Housing Bubbles and Wealth Inequality. Evidence from Spain

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Abstract
This paper combines different sources (tax records, national accounts, wealth surveys) to construct wealth distribution series for Spain over the period 1984-2015. The wealth inequality series and a new asset-specific accumulation decomposition are then used to analyze how housing bubbles shape the wealth distribution. Wealth concentration dropped in Spain since the eighties until the end of the housing boom of the 2000s and it increased afterwards during the years of the housing bust. My findings suggest that differences in rates of return and capital gains drive wealth inequality dynamics during housing booms and busts, but saving rates only play a role during busts. Rich individuals diversify their portfolio during the housing bust substituting housing for financial assets, contributing to revert the decreasing trend in wealth concentration of the housing boom.

Keywords: Wealth Inequality, Housing Bubbles, Portfolio composition, Spain

JEL Classification: D3, N3, R2

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I Introduction

Both the evolution and determinants of wealth inequality are currently at the center of the academic and political sphere. This is largely due to the debate generated by Thomas Piketty’s prominent book, *Capital in the Twenty-First Century* (Piketty (2014)), in which he warns that the tendency of returns on capital to exceed the rate of economic growth threatens to generate extreme inequalities. Moreover, he also emphasizes the importance of analyzing empirically the historical evolution of wealth distributions. Research on wealth inequality has, however, a long tradition which dates back to the late 19th century and beginning of the 20th century, in which a number of authors started to study wealth among the living using mainly French and British inheritance data.\(^1\) Nonetheless, it is only after the first half of the 20th century that academics started to construct long run homogeneous historical series on top wealth shares (Lampman (1962) for the US, Atkinson and Harrison (1978) for the UK, Piketty et al. (2006) for France and Roine and Waldenström (2009) for Sweden).

There exist five main methods and/or sources to analyze wealth inequality. The first is the estate multiplier method, that provides a snapshot of the wealth distribution at the time of death using estate tax records data. The main difficulty is how to generalize from decedents to the full population. The second possible approach is to use surveys of household finances. Contrary to the estate multiplier method, one advantage of using survey data is that it allows to characterize the middle and bottom of the wealth distribution. Nevertheless, even though most of these surveys oversample wealthy households, concentration at the top tends to be underestimated because of misreporting or top coding. The third available source are wealth tax returns. Wealth tax data cover very well the top of the distribution, but three main limitations remain. First, there are very few countries in the world which have a wealth tax (i.e. Spain, France, Norway, Uruguay, etc.). Second, only very wealthy individuals are subject to the tax, making it impossible to analyze the middle and bottom of the distribution. Third, many assets are exempted from this tax, so that it is not possible to have a whole picture of the wealth distribution. The fourth is the capitalization method, which consists of applying a capitalization factor to the capital income distribution to arrive to the wealth distribution. The main advantages of the capitalization technique are that it is based on income data, which are much easier to obtain than wealth data, and that the top is very well covered. The main limitation is, as in the case of the wealth tax, that there are also some assets whose generated income is not subject to the tax. Finally, one

\(^1\)See Piketty (2011) for the main references in this literature.
can also analyze the upper part of the distribution using lists of high-wealth individuals, such as the annual Forbes 400 list. The drawback in this case is that named lists are limited to a very small group of top wealth-holders and have non-systematic coverage.

Despite the immense literature on the analysis of wealth distributions, two important gaps remain. First, there is still no consensus on the method of analysis that should be adopted, since there are conflicting results depending on which of the techniques or sources are used. For instance, Saez and Zucman (2016) 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 by Kopczuk and Saez (2004) using the estate multiplier method. Second, due to data limitations, empirical evidence on the determinants of wealth concentration is still scarce. There is some evidence that the surge in top incomes and offshore wealth (Saez and Zucman (2016), Alstadsæter et al. (2017)), and the increase in saving and rates of return inequality (Garbinti et al. (2017), Saez and Zucman (2016)) have pushed toward wealth concentration in the last two decades. However, it is still unclear which are the distributional effects of specific economic phenomena, such as housing bubbles.

The aim of this research is to analyze wealth inequality in Spain using a mixed survey-capitalization method from 1984 up to 2015, with a particular focus on the years of the housing boom and bust. By analyzing Spain I will contribute to the literature of wealth inequality in three ways. First, Spain experienced a unprecedented increase in aggregate wealth due to a boom in housing between 2000 and 2008. Hence, it is interesting to analyze the distributional effects of this economic phenomenon which have not been deeply studied so far. Second, Spain has high-quality personal income tax micro-files with detailed income for each tax unit and income category over the period 1984-2015. Thus, they allow to provide a careful estimation of the evolution and composition of Spanish wealth shares from bottom to the top, with breakdowns by age for the 1999-2015 sub-period. To my knowledge, the few studies that have analyzed wealth concentration in Spain using administrative data have only focused on the top 1% and survey data (Survey of Household Finances, Bank of Spain) are only available for four waves since 2002. Third, I go one step forward previous distributional studies and further decompose wealth accumulation by asset type. This new asset-specific decomposition allows me to quantify not only the relative importance of each channel (income, saving rate and rate of return inequality), but also the role played by each asset to explain the channels that drive the observed dynamics of the distribution of wealth.
The starting point of the mixed capitalization-survey approach used in this work 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, it is assumed that within each asset class capitalization factors are the same for each individual. By using this methodology, I am able to obtain wealth distribution series consistent with official financial and non-financial household 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 main owner-occupied housing, life insurance, investment and pension funds.

