The Italian Households during the Crisis
Housing Wealth Effects and Cross-sectional Heterogeneity

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« [...] sì perché l'autorità dell'opinione di mille nelle scienze non val per una scintilla di
ragione di un solo, sì perché le presenti osservazioni spogliano d'autorità
i decreti de' passati scrittori, i quali se vedute l'avessero,
avrebbono diversamente determinato. »

« [...] for in the sciences the authority of thousands of opinions is not worth as much as one
tiny spark of reason in an individual man. Besides, the modern observations deprive all
former writers of any authority; since if they had seen what we see,
they would have judged as we judge. »

_Galileo Galilei, *Third Letter on Sunspots to Mark Wesler*, December 1612

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Introduction

The purpose of this research is to investigate whether there existed a wealth effect of housing assets on household consumption in Italy during the years of the global recession and, if that is the case, to quantify it for different groups of households.

The topic is interesting for at least two reasons. First, previous results based on both aggregate and micro-data are mixed, with some researches finding large responses of private spending to house prices shocks, while other find smaller or non-significant effects. Second, a recent theory developed by Atif Mian, economist at Princeton University, and Amir Sufi, finance professor at the University of Chicago, emphasizes the role of the housing wealth effects in explaining the dynamics of the Great Recession in the United States. At the core of their work is a powerful and unique dataset, constructed on the basis of American counties and zip-codes, which allowed them to test how the collapse of the housing market impacted households at different levels of the wealth and the income distributions and, more importantly, characterized by different levels of debt and credit constraints. The "levered losses theory" finds the root of recessions in the leveraging process that usually anticipates them and explains how debt concentrates early wealth losses on the poorest share of the population, setting in motion a series of events that ultimately lead to economic downturn and unemployment. The core of the process lies in the heterogeneous response of individuals to the collapse of the housing market. Our research will serve a dual purpose: it will offer a humble contribution to the existing debate surrounding the existence of a housing wealth effect in Italy; and it will try to determine if the main assumptions of the levered losses framework hold in the Italian landscape.

To pursue our objectives, we exploit the best micro-data database at our disposal, the Survey of Household Income and Wealth (SHIW) form Banca d'Italia. The SHIW was begun in the 1960s to gather data on the incomes and savings of Italian households and has evolved over the years to include wealth and other important aspects of households' economic and financial behavior, such as expenditure on durables and non-durables, value of the properties owned, and financial debt. It is carried out every two years and it is a representative sample of Italian households. Each sample comprises about 8,000 households, or 20,000 individuals, distributed over about 300 Italian municipalities. It truly is an amazing tool and constitutes the perfect instrument to study heterogeneous effects among the population. Our research will follow one of the approaches proposed in the Handbook of Macroeconomics. That is, we will study how housing wealth affects the consumption behavior of different groups of households, sorted by ex-ante characteristics. Among the different sources of heterogeneity, we will pay particular attention to the role of debt. The Italian market is vastly underdeveloped as far as housing debt is concerned, nonetheless understanding its effects on individual households might give us a hint of what the future may bring.

We mainly take inspiration from two existing papers: the one from Mian, Rao and Sufi (2013), who estimate the housing wealth effect for American households during the Great Recession; and the one from Grant and Peltonen (2008), who use SHIW data to estimate wealth effects between 1989 and 2002.

The work is organized as follows. The first chapter will focus on the drivers of the recessions. We will take a look at the Great American Recession and describe both the traditional and the most recent theories that try to explain its causes, with a spotlight on Mian and Sufi's levered losses theory. We will then move to Italy, describing how the crisis crossed the Atlantic and how the Italian recession was different from the American one. We will then perform a statistical analysis on SHIW data to get an idea of how the shocks in income and wealth affected different classes of households, underlining the main differences with respect to the American case.

The second chapter will expand upon our data source, describing the methods we used in the statistical analysis and those we will be using in estimating the housing wealth effect. We will provide justifications for the time periods we chose to analyze and offer a detailed description of the variables we are interested in and of the theoretical rationales behind them. In addition, we will explain the advantages of using a balanced panel of micro-observations.

The third chapter will deal with the estimation of the housing wealth effect, to which we also add the estimation of the income effect. We will go over the reasons that justify the relationship between housing values and consumption and explain why the theoretical rationale is not as straightforward as it may seem. To give relevance to our results, we will review the outcome of previous researches, as well as introduce the most important consumption theories. The review we will present is quite extensive and will include papers based both on aggregate and household-level data. After defining the model, we will finally proceed with the estimation of the marginal propensities to consume for different type of households. All the results will be commented and represented graphically.

Following a circular structure, the fourth and last chapter will go back to analyze the role of debt and of credit constraints in general according to Mian and Sufi, with the aim of providing intuitions of what a highly leveraged system may imply. The analysis will follow the same structure of the previous chapter, with debt being considered an additional source of heterogeneity among households.

Chapter I – Recessions and Their Determinants

The year 2017 will mark the 10th anniversary of the start of the Great Recession, the period of general economic decline which redefined the way of life and consumption habits of millions of people all over the world. As it is well known, the Great Recession was related to the subprime mortgage crisis of 2007-2009 and it spread over to Europe through the European sovereign debt crisis exploded in 2009.

Even though many countries are now formally out of recession[1], global growth is struggling and, more importantly, many people are still paying the price of the reckless speculation and lending policies of those years. In the United States, more than eight million people lost their job and more than four million homes were lost to foreclosures, while in Italy the unemployment rate has more doubled since 2007 (going from 6.3 percent in January 2007 to 12.4 percent in April 2015) and so has the number of people living in absolute poverty (from 3.3 percent of the population in 2005 to 4.5 percent in 2016)[2]. It would be unwise to consider those statistics mere measures of economic performance. Unemployment carries along a subtler set of consequences and externalities which more often than not are ignored by financial reports: human costs are severe. The negative psychological effects of being laid off during a recession have a significant impact on divorce, depression and even suicide rates. There is a difference between being fired with justification and losing a job for reasons that have nothing to do with one's performance and that cannot be easily understood.

Can recessions be prevented? Hopefully, but in order to do so it is crucial to understand where they come from. Atif Mian and Amir Sufi, in their book "House of Debt", argue that economic recessions often follow surges in household debt. Their research focuses on the Great American Recession but they also find evidence in previous economic downturns, such as the Great Depression of 1929, and in the international setting. Their results show that the bigger the increase in debt is prior to a crisis, the harder the fall in spending will be when events are set in motion. The fatal trigger, they claim, is usually a drop in housing prices, which leads to foreclosures. This is what happened with the Great Recession, and the authors point out that consumer spending was already going down before the collapse of Lehman Brothers, suggesting that something was already happening before the most evident banking component kicked in. According to them, it is not wise to completely relate the American recession to the collapse of the financial system and, by contrast, such interpretation might lead to dramatic consequences if it were to direct policy measures and the macro regulatory environment. Let us briefly focus on that[3].

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[1] United States reported a positive GDP growth as early as Q3-2009, while some European were strongly hit by the sovereign crisis and kept falling back into recession until 2013 (France, Spain) or late 2014 (Italy).

[2] Bella M., Mauro L. & Patrignani L., 2016. "Nota sui consumi delle famiglie, le spese obbligate e la povertà assoluta in Italia", *Rapporto dell'Ufficio Studi di Confcommercio*, September.

[3] The following sections will be based on Mian A. & Sufi A., 2014. "*House of Debt: how They (and You) Caused the Great Recession, and How We Can Prevent It from Happening Again*", Chicago: The University of Chicago

I.1 – *A New Narrative for the Great Recession*

The mainstream narrative of the Great Recession focuses on the collapse of Lehman Brothers in September 2008. Alan Blinder, Professor of Economics and Public Affairs at Princeton University and Vice Chairman of the Board of Governors of the Federal Reserve System from 1994 to 1996, judged the decision of allowing Lehman to fail a *"colossal error"*, and he was not alone in his belief[4]. He and many others argued that letting Lehman go was either a case of misjudgment by officials or *"an offering to the moral-hazard gods"* and underlined the inconsistency the Government exhibited with respect to the course of action that was taken for Bear Stearns, a bank half the size of Lehman. The collapse of Lehman Brothers froze the credit system, preventing business from getting the loans they needed to continue operating. No financial institution seemed safe and banks' access to short-term liquidity, in the form of deposits or financial commercial papers was severely constrained[5]. The subsequent reduction in investments forced enterprises to lay off workers. It is no mystery that all of this happened, but what matters is understanding whether avoiding the failure of Lehman would have been enough to protect the economy and leave the crisis for the future. Mian and Sufi call this theory, according to which failures of the financial infrastructure as whole and the subsequent credit crunch are at the root of a recession, the "banking view". In accordance to this approach, rescuing troubled financial institutions and supplying money to the system would then be the most logical solution in order to resume lending, restore jobs and bring the economy back on track. Two additional views are worth mentioning. The "fundamental view" is based on the premise that recessions are caused by fundamental shocks to the economy, such as a natural disaster, political turmoil or a change in expectations of growth. Given that no obvious ground-shaking event happened before the most recent crisis, this view finds its justification in the change of expectation, a generalized switch to pessimism about future income that causes a contraction in current spending. On a similar note, the "animal spirits view" links recessions to irrational and volatile beliefs, such as the idea that house prices might rise forever. Again, a review of those beliefs then leads to a contraction in spending, that brings down house prices and generates a recession in a self-fulfilling way. The latter theories switch the focus from banks to enterprises and households, but they are based on unpredictable parameters such as expectations and beliefs and exclude that recessions can be predicted.

The banking view enjoyed for sure the greatest amount of support during the Great Recession, not only among economists, but among policy makers too. The banks-enterprises-workers vicious circle described above, fueled by the credit crunch, is not a matter of dispute. Actually, the circle was much wider than that and involved structured financial products (Ranieri's controversial legacy, the mortgage-backed securities, and credit default swaps[6]) and insurance companies, namely the American International Group. What

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[4] Blinder A., 2009. "Six errors on the path to the financial crisis", *The New York Times*, January 24.
[5] Montoriol-Garriga J. & Sekeris E., 2009. "A question of liquidity: the great banking run of 2008?", *FRB of Boston reviews*, March 30.
[6] See Lewis M., 1989. *"Liar's Poker"*, New York: W. W. Norton & Company.

matters here, though, is the sequence of the events. Was the debacle of Lehman Brothers the cause of the flame that nearly reduced to ashes the Charging Bull in Bowling Green Park? Mian and Sufi's data show otherwise. The collapse in residential investment and durable consumption in the United States was dramatic well before the infamous Chapter 11 filing. In particular, residential investment started falling as early as second quarter 2006 and since then declined, each quarter, by at least 12 percent up to 2009. Similarly, durable consumption started falling in 2007, more than a year in advance with respect to Lehman collapse. Moreover, according to the National Income and Product Accounts, the drop in GDP during the third and fourth quarters of 2008 were mainly driven by a decrease in consumption and it was not until the first quarter of 2009 that business investment contributed most significantly to the economic contraction. This is not to say that the events of September 2008 were irrelevant, on the contrary the biggest decline in household spending happened during the last two quarters of 2008 and amounted to an overall drop of 5.4 percent[7], but the evidence clearly contradicts the idea that the linchpin of the recession has to be found in the collapse of the banking sector: the downturn was demand driven and job losses materialized because households stopped buying, not because businesses could not invest.

I.2 – *The Hidden Driver of the Recession*

Aggregate United States data demonstrate a clear pattern: consumption was the key driver of the recession. While interesting, this information is not of much help for the future. We need to understand the causes of the decline in household spending to be able to draw useful conclusions. In a way, we are interested in finding the "driver of the driver". Mian and Sufi follow a geographic approach and exploit a powerful micro-level database to answer this question[8]. They split counties in the United States into five quintiles based on the decline in net wealth from 2006 to 2009 and focus on the quintiles with the largest and smallest declines. Both large and small net wealth-decline counties were wide-spread across the country. The former lost an average 26 percent of net worth, while the latter did not incur in any wealth loss. Decline in house prices are amplified in terms of household wealth by the leverage multiplier or, in other words, areas with higher levels of household debt experienced a much larger decline in overall wealth ever for the same percentage variation in house prices. As a result, large net wealth-decline countries were areas that had a combination of high debt levels and a collapse in house prices and were mainly located in states such as California, Florida, Georgia, Maryland, Michigan, and Virginia. In those counties, consumption declined by almost 20 percent. This is huge when compared to the Unites States average, which was about 5 percent, and even more dramatic considering that small net-wealth decline counties had an overall consumption contraction of about 1 percent. Ultimately, the effects of the economic downturn were felt even in areas that avoided the collapse in net worth: in 2009, spending fell by almost 10 percent points in the small-

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[7] This is the biggest consumption drop in NIPA's historical data, which go back to 1947.
[8] Mian A. et. al, 2013. "Household balance sheets, consumption, and the economic slump", *Chicago University*, June.

decline counties. Nonetheless, this does not invalidate the importance of the shock to wealth in the timing and strength of the consumption decline.

What the authors described is known in theory as the "wealth effect". The wealth effect is the change in household spending that follows a change in perceived wealth and is estimated through the marginal propensity to consume out of wealth. It is a core element of modern consumption studies and its relevance varies in time and between countries. Additionally, they underlined the importance of debt. In short, debt augments the wealth effect and increases households' responsiveness in terms of consumption, because credit constrained households are in a much riskier position than financially-solid families. We will better explain those phenomena and the rationales behind them in Chapter III and Chapter IV.

The formal analysis of the wealth effect and the role of debt in the United States is carried out in Mian, Rao and Sufi (2013): the estimated marginal propensity to consume out of wealth for the average American household during the Great Recession was around 0.05, meaning that a fall in house prices of $10k caused a cut in spending of $500 and this effect was larger the higher the leverage of the household and the lower its level of income or assets. A wealth effect not only existed, but it was heterogeneous among the population and mainly determined by the distribution of wealth and debt. In other words, the combination of high debt levels and a sharp asset price decline resulted in a massive decline in spending. A characteristic of the American market in the years of the crisis was that debt was mainly concentrated among the poorest, as those were the people that could not afford to buy a house on their own and banking regulations allowed the so-called sub-prime lending. This is another reason why the collapse of the housing market was especially devastating: not only did housing wealth drop, but it dropped the most for indebted households, who also had the highest marginal propensity to consume out of housing wealth. Obviously, for every borrower there has to be a lender. Those lenders were households who belonged to the richest share of the population, and only a small part of their wealth consisted of real assets, as the majority of it was made of deposits (through which they indirectly lent to other households and enterprises) and financial assets such as government bonds (though which they lent to sovereign entities, in particular to the United States government), which served as a hedge during the economic downturn. In addition, they had very little debt. When the house prices fell, levered households who bought their house through a bank loan had their net worth nearly wiped out, not only because most of their house made up most of their wealth, but also because they held a junior claim on their home equity. This did not happen for the wealthiest households, who could also benefit from the recovery of financial assets. High debt in combination with the decline in house prices, besides contracting household consumption, increased the gap between the poor and the rich and resulted in an increasingly widespread social discontent. FIGURE I.1 and FIGURE I.2 borrow the results of Mian and Sufi and show the wealth composition of American households by net wealth quintiles and the relation between the marginal propensity to consume out of housing and leverage. The excessive reliance on debt, made even more obvious by the subprime banking emergency of July 2007, was at the root of the recession.
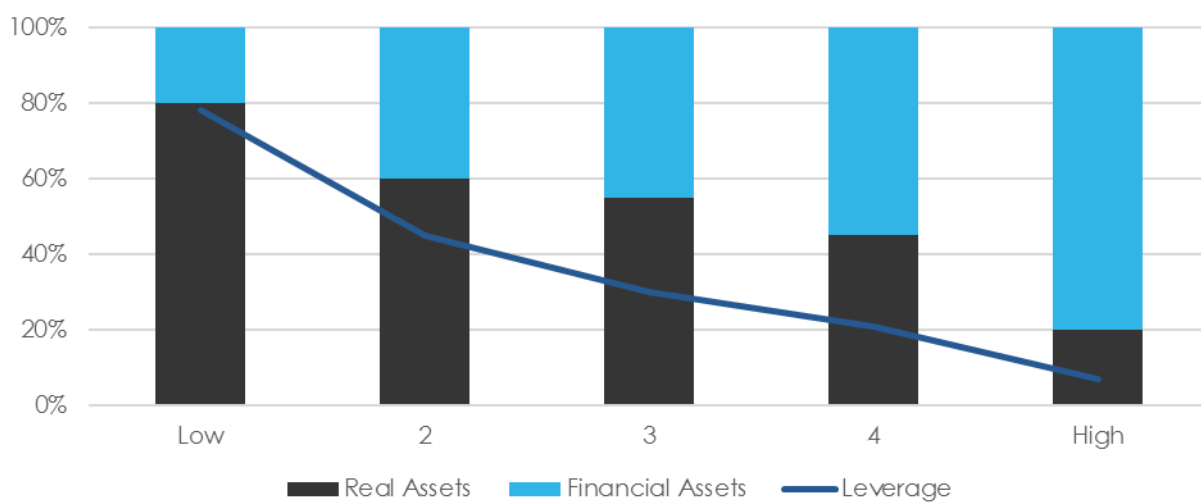
FIGURE I.1 – Wealth Composition and Leverage Ratio of American Households in 2007
by Net Wealth Quintiles
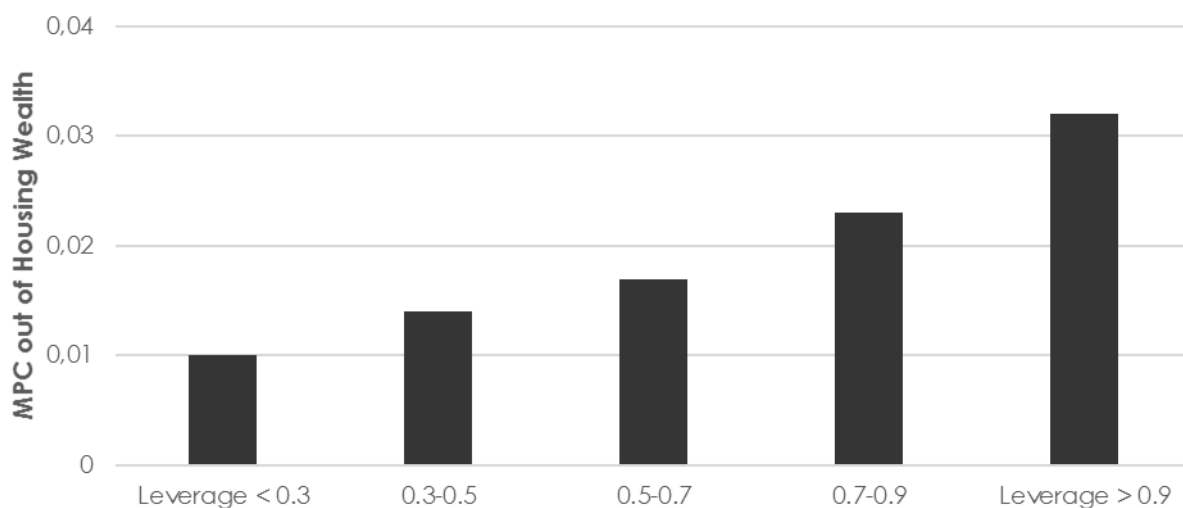
FIGURE I.2 – Marginal Propensity to Consume out of Housing Wealth for American Households
*by Leverage Ratio*

The above figures are taken from Mian A. & Sufi A., 2014. "*House of Debt: how They (and You) Caused the Great Recession, and How We Can Prevent It from Happening Again*", Chicago: The University of Chicago Press.

I.2.1 – *Frictions*

Not only the Great Recession, but many of the economic contractions that hit the western countries were anticipated by a large increase in household debt. This was true for the crises in Spain in 1977, in Norway in 1987, in Sweden in 1991 and in Japan in 1992 and even for the Great Depression of 1929. But why are recessions proceeded by a large rise in household debt and why do they begin with a decline in spending? Most of the models that try to explain the root of GDP contractions focus on the supply-side of the economy (workers, capital, and firms in general) and are based on the premise that an economy is defined by what it can produce, not by what is demanded. The fundamental view emphasizes external, catastrophic shocks because those destroy productive capacity, with no interest in the behavior of demand. There are actually good theoretical reasons to ignore the role of demand and, by extension, household consumption: interest rates and consumer prices are corrective forces that should adjust the economy to lower spending, avoiding an overall decline in output. The point, though, is that those adjustments do not generally work, and did not work for sure between 2007 and 2009. Frictions exist that prevent theory from becoming practice, and this is why household debt and consumer spending play a role. The most well-known friction is probably the "zero lower bound", also known as "liquidity trap": in some scenarios interest rates cannot get low enough to induce savers to start buying and this is because the existence of cash (that cannot have negative returns) prevents interest rates from becoming negative, setting their lower bound to zero. Operating on consumer prices is no easy task either, as lower prices mean, in most of the cases, lower wages and lower wages together with high levels of individual debt might cause an even deeper consumption contraction generating the vicious cycle which was summarized in 1933 by Irving Fisher as the "debt-deflation cycle".

I.2.2 – *The Levered Losses Theory*

All we have said so far underlines the importance of demand in the development of a recession and gives great emphasis to the effects of private debt. Poor and highly leveraged households are the first to cut spending because, in the event of a housing market downturn, wealth losses are concentrated upon them and they must work to rebuild their savings while contemporaneously facing higher borrowing constraints. At the same time, frictions in the economy prevent savers, who are also indirectly lenders, from making up for the spending shortfall. The link between what we have described and a general recession is straightforward: lower spending does not affect indebted households only, but the economy as a whole because firms must then reduce costs by firing workers. Even those who had been cautious in their investments choices might lose their jobs and rigidities in the reallocation process prevent the economy from finding a new full-employment equilibrium, leading to high unemployment rates and to an even deeper contraction in spending. This process is what Mian and Sufi call the "levered losses framework", summarized graphically in FIGURE I.3.
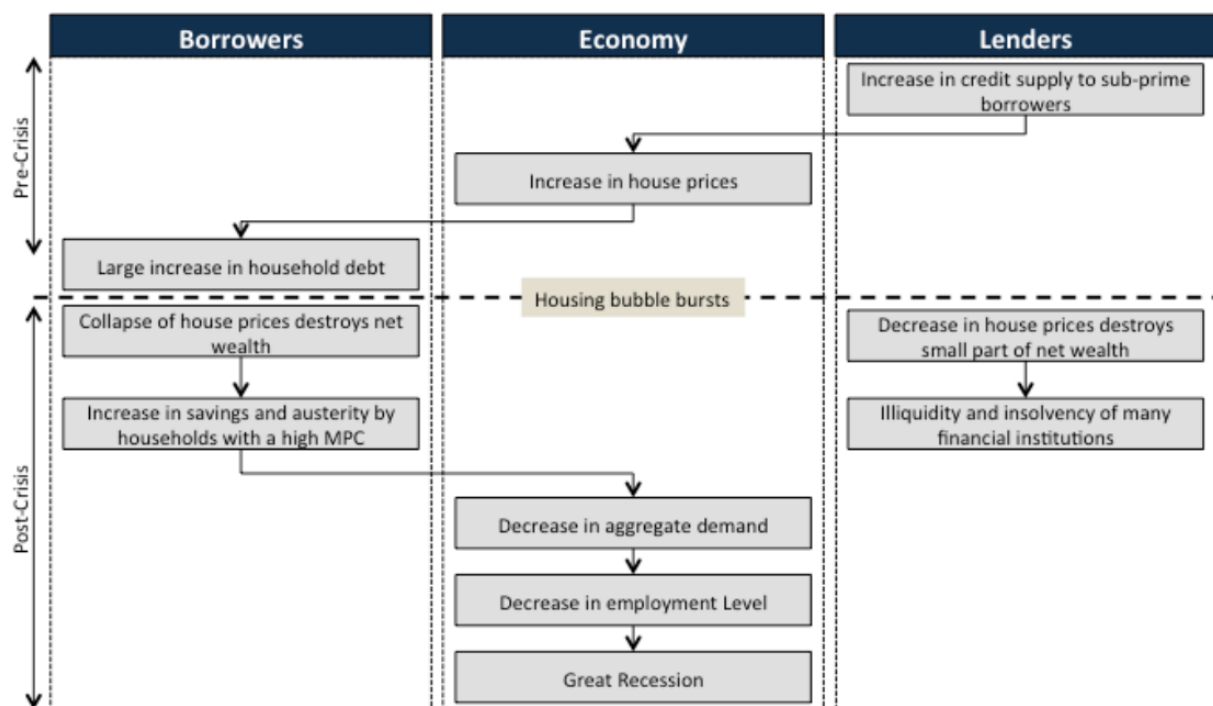
FIGURE I.3 – The Evolution of the Great Recession
According to Mian and Sufi's Levered Losses Theory

The above figure is taken from Hess R., 2014. "House of Debt – critical book review", *University of St. Gallen*, December 1.

I.2.3 – *A Robust Relationship*

The Unites States were not the only country to experience a rise in household debt prior to the financial crisis. Low interest rates and lax lending standards, together with creative financial engineering, fueled a rapid increase in household borrowing all over the world. If the intuitions presented in "House of Debt" are correct, we should be able to identify a pattern between prior-to-crisis leveraging and economic downturns even outside of the United States. A 2010 study from the Federal Reserve Bank of San Francisco is enlightening in that sense[9]. From 1997 to 2007 household leverage ratios increased in many European countries: Ireland (+85 percentage points), Netherlands (+82), Denmark (+69), Portugal (+65), Spain (+52), United Kingdom (+52), Norway (+50), Italy (+20), Austria (+13), France (+15), Belgium (+14)[10]. As expected, countries with the largest increase in household leverage experienced the most severed contractions. Between 2008 and 2009, consumption fell most sharply in Ireland (- 6.7 percent) and Denmark (-6.3 percent) and was relatively flat for countries such as Germany, Austria, Belgium and France, which experienced a modest leveraging process. Those results are presented in FIGURE I.4.

In an extension of their work, Mian and Sufi found similar results looking at public debt behavior from the major European economies. Just like for their county-level analysis in the United States, the results indicate that sovereign entities that relied too much on debt financing suffered the most extreme contractions in consumption, as shown in FIGURE I.5. What happened in Europe and in the United States were not unique phenomena, and the same set of forced contributed to bring down both economies.

Let us go back to the beginning. We started by saying that the mainstream theory in explaining recessions revolves around the meltdown of the financial system, the so-called banking view. Timothy Geithner, who served as the United States Secretary of Treasury from 2009 to 2013, favored this approach and defends his modus operandi in his best-selling "Stress Test", in which he identifies the root cause for economic downturns in the freezing up for financial intermediaries. In order to save the economy, banks had to be saved and this should generally be the mantra when dealing with economic contractions[11]. In the same book, he axes those who wanted to see Wall Street bankers held accountable for the reckless speculation as bearers of *"Old Testament vengeance"* and argues that any action in that sense would have only caused more economic pain and misery to the ordinary people, as it happened when Lehman was allowed to fail[12]. It should be clear now why understanding the true rationale of a recession is important: Geithner says that economic crises are generally banking crises and that governments should confront them by pouring money into the financial system, as this will allow banks to resume lending; Mian and Sufi state that downturns

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[9] Glick R. & Lansing, K., 2010. "Global household leverage, house prices, and consumption", *FRS of san Francisco*, January 11.
[10] The increase for the United States over the same period was 42 percentage points.
[11] See Geithner T., 2014. *"Stress Test"*, New York: Crown Publishing Group.
[12] Lewis M., 2014. "Hot sauce", *The New York Times*, May 15.

mostly follow a deterioration of households' balance sheets, caused by excessive borrowing. Clearly, the two theories imply dramatically different consequences in terms of policy.

While the topic is incredibly interesting, we will now focus now on a different issue. The levered losses theory helped us to understand why households' balance sheets matter and has its root in the existence of a housing wealth effect and in heterogeneous responses among different classes of households. In other words, for the whole chain reaction to take place, households must react in terms of consumption to the collapse of the housing market. The fact that such effect exists in the United States and that general relations can be found when looking at macro-areas such as Europe do not necessarily imply that the same applies for individual countries across the world, and even less so for Italy, that is characterized by very specific housing and debt markets. The rest of this research will focus on Italy but let us be clear: we do not want to test whether the levered losses framework can explain the recent Italian recession, as that is hardly the case; we merely want to understand if the underlying logic holds, i.e. if house prices and debt can directly affect the consumption of Italian households.

With that in mind, in the next sections of this chapter we will describe how the crisis reached Italy and how it affected households, and the next chapters will finally deal with the estimation of the housing wealth effect for the Italian households.
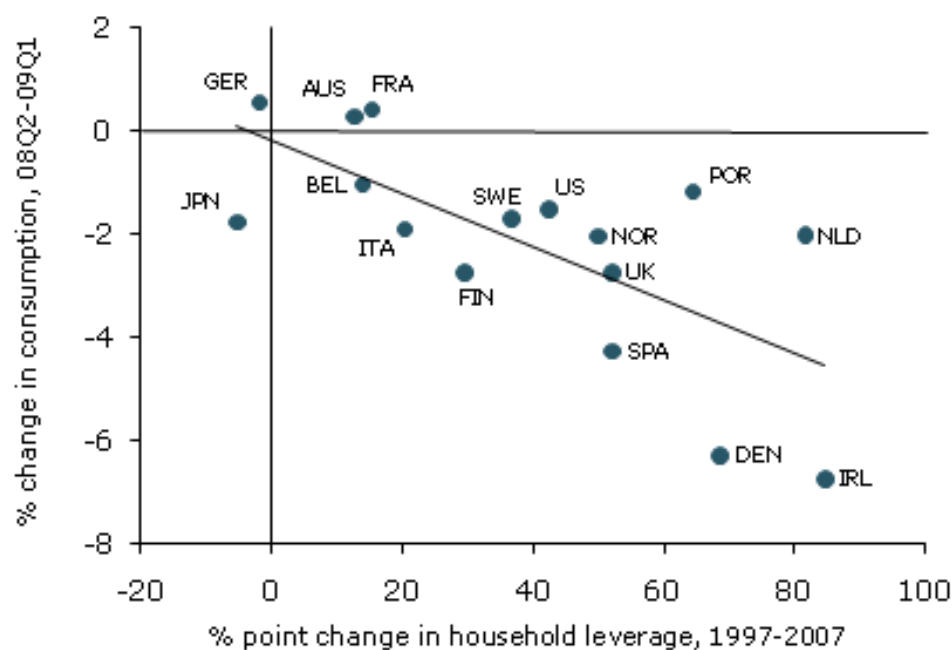
FIGURE I.4 – The Relationship between Household Leverage and Consumption
Main European Countries and Japan
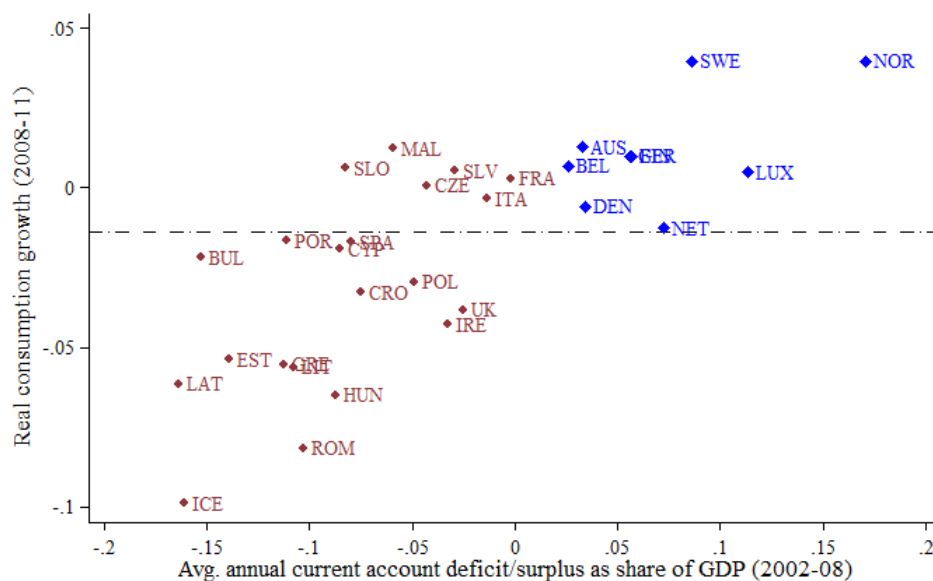
FIGURE I.5 – The Relationship between Sovereign Debt and Consumption
European Countries

The above figures are taken Glick R. & Lansing, K., 2010. "Global household leverage, house prices, and consumption", *FRS of san Francisco*, January 11 and *houseofdebt.org*, respectively.

I.3 – *The Recession in Italy*

The first thing to say about the Italian recession is that it was long. As FIGURE I.6 and FIGURE I.7 show, if the crisis officially lasted about a year in the United States, Italy experienced an impressive forty-two months of economic downturn. Taking a better look at the evolution of the GDP, we can see that between 2007 and 2014 Italy actually faced two different recessions: the first one was linked to the global financial crisis and ranged from the end of 2007 to the end of 2009; the second started in the second half of 2011 and lasted till the third quarter of 2014 and was a consequence of the European sovereign debt crisis. The small 2010 recovery was not enough to contain the disastrous effects of such "double-dip" phenomenon and the most recent estimations by the International Monetary Fund say that the Italian GDP will return to its 2008 peak not before 2025[13]. As we have seen, the global financial crisis originated in the United States and was determined by excessive levels of household debt and by the subsequent collapse of the financial system; the sovereign debt crisis instead was triggered by turmoil in the markets for sovereign bonds and by worries regarding the solidity of the Euro area. As a consequence, the nature of the shocks that hit the Italian economy was very different in the two recessions.

I.3.1 – *The Consequences of the Global Financial Crisis*

The first symptoms of the crisis, those we analyzed in the previous sections, did not particularly upset the Italian economy. Up to the third quarter of 2008, both the consumption contraction and the weakening of the American financial system (caused by excessive exposition to sub-prime mortgage-backed securities) had little to no influence on Italian output and led to the belief that the relatively solid financial system, the low level of household and non-financial enterprises debt and the lack of a "bubbly" trend in the housing market would have spared Italy from severe consequences. The collapse of Lehman Brothers washed away any illusion. Italian banks' stock prices fell, interbank rates skyrocketed and credit availability contracted. Consequently, industrial production started to fall and outright collapsed by the end of 2008, when international trade halted. The dramatic drop in exports, together with a slowdown in private investments and household consumption, determined a strong GDP contraction and set the stage for the subsequent drop in employment (700,000 jobs lost between 2008 and 2010). Nonetheless, expansive policy actions from the government and the main Central Banks proved to be effective and the gradual improvement of the international environment led to a period of economic recovery. Caivano et al. (2010) confirm what can be intuitively supposed: the first recession was prominently an "imported recession", with the fall in international trade and the deterioration of the international environment in general being the main drivers of the decline of economic activity[14].

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[13] Jones G., 2016. "Italy faces two decade-long recession after Brexit shakes growth prospects, IMF warns", *Independent*, July 12.

[14] Caivano M. Er al., 2010. "La trasmissione della crisi finanziaria globale all'economia italiana. Un'indagine controfattuale, 2008-2010", *BI occasional papers*, April.
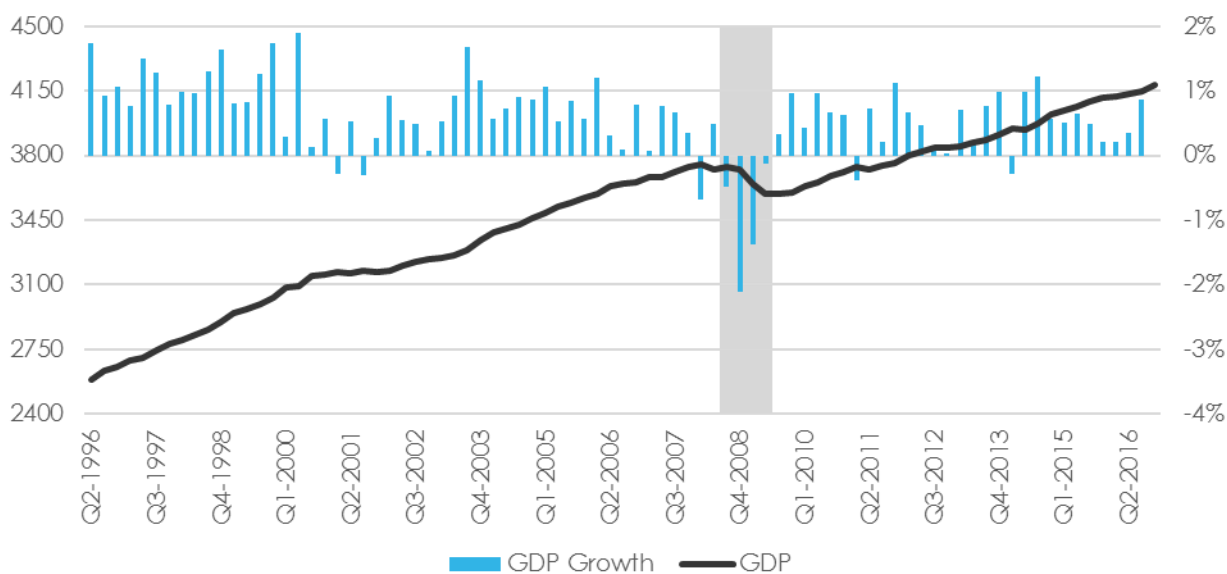
FIGURE I.6 – Evolution of Quarterly Gross Domestic Product
For the United States
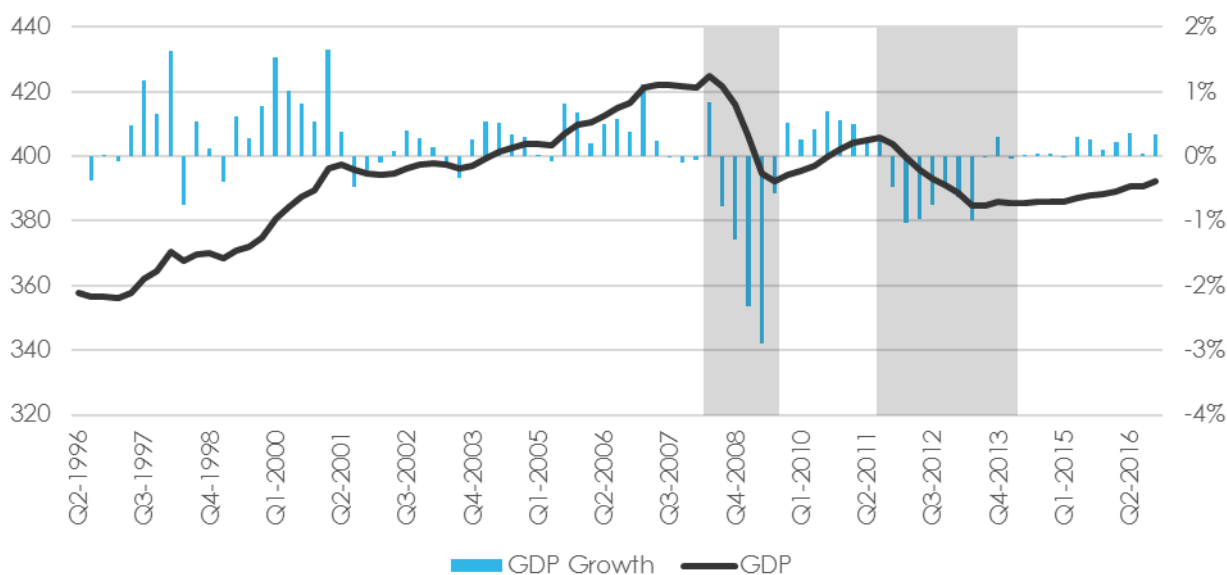
FIGURE I.7 – Evolution of Quarterly Gross Domestic Product
For Italy

Top figure: data from FRED. LHS: Quarterly values expressed in $ bn, seasonally adjusted, chain linked with respect to 2009. RHS: GDP growth rate. Grey areas indicate recessions.

