Income Mobility and Economic Insecurity in Developed Countries during the Great Recession: Spain vs. the US

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Income mobility and economic insecurity in developed countries during the Great Recession: Spain vs. the US

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Abstract

Recent evidence on the impact of the crisis on developed countries shows that the changes in income inequality and poverty have been relatively small even in spite of the macroeconomic heterogeneity of the recession across different economies. However, when evaluating the main changes in individual welfare perceptions linked to the crisis it is not only the increase in inequality or poverty that matter, also changes in individually-perceived chances to move either upwards or downwards in the distribution are crucial. Indeed, downward income mobility may be used as a proxy of the individual and social perception of economic insecurity. In this paper our main aim is to analyze to what extent the recession has changed the level of income mobility (particularly downwards) in countries where job losses have been large and could have contributed to change the level of perceived economic insecurity (uncertainty). We will also aim to identify which are the main determinants of a downward fall in income in both countries and, in particular, we will be most interested in discovering if age has a significant role in predicting the probability of suffering an income loss (e.g. youth vs. mature and old-aged individuals).

Keywords: inequality, mobility, economic insecurity, income losses, recession.

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Authors acknowledge financial support from the Spanish *Ministerio de Economía y Competitividad* (Grant ECO2010-21668-C03-03/ECON). EQUALITAS (www.equalitas.es) is a group of researchers interested in the analysis of inequality and poverty in a wide sense, thus including theoretical discussions of relevant measurement issues, empirical studies on income distribution in a variety of countries, evaluation of social and labor market policies and the study of equity in the labor market.

Introduction

Changes in individual perceived chances to move either upwards or downwards in the distribution of incomes are most likely to be relevant in determining feelings of economic uncertainty. As Jarvis and Jenkins (1996, 1998), Jenkins (2000), Jenkins and Rigg (2001) and Rohde et al. (2010) have discussed, higher mobility implies a higher level of income uncertainty even if structural inequality is reduced. This feeling of uncertainty is expected to be particularly large during recessions if job losses are large and thus is likely to be connected to movements downwards in the distribution of wages and household disposable income. In fact, existing evidence on European countries suggests that people's sense of economic security is affected by individual-level attributes and by their recent experiences in the labor market i.e. job losses and perceptions of the national economy (Anderson, 2001). In terms of job losses, Jenkins *et al.* (2013) underline that, even if the response of employment to the fall in GDP has been generally smaller during the Great Recession than in previous crisis, in some countries such as Ireland, Spain, and the US they have turned out to be unusually large relative to the fall in output. Interestingly, all these three countries share a housing market bubble-bust at the beginning of the recession.

In this setting, individuals living in countries with similar income inequality levels may be experiencing a different degree of wellbeing depending on the frequency and size of downward income mobility determined by job losses and salary reductions during the recession. In this line of argument some recent papers focused on the measurement of Social Welfare such as Jäntti et al. (2013) have argued in favor of incorporating income-reference dependence and loss aversion in utility functions to best measure wellbeing (following the ideas contained in prospect theory, Kahneman and Tversky, 1979).

The purpose of this paper is to analyse to what extent the current recession has had an effect on downward income mobility (most likely to be increasing individual feelings of uncertainty) in countries where job losses have been outstandingly large. We will measure both absolute and relative mobility between three pairs of years from 2004 to 2010 and to what extent this mobility is of a downward nature. In order to understand the role of mobility in shaping income inequality trends we first look at how mobility has contributed to inequality trends in both countries making use of Growth Incidence Curves (GIC) introduced by Ravallion and Chen (2003), Income Mobility profiles proposed by Van Kerm (2009) and the decomposition of the observed changes in inequality into distribution sensitive income growth and mobility (individual re-ranking) as suggested by Jenkins and Van Kerm (2006). However, in order to analyse individual income losses we focus on Fields and Ok approach to the measurement of income mobility and propose the use of a simple index, analogous to that of the measurement of poverty, in order to measure the different dimensions of downward mobility or income losses. Using this indicator we measure the dimension and distribution of income losses in the US and Spain.

Finally, given that the impact of the crisis in reducing individual's labor market chances is outstandingly larger for some demographic groups than for others (e.g. youth versus medium-aged individuals or immigrants versus natives) and is also different across countries, these feelings of uncertainty may have different effects on individual's wellbeing and on the country's macroeconomic performance in the medium and long run (e.g. propensity to consume, consumption patterns or attitudes towards investment, etc.). Therefore, we also aim to identify the main characteristics of individuals experiencing a downward income mobility episode by estimating the determinants of the probability of suffering an income loss (e.g. youth or population at childbearing age vs. mature and old-aged individuals). For this purpose, we estimate a nested multinomial two-level model as in Cantó et al. (2012) so that we can check if estimating a simpler model is adequate or we need to estimate the probability of an income change and the sign of the change (upwards or downwards) in a nested way.

The remainder of this paper is organized as follows. Section 2 is devoted to the discussion of the theoretical background behind the idea that there is a positive correlation between experiencing an income loss and an increase in the individual perception of current and future vulnerability and uncertainty. Section 3 presents a general overview of income inequality trends, job losses and income mobility in the US and Spain. In this section we also describe the data sources and the main difficulties of comparing these longitudinal data and we detail the main methodological choices we have made. Section 4 includes our main results and the last section concludes.

2. Income losses and individual vulnerability or uncertainty perceptions

Since Stiglitz et al. (2009) reported on measuring economic performance and social progress it is always more clear that measuring economic insecurity is a key issue to understand individual wellbeing. Most recently, Boarini and Osberg (2014) in the introduction of a special issue on economic insecurity and the challenges to measure it, underline that approaching the idea of uncertainty about economic losses and the extent to which this harms wellbeing is a main aim for research, mainly when economic shocks are severe, have a long duration and include relevant losses for a wide range of individuals in society.

This paper aims to contribute to this strand of literature by focusing on the dimension and characterization of downward income mobility during the Great Recession in countries where job losses and wage cuts have been large in proportion to the actual fall in GDP. Our paper also aims to discuss the adequacy of the different approaches to the measurement of income insecurity in the light of prospect theory so that loss aversion is considered. We hope to contribute by providing a discussion and an empirical illustration for the development of a promising research strand that uses behavioral economics advances in considering reference-dependence and loss aversion and considers the use of panel data information for evaluating individual static wellbeing (Jäntti et al., 2013).

3. Recent income distribution trends and the dimension of job losses during the crisis

The level of inequality of disposable income in the United States has been traditionally high in comparison with that observed in many other developed countries. In recent years the US inequality has been increasing and in 2012 it is situated within fourth highest of the OECD, only below that of Chile, Mexico and Turkey (OCDE, 2014). The larger level of income inequality in the US versus the OECD average is a result of a process that has been taking place since the early 1980s. Indeed, between the mid-1980s and now, the US Gini coefficient went up by almost five points (or 15%), growing from 0.34 to just below 0.39. Meanwhile, OECD countries, on average, saw inequality increase from 0.29 to 0.32 and only in Sweden (that was starting from a very low level), Israel and New Zealand inequality grew slightly faster than in the US.

One of the main characteristics of the US income distribution is the large distance between the bottom and the top: in 2012, for instance, the S90/S10 ratio shows that the average income of the richest 10% is 16 times that of the poorest 10%, while the OECD average is 9.6 and only Mexico and Chile have a higher dispersion of this ratio than the US. Moreover, in the last decades the share of top-income recipients in total gross income in the US has grown significantly, in fact, more than anywhere else in the OECD: the share of the richest 1 per cent in all pre-tax income more than doubled since 1980, reaching almost 20% in 2012.

As depicted in Figure 1, since 2004 inequality in the US is higher than in Spain and Ireland but the Great Recession seems to have had little effect on it until 2010. Household market income in the US grew in the 2006-2008 period and only fell, in real terms, a 5% between 2008 and 2010. This fall is slightly larger than that of the OECD average (4.2%), but much lower than the

dramatic falls experienced by some European countries such as Spain or Ireland where between 2007 and 2011 household disposable income fell between 3% and 5% respectively. In contrast with the US, Spain was the OECD country where gross income inequality had the greatest increase since the outbreak of the crisis: the Gini coefficient of market income increased eight points, compared to the five points increase in Ireland and Greece or three points in Estonia. In terms of disposable income Spain was also the country with the largest increase: four percentage points. This has situated Spain as the European country in the OECD with the highest level of inequality in 2011: the Gini has reached 0.344, significantly over the OECD mean (0.31 that same year). This negative evolution of inequality in Spain has been the result of a large drop in the incomes of the poorest that have made the S90/S10 ratio of average income of the richest 10% be 14 times as large as that of the poorest 10%, positioning Spanish inequality clearly above that of any other Mediterranean country such as, Portugal, Greece or Italy.

In fact, as Figure 1 clearly shows, from 2007 onwards the income inequality trends in Spain and Ireland diverge. Even if in Ireland household disposable income fell 2 percentage points more than in Spain in the three years following the beginning of the crisis, the distributional impact on poorer households and thus on inequality was substantially different in the two countries. The evolution of the S90/S10 ratio shows that the average income of the richest 10% grows strongly in Spain and in 2011 is almost 14 times that of the poorer 10% while in Ireland this ratio falls between 2010 and 2011 and is 7.7.

The evidence on US income mobility is large even if empirical conclusions are somewhat mixed. A variety of papers with different methodologies, income definitions and time intervals appear to conclude that the level of income mobility in the US in recent times is slightly below that of other developed countries, contrary to what was obtained in earlier evidence for the 1980s and 1990s (Burkhauser and Couch, 2009; Jäntti and Jenkins, 2013). This could be a result of no relevant changes in mobility in the US for the period between 1960s, 1970s and 1980s (Hungerford, 1993; and Gittleman and Joyce, 1999) and a fall in income mobility in the 1990s (Hungerford, 2008, 2011) due to a reduction of individual re-ranking within the distribution. In the same vein, Bradbury (2011) also finds that there was some decrease in income mobility in the US related to the fall in individual re-ranking during the 1969–2006 period, especially for the 1980s. Thus, most relative mobility indexes are significantly smaller in the decade 1995–2005 than in the 1977–1987 one. Therefore, one could say that interpreting mobility as a change in the relative position of individuals in the income scale, disposable incomes in the US now appear to be more stable than they were in previous decades.

