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Who pays the price of folly?
The business cycle
and income and wealth
mobility in Spain

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ECONOMICS DEPARTMENT**WHO PAYS THE PRICE OF FOLLY? THE BUSINESS CYCLE AND
WEALTH AND INCOME MOBILITY IN SPAIN****ECONOMICS DEPARTMENT WORKING PAPERS No. 1561****By Clara Martínez-Toledano, David Law, David Haugh and
Müge Adalet McGowan**

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ABSTRACT/RÉSUMÉ**Who pays the price of folly? The business cycle and income and wealth mobility in Spain**

Spain has experienced a dramatic business cycle, starting with a large construction based boom followed by a long recession, resulting in a substantial rise in unemployment, and income and wealth inequality. This paper uses longitudinal data from the Survey of Household Finances over the period 2002 to 2014 to examine the distributions of income and wealth in Spain, as well as the mobility of households within those distributions. Results show an increase in the concentration of both income and wealth following the sharp decline in house prices that occurred since 2008, with house price fluctuations affecting more negatively the young than the old. Furthermore, differences in average income and wealth by education, gender and home ownership status were accentuated during the crisis, with lower and middle group incomes falling on average and top group incomes rising. In addition, higher levels of mobility within the middle of the household wealth distribution are observed than at either the top or bottom, although mobility at the extremes of the distribution increased after 2008. Finally, a number of characteristics of households, including age, property ownership, being employed on a permanent contract and good health, are found to be positively associated with wealth accumulation over time, while having a mortgage is negatively related. Overall, the paper finds it is the young and those with low income, wealth and education, bad health, temporary contracts and a mortgage that became relatively worse off in Spain's early 21st century boom and bust cycle.

This Working Paper relates to the 2018 OECD Economic Survey of Spain (<http://www.oecd.org/economy/spain-economic-snapshot>)

JEL classification: D31; E21; N3

Keywords: Spain, income, wealth, mobility, inequality, housing market.

Qui paye le prix de la folie? Le cycle économique et la mobilité des revenus et des richesses en Espagne

L'Espagne a connu un cycle économique chaotique, débutant par un boom important dans le secteur de la construction suivi par une longue récession, entraînant une hausse substantielle du chômage et des inégalités de revenus et de richesse. Ce document utilise les données longitudinales de l'Enquête sur les finances des ménages de 2002 à 2014 pour examiner la distribution des revenus et du patrimoine en Espagne, ainsi que la mobilité des ménages au sein de ces distributions. Les résultats montrent une augmentation de la concentration des revenus et de la richesse suite à la forte baisse des prix de l'immobilier survenue depuis 2008, les fluctuations des prix de l'immobilier affectant plus négativement les jeunes que les personnes âgées. En outre, les différences de revenu et de richesse moyens selon le niveau d'éducation, le sexe et le fait d'être propriétaire ou non ont été accentuées pendant la crise, les revenus des groupes moyens et inférieurs diminuant en moyenne et les revenus des groupes les plus élevés augmentant. En plus, on observe des niveaux de mobilité plus élevés au milieu de la distribution de la richesse des ménages que dans la partie supérieure ou inférieure, bien que la mobilité aux extrêmes de la répartition ait augmenté après 2008. Enfin, un certain nombre de caractéristiques des ménages, notamment l'âge, être propriétaire d'immobilier, le fait d'être sous contrat à durée indéterminée et en bonne santé, est associée positivement à l'accumulation de richesse au fil du temps, tandis que le fait d'avoir une hypothèque l'est négativement. Dans l'ensemble, les auteurs découvrent que ce sont les jeunes et les personnes à faible revenu, patrimoine et éducation, en mauvaise santé, avec des contrats temporaires et avec un hypothèque qui ont vu leur situation relative se détériorer au cours du cycle d'expansion et de récession observé en Espagne au début le 21st siècle.

Ce Document de travail se rapporte à l'*Étude économique de l'OCDE de l'Espagne 2018*

(<http://www.oecd.org/fr/economie/espagne-en-un-coup-d-oeil/>)

Classification JEL : D31; E21; N3

Mots-clés : Espagne, revenu, richesse, mobilité, inégalité, marché du logement.

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WHO PAYS THE PRICE OF FOLLY? THE BUSINESS CYCLE AND WEALTH AND INCOME MOBILITY IN SPAIN

By Clara Martínez-Toledano, David Law, David Haugh and Müge Adalet McGowan¹

Introduction

1. Over the past fifteen years, Spain has experienced a dramatic business cycle, starting with a large increase in housing wealth and a huge construction based boom followed by a long recession and a large decrease in housing wealth (Artola et al., 2018). This resulted in a large rise in unemployment, public debt, and income and wealth inequality, especially in recent years (Anghel et al., 2018). In the medium-term, high upward income and wealth mobility can help to reduce relative inequality. Therefore, a detailed understanding of the evolution and determinants of income and wealth inequality, as well as mobility, is important for making policy choices designed to promote growth and equity simultaneously.

2. This paper uses data on approximately 6,000 households from the Survey of Household Finances (SHF) over the period 2002 to 2014 to examine the distributions of income and wealth in Spain, and the mobility of households within those distributions. Between 2002 and 2014, five waves of the SHF were conducted in each of the years 2002, 2005, 2008, 2011 and 2014. These survey waves provide a representative picture of the structure of income, assets and liabilities at the household level at any given point in time. In addition, as the survey is longitudinal, meaning that respondents are tracked over time, it allows the examination of how each household's finances change over time.

3. The SHF also includes a rich set of information on the socio-economic characteristics of households and individuals. This information includes, for instance, household size, marital status, age, education level, gender, region of birth, country of birth (if born abroad), health and employment status, employment history, parents' employment, number of children and monthly expenditures, excluding consumer durables. This allows the descriptive analysis of this paper to be complemented with regression analysis to better understand the factors associated with higher levels of income and wealth accumulation over time. This medium-term perspective is particularly important as highly unequal income or wealth distributions at any given point in time are less of a concern if coupled with income and wealth mobility across time.

4. The results suggest that income and wealth inequality levels in Spain are in line with continental Europe. However, the concentration of income and wealth in Spain has increased somewhat following the sharp decline in house prices since 2008, and house price

1. Clara Martínez-Toledano is a Ph.D. candidate at the Paris School of Economics and was a consultant in the OECD Economics Department at the time of writing this paper. David Law, David Haugh and Müge Adalet McGowan are from the OECD Economics Department. The authors would like to thank Pierre Beynet, Alberto González Pandiella and Isabelle Koske from the Economics Department, Sean Kennedy from Centre for Tax Policy and participants at an OECD workshop "Income and Wealth Inequality and Mobility: Spain in International Perspective". The authors would also like to thank Sylvie Ricordeau and Poeli Bojorquez for editorial assistance.

fluctuations asymmetrically affected different age groups. Individuals over 65 experienced a larger increase in income than others and thanks to pension payments have been able to cope better with the crisis than young individuals who have suffered the consequences of unemployment. Older individuals have also been able to accumulate relatively more wealth than young individuals during the crisis. In addition, differences in average income and wealth by education, gender and home ownership status were accentuated during the crisis.

5. In terms of income and wealth mobility, findings point to higher levels of mobility in the middle of both distributions as compared to the top or bottom, meaning that extremely-poor and rich individuals tend to stay extremely-poor and rich, respectively. However, mobility increased at the top and bottom of each respective distribution after 2008. In general, wealth mobility is lower than income mobility, particularly for those individuals in the upper part of the wealth distribution. In addition, regression analysis suggests that a number of factors influence income and wealth accumulation over time. In particular, increases in age and education, property ownership, being employed and good health have a positive impact on income and wealth accumulation, while having a mortgage has a negative effect.

6. The remainder of the paper proceeds as follows. The following section describes the data used for the inequality, mobility and regression analysis. Section 3 analyses how aggregate income and wealth and their distribution have changed over the business cycle to gain a medium-term perspective on the dynamics of income and wealth in Spain. Income and wealth mobility over time are examined in Section 4, while Section 5 identifies the key determinants of income and wealth accumulation in Spain using regression analysis. Conclusions are drawn together in the final section.

Data

7. The dataset that is used for analysis comes from the Bank of Spain's Survey of Household Finances (SHF). This survey is available over five waves for the years 2002, 2005, 2008, 2011 and 2014, and provides a representative picture of the structure of household incomes, assets and liabilities at the household level. The survey is longitudinal, meaning that respondents are tracked over time, and contains information on approximately 6,000 households.

8. Four main advantages make the SHF the most suitable data source for the current analysis. First, the Survey oversamples at the top of the wealth distribution. This is achieved using wealth tax data assembled through collaboration between the National Statistics Institute and the State Agency of Fiscal Administration, which stringently preserves tax confidentiality. In particular, for the oversampling, the choice of wealth strata was based on the percentile distribution of households filing a wealth tax return. Eight strata were defined and oversampled at progressively increasing rates. The distribution of wealth is heavily skewed and some types of assets are held by only a small fraction of the population. Therefore, unless very large samples are collected, oversampling is important to achieve representativeness of the population and aggregate wealth, to enable the study of financial behaviour at the top of both the income and wealth distributions. Hence, the use of administrative wealth tax records for carrying out the oversampling at the top makes this dataset unique, since most wealth analyses based on surveys suffer from low representativeness at the top of the distribution.

9. Another important advantage of the SHF is that it is the only source of information on income and wealth covering the whole range of the distribution, from bottom to top, in Spain. Administrative tax data in most cases do not adequately cover the bottom end of the distribution due to high exemption thresholds. Third, the Survey is suitable for analysing the mobility of households within each of the income and wealth distributions, due to its longitudinal nature, allowing the formation of a panel so that households can be followed over time.

10. Finally, the SHF includes more information on socio-economic characteristics than other potential data sources, such as administrative tax data, for instance. This information includes household size, marital status, age, education level, gender, region of birth, country of birth (if born abroad), health and employment status, employment history, parents' employment, number of children, monthly expenditures excluding consumer durables and income (labour and capital), asset (financial and non-financial) and debt components. This provides a rich set of conditioning variables for regression analysis in order to better understand the patterns of income and wealth inequality, and those factors associated with mobility of households across the income and wealth distributions.

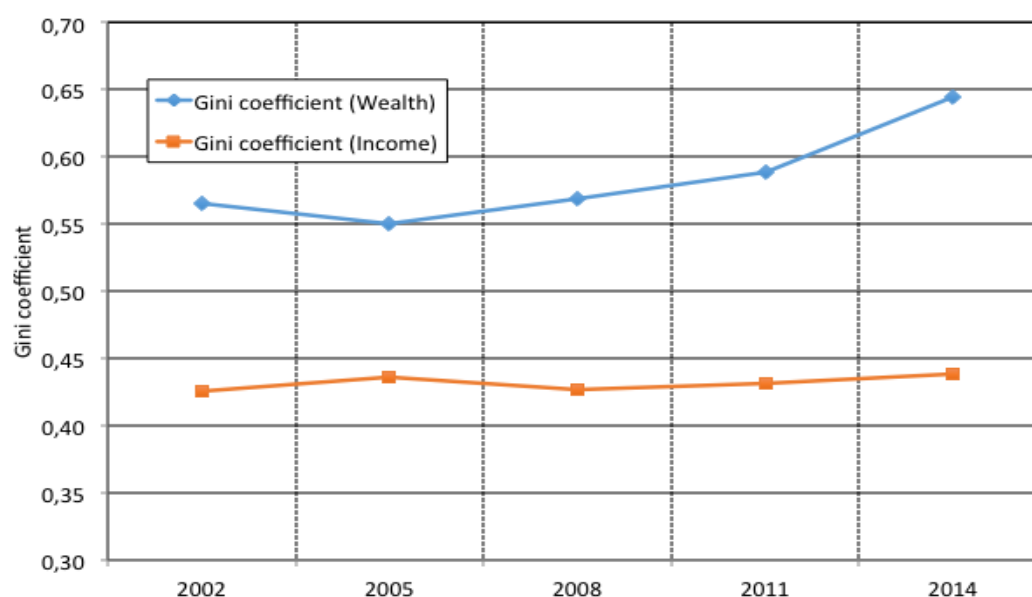
11. The SHF also has some important limitations, two of which are of particular relevance in the current context. First, while some variables in the SHF relate to individuals, others (most notably those relating to assets and liabilities) are only measured at the level of the household, which complicates the analysis. Second, although the SHF is a longitudinal survey, attrition rates between non-consecutive waves are high. The main implication of this for the forthcoming analysis is that any examination of changes in income and wealth over time is limited to that which occurs between consecutive waves of the survey, in order to maintain the representativeness of the sample.