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 (2017) 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. Unfortunately, there are no inheritance data available for the current decades. Hence, it is quite relevant to use the capitalization method instead.

Wealth concentration dropped in Spain since the eighties until the end of the housing boom of the 2000s and it increased afterwards during the years of the housing bust. My findings suggest that differences in rates of return and capital gains drive wealth inequality dynamics during housing booms and busts, but saving rates only play a role during busts. Rich individuals diversify their portfolio during the housing bust substituting housing for financial assets contributing to revert the decreasing trend in wealth concentration of the housing boom. The trends and levels in the wealth shares are very similar to the ones obtained by Alvaredo and Saez (2009) using wealth tax returns.

The layout of the paper is as follows. Section II discusses the wealth concept and data used, together with an analysis of the aggregate trends in wealth in the last three decades in Spain. In Section III I formalize and explain the procedure used in order to obtain wealth shares from income tax and survey data. Results for the period 1984-2015, derived from using the mixed survey-capitalization method, are presented in Section IV, as well as a comparison with the trends in other countries. A new asset-specific decomposition of wealth accumulation and some simulation exercises are presented in Section V in order to better understand the key drivers of the dynamics of wealth inequality during the housing bubble in Spain. Finally, Section VI concludes. All Figures and Tables to which the text refers to are included in the appendix at the end of the paper. The data appendix is an excel file ("Wealth Inequality Spain Database") which includes the complete set of results.
II Wealth: Concept, Data and Aggregate Trends

This section describes the wealth concept used and the trends in the evolution of aggregate wealth over the period 1984-2015, which are the years for which the wealth distribution series are constructed. Complete methodological details of the Spanish specific data sources and computations are presented in the methodological appendix at the end of the paper and the data appendix.

I Wealth Concept and Data Sources

The wealth concept used is based upon national income categories and it is restricted to net household wealth, that is, the current market value of all financial and non-financial assets owned by the household sector net of all debts. For net financial wealth, that is, for both financial assets and liabilities, the latest and previous financial accounts (European System of Accounts (ESA) 2010 and 1995, Bank of Spain) are used for the period 1996-2015 and 1984-1995, respectively. Financial accounts report wealth quarterly and I 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. It is important to mention that pension wealth excludes Social Security pensions, since they are promises of future government transfers. As it is stated in Saez and Zucman (2016), 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.

My wealth concept only considers the household sector (code S14, according to the System of National Accounts (SNA)) and excludes non-profit institutions serving households (NPISH, code S15). 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 approximately 1-2% of household financial wealth between 1996 and 2015 in Spain. Hence, it is a negligible part of wealth and excluding it should not alter the results.

Spanish financial accounts report financial wealth for the household and NPISH sector and also for both households and NPISH isolated as separate sectors. However, 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, I 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, it is not possible to rely on non-financial accounts based on the SNA. 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. I need to use other statistics instead. My definition of household non-financial wealth consists of housing and unincorporated business assets and I rely on the series elaborated by Artola Blanco et al. (2018). Housing wealth is derived based on residential units and average surface from census data on the one hand, and average market prices from property appraisals, on the other hand.\(^2\) Unincorporated business assets have been constructed using the five waves of the Survey of Household Finances (2002, 2005, 2008, 2011, 2014) elaborated by the Bank of Spain and extrapolated backwards using the series of non-financial assets held by non-financial corporations also constructed by the Bank of Spain.\(^3\)

I exclude collectibles since they amount to only 1% of total household wealth and they are not subject to the personal income tax. Furthermore, consumer durables, which amount to approximately 10% of total household wealth, are also excluded, because they are not included in the definition of wealth by the SNA and there are no statistics about consumer durables owned by Spanish households for the period prior to 2002.\(^4\)


In this section I briefly describe the most important stylized facts in the evolution of aggregate household wealth in Spain over the period 1984-2015. Understanding how wealth has changed in aggregate terms is crucial to later interpret the wealth inequality dynamics in Section IV. I distinguish three stylized facts in the evolution of the level and composition of the stock of

\(^2\)Net housing wealth is the result of deducting mortgage loans from household real estate wealth. Note that mortgage debts are approximated by total household liabilities.

\(^3\)A detailed explanation of the sources and methodology used in order to construct these two series can be found in the appendix of Artola Blanco et al. (2018).

\(^4\)The shares of both collectibles and consumer durables over total household wealth are obtained using the Survey of Household Finances developed by the Bank of Spain.
household wealth in Spain during this period of time.

The first stylized fact points out that the household wealth to national income ratio has almost doubled during that period of time. Household wealth amounted to 359% in 1984 and it grew up to around 435% in the mid-nineties. From 1995 onwards, it started to increase more rapidly reaching the peak of 728% of national income in 2007. After the burst of the crisis in 2008, it dropped and it has been decreasing since then. In 2015, the household wealth to national income ratio amounted to 629%, a level which is similar to the wealth to national income ratio of 2004, but much higher than the household wealth to national income ratios of the eighties and nineties (Figure 1). The level of household wealth to national income that Spain reached in 2007 is the highest among all countries with available records in the early twenty-first century (Artola Blanco et al. (2018)).

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 the late eighties the growth in net housing was more than double the growth in financial assets. During the nineties this trend reversed and financial assets started to rise faster due mainly to the dot-com bubble. After the stock market crash of 2000, housing prices increased rapidly surpassing financial assets. The value of dwellings reached the peak in 2008, after which the housing bubble burst and the drop in housing wealth was larger than in financial assets (Figures 1 and 2).

