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# Taxes, income and economic mobility in Ireland: New evidence from tax records data

**Seán Kennedy,**
**Yosuke Jin,**
**David Haugh,**
**Patrick Lenain**

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# TAXES, INCOME AND ECONOMIC MOBILITY IN IRELAND: NEW EVIDENCE FROM TAX RECORDS DATA

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**By Seán Kennedy, Yosuke Jin, David Haugh and Patrick Lenain**

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## ABSTRACT/RÉSUMÉ

### Taxes, income and economic mobility in Ireland: new evidence from tax records data

This paper analyses income inequality in Ireland using a new panel dataset based on the administrative tax records of the Revenue Commissioners for Ireland. High inequality at market incomes in Ireland by international standards appears to be driven by both ends of the income distribution. An analysis of income mobility over time shows it has been low at both ends of the income distribution, though it increased at the low end once the crisis began, reflecting the sharp deterioration of the labour market. The data confirms that the tax system is highly progressive at the high end of income distribution and the welfare system provides the most significant support to lower income deciles in Ireland. The redistributive function in the tax and benefit system was enhanced during the last decade, not only because more income support was necessitated with the crisis, but also because of steeper and more progressive tax rates.

This working paper relates to the 2015 OECD Economic Survey of Ireland (www.oecd.org/eco/surveys/economic-survey-ireland.



*JEL classification:* D31, D63, E24, H24, H53

*Key Words*: Income distribution, earnings mobility, income tax, tax allowances, tax credit, social benefits


*****


### Les impôts, le revenu et la mobilité économique en Irlande: nouvelles preuves à partir des données des dossiers fiscaux

Ce document analyse l'inégalité de revenus en Irlande à l'aide d'un dataset panel construit à la base des déclarations fiscales du Revenue Commissioners de l'Irlande. La forte inégalité du revenu initial en Irlande par rapport aux normes internationales apparait être dirigée par les deux extrémités de la distribution des revenus. Une analyse de la mobilité économique (à travers de la distribution des revenus) dans le temps montre qu'elle était faible aux deux extrémités de la distribution des revenus, mais elle a accru à l'extrémité inférieure de la distribution une fois la crise a commencé, en reflétant la forte détérioration du marché du travail. Les données confirment que le système fiscal est hautement progressif à l'extrémité supérieure de la distribution des revenus et le système de protection sociale fournit le soutien le plus important au sein de déciles de revenu inférieurs en Irlande. Le fonctionnement redistributif du système d'imposition et de protection sociale a été renforcé dans la dernière décennie, non seulement car la crise a nécessité plus de soutien du revenu, mais aussi en raison des taux d'imposition rendus plus accentués et progressifs.

Ce Document de travail se rapporte à l'Étude économique de l'OCDE de Irlande 2015 (www.oecd.org/fr/eco/etudes/etude-economique-irlande.htm).



*Classification JEL* :D31, D63, E24, H24, H53

*Mots-clés:* Distribution des revenus, mobilité économique, impôt sur le revenu, réduction d'impôt, crédit d'impôt, prestations sociales

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# TAXES, INCOME AND ECONOMIC MOBILITY IN IRELAND: NEW EVIDENCE FROM TAX RECORDS DATA

By Seán Kennedy, Yosuke Jin, David Haugh and Patrick Lenain[1]

*This paper analyses income inequality in Ireland using a new panel dataset based on the administrative tax records of the Revenue Commissioners for Ireland. High inequality at market incomes in Ireland by international standards appears to be driven by both ends of the income distribution. An analysis of income mobility over time shows it has been low at both ends of the income distribution, though it increased at the low end once the crisis began, reflecting the sharp deterioration of the labour market. The data confirms that the tax system is highly progressive at the high end of income distribution and the welfare system provides the most significant support to lower income deciles in Ireland. The redistributive function in the tax and benefit system was enhanced during the last decade, not only because more income support was necessitated with the crisis, but also due to reforms which made the statutory tax rate more progressive*.

## Introduction

1. A detailed understanding of the distribution of incomes, the role played by the tax-transfer system, as well as income mobility over time can help to inform better policy that promotes growth and equity simultaneously. The present paper uses a unique micro-level dataset on incomes, taxes and transfers; the dataset covers 15 years (1997-2012), thus giving a unique opportunity to evaluate the impact of the business cycle, the financial crisis and changes in policy settings in the evolution of the income distribution over time. This medium-term perspective is particularly important because a highly unequal income distribution is of less concern if coupled with income mobility across time.

2. The distribution of income before tax and transfers ("*market income*") in Ireland is one of the most unequal in the OECD (OECD, 2015a; O'Connor and Staunton, 2015). There is a high concentration

1. This paper was prepared as supporting material for the OECD Economic Survey of Ireland published in September 2015 under the authority of the Economic and Development Review Committee. It is a joint project of the Revenue Commissioners (Seán Kennedy) and the OECD (Patrick Lenain, David Haugh and Yosuke Jin). The co-authors from the OECD would like to thank staff in the Revenue Commissioners who had direct access to tax records data and processed the data for the purpose of this study. The authors would like to thank the Department of Social Protection for providing data and Bob Ford, Claire Keane, Sarah Perret in the OECD, David Hegarty, Terence Hynes, Brendan O'Connor, other colleagues in the Department of Finance Ireland and Larry McCarthy, Pat Mulhall and Keith Walsh from the Revenue Commissioners for comments and helpful suggestions on the paper. This paper should not be reported as representing the official views of the Revenue Commissioners or of the OECD or of its member countries. The opinions expressed and arguments employed are those of the authors.

of income at the top of the distribution, though less so than in some other countries (Haugh et al., 2015). High market income inequality by international standards appears to be driven to a greater extent by the lower end of the distribution: the income share of the bottom 20% households is the lowest in the OECD countries (Haugh et al., 2015, drawing on the OECD Income Distribution Database).

3. This paper documents the distribution of income and income mobility over time in Ireland, based essentially on micro data from the administrative tax records kept by the Revenue Commissioners. It also uses tax record micro-data to document taxation and social charges in Ireland and reports that the tax and benefit system has become more progressive in the past decade. An important negative side-effect of progressivity is a relatively strong disincentive to increase work due to high marginal tax rates. A companion paper, O'Connor, Hynes, Haugh and Lenain (2015), informed by the analysis here and other empirical work (for e.g. Callan et al., 2015), discusses a set of policy simulations designed to enhance both the efficiency of the tax and welfare system in terms of making it more growth friendly, while also protecting those on lower incomes.

4. The main findings from the analysis of the Revenue Commissioners' administrative tax data include the following:

(Income inequality and mobility)

- The concentration of market income at the top of distribution is high: 36.8% and 10.5% of market income went respectively to the 10% and the 1% of tax units in 2012. The way market income is distributed across different individuals has been possibly affected by the growth pattern.

- Until 2002, when growth showed a sustainable pattern, labour earnings grew in a similar way across income groups. By contrast, those in the highest group saw disproportionately strong growth during the property bubble period. After the property bubble burst, labour earnings in the aggregate declined sharply, reflecting essentially the deterioration at the low end of distribution.

- Capital income has been highly concentrated at the top of distribution, especially during the property bubble period. The crisis alleviated the intensity of capital income concentration but it remains above pre-bubble period levels.

- Around 43% of tax units remained in the same quintile income groups between 2004 and 2012. Income mobility is low at both ends of the income distribution, in line with findings in other countries. It increased however at the low end of income distribution once the crisis began, as more people moved down into the lowest income group, reflecting the sharp deterioration of the labour market, which was offset by relative upward mobility of the rest of the population within the distribution, but shifted the entire distribution downward.

- The very highest income tax units in the top 1% are characterised by a very high share of income coming from capital and particularly low income mobility over time. Around half of the top 1% tax units in 2007 remained in the same position in 2012, partly explained by a number of outstanding tax units with extraordinarily high incomes.

- The share of the top 1% tax units in the finance, insurance and real estate sectors has increased to around 1/3. In contrast, the share of the top 1% tax units in the construction sector has markedly declined after the crisis.

(Income redistribution)

- Ireland's tax system is progressive. The average effective tax rate for the top 10% and 1% of tax units was 24.5% and 31.1%, against 14.4% for total tax units in 2012. The top 10% of tax units paid 59% of total income tax in 2012, while its share of market income was 37%, which seems to be comparatively high by OECD standards.[2]

- Those who are up to the 8th income decile saw their share of income increased after redistribution (including the Universal Social Charge) in 2012: as a whole they accounted for 46.1% of the share of market income and 54.1% of the share of after tax income (an increase by 8 percentage points before and after redistribution.

- Such progressivity was increased in a decade to 2012, reflecting both the macroeconomic situation (for e.g. more unemployment benefits) and changes in the tax and benefit system: the increase in the income share of the bottom 8 deciles after redistribution was by 4 percentage points in 2002 (against 8 percentage points in 2012).

- The changes in the tax and benefit system include, notably, the introduction of the Universal Social Charge with progressive tax rates and the abolition of certain flat rate contributions; increased social benefits; and increased tax credits reducing the tax liabilities of those in low- to middle- income groups.

**What do tax records tell us about income inequality and the tax burden in Ireland?**

*The Revenue Commissioners*

5. The Revenue Commissioners ("Revenue" hereafter), as the Irish tax and customs administration, plays an important role in the Irish economy by collecting taxes and duties due to the State. Revenue also provides policy and technical advice at the national level to support the Department of Finance in the formulation of tax policy and internationally to advance Irish economic development. In this joint project, Revenue's role is to provide tax knowledge and economic analysis on the data.

*Revenue's Income Distribution Statistics (IDS) Data*

6. Revenue's Income Distribution Statistics (IDS) data is the most comprehensive source of information on income distribution in Ireland. The data is constructed using various tax records including self-assessed taxpayer returns and returns by employers on behalf of employees.[3] The data is used to produce Revenue's IDS report, which is published annually.[4] The unit of analysis in the data are tax units rather than taxpayers. The difference arises in the case of married couples who elect for joint assessment. These cases represent two taxpayers and either one or two incomes but only count as one tax unit.

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2 This is higher than the 52% of total federal taxes paid by the top 10% taxpayers in the United States (CBO, 2012), although direct comparison is difficult due to large difference in data coverage and classification.

3 Revenue's IDS data is constructed using information from a range of tax forms including P35, P60, P45 and 11. Various calculations are performed to construct variables in the dataset. Form P35 is an employer's annual declaration of liability for PAYE and PRSI contributions. Form P60 is an employee's certificate of pay, PAYE and PRSI for the year. Form P45 relates to a cessation certificate and particulars of an employee leaving employment. Under the self-assessment system, self-assessed taxpayers are required to complete the full Form 11 (or if all of the information relevant to them is contained in one of the shorter versions, Form 11S and Form 11P).

4 http://www.cso.ie/px/pxeirestat/pssn/rv01/homepagefiles/rv01_statbank.asp

7. The tax administration data consists of the entire population of 2.1 million tax units (these can be individuals or couples). It is important to note that the data is confined to those who fill in tax returns and thus does not cover those entirely reliant on untaxed benefits or undeclared income. Therefore it can be seen as under-representing lower-income groups. Nevertheless it is a rich and detailed population data set and is complementary to household survey data, the other main source of micro data on income inequality. Such household surveys are based on samples and also have representativeness issues, especially of the highest income groups, which the tax record data is better at capturing (OECD, 2013a).

***How unequal is income distribution in Ireland and how has it changed over time?***

8. Inequality developments appear to be affected by macroeconomic conditions.[5] During the "Celtic tiger" period (1994-2002), in which Ireland experienced one of the highest growth rates in the OECD thanks to sound drivers such as attractiveness to FDI and export performance, the income share of each decile remained relatively stable (Table 1).[6] Subsequently, during the property bubble period (2002-2007), only the highest income group saw a rise in its share at the expense of all the other income groups. Polarisation increased during this period, as shown by the S90/S10 and S80/S20 ratios in Table 1. In the aftermath of the property-bubble-burst (2007-2012), concentration at the high end was alleviated but the overall inequality increased when it is measured in terms of the S90/S10 ratio (due to a larger percentage change at the low end).

**Table 1. Distribution of market income in Ireland, Tax Administration Data**

| | 1997 | 2002 | 2007 | 2012 |
|---|---|---|---|---|
| **Decile 1** | 0.7 | 0.7 | 0.6 | 0.6 |
| **Decile 2** | 2.0 | 2.1 | 2.0 | 2.1 |
| **Decile 3** | 3.2 | 3.3 | 3.2 | 3.1 |
| **Decile 4** | 4.6 | 4.7 | 4.6 | 4.6 |
| **Decile 5** | 6.4 | 6.4 | 6.0 | 5.8 |
| **Decile 6** | 8.2 | 8.1 | 7.7 | 7.7 |
| **Decile 7** | 10.3 | 10.1 | 9.6 | 9.7 |
| **Decile 8** | 13.3 | 12.8 | 12.3 | 12.5 |
| **Decile 9** | 17.6 | 17.1 | 16.8 | 17.1 |
| **Decile 10 (Top 10%)** | 33.7 | 34.6 | 37.2 | 36.8 |
| **of which: Top 1%** | 8.7 | 9.5 | 11.2 | 10.5 |
| **of which: Top 0.1%** | 2.6 | 2.7 | 3.5 | 3.3 |
| | | | | |
| **S90/S10** | 51.1 | 46.2 | 60.5 | 63.4 |
| **S80/S20** | 19.1 | 18.4 | 20.7 | 20.0 |

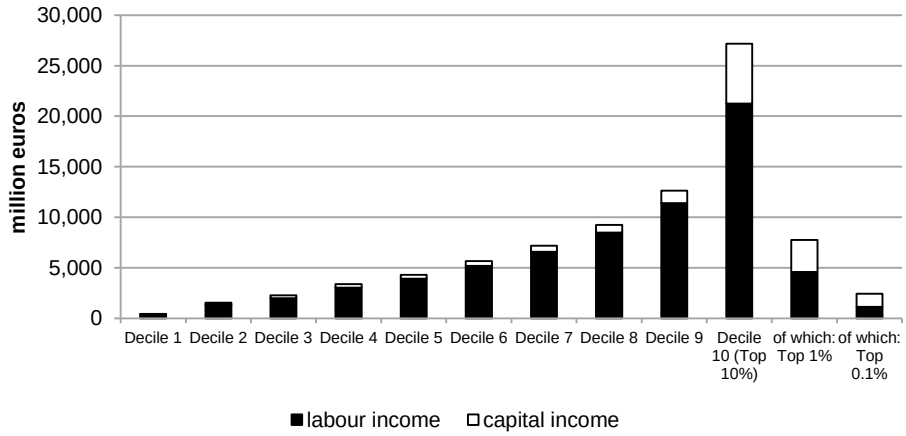
Source: OECD Secretariat's calculation using tax administration data from the Revenue Commissioners, Ireland

5 "Market income" consists of labour earnings (identified as "PAYE" total earnings in Revenue's dataset) and "Capital income" as defined in footnote 7. The Pay As You Earn (PAYE) system is a method of tax deduction under which an employer calculates and deducts any income tax due each time a payment of wages, salary etc. is made to an employee.

6 The income deciles hereafter are calculated in terms of gross income (including social benefits) on which tax is liable.

9. Labour income is the main source of earnings for most people, while capital income is highly concentrated at the top end of the distribution.[7] Capital income accounts for around 10% of total market income for deciles 1 to 9 and only becomes significant for the top decile (21.8% of their gross income). The share increases to 40.9% and 54.0% at the top 1% and the top 0.1%, respectively. The share of capital income in the aggregate (i.e. all the tax units) has been relatively stable: between 16% and 17% until 2007, with an apparent drop to 14% in 2012 after the burst of the property bubble.

**Figure 1. Composition of personal income, 2012**




Source: OECD Secretariat's calculation using tax administration data from the Revenue Commissioners, Ireland

10. The distribution of labour earnings is uneven (Table 2). The share of labour income across groups remained relatively stable during the "Celtic tiger" period (up to 2002). By contrast, only the highest income group saw its share meaningfully increase during the property bubble period. Even after the property bubble burst, the highest income group continued to increase its share along with the 8th and 9th income deciles.

**Table 2. Distribution of Labour Income**

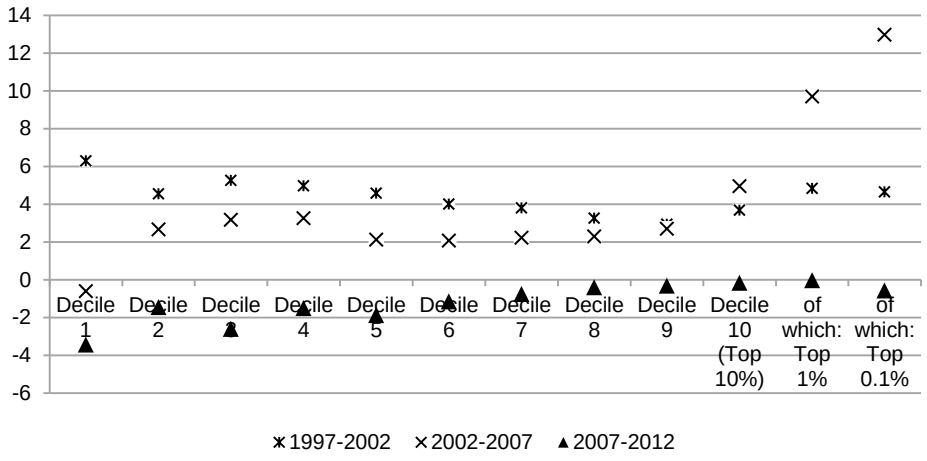
| | 1997 | 2002 | 2007 | 2012 |
|---|---|---|---|---|
| **Decile 1** | 0.8 | 0.8 | 0.7 | 0.6 |
| **Decile 2** | 2.2 | 2.3 | 2.2 | 2.1 |
| **Decile 3** | 3.2 | 3.5 | 3.5 | 3.1 |
| **Decile 4** | 4.7 | 5.0 | 5.0 | 4.8 |
| **Decile 5** | 6.6 | 6.9 | 6.5 | 6.2 |
| **Decile 6** | 8.7 | 8.8 | 8.3 | 8.1 |
| **Decile 7** | 10.9 | 10.9 | 10.4 | 10.4 |
| **Decile 8** | 14.1 | 13.7 | 13.1 | 13.3 |
| **Decile 9** | 18.8 | 18.1 | 17.6 | 17.9 |
| **Decile 10 (Top 10%)** | 30.1 | 30.0 | 32.6 | 33.4 |
| **of which: Top 1%** | 4.9 | 5.2 | 7.0 | 7.2 |
| **of which: Top 0.1%** | 1.1 | 1.1 | 1.8 | 1.8 |

[7] "Capital income" consists of: interest the tax on which (Deposit Interest Retention Tax, or D.I.R.T.) is deducted at source by deposit takers; income from a trade or profession (Case I and II); interest and income from foreign property (Case III, Schedule D); miscellaneous income not falling under any other heading (Case IV, ); rental income (Case V); dividend income (Schedule F). Capital gains are not included.

Source: OECD Secretariat's calculation using tax administration data from the Revenue Commissioners, Ireland

11. The 5-year average annual growth rate in labour income for each income group (per tax unit at constant euro prices) shows that the benefits of growth were more evenly distributed during the Celtic tiger period as generally low- to middle- income people experienced higher growth (Figure 2). However, labour income evolved quite differently during the property boom period, as labour income growth disproportionally favoured the highest income groups, while it was weak in the rest of the distribution. In the aftermath of the property-bubble-burst, labour income decreased in aggregate by 14% from 2007 to 2012 in real terms, with the impact disproportionately borne by people in lower income groups. This reflects the sharp deterioration in the labour market: OECD (2015b) finds that the Gini coefficient at market income in Ireland increased by 0.05 points after the crisis and this is essentially due to the employment effect.

