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Income inequality and household debt as a factor of financial fragility in the Spanish economy

Summary

After the last major financial crisis, the idea that the increase in income inequality during the expansionary phase could have forced middle- and low-income groups to increasingly resort to indebtedness to finance their consumption has been widely disseminated. This debt-led consumption would have stimulated economic growth, but it would also explain its unsustainability since families became more financially fragile. This approach, which we refer to as the “income inequality and debt-financed consumption as a cause of financial fragility hypothesis”, is based on empirical studies that mostly look at the US case. We analyse in this article whether, as part of the literature suggests, this assumption is adequate to explain the expansion and subsequent crisis of the Spanish economy.

Keywords: household debt, income inequality, financial fragility, financial crisis.

JEL classification: E21, E44, D63.

1. Introduction

The arguments contained in this paper are linked to recent literature that analyses the role of income distribution as a causal factor of financial crises; more particularly, the approaches that connect the increase in personal income inequality with a problematic increase in household

debt. Most of these papers assume that the increase in income inequality during the expansion phase has forced middle- and low-income groups to increasingly resort to indebtedness to finance their consumption. This debt-led consumption would have resulted in dynamic economic growth, but it would also explain its unsustainability since these lower income families became more financially fragile. We are going to call this hypothesis “income inequality and debt-financed consumption as a cause of financial fragility”.

As we shall see, the sequence described has been subjected to an in-depth empirical analysis in the case of the US expansion prior to the last financial crisis, but empirical data is much scarcer for other economies. On the one hand, and although they do not propose such a precise hypothesis, there has been a proliferation of papers that empirically test the more general relationship between increasing inequality and over-indebtedness of households for more or less large samples of countries. On the other, there is a body of literature that deals with different types of financing, that identifies the debt-led model for European peripheral economies, and roughly equates its pre-crisis expansion with that of the United States. Both cases, although no precise confirmation is provided, put forth the idea that Spain could be a paradigmatic case of “income inequality and debt-financed consumption as a cause of financial fragility”. There is therefore a certain commonplace in academic literature that suggests that the Spanish experience could fit the aforementioned hypothesis.

In this article we try to verify whether the hypothesis “income inequality and debt-financed consumption as a cause of financial fragility”, profusely analysed for the US¹ case, is applicable for the period of growth of the Spanish economy between 1995-2008. At the same time, the intention is to help complete and specify what role income inequality and household debt would play in the debt-led financing of this economy. Conducting a detailed study such as those focusing on the US case is not possible with the available data, but the *Survey of Household Finances* (SHF) of the Bank of Spain allows us to disaggregate by level of household income some of the key macroeconomic data in the hypothesis.

From this introduction, the paper presented is organised as follows: the second section reviews the literature that allows us to understand and contextualise the hypothesis of “income inequality and debt-financed consumption as a cause of financial fragility”. Then, the third, fourth and fifth sections, respectively, show an empirical test to see whether, during Spanish expansion, personal income inequality grew, lower income households were the protagonists of the household indebtedness process and whether that indebtedness was mainly used to finance household consumption. The sixth section states that, although in the light of the previous sections, the hypothesis of “income inequality and debt-financed consumption as a cause of financial fragility” seems not to be fulfilled for the Spanish case, it is possible to extract useful elements for the analysis of this case. We terminate the paper with conclusions that summarise the results obtained and point to future lines of research.

2. Increasing inequality and increasing role of household debt to finance consumption as a causal factor of the crisis: a review of the literature

The literature that links inequality, household debt and crisis is dated prior to the 2007-2008 financial crisis, but since then renewed interest has been shown in this topic and has led to a comprehensive academic debate. Rajan (2010) and Galbraith (2012) opened the discussion, which is currently active (UNCTAD (2018), Bazilier and Hericourt (2017), Amountzias (2019), Perugini et al. (2015), Bordo and Meissner (2012), ILO (2012), Fitoussi and Saraceno (2010), among others)².

Within this broad perspective that links inequality with household debt and the greater likelihood of financial crises, in this paper we will focus on a more concrete argument: the possible link between the growth of personal income inequality and the increasingly fragile finances of households due to their increasing indebtedness in the financing of household

consumption. The “income inequality and debt-financed consumption as a cause of financial fragility hypothesis” has been used profusely to explain the US experience prior to the last major financial crisis (Barba and Pivetti (2009), Rajan (2010), Reich (2010), Wisman, (2013), Cynamon and Fazzari (2013), Iacoviello (2008), van Treeck (2014), Boushey and Weller (2008)³. The central and common arguments of these works begin with the finding of a seemingly paradoxical reality: in a context in which the distributive pattern becomes more regressive, a depressive effect on aggregate demand could be expected, derived from the differential between the marginal propensity to consumption of groups with higher and lower income (Kalecki (1942), Kaldor (1955)). However, it is found that the increase in the concentration of income prior to the last financial crisis does not lead to the expected slowdown of household consumption, which, on the contrary, becomes even more dynamic. The solution to the paradox would then mostly be explained by an increase in household indebtedness, much more so for households that have fallen in income ranking. Ultimately, these papers propose a sequence that is based, firstly, on a link between the increase in inequality and the increase in indebtedness by households disadvantaged by the distributive pattern. Secondly, between the debt of these households and the financing of consumption that would boost growth.

The bulk of the studies focuses on the analysis of the first link. In situations of clear coincidence in time of processes of concentration on income and household indebtedness, the explanations that link them refer to how the growth of inequality mainly affects demand but also the supply of debt (van Treeck and Sturn (2012))⁴.

Regarding demand, the central idea is that its increase responds to the effort to maintain/increase the consumption levels of the population, whose incomes are being reduced/staggered (Wisman (2013)). The debt thus allows people to counteract (or rather postpone) the sub-consumption crisis at the cost of “problematic” growth (Fitoussi and Saraceno (2010))⁵. It is important to note that, in the face of conventional explanations of demand⁶, the reasoning is established in relative terms: families borrow to maintain a relative

position in terms of consumption, thus neutralising the decline in terms of income, in an attempt of what the literature calls “keep up with the Joneses” (Barba and Pivetti (2009), Wisman (2013), Cynamon and Fazzari (2013))⁷. Frank et al. (2010) summarise it by forging the concept of “expenditure cascades”: the increase in consumption of those social groups that do increase their income level generates a replica in lower income groups, which are forced to increase their indebtedness. Some authors explain that this process also entails both an increase in labour supply and a decrease in the savings ratio in these homes (Wisman (2013), van Treeck and Sturn (2012)). In any case, the key to the sequence is located in the increase in indebtedness.

Some papers complement the explanation with supply factors, based on the idea of Milanovic (2010) or Kumhof and Rancière (2015) according to which the increase in inequality generates a huge accumulation of financial wealth by the richest households, thus encouraging financial innovation and laxity in financial sector practices in search of sufficient profitable placements (Milanovic (2010)). This context would result in an abundance of credit and very easy access to it for lower income households. Taking one more step in terms of the intentionality of the process, Rajan (2010), Fitoussi and Saraceno (2010), along the same lines as Stiglitz (2012), maintain the existence of political pressures in favour of easier access to credit on which the continuity of the financial bubbles and gains of the richest depend. Rajan (2010) insists on the idea that the regressive distributive pattern leads the political class to promote compensatory measures for the middle and lower classes aimed at increasing their access to credit, which Amountzias (2019) describes as redistributive policy through access to credit.

Regarding the second link, between the increase in household debt and dynamic consumption, the development of the plot is more concise. Although the weight of the mortgage loan is recognised, the argument that spins the indebtedness with the financial fragility of the families and therefore of growth centres in the role of the debt substituting income⁸ and financing consumption. Therefore, the bulk of these papers tries to limit their analysis to consumer credit, for which it is important, in the US case, to incorporate the part of credit where homes enter as

collateral but that is intended for consumption (home equity⁹). Finally, in addition to trying to empirically test the relationship between increased inequality and financing of consumption via debt, several papers state for the US that during expansion, the income concentration process is not replicated in terms of consumption. The greater equity in terms of consumption in comparison to income, in a context of extreme household indebtedness affected by the distributive pattern, would be the definitive proof that this debt is a key factor as well as the cause of problems for growth dynamics (Barba and Pivetti (2009), Iacoviello (2008), Fitoussi and Saraceno (2010), Krueger and Perri (2006)).

As we anticipate, although there are no papers that explicitly try to compare the hypothesis of “income inequality and debt-financed consumption hypothesis as a cause of financial fragility” as proposed for the Spanish case, the idea that Spain's could be a fairly close replica of the US experience does indeed appear in many literary works. On the one hand, there are studies that compare the link between inequality and increased household indebtedness for large groups of OECD countries and include Spain in their sample, although the specific conclusions regarding this country are not normally explained (Amountzias (2019), Fitoussi and Saraceno (2010)). Others do explain that the Spanish case confirms their working hypothesis, but the general analysis of the large sample of countries prevents the appropriate specific treatment. For example, UNCTAD (2018) considers an analysis period that does not coincide with Spanish expansion; Bazillier and Hericourt (2017) use the richest 1% income as an indicator of inequality, which offers an incomplete picture of the evolution of income inequality during Spanish expansion; Fitoussi and Saraceno (2010) emphasize the similarities found between Spain and the US, ignoring some major differences, such as the evolution of personal inequality, the temporary profile of indebtedness or the greater weight of the real estate debt for Spanish households. Christelis et al. (2015), who explore and compare the indebtedness characteristics of European and US households, concluding that the Spanish profile corresponds more to the US than to the old continent, also insist on this parallelism.