The third and last stylized fact refers to the increase in the importance of net housing in the asset portfolio of households. Figure 2 shows that even though dwellings are during the whole period the most important asset held by households, always representing more than 40% of total household net wealth, the composition of household wealth has not evolved homogeneously over time. It has gained importance during periods of large housing price increases (i.e. housing boom of 1986-1991) and it has lost importance in times when financial assets significantly increase (i.e. dot-com bubble of 1997-2001). The increase in the fraction of housing in the total portfolio of households has also been exacerbated by the steady decrease in the fraction of unincorporated business assets (from 23% in 1984 up to 10% in 2015), due mainly to the reduction in the importance of agriculture, as documented by Artola Blanco et al. (2018).

The core of this work is to construct wealth shares by allocating the total household wealth depicted in Figure 1 to the various groups of the distribution. For that, it is needed to proceed with the following three steps. First, I start by calculating the distribution of taxable capital income at the individual level. Second, the taxable capital income is capitalized. Third, I account for wealth that does not generate taxable income. This is a mixed method and not the pure capitalization technique, because the survey method is used in order to account for both wealth at the bottom of the distribution and assets that do not generate taxable income.

I The Distribution of Taxable Capital Income

The starting point is the taxable capital income reported on personal income tax returns. I use micro-files of personal income tax returns constructed by the Spanish Institute of Fiscal Studies (Instituto de Estudios Fiscales (IEF)) in collaboration with the State Agency of Fiscal Administration (Agencia Estatal de Administración Tributaria (AEAT)). They have three different types of files: two personal income tax panels that range from 1982-1998 and 1999-2014, respectively, and personal income tax samples for 2002-2015. I use the first income tax panel for 1984-1998, the second panel for 1999-2001 and all income tax samples for 2002-2015. The micro-files provide information for a large sample of taxpayers, with detailed income categories and an oversampling of the top. The income categories I use are interest, dividends, effective and imputed housing rents, as well as the profits of sole proprietorships. The micro-files are drawn from 15 of the 17 autonomous communities of Spain, in addition to the two autonomous cities, Ceuta and Melilla. Two autonomous regions, the Basque Country and Navarre, are excluded, as they do not belong to the Common Fiscal Regime (Régimen Fiscal Común), because they manage their income taxes directly. Combined these two regions represent about 6% and 8% of Spain in terms of population and gross domestic product, respectively.

The unit of analysis used is the adult individual (aged 20 or above), rather than the tax

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5Even though the first panel is available since 1982, I decided to start using it from 1984 since I found some inconsistencies between the files for 1982 and 1983 and subsequent years.

6Personal income tax samples are more exhaustive (i.e. 2,700,593 tax units in 2015) than the panels (i.e. 390,613 tax units in 1999).

7Note that imputed housing rents exclude main residence from the period 1999-2015. I explain the way in which I account for main residence in the following subsection. Moreover, profits of sole proprietorships are considered as a mixed income, so that I assume as it is commonly done in the literature that 70% of profits are labor income and 30% capital income.

8These figures have been obtained using Regional National Accounts and the Census of Population of the Spanish Statistics Institute (Instituto Nacional de Estadística (INE)).
unit. Splitting the data into individual units has on the one hand the advantage of increasing comparability as across units since individuals in a couple with income for example at the 90th percentile is not as well off as an individual with the same level of income. On the other hand, it is also more advantageous for making international comparisons, given that in some countries individual filing is possible (i.e. Spain, Italy) and in others (i.e. France, US) not. Since in personal income tax returns the reporting unit is the tax unit, I 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, only the units for which the tax return has been jointly made by a married couple need to be transformed. For each of these units I split the joint tax returns into two separate individual returns and assign half of the jointly reported capital income to each member of the couple.\footnote{Since business income from self-employment is a mixed income, only the part corresponding to capital income is split among the couple.} In 2015, for instance, this operation converts 19,480,423 tax units into 22,945,329 individual units in the population aged 20 or above, that is, approximately 18\% of units are converted.\footnote{Given the incentives of the tax code to file separately whenever both individuals in the couple receive income – the reductions for filing jointly usually do not compensate for the increase in the tax base – there are more married couples filing individually the further we move up in the income distribution. See AEAT (2015) for a more detailed explanation in Spanish about how personal income tax filing works in Spain.}

One limitation of using personal income tax returns to construct income shares in the Spanish case is that not all individuals are obliged to file. There exist some labour income and capital income thresholds under which individuals are exempted from filing. In 2015, for instance, the labour income threshold when receiving labour income from one single source was 22,000 euros and 12,000 euros when receiving it from two or more sources. The capital income threshold was 1,600 euros for interest, dividends and/or capital gains and 1,000 for imputed rental income and/or Treasury bills.\footnote{See AEAT (2015) for a more detailed explanation in Spanish about how personal income tax filing works in Spain.} In 2015, for instance, approximately one third of the population is exempted from filing.\footnote{This figure has been obtained comparing the total number of personal income tax filers with the population totals of the Spanish Population Census.} I account for the missing adults using the Spanish Population Census for the period 1984-2015 by comparing the population totals by age and gender of the micro-files with the population totals of the Census excluding the regions of Basque Country and Navarre and I then create new observations for all the missing individuals. By construction, my series perfectly match the Census population series by gender and age.\footnote{The oldest personal income tax panel that I use for the period 1984-1998 does not include information about age nor gender. Hence, for this period of time I simply adjust the the micro-files to match the Census population.
although being the poorest since they do not have to file the personal income tax, earn some labour and also some capital income in the form of interest from checking accounts or deposits. Hence, we need to account for this missing income, otherwise we would be overestimating the amount of wealth held by the middle and the top of the distribution. For that, I rely on the Survey of Household Finances for the period 1999-2015 and on the Household Budget Continuous Survey for the period 1984-1998. Appendix A explains in detail the imputation method followed using the two surveys. The imputations are quite robust since as it is shown in Figure ??, the bottom 50% wealth share with the SHF is almost identical to the one using the capitalization method.

