of data on indirect taxes requires a number of steps and assumptions. As with any tax measure, the rate of tax is applied to the base price of a product or service; that is before indirect taxes are added. Consequently, as part of the analysis the HBS expenditure values were adjusted to remove these indirect tax effects.

Dealing with value added tax (VAT), the analysis first established a VAT classification for each of the expenditure items; where necessary a representative product was used as a proxy for all expenditure classified under this item.[16] This VAT classification drew on the comprehensive database available on the Revenue Commissioners website and was accessed in mid-2013. Expenditure items were recorded as having one of six VAT classifications: 0%, exempt (0%), the reduced rate (13.5%), items subject to the second reduced rate from 2011 (9%), the standard rate and non-applicable. The analysis was required to make an assumption on the standard rate of VAT. The HBS data for the 2009-2010 was collected between August 2009 and September 2010, inclusive of those two months, 14 months in total (CSO, 2012a). During that time which included two National Budget periods, two separate standard VAT rates were applied, 21.5% (2009) and 21% (2010). As the HBS survey does not indicate precisely when expenditure occurred it is assumed the expenditure is distributed evenly across the period and therefore assumed that 36% of the spending took place when the standard rate was 21.5% and 64% when the rate was 21%.[17] Table A5 in the appendix summarises these rates. In the case of children's clothes, the HBS data reports expenditure on clothing for those 'aged 5-15 years' and the paper assumes that $6/11^{ths}$ of this is tax free (there is no VAT levied on children's clothes up to 11 years) and the remaining $5/11^{ths}$ is at the standard rate.

Indirect taxes in the form of excise duties arise for expenditure on alcohol, tobacco and fuel and also required a number of analytical assumptions. In the case of excise on alcohol, the two budgetary periods result in two different rates of excise applying during the HBS period. The first in place up to the midnight on the day Budget 2010 was announced and the second for the remainder of the period (131 days and 295 days; 31% and 69% of the time period). The rates coupled with a series of technical assumptions on the alcoholic volume and classification of certain drink types are outline in/with table A6 in the appendix.

The alcohol calculations also required the analysis to assume a representative price for a number of categories of alcoholic beverages. As the HBS only presents expenditure amounts, rather than quantities, an assumption regarding an average/representative price was needed to determine likely consumption quantities and calculate representative figures for the amount of pure alcohol consumed – as some excise duties are levied in this way. These representative prices, in price per litre terms, and assumptions on the percentage proof of alcohol products are outlined in table A7 in the appendix. The alcohol content of the products (proof) has been

[15] See CSO (2012a:5) where these response and accuracy issues are discussed further. A forthcoming paper (Collins, 2014) will consider the reliability of the expenditure figures in both the tobacco and alcohol expenditure categories.

[16] A number of HBS categories were excluded from the indirect taxation classifications as they involved expenditure outside the state, contributions to pensions, money sent abroad, allocations (such as for food, transport or maintenance) and unspecified gifts to children and other family members where it was not possible to determine how this expenditure was allocated.

[17] These percentages are based on the number of days in the two periods.

assumed based on the levels observed in the leading market brands in each category. An implication of this assumption is that where consumption choices differ from these averages, the analysis may under or over-estimate the excise collected. For example, a lower income household that consistently purchases bottles of wine below the assumed average price will consume a greater total litres of wine and pay more excise duties (charged per litre or hectolitre) than the calculations assume. The opposite is true for a similar household with an occasional taste for fine wine. In an attempt to take account of this assumption, and to assess its impact on the estimates established, the results of a sensitivity analysis are outlined in Tables A8a and A8b of the appendix. The analysis examines the impact on the papers indirect tax revenue estimates (VAT and excise) where assumed alcohol prices were 10% and 20% lower for the bottom three deciles and 10% and 20% higher for the top three deciles – a simulation of lower income households buying alcohol that is on average cheaper and those towards the top of the income distribution buying on average more expensive alcohol. Overall, the impact on the baseline results is very small.

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 (€682.81) 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 analysis, it is assumed that 100% of the expenditure is considered as cigarettes & cigarette papers. 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 papers calculations also assume a standard price of €8.55 per packet of 20 cigarettes across the period and a total VAT plus excise figure of 78.48% per packet; both figures from a 2010 Department of Finance Tax Strategy paper (2010/21: 2, 10). Table A9 in the appendix outlines the rates and *ad valorem* amounts of excise on tobacco products during this period.

The excise rates applying to fuel (gas, liquid fuel) and petrol and diesel are summarised in tables A10 and A11 of the appendix. On fuel we have assumed that the rate of fuel levies were constant throughout the period and that the average price per unit (for 2009 and 2010), as supplied by the Sustainable Energy Authority of Ireland (SEAI, 2013), is an accurate representation of the prevailing market price. Our calculations on petrol and diesel used the average price for a litre of petrol between August and December 2009 (€1.175) and between January and September 2010 (€1.300) based on market data from a retail price tracking website (pumps.ie). Similarly, using the same source, we assume that the average price for a litre of diesel between August and December 2009 was €1.073 and that the price between January and September 2010 was €1.211. Table A11 outlines the rates of excise and carbon tax per litre in 2009 and 2010 alongside the national stockholding agency (NORA) levy of €0.02 per litre of fuel.

The remaining assumptions associated with the indirect taxation calculations are summarised in table A12 of the appendix plus its notes. For the purposes of calculating the flat airline tax per flight, we estimated a representative cost per average domestic and international flight, and calculated the size of the tax based on this combined with the household expenditure amount. Other levies relate to insurance products are all calculated at a rate of either 3% or 1% of the base cost of premium.

As a means of assessing the robustness of the modelled indirect taxation, table A13 of the appendix 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 outlined above, and used in the remainder of this paper, offers a good representation of the indirect taxation experience of households.

Alongside expenditure data, the paper also uses HBS income data (see Table 2). The presence of compatible income and expenditure data in the one survey makes the overall household taxation contribution 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).[18] 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, 2012:41). The usual drawbacks associated with any income survey are also present in HBS – issues well summarised by Collins (2013a:3).

Finally, the analysis considers taxation patterns first at the household level and then at the equivalised household level. The former provides an insight into the proportion of household income/expenditure that is consumed by indirect taxes. The latter adjusts the data (both expenditure and income) to account for differences in household size and composition. The analysis uses 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 are ranked by gross income and divided into deciles. These equivalised household deciles are used for policy simulations later in the paper.

DIRECT TAXATION

The HBS data on total household income tax and social insurance contributions are summarised across the gross income deciles in table 3. The reported total tax and social insurance sums are then converted into percentages of the household's gross income to give each deciles effective taxation rate. These range from 0.30% to an average of 22.91% for the top decile. On average, households pay 13.74% of their gross income in taxes and social contributions. The rates are not dis-similar to those established by Collins using the 2011 SILC data who noted that "these rates best reflect the true scale of contributions made by households and individuals in income taxes and incorporate the various tax credits, rates, bands and exemptions which typify the income tax system" (2013a:7). At is simplest; a household with a gross income of €50,000 that pays a total of €10,000 in income taxes and PRSI reports an effective taxation rate of 20%.

[18] See CSO (2013)

A priori effective taxation rates might be expected to be higher than those reported in table 3. However, the combination of tax-free income (e.g. child benefit, pension lump sums) and the availability of various tax expenditures allow households to reduce their actual effective taxation rates.[19]

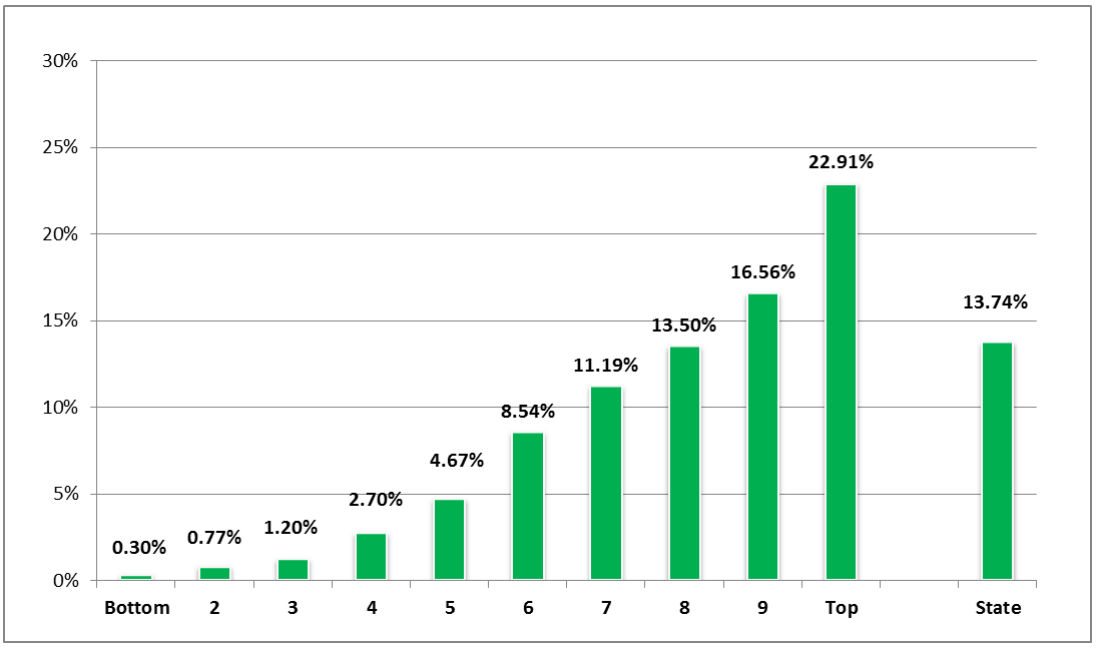
Chart 1 illustrates this data with its shape reflecting the progressivity of the Irish income taxation system – as income rises so too does the direct taxation contribution of households.