On the other hand, also some papers on the different types of financialisation, again without specific empirical evidence for Spain, slip the idea that Spanish expansion would be paradigmatic of the relationship between income inequality, household debt, increasing weight of the debt in financing private consumption and crisis. Stockhammer (2015), Hein (2011 and 2014) and Lapavitsas and Powell (2013) identify for Europe two models of pre-crisis growth, the debt-led being a replica of the Anglo-Saxon experience that would have occurred in Greece, Ireland, Portugal and Spain¹⁰. Fall in the wage share of GDP, high rates of personal income inequality¹¹, significant current account deficits, accumulation of private debt and importance of private consumption as a factor that boosts growth, would be the main common elements that would justify the equalisation.

There is no doubt that there are features of the Spanish economy and its latest expansion that support the idea that “income inequality and debt-financed consumption as a cause of financial fragility hypothesis” would fit like a glove: the high structural inequality in income distribution, the extreme indebtedness and the dynamic demand of families during the expansion, as well as the severe financial and economic impact of the crisis on lower-income families are perhaps the most obvious (Buendía (2018), Pereda (2018), López and Rodríguez (2011)). However, as we analyse in this paper, the detailed study of the growth of those years leads us to question, or at least substantially reformulate, the terms of the hypothesis in order to adapt it to the Spanish experience.

We will then analyse in the following sections the explanatory scope or, failing that, the possible contradictions and limitations that the income inequality hypothesis may present as a newly explained financial fragility factor regarding the empirical evidence in the case of the Spanish economy.

3. Personal income inequality does not increase during Spanish expansion

The causal sequence posed by the hypothesis we are dealing with links the increase in income inequality during the expansion with greater household indebtedness. This is because

households with lower income levels would not benefit from the expansionary cycle and could even see their income diminished in real terms.

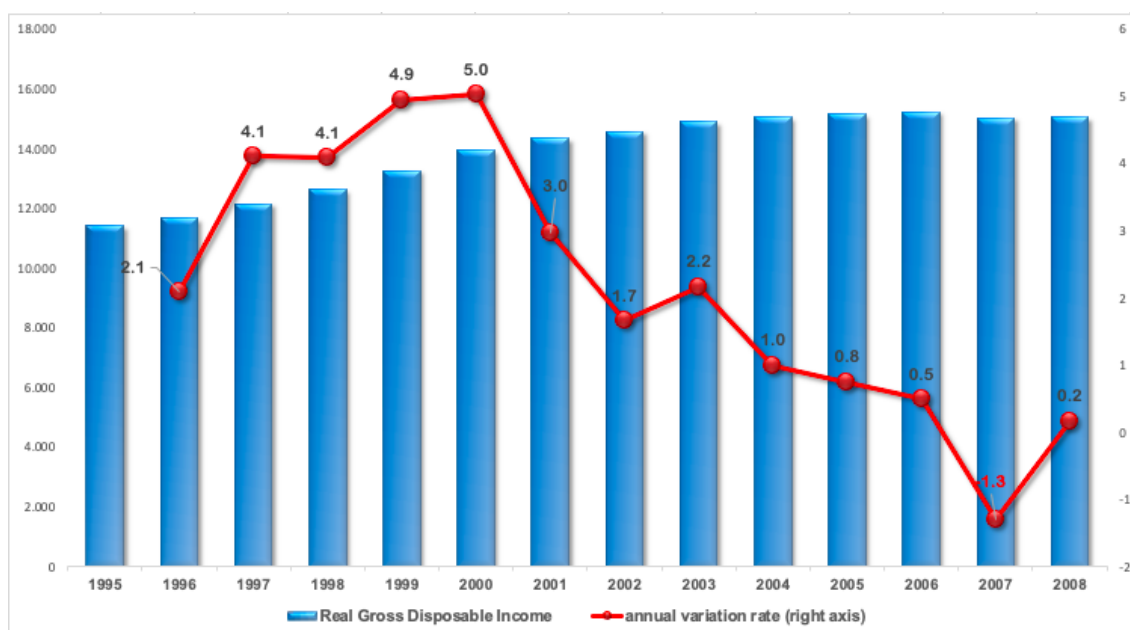
In this regard, although literature on the United States is based on an increase in personal income inequality, the idea that the position (relative or even absolute) of Spanish families with lower income levels worsens during the expansion is usually supported by two factors: a gradual fall in the wage share of GDP and an unfavourable wage evolution in real terms.

Real wages maintained a slightly decreasing trend during the expansion cycle at least until 2006, which indicates that the nominal increase was insufficient to compensate for inflation¹². In 2007 and especially in 2008, the opposite trend is observed, but this would have more to do with the effect of job losses at lower wage levels, and not so much because of a real rise.

With regard to the functional distribution of income, the wage share of GDP also registers a decreasing trend¹³. This fall would be related to a reduction in unit labour costs, that is, a lower salary per current euro produced (Fernández, 2013: 34). This is in turn combined with the strong creation of jobs, which meant that the unit salary remained practically unchanged between 1994-2007. In this way, the share of capital increased to 1.2% per year while the employment quota was reduced to 0.7% (Cárdenas, 2017: 155). Consequently, there is a boost in income distribution in favour of capital and to the detriment of the employment factor.

However, it does not appear that this had the expected impact in terms of personal equity during the expansion. In the first place, it is necessary to start with the fact that the decrease in real average wages and the share of the total wage over the total income coexists with a sustained increase in real household incomes (where more than one salary can exist). If we look at the evolution of the per capita disposable income of households in real terms, we see that it shows positive growth rates during the whole expansion period, with the exception of 2007.

Figure 1. Real disposable gross income per capita (in € millions) of households and annual variation (in %). 1995-2008

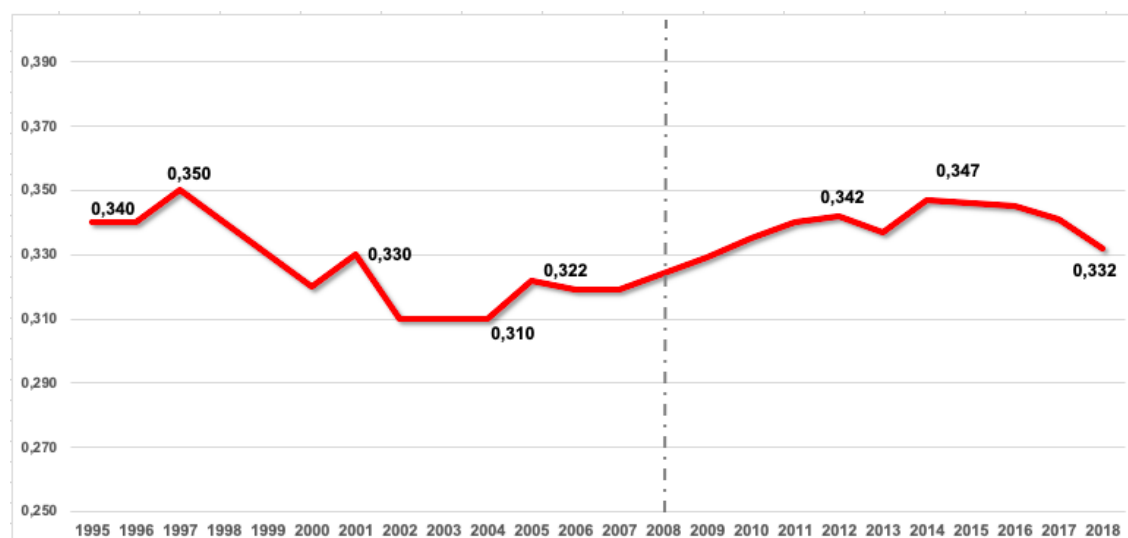


In addition, if we look at the distribution of income in personal and household terms, we find that during the Spanish expansion, equity does not worsen, but rather slightly improves¹⁴.

According to the reference literature from different sources (Ayala (2016)) based on a structural situation of high-income inequality, no significant changes were registered during the expansion period.

From the *Household Budget Survey* (HBS), Ayala (2016) calculates a practically stable Gini index; between 1990 and 2007 it goes from 0.305 to 0.303. A slight correction of inequality can also be seen from Eurostat data (see figure 1): the index goes from 0.340 to 0.324 between 1995 and 2008. As we can see, the process is sharply reversed after the crisis.