Finally, before capitalizing the capital income shares, it is important to check that income is distributed in a coherent way and that there are no significant breaks across years due to, for instance, tax reforms or the use of different data sources. If already the income data are not coherently distributed, neither the wealth distribution estimates will be. In appendix A, I explain in detail the particular aspects of the reforms which could potentially affect my methodology and how I deal with them in order to ensure consistency in the series across the whole period of analysis.

II The Income Capitalization Method

In the second step of the analysis the investment income approach is used. In essence, this method involves the application of a capitalization factor to the distribution of taxable capital income to arrive to an estimate of the wealth distribution.

II.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 \( (j = 1, \ldots, J) \). If the return obtained by the individual on asset type \( j \) is \( r_j \),\(^{14}\), his investment income by asset type is:

\[
y_{ij} = r_j \times a_{ij}
\]

\(^{14}\)Note that the capitalization method relies on the assumption that the rate of return is constant for each asset type, that is, it does not vary at the individual level.
and his total investment income:

\[ y_i = \sum_{j=1}^{J} r_j \ast a_{ij} \]  \hspace{1cm} (2)

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

\[ a_{ij} = \frac{y_{ij}}{r_j} \]  \hspace{1cm} (3)

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

\[ w_i = \sum_{j=1}^{J} y_{ij} \ast r_j \]  \hspace{1cm} (4)

In the next subsection, this formal setting is applied to the Spanish case in order to obtain the wealth distribution series.

II.2 How the Capitalization Technique Works for the Spanish Case

There are five categories of capital income in personal income tax data: effective and imputed (excluding main residence) rental income, business income from self-employment, interest and dividends. Tax return income for each category is weighted in order to match aggregate national income from National Accounts. I then map each income category (e.g. business income from self-employment) to a wealth category in the Financial Accounts from the Bank of Spain (e.g. business assets from self-employment).\(^\text{15}\)

As it was mentioned in Section III, income tax data exclude the regions of the Basque Country and Navarre. Therefore, before mapping the taxable income to each wealth category, income and wealth in national accounts need to be adjusted excluding the amounts corresponding to these two regions. Ideally, if one would know the amount of wealth and income in each category by region, one could simply discount the wealth and income corresponding to these two regions. Unfortunately, neither the Bank of Spain nor the National Statistics Institute have constructed regional national accounts with disaggregated information by asset type yet, so another methodology needs to be used. I assume that income and wealth in each category are

\(^{15}\text{Capital gains are excluded from the analysis. The reason is that they are not an annual flow of income and consequently, they experience large aggregate variations from year to year depending on stock price variations. By including them, the trends in the wealth distribution series could be biased since we observe large variations in capital gains from year to year.}\)
proportional to total gross domestic product and housing wealth excluding these two regions, respectively.\(^{16}\)

Once income and wealth have been adjusted accordingly, a capitalization factor is computed for each category as the ratio of aggregate wealth to tax return income, every year since 1984. This procedure ensures consistency with the Bank of Spain aggregate wealth data by construction. In 2015, for instance, there are about 18.8 billion euros of interest and 576.6 billion euros of business assets from self-employees generating taxable income. Hence, the rate of return on taxable business assets is 3.8% and the capitalization factor is equal to 26.5. As it is shown in Figure 3, rates of return (and thus capitalization factors) vary across asset types, being for instance for most of the period higher for financial assets than for business assets.\(^{17}\)

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 it has been already mentioned, tax returns do not include all income categories. In the following subsection, I carefully account for the assets that do not generate taxable income.

### III 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\(^{18}\), life insurance, investment and pension funds. Although these assets account for a large part of total household wealth, namely 30.7% for main residence and 10.2% for life insurance, investment and pension funds in 2015, 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).

As it was mentioned in the beginning of this section, this survey provides a representative...
picture of the structure of household incomes, assets and debts at the household level and does an oversampling at the top. This is achieved on the basis of the wealth tax through a blind system of collaboration between the National Statistics Institute and the State Agency of Fiscal Administration 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. Hence, this survey is extremely suitable for this analysis and it allows 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 survey. Appendix A explains in detail the imputation method we use relying on the survey, which is very similar to the one developed by Garbinti et al. (2018) for France.

In order to make sure that the imputations are correctly done, I conducted sensitivity tests and applied several alternative imputation methods for tax-exempt assets and I find that the overall impact on wealth distribution series is extremely small. Furthermore, I also calculate wealth shares with and without conducting my imputation method using the four waves of the wealth survey and I obtain very similar results.


I Wealth Inequality Series

This section presents the benchmark unified series for wealth distribution in Spain over the period 1984-2015 and the breakdowns by asset category (1984-2015) and age (1999-2015).