**Figure 2. Labour Income, 5-year average annual growth rate**




Source: OECD Secretariat's calculation based on Tax administration data from the Revenue Commissioners, Ireland

12. Policies have also played a role in these movements: relatively high growth among low deciles in the early 2000s is likely to be related to the introduction of the minimum wage in 2000. Nolan et al. (2012) note the positive effect of a higher hourly wage rate resulting from higher minimum wages. They also point out that the downward pressure on labour earnings in the lower half of the distribution in the mid-2000s was probably influenced by the larger inflow of low-skilled migrants following the expansion of the European Union in 2004.

13. The distribution of capital income is even more uneven (Table 3). Until 2007, with a few minor exceptions, the share of capital income attributed to the 9$^{th}$ decile and above has consistently risen, while the opposite was true for the 1$^{st}$ to 8$^{th}$ decile income group. The concentration of capital income in the highest income group was reinforced during that time. After the burst of the property bubble, the shares of the top decile and 1% have decreased, but remained above the pre property bubble period. In contrast, the share for the top 0.1% continued to rise.

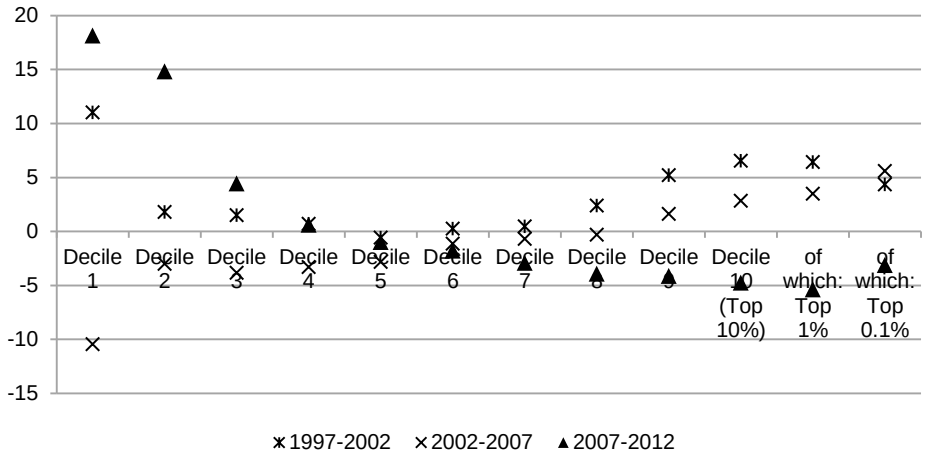
**Table 3. Distribution of capital income**

| | 1997 | 2002 | 2007 | 2012 |
|---|---|---|---|---|
| **Decile 1** | 0.2 | 0.3 | 0.1 | 0.4 |
| **Decile 2** | 1.2 | 1.1 | 0.9 | 2.1 |
| **Decile 3** | 2.8 | 2.4 | 1.9 | 2.8 |
| **Decile 4** | 3.9 | 3.2 | 2.6 | 3.2 |
| **Decile 5** | 5.1 | 4.0 | 3.2 | 3.7 |
| **Decile 6** | 5.9 | 4.8 | 4.2 | 4.6 |
| **Decile 7** | 7.5 | 6.2 | 5.6 | 5.8 |
| **Decile 8** | 9.3 | 8.4 | 7.7 | 7.6 |
| **Decile 9** | 11.8 | 12.2 | 12.3 | 11.9 |
| **Decile 10 (Top 10%)** | 52.3 | 57.5 | 61.7 | 58.1 |
| **of which: Top 1%** | 28.1 | 30.7 | 34.0 | 31.0 |
| **of which: Top 0.1%** | 10.3 | 10.3 | 12.6 | 12.9 |

Source: OECD Secretariat's calculation using tax administration data from the Revenue Commissioners, Ireland

14. Over the sample period, capital income has also evolved differently across income groups (per tax unit at constant euro prices). During the Celtic tiger period, virtually all income groups saw positive growth (Figure 3). Then, in the economy fuelled by the property bubble, only those at the 9th income decile and above benefited from rising capital income increases, with the strongest gains accruing at the highest end of the income distribution. The decrease in capital income, following the property bubble burst, was experienced by a wider range of people, i.e. across the entire upper half of the distribution.

**Figure 3. Capital income, 5-year average annual growth rate**




Source: OECD Secretariat's calculation based on Tax administration data from the Revenue Commissioners,

***How are social benefits spread across the income distribution?***[8]

15. Total social benefits stated in tax returns reached 5.0 billion euros in 2012 (up by 158.1% from 2002 and 62.0% from 2007 in real terms).[9] This is around ¼ of total benefits paid by the government, not all of which have tax paid on them. An important caveat is that most social welfare payments (and recipients) are not captured on the tax records, which especially under-represents the lowest income groups.[10] Many welfare payments are not required to be declared to Revenue. Individuals may also be in employment for part of the year and claim benefits for another part of the year. Therefore, the figures reported here, which are based on the tax records, represent only a small proportion of the total expenditure of the Department of Social Protection (DSP).

16. The share of social benefits to gross income identified in the tax administration dataset increased from 3.1% in 2002 to 6.4% in 2012 (Table 4).[11]

8 The redistribution system plays a strong role in reducing inequality: Ireland has the largest decrease in the OECD between in the Gini index measured at market and post-tax and transfer disposable incomes. Around ¾ of this reduction is due to cash transfers, while the rest comes from household taxation (OECD, 2015a, drawing on the OECD Income Distribution Database). Due to the caveat below, the analysis in this paper cannot fully take account of social benefits as a whole in reducing market income inequality.

9 The figure reported here contrasts with the total expenditure of the Department of Social Protection of 19 billion euros, as detailed in the latest Revised Estimates Volume for 2015.

10 In this dataset, benefit dependence is the highest in low- to middle- income classes but it is low in the lowest income classes, i.e. the first and second deciles. This largely reflects the low take-up rate of benefits, due to the demography of deciles 1 and 2: it is composed of various kinds of groups but typically those with low earned income but no eligibility to welfare payment (for instance, tertiary students living with their parents).

11 Watson and Maitre (2013) found that 30% of household income in 2011 was from social welfare sources, based on the data from EU-SILC.

**Table 4. Social benefits as a percentage of gross income at each decile**

Social Benefits (excluding State Pension Contributory)

| | 2002 | 2007 | 2012 |
|---|---|---|---|
| **Decile 1** | 0.4 | 0.5 | 1.9 |
| **Decile 2** | 1.6 | 2.2 | 4.7 |
| **Decile 3** | 1.5 | 2.6 | 4.5 |
| **Decile 4** | 1.1 | 1.9 | 3.3 |
| **Decile 5** | 0.7 | 1.4 | 2.4 |
| **Decile 6** | 0.6 | 1.0 | 1.9 |
| **Decile 7** | 0.5 | 0.9 | 1.7 |
| **Decile 8** | 0.5 | 0.9 | 1.4 |
| **Decile 9** | 0.3 | 0.6 | 0.9 |
| **Decile 10** | 0.1 | 0.2 | 0.2 |

State Pension Contributory

| | 2002 | 2007 | 2012 |
|---|---|---|---|
| **Decile 1** | 0.4 | 0.2 | 1.0 |
| **Decile 2** | 8.3 | 2.8 | 3.3 |
| **Decile 3** | 13.2 | 10.5 | 15.3 |
| **Decile 4** | 11.9 | 8.9 | 10.3 |
| **Decile 5** | 6.5 | 7.0 | 12.9 |
| **Decile 6** | 3.9 | 4.5 | 9.7 |
| **Decile 7** | 2.5 | 3.2 | 7.3 |
| **Decile 8** | 1.5 | 2.3 | 5.0 |
| **Decile 9** | 0.9 | 1.3 | 3.0 |
| **Decile 10** | 0.3 | 0.5 | 1.0 |

Source: OECD Secretariat's calculation using tax administration data from the Revenue Commissioners, Ireland

17. Social benefits other than the State Pension Contributory have increased notably. They rose by around 55% in real terms since 2007, which can be partly attributed to unemployment benefits, as the unemployment rate has reached 15.1% at its peak in 2012 from very low levels. From a longer-term perspective, the large increase in this category of social benefits, almost tripled since 2002, can be explained also by changes in the benefit system. This includes the increased generosity of family benefits such as Family Income Supplement. These factors are reflected in a large number of households receiving these benefits, including those in higher income groups (Table 5).

**Table 5.Take-up rate of taxed social benefits**

Social Benefits (excluding State Pension Contributory)

| | 2002 | 2007 | 2012 |
|---|---|---|---|
| **Decile 1** | 0.5 | 0.9 | 2.6 |
| **Decile 2** | 3.2 | 4.5 | 10.5 |
| **Decile 3** | 4.8 | 7.5 | 15.4 |
| **Decile 4** | 4.7 | 7.7 | 16.5 |
| **Decile 5** | 4.0 | 7.0 | 14.8 |
| **Decile 6** | 3.6 | 6.2 | 14.5 |
| **Decile 7** | 3.9 | 6.5 | 15.0 |
| **Decile 8** | 4.5 | 7.9 | 16.1 |
| **Decile 9** | 4.3 | 7.9 | 15.6 |
| **Decile 10** | 2.9 | 4.8 | 9.5 |

State Pension Contributory

| | 2002 | 2007 | 2012 |
|---|---|---|---|
| **Decile 1** | 0.4 | 0.3 | 1.0 |
| **Decile 2** | 8.7 | 2.9 | 4.1 |
| **Decile 3** | 19.9 | 14.1 | 19.8 |
| **Decile 4** | 21.5 | 14.6 | 17.0 |
| **Decile 5** | 15.3 | 13.7 | 21.3 |
| **Decile 6** | 11.4 | 10.8 | 19.9 |
| **Decile 7** | 9.1 | 9.4 | 19.2 |
| **Decile 8** | 7.1 | 8.5 | 18.0 |
| **Decile 9** | 5.4 | 6.9 | 15.8 |
| **Decile 10** | 4.0 | 5.2 | 11.9 |

Source: OECD Secretariat's calculation using tax administration data from the Revenue Commissioners, Ireland

18. These benefits do not necessarily always target low income households, but rather certain household types. Many of them set certain income thresholds for eligibility and are paid as a function of earned income. For example, the beneficiaries of Family Income Supplement (FIS) receive 60% of the difference between their earned income and the income limit fixed depending on their family structure. These benefits ensure the share of social benefits to gross income is significant for low income households. However, the way FIS is abated results in high marginal effective tax rates at modest incomes, creating a low-income trap disincentive to work more for those in receipt of the payment (O'Connor et al., 2015).

19. The total amount of the State Pension Contributory has also increased over the period 2002-2012. This is related to the fact that pension payments were protected from welfare cuts even during the crisis. The rise in the take-up rate across income groups between 2007 and 2012 markedly exceeds the increase in the share of population aged 65 and over (Table 5). This likely reflects the loss of other income earning opportunities in the wake of the crisis.[12]

20. Ireland is one of the few countries in the OECD that operate a pure basic pension scheme that pays the same amount of benefits regardless of their pre-retirement earnings level (thus higher replacement ratios for low-income recipients OECD, 2013b). Such a scheme has redistributional effects over a long

[12] The increase in the State Pension is also partly due to the reclassification of the data: In 2011, illness benefit and the widows pension was reclassified from a social welfare benefit to a social welfare pension. This had the effect of causing a reduction in social welfare benefit in 2011 and an associated increase in the social welfare pension in the same year. This then explains the decrease in the social welfare benefit in 2011 and the increase in the pension after 2011.

time period. The total amount of benefits has been relatively evenly distributed across income groups. This means, in turn, that the share of pension benefits to gross income at each income decile is more important toward lower income deciles (except for the two first deciles which consist of those with low earned income but no eligibility to welfare payment; instead those entirely rely on untaxed social benefits are less likely to be in the lowest deciles as they generally do not fill in tax returns).

***Who benefits from tax allowances and credits?***

21. Overall the difference between gross income and taxable income is large at 5.5 billion EUR in 2012, mainly due to many tax allowances. Among them, the details of nine specific tax allowances could be precisely quantified from Revenue's dataset prepared for this paper. Excluding those essentially related to business, these tax allowances are:

- Expenses: Certain work expenses deducted from income before it is assessed for tax.
- Top Slicing Relief: This ensures that an individual's lump sum was not taxed at a rate higher than their average rate of tax for the three years prior to redundancy or retirement.
- Permanent Health Benefit Schemes: Premiums paid by taxpayers to the approved schemes to secure income during disablement through accident, injury or sickness.
- Actual Losses: Assets sold at a loss.
- Retirement Annuity Premiums: Premiums under a Retirement Annuity Contract, for either self-employed or in a non-pensionable employment. Tax relief is given at the individual's highest rate of tax.
- Personal Retirement Savings Accounts: Saving in PRSA, a long-term savings account designed to assist people to save for their retirement. Tax relief is given at the individual's highest rate of tax.

22. A large share of the tax allowances listed above is enjoyed by top income groups, as 53.1% of these tax allowances accruing to the top 10% of tax units (Table 6). Among the tax allowances listed above, the amount of those on retirement annuity premium and assets sold at a loss are very large: accounting for 24.5% and 18.1% of all the tax allowances within this income group (which in turn accounting for 13.0% and 9.6% of the tax allowances for all tax units identified in the dataset). Business related tax allowances are also important, accounting for 39.8% to all the tax allowances within the top income group (or 21.2% of the tax allowances for all tax units in the dataset). These findings suggest that the tax allowance system may disproportionately favour the self-employed.

**Table 6. Tax allowances at each income decile**

Distribution of tax allowances

| | 2002 | 2007 | 2012 |
|---|---|---|---|
| **Decile 1** | 1.1 | 0.3 | 0.4 |
| **Decile 2** | 1.1 | 0.7 | 1.3 |
| **Decile 3** | 1.8 | 1.4 | 2.1 |
| **Decile 4** | 2.4 | 1.9 | 2.6 |
| **Decile 5** | 3.1 | 2.5 | 3.4 |
| **Decile 6** | 4.0 | 3.6 | 4.7 |
| **Decile 7** | 5.5 | 5.1 | 6.8 |
| **Decile 8** | 8.1 | 8.0 | 9.7 |
| **Decile 9** | 12.6 | 13.7 | 15.7 |
| **Decile 10 (Top 10%)** | 60.2 | 62.8 | 53.1 |
| **of which: Top 1%** | 31.9 | 30.6 | 19.8 |
| **of which: Top 0.1%** | 11.0 | 9.6 | 6.3 |

Total tax allowance / Gross income

| | 2002 | 2007 | 2012 |
|---|---|---|---|
| **Decile 1** | 7.2 | 1.6 | 1.9 |
| **Decile 2** | 2.3 | 1.2 | 1.7 |
| **Decile 3** | 2.2 | 1.2 | 1.5 |
| **Decile 4** | 2.1 | 1.2 | 1.4 |
| **Decile 5** | 2.1 | 1.3 | 1.4 |
| **Decile 6** | 2.2 | 1.5 | 1.5 |
| **Decile 7** | 2.5 | 1.7 | 1.8 |
| **Decile 8** | 2.9 | 2.1 | 2.1 |
| **Decile 9** | 3.4 | 2.7 | 2.5 |
| **Decile 10 (Top 10%)** | 7.5 | 5.5 | 4.1 |
| **of which: Top 1%** | 13.2 | 8.4 | 5.3 |
| **of which: Top 0.1%** | 14.1 | 7.6 | 5.4 |

Source: OECD Secretariat's calculation using tax administration data from the Revenue Commissioners, Ireland

23. The tax allowances identified in the dataset decreased by 23.4% in real terms between 2002 and 2012. Among them, significant changes occurred for Retirement Annuity Premium, Actual Losses and Expenses. The retirement annuity allowance declined due to the ceiling amount which has been lowered since 2008. The allowance on actual losses, after its peak in 2008, has declined sharply due to a smaller number of taxpayers making losses in construction related sectors. The expenses allowance has also declined, due to the phasing out of unused losses and capital allowances for rental properties from the mid-2000s period.

24. Overall, the tax allowance system in Ireland seems to follow the same declining trend, including for categories, which are not precisely quantified in Revenue's dataset but are reflected in the difference between the gross income and the taxable income. Between 2006 and 2014, the scope for tax relief to all forms of pension saving was reduced, especially for high income earners (including the above mentioned retirement annuity allowance). Also, many property-related allowances have been curtailed (for example, tax incentives for property investment).

25. The High Earners Restriction (HER), taking effect in 2007, limits the total amount of tax reliefs that can be used by high-income individuals to a maximum amount each year. The restrictions currently in place may be summarised as follows: the relief limits the use of some tax expenditures where income before tax expenditures is more than EUR 125 000 and full restriction applies for incomes in excess of

EUR 400 000, while no restriction is applied if eligible tax expenditures do not exceed EUR 80 000. According to Collins and Walsh (2010), the number of cases where such restrictions apply was not necessarily large but generated an additional tax revenue of EUR 39 million in 2009.

26. The total amount of tax credits is even larger than allowances and the four main tax credits account for some 8.6 billion EUR in 2012. These tax credits are: [13]

- Personal credit, which is due to every individual who is resident in the State. The tax credit due depends on family structure (i.e. single, married, etc.);
- PAYE credit, which is due to every individual in the Pay As You Earn (PAYE) System, earning above certain income thresholds depending on family structure;
- One parent family credit, which is available to a single parent, or a person who has custody of and maintains a child;[14]
- Age credit, which is available when a taxpayer, their spouse or civil partner reach 65 years of age, at any time during a tax year.

These tax credits are much more evenly distributed across income groups. Tax allowances reduce taxable income so their value increases with taxpayers' marginal tax rates. Tax credits, on the other hand, have the same value for all taxpayers because they directly reduce taxpayers' tax liability by a fixed amount. The cost of the tax credit system, however, has been mitigated somewhat by tax credits not being refundable, so the amount exceeding the household's total tax liabilities is not paid out to households.

27. The total amount of tax credits has increased markedly since 2002 by 72.8% in constant euro prices compared to a 27% change in gross income. This increase in tax credits took place essentially until mid-2000s, in exchange for what used to be tax allowances, and benefited especially those in lower income brackets (Table 7). The transition from an allowance at marginal tax rate to a credit at fixed amounts rebalanced benefits from high income to low income tax units.

13 This paper focuses on a set of principal tax credits.

14 It has been replaced by Single Person Child Carer Credit.

**Table 7. Tax credits at each income decile**[15]

Distribution of tax credits

| | 2002 | 2007 | 2012 |
|---|---|---|---|
| **Decile 1** | 1.6 | 8.0 | 7.3 |
| **Decile 2** | 5.0 | 8.4 | 7.9 |
| **Decile 3** | 8.1 | 8.7 | 8.6 |
| **Decile 4** | 9.9 | 9.1 | 9.2 |
| **Decile 5** | 10.7 | 9.5 | 9.9 |
| **Decile 6** | 10.7 | 9.7 | 10.1 |
| **Decile 7** | 11.8 | 10.2 | 10.6 |
| **Decile 8** | 12.7 | 11.1 | 11.2 |
| **Decile 9** | 14.2 | 12.3 | 12.3 |
| **Decile 10 (Top 10%)** | 15.4 | 13.1 | 13.0 |
| **of which: Top 1%** | 1.4 | 1.1 | 1.2 |
| **of which: Top 0.1%** | 0.1 | 0.1 | 0.1 |

Tax credits / Gross income

| | 2002 | 2007 | 2012 |
|---|---|---|---|
| **Decile 1** | 18.6 | 148.3 | 143.0 |
| **Decile 2** | 18.5 | 45.9 | 39.8 |
| **Decile 3** | 17.9 | 27.2 | 25.0 |
| **Decile 4** | 15.6 | 20.3 | 19.3 |
| **Decile 5** | 13.2 | 16.6 | 16.4 |
| **Decile 6** | 10.7 | 13.7 | 13.6 |
| **Decile 7** | 9.6 | 11.6 | 11.6 |
| **Decile 8** | 8.2 | 10.0 | 9.8 |
| **Decile 9** | 6.9 | 8.2 | 8.1 |
| **Decile 10 (Top 10%)** | 3.5 | 3.9 | 4.1 |
| **of which: Top 1%** | 1.1 | 1.1 | 1.3 |
| **of which: Top 0.1%** | 0.3 | 0.3 | 0.4 |

Source: OECD Secretariat's calculation using tax administration data from the Revenue Commissioners, Ireland

### *How is the personal income tax burden spread?*

28. The structure of the Irish income tax system is unique. Income tax operates using a two rate structure with different thresholds depending on family type. A lower rate of 20% applied on all income up to a band threshold whereupon income was taxed up to a higher rate of 41% in 2012. [16] Thus, the Irish tax system combines high marginal rates at lower income with tax credits. The tax credit system plays a crucial role in reducing the tax liabilities of low income households, reducing disincentives to increase work.