Bottom figure: data from ISTAT. LHS: Quarterly values expressed in € bn, seasonally adjusted, chain linked with respect to 2010. RHS: GDP growth rate. Grey areas indicate recessions.

I.3.2 – *The Consequences of the Sovereign Debt Crisis*

The "calm in-between the storms" came to an end in the summer of 2011, after Greece, Ireland and Portugal were forced, for different reasons, to ask the European Union for help. In particular, the announcement of the Private Sector Involvement in the second bailout package for Greece (July 2011) threw financial markets into turmoil. The Italian situation was perceived as extremely risky, given the high level of public debt and the low growth expectations, and the BTP-Bund spread reached 550 basis points. At this point, Italy lost access to the financial markets. Roberto Orsi, London School of Economics Editor, summarizes what happened next:

"The truth is that the Italian state went bankrupt in summer 2011 [...] Of course, because the sheer dimensions of Italy as an economy and as debtor, the ECB and political authorities in Europe have agreed to create around the country's finances the appearance of a market, which is in fact, largely artificial."

Roberto Orsi, 2013[15]

Indeed, the flow of credit was drastically reduced and firms resumed laying off workers, bringing the unemployment rate to 12 percent. In 2012, sales for the automotive sector reached only the 1.4mn mark (the 1979 level), the construction sector slumped by 14 percent and home sales dropped by 29 percent with respect to the already miserable previous year. Austerity measures from the government destroyed household confidence and led to a drastic reduction in spending (-4.3 percent) and investments (-8 percent). As a result, GDP for that year dropped by 2.5 percent. Differently from the previous phase of the recession, the fall in GDP was mainly induced by internal factors. The global financial situation merely exposed the structural weaknesses of the Italian economy, namely an unsustainable public debt and a low potential in terms of growth, and the recession was caused by the worsening of financing conditions and the deterioration household confidence, that resulted in a severe contraction of domestic demand[16].

Looking at FIGURE I.8, which plots the evolution of the main components of demand, confirms the above reasoning: during the global financial crisis the behavior of Italian GDP closely mirrored that of exports, which plummeted in the second half of 2008. Differently, in the second part of the recession GDP dynamics seemed to be driven by household consumption, and so by domestic demand.

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[15] Orsi R., 2013. "The quiet collapse of the Italian economy", *LSE – Euro crisis in the press*, April 23.
[16] Busetti F. & Cova P., 2013. "L'impatto macroeconomico della crisi del debito sovrano: un'analisi controfattuale per l'economia italiana", *BI occasional papers*, September.
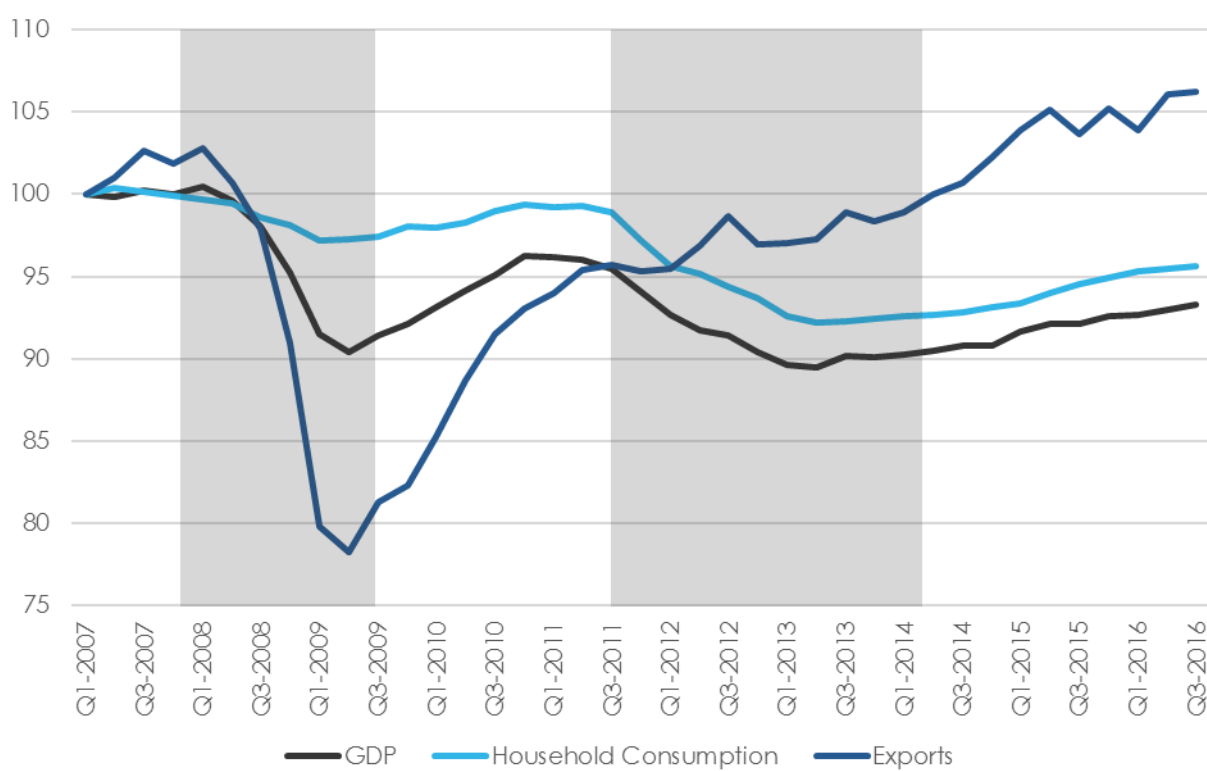
FIGURE I.8 – Evolution of Gross Domestic Product and of the Main Components of Demand
Different Rationales for the Two Recessions

Data from ISTAT. GDP quarterly values, seasonally adjusted, chain linked with respect to 2010, indexed (100=Q1-2007).

I.3.3 – *The Effects on Italian Households in Aggregate Data*

Let us focus on households. Thanks to statistical analysis we can get a glimpse of how the recession affected Italian families. To be consistent with what we said so far, we will investigate the variations in consumption and wealth during the two crises. In addition, we will be looking at the evolution of income. The analysis of Mian and Sufi omits the role played by income in determining consumption, because they focus on the effects of the catastrophic housing collapse. This is not something we will do, for two reasons: first, the Italian crisis did was not caused by the burst of a housing bubble, and the collapse of the housing market was a consequence rather than a cause of the recession; second, income is the main driver of household behavior and has a central role in all the theories of consumption. As will be better explained in Chapter II, our analysis will be based on Banca d'Italia Survey of Income and Household Wealth, an extremely comprehensive collection of micro-data. But before moving on to that, it is useful to take a look at aggregate data to get a general understanding of the dynamics we are interested in.

Quarterly data from ISTAT reveals an interesting behavior. During the global financial crisis, household consumption declined less than income, probably because families were able to smooth consumption by resorting to their savings. The occurrence of a new recession, soon after the previous one, was too much to bear and the further decrease in income, together with a devaluation of real assets, led to a fall in consumption greater than the drop in disposable income in the second part of 2013. There are two possible explanations: first, after years of instability, Italian families might have started to consider the shocks to the economy as permanent rather than transitory, and adjusted their life-styles accordingly; and second, the erosion of deposits might have bought families to an uncomfortable level of wealth and the lack of any future buffer pushed households to save in order to restore their wealth to levels consistent with pre-recession standards[17]. The evolution of consumption and income according to aggregate data is presented in FIGURE I.9, which also depicts the dynamics of the saving rate. Overall, during the global financial crisis, income and consumption dropped by about 1.5 percent, while wealth fell by 1 percent. Between 2010 and 2014 the contractions were far more significative: income dropped by 7 percent and consumption shrunk by 7.5 percent, partly in consequence of the 8 percent reduction in wealth. On the subject of wealth, it is time to quantify the housing collapse we repeatedly referred to. FIGURE I.10 shows the evolution of house price indices for United States and Italy. The first thing that jumps out is how more dramatic the drop was in the United States, with the Case-Shiller index falling by over 30 percent between over four years (note how steeper the drop was during the years of the Great Recession), with respect to a 12 percent drop for the Italian IPAB index. The second important consideration refers to the timing of the collapses: the American index turned bearish as early as 2007, while the Italian housing market collapsed as a consequence of the international instability and was more a consequence, rather than a cause, of the crisis.

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[17] Rodano L. & Rondinelli C., 2014. "The Italian household consumption: a comparison among recessions", *Journal of Economic Policy*, January.
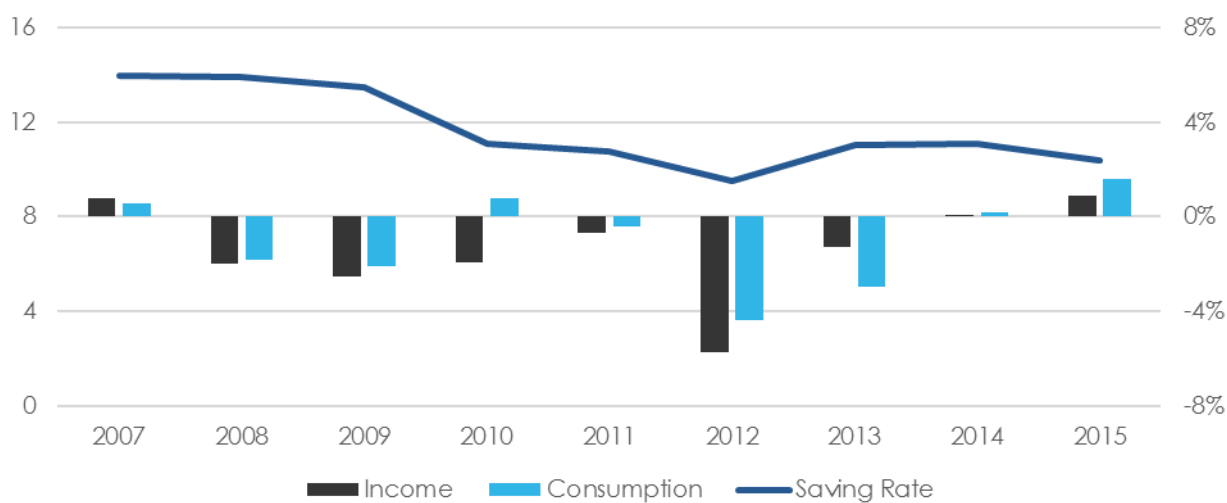
FIGURE I.9 – Evolution of Household Income and Consumption
During the Global Financial Crisis and the Sovereign Debt Crisis
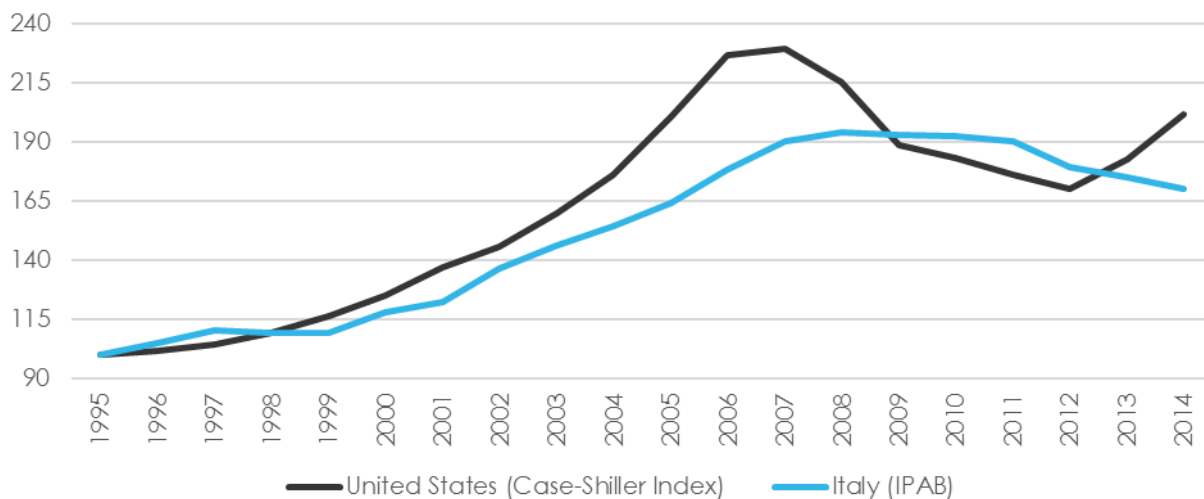
FIGURE I.10 – Evolution of House Price Indices
For Italy and the United States

Top figure: data from ISTAT. LHS: Saving rate, percentage values. RHS: Income and consumption growth rates.
Bottom figure: data for the Unites States from FRED; data for Italy from Banca d'Italia.

I.3.4 – *The Effects on Italian Households in Household-level Data*

The greatest advantage of household-level data is that we are able to study the heterogeneous responses to the crisis of different groups of Italian households. In this section we will comment the main findings in terms of statistical analysis, leaving the responsivity study to the next chapters. To avoid excessive cluttering, the figures and the tables describing the results are left for the Appendix. We study the evolution of the three variables of interest (consumption, income and wealth) along three different time periods: between 2006 and 2008, to capture the effects of the global financial crisis; between 2010 and 2014, to capture the effects of the sovereign debt crisis; and between 2010 and 2012. We will provide justification for these breakdowns in the first sections of Chapter II, for now it is enough to say that the study of the "severed" third time period is necessary to keep the methodology consistent with the analyses of the following chapters. All the data are expressed in real terms (in 2014 money). We use weighted means to study the evolution of income and consumption, and weighted medians for wealth that is characterized by a strongly asymmetrical distribution; weights are provided by Banca d'Italia.

The overall results from micro-data significantly different in magnitude from the aggregate ones. In real terms, the first part of the recession resulted in a drop of 4.1 percent in income, 5 percent in consumption and 1 percent in wealth; between 2010 and 2012 income fell by an impressive 12 percent but that is small compared to the results for wealth, which contracted by 17 percent. Interestingly, even during the first part of the sovereign debt crisis, self-reported drop in consumption was fairly limited, around 5 percent. Increasing the horizon to include the years up to 2014, the situation significantly worsens: consumption shrunk by 16.5 percent, dragged down by a falling housing wealth (-18 percent). Note that the results based on self-reported values depict a much direr economic environment with respect to the aggregate estimates. Let us focus now on different classes of households.

Income and Wealth distributions. Sorting the sample by income or wealth provides an interesting information: the fall in consumption was more or less well distributed among all the population. Actually, during the sovereign debt crisis the largest drop in mean consumption was observed in the last quintile of the income distribution (-19 percent), compared to a reduction of 16 percentage points for the first quintile[18]. While income dropped the most for the poorest, contracting by 17 percent, more careful considerations are required when looking at the results for wealth. The huge negative variations reported in the tables for the lowest quintiles are not very significative considering the shape of the wealth distribution. Looking at level changes, median wealth dropped by around €800 for the poorest households (those who do not even own a house), while the reduction for the richest was so drastic it is hard to make a comparison: €40k between 2010 and 2012 and about twice that amount when comparing to 2014. Income and wealth, impacting on

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[18] We are sorting in an increasing way, so the first quintile is comprised of households who earn very little and the last is comprised of households who earn the most.

different shares of the population probably balanced the distribution of the responses in terms of consumption.

Age of the household head. Looking at different age classes, during the global financial crisis, the reduction of income has been accommodated by a less than proportional reduction in consumption, at all ages with the exception of elders, who kept a positive growth. During the sovereign debt crisis, the reduction of consumption closely mirrored and in some cases exceeded the reduction of income and this was especially true for younger households (less than 55), whose spending declined between 18 and 21 percent. Nonetheless, the variation in consumption, income and wealth turned negative also for elders.

Educational level of the household head. As far as education is concerned, households whose head held at least a high school diploma were strongly affected by the double-dip recession, experiencing the most severe resource contractions. While the pattern was similar during both the global financial crisis and the sovereign debt crisis, this is interesting from an historical point of view, as the results are different from what happened in previous periods of economic downturns, when real consumption dropped the most for uneducated households, as explained in Rodano and Rondinelli (2014).

Home ownership. The same considerations as above can be applied when comparing homeowners and renters. Both the groups suffered a similar contraction in income and consumption and a drop in median wealth during the last recession and this was different with respect to previous episodes, such as the 1991-1993 crisis, that mainly affected renters. Note that the larger drop in wealth registered for renters has to be taken, again, with a grain of salt as renters' wealth is generally very modest and the level variations are limited.

Geographical area. The last breakdown focuses on different areas of Italy. We can see that during both phases of the recession income and consumption fell the most for households living in middle Italy (around -10 percent up to 2008 and nearly -20 percent between 2010 and 2014), while wealth decreased mainly in the north and south and remained quite stable, at least up to 2012, in the middle area.

As mentioned before, the full results of the study are reported in the Appendix. TABLE A.1-A.4 contain the whole set of estimated values for each variable we analyzed and FIGURE A.1-A.6 offer a graphical representation of their variations for each time period we considered. In addition to income, consumption and wealth we also reported the results for real assets, which make up the largest part of the average household's wealth and are driven, for the most part, by exogenous factors.

I.4 – *Peculiarities of the Italian Households*

The county-level analysis carried out by Mian and Sufi for American the United States concluded that consumption dropped the most for the poorest households, who were also those with the highest leverage ratios. Our results show instead that in Italy the drop in consumption was more or less homogeneous among the population and most likely determined by contractions in income and low consumer confidence. While a descriptive statistical analysis is not enough to determine causality between variables, we are given the intuition that the drop in wealth played a bigger role for the richest[19]. Looking at the balance sheet composition of Italian households can help to explain these results. FIGURE I.11 is based on SHIW data and clearly shows that only a minor share of households in the first quintile of the wealth distribution own real estates which, on average, make up about 5 percent of the poorest households' wealth. Real wealth plays a much bigger role for the middle and the richest shares of the population (90 percent of the third quintile's total wealth and about 80 percent of the highest quintile's). Debt does not seem to play a significant role on average. Leverage ratios (defined as the ratio between total financial liabilities and total wealth) are very low, about 5 percent on average for the whole sample. Even considering only household with debt outstanding the magnitude remains reasonable: the leverage ratio for indebted Italian households belonging to the first wealth quintile is the highest, but it is still lower than 40 percent.

The graph presented in FIGURE I.11 can be very helpful as a comparison tool with the American situation, but caution is required. The results of the examination of the net worth distribution presented by Mian and Sufi most likely exclude renters (or non-homeowners in general), which make up most of the first quintile in our breakdown. To be able to compare the results, we must exclude this category of households. We present the results for homeowners only in FIGURE I.12. As expected, the share of real wealth increases drastically for the two lowest quintiles of the wealth distribution, and the overall shape of the graph is in some ways similar to the one relative to the American situation presented at the start of this chapter, in FIGURE I.1. There are two very important differences, though. First, real assets play a much more prominent role in Italy with respect to the United States, and that is true for homeowners belonging to any fraction of the wealth distribution. Keeping in mind that financial assets are generally underreported in Italian surveys, the difference in the wealth composition between the richest shares of population for the two countries is striking: real assets make up 90 percent of Italian richest homeowners' wealth, while they barely reach 20 percent in the United States. Second, debt is much more well distributed among the population, and even taking into account only the share of indebted homeowners, leverage ratios in Italy are significantly lower than in the United States.

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[19] We are omitting something important. A household's wealth can vary for two reasons: exogenous variations in the value of assets, which are the ones we are interested in, and endogenous variations in the amount of wealth the household holds. A reduction in wealth driven by falling house prices obviously has very different consequences with respect to a reduction caused by a higher than average use of bank deposits.
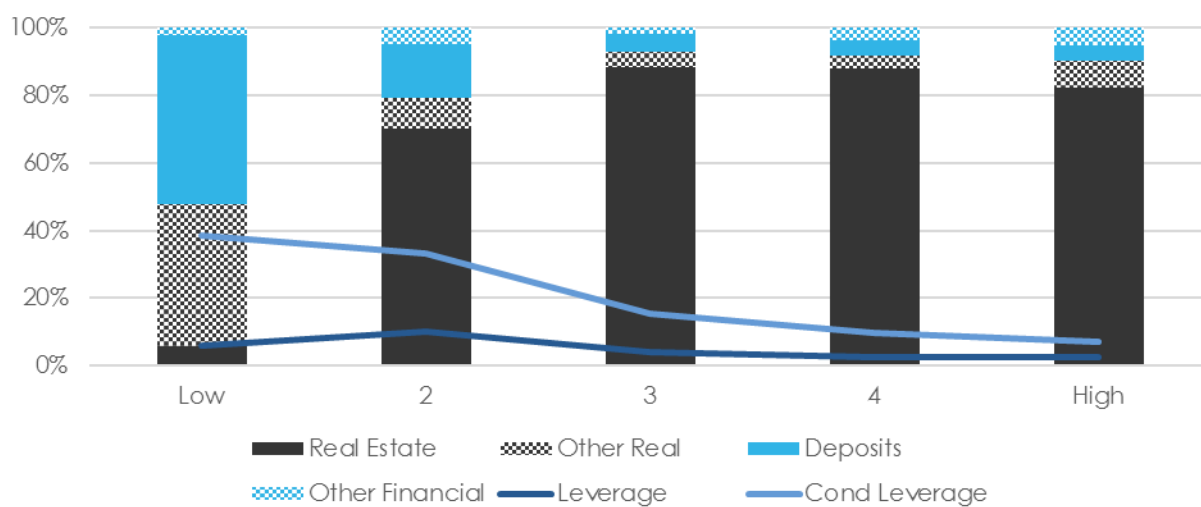
FIGURE I.11 – Wealth Composition and Leverage Ratio of Italian Households in 2010
by Net Wealth Quintiles
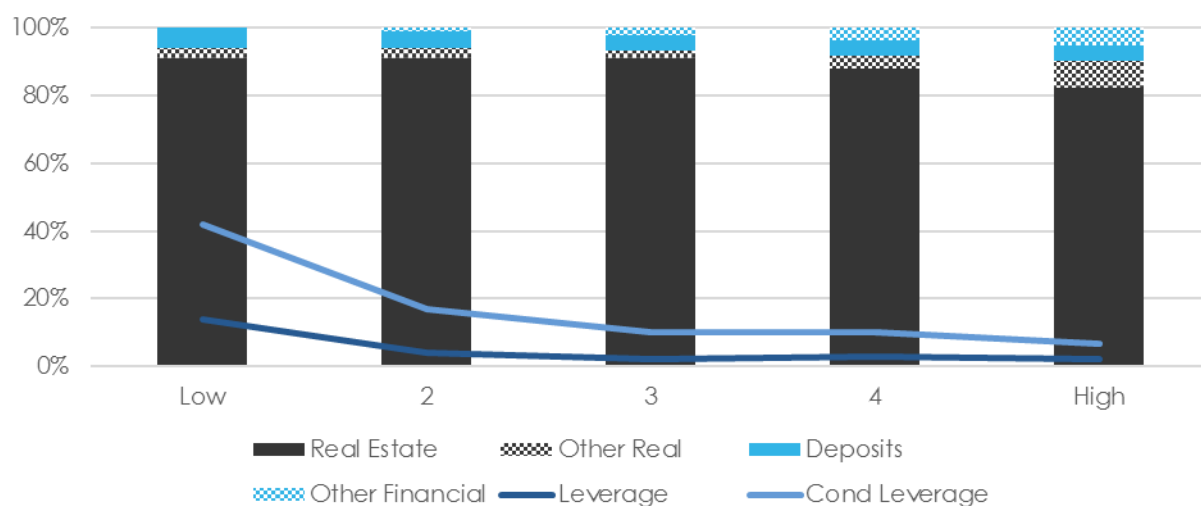
FIGURE I.12 – Wealth Composition and Leverage Ratio of Italian Homeowners in 2010
by Net Wealth Quintiles

I.4.1 – *Private Debt and Housing Wealth in Italy*

Let us take another look at FIGURE I.12. The large difference between unconditional and conditional debt ratios reveals and additional piece of information: only a small share of the Italian population reported a positive value for financial liabilities. Looking at SHIW data, in 2008, only 27.2 percent of Italian families had debt outstanding and the share of indebted households has been progressively decreasing since then (down to 23 percent in 2014). The trend mainly reflects a contraction in the utilization of consumer credit, and to a lesser extent a reduction in housing loans. The share of Italian families with outstanding consumer debt went from 16.5 percent in 2008 to 10.5 percent in 2014, while the share of Italian families with outstanding house loans dropped by 1.5 percent over the same period. The evolution clearly reflects the tightening of credit requirements during the recession. Focusing on different classes of households, we find out that most of the debtors belong to the highest quintiles of the wealth and income distributions (about 30 percent of households belonging to the wealthiest class and 40 percent of households belonging to the top income quintile reported positive financial liabilities), are aged between 35 and 55 and are well educated, having obtained at least a high school diploma[20].

The data reported above are even more indicative when considering that the share of indebted households in the United States exceeded 60 percent, and that was in 2013, after the mortgage market apocalypse of 2008-2009. One might believe that the comparison is unfair; it is well-known that the United States are the most financially-developed economy in the world, so the differences between Italy and the United States in households' loan financing behavior might be due to specific characteristics of the American system. Further cross-country comparison proves this is not the case: in Spain one half of the households have debt outstanding, and the shares for Germany and France are between 46 and 49 percent; the Euro Area average is around 45 percent[21]. Indeed, when compared to the other western European countries, Italy stands out as the country with the least amount of debtors. The results are similar when analyzing one of the most common debt indicators, the debt-to-income (DtY) ratio. FIGURE I.13 has been generated through Eurostat software and shows the average DtY ratios for the main European countries by grouping them in four different groups, to which it associates different colors. (refer to the legend below FIGURE I.13). Italy belongs to the second group from the bottom, together with France. It is worth noting that the first group does not include any Western-Europe country. A more detailed breakdown for the main European economies is provided in FIGURE I.14, which also shows the dynamics of the DtY ratio between 2004 and 2012. Italian DtY ratio has been steadily growing, showing a 50 percent increase over the period considered and reaching 60 percent, but remains well below that of other western countries such as Spain, France, Germany and the UK and the Euro Area average (about 100 percent).

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[20] The results refer to 2010.

[21] International Monetary Fund, 2013. "The financial situation of Italian households and non-financial corporations and the risks to the banking system", *IMF country reports*, December.

The results about debt are even more interesting when considering that Italian households are among the top European countries in terms of net wealth (FIGURE I.15) and that, as we have seen, their assets mainly consist of real properties. Indeed, the home ownership rate is very high in Italy, about 73 percent in 2014, compared to 65 percent for France, 63 percent for the UK and 52 percent for Germany. Spain sports a higher rate, 78 percent, but a great deal of Spaniards house purchases are financed by mortgage loans. It is a very unusual scenario and a peculiarity of the Italian market, as generally home ownership rates and the development of the private debt market go hand-in-hand. Gusio and Jappelli (2002) provide a powerful intuition for solving the apparent paradox, underlining the importance of gifts, bequests and financial support from friends and relatives as a substitute for a developed mortgage market. Indeed, received transfers represent an important share of the net wealth held by Italian households, with estimates ranging from 30 to 55 percent[22]. But the underdevelopment of the mortgage market is not to be completely attributed to cultural reasons. A regulation that greatly favored borrowers, the length and cost of the loan recovery process and difficulties in foreclosing played a major role and led to a very prudent environment with tight capital requirements, as shown in FIGURE I.16 in terms of first-buyer loan to value requirements (the higher the ratio, the lower the collateral required for a mortgage). It is enough to consider that, in 2003, it took lenders about 48 months to foreclose a mortgage in Italy, compared to 9 months in the United States and 25 months in the Euro Area (FIGURE I.17).

We used the term "underdeveloped" to describe the state of the Italian private debt market, which comes with a sort of negative connotation. Summing up the evidence of this chapter, though, it is easy to understand that the wide-spread diffusion of unleveraged wealth prevented the scenario described by Mian and Sufi's levered losses theory from happening in Italy, with even more severe consequences for the overall economy. The lack of a major aggregate rationale does not mean, though, that the contraction of the housing market did not play a role for individual households, or at least for a part of them. To understand how, we now move on to the estimation of the housing wealth effect.

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[22] Cannari L. & D'Alessio G., 2008. "Intergenerational transfers in Italy", *BI research papers*, June 16.
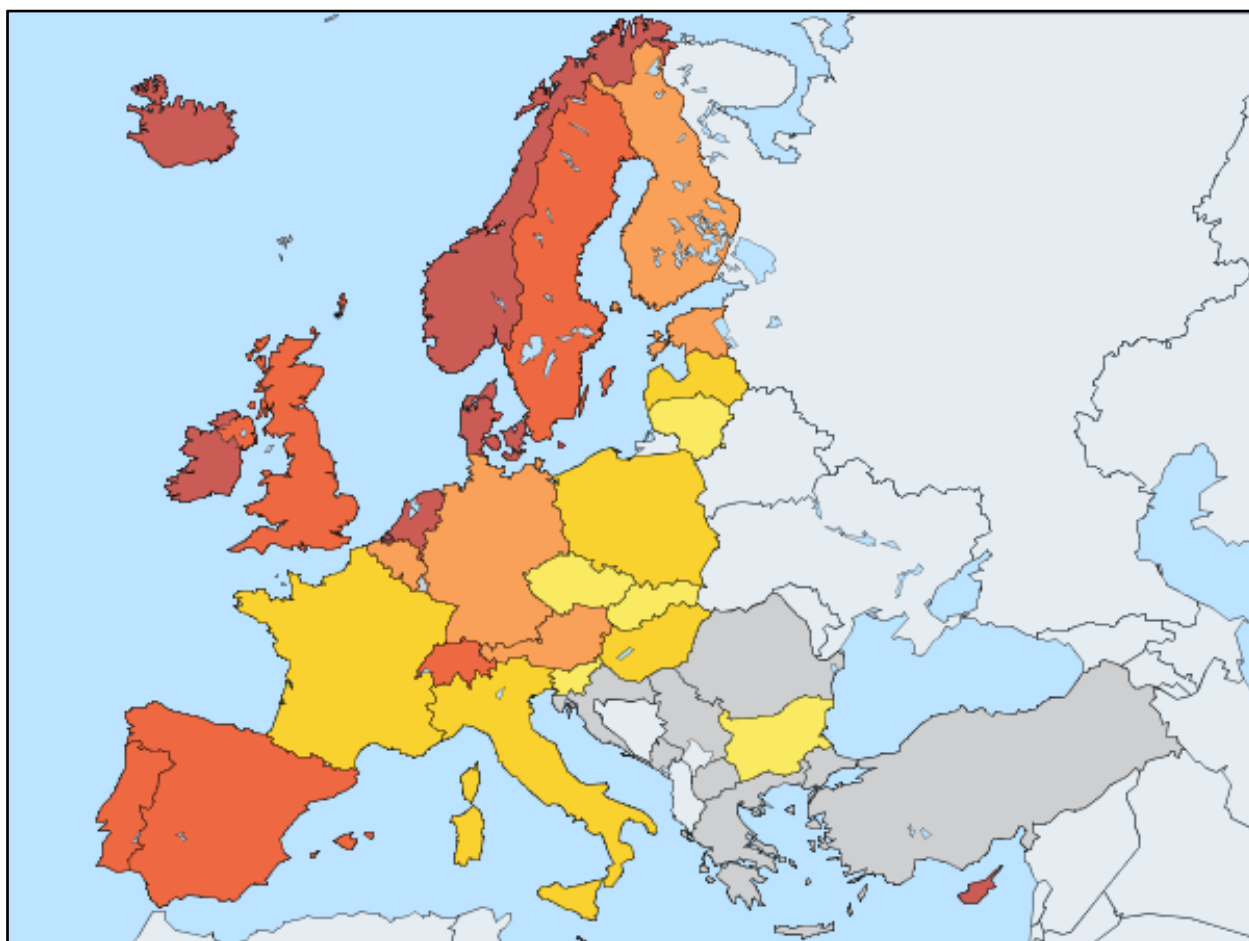
FIGURE I.13 – Debt to Income Ratio
A Comparison among European Union Member States
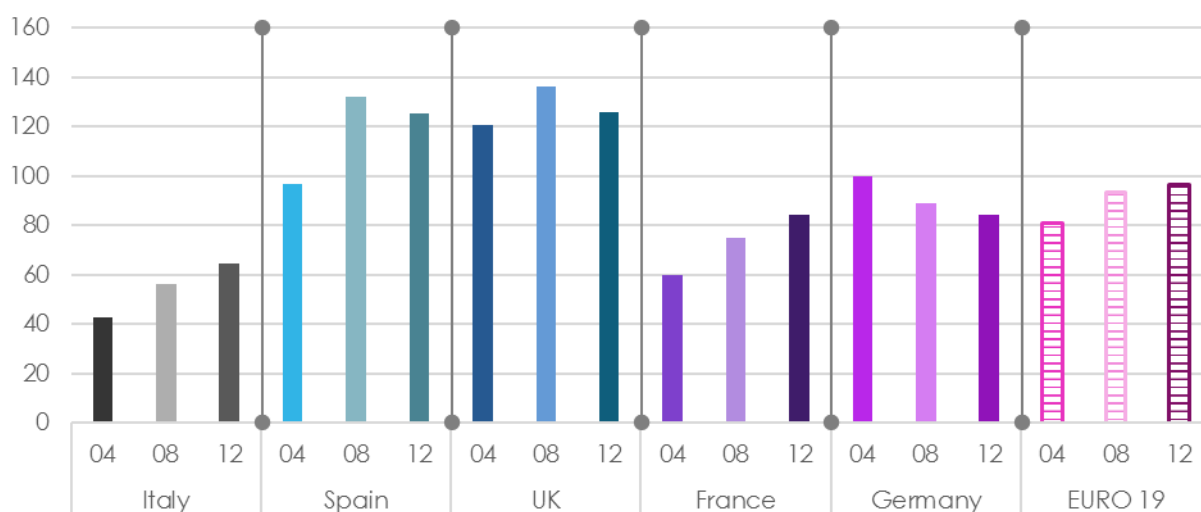
FIGURE I.14 – Evolution of the Debt to Income Ratio
For Selected European Countries
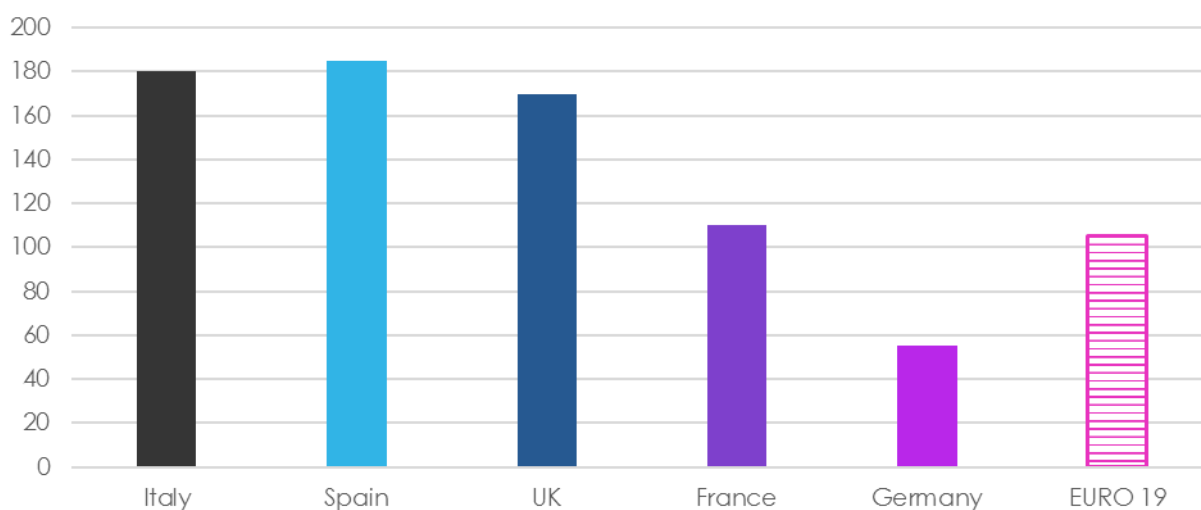
FIGURE I.15 – Median Household Wealth
For Selected European Countries

Top figure: data from Eurostat, percentage values.
Bottom figure: data from ECB, € thousands. Reference years: Italy – 2009, Spain – 2007, France – 2009, Germany – 2009. Data for UK is from Wealth in Great Britain Wave 4, 2012 to 2014, converted at 1.2008 GBP/EUR (12/31/13)
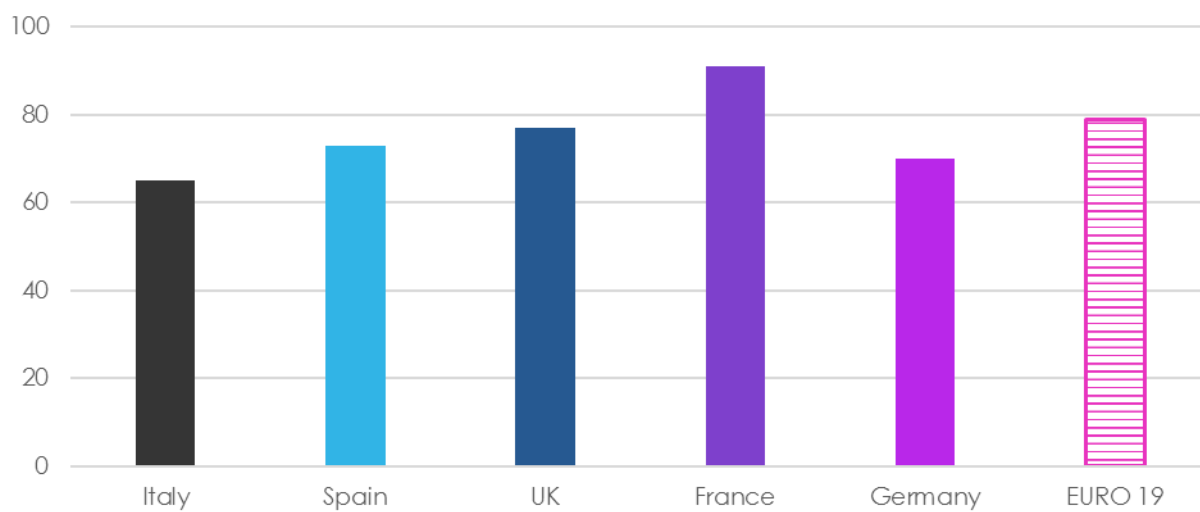
FIGURE I.16 – First-buyer Loan to Value Ratio
For Selected European Countries
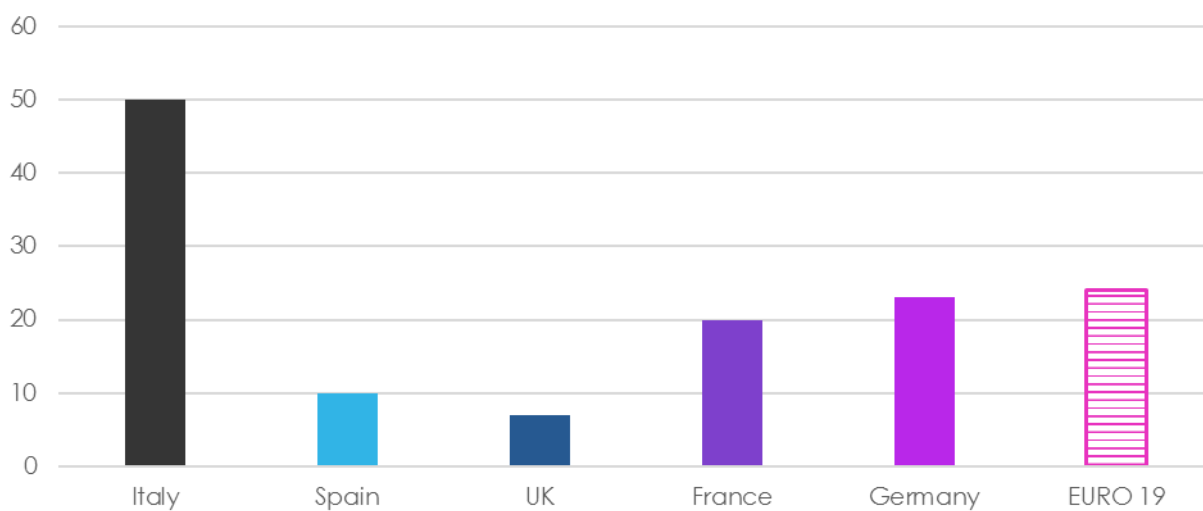
FIGURE I.17 – Average Duration of a Foreclosure Procedure
For Selected European Countries

Top figure: Data from ECB, percentage values.
Bottom figure: data from ECB, months.