Figure 2. Gini coefficient on income in Spain (1995-2018)



According to different indicators, this slight improvement in equality is due to an advance in the relative position of the lower-income group, without major changes in the relative position of the rest. Ayala states that during the expansion there is an advance in the relative position of the lowest income decile that coincides with a (less significant) loss in the higher decile share. For example, from HBS data we can calculate the ratio between the upper and lower deciles in terms of income to see an improvement between the extreme values of distribution: it goes from 7.7 in 1990 to 6.1 in 2007.

Table 1, which provides data on the participation of deciles in total income, confirms this idea: the ratio between the participation of Q90/Q10 improves from 12.5 to 9.7 between 1995 and 2008¹⁵. As the reduction of inequality is explained by the improvement of that first decile, while analysed deciles expand, equity becomes diluted: 20% of the population with higher incomes only suffer a very slight reduction compared to that of 20% with lower incomes (Q80/Q20), receiving 5.6 instead of 5.9 times more.

Table 1. Income share by deciles in Spain (1995-2008)

	1995	1996	1997	1998	1999	2000	2001	2004	2005	2006	2007	2008
1 decile	2	2	2	2	3	3	3	2.6	2.5	2.4	2.4	2.5
2 decile	5	5	4	5	4	5	5	4.7	4.6	4.6	4.7	4.6
3 decile	6	6	6	6	6	6	6	5.9	5.8	5.8	5.8	5.8
4 decile	7	7	7	7	7	7	7	7.1	6.9	7.0	6.9	6.9
5 decile	8	8	8	8	8	8	8	8.3	8.1	8.2	8.1	8.0
6 decile	9	9	9	9	9	9	9	9.5	9.4	9.5	9.5	9.3
7 decile	11	10	10	10	11	10	11	10.9	10.8	10.9	10.9	10.8
8 decile	13	12	13	13	13	12	12	12.6	12.7	12.7	12.7	12.5
9 decile	16	15	16	16	15	15	15	15.1	15.4	15.2	15.4	15.4
10 decile	25	26	26	25	25	25	25	23.3	23.8	23.7	23.6	24.2

Source: Own elaboration based on Eurostat data (SILC survey).

Other indicators are also consistent with the idea that the lower end of the population improved their relative position in terms of income during these years. According to the HBS, the number of people in households in which the main source of income is regular subsidies or benefits (unemployment or social) falls from 3.19 to 1.82%. The number of people living in homes in which they claim to find it very difficult to reach the end of the month was also reduced very slightly from 10.35 to 10.23%¹⁶. On the other hand, according to the Active Population Survey (APS) during the expansion, the percentage of families without income also drops, reaching the minimum of 2.19% in the fourth quarter of 2006.

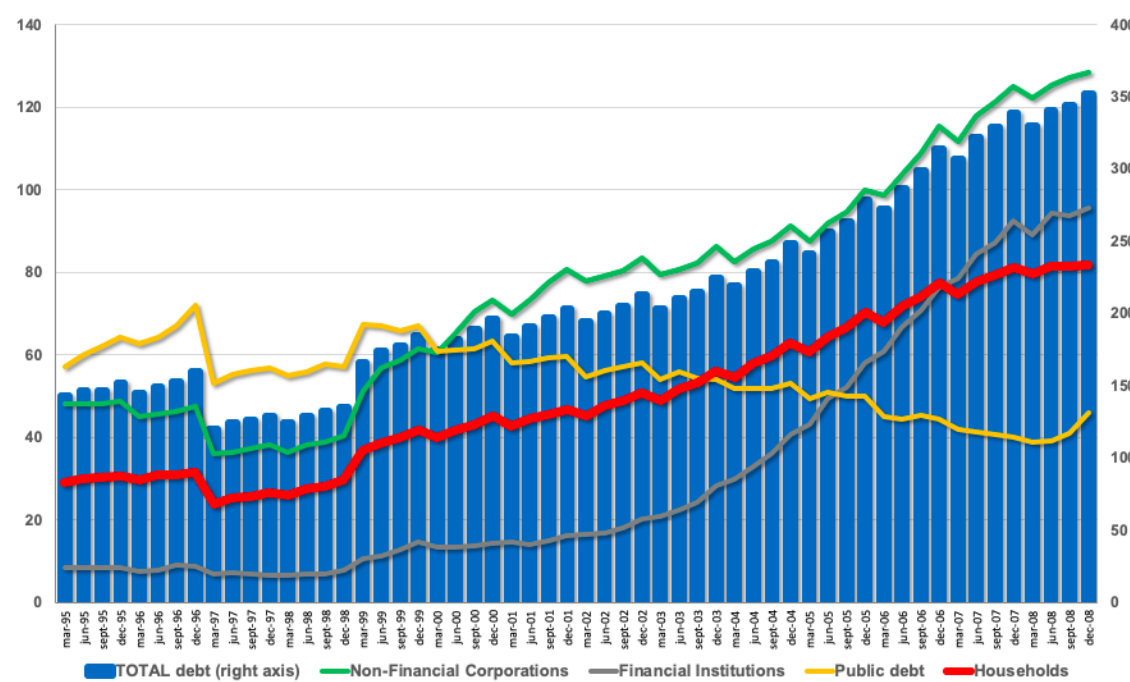
To conclude, despite the decrease in the purchasing power of wages and the loss of relative weight of income from work during the expansion, there is no evidence that this had led to deterioration in the distribution of personal income. This apparent paradox would be explained by the rapid pace of job creation, mainly at lower wage levels (partly associated with the

construction sector), which would have allowed lower income households to improve their relative position within the total. Likewise, this strong growth in employment would make it possible to combine a lower real wage with an increase in real household income, presumably by increasing the number of payrolls in the household unit.

4. Indebtedness of Spanish households: it considerably increases but not especially in low- and middle-income groups

As in the case of the US economy¹⁷, the high increase in household indebtedness is characteristic of this expansion process: in Spain, the household debt/ GDP ratio increases steadily from the late 1990s to 2009, as shown by Figure 3 below.

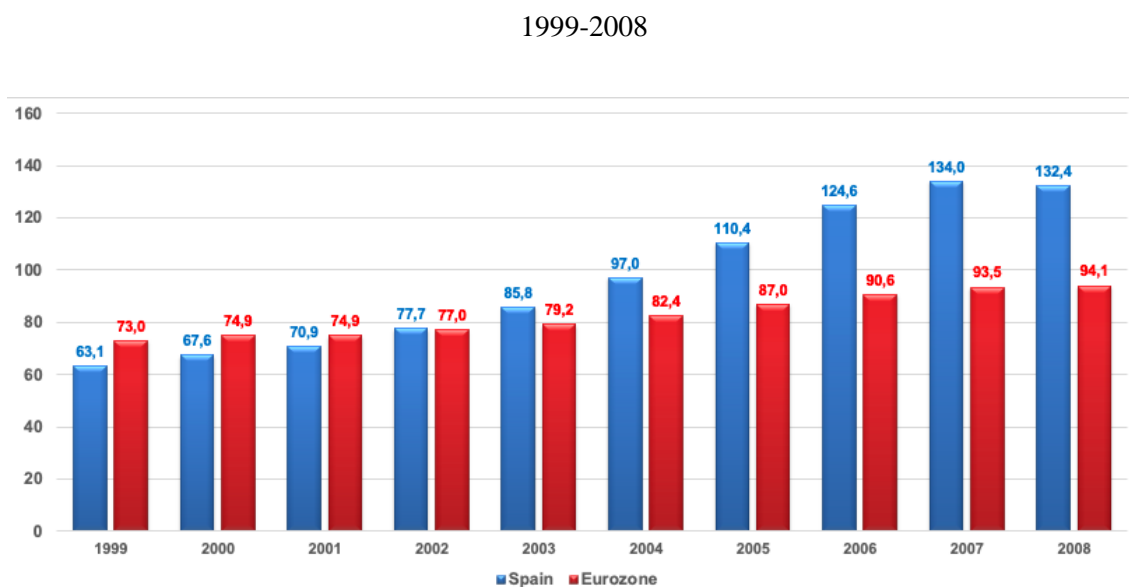
Figure 3. Evolution of debt/GDP ratios (in %). 1995-2008



The expansion phase between 1994 and 2008 shows a considerable increase in household debt, both in terms of income and GDP. With respect to the latter, the household debt rate doubles between 1999 and 2008, from 40 to 82%, according to data from the Bank of Spain.

However, this weight of debt increases and is even greater if we measure it in terms of disposable household income: the total liabilities of families during the referred period goes from 63 to 132% of their gross disposable income. One of the highest ratios in the EU at that time, according to Eurostat data.

Figure 4. Gross household debt on their incomes (in %). Spain and the Eurozone.



If we consult the information provided by the Bank of Spain in its *Survey of Households Finances* (SHF), we can see that the household debt increases in these years, due to the fact that the proportion of families that have some type of debt does so because the average value of such liabilities increases.

As shown in Table 2, both processes are generally registered for all families as a whole except for the group with the lowest income, which reduces the median value of their debt. It should be noted that, unlike what apparently happened in the US, neither process is more intense in low and medium-low income households. In fact, households of the first four deciles of income lose their share of the total debt¹⁸.

