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Does Inequality Matter for the Consumption-Wealth Channel? Empirical Evidence

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Does Inequality Matter for the Consumption-Wealth Channel? Empirical Evidence

Abstract

This paper studies the heterogeneity of the marginal propensity to consume out of wealth based on French household surveys. This heterogeneity is driven by differences in both wealth composition and wealth levels. We find a decreasing marginal propensity to consume out of wealth across the wealth distribution for all net wealth components. The marginal propensity to consume out of financial assets tends to be higher compared with the effect of housing assets, except at the top of the wealth distribution. The marginal propensity to consume out of housing wealth increases with debt pressure and depends on debt composition. Based on a simulation exercise, we find a limited effect of wealth shocks on consumption inequality. An increase in stock prices tends however to slightly increase consumption inequality, especially at the top of the distribution.

JEL-Codes: D120, E210, C210.

Keywords: consumption, marginal propensity to consume out of wealth, policy distributive effects, household survey.

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1. Introduction

The question of whether there is a consumption-wealth channel at play is a crucial policy issue with respect to the transmission of monetary policy to consumer behavior. This question has come back to the fore with unconventional policies that may affect household wealth by targeting asset prices. Total consumption may actually be made up of the aggregation of consumption behaviors reflecting heterogeneous reactions to wealth shocks due to differences in wealth composition and wealth inequality. While a large body of empirical macroeconomic literature (see Muellbauer, 2010; Carroll et al., 2011; and Aron et al., 2012, among others) seeks to evaluate the macroeconomic impact of wealth on consumption, less is known about the heterogeneity of the marginal propensity to consume out of wealth and its implication for aggregate demand.¹ This issue is closely related to the discussions on inequality and the distributive effects of monetary policy.²

This paper estimates the marginal propensity to consume out of wealth (MPC) across the entire wealth distribution, taking account of differences in wealth composition at the household level. We analyze the heterogeneity arising from wealth levels and composition and from indebtedness. We find substantial heterogeneity across the population, which may be a concern for policy-makers, who need to be attentive to the potential distributive effects of public policy. We then investigate the distributional effects of this heterogeneity on consumption inequality.

Our empirical model is based on a consumption function: the consumption-to-income ratio is regressed on the wealth-to-income ratio and on several control variables that take account of the household life-cycle position, preferences, risk exposure and income

¹ Carroll et al. (*forthcoming*) study the marginal propensity to consume out of income across the wealth distribution and they show that the aggregate marginal propensity to consume differs depending on how income shock is distributed across categories of households.

² “The various linkages between heterogeneity and aggregate demand are not yet well understood, either empirically or theoretically. More broadly, even though the tools of monetary policy are generally not well suited to achieve distributional objectives, it is important for policymakers to understand and monitor the effects of macroeconomic developments on different groups within society” (Yellen, 2016).

expectations. We allow for heterogeneous wealth effects across the wealth distribution and across net wealth components. We draw on the 2010 French Wealth Survey,³ which provides detailed information on asset composition, debt, income, socio-demographics and income expectations. We also use a consumption survey, the Household Budget Survey (INSEE), to measure consumption at the household level, in line with the statistical matching methodology proposed by Browning et al. (2003). We are thus able to properly account for both the wealth and the consumption distributions. We then exploit the cross-sectional differences in consumption behaviors and wealth (levels and composition) across households to estimate the marginal propensity to consume out of wealth (see Parker, 1999; Bover, 2005; and Paiella, 2007, for similar approaches).

We find heterogeneity in the marginal propensity to consume out of wealth. This heterogeneity is driven by differences in both wealth composition and wealth levels. First, we find a decreasing marginal propensity to consume out of financial and housing wealth across the wealth distribution. The marginal propensity to consume out of financial wealth decreases from 11.8 cents at the bottom of the wealth distribution and becomes non-significant at the top of the distribution. The decreasing pattern is in line with the theoretical results obtained by Carroll and Kimball (1996).⁴ A similar result is found for housing wealth. The marginal propensity to consume out of housing wealth decreases from 1.3 cents at the bottom of the wealth distribution to 0.7 cents at the top of the distribution. This heterogeneity also affects the measure of the average marginal propensity to consume out of financial wealth; however,

³ The French Wealth Survey is conducted by France's National Statistical Institute (INSEE) and is part of the Household Finance and Consumption Survey (HFCN, 2013). This survey is very similar to the Survey of Consumer Finances conducted by the Fed.

⁴ They show that uncertainty about wealth and income may lead the marginal propensity to consume out of wealth to decline as wealth or income increase. They show that when households have a precautionary saving motive, in the presence of income uncertainty, the consumption function is concave in wealth. The intuition behind the decreasing marginal propensity to consume out of wealth is that wealthy households save for precautionary motives proportionally less than less wealthy ones.

our results confirm the limited wealth effect on consumption in France obtained from macro-based estimates (Slacalek, 2009).

Second, we find evidence that the marginal propensity to consume out of wealth also varies with debt pressure and debt composition. We find a significantly larger marginal propensity to consume out of housing wealth for heavily-indebted households. Such a result is in line with the assumption that the consumption of constrained households is more sensitive to wealth (King, 1994; Blinder, 1976). It could also reflect differences in households' preferences or discount rate; households with higher discount rate taking more debt and spending a higher fraction of their income (Parker, *forthcoming*). We investigate another possible source of heterogeneity in the form of the collateral channel effect of housing wealth: higher housing wealth, everything else being equal, may relax the financing constraints faced by households that have contracted loans guaranteed by the value of their housing assets (mortgages). We find larger values of marginal propensity to consume out of housing wealth for households that have loans with real estate collateral. We discuss the institutional features of the mortgage market in France and argue that such a result is more likely to reflect a selection effect in bank lending policy than additional borrowing capacity for consumption purposes.

Third, we investigate how the heterogeneity in the marginal propensity to consume out of wealth affects consumption inequality. We conduct a simulation exercise⁵ in which we consider in turn increases in financial wealth, stocks and housing wealth at the household level and use our estimation results to simulate the predicted consumption distribution. We find a limited effect of wealth shocks on consumption inequality. Increases in stock prices tend however to slightly increase consumption inequality, especially at the top of the distribution.

⁵ This exercise does not account for changes in household behaviors, especially for changes in asset-holding.

There are only a few papers that provide empirical evidence of heterogeneity in the marginal propensity to consume out of wealth depending on wealth levels. Mian et al. (2013) address this question by drawing on geographical price variations across the U.S. They show that ZIP codes with poorer and more levered households have a significantly higher marginal propensity to consume out of housing wealth. However, the data they use prevent them from investigating the effect of two major features of the household wealth distribution. First, the wealth distribution is highly skewed to the right (e.g. Campbell, 2006), such that the overall consumption-wealth relationship may be driven by just part of the population at the top of the wealth distribution. Second, wealth composition, especially the relative shares of financial and housing assets in household wealth, varies along the wealth distribution (see Arrondel et al., 2016 for euro area countries), which generates differences in exposure to wealth shocks along the wealth distribution.⁶ This wealth heterogeneity is then likely to affect the consumption distribution and may modify consumption inequality.

This paper is organized as follows. Section 2 describes our data. In Section 3, we present our empirical approach and baseline regression. Our main results on the heterogeneity of the marginal propensity to consume out of wealth across the wealth distribution are discussed in Section 4. Section 5 investigates the role of debt pressure and the existence of a collateral channel. Section 6 presents the results of the simulation exercise on consumption inequality. Section 7 concludes.

⁶ Some other papers use household surveys to account for possible differentiated marginal propensity to consume out of wealth (Parker 1999; Bover, 2005; Bostic et al., 2009; Grant and Peltonen, 2008; Paiella, 2007; Sierminska and Takhtamanova, 2007; Arrondel et al. 2014; Christelis et al., 2015). Some of them find evidence of decreasing marginal propensity to consume out of wealth (Parker 1999; Bover, 2005 and Arrondel et al., 2014), while others do not (Grant and Peltonen, 2008; Christelis et al., 2015). However, these papers do not go into detail with respect to this heterogeneity across the entire wealth distribution and depending on the wealth composition. Regarding previous estimates on French data, Arrondel et al. (2014) draw on a qualitative survey and do not provide quantitative estimates of the marginal propensity to consume out of wealth. Another strand of the empirical literature sets out to identify wealth effects on consumption based on price dynamics and controlling for heterogeneity in household behaviors, (Attanasio et al. 2009, Browning et al., 2013; Campbell and Cocco 2007; Disney et al. 2010). These papers study MPC heterogeneity across age and homeownership status, but the empirical strategy used (impact of price dynamics) prevents them from examining MPC heterogeneity due to net wealth composition and wealth inequality.

2. Wealth and consumption at the household level

2.1. Data sources and definitions

Our empirical analysis is based on the 2010 French Wealth Survey (FWS, INSEE), which is designed to measure the distribution and composition of household wealth. We also use the 2010 Household Budget Survey (HBS, INSEE) to impute consumption at the household level in the French Wealth Survey, taking the statistical matching approach proposed by Browning et al. (2003).

Consumption

The measure of consumption is a crucial issue. The best household level information about consumption distribution is provided by the Household Budget Surveys (HBS).⁷ These surveys collect item expenditures by asking households to fill in a highly detailed diary. Unfortunately, the HBS cannot be merged with the FWS because they do not cover the same sample of households. We nevertheless use the French 2010 Household Budget Survey⁸ to impute consumption in the French Wealth Survey. We take the methodology proposed by Browning et al. (2003) and estimate an auxiliary model using the HBS to predict non-durable consumption in the FWS. The imputation strategy is detailed in Appendix A. Various tests are conducted to evaluate the imputation procedure (see Appendix A). The distributions of the imputed consumption variable in the FWS and the original variable measured in the HBS are very close. Moreover, our consumption measure in the Wealth Survey covers 89% of the National Accounts aggregate.⁹

Net wealth components

⁷ The literature on U.S. data points out that the Consumption Expenditure Survey has measurement problem which are likely to bias the estimates of trends in consumption inequality (Attanasio et al., 2017, Blundell et al., 2008). We use here the French Household Budget Survey which is the best data source for measuring household level consumption in France. As far as we know, there is not such a concern for this survey.

⁸ The Household Budget Surveys are conducted by INSEE for France.

⁹ Using harmonized definitions in both sources.

The FWS aims to measure households' net wealth distribution. It provides detailed information at the household level on housing wealth (households' main residence and other residences), financial wealth, business assets, debt (mortgages and other debt), consumption and socio-demographic variables (household composition, employment status, etc.). We use the 2010 survey, which was conducted between October 2009 and February 2010. It covers a cross-section of 15,006 households. The sampling design ensures population representativeness and takes account of wealth concentration (oversampling of the top of the distribution) – see HFCN (2013) for the survey's detailed methodology.

