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**Working Paper**

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ESRI Working Paper, No. 366

**Provided in Cooperation with:**

The Economic and Social Research Institute (ESRI), Dublin

*Suggested Citation:* Leahy, Eimear; Lyons, Seán; Tol, Richard S. J. (2010) : The distributional effects of value added tax in Ireland, ESRI Working Paper, No. 366, The Economic and Social Research Institute (ESRI), Dublin

This Version is available at:

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## Working Paper No. 366

December 2010

# The Distributional Effects of Value Added Tax in Ireland

**Eimear Leahy<sup>a</sup>, Seán Lyons<sup>a,b</sup>, Richard S.J. Tol<sup>a,c,d,b</sup>**

*Abstract:* In this paper we examine the distributional effects of Value Added Tax (VAT) in Ireland. Using the 2004/2005 Household Budget Survey, we assess the amount of VAT that households pay as a proportion of weekly disposable income. We measure VAT payments by equivalised income decile, households of different composition and different household sizes. The current system is highly regressive. With the use of a micro-simulation model we also estimate the impact of changing the VAT rate on certain groups of items and the associated change in revenue. We also consider how the imposition of a flat rate across all goods and services would affect households in different categories. The Irish Government has recently announced that it proposes to increase the standard rate of VAT to 22% in 2013 and to 23% in 2014. We examine the distributional implications of such increases. The general pattern of results shows that those hardest hit are households in the first income decile, households in rural areas, 6 person households and households containing a single adult with children.

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# **The Distributional Effects of Value Added Tax in Ireland**

## **1. Introduction**

While the distributional impact of direct taxes is very well understood in Ireland, the same is not true for indirect taxes. Indirect taxes fall on consumption, and are therefore regressive. Value added tax (VAT) is the main indirect tax. Unlike excises or environmental taxes which aim to influence behaviour, VAT's main purpose is to raise revenue. In this paper, we estimate the impact of VAT on different household types.

VAT is a tax on the consumption of goods and services and is charged as a percentage of the price of a good or service supplied. VAT-registered traders collect VAT and it is then paid to the Revenue Commissioners. A limited number of services are exempt from VAT. These include some financial and professional services, charities and non-profit organisations. For the remainder of goods and services, four rates of VAT, which aim to reduce regressivity in the system, apply. Goods such as children's clothes and shoes, as well as most food items and oral medicine are zero rated. Different rules apply to zero rated and exempt items in that a VAT-registered person who supplies goods or services that are subject to VAT at 0% is entitled to a VAT refund on purchases made for his/her business. A VAT exempt trader, on the other hand, is not entitled to any VAT refund on business purchases. A rate of 4.8% is applied to the sale of livestock from registered farmers,<sup>1</sup> greyhounds and the hire of horses. A VAT rate of 13.5%, known as the reduced rate, applies to items such as domestic fuels, property transactions, repair and maintenance and most construction and building related services. This increased from 12.5% in 2002. The standard rate of 21% applies to all other goods. It was increased to 21.5% in December 2008 but reduced again to 21% in January 2010.

VAT accounted for 33% of the total tax intake in Ireland in 2008 (Department of Finance, 2010a).<sup>2</sup> This exceeded income tax by just one percentage point and was higher than the receipts

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<sup>1</sup> Farmers who do not register for VAT are allowed to add an amount to the sale of their goods (in 2009 this was 5.2% of the price) to VAT registered persons. The VAT registered person then reclaims this amount in his/her VAT return.

<sup>2</sup> VAT collected in 2008 equalled €13.43 billion. In 2009 it fell to €10.7 billion (Department of Finance, 2010a).

received from any other tax. In 2009, income tax increased to 36% while VAT fell to 32% of total tax receipts (Department of Finance, 2010a).<sup>3</sup>

The current VAT system has been criticised for being too regressive (Barrett and Wall, 2006) as has the system in the UK (Crawford et al., 2010). However, the distributional impact of VAT payments has received very little attention in Ireland to date. To our knowledge, the only paper on this topic is that of Barrett and Wall (2006) who studied the distributional impacts of the 2000 and 2004 VAT reforms. They also estimated how different income groups would be affected by imposing uniform rates of 13.5% and 21%. Results show that households at the lower end of the income distribution pay a higher proportion of income in VAT relative to higher income households. In fact, in 2004 households in the lowest equivalised income decile spent 14.5% of income in VAT whereas for the top income decile, the figure was only 6.8%.

The introduction of a uniform rate is favoured by some commentators (Durkan, 2010) because it would reduce the variability of indirect tax receipts when demand weakens and it would also broaden the tax base. The third report of the Commission on Taxation (1984) recommended that VAT should be levied at a single rate on as broad a base as possible because it would reduce administrative costs and enhance efficiency. However, a flat rate across all goods and services could still be regressive if the proportion of income saved differed by income decile. For example, if poor households were to spend all of their money and rich households were to save some money, then the poor would still be paying a higher proportion of their income in VAT (Barrett and Wall, 2006).

In this paper we update and considerably extend the work of Barrett and Wall (2006). We use a more recent dataset with which we create a micro simulation model for VAT in Ireland. We analyse the distribution of VAT payments across different household types as well as across equivalised income deciles based on the expenditure profile of the 2004/05 Household Budget Survey (HBS), (CSO, 2007a). We also assess what the likely distributional effects of a variety of rate changes would be for private households in Ireland. The change in revenue that is collected as a result of changing VAT rates is also considered. Because we analyse the distributional

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<sup>3</sup> Total tax receipts in 2008 were 13.7% lower than in 2007 (Department of Finance, 2010b). Tax receipts in 2009 were almost 19% lower than those in 2008 (Department of Finance, 2010a). Barrett et al., (2010) expect total tax receipts for 2010 to be approximately 7% lower than the 2009 tax intake however the Department of Finance (2010c) believes the total tax intake in 2010 will only be 2.6% lower than in 2009.

impacts of VAT using household expenditure data, we cannot take into account the VAT that is paid by businesses or establishments in which people reside collectively such as hospitals, hostels or prisons. Thus the changes in revenue that result from altering the VAT rates refer to revenue from private households only.