The wealth levels, thresholds and shares for 2015 are reported on Table 1. In 2015, average net wealth per adult in Spain was about 150,000 euros. Average wealth within the bottom 50% of the distribution was slightly less than 20,000 euros, i.e. around 13% of the overall average, so that their wealth share was close to 6.5%. Average wealth within the next 40% of the distribution was slightly more than 132,000 euros, so that their wealth share was close to 36%. Finally, average wealth within the top 10% was about 833,000 euros (i.e. about 5.7 times average wealth), so that their wealth share was 57.7%.

Figure 4 displays the wealth distribution in Spain decomposed into three groups: top 10%, middle 40% and bottom 50%. The wealth share going to the bottom 50% has always been very
small ranging from 3 to 10%, the middle 40% has concentrated between 29% and 40% of total net wealth and the top 10% between 51% and 68% over the period of analysis. Looking at the dynamics, the top 10% wealth share dropped from the mid-eighties until beginning of the 1990s, at the expense of the increase in both the middle 40% and the bottom 50% of the distribution. The top 10% wealth share slightly increased during the nineties, decreased until the mid-2000s and has continued to increase since the the end of the housing boom. Nonetheless, in 2015 the top 10% wealth share is still significantly lower (57.7%) than in 1984 (66.7%).

Contradictory movements in relative asset prices have an important impact on the composition of the different wealth groups, because they own very different asset portfolios. As it is shown on Figure 5, the bottom 50% of the distribution own mostly financial assets in the form of deposits in 2015, whereas housing assets are the main form of wealth for the middle of the distribution. As we move toward the top 10% and the top 1% of the distribution, financial assets (other than deposits) gradually become the dominant form of wealth. The same general pattern applies for the period 1984-2015, except that unincorporated assets have lost importance over time, due mainly to the reduction in agricultural activity among self-employees.

By decomposing by asset categories the evolution of the wealth shares going to the bottom 50%, middle 40%, top 10% and top 1%, the impact of asset price movements on wealth shares, particularly the impact of the 2000 stock market boom and the 2007 housing bubble burst, are clearly captured (Figures 6 and 7). One particularity of the Spanish case is that housing constitutes a very important asset in the portfolio of households even at the top of the distribution. This has been the case during the whole period of analysis, but it has become more striking in the last fifteen years due to the increase in the value of dwellings. For instance, whereas in 2012 the top 10% and 1% of the wealth distribution in Spain own 26% and 9% of total net wealth in housing, respectively, in France these figures are 19% and 5%, respectively (Garbinti et al. (2017)).

Moving to the analysis by age, I find that average wealth is always very small at age 20 (less than 20% of average adult wealth), then rises sharply with age until age 60-70 reaching 150-170% of average adult wealth, and moderately decreases at ages above 60-70 (Figure 8, upper panel). Contrary to the pure life-cycle model with no bequest (the standard Modigliani triangle), average wealth does not seem to sharply decline at high ages and it remains at very high levels, which means that old-age individuals die with substantial wealth and transmit it to their offspring. This age-wealth profile has changed over the 2002-2015 period. Old individuals
(+60) are better-off in 2015 than in 2007 and even more so than in 2002. Furthermore, the age at which individuals reach the maximum average wealth relative to total wealth has increased with the passing of time. In 2002 the maximum average wealth was reached at age 60, in 2007 at age 65 and in 2015 at age 70. In contrast, the young (20-39) are worse-off in 2015 than in 2007 and even more so than in 2002. Hence, the old have benefited from the economic crisis at the expense of the worsening-off of the young. This is consistent with the large increase in youth unemployment (Scarpetta et al. (2010)) after the burst of the crisis and at the same time the stability in Social Security pension payments. When decomposing the wealth distribution series by age, I find that wealth inequality is more pronounced for the young (20-39) than for the old (+60) and middle-old (40-59), for which wealth inequality is slightly lower than for the population taken as a whole (Figure 8, bottom panel). Wealth concentration among the young has significantly increased during the housing bust.

II International Comparison

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 (2016) 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.

Wealth concentration at the top 10 and 1% in Spain was similar to the US during the mid-eighties, but since the nineties the trends have diverged. Concentration at the top 10% and 1% decreased in Spain since the beginning of the nineties until the onset of the recent financial crisis – with the exception of the years of the dot-com bubble – after which concentration started to increase. In contrast, wealth concentration in the US has been steadily increasing since the late eighties. These differences have increased in the last decades due to the relative larger rise in wealth concentration in the US, specially for the top 1% (Figure 9). Contrary to the US case, the levels of wealth concentration in Spain in the eighties and beginning of the nineties were however much larger than in France. Since the mid-nineties Spain has converged to the levels of the rest of Western European countries such as France. Even though all series I compare use the capitalization method, comparisons should be made carefully since there are important
methodological differences across countries.

V How do Housing Bubbles Shape the Wealth Distribution?