Chapter II – Data Overview

Both the statistical considerations of the previous chapter and the responsivity analyses that will be the topic of Chapter III and Chapter IV are based on data from the Survey of Households Income and Wealth (SHIW), published by Banca d'Italia. The SHIW was begun in the 1960s to gather data on the incomes and savings of Italian households. The structure of the survey has evolved over the years and now includes wealth and other important aspects of households' economic and financial behavior, such as expenditure on durables and non-durables, value of the properties owned, and financial debt. It is carried out every two years and it is a representative sample of Italian households. Up to 1897, the survey was conducted with time-independent cross-sections of households. Since then, and in order to facilitate phenomena investigations, part of the sample has included households interviewed in the previous surveys (panel households). In order to better align some socio-demographic distributions with the corresponding distributions developed by ISTAT's Population Statistics and Labor Force Survey, the SHIW also includes a set of sampling weights. Each sample comprises about 8,000 households, or 20,000 individuals, distributed over about 300 Italian municipalities. Lastly, data from SHIW are also distributed as part of harmonized international datasets, such as European Central Bank's Eurosystem's Household Finance and Consumption Survey and Luxemburg Income and Wealth Studies.

II.1 – *SHIW Sample Design, Data Collection and Survey Weights*

Samples for the SHIW are drawn in two stages, with municipalities and households being the primary and the secondary sampling units. Prior to being selected, the primary units are stratified by region and population size and then, within each stratum, the municipalities in which interviews are to be conducted are selected to include all those with more than 40,000 inhabitants and those with panel households, while less populous towns are selected with probabilities proportional to their size. Individual households are then selected randomly[23].

The questionnaire is constructed in a modular way: it is composed of a general part that addresses aspects relevant to all households, and a series of subsections containing questions relevant to specific households. About 80 percent of total interviews are collected with the aid of computers, the rest are conducted using paper-based questionnaires. Each interview lasts, on average, 55 minutes. Missing answers are imputed and the values to assign are estimated through regression models. Those are built in such a way that the resulting values do not alter then mean and the variance of the data actually measured. As individuals are guaranteed complete anonymity, some information, such as the city of residence, are not disclosed.

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[23] Banca d'Italia, 2010. "Household income and wealth in 2008", *BI supplementi al bollettino statistico*, April 14.

While each actual interviewed sample is composed of about 8,000 households, many more were contacted. Participation rate varies through time but generally hovers between 40 and 60 percent, meaning that 13,000 to 20,000 households are contacted for each survey. The most common reason for non-participation is unwillingness on the part of the household, while a residual component is made up of people who could not be contacted by telephone and were not at home when the interviewers called[24]. Non-participation poses a serious issue in statistical surveys because it can lead to selectivity bias, as uncooperative agents might not be randomly distributed. In addition to that, many other factors might influence the reliability and representativeness of the sample. Reluctance of households to report their sources of income or the assets they own is a major issue and it is very difficult to handle, and memory or knowledge-based questions may also result in lower quality replies.

Our main objective is to use the SHIW to estimate average values at the household level, as we did in Chapter I, and regression parameters. As units included in our sample have, as argued above, unequal probability of selection, we correct for this possible source of bias by using survey weights. Survey weights are provided by Banca d'Italia and are constructed through a complex procedure: first of all, each observation is weighted using the inverse of the sampling fraction (design weight), then it is adjusted for the non-response mechanism and modified to take into account of the panel component and, lastly, it is calibrated using additional information coming from external surveys[25]. For statistical analysis, the survey weight is used to obtain unbiased estimates through the Horvitz-Thompson estimator, given by:

$$y^* = \frac{\sum_h \sum_j \sum_i y_{hji} w_{hji}}{\sum_h \sum_j \sum_i w_{hji}} \tag{II.1}$$

Where y_{hji} is the value of y observed for household i interviewed in municipality j belonging to stratum i, while w_{hji} is its survey weight. Banca d'Italia suggests to use survey weights both in descriptive statistics and in regression analysis. In the first case, weights neutralize the effects of over/under-sampling, imperfect coverage and non-response, and in the second case they provide design-unbiased parameters that are robust to model misspecification.

II.2 – *Advantages of Panel Data*

Our goal is to study households' consumption behavior during the crisis. The descriptive analysis carried out in Chapter I showed that different categories of households were hit by different shocks in wealth and income and had different responses in terms of consumption. As it was based on unbalanced aggregates, the analysis does not provide information regarding individual (in the sense of household-level)

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[24] Interviewers usually call three times, on different days and at different times.
[25] Faiella I., 2008. "Accounting for sampling design in the SHIW", *BI working papers*, April 28.

responsiveness to shocks in resources. How did household consumption react to variations in income? Did it react to variations in wealth, given the characteristics of Italian market? If so, how? Those are the questions we are interested in. In order to try answering them, we will build a dataset of household-level observations and will construct a model aimed to estimate the marginal propensities to consume out of income and wealth. In addition to that, we will check for heterogeneity between different classes of households. This is an important topic for a number of reasons: first of all, it provides an insight about the degree of exposition of households to different kind of shocks, just like enterprises are more or less exposed to different kind of risks; secondly, it helps us to understand how and why shocks impact the economy as a whole; and lastly, it may result in a useful tool to fight the negative consequences of unexpected shocks, as it can help redirecting policy measures to the most vulnerable classes of households.

Consumption-related studies generally use aggregate time-series data to estimate marginal propensities. While time-series are widely available, the main drawback of this method is that changes in house price index or stock market index (housing wealth and financial wealth are the main components of total household wealth) are most likely correlated with other changes in the rest of the economy. For example, house prices are strongly related to general economic conditions, which also affects wages and households' income and consumption. In a similar way, stock prices are meant to reflect future profitability of enterprises and if profitability is driven by productivity gains, then those will be reflected, at least in part and at some point in the future, in higher expected wages, which tend to increase current consumption[26]. Needless to say, heterogeneity between household is not considered when looking at aggregate data and the models are based on the "representative agent" assumption.

The most common approach to micro-data revolves around the construction of cohorts. Borrowing from the Handbook of Macroeconomics, we refer to this method as the repeated cross-section approach[27]. It is a technique where households are sorted in different years either into percentiles of consumption, income or wealth distributions or according to some observable characteristic such as the year-of-birth of the household head or the geographical area where the household lives. These cohorts are then compared and studied over time to get insight and clues on individual behaviors. This methodology is sometimes also referred to as "unbalanced" panel data. The advantages of micro-level panel data have been described by Hsiao (2006). According to him, this kind of data offer more accurate inference of model parameters with respect to single cross-sectional or time-series data, thanks to more degrees of freedom and more in-sample variability. In addition, they are characterized by a greater capacity for capturing the complexity of human behavior, as it is possible to test for more complicated behavioral hypothesis and to control for omitted

[26] Grant C. & Peltonen T., 2008. "Housing and equity wealth effects of Italian households", *ECB working paper series,* January

[27] Mian A. & Sufi A., 2015. "Who bears the cost of recessions? The role of house prices and household debt", *Preliminary chapter for the Handbook of Macroeconomics: Volume 2*, April.

variables. Last but not least, panel data can provide micro foundations for aggregate data analysis. As we have seen, aggregate data analysis often relies on the "representative agent" assumption, however, if micro units are heterogeneous, not only can the time series properties of aggregate data be very different from those of micro-data, but policy evaluation based on the former may be grossly misleading. Panel data is the perfect tool to investigate potential heterogeneity[28]. Truth be told, in the above mentioned work, Hsiao was not referring to repeated cross-sections but rather to "pure" or "balanced" panel data. Considering N individuals over T time periods, pure panel data study is based on datasets built observing the exact same N individuals over T time periods, rather than requiring the construction of cohorts. While we can partly extend his considerations to unbalanced samples, cohorts-based models present noteworthy drawbacks. The crucial point is that the same cohorts across years are not based on the same individuals. Some households might move from a cohort to another over time, and others might simply be rotated out. Moreover, just like aggregate data imply no heterogeneity inside the population, cohorts may hide differences in households' balance sheets, portfolios or tastes. Lastly, bad grouping might smooth differences across the population: if, for example, there is a large degree of heterogeneity across individuals but low heterogeneity across cohort averages, then the analysis would have no variations to exploit. Indeed, researchers resort to the repeated cross-sectional approach for practical reasons, as only a few of existing datasets on consumption, income and wealth cover a panel of individuals, or households, that can be tracked over an extended period of time.

As our analysis will look at relatively short time-horizons, and having such a powerful tool as the SHIW at hand, we are able to construct a truly balanced head-to-head dataset. Our sample will include the same households in different periods and we will be searching for the marginal propensity to consume and its heterogeneity by sorting on ex-ante characteristics such as age, initial level of wealth and initial level of income[29]. That being said, our data too present some limitations. First, it may suffer of all the sampling-related issues highlighted in the previous section, even after taking into consideration survey weights. Indeed, many researches show that SHIW data are not very accurate for wealthier households and that wealth components, especially financial assets and liabilities[30] and secondary dwellings[31], are often underreported. As for income, it has been shown that misreporting is particularly severe for income from self-employment, financial assets and secondary jobs[32]. Second, the SHIW is only conducted every two

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[28] Hsiao C., 2006. "Panel data analysis – Advantages and challenges", *IEPR working papers*, May.

[29] Our approach is very close to the "ex-ante" approach described in the Handbooks of Macroeconomics. This is not the only way to exploit balanced micro-data. The same source describes an "in-period" approach, according to which individuals are sorted by contemporaneous shocks as, for example, becoming unemployed during the period in scope.

[30] D'Alessio G. & Neri A., 2015. "Income and wealth sample estimates consistent with macro aggregates: some experiments", *BI occasional papers*, June.

[31] Cannari L. & Faiella I., 2008. "House prices and housing wealth in Italy", *BI working papers*, June 16.

[32] Neri A. & Zizza R., 2010. "Income reporting behavior in the SHIW", *BI working papers*, August.

years and the panel component changes with every iteration, making it difficult to follow the same households for more than two consecutive surveys. Similar issues have been brought up with respect to the Consumer Expenditure Survey (CEX) and the Panel Study of Income Dynamics (PSID), the two most commonly used survey-based databases for similar studies in the United States.

II.3 – *Capturing the Recession*

As we have seen in the previous chapter, the recession in Italy was particularly long and severe. Even though Mian and Sufi (2014) show that the reduction in consumption was already underway in 2007, the recession in the United States formally lasted twelve months, from the third quarter of 2008 to the end of the second quarter of 2009; in Italy, instead, the double-dip phenomenon ranged from the third quarter of 2008 to the third quarter of 2009 and from the third quarter of 2011 to the third quarter of 2014, for a total of forty-two months.

We are interested in household behavior during the recession, but in order to build our dataset we have to consider that the SHIW is conducted every two years, so we basically do not have surveys for the odd years and that the panel component of the SHIW partially changes with every resampling and the number of households interviewed for more than two consecutive times is very limited. In order to build a balanced panel, while at the same time maintaining a relatively large sample size, we have to compromise. As an additional consideration, it is worth mentioning that SHIW interviews are conducted between March and July of the year following the one they refer to. This implies that some answers may not be perfectly aligned with the timing of the surveys. For example, questions such as *"In your opinion, how much is your house/flat worth (unoccupied) […]"* are more likely to be answered in relation to the day of the interview, rather than referring to the first days of the year. All considered, we think it is best to build two different datasets. The first one will be based on the 2006 and 2008 surveys, thus spanning from January 1 2007 to January 1 2009, and the second will be based on the 2010 and 2012 surveys, including data for January 1 2011 and January 1 2013. While we lose some information, most notably the second part of the sovereign debt crisis, this breakdown allows us to keep about 4,000 observations for each sample (before any adjustments are made) and comes with added benefits: first, it allows us to make a comparison of consumer behavior in the two phases of the recession; second, it rules out almost completely the 2010 recovery period. Existing SHIW-based researches, such as Rodano and Rondinelli (2014), refer to the same surveys when looking distinctly at the effects of the global financial crisis and the sovereign debt crisis.

FIGURE II.1 shows the positon of our datasets with respect to the recessions. The red dashes represent the horizons covered by the surveys we selected, taking into account the timing of the interviews, while the grey areas indicate, as usual, recession periods. Moreover, FIGURE II.2 highlights our selections with respect to overall SHIW samples.
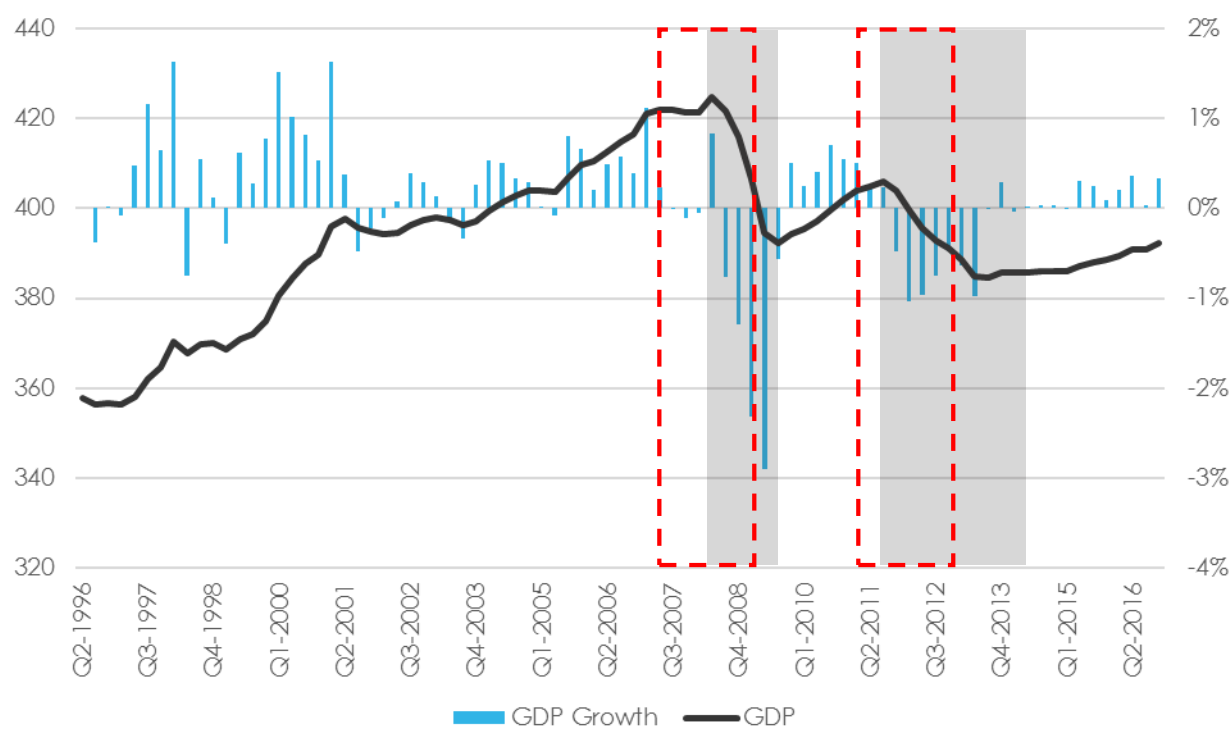
FIGURE II.1 – Defining Time Periods for the Datasets
Trying to Capture GDP Contractions

Data from ISTAT. LHS: GDP quarterly values expressed in € bn, seasonally adjusted, chain linked with respect to 2010. RHS: GDP growth rate. Gray areas indicate recessions; red dashes delimitate the time periods covered by our datasets.

Anno della prima partecipazione all'indagine	Anno di rilevazione													
	1987	1989	1991	1993	1995	1998	2000	2002	2004	2006	2008	2010	2012	2014
1987	8.027	1.206	350	173	126	85	61	44	33	30	28	23	21	13
1989		7.068	1.837	877	701	459	343	263	197	159	146	123	102	64
1991			6.001	2.420	1.752	1.169	832	613	464	393	347	293	244	166
1993				4.619	1.066	583	399	270	199	157	141	124	106	78
1995					4.490	373	245	177	117	101	84	75	62	46
1998						4.478	1.993	1.224	845	636	538	450	380	267
2000							4.128	1.014	667	475	398	330	256	170
2002								4.406	1.082	672	525	416	340	221
2004									4.408	1.334	995	786	631	395
2006										3.811	1.143	856	648	414
2008											3.632	1.145	806	481
2010												3.330	1.015	579
2012													3.540	1565
2014														3697
Numerosità campionaria	8.027	8.274	8.188	8.089	8.135	7.147	8.001	8.011	8.012	7.768	7.977	7.951	8.151	8.156
Quota delle famiglie panel		14,6	26,7	42,9	44,8	37,3	48,4	45,0	45,0	50,9	54,4	58,1	56,6	54,7

FIGURE II.2 – Building a Balanced Panel
Isolating Repeated Observations

Table from the Survey of Household Income and Wealth of 2014. Each column shows the total number of observations for different surveys and each line highlights the number of observations that are repeated through surveys from their first participation. Red dashes show the observations we are interested in: for our first dataset we need those households who were both in the 2006 and the 2008 surveys, and the same reasoning applies to the 2010 to 2012 period.

II.4 – *Identification of the Effects*

SHIW questionnaires contain hundreds of questions and each answer makes up a variable that can be studied and analyzed. We are interested in the sections regarding household expenditure, income and wealth, in addition to reported data regarding the composition and socio-demographic characteristics of households, that will be used as controls. Up to now, we talked about estimating the marginal propensity to consume out of income and the marginal propensity to consume out of wealth, but those general definitions do not properly describe what we will be looking for. Let us better define the variables we are interested in.

II.4.1 – *Dependent Variable and Main Regressors*

Consumption can be split into two categories: durable consumption and non-durable consumption. While the previously cited work by Mian, Rao and Sufi (2013) focuses on durables, autos in particular, we will base our considerations on everyday spending. As noted by Kaplan et al. (2016), most macroeconomic models are in fact specified in terms of non-durable consumption and so the most useful responsivity analysis, if one wants to compare the results, is the one with respect to this kind of spending[33]. Moreover, Grant and Peltonen (2008) argue that between SHIW iterations, purchases of durable goods would be considered as saving, not consumption, as only a small part of the services rendered by a durable good is consumed between survey years. That said, our consumption variable, c_i, will be constructed as the sum of households yearly spending on condominium (including heating), electricity, water, telephone (land line, mobile, internet), gas (if not included in condominium), transport (fuel, bus, tram, metro tickets and subscription, taxis, parking), clothing and footwear, education, leisure, culture, gaming, medical expenses and tobacco, with the addition of rentals (actual or imputed), and expenses for vacations or holydays.

Income comes from a variety of sources and can be generally defined as the sum of payroll income, pensions and net transfers, self-employment income, property income and income from financial assets. Simplifying, we can distinguish between labor income and capital income. In studying consumption, it is important to maintain a distinction between those two forms of income; capital income is the result of previous investment decisions, and is therefore partly determined by consumption choices. As we want to assume that independent variables are outside the control of households, we will only focus on labor income. While this trivializes the treatment of labor supply, the assumption is common in theory and allows us to focus on unexpected shocks to income[34]. Capital income, on the other side, depends on the asset and portfolio choice of the consumer, and is therefore at least partly under the household's control. Income, y_i, will then be the sum of net wages and salaries, fringe benefits, pensions and arrears, other transfers (such as financial assistance and gifts) and self-employment income.

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[33] Kaplan G. et al., 2016. "Non-durable consumption and housing net worth in the great recession: evidence from easily accessible data", *NBER working papers*, April 30.
[34] See Deaton A., 1992. *"Understanding Consumption"*, Oxford: Clarendon Press.

While corrections for consumption and income are relatively minor, more careful considerations must be made with respect to our definition of wealth. Wealth is commonly considered the sum of two components: real assets and financial assets[35]. Real assets are in turn made up of real estate, business equity and other valuables, while financials are comprised of deposits, government bonds, equities and trade credit or credit from other households. First of all, in this research we are ignoring financial wealth. While considerations could be made regarding the previously mentioned reporting biases, we must admit that this is a drawback of our study. Nonetheless, we are following the approach proposed by Mian, Rao and Sufi (2013) and many others and our main interest is to understand whether households' consumption decisions are influenced by the value of their houses, and to which degree. In order to do so, we build our housing wealth variable, HW_i, by extracting the value of the primary residence from real estate wealth. We must make sure that variations in the value of housing are not determined by variations in households' portfolio allocations, in other words we have to be sure that we are not considering households who changed their primary residence between surveys. To do so, we control for the year the house was purchased, allowing for a certain degree of variability to account for human errors. We are generally interested in net housing wealth, which we obtain by subtracting to the self-reported value of housing the value of home mortgages. To get an idea of the effect of house price variations for renter households, whose real estate wealth, by definition, does not include primary residence, we will be using the self-repotted value for the house the household is living in, whether owned or not.

II.4.2 – Control Variables and Household Groups

In addition to the main variables described above, our model will include a set of household characteristics that affect tastes and might hence shift consumption. Those are taken from existing literature and most of them refer to ex-ante characteristics of the household head, while one controls for in-period variations in the size of the households[36]. The remaining ex-ante controls are: the age of the household head; the level of education of the household head, differentiating between junior high school (or lower education) level, high school level and university (or higher education) level; the geographical area in which the household lives, differentiating between northern Italy, middle Italy and southern Italy; the sex of the household head; and the marital status of the household head, differentiating between married and non-married. All of them can be easily derived from the first section of the SHIW questionnaire, which focuses on the composition of the households.

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[35] The definition refers to gross wealth. Net wealth, also known as "net worth", also takes into account financial liabilities.

[36] The use of this control variable was suggested by Andrea Neri, Senior Statistician at the Sample Surveys Unit of Banca d'Italia.

To study the heterogeneity of income and wealth effects among the population, we will perform multiple analysis, for both time periods, on different household sub-samples. In order to construct those groups, we used the following definitions:

Homeowner: a group of households who reported to be living in a house they own and whose resident status remained the same for two consecutive time periods. In addition, only households who had not changed their owner-occupied residence were considered.

Renter: a group of households who reported to be living in a house they do not own and to be paying a rental and whose resident status remained the same for two consecutive time periods.

Employed: a group of households who reported to be working as blue-collar worker, office worker or school teacher or manager whose working status remained the same for two consecutive time periods.

Age Group X: a group of households whose household heads reported, in the first time period, an age coherent with the age group label "X".

Wealth Group X: a group of households who reported, in the first time period, a level of household total wealth coherent with the wealth group label "X". Wealth groups are defined by weighted percentiles.

Income Group X: a group of households who reported, in the first time period, a level of household total income coherent with in the income group label "X". Income groups are defined by weighted percentiles.

All: a group of households who are either homeowners or renters (households living under other arrangements were not considered); whose working status is either employed, self-employed, unemployed or retired; and who belong in any age, wealth or income group.

In addition, the following debt-related groups were also analyzed, albeit only with respect to the 2010 to 2012 time period[37]:

Debtor: a group of households who reported, in 2010, a positive level of housing-related financial liabilities.

Credit Constrained: a group of households who answered "YES" to the 2010 SHIW question: *"Did the household contact a bank or financial company in 2010 with a view to obtaining a loan or mortgage?"* while then answering "GRANTED IN PART" or "REFUSED" to the question: *"Was the request granted in full, granted in part, or refused?"* or answered "NO" to the first question and "YES" to the question: *"During 2010, did you or a member of the household consider applying for a mortgage or a loan from a bank or financial company but later change your mind because you thought the request would be refused?"*.

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[37] We will better describe the indicators upon which those groups are built in Chapter IV.

Loan to Value Group X: a group of households who are both homeowners and debtors and who reported, in 2010, a level of house mortgage and housing wealth such that the resulting loan to value ratio resulted coherent with the loan to value group label "X".

Loan to Income Group X: a group of households who are both homeowners and debtors and who reported, in 2010, a level of house mortgage and total income such that the resulting loan to income ratio resulted coherent with the loan to income group label "X".

Debt Service Ratio Group X: a group of households who are both homeowners and debtors and who reported, in 2010, a level of debt service and total income such that the resulting debt service ratio resulted coherent with the debt service ratio group label "X".

Deposits Group X: a group of households who are homeowners and who reported, in 2010, a level of financial assets net of short-term financial liabilities coherent with the deposits group label "X". Deposits groups are defined by weighted percentiles.

Finally, irrespective of the group (or groups) they belong to, only households who reported positive values for non-durable consumption, labor income and housing wealth for both the years related to each dataset were included in the analysis. TABLE II.1, TABLE II.2 and TABLE II.3 report summary statistics related to the main variables for the "All", "Homeowner" and "Renter" groups, respectively. FIGURE II.3 and FIGURE II.4 summarize information regarding the socio-demographic composition of the two datasets.

Having described the structure of our samples and the variables we will be using, we can move on to the analysis. Chapter III will focus on income and housing wealth effects and will make use of sub-sampling in order to study heterogeneity among the population. Chapter IV will revolve around debt and its effects on households' consumption behavior.

TABLE II.1 – Summary Statistics for "All"

	2006 to 2008		2010 to 2012	
	€	%	€	%
Mean Consumption Variation	-1,103	-4.62%	-577	-2.18%
Median Consumption Variation	-1,182	-5.56%	-121	-0.15%
Mean Income Variation	-1,040	-3.74%	-2,189	-7.62%
Median Income Variation	-341	-1.46%	-2,347	-10%
Mean Housing W. Variation	-7,931	-3.60%	-32,087	-13.11%
Median Housing W. Variation	872	0.51%	-30,720	-17.33%

TABLE II.2 – Summary Statistics for "Homeowner"

	2006 to 2008		2010 to 2012	
	€	%	€	%
Mean Consumption Variation	-1,114	-4.43%	-543	-1.95%
Median Consumption Variation	-1,251	-5.56%	-104	-0.43%
Mean Income Variation	-915	-3.17%	-1,998	-6.69%
Median Income Variation	-318	-1.30%	-2,516	-10.04%
Mean Housing W. Variation	-6,855	-2.91%	-33,921	-14.09%
Median Housing W. Variation	-286	-0.15%	-31,879	-16.09%

TABLE II.3 – Summary Statistics for "Renter"

	2006 to 2008		2010 to 2012	
	€	%	€	%
Mean Consumption Variation	-692	-3.91%	18	0.00%
Median Consumption Variation	-536	-3.26%	-135	-0.78%
Mean Income Variation	-1,360	-5.97%	-2,273	-10.69%
Median Income Variation	-1,450	-7.72%	-1,905	-10.39%
Mean Housing Variation*	-8,885	-6.09%	-15,580	-9.78%
Median Housing Variation*	-6,954	-5.56%	-28,402	-20.97%

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[*] As renters do not own their house, we cannot refer to "housing wealth". Thus, variations in housing refer to variations in the value of the house the household was living in.

FIGURE II.3 – Socio-demographic Characteristics of the 2006 to 2008 Dataset
Visualizing Ex-ante Control Variables

■ Owners   ■ Renters

■ Under 45   ■ 45-55   ■ Over 55

■ Male   ■ Female

■ Married   ■ Single

■ Junior HS   ■ HS   ■ University

■ North   ■ Middle   ■ South
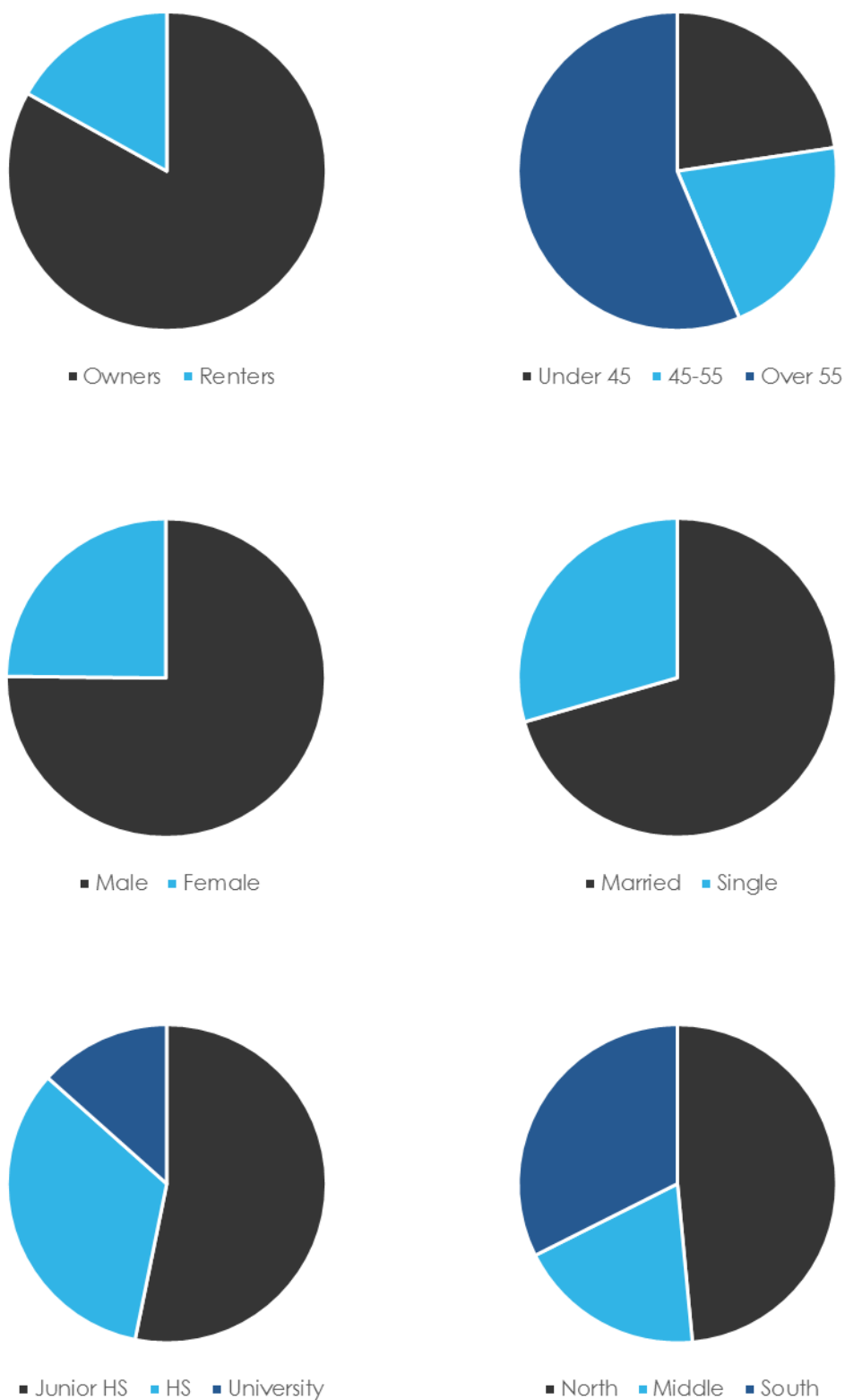
Characteristics refer to the head of the household in 2006. "Single" includes all non-marital statutes, "Junior High School" includes lower education degrees, "University" includes post-graduate degrees, "South" includes islands.

FIGURE II.4 – Socio-demographic Characteristics of the 2010 to 2012 Dataset
Visualizing Ex-ante Control Variables

■ Owners ■ Renters

■ Under 45 ■ 45-55 ■ Over 55

■ Male ■ Female

■ Married ■ Single

■ Junior HS ■ HS ■ University

■ North ■ Middle ■ South
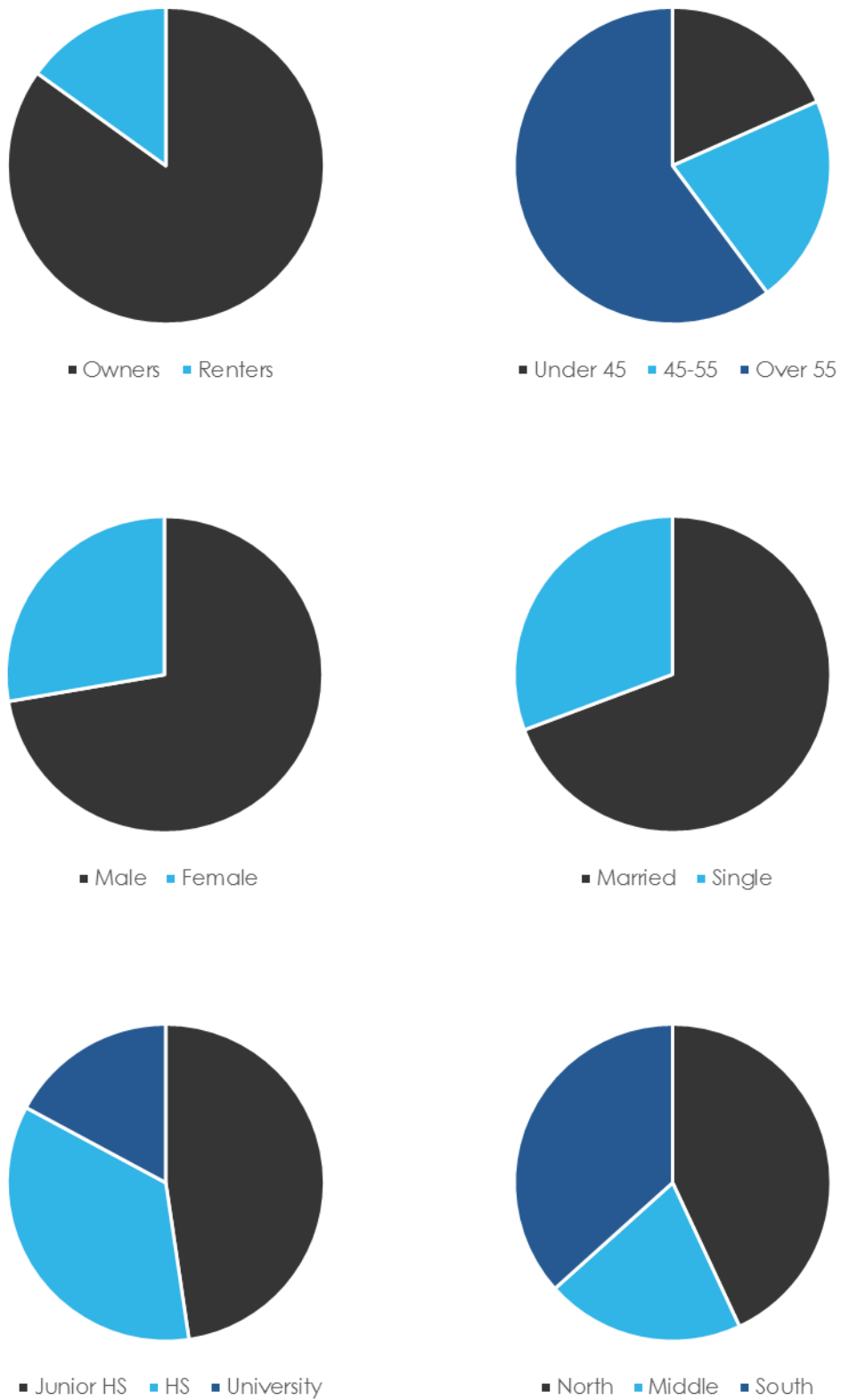
Characteristics refer to the head of the household in 2010. "Single" includes all non-marital statutes, "Junior High School" includes lower education degrees, "University" includes post-graduate degrees, "South" includes islands.