To account for heterogeneity in the wealth composition, we split total wealth into the following components:

- Housing wealth, which includes two components: the household's main residence and other real estate property (holiday homes and rental homes, excluding real estate property held for business purposes). The literature points out that housing wealth has an ambiguous impact on consumption (see, for instance, Cooper, 2013). On the one hand, housing satisfies consumption needs and its cost increases with house prices for all households (renters and homeowners), who may have to reduce their non-housing expenditure (negative wealth effect).¹⁰ On the other hand, it also gives rise to capital gains/losses for homeowners, who may adjust their consumption plans to take account of these (realized or unrealized) housing gains/losses. The role played by the household's main residence is then likely to be specific as it covers both consumption needs and investment motives, while other real estate properties are more likely to reflect investment decisions.

¹⁰ In addition, renters may be prompted to increase their savings to finance a future home acquisition.

- Financial wealth, which includes all financial assets held by the household (deposits, mutual funds, shares, voluntary private pensions, whole life insurance and other financial assets), but excludes business assets;
- Other wealth includes assets held for business purposes (land, farms, office space rented out to businesses, etc.) and all other remaining assets (vehicles, valuables, etc.).

For each category of assets, we consider the net values, i.e. the gross value of the assets less the remaining principal on loans taken out to buy these assets based on the survey information on the main purpose of each contracted loan (see the detailed definition of the variables in Appendix B).

2.2. Consumption and wealth distributions

Table 1 reports the summary statistics for consumption, wealth and income distribution based on our data.¹¹ They are in line with well-known facts about the distributions of consumption, wealth and income.

[INSERT TABLE 1]

First, consumption is less unequally distributed than income (e.g. Blundell et al., 2008). In France, the Gini coefficient for total gross income levels stands at about 0.38 (and about 0.36 when excluding income from housing and financial assets). The Gini coefficient for non-durable consumption is slightly lower (0.31). The fact that non-durable consumption is less unequally distributed than income is also supported by the ratio of the top ten percent to the median value: the top ten percent non-durable consumption is less than double the median, while this ratio is around 2.2 for income. Second, wealth is far more unequally distributed than income (e.g. Davies and Shorrocks, 1999). The Gini coefficient of net wealth is about 0.66, and the top ten percent's net wealth is more than 4.4 times the median net wealth.

¹¹ Given the sampling design of the survey, we use final weights to compute our descriptive statistics in order to ensure the representativeness of our figures.

Indeed, household wealth (gross and net values) increases dramatically across the wealth distribution, especially above the median value (Table 2, columns 1 and 2).

[INSERT TABLE 2]

This wealth concentration partly reflects the homeownership rate in France (55%) and the key role played by housing assets in the wealth distribution. Indeed, asset composition varies a great deal across the wealth distribution (Figure 1). Below the 30th gross wealth percentile, households only hold financial assets (mainly deposits) and other wealth (durable goods and businesses in the case of some of them). From here, the share of housing wealth in total assets increases sharply. It reaches about 70% of total assets in the p50-p90 gross wealth percentiles. At the top of the distribution, the weight of housing assets decreases and its composition changes: the share of the main residence decreases while the share of other housing assets increases. In the top 1%, households hold diversified portfolios in which financial assets and other assets have more weight than housing wealth.¹² The composition of their assets is also highly specific. In particular, business assets play a crucial role in accounting for their total wealth.

[INSERT Figure 1]

Debt differences can also be observed across the wealth distribution (Table 2, last column). In the first gross wealth quartile, debt represents half of the value of total assets and average net wealth is close to zero. This ratio reaches 16% in the p50-p70 interval and decreases above this threshold. This reflects the fact that most households contract debt to buy their main residence.

The concentration of wealth and the heterogeneity of its composition, as well as the crucial role of debt for some households, are then likely to lead to differences in the marginal propensity to consume out of wealth across the wealth distribution.

¹² Given the oversampling of wealthy people in the French Wealth Survey, we are able to provide representative figures for the top 1%.

2.3. Estimation sample

Sample selection

The consumption questions are put to a (representative) sub-sample of 4,519 households (of the 15,006 households in the full sample). To estimate the marginal propensity to consume out of wealth, we exclude households with highly specific wealth, income or consumption figures: households with very high gross wealth values (above 5 million euro), very low annual household income (below 2,000 euro) and extreme consumption-to-income ratio values are excluded. We also restrict the analysis to households where the reference person is aged less than 76 to avoid any old-age survival bias. Our final estimation sample consists of 3,432 households after cleaning. The composition of the econometric sample is very similar to the full sample, with slightly lower mean wealth values (see Table C1 in Appendix C).

Subjective income expectations

We are able to account for income expectations so as to check whether there is a direct wealth effect on consumption or whether the correlation between wealth and consumption partly reflects a confidence channel (Poterba, 2000). The FWS provides useful information on the subjective expectations of the reference person with respect to the expected change in total household income. We construct a dummy variable reflecting household optimism about future total household income (i.e. the individual expects positive average income growth five years hence). This variable disentangles the direct wealth effect from a confidence effect,¹³ as previously considered by Disney et al. (2010). In the FWS, subjective expectations are

¹³ Attanasio et al. (2009) and Carroll et al. (2011) argue that the correlation between consumption and wealth may be spurious due to the omission of common determinants of asset values and consumption such as household expectations of future productivity growth.

collected solely for a sub-sample of households that differs from our estimation sample. We then use in-sample imputation to construct our proxy. We first estimate the linear probability of a household expecting a positive change in household income over the next five years based on the detailed household composition, demographic variables related to the reference person, and certain information about the reference person’s parents. These variables account for the household’s permanent income and heterogeneity in expectations formation. The estimation results (see Table B2 in Appendix B) show that they are highly correlated with our indicator of income expectations. We then use this estimated model to impute a similar qualitative indicator of optimism in our main estimation sample. The percentage of predicted optimistic households in our estimation sample is very close to that observed in the initial sub-sample. The imputation strategy and the results are detailed in Appendix B.

3. Empirical analysis: baseline model

We take the empirical approach used by Paiella (2007) to estimate the marginal propensity to consume out of wealth at the household level using cross-sectional information. We consider a consumption function based on the life cycle model where individuals use wealth accumulation to smooth consumption over their life cycle. Current consumption is proportional to total wealth (i.e. the sum of real non-human wealth and real human wealth, the latter being defined as the present value of expected future income, see Deaton, 1992) and the link between consumption, income and net wealth could be described as:

$$\frac{C_{h,t}}{Y_{h,t}} = \beta_0 + \beta_1 \frac{W_{h,t}}{Y_{h,t}} \quad (1)$$

where C_{ht} and Y_{ht} stand respectively for consumption and income (excluding income from housing and financial assets) for a given household h at time t . In this model, β_1 denotes the propensity to consume out of wealth (or wealth effect). Given that we only have a cross-

sectional survey, this relationship is estimated using household level heterogeneity. In other words, we estimate a long-run relationship linking differences in wealth across households and the heterogeneity in their consumption behaviors. The idea is that when controlling for individual heterogeneity reflecting differences in age, permanent income and preferences, residual differences in wealth across households could be interpreted as unanticipated and non-voluntary gains.¹⁴ We control for individual characteristics such as the reference person's age, work status and qualifications, household composition (number of adults and number of children), a qualitative credit constraint indicator,¹⁵ and qualitative indicators for past periods of unemployment or health problems to factor in life-cycle position, preferences, risk exposure, and credit constraints. We also control for the reference person's subjective expectations of the change in total household income by considering the dummy variable reflecting household optimism about future total household income (i.e. expectation of positive average income growth five years hence).

Estimation results are reported in Table 3a (in which we do not control for income expectations) and Table 3b (in which we control for income expectations). Estimates show a small wealth effect on consumption in France: the estimated marginal propensity to consume out of net wealth is approximately 0.005, meaning that one additional euro of net wealth is associated with 0.5 cents of additional annual consumption. This result is in line with previous results obtained for aggregate data showing limited wealth effect on consumption for France (Slacalek, 2009).

[INSERT TABLE 3a]

[INSERT TABLE 3b]

¹⁴ In the literature, some papers can assess the effect of unexpected shocks using survey information about hypothetical income or wealth changes (Jappelli and Pistaferri, 2014), retrospective questions about tax rebates (Sahm et al., 2010), or using natural experiments (Jappelli and Padula, 2015).

¹⁵ The qualitative indicator of credit constraints is a dummy variable equals one when the household answers that it was turned down by a lender or creditor, not given as much credit as applied for, or did not apply for credit because of perceived constraints.

Significant marginal propensity to consume out of both financial and housing assets is obtained when considering the net wealth components (Tables 3a and 3b, column 3). The estimated marginal propensity to consume out of financial wealth seems slightly lower (0.2 to 0.3 cents for financial assets, 0.4 cents for the main residence) than for other assets (0.5 to 0.8 cents).

The probability of expecting an increase in total household income has a positive significant effect: households that are optimistic about their future income tend to consume a higher share of their current income, everything else being equal. In other words, these results support the view of the existence of a direct wealth effect on consumption in addition to the confidence channel. In our case, the introduction of this variable does not strongly affect the estimated coefficients of the wealth variable.

Socio-demographic variables also have a significant effect on the consumption-to-income ratio. The age effects are significant and suggest a decreasing consumption-to-income ratio pattern over the life cycle. This age profile might reflect the fact that middle-aged households save more than younger households for precautionary reasons, or to finance consumption in their old age. The negative age effect for older people might reflect a bequest motive. There are also significant differences based on household composition. In particular, the number of adults is negatively correlated with the consumption-to-income ratio, which may be explained by some economies of scale. The share of household income used to finance consumption is greater among unemployed, less-educated people, households with credit constraints, and households with periods of unemployment in the past.

These baseline regressions provide average MPC estimated for the entire wealth distribution. However, given the concentration of wealth and the changes in asset composition across the wealth distribution illustrated in Section 2, these average estimates are likely to be affected by heterogeneity in consumption and savings behavior across the wealth distribution

due to differences in preferences, precautionary saving and accumulation for intergenerational transfer motives.

