THE DISTRIBUTION OF WEALTH IN SPAIN: EVIDENCE FROM CAPITALIZED INCOME TAX DATA

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Abstract*

In this paper we analyze wealth inequality in Spain throughout the economic expansion of the early 2000s and the subsequent recession. For that, we construct wealth shares for the period 2002 and 2011 using income tax micro-data and the investment income method. Our results reveal two striking facts. First, there was a generalized drop in wealth concentration between 2002 and 2006, the years of the boom, followed by a marked increase in wealth inequality in 2007, the year of the burst of the crisis, and a subsequent slight decline in concentration until 2011. Second, the increase in wealth inequality between 2002 and 2011 was a phenomenon concentrated within the top 10 to 0.5%. The main reason is that at the very top of the wealth distribution, the surge in stock prices was not enough to compensate for the dramatic increase in real estate prices, which benefits upper (but not very top) wealth holders. Surprisingly, we find that wealth is much more concentrated than in previous studies which use other data and methods. In fact, our series reveal that the level of wealth concentration in Spain is close to the one obtained by Saez and Zucman [2015] in the US.

Keywords: Wealth; Inequality; Spain.

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1 Introduction

The evolution of wealth inequality is currently at the center of the academic and political debate. Piketty [2014] shows in his prominent book, *Capital in the Twenty-First Century*, the importance of analyzing empirically the historical evolution of wealth distributions. Nonetheless, due to data limitations, the evidence is still scarce.

There exist five main methods to analyze wealth inequality. The first is the estate multiplier method, that provides a snapshot of the wealth distribution at the time of death with estate tax records data. The second possible approach is the survey-based method, which uses survey data with an oversampling of wealthy households. The third available method is the use of wealth tax returns to analyze the distribution of wealth. The fourth is the investment income approach, which consists of capitalizing income tax data in order to arrive to the wealth distribution. Finally, one can also analyze the upper part of the distribution using lists of high-wealth individuals, such the annual Forbes 400 list. There are conflicting results depending on the method of analysis used. For instance, Saez and Zucman [2015] find that wealth considerably increased at the top 0.1% in the US over the last two decades using the income capitalization method, contrary to the results obtained using survey data and the estate multiplier method.

The aim of this research is to analyze wealth inequality in Spain using income tax micro-data and the investment income method throughout the economic expansion and the subsequent recession. By analyzing Spain we will contribute to the literature of wealth inequality in three ways. First, Spain has high-quality income tax samples with detailed income for each tax unit and income category. They are constructed by the Spanish Institute of Fiscal Studies (*Instituto de Estudios Fiscales*) and they cover the period between 2002 and 2011. Thus, we are able to provide a careful estimation of the evolution of Spanish wealth shares for the top half of the distribution for years 2002 to 2011. To our knowledge, the few studies that have analyzed wealth concentration in Spain using tax data have only focused on the top 1%. Second, Spain experienced a huge increase in aggregate wealth due to a boom in housing prices during this period of time. Hence, it is interesting to analyze which are the distributional effects of this economic fact which has not been studied in any academic paper yet. Third, Spain is

one of the few countries in the world that has a wealth tax. Thus, from the methodological point of view, it is interesting to compare our wealth shares using the income capitalization method with the shares using wealth tax returns.

The wealth distribution in Spain has been analyzed in the past using three different data sources. Firstly, Alvaredo and Saez [2009] use wealth tax returns to construct long run series of wealth concentration for the period 1982 to 2007. The progressive wealth tax has high exemption levels and only the top 2% or 3% wealthiest individuals file wealth tax returns. Thus, they limit their analysis of wealth concentration to the top 1% and above. They find that top wealth concentration decreases at the top 1% from 19% in 1982 to 16% in 1992 and then increases to almost 20% in 2007. However, in contrast to the top 1%, they obtain that the 0.1% falls substantially from over 7% in 1982 to 5.6% in 2007.

Durán-Cabré and Esteller-Moré [2010] also use wealth tax returns to analyze the distribution of wealth at the top and obtain similar results. Their approach complements theirs by offering a more precise treatment of the correction of fiscal underassessment and tax fraud in real estate, which is the main asset in Spaniards' portfolios.

Secondly, Azpitarte [2010] and Bover [2010] use the 2002 Survey of Household Finances developed by the Bank of Spain in order to analyze the distribution of wealth at the top. This analysis can be carried out because the survey is constructed doing an oversampling of wealthy households. Azpitarte [2010] presents results for the top 10-5%, 5-1% and 1%. Bover [2010] provides shares for the top 50%, top 10%, top 5% and top 1%. Their estimates for the top 1% are very similar, 13.6% and 13.2%, respectively. However, they are much lower than the results of Alvaredo and Saez [2009] using wealth tax returns, who obtain that the top 1% holds 20% of total wealth. The OECD has also published recently a report in which they analyze wealth inequality across countries (OECD [2015]) using household survey data. They find that the top 1% holds 15.2% in 2011 and that wealth inequality in Spain is lower relative to the average of other 16 OECD countries.

Finally, Alvaredo and Artola [2015] use inheritance tax statistics to estimate the concentration of personal wealth at death in Spain between 1901 and 1958. They compare their results with the estimates among the living of Alvaredo and Saez [2009] for the

period between 1982 and 2007. They find that concentration of wealth at the top 1% of the distribution was approximately three times larger during the first half of the 20th century than at the end of the same century.

We follow this branch of the literature by constructing series on the distribution of wealth using individual income tax data disaggregated by asset class and the investment income method. This approach involves the application of a capitalization factor to the distribution of capital income to arrive to an estimate of the wealth distribution. Capitalization factors are computed for each asset in such a way as to map the total flow of taxable income to total wealth recorded in Financial and Non-financial accounts. When combining taxable incomes and aggregate capitalization factors, we assume that within each asset class capitalization factors are the same for each individual. By using this methodology, we are able to obtain the wealth distribution of total aggregate wealth recorded in Financial and Non-Financial Accounts.

In Spain, as in most of countries, not all assets generate taxable income. We account for them by allocating them on the basis of how they are distributed, in such a way as to match the distribution of these assets in the Survey of Household Finances developed by the Bank of Spain. The assets which we account for are owner-occupied housing, investment and pension funds.

Our new series of top wealth shares for years 2002 to 2011 reveal a generalized drop in wealth concentration between 2002 and 2006, the years of the boom, followed by a marked increase in wealth inequality in 2007, the year of the burst of the crisis, and a subsequent slight decline in concentration until 2011. Furthermore, we find that the increase in wealth inequality between 2002 and 2011 was a phenomenon concentrated within the top 10 to 0.5%. The reason is that the dramatic increase in real estate prices that Spain has experienced during this period of time has benefited upper (but not very top) wealth holders.

When comparing our top wealth shares with previous studies that use wealth tax returns (i.e. Alvaredo and Saez [2009]) and the Survey of Household Finances (i.e. Bover [2010]), we find that our estimates reveal a higher concentration of wealth during that period of time. For instance, Bover [2010] and Alvaredo and Saez [2009] find a top 1% wealth share of 13.2% and 20% in 2002, respectively. In contrast, we obtain that

concentration at the top 1% amounts to 42.3%. These conflicting results arise due to significant differences in the methodology and the definitions of wealth used by each of the studies.

The layout of the paper is as follows. Section 2 discusses our definition, and aggregate measures of wealth, together with an analysis of the trends in wealth in the last 20 years in Spain. In Section 3 we carry out an analysis of the distribution of taxable capital income and we formalize and explain the procedure we have used in order to obtain wealth shares from income tax data. Our results for the period 2002 to 2011, derived from using the income capitalization method, are presented in Section 4. In Section 5 we compare our series with previous studies using other methods and with the wealth inequality trends in the US obtained by Saez and Zucman [2015]. Finally, Section 6 concludes. All Figures to which the text refers to are included in the Appendix at the end of the paper. An Excel file ("Data Appendix") includes the complete set of results.

2 Wealth: Definition, Data and Trends

2.1 Our Wealth Concept and Data Sources

According to the System of National Accounts (2009), wealth is the current market value of all the financial and non-financial assets owned by households net of all their debts.

For financial wealth, that is, for both assets and liabilities, we rely on the latest Financial Accounts (SEC 2010, Bank of Spain) for the most recent period (1996 and 2014), and on previous Financial Accounts (SEC95, Bank of Spain) for the period between 1990 and 1995. Financial Accounts report wealth quarterly and we use mid-year values.

Households' financial assets include equities (stocks, investment funds and financial derivatives), debt assets, cash, deposits, life insurance and pensions. Households' financial liabilities are composed of loans and other debts.[1] It is important to mention that pension wealth excludes Social Security pensions. Social Security pensions are promises of future government transfers. As it is stated in Saez and Zucman [2015], including them in wealth would thus call for including the present value of future health care benefits, future government education spending for one's children, etc., net of future taxes. Hence, it would not be clear where to stop.

We will only focus on households, excluding non-profit institutions serving households (NPISH). There are three reasons which explain this decision. First, due to lack of data, non-profit wealth is not easy attributable to individuals. Second, income from NPISH is not reported in personal income tax returns. Third, non-profit financial wealth amounts to around only 1% of household financial wealth between 1996 and 2014 in Spain. Hence, it is a negligible part of wealth and excluding it should not alter our results.[2]

Spanish Financial Accounts report financial wealth for the household and NPISH sector and also for both households and NPISH isolated as separate sectors. However,

[1] See Table A1 in Appendix.
[2] See Table B1 in Appendix.

the level of disaggregation of the Balance Sheets in the latter case is lower than in the case in which households and NPISH are considered as one single sector. For instance, whereas the Balance Sheet of the sector of households and NPISH distinguishes among wealth held in investment funds and wealth held in stocks, the Balance Sheet of the household sector only provides an aggregate value with the sum of wealth held in these two assets. In order to have one value for household wealth held in investment funds and one value for household wealth held in stocks, we assume that they are proportional to the values of households' investment funds and stocks in the Balance Sheet of households and NPISH.

