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Mapping fragility – Functions of wealth and social classes in U.S. household finance

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ABSTRACT

Which households are more exposed to financial risk and to what extent is their debt systemically relevant? To provide an answer, we advance a new classification of the population, adapted from Fessler and Schürz (2017), based on the type of wealth families own and their sources of income. Then, we investigate data from eleven waves of the Survey of Consumer Finances (SCF), a triennial survey run by the U.S. Federal Reserve, to explore the association of different debt configurations and motives to get into debt with our class distinctions. Our new approach allows us to assess competing hypotheses about debt and financial vulnerability that have so far been analyzed separately in disconnected strands of literature. The results of our study reinforce and qualify the controversial hypothesis that relative poverty and inequality of income and access to services have been important factors explaining household indebtedness and its relationship with economic growth over time.

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Introduction

Financial risk permeates the American society and, in many ways, defines it. Decisions regarding education, retirement planning, and health care coverage all involve some kind of bet on the future. A significant reflection of this reality is the indebtedness of the household. Having reached above 13 trillion dollars right before the Covid shock, albeit lower, relative to income, than at the peak of the housing bubble, its effects deeply shape the economy and the welfare of American families. These families, as a group, are only able to realize their financial decisions conditionally on the economic context. But macro conditions do not affect them all equally, and which groups of households are more exposed to financial risk and to what extent their financial decisions have a systemic impact have been intensely debated by economists. This paper hopes to advance our understanding of household debt by considering it more comprehensively in relation to macroeconomics and social class.

Our analysis spotlights the importance of several factors that are not always appreciated. First, we believe that the type of wealth families own and the sources of their incomes, not just their relative size, matter for understanding household-level financial fragility: Portfolios can be more or less liquid, income flows more or less secure, and associated with different patterns of social and policy protections or employment benefits.[1]

During the covid-19 pandemic, for example, emergency policies in the US were more advantageous to those paying a mortgage than to renters (UNCTAD 2021). When inflation started rising, the advantage became even stronger, especially for profit earners, whose real revenues increased (UNCTAD 2023). By contrast, in the literature, the observation of the contribution of a category of households (usually an income decile group) to the growth of debt or of the aggregate debt-to-income ratio is often taken as a litmus test for the locus of financial fragility (Jordà et al., 2016, Mason, 2018, and Costantini, 2022, for a critique).

Second, the macroeconomic impact of household indebtedness has largely been analyzed in interaction with speculative activity in the housing market by upper-middle income earners and financial institutions, in terms of its effects on systemic financial fragility and "post-bust" debt deflation. In this view, income inequality plays a limited role, through Veblenian (emulative) motives, as discussed in the literature review below. Here we advance a different view, exploring non-strictly speculative motives for falling into over-indebtedness. Those are linked to the need to cover basic costs of living, for precautionary motives (private social security) or to invest in education, in a context in which the public sector does not provide adequate support.

Most of these services in the US are financialized and their cost has ballooned even in otherwise deflationary times.[2] The resulting "forced" outlays, which include the servicing of the debt taken on for those reasons, capture a significant percentage of household incomes and tend to be inelastic to changes in income, because they represent either necessary expenditures or expenditures contractually agreed on in the past. Hence, they expose households to insolvency risk when real incomes shrink or disappear. This debt overhang creates a dead-weight factor that affects long-term growth prospects and make the

[1] For instance, "[t]he median family income of [Americans] "underinsured" [for health care] is nearly $60,000—almost exactly the same as the median income of those with adequate coverage. The under insured are as likely to be white as the well insured, nearly as well educated, and as likely to work full time and in large- or medium-sized companies" (Hacker 2012).

[2] Households' debt composition in terms of cost, maturity, and legal protection is also relevant: Under current laws, interest and fee costs may change over time and the household members often have no way to foresee or control it.

system vulnerable to structural change and inflation, and dependent on emergency injection of liquidity by the Fed (Costantini, 2022). In short, given a certain portfolio structure, the financial sustainability of a household's budget depends crucially on the public policies in place, on employment trends, and on the household's social position.

To clarify these structural features of household indebtedness, we set out a conceptual framework that attempts to integrate key social and institutional elements of the economy. That includes defining three social groups, which we call wealth and/or business owners (henceforth WBH), homeowners (HO), and propertyless (PL). The classification, adapted from Fessler and Schürz (2017), is based on the function of the assets each group owns, which are associated with the type of incomes they receive. Those functions are, in our taxonomy: to receive an income; to save on costs; precautionary, and/or to transfer resources over time. Such classification highlights how some get into debt to grow, some to stay still. We then consider aggregate and household-level debt configurations as well as typical motives for debt accumulation, drawing from existing literature. Finally, we examine how those are associated with class distinctions, and the different functions of wealth which those reflect, thus providing a link between the micro and the social and macro dimensions.

To do so, we investigate data from eleven waves of the *Survey of Consumer Finances* (SCF), a triennial survey run by the U.S. Federal Reserve. Our analysis is updated to the run-up to the Covid-induced crisis, both due to data limitations and because we are interested in studying long-term, "normal" conditions of the U.S. economy. Additionally, this allows us to look comprehensively at competing explanations of the observed trends, which have so far been analyzed separately in disconnected strands of literature. Indeed, we regard the synthetic effort, with a wide variety of factors and considerations that we are able to simultaneously consider, as a major contribution of this work.

We begin, in the next section, by reviewing extant literature to select the main competing hypotheses on pre-pandemic trends in households' motives for debt accumulation. These we identify as: (1) an "interest rate snow-ball effect", (2) a consumption smoothing purpose, (3) equity extraction (speculative) behavior, (4) "keeping up with the Joneses" (emulative) behavior, and (5) low income and relative poverty. The second section presents our taxonomy of the classes of households and their financial characteristics. In section 3, we develop a formal treatment of households' financial budgets that allows us to simultaneously consider the five hypotheses above and link them with the different macroeconomic functions of debt reflected in our social class analysis. Section 4 discusses our main results.

In summary, we do not find consistent evidence of speculative behavior among households. More generally, consideration for households' liquidity position and for their desire to smooth consumption seems to have a statistically significant but small impact on household debt, so that its economic significance is rather low. Instead, we find that when we account for incompressible or contractually fixed expenditures, including those that depend on past decisions such as debt payments, income (or lack thereof) is robustly correlated with indebtedness. Being poor in terms of available equivalent income is associated with a up to three times higher debt-to-income ratio than the non-poor. Moreover, the snowball effect is positive and statistically significant in all specifications. Somewhat similarly, changes in asset values become relevantly associated with debt-to-income ratio increases when we consider the determinants of consumption and financial norms within a reference group, confirming the validity, at least in some relevant cases, of the emulation hypothesis and its compatibility with the low income and relative poverty hypotheses.

On the whole, our results confirm the crucial role of poverty and inequality in shaping household

indebtedness, though not for the speculative motive often invoked, and highlight the pronounced fragility of US household finances in the face of macroeconomic or institutional shocks.

1. Household debt and financial decisions

After a period of stability that lasted through the first half of the ’80s, household debt as a ratio of household income started increasing from 1984 (when it was at 70%), and then surged in the years 1999-2007 (reaching 123%). After the crisis, as we will see, certain groups of households were unable to deleverage, and debt picked up again in 2015.

These ups and downs hide distinct trends in terms of the composition and dynamics of household debt. For example, a declining trend in mortgages as a ratio of household incomes set in after the 2007-2008 global financial crisis and continues as of 2019. By contrast, consumer credit started growing again as early as 2012, reaching a new high of 25% of the national income and product accounts (NIPA) disposable personal income in 2017, at just below 4 trillion dollars. The largest component of this debt is education loans, which surpassed auto loans in 2009.

The relationship between debt ratios and financial sustainability is an imprecise science. We accept the widely used debt to income ratio as measure of the financial sustainability of household debt. While there is no precise cut off point which one can identify as unsustainable, this ratio obviously correlates with households’ solvency risk.

Looking at that indicator, we see that households from every rung on the income and net worth distribution ladders contributed to the increase in the ratio before the crisis. Adopting the terminology proposed by Minsky (1992), as a group, households were speculative borrowers, that is to say, the household sector as a whole was unable to save enough to stabilize its debt as a ratio of its income. Indeed, in spite of what the standard Keynesian theory of consumption predicts would happen in the presence of rising income inequality, households’ propensity to save decreased constantly from 1981 onward. The NIPA’s total outlays do not include mortgage payments; Cynamon and Fazzari (2017) calculate that savings (adjusted to include these payments) fell into negative territory as soon as 1987.[3] Throughout the period, real per capita personal outlays grew faster than personal disposable income, but also more smoothly than in the past, notably continuing to grow through the crisis of 2000 and ensuing recession. That, however, should not be taken to suggest any specific financial motive at the micro level and whatever trend we see in these aggregate variables is both a result of individual choices and macro conditions.

Our database does not track most conditions on the supply side of credit, which could have affected households’ decisions. Hence, in this work, we focus only on households’ demand for debt, and we simply exclude from the dataset all households that appear to have been credit constrained (see section 4). In this introductory overview, however, we feel obliged to mention that regulatory transformations

[3] In their analysis, however, what became strongly negative was a measure of “financial saving” as a share of (adjusted) cash flow income. Financial saving is much less than the adjusted gross saving ratio not because of mortgage payments, but because of the exclusion of new construction of owner-occupied houses from financial saving. Their basic idea is that from a financial point of view buying a newly constructed or renovated home is a kind of consumption even though the new home is durable and will provide implicit “service flows” in the future. In contrast, in what follows we focus on a measure of available income, which deducts necessary expenses, such as mortgage payments, from households’ nominal net income.

and technical innovations leading to greater credit availability have doubtlessly played an important part in the story, contributing to the increase in the level of debt and in the debt service to income ratio. Those include the deregulation of interest rates and other financial charges, the creation of new credit products to extract equity, the increase of loan-to-values ratios, that is the lowering of required down payments on purchases, as well as availability of better information on the quality of the borrowers. Authors, more or less convincingly, recall the influence of new aggressive marketing strategies and credit instruments, predatory and even criminal behavior (Black et al. 1995, Wray 2008, Dymski 2009, Mian and Sufi 2009, Kaboub et al. 2010, Keys et al. 2010 Herndon 2017). In a controversial book, Rajan (2010, 39) suggested that the government "cynically" pushed easy credit, deregulation and an aggressive housing policy, to temporarily please an impoverished middle class. However, Ferguson and Johnson (2009a, 2009b) highlight the relevance of regulatory capture, discussing how the banking sector heavily lobbied for deregulation.

