

# The Great Recession, Austerity and Inequality:

## Lessons from Ireland

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*Abstract:* The advent of the Great Recession and the widespread adoption of fiscal austerity policies have heightened concern about inequality and its effects. We examine how the distribution of income in Ireland – a country which experienced one of the most severe economic contractions – has evolved over the years 2008 to 2013. Standard cross-sectional analysis of the income distribution shows broad stability in the Gini coefficient and in decile shares, with one main exception: the share of the bottom decile fell sharply, with the largest fall in average incomes being for that group. Longitudinal analysis shows that the falls in the average income for the bottom decile were not due to decreasing income for those remaining in the bottom decile, but to falls in income from those initially located in higher deciles. The extent of redistribution through taxes and transfers increased strongly, as measured by the Reynolds-Smolensky index, which rose from 0.20 before the onset of the crisis to 0.27 in 2013.. Analysis indicates that about three-quarters of this increased redistribution is due to automatic stabilisers and one-quarter to discretionary policy changes.

*Keywords:*

Inequality, Austerity, Income Distribution, Longitudinal, Microsimulation

*JEL Subject Codes:*

H24, D31, D63

## 1. Introduction<sup>1</sup>

Income inequality has been rising in most OECD countries since well before the onset of the Great Recession, to the point where the OECD has stated that “Arresting the trend of rising inequality has become a priority for policy makers in many countries”.<sup>2</sup> The advent of the Great Recession and the widespread subsequent adoption of fiscal austerity policies have heightened concern about inequality and its effects not only on social outcomes but also in potentially undermining growth in the medium to longer-term. The impact of recession and austerity on the income distribution works through a complex set of channels, and the early years of the crisis were in fact in some instances associated with declining rather than increasing inequality. The comparative study by Jenkins et al. (2013) for example highlighted the extent to which social protection (and tax) systems cushioned the immediate impact of falling GDP on household incomes, and on households in the lower part of the distribution in particular, while declining returns from capital hit those towards the top. However, they also emphasised that medium- and longer-term impacts could look very different depending on how quickly economies returned to steady growth and how they sought to deal with the fiscal deficits produced by the crisis.

Against that background, it is now important to look beyond the initial impact of the Great Recession to explore how income inequality has evolved as policy has responded to the challenges posed by the crisis, both in terms of the specifics of how tax and welfare systems have been changed and the adoption, to a greater or lesser extent, of macro-fiscal austerity policies to cope with ballooning fiscal deficits. This has been most stark in the four European countries that were unable to continue to finance their debt in the financial markets after the financial crash and had to avail of formal ‘bail-out’ arrangements with the European Union and IMF, namely Ireland, Portugal, Greece and Cyprus. Spain was also particularly hard-hit and had to receive assistance from the European Stability Mechanism in recapitalising its banks. The experience of these countries has been very varied. Greece at one end of the spectrum remains in crisis mode. Ireland at the other end of the spectrum has successfully completed a stringent bail-out programme, with growth now returned, and the fiscal deficit having come down to the point where debt can be financed at very low interest rates – indeed, Ireland is seen in some circles as the a prime example of what can be achieved under austerity.<sup>3</sup>

Furthermore, Ireland has also been seen internationally as having a strong social safety-net and implementing austerity in a progressive fashion. The OECD, for example, concluded that household incomes were hit hard but well targeted social spending helped prevent a surge in poverty (OECD, 2014a); a widely-cited comparative study of the distributional impact of the initial stage of fiscal adjustment across six European countries (Callan et al, 2011) showed higher income groups having significantly larger percentage losses than lower-income ones. These assessments are however partial in that they refer to discretionary policy changes rather than the overall distributional impact of the

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<sup>2</sup> <http://www.oecd.org/social/inequality.htm> [accessed 28th June 2016]

<sup>3</sup> For a recent overview, see Roche et al. (2017).

Crisis, to only some of the range of policy responses that were important in the fiscal correction, and to only the initial Crisis period. They also contrast with much of the domestic debate in Ireland, where the distributional impact of the adjustment policies have been hotly contested.

In assessing the impact of recession and austerity on income inequality, Ireland thus provides a case study of particular interest, in light of the extent and nature of the crisis faced – not only deep recession but the inter-related banking crisis of unprecedented proportions and bursting of a housing bubble - and the scale of the fiscal adjustment then undertaken.

A number of recent studies have examined the distributional impact of the Great Recession and of austerity policies. Matsaganis and Leventi (2013) found that in 2010, the first year of the Greek crisis the initial policy response placed a relatively high burden on poorer households, but that changes in overall inequality were limited., Kaplangou and Rapanos (2016) examined how the distribution of consumption in Greece changed over a longer period, between 2008 and 2013. They found evidence of a significant increase in consumption inequality, with indirect tax changes contributing to this outcome. Focussing on the impact of the policy response to the crisis, De Agostini et al. (2016) examined the distributional impact of tax-benefit policies between 2008 and 2014 in the 27 EU countries. Overall findings suggested that initial policy responses at EU-level were progressive in income, but that these became more regressive in later years. Distributional impacts varied substantially across countries. Elsewhere, Avram et al. (2013) examined the impact of distributional impact of policy response across nine countries affected by the Great Recession. Again, the findings suggested substantial variation in the distributional impact of policy changes, in this case between 2008 and mid-2012.

This paper makes a number of significant contributions to the literature on the impact of the Great Recession and austerity policies. First, it contributes new evidence on the experience of Ireland, one of the countries most severely affected by the Great Recession. Second, it provides new perspectives on how recession, discretionary policy changes, and automatic stabilisers shaped overall distributional outcomes. We examine both the overall changes in income and inequality, and the policy impacts over the period from before the Great Recession, through its onset and impact up to 2013, by the end of which year the bail-out programme had been successfully completed.<sup>4</sup> We identify the separate impacts of discretionary changes in policies and the “automatic stabilisation” element whereby policy impacts change as unemployment and incomes change, developing and applying a new approach to allow these to be distinguished. Finally, we also complement the traditional “cross-sectional” perspective on changes in the distribution of income with panel-based analysis, building on the approach developed over the past decade by Jenkins and Van Kerm (2006), Grimm (2007), Fields (2010), Bourguignon (2011), Palmisano and Peragine (2015), Jenkins and Van Kerm (2016) and Palmisano (2016). Observed cross-sectional changes in incomes across various quantiles of the income distribution are the net result of income changes for individuals who began in a given quantile of the income distribution and income changes for individuals that moved into that quantile during the period of interest. Examining the dynamics of changes in the distribution of income can therefore provide additional evidence on how the observed cross-sectional changes were generated.

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<sup>4</sup> Our focus is purely on changes in the distribution of income, but this has been shown to affect other socioeconomic indicators, such as health (Madden, 2014) and economic vulnerability (Whelan and Maitre, 2014)

The paper begins by describing briefly the turbulent macroeconomic background against which household incomes evolved. We then examine some summary measures of income inequality, using concepts and measures standard in international comparisons, based on analysis of micro-data from the Survey on Income and Living Conditions, the source of the data for Ireland used in the EU-wide monitoring of poverty and inequality. Broad measures of inequality such as the Gini coefficient and decile shares of equivalised disposable income show considerable stability, despite the multiple large-scale shocks to the macroeconomy. We examine the role of the tax and welfare system in generating this result, using our new approach to identify separately the impact of discretionary policy changes and “automatic stabilisation”. We find that while discretionary effects were approximately neutral, the automatic stabilisation impacts of a progressive tax-transfer system were large during the recessionary period. While the overall pattern was one of broad stability in inequality, the sharpest falls in income were found to be in the bottom decile. This was a common pattern across OECD countries (OECD, 2014b) during the recession. We use longitudinal data from SILC and find that the driving force behind the large falls in the income of the bottom decile comes from changes in the composition of the bottom decile, rather than income falls in households that began the period in the poorest ten per cent of the population.

## **2. Macroeconomic Background**

The scale of the impact of the Great Recession on Ireland’s national income was striking: by 2010 GNP per head in nominal terms had fallen by close to one-fifth compared with 2007, and in real terms was back to levels seen a decade earlier. Importantly, though, this was against the background of extremely rapid growth over the so-called ‘Celtic tiger’ boom from the mid-1990s to 2007, for some of which Ireland had the highest rates of economic growth in the OECD. Furthermore, the initial impact of the crisis on aggregate income of the household sector was much more muted than its effects on GNP, because much of the immediate decline was felt in the company sector and because of the response of social transfers and taxes.

However, the effects in the labour market were rapid and deep. As Figure 1 shows, the unemployment rate had been between 4 and 5 per cent for most of the period 2000 to 2007, but rose sharply to peak at 15 per cent in 2011. The unemployment rate among men increased almost twice as much as among women. The male unemployment rate increased from just above 4 per cent in 2007 to 18 per cent by 2012. From a similar base, the female unemployment rate peaked below 12 per cent. The decline in employment was very heavily concentrated among young men: unemployment rates for those aged 20–24 rose from 8 per cent to 32 per cent and for those aged 25–34 from 5 per cent to almost 20 per cent; the increase for men aged 45–54, from 4 per cent to 13 per cent, while still pronounced, was considerably less. As discussed in Callan et al. (2014), the collapse in the male-dominated construction sector in Ireland during this period following the bursting of the house price bubble was a significant contributor to this gendered pattern. Net emigration also returned after the strong net inflow during the Celtic Tiger years, both of Irish citizens and recent arrivals from Eastern Europe, with a net outflow of about 35,000 in the twelve months to April 2010 and 60,000 the following year. The percentage of

working-age persons living in households with no-one in work rose by 6 percentage points to reach 16 per cent. Unemployment then remained high through to 2012 but by 2013 was falling quite rapidly.

**Place Figure 1 Here**

Measures of average earnings indicate broad stability over the period, but there is evidence of considerable variability across sectors and types of worker – sectors associated with building and property being under pressure, and public service workers experiencing direct and indirect cuts to pay. Developments regarding tax and welfare are described in detail in Keane et al. (2014), to which we return, also play a substantial role in shaping income distribution outcomes. The net effect of the evolution of income from these different sources on average disposable income is illustrated in Figure 2. This shows a steep fall from peak (2007) to trough (2012) of 14 per cent, with the beginnings of a recovery seen by 2013.

**Place Figure 2 Here**

While there were significant changes in mean income and unemployment during the Great Recession in Ireland, the at-risk-of-poverty rate (AROP) did not change as dramatically. Figure 3 shows that this poverty rate, defined as the proportion of persons with income below 60 per cent of median income in each year, fell in the pre-recession period between 2004 and 2007. In the early years of recession, the poverty rate continued to decrease, falling from 16.5 per cent in 2007 to 14.1 per cent in 2009. Between 2009 and 2012 the poverty rate increased, peaking at 16.5 per cent in 2012. In 2013 it fell back to 15.2 per cent.