For non-financial wealth, we can not rely on Non-financial Accounts based on the System of National Accounts. Even though there are some countries that have these accounts, such as France and United Kingdom, no institution has constructed these type of statistics for Spain yet. We need to use other statistics instead. Our definition of household non-financial wealth consists of housing and business assets from self-employment.

For housing wealth, we use the Housing Market Indicators statistics (Bank of Spain, 2015), which provide the value of household housing wealth for the period between 1987 and 2014. This variable includes the value of all dwellings, main residence and other state properties, regardless of whether they are rented or not. The series are constructed based on residential units, average surface, and average market prices. Our net housing wealth is the result of deducting mortgage loans from household real estate wealth. We approximate mortgage debts by total household liabilities.

For business assets from self-employment, we use the Survey of Household Finances (Bank of Spain, 2002, 2005, 2008 and 2011). In order to obtain annual values for business assets wealth, we first construct the share of business assets over total housing wealth with the survey data. We decide to use the average percentage for the four years, which is 10.6%, since shares do not vary much for the four available years of the survey.[3] We then obtain the value of business assets by calculating which is the amount of housing wealth from the Housing Market Indicators that this average share

[3]See Table B3 in Appendix.

represents for the whole period of analysis.[4]

We exclude collectibles, since they amount to only 1% of total household wealth and they are not subject to the personal income tax. Furthermore, we also exclude consumer durables, which amount to approximately 10% of total household wealth, because they are not included in the definition of wealth by the System of National Accounts.[5]

It is important to keep in mind that the official financial and non-financial data used fail to capture a large part of the wealth held by households abroad such as the portfolios of equities, bonds, and mutual fund shares held by Spanish persons through offshore financial institutions in tax havens. Zucman [2013, 2014] estimates that offshore financial wealth amounts to about 8% and 10% of household financial wealth at the global level and at the European level, respectively. In the case of Spain, this percentage might be even larger. According to Zucman [2015], the wealth held by Spanish people in Switzerland amounts to 80 billion euros in 2013. This already represents about 4.4% of total household financial wealth, according to our household wealth data. Hence, when interpreting our results we need to take into account that there is a significant part of missing wealth.

2.2 Aggregate Wealth Stylized Facts (1990-2013)

Before going into the distributional analysis of wealth, it is important to understand how wealth has evolved in aggregate terms in Spain.

From a historical perspective, the ratio of household wealth to national income has followed a U-shaped evolution over the past century, a pattern also seen in other advanced economies (Artola et al. [2015], Piketty and Zucman [2014]). However, this process was initially delayed with respect to leading European countries. This finding is consistent with a long post-Civil war economic stagnation and the larger importance of agriculture in Spain. Focusing on our period of analysis, the years between 1990 and

[4]See Table A1 in Appendix.

[5]The shares of both collectibles and consumer durables over total household wealth are obtained using the 2002 Survey of Household Finances developed by the Bank of Spain. In a future version of the paper, we plan to include collectibles using wealth tax returns.

2013, we observe four stylized facts that have significantly changed the level and composition of the stock of wealth in Spain.

The first stylized fact is that the household wealth to national income ratio has experienced a huge increase during that period of time. Household wealth amounted to around 470% of national income from early nineties and it remained stable until mid-nineties. However, from 1995 onwards, it started to increase rapidly reaching the peak of 875% of national income in 2007. After the burst of the crisis in 2008, it dropped and it has been decreasing since then. In 2013, the household wealth to national income ratio amounted to 649%, a level which is similar to the wealth to national income ratio of years 2003 and 2004, but much higher than the household wealth to national income ratios of the nineties (Figure .1).

The second stylized fact determines the existence of temporal differences not only in the growth of total net wealth (as it was pointed out in the first stylized fact), but also in the growth of its components. In fact, we can clearly distinguish two phases, being year 1998 the inflection point between the two. During the first phase, from 1990 until 1998, financial assets grew 147% (from 355 up to 877 billion euros), more than three times the growth in net housing wealth which was 39% (from 852 up to 1180 billion euros) and the growth in business assets which was 45% (from 103 up to 150 billion euros). This was mainly driven by the increase in the price of stocks.

Nevertheless, during the second phase, from 1999 until the peak in 2008, net housing wealth growth amounted to 308% (from 1312 up to 5349 billion euros). The increase in the accumulation of net housing during the second phase was more than six times larger than that of financial assets which was 47% (from 948 up to 1170 billion euros) and more than three times larger than the growth of business assets which was 86% (from 168 up to 667 billion euros) (Figure .2).

The third stylized fact points out the different contribution of each of the components of wealth to its total growth. Net housing represented 300% over national income in 1990 and this ratio decreased up to 246% in 1998. However, from 1999 onwards, when the boom in the price of dwellings started, it sharply increased reaching 592% of national income in 2007. The evolution of financial assets has been quite different, they grew from 125% of national income in 1990 up to 185% in 1998. From 1999 onwards,

they have been increasing and decreasing, reaching the minimum of 170% in 2002 and 2003, and the maximum of 210% in 2007. Business assets have experienced a similar evolution to net housing, although they represent a much lower part of wealth. They decreased from 39% in 1991 up to 31% in 1998. From 1999, they started to increase reaching the peak of 73% in 2008. Since 2009 they have decreased up to 52% in 2013 (Figure .1).

The fourth and last stylized fact is the increase in the importance of net housing in the asset portfolios of households. Dwellings are during the whole period the most important asset held by households, always representing more than half of total household net wealth. However, it is important to emphasize that the composition of household wealth has not evolved homogeneously over time. The share of net housing over total household wealth was 65% and 66% in 1990 and 1991, respectively, and it decreased up to 53% in 1998. During that period of time, the proportion of financial assets held by households rose from 27% up to 40% in 1999. This was mainly due to the increase in equities, which rose from 5% to 19%. Business assets decreased from 8 to 7% during that period of time.

From 1999 onwards, the proportion of household wealth devoted to dwellings started to increase again, reaching the peak of 69% in 2008. This value has remained until 2010 and it has decreased since then up to 58% in 2014. On the contrary, the share of financial assets has decreased from 1999 onwards, reaching the minimum of 23% in 2008, 2009 and 2010. This decrease was mainly due to a reduction in deposits and equities. Since then, this share has started to increase reaching 34% in 2014. Business assets have remained stable at 8% during that period, reaching 9% only in 2008, 2009 and 2010 (Figure .3).

3 The Income Capitalization Approach: Using Taxable Capital Income to Obtain the Wealth Distribution

The main goal of our analysis is to construct wealth shares by allocating the total household wealth depicted in Figure .1 to the various groups of the distribution. For that, we need to proceed with the following three steps. Firstly, we start by analyzing the distribution of taxable capital income at the individual level. Secondly, we have to capitalize this income. Finally, we need to account for wealth that does not generate taxable income.

3.1 The distribution of taxable capital income

The starting point is the taxable capital income reported on personal income tax returns. We use personal income tax samples constructed by the Spanish Institute of Fiscal Studies (*Instituto de Estudios Fiscales*). They are available for the period between 2002 and 2011 and they provide information for a large sample of taxpayers, with detailed income categories.[6] Income tax samples are based on Spain excluding two autonomous regions: País Vasco and Navarra. The reason is that they do not belong to the Common Fiscal Regime (*Régimen Fiscal Común*), because they manage their income taxes directly. Hence, they are excluded from the statistics. These two regions represent about 6% and 8% of Spain in terms of population and gross domestic product, respectively.

Different from Piketty and Saez [2003] and Saez and Zucman [2015], our unit of analysis is the individual aged 20 or above, rather than the tax unit. Since in personal income tax returns the unit of analysis is the tax unit, we need to transform it into an individual unit. A tax unit in Spain is defined as a married couple (with or without dependent children aged less than 18 or aged more than 18 if they are disabled) living together, or a single adult (with or without dependent children aged less than 18 or aged more than 18 if they are disabled). Hence, we only need to transform the units

[6] In a future version of this paper, we plan to extend our period of analysis and cover years 1982 to 2011 using the Income Tax Panel constructed by the Spanish Institute of Fiscal Studies.

for which the tax return has been jointly made by a married couple. For each of these units we create a new individual in order to split the joint tax returns into two separate individual returns. We assign then half of the capital income jointly reported to each member of the couple. In 2011, for instance, there are 19.38 million tax units and 23.07 million individual units in the population aged 20 or above. Hence, in 2011 only 19% of tax units file jointly, typically those in the bottom of the distribution, given the incentives of the tax code to file separately.

Fractiles are defined relative to the total number of individuals aged 20 or above according to the Spanish Population Census (Spanish National Statistics Institute, 2015). In 2011, for instance, the proportion of individual units in personal income tax returns was 66% of the total population aged 20 or above. We correct for this 34% of missing individuals by creating one single unit with no capital income, that accounts for this part of the population.[7]

Capital income in personal income tax returns includes interests, dividends, real rents, life insurance income, as well as the profits of sole proprietorships. Before capitalizing all these income categories in order to obtain the wealth distribution, we will analyze the distribution of taxable capital income. Even though our ultimate aim is to arrive to the wealth distribution, we believe that it is important to first focus on the distribution of capital income. There are two reasons for that. Firstly, analyzing the distribution of taxable capital income is a way to check that the income that we have to capitalize is distributed in a coherent way and that there are no significant jumps across years due to, for instance, tax reforms. If already the income data are not coherently distributed, neither our wealth estimates will be.[8] Secondly, the capitalization technique relies on income data to arrive to wealth estimates. Hence, it is important to know how this income is distributed before capitalizing it, in order to better understand the evolution of wealth inequality over time.

Figures .4, .5, .6 and .7 depict shares of reported taxable capital income earned by the top 0.01% and 0.1%, top 0.5% and 1%, top 5% and 10%, and top 25% and 50%,

[7] In a future version of this paper, we plan to use the sample of non-filers provided by the Institute of Fiscal Studies in order to account more carefully for this part of the population.