According to a few, but influential, authors, this institutional push for credit dominates the explanation of the debt boom. The key idea of this supply-side view is that excess availability of loanable funds reduced real interest rates, thus boosting housing demand and prices (Taylor 2007, 2009). Within this approach, Mian and Sufi (2009) developed a popular interpretation according to which changes in mortgage origination technology and in the incentives faced by the financial sector were responsible for an increase in credit availability to low-income and subprime loan applicants. This excess credit would have led to the acceleration of house prices and to the subsequent crash and recession (Mian and Sufi 2014). Their empirical results, however, have been questioned (Glaeser et al. 2013, Adelino, Schoar and Severino 2015, 2016, Mian and Sufi 2015a, 2015b).

In this work we focus on the demand side, trying to identify the main drivers of households' indebtedness. To this aim, in the empirical analysis we take into account households' self-reported difficulties of obtaining credit (either in the form of refusal or of being discouraged from applying because of fear of refusal) as a control variable. We further consider a Heckman-type selection model, in which the household's inability to obtain credit is a main explanatory variable of the selection equation (the results are reported in tables A3 and A4 in appendix), and as a further robustness test we run separate estimations on the subsample of unconstrained households (those who do not report having difficulties in obtaining credit, tables A5 and A6 in appendix). The results of these different set of estimations do not differ qualitatively (once recognizing the differences in the functional form, between a Poisson and a linear regression), implying that over this period, for a vast majority of households, obtaining a loan was indeed a more or less costly, but possible, option, and/or that the share and characteristics of credit-constrained households did not significantly change over the period.

Even focusing on the demand for credit, however, is in itself no simple task, for different interpretations and a menu of hypotheses exists that link individual decisions with the observed aggregate trends. Those are not always mutually incompatible.

Snowball effect

The composition of spending, and especially the role of debt servicing, deserves close attention. In fact, in the run-up to the global financial crisis, from the late 1990s to 2007, household spending (net new borrowing) excluding interest played an important role in the upward trend of the debt-to-income ratio. But in the long run, interest rate charges and the steady decline in inflation leading to a mild deflationary situation for borrowers have been prime contributors to the growth in the aggregate (Maki 2002, Mason and Jayadev 2014). Following Pasinetti (2008a, 2008b) and Sylos Labini (2009), this same

macroeconomic question can become a testable hypothesis at the household (micro) level. Accordingly, in section 4 below we hypothesize the presence of a "snowball effect" on household budgets, defined by the difference between interest payments and income growth: if a positive difference is significantly associated with higher debt-to-income ratios, the hypothesis is confirmed.

Consumption smoothing

Other authors, writing in the 1990s and early 2000s, suggest that households demanded more credit in order to smooth consumption in the face of the large fluctuations of income that characterized the period following the 1970s (Katz and Autor 1999). Empirical support for this thesis includes the observation that in the 1990s consumption inequality slightly decreased, while income inequality increased (Krueger and Perri 2002). Moreover, surges in consumer credit seem to predict, with a lag, increases in consumption. The hypothesis concerning credit demand is that when individuals expect higher incomes in the near future they would like to expand their current consumption by increasing their debt, as predicted in models that assume rational expectations (Hall 1978, Greenspan 1996, 1998). We call this interpretation the hypothesis of "consumption smoothing."

Equity extraction

A complementary hypothesis involves taking a broader portfolio approach, suggesting that increases in the value of owned assets, especially houses but also financial assets, induced households to cash in on their additional wealth, maintaining a desired leverage constant in terms of debt to assets ratios (Dynan and Maki 2001, Maki and Palumbo 2001, Godley and Lavoie 2007, 74–77, Greenspan and Kennedy 2008, Cooper and Dynan 2016). We call this hypothesis that of "equity extraction." Crucially, however, in so far as these capital gains are unrealized, that is to say, households borrow against an increased market value of their assets instead of selling the assets and monetizing the capital gain, this behavior entails an increase in the liquidity risk that households face. Hence, in addition to building an index proxy for the equity extraction purpose, we also develop an illiquidity index, taking into account both positive and negative unrealized capital gains.

Keeping-up-with-the-Joneses

Diverging decisively from a rational expectations approach and focusing on the behavioral drivers of the demand for credit, many scholars have referred to changes in social, consumption, and financial norms since the 1980s (Frank 1989, Schor 1998, Cynamon and Fazzari 2008, Starr 2009, Forges Davanzati and Pacella 2010, Frank et al. 2010). In these works, it is the long-term or permanent component of inequality that attracts most attention. The main problem these studies address is that standard Keynesian theory of consumption would predict an increase in the average saving rate as a consequence of rising income inequality, but in fact the average propensity to save has decreased even while inequality increased in the USA. The explanation, that goes back to Veblen's ([1899] 1934) idea of emulation and conspicuous consumption and to Duesenberry's relative income hypothesis (Duesenberry 1949), is that households constantly compare themselves to other families in their social reference groups as well as to their own past status. This induces households to keep up with the consumption norms of the group to which they (aspire to) belong and to maintain their higher standard of living even in the face of a worsening of their relative situation. The contagious optimism and confidence offered by rising asset prices might have exacerbated this human tendency (Kregel 2008, Wray 2008). In this paper, we call this hypothesis the

"keeping up with the Joneses" effect.[4]

Making ends meet

Still focusing on inequality, other contributions curtail the role of psychological explanations of over-indebtedness, and instead stress the difficulty households face making ends meet, to pay for education, and to save for possible adverse events.

For example, Bushey and Weller (2008) find that inequality affected the growth of consumer debt in the lower income groups by creating significant financial distress, which they estimate by foreclosure rates and credit charge-off rates. "Median family income did not rise in any year between 1999 and 2004 (US Census Bureau, 2006a). At the same time, prices for large consumption items, specifically housing, medical care, household operations, food and cars, grew twice as fast as prices for small consumption items, and price increases for all items accelerated after 2000 compared with the late 1990s […]." Indeed, the increase in credit card debt, particularly strong for the bottom income quintiles, preceded and, according to many, caused the "bankruptcy crisis" of the 1990s and early 2000s (Ausubel, 1997, Ellis, 1998).[5] Robert Pollin (1988, 1990) found similar results that confirm the important role of purchasing power, based on 1980s data. Szymborska (2022 p. 27) finds that "The rise of structured finance based on proliferation of subprime mortgages generated an unequal hierarchy of monetary claims, which boosted asset values and income flows for households at the top of the income distribution at the cost of increasing financial fragility for low- and middle-income families."

Some literature based on aggregate data does indeed support the idea that both budgetary and monetary policies contributed to the worsening of the net lending position of households as a sector, regardless of their individual preferences (Wray, 2008, Seccareccia, 2011, Bibow, 2010, Costantini, 2020). Most of those policies affected households asymmetrically, to the detriment of the poorest or most fragile families. Barba and Pivetti (2009) and Kim et al (2017) add that indebtedness has weakened the bargaining strength of workers inducing further inequality, in a vicious circle.

But a growing literature has questioned the existence of a connection between the growth of household debt and the financial conditions at the bottom of the income distribution, pointing instead to an important role of the upper-middle class (from the 50th to the 90th percentiles of income) and prime borrowers during the bubble of the 2000s and the ensuing crash (Ferreira and Gyourko, 2015, Adelino et al., 2016). In this view, it was the different exposure to asset price fluctuations (historically unfavorable to middle class homeowners) that has ultimately determined financial fragility and further wealth inequality (Foote et al. 2012, Adelino et al., 2016, Bartscher et al., 2020).

This paper cannot hope to unravel the quantitative explanations of rising debt in any specific decade, or, a fortiori, to identify the specific trigger of the 2007 crash. Instead, we want to explore where relatively higher indebtedness and likely financial distress was present and what may have caused them in a long-term perspective.

[4] Some of the empirical arguments built to confirm this hypothesis could also be compatible with the thesis of consumption smoothing (Krueger and Perri 2006, Carr and Jayadev 2014). The key distinction is theoretical: authors who focus on behavioral explanations refuse the assumption of perfect rationality and recognize the presence of long-term inequality, stagnant or declining real wages, and low social mobility, which make emulative habits unsustainable (van Treeck 2013).

[5] The bankruptcy reform of 2005, much lobbied for by credit card companies, made filing more costly, tightened the conditions for discharge, and reduced the repayment options. It also broadened the categories of student loans that cannot be discharged (Costantini 2020).

In this regard, it is important to recall that the growth of indebtedness (both extensive and intensive) of households at the bottom of the income distribution ladder is clear in the data (Amromin and Paulson, 2009, Haughwout et al., 2019).[6] Scholars have also pointed out that (relative) poverty-induced indebtedness might have occurred also outside the group of poor families, as typically defined. Several analysts denounce a relative impoverishment of the middle class, associated with the privatization of essential services, the shift of pensions to defined contribution plans, and the increase in the costs of health care and education (Hacker 2012, Emmons and Noeth 2014, Temin 2016). Indeed, some middle-income earners might fall into poverty if we subtract interest payments from their disposable cash flow (Pressman and Scott 2009). If we consider debt servicing and necessary expenditures such as those related to health care, the situation may look even grimmer. Several contributions have confirmed that poor health contributes to financial strain (Lyons and Yilmazer 2005) and that an increase in the health insurance coverage of the population has a positive effect on household finances and credit scores across the income distribution, not only at the bottom (Mazumder and Miller 2016).[7]

In analyzing these questions, we believe it is better to focus on the concept of insufficient income, which refers to financial distress broadly intended and not just to default or delinquency, but also as a serious compression of the living standards. Accordingly, we explore the hypothesis that debt to income ratios are positively associated with relative low real incomes, considering two indicators. On the one hand, we compute available disposable incomes by subtracting monthly debt and rent payments from net incomes and dividing the result by an equivalence scale, obtaining an "available income" variable. On the other end, we construct a simple indicator of "poverty risk", defined as earning an available disposable income lower than 60% of the median available disposable income.

2. Happy families and social classes

Common to most of the explanations mentioned in the previous section is that families are not all alike. In what way they differ is a key source of controversy. In the literature there are plenty of anecdotal records of individuals and families drowning in debt. However, "each unhappy family is unhappy in its own way."[8] What matters macroeconomically is whether there are some identifiable conditions that make repayment, default, or distress happen more or less systematically for economically defined groups of people.