VAT is just one form of indirect taxation in Ireland. Excise duty is another important indirect tax and accounted for over 14% of the total tax intake in 2009 (Department of Finance, 2010a). Excise is a duty that is levied on selected categories of goods; mineral oils, alcohol and alcoholic beverages, and manufactured tobacco. It is also chargeable on some activities such as betting and premises such as those which have a license to sell liquor. In the 2010 Budget, excise was extended to selected fuels for heating as well as petrol and diesel: the carbon tax. Excise is levied as a euro amount on the volume or quantity sold rather than as a percentage of the price as is the case with VAT.<sup>4</sup> Rates also vary depending on the product. Because of data limitations, this paper offers only an exploratory analysis of excises.

The distributional effects of direct taxation have received more attention than those of indirect taxation. The ESRI's tax benefit model, SWITCH, uses data from the Central Statistics Office's Survey on Income and Living Conditions (EU-SILC) to simulate welfare and income tax changes. The resulting effects on different household types and income levels can then be assessed. Most recently, the distributional impact of replacing PRSI contributions, the health contribution and the income levy with a universal social charge (assumed to be 7.5% of gross income) was examined. Results show that the top 20% of earners in Ireland would gain but losses would be incurred by the remainder of workers (Callan et al., 2010). The distributional impact of a carbon tax in Ireland was examined by Callan et al. (2009). The authors find that a carbon tax of €20/tCO<sub>2</sub> would be regressive. In a similar study Verde and Tol (2009) find that households in the lowest income decile would pay over 2% of their disposable income in carbon taxes if the tax was €20/t CO<sub>2</sub>. The highest earners, on the other hand, would pay only about 0.3% of their disposable income. The carbon tax that was introduced in Budget 2010 is €15/t CO<sub>2</sub>. In 2010 Callan et al. studied the distributional impacts of a property tax in Ireland. The authors assume a tax of 0.4% of the capital value of the property and find that households in the

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<sup>4</sup> In the case of cigarettes, excise is charged at 183.42 per thousand together with an amount equal to 18.25% of the price at which the cigarettes are sold by retail

third income decile would be worst hit. Income exemption limits and marginal relief would be needed to protect low income households.

We also consider the changes in revenue that result from changes in the rates of VAT. The expenditure pattern is that of the 2004/2005 HBS. Total VAT collected in 2005 was €12.1 billion. We estimate that the total VAT intake from private households based on the expenditure items included in the HBS was €5.8 billion<sup>5</sup>. Using Housing Statistics data from The Department of Environment Heritage and Local Government, we estimate that the total VAT payments on the sale of houses in 2005 were over €3 million (DoEHLG, 2006). The remaining €3 billion comes from a variety of sources. These include VAT payments from households on services such as legal services and estate agents (which are not captured accurately in the HBS) as well as VAT paid by small businesses that are not entitled to VAT refunds. The VAT paid by people who reside in residences such as nursing homes and army barracks is also excluded from our study.

This paper continues as follows. Section 2 presents the data and methodology. In section 3 we discuss the results and section 4 provides a discussion and conclusion.

## **2. Data and Methodology**

The data used is the anonymised data file for the 2004/2005 HBS (CSO, 2007a). This is a survey of a representative random sample of all private households in Ireland. The main aim of the HBS is to determine household expenditure in order to update the weightings used for the Consumer Price Index. Detailed information is also provided on income, household characteristics and household facilities. In 2004/2005, 6,884 private households participated in the survey. This represented a response rate of 47%.

Respondents are asked to fill out an expenditure diary in which they list all items bought and the relevant amount spent in the previous week. Expenditure on items such as domestic fuels is recorded over a longer period. In order to estimate the amount that each household pays in VAT per week, we assign the appropriate VAT rate (exempt, 0%, 4.8%, 13.5% or 21%) to 1469 expenditure items recorded in the survey. The website of the Office of the Revenue

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<sup>5</sup> We analyse VAT expenditure as a proportion of disposable income by households of different sizes in the HBS. We apply these expenditure patterns to all households in Ireland using the 2006 Census.

Commissioners (2010) provided information on the appropriate rates for each item in both 2009 and 2010. The HBS provides a household equivalisation factor based on a Eurostat definition.<sup>6</sup> We can thus assess the proportion of weekly disposable income spent in VAT by equivalised income decile. Results are weighted using an appropriate grossing factor. We also compare VAT spending in urban versus rural locations and across households of different size and composition. We then simulate what the distributional impacts of various rate changes would be. First we assume a flat rate of 10.9% on all goods and services. We then increase this to 13.5% and 21%. A flat rate of 7% is also considered.

We also assess the impacts taxing food, alcohol, tobacco, children's clothing and fuel at various rates. Food is currently subject to VAT at 0%, 13.5% and 21%, making the system somewhat complex.<sup>7</sup> We are interested in seeing what the effects of taxing all food at the same rate would be. Like food, fuel is a necessary item, the purchase of which tends to impact more heavily on poorer households. Thus, we examine various rate changes on these goods. We analyse the effect of rate changes on children's clothing because children's clothing is currently zero rated so as to reduce regressivity. The rates on alcohol and tobacco are also considered because, like fuel these goods are heavily taxed. They are subject to both VAT and excise.

In common with most tax benefit models, we assume that demand does not change when VAT changes. This is a reasonable assumption for goods with low price elasticities such as basic food items and fuel, but less realistic for luxury goods. The Irish Government states in the National Recovery Plan that the standard rate of VAT will increase to 22% in 2013 and to 23% in 2014. We analyse the distributional implications of such increases. The results are presented in the next section.

### **3. Results**

In this section the distributional effects of various VAT rates for private households is discussed. We consider the imposition of a flat VAT rate because this would lower administrative costs and

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<sup>6</sup> Head of household = 1, other adults ( $\geq 14$  years of age) = 0.7, Children ( $< 14$  years of age) = 0.5.

<sup>7</sup> The motivation for different rates on food is to reduce regressivity. Staple foods are zero-rated, luxury foods are standard-rated, and in-between foods are reduced-rated. However, the manner in which food items are assigned to different groups is complex. For example, chocolate chip biscuits are subject to VAT at 13.5% while chocolate biscuits are charged at 21%.

remove market distortions. However, the introduction of a flat rate may make the system more regressive than it is at present. Thus, we analyse how a flat VAT rate affects households of different income levels and different household types. Expenditure patterns vary substantially across income levels and household types. We consider the impact of various rate changes on households of different types and income levels. Table 1 shows the change in Government revenue that results under all of the VAT rate scenarios considered in this paper.