4. Main results: marginal propensity to consume out of wealth across the wealth distribution

We now consider a more flexible specification where we allow the MPC to vary across the net wealth distribution. We define net wealth categories in which household wealth composition is fairly homogeneous (see Figure 1) and introduce an index function I_h^j reflecting that household h belongs to the j wealth group, which is interacted with asset values. We consider four net wealth groups defined on the basis of the net wealth percentiles: below median net wealth, p50-p69, p70-p89, and p90-p99.¹⁶

We estimate the following equation:

$$\frac{C_h}{Y_h} = \beta_0 + \sum_{j=1}^J \beta_1^j \frac{W_h}{Y_h} * I_h^j + \gamma Z_h + u_h \quad (2)$$

where C_{ht} and Y_{ht} stand respectively for consumption and income (excluding income from housing and financial assets) for a given household h , β_1^j denotes the propensity to consume out of wealth for the j wealth group, and Z_h is the list of control variables controlling for differences in age, permanent income and preferences already considered in equation (1).

The results are presented in Table 4.

[INSERT TABLE 4]

¹⁶ We have also considered other ways of dividing up the net wealth groups (five net wealth groups instead of the four previously defined) to check the robustness of the results. This does not affect our main conclusions (see Table C2 in Appendix C).

These estimates confirm the significant marginal propensity to consume out of wealth and the differentiated wealth effects by asset type. Most interestingly, we obtain a decreasing marginal propensity to consume out of wealth along the wealth distribution. Taking the total net value of assets (net wealth), we obtain an MPC decreasing from 3.6 cents (for households below the median net wealth) to about 0.5 cent at the top of the distribution (Table 4, Specification A). In the end, the weighted average marginal propensity to consume out of wealth amounts to 0.2 cent. In other words, the average marginal propensity to consume out of wealth estimated from the baseline model in Table 3 is biased by the nonlinear effects arising along the wealth distribution.

This pattern is confirmed when disaggregating net wealth into its components (Table 4, Specifications B and C). The marginal propensity to consume out of financial wealth decreases from 12.2 cents at the bottom of the wealth distribution to a non-significant effect at the top of the distribution. Such heterogeneity may then be a concern for policy-makers, who need to be attentive to the potential distributive effects of public policy. It also affects the measure of the average marginal propensity to consume out of financial wealth. The weighted average marginal propensity to consume out of financial wealth amounts to about 0.6 cent (compared with 0.2 cent without accounting for heterogeneous effects along the wealth distribution – see Table 3b).

These differences across the wealth distribution, and especially the large value of MPC at the bottom of the distribution, could be due to specific precautionary motives or credit constraints faced by households with low levels of net wealth.¹⁷ Financial wealth and housing wealth have differentiated effects which vary across wealth groups (Table 4, Specification B). The financial wealth effect dominates the housing wealth effect at the bottom of the wealth distribution, in contrast to the top of the distribution. Heterogeneity is much less pronounced

¹⁷ The role of indebtedness and debt pressure is investigated in Section 5.

for housing wealth than for financial wealth: the marginal propensity to consume out of housing wealth decreases from 1.3 cents at the bottom of the wealth distribution to 0.7 cents at the top of the distribution. Given that housing assets are not liquid assets, this housing wealth effect could reflect the sensitivity of consumption to the “feeling” of being wealthier rather than to actual capital gains. It could also be partly due to a collateral effect. This issue is investigated in Section 5. When housing wealth is disaggregated into “main residence” and “other real estate” (Table 4, Specification C), the decreasing pattern of the MPC is obtained for both housing components. For a given net wealth group, the MPC out of other real estate is significantly higher than the MPC out of the value of the main residence (except in the p90-p99 wealth group, where there are no significant differences between the two types of housing assets). This result is consistent with the fact that the “other real estate” wealth component can be more easily liquidated or adjusted by households (as it comprises secondary residences and housing assets held for investment purposes) than the household’s main residence.

We compute average consumption elasticity to wealth for each wealth group to investigate the implications for aggregate consumption. Average consumption elasticity is obtained by multiplying the estimated MPC by the ratio of average net wealth to average consumption within the considered wealth group (last column of Table 4). The wealth concentration at the top of the distribution (i.e. the fact that the ratio of wealth to consumption, W/C , increases sharply along the wealth distribution) offsets the decreasing marginal propensity to consume out of wealth. We thus obtain *increasing* average elasticity of consumption to net wealth (from 0.03 to 0.15 at the top of the net wealth distribution). This increasing pattern seems to be driven mainly by housing assets: average consumption elasticity to housing wealth increases from 0.01 at the bottom of the net wealth distribution to 0.11 at the top.

One potential concern when estimating the effect of wealth on consumption is the spurious correlation that may arise from greater expectations of income and future activity, which may be a common determinant of asset prices and consumption. While we already control for household's income expectations, we may nevertheless be concerned about a specific correlation arising from house prices. In line with Cooper (2013), we conduct an additional regression including geographical variables to account for the fact that some households may feel wealthier than others because they live in a more prosperous area. The survey provides information on household location by broad geographical areas (nine regions for France) and the size of the municipalities where the household's main residence is located. Inclusion of these explanatory variables does not dramatically change the estimated marginal propensity to consume out of wealth.¹⁸

The potential endogeneity of asset-holding decisions is another concern for the robustness of the results. Some factors not observed or fully captured by the control variables (such as taste, time and risk preferences) might be expected to affect both consumption and asset allocation. In our case, we are also restricted by the survey, which does not enable us to observe household asset-holding decisions over time (as it is a cross-section). We therefore perform additional regressions to check whether our results continue to hold for households owning similar types of assets, i.e. homeowners and stockholders. Table 5a reports the estimated coefficients when the housing wealth variable is interacted with a dummy variable reflecting homeownership. These estimates confirm the decreasing MPC pattern: among homeowners, the MPC out of housing wealth decreases from 4.0 cents below the median net wealth to 0.9 cents in the p90-p99 group. In Table 5b, we distinguish stocks and the other financial assets. We obtain a significant wealth effect only for stockholders at the top of the net wealth distribution, while the MPC out of other financial assets is significant for

¹⁸ Results are available upon request.

households below the median net wealth. In both cases, the MPC decreases along the net wealth distribution. These results suggest heterogeneity in the reaction of consumption to variations in financial wealth. According to our estimates, stock price developments are likely to have only a limited impact on the consumption of high wealth consumers. For other wealth groups, consumption may be more affected by unexpected changes in fiscal policies affecting deposits for instance.

[INSERT TABLE 5a AND TABLE 5b]

All in all, our empirical analysis sheds light on the heterogeneity of MPC across households. The literature points to several factors that could explain such heterogeneity. First, our results are in line with the framework generating a concave consumption function with wealth, due to higher precautionary savings for less wealthy households. Second, debt is deemed to play a role in MPC heterogeneity through two channels. The higher value of MPC out of financial wealth observed at the bottom of the wealth distribution could reflect liquidity constraints: constrained households cannot adopt their optimal consumption and their consumption is therefore expected to be more sensitive to liquid wealth. The role of housing as collateral for mortgages could lead to heterogeneous MPC out of housing wealth: higher housing values, everything else being equal, may relax financing constraints for households that have contracted loans guaranteed by the value of their housing assets (mortgages). These issues are investigated in the next section.

5. The role of indebtedness

To investigate whether debt pressure affects consumption behavior, we run estimations where the wealth variables are interacted with indicators of debt pressure. Two indicators are considered:

- The debt-to-assets ratio (DA ratio): we consider a household to be “under pressure” when this ratio is above 2 (which corresponds to the 9th decile of this ratio in the population);
- The debt-service-to-income ratio (DSI ratio): we define as “highly indebted” households with a ratio above 25% (which corresponds to the 9th decile of this ratio in the population).

We estimate coefficients for the interactions between the DSI and DA ratios and net wealth groups in separate regressions.¹⁹ With respect to housing wealth, significant MPC is obtained for highly-indebted households at the bottom of the net wealth distribution, while the estimated MPC is not significant for low-indebted households at the bottom of the distribution. These results are in line with the assumption that the consumption of constrained households is more sensitive to wealth. They are also in line with a collateral channel affecting the consumption of households relying on debt financing and using housing wealth as collateral. In order to investigate whether the wealth effect on consumption differs across households depending on the type of loans they have contracted, we distinguish households with loans guaranteed by real estate properties (defined as mortgages) from households without mortgages. We estimate the marginal propensity to consume out of wealth for both sub-populations (Table 6, column 1 and column 2), and obtain larger values of MPC out of housing wealth in the sub-sample of households that have loans with real estate collateral (Table 6, column 1).

[INSERT TABLE 6]

¹⁹ Results available upon request.

This finding may be consistent with a collateral channel that reinforces the direct housing wealth effect: everything else being equal, the consumption of households with mortgages is more sensitive to the value of their housing wealth. Although our regressions include many variables to control for observable heterogeneity in net wealth composition, the concern remains that the MPC estimated for “non-mortgage households” (Table 6, column 2) may result from two types of households with highly heterogeneous behavior: homeowners without mortgages (i.e. outright owners or homeowners with other types of loans) and households without any collateralizable real estate property. We therefore conduct an additional regression on a smaller sub-sample of households without mortgages that are nevertheless indebted and own at least one real estate property (Table 6, column 3). The estimated MPC out of housing wealth for these non-mortgage households is higher than for the total population of “non-mortgage households” (Table 6, column 2), but remains lower than the estimated MPC of “mortgage households” (Table 6, column 1), in particular at the bottom of the wealth distribution. Such differences in the marginal propensity to consume out of wealth are then consistent with a possible collateral effect, which would cause the consumption of “mortgage households” to be more sensitive to housing wealth, everything else being equal.

However, the collateral effect is likely to be limited in France, because the mortgage market is less developed than in some other European countries and is highly specific. First, using mortgages to finance assets other than collateralized ones was only permitted by law during a limited period (2007-2014), which includes our survey period. This means that using mortgages to finance consumption needs has never been common practice in France (see also European Central Bank, 2009). Moreover, when it was permitted, the value of collateral could not be re-evaluated over time (it was fixed to the initial collateralized value). Second, there are two main types of bank loan that can be taken out to purchase a property: either a housing

loan insured by an insurance scheme²⁰ or a mortgage collateralized by housing assets. According to the 2010 French Wealth Survey,²¹ most of the loans contracted to finance the household's main residence are not mortgages (Table 7). Among the French population, 20.1% of households are indebted to finance the household's main residence and only 41.1% of these have at least one mortgage loan. In other words, 58.9% of households that have taken out debt to buy their main residence do not use their real asset as collateral.²² The second main purpose for household debt in France is to buy a car or other vehicle (20.1% of households). Less than 1% of households report that they use real estate property as collateral for this purpose. And only about 2% of the loans whose main purpose is to finance consumption are mortgages.