Table 3: Gross Income, Income Tax & Social Insurance, by decile 2009/10

Decile	Average Gross Income €	Total Income Tax & Social Insurance €	Total Income Tax & Social Insurance as % Gross Income
Bottom	9,887.07	29.59	0.30%
2	15,827.24	122.00	0.77%
3	22,778.14	274.10	1.20%
4	29,453.52	796.21	2.70%
5	36,642.36	1,709.83	4.67%
6	45,789.52	3,911.83	8.54%
7	57,111.53	6,390.85	11.19%
8	71,410.42	9,638.95	13.50%
9	92,095.61	15,251.90	16.56%
Top	154,966.77	35,506.72	22.91%
State	**53,576.86**	**7,359.80**	**13.74%**

Source: Calculated from CSO, 2012b.

Chart 1: Total Income Tax & Social Insurance as % Gross Income



[19] See Collins (2013a:8) who outlines a number of illustrative case studies demonstrating the emergence of these effective rates.

INDIRECT TAXATION

Based on the HBS expenditure data and the aforementioned assumptions, tables 4 and 5 present the results of the papers indirect taxation analysis at an overall (state) level and across the income deciles. Table 4 outlines the nominal values of household contributions across VAT, excise, levies and other indirect taxes while table 5 presents these amounts as percentages of gross income. Charts 2-4 also illustrate these findings.

Table 4: Nominal Values of various Indirect Taxation sources by decile, 2009/10

Decile	VAT €	Excise €	Levies €	Other Indirect €	Total Indirect €
Bottom	1,601.20	800.50	38.75	265.42	2,705.86
2	1,666.53	849.81	42.92	293.14	2,852.40
3	2,118.63	1,183.57	51.37	392.34	3,745.91
4	2,451.71	1,274.09	67.85	473.73	4,267.38
5	2,846.97	1,458.33	80.09	546.26	4,931.65
6	3,378.53	1,682.30	107.56	668.68	5,837.07
7	3,796.87	1,689.36	128.78	703.83	6,318.83
8	4,386.07	1,811.01	148.99	769.22	7,115.30
9	4,921.15	1,898.38	167.72	863.93	7,851.19
Top	6,439.14	2,125.49	215.73	1,022.56	9,802.92
State	**3,360.16**	**1,477.12**	**104.95**	**599.82**	**5,542.05**

Note: Other indirect taxes include vehicle tax and television licence.

Table 5: Indirect Taxation sources by decile, 2009/10 as % Gross Income

Decile	VAT	Excise	Levies	Other Indirect	Total Indirect
Bottom	16.19%	8.10%	0.39%	2.68%	27.37%
2	10.53%	5.37%	0.27%	1.85%	18.02%
3	9.30%	5.20%	0.23%	1.72%	16.45%
4	8.32%	4.33%	0.23%	1.61%	14.49%
5	7.77%	3.98%	0.22%	1.49%	13.46%
6	7.38%	3.67%	0.23%	1.46%	12.75%
7	6.65%	2.96%	0.23%	1.23%	11.06%
8	6.14%	2.54%	0.21%	1.08%	9.96%
9	5.34%	2.06%	0.18%	0.94%	8.53%
Top	4.16%	1.37%	0.14%	0.66%	6.33%
State	**6.27%**	**2.76%**	**0.20%**	**1.12%**	**10.34%**

Note: Tables A14a and A14b in the appendix present another set of comparisons benchmarked against disposable income and household expenditure. The disposable income results are broadly similar while those compared to expenditure mitigate some of the regressivity reported above.

VAT is the largest source of indirect taxation, collecting on average €3,360 per annum from households, equivalent to 6.27% of average gross income. In nominal terms VAT is progressive but judged against gross income it is notably regressive; accounting for a higher percentage of gross income among households lower down the income distribution (see chart 2). Excise demonstrates a similar structure, and represents an average of €1,477 per household. As a proportion of gross income, the bottom three deciles spend more than 5% of their gross income on excise while those in the top three deciles expend less than half of this (below 2.5% of their gross income) on excise taxes (see chart 3).

Chart 2: VAT as a % of Gross Income

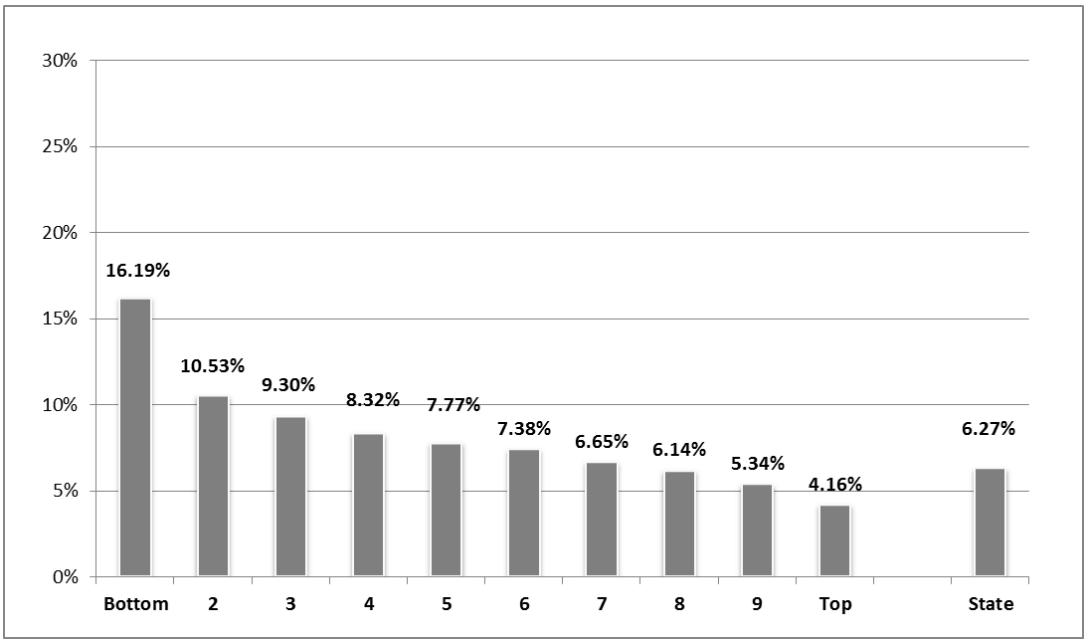


Chart 3: Excise as a % of Gross Income

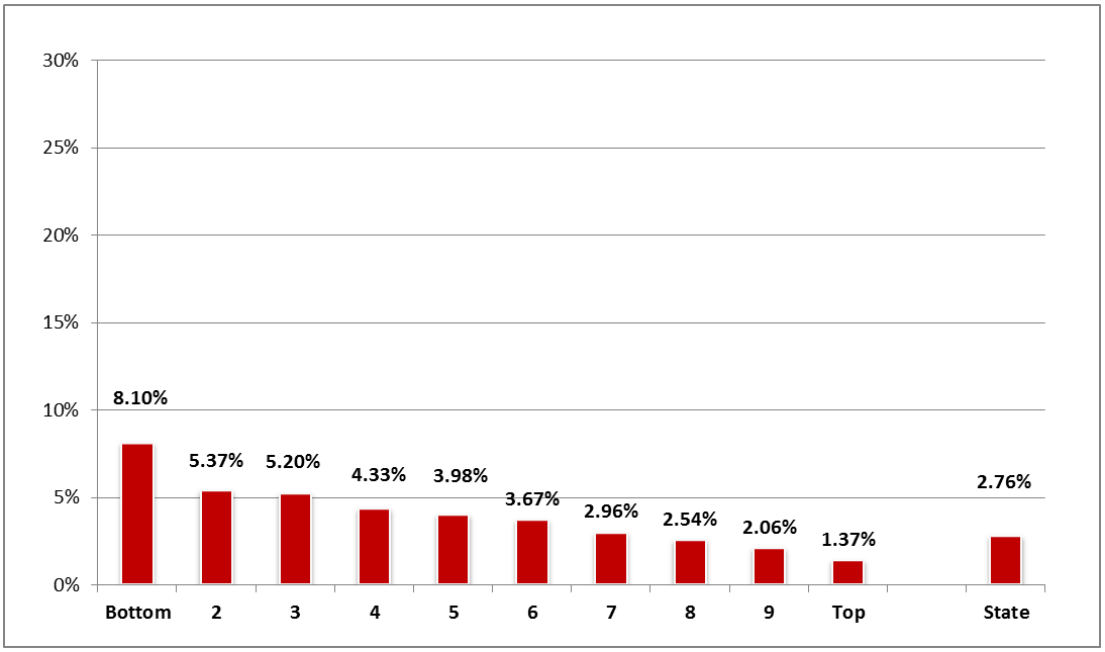


Chart 4 brings together the results as a percentage of gross income for levies and other indirect taxes. The latter category captures vehicle taxes (running cost taxes not registration taxes - VRT) and the television licence. Taken together, these represent an annual expenditure of almost €705 per household and are again regressive.