[8] In order to check whether the obtained shares are coherent in level, we calculate top income shares using the same definition with the 2002 Survey of Household Finances. We obtain very similar results.

respectively. The shares are constructed using income tax samples with no assumption whatsoever. Thus, it is important to keep in mind that these series do not perfectly capture the distribution of total capital income in Spain, since not all capital income is subject to the personal income tax. Figure .4 shows that the top 0.01% and 0.1% shares increase during the boom and decrease after the burst of the crisis. Nonetheless, the top shares in 2011 are still higher, 2.7% and 9.6%, than at the beginning of the boom in 2002, amounting to 4.5% and 11.8%, respectively. Following a similar pattern, the series depicted in Figure .5 show that concentration also increased at the top 0.5% and 1% during the bubble and contracted after the onset of the economic recession. As it was the case with the top 0.01% and top 0.1% shares, the top 0.5% and 1% shares are also higher in 2011 than in 2002.

By contrast, Figure .6 shows that even though the top 5% income share is still higher after the crisis than at the beginning of the boom, for the top 10% this is no longer the case. The top 10% share is 74.4% in 2002 and slightly lower, 74.1%, in 2011. Similarly, in Figure .7 we can observe that the top 25% and 50% shares are also lower in 2011 than in 2002.

Summing up, concentration of capital income increased during the years of the boom and has slightly decreased with the burst of the crisis. Whereas the top 5% and above hold more income in 2011 than in 2002, the rest of the bottom half holds less income. This suggests that the economic expansion in Spain led to a rise in income inequality that has been maintained after the burst of the financial crisis.

3.2 The income capitalization method

In the second step of the analysis we need to use the investment income approach. In essence, this method involves the application of a capitalization factor to the distribution of capital income reported by taxpayers to arrive to an estimate of the wealth distribution.

3.2.1 A formal setting

The income capitalization method used in this paper may be set out formally as follows. An individual i with wealth w invests an amount a_{ij} in assets of type j, where j is an index of the asset classification ($j = 1, .., J$). If the return obtained by the individual on asset type j is r_j, his investment income by asset type is[9]:

$$y_{ij} = r_j * a_{ij} \tag{1}$$

and his total investment income:

$$y_i = \sum_{j=1}^{J} r_j * a_{ij} \tag{2}$$

Rearranging equation (1), we obtain that the wealth for each individual by asset type is, thus, the following:

$$a_{ij} = y_{ij}/r_{ij} \tag{3}$$

By rearranging equation (2), we get the total wealth for each individual which is:

$$w_i = \sum_{j=1}^{J} y_{ij} * r_j \tag{4}$$

In the next subsection, we will exactly apply this formal setting to the Spanish case, by capitalizing personal capital income to obtain the distribution of wealth.

3.2.2 How the capitalization technique works for the Spanish case

There are five categories of capital income in personal income tax data: real rental income, business income from self-employment, interests, dividends[10] and income from

[9]Note that we are making the assumption that the rate of return is constant for each asset type, that is, it does not vary at the individual level.

[10]Since 2007, dividends are exempted up to 1,500 euros from Spanish personal income tax. We adjust this exemption by adding 1,500 euros to each filer that declares dividends between 2007 and 2011.

life insurance. We weight tax return income for each category in order to match aggregate national income from National Accounts. Once we have tax return income at the level of National Accounts, we map each income category (e.g., dividends, business income from self-employment) to a wealth category in the Financial Accounts from the Bank of Spain (e.g., equities, business assets from self-employment).

As it was mentioned in Section 3.1, income tax data exclude the regions of País Vasco and Navarra. Therefore, before mapping the taxable income to each wealth category, we need to adjust wealth in Financial Accounts and national income in National Accounts. Ideally, if we would know the amount of wealth and income in each category by region, we could simply discount the wealth and income corresponding to País Vasco and Navarra.

Unfortunately, neither the Bank of Spain nor the National Statistics Institute provide Financial Accounts and National Accounts for each category disaggregated at the region level. Nonetheless, the National Statistics Institute provides the value of gross domestic product at the region level. Hence, we assume that income in each category excluding País Vasco and Navarra is proportional to total gross domestic product in Spain excluding these two regions. Total gross domestic product in Spain excluding País Vasco and Navarra amounts to approximately 92% of total gross domestic product. For wealth, we rely on a report published by the financial institution *La Caixa* (Caixa Catalunya [2004]). They provide the value of housing wealth by region. The share of housing wealth excluding País Vasco and Navarra amounts on average for the whole period of analysis (1995-2003) to 92%. We thus assume that the amount of wealth in each category is proportional to the value of housing wealth.[11]

Once we have adjusted income and wealth accordingly, we compute for each category a capitalization factor as the ratio of aggregate wealth to tax return income, every year since 2002. This procedure ensures consistency with the Bank of Spain aggregate wealth data by construction. In 2011, for instance, there is about 24 billion euros of reported taxable income from business assets and 558 billion euros of business assets from self-employees generating taxable income. Hence, the rate of return on taxable

[11]We plan to include País Vasco and Navarra in a future version of the paper, once we obtain the income tax samples for these two regions.

business assets is 3.3% and the capitalization factor is equal to 24. Capitalization factors and thus rate of returns, vary across asset types, being for instance higher for rental income than for debt assets.

As in Saez and Zucman [2015], we obtain our wealth estimates at the individual level by assuming that within a given asset class, everybody has the same capitalization factor. Computing wealth shares by capitalizing income consists of allocating the wealth for each asset recorded in the Non-financial and Financial Accounts to each group of the distribution based on how the income for this asset is distributed. Hence, this method does not require us to know the exact rate of return for each asset type, as long as the distribution of each capital income category is similar to the distribution of its corresponding wealth category.

The capitalization method is well suited to estimating the Spanish wealth distribution because the Spanish income tax code is designed so that a large part of capital income flows are taxable. However, as we have already mentioned, tax returns do not include all income categories. In Section 3.3, we carefully account for the assets that do not generate taxable income.

3.2.3 How we deal with capital gains

In this paper we present our main series focusing on capital income excluding capital gains. There are two reasons for that. First, realized capital gains are not an annual flow of income. Second, they are a very volatile component of income, with large aggregate variations from year to year depending on stock price variations.[12]

3.3 Accounting for Wealth that Does not Generate Taxable Income

The third and last step consists of dealing with the assets that do not generate taxable income. In Spain, there are four assets whose generated income is not subject to the personal income tax: Main owner-occupied housing, investment funds, pensions and some fixed-income securities.

[12] We plan to assess the sensitivity of our results to the treatment of capital gains constructing additional series in the future.

Although these assets account for a large part of total household wealth, the fact that they do not generate taxable income does not constitute a non-solvable problem for one main reason. Spain has a high quality Survey of Household Finances (SHF) that allows us to allocate all the previous assets on the basis of how they are distributed, in such a way as to match the distribution of wealth for each of these assets in the SHF.

The Spanish Survey of Household Finances has been conducted by the Bank of Spain for four waves: 2002, 2005, 2008 and 2011. It is the only statistical source in Spain that allows the linking of incomes, assets, debts, and consumption at the household level.

There are two main reasons why this Survey is extremely suitable for our analysis. First, it provides a representative picture of the structure of household incomes, assets and debts at the household level. Second, it is constructed doing an oversampling of wealthy households. This is achieved on the basis of the wealth tax through a blind system of collaboration between the National Statistics Institute and the Tax Office which preserves stringent tax confidentiality. The distribution of wealth is heavily skewed and some types of assets are held by only a small fraction of the population. Therefore, unless one is prepared to collect very large samples, oversampling is important to achieve representativeness of the population and of aggregate wealth and also, to enable the study of financial behavior at the top of the wealth distribution.

The assets for which we account are: Net owner-occupied housing, wealth from investment funds and pensions. Even though some income generated from fixed-income securities is not taxable, we decide not to account for it since a large part of the income that fixed-income assets generate is already taxed in the form of interests and dividends. For instance, 74% of total interests were declared in 2011.[13]

In Spain, the only part of housing that is not subject to the personal income tax is main residence. The rest of dwellings, either rented or not rented, need to be declared. In the case of dwellings that are not rented, taxpayers need to declare an imputed rent, which is a proportion of the rateable value of the dwelling. For instance, in 2011 the imputed rent that had to be declared was 1.1% of the rateable value of the property in

[13]See Table A33 in Data Appendix. We might decide to account for the fixed-income assets that are not taxable in the future in order to assess the sensitivity of our results.

case the values were revised after 1 January 1994, and 2% of of the rateable value of the property in the rest of cases.

The rateable values of properties are underestimated in Spain. For instance, in 2011 the aggregate rateable value of all urban dwellings was two times lower than the aggregate market value provided by the Bank of Spain in the Housing Market Indicators.[14] Hence, we prefer not to use the underestimated imputed rents that appear in personal income tax returns and we will account for both main residence and the rest of non-rented dwellings using the SHF.

Our imputations are conducted using the 2002 Survey of Household Finances and they are based on the methodology used by Garbinti et al. [2015] for France. We only consider individuals aged 20 or above in order to be consistent with our population of interest in the micro tax data, which are all individuals aged 20 or above. The unit of analysis used in the SHF is the household. Since we rearrange the micro tax data in order to have individuals as units of analysis, we proceed in the same way with the survey in order to be as consistent as possible. If the head of the household is not married, we assume that all capital income belongs to him. However, if the head of the household is married, we create a new individual and we split the capital income of the household among the two. The new individuals are the partners of the heads of the households that are married and they become now head of households. As labor income, we only take into account the one generated by each head of household.

The first step of our methodology of imputation consists of constructing groups of individuals according to their labor and capital income. We first group individuals by their labor income. We create 7 groups of percentiles: from 0 to 24, from 25 to 49, from 50 to 74, from 75 to 89, from 90 to 94, from 95 to 98, and from 99 to 100. Secondly, we group individuals according to their capital income. In order for our imputations to be consistent, we consider as capital income only the one that is subject to the personal income tax. We create 6 groups of percentiles: from 0 to 24, from 25 to 49, from 50 to 74, from 75 to 89, from 90 to 94, from 95 to 98, and from 99 to 100. Once we have the individuals sorted by labor and capital income, we combine them and we end up with 49 different groups. We can then calculate which is the share of

[14] See Table B4 in Data Appendix.

total owner-occupied housing, that is, main residence and other properties that are not rented, that corresponds to each group. We also construct the same shares for wealth from investment funds and for pensions.