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Chapter III – The Housing Wealth Effect

Housing is the dominant component of wealth for the typical Italian household. According to Banca d'Italia[38], housing wealth accounted for 62 percent of household aggregate assets in 2012 and the ratio of total real assets to GDP has consistently been above 3 since the nineties, higher than most OECD countries[39]. Real assets accounted for more than 80 percent of the median household wealth in 2010, with an approximate value of €168k. The importance of housing wealth is not limited to Italy. In the United States, it accounts to about half the value of total household net worth on an aggregate level, and is larger than the GDP by a factor of 1.8 ($25.4tn to $14.4tn, in 2009). Balance sheet for the median American household shows that housing wealth accounts for almost two thirds of the total wealth[40]. Even though figures are lower with respect to Italy, in the United States the housing cycle has been an amazingly accurate proxy of the business cycle, to the point that some scholars started suggesting that the Federal Reserve should link its monetary policy to residential investment, rather than aggregate output[41].

III.1 – *An Unclear Rationale*

Housing wealth can influence economic activity in many ways: it can boost or dampen investments by influencing the cost of capital; it can have a direct "wealth" effect on consumption as it can impact on the confidence of economic agents and therefore increase private spending; and, last but not least, it drives the credit channel, by defining the value of collateral. At a first glance, the correlation between housing wealth and consumption might result logical and somewhat intuitive: homeowners feel rich based on their home's paper value and therefore increase consumption as housing values rise, then, when prices start falling, that wealth dissipates and consumption drops. In truth, there is much more to consider.

First of all, housing is a consumption good. For a homeowner who has been living long in the same house and that has no intention of changing his dwelling, house price compensates the implicit rental cost of living in the house. Indeed, housing comes with an opportunity cost in the form of imputed rents, i.e. the payments a household could receive if it were to rent his house to tenants. If house prices were to rise, homeowners would be missing out on higher potential rents, in times of market downturn they would be partially compensated knowing that their opportunity cost is lower. In a way, homeowners with a long expected tenure are perfectly hedged against fluctuations in house prices[42]. This is especially interesting, as it opposes

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[38] Banca d'Italia, 2014. "Household wealth in Italy", *BI supplementi al bollettino statistico*, December 16.

[39] De Bonis R. et al., 2013. "Household aggregate wealth in the main OECD countries from 1980 to 2011: what do the data tell us?", *BI occasional papers*, April.

[40] Iacovello M., 2011. "Housing wealth and consumption", *Board of Governors of the FRS international finance discussion papers*, August

[41] Leamer E., 2007. "Housing is the business cycle", *NBER working papers*, September.

[42] Sinai T. & Souleles N., 2005. "Owner-occupied housing as a hedge against rent risk", *The quarterly journal of economics*, May.

the traditional view that owning a house, given house prices volatility, is quite risky. Assuming that house prices reflect the present value of future expected rents (or imputed rents), then the variation in the value of the houses more than offsets the opposite income effect of imputed rents for homeowners. That is to say, homeowners are generally "long" in housing. Obviously, the previous reasoning excludes a significant share of households, the "short" side, consisting of renters. For renters, the total effects of house price variations are negative due to negative income and wealth effects, in the form of higher expected rental prices and, possibly, down payments, were they to purchase their own house. Clearly then, the aggregate effect of house prices on consumption is strongly linked to the distribution of homeowners and renters. But short positions are not exclusive to renters. Young homeowners might plan to increase house size as they grow up, or they might be forced to do it after getting married. Those who can afford it might simply want to move to a better, and generally more expensive, area. Those households can be thought of as short in housing. On the other side, a significant share of old households plans to move to a smaller house after retirement, or out of the city center, and so they are long in housing[43].

Secondly, as mentioned previously, house prices can affect consumption by relaxing or tightening borrowing constraints. Housing is the main form of collateral for long term financial loans, and borrowers might find themselves constrained were the house market to slow down, even if there is no direct wealth effect associated with the house price decrease. A drop in consumption would not depend on the household position with respect to housing, but on its overall financial condition with respect to lending institutions, as a weaker collateral would imply higher costs of debt, and vice versa.

Lastly, unobserved factors cannot be ruled out. It is possible that correlation between house prices and consumption might be driven by other macroeconomic factors. For example, house prices might be related to future income prospects, to which current consumption also respond for the majority of households. It is no coincidence that house prices indices are often used as a proxy for the economy as a whole. Another unobserved variable could be financial liberalization: financial markets development may drive up house prices and stimulate consumption for all agents by relaxing borrowing constraints.

III.2 – *The Model*

The aim of this research is to understand if variations in the value of housing had an effect on the consumption behavior of households during the crisis. It is important to consider that, although the general theoretical basis of consumption-related analyses is the life-cycle model, our focus is not on testing the validity of any consolidated theory; instead, we will perform an empirical study following a bottom-up approach, and our main concern lies in identifying the marginal propensities to consume out of housing wealth and, to a lesser extent, income for different types of households, in time spans characterized by a

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[43] Campbell J. & Cocco J., 2005. "How do house prices affect consumption? Evidence from microdata", *NBER working papers*, August.

contraction in the overall level of resources. Therefore, the model we use is to be interpreted as a reduced form equation.

Most studies have estimated the marginal propensity to consume out of income and wealth and have deployed models based on the Euler equation format[44]. Assuming that utility u_t is additive separable, and is discounted at rate δ, and that it is possible to lend and borrow at the same rate, the solution of the intertemporal utility maximization problem for the individual household can be written as:

$$u_t'(c_t, \omega_t) = (1 + \delta)^{-1} E_t[(1 + r_{t+1})u_t'(c_{t+1}, \omega_{t+1})] \tag{III.1}$$

Where E_t and c_t denote expectations and household consumption at time t, respectively. As usual, r_t is the interest rate and, finally, ω_t identifies a set of taste-shifters and other factors affecting the marginal utility of consumption. The equation is generally known as the Euler equation for consumption and is a more sophisticated generalization of the condition that the marginal rate of substitution should equal the asset prices. The simplest models state that the optimal level of consumption is directly proportional to total resources, which are the sum of non-human wealth, W_t, and human wealth, Y_t:

$$c_t = a_t(W_t + Y_t) \tag{III.2}$$

Where non-human wealth is real and financial capital, while human wealth is mainly current and discounted future labor income and may also include the discounted value of transfers and any other income not contingent on saving decisions, i.e. excluding capital income and imputed rents[45]. As we are interested in variations in households' housing wealth, HW_i, over a specified time horizon, we obtain the following equation for household i:

$$\Delta \ln c_i = a_0 + a_1 \Delta \ln y_i + a_2 \Delta \ln HW_i + \alpha_3 \omega_i + \varepsilon_i \tag{III.3}$$

In which we assume all the changes are unpredictable, i.e. windfall gains. Taking into consideration the datasets defined in Chapter II, deltas represent the variations of the respective measures between the relevant consecutive SHIW publications, i.e. between 2006 and 2008 and between 2010 and 2012. c_i is, as explained before, non-durable consumption. We are including labor income, y_i, as it is a fundamental component of consumption behavior and ignoring the effect of interest rates and financial wealth. While the effect of interest rates has often been found non-significant, it can be argued that financial wealth plays

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[44] Grant C. & Peltonen T., 2008. "Housing and equity wealth effects of Italian households", *ECB working paper series,* January.

[45] Carroll C., 2001. "A theory of the consumption function, with and without liquidity constraints", *NBER working papers*, July 6.

a relevant role in defining consumption behavior. There are two reasons we are excluding it from this analysis: the first is that we are focusing on the marginal propensity to consume with respect to housing wealth, whose existence and significance are still debated, and the second is that the Survey of Household Income and Wealth is not particularly reliable as far as financials are concerned[46].

We will be running different regressions using equation (III.3). In this setting, we are mainly interested in the value and significance of α_2, the coefficient that relates variation in spending to variations in housing wealth and will be our measure of marginal propensity to consume out of housing wealth. In addition to that, we will be taking in consideration also α_1, which will proxy the marginal propensity to consume out of income.

III.3 – *A Brief Overview of Consumption Theories*

We have already underlined the fundamental theoretical difference between homeowners and renters in responding to housing wealth shocks. To summarize, assuming homeowners are effectively long on housing, that is to say that house prices are assumed to reflect the present value of expected rents, then the positive wealth effect should dominate the negative income effect the negative imputed rents-related income effect for owners-occupiers and we expect their consumption to react positively to variations in the value of housing. On the contrary, for renters and especially for those willing to purchase a home later on, we expect housing wealth to be negatively correlated, or possibly uncorrelated, with current consumption. In addition to that, it is useful to recall some long-established results that will be useful to interpret our estimations.

III.3.1 – *The Life-cycle Hypothesis (Modigliani, Brumberg; 1954)*

The life-cycle hypothesis assumes that individuals or families try to maximize the utility deriving from their entire life-cycle of consumption. For each agent an increase in life-time resources lead to proportionate increases in consumption in all periods of life. As a result, consumption is proportional to lifetime resources. Thus, consumption is continuous, even if income through the life-cycle is discontinuous. Saving is done to finance consumption during retirement. While this may seem a trivial intuition, its implications are revealing. The theory formally describes how wealth of a nation gets passed around: the very young have little wealth, middle aged people have more, and wealth peaks just before retirement. From that point on, dissaving occurs and elders sell off their assets to provide for current consumption goods. The buying side of the trade is made up of young people, who are still accumulating resources. The life-cycle hypothesis is the cornerstone of modern consumption theory. It switches the focus from the Keynesian view that current consumption expenditures are determined mainly by current disposable income, in favor of a setting in which agents' behavior is driven by the desire to smooth consumption over the entire life span. Angus

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[46] D'Aurizio L. et al., 2007. "The under-reporting of households' financial assets in Italy", *BI temi di discussione del servizio studi*, July 5.

Deaton, who was awarded the Nobel Prize in Economic Sciences in 2015, summarized in a few words the weight of the life-cycle hypothesis:

"Once upon a time, before we had quite the high status that we enjoy today, it was common for economists to be harassed by scientists (high status of yesterday) who wanted to know whether we had ever come up with anything that was neither trivial nor obvious. Such questions were asked in the clear expectation that the answer would be no, or would be so unsatisfactory as to lead quickly to that conclusion. When faced with such a challenge, I would always talk about Franco Modigliani and his life-cycle theory of saving."

Angus Deaton, 2005[47]

According to Modigliani himself, the basic version of the life-cycle model is based on the following assumptions: income is constant until retirement, zero thereafter; zero interest rate and no borrowing constraints; preference for constant consumption over the life cycle; absence of bequests. Relaxing the assumption on income by adding an expectation of income growth during the working years, we obtain a situation in which individuals start off with negative saving, meaning they consume more than they earn, either because they have a positive level of initial wealth or because they borrow, and gradually increase their savings and build up wealth up to retirement. In this setting, rational agents have no reason to die with any asset left and so they are motivated to dissave to keep their level of consumption in line with their quality of life expectations[48].

Implicit in the life-cycle approach is the idea of a lifetime budget constraint that links consumption at various stages during the lifetime. The slope of such budget constraint is determined by the interest rate, r, at which agents lend and borrow. This is clear from equation (III.1): assuming no uncertainty, δ equal zero and rearranging terms, we obtain:

$$\frac{u_t'(c_t, \omega_t)}{u_t'(c_{t+1}, \omega_{t+1})} = (1 + r_{t+1}) \qquad (III.4)$$

The position of the budget constraint depends on the present value of lifetime resources[49]. Assuming a constant interest rate, we get:

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[47] Deaton A., 2005. "Franco Modigliani and the life cycle theory of consumption", *Princeton University*, March.
[48] Baranzini M., 2005. "Modigliani's life-cycle theory of savings fifty years later", *Lugano University,* June.
[49] See Parker J., 2010. *"Economics 314 Coursebook"*, Portland: Reed College.

$$R_t = W_t + \sum_{s=t}^{T} \frac{Y_s}{(1+r)^s} \qquad \text{(III.5)}$$

Where R_t is the stock of resources at time t and, as before, W_t, and Y_t are non-human and human wealth, or income, respectively.

III.3.2 – *The Permanent Income Hypothesis (Friedman; 1957)*

While Modigliani focused on the relationship between age, saving and wealth creation, Friedman was more concerned with the dynamic behavior of consumption, especially in the short term, and in relation to income[50]. In the life-cycle hypothesis consumption is determined by the value of lifetime resources, the permanent-income hypothesis argues that consumption behavior is determined by permanent-income, typically defined as average income over the life span.

The intuitive results of Friedman's hypothesis, not initially backed up by a formal mathematical model, were often rejected during the 1970s and 1980s in favor of an alternative hypothesis in which households simply spent most of their current income. Modern research shows instead that when there is meaningful uncertainty in future labor income, the behavior of consumers is well described by the permanent-income hypothesis[51]. It is essential to consider that Friedman asserted that his vision of the model implied a marginal propensity to consume out of windfall shocks of about 0.3 and that permanent-income had to be empirically defined as a mean of the expected level of income in the very near term. Households adopt a very short planning horizon, summarized in a "subjective discount rate" for future income of 0.33[52], this because capital markets are imperfect and it is difficult to borrow against very distant income. Basically, Friedman's intent was to prove that the marginal propensity to consume out of current income is much less than one, to discredit the Keynesian models, rather than to state that it is significantly equal to zero.

Both the life-cycle and the permanent-income models focused on consumption smoothing and were aimed to replace the perception that people had a marginal propensity to consume tied to current income. If permanent income is taken to be the annuity value of lifetime resources (including non-human wealth), the two theories are very close.

Actually, knowing the future income path, i.e. assuming no uncertainty, and considering infinitely-lived agents, we can calculate permanent income, Y^P, from the budget constraint as:

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[50] See Deaton A., 1992. *"Understanding Consumption"*, Oxford: Clarendon Press.

[51] Carroll C., 2001. "A theory of the consumption function, with and without liquidity constraints", *NBER working papers*, July 6.

[52] Friedman M., 1963. "Windfalls, the horizon, and related concepts in the permanent-income hypothesis", *Stanford University*, June 1.

$$\sum_{s=t}^{\infty} \frac{Y^P}{(1+r)^s} = W_t + \sum_{s=t}^{\infty} \frac{Y_s}{(1+r)^s} \qquad \text{(III.6)}$$

Considering that Y^P is not indexed and assuming $t = 0$, the infinite summation converges to $Y^P * (1/r)$. We can easily see that $Y^P = rR_0$, which shows how close the two theories are and give us the interpretation of permanent income as an interest return on total resources.

III.3.3 – *Complete Market and Risk Sharing*

Starting from equation (III.1) and assuming that the interest rate is constant and equal to the intertemporal utility discount rate, and that utility functions are independent of age, we obtain:

$$u'(c_t, \omega_t) = E_t u'(c_{t+1}, \omega_{t+1}) \qquad \text{(III.7)}$$

Which shows that the stochastic process governing marginal utility is a martingale. Assuming quadratic utility functions, so that the marginal utilities are linear, and ignoring other taste-shifters, we get:

$$E_t(c_{t+1}) = (c_t) \mid c_{t+1} = c_t + u_{t+1} \qquad \text{(III.8)}$$

This martingale model of consumption is a stochastic generalization of the basic life-cycle model discussed before, in which consumption is constant over time and resources play a role in determining the initial level of consumption, while u_{t+1}, the innovation term, reflects unanticipated changes in resources. In the presence of uncertainty, plans will not be fulfilled and identical consumers will evolve in different lifetime consumption profiles. The effect of the innovation term will be cumulative over time, with consumption trajectories typically diverging. Generally, if the distribution of innovations is independent of levels of marginal utility, individual marginal utilities will drift apart through time and if the marginal utility function is concave (which includes linear), consumption levels will also diverge, consisting in potential losses for some agents.

As individuals are generally risk-averse, the situation could be improved by an initial decision of sharing good and bad fortune among all market participants, which is possible under the complete-market hypothesis, as complete markets offer the possibility to every agent to be insured against every state of nature. This leads to the following maximization condition for consumer i:

$$u_t'(c_t^i) = \theta^i \left(\frac{1+\delta}{1+r} \right) \frac{p_s}{\pi_s} \qquad \text{(III.9)}$$

In which p_s and π_s are the cost of insuring against state s and the probability of state s to happen, respectively and θ^i is the Lagrange multiplier for consumer i. The important feature of equation (III.9) is that the relation between marginal utilities between two consumers is constant and equal to the ratio of the Lagrange multipliers[53]. Even more interestingly, the growth rate of all the market participants will be the same, thus implying a cross-sectional marginal propensity to consume equal to zero, i.e. consumption growth rates would not change because of idiosyncratic variation in resources.

As Cochrane argues[54], consumption insurance, or risk-sharing, hypothesis can be seen as the cross-sectional equivalent of the permanent-income hypothesis: just like the borrowing and lending opportunities imply that consumption should not vary over time in response to expected shocks, full insurance implies that consumption should not vary across individuals in response to idiosyncratic shocks. The complete-market assumption, in the sense that individuals might be able to buy contingent insurance and hence able to smooth consumption over states of nature, is hardly realistic per se. But this assumption is not strictly necessary, as a wide variety of institutions can provide partial consumption insurance. Examples include unemployment, disability, and medical insurance; welfare and other government social programs; state-contingent government transfers such as "disaster area" designation following a flood or an earthquake; charity foundations; gifts, loans and other forms of altruism from friends or relatives.

III.3.4 – Concavity of the Consumption Function

Carroll and Kimball[55] proved analytically that in a world with uncertainty in resources, individuals with a precautionary saving motive, i.e. characterized by a convex marginal utility $u_t'''(c_t^i) > 0$, have a concave consumption function[56]. Their work, which confirmed an intuition that dated back to Kaynes himself, shows that the marginal propensity to consume out of transitory income and wealth declines with the level of wealth. A similar prediction emerges in models in which wealth, or net worth, is used as a measure of credit constraints rather that precautionary savings, as a matter of fact:

"Indeed, for many purposes the behavior of constrained consumers is virtually indistinguishable from the behavior of unconstrained consumers with a precautionary motive."

Christopher D. Carroll, 2001[57]

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[53] See Deaton A., 1992. *"Understanding Consumption"*, Oxford: Clarendon Press.

[54] Cochrane J., 1991. "A simple test of consumption insurance", *The journal of political economy*, October.

[55] Carroll C. & Kimball M., 1996. "On the concavity of the consumption function", *Econometrica*, July.

[56] Note that the quadratic utility function used to derive equation (III.8) does not have this property. Indeed, quadratic utility functions are used to exclude precautionary savings.

[57] Carrol C, 2001. "A theory of the consumption function, with and without liquidity constraints", *NBER working papers*, July 6.

III.3.5 – *Consumption Theory: Summing Up*

The models summarized in the previous paragraphs give us some hints about what we should expect to find in terms of marginal propensities to consume. Recalling equation (III.3):

$$\Delta \ln c_i = a_0 + a_1 \Delta \ln y_i + a_2 \Delta \ln HW_i + \alpha_3 \omega_i + \varepsilon_i$$

First of all, risk-sharing hypothesis would imply $a_1 = a_2 = 0$, as idiosyncratic variations in resources should not affect consumption. The datasets we use are cross-sections of first-differences, so we will not be able to trace actual life-cycle behavior of individual households. Nonetheless, we will be able to compare differences in income and wealth effects between age groups. Life-cycle implies that households in different age groups should react differently to similar income and wealth shocks due to different expected life time. Considering that older households are likely to have a shorter planning horizon, and hence should react more to shocks in income and wealth, our second consideration is that $(a_1, a_2) = f(Age^+)$, i.e. the marginal propensities to consume should increase with age. Thirdly, following Carroll and Kimball, we expect that $(a_1, a_2) = f(Wealth^-)$, so that poor households are more reactive to shocks in resources. Lastly, as we do not actually analyze whether the shocks are perceived as transitory or permanent, we cannot properly check for consistency with the permanent-income hypothesis. Still, following Friedman's considerations and assuming that the shocks are, in fact, windfalls, we expect the values for the parameters to be much smaller than one.

III.4 – *Literature Survey*

In this section we will take a look at the results from some of the previous studies that tried to estimate the effects of wealth on consumption[58]. Methodically, two main approaches have been used to estimate wealth effects. The first is based on aggregate, or macro, data. The advantage of this method is that it exploits long time series available for many countries. However, aggregate data do not allow to distinguish between individuals and implies no cross-sectional heterogeneity. Individual characteristics such as age, income and wealth are not taken into account. Numerous empirical studies have tried to estimate the marginal propensity to consume out of housing wealth, or wealth in general, using time-series, mainly in the United States. The microeconomic evidence of wealth effects is relatively recent and is intended to focus on the individual household behavior underlying the relationship of wealth and consumption. While time-series allow to distinguish between the short-run and the long-run relationship between consumption, income and

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[58] This section is based on multiple sources: Barrel et. al, 2015. "Housing wealth, financial wealth, and consumption: new evidence for Italy and the UK", *International review of financial analysis*, July; Grant C. & Peltonen T., 2008. "Housing and equity wealth effects of Italian households", *ECB working paper series,* January; Helander M., 2014. "Estimating wealth effects on consumption in Finland", *Statistics Finland working papers*, January; Paiella M., 2009. "The stock market, housing and consumer spending: a survey of the evidence of wealth effects", *Journal of economic surveys*, September 25.

wealth, they are not informative about the nature of such relationship. Micro-data can allow the identification of the transmission channel, be it of direct causality, of common factors or of impact through borrowing constraints. Moreover, as noted previously, individual analysis sheds light on heterogeneous behaviors and can be helpful to direct policy measures.

The results of the main studies on wealth effects are reported in the following sections. We distinguish, methodically, between aggregate and household-level analyses and, geographically, between tests performed on the United States and tests performed on Italy and other industrialized countries. As it is out of the scope of this research, we will be not reporting findings related to the marginal propensity to consume out of financial wealth. It is important to consider that the studies may greatly differ in the methodology adopted and in the definition of the variables, so the values reported are not directly comparable. Nonetheless, they can help us to understand the relevance of the effect in the respective setting.

III.4.1 – *Wealth Effects in Aggregate Data in the United States*

Nearly fifty years ago, Modigliani himself estimated a marginal propensity to consume out of total wealth of 0.05 for the United States, meaning that for an increase in wealth of $1, consumption increased by $0.05. More recently, Ludvigson and Steindel (1999) and Lettau and Ludvigson (2004), studying sample periods ranging from 1953 to 1997 and 1951 to 2003, respectively, confirmed Modigliani's predictions by estimating a marginal propensity to consume out of total wealth of 0.046, and only slightly different results, ranging from 0.036 to 0.054 were obtained by Davis and Palumbo (2001), Mehra (2001) and Bertaut (2002). It is interesting to note that Ludvigson and Steindel emphasized the fact that the marginal propensity to consume can vary greatly over time. Their estimation for the period from 1986 to 1997 was 0.021, about half of the average for the whole period they considered. Regarding housing wealth specifically, Peek (1983) and Skinner (1994) found the marginal propensity to consume to be in the range of 4 to 5 percent, while Carroll et al. (2011) found a short-run effect of 0.02 and a long-run effect of 0.10 focus on the pre-crisis period from 1960 to 2007.

III.4.2 – *Wealth Effects in Aggregate Data in Italy and Other Countries*

Bertasut (2002) and Fernandez-Corugedo et al. (2003) found comparable evidence for the United Kingdom, with an estimated marginal propensity to consume out of total wealth of around 0.045. The former also focused on Australia and Canada, with significant results of 0.049 and 0.083 for the respective countries. As for housing wealth effects, Marquez et al. (2013) found a very high value of 0.13, for the United Kingdom, over the period from 1976 to 2009. Some widely quoted analyses compared different countries. Case et al. (2005) found a marginal propensity to consume in the range of 12 to 14 percent for 14 OECD countries from 1975 to 1999. Their results are in contrast with those of Ludwing and Slok (2004) and Sousa (2009), who reported findings of non-significant marginal propensity to consume out of housing wealth for

the Euro Area and the OECD countries, respectively, but are consistent with those of Salo (2009), who estimated a large and significant housing wealth effect (0.09) in the OECD countries and in Finland.

The results are even more puzzling when looking at Italy. Catte et. al (2004) found a small but positive (0.01) housing wealth effect, and their results are consistent with those of Bassanetti and Zollino (2010), whose estimated parameter was close to 0.02, but clash with Boone and Girouard (2002), Slacalek (2009), who estimated a marginal propensity to consume out of housing wealth of -0.06 and -0.10, respectively, and Barrel et. al (2015) who used data up to 2012, thus including the global financial crisis, and found a non-significant effect.

III.4.1 – *Wealth Effects in Micro-data in the United States*

A direct wealth effect on consumption has been estimated using micro-data by Skinner (1989) and Parker (1999). While the latter focused on total wealth, estimating an average marginal propensity to consume of 0.04, the former concentrated mainly on real estate and found a significant effect. Similarly, Engelhardt (1996) estimated a marginal propensity to consume out of housing wealth in the range of 3 to 6 percent. Mian, Rao and Sufi (2013) investigated the consumption consequences of the recent housing collapse using a zip code-level dataset and found an average marginal propensity to consume of 0.05 to 0.07 with substantial heterogeneity across zip codes, showing that the value of the parameter declined with wealth.

III.4.2 – *Wealth Effects in Micro-data in Italy and Other Countries*

The paper by Campbell and Cocco (2005) studies housing wealth effects in the United Kingdom and finds evidence in line with the life-cycle theory, showing that elders react more to changes in the values of housing. In addition to that, they find non-significant parameters for renters, indicating the existence of a pure housing wealth effect. Other United Kingdom-based studies include Disney et al. (2003), Attanasio et al. (2005) and, earlier in time, Carruth and Henley (1990) and Miles (1997). They all reported a marginal propensity to consume out of housing wealth in the range of 3 to 8 percent. In Japan, Ogawa et al. (1996) and Hori and Shimizutani (2003) found non-significant parameters. In Spain, Bover (2005) followed a geographical approach and estimated a significant housing wealth effect of 0.015. In a cross-country analysis, Sierminska and Takhtamanova (2006) found the housing wealth effect on consumption to be significant and larger than the financial wealth effect in Canada, Finland and Italy, and to be significantly lower for younger households[59].

Moving to Italy, Paiella (2007) and Grant and Peltonen (2008) looked for wealth effects using data from the Survey of Household Income and Wealth. The former found a marginal propensity to consume out of total wealth of 0.04, while the latter estimated a significant housing wealth effect in the range of 5 to 8 percent for the period between 1989 and 2002.

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[59] They base their research on the previously mentioned Luxemburg Wealth Study which, for Italy, refers to Banca d'Italia SHIW data.

III.5 – *Empirical Results*

The following regressions have been performed for two different datasets (2006 to 2008 and 2010 to 2012) using an outliers-robust bisquare procedure[60]. The tuning constant has been set equal to 4.685 and should give coefficient estimates that are approximately 95 percent as statistically efficient as the ordinary least-squares estimates. The observations were weighted using population weights. All consumption, income and wealth variables were expressed in real terms (in 2014 money) and as first-difference of natural logarithms. Regressions were run separately for homeowners, renters and for households who belonged to any of these groups (called "all"), according to the definitions given in Chapter II. For any of these groups we also run separate estimations for employed households and households who were either employed, self-employed or unemployed. In addition, income and housing wealth effects were estimated for different age, wealth and income groups.

III.5.1 – *Income and Housing Wealth Effects during the Global Financial Crisis*

We start with the results for the 2006 to 2008 time span, presented in TABLE III.1. The estimated marginal propensities to consume for non-financial monetary income are statistically significant at the 1 percent level for all the categories of households, as shown in the first line of the table. Specifically, we can see that renters were much more sensitive to changes in income with respect to homeowners. The estimated marginal propensity to consume for renters is 35 percent, much higher than the 18 percent observed for homeowners. Taking into account the fact that most of the sample is comprised of homeowners, the average marginal propensity to consume out of income for the whole sample is around 20 percent, meaning that a 1 percent decrease in income reduced non-durable consumption by 0.2 percent. FIGURE III.1 shows the effect of changing the income variable as the other predictors are held constant, showing the much greater sensitivity of renters.

Column 2, 4 and 6 report the results for employed households only[61], which includes blue-collar workers, office workers and school teachers, and managers. We can see that, while significant, the estimated marginal propensities to consume are lower with respect to those estimated for the whole samples, comprising also of self-employed and unemployed families. This is true for homeowners and, on average, for the whole sample, but not for renters., who were more sensitive than their peers to income changes by around 4 percent. The overall income-related results for 2006-2008 are reported in FIGURE III.2.

The second line of the table reports the results for the marginal propensity to consume out of housing wealth. The overall effect is estimated to be positive, about 7 percent on average and statistically significant

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[60] The use of a robust procedure was suggested by Andrea Neri, Senior Statistician at the Sample Surveys Unit of Banca d'Italia. as outliers are frequent in surveys for a number of reasons and could have very misleading effects.
[61] The characteristic refers to the household head.

at the 1 percent level. As we would expect, the results are marginally higher for homeowners and non-significant for renters. This is crucial. The fact that renters are insensitive to self-reported variations in the value of housing means that the estimated parameter is not solely determined by an underlying macroeconomic factor. If houses were just a proxy for the general economy environment, we would have had some positive significance also for renters. This is not to say that this effect does not play a role: were it completely absent, we would have probably found a significant negative effect for renters, for the reasons we explained in the first section of this chapter. Nonetheless, a "pure" wealth effects remains.

As it was the case with income, the marginal propensity to consume out of housing wealth is lower for employed households, than for the other categories. One possible way to explain this is to consider that the biggest class among the non-employed is that of retired people, who are naturally much older on average. As we saw, according to the life-cycle hypothesis, older people should be characterized by higher responses, as their life expectancy is shorter. We will test age differences in the following sections. The results for housing wealth effects are summarized in FIGURE III.3 and FIGURE III.4, in which dashes indicate non-significant effects.

Among the control variables, the only one presenting a considerable significant effect in most of the regressions is the variation in the size of the household, expressed as a difference of natural logarithms. As we would expect from theory, an increase in the size of the households leads to an increase in overall non-durable consumption, and this is confirmed by a positive sign of the estimated parameter.

Our results reject the risk sharing hypothesis, as the significance of the parameters implies that households react to idiosyncratic shocks in resources, and are consistent with the SHIW estimations of Grant and Peltonen (2008) for the period between 1989 and 2002. The risk-sharing hypothesis has also been tested and rejected (at least in its strictest specification), among others, by Cochrane (1991) and Mian, Rao and Sufi (2013).
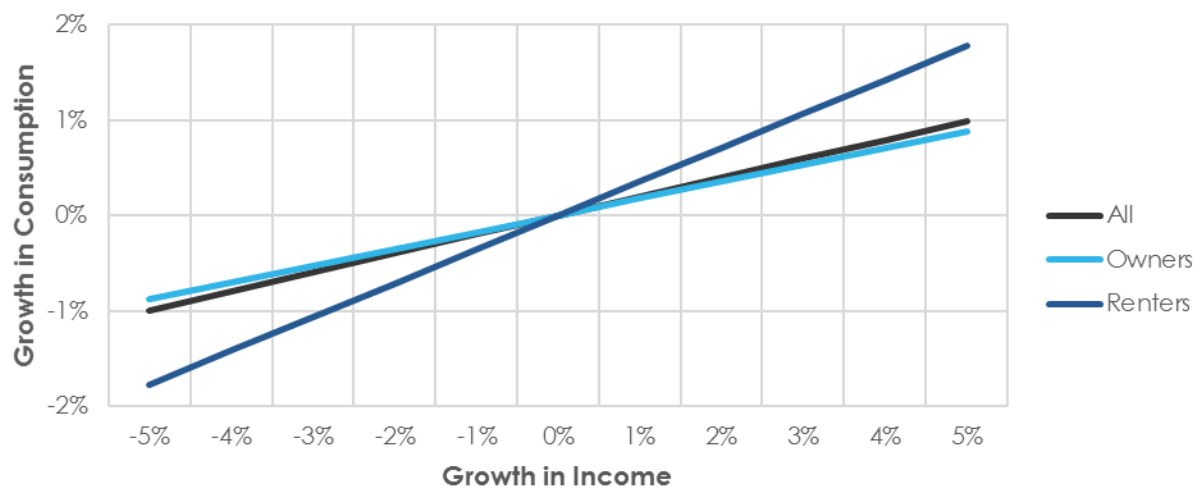
FIGURE III.1 – Marginal Propensity to Consume out of Income between 2006 and 2008
Projected Slopes
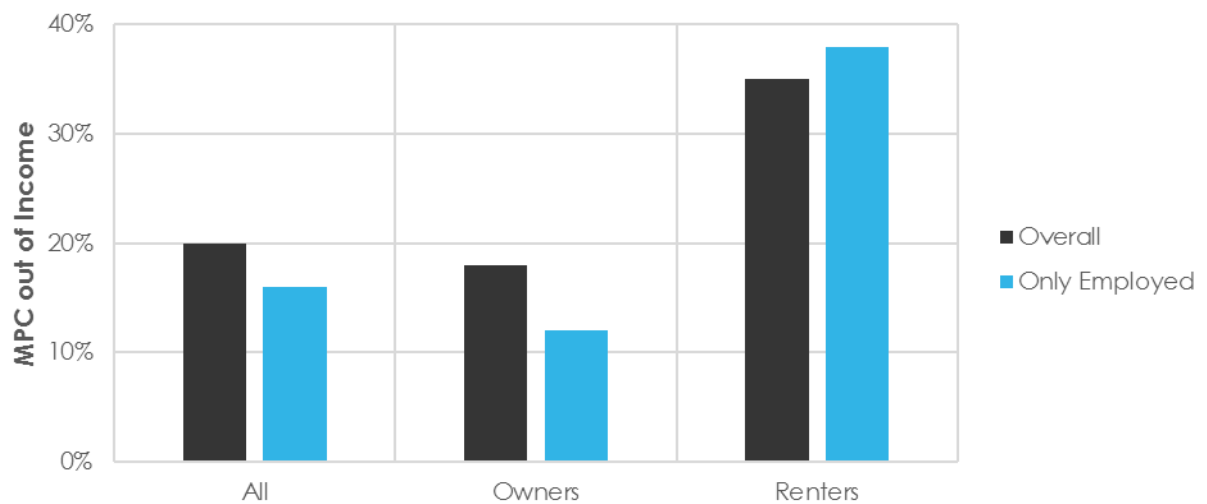
FIGURE III.2 – Marginal Propensity to Consume out of Income between 2006 and 2008
Overall Samples and Only Employed Households

FIGURE III.3 – Marginal Propensity to Consume out of Housing Wealth between 2006 and 2008
Projected Slopes

FIGURE III.4 – Marginal Propensity to Consume out of Housing Wealth between 2006 and 2008
Overall Samples and Only Employed Households

TABLE III.1 – Income and Housing Wealth Effects between 2006 and 2008

	Dependent Variable: $\Delta \ln c_i$					
	All	All Employed	Owners	Owners Employed	Renters	Renters Employed
$\Delta \ln y_i$	0.19824***	0.15610***	0.17629***	0.11714***	0.35472***	0.38298***
$\Delta \ln HW_i$	0.07211***	0.02951**	0.07348***	0.03267**	0.01011	0.01624
$\Delta \ln Size_i$	0.17342***	0.23299***	0.19746***	0.24860***	0.04233	0.07915
Age/10	0.08479	-0.77953*	0.14821*	-0.89941	0.07406	0.08514
High School	-0.01746	-0.02137	-0.00756	-0.00689	-0.06866	-0.06182
University	-0.02538*	-0.04891*	-0.01063	-0.02473	-0.10048	-0.12809*
Lives in North	0.00338	-0.08329**	-0.00762	-0.09733**	0.08963*	-0.07691
Lives in South	0.00836	-0.02860	0.01667	-0.02062	0.02263	-0.10325
Female Head	-0.00442	-0.01912	-0.00940	-0.02036	0.01965	-0.02102
Married	-0.01368	-0.06289**	-0.01335	-0.03463	-0.0193	-0.10925
$\Delta \ln Size_i^2$	0.05975	0.16275	0.04207	-0.02827	0.20055	0.47159
$Age^2/100$	-0.01549	0.18578	-0.02362	0.21297	-0.01797	-0.00264
$Age^3/1000$	0.00091	-0.01373	0.00126	-0.01553	0.00106	-0.00142
Intercept	-0.16241	1.08745*	-0.32307*	1.20425*	-0.08775	0.00235
R^2	0.143	0.110	0.133	0.096	0.279	0.180
Observations	3557	1234	2956	970	601	264

* indicates statistical significance at the 10 percent level, ** at the 5 percent level, *** at the 1 percent level.
Coefficients for qualitative regressors are to be interpreted as differences in relation to the respective base levels.