[Table 1 about here]

### **3.1 The current system and the imposition of a flat rate**

First we consider the distributional impact of VAT using 2009 and 2010 rates and we compare this to the imposition of flat rates of various levels. Results are shown in Figure 1. The Budget 2010 line is hidden behind that of Budget 2009, indicating that the distributional impact of VAT hardly change between these years.<sup>8</sup> Households in the lowest equivalised income decile currently pay about 16% of their disposable income in VAT while the richest households pay only about 6%. Thus, the system is highly regressive.

Figure 1 also shows the impact of imposing a flat rate across all goods and services. We compare the distributional effects of different flat rates of 7% (roughly half the reduced rate), 13.5% (the reduced rate), and 21% (the standard rate). In each scenario, the poorest households pay the highest proportion of disposable income in VAT. Although a flat rate across all goods and services would widen the tax base, a flat rate of 7% would imply a lower burden for all deciles compared to the current system. The loss in revenue (assuming no change in demand) would be almost €2 billion however. A flat rate of 13.5% would raise almost €1.2 billion more revenue than that collected under the 2009 scenario, but it would be slightly more regressive. A flat rate of 21% would raise €4.3 billion extra revenue but is the most regressive of all of the scenarios considered in Figure 1.

After some experimentation, we found that a flat rate of 10.9% would have the same impact across the income spectrum. It would raise €74 million less revenue, which is only 0.6% of all

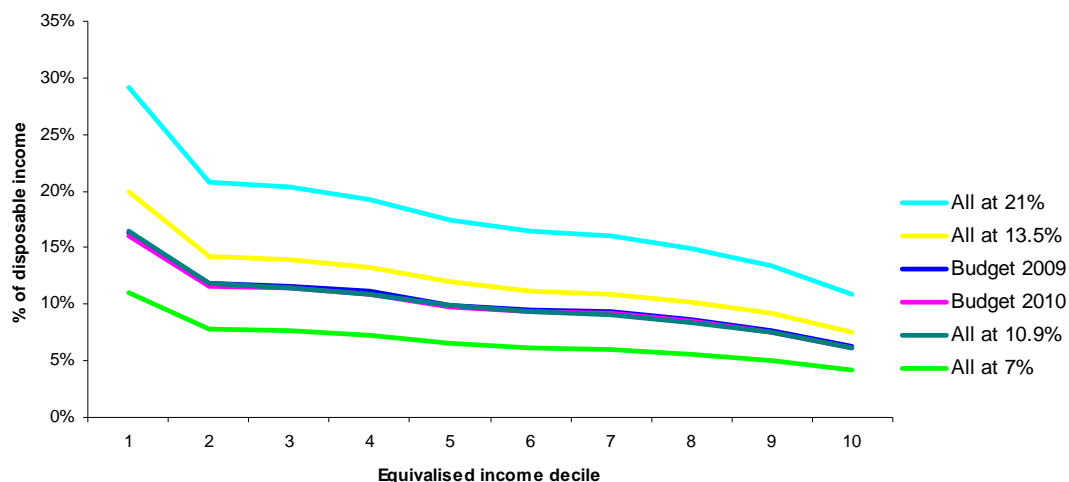
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<sup>8</sup> The standard rate was increased to from 21% 21.5% on December 1<sup>st</sup> 2008. It was brought back to 21% in January 2010.



VAT revenue collected in 2005. The administrative costs of a flat rate are, of course, lower and as argued above, a flat rate would be less distortionary.

**Figure 1. VAT spending across equivalised income deciles: The current system and flat rates**



When we compare the same rates across household size (see Figure 2), we find that for the 2010 rates, 2 person households pay the lowest proportion of their income in VAT while 6 person households pay the highest, as was the case for the 2009 rates. A flat rate of 10.9% would have almost the same effect on all household sizes as the present system. The effect of a 7% flat VAT rate is fairly stable across households of different sizes, however, fluctuations between households of different size become more pronounced as the rate increases.

**Figure 2. VAT spending across household size: The current system and flat rates**

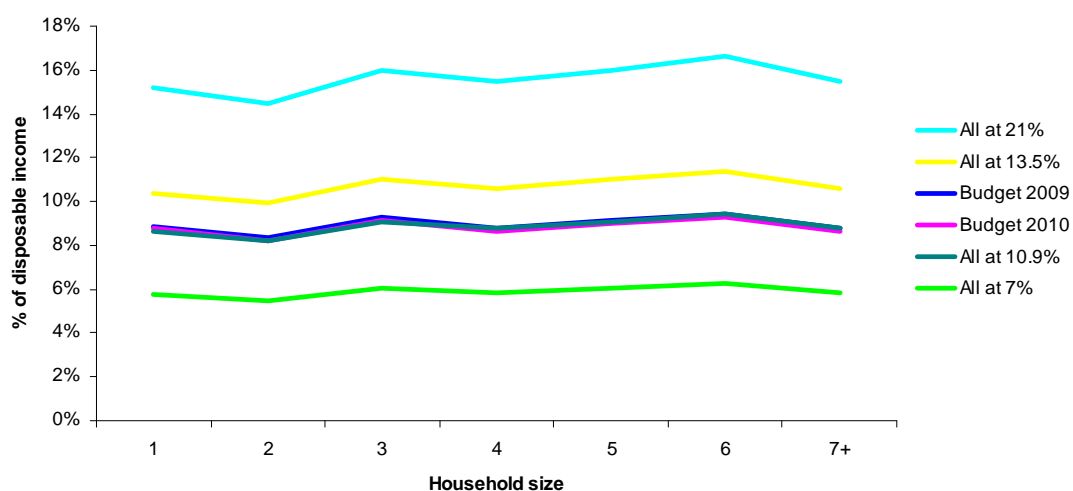
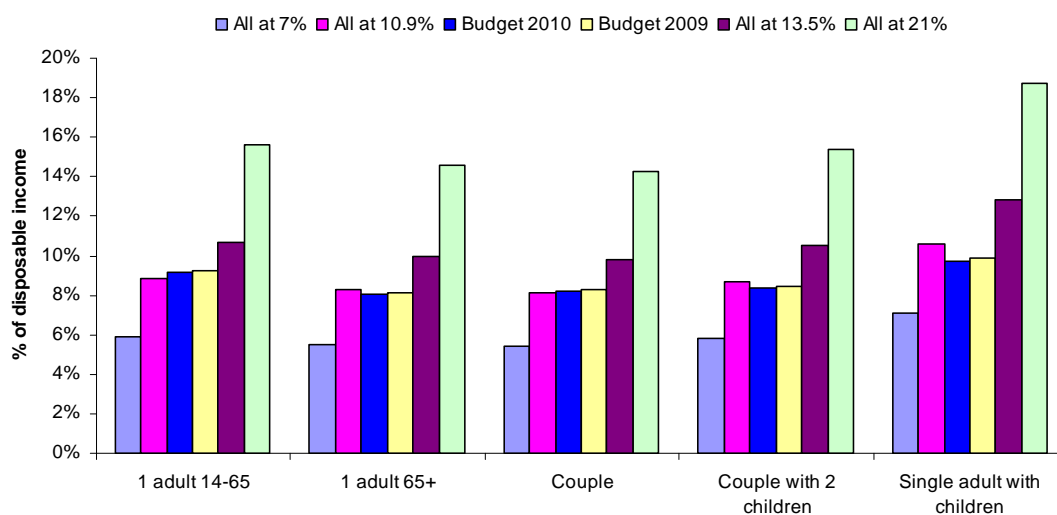