Our final aim is to impute the value of these assets that do not generate taxable income to the capitalized distribution of income constructed with the micro tax samples in order to obtain the distribution of total net wealth. For that, we need to construct with the micro tax data the same groups by age, labor and capital income. Once we have the individuals in the tax data classified in groups, we can use the shares that we have obtained with the survey in order to calculate which is the amount of owner-occupied housing, wealth from investment funds and pensions from Financial Accounts and Non-financial Accounts that corresponds to each group. Finally, within each group we allocate the wealth from these assets to all individuals in an homogeneous way.

4 Trends in the Distribution of Wealth before and after the *Housing Bubble*

Our new series of top wealth shares for years 2002 to 2011 reveal a generalized drop in wealth concentration between 2002 and 2006, the years of the boom, followed by a marked increase in wealth inequality in 2007, the year of the burst of the crisis, and a subsequent slight decline in concentration until 2011. If we compare shares at the beginning of the boom in 2002 and after the economic recession in 2011, we clearly observe differences between the top 50% to 5% and the top 1% to 0.01% shares.

Figure .8 displays top wealth shares for three groups within the top half of the distribution: the top 50%, the top 25% and the top decile. As we can observe, in all three groups concentration is higher in 2011 than in 2002. For instance, the top 10% wealth share increases from 67.7% to 72.3% in 2011. Figure .9 shows that this rise is not due to the increase in concentration at the top 50-25% nor at the top 25-10%, since shares are lower in both cases in 2011 as compared to 2002.

In order to understand the mechanisms behind this increase in wealth concentration at the top 50%, 25% and 10%, we next turn to the analysis of the composition of the top 10%. Figure .10 reveals that the increase in wealth inequality between 2002 and 2011 is mainly driven by the top 5-1% share and by the top 10-5% to a smaller extent. In fact, these shares increase from 16.2% and 9.2% up to 22% and 10.4% for the top 5-1% and 10-5%, respectively, during this period. On the contrary, the top 1% wealth share decreased in 2011 as compared to 2002.

The reason for this decline can be found on Figures .11 and .12. The top 0.5-0.1%, 0.1-0.01%, 0.1%, 0.1-0.01% and 0.01% shares are lower in 2011 than in 2002. Even though the top 1-0.5% share increases during that period, the decrease in shares of the upper part of the distribution is larger, thus, lowering the top 1% wealth share. Hence, our results reveal that the increase in wealth concentration between 2002 and 2011 was a phenomenon concentrated within the top 10 to 0.5%. One reasonable explanation for this finding is that at the very top of the wealth distribution, the surge in stock prices was not enough to compensate for the dramatic increase in real estate prices, which benefits upper (but not very top) wealth holders.

If we focus on the years of the burst of the crisis, 2007 and 2008, we find a surprising result. Even though wealth held in equities significantly dropped from 657 to 504 billion euros between 2007 and 2008, concentration at the top 1 and 10% increased. The reason is that wealth held in all the other assets rose during these two years and this increase concentrated on the top 10% almost entirely. Thus, the decrease in wealth held in equities was more than compensated by the increase in the rest of all other assets. Consequently, concentration rose between these two years.

Finally, it is important to mention that in Spain, as in many other countries, wealth inequality is higher than income inequality. If we compare our series of top wealth shares with the top income shares constructed by Alvaredo and Saez [2009], we find, for instance, that the top 1% wealth share in 2005 is 33.2%, is more than three times larger than the top 1% income share which is 8.7%. Similarly, the top 0.01% wealth share is also higher than the top 0.01% income share. In 2005, these shares were 3.5% and 0.9%, respectively.

5 Comparison of our Results with Previous Studies

5.1 Wealth Tax

The wealth tax in Spain was introduced for the first time in 1978 as by law 50/1977. Initially, it was meant to be "transitory" and "exceptional". The tax rate was relatively small, with a maximum of 2%. The aim of the Spanish wealth tax was basically to complement the Spanish personal income tax, which had limited redistributive goals. Tax filing was done on an individual basis, with the exception of married couples under joint tenancy. Since 1988, married couples can file individually.

In 1992, a major reform by the Law 19/1991 put an end to the transitory an exceptional character of the tax. It established a strictly individual filing and introduced changes in some of the included components as well as in their valuation rules. In year 2008, the tax was not abolished but a bonus of 100% was introduced by law 4/2008. Nevertheless, the economic crisis and the lack of funds of the Spanish Inland Revenue, reactivated the wealth tax from exercise 2011 (payable in 2012) up to 2014 (payable in 2015).

Alvaredo and Saez [2009] use wealth tax returns and the Pareto interpolation method to construct long run series of wealth concentration for the period 1982 to 2007. The progressive wealth tax has high exemption levels and only the top 2% or 3% wealthiest individuals file wealth tax returns. Thus, they limit their analysis of wealth concentration to the top 1% and above. They find that top wealth concentration decreases at the top 1% from 19% in 1982 to 16% in 1992 and then increases to almost 20% in 2007. However, in contrast to the top 1%, they obtain that the 0.1% falls substantially from over 7% in 1982 to 5.6% in 2007.

In line with the trend observed by Alvaredo and Saez [2009] until 2007, our estimates also reveal a fall in concentration at the very top and an increase in the upper (but not very top) part of the distribution. Nevertheless, Figure .13 shows that concentration at the top 1% is much higher than what Alvaredo and Saez [2009] find. For instance, whereas they obtain a top 1% wealth share of 18.9% in 2005, we find that the top 1% wealth share in 2005 is 33.8%. Durán-Cabré and Esteller-Moré [2010] also use wealth

tax returns to analyze the distribution of wealth at the top and obtain similar results to them. Their approach complements theirs by offering a more precise treatment of the correction of fiscal underassessment and tax fraud in real estate, which is the main asset in Spaniards' portfolios.

One of the potential reasons why we obtain different results is because the definition of wealth used by Alvaredo and Saez [2009] differs from our definition in the following aspects. First, they consider the wealth of both households and non-profit institutions serving households rather than only household wealth. Second, they exclude pensions from the wealth denominator and they do not include business assets. Third, they use real state declared, being for some individuals the cadastral value. By contrast, we impute wealth from owner-occupied housing using the Survey of Household Finances and the Housing Market Indicators using series at market prices. Another difference with respect to our methodology is that they use the Pareto interpolation method in order to obtain top wealth shares because they have aggregate data. Finally, one last difference is that they use tax units as units of analysis and we use individual units instead.[15]

5.2 The Survey of Household Finances

As we have seen in Section 3.3.1, the Survey of Household Finances can be used to analyze the distribution of wealth because it is constructed doing an oversampling of wealthy individuals. Azpitarte [2010] and Bover [2010] use the 2002 survey in order to analyze the distribution of wealth at the top. Azpitarte [2010] presents results for the top 10-5%, 5-1% and 1%. Bover [2010] provides shares for the top 50%, top 10%, top 5% and top 1%. Their estimates for the top 1% are very similar, 13.6% and 13.2%, respectively. However, they are lower than the results of Alvaredo and Saez [2009] using wealth tax returns, who obtain that the top 1% holds 20% of total wealth. Besides, they are much lower than our top 1% estimate for 2002, which is 42.3%.

The OECD has also published very recently a paper (OECD [2015]) in which they

[15] In a future version of the paper, we plan to compute top wealth shares using wealth tax returns at the individual level. These results will provide more evidence to assess which of the sources works best in order to analyze the wealth distribution in Spain.

construct top wealth shares using the 2011 SHF. They find that concentration at the top is lower than the OECD average considering other 16 countries. Comparing their results with the ones using tax data, we find that the top 1% is lower than in the case wealth tax or capitalized income data are used. For instance, the top 1% in 2011 using capitalized income data is 39.9% and the one obtained by OECD [2015] is 15.2%. Figure .13 shows top 1% wealth shares for all the mentioned studies.

There are notable differences in terms of definitions and methodology between our estimates and the studies using the SHF. First, we use individual units while the SHF uses households to define each fractile. Second, they use a different definition of wealth. Azpitarte [2010] includes collectibles, Bover [2010] also considers consumer durables on top of collectibles, and OECD [2015] excludes pension wealth and incorporates collectibles and consumer durables to its definition of wealth as well.

As with all surveys, it is a challenge for the SHF to accurately capture wealthy individuals because of limited sample size and low response rates at the very top, so as it is the case with income, wealth shares tend to be lower using survey data instead of tax data. This is also the case in the US, as documented by Saez and Zucman [2015].

5.3 Spain versus US

In order to have an idea about the level of wealth concentration in a country, it is always very interesting to make comparisons across nations. Saez and Zucman [2015] estimate the distribution of wealth in the US using the income capitalization method. They find that wealth concentration has followed a U-shaped evolution over the past 100 years. It was high in the beginning of the twentieth century, fell from 1929 to 1978, and has continuously increased since then. Their series of wealth shares reveal that the rise in wealth inequality is almost entirely due to the rise of the top 0.1% share.

All previous studies about wealth concentration in Spain found that wealth inequality was considerably lower than in the US. Surprisingly, our findings reveal that the level of wealth concentration is Spain is similar to the US, even higher for some years and groups of the distribution. As it can be observed in Figure .14, the concentration at the top 10% in Spain is only by 1 to 6% lower than in the US except for year 2008 in

which Spain has a slightly higher level of concentration. If we look at the top 5% wealth share in Figure .15, we observe that it is higher is Spain for years 2002, 2003, 2008 and 2009 and lower for the rest of the period. The differences range again between 1 and 6%. Nevertheless, very top wealth holders in the US do not hold at any period less wealth than Spanish top wealth holders. As it can be observed in Figure .16, whereas the top 0.01% is 10% for the US in 2011, it is 5% in Spain.