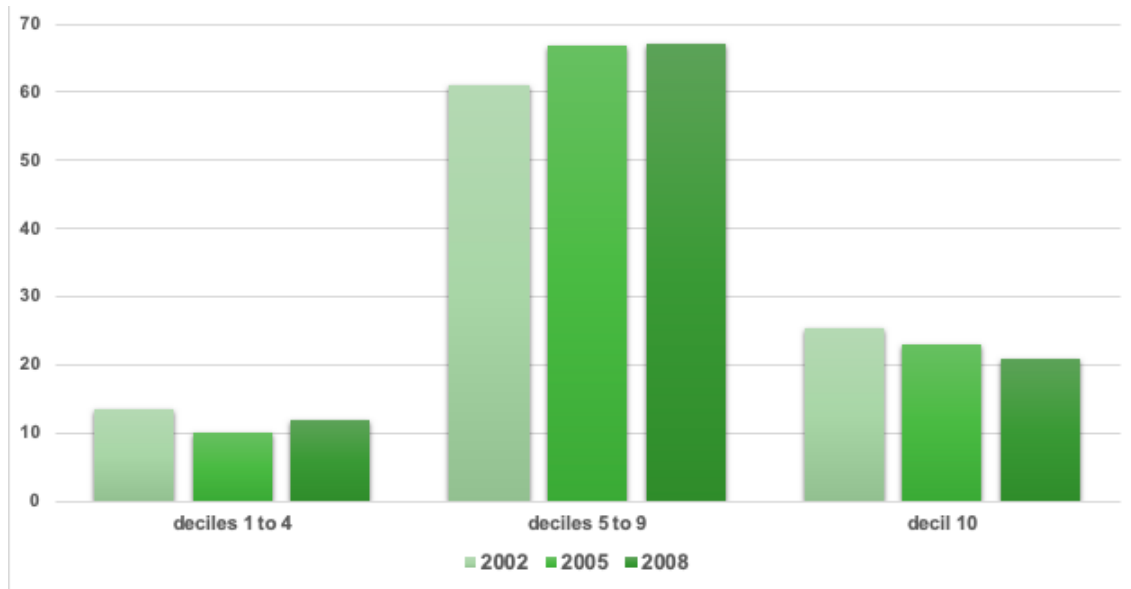
Table 2. Debt distribution according to household income level

	Mean value of debt (in thousands of 2014 euros)			% of households with debt			Share by groups (%)		
	2002	2005	2008	2002	2005	2008	2002	2005	2008
all households	29.1	37.8	40.1	43.6	49.6	50.0	100	100	100
Income percentile									
Less than 20	12.9	7.2	11.8	15.7	18.8	16.2	3.1	1.3	1.9
Between 20 and 40	18.3	20.7	24.7	37.6	42.4	42.3	10.4	8.7	10.2
between 40 and 60	27.9	30.8	41.3	49.4	58.8	63.6	20.9	17.9	25.5
between 60 and 80	30.8	49.1	41.7	54.0	62.0	61.6	25.2	30.2	25.0
between 80 and 90	33.9	57.2	49.9	58.1	66.4	67.9	14.9	18.8	16.5
between 90 and 100	52.2	72.3	66.4	64.2	64.4	65.1	25.4	23.1	21.0

Source: own elaboration based on SHF data (several years).

First, when analysing the distribution of indebted families, we see that, between 2002 and 2008, the proportion of households with some type of debt over the total increases 6.4 percentage points overall (this rises from 43.6 to 50%) However, in the first two deciles of income this proportion increases very slightly (from 15.7 to 16.2% in those years), while in the next two deciles it does so below the overall average (it increases 4.7 percentage points, while the average increase is of 6.4 pp). Likewise, in a context in which the median value of the debt registers large increases overall (for the group of households it increases almost 37.9%), in 20% of households with less income it declines, while the value corresponding to deciles 3 and 4 increases again, this time slightly below average. Consequently, the share of the total debt for 40% of households with less income drops from 13.5% in 2002 to 12% in 2008¹⁹.

Figure 5, Participation of households in total debt (%)



As shown in figure 5, it is thus wrong to say that the indebtedness has been concentrated especially in these lower income households. The data actually indicates that most of the highest indebtedness in these last years of the expansion cycle can be found in households with medium and medium-high levels of income. The deciles showing the highest increase in the proportion of indebted families and the value of their debts are by far the fifth and sixth, which, together, gain almost 5 percentage points in the share of total debt. The next group of households with the highest figures is that corresponding to the ninth decile, while deciles 7 and 8, together, maintain a stable share.

Either way, it cannot be generally established that the level of indebtedness increases with income at all levels: households in the last decile increase both the relative weight of those in debt and their below average median value, so their share decreases (see figure 5).

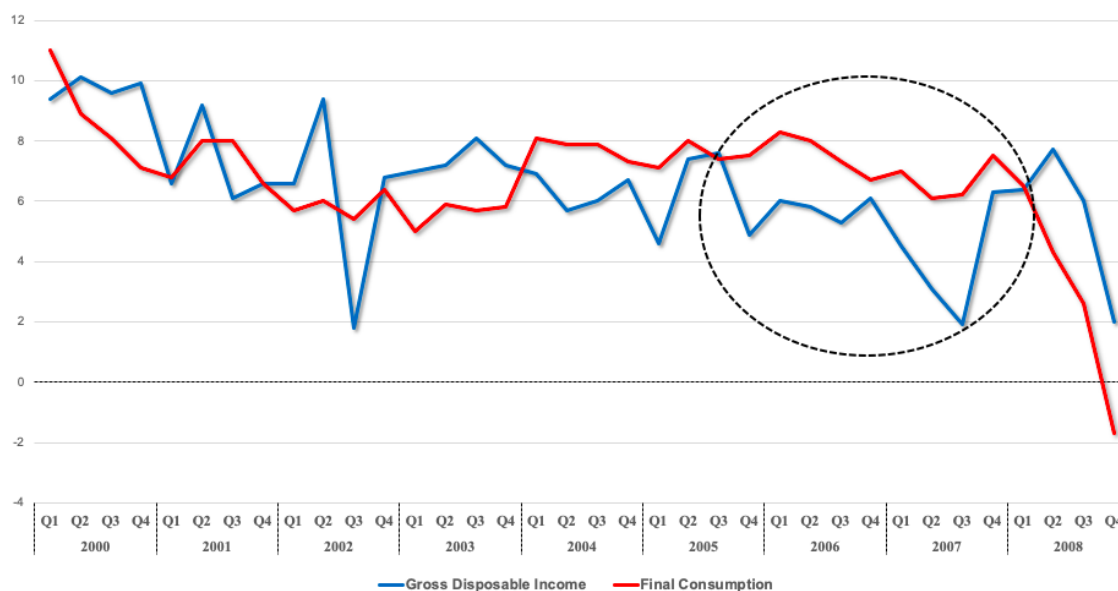
5. Consumption: it does not explain the high leverage of Spanish households

The third link in the sequence posed by the hypothesis is that lower income families, given their supposed (relative or absolute) loss of purchasing power, increasingly finance their consumption with debt. The ability to examine this for the Spanish case is severely limited here

because there are no data available on consumer credit, final consumption expenditure or savings by household income levels. However, the available data allows us to pinpoint major weaknesses in this approach.

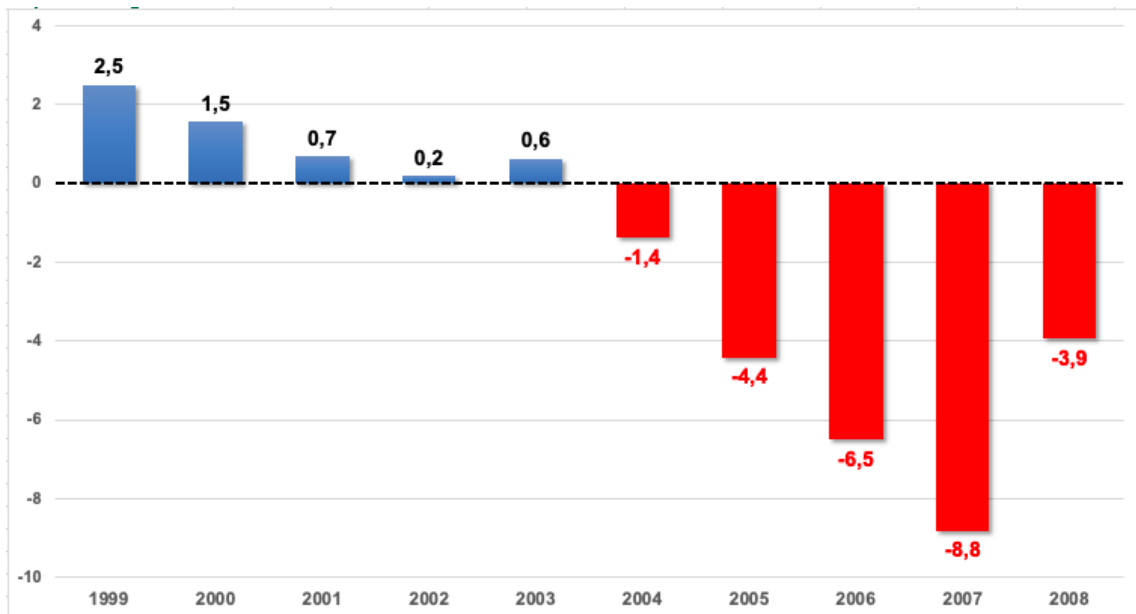
To begin with, it should be noted how household income and consumption increased in those years. In this regard, as shown in figure 6, we see that the increase in household consumption as a whole is not generally above the increase in its disposable income. A higher increase in consumption than in income is only recorded between 2004 and 2008.