[INSERT TABLE 7]

In view of this institutional background, we suspect that the heterogeneity in the MPC out of housing wealth may reflect a selection effect in the bank lending supply, i.e. banks only offer mortgages to highly specific households. Indeed, significant differences can be observed between the average characteristics of indebted households²³ depending on the type of loan they have (see Table C3 in the Appendix). The “mortgage households” have higher income, housing wealth and total debt. They are also more often self-employed and younger than the other indebted households. The “mortgage households” may also differ in terms of unobservable characteristics. They may be more concerned about the value of their housing

²⁰ Under this insurance scheme, if repayments are missed, the guarantor pays the lender and simultaneously tries to find amicable solutions to the defaulting problem. In theory, if no solution can be found, the guarantor registers a mortgage by court order at the borrower's expense and the property may be sold to repay the loan. However, in practice, it seems that the full procedure is very rarely carried out so that, from the borrower's point of view, there is a clear difference in terms of risk between a mortgage and an insurance scheme. Lenders also prefer the insurance scheme as it covers the household's default risk without requiring any specific measures or provisions for the lender in the event of default.

²¹ We classify a loan as a mortgage when the household declares that one of the following guarantees is attached to the loan: “hypothèque”, “inscription en privilège de prêteur de deniers” or “bien immobilier”. All other loans are classified as “non-mortgages”. 12.6% of households in our econometric sample (i.e. 437 households) have contracted at least one loan which is a mortgage.

²² These figures are consistent with a banking survey conducted annually by the Banque de France. In 2010, most of the loans granted for property purchases were insured by an insurance scheme, while only about 30% were guaranteed by a real estate property (mortgage).

²³ This comparison is made for households with at least one real estate property (the household's main residence or other real estate) so as to focus on households with collateralizable assets.

assets, have a more accurate assessment of their wealth, and ultimately be more sensitive to it compared with households that do not provide any real estate collateral.

6. Simulation results on consumption inequality

We perform a simulation of the effect that an exogenous shock on household asset values (which could be due to various public policies such as changes in fiscal policy or a price effect coming from unconventional monetary policy for instance) would have on consumption inequality. We consider in turn 100% increases in financial wealth, stocks and housing wealth²⁴ at the household level: for households holding the asset, we consider that the value of the given asset is doubled, while for the other households we leave their net wealth unchanged. We then use our estimation results to simulate the predicted consumption distribution. These exercises do not account for changes in household behaviors, especially for changes in asset-holding.²⁵ They are however useful in investigating how the consumption distribution might be affected by changes in the wealth distribution accounting for decreasing marginal propensity to consume out of wealth and for heterogeneity in wealth levels and composition.

We find limited effects of the net wealth shocks on the consumption distribution (see Table 8).

[INSERT TABLE 8]

[INSERT FIGURE 2]

²⁴ Note that house prices have seen large fluctuations in France. They rose very sharply between 1996 and 2008, a period during which the value of French houses and apartments more than doubled. Following the crisis in 2008, house prices dropped by 10%, then recovered and even exceeded their highest value in 2011. The following recent period has seen prices decrease slowly back down to their 2010 level.

²⁵ They are also conducted considering a partial equilibrium and do not account for other channels through which public policy may also affect household consumption.

When considering 100% increases in financial wealth at the household level, mean and median consumption increase by about 3.3% and 4.3% respectively through the wealth effect on consumption (Table 8).²⁶ If no account is taken of heterogeneity in the marginal propensity to consume out of wealth, there is almost no effect on the consumption distribution (see Figure 2). The financial wealth shock tends to decrease consumption inequality because virtually all households hold financial assets. Moreover, the share of financial assets in total net wealth is higher for low-wealth households (Table 2), who are also the ones with a larger marginal propensity to consume out of financial wealth.

The picture is slightly different when we look at stocks. The wealth effect on consumption leads to small increases in mean and median consumption (less than 1%). Overall consumption inequality tends however to increase (+0.1% for the Gini Index). This increase in inequality is driven by the top of the consumption distribution: the share of the top 10% (S90) increases slightly by 0.2%, while the ratio between the share of the top quintile and the share of the bottom quintile (S80/S20) decreases (-0.9%).

When we apply a 100% increase in housing wealth, larger effects are obtained (+5.4% for mean consumption and + 5.9% for median consumption). This is mainly due to the weight of housing wealth in total net wealth (more than 60% of households' total assets at the aggregate level, see Table 2). Consumption inequality tends to decrease, whatever the inequality indicator. Unlike financial assets, the effect of housing shocks on the consumption distribution is not strongly affected by taking into account the heterogeneity in the marginal propensity to consume out of housing wealth (see Figure 2): there is less heterogeneity in the marginal propensity to consume out of housing wealth (compared with financial wealth), and

²⁶ These figures are obtained by comparing the consumption distributions predicted by our regression results (Specification B in Table 4) with and without increasing financial asset values by 100% at the household level.

housing wealth is less concentrated than financial wealth at the top of the wealth distribution and basically only concerns homeowners (55% of the population).

Overall, these simulation exercises show a limited effect of wealth shocks on consumption inequality. Increases in stock prices tend however to slightly increase consumption inequality.

7. Conclusion

Household wealth is highly concentrated and its composition (in terms of asset categories and debt components) varies a great deal across the population, which may result in heterogeneous consumption reactions to wealth shocks. This paper provides micro estimates of the marginal propensity to consume out of wealth, controlling for income expectations, and investigates its heterogeneity across the population.

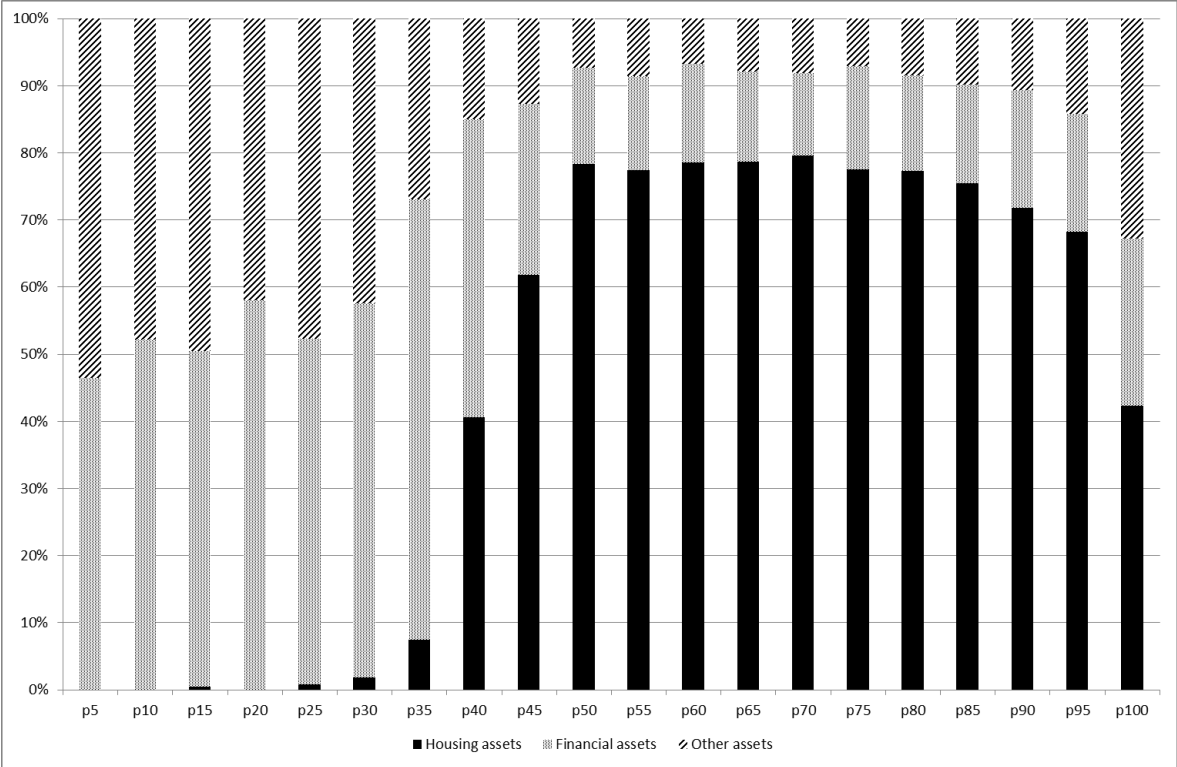
We find a decreasing marginal propensity to consume out of wealth across the wealth distribution. Despite the theoretical work by Carrol and Kimball (1996), empirical evidence of such a pattern across the entire wealth distribution is scarce in the literature. In addition, our results confirm the limited wealth effects on consumption in France generated by both housing and financial wealth.

We also contribute to the debate as to which wealth effect is the largest (the housing or financial wealth effect) and show that the answer depends on the position of households in the wealth distribution. At the bottom of the net wealth distribution, the marginal propensity to consume out of financial wealth dominates the housing wealth effect; while at the top of the net wealth distribution, the marginal propensity to consume out of financial wealth is not significant. The pattern of wealth effects changes slightly when looking at consumption elasticity to wealth, as the wealth concentration at the top of the distribution offsets the decreasing marginal propensity to consume out of wealth. Taken together, there are several

policy implications arising from this heterogeneity in the MPC and consumption elasticity. First, the decreasing MPC means that the consumption of some sub-populations (the less wealthy ones) is more sensitive to a change in their asset values. Thus, public policy (monetary policy regarding interest rates as well as tax policy regarding income from assets, for instance) could have distributive effects across the population. Heterogeneous MPC is then a key factor to be considered in analyzing the transmission of wealth shocks to aggregate consumption (see the European Central Bank, 2014). However, the wealth concentration within the population suggests that the consumption response of rich people plays a key role in the overall wealth effect on consumption at the aggregate level. We argue that such heterogeneities should be considered when performing welfare analysis.