Chart 4: Levies & Other Indirect Taxes as a % of Gross Income

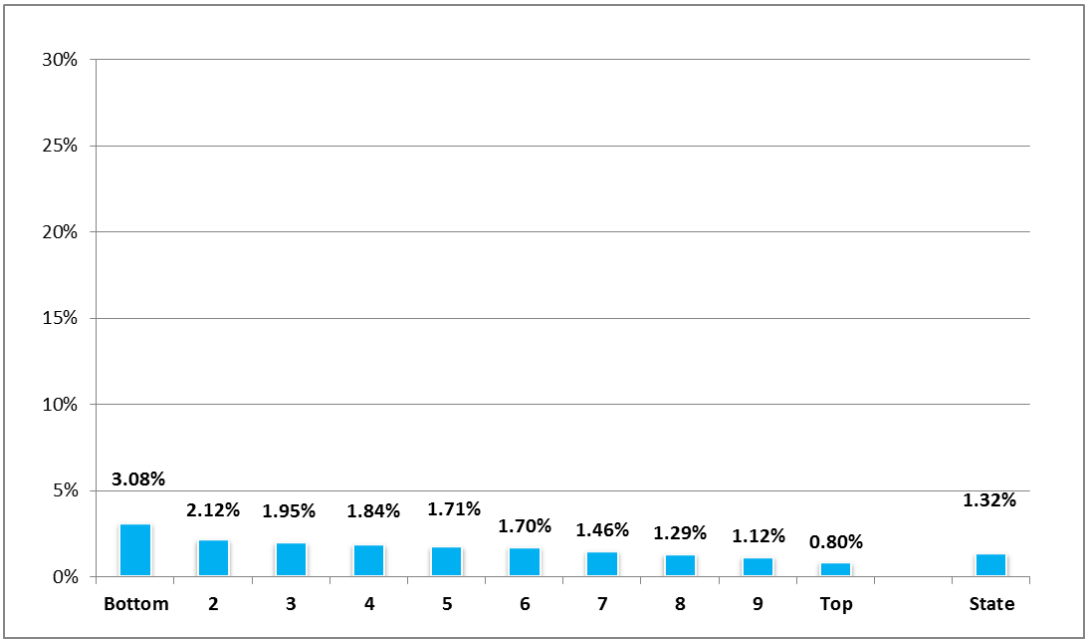


Chart 5 summarised the indirect tax contributions of households across the income distribution, given the calculations undertaken for this paper. Overall, indirect taxation is notably regressive, collecting more as a percentage of gross income from households at the bottom of the income distribution than from those with higher gross incomes further up.

Concluding this section is chart 6 which allows an exploration of the importance of indirect taxes in the overall taxation contribution of households across the deciles. It calculates the proportion of the total taxes paid by households which derive from indirect taxes. Unsurprisingly, given the aforementioned low incomes, consumption patterns and the regressive profile of all the indirect tax measures, the chart highlights the relative significance of indirect taxes in the bottom half of the income distribution.

Chart 5: Total Indirect Taxes as a % of Gross Income

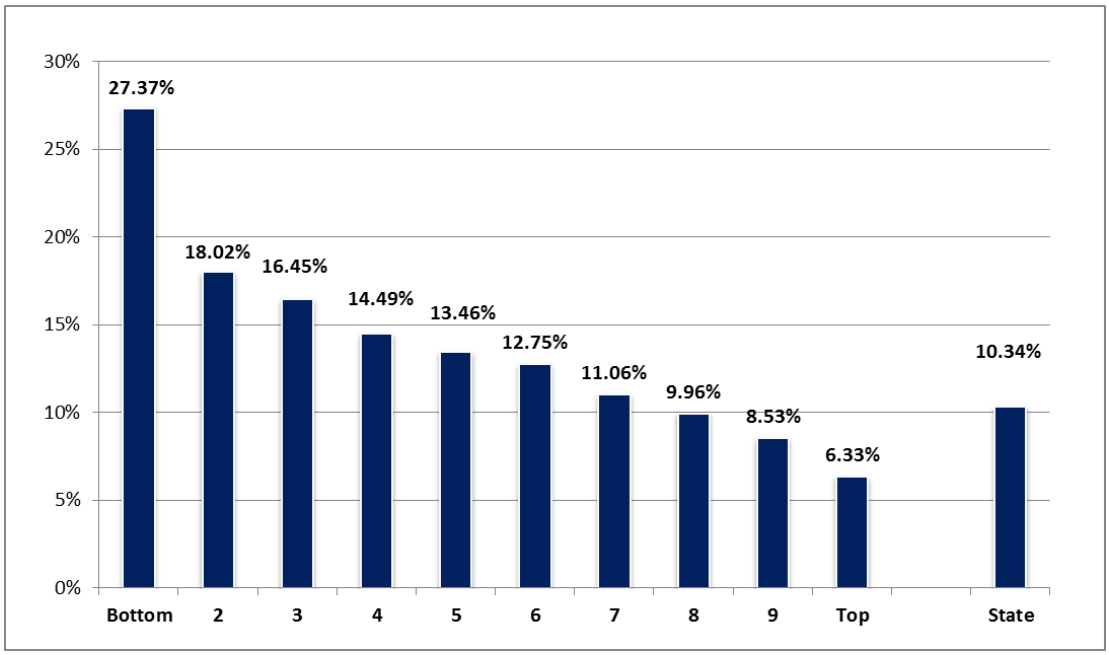
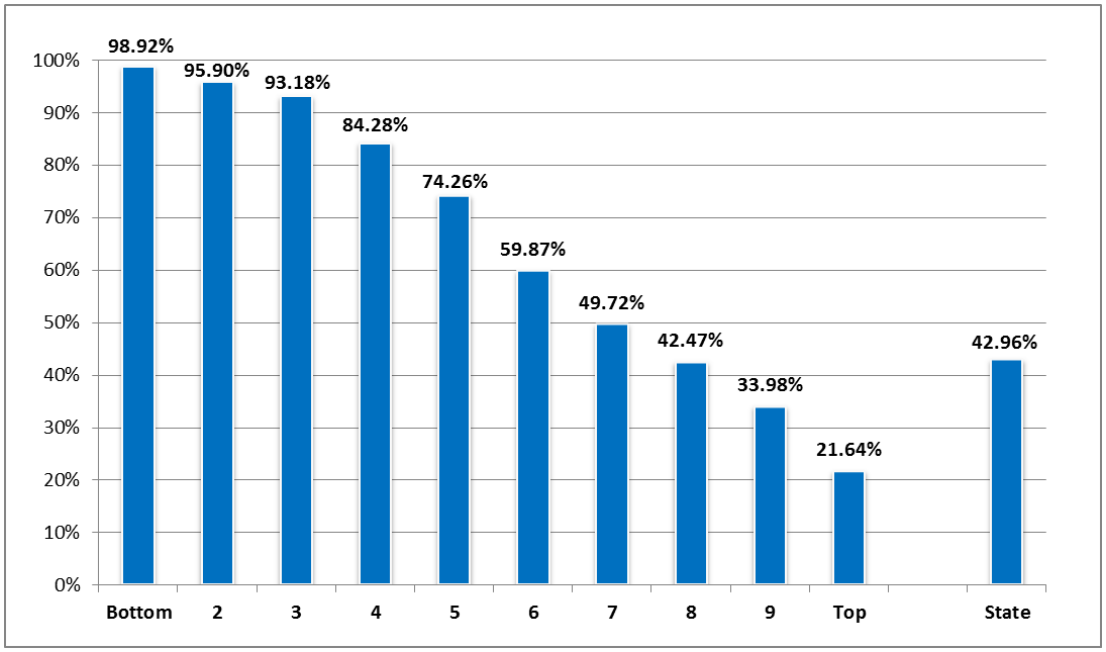