Figure 6. Gross disposable income and final consumption of households. Interannual variation (%)



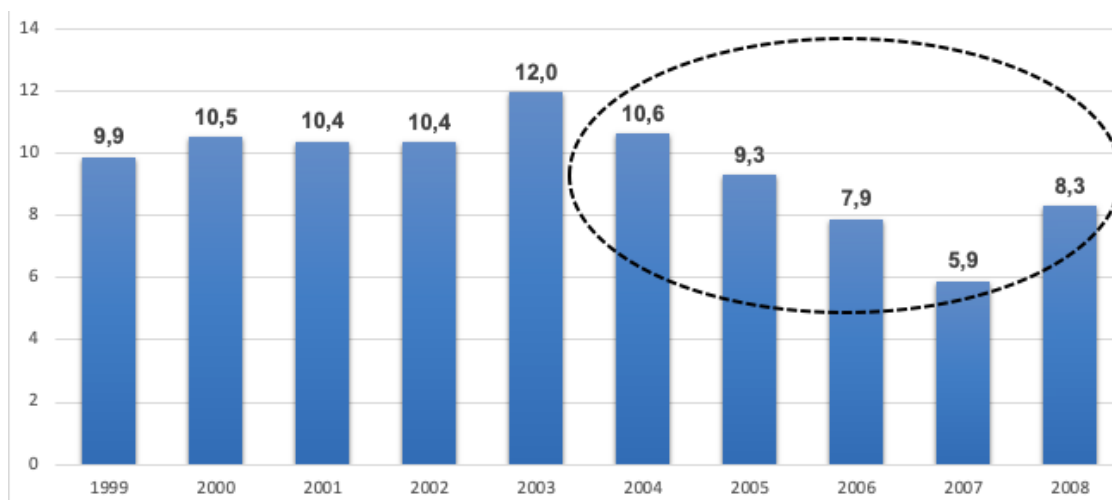
Furthermore, it is precisely in those five years that households show a net need for financing, as the graph below shows. The apparent conclusion would be to relate both facts. It could therefore be assumed that the greater increase in consumption than in income during those years would be expressed in a net need for financing, thus adding to their debt process until reaching the crisis, in 2008.

Figure 7. Capacity (+) / Need (-) for financing of households. % of Gross Disposable Income (GDI).1999 – 2008



But that argument is wrong. Firstly, a greater rise in consumption than in income does not necessarily imply greater indebtedness for this purpose, but a lower level of gross savings²⁰, as shown in figure 8. During this sub-period, consumption does not exceed aggregate disposable income. Accumulated data on disposable income and final consumption of households between 2004-2008 indicate that consumption represents around 92% of income²¹. Reducing savings in periods of economic expansion is normal and cannot be attributed solely to consumption behaviour. In the case at hand, a decreasing trend in savings has been observed since the 1960s, which indicates that it is of a more structural than cyclical nature (Laborda, 2007: 12).

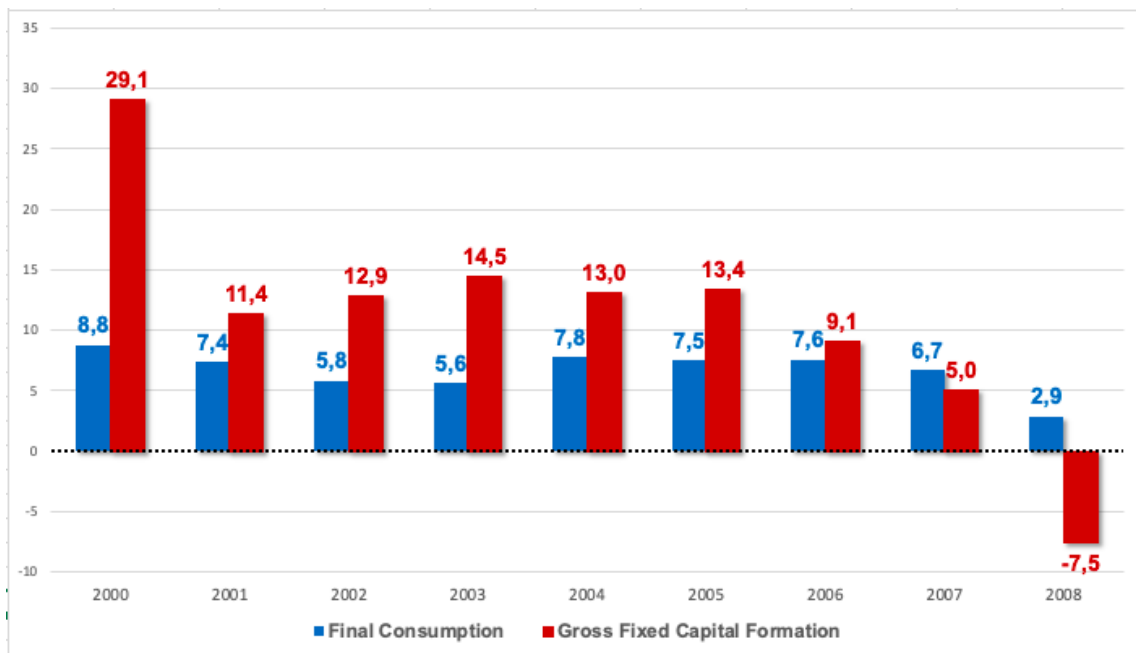
Figure 8. Gross savings to disposable income households, %. 1999-2008



Secondly, the apparent link actually misinterprets the data. Net financing capacity or need (financial savings) expresses the difference between the capital resources of households with respect to their investment²², primarily for home purchases. Therefore, what causes this net need for household financing is their greater real estate investment with respect to available capital resources.

It is precisely the gross fixed capital formation (GFCF) that is the most dynamic component of household demand during the expansion cycle, as seen in the figure below. It is a component of demand, namely investment, also more dependent on foreign financing than consumption.

Figure 9. Household consumption and investment. Annual variation rate, in %

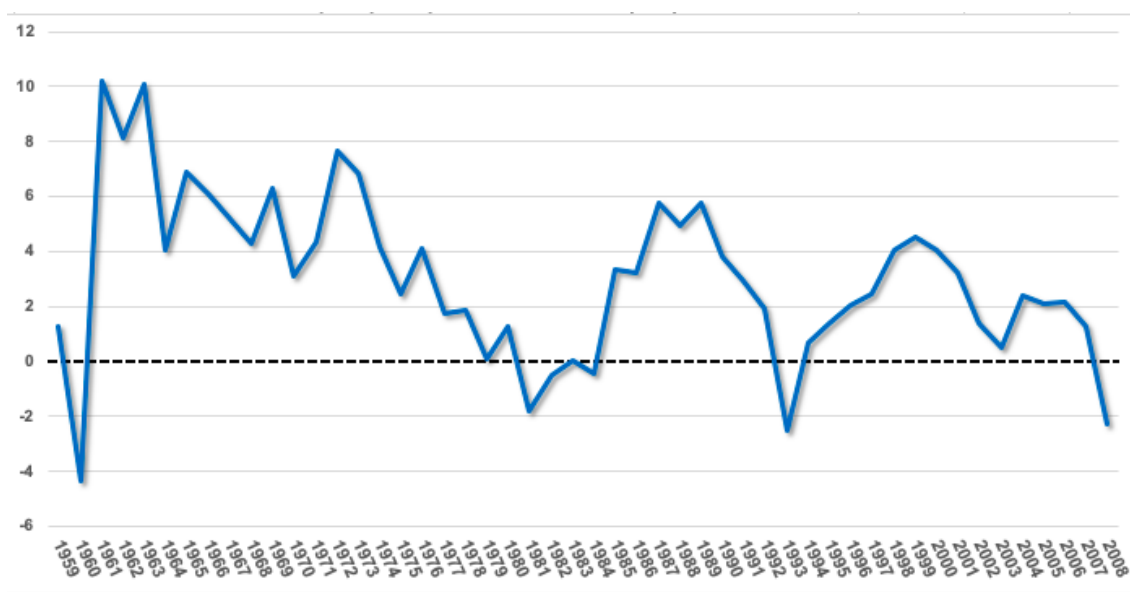


Consequently, increased investment, which is more dependent on credit, has a greater relative weight compared to consumer loans, which in fact register a decrease in the share of total household financing. Therefore, although consumer credit does increase in absolute terms, its relative weight over the total lending to households goes from 17.3% in December 1997 to 11.7% in the same month of 2008²³. In short, the relevant part of household debt lies in investment, basically real estate, and for 2008 it represents almost 80% of household financing.