Evolution of aggregate income and wealth and their distribution

12. This section examines the evolution of aggregate income and wealth over time as well as their distribution. Standard statistical and inequality measures, such as the mean, median, Gini coefficient and Lorenz curves, are presented. In addition, the way in which both income and wealth vary with education, gender, age and home-ownership is also explored.

13. Figure 1 illustrates how inequality in both income and wealth have changed over time in Spain. In particular, the Gini coefficient for each variable is presented over the period 2002 to 2014. When this measure of inequality is zero, there is perfect equality, where all values of a variable are the same. By contrast, a Gini coefficient of 1 expresses maximum inequality among values, where only one person possesses all income or wealth, for example.

14. It appears that the housing price fluctuations of the 2000s, among other forces acting, had significant effects on the distribution of income and especially wealth in Spain over the period of analysis. In particular, the Gini coefficient for wealth experienced a sharp increase from approximately 0.57 in 2002 to 0.65 in 2014, exacerbated by a sharp increase in the share of wealth held by the top 1%. Aided by the redistributive role of pensions, unemployment benefits and other type of social transfers, inequality in income on the other hand increased by less, with the Gini coefficient increasing from 0.42 to 0.44 between 2002 and 2014.

Figure 1. Gini coefficient in Spain, 2002-2014

15. Lorenz curves are presented in Figures 2 and 3, and provide complementary evidence of the evolution of inequality in income and wealth. In particular, a Lorenz curve shows the proportion of overall income or wealth held by a cumulative percentage of the population starting from the bottom of the distribution. The closer the curve is to a 45 degree line, the lower is inequality.

16. The Lorenz curve for income shows that the distribution was nearly stable during the period 2002-08, but that it sharply skewed to the right during the crisis years, with income becoming even more concentrated in upper deciles of the distribution in 2014 than in 2011 (Figure 2). Two aspects are worth noting when comparing the Lorenz curve for income with the Lorenz curve for wealth (Figure 3). First, income is less concentrated than wealth, as is the case in other countries. Second, contrary to income, the distribution of wealth was slowly becoming more unequal until 2011, and then became significantly more skewed to the right through to 2014. These differences can be explained by the large rise in unemployment following the fall in house prices in 2008. This led to a substantial drop in income for many workers, but the slower adjustment in asset prices meant changes in the distribution of wealth occurred later.

Figure 2. Lorenz curves for income in Spain, 2002-2014

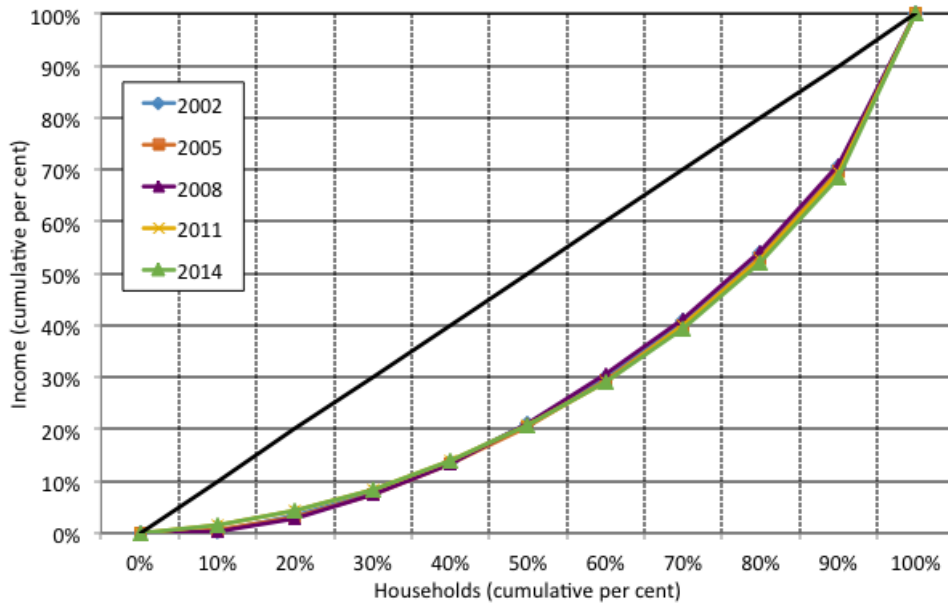
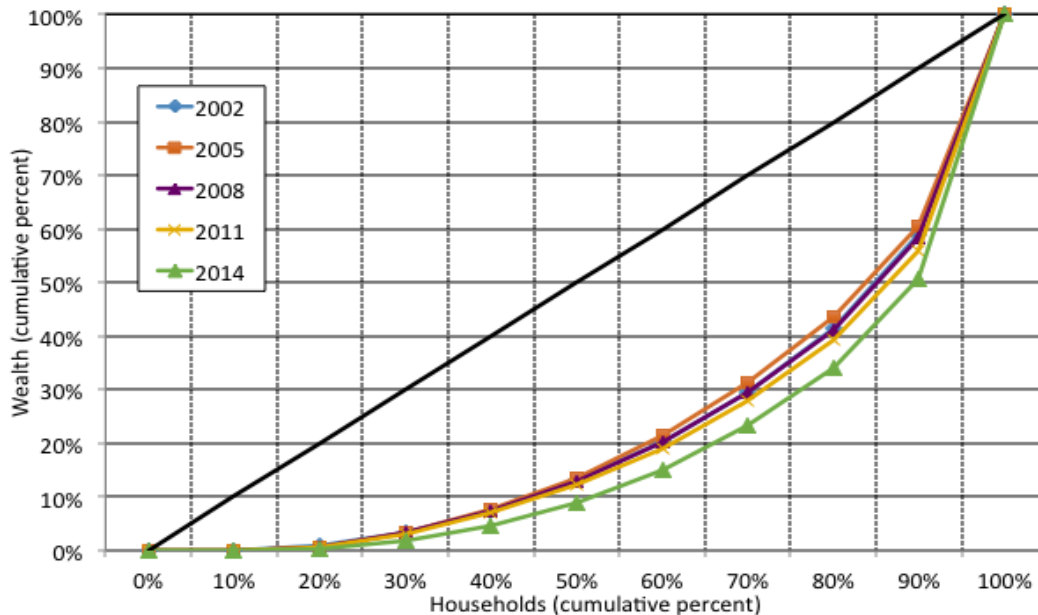


Figure 3. Lorenz curves for wealth in Spain, 2002-2014



17. Figures 4 and 5 present the shares of income and wealth held by various proportions of the Spanish population. Income and wealth inequality levels in Spain appear in line with continental Europe (WIR, 2018). The income share of the top 10% of the population rose from 29% to 32% between 2008 and 2014. This increase, however, came at the expense of the middle 40% of the distribution, which experienced a decrease in their share of income,

from 50% to 48%. Similarly, the share of income held by the bottom 50% of the income distribution, declined from 21% to 20% (Figure 4).

Figure 4. Income shares in Spain, 2002-2014

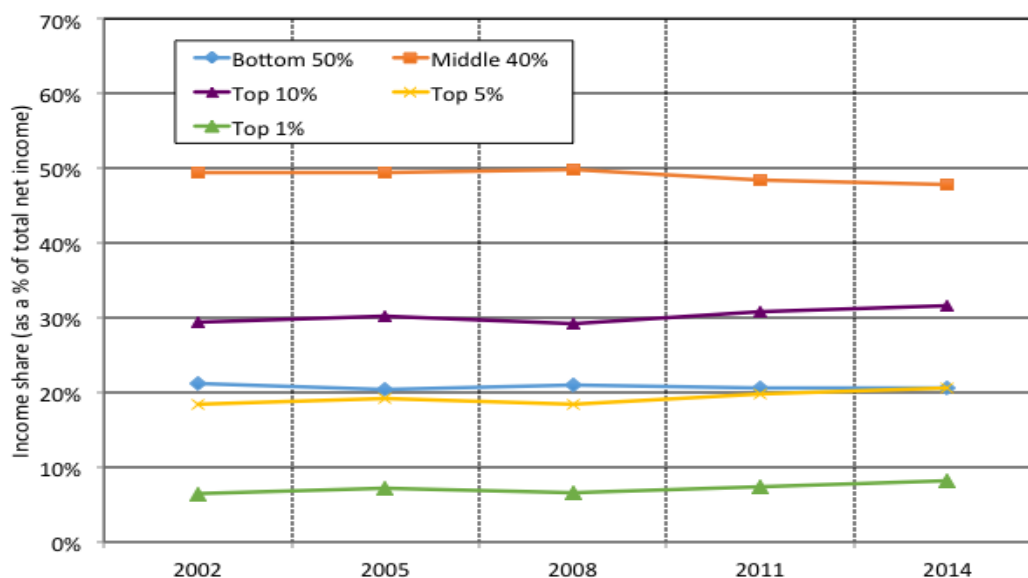
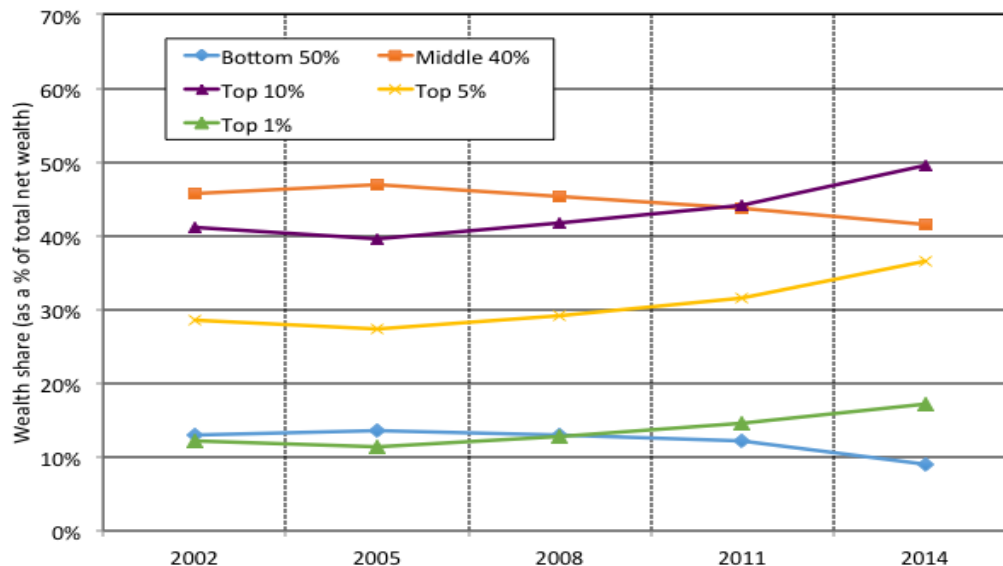


Figure 5. Wealth shares in Spain, 2002-2014



18. As in the case of income, the share of wealth held by the top 10% of the sample also increased between 2002 and 2014, from 41% to 50%. This increase was larger than was the case for income, and appears to be concentrated amongst the wealthiest households, with the share of wealth held by the top 1% increasing from 12% to 17%. The share of wealth held by the middle 40% of the distribution therefore fell from 46% to 42%, and the wealth share of the bottom 50%, from 13% to 9% (Figure 5).