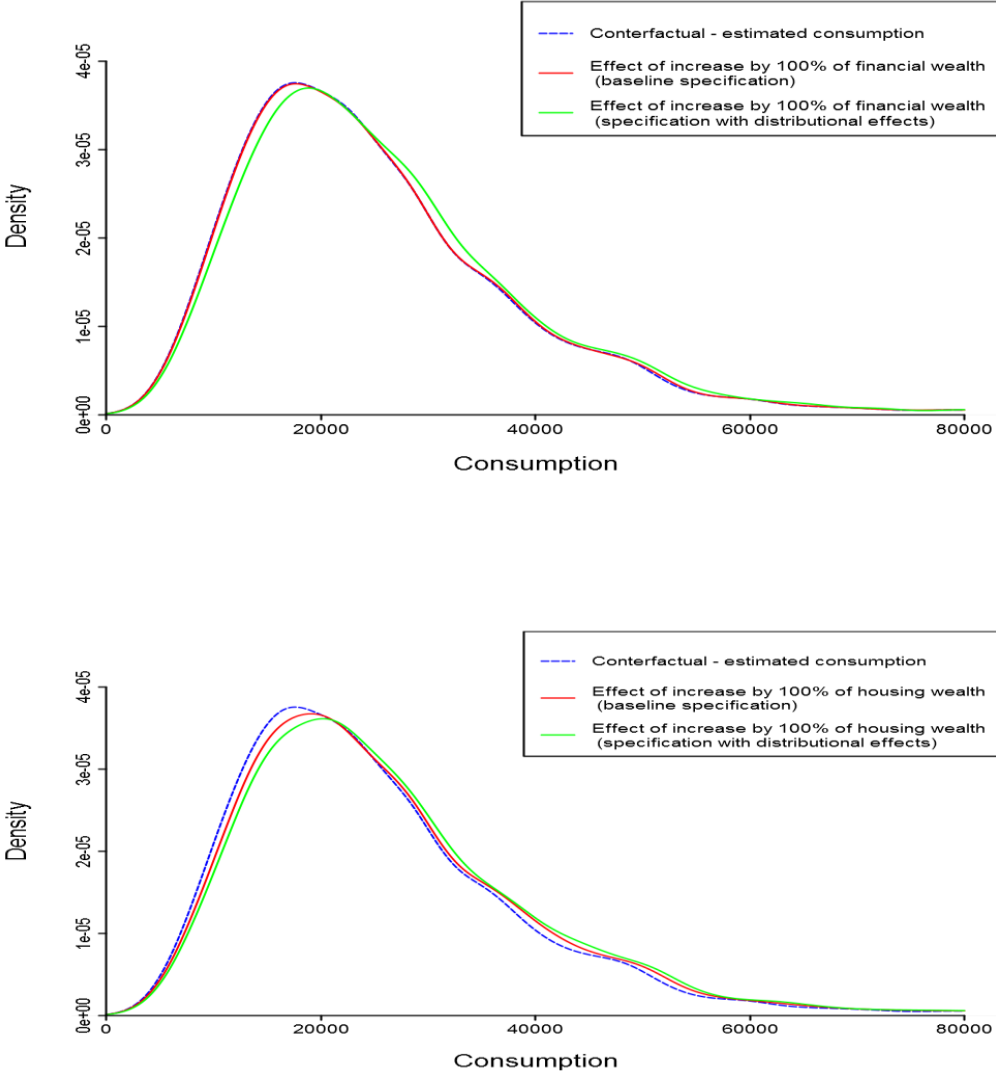
The simulation exercise we perform provides new insights into the link between wealth and consumption inequalities. It illustrates that changes in the net wealth distribution may have a limited effect on consumption inequality. Future research should extend the analysis to other countries. Differences in institutional features, such as the functioning of the credit and housing markets, are likely to provide additional insights on this issue.

Figure 1. Average gross wealth composition by gross wealth percentiles in France



Source: French Wealth Survey (*Enquête Patrimoine 2010*) - Whole population - Weighted statistics. Housing assets: household’s main residence and real estate property other than the household’s main residence (holiday homes, rental homes, excluding real estate property held for business purposes). Financial assets: deposits, mutual funds, shares, voluntary private pensions, whole life insurance and other financial assets (excluding business assets). Other assets: assets held for business purposes (land, farms, office space rented out to businesses, etc.) and valuables.

Figure 2. Effect of a 100% increase in financial assets and housing wealth on the distribution of consumption



The blue line (counterfactual) is the consumption distribution simulated in the econometric sub-sample following the Browning et al. (2003) approach. The red line is the consumption distribution simulated with a 100% increase in financial (or housing wealth) using the baseline regression (without heterogeneous wealth effects). The green line is the consumption distribution simulated with a 100% increase in financial (or housing wealth) using the regression with heterogeneous wealth effects.

Table 1. Distributions of non-durable consumption, net wealth and income

	Non-durable consumption	Net wealth	Income	
			Total Income	Excl. Capital income
Mean (euros)	23 100	229 300	36 500	32 400
Median (euros)	20 100	113 500	28 800	26 800
P90/Median	1,99	4,42	2,22	2,16
Gini	0,31	0,66	0,38	0,36

Source: French Wealth Survey (*Enquête Patrimoine 2010*) and Household Budget Survey (*Enquête Budget de Famille 2010*) - Whole population - Weighted statistics.

Table 2. Mean values of gross and net wealth and share of asset categories and debt in total across the wealth distribution

Gross wealth percentiles	Mean values		Shares in total assets				
	Gross wealth	Net wealth	Financial wealth	Main residence	Other housing assets	Other Assets	Debt
0-25	4,000	2,000	0.52	0.00	0.00	0.47	0.50
25-50	61,200	51,700	0.31	0.46	0.08	0.15	0.15
50-70	202,700	169,600	0.13	0.73	0.06	0.08	0.16
70-90	362,000	318,900	0.15	0.64	0.12	0.09	0.12
90-99	851,200	762,700	0.19	0.40	0.22	0.19	0.10
99-100	4,448,600	4,174,200	0.28	0.13	0.16	0.42	0.06
All	259,000	229,300	0.20	0.47	0.15	0.18	0.11

Source: French Wealth Survey (*Enquête Patrimoine 2010*) - Whole population - Weighted statistics

Financial assets: deposits, mutual funds, shares, voluntary private pensions, whole life insurance and other financial assets (excluding business assets). Other housing assets: real estate property other than the household's main residence (holiday homes, rental homes, excluding real estate property held for business purposes). Other assets: assets held for business purposes (land, farms, office space rented out to businesses, etc.) and valuables. Debt: all forms of debt contracted by households (mortgage debt, non-collateralized debt including debt contracted for business purposes).

Table 3a. Marginal propensity to consume out of wealth: baseline results

	(1)		(2)		(3)	
	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.
Wealth						
Gross wealth	0.005 ***	0.000	-	-	-	-
Net wealth	-	-	0.005 ***	0.000		
Financial wealth	-	-	-	-	0.002 **	0.001
Main residence	-	-	-	-	0.004 ***	0.001
Other real estate	-	-	-	-	0.008 ***	0.001
Other assets	-	-	-	-	0.005 ***	0.001
Age						
25 to 29	ref.		ref.			
30 to 39	-0.100 ***	0.034	-0.100 ***	0.034	-0.098 ***	0.034
40 to 49	-0.134 ***	0.034	-0.136 ***	0.034	-0.131 ***	0.034
50 to 59	-0.210 ***	0.033	-0.215 ***	0.033	-0.209 ***	0.033
60 to 69	-0.166 ***	0.040	-0.172 ***	0.040	-0.164 ***	0.040
70 to 75	-0.166 ***	0.045	-0.173 ***	0.045	-0.163 ***	0.045
Situation on labor market						
Self-employed	0.002	0.023	0.008	0.023	0.002	0.024
Employee	ref.	-	ref.	-	ref.	-
Retired	0.066 **	0.028	0.064 **	0.028	0.067 **	0.028
Unemployed	0.060 *	0.033	0.058 *	0.033	0.061 *	0.033
Others	0.190 ***	0.044	0.188 ***	0.044	0.192 ***	0.044
Education						
No qualification	ref.	-	ref.	-	ref.	-
Primary or Secondary	-0.048 **	0.019	-0.048 **	0.019	-0.048 **	0.019
Baccalaureat	-0.060 **	0.025	-0.059 **	0.025	-0.061 **	0.025
Post-secondary	-0.076 ***	0.027	-0.075 ***	0.027	-0.077 ***	0.027
Tertiary	-0.131 ***	0.023	-0.130 ***	0.023	-0.131 ***	0.023
Household composition						
Number of adults	-0.170 ***	0.013	-0.169 ***	0.013	-0.171 ***	0.013
Number of children	0.007	0.007	0.007	0.007	0.007	0.007
Credit constraint						
	0.071 ***	0.021	0.071 ***	0.021	0.069 ***	0.021
Periodes of unemployment						
Long periods of unemployment	0.074 ***	0.021	0.074 ***	0.021	0.075 ***	0.021
Short periods of unemployment	0.027	0.021	0.028	0.021	0.027	0.021
Past sick leave						
	0.123 ***	0.043	0.123 ***	0.043	0.124 ***	0.043
Intercept	1.191 ***	0.040	1.193 ***	0.040	1.194 ***	0.040
R²	0.141		0.143		0.143	
# observations	3,432		3,432		3,432	

Dependent variable: ratio of non-durable consumption to income (excluding income from financial and housing assets).

OLS estimates. Significant at ***1%, **5% and *10%. Econometric sample.

Table 3b. Marginal propensity to consume out of wealth: baseline results accounting for subjective income expectations

	(1)		(2)		(3)	
	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.
Wealth						
Gross wealth	0.005 ***	0.000	-	-	-	-
Net wealth	-	-	0.005 ***	0.000		
Financial wealth	-	-	-	-	0.002 **	0.001
Main residence	-	-	-	-	0.004 ***	0.001
Other real estate	-	-	-	-	0.008 ***	0.001
Other assets	-	-	-	-	0.005 ***	0.001
Positive income expectations	-0.048	0.027	-0.048	0.032	-0.049	0.032
Age						
25 to 29	ref.	-	ref.	-	ref.	-
30 to 39	-0.100 ***	0.034	-0.100 ***	0.034	-0.098 ***	0.034
40 to 49	-0.133 ***	0.034	-0.135 ***	0.034	-0.131 ***	0.034
50 to 59	-0.247 ***	0.041	-0.251 ***	0.041	-0.246 ***	0.041
60 to 69	-0.211 ***	0.050	-0.217 ***	0.050	-0.210 ***	0.050
70 to 75	-0.211 ***	0.054	-0.217 ***	0.054	-0.209 ***	0.054
Situation on labor market						
Self-employed	-0.003	0.024	0.004	0.023	-0.002	0.024
Employee	ref.	-	ref.	-	ref.	-
Retired	0.063 **	0.028	0.062 **	0.028	0.064 **	0.028
Unemployed	0.059 *	0.033	0.057 *	0.033	0.060 *	0.033
Others	0.187 ***	0.044	0.187 ***	0.044	0.189 ***	0.044
Education						
No qualification	ref.	-	ref.	-	ref.	-
Primary or Secondary	-0.047 **	0.019	-0.047 **	0.019	-0.047 **	0.019
Baccalaureat	-0.057 **	0.026	-0.057 **	0.025	-0.057 **	0.026
Post-secondary	-0.076 ***	0.027	-0.075 ***	0.027	-0.077 ***	0.027
Tertiary	-0.125 ***	0.023	-0.126 ***	0.023	-0.126 ***	0.023
Household composition						
Number of adults	-0.171 ***	0.013	-0.170 ***	0.013	-0.171 ***	0.013
Number of children	0.008	0.007	0.008	0.007	0.007	0.007
Credit constraint	0.071 ***	0.021	0.071 ***	0.021	0.069 ***	0.021
Periodes of unemployment						
Long periods of unemployment	0.073 ***	0.021	0.073 ***	0.021	0.074 ***	0.021
Short periods of unemployment	0.027	0.021	0.028	0.021	0.027	0.021
Past sick leave	0.124 ***	0.043	0.124 ***	0.021	0.125 ***	0.043
Intercept	1.238 ***	0.051	1.241 ***	0.051	1.242 ***	0.051
R²	0.141		0.142		0.144	
# observations	3,432		3,432		3,432	

Dependent variable: ratio of non-durable consumption to income (excluding income from financial and housing assets). OLS estimates. Significant at ***1%, **5% and *10%. Econometric sample.