Faced with the idea of “debt for wages” (Wisman (2013)), in the sense that consumer credit would try to compensate for a lower level of purchasing power caused by stagnating or even falling wages in real terms, evidence suggests rather that the growth of consumer credit is mainly explained by the positive evolution of income and employment²⁴. This idea is also consistent with the evolution of income distribution set forth above. In fact, and even with a lack of disaggregated data, it does not seem risky to state that greater consumption by households would have been motivated by job creation, especially among lower income levels that show a greater propensity for consumption²⁵.

A final consideration of the supposed role attributed to consumer credit as a key factor in economic momentum from demand. If the expansion cycle created the greatest recorded credit bubble and the debt for consumption was as relevant as some authors presume, this would be expected to be reflected in a greater increase in private consumption with respect to other periods. However, this is not the case (see figure 10). The largest credit and household debt bubble was not reflected in private consumption, whose expansion has been less evident since 1959²⁶. In fact, we are facing the lowest private consumption growth cycle since at least 1959. Consequently, the largest credit and debt bubble in households was not reflected in the private consumption cycle. Far from it, it has been the lowest in decades.

Figure 10. Real consumption per capita. Annual variation (in %). 1959-2008, here



6. Nevertheless... the strategic role of household debt in Spanish expansion

As we have stated, income inequality and debt-financed consumption as a cause of financial fragility does not seem to be the case for Spain before the 2008 crisis. However, the aforementioned hypothesis does point out elements in its approach that, formulated in other terms, are relevant characteristics of the Spanish expansion.

In the first place, although Spanish households with the lowest level of income do not register the highest debts during the expansion, their relative financial position does deteriorate during this period. This can be seen in various indicators. For example, lower-income families increase their relative share of the financial burden of all households (Marhuenda, 2006)²⁷. A sharp rise takes place in participation for those in the first two income deciles, which increase 10 percentage points in just five years (they go from supporting 22 to 32% of the total financial burden in 1995 to 32% in the year 2000). The homes of the third decile gain 6 percentage points in the same period (from 26 to 32%), with the general trend from the fourth decile of income and higher is of relative loss of their share in the total financial burden.

SHF data from 2002 allows us to see in greater detail the financial fragility concentrated in lower-income households. The deterioration of the debt to household income ratio is notorious: the median debt of all households as a whole goes from 69.2 to 107% between 2002 and 2008, but in the families of the first two deciles of income, it is already at 104.8% in 2002 and reaches 149.4% at the end of the expansion. This indicator in general tends to decline among Spanish families as their income level increases²⁸.

The effort of households to finance their liabilities, measured by debt payments with respect to their income, also shows how the intensity of financial deterioration depends on the level of income, observing the greatest deterioration in the first deciles. Therefore, while the median debt payment evolves from 14.5 to 19.1% between 2002-2008, households in the first two deciles already allocated 30.5% of their income in 2002 and 39.2% in 2008. It should also be noted that, in 2008, 16.6% of all households as a whole devoted more than 40% of their income to debt payments (it was 6.7% in 2002), and that percentage reached 46.5% for the families of the first two deciles of income (it was 29.7% in 2002).

Table 3. Debt/income payment according to household income level
(median, in %)

	2002	2005	2008	2011	2014
all households	14.5	17.2	19.1	18.4	18.1
<i>income percentile</i>					
less than 20	30.5	37.7	39.2	46.2	38.5
Between 20 and 40	20.5	24.6	26.4	28.0	24.9
Between 40 and 60	16.7	20.6	24.0	20.5	22.0
Between 60 and 80	13.1	15.6	17.3	18.1	16.6
Between 80 and 90	10.8	11.8	14.6	11.7	13.2
Between 90 and 100	7.8	8.1	10.4	9.1	10.1
<i>age of the head of the household</i>					
less than 35 years	16.6	21.7	25.7	23	22.9

Source: SHF (several years)

SHF data also confirms the enormous weight of the debt for the purchase of first homes as the main source of the financial deterioration of these families: It is therefore evident that, although we explain that the homes of the first four deciles do not increase their share of total household indebtedness, this increase does occur and is relevant to the debt for the purchase of first homes. In fact, this type of debt increases the most in medium-low income households: deciles 3 and 4 increase the value of their debts by 27.6%, compared to 19% from all families as a whole. It emphasizes that, in 2008, these families have a median debt above that corresponding to all households as a whole. The debt is also very high for the purchase of primary homes owed by the families of the first two deciles of income, taking into account their level of income, indebted for this reason: it is equivalent to 75% of the average of all homes as a whole.

In short, this seems to confirm that the lowest income households were not the ones with the highest debts, but their financial position did deteriorate especially during the expansion phase, and this deterioration is closely linked to having access to home ownership. The problematic issue regarding the financial fragility of these households would not be the loss of income or an increase in inequality during the expansion phase, but the unrealistic expectations of both future income and the apparent security of real estate assets. Easy access to financing for the acquisition of a primary need, but at the same time an apparently liquid asset in continuous

revaluation, such as housing, would have led to a false idea of leveraged residential investment as a means of saving. On the other hand, the prolonged expansion of real estate credit implied that higher and more vulnerable risk profiles would enter over time, as is the case of lower-income households.

Figures show the growing prominence of mortgage credit as the main reason for household indebtedness, intensifying in particular since 2004. Therefore, real estate credit goes from representing 61.7% in December 1998 to 74.9% of total household financing a decade later, at the end of 2008²⁹. A mortgage loan attracted by constant revaluation of housing as an investment. The price increase was uninterrupted from 1994 to the third quarter of 2008³⁰, with double-digit year-on-year growth rates since the end of 2001.

The result of all this was that the real estate bubble was accompanied by a considerable increase in real estate stock in Spain, without this stopping the price spiral. According to data from the Spanish Ministry of Development, more than 5.6 million units were completed in private building projects alone. And almost half (49%) were completed between 2004 and 2008. Something similar can be said about the homes started: in 2006 construction began on three times as many units as a decade earlier. This was more than those started in the same years by Italy, France and Ireland together. Within this context, the Spanish housing stock increased by more than 3.5 million units between 2001 and 2008. Such an increase in the real estate offer was only possible in this context of continuous price escalation and thanks to the push provided by credit.

In this context of real estate boom and bubble, the high mortgage debt of families contributes to economic growth in at least three ways. First, the greater weight of investment by households, which went from 6.1% of GDP in 1999 to a maximum of 9.4% in 2006. The weight of household investment on the total gross fixed capital formation (GFCF) also increased from 24.5% in 1999 to 31.2% in 2005.

Second, the strong growth of GFCF of households contributes to the dynamism of the construction sector in general and of real estate in particular, especially real estate development, and fosters the growth of total investment in the economy and its impact on employment.

Third, a final channel through which household debt would fuel the dynamics of growth is the expansion of the credit cycle in the Spanish economy via mortgage loan securitisations. A low delinquency rate and a continuously expanding real estate sector were elements of undoubted appeal to foreign investment. The ability to increase turnover as well as the collection of resources further boosted the financial offer, especially in the real estate sector. Growth was exponential: the value of these securitisations amounted to a total of 212,052 million euros in 2008, four times more than in 2004 and 42 times the value of mortgage securitisations ten years previously (source: Spanish Mortgage Association). Therefore, the percentage of mortgage credit financed with securities, insignificant in the mid-1990s, reaches 30.9% in 2005 and continues its rapid growth to 49% in 2008. This exposure to real estate credit would ultimately benefit the financing of other companies outside this business field, as evidenced by Jiménez et al. (2014).

7. Conclusions

An important part of academic literature raises a causal link between a decrease in income in the lower-income deciles and greater personal income inequality, with the subsequent over-indebtedness of households and finally the crisis caused by these unsustainable dynamics. A debt-led growth pattern that we have called “the income inequality and debt-financed consumption as a cause of financial fragility hypothesis”.

In this regard, we try to determine to what extent such a hypothesis would be adequate to explain the expansion cycle of the Spanish economy between 1995 and 2008. The analysis conducted shows that such an approach would not be valid. To start with, personal income inequality does not grow during expansion, but is reduced. Specifically, it so happens that lower

income deciles increase their share in total income. We also see that it is not those low- and middle-income households the ones with the highest debts. Therefore, the idea that they increase their relative weight in total debt to compensate for their losses in terms of income cannot be sustained. Furthermore, it should be added that greater household indebtedness is mainly due to housing purchases, not to finance consumption. In fact, growth is actually discreet compared to the high leveraging of households.

However, the approach underlying this hypothesis raises some issues that are useful for the Spanish case. To start with, although the lowest income deciles are not the ones with the highest debt, they do register the highest increase in their financial fragility, which will make them especially vulnerable once the recession starts in 2008. In addition, household indebtedness does play an important role in economic dynamics, although not via consumption but through residential investment in a context of the continued rise in real estate prices. The residential investment by households did have a role in the Spanish economic growth cycle. First, due to its greater participation in the total GFCF; secondly, because it generated attraction to residential investment by other sectors, especially real estate development companies; and, thirdly, thanks to the possibility offered by mortgage loans to financial institutions to increase financial loans through mortgage securitisations.