29. The data show the personal income tax system is progressive in Ireland, which is shown by the average effective tax rate – the income tax paid as a percentage of gross income – which increases with income. The average effective tax rate (excluding social security contributions and the universal social charge which will be considered below) ranges from 0.5% in the first income decile, 4.0% in the fifth

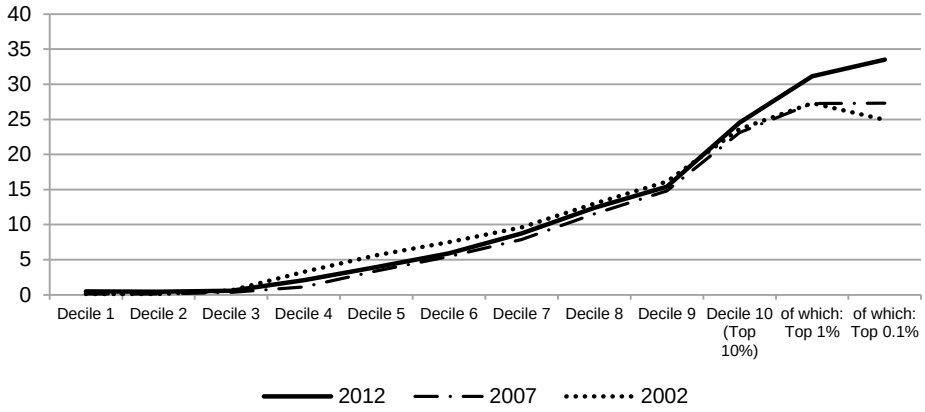
15 The tax credits are not refundable, so the amount exceeding the household's total tax liabilities is not paid out to households.

16 The higher rate was reduced to 40% in the 2015 Budget.

income decile and 24.5% in the tenth income decile (Figure 4). At the top 1% and 0.1% income group, this rate rises to 31.1% and 33.5%, respectively.

30. Between 2007 and 2012, the taxation system became more progressive at the highest end (i.e. at the top 1% and 0.1% level where the progressivity almost abated in the previous system, which seems to have resulted from the changes in the tax allowance system). Also between 2002 and 2007, the tax burden of middle income classes was reduced in the middle of the 2000s (by around 2 percentage points for those in the 4th through to 7th deciles), which seems to have resulted from the changes in the tax credit system.

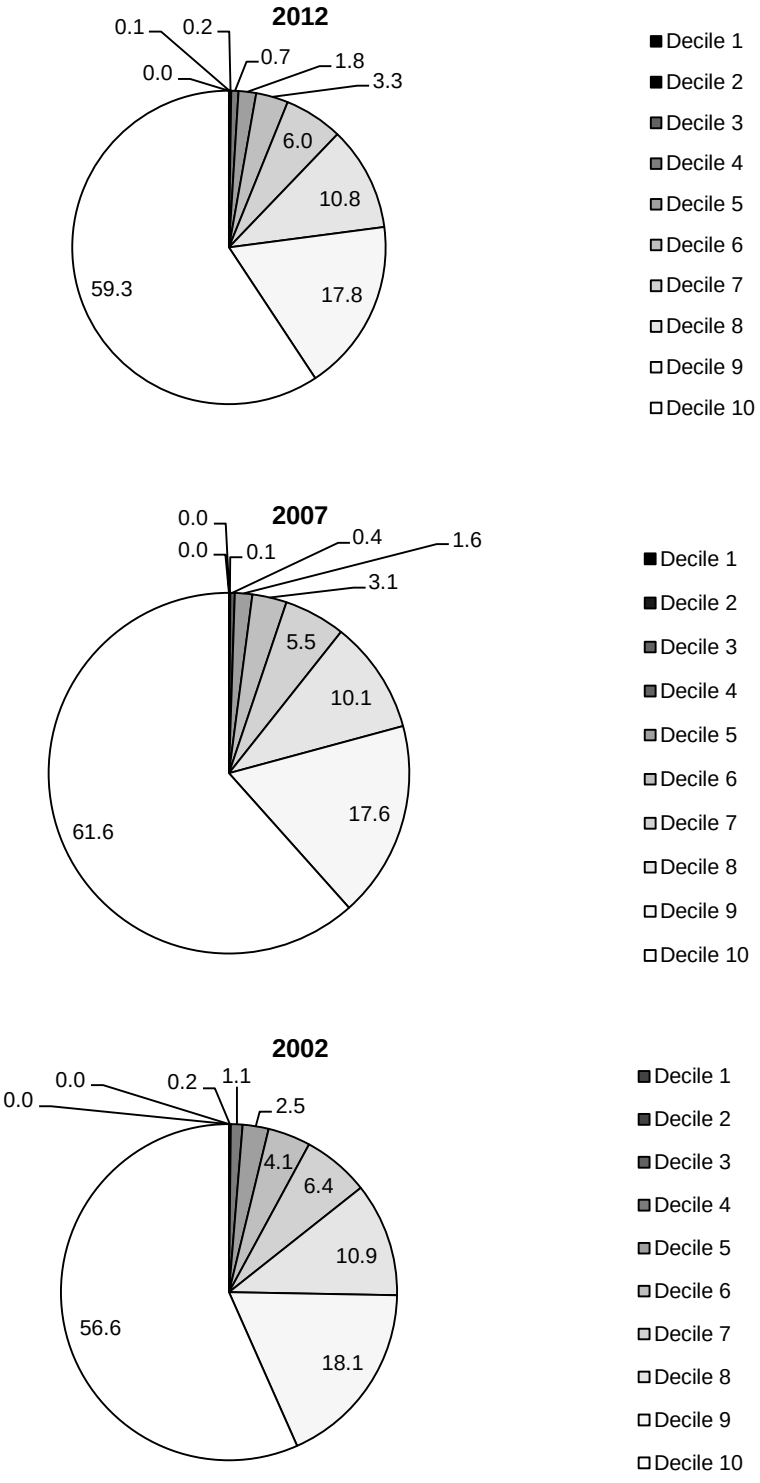
**Figure 4. Average effective tax rates by income decile**




Source: OECD Secretariat's calculation based on Tax administration data from the Revenue Commissioners, Ireland

31. The progressivity in the Irish tax system is also confirmed by the contribution of total tax receipts by each income decile. In 2012, 59.3% of income tax was paid by the top 10% tax units, with the top 1% and 0.1% tax units accounting for slightly above 21.3 percentage points and 7.2 percentage points, respectively (Figure 5). This is significantly higher than their share of gross incomes. Although the average effective tax rate was increased at the highest end of the income spectrum between 2007 and 2012, The slight reduction in the share of tax receipts accounted for by the top 10% tax units, in spite of the increase in the average effective tax rate for this income group, seems to be the result of the reduction in their market income itself.

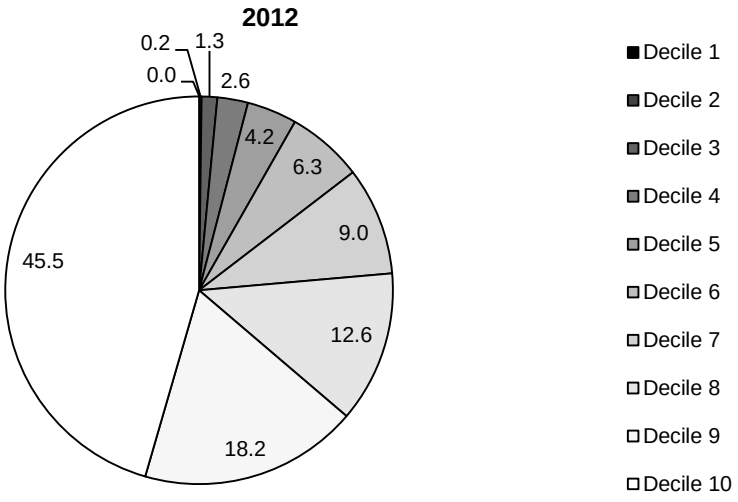
**Figure 5. Contribution of each income decile to the total tax receipt**




Source: OECD Secretariat's calculation using tax administration data from the Revenue Commissioners, Ireland

32. Part of the personal income tax system is the Universal Social Charge (USC), which was introduced in 2011 and replaced the health and income levies.[17] The USC has some unique features: it has four income bands for employees, corresponding to the rates of 1.5%, 3.5%, 7% and 8%, respectively[18] and the tax base is broader than the personal income tax base allowing fewer tax allowances and no reduction arising from tax credits. Overall the USC increased the progressivity of the income tax system, compared with the previous health and income levies which had flat contribution rates (Figure 6 and 7).

**Figure 6. Contribution of each income decile to the total USC receipt**

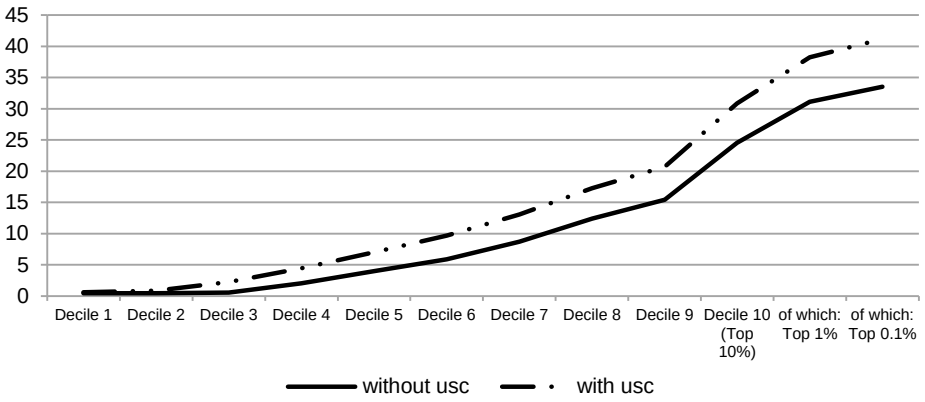



Source: OECD Secretariat's calculation using tax administration data from the Revenue Commissioners, Ireland

17 The USC is collected by Revenue and as such the data on USC is also integrated in the tax administration data. This paper is based on the tax system up until and including 2012, the last yaer with data available. The government announced in Budget 2016 that it would reduce the Universal Social Charge (USC) from 2016. These changes reduced the bottom three USC rates from 1.5% to 1%, 3.5% to 3% and 7% to 5.5% respectively. The threshold between the second and third bands was increased from EUR 17576 to EUR 18669.

18 There are five bands for self-employed – the fifth is in excess of €100 000, corresponding to the rate of 11%.

**Figure 7. Average effective tax rates with USC, 2012**




Source: OECD Secretariat's calculation based on Tax administration data from the Revenue Commissioners, Ireland

33. Due to the redistribution system, the share of after-tax income (including USC) is higher than the share before tax-income up to the eighth decile. The share of income of the first to the eighth deciles as a whole, is increased from 48.7% of pre-tax income, to 54.1% in after tax income (Table 8). By contrast, the share of the top decile is reduced by almost the same extent and the tax units within this group bear an increasing burden as their pre-tax income rises up to the top 1% income group. However, such additional tax burden seems to be relatively limited at the highest point, the top 0.1% group.

**Table 8. Income distribution before and after tax**

Gross Income (including social security benefits)

| | 1997 | 2002 | 2007 | 2012 |
|---|---|---|---|---|
| **Decile 1** | 0.6 | 0.7 | 0.6 | 0.6 |
| **Decile 2** | 2.0 | 2.1 | 2.0 | 2.2 |
| **Decile 3** | 3.6 | 3.6 | 3.5 | 3.8 |
| **Decile 4** | 5.1 | 5.1 | 4.9 | 5.2 |
| **Decile 5** | 6.5 | 6.5 | 6.3 | 6.6 |
| **Decile 6** | 8.1 | 8.0 | 7.8 | 8.1 |
| **Decile 7** | 10.1 | 9.9 | 9.6 | 10.0 |
| **Decile 8** | 12.9 | 12.4 | 12.1 | 12.5 |
| **Decile 9** | 17.1 | 16.5 | 16.4 | 16.6 |
| **Decile 10 (Top 10%)** | 33.9 | 35.3 | 36.8 | 34.7 |
| **of which: Top 1%** | 9.2 | 10.6 | 11.7 | 9.8 |
| **of which: Top 0.1%** | 2.8 | 3.4 | 4.1 | 3.1 |
| | | | | |
| **Decile 1-8** | 49.0 | 48.3 | 46.9 | 48.7 |
| **Decile 9-10** | 51.0 | 51.7 | 53.1 | 51.3 |

After Tax Income

| | 1997 | 2002 | 2007 | 2012 |
|---|---|---|---|---|
| **Decile 1** | 0.8 | 0.8 | 0.7 | 0.7 |
| **Decile 2** | 2.6 | 2.5 | 2.3 | 2.6 |
| **Decile 3** | 4.2 | 4.2 | 4.1 | 4.6 |
| **Decile 4** | 5.8 | 5.7 | 5.7 | 6.1 |
| **Decile 5** | 7.3 | 7.2 | 7.0 | 7.5 |
| **Decile 6** | 8.8 | 8.7 | 8.5 | 9.0 |
| **Decile 7** | 10.5 | 10.4 | 10.3 | 10.7 |
| **Decile 8** | 12.9 | 12.6 | 12.4 | 12.8 |
| **Decile 9** | 16.8 | 16.2 | 16.2 | 16.3 |
| **Decile 10 (Top 10%)** | 30.3 | 31.6 | 32.8 | 29.7 |
| **of which: Top 1%** | 7.8 | 9.1 | 9.9 | 7.5 |
| **of which: Top 0.1%** | 2.4 | 3.0 | 3.4 | 2.2 |
| | | | | |
| **Decile 1-8** | 52.9 | 52.2 | 51.0 | 54.1 |
| **Decile 9-10** | 47.1 | 47.8 | 49.0 | 45.9 |

Source: OECD Secretariat's calculation using tax administration data from the Revenue Commissioners, Ireland

### *What role do social insurance charges play?*

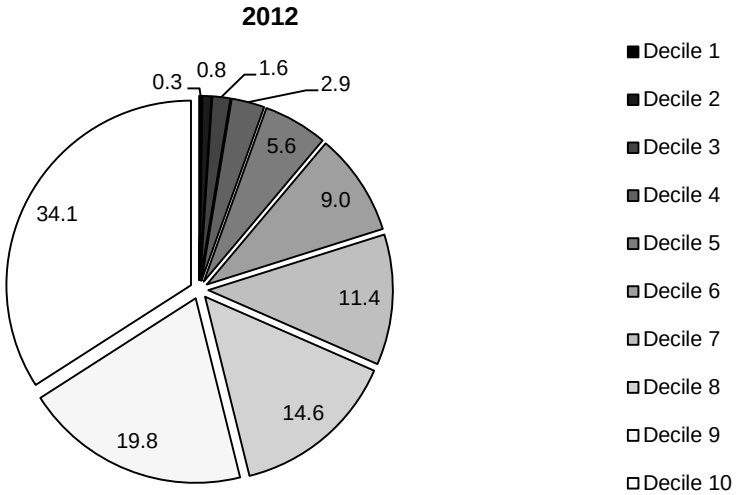
34. Part of the effective personal marginal tax rate, which affects the incentive to work more, is made up of employee social charges. In Ireland this is the Pay Related Social Insurance (PRSI), which funds pension and a wide variety of other benefit payments including disability, maternity, widows and illness. The data for PRSI are classified separately and not fully comparable with the tax administration data described above.[19] However, the separate dataset from the Department of Social Protection reports almost identical earnings distribution patterns as the tax administration data, suggesting at least broad comparability. It shows that overall individuals in different income groups pay the amount of PRSI contribution proportional to their earnings. This result is intuitive since except for a minimum earnings

[19] Data is classified by individuals rather than tax units.

threshold, PRSI does not have a progressive rate structure being levied at a single rate of 4% on gross wage income.

35. The contribution to total PRSI receipts from each income decile is closely related to the share of gross income of each income group (Figure 8). The average effective tax rate arising from PRSI is slightly progressive up to the 9th decile, while it drops at the top decile, presumably because capital income, on which PRSI is not levied, is a much more significant income resource for that group (Figure 9).[20] The health contribution was charged at the rate of 2% in 2007, on top of the 4% on pension and social insurance. The health contribution was replaced by the Universal Social Charge (which also integrated other contributions) in 2011.

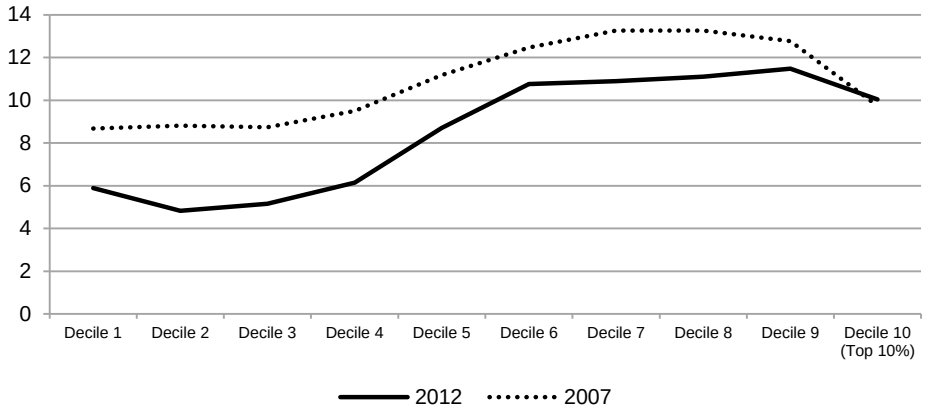
**Figure 8. Contribution of each income decile to the total PRSI receipt**




Source: OECD Secretariat's calculation based on data from the Department of Social Protection, Ireland

[20] From 2014 onwards, PRSI is payable on all earned and unearned income. Therefore, income from investments, rents, interest, etc. are subject to PRSI. However, this was not the case in 2012.

**Figure 9. Average effective tax rate, PRSI**




Source: OECD Secretariat's calculation based on data from the Department of Social Protection, Ireland

**How much mobility is there across the income distribution and what determines this?**

36. While income mobility has multiple conceptual dimensions and associated approaches to measurement (Jäntti and Jenkins, 2013), one approach is to measure the positional change of individuals in the income distribution over time. In this section, the mobility of tax units is examined through transition matrices across the gross income distribution for selected periods. Transitions show the evolution of each tax unit's income position relative to all other tax units. Any upward transition implies at least some associated downward counterpart. The gross income figures used in the transition matrix are nominal rather than real values.