III.5.2 – *Income and Housing Wealth Effects during the Sovereign Debt Crisis*

The results for 2010 to 2012 are quite similar and are presented in TABLE III.2. The estimated marginal propensities to consume out of income are statistically significant for all the samples of households, as can be seen from the first line of the table. The effect is, naturally, positive and ranges from about 25 percent for homeowners, to 45 percent for employed renters. The average marginal propensity to consume for the whole is 26 percent. Once again, renters were much more sensitive to changes in income. Keeping in mind that there are important theoretical differences between expected and unexpected shocks, and that we do not investigate the nature of the shocks, a possible explanation for the different behavior between homeowners and renters is that the latter category is generally comprised of poorer households, who are mainly reliant on their income to meet their monthly obligations and consumption needs. Differently from the previous results, we can note that households whose head is employed are characterized by higher marginal propensities to consume with respect to the overall samples. Employed homeowners varied their consumption by 0.35 percent for each percent point change in income, while employed renters were even more sensitive with a factor of 0.52. FIGURE III.5 and FIGURE III.6 summarize our income-related finding for the period in scope.

Something that stands out when looking at the results for the two periods is that the estimated coefficients for the sovereign debt crisis are significantly higher than those measured for the earliest part of the recession. It is possible that the length of the double-dip recession impacted the expectations of the Italian households, who started to perceive the contraction in income as permanent.

The results for the housing wealth effects are reported in the second line of the table. The overall effect is, again, significative at the 1 percent level and ranged between 3.5 percent for the fraction of employed households to 7.5 percent for the whole sample of homeowners. Results for renters are non-significative, confirming, to a certain degree, our previous reasoning. There are no notable differences between the parameters estimated for the first and the second time span. We report the results for the housing wealth effect in FIGURE III.7 and FIGURE III.8.
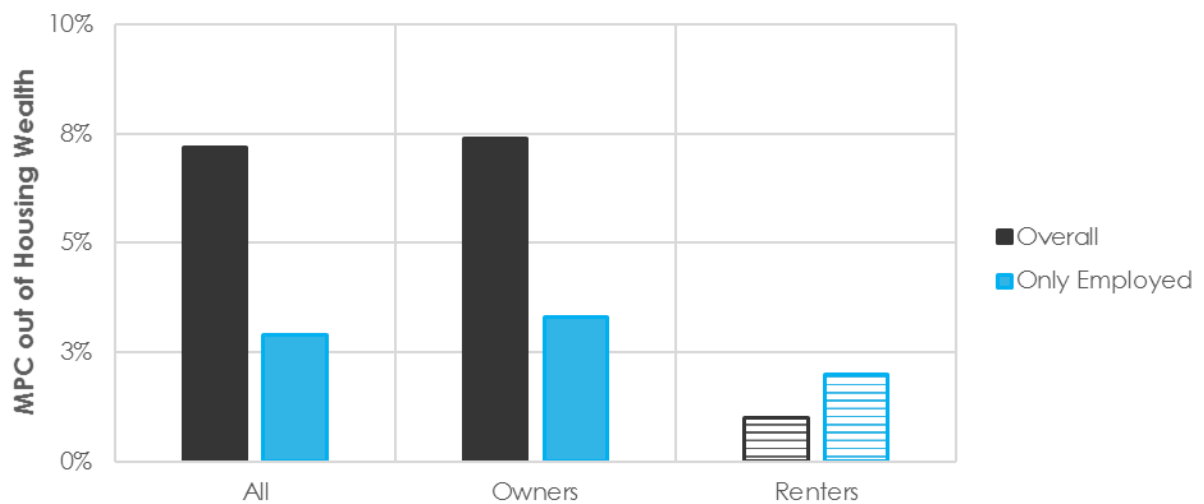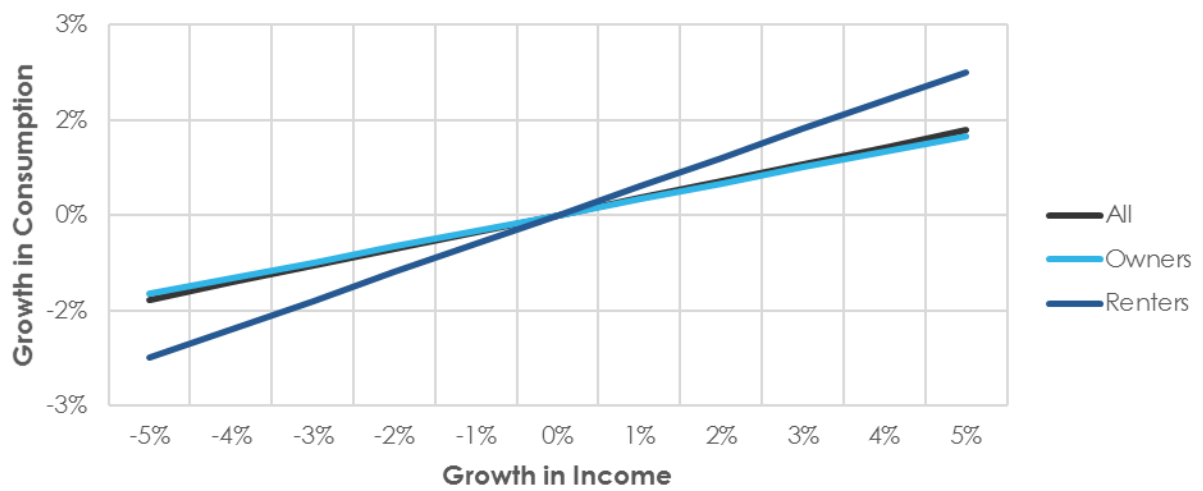
FIGURE III.5 – Marginal Propensity to Consume out of Income between 2010 and 2012
Projected Slopes
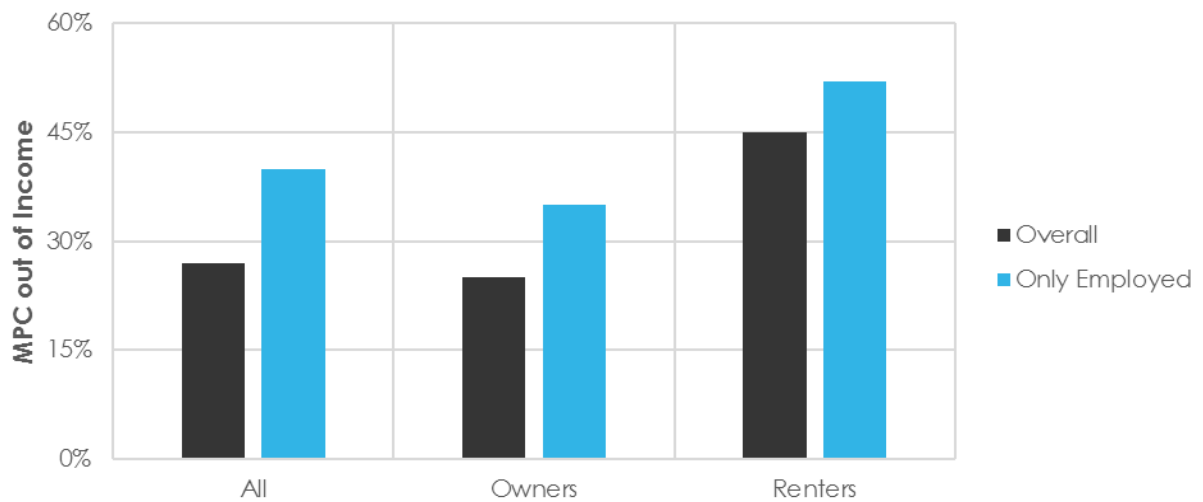
FIGURE III.6 – Marginal Propensity to Consume out of Income between 2010 and 2012
Overall Samples and Only Employed Households

FIGURE III.7 – Marginal Propensity to Consume out of Housing Wealth between 2010 and 2012
Projected Slopes
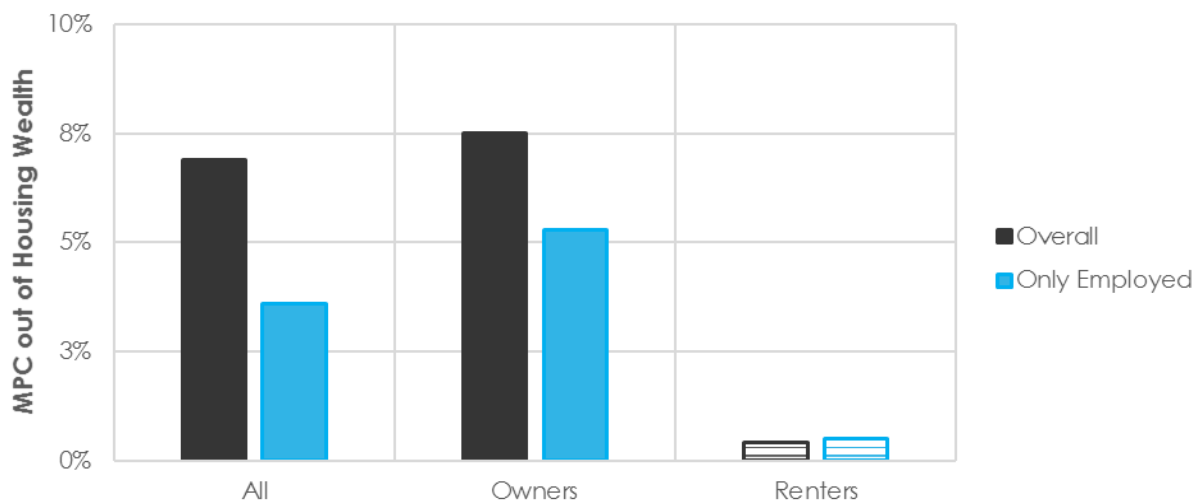
FIGURE III.8 – Marginal Propensity to Consume out of Housing Wealth between 2010 and 2012
Overall Samples and Only Employed Households

TABLE III.2 – Income and Housing Wealth Effects between 2010 and 2012

	Dependent Variable: $\Delta \ln c_i$					
	All	All Employed	Owners	Owners Employed	Renters	Renters Employed
$\Delta \ln y_i$	0.26620***	0.40077***	0.24884***	0.35702***	0.45012***	0.52216***
$\Delta \ln HW_i$	0.06933***	0.03637**	0.07551***	0.05299***	0.00477	0.00534
$\Delta \ln Size_i$	0.16181***	0.16024**	0.14060	0.10719*	0.22764**	0.32256**
Age/10	0.01003	-0.24530	-0.02771	-0.23106	0.10400	0.04754
High School	0.01676	0.02548	0.00531	0.00680	0.05899	0.10503
University	0.01011	0.00813	0.00408	0.01077	0.02873	-0.02667
Lives in North	-0.02516*	-0.00233	-0.00186	0.03188	-0.09806*	-0.07711
Lives in South	0.00258	0.04167*	0.01697	0.06316**	-0.04490	0.00368
Female Head	-0.00289	-0.01130	0.00779	0.00017	-0.05786*	-0.05946
Married	-0.03007*	-0.04608	-0.01898	-0.01795	-0.09131**	-0.12544*
$\Delta \ln Size_i^2$	-0.05242	-0.01282	-0.04619	-0.02152	0.05214	0.12431
$Age^2/100$	0.00145	0.06429	0.00703	0.05608	-0.01372	0.01708
$Age^3/1000$	-0.00030	-0.00538	-0.00057	-0.00456	0.00048	-0.00308
Intercept	0.01336	0.35048	0.07181	0.33126	-0.05690	-0.08067
R^2	0.201	0.230	0.190	0.281	0.367	0.280
Observations	3731	1245	3169	1014	562	231

* indicates statistical significance at the 10 percent level, ** at the 5 percent level, *** at the 1 percent level.
Coefficients for qualitative regressors are to be interpreted as differences in relation to the respective base levels.

### III.5.3 – *Income and Housing Wealth Effects by Age*

Having taken a look at the effects of income housing capital gains on consumption, it is interesting to disaggregate the effects by household type. In doing this we will be analyzing the results for both time spans simultaneously, as our main focus is to check whether there was heterogeneity in households' behavior and if such heterogeneity persists through time. As already mentioned, the basic life-cycle model of consumption implies that households in different age groups should react differently to similar shocks in resources due to differences in life expectancy. The word "similar" is an assumption, as we are unable to distinguish the source of the shocks, nor their predictability or permanence, which have different theoretical consequences. Nonetheless, older households are likely to have a shorter planning horizon, and hence we expect those to react more to windfall shocks, vice versa for younger households. On the other side, older households might very well be less credit constrained than younger households, thus implying a weaker reaction to any kind of shock.

TABLE III.3 and TABLE III.4 report the results of the age-based investigation for the 2006 to 2008 and the 2010 to 2012 time periods, respectively. Once again, households are split between homeowners and renters, as this allows us to properly estimate the housing wealth effect on the share of the population that has a significant response to it. The left part of the tables reports the results for homeowners. The regressions were conducted on three age-based subsamples. The first subsample contains households whose head was younger than 45, the second subsample contains households whose head was over the age of 45 and under the age of 55, and the last subsample contains older households, whose head was over the age of 55[62]. The same procedure has been used for renters and the results are reported in the right part of the tables.

Let us start with homeowners. As we can see from the first line of both tables, old homeowners were more reactive to changes in income with respect to the other two groups, with an estimated marginal propensity to consume of 22 and 29 percent for the 2006 to 2008 and 2010 to 2012 time periods, respectively. The relationship between sensitivity and age turns out to be clearly positive from the first set of regressions: the reported parameter for the younger group is 11 percent, while for the middle group is 21 percent. The results for the sovereign debt crisis are not as smooth, with the parameter for the younger households resulting higher than the one estimated for the 45 to 55 class, 22 and 20 percent, respectively.

Results for renters report the exact same behaviors, as shown in the three rightmost columns of the tables. During the global financial crisis, younger renters reacted the least to changes in income with an estimated parameter of 29 percent, and the estimated marginal propensities to consume out of income are strictly increasing, 42 percent for the middle group and 43 percent for older households. Again, looking at the second set of regressions, we see that younger households reacted more, in terms of consumption, to

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[62] The characteristic refers to the base year of each time span, i.e. 2006 for the first set of regressions and 2010 for the second set.

changes in income with respect to the middle-aged group by about 3 percent. Nonetheless, the overall behavior is similar to that of the previous period, as the estimated marginal propensity to consume for older families is the highest, about 48 percent. Results for the income effect by age are reported in FIGURE III.9.

As for the housing wealth effect, the results are equally interesting. Younger homeowners' consumption was unresponsive to changes in wealth during both periods, as shown by the estimated non-significant coefficients. Looking at the years between 2006 and 2008, the highest coefficient refers to the oldest group and is about 11 percent. As for the second time span, households between 45 and 55 come out on top, with an estimated marginal propensity to consume out of housing wealth of 10 percent. Either way, the difference with the oldest group is very small, only about 0.5 percent. Note that we do not consider renters, as we have shown that housing wealth does not play a role in their consumption decisions. FIGURE III.10 summarizes the results for the housing wealth effect. One again, dashes indicate non-significant effects.

Overall, our results are consistent with the prediction of the life-cycle model. Older households seem to react more to variation in resources with respect to their younger peers, possibly reflecting a shorter planning horizon. Our housing wealth effect estimations are consistent with both those of Grant and Peltonen (2008) and Sierminska and Takhtamanova (2006), who also base their analysis on SHIW data but employ different methods and look at different periods.
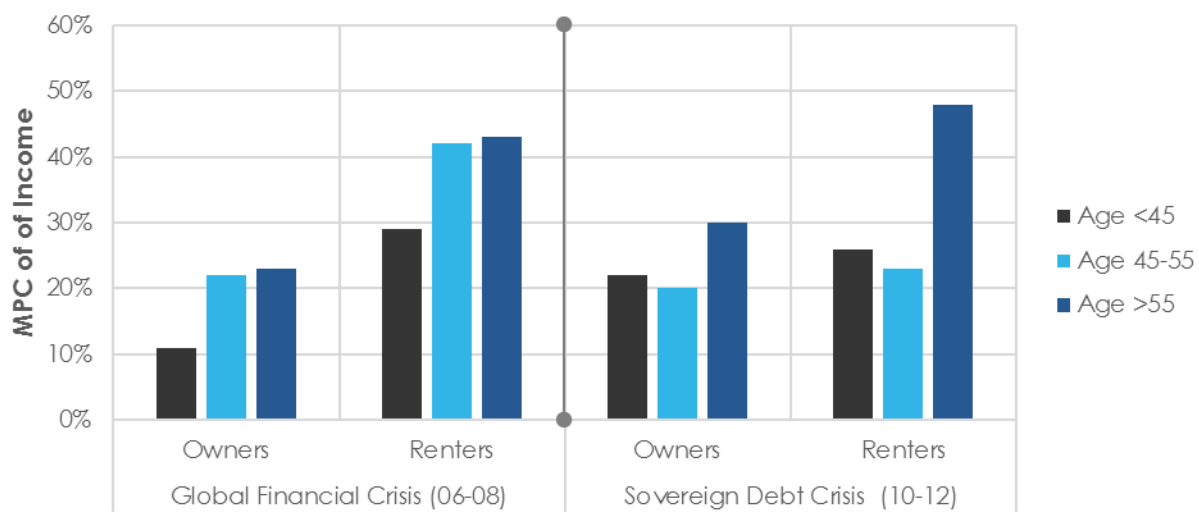
FIGURE III.9 – Marginal Propensity to Consume out of Income in the Two Crises
by Age
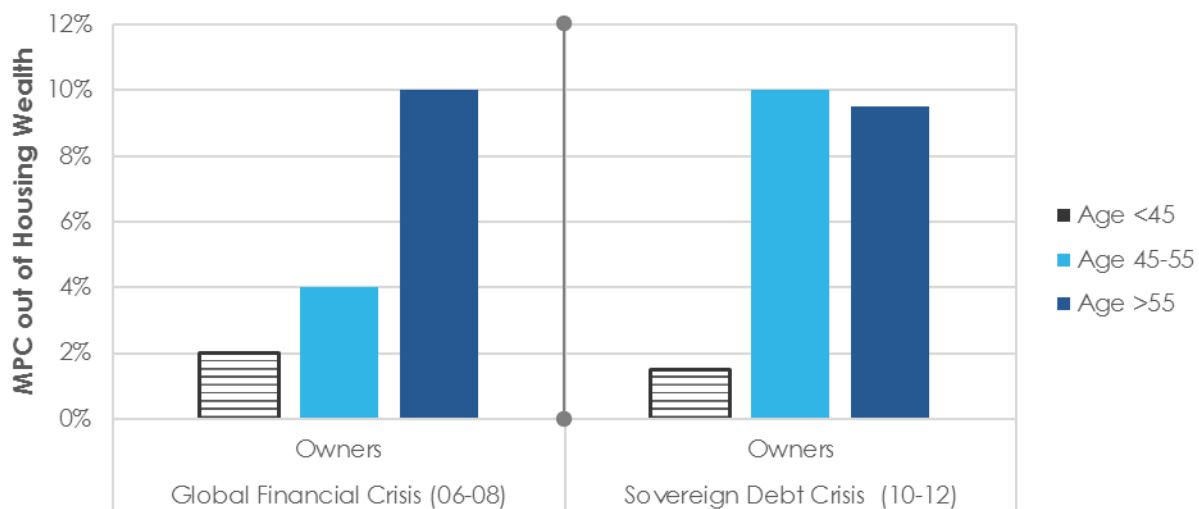
FIGURE III.10 – Marginal Propensity to Consume out of Housing Wealth in the Two Crises
by Age

TABLE III.3 – Income and Housing Wealth Effects between 2006 and 2008 by Age

	Owners	Owners	Owners	Renters	Renters	Renters
			Dependent Variable: $\Delta \ln c_i$			
Age Class	<=45	45-55	>55	<=45	45-55	>55
$\Delta \ln y_i$	0.10946***	0.21953***	0.22390***	0.29591***	0.41916***	0.43387***
$\Delta \ln HW_i$	0.02496	0.03881**	0.10717***	-	-	-
$\Delta \ln Size_i$	0.33315***	-0.22268**	0.20523***	0.02750	0.05698	0.03121
Age/10	-0.08950	-1.23297**	0.09618	0.30848	0.08073	-0.97515**
High School	-0.00675	0.00508	0.00789	-0.11367*	-0.01990	-0.01843
University	-0.03160	0.03423	-0.03067	-0.23364**	0.11925	-0.21303*
Lives in North	-0.10147**	-0.02821	0.04749**	-0.06352	0.05036	0.08440
Lives in South	-0.01583	-0.04375	0.04383**	-0.11365	0.03005	-0.01820
Female Head	-0.05405*	0.01081	0.00463	-0.02304	-0.09648	0.11409**
Married	-0.04619*	0.03247	-0.00369	-0.06350*	-0.18273	0.10236
$\Delta \ln Size_i^2$	0.18532*	-0.28265	0.03510	0.36283	0.44838	0.19551
$Age^2/100$	0.03850	0.24008*	-0.02050	-0.07181	0.05597	0.15330**
$Age^3/1000$	-0.00329	-0.01431*	0.00136	0.00432	-0.00811	-0.00788*
Intercept	0.00296	1.90484**	-0.19652	-0.19406	-0.69327	1.87105
R^2	0.118	0.130	0.192	0.245	0.228	0.284
Observations	612	610	1734	193	137	217

* indicates statistical significance at the 10 percent level, ** at the 5 percent level, *** at the 1 percent level.
Coefficients for qualitative regressors are to be interpreted as differences in relation to the respective base levels.

TABLE III.4 – Income and Housing Wealth Effects between 2010 and 2012 by Age

	Owners	Owners	Owners	Renters	Renters	Renters
	colspan="6" **Dependent Variable**: $\Delta \ln c_i$					
Age Class	<=45	45-55	>55	<=45	45-55	>55
$\Delta \ln y_i$	0.22071***	0.20390***	0.29245***	0.26763***	0.23789***	0.48529***
$\Delta \ln HW_i$	0.01256	0.10350***	0.09433***	-	-	-
$\Delta \ln Size_i$	0.23757***	0.26092***	0.09072***	0.38391**	-0.19050	0.09518
Age/10	0.16247	-0.12026	-0.10902	0.44896	0.64130	0.51327
High School	-0.00268	0.03778	-0.00028	0.04972	0.13559*	-0.06618
University	-0.01905	0.09410**	-0.03686*	0.01537	0.22592	-0.00481
Lives in North	0.02882	-0.00154	-0.02040	-0.12231	-0.13284	-0.11848**
Lives in South	0.02138	0.05392	-0.01022	0.01996	-0.01507	-0.07753
Female Head	0.06746**	-0.02969	0.00545	-0.01255	-0.18479**	-0.01699
Married	-0.00979	-0.07003**	-0.00276	-0.09604	-0.10569	-0.03623
$\Delta \ln Size_i^2$	-0.30800**	0.05814	-0.02540	0.00128	-0.37802	0.07447
$Age^2/100$	-0.02488	0.01999	0.02031	-0.10213	-0.01735	-0.06977
$Age^3/1000$	0.00120	-0.00112	-0.00126	0.00690	-0.00654	0.00297
Intercept	-0.31929	0.27435	0.24831	-0.44776	-1.73793	-1.04231
R^2	0.238	0.144	0.215	0.239	0.278	0.255
Observations	526	681	1962	159	119	284

* indicates statistical significance at the 10 percent level, ** at the 5 percent level, *** at the 1 percent level.
Coefficients for qualitative regressors are to be interpreted as differences in relation to the respective base levels.

III.5.4 – *Income and Housing Wealth Effects by Wealth Class*

Having taken a look at the different behavior of homeowners and renters and having investigated the effect of age on the marginal propensity to consume, we now turn at the wealth distribution. As mentioned in the previous sections, under certain assumptions, households' consumption function should be concave with respect to wealth, either due to a precautionary motive or to the presence of credit constraints. In terms of marginal propensity to consume, we expect the wealthiest households to respond the least to unpredictable changes in income and wealth. In this section we investigate the differences in consumption responses between below-median, above-median and the richest households, differentiating, as usual, between homeowners and renters. In TABLE III.5 and TABLE III.6, households are grouped as follows: the first column includes homeowners whose initial wealth was below the weighted median of homeowners' wealth distribution[63], the second column include families with an above-median level of wealth and the third column refers to the richest homeowners, those above the 90th weighted percentile of the wealth distribution. Columns 4, 5 and 6 refer to renters and are built in a similar way. Given the small size of the sample relative to renters, we built slightly different subsamples. Households are divided according to wealth quintiles and, specifically, between below second quintile, between second and fourth quintiles and above fourth quintile households. In commenting the results, we look again at both periods simultaneously.

Looking at homeowners and focusing on the first line of the tables, we see that poorer households were indeed the most reactive to windfall variations in income. The estimated marginal propensities to consume are 22 percent for the first period and 27 percent for the second, in both cases higher than the 21 and 11 percent reported for the wealthiest groups. It is interesting to see that the difference increased significantly between the two phases of the recession. The overall trend is quite smooth when looking at the sovereign debt crisis, while, in the earlier time span, middle wealth households seemed to react even less than the richest consumers to changes in income, with an estimated parameter of 11 percent.

Results for renters are also consistent with theory. Households below the second quintile of the wealth distribution reacted more than those above the fourth quintile. For the years between 2006 and 2008, estimation for poorer renters resulted in a marginal propensity to consume of about 60 percent, more than three times higher than the result relative to the richest group, which is about 18 percent. Middle wealth renters stand in the middle with an estimated income effect of 26 percent. The estimation for the second period reported a similar behavior, although, notably, renters between the 40th and the 80th percentiles of the wealth distribution seemed to respond the most to variations in income, with an estimated marginal propensity to consume of 0.52. Refer to FIGURE III.11 for a summary of income effects.

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[63] As before, the characteristic refers to the base year of each time span, i.e. 2006 for the first set of regressions and 2010 for the second set.

The results for the housing wealth effect are, instead, puzzling. As can be seen from the second line of both tables, the poorest homeowners seemed to react the least to variations in the value of housing and the result is true for both the global financial crisis and the sovereign debt crisis. The estimated parameter hovers, in both cases, in the 4 to 5 percent range. It is worth to note, though, that the estimations for the richest homeowners are only significant at the 10 percent level and the resulting parameters are, as expected, lower than those estimated for the median households: 8 percent against 9 percent in the first period and 9 percent against 10 percent in the second, as summarized in FIGURE III.12. In any case, those results are in line with the intuition from the statistical analysis of Chapter I, in the sense that the consumption contraction of the wealthiest group was determined, in part, by the devaluation of their housing assets.

The fact that poorer households respond the least to housing wealth might be explained, at least partly, by the collateral role played by housing. One important difference between the United States and Italy is that, while oversea debt is concentrated among the poorest, in Italy it is mainly related to the middle class and to the wealthiest. Tighter regulations do not allow the development of a subprime mortgage market. Looking at our samples, we can indeed see that in 2006, only 20 percent of the below-median household had any kind of outstanding debt, with respect to the 30 percent of above-median households and the 32 percent of the wealthiest class and in 2010 the shares of debt owners were 22, 31 and 35 percent, respectively for the first, second and third group of homeowners[64]. Indebted households might be more responsive to house price changes as they are more credit constrained, and non-indebted households might still act in a precautionary way knowing that they might resort, some day, to debt financing.

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[64] Keep in mind that the two samples include different households, so the growth of the share of indebted households might derive from different sampling rather than different individual behaviors.
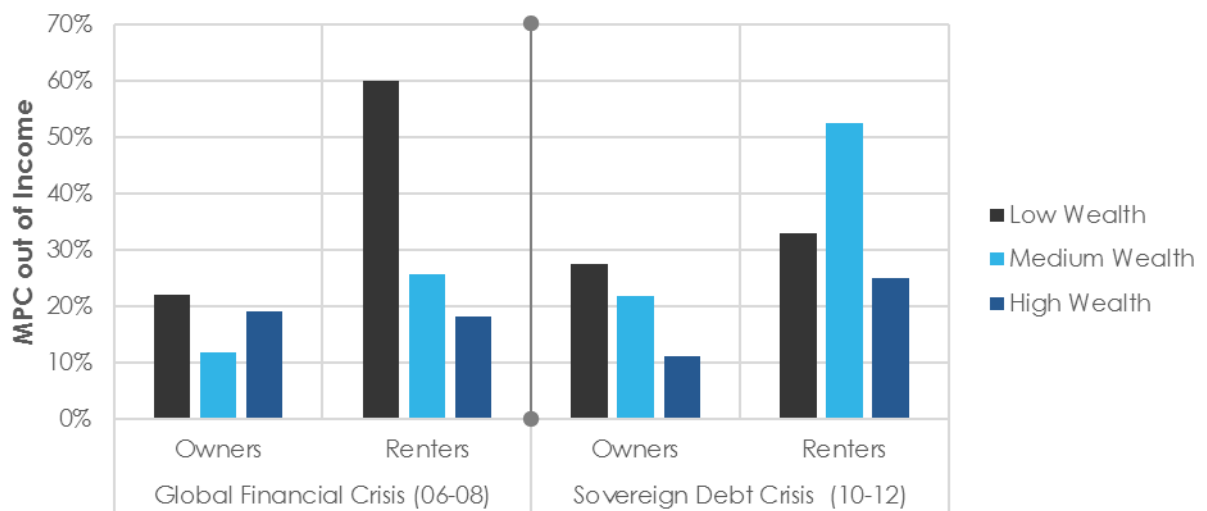
FIGURE III.11 – Marginal Propensity to Consume out of Income in the Two Crises
by Ex-ante Wealth Class
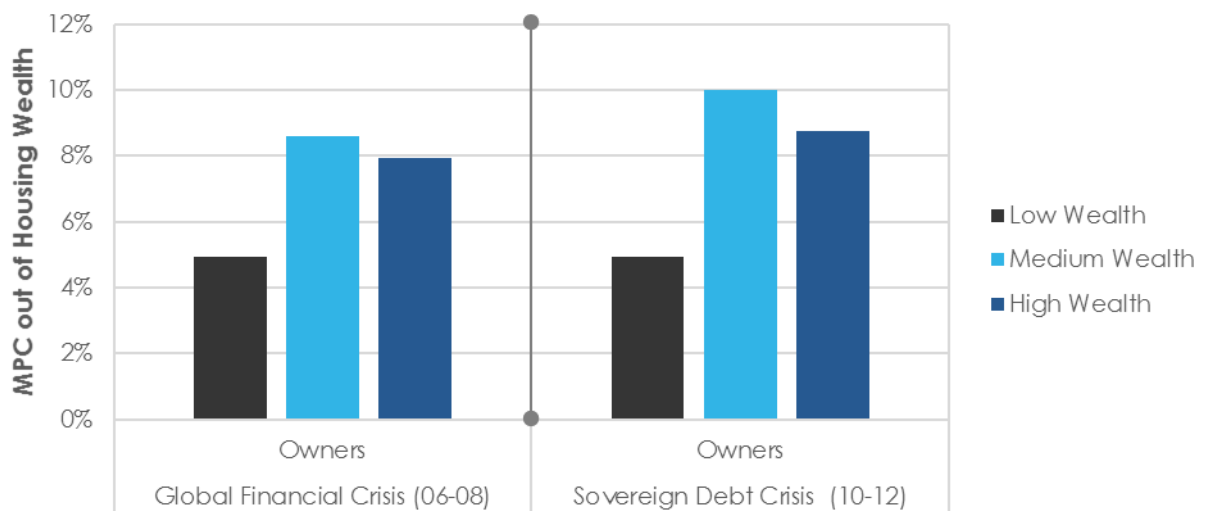
FIGURE III.12 – Marginal Propensity to Consume out of Housing Wealth in the Two Crises
by Ex-ante Wealth Class

TABLE III.5 – Income and Housing Wealth Effects between 2006 and 2008 by Wealth Class

	Dependent Variable: $\Delta \ln c_i$					
	Owners	Owners	Owners	Renters	Renters	Renters
Wealth %ile	<=50th	50th-90th	>90th	<=40th	40th-80th	>80th
$\Delta \ln y_i$	0.21559***	0.11821***	0.20472***	0.59866***	0.25608***	0.18119*
$\Delta \ln HW_i$	0.04944***	0.08598***	0.07927*	-	-	-
$\Delta \ln Size_i$	0.22490***	0.22943***	0.05854**	-0.06970	0.15622	-0.11691
Age/10	-0.01830	0.31851*	0.15183	0.35621	-0.19991	-0.77658*
High School	0.02458	-0.01735	-0.03484	-0.07372	-0.04522	0.05585
University	-0.02397	0.02120	-0.05855	0.14853	-0.12789	0.00283
Lives in North	-0.04078*	0.00056	0.00060	0.02972	0.09078	0.29822**
Lives in South	-0.02467	0.02802	0.00035	-0.08081	0.04997	0.10661
Female Head	0.02553	-0.06452**	0.08128	0.03923	-0.02927	-0.01764
Married	0.01148	-0.01352	0.03815	0.05263	-0.06713	0.04378
$\Delta \ln Size_i^2$	0.19068	-0.00871	-0.36613	0.28315	0.21126	0.30182
$Age^2/100$	0.00965	-0.05246*	-0.03990	-0.09389	0.04797	0.11372
$Age^3/1000$	-0.00071	0.00282	0.00269	0.00665	-0.00354	-0.00452
Intercept	-0.08204	-0.64318*	-0.13970	-0.28320	0.25238	1.10898
R^2	0.156	0.119	0.192	0.310	0.191	0.141
Observations	1431	1201	324	251	231	119

* indicates statistical significance at the 10 percent level, ** at the 5 percent level, *** at the 1 percent level.
Coefficients for qualitative regressors are to be interpreted as differences in relation to the respective base levels.

TABLE III.6 – Income and Housing Wealth Effects between 2010 and 2012 by Wealth Class

	Dependent Variable: $\Delta \ln c_i$					
	Owners	Owners	Owners	Renters	Renters	Renters
Wealth %ile	<=50th	50th-90th	>90th	<=40th	40th-80th	>80th
$\Delta \ln y_i$	0.27389***	0.21814***	0.11014**	0.32871***	0.52402***	0.24959***
$\Delta \ln HW_i$	0.04921***	0.09981***	0.08767*	-	-	-
$\Delta \ln Size_i$	0.11463***	0.17116***	0.13737	0.39570*	0.05873	0.06347
Age/10	-0.02228	0.12789	-0.57686	0.07017	-0.14792	0.16558
High School	0.01393	0.01982	-0.02434	0.16657*	0.04643	0.11073
University	0.05165	0.02442	-0.01466	0.24333	0.01836	0.17591
Lives in North	-0.04121*	0.03426	0.01241	-0.11834	-0.06708	0.03602
Lives in South	-0.00733	0.01085	-0.11726*	-0.12731*	0.00646	0.26799*
Female Head	0.00587	0.00411	-0.00514	-0.05146	-0.10799*	-0.13851
Married	-0.01000	-0.01670	0.00646	-0.01795	-0.10594	-0.10432
$\Delta \ln Size_i^2$	-0.03146	-0.07183	-0.11562	0.07805	0.02057	-0.18510
$Age^2/100$	0.00851	-0.02353	0.10387	-0.00611	0.01654	0.00236
$Age^3/1000$	-0.00080	0.00141	-0.00601	0.00008	-0.00049	-0.00172
Intercept	0.07621	-0.23562	1.00393	-0.01645	0.56363	-0.73673
R^2	0.280	0.124	0.062	0.151	0.306	0.178
Observations	1561	1341	302	204	243	115

* indicates statistical significance at the 10 percent level, ** at the 5 percent level, *** at the 1 percent level.
Coefficients for qualitative regressors are to be interpreted as differences in relation to the respective base levels.

III.5.5 – *Income and Housing Wealth Effects by Income Class*

As a last test, before moving on to analyze the role of debt in consumption reactions, we will be looking at the income distribution. While wealth and income are two very different measures of households' conditions, we can expect consumption to behave similarly with respect to income and wealth distributions. In other words, we expect households who earn less to be more sensitive to unexpected shocks in income and wealth, exhibiting a concave relationship between consumption and income. Similarly to the previous section, we investigate the differences in consumption responses between below median, above median and highest-earning households, differentiating between homeowners and renters. The columns of TABLE III.7 and TABLE III.8 follow the exact same structure we discussed before: the first column, includes homeowners whose initial income was below the weighted median of homeowners' income distribution[65], the second column include families with an above-median level of income and the third column refers to the homeowners who earned the most, those above the 90th weighted percentile of the income distribution. Columns for renters follow the same pattern, albeit, again, with slightly different percentile breakdowns.

Looking at homeowners, in either period, the patterns are not very clear as far as the marginal propensity to consume out of income is concerned: above-median households seemed to react more than both below-median and the highest-earning households, with an estimated coefficient of about 30 percent. Between 2006 and 2008, surprisingly, low-paid households seemed to react the least, with a marginal propensity to consume of about 10 percent, while in the second period the lowest coefficient, 21 percent, belonged to the highest share of the income distribution. Interestingly, we can see that the reactivity of the two top groups did not change much over time, while for lowest-earning households it more than doubled.

Results for renters confirm a decreasing behavior for the second half of the distribution, while results for the lowest half are again mixed. In the first period lowest-earning renters seemed to react the most to variations in income, in the second they seemed to react the least.

Much nicer results are obtained when looking at the housing wealth effect. Lowest-earning households resulted having the strongest reactions in both time periods: the coefficient is 9 percent for the first period and 9.5 percent for the second. Top-paid households, on the other side, showed a non-significant or barely significant consumption reaction to housing capital variations.

Results for both income and housing wealth effects are summarized in FIGURE III.13 and FIGURE III.14. Dashed lines indicate non-significant results.