Figure 3 shows how the VAT rate affects households of different composition. In all cases, households containing a single adult with children pay the highest proportion of their disposable income in VAT relative to other household types. This is partly because these households have a low ability to save and they also pay a lower amount in direct taxes than other households. Under the current system, about 10% of their disposable income is spent in the form of VAT. The amount of VAT spent by single adult households varies with the age of the occupant. Adults under 65 spend a much higher proportion of their income in VAT than older adults. With the exception of the 2009 scenario, households containing couples pay the lowest proportion of their disposable income in VAT. This may be because a higher proportion of their income is diverted towards mortgage repayments, savings or direct taxation than other household types.

**Figure 3. VAT spending across household composition: The current system and flat rates**



It is likely that people of different ages would have systematically different consumption patterns. We are not able to identify the ages of all of the members of multi-person households. However, we did consider the differential impact of VAT by age of the household reference person (HRP). The results are very similar to those of the household composition analysis. Households whose reference person is aged between 14-65 spend about 9% of their disposable income in VAT at present. This mirrors the result for households containing one adult aged between 14 and 65 shown in Figure 3. Where the HRP is over 65, the amount of disposable income spent on VAT is 8%. This corresponds to the spending of households containing one adult aged over 65. Households containing a couple or a couple with children spend a similar

proportion of their income on VAT to households whose reference person is aged between 25 and 44.

We also considered the effect of VAT in rural versus urban areas. Differences are small and cannot be clearly observed from a graph. Rural households pay a slightly higher proportion of their disposable income in VAT under the current system. If a flat rate on all goods and services were introduced, urban households would pay a slightly higher proportion of their disposable income in VAT compared to rural households. This is because urban and rural households have slightly different expenditure patterns. Urban households spend more on rent or mortgage repayments, clothing, alcohol and tobacco than rural households. Rural households, on the other hand, spend more on food, fuel, transport and lighting. These expenditure patterns, as well as the fact that total expenditure is higher amongst urban households, mean that urban households would pay a higher proportion of their income in VAT if a flat rate were introduced.

### **3.2 Food and children's clothing**

Children's clothing and footwear and most food items are currently zero rated. In this section we discuss the implications of changing the rate on these items and we compare the distributional effects of doing so to those of the current situation.

Different types of food have different VAT rates. Staple foods are subject to a zero rate, while luxury foods are taxed at the standard rate – with some food at the reduced rate. The definition of “staple” and “luxury” food is arbitrary to a degree and the current definitions may be discriminatory to immigrants. Croissants and custard, for instance, are zero-rated while poppadoms and baklava have a VAT rate of 13.5%.

Figure 4 shows that the imposition of a rate of 0% on all food items (keeping VAT rates on all other items as they are under the 2010 scenario) reduces the amount that all households pay in VAT. The associated loss in revenue would be €382 million. The HBS shows that spending as a proportion of disposable income on food items that are levied at either 13.5% or 21% under the 2010 scenario decreases dramatically as income increases. Households in the lowest income decile spend almost 10% of their weekly disposable income on these items whereas the richest 10% of the population spend less than 1%. Upon the introduction of 0% VAT on all food items, the biggest savings would be made by households in the second equivalised income decile. Imposing a rate of 21% on all food items would increase the proportion of income spent in VAT

by all households, dramatically so for those at the lower end of the income distribution. The amount of VAT collected would increase by €91 million, however.

Increasing the rate on children's clothing to 21% appears only marginally worse for households than the current situation.<sup>9</sup> In each case the system is regressive and reducing the VAT on all food to 0% does not overcome this problem.