Chart 6: Total Indirect Taxes as a % of Total Tax Paid, by decile

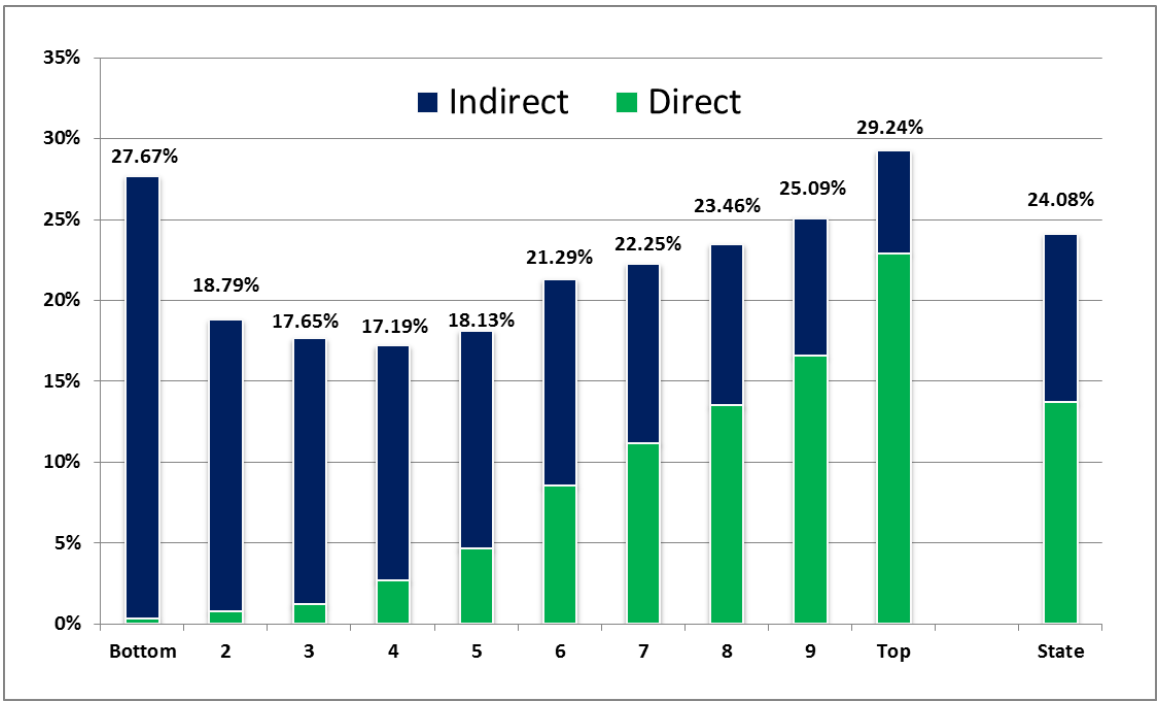


Note: See table A15 in the appendix for the corresponding nominal amounts.

RESULTS AND EQUIVALISATION

Chart 7 brings together the direct income household contributions from chart 1 and the total indirect household contributions from chart 5. It presents a picture of the overall average level of household tax contributions alongside how these differ across the gross income deciles. On average, the analysis finds that Irish households contribute 13.7% of their gross income in direct taxes and 10.3% of their income in indirect taxes giving an overall total contribution of just over 24% of their household gross income.

Chart 7: Total Household Tax Contributions, % Gross Income



Across the income distribution, three deciles contribute taxation to the exchequer at above the average level – the top 2 deciles and the bottom decile. This gives a U-shape to the overall household tax contribution curve – households at the bottom and top of the income distribution contribute the most, with contributions as a percentage of gross income declining to their lowest point in the fourth decile and then increasing after that towards the top decile. Table 6 presents the results in tabular form and table A15 in the appendix reports the nominal values.

Similar results are established when the data is equivalised (adjusted for household size and composition) – see table 7, table 8 and chart 8. On average households contribute 23.95% of their income in taxes with the aforementioned U-shape re-emerging - contributions as a percentage of gross income decline to their lowest point in the third decile and then increase after that. The equivalised data (table 7) serves as baseline for the policy simulations later in this paper as measures of poverty and income distribution dynamics are usually presented in these terms.

Table 6: Direct, Indirect and Total Household Taxation as % Gross Income

Decile	Direct	Indirect	Total
Bottom	0.30%	27.37%	27.67%
2	0.77%	18.02%	18.79%
3	1.20%	16.45%	17.65%
4	2.70%	14.49%	17.19%
5	4.67%	13.46%	18.13%
6	8.54%	12.75%	21.29%
7	11.19%	11.06%	22.25%
8	13.50%	9.96%	23.46%
9	16.56%	8.53%	25.09%
Top	22.91%	6.33%	29.24%
State	**13.74%**	**10.34%**	**24.08%**

Note: See table A15 in the appendix for the corresponding nominal amounts.

Table 7: 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%**

Notes: Tables A16a and A16b 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.

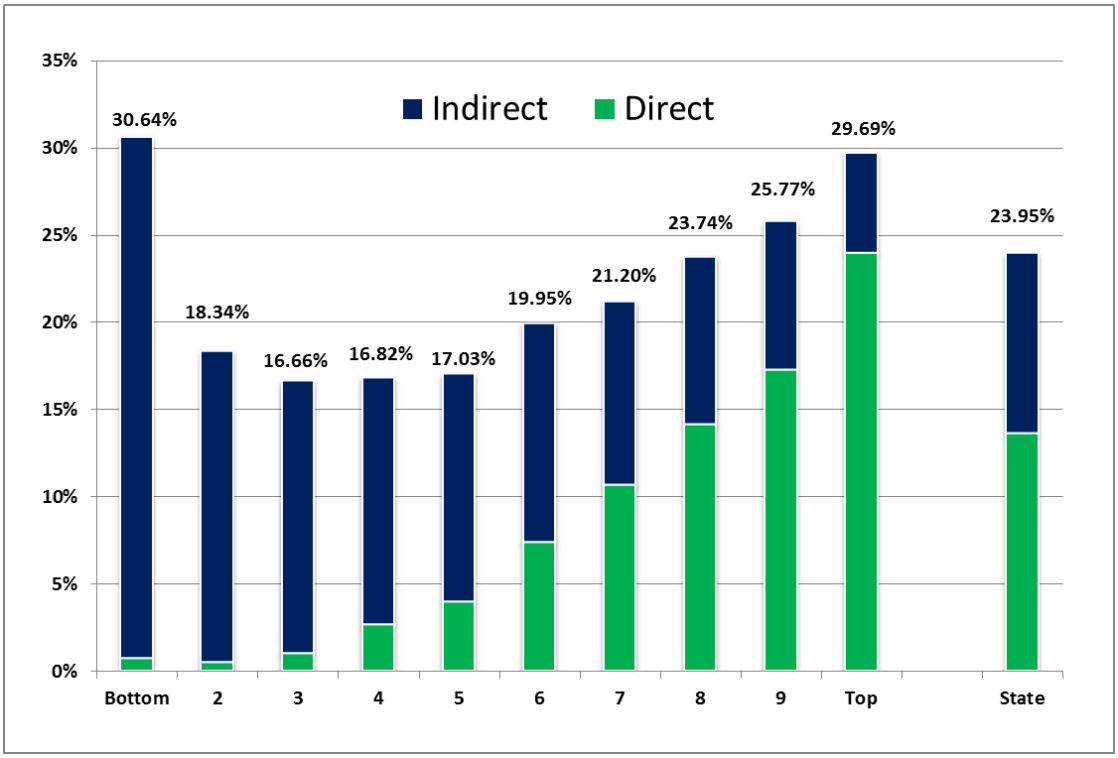
The results across the paper assist in informing our understanding of the contribution individuals and households across the income distribution make to the costs of funding the state. Clearly, judging tax contributions by income taxes alone offers a limited, and misleading, picture of the distribution of tax contributions across society. Households are contributing in various ways, leading to the U-shaped curve in charts 7 and 8 which summarises the findings on the overall shape of household tax contributions.

Table 8: Direct, Indirect and Total Household Taxation as % Gross Income (Equivalised data)

Decile	Direct	Indirect	Total
Bottom	0.72%	29.93%	30.64%
2	0.49%	17.85%	18.34%
3	1.00%	15.66%	16.66%
4	2.62%	14.20%	16.82%
5	3.97%	13.05%	17.03%
6	7.38%	12.57%	19.95%
7	10.67%	10.53%	21.20%
8	14.12%	9.62%	23.74%
9	17.27%	8.50%	25.77%
Top	23.99%	5.70%	29.69%
State	**13.60%**	**10.36%**	**23.95%**

Note: Equivalised using national scale.

Chart 8: Total Household Tax Contributions, % Gross Income (Equivalised data – national scale)



POLICY SIMULATIONS

Changes to indirect taxes are a regular feature of annual Budgets and the distributive patterns established by this paper offer the potential to model *ex post* and *ex ante* indirect taxation policy choices. A forthcoming paper (Collins, 2014) will examine *ex ante* the distributive impact of a suite of indirect taxation changes. Here the focus is on two recent changes to VAT rates.

Since 2011 there have been two notable changes to the rates of VAT:

(i) The temporary introduction, and subsequent retention, of a second reduced rate of VAT for specific items (where the rate decreased from 13.5% to 9%); and
(ii) An increase in the standard rate of VAT from 21% to 23%.

Each of these changes is examined in turn below.