***Methodological Approach***

37. The research literature shows a number of approaches are possible to calculating transition matrices. In this paper, the following standard approach is adopted. First, the group of tax units to be examined is identified. For example, tax units reporting an age between 25 and 65 or those who are classified as married for tax purposes. In the literature, it is common practice to truncate the sample to only those cases that are aged 25 and over in the initial year or sometimes over the full period (Sawhill-Condon, 1992, Auten and Gee, 2009). The principal reason for this is to exclude the unrepresentative 'school-to-work-transition' cohort. Second, tax units observed in either of the comparison years are identified and only tax units observed in both years are selected. Each tax unit therefore has both an origin and destination position. It is also noteworthy that retaining only individuals of certain characteristics, for example, of those who continued to complete tax returns for a certain period is in line with the literature (US Department of Treasury, 1992a; 1992b, Carroll et al., 2006). Third, two distinct gross income deciles (quintiles or percentiles) are then calculated for each year. Finally, the tax unit transition matrix is calculated across the two years.

38. The calculation approach has several important implications. First, the matrices calculate relative changes in the income distribution position of tax units at two points in time rather than absolute changes. For this reason, it is possible for a unit's relative position in the distribution to fall while their absolute income increases and vice versa. Second, examination at two points in time does not allow for observing units who frequently change their distributional position over the course of the reference period and such changes are not captured in the analysis. Consequently, the analysis does not capture those who leave the

workforce for various reasons over the period (for example due to deaths, unemployment, emigration and retirement) or those who enter the workforce in the later period (for example, through employment and immigration). Third, tax units observed in both years are on average less likely to be those units with a propensity to 'fall-off' the tax records in a given year. For this reason, the matrices may be more representative of full-time employees rather than part-time employees or students. Fourth, all transition matrices calculated are biostochastic, that is, the rows and columns sum to one.

39. The transition matrices can be interpreted as follows. If there was no mobility, the data was time-invariant, the diagonal entries would be 100% and off-diagonals would be 0%. A high diagonal entry indicates that tax units remain in the same income decile over the period. Similarly, low diagonal entries indicate higher mobility – tax units have moved from that decile to another decile. The number of years between the two periods selected is also important. In general, it is expected that annual transitions are more likely to have less mobility while longer horizon transitions will have greater mobility. Based on the literature, it might be expected that there would be relatively less mobility at the upper and lower ends of the decile distributions and relatively greater mobility in the middle deciles.

***Data description***

40. The analysis in this section is based on a representative sample of about 175,000 tax units, each observed in 5.7 years on average (a total of about 993,000 year-tax unit observations) drawn from a population dataset of 3.4 million unique tax units over the period 2004 to 2012 (see Annex for further sampling details and data description). For the purposes of the transition matrix analysis, three periods are examined as follows: the full period 2004 to 2012, 2004 to 2007 and 2007 to 2012. While the latter two periods are uneven in length, they allow for a broad assessment of income mobility in the run-up to, and in the aftermath of, the economic crisis. Ireland experienced an exceptional level of economic growth between 2004 and 2007. By contrast, the 2007 to 2012 period was characterised by a severe recession in 2008 followed by a period of relative stabilisation to 2012. For simplicity, these three periods are referred to as the full, pre-2007 and post-2007 periods respectively.

***Mobility of the Taxpayer Population as a Whole***

41. Table 9 shows the transition probabilities by decile for tax units observed in the full period 2004 to 2012 (there are a total of 66,560 tax units in both years). The analysis shows that in the first, second and third deciles, 25%, 23% and 23% of tax units remained in that decile eight years later in 2012. In other words, among the bottom three deciles, approximately one in four tax units remained in the same decile over the full period. In the top decile, 55% of tax units remained in the top decile eight years later while 30% remained in the ninth decile.

**Table 9. Income Mobility of Tax Units by Decile, 2004 – 2012 (66,560)**

| | Deciles 2012 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Deciles 2004** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |
| **1** | 25.3 | 18.3 | 13.3 | 11.9 | 8.7 | 8.9 | 6.2 | 3.7 | 2.2 | 1.3 |
| **2** | 19.3 | 23.0 | 14.0 | 12.5 | 9.6 | 7.9 | 6.1 | 4.0 | 2.5 | 1.2 |
| **3** | 15.0 | 19.0 | 23.0 | 13.7 | 9.4 | 7.5 | 5.4 | 3.6 | 2.3 | 1.3 |
| **4** | 11.3 | 11.6 | 18.7 | 20.8 | 14.3 | 8.9 | 6.4 | 4.2 | 2.9 | 1.0 |
| **5** | 8.0 | 9.0 | 10.1 | 15.5 | 20.8 | 13.9 | 9.4 | 6.4 | 4.8 | 2.2 |
| **6** | 6.0 | 6.8 | 6.8 | 8.8 | 14.7 | 20.4 | 16.0 | 9.8 | 7.1 | 3.5 |
| **7** | 5.2 | 5.0 | 5.8 | 6.5 | 8.7 | 13.4 | 21.8 | 17.3 | 10.2 | 6.1 |
| **8** | 4.2 | 3.7 | 4.4 | 5.6 | 7.0 | 9.2 | 14.4 | 24.7 | 18.0 | 8.8 |
| **9** | 3.2 | 2.2 | 2.7 | 3.4 | 5.0 | 7.1 | 9.3 | 17.5 | 30.3 | 19.3 |
| **10** | 2.6 | 1.4 | 1.2 | 1.4 | 1.8 | 2.7 | 5.0 | 8.9 | 19.7 | 55.4 |

Source: Analysis of tax administration data by the Revenue Commissioners. 99,885 and 107,801 tax units in 2004 and 2012 respectively. 66,560 were observed in both years.

*2004 – 2007 Period*

42. Table 10 shows the transition probabilities by decile for tax units observed in both years 2004 and 2007. Compared with the previous longer time-horizon matrix, there is relatively less mobility, which is expected. There are a total of 81,250 tax units in both years and therefore, by construction, 8,125 units in each row and column[21]. Of those in the bottom decile in 2004, 44% remained in that decile by 2007. 21% progressed upwards to the next decile and 12% progressed upwards by two deciles. Less than one per cent progressed to the top decile. Of those in the 5$^{th}$ decile in 2004, one in four (27%) remained in the same decile while 14% progressed to the 6$^{th}$ decile. Of those in the top decile, about three-quarters (73%) remained in the top decile, 17% dropped to the 9$^{th}$ decile and 4% to the 8$^{th}$. Only 6% dropped to the 7$^{th}$ decile or below.

[21] Note that there are small rounding discrepancies in the case of some rows and columns which may not have exactly 8,125. In the case of this transition matrix, the largest discrepancy is decile row five which has 8,129 units. Similar small discrepancies also arise in the remaining transition matrices.

**Table 10. Income Mobility of Tax Units by Decile, 2004 – 2007 (81,250)**

| | 2007 deciles | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **2004 deciles** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |
| **1** | 44.3 | 20.5 | 11.9 | 8.1 | 5.4 | 4.4 | 2.6 | 1.3 | 0.8 | 0.6 |
| **2** | 24.2 | 29.3 | 14.8 | 11.5 | 8.0 | 5.7 | 3.7 | 1.6 | 1.0 | 0.3 |
| **3** | 11.1 | 25.6 | 25.1 | 14.7 | 9.0 | 6.3 | 4.2 | 2.3 | 1.2 | 0.6 |
| **4** | 7.2 | 10.0 | 28.3 | 24.9 | 12.8 | 7.7 | 4.8 | 2.4 | 1.4 | 0.4 |
| **5** | 4.3 | 6.0 | 9.4 | 24.0 | 27.0 | 14.3 | 7.9 | 4.5 | 1.9 | 0.8 |
| **6** | 3.3 | 3.7 | 4.7 | 8.4 | 23.6 | 28.6 | 14.8 | 7.9 | 3.7 | 1.3 |
| **7** | 2.2 | 2.3 | 2.7 | 4.2 | 7.9 | 22.2 | 33.0 | 16.3 | 7.2 | 2.2 |
| **8** | 1.5 | 1.4 | 1.7 | 2.4 | 3.6 | 7.0 | 21.1 | 39.3 | 16.9 | 5.2 |
| **9** | 1.0 | 0.8 | 1.0 | 1.3 | 2.0 | 2.9 | 6.2 | 20.1 | 48.7 | 16.0 |
| 10 | 0.9 | 0.4 | 0.5 | 0.6 | 0.7 | 0.9 | 1.8 | 4.3 | 17.4 | 72.6 |

Source: Analysis of tax administration data by the Revenue Commissioners. 99,885 and 120,799 tax units in 2004 and 2007 respectively. 81,250 were observed in both years.

*2007 – 2012 Period*

43. Table 11 shows the transition probabilities by decile for tax units observed in both years 2007 and 2012. There are a total of 82,948 tax units observed in both years. According to the analysis, 65% remained in the top decile over the period while 35% remained in the bottom decile.

44. Comparing the pre and post-2007 periods, income mobility has increased among the lower deciles post-2007. A smaller proportion of tax units remained entrenched in the bottom decile (35% compared to 44%) while a higher proportion moved upwards to the second, third and fourth deciles (47% compared to 41%). Similarly, relatively larger proportions moved upwards in the second, third and fourth deciles (54% compared to 47%; 42% compared to 38% and 39% compared to 30%).

45. Among the top deciles, relatively smaller proportions of tax units managed to remain in those deciles in the post-2007 period. For example, in the 8$^{th}$, 9$^{th}$ and 10$^{th}$ deciles, the proportions retaining the same decile were 32%, 39% and 65% in the post-2007 period compared to 39% and 49% and73% in the pre-period.

46. Furthermore, there was a much higher transition from the highest to the lowest deciles in the post-2007 period reflecting the dramatic nature of the economic crisis where some 'high-flyers' were hit hard. Among the top deciles, the proportions dropping to the bottom decile were more than twice as high post-2007 compared to pre-2007. For example, 0.9%, 1.0% and 1.5% dropped to the bottom decile from the 10$^{th}$, 9$^{th}$ and 8$^{th}$ deciles pre-2007. This compares to 2%, 2.3% and 3.1% in the post-period. A similar trend is observed dropping from the top deciles to the 2$^{nd}$ and 3$^{rd}$ deciles. These trends are also correlated with a higher transition from the 9$^{th}$ to the 10$^{th}$ decile as the former decile 10 cohorts are replaced by those from decile 9.

**Table 11. Income Mobility of Tax Units by Decile, 2007 – 2012 (82,948)**

| | Deciles 2012 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Deciles 2007** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |
| **1** | 34.8 | 21.7 | 15.0 | 10.1 | 7.0 | 4.9 | 3.2 | 1.8 | 0.9 | 0.6 |
| **2** | 19.1 | 26.5 | 17.6 | 13.1 | 8.7 | 6.7 | 4.4 | 2.3 | 1.1 | 0.5 |
| **3** | 13.5 | 18.0 | 26.3 | 17.4 | 9.8 | 6.1 | 4.7 | 2.5 | 1.3 | 0.5 |
| **4** | 9.0 | 11.6 | 15.3 | 25.0 | 17.9 | 9.4 | 5.8 | 3.5 | 1.8 | 0.7 |
| **5** | 6.9 | 7.4 | 9.0 | 13.9 | 24.8 | 19.0 | 9.7 | 5.5 | 2.8 | 0.9 |
| **6** | 5.2 | 5.0 | 6.2 | 8.1 | 13.5 | 25.3 | 20.5 | 9.4 | 5.4 | 1.6 |
| **7** | 4.1 | 4.2 | 4.5 | 5.2 | 7.9 | 13.1 | 26.6 | 21.3 | 9.1 | 3.8 |
| **8** | 3.1 | 2.9 | 3.0 | 3.6 | 5.7 | 8.4 | 14.0 | 31.5 | 21.0 | 6.9 |
| **9** | 2.3 | 1.6 | 2.1 | 2.2 | 3.4 | 5.4 | 8.1 | 15.8 | 39.1 | 20.0 |
| **10** | 2.0 | 0.9 | 1.0 | 1.3 | 1.3 | 1.8 | 3.2 | 6.3 | 17.6 | 64.6 |

Source: Analysis of tax administration data by the Revenue Commissioners. 120,799 and 107,801 tax units in 2007 and 2012 respectively. 82,948 were observed in both years.

### *A Closer Look at Mobility for Different Population Cohorts*

47. In addition to the overall transition matrices, a number of further matrices are presented for different tax unit cohorts. These include taxpayers who report an age of between 25 and 65, taxpayers who might best be described as employees or self-assessed[22] and taxpayers of various personal statuses (for example, married or single).

*Mobility by Age, 2004 – 2007*

48. This section considers the income mobility of tax units who report an age between 25 and 65. As mentioned, this has the advantage of excluding the 'school-to-work-transition' cohort and is in line with the literature. However, it should be noted that some taxpayers do not report an age on their tax return. These cases are excluded from the analysis in addition to those taxpayers reporting an age of 25 or below or 65 and over. The transition matrices relating to age should be interpreted in this context.[23]

49. Tables 12 and 13 below show the transition probabilities by decile and quintile for tax units who report an age between 25 and 65 and are observed in both periods for the years 2004 to 2007. The analysis shows that 41% of tax units in the bottom decile and 66% of those in the top decile remained in that decile for the period.

[22] As mentioned previously, employees are defined as tax units with PAYE income greater than 50% of gross income and self-assessed are defined as tax units with Schedule D income greater than 50% of gross income.

[23] A discussion, including a distributional comparison against persons over the age of 15 in Ireland, is provided in the appendix (Figure A1).

**Table 12. Income Mobility of Tax Units by Decile, 2004 – 2007, Aged 25 to 65 (20,447)**

| 2004 deciles | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| **1** | 40.7 | 17.5 | 11.6 | 8.9 | 6.3 | 6.3 | 3.4 | 2.9 | 1.8 | 0.6 |
| **2** | 21.9 | 30.9 | 16.3 | 9.7 | 7.3 | 4.9 | 3.9 | 2.8 | 1.4 | 0.9 |
| **3** | 12.8 | 24.4 | 27.4 | 14.3 | 7.3 | 5.9 | 4.1 | 2.1 | 1.4 | 0.5 |
| **4** | 7.6 | 11.2 | 23.6 | 25.7 | 13.3 | 7.2 | 4.8 | 3.9 | 1.9 | 0.9 |
| **5** | 5.8 | 6.2 | 9.5 | 22.4 | 25.7 | 13.8 | 7.8 | 5.3 | 2.2 | 1.3 |
| **6** | 4.2 | 3.7 | 5.2 | 9.9 | 24.0 | 24.3 | 13.6 | 8.7 | 4.0 | 2.5 |
| **7** | 2.9 | 2.6 | 2.9 | 4.7 | 9.8 | 23.0 | 28.0 | 13.9 | 8.4 | 3.7 |
| **8** | 1.7 | 1.9 | 1.6 | 2.3 | 3.4 | 10.4 | 24.4 | 31.4 | 16.4 | 6.6 |
| **9** | 1.4 | 1.1 | 1.5 | 1.4 | 2.4 | 3.2 | 8.2 | 23.4 | 40.8 | 16.7 |
| **10** | 1.1 | 0.6 | 0.4 | 0.7 | 0.6 | 1.1 | 1.7 | 5.6 | 21.9 | 66.4 |

Source: Analysis of tax administration data by the Revenue Commissioners. 28,091 and 67,014 tax units who report an age between 25 and 65 (and have no data quality issues) in 2007 and 2012 respectively. Of these, 20,447 are observed in both years.

50. According to the quintile analysis, 56% of tax units who were in the bottom 20% in 2004 remained in the bottom 20% by 2007. Almost 3 in 4 tax units (73%) in the top 20% remained in the top 20% by 2012.

**Table 13. Income Mobility of Tax Units by Quintile, 2004 – 2007, Aged 25 to 65 (20,447)**

| | 2007 quintiles | | | | |
|---|---|---|---|---|---|
| **2004 quintiles** | **1** | **2** | **3** | **4** | **5** |
| **1** | 55.5 | 23.3 | 12.4 | 6.6 | 2.4 |
| **2** | 28.0 | 45.5 | 16.9 | 7.4 | 2.3 |
| **3** | 10.0 | 23.5 | 43.9 | 17.7 | 4.9 |
| **4** | 4.6 | 5.8 | 23.3 | 48.9 | 17.5 |
| **5** | 2.1 | 2.0 | 3.6 | 19.4 | 72.9 |

Source: Analysis of tax administration data by the Revenue Commissioners. 28,091 and 67,014 tax units who report an age between 25 and 65 (and have no data quality issues) in 2007 and 2012 respectively. Of these, 20,447 are observed in both years.

*Mobility by Age, 2007 - 2012*

51. Table 14 shows the transition probabilities by decile for the post-2007 period. Compared to the pre-2007 period, once again the results show that there is a greater overall level of mobility. For example, in the first three deciles 36%, 28% and 25% stayed in the same decile compared to 41%, 31% and 27% in the post-2007 period. There is also evidence to suggest that a consistently greater proportion of tax units have moved from the top deciles to the bottom deciles in the post-2007 period which again reflects the dramatic nature of the economic crisis in that period. Furthermore, the crowding of these previously high income tax units into the lower deciles has the effect of increasing upward mobility for tax units already in those cohorts, in comparative terms. This partly explains the increased mobility in the bottom decile over the period.

**Table 14. Income Mobility of Tax Units by Decile, 2007 – 2012, Aged 25 to 65 (40,428)**

| | Deciles 2012 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Deciles 2008** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |
| **1** | 35.5 | 23.2 | 15.3 | 8.4 | 5.7 | 4.9 | 3.0 | 1.9 | 1.1 | 1.0 |
| **2** | 18.7 | 28.4 | 22.6 | 11.6 | 7.1 | 4.8 | 3.4 | 2.0 | 1.1 | 0.4 |
| **3** | 13.0 | 16.0 | 25.0 | 21.8 | 10.1 | 5.7 | 4.1 | 2.5 | 1.5 | 0.5 |
| **4** | 8.9 | 10.0 | 13.2 | 24.5 | 21.2 | 10.0 | 6.2 | 3.5 | 1.8 | 0.7 |
| **5** | 6.7 | 7.6 | 8.0 | 13.7 | 23.6 | 20.0 | 10.1 | 5.7 | 3.9 | 0.7 |
| **6** | 5.0 | 5.3 | 5.8 | 7.7 | 12.6 | 24.7 | 20.0 | 10.2 | 6.3 | 2.2 |
| **7** | 4.7 | 4.3 | 4.5 | 5.1 | 8.7 | 14.7 | 26.2 | 19.1 | 8.9 | 3.8 |
| **8** | 3.0 | 2.8 | 3.0 | 3.7 | 5.7 | 7.7 | 16.5 | 31.3 | 19.5 | 6.7 |
| **9** | 2.6 | 1.5 | 1.7 | 2.2 | 3.9 | 5.3 | 7.8 | 17.8 | 38.7 | 18.4 |
| **10** | 2.0 | 1.1 | 0.9 | 1.2 | 1.3 | 2.3 | 2.8 | 5.8 | 17.1 | 65.6 |

Source: Analysis of tax administration data by the Revenue Commissioners. 67,014 and 68,003 tax units who report an age of over 25 (and have no data quality issues) in 2007 and 2012 respectively. Of these, 40,428 are observed in both years.

52. Table 15 shows the transition probabilities by quintile for the post-2007 period. According to the analysis, half (53%) of tax units who were in the bottom 20% in 2007 remained in the bottom 20% by 2012. Over two-thirds (70%) of tax units in the top 20% remained in the top 20% by 2012. Compared to the pre-2007 period, a similar story emerges. There is greater overall mobility across all quintiles[24], that is, a smaller proportion of tax units are remaining entrenched within the same quintile. In the bottom quintile, 53% remained in the same quintile in 2012 and 47% moved upwards (compared to 56% and 44% in the pre-2007 period respectively). In the top quintile, 70% remained in that quintile by the end of the period (compared to 73% in the pre-2007 period).