**Figure 4. VAT spending across equivalised income deciles: Food and children's clothing**

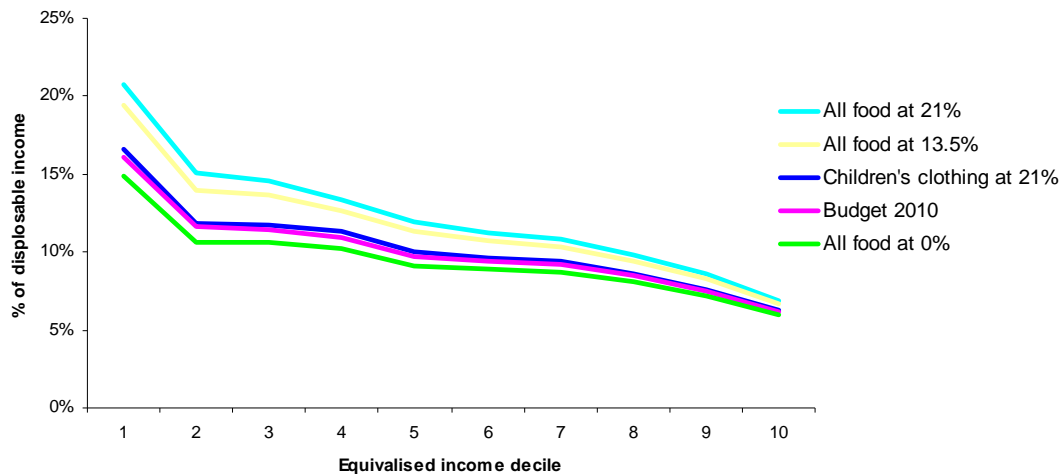
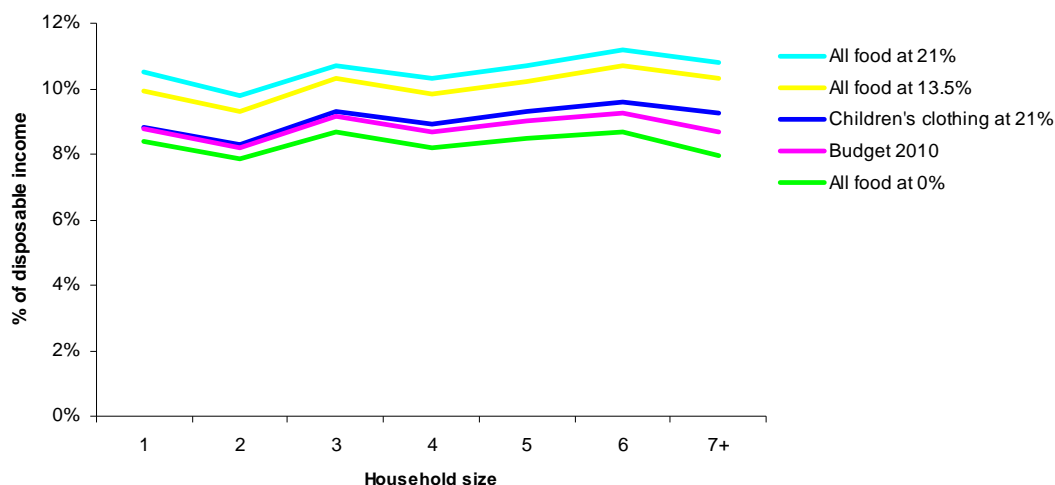


Figure 5 shows that increasing the rates of VAT on food would have the most significant effect on 6 person households. As we might expect, a rate of 21% on children's clothes does not appear to affect 1 or 2 person households; however, larger households would be forced to increase the proportion of their income that they spend in VAT from 9% to 11%.

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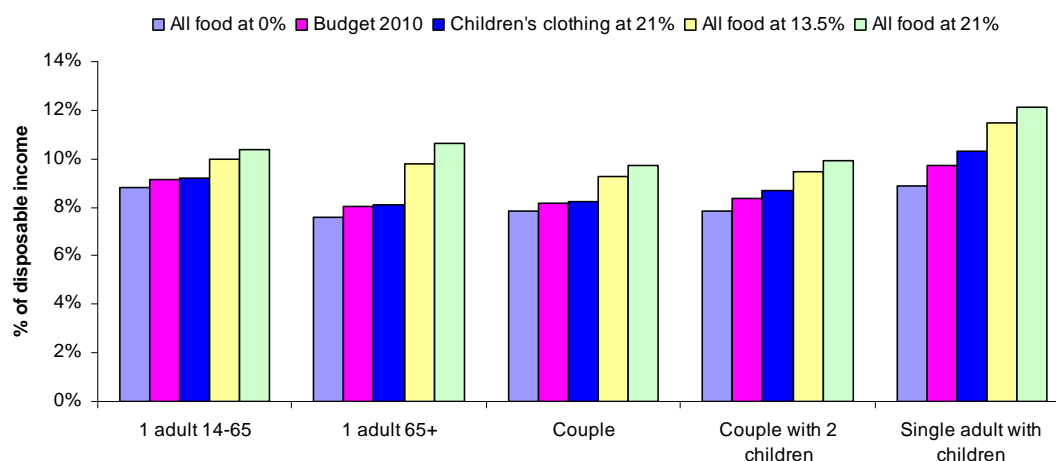
<sup>9</sup> We include children's footwear in the "children's clothing" category.

**Figure 5. VAT spending across household size: Food and children's clothing**



Households containing single adults and children would spend about 12% of their disposable income in VAT if all food was liable at 21% (see Figure 6). However, for couples with 2 children, the figure would be less than 10%. Interestingly, couples with 2 children would only increase the amount they spend in VAT by 0.3% if VAT on children's clothes were increased to 21%. This is probably because, spending on clothes accounts for only a small proportion of their income. The HBS suggests that they are, instead, diverting a higher proportion of their income towards mortgage repayments and housing costs. In all circumstances considered here, households containing 1 adult under 65 spent more of their income in VAT than their older counterparts, except for the scenario in which all food is liable at 21%.

**Figure 6. VAT spending across household composition: Food and children's clothing**



We also compared the effects of these scenarios in urban versus rural areas and found that differences between the two groups are small. In all of the scenarios, rural households spend a slightly higher proportion of their disposable income in VAT than their urban counterparts. Descriptive statistics from the HBS show that rural households are bigger on average than urban ones; however, urban incomes are higher. The HBS also shows that rural households have a higher number of children on average than urban ones. This explains why rural households would be disproportionately hit if the rate of children's clothing were increased to 21%.