Under the standard AROP measure, the poverty line is recalculated in each year as 60 per cent of median income. Therefore, while incomes may be falling, the change in the poverty rate will depend on relative income changes at different points along the income distribution. For example, if income decreases are concentrated among persons above the poverty line, then the rate of poverty is likely to decrease despite the overall fall in income. Figure 3 also shows the rate of poverty when the poverty line is calculated as 60 per cent of median income in a base year and adjusted only for inflation. By “anchoring” the poverty line in 2004, when mean real income was close to 2011 levels, the rate of poverty decreased significantly more by 2008 than the standard measure. This is a result of the poverty line being fixed at a point in time while real incomes continued to increase during the boom period. Since incomes were still higher than the base period in the early years of the recession, the

poverty rate remained lower with the fixed poverty line compared to the standard AROP rate. In later years of the recession, when mean income was equal to or below 2004 income, the poverty rate increased significantly more with the fixed poverty line. When the poverty line is anchored in 2007, with median income close to its peak, the rate of poverty is considerably higher than the standard AROP measure for most years, though following a similar pattern U-shaped pattern as described above.

### **Place Figure 3 Here**

To analyse how the distribution of income changed throughout this period in Ireland, we primarily use the Irish Survey of Income and Living Conditions (SILC). The survey has been conducted by the Central Statistics Office (CSO) of Ireland every year since 2003 and contains a range of microdata on income, poverty, social exclusion and living conditions. In the first survey year, 2003, only six months of data was collected, and the sample size was approximately half of the other survey years. We therefore omit this wave from our analysis. Each of the 2004 to 2013 waves contain more than 11,000 individuals, or more than 4,000 households. We are primarily concerned with the distribution of equivalised household disposable income, although we also examine changes in the distribution of market income and gross income, both also measured at household level throughout. For each of the income types we equivalise using a scale of 1 for the first adult, 0.66 for subsequent adults, and 0.33 for children (aged 14 or less)<sup>5</sup>. Section 4 and 5 rely largely on cross-sectional SILC surveys from 2004 to 2013. In section 6, we also make use of the panel element of SILC. The panel element of SILC is designed so that 75 per cent of households in a given year are sought for interview in the following year. However, a significant rate of sample attrition in combination with sample design means that the retention rate of households is closer to 50 per cent in each year. Appendix A discusses the longitudinal data in more detail and provides evidence that, despite the relatively low retention rate of households in the survey, the longitudinal sample is broadly representative of the full population.

### **3. The Evolution of Income Inequality, 2004 to 2013**

Given the scale of the macroeconomic changes just described, summary measures of income inequality for Ireland remained remarkably stable over the period. Figure 4 shows the Gini coefficient for equivalised household disposable income among persons for the years 2004 to 2013, calculated from the SILC microdata.

### **Place Figure 4 Here**

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<sup>5</sup> This is the equivalence scale used by the CSO in calculating poverty and income distribution statistics, and closely matches that implied by the rates of the main social welfare payments in Ireland. Use of an alternative scale such as the square root of household size or the so-called 'modified OECD' scale instead would not affect the patterns over time on which we focus.

In 2007, as the economic boom peaked, the Gini coefficient was about 0.31, and remained at about that level between then and 2013 apart from 2009, when it fell temporarily to 0.29 – the only statistically significant difference from one year to the next seen over the period. This reflects the fact that 2009 was when a series of policy measures had a considerable impact, notably substantial increases in income-related taxes which were progressive, a rise in social welfare payment rates, and progressively structured public service pay cuts (see Callan et al., 2014 for a detailed description and analysis).

It is noteworthy that this stability in the Gini coefficient for Ireland is not limited to the 2004 to 2013 period. Table 1 compares the Gini coefficients for 2004 to 2013 with comparable estimates for 1994 and 2000, based on the Living in Ireland Survey and the European Community Household Panel (ECHP). We see that this summary measure showed little change, which also appears to be true back to at least 1987 and perhaps 1980 (see Nolan et al, 2012, 2014).

**Place Table 1 Here**

Examining how average income in each decile changed throughout the recessionary period can highlight changes in the distribution of income which are not evident from summary measures of inequality such as the Gini coefficient. While Figure 2 showed that average real income fell significantly between 2008 and 2013, these losses were not uniform across the income distribution. The distribution of outcomes is reported in Table 2, in the form of percentage losses in income at each decile level. Most commonly, analysis is undertaken in terms of disposable income, without any adjustment for housing costs (i.e., before housing costs). In the UK, analysis is often undertaken at both before housing cost (BHC) and after housing cost (AHC) levels (e.g., Belfield et al., 2014). The arguments for and against each measure may be summarised as follows. Adjustment for housing costs – i.e., spending on housing – is not appropriate if the size of housing costs reflects the preferences of the household for larger or higher quality housing: in these circumstances it would simply reflect a choice of how the household allocates its resources. However, the nature of housing purchases means that individuals may not be free to adjust their housing spending to their current income situation – a high mortgage may be a legacy of earlier decisions. This is particularly relevant to the situation in which a housing bubble burst, leaving many households with high mortgages, while incomes came under pressure via unemployment, lower wages and higher taxes. We find, however, that income distribution analyses over this period are very similar whether conducted on a BHC or AHC basis. Table 2 illustrates this point.

The greatest losses are for the bottom decile, by a considerable margin in both cases. (Similar results are obtained when comparing changes in average income pre- and post- recession as in Maitre et al., 2014). On average, the bottom decile lost over 20 per cent of income between 2008 and 2013. The gap between losses for the bottom decile and the average loss is about 10 percentage points on a BHC basis, but is even larger, around 12 percentage points, on an AHC basis. The next highest losses occur for the top decile, at 13 to 14 per cent of income, though these losses are not statistically different from those in the middle of the income distribution.

## **Place Table 2 Here**

In an international context, OECD (2014b) showed that greater losses (or in some countries, smaller gains) for the bottom decile are a common feature for OECD countries over this period, in particular among countries worst hit by recession. The bottom income decile in Spain, Greece and Ireland experienced particularly large income losses.

Changes in decile shares can highlight further how the distribution of income changed from one year to the next. Table 3 shows that the 2008 decile shares of disposable income are quite similar to the decile shares from the mid-1990s, as reported by Nolan and Maitre (2000), particularly at the extremes of the income distribution. The second to the sixth deciles have a slightly higher share of income in 2008 than the mid-1990s at the expense of the seventh to ninth deciles..

While in this case changes in shares of income over time are often not statistically significant, the point estimates provide insight into how income was redistributed from one year to the next. In the early years of recession, between 2008 and 2009, the only decile that suffered a fall in its share of income was the top decile, Callan et al. (2014) showing that the first austerity budgets contributed to this pattern as noted above. This resulted in the richest households losing out the most, at least partly explaining the significantly lower Gini coefficient in 2009.

Between 2009 and 2010, the pattern of decile share changes is almost precisely the reverse of that between 2008 and 2009. In this period, the top decile experienced an increase in their share of income. Most other deciles saw a fall in their share of income. This is particularly true for the bottom decile, whose share fell from 3.6 per cent to 3.1 per cent; this substantial fall, though again not statistically significant, and the exceptionally large fall in average income for the bottom decile producing it were widely commented on domestically by those arguing that the most vulnerable had not been adequately protected in Ireland's fiscal adjustment. Between 2010 and 2013 the point estimates of decile shares remained reasonably stable.



**Place Table 3 Here**

The analysis undertaken here relates to how incomes have changed for the decile groupings – this is the main focus of international work on this topic. It must be remembered of course that each decile does not represent the same groups of individuals across years. Rather it measures the share of income going to the poorest 10 per cent of individuals, the second poorest ten per cent of individuals, and so on, in each year. These may not be the same individuals across the years. Section 5 of this paper uses available data to examine the mobility of those in each decile, focusing particularly on those at the bottom of the income distribution.

We examine the issue of losses at low incomes more closely in Section 5, but first we examine how tax and welfare policies have contributed to these observed distributional outcomes.

#### 4. The Role of Tax and Welfare Policies

The distributional impact of tax-transfer systems can change due to explicit discretionary changes in tax-benefit policies (e.g., higher tax rates or lower welfare payment rates). But the distributional impact may also be substantially affected by changes in the underlying population and distribution of income (e.g., a higher proportion of pensioners, or increased unemployment)<sup>6</sup>. Dolls et al. (2012) concentrate on this latter component, and examine the degree of “automatic stabilisation” of aggregate income inherent in the systems of EU countries and the US, under either an income or an unemployment shock.<sup>7</sup> Their focus is therefore on the redistributive properties of a given tax-transfer system on alternative distributions of market income. Bargain and Callan (2010), by contrast, focus on identifying, for a given population and income distribution, the impact of discretionary changes in tax-transfer policy on measures of income inequality and poverty. In their approach “automatic” responses of existing policies to income or unemployment shocks are not separately identified but included with other factors, such as changes in unemployment or the distribution of market incomes. Here we set out an approach which draws on both of these perspectives to identify how the total impact of tax and benefit policy on the Gini coefficient changes over time, and the breakdown of this change in impact between discretionary and automatic components.

We start from the Reynolds-Smolensky index of redistributive impact,  $R_0$ , defined as the difference between the Gini index based on market income,  $G(M_0)$ , and the Gini based on disposable income,  $G(D_0)$ , both measured at time 0. Rearranging, we have

$$(1) \quad G(D_0) = G(M_0) - R_0$$

Taking first differences helps to separate changes in inequality which are due to changes in the distribution of market income (the first term) from those which are due to policy factors (the second term).

$$(2) \quad G(D_1) - G(D_0) = [G(M_1) - G(M_0)] - [R_1 - R_0]$$

The second term in square brackets on the right hand side of the equation includes both the impact of automatic stabilisation, as well as the impact of discretionary changes in the tax-benefit system. In order to identify the impact of discretionary policy, as against an automatic effect, we adopt a similar approach to Bargain-Callan (2010):<sup>8</sup>

$$(3) \quad R_1(M_1, D_1) - R_0(M_0, D_0) =$$

$$(a) \quad \{R[M_1, d_1(p_1, M_1)] - R[M_1, d_o(\alpha, p_o, M_1)]\}$$

$$(b) \quad + \{R[M_1, d_o(\alpha, p_o, M_1)] - R[(M_0, d_o(p_o, M_0))]\}$$

where  $G$  is the Gini coefficient summary measure of inequality,  $d_t(p_t, y_t)$  is the ‘tax-benefit function’ transforming, for each household, market incomes  $M_t$  and household characteristics into a certain

<sup>6</sup> This has long been recognised in the literature on tax progressivity; see, for example, Lambert and Thoresen (2009).