Table 4. Marginal propensity to consume out of wealth and average elasticity across the wealth distribution

Specification	Regression results			Computation of elasticities			
	(1)			(2)	(3)	(4)=(1)*(2)/(3)	
	Wealth percentile dummy	Marginal propensity to consume wealth		W	Consumption C elasticity to wealth		
		Coefficient	Std. Err.	(mean - euros)	(mean-euros)		
(A)	Net wealth						
	p1-p49	0.036	***	0.005	25,100	25,800	0.035
	p50-p69	0.009	***	0.002	180,200	25,600	0.065
	p70-p89	0.008	***	0.001	354,400	31,600	0.091
	p90-p99	0.005	***	0.000	1,154,300	39,800	0.148
	Control variables	yes					
	R ²	0.153					
(B)	Financial assets						
	p1-p49	0.118	***	0.015	8,900	25,800	0.041
	p50-p69	0.007		0.008	28,800	25,600	0.008
	p70-p89	0.018	***	0.006	58,000	31,600	0.033
	p90-p99	0.002		0.001	280,500	39,800	0.013
	Housing wealth						
	p1-p49	0.013	**	0.006	12,600	25,800	0.006
	p50-p69	0.009	***	0.003	137,200	25,600	0.046
	p70-p89	0.007	***	0.002	266,200	31,600	0.056
	p90-p99	0.007	***	0.001	593,600	39,800	0.108
	Other assets						
	p1-p49	0.029	***	0.008	1,300	25,800	0.001
	p50-p69	0.023	***	0.009	14,000	25,600	0.012
p70-p89	0.009	***	0.003	29,000	31,600	0.008	
p90-p99	0.005	***	0.001	261,800	39,800	0.033	
Control variables	yes						
R ²	0.166						

Table 4 (continued). Marginal propensity to consume out of wealth and average elasticity across the wealth distribution

Specification	Regression results			Computation of elasticities			
	(1)			(2)	(3)	(4)=(1)*(2)/(3)	
	Marginal propensity to consume wealth			W	C	Consumption elasticity to wealth	
	Wealth percentile dummy	Coefficient	Std. Err.	(mean - euros)	(mean-euros)		
Financial assets							
	p1-p49	0.117	***	0.015	8,900	25,800	0.040
	p50-p69	0.007		0.008	28,800	25,600	0.008
	p70-p89	0.018	**	0.006	58,000	31,600	0.032
	p90-p99	0.002	*	0.001	280,500	39,800	0.015
Main residence							
	p1-p49	0.010		0.007	11,900	25,800	0.005
	p50-p69	0.007	**	0.003	120,800	25,600	0.032
	p70-p89	0.006	***	0.002	224,600	31,600	0.042
	p90-p99	0.005	***	0.002	360,100	39,800	0.044
(C)	Other real estate						
	p1-p49	0.033	**	0.016	700	25,800	0.001
	p50-p69	0.024	***	0.008	16,400	25,600	0.015
	p70-p89	0.010	**	0.004	41,600	31,600	0.013
	p90-p99	0.009	***	0.001	233,500	39,800	0.052
	Other assets						
	p1-p49	0.030	***	0.008	1,300	25,800	0.002
	p50-p69	0.023	***	0.009	14,000	25,600	0.013
	p70-p89	0.009	***	0.003	29,000	31,600	0.008
	p90-p99	0.005	***	0.001	261,800	39,800	0.034
	Control variables						
		yes					
	R ²	0.168					

Dependent variable: ratio of non-durable consumption to income (excluding income from financial and housing assets). Other control variables: income expectations, age, work status, reference person's level of education, household composition, credit constraint, periods of unemployment, sick leave.

OLS estimates. Econometric sample. Significant at ***1%, **5% and *10%.

Table 5a. Marginal propensity to consume out of wealth: housing wealth interacted with a dummy for homeowners

Wealth variables	Wealth percentile	Coefficient		Std. Err.
Housing wealth*Homeowners				
	p1-p49	0.040	*	0.024
	p50-p69	0.026	***	0.009
	p70-p89	0.020	***	0.006
	p90-p99	0.009	**	0.004
Dummy homeowner		-0.367	***	0.019
Control variables		yes		
R ²		0.251		
#observations		3,432		

Dependent variable: ratio of non-durable consumption to income (excluding income from financial and housing assets). This regression is based on Specification B in Table 4. A dummy variable identifying homeowners is introduced as well as its interaction with housing wealth. Other control variables: Financial wealth, other assets, income expectations, age, work status, reference person’s level of education, household composition, credit constraint, periods of unemployment, sick leave. OLS estimates Significant at ***1%, **5% and *10%.

Table 5b. Marginal propensity to consume out of wealth: stocks and other financial assets

Wealth variables	Wealth percentile	Coefficient	
Financial wealth (excluding stocks)			
	p1-p49	0.119	***
	p50-p69	0.009	
	p70-p89	0.021	***
	p90-p99	0.002	
Stocks*Stockholder			
	p1-p49	0.106	
	p50-p69	0.080	
	p70-p89	0.051	**
	p90-p99	0.014	***
Dummy stockholder		-0.115	***
Control variables		yes	
R ²		0.177	
#observations		3,432	

Dependent variable: ratio of non-durable consumption to income (excluding income from financial and housing assets). This regression is based on Specification B in Table 4. We split financial wealth into two components: stocks and financial wealth excluding stocks. A dummy variable identifying stockholders is introduced as well as its interaction with stocks. Other control variables: housing wealth, other assets, income expectations, age, work status, reference person’s level of education, household composition, credit constraint, periods of unemployment, sick leave. OLS estimates Significant at ***1%, **5% and *10%.

Table 6. Differences across household groups: indebtedness and collateral

Wealth variables	Wealth percentile	With loans guaranteed by real estate collateral	Without loans guaranteed by real estate collateral	
		(1)	All	Indebted households with a real estate property
		Coeff.	Coeff.	Coeff.
		Std. Err.	Std. Err.	Std. Err.
Financial Wealth				
	p1-p49	0.042 <i>0.057</i>	0.120 *** <i>0.016</i>	0.189 *** <i>0.045</i>
	p50-p69	0.026 <i>0.034</i>	0.007 <i>0.008</i>	0.007 <i>0.016</i>
	p70-p89	0.054 *** <i>0.017</i>	0.016 *** <i>0.006</i>	0.038 *** <i>0.010</i>
	p90-p99	0.003 <i>0.004</i>	0.001 <i>0.001</i>	0.005 ** <i>0.002</i>
Housing wealth				
	p1-p49	0.078 *** <i>0.020</i>	0.011 * <i>0.007</i>	0.059 *** <i>0.011</i>
	p50-p69	0.044 *** <i>0.010</i>	0.009 *** <i>0.003</i>	0.037 *** <i>0.005</i>
	p70-p89	0.032 *** <i>0.005</i>	0.006 *** <i>0.002</i>	0.020 *** <i>0.003</i>
	p90-p99	0.012 *** <i>0.002</i>	0.007 *** <i>0.001</i>	0.010 *** <i>0.001</i>
Other wealth				
		0.005 ** <i>0.002</i>	0.007 *** <i>0.001</i>	0.009 *** <i>0.002</i>
Control variables				
		yes	yes	yes
	R ²	0.220	0.167	0.238
	#observations	436	2,996	1,170

Dependent variable: ratio of non-durable consumption to income (excluding income from financial and housing assets). Other control variables: income expectations, age, work status, reference person's level of education, household composition, credit constraint, periods of unemployment, sick leave. In column 1, the econometric sample is restricted to households with at least one mortgage (i.e. a loan with one of the following associated guarantees: "hypothèque", "inscription en privilège de prêteur de deniers" or "bien immobilier"). The results for the other households without mortgages are in column 2. Column 3 reports the results for a sub-population of column 2: households without mortgages that are nonetheless in debt and have at least one real estate property. OLS estimates. Significant at ***1%, **5% and *10%. Econometric sample

Table 7. Percentage of indebted households

Purpose of the loans	% of households with one loan (or more) contracted for the following purpose	% of households with at least one mortgage for financing the associated purpose (among HH reporting the associated purpose)
Main residence	20.1	41.1
Other real estate	6.3	36.9
Renovation work	6.8	7.4
Cars, vehicles	20.7	0.5
Others (consumption)	9.9	2.3
Business	5.6	2.6
All purposes	47.9	22.6

Among the French population, 20.1% of households are indebted to finance the household's main residence. Among these households, 41.1% have at least one mortgage loan (defined as a loan with one of the following associated guarantees: "hypothèque", "inscription en privilege de prêteurs de deniers" or "bien immobilier").

Source: French Wealth Survey (INSEE) - Whole population - Weighted statistics.

Table 8. Simulation exercise: Effect of net wealth shocks on consumption inequality

	Consumption distribution			
	Predicted	simulated with 100% increase in:		
		Financial wealth	Stocks	Housing wealth
Mean	26000	3.3%	0.7%	5.4%
Median	22700	4.3%	0.6%	5.9%
Gini	0.29	-1.8%	0.1%	-1.6%
S80/S20	4.37	-3.2%	-0.9%	-2.9%
S90	22.61	-0.9%	0.2%	-1.1%

The estimated mean in the French Wealth Survey for non-durable consumption is 26,000 euro. When increasing by 100% the value of financial wealth at the household level, the predicted mean value of consumption increases by 3.3%, reaching 26,800 euro. To compute this effect, we take the estimated value of consumption and add the increase in consumption as estimated by our empirical model (Table 4, Specification B or Table 5, Specification B for stocks), taking the estimated coefficients for financial wealth along the wealth distribution and applying a 100% increase in financial wealth for each household. The effect is computed over the econometric sample.