### 3.3 Food, alcohol, tobacco and fuel

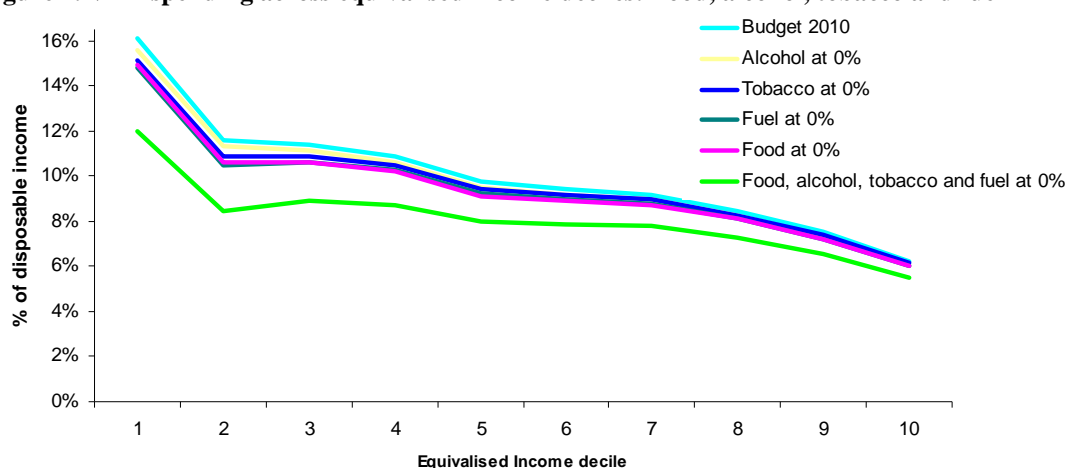
Imposing a rate of 0% on all food, alcohol, tobacco and fuel would result in savings for all households, especially those at the lower end of the income distribution (see Figure 7). The loss in revenue would be just over €1 billion. The zero rating of tobacco and alcohol would make the system slightly less regressive but only if the current level of demand was to be maintained in poor households. The HBS shows that households in the lowest income decile spend over 8% of their disposable income on alcohol whereas the average for the rest of the population is only 4.3%. The HBS also shows that the amount spent on tobacco as a proportion of disposable income decreases dramatically as income increases.<sup>10</sup> If a reduction in the price of alcohol and

<sup>10</sup> Those in the lowest income decile also spend more on cigarettes in absolute terms.

tobacco were to result in increased demand the system may become even more regressive.<sup>11</sup> This may also have a negative effect on health.

Fuel for domestic use is currently subject to VAT at 13.5% while petrol and road diesel are liable at 21%. Reducing the VAT on these fuels to 0% would also result in savings for all households but about €360 million in revenue would be lost. Poorest households would gain most in such a situation. This result is driven mainly by the fact that households in the lowest income decile spend almost 20% of disposable income on home heating whereas the richest households spend under 2%.

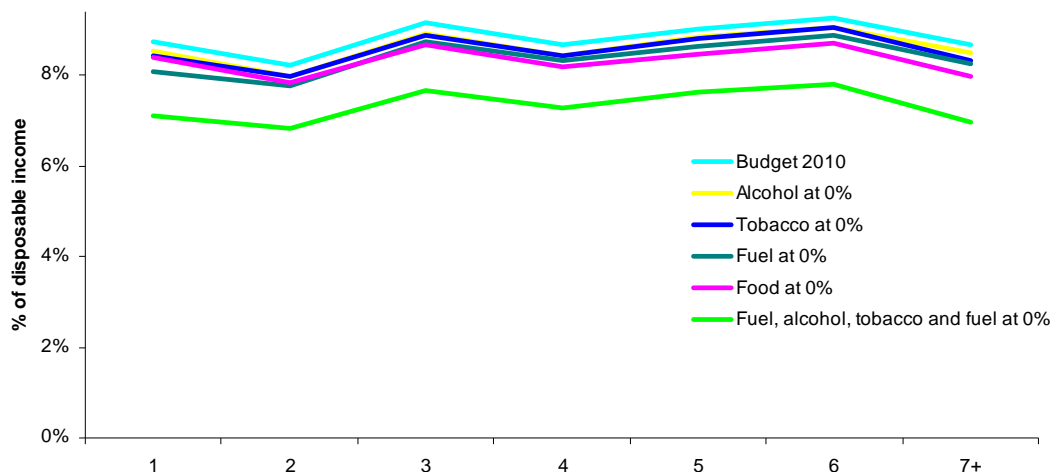
**Figure 7. VAT spending across equivalised income deciles: Food, alcohol, tobacco and fuel**



In all cases, 6 person households spend the highest proportion of their disposable income in VAT and 2 person households spend the least, even if the selected items are liable at 0% (see Figure 8). The reduction of VAT to 0% on tobacco and alcohol has almost the same effect across household sizes except for minor differences in the smallest and largest household size categories. Households of all sizes would reduce the amount they spend in VAT by between 16% and 19% if all four items were zero rated. The largest savings would be made by households with 7 or more people.

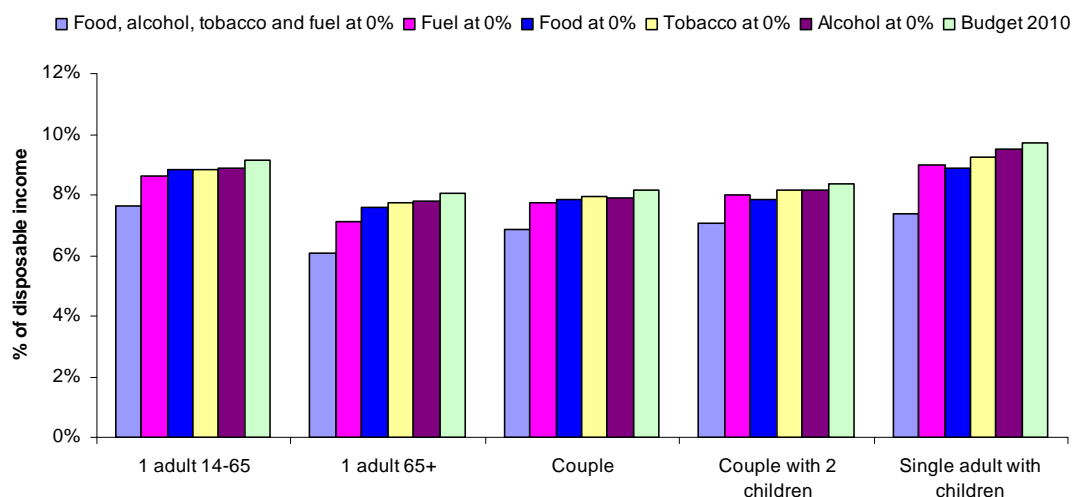
<sup>11</sup> Note that alcohol and tobacco are also subject to excise duties as well as VAT.