**Table 15. Income Mobility of Tax Units by Quintile, 2007 – 2012, Aged 25 to 65 (40,428)**

| | 2012 quintiles | | | | |
|---|---|---|---|---|---|
| **2007 quintiles** | **1** | **2** | **3** | **4** | **5** |
| **1** | 52.9 | 28.9 | 11.2 | 5.2 | 1.8 |
| **2** | 23.9 | 42.2 | 23.5 | 8.1 | 2.2 |
| **3** | 12.2 | 17.7 | 40.5 | 23.0 | 6.6 |
| **4** | 7.4 | 8.2 | 18.4 | 46.6 | 19.5 |
| **5** | 3.6 | 3.0 | 6.4 | 17.1 | 69.9 |

Source: Analysis of tax administration data by the Revenue Commissioners. 67,014 and 68,003 tax units who report an age of over 25 (and have no data quality issues) in 2007 and 2012 respectively. Of these, 40,428 are observed in both years.

53. Table 16 shows income mobility in Ireland compared to the United States for taxpayers reporting an age over 25. The Irish transition probabilities are by quintile, for the full period 2004 to 2012 and for those reporting an age between 25 and 65. The table also reproduces the results from a similar analysis for the United States (Auten and Gee, 2009) for the years 1996 to 2005. Notwithstanding that the analysis and periods under examination are different, some similar characteristics emerged: less mobility occurs at the low and high ends of income distribution, while mobility is more frequent in middle income classes. In

[24] It should be noted that greater mobility over a greater time horizon may to a certain extent be expected.

Ireland, the mobility at the lowest end of income distribution increased during the crisis as more people crowded into that group after losing their job and main source of income (which resulted in comparative and incremental upward mobility of the rest of the population).

**Table 16. Income Mobility in Ireland and the United States by Quintile, Aged over 25***

| IRELAND | | | | | |
|---|---|---|---|---|---|
| | 2012 quintiles | | | | |
| **2004 quintiles** | **1** | **2** | **3** | **4** | **5** |
| 1 | 46.5 | 26.6 | 14.5 | 8.5 | 3.9 |
| 2 | 27.0 | 38.1 | 20.8 | 9.8 | 4.2 |
| 3 | 12.4 | 22.0 | 34.3 | 20.5 | 10.9 |
| 4 | 8.9 | 9.0 | 22.1 | 37.4 | 22.7 |
| 5 | 5.2 | 4.3 | 8.3 | 23.8 | 58.4 |

| UNITED STATES | | | | | |
|---|---|---|---|---|---|
| **Reproduced from Auten and Gee (2009)** | | | | | |
| | 2005 quintiles | | | | |
| **1996 quintiles** | **1** | **2** | **3** | **4** | **5** |
| 1 | 57.7 | 24.1 | 10.1 | 5.3 | 3.0 |
| 2 | 25.1 | 36.3 | 23.3 | 11.2 | 4.1 |
| 3 | 10.5 | 24.1 | 33.7 | 23.6 | 8.1 |
| 4 | 5.6 | 12.4 | 23.2 | 36.7 | 22.2 |
| 5 | 3.6 | 4.7 | 10.0 | 21.9 | 59.8 |

Source: Analysis of tax administration data by the Revenue Commissioners. *Irish income mobility quintiles are based on tax units reporting an age of between 25 and 65 while Auten and Gee analysis based on those reporting an age of over 25. 28,091 and 68.003 tax units who report an age between 25 and 65 (and have no data quality issues) in 2004 and 2012 respectively. Of these, 14,939 are observed in both years.

*Mobility by Tax Unit Type, 2008 - 2012*

54. A further important distinction, which may impact on mobility, is whether taxpayers are predominantly PAYE employees or self-assessed businesses. In the IDS data, tax units are assigned to one of the two categories conditional on which category type comprises a greater proportion of overall income.[25] Using this definition, it is possible to gain an understanding of mobility for both employees and businesses. Before presenting the analysis, it is important to note the wide diversity of different taxpayer types across the self-assessed taxpayer population. For instance, these taxpayers can range from local part-time businesses with very small incomes to high net worth individuals employing multiple employees.

55. According to the analysis, PAYE tax units make up the vast majority of tax units in all years; for example over 90% in 2012. Self-assessed taxpayers have consistently higher mean incomes. The relatively wider gap between the mean and the median for the self-assessed category signals a wider distribution and a greater number of outliers compared with PAYE employees.

[25] Specifically, a tax unit is defined as a PAYE tax unit if 50% or more of its gross income is comprised of PAYE income. Similarly, a tax unit is defined as a self-assessed tax unit if 50% or more of its gross income is comprised of self-assessed income.

56. Before considering these transition matrices, it is instructive to view the within and between variation of PAYE and self-assessed tax units over the period. Of the 174,584 tax units over the full period 2004 to 2012, 96% were PAYE at least once and 10% were self-assessed at least once. Overall, the analysis shows that PAYE tax units are close to time-invariant (96% who were ever defined as PAYE were always PAYE) while self-assessed tax units changed status more often (65% who were ever self-assessed units were always self-assessed).

**Table 17. Taxpayer Type, 2004 - 2012 (174,584)**

| | Overall | | Between | | Within |
|---|---|---|---|---|---|
| | **No.** | **%** | **No.** | **%** | **%** |
| PAYE | 903,552 | 91 | 166,739 | 96 | 96 |
| Self-Assessed | 89,624 | 9 | 21,691 | 12 | 65 |
| **Total** | **993,176** | **100** | **188,732** | **108** | **93** |

Source: Analysis of tax administration data by the Revenue Commissioners.

57. Tables 18 and 19 show income mobility for PAYE and self-assessed tax units in the post-2007 period. There are 72,722 PAYE tax units observed in both 2007 and 2012. According to the results, there is significantly less mobility in the bottom decile among tax units who are self-assessed (49% compared to 36%) and marginally lower mobility in the top decile (72% compared to 65%). In the middle deciles, there is consistently more mobility among self-assessed tax units who are much less likely to remain in the same decile and much more likely to move upwards over the period.

58. Overall, mobility is relatively higher in the middle deciles for self-assessed tax units over the period and lower in the upper and lower deciles. This is consistent with the inherently higher risks and rewards faced by businesses and entrepreneurs relative to employees. However, a greater proportion of self-assessed tax units remain in the top decile over the period.

**Table 18. Income Mobility of Tax Units by Decile, 2007 – 2012, PAYE* (72,722)**

| | Deciles 2012 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Deciles 2007** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |
| 1 | 36.0 | 22.0 | 14.4 | 10.0 | 6.7 | 4.8 | 3.2 | 1.6 | 0.9 | 0.4 |
| 2 | 20.3 | 26.4 | 17.2 | 12.9 | 8.8 | 6.5 | 4.5 | 2.2 | 1.0 | 0.3 |
| 3 | 13.8 | 19.6 | 26.6 | 16.2 | 9.5 | 5.8 | 4.7 | 2.4 | 1.0 | 0.5 |
| 4 | 9.0 | 11.1 | 17.6 | 26.2 | 16.0 | 9.1 | 5.4 | 3.2 | 1.8 | 0.6 |
| 5 | 7.1 | 7.3 | 9.0 | 15.0 | 26.3 | 17.2 | 9.2 | 5.3 | 2.7 | 0.9 |
| 6 | 4.7 | 5.0 | 6.2 | 8.5 | 14.9 | 27.0 | 18.6 | 8.9 | 4.7 | 1.5 |
| 7 | 3.6 | 4.1 | 4.2 | 4.9 | 7.7 | 14.8 | 28.1 | 19.9 | 8.7 | 4.0 |
| 8 | 2.6 | 2.5 | 2.6 | 3.5 | 5.6 | 8.2 | 15.2 | 33.1 | 19.8 | 6.8 |
| 9 | 1.8 | 1.2 | 1.6 | 1.8 | 3.3 | 5.0 | 7.9 | 17.3 | 40.4 | 19.6 |
| 10 | 1.2 | 0.8 | 0.7 | 0.9 | 1.2 | 1.7 | 3.2 | 6.1 | 18.9 | 65.3 |

Source: Analysis of tax administration data by the Revenue Commissioners. Of PAYE tax units as defined above, 110,336 and 98,683 were observed in 2007 and 2012 respectively. 72,722 were observed in both years.

**Table 19. Income Mobility of Tax Units by Decile, 2007 – 2012, Self-Assessed*(5,202)**

| | Deciles 2012 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Deciles 2007** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |
| **1** | 48.8 | 24.6 | 11.5 | 5.6 | 3.7 | 2.5 | 0.8 | 0.8 | 1.0 | 1.0 |
| **2** | 17.5 | 31.5 | 25.2 | 12.3 | 5.8 | 3.9 | 1.4 | 1.5 | 0.4 | 0.6 |
| **3** | 11.2 | 18.7 | 23.1 | 22.7 | 11.2 | 7.5 | 3.7 | 1.0 | 0.8 | 0.4 |
| **4** | 7.3 | 9.4 | 17.1 | 20.4 | 20.2 | 14.8 | 6.2 | 3.3 | 1.2 | 0.2 |
| **5** | 4.8 | 7.3 | 7.9 | 16.7 | 22.5 | 20.8 | 13.3 | 4.4 | 1.9 | 0.4 |
| **6** | 3.5 | 3.8 | 5.0 | 8.5 | 17.3 | 21.7 | 23.6 | 13.6 | 2.5 | 0.6 |
| **7** | 2.1 | 2.5 | 5.0 | 6.7 | 7.9 | 15.8 | 22.5 | 25.2 | 11.0 | 1.4 |
| **8** | 2.3 | 1.7 | 3.1 | 4.2 | 7.9 | 6.7 | 16.9 | 26.7 | 25.4 | 5.0 |
| **9** | 1.7 | 0.2 | 1.0 | 1.4 | 2.9 | 6.0 | 9.4 | 19.4 | 39.6 | 18.5 |
| **10** | 1.0 | 0.4 | 1.0 | 1.5 | 0.8 | 0.6 | 2.3 | 4.0 | 16.4 | 72.1 |

Source: Analysis of tax administration data by the Revenue Commissioners. Of self-assessed tax units as defined above, 10,463 and 9,118 were observed in 2007 and 2012 respectively. 5,202 were observed in both years.

*Mobility by Status*

59. This section explores transitions in tax unit status over the full period. Tax units are categorised under six personal statuses as follows: single males, single females, married two-earners, married one-earners, widowers and widows. As mentioned, it's important to note that a married couple who has elected for joint assessment is counted as one tax unit.[26] As shown in Table 20, of the 174,879 tax units observed in 2008 and 2012, 75% were single tax units at least once and 36% were married tax units at least once. 11% of the samples have been both single and married tax units over the period. 93% of tax units who were ever single remain so over the period.

**Table 20. Personal Status, Single and Married Tax Units (174,584)**

| | **Overall** | | **Between** | | **Within** |
|---|---|---|---|---|---|
| | **No.** | **%** | **No.** | **%** | **%** |
| Single male (A) | 315,751 | 32 | 68,103 | 39 | 91 |
| Single female (B) | 285,720 | 29 | 57,274 | 33 | 94 |
| Married two earner (C) | 186,630 | 19 | 35,626 | 20 | 71 |
| Married one earner (D) | 169,788 | 17 | 45,099 | 26 | 62 |
| Widower (E) | 9,659 | 1 | 1,962 | 1 | 77 |
| Widow (F) | 25,628 | 3 | 4,564 | 3 | 92 |
| **Total** | **993,176** | **100** | **212,628** | **122** | **82** |
| Single (A + B + E + F) | 638,974 | 64 | 130,770 | 75 | 93 |
| Married (C + D) | 356,639 | 36 | 62,818 | 36 | 84 |
| **Total** | **993,176** | **100** | **193,274** | **111** | **90** |

[26] It is also possible that a married couple can also opt for single assessment in which case they would be counted as two single units.

Source: Analysis of tax administration data by the Revenue Commissioners.

60. Table 21 shows that 84% of single males and 92% of single females had the same status in the subsequent period. For single males (females), 9% (3%) and 7% (5%) transitioned to married two-earners and married one-earners by 2012 respectively. 80% of married two-earners maintain that status and 17% switch to married one-earners. 95% and 99% of widowers and widows maintained that status over the period.

**Table 21. Transitions in Personal Status, 2007 - 2012**

| | Single Male | Single Female | Married Two Earner | Married One Earner | Widower | Widow |
|---|---|---|---|---|---|---|
| Single Male | 84.0 | 0.0 | 9.2 | 6.6 | 0.1 | 0.0 |
| Single Female | 0.0 | 91.5 | 3.4 | 4.7 | 0.0 | 0.3 |
| Married Two-Earner | 0.9 | 0.1 | 80.0 | 18.4 | 0.6 | 0.1 |
| Married One-Earner | 1.6 | 0.5 | 17.5 | 78.1 | 1.5 | 0.8 |
| Widower | 1.8 | 0.0 | 0.6 | 2.3 | 94.8 | 0.6 |
| Widow | 0.0 | 0.4 | 0.2 | 0.3 | 0.1 | 99.0 |

Source: Analysis of tax administration data by the Revenue Commissioners.

61. Tables 22 and 23 show the transition matrices for single and married tax units in the post-2007 period. In the bottom two deciles, single tax units were less likely to have stayed in the same decile (29% and 19% compared to 37% and 27%).

**Table 22. Income Mobility of Tax Units by Decile, 2007 – 2012, Single Tax Unit Status (45,140)**

| | Deciles 2012 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Deciles 2007** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |
| **1** | 29.2 | 21.3 | 15.4 | 9.9 | 6.8 | 5.3 | 4.3 | 4.3 | 2.0 | 1.5 |
| **2** | 19.2 | 18.8 | 13.6 | 14.1 | 10.2 | 7.5 | 5.8 | 6.0 | 3.3 | 1.5 |
| **3** | 12.3 | 16.0 | 22.0 | 13.2 | 11.8 | 9.0 | 5.9 | 5.1 | 3.3 | 1.2 |
| **4** | 10.1 | 13.1 | 16.8 | 21.9 | 13.3 | 9.6 | 5.8 | 4.5 | 3.4 | 1.6 |
| **5** | 8.1 | 9.9 | 10.0 | 16.8 | 23.8 | 13.8 | 7.6 | 5.2 | 3.1 | 1.6 |
| **6** | 5.6 | 7.3 | 8.0 | 8.9 | 15.1 | 24.4 | 15.2 | 8.4 | 4.8 | 2.4 |
| **7** | 5.2 | 5.1 | 5.5 | 6.6 | 9.0 | 15.6 | 26.6 | 15.6 | 7.5 | 3.2 |
| **8** | 4.0 | 4.1 | 3.7 | 4.2 | 4.8 | 8.0 | 16.9 | 29.3 | 18.7 | 6.3 |
| **9** | 3.2 | 2.9 | 3.1 | 2.9 | 3.5 | 4.3 | 7.6 | 15.8 | 37.8 | 19.0 |
| **10** | 3.1 | 1.6 | 1.7 | 1.6 | 1.6 | 2.4 | 4.3 | 5.8 | 16.2 | 61.9 |

Source: Analysis of tax administration data by the Revenue Commissioners. Of single tax units as defined above, there were 80,045 and 65,246 units in 2007 and 2012 respectively. 45,140 were observed in both years.

62. However, for subsequent deciles there is a consistently greater degree of upward mobility among married tax units with the exception of the top decile where it is approximately similar. In the middle income deciles, $4^{th} – 7^{th}$, upward mobility is much more likely among married tax units compared to single tax units.

**Table 23. Income Mobility of Tax Units by Decile, 2007 – 2012, Married Tax Unit Status (31,009)**

| | Deciles 2012 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Deciles 2007** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |
| 1 | 37.3 | 26.8 | 16.9 | 8.6 | 4.8 | 2.1 | 1.4 | 0.7 | 0.8 | 0.7 |
| 2 | 17.5 | 26.6 | 27.1 | 13.7 | 7.9 | 3.9 | 1.4 | 1.1 | 0.5 | 0.3 |
| 3 | 12.2 | 14.7 | 19.3 | 24.7 | 15.5 | 6.9 | 3.6 | 1.9 | 1.0 | 0.3 |
| 4 | 8.7 | 10.1 | 11.6 | 18.1 | 22.9 | 16.4 | 6.7 | 3.6 | 1.7 | 0.3 |
| 5 | 7.5 | 7.9 | 8.7 | 11.6 | 17.6 | 23.6 | 13.9 | 5.3 | 2.9 | 1.1 |
| 6 | 4.9 | 4.8 | 6.9 | 9.1 | 11.4 | 19.3 | 24.8 | 12.7 | 4.8 | 1.4 |
| 7 | 4.1 | 3.7 | 4.1 | 6.3 | 9.2 | 11.9 | 21.2 | 26.1 | 10.5 | 2.9 |
| 8 | 3.0 | 2.6 | 2.7 | 4.1 | 5.8 | 7.9 | 14.1 | 26.1 | 27.5 | 6.2 |
| 9 | 2.2 | 1.6 | 1.8 | 2.2 | 3.0 | 5.4 | 9.5 | 15.4 | 35.3 | 23.5 |
| 10 | 2.7 | 1.2 | 0.8 | 1.6 | 2.0 | 2.7 | 3.6 | 7.2 | 14.9 | 63.4 |

Source: Analysis of tax administration data by the Revenue Commissioners. There were 40,754 and 42,555 tax units in 2007 and 2012 respectively. 31,009 were observed in both years.

63. Table 24 shows income mobility for married-two earner tax units for the same period. The general pattern is broadly the same - greater upward mobility among married tax units in the middle deciles but much lower mobility among married units in the bottom deciles. However, the magnitude of upward mobility is greater for married-two earner tax units compared to married tax units. The proportion of tax units in the top decile is the same as for married tax units.

**Table 24. Income Mobility of Tax Units by Decile, 2007 – 2012, Married Two Earners (14,443)**

| | Deciles 2012 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Deciles 2007** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |
| 1 | 43.8 | 29.4 | 14.5 | 6.9 | 2.6 | 1.1 | 0.5 | 0.8 | 0.1 | 0.2 |
| 2 | 18.6 | 24.7 | 26.3 | 15.9 | 7.6 | 3.5 | 1.9 | 0.7 | 0.9 | 0.0 |
| 3 | 12.4 | 15.5 | 17.7 | 24.9 | 15.2 | 8.5 | 2.8 | 1.7 | 0.9 | 0.4 |
| 4 | 7.3 | 9.9 | 13.4 | 17.5 | 23.4 | 16.1 | 7.0 | 4.1 | 1.0 | 0.4 |
| 5 | 4.9 | 6.4 | 10.0 | 11.4 | 18.4 | 22.9 | 15.9 | 6.8 | 2.4 | 0.8 |
| 6 | 4.1 | 5.0 | 6.8 | 8.5 | 11.1 | 18.4 | 24.7 | 15.4 | 4.9 | 1.3 |
| 7 | 3.4 | 3.8 | 4.7 | 6.9 | 8.3 | 11.9 | 20.4 | 24.0 | 14.0 | 2.7 |
| 8 | 2.3 | 3.1 | 2.6 | 4.0 | 7.3 | 9.1 | 12.0 | 23.7 | 28.9 | 7.1 |
| 9 | 1.5 | 1.2 | 2.4 | 2.6 | 4.2 | 5.3 | 10.6 | 15.4 | 33.0 | 23.8 |
| 10 | 1.8 | 1.0 | 1.5 | 1.8 | 1.9 | 3.1 | 4.4 | 7.3 | 13.9 | 63.4 |

Source: Analysis of tax administration data by the Revenue Commissioners. Of tax units with a personal status of married two-earner, there were 21,142 and 22,212 units in 2007 and 2012 respectively. 14,443 were observed in both years.