<sup>7</sup> In an Irish context, FitzGerald (2014) points to the role of the automatic stabilisation response during the recession.

<sup>8</sup> The equations show the algebra of the decomposition when applied to the end-year population; a similar decomposition is also possible for the base-year population. Both are applied in our empirical work.

level of disposable income based on tax-benefit monetary parameters  $p_i$  and  $\alpha$  is an index adjusting nominal monetary tax and benefit parameters to a common year value.

Implementation of the Bargain-Callan decomposition requires that both initial and end period data be included in a tax-benefit model. Here we use the SWITCH model (Simulating Welfare and Income Tax CHanges) which is based on the full detail of the national version of the Irish Survey on Income and Living Conditions for the years 2008 and 2013. This includes comprehensive data on welfare reciprocity, based predominantly, with the permission of respondents, on administrative register data. It also includes data on current incomes as at date of interview, as well as annual incomes. Current incomes are a key resource in simulating welfare entitlements, and are not available in the Eurostat “User Data Base” (UDB) underpinning EUROMOD, the widely-used set of tax-benefit simulation models for EU countries. SWITCH is similar in structure to the IFS TaxBen and has also been used in comparative work with EUROMOD (Callan et al., 2011). It simulates income tax and other levies on income, employee social insurance contributions, and all major welfare payments. Means-tested benefits are fully modelled, and the amounts of contributory benefits conditional on receipt. The main exclusion is changes in rules related to contribution history conditions for social insurance benefits. The data years used in the present analysis are 2008 and 2013.

There were substantial changes in tax and welfare policy over the 2008 to 2013 period, in response to the combination of the international Great Recession, the collapse of a housing price bubble, a banking crisis, and a public finance crisis. In this analysis we include the following measures which are part of the “core” SWITCH model analysis<sup>9</sup>:

- the introduction of a Universal Social Charge (USC), a compulsory charge on income, structured progressively, with no link to social insurance
- the elimination of the earnings ceiling for Pay Related Social Insurance contributions
- changes to income tax – including cuts to income tax credits and the width of the standard rate band
- the net changes in welfare payment rates over the period, with pension payment rates retaining the increase awarded in October 2008, and working-age payments ultimately reduced below their 2008 levels
- reductions in universal Child Benefit
- reductions in Jobseeker’s Allowance for the young unemployed
- the impact of the public sector pension levy
- explicit cuts in public service pay in 2010 and in 2013
- reductions in public service pensions
- The introduction of the Local Property Tax (applied at half rates in this analysis, as the tax was introduced mid-way through 2013)
- the Non-Principal Private Residence Charge, a flat charge of €200 on second homes
- The abolition of the Christmas bonus for welfare recipients in 2009

Changes in the overall impact of the tax and transfer system are summarised in Table 4. The upper panel shows Gini coefficients for market income, gross income (i.e., market income plus transfers) and disposable income (gross income less income-related taxes and employee social insurance contributions). Market income inequality, based on incomes before any redistribution through the tax or benefit system has taken place, rose sharply between 2008 and 2013. There was a smaller rise in the Gini coefficient for gross income, as social welfare transfers played an equalizing role.<sup>10</sup> Direct taxes were also progressive,<sup>11</sup> so that the Gini index for disposable income in 2013 is close to its 2008 level. The lower panel presents results for the Reynolds-Smolensky index, which measures the reduction in the Gini coefficient brought about by the tax and transfer system. The overall redistributive effect as measured by the Reynolds-Smolensky index, rose sharply from 0.21 to 0.27. In the pre-crisis years, the transfer system tended to reduce the Gini coefficient by about 0.15, with the tax system contributing a reduction of a further 0.05. By 2010, the reduction arising from the transfer system had risen to 0.20, remaining at that level through to 2013. The impact of the tax system also rose, from 0.05 to 0.07. Overall, the relative importance of the tax and welfare systems in reducing inequality remained roughly constant: about three quarters of the total reduction coming from the transfer system, and one-quarter from the direct tax system.

#### **Place Table 4 Here**

To what extent does the increased redistributive effect identified here reflect changes in policy outlined above, and to what extent is it due to the automatic stabilization properties of a strong safety net and progressive income taxation? We apply the decomposition set out in Equation (3) in order to answer this question. Essentially this identifies the impact of discretionary policy changes by comparing the actual policy regime with a counterfactual which simply indexes money-valued parameters in the tax and welfare systems in line with wage growth during the period. (This is the approach adopted by Bargain and Callan, 2010). Automatic stabilisation effects arise because of changes in the underlying population and income distribution, under a tax-transfer system which is held constant in relative terms, by the same indexation approach. This approach gives rise to the results reported in Table 5.

#### **Place Table 5 Here**

The proportion of the inequality reduction due to automatic effects is between 70 per cent, if calculated on a base-year population, and 83 per cent, if calculated on an end period basis. The Shapley value in this instance is simply the average of these two values, and suggests that over three-quarters of the inequality reduction is due to automatic stabilisation effects, and just under a quarter is due to changes in discretionary policy.

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<sup>10</sup> A similar pattern is found using the Theil index.

<sup>11</sup> Indirect taxes are known to be regressive: see Savage (2017) and Collins (2014) for further analysis of indirect taxes in an Irish context, or Pestel and Sommer (2015) for a similar analysis in a German context.

## Place Figure 5 Here

A finer grained analysis of the discretionary policy impacts, going beyond the impact on the Gini to examine effects across deciles, is presented in Figure 5. This analysis also uses the SWITCH model, covering the impact of policy changes introduced between 2009 and 2013 inclusive.<sup>12</sup> Results are shown based on the 2008 and 2013 populations. In both cases, the pattern is complex and cannot be neatly summarized as progressive, regressive or proportional. Discretionary policy changes had a strong negative impact across all income deciles. For the 2013 population, the pattern could be described as an inverse U, with the largest negative impact on the top income deciles, followed by those at the bottom, and with the least negative impact on the middle income deciles. Substantial tax increases, and progressively structured cuts in public sector pay are the major factors underlying the policy impact on top income deciles. Cuts in welfare payment rates were of particular importance for the lowest income deciles, with protection against such cuts for the elderly<sup>13</sup> helping to reduce the impact on deciles 3 and 4. For the 2008 population, the top two income deciles are still the most negatively affected by the austerity policies, largely due to increased taxation and progressively structured increases in public service pay. However, the lower unemployment rate in 2008 (less than 7 per cent as against more than 13 per cent in 2013) means that cuts in welfare payment rates has less impact when measured using the 2008 population.

## 5. Why Have Average Incomes for the Bottom Decile Fallen?

We saw in section 3 that the average income of the bottom decile fell sharply in Ireland over the period 2008 to 2013; and that there were similar sharp falls in Spain and Greece. Here we focus on the evolution of incomes for the bottom decile from a number of perspectives. In principle, similar techniques could be used to analyse changes in the average incomes of other deciles, such as the top decile. Here we focus on the bottom decile as it is this share which has fallen by much more than any other in the recession years, which has been the main focus of attention in debates about the fairness of the fiscal adjustment process and the impact of the crisis and recession more generally on inequality in Ireland.

First, we make use of the rotating panel design of the SILC to follow a subset of households, from one year to the next. The broad design is such that 75 per cent of households are eligible for re-interview in the next year. However, sample attrition means that the achieved rate of follow up from one year

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<sup>12</sup> As noted earlier, the counterfactual used in this analysis is indexation of tax and welfare policy in line with growth in wages, the largest component of national income. The rationale for this approach is set out in a series of papers (Callan et al., 2006; Bargain and Callan, 2010). Analysis based on a counterfactual with tax and welfare parameters frozen in nominal terms would in this instance yield very similar results, given that average wages increased by only about one per cent over the period.

<sup>13</sup> All welfare payment rates were increased in October 2008, but while other payment rates were then cut to below the original levels, pension rates were held constant at this new higher level.

to the next is closer to 50 per cent<sup>14</sup>. Given this, we look only at households in wave t and wave t+1. Sample sizes from year t+2 onwards become too small for robust conclusions to be drawn. Watson (2003) and Nolan et al. (2002) found that while there was substantial attrition in the ECHP and Living in Ireland Surveys, this did not appear to be systematic. Appendix Table B again finds no evidence of systematic attrition bias in the SILC panel, at least along the observable characteristics examined (including age, gender, marital status, labour force status, and income in the top and bottom deciles, among others).

Figure 6 shows the average income growth for individuals<sup>15</sup> ranked by initial year decile. This is what Bourguignon (2011) called a non-anonymous Growth Incidence Curve, or what Jenkins and Van Kerm (2016) called an income growth profile. Based on the cross-sectional (or anonymous) results, the largest decline in average income between 2008 and 2013 occurred in the bottom decile. By contrast, Figure 6 shows that in each year between 2004 and 2012, average income of the individuals that started in the bottom decile grew by between 30 per cent (from 2009 to 2010) and 70 per cent (from 2004 to 2005, and from 2010 to 2011) by the following year.<sup>16</sup> Income growth for individuals who began each two-year period in the middle of the income distribution was, on average, more modest throughout, while the income of those that started in the top decile fell by between 10 per cent and 20 per cent on average in each year. Though these income growth profiles have reasonably large confidence intervals<sup>17</sup>, the growth in average income for those that started at the bottom of the income distribution is significantly (economically and statistically) larger than for those that started higher up the income distribution. This suggests that there was significant reranking of individuals throughout the income distribution in both boom and recession periods in Ireland.

#### **Place Figure 6 Here**

To examine the extent to which individuals moved between deciles, Table 6<sup>18</sup> examines where individuals in the bottom decile in year t end up in the income distribution in year t+1, for each pair of years between 2004 and 2013. In the pre-crisis years, with the exception of the 2004 to 2005 transitions, close to 9 out of 10 of those in the bottom decile were found in one of the bottom 3 deciles in the next year. This figure fell somewhat during the crisis years, to a level of about 8 out of 10 in 2013. Close to 55 per cent of bottom decile individuals remained in the bottom decile in the pre-crisis years; this figure fell to just under 45 per cent by 2013<sup>19</sup>.

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<sup>14</sup> By design, the use of longitudinal data means that immigrants and emigrants that migrated between year t and year t+1 will not be included in the analysis. However, given the analysis is conducted using household income, part of the impact of migration will be captured in the change in income of other members of the migrant's household.

<sup>15</sup> As before, analysis is on individuals, using equivalised household disposable income as the measure of income.