In studying the wealth of households, most works rely on statistically defined stratifications such as income percentiles, sometimes together with demographics (e.g., Davies and Shorrocks 2000, Alvaredo et al. 2017). However, we cannot interpret these strata as meaningful economic or sociological aggregates without making implicit assumptions about the functional and macroeconomic relations underneath the distribution (Sylos Labini, 1974, Cirillo et al., 2017, Fessler and Schürz 2017, Szymborska, 2022). For this reason we adopt instead an approach similar to Fessler and Schürz (2017) and distinguish three classes of households, based on the functions of their wealth: the *wealth or business owners*, the

[6] The indebtedness of the low-income strata is not negligible. If the households between the 50th and 90th income percentiles own the largest share of mortgages and total debt, the bottom group's total debt grew at the fastest pace, with the first quintile more than doubling its liabilities between 1989 and 2016. The bottom 50% of the income distribution bears the highest debt-to-income ratio and the highest increase in the number of households in debt. For households in the first and second income quintiles, paying more than 15% of their already small income in debt servicing may cause significant economic stress (all data are from our calculations, based on the *Survey of Consumer Finances*).

[7] Himmelstein et al. (2005, 2009) produced controversial work on the role of medical expenditures in bankruptcy.

[8] We refer here to the famous opening paragraph of the novel *Anna Karenina* by Lev Tolstoj.

homeowners, and the *propertyless*, as detailed in table 1.[9] This classification is useful in so far as we argue that different kinds of wealth (or lack thereof) are associated with different reasons for incurring debt.

The wealth of the *propertyless* can only have a precautionary function (or it can be a way to transfer resources over time): with the exception of the self-employed, who might own some capital, they own liquid or quasi-liquid assets. The *homeowners* also obtain an implicit income (imputed rent) from their primary residence (in terms of saving on rent costs, even though they may still be paying mortgage instalments), thus their wealth has two potential functions. Finally, some or all the assets owned by the *wealth or business owners* produce an income, so their wealth has three potential functions (Fessler and Schürz, 2017).

In many cases, households will get into debt to fulfill one of those functions, whether it means to substitute precautionary savings or purchase an asset. Hence, to these functions of wealth we can associate functions of debt, which can be described as: *cost-saving* (obtaining an implicit income), *earning*, or *consuming*. A WBO household can get into debt to *earn* a monetary or an implicit income, but also to *consume*. HO get into debt to *save* on some costs (typically: the rent) or to *consume*; if instead they start gaining an income from their assets, they become wealth or business owners. The PL get into debt merely to *consume* (we are ignoring minor cost savings that assets different from a house could provide).

Table 1 – Definition of classes and functions of debt

	Definition	**Function(s) of wealth**	**Function(s) of debt**
Wealth and/or business owners (WBO)	All households who receive rent income,[10] and/or own shares of a business	Receive an income; Save on costs; Precautionary; and/or resource transfer over time	Investment; cost-saving; or consumption
Homeowners (HO)	All households who own at least one house without being wealth or business owners, including those living in mobile homes who do not rent either the land or the home	Save on costs; Precautionary; and/or resource transfer over time	Cost-saving; or consumption
Propertyless (PL)	Everyone else	Precautionary; and/or resource transfer over time	Consumption

[9] We are sympathetic with a similar approach by Szymborska (2022). While the motivation behind her analysis and ours is similar, the empirical determination of classes differs. She distinguishes between three classes: the working class, the middle class, and the rentier class, who differ by exposure to financial fragility due to degrees of wealth diversification. In our case, the distinction is based on functions of wealth, which we use to test, among other hypotheses, also financial fragility.

[10] Rent income includes income from net rent, trusts, or royalties from any other investment or business (variable X5714 of the codebook). It does not include income from interests and dividends. Receiving income from a pension account only does not automatically qualify one as a capitalist. Ownership of shares could be either with an active role or a non-active role.

Section 3 below provides a formalization which helps us connect the taxonomy we just presented with the hypotheses listed in the previous section. But first let us look at some aggregate trends.

As mentioned, we consider eleven waves of the microdata of the US *Survey of Consumer Finances* (SCF), from 1989 to 2019. We define households' total debt as the sum of the value (in 2019 dollars) of all outstanding credit lines that any member of the household has opened.[11] These debts could be incurred for consumption purposes (including cars and vehicles), investment (including purchase of non-residential real estate), education (excluding debt that the household has not yet begun to repay[12]), and mortgages.

Homeowners made up a relative majority of the population until 2002 (figure 1.a). After that point there is a relative increase in the number of propertyless. The share of wealth or business owners shrinks immediately after the 2007 crisis and then increases again in 2013 and 2016, but by less than the increase in the share of propertyless. In 2019, the share in HO shows the first increase since 2004 but remains lower than in 1995. Correspondingly, there is a decrease in the share of PL, while WBO remain largely stable. As shown in figure 1.b, the PL mostly populate the lower income percentiles, the HO largely reside in the middle of the distribution, and the WBO are overwhelmingly at the top end; but all classes are represented across the whole distribution.

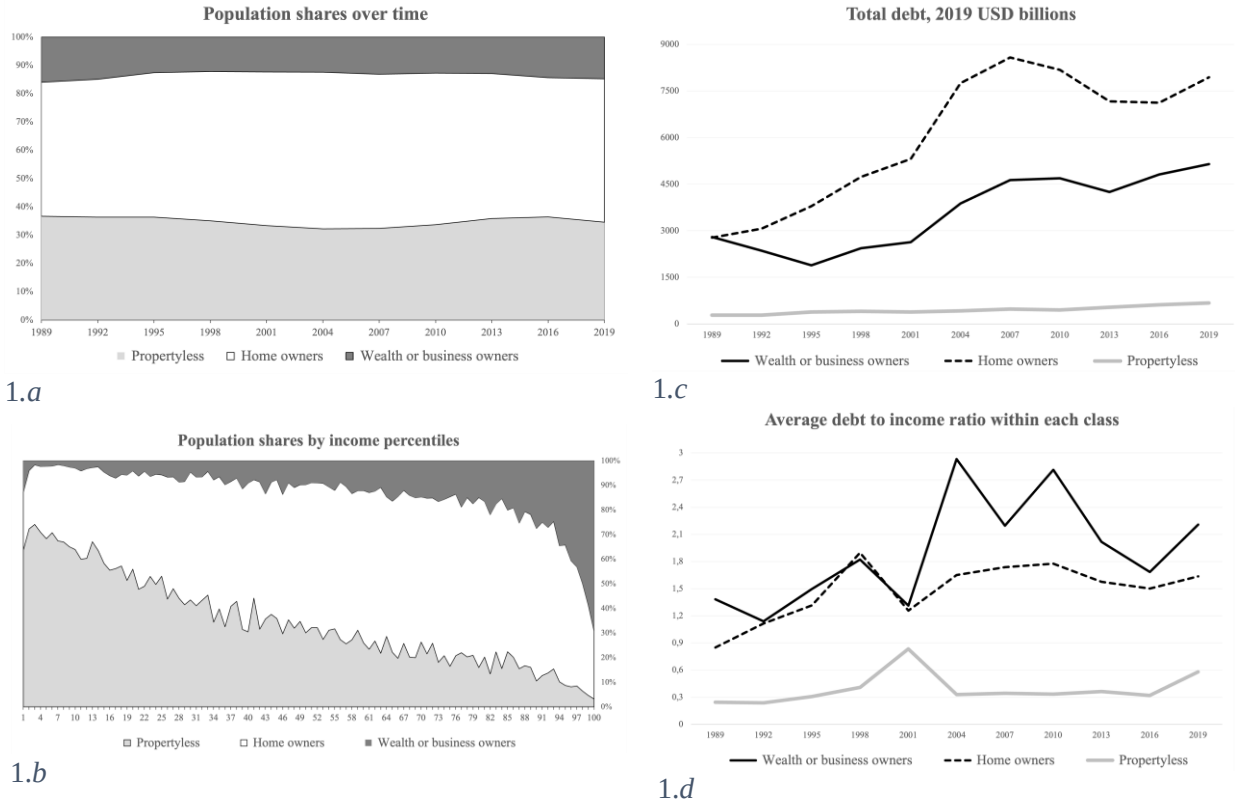
As shown in figure 1.c, the HO bear most of the debt (*D*): throughout the period, they accumulate a portion of total household debt that is just above their population share. The PL exhibit a lower share of debt than their share in the total population, while the opposite holds for the WBO, whose share of debt is more than double their share in the population. Data from the SCF allow us to understand if these figures reflect credit constraints or households' independent decisions. Considering the households who experienced credit denial or abstained from requesting credit for fear of denial, the shares of credit-constrained households amount to around 10% of the PL; just below 2% of the HO (except for peaks of 4% and 3.5% in 2010 and 2013, respectively); and for WBO fluctuating between 2.8% in 1995 and 2010 to below 1% in most of the other years (see table A1 in appendix).

The trend in the total debt of the three classes, expressed in 2019 dollars, differs in interesting ways. The total debt of the PL remains slightly constant in real terms throughout the 1990s. From 2001 it begins to systematically increase, likely as a result of both an increase in student debt and a movement of previous HO or WBO to the group after experiencing a foreclosure (the SCF does not contain longitudinal information on the past economic and financial conditions of the single households). Crucially, even though their total debt is the lowest in monetary terms, the propertyless failed to reduce it after the crisis.

[11] We consider total debt as the sum of PLOAN1-8 variables from the SCF's bulletin macro (SCF 2019) and the debt outstanding on non-residential assets (isolated from the NNRESRE variable in the bulletin macro). The SCF reports do not include non-residential real estate debt in total debt but consider it as a form of business debt. Since we are looking at the indebtedness of wealth or business owners, we decided to include it within the investment loans, adding it to variable PLOAN5 of the bulletin macro.

[12] The reason is that this is a sort of "inactive" debt that only becomes relevant in terms of financial flows and spending decisions at a time when it is likely that the income and occupational status of those who hold it have significantly changed. The results of our multivariate analyses shown in the next section are not affected by this exclusion: additional robustness tests are available from the authors upon request.