S80/S20: share of the top 20% over the share of the bottom 20% (in terms of aggregate non-durable consumption)

S90: share of the top 10% (in terms of aggregate non-durable consumption)

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Appendix A: Consumption variable

The consumption variable in the FWS data is obtained following the procedure proposed by Browning et al., 2003.²⁷ We estimate an auxiliary model in a consumption survey (HBS) to predict non-durable consumption in the FWS.

Instead of asking one question about the total amount spent on (non-durable) consumption, which leads to a strong underestimation of consumption, Browning et al. (2003) recommend asking a small number of questions about highly precise, delimited parts of their expenditure²⁸ in a survey that does not focus on consumption. Questions about food consumption (at home and outside the home) and utilities were put to a random, representative sub-sample of one-third of the full sample of the FWS (4,519 households out of the 15,006 in the entire sample). For these households, we estimate total consumption in the following way. First, taking the HBS, non-durable consumption is regressed on the selected expenditure items (food consumption at home, food consumption outside the home and utilities) and on a set of qualitative indicators reflecting regular expenditure on eight other items (clothing, public transport, cultural goods, etc.).²⁹ Then, the coefficients from this auxiliary regression estimated on the HBS are used to impute non-durable consumption in the Wealth Survey.

The regression model displays a good fit with an R^2 equal to 77%, in line with the experiments presented by Browning et al. (2003). Since this method can be seen as a model-

²⁷ Browning et al. (2003) explain that the best way to obtain accurate information on consumption at the household level is to conduct consumption surveys where households have to fill in diaries, as is the case with the Household Budget Survey (HBS, Eurostat) for example. Obviously, this approach cannot be used in a survey where the core output (the assessment of assets and liabilities) is already a difficult task that calls for a long and demanding questionnaire.

²⁸ Food consumption at home, food consumption outside the home and utilities (water, electricity, fuel and communications expenditure). They show that households seem to be able to provide more reliable information on these precise questions than on an aggregate amount.

²⁹ We choose to use only the available consumption composition information in our imputation equation. We do not introduce income or other demographic variables, to avoid any “mechanical” correlation between consumption, income and wealth when estimating the marginal propensity to consume out of wealth.

based application of statistical matching, we also draw on the literature related to these techniques.³⁰

Comparisons between imputed consumption in the Wealth Survey and the HBS

A comparison of FWS data with HBS data reveals that the distributions for the consumption items (food at home, food outside the home and utilities) are very close in both sources (Fig. A1). Given that these three variables are explanatory variables in our imputation model with a high level of explanatory power, this close comparability establishes that there is a good match between the imputed non-durable consumption distribution in the Wealth Survey and the distribution measured in the HBS (Fig 1).

Comparisons with aggregate figures (National Accounts)

Table A1 compares the 2009 National Accounts with our survey measure. We subtract durable consumption, insurance premiums and imputed rents to obtain comparable figures with the survey definitions of non-durable consumption. We then find that our imputed non-durable consumption covers about 89% of the non-durable consumption measured using the National Accounts.

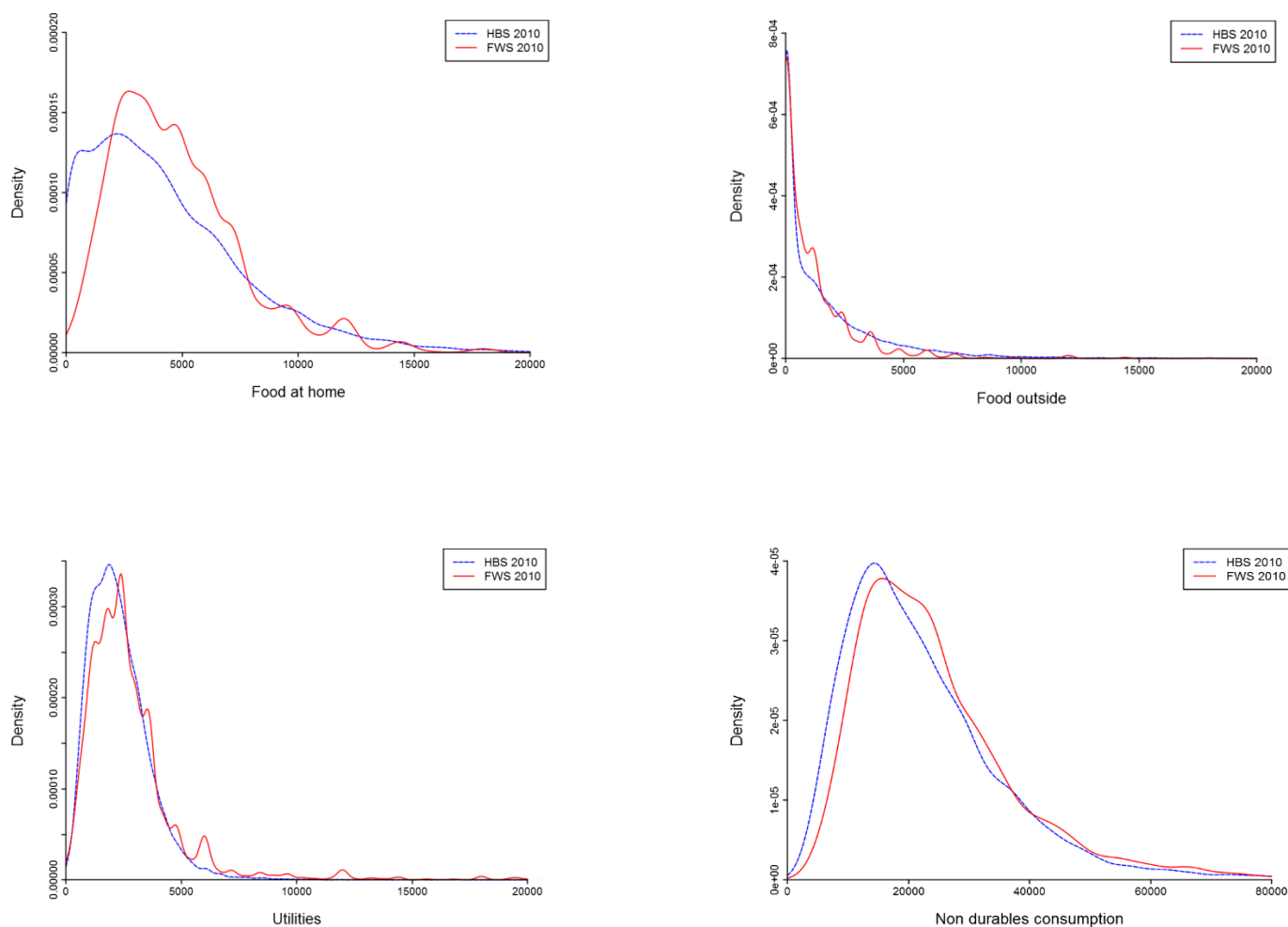
³⁰ D’Orazio et al. (2006) have emphasized the importance of the comparability between the various sources to be matched. D’Orazio, M., Di Zio, M. and Scanu M., 2006, Statistical matching: Theory and Practice, John Wiley & Sons.

Table A.1 – Comparison of average consumption and disposable income based on National Accounts and our survey results (in euro)

	Consumption	Disposable income
Average total amount in NA (1)	38,200	45,700
Including:		
<i>Durable goods</i> (2)	3,600	-
<i>Imputed rents</i> (3)	5,500	5,500
<i>Insurance services</i> (4)	1,300	1,600
<i>FISIM</i> (5)	500	500
Applying the survey definition to the National Accounts (a)=(1)-(2)-(3)-(4)-(5)	27,300	38,100
Measured using the surveys (b)	24,400	35,000
Coverage rate (b)/(a)	89%	92 %

Sources: National Accounts (a), French Wealth Survey and Household Budget Survey (b)

Fig. A1 - Observed distributions of consumption items in the HBS and the FWS



Appendix B: Other variable definitions

Net wealth components

For each category of assets, we consider the net values, i.e. the gross value of the assets less the remaining principal on loans taken out to buy these assets, based on the survey information about the main purpose of each contracted loan.

Net value of the household's main residence (HMR) is the value of the HMR less the remaining principal on loans taken out to buy the household's main residence.

Net value of other real estate is the gross value less the remaining principal on loans taken out to buy other real estate property (excluding businesses).

Net financial wealth is gross financial wealth less the remaining principal on loans taken out for consumption purposes (excluding durable goods).

Other net wealth is gross other wealth less the remaining principal on loans taken out for businesses or to buy durable goods. As explained in Section 5, the institutional features of the credit market in France are such that very few loans use a property (HMR or other real estate) as collateral for any other purpose than to finance the collateralized asset (see Table 8). When they do, these loans are included in the net value for "other wealth".

Measure of income expectations

The French Wealth Survey collects information on households' income expectations by asking a probabilistic question. This question is put in a specific module on preferences and expectations. In order to limit the duration of the questionnaire, the module is only put to a representative sub-sample (one-third of the full sample, 4,725 respondents), which is different from the sub-sample asked about consumption expenditure (there is no overlapping between the two sub-samples). This means that we need to compute a household-specific measure of

income expectations in our econometric sample (sub-sample asked about consumption). To this end, we first estimate the probability of a household being “optimistic” about future household income in the sub-sample to which the expectations question is put. We then compute the estimated probability of “optimistic” expectations for each household in our econometric sub-sample. The reference person’s expectations concerning future household income are elicited using the following question:

How do you imagine your household’s total income will change over the next five years?

You have 100 percentage points to allocate among the 7 choices below:

Your household’s total income will:

- *increase by [more than 25%, 10% to 25%, less than 10%]*
- *be the same as today,*
- *decrease by [less than 10%, 10% to 25%, more than 25%]*

We compute the mean expected changes for each respondent taking the mean value for each bracket and the percentage points given for each choice. We define as “optimistic households” those where the respondent expects a positive mean change in total income in the next five years. Then we estimate the linear probability of a household expecting a positive change in household income in the next five years based on the detailed household composition, the reference person’s demographic variables (age, age squared, detailed social status, education) and certain information about the reference person’s parents (father’s main occupation during the reference person’s childhood). These variables aim to account for the household’s permanent income and heterogeneity in expectations formation. The estimation results (Table B2) show that they are closely correlated with our income expectations indicator. Taking this estimated model to impute a similar qualitative indicator for optimism in our econometric sub-sample, we find that the percentage of predicted optimistic households

is very close to both the observed and the estimated percentages in the “expectations and preferences” sub-sample (Table B1).