<sup>16</sup> These high percentage increases are from a low base, and lead to transitions into the second or third decile as detailed below.

<sup>17</sup> See Appendix Figure A

<sup>18</sup> Tables 5 and 6 are weighted to represent the base year, 2008. Analysis based on the end-year (2013) weights produced very similar results.

<sup>19</sup> To ensure consistency with the results based on the cross-sectional data, decile cut-offs are calculated using the cross-sectional data. Therefore, when using only the longitudinal observations, each decile may not contain

## Place Table 6 Here

Table 7 looks at the converse of this issue: for persons who are in the bottom decile in year  $t$ , which decile did they come from in year  $t-1$ ? Again, with the exception of 2004 to 2005, about 90 per cent of those in the bottom income decile came from one of the bottom three deciles in the pre-crisis years. This figure fell to below 70 per cent in 2010, and by 2013 was at 80 per cent. Looking at longer range mobility, in the immediate pre-crisis years less than 10 per cent of bottom decile individuals came from the top 6 deciles. This figure rose to over 25 per cent in 2010, and fell back to below 10 per cent in 2013.

## Place Table 7 Here

The broad picture painted here is one with considerable stability in the bottom decile from year to year, combined with substantial short-range mobility within the bottom 3 deciles. Downward mobility from the upper part of the income distribution did rise during the worst of the recession, but the composition of the low income deciles remains dominated by those who are in the bottom three deciles from year to year.

We pursue this analysis further by defining 3 different groups which play a role in the composition of the bottom decile in each year. Those who stay in the bottom decile in years  $t$  and  $t+1$  are termed “stayers”. Those who move up from the bottom decile in year  $t$  to a higher decile in  $t+1$  are termed “movers up”, and those who move down from a higher decile into the bottom decile at time  $t+1$  are termed “movers down”.

Using these definitions, we can gain some insight from Tables 8 and 9 into the issue of whether falls in bottom decile income arise from falls in the income of those who remain at such low income levels, or whether falls in bottom decile income reflect changes in the composition of the decile. Table 9<sup>20</sup> shows that, unsurprisingly, the largest percentage changes in income are among those who moved between deciles. During the recessionary years, the falls in real income for those dropping into the bottom decile were significantly larger than in previous years, particularly in 2010 and 2011. Interestingly, for those who are “stayers” in the bottom decile, average incomes are either constant

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exactly ten per cent of the population. For this reason, the proportion of “stayers” in the bottom decile differs between Tables 5 and Table 6, as Table 5 is based on year 1 decile cut-offs, and Table 6 is based on year 2 decile cut-offs. Jenkins and Van Kerm (2014) follow a similar approach when measuring poverty rates in EU-SILC.

<sup>20</sup> Tables 8 and 9 are weighted by the weight for each individual year. Results were qualitatively equivalent when we used only year  $t$  weights, and only year  $t+1$  weights. Results available upon request.

or increase slightly<sup>21</sup>. The sharp falls in bottom decile income must then arise from shifts in composition, due to movements in and out of the bottom decile.

#### **Place Table 8 Here**

The large decrease in mean real income in the bottom decile are thus driven by a reduction of the income of those dropping into the bottom decile, leaving them below the average income (in the previous year) of those they replaced in that decile, rather than a reduction in the incomes of those already in the bottom decile<sup>22</sup>.

Table 9 decomposes the overall change in average income in the bottom decile between each pair of years into the part caused by the change in income of the stayers, the part caused by the change in income of those moving down from decile 2 or 3, and the part caused by the income change of those moving down from decile 4 or above<sup>23</sup>. The approach of the decomposition is to allow the income of the transition group of interest move to its year  $t+1$  level, holding all other incomes fixed at year  $t$  levels. The change in average income in the bottom decile between year  $t$  and this hypothetical (or counterfactual) distribution of income then shows the contribution of the relevant transition group to the overall change in income in the bottom decile. The decomposition therefore allows us to identify what would have happened to income in the bottom decile if only the incomes of each of the transition groups had changed between year  $t$  and year  $t+1$ .

Pre-recession, average real income in the bottom decile increased in each year, driven largely by the stayers group and those dropping into the bottom decile from decile 2 or 3. During the recession, in particular between 2009 and 2011, average real income in the bottom decile decreased substantially. Between 2009 and 2010, more than 10 percentage points of the overall fall of 15 per cent in real income in the bottom decile was driven by the large falls in income for those dropping into the bottom decile from decile 4 or above. The remaining decline in income (4.8 percentage points) was driven by those dropping into the bottom decile from decile 2 or 3. These income falls for those dropping into the bottom decile were offset slightly by small gains in real income for those remaining in the bottom decile.

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<sup>21</sup> Relatively small sample sizes result in wide confidence intervals in many cases, which should be borne in mind when interpreting results.

<sup>22</sup> See Appendix Table C for further analysis of how the average incomes of the stayers and movers changed during the period of analysis.

<sup>23</sup> See Appendix B for details of the decomposition methods used.



A similar pattern emerges between 2010 and 2011 when average income in the bottom decile fell by almost 11 per cent. Stayers income increased slightly between these years, again meaning that the large fall in income was driven by those dropping into the bottom decile. In contrast to the 2009 to 2010 period, the 2010 to 2011 falls in income were driven more by falls in income for those dropping in to the bottom decile from decile 2 or 3 (contributing 8.5 percentage points of the overall decline in income), rather than those moving from decile 4 or above (contributing 4.6 percentage points of the overall decline in income). Two factors contribute to the contrasting share of the overall fall income that is driven by the two movers down groups in 2009-10 and 2010-11. First, the proportion of those dropping into the bottom decile from decile 4 or above was higher between 2009 and 2010 than between 2010 and 2011 (see Table 7). Secondly, the income of those dropping from decile 4 or above was almost 30 per cent lower than the movers up group in 2009-10, while it was just above 20 per cent lower than the movers up group in 2010-11<sup>24</sup>.

## Place Table 9 Here

Employment loss was a significant contributory factor in the large contribution of those moving from decile 4 or above to the overall fall in bottom decile income between 2009 and 2010. As income is measured over the 12 months prior to interview in SILC<sup>25</sup>, the 2009 to 2010 income changes cover the period during which unemployment in Ireland increased from about 6 per cent in 2008 to over 14 per cent during 2010. Between 2009 and 2010, more than 1 in 4 of those that dropped into the bottom decile from decile 4 or above lived in a household where someone became unemployed, while just under half of the individuals falling into the bottom decile from decile 4 or above lived in a household that had one less person in employment in 2010 than in 2009. Reduced numbers of individuals in employment in a household can arise from migration, retirement or individuals exiting the labour market, as well as the effect of unemployment.

## 6. Conclusions and Further Research

The impact of the Great Recession and associated austerity policies on poverty and inequality in OECD countries is of central interest, not least in light of the political turmoil and rise of populism to which it may be contributing. Existing studies often relate only to the initial impact of the Crisis and to discretionary tax/transfer policy changes, whereas the effects through the recession may now be seen and automatic ‘stabilisers’ need to be brought into the picture. After an unprecedented economic boom peaking in 2007, Ireland was one of the countries worst affected by the onset of the Great Recession, and faced a remarkably challenging fiscal adjustment in the context of a ‘bail-out’ by the

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<sup>24</sup> See Appendix Table C for more details.

<sup>25</sup> So, for example, the income data for a household in SILC 2009 interviewed in June 2009 would cover the period June 2008 to June 2009. This is different to the majority of other countries in SILC, where the income reference period is the previous calendar year.

EU and IMF. By 2014 Ireland had successfully completed a stringent bail-out programme, economic growth had returned, and unemployment was falling rapidly. The scale and nature of its Great Recession makes Ireland a particularly interesting case-study, and the fact that it has been hailed in some circles as an exemplar for embracing austerity makes a comprehensive assessment of the distributional consequences all the more important.

We have shown that, despite extraordinary changes at the macroeconomic level, summary measures of income inequality remained quite stable throughout the adjustment period. However, the bottom decile's share in total disposable income fell by 0.4 percentage points, with its real income falling by 22 per cent compared with the average loss across the entire distribution of 13 per cent. Market income inequality rose sharply between 2008 and 2013, but the Gini index for disposable income was little changed, with the reduction in the Gini coefficient brought about by the tax and transfer system as measured by the Reynolds-Smolensky index rising sharply from 0.21 to 0.27. About three quarters of that total reduction came from the transfer system and one-quarter from the direct tax system in each year, with both elements rising markedly through the recession.

Much of the emphasis in research and debate about inequality and fiscal adjustment focuses on discretionary changes in tax and transfer system parameters, explored via tax-benefit simulation models. In the Irish case, our analysis using the SWITCH microsimulation model shows that such changes in the "austerity budgets" implemented to deal with soaring government deficit and debt over the entire period of adjustment had a strong negative impact across all income deciles. The largest negative impact was on the top income deciles, followed by those at the bottom, with somewhat less impact on the middle deciles. Substantial tax increases and progressively structured cuts in public sector pay produced this policy impact towards the top, while cuts in welfare payment rates were of particular importance for the lowest income deciles.

However, the 'automatic' stabiliser effects as the tax and transfer systems respond to changes in household incomes and employment levels also play a central role. Applying a new approach we developed to distinguish the scale of these effects using the tax-transfer simulation model, our results show that over three-quarters of the effective buffering against inequality increases by the Irish tax and transfer systems was due to automatic stabilisation effects, and just under a quarter was due to changes in discretionary policy.

In assessing the implications of income changes at different points in the distribution through the recession, it is also very important that the individuals making up a particular income group vary over time. The rotating panel component of the survey allowed us to examine how much the particularly large average income falls for the bottom decile – the subject of considerable commentary and concern – reflected what happened to those at the bottom of the distribution initially as opposed to persons higher up the distribution but falling to the bottom from one year to the next. We found that about half of the bottom decile in each year remained in that decile in the following year, but their incomes did not fall on average. Instead, a decomposition method developed for the purpose showed that the large declines in average income for the bottom decile between 2009-2010 and 2010-11 were driven by those falling into that decile, in part due to loss of employment. Between 2009-2010 a significant proportion of these came from the middle and upper reaches of the distribution, whereas from 2010 and 2011 they mostly came from the 2<sup>nd</sup> and 3<sup>rd</sup> deciles. The longitudinal perspective brings out that the pronounced decline in average income observed for the bottom of the distribution should

not be taken as meaning that the greatest income losses were felt by those who were at the bottom as the Crisis struck.