Figure 1 – Class composition and debt dynamics in US society



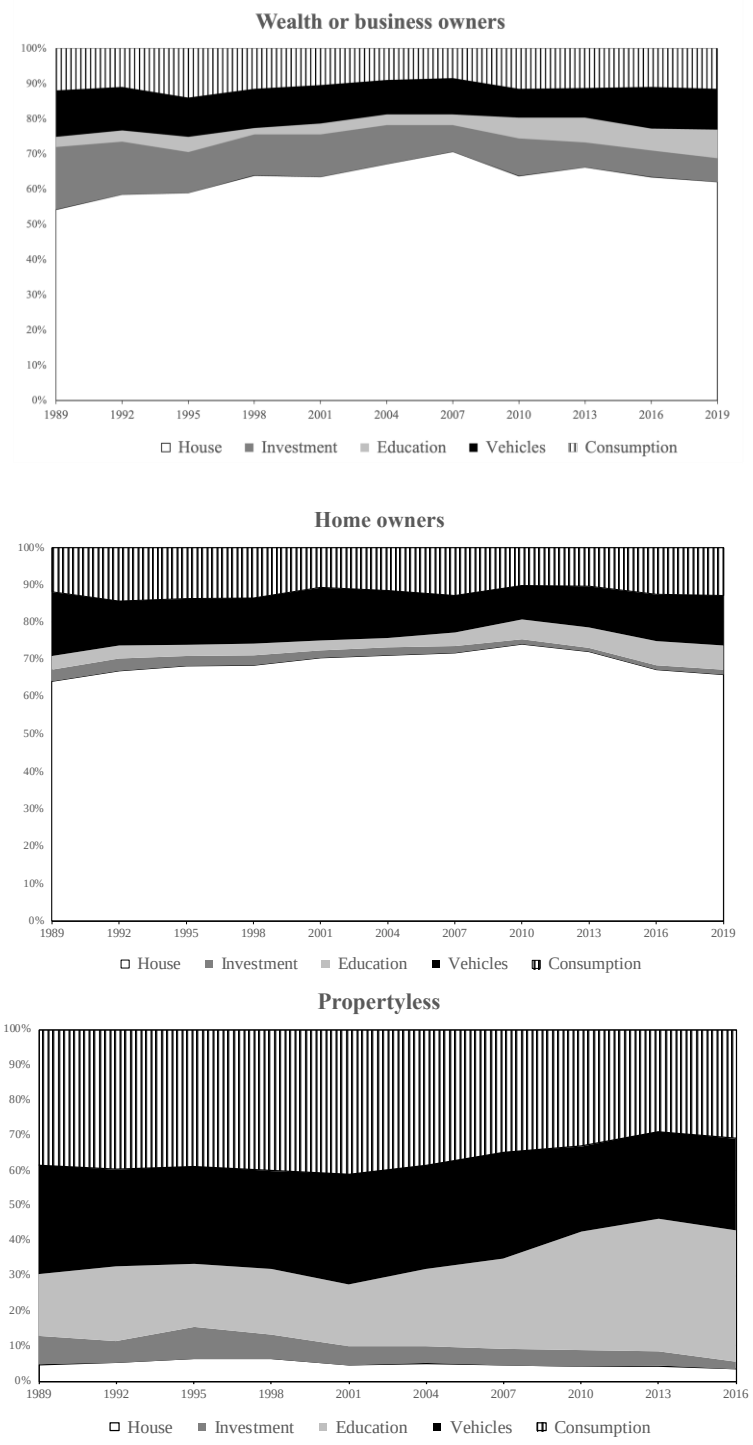
Notes: for the definition of classes, see table 1. For the definition of total debt, see main text (in particular, education debt excludes debt that the household has not yet begun to repay).

Homeowners' debt slows down its growth in the years of the 1990-91 crisis, and then begins a large ascent in 1995 before jumping up sharply after 2001. It slows down as soon as 2004, but only really collapses from 2007. In 2013 the falling trend comes to a close, with modest new growth. The wealth and/or business owners reduce their total debt in the first half of the 1990s and then follow the trend of the HO, though at a distance. From 2013 they start borrowing again at a faster pace than HO, consistent with evidence of the increase in credit to middle-high income, high credit score, usually older households (Houghwat et al. 2019).

The average debt-to-income ratio across WBO is higher than across the other classes, which is to be expected (figure 1.d). Both WBO and HO significantly deleverage in 2001, after a spike of their average debt to income ratios in 1998. This seems to confirm evidence that there were great and misplaced expectations of an economic expansion in 1998, which failed dramatically in 2001. But the appetite for credit and, crucially, its policy-driven availability, did not fade away, and debt to income grew again in the 2000s. After the crisis, debt to income ratios actually increased in 2010 because income collapsed more than debt, so that a substantial reduction only took place in the 2010s, though still at historically high levels. In contrast, the average debt-to-income ratio of the PL showed only a negligibly increasing

trend over the whole period, with a spike in 2001 probably due, again, to the collapse of incomes rather than an increase in debt. 2019 data show what could be the beginning of a new rising trend in debt-to-income ratio of the three groups, possibly as a result of positive labor market conditions and growth prospects. As we now know, the 2020 pandemic and economic crisis likely changed that scenario drastically.

Figure 2 – Debt composition over time, by class



Concerning debt portfolios across classes, shown in figure 2, the configuration of the debt of WBO and HO is similar: housing debt counts for the largest average share in both cases.[13] With respect to HO, wealth or business owners have a comparatively smaller share of education loans, auto loans, and a larger share of investment loans. Among the PL, the share of education loans in the debt portfolio increases dramatically after 2004, becoming the second largest share, after consumption loans. The average share of auto-loans and other consumption loans decreases during the 2000s and then increases at the end of the period. Consistently with aggregate data, we see that auto-loans increase quite significantly after 2010, across classes. This is commensurate with a significant increase in car prices.

While for the PL debt for consumption purposes is always above 30%, that form of debt (even excluding auto loans) also accounts for more than 10% of the debt of WBO and HO too, in all years. Consumer credit and the related lines of credit are not a negligible portion of those families' finances; hence, depending on the liquidity risk attached to them, they can be systemically relevant.

3. A formalization of the determinants of changes in household debt

The five families of explanations for the rise in household debt that we could identify in the literature pertain to both mainstream and heterodox analyses. Notably, some are based on a utility maximization choice setup, and some are inspired by institutionalist or post-Keynesian approaches that do not rely on that specific notion of rationality. For this reason, we develop here a general framework capable of encompassing all families of explanations, based on the derivation of debt dynamics from accounting definitions. Given the descriptive evidence (especially figures 1.c and 1.d), we know that the HO have the highest total aggregate debt, and the WBO have the highest per-capita debt (both in dollar terms and as a ratio to their income). But in order to highlight the heterogeneity among households within each class, in what follows we focus on the debt to income ratio as a crucial measure of financial fragility.

Defined on the basis of flows, at each time *t*, saving (S_t) is the difference between receipts (Y_t) and outflows, which we define as the sum of expenditures incurred for consumption (C_t) and for debt servicing. Let use denote debt service by $i_t \cdot D_{t-1}$, where i represents both interest and principal repayment at time *t* as a share of outstanding debt:

$$S_t \equiv Y_t - C_t - i_t \cdot D_{t-1} \quad (1)$$

Defined based on stocks, saving is the change in individual or family net worth (*NW*), defined as the change in the value of assets (*A*) minus the change in the value of liabilities (*D*):

$$S_t \equiv \Delta A_t - \Delta D_t = \Delta NW_t \quad (2)$$

Equations [1] and [2] are accounting identities, provided their components take into account changes in both the quantities (transactions) and the values (prices) of stocks and flows. Note that we include unrealized capital gains on assets in ΔA_t and therefore they must enter Y_t (as financial income) too.
Plugging [1] into [2]:

$$\Delta D_t = \Delta A_t - Y_t + C_t + i_t \cdot D_{t-1} \quad (3)$$

[13] The amount of housing debt may reflect the influence of the fraudulent use of first-lien mortgages by "real estate investors" discovered by Houghwout et al. (2011).

This formulation highlights that households can potentially incur debt for consumption purposes, to increase the value of their assets (to cost-save or earn), and in order to repay past debt.[14]

Let us now decompose income into a normal component (Y^P) and an income shock (Y_t^ε), which may be transitory or permanent, and let us consider the debt-to-income ratio as a measure of relative indebtedness:

$$\frac{\Delta D_t}{Y} = \frac{\Delta A_t}{Y} + \left(\frac{C_t - Y^P}{Y}\right) + \left(\frac{i_t \cdot D_{t-1}}{Y} - \frac{Y_t^\varepsilon}{Y}\right) \quad (4)$$

When the household is subject to an income shock and/or an interest rate variation, it faces a change in the last term of the right-hand side of [4]: this is the only variable the household cannot voluntarily change, unless it becomes delinquent or decides to pay off its debt in advance (which would be reflected in [4] by a change in the value of *i*). Unless decisions on new borrowing change, a change in income or interest rates, however temporary, will have some sort of permanent effect on subsequent debt payments. For this reason, when the last term in brackets in [4] is positive, it is frequently referred to as the "snowball effect" or the "Fisher effect."[15]

Finally, solving [4] for the debt-to-income ratio:

$$\frac{D_t}{Y} = \frac{\Delta A_t}{Y} + \left(\frac{C_t - Y^P}{Y}\right) + \left[(1 + i_t) \cdot \frac{D_{t-1}}{Y} - \frac{Y_t^\varepsilon}{Y}\right] \quad (5)$$

As with the previous ones, equation [5] strictly descends from accounting identities. Being an equilibrium condition of stocks and flows, it must always be realized and therefore it cannot be empirically estimated. However, in the face of a variation in any of the stocks or flows in [5] households can decide how to adjust other elements of their balance sheet, so the behavior of the various parts of [5] taken in isolation is indicative of behavioral responses to exogenous shocks. In what follows we consider a number of separate estimations for the various purposes and adjustments of debt. Our analysis does not imply direct causality linkage, but it is rather aimed at descriptively understanding what the most relevant correlates of household debt are, among the several hypotheses put forward in the literature.

3.1 Variables construction and definition

The debt-to-income ratio is only defined for non-negative values, and empirically has a highly skewed distribution, as shown in figure A1 in appendix. For this reason, we refrain from running a simple OLS regression. Common practice in applied econometrics in these cases has been to estimate a linear model on the logarithm of the dependent variables. However, Santos Silva and Tenreyro (2006) have shown that this could result in biased estimates; they recommend the use of a Poisson Pseudo Maximum Likelihood (PML) estimator instead. Although Poisson regression is typically used for count data, all that is needed for the quasi-maximum likelihood estimator to be consistent is that the conditional mean is correctly specified, i.e., $E(y_i|x) = exp(x_i\beta)$, with y denoting the dependent variable, x the

[14] One could further distinguish between an increase in the value of income-producing assets, A_{yt} and an increase in implicit-income producing assets, A_{st} (with $A_{yt} + A_{st} = A_t$).

[15] The permanent income thesis would have it that such behavior reflects the expectation of higher income in the future, hence there would be an economic expansion ahead. Theories of debt deflation would expect a deleveraging period ahead.

independent variables, and *i* observations. Specifically, it is not necessary that y_i be an integer and the method can be used with any non-negative continuous variable. In our case, this method has the advantage of allowing us to consider the several households with zero debt, whereas a zero debt-to-income ratio would not be defined in logarithmic terms. Due to the complex sampling method of the survey and the way the data are provided in order to preserve confidentiality of the information about the single households, standard errors have been estimated accounting for both multiple imputation (due to corrections by the Fed of possible misreporting and missing data) and 999 repetitions bootstrap weights that permit inferences on the total US population even though the survey oversamples relatively richer households.