However, using measures that conceive mobility as the distance between incomes at two moments in time which is more associated with income insecurity (Fields and Ok, 1999), even if relative mobility was quite stable and re-ranking was diminishing, the literature seems to point out that there is a significant increase in the variance of disposable US household incomes during the periods 1969–1976 y 1979–1986. Therefore, one could say that interpreting income as measure of welfare instability or insecurity (uncertainty), disposable incomes in the US appear to be less stable now than they were in previous decades.[1]

A very recent comparative analysis of inequality and mobility in 27 EU countries by Van Kerm and Pi Alperin (2013) concludes that, before the crisis, mobility had a limited inequality-reducing impact in the short-run in most European countries. Regarding Spain one of the first studies is Cantó (2000) and her results show that relative income mobility in that country is relatively high in comparison with other European and, in general, developed countries. Mobility in Spain was actually increasing during the second part of the 1980s and only the 1992-93 crises made it decrease slightly for a short period of time. Ayala and Sastre (2005, 2008), with data for the 1990s and using a large number of mobility indices conclude that mobility fell in Spain at the beginning of the decade and increased back again in the last years of

[1] Also, interpreting income as a way of equalizing incomes in time more than as a change in the relative position of individuals in the income scale, recent evidence in Bayaz-Ozturk et al. (2013) shows that mobility in the US was largely stable until the mid-80s, then grew until the end of the last century and subsequently fell up until 2006.

that period. In contrast with the US, household income variance in Spain fell towards the end of the century and the main explanatory component of mobility continues to be re-ranking, i.e. change in the relative position of individuals. The impact of the recession on income mobility in Spain seems to be, in the words of Bárcena and Moro (2013), an increase in household income volatility.

Jenkins *et al.* (2013) underline that, even if the response of employment to the fall in GDP has been generally smaller during the Great Recession than in previous crisis, in some countries such as the US, and mostly in Ireland and Spain, they have turned out to be unusually large relative to the fall in output. Interestingly, all these three countries share a housing market bubble-bust at the beginning of the recession. In Figure 2 we depict the evolution of the harmonized unemployment rate of the US, Spain, Ireland and in the average OECD country. It becomes clear that, particularly in the case of Spain and Ireland, job losses since 2007 have been outstandingly large and have multiplied the unemployment rate by a factor of 3 in both of these countries. In the case of the US job losses have been larger than in the average OECD country but, during the worst period of the crisis (2007-2009), unemployment rates where multiplied by a factor of 2 and not 3 as in Ireland or Spain.

Strong employment losses are expected to have a significant influence on household equivalent income instability. While income changes may be typically seen as positive it is straightforward that income fluctuations that imply an income loss (often related to some household member's job loss or wage drop) will tend to lower welfare if one unit of income loss has a higher cost of wellbeing than one unit of income gain. Further, income instability itself may have a negative impact on individual wellbeing in a recession context where people's welfare is negatively affected by economic insecurity modelled by their recent experiences in the labor market and their perception of the national economy.

3. Describing Inequality and Mobility trends during the Great Recession in the US and Spain

3.1 Data sources and methodological choices

Our data source for the US is the Panel Study of Income Dynamics even if we use the CNEF harmonized data for the period between 2004 and 2008. The CNEF is multinational longitudinal micro-database distributed by Cornell University that harmonizes the information of a variety of panels so that we can have post-tax post transfer disposable income data for the US that is largely comparable to other country's income information. We choose to do this at the cost of not having information on the period 2008-2010 for the US (the CNEF has not made it available yet). The CNEF data for the US is based on the Panel Study of Income Dynamics (PSID), a longitudinal panel survey of American families, conducted by the Survey Research Centre at the University of Michigan since 1968. The information of the first respondent and their descendants has been collected continuously, including data covering employment, income, wealth, expenditures, health, marriage, childbearing, child development, philanthropy, education, and numerous other topics. Unfortunately, Spain is not included in the CNEF database so we must nevertheless a different data source constructed from the panel structure of the Survey of Income and Living Conditions (EU-SILC Longitudinal Survey) for the period between 2004 and 2010. This Survey is a four-year rotating panel that is running since 2004 and provides information on labor market and living conditions in most of the 27 European Union countries.

Both the PSID (and thus the CNEF) and the EU-SILC surveys collect information on individual and household incomes during the calendar year prior the interview at which demographic and socioeconomic information is obtained. Since 1997 PSID data are only available in a biennial pattern and at the time this analysis is being undertaken the latest surveys available for the US

are: 2003, 2009, 2007 and 2005 (i.e. incomes of 2008, 2006 and 2004 calendar years). Therefore, our analysis will focus on survey years 2004 to 2008.

Using CNEF data allows us to make little effort in harmonizing our main variable of analysis: equivalent household disposable income. In general, household disposable income is the sum of the components of gross personal income for all household members minus taxes and social security contributions (employee and employer). For the US we measure disposable income as the "Household Post-Government Income" which is a post-tax, post-transfer income measure and is the sum of all household members' labor and self-employment earnings, flows of income from financial assets and pensions, private and public transfers, the imputed rental value of owner-occupied housing and any other income sources minus taxes and employee social security contributions.[2] For Spain we also use a post-tax, post-transfer income measure. Household income in this case includes cash or near-cash employee income, non-cash wage income, profits or losses from self-employment (including intellectual property rights), interests, dividends and capital gains from investments in companies, imputed rent (minus mortgage interest payments and property tax), value of goods produced for own consumption, unemployment benefits, retirement pensions, survivors pensions, disability pensions, regular monetary transfers between households and income from educational grants.

Finally, since the same level of household income may lead to different levels of living standards depending on household size and composition, the way we choose to correct these differences is standard. We use an equivalent scale (OECD - modified equivalence which assigns a value of 1 to the first household member, of 0.5 to each additional adult (15 or over) and of 0.3 to each child aged 14 or younger) so that individual equivalent disposable income is total household income divided by the household corresponding factor.[3] In addition, as it is usual in dynamic analysis the income distribution tails are trimmed for robustness, 1 percent of the observations at the tails are trimmed and data are then a balanced sample of those annual distributions. This implies losing a approximately a 5 percent of the Spanish sample and a 10 percent of the US one (see Appendix). Further, all absolute values of incomes for the US are expressed in constant 2002 dollars using the CPI-U of the Bureau of Labor Statistics and for Spain they are expressed in 2011 euros using the Consumer Price Index (*Instituto Nacional de Estadística*, INE) making income of different years directly comparable.

3.2 Explaining changes in inequality trends in the US and Spain

In order to set our results on mobility in context, in this section we describe the income distribution trends in both countries by comparing the impact of growth on inequality trends making use of Growth Incidence Curves (GIC)[4] and decompose inequality changes into income

[2] Household income was computed as the sum for all household members earnings (wages, salaries, and self-employment income), income from interests and dividends, rents, royalties, estate, and trust income, retirement pensions, veterans' payments, survivor pensions, disability pensions and annuities, realized capital gains (losses), educational assistance, child Support, alimony, regular contributions from persons not living in the household, money income not elsewhere classified, unemployment compensation, workers' compensation, educational assistance, imputed return to home equity on owner-occupied housing. The taxes deducted include Federal income taxes after refundable credits except EIC, State income taxes after all refundable credits, Payroll taxes (FICA and other mandatory deductions).

[3] An important element to consider here is that the definition of household in both surveys is not identical. This may affect some socioeconomic indicators, the EU-SILC survey defines "household "as the person or group of persons who live together in the same house and consume or share food and other goods under the same budget. In contrast, the definition of "household" in the PSID is similar to that of the CPS, it includes persons related by blood, marriage or adoption, thus including those who have parenting relationship, co-singles (the opposite sex) and other related persons (can be the same sex). In turn, it does not consider as "households" individuals who are unmarried partners or foster children.

[4] The GIC curve shows the rate of income growth of the pth quantile of the distribution. The distributional impact of growth is thus represented through the inverse of the cumulative density functions.

growth and re-ranking drawing on the methodology proposed by Jenkins and Van Kerm (2006). Subsequently, in order to provide a first measure the dimension and relevance of downward income mobility, we calculate some traditional mobility indexes and provide some simple calculations of the relative dimension of downward mobility in the recession. We also construct Income Mobility profiles, a particularly useful graphical device proposed by Van Kerm (2009), that allow us to measure the role of mobility at different points of the income distribution[5].

Our results (Table 1) show that, indeed, longitudinal data also indicate that in the first years of the crisis, income inequality in Spain was increasing (in fact, in recent times it increased more than anywhere else in the European Union, OECD 2014) while in the US it had a slightly falling trend. Growth Incidence Curves in Figure 3 and 4 suggest that the increase in income inequality in Spain is related to a large drop in the incomes of those at the bottom of the distribution while in the US the small decrease in inequality is, on the contrary, linked to a relatively larger improvement in the incomes of the poor (pro-poor growth). Thus, in the case of Spain increasing inequality occurs when mean incomes fall and those of the poorest fall significantly more. Spanish GIC for the period between 2008 and 2010 has also a clearly positive slope indicating that the lowest percentiles of the distribution experienced greater income drops than those in the middle or at the top (except those at the very bottom). In contrast, in the US, at the very beginning of the recession, income growth was positive and was strongly pro-poor, so the US GIC curve had a pronounced negative slope.

In order to explain the sources of the observed changes in the distribution it is useful to decompose these changes in inequality into income growth and re-ranking (Tables 2 and 3). As Jenkins and Van Kerm (2006) underline "Greater equality in final year incomes is guaranteed only if the pattern of income growth does not lead to re-ranking of individuals between the two years that is sufficiently large to offset the progressive (regressive) income growth". Thus, decomposing inequality changes one can start to explain how mobility contributes to different inequality trends which, indeed, may start to clarify who in the income rank has actually experienced more downward income movements than upward ones. In the case of negative growth income growth is pro-poor if the income losses are concentrated more among richer individuals than among poorer ones. As the GIC curves showed this is not the case in Spain and income losses were more concentrated among the poor in the period 2006-2008 and in the period 2008-2010. The decomposition clarifies that re-ranking could not offset the income growth regressivity and consequently inequality increased. In the case of the US income growth was strongly pro-poor and the equalizing effect of progressive income growth was not offset by the disequalizing effect of re-ranking so inequality decreased.