**Figure 8. VAT spending across household size: Food, alcohol, tobacco and fuel**



When we look at the effect across households of different composition (see Figure 9), we see that households containing a single adult and children pay the highest proportion of disposable income in VAT in all circumstances except when all four items are zero rated. In fact, if this change was made, single parent households would reduce the amount they spend in VAT (as a proportion of disposable income) by over 24%. Households containing 1 adult over 65 years of age would make gains of a similar magnitude while other households would save 16% on average.

**Figure 9. VAT spending across household composition: Food, alcohol, tobacco and fuel**



Both rural and urban households would only begin to make savings if VAT was removed from all four groups of items considered here; food, alcohol tobacco and fuel. Interestingly, rural

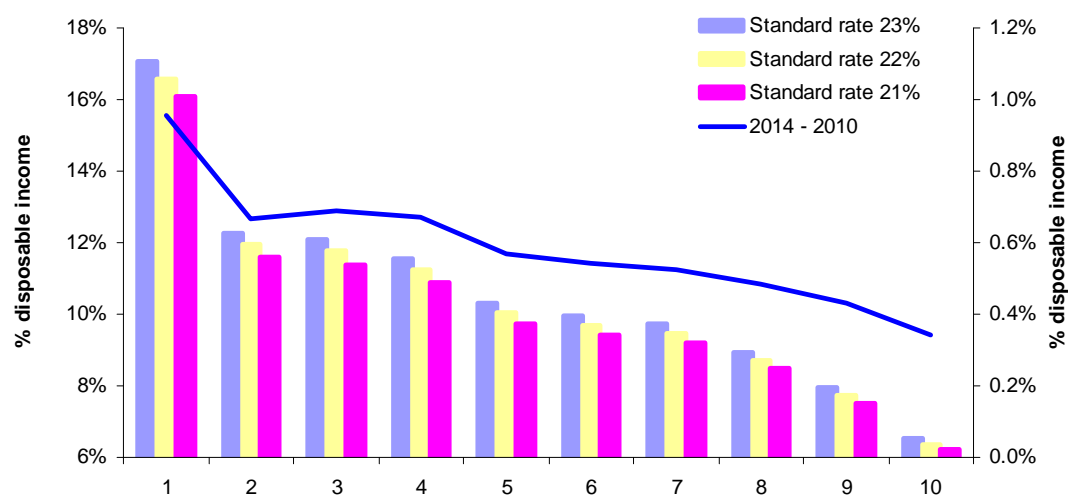


households would only save 0.5% of their disposable income if VAT was removed on fuel. It may be that any gains that are made from a reduction in VAT on petrol or diesel may be diminished because rural households generally spend more (as a proportion of disposable income and in absolute terms) on heating their homes. In all cases, rural households spend a slightly higher proportion of their disposable income in VAT even if the selected items are zero rated. However, differences between the two groups are small and cannot be observed clearly from a graph.

### 3.4. Increasing the standard rate of VAT

As part of the National Recovery Plan, the Government plans to increase the standard rate of VAT from 21% to 22% in 2013 and to 23% in 2014. Figure 10 shows the impact of such increases across the income distribution. The blue, red and green columns, which correspond to the axis on the left hand side, show the percentage of disposable income spent by households in each income decile under the 3 scenarios. The grey line, which corresponds to the axis on the right hand side, shows the extent to which VAT payments will increase between 2010 and 2014. The poorest households will be worst affected, spending almost 1% more of their income on VAT in 2014 than they do at present. The implications of these rate increases on households of different sizes and compositions can be seen in Table 2.

**Figure 10. Increasing the standard rate of VAT**



[Table 2 about here]

### **3.5. Excise duties**

We were unable to assess the effect of excise duties across the income distribution or different household types using the HBS because it only records expenditures and not the volume or quantity of items bought. However, we were able to conduct an analysis of excise on alcohol and cigarettes using data from Wave 1 of the Growing Up in Ireland (GUI) study. GUI is a comprehensive study of 8,568 nine year olds in Ireland; 14% of the total nine year old population. Parents and guardians of the children were also asked to complete a questionnaire.<sup>12</sup> The questionnaires included questions on eating, drinking and smoking habits as well as socio economic characteristics. We estimated the proportion of net household income spent in the form of excise on wine, beer and spirits by the parents/guardians.<sup>13</sup> We also estimated excise spent on cigarettes. Because excise is charged on each cigarette as well as per the price of a packet, we assumed that cigarettes were sold in packets of 20. We assumed the average price of a packet was €8.45. We were unable to estimate the excise spent on cigars or fine-cut tobacco because excise on these items is charged per weight sold. Table 3 shows the proportion of net household income that is spent by parents/guardians in the form of excise on cigarettes and alcohol across the income distribution. Excise on cigarettes far outweighs that of alcohol. Although the study is not representative of the drinking and smoking population, the results show that excise duties on cigarettes are highly regressive. This is not the case for alcohol. In fact, the amount of excise, as a proportion of net household income, paid on alcohol is stable across the income distribution. If more detailed data are available in the future, the distributional effects of excise duty in Ireland could be assessed in greater detail.

[Table 3 about here]

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<sup>12</sup> Questionnaires were completed by both parents/guardians in 6,608 households. 928 households are single parent households.

<sup>13</sup> There were no questions about the consumption of other types of alcoholic drinks such as port, sherry, liqueurs or alcopops.

#### **4. Discussion and Conclusion**

In this paper, we study the effects of VAT in Ireland across income deciles, household size and household composition. We also analyse the differences between urban and rural households. The current rates, as well as the rates that were in place in 2009, give rise to a system which is highly regressive. Even when we simulate various rate changes such as the abolition of VAT on food or children's clothing, households in the lowest income decile still pay the highest proportion of disposable income in VAT. The imposition of a flat rate across all goods and services, no matter what the level, would also disproportionately hit the poorest households.