We run the regression on the entire population and on each class. Since we associate the classes with particular motives for going into debt, we expect the distinction to help identify the empirical relations we test. As a robustness test, we run Heckman selection models (with standard errors corrected for multiple imputations and bootstrap sample weights) with the same specification of the Poisson PML estimates shown in the text. Results of these further estimates are not qualitatively different and are presented in tables A3 and A4 in appendix.

We build the explanatory variables to reflect all the hypotheses spelled in the previous section. First, we want to capture the incidence of indebtedness related to low income for people who struggle to make ends meet. We include a *risk of poverty* variable, defined as a binary dummy variable, which takes on value 1 if the household's available equivalent income (defined below) is lower than 60% the average, and 0 otherwise, and an *available equivalent income* variable. The latter is expressed in thousands of 2019 USD and defined as the household's total gross income, subtracting the necessary expenses for debt service and rent payments, divided by an equivalence scale.[16]

Then, to measure the possible impact of a *keeping up with the Joneses* effect, we estimate how much a household has "overspent" on some assets, by measuring the difference between the value of two types of assets, *V*, (home; and cars/vehicles) and the predicted value of that asset, $\hat{V}$, based on the household's income and other assets (all expressed in 2019 USD). For each household *i* in year *t*, the predicted value was estimated through a pooled cross-section Tobit regression model, including year fixed effects and a number of socio-economic and demographic control variables. Results of these estimations are shown in table A2 in the appendix. Our "keeping up" index is thus the difference between the value of the asset owned (V_{it}) and the value predicted on the basis of the household finances ($\widehat{V_{it}}$). The predicted value is set to zero when it is lower than zero; and the index is set to zero for those households who do not own a house or a car.[17]

The hypothesis of *equity extraction* more broadly predicts a desire to borrow against unrealized capital gains, regardless of the reference group of the household, and of any emulative pressure its members might feel. We estimate it by looking at the impact on debt of a household's self-assessment of the value of (unrealized) capital gains on the household's real estate assets, over and above the average house prices inflation, measured by the percentage change in the S&P/Case-Shiller U.S. National Home Price (*NHP*) index. The simple difference between households' self-assessed capital gains (as a percentage of

[16] We use the customary OECD formula, which assigns weight 1 to the household head, 0.75 to any additional adult, and 0.5 to each child (*OECD Project on Income Distribution and Poverty*, via www.oecd.org/social/inequality.htm accessed in August 2018).

[17] Due to privacy concerns, the SCF data do not contain information on households' geographic location or on the size of the local community.

the house value) and the average house prices inflation since the date of purchase of the house is our index of *extra unrealized capital gains on house*, or *equity extraction*.

As mentioned in section 2, when capital gains are unrealized, they entail a liquidity risk for the household who borrows against them. To examine the potential impact of this risk, we consider all assets, including and beyond the house. Following Minsky, we assume that liquidity risk – arising from the term structure of assets and liabilities – can impact on a household's ability to face unexpected financial shocks: households with small liquidity stocks buffers may have to compress their consumption, increase their gross debt relative to income, or default. To measure such possibly widespread financial fragility, we estimate the impact of all self-assessed unrealized capital gains accrued on any household asset as a ratio to household income. Since we are only interested in the liquidity of households' incomes, and not in their actual earnings, we consider both positive and negative capital gains as manifestations of illiquidity and therefore include both gains and losses with a positive sign.[18] The explanatory variable *liquidity risk* thus ranges between zero for households who have no assets or whose assets incurred into no self-assessed value change, and (hypothetically) infinite for households with no income and assets that produced a non-zero capital gain or loss.

We further consider the impact of changes in income flows independent of the household's decisions. We separately consider *income shocks*, defined by households' answer on how different their current income is relative to their self-perceived "normal income", as a share of the household's current income; and a *snowball effect*, defined as in the last term on the right-hand side of equation [5]: that is, the difference between income shocks and the cost of debt. Households could respond to income shocks or changes in their effective average interest rate either by trying to offset them or by allowing a 'mechanical' change in D/Y. So the coefficient on the two variables too must be interpreted as resulting from a behavioral rule rather than an accountancy identity.[19]

Finally, as control variables in all estimates we include the household size (equivalent scale); the household head's sex, educational attainment (2 dummy variables), race (2 dummy variables), and age; and their declaration of having been denied credit in the previous 12 months, or having abstained from applying for credit for fear of being denied (dummy variable); their occupation (3 dummy variables), self-reported risk aversion (2 dummy variables), self-reported propensity to plan ahead (2 dummy variables); and a set of fixed effects for each year.

4. A map of financial fragility

The coefficients estimated by Poisson PML regression are interpreted as changes in the natural logarithm of the dependent variable. For ease of interpretation and in order to allow for comparisons between widely variable levels of debt, in tables 1 and 2 we report the main results of our estimates in terms of

[18] Evidently, we cannot directly include the value of assets in the estimation (e.g. liquidity buffer stocks) because they would most likely be an endogenous regressor (see equation [5]).

[19] In Pasinetti's (2008a, 2008b) and Sylos Labini's (2009) original definition, the snowball effect is defined by the difference between the growth of income and nominal interest rates ($\dot{Y} - i$). Since the SFC does not consistently follow the same households over time, we proxy income growth by the difference between current and normal income ($Y - \dot{Y}$, i.e. we assume families consider their previous year's income as "normal", and thus exhibit adaptive but not rational expectations). The effective average interest rate on each household's total debt, i, was obtained as a ratio between debt service, i, and total debt, D (see previous section). In all estimates we trimmed the top percentile of observations for both income shocks and the snowball effect, which include abnormally high values (corresponding to zero or near zero incomes) due to the fact that these variables are expressed as a ratio to household income.

incidence rate ratios (the ratio of the values of the dependent variable before and after a hypothetical ceteris paribus change in the independent variable, IRR).

Accordingly, coefficient values above unity denote a positive correlation (the ratio of the dependent variable increases) while values lower than 1 denote a negative one (the ratio decreases). The mainstream approach to consumption smoothing implies that a positive income shock should lower indebtedness, and this is what indeed emerges for the whole sample and for the subsamples of WBO and HO. However, it does not for the PL, suggesting that accumulated assets are indeed fundamental to smooth consumption over time.

From our estimates, making ends meet emerges as the most relevant empirical correlate of household debt. Being poor in terms of available equivalent income is associated with an up to three times higher debt-to-income ratio than the non-poor (i.e., the IRR is between 120% and 300% across the estimates). Such evidence suggests a role for uncompressible expenditures in producing higher debt-to-income ratios (since we excluded education loans not being repaid, this cannot be an effect of the presence of students in the population). This is true even among the WBO, for whom the estimated IRR is indeed the highest. It is reasonable to expect that those who are poor, for example if investment plans go wrong, are only able to hold income-producing assets (and therefore to be classified by us as WBO) if they also hold high debt.

For all classes, less (available) income is associated with more debt, suggesting that the difficulty of coping with uncompressible expenditures and/or maintaining habitual standards of living is not limited to the poor only. Unsurprisingly, this impact is larger (the IRR furthest from 1) for the PL.

The relevance of incompressible and contractually fixed expenditures, or in general the lack of resources and difficulty of making ends meet, may also be the origin of our second main finding, i.e., that the snowball effect is positive and statistically significant in all specifications. We thus find robust micro-level evidence of what Mason and Jayadev (2014) documented on aggregate data: households seriously risk incurring into debt just in order to pay back old debt.

Households' financial fragility emerges on the assets side of their balance sheets too. Liquidity risk, entailed by unrealized capital gains as a ratio to household incomes, has a small but consistently positive correlation with household debt. Such risk is not strictly related to real estate investments and should not be interpreted as evidence of widespread equity extraction on the side of HO. Indeed, unrealized capital gains on one's house, above and beyond average house prices inflation, are not consistently associated with the debt-to-income ratio in a robust way. The correlation with household debt within the whole sample is positive but very small, so that in the smaller sample of WBO the coefficient is almost never statistically significant. Among HO, it is even negative (that is, opposite to what may be expected on the basis of the stream of literature focused on the growth of mortgages for speculative purposes). This could be because the largest capital gains accrue to long-time HO, who may not hold a large mortgage at the time of the survey.

Such contrasting evidence on equity extraction is mirrored by that on variables that imply indebtedness due to emulative consumption behavior. Earning an income lower than that predicted on the basis of the education and socio-economic characteristics of the head of the household (the "income gap") is associated with more debt among the WBO and the HO, but with a very low coefficient, and it is not associated with debt among the propertyless. The latter are the only ones among which having spent on cars or vehicles more than would be predicted by the household's finances is associated with more debt.

For the HO, the coefficient is even negative, denoting that, within that class, possibly only those households that do not have substantial debt overhang indulge in spending more than the average on these consumption items.

The Veblenian motive for indebtedness seems more relevant when we compare the value of a household's house with what would be predicted on the basis of the household's income and other assets. Both for the WBO and HO, having 'overspent' on one's house is consistently associated with greater debt (this variable is evidently not defined for the PL).

In conclusion, by taking a long-term perspective and allowing for different motivations among different groups of population, we find evidence of consumption smoothing limited to the upper classes, while among all classes we find – to different degrees – strong evidence of "involuntary" indebtedness, due to poverty or liquidity risk and incompressible expenses, and more limited evidence of "behavioral" indebtedness due to emulation and "keeping up with the Joneses."