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[65] As before, the characteristic refers to the base year of each time span, i.e. 2006 for the first set of regressions and 2010 for the second set.
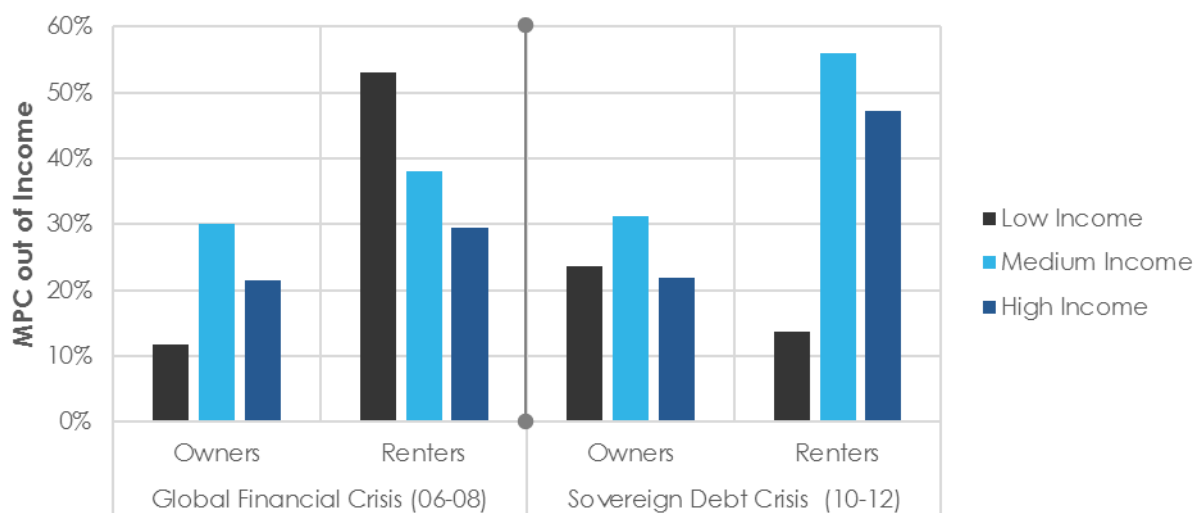
FIGURE III.11 – Marginal Propensity to Consume out of Income in the Two Crises
by Ex-ante Income Class
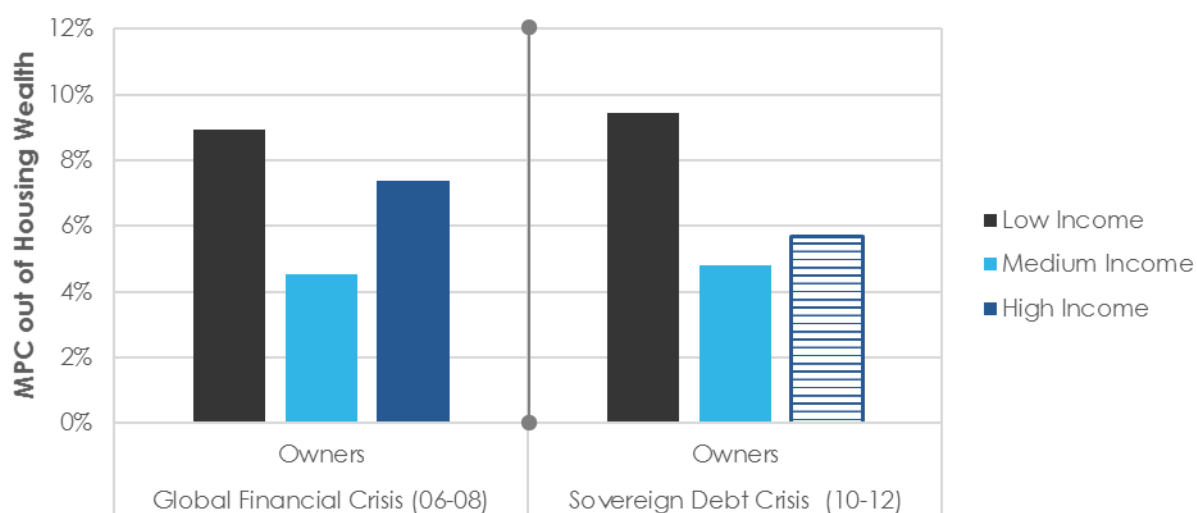
FIGURE III.12 – Marginal Propensity to Consume out of Housing Wealth in the Two Crises
by Ex-ante Income Class

TABLE III.7 – Income and Housing Wealth Effects between 2006 and 2008 by Income Class

	Owners	Owners	Owners	Renters	Renters	Renters

Dependent Variable: $\Delta \ln c_i$						
	Owners	Owners	Owners	Renters	Renters	Renters
Income %ile	<=50th	50th-90th	>90th	<=40th	40th-80th	>80th
$\Delta \ln y_i$	0.11814***	0.30125***	0.21511***	0.53130***	0.37990***	0.29473***
$\Delta \ln HW_i$	0.08956***	0.04535***	0.07389*	-	-	-
$\Delta \ln Size_i$	0.30758***	0.09503*	-0.17761	0.21022	0.01712	-0.14554
Age/10	-0.00082	0.23022	1.08354**	0.32591	0.60826*	-1.25833
High School	0.00638	-0.01977	0.02523	-0.21715**	-0.06294	0.09245
University	0.02912	-0.04715*	0.05106	-0.07511	0.11557	-0.00246
Lives in North	-0.00350	-0.00762	-0.05281	-0.05173	0.12434*	-0.09960
Lives in South	0.00507	0.02120	0.01403	-0.11722	0.03622	-0.10201
Female Head	0.03281*	-0.02315	-0.13147**	0.04377	-0.02433	-0.02969
Married	0.02561	-0.00995	-0.12042**	-0.00978	-0.01780	0.09937
$\Delta \ln Size_i^2$	0.07938	0.14294	-0.56738	-0.02796	0.31922	0.00628
$Age^2/100$	0.00099	-0.03587	-0.20977**	-0.06173	-0.11848*	0.22853
$Age^3/1000$	0.00001	0.00186	0.01249*	0.00350	0.00707	-0.01351
Intercept	-0.08608	-0.47831	-1.59182	-0.42136	-1.00574*	2.19932**
R^2	0.129	0.114	0.246	0.401	0.250	0.188
Observations	1456	1190	310	243	233	123

* indicates statistical significance at the 10 percent level, ** at the 5 percent level, *** at the 1 percent level.
Coefficients for qualitative regressors are to be interpreted as differences in relation to the respective base levels.

TABLE III.8 – Income and Housing Wealth Effects between 2010 and 2012 by Income Class

Income %ile	Owners $\leq 50^{th}$	Owners $50^{th}-90^{th}$	Owners $>90^{th}$	Renters $\leq 40^{th}$	Renters $40^{th}-80^{th}$	Renters $>80^{th}$
			Dependent Variable: $\Delta \ln c_i$			
$\Delta \ln y_i$	0.23613***	0.31214***	0.21938***	0.13667***	0.55898***	0.47250***
$\Delta \ln HW_i$	0.09455***	0.04797***	0.05690	-	-	-
$\Delta \ln Size_i$	0.15534***	0.07032	0.32969***	0.45509**	0.08620	0.07762
Age/10	0.06407	-0.15173	0.24422	0.34853	0.47017	-0.78734
High School	-0.00331	-0.00124	-0.04338	0.00796	0.03036	0.07686
University	0.01530	0.00894	-0.08152*	0.03347	-0.07265	0.12417
Lives in North	-0.02640	0.03225	-0.05640	-0.17055**	-0.15259**	0.05944
Lives in South	0.00027	0.06986**	-0.07930	-0.14676*	0.06328	0.02859
Female Head	-0.01248	0.04757**	-0.07561	0.11652*	-0.04324	-0.15125*
Married	-0.05465**	0.03881*	-0.06678	0.03548	-0.11106**	-0.20868**
$\Delta \ln Size_i^2$	-0.03835	-0.04823	0.19950	-0.18212	0.06585	0.14111
$Age^2/100$	-0.00418	0.01344	-0.04020	-0.07323	-0.08166	0.15609
$Age^3/1000$	-0.00019	-0.00008	0.00190	0.00456	0.00418	-0.00933
Intercept	-0.10675	0.37483	-0.24879	-0.37209	-0.55012	1.28044
R^2	0.239	0.163	0.122	0.114	0.339	0.233
Observations	1557	1292	320	215	219	128

* indicates statistical significance at the 10 percent level, ** at the 5 percent level, *** at the 1 percent level.
Coefficients for qualitative regressors are to be interpreted as differences in relation to the respective base levels.

Chapter IV – Debt and Credit Constraints

As we discussed in Chapter I, the Italian household debt market is considerably underdeveloped with respect to the majority of western economies. Low levels of household debt and, generally, a low degree of liquidity of real assets are determined by both cultural and institutional reasons. Intergenerational transfers and bequests play a big role in households' wealth creation and have historically acted as a buffer to limit the need of loan financing. Tight banking requirements, in part driven by inefficiencies in the foreclosing mechanism, prevent the poorest share of the population from accessing mortgages and the market the market for home-equity loans, which could be exploited by homeowners, is almost non-existent. We mentioned in the previous chapter that one of the channels through which house prices affect consumption is through their role as collateral for loans. Low overall levels debt can then justify weaker, housing wealth effects, especially on an aggregate level, as the collateral channel is limited. In the previous chapter, we did not focus on disentangling the different rationales of the effect, but given the considerations on the Italian debt market we can assume that it is mainly driven by anticipations of future expected income, in the sense that variations in the value of housing may someday result in a capital gain or loss were the asset to be sold or rented, and by psychological motives. Muellbauer, commenting the quantitative easing measures of the European Central Bank, extends the concept to the whole continental Europe:

"The housing collateral channel does not work in the core Eurozone, and the down-payment constraint for mortgages is far tighter than in the United States."

John Muellbauer, 2014[66]

Nonetheless, in the last decade, the loans market underwent a significant development. The ratio of households housing loans to GDP, which make up about 40 percent of total household debt, climbed from 7 percent in 1988 to 22 percent in 2014 with an aggregate value of home-purchase loans of €390bn. In addition, during the last few years, the Italian government embarked on a series of reforms aimed to increase the speed and efficiency of insolvency procedures and property foreclosures, and to promote higher recovery rates for creditors[67]. Lastly, following a formal request from the Italian Banking Association and other consumer associations, improvements have also been made to increase the liquidity potential of real estate assets, with the approval, in 2015, of a new set of rules for the *"prestitito vitalizio ipotecario"* [68].

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[66] Muellbauer J., 2014. "Combatting Eurozone deflation: QE for the people", *Voxeu.org*, December 23.
[67] Law Decree No. 83/2015 published in Gazzetta Ufficiale No. 147 of 27 June 2015, turned into Law No. 132/2015 published in Gazzetta Ufficiale No. 192 of 20 August 2015.
[68] Decree of the Minister for Economic Development No. 226 of 22 December 2015, published in Gazzetta Ufficiale No. 38 of 16 February 2016, in implementation of Law No. 44/2015, Art. 2.

This is a contract that allows homeowners older than 60 to obtain a loan using as collateral their own house, for an amount between 15 to 50 percent the value of the house itself; a sort of home-equity loan, or reverse mortgage, reserved for the elders.

Even if at a slow pace, Italy might be slowly moving towards a system *à la* United States, in which real assets are much more liquid and bank lending plays a significant role in defining households' life-styles. While this might enhance the consumption capabilities of Italian households, Mian and Sufi's "House of Debt" warns us about the dangers such a system implies. Taking inspiration from their research, this chapter will focus on indebted households in order to understand if and how debt impacts their consumption behavior. This chapter is an extension of the previous one: once again we are looking for heterogeneity in the marginal propensity to consume out of income and wealth, this time in relation to the second set of groups defined in Chapter II.

IV.1 – *Theoretical Rationale*

The considerations presented in Chapter I show that debt plays a minor role in the balance sheets of Italian households. Thus, the macro considerations of Mian and Sufi regarding the role of debt in enhancing and spreading recessive shocks throughout the economy can hardly be applied to Italy. Nonetheless, it can be very interesting to study what happens at the individual level, because understanding how a household behaves with respect to the negative side of its balance sheet is the first step to preventing the catastrophic consequences of an overleveraged environment.

The main way debt can influence consumption is by acting as a wealth effect multiplier. Let us consider a recessive scenario, in which house prices fell by 20 percent, and a family whose wealth only consists of its house, worth €100k. If we assume that the family bought the property outright, i.e. without a mortgage, then its wealth would drop to €80k and consumption would contract by an amount determined by its marginal propensity to consume out of wealth. Let us presume instead that the house was bought thanks to bank lending and that the mortgage covered 80 percent of its value. Since in this scenario the house is the collateral for the mortgage, the starting gross wealth of the family is still €100k, but its actual net wealth, or equity, is just €20k: four-fifths of the asset are not owned by the household until the mortgage is repaid. What happens as house prices fall? The value of the asset drops to €80k, but this remaining value does not belong to the family and the house goes into foreclosure, wiping out the overall wealth of the household. That means that a 20 percent decline in house prices leads to a 100 percent decline in the homeowner's equity. As we know that there exists a housing wealth effect, excluding considerations on heterogeneity across the wealth distribution and assuming then that the marginal propensity to consume is the same in both scenarios, the family would then reduce its consumption five times more than in the previous case and will obviously have to bear all the dramatic consequences of losing its residence. In a realistic scenario and in terms of marginal propensity to consume, we would expect the indebted families to be then more reactive

to changes in value of their houses, as the results of unexpected variations could be much more significative. This collateral rationale is just one reason why debt might influence consumption, and the foreclosure explanation might be quite extreme when referred to a market such as the Italian one[69]. In a milder environment, households who base their habits on debt financing might be forced to reduce their consumption more than other consumers because higher levels of debt relative to assets (following a devaluation of assets) prevent them from obtaining any further credit needed to finance their desired spending or because they cannot refinance their mortgages with lower-rate loans. Adding the effect of expectations and subjective behavior, highly leveraged households may become more uncertain about future credit availability and cut consumption to decrease leverage, or they might target a given level of debt relative to assets (or income) and subsequently choose to reduce consumption to pay down debt if external shocks pushed their leverage above such ratios[70]. Those motives can all be summarized, with a certain degree of generality, as credit constraints.

IV.2 – *Existing Literature and Proposed Approach*

Despite the reasonable theoretical considerations, the relationship between leverage and consumer spending is not widely accepted. Commenting on the issue, The New Yorker journalist James Surowiecki wrote:

"It's well established that when housing prices go up people feel richer and spend more… but when housing prices go down people cut their spending by the same amount in response. That means that – even if consumers had no debt at all – we'd expect a dropoff in consumption."

James Surowiecki, 2011[71]

But even if debt did not directly impact consumers' behavior, think about the previous example: declining house prices might lead to foreclosures and large-scale foreclosures have a considerable impact on house prices themselves, leading to an inevitable downward spiral. Debt does indeed have an effect on consumption through house prices. In addition, the above quotation does not consider the importance of cross-sectional heterogeneity. As we have seen, house prices impact differently different classes of households and even if the aggregate effect of debt might be superfluous, it is important to study its effect at the household-level to understand if and how it contributes to the distribution of the shocks. One could argue that to look at the wealth distribution, as we did in a section of Chapter III, is enough to isolate the role of credit constraints, as poorer households own less collateral to finance borrowing. But the best way

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[69] See Baldini M., 2010. *"La Casa degli Italiani"*, Bologna: Il Mulino.
[70] Dynan K & Edelberg W., 2013. "The relationship between leverage and household spending behavior: evidence from the 2007-2009 survey of consumer finance", *FRB of St. Louis reviews*, October.
[71] Surowiecki J., 2011. "The deleveraging myth", *The New Yorker*, November 14.

to get rid of the influence of spurious factors is to test directly whether debt plays a role. Does debt affect the consumption behavior of households? Do debtors suffer the most from unexpected changes in resources? Answering those questions might help explain where a recession begins and whom it hits the hardest and can provide important tools to prevent or at least limit the propagation of shocks in the economy. The levered losses theory introduced in Chapter I has its core in the difference in spending sensitivity between debtors and savers and so understanding whether this heterogeneity exists has very important implications, especially as far as policy is concerned.

Answering the call for more empirical evidence, the past few years have seen a rise of debt-related literature, some of which have tried to link household debt to real economic activity, mainly in the United States. Dynan (2012) used data from the PSID to show that spending by highly leveraged American households fell more sharply between 2007 and 2009 than would be expected based on other factors affecting these households, including their decline in wealth. Similar findings are reported by Cooper (2012), who used the same source for data. Dynan and Edelberg (2013) used the 2007 to 2009 Survey of Consumer Finances (SCF) to better explore the same issues and find that highly leveraged households were indeed more likely to report reductions in consumption in the aftermath of the crisis, even after controlling for other factors such as variations in income and wealth. The many-times cited work of Mian, Rao and Sufi (2013) estimated the effects of the 2006 to 2009 housing collapse on households' consumption, using a dataset based on proprietary data and exploiting geographic variation in housing prices at the county and zip code levels. They found that zip codes with poorer and more levered households experienced a larger drop in consumption, as indicated by higher marginal propensities to consume. Using publicly available data and looking to re-affirm Mian and Sufi's work, Kaplan et al. (2016) found instead a non-significant independent effect of initial leverage on non-durable expenditures, casting doubt, for the first time, on the balance-sheet channel interpretation of the Great Recession.

Moving away from the United States, we find few but significative researches. Disney et al. (2010) provide evidence from the United Kingdom that spending by underwater homeowners has a higher sensitivity to wealth shocks. Kukk (2014) investigated the extent to which household indebtedness suppressed consumption during the economic downturn in 2008-2009 in Estonia and found out that household indebtedness amplifies the recession. Andersen et al. (2014) use data for nearly 800,000 Danish families to examine whether high household leverage may have amplified the reduction in spending during the crisis and find supporting evidence. Yao et al. (2015) focused on Norway and, among other things, found evidence that households who have recently bought houses have high leverage and high marginal propensities to consume. Following a slightly different approach, Choi and Son (2016) managed to define certain thresholds for debt ratios beyond which consumption can be hampered by an additional increase in the ratio, using household-level panel data in Korea.

Our aim in this section is to understand how indebted or credit constrained Italian households react in response to income or housing wealth shocks, applying the same methodology we used in Chapter III. Using again equation (III.3), we will be running multiple regressions on different groups of households to see how the marginal propensities to consume vary across them. As mentioned in Chapter II, we will be only considering one dataset, the one related to the sovereign debt crisis, because the 2006 SHIW questionnaire was quite different with respect to the following one, as far as debt-related questions are concerned. While we will be missing out on valuable information, the dataset we are left with is the one we most care about, as it describes the most critical part of the recession. We want to stress out that we make no pretense of exhaustively, nor we consider our results compliant with unbiasedness criteria[72]. All we want to do is provide an intuition regarding cross-sectional heterogeneity with respect to debt and check if our results are in line with what we would expect, i.e. a marginal propensity to consume that increases the more households are credit constrained.

IV.3 – *Empirical Results*

As before, the following regressions have been performed using an outlier-robust bisquare procedure. The observations were weighted using population weights. All consumption, income and wealth variables were expressed in real terms (in 2014 money) and as first-difference of natural logarithms. With the exception of the results contained in TABLE IV.I, the samples will be made of only homeowners. Differently from before, $\Delta \ln HW_i$, the variable used to estimate the housing wealth effect, will refer to variations in gross housing wealth, as we don't want to include the effect of variations in the level of debt during the course of the crisis.

IV.3.1 – *Income and Housing Wealth Effects by Debt and Credit Constraints*

TABLE IV.1 presents the results for the first and most general breakdown: overall sample versus indebted households, in which debt refers to both housing loans and consumer credit[73]. We focus on ex ante levels of debt because of concerns that ex post levels of debt may be endogenous with respect to some of the outcome variables of interest in our study. For example, indebted households that cut back on consumption between 2010 and should have tended to reduce their debt over the period solely because they needed less debt to finance their lower levels of spending. By comparing the first and the second column, we can see that debtors are, on average, more responsive with respect to the overall sample. This is consistent with what we would expect: indebted households cut spending more when resources shrink and can be more generous when constraints are relaxed. As usual, the first line refers to the income effect. We see that the results are statistically significant at the 1 percent level and that the coefficient for indebted households is

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[72] This is partly because only a small share of households in our sample reported a positive value for financial liabilities.

[73] The results are not directly comparable with those reported in TABLE III.2 because here we are considering variations in gross housing wealth.

about 6 percent higher than the one estimated for the overall sample: 32 percent and 26 percent, respectively. Debt comes with monthly obligations and so it is quite understandable that variations in income are reflected in adjustments in consumption behavior, even though unobserved factors such as the overall wealth of the household might indeed play a role.

Our main interest lies, though, in the housing wealth effect. Results are indeed reassuring: once again the estimating for the indebted class results in a higher parameter, indicating that these families, relatively speaking, give more importance to the value of their main form of wealth in defining their consumption choices. While we do not try to understand which of the reasons described in the previous section is the true rationale for this behavior, the estimation is consistent with the idea of collateral augmenting the role of housing wealth for debtors. During the sovereign debt crisis, they reduced their consumption by about 0.1 percent for any percent point decrease in their housing wealth, while on average the effect was lower, 0.075 consumption variation for each point percent shock.

Column 3 follows a different approach. We thought it might be interesting to study how people who reported themselves to be credit constrained in 2010 reacted to shocks during the recession. In order to do this, we built a variable from three financing availability-related SHIW questions and separated those who reported positive answers, in the sense that they did not feel credit constrained, and those who did not. In short, we checked whether households were able to obtain a loan from a bank or if such request was turned down[74]. Unfortunately for us (and luckily for them) only a small fraction of the households resulted compliant with our criteria for defining credit constraints and so the results are not reliable. That said, estimation for credit constrained households resulted again in an above-average marginal propensity to consume out of housing wealth, while the parameter for the income effect was lower. It is important to note that we do not know if the households we considered already had any outstanding debt and made often use of bank lending or if it was the first time they tried to approach financial institutions.

All the results are summarized in FIGURE IV.1 and FIGURE IV.2.

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[74] We reported the questions we used in Chapter II, when talking about households' groups.
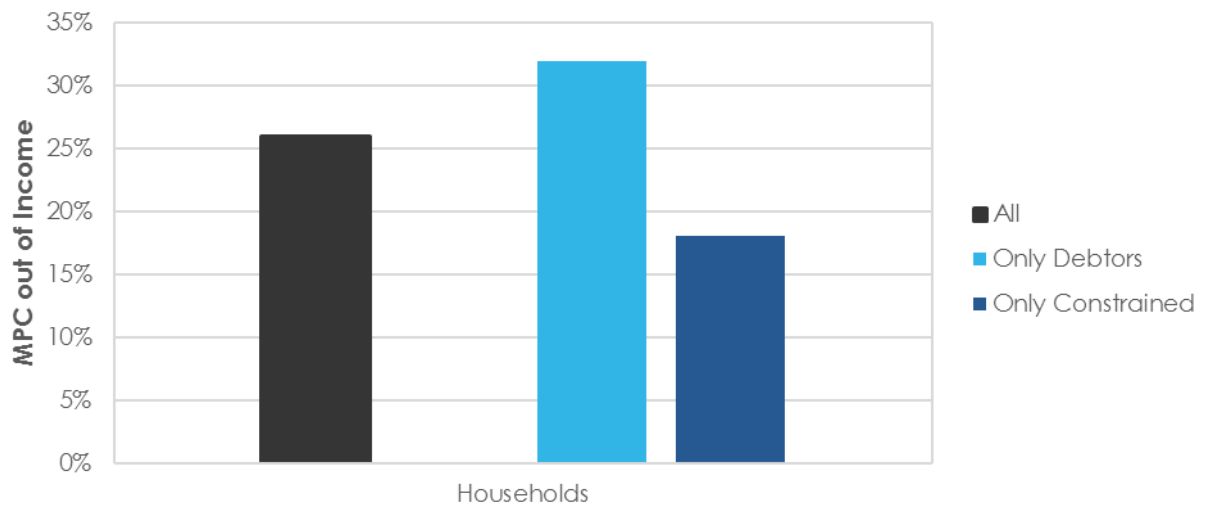
FIGURE IV.1 – Marginal Propensity to Consume out of Income between 2010 and 2012
by Debt and Credit Constraints
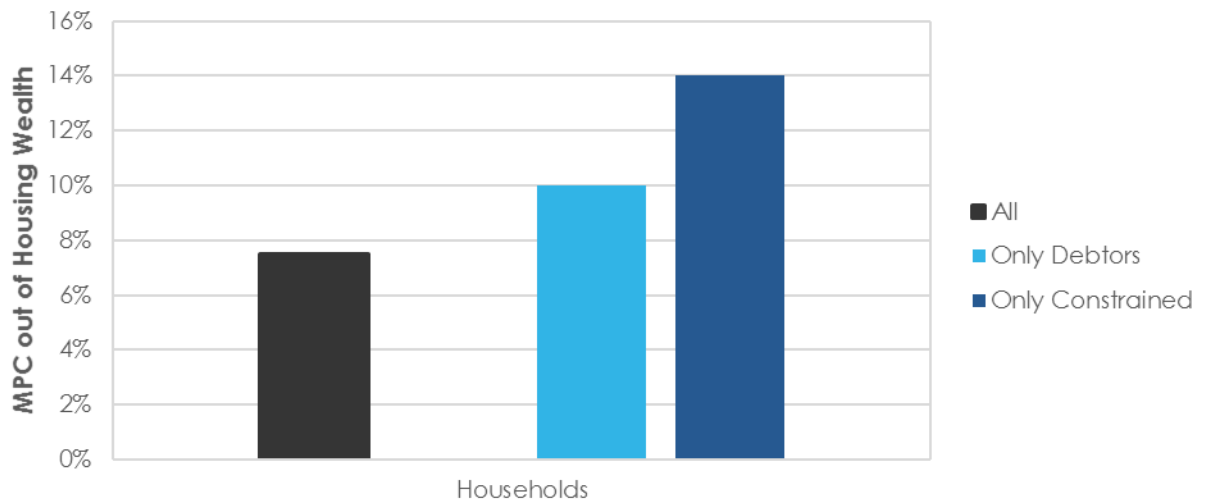
FIGURE IV.2 – Marginal Propensity to Consume out of Housing Wealth between 2010 and 2012
by Debt and Credit Constraints

TABLE IV.1 – Income and Housing Wealth Effects between 2010 and 2012 by Debt and Constraints

	Dependent Variable: $\Delta \ln c_i$		
	All	All Debtors	All Constr.
$\Delta \ln y_i$	0.26462***	0.31968***	0.17667***
$\Delta \ln HW_i$	0.07515***	0.10033***	0.13899**
$\Delta \ln Size_i$	0.16430***	0.12790**	0.18486
Age/10	0.011105	0.17696	0.56593
High School	0.016404	0.00798	0.15433*
University	0.012505	0.02218	0.11300
Lives in North	-0.02386*	0.00425	-0.28920**
Lives in South	0.00260	0.03581	-0.06387
Female Head	-0.00282	0.00646	0.03757
Married	-0.030490	-0.03582	-0.08450
$\Delta \ln Size_i^2$	-0.05177	-0.03290	0.05708
$Age^2/100$	0.00116	-0.02574	-0.09394
$Age^3/1000$	-0.00028	0.00106	0.00531
Intercept	0.01278	-0.33410	-0.96364
R^2	0.198	0.188	0.254
Observations	3717	976	125

* indicates statistical significance at the 10 percent level, ** at the 5 percent level, *** at the 1 percent level.
Coefficients for qualitative regressors are to be interpreted as differences in relation to the respective base levels.

IV.3.2 – *Income and Housing Wealth Effects by Debt Ratios*

We now move on to something more specific. The following analysis will apply to homeowners only and will use a different definition of debt. To mirror our definition of housing wealth, we will focus in this section on the portion of debt directly related to it: bank mortgages used to purchase households' primary residence. This allows us to build accurate indicators, without any interference from other kinds of financial liabilities that are not precisely measured in the SHIW, such as consumer credit. This time, though, we will not simply differentiate between those who had debt outstanding and those who did not; instead, we are interested in how the most vulnerable households behaved with respect to the average. To do so, we will use three indicators:

Loan to Value (LtV): it is a tool used to evaluate the risk in a collateralized loan, usually a mortgage loan. The ratio is equal to the mortgage amount divided by the value of the property used as collateral for the loan. In our case, we will assume that those with an outstanding house mortgage used their house as collateral and the LtV will be equal to the self-reported value of the mortgage divided by the self-reported value of the residence.

Loan to Income (LtY): it is an indicator of sustainability, showing how many years' income is needed to pay off the debt. The indicator is obtained by dividing the self-reported value of the mortgage by the value of yearly income which will be, as usual, non-financial monetary income.

Debt Service (DS): it is yet another indicator of debt sustainability, often used to identify borrowers more likely to struggle to meet their debt obligations. It is obtained by dividing the annual mortgage payments by the annual family income.

As mentioned in Chapter II, the above indicators are used to split the sample into different sub-groups: we define threshold to differentiate between safer or less constrained debtors and more exposed households, and we then run multiple regression to study the behavior of the marginal propensity to consume. The thresholds are set taking inspiration from existing literature and adjusted after taking into considerations the peculiarities of the Italian debt market[75]. We stress once more that the very small sample size does not allow us to draw definite conclusions. It is worth noting, though, that the use of three different indicators can partially serve as a robustness check for the results.

TABLE IV.2 is built as follows: the first column reports the results from income and housing wealth effects for non-indebted homeowners[76], columns 2 and 3 show the results for the breakdown by the loan to value

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[75] We will use 0.35 as threshold for the loan to value ratio, 2 for the loan to income ratio and 0.15 for the debt service ratio.

[76] The results are not directly comparable with those reported in TABLE III.2 because here we are considering variations in gross housing wealth.

ratio, 4 and 5 refer to the loan to income ratio and the last two columns are built with reference to the debt service ratio. Results for the first row are all statistically significant at the 1 percent level, confirming that income is the main driver of consumption choices. We can see that the estimated parameters for all the groups of indebted households are higher with respect to the one obtained for non-indebted families, in line with the idea that consumption behavior of borrowing families is partly determined by their monthly debt obligations. Indebted households of the lower classes, i.e. those reported in columns 3,5 and 7, have a marginal propensity to consume out of income between 6 and 10 percent points higher than the non-indebted average. Looking at the specific groups, we notice an appropriate increasing trend: the estimated parameters for households characterized by a low loan to value ratio is 35 percent, while the estimation reports a coefficient of 0.45 for the high loan to value class, indicating that households are more reactive to shocks the more financially vulnerable they are. The same applies when considering the loan to income and debt service ratios, as graphically shown in FIGURE IV.3.

Results for the housing wealth effect are most likely conditioned by the low number of observations and are non-significant for many groups. In any case, column 2, 4 and 7 report significant coefficients and all of them are higher than the estimate for the sample of non-indebted households. We obtained a single significant coefficient for every couple of groups, but even the non-significant parameters seem to suggest a reasonable result. The coefficients for the below-threshold households are 10 percent, 9.5 percent and 9 percent (non-significant) for the breakdowns based on loan to value ratio, loan to income ratio and debt service ratio, respectively; while the estimated results for the most vulnerable households are 12 percent (non-significant), 9.6 percent (non-significant) and 11 percent with reference to the same indicators.

Our analysis of ex-ante debt ratios, keeping in mind the caveats regarding the poor performance of the estimations, yields results that are consistent with those of Mian, Rao and Sufi (2013): households characterized by high debt ratios are more vulnerable to shocks in their resources. Focusing on housing wealth, the collateral role of the asset amplifies the responses in terms of consumption and this effect is greater the higher the leverage of the household. Results are reported in FIGURE IV.4.
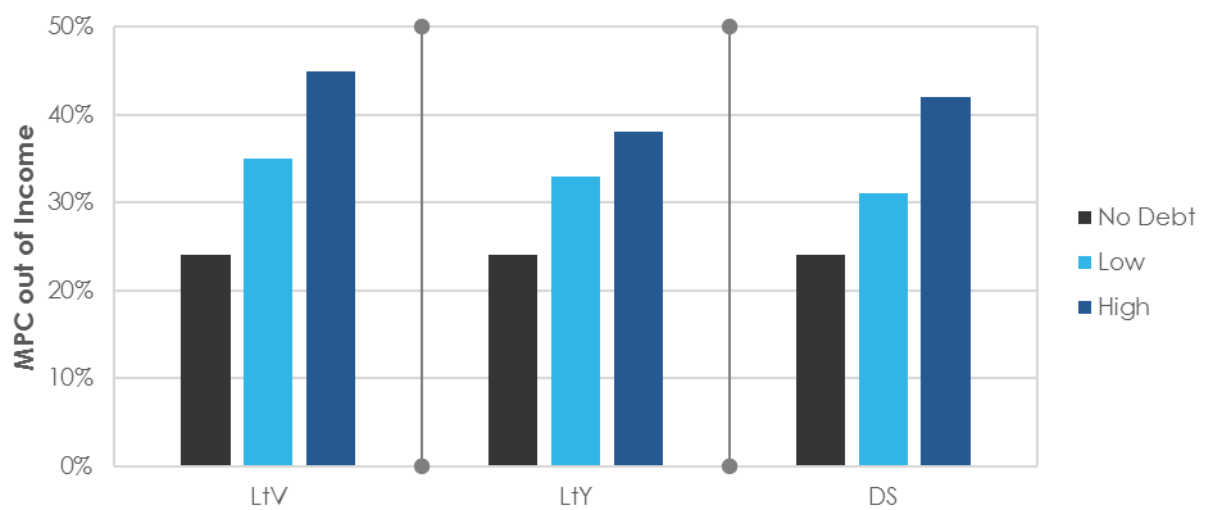
FIGURE IV.3 – Marginal Propensity to Consume out of Income between 2010 and 2012
by Debt Ratios
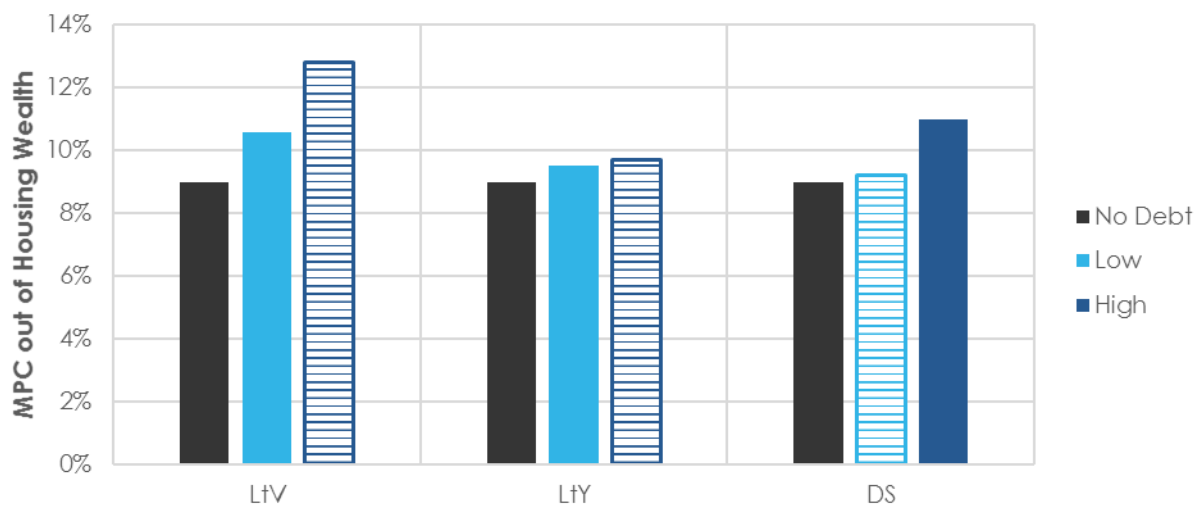
FIGURE IV.4 – Marginal Propensity to Consume out of Housing Wealth between 2010 and 2012
by Debt Ratios

TABLE IV.2 – Income and Housing Wealth Effects between 2010 and 2012 by Debt Ratios

|	Dependent Variable: $\Delta \ln c_i$						
Income %ile	Owners No Debt	Owners LtV<0.35	Owners LtV>0.35	Owners LtY<2	Owners LtY>2	Owners DS<0.15	Owners DS>0.15
$\Delta \ln y_i$	0.23597***	0.35420***	0.45482***	0.33204***	0.38842***	0.31298***	0.42973***
$\Delta \ln HW_i$	0.09029***	0.10649**	0.12807	0.09537*	0.09617	0.09265	0.11399**
$\Delta \ln Size_i$	0.14497***	0.24434*	0.28009	0.30882	-0.04712	0.13656	0.10670
Age/10	-0.02609	-0.40890	-0.50371	-0.65131	1.09590	-0.97629	0.23835
High School	0.00464	0.05518	-0.04488	0.05931	-0.05436	0.16045**	-0.04496
University	0.00752	0.07181	0.09243	0.13105	0.07245	0.15738	0.07096
Lives in North	-0.00041	0.06003	-0.04517	0.08200	-0.07026	0.08469	-0.00880
Lives in South	0.01665	0.11104**	-0.01033	0.13716**	-0.03973	0.10553	0.04291
Female Head	0.00820	0.02143	0.09521	0.05899	0.02646	-0.09432	0.09631*
Married	-0.01912	-0.00925	-0.08180	0.10574*	-0.14920**	-0.00932	-0.02095
$\Delta \ln Size_i^2$	-0.04490	0.07262	-0.35262	0.11853	0.12323	-0.01418	-0.03382
$Age^2/100$	0.00665	0.05820	0.10791	0.10839	-0.21816	0.21637	-0.04683
$Age^3/1000$	-0.00055	-0.00264	-0.00712	-0.00562	0.01341	-0.01490	0.00281
Intercept	0.07009	0.84621	0.86083	1.02920	-1.50865	1.17275	-0.30866
R^2	0.192	0.147	0.220	0.187	0.174	0.251	0.190
Observations	2779	253	137	229	131	177	213

* indicates statistical significance at the 10 percent level, ** at the 5 percent level, *** at the 1 percent level.
Coefficients for qualitative regressors are to be interpreted as differences in relation to the respective base levels.

IV.3.3 – *Income and Housing Wealth Effects by Deposits*

The low number of indebted households interviewed in the SHIW does not allow us to obtain satisfying results. To overcome this obstacle, we propose a last test based on net liquid deposits. This can be considered a middle ground between the estimation based on the wealth distribution of Chapter III and the ones relative to credit constraints presented in this chapter. The underlying rationale is that we expect households with a lower amount of net liquid financial assets to react more consumption-wise to external shocks, because they lack an immediate buffer. Being real estate wealth relatively illiquid, this approach might better isolate constrained households with respect to an ex-ante classification based on overall wealth. Note that our definition of deposits includes also government bonds and other liquid financial assets and is net of short-term financial liabilities. Once again, we focus on homeowners only.