19. Table 1 documents average income by income deciles and top percentile for each of the five waves of the survey. Large differences in average income exist between those belonging to the bottom and top income groups. For instance, whereas average income was EUR 4 125 for decile 1 in 2014, it was EUR 90 997 for decile 10. Moreover, whereas average income has fallen for most bottom and middle groups during the crisis, it has increased significantly for the top decile. A comparison of P90/P10 ratios of total net income in Europe suggests that Spain has the third largest ratio, only lower than that in Germany or Latvia (Anghel et al., 2018). The income of the top 1% and 0.01% fell from 2011 to 2014, most likely reflecting the weak economy weighing on profit and other capital income.

Table 1. Average nominal income by income decile

(in euros)	2002	2005	2008	2011	2014
Decile 1	888	1.183	946	4.560	4.125
Decile 2	5.900	6.863	7.445	8.373	8.497
Decile 3	9.462	11.135	12.581	11.940	11.787
Decile 4	12.502	14.909	17.216	16.112	15.576
Decile 5	15.517	18.944	22.334	20.481	19.754
Decile 6	18.766	23.252	26.520	25.429	24.522
Decile 7	22.606	27.696	31.492	31.122	30.287
Decile 8	27.193	34.049	37.570	38.204	36.704
Decile 9	34.955	43.686	48.024	49.423	47.302
Decile 10	60.951	76.353	82.664	90.926	90.997
Top 5%	75.785	95.305	103.417	116.279	118.650
Top 1%	128.167	163.118	177.244	216.195	231.216
Top 0.5%	163.457	208.392	227.000	280.093	282.467
Top 0.1%	277.664	346.888	350.444	460.171	398.564
Top 0.01%	467.803	513.423	658.610	975.195	743.253

20. The average wealth of the same income groups for each of the five waves of the survey is presented in Table 2. The differences between average wealth between bottom groups and top groups are also quite large, particularly for the very top. For instance, whereas decile 1 has average wealth of EUR 117 989, decile 10 has EUR 657 266. Contrary to the case of income, wealth decreased after the crisis for all income groups, except for the top 0.01%. For this group, average wealth increased from EUR 10 339 336 in 2008 to EUR 17 959 844 in 2014. Overall, these results suggest that the housing bubble and the consequent financial crisis have led to an increase in income and wealth inequality.

Table 2. Average wealth by income decile

(in euros)	2002	2005	2008	2011	2014
Decile 1	76.209	143.591	161.601	128.616	117.989
Decile 2	76.956	150.256	186.095	149.300	113.162
Decile 3	101.195	143.711	185.709	158.942	113.802
Decile 4	99.240	164.557	181.806	163.131	135.511
Decile 5	103.676	187.902	185.723	181.422	185.491
Decile 6	110.772	181.973	209.962	174.403	175.863
Decile 7	138.254	223.728	239.134	211.543	204.141
Decile 8	158.125	256.185	265.346	253.861	256.066
Decile 9	195.032	301.581	319.532	306.800	263.978
Decile.10	340.243	604.100	662.836	686.126	657.266
Top 5%	442.496	796.649	940.301	938.540	904.917
Top 1%	875.382	1.397.230	1.999.955	1.952.296	1.462.593
Top 0.5%	1.165.919	1.732.178	2.981.371	2.379.326	1.988.416
Top 0.1%	2.342.862	2.681.113	7.369.830	6.749.488	4.682.123
Top 0.01%	7.285.396	2.811.686	10.339.336	18.094.707	17.959.844

21. In order to better understand how inequality has evolved over the business cycle in Spain, it is useful to examine how income and wealth vary with respect to age, education, gender and home ownership status. Figures 6 to 13 illustrate average levels of both income and wealth for each wave of the SHF across these dimensions.

22. Figure 6 depicts average income by age for seven different age groups over the period 2002-14. The age corresponds to that of the head of each household. The most remarkable finding is that the crisis had an asymmetrical effect on different age groups. For instance, for households in which the head of the household is below 25 years old, average income remained the same between 2002 and 2014. By contrast, households in which the household head is more than 65 years old, on average, experienced an almost doubling of income over the same period. This finding suggests that older individuals, thanks to pension payments and larger housing and financial portfolios, have been able to cope better with the crisis than younger individuals who have suffered the consequences of very high rates of unemployment and had almost no wealth (OECD, 2018; Martínez-Toledano, 2018). Moreover, the share of part-time employment increased considerably, especially for those individuals earning the lowest hourly wages (Anghel et al., 2018). Similarly, Figure 7 shows average wealth by age. Results are even more pronounced than in the case of income, with younger individuals faring relatively worse than older individuals.

Figure 6. Average income by age in Spain, 2002-2014

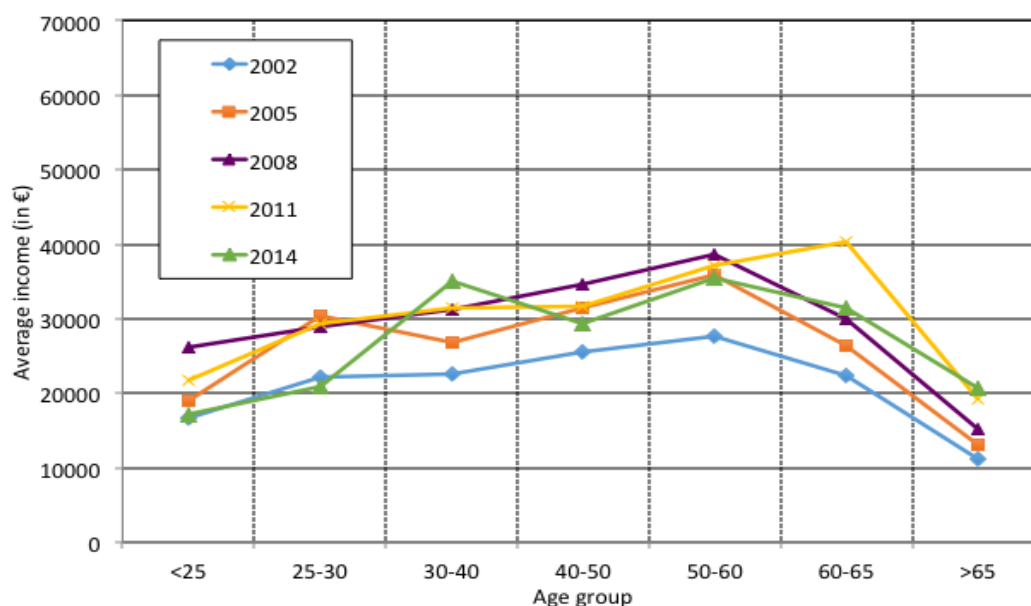
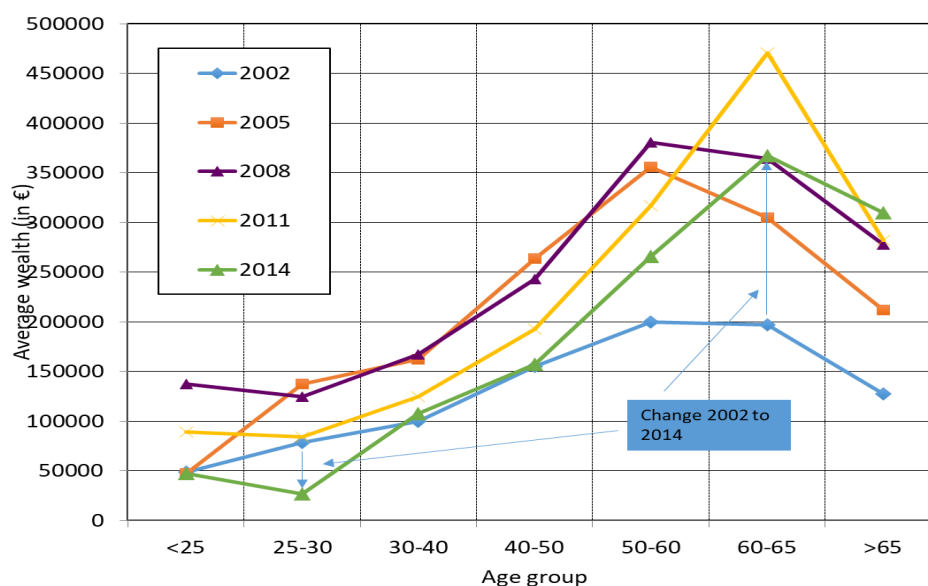


Figure 7. Average wealth by age in Spain, 2002-2014



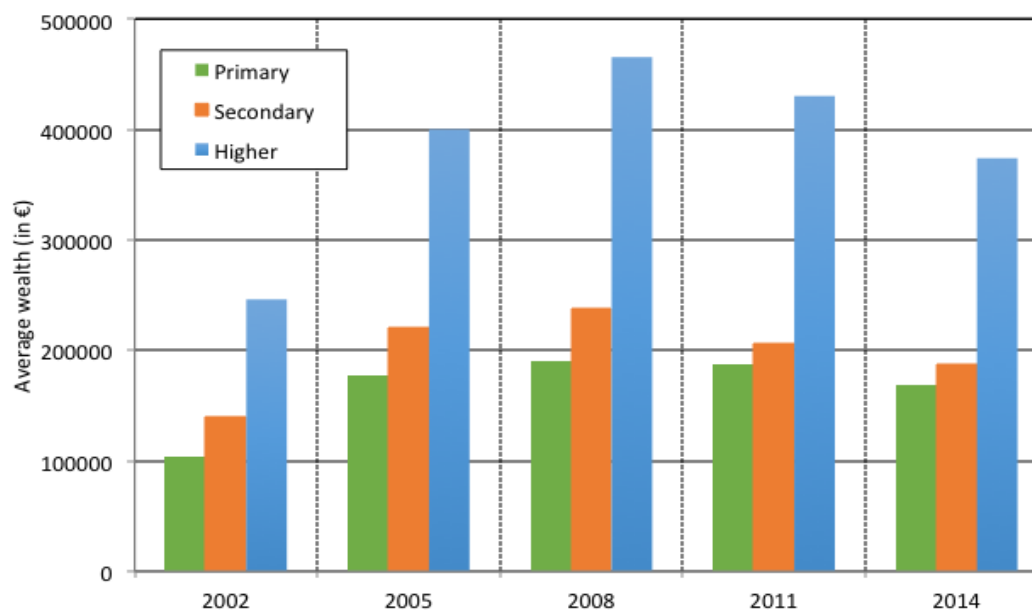
23. Average income and wealth also differ significantly with respect to educational attainment. Figure 8 shows that in households in which the household head only had primary education in 2002, average income was approximately EUR 14 000. This compares to EUR 37 000 for households where the household head had higher education. This difference has become more pronounced over time. In 2014, the average income for those with primary education was EUR 17,000, as compared to EUR 50 000 for those with higher education. The differences in average wealth by level of education are even larger, and also increased following the crisis (Figure 9). In 2014, average wealth was EUR 169 000 in

households whose head had only primary education, EUR 188 000 in households with secondary education and EUR 374 000 in households with higher education.

Figure 8. Average income by education in Spain, 2002-2014



Figure 9. Average wealth by education in Spain, 2002-2014



24. Figures 10 and 11 illustrate the differences in average income and wealth over time by gender. In households in which the head is a woman, average income and wealth are lower than in those in which the head is a man. Of course, any such difference may relate to other household composition effects not captured by this simple analysis. In any event, differences across gender appear more pronounced following the crisis, particularly in the case of wealth. For instance, in 2014, average income for men was EUR 33 000, compared

to EUR 24 000 for women, while average wealth was EUR 266 000 for men, compared to EUR 176 000 for women.