Table 2 – Determinants of the debt-to-income ratio, Poisson PML estimation, incidence rate ratios (IRRs): whole sample, and wealth and/or business owners

	(1) All	(2) All	(3) All	(4) All	(5) All	(6) All	(7) WBO	(8) WBO	(9) WBO	(10) WBO	(11) WBO	(12) WBO
Making ends meet												
Poverty	1.602**	1.550**	1.107**	1.658**	1.598**	1.128**	2.749**	2.624**	1.724**	2.862**	2.719**	1.743**
	[0.0627]	[0.0552]	[0.0286]	[0.0456]	[0.0439]	[0.0269]	[0.179]	[0.171]	[0.0982]	[0.192]	[0.184]	[0.103]
Available income	0.997**	0.997**	0.998**				0.998**	0.998**	0.999**			
	[0.00106]	[0.000942]	[0.000370]				[0.000712]	[0.000637]	[0.000398]			
Keeping up with the Joneses												
Income gap				1.001**	1.001**	1.001**				1.001**	1.001**	1.001**
				[5.96e-05]	[5.69e-05]	[5.19e-05]				[6.68e-05]	[6.66e-05]	[6.09e-05]
Overspent on car	0.952**	0.952**	0.957**	0.956**	0.956**	0.959**	0.993	0.993	0.991	0.996	0.995	0.993
	[0.00732]	[0.00724]	[0.00592]	[0.00665]	[0.00660]	[0.00588]	[0.00659]	[0.00644]	[0.00672]	[0.00533]	[0.00531]	[0.00566]
Overspent on house				1.002**	1.002**	1.001**	1.002**	1.002**	1.001**	1.002**	1.002**	1.001**
				[0.000173]	[0.000181]	[0.000158]	[0.000186]	[0.000179]	[0.000187]	[0.000155]	[0.000157]	[0.000128]
Financial fragility												
Unrealized extra capital gains on house	1.019**	1.019**	1.020**	1.016**	1.017**	1.018**	1.011	1.011	1.014	1.013	1.013	1.016*
	[0.00351]	[0.00344]	[0.00320]	[0.00371]	[0.00366]	[0.00344]	[0.00970]	[0.00974]	[0.00863]	[0.00936]	[0.00934]	[0.00833]
Liquidity risk	1.003**	1.003**	1.003**	1.003**	1.003**	1.003**	1.003**	1.003**	1.003**	1.003**	1.003**	1.003**
	[0.000414]	[0.000416]	[0.000413]	[0.000410]	[0.000413]	[0.000412]	[0.000430]	[0.000434]	[0.000437]	[0.000431]	[0.000436]	[0.000437]
Snowball effect			1.917**			1.930**			1.709**			1.742**
			[0.0324]			[0.0333]			[0.0668]			[0.0657]
Consumption smoothing												
Income shock		0.750**			0.731**			0.723**			0.702**	
		[0.0339]			[0.0341]			[0.0617]			[0.0612]	
Observations (x 5 repetitions)	45,195	45,195	45,195	45,195	45,195	45,195	12,704	12,704	12,704	12,704	12,704	12,704

** p<0.01, * p<0.05 Standard errors in brackets corrected for 5 repetitions of multiple imputations and 999 bootstrap sampling weights.

Notes: control variables include a constant term; year fixed effects; household size (equivalent scale); the household head's sex, educational attainment (2 dummy variables), race (2 dummy variables), occupation (3 dummy variables), self-reported risk aversion (2 dummy variables), self-reported propensity to plan ahead (2 dummy variables), and age (in linear and quadratic form); and the head of the household's declaration of having been denied credit in the previous 12 months, or having abstained from applying for credit for fear of being denied (dummy variable). IRRs larger than 1 denote positive effect, IRRs lower than 1 negative.

Table 3 – *Determinants of the debt-to-income ratio, Poisson PML estimation, incidence rate ratios (IRRs): homeowners, and propertyless*

	(1) HO	(2) HO	(3) HO	(4) HO	(5) HO	(6) HO	(7) PL	(8) PL	(9) PL	(10) PL	(11) PL	(12) PL
Making ends meet												
Poverty	1.732**	1.705**	1.361**	2.048**	1.989**	1.497**	1.200**	1.194**	1.045	1.922**	1.886**	1.512**
	[0.0428]	[0.0429]	[0.0336]	[0.0541]	[0.0533]	[0.0383]	[0.0737]	[0.0734]	[0.0658]	[0.120]	[0.120]	[0.0896]
Available income	0.991**	0.992**	0.994**				0.978**	0.979**	0.983**			
	[0.000440]	[0.000436]	[0.000335]				[0.00225]	[0.00227]	[0.00191]			
Keeping up with the Joneses												
Income gap				1.001**	1.001**	1.001**				1.001	1.001	1.000
				[0.000122]	[0.000117]	[9.62e-05]				[0.000709]	[0.000681]	[0.000371]
Overspent on car	0.984**	0.984**	0.983**	0.988*	0.989*	0.986**	1.145**	1.144**	1.119**	1.057**	1.056**	1.047**
	[0.00570]	[0.00569]	[0.00539]	[0.00521]	[0.00520]	[0.00506]	[0.0360]	[0.0359]	[0.0303]	[0.0140]	[0.0136]	[0.0114]
Overspent on house	1.004**	1.004**	1.003**	1.003**	1.003**	1.003**						
	[0.000483]	[0.000481]	[0.000470]	[0.000350]	[0.000354]	[0.000385]						
Financial fragility												
Unrealized extra capital gains on house	0.969**	0.969**	0.978*	0.967**	0.968**	0.978*						
	[0.00990]	[0.00988]	[0.00883]	[0.0102]	[0.0101]	[0.00897]						
Liquidity risk	1.008	1.008	1.006	1.010*	1.010*	1.007	1.022*	1.022*	1.027**	1.040**	1.040**	1.037**
	[0.00431]	[0.00436]	[0.00405]	[0.00398]	[0.00407]	[0.00377]	[0.00902]	[0.00900]	[0.00877]	[0.0127]	[0.0126]	[0.0122]
Snowball effect			1.681**			1.754**			1.578**			1.659**
			[0.0388]			[0.0399]			[0.0790]			[0.0792]
Consumption smoothing												
Income shock		0.823**			0.735**			0.945			0.843	
		[0.0442]			[0.0401]			[0.100]			[0.0943]	
Observations (x 5 repetitions)	18,872	18,872	18,872	18,872	18,872	18,872	13,602	13,602	13,602	13,602	13,602	13,602

** p<0.01, * p<0.05 Standard errors in brackets corrected for 5 repetitions of multiple imputations and 999 bootstrap sampling weights.

Notes: control variables include a constant term; year fixed effects; household size (equivalent scale); the household head's sex, educational attainment (2 dummy variables), race (2 dummy variables), occupation (3 dummy variables), self-reported risk aversion (2 dummy variables), self-reported propensity to plan ahead (2 dummy variables), and age (in linear and quadratic form); and the head of the household's declaration of having been denied credit in the previous 12 months, or having abstained from applying for credit for fear of being denied (dummy variable). IRRs larger than 1 denote positive effect, IRRs lower than 1 negative.

Conclusions

In this paper we study American household finances over the past four decades, advancing a new classification of the population that does not rely on arbitrary income or wealth thresholds, and designing a comprehensive set of variables that reflects the several explanations of household debt trends put forward in the literature. This analysis sheds light on the macroeconomic impact of different motives to go into debt and on the financial risk associated with them. Our approach allows us to go past the issue of which income groups show the highest ratios or who most contributed to debt growth, by instead focusing on the different financial behavior and portfolio configurations within each class.

In fact, our class definition provides the key to a macroeconomic reading of the observed phenomena. We classify households based on the function of the assets they own, which are associated with the type of incomes they receive, and the motives for which they have taken on and accumulated debt. Based on the literature, we hypothesize that the debt-to-income ratios of households reflect a desire for equity extraction, consumption smoothing, emulation, or a necessity to make up for insufficient income.

The results reinforce and qualify the controversial hypothesis that inequality has been an important factor behind household indebtedness in the past decades. In particular, we find that when we account for incompressible or contractually fixed expenditures, including those that depend on past decisions such as debt payments, income (or lack thereof) is robustly correlated with indebtedness (variables such as "poverty," "available equivalent income," "income shock," and "snowball effect"). Such a nexus is especially strong for those who are poor among wealth or business owners and, to some extent, homeowners, supporting the idea that poor and middle-class households might have faced significant financial distress over the period, despite the significant differences in their portfolio and motives to go into debt.

Somewhat similarly, changes in asset values become relevant when we consider some determinants of consumption and financial norms within a reference group. The Veblenian motive (overspending on assets) retains explanatory power for a portion of the debt, both looking at the house for the higher classes, and at vehicles for the propertyless, although the impact of "equity extraction" is usually not significant.

Whether the observed debt-to-income ratios translate into a condition of financial fragility at the household or at the macroeconomic level depends on a variety of other factors, including the size of the social safety net, the asset prices cycle, monetary policy, and the concentration of the more leveraged positions in terms of geographical space and social and demographic determinants. Our dataset only provides limited information. However, based on our analysis, a systematic over-indebtedness of wealth or business owners, motivated by the difficulty to make ends meet and face incompressible or contractually fixed expenditures, should be interpreted as a sign that the economy is not growing in a sustainable way. Speculative financial positions, such as getting into debt for equity extraction purposes and increasing one's liquidity risk, do not seem to imply a higher indebtedness in the long run (liquidity risk has a positive but very small coefficient). A possible reason could in part be because default is not too costly an option. Thus, the question arises of whether the growth pattern of the American economy is really just a sequence of speculative bubbles, that benefit first and foremost the rentiers and speculative investors.

Purchasing a first house implies an expectation of independent earnings (and/or cost-saving) over time that can make that financial decision sustainable, regardless of asset prices fluctuations. There is evidence that some homeowners and wealth or business owners have overspent on this asset, but

also that they accumulate debt when they struggle to make necessary payments, trying to keep their home.

Furthermore, the evidence that all classes, especially the propertyless, go into debt not only because they overspend, but also to make ends meet, is worrisome. A significant impact of variables related to poverty and insufficient income, given the possibility of a default, may indicate the systematic need of those households to resort to credit for unproductive purposes. In this case, credit would almost assume a function of welfare provider of last resort for those without assets or with negative equity. Such credit-fueled household spending provides a smooth flow of revenues to the financialized corporate and rentier sectors, for a range of services and debt repayment, which is essentially inelastic to changes in household real incomes. Hence, in contrast with recent literature that takes a portfolio approach to household financial instability, [20] we believe that our research supports the conclusion that policies attempting to reduce fragility cannot avoid tackling the structure of aggregate demand and the sources of income inequality. And those policies must consider the effect that new productive and employment-creating investments may have on the real incomes of many families in the short to medium term in such a chronically financialized (and concentrated) economy. To that end, measures such as price capping and reinforced provision of free or cheap public services should be devised.

Finally, we must acknowledge that this study presents some limitations, especially due to data availability in the Survey of Consumer Finances, as we pointed out at various instances in the body of the paper. Nevertheless, we hope that this work can provide a valuable framework and a sound methodology that can be further tested and improved by their application to different datasets. We recognize in particular that there is ample opportunity to explore the class analysis of US households further. That could be done by using a survey, such as the Fed's Consumer Credit Panel, that observes households over time, thus providing insights on how conditions may change due to macroeconomic fluctuations and how class movements may occur. Furthermore, the analysis of the impact of relative poverty and available equivalent income could be further specified thanks to observations pertaining to the consumption behavior of households as well as their occupation and employment benefits.

[20] See for instance Foote et al. 2012, Adelino et al., 2016, Bartscher et al., 2020 and the discussion on page 10.