***Mobility by Percentile and Analysis of Top 1%***

64. This section provides a more detailed examination of mobility at the upper and lower ends of the income distribution using percentile transition matrices. Specifically, the transition matrices are shown for tax units above the 90$^{th}$ percentile and for the 10$^{th}$ percentile and below. Consequently, the matrices do not sum to 100 per cent as before since these tax units can move out of the top and bottom deciles entirely. Notwithstanding this point, a similar overall methodology is adopted to the previous decile analysis.

*Mobility by Percentile, 2004 – 2007*

65. The previous decile analysis showed that 73% or 5,898 tax units in the top decile in 2004 remained in the top decile by 2007. Table 25 extends the analysis by examining the same cohort of tax units using a percentile transition matrix. According to the analysis, a low degree of mobility is observed among the top one per cent cohort - approximately 2 in 3 (65%) tax units in 2004 remained in that percentile in 2007. Among those in the top one per cent in 2004, 95% remained within the top decile in 2007. Of those in the top two per cent, 37% remained in that category in 2007, 16% moved up to the top one per cent and 91% remained in the top decile. It should be noted that low levels of mobility at the top end of the distribution may partly be due to outlier tax units with very large incomes; even a significant reduction in income for these tax units may not be sufficient to cause downward mobility.

**Table 25. Income Mobility of Tax Units by Percentile, Above 90th Percentile, 2004 – 2007 (5,898)**

| | 2007 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **2004** | **91** | **93** | **93** | **94** | **95** | **96** | **97** | **98** | **99** | **100** | **Total** |
| 91 | 9.6 | 7.4 | 5.3 | 4.2 | 4.4 | 3.8 | 2.1 | 1.6 | 1.1 | 0.4 | **39.9** |
| 92 | 10.2 | 9.6 | 8.1 | 7.6 | 4.3 | 3.4 | 2.1 | 1.1 | 2.1 | 0.5 | **49.1** |
| 93 | 10.6 | 12.1 | 10.2 | 8.2 | 7.0 | 3.4 | 3.3 | 2.3 | 1.7 | 0.2 | **59.2** |
| 94 | 6.5 | 11.6 | 12.1 | 11.8 | 8.6 | 6.7 | 5.0 | 2.2 | 1.5 | 0.4 | **66.4** |
| 95 | 4.4 | 6.8 | 9.2 | 13.2 | 14.0 | 11.7 | 7.1 | 4.3 | 3.2 | 1.6 | **75.5** |
| 96 | 2.7 | 3.7 | 6.2 | 9.6 | 16.3 | 17.1 | 9.6 | 7.6 | 4.2 | 2.2 | **79.2** |
| 97 | 2.1 | 2.7 | 3.1 | 6.3 | 8.6 | 17.2 | 23.2 | 13.8 | 6.8 | 2.0 | **85.7** |
| 98 | 1.0 | 1.2 | 1.8 | 2.2 | 5.2 | 9.0 | 17.6 | 28.6 | 13.8 | 4.7 | **85.1** |
| 99 | 1.0 | 1.1 | 1.6 | 2.2 | 3.1 | 4.4 | 8.5 | 17.2 | 36.5 | 15.5 | **91.1** |
| 100 (Top 1%) | 0.4 | 0.2 | 0.4 | 1.0 | 0.7 | 1.0 | 2.5 | 5.0 | 18.3 | 65.1 | **94.7** |

Source: Analysis of tax administration data by the Revenue Commissioners. 99,885 tax units observed in 2004 and 120,799 in 2007. 81,250 observed in both years. 5,898 observed in the top decile in both years. The total column refers to the sum of all tax units in a given percentile in 2004 remaining in the top decile by 2007.

66. In the previous decile analysis, 44% or 3,602 tax units in the bottom decile in 2004 remained in the bottom decile by 2007. Table 26 shows that, among the bottom one and two percentiles, 1 in 6 (16%) and 1 in 8 (13%) tax units remained in that percentile over the period respectively. Of those in the bottom one per cent, one half (49%) remained in the bottom decile while the other half (51%) made it out of the decile by 2007. As expected, the data show that tax units which are relatively higher within the decile are less likely to remain within it over the period and are more likely to engage in upward mobility.

**Table 26. Income Mobility of Tax Units by Percentile, 10th Percentile and Below, 2004 – 2007 (3,602)**

| | 2007 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **2004** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **Total** |
| 1 | 16.1 | 4.2 | 4.4 | 4.7 | 4.3 | 3.2 | 3.3 | 2.8 | 2.5 | 3.0 | **48.5** |
| 2 | 4.9 | 13.1 | 5.4 | 5.5 | 5.0 | 3.9 | 4.7 | 3.8 | 4.4 | 2.2 | **53.1** |
| 3 | 3.3 | 10.2 | 5.9 | 5.5 | 3.3 | 5.4 | 4.3 | 4.8 | 3.8 | 4.2 | **50.7** |
| 4 | 3.3 | 4.3 | 11.8 | 4.6 | 5.3 | 5.1 | 3.9 | 4.2 | 2.5 | 2.6 | **47.6** |
| 5 | 2.9 | 3.4 | 9.1 | 7.0 | 3.6 | 5.0 | 3.6 | 4.7 | 3.6 | 3.1 | **45.9** |
| 6 | 2.8 | 3.0 | 5.3 | 10.1 | 3.5 | 4.0 | 4.9 | 3.8 | 4.3 | 4.2 | **45.9** |
| 7 | 2.8 | 2.7 | 3.8 | 5.8 | 6.5 | 6.7 | 3.3 | 2.8 | 3.9 | 2.2 | **40.6** |
| 8 | 2.3 | 2.8 | 2.3 | 4.7 | 7.5 | 5.6 | 2.7 | 4.1 | 4.1 | 3.8 | **40.0** |
| 9 | 2.5 | 1.8 | 2.9 | 3.3 | 6.0 | 6.0 | 4.7 | 3.8 | 2.7 | 2.5 | **36.2** |
| 10 | 2.2 | 3.3 | 2.5 | 2.3 | 4.4 | 6.4 | 5.6 | 3.0 | 2.8 | 2.2 | **34.8** |

Source: Analysis of tax administration data by the Revenue Commissioners. 99,885 tax units observed in 2004 and 120,799 in 2007. 81,250 observed in both years. 3,602 observed for percentiles 10 and below. The total column refers to the sum of all tax units in a given percentile in 2004 remaining in the bottom decile by 2007. It should be noted that the sample size is somewhat smaller in this case.

*Mobility by Percentile, 2007 - 2012*

67. In the previous analysis, 65% or 5,357 tax units in the top decile in 2007 remained in that decile by 2012. Table 27 shows the percentile transition matrix over the period for tax units above the 90$^{th}$ percentile. The proportions remaining in the same percentiles are smaller in the post-2007 period indicating a greater overall degree of mobility. However, direct comparison between the periods is somewhat challenging because of the substantial proportions dropping out of the top decile. Notwithstanding this, it is notable that tax units are significantly more likely to drop out in post-2007 period, particularly among tax units at the upper end of the top decile. For example, among the 95$^{th}$, 99$^{th}$ and 100$^{th}$ percentiles in the pre-2007 period, 76%, 91% and 95% managed to remain within the top decile respectively. Correspondingly, 24%, 9% and 5% dropped out of the top decile from these percentiles over the period. By comparison in the post-2007 period, 35%, 22% and 13% dropped out for the same percentiles. Overall, the evidence suggests that mobility was much greater post-2007 with proportionately more tax units falling out of the top percentiles, particularly among the highest earners near the top of the distribution.

**Table 27. Income Mobility of Tax Units by Percentile, Above 90th Percentile, 2007 – 2012 (5,357)**

| | 2012 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **2007** | **91** | **92** | **93** | **94** | **95** | **96** | **97** | **98** | **99** | **100** | **Total** |
| 91 | 7.5 | 6.3 | 5.8 | 6.5 | 5.2 | 3.9 | 3.3 | 2.1 | 2.1 | 0.5 | **42.9** |
| 92 | 5.4 | 6.6 | 7.6 | 7.1 | 8.4 | 4.6 | 2.9 | 3.0 | 2.5 | 1.4 | **49.6** |
| 93 | 3.4 | 5.4 | 8.6 | 9.3 | 7.6 | 8.2 | 5.9 | 3.0 | 2.3 | 0.7 | **54.4** |
| 94 | 4.3 | 5.1 | 7.7 | 8.1 | 9.7 | 7.9 | 6.5 | 5.3 | 1.6 | 1.6 | **57.8** |
| 95 | 3.3 | 5.0 | 6.0 | 8.7 | 9.5 | 10.3 | 9.1 | 6.6 | 4.3 | 1.8 | **64.6** |
| 96 | 4.2 | 2.7 | 3.6 | 4.8 | 7.2 | 11.7 | 12.9 | 10.0 | 6.1 | 2.3 | **65.5** |
| 97 | 2.7 | 3.0 | 3.6 | 4.8 | 5.7 | 7.4 | 12.8 | 16.0 | 10.4 | 3.7 | **70.1** |
| 98 | 2.9 | 3.0 | 2.5 | 3.5 | 4.8 | 6.3 | 10.1 | 17.6 | 18.6 | 7.0 | **76.3** |
| 99 | 1.2 | 1.7 | 1.9 | 2.1 | 3.3 | 4.5 | 5.7 | 11.3 | 25.9 | 20.4 | **77.9** |
| 100 (Top 1%) | 0.8 | 1.1 | 0.8 | 1.8 | 1.3 | 2.4 | 4.5 | 6.2 | 15.3 | 52.5 | **86.7** |

Source: Analysis of tax administration data by the Revenue Commissioners. 120,799 tax units observed in 2007 and 107,801 in 2012. 82,948 observed in both years. 5,357 observed for percentiles above 90 in both years. The total column refers to the sum of all tax units in a given percentile in 2007 remaining in the top decile by 2012.

68. Table 28 shows the percentile transition matrix for tax units in and below the 10th percentile between 2007 and 2012. In the previous decile analysis, 35% or 2,886 tax units in the bottom decile in 2007 remained in the bottom decile by 2012. Table 28 shows that, among the bottom one and two percentiles, 11% and 6% of tax units remained in the same percentile over that period. Of those in the bottom one per cent, 52% moved upwards outside the bottom decile compared to 59% and 65% for the $7^{th}$ and $10^{th}$ percentiles respectively. Compared to the pre-2007 period, tax units across all percentiles within the bottom decile are more likely to move upwards post-2007. Again, part of the explanation is the dramatic nature of the recession which reduced incomes sharply at the top end of the distribution. According to the analysis, there is greater mobility among the bottom one and two percentiles in the post-2007 period – these tax units are relatively less likely to remain entrenched in the same percentiles in the later period. Outside of these two deciles, similar, albeit small, proportions remain in the same percentiles.

**Table 28. Income Mobility of Tax Units by Percentile, 10th Percentile and Below, 2007 – 2012 (2,886)**

| | 2012 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **2007** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **Total** |
| 1 | 11.0 | 4.9 | 4.7 | 3.9 | 3.0 | 2.9 | 4.7 | 2.9 | 2.7 | 2.0 | **42.7** |
| 2 | 4.1 | 5.9 | 4.3 | 5.4 | 4.3 | 3.4 | 4.6 | 3.3 | 2.8 | 2.8 | **40.8** |
| 3 | 2.3 | 2.8 | 6.8 | 4.1 | 4.1 | 4.5 | 4.0 | 3.3 | 2.4 | 3.5 | **37.6** |
| 4 | 2.7 | 3.7 | 4.7 | 6.4 | 3.5 | 2.7 | 3.5 | 4.5 | 4.1 | 2.4 | **38.1** |
| 5 | 2.3 | 3.5 | 3.1 | 4.7 | 4.2 | 3.9 | 3.1 | 3.4 | 3.2 | 3.2 | **34.7** |
| 6 | 2.2 | 3.9 | 2.1 | 4.2 | 5.4 | 3.5 | 2.3 | 4.6 | 2.4 | 2.8 | **33.3** |
| 7 | 1.9 | 3.3 | 3.0 | 3.1 | 3.3 | 4.1 | 2.3 | 3.3 | 3.0 | 3.9 | **31.1** |
| 8 | 1.8 | 3.0 | 2.7 | 3.9 | 3.1 | 2.9 | 2.5 | 3.3 | 3.3 | 3.6 | **30.0** |
| 9 | 1.0 | 4.0 | 3.0 | 2.9 | 3.5 | 2.7 | 4.6 | 2.4 | 2.7 | 2.0 | **28.7** |
| 10 | 1.8 | 2.4 | 2.9 | 2.8 | 2.5 | 3.4 | 4.2 | 5.9 | 3.4 | 1.6 | **30.9** |

Source: Analysis of tax administration data by the Revenue Commissioners. 120,799 tax units observed in 2007 and 107,801 in 2012. 82,948 observed in both years. 2,886 observed for percentiles 10 and below for both years.

### *Sectoral Analysis*

69. This section examines the sector of employment of the general population of tax units and the top one per cent of tax units for the years 2004, 2007 and 2012. Before presenting the results, it should be noted that in the case of employees, the sector relates to the sector of the employer.[27] According to the analysis, the principal sectors of employment reported on the tax records are wholesale and retail trade, public administration, accommodation and food and health and financial activities. While the overall shares by sector have arguably not too changed too dramatically, the most striking result, as expected, is that both the proportions and incomes of tax units in the construction sector dropped significantly between 2007 and 2012.

[27] In the analysis each tax unit is associated with one sector in each year. However it should be noted that tax units may have multiple trades or businesses and this is not accounted for in this analysis.

**Table 29. Proportions and Gross Incomes of Tax Units by Sector, 2004 - 2012**

| | Proportions | | | Mean Gross Incomes | | |
|---|---|---|---|---|---|---|
| | **2004** | **2007** | **2012** | **2004** | **2007** | **2012** |
| Agriculture, forestry and fishing (A) | 7% | 6% | 6% | 34,238 | 43,854 | 40,179 |
| Construction (F) | 10% | 11% | 5% | 32,678 | 35,769 | 30,861 |
| Wholesale and retail trade (G) | 15% | 15% | 15% | 22,652 | 24,874 | 27,050 |
| Transportation and storage (H) | 5% | 5% | 4% | 32,457 | 35,505 | 34,848 |
| Accommodation and food service activities (I) | 7% | 7% | 8% | 16,896 | 17,724 | 17,063 |
| Information and communication (J) | 4% | 4% | 3% | 36,780 | 42,628 | 43,762 |
| Professional, scientific and technical activities | 4% | 4% | 5% | 51,146 | 57,442 | 55,695 |
| Administrative and support service activities (N) | 5% | 5% | 5% | 22,928 | 25,391 | 24,320 |
| Public administration and defence (O) | 9% | 9% | 11% | 37,615 | 41,698 | 41,345 |
| Education (P) | 2% | 2% | 3% | 31,846 | 34,258 | 31,776 |
| Human health and social work activities (Q) | 7% | 7% | 8% | 38,996 | 43,438 | 42,144 |
| Industry (B to E) | 13% | 11% | 8% | 32,546 | 36,899 | 40,954 |
| Financial, insurance and real estate (K,L) | 9% | 9% | 13% | 41,704 | 48,507 | 52,202 |
| Arts, entertainment, recreation (R,S) | 2% | 3% | 5% | 23,006 | 25,757 | 25,755 |
| **All NACE economic sectors** | **100%** | **100%** | **100%** | **31,980** | **35,951** | **37,638** |

Source: Analysis of tax administration data by the Revenue Commissioners. The sample sizes for total tax units are 91,470, 114,864 and 104,012 for 2004, 2007 and 2012 respectively. Activities of households and sectors not stated are not included for the purposes of the analysis. Note that not all taxpayers report a sector of employment on their tax returns so the gross income figures differ slightly from the overall figures. A matching exercise was conducted due to a sector reclassification from Nace Rev 1 to Nace Rev 2 after 2010.

70. By comparison, the top one per cent of tax units are concentrated in a much smaller set of sectors, namely, financial, insurance and real estate (31% in 2012), professional and scientific (18%) and health and social work (17%). There has been a notable rise in the proportions in the financial, insurance and real estate sector and a moderate decline in the professional and scientific sector over the period. There is also evidence that the rise in average gross incomes was greater among the top one percent between 2004 and 2007 while the subsequent decline after 2007 was much greater. For instance, in the general population of tax units in the construction sector, incomes rose by 9% between 2004 and 2007 and declined by 14% between 2007 and 2012. By comparison, among the top one percent, incomes grew by 17% and then declined by 61% over the same periods. A similar trend is observed for many other sectors.

**Table 30. Proportions and Gross Incomes of Tax Units in the Top One Per Cent by Sector, 2004 - 2012**

| | Proportions | | | Mean Gross Income | | |
|---|---|---|---|---|---|---|
| | **2004** | **2007** | **2012** | **2004** | **2007** | **2012** |
| Agriculture, forestry and fishing (A) | 7.1% | 7.3% | 2.9% | 318,589 | 489,222 | 360,626 |
| Construction (F) | 7.7% | 7.5% | 1.6% | 622,942 | 731,808 | 286,465 |
| Wholesale and retail trade (G) | 6.7% | 4.9% | 4.8% | 243,881 | 305,071 | 270,227 |
| Transportation and storage (H) | 2.2% | 1.0% | 0.8% | 212,093 | 262,083 | 240,874 |
| Accommodation and food service activities (I) | 3.0% | 1.8% | 1.1% | 358,317 | 344,882 | 274,405 |
| Information and communication (J) | 3.2% | 4.3% | 2.2% | 227,450 | 266,672 | 375,754 |
| Professional, scientific and technical activities | 25.4% | 21.8% | 17.9% | 368,001 | 485,931 | 420,573 |
| Administrative and support service activities (N) | 0.9% | 1.3% | 1.2% | 217,371 | 290,847 | 318,289 |
| Public administration and defence (O) | 0.8% | 0.5% | 0.6% | 218,464 | 239,279 | 225,395 |
| Education (P) | 0.3% | 0.8% | 0.9% | 281,000 | 343,569 | 216,831 |
| Human health and social work activities (Q) | 19.1% | 20.0% | 17.1% | 296,461 | 355,400 | 343,551 |
| Industry (B to E) | 2.0% | 3.1% | 3.2% | 233,926 | 273,017 | 295,006 |
| Financial, insurance and real estate activities | 20.2% | 24.7% | 31.2% | 456,218 | 432,903 | 378,143 |
| Arts, entertainment, recreation (R,S) | 0.9% | 0.8% | 0.9% | 500,755 | 604,324 | 308,657 |
| **All NACE economic sectors** | **100%** | **100%** | **100%** | **367,238** | **431,361** | **362,978** |

Source: Analysis of tax administration data by the Revenue Commissioners. The sample sizes for the top one percent of tax units are 743, 910 AND 1,078 for 2004, 2007 and 2012 respectively. Note that not all taxpayers report a sector of employment on their tax returns, particularly in earlier years, so the gross income figures differ slightly from the overall figures. A matching exercise was conducted due to a sector reclassification from Nace Rev 1 to Nace Rev 2 after 2010.

## Conclusions

68. The evidence in this paper suggests that there is some relationship between the pattern of growth and changes in inequality and that sustainable growth may also be more inclusive. Labour earnings grew in a similar way across the income distribution during the sustainable growth period prior to 2002, while those in the highest group saw disproportionately strong growth during the property bubble period. In the aftermath of the property bubble burst, labour earnings in the aggregate declined sharply, reflecting essentially the deterioration at the low end of distribution. Capital income has been highly concentrated at the top of distribution, especially during the property bubble period. The crisis alleviated the intensity of capital income concentration but it remains above pre-bubble period levels.

69. An analysis of income mobility over time shows mobility has been low at both ends of the income distribution. It increased however at the low end once the crisis began, reflecting the sharp deterioration of the labour market, as more people including those at the highest income groups moved down into the lowest income group, reflecting the sharp deterioration of the labour market. This relatively abrupt downward mobility was offset by relatively incremental upward mobility in the rest of the population within the distribution, while shifting the entire income distribution downward.