Table B1. Indicators of income expectations: quality of fit

		Average expected changes in income (%)	% of "optimistic" households
"expectations and preferences" sub-sample	Observed	3.25	56.3
	Estimated	3.13	56.5
Econometric sub-sample	Predicted	1.56	52.2

Table B2. Determinants of the probability of expecting a positive change in total household income

Social status of the reference person (RP)		
Farmer	ref.	
craftsman, merchant	0.062	0.043
Industrialist	-0.063	0.086
Self-employed professional (lawyers, doctors, etc.)	0.036	0.058
Executive	0.143 ***	0.042
White collar (higher grade)	0.134 ***	0.039
White collar (lower grade)	0.061	0.040
Blue collar (higher grade)	0.090 **	0.041
Blue collar (lower grade)	0.025	0.050
Retired-Farmer	0.093 *	0.056
Retired self-employed workers or businessmen	0.143 **	0.051
Retired liberal profession or executive	0.052	0.047
Retired white collar (higher grade)	0.069	0.045
Retired white collar (lower grade)	0.067	0.045
Retired blue collar	0.114 ***	0.045
Unemployed	-0.019	0.049
Education of RP		
No qualification	ref.	
Primary or Secondary	-0.005	0.020
Baccalaureat	-0.013	0.028
Post-secondary	-0.056 *	0.031
Tertiary	-0.016	0.030
Age of RP	-0.027 ***	0.003
Age square of RP	0.000 **	0.000
Father's social status during the RP's childhood		
Farmer	ref.	
craftsman, merchant	0.064 **	0.026
Industrialist	0.085 **	0.039
Self-employed professional (lawyers, doctors, etc.)	0.022	0.045
Executive	0.103 ***	0.028
White collar (higher grade)	0.118 ***	0.032
White collar (lower grade)	0.065 ***	0.023
Blue collar	0.058 ***	0.021
Unemployed	0.013	0.085
Family composition		
One adult	ref.	
One adult with children	-0.023	0.028
Couple without children	-0.043 **	0.019
Couple with children	0.009	0.021
Others	0.025	0.041
Intercept	1.381 ***	0.084
R²	0.153	
# observations	4,725	

Dependent variable: the dummy variable equals one if the household's expected income change over the next five years is positive, and equals zero otherwise. Linear probability model (OLS estimates). Significant at ***1%, **5% and *10%.

Representative sub-sample for the specific FWS module on "expectations and preferences".

Appendix C

Table C1. Summary statistics: mean values

Variables	Full sample	Consumption Sub-sample	Econometric sample
Gross wealth	258,958	265,330	254,861
Net wealth	229,259	235,231	220,654
Financial assets	50,840	52,023	44,593
Main residence	122,419	129,177	137,786
Other real estate	38,124	39,418	39,130
Other assets	47,574	44,712	33,352
Consumption	-	27,057	25,486
Income (excluding income from housing and financial assets)	32,567	32,841	36,143
Income Expectation (positive) over 5 years	0.520	0.507	0.522
Age			
25 to 29	0.115	0.110	0.074
30 to 39	0.173	0.187	0.224
40 to 49	0.180	0.193	0.231
50 to 59	0.175	0.183	0.214
60 to 69	0.158	0.147	0.177
70 to 75	0.113	0.105	0.081
More than 75	0.086	0.074	0.000
Employment status			
Self-employed	0.063	0.050	0.050
Employee	0.488	0.527	0.611
Retired	0.345	0.316	0.253
Unemployed	0.058	0.056	0.031
Others	0.046	0.051	0.055
Education			
No qualification	0.184	0.160	0.147
Primary or Secondary	0.447	0.447	0.447
Baccalauréate	0.134	0.134	0.127
Post-secondary	0.104	0.095	0.103
Tertiary	0.133	0.164	0.176
Household composition			
Number of adults	1.575	1.578	1.624
Number of children	0.655	0.665	0.792
Credit constraint	0.114	0.122	0.130
Periods of unemployment			
Long periods of unemployment	0.134	0.139	0.152
Short periods of unemployment	0.117	0.127	0.139
Past sick leave	0.035	0.034	0.035
# observations	15,006	4,519	3,432

Source: French Wealth Survey (*Enquête Patrimoine 2010*). Full sample: whole population.

Table C2. Robustness of regression results: Considering 5 wealth groups instead of 4

Specification	Regression results			Computation of elasticities		
	(1)			(2)	(3)	(4)=(1)*(2)/(3)
Wealth percentile dummy	Marginal propensity to consume out of wealth			W	C	Consumption elasticity to wealth
	Coefficient		Std. Err.	(mean - euros)	(mean-euros)	
(A)						
Net wealth						
p1-p29	0.162	***	0.024	1,500	22,800	0.011
p30-p39	0.098	***	0.015	28,500	27,300	0.102
p40-p79	0.014	***	0.001	177,700	25,400	0.097
p80-p89	0.010	***	0.001	401,100	32,800	0.122
p90-p99	0.006	***	0.001	1,096,300	38,700	0.162
Control variables	yes					
R ²	0.178					
(B)						
Financial assets						
p1-p29	0.433	***	0.051	2,100	22,800	0.040
p30-p39	0.152	***	0.028	16,300	27,300	0.091
p40-p79	0.025	***	0.006	29,000	25,400	0.029
p80-p89	0.022	***	0.007	71,100	32,800	0.048
p90-p99	0.002	*	0.001	263,000	38,700	0.013
Housing wealth						
p1-p29	0.064	*	0.038	-800	22,800	-0.002
p30-p39	0.040		0.028	5,300	27,300	0.008
p40-p79	0.010	***	0.002	134,400	25,400	0.053
p80-p89	0.007	***	0.002	293,600	32,800	0.067
p90-p99	0.008	***	0.001	573,400	38,700	0.122
Other assets						
p1-p29	0.016	*	0.009	-3,500	22,800	-0.003
p30-p39	0.094	***	0.027	6,900	27,300	0.024
p40-p79	0.032	***	0.005	14,000	25,400	0.018
p80-p89	0.014	***	0.004	35,600	32,800	0.015
p90-p99	0.006	***	0.001	242,400	38,700	0.039
Control variables	yes					
R ²	0.195					

Table C2 (cont.) Robustness of regression results: Considering 5 wealth groups instead of 4 groups

Specification	Regression results			Computation of elasticities		
	(1)		(2)	(3)	(4)=(1)*(2)/(3)	
Wealth percentile dummy	Marginal propensity to consume out of wealth		W	C	Consumption elasticity to wealth	
	Coefficient	Std. Err.	(mean - euros)	(mean-euros)		
Financial assets						
p1-p29	0.445 ***	0.052	2,100	22,800	0.041	
p30-p39	0.152 ***	0.028	16,300	27,300	0.091	
p40-p79	0.025 ***	0.006	29,100	25,400	0.029	
p80-p89	0.023 ***	0.007	71,100	32,800	0.049	
p90-p99	0.002	0.001	263,000	38,700	0.013	
Main residence						
p1-p29	0.162 *	0.084	1,200	22,800	0.009	
p30-p39	0.024	0.030	4,900	27,300	0.004	
p40-p79	0.009 ***	0.002	118,300	25,400	0.044	
p80-p89	0.008 ***	0.002	241,200	32,800	0.061	
p90-p99	0.008 ***	0.002	353,100	38,700	0.077	
Other real estate						
p1-p29	0.070 *	0.038	-2,000	22,800	-0.006	
p30-p39	0.064 **	0.032	400	27,300	0.001	
p40-p79	0.017 ***	0.006	16,000	25,400	0.011	
p80-p89	0.004	0.005	52,400	32,800	0.006	
p90-p99	0.008 *	0.001	220,300	38,700	0.046	
Other assets						
p1-p29	0.020 **	0.009	-3,500	22,800	-0.003	
p30-p39	0.108 ***	0.028	6,800	27,300	0.027	
p40-p79	0.032 ***	0.005	14,000	25,400	0.018	
p80-p89	0.014 ***	0.004	35,600	32,800	0.015	
p90-p99	0.006 ***	0.001	242,400	38,700	0.039	
Control variables	yes					
R ²	0.1959					

Dependent variable: ratio of non-durable consumption to income (excluding income from financial and housing assets). Other control variables: income expectations, age, work status, reference person's level of education, household composition, credit constraint, periods of unemployment, sick leave.

OLS estimates. Significant at ***1%, **5% and *10%.

Table C3. Comparing indebted households with and without mortgages

	All households (mean values)	All households owning one property or more	Indebted households owning one property or more	
			With at least one mortgage (mean values)	With other loans (and no mortgage) (mean values)
Wealth and income				
Gross wealth	259,000	413,500	460,600	429,200
Net wealth	229,300	366,800	346,700	350,200
Financial assets	50,800	72,800	52,200	61,600
Main residence	122,400	204,700	229,600	212,700 **
Other real estate	38,100	63,800	84,800	61,800 **
Other assets	47,600	72,200	93,900	87,100
Income (excluding income from housing and financial assets)	32,600	38,300	46,000	44,200 **
Total debt	31,700	49,800	121,200	71,500 **
Debt Service	3,400	5,200	12,000	7,700 **
Asset holding (% of HH)				
household's main residence	0.552	0.924	0.950	0.924 **
Other real estate	0.199	0.333	0.316	0.322
Business	0.156	0.219	0.283	0.236 **
Demographics				
<i>Age</i>				
25 to 29	0.115	0.032	0.049	0.046
30 to 39	0.173	0.145	0.289	0.213 **
40 to 49	0.180	0.193	0.351	0.253 **
50 to 59	0.175	0.213	0.211	0.257 **
60 to 69	0.158	0.197	0.083	0.179 **
70 to 75	0.113	0.133	0.011	0.044 **
More than 75	0.086	0.088	0.006	0.008
<i>Employment status</i>				
Self-employed	0.063	0.080	0.141	0.108 **
Employee	0.488	0.470	0.735	0.635 **
Retired	0.345	0.407	0.087	0.224 **
Unemployed	0.058	0.019	0.022	0.019
Others	0.046	0.025	0.015	0.014
<i>Education</i>				
No qualification	0.184	0.147	0.107	0.094
Primary or Secondary	0.447	0.466	0.377	0.436 **
Baccalaureat	0.134	0.123	0.161	0.145
Post-secondary	0.104	0.110	0.174	0.137 **
Tertiary	0.133	0.152	0.181	0.188
# observations	15,006	10,710	1,681	4,200

Source: French Wealth Survey (*Enquête Patrimoine 2010*, INSEE). Weighted Statistics. In the last column,** indicates significant differences (at the 5% level) in the mean values of the household characteristics between households with and without mortgages (columns 3 and 4) among indebted households owning one property or more.