6 Conclusion

In this paper we have constructed wealth shares for the top half of the distribution for the period 2002 and 2011 using the income capitalization method. Our results reveal two striking facts. First, there was a generalized drop in wealth concentration between 2002 and 2006, the years of the boom, followed by a marked increase in wealth inequality in 2007, the year of the burst of the crisis, and a subsequent slight decline in concentration until 2011. Second, the increase in wealth concentration between 2002 and 2011 was a phenomenon concentrated within the top 10 to 0.5%. The main reason is that the dramatic increase in real estate prices that Spain experienced during this period of time benefited upper (but not very top) wealth holders.

Surprisingly, there are important differences between our wealth shares and the series obtained by previous studies using wealth tax and household survey data. In fact, our results reveal that wealth is much more concentrated, being close to the trends observed by Saez and Zucman [2015] in the US. One of the reasons for these conflicting results is that the definition of wealth and data used in previous studies are not the same.

In a future version of the paper, we want to assess the robustness of our results by carrying out the following three analyses. First, we would like to construct series of shares with our same definition of wealth using the Survey of Household Finances and wealth tax returns. This will allow us to understand whether the differences in definitions are the reason for the conflicting results between the different methods. Second, we would also like to construct individual rates of return for each asset type using wealth tax returns, in order to assess the validity of the income capitalization approach, the method we are using in this study. In fact, this technique relies on the assumption that returns do not vary at the individual level by asset class. Third, we also want to analyze the correlation between the distribution of income and wealth for each category at the individual level using the SHF. As it was mentioned in Subsection 3.2.2, if both distributions behave similarly, the income capitalization approach works very well.

Further research is needed about the evolution of wealth inequality over time. There

are conflicting results among studies that need to be better explained. Although sometimes it may be forgotten, how wealth is concentrated extremely matters from the policy point of view. It can help in the designing of policies aimed at achieving a more equitable system that at the same time could create new sources of economic growth.

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Appendices

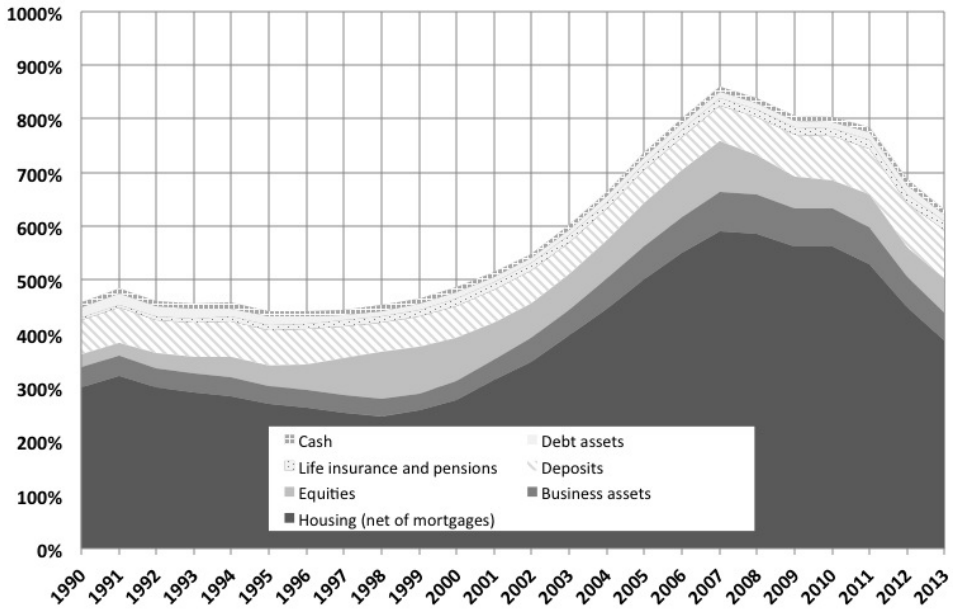

Figure .1: The composition of household wealth to national income in Spain
Source: Own elaboration with data from Bank of Spain

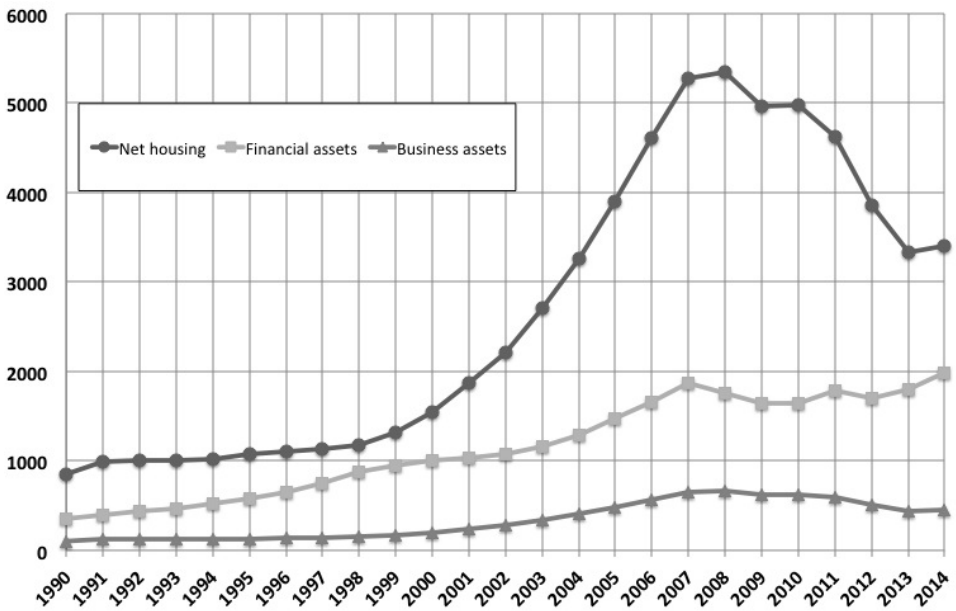

Figure .2: The composition of household wealth in Spain
Source: Own elaboration with data from Bank of Spain (in billion of euros)

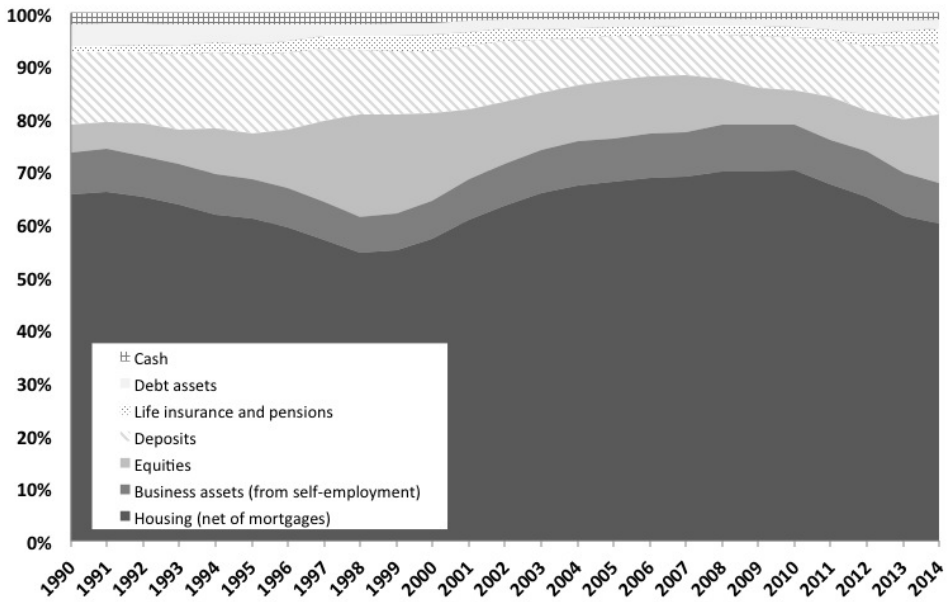

Figure .3: The composition of household wealth in total household wealth
Source: Own elaboration with data from Bank of Spain

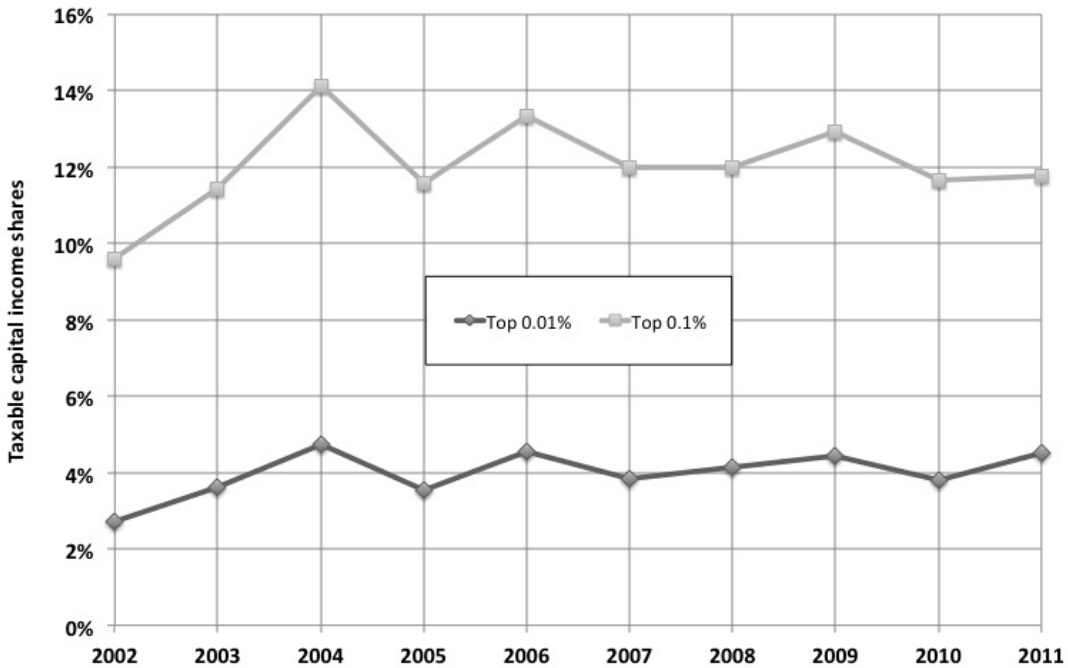

Figure .4: Top 0.01% and Top 0.1% Taxable Capital Income Shares (2002-2011)
Source: Own elaboration with Personal Income Tax Samples from the Spanish Institute of Fiscal Studies