In short, household indebtedness does occupy a strategic place in the expansion and subsequent crisis of the Spanish economy. This debt is a key factor for the growth of residential investment that was both cause and consequence of the real estate cycle. The leveraged demand made the upward expectation on prices plausible, but that price increase also attracted demand. This scenario attracted other domestic and foreign investors with a significant multiplier effect on economic activity. However, at the same time, mortgages led to the generation of marketable assets through securitisations, which allowed financial entities to increase their financing capacity to homes and businesses. This unsustainable process would, however, have an uneven impact depending on household income levels. It greatly weakened the lower income deciles that started from a more vulnerable position.

References

- Amountzias, C. (2019). An investigation of the effects of income inequality on financial fragility: Evidence from Organization for Economic Co-operation and Development countries. *International Journal of Finance & Economics*, 24(1), 241-259.
- Ayala, L. (2016). La desigualdad en España, fuentes, tendencias y comparaciones internacionales. Work Shop sobre la desigualdad de la renta en España, Universidad Rey Juan Carlos, Madrid 4 de julio de 2016.
- Barba, A., & Pivetti, M. (2009). Rising household debt: Its causes and macroeconomic implications; a long-period analysis. *Cambridge Journal of Economics* 33 (1): 113–37.
- Bazillier, R., & Héricourt, J. (2017). The circular relationship between inequality, leverage, and financial crises. *Journal of Economic Surveys*, 31(2), 463-496.
- Bonhomme, S., & Hospido, L. (2012). The Cycle of Earnings Inequality: Evidence from the Spanish Social Security Data. Working Paper No. 1225. Banco de España.
- Bordo, M. D., & Meissner, C. M. (2012). Does inequality lead to a financial crisis? *Journal of International Money and Finance*, 31(8), 2147-2161.
- Boushey, H., & Weller, C. E. (2008): Has Growing Inequality Contributed to Rising Household Economic Distress?, *Review of Political Economy*, 20:1, 1-22,
- Buendía, L. (2018). A perfect storm in a sunny economy: a political economy approach to the crisis in Spain. *Socio-Economic Review*.
- Cardaci, A. (2018). Inequality, household debt and financial instability: An agent-based perspective. *Journal of Economic Behavior & Organization*, 149, 434-458.
- Cárdenas, L. (2017). Estudios de macrodinámica aplicados a la economía española: productividad, inversión y distribución de la renta. PhD Thesis. Universidad Complutense de Madrid.

- Chmelar, A. (2013). Household debt and the European crisis. European Credit Research Institute, Research Report 13.
- Christelis, D., & Ehrmann, M., & Georgarakos, D. (2015). Exploring differences in household debt across Euro Area countries and the United States (No. 2015-16). Bank of Canada Working Paper.
- Cynamon, B.Z., & Fazzari, S.M. (2008). Household debt in the consumer age: Source of growth—risk of collapse. *Capitalism and Society* 3 (2): article 3.
- Cynamon, B.Z., & Fazzari, S.M. (2013). Inequality and household finance during the consumer age. Levy Economic Institute, Working Paper No. 752.
- Cynamon, B.Z., & Fazzari, S.M. (2015). Household Income, Demand and Saving: Deriving Macro data with micro data Concepts. Institute for New Economic Thinking Working Paper Series No. 13.
- Debelle, G. (2004). Macroeconomic implications of rising household debt, BIS Working Paper No. 153.
- Duesenberry, J. S. (1949). *Income, saving, and the theory of consumer behavior*. Cambridge: Oxford University Press.
- European Commission (2019). Country Report Spain 2019. Commission Staff Working Document.
- Fernández, M.J. (2013). La distribución funcional de la renta en España y en la UEM en la última década. *Cuadernos de Información Económica* 231, 31-38.
- Fernández-Villaverde, J., & Garicano, L., & Santos, T. (2013). Political Credit Cycles: The Case of the Euro Zone. National Bureau of Economic Research (NBER), WP 18899 (March).
- Fitoussi, J. P., & Saraceno, F. (2010). Inequality and macroeconomic performance. hal-01069429

- Frank, R. H., Levine, & A. S., & Dijk, O. (2010). Expenditure cascades. Available at SSRN 1690612
- Friedman, M. (1957), *A Theory of the Consumption Function*, Princeton University Press.
- Friedman, M. (1957). The permanent income hypothesis. In *A theory of the consumption function* (pp. 20-37). Princeton University Press.
- Galbraith, J. K. (2012). *Inequality and Instability: A Study of the World Economy Just Before the Great Crisis*. Oxford University Press.
- Hein, E. (2011). Distribution, 'financialisation' and the financial and economic crisis: Implications for post-crisis economic policies. Institute for International Political Economy Berlin, Working Paper No. 09/2011.
- Hein, E. (2014). The crisis of finance-dominated capitalism in the euro area, deficiencies in the economic policy architecture, and deflationary stagnation policies. *Journal of Post Keynesian Economics*, Winter 2013–14, Vol. 36, No. 2 325.
- Iacoviello, M. (2008), Household debt and income inequality, 1963-2003, *Journal of Money, Credit and Banking* 40(5), 929-965.
- ILO (International Labour Organization) (2012). *Global Employment Trends 2012. Preventing a Deeper Jobs Crisis*, ILO.
- Izquierdo, M., & Lacuesta, A. (2012). The contribution of changes in employment composition and relative returns to the evolution of wage inequality: the case of Spain, *Journal of Population Economics*, 25, 511543.
- Jappelli, T., & Pagano, M., & Di Maggio, M. (2013). Households' indebtedness and financial fragility. *Journal of Financial Management, Markets and Institutions*, 1(1), 23-46.
- Jiménez, G, & Atif, M., & Peydró, J.L., & Saurina, J. (2014). The real Effects of the bank lending channel (updated version: March 2019). Universitat Pompeu Fabra. Economics Working Paper Series, WP No. 1653.

- Jordà, Ò., Schularick, M.H.P., & Taylor, A.M. (2014). Betting the House. National Bureau of Economic Research (NBER), Working Paper 20771 (December).
- Jordà, Ò., Schularick, M.H.P., & Taylor, A.M. (2015). Leveraged Bubbles. *Journal of Monetary Economics*, 76 (Supplement), S1-S20.
- Kaldor, N. (1955). Alternative Theories of Distribution, *The Review of Economic Studies*, 23(2), 83-100.
- Kalecki, M. (1942). A Theory of Profits, *The Economic Journal*, 52(206/207), 258-67.
- Krueger, D., & Perri, F. (2006). Does income inequality lead to consumption inequality? Evidence and theory. *The Review of Economic Studies*, 73(1), 163-193.
- Krugman, P. (2009). The return of depression economics and the crash of 2008, New York: Norton.
- Kumhof, M., Rancière, R., & Winant, P. (2015). Inequality, leverage, and crises. *American Economic Review*, 105(3), 1217-45.
- Laborda, Á. (2007). La formación del ahorro en España: Tendencias y perspectivas. *Cuadernos de Información Económica*, 200 (sept.-oct.), 1-20.
- Lapavistas, C., & Powell, J. (2013). Financialisation varied: a comparative analysis of advanced economies. *Cambridge Journal of Regions, Economy and Society*, 6(3), 359-379.
- López, I., & Rodríguez, E. (2011). The Spanish model. *New left review*, 69(3), 5-29.
- Marchetti, M. A., & Martínez Carrascal, C. (2013). Un análisis del endeudamiento de las familias a partir de la encuesta del Eurosistema sobre la situación financiera y el consumo de los hogares de 2010. *Boletín económico*, Banco de España (December), 29-40.
- Marhuenda, P. G. (2006). La evolución del endeudamiento de los hogares españoles durante el decenio 1996-2005. *Revista Asturiana de Economía*, (36), 141-170.
- Martínez-Toledano (2017). *Housing Bubbles, Offshors Assets and Wealth Inequality in Spain*. Wid World Working Paper Series nº 207/19.

- Mason, J. W. (2018). *Income Distribution, Household Debt and Aggregate Demand: A Critical Assessment*. Levy Economics Institute, Working Papers Series, (901).
- Milanovic, B. (2010). *The Haves and the Have-Nots: A brief and idiosyncratic history of global inequality*. New York: Basic Books.
- Modigliani, F., & Brumberg, R. (1954). Utility analysis and the consumption function: An interpretation of cross-section data. *Post-keynesian economics*, 1, 338-436.
- OECD (2018). *OECD Economic Surveys: Spain 2018* (November).
- Pereda, C. (2018). Endeudamiento, pobreza y desigualdad en la España postcrisis. *Papeles de relaciones ecosociales y cambio global*, (141), 157-166.
- Perugini, C., Hölscher, J., & Collie, S. (2015). Inequality, credit and financial crises. *Cambridge Journal of Economics*, 40(1), 227-257.
- Pijoan-Mas, J., & Sánchez Marcos, V. (2010). Spain is Different: Falling Trends of Inequality. *Review of Economic Dynamics*, 13, 154-178.
- Prados de la Escosura, L. (2017). *Spanish Economic Growth 1850-2015*. London: Palgrave-McMillan.
- Rajan, R. G. (2010). *Fault Lines: How Hidden Fractures Still Threaten the World Economy*. Princeton, N.J.: Princeton University Press.
- Reich, R. B. (2010). *Aftershock: The next economy and America's future.*, New York: Random House.
- Stiglitz, J. E. (2012). *The price of inequality: How today's divided society endangers our future*. New York: W.W. Norton & Company.
- Stockhammer, E. (2015). Rising inequality as a cause of the present crisis. *Cambridge Journal of Economics*, 39(3), 935-958.
- Stockhammer, Engelbert and Rafael Wildauer (2016). Debt-driven growth? Wealth, distribution and demand in OECD countries. *Cambridge Journal of Economics* 40 (6): 1609–34.