One's view of the Ireland's successful fiscal adjustment from a distributional perspective, in light of this evidence, will then be a matter of both judgement and preferences: the relatively large income losses seen at the bottom of the distribution need to be interpreted with care, but leaving that aside, how one views a broadly proportional sharing of the income losses associated with severe recession will depend on both one's distributional preferences and one's view of the feasible alternatives. From a methodological and analytical point of view, the paper brings out the importance of going beyond comparison of cross-sectional income shares over time to incorporate a longitudinal perspective, of broadening the focus in assessing policy impacts beyond the realm of income tax and cash transfers for which microsimulation approaches to distributional assessment were initially developed (as other more recent studies such as Avram et al, 2014 have sought to do), and of setting the results of analysis of discretionary policy impacts in the broader context of the role of automatic stabilisers and overall distributional change.

## Appendix A: Data

### SILC Longitudinal 2004 to 2013

To investigate patterns observed in the cross-sectional analysis, it is useful to be able to track individuals and households from one period to the next. The longitudinal element of SILC is designed so that 75 per cent of households in a given year are sought for interview in the following year. However, a significant rate of sample attrition means that the retention rate of households is closer to 50 per cent in each year, as can be seen in Appendix Table A. This significant rate of household attrition raises the possibility of selection biases being introduced when using the longitudinal data. These biases may occur if attrition is related to characteristics of the household such as income, marital status, poverty status, household composition and so on. To check whether such biases exist in the longitudinal element of each year's SILC, Appendix Table B compares a number of key characteristics of individuals in the cross-section and panel elements of each year of SILC used in this analysis.

#### Place Appendix Table A Here

The results suggest that the degree of bias introduced by sample attrition is quite limited. For the majority of cases, the distribution of variables (percentages or € values) from the longitudinal data represent between 90 per cent and 110 per cent of the cross-section value. For example, 19.5 per cent of individuals live in 2-person households in the 2005 wave of SILC. Of the observations in the 2005 wave who are also present in the 2006 wave of SILC, 19.6 per cent live in two-person households. Similarly, 72.8 per cent of individuals live in households with 3 or more people according to the 2005 cross-section, compared to 72.3 per cent of the longitudinal respondents. While one might expect that low income households may be under-represented in longitudinal surveys, the evidence in Appendix Table B suggests this is not evident in the longitudinal element of SILC. The mean income in the bottom decile is within 3 per cent of the cross-sectional value in all eight years of comparison. Similarly, the poverty rate among the longitudinal respondents is within 1 percentage point of the poverty rate in the full cross-section in five of the eight years of comparison; the difference in poverty rates is above 2 percentage points in just one of the eight years (2005).

There are some comparisons that indicate that attrition may be non-random by certain characteristics. For example, a lower proportion of individuals among the longitudinal respondents live in households where the head is aged less than 30 compared to the full cross-sections, particularly before 2010. Conversely, a higher proportion of individuals live in households with a head aged 65 or older, or where the household head is retired, among the longitudinal respondents than the full cross-section. The most consistent pattern emerges in the comparison of urban and rural respondents. The proportion of rural respondents among the longitudinal observations is more than ten per cent higher than the cross-sectional observations in six of the eight years of analysis. These patterns are consistent with Nolan et al.'s (2002) results based on the longitudinal element of the Living in Ireland Survey where attrition was also greater for urban households. They also suggested that attrition is most likely among those with the highest propensity to change address, such as young adults.

Overall, the evidence suggests that, despite the relatively high rate of attrition, the year-to-year changes for the panel respondents are broadly representative of changes for the full population. While the pattern of attrition was not always random, the impact on the structure of the sample over two waves was modest.

**Place Appendix Table B Here**



## Appendix B: Decomposition Methods

In this appendix section, we briefly summarise the decomposition methods used in Section 5.. The decomposition proceeds as follows: Year t average income in the bottom decile can be written as:

$$\mu_t^1 = \sigma^s \mu_t^s + (1 - \sigma^s) \mu_t^{mu} \quad (A.1)$$

where  $\mu_t^1$  is average income in decile 1 at year t,  $\sigma^s$  is the share of the bottom decile occupied by stayers,  $\mu_t^s$  is the average income of the stayers in year t, and  $\mu_t^{mu}$  is the average income of movers up in year t.

Similarly, we can write average income in the bottom decile in year t + 1 as:

$$\mu_{t+1}^1 = \sigma^s \mu_{t+1}^s + (1 - \sigma^s) \mu_{t+1}^{md} \quad (A.2)$$

where  $\mu_{t+1}^{mu}$  is the average income of the movers down group in year t + 1.

Only stayers and movers up income appear in equation A.1, while only stayers and movers down income appear in equation 2. Between two time points, individuals in the bottom decile have either stayed in the bottom decile (stayers), or moved between deciles (movers). Movers are split by whether they go from decile 1 to decile 2-10 (movers up), or decile 2-10 to decile 1 (movers down). In year t, the movers down are not in the bottom decile – therefore their income is not relevant to income in bottom decile in year t. In year t+1, the movers up are not in bottom decile, therefore their income is not relevant to income in bottom decile in year t+1.

Using equations A.1 and A.2, we can write the change in average income in the bottom decile between year t and year t + 1 as:

$$\delta^1 = \mu_{t+1}^1 / \mu_t^1 - 1 \quad (A.3)$$

By defining two counterfactual income scenarios, we can isolate the impact of the changes in income of the various groups identified in Table 1. CF1 is the distribution of income if the income of the “stayers” group in year  $t + 1$  is held constant at its year  $t$  value, and all other incomes are allowed to change. Average income in the bottom decile in this first counterfactual income scenario can be calculated as:

$$\mu_{cf1}^1 = \sigma^s \mu_t^s + (1 - \sigma^s) \mu_{t+1}^{md} \quad (A.4)$$

The “movers effect”, or the change in average income in the bottom decile if only the income of those transitioning into and out of the bottom decile changed, can therefore be calculated as:

$$\delta_{cf1}^1 = \mu_{cf1}^1 / \mu_t^1 - 1 \quad (A.5)$$

Conversely, the second counterfactual income distribution, CF2, is the distribution of income when only the income of the stayers is allowed to change to its year  $t+1$  value. All other incomes are held at their year  $t$  values. In this case, average income in the bottom decile can be calculated as:

$$\mu_{cf2}^1 = \sigma^s \mu_{t+1}^s + (1 - \sigma^s) \mu_t^{mu} \quad (A.6)$$

The “stayers effect” can therefore be calculated as:

$$\delta_{cf2}^1 = \mu_{cf2}^1 / \mu_t^1 - 1 \quad (A.7)$$

The proportion of the overall change in income that can be attributed to the “stayers effect” and the “movers effect” is straightforward to calculate, based on the fact that:

$$\delta^1 = \delta_{cf1}^1 + \delta_{cf2}^1 \quad (A.8)$$

In section 5, the decomposition is simply extended to isolate the impact of those that drop into the bottom decile from deciles 2 or 3, and those that drop into the bottom decile from decile 4 or above using a similar logic.



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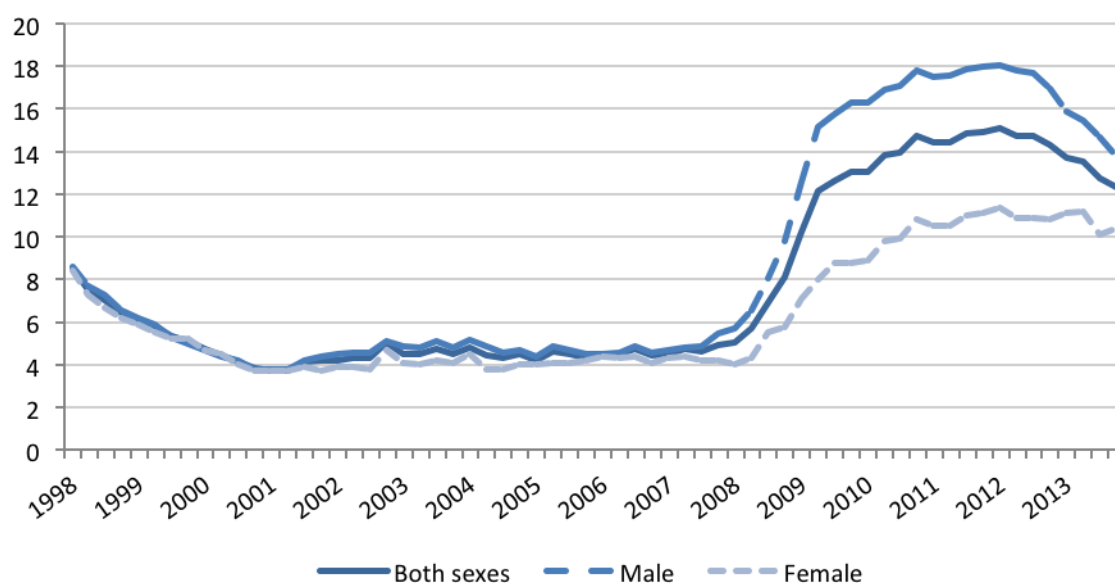
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**Figure 1: ILO Unemployment Rate (seasonally-adjusted), Ireland, 1998 to 2013**



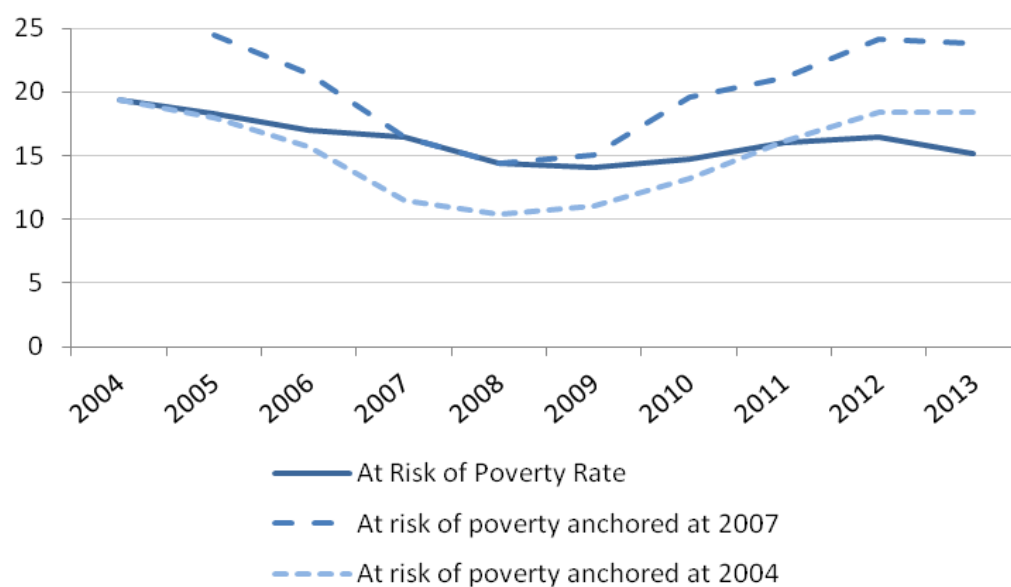
**Figure 2: Average Household Disposable Income per Adult Equivalent, 2004-2013**