Figure 10. Average income by gender in Spain, 2002-2014

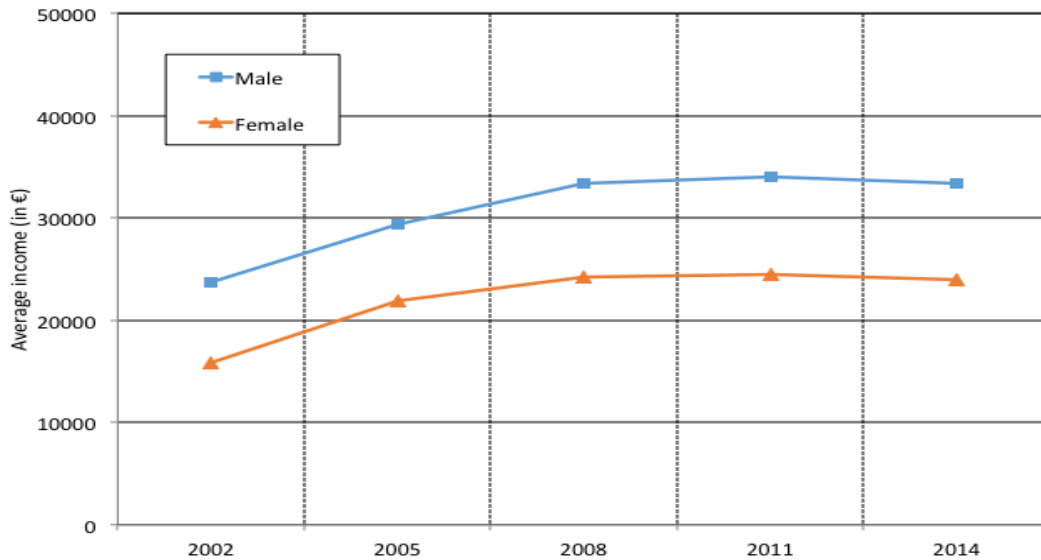
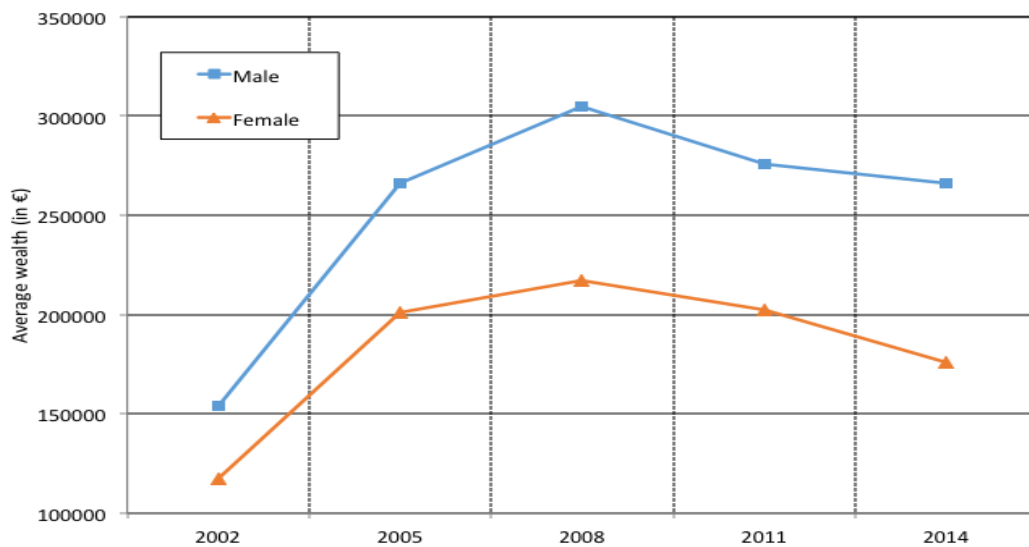
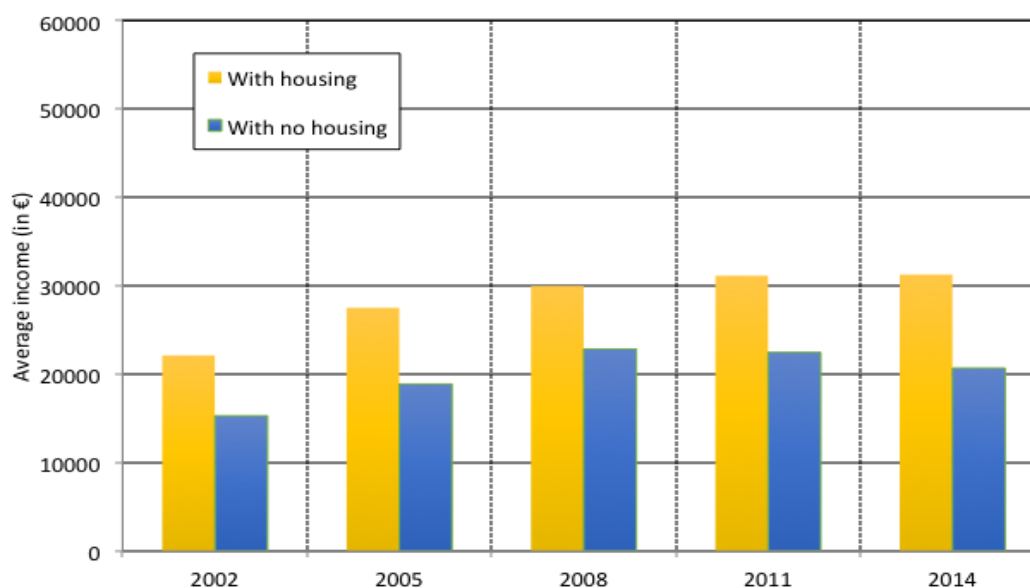
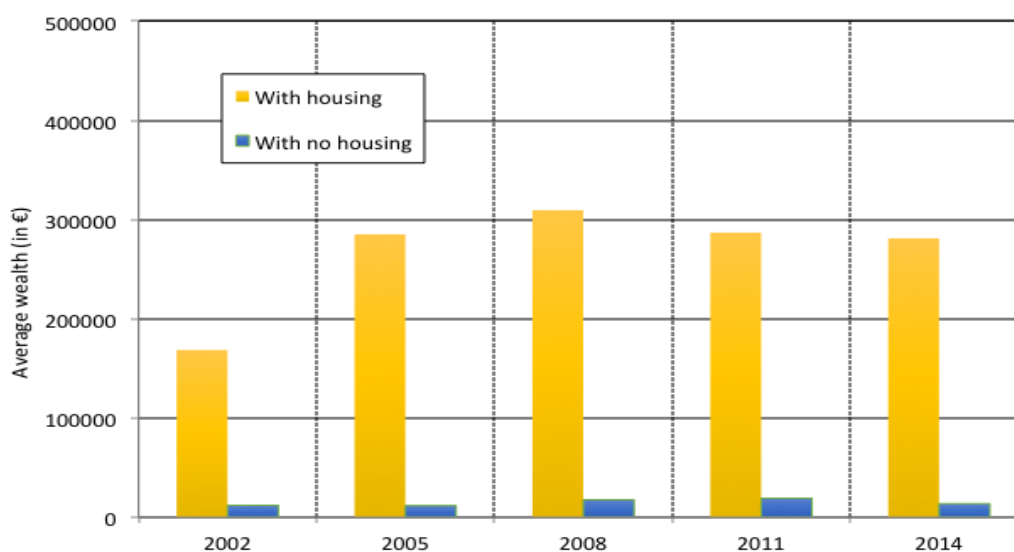


Figure 11. Average wealth by gender in Spain, 2002-2014



25. Finally, differences in average income and wealth by home-ownership status are also quite remarkable and are presented in Figures 12 and 13, respectively. The rate of home ownership is high at 78% in Spain. Households who own a house have higher income and wealth than households who do not and hence rent their main residence. In 2014, average income and wealth for those who own a house were EUR 31 000 and EUR 281 000, respectively compared to EUR 21 000 and EUR 14 000, respectively for those who rent. One reason for this may be that renters are, in general, younger than homeowners and have had less time to accumulate wealth.

Figure 12. Average income by home ownership in Spain, 2002-2014**Figure 13. Average wealth by home ownership in Spain, 2002-2014**

Income and wealth mobility analysis

26. Income and wealth mobility have multiple conceptual dimensions and associated approaches to measurement (Jäntti and Jenkins, 2013). In this section, the mobility of households is examined in two ways: *i*) calculation of transition matrices across the income and wealth distributions; and *ii*) a regression analysis based on the change in the household's percentile in the income or wealth distribution.

Empirical methodology

27. The transition matrices are calculated for the different waves of the survey, which are then presented graphically. Transitions show the evolution of each household unit's income or wealth position relative to all other household units. Any upward transition implies at least some corresponding downward relative movement.

28. The methodology used to calculate the transition matrices is very standard and similar to the one used in Kennedy et al. (2016) to analyse income mobility in Ireland. First, the group of household units needs to be identified. In this case, all household units are selected. Second, household units observed in either of the comparison years are identified and only household units observed in both years are selected. Hence, each unit has both an origin and destination position within a distribution. Third, two distinct gross income and wealth deciles (quintiles or percentiles) are then calculated for each year. Finally, the household transition matrix is calculated across the two years, which shows the probability that a household will end the period in any given decile of either the income or wealth distribution, conditional on their place in that distribution at the beginning of the period.

29. This method has several important implications. First, the matrices provide relative changes in the income or wealth distribution position of household units at two points in time rather than absolute changes. For this reason, it is possible for a unit's relative position in the distribution to fall, while their absolute income or wealth increases and vice versa. Second, examination at two points in time does not allow for observing units who frequently change their distributional position over the course of the reference period and such changes are not captured in the analysis. Consequently, the analysis does not capture those who leave the survey for various reasons over the period (for example, due to death or emigration) or those who enter the survey in the later period (for example, through immigration).

30. The transition matrices can be interpreted as follows. If there was no mobility of households within the distribution of either income or wealth, the diagonal elements would be 100% and off-diagonal elements would be equal to 0%. A high diagonal entry indicates that household units are more likely to remain in the same income or wealth decile over the period. Similarly, low diagonal entries indicate higher mobility, that is, households have moved from their initial decile to another decile. The number of years between the two periods selected is also important. In general, it is expected that longer horizon transitions will show greater mobility. Other literature suggests that there would be relatively less mobility at the upper and lower ends of the distributions and relatively greater mobility in the middle deciles (see, Law and Scobie (2018) for an example with respect to wealth transitions in the case of New Zealand).

31. The analysis in this section is based on the comparison of each consecutive wave of the survey. It is not possible to compare transitions across non-consecutive waves since the weights are no longer representative of the population. For the purposes of the transition matrix analysis, four periods are examined as follows: 2002-2005 (2 577 household units); 2005-2008 (3 961 household units); 2008-2011 (3 710 household units); and 2011-2014 (3 057 household units).

32. Following the approach taken in calculating the transition probabilities, regression analysis is undertaken using the same balanced panel created for each bi-year period. The dependent variable is calculated as the change in a household's percentile position in the wealth or income distribution between the two periods. For instance, if a household's relative position within a given distribution changed from the 15th percentile to the 40th,

then the dependant variable would be equal to 25. If, on the other hand, a household's relative position deteriorated over time, say from the 90th percentile to the 50th, then the dependant variable would be equal to -40. Two specifications are considered to model the change in the household's percentile position for each of the four periods. To assess the importance of households starting point in the income or wealth distribution, the baseline specification uses only the initial income or wealth deciles to explain households' percentile movement. The second specification extends the baseline by including demographic and socio-economic information such as age, education, employment and health status, asset ownership, household size, income and initial wealth. Table 3 summarizes all the variables used in the regression analysis in Sections 4 and 5. Adding age helps to control for the life-cycle income or wealth effects identified above. A base category for each variable is specified that determines the base household against which coefficients are interpreted. The middle (sixth) decile is taken as the base category for the initial deciles.