The Irish Government has made an attempt to address this regressivity by zero rating most food and children's clothes and shoes. While the system is still regressive, we find that if the rates on these items were increased, the situation would be even worse and households in the second income decile would suffer most. Conversely, imposing a rate of 0% on all food items would bring some relief to poor households. As stated earlier, some bakery products are subject to VAT at 13.5% while 21% VAT is charged on confectionery, some savoury snacks and soft drinks. If all of these items were zero rated, households in the lowest income decile would spend 7% less of their disposable income in VAT while households in the second income decile would save 9%, the highest of any group. We also examined the impact of zero rating alcohol and tobacco. While this could make the system slightly less regressive, policy makers should be careful not to encourage increased consumption of these products, especially among low income households where consumption levels are already relatively high.

We have also examined the possible effects of introducing a flat rate of VAT across all goods and services and the associated revenue changes. We considered rates of 7%, 10.9%, 13.5% and 21%. A rate of 7% would result in gains for all households while a rate of 10.9% would have approximately the same effect on the income distribution as the current system, but would lower administrative costs, widen the tax base and reduce economic distortions. The Commission on Taxation (1984) suggested that those households that are disproportionately hit could be compensated with some form of welfare payment which would be more effective in achieving redistribution than the use of zero-rating. This point was reiterated by Durkan (2010). Our analysis suggests that such compensation should particularly target children and single parents. Crawford et al. (2010) suggest that all zero and reduced rates, except for those on housing and exports, should be ended in the UK. However, they warn that such a move should be matched by

increased benefits and tax credits for the poorest households. Not only would this result in increased revenue for Government but the poorest 30% of the population would subsequently be better off.

We also analysed the distributional implications of VAT increases proposed in The National Recovery Plan. Increasing the standard rate of VAT to 22% and 23% will disproportionately hit the poorest households if it is not offset by other measures.

As far as we know, this is the first paper to consider the distribution of Irish VAT payments based on household characteristics. In relation to household size, 6 person households pay the highest proportion of disposable income in VAT. The imposition of a flat rate or the zero rating of various items does not change this result. In the household composition category, households containing a single adult and children are worst affected. Reducing the rate on all food and/or fuel to 0%, however, would result in significant gains for these households. The analyses of VAT spending by household composition and age of the HRP yield similar results. Considering location, in almost all circumstances, rural households bear a disproportionate burden of VAT compared to urban households. The exception occurs in a situation where a flat rate would be applied to all goods and services. However, the differences between the two groups are small.

We were unable to estimate the effects of VAT on people who live in collective residences, as they are omitted from the HBS. For the same reason, age and ethnicity are excluded from the current analysis. The analysis for the different types of households suggests that VAT falls more heavily on younger people than older people.

The available data do not allow us to include excise duties on alcohol and tobacco in the main analysis. However, data from another, imperfectly suited source suggests that the excise paid on alcohol is proportional to income, while poorer household pay a much larger share of their income towards excise on tobacco.

This paper offers a descriptive analysis. Changes in VAT rates would induce changes in demand and supply but these considerations are omitted from this paper. We find a flat rate VAT that would not affect the income distribution and it would raise approximately the same amount of revenue. Reduced VAT rates apply to necessary goods which (by definition) have a low price elasticity. The revenue-neutral flat rate VAT is therefore lower when correcting for the response of the market. Furthermore, market power is different for different goods and services. Retail margins of supermarkets in Ireland are not published but they are believed to be particularly high

(Office of the Revenue Commissioners and CSO, 2009). Thus, one may suspect that a price increase from zero- to flat-rate VAT for food would be partly absorbed by the retailer.

A single VAT rate would have wider consequences for the economy. During recessions, households tend to maintain their expenditure on essentials and consumables but postpone the purchase of luxury goods and durables. A flat rate VAT would shift consumption towards luxuries and durables and may have a counter-cyclical impact. Cross-border shoppers and tourists disproportionately purchase luxury goods. A flat rate VAT would make Ireland more attractive to them. These issues are deferred to future research.

### **Acknowledgements**

We are grateful to Anne Jennings and Donal McCarthy for data support. An earlier version of this paper was presented at the ESRI; participants had excellent comments that helped to improve the exposition.

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**Table 1. Change in revenue as a result of VAT changes**

	Total VAT intake from households 000000s	Change in revenue compared to 2009
2009	5,777	
All goods and services at 7%	3,796	-1,981
Food, alcohol, tobacco and fuel at 0%	4,750	-1,027
All Food at 0%	5,395	-382
Fuel at 0%	5,417	-360
Tobacco at 0%	5,533	-244
Alcohol at 0%	5,545	-233
All goods and services at 10.9%	5,703	-74
Children's clothing at 21%	5,815	38
All food at 13.5%	6,462	685
All food at 21%	6,768	991
All goods and services at 13.5%	6,906	1,129
All goods and services at 21%.	10,066	4,289

**Table 2. Implications of increasing standard VAT rate on household types**

Household Size	Standard rate at 21%	Standard rate at 22%	Standard rate at 23%	2014-2010
1	8.75%	8.99%	9.21%	0.46%
2	8.21%	8.44%	8.67%	0.46%
3	9.15%	9.42%	9.69%	0.54%
4	8.67%	8.93%	9.18%	0.51%
5	9.02%	9.28%	9.53%	0.51%
6	9.27%	9.54%	9.80%	0.54%
7	8.66%	8.93%	9.20%	0.54%
Household Composition				
1 adult 14-65	9.14%	9.39%	9.63%	0.49%
1 adult 65+	8.04%	8.24%	8.44%	0.40%
Couple	8.17%	8.40%	8.63%	0.46%
Couple with 2 children	8.35%	8.59%	8.82%	0.47%
Single adult with children	9.74%	10.03%	10.31%	0.57%



**Table 3. Excise duty as a proportion of income**

Income Decile	Excise on alcohol as a proportion of net household income	Excise on cigarettes as a proportion of net household income	Total
1	0.002	0.060	0.062
2	0.002	0.041	0.044
3	0.002	0.034	0.036
4	0.002	0.028	0.030
5	0.002	0.024	0.027
6	0.002	0.020	0.023
7	0.002	0.017	0.019
8	0.002	0.015	0.017
9	0.002	0.012	0.014
10	0.002	0.007	0.008

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