The results reported in TABLE IV.3 are quite satisfying. Households with a low level of bank deposits, those below the 20th percentile of the distribution, are more reactive then their peers with respect to both income and housing wealth. The estimated marginal propensity to consume out of income for this group is 27 percent and the estimated housing wealth effect is around 12.5 percent. Families with a level of deposits between the 20th and the 60th percentiles of the distribution reacted less: they lowered consumption by 0.24 percent for every 1 percent change in income, and by 0.09 percent for every percent point change in housing wealth. Those with the richest bank accounts behaved similarly to the middle group as far as sensitiveness to income is concerned, while their response to housing values variations was even lower, yet still significantly different from zero, and about 6 percent. Results for income and housing wealth are presented in FIGURE IV.5 and FIGURE IV.6, respectively.

Those results are interesting. Consumption of Italian households seems to behave in a concave manner with respect to liquid financial assets, more than with respect to overall wealth, as far as housing prices responsiveness is concerned. This might be a consequence of the low degree of liquidity that characterizes real assets in Italy.
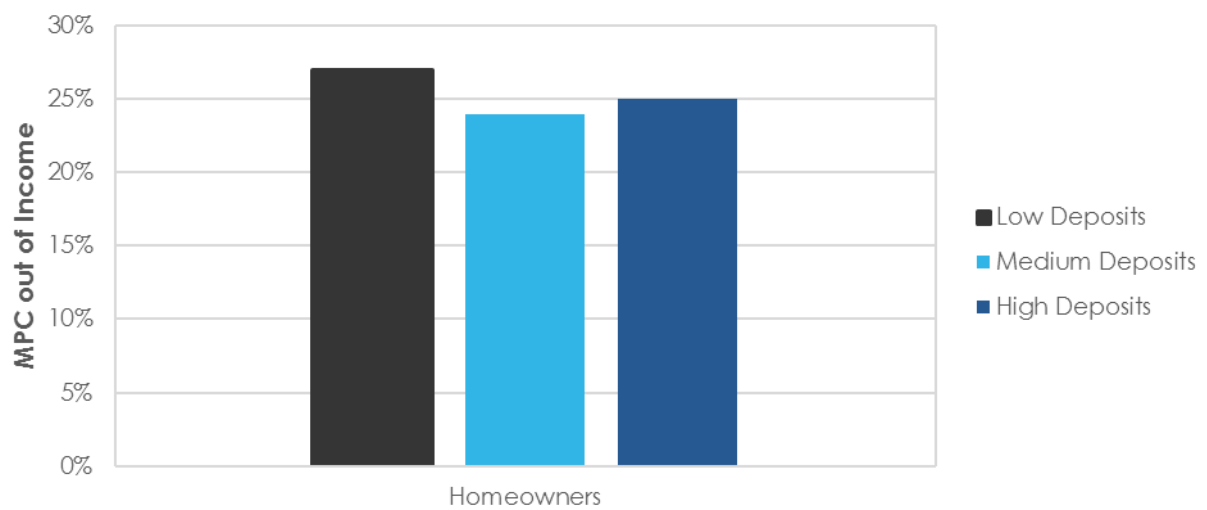
FIGURE IV.5 – Marginal Propensity to Consume out of Income between 2010 and 2012
by Deposits
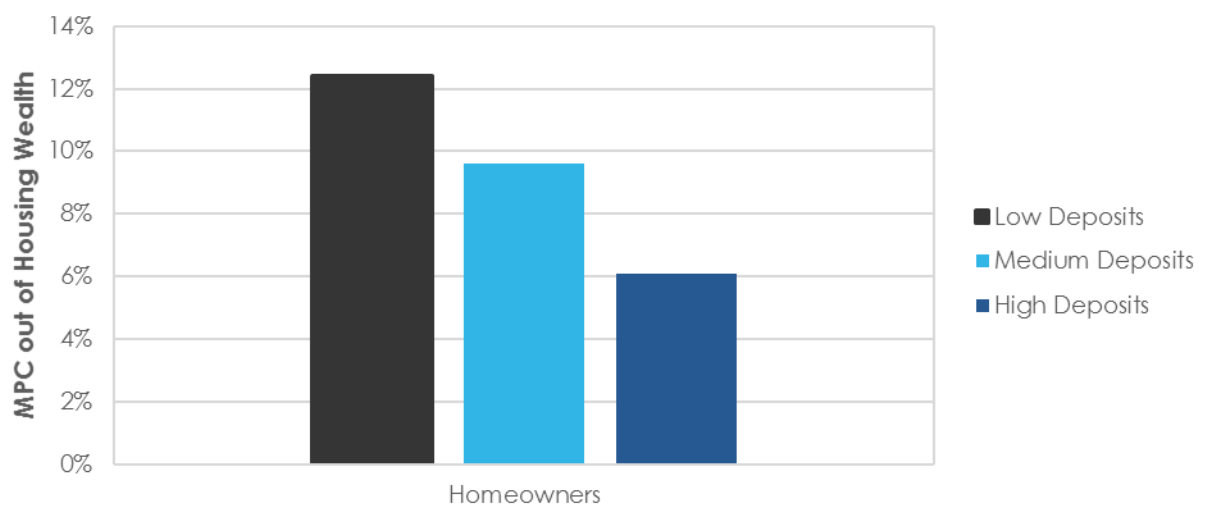
FIGURE IV.6 – Marginal Propensity to Consume out of Income between 2010 and 2012
by Deposits

TABLE IV.3 – Income and Housing Wealth Effects between 2010 and 2012 by Deposits

	Dependent Variable: $\Delta \ln c_i$		
	Owners	Owners	Owners
Deposits %ile	$<=20^{th}$	20th-60th	$>60^{th}$
$\Delta \ln y_i$	0.27384***	0.24109***	0.25144***
$\Delta \ln HW_i$	0.12431***	0.09656***	0.06107***
$\Delta \ln Size_i$	0.11327*	0.13210***	0.15955***
Age/10	-0.08637	-0.29249*	0.21998
High School	-0.04090	0.03282*	-0.01266
University	-0.08174*	0.03689	-0.00304
Lives in North	-0.03890	0.00858	0.00214
Lives in South	0.00835	0.025655	0.03258
Female Head	0.00902	-0.01288	0.04473**
Married	-0.01913	0.00267	-0.03574
$\Delta \ln Size_i^2$	-0.00237	-0.04477	-0.08289
$Age^2/100$	0.02961	0.04678	-0.04110
$Age^3/1000$	-0.00251	-0.00241	0.00232
Intercept	0.07513	0.58894*	-0.30698
R^2	0.287	0.170	0.146
Observations	624	1213	1332

* indicates statistical significance at the 10 percent level, ** at the 5 percent level, *** at the 1 percent level.
Coefficients for qualitative regressors are to be interpreted as differences in relation to the respective base levels.

Conclusion

This research focused on the estimation of the housing wealth and income effects on Italian households' consumption using household-level panel data from the Survey of Household Income and Wealth. The characteristics of the data source allowed us to construct head-to-head datasets without the need to resort to approximations or grouping techniques. The main source of inspiration was the 2014 book "House of Debt" and so we placed great importance on the heterogeneous responses of different classes of households during the recent period of economic downturn.

Our results show that households' non-durable consumption reacted statistically significantly to income variations and that renters were more responsive that homeowners, nearly twice as much. In addition, we found out that the response to income shocks was stronger during the sovereign debt crisis than in the earliest years of the recession. Regarding housing wealth effects, our estimations indicate that homeowners reacted significantly to shocks in the value of their primary residence and that this effect was in the range of 7 to 9 percent, without substantial differences between the two periods we analyzed.

We also found that older households were more reactive to shocks in resources with respect to households led by younger individuals. Indeed, younger households seemed to be unresponsive to variations in their housing wealth. This result is consistent with the predictions of the life-cycle hypothesis.

More puzzling results followed the estimation based on the wealth distributions, that resulted in a relatively low marginal propensity to consume for the poorest share of the population. This is probably a consequence of the tight requirements of the Italian banking system, which prevent the poorest from accessing loan financing and diminishes the role of housing as collateral. The focus on the income distribution yielded, instead, more conventional results, with lowest-earning households showing stronger reactivity.

As last source of heterogeneity, we investigated the effect of debt and credit constraints. While the results are weak, most likely as a consequence of the small sample size of indebted households, they seem to suggest a positive relationship between consumption elasticity and balance sheet vulnerability in terms of debt ratios.

In addition, in the first part of this document, we tried to explain the different rationales between the American and the Italian crises and performed a statistical analysis to understand the effects of the double-dip recession on Italian households. The resulting growth rates show that the effect of the earliest part of the recession was quite limited and that Italian families managed to smooth their consumption against income fluctuations. During the sovereign debt crisis, instead, the further reduction in wealth caused by increasing difficulties and a further devaluation of real assets, together with a widespread loss of confidence, resulted in a collapse of household spending and a fall of internal demand.

Appendix

FIGURE A.1 – Variations of Relevant Variables by Income Quintiles during the Recessions

In Order: Income, Consumption, Wealth and Real Assets
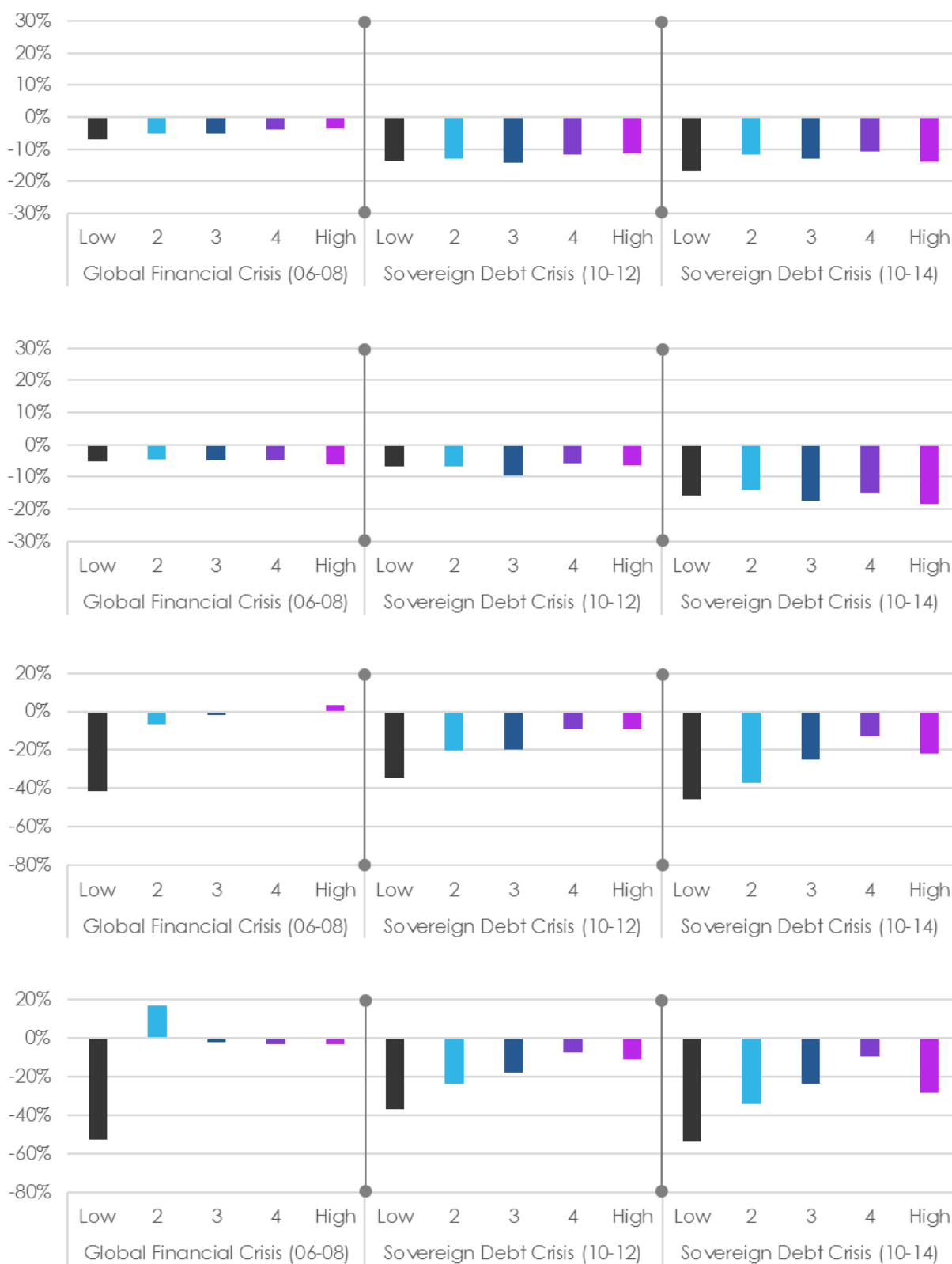
FIGURE A.2 – Variations of Relevant Variables by Wealth Quintiles during the Recessions

In Order: Income, Consumption, Wealth and Real Assets
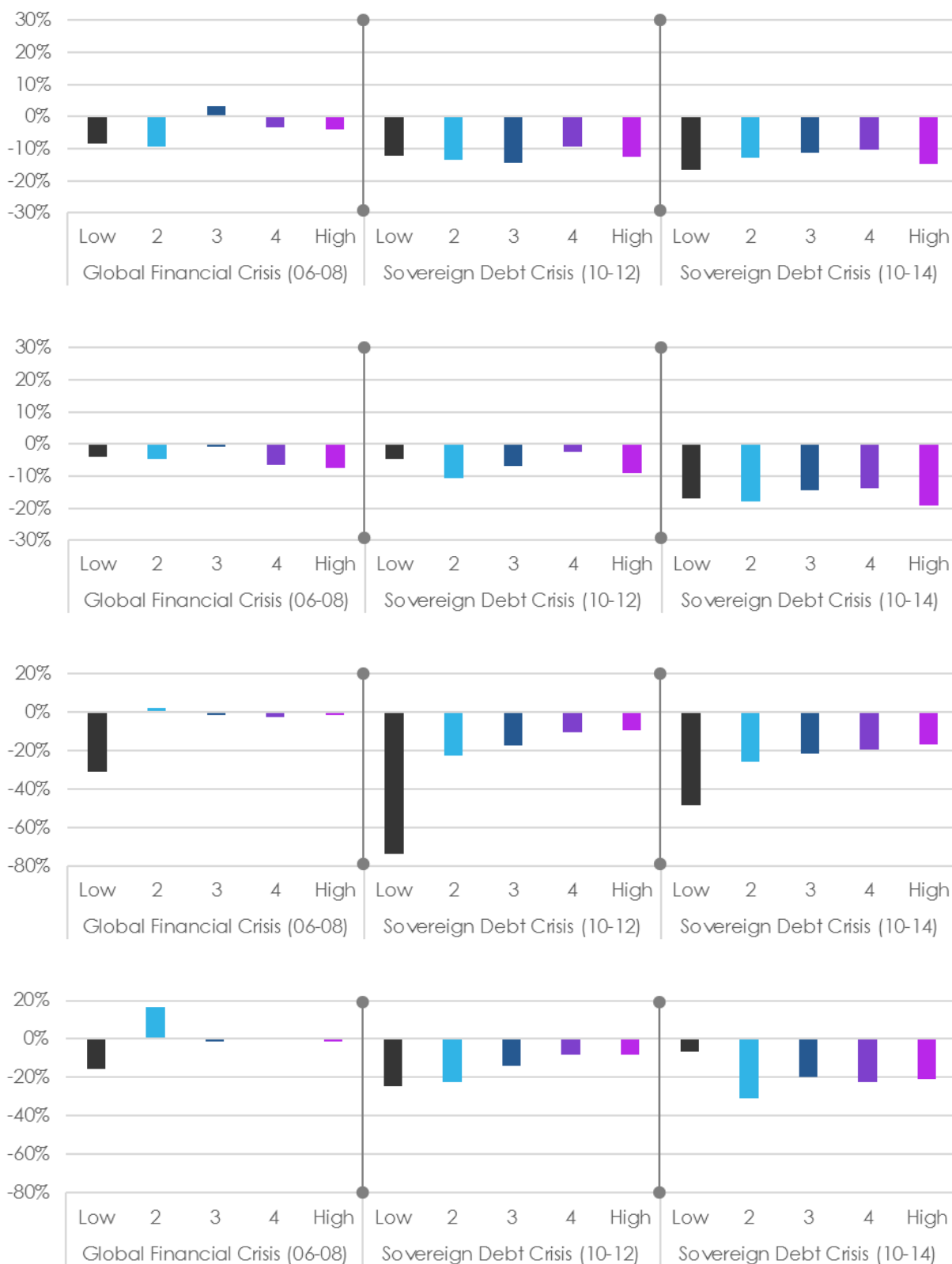
FIGURE A.3 – Variations of Relevant Variables by Age during the Recessions

In Order: Income, Consumption, Wealth and Real Assets
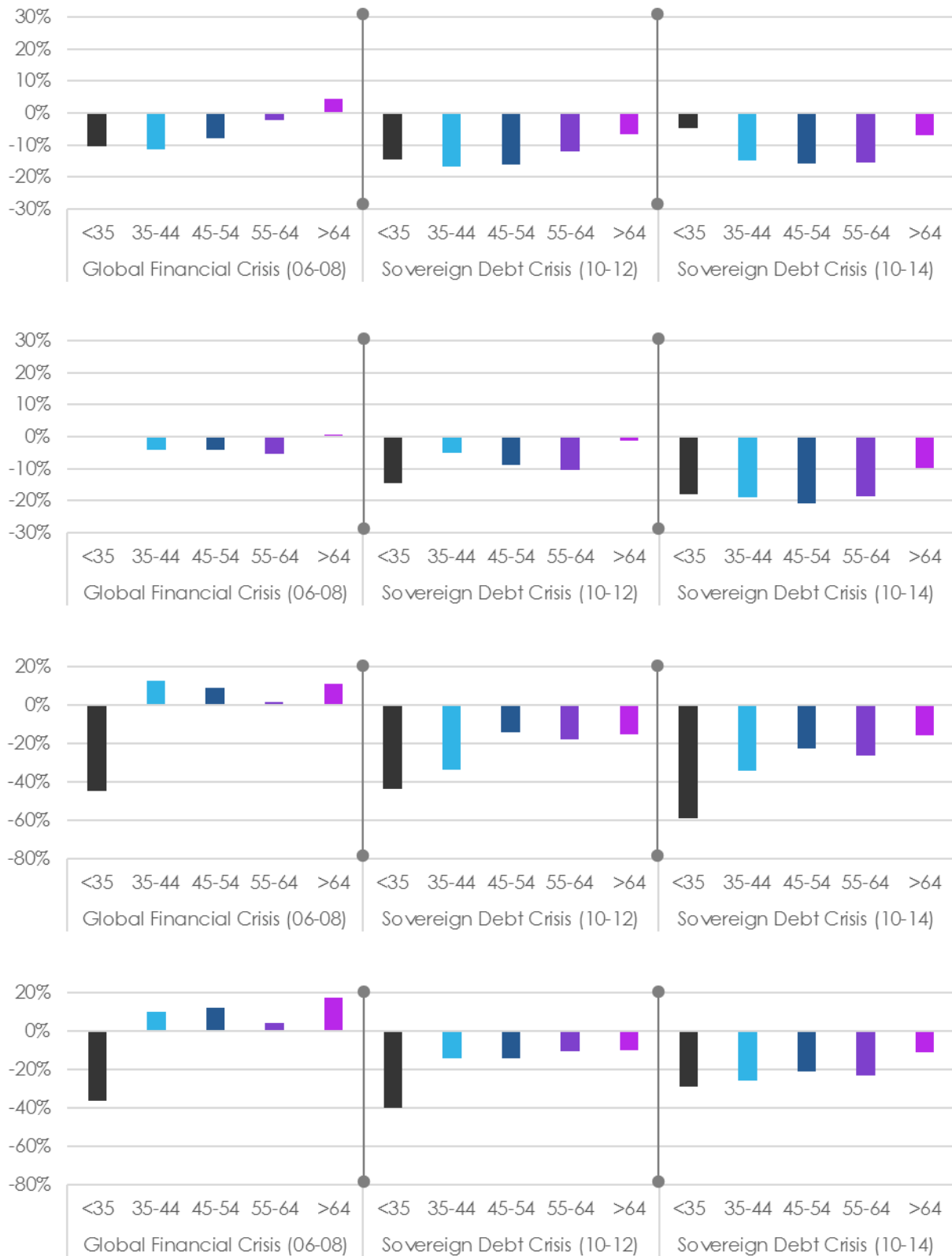
FIGURE A.4 – Variations of Relevant Variables by Education Level during the Recessions

In Order: Income, Consumption, Wealth and Real Assets

FIGURE A.5 – Variations of Relevant Variables by Home Ownership during the Recessions

In Order: Income, Consumption, Wealth and Real Assets

FIGURE A.6 – Variations of Relevant Variables by Geography during the Recessions
In Order: Income, Consumption, Wealth and Real Assets

TABLE A.1 – Evolution of Income (2014 prices) during the Crisis from SHIW Data

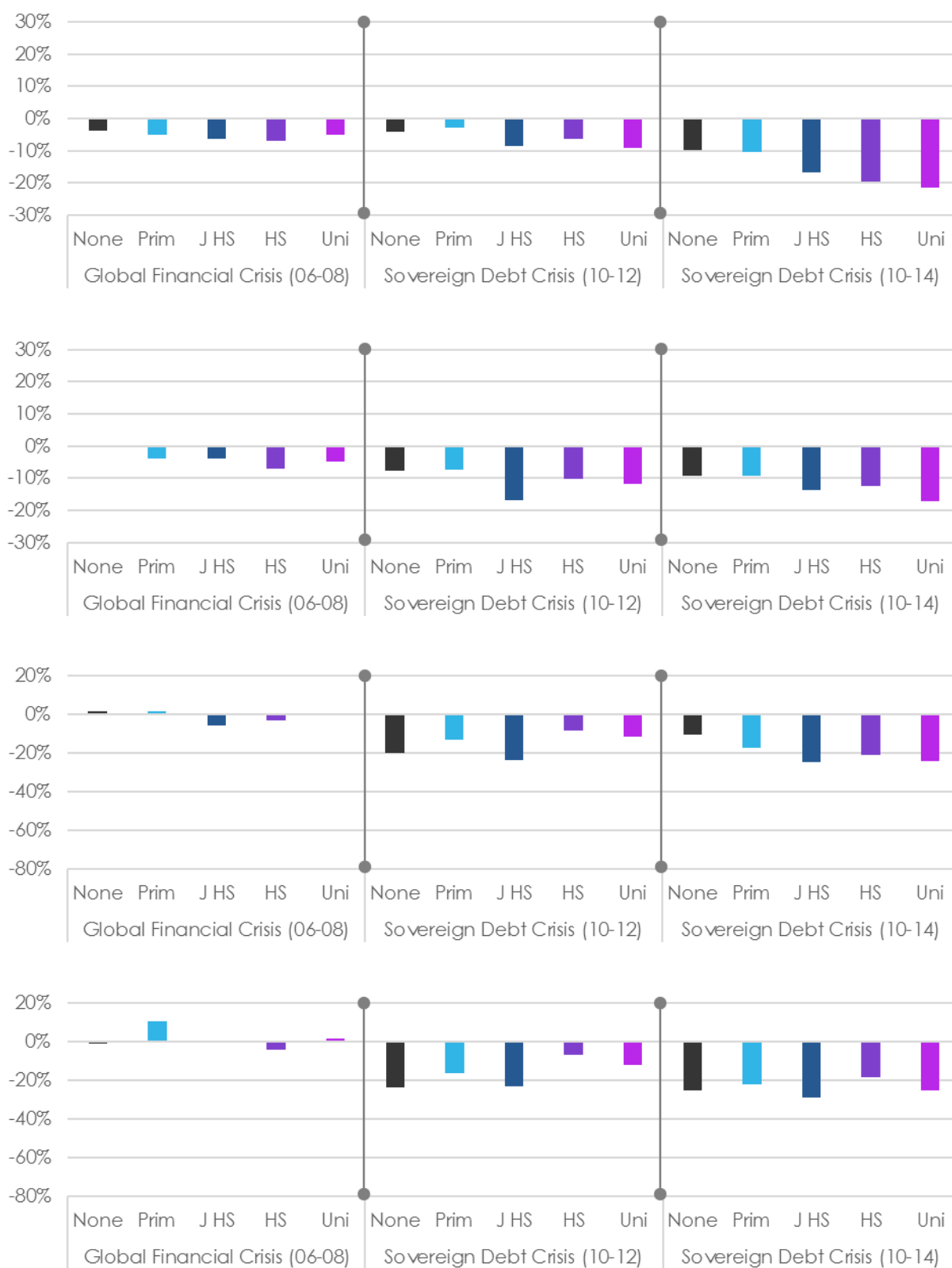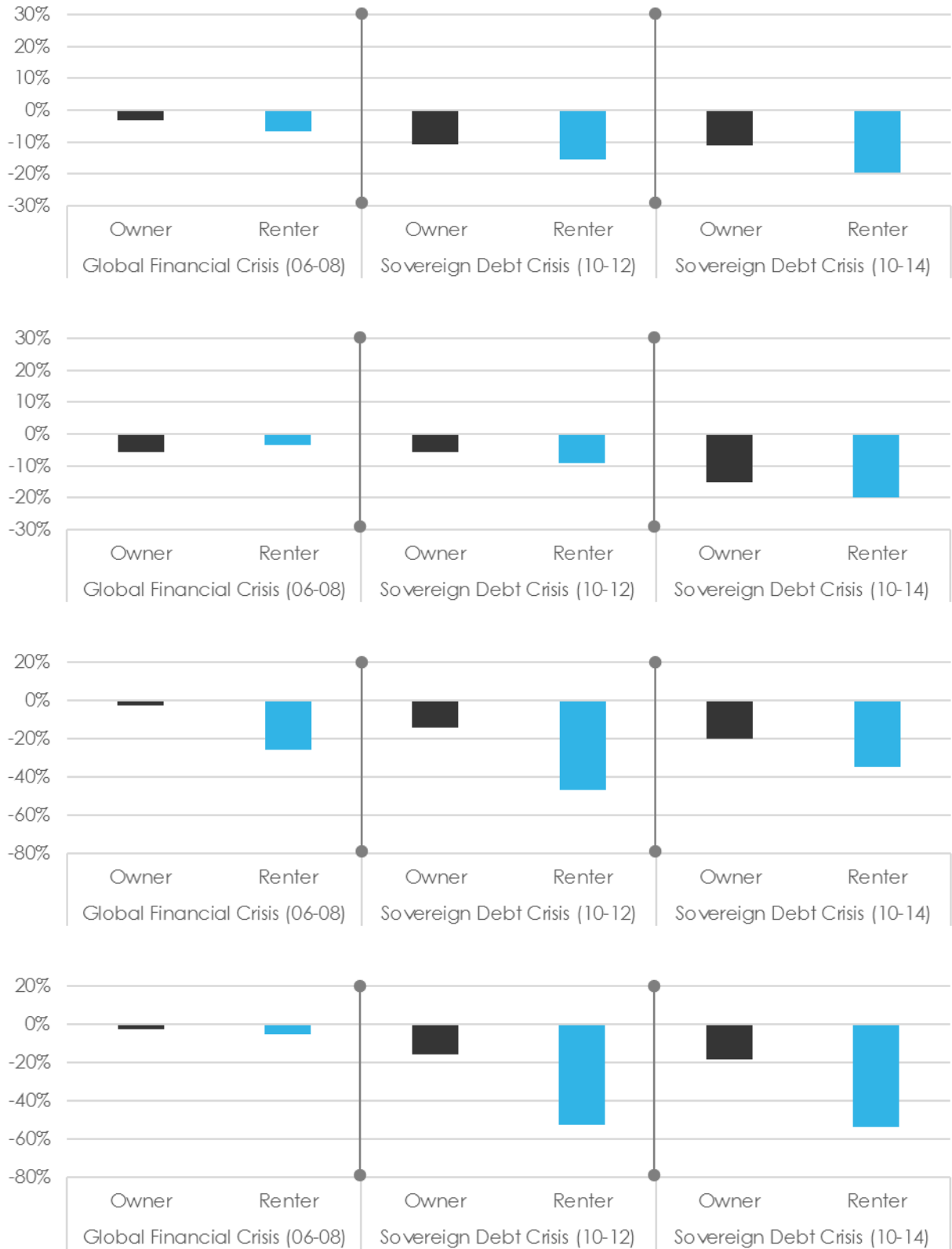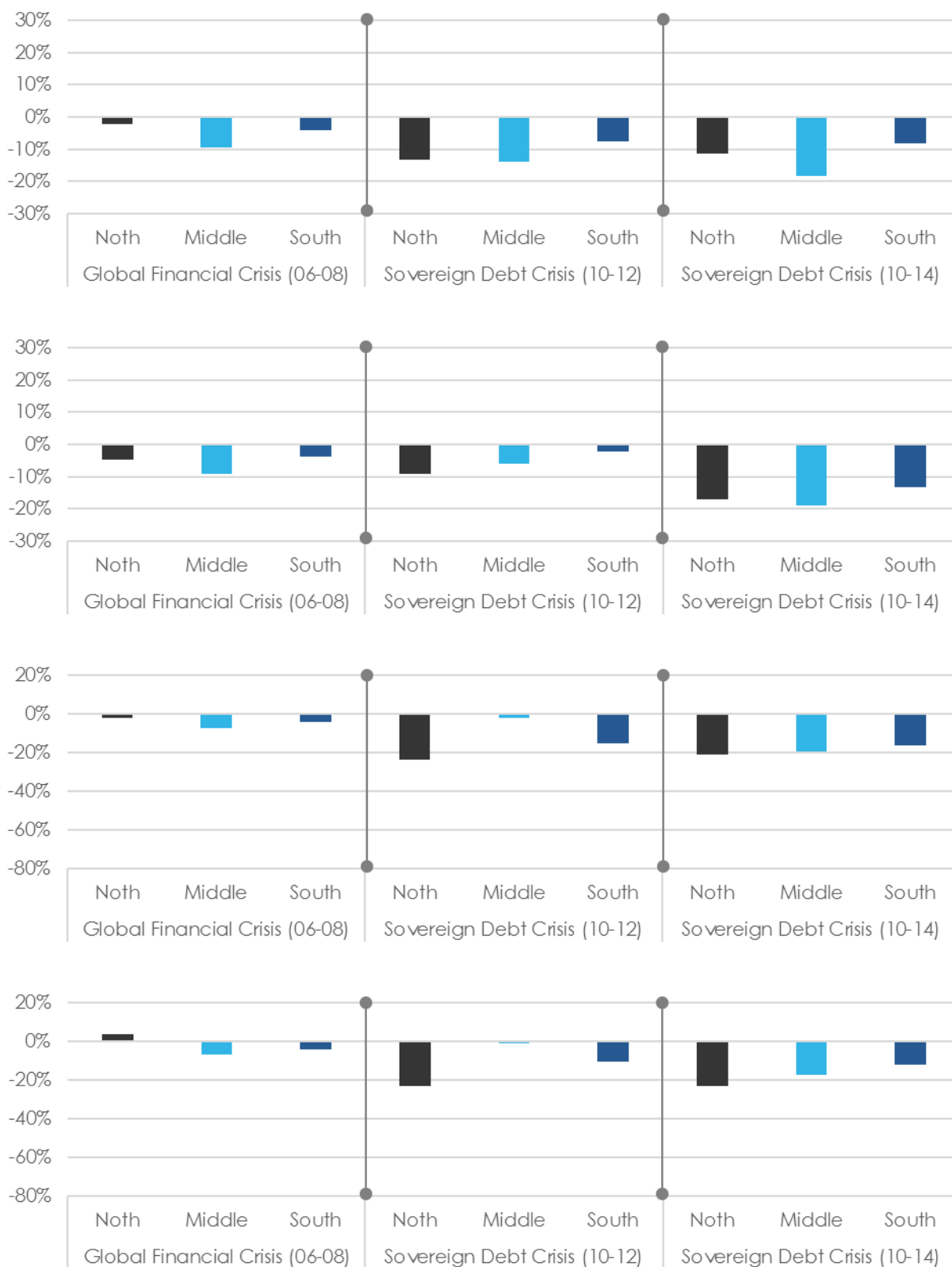|	2006	2008	2010	2012	2014	GFC (06-08)	SDC (10-12)	SDC (10-14)
Income Quintile: Low	12567	11715	11625	10069	9680	-6.8%	-13.4%	-16.7%
Income Quintile: 2	21538	20466	20667	18017	18277	-5.0%	-12.8%	-11.6%
Income Quintile: 3	29995	28538	29197	25080	25391	-4.9%	-14.1%	-13.0%
Income Quintile: 4	41737	40207	40657	35924	36294	-3.7%	-11.6%	-10.7%
Income Quintile: High	75923	73286	73307	65058	63049	-3.5%	-11.3%	-14.0%
Wealth Quintile: Low	20198	18466	18208	15981	15164	-8.6%	-12.2%	-16.7%
Wealth Quintile: 2	26846	24369	25657	22193	22401	-9.2%	-13.5%	-12.7%
Wealth Quintile: 3	30695	31683	30532	26158	27097	3.2%	-14.3%	-11.2%
Wealth Quintile: 4	40203	38837	38426	34801	34456	-3.4%	-9.4%	-10.3%
Wealth Quintile: High	63334	60842	62937	54975	53565	-3.9%	-12.7%	-14.9%
Age: <34	31799	28521	26986	23078	25729	-10.3%	-14.5%	-4.7%
Age: 35-44	36601	32469	31874	26553	27140	-11.3%	-16.7%	-14.9%
Age: 45-54	40871	37703	37417	31442	31559	-7.8%	-16.0%	-15.7%
Age: 55-64	43605	42717	43217	38088	36488	-2.0%	-11.9%	-15.6%
Age: >64	26775	28009	28445	26607	26495	4.6%	-6.5%	-6.9%
Education: None	15878	15875	15904	14694	14436	0.0%	-7.6%	-9.2%
Education: Primary	23891	22950	22905	21192	20789	-3.9%	-7.5%	-9.2%
Education: Juniors HS	33074	31800	31392	26095	27140	-3.9%	-16.9%	-13.5%
Education: HS	44226	41100	40792	36602	35775	-7.1%	-10.3%	-12.3%
Education: University	62716	59652	56971	50311	47143	-4.9%	-11.7%	-17.3%
Ownership: Owner	40932	39655	40292	35967	35859	-3.1%	-10.7%	-11.0%
Ownership: Renter	25965	24271	24006	20281	19330	-6.5%	-15.5%	-19.5%
Geography: North	40076	39167	38858	33660	34401	-2.3%	-13.4%	-11.5%
Geography: Middle	40847	37056	39940	34343	32636	-9.3%	-14.0%	-18.3%
Geography: South	27208	26062	25664	23714	23547	-4.2%	-7.6%	-8.2%
OVERALL	**36142**	**33658**	**34863**	**30583**	**30525**	**-4.1%**	**-12.3%**	**-12.4%**

TABLE A.2 – Evolution of Consumption (2014 prices) during the Crisis from SHIW Data

	2006	2008	2010	2012	2014	GFC (06-08)	SDC (10-12)	SDC (10-14)
Income Quintile: Low	13853	13158	13241	12334	11143	-5.0%	-6.9%	-15.8%
Income Quintile: 2	19672	18795	18787	17524	16142	-4.5%	-6.7%	-14.1%
Income Quintile: 3	24997	23819	24465	22103	20226	-4.7%	-9.7%	-17.3%
Income Quintile: 4	30971	29481	30680	28948	26089	-4.8%	-5.6%	-15.0%
Income Quintile: High	46271	43491	47784	44671	38935	-6.0%	-6.5%	-18.5%
Wealth Quintile: Low	18554	17788	17474	16686	14512	-4.1%	-4.5%	-17.0%
Wealth Quintile: 2	21438	20454	21496	19236	17655	-4.6%	-10.5%	-17.9%
Wealth Quintile: 3	23605	23435	23498	21857	20135	-0.7%	-7.0%	-14.3%
Wealth Quintile: 4	29734	27776	28629	27896	24711	-6.6%	-2.6%	-13.7%
Wealth Quintile: High	42431	39281	43856	39881	35515	-7.4%	-9.1%	-19.0%
Age: <34	24089	23989	24215	20721	19855	-0.4%	-14.4%	-18.0%
Age: 35-44	28013	26862	26945	25569	21881	-4.1%	-5.1%	-18.8%
Age: 45-54	31242	30015	31489	28744	24962	-3.9%	-8.7%	-20.7%
Age: 55-64	31005	29311	32457	29053	26400	-5.5%	-10.5%	-18.7%
Age: >64	21136	21304	22186	21890	20052	0.8%	-1.3%	-9.6%
Education: None	13590	13089	13789	13209	12425	-3.7%	-4.2%	-9.9%
Education: Primary	19296	18331	18707	18188	16755	-5.0%	-2.8%	-10.4%
Education: Juniors HS	26124	24475	24665	22535	20532	-6.3%	-8.6%	-16.8%
Education: HS	32397	30150	31548	29575	25427	-6.9%	-6.3%	-19.4%
Education: University	41057	39003	41640	37834	32715	-5.0%	-9.1%	-21.4%
Ownership: Owner	29659	27961	29775	28075	25234	-5.7%	-5.7%	-15.3%
Ownership: Renter	21635	20888	20952	19039	16762	-3.5%	-9.1%	-20.0%
Geography: North	29456	28111	29539	26838	24550	-4.6%	-9.1%	-16.9%
Geography: Middle	30796	28017	30207	28449	24486	-9.0%	-5.8%	-18.9%
Geography: South	21322	20499	21045	20569	18269	-3.9%	-2.3%	-13.2%
OVERALL	**27146**	**25745**	**26986**	**25110**	**22500**	**-5.2%**	**-7.0%**	**-16.6%**

TABLE A.3 – Evolution of Wealth (2014 prices) during the Crisis from SHIW Data

	2006	2008	2010	2012	2014	GFC (06-08)	SDC (10-12)	SDC (10-14)
Income Quintile: Low	14815	8669	8010	5247	4363	-41.5%	-34.5%	-45.5%
Income Quintile: 2	104905	98088	101578	81157	63920	-6.5%	-20.1%	-37.1%
Income Quintile: 3	171457	168515	188745	151663	142017	-1.7%	-19.6%	-24.8%
Income Quintile: 4	234896	235488	235932	214387	205000	0.3%	-9.1%	-13.1%
Income Quintile: High	424071	438356	451488	410860	352562	3.4%	-9.0%	-21.9%
Wealth Quintile: Low	2360	1626	1930	507	1000	-31.1%	-73.7%	-48.2%
Wealth Quintile: 2	55209	56352	53621	41593	39900	2.1%	-22.4%	-25.6%
Wealth Quintile: 3	168028	165806	176156	145374	138110	-1.3%	-17.5%	-21.6%
Wealth Quintile: 4	288620	281762	289210	258294	233000	-2.4%	-10.7%	-19.4%
Wealth Quintile: High	582464	573819	597338	540713	496220	-1.5%	-9.5%	-16.9%
Age: <34	72584	40097	44345	24958	18300	-44.8%	-43.7%	-58.7%
Age: 35-44	126184	142151	129763	86378	85500	12.7%	-33.4%	-34.1%
Age: 45-54	174887	190292	193558	165853	150000	8.8%	-14.3%	-22.5%
Age: 55-64	225181	228877	249338	205261	183845	1.6%	-17.7%	-26.3%
Age: >64	151255	168397	182848	154932	154000	11.3%	-15.3%	-15.8%
Education: None	53723	54727	55766	44637	50000	1.9%	-20.0%	-10.3%
Education: Primary	128826	131128	139054	120823	114820	1.8%	-13.1%	-17.4%
Education: Juniors HS	143024	135224	146385	111592	110000	-5.5%	-23.8%	-24.9%
Education: HS	232954	226052	221024	202104	175053	-3.0%	-8.6%	-20.8%
Education: University	340629	339198	337596	298254	256878	-0.4%	-11.7%	-23.9%
Ownership: Owner	246900	240040	258130	221480	207000	-2.8%	-14.2%	-19.8%
Ownership: Renter	7218	5376	5720	3043	3740	-25.5%	-46.8%	-34.6%
Geography: North	186550	182325	200006	152625	158500	-2.3%	-23.7%	-20.8%
Geography: Middle	237135	220006	223174	219126	180000	-7.2%	-1.8%	-19.3%
Geography: South	115448	110537	119648	101751	100000	-4.3%	-15.0%	-16.4%
OVERALL	**167706**	**165806**	**175742**	**145347**	**138047**	**-1.1%**	**-17.3%**	**-21.4%**

TABLE A.4 – Evolution of Real Assets (2014 prices) during the Crisis from SHIW Data

	2006	2008	2010	2012	2014	GFC (06-08)	SDC (10-12)	SDC (10-14)
Income Quintile: Low	6858	3251	3217	2029	1500	-52.6%	-36.9%	-53.4%
Income Quintile: 2	92587	108370	107242	82172	70500	17.0%	-23.4%	-34.3%
Income Quintile: 3	171572	167974	185529	152333	142000	-2.1%	-17.9%	-23.5%
Income Quintile: 4	229182	222159	221991	205937	201000	-3.1%	-7.2%	-9.5%
Income Quintile: High	402354	390132	432185	384484	310000	-3.0%	-11.0%	-28.3%
Wealth Quintile: Low	1029	867	536	406	500	-15.7%	-24.3%	-6.8%
Wealth Quintile: 2	46865	54727	53621	41593	37000	16.8%	-22.4%	-31.0%
Wealth Quintile: 3	165742	163639	166225	143040	133000	-1.3%	-13.9%	-20.0%
Wealth Quintile: 4	270903	272009	272395	249560	212000	0.4%	-8.4%	-22.2%
Wealth Quintile: High	552093	545101	557658	511293	443000	-1.3%	-8.3%	-20.6%
Age: <34	69726	44432	42897	25768	30500	-44.8%	-43.7%	-58.7%
Age: 35-44	148597	163639	141559	121736	105000	12.7%	-33.4%	-34.1%
Age: 45-54	173744	195066	195180	167895	154000	8.8%	-14.3%	-22.5%
Age: 55-64	209178	217824	225744	201880	174000	1.6%	-17.7%	-26.3%
Age: >64	138595	163097	163544	147098	146000	11.3%	-15.3%	-15.8%
Education: None	49151	48767	53621	41086	40200	1.9%	-20.0%	-10.3%
Education: Primary	117734	130044	129763	108548	101500	1.8%	-13.1%	-17.4%
Education: Juniors HS	142881	143048	159254	122244	113000	-5.5%	-23.8%	-24.9%
Education: HS	228839	219991	217701	202894	178000	-3.0%	-8.6%	-20.8%
Education: University	323483	328361	322798	284153	241000	-0.4%	-11.7%	-23.9%
Ownership: Owner	233180	227580	246660	207970	201000	-2.8%	-14.2%	-19.8%
Ownership: Renter	2286	2167	2145	1015	1000	-25.5%	-46.8%	-34.6%
Geography: North	173744	179894	197861	152678	152000	-2.3%	-23.7%	-20.8%
Geography: Middle	234325	218907	217165	215068	180200	-7.2%	-1.8%	-19.3%
Geography: South	114305	109454	113677	101954	100100	-4.3%	-15.0%	-16.4%
OVERALL	**171457**	**164722**	**171587**	**150141**	**140500**	**-3.9%**	**-12.5%**	**-18.2%**

Bibliography

Andersen, Asger, Charlotte Duus, and Thais Jensen. 2014. "Household Debt and Consumption during the Financial Crisis: Evidence from Danish Micro-data." *Danmarks Nationalbank - Wokring Papers*, March.