Table 3. Variables used in the regression models

Variable name	Definition	Measurement over period
Change in net wealth	The change in net wealth for a given household between consecutive waves ()	End less start
Net wealth	The level of a the household's net wealth ()	Start
Income	The gross income of the household earned over the period ()	Sum
Owns mortgage	A dummy variable equal to one if the household has a mortgage	Start
Owns house	A dummy variable equal to one if the household owns at least one house	Start
Owns stocks	A dummy variable equal to one if the household owns stocks	Start
Age	The age of the head of the household	Start
Age squared	The age of the head of the household squared	Start
Higher education	A dummy variable equal to one if the head of the household has higher education (an university degree)	Start
Unemployed	A dummy variable equal to one if the head of the household is unemployed	Start
Temporary contract	A dummy variable equal to one if the head of the household has a temporary contract	Start
Inactive	A dummy variable equal to one if the head of the household is inactive	Start
Good health	A dummy variable equal to one if the head of the household reported that he was in good health	Start
Fair health	A dummy variable equal to one if the head of the household reported that he was in fair health	Start
Poor health	A dummy variable equal to one if the respondent if the head of the household reported that he was poor health	Start
Household size	Number of individuals in each household	Start
Dummy 2005	A dummy variable equal to one when considering the final net wealth change (between waves 2002 and 2005)	End
Dummy 2008	A dummy variable equal to one when considering the final net wealth change (between waves 2005 and 2008)	End
Dummy 2011	A dummy variable equal to one when considering the final net wealth change (between waves 2008 and 2011)	End

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33. Figures 14-17 show the income transition matrices for each of the four periods examined. The y-axis of each figure depicts the various deciles and the x-axis the mobility shares, that is, the fraction of individuals who stay in the same decile (boxed in black) and the fraction of movers from one decile to each of the other nine deciles of the income

distribution. Each colour represents one decile and these are ordered from left to right from the first to the tenth decile.

Figure 14. Income transition matrix 2002-2005

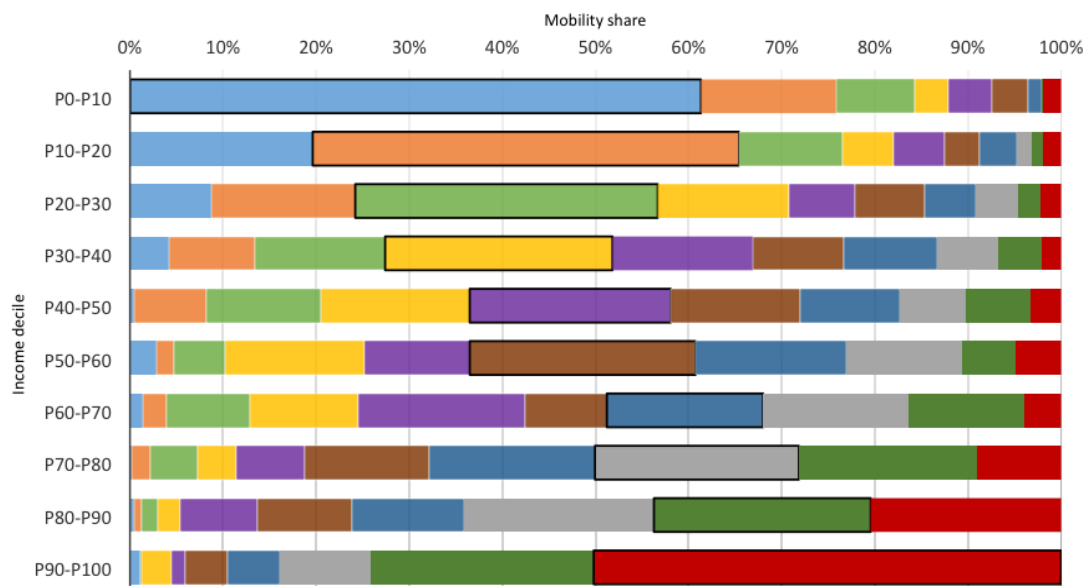
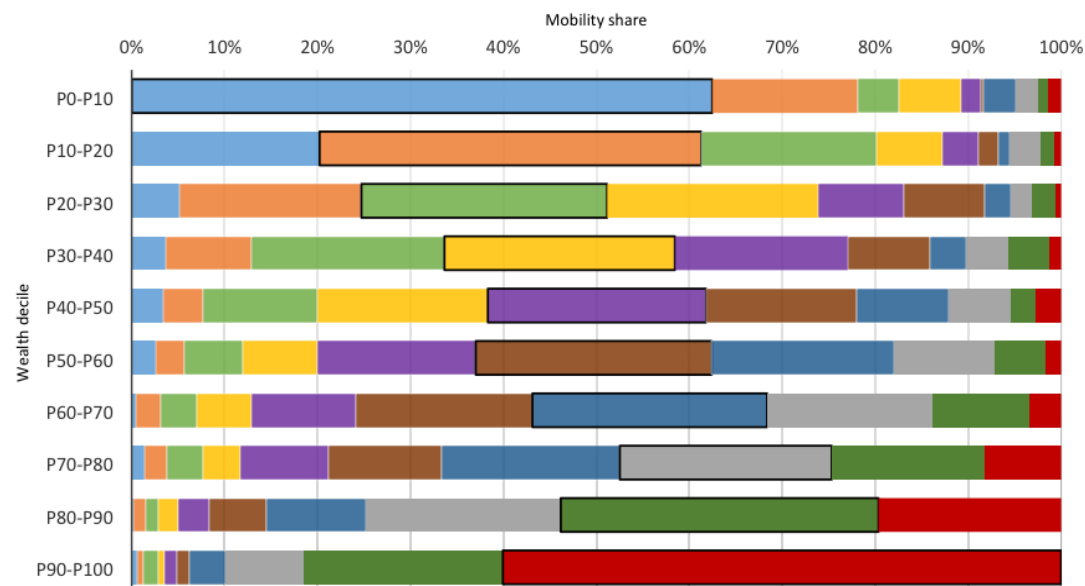


Figure 15. Income transition matrix 2005-2008



34. Income mobility is higher in middle deciles than in deciles 1 and 10 in all periods, meaning that for extreme-low-income and extreme-high-income individuals, it is harder to move upwards and downwards, respectively. Comparing the pre- and post-2008 periods, income mobility increased among the lower deciles after 2008, most likely due to individuals moving in and out of unemployment. A smaller proportion of household units remained entrenched in the bottom decile (58% between 2005 and 2008 compared to 39%

between 2008 and 2011), while a higher proportion moved up to the second, third and fourth deciles (approximately 50% compared to 30%).

Figure 16. Income transition matrix 2008-2011

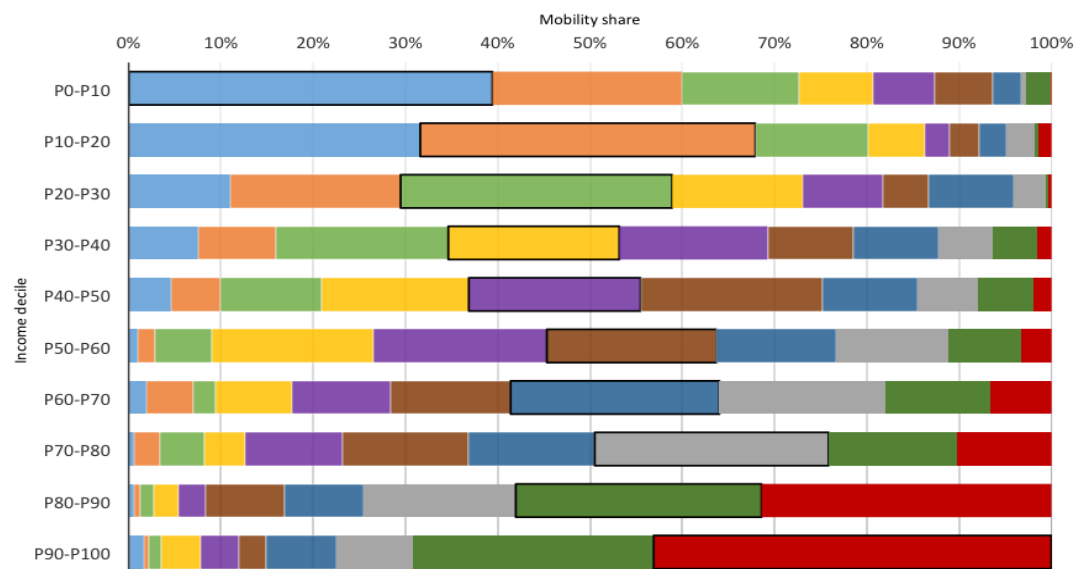
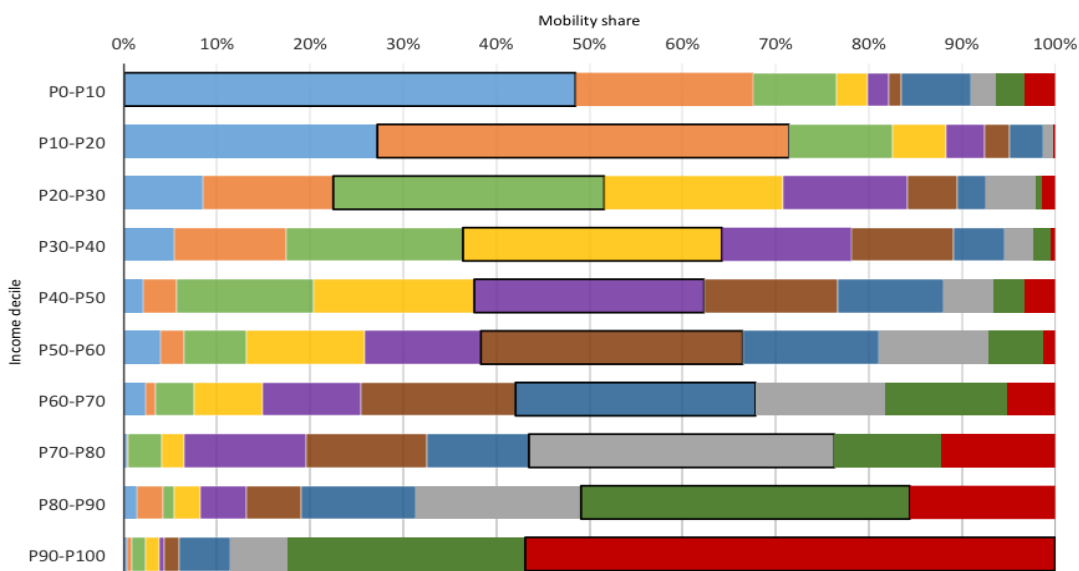


Figure 17. Income transition matrix 2011-2014



35. Among the top deciles, a relatively smaller proportion of households managed to remain in those deciles in the post-2008 period. For example, in the 9th and 10th deciles, the proportions remaining in the same decile were 27% and 43% between 2008 and 2011, compared to 29% and 49% between 2005 and 2008. These results are in line with those of Cantó and Ruiz (2014), who obtain similar findings for Spain and the United States.

36. When comparing the results for Spain with those for Ireland (Kennedy et al., 2016), it appears that income mobility is lower in Spain than in Ireland for bottom deciles, but higher for top deciles. In other words, in Spain, it is harder to move from being relatively poor to relatively less poor, but also harder to remain relatively rich.