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Appendix

Table A1 – Credit constrained households, by class and year

Refused credit (%)

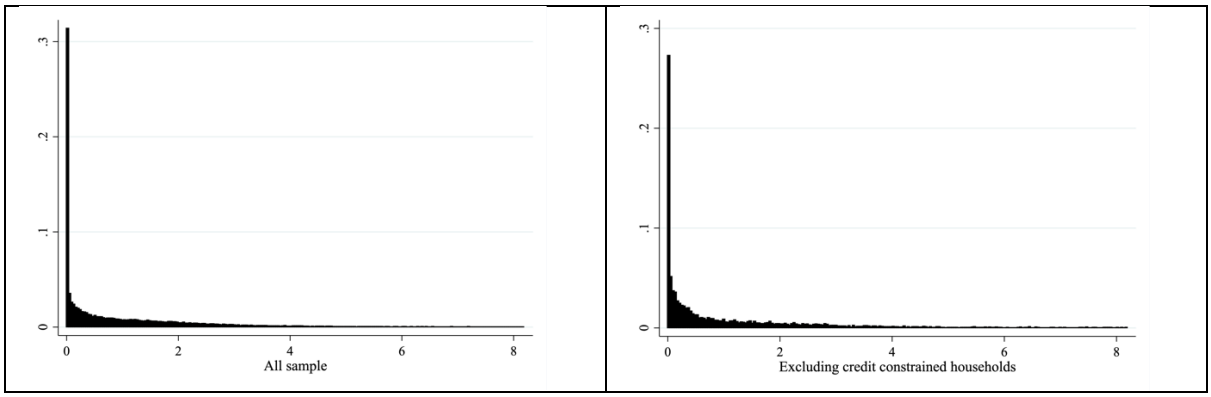
	All sample	WBO	HO	PL
1989	11.63	8.82	7.70	17.92
1992	14.78	11.79	9.44	23.18
1995	12.14	10.00	8.76	17.63
1998	12.64	9.06	8.76	19.74
2001	12.29	8.53	8.08	20.53
2004	13.04	7.77	8.97	22.07
2007	10.92	7.09	7.60	18.04
2010	13.86	12.55	11.01	18.91
2013	12.30	12.10	8.74	17.46
2016	9.63	7.67	7.44	13.35
2019	9.31	5.83	6.69	14.63

Discouraged (%)

	All sample	WBO	HO	PL
1989	0.00	0.00	0.00	0.00
1992	0.00	0.00	0.00	0.00
1995	5.43	2.77	1.94	11.26
1998	4.73	1.45	1.38	10.93
2001	4.71	0.56	1.67	11.18
2004	4.18	1.12	1.71	9.61
2007	4.92	0.25	1.89	11.90
2010	6.48	1.68	3.99	12.28
2013	7.03	2.81	3.51	13.56
2016	0.00	0.00	0.00	0.00
2019	0.00	0.00	0.00	0.00

Notes: we define as having been "refused credit" those households who were refused credit (application turned down or not given as much as applied for) in the past 12 months, and who were unable to obtain the full amount elsewhere; "discouraged" are those households who did not apply for credit in the past 12 months but thought about it and then changed their minds for fear of being turned down. For the same variables, from 2016 the reference period is the past five years. The question on discouraged borrowers was not present in the 1989 and 1992 questionnaires.

Figure A1 – Distribution of the debt-to-income ratio



Notes: for visual clarity we do not show the top 1% of values of D/Y (higher than 8.2). Credit constrained households defined as in the previous note.

Table A2 – Predicted values of households' assets (Tobit regressions) and incomes (OLS)

	Car	**House**	**Income**
Household income	0.00276	0.00415	
	[0.00269]	[0.00263]	
Assets excl. vehicles	5.07e-07**		
	[1.49e-07]		
Assets excl. house		1.59e-06**	
		[2.12e-07]	
Edu: Some college	7.138**	16.90**	198.5**
	[1.371]	[3.512]	[39.77]
Edu: BA or higher	13.38**	87.19**	992.4**
	[1.995]	[4.286]	[77.96]
Age of household head	0.142**	4.919**	29.28**
	[0.0368]	[0.288]	[1.362]
Age (quadratic term)	-1.439**	-10.72**	-32.29**
	[0.235]	[0.715]	[6.170]
Woman household head	-17.42**	-58.68**	-633.9**
	[1.976]	[3.734]	[37.61]
Race: black/African American	-19.34**	-88.95**	-429.8**
	[2.303]	[5.686]	[26.10]
Race: Hispanic/Latino	-8.329**	-64.79**	-448.3**
	[1.253]	[4.991]	[31.06]
Race: Asian or other	-9.577**	-26.83**	-483.3**
	[1.726]	[4.730]	[66.59]
Household size	2.060**	24.67**	139.0**
	[0.434]	[1.446]	[20.30]
Constant	-19.82**	-111.7**	-401.9**
	[3.496]	[9.030]	[101.6]
Estimated var. of reg.: s^2	16,630**	48,005**	
	[4,113]	[8,517]	
Observations	53,553	53,553	53,553

** p<0.01, * p<0.05
Standard errors in brackets corrected for 5 repetitions of multiple imputations and 999 bootstrap sampling weights.
Notes: income values expressed in thousands of 2019 USD, asset values in tens of thousands of 2019 USD. The regressions aim at descriptively defining a predicted value of the assets held by the household or of the income of their reference group, and do not have inferential aims. Control variables include year fixed effects.

Table A3 – Heckman model: debt-to-income ratio: whole sample, and wealth or business owners

	(1) All	(2) All	(3) All	(4) All	(5) All	(6) All	(7) WBO	(8) WBO	(9) WBO	(10) WBO	(11) WBO	(12) WBO
Making ends meet												
Poverty				0.778**	0.730**	0.114				2.144**	1.987**	0.753
				[0.0426]	[0.0417]	[0.126]				[0.237]	[0.238]	[0.782]
Available income	-0.00153**	-0.00137**	-0.000586**				-0.00144**	-0.00124**	-0.000621*			
	[0.000135]	[0.000128]	[0.000200]				[0.000140]	[0.000141]	[0.000271]			
Keeping up with the Joneses												
Income gap				0.00044**	0.00039**	0.00019**				0.00053**	0.00047**	0.00032
				[4.30e-05]	[4.28e-05]	[4.59e-05]				[4.84e-05]	[4.84e-05]	[0.000199]
Overspent on car	-0.00884**	-0.00950**	-0.0122**	-0.0122**	-0.0125**	-0.0133**	-0.000241	-0.00110	-0.00342	-0.00171	-0.00233	-0.00190
	[0.00289]	[0.00279]	[0.00253]	[0.00254]	[0.00250]	[0.00226]	[0.00225]	[0.00209]	[0.00186]	[0.00164]	[0.00156]	[0.00254]
Overspent on house	0.00725**	0.00709**	0.00536**	0.00670**	0.00661**	0.00538**	0.00417**	0.00389**	0.00368*	0.00364**	0.00345**	0.00166
	[0.000772]	[0.000762]	[0.000987]	[0.000748]	[0.000743]	[0.000837]	[0.00118]	[0.00119]	[0.00147]	[0.000733]	[0.000733]	[0.00209]
Financial fragility												
Unrealized extra capital gains on house	-0.0346*	-0.0331*	-0.0201	-0.0282	-0.0275	-0.0207	-0.0321	-0.0297	-0.0153	-0.0131	-0.0127	0.0113
	[0.0151]	[0.0149]	[0.0142]	[0.0147]	[0.0146]	[0.0135]	[0.0342]	[0.0340]	[0.0289]	[0.0331]	[0.0330]	[0.0237]
Liquidity risk	0.111**	0.110**	0.0865**	0.108**	0.108**	0.0882**	0.0829**	0.0801**	0.0788*	0.0689**	0.0676**	0.0360
	[0.0229]	[0.0229]	[0.0225]	[0.0228]	[0.0228]	[0.0223]	[0.0305]	[0.0303]	[0.0328]	[0.0253]	[0.0250]	[0.0512]
Snowball effect			1.617**			1.555**			2.605**			1.169
			[0.0859]			[0.0854]			[0.226]			[1.327]
Consumption smoothing												
Income shock		-0.647**			-0.422**			-1.407**			-1.014**	
		[0.0626]			[0.0599]			[0.403]			[0.176]	
athrho	*-0.0350***	*-0.0376***	*0.244*	*-0.0629***	*-0.0626***	*0.144*	*0.503*	*0.517*	*-0.0255*	*0.721*	*0.731*	*2.762*
	[0.00979]	*[0.0101]*	*[0]*	*[0.0135]*	*[0.0135]*	*[0]*	*[0]*	*[0]*	*[0.0158]*	*[0]*	*[0]*	*[0]*
lnsigma	*0.661***	*0.658***	*0.587***	*0.650***	*0.649***	*0.588***	*1.215***	*1.211***	*1.114***	*1.187***	*1.186***	*1.199***
	[0.0510]	*[0.0513]*	*[0.0656]*	*[0.0515]*	*[0.0517]*	*[0.0574]*	*[0.117]*	*[0.119]*	*[0.131]*	*[0.123]*	*[0.124]*	*[0.179]*
Obs	*45195*	*45195*	*45195*	*45195*	*45195*	*45195*	*12704*	*12704*	*12704*	*12704*	*12704*	*12704*

** p<0.01, * p<0.05 Standard errors in brackets corrected for 5 repetitions of multiple imputations and 999 bootstrap sampling weights.

Notes: control variables include a constant term; year fixed effects; household size (equivalent scale); the household head's sex, educational attainment (2 dummy variables), race (2 dummy variables), and age (in linear and quadratic form). The selection equation includes the head of the household's declaration of having been denied credit in the previous 12 months, or having abstained from applying for credit for fear of being denied (dummy variable); their occupation (3 dummy variables), self-reported risk aversion (2 dummy variables), self-reported propensity to plan ahead (2 dummy variables), sex, educational attainment (2 dummy variables), race (2 dummy variables), and age; and a time trend.