To complement these results we also construct Income Mobility profiles that summarize patterns of income growth while also tracking the fortunes of the same individuals in a longitudinal perspective.[6] As Jenkins and Van Kerm (2011) indicate these profiles "are 'non-anonymous' (Grimm, 2007, Bourguignon, 2011) versions of growth incidence curves". Just like the existing evidence for the UK, mobility profiles in the US and Spain are negatively-sloped, that is, from a longitudinal perspective, individual income growth has been progressive, also during the crisis: thus the lower the percentile in the first year, the larger expected income

[5] As Jenkins and Van Kerm (2011) point out these profiles "are 'non-anonymous' (Grimm, 2007, Bourguignon, 2011) versions of growth incidence curves".

[6] We have calculated Income Mobility profiles by calculating the mean income growth for individuals in a given percentile. In the x-axis we rank individuals by their position at the first period and on the y-axis we plot mean income growth for their first period percentile. This is intuitively similar to what Van Kerm (2006) proposes as a non-anonymous measure of income mobility. The mobility profile plots the expected individual mobility conditionally on a person's position in the base period distribution. In other words, separate mobility levels are estimated for each position in the initial income distribution, and the resulting mobility profile is plotted to obtain an evocative picture of the repartition of mobility levels across different parts of the distribution. In our case we replace de quartile function, for a inter-quantile mean of log growth function.

growth is.[7] However, one can see that, in general, slopes are steeper for the US than for Spain, so income growth is more progressive there. Moreover, slopes tend to decrease in Spain as the recession evolves while the opposite seems to be the case in the US.

3.3 Income Mobility trends and the dimension of downward mobility

The literature on intra-distributional mobility has followed various strands of analysis. The first one is strongly related to the analysis of income instability and persistence and is linked to Friedman's permanent income hypothesis. Studies on earnings dynamics aim to determine the link between current and past individual earnings while leaving aside a more comprehensive analysis of household income dynamics. Surely moving into household income dynamics raises large difficulties in order to determine the origins of income variability. However, we believe that if the aim of a particular study is to determine to what extent individuals in a society are capable of improving their economic situation in time (or, similarly, how some of them suffer from a larger deterioration of their economic conditions) the focus on household income dynamics is crucial.

Within the literature that has aimed to analyze household income dynamics by proposing mobility measures there is a further division into two main streams. The first one focuses on the idea that the individual's relative position in the income distribution is a strong determinant of individual well-being and is based on the initial statistical work by Prais (1955) and Bibby (1975). It proposes a number of mobility measures stemming from transition matrices so that the notion of mobility considers the role of individual re-rankings within the distribution even if it is strongly linked to a natural interpretation of mobility related to the degree of dependence of the final income to the initial one. The main criticism to this first approach is that in measuring mobility they do not make full use of the information at the individual level and, in the case of the indices based on transition matrices, the role of income growth is ignored given that they only measure re-ranking.[8] In order to make use of the full information on incomes in time, Fields and Ok (1996, 1999a, 1999b) introduced a class of mobility measures that is particularly adequate for the measurement of income instability given that it considers individual income changes and averages them across time.

A third approach to measuring mobility is related to both of the previous strands. It is linked to a natural interpretation of mobility as the degree of dependence of the final income to the initial one but, at the same time, uses more information about individual incomes than transition matrices do. However, as Jäntti and Jenkins (2013) underline this last approach measures mobility related to income growth and to re-ranking even if, it may appear that it focusses on the second one more than on the first one. This last approach uses basic indicators of correlation such as the correlation coefficient, Spearman rank or the regression coefficient of log final income to log initial income (most often used in measuring intergenerational transmission of advantage).

Let us consider a society consisting of N individuals where the vector of incomes at moment t is $X = (x_1, x_2, x_3, \dots, x_N)$ and the vector of incomes some time later at t+1 (two years later in our empirical analysis) is $Y = (y_1, y_2, y_3, \dots, y_N)$. Any measure of income mobility in this society will aim to evaluate the main features of the changes in incomes in these two moments in time.

Income mobility measures of positional change such as transition matrices (both absolute and relative) conceive mobility as changes in the relative position of individuals in the income scale over time. The key here is not so much the extent of income changes but if the movement

[7] Note here that, as the authors explain, the negative slope of the Income Mobility Profiles in related to the "regression to the mean" so that the main discussion must be the comparison of the slopes of the curves more than the fact that they are negatively sloped.

[8] Moreover, if the dimension of categories is relative to each distribution and defined at each moment in time, transition matrices do not allow for the measurement of directional mobility. That is, by definition in a decile transition matrix the same number of individuals move upward and downward.

allows one to occupy a different position independently of the changes in the shape of each period's marginal distributions (e.g. changes in average income or changes in the concentration of individuals at different points of initial and final distributions). The information provided by transition matrices may be synthesized in various indicators essentially using the values of the diagonal. Shorrocks (1978) defines a synthetic index such as:

$$M_s(A) = \frac{k - trace(A)}{k - 1}$$

where A is a transition matrix with *k* income classes. If we have a notion of mobility as "independence of the origin", this index's values range between 0 (minimum mobility) and 1 (maximum mobility). Thus mobility is at its maximum when the probability to move to any class is the same therefore the value of the matrix trace is one. In the opposite case, all individuals remain in the same class so that the trace is equal to the number of classes and the index value is zero. A disadvantage of this indicator is that it is insensitive to any moves that take place aside from diagonals. A complementary index that aims to consider movements out of the diagonal and incorporates some more information to the analysis of mobility was proposed by Bartholomew (1973) and measures the "average jump". This index is equal to the number of income class boundaries crossed by an individual (whether upwards or downwards), averaged over all of them:

$$M_B = \sum_{i}^{k} \sum_{j}^{k} p_{i.}\, p_{ij} |i - j|$$

where p_{ij} is the value of the element in row *i* and column *j* and $p_{i.}$ is the marginal distribution of income class *i* in the first year of observation (if the first distribution is conformed in groups of an identical dimension then $p_{i.} = \frac{1}{k}$). This is multiplied by the distance between the two classes. This index weights transitions by the number of classes the individual traverses in the income movement and then calculates an average. The index is the population average of absolute changes in fractional ranks (i.e. a fractional rank is the individual position in the population normalized from 0 to 1 instead of using the population rank). In the complete immobility case the index takes the value zero and the higher its value, the higher mobility (even if it does not have an upper limit).

Measuring mobility in an intuitive and simple form as the association between origins and destinations has long been linked with the idea of equality of opportunity and one the most used indicators is that of the estimation of the beta coefficient (β) in a linear regression such as the following:

$$\ln y_i = \alpha + \boldsymbol{\beta} \ln x_i + \varepsilon_i$$

This modelling was first proposed by Galton in 1889 in order to study the inheritance of genetic characteristics and is obtained from a regression between the initial and final natural logarithms of incomes. If the slope of the previous regression coefficient is less than one we have the Galtonian regression towards the mean (i.e. on average, the better paid increase their income proportionally less quickly than the poorer paid, just as a totally spurious effect). In this setting we rule out the serial correlation in income and we also assume that transitory factors as general fluctuations either specific to individuals or a general fluctuation for everyone and thus not due to fluctuations of income that affect their particular percentile (i.e. no differences in the distribution of growth or contraction by percentiles). Also, population homogeneity of mobility is assumed as well as the independence of income at time *t* on income before time *t-1* (first order Markov assumption).

The same idea of relation between income in both periods is reflected by Hart index (M_{Hart}), which is formulated as the complement of the correlation between income (measured in natural logarithms) of different periods. In the formulation reported by Shorrocks (1993) this index is expressed as:

$$M_{Hart} = 1 - \rho(\ln x, \ln y)$$

where ρ is the coefficient of correlation. Jäntti and Jenkins (2013) underline that ρ is a more suitable index than β as an (im)mobility index when undertaking cross-national comparisons given that ρ controls for differences in marginal distributions given that $\rho = \beta \frac{\sigma_1}{\sigma_2}$, and σ_1 is the standard deviation of log income in the first period and σ_2 is that of the second one. However, inequality is not the only distributional feature of a given distribution. Jäntti and Jenkins (2013) note that a similar index to ρ is the Spearman rank coefficient that fully controls for marginal distributions and thus has the advantage of focussing only on positional change, which is clearly and advantage when analysing intergenerational mobility, for instance.[9]

We present all these income mobility indicators for Spain and the US in Table 4 (see also detailed transition matrices in the Appendix, Table A3). Regarding the dimension of income mobility our first results suggest that mobility as positional change is larger in Spain than in the US both before the crisis and during the crisis (Shorrocks M index of mobility). Further, the correlation of incomes between two moments in time is also sensibly bigger in the US than it is Spain, no matter if we use a correlation coefficient or a Spearman rank. Comparing our results with previous evidence for Spain (Cantó, 2000; Ayala and Sastre, 2005, 2008; Bárcena and Moro-Egido, 2013) it appears that in this country the recession has either maintained income mobility or pushed it slightly downwards: the probability that individuals change decile group in 2004-2006 is lower than later on. A similar pattern is found for the US. Further, if decile changes occur the average jump is shorter in both countries (Bartholomew's index).

Interestingly, if one conceives mobility as the association between origins and destinations, and uses the Hart index to measure mobility, income instability increases during the crisis in Spain and falls in the US. However, using the Spearman rank coefficient, that fully controls for marginal distributions and focuses only on positional change; we confirm that the probability of a positional change is smaller in both countries in comparison with what it was in the pre-crisis period. The beta coefficient becomes smaller in Spain because the correlation coefficient falls more than it is compensated by the increase in the standard deviation of incomes in the second period due to the increase of inequality. This is not the case in the US where beta grows as the correlation coefficient grows.