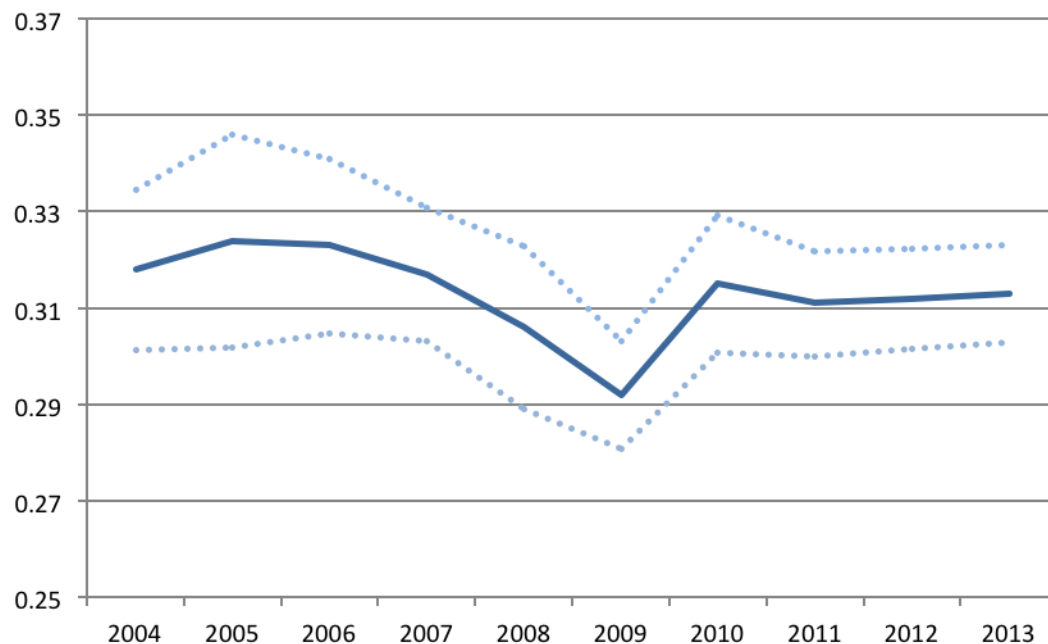
Source: Author's analysis of SILC Research Microdata Files.

- Notes:
1. Disposable income is before housing costs, and the equivalence scale is that used in the Irish national poverty target (1 for the first adult, 0.66 for subsequent adults, 0.33 for children aged under 14).
  2. The adjustment from nominal to real income is calculated by the authors based on the CPI for the relevant year. Results are broadly similar to those reported by CSO in SILC publications, which make a more refined adjustment allowing for the time pattern of data collection.
  3. 95 per cent confidence intervals shown by dotted lines. Standard errors calculated using delta method throughout analysis, except where explicitly stated. Sample clustering not accounted for in calculation of standard errors.

**Figure 3: At-Risk-of-Poverty Rate, 2004-2013**



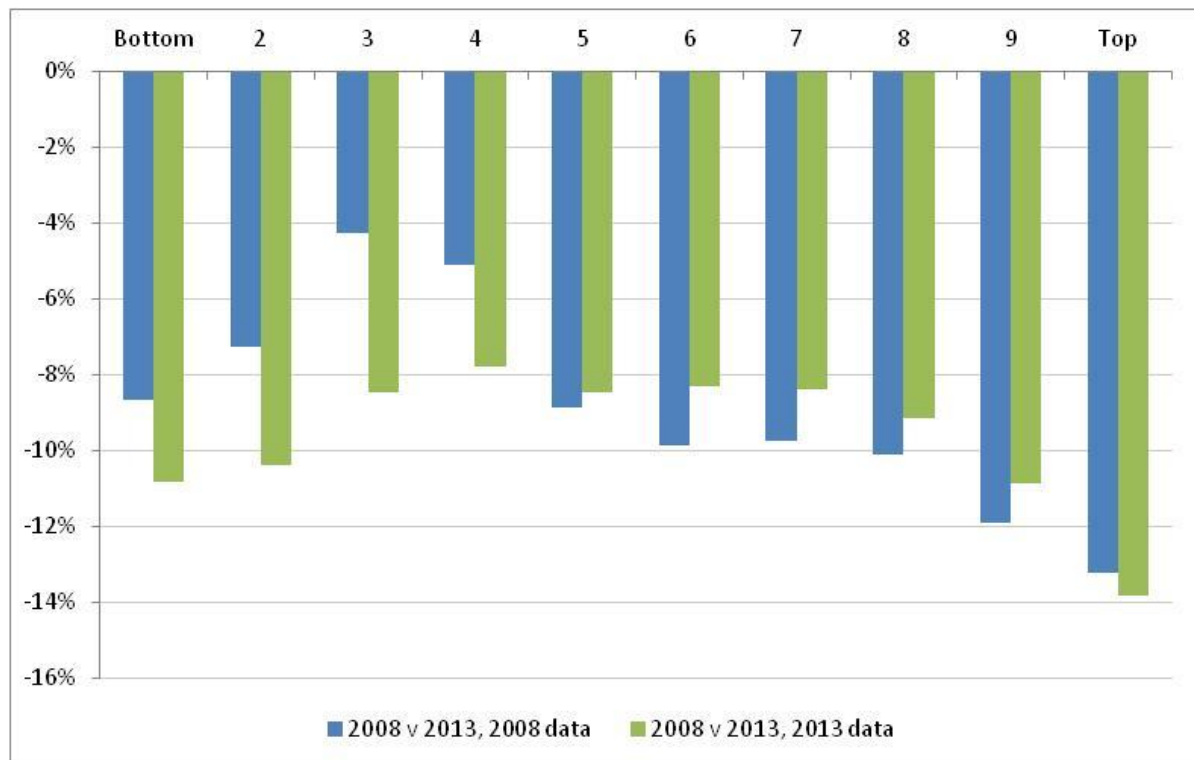
**Figure 4: Trends in the Gini Coefficient, Ireland 2005-2013**



*Note: Dashed lines show 95% confidence intervals<sup>26</sup>*

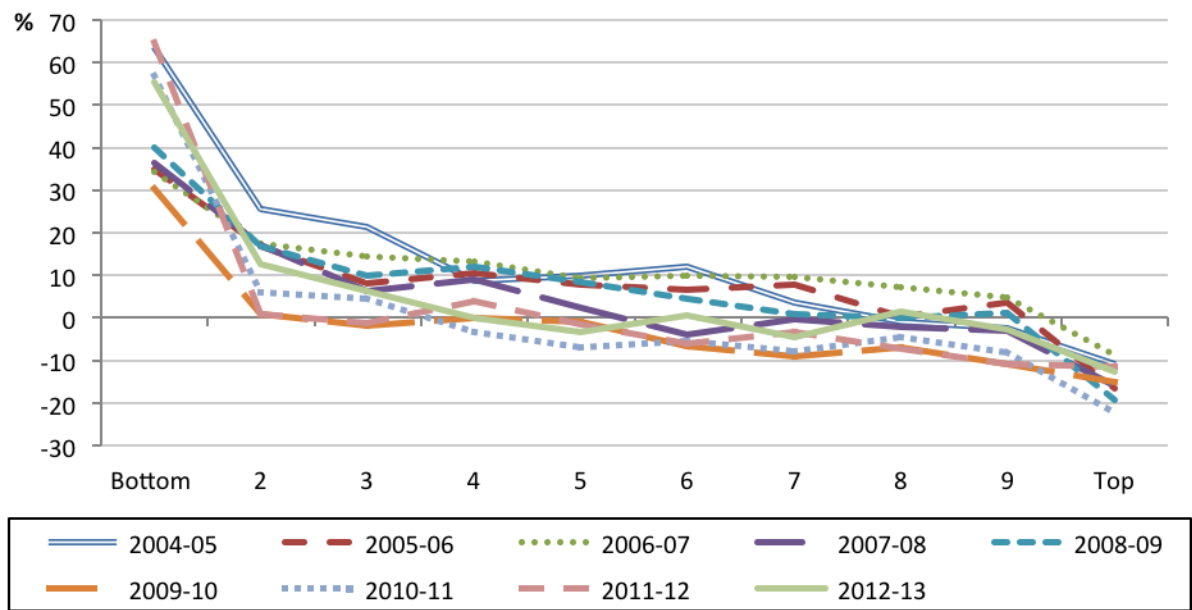
<sup>26</sup> Confidence intervals estimated in Stata using Jenkins' (2006) `svylorrenz` command. This uses the methods of Kovacevic and Binder (1997) based on Taylor linearization. The fact that the sample is clustered is not taken into account in these estimates of confidence intervals.

**Figure 5: Impact of Discretionary Budgetary Policy 2009-2013 - Percentage Change in Disposable Income by Income Decile – 2008 and 2013 Populations**



*Source:* SWITCH model at January 2017 incorporating main changes in direct tax, welfare and public service pay/pensions.. Policies are indexed in line with wage growth between the policy year and the data year: for the 2013 data results, the 2008 policy is indexed so that monetary tax-benefit parameter values are expressed in 2013 values, while for the 2008 data results, the 2013 policy is indexed so that monetary tax-benefit parameter values are expressed in 2008 values.

Figure 6: Percentage Change in Average Real Income by Base-Year Decile



**Table 1: Gini Coefficients, Selected Years, 1994 to 2013**

Year	Gini Coefficient
1994	0.32
2000	0.31
2005	0.32
2006	0.32
2007	0.32
2008	0.31
2009	0.29
2010	0.32
2011	0.31
2012	0.31
2013	0.31

Sources: 1994 and 2000 from Living in Ireland Survey as reported by Nolan et al. (2012). All other years from authors' calculations based on SILC Research Microdata File.