70. The very highest income households in the top 1% are characterised by a very high share of income coming from capital and particularly low income mobility over time. Around half of the top 1% tax units in 2007 remained in the same position in 2012, partly explained by a number of outstanding tax units with extraordinarily high incomes. The share of the top 1% tax units in the finance, insurance and real estate sectors has increased to around 1/3, which is disproportionately high with respect to the total number of employment in these sectors. In contrast, the share of the top 1% tax units in the construction sector has markedly declined after the crisis.

71. The tax and benefit system plays a strong role in reducing inequality in Ireland. The data show strong progressivity of taxation at the high end of distribution. The average effective tax rate at the top decile is 24.5%, against 14.4% for all tax units. Those who are at the top decile pay 59% of total income tax, although their share of market income is 37%. The progressivity in the tax and benefit system became steeper over the last decade by increased tax credits and reduced tax allowances (which used to disproportionately favour the highest income groups), both contributing to redistribution toward low- and middle- income groups. The welfare system provides the most significant support to households in lower income deciles. Overall, the share of those who are up to the 8$^{th}$ decile becomes higher in after tax income than in market income.

72. The design of tax credits and benefits should be closely assessed, particularly for those that are withdrawn with income as they drive marginal effective tax rates up when they are withdrawn and can create disincentives to work/earn more (see O'Connor et al., 2015). Also, still a large share of total tax allowances is enjoyed by top income groups (as 53.1% of the tax allowances identified in this paper accruing to the top 10% of tax units). Scaling back some of these allowances could be good not only from a revenue-raising and efficiency perspective but also from an equity perspective.

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## ANNEX: MOBILITY ANALYSIS SAMPLING ISSUES AND DATA DESCRIPTION

### The Sample

1. Since the focus of the analysis is income inequality, it is particularly important to ensure that the sample accurately represents the income distribution of the taxpayer population in Ireland. To achieve this, a stratified randomisation approach was employed as follows. First, for each unique tax unit, a new variable was constructed summing gross income across all years from 2004 to 2012. There were a total of 3.4 million unique tax units over the period. Second, the variable was stratified into ten gross income deciles of 341,434. Third, simple randomisation was applied to each decile to obtain representative decile samples of 17,500 tax units. The deciles were then appended to give the total sample. A representative sample of 175,000 tax units was obtained; each observed in 5.7 years on average. To test the quality of the randomisation process, the distributions of certain variables are compared between the sample and the population (Table A1). Overall, the results show that block randomisation produces a sample that is representative of the approximately 2.1 million tax units each year in the total taxpayer population.

**Table A1: Comparison of Sample and Population, Average Gross Income Percentiles 2012**

| | Sample (107,801) | | | Population (2,107,099) | | | |
|---|---|---|---|---|---|---|---|
| | N | Mean | Median | N | Mean | Median | *% Diff* |
| 1 | 1,080 | 22 | 0 | 21,082 | 21 | 0 | *-3.77%* |
| 2 | 1,083 | 346 | 346 | 21,063 | 344 | 345 | *-0.65%* |
| 3 | 1,074 | 779 | 774 | 21,074 | 773 | 771 | *-0.71%* |
| 4 | 1,076 | 1,233 | 1,236 | 21,064 | 1,226 | 1,225 | *-0.56%* |
| 5 | 1,078 | 1,735 | 1,737 | 21,060 | 1,719 | 1,717 | *-0.91%* |
| 6 | 1,079 | 2,256 | 2,255 | 21,101 | 2,244 | 2,244 | *-0.53%* |
| 7 | 1,077 | 2,782 | 2,773 | 21,052 | 2,790 | 2,788 | *0.31%* |
| 8 | 1,078 | 3,335 | 3,333 | 21,073 | 3,364 | 3,362 | *0.86%* |
| 9 | 1,079 | 3,940 | 3,940 | 21,077 | 3,966 | 3,966 | *0.66%* |
| 10 | 1,079 | 4,592 | 4,593 | 21,071 | 4,585 | 4,582 | *-0.15%* |
| 11 | 1,077 | 5,207 | 5,200 | 21,053 | 5,200 | 5,200 | *-0.13%* |
| 12 | 1,077 | 5,851 | 5,850 | 21,078 | 5,835 | 5,836 | *-0.27%* |
| 13 | 1,078 | 6,490 | 6,470 | 21,062 | 6,489 | 6,485 | *-0.01%* |
| 14 | 1,082 | 7,162 | 7,163 | 20,992 | 7,152 | 7,153 | *-0.14%* |
| 15 | 1,076 | 7,840 | 7,846 | 21,150 | 7,816 | 7,814 | *-0.31%* |
| 16 | 1,076 | 8,496 | 8,494 | 21,087 | 8,464 | 8,461 | *-0.38%* |
| 17 | 1,079 | 9,156 | 9,152 | 21,072 | 9,129 | 9,128 | *-0.30%* |
| 18 | 1,078 | 9,803 | 9,797 | 21,053 | 9,778 | 9,776 | *-0.26%* |
| 19 | 1,079 | 10,452 | 10,450 | 21,077 | 10,407 | 10,403 | *-0.43%* |
| 20 | 1,077 | 11,059 | 11,051 | 21,077 | 10,989 | 10,973 | *-0.64%* |
| 21 | 1,077 | 11,733 | 11,734 | 21,073 | 11,628 | 11,627 | *-0.89%* |
| 22 | 1,079 | 12,360 | 12,371 | 21,063 | 12,255 | 12,258 | *-0.86%* |
| 23 | 1,077 | 12,934 | 12,950 | 21,077 | 12,838 | 12,842 | *-0.75%* |
| 24 | 1,078 | 13,458 | 13,460 | 21,084 | 13,383 | 13,381 | *-0.56%* |
| 25 | 1,078 | 14,002 | 14,000 | 21,060 | 13,937 | 13,938 | *-0.46%* |
| 26 | 1,078 | 14,571 | 14,586 | 21,079 | 14,497 | 14,497 | *-0.51%* |
| 27 | 1,078 | 15,119 | 15,109 | 21,070 | 15,052 | 15,045 | *-0.44%* |
| 28 | 1,081 | 15,673 | 15,670 | 21,062 | 15,604 | 15,600 | *-0.44%* |
| 29 | 1,078 | 16,180 | 16,171 | 21,070 | 16,134 | 16,127 | *-0.28%* |
| 30 | 1,078 | 16,705 | 16,695 | 21,071 | 16,661 | 16,656 | *-0.26%* |
| 31 | 1,076 | 17,236 | 17,240 | 21,058 | 17,196 | 17,197 | *-0.23%* |
| 32 | 1,077 | 17,737 | 17,735 | 21,085 | 17,712 | 17,712 | *-0.14%* |
| 33 | 1,078 | 18,228 | 18,215 | 21,070 | 18,197 | 18,200 | *-0.17%* |
| 34 | 1,079 | 18,741 | 18,739 | 21,061 | 18,697 | 18,699 | *-0.24%* |
| 35 | 1,077 | 19,265 | 19,269 | 21,070 | 19,223 | 19,227 | *-0.21%* |
| 36 | 1,079 | 19,784 | 19,787 | 20,904 | 19,742 | 19,743 | *-0.21%* |
| 37 | 1,077 | 20,286 | 20,290 | 21,255 | 20,247 | 20,245 | *-0.19%* |
| 38 | 1,078 | 20,774 | 20,784 | 21,064 | 20,739 | 20,742 | *-0.17%* |
| 39 | 1,078 | 21,275 | 21,273 | 21,073 | 21,241 | 21,241 | *-0.16%* |
| 40 | 1,078 | 21,786 | 21,780 | 21,070 | 21,764 | 21,761 | *-0.10%* |
| 41 | 1,079 | 22,301 | 22,305 | 21,055 | 22,289 | 22,293 | *-0.05%* |
| 42 | 1,077 | 22,828 | 22,828 | 21,096 | 22,820 | 22,821 | *-0.04%* |
| 43 | 1,079 | 23,338 | 23,331 | 21,061 | 23,352 | 23,356 | *0.06%* |
| 44 | 1,077 | 23,890 | 23,899 | 21,079 | 23,889 | 23,896 | *0.00%* |
| 45 | 1,078 | 24,433 | 24,435 | 21,066 | 24,415 | 24,414 | *-0.07%* |
| 46 | 1,079 | 24,964 | 24,971 | 21,064 | 24,948 | 24,959 | *-0.06%* |
| 47 | 1,077 | 25,491 | 25,494 | 21,075 | 25,476 | 25,477 | *-0.06%* |
| 48 | 1,078 | 26,028 | 26,021 | 21,073 | 26,012 | 26,000 | *-0.06%* |
| 49 | 1,078 | 26,561 | 26,559 | 21,080 | 26,558 | 26,556 | *-0.01%* |
| 50 | 1,078 | 27,116 | 27,109 | 21,059 | 27,122 | 27,120 | *0.02%* |

Source: Analysis of tax administration data by the Revenue Commissioners. Mean and medians reported refer to average incomes within the percentile ranges. Percentage difference column refers to mean percentage differences.

**Table A1 Continued: Comparison of Sample and Population, Average Gross Income Percentiles, 2012**

| | N | Mean | Median | N | Mean | Median | *% Diff* |
|---|---|---|---|---|---|---|---|
| 51 | 1,079 | 27,692 | 27,704 | 21,070 | 27,699 | 27,702 | *0.03%* |
| 52 | 1,077 | 28,255 | 28,247 | 21,075 | 28,282 | 28,280 | *0.09%* |
| 53 | 1,079 | 28,874 | 28,878 | 21,068 | 28,895 | 28,896 | *0.07%* |
| 54 | 1,077 | 29,527 | 29,534 | 21,082 | 29,529 | 29,531 | *0.00%* |
| 55 | 1,078 | 30,152 | 30,145 | 21,053 | 30,150 | 30,141 | *0.00%* |
| 56 | 1,078 | 30,775 | 30,778 | 21,073 | 30,784 | 30,784 | *0.03%* |
| 57 | 1,078 | 31,415 | 31,417 | 21,080 | 31,419 | 31,420 | *0.01%* |
| 58 | 1,078 | 32,075 | 32,076 | 21,079 | 32,072 | 32,066 | *-0.01%* |
| 59 | 1,078 | 32,726 | 32,724 | 21,061 | 32,728 | 32,741 | *0.01%* |
| 60 | 1,078 | 33,412 | 33,416 | 21,060 | 33,392 | 33,390 | *-0.06%* |
| 61 | 1,078 | 34,130 | 34,115 | 21,094 | 34,102 | 34,098 | *-0.08%* |
| 62 | 1,078 | 34,854 | 34,864 | 21,056 | 34,824 | 34,829 | *-0.09%* |
| 63 | 1,078 | 35,564 | 35,567 | 21,089 | 35,547 | 35,548 | *-0.05%* |
| 64 | 1,078 | 36,290 | 36,295 | 21,063 | 36,281 | 36,280 | *-0.03%* |
| 65 | 1,080 | 37,059 | 37,064 | 21,054 | 37,037 | 37,031 | *-0.06%* |
| 66 | 1,076 | 37,830 | 37,828 | 21,070 | 37,814 | 37,814 | *-0.04%* |
| 67 | 1,079 | 38,627 | 38,622 | 21,071 | 38,614 | 38,610 | *-0.03%* |
| 68 | 1,077 | 39,497 | 39,494 | 21,080 | 39,448 | 39,447 | *-0.12%* |
| 69 | 1,078 | 40,324 | 40,320 | 21,073 | 40,281 | 40,277 | *-0.11%* |
| 70 | 1,078 | 41,224 | 41,216 | 21,070 | 41,162 | 41,161 | *-0.15%* |
| 71 | 1,079 | 42,183 | 42,181 | 21,070 | 42,098 | 42,095 | *-0.20%* |
| 72 | 1,077 | 43,159 | 43,172 | 21,072 | 43,066 | 43,061 | *-0.22%* |
| 73 | 1,078 | 44,151 | 44,150 | 21,074 | 44,085 | 44,085 | *-0.15%* |
| 74 | 1,080 | 45,155 | 45,147 | 21,065 | 45,124 | 45,116 | *-0.07%* |
| 75 | 1,076 | 46,197 | 46,188 | 21,075 | 46,205 | 46,201 | *0.02%* |
| 76 | 1,078 | 47,341 | 47,360 | 21,069 | 47,348 | 47,354 | *0.01%* |
| 77 | 1,078 | 48,547 | 48,544 | 21,070 | 48,522 | 48,518 | *-0.05%* |
| 78 | 1,078 | 49,787 | 49,783 | 21,066 | 49,740 | 49,746 | *-0.09%* |
| 79 | 1,078 | 51,065 | 51,069 | 21,080 | 51,002 | 50,999 | *-0.12%* |
| 80 | 1,078 | 52,429 | 52,417 | 21,068 | 52,346 | 52,339 | *-0.16%* |
| 81 | 1,078 | 53,885 | 53,887 | 21,069 | 53,791 | 53,789 | *-0.17%* |
| 82 | 1,078 | 55,466 | 55,474 | 21,078 | 55,359 | 55,350 | *-0.19%* |
| 83 | 1,078 | 57,127 | 57,127 | 21,068 | 57,052 | 57,045 | *-0.13%* |
| 84 | 1,079 | 58,909 | 58,924 | 21,072 | 58,854 | 58,848 | *-0.09%* |
| 85 | 1,077 | 60,875 | 60,839 | 21,074 | 60,794 | 60,784 | *-0.13%* |
| 86 | 1,078 | 62,940 | 62,897 | 21,067 | 62,885 | 62,876 | *-0.09%* |
| 87 | 1,078 | 65,124 | 65,111 | 21,071 | 65,116 | 65,111 | *-0.01%* |
| 88 | 1,078 | 67,555 | 67,563 | 21,073 | 67,510 | 67,500 | *-0.07%* |
| 89 | 1,078 | 70,071 | 70,000 | 21,068 | 70,115 | 70,103 | *0.06%* |
| 90 | 1,078 | 73,037 | 72,971 | 21,071 | 72,956 | 72,933 | *-0.11%* |
| 91 | 1,078 | 76,401 | 76,379 | 21,087 | 76,205 | 76,181 | *-0.26%* |
| 92 | 1,078 | 80,143 | 80,124 | 21,059 | 79,945 | 79,957 | *-0.25%* |
| 93 | 1,078 | 84,397 | 84,431 | 21,069 | 84,258 | 84,229 | *-0.16%* |
| 94 | 1,078 | 89,537 | 89,501 | 21,068 | 89,407 | 89,367 | *-0.15%* |
| 95 | 1,078 | 95,954 | 95,938 | 21,071 | 95,675 | 95,637 | *-0.29%* |
| 96 | 1,078 | 103,869 | 103,724 | 21,070 | 103,524 | 103,396 | *-0.33%* |
| 97 | 1,078 | 114,553 | 114,212 | 21,072 | 114,323 | 114,100 | *-0.20%* |
| 98 | 1,078 | 130,667 | 130,012 | 21,072 | 130,735 | 130,217 | *0.05%* |
| 99 | 1,078 | 162,741 | 160,510 | 21,075 | 163,022 | 160,949 | *0.17%* |
| 100 | 1,078 | 362,978 | 265,085 | 21,070 | 369,745 | 264,660 | *1.86%* |
| **Total** | **107,801** | **37,638** | **27,392** | **2,107,099** | **37,668** | **27,411** | ***0.07%*** |

Source: Analysis of tax administration data by the Revenue Commissioners.

**Balanced Panel**

2. It is also possible to construct a balanced panel from the sample data, that is, a subset of the data in which only tax units observed in all 9 years are included. Descriptive statistics for a balanced panel are shown in table A2. The balanced panel consists of 50,144 tax units observed in all 9 years (451,296 pooled observations). According to the analysis, tax units observed in all years have significantly higher incomes at lower deciles, higher incomes at middle deciles and moderately higher incomes at higher deciles. These differences arise as a result of a different distribution of characteristics among tax units on the balanced and unbalanced panels. For example, tax units in a balanced panel are likely to have been in full-time employment for the full 9-year period. In general, taxpayers who sustain employment over longer periods are more likely to increase their incomes through pay rises. Taxpayers in the balanced panel are less likely to be students, part-time workers and unemployed persons since these cohorts are much more likely to 'fall off' the tax records in a given year. They also have much lower incomes on average, particularly at the lower end of the income distribution (it could also be that the likelihood of unemployment is higher at lower incomes although we do not have direct evidence for this).

**Table A2: Balanced Panel Mean Summary Statistics by Decile, 2004, 2008 and 2012**

| Year | Deciles | Gross Income | USC | Income Tax | Taxable Income | Personal Credit | PAYE Credit |
|---|---|---|---|---|---|---|---|
| 2004 | 1 | 4,282 | | 404 | 4,383 | 879 | 83 |
| | 2 | 11,583 | | 315 | 11,391 | 1,598 | 706 |
| | 3 | 17,471 | | 895 | 17,106 | 1,761 | 971 |
| | 4 | 22,607 | | 1,587 | 22,063 | 1,809 | 1,036 |
| | 5 | 27,708 | | 2,426 | 26,988 | 1,858 | 1,080 |
| | 6 | 33,341 | | 3,746 | 32,308 | 2,025 | 1,130 |
| | 7 | 40,286 | | 5,614 | 38,916 | 2,212 | 1,213 |
| | 8 | 49,950 | | 8,175 | 47,952 | 2,396 | 1,334 |
| | 9 | 64,826 | | 12,227 | 61,760 | 2,627 | 1,487 |
| | 10 | 145,149 | | 37,398 | 127,992 | 2,792 | 1,553 |
| | **Total** | **41,719** | | **9,277** | **39,659** | **2,015** | **1,171** |
| 2008 | 1 | 9,238 | | 605 | 9,196 | 2,192 | 1,834 |
| | 2 | 19,436 | | 600 | 18,922 | 2,201 | 1,830 |
| | 3 | 25,700 | | 1,281 | 24,986 | 2,184 | 1,861 |
| | 4 | 31,372 | | 2,051 | 30,418 | 2,191 | 1,915 |
| | 5 | 37,280 | | 3,112 | 36,032 | 2,264 | 2,009 |
| | 6 | 43,918 | | 4,578 | 42,341 | 2,395 | 2,126 |
| | 7 | 52,499 | | 6,538 | 50,325 | 2,630 | 2,347 |
| | 8 | 64,359 | | 9,351 | 61,385 | 2,861 | 2,538 |
| | 9 | 83,075 | | 14,218 | 78,081 | 3,143 | 2,735 |
| | 10 | 183,699 | | 44,625 | 159,349 | 3,343 | 2,756 |
| | **Total** | **55,056** | | **10,829** | **51,498** | **2,474** | **2,199** |
| 2012 | 1 | 8,624 | 316 | 556 | 8,360 | 2,023 | 1,698 |
| | 2 | 18,318 | 534 | 618 | 17,966 | 2,094 | 1,736 |
| | 3 | 24,289 | 819 | 1,287 | 23,619 | 2,188 | 1,818 |
| | 4 | 29,541 | 1,188 | 2,054 | 28,870 | 2,230 | 1,856 |
| | 5 | 34,944 | 1,499 | 2,925 | 34,225 | 2,292 | 1,922 |
| | 6 | 41,067 | 1,892 | 4,301 | 40,017 | 2,370 | 2,020 |
| | 7 | 48,683 | 2,424 | 6,366 | 47,395 | 2,482 | 2,134 |
| | 8 | 59,171 | 3,084 | 8,668 | 57,074 | 2,693 | 2,330 |
| | 9 | 76,379 | 4,285 | 13,338 | 73,283 | 2,910 | 2,557 |
| | 10 | 159,394 | 10,468 | 41,192 | 145,340 | 3,025 | 2,582 |
| | **Total** | **50,039** | **3,009** | **10,080** | **49,656** | **2,431** | **2,072** |

Source: Analysis of tax administration data by the Revenue Commissioners. Panel consists of 50,144 tax units observed in all 9 years.