Therefore, if income instability is positively related to insecurity and uncertainty and we measure this instability by the lack of dependence between incomes in two moments in time by, we could conclude that during the crisis insecurity of incomes is increasing in Spain and falling in the US. Thus, even if in both countries positional changes in the distribution are less likely than they were before the recession, insecurity in Spain could have increased while this would not be the case in the US.[10]

4. Income instability, uncertainty and income losses in the US and Spain

In this setting, it becomes clear that given that we are more interested in an absolute interpretation of mobility than in a relative one, we should turn to a methodology that makes the most of the information on incomes in time. For this purpose we follow Fields and Ok (1996, 1999) and we interpret mobility as the distance of individual incomes in a given time interval.

[9] Indeed, D'Agostino and Dardanoni (2009) provide an axiomatic characterization of the Spearman rank correlation as a measure of exchange mobility.

[10] In this paper we identify individuals as suffering from economic insecurity if they have experienced from a downward income movement. Obviously, we will only be capturing a part of the total feeling of insecurity given that this perception has a "realized" and an "unrealized" component. We are only considering the first one so that even if individuals may feel insecure due to perceptions of the general economy we will only consider those who effectively suffered from an income drop. The fact that changes in income mobility patterns in the recession may be different for individuals situated at different points of the income distribution is for us particularly relevant given that it is most likely that job and wage losses will be strongly related to movements at the lowest end of the distribution compressing the long run average incomes of the poorest population.

This distance reflects individual income instability in a way that can be directly associated with income fluctuation, unpredictability and economic insecurity. The index these authors propose is the following:

$$M_{FO} = \frac{1}{N}\sum_{i=1}^{n}|\ln y_i - \ln x_i|$$

Even if it fulfils a set of adequate axiomatic properties[11], this indicator does not distinguish between upward and downward income changes, given that all of them contribute to increase mobility. Also, it weights all individuals the same regardless either of their base-year income or how much income growth they actually experience (a basic issue to be considered in the idea of prospect theory). In fact, as Van Kerm and Pi Alperin (2013) underline, these measures consider a change from 100 to 150 as identical to a change from 1000 to 1500.

In recent work, Demuynck and Van der Gaer (2012) have provided some further measures building on Fields and Ok (1999) that incorporate aversion for inequality of growth rates so that they allow for different weights depending on the dimension of the change in individual income between the two moments in time. This generally implies assuming some aversion to the inequality of growth rates but it is not straightforward that this is a better option than allowing for some weights related to the individual distributional rank in the first period as Jenkins and Van Kerm (2011) suggest (pro-poor growth) in their class of measures. However, still few advances have been made in the literature (apart from the recent paper of Jäntti et al, 2013) to provide empirical researchers with measures that incorporate income-reference dependence and loss aversion into mobility measures. These advances could provide in the near future a reasonable framework in order to measure the impact of downward income mobility at different points of the income distribution during a recession.

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[11] One attractive property of this index is that it allows for a consistent additive decomposition into the two components which can be interpreted as total social utility due to growth and total social utility due to transfers. The first component is an indicator of individual income growth that for a growing economy (i.e. $\sum y_i > \sum x_i$) is defined as G= $\frac{1}{N}\sum_{i=1}^{n}\ln y_i - \ln x_i$ while in a shrinking economy (i.e. $\sum y_i < \sum x_i$) it would be G= $\frac{1}{N}\sum_{i=1}^{n}\ln x_i - \ln y_i$. The second component is the dimension of mobility in terms on changes of income caused by transfers between individuals and can be defined as twice the amount lost by the losers (and, at the same time, won by the winners; because income lost by a loser is always gained by a winner) ($L = i: x_i > y_i$):

$$T = \frac{2}{N}\sum_{\mathrm{i}\in\mathrm{L}}\ln x_i - \ln y_i$$

The aggregation of both components is overall mobility:

$$\frac{1}{N}\sum_{i=1}^{n}|\ln y_i - \ln x_i| = \frac{1}{N}\sum_{i=1}^{n}\ln y_i - \ln x_i + \frac{2}{N}\sum_{\mathrm{i}\in\mathrm{L}}\ln x_i - \ln y_i$$
$$M_{FO}(x,y) \quad = \quad G(x,y) \quad + \quad T(x,y)$$

And in a shrinking economy:

$$\frac{1}{N}\sum_{i=1}^{n}|\ln y_i - \ln x_i| = \frac{1}{N}\sum_{i=1}^{n}\ln x_i - \ln y_i + \frac{2}{N}\sum_{\mathrm{i}\notin\mathrm{L}}\ln y_i - \ln x_i$$
$$M_{FO}(x,y) \quad = \quad G(x,y) \quad + \quad T(x,y)$$

The first term represents movements of income caused by individual income growth (structural mobility) and second term reflects fluctuations in the incomes due to the increases or declines in individuals income, without any change in total income (transfer mobility).

4.1 How much downward mobility is there?

Let us now measure income mobility using Fields and Ok's mobility index (1996, 1999). Results appear in Table 5. We find a similar level of absolute mobility in both countries so that the distance of individual incomes is similar, meaning that, even if positional mobility is consistently larger in Spain, total absolute income changes along the whole period appear to be quite similar in both countries. Also, in both countries, transfers from one person to another are the main explanatory component of income instability (ninety percent) in contrast with the more limited role of economic growth or contraction.

In any case, we are interested in measuring the dimension of "downward income mobility" and not mobility in general. A methodological framework that may be useful here in order to focus on income losses is to quantify the lack of wellbeing that suffering from a fall in household equivalent income may imply for an individual. Following Sen (1976)'s terminology on poverty measurement a we may quantify downward income mobility in a similar path to the Foster-Greeer-Thorbecke (FGT) family of indices in measuring poverty over a cross-section of individuals (Foster et al., 1984) which was recently extended to a panel (Gradín et al., 2012) and to an aggregate measure of unemployment deprivation (Gradín et al., 2014). This measure would take into account the incidence of income losses, their intensity, and the inequality of income losses across individuals in the population.

In a first step we have constructed a simple incidence indicator (see Tables 6 and 7) where we only consider the incidence of downward and upward moves in the distribution while ruling out spurious income instability (i.e. income changes smaller than a 5 or 10 percent of the initial individual equivalent income). Results indicate that in both countries between 30 and 40 percent of the population suffered from an equivalent income change that is larger than 10 percentage points. In Spain, the largest incidence of income losses occurred in the 2008-2010 period (41.2 percent) while, interestingly, during the first years of the recession the number of downward moves were similar to a couple of years earlier. In the US, the largest incidence of income losses occurred before the crisis (44.9 percent).

However, incidence is not the only dimension of income losses, the intensity of the income loss (how large is the change in income) and the inequality of income losses within those individuals that have experienced downward mobility is also relevant. Adding a longitudinal dimension to the static view of individual wellbeing at any particular moment can be undertaken following a similar strategy to that of Gradín et al. (2012).

Consider a society consisting of *N* individuals observed two periods of time represented by a $N \times 2$ matrix *Y* which elements are per-period individual equivalent income (or consumption). For each individual *i* we can denote the raw vector $y_i = (y_{it-1}, y_{it})$ representing her non-negative income profile in time. Matrix *Y* may be written as:

$$Y = \begin{bmatrix} y_{it-1} & y_{it} \\ \vdots & \vdots \\ y_{jt-1} & y_{jt} \end{bmatrix}$$

An individual's *i* mobility or insecurity experience in period *t* is a positive number if and only if her income drops more than a corresponding threshold τ.[12] Let g_{it} be the value of a normalized income gap for individual *i*, which elements are given by:

$$g_{it} = \begin{cases} (ln\,(y_{it-1}) - \ln(y_{it})) & if \quad y_{it} < y_{it-1}\ and\ i\ \in \Theta_i \\ 0 & otherwise \end{cases}$$

Then g_{it} quantifies the relative income drop for each individual between two moments in time; being Θ_i is the set of downward mobile individuals whose income fell more than a particular

[12] This threshold may be changed ad hoc, as it is common in the measurement of absolute poverty.

threshold τ. Thus $0 < g_{it} < 1$ and g_{it} maps each income profile y_i into $\Re_+$ (where $\Re_+$ is the nonnegative real number set) for a given threshold τ. Let $g = (g_1, g_2..., g_N)$ denote the vector of individual downward mobility indicators for a society, and $\tilde{g} = (\tilde{g}_1, \tilde{g}_2..., \tilde{g}_N)$ the same vector ordered so that $(\tilde{g}_1 \geq \tilde{g}_2 \geq ... \geq \tilde{g}_N)$, and being $q(g)$ the number of downward mobile individuals ($g_i > 0$).

In this setting, we can summarize the extent of downward mobility for whole population by constructing an aggregate measure *D*, which is consistent with the way that poverty is usually measured in a cross-section of individuals:

$$D(Y;\pi) = \frac{1}{N}\sum_{i=1}^{N} g_{it}^{\gamma}$$

An aggregate downward mobility or insecurity index is a function $D(Y;\pi)$ which, given a corresponding threshold τ, it maps each income matrix *Y* into R_+. The value of $D(Y;\pi)$ represents the aggregate downward mobility level of a particular society.

Our aggregate measure *D* is also normalized to lie between 0 and 1, taking the lowest value when nobody in the population suffers from an income loss. Further, it fulfills all the adequate axioms as far as $\gamma > 1$ .Moreover, the *D* index also satisfies the additive decomposability by subpopulations property, which is of particular interest for empirical analysis. Let $D = (D^1, D^2,..., D^K)'$ an exhaustive partition of the population into *K* mutually exclusive demographic groups, with $\alpha = (\alpha^1, \alpha^2,..., \alpha^K)'$ their respective population shares, then:

$$D(Y;\pi) = \sum_{k=1}^{K} D(Y^k;\pi)\alpha^k$$

Finally, as Gradín et al. (2012) note in an intertemporal poverty framework, our aggregate indicator *D* is consistent with a partial ordering that comes from dominance criteria based on modified TIP (*Three I's of Poverty*) curves defined over the vector of ordered individual downward mobility indicators for a society, $\tilde{g} = (\tilde{g}_1, \tilde{g}_2..., \tilde{g}_N)$, instead of over that of ordered individual poverty gaps as in Jenkins and Lambert (1997). Similar to conventional TIP curves, this curve shows i) the *incidence* of income losses (the proportion of population that suffers an income loss), ii) the *intensity* of income losses (how large the income drop is), and iii) the *inequality* of income losses across the downward mobile population. The dominance in these curves (i.e., when the curve of a distribution is always equal or below that of another one) allow to identify partial orderings of aggregate downward mobility which are robust to the choice of a particular aggregate downward mobility indicator verifying our set of axioms.