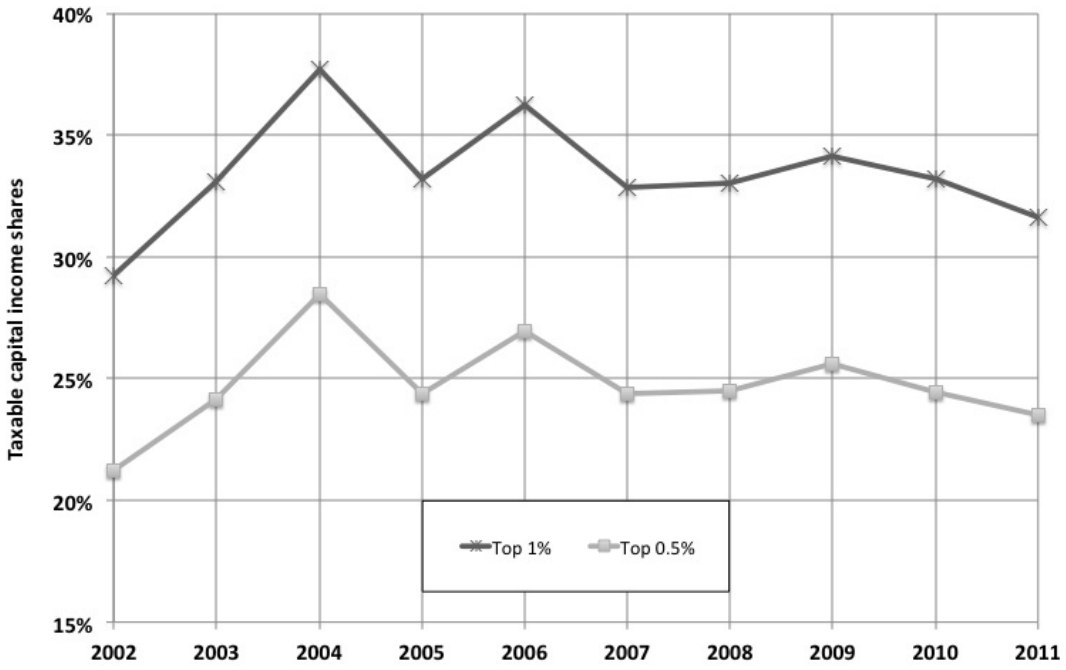

Figure .5: Top 0.5% and Top 1% Taxable Capital Income Shares (2002-2011)
Source: Own elaboration with Personal Income Tax Samples from the Spanish Institute of Fiscal Studies

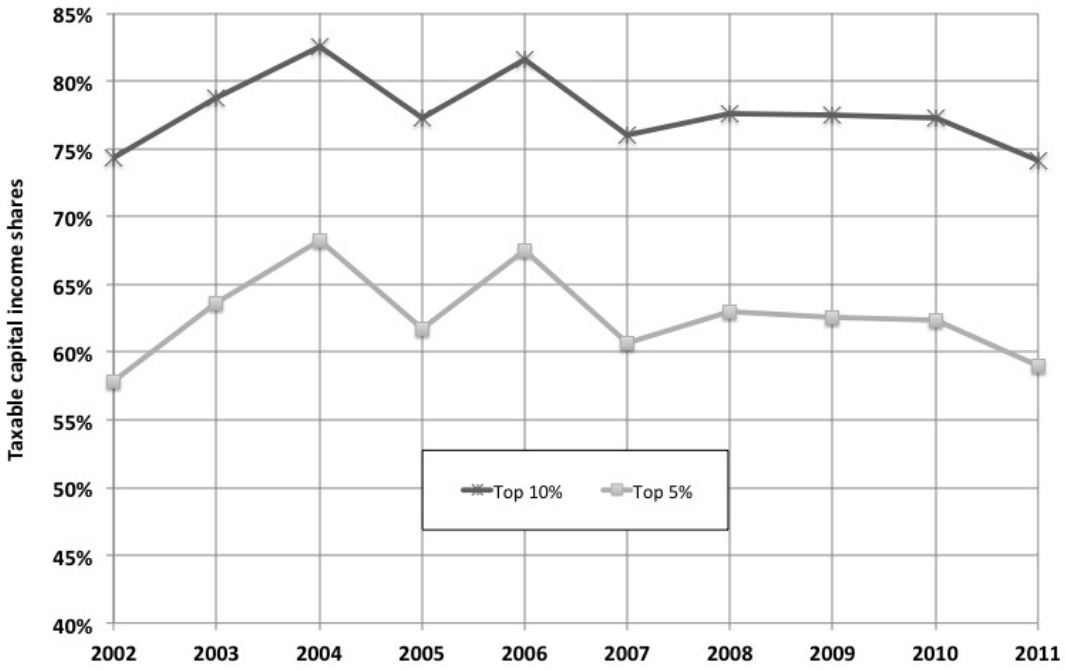

Figure .6: Top 5% and Top 10% Taxable Capital Income Shares (2002-2011)
Source: Own elaboration with Personal Income Tax Samples from the Spanish Institute of Fiscal Studies

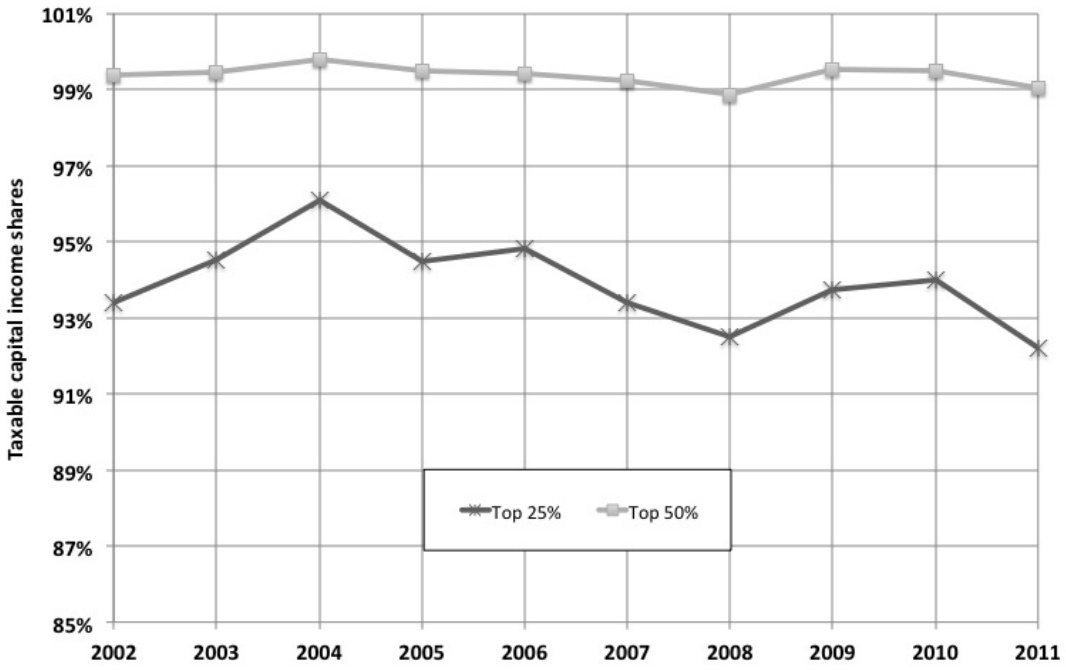

Figure .7: Top 25% and Top 50% Taxable Capital Income Shares (2002-2011)
Source: Own elaboration with Personal Income Tax Samples from the Spanish Institute of Fiscal Studies

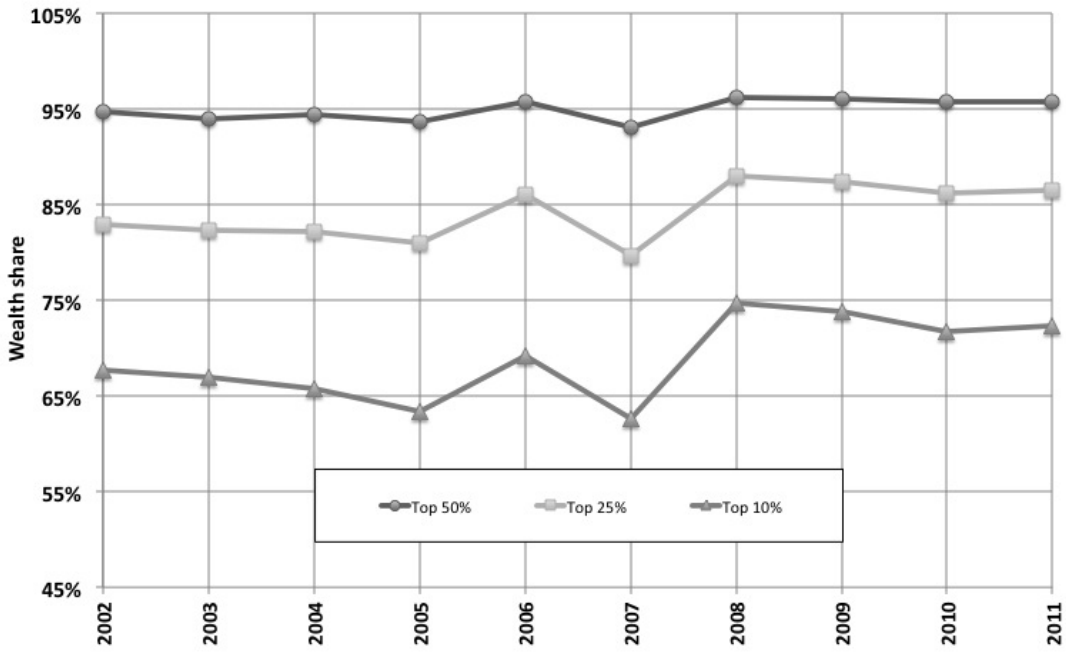

Figure .8: Top 50%, 25% and 10% Wealth Shares (2002-2011)
Source: Own elaboration with Personal Income Tax Samples from the Spanish Institute of Fiscal Studies