Arrodel, Luc, Pierre Lamarche, and Frederique Savignac. 2015. "Wealth Effects on Consumption across the Wealth Distribution: Empirical Evidence." *European Central Bank - Working Paper Series*, June.

Baldini, Massimo. 2010. *La Casa degli Italiani.* Bologna: Il Mulino.

Banca d'Italia. 2008. "Household Income and Wealth in 2006." *Banca d'Italia - Supplements to the Statistical Bulletin*, January 28.

—. 2010. "Household Income and Wealth in 2008." *Banca d'Italia - Supplements to the Statistical Bulletin*, April 14.

—. 2012. "Household Income and Wealth in 2010." *Banca d'Italia - Supplements to the Statistical Bulletin*, January 25.

—. 2014. "Household Income and Wealth in 2012." *Banca d'Italia - Supplements to the Statistical Bulletin*, January 27.

—. 2015. "Household Income and Wealth in 2014." *Banca d'Italia - Supplements to the Statistical Bulletin*, December 3.

—. 2014. "Household Wealth in Italy." *Banca d'Italia - Supplements to the Statistical Bulletin*, December 16.

Baranzini, Mauro. June. "Modigliani's Life-cycle Theory of Savings Fifty Years Later." *Lugano University.*

Barrell, Ray, Mauro Costantini, and Iris Meco. 2015. "Housing Wealth, Financial Wealth, and Consumption: New Evidence for Italy and the UK." *International Review of Financial Analysis*, July.

Bella, Mariano, Luciano Mauro, and Livia Patrignani. 2016. "Nota sui Consumi delle Famiglie, le Spese Obbligate e la Povertà Assoluta in Italia." *Rapporto dell'Ufficio Studi di Confcommercio*, September.

Blinder, Alan. 2009. "Six Errors on the Path to the Financial Crisis." *The New York Times*, January 24.

Borzi, Nicola. 2014. "Il Prestito Vitalizio Ipotecario Cambia Volto per Diventare Conveniente ai Proprietari." *Il Sole 24 Ore*, July 9.

Busetti, Fabio, and Pietro Cova. 2013. "L'Impatto Macroeconomico della Crisi del Debito Sovrano: un'Analisi Controfattuale per l'Economia Italiana." *Banca d'Italia - Occasional Papers*, September.

Caivano, Michele, Lisa Rodano, and Stefano Siviero. 2010. "La Trasmissione della Crisi Finanziaria Globale all'Economia Italiana. Un'Indagine Controfattuale, 2008-2010." *Banca d'Italia - Occasional Papers*, April.

Campbell, John, and Joao Cocco. n.d. "How Do House Prices Affect Consumption? Evidence from Micro-data."

Cannari, Luigi, and Giovanni D'Alessio. 2008. "Intergenerational Transfers in Italy." *Banca d'Italia - Research Papers*, June 16.

Cannari, Luigi, and Ivan Faiella. 2008. "House Prices and Housing Wealth in Italy." *Banca d'Italia - Working Papers*, June 16.

Carroll, Christopher. 2001. "A Theory of the Consumption Function, with and without Liquidity Constraints." *National Bureau of Economic Research - Working Papers*, July 6.

Carroll, Christopher, and Miles Kimball. 1996. "On the Concavity of the Consumption Function." *Econometrica*, July.

Choi, Youngjoo, and Jong Son. 2016. "Nonlinear Effect of Household Debt on Consumption: evidence from Household-level Panel data in korea." *Economics Bullettin*, June 11.

Cochrane, John. 1991. "A Simple Test of Consumption Insurance." *The Journal of Political Economy*, October.

D'Alessio, Giovanni, and Andrea Neri. 2015. "Income and Wealth Sample Estimates Consistent with Macro Aggregates. Some Experiments." *Banca d'Italia - Occasional Papers*, June.

D'Aurizio, Leandro, Ivan Faiella, Stefano Iezzi, and Andrea Neri. 2007. "The Under-reporting of Households' Financial Assets in Italy." *Banca d'Italia - Working Papers*, July 5.

De Bonis, Riccardo, Daniele Fano, and Teresa Sbano. 2013. "Household Aggregate Wealth in the Main OECD Countries from 1980 to 2011: What Do the Data tell Us?" *Banca d'Italia - Occasional Papers*, April.

Deaton, Angus. March. "Franco Modigliano and the Life-cycle theory of Consumption." *Princeton University.*

—. 1992. *Understanding Consumption.* Oxford: Clarendon Press.

Dynan, Karen, and Wendy Edelberg. 2013. "The Relationship between Leverage and Household Spending Behavior: Evidence from the 2007-2009 Survey of Consumer Finance." *Federal reserve Bank of St. Louis - Reviews*, October.

Faiella, Ivan. 2008. "Accounting for Sampling Design in the SHIW." *Banca d'Italia - Working Papers*, April.

Friedman, Milton. 1963. "Windfalls, the Horizon, and Related Concepts in the Permanent-income Hypothesis." *Stanford University*, June 1.

Geithner, Timothy. 2014. *Stress Test: Reflections on Financial Crises.* New York: Crown Publishing Group.

Glick, Reuven, and Kevin Lansing. 2010. "Global Household Leverage, House Prices, and Consumption." *Federal Reserve Bank of San Francisco - Economic Letters*, January 11.

Grant, Charles, and Peltonen Tuomas. 2008. "Housing and Equity Wealth Effects of Italian Households." *European Central Bank - Working Paper Series*, January.

Guiso, Luigi, and Tullio Jappelli. 2002. "Private Transfers, Borrowing Constraints and the Timing of Homeownership." *Journal of Money, Credit and Banking*, May.

Helander, Maria. 2014. "Estimating Wealth Effects on Consumption in Finland." *Statistics Finland - Working Papers*, January.

Hess, Richard. 2014. "House of Debt - Critical Book Review." *University of St. Gallen*, December 1.

Hsiao, Cheng. 1989. *Analysis of Panel Data.* New York: Cambridge University Press.

—. 2006. "Panel data Analysis - Advantages and Challenges." *Institute for Economic Policy Research - Working Papers*, May.

Iacovello, Matteo. 2011. "Housing Wealth and Consumption." *Board of Governors of the Federal Reserve System - International Finance Discussion Papers*, August.

International Monetary Fund. 2013. "The Financial Situation of Italian Households and Non-financial Corporations and Risks to the Banking System." *International Monetary Fund - Country Reports*, December.

Jappelli, Tullio, and Luigi Pistaferri. 2010. "The Consumption Response to Income Changes." *Annual Review of Economics*, January.

Jappelli, Tullio, Immacolata Marino, and Mario Padula. 2015. "Households' Saving and Debt in Italy." *Centre for Studies in Economics and Finance - Working Papers*, March.

Jones, Galvin. 2016. "Italy Faces Two Decade-long Recession after Brexit Shakes Growth Prospects, IMF Warns." *Independent*, July 12.

Kaplan, Greg, Kurt Mitman, and Giovanni Violante. 2016. "Non-durable Consumption and Housing Net Worth in the Great Recession: Evidence from Easily Accessible Data." *National Bureau of Economic Research - Working Papers*, April 30.

Leamer, Edward. 2007. "Housing IS the Busines Cycle." *National Bureau of Economic Research - Working Papers*, September.

Lewis, Michael. 1989. *Liar's Poker.* New York: W. W. Norton & Company.

—. 2014. "The Hot Seat." *The New York Times*, May 15.

Mian, Atif, and Amir Sufi. 2014. *House of Debt: How They (and You) Caused the Great Recession, and How We Can Prevent It from Happening Again.* Chicago: The University of Chicago Press.

—. 2015. "Who Bears the Cost of Recessions? The Role of House Prices and Household Debt." *Preliminary Chapter for the Handbook of Macroeconomics: Volume 2*, April.

Mian, Atif, Kamalesh Rao, and Amir Sufi. 2013. "Household Balance Sheets, Consumption, and the Economic Slump." *University of Chicago - Research Paper Series*, June.

Montoriol-Garriga, Judit, and Sekeris Evan. 2009. "A Question of Liquidity: The Great Banking Run of 2008?" *Federal Reserve Bank of Boston - Reviews*, March 30.

Muellbauer, John. 2014. "Combatting Eurozone Deflation: QE for the People." *Voxeu.org.*

Munchau, Wolfgang. 2014. "Europe Faces the Horrors of its own House of Debt." *Financial Times*, June 15.

Neri, Andrea, and Roberta Zizza. 2010. "Income Reporting Behavior in the SHIW." *Banca d'Italia - Working Papers*, August.

Orsi, Roberto. 2013. "The Quiet Collapse of the Italian Economy." *London School of Economics and Political Science - Euro Crisis in the Press*, April 23.

Paiella, Monica. 2009. "The Stock Market, Housing and Consumer Spending: A Survey of the Evidence of Wealth Effects." *Journal of Economic Surveys*, September 25.

Parker, Jeffrey. 2010. *Economics 314 Coursebook.* Portland: Reed College.

Rodano, Lisa, and Concetta Rondinelli. 2014. "The Italian Household Consumption: A Comparison among Recessions." *Journal of Economic Policy*, January.

Sierminska, Eva, and Yelena Takhtamanova. 2007. "Wealth Effects out of Financial and Housing Wealth: Cross Country and Age Group Comparisons." *Federal Reserve Bank of San Francisco - Working Paper Series*, January.

Sinai, Todd, and Nicholas Souleles. 2005. "Owner-occupied Housing as a Hedge Against Rent Risk." *The Quarterly Journal of Economics*, May.

Surowiecki, James. 2011. "The Deleveraging Myth." *The New Yorker*, November 14.

Yao, Jiaxiong, Andreas Fagereng, and Gisle Natvik. 2015. "Housing, Debt and the Marginal Propensity to Consume." *Norges Bank - Research Papers*, June 20.

DEPARTMENT OF ECONOMICS AND FINANCE

CHAIR OF FIXED INCOME, CREDIT AND COMMODITIES MARKETS

The Italian Households during the Crisis

Housing Wealth Effect and Cross-sectional Heterogeneity
-EXTENDED ABSTRACT-

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Recessions and Their Determinants. The mainstream narrative for the Great Recession in the United States focuses on the consequences of the slowdown of the financial system and attributes a leading role to the collapse of Lehman Brothers. What happened in September 2008 froze the credit system, preventing business from getting the loans they needed to continue operating. No financial institution seemed safe and banks' access to short-term liquidity, in the form of deposits or financial commercial papers was severely constrained. The subsequent reduction in investments forced enterprises to lay off workers, leading to over 8 million jobs lost between 2008 and 2010 and dramatic consequences for many American households. Many economists and policymaker argued, in hindsight, that Lehman Brothers should not have been allowed to go bust and judged the Fed decision a colossal error, motivated by political reasons rather than rationality and greatly inconsistent with respect to the course of action that was taken for smaller institutions such as Bear Stearns. It is no mystery that all of this happened, but what matters is understanding whether avoiding the failure of Lehman would have been enough to protect the economy and leave the crisis for the future. Atif Mian, economist at Princeton University, and Amir Sufi, finance professor at the University of Chicago, make a strong argument against this interpretation. According to them, it is not wise to completely relate the American recession to the collapse of the financial system and, by contrast, such interpretation might lead to dramatic consequences if it were to direct policy measures and the macro regulatory environment. Why did cause the Great Recession, then? Or, more in general, why do recessions happen? In their 2014 book "House of Debt", Mian and Sufi describe three theories traditionally used to explain economic downturns. The first one, which they dub the "banking view", finds the root of crises in failures of the financial infrastructure as whole and the inevitable credit crunch that follows. The second one, the "fundamental view", is based on the premise that recessions are caused by fundamental shocks to the economy, such as a natural disaster, political turmoil or a change in expectations of growth. The last theory, or the "animal spirits view", links recessions to irrational and volatile beliefs, such as the idea that house prices might rise forever. Again, a review of those beliefs then leads to a contraction in spending, that brings down house prices and generates a recession in a self-fulfilling way. As we have said, the banking view enjoyed for sure the greatest amount of support during the Great Recession, but the two American authors believe that none of the traditional interpretations are correct. Of course, the banks-enterprises-workers vicious circle described above, fueled by the credit crunch, is not a matter of dispute and in 2008 involved a variety of structured financial products and a wide array of financial intermediaries, including insurance companies. What matters, though, is the actual sequence of the events. Mian and Sufi's data show that household spending started falling well before business investment. Moreover, according to the National Income and Product Accounts, the drop in GDP during the third and fourth quarters of 2008 were mainly driven by a decrease in consumption and it was not until the first quarter of 2009 that business investment contributed most significantly to the economic contraction. This is not to say that the events of September 2008 were irrelevant, on the contrary the biggest decline in household spending happened during the last two quarters of 2008 and amounted to an overall drop of 5.4 percent, but the evidence clearly contradicts

the idea that the linchpin of the recession has to be found in the collapse of the banking sector. In other words, the timing implicates that household spending was the key driver of the recession, not the effects of the banking crisis on business: the recession was demand driven and job losses materialized because households stopped buying, not because businesses could not invest.

Understanding the role of consumption is important, but it is not enough to prevent recessions from happening. We need to understand the causes of the decline in household spending to be able to draw useful conclusions. Using a powerful county-level database, Mian and Sufi find out that areas in the United States with the highest decline in net wealth from 2006 to 2009, which were also areas with the highest levels of household debt, experienced the greatest contraction in consumption. What the authors described is known in theory as the "wealth effect". The wealth effect is the change in household spending that follows a change in perceived wealth and is estimated through the marginal propensity to consume out of wealth. It is a core element of modern consumption studies and its relevance varies in time and between countries. Additionally, they underlined the importance of debt. In short, debt augments the wealth effect and increases households' responsiveness in terms of consumption, because, generally speaking, credit constrained households are in a much riskier position than financially-solid families and because debt amplifies the decline in real wealth by enabling the "foreclosure externality". While their research focuses on the Great American Recession, Mian and Sufi also find evidence in previous economic downturns, such as the Great Depression of 1929, and in the international setting. The bottom line is that the bigger the increase in debt is prior to a crisis, the harder the fall in spending will be when asset prices start declining. Poor households' balance sheets mainly consist of highly levered housing assets and they are the first to cut spending because, in the event of a housing market downturn, wealth losses are concentrated upon them and they must work to rebuild their savings while contemporaneously facing higher borrowing constraints. At the same time, frictions in the economy prevent savers, who are indirectly lenders, from making up for the spending shortfall. This process is what Mian and Sufi call the "levered losses framework" and provides a very credible explanation of the dynamics of the Great Recession.

The Italian market is very peculiar when it comes to household wealth and debt, so the levered losses framework can hardly be applied. Nonetheless, it can be interesting to see if the underlying assumptions of the model hold, i.e. if housing wealth and debt play a role in determining Italian household consumption. Before moving on to that, let us see how the crisis spread to Italy and how Italian households were affected. If the crisis officially lasted about a year in the United States, Italy experienced an impressive forty-two months of economic downturn. Taking a better look at the evolution of the GDP, we can see that between 2007 and 2014 Italy actually faced two different recessions: the first one was linked to the global financial crisis and ranged from the end of 2007 to the end of 2009; the second started in the second half of 2011 and lasted till the third quarter of 2014 and was a consequence of the European sovereign debt crisis. The small 2010 recovery was not enough to contain the disastrous effects of such "double-dip" phenomenon and the

most recent estimations by the International Monetary Fund say that the Italian GDP will return to its 2008 peak not before 2025. The first part of the recession was prominently an "imported recession", with the fall in international trade and the deterioration of the international environment in general being the main drivers of the decline of economic activity. The impact of the deterioration of the American economy were in the beginning so little that led to the belief that the relatively solid financial system, the low level of household and non-financial enterprises debt and the lack of a "bubbly" trend in the housing market would have spared Italy from severe consequences. Even after the collapse of Lehman Brothers, which led to significant contractions in the job market, timely policy actions from the government and the European Central Bank managed to contain the situation and led to a period of economic recovery. Everything came crashing down in July 2011, after the announcement of the second bailout package for Greece, which for the first time included a Private Sector Involvement. The Italian situation was perceived as extremely risky, given the high level of public debt and the low growth expectations, and the BTP-Bund spread reached 550 basis points. Italy lost then access to financial markets, the flow of credit was drastically reduced and firms resumed laying off workers, bringing the unemployment rate to 12 percent. Differently from the previous phase of the recession, the fall in GDP was mainly induced by internal factors: production collapsed in almost every sector and household confidence and purchasing power were dramatically reduced by the austerity measures introduced to reduce the public deficit.

Focusing on households, both aggregate data (from ISTAT) and micro-data (from Banca d'Italia Survey on Household Income and Wealth, or SHIW) confirm the same trend: the real contraction in consumer spending happened after 2011, while the effects of the global financial crisis were rather limited. Our calculations from ISTAT data reveal that during the sovereign debt crisis income dropped by 7 percent and consumption shrunk by 7.5 percent, partly in consequence of the 8 percent reduction in wealth. The overall results from micro-data significantly different in magnitude from the aggregate ones, but show the same behavior: Income fell by 12 percent and consumption shrunk by 16.5 percent, dragged down by a falling housing wealth (-18 percent). What is interesting is that, according to both our data sources, consumption dropped more than income. This is something unusual which did not happen in the first part of the crisis and shows how dramatic the consequences of such a long period of recession can be. The best advantage in using micro-data comes from being able to analyze different classes of households, to get a better understanding of the distribution of the shocks among the population. By breaking up the sample according to the income or wealth distributions provides we see that the fall in consumption was more or less well distributed among all the population and actually the largest drop in mean consumption was observed in the top quintile of the income distribution (-19 percent), compared to a reduction of 16 percentage points for the first quintile. This alone shows a very different pattern with respect to the United States and suggests that different shocks are balancing the outcome in terms of consumption: income is acting on the poorest, while the devaluation of assets is driving down the purchasing power of the richest. Looking at age, the

results show that households whose head was younger than 55 suffered the most, with a reduction in spending between 18 and 21 percent between 2010 and 2014. Sorting by educational level or by home ownership (i.e., splitting the sample between homeowners and renters) reveals an interesting scenario from an historical point of view. Educated households' consumption dropped the most, when the previous recessions had a deeper impact on uneducated families. The same can be said for homeowners, who suffered a consumption contraction similar to that of renters, probably due to the collapse of the housing market, while historically their consequences in terms of consumption during downturns used to be much more limited. Lastly, from a geographical perspective, we see that income and consumption fell the most for households living in middle Italy (around -10 percent up to 2008 and nearly -20 percent between 2010 and 2014), while wealth decreased mainly in the north and south and remained quite stable, at least up to 2012, in the middle area, when it collapsed consistently with the rest of Italy.

Our results show that in Italy the drop in consumption was more or less homogeneous among the population. Differently from the American situation, in Italy real assets are the most significant part of household wealth for all the shares of the population, but what matters the most is that this wealth is generally owned outright. That is, only a small share of the population makes use of bank financing to purchase a house. Outright home ownership rates in Italy are high not only with respect to the United States, but in relation to almost any other western country. The "underdevelopment" of the mortgage market, which did not concentrate the losses among the poorest, prevented the scenario described by Mian and Sufi's levered losses theory from happening in Italy, with even more severe consequences for the overall economy. The lack of a major aggregate rationale does not mean, though, that the contraction of the housing market did not play a significant role for individual households, or at least for a part of them. To understand how, we now move on to the estimation of the housing wealth effect.

Data Overview. Both the statistical considerations we already presented and the responsivity analyses that will follow are based on data from the Survey of Households Income and Wealth, published by Banca d'Italia. The structure of the survey has evolved over the years, and since 1987 contains a panel component in order to facilitate phenomena investigations. We use the SHIW to estimate average values at the household level and regression parameters. As units included in our sample have unequal probability of selection, we correct for this possible source of bias by using survey weights. Survey weights are provided by Banca d'Italia and are constructed through a complex procedure.

Our goal is to study households' consumption behavior during the crisis. To do so we built a dataset of household-level observations and constructed a model aimed to estimate the marginal propensities to consume out of income and wealth. In addition to that, we checked for heterogeneous responses between different classes of households. This is an important topic for a number of reasons: first of all, it provides an insight about the degree of exposition of households to different kind of shocks; secondly, it helps us to understand how and why shocks impact the economy as a whole; and lastly, it may result in a useful tool

to direct policy measures. As our analysis will look at relatively short time-horizons, and having such a powerful tool as the SHIW at hand, we are able to construct a truly balanced head-to-head dataset. The advantages of micro-level panel data are multiple, especially when the construction of unbalanced cohorts can be avoided: they offer more accurate inference of model parameters with respect to single cross-sectional or time-series data, thanks to more degrees of freedom and more in-sample variability; they are characterized by a greater capacity for capturing the complexity of human behavior, as it is possible to test for more complicated behavioral hypothesis and to control for omitted variables; and, last but not least, panel data can provide micro foundations for aggregate data analysis. Our sample included the same households in different periods and we searched for the marginal propensity to consume and its heterogeneity by sorting on ex-ante characteristics such as age, initial level of wealth and initial level of income, an approach suggested in the Handbook of Macroeconomics. We took great care in defining the time periods, appropriately exploiting SHIW iterations and maintaining adequate sample sizes. We constructed two different datasets, one based on the 2006 and 2008 surveys, thus spanning from January 1 2007 to January 1 2009, and the second on the 2010 and 2012 surveys, including data for January 1 2011 and January 1 2013. While we lost some information, most notably the second part of the sovereign debt crisis, this breakdown allowed us to keep about 4,000 observations for each sample (before any adjustments are made) and came with added benefits: first, it allowed us to make a comparison of consumer behavior in the two phases of the recession; second, it ruled out almost completely the 2010 recovery period.

SHIW questionnaires contain hundreds of questions and each answer makes up a variable that can be studied and analyzed. We are interested in the sections regarding household expenditure, income and wealth, in addition to reported data regarding the composition and socio-demographic characteristics of households, that will be used as controls. Up to now, we talked about estimating the marginal propensity to consume out of income and the marginal propensity to consume out of wealth, but those general definitions do not properly describe what we will be looking for. In short, for both theoretical reasons and practical needs, we will be effectively looking at the effects of labor income and housing wealth on non-durable consumption. While our definitions of income and consumption are most definitely solid, the lack of consideration for financial wealth, even though motivated, is a drawback of this study.

The Housing Wealth Effect. Housing wealth can influence economic activity in many ways: it can boost or dampen investments by influencing the cost of capital; it can have a direct "wealth" effect on consumption as it can impact on the confidence of economic agents and therefore increase private spending; and, last but not least, it drives the credit channel, by defining the value of collateral. At a first glance, the correlation between housing wealth and consumption might result logical and somewhat intuitive: homeowners feel rich based on their home's paper value and therefore increase consumption as housing values rise, then, when prices start falling, that wealth dissipates and consumption drops. Actually, the rationale is not so clear and the results in theory are mixed. Houses are also consumption goods, which

come with an associated opportunity cost, moreover people who wish to buy, someday, a bigger house behave differently from those who wish to move out of big cities. In addition, housing wealth is the main form of collateral for long term financial loans and this adds another layer of complexity to the analysis. Lastly, unobserved factors cannot be ruled out. It is possible that correlation between house prices and consumption might be driven by other macroeconomic factors. For example, house prices might be related to future income prospects, to which current consumption also respond for the majority of households.

The model we will use is quite straightforward and is based on the direct relationship between consumption and resources:

$$\Delta \ln c_i = a_0 + a_1 \Delta \ln y_i + a_2 \Delta \ln HW_i + \alpha_3 \omega_i + \varepsilon_i$$

Where c_i is non-durable consumption for household i, y_i is labor income and HW_i is housing wealth. We assume that all changes are windfall gains and deltas represent the variations of respective measures between the relevant consecutive SHIW publications, i.e. between 2006 and 2008 and between 2010 and 2012. Finally, ω_t identifies a set of taste-shifters and other factors affecting consumption. We are mainly interested in the value and significance of α_2, the coefficient that relates variation in spending to variations in housing wealth and will be our measure of marginal propensity to consume out of housing wealth. In addition to that, we take in consideration also α_1, which proxies the marginal propensity to consume out of income. While our analysis is purely empirical and is not aimed at testing the validity of any model, we take in consideration established theoretical frameworks to interpret our results. Specifically, we look at the risk-sharing hypothesis, which would imply $a_1 = a_2 = 0$, as idiosyncratic variations in resources should not affect consumption; at the basic version of the life-cycle theory, which states that elder households should be more reactive to shocks in income and wealth with respect to the young; at the studies on the concavity of the consumption function by Carroll and Kimball (1991), that predict a marginal propensity to consume that decreases with respect to wealth; and at the permanent-income hypothesis, according to which the consumption reaction to transitory shocks should be much closer to zero than to one. The regressions are performed for two different datasets (2006 to 2008 and 2010 to 2012) using an outliers-robust bisquare procedure. The tuning constant is set equal to 4.685 and should give coefficient estimates that are approximately 95 percent as statistically efficient as the ordinary least-squares estimates. The observations are weighted using population weights. All consumption, income and wealth variables were expressed in real terms (in 2014 money) and as first-difference of natural logarithms. Regressions are run separately for homeowners and renters, and again according to different ex-ante characteristics of the household, in order to look for potential cross-sectional heterogeneity.

We find statistically and economic significant housing wealth effects for homeowners, with a marginal propensity to consume out of housing wealth between 6 and 10 percent. In other words, households cut

consumption by 0.08 percent on average for each percentage point decrease in the value of their house. As expected, renters do not react to variations in the value of the house they are living in. Results for income are much more variable between different classes of households, but are generally contained between the 20 to 30 percent range. Renters are much more responsive to income variations with respect to homeowners. Something that stands out when looking at the results for the two periods is that the estimated coefficients for income during the sovereign debt crisis are significantly higher than those measured for the earliest part of the recession. It is possible that the length of the double-dip recession impacted the expectations of the Italian households, who started to perceive the contraction in income as permanent, rather than transitory. The results reject the risk sharing hypothesis, as the significance of the parameters implies that households react to idiosyncratic shocks in resources, and are consistent with the SHIW estimations of Grant and Peltonen (2008) for the period between 1989 and 2002. The risk-sharing hypothesis has also been tested and rejected (at least in its strictest specification), among others, by Cochrane (1991) and Mian, Rao and Sufi (2013).

The results of the age-based investigation are consistent with the prediction of the life-cycle model. Older households seem to react more to variation in resources with respect to their younger peers, possibly reflecting a shorter planning horizon. The parameter for the housing wealth effect for younger households was non-significant, while the estimated marginal propensities to consume out of income for the elder is about 10 percent. The same relation holds when looking at income.

Turning at the wealth distribution, we investigate the differences in consumption responses between below-median, above-median and the richest households. Results for income effect show a decreasing trend and are in general consistent with theory, even though in the 2006-2008 period richest homeowners resulted more reactive than the middle group. Results for housing wealth are instead puzzling. the poorest homeowners seemed to react the least to variations in the value of housing and the result is true for both the global financial crisis and the sovereign debt crisis. The estimated parameter hovers, in both cases, in the 4 to 5 percent range. It is worth to note, though, that the estimations for the richest homeowners are only significant at the 10 percent level and the resulting parameters are, as expected, lower than those estimated for the median households: 8 percent against 9 percent in the first period and 9 percent against 10 percent in the second. In any case, those results are in line with the intuition from the statistical analysis, in the sense that the consumption contraction of the wealthiest group was determined, in part, by the devaluation of their housing assets.

Looking at the income distribution is somewhat reassuring: lowest-earning households resulted having the strongest reactions in both time periods: the coefficient is about 9 percent for the first period and 9.5 percent for the second. Top-paid households, on the other side, show a non-significant or barely significant consumption reaction to housing capital variations.

Debt and Credit Constraints. The Italian household debt market is considerably underdeveloped with respect to the majority of western economies. Low levels of household debt and, generally, a low degree of liquidity of real assets are determined by both cultural and institutional reasons. Intergenerational transfers and bequests play a big role in households' wealth creation and have historically acted as a buffer to limit the need of loan financing. Tight banking requirements, in part driven by inefficiencies in the foreclosing mechanism, prevent the poorest share of the population from accessing mortgages and the market the market for home-equity loans, which could be exploited by homeowners, is almost non-existent. We mentioned in the previous chapter that one of the channels through which house prices affect consumption is through their role as collateral for loans. Low overall levels debt can then justify weaker, housing wealth effects, especially on an aggregate level, as the collateral channel is limited. In the previous chapter, we did not focus on disentangling the different rationales of the effect, but given the considerations on the Italian debt market we can assume that it is mainly driven by anticipations of future expected income, in the sense that variations in the value of housing may someday result in a capital gain or loss were the asset to be sold or rented, and by psychological motives. Nonetheless, in the last decade, the loans market underwent a significant development. The ratio of households housing loans to GDP, which make up about 40 percent of total household debt, climbed from 7 percent in 1988 to 22 percent in 2014 with an aggregate value of home-purchase loans of €390bn. In addition, a series of reforms were carried out to reduce the inefficiencies of the insolvency procedures and to boost the liquidity potential of real estate assets, by creating a market for home-equity loans.

Since debt acts as a multiplier of the housing wealth effect, in the sense that variations in house prices produce a relatively greater variation in wealth for indebted families, we expect those households to be then more reactive to changes in value of their houses and their consumption reactions to unexpected variations to be much more significative. Indeed, debtors have a junior claim on their housing equity as their house is used, more often than not, as collateral for their mortgage. In addition to the collateral rationale, households who base their habits on debt financing might be forced to reduce their consumption more than other consumers because higher levels of debt relative to assets (following a devaluation of assets) prevent them from obtaining any further credit needed to finance their desired spending or because they cannot refinance their mortgages with lower-rate loans. Adding the effect of expectations and subjective behavior, highly leveraged households may become more uncertain about future credit availability and cut consumption to decrease leverage, or they might target a given level of debt relative to assets (or income) and subsequently choose to reduce consumption to pay down debt if external shocks pushed their leverage above such ratios

Our aim in to understand how indebted or credit constrained Italian households react in response to income or housing wealth shocks, applying the same ex-ante methodology we used before. We focus on ex ante levels of debt because of concerns that ex post levels of debt may be endogenous with respect to some of the outcome variables of interest in our study. For example, indebted households that cut back on

consumption between 2010 and should have tended to reduce their debt over the period solely because they needed less debt to finance their lower levels of spending. As the sample of indebted households is very limited, we are merely interested in providing an intuition regarding cross-sectional heterogeneity with respect to debt and check if our results are in line with what we would expect, i.e. a marginal propensity to consume that increases the more households are credit constrained.

Our first breakdown focuses on indebted and "subjectively credit constrained" households. The second group consists of household who answered negatively to certain SHIW questions regarding their accessibility to loan financing. During the sovereign debt crisis, debtors reduced their consumption by about 0.1 percent for any percent point decrease in their housing wealth, while on average the effect was lower, 0.075 consumption variation for each percent point shock. The estimation is consistent with the idea of collateral augmenting the role of housing wealth for debtors. Similar results are obtained for credit constrained households. On the side of income, again, debt seems to play a role in increasing the overall responsiveness to shocks. After all, debt comes with monthly obligations and so it is quite understandable that variations in income are reflected in adjustments in consumption behavior.

The second analysis is more specific and focuses on homeowners only and on the share of debt strictly related to the purchase of the primary residence. We use three indicators to study how the most vulnerable households reacted with respect to the average. The indicators are: the loan to value ratio, equal to the mortgage amount divided by the value of the property used as collateral for the loan.; the loan to income ratio, obtained by dividing the self-reported value of the mortgage by the value of yearly income which will be, as usual, non-financial monetary income; and the debt service ratio, obtained by dividing the annual mortgage payments by the annual family income. Results for income are all significant at the 1 percent level and follow the same trend according to all the indicators; responsiveness to income increases the more vulnerable the household is. Results for wealth are many times non-significative, probably due to the very small sample size of indebted households, but seem to confirm the pattern. Nonetheless, the significative results still show a marginal propensity to consume out of housing wealth in the range of 9.5 and 11 percent, about 2 percentage points higher than the estimated coefficient for non-debtors.

We are not particularly satisfied with the results of the previous tests, as the low sample size greatly limits our statistical power. To overcome this obstacle, we run one last test, based on net liquid bank deposits. This is not directly related to debt, and cannot be considered a test on the role of collateral. Nonetheless, it is certainly a way to test constraints in a loose specification, because bank deposits are households' main buffer against shocks, especially in a country characterized by a low degree of liquidity of real assets. This test can be considered a middle ground between the tests based on the wealth distribution and those aimed at understanding the effects of debt. The results are interesting. Consumption of Italian households seems to behave in a concave manner with respect to liquid financial assets, far as housing prices responsiveness is concerned.