Notes: Gini coefficients calculated from the Household Budget Surveys of 1994/95 and 2000/01 are each 0.30



**Table 2: Changes in Average Real Incomes by Decile of Equivalised Disposable Income 2008-2013**

<i>% Change from 2008 – 2013</i>		
<i>Decile</i>	<i>Before Housing Costs</i>	<i>After Housing Costs</i>
Bottom	-22.1 [-26.2, -17.9]	-26.7 [-32.3, -21.0]
2	-14.4 [-15.4, -13.4]	-18.7 [-21.3, -16.1]
3	-11.4 [-12.1, -10.8]	-16.2 [-18.5, -14.0]
4	-12.5 [-13.2, -11.9]	-14.7 [-16.9, -12.5]
5	-14.4 [-15.2, -13.7]	-16.3 [-18.2, -14.4]
6	-13.5 [-14.1, -12.8]	-15.7 [-17.2, -14.2]
7	-12.3 [-13.0, -11.6]	-15.7 [-17.7, -13.8]
8	-12.1 [-13.0, -11.3]	-10.9 [-13.1, -8.7]
9	-10.2 [-11.3, -9.0]	-11.8 [-13.8, -9.9]
Top	-12.7 [-21.0, -4.4]	-13.9 [-22.7, -5.1]
Total	-12.7 [-16.3, -9.2]	-14.6 [-18.3, -10.9]

Note: Housing costs are defined as rent or mortgage interest payments.

95 per cent confidence intervals shown in parentheses

**Table 3: Decile Shares of equivalised disposable income among persons, 1994 to 2013**

Decile	1994	1997	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
1	3.8	3.6	3.3	3.2	3.5	3.4	3.5	3.5	3.1	3.0	3.0	3.1
	-	-	[2.9,3.7]	[2.8,3.7]	[2.9,4.0]	[2.8,3.9]	[3.0,4.1]	[2.9,4.2]	[2.5,3.7]	[2.5,3.5]	[2.5,3.5]	[2.7,3.5]
2	4.9	4.7	4.7	4.6	4.8	4.9	5.1	5.2	5.0	5.0	4.9	5.0
	-	-	[4.1,5.3]	[4.1,5.2]	[4.0,5.5]	[4.2,5.6]	[4.2,6.1]	[4.3,6.1]	[4.2,5.8]	[4.3,5.7]	[4.2,5.6]	[4.4,5.7]
3	5.6	5.5	5.6	5.7	5.7	5.7	5.9	6.1	5.9	6.0	6.0	6.0
	-	-	[5.0,6.3]	[4.9,6.4]	[4.9,6.4]	[4.8,6.7]	[5.1,6.7]	[5.0,7.3]	[5.0,6.8]	[5.1,6.9]	[5.2,6.8]	[5.2,6.8]
4	6.4	6.6	6.8	6.7	6.6	6.6	6.8	7.0	6.7	6.9	6.9	6.8
	-	-	[5.9,7.6]	[5.8,7.6]	[5.6,7.6]	[5.3,7.9]	[5.6,8.0]	[5.8,8.1]	[5.7,7.7]	[5.9,7.9]	[6.0,7.9]	[6.0,7.6]
5	7.5	7.5	7.9	7.8	7.7	7.7	7.9	8.0	7.9	7.9	7.9	7.7
	-	-	[6.9,8.9]	[6.7,8.9]	[6.6,8.8]	[6.5,8.9]	[6.6,9.1]	[6.7,9.3]	[6.7,9.1]	[6.7,9.1]	[6.9,8.9]	[6.7,8.7]
6	8.9	9.2	9.3	9.2	8.9	9.0	9.1	9.4	9.1	9.2	9.1	9.0
	-	-	[8.1,10.5]	[8.1,10.3]	[7.5,10.2]	[7.7,10.4]	[7.6,10.6]	[7.7,11.0]	[7.6,10.5]	[7.8,10.5]	[7.8,10.4]	[7.9,10.0]
7	10.6	10.6	10.6	10.5	10.3	10.6	10.4	10.6	10.4	10.5	10.6	10.4
	-	-	[9.3,11.8]	[9.1,11.9]	[8.9,11.7]	[9.2,11.9]	[8.8,12.1]	[8.8,12.3]	[8.6,12.1]	[9.0,11.9]	[9.2,11.9]	[9.1,11.7]
8	12.6	12.6	12.2	12.1	12.0	12.3	12.2	12.2	12.0	12.4	12.4	12.3
	-	-	[10.8,13.6]	[10.6,13.6]	[10.6,13.5]	[10.6,14.1]	[10.2,14.2]	[10.3,14.1]	[10.3,13.8]	[10.7,14.1]	[10.8,14.0]	[10.9,13.7]
9	15.3	15.4	14.7	14.5	14.7	15.1	14.7	14.8	15.1	15.1	15.2	15.2
	-	-	[13.0,16.3]	[12.9,16.1]	[13.0,16.5]	[13.1,17.0]	[12.7,16.8]	[12.7,16.9]	[13.0,17.3]	[13.0,17.2]	[13.5,16.9]	[13.5,16.8]
10	24.4	24.3	24.9	25.6	25.9	24.7	24.4	23.2	24.7	24.0	24.0	24.4
	-	-	[21.9,27.9]	[22.4,28.9]	[22.9,28.9]	[21.9,27.5]	[21.4,27.5]	[20.6,25.8]	[21.5,28.0]	[21.2,26.9]	[21.3,26.6]	[22.1,26.8]

*Notes: 1994 and 1997 from Nolan and Maitre (2000). All other years from authors' calculations based on SILC Research Microdata File. 95 per cent confidence intervals shown in parentheses (where available).*

**Table 4: Income Inequality measures for Market, Gross, Disposable Incomes, and Reynolds-Smolensky Indices, 2008 and 2013**

	<b>2008</b>	<b>2013</b>
<i>Gini Coefficient</i>		
Market	0.52	0.59
Gross	0.36	0.39
Disposable	0.31	0.31
<i>Reynolds-Smolensky Index</i>		
Taxes and Transfers	0.21	0.27
<i>of which:</i>		
Taxes	0.05	0.07
Transfers	0.16	0.20

**Table 5: Decomposition of Change in Reynolds-Smolensky Indices, 2008 to 2013**

	$R_1 - R_0$		
	Base Year Population	End Year Population	Shapley Value
Total change in Reynolds-Smolensky index (x100) , based on simulated current incomes	0.04	0.04	0.04
<i>of which:</i>			
Automatic Stabilisation	70%	83%	77%
Discretionary Policy	30%	17%	23%

Note: As in the Bargain-Callan decomposition, the decomposition must be based on simulated current incomes to allow the appropriate counterfactual to be constructed. The increase in the R-S index based on actual annual income data is 0.06, as shown in Table 4.

**Table 6: Decile Distribution of Individuals that were in Bottom decile in Previous Year (%) – Where did bottom decile Individuals move to?**

Decile	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
Bottom	47.9	56.6	53.2	53.3	50.3	35.8	47.3	40.1	45.6
	[40.1, 55.7]	[47.6, 65.6]	[43.2, 63.2]	[42.9, 63.7]	[40.9, 59.7]	[25.2, 46.4]	[35.7, 58.9]	[30.3, 49.9]	[36.2, 55]
2	22.5	27.6	26.0	23.8	23.9	34.2	21.3	19.0	28.0
	[16.0, 29.0]	[19.0, 36.2]	[16.4, 35.6]	[15, 32.6]	[16.5, 31.3]	[22.4, 46]	[12.1, 30.5]	[11.6, 26.4]	[18.2, 37.8]
3	11.1	4.5	9.8	9.5	10.4	14.4	18.4	20.7	9.5
	[6.0, 16.2]	[2.1, 6.9]	[3.5, 16.1]	[4.6, 14.4]	[5.5, 15.3]	[5.2, 23.6]	[9.2, 27.6]	[12.7, 28.7]	[4.8, 14.2]
4	7.1	7.7	5.4	3.9	7.0	5.0	6.4	11.3	10.6
	[2.8, 11.4]	[3.0, 12.4]	[1.9, 8.9]	[1.0, 6.8]	[2.3, 11.7]	[0.0, 10.1]	[2.1, 10.7]	[5.0, 17.6]	[4.5, 16.7]
5+	11.4	3.6	5.6	9.6	8.4	10.5	6.5	8.9	6.3
	[6.5, 16.3]	[1.4, 5.8]	[0.7, 10.5]	[2.2, 17]	[3.9, 12.9]	[4.8, 16.2]	[3.0, 10.0]	[4.6, 13.2]	[2.2, 10.4]
	100	100	100	100	100	100	100	100	100

*Notes: 95 per cent confidence intervals shown in parentheses.*

**Table 7: Decile Distribution of Persons that are in Bottom decile in Each Year (%) – Where did bottom decile Persons come from?**

Decile	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
Bottom	56.8 [48.2, 65.4]	59.1 [50.5, 67.7]	54.5 [44.7, 64.3]	44.5 [34.5, 54.5]	54.2 [43.8, 64.6]	40.2 [27.5, 52.9]	44.4 [32.8, 56]	42.4 [32.4, 52.4]	45.5 [37.1, 53.9]
2	14.5 [8.4, 20.6]	18.6 [12.1, 25.1]	30.1 [20.3, 39.9]	17.2 [9.2, 25.2]	14.4 [7.9, 20.9]	14.7 [6.7, 22.7]	28.5 [18.1, 38.9]	28.9 [19.3, 38.5]	22.3 [15.4, 29.2]
3	6.1 [2.6, 9.6]	9.9 [4.4, 15.4]	7.6 [2.5, 12.7]	16.1 [6.5, 25.7]	9.1 [3.6, 14.6]	10.7 [3.1, 18.3]	9.7 [1.1, 18.3]	11.7 [7.0, 16.4]	13.4 [7.7, 19.1]
4	9.7 [3.6, 15.8]	5.9 [2.8, 9]	4.5 [1.8, 7.2]	9.2 [3.7, 14.7]	8.6 [0.0, 17.2]	8.2 [2.5, 13.9]	6.7 [2.4, 11]	2.7 [0.9, 4.5]	10.1 [4.0, 16.2]
5+	12.9 [7.4, 18.4]	6.5 [2.2, 10.8]	3.3 [1.1, 5.5]	12.9 [7.2, 18.6]	13.7 [8.2, 19.2]	26.2 [10.7, 41.7]	10.7 [4.8, 16.6]	14.3 [8.4, 20.2]	8.7 [5.0, 12.4]
	100	100	100	100	100	100	100	100	100