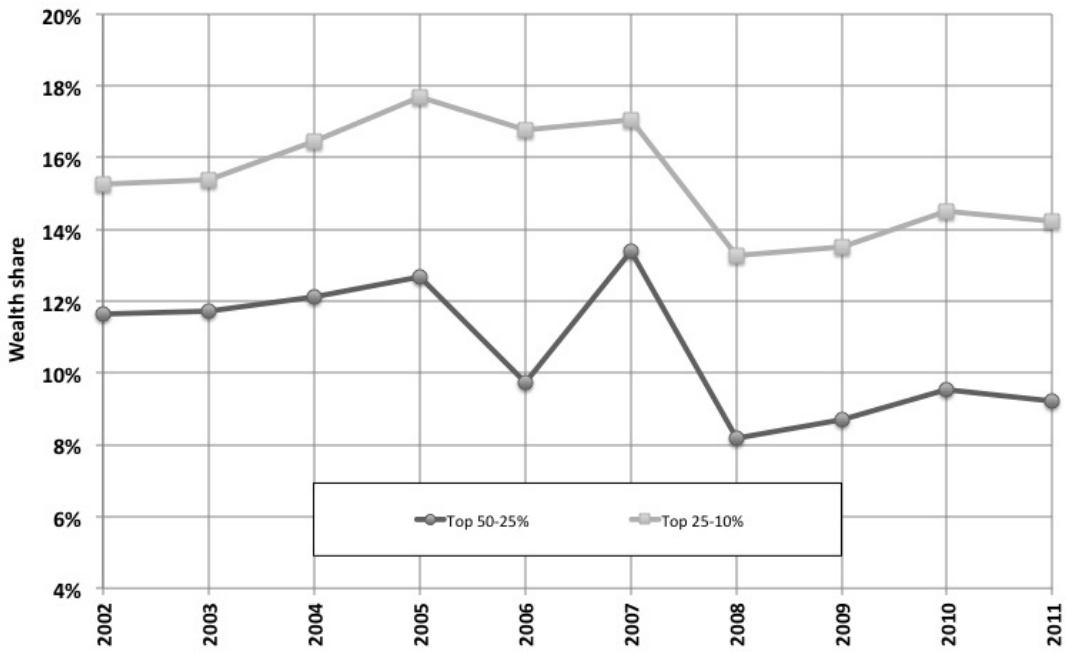

Figure .9: Top 50-25% and 25-10% Wealth Shares (2002-2011)
Source: Own elaboration with Personal Income Tax Samples from the Spanish Institute of Fiscal Studies

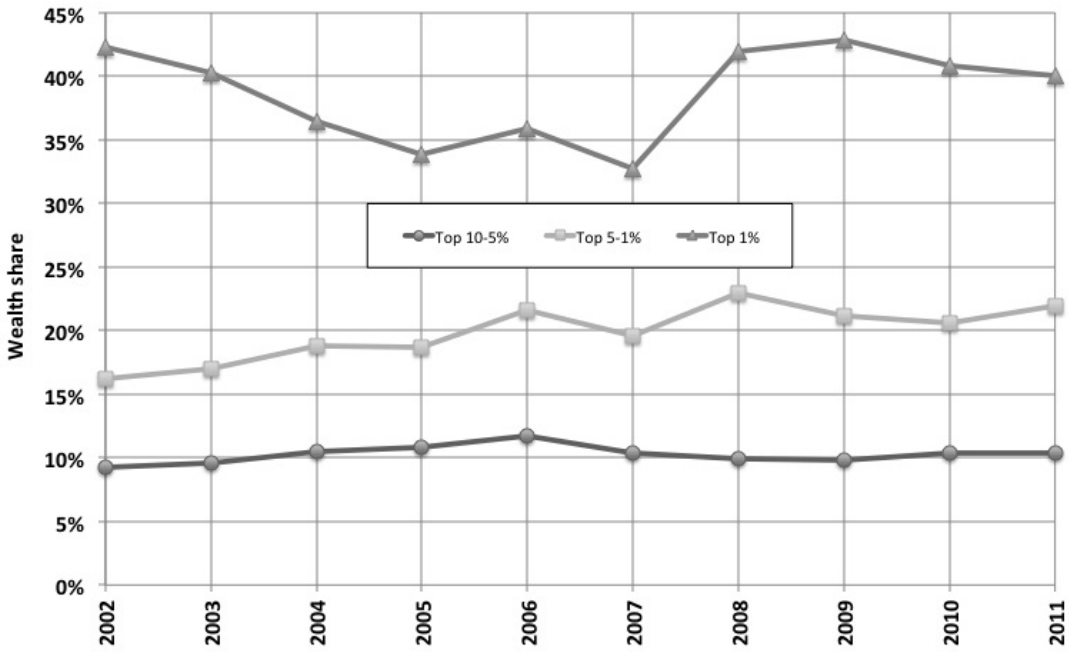

Figure .10: Top 10-5%, 5-1% and 1% Wealth Shares (2002-2011)
Source: Own elaboration with Personal Income Tax Samples from the Spanish Institute of Fiscal Studies

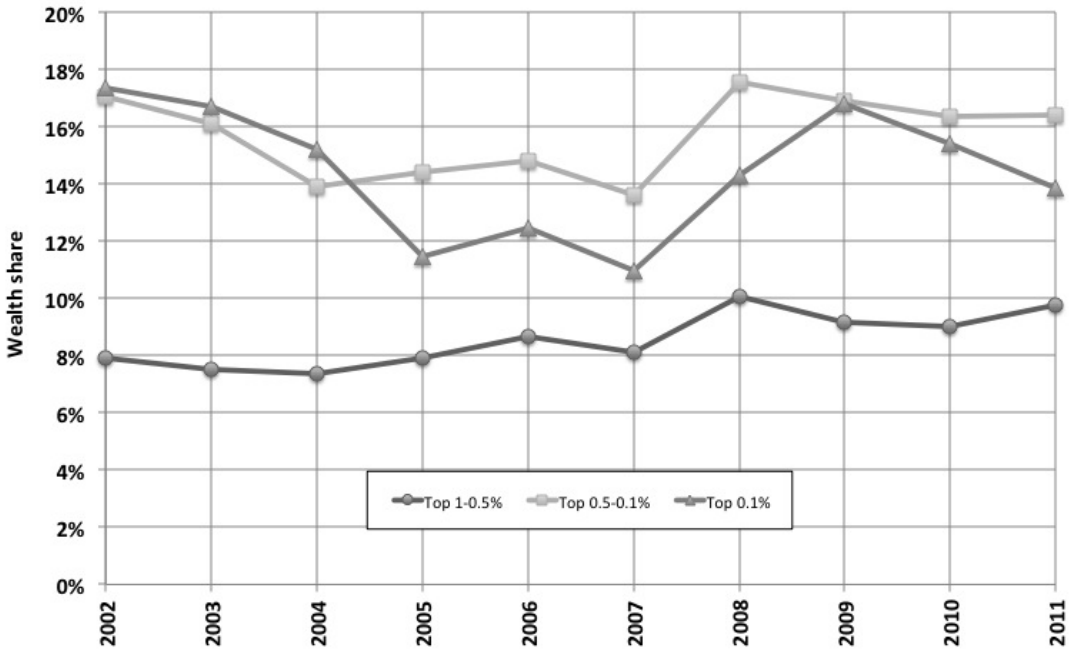

Figure .11: Top 1-0.5%, 0.5-0.1% and 0.1% Wealth Shares (2002-2011)
Source: Own elaboration with Personal Income Tax Samples from the Spanish Institute of Fiscal Studies

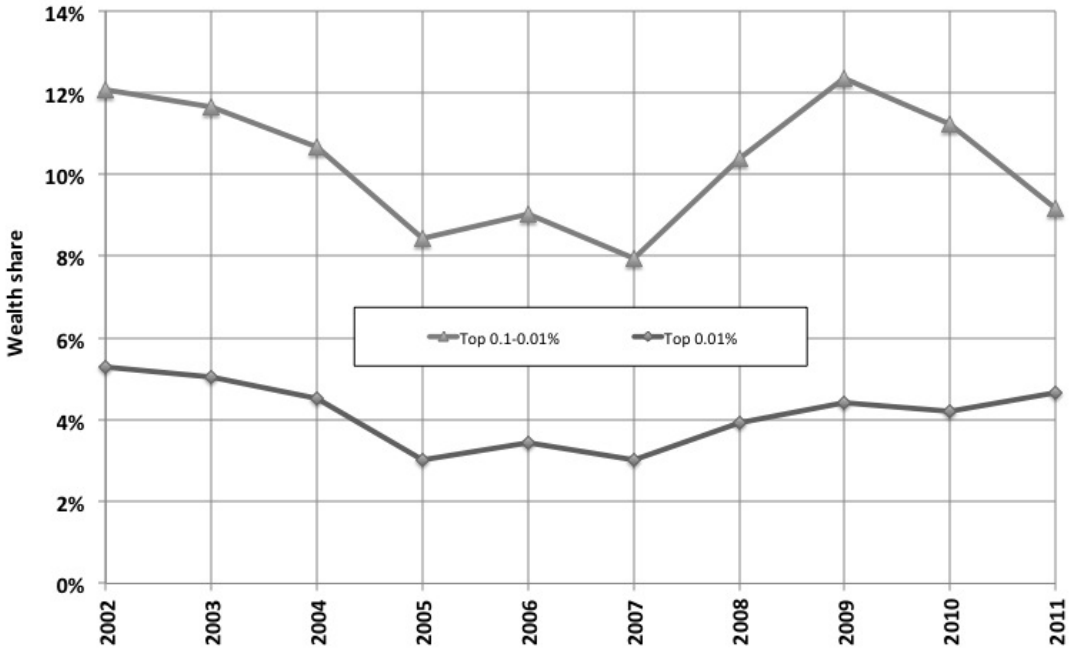

Figure .12: Top 0.1-0.01% and 0.01% Wealth Shares (2002-2011)
Source: Own elaboration with Personal Income Tax Samples from the Spanish Institute of Fiscal Studies