Figure 18. Wealth transition matrix 2002-2005

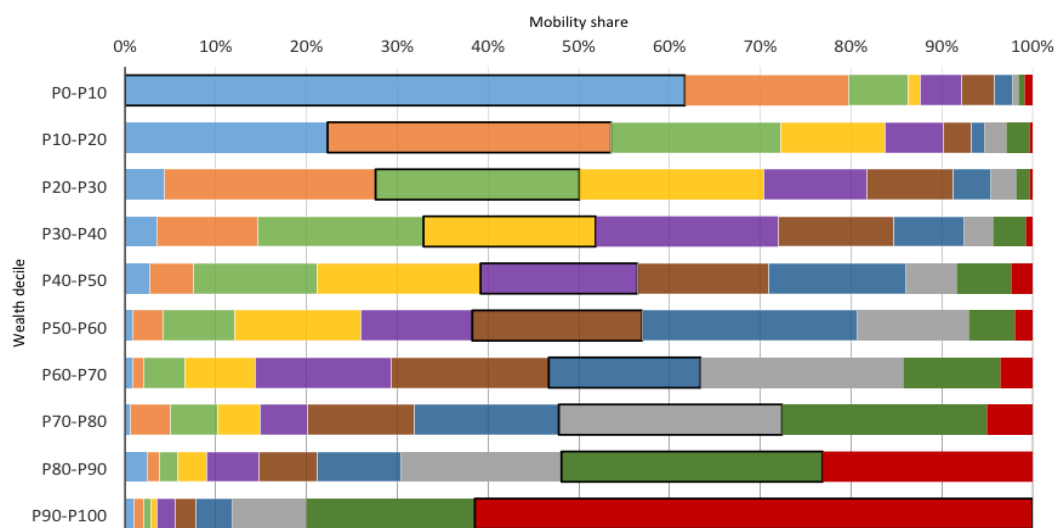
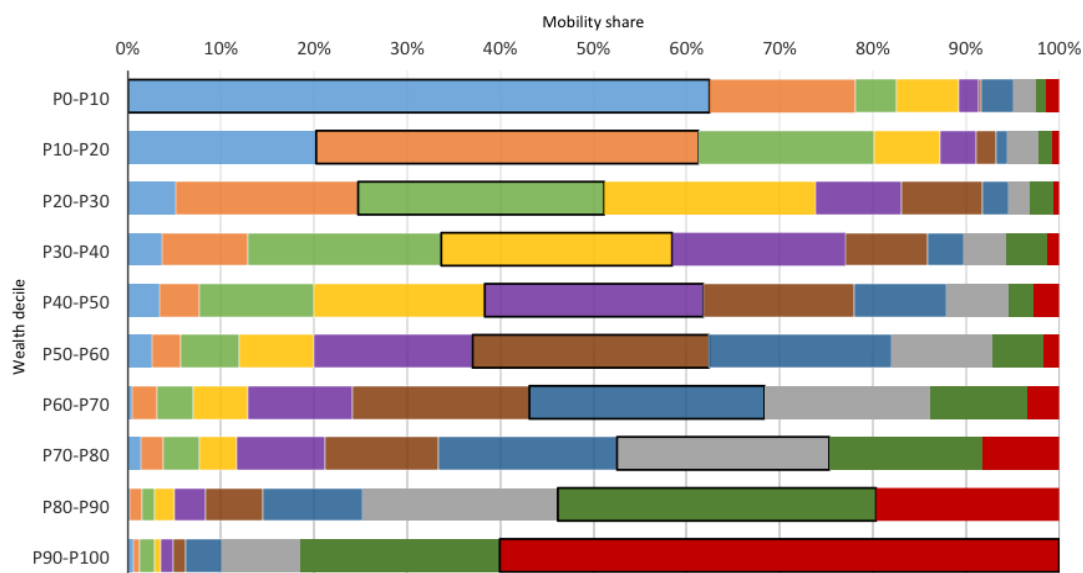
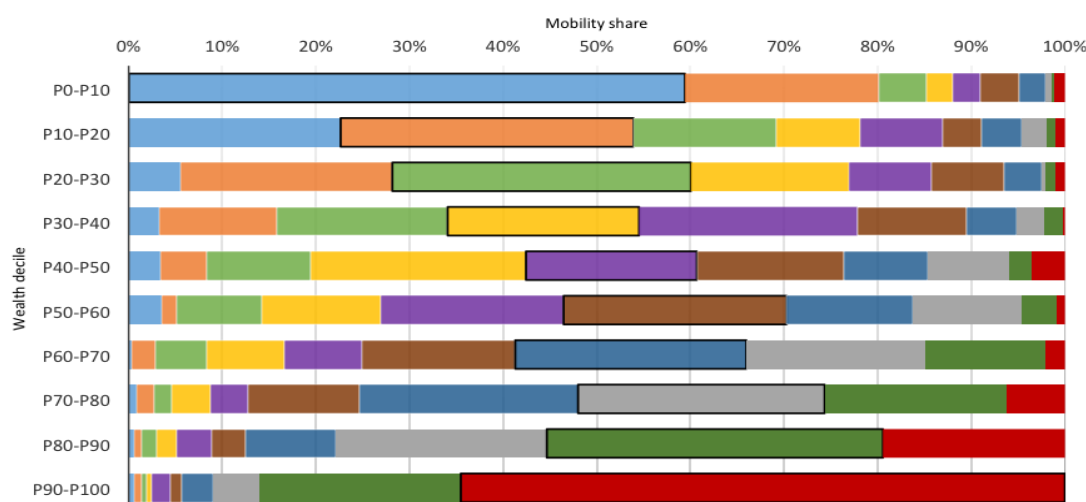
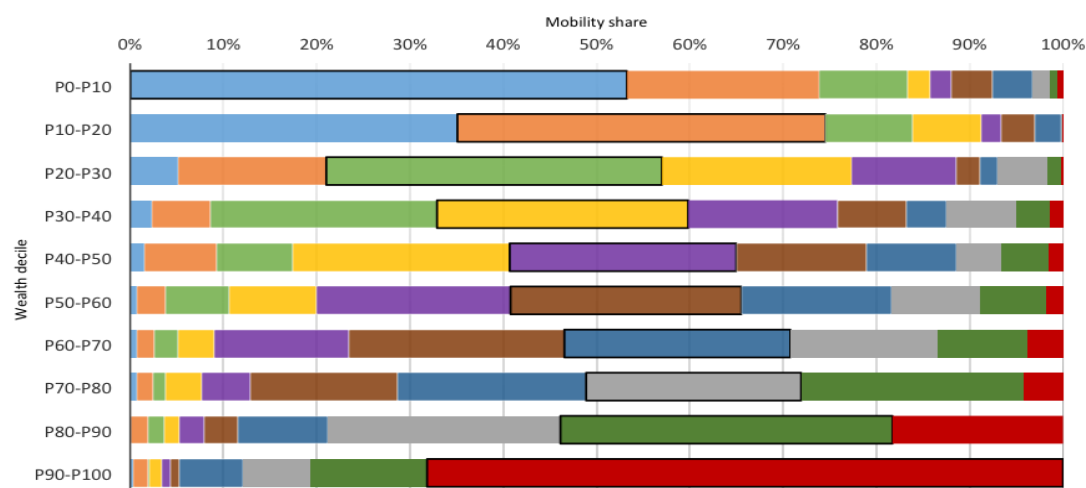


Figure 19. Wealth transition matrix 2005-2008



37. Comparing the pre- and post-2008 periods, wealth mobility has increased among the lower deciles after 2008. A smaller proportion of households remained entrenched in the bottom decile (63% between 2005 and 2008, compared to 60% between 2008 and 2011), while a higher proportion moved up to the second, third and fourth deciles (approximately 31% compared to 29%). Nonetheless, the differences are much smaller than in the case of income.

Figure 20. Wealth transition matrix 2008-2011**Figure 21. Wealth transition matrix 2011-2014**

38. Furthermore, among the top deciles, relatively smaller proportions of households managed to remain in those deciles in the post-2008 period. For example, in the 9th and 10th deciles, the proportions staying in the same decile were 34% and 60% between 2008 and 2011, compared to 36% and 65% between 2005 and 2008.

39. Table 4 presents the results from a set of regressions on the change in each households' income percentile position. Initial income is, as expected, an important driver of subsequent mobility. A household starting in the bottom decile in 2002 will move up approximately 14 percentiles by 2005 when compared to a household starting in the middle decile. A household starting in the top decile in 2002 will move down approximately 11 percentiles by 2005 relative to a household starting in the middle decile. Overall, households starting at deciles below the middle decile experience an increase in mobility relative to the middle decile and those starting above the middle decile experience a decrease. Moreover, the downward trend in terms of coefficient magnitude is approximately linear. That is, upwards mobility is greatest for those starting in the bottom

decile. In contrast, for those starting in the fifth decile their upwards mobility is the smallest. This trend is the same for those starting in the top decile and just above the middle decile.²

Table 4. Change in the households' income percentile position

VARIABLES	Baseline				Extension			
	Expansion (First period)	Expansion (Second period)	Recession	Recovery	Expansion (First period)	Expansion (Second period)	Recession	Recovery
	(2002-05)	(2005-08)	(2008-11)	(2011-14)	(2002-05)	(2005-08)	(2008-11)	(2011-14)
Initial Decile: Bottom	14,3***	12,6***	14,6***	11,1***	37,0***	31,5***	29,4***	21,3***
Initial Decile: 2	12,6***	10,5***	10,5***	6,2***	30,0***	24,6***	22,0***	15,0***
Initial Decile: 3	13,4***	12,4***	8,2***	8,3***	24,2***	20,6***	17,5***	14,7***
Initial Decile: 4	13,5***	7,0***	9,9***	5,4***	18,7***	11,6***	15,2***	9,4***
Initial Decile: 5	10,6***	6,5***	4,0***	2,5***	11,8***	8,4***	6,5***	4,8***
Initial Decile: 6 (base)	-	-	-	-	-	-	-	-
Initial Decile: 7	-0,2	-0,6	-8,1***	-8,1***	-5,9***	-4,0***	-9,2***	-9,9***
Initial Decile: 8	-6,4***	-5,3***	-8,3***	-9,2***	-15,0***	-10,9***	-13,1***	-13,8***
Initial Decile: 9	-6,2***	-4,9***	-7,8***	-10,8***	-23,4***	-16,2***	-18,4***	-21,2***
Initial Decile: Top	-10,7***	-8,5***	-9,5***	-12,7***	-46,8***	-30,9***	-32,7***	-36,0***
Age (t-1)					0,1	0,4***	-0,2***	0,2***
Age squared (t-1)					0,0***	0,0***	0,0***	0,0***
Household size (t-1)					1,3***	1,5***	0,2*	1,1***
Owens house (t-1)					4,1***	2,4***	3,2***	4,9***
Owens mortgage (t-1)					1,3***	0,7**	5,7***	1,5***
Owens stocks (t-1)					2,7***	1,5***	2,8***	1,4***
Income (t + t-1)					0,0***	0,0***	0,0***	0,0***
Wealth (t-1)					0,0***	0,0***	0,0***	0,0***
Unemployed (t-1)					-0,5	-6,2***	-7,6***	-3,7***
Inactive (t-1)					-3,4***	-2,1***	-4,1***	2,0***
Temporary contract (t-1)					-1,7***	0,3	-3,6***	-7,7***
University education (t-1)					-0,3	4,4***	6,7***	5,9***
Good health (t-1)					0,1	1,7***	3,5***	2,1***
Poor health (t-1)					-1,1**	-1,1***	-1,4***	4,1***
N	2577	3961	3710	3049	2577	3961	3710	3049

Note: Significance levels: * p<0.05, ** p<0.01, *** p<0.001.

40. The observed trend holds for each of the four periods considered here. When examining the impact of the expansion, recession and recovery periods on mobility, it is

² Note that the greatest upwards mobility at the bottom decile and the greatest downwards mobility at the top decile are partly driven by the fact that taxpayers starting in the bottom decile cannot move downwards (and vice versa for those starting in the top deciles). Nevertheless, the fact that the trend holds through to the middle deciles suggests that the underlying trend holds.

apparent that mobility over the three periods is broadly similar. Upward mobility is greatest during the recession and the first expansionary period for those starting at income deciles below the middle. This is most likely due to individuals moving in and out of unemployment. Downward mobility is greatest during the recovery for those starting in the top income decile.