Reduction of items to a second reduced rate of VAT

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. 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%. In 2011 Ireland possessed a standard VAT rate of 21% and a reduced rate of 13.5%. As part of that years 'Jobs Initiative' programme, the Government introduced a new second reduced rate of 9%.

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 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.[20] The annual cost of the reform (in revenue forgone terms) was estimated by the Department of Finance at €350 million.

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.

To date papers from the Department of Finance (O'Connor, 2012), Deloitte for Fáilte Ireland (2013) and Foley for the Restaurants Association of Ireland (2013) have considered the pass through of the VAT reduction and the likely impact it had on tourism activity and job creation since its introduction. When announcing an extension of the reform in Budget 2014, the Minister for Finance cited the creation of over 15,000 jobs as a result of the measure (Department of Finance, 2013: 3). While robust data sources are limited, Consumer Price Index trends and tourism statistics suggest a reasonable pass through of the reform in price reductions and employment growth; although the latter was accompanied by a general recovery in the tourism sector.

[20] 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.

To date there have been no examinations of the distributive impact of this tax reduction, a void this analysis attempts to address. In modelling the policy reform the paper:

- Takes as a baseline the indirect taxation contributions established for equivalised household deciles (Tables 7 and 8).
- The model has been set up so that each HBS expenditure item is classified as being subject to one of six VAT classifications (see earlier). The analysis simulated a reduction in the VAT rate for those items subject to the second reduced rate (from 13.5% to 9%) while leaving all other expenditure data unchanged.
- The household expenditure data from 2009/10 is taken to offer a good representation of household expenditure at the time of the policies implementation. Over the period from 2009/10 to 2013 overall household consumption, as recorded in the national accounts statistics, remained flat (see Table A17 in the appendix).
- 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 it is probable that such changes did occur (it is an objective of the policy that they should), 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 impact identified below. Similarly, the analysis assumes that the incidence of the tax decrease falls on the consumer i.e. that the VAT reduction is passed on in full.
- The results are reported as reductions 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 reduction is analogous to a cash transfer to households.

Table 9 and Chart 9 present the results of the modelled policy simulation. Overall the measure is notably progressive, impacting more positively on lower income households than on those further up the income distribution. On average, the VAT reduction was equivalent to an increase in gross income of 0.26% per annum, with the bottom six deciles gaining at above the average.

The simulated average gain implies an exchequer cost associated with gains to all households of €231 million; approximately 66% of the overall Department of Finance estimate of €350 million.[21] The proportion of VAT revenue associated with households 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.

In overall terms the average and decile impact of the reclassification of goods and services to the second reduced VAT rate is small yet progressive. It should also be noted that the VAT reclassification was only one of a number of measures announced simultaneously by Government as part of its 2011 'Jobs Initiative'. The inclusion of changes to other taxes, levies,

[21] The exchequer cost is calculated as the average equivalised gain multiplied by the average national equivalence scale value multiplied by the number of households in the state. The latter figure is taken from Murray and Collins (2012) who used Census 2011 data to determine the number of permanent households in the state as 1,649,691.

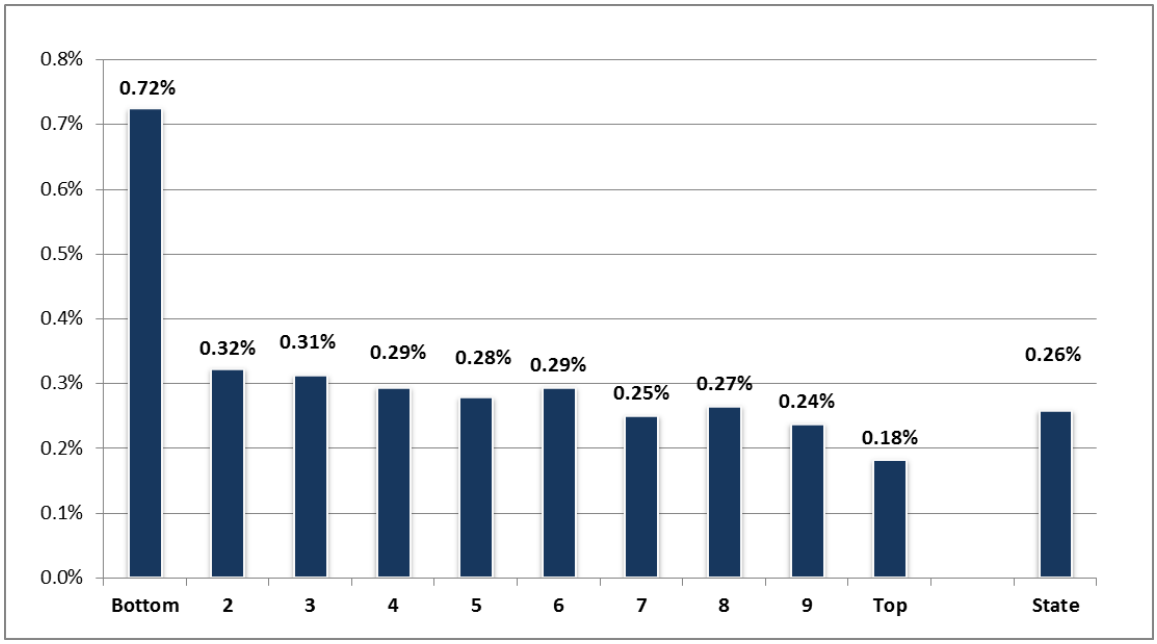
social insurance rates, public service provisions and the minimum wage might alter the distributive picture of the overall 'Jobs Initiative' package.[22]

Table 9: The Distributive Impact of the reduction of items to a second reduced rate of VAT (from 13.5% to 9%)

Decile	€ per annum*	% Gross Income
Bottom	+54.77	+0.72%
2	+36.54	+0.32%
3	+41.30	+0.31%
4	+45.47	+0.29%
5	+51.41	+0.28%
6	+66.40	+0.29%
7	+70.20	+0.25%
8	+92.78	+0.27%
9	+108.37	+0.24%
Top	+140.04	+0.18%
State**	**+70.72**	**+0.26%**

Notes: *The euro values are on a per equivalent adult basis.
**The state/average per adult figure transformed into an average household figure implies a gain of €140 per annum.

Chart 9: The Distributive Impact of the reduction of items to the second reduced rate of VAT (from 13.5% to 9%), % Gross Income



[22] The 2011 Jobs Initiative also included a 0.6% levy on private pension funds, PRSI reductions for low income workers, an increase in the minimum wage by €1 per hour (reversing an earlier reduction), various labour activation programmes and a series of small capital expenditure measures.

An increase in the standard VAT rate from 21% to 23%

Ireland's programme of fiscal reforms between 2008 and 2015 witness a series of ten contractionary adjustments, which by 2014 had seen more than 18% of GDP (€30 billion) removed from the economy through tax increases and expenditure reductions. As part of that process Budget 2012 (December 2011) included an increase in the standard rate of VAT from 21% to 23% yielding an additional €670 million to the exchequer.

At the time of the reform, and subsequent to it, there was limited empirical consideration of the impact of this reform on households and individuals across the income distribution. The documentation issued to accompany the Budget did not include any assessment of the impact of the change, despite it being the largest taxation or expenditure measure included in the Budget.[23] Only Callan et al (2012) and Social Justice Ireland (2011) made any detailed empirical based comment, with only the latter challenging the assertion by Government that the VAT increase was progressive.

To date there have been no examinations of the distributive impact of this tax increase, a void this analysis attempts to address. In modelling the policy reform the paper:

- Takes as a baseline the indirect taxation contributions established for equivalised household deciles (Tables 7 and 8).
- The model has been set up so that each HBS expenditure item is classified as being subject to one of six VAT classifications (see earlier). The analysis simulated an increase in the VAT rate for those items subject to the standard rate while leaving all other expenditure data unchanged. The simulation takes account of the fact that the HBS data covered a period where two separate standard VAT rates were applied, 21.5% (2009) and 21% (2010). Reflecting this, the analysis simulates a VAT increase of 1.5% in the relevant 2009 expenditure and 2% in the relevant 2010 expenditure.
- The household expenditure data from 2009/10 is taken to offer a good representation of household expenditure at the time of the policies implementation. Over the period from 2009/10 to 2013 overall household consumption, as recorded in the national accounts statistics, remained flat (see Table A17 in the appendix).
- 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 it is probable that such changes did occur (price elasticity of demand effects are likely to imply that higher prices will have driven consumption decreases or good substitution), 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 impact identified below. Similarly, 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

[23] The impact of smaller income taxation reforms on representative income levels and household types was included.

policy, the VAT increase is analogous to a cash transfer (lump sum tax) from households to Government.

Table 10 and Chart 10 present the results of the modelled policy simulation. Overall the measure is notably regressive, impacting more heavily on lower income households than on those further up the income distribution. On average, the standard rate VAT increase was equivalent to a decrease in gross income of 0.38% per annum, with the bottom 70% of the income distribution experiencing an above average loss.