In the past fifteen years Spain has experienced a dramatic business cycle with a large housing based boom followed by a bust and consequently, a large rise in unemployment and significant effects on public finances. The high level of disaggregation of the wealth distribution series allows a good understanding about the way housing bubbles shape the wealth distribution. To my knowledge, this is the first academic paper analyzing the relationship between housing bubbles and wealth inequality with such a high level of disaggregation and detail. In order to understand which are the underlying forces driving the dynamics of wealth inequality in Spain during the housing boom and bust, I decompose the wealth distribution series using the following transition equation:

$$W_{g,t+1}^g = (1 + q_{t}^g)W_{t}^g + s_{t}^g(Y_{L,t}^g + r_{t}^gW_{t}^g),$$  \hspace{1cm} (5)$$

where $W_{t}^g$ stands for the average real wealth of wealth group $g$ at time $t$, $Y_{L,t}^g$ is the average real labor income of wealth group $g$ at time $t$, $r_{t}^g$ the average rate of return of group $g$ at time $t$, $q_{t}^g$ the average rate of real capital gains of wealth group $g$ at time $t$\(^19\) and $s_{t}^g$ the synthetic saving rate of wealth group $g$ at time $t$. The saving rate is synthetic because the identity of individuals in wealth group $g$ changes over time due to wealth mobility.

I follow the same approach of Garbinti et al. (2017) and Saez and Zucman (2016) and calculate the synthetic savings rates that can account for the evolution of average wealth of each group $g$ as a residual from the previous transition equation. This is straightforward since I observe variables $W_{t}^g$, $W_{t+1}^g$, $Y_{L,t}^g$, $r_{t}^g$ and $q_{t}^g$ in my 1999-2015 wealth distribution series. Hence, the three forces that can affect the dynamics of wealth inequality are income, saving rate and rate of return inequality.

In this paper, I go one step forward and further decompose the previous transition equation into three asset components: net housing, business assets and financial assets.\(^20\) The transition equation is as follows:

\(^{19}\)Real capital gains are defined as the excess of average asset price inflation, given average portfolio composition of wealth group $g$, over consumer price inflation.

\(^{20}\)Artola Blanco et al. (2018) do a similar decomposition for analyzing the dynamics of aggregate wealth in Spain but they calculate real capital gains as a residual.
\[ W_{t+1}^g = W_{H,t+1}^g + W_{B,t+1}^g + W_{F,t+1}^g, \]  

where

\[ W_{H,t+1}^g = (1 + q_{H,t}^g) [W_{H,t}^g + s_{H,t}^g (Y_{L,t}^g + r_t^g W_{H,t}^{H,g})] \]  

\[ W_{B,t+1}^g = (1 + q_{B,t}^g) [W_{B,t}^g + s_{B,t}^g (Y_{L,t}^g + r_t^g W_{B,t}^{B,g})] \]  

\[ W_{F,t+1}^g = (1 + q_{F,t}^g) [W_{F,t}^g + s_{F,t}^g (Y_{L,t}^g + r_t^g W_{F,t}^{F,g})] \]

This new asset-specific decomposition allows me to quantify not only the relative importance of each channel (income, saving rate and rate of return inequality), but also the role played by each asset to explain the channels that drive the observed dynamics of the distribution of wealth. This is quite relevant for my purpose of understanding how housing bubbles shape the wealth distribution since during these types of episodes one should expect housing to play a relative more important role in explaining the dynamics of wealth inequality than in other more stable periods.

The top panel of Figure 10 depicts synthetic saving rates for the top 10%, middle 40% and bottom 50% over the period 1999-2014. Consistent with the high levels of concentration that we observe during this period in Spain, there is a high level of stratification between the top 10% who save on average 30% of their income and the middle 40% and bottom 50% who save 8% and -1% of their income on average. These figures are similar to the ones obtained for France and the US (Garbinti et al. (2017), Saez and Zucman (2016)).

Analyzing the dynamics of the saving rates during the housing bubble I find that the stratification in saving rates between the rich and the poor increased during the boom years and decreased during the bust. The top panel of Figure 10 shows how during the years prior to the burst of the bubble the savings rate increased for the top 10%, since they were accumulating more housing and decreased for the middle 40% and bottom 50%, who were also accumulating housing but by getting highly indebted (see bottom panel of Figure 10). Therefore, the observed dynamics in saving rates cannot explain the drop in wealth concentration during the boom. After the burst of the bubble the top 10% sold some of their housing assets and started to accumulate
more financial assets in order to compensate for the decrease in housing prices (see bottom panel of Figure 11). Nonetheless, the total saving rate for the top 10% decreased during these years, most likely because they had to consume a larger fraction of their income. The middle 40% instead started to save more in order to repay the housing mortgages, so that the stratification in saving rates across the two wealth groups was reduced. Hence, even though saving rates did not play a role in the drop in wealth concentration during the boom, they did play a role during the bust. Rich individuals substituted housing assets for financial assets and the middle 40% increased its saving, contributing to reduce the increase in wealth concentration.

Figure 12 displays the evolution of flow rates of return for the different wealth groups over the 1999-2015 period. The further up one moves along the distribution, the higher are the rates of return. This is consistent with the large portfolio differences that were previously documented, that is, top wealth groups own more financial assets like equity with higher rates of return than for instance housing. The differences in rates of return between the top 10% and the middle 40% decreased during the boom, which is consistent with the fall in wealth concentration during that period of time. Since 2011 the differences in rates of return between the top 10% and the middle 40% have started to increase. Hence, trends in rates of return across wealth groups have contributed to a large extent to reduce wealth concentration during the boom and to a low extent to increase wealth concentration during the bust.

Looking at the evolution of flow rates of return (including capital gains), I find that differences in capital gains and not only in rates of return have driven the dynamics of wealth inequality over the boom and bust (Figure 13). During the first years of the boom capital gains were larger among the middle 40% than among the top 10% because the housing market was outperforming the stock market, contributing to the reduction in wealth concentration. Capital gains also helped to increase wealth concentration during the bust since they rose more for the top 10% than for the middle 40% because the stock market has outperformed the housing market.