Table A4 – Heckman model: debt-to-income ratio: homeowners, and propertyless

	(1) HO	(2) HO	(3) HO	(4) HO	(5) HO	(6) HO	(7) PL	(8) PL	(9) PL	(10) PL	(11) PL	(12) PL
Making ends meet												
Poverty				1.418**	1.367**	0.682**				0.385**	0.374**	0.241**
				[0.0655]	[0.0654]	[0.0568]				[0.0306]	[0.0308]	[0.0266]
Available income	-0.00426**	-0.00385**	-0.00197**				-9.61e-05	-9.62e-05	-9.58e-05			
	[0.000784]	[0.000722]	[0.000369]				[0.0109]	[0.00273]	[0.119]			
Keeping up with the Joneses												
Income gap				0.00095**	0.00085**	0.00043**				0.000319*	0.000271	-1.75e-05
				[0.000139]	[0.000127]	[8.62e-05]				[0.000155]	[0.000148]	[0.000129]
Overspent on car	-0.0107	-0.0109*	-0.0165*	-0.0120*	-0.0121*	-0.0165*	0.000574	0.000585	0.000555	0.0258*	0.0258*	0.0185
	[0.00548]	[0.00550]	[0.00708]	[0.00598]	[0.00598]	[0.00719]	[1.049]	[0.119]	[2.279]	[0.0107]	[0.0108]	[0.0102]
Overspent on house	0.0119**	0.0115**	0.00875**	0.00970**	0.00953**	0.00792**						
	[0.00137]	[0.00133]	[0.00101]	[0.00108]	[0.00107]	[0.000923]						
Financial fragility												
Unrealized extra capital gains on house	-0.0740**	-0.0715**	-0.0483**	-0.0675**	-0.0661**	-0.0480**						
	[0.0162]	[0.0159]	[0.0126]	[0.0161]	[0.0159]	[0.0129]						
Liquidity risk	0.108**	0.103**	0.0685**	0.0890**	0.0871**	0.0642**	0.000589	0.000586	0.000577	0.0993*	0.0989*	0.0881*
	[0.0207]	[0.0214]	[0.0203]	[0.0222]	[0.0227]	[0.0212]	[2.243]	[0.188]	[0.504]	[0.0439]	[0.0437]	[0.0397]
Snowball effect			1.946**			1.724**			2.93e-05			0.432**
			[0.107]			[0.113]			[19.54]			[0.0762]
Consumption smoothing												
Income shock		-0.917**			-0.547**			-2.33e-06			-0.101	
		[0.0978]			[0.0904]			[0]			[0.0533]	
athrho	*-0.0622***	*-0.0612***	*-0.0586***	*-0.0839***	*-0.0824***	*-0.0717***	*14.54***	*14.54***	*14.54***	*-0.0278*	*-0.0276*	*-0.0275*
	[0.0175]	*[0.0173]*	*[0.0182]*	*[0.0170]*	*[0.0169]*	*[0.0182]*	*[0.492]*	*[0.118]*	*[1.496]*	*[0.0269]*	*[0.0269]*	*[0.0264]*
lnsigma	*0.490***	*0.484***	*0.369***	*0.445***	*0.443***	*0.359***	*0.208*	*0.208*	*0.208*	*0.0364*	*0.0361*	*0.0153*
	[0.0321]	*[0.0324]*	*[0.0292]*	*[0.0324]*	*[0.0326]*	*[0.0295]*	*[5.963]*	*[0.949]*	*[0]*	*[0.130]*	*[0.131]*	*[0.129]*
Obs	*18872*	*18872*	*18872*	*18872*	*18872*	*18872*	*13602*	*13602*	*13602*	*13602*	*13602*	*13602*

** p<0.01, * p<0.05 Standard errors in brackets corrected for 5 repetitions of multiple imputations and 999 bootstrap sampling weights.

Notes: control variables include a constant term; year fixed effects; household size (equivalent scale); the household head's sex, educational attainment (2 dummy variables), race (2 dummy variables), and age (in linear and quadratic form). The selection equation includes the head of the household's declaration of having been denied credit in the previous 12 months, or having abstained from applying for credit for fear of being denied (dummy variable); their occupation (3 dummy variables), self-reported risk aversion (2 dummy variables), self-reported propensity to plan ahead (2 dummy variables), sex, educational attainment (2 dummy variables), race (2 dummy variables), and age; and a time trend.

Table A5 – Poisson PPML estimation: debt-to-income ratio for the subsample of unconstrained households, IRRs, all classes, and wealth or business owners

	(1) All	(2) All	(3) All	(4) All	(5) All	6 All	(7) WBO	(8) WBO	(9) WBO	(10) WBO	(11) WBO	(12) WBO
Making ends meet												
Poverty	1.604**	1.550**	1.095**	1.655**	1.594**	1.115**	2.693**	2.566**	1.702**	2.807**	2.660**	1.725**
	[0.0621]	[0.0558]	[0.0299]	[0.0513]	[0.0492]	[0.0302]	[0.191]	[0.182]	[0.106]	[0.209]	[0.198]	[0.110]
Available income	0.997**	0.997**	0.998**				0.998**	0.998**	0.999**			
	[0.000889]	[0.000769]	[0.000268]				[0.000581]	[0.000505]	[0.000278]			
Keeping up with the Joneses												
Income gap				1.001**	1.001**	1.001**				1.001**	1.001**	1.001**
				[6.51e-05]	[6.22e-05]	[5.50e-05]				[6.81e-05]	[6.68e-05]	[5.81e-05]
Overspent on car	0.966**	0.967**	0.970**	0.969**	0.969**	0.970**	0.996	0.996	0.994	0.997	0.997	0.995
	[0.00778]	[0.00763]	[0.00602]	[0.00680]	[0.00672]	[0.00580]	[0.00502]	[0.00502]	[0.00558]	[0.00431]	[0.00441]	[0.00514]
Overspent on house				1.002**	1.002**	1.001**	1.002**	1.002**	1.001**	1.002**	1.001**	1.001**
				[0.000186]	[0.000192]	[0.000156]	[0.000192]	[0.000183]	[0.000184]	[0.000168]	[0.000167]	[0.000129]
Financial fragility												
Unrealized extra capital gains on house	1.019**	1.019**	1.019**	1.015**	1.016**	1.016**	1.009	1.009	1.012	1.011	1.011	1.014
	[0.00371]	[0.00364]	[0.00349]	[0.00425]	[0.00418]	[0.00396]	[0.0101]	[0.0101]	[0.00905]	[0.00972]	[0.00969]	[0.00874]
Liquidity risk	1.005**	1.005**	1.005**	1.005**	1.005**	1.005**	1.004**	1.004**	1.004**	1.004**	1.004**	1.004**
	[0.00102]	[0.001000]	[0.000825]	[0.000872]	[0.000868]	[0.000762]	[0.00102]	[0.00100]	[0.000824]	[0.00101]	[0.000999]	[0.000824]
Snowball effect			1.942**			1.953**			1.688**			1.721**
			[0.0382]			[0.0385]			[0.0661]			[0.0660]
Consumption smoothing												
Income shock		0.735**			0.716**			0.710**			0.686**	
		[0.0366]			[0.0377]			[0.0651]			[0.0650]	
Observations (x 5 repetitions)	39023	39023	39023	39023	39023	39023	11957	11957	11957	11957	11957	11957

** p<0.01, * p<0.05 Standard errors in brackets corrected for 5 repetitions of multiple imputations and 999 bootstrap sampling weights.

Notes: control variables include a constant term; year fixed effects; household size (equivalent scale); the household head's sex, educational attainment (2 dummy variables), race (2 dummy variables), occupation (3 dummy variables), self-reported risk aversion (2 dummy variables), self-reported propensity to plan ahead (2 dummy variables), and age (in linear and quadratic form); and the head of the household's declaration of having been denied credit in the previous 12 months, or having abstained from applying for credit for fear of being denied (dummy variable). IRRs larger than 1 denote positive effect, IRRs lower than 1 negative.

Table A6 – Poisson PPML estimation: debt-to-income ratio for the subsample of unconstrained households, IRRs, homeowners and propertyless

	(1) HO	(2) HO	(3) HO	(4) HO	(5) HO	6 HO	(7) PL	(8) PL	(9) PL	(10) PL	(11) PL	(12) PL
Making ends meet												
Poverty	1.765**	1.739**	1.363**	2.073**	2.015**	1.492**	1.142	1.144	0.972	1.823**	1.805**	1.412**
	[0.0479]	[0.0477]	[0.0381]	[0.0600]	[0.0587]	[0.0437]	[0.0818]	[0.0821]	[0.0722]	[0.138]	[0.139]	[0.103]
Available income	0.992**	0.992**	0.994**				0.980**	0.980**	0.984**			
	[0.000448]	[0.000443]	[0.000342]				[0.00229]	[0.00232]	[0.00203]			
Keeping up with the Joneses												
Income gap				1.001**	1.001**	1.001**				1.001	1.001	1.000
				[0.000125]	[0.000119]	[0.000102]				[0.000723]	[0.000716]	[0.000466]
Overspent on car	0.989	0.990	0.988*	0.994	0.994	0.991	1.133**	1.133**	1.114**	1.053**	1.053**	1.045**
	[0.00583]	[0.00582]	[0.00570]	[0.00521]	[0.00521]	[0.00530]	[0.0355]	[0.0355]	[0.0320]	[0.0139]	[0.0138]	[0.0120]
Overspent on house	1.004**	1.004**	1.003**	1.003**	1.003**	1.003**						
	[0.000475]	[0.000473]	[0.000457]	[0.000350]	[0.000354]	[0.000388]						
Financial fragility												
Unrealized extra capital gains on house	0.969**	0.970**	0.978*	0.968**	0.968**	0.978*						
	[0.0112]	[0.0111]	[0.0102]	[0.0114]	[0.0114]	[0.0104]						
Liquidity risk	1.008	1.008	1.006	1.010*	1.009*	1.007	1.021*	1.021*	1.026**	1.037**	1.037**	1.034**
	[0.00481]	[0.00487]	[0.00454]	[0.00451]	[0.00461]	[0.00426]	[0.00891]	[0.00894]	[0.00874]	[0.0118]	[0.0117]	[0.0116]
Snowball effect			1.727**			1.802**			1.615**			1.692**
			[0.0446]			[0.0461]			[0.0998]			[0.101]
Consumption smoothing												
Income shock		0.828**			0.737**			1.015			0.911	
		[0.0504]			[0.0452]			[0.124]			[0.119]	
Observations (x 5 repetitions)	17093	17093	17093	17093	17093	17093	9946	9946	9946	9946	9946	9946

** p<0.01, * p<0.05 Standard errors in brackets corrected for 5 repetitions of multiple imputations and 999 bootstrap sampling weights.

Notes: control variables include a constant term; year fixed effects; household size (equivalent scale); the household head's sex, educational attainment (2 dummy variables), race (2 dummy variables), occupation (3 dummy variables), self-reported risk aversion (2 dummy variables), self-reported propensity to plan ahead (2 dummy variables), and age (in linear and quadratic form); and the head of the household's declaration of having been denied credit in the previous 12 months, or having abstained from applying for credit for fear of being denied (dummy variable). IRRs larger than 1 denote positive effect, IRRs lower than 1 negative.