Table 10: The Distributive Impact of an increase in the standard VAT rate (from 21% to 23%)

Decile	€ per annum*	% Gross Income
Bottom	-80.70	-1.07%
2	-67.34	-0.59%
3	-70.94	-0.54%
4	-79.92	-0.52%
5	-87.94	-0.48%
6	-102.71	-0.46%
7	-109.37	-0.39%
8	-124.25	-0.35%
9	-150.15	-0.33%
Top	-171.85	-0.22%
State**	**-104.51**	**-0.38%**

Notes: *The euro values are on a per equivalent adult basis.
**The state/average per adult figure transformed into an average household figure implies a loss of €207 per annum.

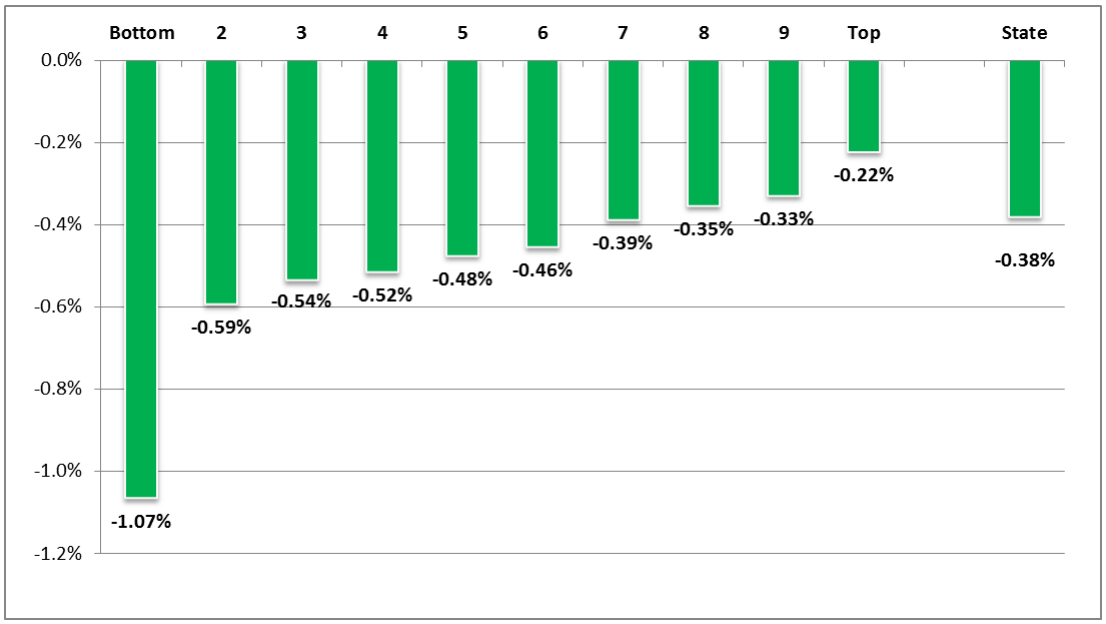
The simulated average equivalised cost implies an exchequer gain from all households of €342 million; approximately 51% of overall Department of Finance estimate of €670 million.[24] The proportion of VAT revenue associated with households is similar to the 2013 EC figure of 49% reported earlier, something to be expected given the broad reach of the standard VAT rate across most areas of consumption by households; the remainder comes from investment, industry and Government and non-profits. The average household impact of €207 per annum supports the assertion by the Minister for Finance in his Budget 2012 speech that the average impact on households would not be €500 per annum as suggested by some commentators (2011: A14).

Unsurprisingly, given the aforementioned research from Murphy (1984), the CSO (1995), Barrett and Wall (2006) and Leahy et al. (2011), the analysis finds the Budget 2012 standard rate VAT increase to be regressive. However, it should be noted that the VAT increase was only one element of an overall Budgetary package, representing 15% of the total fiscal adjustment

[24] The exchequer cost is calculated as the average equivalised cost multiplied by the average national equivalence scale value multiplied by the number of households in the state. The latter figure is taken from Murray and Collins (2012) who used Census 2011 data to determine the number of permanent households in the state as 1,649,691.

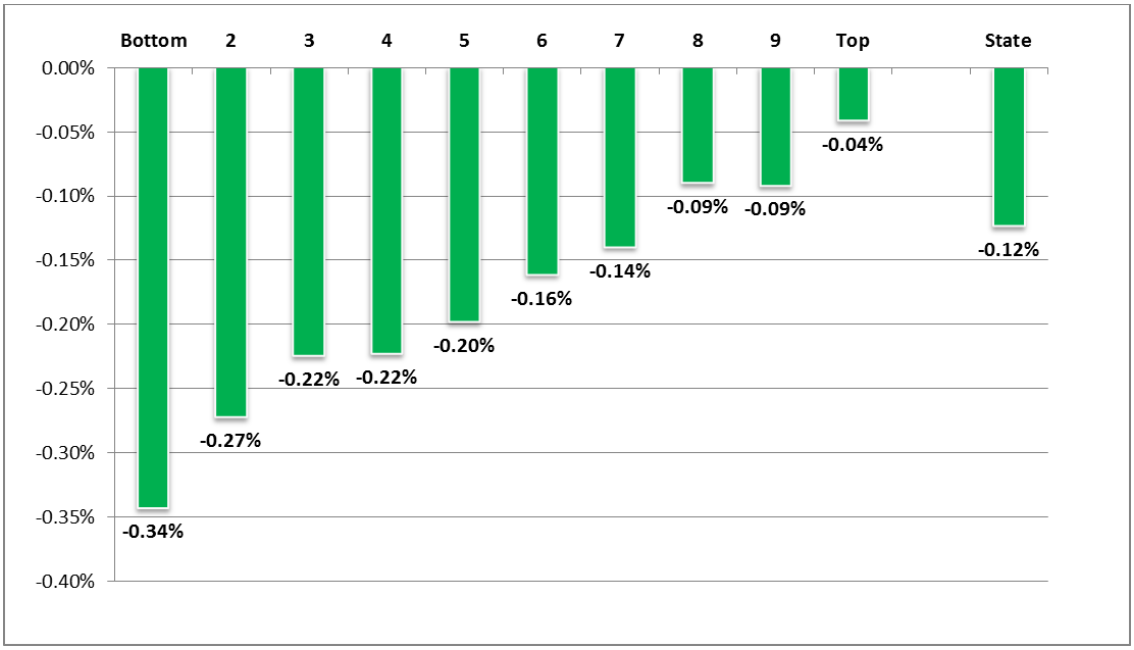
included in Budget 2012. The inclusion of changes to other taxes and public expenditure measures might alter the overall distributive picture.

Chart 10: The Distributive Impact of an increase in the standard VAT rate (from 21% to 23%), % Gross Income



Finally, chart 11 brings together the result of both policy simulations to assess the cumulative impact of both VAT changes. Overall the measures were regressive, with the negative impact of the standard rate VAT increase dominating the gains from the reclassification of goods to the second reduced rate.

Chart 11: The Cumulative Distributive Impact of Two Recent VAT reforms, % Gross Income



CONCLUSION

The aim of this paper has been to provide a more detailed understanding of the overall taxation contribution of households. Using HBS microdata the paper finds a progressive income taxation structure with the average household paying almost 14% of its gross income in income and social insurance taxes. Using the indirect taxation model constructed as part of this papers research, the analysis finds a regressive indirect taxation structure with the average household paying just over 10% of its gross income in indirect taxes. Across the income deciles the cumulative effect of household's taxation contributions displays a U-shape; contributions are highest at the bottom and top of the distribution and lowest for those in the middle deciles.

Aside from establishing the overall shape of household tax contributions, the paper also reflects the establishment of an indirect tax modelling framework which will assist in the analysis of the distributive and revenue effects of previous and future indirect taxation changes. 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, the model at least offers a heretofore lacking insight into the distributive impact of indirect tax changes.

The paper also examined two recent VAT changes; policy reforms totalling more than €1 billion per annum, equivalent to 9% of the annual VAT revenues. The reclassification of tourism related goods and services to a second reduced VAT rate (moving from 13.5% to 9%) was found to be progressive while an increase in the standard VAT rate (from 21% to 23%) was found to be regressive.

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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: Calculated from Department of Finance, Budget 2014 (C15, C30)

Note: This table updates Collins (2011:91)

Table A2: Results from CSO Analysis of HBS' 1973, 1980 and 1987 (€ per annum)

Decile	Average Gross Income	Direct	Indirect	Total
1973	2,664.77	261.04	493.60	755.31
1980	8308.37	1255.53	1213.13	2468.66
1987	16,493.50	3,104.71	2,628.33	5,733.17
Decile Decomposition for 1987				
Bottom	3,105.83	16.36	774.98	791.35
2	5,053.73	45.38	1,175.03	1,220.35
3	6,939.14	85.07	1,476.42	1,561.50
4	9,025.78	412.30	1,904.70	2,317.00
5	11,495.16	1,172.38	2,409.56	3,581.94
6	14,544.08	2,149.18	2,609.72	4,758.89
7	18,048.84	3,117.16	2,993.40	6,110.63
8	22,493.48	4,541.38	3,491.50	8,032.88
9	29,015.82	6,953.32	4,059.51	11,012.43
Top	45,230.59	12,577.84	5,388.12	17,952.70
State	16,493.50	3,104.71	2,628.33	5,733.17

Source: Calculated from CSO (1980, 1983 and 1995).