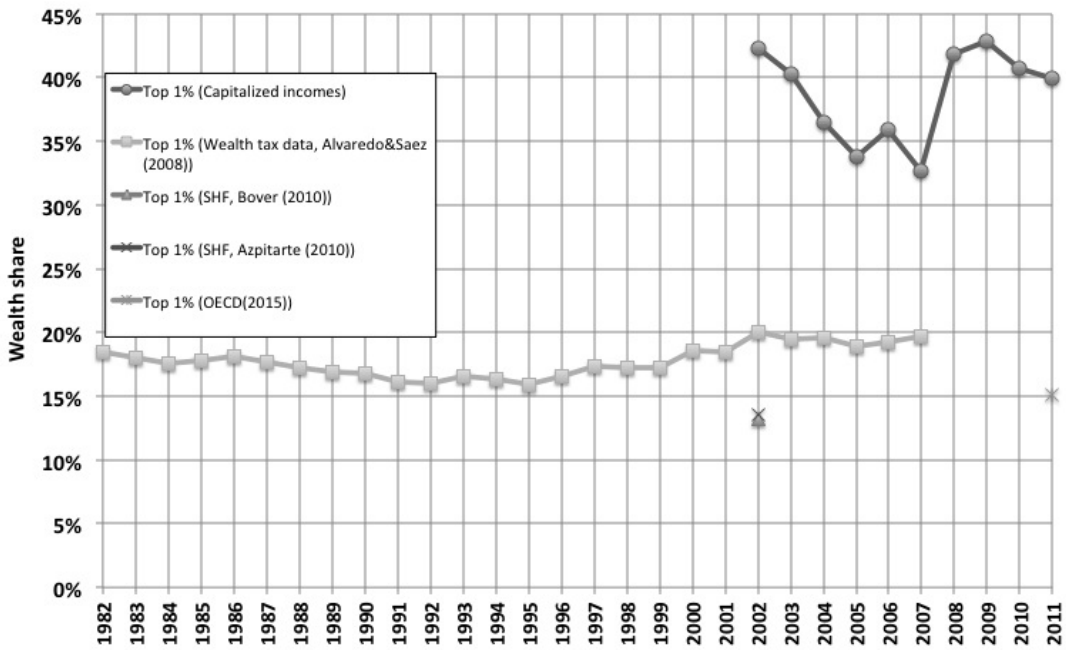

Figure .13: Top 1% Wealth Share in Spain: Capitalized incomes vs. Wealth tax vs. SHF, 1982-2011

Source: Own elaboration with Personal Income Tax Samples from the Spanish Institute of Fiscal Studies

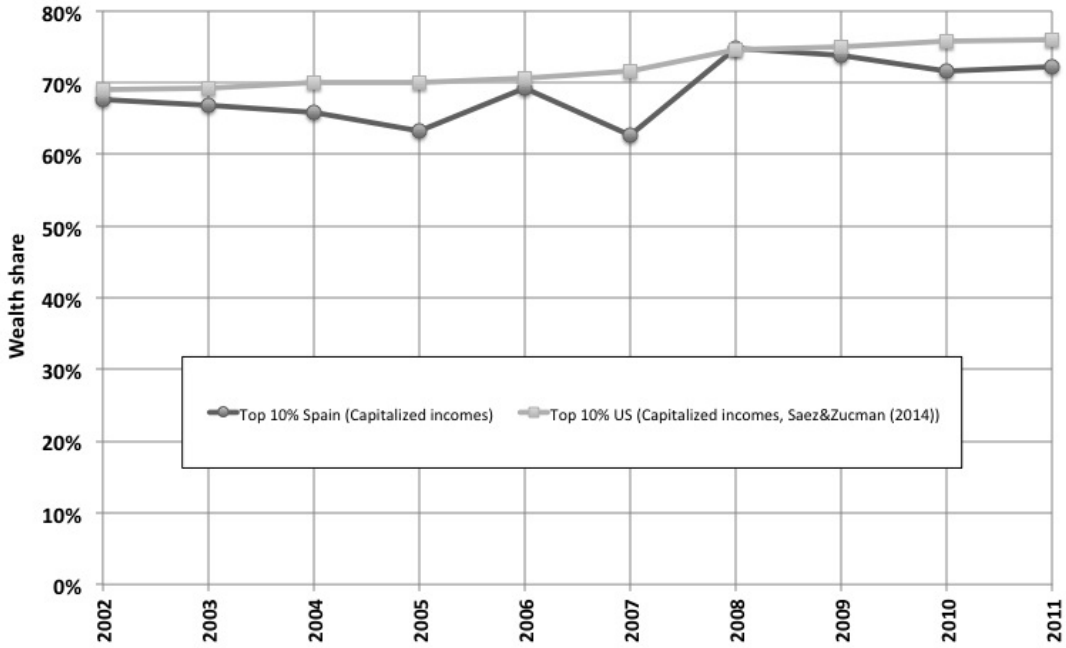

Figure .14: Top 10% Wealth Share in Spain, 2002-2011: Spain vs. US

Source: Own elaboration with Personal Income Tax Samples from the Spanish Institute of Fiscal Studies

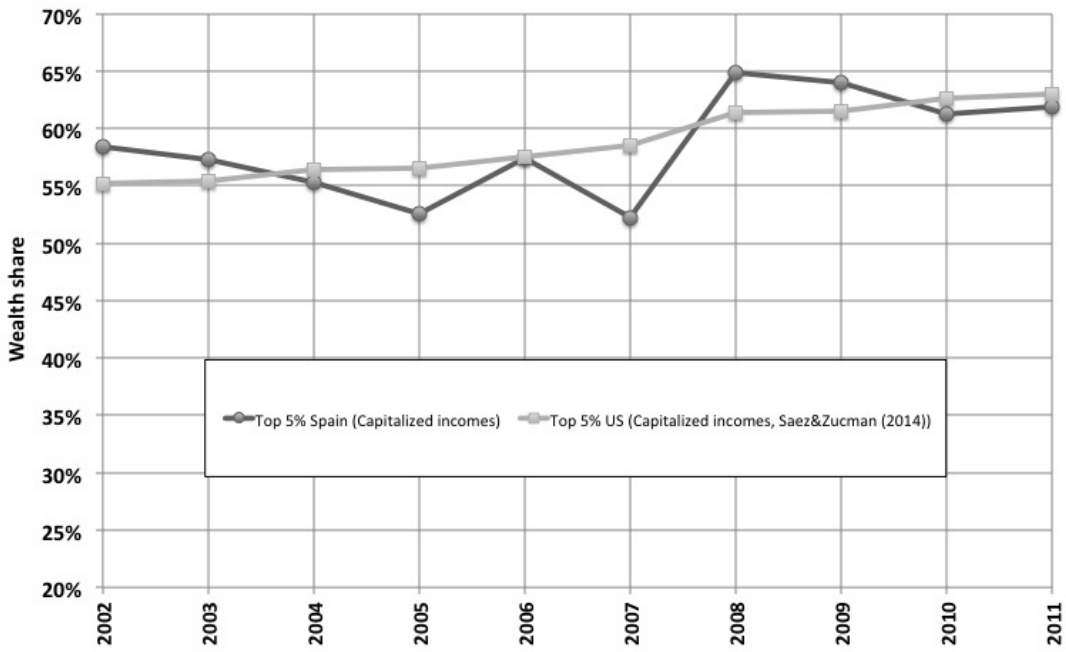

Figure .15: Top 5% Wealth Share in Spain, 2002-2011: Spain vs. US
Source: Own elaboration with Personal Income Tax Samples from the Spanish Institute of Fiscal Studies

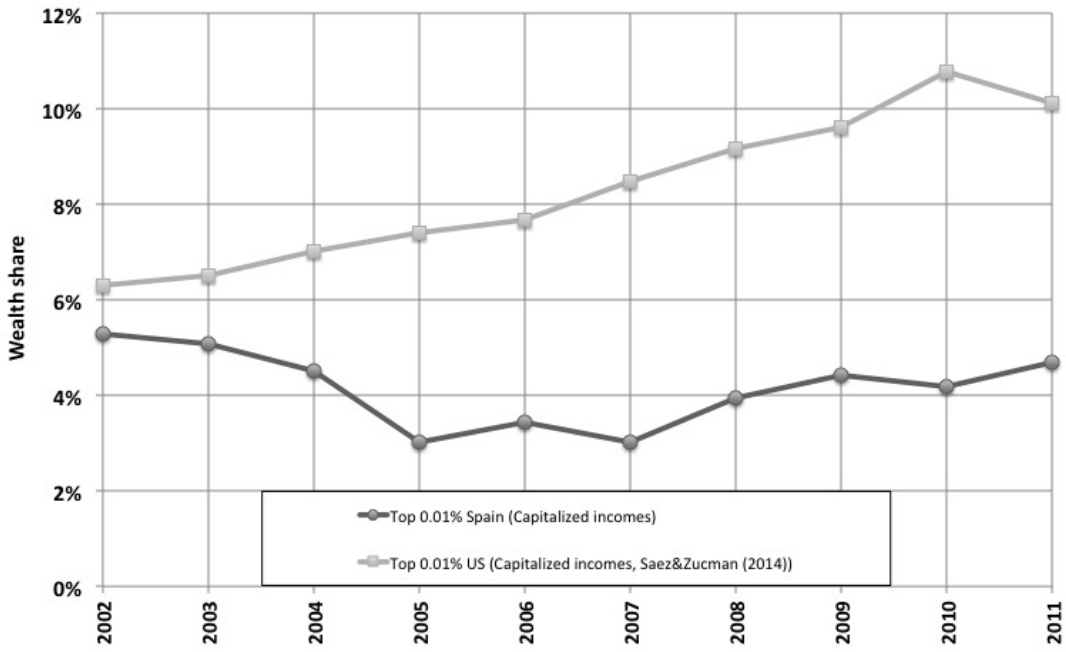

Figure .16: Top 0.01% Wealth Share, 2002-2011: Spain vs. US
Source: Own elaboration with Personal Income Tax Samples from the Spanish Institute of Fiscal Studies