41. Both asset and mortgage ownership are associated with greater upward income mobility across all periods. Labour market status is also a key driver of mobility. Households in which the head is unemployed experienced more downward mobility across all periods, compared to a household where the head was employed with a permanent contract. This is also the case for households in which the head is inactive, except for the recovery period. This is consistent with the findings that retired individuals have become relatively richer during the recovery due to the stability of pension benefits (Martínez-Toledano, 2017). Households in which the head has a temporary contract experienced more downward mobility, except during the second expansion period. The negative effect is particularly strong compared to other influences in the second expansion period. Having a higher education degree is positively related with upward mobility across all periods except during the first period of the expansion. This is certainly related to the increase in secondary school dropout rates during this period due to high wages in low-skilled jobs such as construction (Aparicio-Fenoll, 2016). By contrast, while differences in age, household size, total income and initial wealth are significant determinants of income mobility, the effect is small relative to other variables.

42. Table 5 presents the results of a set of regressions on the change in each households' wealth percentile position. Overall, households starting at deciles below the middle decile experience an increase in wealth mobility relative to the middle decile and those starting above the middle decile experience a decrease. However, the level of mobility is much lower than that for income. The observed trend holds for each of the four periods considered here. When examining the impact of the expansion, recession and recovery periods on mobility, it is apparent that mobility over the three periods is broadly similar. As in the case of income, upward mobility is greatest during the recession and the first expansionary period for those starting at wealth deciles below the middle. Downward mobility is greatest during the recovery for those starting in the top wealth decile.

43. As for income mobility, differences in age, household size, total income and initial wealth are significant determinants of wealth mobility, the effect is small relative to other variables. Asset ownership is associated with greater upward mobility across all periods. Contrary to the case of income, households having a mortgage are exposed to more downward mobility during the recession. This is consistent with the fact that households that are more indebted devote a fraction of their income to paying back their debt every period and thus are less able to accumulate wealth. Households in which the head is unemployed experienced more downward mobility in three periods. As in the case of income, having a higher education degree is positively related with upward mobility across all periods, except for the first period of the expansion, underlining the importance of education differences as a determinant of inequality trends.

Table 5. Change in the households' wealth percentile position

VARIABLES	Baseline				Extension			
	Expansion (First period)	Expansion (Second period)	Recession	Recovery	Expansion (First period)	Expansion (Second period)	Recession	Recovery
	(2002-05)	(2005-08)	(2008-11)	(2011-14)	(2002-05)	(2005-08)	(2008-11)	(2011-14)
Initial Decile: Bottom	12.7***	10.3***	12.4***	6.8***	17.1***	5.1***	11.4***	14.2***
Initial Decile: 2	15.1***	11.7***	13.4***	13.5***	16.7***	10.0***	13.6***	17.0***
Initial Decile: 3	14.4***	10.2***	12.7***	6.7***	15.8***	12.0***	13.5***	8.7***
Initial Decile: 4	8.2***	3.0***	10.6***	5.1***	9.3***	4.9***	11.4***	7.0***
Initial Decile: 5	3.4	3.7***	3.9***	2.9***	3.8*	4.9***	4.3***	3.8***
Initial Decile: 6 (base)	-	-	-	-	-	-	-	-
Initial Decile: 7	-2.53	-4.9***	-0.8	-4.8***	-3.4*	-4.9***	-1.1	-4.6***
Initial Decile: 8	-5.2***	-9.3***	-2.4*	-7.8***	-6.6***	-9.5***	-3.1**	-9.6***
Initial Decile: 9	-8.3***	-11.8***	-2.9***	-10.5***	-10.3***	-12.7***	-5.0***	-13.8***
Initial Decile: Top	-4.0***	-9.5***	-4.1***	-7.5***	-8.9***	-13.0***	-8.0***	-14.9***
Age (t-1)					0.4***	0.4***	0.3***	0.6***
Age squared (t-1)					0.0***	0.0***	0.0**	0.0***
Household size (t-1)					-1.6***	0.6***	-0.4***	-0.1***
Owns house (t-1)					2.8*	-7.7***	-3.0	3.9***
Owns mortgage (t-1)					0.2	-0.8**	0.2	-4.3***
Owns stocks (t-1)					2.8*	4.6***	2.2***	3.3***
Income (t + t-1)					0.0***	0.0***	0.0***	0.0***
Wealth (t-1)					0.0***	0.0***	0.0***	0.0***
Unemployed (t-1)					-2.8***	-2.6***	2.8***	-3.2***
Inactive (t-1)					-1.3***	4.4***	-0.7*	1.1***
Has temporary contract (t-1)					-2.3***	-0.5***	1.7***	-3.2***
University education (t-1)					0.9*	2.6***	1.4*	2.8***
Good health (t-1)					1.8***	1.7***	1.3***	2.7***
Poor health (t-1)					2.2*	-0.6*	-2.2***	0.9
Observations	2577	3961	3710	3049	2577	3961	3710	3049

Note: Significance levels: * p<0.05, ** p<0.01, *** p<0.001.

Determinants of wealth accumulation

Empirical methodology

44. This section carries out a regression analysis in order to study which variables are associated with wealth accumulation over time. To test the determinants of the changes in nominal net wealth, we estimate the following model:

$$\Delta NW_{it} = \alpha + \beta_1 NW_{it-1} + \beta_2 Income_i + \beta_3 X_{it-1} + D_t + \epsilon_{it}$$

where NW refers to net wealth of the household to which person i belongs to at time t ; income is the average income during the two time periods; X includes a number of individual characteristics such as whether the person has a mortgage, owns a house or stocks, age and household size.

45. This model is estimated separately for each of the periods 2002 to 2005, 2005 to 2008, 2008 to 2011 and 2011 to 2014. In addition, a pooled OLS regression is estimated which includes year dummies, denoted by D . Pooled OLS is favoured in this case over panel data techniques due to high rates of attrition in the sample. This base model is then extended with the inclusion of a number of characteristics of the household head (defined as the oldest adult belonging to any given household).

46. Data on household assets and liabilities are subject to measurement error. To address this limitation related to the dependent variable, that is, changes in net wealth, outliers have been excluded from both the base and extended regression specifications described above. In particular, the top 5% of observations on absolute changes in net wealth between each of the four periods examined have been excluded from the sample.

47. Most explanatory variables are defined at the start of the period for which the change in net wealth is being estimated, i.e., at wave 2002 when we are estimating the change in net wealth that occurred between waves 2005 and 2002. One exception is income, which is the sum of the income an individual earns over the period of asset accumulation that is included in regressions (in the current example, the sum of income earned in waves 2002 and 2005). The unit of observation is the household, but for variables such as age, education, health and employment status, the information of the household head is used.

48. In addition, the Appendix presents results of both the base and extended regression specifications described above for two different dependent variables. These dependent variables are the levels (as opposed to changes over time) of both income and wealth.

Empirical results

49. Table 6 presents the results of the base model of wealth accumulation in Spain over the period 2002 to 2014. Results over each of the four time periods considered, as well as when all observations are pooled, are largely consistent. However, the pooled regression suggests that on average, wealth accumulation was lower during the periods immediately before and after the crisis, as compared to either the 2002-05 or 2011-14 periods.

50. In all five regressions presented in Table 6, income and property ownership (both own home and investment property, except for the period 2008-2011) are positively associated with changes in net wealth and are statistically significant. For example, a one euro increase in income in 2002 is associated with a 3.1 percent greater change in net wealth between 2005 and 2002. The overall effect of age (considering both variables Age and Age Squared) is significant, except for the period 2011-2014, but changes sign depending on the sample period. Conversely, those with a mortgage had, on average, a significantly smaller change in net wealth than those not holding a mortgage or those whose household size was larger.

51. Those with higher levels of wealth at the start of each period, over which changes in wealth were calculated, experienced lower measured wealth accumulation on average. While perhaps not economically intuitive (for at least part of the period analysed), this is likely related to measurement error in the dependent variable. The inclusion of wealth at the start of each period as an explanatory variable in regressions should therefore improve the precision of other coefficient estimates.

Table 6. Regressions on the changes in net wealth between t and t-1 (Base model)

Variable	2005-2002	2008-2005	2011-2008	2014-2011	All (pooled)
Wealth (t-1)	-0.6*** (-17.8)	-0.5*** (-32.6)	-0.5*** (-10.3)	-0.4*** (-9.0)	-0.4*** (-49.1)
Income ((t-1)+t)	3.1*** (22.9)	3.2*** (39.5)	3.3*** (15.6)	2.1*** (8.1)	2.7*** (52.0)
Owns mortgage (t-1)	-62256.5*** (-23.4)	-41073.3*** (-10.7)	-64527.7*** (-9.5)	-79521.7*** (-7.7)	-61321.1*** (-23.3)
Owns house (t-1)	108867.4*** (23.3)	34236.1*** (3.3)	15938.4 (1.4)	16498.6*** (1.9)	35675.5*** (13.7)
Owns stocks (t-1)	95653.2*** (10.7)	41041.7*** (5.5)	11354.5 (0.8)	19937.5*** (3.3)	39018.1*** (20.1)
Age (t-1)	7804.4*** (13.5)	-1825.8*** (-2.5)	2932.7*** (5.1)	-554.5 (-1.2)	1305.0*** (4.4)
Age squared (t-1)	-62.1*** (-11.9)	36.2*** (5.1)	-12.0*** (-2.3)	20.9*** (5.5)	2.9 (1.0)
Household size (t-1)	-16808.3*** (-12.0)	-16851.2*** (-14.8)	-24392.4*** (-11.2)	-1614.6 (-1.4)	-11582.7*** (-28.5)
Dummy 2005					-43316.7*** (-9.1)
Dummy 2008					-94539.8*** (-30.1)
Dummy 2011					-101774.3*** (-132.8)
N	2577	3961	3710	3049	13297

Note: Significance levels: * p<0.05, ** p<0.01, *** p<0.001.

52. Table 7 presents the results of the extended model of wealth accumulation in Spain. This extended model differs from the base model in that variables that capture a number of characteristics associated with an assigned household head have been included. These are three sets of categorical variables relating to the education level of the household head, their health status and their employment status. Coefficient estimates for these variables show effects on changes in net wealth relative to that of a base case. For the categorical variables related to education, this base case is that the household head has less than higher education, with respect to employment, it is that the household head is employed with a permanent contract and with respect to health, the base case is excellent health.

53. The coefficient estimates for the variables used in both the base and extended model are broadly similar. However, some of the coefficient estimates related to characteristics of the household head are somewhat surprising. In particular, while having a household head who possessed higher education is positively associated with wealth accumulation over the period 2002 to 2005, the opposite is the case in all subsequent periods. Similarly, as one would expect, those households with a household head that was either employed with a temporary contract, inactive or unemployed (relative to being employed with a permanent contract) accumulated less wealth during early periods, but the opposite is observed for later periods.

54. Coefficient estimates relating to the health status of the household head are also difficult to interpret. For example, good health relative to excellent health is associated with higher wealth accumulation, except for the recession period 2008-2011. These peculiarities with respect to results related to the association between wealth accumulation of the

household and various characteristics of an assigned household head suggest that these variables may not be very good proxies for the overall education, employment, and health status of households.