The third force which can drive the dynamics in wealth concentration is labour income inequality. Figure 14 depicts the evolution of labor income shares for the different wealth groups over the 1999-2015 period. The evolution of the labor share for the top 10% wealth group has been quite stable during this period of time, so that it does not seem to have played an important role in explaining the dynamics of wealth inequality during the boom nor the bust.

Finally, in order to corroborate the suggestive findings derived from the wealth accumulation decomposition, I simulate the top wealth shares fixing the composition of assets to 2002. Fig
Figure 15 shows that in the absence of a change in the composition of assets after 2002, the drop in wealth concentration during the boom would have still still been present, but the increase in wealth concentration would have disappeared, suggesting that saving rates – in particular, the substitution from housing to financial assets – have played an important role in explaining the increase in wealth concentration during the bust.

VI Conclusion

This paper presents unified wealth distribution series for Spain from bottom to the top over the period 1984 to 2013. They are obtained by combining different sources (tax records, national accounts, wealth surveys) and a mixed capitalization-survey method. Wealth concentration dropped in Spain since the eighties until the end of the housing boom of the 2000s and it increased afterwards during the years of the housing bust. My findings suggest that differences in rates of return and capital gains drive wealth inequality dynamics during housing booms and busts, but saving rates only play a role during busts. Rich individuals diversify their portfolio during the housing bust substituting housing for financial assets contributing to revert the decreasing trend in wealth concentration of the housing boom. The trends and levels in the wealth shares are very similar to the ones obtained by Alvaredo and Saez (2009) using wealth tax returns.

Even though my findings are helpful to understand the almost non-studied impact of a housing bubble on wealth inequality, extrapolating these results to other countries needs to be done carefully. Spain is a country in which rich individuals have a very particular portfolio composition with a large fraction of housing in their asset portfolio, that is, even before the housing boom rich individuals had a higher taste towards housing than in other countries. If rich individuals would not have purchased more and more dwellings during the bubble, wealth concentration could have potentially fallen. Therefore, the effects of a housing bubble on wealth concentration might not be neutral in countries in which rich individuals do not have these preferences towards housing.

Further research is needed on the evolution of wealth inequality over time and more specifically, on the effect of large short-run fluctuations such as housing bubbles on wealth concentration. 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.
References


25


**Figures and tables**

![Level and composition of household wealth, Spain 1984-2015](image)

**Figure 1: Level and composition of household wealth, Spain 1984-2015**

Notes: The figure depicts the level and composition of aggregate household wealth from 1984 to 2015 expressed as a percentage of national income. Net housing includes owner- and tenant-occupied housing net of mortgage debt, the latter approximated by total household liabilities. Unincorporated business assets include the total value of the business of sole proprietorships. Financial assets cover equities, investment funds, fixed income assets (mainly bonds), saving and current deposits, currency, life insurance reserves and pension funds, excluding Social Security.
Figure 2: Composition of household wealth, Spain 1984-2015

Notes: The figure displays the composition of aggregate household wealth from 1984 to 2015 expressed as a percentage of total net household wealth. Net housing includes owner- and tenant-occupied housing net of mortgage debt, the latter approximated by total household liabilities. Unincorporated business assets include the total value of the business of sole proprietorships. Financial assets cover equities, investment funds, fixed income assets (mainly bonds), saving and current deposits, currency, life insurance reserves and pension funds, excluding Social Security.
Figure 3: Flow returns in Spain, 1984-2015 (gross of all taxes)

Notes: The figure depicts flow returns in Spain from 1984 to 2015 gross of all taxes. Returns are calculated using National Accounts as the ratio between the income generated by each asset and the total value of each asset. Housing includes owner- and tenant-occupied housing. Unincorporated business assets include the total value of the business of sole proprietorships. Financial assets cover equities, investment funds, fixed income assets (mainly bonds), saving and current deposits, currency, life insurance reserves and pension funds, excluding Social Security.
<table>
<thead>
<tr>
<th>Wealth group</th>
<th>Number of adults</th>
<th>Wealth threshold</th>
<th>Average wealth</th>
<th>Wealth share</th>
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<td>62,924€</td>
<td>132,364€</td>
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</tbody>
</table>

Table 1: Wealth thresholds and wealth shares in Spain, 2015

Notes: This table reports statistics on the distribution of wealth in Spain in 2015 obtained by capitalizing income tax returns. The unit is the adult individual (20-year-old and over; net wealth of married couples is split into two). Fractiles are defined relative to the total number of adult individuals in the population.
Figure 4: Wealth concentration in Spain, 1984-2015

Notes: The figure depicts the breakdown of the wealth distribution in Spain for years 1984-2015 into three groups: top 10%, middle 40% and bottom 50%. Wealth includes net housing, unincorporated business assets and financial assets (equities, fixed income assets (mainly bonds), saving and current deposits, currency, life insurance reserves, pension and investment funds). Wealth shares are constructed by capitalizing taxable income and accounting for the assets that do not generate taxable income (main residence (1999-2013), life insurance, pension and investment funds) with the SHF. The unit of analysis is the adult individual (+20), excluding the regions of Basque Country and Navarre since they do not belong to the Common Fiscal Regime and hence, they are not included in the personal income tax samples.
Figure 5: Asset composition by wealth level, Spain 2015