Notes: Data converted from Irish £ to €.
This table complements table 1 in the paper.

Table A2: Decomposition of Average Household Expenditure, by decile 2009/10 € per annum

Commodity Group	No of items / groups	Decile 1	Decile 2	Decile 3	Decile 4	Decile 5	Decile 6	Decile 7	Decile 8	Decile 9	Decile 10	State
Food	237	3463.19	3855.58	5028.59	5925.56	6315.87	6977.51	7468.52	8536.13	9401.79	11542.22	**6850.19**
Alcoholic drink and tobacco	23	1177.18	1339.46	1659.85	1755.34	1951.01	2200.95	2176.43	2481.16	2684.14	3180.37	**2060.07**
Clothing and footwear	17	732.61	1032.64	1326.94	1539.83	1838.82	1966.14	2462.90	2607.43	3328.56	4100.30	**2092.94**
Fuel and light	4	1283.11	1313.89	1648.37	1793.43	1894.66	1956.75	2072.59	2002.15	2043.89	2437.33	**1844.56**
Housing	21	3755.92	4121.70	4768.21	5755.98	6265.77	7506.09	8422.90	10006.04	10197.02	16304.16	**7708.55**
Household non-durables	10	339.69	480.58	656.42	667.90	850.01	857.32	963.24	1114.04	1206.92	1469.39	**860.45**
Household durables	58	714.87	885.49	975.77	1078.56	1357.20	1667.15	1868.57	2044.93	2400.80	2693.01	**1568.53**
Transport	39	2392.45	2358.54	2904.86	4008.99	4958.14	6280.38	7149.70	8570.57	9636.60	12437.10	**6069.06**
Miscellaneous, services and other	129	4600.19	4651.85	5956.87	7518.09	8804.33	11226.53	14133.47	17511.61	22663.86	35399.43	**13243.81**
Total Expenditure	**538**	**18459.20**	**20039.73**	**24925.86**	**30043.68**	**34235.82**	**40638.83**	**46718.32**	**54874.05**	**63563.59**	**89563.32**	**42298.15**

Table A3: Decomposition of Average Household Expenditure, by decile 2009/10 %

Commodity Group	No of items / groups	Decile 1	Decile 2	Decile 3	Decile 4	Decile 5	Decile 6	Decile 7	Decile 8	Decile 9	Decile 10	State
Food	237	18.8%	19.2%	20.2%	19.7%	18.4%	17.2%	16.0%	15.6%	14.8%	12.9%	**16.2%**
Alcoholic drink and tobacco	23	6.4%	6.7%	6.7%	5.8%	5.7%	5.4%	4.7%	4.5%	4.2%	3.6%	**4.9%**
Clothing and footwear	17	4.0%	5.2%	5.3%	5.1%	5.4%	4.8%	5.3%	4.8%	5.2%	4.6%	**4.9%**
Fuel and light	4	7.0%	6.6%	6.6%	6.0%	5.5%	4.8%	4.4%	3.6%	3.2%	2.7%	**4.4%**
Housing	21	20.3%	20.6%	19.1%	19.2%	18.3%	18.5%	18.0%	18.2%	16.0%	18.2%	**18.2%**
Household non-durables	10	1.8%	2.4%	2.6%	2.2%	2.5%	2.1%	2.1%	2.0%	1.9%	1.6%	**2.0%**
Household durables	58	3.9%	4.4%	3.9%	3.6%	4.0%	4.1%	4.0%	3.7%	3.8%	3.0%	**3.7%**
Transport	39	13.0%	11.8%	11.7%	13.3%	14.5%	15.5%	15.3%	15.6%	15.2%	13.9%	**14.3%**
Miscellaneous, services and other	129	24.9%	23.2%	23.9%	25.0%	25.7%	27.6%	30.3%	31.9%	35.7%	39.5%	**31.3%**
Total Expenditure	**538**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Table A5: VAT Rates used

Date Effective From	Standard Rate (%)	Reduced Rate (%)	0% Rate	Exempt Rate
1st December 2008	21.5	13.5	0	N/A
1st January 2010	21.0	13.5	0	N/A

Source: Revenue Commissioners (2013a)

Table A6: Excise on Alcohol

Goods	Description or Usage	Rate (1) of Duty in € 2009*	Rate (2) of Duty in € 2010**
Spirits	Exceeding 0.5% vol but not exceeding 1.2% vol	€39.25 per litre of alcohol in the spirits	€31.13 per litre of alcohol in the spirits
Beer	Exceeding 0.5% vol but not exceeding 1.2% vol	€0.00 per hectolitre per cent of alcohol	€0.00 per hectolitre per cent of alcohol
	Exceeding 1.2% vol but not exceeding 2.8% vol	€9.93 per hectolitre per cent of alcohol	€7.85 per hectolitre per cent of alcohol
	Exceeding 2.8% vol	€19.87 per hectolitre per cent of alcohol	€15.71 per hectolitre per cent of alcohol
Wine	Still and sparkling, not exceeding 5.5% vol	€109.34 per hectolitre	€87.39 per hectolitre
	Still, exceeding 5.5% vol but not exceeding 15% vol	€328.09 per hectolitre	€262.24 per hectolitre
	Still, exceeding 15% vol	€476.06 per hectolitre	€380.52 per hectolitre
	Sparkling, not exceeding 5.5% volume	€656.18 per hectolitre	€524.48 per hectolitre
Cider and Perry	Still and sparkling, not exceeding 2.8% vol	€41.62 per hectolitre	€32.93 per hectolitre
	Still and sparkling, exceeding 2.8% vol but not exceeding 6.0% volume	€83.25 per hectolitre	€65.86 per hectolitre
	Still and sparkling, exceeding 6.0% vol but not exceeding 8.5% volume	€192.47 per hectolitre	€152.28 per hectolitre
	Still, exceeding 8.5% volume	€273.00 per hectolitre	€216.00 per hectolitre
	Sparkling, exceeding 8.5% vol	€546.01 per hectolitre	€432.01 per hectolitre
Other Fermented Beverages: Other than Cider or Perry	Still and sparkling, not exceeding 5.5% vol	€109.34 per hectolitre	€87.39 per hectolitre
	Still exceeding 5.5% vol	€328.09 per hectolitre	€262.24 per hectolitre
	Sparkling, exceeding 5.5% vol	€656.18 per hectolitre	€524.48 per hectolitre
Intermediate Beverages	Still, not exceeding 15% volume	€328.09per hectolitre	€262.24 per hectolitre
	Still, exceeding 15% vol	€476.06 per hectolitre	€380.52 per hectolitre
	Sparkling	€656.18 per hectolitre	€524.48 per hectolitre

Source: Reply to parliamentary question [21039/13]
Note: * Rate in place since 15th of October 2008 ** Rate in place since 10th December 2009

Additional assumptions regarding alcohol calculations:

- all beer purchased falls into the category of "Exceeding 2.5% volume"
- all wine purchased falls into the category of "Still, exceeding 5.5% volume but not exceeding 15% volume"
- all 'liqueurs' fall into the category of 'Intermediate Beverages' "Still, exceeding 15% volume"
- all ciders and perries fall into the category "Still and sparkling, exceeding 2.8% vol but not exceeding 6.0% volume"
- all alcopops fall into the category of 'Spirits'

Table A7: Assumed Prices/Proofs per litre of Alcohol*

Drinks (Off-Sales)	Price per Litre (€)	Assumed Proof (% of alcohol per litre
Spirits (e.g. gin, vodka & whiskey)	25.00	37.5%
Liquers & cocktails (e.g. Baileys & Daiquiri)	20.00	17.0%
Table wine	12.85	12.5%
Champagne, sparkling wines & wine with mixer	38.56	12.0%
Fortified wine, port, sherry, vermouth & Martini	16.66	20.0%
Ciders & Perry	3.60	4.5%
Alcopops & alcoholic soft drinks	8.00	4.0%
Beers (including pale ales & stout)	4.10	4.3%
Lagers & continental beers	4.10	4.3%

Drink (Consumed Out)	Price per Litre (€)	Assumed Proof (% of alcohol per litre
Spirits (e.g. gin, vodka & whiskey)	72.40	37.5%
Liquers & cocktails (e.g. Baileys & Daiquiri)	72.40	17.0%
Spirits with mixer**	60.00	18.8%
Table wine	33.33	12.5%
Champagne, sparkling wines & wine with mixer	99.99	12.0%
Fortified wine, port, sherry, vermouth & Martini	72.40	20.0%
Ciders & Perry	7.91	4.5%
Alcopops & alcoholic soft drinks	15.45	4.0%
Beers (including pale ales & stout)	7.91	4.3%
Lagers & continental beers	7.91	4.3%

Notes: *Based on the observed market price/proof of indicative product(s) in each category

** The analysis assumed that half of the price of 'Spirits with mixer' is the alcoholic drink and that the rest is the price of the mixer

The alcohol content figures estimated above are similar to those reported by the Health Service Executive (HSE) in their assessment of the strength of a standard drink in Ireland (2009:7). The only difference is our assumption for Alcopops at 4% and theirs at 5%.