Table 7. Regressions on the changes in net wealth between t and t-1 (Extended model)

Variable	2005-2002	2008-2005	2011-2008	2014-2011	All (pooled)
Wealth (t-1)	-0.6*** (-19.2)	-0.5*** (-31.8)	-0.5*** (-10.4)	-0.4*** (-8.9)	-0.5*** (-49.0)
Income ((t-1)+t)	2.8*** (15.2)	3.3*** (45.3)	3.5*** (15.7)	2.2*** (7.6)	2.8*** (43.7)
Owns mortgage (t-1)	-63948.5*** (-23.7)	-33823.4*** (-9.1)	-58879.0*** (-9.0)	-78730.5*** (-7.9)	-59446.3*** (-24.4)
Owns house (t-1)	105168.5*** (24.6)	36107.2*** (3.6)	14270.7 (1.2)	19198.9** (2.2)	36987.6*** (14.0)
Owns stocks (t-1)	87928.5*** (11.6)	44084.3*** (4.8)	18903.3 (1.2)	32688.3*** (7.7)	43757.7*** (31.2)
Age (t-1)	8059.0*** (12.8)	23.4 (0.0)	3971.3*** (5.6)	765.8 (1.0)	2019.9*** (6.5)
Age squared (t-1)	-61.6*** (-12.6)	7.0 (1.1)	-28.4*** (-3.9)	6.9 (1.1)	-7.7** (-2.4)
Higher education (t-1)	38841.6*** (4.0)	-16282.2 (-1.5)	-33175.8*** (-2.8)	-33572.8*** (-2.8)	-17611.4*** (-3.2)
Unemployed (t-1)	-30028.6** (-10.7)	-13563.5*** (-3.3)	51851.4*** (6.6)	12391.9*** (7.4)	13444.6*** (8.3)
Inactive (t-1)	-13468.0*** (-2.9)	78019.2*** (17.8)	53228.2*** (6.2)	14022.3** (2.3)	29855.5*** (14.7)
Temporary contract (t-1)	-34836.0 (-9.3)	-23717.0 (-3.2)	36587.2*** (6.7)	35270.1** (6.1)	8414.7*** (5.7)
Good health (t-1)	31250.9*** (11.3)	15570.5 (1.2)	-6212.2** (-2.0)	17201.6*** (3.1)	13429.4*** (5.6)
Poor health (t-1)	34800.4*** (11.3)	-2470.0 (-1.1)	-32965.5*** (-25.1)	76276.9*** (21.9)	19130.5*** (11.3)
Household size (t-1)	-15490.3*** (-8.5)	-19038.6*** (-13.2)	-27339.6*** (-11.4)	-3245.0** (-2.3)	-12595.7*** (-26.1)
Dummy 2005					-44912.7*** (-9.4)
Dummy 2008					-95433.0*** (-29.6)
Dummy 2011					-105598.0*** (-121.8)
N	2577	3961	3710	3049	13297

Note: Significance levels: * p<0.05, ** p<0.01, *** p<0.001.

Conclusion

55. The evidence in this paper suggests that house price fluctuations, among other forces acting, might have significantly affected the dynamics of income and wealth in Spain.

56. Income and wealth inequality moderately increased following the sharp decline in house prices that occurred since 2008. This is mainly the consequence of the substantial rise in unemployment, especially among the young, that happened after 2008. Less

educated individuals, renters and women have suffered the consequences of the crisis to a greater extent, which is reflected in their relative lower average income and wealth than before the crisis.

57. Wealth and income mobility are higher for those in the middle than in bottom or top deciles of each distribution, respectively, and mobility is lower for wealth than it is for income. Wealth and income mobility have increased among the lower and top deciles. This is again consistent with the large increase in unemployment and the sharp asset price fluctuations of the first decade of the 2000s.

58. There are many factors influencing wealth accumulation over time. Age, property ownership, being employed and good health seem to have a positive impact on wealth accumulation over time, while having a mortgage has a negative effect. Being on a temporary contract has been negative for upward income and wealth mobility in the post crisis period. Hence, the price of the folly is paid by those households with low income, wealth and education, a temporary contract, bad health and a mortgage.

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ANNEX

Table A1. Regressions on wealth at time t (Base model)

Variable	2005-2002	2008-2005	2011-2008	2014-2011	All (pooled)
Income ((t-1)+t)	4.5*** (41.2)	5.2*** (46.6)	5.5*** (71.7)	5.7*** (117.6)	5.4*** (92.7)
Owns mortgage (t-1)	-84227.6*** (-32.0)	-84308.1*** (-15.4)	-114677.5*** (-26.5)	-169738.2*** (-23.9)	-115860.8*** (-26.0)
Owns house (t-1)	147708.8*** (83.7)	129727.1*** (14.5)	99844.4*** (15.0)	104780.4*** (17.5)	118786.6*** (41.2)
Owns stocks (t-1)	122417.9*** (24.4)	100904.9*** (11.4)	66172.1*** (7.6)	93184.8*** (11.9)	94613.1*** (59.4)
Age (t-1)	9008.4*** (58.5)	1175.0* (1.8)	5101.6*** (559.6)	1392.5*** (2.7)	3374.3*** (13.6)
Age squared (t-1)	-68.5*** (-50.7)	20.9*** (3.3)	-17.9*** (-4.0)	28.7*** (5.7)	-0.5 (-0.2)
Household size (t-1)	-27429.3*** (-29.2)	-19451.0*** (-22.6)	-33331.2*** (-18.0)	-18818.2*** (-13.1)	-25492.7*** (-33.5)
Dummy 2005					-8558.2** (-2.1)
Dummy 2008					-57161.2*** (-20.2)
Dummy 2011					-77231.7*** (-48.6)
N	2577	3961	3710	3049	13297

Note: Significance levels: * p<0.05, ** p<0.01, *** p<0.001.

Table A2. Regressions on wealth at time t (Extended model)

Variable	2005-2002	2008-2005	2011-2008	2014-2011	All (pooled)
Income ((t-1)+t)	4.3*** (32.3)	5.3*** (46.8)	5.7*** (72.8)	6.1*** (111.5)	5.6*** (87.1)
Owns mortgage (t-1)	-85944.7*** (-33.7)	-76448.1*** (-14.7)	106279.0*** (-25.4)	-160481.1*** (-22.7)	-110851.2*** (-25.7)
Owns house (t-1)	143640.5*** (103.6)	130557.0*** (14.8)	92557.7*** (12.7)	106925.7*** (17.7)	119684.1*** (39.4)
Owns stocks (t-1)	116408.6*** (25.7)	99615.8*** (9.6)	77389.0*** (7.9)	132074.8*** (17.9)	104907.7*** (71.5)
Age (t-1)	9057.2*** (37.2)	2874.4*** (4.5)	7323.9*** (9.5)	6853.7*** (11.6)	4948.0*** (18.2)
Age squared (t-1)	-68.3*** (-37.0)	-7.4 (-1.3)	-51.1*** (-6.4)	-22.9*** (-3.7)	-22.4*** (-7.8)
Higher education (t-1)	21827.7*** (3.9)	380.2 (0.0)	-31055.8* (-1.8)	-134727.4*** (-36.2)	-48000.5*** (-10.6)
Unemployed (t-1)	-31775.3*** (-32.3)	-14555.2*** (-4.2)	75566.7*** (22.5)	43028.3*** (12.8)	23467.1*** (25.6)
Inactive (t-1)	-8575.6 (-3.5)	84151.1*** (23.5)	103917.4*** (8.6)	69285.6*** (13.9)	61143.9*** (23.1)
Temporary contract (t-1)	-42836.4 (-8.8)	-52454.8*** (-8.5)	48772.6*** (16.0)	147851.9*** (41.2)	24338.4*** (22.9)
Good health (t-1)	27579.6*** (11.3)	22038.6* (1.7)	9603.6*** (2.7)	63780.2*** (25.3)	28086.7*** (8.3)
Poor health (t-1)	37798.2*** (11.9)	-12306.0*** (-4.9)	-54450.6*** (-32.5)	68045.8*** (15.7)	12170.9*** (7.1)
Household size (t-1)	-26851.1** (-23.4)	-20925.6*** (-18.1)	-37814.9*** (-17.8)	-23704.9*** (-15.3)	-27990.1*** (-39.2)
Dummy 2005					-12487.6*** (-3.0)
Dummy 2008					-60106.4*** (-21.2)
Dummy 2011					-84987.7*** (-49.4)
N	2577	3961	3710	3049	13297

Note: Significance levels: * p<0.05, ** p<0.01, *** p<0.001.

Table A3. Regressions on income at time t (Base model)

Variable	2005-2002	2008-2005	2011-2008	2014-2011	All (pooled)
Wealth (t-1)	0.0*** (10.1)	0.0*** (61.9)	0.0*** (8.8)	0.0*** (27.0)	0.0*** (27.1)
Owns mortgage (t-1)	3962.8*** (19.7)	5404.0*** (26.3)	12182.6*** (73.6)	11337.3*** (121.9)	8455.4*** (97.5)
Owns house (t-1)	1968.1** (441.1)	-1561.8*** (-7.2)	752.4* (1.8)	-180.4 (0.5)	597.0*** (2.6)
Owns stocks (t-1)	9298.2*** (22.8)	10902.4*** (23.8)	15302.3*** (13.3)	17806.8*** (84.1)	13642.8*** (46.4)
Age (t-1)	983.9*** (28.7)	769.0*** (14.8)	667.9*** (-14.3)	893.3*** (29.9)	873.7*** (67.4)
Age squared (t-1)	-10.8*** (-34.7)	-9.3*** (-21.6)	-6.5*** (-17.6)	-9.3*** (-38.7)	-9.3*** (-94.3)
Household size (t-1)	4267.5*** (31.7)	4469.7*** (54.6)	3885.8*** (35.3)	3058.8*** (115.0)	3888.5*** (66.7)
Dummy 2005					-1925.7*** (14.8)
Dummy 2008					-3135.5*** (42.3)
Dummy 2011					-3071.9*** (-28.7)
N	2577	3961	3710	3049	13297

Note: Significance levels: * p<0.05, ** p<0.01, *** p<0.001.

Table A4. Regressions on income at time t (Extended model)

Variable	2005-2002	2008-2005	2011-2008	2014-2011	All (pooled)
Wealth (t-1)	0.0*** (8.8)	0.0*** (55.3)	0.0*** (8.3)	0.0*** (26.5)	0.0*** (25.9)
Owens mortgage (t-1)	2750.4*** (12.9)	3225.8*** (16.1)	8247.8*** (39.8)	8862.4*** (94.8)	6128.7*** (62.0)
Owens house (t-1)	1502.2*** (3.5)	-1930.0*** (-8.9)	1137.5*** (2.4)	-975.9*** (-4.3)	-37.8 (-0.2)
Owens stocks (t-1)	5571.3*** (14.0)	7281.3*** (18.9)	9250.9*** (8.6)	10778.9*** (42.2)	8260.9*** (30.4)
Age (t-1)	886.5*** (26.4)	544.8*** (11.0)	421.1*** (8.2)	449.5*** (12.9)	604.5*** (46.9)
Age squared (t-1)	-7.7*** (-28.4)	-5.8*** (-14.9)	-2.3*** (-4.3)	-4.6*** (-16.9)	-5.5*** (-59.5)
Higher education (t-1)	16066.8*** (49.5)	14680.4*** (45.3)	20484.9*** (23.7)	19503.2*** (78.4)	18212.3*** (85.3)
Unemployed (t-1)	-2448.7*** (-7.1)	-5923.1*** (-20.0)	-9718.8*** (-51.0)	-6260.0*** (-75.5)	-6382.2*** (-76.6)
Inactive (t-1)	-7956.5*** (-38.2)	-7062.9*** (-33.4)	-9484.3*** (-9.6)	-3878.6*** (-27.2)	-6316.1*** (-25.2)
Temporary contract (t-1)	-2057.6*** (-2.3)	2299.1*** (9.6)	-7616.6*** (-51.7)	-5538.7*** (-36.4)	-3138.3*** (-15.2)
Good health (t-1)	2524.0*** (18.9)	-421.5*** (-4.3)	4069.0*** (46.0)	-766.2*** (-9.1)	1407.9*** (28.8)
Poor health (t-1)	-487.7*** (-4.0)	-1510.5*** (-8.8)	1447.5*** (20.3)	190.8*** (1.7)	-348.8*** (-8.8)
Household size (t-1)	4113.1*** (31.2)	4723.4*** (56.0)	4332.6*** (40.0)	3805.2*** (117.4)	4224.9*** (76.9)
Dummy 2005					2539.7*** (19.7)
Dummy 2008					3614.0*** (56.0)
Dummy 2011					3899.3*** (30.8)
N	2577	3961	3710	3049	13297

Note: Significance levels: * p<0.05, ** p<0.01, *** p<0.001.