UNCTAD (2018). Trade and Development Report 2017. Beyond austerity: Towards a global new deal. UNCTAD.

Van Treeck, T., & Sturn, S. (2012). Income inequality as a cause of the Great Recession? A survey of current debates. ILO, Conditions of Work and Employment Branch. 2008. *Cambridge Journal of Economics*, 37(4), 921-945.

Van Treeck, T. (2014). Did inequality cause the U.S. financial crisis? *Journal of Economic Surveys* 28 (3): 421–48.

Veblen, T. (1899 [2007]). The Theory of the Leisure Class, Oxford University Press.

Velilla, P. (2011). Una actualización de la situación patrimonial de las familias en España, Estados Unidos e Italia a partir de los resultados de encuestas financieras. *Boletín Económico*. Banco de España, (10), 113-133.

Vicent, L. (2018). Precariedad laboral en la economía española. Una perspectiva de género. El mercado de trabajo en los primeros años del siglo XXI. PhD Thesis. Universidad Complutense de Madrid.

Wildauer, R. (2016). Determinants of US household debt: New evidence from the SCF. Kingston University, Discussion Paper nº 2016-6.

Wisman, J. D. (2013). Wage stagnation, rising inequality and the financial crisis of 2008. *Cambridge Journal of Economics*, 37(4), 921-945.

¹ As we will see, recent minor papers also question the validity of this hypothesis with regard to the United States.

² All of them would confirm the link between inequality growth, household indebtedness and greater likelihood of financial crisis. The exception is Bordo and Meissner (2012) who analysed the experience of 14 developed countries between 1920 and 2008 and reject what they call "RKR (Rajan, Kumhof and Rancièrè) Hypothesis". Also, more recently Stockhammer and Wildauer (2016), based on the experience of 18 OECD countries between 1980-2013, cast doubt on the approach.

³ It should be noted that there are also some papers that question the validity of such interpretation for the US case. See, for example, Cynamon and Fazzari (2015), Wildauer (2016) or Mason (2018).

⁴ Jappelli et al. (2013) add to the factors of supply and demand those of an institutional type (regulation on non-payments, legal security, risk information systems).

⁵ The idea that this mechanism was being implemented among US families in the pre-crisis expansion is also defended by Krugman (2009), Stiglitz (2012) or Kumhof and Ranci ere (2015).

⁶ We refer to those who argue that debt is a rational response to soften the impact of fluctuations (short-term or inherent in the life cycle) of income over consumption, based on the Permanent Income Hypothesis (Friedman, 1957) and the life cycle model of Modigliani and Brumberg (1954).

⁷ According to van Treeck and Sturn (2012) these approaches update the hypothesis of relative income (Duesenberry, 1949). The connection is also evident with the social character of the consumption patterns explained by Veblen (1899).

⁸ Some authors forge the expression of “debt for salary” and argue that indebtedness not only replaces direct salary, but also indirect (social public expenditure) and deferred (pensions) through cuts in public services and benefits, establishing a kind of replacement of public by private debt (Barba and Pivetti (2009), Wisman (2013)).

⁹ In the US, mortgaging homes to finance consumption is widespread (home equity), so several of these papers try to estimate it: Cardaci (2018); Barba and Pivetti (2009: 115-116); Debelle (2004: 25-27).

¹⁰ From a very different theoretical perspective, Chmelar (2013) also establishes parallels between the pattern of household indebtedness and the growth dynamics in the US and southern and eastern European countries.

¹¹ Hein (2011) does state, as we will see below, that personal income inequality does not worsen, but rather improves slightly during Spanish expansion. However, as in other works that opt for the analysis of groups of countries, more available indicators for international comparison such as the percentage of the top 1% of income, or the fact that Spain records very high structural inequality rates, leads to assume that it “meets” the assumptions regarding inequality growth during expansion.

¹² Data on average salaries differs according to the source used: the Spanish Statistical Institute (INE) calculates it on the basis of salary earned for full-time jobs and serves as a source for other international databases, such as AMECO or the OECD. Meanwhile, the Tax Agency calculates it based on the declared income. In either case, the trend observed until 2006 is similar (see Vicent, 2018: 148-155).

¹³ The wage share of GDP is two percentage points lower in 2008 than in 1995 (from 65.1% to 63.1%). However, if we look at the difference with respect to 2007 (62.2%), we see a decrease of almost 3 percentage points. In 2008, the share is recovering, but due to the drop in employment that improves the unit salary (Source: AMECO).

¹⁴ The same behaviour is observed with regard to equity inequality: the starting level is structurally high, but, due to the effect of rising prices of real estate assets (proportionally higher over total equity of groups with less equity), inequality is reduced in the expansion period (Mart inez-Toledano (2019)).

¹⁵ These results are consistent with more detailed studies, such as Bonhomme and Hospido (2012), where, based on Social Security data and the Continuous Survey of Working Lives, a reduction in wage inequality can be seen in the Q90/Q10 ratio, especially in men and linked mainly to the employment boom in the construction sector. The increase in employment and wages contributed to the reduction of inequality between 1997-2007. Their results qualitatively coincide with previous ones such as those of Izquierdo and Lacuesta (2012), Carrasco et al. (2011) and Pijoan-Mas and S anchez-Marcos (2010).

¹⁶ Own elaboration based on data from the HBS (base 1997) of the INE.

¹⁷ As Jord a, Schularick and Taylor (2014 and 2015), among others, confirm, this process has been widespread in Western economies since the second half of the twentieth century and is largely explained by a sharp increase in mortgage debt. At present, this represents an average of three fifths of the bank balance in developed economies.

¹⁸ It should be noted that the only source of data that allows us to relate household indebtedness to the level of household income in Spain is the SHF, which provides household rather than personal data. Correspondence with the evolution of personal income (on which almost all the

inequality indicators managed in the previous section are based) is not exact. It depends on how the average household size varies in each income group.

¹⁹ There is no unanimous consensus as to which deciles correspond to low, medium or high levels of income. Our analysis is based on the principles of UNCTAD (2018) that distinguishes between 40% of the lower income population, 50% of the intermediate and 10% of the higher.

²⁰ In terms of National Accounts, gross household savings is equal to gross disposable income plus the variation in pension funds minus their final consumption.

²¹ Calculations based on data from Quarterly Non-Financial Accounts of Institutional Sectors, of the INE.

²² More precisely, it is the gross savings plus net capital transfers minus gross fixed capital formation of households. It is true that capital resources (both savings and net transfers) decrease between 2004-2008. But during that time margin, household investment was greater than the sum of gross savings and net transfers (in 2007 they did not comprise even half the household investment for that year).

²³ Source: Own calculations based on data from the Bank of Spain: OIFM (Other Monetary Financial Institutions), Loans and Credits to Families.

²⁴ This is also indicated by the OECD (2018: 22-25), European Commission (2019: 40-41)

²⁵ The correlation between year-on-year variation in employment and consumption between 2000 and 2008 is 88%.

²⁶ Data available at <http://www.macrohistory.net/data> (last visit: 30/09/2019). The trend is very similar to that observed in the data collected by Prados de la Escosura (2017) referring to a variation in volume in private consumption. Private consumption data requires additional caution, insofar as it includes the rent attributable to homeowners and represents around 10% during expansion. Therefore, part of the consumption registered in the statistics is due to the increase in the imputed rent in the face of the real estate price bubble, which increased from 8.7% of overall consumption in 1995 to 12.4% in 2008 (Source: Eurostat).

²⁷ In this study, based on surveys with a sample of 80,000 operations, financial burden is defined as the ratio between the commitment of payments acquired via debts on the income of the individual at the time of contracting the loan.

²⁸ This clear trend is specific of the Spanish case but not as evident in the US (Velilla, 2011: 130) or, on average, in the 15 Eurozone countries analysed at Marchetti and Martínez Carrascal (2013: 32).

²⁹ Source: *Statistical Bulletin*, Bank of Spain. Loans and deposits of Other Monetary Financial Institutions to other resident sectors.

³⁰ Between 1998 and 2008, the accumulated increase in the price of housing was 175% compared to the 61.5% increase in the consumer price index (Fernández-Villaverde, Garicano and Santos, 2013: 154).