We have calculated the values of the *D* index for Spain and results appear in Table 8.

[TBW]

4.2 Whose income changes? Who suffer from an income loss?

We are not only interested in measuring the dimension and distribution of income losses during the recession in the US and Spain, we are also largely interested in identifying the main characteristics of those individuals in the population that are experiencing a downward income mobility episode and in discovering if age has a significant role in predicting the probability of suffering an income loss (e.g. youth or population at childbearing age vs. mature and old-aged individuals). For this purpose, following a similar strategy to that of Cantó et al. (2012), we will

estimate a nested multinomial two-level model and we will check if estimating a multinomial logit model is enough.[13] Our main interest is to investigate the extent to which being young is a determinant of being mobile (and particularly downwardly mobile) across countries.

We consider that if individual that experiences an equivalent income change of 5, 10 or 25 percent between two moments in time she is a mover (otherwise she is a stayer). In a first level estimation, individuals can be movers or stayers, that is the possibilities are only two, m = {1, 2}. In a second level, those who actually move (m = 1) can move upwards or downwards and therefore can belong to two further groups: upward movers, downward movers, that is, j = {1, 2}. The remaining option at this second level (m = 2) only considers the possibility of being immobile so that we make no other distinctions. Thus, the probability that some individual in the population will suffer from an income loss is p_{1j}:

$$p_{1j} = p_1 \times p_{j|1} = \frac{\exp(\lambda_1 I_1)}{\sum_{m=1}^{2}\exp(\lambda_m I_m)} \times \frac{\exp\left(x'\beta_{1j}/\lambda_1\right)}{\sum_{k=1}^{3}\exp\left(x'\beta_{1k}/\lambda_1\right)}$$

where p_1 is the probability of being a mover and where $p_{j|1}$ is the probability of moving upwards or downwards (*j)* conditioned on being a mover. In this last expression, $I_m = \ln\left\{\sum_{k=1}^{3}\exp\left(x'\beta_{mk}/\lambda_m\right)\right\}$, x' is the vector of individual characteristics, β_{mk} are the parameters associated with tipology k y λ_m is the dissimilarity parameter that allows for adjusting for the correlation of the errors of individuals in the same group. For the correct identification of the model we must choose a reference alternative (being a stayer and an upward mover) fixing its coefficients equal to zero. As explanatory variables we have included only a short range of them: gender, age, level of education achieved, and percentile (to control for "regression to the mean" effects). The results of the estimations of a multinomial logit model are reported in Table 9 and 10.

[TBW]

Some preliminary conclusions

[TBW]

[13] See Hensher et al. (2005) for more details on the econometric estimation of these models Nested logit models relax the assumption of independently distributed errors and the independence of irrelevant alternatives inherent in conditional and multinomial logit models by clustering similar alternatives into nests

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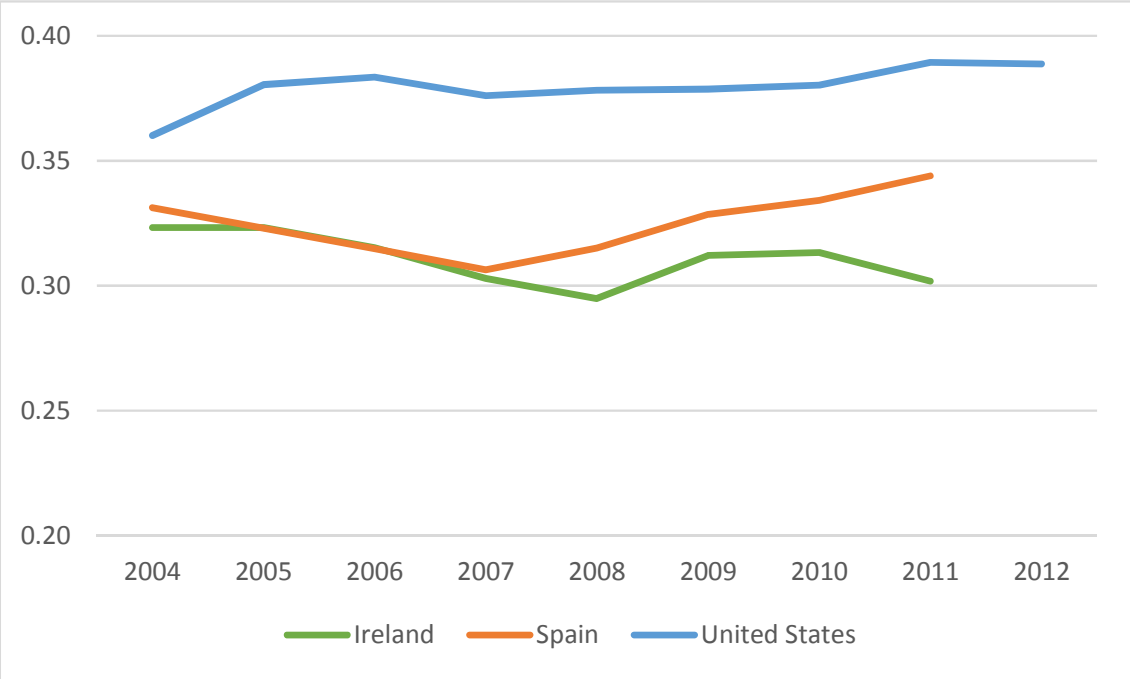
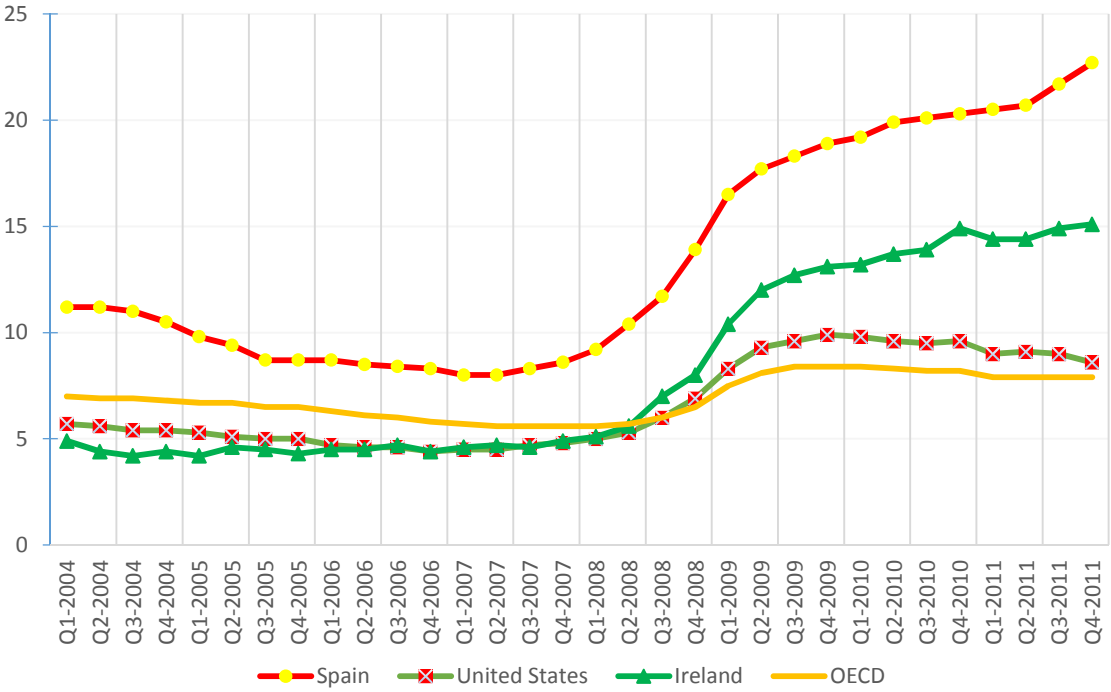
Figure 1. Inequality trends in the US, Spain and Ireland.



Source: OECD.

Figure 2. Harmonized Unemployment rate US, Spain and Ireland, 2004-Q1 to 2011-Q4.

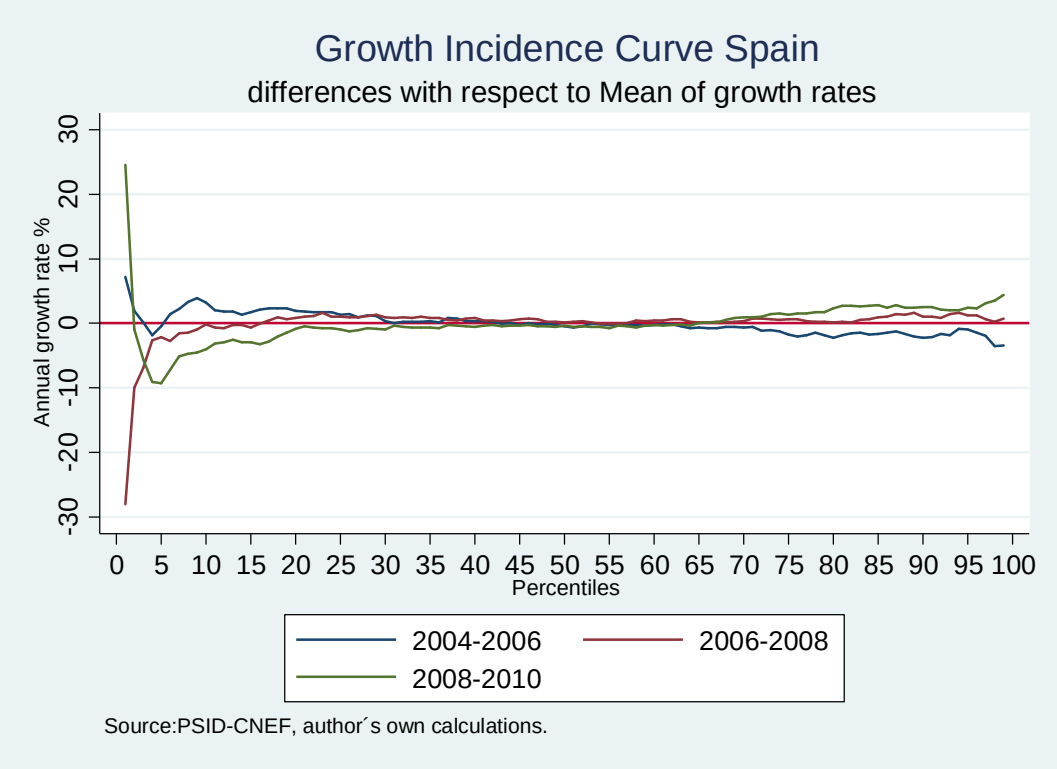


Source: OECD.