Table A8a: Sensitivity Tests: Alcohol price assumptions – unequivalised data

The table presents the results of two sensitivity tests (ST) and their impact on the papers indirect tax revenue estimates (VAT and excise). These are:

> **ST1**: where assumed alcohol prices are 10% lower for the bottom three deciles and 10% higher for the top three deciles.
>
> **ST2**: where assumed alcohol prices are 20% lower for the bottom three deciles and 20% higher for the top three deciles.

Decile	Change in VAT €	Change in excise€	Change in total alcohol indirect €	% Change Gross Income	% Change Total Expenditure
	ST1	**ST1**	**ST1**	**ST1**	**ST1**
Bottom	-1.57	8.99	7.42	0.08%	0.04%
2nd	-1.93	11.04	9.11	0.06%	0.05%
3rd	-2.10	12.01	9.91	0.04%	0.04%
4th	0.00	0.00	0.00	0.00%	0.00%
5th	0.00	0.00	0.00	0.00%	0.00%
6th	0.00	0.00	0.00	0.00%	0.00%
7th	0.00	0.00	0.00	0.00%	0.00%
8th	3.22	-18.45	-15.22	-0.02%	-0.03%
9th	3.67	-21.01	-17.33	-0.02%	-0.03%
Top	4.71	-26.94	-22.23	-0.01%	-0.02%
	ST2	**ST2**	**ST2**	**ST2**	**ST2**
Bottom	-3.54	20.23	16.69	0.17%	0.09%
2nd	-4.34	24.85	20.50	0.13%	0.10%
3rd	-4.72	27.03	22.31	0.10%	0.09%
4th	0.00	0.00	0.00	0.00%	0.00%
5th	0.00	0.00	0.00	0.00%	0.00%
6th	0.00	0.00	0.00	0.00%	0.00%
7th	0.00	0.00	0.00	0.00%	0.00%
8th	5.91	-33.82	-27.91	-0.04%	-0.05%
9th	6.73	-38.51	-31.78	-0.03%	-0.05%
Top	8.63	-49.38	-40.75	-0.03%	-0.05%

Table A8b: Sensitivity Tests: Alcohol price assumptions – equivalised data

The table presents the results of two sensitivity tests (ST) and their impact on the papers indirect tax revenue estimates (VAT and excise). These are:

> **ST1**: where assumed alcohol prices are 10% lower for the bottom three deciles and 10% higher for the top three deciles.
>
> **ST2**: where assumed alcohol prices are 20% lower for the bottom three deciles and 20% higher for the top three deciles.

Decile	Change in VAT €	Change in excise€	Change in total alcohol indirect €	% Change Gross Income	% Change Total Expenditure
	ST1	**ST1**	**ST1**	**ST1**	**ST1**
Bottom	-1.57	8.98	7.41	0.10%	0.05%
2nd	-0.91	5.23	4.32	0.04%	0.03%
3rd	-1.34	7.66	6.32	0.05%	0.05%
4th	0.00	0.00	0.00	0.00%	0.00%
5th	0.00	0.00	0.00	0.00%	0.00%
6th	0.00	0.00	0.00	0.00%	0.00%
7th	0.00	0.00	0.00	0.00%	0.00%
8th	1.51	-8.63	-7.12	-0.02%	-0.03%
9th	1.83	-10.46	-8.64	-0.02%	-0.03%
Top	2.10	-12.03	-9.93	-0.01%	-0.02%
	ST2	**ST2**	**ST2**	**ST2**	**ST2**
Bottom	-3.53	20.20	16.67	0.22%	0.10%
2nd	-2.06	11.78	9.72	0.09%	0.07%
3rd	-3.01	17.23	14.22	0.11%	0.10%
4th	0.00	0.00	0.00	0.00%	0.00%
5th	0.00	0.00	0.00	0.00%	0.00%
6th	0.00	0.00	0.00	0.00%	0.00%
7th	0.00	0.00	0.00	0.00%	0.00%
8th	2.76	-15.82	-13.05	-0.04%	-0.05%
9th	3.35	-19.18	-15.83	-0.03%	-0.05%
Top	3.85	-22.05	-18.20	-0.02%	-0.04%

Table A9: Tobacco Excise

Duty per 1,000 cigarettes	€183.40
Ad Valorem Duty as a % of Retail Price (Cigarettes)	18.25%
Cigars – per Kilo	€261.07
Fine Cut per Kilo	€220.30
Other Smoking per Kilo	€181.12

Source: Reply to parliamentary question [27330/13]

Table A10: Fuel Excise

	Avg. Price per Unit - 2009	Avg. Price per Unit - 2010	Levy per Unit
Gas	0.057	0.047	0.0037
Liquid Fuel	0.62	0.80	0.07653

Sources: SEAI, Budget (2010)

Table A11: Petrol & Diesel Excise & Carbon Tax

	Excise & Carbon per litre – 2009 (€)	Excise & Carbon per litre – 2010 (€)	NORA Levy per Litre
Petrol	0.50571	0.54771	0.02
Diesel	0.48002	0.53002	0.02

Source: AA Ireland (2012)

Table A12: Levies: Airlines and Insurance

Flat Airline Tax per Flight	€3
Primary Dwelling Insurance	3% of base cost of premium
Vehicle Insurance	3% of base cost of premium
Travel Insurance	3% of base cost of premium
Life Assurance	1% of base cost of premium
Medical Insurance	3% of base cost of premium
Animal Insurance	3% of base cost of premium

Source: Irish Life, TMF Group, Revenue (2013b)

Additional assumptions regarding airline and insurance calculations:

- assume that the average cost of a domestic flight (i.e. a flight within the Republic of Ireland) was €30 throughout the measurement period
- assume that the average cost of an international flight (i.e. a flight between the Republic of Ireland and an overseas territory) was €65 throughout the measurement period
- assume that all insurance levies stated to be 3% in Table A12 fall into the category of non-life assurance and are therefore 3% rather than 1%

Table A13: Comparing Modelled Household VAT Contributions to Exchequer Yield

Average VAT per household (table 4)	€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%

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)

Table A14a: Indirect Taxation sources by decile, 2009/10 as % Disposable Income

Decile	VAT	Excise	Levies	Other Indirect	Total Indirect
Bottom	16.24%	8.12%	0.39%	2.69%	27.45%
2	10.61%	5.41%	0.27%	1.87%	18.16%
3	9.41%	5.26%	0.23%	1.74%	16.65%
4	8.56%	4.45%	0.24%	1.65%	14.89%
5	8.15%	4.17%	0.23%	1.56%	14.12%
6	8.07%	4.02%	0.26%	1.60%	13.94%
7	7.49%	3.33%	0.25%	1.39%	12.46%
8	7.10%	2.93%	0.24%	1.25%	11.52%
9	6.40%	2.47%	0.22%	1.12%	10.22%
Top	5.39%	1.78%	0.18%	0.86%	8.21%
State	**7.27%**	**3.20%**	**0.23%**	**1.30%**	**11.99%**

Table A14b: Indirect Taxation sources by decile, 2009/10 as % Total Household Expenditure

Decile	VAT	Excise	Levies	Other Indirect	Total Indirect
Bottom	8.67%	4.34%	0.21%	1.44%	14.66%
2	8.32%	4.24%	0.21%	1.46%	14.23%
3	8.50%	4.75%	0.21%	1.57%	15.03%
4	8.16%	4.24%	0.23%	1.58%	14.20%
5	8.32%	4.26%	0.23%	1.60%	14.40%
6	8.31%	4.14%	0.26%	1.65%	14.36%
7	8.13%	3.62%	0.28%	1.51%	13.53%
8	7.99%	3.30%	0.27%	1.40%	12.97%
9	7.74%	2.99%	0.26%	1.36%	12.35%
Top	7.19%	2.37%	0.24%	1.14%	10.95%
State	**7.94%**	**3.49%**	**0.25%**	**1.42%**	**13.10%**

Table A15: Direct, Indirect and Total Household Taxation, € per annum

Decile	Direct	Indirect	Total
Bottom	29.59	2,705.86	2,735.44
2	122.00	2,852.40	2,974.40
3	274.10	3,745.91	4,020.02
4	796.21	4,267.38	5,063.60
5	1,709.83	4,931.65	6,641.49
6	3,911.83	5,837.07	9,748.90
7	6,390.85	6,318.83	12,709.68
8	9,638.95	7,115.30	16,754.25
9	15,251.90	7,851.19	23,103.09
Top	35,506.72	9,802.92	45,309.64
State	**7,359.80**	**5,542.05**	**12,901.85**

Note: This table complements chart 6 and table 5 earlier in the paper.

Table A16a: 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 A16b: 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 A17: 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