3. Table A3 shows selected variables by decile for 2004 and 2012. Between 2004 and 2008, mean gross income shifted upwards significantly within all deciles with the exception of the first decile which remained approximately the same. Between 2008 and 2012, most deciles saw a decline in mean gross

income. The highest declines were in the 9th (-7%), 1st (-6%) and 10th (-3%) deciles. The analysis also shows that the personal and PAYE credits have increased between 2004 and 2012 and are larger among higher decile tax units reflecting policy changes in tax credits over the period. Single (jointly-assessed) credits increased from €1,760 (€3,520) in 2007 to €1,830 (€3,360) in 2010 and were then reduced to €1,650 (€3,300) in 2012.

**Table A3: Summary Statistics for Selected Variables by Decile, 2004 and 2012**

| Year | Deciles | Gross Income | USC | Income Tax | Taxable Income | Personal Credit | PAYE Credit |
|---|---|---|---|---|---|---|---|
| 2004 | 1 | 2,225 | | 360 | 2,309 | 469 | 1,090 |
| | 2 | 6,935 | | 460 | 6,870 | 1,318 | 166 |
| | 3 | 11,723 | | 285 | 11,573 | 1,592 | 765 |
| | 4 | 16,459 | | 720 | 16,196 | 1,732 | 972 |
| | 5 | 21,066 | | 1,421 | 20,639 | 1,782 | 1,025 |
| | 6 | 26,127 | | 2,165 | 25,533 | 1,820 | 1,068 |
| | 7 | 32,199 | | 3,544 | 31,352 | 1,969 | 1,115 |
| | 8 | 40,498 | | 5,810 | 39,244 | 2,182 | 1,212 |
| | 9 | 54,137 | | 9,403 | 52,030 | 2,452 | 1,372 |
| | 10 | 119,012 | | 29,733 | 107,492 | 2,735 | 1,527 |
| | **Total** | **33,037** | | **7,874** | **31,914** | **1,823** | **1,105** |
| 2012 | 1 | 2,102 | 1,203 | 367 | 2,224 | 1,778 | 1,657 |
| | 2 | 8,152 | 239 | 505 | 8,002 | 1,813 | 1,672 |
| | 3 | 14,274 | 364 | 673 | 14,013 | 1,909 | 1,688 |
| | 4 | 19,512 | 608 | 625 | 19,225 | 1,988 | 1,717 |
| | 5 | 24,695 | 877 | 1,407 | 24,228 | 2,114 | 1,812 |
| | 6 | 30,491 | 1,259 | 2,237 | 29,930 | 2,197 | 1,876 |
| | 7 | 37,541 | 1,677 | 3,522 | 36,861 | 2,305 | 1,976 |
| | 8 | 47,003 | 2,311 | 5,949 | 45,923 | 2,450 | 2,117 |
| | 9 | 62,499 | 3,324 | 9,689 | 60,520 | 2,722 | 2,369 |
| | 10 | 130,065 | 8,233 | 31,860 | 121,214 | 2,980 | 2,579 |
| | **Total** | **37,633** | **2,479** | **8,575** | **37,307** | **2,226** | **1,957** |

Source: Analysis of tax administration data by the Revenue Commissioners.

*Region, Taxpayer Type and Status*

4. This section provides selected sample descriptive statistics by region, tax unit type and tax unit status. Before presenting the results, it is instructive to define the three classifications. First, Revenue has four regional divisions for the purposes of this analysis as follows: Dublin Region; Border, Midlands and West (BMW) Region; East South-East (ESE) Region and South-West Region (SW).[28] Second, tax units are categorised into two types - PAYE employees and self-assessed businesses. In the IDS data, tax units are assigned to one of the two categories conditional on which category type comprises a greater proportion of overall income.[29] Third, tax units are categorised under six personal statuses as follows: single males,

[28] Revenue also has a fifth regional division, Large Cases Division (LCD), which is excluded from the analysis. LCD was created to be responsible for all taxes and duties by Revenue's biggest customers regardless of geographic location.

[29] Specifically, a tax unit is defined as a PAYE tax unit if 50% or more of its gross income is comprised of PAYE income. Similarly, a tax unit is defined as a self-assessed tax unit if 50% or more of its gross income is comprised of self-assessed income.

single females, married two-earners, married one-earners, widowers and widows. As mentioned, it's important to note that a married couple who has elected for joint assessment is counted as one tax unit.[30]

5. Table A4 shows average gross incomes and the number of tax units by region for 2004, 2008 and 2012. As expected, Dublin has the highest mean income for all years. While mean incomes are higher than median incomes across all regions, the difference is consistently highest in Dublin. This reflects the relatively higher proportion of outlying taxpayers with very high incomes in the Dublin area. The Border, Midlands, West (BMW) region has the lowest incomes on average.

**Table A4 Summary Gross Income Statistics, by Region, 2004, 2008 and 2012**

| | 2004 | | | 2008 | | | 2012 | | |
|---|---|---|---|---|---|---|---|---|---|
| **Region** | **Mean** | **Median** | **No. Tax Units** | **Mean** | **Median** | **No. Tax Units** | **Mean** | **Median** | **No. Tax Units** |
| Dublin | 35,940 | 24,686 | 32,122 | 43,114 | 28,708 | 38,681 | 41,286 | 28,828 | 34,792 |
| Border, Midlands, West | 29,393 | 21,770 | 20,645 | 34,515 | 25,885 | 24,429 | 33,184 | 25,847 | 22,194 |
| East South-East | 31,783 | 23,546 | 22,738 | 36,888 | 27,223 | 27,129 | 35,416 | 26,755 | 24,540 |
| South-West | 32,510 | 23,555 | 24,327 | 38,081 | 27,964 | 28,804 | 37,075 | 27,619 | 26,212 |
| **Total** | **32,804** | **23,525** | **99,832** | **38,713** | **27,591** | **119,043** | **37, 255** | **27,384** | **107,738** |

Source: Analysis of tax administration data by the Revenue Commissioners. LCD cases and those with erroneously reported locations are excluded.

6. Table A5 shows summary income statistics for PAYE employees and self-assessed business tax units for 2004, 2008 and 2012. PAYE tax units make up the vast majority of tax units in all years; over 90% in 2012. Self-assessed taxpayers have consistently higher mean incomes. The relatively wider gap between the mean and the median for the self-assessed category signals a wider distribution and a greater number of outliers compared with PAYE employees.

**Table A5 Summary Gross Income Statistics, by Taxpayer Type, 2004, 2008 and 2012**

| | 2004 | | | 2008 | | | 2012 | | |
|---|---|---|---|---|---|---|---|---|---|
| | **Mean** | **Median** | **No. Tax Units** | **Mean** | **Median** | **No. Tax Units** | **Mean** | **Median** | **No. Tax Units** |
| PAYE | 30,605 | 23,180 | 88,909 | 36,385 | 27,149 | 109,158 | 36,289 | 27,456 | 98,683 |
| Self-Assessed | 52,677 | 26,863 | 10,976 | 67,163 | 33,854 | 9,924 | 52,236 | 26,530 | 9,118 |
| **Total** | **33,031** | **23,522** | **99,885** | **38,954** | **27,592** | **119,082** | **37,638** | **27,392** | **107,801** |

Source: Analysis of tax administration data by the Revenue Commissioners.

7. Table A6 shows summary statistics for tax units by personal status for 2004, 2008 and 2012. According to the analysis, married two-earners consistently have the highest incomes across all years followed by married one-earners. This is to be expected since these tax units represent two taxpayers. The analysis also shows that, on average, tax units with a single male status earned more than those with a single female

[30] It is also possible that a married couple can also opt for single assessment in which case they would be counted as two single units.

status in 2004 and 2008. By 2012, the mean gap is no longer significant and, calculated on a median basis tax units with a single female status have higher gross incomes.

**Table A6 Summary Gross Income Statistics, by Status, 2004, 2008 and 2012**

| | 2004 | | | 2008 | | | 2012 | | |
|---|---|---|---|---|---|---|---|---|---|
| | **Mean** | **Median** | **No. Tax** | **Mean** | **Median** | **No. Tax** | **Mean** | **Median** | **No. Tax** |
| Single Male | 23,226 | 18,995 | 33,061 | 26,347 | 21,564 | 39,216 | 24,593 | 19,398 | 31,042 |
| Single Female | 20,682 | 17,125 | 29,138 | 24,673 | 20,450 | 34,568 | 24,586 | 20,259 | 29,966 |
| Married Two-Earner | 65,625 | 54,314 | 17,194 | 76,826 | 62,804 | 21,891 | 68,745 | 57,319 | 22,212 |
| Married One-Earner | 42,486 | 29,586 | 16,733 | 48,584 | 33,609 | 19,483 | 44,271 | 32,567 | 20,343 |
| Widower | 30,897 | 22,381 | 990 | 40,423 | 28,688 | 1,070 | 36,930 | 26,649 | 1,183 |
| Widow | 21,264 | 16,362 | 2,769 | 28,223 | 21,784 | 2,854 | 28,150 | 22,694 | 3,055 |
| **Total** | **33,031** | **23,522** | **99,885** | **38,950** | **27,592** | **119,082** | **37,638** | **27,392** | **107,801** |

Source: Analysis of tax administration data by the Revenue Commissioners.

*Gross Income Percentiles and Ratio Analysis*

8. Table A7 shows gross income thresholds[31] for different percentiles and ratios for selected points along the percentile income distribution. A full set of gross incomes by percentile is available in Table A8).

9. According to the analysis, developments in percentile income thresholds approximately followed economic activity in the economy more broadly. Median incomes for example rose from €23,522 in 2004 to €27,592 in 2008 before declining to €27,200 in 2010 and recovering moderately to €27,392 in 2012. Similar trends are observed in the 80$^{th}$, 90$^{th}$ and 99$^{th}$ percentile cohorts. Between 2004 and 2008, income generally grew faster in the higher percentile cohorts. For example, in the 50$^{th}$, 80$^{th}$ and 90$^{th}$ percentiles income grew by 16%, 15% and 16% respectively over the period. By comparison, income growth in the 10$^{th}$ percentile cohort was only 10%. The largest proportional declines between 2008 and 2010 were in the 10$^{th}$ percentile cohort (-7%) and the top 1% (-7%). The 10$^{th}$ percentile cohort recorded the fastest relative income growth between 2010 and 2012.

[31] The maximum gross income reported for the percentile in question.

**Table A7: Gross Income Thresholds by Percentile (1 to 50), 2004 – 2012**

| | 2004 | 2006 | 2008 | 2010 | 2012 |
|---|---|---|---|---|---|
| 1 | 373 | 306 | 223 | 157 | 131 |
| 2 | 894 | 764 | 666 | 519 | 560 |
| 3 | 1,374 | 1,209 | 1,155 | 954 | 1,005 |
| 4 | 1,809 | 1,647 | 1,654 | 1,396 | 1,472 |
| 5 | 2,251 | 2,082 | 2,175 | 1,852 | 1,993 |
| 6 | 2,688 | 2,520 | 2,696 | 2,373 | 2,510 |
| 7 | 3,119 | 2,962 | 3,222 | 2,889 | 3,052 |
| 8 | 3,558 | 3,392 | 3,778 | 3,450 | 3,633 |
| 9 | 4,000 | 3,860 | 4,350 | 4,005 | 4,270 |
| 10 | 4,475 | 4,350 | 4,957 | 4,600 | 4,909 |
| 11 | 4,956 | 4,837 | 5,493 | 5,200 | 5,509 |
| 12 | 5,435 | 5,320 | 6,104 | 5,838 | 6,178 |
| 13 | 5,950 | 5,840 | 6,736 | 6,473 | 6,825 |
| 14 | 6,452 | 6,350 | 7,410 | 7,127 | 7,496 |
| 15 | 6,963 | 6,914 | 8,026 | 7,750 | 8,163 |
| 16 | 7,470 | 7,515 | 8,703 | 8,400 | 8,832 |
| 17 | 7,956 | 8,100 | 9,348 | 9,043 | 9,476 |
| 18 | 8,410 | 8,671 | 9,997 | 9,676 | 10,124 |
| 19 | 8,840 | 9,241 | 10,612 | 10,319 | 10,784 |
| 20 | 9,300 | 9,786 | 11,225 | 10,966 | 11,405 |
| 21 | 9,779 | 10,251 | 11,749 | 11,481 | 12,046 |
| 22 | 10,236 | 10,764 | 12,280 | 12,069 | 12,653 |
| 23 | 10,705 | 11,290 | 12,869 | 12,639 | 13,196 |
| 24 | 11,208 | 11,827 | 13,433 | 13,217 | 13,718 |
| 25 | 11,702 | 12,381 | 14,021 | 13,821 | 14,284 |
| 26 | 12,207 | 12,901 | 14,600 | 14,394 | 14,842 |
| 27 | 12,732 | 13,460 | 15,190 | 14,941 | 15,414 |
| 28 | 13,197 | 14,000 | 15,776 | 15,520 | 15,926 |
| 29 | 13,672 | 14,529 | 16,381 | 16,084 | 16,450 |
| 30 | 14,175 | 15,054 | 16,947 | 16,653 | 16,974 |
| 31 | 14,641 | 15,582 | 17,507 | 17,204 | 17,481 |
| 32 | 15,077 | 16,044 | 18,042 | 17,754 | 17,995 |
| 33 | 15,549 | 16,527 | 18,523 | 18,246 | 18,481 |
| 34 | 16,004 | 17,001 | 19,043 | 18,743 | 19,006 |
| 35 | 16,473 | 17,490 | 19,547 | 19,250 | 19,524 |
| 36 | 16,898 | 17,944 | 20,076 | 19,779 | 20,030 |
| 37 | 17,360 | 18,400 | 20,590 | 20,279 | 20,542 |
| 38 | 17,800 | 18,890 | 21,096 | 20,797 | 21,016 |
| 39 | 18,256 | 19,402 | 21,614 | 21,300 | 21,536 |
| 40 | 18,710 | 19,888 | 22,161 | 21,845 | 22,047 |
| 41 | 19,158 | 20,357 | 22,643 | 22,374 | 22,557 |
| 42 | 19,638 | 20,819 | 23,188 | 22,870 | 23,086 |
| 43 | 20,070 | 21,332 | 23,733 | 23,369 | 23,619 |
| 44 | 20,549 | 21,860 | 24,267 | 23,897 | 24,155 |
| 45 | 21,026 | 22,370 | 24,816 | 24,427 | 24,703 |
| 46 | 21,501 | 22,886 | 25,353 | 24,954 | 25,226 |
| 47 | 22,003 | 23,395 | 25,888 | 25,494 | 25,758 |
| 48 | 22,506 | 23,920 | 26,449 | 26,016 | 26,292 |
| 49 | 23,028 | 24,457 | 27,027 | 26,600 | 26,836 |
| 50 | 23,522 | 25,000 | 27,592 | 27,200 | 27,392 |

Source: Analysis of tax administration data by the Revenue Commissioners. Note that thresholds refer to the maximum gross income reported in each percentile.

**Table A8: Gross Income Thresholds by Percentile (50 to 100), 2004 – 2012**

| | 2004 | 2006 | 2008 | 2010 | 2012 |
|---|---|---|---|---|---|
| 51 | 24,002 | 25,548 | 28,198 | 27,787 | 27,977 |
| 52 | 24,519 | 26,118 | 28,767 | 28,368 | 28,539 |
| 53 | 25,029 | 26,703 | 29,363 | 28,992 | 29,199 |
| 54 | 25,542 | 27,252 | 29,984 | 29,589 | 29,840 |
| 55 | 26,054 | 27,859 | 30,608 | 30,209 | 30,469 |
| 56 | 26,622 | 28,466 | 31,282 | 30,873 | 31,092 |
| 57 | 27,176 | 29,052 | 31,984 | 31,541 | 31,723 |
| 58 | 27,755 | 29,691 | 32,678 | 32,224 | 32,419 |
| 59 | 28,269 | 30,298 | 33,366 | 32,947 | 33,044 |
| 60 | 28,889 | 30,918 | 34,079 | 33,637 | 33,772 |
| 61 | 29,517 | 31,574 | 34,814 | 34,336 | 34,511 |
| 62 | 30,119 | 32,240 | 35,516 | 35,009 | 35,194 |
| 63 | 30,754 | 32,944 | 36,269 | 35,728 | 35,934 |
| 64 | 31,415 | 33,654 | 37,046 | 36,440 | 36,670 |
| 65 | 32,131 | 34,387 | 37,835 | 37,194 | 37,445 |
| 66 | 32,831 | 35,124 | 38,640 | 37,954 | 38,214 |
| 67 | 33,534 | 35,911 | 39,456 | 38,731 | 39,051 |
| 68 | 34,236 | 36,668 | 40,303 | 39,553 | 39,926 |
| 69 | 35,011 | 37,485 | 41,219 | 40,380 | 40,751 |
| 70 | 35,795 | 38,362 | 42,179 | 41,235 | 41,696 |
| 71 | 36,630 | 39,234 | 43,149 | 42,148 | 42,668 |
| 72 | 37,466 | 40,183 | 44,223 | 43,078 | 43,648 |
| 73 | 38,352 | 41,157 | 45,300 | 44,096 | 44,653 |
| 74 | 39,296 | 42,219 | 46,385 | 45,153 | 45,646 |
| 75 | 40,278 | 43,299 | 47,535 | 46,240 | 46,749 |
| 76 | 41,293 | 44,444 | 48,781 | 47,348 | 47,922 |
| 77 | 42,400 | 45,573 | 50,027 | 48,571 | 49,175 |
| 78 | 43,554 | 46,828 | 51,398 | 49,817 | 50,403 |
| 79 | 44,738 | 48,145 | 52,895 | 51,145 | 51,727 |
| 80 | 46,083 | 49,590 | 54,418 | 52,571 | 53,142 |
| 81 | 47,431 | 51,038 | 56,060 | 54,085 | 54,640 |
| 82 | 48,834 | 52,611 | 57,742 | 55,729 | 56,291 |
| 83 | 50,311 | 54,239 | 59,573 | 57,436 | 57,969 |
| 84 | 51,929 | 56,129 | 61,547 | 59,274 | 59,889 |
| 85 | 53,669 | 58,101 | 63,749 | 61,339 | 61,940 |
| 86 | 55,487 | 60,191 | 66,061 | 63,495 | 63,979 |
| 87 | 57,327 | 62,429 | 68,493 | 65,901 | 66,289 |
| 88 | 59,376 | 64,749 | 71,184 | 68,306 | 68,754 |
| 89 | 61,742 | 67,269 | 74,136 | 70,963 | 71,477 |
| 90 | 64,522 | 70,366 | 77,469 | 73,951 | 74,722 |
| 91 | 67,682 | 73,892 | 80,970 | 77,361 | 78,182 |
| 92 | 71,037 | 77,911 | 85,057 | 81,339 | 82,121 |
| 93 | 75,095 | 82,362 | 90,095 | 85,943 | 86,758 |
| 94 | 80,052 | 87,775 | 96,259 | 91,430 | 92,541 |
| 95 | 86,334 | 94,760 | 103,975 | 98,480 | 99,501 |
| 96 | 94,538 | 104,072 | 113,855 | 107,517 | 108,648 |
| 97 | 105,860 | 117,393 | 127,448 | 120,453 | 121,373 |
| 98 | 123,742 | 137,864 | 150,298 | 141,951 | 142,246 |
| 99 | 172,776 | 194,307 | 205,965 | 191,975 | 192,479 |
| **Total** | **33,031** | **35,933** | **38,950** | **37,276** | **37,638** |

Source: Analysis of tax administration data by the Revenue Commissioners. Note that thresholds refer to the maximum gross income reported in each percentile.