*Notes: 95 per cent confidence intervals shown in parentheses.*

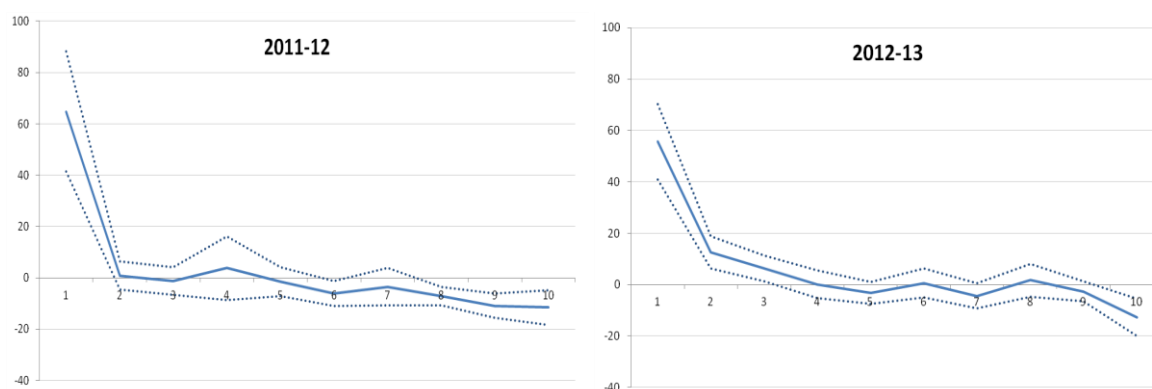
**Table 8: Percentage Change in Mean Real Income – Persons grouped by transition status**

	Stayers (%)		Move Up (%)		Move Down (%)	
2004-05	3.7	[-4.3,11.7]	119.3	[83.9,154.8]	-52.7	[-60.7,-44.6]
2005-06	6.5	[-1.7,14.8]	77.3	[58.4,96.3]	-39.1	[-45.4,-32.8]
2006-07	0.4	[-19.7,20.6]	73.8	[59.7,87.8]	-26.2	[-32.1,-20.2]
2007-08	6.3	[-4.0,16.7]	66.7	[51.4,82.0]	-47.6	[-54.8,-40.3]
2008-09	0.2	[-8.2,8.7]	75.4	[60.3,90.5]	-51.8	[-58.8,-44.9]
2009-10	1.5	[-14.9,18.0]	45.2	[33.2,57.1]	-64.8	[-73.6,-56.0]
2010-11	6.9	[-23.9,37.7]	86.6	[35.8,137.4]	-59.4	[-70.6,-48.2]
2011-12	4.6	[-18.5,27.7]	97.2	[69.2,125.2]	-49.1	[-54.0,-44.3]
2012-13	9.2	[-5.0,23.4]	92.5	[74.0,111.1]	-46.0	[-50.7,-41.2]

**Table 9: Decomposition of Changes in Average Real Income in Bottom Decile**

	2004- 05	2005- 06	2006- 07	2007- 08	2008- 09	2009- 10	2010- 11	2011- 12	2012- 13
Overall	4.7	10.3	5.6	1.6	1.9	-14.7	-10.7	1.6	11
Stayers	2.1	3.9	0.2	2.7	0.1	0.5	2.4	1.7	3.9
Movers Down (2/3)	2.3	4.6	5.1	0.1	0.1	-4.8	-8.5	1.0	5.0
Movers Down (4+)	0.4	1.8	0.3	-1.2	1.7	-10.4	-4.6	-1.0	2.1

**Appendix Figure A: Percentage Change in Average Real Income between year t and year t+1 – individuals ranked by year t income position**



Notes: 95 per cent confidence intervals shown in dotted lines. 2011 and 2012 shown for illustration. Other years lead to similar results.

**Appendix Table A: Retention Rate of Households by wave of SILC**

	%	N
2004	49.8	2,727
2005	51.7	3,147
2006	50.9	2,973
2007	51.2	2,870
2008	52.6	2,759
2009	49.6	2,570
2010	52.6	2,441
2011	55.2	2,391
2012	54.7	2,513



**Appendix Table B: Characteristics of All Individuals at Year t in SILC Cross-Section Year t, and of Individuals at Year t who are in SILC Panel in Year t and Year t+1**

	2004 Sample		2005 Sample		2006 Sample		2007 Sample		2008 Sample		2009 Sample		2010 Sample		2011 Sample		2012 Sample	
	CS	LD	CS	LD	CS	LD	CS	LD	CS	LD	CS	LD	CS	LD	CS	LD	CS	LD
<i>Tenure</i>																		
Owned Outright	46.5	47.0	43.2	45.5	43.9	47.8	44.9	47.2	42.2	44.2	40.9	42.0	38.8	40.2	35.7	36.3	34.7	36.0
Owned With Mortgage	35.3	38.1	35.0	35.2	34.1	34.2	33.2	33.2	35.2	34.2	33.1	33.4	34.5	34.6	34.6	35.1	34.9	36.4
Rent	18.1	14.9	21.8	19.3	22.0	18.0	21.9	19.6	22.7	21.7	26.1	24.6	26.7	25.2	29.8	28.6	30.4	27.6
<i>Sex of HoH</i>																		
Male	43.3	41.7	41.2	40.6	41.8	42.0	41.2	44.3	44.9	44.1	42.6	39.5	42.8	42.6	43.4	44.1	45.4	47.8
<i>Age HoH</i>																		
<30	10.6	8.1	10.6	7.7	11.2	7.7	10.8	8.5	10.5	8.1	10.2	7.3	8.0	7.4	9.2	8.6	8.8	7.1
<45	34.6	36.7	36.4	36.0	34.1	36.3	34.9	34.3	34.6	34.3	35.8	37.7	38.4	38.3	37.6	37.1	37.7	35.1
<65	42.8	42.0	40.7	42.5	42.4	42.8	42.5	43.5	42.9	43.6	41.5	40.7	40.8	40.3	40.3	40.3	40.1	42.9
65+	12.1	13.2	12.4	13.8	12.2	13.3	11.8	13.8	12.0	14.0	12.6	14.3	12.8	14.0	12.9	14.1	13.4	14.9
<i>Marital Status HoH</i>																		
Single	17.0	15.1	18.1	14.4	18.3	16.1	17.7	17.0	18.6	16.9	19.9	19.0	19.9	19.2	20.9	20.3	20.3	19.1
Married	68.9	70.1	65.6	68.4	65.4	67.6	65.0	65.7	64.6	66.5	65.3	67.2	65.2	66.6	65.4	65.7	65.8	65.5
Other	12.7	13.2	15.2	16.2	15.4	15.4	15.8	16.8	15.9	16.1	14.7	13.7	15.0	14.2	13.8	14.0	13.9	15.5
<i>Labour Force Status HoH</i>																		
Employed	54.9	53.6	56.0	54.7	57.2	55.6	58.2	57.8	58.4	53.9	52.1	48.0	49.7	48.8	50.5	51.2	53.2	51.2
Unemployed	3.8	3.8	3.1	3.1	3.0	3.5	3.2	3.3	4.4	4.4	8.1	8.7	9.5	9.9	10.7	11.5	10.7	11.5
Retired	8.8	9.4	8.4	8.9	8.1	8.7	8.2	9.9	8.2	9.2	9.0	10.3	9.9	11.4	9.7	10.2	10.9	11.8
Other	32.5	33.3	32.6	33.3	31.7	32.2	30.5	29.1	29.0	32.5	30.9	33.1	31.0	29.9	29.0	27.2	25.3	25.5
<i>Location</i>																		
Urban	62.2	59.7	62.0	58.0	62.5	58.0	63.1	57.4	62.7	56.7	62.2	56.2	60.8	59.0	61.6	57.2	60.6	57.2
Rural	37.8	40.3	38.1	42.0	37.5	42.1	37.0	42.6	37.4	43.3	37.8	43.8	39.2	41.0	38.4	42.8	39.4	42.8

Appendix Table B (cont'd)

	2004 Sample		2005 Sample		2006 Sample		2007 Sample		2008 Sample		2009 Sample		2010 Sample		2011 Sample		2012 Sample	
	CS	LD	CS	LD	CS	LD	CS	LD	CS	LD	CS	LD	CS	LD	CS	LD	CS	LD
<i>Number of Households Members</i>																		
1	7.5	7.2	7.6	8.1	7.7	7.7	7.6	7.9	7.8	8.3	8.0	8.7	8.3	9.2	8.0	8.3	8.1	8.6
2	19.1	18.6	19.5	19.6	19.6	20.2	20.0	20.7	21.1	21.6	21.8	22.4	22.3	23.0	21.9	21.9	22.5	23.7
3+	73.5	74.2	72.8	72.3	72.7	72.0	72.5	71.4	71.1	70.1	70.1	68.9	69.4	67.8	70.0	69.8	69.4	67.7
<i>Poverty (60% median)</i>																		
Individuals in Poverty	19.4	20.3	18.5	21.0	17.0	18.9	16.5	15.7	14.4	15.7	14.1	14.3	14.7	14.6	16.0	16.5	16.5	16.4
<i>Mean Household Disposable Income</i>																		
Overall (€000s)	18.8	18.8	19.8	19.3	21.2	20.4	23.6	23.3	24.4	23.6	23.3	22.7	22.1	22.0	21.4	20.9	20.9	20.7
Bottom Decile (€000s)	6.2	6.2	6.4	6.4	7.4	7.4	8.0	8.2	8.6	8.6	8.3	8.5	6.9	6.8	6.4	6.3	6.2	6.2
Top Decile (€000s)	46.6	46.9	50.6	53.6	54.9	54.5	58.4	60.3	59.6	61.3	54.1	54.6	54.8	55.6	51.4	50.9	50.0	50.4
Gini Coefficient	0.32	0.32	0.32	0.34	0.32	0.32	0.32	0.31	0.31	0.31	0.29	0.29	0.32	0.32	0.31	0.31	0.31	0.31

Note - CS: Cross Section Dataset. LD: 2-Year Longitudinal/Panel Dataset

**Appendix Table C: Mean Real Income of Income of Persons that Left and Persons that Entered Bottom Decile**

	Move Up (year t)		Move Down from Decile 2 or 3 (year t+1)		Move Down from Decile 4+ (year t+1)	
2004-05	7,005	[6560,7449]	7,792	[7406,8177]	7,122	[5772,8473]
2005-06	7,041	[6439,7642]	8,197	[7735,8659]	8,064	[7537,8591]
2006-07	8,115	[7797,8433]	9,185	[8586,9785]	8,468	[7580,9356]
2007-08	8,813	[8302,9323]	8,851	[8318,9383]	8,339	[6964,9715]
2008-09	8,498	[8024,8972]	8,534	[7811,9257]	9,148	[8269,10026]
2009-10	9,375	[8825,9925]	7,730	[6827,8634]	6,741	[4832,8650]
2010-11	8,343	[7826,8861]	6,749	[6050,7447]	6,435	[5341,7530]
2011-12	7,027	[6484,7570]	7,179	[6570,7788]	6,653	[6019,7287]
2012-13	6,435	[5935,6935]	7,290	[6727,7852]	7,108	[6326,7890]