Notes: The figure depicts the asset composition by wealth group in 2015 using the mixed capitalization-survey method. Net housing includes owner- and tenant-occupied housing net of mortgage debt, the latter approximated by total household liabilities. Unincorporated business assets include the total value of the business of sole proprietors.
Figure 6: Composition of the top of the wealth distribution, Spain 1984-2015

Notes: The figure displays the composition of the top 1% (panel a) and top 10% (panel b) wealth shares in Spain using the capitalization method for the period 1984-2015. Net housing includes owner- and tenant-occupied housing net of mortgage debt, the latter approximated by total household liabilities. Unincorporated business assets include the total value of the business of sole proprietorships. Financial assets cover equities, investment funds, fixed income assets (mainly bonds), saving and current deposits, currency, life insurance reserves and pension funds, excluding Social Security.
Notes: The figure displays the composition of the middle 40% (panel a) and bottom 50% (panel b) wealth shares in Spain using the capitalization method for the period 1984-2015. Net housing includes owner- and tenant-occupied housing net of mortgage debt, the latter approximated by total household liabilities. Unincorporated business assets include the total value of the business of sole proprietorships. Financial assets cover equities, investment funds, fixed income assets (mainly bonds), saving and current deposits, currency, life insurance reserves and pension funds, excluding Social Security.
Notes: The figure in panel (a) displays age-wealth profiles as a % of average wealth for years 2002, 2007 and 2015 in Spain. The figure in panel (b) depicts the breakdown of the wealth distribution in Spain over the period 1999-2015 into three age groups: the young (20-39), the middle-old (40-59) and the old (+60). Both figures have been elaborated based on the benchmark series using the mixed capitalization-survey method. Results are only available from 1999 onwards, since there is no information available on age in the micro-files for previous years.
Figure 9: International comparison of top wealth shares, 1984-2015

Notes: The figure compares the top 10% (panel (a)) and 1% (panel (b)) wealth shares in Spain with the rest of countries (US (Saez and Zucman (2016)) and France (Garbinti et al. (2017)) for which the capitalization has been used.
Figure 10: Synthetic saving rates by wealth group, Spain 1999-2014

Notes: Panel (a) plots the synthetic saving rates for the top 10%, middle 40%, and bottom 50% using a five year moving average from 1999 up to 2014. Synthetic saving rate $s_g^t$ for wealth group $g$ in year $t$ is defined so that $W_{t+1}^g = (1 + q_g^t)[W_t^g + s_g^t(Y_t^g + r_t^gW_t^g)]$, where $W_t^g$ stands for the average real wealth of wealth group $g$ at time $t$, $Y_t^g$ is the average real labor income of wealth group $g$ at time $t$, $r_t^g$ the average rate of return of group $g$ at time $t$, $q_t^g$ the average rate of real capital gains of wealth group $g$ at time $t$ and $s_g^t$ the synthetic saving rate of wealth group $g$ at time $t$. Panel (b) displays synthetic saving rates on housing for the top 10%, middle 40%, and bottom 50% using a five year moving average from 1986 up to 2012. Synthetic saving rate $s_{H,t}^g$ for wealth group $g$ in year $t$ is defined so that $W_{H,t+1}^g = (1 + q_t^g)[W_{H,t}^g + s_{H,t}^g(Y_t^g + r_t^gW_{H,t}^g)]$, where $W_{H,t}^g$ stands for the average housing wealth of wealth group $g$ at time $t$, $s_{H,t}^g$ the synthetic saving rate on housing of wealth group $g$ at time $t$ and the rest of variables are the same as in panel (a).
Figure 11: Saving rates on financial assets by wealth group in Spain, 1999-2014 (5-year moving average)

Notes: This figure displays synthetic saving rates on financial assets for the top 10%, middle 40%, and bottom 50% using a five year moving average from 1999 up to 2014. Synthetic saving rate $s_{g,t}$ for wealth group $g$ in year $t$ is defined so that $W_{F,t+1}^{g} = (1+q_{t}^{g})[W_{F,t}^{g} + s_{H,t}^{g}(Y_{L,t}^{g} + r_{t}^{g}W_{F,t}^{g})]$, where $W_{F,t}^{g}$ stands for the average financial assets of wealth group $g$ at time $t$, $s_{H,t}^{g}$ the synthetic saving rate on financial assets of wealth group $g$ at time $t$ and the rest of variables are the same as described in panel (a) of Figure ??.
Figure 12: Flow return by wealth group in Spain, 1999-2014 (3-year moving average)

Notes: The figure depicts the top 10%, middle 40% and bottom 50% flow returns in Spain using 3-year moving averages over the period 1999-2014. The flow return is the ratio of average income to average wealth in wealth group $g$. 
Figure 13: Total return (flow return + capital gains) by wealth group in Spain, 1999-2014 (3-year moving average)

Notes: The figure depicts the top 10%, middle 40% and bottom 50% total returns in Spain using 3-year moving averages over the period 1999-2014. The total return is the sum of the flow return, that is the ratio of average income to average wealth in wealth group $g$, and capital gains, which are defined as the excess of average asset price inflation, given average portfolio composition of wealth group $g$, over consumer price inflation.
Figure 14: Labor income concentration by wealth group, 1999-2015

Notes: The figure depicts the concentration of labor income among the top 10%, middle 40% and bottom 50% wealth groups using 3-year moving averages over the period 1999-2014.
Figure 15: Simulated wealth distribution series fixing 2002 asset composition, 1999-2015

Notes: The figure depicts the simulated top wealth distribution series fixing the asset composition to year 2002 from 2003 onwards.