Table 1. Inequality in Spain and the US, 2006-2010

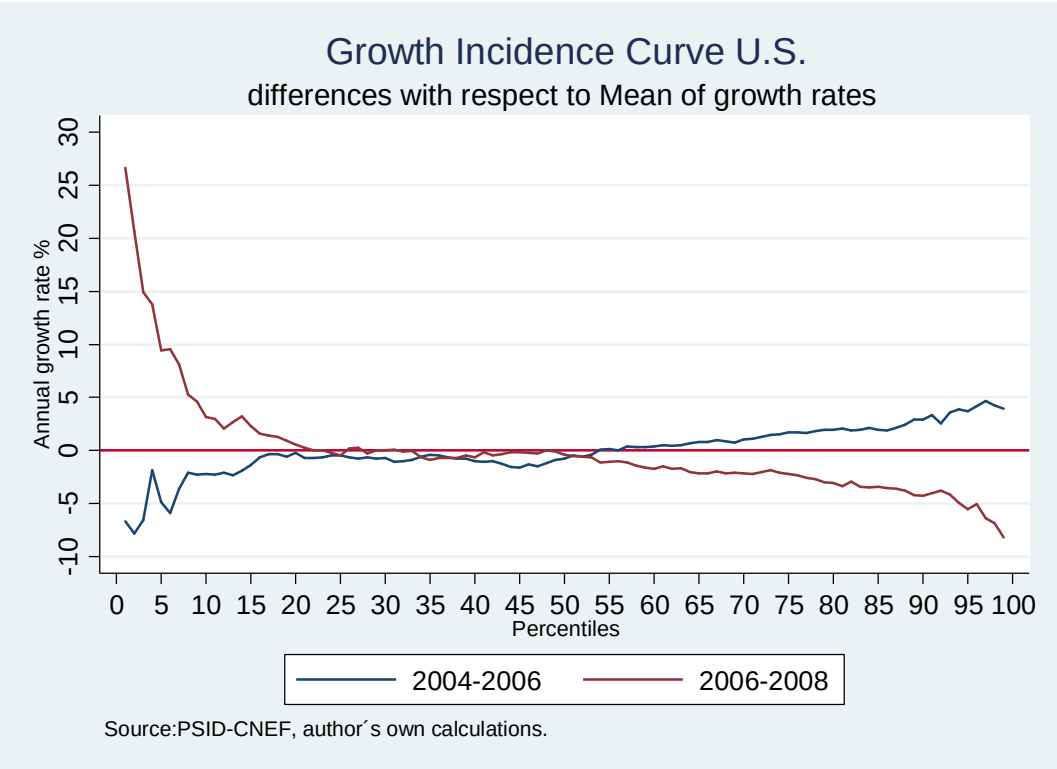
Spain 2006-2008				
Parameter:	**v=1,5**	**v=2**	**v=3**	**v=4**
Initial S-Gini	0.190	0.296	0.415	0.483
Final S-Gini	0.193	0.301	0.423	0.494
Spain 2008-2010				
Parameter:	**v=1,5**	**v=2**	**v=3**	**v=4**
Initial S-Gini	0.191	0.299	0.423	0.496
Final S-Gini	0.203	0.317	0.446	0.52
U.S. 2006-2008				
Parameter:	**v=1,5**	**v=2**	**v=3**	**v=4**
Initial S-Gini	0.261	0.393	0.532	0.609
Final S-Gini	0.249	0.375	0.509	0.582

Figure 3. Growth Incidence Curves (Spain 2004-2010).



Source:PSID-CNEF, author´s own calculations.

Figure 4. Growth Incidence Curves (US 2004-2008).



Source:PSID-CNEF, author´s own calculations.

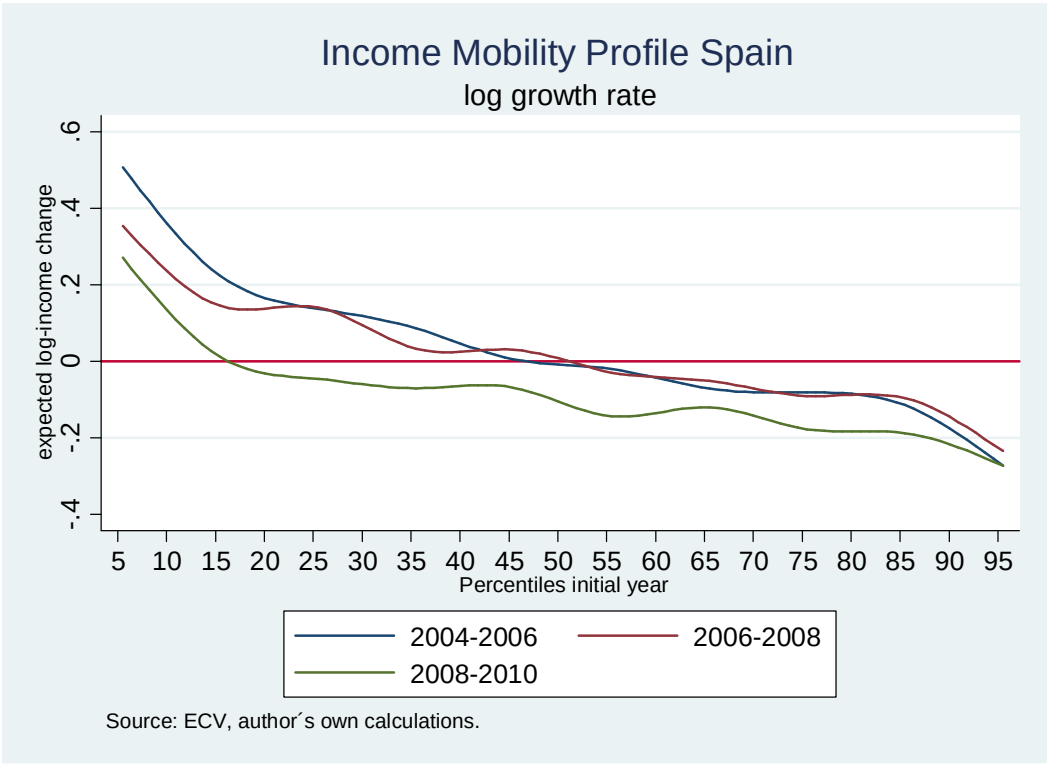
Table 2. Decomposing Income Inequality Trends, Spain and the US (2006-2008)

Jenkins and Van Kerm , Decomposition of change in S-Gini 2004 -2006								
Country	Spain				USA			
Parametre value	v=1.5	v=2	v=3	v=4	v=1.5	v=2	v=3	v=4
Initial S-Gini	0.201	0.313	0.436	0.506	0.246	0.373	0.510	0.587
Final S-Gini	0.194	0.302	0.422	0.490	0.261	0.392	0.532	0.608
Change	-0.007	-0.010	-0.014	-0.016	0.015	0.019	0.021	0.021
R-component	0.067	0.105	0.150	0.179	0.059	0.085	0.114	0.132
P-component	0.074	0.115	0.164	0.195	0.044	0.066	0.093	0.110

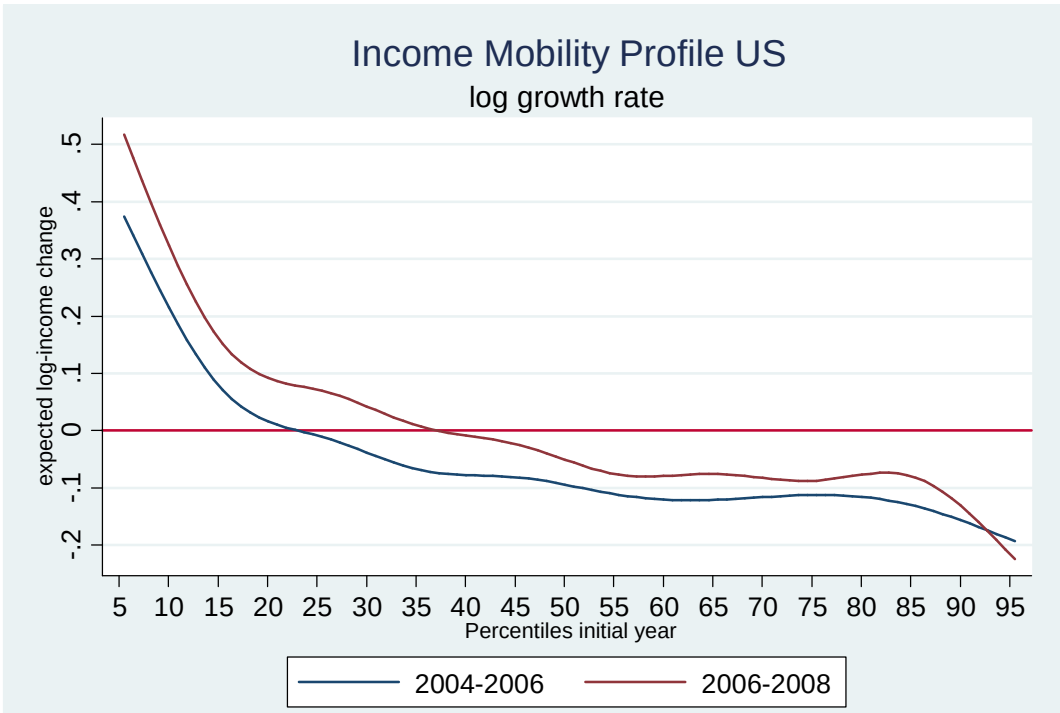
Jenkins and Van Kerm , Decomposition of change in S-Gini 2006 -2008								
Country	Spain				USA			
Parametre value	v=1.5	v=2	v=3	v=4	v=1.5	v=2	v=3	v=4
Initial S-Gini	0.190	0.296	0.415	0.483	0.261	0.393	0.532	0.609
Final S-Gini	0.193	0.301	0.423	0.494	0.249	0.375	0.509	0.582
Change	0.003	0.005	0.008	0.011	-0.012	-0.017	-0.023	-0.027
R-component	0.063	0.096	0.135	0.160	0.053	0.076	0.104	0.122
P-component	0.060	0.091	0.127	0.149	0.065	0.094	0.127	0.149

Jenkins and Van Kerm , Decomposition of change in S-Gini 2008 -2010								
Country	Spain				USA			
Parametre value	v=1.5	v=2	v=3	v=4	v=1.5	v=2	v=3	v=4
Initial S-Gini	0.191	0.299	0.423	0.496	-	-	-	-
Final S-Gini	0.203	0.317	0.446	0.520	-	-	-	-
Change	0.012	0.018	0.022	0.024	-	-	-	-
R-component	0.064	0.097	0.136	0.160	-	-	-	-
P-component	0.052	0.080	0.113	0.136	-	-	-	-

Figure 5. Income mobility profiles (Spain 2004-2010, US 2004-2008).



Source: ECV, author´s own calculations.



Source: PSID-CNEF, author´s own calculations.

Table 3. Mobility Indexes US, Spain (2004-2010)

Some Indexes of Income Mobility						
Period	**2004 -2006**		**2006 -2008**		**2008 - 2010**	
	Spain	**US**	**Spain**	**US**	**Spain**	**US**
Shorrocks M index	0.816	0.751	0.791	0.731	0.791	-
Bartholomew's Mobility Index	1.734	1.375	1.633	1.292	1.595	-
Hart (1976) mobility index:	0.400	0.308	0.445	0.280	0.482	-
Hart Index with Spearman no weights	0.359	0.245	0.335	0.225	0.308	-
Beta Index (1-b)	0.370	0.370	0.526	0.207	0.493	-

Table 4. Movers and stayers, US and Spain (2004-2010)

	Spain			**US**	**US**
	2004-2006	**2006-2008**	**2008-2010**	**2004-2006**	**2006-2008**
Movers		71.2	71.2		65.8
Stayers		28.8	28.8		34.2
Total		100.0	100.0		100.0

Table 5. Income mobility related to income instability, Fields and Ok mobility index, US and Spain (2004-2010)

Fields & Ok [1999] mobility index						
	2004 -2006		**2006 - 2008**		**2008 - 2010**	
	Spain	**US**	**Spain**	**US**	**Spain**	**US**
Total Mobility:	0.376	0.398	0.365	0.375	0.401	-
Transfer component	0.303	0.353	0.336	0.334	0.341	-
Growth component	0.073	0.045	0.029	0.041	0.060	-

Table 6. The dimension of Downward and Upward Income mobility Spain (2004-2010)

Spain 2004 - 2006 Income changes							
Change %5	Frequency	Percent	Cumulate	**Change 10%**	Frequency	Percent	Cumulate
Upwards	6,650.53	49.45	49.45	Upwards	5,810.83	43.21	43.21
Stayer	1,533.14	11.40	60.85	Stayer	3,198.66	23.79	67.00
Downwards	5,264.33	39.15	100.00	Downwards	4,438.51	33.00	100.00

Spain 2006 - 2008 Income changes							
Change %5	Frequency	Percent	Cumulate	**Change 10%**	Frequency	Percent	Cumulate
Upwards	7,246.54	49.39	49.39	Upwards	6,305.27	42.97	42.97
Stayer	2,067.60	14.09	63.48	Stayer	3,863.49	26.33	69.31
Downwards	5,357.86	36.52	100.00	Downwards	4,503.24	30.69	100.00

Spain 2008 - 2010 Income changes							
Change %5	Frequency	Percent	Cumulate	**Change 10%**	Frequency	Percent	Cumulate
Upwards	5,666.71	38.27	38.27	Upwards	4,733.65	31.97	31.97
Stayer	2,130.95	14.39	52.67	Stayer	3,942.95	26.63	58.60
Downwards	7,008.34	47.33	100.00	Downwards	6,129.40	41.40	100.00

Table 7. The dimension of Downward and Upward Income mobility US (2004-2010)

US 2004- 2006 Income change							
Change %5	Frequency	Percent	Cumulate	**Change 10%**	Frequency	Percent	Cumulate
Moving up	5,956.73	41.55	41.55	moving down	5,082.76	35.45	35.45
Static	1,934.15	13.49	55.03	Static	3,648.13	25.44	60.89
moving down	6,447.12	44.97	100.00	moving up	5,607.11	39.11	100.00

US 2006- 2008 Income change							
Change %5	Frequency	Percent	Cumulate	**Change 10%**	Frequency	Percent	Cumulate
Moving up	6,733.40	45.49	45.49	moving down	5,742.92	38.80	38.80
Static	2,027.78	13.70	59.19	Static	3,897.27	26.33	65.12
moving down	6,041.83	40.81	100.00	moving up	5,162.81	34.88	100.00

US 2008- 2010 Income change

Change %5	Frequency	Percent	Cumulate	Change 10%	Frequency	Percent	Cumulate
Moving up	.	.	.	Moving up	.	.	.
Static	.	.	.	Static	.	.	.
moving down	.	.	.	moving down	.	.	.

Table 8. Downward income mobility in both countries

[To be completed]

Table 9. The probability of moving upwards, downwards or being a stayer Spain (10% change, 2008-2010)

```
150 . mlogit Dml10 Muj  i.iedad i.Edu  Work Per [pw=W] ,  base(2)

Iteration 0:   log pseudolikelihood =  -35503206
Iteration 1:   log pseudolikelihood =  -33039337
Iteration 2:   log pseudolikelihood =  -33004039
Iteration 3:   log pseudolikelihood =  -33004008
Iteration 4:   log pseudolikelihood =  -33004008

Multinomial logistic regression                 Number of obs     =      11582
                                                Wald chi2(22)     =     812.50
                                                Prob > chi2       =     0.0000
Log pseudolikelihood =  -33004008               Pseudo R2         =     0.0704
```

Dml10	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
moving_down						
Muj	-.0730941	.0584259	-1.25	0.211	-.1876068	.0414186
iedad						
2	.0424379	.1298085	0.33	0.744	-.211982	.2968578
3	.0254141	.1202298	0.21	0.833	-.2102319	.2610601
4	-.0675322	.1230027	-0.55	0.583	-.3086131	.1735486
5	-.0337761	.1270855	-0.27	0.790	-.2828591	.2153069
6	-.7646365	.1254508	-6.10	0.000	-1.010516	-.5187574
Edu						
2	.0779631	.0942516	0.83	0.408	-.1067666	.2626928
3	-.1875543	.1033494	-1.81	0.070	-.3901153	.0150068
4	-.5506379	.1066273	-5.16	0.000	-.7596236	-.3416522
Work	-.2895716	.0822751	-3.52	0.000	-.4508279	-.1283153
Per	.0113705	.001318	8.63	0.000	.0087873	.0139538
_cons	.230766	.1296767	1.78	0.075	-.0233956	.4849276
Stayers	(base outcome)					
moving_up						
Muj	-.1113246	.0629372	-1.77	0.077	-.2346794	.0120301
iedad						
2	-.1785739	.1360577	-1.31	0.189	-.4452422	.0880944
3	-.5465278	.1300444	-4.20	0.000	-.8014101	-.2916455
4	-.3455942	.1311471	-2.64	0.008	-.6026377	-.0885507
5	-.0320995	.1371183	-0.23	0.815	-.3008465	.2366475
6	-.4700669	.1320416	-3.56	0.000	-.7288637	-.21127
Edu						
2	.4096827	.1023712	4.00	0.000	.2090389	.6103266
3	.5514516	.1128553	4.89	0.000	.3302593	.772644
4	.9472202	.1129002	8.39	0.000	.7259399	1.168501
Work	.0897684	.0881097	1.02	0.308	-.0829233	.2624602
Per	-.0244965	.0014091	-17.38	0.000	-.0272583	-.0217346
_cons	1.199451	.1341107	8.94	0.000	.9365992	1.462304

Table 10. The probability of moving upwards, downwards or being a stayer US (10% change, 2006-2008)

```
132 . mlogit Dml10 Muj  i.iedad i.Edu  Work Per [pw=W] ,  base(2)

Iteration 0:   log pseudolikelihood = -319712.32
Iteration 1:   log pseudolikelihood = -299111.54
Iteration 2:   log pseudolikelihood = -298987.71
Iteration 3:   log pseudolikelihood = -298987.69

Multinomial logistic regression                 Number of obs     =       9549
                                                Wald chi2(22)     =     788.96
                                                Prob > chi2       =     0.0000
Log pseudolikelihood = -298987.69               Pseudo R2         =     0.0648
```

Dml10	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
moving_down						
Muj	.0685053	.0661529	1.04	0.300	-.061152	.1981626
iedad						
2	-.2477652	.1058436	-2.34	0.019	-.4552149	-.0403154
3	-.3877411	.1104625	-3.51	0.000	-.6042436	-.1712386
4	-.4551735	.1088973	-4.18	0.000	-.6686083	-.2417386
5	-.3224916	.1219276	-2.64	0.008	-.5614654	-.0835179
6	.0987539	.1313607	0.75	0.452	-.1587085	.3562162
Edu						
2	.3219937	.3302351	0.98	0.330	-.3252553	.9692426
3	.2791892	.3121193	0.89	0.371	-.3325534	.8909318
4	.1356436	.3155993	0.43	0.667	-.4829197	.7542069
Work	-.1811773	.0913869	-1.98	0.047	-.3602922	-.0020623
Per	.0053535	.0013846	3.87	0.000	.0026397	.0080673
_cons	.0964639	.3222851	0.30	0.765	-.5352032	.728131
Stayers	(base outcome)					
moving_up						
Muj	-.0241639	.0671083	-0.36	0.719	-.1556937	.107366
iedad						
2	-.1920499	.1052578	-1.82	0.068	-.3983514	.0142517
3	-.2497769	.109562	-2.28	0.023	-.4645145	-.0350393
4	-.1670674	.10801	-1.55	0.122	-.3787632	.0446284
5	-.0440711	.1233699	-0.36	0.721	-.2858717	.1977295
6	.2660043	.1291034	2.06	0.039	.0129662	.5190423
Edu						
2	.1823981	.3191562	0.57	0.568	-.4431365	.8079328
3	.7998523	.2978425	2.69	0.007	.2160918	1.383613
4	1.134483	.301077	3.77	0.000	.5443832	1.724584
Work	-.0436986	.0888586	-0.49	0.623	-.2178582	.130461
Per	-.0277574	.0014062	-19.74	0.000	-.0305134	-.0250014
_cons	1.012909	.3092657	3.28	0.001	.4067594	1.619059

APPENDIX

Table A1. Longitudinal samples, Spain.

Spain – Annual longitudinal samples of individuals				
	2006 - 2007	**2007 - 2008**	**2008 - 2009**	**2009 - 2010**
Total	23,739	24,605	25,190	23,907
Complete interview data	23,666	24,526	25,123	23,836
Data no tails and balanced panel	22,852	23,635	24,101	22,899
% Complete interview data	99.7%	99.7%	99.7%	99.7%
% Final data	96.3%	96.1%	95.7%	95.8%
Spain – Biennial longitudinal samples of individuals				
	2004 -2006	**2006 -2008**	**2008 - 2010**	
Total	14,504	15,584	15,629	
Complete interview data	14,511	15,222	15,421	
Data no tails and balanced panel	13,448	14,672	14,765	
% Complete interview data	96.8%	97.7%	98.7%	
% Final data	92.7%	94.1%	94.5%	

Table A2. Longitudinal samples, US.

US – Biennial longitudinal samples of individuals				
	2004 -2006	**2006 -2008**	**2008 - 2010**	
Total since 1968	68,322	68,322	-	
Complete interview data	17,548	18,218	-	
Data no tails and balanced panel	16,005	16,562	-	
% Complete interview data	25.7%	26.7%	-	
% Final data	91.2%	90.9%	-	

Table A3. Transition matrices Spain, 2006-2010

Transition matrix, Spain 2006 -2008										
	Income Decile 2008									
Decile 2006	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
1	39.00	22.15	12.42	6.72	6.90	3.53	3.94	1.85	1.68	1.80
2	21.62	32.44	15.79	9.73	4.28	5.87	4.47	3.19	1.33	1.29
3	12.84	14.16	24.39	17.57	9.20	6.68	4.94	5.16	2.97	2.09
4	6.69	10.50	18.78	20.20	12.07	10.78	10.14	4.77	4.37	1.70
5	7.06	6.69	8.45	17.06	23.64	15.91	10.47	5.69	3.96	1.08
6	3.29	5.06	6.33	12.07	20.29	18.68	14.42	10.76	5.70	3.40
7	2.47	3.02	5.56	6.00	9.85	18.30	17.75	17.79	12.52	6.73
8	2.73	1.26	3.85	4.69	8.90	10.76	20.24	23.59	15.79	8.19
9	1.73	1.67	1.61	3.36	1.67	6.81	10.18	20.45	33.86	18.64
10	2.60	2.86	2.86	2.66	3.51	2.36	3.84	6.40	18.40	54.52

Transition matrix, Spain 2008 -2010										
	Income Decile 2010									
Decile 2008	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
1	41.67	28	10.28	5.34	5.81	1.69	2	1.77	0.98	2.46
2	17.87	29.97	18.68	14.58	4.71	5.2	3.5	1.61	2.5	1.38
3	13.34	12.57	24.11	20.14	10.34	8.53	5.81	2.96	1.25	0.95
4	7.37	9.89	13.07	22.4	15.14	13.46	9.28	4.2	3.35	1.83
5	4.77	4.55	15.3	12.15	21.97	18.13	10.74	6.47	3.07	2.85
6	5.13	4.99	7.31	10.24	16.61	19.56	15.92	9.38	6.4	4.46
7	3.14	3.05	5.7	7.04	12.61	11.85	19.68	21.6	8.58	6.75
8	2.05	3.31	3.17	5.35	6.7	8.35	15.53	24.01	22.5	9.04
9	2.86	2.45	1.25	2.27	2.87	6.63	11.44	18.55	33.18	18.5
10	1.73	1.11	1.15	0.75	2.99	6.67	6.24	9.29	18.39	51.68

Table 2. Transition matrices US, 2006-2008

Transition matrix, USA 2006 -2008										
	Income Decile 2008									
Decile 2006	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
1	51.26	18.85	11.92	6.34	4.32	3.53	1.36	0.68	1.34	0.41
2	21.78	32.01	16.93	13.86	5.86	3.76	2.76	0.87	1.37	0.81
3	9.37	22.03	28.39	15.55	11.27	6.36	3.2	1.87	1.25	0.72
4	6.54	11.45	18.25	22.13	16.42	9.79	8.13	4.23	2.15	0.9
5	4.01	8.45	10.72	19	24.35	16.11	9.15	5.09	1.54	1.58
6	2.35	2.51	6.71	11.14	19.4	24.41	18.43	9.06	4.55	1.44
7	1.88	2.27	4.18	6.05	9.36	18.4	26.77	17.17	9.5	4.43
8	0.93	0.96	1.33	3.77	4.08	10.78	18.46	31.16	22.17	6.36
9	0.52	0.35	1.44	1.58	2.75	4.67	8.22	21.01	38.82	20.64
10	1.38	1.05	0.15	0.64	2.15	2.25	3.67	8.66	17.25	62.81

Table A4. Transition matrices Spain, 2004-2010

SPAIN							
Equivalent Income % of median at 2004	Equivalent Income % of median at 2006						
	below 50%	50-75%	75-100%	100-125%	125-150%	over 150%	Total
below 50%	43.49	23.46	14.75	7.13	4.72	6.45	100
50-75%	17.76	39.96	20.42	11.41	4.84	5.61	100
75-100%	8.61	25.78	32.87	17.27	7.42	8.05	100
100-125%	5.50	12.90	25.64	28.31	14.13	13.53	100
125-150%	3.72	8.61	13.53	22.67	25.21	26.26	100
over 150%	2.01	3.32	7.53	10.19	16.42	60.53	100
Total	12.35	18.79	18.83	15.31	11.66	23.06	100

SPAIN							
Equivalent Income % of median at 2006	Equivalent Income % of median at 2008						
	below 50%	50-75%	75-100%	100-125%	125-150%	over 150%	Total
below 50%	44.86	28.76	13.39	6.95	2.32	3.72	100
50-75%	20.54	37.27	22.94	8.33	5.95	4.98	100
75-100%	8.00	19.43	37.48	19.88	8.89	6.32	100
100-125%	3.67	9.81	27.48	27.33	16.45	15.26	100
125-150%	2.23	5.39	15.04	23.68	23.79	29.87	100
over 150%	2.81	3.68	6.67	8.83	15.27	62.75	100
Total	12.10	17.12	20.77	15.32	11.96	22.73	100

SPAIN							
Equivalent Income % of median at 2008	Equivalent Income % of median at 2010						
	below 50%	50-75%	75-100%	100-125%	125-150%	over 150%	Total
below 50%	51.07	28.79	10.25	3.32	1.89	4.68	100
50-75%	19.96	39.31	22.04	10.78	4.02	3.90	100
75-100%	8.51	20.73	33.57	22.96	6.18	8.05	100
100-125%	5.90	11.57	22.09	25.92	18.97	15.55	100
125-150%	3.14	7.96	13.23	15.55	21.44	38.68	100
over 150%	3.16	2.51	4.29	11.48	13.71	64.85	100
Total	13.78	18.43	17.77	15.23	10.82	23.97	100

Table A5. Transition matrices US, 2004-2008

US							
Equivalent Income % of median at 2004	Equivalent Income % of median at 2006						
	below 50%	50-75%	75-100%	100-125%	125-150%	over 150%	Total
below 50%	58.66	24.41	9.21	3.31	1.88	2.53	100
50-75%	25.34	34.60	24.30	7.41	4.50	3.85	100
75-100%	11.92	21.62	30.76	19.39	8.80	7.51	100
100-125%	6.02	9.83	19.43	25.60	20.06	19.06	100
125-150%	3.31	6.69	11.97	18.44	25.49	34.10	100
over 150%	2.62	2.39	3.58	5.59	9.85	75.96	100
Total	18.60	16.14	15.25	11.73	10.47	27.80	100

US

Equivalent Income % of median at 2006	Equivalent Income % of median at 2008						
	below 50%	50-75%	75-100%	100-125%	125-150%	over 150%	Total
below 50%	60.00	22.76	9.28	4.35	1.13	2.48	100
50-75%	25.94	40.15	18.31	8.01	4.02	3.57	100
75-100%	11.82	22.51	34.14	17.35	7.70	6.48	100
100-125%	4.54	12.55	23.80	30.40	16.18	12.53	100
125-150%	2.20	6.41	11.14	25.86	28.26	26.13	100
over 150%	1.63	2.15	3.67	7.80	12.35	72.41	100
Total	18.23	16.84	14.93	13.19	10.31	26.50	100